

SECTION 26 05 04

BASIC ELECTRICAL MATERIALS AND METHODS

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CITY OF COOS BAY, OREGON

WASTEWATER TREATMENT PLANT 1 PHASE 1A IMPROVEMENTS

SEPTEMBER 2025

SECTION 26 05 04

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 - MANUALS & CUT SHEETS



OPTIMAL CONTROL SYSTEMS, INC.
2324 Three Lakes Road SE
Albany, OR 97322
Phone: (541) 967-9323
Fax: (541) 967-9485
Project No. 0723-08MSI

SECTION 26 05 04

BASIC ELECTRICAL MATERIALS AND METHODS

•

CONTROL STATION, C40CS1001

567

○

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

○

MAINTENANCE SUMMARY FORM

○

BILL OF MATERIALS

○

DRAWINGS

○

MANUALS & CUT SHEETS

•

CONTROL STATION, C40CS1002

619

○

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

○

MAINTENANCE SUMMARY FORM

○

BILL OF MATERIALS

○

DRAWINGS

○

MANUALS & CUT SHEETS

LIMIT SWITCHES

671

•

DOOR INTRUSION LIMIT SWITCH, C92ZS9401

671

○

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

○

MAINTENANCE SUMMARY FORM

○

BILL OF MATERIALS

○

MANUALS & CUT SHEETS

SPARE PARTS

691



OPTIMAL CONTROL SYSTEMS, INC.

2324 Three Lakes Road SE

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Phone: (541) 967-9323

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Project No. 0723-08MSI

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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name_____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

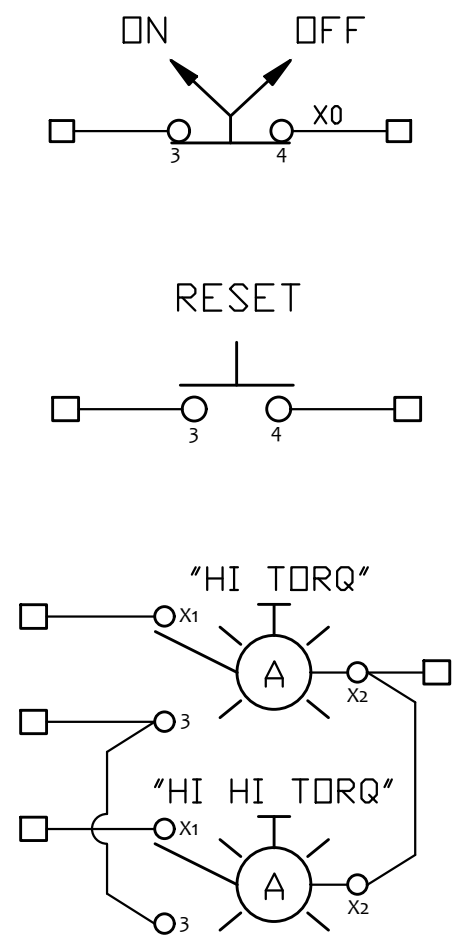
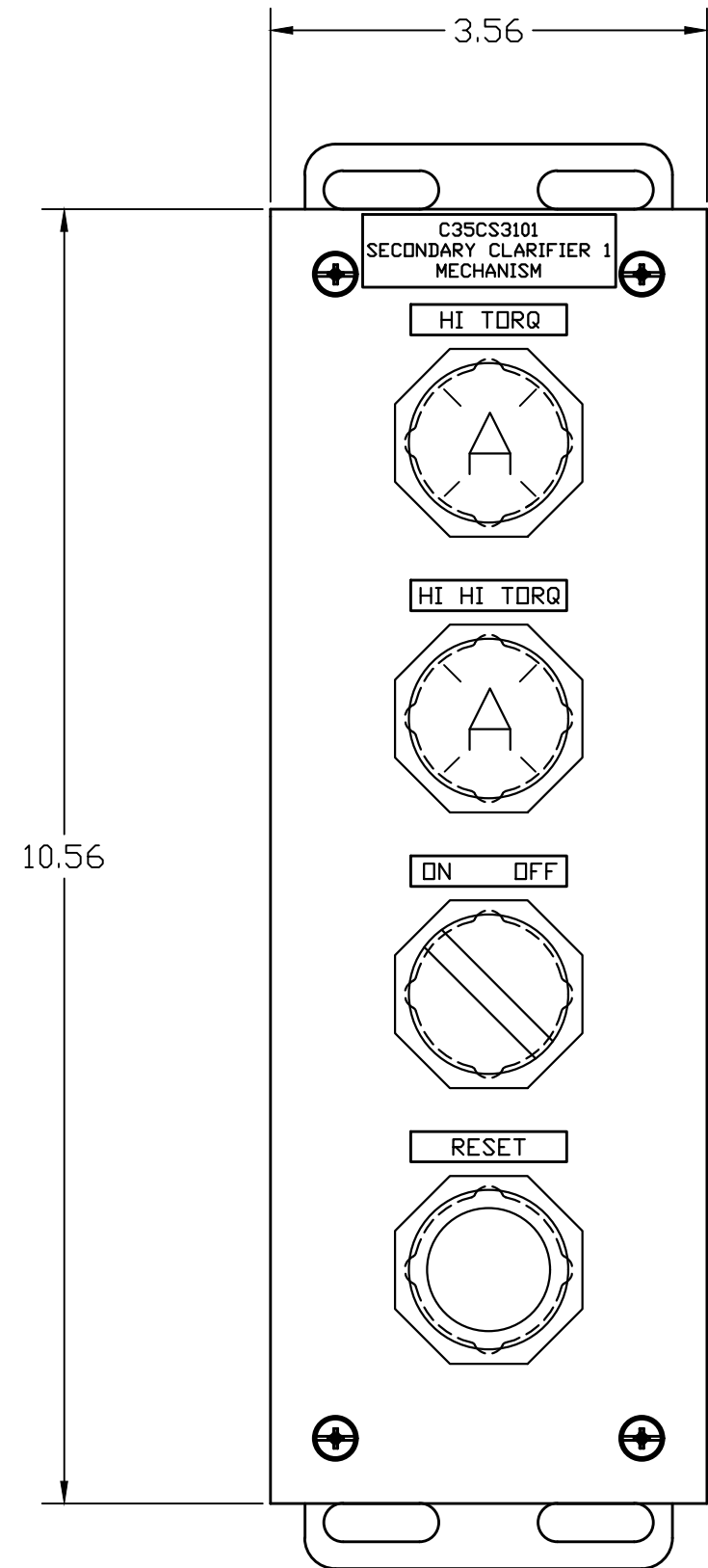
Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3101	PB Enclosure, SS Type 316/316L, NEMA 4X 10.25" H x 3.25" W x 2.75" D	Saginaw Control & Engineering	SCE-4PBSS6	Section 26 05 04	09-I-001, 90-E-304
002	1	C35CS3101	Selector Switch, 2-Position, Black Lever, 1NC/1NO	Eaton	E34VFB1-1X	Section 26 05 04	09-I-001, 90-E-304
003	2	C35CS3101	Indicating Light, PresTest, LED, Full Voltage, Amber	Eaton	E34FPB297LAP2A	Section 26 05 04	09-I-001, 90-E-304
004	1	C35CS3101	Pushbutton, Flush, Black, 1NO	Eaton	E34PB1-53	Section 26 05 04	09-I-001, 90-E-304
005	1	C35CS3101	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
006	4	C35CS3101	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
007							
008							
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010							
011							
012							
013							
014							
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039							
040							

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H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323		FAX (541) 967-9485	
D				CLIENT			
C				MCCLURE & SONS			
B	2024.02.27.	CORRECTED			TITLE		
A	2023.10.25.	Original Draft	KCED	CDDO BAY WASTE WATER TREATMENT PLANT			
REV	DATE	DESCRIPTION	INIT	C35CS3101 SECONDARY CLARIFIER 2 MECHANISM			
REVISIONS				DRAWN	KCD	ISSUED	JOB NO.
				CHECKED	ME	DATE	0723-08MSI
				APPROVED	HAD	SCALE	DWG NO.
						2023.10.25	0723-08MSI-SC1M-3101
						NONE	SHEET 1 OF 1

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SCE-4PBSS6

Product Specifications:

Part Number: SCE-4PBSS6
Description: S.S. PB Enclosure
Height: 10.25"
Width: 3.25"
Depth: 2.75"
Price Code: S1
List Price: \$298.75
Catalog Page: 252
Est. Ship Weight: 4.00 lbs



Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Captivated cover screws thread into sealed wells.
- ✱ 4-way standard pushbutton holes accept all brands of oil-tight pushbuttons, switches and pilot lights. Hole diameter is 1.20 In. (30.5mm).
- ✱ Immediate removal of cover is permitted.
- ✱ Pour in place oil & water resistant gasket
- ✱ Welded mounting provision top and bottom of back.

Application

Designed to house standard pushbuttons, switches and pilot lights in wet and hosed down areas and in corrosive atmospheres.

Finish

#4 brushed finish on all exterior surfaces.

Industry Standards - (IS5)

- ✱ NEMA Type 4, 4X, 12 and Type 13
- ✱ UL Listed Type 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Similar Part Numbers

SCE-12PBSS6S.S. PB Enclosure
SCE-1PBSS6S.S. PB Enclosure
SCE-1PBXSS6S.S. PBX Enclosure
SCE-2PBSS6S.S. PB Enclosure
SCE-2PBXSS6S.S. PBX Enclosure
SCE-3PBSS6S.S. PB Enclosure
SCE-3PBXSS6S.S. PBX Enclosure
SCE-4PBXSS6S.S. PBX Enclosure
SCE-4SPBSS6S.S. PB Enclosure
SCE-6PBSS6S.S. PB Enclosure

Installation Information

- ✱ Pushbutton Enclosures

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PUSHBUTTON ENCLOSURES SERVICE PARTS



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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

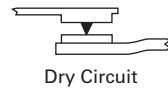
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

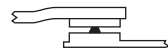
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

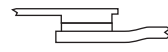
Reliability Nibs



Dry Circuit



Medium Duty



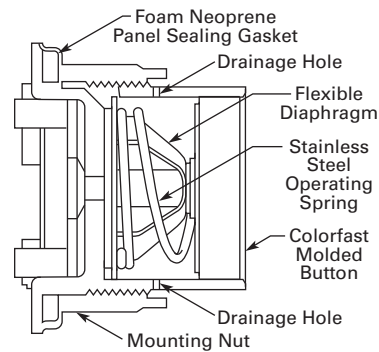
Heavy-Duty

Diaphragm Seal with Drainage Holes

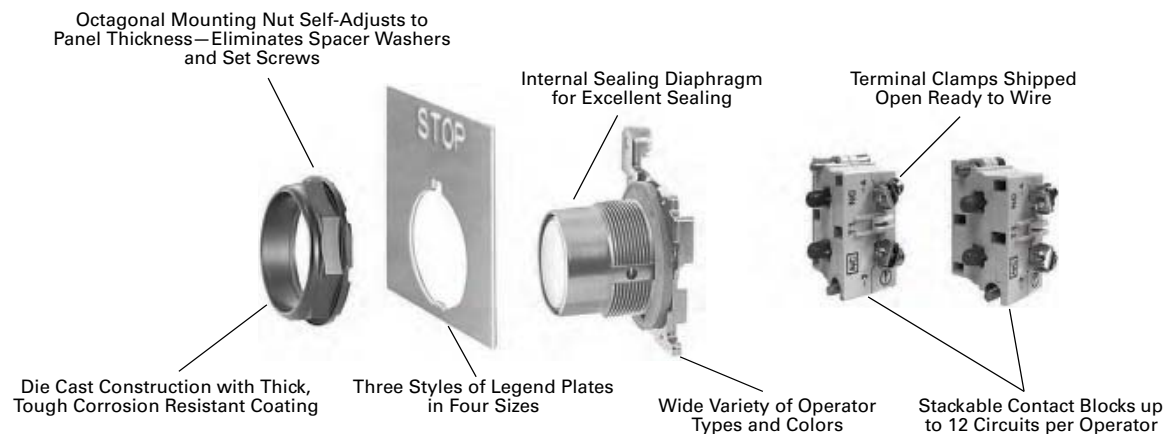
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



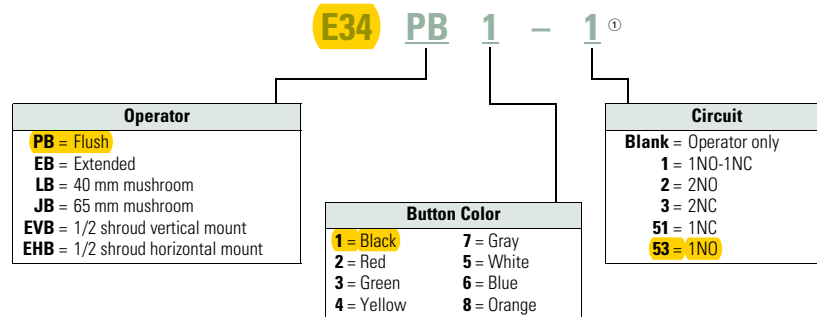
1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Non-Illuminated Pushbuttons



Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

E34

FB06

H2

①

Light Unit Type	
Standard—Incandescent	Standard—LED
TB120 = 120V/XFR	TB120L = 120V/XFR
TB240 = 240V/XFR	TB240L = 240V/XFR
TB277 = 277V/XFR	TB277L = 277V/XFR
TB380 = 380V/XFR	TB380L = 380V/XFR
TB480 = 480V/XFR	TB480L = 480V/XFR
TB600 = 600V/XFR	TB600L = 600V/XFR
FB06 = 6V/FV	FB197L = Full voltage
FB12 = 12V/FV	PresTest—LED
FB24 = 24V/FV	
FB32 = 32V/FV	
FB48 = 48V/FV	
RB120 = 120V/RES	
RB240 = 240V/RES	TPB120L = 120V/XFR
NB120 = 120V/neon	TPB240L = 240V/XFR
NB240 = 240V/neon	TPB380L = 380V/XFR
	TPB480L = 480V/XFR
	TPB600L = 600V/XFR
	FPB297L = Full voltage
PresTest—Incandescent	
TPB120 = 120V/XFR	
TPB240 = 240V/XFR	
TPB380 = 380V/XFR	
TPB480 = 480V/XFR	
TPB600 = 600V/XFR	
FPB06 = 6V/FV	
FPB12 = 12V/FV	
FPB24 = 24V/FV	
FPB32 = 32V/FV	
FPB48 = 48V/FV	
RPB120 = 120V/RES	
RPB240 = 240V/RES	

Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
Standard/Master—Incandescent			Standard/Master/PresTest—LED		
H2 =	G2 =	Red	RP =	RG =	Red
H3 =	G3 =	Green	GP =	GG =	Green
H4 =	G4 =	Yellow	YP =	YG =	Yellow
H5 =	G5 =	White	WP =	WG =	White
H6 =	G6 =	Blue	LP =	LG =	Blue
H9 =	G9 =	Amber	AP =	AG =	Amber
H0 =	G0 =	Clear			
PresTest—Incandescent					
V2 =	P2 =	Red			
V3 =	P3 =	Green			
V4 =	P4 =	Yellow			
V5 =	P5 =	White			
V6 =	P6 =	Blue			
V9 =	P9 =	Amber			
V0 =	P0 =	Clear			

LED Voltage	
Blank = Incandescent	
06 = 6 Vac/Vdc	
12 = 12 Vac/Vdc	
24 = 24 Vac/Vdc	
48 = 48 Vac/Vdc	
60 = 60 Vac/Vdc	
2A = 120 Vac	
2D = 120 Vdc	

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

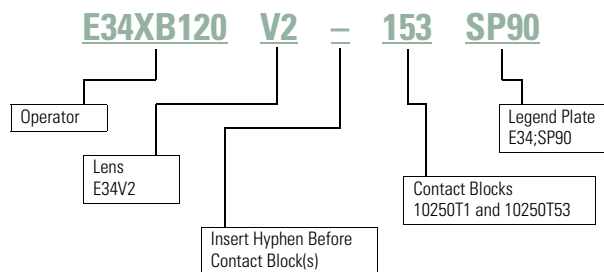
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Non-Illuminated Momentary Pushbutton Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Flush Button



Extended Button



Mushroom Button



Jumbo Mushroom



Pushbutton Units

Contact Type	Button Color	Flush Button Catalog Number	Extended Button Catalog Number	Mushroom Button Catalog Number	Jumbo Mushroom ^① Catalog Number
1NO	Black	E34PB1-53X	E34EB1-53X	E34LB1-53X	E34JB1-53X
	Red	E34PB2-53X	E34EB2-53X	E34LB2-53X	E34JB2-53X
	Green	E34PB3-53X	E34EB3-53X	E34LB3-53X	E34JB3-53X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-53X
1NC	Black	E34PB1-51X	E34EB1-51X	E34LB1-51X	E34JB1-51X
	Red	E34PB2-51X	E34EB2-51X	E34LB2-51X	E34JB2-51X
	Green	E34PB3-51X	E34EB3-51X	E34LB3-51X	E34JB3-51X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-51X
1NO-1NC	Black	E34PB1-1X	E34EB1-1X	E34LB1-1X	E34JB1-1X
	Red	E34PB2-1X	E34EB2-1X	E34LB2-1X	E34JB2-1X
	Green	E34PB3-1X	E34EB3-1X	E34LB3-1X	E34JB3-1X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-1X

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage Indicating Light



Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① Anodized aluminum head—may not be suitable for some corrosive environments.

Pushbuttons

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Momentary Pushbutton Operators, Non-Illuminated

	Button	Color	Catalog Number	
	Flush button	Black	E34PB1	
		Red	E34PB2	
		Green	E34PB3	
		Yellow	E34PB4	
		White	E34PB5	
		Blue	E34PB6	
		Gray	E34PB7	
		Orange	E34PB8	
	Extended button	Black	E34EB1	
		Red	E34EB2	
		Green	E34EB3	
		Yellow	E34EB4	
		White	E34EB5	
		Blue	E34EB6	
		Gray	E34EB7	
		Orange	E34EB8	
	Half shrouded button		Vertical	Horizontal
		Black	E34EVB1	E34EBH1
		Red	E34EVB2	E34EBH2
		Green	E34EVB3	E34EBH3
		Yellow	E34EVB4	E34EBH4
		White	E34EVB5	E34EBH5
		Blue	E34EVB6	E34EBH6
		Gray	E34EVB7	E34EBH7
		Orange	E34EVB8	E34EBH8
	Mushroom button	Black	E34LB1	
		Red	E34LB2	
		Green	E34LB3	
		Yellow	E34LB4	
		Blue	E34LB6	
	Anodized aluminum jumbo mushroom button ^①	Black	E34JB1	
		Red	E34JB2	
		Red (Engraved EMERG. STOP)	E34JB2N8	
		Green	E34JB3	
		Yellow	E34JB4	

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
					1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK**2**-X1.

Selector Switch Selection



Cam and Contact Block Selection

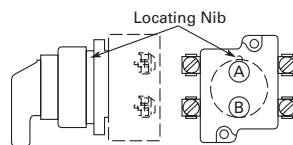
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

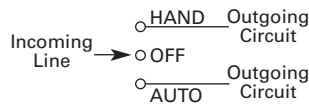


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

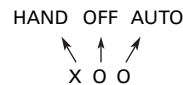
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



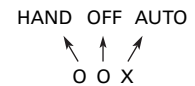
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

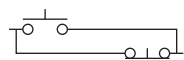
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	NO	NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

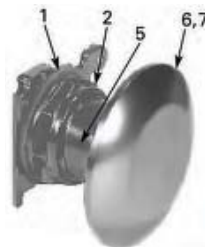
- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



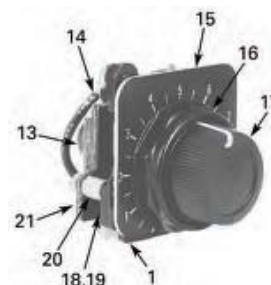
**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



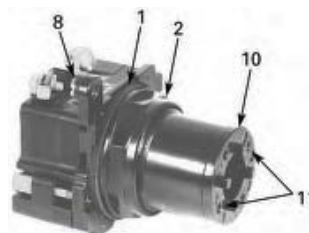
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

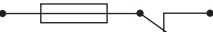
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

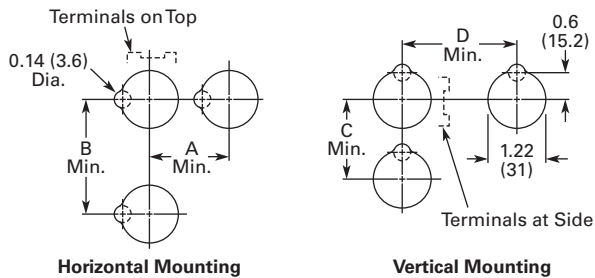
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

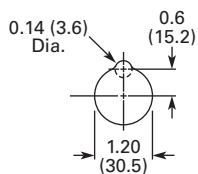
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block. Vertical mounting means terminals are left and right of contact block. This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



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Eaton E34FPB297LAP2A

Catalog Number: E34FPB297LAP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Amber, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LAP2A

UPC

782114718971

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

CSA Certified

UL Listed

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4X

NEMA 13

NEMA 3R

NEMA 12

NEMA 3

NEMA 4

Lens material

Plastic

Lens color

Amber

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LAP2A

Cam selection for pushbutton selectors



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Eaton E34PB1-53

Catalog Number: E34PB1-53

E34, 30.5 mm, Corrosion Resistant, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Momentary, Black actuator, Flush, 1NO, Black bezel, Plastic actuator

General specifications



Product Name
Eaton E34 pushbutton

Catalog Number
E34PB1-53

UPC
782114958018

Product Length/Depth
3 in

Product Height
2 in

Product Width
2 in

Product Weight
0.25 lb

Warranty
1 year

Compliances
CE Marked
FDA 3-A

Certifications
CSA Certified
UL Listed

Product specifications

Contact configuration

1 NO

Series

E34

Type

Pushbutton

Actuator color

Black

Operating mode

Momentary

Actuator material

Plastic

Rating

NEMA 4X

NEMA 13

NEMA 3R

NEMA 12

NEMA 3

NEMA 4

Illumination

Non-illuminated

Mounting method

Flush

Bezel

Black

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

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Eaton Specification Sheet - E34PB1-53



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Eaton E34VFBL1-1X

Catalog Number: E34VFBL1-1X

Eaton E34 pushbutton, Assembled Selector Switch, E34, 30.5 mm, Corrosion Resistant, Cam 1, 60° throw, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Two-position, Knob, Black actuator, 1NO-1NC.



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton	E34VFBL1-1X
UPC	Product Length/Depth
782113891637	1 in
Product Height	Product Width
1 in	1 in
Product Weight	Warranty
1 lb	1 year
Compliances	Certifications
CE Marked FDA 3-A	CSA Certified UL Listed
Catalog Notes	
Assembled at Factory	

Product specifications

Contact configuration

1 NO-1 NC

Throw type

60 °

Series

E34

Number of positions

2

Type

30.5 mm, Corrosion Resistant

Actuator color

Black

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Illumination

Non-illuminated

Cam code

Cam 1

Actuator

Knob

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

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Cam selection for pushbutton selectors



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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

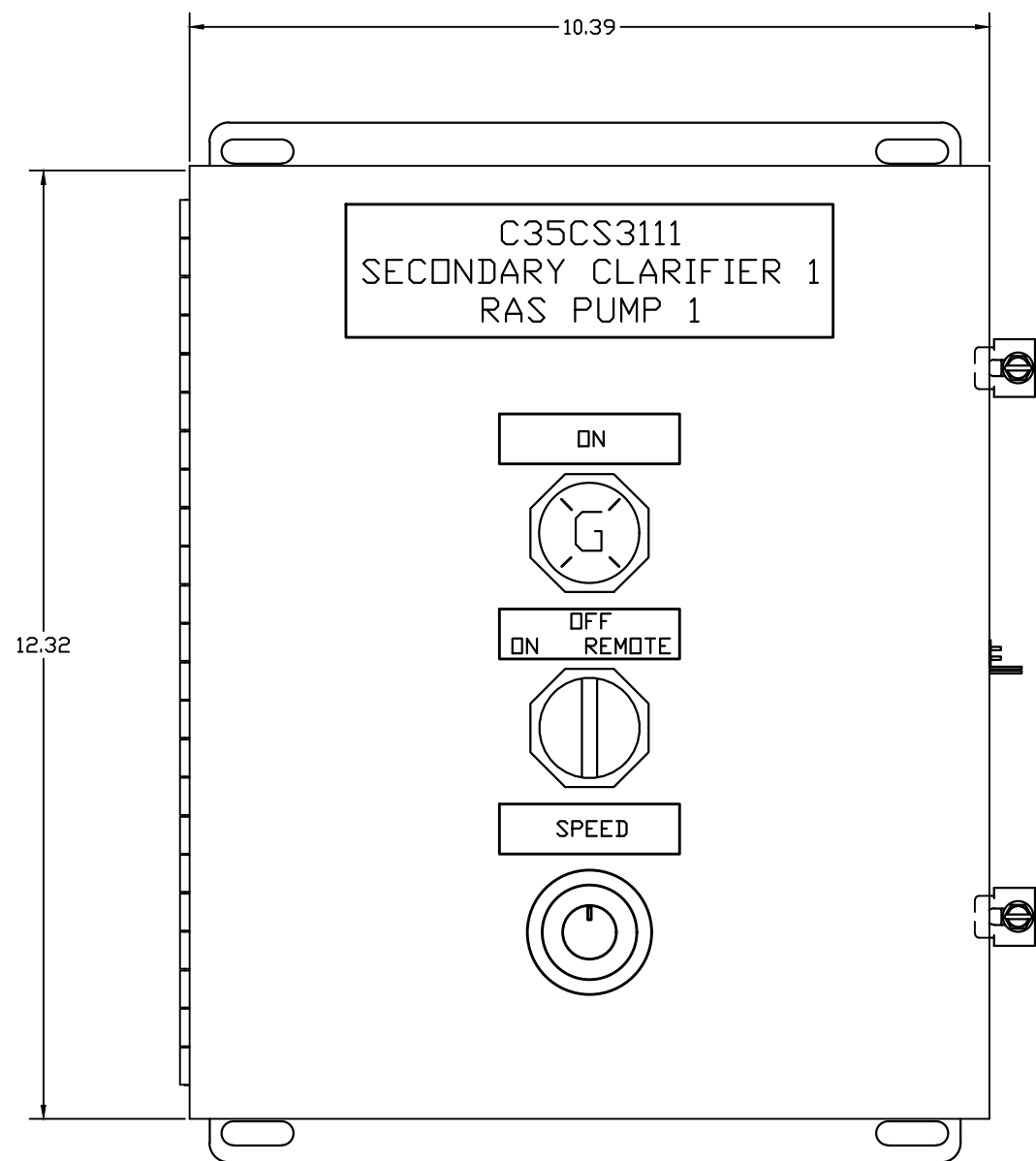
Bill of Materials



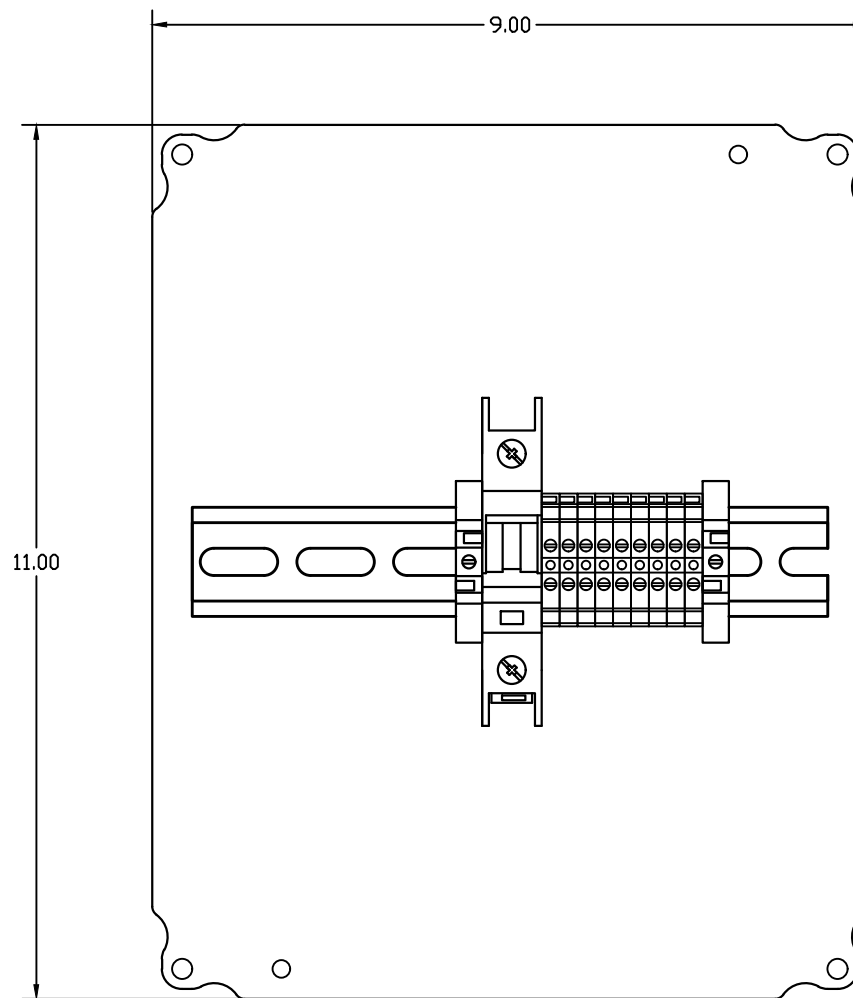
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3111	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-002, 90-E-306
002	1	C35CS3111	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-002, 90-E-306
003	1	C35CS3111	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-002, 90-E-306
004	1	C35CS3111	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-002, 90-E-306
005	1	C35CS3111	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-002, 90-E-306
006	1	C35CS3111	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-002, 90-E-306
007	1	C35CS3111	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-002, 90-E-306
008	1	C35CS3111	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3111	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
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013							
014							
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016							
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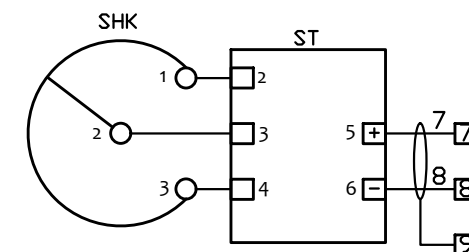
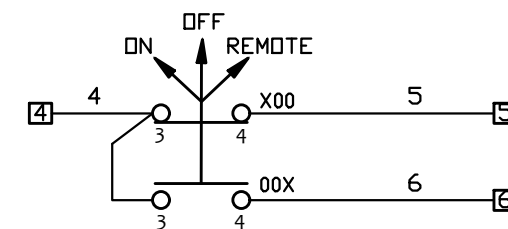
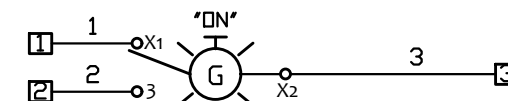
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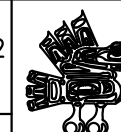
FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS	
G				2324 THREE LAKES RD / PO BOX 462	
F				ALBANY, OR 97321	
E				PHONE (541) 967-9323 FAX (541) 967-9485	
D				CLIENT McClure & Sons	
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOOS BAY WASTE WATER TREATMENT PLANT	
B	2024.02.27	CORRECTED	KCED	C35CS3111 SECONDARY CLARIFIER 1 RAS PUMP 1	
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25
REVISIONS				APPROVED HAD	SCALE NONE
					JOB NO. 0723-08MSI
					DWG NO. 0723-08MSI-SC1R1-3111
					SHEET 1 OF 1



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Your Enclosure Source®

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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- * 0.063 In. stainless steel Type 316/316L.
- * Seams continuously welded and ground smooth.
- * Pour in place oil & water resistant gasket
- * Ground stud on door.
- * Stainless steel continuous hinge.
- * Standoffs provided for mounting optional panels.
- * Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- * NEMA Type 3R, 4, 4X, 12 and Type 13
- * UL Listed Type 3R, 4, 4X and 12
- * CSA Type 4, 4X and 12
- * IEC 60529
- * IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- * Dead Front CH & ELJ Style Installation Instructions
- * Padlock Kit For Junction Boxes
- * Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

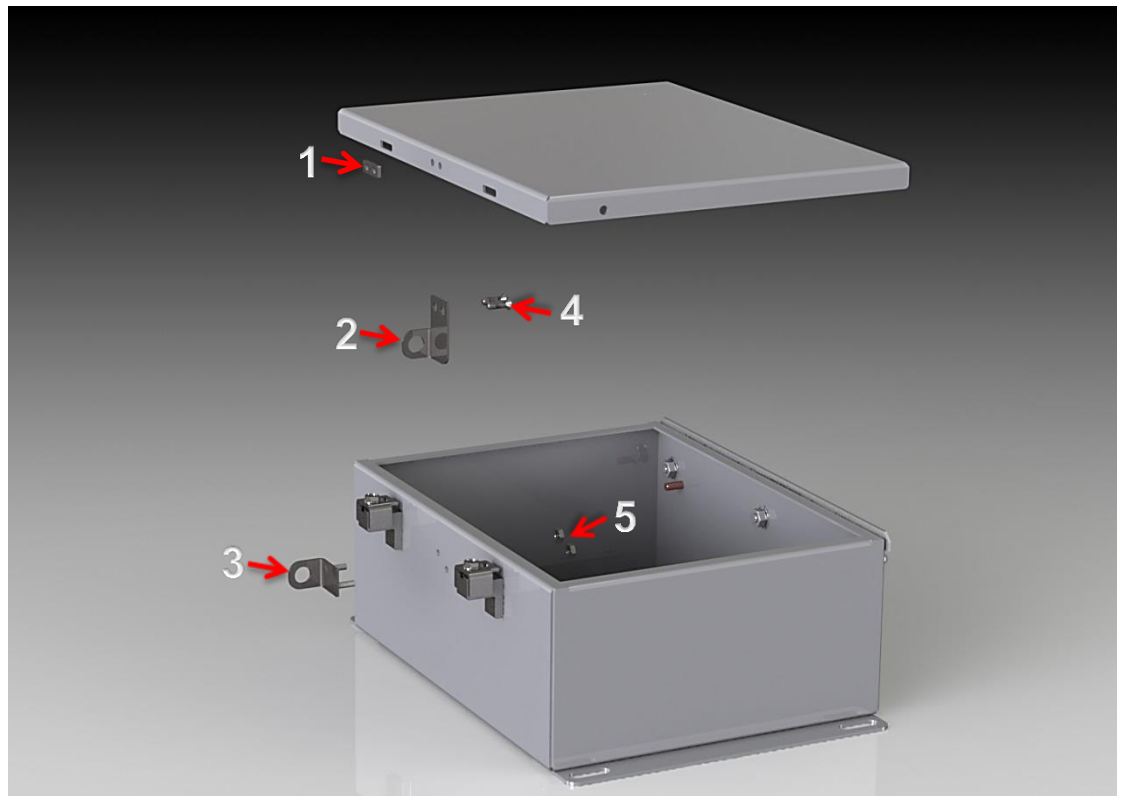
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

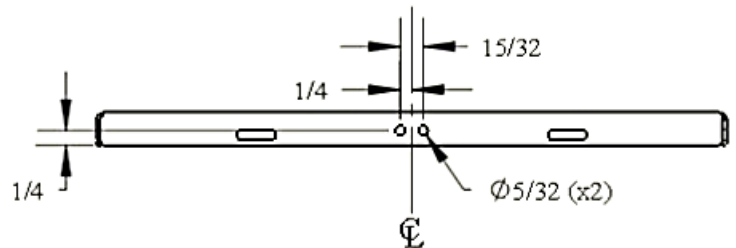
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SCE-PLKJIC INSTALLATION

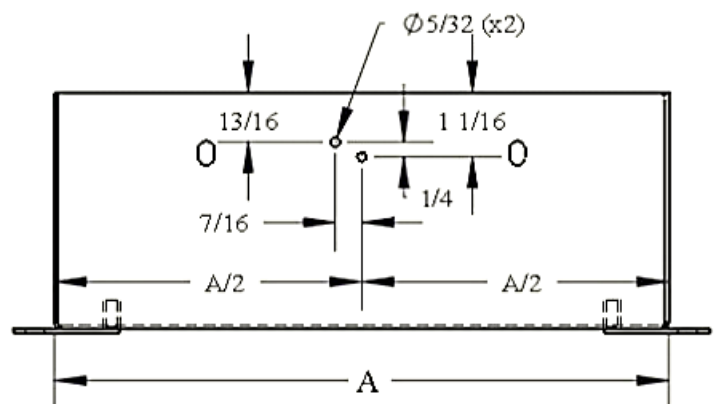
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

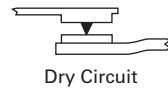
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

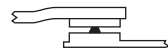
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

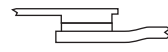
Reliability Nibs



Dry Circuit



Medium Duty



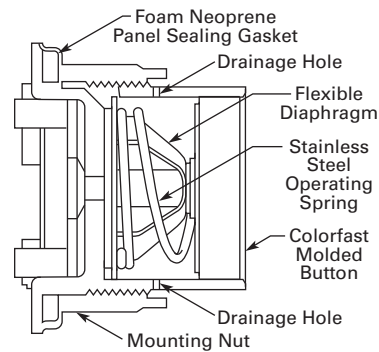
Heavy-Duty

Diaphragm Seal with Drainage Holes

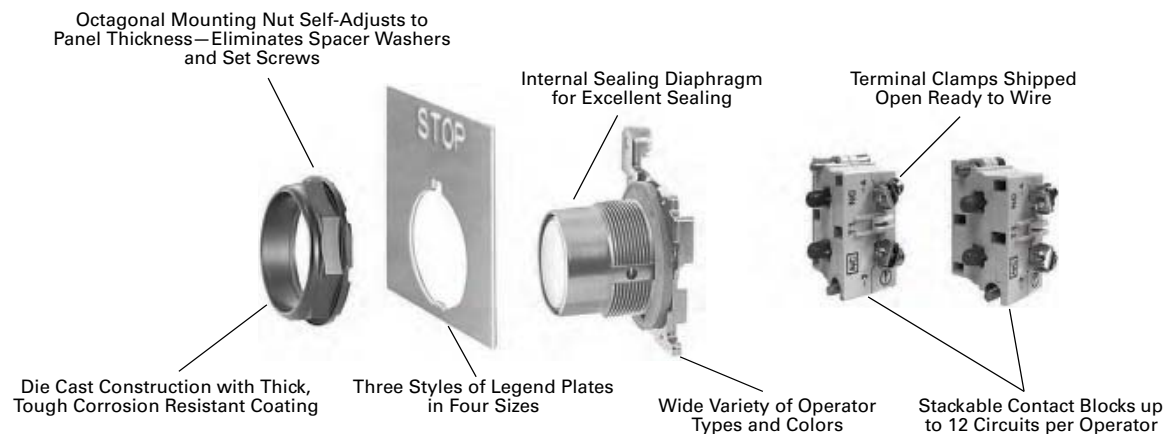
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type	
Standard—Incandescent	Standard—LED
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage
PresTest—LED	
	TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage
PresTest—Incandescent	
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES	

E34

FB06

H2

①

LED Voltage					
Blank = Incandescent					
06 = 6 Vac/Vdc					
12 = 12 Vac/Vdc					
24 = 24 Vac/Vdc					
48 = 48 Vac/Vdc					
60 = 60 Vac/Vdc					
2A = 120 Vac					
2D = 120 Vdc					

Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
Standard/Master—Incandescent			Standard/Master/PresTest—LED		
H2 =	G2 =	Red	RP =	RG =	Red
H3 =	G3 =	Green	GP =	GG =	Green
H4 =	G4 =	Yellow	YP =	YG =	Yellow
H5 =	G5 =	White	WP =	WG =	White
H6 =	G6 =	Blue	LP =	LG =	Blue
H9 =	G9 =	Amber	AP =	AG =	Amber
H0 =	G0 =	Clear			
PresTest—Incandescent					
V2 =	P2 =	Red			
V3 =	P3 =	Green			
V4 =	P4 =	Yellow			
V5 =	P5 =	White			
V6 =	P6 =	Blue			
V9 =	P9 =	Amber			
V0 =	P0 =	Clear			

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

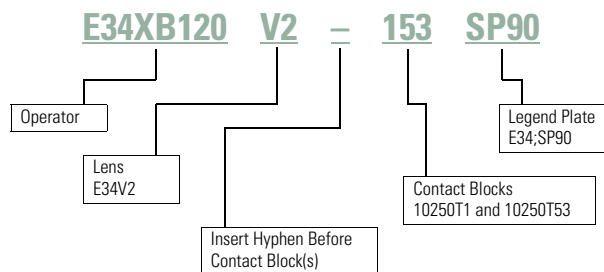
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑤ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
				1NC								

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

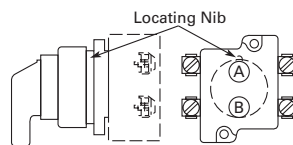
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of "pushbuttons" can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The "X-O" chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block "open." Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

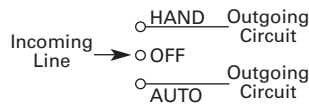


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

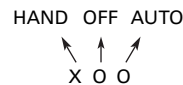
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



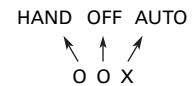
Step 2: "X-O" Pattern.

From the elementary diagram, you can construct an "X-O" diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The "X-O" for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the "X-O" diagram would look like this:



Putting them together, the complete "X-O" diagram is:



Once the "X-O" diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired "X-O" functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your "X-O" diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

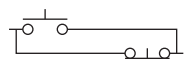
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	NO	NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks

Standard Contact Blocks

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

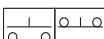
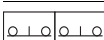
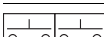
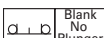
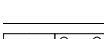
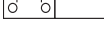
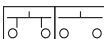
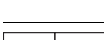
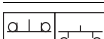
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



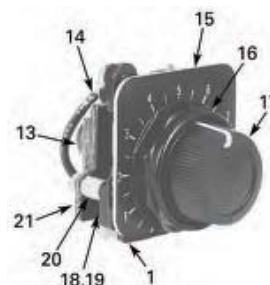
**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



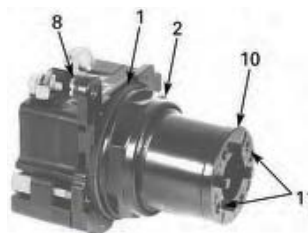
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

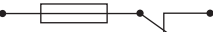
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

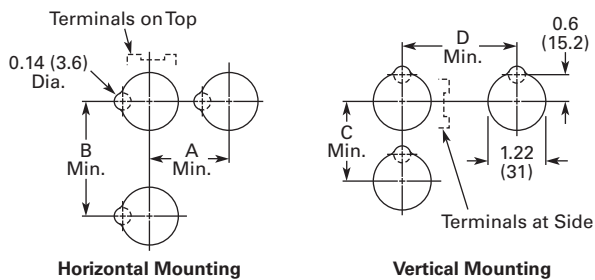
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

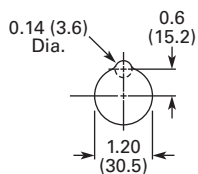
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Multimedia

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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

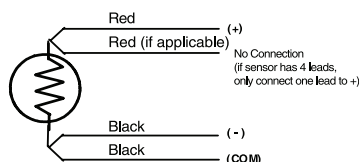
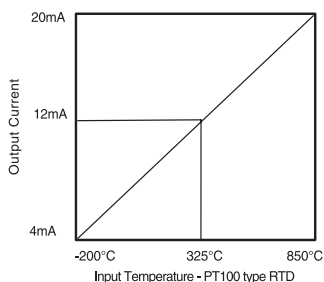
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

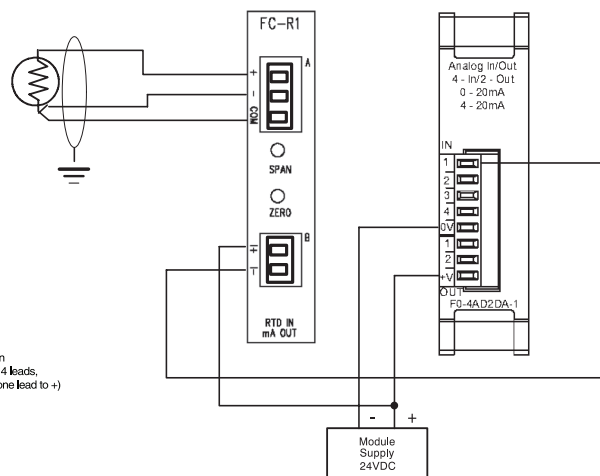
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT10 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

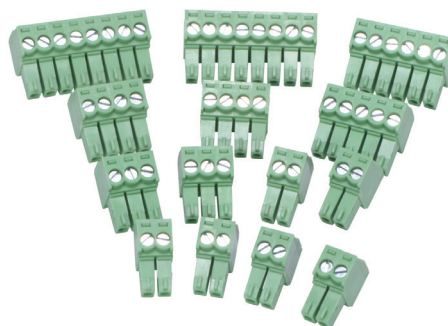


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

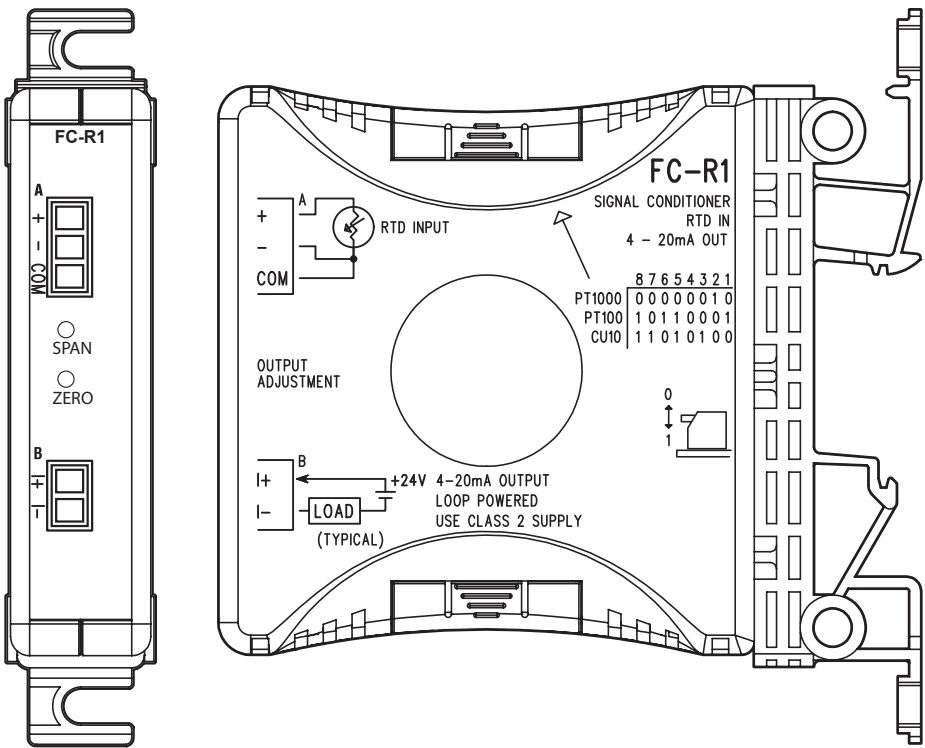
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

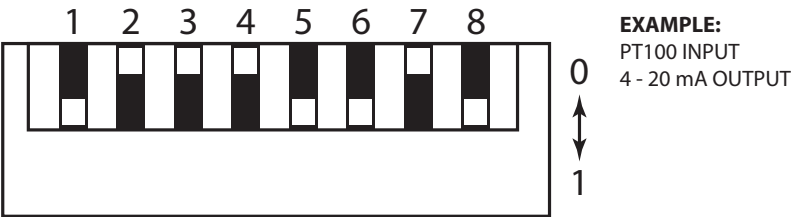
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) termnial and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

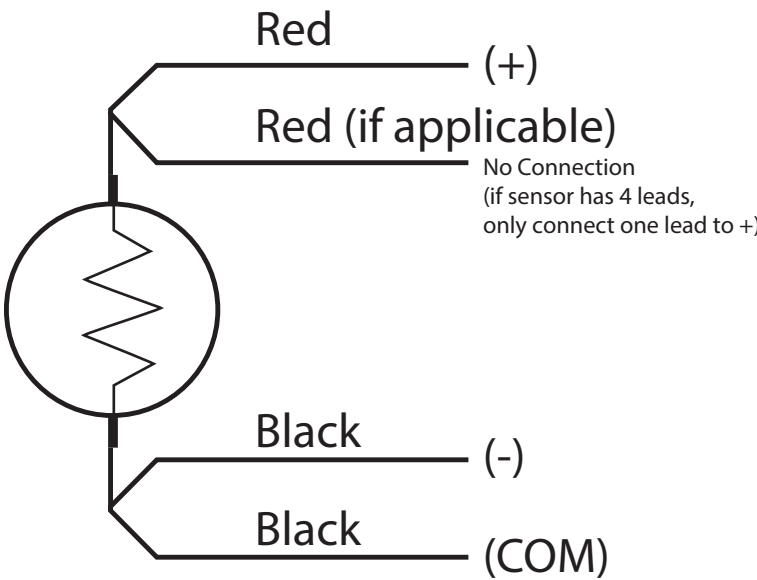
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

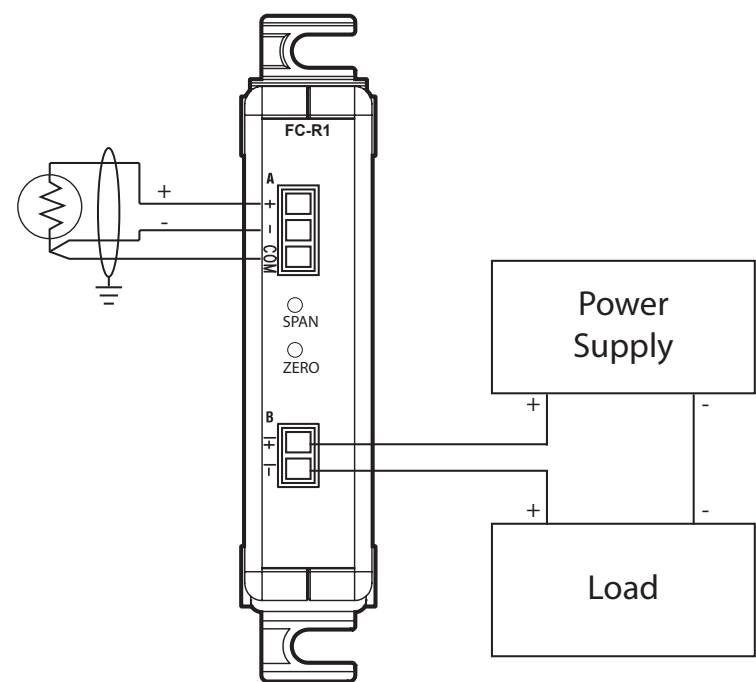
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



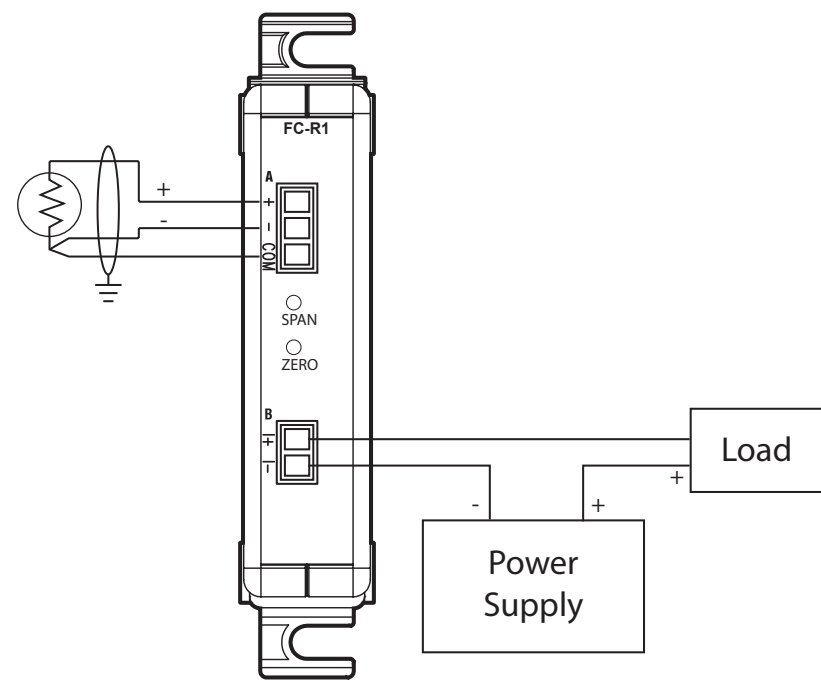
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

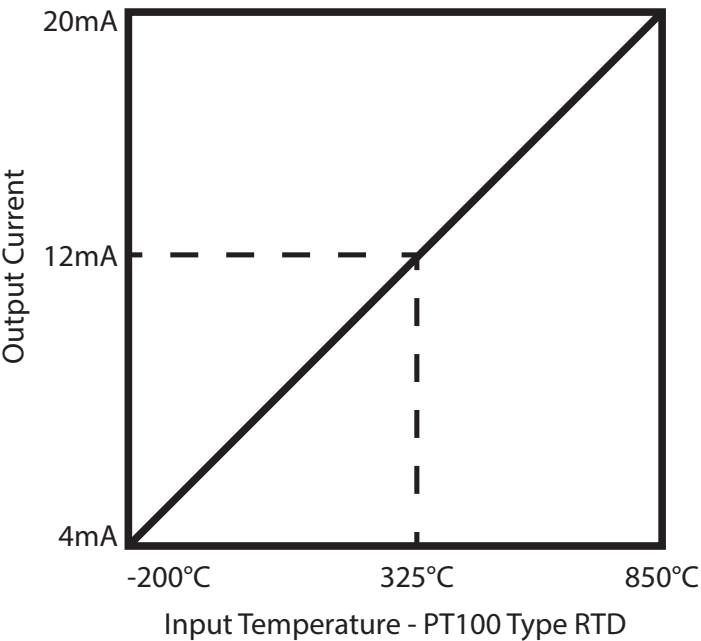
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name_____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

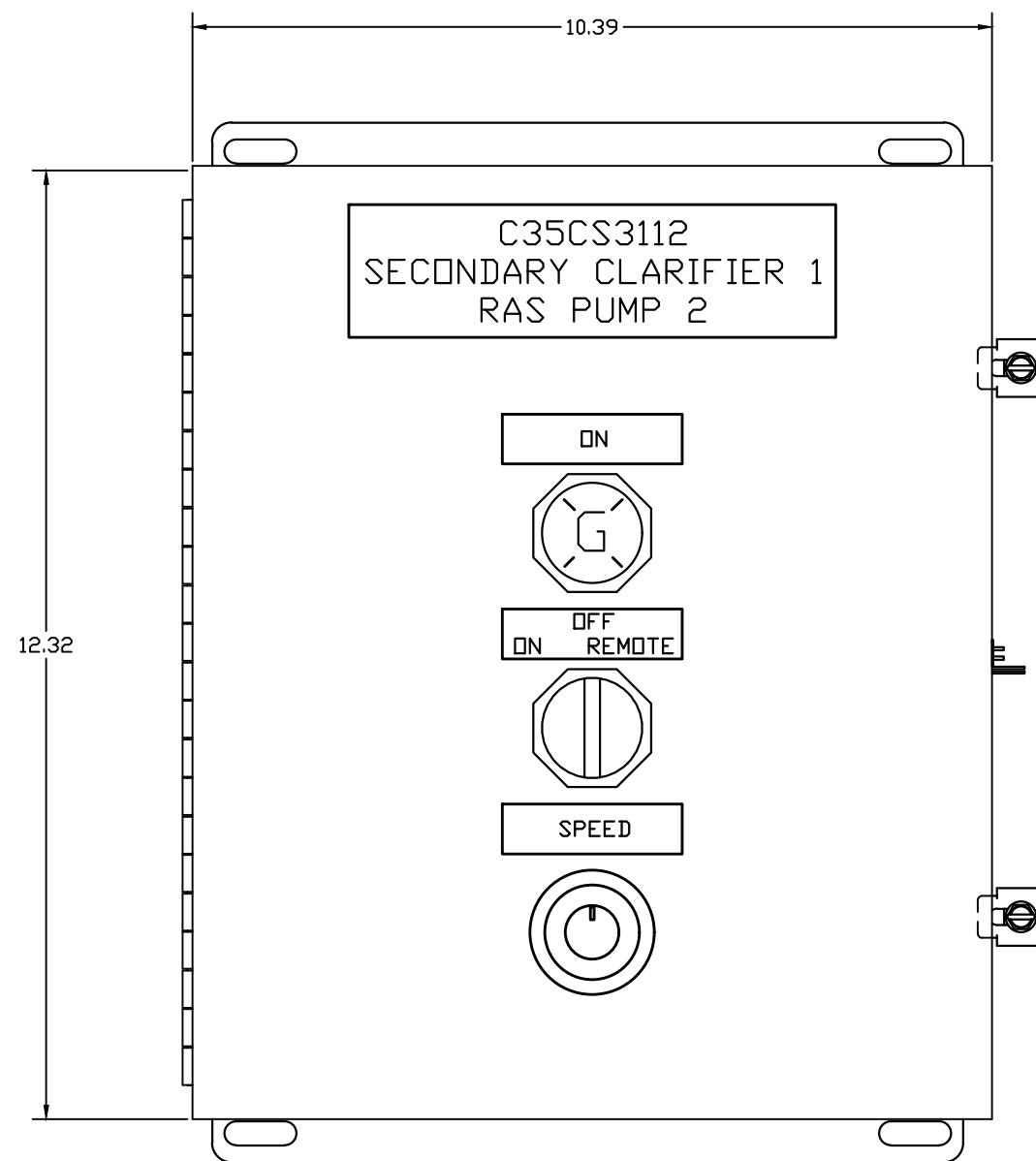
Bill of Materials



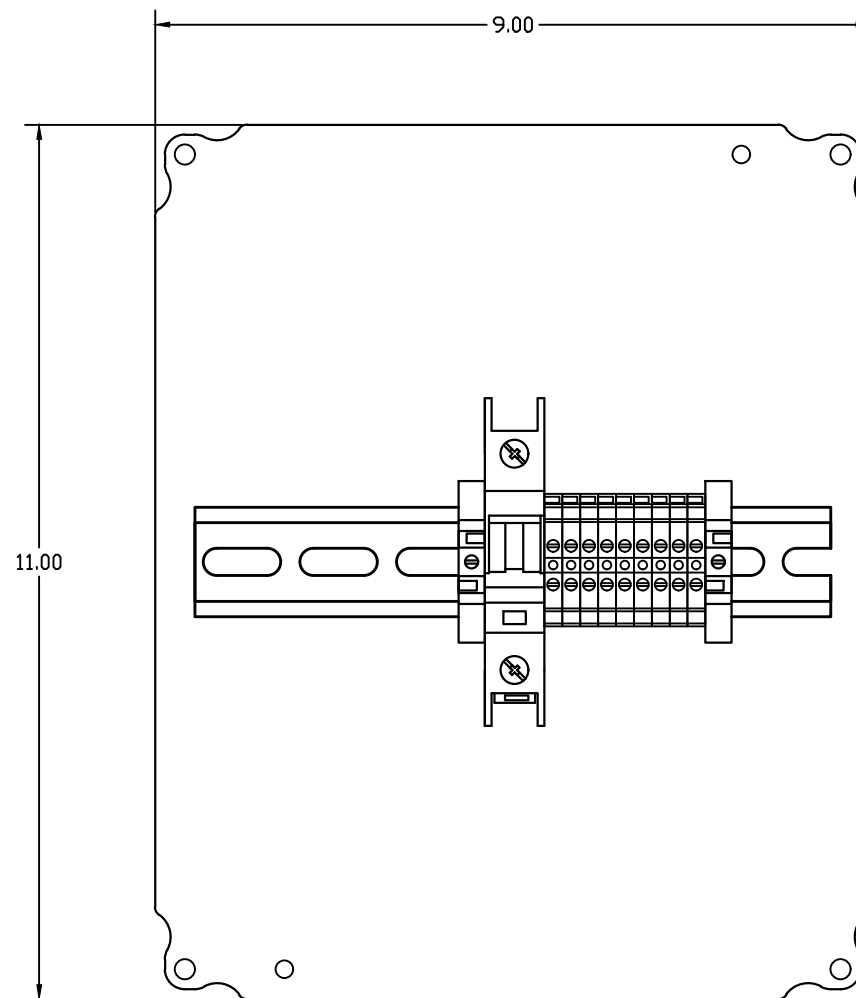
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3112	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-002, 90-E-306
002	1	C35CS3112	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-002, 90-E-306
003	1	C35CS3112	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-002, 90-E-306
004	1	C35CS3112	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-002, 90-E-306
005	1	C35CS3112	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-002, 90-E-306
006	1	C35CS3112	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-002, 90-E-306
007	1	C35CS3112	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-002, 90-E-306
008	1	C35CS3112	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3112	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
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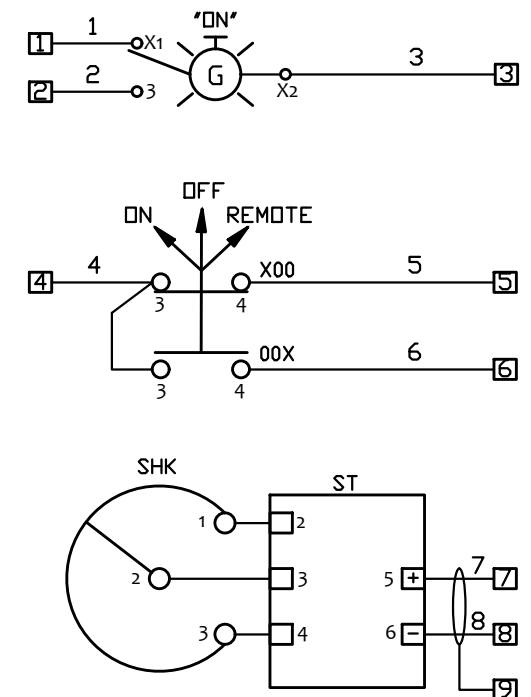
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT McCLOURE & SONS			
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOOS BAY WASTE WATER TREATMENT PLANT			
B	2024.02.27	CORRECTED	KCED	C35CS3112 SECONDARY CLARIFIER 1 RAS PUMP 2			
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SC1R2-3112	
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1	

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Pour in place oil & water resistant gasket
- ✱ Ground stud on door.
- ✱ Stainless steel continuous hinge.
- ✱ Standoffs provided for mounting optional panels.
- ✱ Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- ✱ NEMA Type 3R, 4, 4X, 12 and Type 13
- ✱ UL Listed Type 3R, 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- ✱ Dead Front CH & ELJ Style Installation Instructions
- ✱ Padlock Kit For Junction Boxes
- ✱ Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

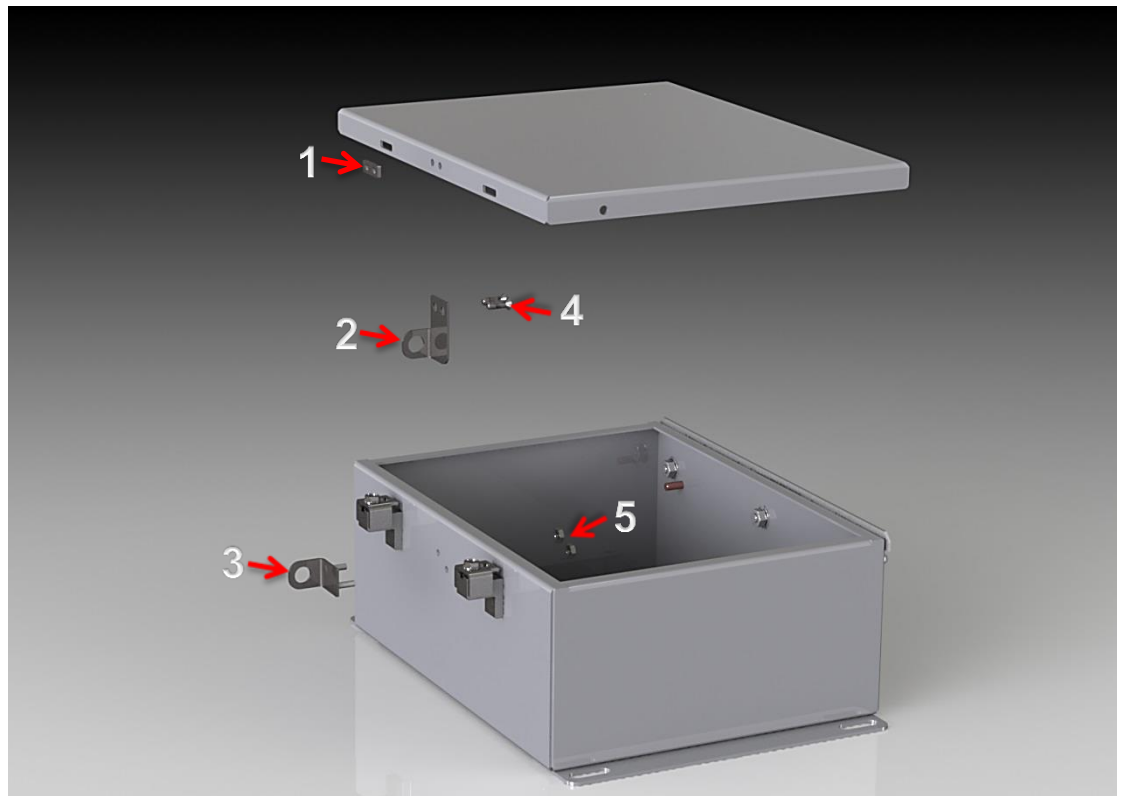
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

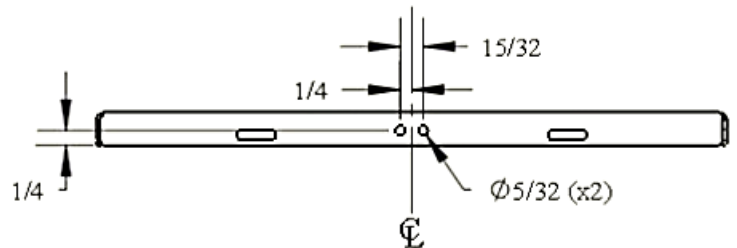
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SCE-PLKJIC INSTALLATION

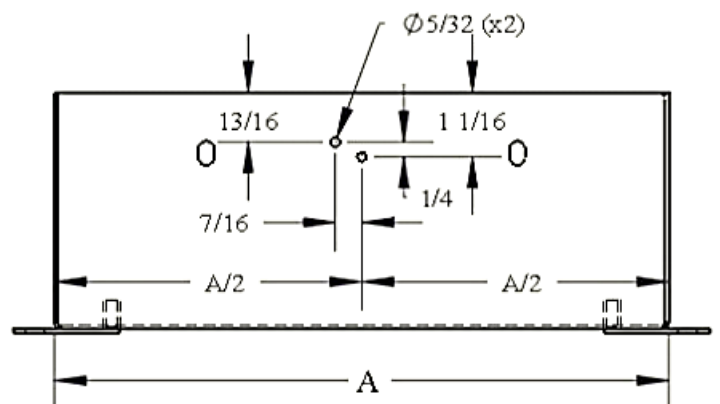
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12P10

Product Specifications:

Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs



Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

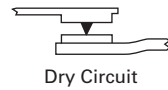
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

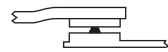
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

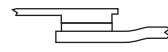
Reliability Nibs



Dry Circuit



Medium Duty



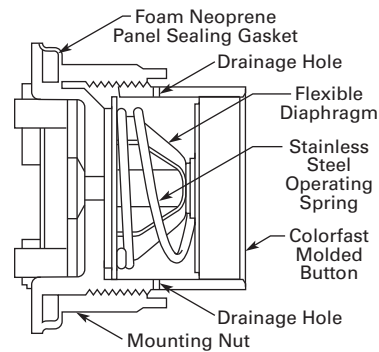
Heavy-Duty

Diaphragm Seal with Drainage Holes

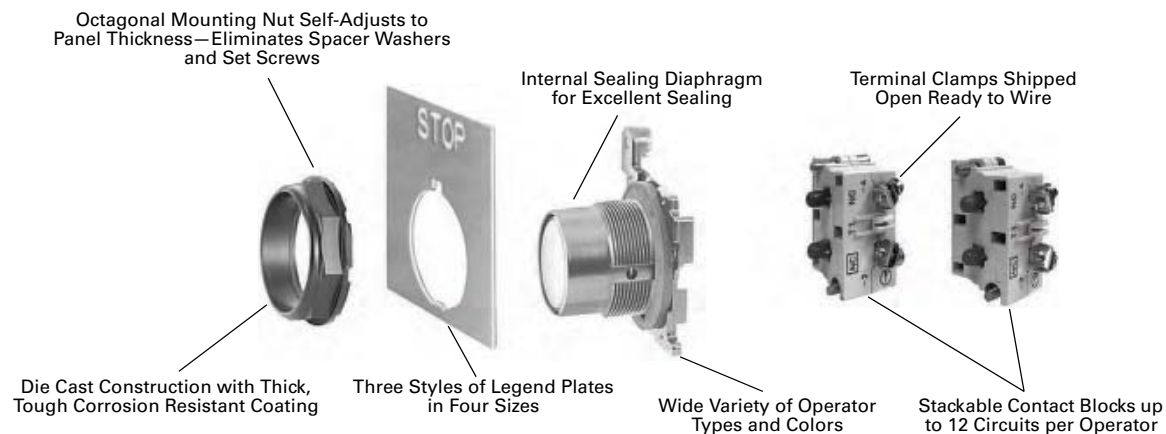
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type	
Standard—Incandescent	Standard—LED
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage
PresTest—Incandescent	PresTest—LED
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES	TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage

Plastic	Glass	Lens Color
Standard/Master—Incandescent		
H2 =	G2 = Red	
H3 =	G3 = Green	
H4 =	G4 = Yellow	
H5 =	G5 = White	
H6 =	G6 = Blue	
H9 =	G9 = Amber	
H0 =	G0 = Clear	

Plastic	Glass	Lens Color
Standard/Master/PresTest—LED		
RP =	RG = Red	
GP =	GG = Green	
YP =	YG = Yellow	
WP =	WG = White	
LP =	LG = Blue	
AP =	AG = Amber	

PresTest—Incandescent	
V2 =	P2 = Red
V3 =	P3 = Green
V4 =	P4 = Yellow
V5 =	P5 = White
V6 =	P6 = Blue
V9 =	P9 = Amber
V0 =	P0 = Clear

LED Voltage	
Blank = Incandescent	
06 = 6 Vac/Vdc	
12 = 12 Vac/Vdc	
24 = 24 Vac/Vdc	
48 = 48 Vac/Vdc	
60 = 60 Vac/Vdc	
2A = 120 Vac	
2D = 120 Vdc	

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

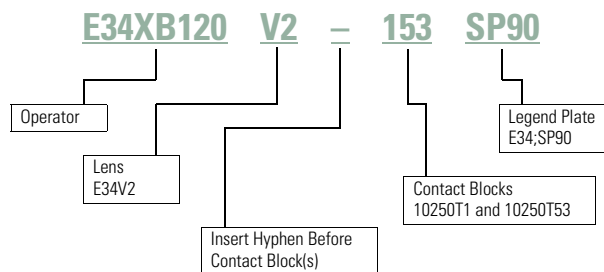
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F1**36**. To order separately, see footnote ^⑤ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
				1NC								

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

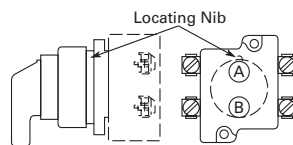
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

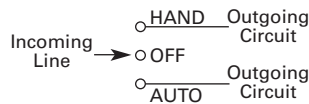


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

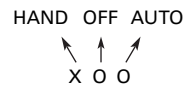
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



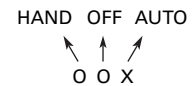
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

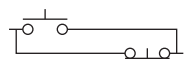
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X 0 0				—
4	0 0 X	—		—	

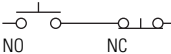
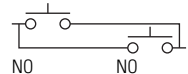
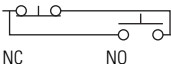
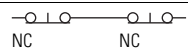
Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	0		or
2	0	X		or

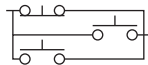
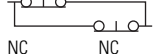
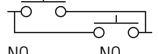
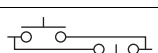
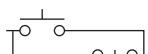
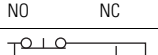
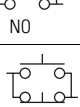
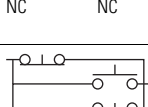
Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function		No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function		
					Mounting Location							Mounting Location		
					Top Plunger A	Bottom Plunger B						Top Plunger A	Bottom Plunger B	
1	X	0	0	0		NC	10	X	0	X	0		NC NO	
2	0	X	0	0			NO							
3	0	0	X	0		NO	11	X	X	X	0		NC NO	
4	0	0	0	X			NC						NO	
5	X	0	0	X		NC NC	12	0	X	X	X		NO NC NO	
6	0	X	X	0		NO NO								
7	0	0	X	X		NO NC	13	X	0	X	X		NO NC	
8	X	X	0	0		NC NO								
9	0	X	0	X			NO NC	14	X	X	0	X		NC NO NC

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks

Standard Contact Blocks

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

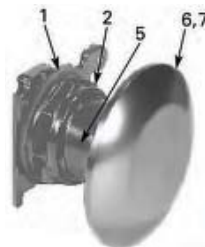
- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



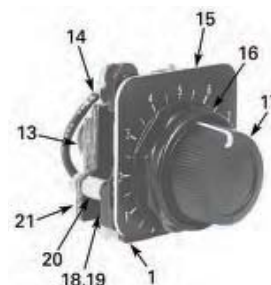
**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



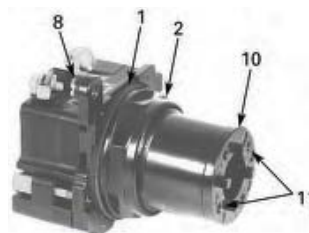
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

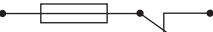
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls T1A 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

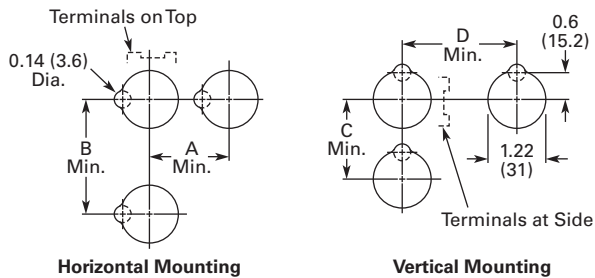
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

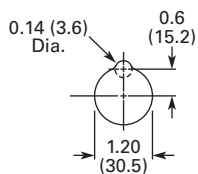
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

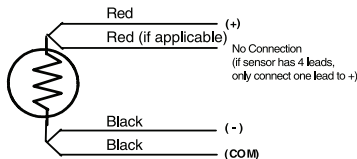
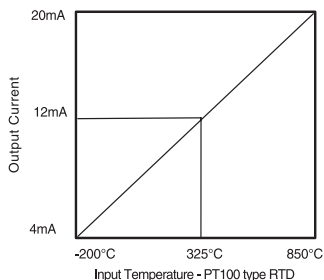
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

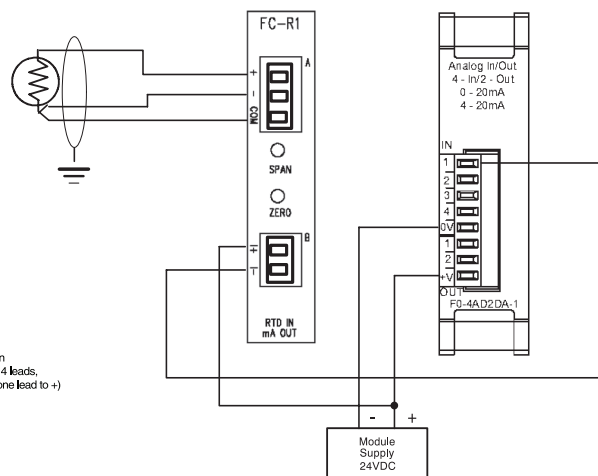
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

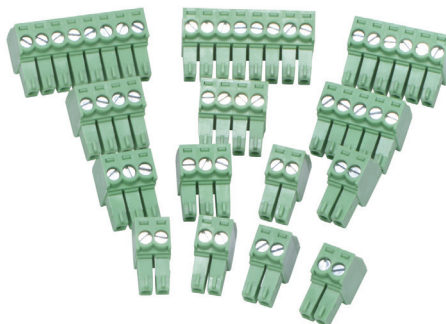


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

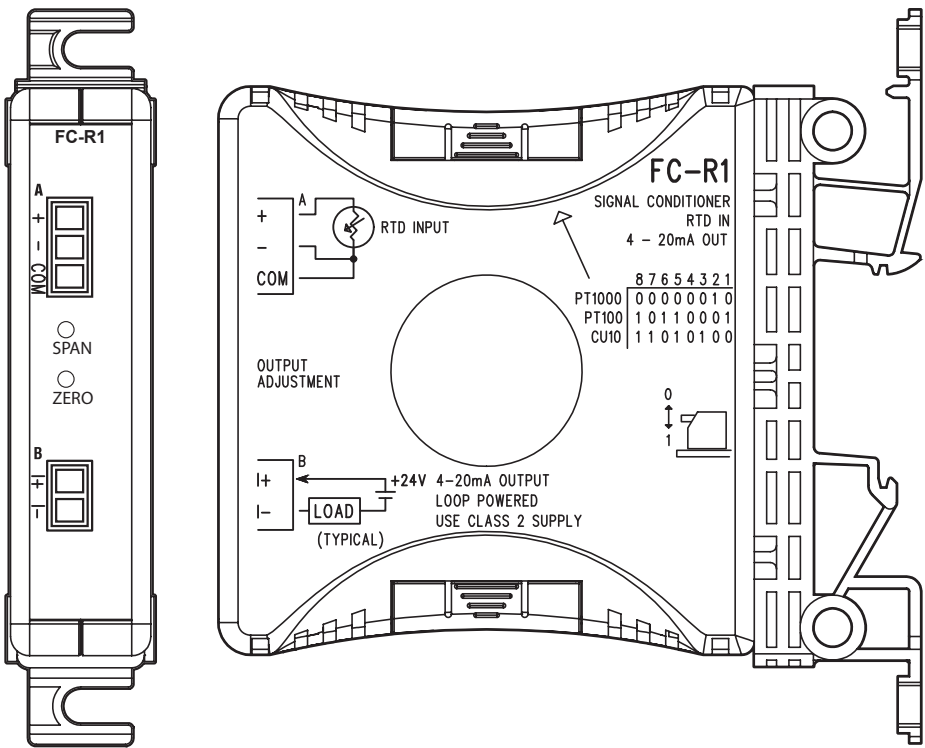
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

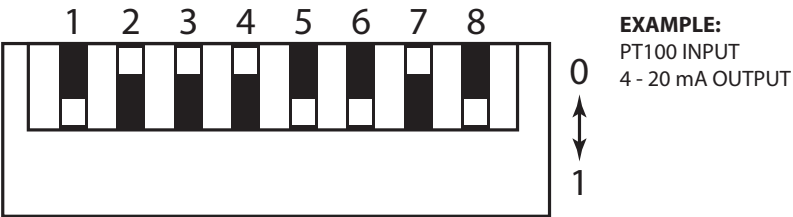
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) terminal and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

<i>Input Ranges</i>	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
<i>RTD Excitation Current</i>	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
<i>Common Mode Range</i>	0-3.5 VDC		
<i>Maximum Inaccuracy (Includes Offset, Span, Linearity)</i>	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
<i>Maximum Loop Supply</i>	30VDC		
<i>Load Impedance</i>	0Ω Minimum		
<i>Maximum Load</i>	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
<i>Linearity Error</i>	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
<i>Output Slew Rate</i>	1% @ 20mS		
<i>Filter Characteristics</i>	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
<i>Stability</i>	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

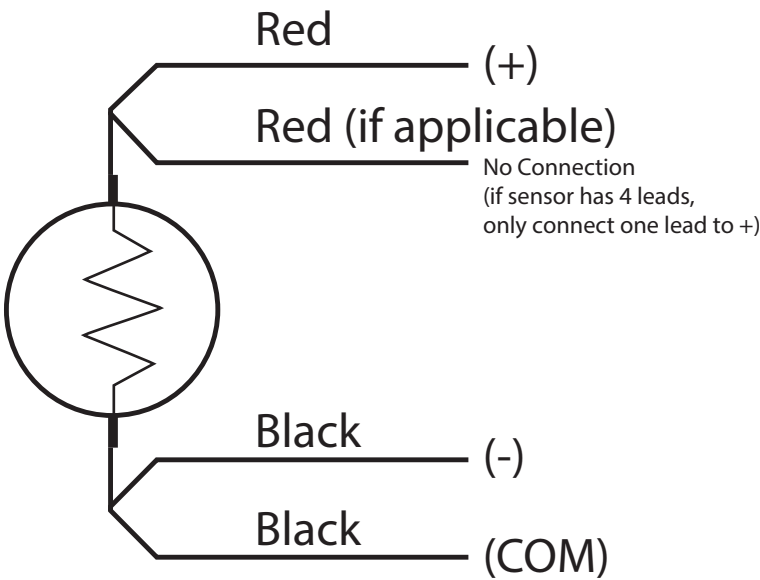
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

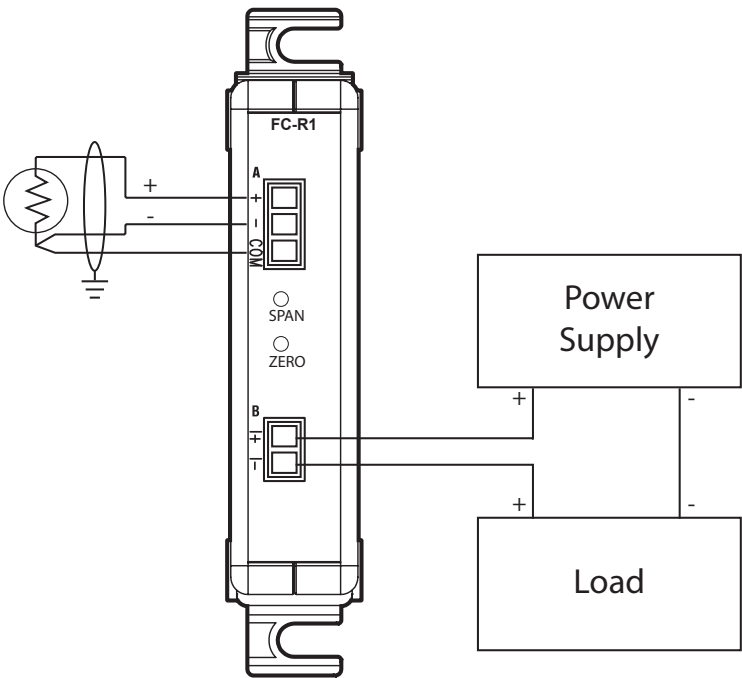
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



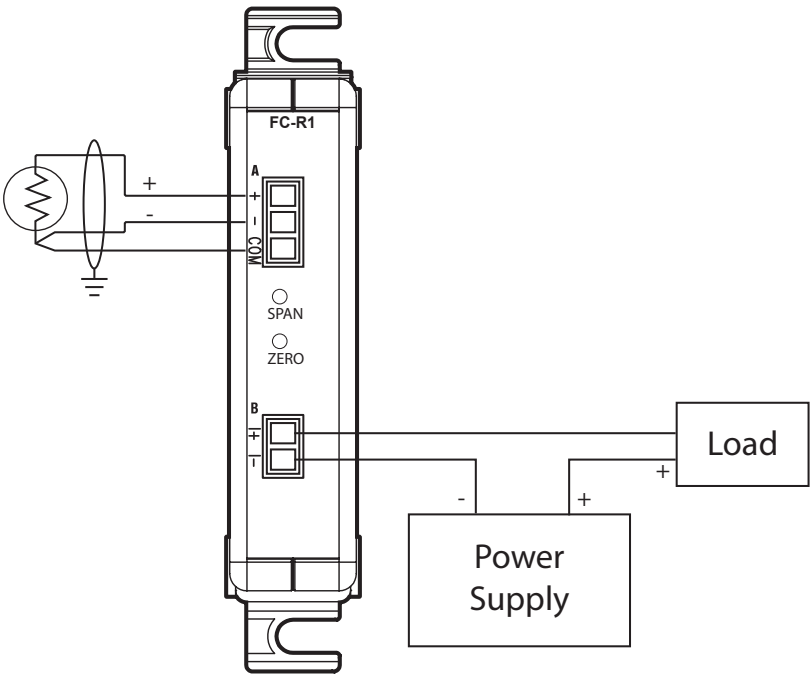
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

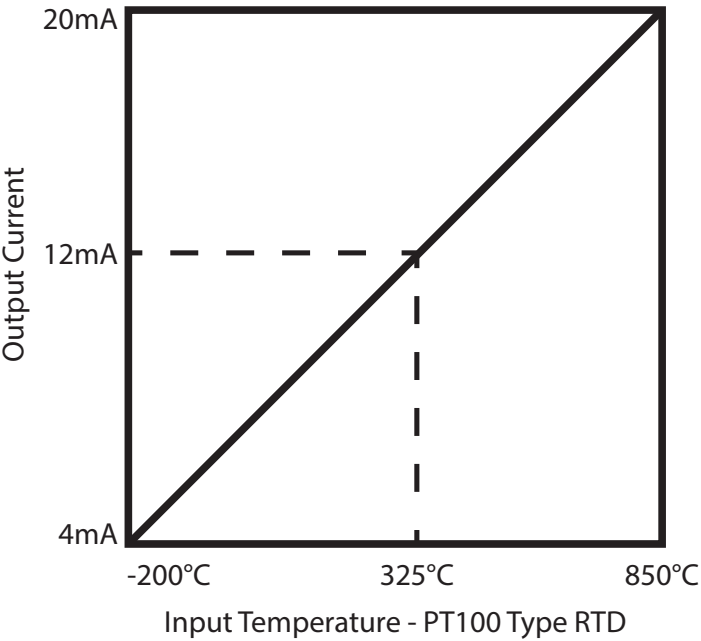
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d'explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d'explosion: Ne pas déconnecter l'équipement à moins que l'alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

COOS BAY WWTP 1
PHASE 1A FINAL DESIGN

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

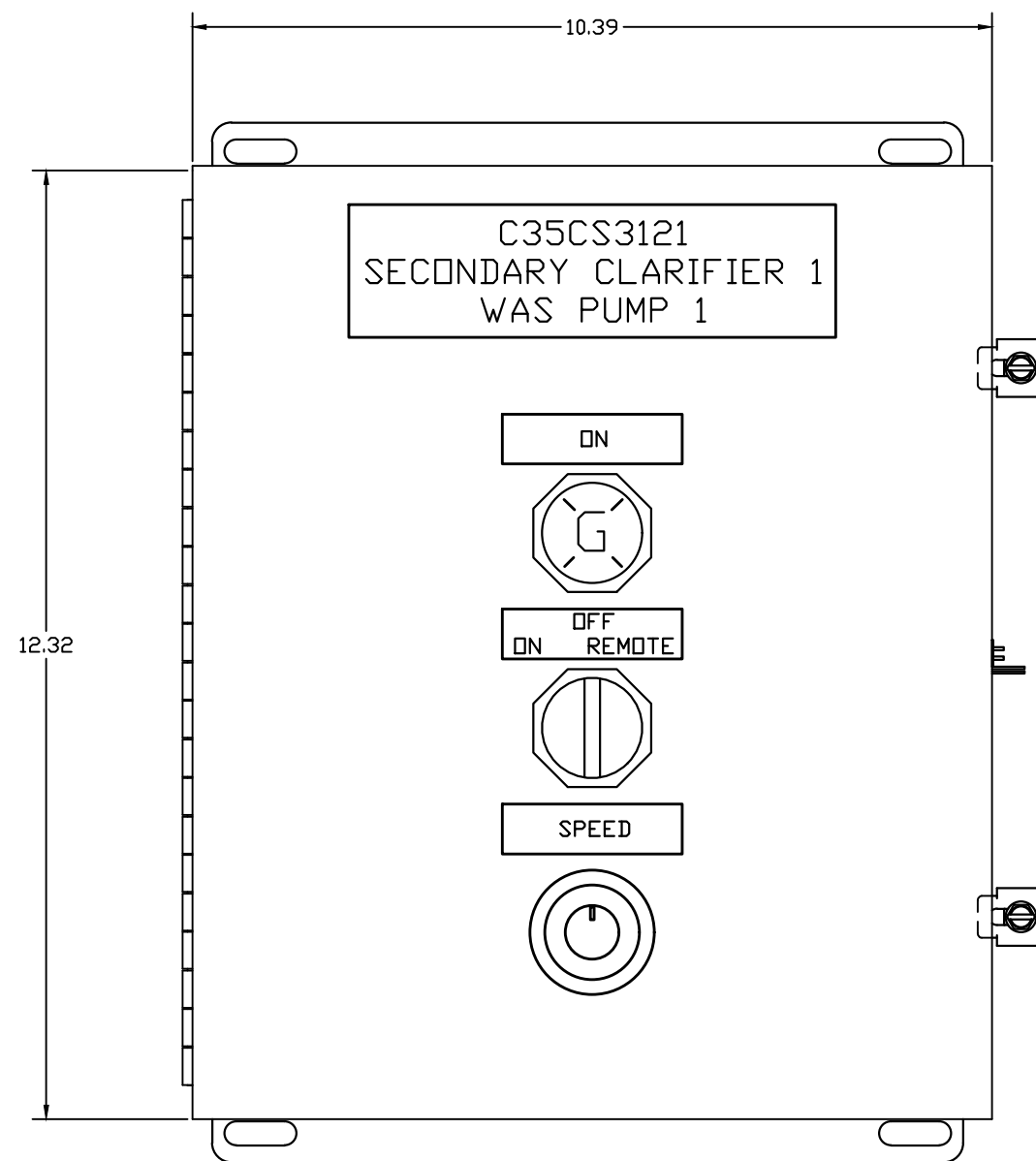
Bill of Materials



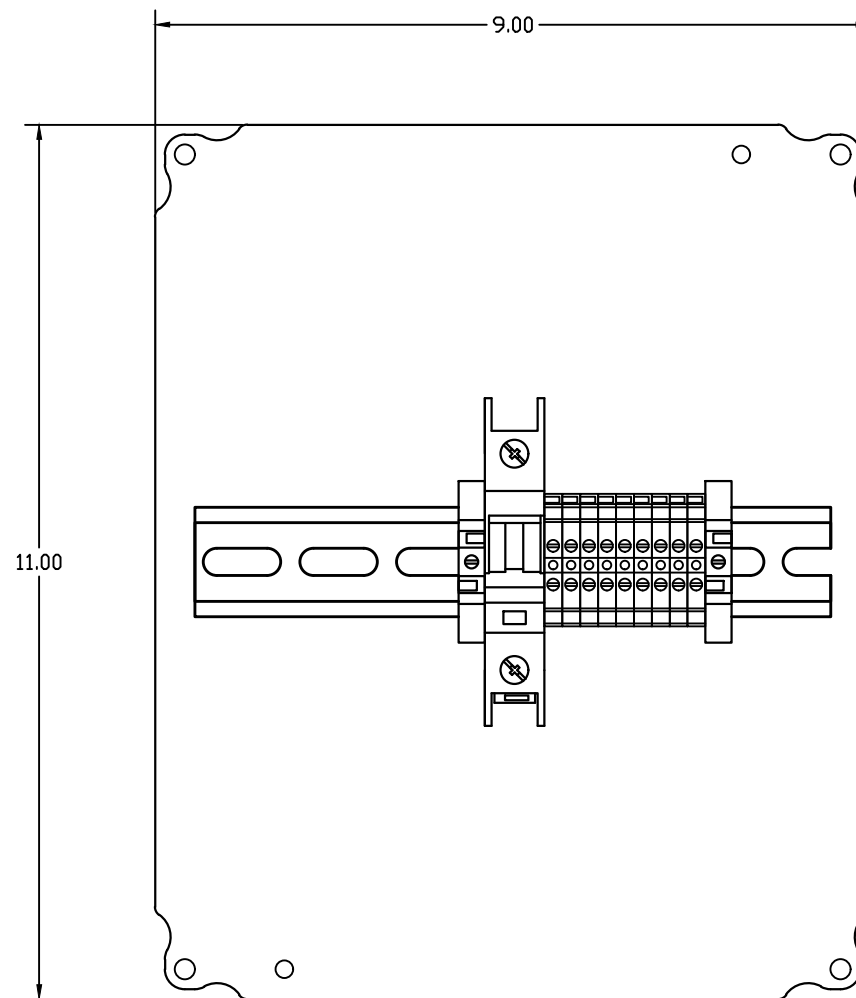
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3121	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-002, 90-E-306
002	1	C35CS3121	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-002, 90-E-306
003	1	C35CS3121	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-002, 90-E-306
004	1	C35CS3121	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-002, 90-E-306
005	1	C35CS3121	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-002, 90-E-306
006	1	C35CS3121	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-002, 90-E-306
007	1	C35CS3121	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-002, 90-E-306
008	1	C35CS3121	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3121	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
011							
012							
013							
014							
015							
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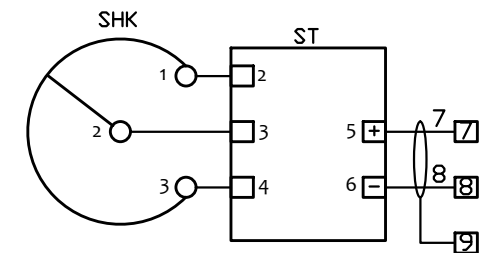
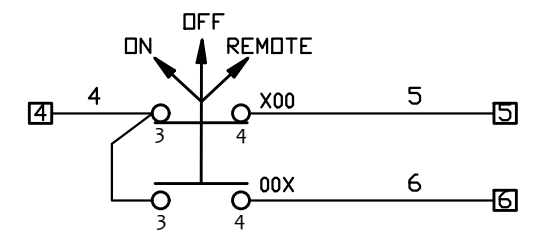
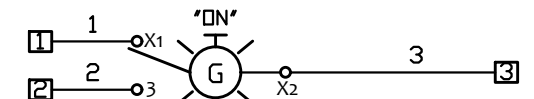
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT	MCCLURE & SONS		
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE	CDOOS BAY WASTE WATER TREATMENT PLANT		
B	2024.02.27	CORRECTED	KCED		C35CS3121 SECONDARY CLARIFIER 1 WAS PUMP 1		
A	2023.10.25	Original Draft	KCD	DRAWN	KCD	ISSUED	JOB NO. 0723-08MSI
REV	DATE	DESCRIPTION	INIT	CHECKED	ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SC1WP1-3121
REVISIONS				APPROVED	HAD	SCALE NONE	SHEET 1 OF 1

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Your Enclosure Source®

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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- * 0.063 In. stainless steel Type 316/316L.
- * Seams continuously welded and ground smooth.
- * Pour in place oil & water resistant gasket
- * Ground stud on door.
- * Stainless steel continuous hinge.
- * Standoffs provided for mounting optional panels.
- * Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- * NEMA Type 3R, 4, 4X, 12 and Type 13
- * UL Listed Type 3R, 4, 4X and 12
- * CSA Type 4, 4X and 12
- * IEC 60529
- * IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- * Dead Front CH & ELJ Style Installation Instructions
- * Padlock Kit For Junction Boxes
- * Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

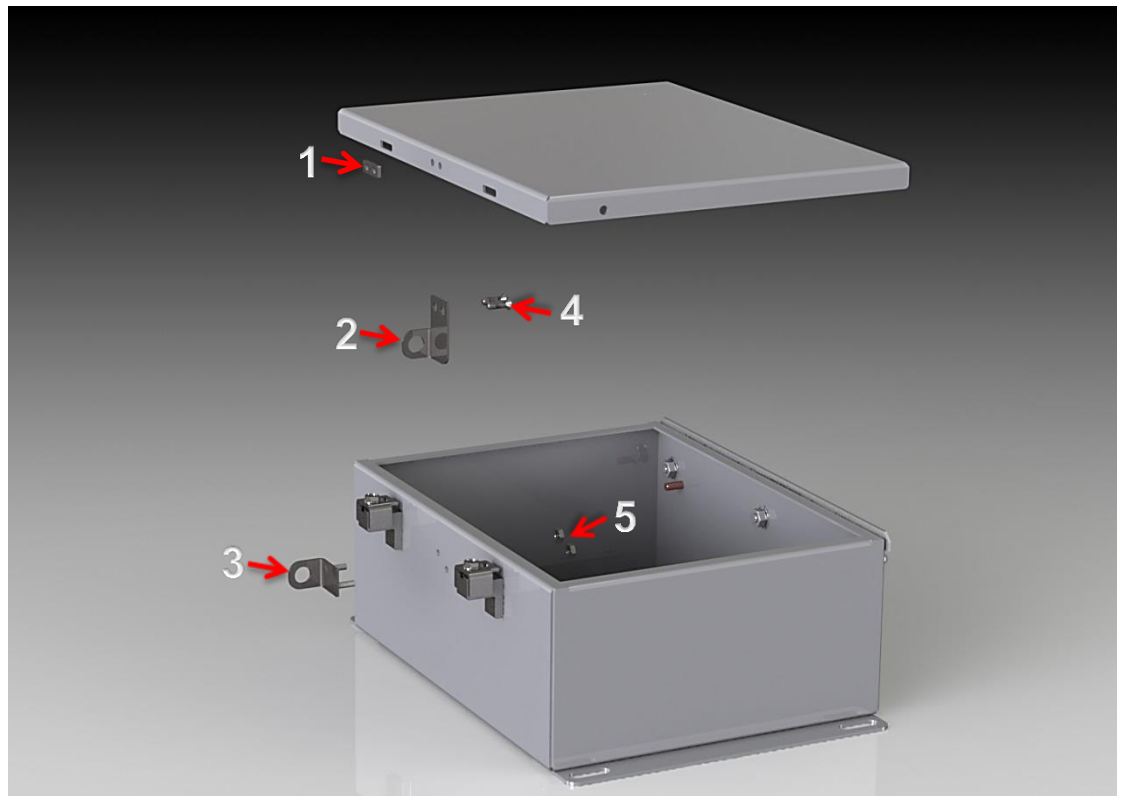
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

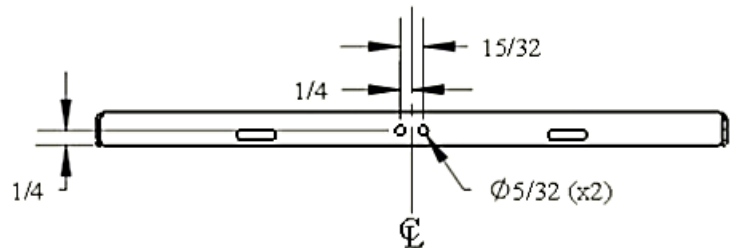
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SCE-PLKJIC INSTALLATION

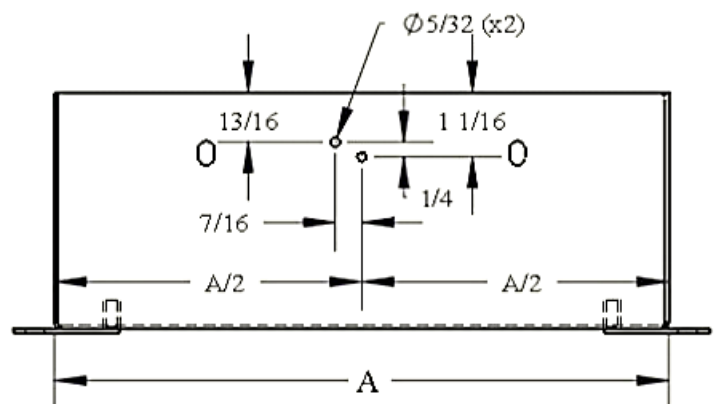
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
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Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
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Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

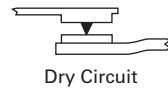
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

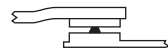
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

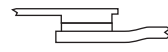
Reliability Nibs



Dry Circuit



Medium Duty



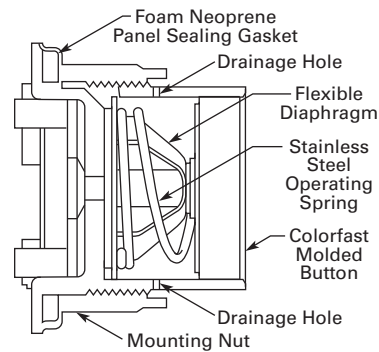
Heavy-Duty

Diaphragm Seal with Drainage Holes

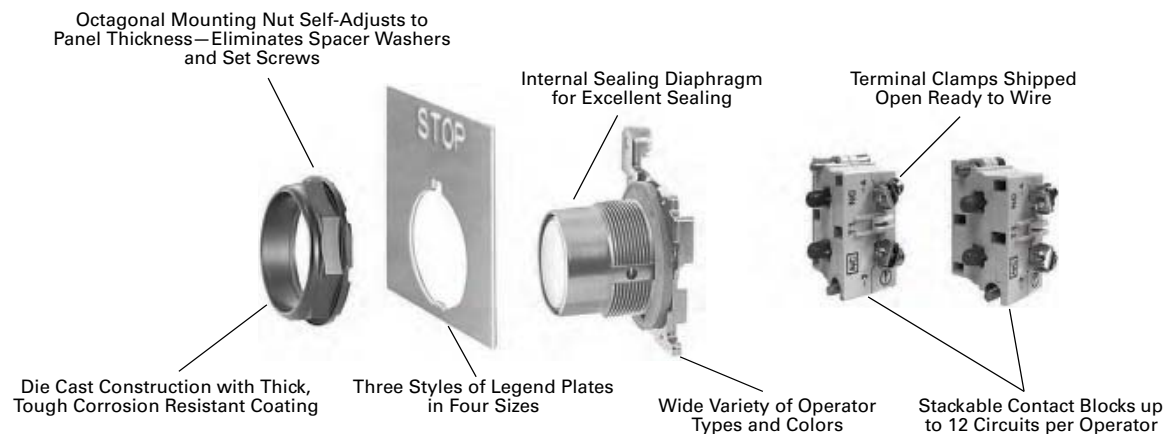
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		LED Voltage	
Standard—Incandescent	Standard—LED	Blank = Incandescent	
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage	06 = 6 Vac/Vdc 12 = 12 Vac/Vdc 24 = 24 Vac/Vdc 48 = 48 Vac/Vdc 60 = 60 Vac/Vdc 2A = 120 Vac 2D = 120 Vdc	
PresTest—LED			
TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage			
PresTest—Incandescent			
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES			

Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
Standard/Master—Incandescent			Standard/Master/PresTest—LED		
H2 =	G2 =	Red	RP =	RG =	Red
H3 =	G3 =	Green	GP =	GG =	Green
H4 =	G4 =	Yellow	YP =	YG =	Yellow
H5 =	G5 =	White	WP =	WG =	White
H6 =	G6 =	Blue	LP =	LG =	Blue
H9 =	G9 =	Amber	AP =	AG =	Amber
H0 =	G0 =	Clear			
PresTest—Incandescent					
V2 =	P2 =	Red			
V3 =	P3 =	Green			
V4 =	P4 =	Yellow			
V5 =	P5 =	White			
V6 =	P6 =	Blue			
V9 =	P9 =	Amber			
V0 =	P0 =	Clear			

Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

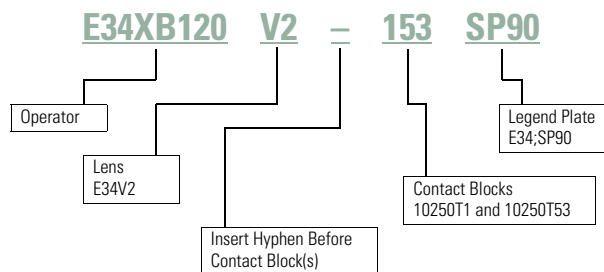
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F1**36**. To order separately, see footnote ^⑥ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
				1NC								

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

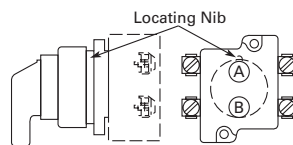
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

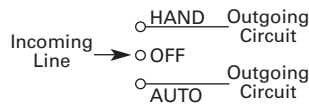


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

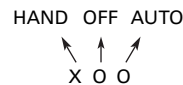
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



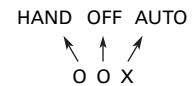
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

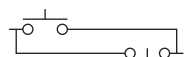
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	NO	NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

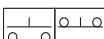
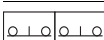
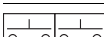
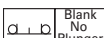
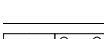
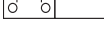
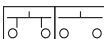
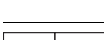
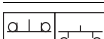
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



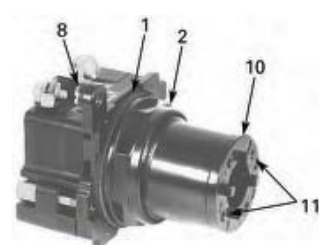
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

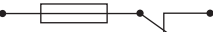
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

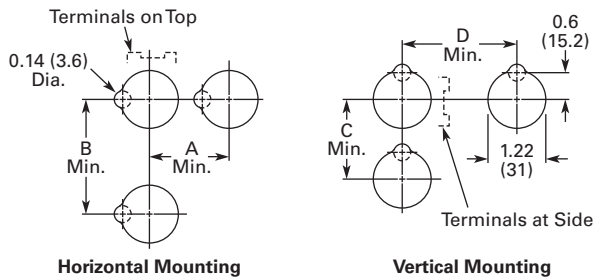
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

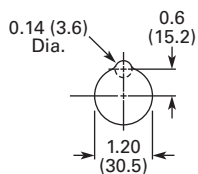
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

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Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

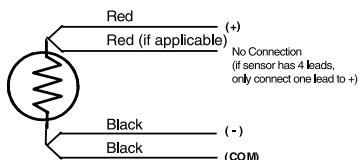
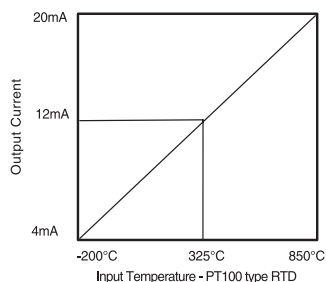
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

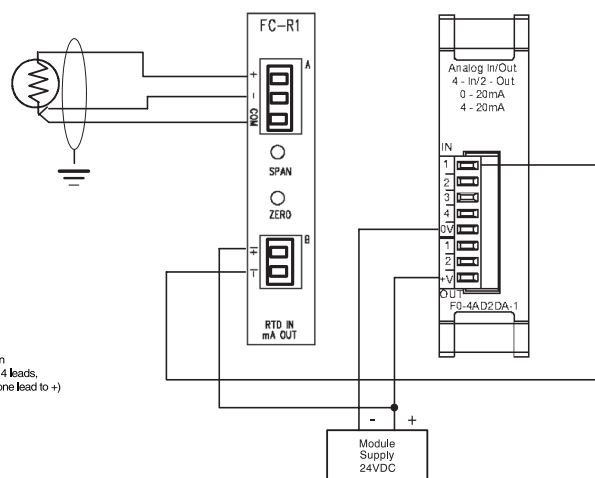
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

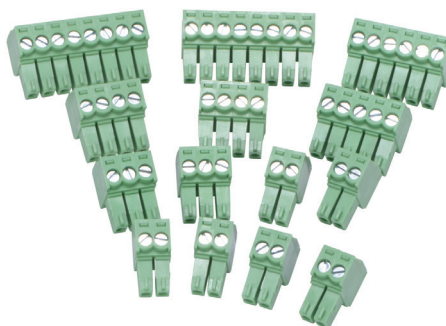


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

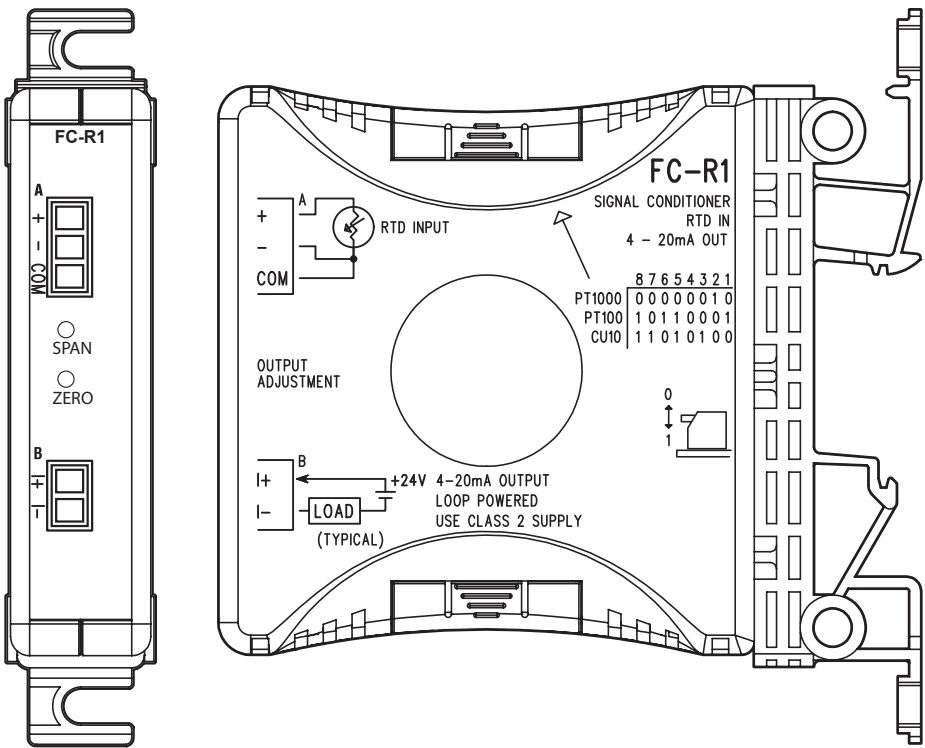
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

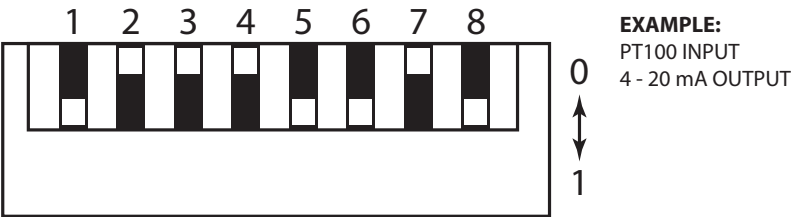
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) termnial and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

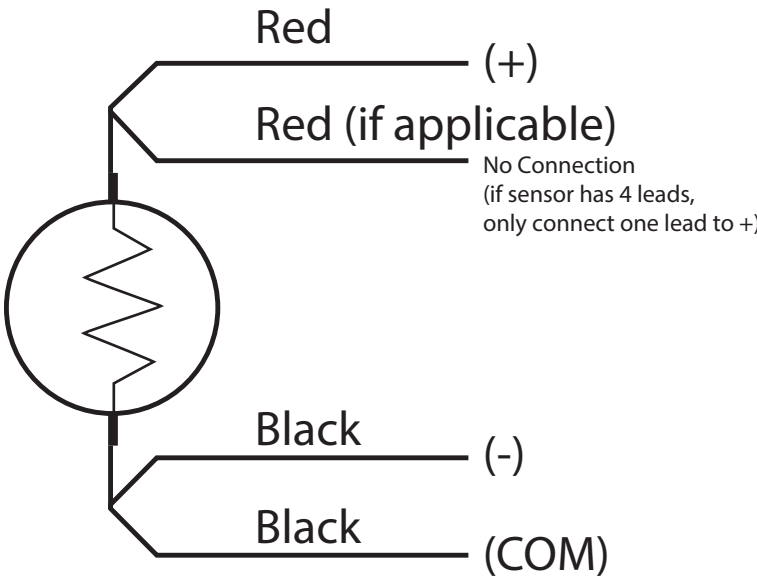
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

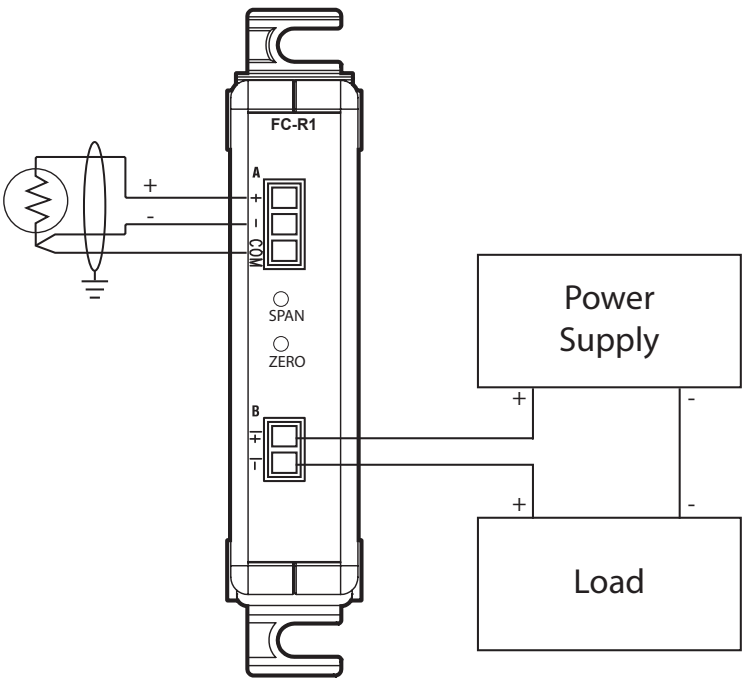
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



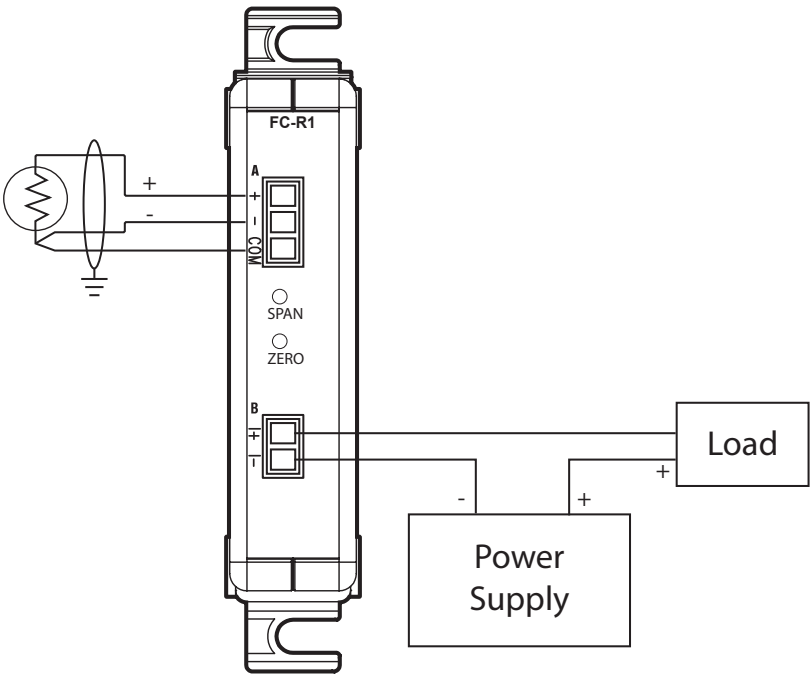
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

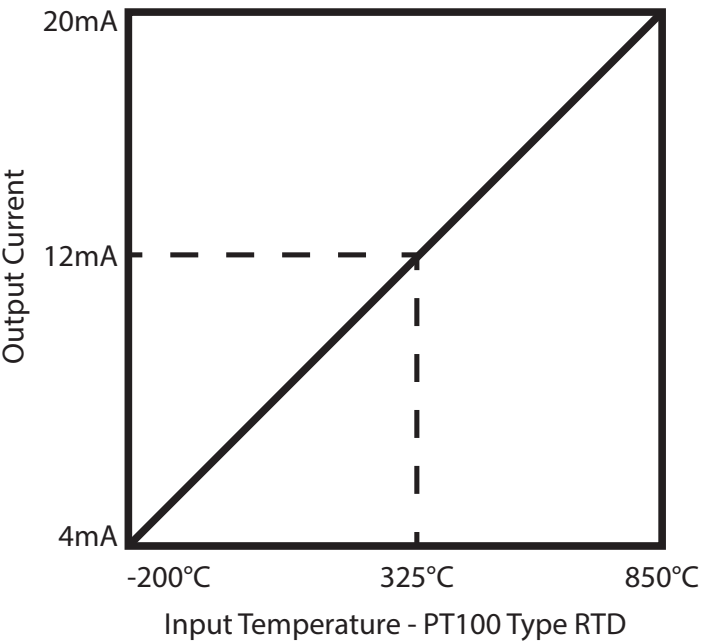
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

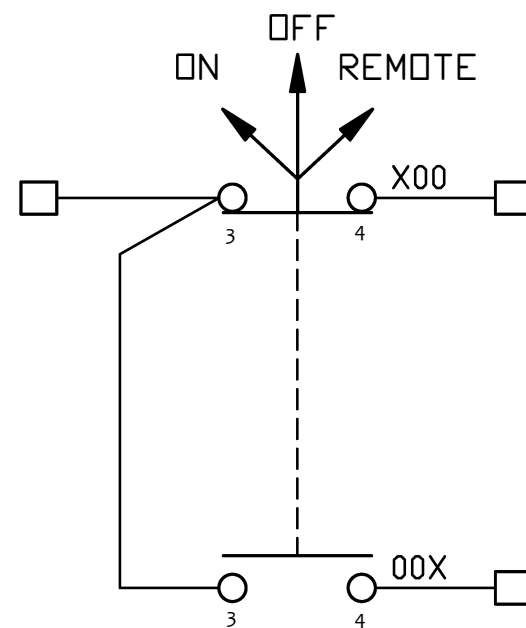
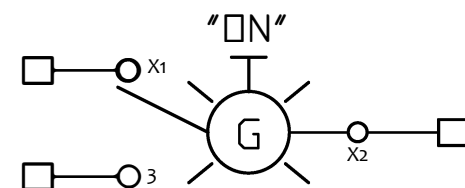
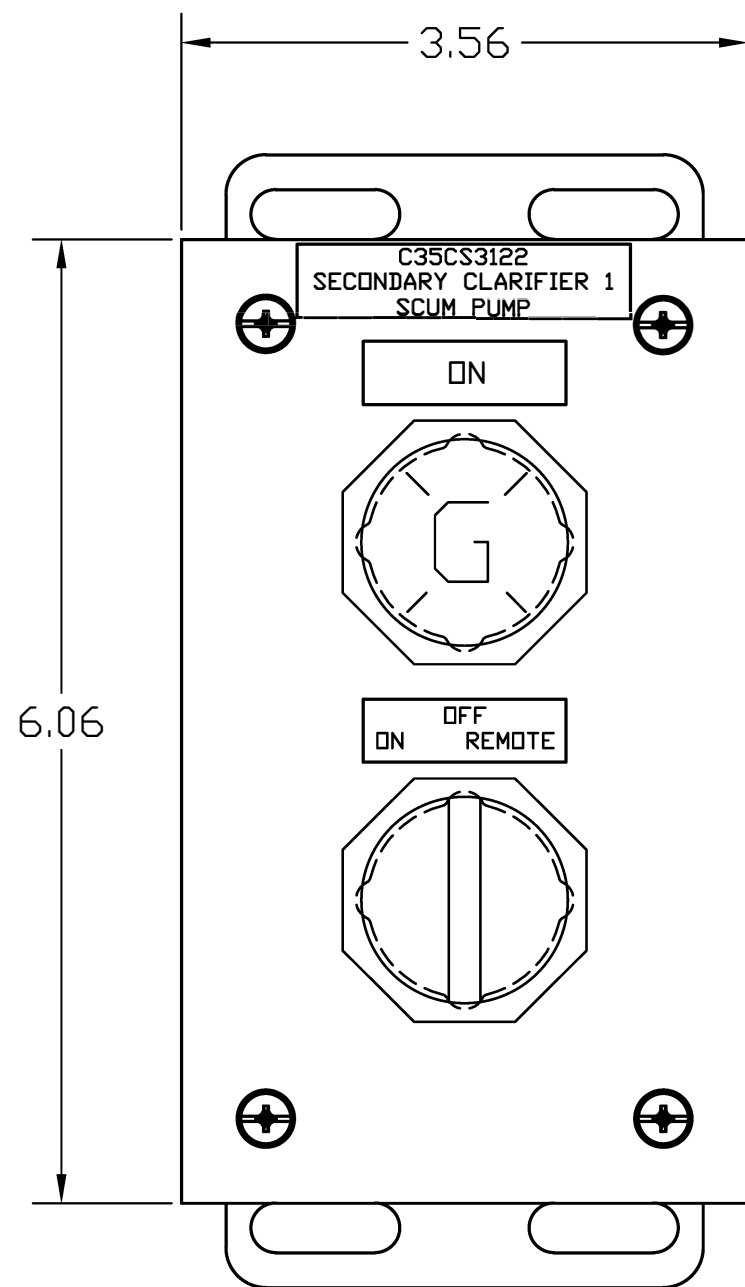
Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3122	PB Enclosure, SS Type 316/316L, NEMA 4X 5.75" H x 3.25" W x 2.75" D	Saginaw Control & Engineering	SCE-2PBSS6	Section 26 05 04	09-I-001, 90-E-304
002	1	C35CS3122	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-001, 90-E-304
003	1	C35CS3122	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-001, 90-E-304
004	1	C35CS3122	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
005	2	C35CS3122	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
006							
007							
008							
009							
010							
011							
012							
013							
014							
015							
016							
017							
018							
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H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323		FAX (541) 967-9485	
D				CLIENT McCLURE & SONS			
C				TITLE COOS BAY WASTE WATER TREATMENT PLANT			
B	2024.02.27.	CORRECTED	KCED	C35CS3122 SECONDARY CLARIFIER 1 SCUM PUMP			
A	2023.10.25.	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SC1SP-3122	
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1	

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-2PBSS6

Product Specifications:

Part Number: SCE-2PBSS6
Description: S.S. PB Enclosure
Height: 5.75"
Width: 3.25"
Depth: 2.75"
Price Code: S1
List Price: \$242.12
Catalog Page: 252
Est. Ship Weight: 2.92 lbs



Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Captivated cover screws thread into sealed wells.
- ✱ 4-way standard pushbutton holes accept all brands of oil-tight pushbuttons, switches and pilot lights. Hole diameter is 1.20 In. (30.5mm).
- ✱ Immediate removal of cover is permitted.
- ✱ Pour in place oil & water resistant gasket
- ✱ Welded mounting provision top and bottom of back.

Application

Designed to house standard pushbuttons, switches and pilot lights in wet and hosed down areas and in corrosive atmospheres.

Finish

#4 brushed finish on all exterior surfaces.

Industry Standards - (IS5)

- ✱ NEMA Type 4, 4X, 12 and Type 13
- ✱ UL Listed Type 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Optional Accessories

SCE-ASPB-SS Plug, Hole

Similar Part Numbers

SCE-12PBSS6S.S. PB Enclosure
SCE-1PBSS6S.S. PB Enclosure
SCE-1PBXSS6S.S. PBX Enclosure
SCE-2PBXSS6S.S. PBX Enclosure
SCE-3PBSS6S.S. PB Enclosure
SCE-3PBXSS6S.S. PBX Enclosure
SCE-4PBSS6S.S. PB Enclosure
SCE-4PBXSS6S.S. PBX Enclosure
SCE-4SPBSS6S.S. PB Enclosure
SCE-6PBSS6S.S. PB Enclosure

Installation Information

- ✱ Pushbutton Enclosures

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PUSHBUTTON ENCLOSURES SERVICE PARTS



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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
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Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
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Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
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Replacement Parts	V7-T1-317
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Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

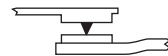
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

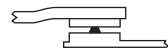
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

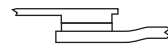
Reliability Nibs



Dry Circuit



Medium Duty



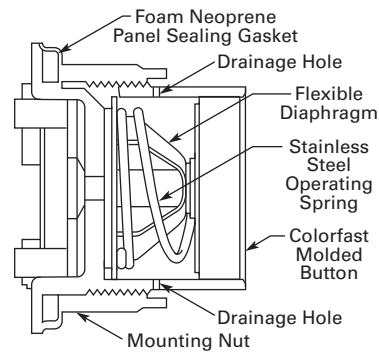
Heavy-Duty

Diaphragm Seal with Drainage Holes

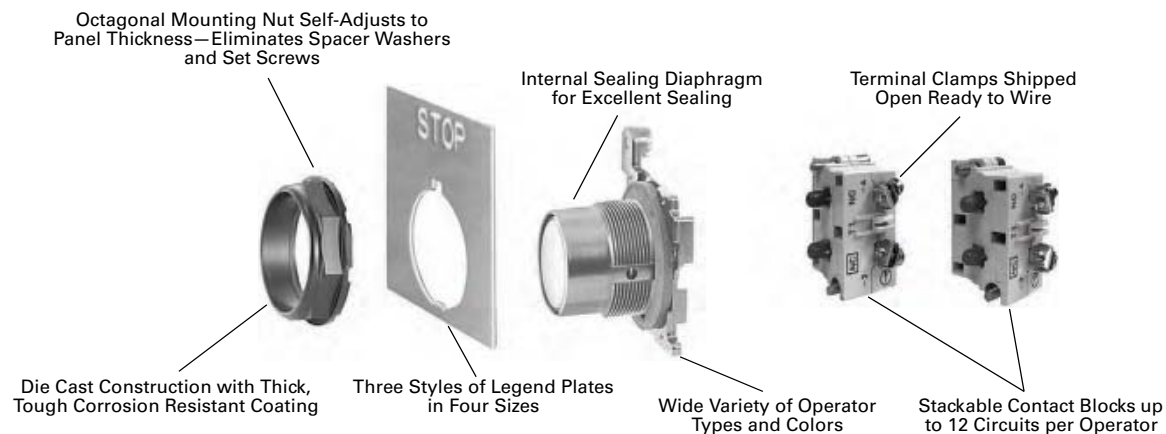
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		LED Voltage	
Standard—Incandescent	Standard—LED	Blank = Incandescent	
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage	06 = 6 Vac/Vdc 12 = 12 Vac/Vdc 24 = 24 Vac/Vdc 48 = 48 Vac/Vdc 60 = 60 Vac/Vdc 2A = 120 Vac 2D = 120 Vdc	
PresTest—LED			
TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage			
PresTest—Incandescent			
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES			

Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
Standard/Master—Incandescent			Standard/Master/PresTest—LED		
H2 =	G2 =	Red	RP =	RG =	Red
H3 =	G3 =	Green	GP =	GG =	Green
H4 =	G4 =	Yellow	YP =	YG =	Yellow
H5 =	G5 =	White	WP =	WG =	White
H6 =	G6 =	Blue	LP =	LG =	Blue
H9 =	G9 =	Amber	AP =	AG =	Amber
H0 =	G0 =	Clear			
PresTest—Incandescent					
V2 =	P2 =	Red			
V3 =	P3 =	Green			
V4 =	P4 =	Yellow			
V5 =	P5 =	White			
V6 =	P6 =	Blue			
V9 =	P9 =	Amber			
V0 =	P0 =	Clear			

Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

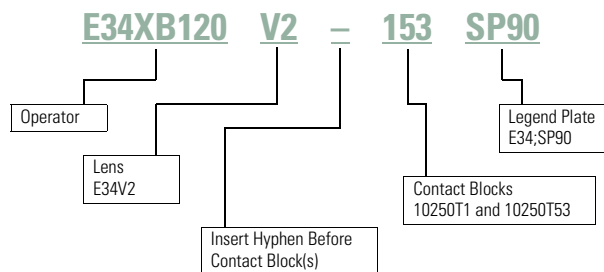
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0		2NC (Series)							
0	0	X		1NO							

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0		1NO							
0	0	0	X		1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

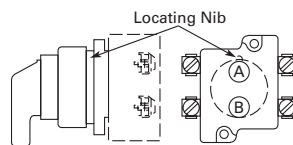
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

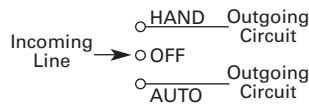


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

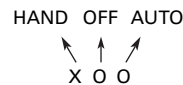
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



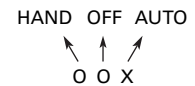
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

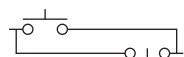
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X 0 0				—
4	0 0 X	—		—	

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	0		or
2	0	X		or

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



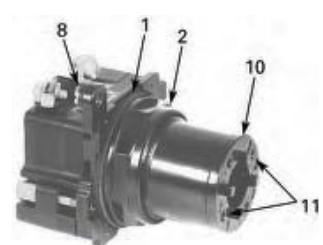
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

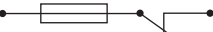
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

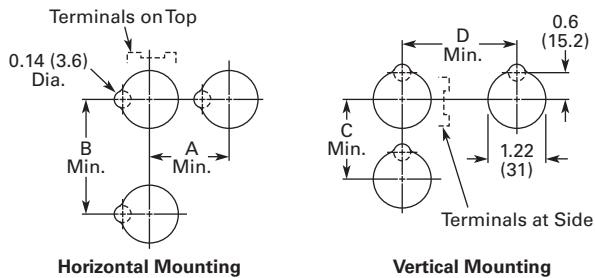
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

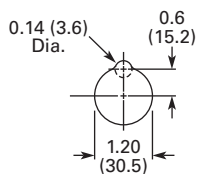
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



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Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

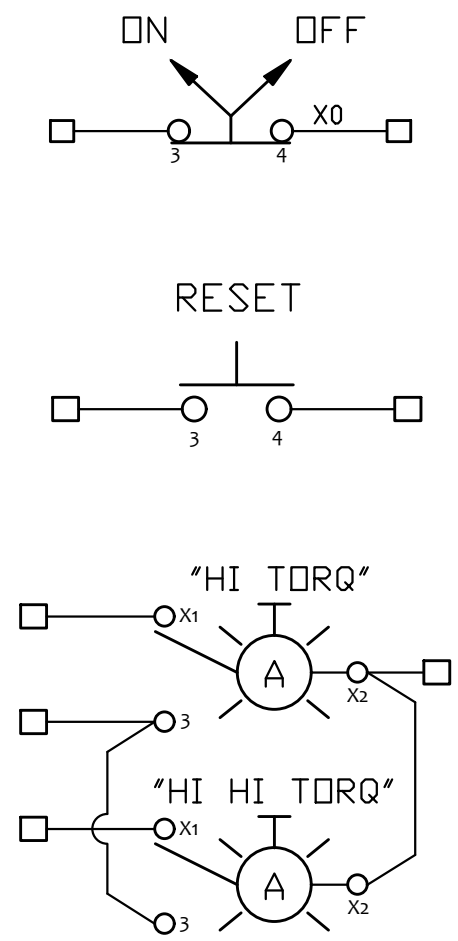
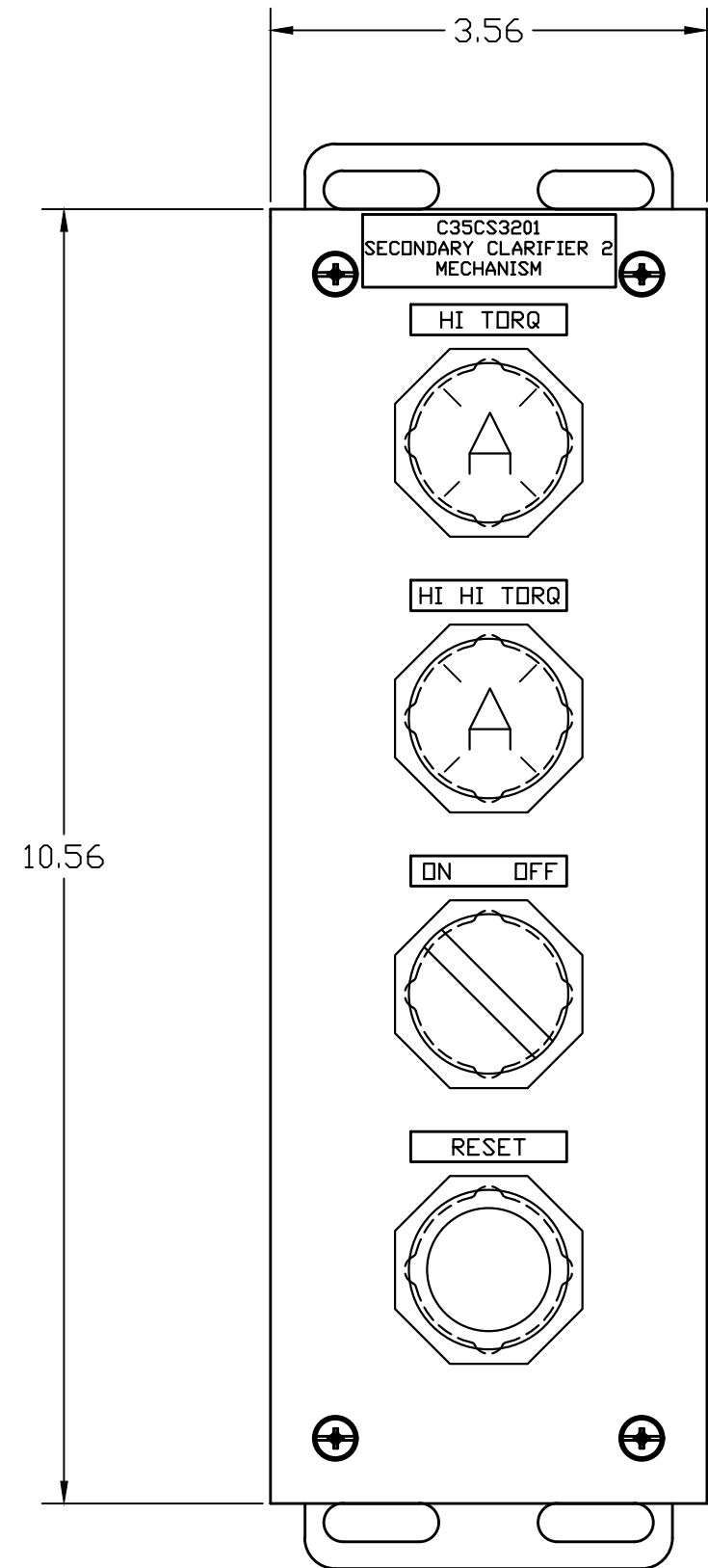
Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3201	PB Enclosure, SS Type 316/316L, NEMA 4X 10.25" H x 3.25" W x 2.75" D	Saginaw Control & Engineering	SCE-4PBSS6	Section 26 05 04	09-I-003, 90-E-304
002	1	C35CS3201	Selector Switch, 2-Position, Black Lever, 1NC/1NO	Eaton	E34VFB1-1X	Section 26 05 04	09-I-003, 90-E-304
003	2	C35CS3201	Indicating Light, PresTest, LED, Full Voltage, Amber	Eaton	E34FPB297LAP2A	Section 26 05 04	09-I-003, 90-E-304
004	1	C35CS3201	Pushbutton, Flush, Black, 1NO	Eaton	E34PB1-53	Section 26 05 04	09-I-003, 90-E-304
005	1	C35CS3201	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
006	4	C35CS3201	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-304
007							
008							
009							
010							
011							
012							
013							
014							
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H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT MCCLURE & SONS			
C				TITLE CDOOS BAY WASTE WATER TREATMENT PLANT			
B	2024.2.27.	CORRECTED	KCED	C35CS3201 SECONDARY CLARIFIER 2 MECHANISM			
A	2023.10.25.	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SC2M-3201	
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1	

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-4PBSS6

Product Specifications:

Part Number: SCE-4PBSS6
Description: S.S. PB Enclosure
Height: 10.25"
Width: 3.25"
Depth: 2.75"
Price Code: S1
List Price: \$298.75
Catalog Page: 252
Est. Ship Weight: 4.00 lbs



Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Captivated cover screws thread into sealed wells.
- ✱ 4-way standard pushbutton holes accept all brands of oil-tight pushbuttons, switches and pilot lights. Hole diameter is 1.20 In. (30.5mm).
- ✱ Immediate removal of cover is permitted.
- ✱ Pour in place oil & water resistant gasket
- ✱ Welded mounting provision top and bottom of back.

Application

Designed to house standard pushbuttons, switches and pilot lights in wet and hosed down areas and in corrosive atmospheres.

Finish

#4 brushed finish on all exterior surfaces.

Industry Standards - (IS5)

- ✱ NEMA Type 4, 4X, 12 and Type 13
- ✱ UL Listed Type 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Similar Part Numbers

SCE-12PBSS6S.S. PB Enclosure
SCE-1PBSS6S.S. PB Enclosure
SCE-1PBXSS6S.S. PBX Enclosure
SCE-2PBSS6S.S. PB Enclosure
SCE-2PBXSS6S.S. PBX Enclosure
SCE-3PBSS6S.S. PB Enclosure
SCE-3PBXSS6S.S. PBX Enclosure
SCE-4PBXSS6S.S. PBX Enclosure
SCE-4SPBSS6S.S. PB Enclosure
SCE-6PBSS6S.S. PB Enclosure

Installation Information

- ✱ Pushbutton Enclosures

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PUSHBUTTON ENCLOSURES SERVICE PARTS



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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Product Selection	
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Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
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Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
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Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

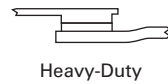
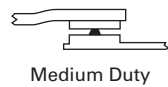
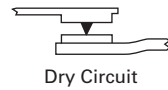
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

Reliability Nibs

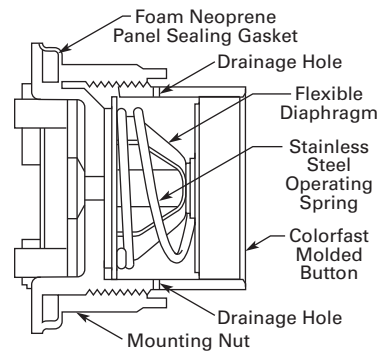


Diaphragm Seal with Drainage Holes

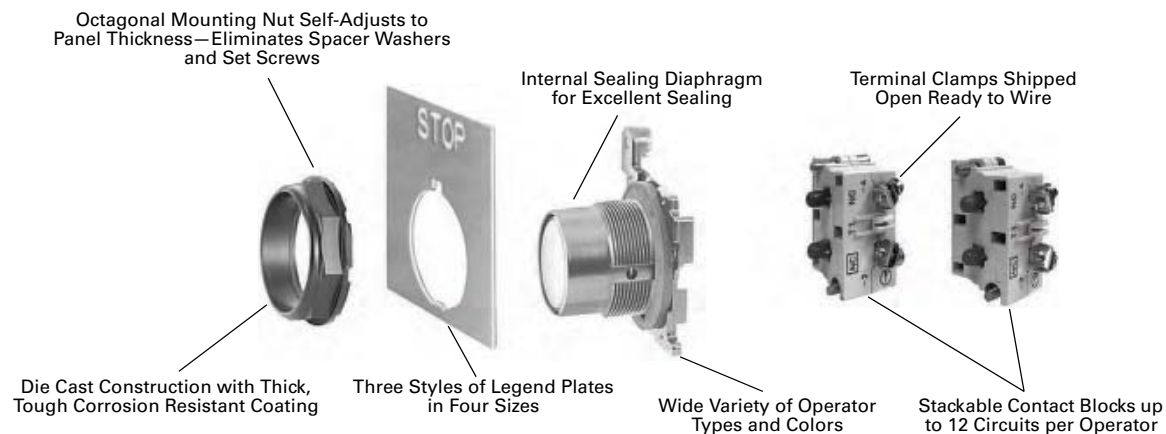
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



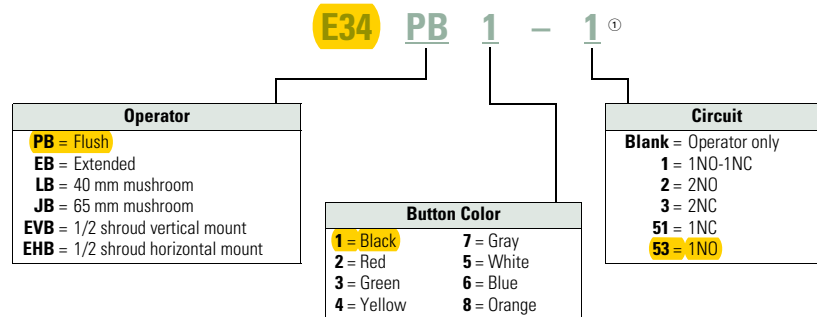
1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Non-Illuminated Pushbuttons



Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①					
Standard—Incandescent	Standard—LED						
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage PresTest—LED TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage						
PresTest—Incandescent							
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES							
		LED Voltage					
		Blank = Incandescent 06 = 6 Vac/Vdc 12 = 12 Vac/Vdc 24 = 24 Vac/Vdc 48 = 48 Vac/Vdc 60 = 60 Vac/Vdc 2A = 120 Vac 2D = 120 Vdc					
		Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
		Standard/Master—Incandescent			Standard/Master/PresTest—LED		
		H2 =	G2 = Red		RP =	RG = Red	
		H3 =	G3 = Green		GP =	GG = Green	
		H4 =	G4 = Yellow		YP =	YG = Yellow	
		H5 =	G5 = White		WP =	WG = White	
		H6 =	G6 = Blue		LP =	LG = Blue	
		H9 =	G9 = Amber		AP =	AG = Amber	
		H0 =	G0 = Clear				
		PresTest—Incandescent					
		V2 =	P2 = Red				
		V3 =	P3 = Green				
		V4 =	P4 = Yellow				
		V5 =	P5 = White				
		V6 =	P6 = Blue				
		V9 =	P9 = Amber				
		V0 =	P0 = Clear				

Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

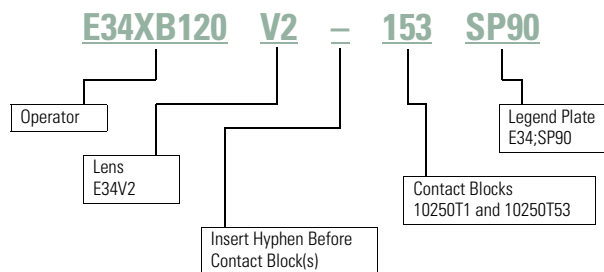
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Non-Illuminated Momentary Pushbutton Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Flush Button



Extended Button



Mushroom Button



Jumbo Mushroom



Pushbutton Units

Contact Type	Button Color	Flush Button Catalog Number	Extended Button Catalog Number	Mushroom Button Catalog Number	Jumbo Mushroom ^① Catalog Number
1NO	Black	E34PB1-53X	E34EB1-53X	E34LB1-53X	E34JB1-53X
	Red	E34PB2-53X	E34EB2-53X	E34LB2-53X	E34JB2-53X
	Green	E34PB3-53X	E34EB3-53X	E34LB3-53X	E34JB3-53X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-53X
1NC	Black	E34PB1-51X	E34EB1-51X	E34LB1-51X	E34JB1-51X
	Red	E34PB2-51X	E34EB2-51X	E34LB2-51X	E34JB2-51X
	Green	E34PB3-51X	E34EB3-51X	E34LB3-51X	E34JB3-51X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-51X
1NO-1NC	Black	E34PB1-1X	E34EB1-1X	E34LB1-1X	E34JB1-1X
	Red	E34PB2-1X	E34EB2-1X	E34LB2-1X	E34JB2-1X
	Green	E34PB3-1X	E34EB3-1X	E34LB3-1X	E34JB3-1X
	Red—Engraved EMERG. STOP	—	—	—	E34JB2N8-1X

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage Indicating Light



Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① Anodized aluminum head—may not be suitable for some corrosive environments.

Pushbuttons

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Momentary Pushbutton Operators, Non-Illuminated

	Button	Color	Catalog Number	
	Flush button	Black	E34PB1	
		Red	E34PB2	
		Green	E34PB3	
		Yellow	E34PB4	
		White	E34PB5	
		Blue	E34PB6	
		Gray	E34PB7	
		Orange	E34PB8	
	Extended button	Black	E34EB1	
		Red	E34EB2	
		Green	E34EB3	
		Yellow	E34EB4	
		White	E34EB5	
		Blue	E34EB6	
		Gray	E34EB7	
		Orange	E34EB8	
	Half shrouded button		Vertical	Horizontal
		Black	E34EVB1	E34EHB1
		Red	E34EVB2	E34EHB2
		Green	E34EVB3	E34EHB3
		Yellow	E34EVB4	E34EHB4
		White	E34EVB5	E34EHB5
		Blue	E34EVB6	E34EHB6
		Gray	E34EVB7	E34EHB7
		Orange	E34EVB8	E34EHB8
	Mushroom button	Black	E34LB1	
		Red	E34LB2	
		Green	E34LB3	
		Yellow	E34LB4	
		Blue	E34LB6	
	Anodized aluminum jumbo mushroom button ^①	Black	E34JB1	
		Red	E34JB2	
		Red (Engraved EMERG. STOP)	E34JB2N8	
		Green	E34JB3	
		Yellow	E34JB4	

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
					1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK**2**-X1.

Selector Switch Selection



Cam and Contact Block Selection

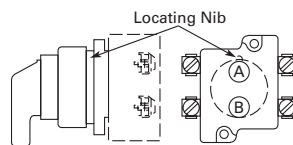
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

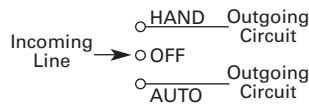


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

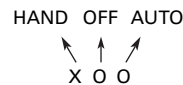
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



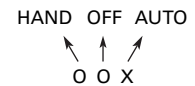
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

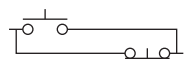
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	— NO	— NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



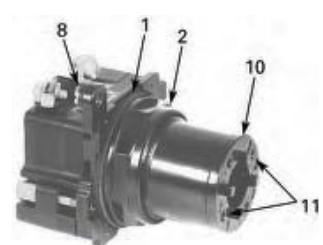
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

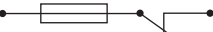
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls T1A 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

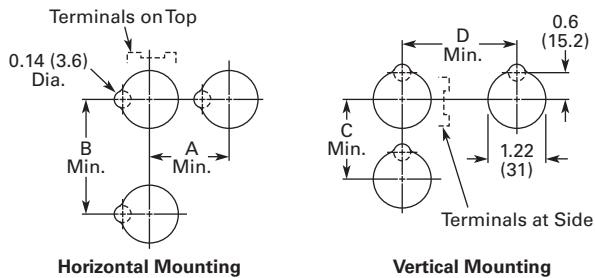
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

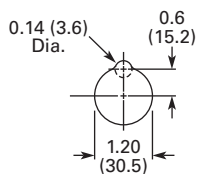
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



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Eaton E34FPB297LAP2A

Catalog Number: E34FPB297LAP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Amber, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LAP2A

UPC

782114718971

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

CSA Certified

UL Listed

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4X

NEMA 13

NEMA 3R

NEMA 12

NEMA 3

NEMA 4

Lens material

Plastic

Lens color

Amber

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LAP2A

Cam selection for pushbutton selectors



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Eaton E34PB1-53

Catalog Number: E34PB1-53

E34, 30.5 mm, Corrosion Resistant, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Momentary, Black actuator, Flush, 1NO, Black bezel, Plastic actuator

General specifications



Product Name
Eaton E34 pushbutton

Catalog Number
E34PB1-53

UPC
782114958018

Product Length/Depth
3 in

Product Height
2 in

Product Width
2 in

Product Weight
0.25 lb

Warranty
1 year

Compliances
CE Marked
FDA 3-A

Certifications
CSA Certified
UL Listed

Product specifications

Contact configuration

1 NO

Series

E34

Type

Pushbutton

Actuator color

Black

Operating mode

Momentary

Actuator material

Plastic

Rating

NEMA 4X

NEMA 13

NEMA 3R

NEMA 12

NEMA 3

NEMA 4

Illumination

Non-illuminated

Mounting method

Flush

Bezel

Black

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34PB1-53



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Eaton E34VFBL1-1X

Catalog Number: E34VFBL1-1X

Eaton E34 pushbutton, Assembled Selector Switch, E34, 30.5 mm, Corrosion Resistant, Cam 1, 60° throw, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Two-position, Knob, Black actuator, 1NO-1NC.



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton	E34VFBL1-1X
UPC	Product Length/Depth
782113891637	1 in
Product Height	Product Width
1 in	1 in
Product Weight	Warranty
1 lb	1 year
Compliances	Certifications
CE Marked FDA 3-A	CSA Certified UL Listed
Catalog Notes	
Assembled at Factory	

Product specifications

Contact configuration

1 NO-1 NC

Throw type

60 °

Series

E34

Number of positions

2

Type

30.5 mm, Corrosion Resistant

Actuator color

Black

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Illumination

Non-illuminated

Cam code

Cam 1

Actuator

Knob

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34VFBL1-1X

Cam selection for pushbutton selectors



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Eaton House
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Dublin 4, Ireland
Eaton.com

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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

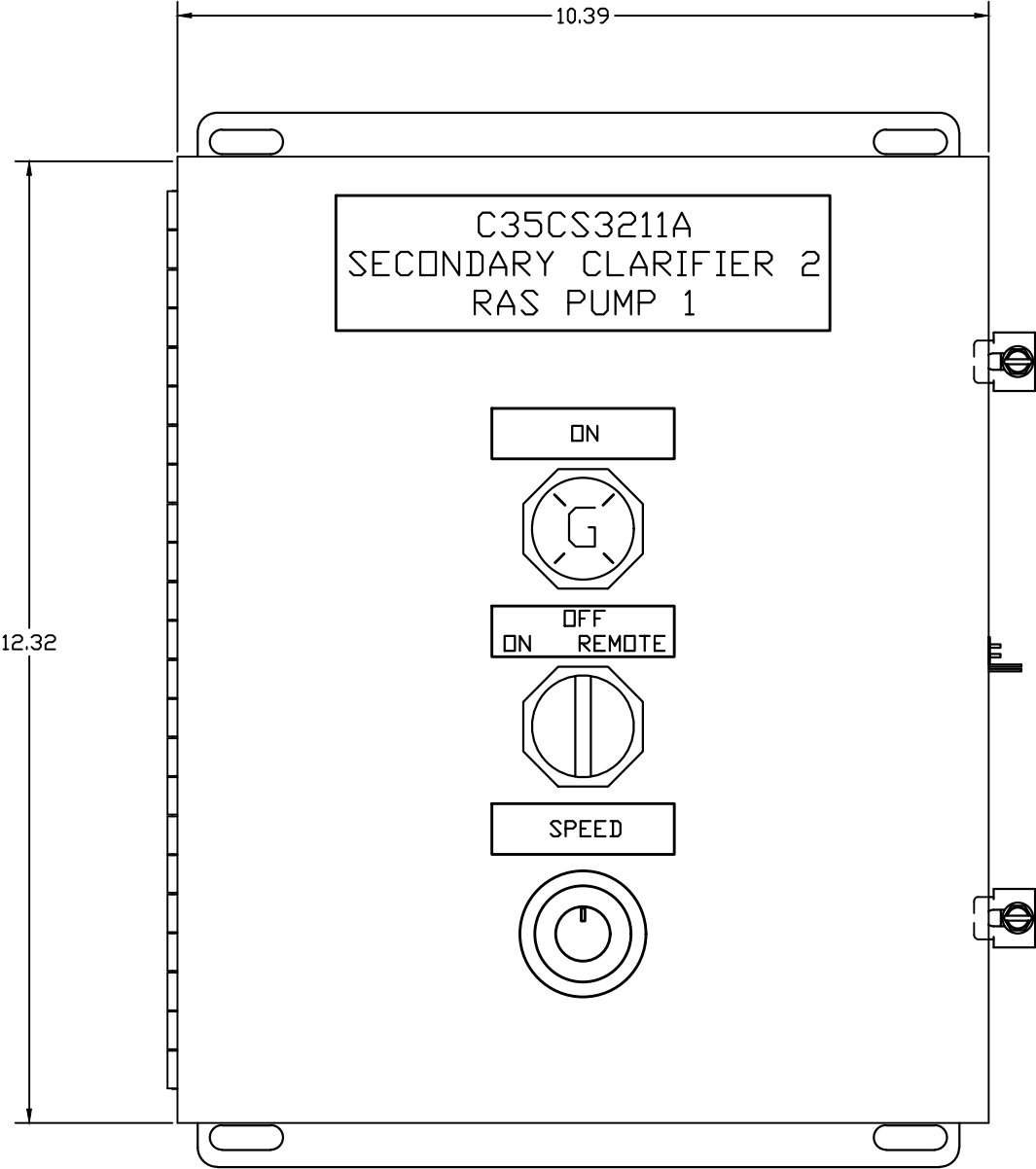
Bill of Materials



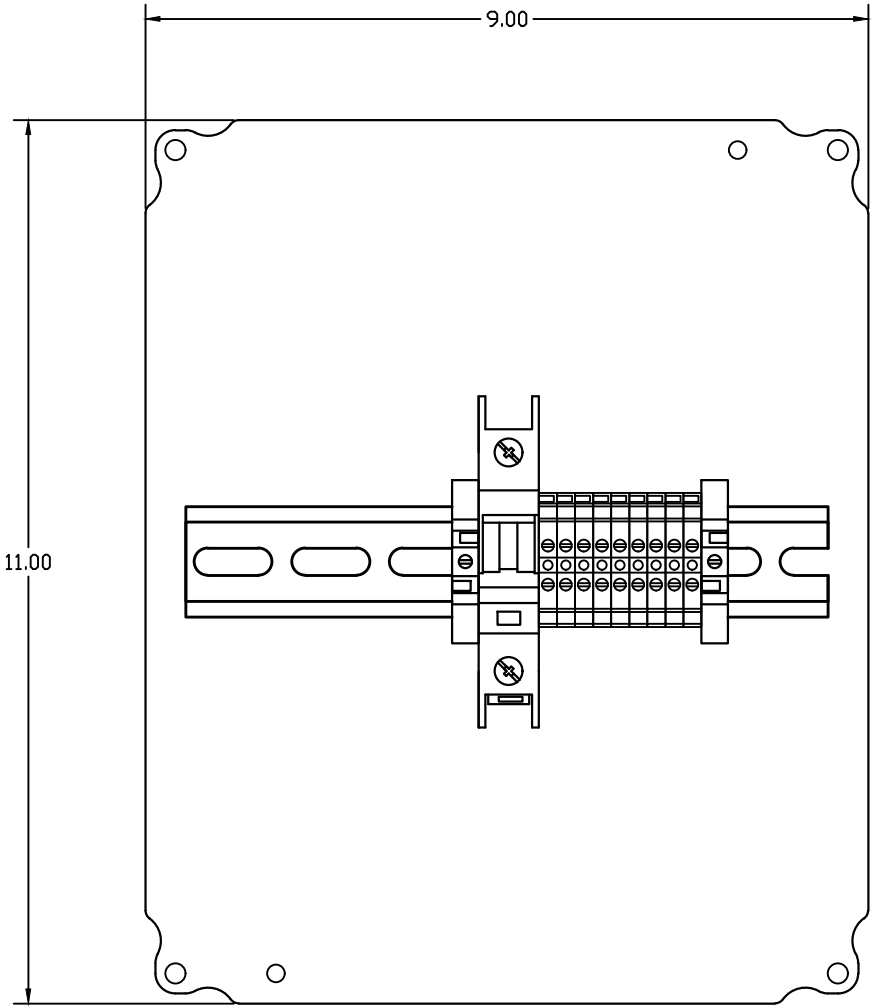
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3211A	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-004, 90-E-306
002	1	C35CS3211A	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-004, 90-E-306
003	1	C35CS3211A	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-004, 90-E-306
004	1	C35CS3211A	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-004, 90-E-306
005	1	C35CS3211A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-004, 90-E-306
006	1	C35CS3211A	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-004, 90-E-306
007	1	C35CS3211A	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-004, 90-E-306
008	1	C35CS3211A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3211A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
011							
012							
013							
014							
015							
016							
017							
018							
019							
020							
021							
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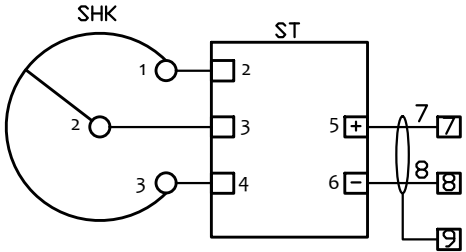
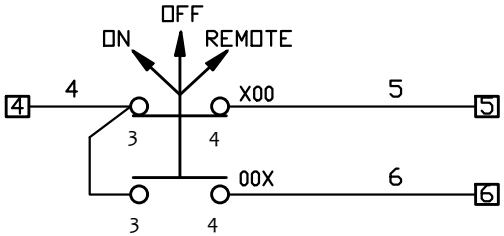
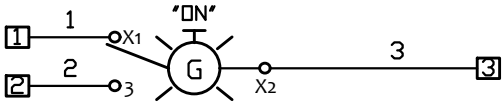
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS		
G				2324 THREE LAKES RD / PO BOX 462		
F				ALBANY, OR 97321		
E				PHONE (541) 967-9323 FAX (541) 967-9485		
D				CLIENT McClure & Sons		
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOOS BAY WASTE WATER TREATMENT PLANT		
B	2024.02.27	CORRECTED	KCED	C35CS3211A SECONDARY CLARIFIER 2 RAS PUMP 1		
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-S2RP1-3211A
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1

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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- * 0.063 In. stainless steel Type 316/316L.
- * Seams continuously welded and ground smooth.
- * Pour in place oil & water resistant gasket
- * Ground stud on door.
- * Stainless steel continuous hinge.
- * Standoffs provided for mounting optional panels.
- * Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- * NEMA Type 3R, 4, 4X, 12 and Type 13
- * UL Listed Type 3R, 4, 4X and 12
- * CSA Type 4, 4X and 12
- * IEC 60529
- * IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- * Dead Front CH & ELJ Style Installation Instructions
- * Padlock Kit For Junction Boxes
- * Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

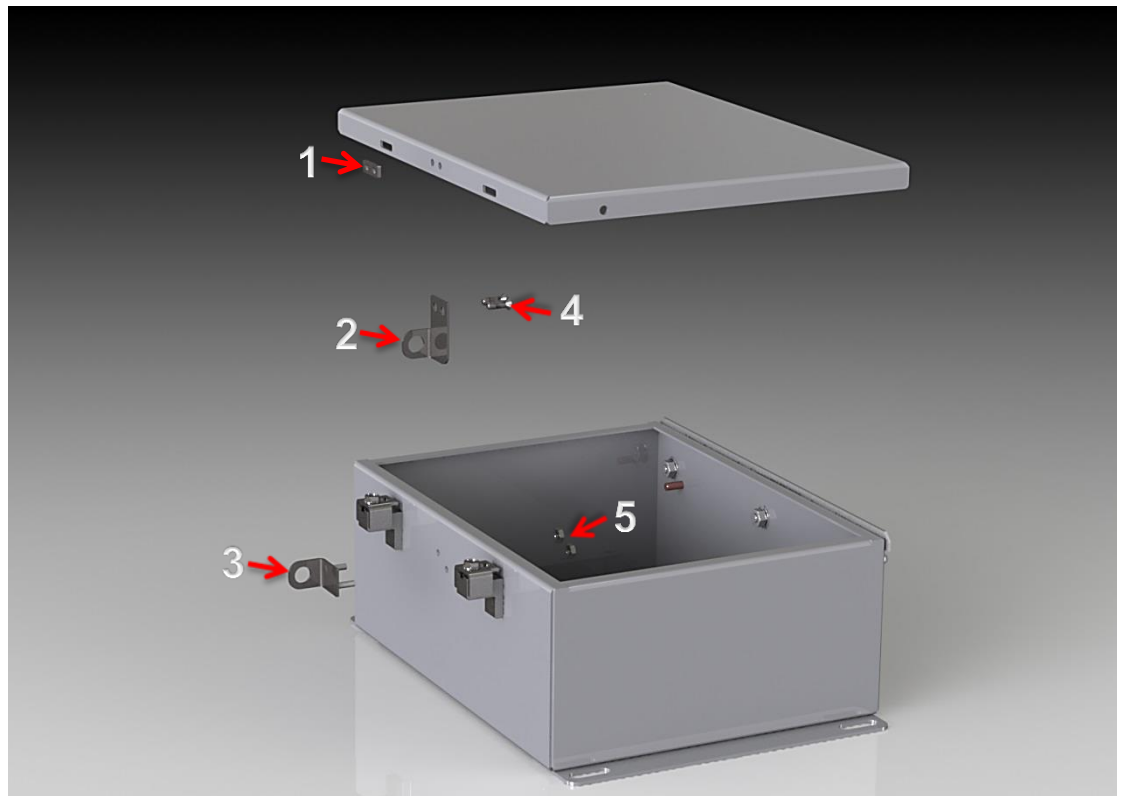
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

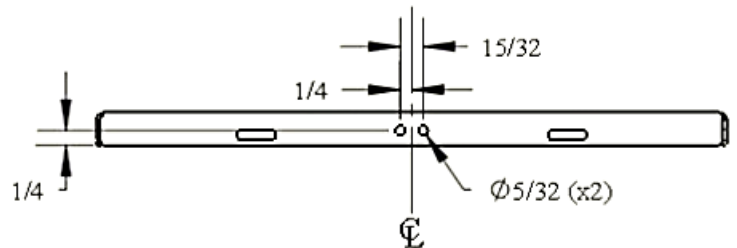
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SCE-PLKJIC INSTALLATION

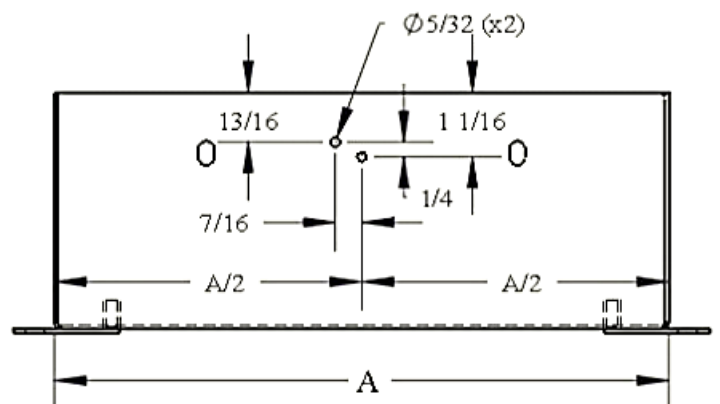
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
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Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

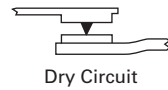
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

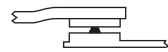
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

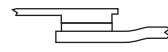
Reliability Nibs



Dry Circuit



Medium Duty



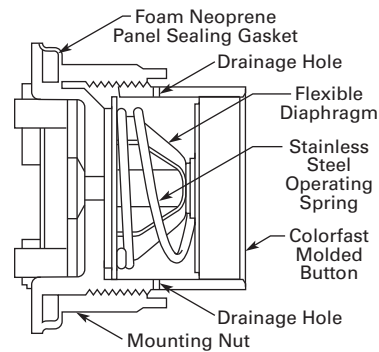
Heavy-Duty

Diaphragm Seal with Drainage Holes

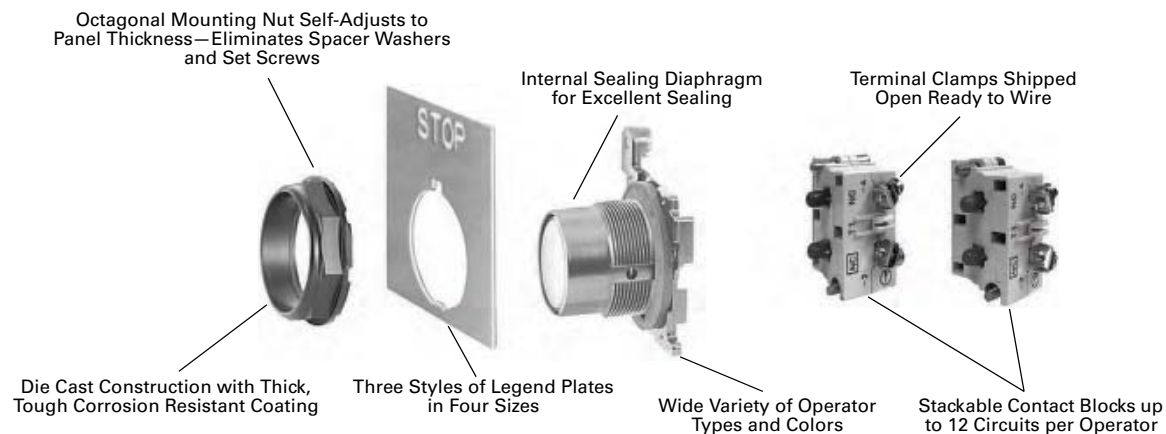
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①					
Standard—Incandescent	Standard—LED						
TB120 = 120V/XFR	TB120L = 120V/XFR						
TB240 = 240V/XFR	TB240L = 240V/XFR						
TB277 = 277V/XFR	TB277L = 277V/XFR						
TB380 = 380V/XFR	TB380L = 380V/XFR						
TB480 = 480V/XFR	TB480L = 480V/XFR						
TB600 = 600V/XFR	TB600L = 600V/XFR						
FB06 = 6V/FV	FB197L = Full voltage						
FB12 = 12V/FV	PresTest—LED						
FB24 = 24V/FV	TPB120L = 120V/XFR						
FB32 = 32V/FV	TPB240L = 240V/XFR						
FB48 = 48V/FV	TPB380L = 380V/XFR						
RB120 = 120V/RES	TPB480L = 480V/XFR						
RB240 = 240V/RES	TPB600L = 600V/XFR						
NB120 = 120V/neon	FPB297L = Full voltage						
NB240 = 240V/neon							
PresTest—Incandescent							
TPB120 = 120V/XFR							
TPB240 = 240V/XFR							
TPB380 = 380V/XFR							
TPB480 = 480V/XFR							
TPB600 = 600V/XFR							
FPB06 = 6V/FV							
FPB12 = 12V/FV							
FPB24 = 24V/FV							
FPB32 = 32V/FV							
FPB48 = 48V/FV							
RPB120 = 120V/RES							
RPB240 = 240V/RES							
		Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
		Standard/Master—Incandescent			Standard/Master/PresTest—LED		
		H2 =	G2 =	Red	RP =	RG =	Red
		H3 =	G3 =	Green	GP =	GG =	Green
		H4 =	G4 =	Yellow	YP =	YG =	Yellow
		H5 =	G5 =	White	WP =	WG =	White
		H6 =	G6 =	Blue	LP =	LG =	Blue
		H9 =	G9 =	Amber	AP =	AG =	Amber
		H0 =	G0 =	Clear			
		PresTest—Incandescent					
		V2 =	P2 =	Red			
		V3 =	P3 =	Green			
		V4 =	P4 =	Yellow			
		V5 =	P5 =	White			
		V6 =	P6 =	Blue			
		V9 =	P9 =	Amber			
		V0 =	P0 =	Clear			

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

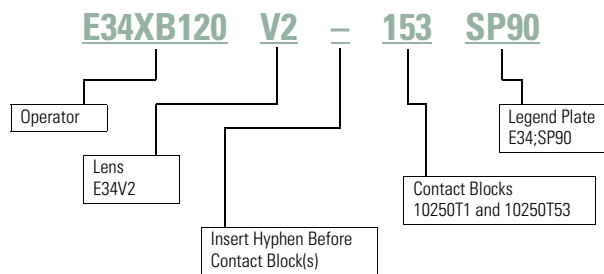
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑤ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0		2NC (Series)							
0	0	X		1NO							

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0		1NO							
0	0	0	X		1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

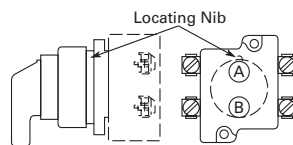
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

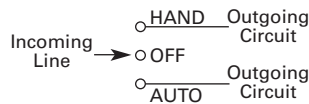


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

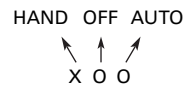
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



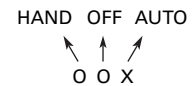
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

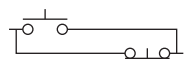
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	— NO	— NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

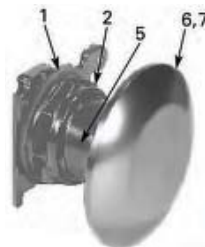
- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



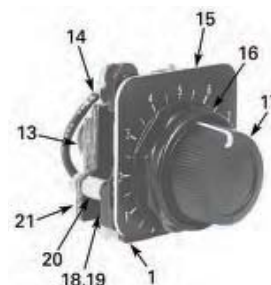
**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



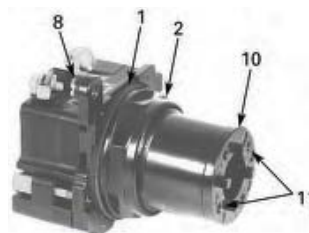
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

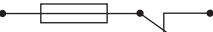
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

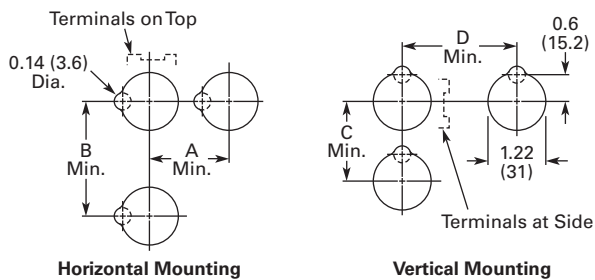
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

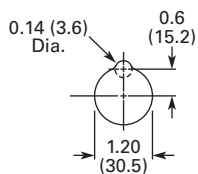
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Specifications and datasheets

Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

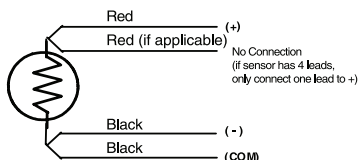
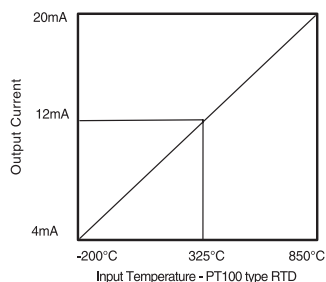
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

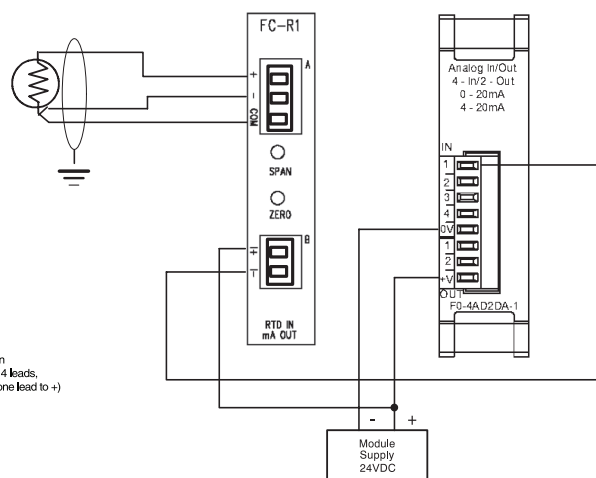
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

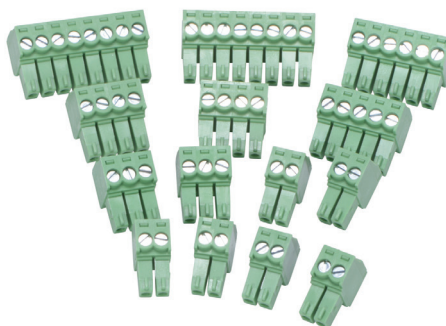


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

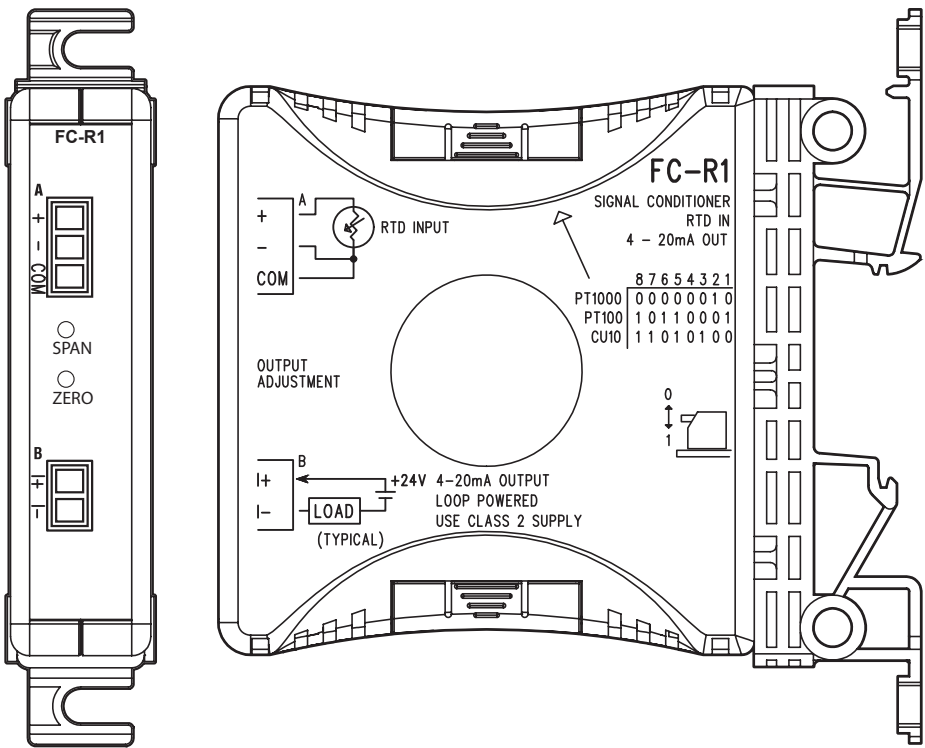
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

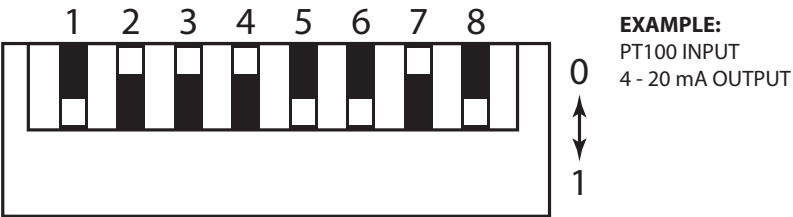
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) termnial and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

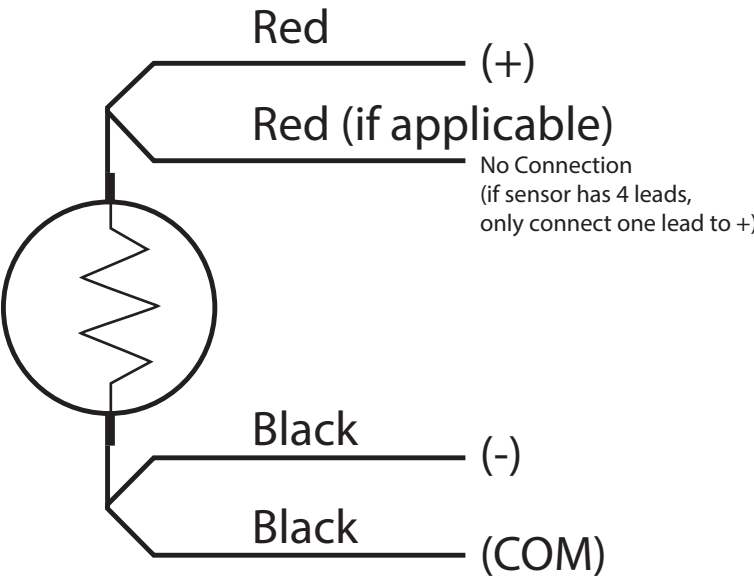
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

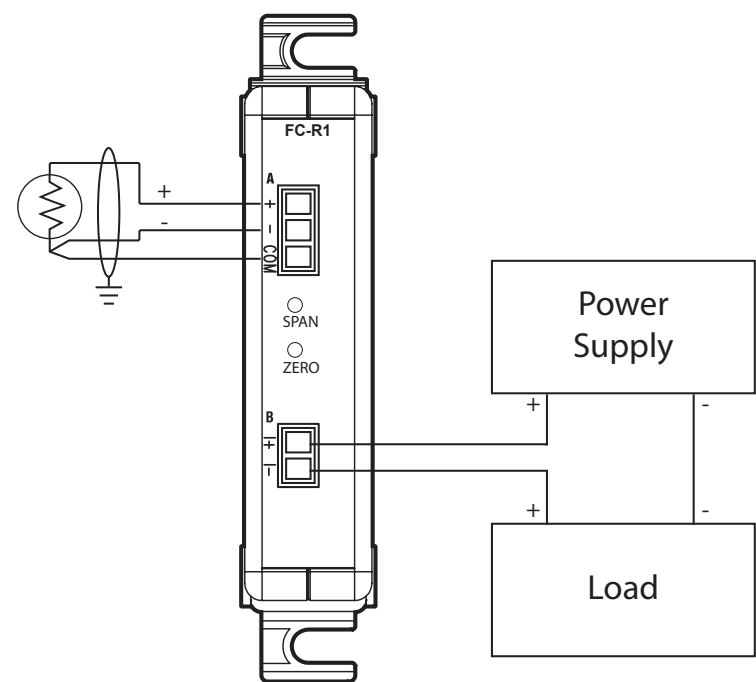
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



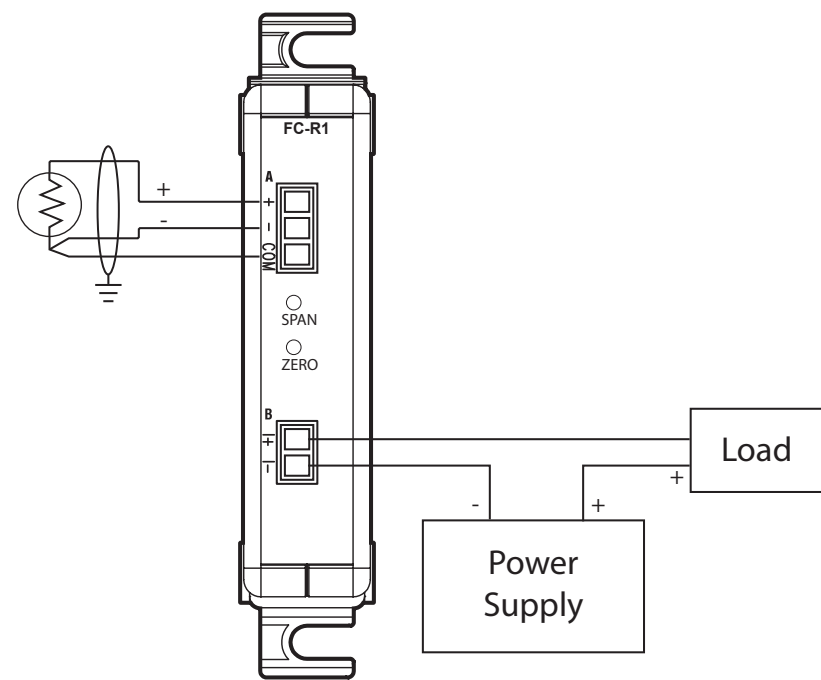
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

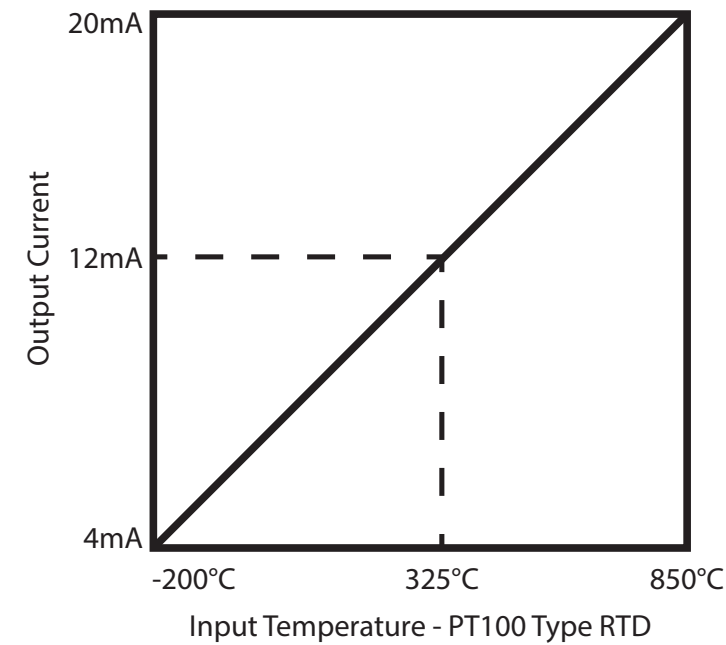
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

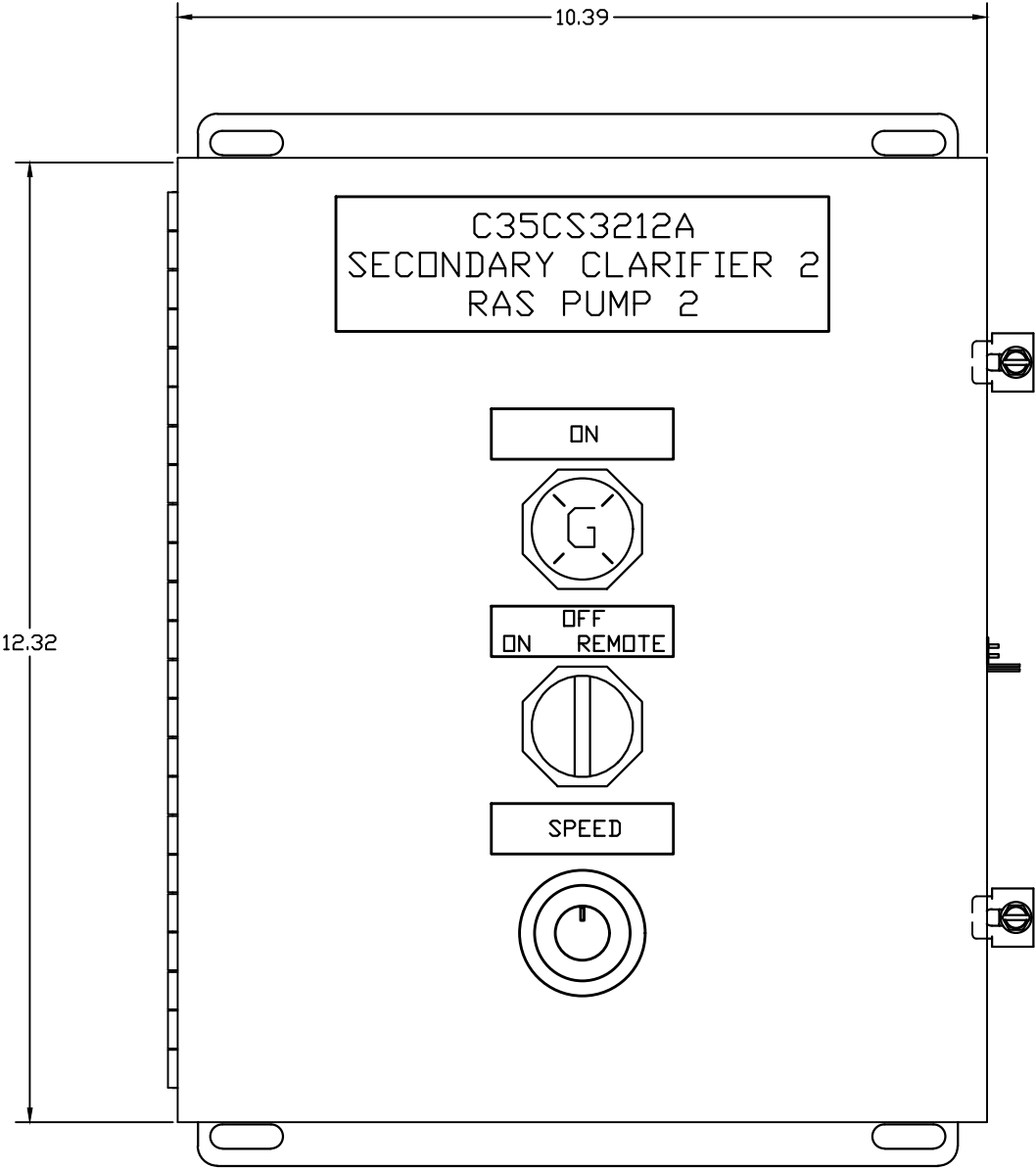
Bill of Materials



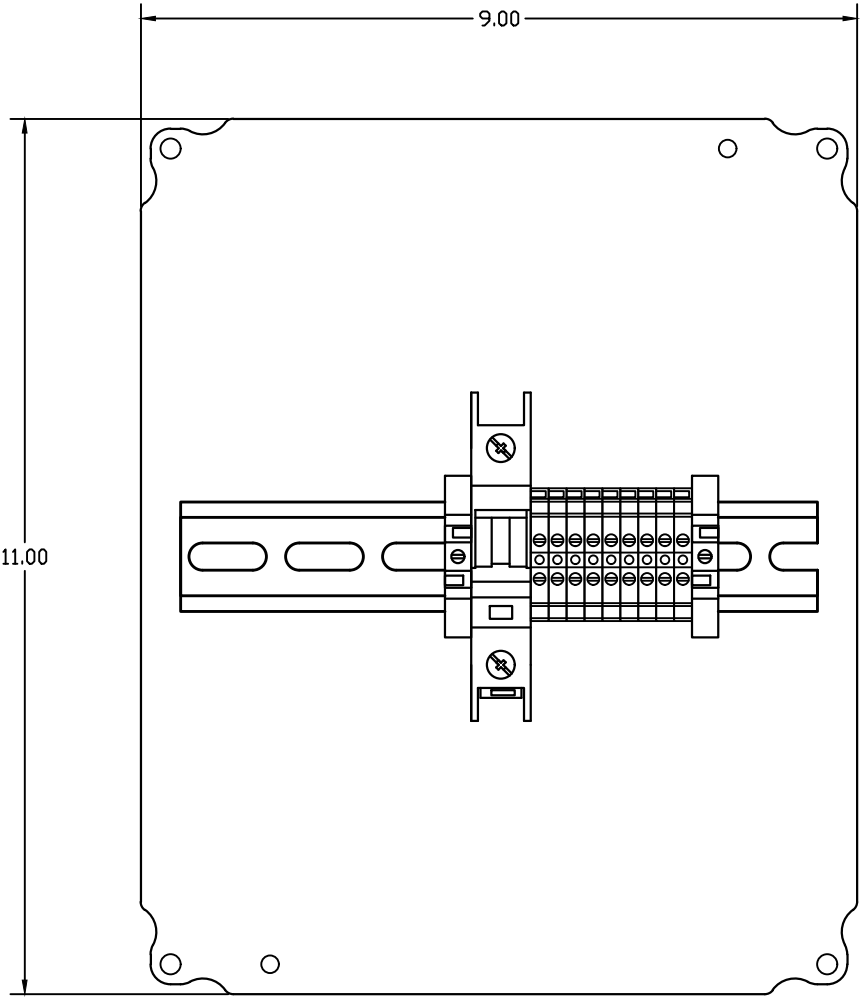
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3212A	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-004, 90-E-306
002	1	C35CS3212A	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-004, 90-E-306
003	1	C35CS3212A	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-004, 90-E-306
004	1	C35CS3212A	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-004, 90-E-306
005	1	C35CS3212A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-004, 90-E-306
006	1	C35CS3212A	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-004, 90-E-306
007	1	C35CS3212A	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-004, 90-E-306
008	1	C35CS3212A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3212A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
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013							
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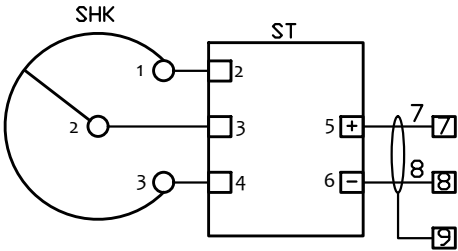
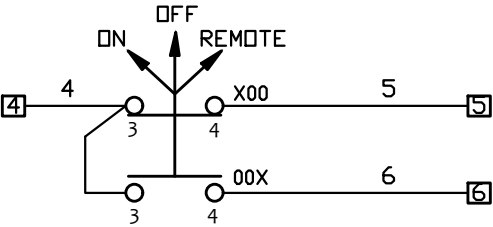
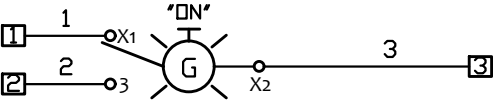


FRONT
VIEW



PANEL
VIEW

□ □ □ □ □ □ □ □ □ □



H				OPTIMAL CONTROL SYSTEMS				
G				2324 THREE LAKES RD / PO BOX 462				
F				ALBANY, OR 97321				
E				PHONE (541) 967-9323 FAX (541) 967-9485				
D				CLIENT McCLURE & SONS				
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOO BAY WASTE WATER TREATMENT PLANT				
B	2024.02.27	CORRECTED	KCED	C35CS3212A SECONDARY CLARIFIER 2 RAS PUMP 2				
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO.	0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO.	0723-08MSI-S2RP1-3212A	
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1		

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Pour in place oil & water resistant gasket
- ✱ Ground stud on door.
- ✱ Stainless steel continuous hinge.
- ✱ Standoffs provided for mounting optional panels.
- ✱ Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- ✱ NEMA Type 3R, 4, 4X, 12 and Type 13
- ✱ UL Listed Type 3R, 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- ✱ Dead Front CH & ELJ Style Installation Instructions
- ✱ Padlock Kit For Junction Boxes
- ✱ Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE@SaginawControl.com

SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

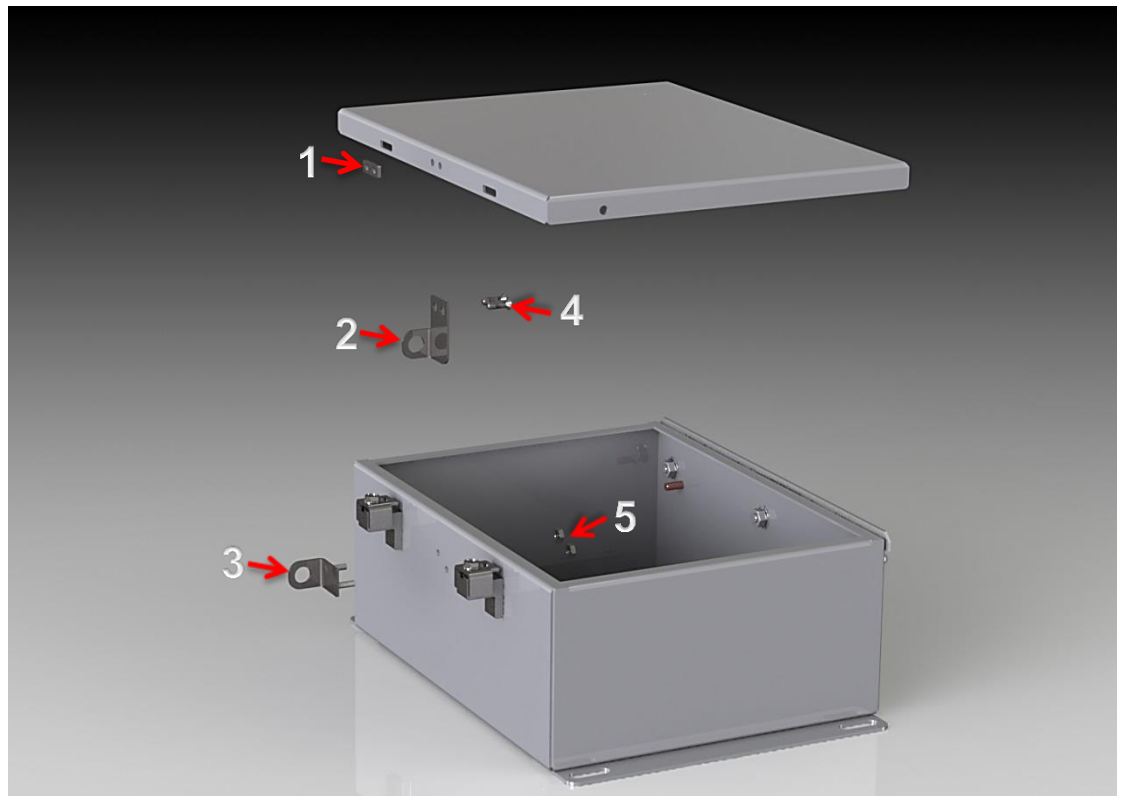
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

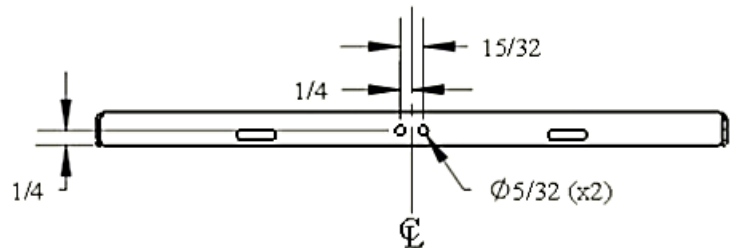
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SCE-PLKJIC INSTALLATION

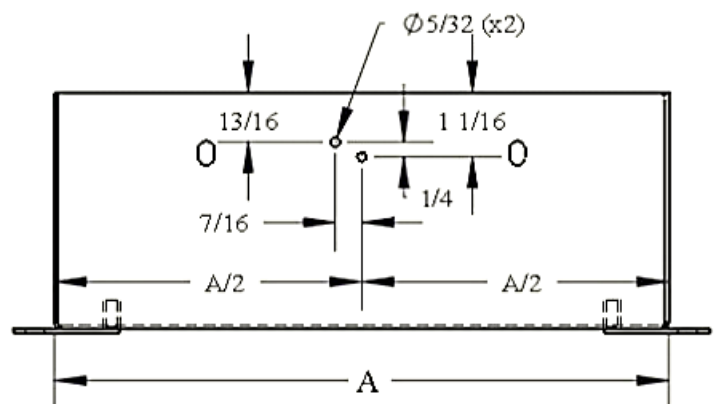
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
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Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

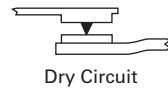
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

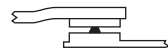
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

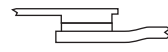
Reliability Nibs



Dry Circuit



Medium Duty



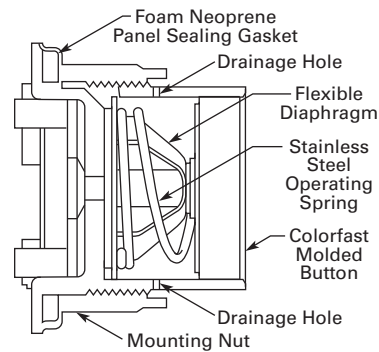
Heavy-Duty

Diaphragm Seal with Drainage Holes

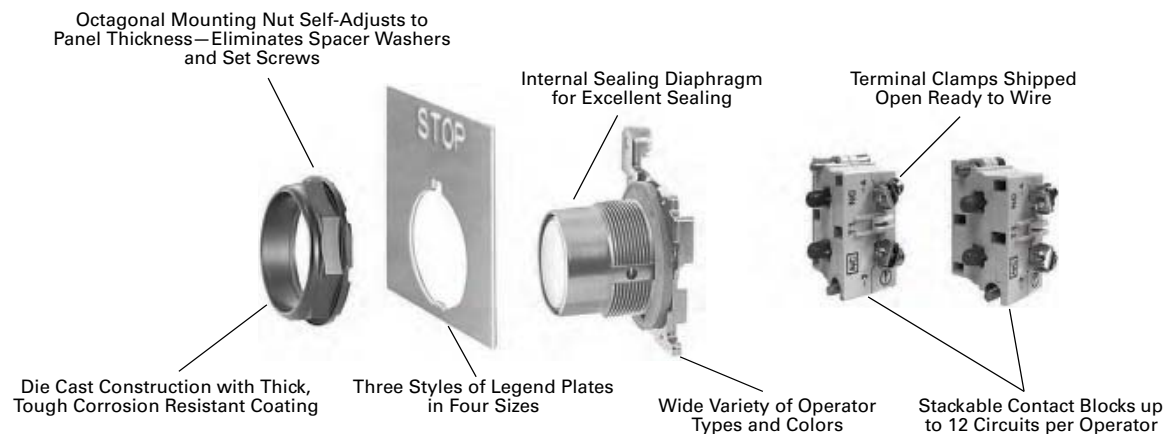
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①						LED Voltage	
Standard—Incandescent	Standard—LED							Blank = Incandescent	
TB120 = 120V/XFR	TB120L = 120V/XFR							06 = 6 Vac/Vdc	
TB240 = 240V/XFR	TB240L = 240V/XFR							12 = 12 Vac/Vdc	
TB277 = 277V/XFR	TB277L = 277V/XFR							24 = 24 Vac/Vdc	
TB380 = 380V/XFR	TB380L = 380V/XFR							48 = 48 Vac/Vdc	
TB480 = 480V/XFR	TB480L = 480V/XFR							60 = 60 Vac/Vdc	
TB600 = 600V/XFR	TB600L = 600V/XFR							2A = 120 Vac	
FB06 = 6V/FV	FB197L = Full voltage							2D = 120 Vdc	
FB12 = 12V/FV	PresTest—LED								
FB24 = 24V/FV	TPB120L = 120V/XFR	Plastic	Glass	Lens Color	Plastic	Glass	Lens Color		
FB32 = 32V/FV	TPB240L = 240V/XFR	Standard/Master—Incandescent			Standard/Master/PresTest—LED				
FB48 = 48V/FV	TPB380L = 380V/XFR	H2 =	G2 =	Red	RP =	RG =	Red		
RB120 = 120V/RES	TPB480L = 480V/XFR	H3 =	G3 =	Green	GP =	GG =	Green		
RB240 = 240V/RES	TPB600L = 600V/XFR	H4 =	G4 =	Yellow	YP =	YG =	Yellow		
NB120 = 120V/neon	FPB297L = Full voltage	H5 =	G5 =	White	WP =	WG =	White		
NB240 = 240V/neon		H6 =	G6 =	Blue	LP =	LG =	Blue		
		H9 =	G9 =	Amber	AP =	AG =	Amber		
		H0 =	G0 =	Clear					
PresTest—Incandescent		PresTest—Incandescent							
TPB120 = 120V/XFR		V2 =	P2 =	Red					
TPB240 = 240V/XFR		V3 =	P3 =	Green					
TPB380 = 380V/XFR		V4 =	P4 =	Yellow					
TPB480 = 480V/XFR		V5 =	P5 =	White					
TPB600 = 600V/XFR		V6 =	P6 =	Blue					
FPB06 = 6V/FV		V9 =	P9 =	Amber					
FPB12 = 12V/FV		V0 =	P0 =	Clear					
FPB24 = 24V/FV									
FPB32 = 32V/FV									
FPB48 = 48V/FV									
RPB120 = 120V/RES									
RPB240 = 240V/RES									

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

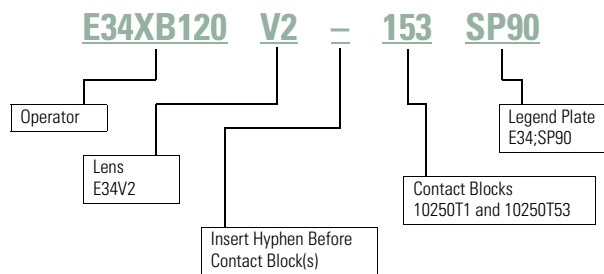
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑥ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M M M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M M M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0		2NC (Series)							
0	0	X		1NO							

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M M M M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0		1NO							
0	0	0	X		1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

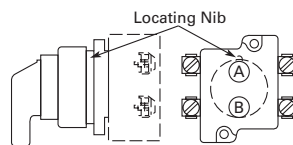
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

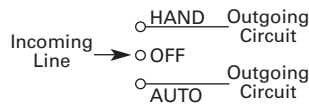


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

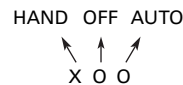
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



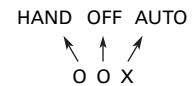
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

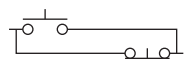
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X 0 0				—
4	0 0 X	—		—	

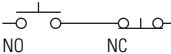
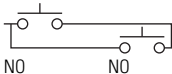
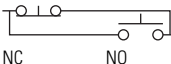
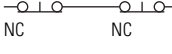
Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	0		or
2	0	X		or

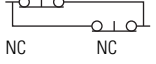
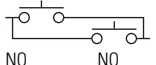
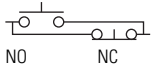
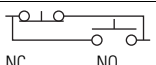
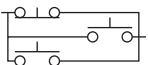
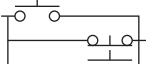
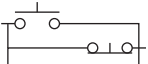
Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0	 NO NC	 NO
2	X	X	0		 NC
3	X	0	X	 NO	 NO NO
4	0	0	X		 NO
5	0	X	X	 NC NO	 NC
6	0	X	0	 NC	 NC NC

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0	 NC	
2	0	X	0	0		 NO
3	0	0	X	0	 NO	
4	0	0	0	X		 NC
5	X	0	0	X	 NC NC	
6	0	X	X	0	 NO NO	
7	0	0	X	X	 NO NC	
8	X	X	0	0	 NC NO	
9	0	X	0	X		 NO NC
10	X	0	X	0		 NC NO
11	X	X	X	0		 NO NO
12	0	X	X	X		 NO NC NO
13	X	0	X	X		 NO NC
14	X	X	0	X		 NO NC

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks

Standard Contact Blocks

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



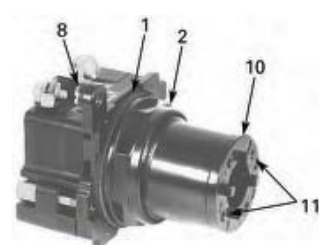
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

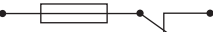
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

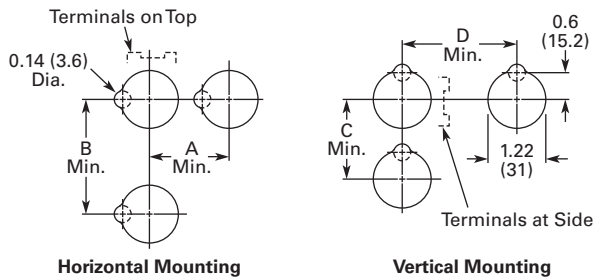
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

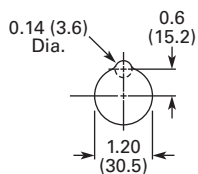
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

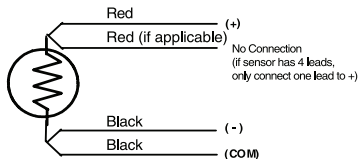
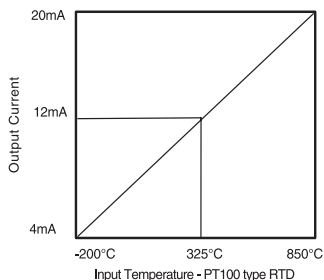
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

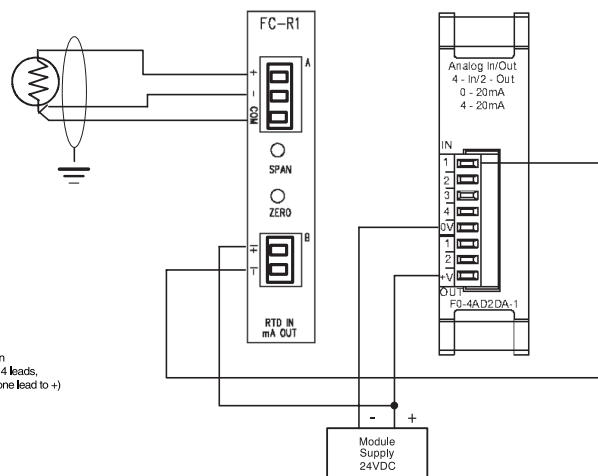
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

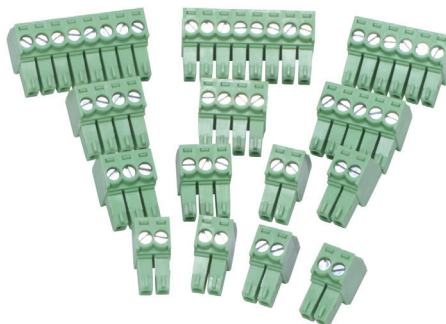


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

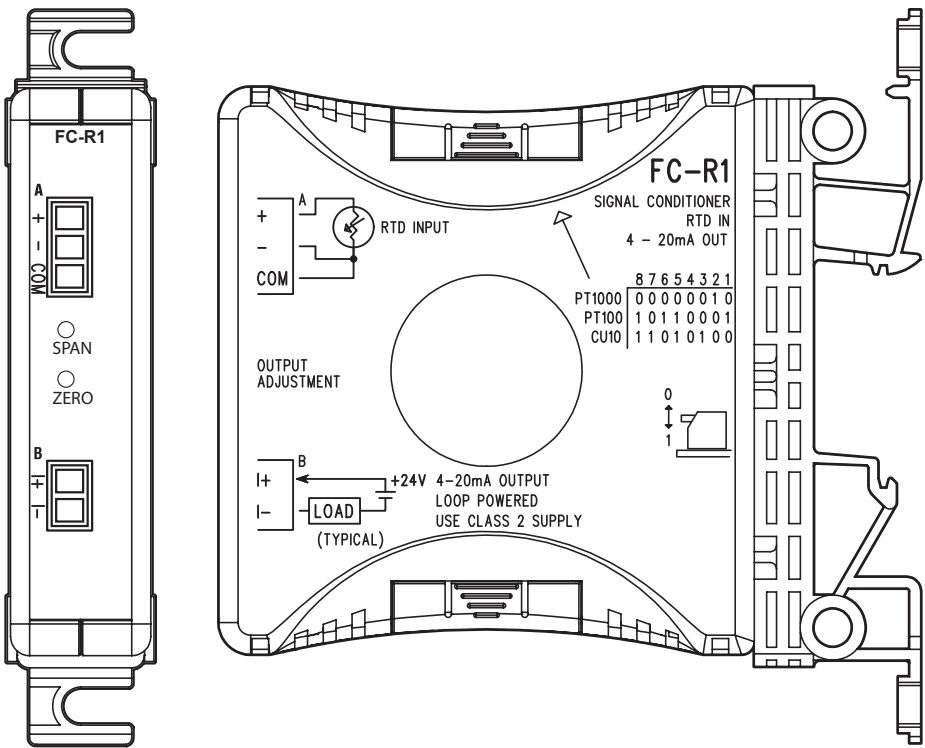
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

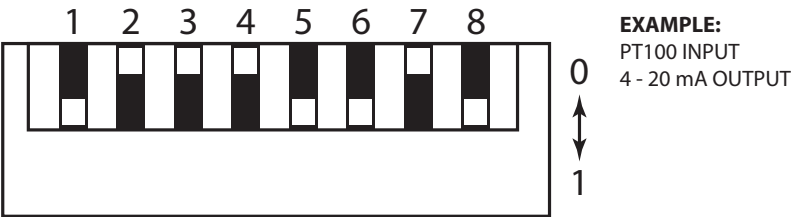
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) terminal and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

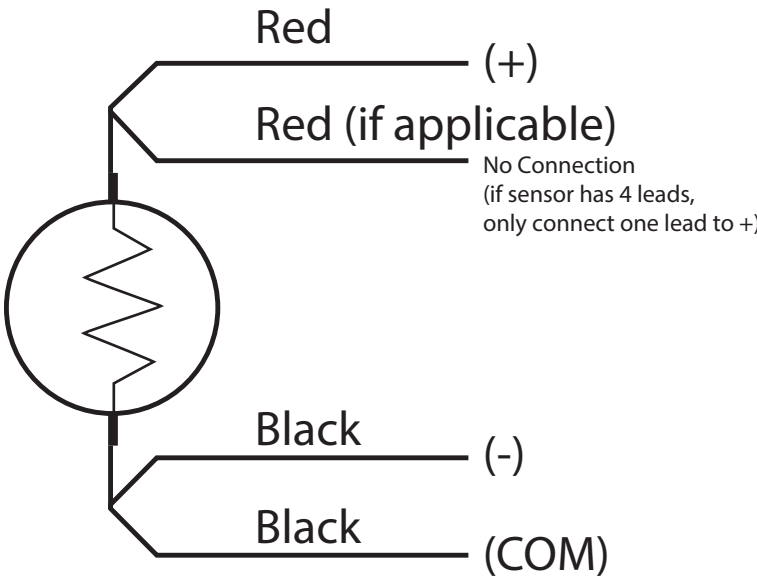
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

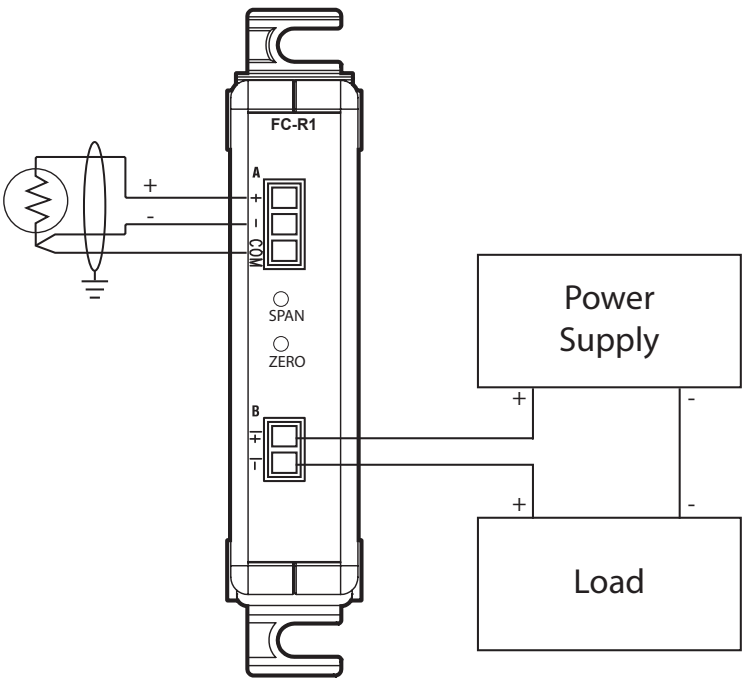
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



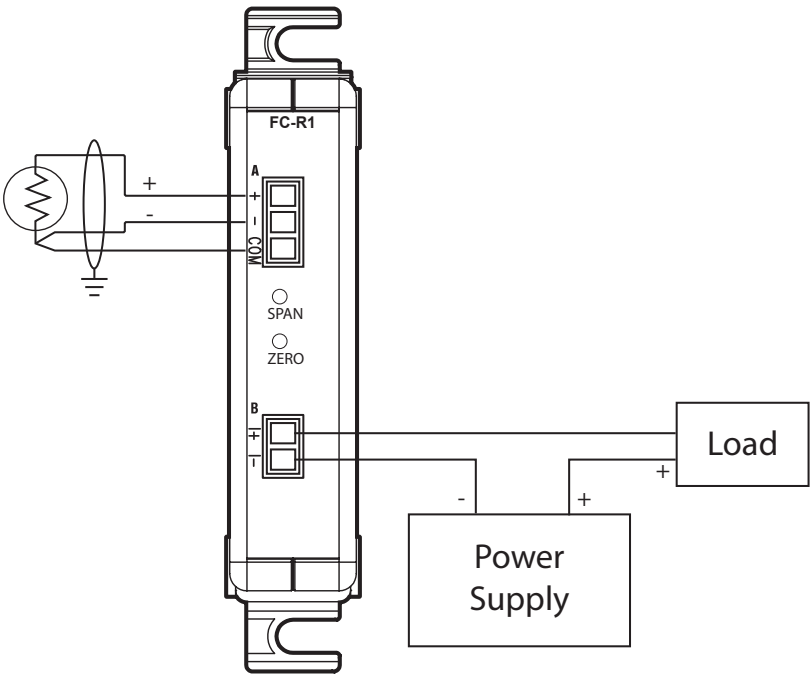
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

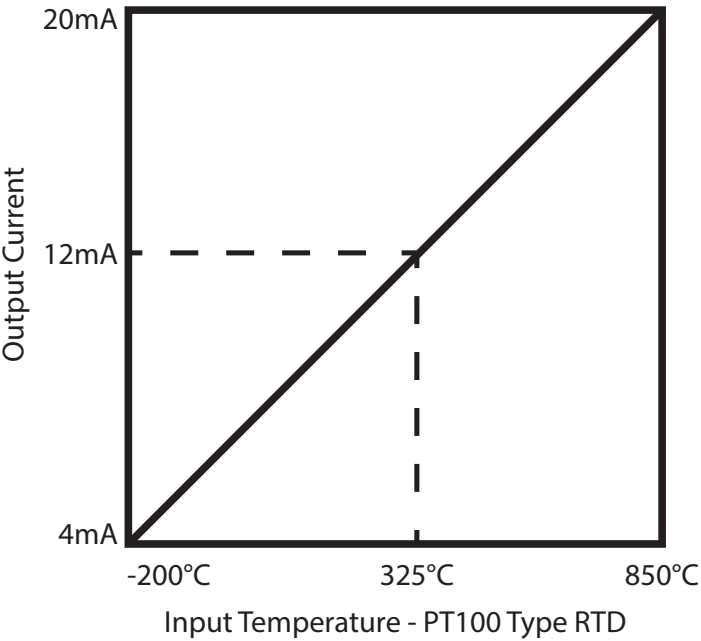
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

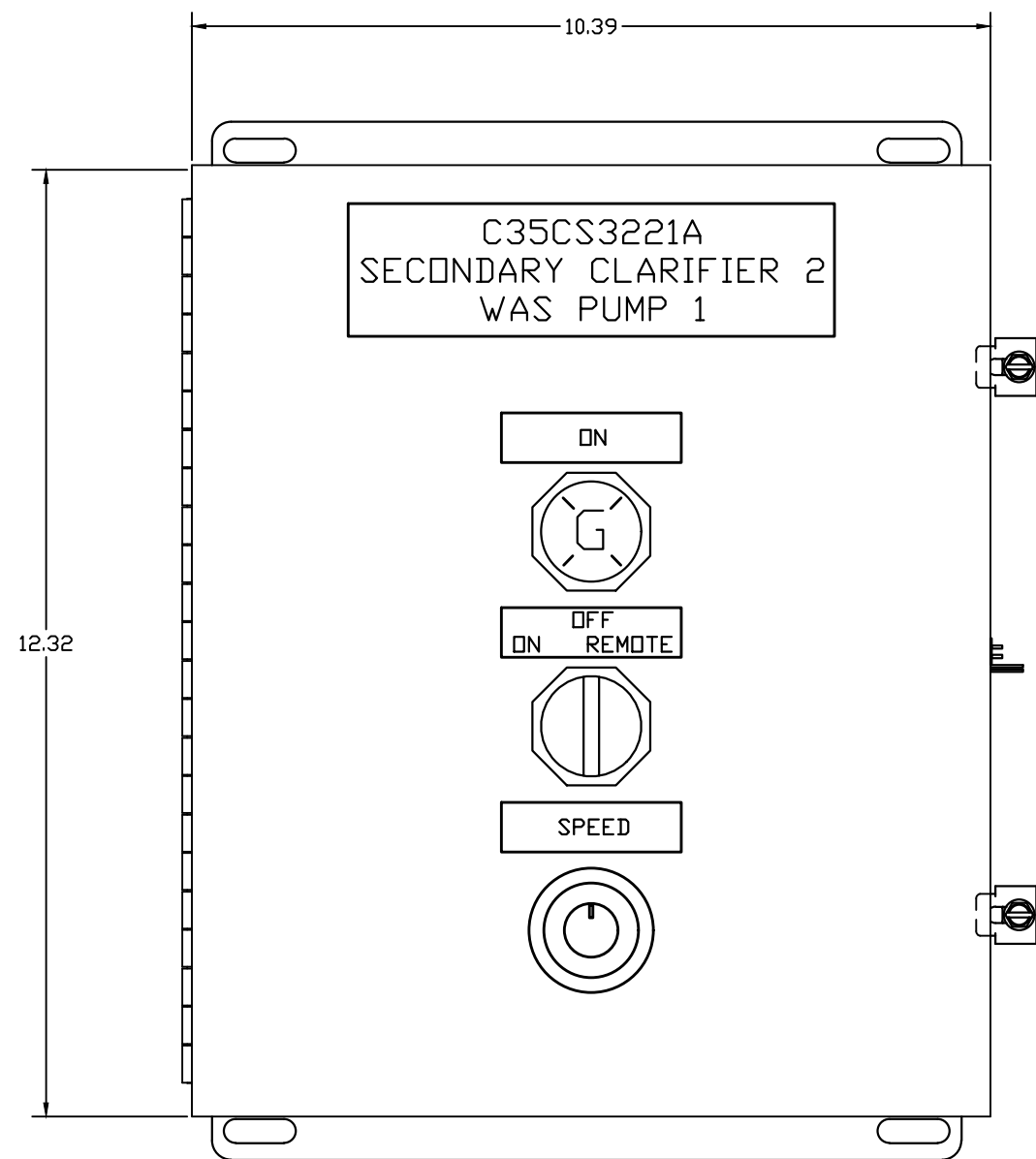
Bill of Materials



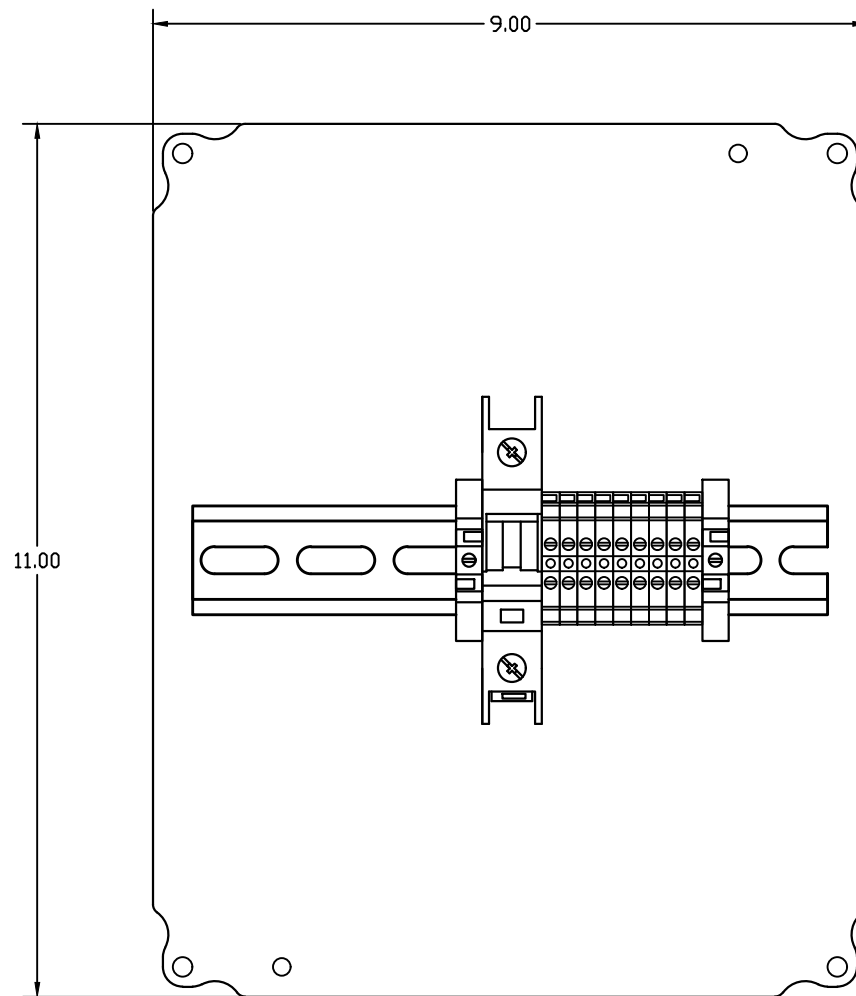
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3221A	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-004, 90-E-306
002	1	C35CS3221A	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-004, 90-E-306
003	1	C35CS3221A	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-004, 90-E-306
004	1	C35CS3221A	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-004, 90-E-306
005	1	C35CS3221A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-004, 90-E-306
006	1	C35CS3221A	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-004, 90-E-306
007	1	C35CS3221A	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-004, 90-E-306
008	1	C35CS3221A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3221A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
010							
011							
012							
013							
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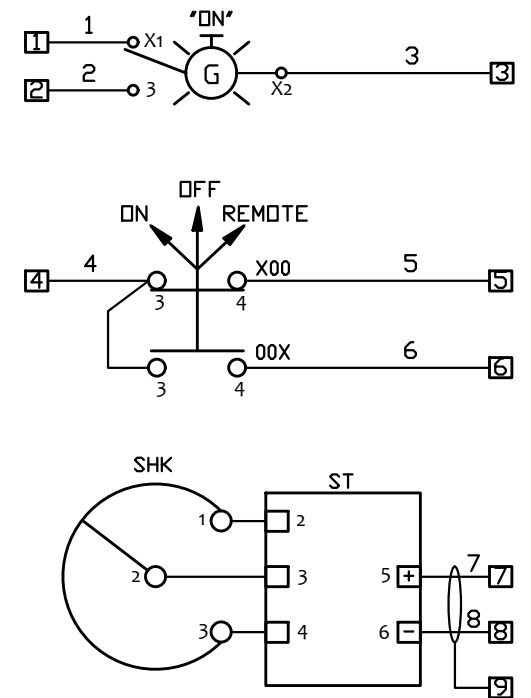
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS				
G				2324 THREE LAKES RD / PO BOX 462				
F				ALBANY, OR 97321				
E				PHONE (541) 967-9323		FAX (541) 967-9485		
D				CLIENT McCLURE & SONS				
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOOS BAY WASTE WATER TREATMENT PLANT				
B	2024.02.27	CORRECTED	KCED	C35CS3221A SECONDARY CLARIFIER 2 WAS PUMP 1				
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI		
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-S2WP1-3221A		
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1		

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(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- * 0.063 In. stainless steel Type 316/316L.
- * Seams continuously welded and ground smooth.
- * Pour in place oil & water resistant gasket
- * Ground stud on door.
- * Stainless steel continuous hinge.
- * Standoffs provided for mounting optional panels.
- * Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- * NEMA Type 3R, 4, 4X, 12 and Type 13
- * UL Listed Type 3R, 4, 4X and 12
- * CSA Type 4, 4X and 12
- * IEC 60529
- * IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- * Dead Front CH & ELJ Style Installation Instructions
- * Padlock Kit For Junction Boxes
- * Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

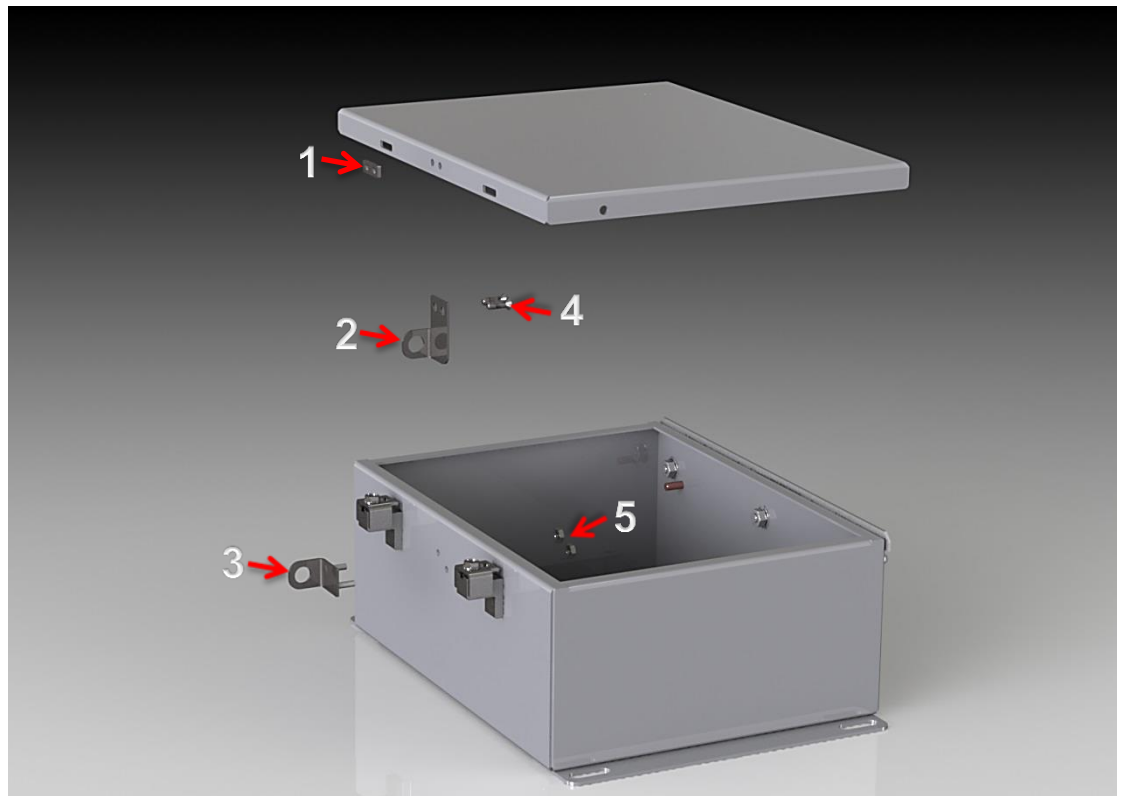
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

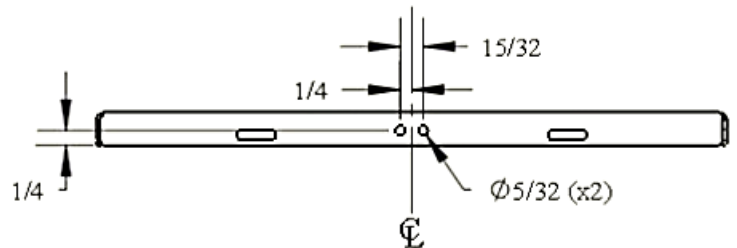
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SCE-PLKJIC INSTALLATION

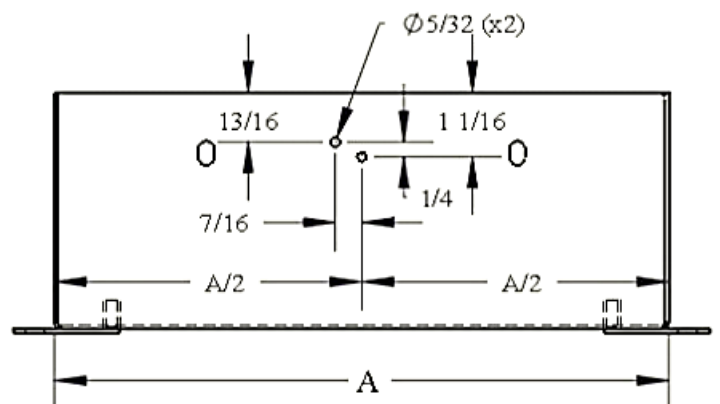
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
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Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

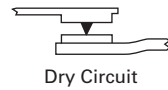
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

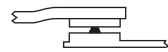
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

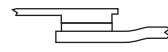
Reliability Nibs



Dry Circuit



Medium Duty



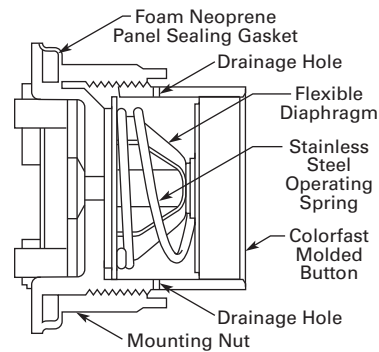
Heavy-Duty

Diaphragm Seal with Drainage Holes

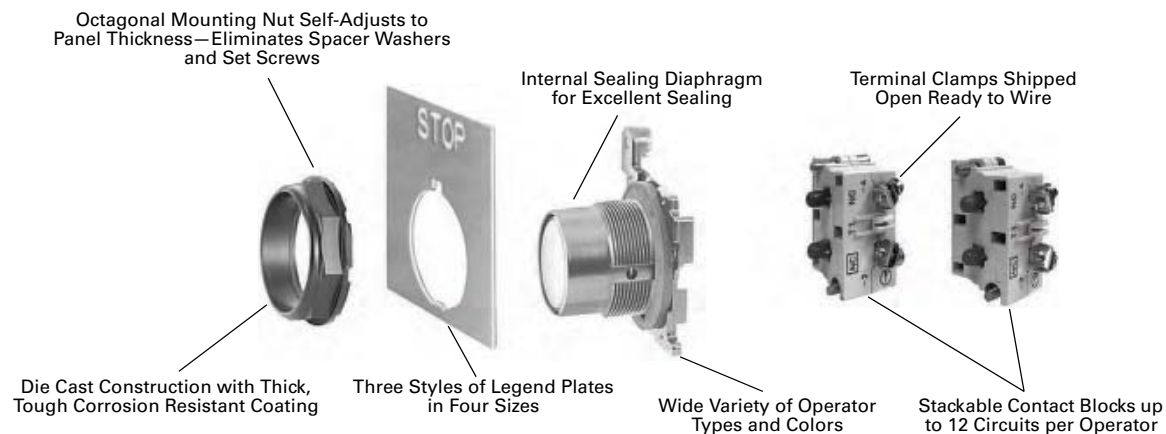
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①						LED Voltage	
Standard—Incandescent	Standard—LED							Blank = Incandescent	
TB120 = 120V/XFR	TB120L = 120V/XFR							06 = 6 Vac/Vdc	
TB240 = 240V/XFR	TB240L = 240V/XFR							12 = 12 Vac/Vdc	
TB277 = 277V/XFR	TB277L = 277V/XFR							24 = 24 Vac/Vdc	
TB380 = 380V/XFR	TB380L = 380V/XFR							48 = 48 Vac/Vdc	
TB480 = 480V/XFR	TB480L = 480V/XFR							60 = 60 Vac/Vdc	
TB600 = 600V/XFR	TB600L = 600V/XFR							2A = 120 Vac	
FB06 = 6V/FV	FB197L = Full voltage							2D = 120 Vdc	
FB12 = 12V/FV	PresTest—LED								
FB24 = 24V/FV	TPB120L = 120V/XFR	Plastic	Glass	Lens Color	Plastic	Glass	Lens Color		
FB32 = 32V/FV	TPB240L = 240V/XFR	Standard/Master—Incandescent			Standard/Master/PresTest—LED				
FB48 = 48V/FV	TPB380L = 380V/XFR	H2 =	G2 =	Red	RP =	RG =	Red		
RB120 = 120V/RES	TPB480L = 480V/XFR	H3 =	G3 =	Green	GP =	GG =	Green		
RB240 = 240V/RES	TPB600L = 600V/XFR	H4 =	G4 =	Yellow	YP =	YG =	Yellow		
NB120 = 120V/neon	FPB297L = Full voltage	H5 =	G5 =	White	WP =	WG =	White		
NB240 = 240V/neon		H6 =	G6 =	Blue	LP =	LG =	Blue		
		H9 =	G9 =	Amber	AP =	AG =	Amber		
		H0 =	G0 =	Clear					
PresTest—Incandescent		PresTest—Incandescent							
TPB120 = 120V/XFR		V2 =	P2 =	Red					
TPB240 = 240V/XFR		V3 =	P3 =	Green					
TPB380 = 380V/XFR		V4 =	P4 =	Yellow					
TPB480 = 480V/XFR		V5 =	P5 =	White					
TPB600 = 600V/XFR		V6 =	P6 =	Blue					
FPB06 = 6V/FV		V9 =	P9 =	Amber					
FPB12 = 12V/FV		V0 =	P0 =	Clear					
FPB24 = 24V/FV									
FPB32 = 32V/FV									
FPB48 = 48V/FV									
RPB120 = 120V/RES									
RPB240 = 240V/RES									

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

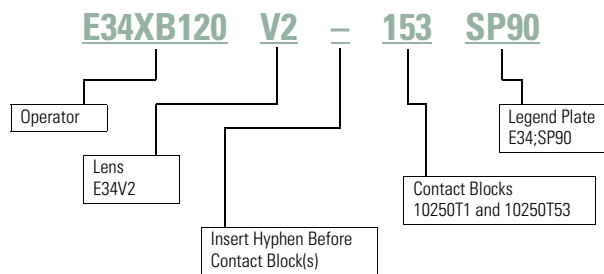
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑤ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

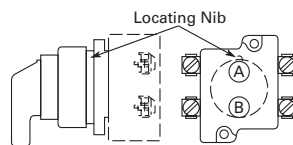
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of "pushbuttons" can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The "X-O" chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block "open." Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

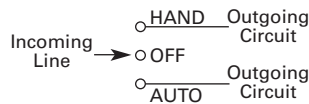


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

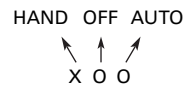
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



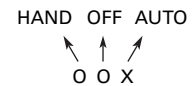
Step 2: "X-O" Pattern.

From the elementary diagram, you can construct an "X-O" diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The "X-O" for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the "X-O" diagram would look like this:



Putting them together, the complete "X-O" diagram is:



Once the "X-O" diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired "X-O" functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your "X-O" diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

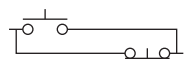
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO NC
4	0 0 X	NO NO	NO NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

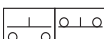
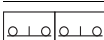
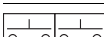
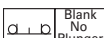
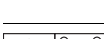
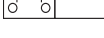
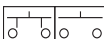
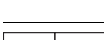
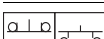
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



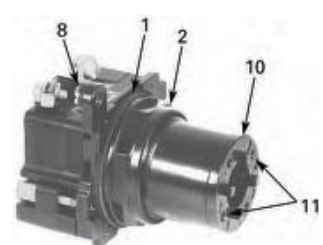
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

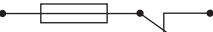
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls T1A 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

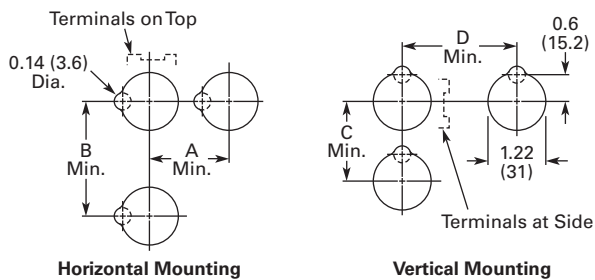
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

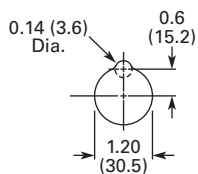
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton.com/socialmedia

Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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Eaton House
30 Pembroke Road
Dublin 4, Ireland
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Eaton.com/socialmedia

Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

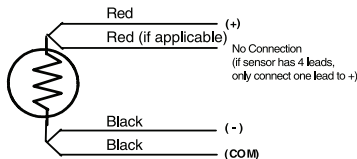
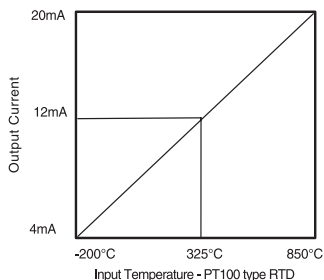
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

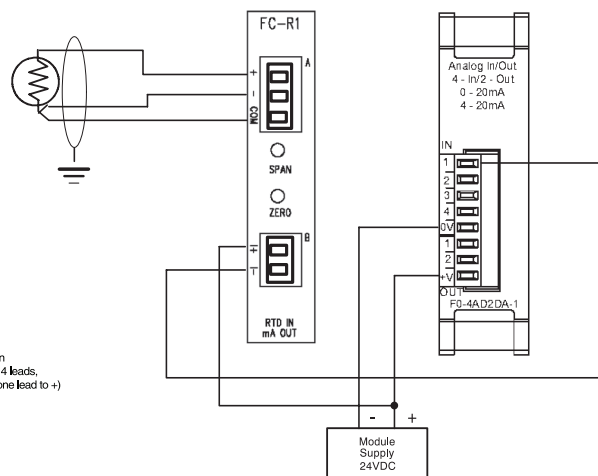
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

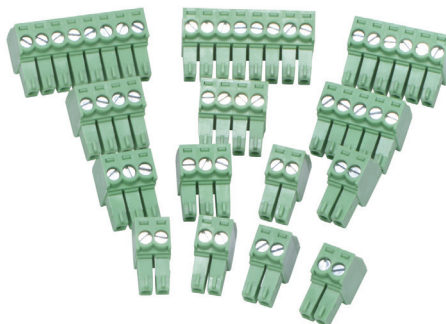


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

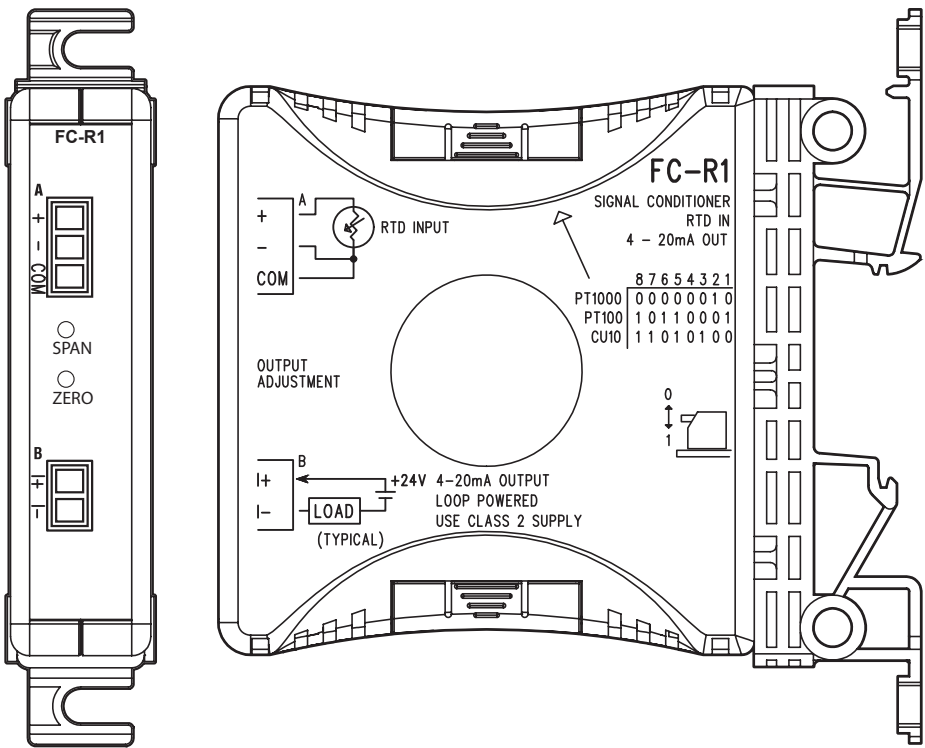
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

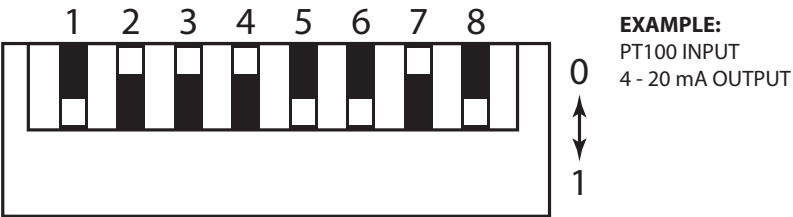
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) termnial and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

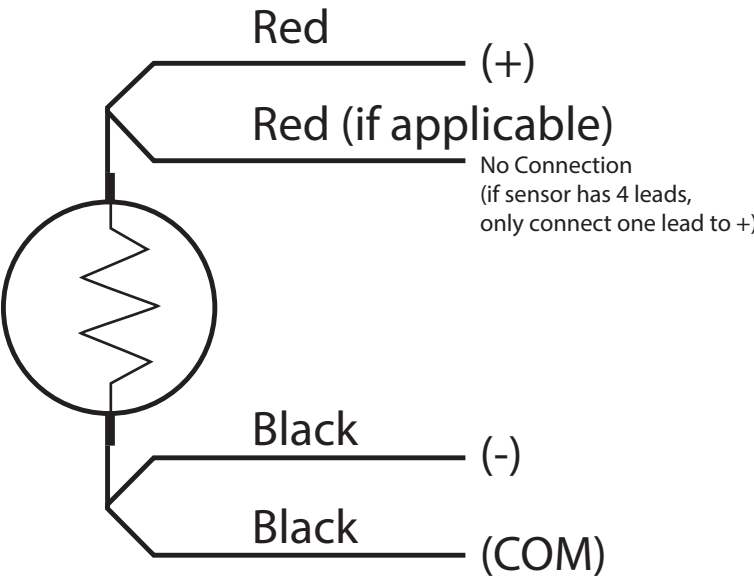
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

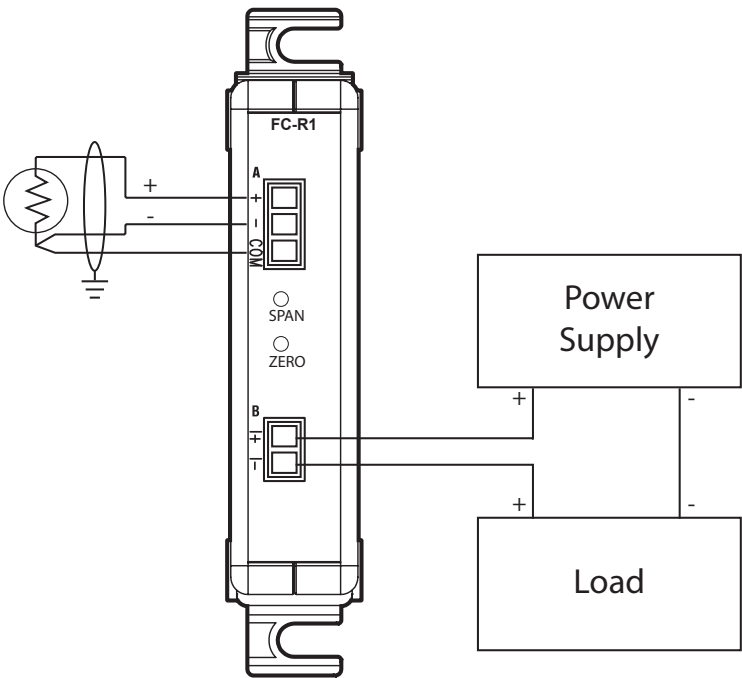
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



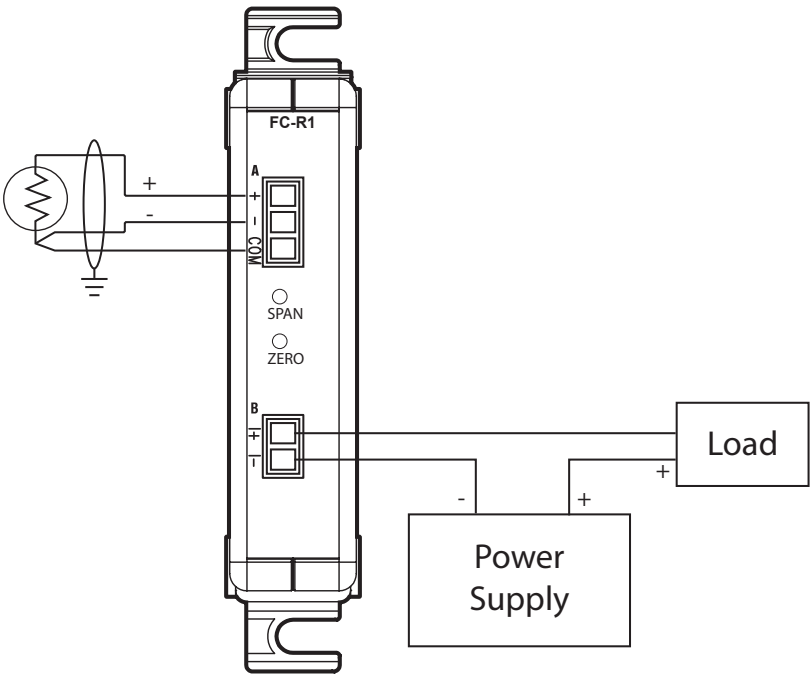
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

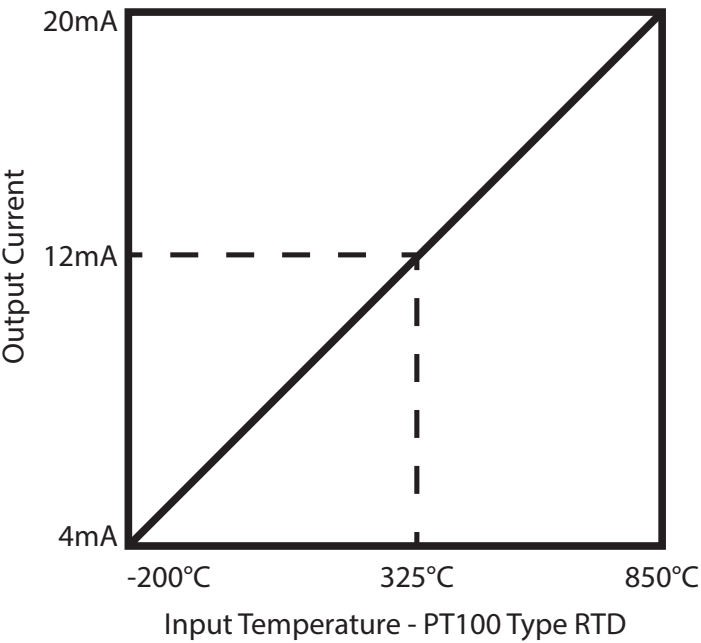
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

- A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.
- B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.
- C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

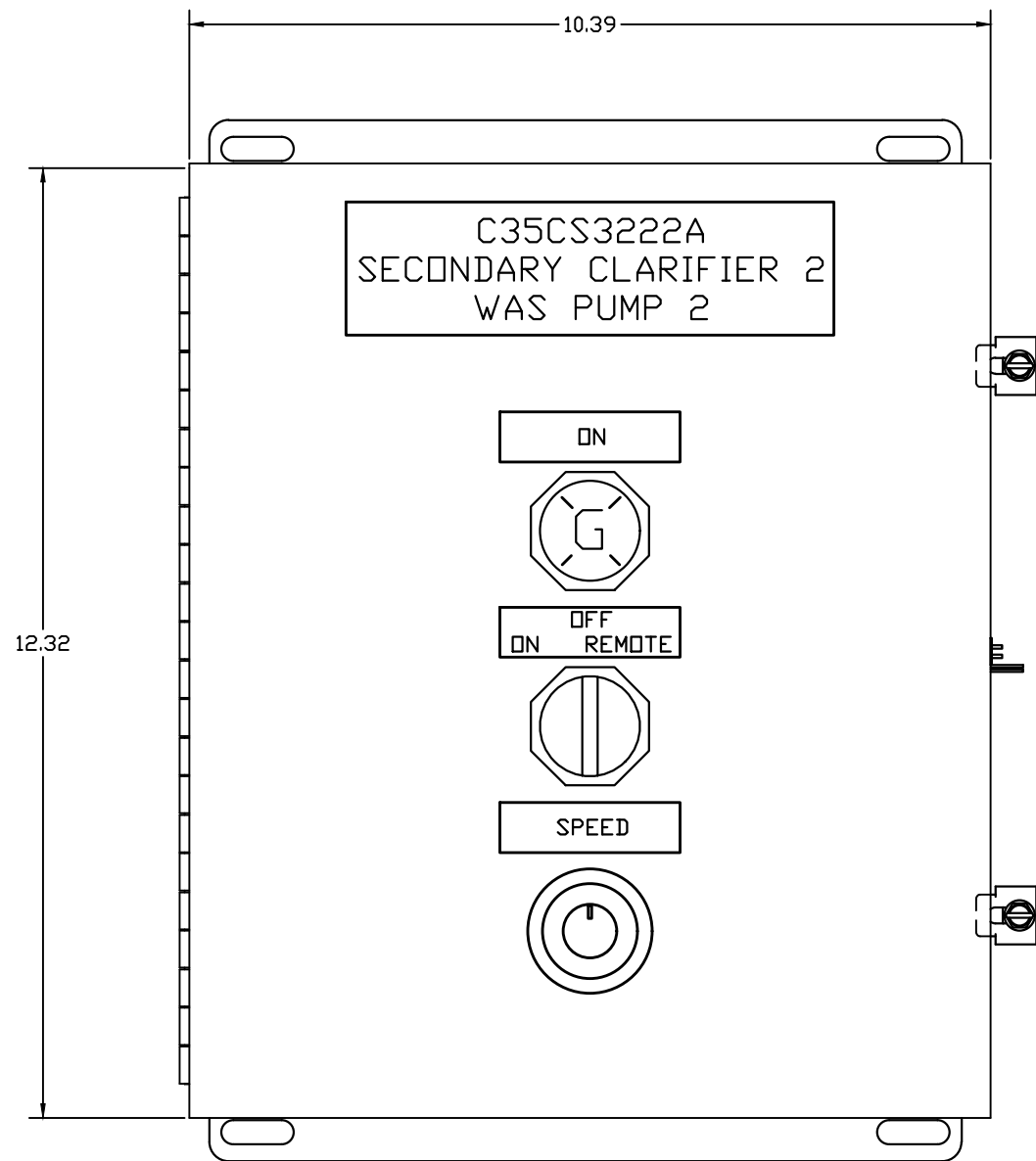
Bill of Materials



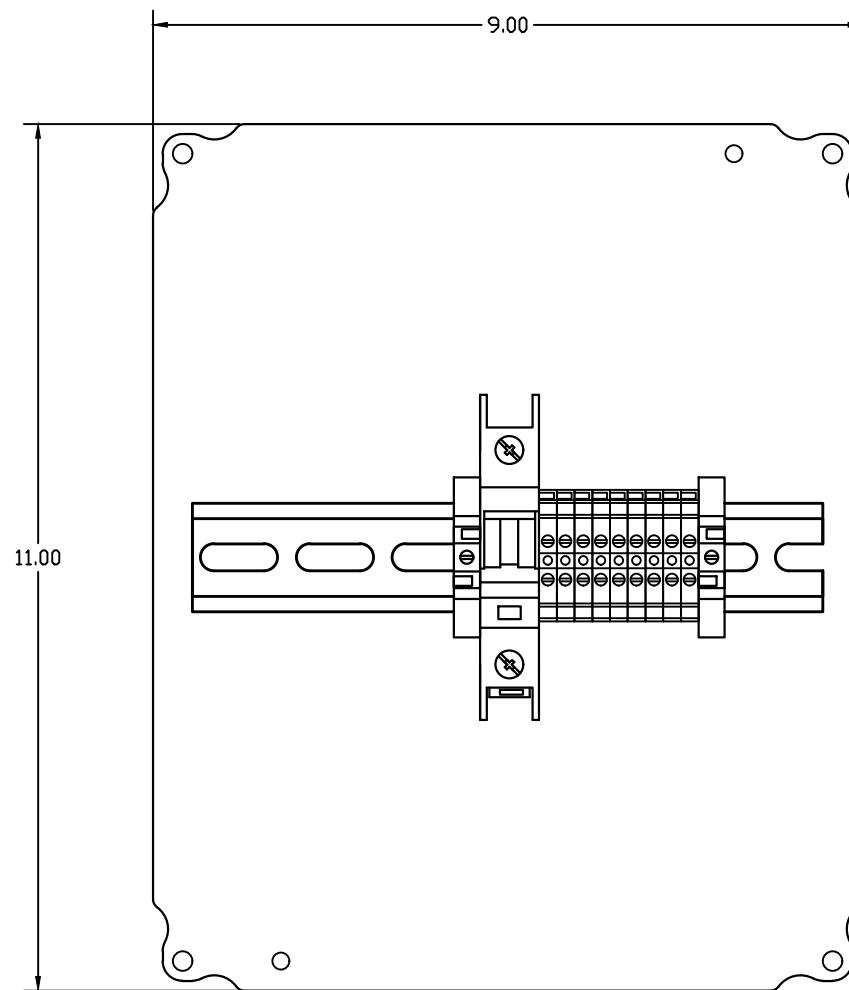
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C35CS3222A	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-004, 90-E-306
002	1	C35CS3222A	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-004, 90-E-306
003	1	C35CS3222A	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-004, 90-E-306
004	1	C35CS3222A	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-004, 90-E-306
005	1	C35CS3222A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-004, 90-E-306
006	1	C35CS3222A	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-004, 90-E-306
007	1	C35CS3222A	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-004, 90-E-306
008	1	C35CS3222A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
009	3	C35CS3222A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-306
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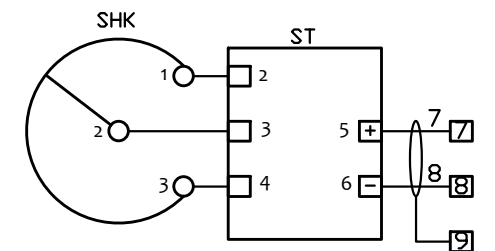
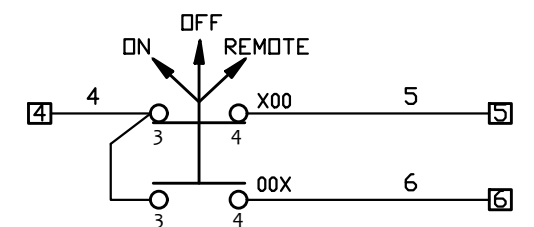
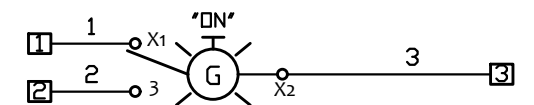
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT	MCCLURE & SONS		
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE	CDDS BAY WASTE WATER TREATMENT PLANT		
B	2024.02.27	CORRECTED	KCED		C35CS3222A SECONDARY CLARIFIER 2 WAS PUMP 2		
A	2023.10.25	Original Draft	KCD	DRAWN	KCD	ISSUED	JOB NO. 0723-08MSI
REV	DATE	DESCRIPTION	INIT	CHECKED	ME	DATE 2023.10.25	DWG NO. 0723-08MSI-S2WP23222A
REVISIONS				APPROVED	HAD	SCALE NONE	SHEET 1 OF 1

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Pour in place oil & water resistant gasket
- ✱ Ground stud on door.
- ✱ Stainless steel continuous hinge.
- ✱ Standoffs provided for mounting optional panels.
- ✱ Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- ✱ NEMA Type 3R, 4, 4X, 12 and Type 13
- ✱ UL Listed Type 3R, 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- ✱ Dead Front CH & ELJ Style Installation Instructions
- ✱ Padlock Kit For Junction Boxes
- ✱ Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

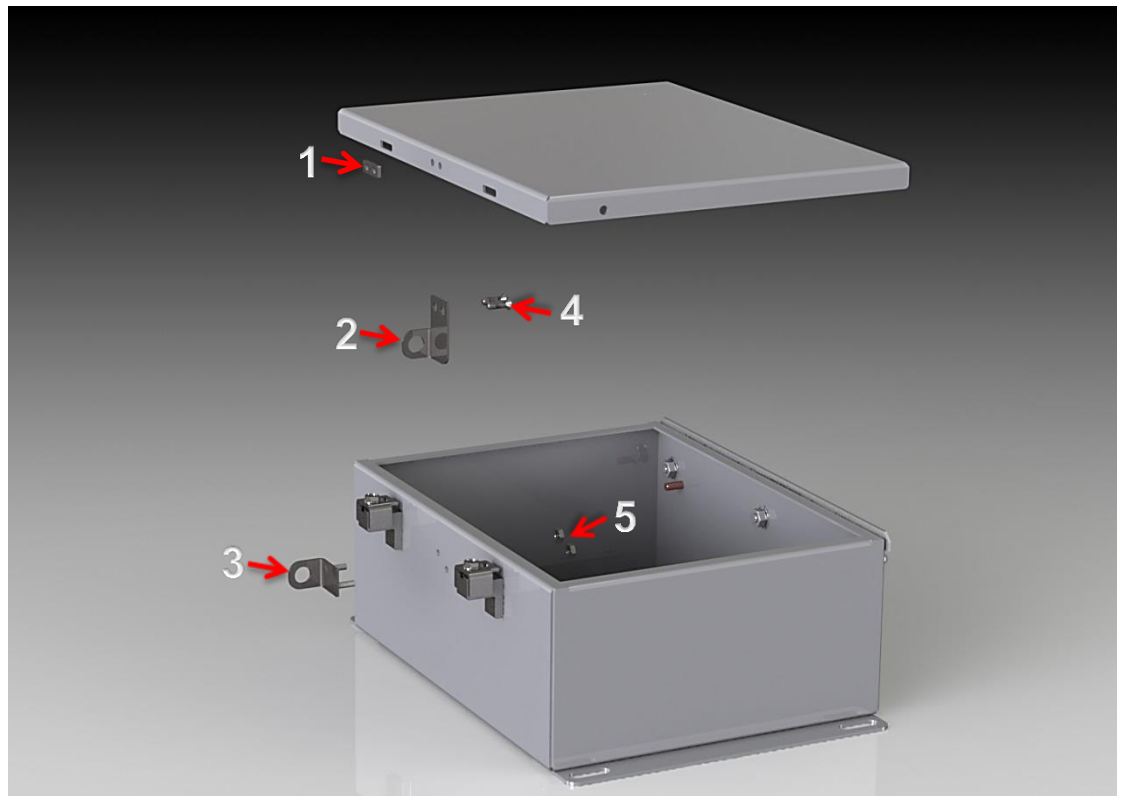
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

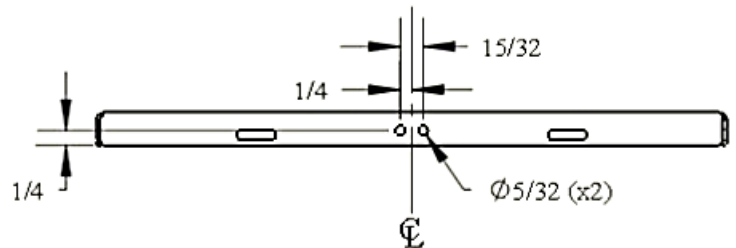
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SCE-PLKJIC INSTALLATION

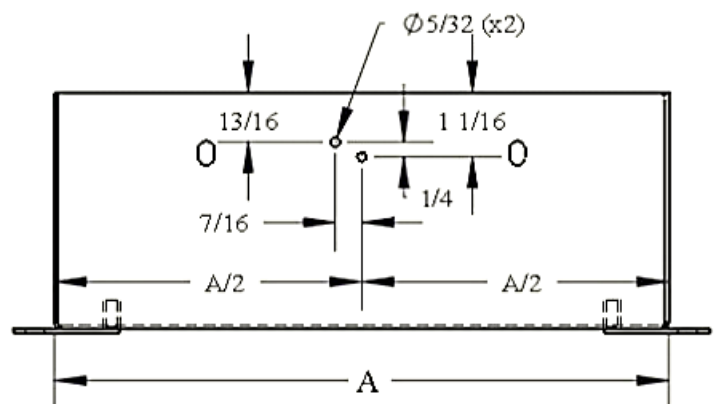
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

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Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

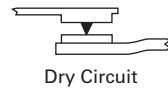
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

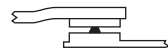
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

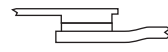
Reliability Nibs



Dry Circuit



Medium Duty



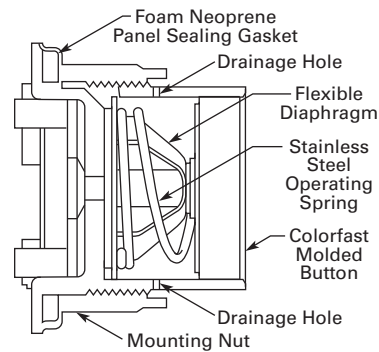
Heavy-Duty

Diaphragm Seal with Drainage Holes

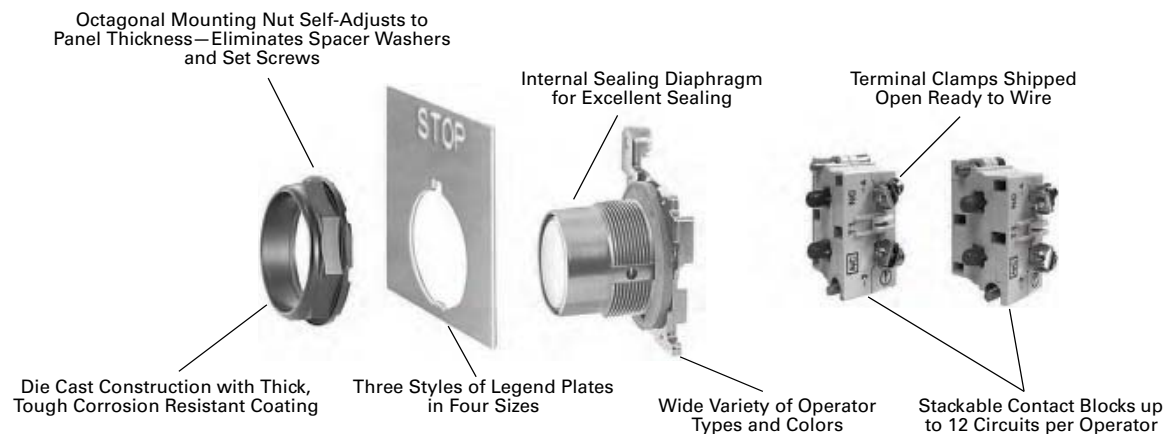
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①						LED Voltage	
Standard—Incandescent	Standard—LED							Blank = Incandescent	
TB120 = 120V/XFR	TB120L = 120V/XFR							06 = 6 Vac/Vdc	
TB240 = 240V/XFR	TB240L = 240V/XFR							12 = 12 Vac/Vdc	
TB277 = 277V/XFR	TB277L = 277V/XFR							24 = 24 Vac/Vdc	
TB380 = 380V/XFR	TB380L = 380V/XFR							48 = 48 Vac/Vdc	
TB480 = 480V/XFR	TB480L = 480V/XFR							60 = 60 Vac/Vdc	
TB600 = 600V/XFR	TB600L = 600V/XFR							2A = 120 Vac	
FB06 = 6V/FV	FB197L = Full voltage							2D = 120 Vdc	
FB12 = 12V/FV	PresTest—LED								
FB24 = 24V/FV	TPB120L = 120V/XFR	Plastic	Glass	Lens Color	Plastic	Glass	Lens Color		
FB32 = 32V/FV	TPB240L = 240V/XFR	Standard/Master—Incandescent			Standard/Master/PresTest—LED				
FB48 = 48V/FV	TPB380L = 380V/XFR	H2 =	G2 =	Red	RP =	RG =	Red		
RB120 = 120V/RES	TPB480L = 480V/XFR	H3 =	G3 =	Green	GP =	GG =	Green		
RB240 = 240V/RES	TPB600L = 600V/XFR	H4 =	G4 =	Yellow	YP =	YG =	Yellow		
NB120 = 120V/neon	FPB297L = Full voltage	H5 =	G5 =	White	WP =	WG =	White		
NB240 = 240V/neon		H6 =	G6 =	Blue	LP =	LG =	Blue		
PresTest—Incandescent		H9 =	G9 =	Amber	AP =	AG =	Amber		
TPB120 = 120V/XFR		H0 =	G0 =	Clear					
TPB240 = 240V/XFR		PresTest—Incandescent							
TPB380 = 380V/XFR		V2 =	P2 =	Red					
TPB480 = 480V/XFR		V3 =	P3 =	Green					
TPB600 = 600V/XFR		V4 =	P4 =	Yellow					
FPB06 = 6V/FV		V5 =	P5 =	White					
FPB12 = 12V/FV		V6 =	P6 =	Blue					
FPB24 = 24V/FV		V9 =	P9 =	Amber					
FPB32 = 32V/FV		V0 =	P0 =	Clear					
FPB48 = 48V/FV									
RPB120 = 120V/RES									
RPB240 = 240V/RES									

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

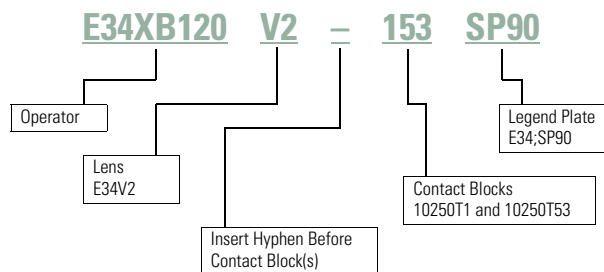
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F1**36**. To order separately, see footnote ^⑥ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
				1NC								

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

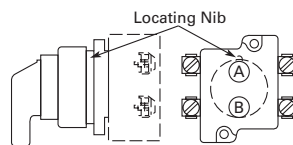
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

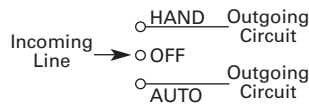


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

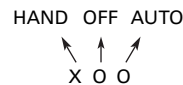
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



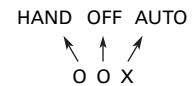
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

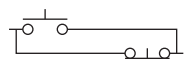
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X 0 0				—
4	0 0 X	—		—	

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	0		or
2	0	X		or

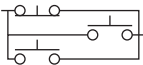
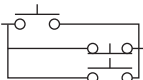
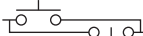
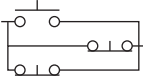
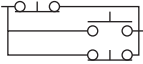
Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

Contact Blocks Required to Accomplish Circuit Function						Contact Blocks Required to Accomplish Circuit Function								
No.	Desired Circuit and Operator Position				Mounting Location		No.	Desired Circuit and Operator Position				Mounting Location		
					Top Plunger A	Bottom Plunger B						Top Plunger A	Bottom Plunger B	
1	X	0	0	0		NC	10	X	0	X	0		NC	
2	0	X	0	0			NO						NO	
3	0	0	X	0		NO	11	X	X	X	0		NC NO	
4	0	0	0	X			NC						NO	
5	X	0	0	X		NC	12	0	X	X	X		NO NC	
6	0	X	X	0		NO							NC NO	
7	0	0	X	X		NO	13	X	0	X	X		NO NC	
8	X	X	0	0		NC							NO NC	
9	0	X	0	X			NO NC	14	X	X	0	X		NC NO NC

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks

Standard Contact Blocks

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

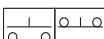
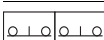
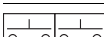
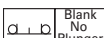
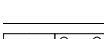
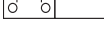
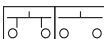
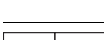
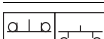
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



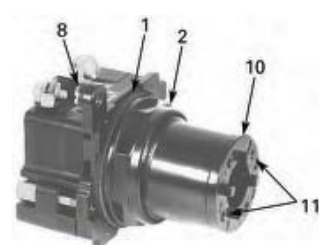
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

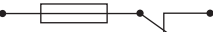
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

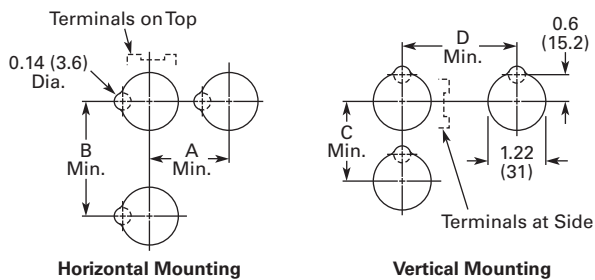
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

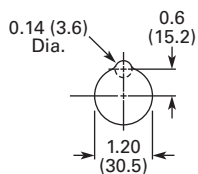
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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30 Pembroke Road
Dublin 4, Ireland
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Eaton.com/socialmedia

Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Cam selection for pushbutton selectors

Eaton Specification Sheet - E34VHBL1-2X



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Dublin 4, Ireland
Eaton.com
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Eaton.com/socialmedia

FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

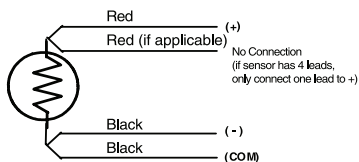
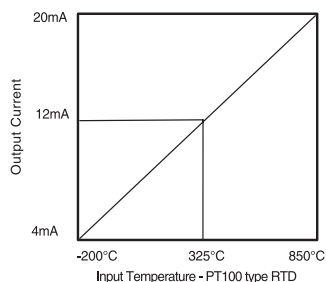
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

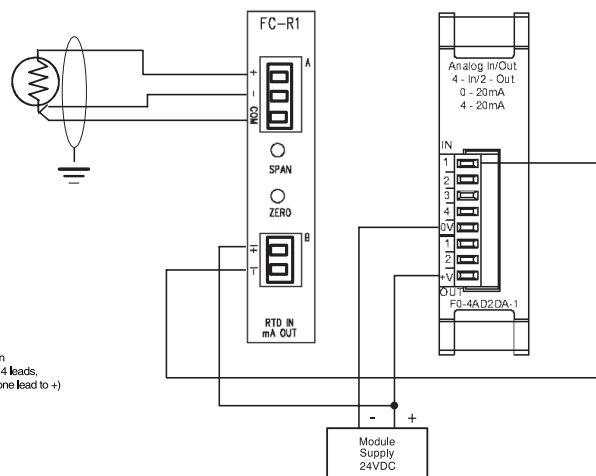
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

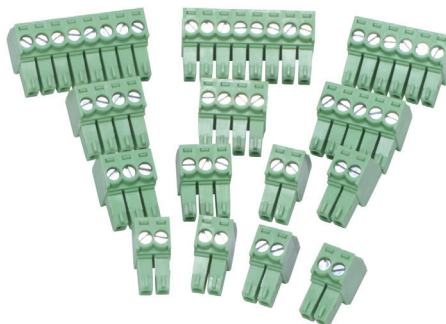


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

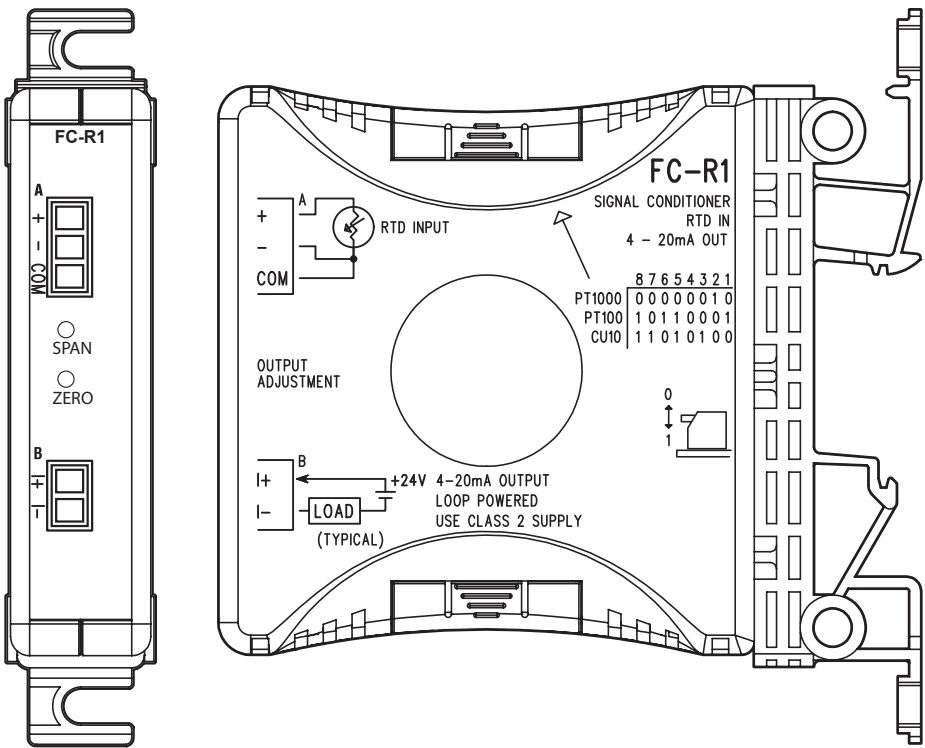
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

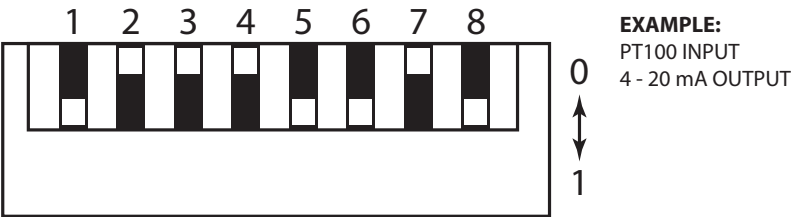
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) terminal and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

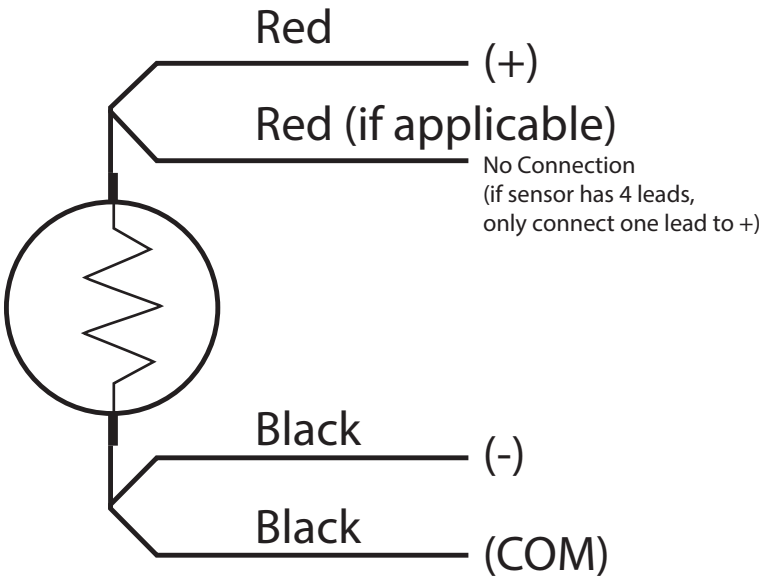
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

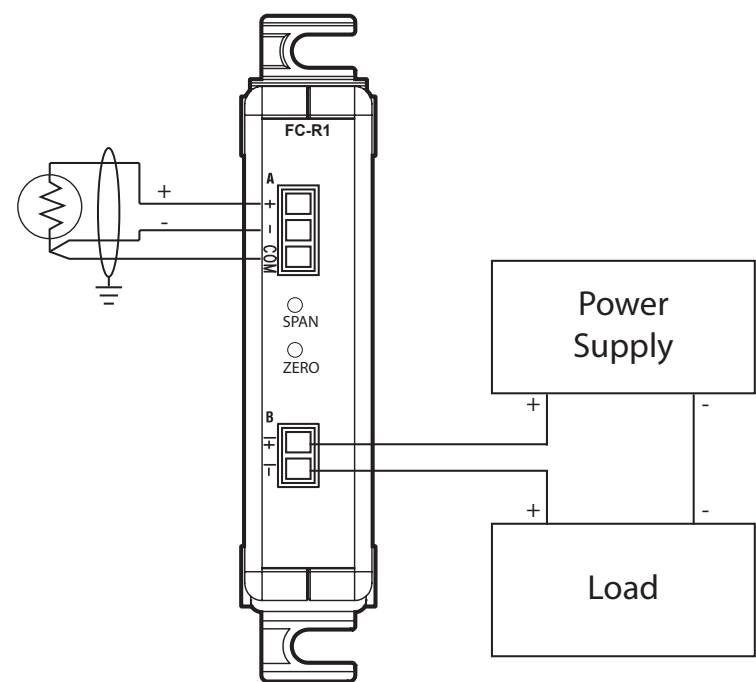
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



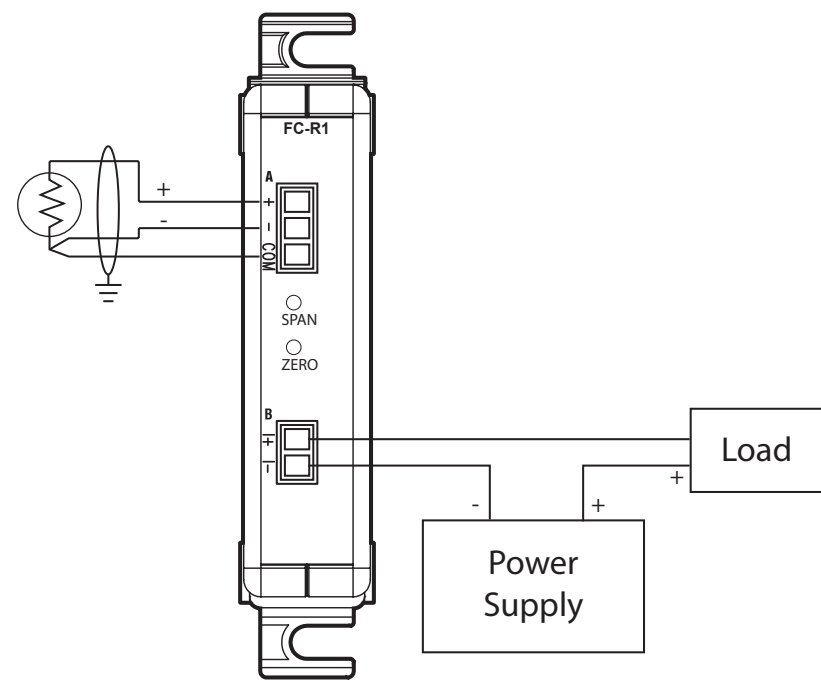
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

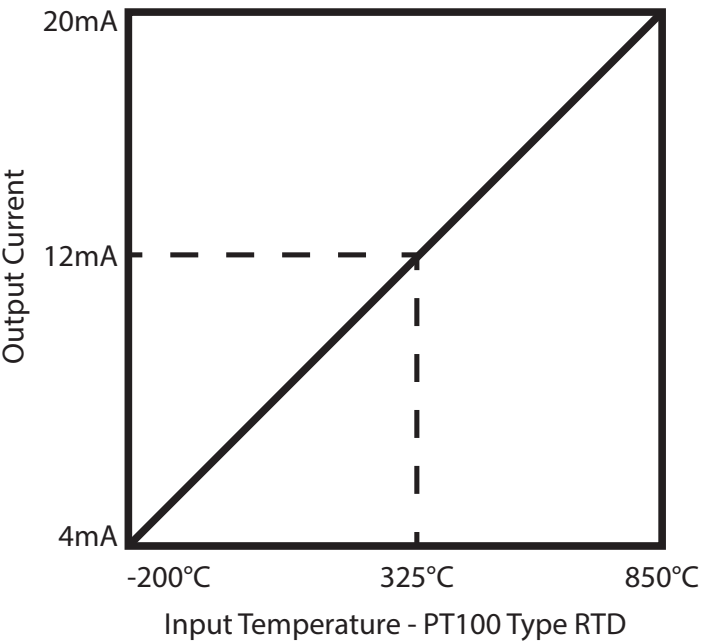
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

- A.

THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.
- B.

WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.
- C.

WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

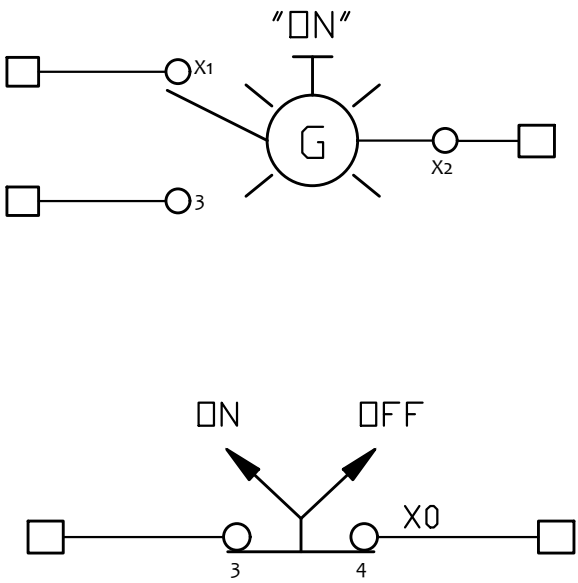
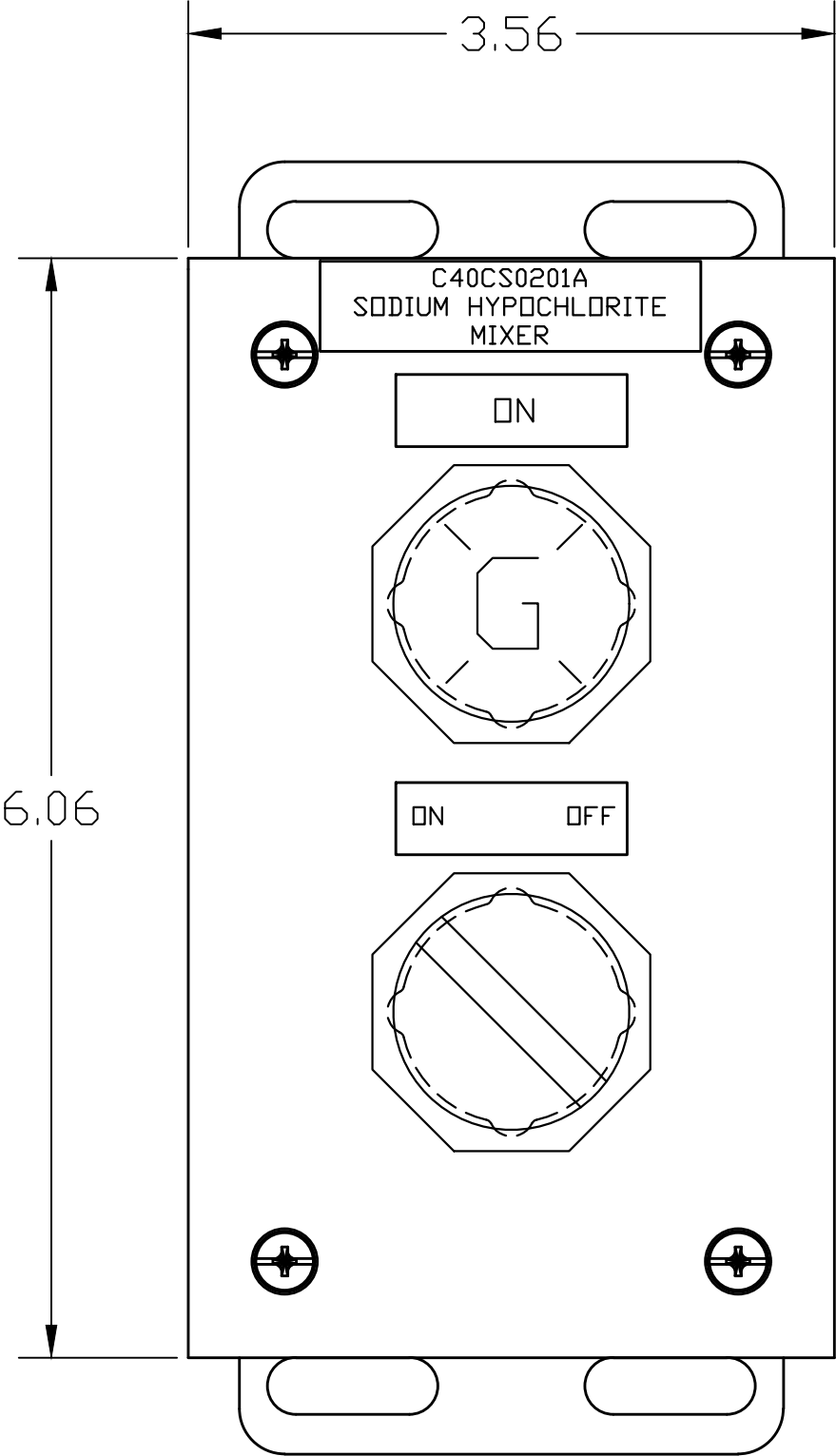
Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C40CS0201A	PB Enclosure, SS Type 316/316L, NEMA 4X 5.75" H x 3.25" W x 2.75" D	Saginaw Control & Engineering	SCE-2PBSS6	Section 26 05 04	09-I-005, 90-E-305
002	1	C40CS0201A	Selector Switch, 2-Position, Black Lever, 1NC/1NO	Eaton	E34VFBL1-1X	Section 26 05 04	09-I-005, 90-E-305
003	1	C40CS0201A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-005, 90-E-305
004	1	C40CS0201A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
005	2	C40CS0201A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
006							
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H				OPTIMAL CONTROL SYSTEMS				
G				2324 THREE LAKES RD / PO BOX 462				
F				ALBANY, OR 97321				
E				PHONE (541) 967-9323 FAX (541) 967-9485				
D				CLIENT McCLURE & SONS				
C				TITLE CDOO BAY WASTE WATER TREATMENT PLANT				
B	2024.02.27.	CORRECTED	KCED	C40M0201A HYPOCHLORITE MIXER				
A	2023.10.25.	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI		
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SHM-0201A		
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1		

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-2PBSS6

Product Specifications:

Part Number: SCE-2PBSS6
Description: S.S. PB Enclosure
Height: 5.75"
Width: 3.25"
Depth: 2.75"
Price Code: S1
List Price: \$242.12
Catalog Page: 252
Est. Ship Weight: 2.92 lbs



Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Captivated cover screws thread into sealed wells.
- ✱ 4-way standard pushbutton holes accept all brands of oil-tight pushbuttons, switches and pilot lights. Hole diameter is 1.20 In. (30.5mm).
- ✱ Immediate removal of cover is permitted.
- ✱ Pour in place oil & water resistant gasket
- ✱ Welded mounting provision top and bottom of back.

Application

Designed to house standard pushbuttons, switches and pilot lights in wet and hosed down areas and in corrosive atmospheres.

Finish

#4 brushed finish on all exterior surfaces.

Industry Standards - (IS5)

- ✱ NEMA Type 4, 4X, 12 and Type 13
- ✱ UL Listed Type 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Optional Accessories

SCE-ASPB-SS Plug, Hole

Similar Part Numbers

SCE-12PBSS6S.S. PB Enclosure
SCE-1PBSS6S.S. PB Enclosure
SCE-1PBXSS6S.S. PBX Enclosure
SCE-2PBXSS6S.S. PBX Enclosure
SCE-3PBSS6S.S. PB Enclosure
SCE-3PBXSS6S.S. PBX Enclosure
SCE-4PBSS6S.S. PB Enclosure
SCE-4PBXSS6S.S. PBX Enclosure
SCE-4SPBSS6S.S. PB Enclosure
SCE-6PBSS6S.S. PB Enclosure

Installation Information

- ✱ Pushbutton Enclosures

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PUSHBUTTON ENCLOSURES SERVICE PARTS



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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

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Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
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Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

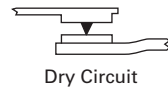
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

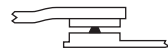
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

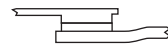
Reliability Nibs



Dry Circuit



Medium Duty



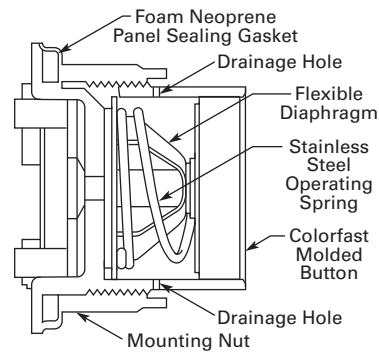
Heavy-Duty

Diaphragm Seal with Drainage Holes

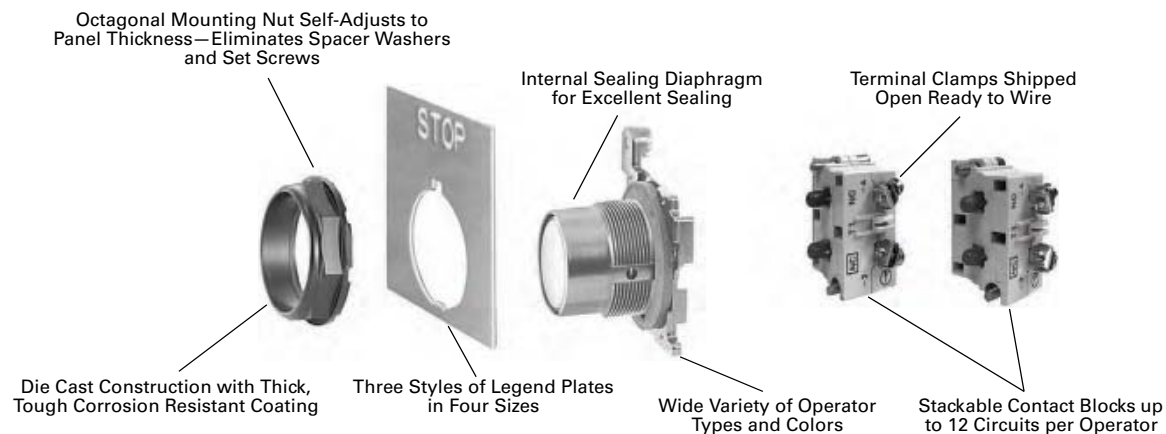
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34		FB06		H2		①	
Standard—Incandescent	Standard—LED								
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage PresTest—LED TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage								
PresTest—Incandescent									
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES									
		</							

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

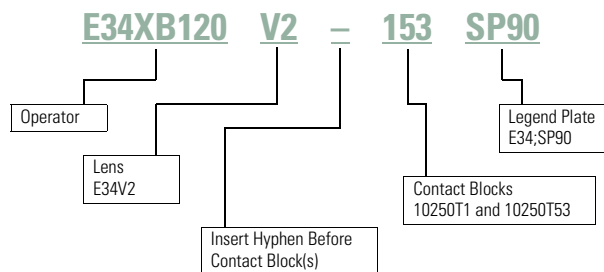
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

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Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
					1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK**2**-X1.

Selector Switch Selection



Cam and Contact Block Selection

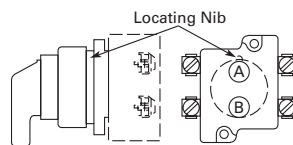
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

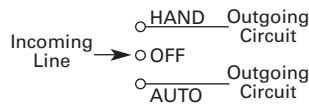


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

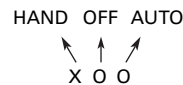
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



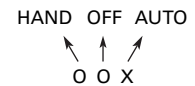
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

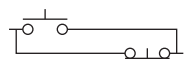
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	— NO	— NO

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

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Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



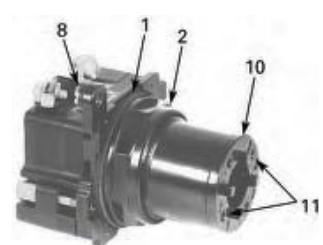
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

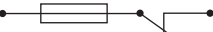
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

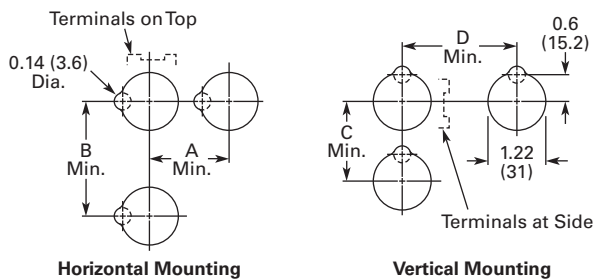
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

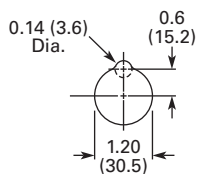
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



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Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton House
30 Pembroke Road
Dublin 4, Ireland
Eaton.com

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Eaton.com/socialmedia

Eaton E34VFBL1-1X

Catalog Number: E34VFBL1-1X

Eaton E34 pushbutton, Assembled Selector Switch, E34, 30.5 mm, Corrosion Resistant, Cam 1, 60° throw, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Two-position, Knob, Black actuator, 1NO-1NC.



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton	E34VFBL1-1X
UPC	Product Length/Depth
782113891637	1 in
Product Height	Product Width
1 in	1 in
Product Weight	Warranty
1 lb	1 year
Compliances	Certifications
CE Marked FDA 3-A	CSA Certified UL Listed
Catalog Notes	
Assembled at Factory	

Product specifications

Contact configuration

1 NO-1 NC

Throw type

60 °

Series

E34

Number of positions

2

Type

30.5 mm, Corrosion Resistant

Actuator color

Black

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Illumination

Non-illuminated

Cam code

Cam 1

Actuator

Knob

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Eaton.com

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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT: _____ CONTRACT NO.: _____

1. EQUIPMENT ITEM _____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS) _____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name _____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

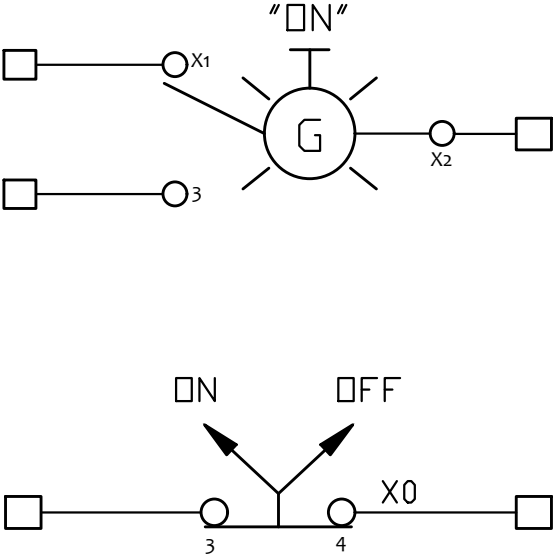
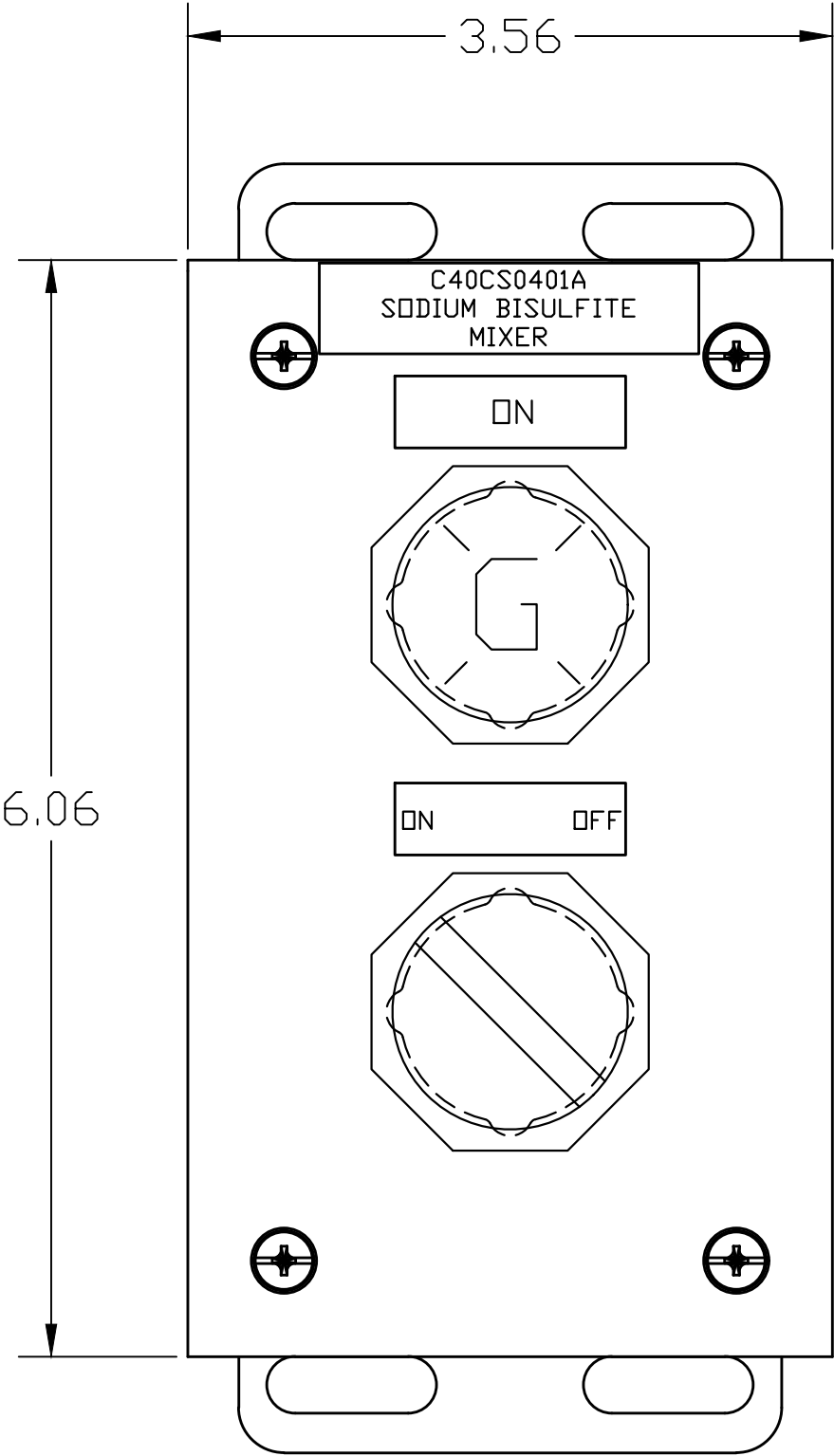
Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C40CS0401A	PB Enclosure, SS Type 316/316L, NEMA 4X 5.75" H x 3.25" W x 2.75" D	Saginaw Control & Engineering	SCE-2PBSS6	Section 26 05 04	09-I-005, 90-E-305
002	1	C40CS0401A	Selector Switch, 2-Position, Black Lever, 1NC/1NO	Eaton	E34VFBL1-1X	Section 26 05 04	09-I-005, 90-E-305
003	1	C40CS0401A	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-005, 90-E-305
004	1	C40CS0401A	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
005	2	C40CS0401A	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
006							
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H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT McCLURE & SONS			
C	2024.3.12	BISULFITE	HAD	TITLE CDDS BAY WASTE WATER TREATMENT PLANT			
B	2024.02.27	CORRECTED	KCED	C40M0401 SODIUM BISULFITE MIXER			
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-SBM-0401A	
REVISIONS			APPROVED HAD	SCALE NONE	SHEET 1 OF 1		

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-2PBSS6

Product Specifications:

Part Number: SCE-2PBSS6
Description: S.S. PB Enclosure
Height: 5.75"
Width: 3.25"
Depth: 2.75"
Price Code: S1
List Price: \$242.12
Catalog Page: 252
Est. Ship Weight: 2.92 lbs



Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Captivated cover screws thread into sealed wells.
- ✱ 4-way standard pushbutton holes accept all brands of oil-tight pushbuttons, switches and pilot lights. Hole diameter is 1.20 In. (30.5mm).
- ✱ Immediate removal of cover is permitted.
- ✱ Pour in place oil & water resistant gasket
- ✱ Welded mounting provision top and bottom of back.

Application

Designed to house standard pushbuttons, switches and pilot lights in wet and hosed down areas and in corrosive atmospheres.

Finish

#4 brushed finish on all exterior surfaces.

Industry Standards - (IS5)

- ✱ NEMA Type 4, 4X, 12 and Type 13
- ✱ UL Listed Type 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Optional Accessories

SCE-ASPB-SS Plug, Hole

Similar Part Numbers

SCE-12PBSS6S.S. PB Enclosure
SCE-1PBSS6S.S. PB Enclosure
SCE-1PBXSS6S.S. PBX Enclosure
SCE-2PBXSS6S.S. PBX Enclosure
SCE-3PBSS6S.S. PB Enclosure
SCE-3PBXSS6S.S. PBX Enclosure
SCE-4PBSS6S.S. PB Enclosure
SCE-4PBXSS6S.S. PBX Enclosure
SCE-4SPBSS6S.S. PB Enclosure
SCE-6PBSS6S.S. PB Enclosure

Installation Information

- ✱ Pushbutton Enclosures

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PUSHBUTTON ENCLOSURES SERVICE PARTS



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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

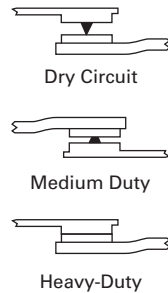
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

Reliability Nibs

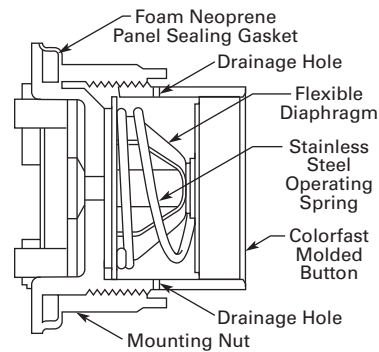


Diaphragm Seal with Drainage Holes

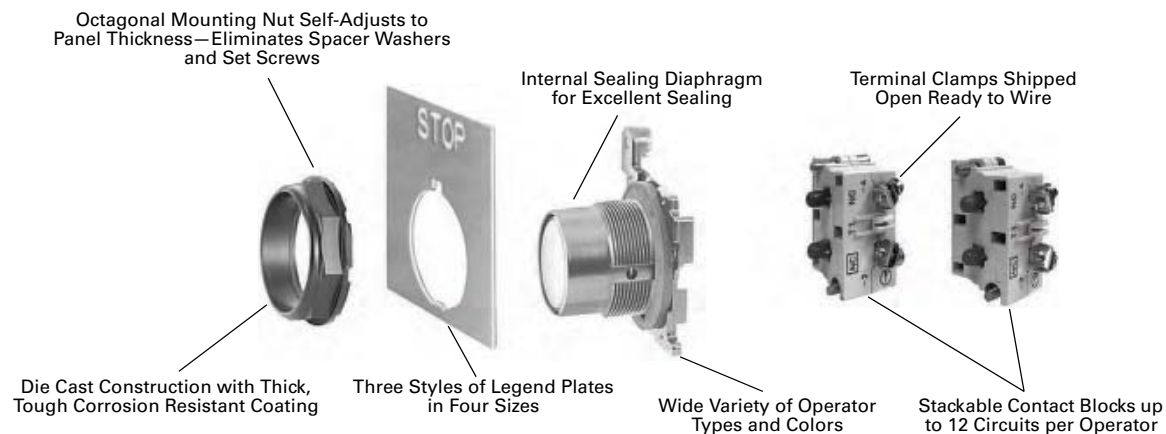
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①						LED Voltage	
Standard—Incandescent	Standard—LED							Blank = Incandescent	
TB120 = 120V/XFR	TB120L = 120V/XFR							06 = 6 Vac/Vdc	
TB240 = 240V/XFR	TB240L = 240V/XFR							12 = 12 Vac/Vdc	
TB277 = 277V/XFR	TB277L = 277V/XFR							24 = 24 Vac/Vdc	
TB380 = 380V/XFR	TB380L = 380V/XFR							48 = 48 Vac/Vdc	
TB480 = 480V/XFR	TB480L = 480V/XFR							60 = 60 Vac/Vdc	
TB600 = 600V/XFR	TB600L = 600V/XFR							2A = 120 Vac	
FB06 = 6V/FV	FB197L = Full voltage							2D = 120 Vdc	
FB12 = 12V/FV	PresTest—LED								
FB24 = 24V/FV	TPB120L = 120V/XFR	Plastic	Glass	Lens Color	Plastic	Glass	Lens Color		
FB32 = 32V/FV	TPB240L = 240V/XFR	Standard/Master—Incandescent			Standard/Master/PresTest—LED				
FB48 = 48V/FV	TPB380L = 380V/XFR	H2 =	G2 =	Red	RP =	RG =	Red		
RB120 = 120V/RES	TPB480L = 480V/XFR	H3 =	G3 =	Green	GP =	GG =	Green		
RB240 = 240V/RES	TPB600L = 600V/XFR	H4 =	G4 =	Yellow	YP =	YG =	Yellow		
NB120 = 120V/neon	FPB297L = Full voltage	H5 =	G5 =	White	WP =	WG =	White		
NB240 = 240V/neon		H6 =	G6 =	Blue	LP =	LG =	Blue		
PresTest—Incandescent		H9 =	G9 =	Amber	AP =	AG =	Amber		
TPB120 = 120V/XFR		H0 =	G0 =	Clear					
TPB240 = 240V/XFR		PresTest—Incandescent							
TPB380 = 380V/XFR		V2 =	P2 =	Red					
TPB480 = 480V/XFR		V3 =	P3 =	Green					
TPB600 = 600V/XFR		V4 =	P4 =	Yellow					
FPB06 = 6V/FV		V5 =	P5 =	White					
FPB12 = 12V/FV		V6 =	P6 =	Blue					
FPB24 = 24V/FV		V9 =	P9 =	Amber					
FPB32 = 32V/FV		V0 =	P0 =	Clear					
FPB48 = 48V/FV									
RPB120 = 120V/RES									
RPB240 = 240V/RES									

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

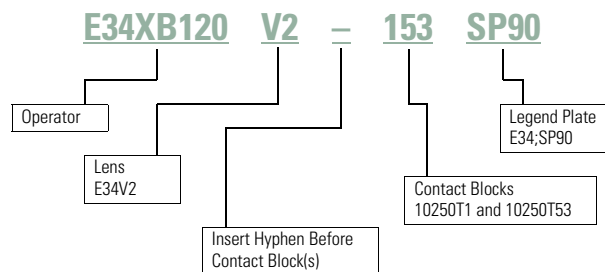
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
					1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK**2**-X1.

Selector Switch Selection



Cam and Contact Block Selection

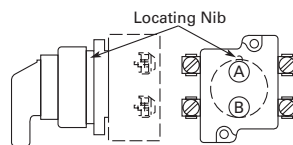
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

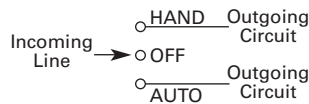


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

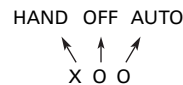
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



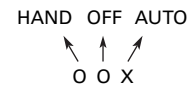
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

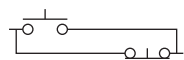
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	 NO NC	 NO
4	0 0 X	— NO	— NO

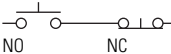
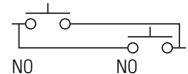
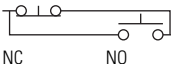
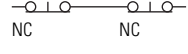
Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
1	X 0	Top Plunger A: NC or Bottom Plunger B: NC
2	0 X	Top Plunger A: NO or Bottom Plunger B: NO

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

Contact Blocks Required to Accomplish Circuit Function							Contact Blocks Required to Accomplish Circuit Function							
No.	Desired Circuit and Operator Position				Mounting Location		No.	Desired Circuit and Operator Position				Mounting Location		
					Top Plunger A	Bottom Plunger B						Top Plunger A	Bottom Plunger B	
1	X	0	0	0		NC	10	X	0	X	0		NC	
2	0	X	0	0			NO						NO	
3	0	0	X	0		NO	11	X	X	X	0		NC	
4	0	0	0	X			NC						NO	
5	X	0	0	X		NC	12	0	X	X	X		NO	
6	0	X	X	0		NO							NC	
7	0	0	X	X		NO	13	X	0	X	X		NO	
8	X	X	0	0		NC							NC	
9	0	X	0	X			NO	14	X	X	0	X		NC

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

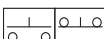
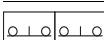
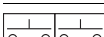
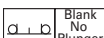
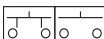
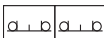
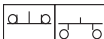
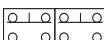
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



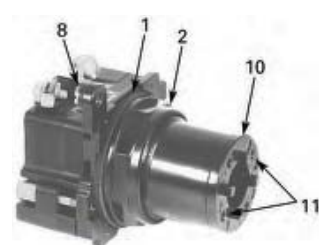
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

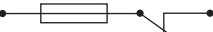
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

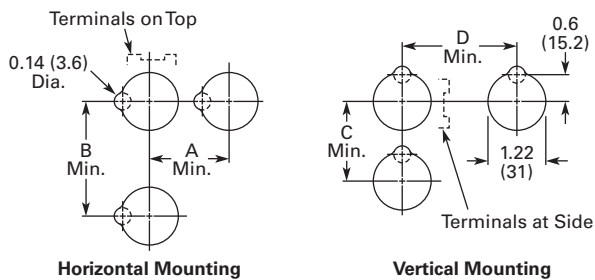
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

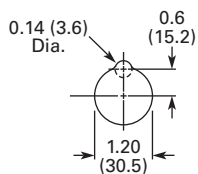
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



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Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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30 Pembroke Road
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Eaton.com/socialmedia

Eaton E34VFBL1-1X

Catalog Number: E34VFBL1-1X

Eaton E34 pushbutton, Assembled Selector Switch, E34, 30.5 mm, Corrosion Resistant, Cam 1, 60° throw, NEMA 3, 3R, 4, 4X, 12, 13, Non-illuminated, Two-position, Knob, Black actuator, 1NO-1NC.



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton	E34VFBL1-1X
UPC	Product Length/Depth
782113891637	1 in
Product Height	Product Width
1 in	1 in
Product Weight	Warranty
1 lb	1 year
Compliances	Certifications
CE Marked FDA 3-A	CSA Certified UL Listed
Catalog Notes	
Assembled at Factory	

Product specifications

Contact configuration

1 NO-1 NC

Throw type

60 °

Series

E34

Number of positions

2

Type

30.5 mm, Corrosion Resistant

Actuator color

Black

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Illumination

Non-illuminated

Cam code

Cam 1

Actuator

Knob

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

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Cam selection for pushbutton selectors



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Dublin 4, Ireland
Eaton.com

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MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

a. Name_____ Telephone No. _____

b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

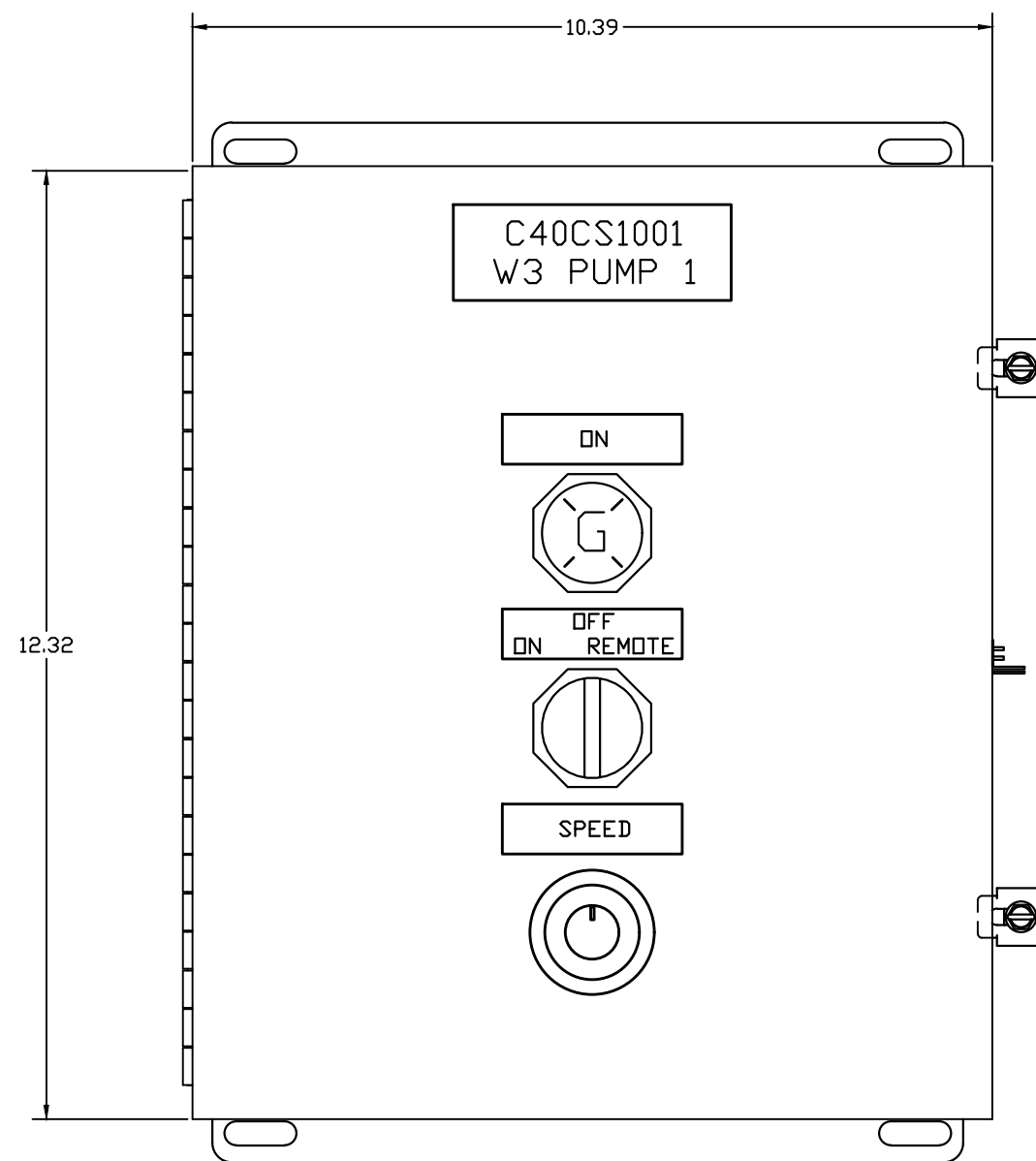
Bill of Materials



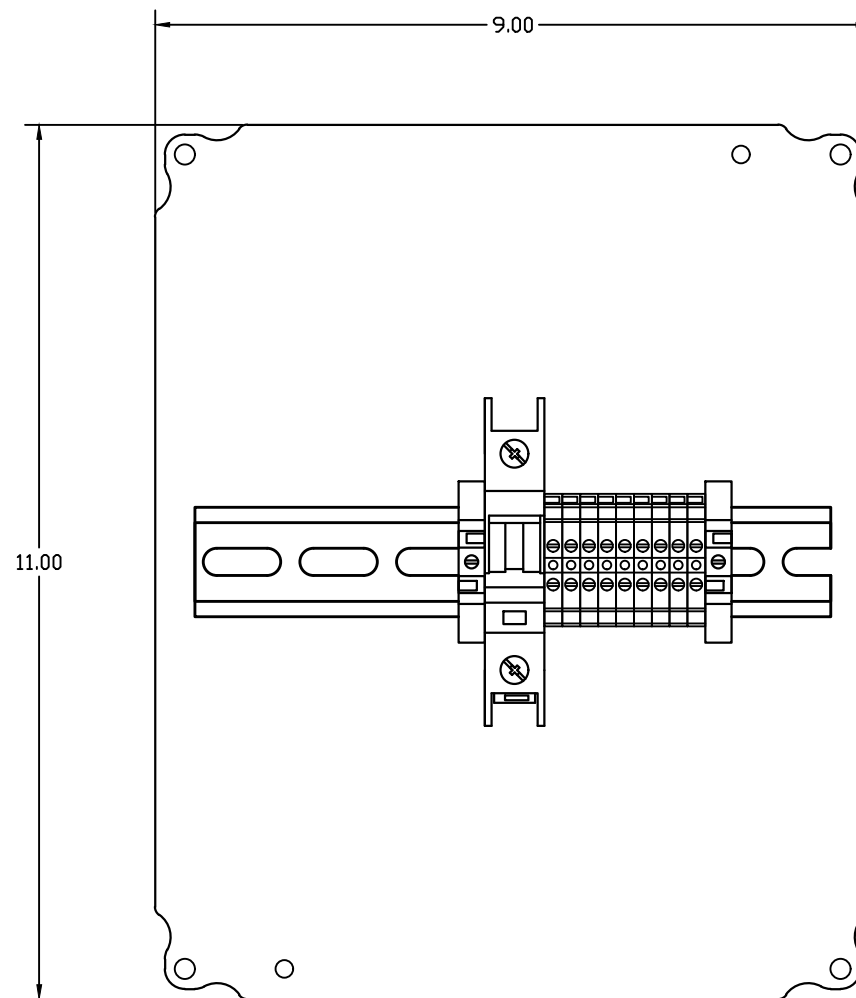
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C40CS1001	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-006, 90-E-305
002	1	C40CS1001	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-006, 90-E-305
003	1	C40CS1001	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-006, 90-E-305
004	1	C40CS1001	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-006, 90-E-305
005	1	C40CS1001	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-006, 90-E-305
006	1	C40CS1001	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-006, 90-E-305
007	1	C40CS1001	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-006, 90-E-305
008	1	C40CS1001	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
009	3	C40CS1001	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
010							
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013							
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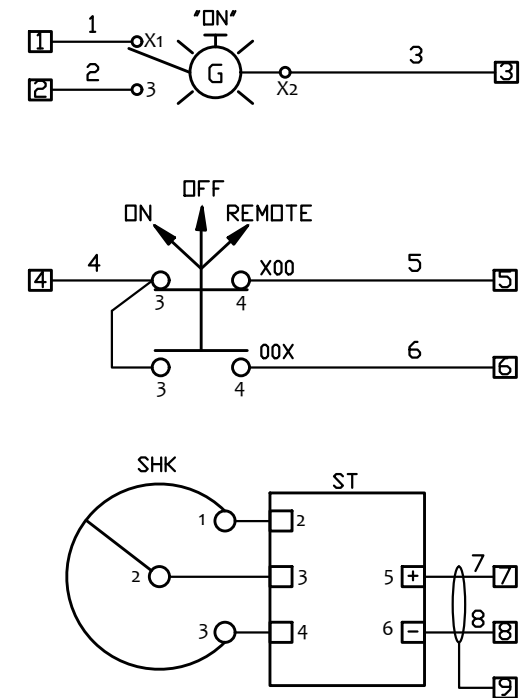
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS	
G				2324 THREE LAKES RD / PO BOX 462	
F				ALBANY, OR 97321	
E				PHONE (541) 967-9323 FAX (541) 967-9485	
D				CLIENT	
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE	
B	2024.02.27	CORRECTED	KCED	CCDS BAY WASTE WATER TREATMENT PLANT	
A	2023.10.25	Original Draft	KCD	C40P1001 W3 PUMP 1	
REV	DATE	DESCRIPTION	INIT	DRAWN	
				KCD	
				CHECKED	
				ME	
				APPROVED	
				HAD	
				ISSUED	
				DATE	
				2023.10.25	
				SCALE	
				NONE	
				JOB NO.	
				0723-08MSI	
				DWG NO.	
				0723-08MSI-W3P1-1001	
				SHEET 1	OF 1

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95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Pour in place oil & water resistant gasket
- ✱ Ground stud on door.
- ✱ Stainless steel continuous hinge.
- ✱ Standoffs provided for mounting optional panels.
- ✱ Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- ✱ NEMA Type 3R, 4, 4X, 12 and Type 13
- ✱ UL Listed Type 3R, 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- ✱ Dead Front CH & ELJ Style Installation Instructions
- ✱ Padlock Kit For Junction Boxes
- ✱ Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

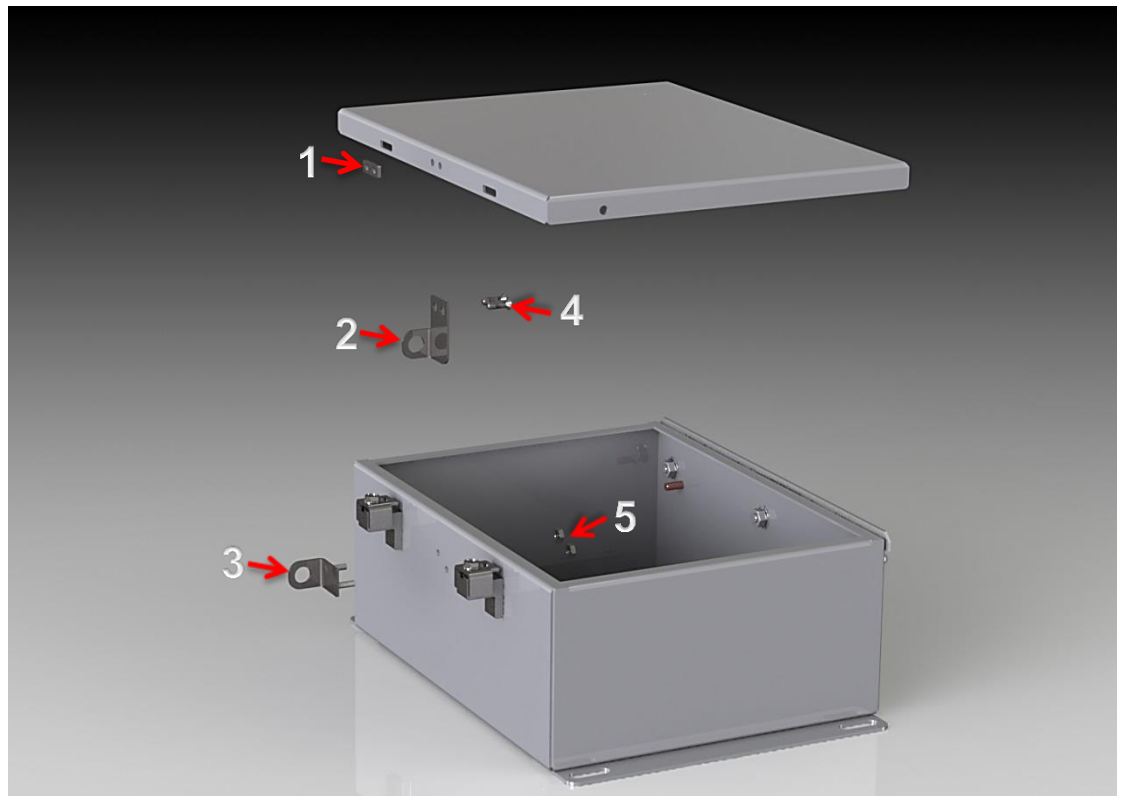
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

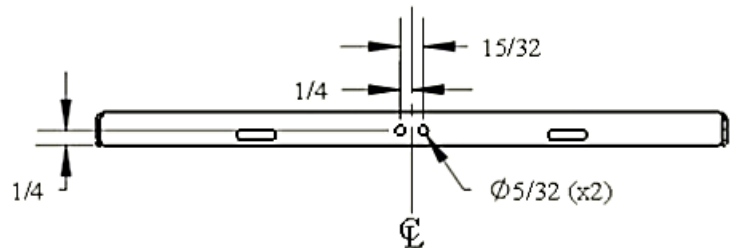
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SCE-PLKJIC INSTALLATION

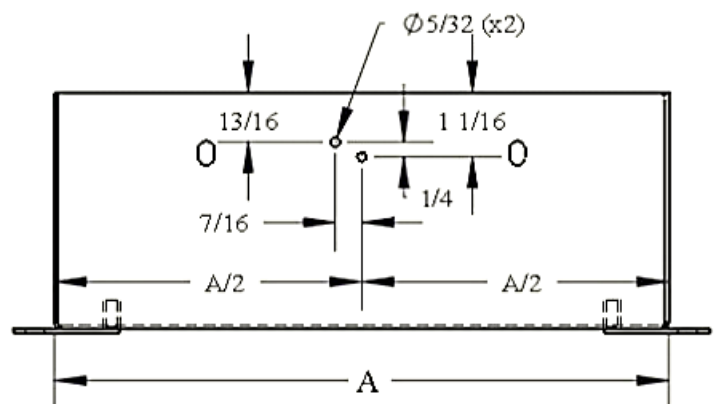
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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(800) 234-6871 - Fax: (989) 799-4524
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SCE-12P10

Product Specifications:

Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs



Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
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Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

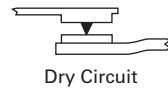
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

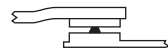
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

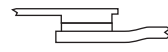
Reliability Nibs



Dry Circuit



Medium Duty



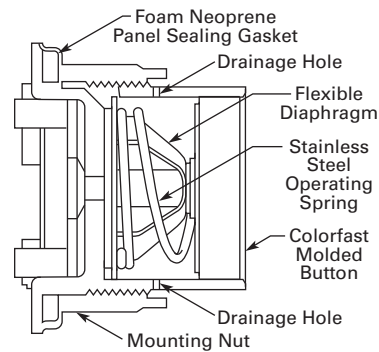
Heavy-Duty

Diaphragm Seal with Drainage Holes

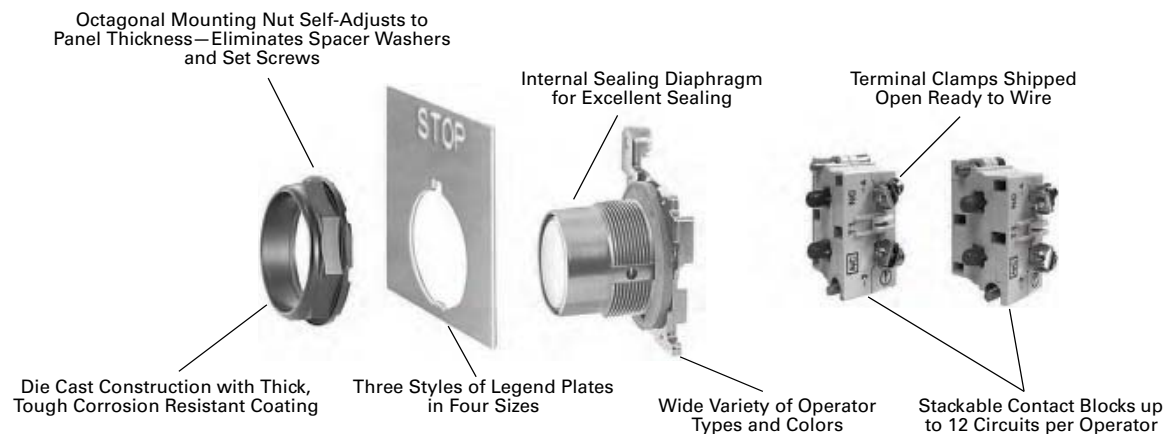
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type		E34 FB06 H2 ①					
Standard—Incandescent	Standard—LED						
TB120 = 120V/XFR TB240 = 240V/XFR TB277 = 277V/XFR TB380 = 380V/XFR TB480 = 480V/XFR TB600 = 600V/XFR FB06 = 6V/FV FB12 = 12V/FV FB24 = 24V/FV FB32 = 32V/FV FB48 = 48V/FV RB120 = 120V/RES RB240 = 240V/RES NB120 = 120V/neon NB240 = 240V/neon	TB120L = 120V/XFR TB240L = 240V/XFR TB277L = 277V/XFR TB380L = 380V/XFR TB480L = 480V/XFR TB600L = 600V/XFR FB197L = Full voltage PresTest—LED TPB120L = 120V/XFR TPB240L = 240V/XFR TPB380L = 380V/XFR TPB480L = 480V/XFR TPB600L = 600V/XFR FPB297L = Full voltage						
PresTest—Incandescent							
TPB120 = 120V/XFR TPB240 = 240V/XFR TPB380 = 380V/XFR TPB480 = 480V/XFR TPB600 = 600V/XFR FPB06 = 6V/FV FPB12 = 12V/FV FPB24 = 24V/FV FPB32 = 32V/FV FPB48 = 48V/FV RPB120 = 120V/RES RPB240 = 240V/RES							
		LED Voltage					
		Blank = Incandescent 06 = 6 Vac/Vdc 12 = 12 Vac/Vdc 24 = 24 Vac/Vdc 48 = 48 Vac/Vdc 60 = 60 Vac/Vdc 2A = 120 Vac 2D = 120 Vdc					
		Plastic	Glass	Lens Color	Plastic	Glass	Lens Color
		Standard/Master—Incandescent			Standard/Master/PresTest—LED		
		H2 =	G2 = Red		RP =	RG = Red	
		H3 =	G3 = Green		GP =	GG = Green	
		H4 =	G4 = Yellow		YP =	YG = Yellow	
		H5 =	G5 = White		WP =	WG = White	
		H6 =	G6 = Blue		LP =	LG = Blue	
		H9 =	G9 = Amber		AP =	AG = Amber	
		H0 =	G0 = Clear				
		PresTest—Incandescent					
		V2 =	P2 = Red				
		V3 =	P3 = Green				
		V4 =	P4 = Yellow				
		V5 =	P5 = White				
		V6 =	P6 = Blue				
		V9 =	P9 = Amber				
		V0 =	P0 = Clear				

Note

① Add **X** at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

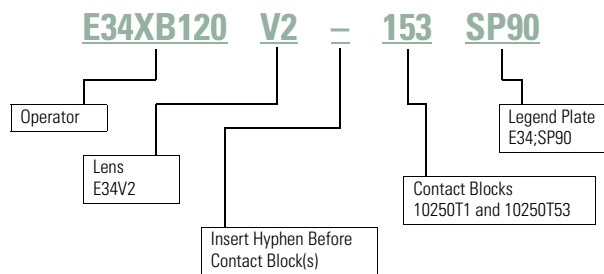
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑤ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M M M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M M M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0		2NC (Series)							
0	0	X		1NO							

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M M M M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0		1NO							
0	0	0	X		1NC							

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

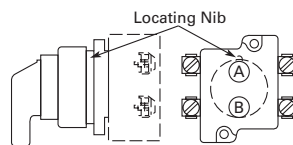
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

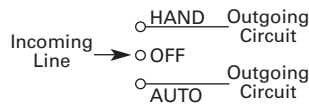


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

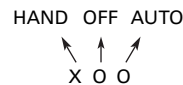
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



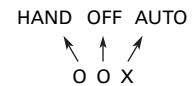
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

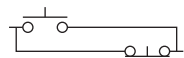
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2		Cam Code #3	
		Top A	Bottom B	Top A	Bottom B
1	X 0 0				—
4	0 0 X	—		—	

Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position		Contact Blocks Required to Accomplish Circuit Function	
			Top Plunger A	Bottom Plunger B
1	X	0		or
2	0	X		or

Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function	
					Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
					Top Plunger A Bottom Plunger B	Top Plunger A Bottom Plunger B
1	X	0	0	0		
2	0	X	0	0		
3	0	0	X	0		
4	0	0	0	X		
5	X	0	0	X		
6	0	X	X	0		
7	0	0	X	X		
8	X	X	0	0		
9	0	X	0	X		
10	X	0	X	0		
11	X	X	X	0		
12	0	X	X	X		
13	X	0	X	X		
14	X	X	0	X		

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Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ^①	Standard Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number	Logic Level Pressure Terminal Catalog Number	Spade Terminal ^② Catalog Number
	Blank No Plunger 1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger 1NO	Stack up to six blocks (six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
	NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
	2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
	2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ^③						
	Blank No Plunger LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ^③	—	10250T71E ^③	—
	ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ^{③④}	—	10250T47E ^③	—
	ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ^{③④}	—	10250T57E ^③	—
	2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ^③	—	10250T45E ^③	—
	LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ^{③④}	—	10250T55E ^③	—
Special Purpose Blocks ^⑤						
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ^⑤	—		

Notes

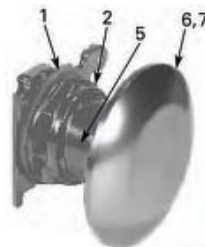
- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



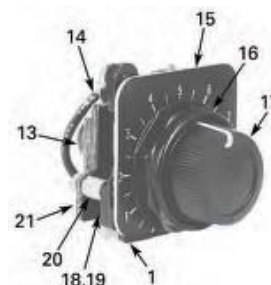
**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



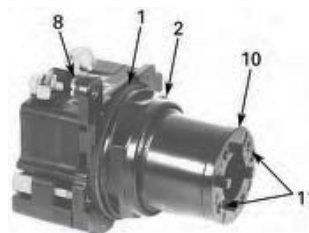
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

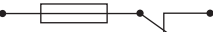
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

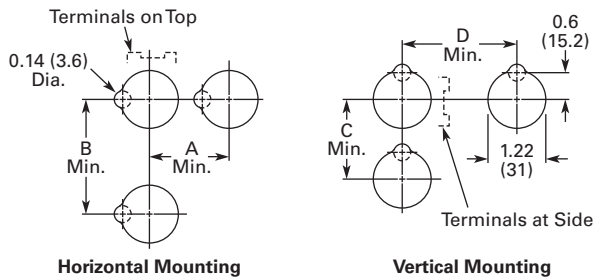
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

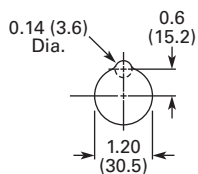
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

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Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

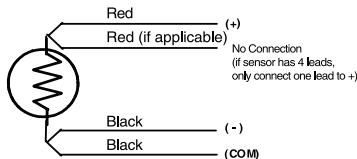
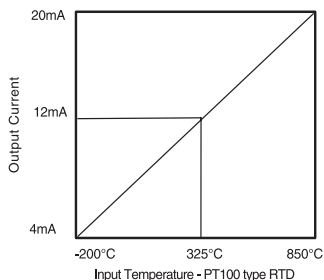
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

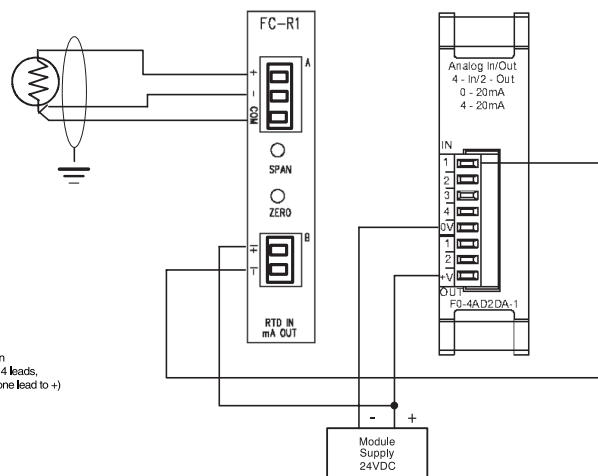
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

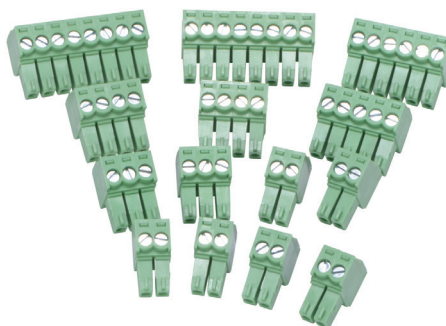


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

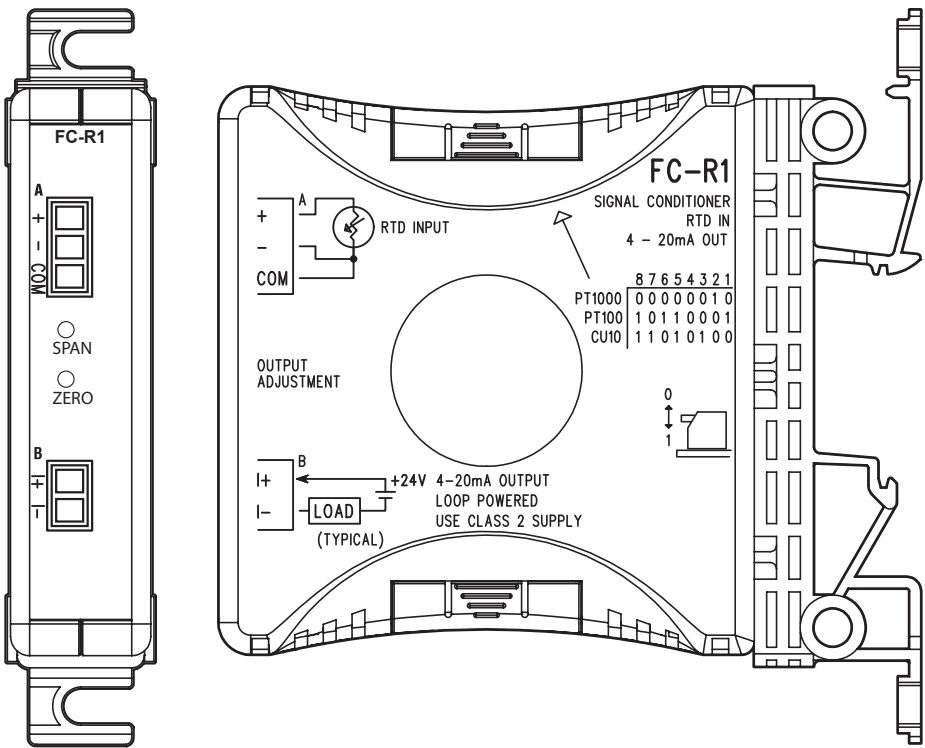
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

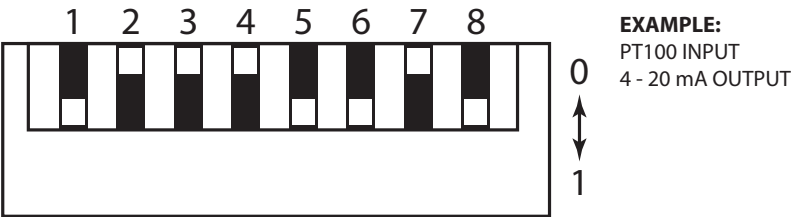
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) terminal and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

<i>Input Ranges</i>	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
<i>RTD Excitation Current</i>	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
<i>Common Mode Range</i>	0-3.5 VDC		
<i>Maximum Inaccuracy (Includes Offset, Span, Linearity)</i>	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
<i>Maximum Loop Supply</i>	30VDC		
<i>Load Impedance</i>	0Ω Minimum		
<i>Maximum Load</i>	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
<i>Linearity Error</i>	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
<i>Output Slew Rate</i>	1% @ 20mS		
<i>Filter Characteristics</i>	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
<i>Stability</i>	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

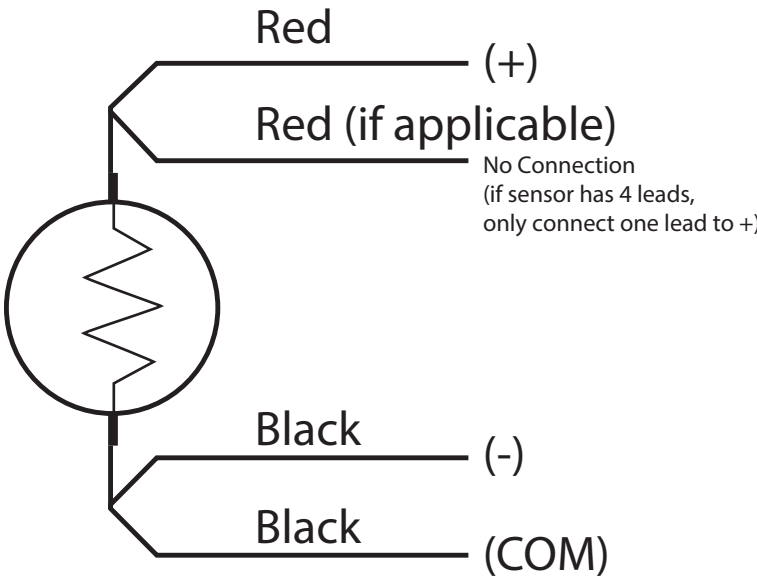
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

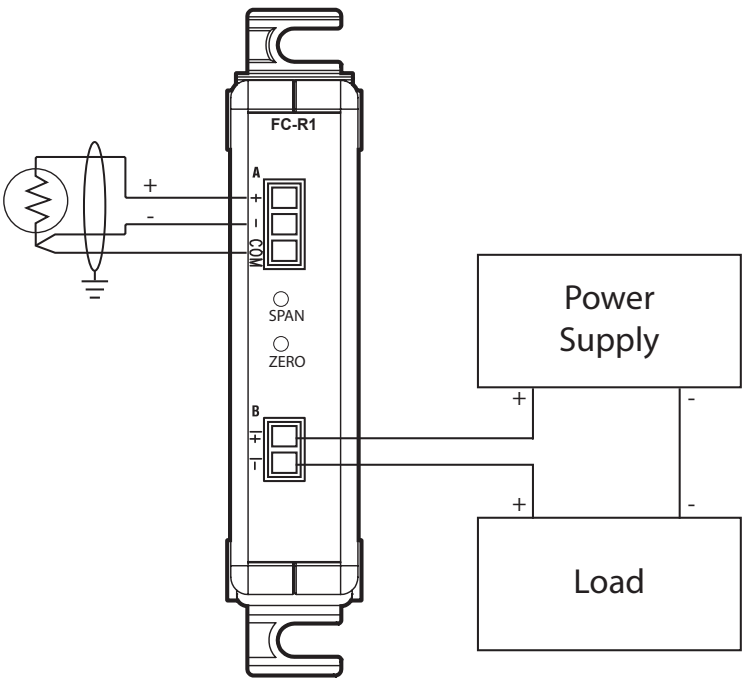
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



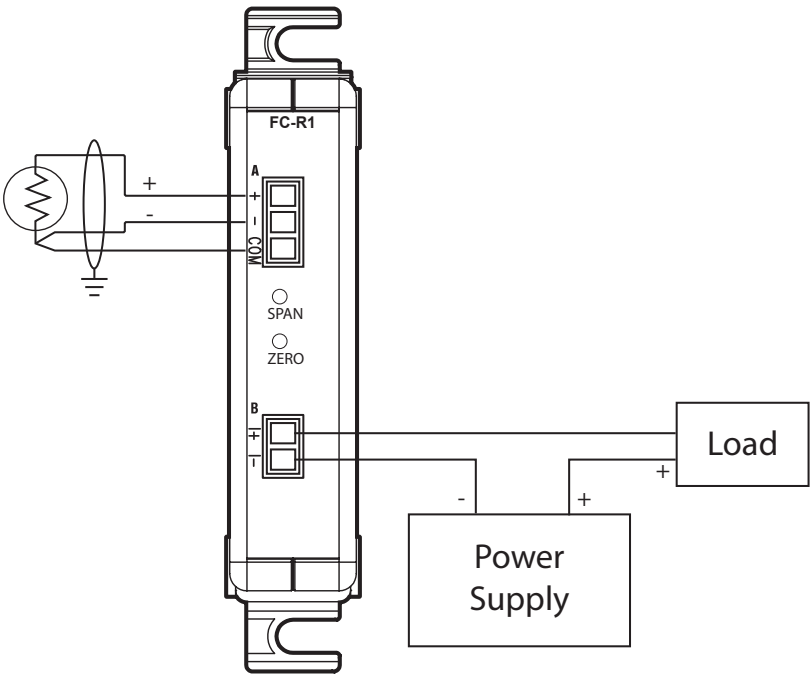
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

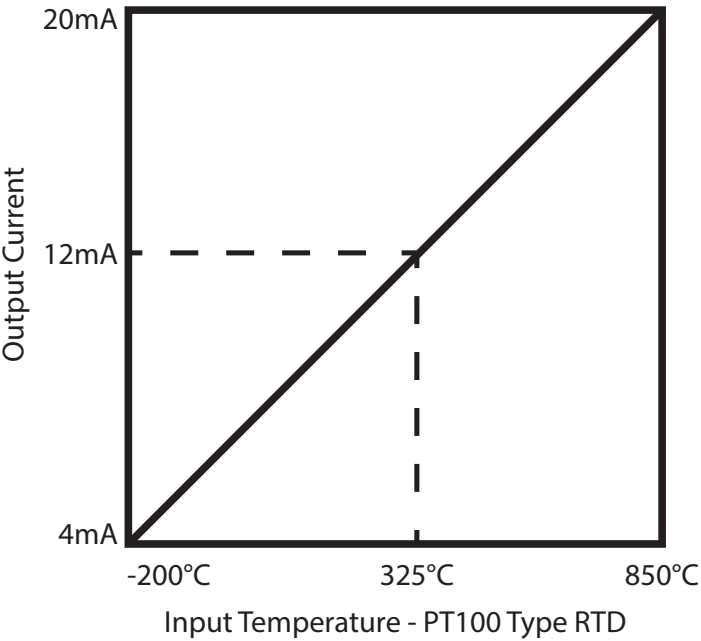
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

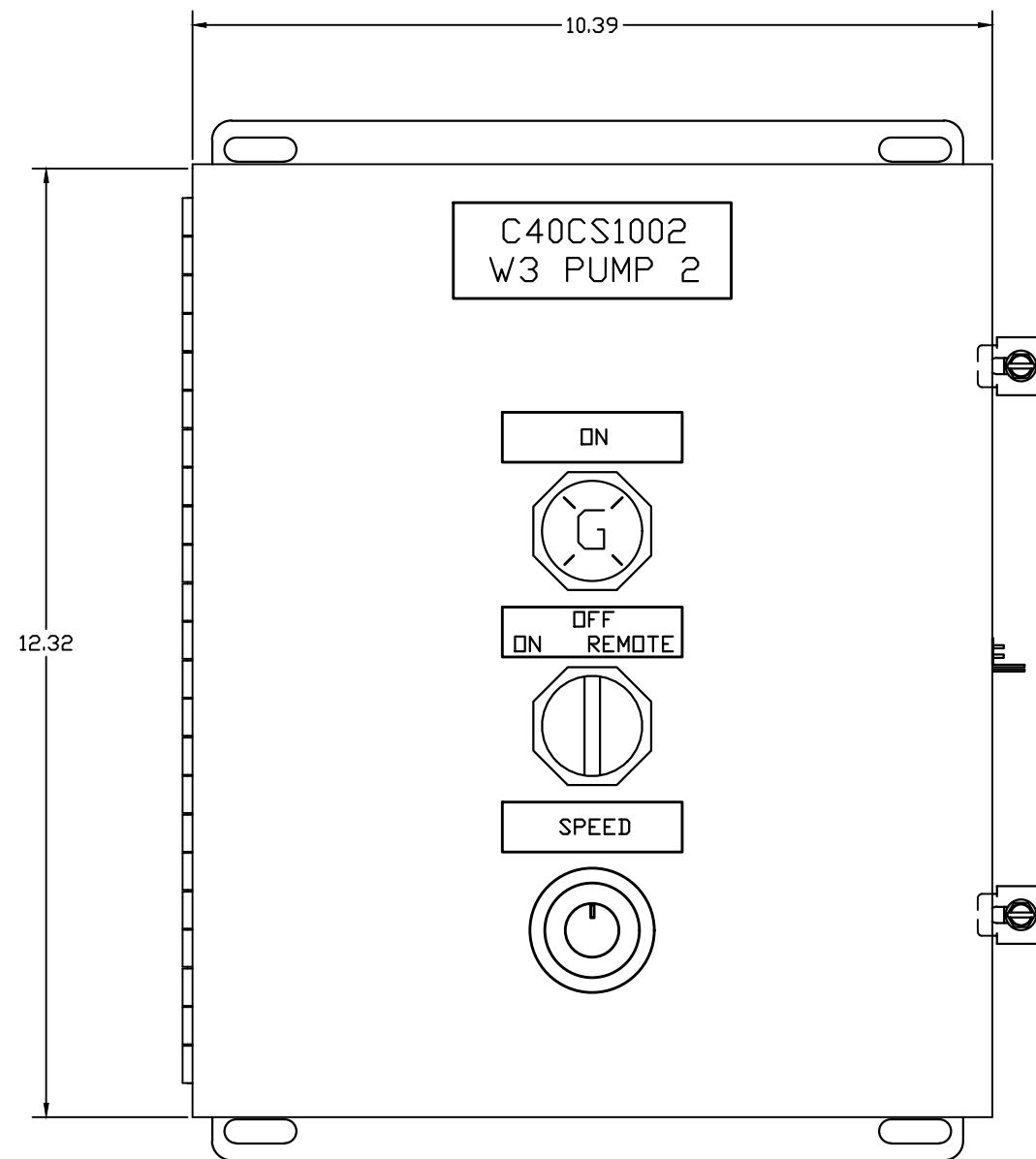
Bill of Materials



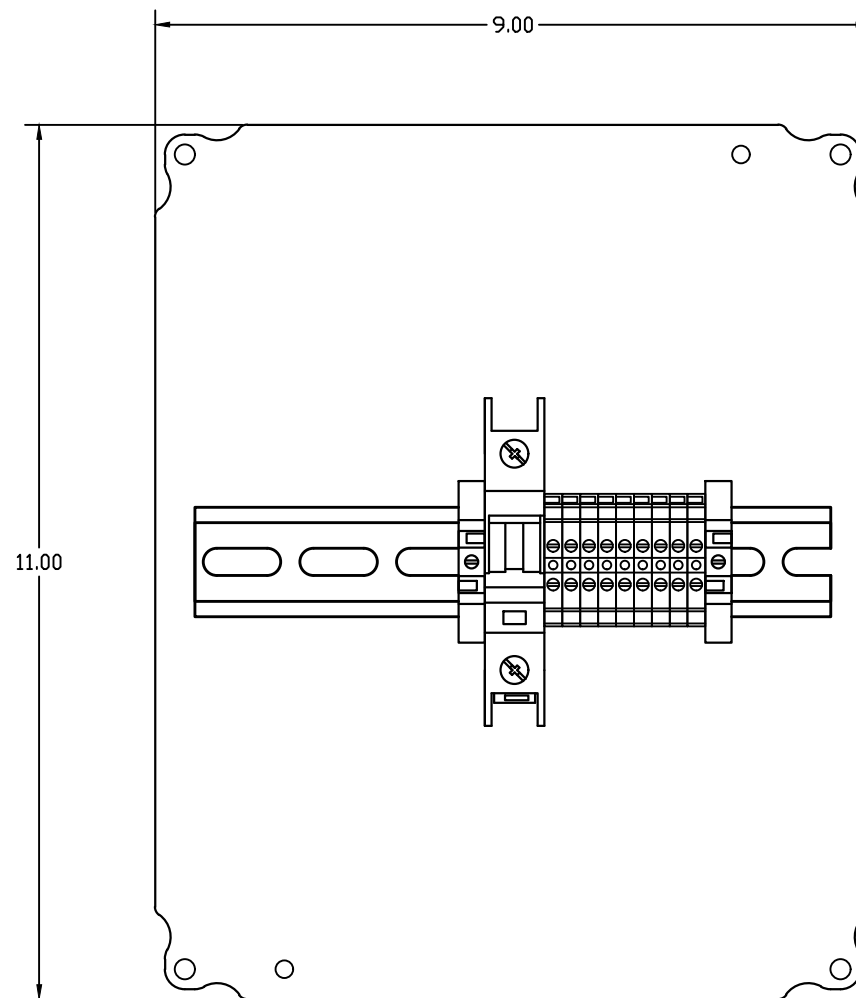
Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C40CS1002	CHNF Enclosure, SS Type 316/316L, NEMA 4X 12.13" H x 10.00" W x 8.00" D	Saginaw Control & Engineering	SCE-12108CHNFSS6	Section 26 05 04	09-I-006, 90-E-305
002	1	C40CS1002	Padlock Kit	Saginaw Control & Engineering	SCE-PLKJIC	Section 26 05 04	09-I-006, 90-E-305
003	1	C40CS1002	Subpanel	Saginaw Control & Engineering	SCE-12P10	Section 26 05 04	09-I-006, 90-E-305
004	1	C40CS1002	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	Section 26 05 04	09-I-006, 90-E-305
005	1	C40CS1002	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	Section 26 05 04	09-I-006, 90-E-305
006	1	C40CS1002	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	Section 26 05 04	09-I-006, 90-E-305
007	1	C40CS1002	Potentiometer Transmitter, 4-20mA Output	AutomationDirect	FC-R1	—	09-I-006, 90-E-305
008	1	C40CS1002	Nameplate	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
009	3	C40CS1002	Legend Plates	Optimal Control Systems, Inc.	—	Section 26 05 04	90-E-305
010							
011							
012							
013							
014							
015							
016							
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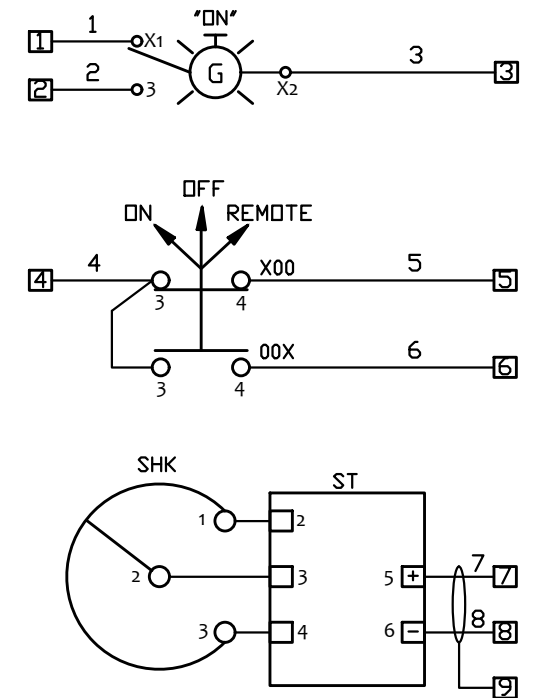
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FRONT
VIEW



PANEL
VIEW



H				OPTIMAL CONTROL SYSTEMS			
G				2324 THREE LAKES RD / PO BOX 462			
F				ALBANY, OR 97321			
E				PHONE (541) 967-9323 FAX (541) 967-9485			
D				CLIENT McCLURE & SONS			
C	2024.3.11	TERMINAL BLOCKS	HAD	TITLE CDOOS BAY WASTE WATER TREATMENT PLANT			
B	2024.02.27	CORRECTED	KCED	C40P1002 W3 PUMP 2			
A	2023.10.25	Original Draft	KCD	DRAWN KCD	ISSUED	JOB NO. 0723-08MSI	
REV	DATE	DESCRIPTION	INIT	CHECKED ME	DATE 2023.10.25	DWG NO. 0723-08MSI-W3P2-1002	
REVISIONS				APPROVED HAD	SCALE NONE	SHEET 1 OF 1	

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Your Enclosure Source®

Saginaw Control and Engineering
95 Midland Road Saginaw, MI 48638-5770
(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12108CHNFSS6

SCE-12108ELJSS6 - Cost Effective Alternative.



Product Specifications:

Part Number: SCE-12108CHNFSS6

Description: S.S. CHNF Enclosure

Height: 12.13"

Width: 10.00"

Depth: 8.00"

Price Code: S1

List Price: \$630.71

Catalog Page: 268

Est. Ship Weight: 16.00 lbs

Construction

- ✱ 0.063 In. stainless steel Type 316/316L.
- ✱ Seams continuously welded and ground smooth.
- ✱ Pour in place oil & water resistant gasket
- ✱ Ground stud on door.
- ✱ Stainless steel continuous hinge.
- ✱ Standoffs provided for mounting optional panels.
- ✱ Welded mounting provision top and bottom of back.

Application

Designed for use as electrical junction boxes, terminal wiring boxes, instrument housings, and electrical control enclosures. For use in wet and hosed down areas and in corrosive atmospheres.

For Details about the Design, Performance Expectations, Applications and Design Suggestions - See Design Considerations
www.saginawcontrol.com/instman/considerations.pdf

Finish

#4 brushed finish on all exterior surfaces. Optional sub-panels are powder coated white.

Industry Standards - (IS6)

- ✱ NEMA Type 3R, 4, 4X, 12 and Type 13
- ✱ UL Listed Type 3R, 4, 4X and 12
- ✱ CSA Type 4, 4X and 12
- ✱ IEC 60529
- ✱ IP 66

Notes

Special Instructions apply for IS3, IS4 and IS6 to maintain the environmental rating of Type 3R for these parts. Instructions are located on the enclosure door. Drip shield is required on IS3, drip shield is recommended on IS4 and IS6. Drain holes are required on all.

Optional Accessories

SCE-12P10 Subpanel, Flat
SCE-12P10AL Subpanel, Flat Aluminum
SCE-12P10GALV Subpanel, Flat Galvannealed
SCE-12P10SS Subpanel, Type 316 SS
SCE-BVK Breather Vent
SCE-CHCLAMP Assembly, CH Clamp & Base
SCE-DFJ1210 Panel, Dead Front (ELJ & CH)
SCE-PLKJIC Padlock Kit

Similar Part Numbers

SCE-10086CHNFSS6S.S. CHNF Enclosure
SCE-1008CHNFSS6S.S. CHNF Enclosure
SCE-12106CHNFSS6S.S. CHNF Enclosure
SCE-1212CHNFSS6S.S. CHNF Enclosure
SCE-1412CHNFSS6S.S. CHNF Enclosure
SCE-16148CHNFSS6S.S. CHNF Enclosure
SCE-1614CHNFSS6S.S. CHNF Enclosure
SCE-6044CHNFSS6S.S. CHNF Enclosure
SCE-606CHNFSS6S.S. CHNF Enclosure
SCE-8064CHNFSS6S.S. CHNF Enclosure

Installation Information

- ✱ Dead Front CH & ELJ Style Installation Instructions
- ✱ Padlock Kit For Junction Boxes
- ✱ Continuous Hinge Junction Enclosure

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CONTINUOUS HINGE JUNCTION ENCLOSURES SERVICE PARTS



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SCE-PLKJIC

Product Specifications:



Part Number: SCE-PLKJIC

Description: Padlock Kit

Height: 3.00"

Width: 2.00"

Depth: 1.00"

Price Code: P2

List Price: \$11.47

Catalog Page: 407

Est. Ship Weight: 1.00 lbs

Application

Designed for CH, and CHNF enclosures. Maintains water-tight and dust-tight seal. Made from stainless steel.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

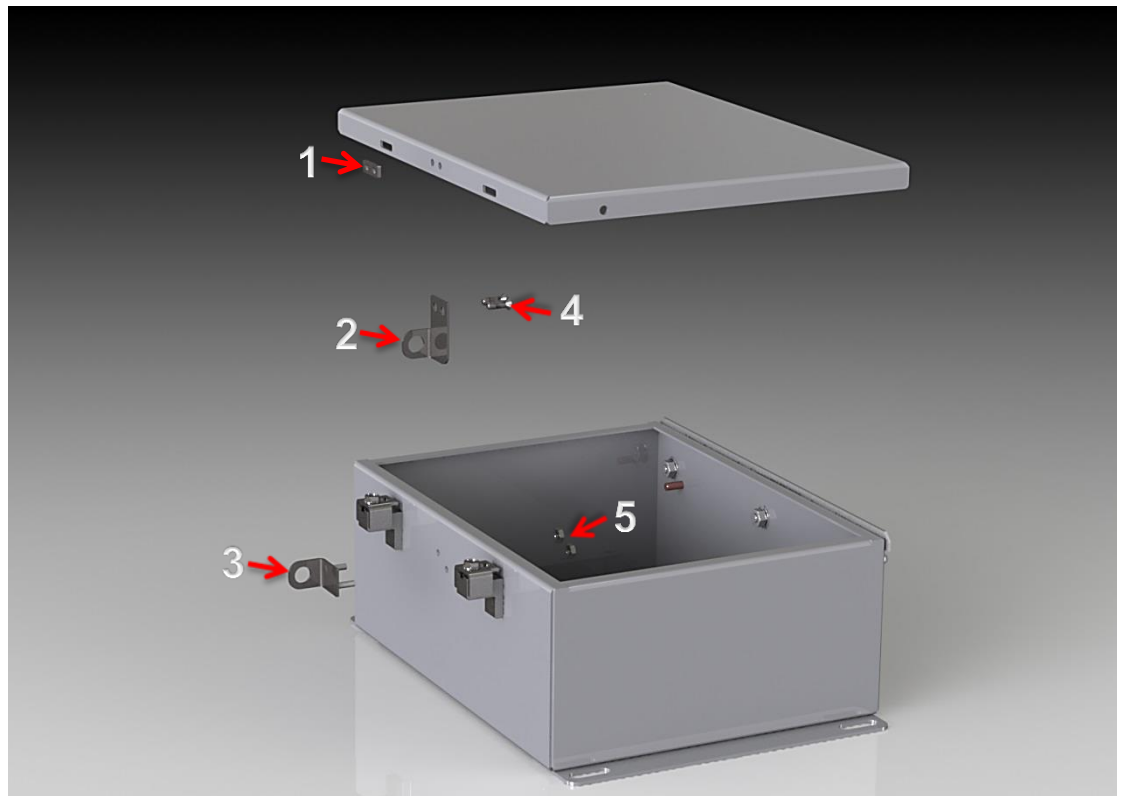
Installation Information

- ⚙ [Padlock Kit For Junction Boxes](#)

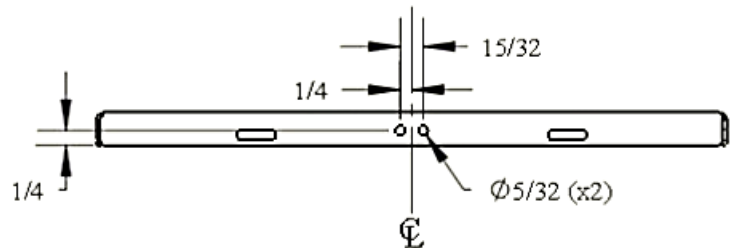
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SCE-PLKJIC INSTALLATION

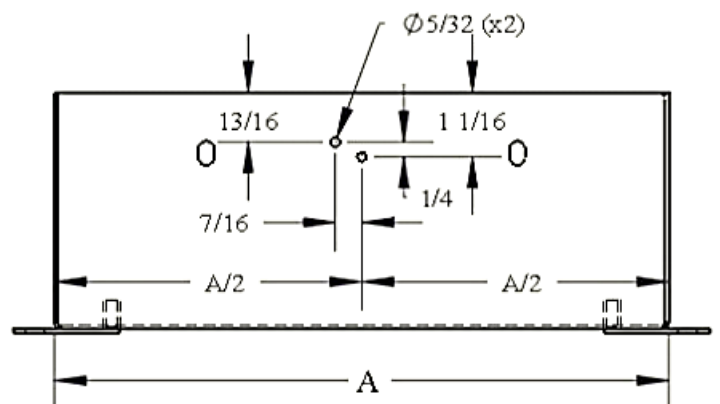
1. Nut Plate
2. Door Staple
3. Body Staple
4. 6-32 Flat Head Screw (x2)
5. 6-32 Zinc Plated Keps Nut (x2)



- A. Pre-drill two $\frac{5}{32}$ diameter holes in the door. Shown in "Enclosure Door Drill Detail"
- B. Pre-drill two $\frac{5}{32}$ diameter holes in body. Shown in "Enclosure Body Drill Detail"
- C. Align and place nut plate (Item 1) on exterior and door staple (Item 2) on interior of the door with the pre-drilled holes from step A.
- D. Fasten together the door staple and nut plate with Two 6-32 flat head screws (Item 4) onto the door.
- E. Place the body staple (Item 3) into the pre-drilled holes in the enclosure from step B.
- F. Fasten the body staple to the body with two 6-32 keps nuts (Item 5) on the interior of the body.



ENCLOSURE DOOR DRILL DETAIL



ENCLOSURE BODY DRILL DETAIL

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(800) 234-6871 - Fax: (989) 799-4524
SCE@SaginawControl.com

SCE-12P10

Product Specifications:



Part Number: SCE-12P10
Description: Subpanel, Flat
Height: 11.00"
Width: 9.00"
Depth: 0.08"
Price Code: P3
List Price: \$8.59
Catalog Page: 440
Est. Ship Weight: 2.00 lbs

Finish

Powder Coated White.

Industry Standards - (IS17)

- ⚙ NEMA Not Applicable
- ⚙ UL Not Applicable
- ⚙ CSA N/A

Similar Part Numbers

SCE-10P10Subpanel, Flat
SCE-10P6Subpanel, Flat
SCE-10P8Subpanel, Flat
SCE-12DLP12Subpanel, Flat
SCE-12P12Subpanel, Flat
SCE-12P12CSubpanel, Flat
SCE-12P16CSubpanel, Flat
SCE-12P20CSubpanel, Flat
SCE-12P24Subpanel, Bent
SCE-12P6Subpanel, Flat

Installation Information

- ⚙ Sub-Plate Layout & Grounding for 3/8-16

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30.5 mm Corrosion Resistant Watertight/Oiltight—E34



Product Description

Eaton's E34 Series 30.5 mm pushbutton line features the same rugged die cast construction of our 10250T line with an additional two-layer 100% solid thermosetting cathodic epoxy coating. This coating provides a flat black smooth, consistent, corrosion resistant surface that has passed a demanding 600 hour salt spray test. (The industry standard for this 4X test requires only 200 hours.)

Features

- Epoxy-coated metal operators
- Corrosion resistant
- Integral ground screw terminal on operators
- FDA approved for sanitary chemical resistance requirements

Contents

Description

Page

30.5 mm Corrosion Resistant Watertight/Oiltight—E34

Product Overview	V7-T1-285
Product Identification	V7-T1-286
Catalog Number Selection	V7-T1-287
Ordering Complete Devices	V7-T1-289
Product Selection	
Non-Illuminated Momentary	
Pushbutton Units	V7-T1-290
Plastic Lens Indicating Light Units	V7-T1-290
Pushbuttons	V7-T1-291
Illuminated Pushbuttons and	
Indicating Lights	V7-T1-292
Push-Pull Units	V7-T1-294
Illuminated Push-Pull Units	V7-T1-295
Potentiometers	V7-T1-297
Push-Pull Operators	V7-T1-298
Selector Switch Units	V7-T1-302
Selector Switch Selection	V7-T1-303
Selector Switch Operators	V7-T1-306
Key Operators	V7-T1-306
Illuminated Selector Switch Operators	V7-T1-308
Accessories	V7-T1-309
Options	V7-T1-311
Replacement Parts	V7-T1-317
Technical Data and Specifications	V7-T1-319
Dimensions	V7-T1-322

Standards and Certifications

- CE EN60947-5-1 and 60947-5-5
- UL 508—File No. E131568
- CSA C22.2 No. 14—File No. LR68551
- FDA 3-A Sanitary Standards



Ingress Protection

When mounted in similarly rated enclosure—

- Standard indicating lights
 - UL (NEMA) Type 1, 2, 3, 3R, 3S, 4, 4X, 12, 13
 - IEC IP65
- All other operators
 - UL (NEMA) Type 1, 2, 3, 3R, 4, 4X, 12, 13
 - IEC IP65

Product Overview

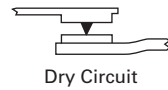
Ultraviolet Light

E34 cathodic coating is not recommended for use in applications where exposure to ultraviolet light exists—use NEMA 4X 10250T operators.

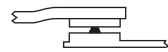
Reliability Nibs

Eaton's contact blocks feature enclosed silver contacts with pointed "reliability nibs" for reliable performance from logic level up to 600V. To ensure reliable switching, nibs bite through oxide which can form on silver contacts, eliminating the need for expensive logic level blocks for most applications.

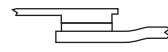
Reliability Nibs



Dry Circuit



Medium Duty



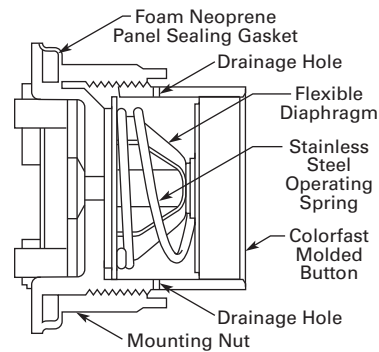
Heavy-Duty

Diaphragm Seal with Drainage Holes

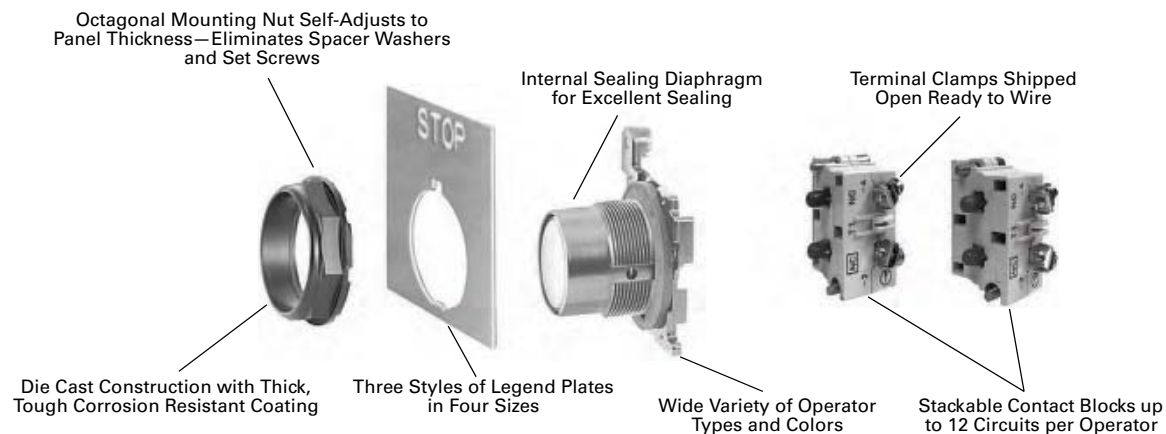
Liquid Drainage

Eaton's pushbutton operators offer front of panel drainage via holes in the operator bushing. Hidden from view by the mounting nut, these holes prevent buildup of liquid inside the operator, which can prevent operation in freezing environments. The holes also provide a route for escaping liquid in high pressure washdowns, effectively relieving pressure from the internal diaphragm seal, ensuring reliable sealing in applications even beyond NEMA 4.

Diaphragm Seal



1

Product Identification**30.5 mm Corrosion Resistant Watertight/Oiltight—E34 Series**

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Standard Indicating Lights, PresTest and Master Test

Light Unit Type	
Standard—Incandescent	Standard—LED
TB120 = 120V/XFR	TB120L = 120V/XFR
TB240 = 240V/XFR	TB240L = 240V/XFR
TB277 = 277V/XFR	TB277L = 277V/XFR
TB380 = 380V/XFR	TB380L = 380V/XFR
TB480 = 480V/XFR	TB480L = 480V/XFR
TB600 = 600V/XFR	TB600L = 600V/XFR
FB06 = 6V/FV	FB197L = Full voltage
FB12 = 12V/FV	
FB24 = 24V/FV	
FB32 = 32V/FV	
FB48 = 48V/FV	
RB120 = 120V/RES	
RB240 = 240V/RES	
NB120 = 120V/neon	
NB240 = 240V/neon	
	PresTest—LED
	TPB120L = 120V/XFR
	TPB240L = 240V/XFR
	TPB380L = 380V/XFR
	TPB480L = 480V/XFR
	TPB600L = 600V/XFR
	FPB297L = Full voltage

Note

① Add X at end of catalog number to receive parts assembled from factory.

Catalog Number Selection is for illustrative purposes only and not to be used to create new catalog numbers.

Ordering Complete Devices

Complete E34 pushbuttons, indicating lights and/or selector switch operators including contact block(s) and legend plate can be ordered using a single composite catalog number. The

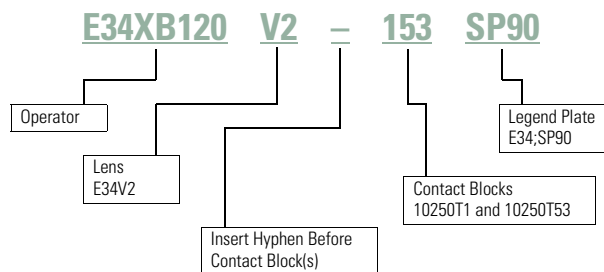
individually packaged components will be shipped unassembled in a single overpack carton marked with the composite catalog number.

Ordering Example

Illuminated Pushbutton Device—Catalog Number E34XB120V2-153SP90

For a complete Catalog Number breakdown, see **Pages V7-T1-287 to V7-T1-288.**

For Complete E34 Device Ordering



Product Selection

Plastic Lens Indicating Light Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

24V Full Voltage
Indicating Light

Indicating Light Units

Type	Voltage	Color	LED/Lamp Number	Indicating Light ^① Catalog Number
LED Lamp				
Full voltage	24 Vac/Vdc	Red	Bayonet base	E34FB197LRP24
		Green		E34FB197LGP24
		Amber		E34FB197LAP24
	120 Vac	Red		E34FB197LRP2A
		Green		E34FB197LGP2A
		Amber		E34FB197LAP2A
Incandescent Lamp				
Full voltage	24 Vac/Vdc	Red	#757	E34FB24H2X
		Green		E34FB24H3X
		Amber		E34FB24H9X
Resistor	120 Vac/Vdc	Red	120MB	E34RB120H2X
		Green		E34RB120H3X
		Amber		E34RB120H9X
Transformer	120 Vac 50/60 Hz	Red	#755	E34TB120H2X
		Green		E34TB120H3X
		Amber		E34TB120H9X

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① Anodized aluminum head—may not be suitable for some corrosive environments.

Illuminated Pushbuttons and Indicating Lights

Illuminated Pushbutton

Operators without Lens



Indicating Light



PresTest



Type	Voltage	Lamp Number	Illuminated Pushbutton Catalog Number	Indicating Light Catalog Number	PresTest Catalog Number
LED Lamp (LEDs not included) ①					
Full voltage	—	Bayonet base	E34CB497L	E34FB197L	E34FPB297L
Transformer AC only	24		E34XB024L	—	—
	120		E34XB120L	E34TB120L	E34TPB120L
	240		E34XB240L	E34TB240L	E34TPB240L
	277		E34XB277L	E34TB277L	—
	380		E34XB380L	E34TB380L	E34TPB380L
	480		E34XB480L	E34TB480L	E34TPB480L
	600		E34XB600L	E34TB600L	E34TPB600L
Incandescent Lamp					
Full voltage AC/DC	6	#755	E34CB06	E34FB06	E34FPB06
	12	#756	E34CB12	E34FB12	E34FPB12
	24	#757	E34CB24	E34FB24	E34FPB24
	32	#1828	E34CB32	E34FB32	E34FPB32
	48	#1835	E34CB48	E34FB48	E34FPB48
Resistor AC/DC ②	120	120MB	E34SB120	E34RB120	E34RPB120
	240		E34SB240	E34RB240	E34RPB240
Transformer AC only	24	#755	E34XB024	—	—
	120		E34XB120	E34TB120	E34TPB120
	240		E34XB240	E34TB240	E34TPB240
	277		E34XB277	E34TB277	—
	380		E34XB380	E34TB380	E34TPB380
	480		E34XB480	E34TB480	E34TPB480
	600		E34XB600	E34TB600	E34TPB600
Neon AC/DC	120	NE51H-R-22	—	E34NB120	—
	240	NE51H-4-68	—	E34NB240	—

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

① These units do not include lamps. Order LED separately to match lens color, see **Page V7-T1-269** for LED Selection and **Pages V7-T1-287 to V7-T1-288** for Catalog Numbering Selection.

② Resistor units are not available for use with LEDs, choose either transformer or full voltage LED style.

Plastic**Indicating Light Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34H2	E34G2
Green	E34H3	E34G3
Yellow	E34H4	E34G4
White	E34H5	E34G5
Blue	E34H6	E34G6
Ambler	E34H9	E34G9
Clear	E34H0	E34G0

Glass**E34V_****Illuminated Pushbutton Lens**

Color	Catalog Number
Red	E34V2
Green	E34V3
Yellow	E34V4
White	E34V5
Blue	E34V6
Ambler	E34V9
Clear	E34V0

Plastic**PresTest Lens**

Color	Plastic Catalog Number	Glass ^① Catalog Number
Red	E34V2	E34P2
Green	E34V3	E34P3
Yellow	E34V4	E34P4
White	E34V5	E34P5
Blue	E34V6	E34P6
Ambler	E34V9	E34P9
Clear	E34V0	E34P0

Glass**Note**

^① Glass lens has black anodized aluminum bezel.

Vertical or Horizontal
One-Hole Mounting ^③



Potentiometers

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

Potentiometer with Knob and Standard Dial Plate—Linear Type $\pm 10\%$

Potentiometer Ohms	Catalog Number
2 Watt (60V Max.) Single Potentiometer with Standard Aluminum Dial Plate ^{④⑤}	
1000	E34PDB1F1
2500	E34PDB1F2
5000	E34PDB1F5
10000	E34PDB1F10
25000	E34PDB1F25
50000	E34PDB1F50
Operator only ^⑥	E34PDB1A0
Alternative—black plastic large legend with standard markings	E34LP99

Dimensions, see **Page V7-T1-322**.

Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.

^① X = closed circuit, O = open circuit.

^② To order different type or color lens, substitute the underlined characters with appropriate suffix code from table on the bottom of **Page V7-T1-295**.

Example: E34GFB79M3-3X. For LEDs with different voltages see ordering example on **Page V7-T1-301**.

^③ Shown with standard aluminum dial plate.

^④ Large dial plate with space for legend is available at no charge. To order, add suffix **36** to catalog number.

Example: E34PDB1F136. To order separately, see footnote ^⑥ below.

^⑤ Large dial plate has space at top for 15 letters. 3/32 in high. For custom stamped legend plates, order legend plate as separate item **10250TR30** and specify stamping.

^⑥ For use with commercially purchased potentiometers having shaft dimensions per dimension drawing on **Page V7-T1-274**.

Standard LED Lamp



LED Selection

Voltage	Color	Catalog Number
6 Vac/Vdc suitable for use with transformers	Red	E22LED006RN
	Orange	E22LED006ON
	Yellow	E22LED006YN
	Green	E22LED006GN
	Blue	E22LED006BN
	White	E22LED006WN
12 Vac/Vdc	Red	E22LED012RN
	Orange	E22LED012ON
	Yellow	E22LED012YN
	Green	E22LED012GN
	Blue	E22LED012BN
	White	E22LED012WN
24 Vac/Vdc	Red	E22LED024RN
	Orange	E22LED024ON
	Yellow	E22LED024YN
	Green	E22LED024GN
	Blue	E22LED024BN
	White	E22LED024WN
48 Vac/Vdc	Red	E22LED048RN
	Orange	E22LED048ON
	Yellow	E22LED048YN
	Green	E22LED048GN
	Blue	E22LED048BN
	White	E22LED048WN

Voltage	Color	Catalog Number
60 Vac/Vdc	Red	E22LED060RN
	Orange	E22LED060ON
	Yellow	E22LED060YN
	Green	E22LED060GN
	Blue	E22LED060BN
	White	E22LED060WN
120 Vac	Red	E22LED120RA
	Orange	E22LED120OA
	Yellow	E22LED120YA
	Green	E22LED120GA
	Blue	E22LED120BA
	White	E22LED120WA
120 Vdc	Red	E22LED120RD
	Orange	E22LED120OD
	Yellow	E22LED120YD
	Green	E22LED120GD
	Blue	E22LED120BD
	White	E22LED120WD

1

Selector Switch Units

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

- Two-, three- and four-position—maintained
- Non-illuminated and illuminated

Two-Position Maint. Switch Knob**Two-Position Selector Switch**

Operator Position ^①		Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
				A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	M	1NC			1	E34VFBK1-1X	E34VFB1-1X	E34VFB120ER-1X	E34VFB120FR-1X
0	X		1NO							

Three-Position Maint. Switch Knob**Three-Position Selector Switch**

Operator Position ^①			Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
					A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	M	1NO			3	E34VHBK1-2X	E34VHBL1-2X	E34VHB120TER-2X	E34VHB120TFR-2X
0	0	X		1NO							
X	0	0	M	1NO			3	E34VHBK1-23X	E34VHBL1-23X	E34VHB120TER-23X	E34VHB120TFR-23X
0	X	0									
0	0	X		2NC (Series)							
			1NO								

Four-Position Maint. Switch Lever**Four-Position Selector Switch**

Operator Position ^①				Operator Action ^②	Contact Type	Mounting Location		Cam Code	Non-Illuminated	Black Lever	Illuminated—120V Transformer	
						A	B		Black Knob Catalog Number ^③	Catalog Number ^③	Red Knob Catalog Number ^③	Red Lever Catalog Number ^③
X	0	0	0	M	1NC			7	E34VTBK1-23X	E34VTBL1-23X	E34VRB120TER-23X	E34VRB120TFR-23X
0	X	0	0		1NO							
0	0	X	0	M	1NO							
0	0	0	X		1NO							
				1NC								

Color Selection, Non-Illuminated

Color	Code Letter	Color	Code Letter
Black	1	White	5
Red	2	Blue	6
Green	3	Gray	7
Yellow	4	Orange	8

NotesFor Light Unit Voltage Suffix and Knobs, Levers tables, see **Page V7-T1-308**.Use NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① X = closed circuit, 0 = open circuit.^② M = Maintained.^③ To order different type or color selector switch, substitute the underlined character with appropriate suffix code from the Color Selection table. Example: E34VFBK2-X1.

Selector Switch Selection



Cam and Contact Block Selection

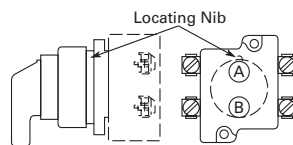
Selector switches in their varied forms (two-position, three-position and four-position) are a big factor contributing to the great flexibility of control that a well rounded line of “pushbuttons” can achieve. Because of their flexibility, they tend to cause difficulty with product selection and application. The following systematic approach should simplify that task.

Cam and contact block selection is better understood if you:

- Work with each incoming and outgoing wire/circuit separately.
- Recognize the terms NO and NC only identify the type of contact by its mode before mounting to the operator. The “X-O” chart (Page V7-T1-305) shows how that contact will act after assembly to the operator with the selected cam shape. X = closed circuit, O = open circuit.

- Up to six NO or NC contacts may be mounted behind each plunger location for a total of twelve contacts. Single circuit contact blocks have only one plunger with the other side of the block “open.” Therefore, single circuit contact blocks transmit motion to blocks behind them only for the position containing the circuit.
- Each cam has two separate lobes, each of which operates one of the two contact block plungers independently of each other. Those are identified as position A (locating nib side) and position B (opposite of locating nib). The position designations give direction in selecting and mounting of the contact blocks.

Contact Circuit Locations

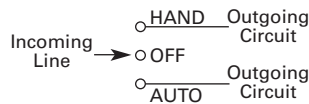


Systematic Approach

Application: **HAND-OFF-AUTO** selector switch. In this circuit, one incoming line is distributed to two other outgoing circuits by the switch. The two circuits can be looked at individually.

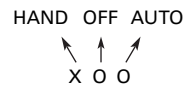
Step 1: Elementary Diagram.

Construct on paper, or in your mind, a simple elementary diagram of the switching scheme as follows:



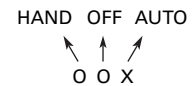
Step 2: “X-O” Pattern.

From the elementary diagram, you can construct an “X-O” diagram which describes when the contacts are to be closed (X) or open (O) in the various positions of the switch. The “X-O” for the **HAND** circuit looks like this:



In this circuit, you want a contact closed on the left (HAND) but open in the center and right.

For the **AUTO** circuit, the “X-O” diagram would look like this:



Putting them together, the complete “X-O” diagram is:



Once the “X-O” diagram has been generated, the next step is to select the cam and contact block, or blocks, needed to perform the desired “X-O” functions. The selection tables on the following pages list the various types (shapes) of cams by number to choose from and the type of contact and position to achieve the function outlined in your “X-O” diagram.

1

Step 3: Cam Selection.

The cam you select determines the operation of all contact blocks mounted to the operator. It is selected on the basis that it provides the simplest circuitry for the desired "X-O" diagram. The selection tables show all the "X-O" combinations. For the purpose of this example, the applicable portion of those tables is shown on this page.

Now to make the cam selection, make a simple worksheet such as:

	Cam 2	Cam 3
X O O	(A)NO-(B)NC	(A)NO
O O X	(B)NO	(B)NO

It becomes immediately obvious that cam 3 is the better choice for two reasons, (1) the series combination can be avoided making it simpler to wire, (2) only two contacts are required, which is less expensive than the three contacts required by cam 2.

Step 4: Contact Block Selection.

Having selected the cam, contact block selection is simply a matter of gathering the A position and B position circuits into pairs which make up the most convenient contact block arrangement. If there is an imbalance in the number of circuits under A or B, then single circuit blocks must be selected for these leftover circuits.

Back to the worksheet, having selected cam 3 do this:

X O X	(A)NO	10250T2
O O X	(B)NO	

Step 5: Selector Switch Operator.

Lastly, you have to choose from the many types of operators—knob and lever in various colors or keyed. Also what combinations of maintained and spring return functions are required. Selection of these operators can be found on **Page V7-T1-306**. For the example in step 4, you may want a three-position maintained black knob, cam 3—Catalog Number E34VHBK1.

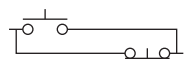
The Complete Switch:

E34VHBK1 with one 10250T2 or, for one composite catalog number, E34VHBK1-Y1 found on **Page V7-T1-303**.

Diagrams

Circuits shown illustrate connections to obtain a selector switch circuit combination and are shown with their appropriate line diagrams. Field wiring of jumper connections required as shown.

X = Closed circuit
O = Open circuit

Wiring of Jumper Connections**Series Connection****Parallel Connection**

Four-position selector switches are limited to four contact blocks.

Contact Blocks

For selection and number of available contact blocks per operator, see **Page V7-T1-315**.

Example Selection Table

No.	"X-O" Pattern	Cam Code #2 Top A Bottom B	Cam Code #3 Top A Bottom B
1	X 0 0	NO NC	NO
4	0 0 X	— NO	— NO

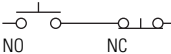
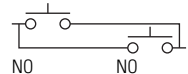
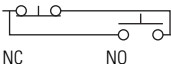
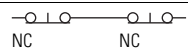
Two-Position Selector Switch Contact Block Selection

No.	Desired Circuit and Operator Position	Contact Blocks Required to Accomplish Circuit Function
		Top Plunger A Bottom Plunger B
1	X 0	NC or NC
2	0 X	NO or NO

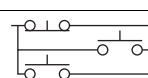
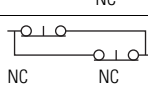
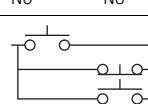
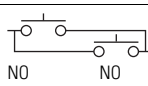
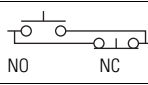
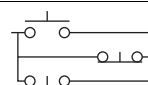
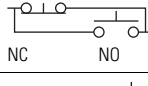
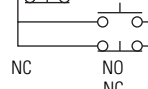
Note

① Wired in series.

Three-Position Switch—Cam and Contact Block Selection

No.	Desired Circuit and Operator Position			Contact Blocks Required to Accomplish Circuit Function (Jumpers must be installed where indicated)	
				Operator with Cam Code #2	Operator with Cam Code #3
				Mounting Location Top Plunger A Bottom Plunger B	Mounting Location Top Plunger A Bottom Plunger B
1	X	0	0		
2	X	X	0		
3	X	0	X		
4	0	0	X		
5	0	X	X		
6	0	X	0		

Four-Position Switch—Contact Block Selection

No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function		No.	Desired Circuit and Operator Position				Contact Blocks Required to Accomplish Circuit Function		
					Mounting Location							Mounting Location		
					Top Plunger A	Bottom Plunger B						Top Plunger A	Bottom Plunger B	
1	X	0	0	0		NC	10	X	0	X	0		NC NO	
2	0	X	0	0			NO							
3	0	0	X	0		NO	11	X	X	X	0		NC NO	
4	0	0	0	X			NC						NO	
5	X	0	0	X		NC NC	12	0	X	X	X		NO NC NO	
6	0	X	X	0		NO NO								
7	0	0	X	X		NO NC	13	X	0	X	X		NO NC	
8	X	X	0	0		NC NO								
9	0	X	0	X			NO NC	14	X	X	0	X		NC NO NC

1

Selector Switch Operators

UL (NEMA) Type 3, 3R, 4, 4X, 12, 13

**Two-Position Knob
Selector Switch****Operators with Knob Assembled**

Positions	Operator Action ^①	Black Knob Selector Switch— Vertical Mounting ^②	
		Cam Code ^③	Catalog Number ^④
Two-position—60° throw		1	E34VFBK1
		1	E34VEBK1
Three-position—60° throw		2	E34VGBK1
		3	E34VHBK1
		2	E34VJBK1
		3	E34VKBK1
		2	E34VLBK1
		3	E34VMBK1
		2	E34VNBK1
		3	E34VPBK1
Four-position—40° throw		7	E34VTBK1

NotesUse NEMA 4X 10250T operators where exposed to ultraviolet light, see **Pages V7-T1-213 to V7-T1-283**.^① M = Maintained. S = Spring return in direction of arrow (R).^② Field convertible to horizontal mounting.^③ For selection of the proper cam and contact block to obtain the proper circuit sequence, see selection instructions and tables on **Pages V7-T1-303 to V7-T1-305**.^④ For other colors of either the knob or lever, replace the underlined characters of the catalog number with the appropriate suffix code from Alternate Knob and Lever table on **Page V7-T1-307**. Example: E34VFBL2.^⑤ Choose key removal position required for application from table on **Page V7-T1-307**. Add key removal code number to listed catalog number. Example: E34KFB2.

E34K_



E34L_



E34A_

**Alternate Knobs and Levers for Operators** ^②

Color	Knob Suffix Code	Catalog Number	Lever Suffix Code	Catalog Number	Lever Designed for Added Ingress Protection ^③	
					Suffix Code	Catalog Number
Black	K1	E34K1	L1	E34L1	A1	E34A1
Red	K2	E34K2	L2	E34L2	A2	E34A2
Green	K3	E34K3	L3	E34L3	A3	E34A3
Yellow	K4	E34K4	L4	E34L4	A4	E34A4
White	K5	E34K5	L5	E34L5	A5	E34A5
Blue	K6	E34K6	L6	E34L6	A6	E34A6
Gray	K7	E34K7	L7	E34L7	A7	E34A7
Orange	K8	E34K8	L8	E34L8	A8	E34A8

Notes

① Key removal in “spring return from” positions not recommended.

② See operators on **Page V7-T1-306**.

③ For use on maintained operators only.

Contact Blocks**Standard Contact Blocks**

- UL A600/P600 rated
- Color-coded plungers—red/green for NC/NO circuits
- Silver contact tips with “reliability nibs”
- Black (opaque) or amber (translucent) housings
- Pressure plate or spade terminals
- Fingerproof shrouds (for pressure terminals only)

Logic Level Contact Blocks

- UL A600/P600 rated
- Black plungers
- Inert palladium knife-blade contacts
- Black (opaque) housings
- Pressure plate or spade terminals
- Fingerproof shrouds not available

Special Function Contact Blocks

- UL A600/P600 rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Special Purpose Contact Block

- Maximum 300V rated
- Black plungers
- Silver contact tips with “reliability nibs”
- Black (opaque) housings
- Pressure plate terminals only
- Fingerproof shrouds not available

Reliability Nibs

Reliability nibs are the hallmark of Eaton’s contact blocks. A pointed silver nib on the contact tip ensures reliable switching from logic level (5V) up to 600V applications. Therefore standard contact blocks can be used for most logic level applications where the contacts are not exposed to any harsh environmental conditions.

Palladium Contacts

Palladium, which is more inert than gold, is well suited for voltages and currents approaching zero and is recommended for applications where environmental conditions are a factor.

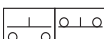
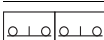
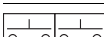
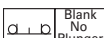
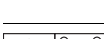
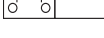
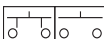
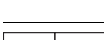
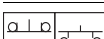
Maximum Contact Block Mounting per Operator Type

Operator	Max. Stack
Pushbuttons	6
Push-pull operators	2
Roto-push operators	4
Two- or three-position selector switches	6
Four-position selector switches	4
Joysticks	4

10250T1



Contact Blocks

Symbol	Circuit	Description ①	Standard Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	Logic Level Pressure Terminal Catalog Number	Spade Terminal Catalog Number ②	
	Blank No Plunger	1NC	Stack up to six blocks (six circuits) unless otherwise noted.	10250T51	10250T59	10250T51E	10250T59E
	Blank No Plunger	1NO	Stack up to six blocks six circuits) unless otherwise noted.	10250T53	10250T60	10250T53E	10250T60E
		NO-NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T1	10250T40	10250T1E	10250T40E
		2NC	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T3	10250T42	10250T3E	10250T42E
		2NO	Stack up to six blocks (12 circuits) unless otherwise noted.	10250T2	10250T41	10250T2E	10250T41E
Special Function Blocks ③							
	Blank No Plunger	LONC	Late opening NC. Stack up to six blocks (six circuits) unless otherwise noted.	10250T71 ③	—	10250T71E ③	—
		ECNO-NC	Early closing NO and standard NC. Stack up to six blocks unless otherwise noted.	10250T47 ③④	—	10250T47E ③	—
		ECNO-NO	Early closing NO and standard NO. Stack up to four blocks unless otherwise noted.	10250T57 ③④	—	10250T57E ③	—
		2LONC	Two late opening NC contacts. Stack up to six blocks unless otherwise noted.	10250T45 ③	—	10250T45E ③	—
		LONC-ECNO	Overlapping contacts. Stack up to four blocks unless otherwise noted.	10250T55 ③④	—	10250T55E ③	—
Special Purpose Blocks ⑤							
	2NO-2NC	Four circuits in single block depth. Rated 300V max. Stack up to four blocks unless otherwise noted.	10250T44 ⑤	—			

Notes

- ^① All 10250T contact blocks shown are suitable for use on standard 10250T and E34 operators. These contact blocks are not suitable for Class I Division 2 type 10250T or E34 devices.
- ^② Contact blocks with spade terminals are limited to a maximum of one contact block per operator and minimum spacing between devices is 2.5 in (63.5 mm). Not suitable for use in 10250T or E34 enclosures. Also available in amber housing. Not available with fingerproof shrouds.
- ^③ Special function contact blocks are not suitable for use with roto-push operators, three-position push-pull operators, or four-position selector switches.
- ^④ ECNO contact blocks are not suitable for use with two-position joysticks or when operators are used with padlock attachments.
- ^⑤ Special purpose 10250T44 contact blocks are not suitable on selector switches or roto-push operators. Okay to use with three-position push-pull operators only on low voltage (30V or less) circuits.



**Flush Head
Pushbutton Operator**



**Mushroom Head
Pushbutton Operator**



**Jumbo Mushroom
Head Operator**



Potentiometers



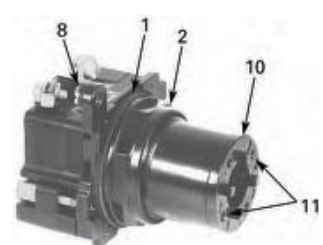
**Illuminated
Pushbutton Operator**



**Transformer Type
Indicating Light**



**Knob-Operated
Selector Switch
Operator**



**Full Voltage, Resistor
and Transformer Type
Illuminated Selector Switch**

E34 Style Operator Replacement Parts

Item No.	Description	No. Req.	Part Number
1	Gasket	1	16-1548
2	Mounting nut	1	15-1530-4
3	Set screw (#6-32 x 0.250 in long hollow hex)	2	11-2014
4	Mushroom head button (includes [2] item 5)	1	As Req. Below
	Black	—	53-1317
	Red	—	53-1317-2
	Yellow	—	53-1317-3
	Green	—	53-1317-4
	Blue	—	53-1317-22
5	Set screw (#10-32 x 0.250 in long hollow hex)	2	11-544
6	Jumbo mushroom head button (aluminum—includes [2] item 5)	1	As Req. Below
	Red	—	53-1317-9
	Black	—	53-1317-10
	Yellow	—	53-1317-11
	Green	—	53-1317-12
7	Jumbo mushroom head button (aluminum—red EMERG. STOP) does not include item 5	1	53-1349-18
8	Mounting screw (#6-32 x 0.710 in long)	2	10250TA79
	Washer	2	16-2038
9	Terminal screw and lug (captive)	Req.	80-5502
10	Gasket (supplied with basic unit)	1	32-803
11	Round head screw (#4-40 x 0.344 in long) (supplied with basic unit)	2	11-4553

Item No.	Description	No. Req.	Part Number
12	Mounting screw	2	11-1632
13	Simple potentiometer (does not include items 18, 28 or 29)	1	As Req. Below
	1,000 ohms	—	41-782-2
	2,500 ohms	—	41-782-3
	5,000 ohms	—	41-782-10
	10,000 ohms	—	41-782-4
	25,000 ohms	—	41-782-5
	50,000 ohms	—	41-782-6
14	Connector (includes screw and lug)	2	25-1851
15	Indicating plate	1	As Req. Above
	Standard size (without legend)	—	30-4460
	Large size (specify legend)	—	10250TR30
16	Retaining nut	1	15-1547-3
17	Knob	1	53-1314
	Socket set screw (#6-32 x 0.250 in long)	1	11-2014
18	Coupling	1	11-2014 29-3749-2
19	Set screw (#6-32 x 0.188 in long)	1	11-1199
20	Spacer	2	56-1066-18
21	Connector (includes screw and lug)	1	25-1851-2
22	Mounting nut	1	15-1938-2

Technical Data and Specifications

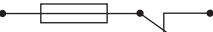
Mechanical Ratings

Description	Specification
Frequency of Operation	
All pushbuttons	6000 operations/hr.
Key and lever selector switches	3000 operations/hr.
Auto-latch devices	1200 operations/hr.
Life	
Pushbuttons	10 x 10 ⁶ operations
Contact blocks	10 x 10 ⁶ operations
PresTest units	10 x 10 ⁶ operations
Lever and key selector switches	0.25 x 10 ⁶ operations
Twist to release pushbuttons	0.3 x 10 ⁶ operations
Shock Resistance	
Duration	210 ms ≥5g

General Specifications

Description	Specification
Climate Conditions	
Operating temperature	1° to 150°F (–17° to 66°C)
Storage temperature	–40° to 176°F (–40° to 80°C)
Altitude	6,562 ft (2,000m)
Humidity	Max. 95% RH at 60°C
Terminals	
Marking	NC-NO on the contact block to meet the NEMA requirements. Dual marking system 1–2 for normally closed, 3–4 for normally open to meet BS5472 (Cenelec EN50 005).
Clamps	Terminals are saddle clamp type for 1 x 22 AWG (0.34 mm ²) to 2 x 14 AWG (2.5 mm ²) conductors
Torque	7 lb-in (0.8 Nm)
Degree of protection against direct electrical contact	IP2X with fingerproof shroud
Light Units	
Transformers	Will withstand short-circuit for 1 hour per IEC 60947-5-1
Bulbs—average life:	
Transformer type	20,000 hrs.
Resistor/direct voltage type	2500 hrs. minimum at rated V
LED	60,000 to 100,000 hrs.

Electrical Ratings

Description	Specification
Insulation	$U_i = 660 \text{ Vac or Vdc}$
Thermal	$I_{th} = 10\text{A}$
Short Circuit Coordination to IEC/EN 60947-5-1	
Rated conditional short circuit current	1 kA
Fuse type	GE power controls TIA 10, red spot type gG, 10A, 660 Vac, 460 Vdc, BS88-2, IEC 60269-2-1
	
UL rating	A600, P600
AC load life duty cycle 1200 operations/hour	
10A	110V pf 0.4— 1×10^6 operations
5A	250V pf 0.4— 1×10^6 operations
2A	600V pf 0.4— 1×10^6 operations
Switching capacity	
AC 15 rated make/break ($11 \times I_g$ at $1.1 \times U_g$)	
6A	120V pf 0.3
4A	240V pf 0.3
2A	660V pf 0.3
DC13 rated make/break ($1.1 \times I_g$ at $1.1 \times U_g$)	
1.0A	125V L/R ≥ 0.95 at 300 ms
0.55A	250V L/R ≥ 0.95 at 300 ms
0.1A	660V L/R ≥ 0.95 at 300 ms
10A	110V pure resistive
Maximum ratings for logic level and hostile atmosphere application	
Maximum amperes	0.5A
Maximum volts	120 Vac/Vdc
Low voltage switching	Conical shaped points or “reliability nibs” improve performance in dry circuit, corrosive, fine dust and other contaminated atmospheres. Under normal environmental conditions, the minimum operational voltage is 5V and the minimum operational current is 1 mA, Vac/Vdc.
Contact operation	Slow make and break. All normally closed contacts have positive opening operation, i.e., normally closed contacts are forced open in the event of contact weld or spring breakage.

Electrical Ratings—Contact Block**Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC**

Description	50 Vac or 60 H				Vdc		
	120	240	480	600	24/28	125	250
Meet or Exceed NEMA Rating Designations A600, A300 and B300 for AC and P600 for DC							
Make and emerg. interrupting capacity (amp)	60	30	15	12	5.7	1.1	0.55
Normal load break (amp)	6	3	1.5	1.2	5.7	1.1	0.55
Thermal current (amp)	10	10	10	10	5.0	5.0	5.0
Voltamperes:							
Make and emerg. interrupting capacity	7200	7200	7200	7200	138	138	138
Normal load break	720	720	720	720	138	138	138

Mounting Options

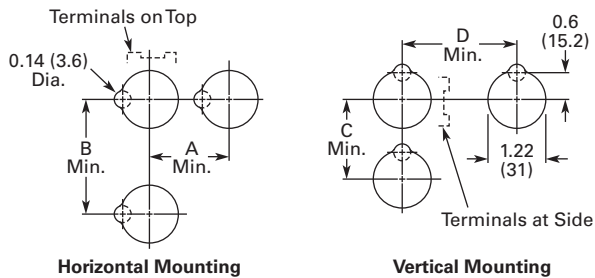
Panel Thickness

- Minimum: 0.06 in (1.6 mm)
- Maximum: 0.25 in (8 mm) including legend plate
- Maximum can be increased to 0.375 in (15.9 mm) using optional retaining nut
 - Indicating light: 10250TA30
 - Pushbutton/selector switch: 10250TA31

Mounting Matrix

Legend Plate	Dimensions in Inches (mm)			
	A	B	C	D
Small	1.63 (41.3)	2.25 (57.2)	2.25 (57.2)	1.63 (41.3)
Medium	1.75 (44.5)	2.25 (57.2)	2.25 (57.2)	1.75 (44.5)
Large	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)	2.25 (57.2)

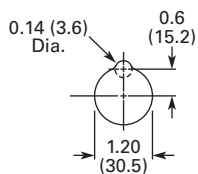
Mounting Options in Inches (mm)



Horizontal mounting means terminals are located top and bottom of contact block.
 Vertical mounting means terminals are left and right of contact block.
 This allows close spacing of adjacent operators with easy access to terminals.

Locating nib hole or notch is 0.14 in (3.6 mm) #29 drill.

Drilling Dimensions in Inches (mm)



Eaton E34FPB297LGP2A

Catalog Number: E34FPB297LGP2A

Eaton E34 pushbutton, Green, Corrosion Resistant Assembled Indicating Light, PresTest, LED, Full voltage, NEMA 3, 3R, 4, 4X, 12, 13, 120 Vac, Bayonet base, Green, Plastic, 120 V



General specifications

Product Name

Eaton E34 pushbutton

Catalog Number

E34FPB297LGP2A

UPC

782114718933

Product Length/Depth

0.01 in

Product Height

0.01 in

Product Width

0.01 in

Product Weight

0.01 lb

Warranty

1 year

Compliances

FDA 3-A

CE Marked

Certifications

UL Listed

CSA Certified

Catalog Notes

Use NEMA 4X 10250T operators where exposed to ultraviolet light

Product specifications

LED lamp number

Bayonet base

Supply voltage

120 Vac

Light unit type

LED, full voltage

Series

E34

Type

30.5 mm, Corrosion Resistant Watertight/Oiltight

Lamp voltage

120 Vac

Rating

NEMA 4

NEMA 3

NEMA 12

NEMA 4X

NEMA 13

NEMA 3R

Lens material

Plastic

Lens color

Green

Actuator

PresTest

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34FPB297LGP2A

Cam selection for pushbutton selectors



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Eaton E34PDB1F1

Catalog Number: E34PDB1F1

Eaton E34 Potentiometer, 30.5 mm, Corrosion Resistant, 60 Vac/dc, 2W DC coil power, NEMA 3, 3R, 4, 4X, 12, 13, 1000 Ohms



General specifications

Product Name	Catalog Number
Eaton E34 potentiometer	E34PDB1F1
UPC	Product Length/Depth
	2.4 in
Product Height	Product Width
3. in	2 in
Product Weight	Warranty
0.35 lb	1 year
Compliances	Certifications
CE Marked	UL Listed
FDA 3-A	CSA Certified

Catalog Notes

Large dial plate with space for legend is available at no charge. Large dial plate has space at top for 15 letters, 3/32 inch high. For custom stamped legend plates, order legend plate as separate item 10250TR30 and specify stamping.

Product specifications

Product Category

Potentiometer

Resistance

1000 Ω

Special features

2W DC coil power

Series

E34

Type

30.5 mm, Corrosion Resistant

Rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Voltage rating

60 Vac/dc

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

How to size and select a Power Supply

Specifications and datasheets

Eaton Specification Sheet - E34PDB1F1

Cam selection for pushbutton selectors



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Eaton E34VHBL1-2X

Catalog Number: E34VHBL1-2X

Eaton E34 pushbutton selector switch, Corrosion Resistant Watertight/Oiltight, 30.5 mm, Selector switch, Knob, 1/4 in, Three-position, Cam 3, Maintained, NEMA 3, 3R, 4, 4X, 12, 13



General specifications

Product Name	Catalog Number
Eaton E34 pushbutton selector switch	E34VHBL1-2X
UPC	Product Length/Depth
782113027753	2 in
Product Height	Product Width
3.5 in	2.5 in
Product Weight	Warranty
0.3 lb	1 year
Compliances	
CE Marked	

Product specifications

Product Category

Selector switch

Number of positions

3

Series

E34

Type

Knob

Operating mode

Maintained

NEMA rating

NEMA 3, NEMA 3R, NEMA 4, NEMA 4X, NEMA 12, NEMA 13

Size

1/4 in

Cam code

Cam 3

Resources

Brochures

10250T and E34 Class I Division 2

Catalogs

Eaton's Volume 7—Logic Control, Operator Interface and Connectivity Solutions

Multimedia

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Eaton Specification Sheet - E34VHBL1-2X



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FC-R1 Cut Sheet



AutomationDirect temperature transmitter, isolated, Input: 1-channel, RTD, deg F or deg C, Output: 1-channel, current, 24 VDC operating voltage, 35mm DIN rail or panel mount, removable screw terminal plugs.

For complete product information, please see this item on our store at the following link:



<https://www.automationdirect.com/pn/FC-R1>

Technical Specifications

Brand	AutomationDirect
Item	Temperature transmitter
Isolation	Isolated
Field Configurable	Yes
Number Of Input Channels	1
Input	RTD
Input RTD Signal Types	Pt100, Pt1000 and Cu10
Programmable Temperature Range	Deg F or deg C

Number Of Output Channels	1
Output	Current
Output Current Signal Range	4-20 mA
Operating Voltage	24 VDC
Housing Material	Plastic
Mounting	35mm DIN rail or panel
Electrical Connection	Removable screw terminal plugs

Agency Approvals

UL Listed File #	None
UL Recognized File #	None
UL Hazardous File #	E200031
CE	View CE declarations
CSA File #	None
RoHS Status	Yes (See CE Doc)
EU REACH	View EU REACH document

Dimensional Drawings



2D Drawing PDF Link:
<https://cdn.automationdirect.com/static/drawings/FC-R1.pdf>
See store item page for other formats.

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FC-R1 RTD Input Loop Powered Signal Conditioner

\$192.00



cULus UL file E200031

Overview

The FC-R1 is a DIN-rail or side-mount Resistive Temperature Detector signal conditioner. It is a non-isolated signal conditioner which converts a 3-wire RTD to a linearized 4-20 mA current loop signal.

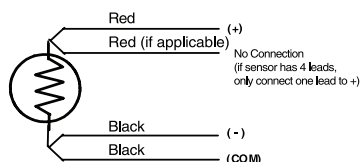
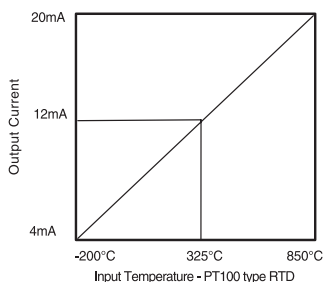
The FC-R1 has a user selectable CU10 (10 Ohm copper), PT100 (100 Ohm platinum) or PT1000 (1000 Ohm platinum) RTD input, and also offers OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET has an adjustment range of 0 to 25% of full scale output and the SPAN has an adjustment of 80% to 102%.



Click on the thumbnail or go to <https://www.automationdirect.com/VID-TE-0006> for a short video on Remote Temperature Sensing

Application

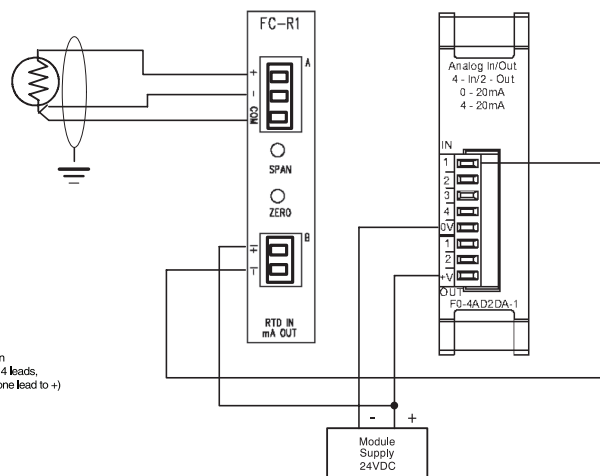
The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to PLC analog current input modules. It is recommended that shielded RTDs be used whenever possible to minimize noise on the input signal.



Specifications

Input Ranges	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10, PT100 500 μ A $\pm$ 50 μ A PT1000 80 μ A $\pm$ 20 μ A		
Common Mode Range	0 - 3.5 VDC		
Output Range	4-20 mA (linearized)		
Maximum Inaccuracy	0.35% FSO / CU10 0.2% FSO @ 25°C / PT100 & PT1000 0.26% FSO @ 60°C / PT100 & PT1000		
Maximum Loop Supply	30VDC		
Load Impedance	0 Ω minimum		
Maximum Load/Power Supply	203 Ω / 12V, 745 Ω / 24V		
Linearity Error	0.35% FSO / CU10 0.2% FSO / PT100 & PT1000		
Output Slew Rate	1% @ 20 mS		
Filter Characteristics	105 dB @ DC, 60 dB @ 10 Hz, 40 dB @ 60Hz		
Stability	0.05% FSO maximum		
Operating Temperature	0 to 60°C (32 to 140°F)		
Storage Temperature	-20 to 70°C (-4 to 158°F)		
Relative Humidity	5 to 90% (non-condensing)		
Environmental Air	No corrosive gases permitted		
Vibration	ML STD 810C 514.2		
Shock	ML STD 810C 516.2		
Noise Immunity	NEMA ICS3-304		

Typical User Wiring

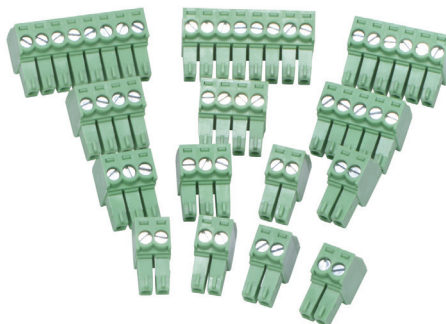


RTD Signal Conditioner to 4-20 mA DL05/06 analog module
Only use three wire and four wire RTDs.

FC Series Accessories



FC-5MM



FC-35MM

Description

Universal terminal block replacements for the FC Series signal conditioners. Each package includes enough terminal blocks to replace all the terminal blocks on any FC Series signal conditioner according to the following table:

FC Series Terminal Blocks		
FC Series Model	Terminal Block Replacement Part Number	Package Includes
<u>FC-11</u>	FC-5MM	(2) 2-pole blocks (2) 3-pole blocks (1) 4-pole blocks
<u>FC-33</u>		
<u>FC-R1</u>		
<u>FC-T1</u>		
<u>FC-ISO-C</u>	FC-35MM	(6) 2-pole blocks (2) 3-pole blocks (2) 4-pole blocks (1) 5-pole blocks (1) 6-pole blocks (2) 8-pole blocks
<u>FC-ISO-D</u>		
<u>FC-B34</u>		
<u>FC-35B</u>		
<u>FC-P3</u>		
<u>FC-3RLY2</u>		
<u>FC-3RLY4</u>		

Note: Depending on the model, some terminal blocks in the package may be unused.

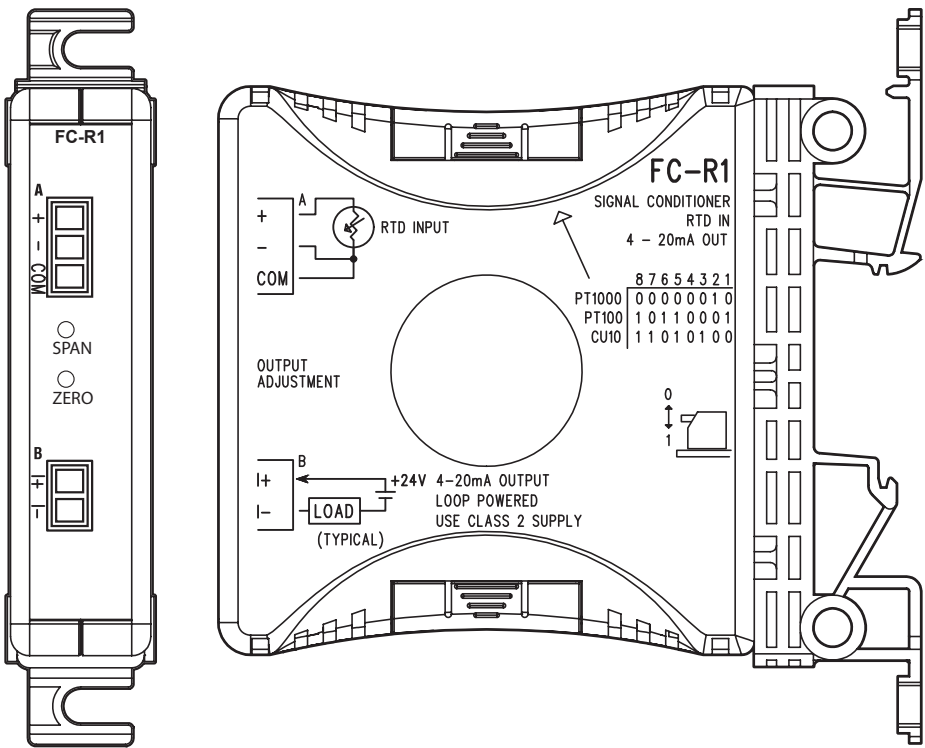
Universal Signal Conditioners				
Part No.	Description	Rated Torque (N·m)	Weight (Lbs)	Price
<u>FC-5MM</u>	Terminal block, replacement, 5mm. Package of 5. For use with FC Series signal conditioners.	0.5	0.1	\$18.00
<u>FC-35MM</u>	Terminal block, replacement, 3.5mm. Package of 14. For use with FC Series signal conditioners.	0.2	0.1	\$33.00

FC-R1 RTD INPUT

LOOP POWERED SIGNAL CONDITIONER

Product Guide

3505 HUTCHINSON ROAD
CUMMING, GA 30040-5860



Description:

The FC-R1 is a DIN rail mount, Resistive Temperature Detector, signal conditioner. FC-R1 is non-isolated, 3-wire RTD which converts to linearized 4-20 mA current loop.

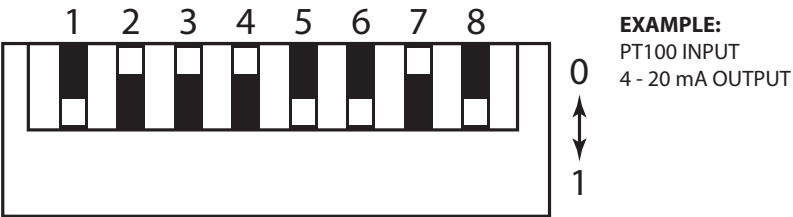
The FC-R1 has user selectable, CU10 (10 Ohm Copper), PT100 (100 Ohm Platinum), PT1000 (1000 Ohm Platinum) RTD Input, but also has OFFSET (zero) and SPAN (full scale) adjustments of the output signal. The OFFSET (zero) has an adjustment range of 0 to 25% of full scale output, the SPAN (full scale) has an adjustment of 80 to 102%.

Application

The FC-R1 field configurable input signal conditioner is useful for interfacing RTD sensors to our PLC analog current input modules. Use shielded RTD's whenever possible to minimize noise on the input signal. Ground the shield wire at one end only. The suggested 3-lead configuration shown provides one lead to (+) terminal, one lead to the (-) termnial and one lead to the (COM) terminal. Compensation circuitry nulls out the lead length for accurate temperature measurements. Some sensors have 4-leads, when making connections, do not connect the second lead to the (+) terminal, leave that lead unconnected.

Input Selection

The signal conditioner can be configured for either CU10, PT100, PT1000 Input and Output signal type of 4 - 20mA.



Input Ranges	Switch Position							
	1	2	3	4	5	6	7	8
CU10	0	0	1	0	1	0	1	1
PT100	1	0	0	0	1	1	0	1
PT1000	0	1	0	0	0	0	0	0

Specifications

Input Ranges	Ranges		
	CU10	-200°C to 260°C	-328°F to 500°F
	PT100	-200°C to 850°C	-328°F to 1562°F
	PT1000	-200°C to 595°C	-328°F to 1103°F
RTD Excitation Current	CU10 & PT100	500µA ± 50µA	
	PT1000	80µA ± 20µA	
Common Mode Range	0-3.5 VDC		
Maximum Inaccuracy (Includes Offset, Span, Linearity)	CU10	0.35% FSO	
	PT100 & PT1000	0.2% FSO @ 25°C	
	PT100 & PT1000	0.26% FSO	
Maximum Loop Supply	30VDC		
Load Impedance	0Ω Minimum		
Maximum Load	12V Power Supply	203Ω	
	24V Power Supply	745Ω	
Linearity Error	CU10	0.35% FSO	
	PT100 & PT1000	0.2%FSO Maximum	
Output Slew Rate	1% @ 20mS		
Filter Characteristics	105dB @ DC, 60dB @ 10Hz, 40dB @ 60Hz		
Stability	0.05% FSO Maximum		

NOTE: All data 0-60°C except where specified.

Input Setting Explanation

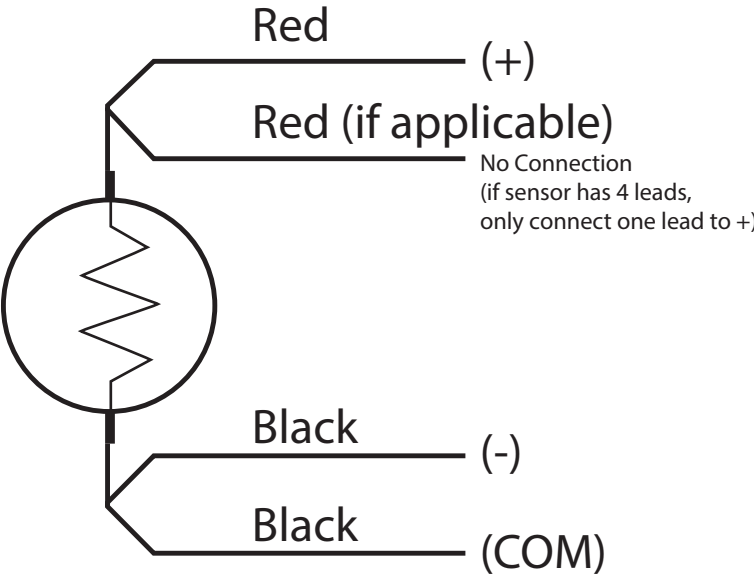
The default setting from the factory is PT100. This selects the DIN (Deutsche Institute for Normung) requirements for accuracy of the RTD element. The temperature vs. resistance curve, RTD's are calibrated to DIN 43760, BS1995, or IEC751 specifications which is 0.00385Ω/°C (100°C=138.50Ω).

The PT1000 utilizes the same type curve except it is (100°C=1385Ω).

The CU10 utilizes temperature coefficient of 0.0042Ω/Ω/°C (100°C=12.89683Ω).

Precision excitation currents are used to generate voltage drop across the RTD element. To maintain accuracy it is important that all 3 RTD wires are the same length.

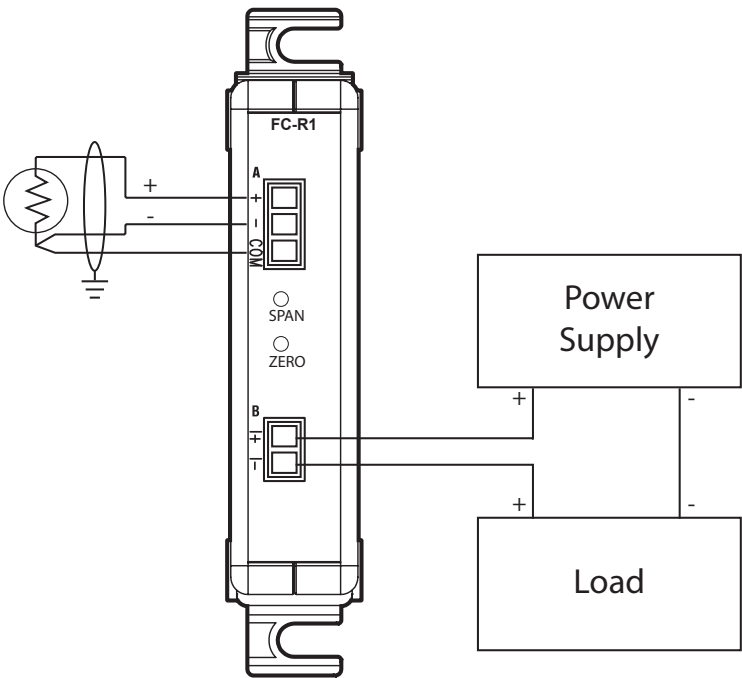
It is suggested if your application does not need modified OFFSET or SPAN - DO NOT ADJUST potentiometers since this loses the factory calibration.



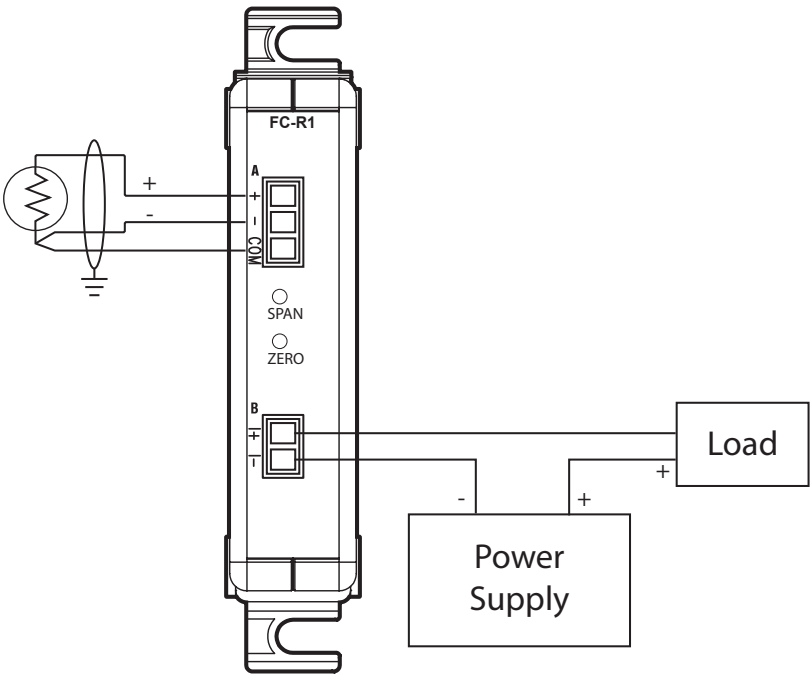
Operating Specifications

Operating Temperature	0 to 60°C (32 to 140°F)
Storage Temperature	-20 to 70°C (-4 to 158°F)
Relative Humidity	5 to 90% (non-condensing)
Environmental Air	No Corrosive Gases Permitted
Vibration	MIL STD 810C 514.2
Shock	MIL STD 810C 516.2
Noise Immunity	NEMA ICS3-304

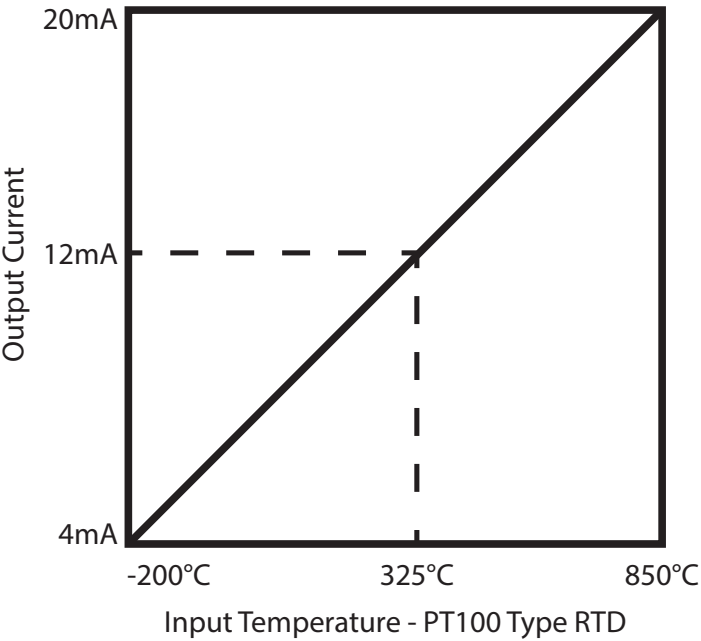
Typical Connections



RTD Signal Conditioner to 4-20mA Sourcing



RTD Signal Conditioner to 4-20mA Sinking



$$\text{Max}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Counts} = \text{resolution}$$
$$850^{\circ} - (-200^{\circ}) = 1050^{\circ} / 4095 = 0.256^{\circ}\text{C} / \text{count} - \text{resolution}$$

$$\text{Actual}_{\text{temp}} - \text{Min}_{\text{temp}} = \text{Total}_{\text{temp}} / \text{Resolution} = \text{Counts}$$
$$325^{\circ} - (-200^{\circ}) = 525^{\circ} / 0.256^{\circ} = 2050 \text{ Counts}$$

$$\text{Counts} \times \text{Resolution} = \text{Total}_{\text{temp}} + \text{Min}_{\text{temp}} = \text{Actual}_{\text{temp}}$$
$$2048 \times 0.256^{\circ} = 524.3^{\circ} + -200^{\circ} = 324.3^{\circ}\text{C}$$

UL Information

A. THIS EQUIPMENT IS SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D OR NON-HAZARDOUS LOCATIONS ONLY.

Cet équipement est conçu pour être utilisé dans des environnements de Classe I, Division 2, Groupes A, B, C, D ou non dangereux.

B. WARNING - EXPLOSION HAZARD - SUBSTITUTION OF COMPONENTS MAY IMPAIR SUITABILITY FOR CLASS I, DIVISION 2/ZONE 2.

AVERTISSEMENT : Risque d’explosion: la substitution de composants peut compromettre la convenance pour la Classe I, Division 2/Zone 2.

C. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT UNLESS POWER HAS BEEN SWITCHED OFF OR THE AREA IS KNOWN TO BE NON-HAZARDOUS.

AVERTISSEMENT: Risque d’explosion: Ne pas déconnecter l’équipement à moins que l’alimentation soit coupée ou que la zone soit reconnue non dangereuse.

MANUFACTURER’S CERTIFICATE OF PROPER INSTALLATION

OWNER _____ EQPT SERIAL NO: _____
EQPT TAG NO: _____ EQPT/SYSTEM: _____
PROJECT NO: _____ SPEC. SECTION: _____

I hereby certify that the above-referenced equipment/system has been:

(Check Applicable)

- ☐ Installed in accordance with Manufacturer’s recommendations.
- ☐ Inspected, checked, and adjusted.
- ☐ Serviced with proper initial lubricants.
- ☐ Electrical and mechanical connections meet quality and safety standards.
- ☐ All applicable safety equipment has been properly installed.
- ☐ Functional tests.
- ☐ System has been performance tested, and meets or exceeds specified performance requirements. (When complete system of one manufacturer)

Note: Attach any performance test documentation from manufacturer.

Comments: _____

I, the undersigned Manufacturer’s Representative, hereby certify that I am (i) a duly authorized representative of the manufacturer, (ii) empowered by the manufacturer to inspect, approve, and operate their equipment and (iii) authorized to make recommendations required to ensure equipment furnished by the manufacturer is complete and operational, except as may be otherwise indicated herein. I further certify that all information contained herein is true and accurate.

Date: _____, 20____

Manufacturer: _____

By Manufacturer’s Authorized Representative: _____
(Authorized Signature)

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MAINTENANCE SUMMARY FORM

PROJECT:_____ CONTRACT NO.:_____

1. EQUIPMENT ITEM_____

2. MANUFACTURER _____

3. EQUIPMENT/TAG NUMBER(S) _____

4. WEIGHT OF INDIVIDUAL COMPONENTS (OVER 100 POUNDS)_____

5. NAMEPLATE DATA (hp, voltage, speed, etc.) _____

6. MANUFACTURER’S LOCAL REPRESENTATIVE _____

 a. Name_____ Telephone No. _____

 b. Address _____

7. MAINTENANCE REQUIREMENTS

Maintenance Operation Comments	Frequency	Lubricant (If Applicable)
List briefly each maintenance operation required and refer to specific information in manufacturer’s standard maintenance manual, if applicable. (Reference to manufacturer’s catalog or sales literature is not acceptable.)	List required frequency of each maintenance operation.	Refer by symbol to lubricant required.

8. LUBRICANT LIST

Reference Symbol	Shell	Exxon Mobile	Chevron Texaco	BP Amoco	Or Equal
List symbols used in No. 7 above.	List equivalent lubricants, as distributed by each manufacturer for the specific use recommended.				

9. RECOMMENDED SPARE PARTS FOR OWNER’S INVENTORY.

Part No.	Description	Unit	Quantity	Unit Cost
Note: Identify parts provided by this Contract with two asterisks.				

Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	1	C92ZS9401	Limit Switch, Pre-Wired Factory Sealed, Corrosion Resistant, Lever Type, Spring Return	Allen-Bradley	802MC-AY5	—	09-I-009
002	1	C92ZS9401	Operating Lever, Corrosion Resistant Roller Lever, Adjustable, Type 316 Stainless Steel	Allen-Bradley	802MC-W2B	—	09-I-009
003							
004							
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802MC Corrosion-resistant Prewired – Factory Sealed Switches

802MC corrosion-resistant switches have the following features:

- Prewired and factory sealed
- Corrosion resistant
- Submersible



Specifications

Attribute	Value
Certifications	UL Listed, CSA Certified, and CE Marked for applicable directives
Enclosure type rating	NEMA 1, 4X, 6P, 13; and IP66/67 (IEC 529)
Pollution degree	3
Ambient temperature ⁽¹⁾	0...80 °C (32...180 °F)

(1) Minimum temperature is based on the absence of freezing moisture or water.

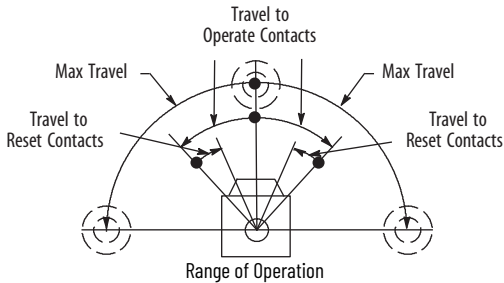
Table 13 - AC Contact Rating (Max per Pole, 50 or 60 Hz, Two Circuits Same Polarity)

NEMA Rating Designation	Max Voltage [AC]	A		Continuous Carrying Current [A]	VA	
		Make	Break		Make	Break
A600 AC-15	120	60	6.00	10	7200	720
	240	30	3.00			
	480	15	1.50			
	600	12	1.20			

Table 14 - DC Contact Rating (Max per Pole, Two Circuits Same Polarity)

Nominal Voltage	A	Continuous Carrying Current [A]
24	1.1	5

Factory Sealed



Adjustable Top Push Rod



Side Push Rod



Top Push Roller

Product Selection

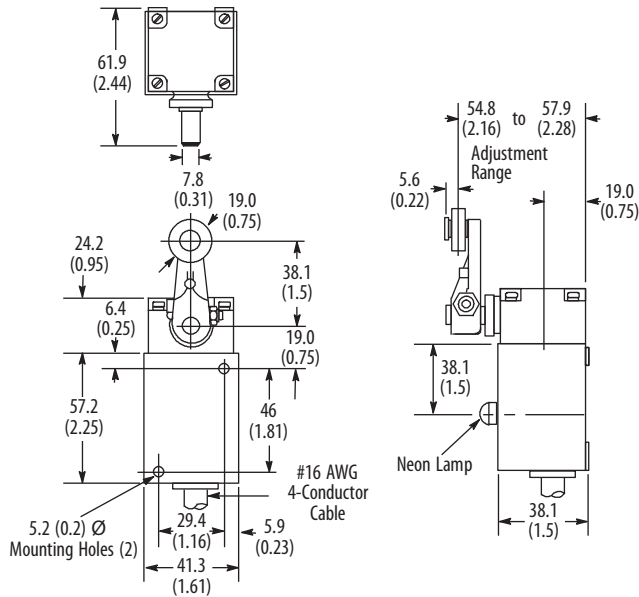
Number of Circuits	Lever Movement vs. Contact Operation		Torque/Force to Operate, Max	Travel to Operate Contacts, Max	Max Travel	Travel to Reset Contacts, Max	Cat. No.		
							Switch without Lever ⁽¹⁾	Operator Head Only	Switch Body Only ⁽¹⁾
2	Clockwise or Counterclockwise		0.34 N•m (3 lb•in)	15°	86°	6°	802MC-AY5	802MC-AX	802MC-XY5
	Clockwise						802MC-ATY5	802MC-ATX	
	Counterclockwise						802MC-A2Y5	802MC-A2X	

(1) The standard length of STO cable is 1.52 m (5 ft). For other lengths, see [Table 16 on page 27](#).

Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

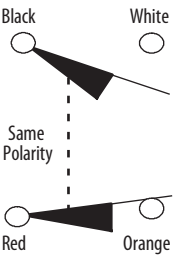
IMPORTANT For operating head and lever assembly dimensions that are not shown, see [Approximate Dimensions on page 132](#).
Conduit pipe opening 1/2 in. NPT.



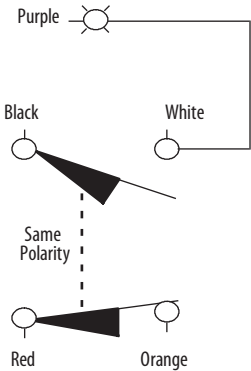
Wiring Diagrams

IMPORTANT See applicable codes and laws.

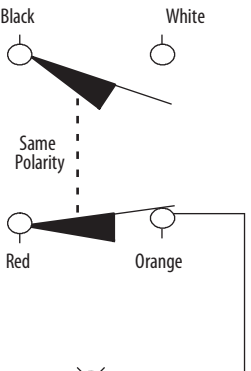
Cable Models



Cable Models with Status Indicator

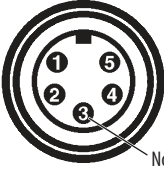
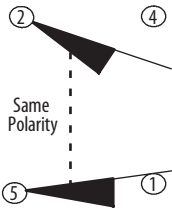


Status Indicator Wired to N.O. (White) Wire

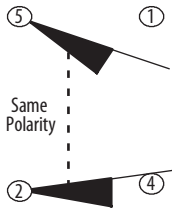


Status Indicator Wired to N.C. (Orange) Wire

5-pin Mini Receptacle

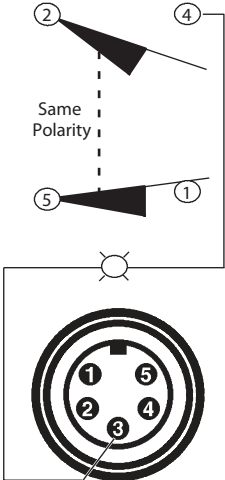


J1 Wiring

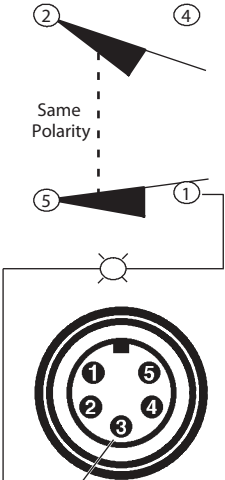


J9 Wiring

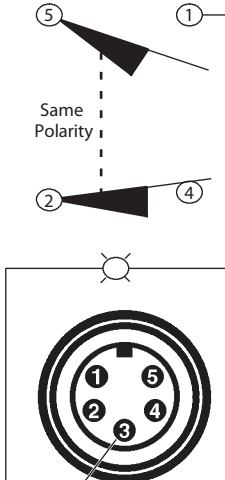
5-pin Mini-type Receptacle Status Indicator



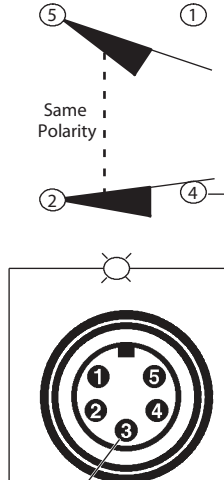
J1 Wiring
Status Indicator
Wired to N.O.



J1 Wiring
Status Indicator
Wired to N.C.



J9 Wiring
Status Indicator
Wired to N.O.



J9 Wiring
Status Indicator
Wired to N.C.

Modifications for 802MC Limit Switches

Status Indicators

Bulletin 802MC prewired limit switches can be supplied with a status indicator that is wired to one side of either the N.O. or N.C. contact. The second lead of the status indicator is available as a fifth conductor for wiring flexibility.



Neon Status Indicator

To order, add the appropriate suffix that is listed in [Table 15](#) to the Cat. No. Example: Cat. No. 802MC-AY5 with a 120V AC LED status indicator that is wired across the N.O. contact would be Cat. No. 802MC-AY5L1F.

Table 15 - Status Indicators

Voltage	Wired to:	Cat. No. Suffix
LED		
24V DC ⁽¹⁾	N.O. contact	LF
	N.C. contact	LC
120V AC 50...60 Hz	N.O. contact	L1F
	N.C. contact	L1C
Neon		
120V AC 50...60 Hz	N.O. contact	NF
	N.C. contact	NC
240V AC 50...60 Hz	N.O. contact	N5F
	N.C. contact	N5C

(1) Requires switch to be rated for 24V DC operation.

Cable Lengths

The factory-installed, prewired, type STO cable is normally supplied in 1.52 m (5 ft) lengths. Extended cable lengths are available in multiples of 4 feet. To order, replace the suffix Y5 in the Cat. No. with the appropriate suffix from [Table 16](#). Example: A lever-type spring return switch with 1.83 m (8 ft) of STO cable is Cat. No. 802MC-AY8. Cable lengths up to 96 feet are available as a special order.

Table 16 - Additional Cable Lengths

Modifications	Cat. No. Suffix
1.83 m (8 ft) cable	Y8
3.66 m (12 ft) cable	Y12
4.78 m (16 ft) cable	Y16

Two-circuit 24V DC Switches

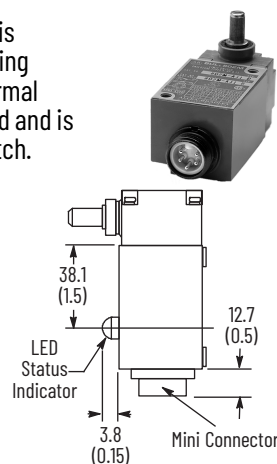
All two-circuit Bulletin 802MC limit switches are available with silver-nickel contacts and rated for 24V DC applications. To order a switch rated for 24V DC use, insert the letter Z before the cable or connection designation. Example: Cat. No. 802MC-AZY5 is a 24V DC version of Cat. No. 802MC-AY5. The use of the 24V DC status indicator option requires the switch be rated for 24V DC operation.

5-pin Mini-type Receptacle – Two-circuit Contact Block



A 5-pin mini-type receptacle is supplied to facilitate retrofitting existing installations. The normal ground wire pin is not required and is not connected inside the switch.

To order a Bulletin 802MC pre-wired limit switch with a 5-pin mini connector in place of the 1.52 m (5 ft) of STO ^(a) cable, replace the Y5 in the Cat. No. with the suffix J1 or J9 depending upon the wiring configuration required. Maximum voltage rating for this receptacle is 250V AC.



An appropriate female connector with cable (Cat. No. 889N-F5AFC-6F) is available.

(a) STO is a common identification of this cable. The complete identification of the cable that is used on the Bulletin 802M is ST00W-A, which incorporates an oil-resistant jacket and conductor insulation, for indoor and outdoor use.

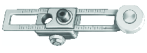
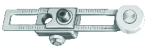
Bulletin 802

IMPORTANT For use with 802M, 802MC, 802R, 802T, 802X, and 802XR

Roller Levers

Type	Roller			Cat. No.
	Material	Dia. [in.]	Width [in.]	
 Non-adjustable Cast Lever 0.75 in. Radius	Metal	0.75	0.27	802T-W9A
	Nylon	0.75	0.28	802T-W1
 Non-adjustable Cast Lever 1.5 in. Radius Roller on Front	Nylon	0.75	1	802T-W1H
	Dual nylon	0.75	1 (each)	802T-W1HH
	Steel	0.75	0.25	802T-W1A
	Steel	0.75	0.75	802T-W1N
	Ball bearing	0.75	0.23	802T-W1B
	Beryllium copper (nonsparking)	0.75	0.28	802T-W1J
	Nylon	0.75	0.75	802T-W1L
 Non-adjustable Cast Lever 1.5 in. Radius Roller on Rear	Nylon	0.75	0.28	802T-W1E
	Nylon	0.75	1	802T-W1D
	Nylon	1.5	0.28	802T-W1G
	Steel	0.75	0.25	802T-W1F
	Steel	0.75	0.75	802T-W1C
	Nylon	0.75	0.75	802T-W1M
	Nylon	0.75	0.28	802T-W20
 Non-adjustable Steel Lever 2.0 in. Radius Roller on Front	Nylon	0.75	1	802T-W20D
	Steel	0.75	0.25	802T-W20A
	Steel	0.75	0.75	802T-W20B
	Ball bearing	0.75	0.23	802T-W20C
	Beryllium copper	0.75	0.28	802T-W20E
	Nylon	0.75	0.28	802T-W20J
 Non-adjustable Steel Lever 2.0 in. Radius Roller on Rear	Nylon	0.75	1	802T-W20K
	Steel	0.75	0.25	802T-W20L
	Steel	0.75	0.75	802T-W20M
	Ball bearing	0.75	0.23	802T-W20N
	Beryllium copper	0.75	0.28	802T-W20P
	Nylon	0.75	0.75	802T-W18
 Non-adjustable Steel Lever 2-1/8 in. Radius Roller on Front	Nylon	0.75	1	802T-W18A

Roller Levers, continued

Type	Roller			Cat. No.
	Material	Dia. [in.]	Width [in.]	
 Non-adjustable Steel Lever 2.5 in. Radius Roller on Front	Nylon	0.75	0.28	802T-W25
	Nylon	0.75	1	802T-W25D
	Steel	0.75	0.25	802T-W25A
	Steel	0.75	0.75	802T-W25B
	Ball bearing	0.75	0.23	802T-W25C
	Beryllium copper	0.75	0.28	802T-W25E
 Non-adjustable Steel Lever 2.5 in. Radius Roller on Rear	Nylon	0.75	0.28	802T-W25J
	Nylon	0.75	1	802T-W25K
	Steel	0.75	0.25	802T-W25L
	Steel	0.75	0.75	802T-W25M
	Ball bearing	0.75	0.23	802T-W25N
	Beryllium copper	0.75	0.28	802T-W25P
 Non-adjustable Steel Lever 3.0 in. Radius Roller on Front	Nylon	0.75	0.28	802T-W30
	Nylon	0.75	1	802T-W30D
	Steel	0.75	0.25	802T-W30A
	Steel	0.75	0.75	802T-W30B
	Ball bearing	0.75	0.23	802T-W30C
	Beryllium copper	0.75	0.28	802T-W30E
 Non-adjustable Steel Lever 3.0 in. Radius Roller on Rear	Nylon	0.75	0.28	802T-W30J
	Nylon	0.75	1	802T-W30K
	Steel	0.75	0.25	802T-W30L
	Steel	0.75	0.75	802T-W30M
	Ball bearing	0.75	0.23	802T-W30N
	Beryllium copper	0.75	0.28	802T-W30P
 Adjustable Lever 1.19...3 in. Radius	Nylon	0.75	0.28	802T-W2
	Nylon	0.75	1	802T-W2D
	Nylon	1.5	0.28	802T-W2A
	Steel	0.75	0.25	802T-W2B
	Ball bearing	0.75	0.23	802T-W2C
	Steel	1.4	0.27	802T-W2E
	Rubber	1.5	0.5	802T-W2R
	Beryllium copper	0.75	0.28	802T-NX94
	Nylon	0.75	0.28	802T-W17
 Adjustable Lever 1.19...3.5 in. Radius	Metal			802T-W17B
	Nylon	1.5		802T-W17A

Roller Levers, continued

Type	Roller			Cat. No.
	Material	Dia. [in.]	Width [in.]	
 Fork Lever 1.5 in. Radius	Nylon (L.H. roller on front; R.H. roller on back)	0.75	0.28	802T-W4
	Steel (L.H. roller on front; R.H. roller on back)	0.75	0.25	802T-W4B
	Nylon (both rollers on front)	0.75	0.28	802T-W4A
	Nylon (both rollers on rear)	0.75	0.28	802T-NX115
	Nylon (both rollers on front)	0.75	1	802T-W4F
	Steel (both rollers on front)	0.75	0.25	802T-W4C
	Nylon (L.H. roller on back; R.H. roller on front)	0.75	0.28	802T-W4D
 Micrometer Adjustment Lever 1.5 in. Radius ⁽¹⁾	Nylon (R.H. adj.)	0.75	0.28	802T-W6
	Steel (R.H. adj.)	0.75	0.25	802T-W6A
	Ball bearing (R.H. adj.)	0.75	0.23	802T-W6B
	Nylon (L.H. adj.)	0.75	0.28	802T-W6C
	Steel (L.H. adj.)	0.75	0.25	802T-W6D
	Ball bearing (L.H. adj.)	0.75	0.23	802T-W6E
	Nylon (R.H. adj.)	0.75	1	802T-W6F
 Non-Adj. One-Way Lever 1.5 in. Radius	Nylon	0.75	0.28	802T-W7 ⁽²⁾
	Steel	0.75	0.25	802T-W7A ⁽²⁾
	Ball bearing	0.75	0.23	802T-W7B ⁽²⁾
 Non-Adj. Offset Lever 1.44 in. Radius Roller on Front	Nylon	0.75	0.28	802T-W12 ⁽³⁾
	Steel	0.75	0.25	802T-W12A ⁽³⁾
	Bearing roller	0.75	0.23	802T-W12B
 Non-Adj. Offset Lever 1.44 in. Radius Roller on Rear	Nylon	0.75	0.28	802T-W12E
	Steel	0.75	0.25	802T-W12F

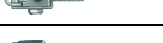
- (1) The micrometer adjustment roller lever is designed especially for installations where the position of the roller is a critical factor. This lever has a pivoted roller that can be turned laterally. After clamping the lever to the switch shaft, the position of the roller can be precisely adjusted through an arc of 7.5° on either side of the center or straight-line position.
- (2) Do not use on maintained contact limit switches.
- (3) When mounted on plug-in devices, the offset lever provides equivalent cam tracking to the NonPlug-In devices using catalog number 802T-W1 levers.

Roller Levers – Corrosion-resistant

Type	Roller			Cat. No.
	Material	Dia. [in.]	Width [in.]	
 1.5 in. Radius Roller on Front	Type 316 stainless steel roller, roller pin, and clamp pin One-piece cast aluminum arm is protected with TUFRAM ⁽¹⁾	0.75	0.25	802MC-W1A
 1.5 in. Radius Roller on Rear	Nylon Roller One-piece cast aluminum arm is protected with TUFRAM ⁽¹⁾	1.5	0.28	802MC-W1G
 Non-Adj. Offset Lever 1.44 in. Radius Roller on Front	Nylon Roller One-piece cast aluminum arm is protected with TUFRAM ⁽¹⁾	0.75	0.28	802MC-W12
 Adjustable 1.19...3 in. Radius	Type 316 stainless steel roller, roller pin, clamp pin, and adjustable lever arm Block is cast aluminum protected with TUFRAM ⁽¹⁾	0.75	0.25	802MC-W2B

- (1) TUFRAM is a synergistic coating that combines the advantages of anodizing with a controlled infusion of PTFE for added corrosion resistance.

Rod Levers

Type	Material	Dia. [in.]	Cat. No.
	Stainless steel rod 5 in. long	0.13	802T-W3 ⁽¹⁾
	Stainless steel rod 8.5 in. long	0.13	802T-W3B ⁽¹⁾
	Stainless steel rod 12 in. long	0.13	802T-NX50
	Stainless steel rod 11.5 in. long	0.13	802T-W3A
	Stainless steel rod 14 in. long	0.08	802T-W3F ⁽²⁾
	Stainless steel rod 14 in. long	0.13	802T-NX159
	Nylon rod 12 in. long	0.25	802T-W3C 802T-NX142 ⁽³⁾
	Stainless steel rod 5 in. long	0.06	802T-W5 ⁽¹⁾
	Stainless steel rod 5 in. long one way	0.06	802T-W8 ⁽⁴⁾
	Nylatron looped rod 6 in. long, 2 in. wide loop	0.18	802T-W14
	Nylatron looped rod 9 in. long, 2 in. wide loop		802T-NX119
	Steel rod 9 in. long	0.25	802T-W16
	Nylon rod 9 in. long		802T-W16A

- (1) Recommended for use with low operating torque switches.
- (2) Not for use with 802M-NPY5 or 802M-ASY5 type switches.
- (3) Recommended for high impact applications.
- (4) Do not use on maintained contact limit switches.

Rod Levers – Corrosion-resistant

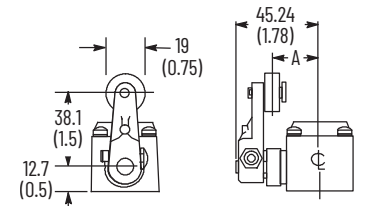
Type	Material	Dia. [in.]	Cat. No.
	Type 316 stainless steel rod 5 in. long Block is cast aluminum protected with TUFRAM ⁽¹⁾	0.13	802MC-W3
	Type 316 stainless steel rod 11.5 in. long Block is cast aluminum protected with TUFRAM ⁽¹⁾	0.08	802MC-W3A
	Nylon rod 12 in. long Block is cast aluminum protected with TUFRAM ⁽¹⁾	0.25	802MC-W3C
	Nylon rod only	0.25	WF25507

(1) TUFRAM is a synergistic coating that combines the advantages of anodizing with a controlled infusion of PTFE for added corrosion resistance.

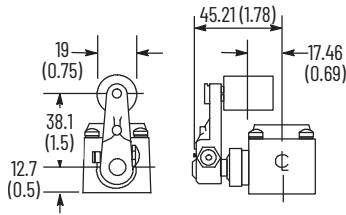
Approximate Dimensions

Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.

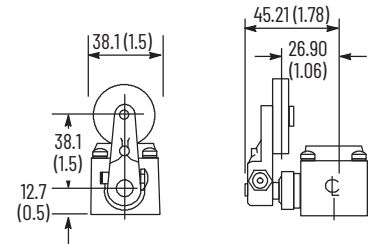
802 Levers



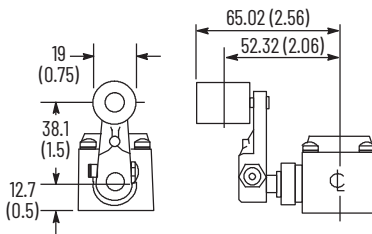
Cat. No. 802T-W1C [A = 20.6 (0.81)]
Cat. Nos. 802T-W1E and 802T-W1F [A = 26.2 (1.03)]
Shipping Wt. 57 g (2 oz) (W1C), 28 g (1 oz) (W1E),
43 g (1.5 oz) (W1F)



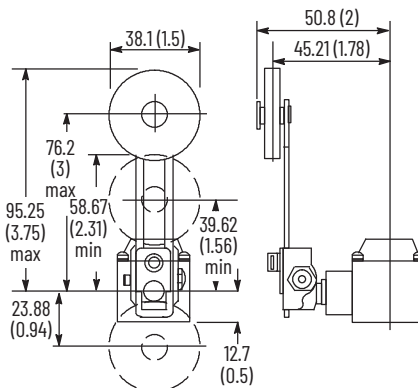
Cat. No. 802T-W1D
Shipping Wt. 43 g (1.5 oz)



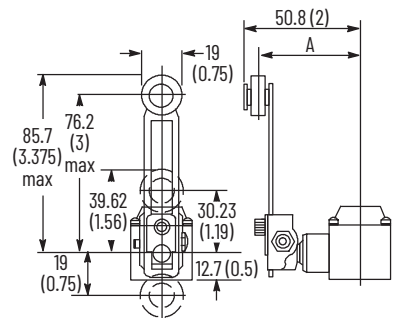
Cat. No. 802T-W1D
Shipping Wt. 43 g (1.5 oz)



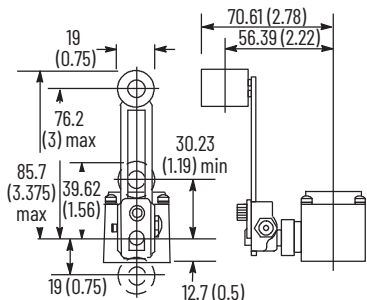
Cat. No. 802T-W1H
Shipping Wt. 43 g (1.5 oz)



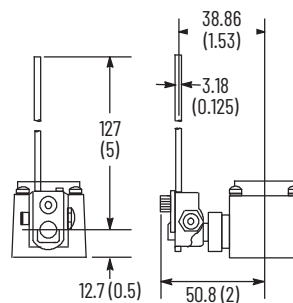
Cat. No. 802T-W2A
Shipping Wt. 57 g (2 oz)



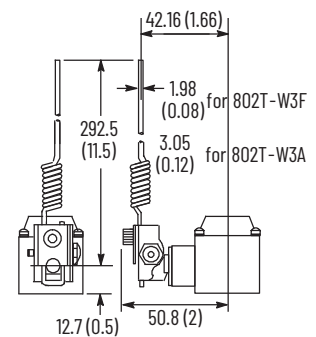
Cat. Nos. 802T-W2 and 802T-W2B [A = 45.2 (1.78)]
Cat. No. 802T-W2C [A = 46 (1.81)]
Shipping Wt. 57 g (2 oz)



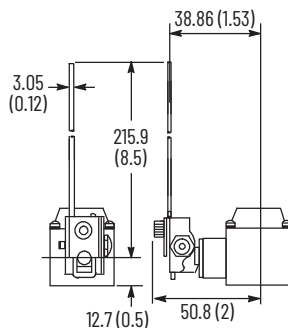
Cat. No. 802T-W2D
Shipping Wt. 57 g (2 oz)



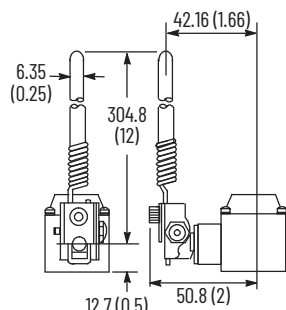
Cat. No. 802T-W3
Shipping Wt. 43 g (1.5 oz)



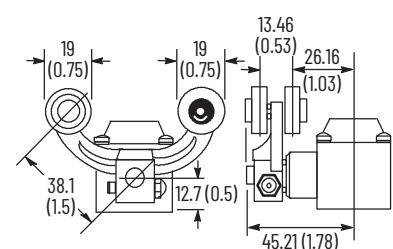
Cat. Nos. 802T-W3A and 802T-W3F
Shipping Wt. 57 g (2 oz)



Cat. Nos. 802T-W3B and 802T-W3F
Shipping Wt. 43 g (1.5 oz)

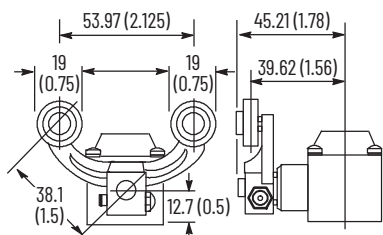


Cat. No. 802T-W3C
Shipping Wt. 57 g (2 oz)

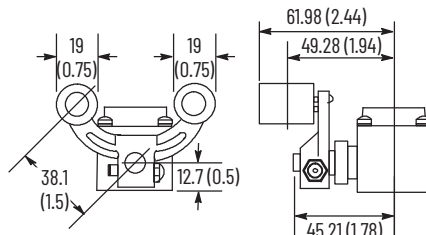


Cat. Nos. 802T-W4 and 802T-W4D
Shipping Wt. 43 g (1.5 oz)
Cat. No. 802T-W4B
Shipping Wt. 57 g (2 oz)

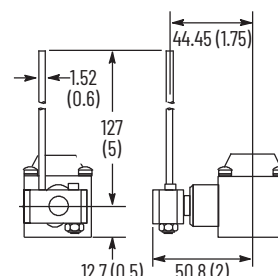
Dimensions are shown in mm (in.). Dimensions are not intended to be used for installation purposes.



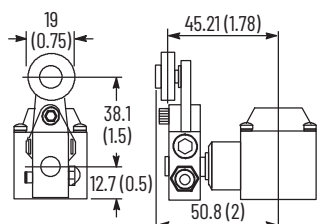
Cat. Nos. 802T-W4A and 802T-W4C
Shipping Wt. 57 g (2 oz)



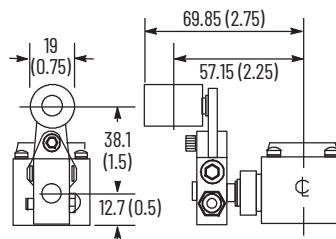
Cat. No. 802T-W4F
Shipping Wt. 57 g (2 oz)



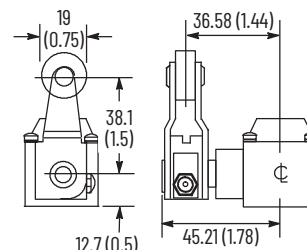
Cat. No. 802T-W5
Shipping Wt. 28 g (1 oz)



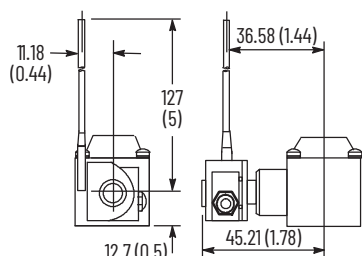
Cat. Nos. 802T-W6, 802T-W6A,
802T-W6B, 802T-W6E
Shipping Wt. 57 g (2 oz)



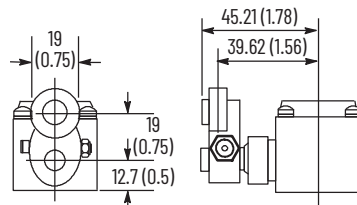
Cat. No. 802T-W6F
Shipping Wt. 57 g (2 oz)



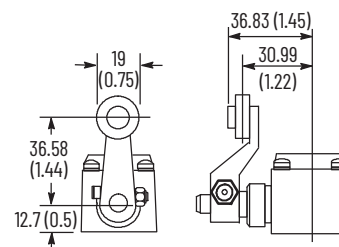
Cat. Nos. 802T-W7, 802T-W7A
and 802T-W7B
Shipping Wt. 57 g (2 oz)



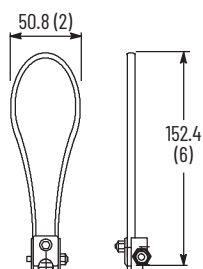
Cat. No. 802T-W8
Shipping Wt. 43 g (1.5 oz)



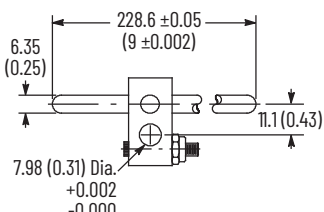
Cat. No. 802T-W9
Shipping Wt. 28 g (1 oz)



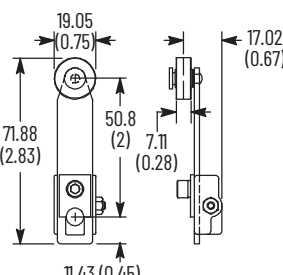
Cat. No. 802T-W12
Shipping Wt. 28 g (1 oz.)
Cat. Nos. 802T-W12A, 802T-W6B, 802T-W6E
Shipping Wt. 43 g (1.5 oz)



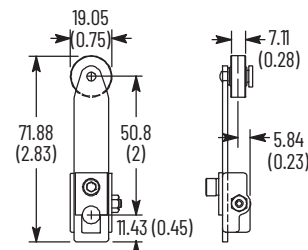
Cat. No. 802T-W14
Shipping Wt. 43 g (1.5 oz)



Cat. Nos. 802T-W16 and 802T-W16A



Cat. No. 802T-W20
Shipping Wt. 57 g (2 oz)



Cat. No. 802T-W20J
Shipping Wt. 57 g (2 oz)

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802MC Pre-Wired Factory Sealed Corrosion Resistant

[802MC-AY5](#)



Representative Rendering, Not The Actual Product

Limit Switch, Pre-Wired Factory Sealed, Corrosion Resistant, Complete Switch, Lever Type, Spring Return, Standard Operating Torque, 2-Circuit, CW and CCW operation, 1.52m (5ft) length STO cable

Product Details

SWITCH DATA	
Switch Components	Complete Switch
Actuation Type	Lever Type, Spring Return, Standard Operating Torque
Number of Circuits	2-Circuit
Mode of Operation	CW and CCW operation
Travel to Operate Contacts (Max)	15°
Torque to Operate Contacts (Max.)	0.34N.m (3lb in)
Travel to Reset Contacts (Max.)	6°
Maximum Travel	86°
MODIFICATIONS	
24V DC Switch	AC Model
Indicating Lights	No Indicating Light(s)
Connection Options	1.52m (5ft) length STO cable (standard)
NOTE	Build to Order Cable Length
OPERATING LEVER DATA	
Operating Lever	Operating Lever Not Selected

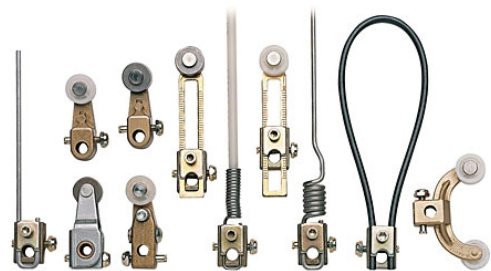
Supporting Documentation and Downloads

- [Photo](#)

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NEMA Style Operating Levers

[802MC-W2B](#)



Representative Rendering, Not The Actual Product

Operating Lever, Corrosion Resistant Roller Lever, Adjustable, 1.19 to 3.0 In, Roller On Front, Type 316 Stainless Steel, 0.75 In, 0.25 In

Product Details

OPERATING LEVER DATA	
Lever Type	Corrosion Resistant Roller Lever
Adjustable or Non-Adjustable	Adjustable
Radius	1.19 to 3.0 In
Roller Material	Type 316 Stainless Steel
Roller Diameter	0.75 In
Roller Width	0.25 In
Roller Position	Roller On Front
ADDITIONAL INFORMATION	
Message	Operating Lever 802T-W3F Should Not Be Used With 802M-NPY5 or 802M-ASY5 Switches.
Message	Do Not Use 802T-W7, 802T-W7A, 802T-W7B On Maintained Contact Limit Switches.

Supporting Documentation and Downloads

- [Photo](#)

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Bill of Materials



Project: Coos Bay Wastewater Treatment Plant 1 Phase 1A Improvements
Specification Section(s): Section 26 05 04 – Basic Electrical Materials and Methods
Date: September 2025

Item No.	Qty.	Control Station	Description	Manufacturer	Manufacturer Part Number	Specification Section	Drawing
001	10	SPARE PARTS	Replacement Lamp, LED, 120V AC/DC	Eaton	E22LED120WN	—	—
002	2	SPARE PARTS	Indicating Light, PresTest, LED, Full Voltage, Amber	Eaton	E34FPB297LAP2A	—	—
003	2	SPARE PARTS	Indicating Light, PresTest, LED, Full Voltage, Green	Eaton	E34FPB297LGP2A	—	—
004	2	SPARE PARTS	Pushbutton, Flush, Black, 1NO	Eaton	E34PB1-53	—	—
005	2	SPARE PARTS	Potentiometer, 1k Ohms	Eaton	E34PDB1F1	—	—
006	2	SPARE PARTS	Selector Switch, 2-Position, Black Lever, 1NC/1NO	Eaton	E34VFBL1-1X	—	—
007	2	SPARE PARTS	Selector Switch, 3-Position, Black Lever, 2NO	Eaton	E34VHBL1-2X	—	—
008							
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