

System Reliability Performance Beyond Expectations

Complete your distribution protection puzzle with the Form 6 Recloser Control - *the perfect fit into your existing system*. The combination of Kyle's 60+ years of recloser experience, advanced technology, customer service, customer-focused direction, and future industry trends results in a standardized, yet customizable system - the Form 6 Recloser Control.

The Form 6 Recloser Control uses a powerful, yet flexible platform design to provide maximum protective functionality, standardized hardware design, and simple interactive graphical interfaces. Two versions of the control are available. The Rack Mount Recloser Control, designed for substation applications, allows side-by-side mounting to economize substation house real estate. The Yard Mount Recloser Control includes a weatherproof steel cabinet for direct mounting on the recloser's substation frame, while using substation supply power.

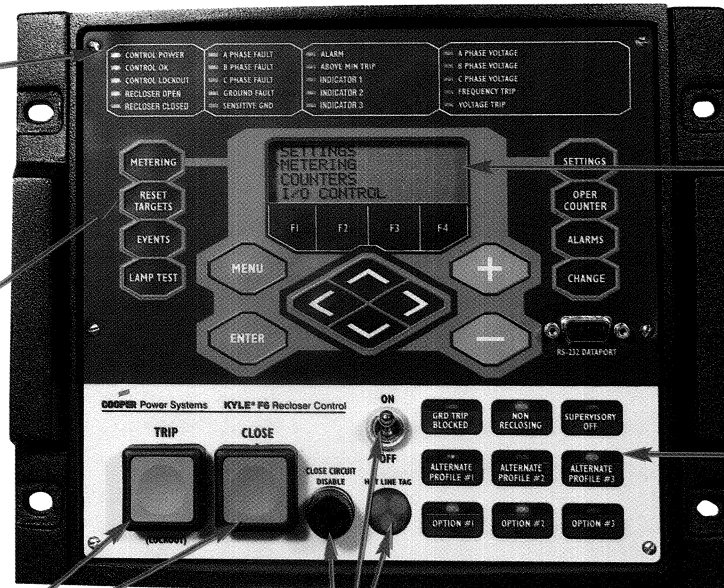
New engineering features such as TCC Editor II, Idea Workbench™, and Oscillography Replay highlight innovative new tools to standardize on one protection system for your distribution system.

ProView™ interface software integrates a host of protection, metering, and automation functions in a simple pull-down menu Microsoft® Windows® environment to quickly configure the Form 6 recloser control. Since there are no special commands or strings of commands to learn, your training and installation costs are considerably lowered. Even customization can be quickly completed with the graphical Idea Workbench™.

Consider the simple color-coordinated front operating panel, distinctive with both a programming and basic operating panel.

Clearly defined and guarded Trip and Close Pushbuttons promote intuitive operation, reducing the possibility of inadvertent operations. Thirty LED indicators provide immediate status indication of key operating and system conditions. Take action quickly, flawlessly with the positive feedback Analysis and Function keys. All your operating ideas have been anticipated in this front panel design.

Distribution System Protection, Metering, and Automation — All Integrated in One Package — Ready to Lower your Operating Costs



Twenty bright LED indicators are easily visible for user (even in direct sunlight).

Eight One-Touch Analysis Keys

Large and definite TRIP and CLOSE pushbuttons. The TRIP pushbutton is hardwired to the Trip Circuit to provide assurance of trip function.

Direct Live-Line Protection. Kyle's® Exclusive Hot Line Tag with Positive, Robust Toggle Switch, 3-Segment LED Display, and Visible Close Circuit Disable

Day or night visibility is assured with the backlit sharp 4-line x 20-character LCD display which gives additional instructions and information beyond a cryptic code.

Nine security-protected, one-touch function keys for "Hot Key" operation of frequently-used functions.

Familiar operating panel color scheme and functional terminology to reduce training and installation costs.

A powerful, yet flexible platform for efficient system protection applications.

Flexible Packages for Substation Installation

One Common Platform, Two Control Options...Simple

The common platform of the Form 6 Recloser Control spearheaded the development of two controls to meet your specific application requirements:

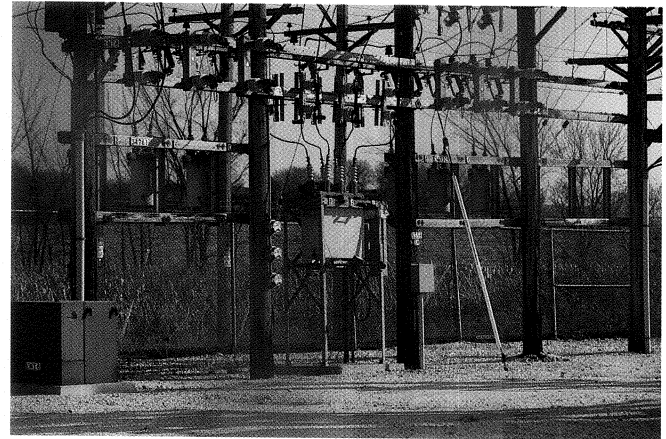
Extensive Protective Functionality for Substation Applications

- Common Hardware/Software Platform for Rack and Yard Mount Controls
 - Standardization and cost savings with only one system to learn and operate.
- Economize substation house real estate by mounting control close to apparatus and utilizing central battery source.
- Modernize substations with easy upgrade systems.
- Eliminate additional costs for auxiliary relays, interfaces, and meters with one integrated package.

Common Industry Terminology

Manage your training expenses with common industry terminology bridging the gap between your legacy equipment and new equipment.

- Increase functionality without learning a new operating system for programming and using your control.
- Avoid expensive training costs and potential for improper settings.



Form 6 Yard Mount Recloser Control fits easily into any substation application.

Yard Mount Recloser Control Cabinet Features Back Panel Access

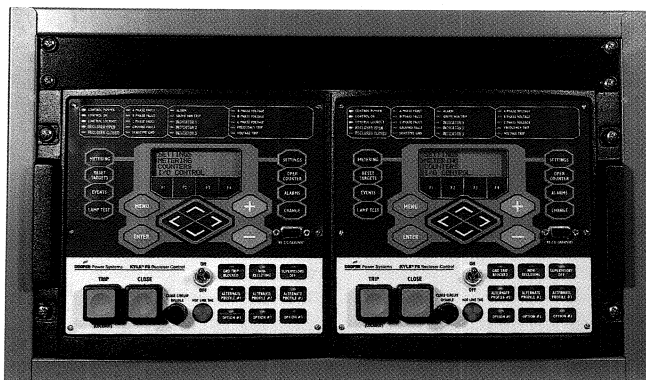
For outdoor substation applications, cabinet-mounted on the recloser substation frame, and powered from your substation battery.

- Simplify wiring and lower installation costs.
- Avoid difficult bending radii of cables.
- Separate wiring and operation sections.
- Simple troubleshooting.

Lightweight, Compact Rack Mount Design

For indoor substation rack mount applications, designed specifically for use in a 19 inch rack and powered from your substation battery.

- Install two Form 6 Rack Mount recloser controls side-by-side in a 19 inch rack to reduce installation costs.



Two Form 6 Rack Mount Recloser Controls in a 19" Substation Rack.

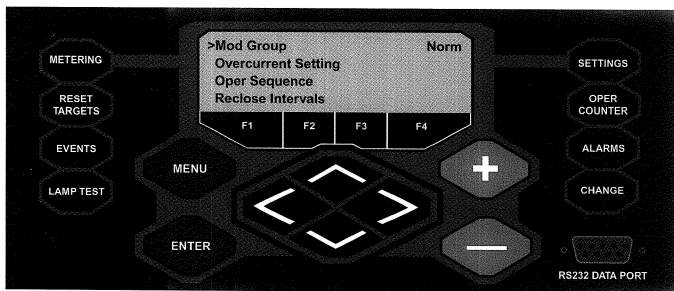
User-Interface... *Saves Time and Money*

The intuitive and customizable front panel and Windows®-based ProView™ software ensure quick and simple configuration of your controls.

Front Panel Programmability

The Form 6 Recloser Control has the most intuitive front operating panel in the industry. The 4 line by 20 character back-lit liquid crystal display provides a powerful nested menu system that allows for control programming and interrogation.

- Immediate distribution system knowledge without scrolling through a series of menus.
- Minimize training costs with the intuitively-designed front operating panel design.
 - The top portion is used for control programming.
 - The lower portion is used for critical operating functions.



Intuitive front panel programming.

One-Touch Analysis Keys

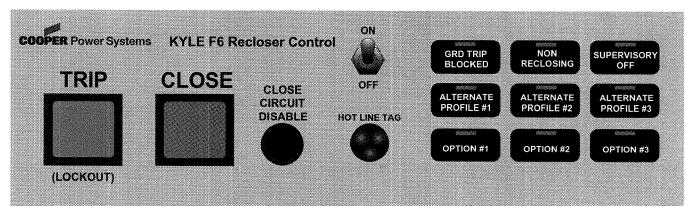
Eight one-touch analysis keys are located on the top half of the panel.

- Avoids PC connection costs, when simple setting changes are required.
- Reduces operator costs by allowing faster and easier access to the most common system quantities, such as metering, events, and alarms.
- Saves line troubleshooting time and provides exact system disturbance information.
 - The LCD display provides quick access to the fault distance, fault level, fault duration, and fault type for the most recent fault.
- Instills activation and system data confidence via positive feedback keypads.

One-Touch Function Keys

Operational functions are located on the lower half of the panel.

- Function terminology and operation consistent with other Kyle controls provides a common platform of operation for both new and legacy controls.
- Additional system flexibility with three user-configurable options.
- Profile selectability allows parameter changes for storm, non-storm conditions, summer, winter loading, or any other operating condition.

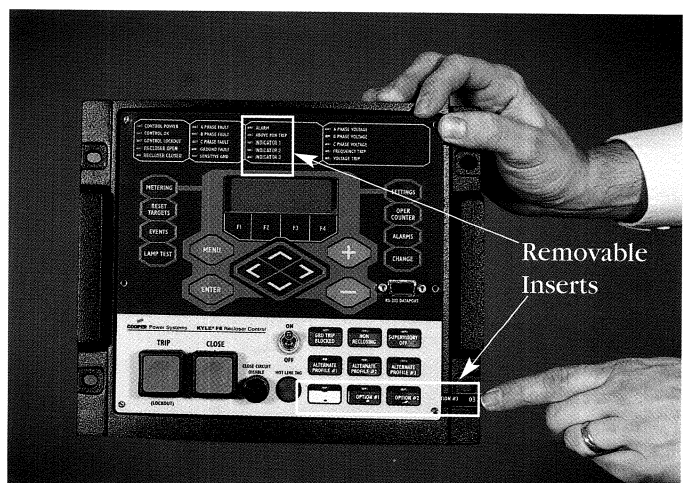


Operating function front panel access.

User-Customizable Operating Panel Label Inserts

Easily customize the Form 6 Recloser Control with removable inserts.

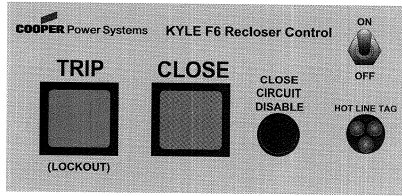
- No adhesives, labelmakers, or temporary labels are required.
- Simply change the inserts that identify the LEDs for Indicators 1, 2, and 3 and Options 1, 2, and 3 on the keypads.
- Name the function your way, quickly, professionally.



Simple label-customization.

Hot Line Tag

Hot Line Tag meets and exceeds NESC Standard 442.E to provide a fail-safe and verifiable method for live line work.



Hot Line Tag Toggle LED Indicator and Toggle Switch.

- Hot Line Tag is activated from the operator panel toggle switch, serial communications, or a discrete SCADA function.
 - For SCADA applications, significant cost savings are obtained by reporting directly to the work area, without first setting up the control for tagging applications.
 - For non-SCADA applications, Hot Line Tag, including an LED indicator and a close circuit disconnect, is a simple solution for live-line work.
- The close-circuit disconnect provides a removable link directly in series with the close circuit for operating practices requiring a visible break in the close circuit.
- If a fault occurs while in Hot Line Tag, the Form 6 Recloser Control times on a user programmed definite time for overcurrent protection operating one trip to lockout.

Cold Load Pickup

Cold Load Pickup (CLPU) can be activated from the operator panel or remotely to provide the user with the ability to alter protection for service restoration after a system outage.

- The user may configure a unique time-current curve to be used only for cold-load pickup, independent of normal protection settings. It is active for a programmable time interval which begins with the first close signal after a lockout condition. Once cold-load pickup time elapses, protection reverts back to the programmed sequence.

Fault Targets

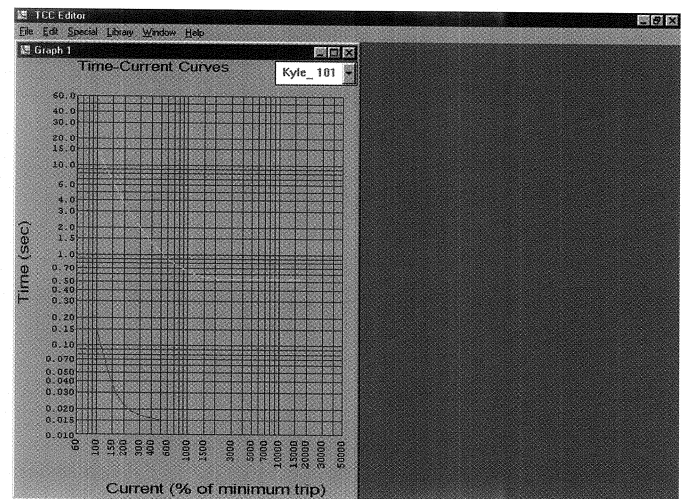
Fault targets are provided with the Form 6 Recloser Control for each phase, ground sensing, and sensitive ground fault.

- The targets indicate the appropriate phase or phases subjected to the fault current.
- Reset of the targets may be accomplished either manually or automatically configured by the user.
- The front panel also includes an easily-accessible RESET TARGETS key for operator reset of the targets.

Protection Profiles

Advanced protection functions are incorporated to provide reliable protection for distribution feeders. These are enhanced on the Form 6 Recloser Control to provide increased operational flexibility with the inclusion of multiple protection profiles. Selecting one of four possible profiles provides the user with the utmost versatility in adapting recloser protection to dynamic system conditions.

- The selection of the desired profile can be made locally with front panel switches or via the serial communications ports.
- Fifty time-current curves are resident on the Form 6 Recloser Control at any one time and can be customized to user preferences.
 - This includes the Kyle® 101 time-current curve with its fast-timing characteristics to provide maximum fuse saving coordination — often preferred over breaker instantaneous elements.



Type Kyle 101 Time Current Curve.

Directional

Directional functionality is included to maintain system coordination from multiple sources, as well as circuit reconfiguration for each profile.

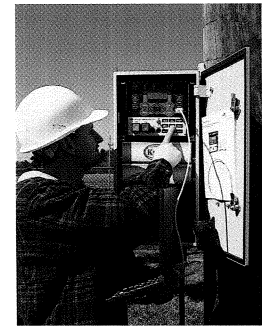
- Directional applies to phase, ground, and negative sequence protection, selected independently.
- A maximum torque angle has a range of 0-90 degrees with 1 degree increments.

ProView™ Operating Software

Windows®-Based Operating System Dialog Boxes with Common Windows® Tools

- Intuitive ProView™ application software utilizes standardized tools to minimize training costs and miscoordination.
- Software for complete configuration of your recloser controls.
- PC-based software to be used independently or connected to the control via the following options:
 - local RS-232 port
 - modem
- Detailed Help Screens to provide the latest application, function, and terminology update information.

- Settings configuration guesswork is eliminated with an active dialog that identifies the available minimum and maximum values. No need to refer to a separate manual or interpret warning messages after a value is entered.
- Operates on Windows® 95, 98, 2000, and NT operating systems.
- ProView™ offers the following advantages:
 - Application Diagram
 - Protective Settings Manager
 - Idea Workbench™
 - Metering
 - Oscillography
- Firmware upgrades are quick and easy with local or remote downloading of a new scheme through the serial port. No hardware changes required.



Simple Front-Panel Programmability for any application.

Programmable Logic Simplified

Operations Parameters – TCC1/TCC2

The TCC1 and TCC2 dialogs allow the user to program the control with the settings associated with the specific curve characteristics for the TCC1 and TCC2 curve shapes. These dialogs give the user access to all 45 of the standard time-current-curve shapes, plus the five custom User curves, as well as the curve modifiers. These dialogs also allow the user to launch TCCEditor™, and read or write to the three TCC editor associated with the curve shape modifiers. The settings and dialog controls descriptions, and the allowable limits of the settings are listed below.

Curve Type (Phase, Ground and Negative Sequence)

The Curve Type settings define the shape or the TCC. Kyle curve types 101 thru 200, along with a Constant (Definite Time), ANSI Inverse, Very Inverse, and Extremely Inverse, as well as five custom curves (User1 – User5), are selectable from the Curve Type Setting. User curves are definable using the TCCEditor™, and imported using the controls in the User Curves dialog.

Phase Curve Type	
Units:	Unitless
Range:	See Curve Type Descriptions
Accuracy:	n/a
MMI Setting Interface Designation:	TCC1PCurve, TCC2PCurve
Residual Curve Type	
Units:	Unitless
Range:	See Curve Type Descriptions
Accuracy:	± 5% and ± 5 ms
MMI Setting Interface Designation:	TCC1GCurve, TCC2GCurve
Negative Sequence Curve Type	
Units:	Unitless
Range:	See Curve Type Descriptions
Accuracy:	± 5% and ± 5 ms

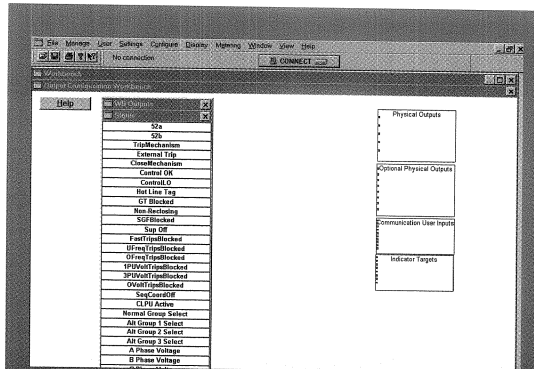
ProView™ features detailed on-line Help Screens.

Idea Workbench™

Select your Logic, Customize your Application

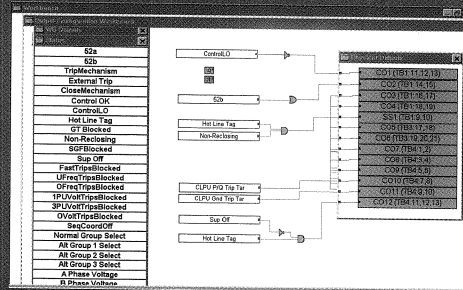
The Form 6 Recloser Control introduces a new and simple graphical method for programmable logic applications. ProView™ software includes the Idea Workbench™ to customize not only your hardware control and status points, but also your serial communication points, front panel function keys, and LED status indicators.

- Select and visualize a multiple logic gate connected to multiple arrays of functions by simply clicking and dragging your application to your location.
- Save your Idea Workbench™ files to be used again as needed, independent of your scheme.
- Quickly program your operating settings with standardized dialog boxes, yet customize your applications through the Idea Workbench™.



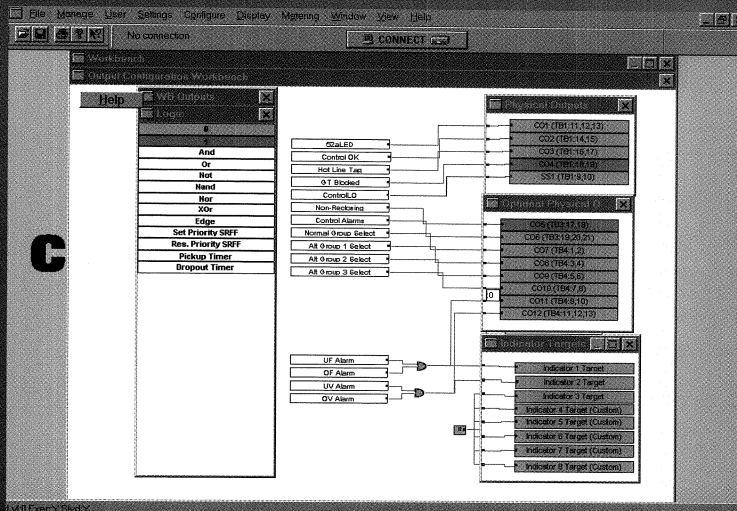
Go from this...

... to this in 20 minutes.



- Default settings for the control and status points include common functions such as Recloser Lockout, Open, Close, Ground Trip Block, etc.
- No-worry user-customization for Supervisory Inputs/Outputs, LEDs, and Operating functions.
- Quick control customization to meet specific applications without factory firmware and software development.
- Visualize proper logic, rather than memorize commands.
- Easily-understandable graphic logic icons.
- Quick-connect graphic wiring.
- Full SCADA input/output availability.
- Operational I/O capability.
- Eliminate complex formula ASCII strings.

Your Thoughts and Ideas Expressed by a Powerful Graphical Interface



User-customizable option keys.

- ALARM
- ABOVE MIN TRIP
- INDICATOR 1
- INDICATOR 2
- INDICATOR 3

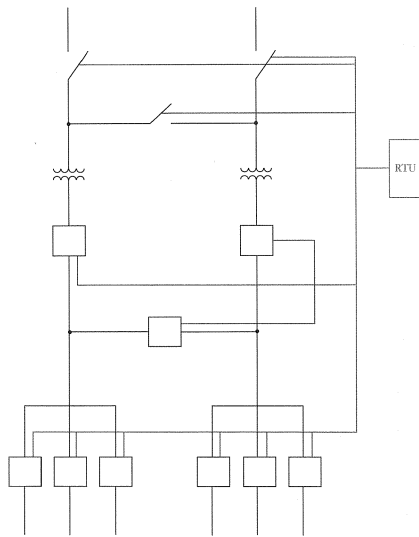
User-customizable indicator LEDs.

The Idea Workbench™ makes user-customization easy.

Automation Advantages

Standardize all your substation equipment with the common automation platform in the Form 6 Recloser Control and Edison® Idea™ Relay.

Wiring connections or serial communications integrated with the Idea Workbench™ easily automates your substation - all with a click of the mouse!



Substation One-Line Diagram with Communications.

The following features for substation automation ease are standard with the Form 6 Recloser Control:

- Configurable I/O easily accomplished with the Idea Workbench™.
- Resident protocols eliminate cost of translator boards and are front panel programmable for future upgrades.
- Communication software for your modem applications.
- RS-232 and RS-485 serial ports for easy connection to your automation system.

Protocols

Two protocols, along with ProView™, are available for configuring the Form 6 Recloser Control, either locally or remote.

- Select either Modbus or DNP3.0 to provide your serial communication needs.
- Both protocols provide excellent serial communication interfaces to equipment produced by numerous SCADA manufacturers.
 - Simplified SCADA interface for low cost integration.
- The use of a resident protocol eliminates the additional cost of protocol converters and ancillary support costs.
- The rear panel RS-232 and RS-485 serial ports may be configured for either the Modbus or the DNP 3.0 protocols.
- Simple upgrades via front panel download.

Expansion I/O Board Accessory

The expansion I/O board accessory provides for connection of additional controls, as well as processing and protection applications.

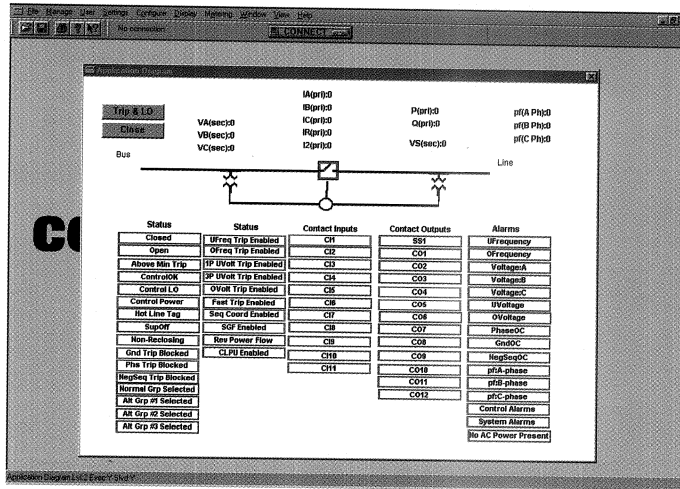
- The accessory includes eight isolated contact inputs to accommodate universal wetting voltage and heavy-duty rating applications.
- Eight isolated contact outputs are also included for interfacing to ancillary equipment.

ProView™ simplifies substation automation.

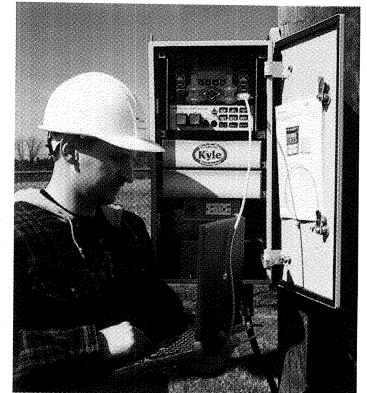
Point Index	Scaling	Deadband	Point Index	Scaling	Deadband	Point Index	Scaling	Deadband
0	1	100	16	1	1000	32	1	1
1	1	100	17	1	1000	33	1	1
2	1	100	18	1	1000	34	1	1
3	1	20	19	1	1000	35	1	1
4	1	500	20	1	1000			
5	1	500	21	1	1000			
6	1	500	22	0	0.02			
7	1	1	23	1	1000			
8	1	1	24	1	1000			
9	1	1	25	1	1000			
10	0	0.05	26	1	1000			
11	0	0.05	27	1	4			
12	0	0.05	28	1	0.5			
13	1	1000	29					
14	1	1000	30					
15	1	1000	31					

Application Diagram

The application diagram provides a display of all the logic elements, voltages, currents, watts, and vars of the Form 6 Recloser Control. This live display of the connected recloser provides a quick summary of the distribution system and the active control functions. The application diagram is also ideal for testing or for providing a quick system overview via modem connection.

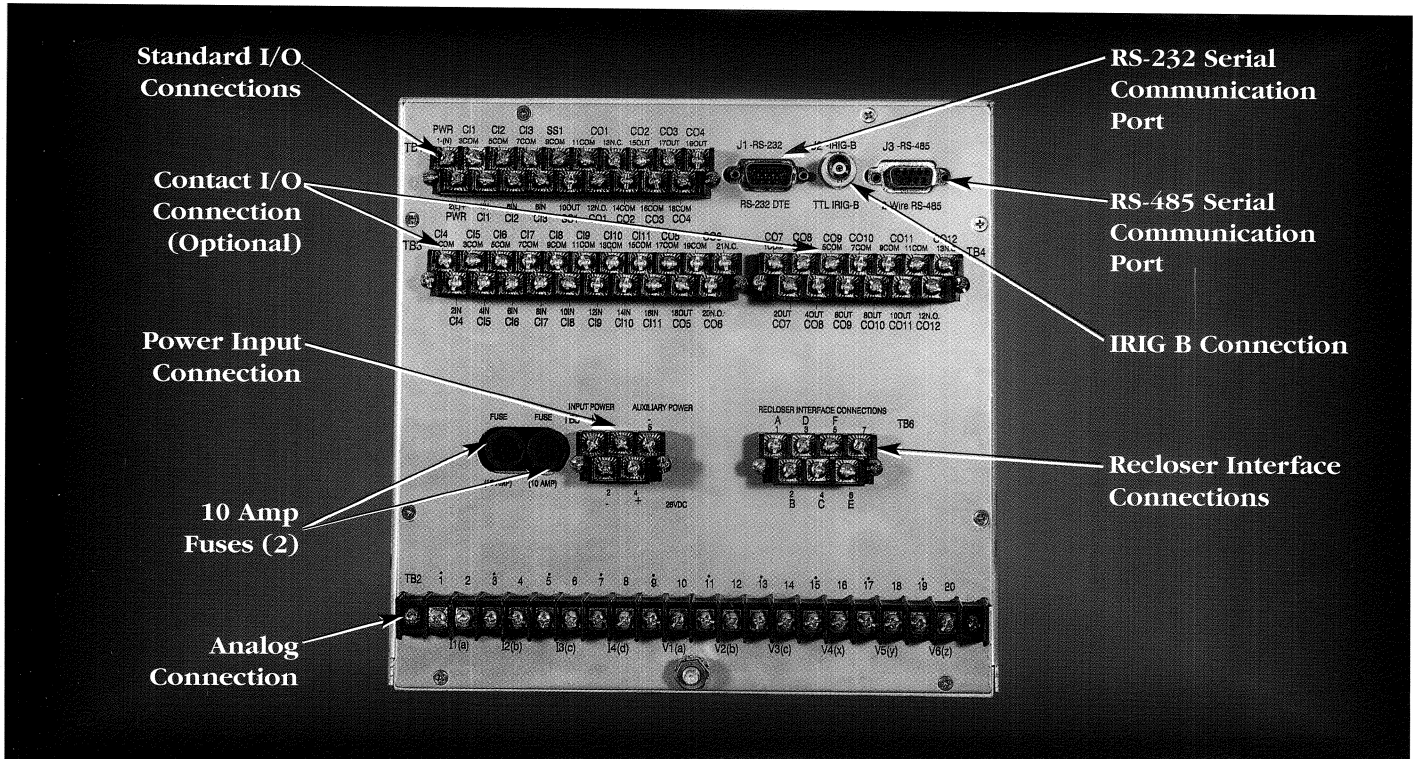


ProView Application Diagram.



Interrogate the Form 6 Recloser Control via the front panel RS-232 Port.

- IRIG-B Port
- SCADA-Ready
- Resident Protocol
- RS-232 and RS-485 Ports
- Front Panel Programmable



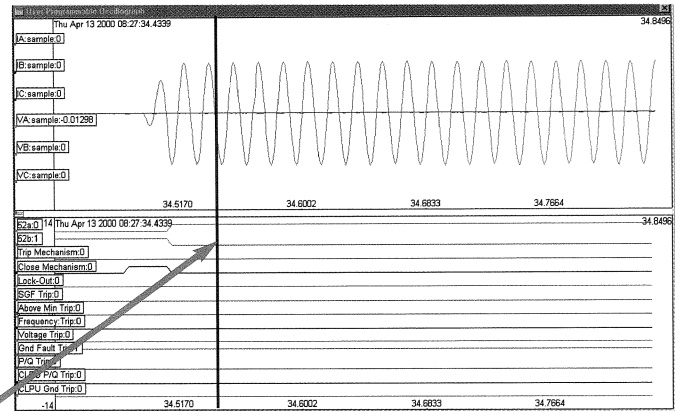
Form 6 Yard and Rack Mount Recloser Controls have a common Back Panel.

Knowledge-Based Data Analysis

Oscillography

The integrated performance of the recloser and control can be monitored simultaneously with system events to analyze and prevent future outages. As an example, fault currents combined with configured inputs to the control allow the user to completely review the distribution protection activity for each fault occurrence.

- Total oscillographic data of three seconds is recorded to analyze multiple events during a permanent fault or other event type.
- The oscillographic data shows two cycles before the trigger point and eight cycles after the trigger point and monitors real time analog/digital signals customized by the user.



Form 6 Recloser Control offers detailed Oscillography analysis.

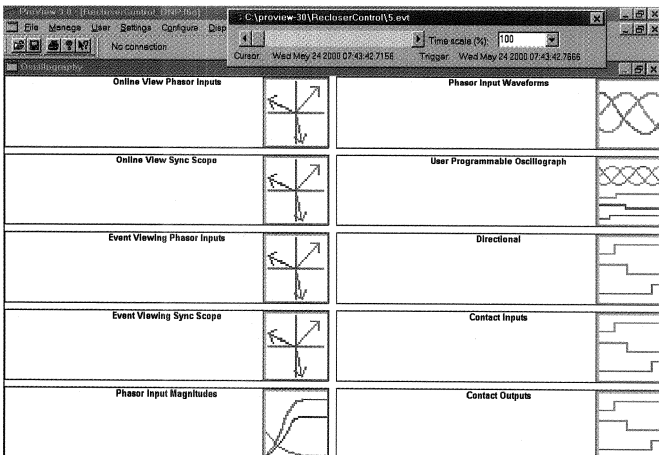


Time cursor to accurately measure all analogs and determine function status throughout the total Oscillographic event.

Oscillography Replay

The Oscillography Replay feature provides the opportunity for oscillography events to be played back through the control scheme, even with altered settings. The unlimited potential of this feature gives the user "20/20 hindsight" to determine how the control would have behaved for the same fault under different settings.

- Save future fault incidences with past fault performance analysis.
- View accurate graphical events to compare actual control performance against expected results.



Form 6 Recloser Control Multiple Oscillography Displays.

Duty Cycle Monitor

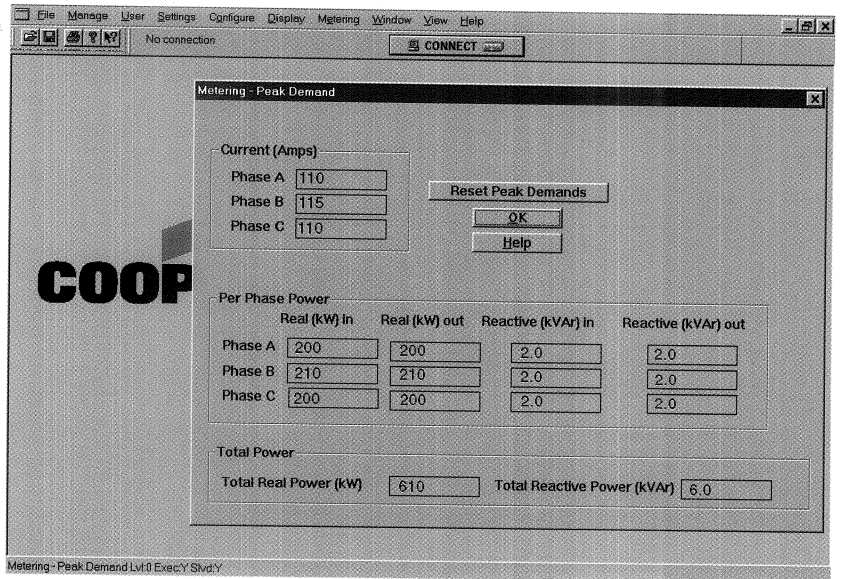
Accurately predict the life of the recloser interrupter, either vacuum or oil, through the Duty Cycle Monitor.

- The Duty Cycle Monitor measures and records duty for each individual phase in non-volatile memory per the ANSI C37.61-defined method for determining contact life for a recloser.
- Readout is based on a percentage of total duty cycle for each phase.
- The duty cycle can be adjusted or reset if the recloser is changed or serviced.

Event Recorder

The Form 6 Recloser Control features a comprehensive, time-tagged event recorder.

- The event recorder includes the following information:
 - Date and Time of the Event
 - Type of Event
 - Event Recorder Information, such as Current and Voltage Values for the Event Type
- Thirty-two different event types, including distinctions between local and supervisory functions, comprise the detailed reporting of system operations.
- Ten additional user-defined event types are configured through the Idea Workbench™.
- The event recorder maintains a minimum of 150 events.



ProView™ Metering - Peak Demand screen.

Power Metering with Instantaneous and Demand Metering

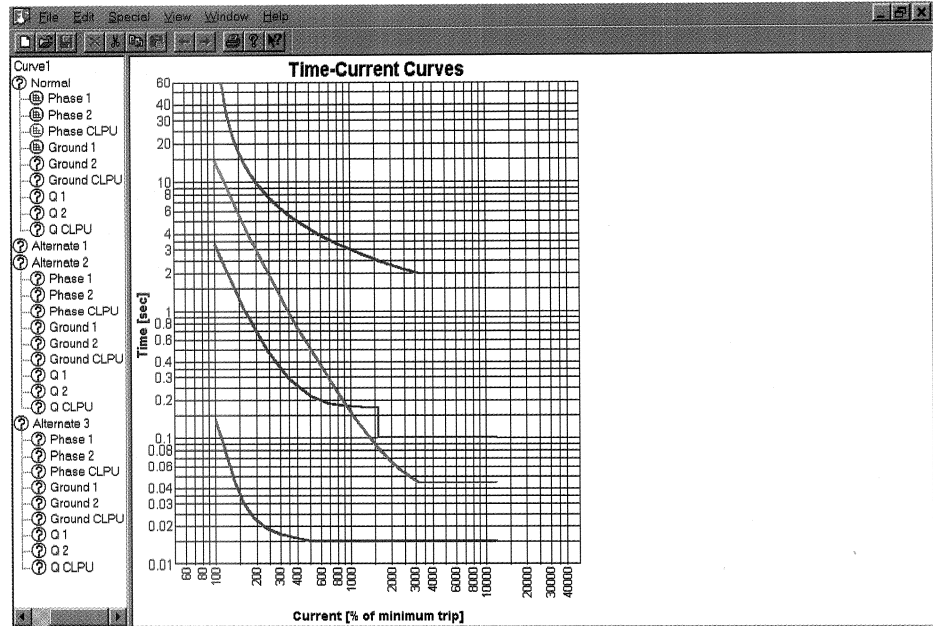
The Form 6 Recloser Control displays comprehensive metering, viewable on the front panel LCD, or through ProView™ interface software.

- Metering includes instantaneous, demand, and peak demand (draghand) values for Amps, Watts, and Vars.
- Instantaneous Volts are also included for real time metering applications.
- Harmonics, power factor, and energy metering (KWH) examine system efficiency and power usage.
- Increase service reliability through quick fault area location and identification.
- Reduce operating costs through accurate load current measurement to provide balance feeders and report real-time data to system planning.

TCC Editor II

The Windows® operating system-based TCC Editor II software provides immediate verification of the selected TCC.

- The graphical display eliminates any of the guessing or cumbersome plotting of Time-Current Curves, particularly if the base curve slope is modified.
 - Eliminates re-plotting to verify modifications.
- Add a time multiplier and immediately determine the impact on your coordination margin with other devices.
- Provides a visual representation of TCCs in a familiar log-log graphical format.
 - Visualizes actual time current curve.
- Each TCC, whether from the standard TCC library or custom-created from data points entered by the user, can be extensively modified.
- With the flexibility provided by the ProView™ application software package, it is possible to construct time-current curves to meet the most exacting coordination requirements.



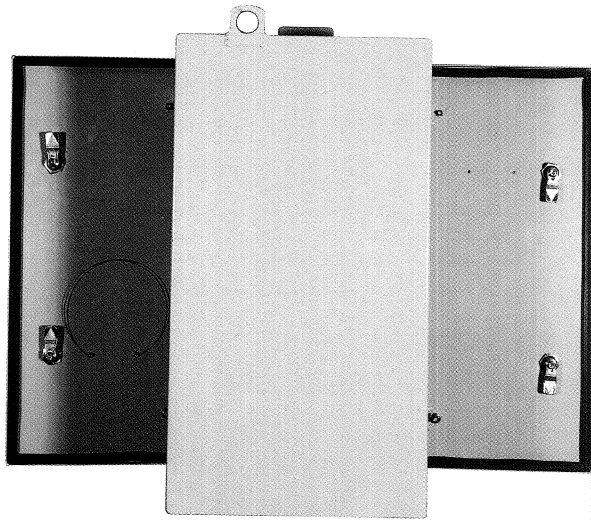
Graphical TCC Editor II.

New enhancements to TCC Editor II include:

- Displays up to thirty-six Time Current Curves for all four profiles with individual identifications. Each profile includes nine time current curves.
- Identification of corresponding usage of each Time Current Curve by identifying TCC1, TCC2, and Cold Load Pickup TCC for phase, ground, and negative sequence protection.
- Improved dialogs and faster access for selecting and modifying curves.
- Immediate importing of the TCC Editor II curves along with modifications directly in the dialog drop-down menus.
- Advanced copy feature to copy one TCC and/or one profile to another.

TCC1 Group Change Screen.

Substation Mounting



Easily Accessible Dual-Sided Form 6 Recloser Control Yard Mount Cabinet.

The Form 6 Recloser Control is versatile, flexible, and easy to operate. The dual-sided yard mount cabinet allows easy access to the front and back, making it easy to check connections.

Half-Rack Mounting Available

A compact half-rack mounting cabinet is available as an aid to reduce substation automation costs. A standard 19 inch rack can accommodate two controls mounted side-by-side.

Substation Dc Power Supply

The Form 6 Recloser Control can be equipped with a 24 Vdc power supply or 48/125Vdc universal power supply. The 48/125 Vdc universal power supply is adaptable to a substation with either a 48 Vdc or 125 Vdc service, standardizing your protection while reducing your planning and inventory costs.



Simple wiring and interrogation of the Form 6 Recloser Control for yard application.

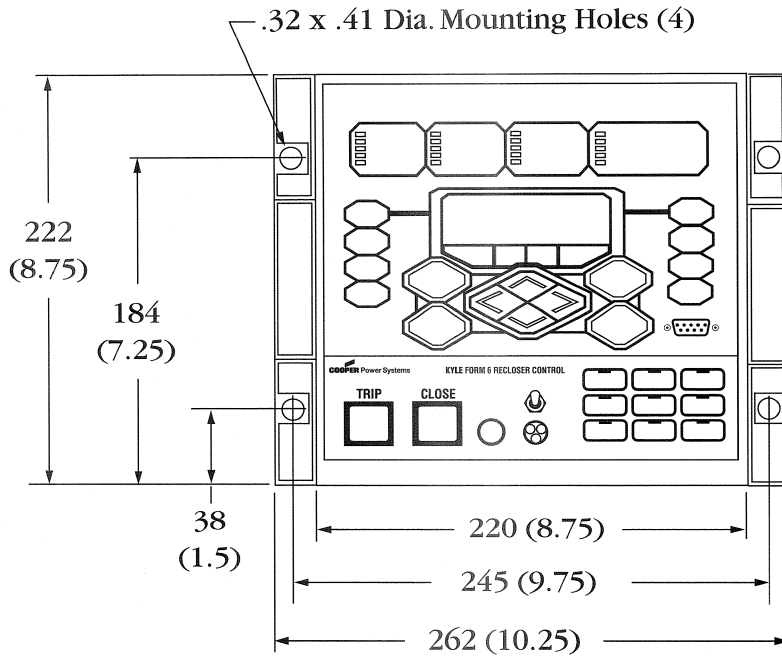
**Integrated Operating Switches -
Includes Kyle's Hot Line Tag**

Operating Temperature of -40°C to 70°C

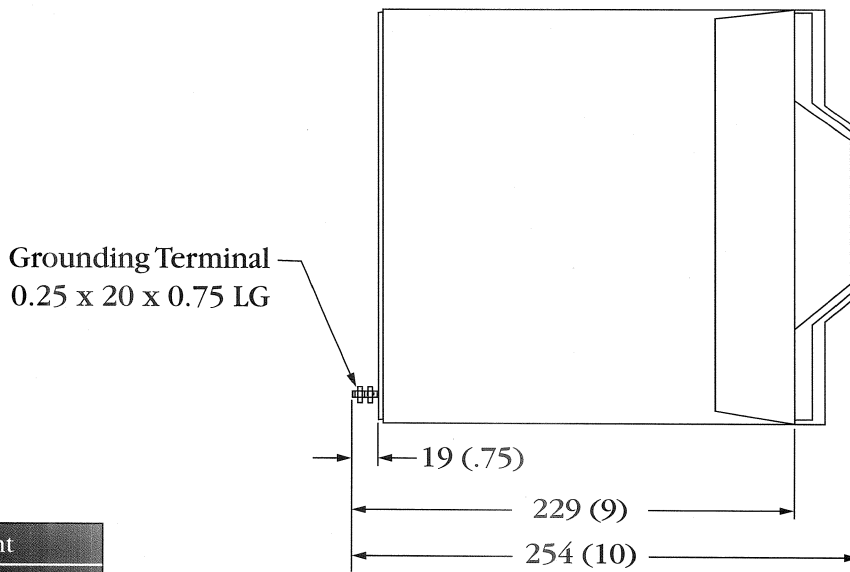
An operating temperature suitable for yard-mount applications, pedestal cabinets, and unheated substation houses, emergency conditions.

Weights and Dimensions

Note: Weights kg (lb.) and Dimensions mm (in.) are approximate.



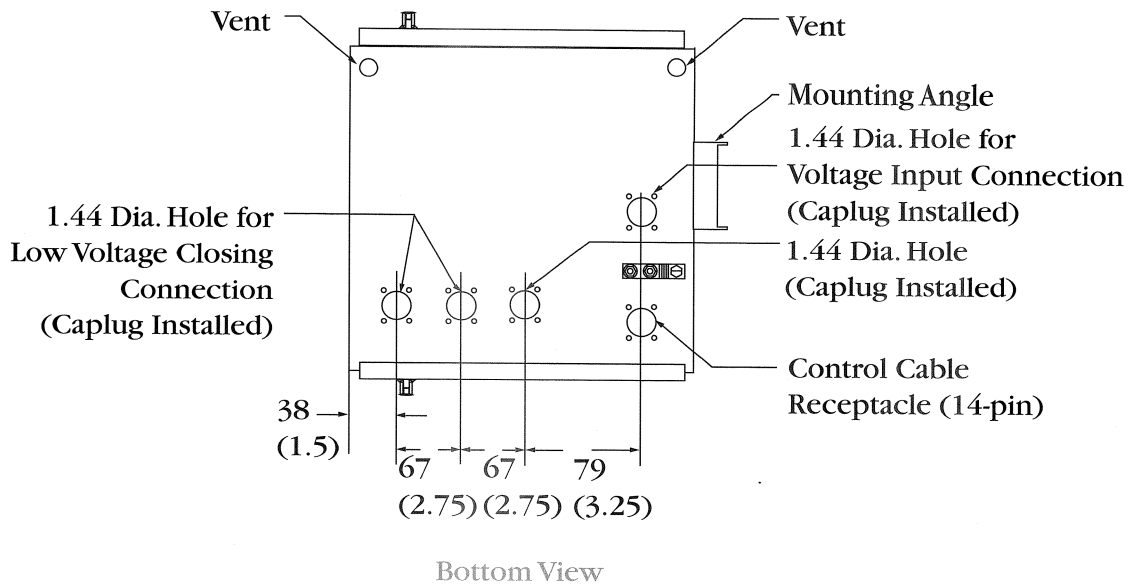
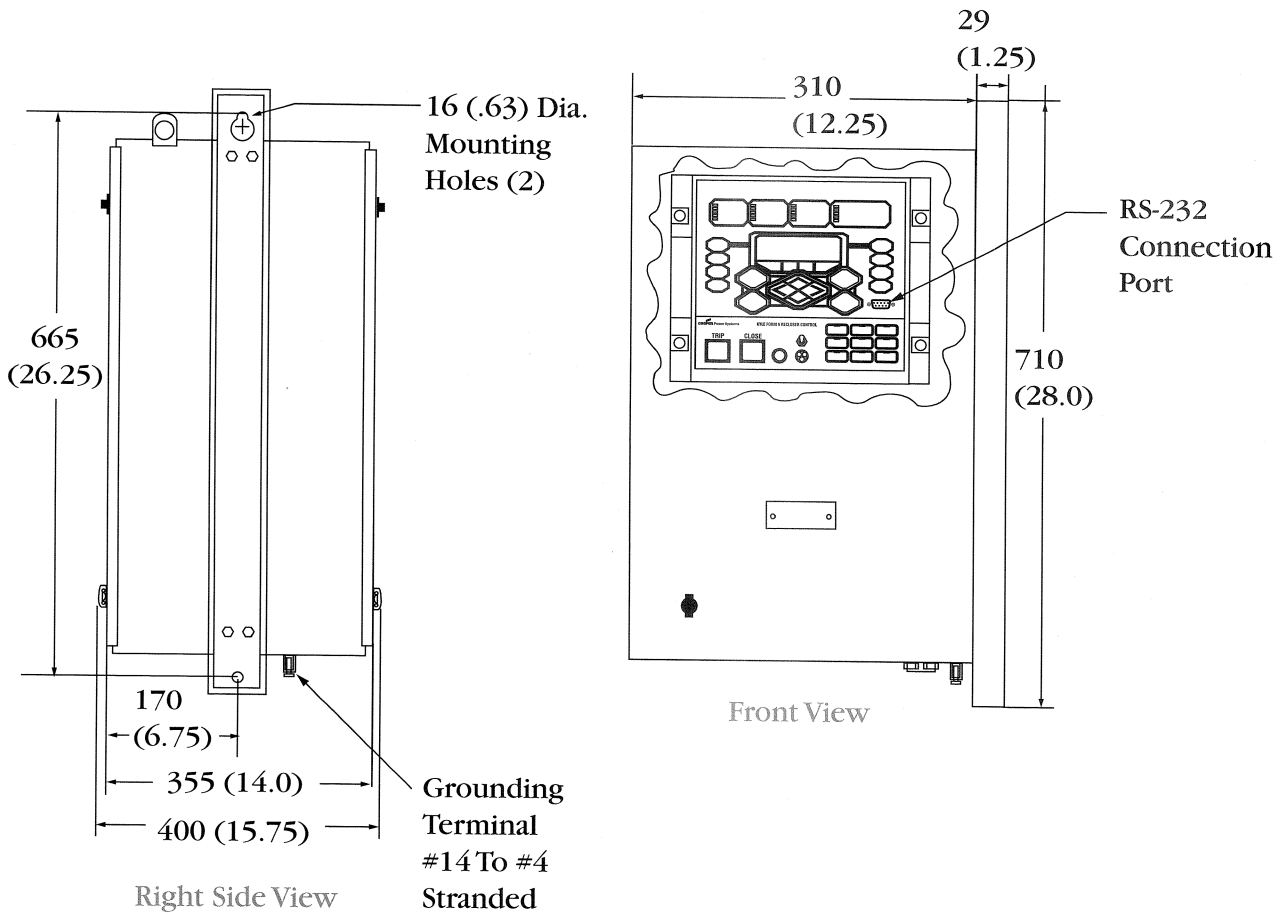
Front View



Side View

Weight
7 kg (15 lbs.)

Form 6 Rack Mount Recloser Control Weight and Dimensions.

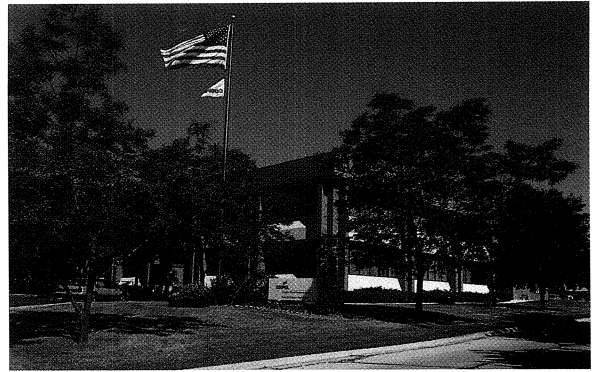


Weight
34 kg (75 lbs.)

Form 6 Yard Mount Recloser Control Weight and Dimensions.

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