

# Reclosers

## Substation Frame KA584R1 and Accessories

### Assembly and Installation Instructions

# S280-85-1

Service Information

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### RECLOSER DIMENSIONS

Typical frame dimensions for hydraulically controlled reclosers are shown in Figure 1 and Table 1. Typical frame dimensions for electronically controlled reclosers are shown in Figure 2 and Table 1.

NOTE: Frame height is adjustable from 87-1/4 to 114-1/4 in. in 3-in. increments except when a meter trough and control mounting straps are installed; in which case, the minimum frame height is 99-1/4-in.

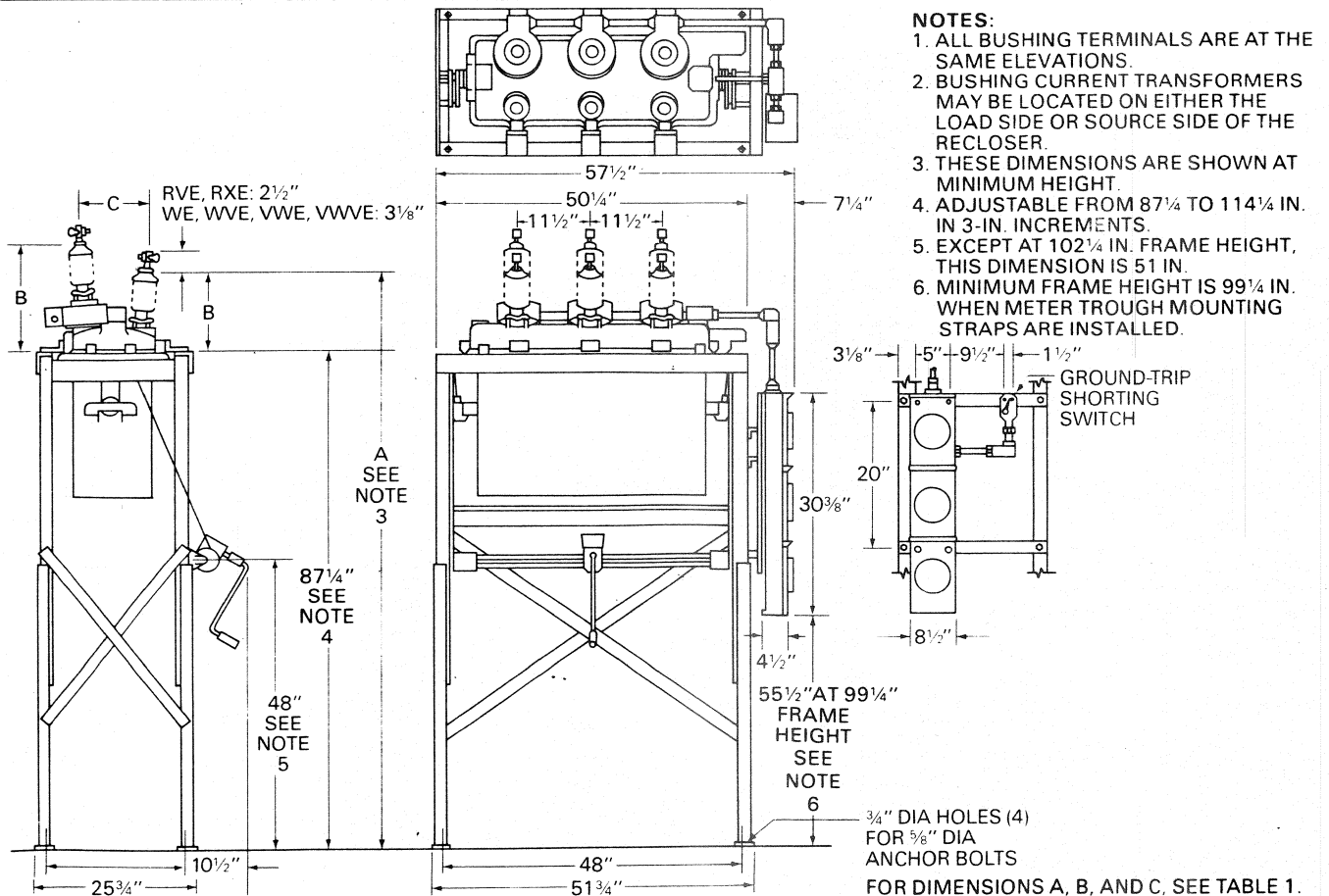
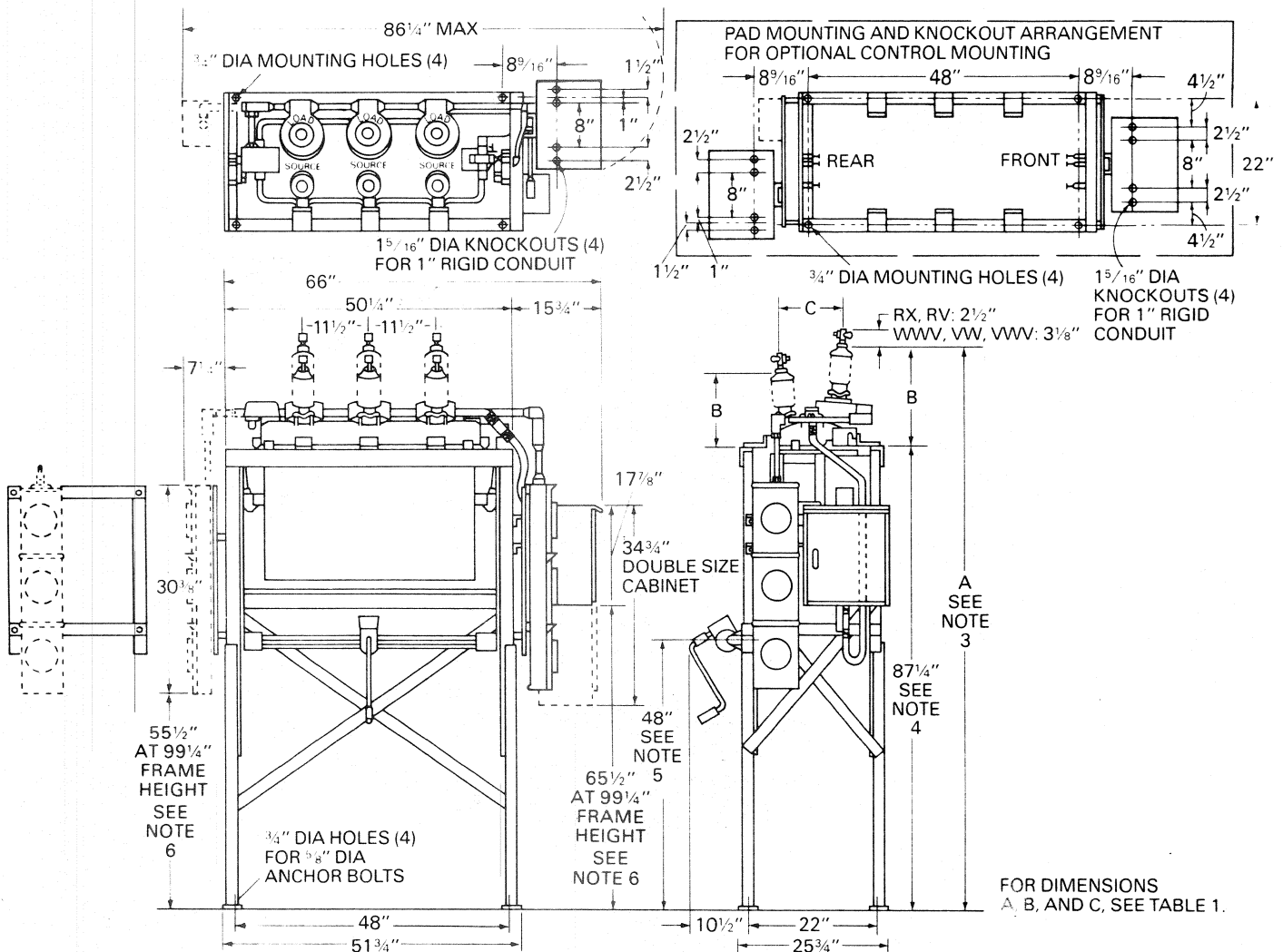


Figure 1. Typical mounting dimensions of hydraulically controlled recloser in KA584R1 substation frame.

These instructions do not claim to cover all details or variations in the equipment, procedure, or process described, nor to provide directions for meeting every possible contingency during installation, operation, or maintenance. When additional information is desired to satisfy a problem not covered sufficiently for the user's purpose, please contact your McGraw-Edison Power Systems Division sales engineer.



- NOTES:**
1. ALL BUSHING TERMINALS ARE AT THE SAME ELEVATIONS.
  2. BUSHING CURRENT TRANSFORMERS MAY BE LOCATED ON EITHER THE LOAD OR THE SOURCE SIDE OF THE RECLOSER.
  3. THESE DIMENSIONS ARE SHOWN AT MINIMUM HEIGHT.
  4. ADJUSTABLE FROM 87 1/4 TO 114 1/4 IN. IN 3-IN. INCREMENTS.
  5. EXCEPT AT 102 1/4 IN. FRAME HEIGHT, THIS DIMENSION IS 51 IN.
  6. MINIMUM FRAME HEIGHT IS 99 1/4 IN. WHEN CONTROL MOUNTING STRAPS ARE INSTALLED.

**Figure 2.**  
Typical mounting dimensions of electronically controlled recloser in KA584R1 substation frame.

**Table 1.**  
Dimensions of Hydraulic and Electronic Reclosers  
(Indexed to Figures 1 and 2)

Recloser Type	Bushing	Dimensions (in)					
		Recloser without Bct			Recloser with Bct		
		A*	B	C	A*	B	C
R, RX, RE, RXE W, VW, WE, VWE	Standard or 17-in. Extra Creepage	100 3/4	13 1/2	11	105 1/2	18 1/4	11 3/4
RV, RVE WV, VWV, WVE, VWVE	Standard	104 1/4	17	11 1/2	109	21 3/4	12 1/4
RV, RVE WV, VWV, WVE, VWVE	26 1/2-in. Extra Creepage	106	18 3/4	12	110 3/4	23 1/2	13 3/4

\*At minimum height.

**ASSEMBLY OF BASIC FRAME  
(KA584R1)**

(Figures 3, 4, 5, 6; Table 3)

**General**

The assembly of the basic substation frame is shown in Figures 3, 4, 5, and 6. Parts are indexed to—and identified in—Table 3.

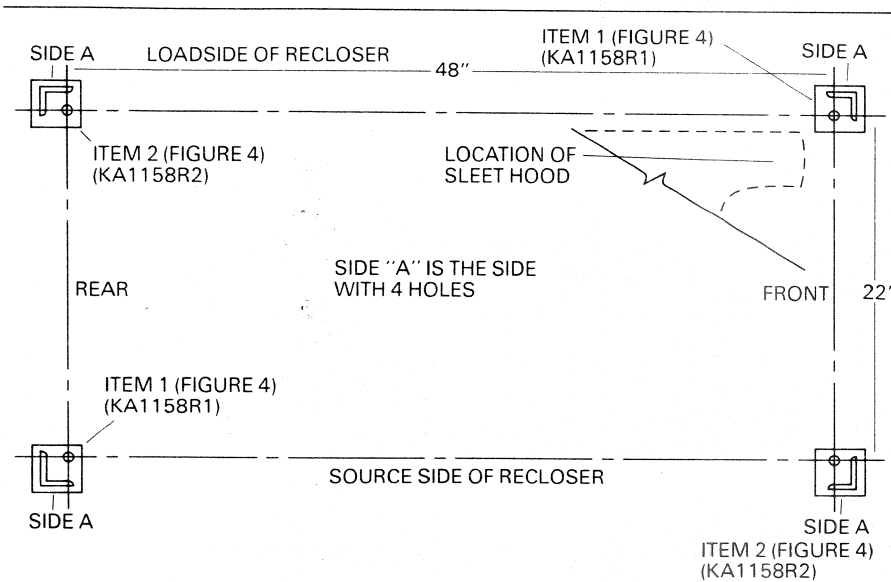
To simplify the assembly procedure, erect the frame in four stages:

Stage 1: Set the frame base (bottom half).

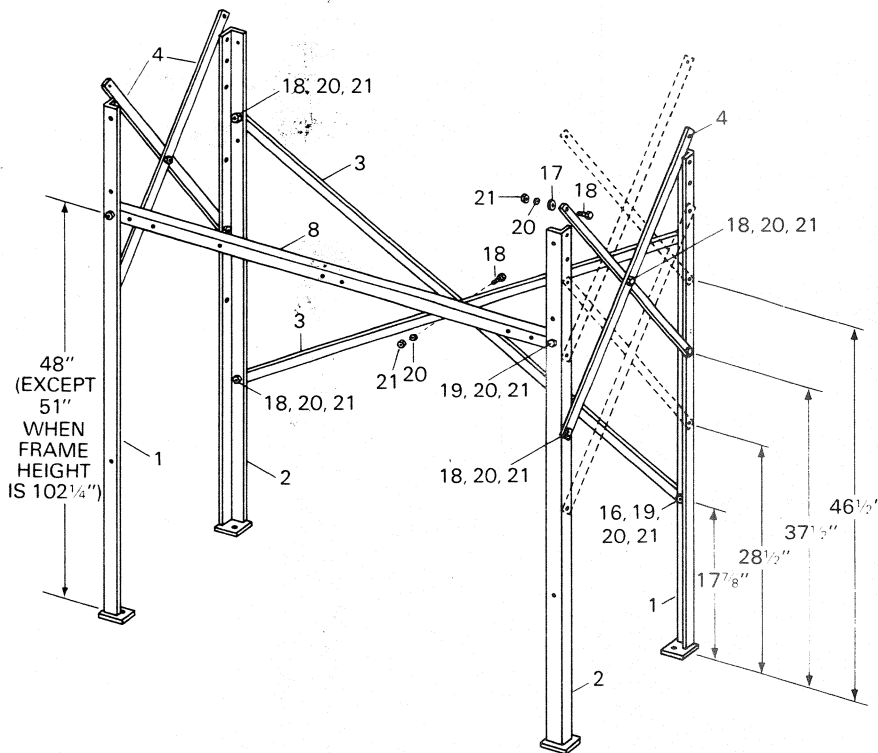
Stage 2: Add the top half.

Stage 3: Install the recloser.

Stage 4: Add the frame accessories.



**Figure 3.**  
Orientation of frame and position of lower frame posts.



**Figure 4.**  
Assembly of bottom half of frame (KA584R1).

**Assembly of Bottom Half of Frame**  
(Figures 3 and 4; Table 3)

To assemble the bottom half of the frame:

1. Position two each of lower frame posts (1 and 2) as shown in Figure 3.

**NOTE:** Construction details for a mounting pad are given in Service Information S280-85-10. Anchor bolts (5/8-in. diameter) should be embedded with centers placed at the corners of a 48- x 22-in. rectangle.

2. Place lower posts (1 and 2) on the anchor bolts as shown in Figure 3, and assemble lockwashers and nuts to anchor bolts.
3. Attach the lower ends of long cross braces (3) to the lower frame posts as shown in Figure 4, using capscrew (18) on one end and capscrew (19) and ground clamp (16) on the other. Secure with lockwasher (20) and nut (21).

- A. For frame heights of 105-1/4, 108-1/4, and 111-1/4 in., attach the upper ends of the long cross braces to the frame posts.
- B. For frame heights below 105-1/4 in., the holes for attaching the upper ends of the long cross braces are also used for attaching the upper frame posts.

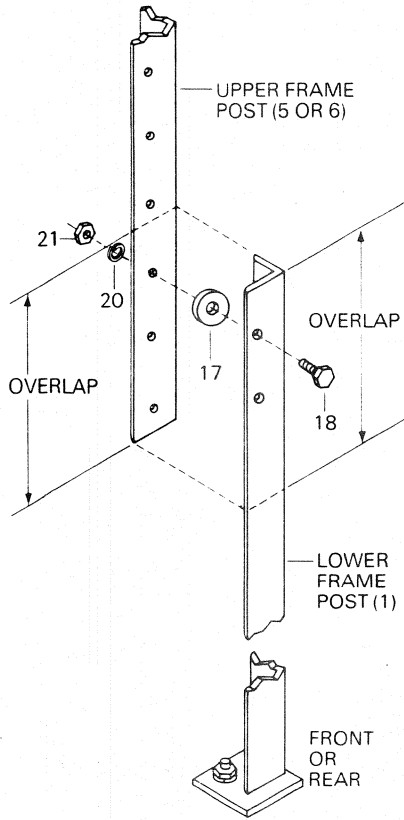
**Determining Frame Height**  
(Figure 5, Table 2)

The upper frame posts assembled to the lower frame posts determine the frame height. The range of frame heights is shown in Figures 1 and 2. The amount of required overlap (upper post inside lower post) to obtain the desired frame height is shown in Table 2 and Figure 5.

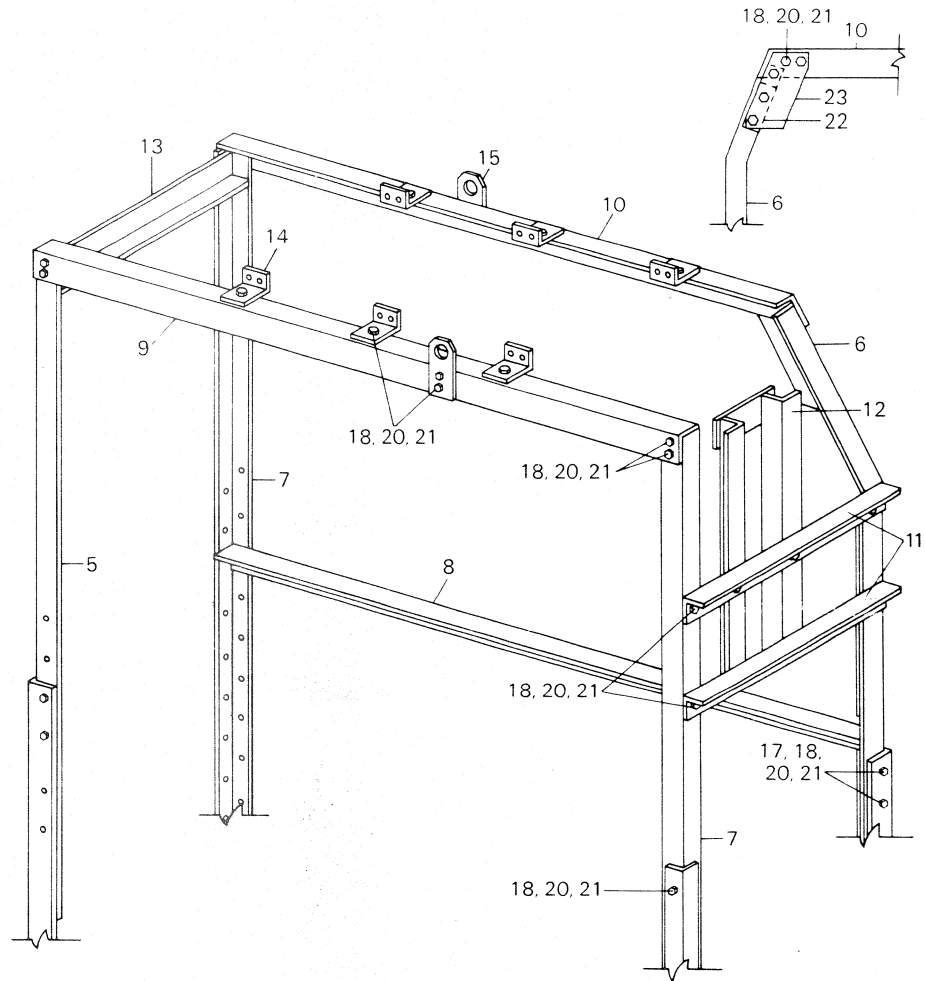
**Table 2.**  
Frame Heights and Overlap

Frame Height (in)	Overlap (in)
87 1/4	28 1/2
90 1/4	25 1/2
93 1/4	22 1/2
96 1/4	19 1/2
99 1/4*	16 1/2
102 1/4	13 1/2
105 1/4	10 1/2
108 1/4	7 1/2
111 1/4	4 1/2

\*Minimum height when KA584R4 or KA584R5 is used.



**Figure 5.**  
Frame height is determined by amount of overlap between upper and lower frame posts.



**Figure 6.**  
Assembly of top half of frame (KA584R1).

### Assembly of Top Half of Frame

(Figures 5 and 6; Table 3)

To assemble the top half of the frame:

1. At the desired height, attach upper frame posts (5, 6, and 7) to lower frame posts (1 and 2) as shown in Figures 5 and 6, using a minimum of three bolts at each junction. Use spacer (17) between surfaces at the front and the rear of the posts as shown in Figure 5.

NOTE: Upper post with knee (6) is positioned adjacent to the sleet hood of the recloser (right-front leg in Figure 3) for access to the yellow manual operating handle of the recloser.

2. Attach the upper ends of short cross braces (4), using spacers (17) between the braces and the post.
3. Assemble windlass mounting support angles (8) to the inside surfaces of the frame posts.

**Table 3.**

**Parts Lists, Basic Frame Assembly (KA584R1)**  
Indexed to Figures 4, 5, and 6)

Item	Description	Part No	Qty
1	Lower Post (RH)	KA1152R1	2
2	Lower Post (LH)	KA1152R2	2
3	Long Cross Brace	KP1533R1	2
4	Short Cross Brace	KP1533R2	4
5	Upper Post (RH)	KP2377R2	1
6	Upper Post w/knee	KP2390R	1
7	Upper Post (LH)	KP2377R1	2
8	Support Angle	KP1522A	2
9	Top Support Angle	KP2374R	1
10	Top Support Angle	KP2391R	1
11	Hoist Support Angle	KP1531R	2
12	Hoist Support Assembly	KA596R	1
13	Hoist Support Assembly	KA1160R	1
14	Recloser Mounting Brackets	KP1538R	6
15	Lifting Mug	KP2383R	2
16	Ground Clamp	KP1596R	1
17	Spacer	KP2028A61	8
18	Capscrew, hex hd, 1/2-13, X 1 1/2, stl	KP1354	69
19	Capscrew, hex hd, 1/2-13 X 2, stl	KP1399	3
20	Lockwasher, med, 1/2, stl	KP1107	72
21	Hex Nut, 1/2-13, stl	KP1214	60
22	Spacer	KP2388R	1
23	Gusset	KP2389R	1

- A. Mount the support on the far side (loadside of the recloser) at 33-1/4 in. from the top of the frame.
- B. Mount the support angle on the near side (source side of the recloser) 48 in. from the pad (except for frame heights of 102-1/4 in., for which this support is mounted at a height of 51 in. from the pad because of assembly interference.)
4. Attach top support angle (9) to the near side of the frame.
5. Attach top support angle (10) to the far side of the frame, using gusset (23) and spacer (22) to attach to upper post with knee (6) as shown in Figure 6 inset.
6. Attach hoist support angles (11) to the front of the frame; attach hoist support assembly (12) to these angles.
7. Attach hoist support assembly (13) to the rear of the frame.

### INSTALLING THE RECLOSER

(Figure 6, Table 3)

1. Attach recloser mounting brackets (14) loosely to top support angles (9) and (10).
2. Hoist the recloser into place.
3. Attach the recloser head to the angles with capscrews (18) and lockwashers (20) and tighten all hardware.

### ASSEMBLY OF FRAME ACCESSORIES

#### Tank-Lifting Mechanism (KA584R2)

(Figure 7: Table 4)

#### CAUTION

When lifting a recloser with the tank-lifting mechanism, make sure that the recloser remains level, the cable winds evenly on the spools, and the recloser is not raised to the point where the crimp in the cable end is bent around the sheave assembly.

Extra care must be taken when raising a recloser equipped with one set of externally mounted bushing current transformers. Because of possible interference, it is recommended that recloser mounting brackets (14, Figure 6) not be installed until the recloser has been raised high enough for the current-transformer housings to clear top support angles (9 and 10, Figure 6).

Reclosers equipped with two sets of bushing current transformers (load and source side) will not clear the frame when raised with the tank-lifting hoist. They must be lowered into the frame from the top.

The tank-lifting mechanism—which must be ordered separately—is shipped in a separate carton. Only one mechanism needs to be purchased for use on several frame structures in the same substation or at the same location because the mechanism can be easily transferred between frames as required.

The tank-lifting mechanism is mounted on the side of the substation frame assembly adjacent to the recloser source-side bushings:

1. Detach the two nuts and lockwashers from the captive machine bolts in each spool assembly.

2. Mount complete gear-box-and-spool assembly (1) on the frame support angle and fasten the spool assemblies with the hardware previously detached.
3. Attach the gear box to the support angle with capscrews (6) and lockwashers (7).
4. Position frame sheave assemblies (2) on the pins of the frame hoist-support angles.
5. Hook recloser sheave assemblies (3) to each end of the recloser tank.

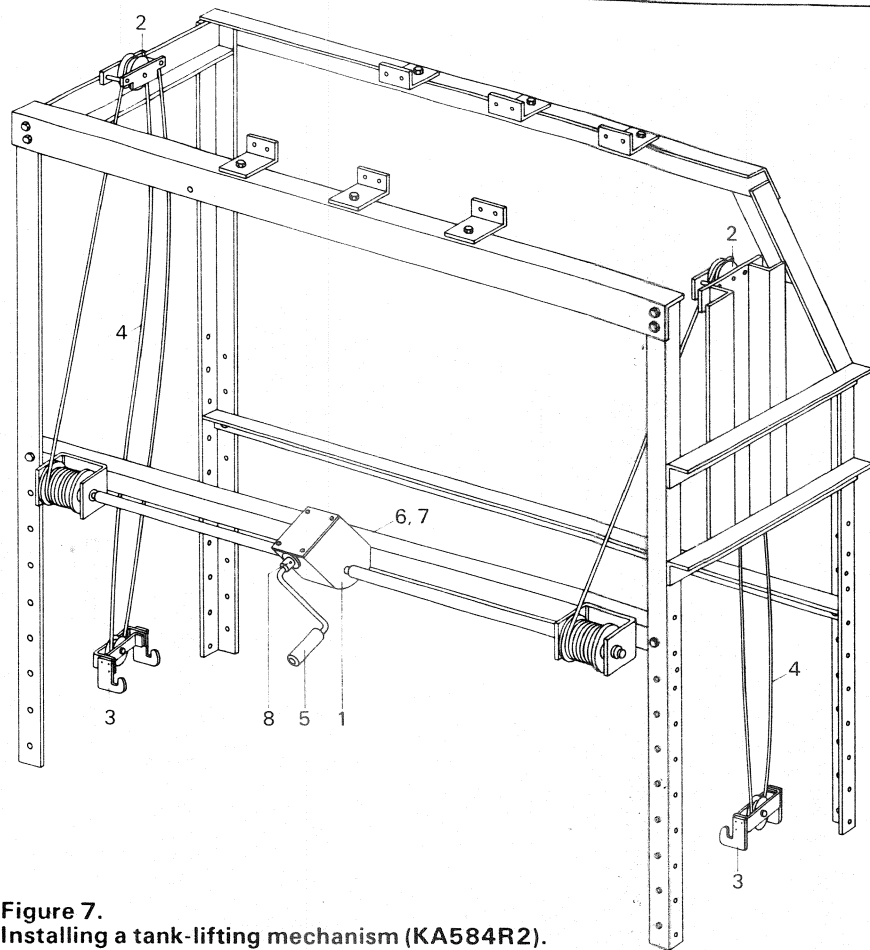


Figure 7. Installing a tank-lifting mechanism (KA584R2).

Table 4. Parts List, Tank-Lifting Mechanism (KA584R2) (Indexed to Figure 7)

Item	Description	Part No	Qty
1	Gear box and spool assembly	KA19CE3	1
2	Sheave assembly, frame	KA123R	2
3	Sheave assembly, recloser tank	KA121R	2
4	Cable assembly	KA592R1	2
5	Crank, gear box	KA112CE1	1
6	Capscrew, hex hd, 1/2—13 X 1, stl	KP1282	2
7	Lockwasher, med, 1/2, stl	KP1107	2
8	Cotter pin, 1/8 X 1, brass	KP314	1

6. Remove the hex nut from the stud end of each cable assembly (4) and thread the cable through the tank sheave, then up through the frame sheave into the hole in the cable spool.
7. Fasten the stud terminal end of the cable to the spool with the previously removed hex nut and attach the loop at the other end of the cable to the remaining pin on the hoist-support angle.
8. Attach windlass crank (5) to the gear box with cotter pin (8) and take up the slack in the cables while directing both cables in an even wind on the spools.

### CAUTION

Brass cotter pin (8) is used as a shear pin to prevent undue stress on the lifting mechanism. If damaged, it must be replaced with an identical pin. A spare cotter pin is provided.

### LOWERING THE RECLOSER TANK

To lower a recloser tank:

1. Apply a slight tension to the lifting cables.
2. Loosen and remove the head bolts which attach the tank to the head mechanism.
3. Lower the tank with the crank to gain access to the recloser mechanism and the contact structure for inspection and routine maintenance.

### RAISING THE RECLOSER TANK

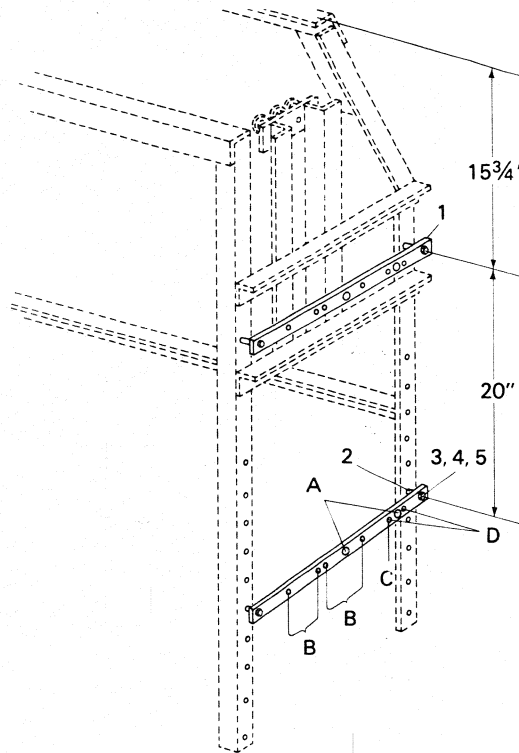
To raise a recloser tank:

1. For proper alignment and to eliminate undue stress on the lifting mechanism, raise the tank to approximately 1/8 in. of the head and complete the reassembly with the tank and bolts.

### CAUTION

Refer to the maintenance instruction manual for the specific switchgear unit for retanking procedures; i.e., condition and level of oil, condition of head gasket, special bolting procedures, and bolting torques.

2. If the lifting mechanism is to remain installed after the tank has been bolted to the head, install the cable clips provided over the two cable spools.



- A. MOUNTING HARDWARE FOR CONTROL CABINET 6, 7, 8, AND 9.  
 B. MOUNTING HARDWARE FOR METER TROUGH 10, 11, AND 12.  
 C. MOUNTING HARDWARE FOR CABLE CLAMPS 11, 12, 13, AND 14.  
 D. MOUNTING HARDWARE FOR GROUND-TRIP SHORTING SWITCH 11, 12, 14, AND 15.

Figure 8.

Brackets for installing a standard-size control cabinet and/or meter trough (KA584R4).

Table 5.

Parts List, Meter Trough and/or Standard-Size Electronic Control Cabinet Mounting Hardware (KA584R4) (Indexed to Figure 8)

Item	Description	Part No.	Qty.
1	Mounting strap	KP1730R	2
2	Spacer	KP1556R	4
3	Capscrew, hex hd, 3/8—16 X 3 1/2, stl	KP1378	4
4	Lockwasher, med, 3/8, stl	KP1108	4
5	Hex nut, 3/8—16, stl	KP1215	4
6	Capscrew, hex hd, 1/2—13 X 2 1/2, stl	KP1355	2
7	Flat washer, SAE, 1/2, stl	KP1140	2
8	Lockwasher, med, 1/2, stl	KP1107	2
9	Hex nut, 1/2—13, stl	KP1214	2
10	Machine screw, rd hd, 1/4—20 X 1, stl	KP1440	6
11	Lockwasher, med, 1/4, stl	KP837	8
12	Hex nut, 1/4—20, stl	KP1206	8
13	Cable clamp	KP2055A4	2
14	Capscrew, hex hd, 1/4—20 X 1 3/4, stl	KP1379	2
15	Spacer	KP3009A65	2

### Mounting Straps for Meter Trough and/or Standard-Size Control Cabinet (KA584R4)

(Figure 8; Table 5)

The straps for mounting a meter trough and/or standard-size control cabinet can be attached to either the front of the frame (sleet-hood end of the recloser)

or the rear (auxiliary-switch end of the recloser).

1. Using the two 7/16-in. holes at 15-3/4 in. from the top of the frame, attach one of the horizontal mountings (1), using spacers (2), cap screws (3), lockwashers (4), and nuts (5).

2. Attach the other mounting strap in the 7/16-in holes at 20 in. below the top strap.
3. Mount the control cabinet to the horizontal straps, using capscrews (6), flat washers (7), lockwashers (8), and nuts (9).

NOTE: If only a control cabinet is being mounted, use the 9/16-in. holes at the midpoint of the horizontal straps. If both a control and a meter trough are being mounted, use the 9/16-in. holes to the right.

4. Cable clamps (13) are provided for securing the control cable to the frame. Attach the clamps with machine screws (10), lockwashers (11), and nuts (12).
5. Mount the meter trough to the horizontal straps with machine screws (10), lockwashers (11), and nuts (12).

NOTE: If only a meter trough is being mounted, use the four 5/16-in. elongated holes at the midpoint of the straps. If both a meter trough and a control cabinet or a ground-trip shorting switch are being mounted, use the four 5/16-in. elongated holes to the left.

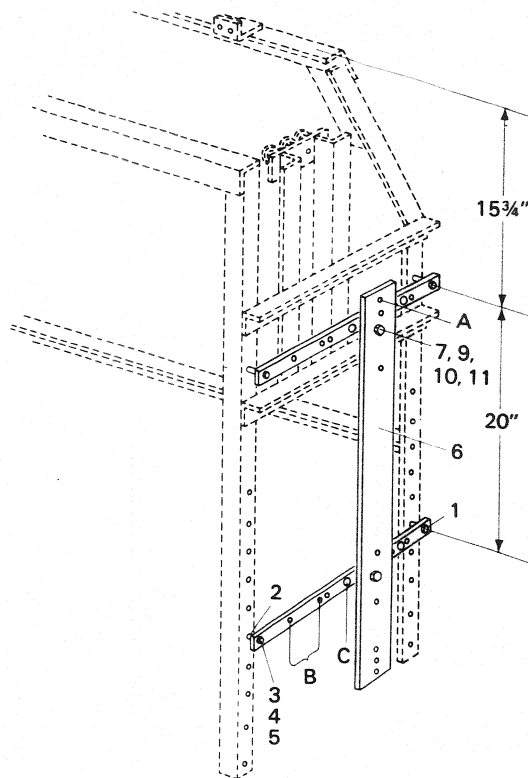
6. Hardware is provided for mounting a ground-trip shorting switch to the upper horizontal straps as shown in Figure 1:

A. Use capscrews (14), lockwashers (11), and nuts (12), with spacers (15) between the switch and the mounting strap.

**Mounting Straps for Double-Size Control Cabinet with—or without—Meter Trough (KA584R5)**  
(Figure 9; Table 6)

The brackets for mounting a control in a double-size cabinet with—or without—a meter trough can be attached to either the front of the frame (sleethood end of the recloser) or the rear (auxiliary switch end of the recloser):

1. Using the two 7/16-in. holes at 15-3/4 in. from the top of the frame, attach one of the horizontal mountings (1), using spacers (2), capscrews (3), lockwashers (4), and nuts (5).
2. Attach the other mounting strap in the 7/16-in. holes at 20 in. below top strap.



A. MOUNTING HARDWARE FOR CONTROL CABINET 8, 9, 10, AND 11.  
B. MOUNTING HARDWARE FOR METER TROUGH 13, 14, AND 15.  
C. MOUNTING HARDWARE FOR CABLE CLAMPS 12, 13, 14, AND 15.

Figure 9.

**Brackets for installing a double-size control cabinet with—or without—meter trough (KA584R5).**

Table 6.

**Mounting Hardware Parts List, Double-Size Control Cabinet with—or without Meter Trough (KA584R5) (Indexed to Figure 9)**

Item	Description	Part No.	Qty.
1	Mounting strap	KP1730R	2
2	Spacer	KP1556R	4
3	Capscrew, hex hd, 3/8—16 X 3 1/2, stl	KP1378	4
4	Lockwasher, med, 3/8, stl	KP1108	4
5	Hex nut, 3/8—16, stl	KP1215	4
6	Control mounting strap	KP1366M	1
7	Capscrew, hex hd, 1/2—13 X 1 1/2, stl	KP1354	2
8	Capscrew, hex hd, 1/2—13 X 2 1/2, stl	KP1355	2
9	Lockwasher, med, 1/2, stl	KP1107	4
10	Hex nut, 1/2—13, stl	KP1214	4
11	Flat washer, SAE, 1/2, stl	KP1140	2
12	Cable clamp	KP2055A4	2
13	Machine screw, rd hd, 1/4—20 X 1, stl	KP1440	6
14	Lockwasher, med, 1/4, stl	KP837	6
15	Hex nut, 1/4—20, stl	KP1206	6

3. Attach control cabinet mounting straps, (6) using capscrews (7), lockwashers (9), and nuts (10).

NOTE: If only a control cabinet is being mounted, use the 9/16-in. holes at the midpoint of the horizontal straps. If both a control cabinet and a meter trough are being mounted, use the holes to the right.

4. Mount the control cabinet to the mounting strap, using capscrews (8), flat washers (11), lockwashers (9), and nuts (10).

5. Cable clamps (12) are provided for securing the control cable to the frame.

A. Attach the clamps with machine screws (13), lockwashers (14), nuts (15).

6. If a meter trough is also being mounted, using machine screws (13), lockwashers (14), and nuts (15), attach the trough to the four 5/16-in.-elongated holes in the horizontal straps to the left of the control cabinet.

### Ground-Trip Shorting Switch (KA584R6)

(Figure 10; Table 7)

When meter trough metering brackets are not specified, a shorting-switch bracket may be mounted on the frame as shown in Figure 10. Attach the bracket to the upper hoist support angle with the 1/2-in. hardware. Attach the switch to the bracket with the 1/4-in. hardware.

### Control Cabinet on Side of Frame (KA584R9)

(Figure 11; Table 8)

A standard-size or a double-size control cabinet may be mounted on either side of the frame:

1. Attach strap (1) to the frame, using capscrews (2), lockwashers (4), and nuts (5).
2. Mount the control cabinet to the strap, using capscrews (3), lockwashers (4), flat washers (7), spacers (6), and nuts (5).
3. Attach cable clamps (8) to the frame with machine screws (9), lockwashers (10), and nuts (11) to secure the control cable to the frame.

### FACTORY-ASSEMBLED UNITS

When specified on the order, the frame can be partially assembled and shipped from the factory with the recloser, meter troughs, control, and recloser accessories mounted and wired on the frame. To place a factory-assembled unit in service:

1. Uncrate the unit and remove the shipping skids.
2. Relocate the frame parts that are assembled in the shipping position.

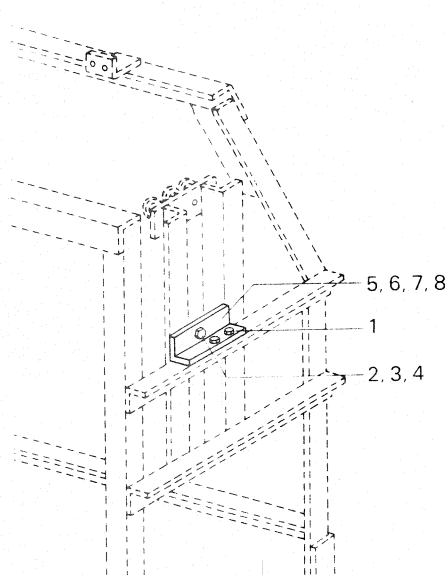


Figure 10.  
Installing a ground-trip shorting switch (KA584R6).

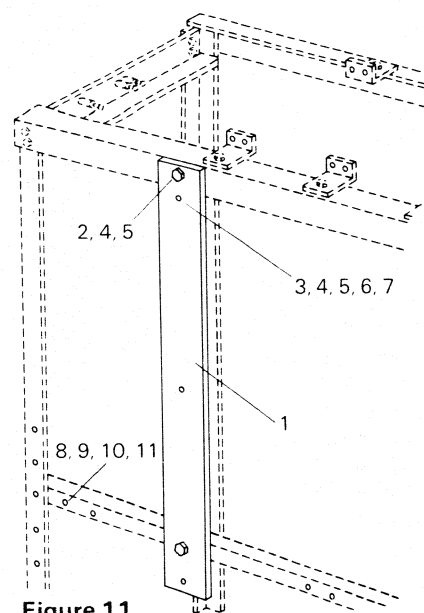


Figure 11.  
Installing a control cabinet on the side of a frame (KA584R9).

Table 7.

Parts List, Ground Trip Shorting Switch to Basic Substation Frame (KA584R6) (Indexed to Figure 10)

Item	Description	Part No	Qty
1	Bracket	KP1623R	
2	Capscrew, hex hd,	KP1354	2
3	Lockwasher, med, 1/2, stl	KP1107	2
4	Hex nut, 1/2-13, stl	KP1214	2
5	Capscrew, hex hd, 1/4—20 X 1 3/4, stl	KP1379	2
6	Spacer	KP3009A65	2
7	Lockwasher, med, 1/4, stl	KP837	2
8	Hex nut, 1/4, stl	KP1206	2

Table 8.

Parts List, Electronic Control (Standard- or Double-Size Cabinet) to Load Side of Frame (KA584R9) (Indexed to Figure 11)

Item	Description	Part No	Qty
1	Mounting strap	KP1807R	1
2	Capscrew, hex hd, 1/2—13 X 1 1/2, stl	KP1354	2
3	Capscrew, hex hd, 1/2—13 X 2 1/2, stl	KP1355	2
4	Lockwasher, med, 1/2, stl	KP1107	4
5	Hex nut, 1/2—13, stl	KP1214	4
6	Spacer	KP3013A48	2
7	Flat washer, SAE, 1/2, stl	KP1140	2
8	Cable clamp	KP2055A4	2
9	Machine screw, rd hd, 1/4—20 X 1, stl	KP1358	2
10	Lockwasher, med, 1/4, stl	KP837	2
11	Hex nut, 1/4—20, stl	KP1206	2

A. The lower frame posts are bolted across the upper frame posts and the long and the short cross braces are not in their proper locations.

B. Detach the lower frame posts and the cross braces and assemble the frame in accordance with the instructions presented earlier in these instructions.

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