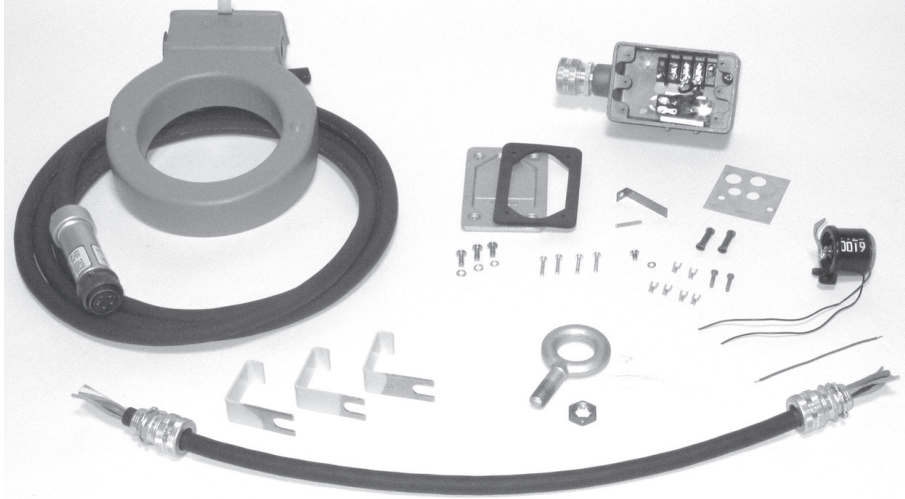


Types L, V4L, E, 4E, and V4E; KA785L10S, KA785L20S,
KA785L30S, and KA785L40S
Automation upgrade kit installation instructions



DISCLAIMER OF WARRANTIES AND LIMITATION OF LIABILITY

The information, recommendations, descriptions and safety notations in this document are based on Eaton Corporation's ("Eaton") experience and judgment and may not cover all contingencies. If further information is required, an Eaton sales office should be consulted. Sale of the product shown in this literature is subject to the terms and conditions outlined in appropriate Eaton selling policies or other contractual agreement between Eaton and the purchaser.

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Safety for life



Eaton's Cooper Power series products meet or exceed all applicable industry standards relating to product safety. We actively promote safe practices in the use and maintenance of our products through our service literature, instructional training programs, and the continuous efforts of all Eaton employees involved in product design, manufacture, marketing, and service.

We strongly urge that you always follow all locally approved safety procedures and safety instructions when working around high voltage lines and equipment and support our "Safety For Life" mission.

Safety information

The instructions in this manual are not intended as a substitute for proper training or adequate experience in the safe operation of the equipment described. Only competent technicians who are familiar with this equipment should install, operate, and service it.

A competent technician has these qualifications:

- Is thoroughly familiar with these instructions.
- Is trained in industry-accepted high- and low-voltage safe operating practices and procedures.
- Is trained and authorized to energize, de-energize, clear, and ground power distribution equipment.
- Is trained in the care and use of protective equipment such as flash clothing, safety glasses, face shield, hard hat, rubber gloves, hotstick, etc.

Following is important safety information. For safe installation and operation of this equipment, be sure to read and understand all cautions and warnings.

Hazard Statement Definitions

This manual may contain four types of hazard statements:

DANGER

Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

Indicates a potentially hazardous situation which, if not avoided, may result in equipment damage only.

Safety instructions

Following are general caution and warning statements that apply to this equipment. Additional statements, related to specific tasks and procedures, are located throughout the manual.

DANGER

Hazardous voltage. Contact with hazardous voltage will cause death or severe personal injury. Follow all locally approved safety procedures when working around high and low voltage lines and equipment.

G103.3

WARNING

Before installing, operating, maintaining, or testing this equipment, carefully read and understand the contents of this manual. Improper operation, handling or maintenance can result in death, severe personal injury, and equipment damage.

G101.0

WARNING

This equipment is not intended to protect human life. Follow all locally approved procedures and safety practices when installing or operating this equipment. Failure to comply can result in death, severe personal injury and equipment damage.

G102.1

WARNING

Power distribution and transmission equipment must be properly selected for the intended application. It must be installed and serviced by competent personnel who have been trained and understand proper safety procedures. These instructions are written for such personnel and are not a substitute for adequate training and experience in safety procedures. Failure to properly select, install, or maintain power distribution and transmission equipment can result in death, severe personal injury, and equipment damage.

G122.3

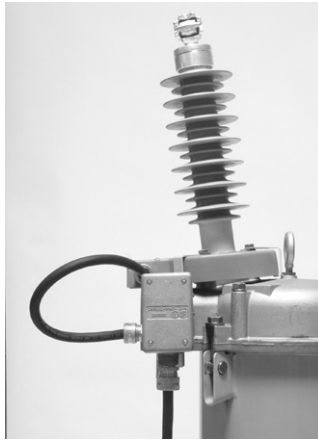


Figure 1. Automation upgrade kit and typical completed installation

Table 1. Ordering information

| Description | Catalog number |
|---|----------------|
| L and E recloser automation kit with 10 ft. control cable | KA785L10S |
| L and E recloser automation kit with 20 ft. control cable | KA785L20S |
| L and E recloser automation kit with 30 ft. control cable | KA785L30S |
| L and E recloser automation kit with 40 ft. control cable | KA785L40S |

Product information

Introduction

Service Information MN280054EN provides installation instructions for the KA785L10S, KA785L20S, KA785L30S, and KA785L40S Automation Upgrade Kit. Refer to the following applicable service and maintenance bulletins for additional information:

- *MN280051EN, Types E, 4E, V4E, H, 4H, V4H, L, and V4L; Single-Phase Installation and Operation Instructions.*
- *MN280053EN, Type L Recloser Maintenance Instructions.*
- *S280-25-1, Type E Recloser Maintenance Instructions, Serial Numbers 13000 through 51999.*
- *MN280058EN, Type E Recloser Maintenance Instructions, Serial Numbers 52000 and above.*
- *S280-90-5, Slip-On Bushing CT Kits KA712L1S, KA712L2S, KA712L3S, and KA715L5S Installation, Instructions and Technical Data.*

Read this manual first

Read and understand the contents of this manual and follow all locally approved procedures and safety practices before installing or operating this equipment.

Additional information

These instructions cannot cover all details or variations in the equipment, procedures, or process described, nor

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, contact your Eaton representative.

Acceptance and initial inspection

This kit is in good condition when accepted by the carrier for shipment.

Upon receipt, inspect the carton for signs of damage. Unpack the control and inspect it thoroughly for damage incurred during shipment. If damage is discovered, file a claim with the carrier immediately.

Handling and storage

Be careful during handling and storage of this kit to minimize the possibility of damage. If this kit is to be stored for any length of time prior to installation, provide a clean, dry storage area.

Quality standards

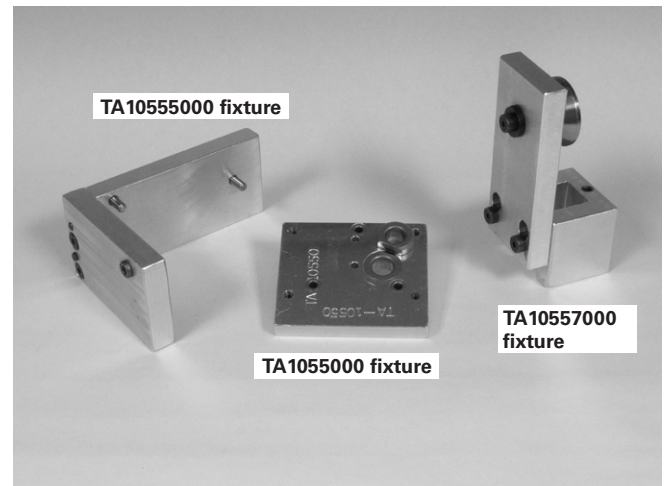
ISO 9001 Certified Quality Management System.

Description

The KA785L10S, KA785L20S, KA785L30S, and KA785L40S Automation Upgrade Kit provides discrete reporting of Types L, V4L, E, 4E, and V4E recloser lockout lever position status and analog current levels for distribution networks.

This upgrade kit has been engineered to be installed without the necessity of removing the recloser head assembly.

Eaton's Cooper Power series KA785-T tool fixture set is required for installation of the Automation Accessory Kit.



040005KM

Figure 2. Type KA785-T tool fixture set

Installation procedure

⚠ WARNING

Hazardous voltage. De-energize the switchgear before installing this kit. Follow all locally approved safety practices and procedures when working around high voltage lines and equipment. Failure to comply can result in contact with high voltage, which will cause death or severe personal injury.

T232.3

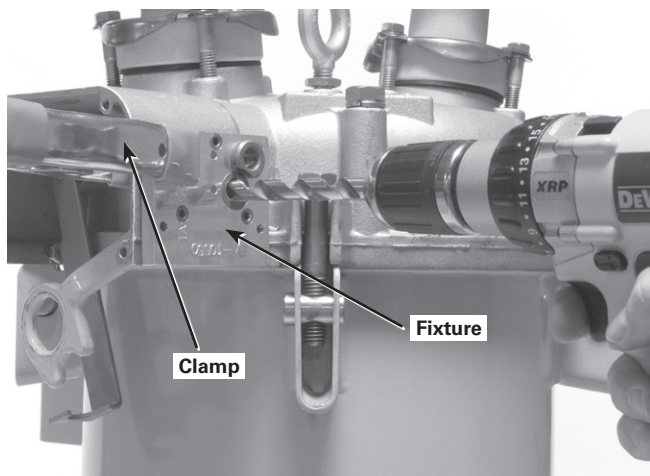
⚠ CAUTION

Follow all locally approved safety practices when lifting and mounting the equipment. Use the tapped lifting provisions provided. Lift the load smoothly and do not allow the load to shift. Improper lifting can result in equipment damage.

G126.0

The entire installation process should be conducted at ground level, preferably in a shop environment.

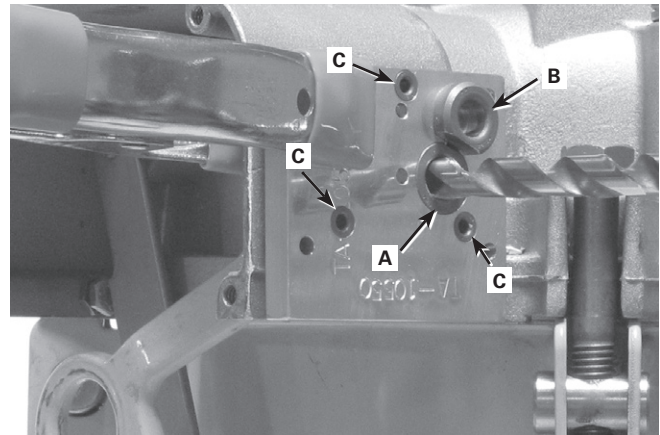
1. Bypass, trip, and de-energize the recloser.
2. Remove the recloser from the pole and bring it down to ground level.
3. Remove sleet hood shield. Save the sleet hood shield screws for re-use.
4. Remove and discard existing counter mechanism. Save counter mounting screws for re-use.
5. Using a clamp, attach tool fixture TA10550000 (Figures 2 and 3) to recloser sleet hood. Align the tool fixture guide pins to the existing counter screw bores prior to clamping the tool fixture to the sleet hood.



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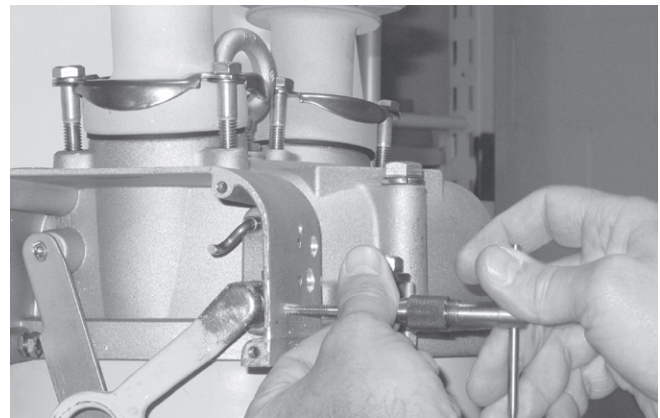
Figure 3. TA10550000 fixture clamped to sleet hood

6. Position a 7/16" diameter drill bit in guide hole "A" and drill completely through the sleet hood wall. Refer to Figure 2 and 4 for steps 6 through 8.
7. Position a 25/64" diameter drill bit in guide hole "B" and drill completely through the sleet hood wall.
8. In each of the three "C" designated guide holes of tool fixture 10550, drill completely through the sleet hood wall using a #26 drill bit.
9. Using a 10-24 NC-2B tap, tap each of the 3 bores created in step 8. Refer to Figure 5.



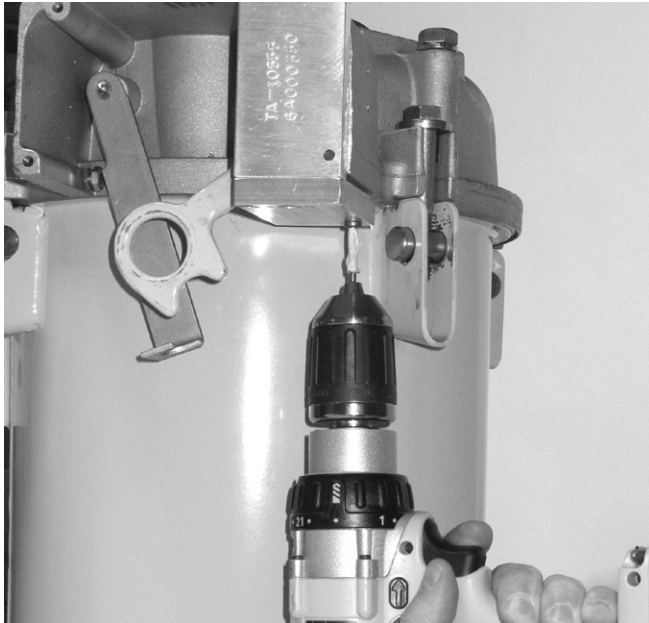
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Figure 4. TA10550000 fixture - identification of drill bushings



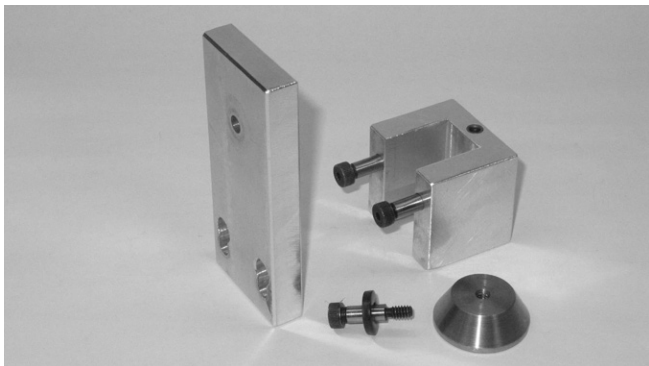
040010KM

Figure 5. Sleet hood tapping operation



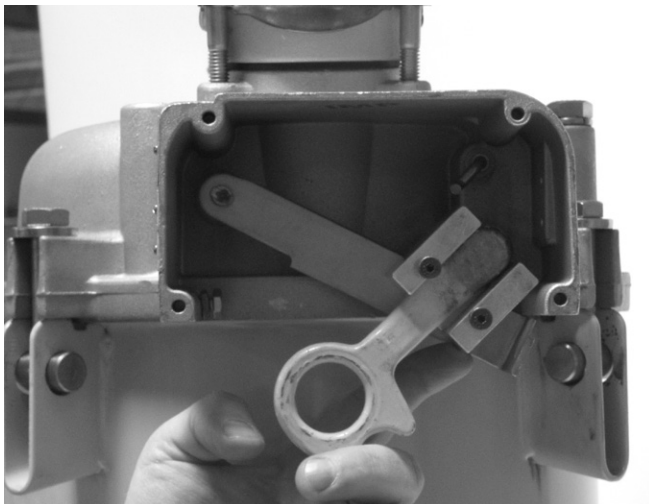
040011KM

Figure 6. Sleet hood drilling operations-fixture TA10555000



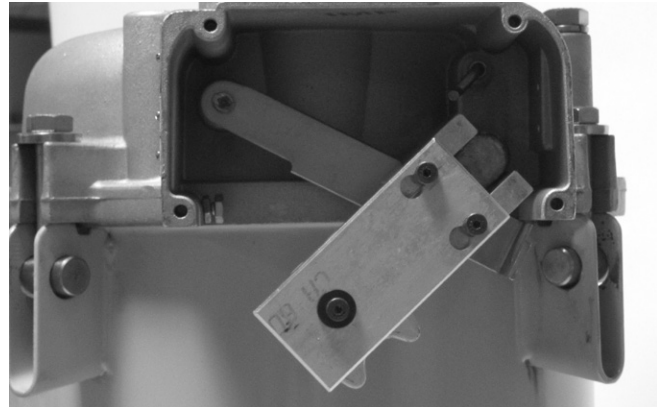
040012KM

Figure 7. Disassembled TA10557000 fixture



040013KM

Figure 8. Bushing block positioned against recloser handle



040014KM

Figure 9. Support plate attached to bushing block

10. Attach fixture TA10555000 to base of sleet hood. Align fixture locating pin to sleet hood cover bore prior to attaching fixture to sleet hood. Refer to Figure 6.
11. Position a #29 drill bit in the center of the TA10555000 tool fixture guide bushing and drill into the sleet hood to a depth of 3/8".
12. Using a 8-32 NC-2 tap, tap the bore created in step 11 to a depth of 1/4".
13. Prepare fixture TA10557000 for attachment to the recloser operating handle and shaft assembly. Separate drill bushing block from center plate by loosening knurled shoulder bolts. Remove tapered locating cone from center plate. Refer to Figure 7.



040015KM

Figure 10. TA10557000 fixture installed upon recloser lever with centering cone passing through ring of recloser operating lever

14. From the back-side of the yellow recloser operating handle, position the TA10557000 bushing block against the operating handle and shaft assembly. Refer to Figure 8.

15. From the front-side of the recloser operating handle, position the kidney-shaped bores of the TA10557000 fixture center plate over the bushing block shoulder bolts, and then slide the center plate downward to interlock the two assemblies. Tighten the bushing block shoulder bolts to secure the TA1057 fixture to the recloser operating handle. Refer to Figure 9.
16. From the backside of the recloser operating lever, center the smaller diameter face of the locating cone within the recloser handle ring and firmly secure it using the knurled shoulder bolt and washer. Refer to Figure 10.

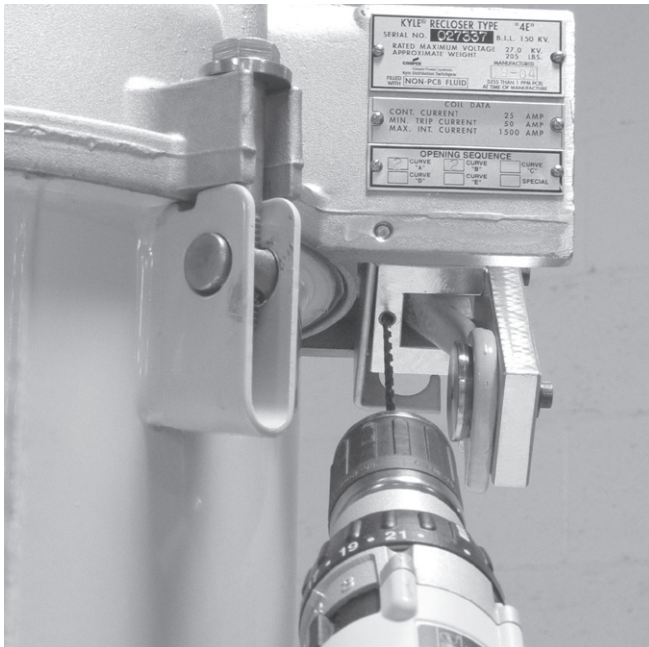


Figure 11. Recloser operating lever shaft drilling operation

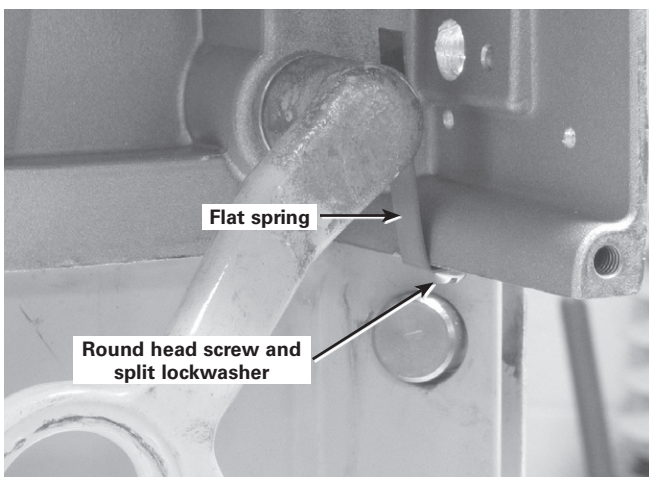


Figure 12. Installation of flat spring within sleet hood

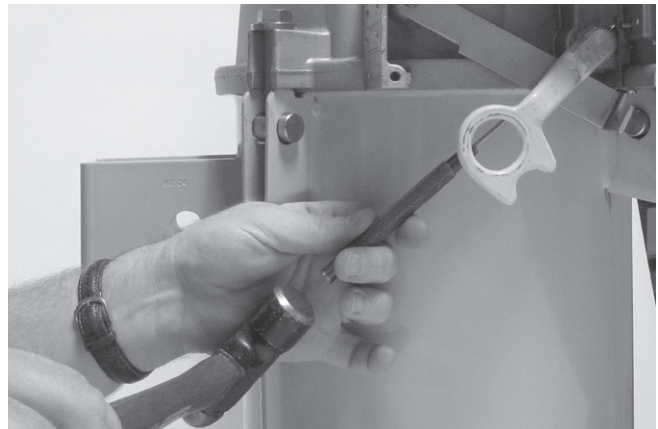


Figure 13. Roll pin Installation

17. Position a 1/8" drill bit in the center of TA10557000 tool fixture guide hole and drill completely through the brass recloser operating handle and stainless steel shaft. Refer to Figure 11.
18. Attach flat spring using one #8-32 x .25" round-head machine screw and #8 stainless steel split washer. Refer to Figure 12.
19. Attach the automation accessory junction box and backing gasket to the recloser. Secure junction box with three #10-24 x .500" round-head machine screws and #10 stainless steel split washers.
20. Using a drift, drive the .125" x .50" steel roll pin into, and partially through, the operating lever shaft bore previously drilled in step 17. Verify the roll pin is sufficiently extending beyond the shaft by rotating the yellow operating lever upward and toward the closed position, while listening for the distinct click of the micro-switch closing, as the roll-pin contacts the flat spring, which in turn operates the micro-switch. If no click can be heard, drive the roll pin deeper into the bore until the click of the micro-switch closing can be heard while operating the yellow lever. Refer to Figure 14.

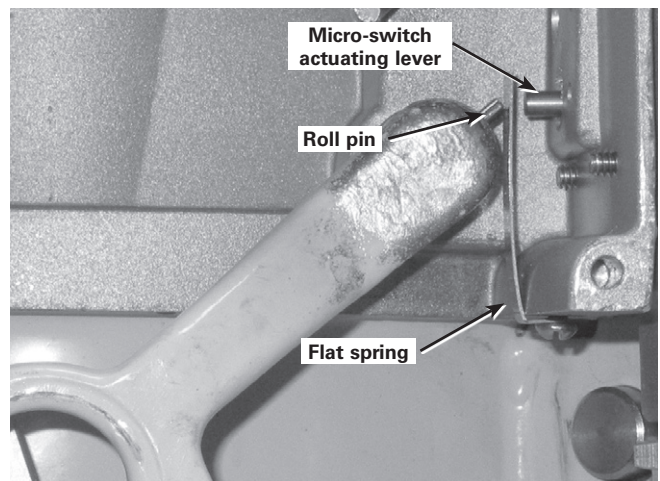
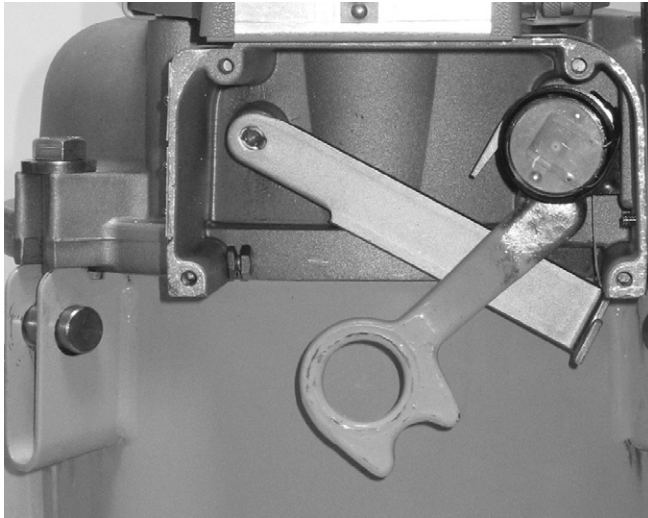


Figure 14. Close-up of recloser lever position sensing mechanism



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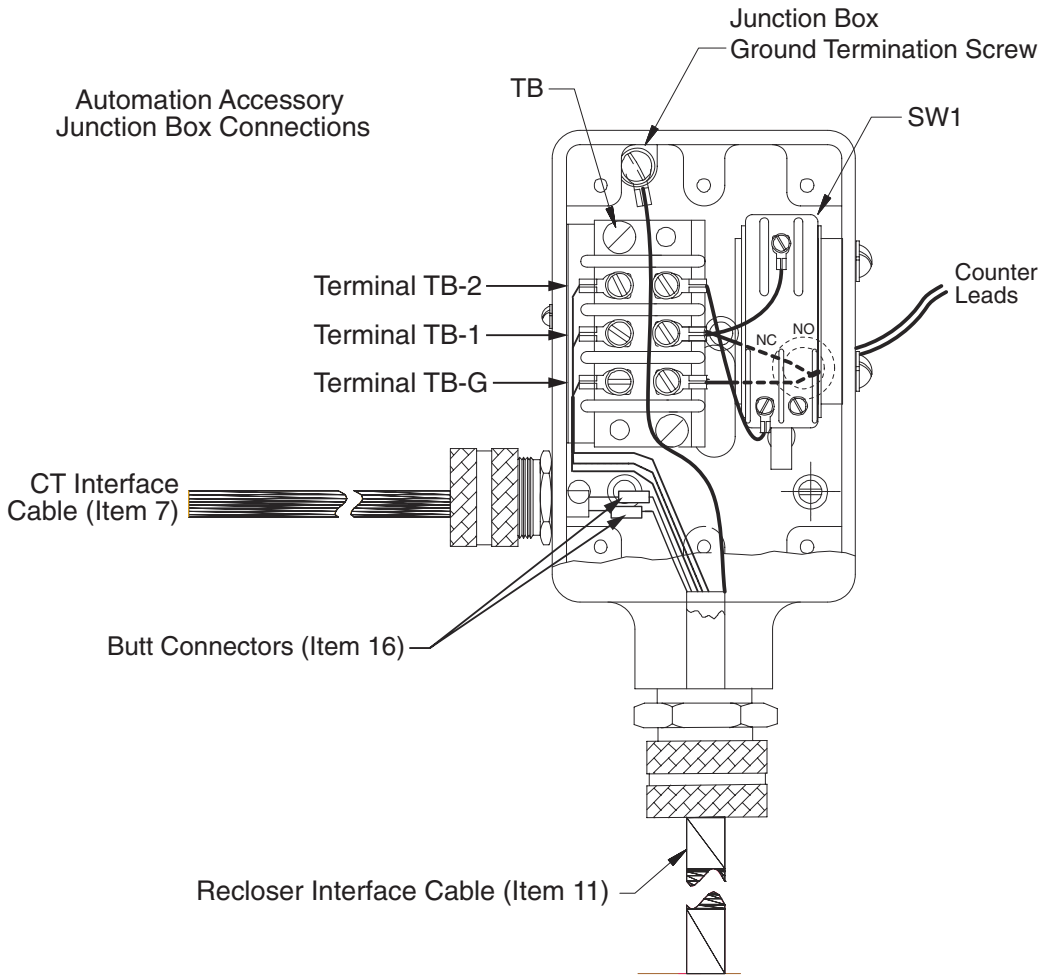
Figure 15. Counter installed below sleet hood

21. Attach a #22-18 AWG spade type terminal connector to each of the two counter assembly leads.
22. Prepare to install counter under sleet hood. Route counter leads into the junction box thru the 25/64" hole created in step 7. Fasten the counter to the sleet hood using the original counter mounting screws saved in step 4. Refer to Figure 15.
23. Re-attach the sleet hood cover to the recloser using the screws saved in step 3.
24. Attach counter leads to terminals TB-G and TB-1 of the TB terminal block. Refer to Figure 16.

Note: The counter leads are not polarized.

25. Open the cover plate of the CT junction box and verify shorting resistor is installed. If the resistor is missing, do not proceed with this procedure. Contact your local Cooper Representative to obtain the correct resistor required of your application.

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* The CT assembly is prewired for a 300:5 ratio with a 100 ohm shunt resistor. To ensure accurate current measurement in automation applications using a remote terminal unit, the CT interface cable leads must be connected to the 300:5 ratio taps of the C.T. assembly only.

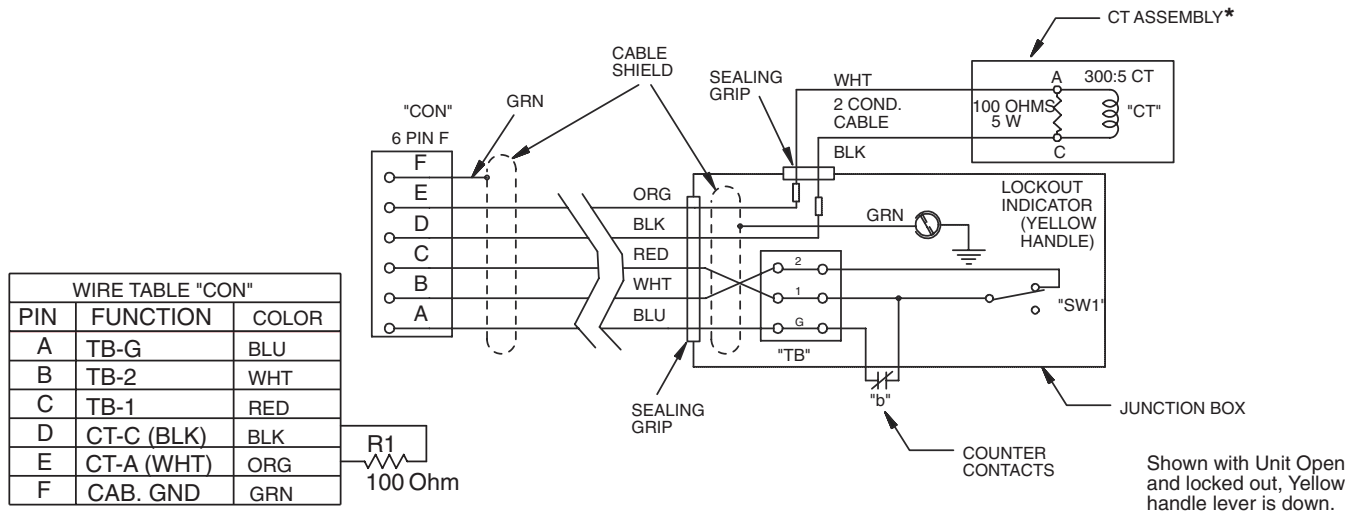


Figure 16. Automation accessory junction box diagram and connection schematic

- Connect one end of the CT-to-junction box interface cable to the CT junction box assembly. Firmly tighten the cable connector to secure the cable to the junction box.

For steps 27 through 29, refer to *Service Bulletin S280-90-5, Slip-On Bushing CT Kits KA712L1S, KA712L2S, KA712L3S, and KA715L5S Installation, Instructions and Technical Data*, included with this upgrade kit, for detailed CT installation procedures.

- Connect the black and white leads of the interface cable to the A and C terminal taps of the CT assembly, which will provide, per Table 2, the required 300:5 current ratio required of the Automation Accessory device.

IMPORTANT:

The C.T. assembly is prewired for a 300:5 ratio with 100 ohm shunt resistor. During installation, the C.T. interface cable leads must be only connected to the "A" and "C" 300:5 ratio tap terminals of the C.T. assembly to ensure accurate current measurement in automation applications using a remote terminal unit.

Table 2. Automation accessory C.T. Tap connection

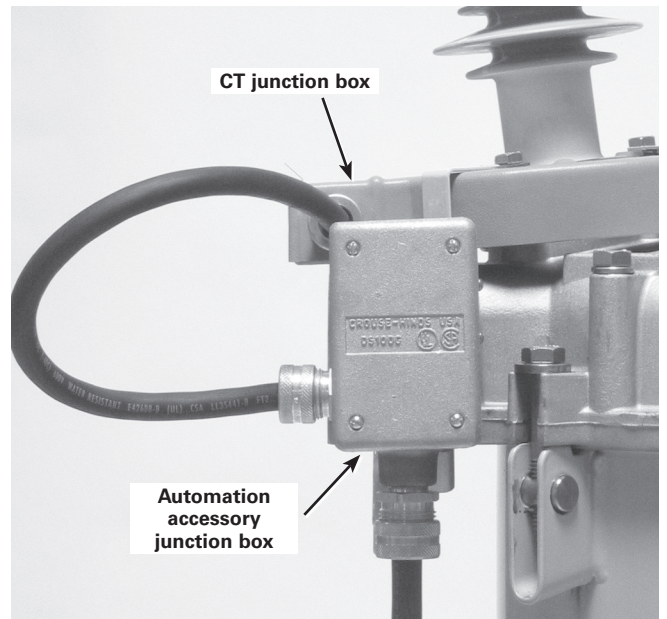
| DC Resistance | Current Ratio | Connection Terminals |
|---------------|---------------|----------------------|
| .034 Ω | 400:5 | B-C |
| .014 Ω | 150:5 | C-D |
| .024 Ω | 200:5 | A-B |
| | 250:5 | B-D |
| | 300:5 | A-C |
| | 450:5 | A-D |

Winding - NO. 14 AWG

- Reinstall CT access cover plate on to CT junction box.
- Install slip-on CT assembly on to recloser bushing using provided clamps.
- Connect the remaining loose end of the CT-to-junction-box interface cable to the automation accessory junction box. See Figure 17. Firmly tighten the cable connector to secure the cable to the junction box.

Refer to Figure 18 for steps 31 through 34.

- Prepare the recloser interface cable for connection to the automation accessory junction box. Remove 6 inches of outer sheath and shielding from the loose cable end.
- Strip back each exposed cable lead 1/2".
- Strip back an additional 1/2" of outer sheath, exposing the cable shield.
- Solder the green 5" length of 16 AWG multi-strand wire to the exposed shielding. Cover exposed shield with electrical tape.
- Connect a #16-14 AWG spade lug terminal to the unsoldered end of the green wire.



040005KM

Figure 17. CT bushing to automation accessory junction box cable connection

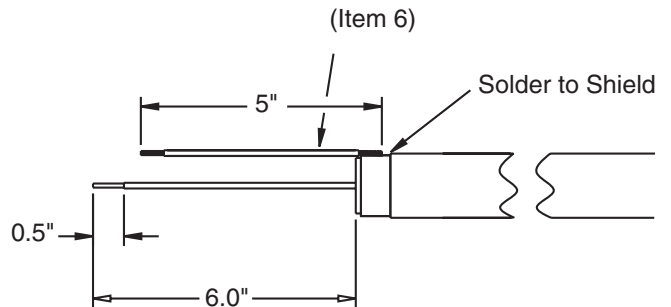


Figure 18. Preparation of recloser interface cable prior to attaching connectors, and connecting to junction box

- Connect a #16-14 AWG spade lug terminal to the red, white, and blue cable leads of the recloser interface cable.

Refer to Figure 16 for steps 37 through 44.

- Feed the cable leads into the automation accessory junction box. Firmly tighten the cable connector to secure the cable to the junction box.
- Connect the green ground lead of the recloser interface cable to the junction box grounding screw.
- Connect the black lead of the recloser interface cable to the black CT bushing lead using a crimp-on butt connector.
- Connect the orange lead of the recloser interface cable to the white CT bushing lead using a crimp-on butt connector.

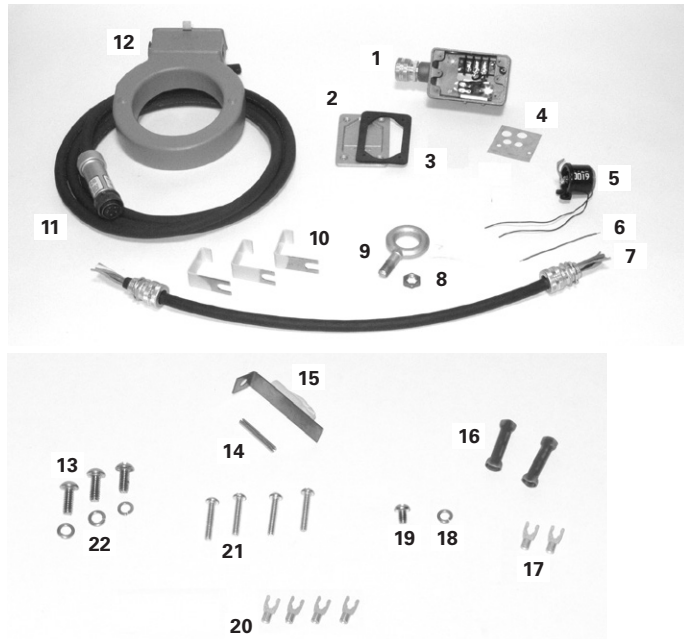
Types L, V4L, E, 4E, and V4E; KA785L10S, KA785L20S, KA785L30S, and KA785L40S

41. Connect the red lead of the recloser interface cable to the TB-1 terminal of the TB terminal block.
42. Connect the white lead of the recloser interface cable to the TB-2 terminal block.
43. Connect the blue lead of the recloser interface cable to the TB-G terminal of the TB terminal block.
44. Attach the junction box cover using four #6-32 × .750" screws.
45. Remove the existing lifting lug from the recloser head and replace with the eyebolt included with this kit. Lock it in position using the provided palnut.

Note: The eyebolt provided with this kit must be used to ensure adequate clearance between the CT bushing assembly and lifting straps during lifting operations.

46. Return the recloser to service.

Automation kit parts list



040022KM/040023KM

Figure 19. Automation kit parts

Table 3. Automation kit parts list

| Item no. | Qty. | Description | Part number |
|-----------|------|--|---------------------|
| 1 | 1 | Junction box | 6A00427601 |
| 2 | 1 | Cover, junction box | KA20520005 |
| 3 | 1 | Gasket, junction box cover | KA20510010 |
| 4 | 1 | Gasket, junction box | E000160 |
| 5 | 1 | Counter assembly | COA0028017 |
| 6 | 1 | Ground wire, 16 AWG x 5", green | KA53351050 |
| 7 | 1 | Interface cable, 1.3 Ft 3c 14 AWG | KA60110002 |
| 8 | 1 | Nut | 881101113050W |
| 9 | 1 | Eyebolt | 3H00074001 |
| 10 | 3 | Hold down clamp | L000357901 |
| 11 | 1 | Interface cable w/connector, 10', 20', 30', 40' | 6A00427410,20,30,40 |
| 12 | 1 | Slip-on CT assembly, w/100 ohm resistor | 6A00427201 |
| 13 | 3 | Rd. head screw, #10-24 x .500" | 721515110050A |
| 14 | 1 | Roll pin, steel, 0.125" x .50" | 970815125112A |
| 15 | 1 | Flat spring | E000150 |
| 16 | 2 | Butt connector, 16-14 AWG | KA20650002 |
| 17 | 2 | Spade connector, 22-18 AWG | KA20100050 |
| 18 | 1 | Split washer, #8 | 900815008000A |
| 19 | 1 | Rd. head screw, #8-32 x .250" | 721515108025A |
| 20 | 4 | Spade connector, 16-14 AWG | KA20100061 |
| 21 | 4 | Rd. head screw, #6-32 x .750" | 721515106062A |
| 22 | 3 | Split washer, #10 | 900815010000A |
| Not shown | 1 | Service bulletin, automation kit installation | S280-15-10 |
| Not shown | 1 | Service bulletin, slip-on bushing CT kits Installation instructions and technical data installation instructions and technical data | S280-90-5 |

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