

# **RELT Upgrade Kit**

## **For ABB Owned GE Brand WavePro™ Low Voltage Power Circuit Breaker Installation Instructions**

### **Introduction**

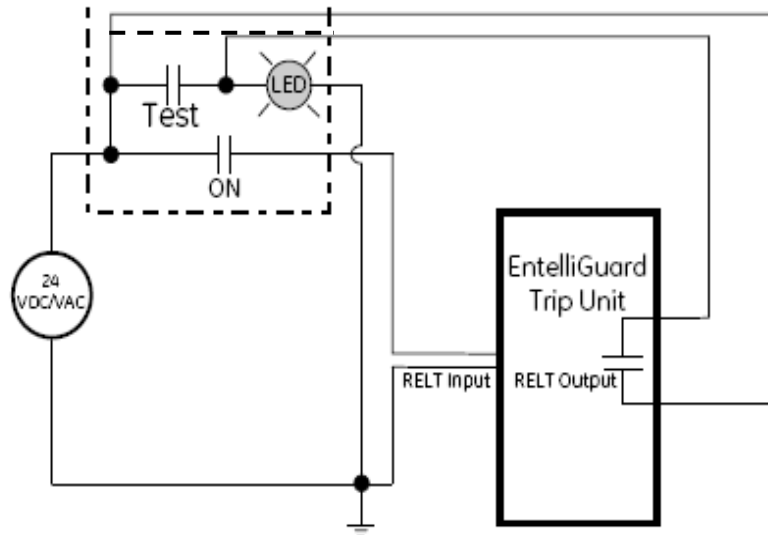
This manual covers specific instructions for the installation of EntelliGuard® TU with advanced optional features like RELT (Reduced Energy Let Through mode), Ground Fault Alarm etc. in WavePro™ Low Voltage Power Circuit Breakers.

The EntelliGuard TU trip unit provides an optional second, user-adjustable, RELT Instantaneous trip. This trip provides an alternate Instantaneous setting that allows a user to temporarily set a circuit breaker to a more sensitive pickup to provide better protection, only when better protection is needed and some selectivity may be sacrificed.

RELT Instantaneous pickup can be enabled via application of 24Vdc or Vac at the RELT input terminals or serial communications via the Modbus communication port. The RELT input command may be wired to a manual switch, automatic sensor or, via external logic, to one or more signal sources. When the EntelliGuard TU trip unit has the RELT Instantaneous pickup enabled, the trip unit provides a feedback signal via an optically isolated dry contact and serial communication. This provides positive feedback that the trip unit has received and reacted to the RELT Enable command. The RELT harness consists of four wires for these input and output signals.

The EntelliGuard TU trip unit's RELT capability provides the ultimate in user flexibility for wiring and controlling an alternate Instantaneous setting for temporary use to reduce personnel hazard.

The RELT switch may be connected to a manually operated two-position switch, a remote sensor, or both simultaneously. The EntelliGuard TU trip unit provides a feedback capability directly from the trip so the user is able to verify that the signal was received by the trip unit and the settings have changed. Optionally, an indicating light may also be connected to the source of control power so the user knows if control power is available to change the setting. The trip unit does not require its own control power to accept a RELT input and change the Instantaneous trip pickup according to the user settings. However, if control power is available to the trip unit, the feedback signal will function immediately, rather than when the trip unit becomes self-powered through its load current (Fig. 1).



- This configuration provides positive indication that the trip unit has received and processed the RELT "On" signal. It Also provides a control power check. Caution: It is recommended that RELT output be wired to an appropriate annunciation when remote activation control of RELT is used.

**Figure 1**

Section 3 in this instruction manual explains the process of upgrading the WavePro™ LV power Circuit Breaker from MVT (Microversatrip Plus and PM) to EntelliGuard TU with RELT. It outlines the process of changing the wire harness to add 4 extra wires for RELT and Relay output functions. It also includes the process of routing the "RELT wire harness" for the 3 different types of GE WavePro™ circuit breakers.

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## SECTION 1 Prior To Installation

1. Before starting any work, turn off and lock out all power sources leading to the breaker, both primary and secondary. Remove the breaker to a clean, well-lighted work area.



**WARNING:** Low-voltage power circuit breakers use high-speed, stored-energy spring operated mechanisms. The breakers and their enclosures contain interlocks and safety features intended to provide safe, proper operating sequences. For maximum personnel protection during installation, operation, and maintenance of these breakers, the following procedures must be followed. Failure to follow these procedures may result in personal injury or property damage.

2. Only qualified persons, as defined in the National Electrical Code, who are familiar with the installation and maintenance of low-voltage power circuit breakers and switchgear assemblies, should perform any work on these breakers.
3. Completely read and understand all instructions before attempting any breaker installation, operation, maintenance, or modification.
4. Turn off and lock out the power source feeding the breaker before attempting any installation, maintenance, or modification. Follow all lock-out and tag-out rules of the National Electrical Code and all other applicable codes.
5. Do not work on a closed breaker or a breaker with the closing springs charged. Trip the breaker OPEN and be sure the stored-energy springs are discharged, thus eliminating the possibility that the breaker may trip open or the closing springs discharge and cause injury.
6. For 800,1600 & 2000A breakers only: Engage racking tool and rotate clockwise fully to put racking cams into the connect position. Remove racking tool, depress open button to close racking screw access door.
7. Do not perform any maintenance that includes breaker charging, closing, tripping, or any other function that could cause significant movement of a draw-out breaker while it is on the draw-out extension rails.
8. Do not leave the breaker in an intermediate position in the switchgear compartment. Always leave it in the CONNECTED, TEST, or DISCONNECTED position. Failure to do so could lead to improper positioning of the breaker.

## SECTION 2 Removing MVT Trip Unit

### For GE WavePro™ Low Voltage Power Circuit Breakers.

1. Loosen the 6 screws ( 5/16" hex head ) securing the front cover to the frame (shown in Figure2) Save the screws for reinstalling of the cover later.

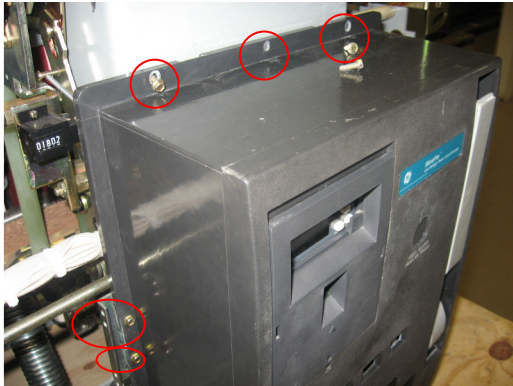


Figure 2

2. Remove the front cover by pulling it towards you as you face the breaker. Slowly pull the manual charging lever down as you begin to remove the cover and slide the cover over it as you pull the cover out. This can be seen in Figure 3.

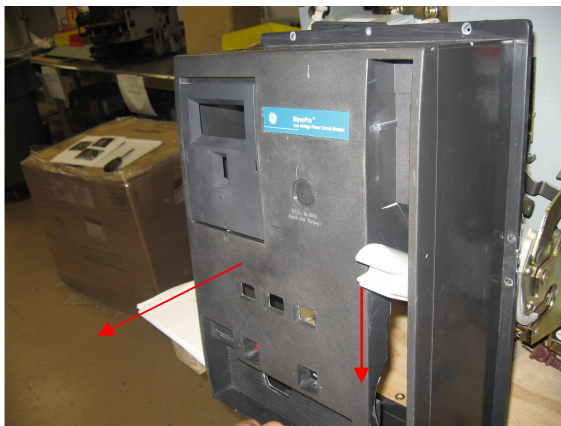


Figure 3

3. Remove the existing MVT trip unit by pulling the lever on the side of the trip unit mounting plate as shown in Figure 4. Pull the lever and while still holding it away from the mounting plate, gently pull the MVT unit towards you.



Figure 4

### Section 3 Installation Instructions for "RELT wire harness kit" ( Cataloge Number - GTURH)

#### Installation of 4 Pins into 50-Pin Connector

4. Loosen the two screws mounting the 50-pin connector to the mounting plate using a screwdriver. Save the screws, washers, and nuts for remounting the connector later.

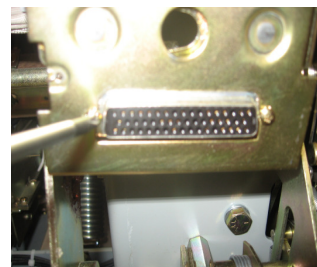


Figure 5

5. Remove the three screws holding the mounting plate with a screwdriver as shown in figure 6. Save the screws and washers for remounting the plate later.

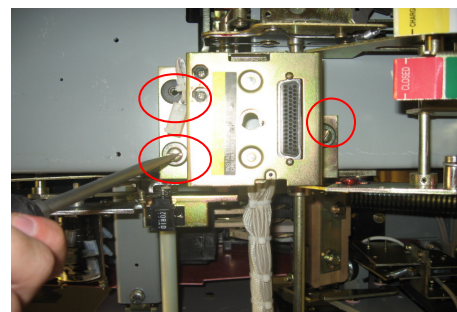


Figure 6 (Side Ways)



6. Remove the mounting plate from breaker, being careful not to pull on existing wires (Figure 7).
7. Gently slide the connector out of the mounting plate being cautious of the wires already attached (Figure 8).



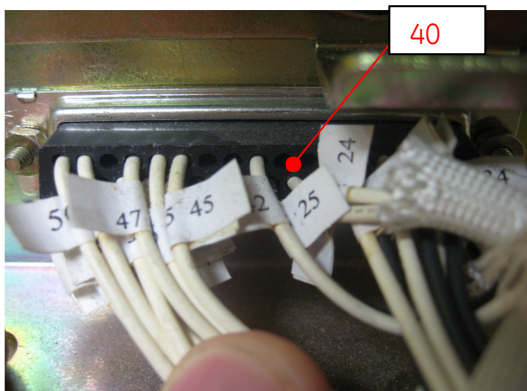
**Figure 8**

8. Install the “RELT wire harness” provided (Figure 9) with kit. Insert the sockets (Figure 10) at the end of wire into respective terminals on 50-pin connector. Refer to Table 1 for the part numbers of each harness and the corresponding breaker. Use needle nose pullers, seat sockets to full depth into detent.

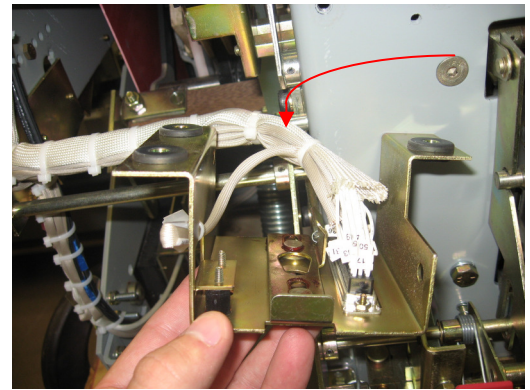
**Table 1:**

| Breaker  | Part Number | Length      |
|----------|-------------|-------------|
| GTURHWP1 | 10056336G7  | ~ 61 inch   |
| GTURHWP2 | 10056336G8  | ~ 65 inch   |
| GTURHWP3 | 10056336G9  | ~ 63.5 inch |

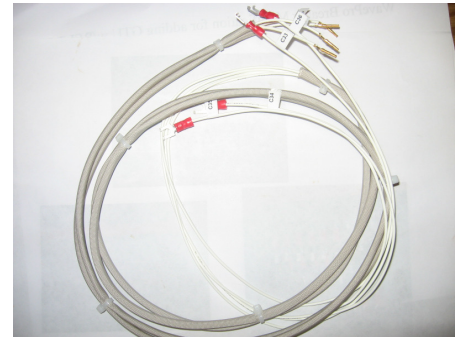
Individual wires in harness are numbered and should be inserted at correct places on backside of 50-pin connector. Refer to Figures 11 and 12 and Table 2.



**Figure 11: View from back of plug**



**Figure 7**



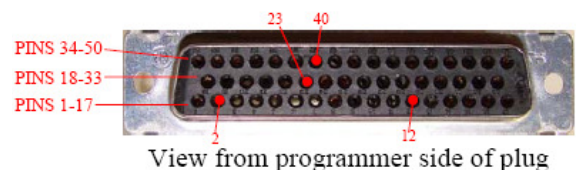
**Figure 9**



**Figure 10**

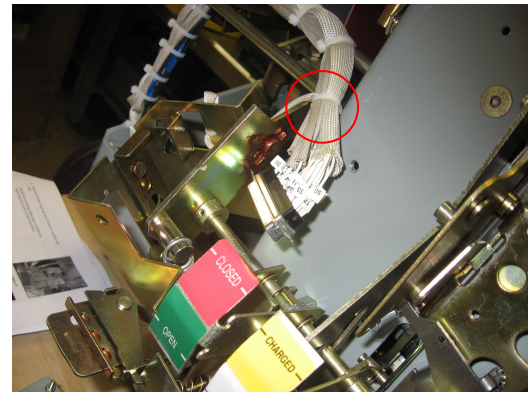
**Table 2: RELT Wire Connections**

| Slot in 50 pin connector | Function                |
|--------------------------|-------------------------|
| 2                        | Programmable Output “+” |
| 12                       | Programmable Output “-” |
| 23                       | RELT Input “+”          |
| 40                       | RELT Input “-”          |



**Figure 12**

9. Tie these extra four wires with wire bundle at back of 50-pin connector using a wire tie. (Figure13) Inspect the 50-pin connector from front side of plate for four new sockets installed.



**Figure 13**

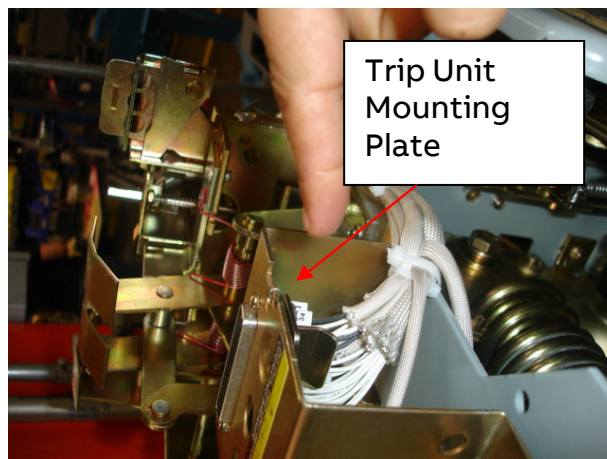
### **SECTION 3 Installation instructions for “RELT wire harness kit” (Cataloge Number – GTURH)**

#### **Routing of “RELT wire harness”**

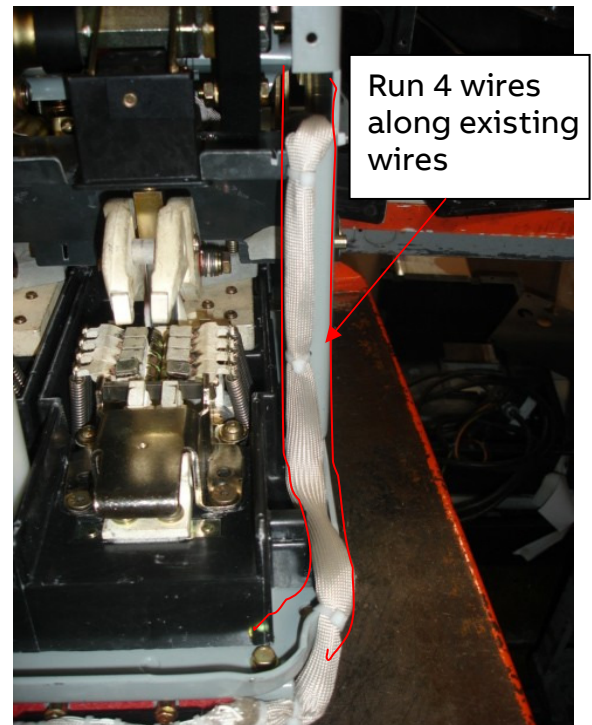
10. Route the RELT wire harness (set of 4 wires) from left of trip unit mounting plate to the “C” secondary disconnect securing the wires with wire ties along the way.

The different paths taken and the different layouts for the 800-2000A, 3200-4000A and the 5000A Frames are shown below:

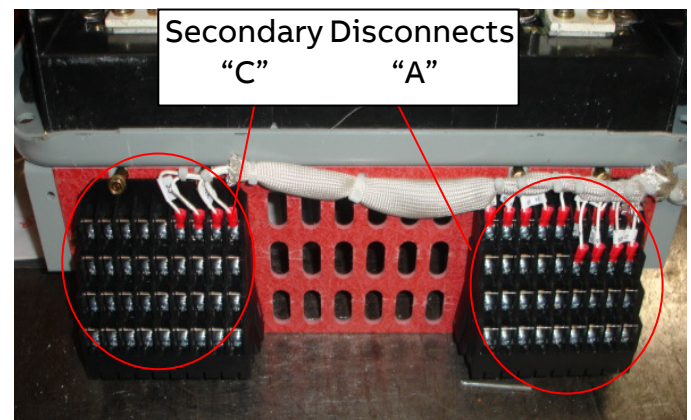
#### **GTURHWP1 for 800-2000A:**



**Figure 14**



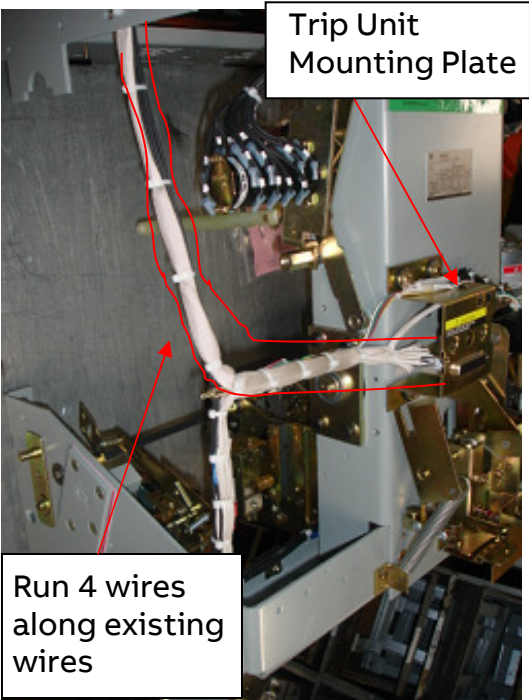
**Figure 15**



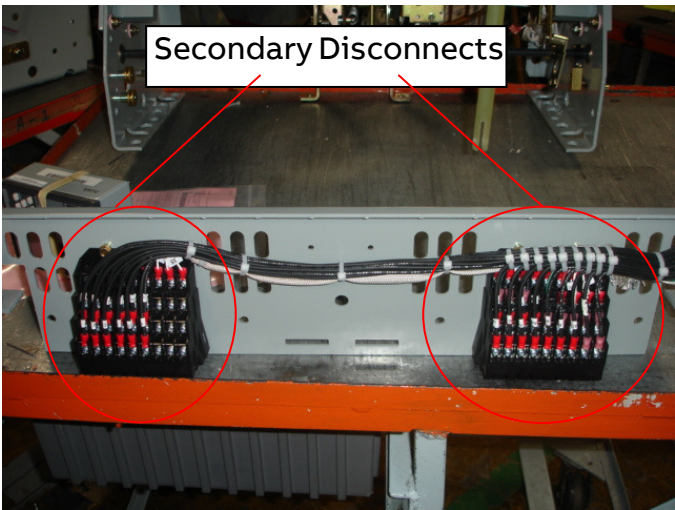
**Figure 16**



**GTURHWP2 for 3200-4000A:**

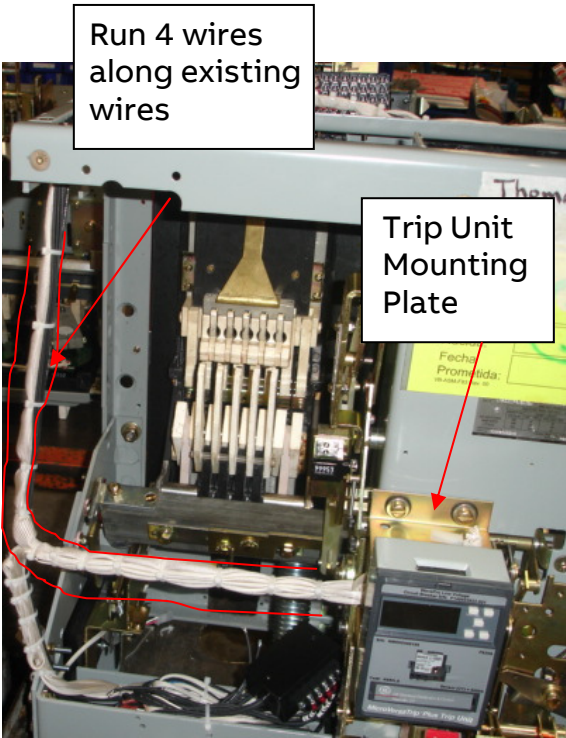


**Figure 17**

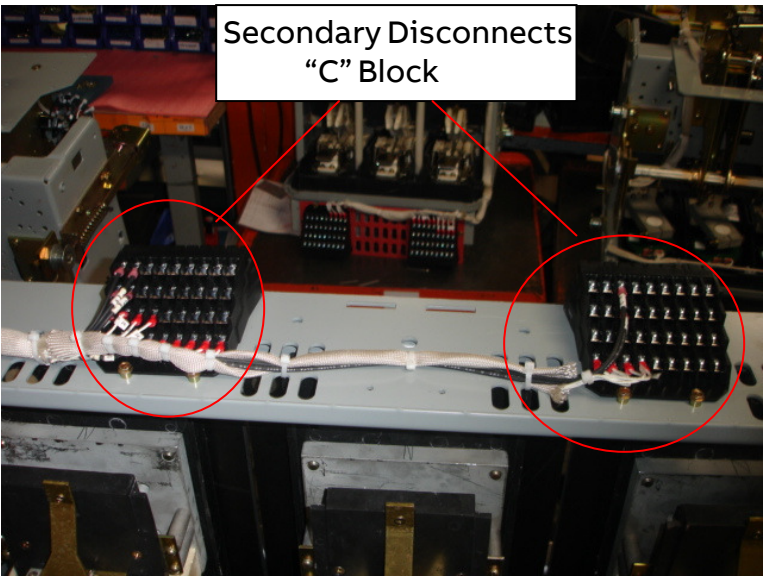


**Figure 18**

**GTURHWP3 for 5000A:**



**Figure 19**



**Figure 20**



## SECTION 3 Installation instructions for “RELТ wire harness kit” (Cataloge Number - GTURH)

### Installation of 4 Terminals into “C” Secondary Disconnect

11. After running the new wires along the existing harness, insert the connectors on the end of “RELТ wire harness” into respective terminals and use a screwdriver to tighten the screws as shown in figure 22.

Individual wires in harness are numbered and should be inserted at respective places on “C” secondary disconnect (Figure 21). Refer to Table 3.

Table 3

| Location on<br>“C” Secondary<br>Disconnect | Function            |
|--|---------------------|
| 33   | Relay<br>Output “+” |
| 34   | Relay<br>Output “-” |
| 35   | Relay Input<br>“+”  |
| 36   | Relay Input<br>“-”  |

12. Reuse screws, washers, and nuts to re-install the 50-pin connector onto the mounting plate.
13. Re-install the mounting plate again on frame by tightening the screws at three locations (Figures 23 & 24).



Figure 23

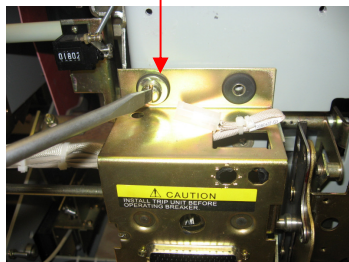


Figure 24

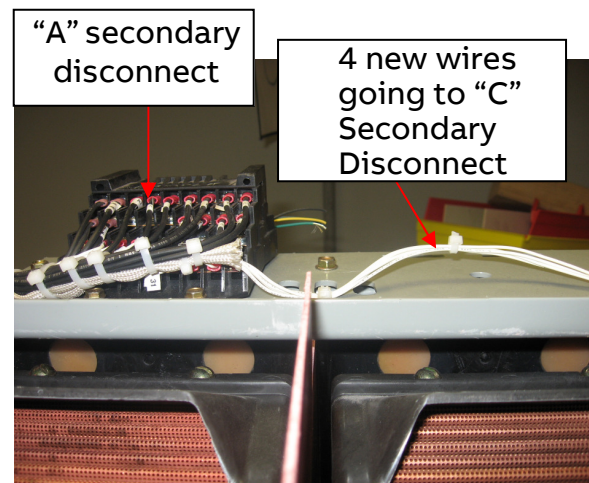


Figure 21

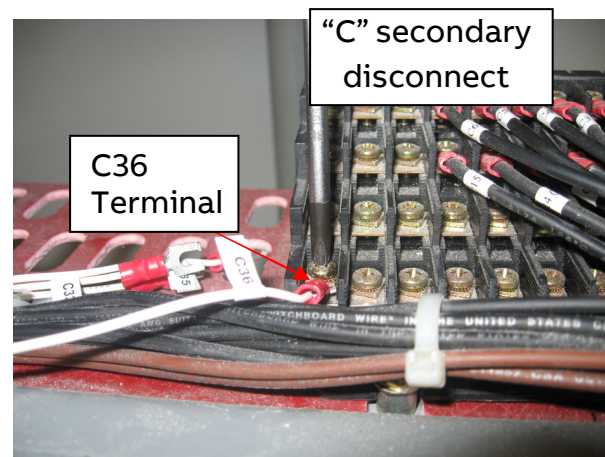


Figure 22 (C36 terminal)

14. Mount the new EntelliGuard® TU on front frame.

Pull the lever on the side of trip unit mounting plate as shown in Figure 4. While still holding it away from the mounting plate, gently interlock the male and female 50-pin connectors and release the lever. Make sure the lever fully retracts and holds the TU in place. (If C, B will not close, check for de-energized UVR, electric lockout, bell alarm lockout or other interlocks.)

**Note:** On 800-2000A breakers the CB racking mechanisms should have been place in connect position in step6 on page4. If not done earlier, do this now. So racking screw access door can be in its closed position, under the least return spring force as the escutcheon is installed. Failure to do this may result in damage to the racking mechanism interlock arrangement and inability to close the circuit breaker.

Install the top center hex screw loosely first, then bottom center, then four outers. Check racking access door function, depress open button & slide racking access door open & hold, release open button, racking access door should remain open on its own.

15. Replace front cover onto breaker by sliding it over the manual-charging lever in the same way it was taken off.
16. Change & close the breaker, perform a high current test or quick trip test using the EntelliGuard TU test kit to verify trip unit to flux shifter connectivity.
17. For 800-2000A circuit breakers, turn racking screw fully counterclockwise to the disconnect position to prepare for reinstallation into the equipment.

These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency that may be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the ABB Inc.

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