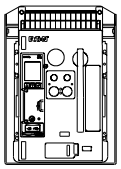
Instruction Leaflet **IL0131088EN**

Supersedes May 2015
Effective January 2019

Power Defense – ICCB

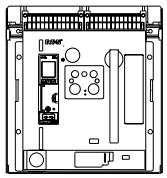
Instructions for spring release, latch check switch, and motor operator

Instructions apply to:



UL489 : **PD-NF**

IEC : **PD-NF, IZMX16**



UL489 : **PD-RF**

IEC : **PD-RF, IZMX40**

⚠ WARNING

(1) ONLY QUALIFIED ELECTRICAL PERSONNEL SHOULD BE PERMITTED TO WORK ON THE EQUIPMENT.
(2) ALWAYS DE-ENERGIZE PRIMARY AND SECONDARY CIRCUITS IF A CIRCUIT BREAKER CANNOT BE REMOVED TO A SAFE WORK LOCATION.
(3) DRAWOUT CIRCUIT BREAKERS SHOULD BE LEVERED (RACKED) OUT TO THE DISCONNECT POSITION.
(4) ALL CIRCUIT BREAKERS SHOULD BE SWITCHED TO THE OFF POSITION AND MECHANISM SPRINGS DISCHARGED.
FAILURE TO FOLLOW THESE STEPS FOR ALL PROCEDURES DESCRIBED IN THIS INSTRUCTION LEAFLET COULD RESULT IN DEATH, BODILY INJURY, OR PROPERTY DAMAGE.

⚠ WARNING

THE INSTRUCTIONS CONTAINED IN THIS IL AND ON PRODUCT LABELS HAVE TO BE FOLLOWED. OBSERVE THE FIVE SAFETY RULES:
– DISCONNECTING
– ENSURE THAT DEVICES CANNOT BE ACCIDENTALLY RESTARTED
– VERIFY ISOLATION FROM THE SUPPLY
– EARTHING AND SHORT-CIRCUITING
– COVERING OR PROVIDING BARRIERS TO ADJACENT LIVE PARTS
DISCONNECT THE EQUIPMENT FROM THE SUPPLY. USE ONLY AUTHORIZED SPARE PARTS IN THE REPAIR OF THE EQUIPMENT. THE SPECIFIED MAINTENANCE INTERVALS AS WELL AS THE INSTRUCTIONS FOR REPAIR AND EXCHANGE MUST BE STRICTLY ADHERED TO PREVENT INJURY TO PERSONNEL AND DAMAGE TO THE SWITCHBOARD.

Power Defense™

Powering Business Worldwide

Section 1: General Information

Spring Release (SR)

A spring release is recommended for electrically operated circuit breakers, although it is an optional device (Figure 1). It remotely closes the circuit breaker when the coil is energized by a voltage input. When a latch check switch is installed, the closing spring must be fully charged and the trip latch reset (not held in the tripped position) for the SR to operate. If these two conditions are not met, the close signal will be ignored until it is removed and re-applied (Table 1).

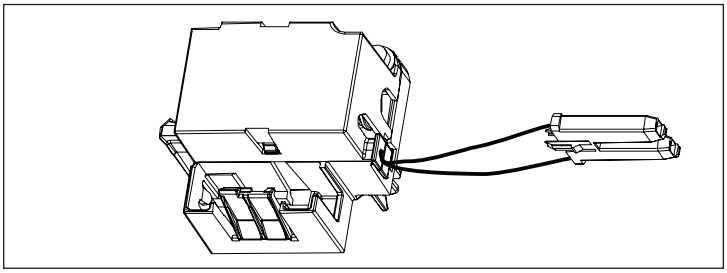


Figure 1. Spring Release.

Latch Check Switch (LCS)

A latch check switch indicates when the circuit breaker is "ready to close" (Figure 2 and Table 2). Two versions of the LCS are available:

1. Internal - The LCS wired to the spring release will not permit activation of the spring release until the circuit breaker is fully charged and the trip latch is reset. The LCS is supplied with two leads and a small 2-pin connector.

2. External - The LCS used for remote indication consists of one Form C contact wired to the circuit breaker secondary contacts for integration into external control schemes.

Note: Note: Wiring the LCS for remote indication directly in series with the SR accessory is not recommended as this will override the "anti-pump" feature. The LCS is supplied with three leads and two secondary connectors.

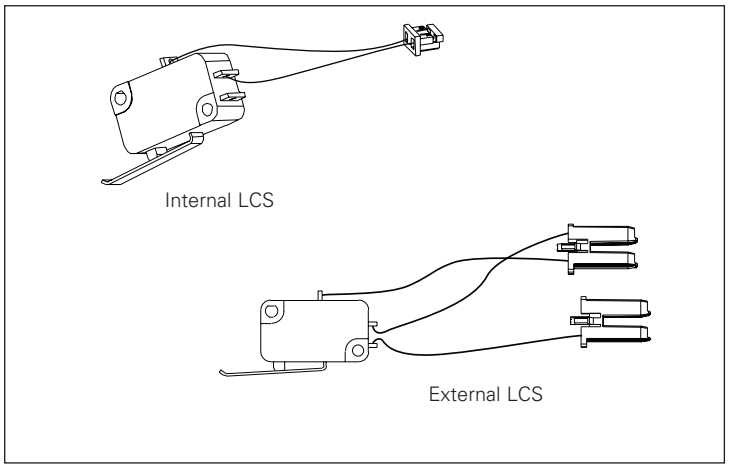


Figure 2. Latch Check Switches.

Table 1. Latch Check Ratings.

Control Voltage	Frequency	Contact Rating (Amperes)
250	50 - 60 Hz	10
125	DC	0.5
250	DC	0.25

Note: Many illustrations use the NF Frame 1600A circuit breaker for illustrative purposes only. The RF Frame 4000A circuit breaker is handled in a similar fashion.

Table 2. Spring Release Ratings.

Control Voltage	Frequency	Operational Voltage (Range 85–110%)	Inrush Power Consumption (VA)	Closing Time (ms)
24	DC	20 - 26	400	25
48	DC	41 - 53	500	25
60	DC	51 - 66	500	25
110 - 127	50 - 60 Hz	94 - 140	750	25
110 - 125	DC	94 - 138	750	25
208 - 240	50 - 60 Hz	177 - 264	800	25
220 - 250	DC	187 - 275	800	25

Section 2: Installation of Spring Release

Proceed with the following eight steps.

Step 1: Remove the four screws holding the front cover in place (two on each side of the cover).

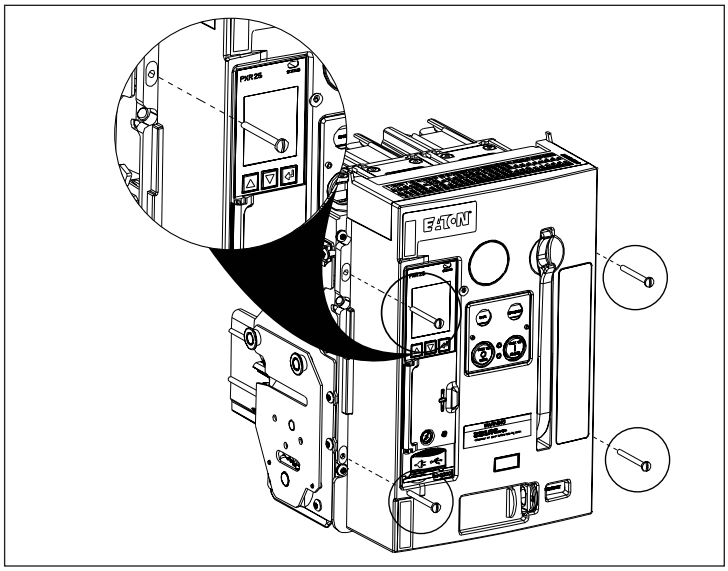


Figure 3. Step 1.

Step 2: Remove the front cover. Pull down on the charging handle to simplify removal.

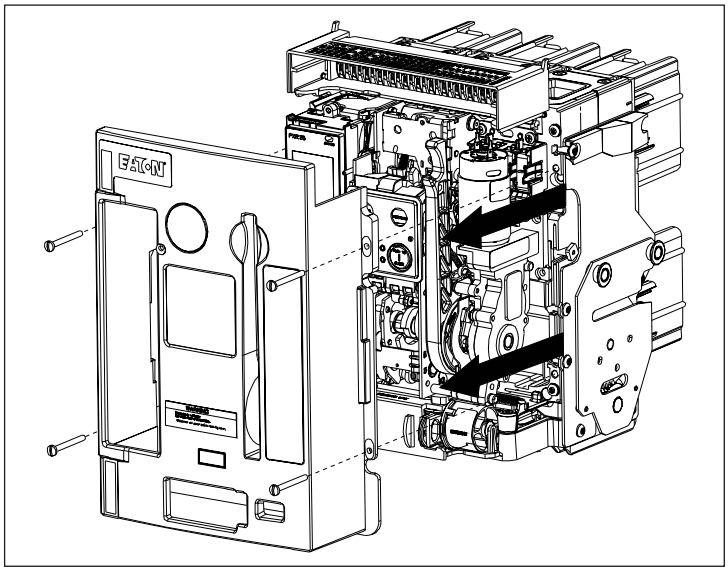


Figure 4. Step 2.

Step 3: To gain access to the mounting location, pull the charging handle down as shown in Figure 5.

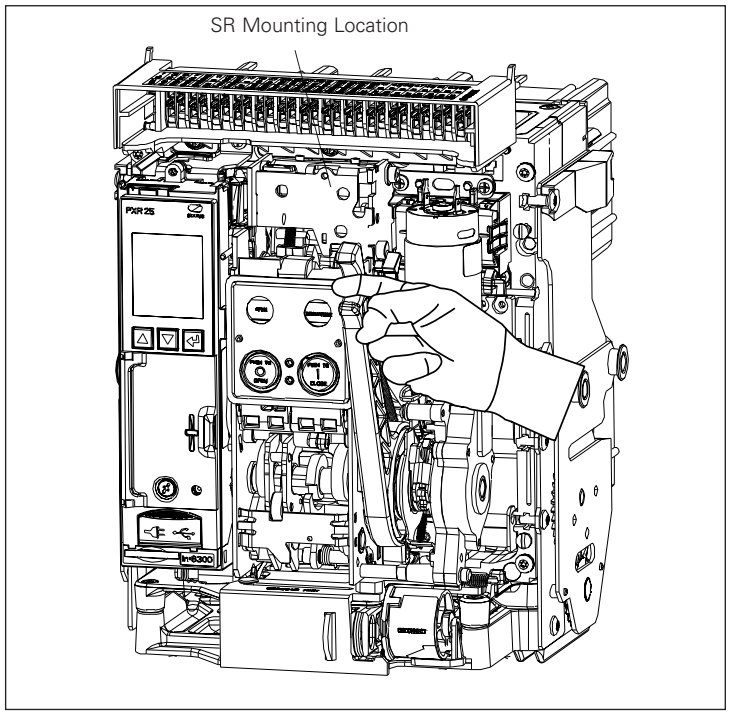


Figure 5. Step 3.

Step 4: Position the spring release as shown to begin the installation process (Figure 6).

Note: The spring release is secured in its mounted position with one captive retaining screw.

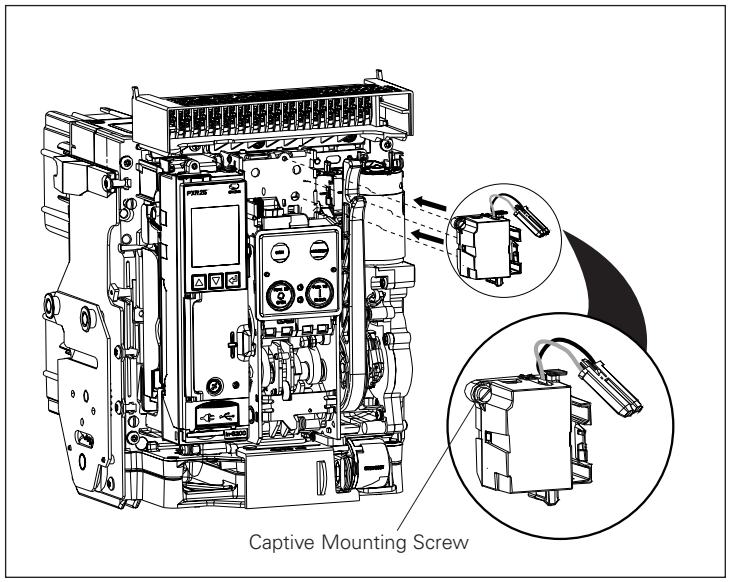


Figure 6. Step 4.

Step 5: While pulling back on the manual charging handle, tilt the spring release backward so it fits into and under the slot feature on the breaker sideplate as shown.

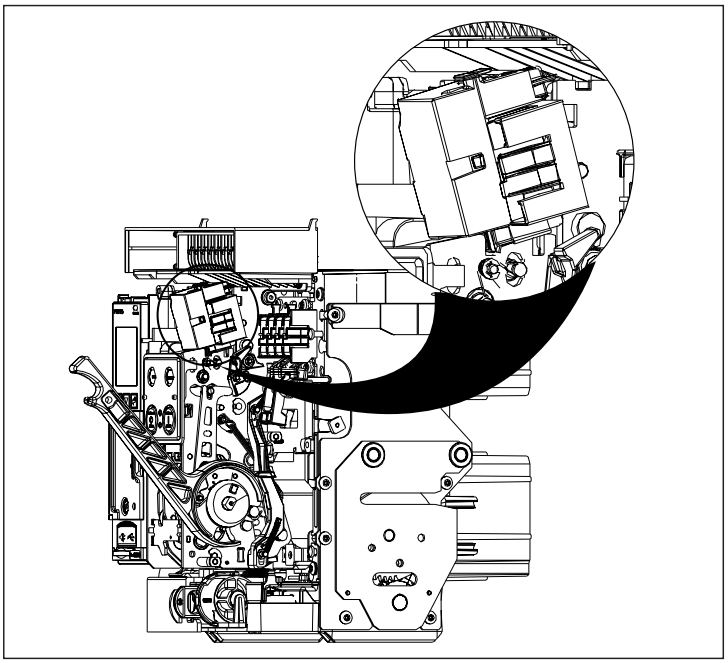


Figure 7. Step 5.

Step 6: Complete the mounting process by pushing the spring release forward and securing it in place with its captive retaining screw. Use a screwdriver to hand tighten the retaining screw.

Step 7: Make the appropriate secondary connections as outlined in Section 9. If necessary, bundle secondary wires using industry-accepted wire tie practices.

Step 8: Replace the front cover and secure it in place with the four mounting screws previously removed in Step 1.

Section 3: Removal of Spring Release

Proceed with the following four steps:

Step 1: Remove the front cover from the breaker by first performing Steps 1 and 2 of Section 2.

Step 2: Locate the spring release and disconnect the appropriate secondary connection as described in Section 9.

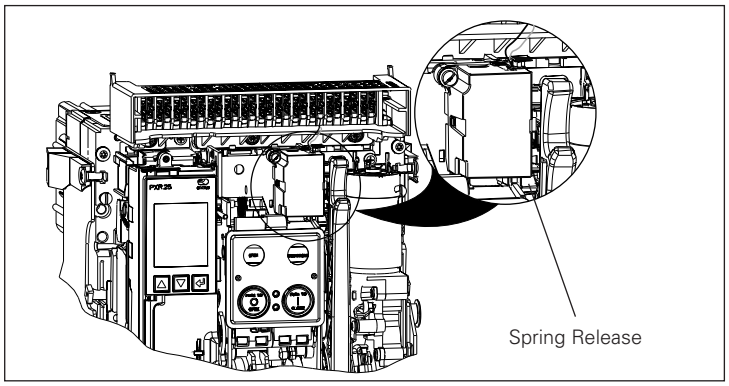


Figure 8. Step 2.

Step 3: Unscrew the captive retaining screw from the spring release and remove the spring release. Pulling forward on the manual charging handle simplifies removal.

Step 4: If another spring release is to be installed, perform Steps 3 through 8 of Section 2. If not, complete the removal operation by performing Step 8 of Section 2.

Section 4: Installation of Latch Check Switch in Spring Release

Proceed with the following five steps:

Step 1: Remove the spring release from the breaker prior to installing a latch check switch by performing Steps 1 through 3 of Section 3.

Step 2: Position the spring release as shown. Tilt the latch check switch back to properly position it for final installation. The LCS is shown without leads soldered to appropriate terminals for clarity purposes (Figure 9).

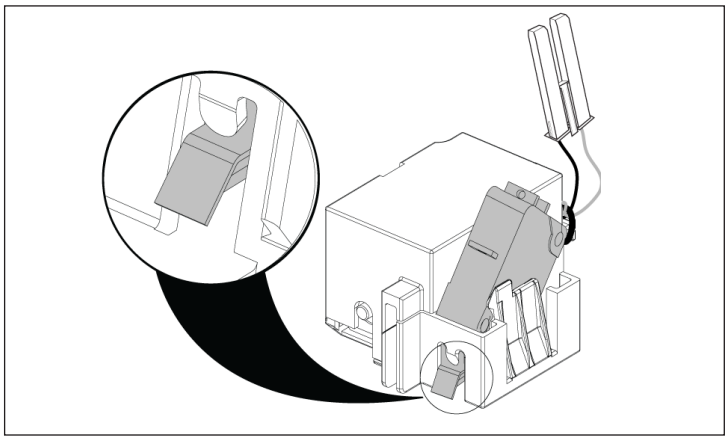


Figure 9. Step 2.

Step 3: Carefully press the latch check switch down as shown until a snapping sound is heard. This sound indicates the switch is properly seated (Figure 10).

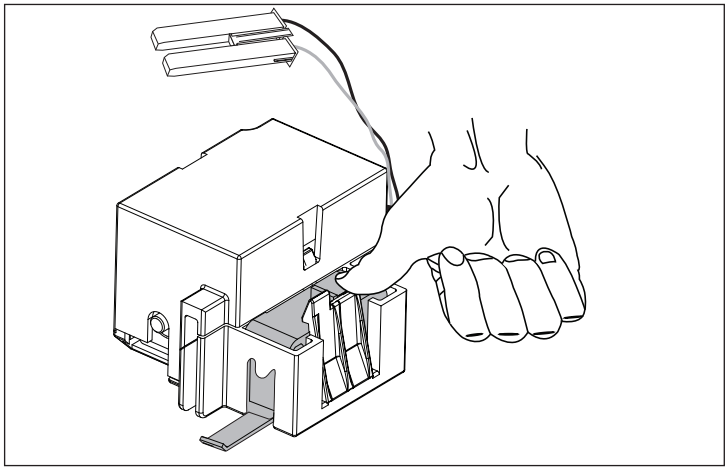


Figure 10. Step 3.

Step 4: If the latch check switch being installed is for use **internally** in conjunction with the spring release, plug the small 2-pin connector of the latch check switch into the 2-pin plug in the spring release. The 2-pin connector only fits one way and will latch into place. If the latch check switch being installed is for use **externally**, skip this step and proceed to Step 5. Keep in mind that separate secondary connections with an **externally mounted** LCS will have to be made as part of Step 5.

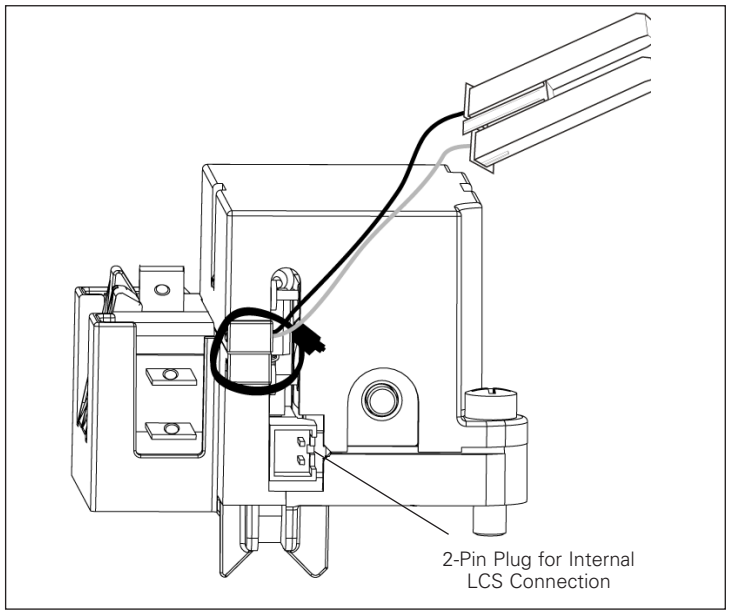


Figure 11. Step 4.

Step 5: With the latch check switch now installed in the spring release, repeat Steps 3 through 8 of Section 2.

Section 5: Removal of Latch Check Switch from Spring Release

Proceed with the following five steps.

Step 1: Remove the spring release from the breaker prior to removing a latch check switch by performing Steps 1 through 3 of Section 3.

Step 2: If the latch check switch is internally connected to the spring release, unplug its connector from the 2-pin plug in the spring release.

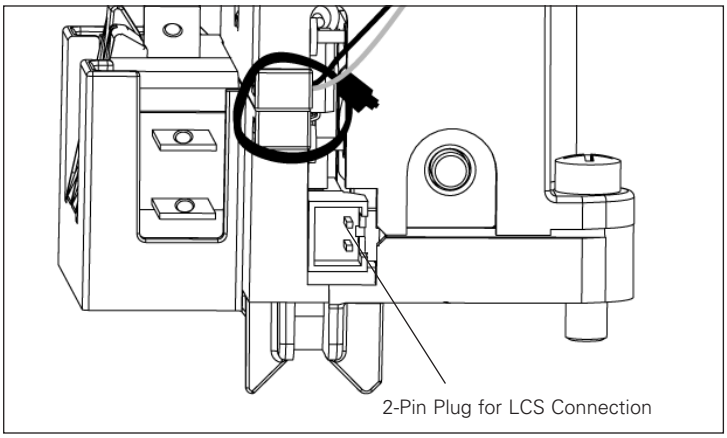


Figure 12. Step 2.

Step 3: With the spring release positioned as shown, pull back on the locking tab to unlock the latch check switch from the spring release.

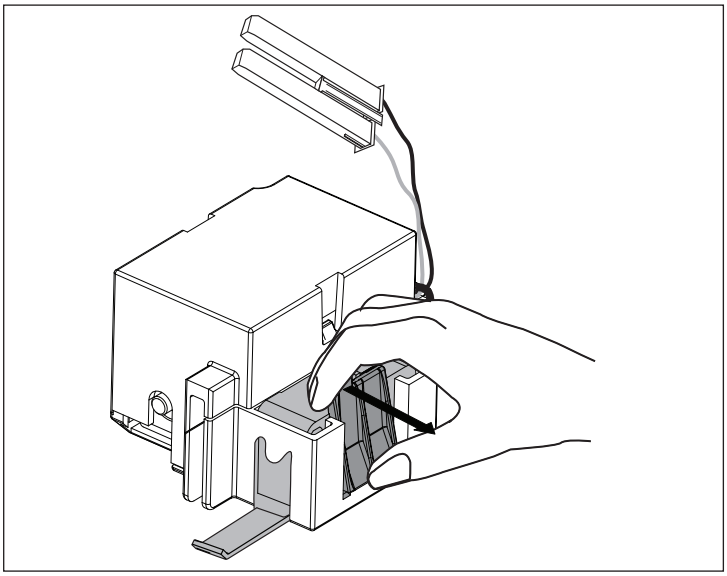


Figure 13. Step 3.

Step 4: Tilt the latch check switch back and lift to release and remove it from the spring release.

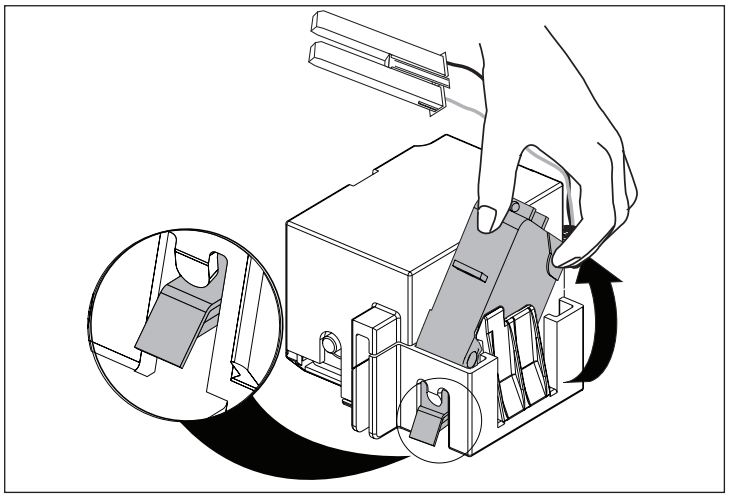


Figure 14. Step 4.

Step 5: If another latch check switch is to be installed in the spring release, perform Steps 2 through 5 of Section 4. If not, just reinstall the spring release by performing Steps 3 through 8 of Section 2.

Section 6: Motor Operator General Information

A motor operator is an electric motor assembly internally mounted in the right-hand side of the circuit breaker (Figure 15). It charges the closing springs electrically for remote or local operation. The motor operator can be factory or field installed (Table 3 NF and Table 4 RF). If a motor operator is being installed in the field, an optional spring release device can also be installed. Instructions for the installation of a spring release are provided in Section 2 of this document.

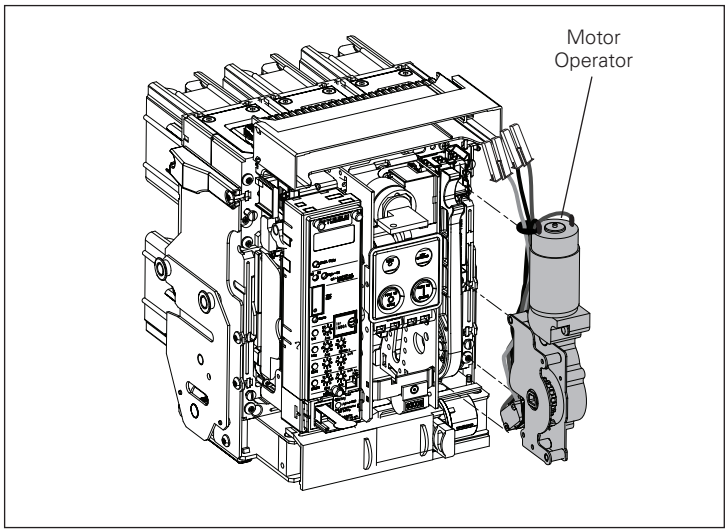


Figure 15. Motor Operator Location.

Table 3. Motor Operator Ratings - NF.

Control Voltage	Frequency	Operational Voltage (Range 85–110%)	Run Current (Amperes)	Typ. Inrush Current	Power Consumed (VA)	Max. Charge Time (sec)
24	DC	20 - 26	6	325%	160	4
48	DC	41 - 53	3	500%	150	3
60	DC	51 - 66	2	350%	150	4
110 - 127	50 - 60 Hz	94 - 140	2	300%	280	3
110 - 125	DC	94 - 138	1	500%	150	3
208 - 240	50 - 60 Hz	177 - 264	1	1000%	280	4
220 - 250	DC	187 - 275	1	1000%	280	4

Table 4. Motor Operator Ratings - RF.

Control Voltage	Frequency	Operational Voltage (Range 85–110%)	Run Current (Amperes)	Typ. Inrush Current	Power Consumed (VA)	Max. Charge Time (sec)
24	DC	20 - 26	7	350%	200	6
48	DC	41 - 53	3	450%	175	6
60	DC	51 - 66	3	450%	225	6
110 - 127	50 - 60 Hz	94 - 140	3	300%	425	6
110 - 125	DC	94 - 138	2	375%	275	6
208 - 240	50 - 60 Hz	177 - 264	1.5	300%	400	6
220 - 250	DC	187 - 275	1	400%	250	6

Section 7: Installation of Motor Operator

Proceed with the following 11 steps:

Step 1: Remove the four screws holding the front cover in place (two on each side of the cover).

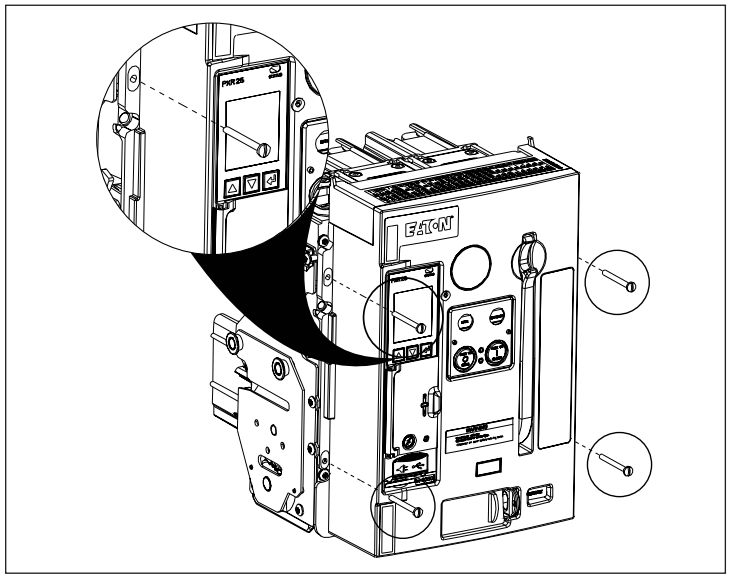


Figure 16. Step 1.

Step 2: Remove the front cover. Pull down on the charging handle to simplify removal.

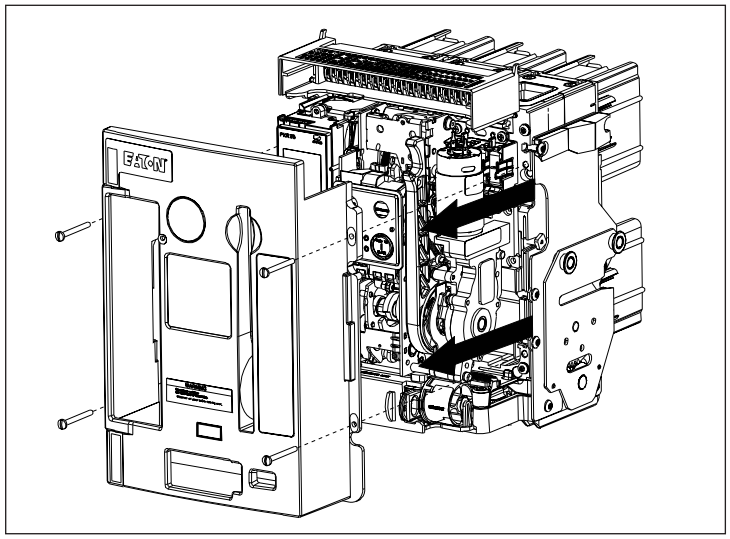


Figure 17. Step 2.

Step 3: If an existing motor operator is already installed, remove it first by following the instructions outlined in Section 8. If not, proceed with Step 4.

Step 4: To simplify installation, examine the motor operator to verify that the hub key on the motor operator is in the proper position. It is properly positioned if the arrowhead on the hub key lines up with the hole in the hub housing as shown. If they are aligned, proceed to Step 6.

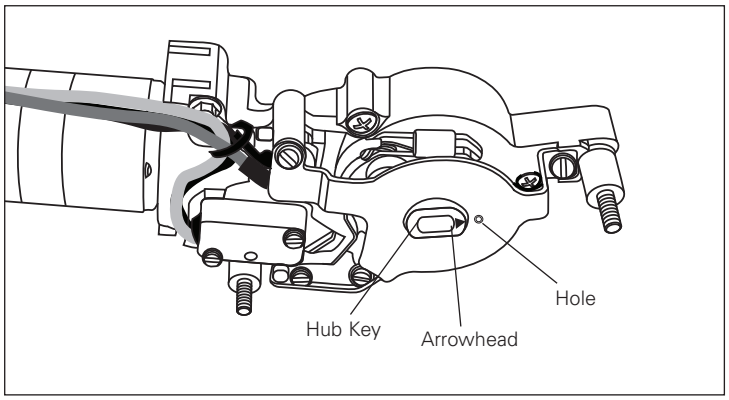


Figure 18. Step 4.

Step 5: If the arrowhead and hole are not aligned, rotate the hub key clockwise using any appropriate tool to achieve alignment.

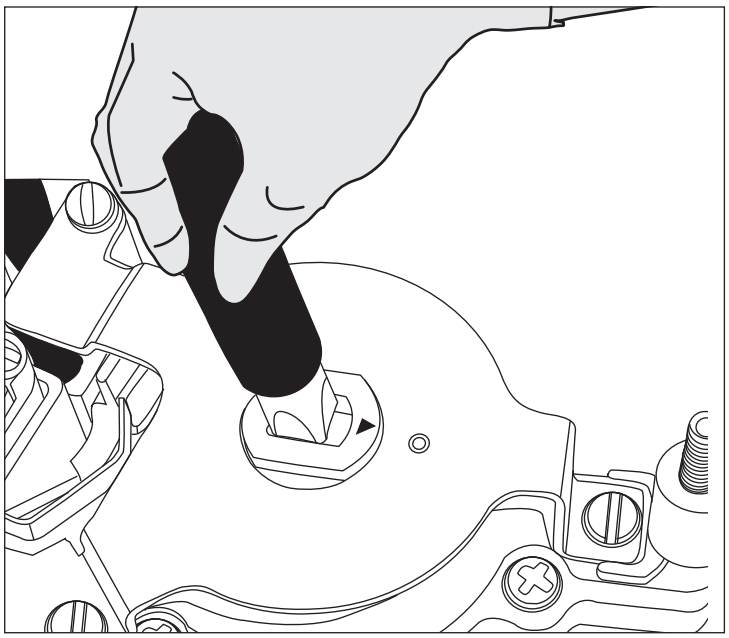


Figure 19. Step 5.

Step 6: With the arrowhead and hole aligned, push on the two captive mounting screws until they are nearly flush with their mounting collars. This will simplify the Step 7 mounting process.

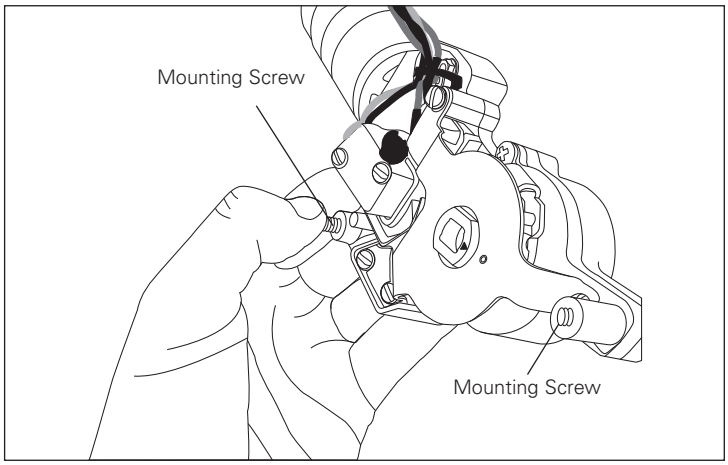


Figure 20. Step 6.

Step 7: For the NF Frame, align the hub key on the motor operator with the key on the cam shaft and push the motor operator into its mounted position. For the RF Frame, align the hub key on the motor operator with the key in the cam shaft and position the motor operator so the black actuator lever rests on the pin and is settled in the mounted position.

IMPORTANT

IT IS IMPORTANT THAT THE TWO KEYS ARE PROPERLY ALIGNED AND MATE EASILY BEFORE TIGHTENING THE MOUNTING SCREWS IN STEP 8.

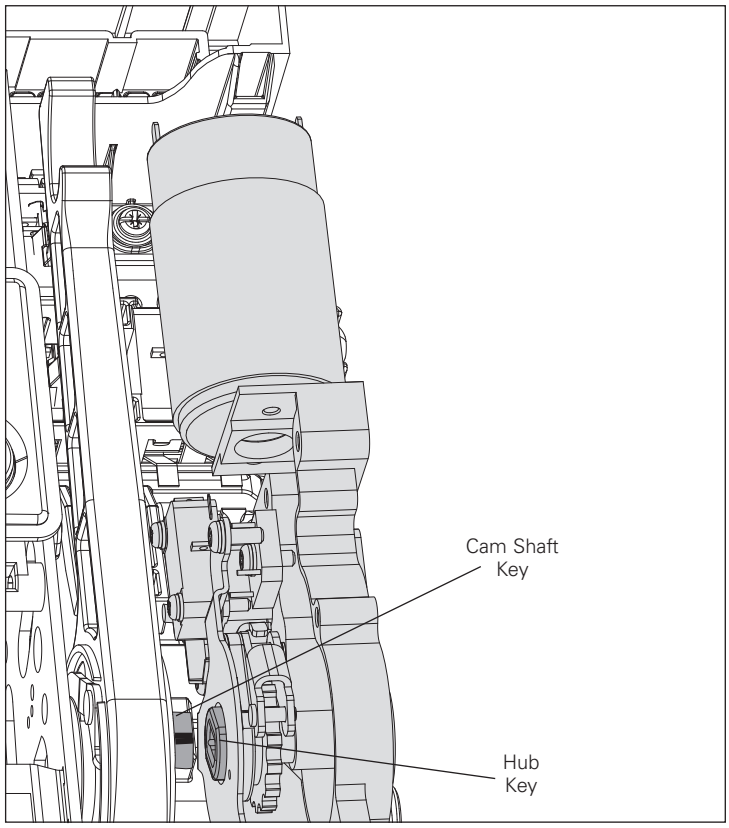


Figure 21. Step 7. NF Frame.

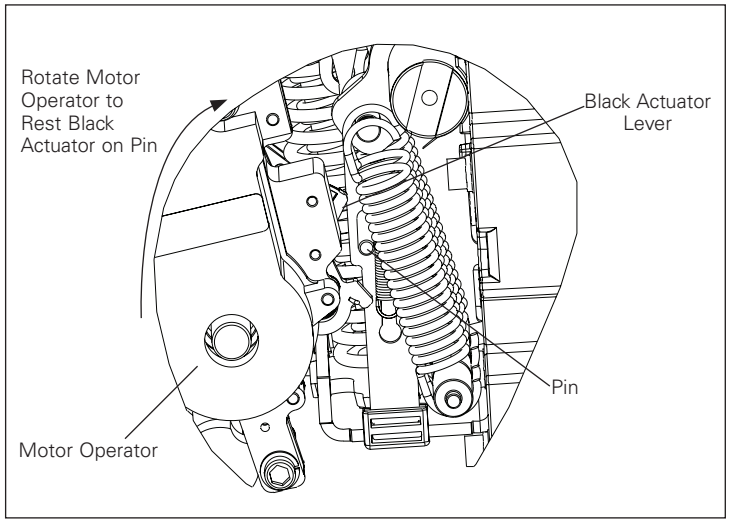


Figure 21a. Step 7 - RF Frame.

Step 8: Use an Allen wrench to screw the captive mounting screws (2 screws for NF and 3 screws for RF) of the motor operator into the already tapped mounting holes in the circuit breaker. Firmly hand tighten the two mounting screws.

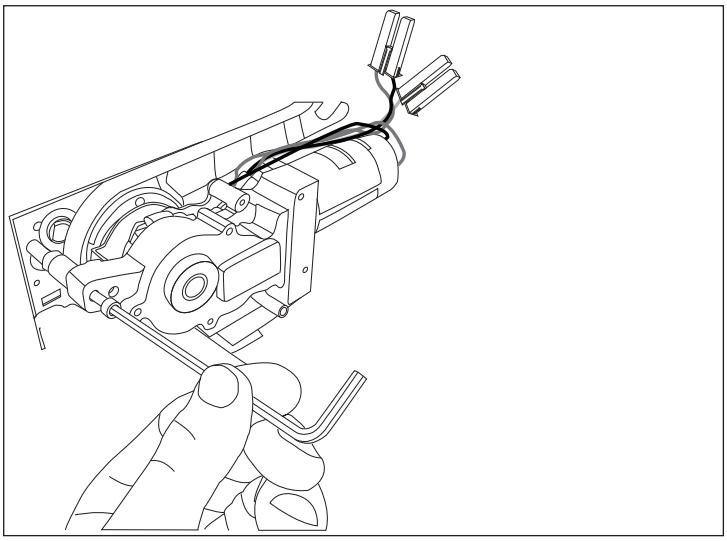


Figure 22. Step 8.

Step 9: The installed motor operator should look as shown with secondary leads extending up and ready to be made.

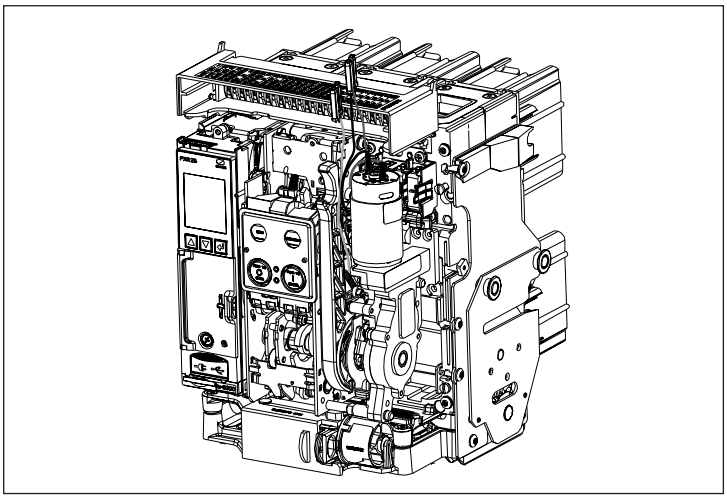


Figure 23. Step 9.

Step 10: Make the appropriate secondary connections as outlined in Section 9. If necessary, bundle secondary wires using industry-accepted wire tie practices.

Note: If an externally wired latch check switch and a motor operator are installed together, a simple secondary wiring change must be made. Remove the latch check switch's secondary connector plug as described in Section 9. Once removed, disconnect the latch check switch's secondary lead (#39-NF, #51-RF) from the connector plug by inserting the terminal extraction tool (included in the externally wired latch check switch kit) into the end of the connector plug as shown. The tool releases the lead so it can be removed from the other end. The connector plug can be discarded. The latch check switch's disconnected lead (#39-NF, #51-RF) is now reconnected into the open secondary location in the motor operator's connector plug. No tool is required to make this connection. It is, however cautioned that the connector plug must be oriented as shown in Figure 26 before making the connection. Gently push the lead into the connector's open spot, and it will easily connect and lock into place.

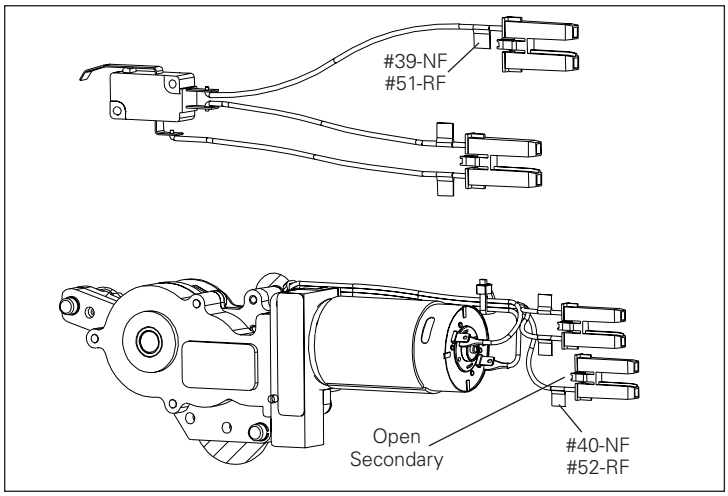


Figure 24. Step 10.

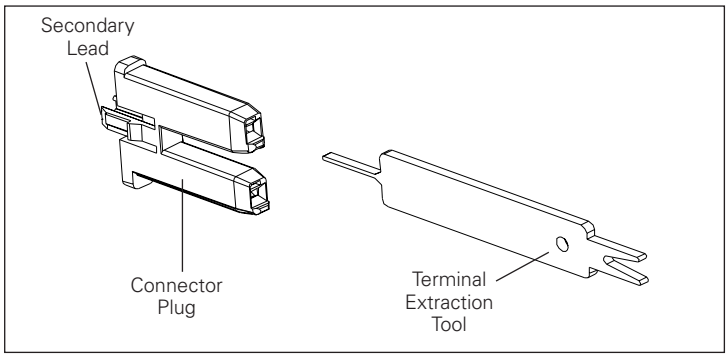


Figure 25. Step 10.

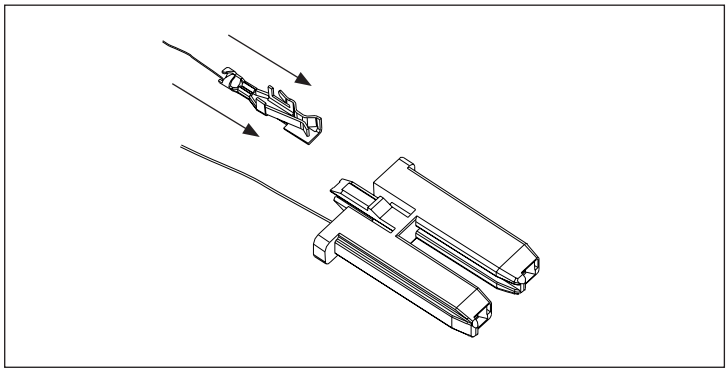


Figure 26. Step 10.

Step 11: Replace the front cover, and secure it in place with the four mounting screws previously removed in Step 1.

Section 8: Removal of Motor Operator

Proceed with the following five steps.

Step 1: If necessary, remove the front cover from the breaker by performing Steps 1 and 2 of Section 2.

Step 2: Locate the motor operator and disconnect the appropriate secondary connections as described in Section 9.

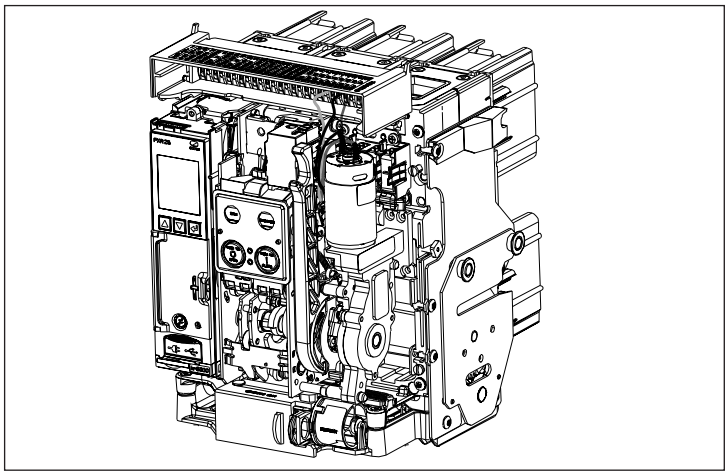


Figure 27. Step 2.

Step 3: Remove the motor operator from the circuit breaker by using an Allen wrench to unscrew the captive motor operator mounting screws (2 screws for NF and 3 screws for RF).

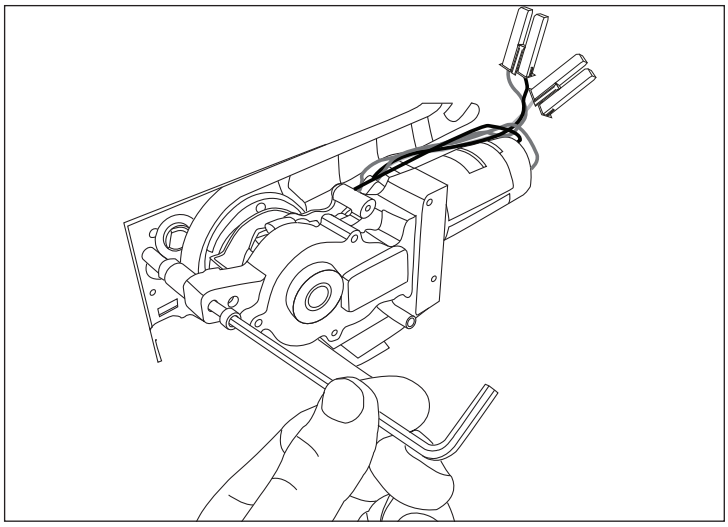


Figure 28. Step 3.

Step 4: Complete removal of the motor operator by pulling it out (Figure 29).

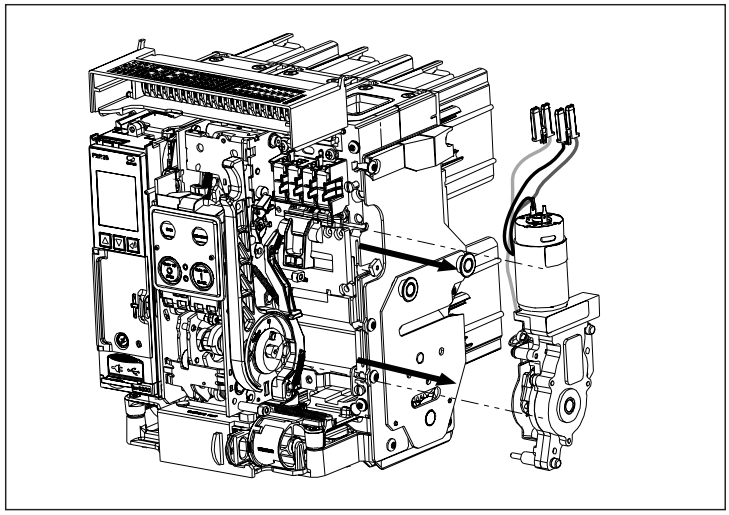


Figure 29. Step 4.

Step 5: Repeat Steps 4 through 11 of Section 7 if another motor operator is to be installed. If not, just complete Step 11 of Section 7.

Section 9: Accessory Secondary Connections

General Information

1. Electrical accessory leads are tagged with numbers associated with the applicable connection diagram located in instruction book MN013001EN (NF) and MN013002EN (RF). Leads are also supplied with keyed secondary connector plugs to ensure proper connections (Figure 30).
2. Secondary connections are made by plugging the connector plugs into the appropriate location. A connector plug already connected can be removed by squeezing two release tabs together with small needle nose pliers and pulling out (Figure 31).

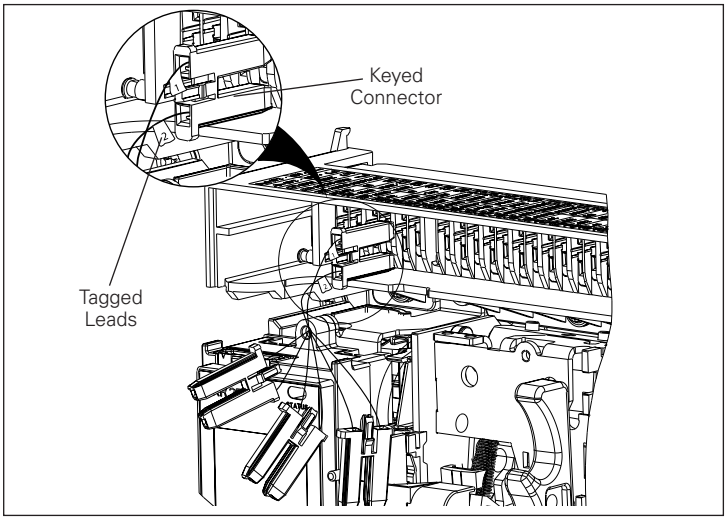


Figure 30. Leads and Connectors.

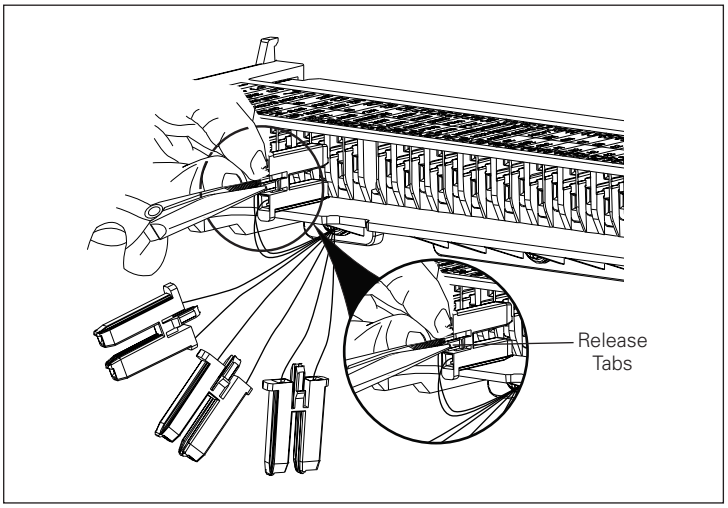


Figure 31. Connector Plug Removal.

Fixed Breaker Connections

Proceed with the following five steps.

Step 1: Become familiar with the fixed terminal block DIN rail type mounting plate where secondary connections are made.

Note: Secondary connection points have numerical and descriptive laser-etched identifications.

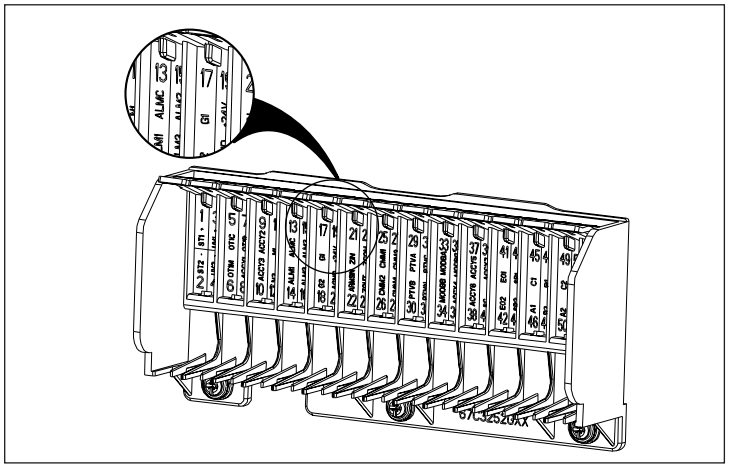


Figure 32. Step 1.

Step 2: Plug the accessory connector plug into the fixed secondary terminal block.

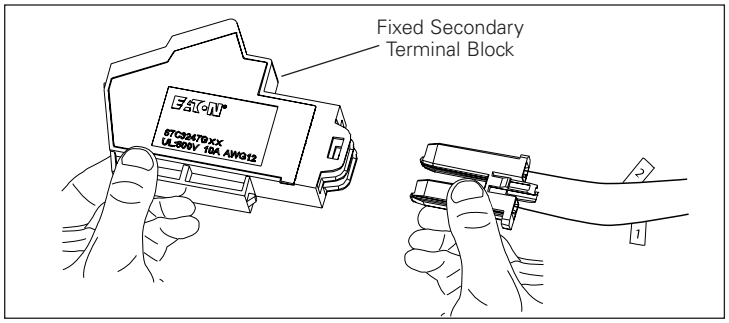


Figure 33. Step 2.

Step 3: Identify the correct mounting location on the fixed terminal block mounting plate for mounting the fixed secondary terminal block. Insert the bottom end of the fixed secondary terminal block into the proper location on the DIN rail type mounting plate.

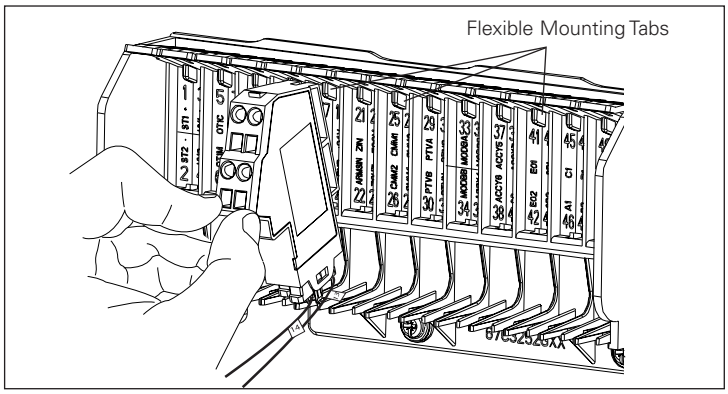


Figure 34. Step 3.

Step 4: Rotate the top end of the terminal block in until it engages the appropriate flexible mounting tab at the top of the mounting plate. A clicking sound will be heard if done properly.

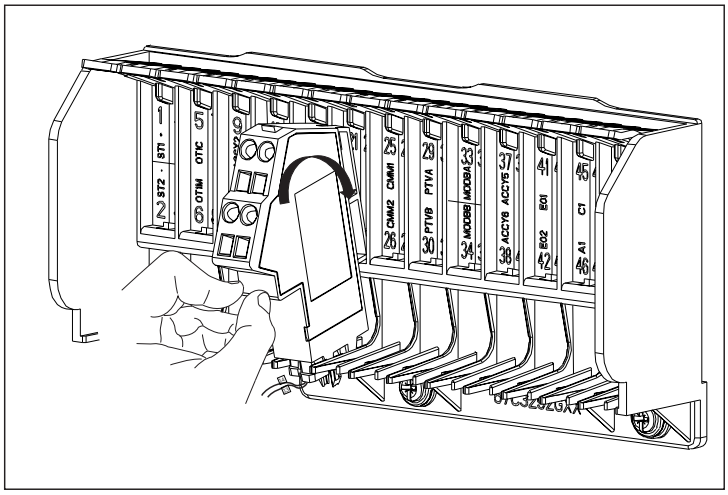


Figure 35. Step 4.

IMPORTANT

TO REMOVE RIGHT AND LEFT ACCESSORY TRAYS OR ANY OTHER ELECTRICAL ACCESSORY, THE APPROPRIATE ACCESSORY CONNECTOR PLUG MUST FIRST BE DISCONNECTED.

Step 5: To remove an accessory plug on a fixed circuit breaker, the appropriate fixed secondary terminal block must first be removed. To remove a fixed secondary terminal block, lift up on the small flexible mounting tab at the top of the fixed terminal block mounting plate, and rotate the terminal block out in the opposite direction shown in Figure 35. Once the terminal block is removed, the accessory connector plug can be unplugged from the bottom of the terminal block. Refer to Item 2 and Figure 31 under the heading "General information" in this section for detailed assistance with the removal.

Drawout Breaker Connections

Proceed with the following three steps.

Step 1: Become familiar with the drawout secondary plug housing where secondary connections are made.

Note: Secondary connection points have numerical and descriptive laser-etched identifications on top of the housing directly matching the plug-in locations below.

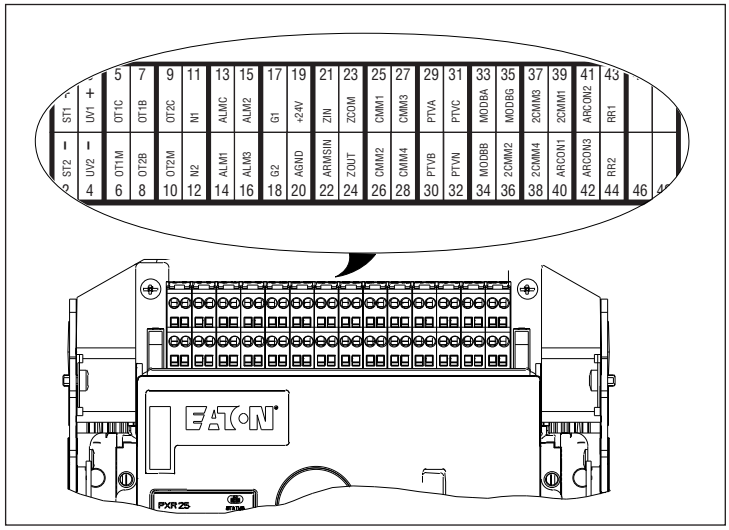


Figure 36. Step 1.

Step 2: Match the numbers on the secondary leads with the numbers etched on the top of the secondary housing, and insert the connector plug into the associated slot.

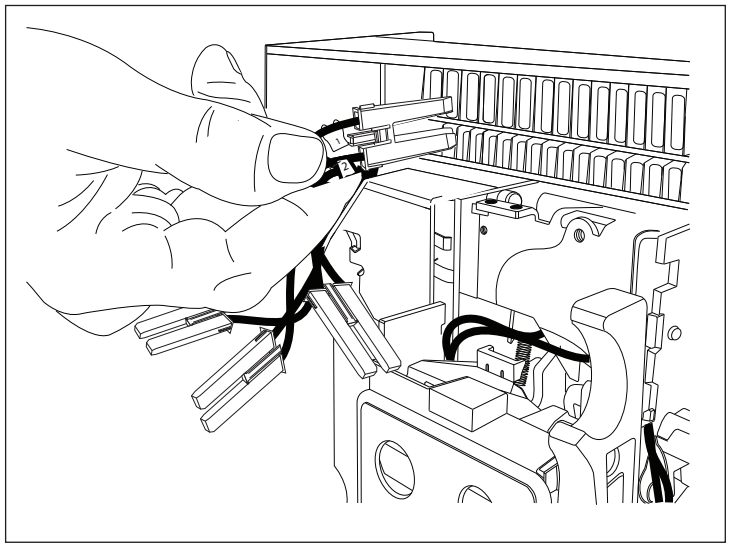


Figure 37. Step 2.

IMPORTANT

TO REMOVE RIGHT AND LEFT ACCESSORY TRAYS OR ANY OTHER ELECTRICAL ACCESSORY, THE APPROPRIATE ACCESSORY CONNECTOR PLUG MUST FIRST BE DISCONNECTED.

Step 3: To remove an accessory connector plug on a drawout circuit breaker, unplug it from its secondary plug housing. Refer to Item 2 and Figure 31 under the heading "General information" in this section for detailed assistance with the removal.

Section 10: Spring Release/Latch Check/ Motor Operator Testing

IMPORTANT

BEFORE PERFORMING ANY TEST ACTIVITIES, LEVER A DRAWOUT CIRCUIT BREAKER TO THE TEST POSITION. FOR FIXED TYPE CIRCUIT BREAKERS, MAKE SURE PRIMARY CIRCUITS ARE DE-ENERGIZED.

Spring Release Testing

1. Verify that the circuit breaker is in the Open position. Charge the breaker's closing spring using the manual charging handle.
2. Apply rated voltage to the spring release and verify that the breaker toggles to the Closed position.

Spring Release with Internal Latch Check Switch Testing

Place the circuit breaker in the different positions shown in Table 5 and apply rated voltage to the spring release.

Note: The voltage needs to be removed from the spring release before it can be applied each time.

Table 5. Testing Sequence with Internal Latch Check Switch.

Initial Breaker Position	Spring Release Result	Final Breaker Position
OPEN, discharged	Does not actuate	No change
OPEN, charged	Actuates	Closed
CLOSED, discharged	Does not actuate	No change
CLOSED, charged	Actuates	Attempts to close again
Hold OPEN button, discharged	Does not actuate	No change
Hold OPEN button, charged	Does not actuate	No change

Spring Release with External Latch Check Switch Testing

Place the circuit breaker in the different positions shown in Table 6 and check the continuity between the leads shown in the table.

Table 6. Testing Sequence with External Latch Check Switch.

Initial Breaker Position	NF Continuity Between Red (38) and Black (37) Leads RF Continuity Between Red (50) and Black (49) Leads	NF Continuity Between Blue (39) and Black (37) Leads RF Continuity Between Blue (51) and Black (49) Leads
OPEN, discharged	Yes	No
OPEN, charged	No	Yes
CLOSED, discharged	Yes	No
CLOSED, charged	No	Yes
Hold OPEN button, discharged	Yes	No
Hold OPEN button, charged	Yes	No

Motor Operator Testing

1. Verify that the circuit breaker is in the open and discharged condition. Apply voltage to the motor operator. Breaker charging should initiate. Verify that the breaker flag changes state to indicate the fully "Charged" condition, and that the motor operator has stopped running.
2. Close the breaker and verify that the motor operator automatically charges the breaker again.
3. ***Drawout breaker only:*** Remove voltage from the motor operator and return breaker to the open and discharged condition. Hold the levering access door open and apply voltage to the motor operator. The operator should NOT charge the breaker. Release the levering access door and verify that the operator charges the breaker.

Notes:

Instructions for spring release, latch check switch, and motor operator

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