

Surge Trap Installation for Carrier Unit Mount LiquiFlo 2 Frame 3 VFDs: 19XRV models, 460 to 608Amps

ATTENTION



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Only qualified electrical personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, or service this equipment. Read and understand this procedure in its entirety before proceeding.

The VFD is at line voltage when connected to incoming AC power.

Disconnect, lock out and tag all incoming power before performing these modifications.

DC bus capacitors retain hazardous voltages after input power has been disconnected.

After disconnecting input power, wait five minutes then perform the following:

1. Verify that the controller has lost communication with the VFD.
2. With a confidence tested AC voltmeter, verify that AC power is no longer present on the line side of the VFD cabinet's main incoming circuit breaker.
Test all phase to phase and **phase to ground** voltages.

WARNING



3. Visually inspect the VFD to insure no lamps or indicators are illuminated, then check that the DC bus capacitors are discharged.

SHOCK HAZARD



**Failure to observe these precautions could result
in severe bodily injury or loss of life.**

Tools required: (1) Drill; (2) Short #17 Drill bit (11/64 in.); (3) Center punch; (4) **Drop-cloth.**
(5) Torque wrench (14.75 **in-lbs**, 10-12 ft-lbs, 26-32 ft-lbs).

Tools that may be required: (1) Torx T30 bit; (2) Lug Crimper for #10 awg wire.
(3) 5/16 in. and 3/8 in. hex head wrenches; (4) 3/8 in drill bit.

1. Open the Surge Trap box and review the enclosed installation instructions.
 - Note the maximum recommended **20 inch** wire length.
 - Note the minimum recommended **4 inch** bend radius.
 - The wires enclosed in the kit are longer than the recommendation since they may have to be re-lugged for your particular circuit breaker. The wires should be routed and trimmed to meet the recommendations.
2. **Read and follow the lock out, tag out and safety verifications described above.**
3. **Cover the electrical components mounted on the cabinet floor in the circuit breaker bay with an appropriate drop-cloth prior to drilling.**

4. Connect new #10 AWG black wire harness to load side of circuit breaker:

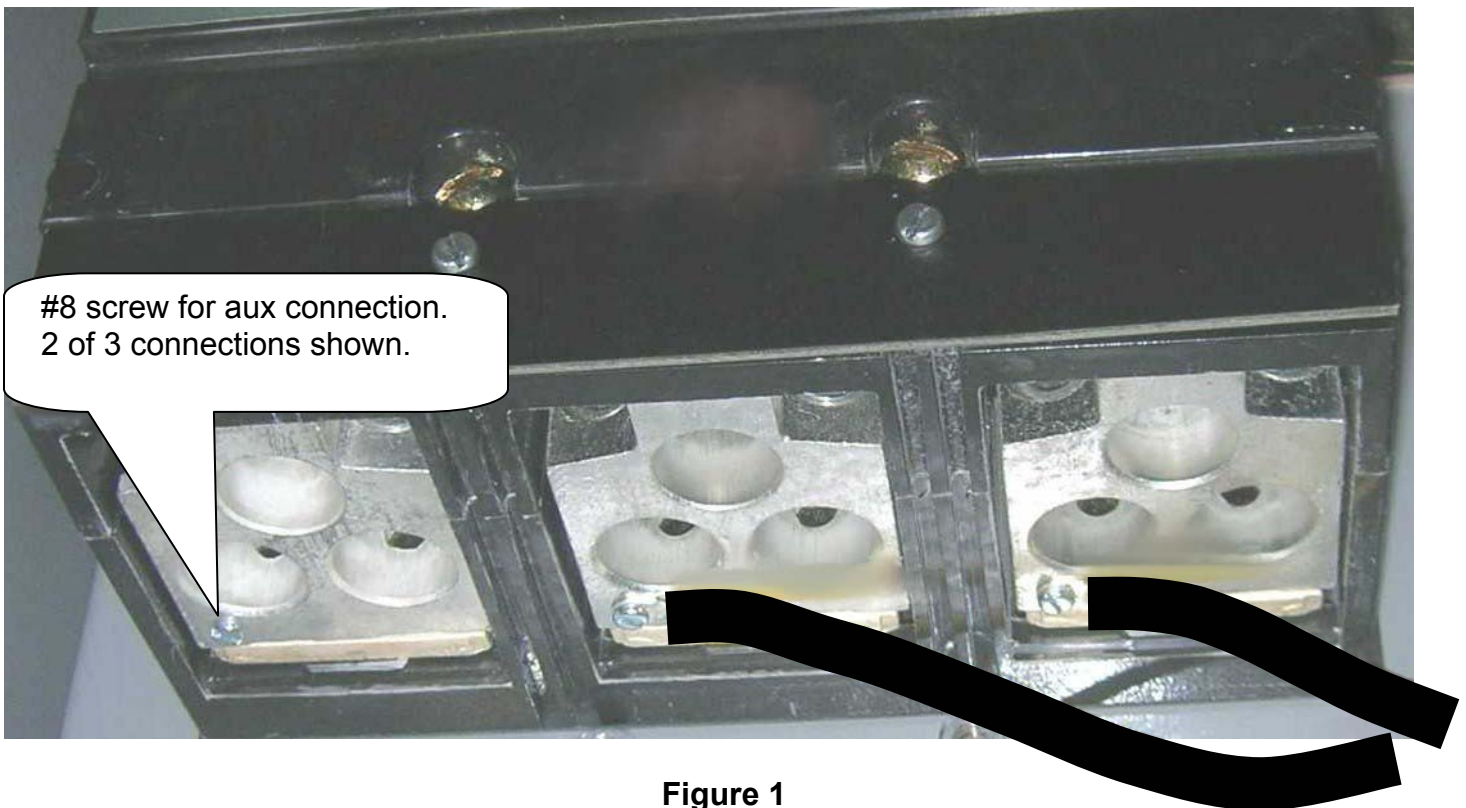
- There are several options for circuit breakers in the product. The #10 AWG black harness comes standard with a #8 ring lug for the Square D circuit breakers. The upgrade kit also contains a selection of ring lugs for different size stud connections: #6, 3/8 in and 1/2 in.

The kit also contains non-insulated ferrules to crimp on the stripped end of the #10 wire, if a parallel connection in with a power cable is per local codes and deemed necessary.

- Figure 1 is representative of the **recommended** connection method of the new #10 AWG black wire harness to the load side of the Square D circuit breakers using the #8 auxiliary screw connection points on the lugs.

This may require disconnection of power cables from the circuit breaker for hand and tool access to that area of the cabinet.

- Connect one wire to each phase on the load side of the circuit breaker. L1, L2, L3 phasing is not a concern with the Surge Trap device, lead length is.
- Reconnect and tighten any power cables removed from the load side of the circuit breaker during this wiring step. Pull-test power cables to insure tightness.
- Move harness ends out of the way for the next step, DIN rail mounting.



5. DIN rail mounting:

- Strike a line on the right side wall of the circuit breaker bay **16 inches** up from the cabinet floor. Mark a point on the line **7 inches** back from the edge of the mullion, and mark a second point **9 inches** back from the edge of the mullion. **See figure 2** and verify the 2 inch mounting centers on the DIN rail.
- Use the center punch on both marks to keep the drill bit from walking.
- Check that the # 17 (11/64 in) drill bit will not puncture components on the opposite side of the circuit breaker bay wall when it breaks through.
- Drill the two mounting holes with the #17 (11/64 in) drill bit. Avoid pushing drill bit too far into the next bay.
- Carefully remove drop cloth. Do not drop metal shavings or filings on electrical devices.
- Mount the DIN rail using the #10/32 self threading bolts, which are provided in the kit.

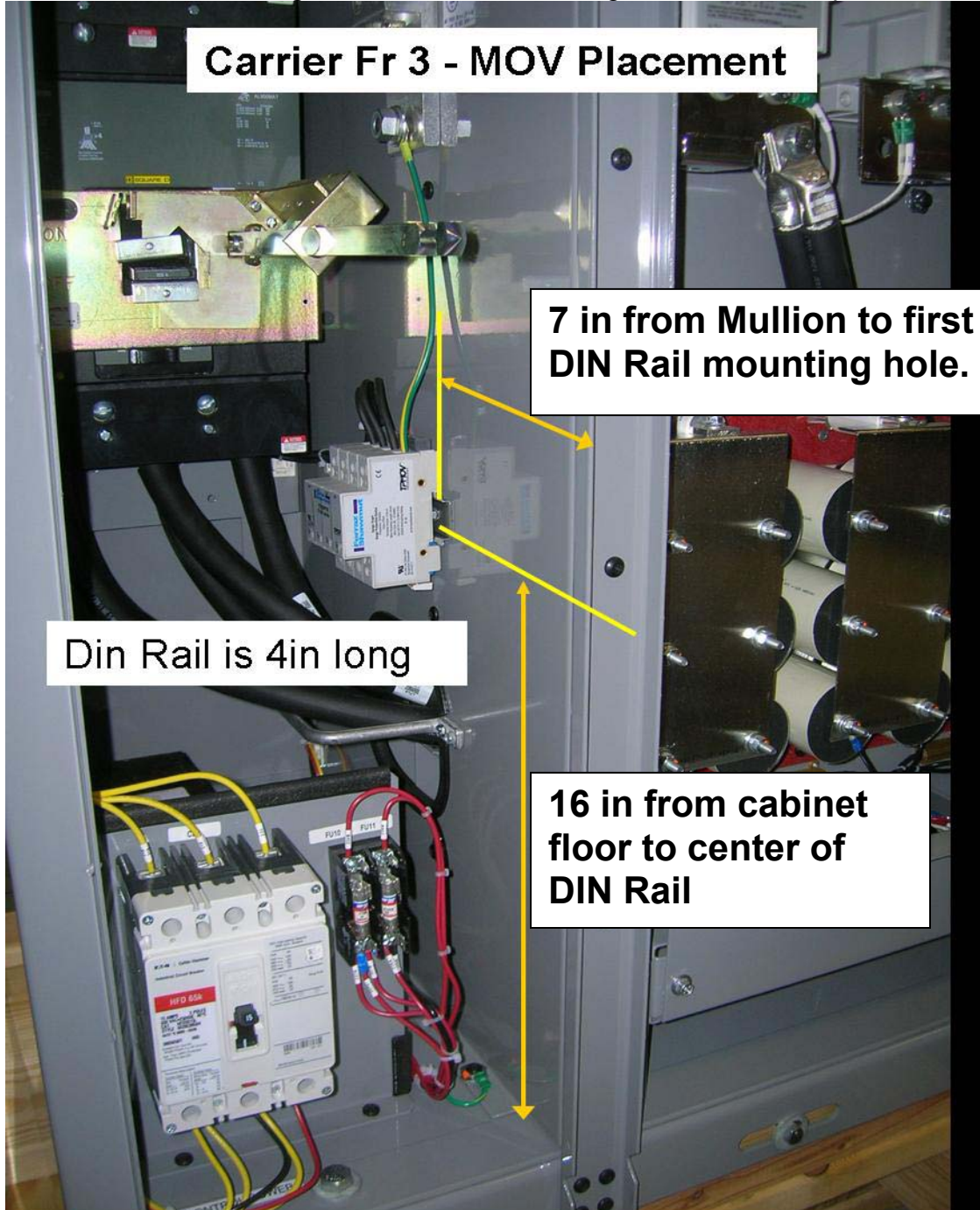


Figure 2

6. Attach DIN rail end stop to back end of DIN rail, tighten with small blade screwdriver.

7. Attach the Surge Trap to the DIN rail.

Note the position of the **G (ground)** terminal. L1, L2, and L3 are phase insensitive, but the green wire goes to **G**. The Surge Trap can mount in either orientation on the DIN rail.

Short lead lengths are desirable: 20 inch maximum with minimum 4 inch bend radius.

You may find it easier to put the blue spring loaded mounting clips on the DIN rail first, then push until assembly clears the other lip.

In either case, it is always easiest to remove by sliding it laterally off the DIN rail.

8. Attach DIN rail end stop to front of DIN rail.



DIN Rail End Stop

Figure 3

9. Connect the wires of the new 10 AWG black wire harness to the L1, L2 and L3 terminals of the Surge Trap. The harness was added to the load side of the circuit breaker in step 4. Phasing does not matter, lead length does. The wires should be routed and trimmed to meet the 20 inch max wire length and 4 inch minimum bend radius. Shorter lead lengths are desirable. Maximum torque applied to the Surge Trap screw terminals is **14.75 in-lbs**.

10. Connect the green wire assembly between the **G** terminal of the Surge Trap and the drive cabinet ground lug's mounting stud (M12). Place an M12 flat washer over the ring lug. Maximum torque applied to the Surge Trap screw terminals is **14.75 in-lbs**. Maximum torque applied to the M12 grounding hardware is **26 - 32 ft-lbs**. Paint cutting washers are included if a different grounding location has to be identified, see figure 4. Grounding to the ground lug is preferred.

11. Final checks:

- **Verify that metal shavings have been cleaned out of the drive cabinet.**
- **Verify that all tools and hardware have been removed from the drive cabinet.**
- **Pull-test power cables on load side of circuit breaker to insure tightness.**
- Close the cabinet doors and follow appropriate power up procedures.

This completes the MOV installation procedure.

Figure 4

If DIN rail mounting on the outside wall is necessary, a different grounding method may have to be used to meet 20 inch wire length specification.

This shows the hardware line-up for grounding through the cabinet wall using paint cutting washers. A 3/8 in hole has to be drilled for the M8 screw.:

1. M8 bolt
2. Paint cutting washer
- 3. Cabinet wall**
4. Paint cutting washer
5. M8 flat washer
6. Ring lug / ground wire
7. M8 flat washer
8. M8 nut with captive conical spring washer

Tighten to 10 -12 ft-lbs .

