

## **Appleton™ PlexPower™ Factory-Sealed Contactor and Motor Starter Installation and Operation Instructions**

FOR PROPER AND SAFE INSTALLATION OF THIS PRODUCT, PLEASE READ THE FOLLOWING INSTRUCTIONS

### **Signal Words Defined**

**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury. **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury. **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. **NOTICE** is used to address practices not related to physical injury.

### **Product Safety**

The PlexPower™ Contactor and Motor Starter with or without a main breaker is rated 125 amps maximum. For individual breaker disconnect, maximum rating applies at 30 amps. Contactor and overload relay are rated up to 27 amps, 600 volts AC maximum.

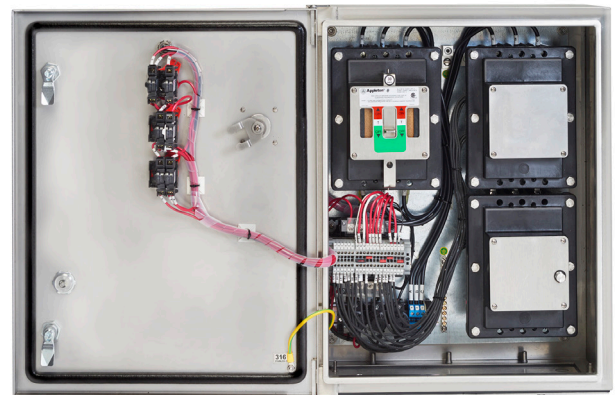
### **Safety Instructions**

- ⚠ WARNING:** Ensure that the power to the panel mains is switched off before replacing any parts or accessories in the contactor and motor starter.
- ⚠ CAUTION:** Only authorized personnel may open the unit because live components are installed behind the cover.
- ⚠ NOTICE:** To ensure finger-safe operation, a dead pan is supplied inside the unit.

### **Applications**

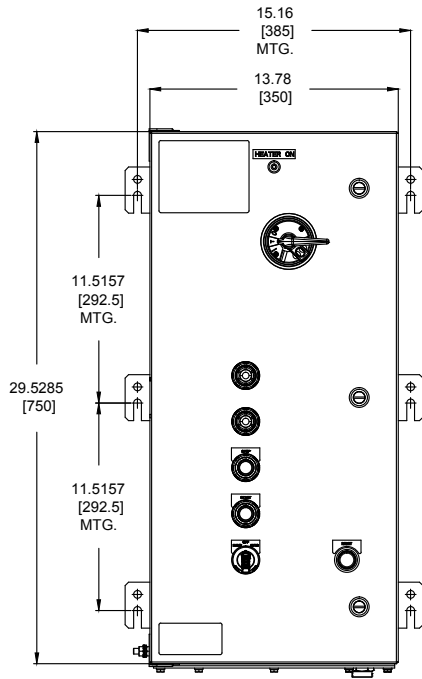
The Appleton™ PlexPower™ Contactor and Motor Starter provides electrical protection and control of electrical circuits in hazardous environments such as:

- Petroleum plants
- Chemical plants
- Refineries
- Wastewater treatment plants
- Paper and pulp industry facilities
- Other process facilities

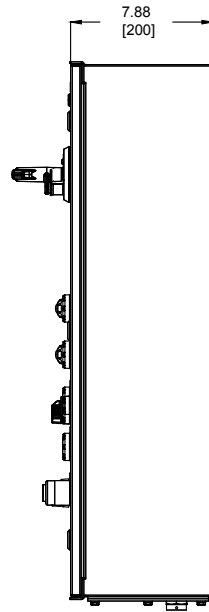


# Installation

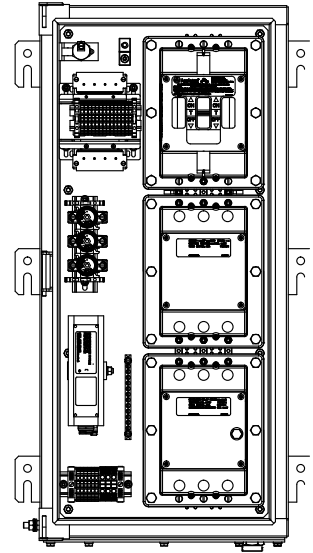
## Single Contactor and Motor Starter - Approximate Weight: 70 kg



**FRONT VIEW**

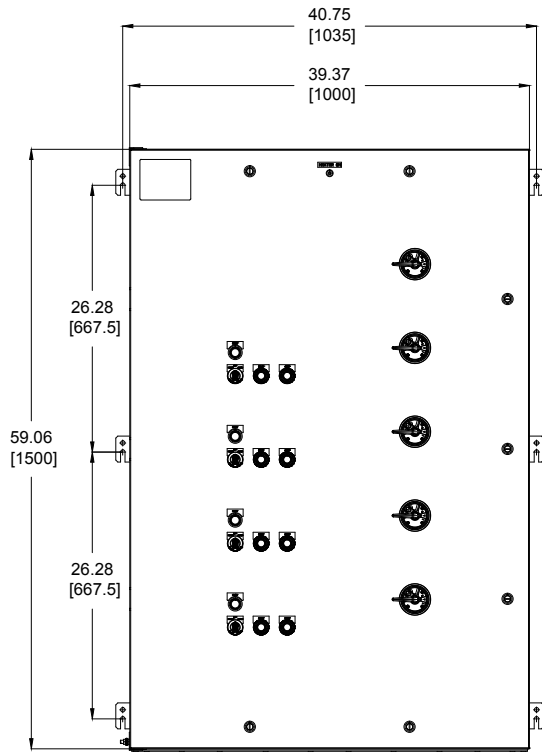


**SIDE VIEW**

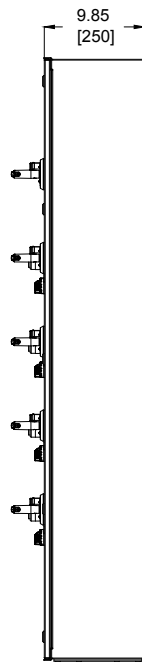


**INTERNAL VIEW**

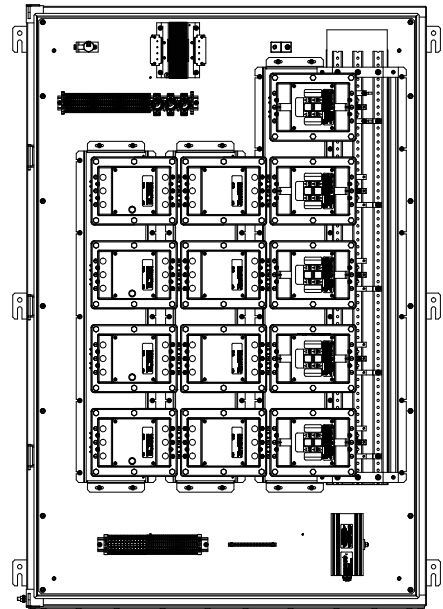
## Multiple Contactor and Motor Starter - Approximate Weight: 225 kg



**FRONT VIEW**



**SIDE VIEW**



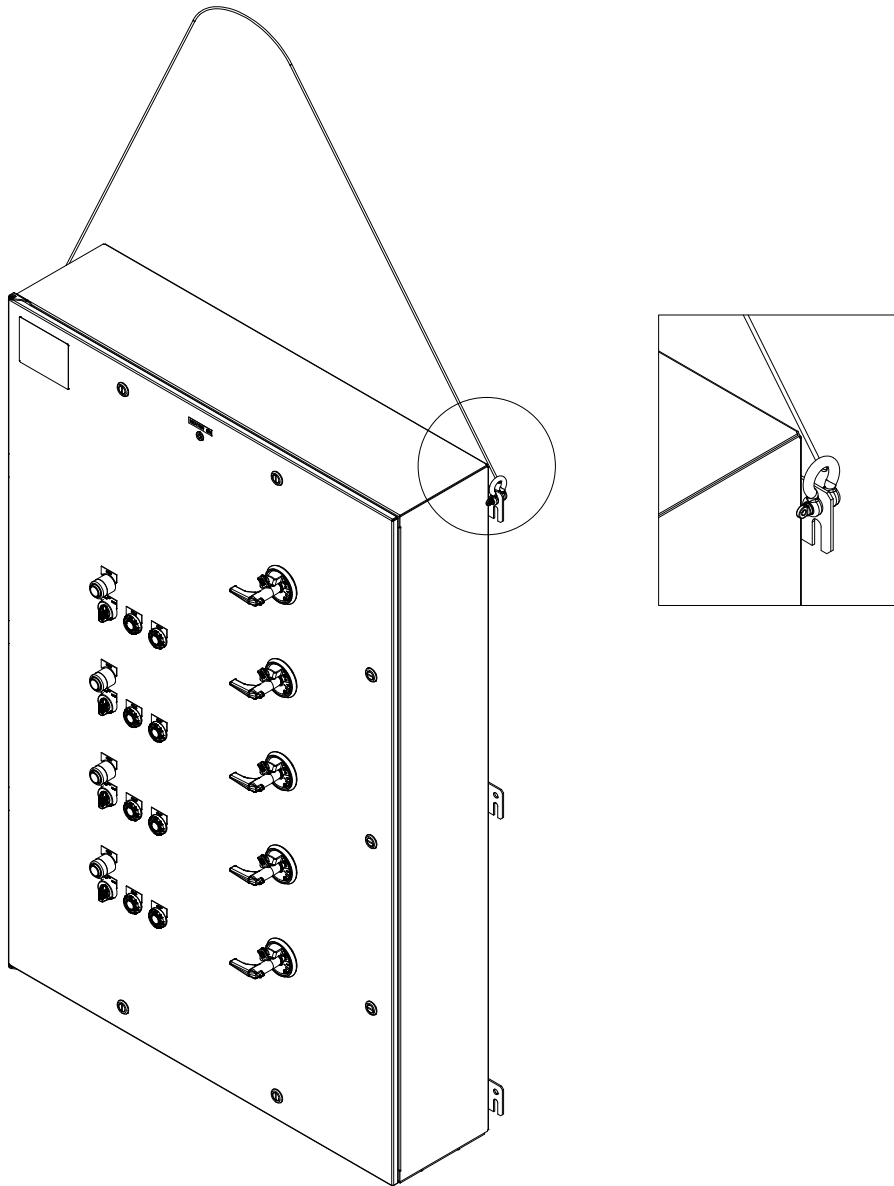
**INTERNAL VIEW**

## Owner's Responsibilities

- Ensuring that all installation instructions are followed.
- Carefully reading, understanding and following the current edition of the National Electrical Code® (NEC®) or the Canadian Electrical Code.
- Inspecting the contactor and motor starter thoroughly before operating.
- Understanding how to operate all standard and accessory equipment.
- Ensuring that anyone operating or maintaining the contactor and motor starter is qualified and has been fully instructed on how to perform those tasks.
- Retaining and storing these instructions for reference during future inspections and maintenance.

## Lifting and Transfer

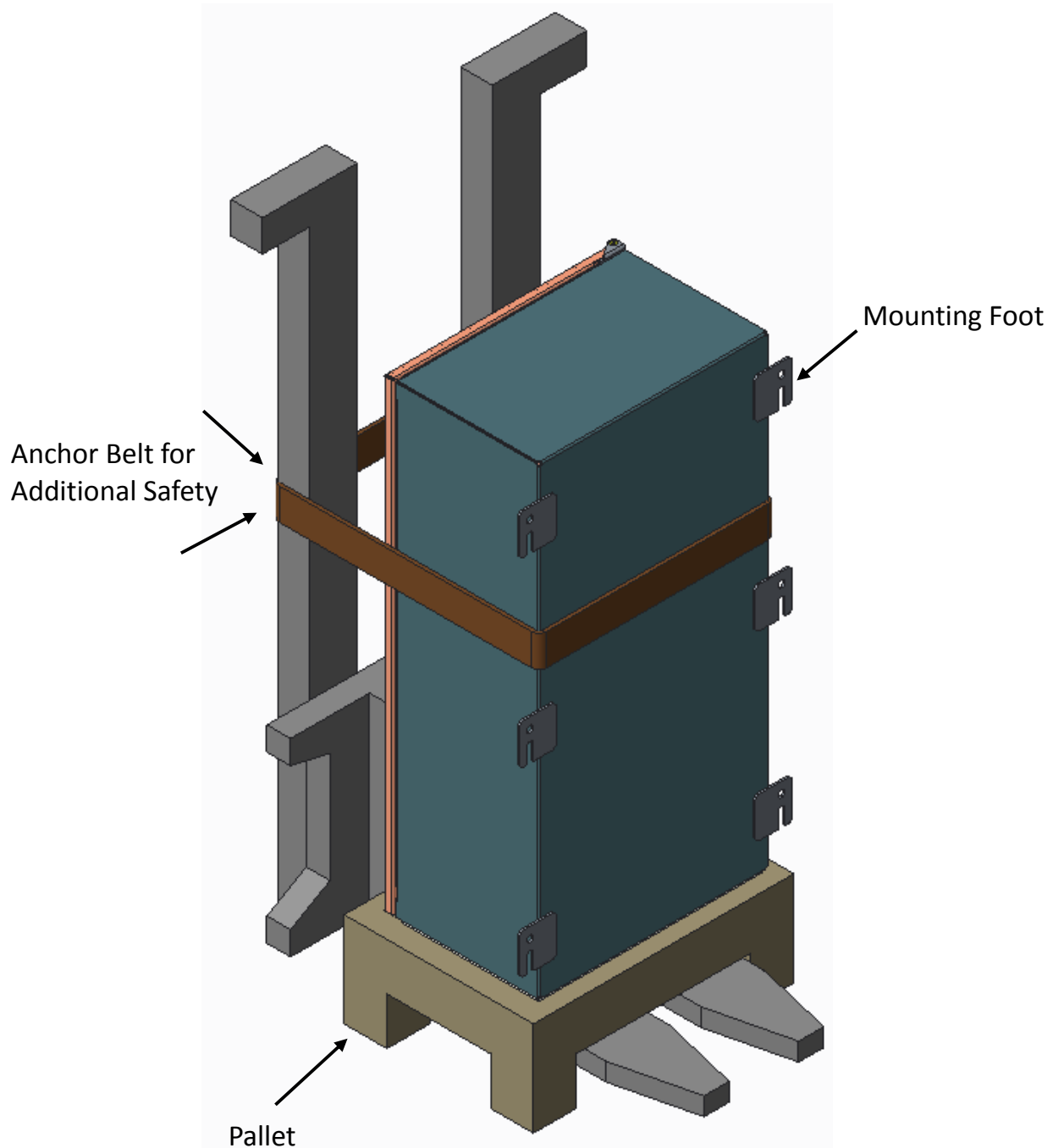
To lift the contactor and motor starter, insert the supplied shackle into the top mounting foot of the enclosure. Lift the unit vertically with the help of a crane, wire rope, chain, or flat lifting belt to enable the movement/transfer to the mounting location.



## Lifting and Transfer by Forklift Truck:

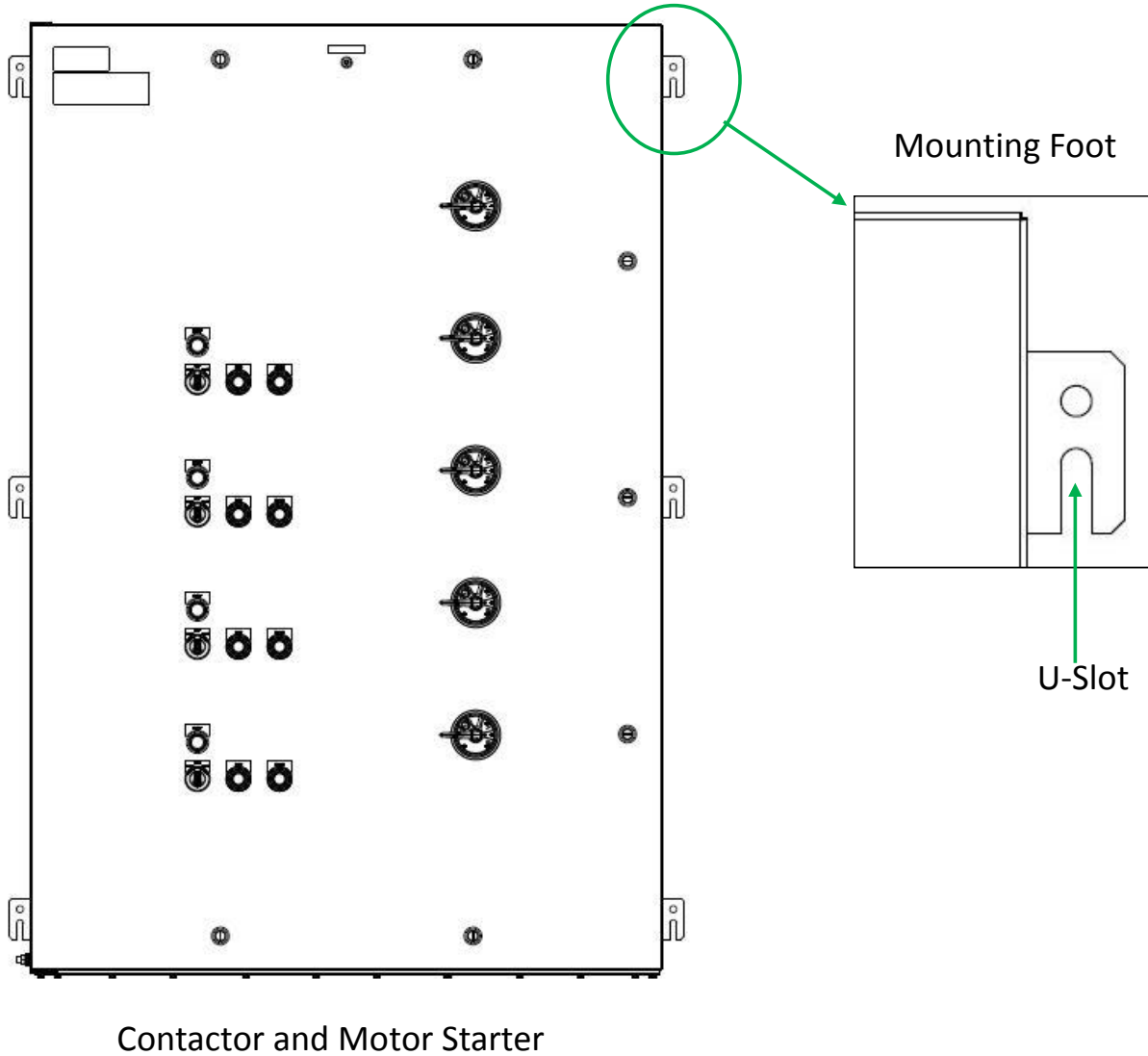
Additional steps need to be taken when transferring the contactor and motor starter from one location to another using a forklift.

1. First, install a pallet or stand onto the forks of the forklift.
2. Then, set the contactor and motor starter vertically onto the pallet or stand.
3. The unit can then be lifted and transferred to the desired location. Moving the unit with a forklift without using a pallet or stand could damage the gland plate on the bottom of the contactor and motor starter.
4. Ensure that contactor and motor starter's mounting side is facing forward as the unit is set onto the pallet or stand.
5. For additional safety during the transfer using a forklift, it is necessary to secure the unit to the forklift with a belt, wire rope, or chain.
6. To prevent injuries, ensure that the forklift operator understands all the steps for the transfer before beginning the process.



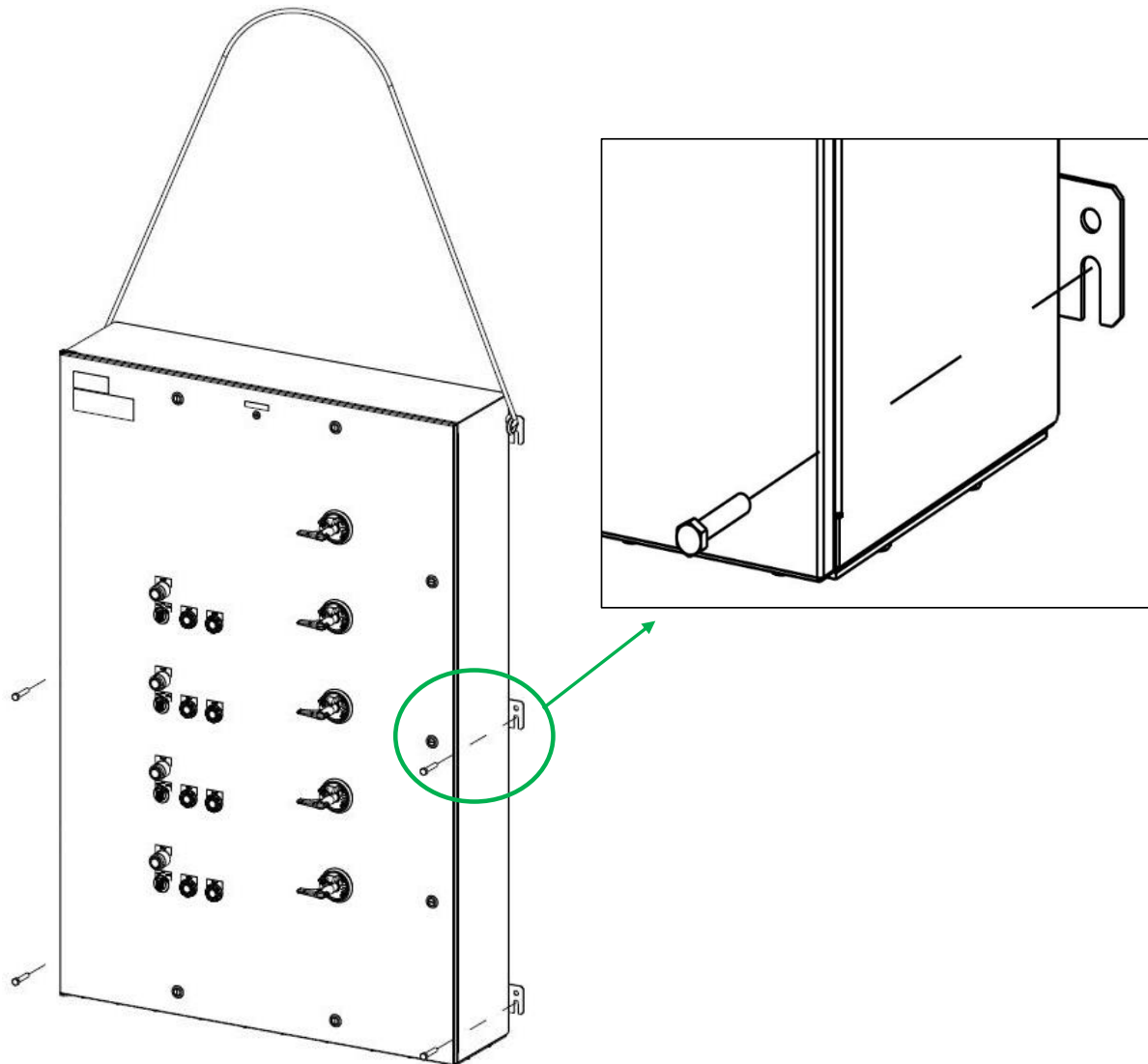
## Before Mounting the Contactor and Motor Starter

- Inspect the mounting feet on unit before beginning the installation. Consult the factory immediately if you find a mounting foot damaged or missing. All mounting feet must be in perfect condition to install the unit safely and correctly.
- Make sure that the mounting studs/bolts are in place on the mounting frame, mounting strut, or wall according to the dimensions specified on the drawings in the “Installation” section of this document.
- The contactor and motor starter is intended to be mounted vertically. Use the “U-Slot” on each mounting foot for positioning and fastening the unit to the mounting frame, mounting strut, or wall.
- All mounting locations must be secured properly to avoid any damage to the unit or injuries to personnel.



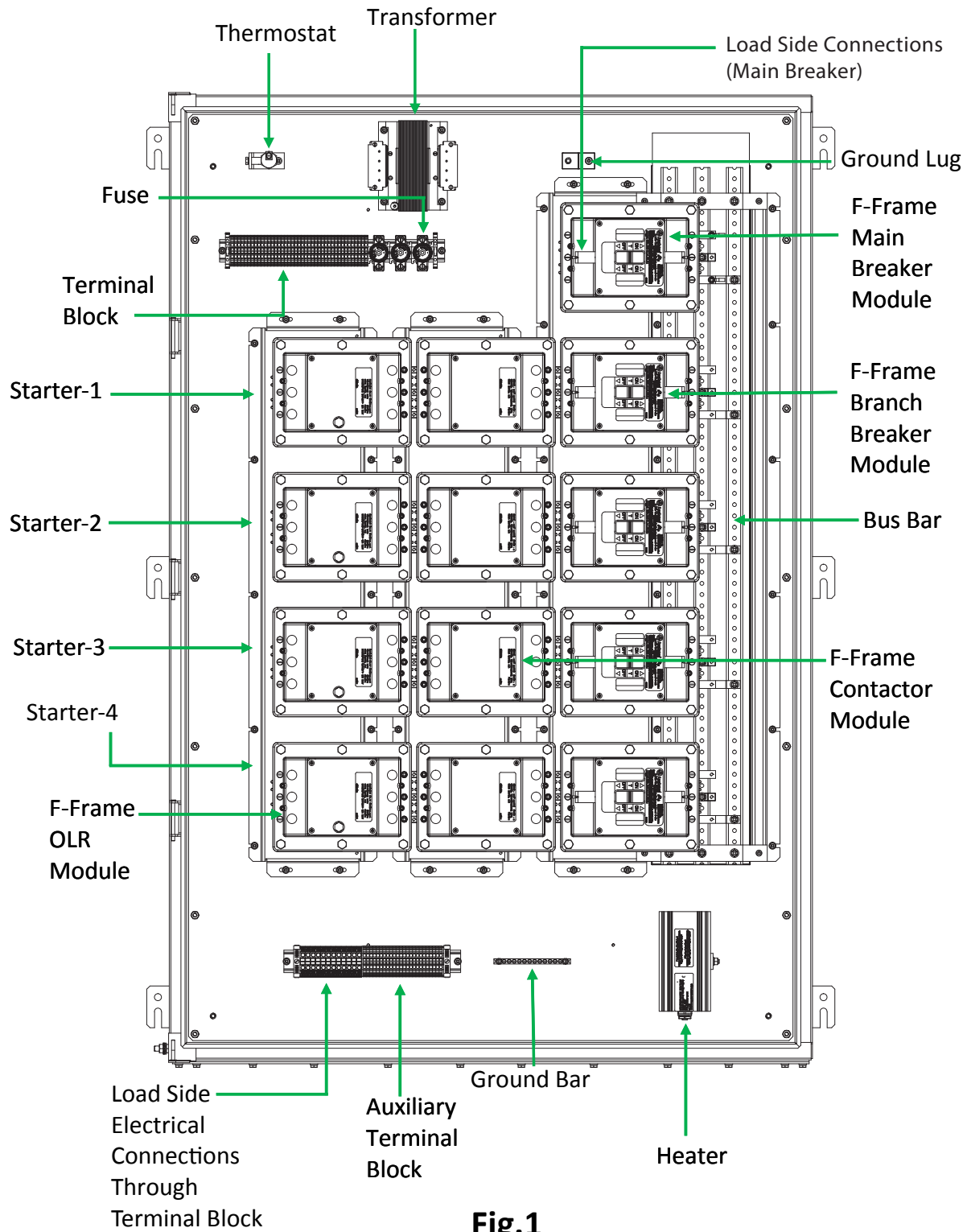
## Mounting Procedures

- If the unit was moved by using the eye bolt, secure the bottom mounting locations first.
- Once the bottom mounting locations are securely fastened, release the lifting accessories and fasten the upper mounting locations to the mounting frame, mounting strut, or wall.
- After the bottom middle mounting feet are fastened to the mounting frame, mounting strut or wall, remove the eye bolt from top mounting foot and secure it to the mounting frame, mounting strut or wall with an M10 bolt.
- Make sure that all bolts are fully tightened.
- The number of bolts required to mount the panel should be equal to the number of mounting feet on the panel.
- For the Multiple Contactor and Motor Starter:
  - Allow 20 inches of clearance to the left of the panel to facilitate the 120° swing of the door.
  - The maximum clearance between the floor and bottom side of the panel should be one foot to facilitate the easy operation of switches and handles.
- For the Single Contactor and Motor Starter:
  - Allow 8 inches of clearance to the left of panel to the facilitate the 120° swing of the door.
  - The maximum clearance between the floor and the bottom side of the panel should be 2'3" to facilitate the easy operation of switches and handles.



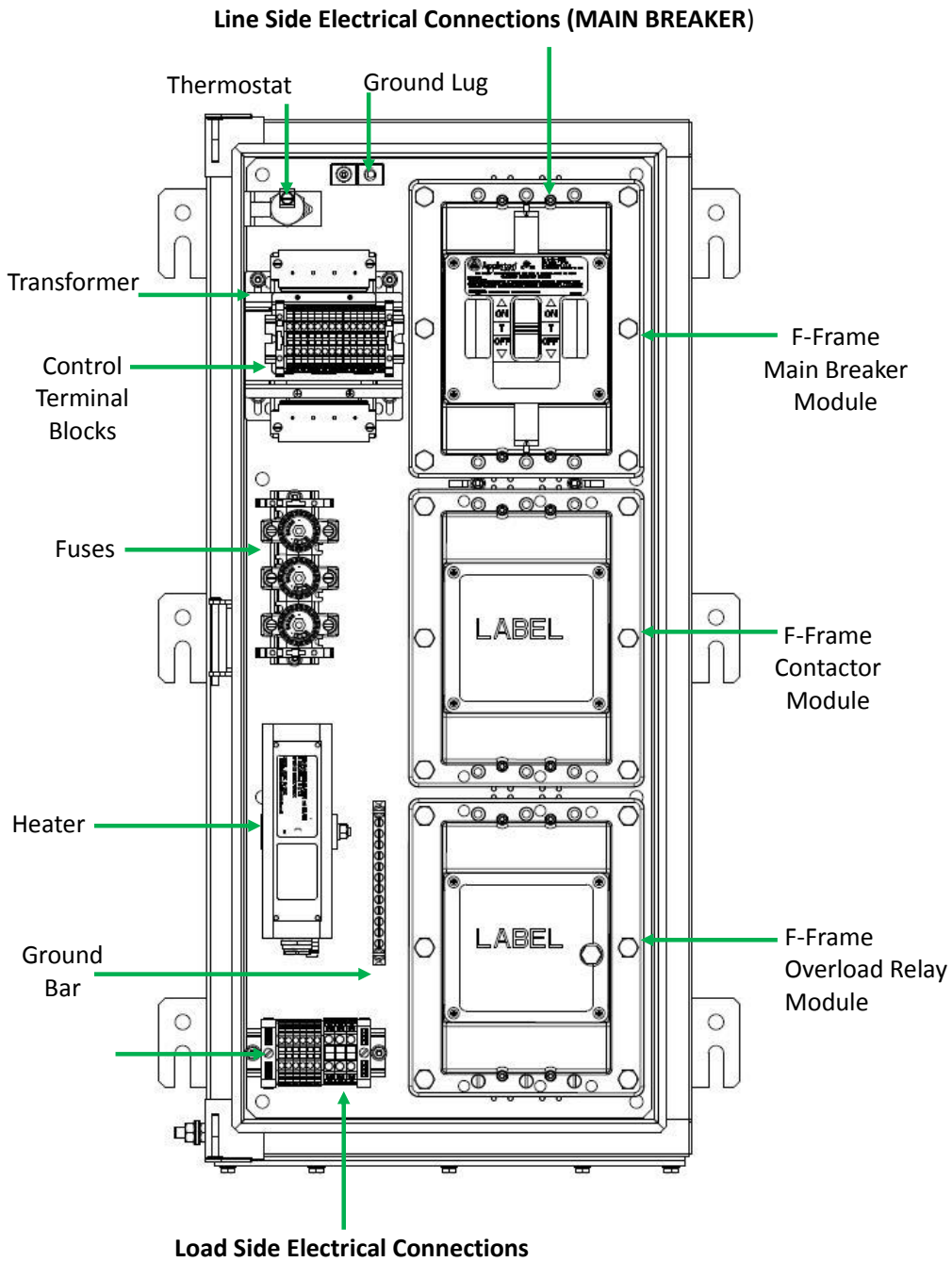
# Electrical Connections

1. To open the cover for access to wiring, unlock the latch using a screwdriver.
2. Incoming supply can be wired to the line side main of the main breaker. Figures 1 and 2 represent main connection through the main breaker. Load side connections are hard-wired (customer wiring). A main ground lug is provided for system ground.



**Fig.1**

# Electrical Connections (Continued)



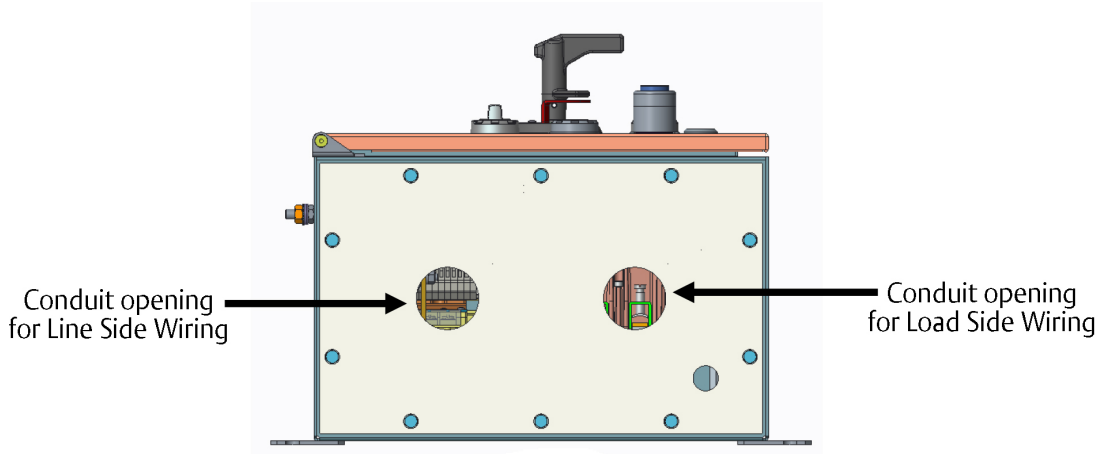
**Fig.2**



# Wiring Connections for Customer Input and Output

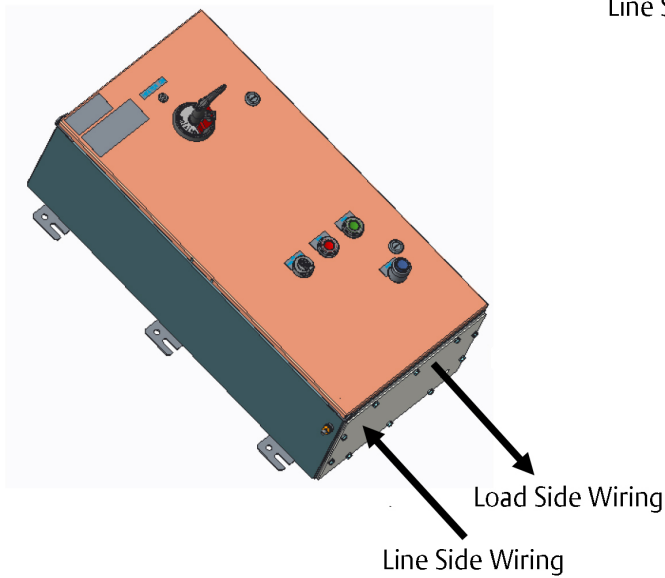
## Incoming and outgoing connection to panel:

- To facilitate wiring connection to both the line side and load side of the panel, two holes need to be drilled on the gland plate provided on the bottom side of enclosure.
  - Make sure to utilize the correct and required wire size according to the panel specifications.

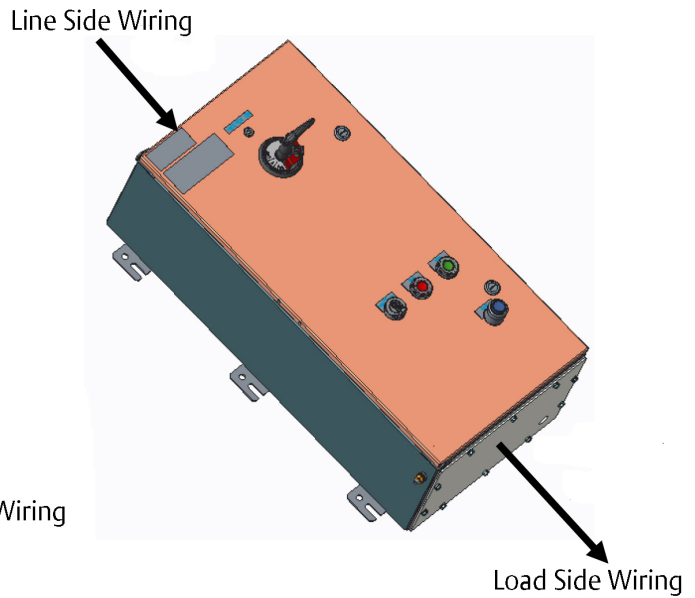


**Diagram refers to Bottom In-Bottom Out connection**

### Bottom In-Bottom Out connection

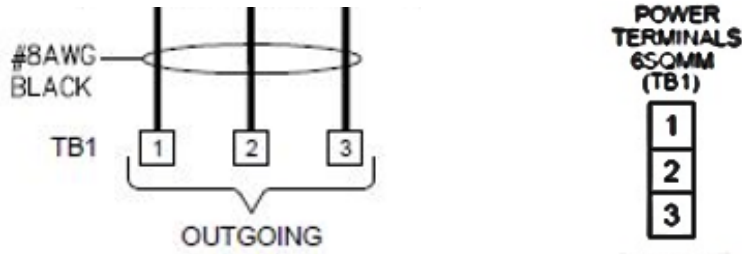


### Top In-Bottom Out connection

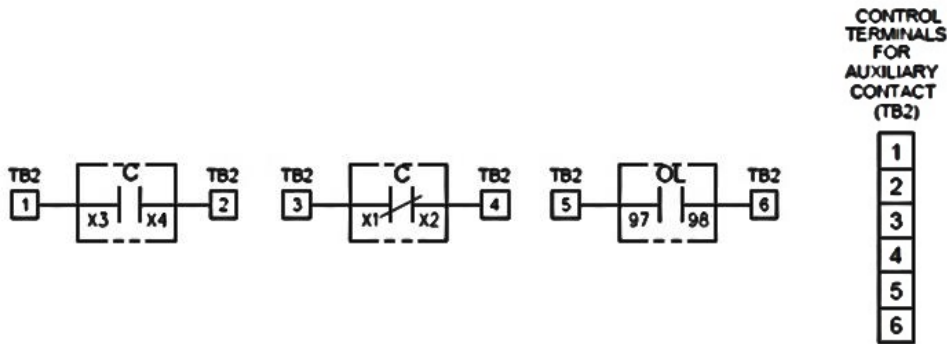


# Wiring Diagram

To connect wires from load side to the terminal blocks, refer to the wiring diagram below. Also note the terminal block markings.



To connect wires to control terminals for the auxiliary block, refer to the wiring diagram below and to the terminal block markings.



Note: The following directions must be followed for wiring routing through the contactor and motor starter enclosure.

- All wires must be routed in such a way that they will not interfere with each other.
- All wires should be tied with cable ties.
- All wires must be appropriately tagged for easy identification.
- Secure wires firmly by applying the required torque on the pressure screw.
- Special care needs to be taken while connecting wires to line side and load side. Wires routed close to the heater must be examined carefully as well.

## Wire Information as per Ampacity

Current (amps)	Required Wire Size
15 or less	10 AWG minimum
20-25	8 AWG minimum
30	6 AWG minimum
40-50	4 AWG minimum
60-70	3 AWG minimum
80	2 AWG minimum
90	1 AWG minimum
100	1/0 AWG minimum
110	2/0 AWG minimum
125	3/0 AWG minimum

## Terminals - Connection Devices

Purpose	Conductor Size (UL/CSA)	Conductor Strip Length	Maximum Amps	Pressure Screw Torque
Line Phase 1, 2, 3	6 AWG	1/2"	30	35 in-lbs.
Auxiliary Terminal Blocks	14 AWG	3/8"	10	10 in-lbs.
Control Terminal Blocks	14 AWG	3/8"	10	10 in-lbs.
Power Terminal Blocks	6 AWG	1/2"	30	10 in-lbs.
Ground Lug	4/0 AWG	7/8"	150	150 in-lbs.
Ground Lug	2/0 AWG	7/8"	110	150 in-lbs.

## Electrical Testing

**⚠ WARNING:** All wiring must be checked and tested to ensure all circuits are wired correctly and there are no unwanted opens, shorts or grounds. **Do not** apply power until the following steps are completed:

- Test each circuit to verify correct phasing and ground connections.
- Test each circuit for insulation resistance by hi-pot test; to be sure the system does not have any short circuits or unwanted grounds.
- All wiring completed at the factory will have passed a hi-pot test.
- If any circuit displays a resistance to another circuit or to ground of 1 megaohm or less, that circuit must be analyzed, corrected and tested to be good to more than 1 megaohm before applying power.
- Perform these tests with the circuit breakers in both the "ON" and "OFF" positions.
- Check the terminals and connectors for looseness or signs of overheating.
- Overheating will show as discoloration, melting, or blistering of conductor/connector insulation, or as pitting or melting of conductor surfaces due to arcing.
- If there is evidence of overheating, terminations should be cleaned or replaced.
- Before re-energizing the contactor and motor starter, all terminations and cable should be refurbished to the condition of the original install.

## Operation

### Main Breaker

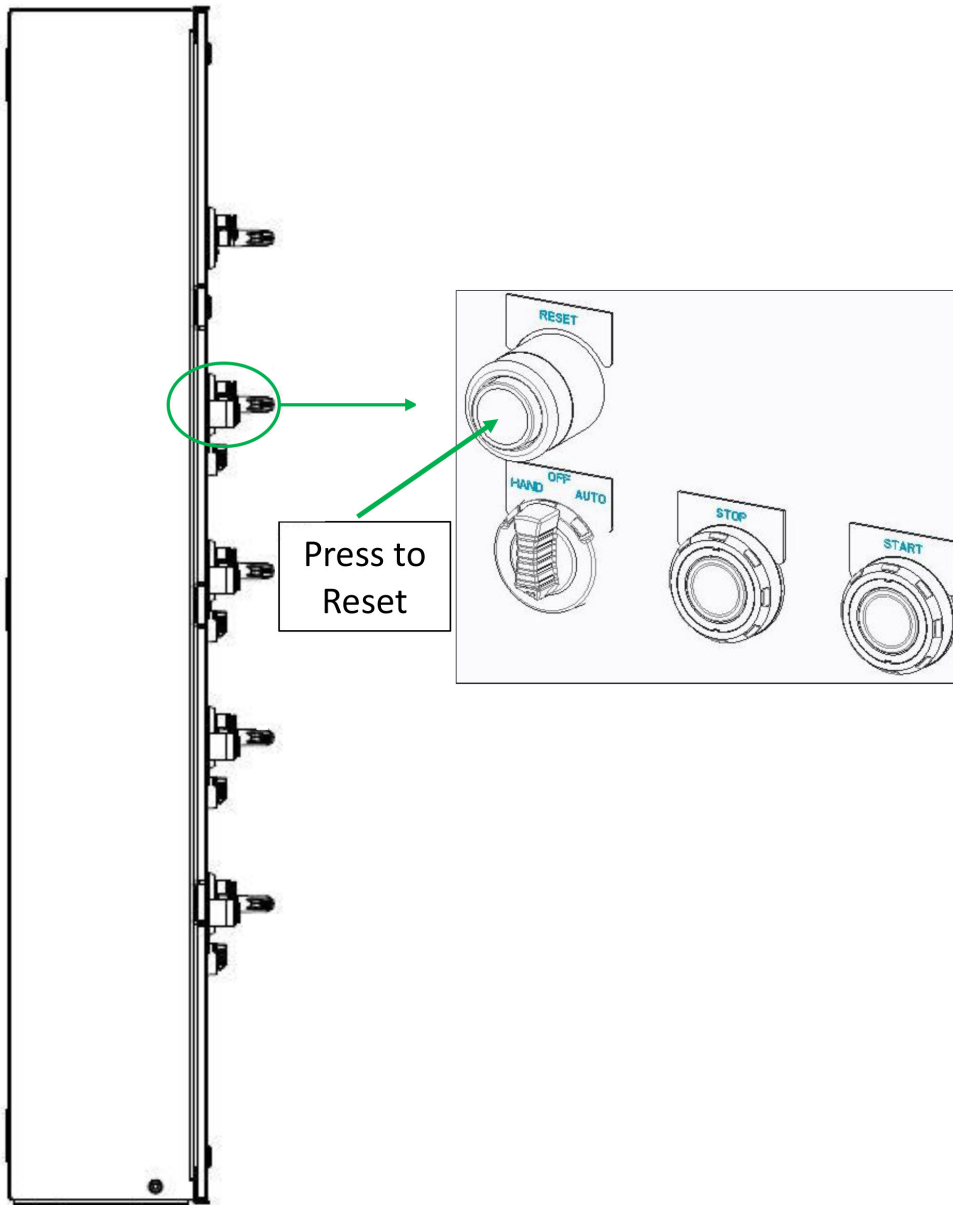
The status of the breaker is determined by the position of the knob indicated on the label. Operation simply consists of twisting the handle to the desired position.

### Contactor

The status of the contactor is determined by illuminated lights as indicated by the label.

## Resetting Tripped Overload Relay

- Simply push the reset button on the panel.
- If it the unit cannot be turned on, it is either not reset, or it is being subjected to conditions which are causing an immediate trip. Investigate the circuit immediately.



# Position Selector Switch Operation

## Auto Mode

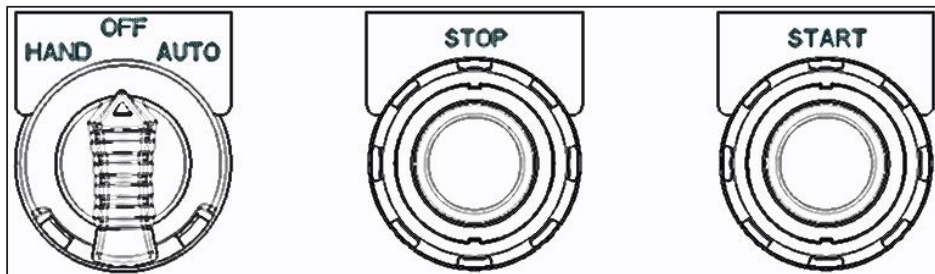
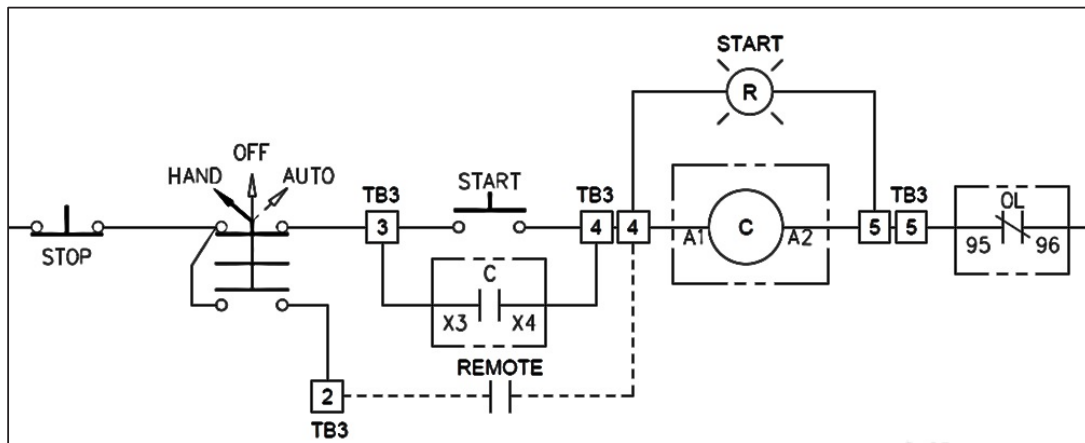
- “Auto” mode allows the user to operate the motor from a remote location. By selecting the “auto” mode, the user does not need to start and stop the motor locally provided there is an electrical switch connected from Terminal Block 2 (TB2) to Terminal Block 4 (TB4) as depicted in the diagram below.

## Hand Mode

- “Hand” mode enables the user to start and stop the motor manually.

## Off Mode

- When the “Off” mode is selected, the user cannot start the motor remotely or manually.



## General Maintenance

**⚠ WARNING:** Electrical power must be disconnected before and during maintenance. Modification of this contactor and motor starter or substitution of parts with non-standard parts may result in serious/fatal injury.

### Maintenance

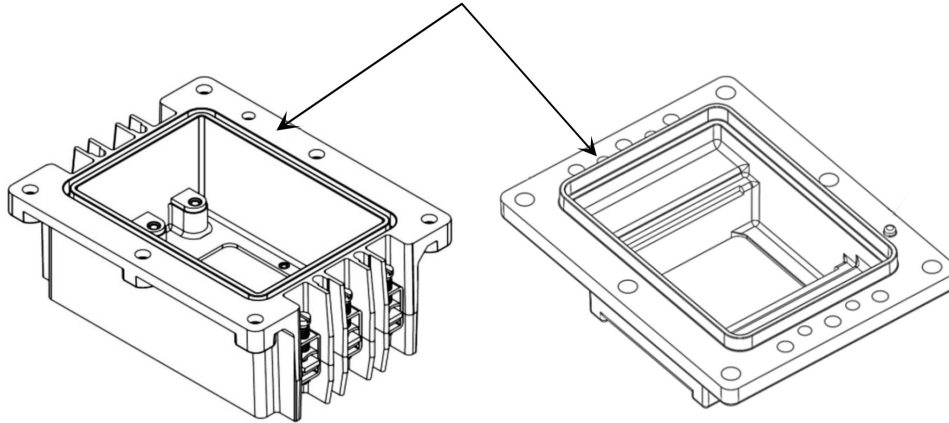
- Before carrying out any work on equipment, cited safety instructions must be very carefully observed.
- 1. Disconnect power to the contactor and motor starter panel before opening the panel.
- 2. The main breaker and branch breaker should be locked and tagged out for safety during maintenance procedures.
- 3. The hardware installed shall be inspected on regular schedule.
- 4. It is the user's responsibility to ensure these inspections are implemented according to the protection modes of the equipment hardware installed.
- 5. Before use of the contactor and motor starter, check that all module cover attaching screws are properly tightened to ensure that the product remains explosion-proof.
- 6. The flameproof function for product must be kept for complete duration of service life therefore joints must be maintained in good condition.
- No scratches, marks or modifications are allowed on parts such as the module body and module cover which are critical for flamepath integrity.
- To ensure the security and electrical safety of the unit, the external lug assembly and connecting wires from other devices should be checked on a regular basis
- Any appliance found to be defective should be replaced as quickly as possible.
- Perform visual, electrical, and mechanical checks on all components on a regular basis.
- Visually check for undue heating as evidenced by discoloration of wires or other components, damaged or worn parts, or leakage as evidenced by water or corrosion of the interior.
- Electrically check to ensure that all connections are clean and tight.
- Mechanically check that all parts are properly assembled, and operating mechanisms move freely.
- Contact Appleton if the contactor and motor starter does not function correctly.
- Maintenance should be done only by skilled and authorized personnel who have complete knowledge and understanding of the product, its applications, and requirements.

## Module Assembly General Maintenance

**⚠ IMPORTANT:** No scratch marks or modifications are allowed on parts or features which are critical for flamepath integrity.

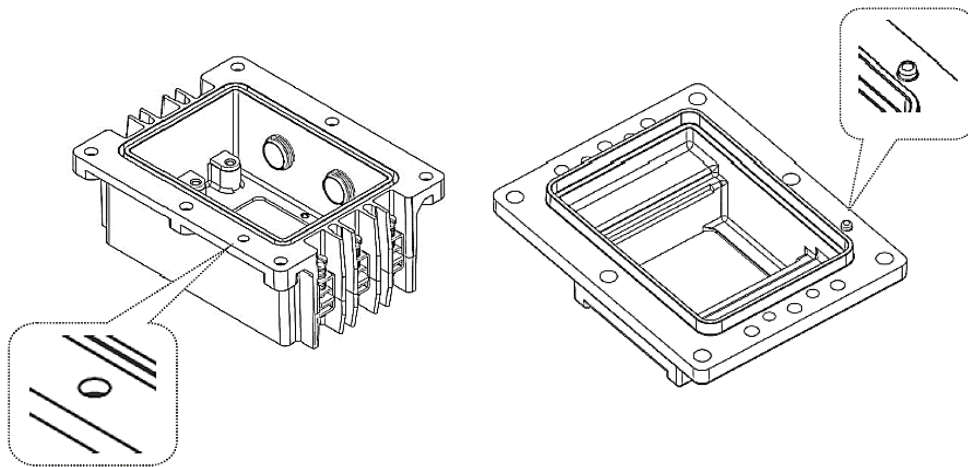
In general, no scratches/marks/modification are allowed on the body flange and cover flange areas. Damage to these parts/features may compromise the flameproof function of entire housing.

\*\*Important: No modification allowed to these areas.



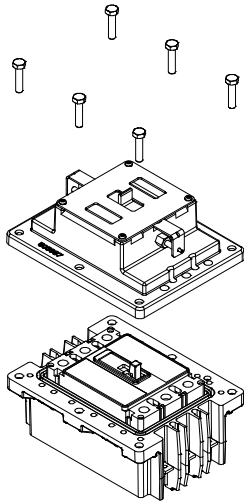
## Alignment of Mistake-proof Feature

While assembling the body and cover, ensure the alignment of the mistake-proof feature orientation on the body and cover. Also check for correct orientation and placement of the cover to avoid any damage.

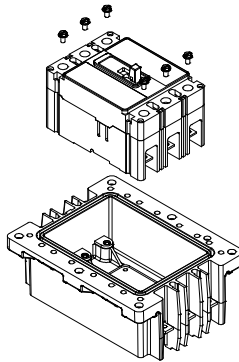


# Replacement Of F-Frame Main/Branch Breaker

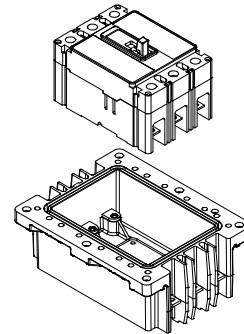
1. Remove F-Frame cover from body by unscrewing M8 screws.
2. Once the cover is off, unscrew the #10-32 screws from the body, The main/branch breaker can now be uninstalled from the body.
3. Install new breaker into the body. While installing the breaker into the body, make sure that it is installed with the correct orientation (line side/load side).
4. After installing the breaker, secure it with the #10-32 screws to a torque value of 35 in-lbs.
5. After installing the breaker into the body, check the mistake-proof feature orientation, then replace the cover. Fasten the M8 screws to a torque value of 90 in-lbs.



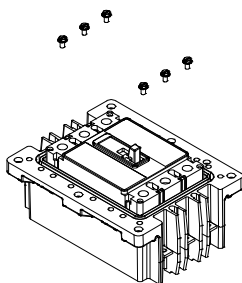
**1. REMOVE COVER.**



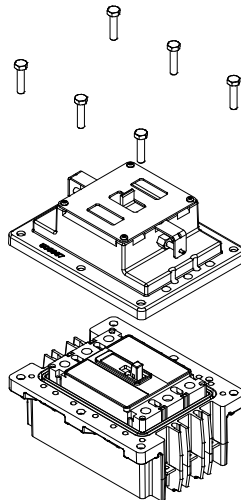
**2. UNINSTALL MAIN/BRANCH BREAKER FROM BODY.**



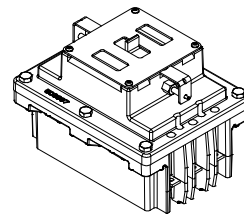
**3. INSTALL NEW MAIN/BRANCH BREAKER INTO BODY.**



**4. SECURE MAIN/BRANCH BREAKER WITH SCREWS.**



**5. REPLACE COVER AND FASTEN WITH M8 SCREWS.**

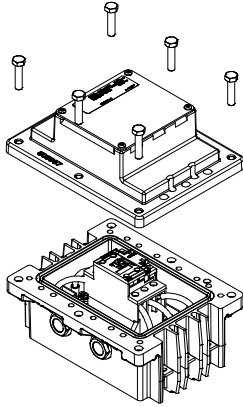


**CLOSE-UP VIEW OF ASSEMBLED F-FRAME MAIN/BRANCH BREAKER.**

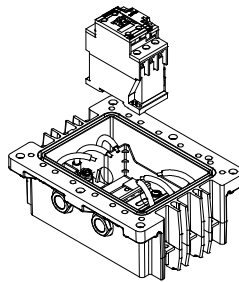


## Replacement of Contactor

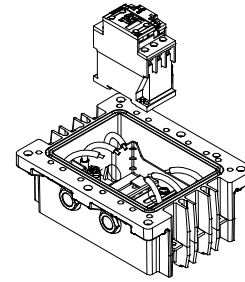
1. Remove the F-Frame cover from the body by unscrewing the M8 screws.
2. Once the cover is removed, unscrew power and control connection from the contactor and auxiliary, respectively. Then, remove contactor from DIN rail.
3. Install the new contactor into the body. While installing the new contactor into the body, make sure that it is installed with the correct orientation (line side/load side).
4. After installing the contactor into its designated place, make all power and control connections.
5. After installing the contactor into the body, check the mistake-proof feature orientation, then replace the cover. Fasten the M8 screws to a torque value of 90 in-lbs.



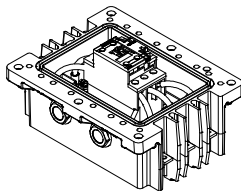
**1. REMOVE COVER.**



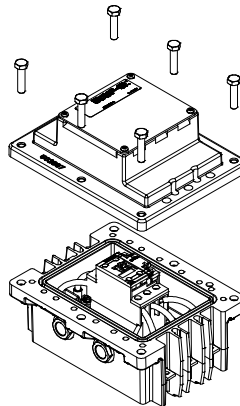
**2. UNINSTALL CONTACTOR FROM DIN RAIL.**



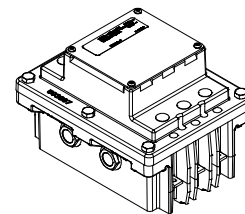
**3. INSTALL NEW CONTACTOR ONTO DIN RAIL.**



**4. MAKE ALL POWER AND CONTROL CONNECTIONS.**



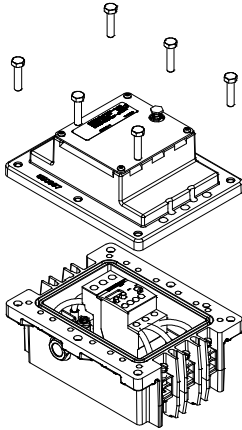
**5. REPLACE COVER AND FASTEN WITH M8 SCREWS.**



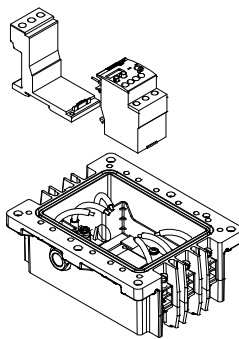
**CLOSE-UP VIEW AFTER CONTACTOR REPLACEMENT.**

## Replacement of Overload Relay

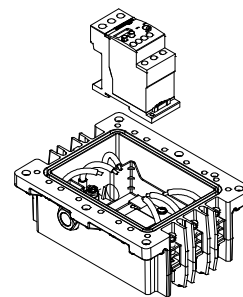
1. Remove the F-Frame cover from the body by unscrewing the M8 screws.
2. Once the cover is removed, unscrew the power and control connection from the overload relay and auxiliary switch. Then, remove the overload relay with its stand from the DIN rail.
3. Push the new overload relay into the stand and install overload relay with stand into the body. While installing the overload relay into the body, make sure that it is installed with the correct orientation (line side/load side).
4. After installing the overload relay into its designated place, make all power and control connections.
5. After installing the overload relay into the body, check the mistake-proof feature orientation, then replace the cover. Fasten the M8 screws to a torque value of 90 in-lbs. **NOTE: If the overload relay is damaged, order a new relay with mounting stand.**



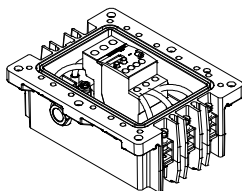
**1. REMOVE COVER.**



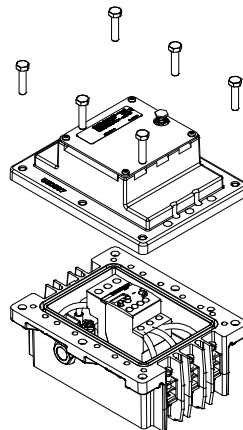
**2. UNINSTALL OVERLOAD RELAY FROM DIN RAIL.**



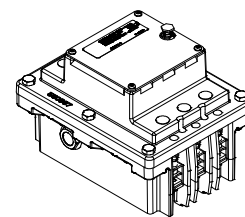
**3. INSTALL NEW OVERLOAD RELAY ONTO DIN RAIL.**



**4. MAKE ALL POWER AND CONTROL CONNECTIONS.**



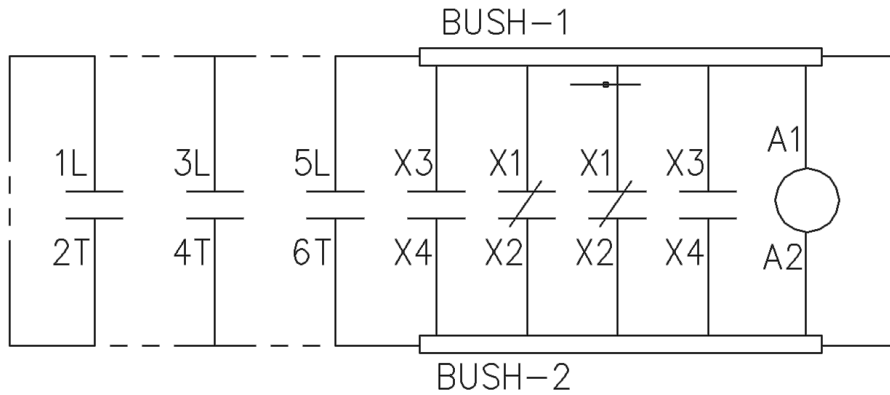
**5. REPLACE COVER AND FASTEN WITH M8 SCREWS.**



**CLOSE-UP VIEW AFTER OVERLOAD RELAY REPLACEMENT.**

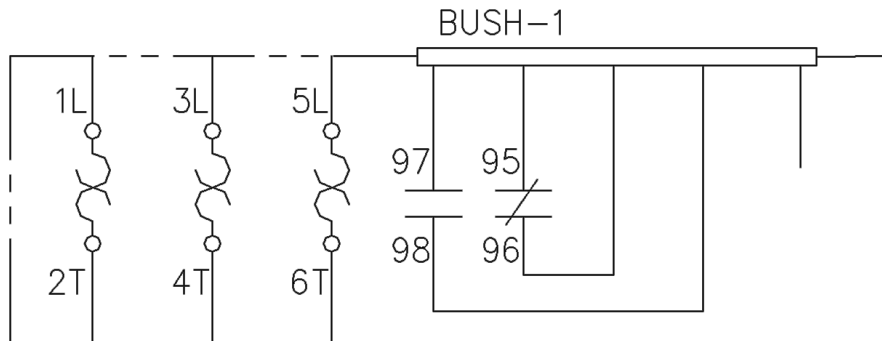
## Wiring Connection for Contactor and Line Bushing Installed in Housing

After installing the new contactor into the housing, make line bushing connections on the contactor as shown in the diagram below. Once the connections are completed, verify that all wires are secured into their correct locations as per the wiring diagram. Pay careful attention to the markings on contactor terminals and on line bushing wires.



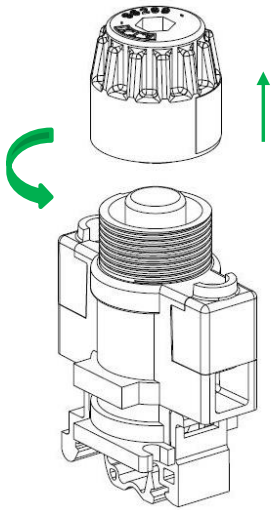
## Wiring Connection for Overload Relay and Line Bushing Installed in Housing

After installing the new overload relay into the housing, make line bushing connections on the overload relay as shown in the diagram below. Once the connections are completed, verify that all wires are secured into their correct locations as per the wiring diagram. Pay careful attention to the markings on overload relay terminals and on line bushing wires.

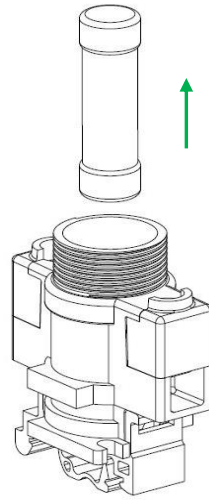


## Replacement of Fuses

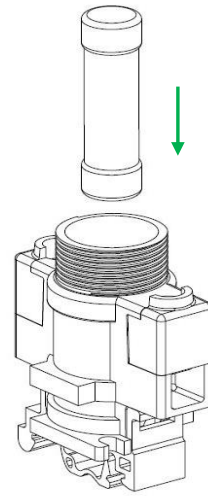
- Check the continuity of the fuse. If it is broken, replace fuse from the fuse holder.
1. Unscrew the FU40 fuse holder cap.
  2. Remove the fuse from the fuse holder body.
  3. Install a new fuse into the fuse holder.
  4. Replace cap by screwing onto the body until it is securely fastened hand-tight.



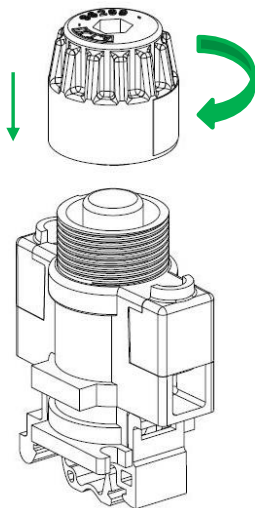
1. Unscrew Cap



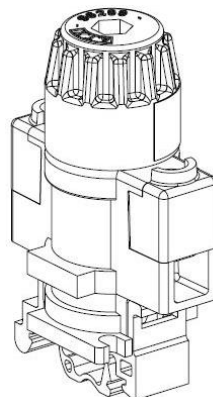
2. Extract Fuse  
from Fuse Holder



3. Install New Fuse  
into Fuse Holder



4. Replace Cap



5. Final Assembly  
After Replacement of Fuse

## Replacement Parts

Description	Quantity	Catalog No.
Illuminated PB - Red	1	59550745000
Illuminated PB - Green	1	59550746000
Push Button - Start	1	UA0GP
Push Button - Stop		UA0RP
Push Button - Reset	1	59550751000
Pilot Light - Red	1	UPR0P
Pilot Light - Green	1	UPG0P
Pilot Light - Yellow	1	UPY0P
Selector Switch - 3 position	1	59550747000
Heater ON LED light	1	59351106000
Push Button Insert - Black	2	UIAN
Illuminated Push Button Insert - Red	1	UILR
Illuminated Push Button Insert - Green	1	UILG
Hand - Off - Auto Legend Plate	1	ULPSJ04
Run Legend Plate	1	ULPSA06
Start Legend Plate	1	ULPSA07
Stop Legend Plate	1	ULPSA08
Reset Legend Plate	1	ULPSA20
Heater Legend Plate	1	ZF8603
Quarter turn latch - Padlockable	1	59303581000
Quarter turn latch - Slotted Head	1	59303512000
<b>Gland Plates</b>		
Gland Plate for enclosure M1 and W1	1	JBESGP3720
Gland Plate Gasket for enclosure M1 and W1	1	JBESGP3720GKT
Gland Plate Hardware for enclosure M1 and W1	1	JBESGP3720HDW
Gland Plate for enclosure N1 and R1	1	JBESGP3520
Gland Plate Gasket for enclosure N1 and R1	1	JBESGP3520GKT
Gland Plate Hardware for enclosure N1 and R1	1	JBESGP3520HDW
Gland Plate for enclosure T1	1	JBESGP4520
Gland Plate Gasket for enclosure T1	1	JBESGP4520GKT
Gland Plate Hardware for enclosure T1	1	JBESGP4520HDW
Gland Plate for enclosure I1, E1, and G1	1	JBESGP7525
Gland Plate Gasket for enclosure I1, E1, and G1	1	JBESGP7525GKT
Gland Plate Hardware for enclosure I1, E1, and G1	1	JBESGP7525HDW
Gland Plate for enclosure Q1 and P1	1	JBESGP1025
Gland Plate Gasket for enclosure Q1 and P1	1	JBESGP1025GKT
Gland Plate Hardware for enclosure Q1 and P1	1	JBESGP1025HDW

Description	Quantity	Catalog No.
Heater - HEF 50W	1	59550866000
Heater - MicroTherm 75W	1	59550838001
Heater - MultiTherm 100W	1	59503930000
Thermostat	1	59503931000
Transformer - 50VA	1	E050JN
Transformer - 100VA	1	E100JN
Transformer - 150VA	1	E150JN
Transformer - 250VA	1	E250JN
Transformer Terminal Cover	1	IP20
<b>Fuses</b>		
Fuse Holder	1	FU40
Fuse - 0.5A	1	59503856003
Fuse - 1A	1	59503856002
Fuse - 2A	1	59503856001
Fuse - 4A	1	59503856000
Hardware kit - contains screws, cover bolts, lugs and ground bar		RMSHDWKIT

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