

# YASKAWA

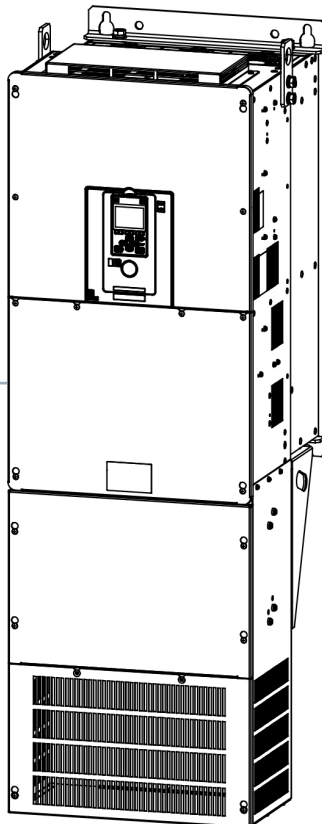
# UL TYPE 1 FUSE-READY KIT

## INSTALLATION MANUAL

YASKAWA AC DRIVE OPTION

### KITS:

UUX001700, UUX001701, UUX002314, UUX002315



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# 1 Receiving

## ◆ Applicable Documentation

| Document                                                        | Description                                                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Yaskawa AC Drive Option<br>UL Type 1 Kit<br>Installation Manual | Read this manual before you install this option to the drive.<br>This manual gives information about how to install the option and change the enclosure type of the drive from IP20/UL Open Type to IP20/UL Type 1.                                                                          |
| Yaskawa AC Drive<br>Manuals                                     | Refer to the manual packaged with the drive for basic information about the drive.<br>Refer to the Technical Manual for more information about programming and parameter settings.<br>You can download the Technical Manual from the Yaskawa website shown on the back cover of this manual. |

## ◆ Glossary

| Terminology Used in this Document | Description                              |
|-----------------------------------|------------------------------------------|
| Drive                             | YASKAWA AC Drive GA800                   |
| Kit<br>Option                     | YASKAWA AC Drive Option<br>UL Type 1 Kit |

# 2 General Safety

## ◆ Supplemental Safety Information

- ⚠ DANGER** This signal word identifies a hazard that will cause serious injury or death if you do not prevent it.
- ⚠ WARNING** This signal word identifies a hazard that can cause death or serious injuries if you do not prevent it.
- ⚠ CAUTION** This signal word identifies a hazard that can cause minor or moderate injuries if you do not prevent it.
- NOTICE** This signal word identifies a property damage message that is not related to personal injury.

## ◆ Section Safety

| General Precautions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Some figures in the instructions include options and drives without covers or safety shields to more clearly show the inside of the drive. Replace covers and shields before operation. Use options and drives only as specified by the instructions.</li> <li>The figures in this manual are examples only. All figures do not apply to all products included in this manual.</li> <li>Yaskawa can change the products, specifications, and content of the instructions without notice to make the product and/or the instructions better.</li> <li>If you damage or lose these instructions, contact a Yaskawa representative or the nearest Yaskawa sales office on the rear cover of the manual, and tell them the document number on the front cover to order new copies.</li> </ul> |

**⚠ DANGER** **Electrical Shock Hazard.** Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, remove the covers before measuring for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock.

**⚠ WARNING** **Electrical Shock Hazard.** Only let approved personnel install, wire, maintain, examine, replace parts, and repair the drive. If personnel are not approved, it can cause serious injury or death.

**⚠ WARNING** **Sudden Movement Hazard.** Tighten the screws to the specified tightening torque. Incorrect tightening torques can cause damage to equipment and cause serious injury or death from falling equipment.

**⚠ CAUTION** **Burn Hazard.** Do not touch a hot drive heatsink. De-energize the drive, wait for a minimum of 15 minutes, then make sure that the heatsink is cool before you replace the cooling fans. If you touch a hot drive heatsink, it can burn you.

**NOTICE** **Damage to Equipment.** When you touch the drive and circuit boards, make sure that you observe correct electrostatic discharge (ESD) procedures. If you do not follow procedures, it can cause ESD damage to the drive circuitry.

## ◆ Main Circuit Wire Gauges and Tightening Torques

Refer to the manual packaged with the drive for the recommended wire gauges and tightening torques of the main circuit terminals.

Comply with local standards for correct wire gauges in the region where the drive is used.

**⚠ WARNING** *Electrical Shock Hazard. Only connect peripheral options, for example a DC link choke or braking resistor, to terminals +1, +2, +3, -, B1, and B2. Incorrect wiring can cause serious injury or death.*

**Note:**

- The recommended wire gauges are based on drive continuous current ratings with 75 °C (167 °F) 600 V class 2 heat-resistant indoor PVC wire. Assume these conditions:
  - Surrounding air temperature 40 °C (104 °F) or lower
  - Wiring distance: 100 m (328 ft) or shorter
  - Normal Duty Rated current value
- Refer to the instruction manual for each device for recommended wire gauges to connect peripheral devices or options to terminals +1, +2, +3, -, B1, and B2. Contact Yaskawa or a Yaskawa representative if the recommended wire gauges for the peripheral devices or options are out of the range of the applicable gauges for the drive.
- Use UL-approved closed-loop crimp terminals on the drive main circuit terminals. Use the tools recommended by the terminal manufacturer and make sure that the terminals are correctly connected.

## ◆ Closed-Loop Crimp Terminals

To comply with UL standards, use UL-approved closed-loop crimp terminals and heat-shrinkable tubing. Use the tools recommended by the terminal manufacturer to crimp the closed-loop crimp terminal. Yaskawa recommends closed-loop crimp terminals and heat-shrinkable tubing from PANDUIT Corp.

Make sure that you comply with local standards for correct wire gauges in the region where you will use the drive.

Refer to [Table 2.1](#), [Table 2.2](#), and [Table 2.3](#) to select crimp terminals as specified by drive model and wire gauge.

**Note:**

To comply with UL standards, use only insulated crimp terminals or crimp terminals with insulation tubing. Use UL-Listed, vinyl-coated insulated copper for operation with a continuous maximum permitted temperature of 75 °C at 600 V.

**Table 2.1 Closed-Loop Crimp Terminals for Three-Phase 200 V Class Drives (Manufacturer: PANDUIT Corp.)**


| Model      | Recommended Gauge (AWG, kcmil) |                      |       |    |    | Crimp Terminal Model<br>*/ |
|------------|--------------------------------|----------------------|-------|----|----|----------------------------|
|            | R/L1<br>S/L2<br>T/L3           | U/T1<br>V/T2<br>W/T3 | -, +1 | +3 | ⊕  |                            |
| 2169       | 4/0                            | -                    | -     | -  | *2 | S4/0-38R                   |
| 2211       | 250                            | -                    | -     | -  | *2 | S250-38R                   |
| 2257       | 2/0 × 2P                       | *2                   | *2    | *2 | *2 | S2/0-38R                   |
| 2313       | 4/0 × 2P                       | *2                   | *2    | *2 | *2 | S4/0-38R                   |
| 2360, 2415 | 250 × 2P                       | *2                   | *2    | *2 | *2 | S250-12R                   |

\*1 For use with PANDUIT Corp. heat-shrinkable tubing HSTT-series or an equivalent UL-recognized heat-shrinkable tubing rated 600 V minimum.

\*2 Refer to the manual packaged with the drive for recommended closed-loop crimp terminals for the drive.

**Table 2.2 Closed-Loop Crimp Terminals for Three-Phase 400 V Class Drives (Manufacturer: PANDUIT Corp.)**


| Model | Recommended Gauge (AWG, kcmil) |                      |       |    |    | Crimp Terminal Model<br>*/ |
|-------|--------------------------------|----------------------|-------|----|----|----------------------------|
|       | R/L1<br>S/L2<br>T/L3           | U/T1<br>V/T2<br>W/T3 | -, +1 | +3 | ⊕  |                            |
| 4140  | 3/0                            | -                    | -     | -  | *2 | S3/0-38R                   |
| 4168  | 4/0                            | -                    | -     | -  | *2 | S4/0-38R                   |
| 4208  | 1/0 × 2P                       | *2                   | *2    | *2 | *2 | S1/0-38R                   |
| 4250  | 2/0 × 2P                       | *2                   | *2    | *2 | *2 | S2/0-38R                   |
| 4302  | 3/0 × 2P                       | *2                   | *2    | *2 | *2 | S3/0-38R                   |

| Model      | Recommended Gauge (AWG, kcmil) |                      |       |    |                                                                                     | Crimp Terminal Model<br>*1 |
|------------|--------------------------------|----------------------|-------|----|-------------------------------------------------------------------------------------|----------------------------|
|            | R/L1<br>S/L2<br>T/L3           | U/T1<br>V/T2<br>W/T3 | -, +1 | +3 |  |                            |
| 4371       | 250 × 2P                       | *2                   | *2    | *2 | *2                                                                                  | S250-12R                   |
| 4414       | 300 × 2P                       | *2                   | *2    | *2 | *2                                                                                  | LCA300-12                  |
| 4477, 4568 | 250 × 4P                       | *2                   | *2    | *2 | *2                                                                                  | S250-12R                   |
| 4605, 4270 | 300 × 4P                       | *2                   | *2    | *2 | *2                                                                                  | LCA300-12                  |

\*1 For use with PANDUIT Corp. heat-shrinkable tubing HSTT-series or an equivalent UL-recognized heat-shrinkable tubing rated 600 V minimum.

\*2 Refer to the manual packaged with the drive for recommended closed-loop crimp terminals for the drive.

**Table 2.3 Closed-Loop Crimp Terminals for Three-Phase 600 V Class Drives (Manufacturer: PANDUIT Corp.)**

| Model      | Recommended Gauge (AWG, kcmil) |                      |       |    |                                                                                     | Crimp Terminal Model<br>*1 |
|------------|--------------------------------|----------------------|-------|----|-------------------------------------------------------------------------------------|----------------------------|
|            | R/L1<br>S/L2<br>T/L3           | U/T1<br>V/T2<br>W/T3 | -, +1 | +3 |  |                            |
| 5062, 5077 | 2                              | -                    | -     | -  | *2                                                                                  | S2-38R                     |
| 5099       | 1                              | -                    | -     | -  | *2                                                                                  | S2-38R                     |
| 5125       | 1/0                            | *2                   | *2    | *2 | *2                                                                                  | S2/0-38R                   |
| 5144       | 2/0                            | *2                   | *2    | *2 | *2                                                                                  | S2/0-38R                   |
| 5192       | 250                            | *2                   | *2    | *2 | *2                                                                                  | S250-12R                   |
| 5242, 5289 | 2/0 × 2P                       | *2                   | *2    | *2 | *2                                                                                  | S2/0-12R                   |
| 5382       | 4/0 × 2P                       | *2                   | *2    | *2 | *2                                                                                  | S4/0-12R                   |
| 5412       | 2/0 × 4P                       | *2                   | *2    | *2 | *2                                                                                  | S2/0-12R                   |
| 5472       | 3/0 × 4P                       | *2                   | *2    | *2 | *2                                                                                  | S3/0-12R                   |

\*1 For use with PANDUIT Corp. heat-shrinkable tubing HSTT-series or an equivalent UL-recognized heat-shrinkable tubing rated 600 V minimum.

\*2 Refer to the manual packaged with the drive for recommended closed-loop crimp terminals for the drive.

## 3 Overview

This option will change an open-chassis type (IP20) drive to an enclosed wall-mounted type (UL Type 1) drive.

This option will let you install the drive outside the enclosure panel as an enclosed wall-mounted type drive.

The option has a bracket that will prevent damage to the wiring and a top protective cover that will not let unwanted material get in the drive. You can use this option when the installation environment of the drive meets the specifications shown in [Installation Environment on page 8](#).

**NOTICE** *Damage to Equipment. Do not transport the assembled Drive/UL Type 1 Kit in a horizontal position. If horizontal shipment is required, you must install the UL Type 1 Kit at the final destination. Incorrect shipping positions can cause damage to the drive.*

### ◆ Compatible Products

**Table 3.1 GA800 Compatible Models**

| Drive Model                              | Kit Model |
|------------------------------------------|-----------|
| 2169, 2211, 4140, 4168, 5062, 5077, 5099 | UUX002314 |
| 2257, 2313, 4208, 4250, 4302, 5125, 5144 | UUX002315 |
| 2360, 2415, 4371, 4414, 5192, 5242, 5289 | UUX001700 |
| 4477, 4568, 4605, 4720, 5382, 5412, 5472 | UUX001701 |

## ◆ Installation Environment

| Environment                 | Conditions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Area of Use                 | Indoors                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Power supply                | Overvoltage Category III                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Ambient temperature setting | IP20/UL Open Type: -10°C to +50 °C (14 °F to 122 °F)<br>IP20/UL Type 1: -10 °C to +40 °C (14 °F to 104 °F) <ul style="list-style-type: none"> <li>• Drive reliability is better in environments where the temperature does not increase or decrease quickly.</li> <li>• When you install the drive in an enclosure, use a cooling fan or air conditioner to keep the internal air temperature in the permitted range.</li> <li>• Do not let the drive freeze.</li> <li>• You can use IP20/UL Open Type drives at a maximum of 60 °C (140 °F) when you derate the output current.</li> <li>• You can use IP20/UL Type 1 drives at a maximum of 50 °C (122 °F) when you derate the output current.</li> </ul> |
| Humidity                    | 95%RH or less<br>Do not let condensation form on the drive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Storage Temperature         | -20°C to +70°C (-4°F to +158°F) (short-term temperature during transportation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Surrounding Area            | Pollution degree 2 or less<br>Install the drive in an area without: <ul style="list-style-type: none"> <li>• Oil mist, corrosive or flammable gas, or dust</li> <li>• Metal powder, oil, water, or other unwanted materials</li> <li>• Radioactive or flammable materials.</li> <li>• Harmful gas or fluids</li> <li>• Salt</li> <li>• Direct sunlight</li> </ul> Keep wood and other flammable materials away from the drive.                                                                                                                                                                                                                                                                              |
| Altitude                    | 1000 m (3281 ft) Maximum<br><b>Note:</b><br>Derate the output current by 1% for each 100 m (328 ft) to install the drive in altitudes between 1000 m to 4000 m (3281 ft to 13123 ft).<br>It is not necessary to derate the rated voltage in these conditions: <ul style="list-style-type: none"> <li>• Installing the drive at 2000 m (6562 ft) or lower</li> <li>• Installing the drive between 2000 m to 4000 m (6562 ft to 13123 ft) and grounding the neutral point on the power supply. Contact Yaskawa or your nearest sales representative if you will not ground the neutral point.</li> </ul>                                                                                                      |
| Vibration                   | Contact technical support for assistance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Installation Orientation    | Install the drive vertically for sufficient airflow to cool the drive.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**NOTICE** Do not let unwanted objects, for example metal shavings or wire clippings, fall into the drive during drive installation. Put a temporary cover over the drive during installation. Remove the temporary cover before start-up. Unwanted objects inside of the drive can cause damage to the drive.

## 4 Receiving

1. Examine the products for damage.  
If there is damage to the products, contact the shipping company immediately. The Yaskawa warranty does not include damage from shipping.
2. Verify the product model number to make sure that you received the correct model.  
If you have problems with the products, contact the distributor where you purchased the products or the Yaskawa sales office immediately.

## ◆ Option Package Contents

### ■ Kit UUX002314 Contents

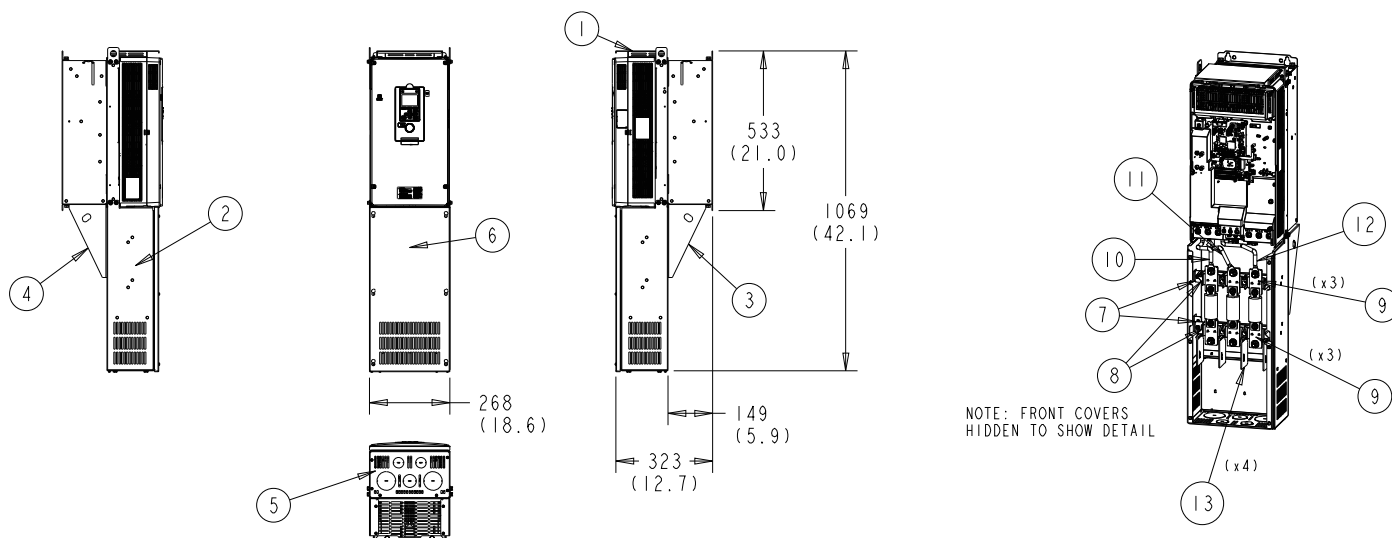


Figure 4.1 Kit UUX002314 Contents for Models 2169, 2211, 4140, 4168, and 5062 to 5099

| Component # | Component Description  | Part #     | Quantity |
|-------------|------------------------|------------|----------|
| 1           | Top Cover              | USP05620-1 | 1        |
| 2           | Bottom Housing         | USP05471-A | 1        |
| 3           | Right Support Bracket  | USP05475-1 | 1        |
| 4           | Left Support Bracket   | USP05470-1 | 1        |
| 5           | Bottom Cover           | USP05621-1 | 1        |
| 6           | Front Cover            | USP05473-1 | 1        |
| 7           | Fuse Support Bracket   | USP05474-1 | 2        |
| 8           | Fuse Support Insulator | UIS00374-1 | 2        |
| 9           | Customer Busbar        | UBR02663-1 | 6        |
| 10          | Left Busbar            | UBR02660-1 | 1        |
| 11          | Center Busbar          | UBR02661-1 | 1        |
| 12          | Right Busbar           | UBR02662-1 | 1        |
| 13          | Terminal Barrier       | UIS00354-1 | 4        |

| Kit Part # | Drive Model                                          | Hardware Description           | Quantity | Bag ID Label | Usage                                     |
|------------|------------------------------------------------------|--------------------------------|----------|--------------|-------------------------------------------|
| UUX002314  | 2169<br>2211<br>4140<br>4168<br>5062<br>5077<br>5099 | M4 × 10 Captive Pan Head Screw | 18       | A            | Top and Bottom Covers<br>Support Brackets |
|            |                                                      | M6 × 16 Captive Hex Head Screw | 4        | B            | Bottom Housing                            |
|            |                                                      | M8 Flat Washer                 | 2        |              |                                           |
|            |                                                      | M8 × 16 Bolt                   | 2        |              |                                           |
|            |                                                      | M4 × 10 Truss Head Screw       | 6        | C            | Front Cover                               |
|            |                                                      | M10 × 28 Bolt                  | 6        | D            | Customer Bus Bars                         |
|            |                                                      | M10 Nut                        | 6        |              |                                           |
|            |                                                      | M5 × 20 Captive Pan Head Screw | 16       | E            | Fuse Support Insulator                    |
|            |                                                      | M6 × 12 Captive Pan Head Screw | 4        | F            | Fuse Support Bracket                      |
|            |                                                      | M8 × 20 Captive Hex Head Screw | 6        | G            | Fuse                                      |

■ Kit UUX002315 Contents

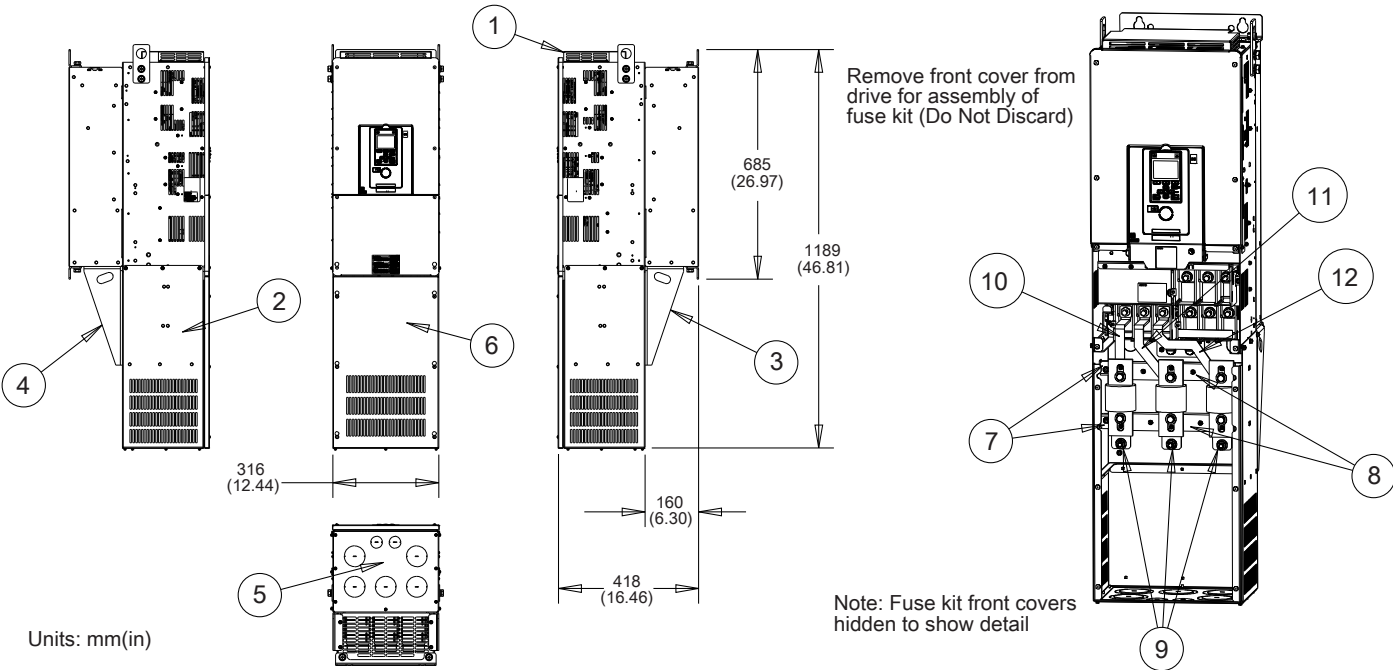


Figure 4.2 Kit UUX002315 Contents for Models 2257, 2313, 4208, 4250, 4302, 5125, and 5144

| Component # | Component Description  | Part #     | Quantity |
|-------------|------------------------|------------|----------|
| 1           | Top Cover              | USP05619-1 | 1        |
| 2           | Bottom Housing         | USP05464-A | 1        |
| 3           | Right Support Bracket  | USP05469-1 | 1        |
| 4           | Left Support Bracket   | USP05468-1 | 1        |
| 5           | Bottom Cover           | USP05618-1 | 1        |
| 6           | Front Cover            | USP05466-1 | 1        |
| 7           | Fuse Support Bracket   | USP05467-1 | 2        |
| 8           | Fuse Support Insulator | UIS01279-1 | 2        |
| 9           | Customer Busbar        | UBR02656-1 | 3        |
| 10          | Left Busbar            | UBR02657-1 | 1        |
| 11          | Center Busbar          | UBR02658-1 | 1        |
| 12          | Right Busbar           | UBR02659-1 | 1        |

| Kit Part # | Drive Model                                          | Hardware Description           | Quantity | Bag ID Label | Usage                                   |
|------------|------------------------------------------------------|--------------------------------|----------|--------------|-----------------------------------------|
| UUX002315  | 2257<br>2313<br>4208<br>4250<br>4302<br>5125<br>5144 | M4 × 10 Captive Pan Head Screw | 11       | A            | Top and Bottom Covers                   |
|            |                                                      | M5 × 12 Captive Pan Head Screw | 16       | B            | Housing and Support Brackets            |
|            |                                                      | M4 × 10 Truss Head Screw       | 6        | C            | Front Cover                             |
|            |                                                      | M6 × 14 Captive Pan Head Screw | 4        | D            | Fuse Support Bracket                    |
|            |                                                      | M4 × 16 Captive Pan Head Screw | 10       | E            | Fuse Support Insulator                  |
|            |                                                      | M10 × 28 Bolt                  | 3        | F            | Customer Bus Bars and Internal Bus Bars |
|            |                                                      | M10 Lock Nut                   | 3        |              |                                         |
|            |                                                      | M8 × 30 Bolt                   | 6        |              |                                         |
|            |                                                      | M8 Fender Washer               | 6        |              |                                         |
|            |                                                      | M8 Lock Washer                 | 6        |              |                                         |

## ■ Kit UUX001700 Contents

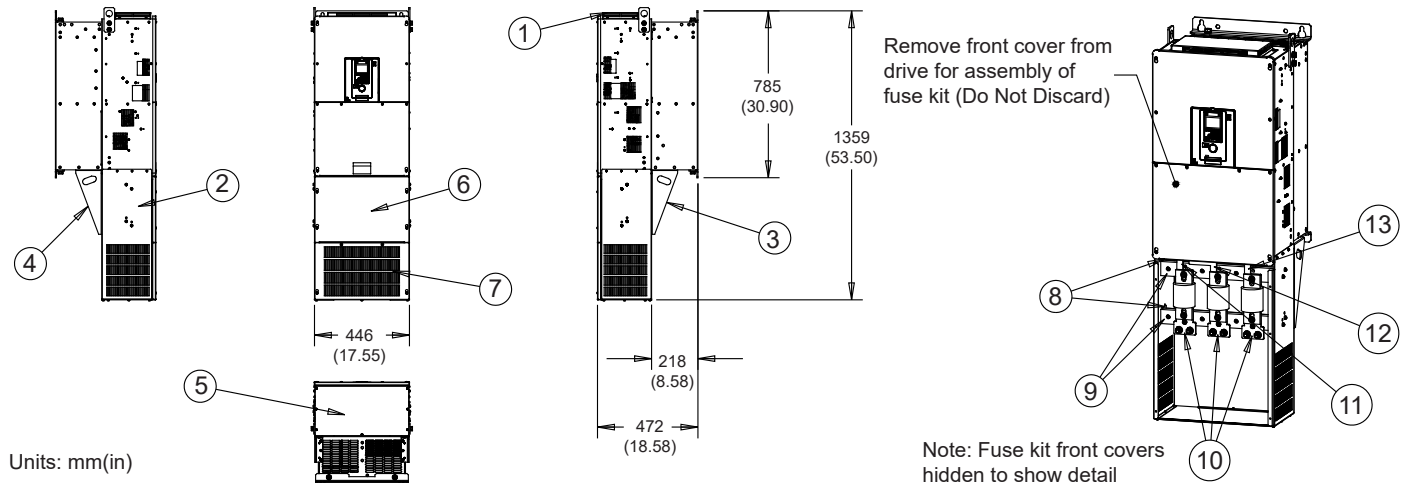


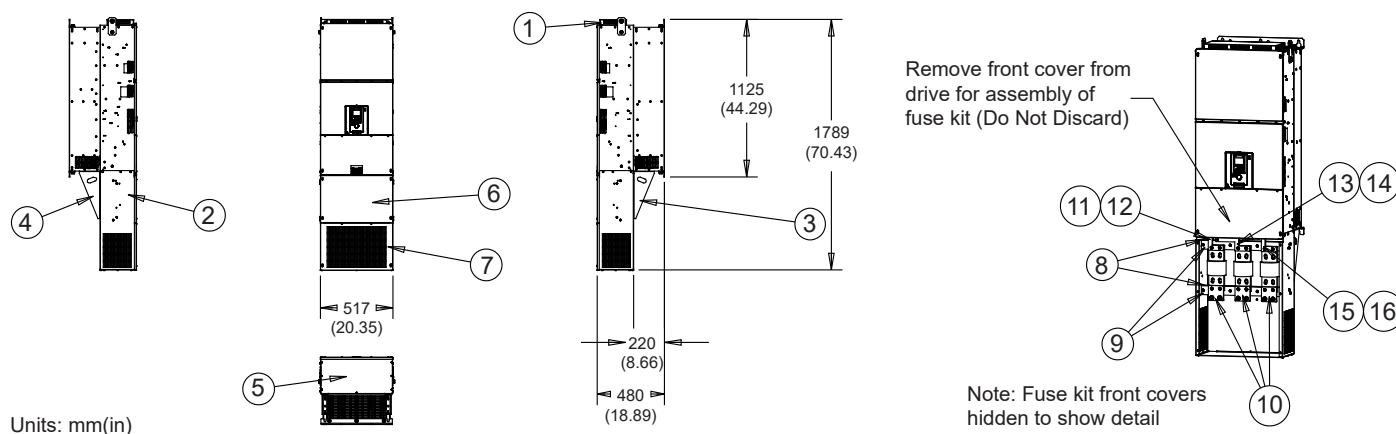
Figure 4.3 Kit UUX001700 Contents for Models 2360, 2415, 4371, 4414, and 5192 to 5289

| Component # | Component Description  | Part #     | Quantity |
|-------------|------------------------|------------|----------|
| 1           | Top Cover              | USP04784-1 | 1        |
| 2           | Bottom Housing         | USP04780-1 | 1        |
| 3           | Right Support Bracket  | USP04782-A | 1        |
| 4           | Left Support Bracket   | USP04783-A | 1        |
| 5           | Bottom Cover           | USP04781-1 | 1        |
| 6           | Upper Front Cover      | USP04778-1 | 1        |
| 7           | Lower Front Cover      | USP04779-1 | 1        |
| 8           | Fuse Support Bracket   | USP04785-1 | 2        |
| 9           | Fuse Support Insulator | UIS01074-1 | 2        |
| 10          | Customer Busbar        | UBR02195-1 | 3        |
| 11          | Left Busbar            | UBR02189-1 | 1        |
| 12          | Center Busbar          | UBR02190-1 | 1        |
| 13          | Right Busbar           | UBR02191-1 | 1        |

| Kit Part # | Drive Model                                          | Hardware Description     | Quantity | Bag ID Label | Usage                                   |
|------------|------------------------------------------------------|--------------------------|----------|--------------|-----------------------------------------|
| UUX001700  | 2360<br>2415<br>4371<br>4414<br>5192<br>5242<br>5289 | M4 × 10 Pan Head Screw   | 23       | A            | Covers and Housing                      |
|            |                                                      | M5 × 14 Pan Head Screw   | 6        | B            | Support Brackets                        |
|            |                                                      | M4 × 10 Truss Head Screw | 8        | C            | Front Covers                            |
|            |                                                      | M6 × 14 Pan Head Screw   | 8        | D            | Fuse Support Bracket                    |
|            |                                                      | M6 × 30 Pan Head Screw   | 8        | E            | Fuse Support Insulator                  |
|            |                                                      | M12 × 32 Bolt            | 6        | F            | Customer Bus Bars and Internal Bus Bars |
|            |                                                      | M12 Nut                  | 6        |              |                                         |
|            |                                                      | M12 Flat Washer          | 6        |              |                                         |
|            |                                                      | M12 Lock Washer          | 6        |              |                                         |
|            |                                                      | M8 × 35 Screw            | 6        |              |                                         |
|            |                                                      | M8 × 25 Screw            | 3        |              |                                         |
|            |                                                      | M8 Fender Washer         | 6        |              |                                         |



## ■ Kit UUX001701 Contents



**Figure 4.4 Kit UUX001701 Contents for Drive Models 4477 to 4720 and 5382 to 5472**

| Component # | Component Description  | Part #     | Quantity |
|-------------|------------------------|------------|----------|
| 1           | Top Cover              | USP04777-1 | 1        |
| 2           | Bottom Housing         | USP04151-1 | 1        |
| 3           | Right Support Bracket  | USP04154-A | 1        |
| 4           | Left Support Bracket   | USP04153-A | 1        |
| 5           | Bottom Cover           | USP04152-1 | 1        |
| 6           | Upper Front Cover      | USP04767-1 | 1        |
| 7           | Lower Front Cover      | USP04150-1 | 1        |
| 8           | Fuse Support Bracket   | USP04766-1 | 2        |
| 9           | Fuse Support Insulator | UIS01071-1 | 2        |
| 10          | Customer Busbar        | UBR02184-1 | 3        |
| 11          | Left Back Busbar       | UBR02178-1 | 1        |
| 12          | Left Front Busbar      | UBR02179-1 | 1        |
| 13          | Center Back Busbar     | UBR02180-1 | 1        |
| 14          | Center Front Busbar    | UBR02181-1 | 1        |
| 15          | Right Back Busbar      | UBR02182-1 | 1        |
| 16          | Right Front Busbar     | UBR02183-1 | 1        |

## 4 Receiving

| Kit Part # | Drive Model                                          | Hardware Description     | Quantity | Bag ID Label | Usage                  |
|------------|------------------------------------------------------|--------------------------|----------|--------------|------------------------|
| UUX001701  | 4477<br>4568<br>4605<br>4720<br>5382<br>5412<br>5472 | M4 × 10 Pan Head Screw   | 11       | A            | Top and Bottom Covers  |
|            |                                                      | M4 × 16 Pan Head Screw   | 4        | B            | Bus Bars               |
|            |                                                      | M5 × 14 Pan Head Screw   | 18       | C            | Support Brackets       |
|            |                                                      | M4 × 10 Truss Head Screw | 8        | D            | Front Covers           |
|            |                                                      | M6 × 14 Pan Head Screw   | 8        | E            | Fuse Support Bracket   |
|            |                                                      | M6 × 30 Pan Head Screw   | 8        | F            | Fuse Support Insulator |
|            |                                                      | M12 × 38 Bolt            | 6        | G            | Customer Bus Bars      |
|            |                                                      | M12 Nut                  | 6        |              |                        |
|            |                                                      | M12 Lock Washer          | 6        |              |                        |
|            |                                                      | M12 Flat Washer          | 6        |              |                        |
|            | 4477<br>4568<br>5382<br>5412                         | M8 × 30 Screw            | 6        | H1           | Internal Bus Bars      |
|            |                                                      | M8 × 40 Screw            | 6        |              |                        |
|            |                                                      | M8 Fender Washer         | 6        |              |                        |
|            | 4605<br>4720                                         | M8 × 45 Screw            | 12       | H2           | Internal Bus Bars      |
|            | 4477<br>4568<br>5382<br>5412                         | M8 × 40 Screw            | 6        | H3           | Internal Bus Bars      |
|            | 5472                                                 | M8 × 35 Screw            | 6        | H4           | Internal Bus Bars      |

### ◆ Required Tools

Use these tools to install the attachment:

- Phillips screwdriver #2
- Straight-edge screwdriver
- Hammer
- File
- Torque Wrench or Driver

## 5 Installation Procedure

**CAUTION** Crush Hazard. Tighten terminal cover screws and hold the case safely when you move the drive. If the drive or covers fall, it can cause moderate injury.

### ◆ Drive Exterior and Mounting Dimensions

#### ■ Exterior and Mounting Dimensions with Kit Installed

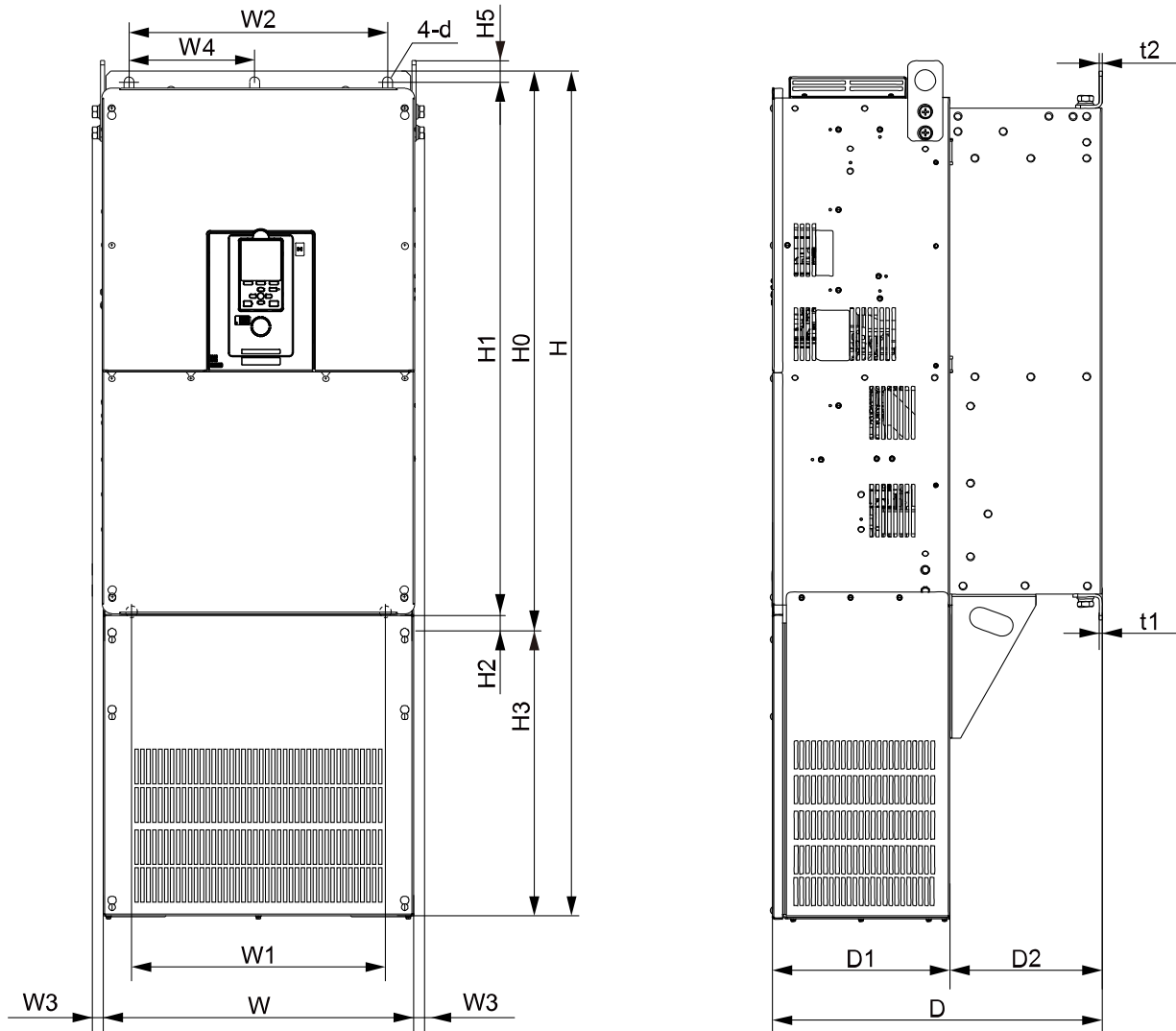


Figure 5.1 Exterior and Mounting Dimensions

## 5 Installation Procedure

| Drive Model                                          | Dimensions mm (in) |                 |                |                |               |                |                |              |               |                 |                 |                |                |                |               |               |     | Est. Weight<br>kg (lb) |
|------------------------------------------------------|--------------------|-----------------|----------------|----------------|---------------|----------------|----------------|--------------|---------------|-----------------|-----------------|----------------|----------------|----------------|---------------|---------------|-----|------------------------|
|                                                      | W                  | H               | D              | D1             | D2            | W1             | W2             | W3<br>(max.) | W4            | H0              | H1              | H2             | H3             | H5             | t1            | t2            | d   |                        |
| 2169<br>2211<br>4140<br>4168<br>5062<br>5077<br>5099 | 268<br>(10.55)     | 1071<br>(42.18) | 335<br>(13.19) | 181<br>(7.12)  | 154<br>(6.06) | 190<br>(7.48)  | 182<br>(7.17)  | 10<br>(0.39) | -             | 543<br>(21.38)  | 516<br>(20.31)  | 17.5<br>(0.69) | 528<br>(20.8)  | 11<br>(0.43)   | 2.3<br>(0.09) | 2.3<br>(0.09) | M8  | 54<br>(119)            |
| 2257<br>2313<br>4208<br>4250<br>4302<br>5125<br>5144 | 316<br>(12.44)     | 1191<br>(46.87) | 420<br>(16.54) | 260<br>(10.23) | 160<br>(6.30) | 265<br>(10.43) | 218<br>(8.58)  | 14<br>(0.55) | -             | 727<br>(28.62)  | 664<br>(26.14)  | 50.1<br>(1.97) | 464<br>(18.27) | 28.5<br>(1.12) | 4.5<br>(0.18) | 4.5<br>(0.18) | M10 | 89<br>(196)            |
| 2360<br>2415<br>4371<br>4414<br>5192<br>5242<br>5289 | 444<br>(17.48)     | 1045<br>(41.14) | 472<br>(18.58) | 254<br>(10.00) | 218<br>(8.58) | 370<br>(14.57) | 370<br>(14.57) | 18<br>(0.71) | -             | 800<br>(31.50)  | 757<br>(29.80)  | 28<br>(1.10)   | 245<br>(9.65)  | 30<br>(1.18)   | 4.5<br>(0.18) | 4.5<br>(0.18) | M12 | 130<br>(286.60)        |
| 4477<br>4568<br>4605<br>4720<br>5382<br>5412<br>5472 | 510<br>(20.08)     | 1789<br>(70.43) | 480<br>(18.90) | 260<br>(10.23) | 220<br>(8.66) | 450<br>(17.72) | 450<br>(17.72) | 20<br>(0.79) | 225<br>(8.86) | 1136<br>(44.70) | 1093<br>(43.03) | 43<br>(1.71)   | 664<br>(26.14) | 35<br>(1.37)   | 4.5<br>(0.18) | 4.5<br>(0.18) | M12 | 207<br>(455)           |

## ◆ Kit Installation Procedure

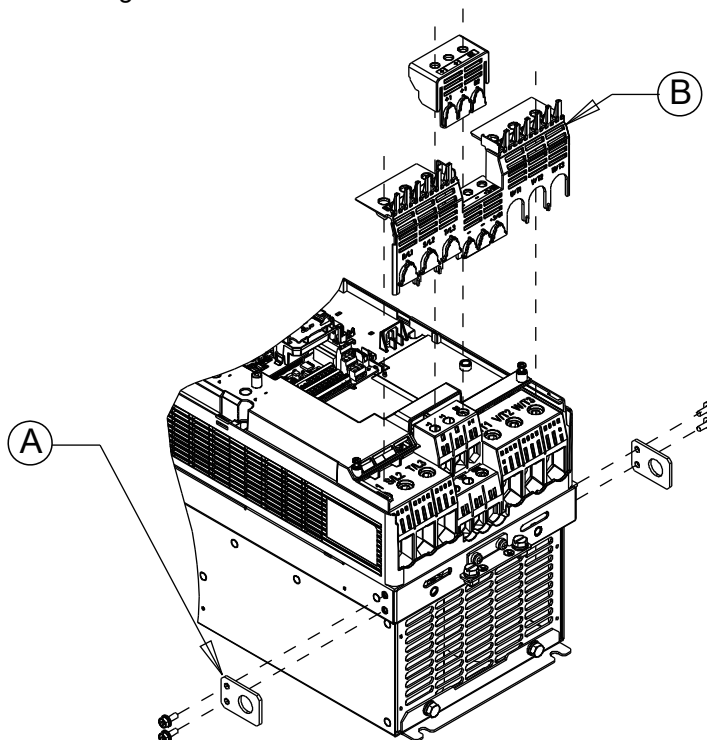
Table 5.1 Kit Installation Procedure

| Drive Model                                  | Kit Model | Ref. |
|----------------------------------------------|-----------|------|
| 2169, 2211<br>4140, 4168<br>5062, 5077, 5099 | UUX002314 | 17   |
| 2257, 2313<br>4208, 4250, 4302<br>5125, 5144 | UUX002315 | 28   |
| 2360, 2415<br>4371, 4414<br>5192, 5242, 5289 | UUX001700 | 39   |
| 4477, 4568, 4605, 4720<br>5382, 5412, 5472   | UUX001701 | 49   |

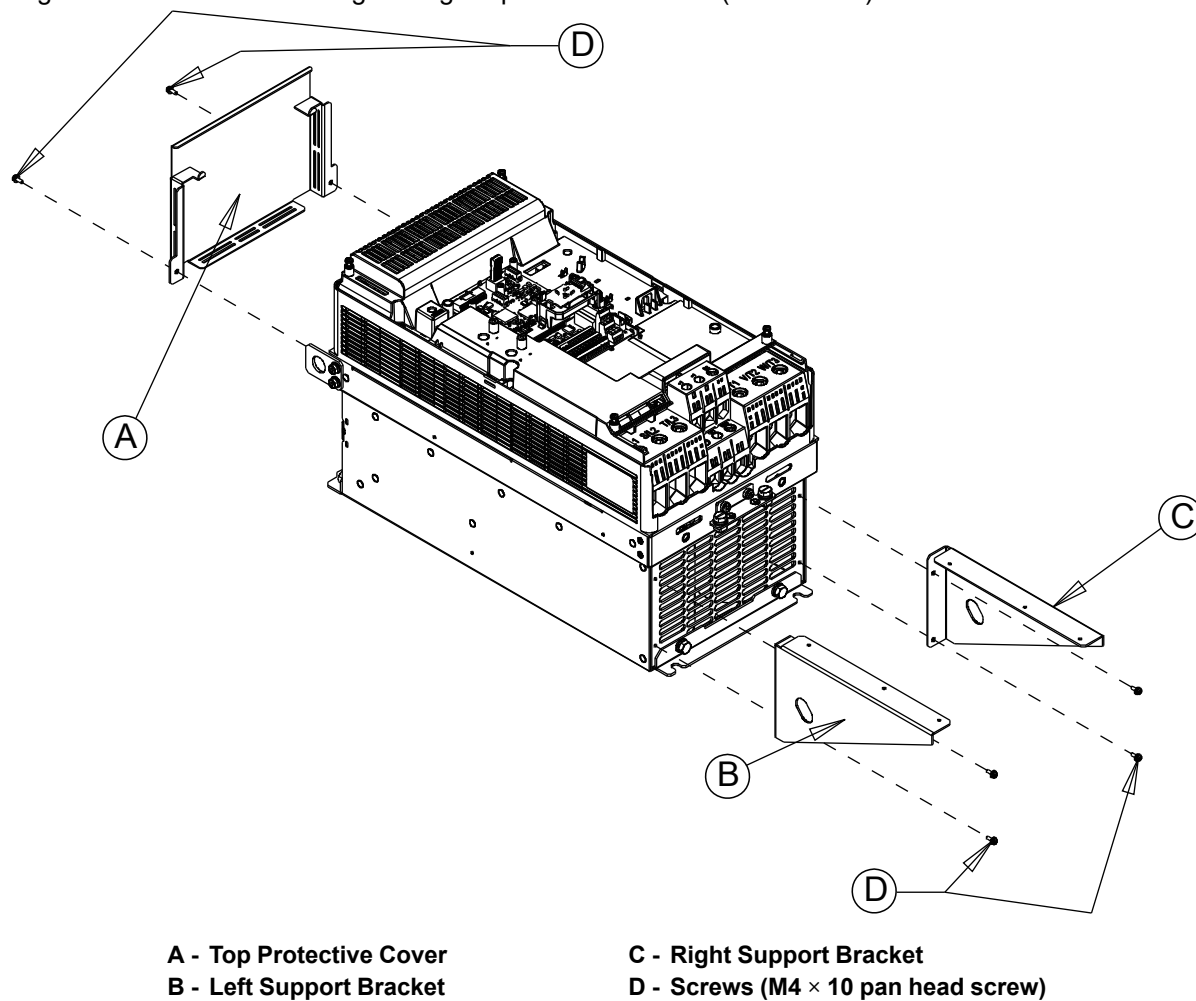
**NOTICE** *Damage to Equipment. Do not transport the assembled Drive/UL Type 1 Kit in a horizontal position. If horizontal shipment is required, you must install the UL Type 1 Kit at the final destination. Incorrect shipping positions can cause damage to the drive.*

**■ Models 2169, 2211, 4140, 4168, and 5062 to 5099**

1. Remove the drive front cover. Do not discard.  
Remove the terminal cover. Do not discard.  
Remove and discard the two bottom hanging brackets.  
Remove and discard the wiring covers.

**A - Bottom Hanging Brackets****B - Wiring Covers****Figure 5.2 Remove the Front Cover, Brackets and Wiring Covers**

2. Use two M4 × 10 pan head screws to attach the top cover.  
Use two M4 × 10 pan head screws to attach the left support bracket.  
Use two M4 × 10 pan head screws to attach the right support bracket.  
Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



**Figure 5.3 Attach the Top Cover and Support Brackets**

3. Use six M4 × 10 pan head screws, four M6 × 16 hex screws, and two M8 bolt/washers to attach the bottom housing.  
 Use six M4 × 10 pan head screws to attach the bottom cover.  
 Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).  
 Tighten the M6 screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).  
 Tighten the M8 screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).  
 Cut the knockout holes in the bottom cover as required.

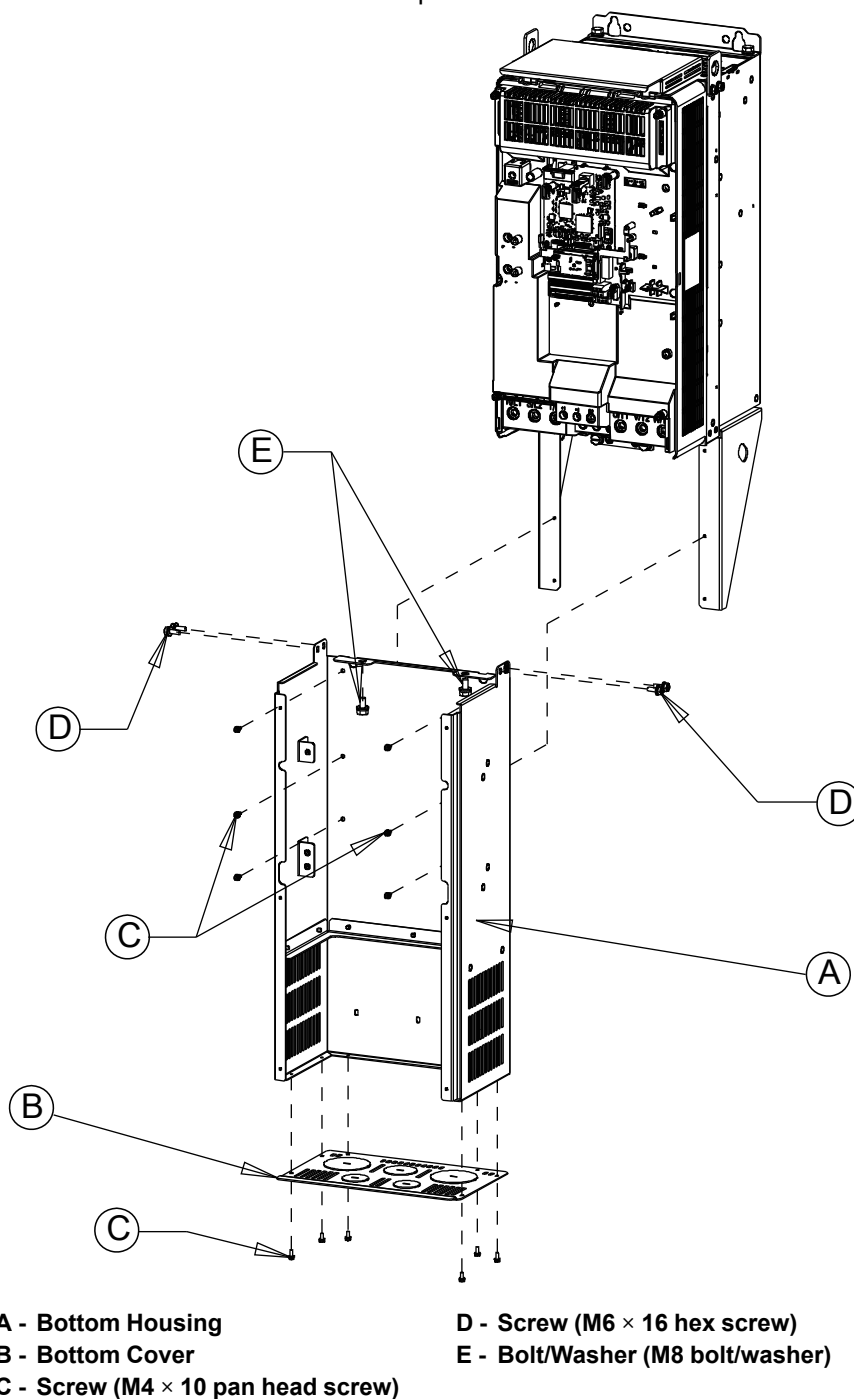
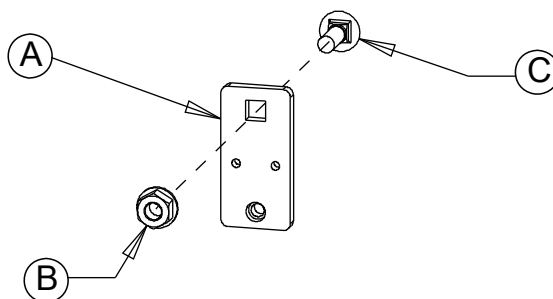


Figure 5.4 Attach the Bottom Housing and Bottom Cover

4. Use M10 hardware to assemble customer busbar.  
Do not fully tighten hardware.  
Repeat this process six times.

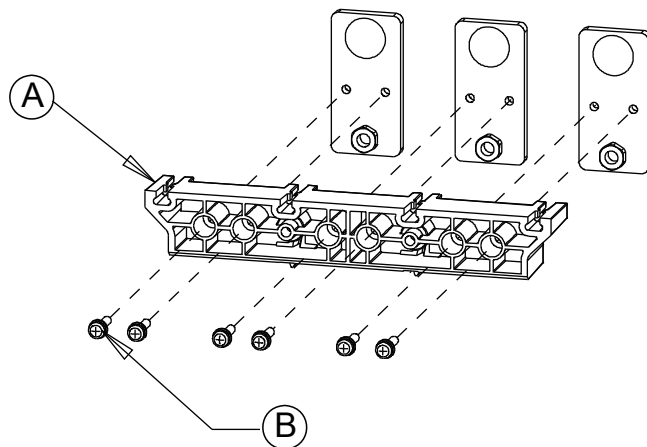


**A - Customer Busbar**  
**B - M10 Nut**

**C - M10 × 28 Bolt**

**Figure 5.5 Assemble the Customer Busbar**

5. Use six M5 × 20 pan head screws to attach three customer busbars to fuse support insulator.  
Tighten the M5 screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).  
Repeat this process twice.  
Note orientation of customer busbars.

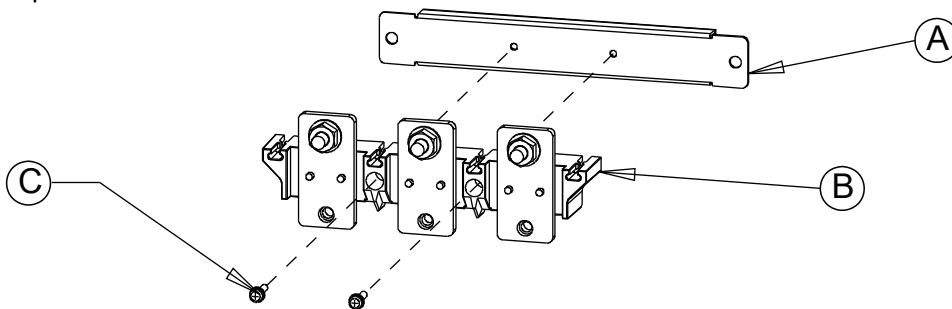


**A - Fuse Support Insulator**

**B - Screw (M5 × 20 pan head screw)**

**Figure 5.6 Attach Customer Busbars to the Fuse Support Insulator**

6. Use two M5 × 20 pan head screws to attach fuse support insulator to fuse support bracket.  
Tighten the M5 screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).  
Repeat this process twice.



**A - Fuse Support Bracket**  
**B - Fuse Support Insulator**

**C - Screw (M5 × 20 pan head screw)**

**Figure 5.7 Assemble the Fuse Support Subassembly**



7. Install drive output wiring.
8. Use two M6 × 12 pan head screws to attach the fuse support subassembly to the bottom housing.  
Verify that the support is positioned and oriented as shown.  
Tighten the M6 screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).  
Repeat this process twice.

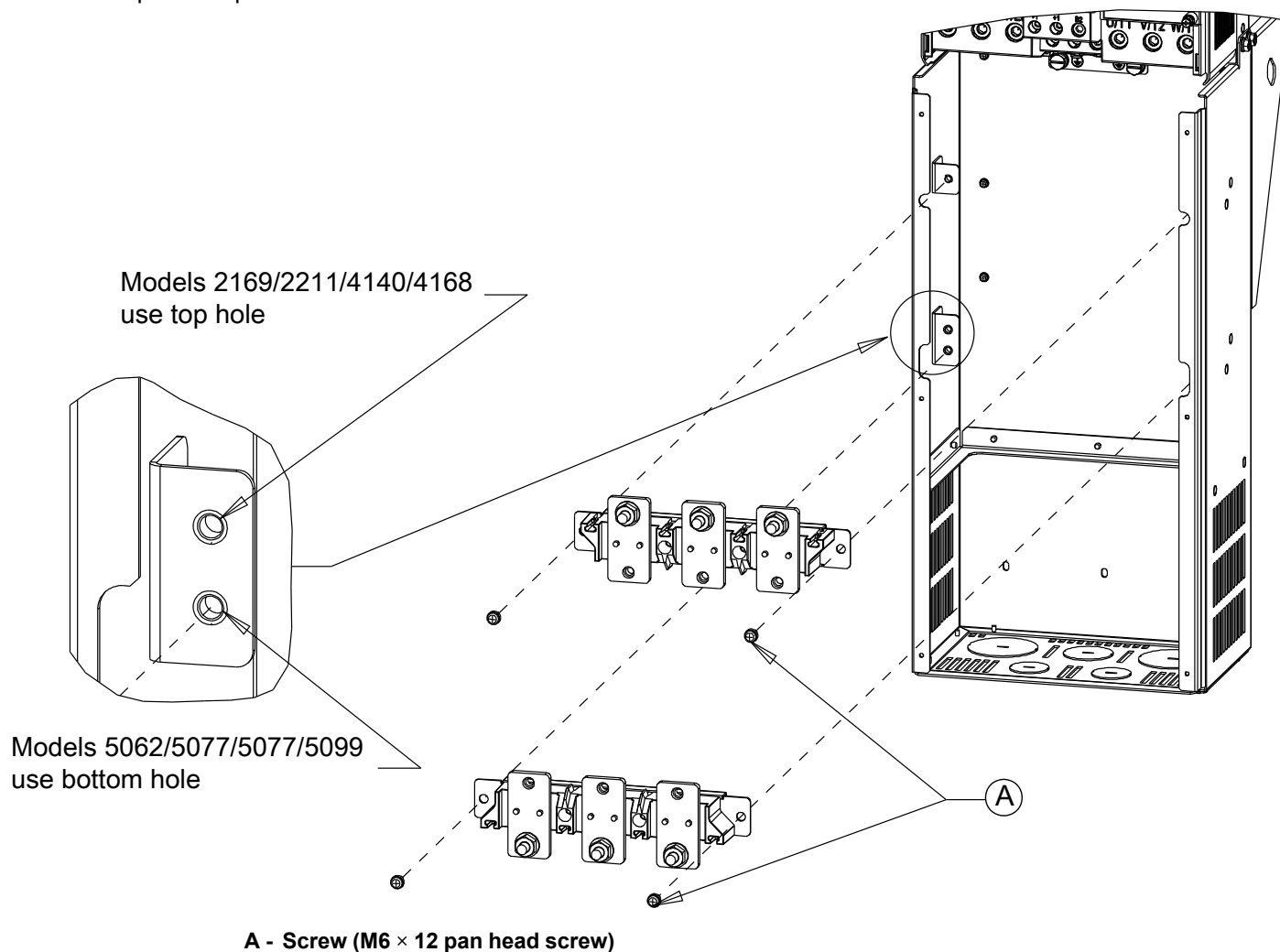
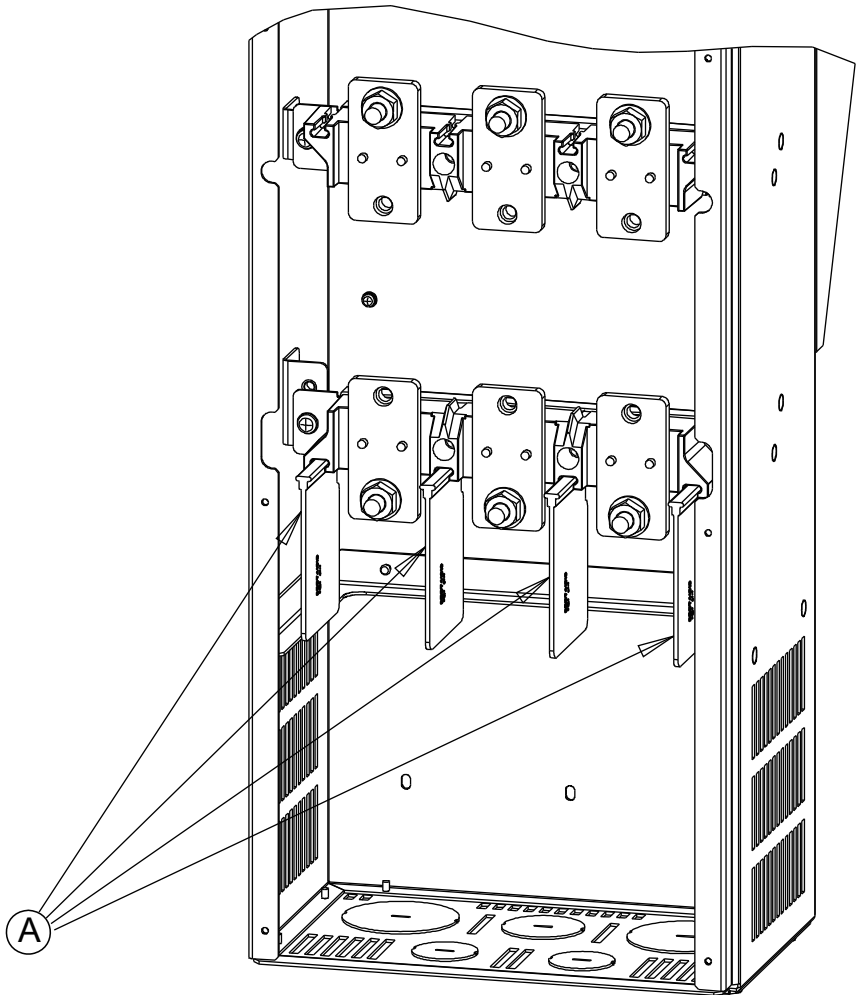


Figure 5.8 Attach the Fuse Support Subassembly to Bottom Housing

9. Snap-fit terminal barrier as shown.  
Repeat this process four times.



A - Terminal Barrier

Figure 5.9 Attach the Terminal Barrier

10. Use [Table 5.2](#) to select the correct fuses for your installation. Fuses are not provided in the kit.

Table 5.2 Semiconductor Fuse Selection

| Drive Model          | Semiconductor Fuse<br>Manufacturer: EATON/Bussmann | Yaskawa Part Number                 |
|----------------------|----------------------------------------------------|-------------------------------------|
| 2169                 | FWH-275A or FWH-300A or FWH-350A                   | UFU000037 or UFU000038 or UFU000040 |
| 2211                 | FWH-325A or FWH-350A, or FWH-450A                  | UFU000043 or UFU000039 or UFU000040 |
| 4140                 | FWH-275A or FWH-300A                               | UFU000037 or UFU000038              |
| 4168                 | FWH-400A or FWH-325A                               | UFU000041 or UFU000039              |
| 5062<br>5077<br>5099 | FWP-150A                                           | 05P00017-0166                       |

11. Use six M8 × 20 captive hex head screws to attach three fuses.
- Tighten the M8 screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).

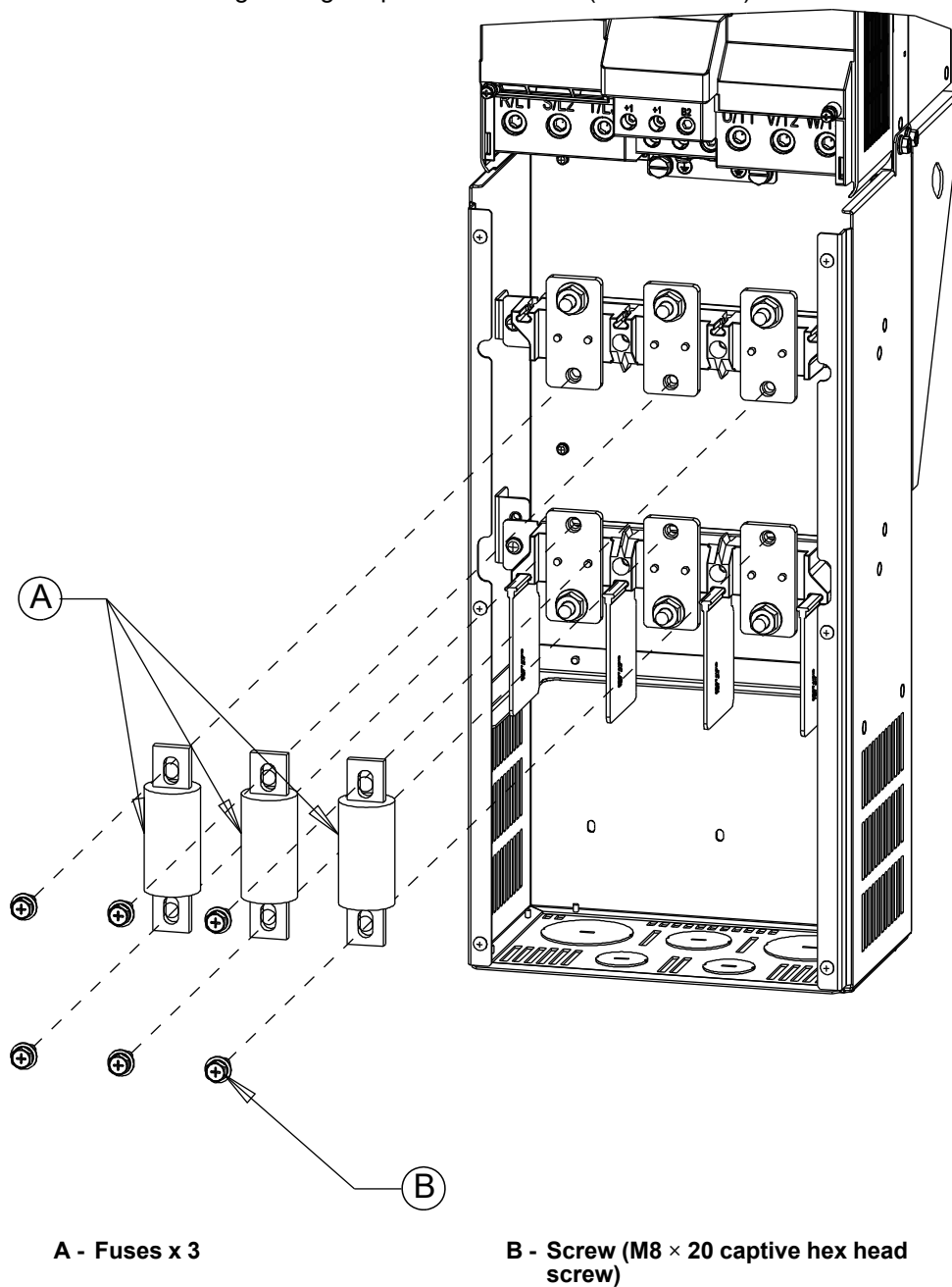
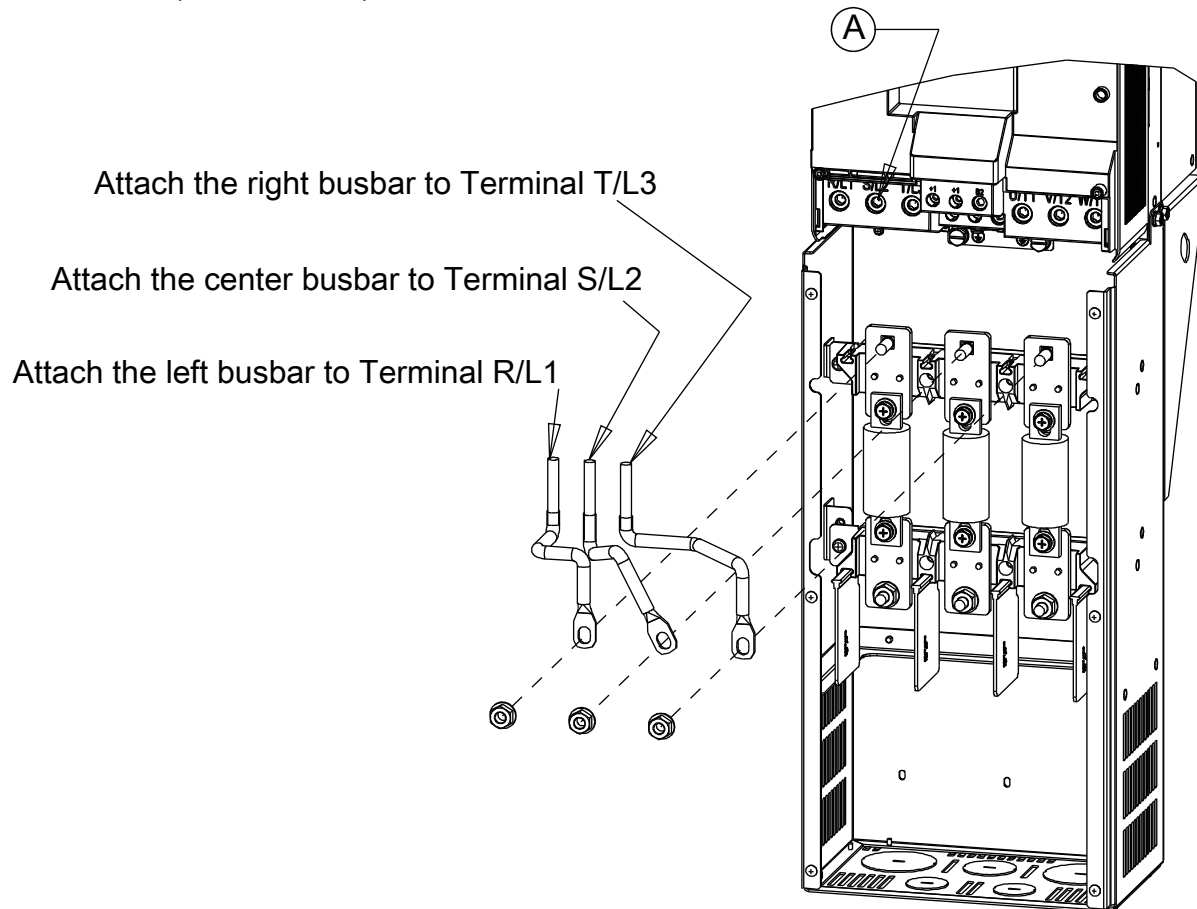


Figure 5.10 Attach the Fuses

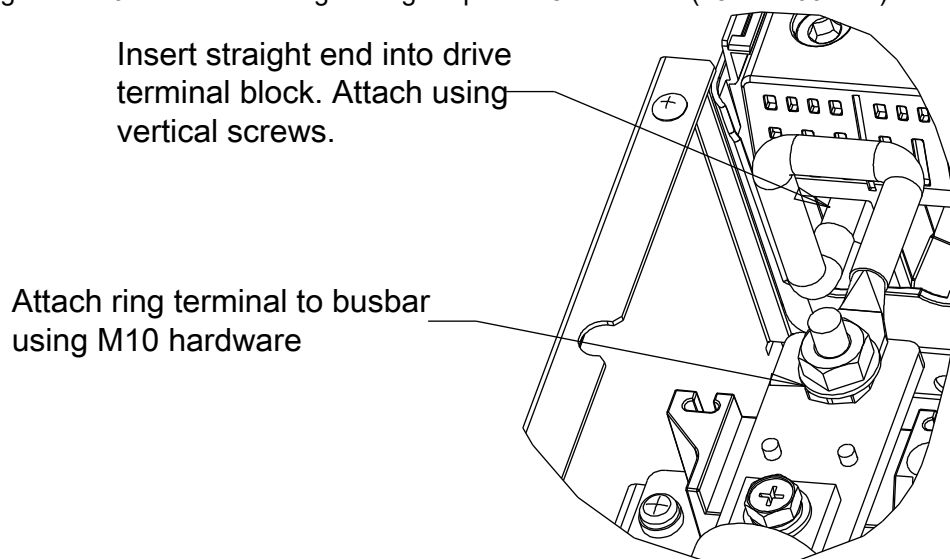
12. Use the existing terminal block hardware to attach the left busbar to Terminal R/L1. Attach the center busbar to Terminal S/L2, and attach the right busbar to Terminal T/L3. Tighten the hardware to a tightening torque of 12 to 14 N·m (106 to 124 in·lb).



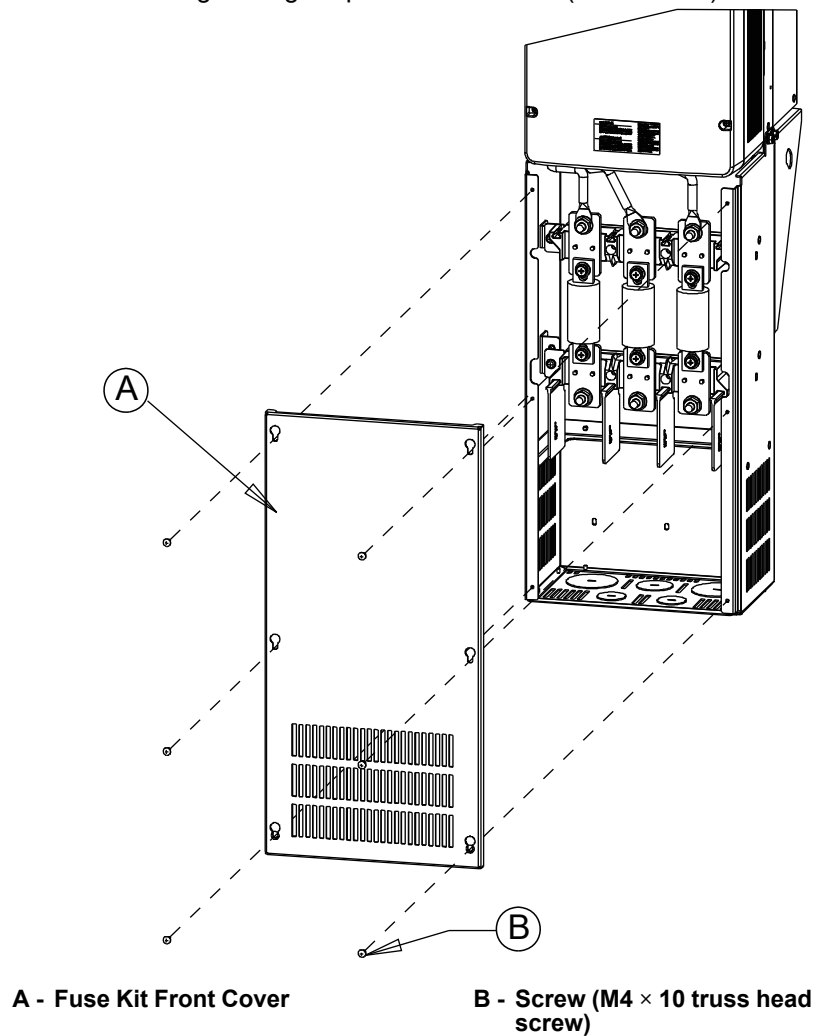
**Figure 5.11 Attach the Remaining Busbars**

## Assembly order:

1. Loosen terminal block screws.
2. Position interconnect busbars as shown in figure below.
3. Verify that straight end is seated correctly in terminal block.
4. Hand tighten M10 hardware.
5. Fully tighten terminal block screws.
6. Fully tighten M10 hardware to a tightening torque of 18 to 22 N·m (157 to 200 in·lb).

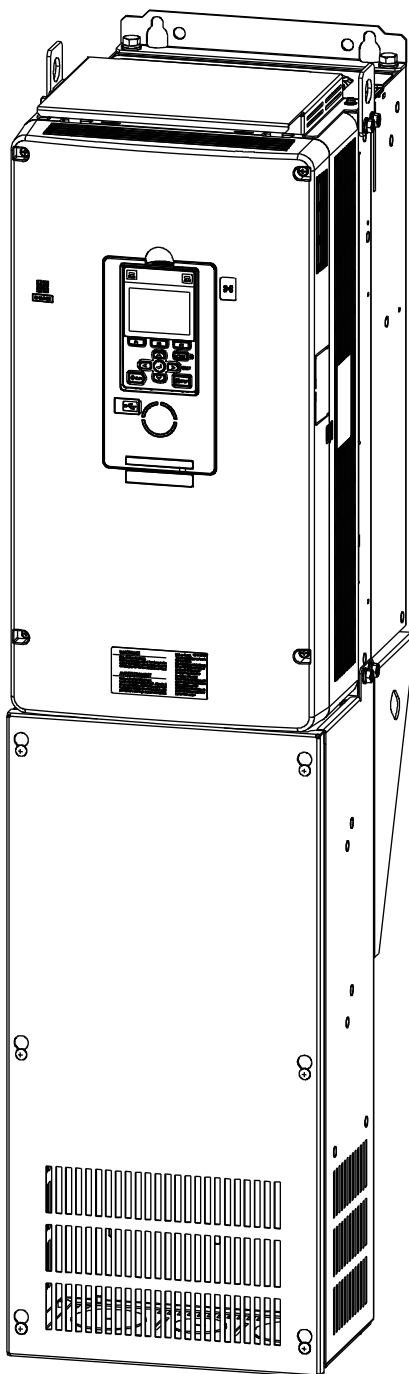
**Figure 5.12 Attach the Remaining Busbars**

13. Select the AC conductor wire gauges, tightening torques, and closed-loop crimp terminals based on [Main Circuit Wire Gauges and Tightening Torques on page 6](#) and [Closed-Loop Crimp Terminals on page 6](#). Connect input AC conductors as specified in the drive manual. Fully tighten hardware from step 4.
14. Attach the front cover from Step 1.
15. Use six M4 × 10 truss head screws to attach the fuse kit front cover.  
Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



**Figure 5.13 Attach the Kit Front Cover**

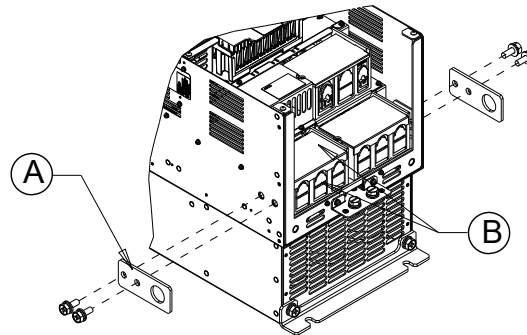
16. The kit installation is complete and the drive is now fitted with a UL Type 1 enclosure.



**Figure 5.14 Completed View**

■ **Models 2257, 2313, 4208 to 4302, 5125, and 5144**

1. Remove the drive front cover. Do not discard.
2. Remove and discard the two bottom hanging brackets and the drive terminal block covers.

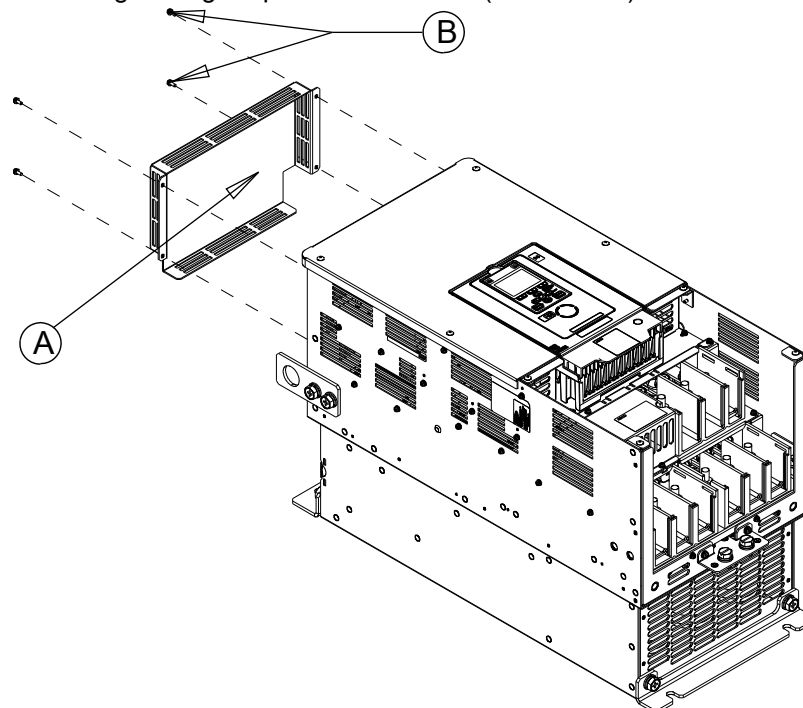


**A - Bottom Hanging Brackets**

**B - Terminal Block Covers**

**Figure 5.15 Remove the Brackets and Terminal Covers**

3. Use four M4 × 10 screws to attach the top protective cover.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



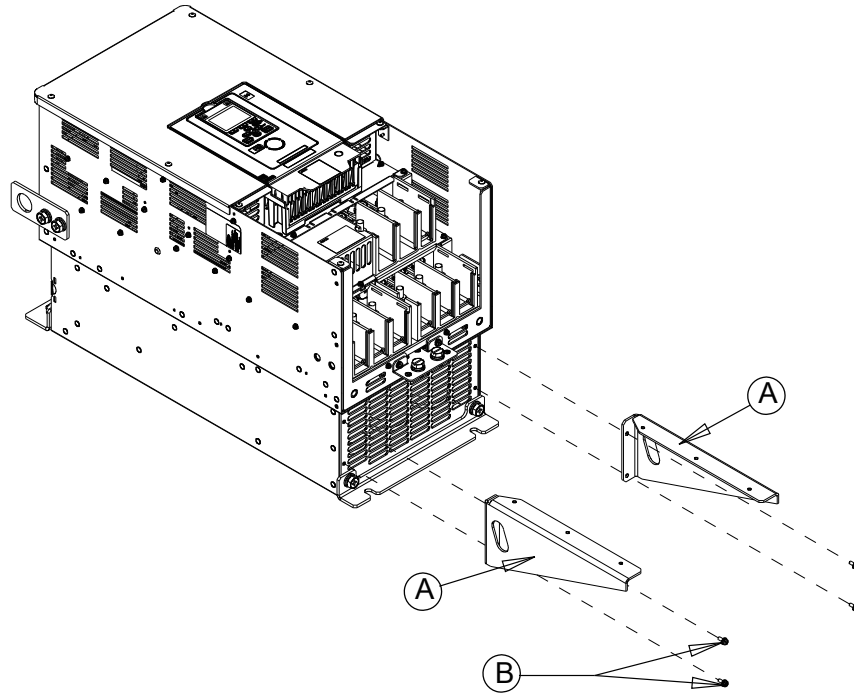
**A - Top Protective Cover**

**B - Screws (M4 × 10 pan head screw)**

**Figure 5.16 Attach the Top Protective Cover**



4. Use four M5 × 12 pan head screws to attach the support brackets.  
Tighten the screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).

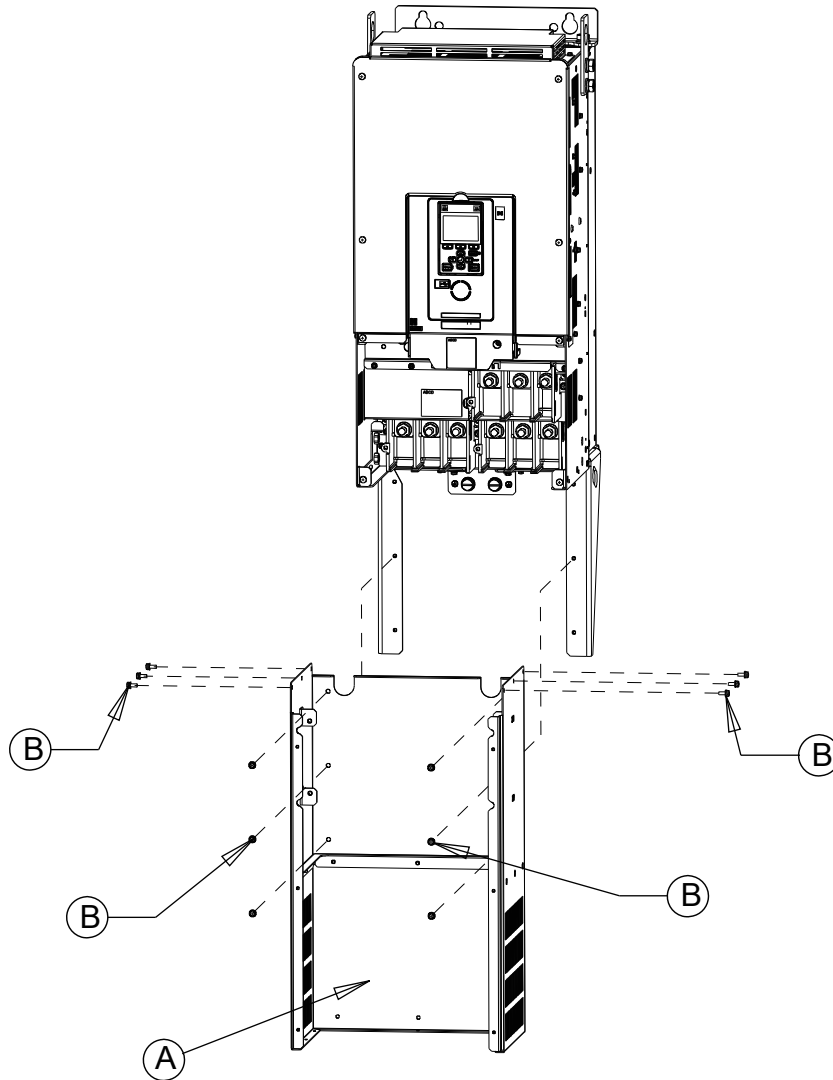


**A - Support bracket**

**B - Screw (M5 × 12 pan head screw)**

**Figure 5.17 Attach the Support Brackets to the Drive**

5. Use twelve M5 × 12 pan head screws to attach the bottom housing to the support brackets. Tighten the screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).

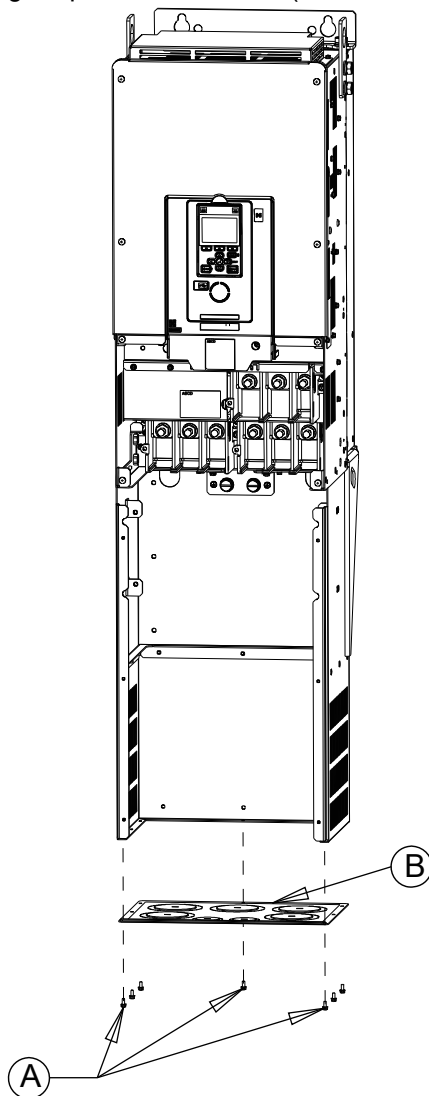


A - Bottom Housing

B - Screw (M5 × 12 pan head screw)

Figure 5.18 Attach the Bottom Housing to the Support Brackets

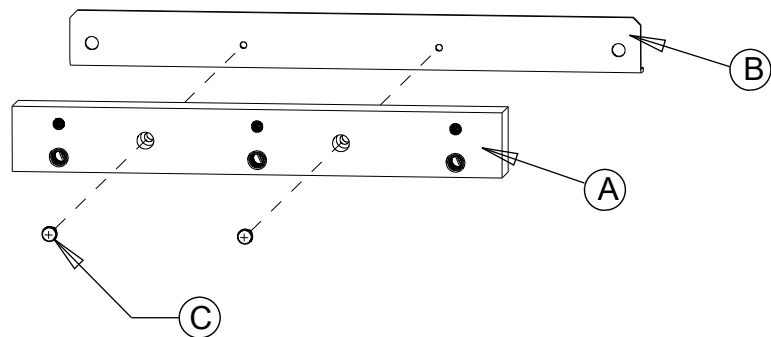
6. Use seven M4 × 10 pan head screws to attach the bottom cover to the bottom housing.  
Cut the knockout holes in the bottom cover as required.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



A - Screw (M4 × 10 pan head screw)      B - Bottom Cover

**Figure 5.19 Attach the Bottom Cover**

7. Use two M4 × 16 pan head screws to assemble the fuse bracket.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).  
Repeat this process twice.

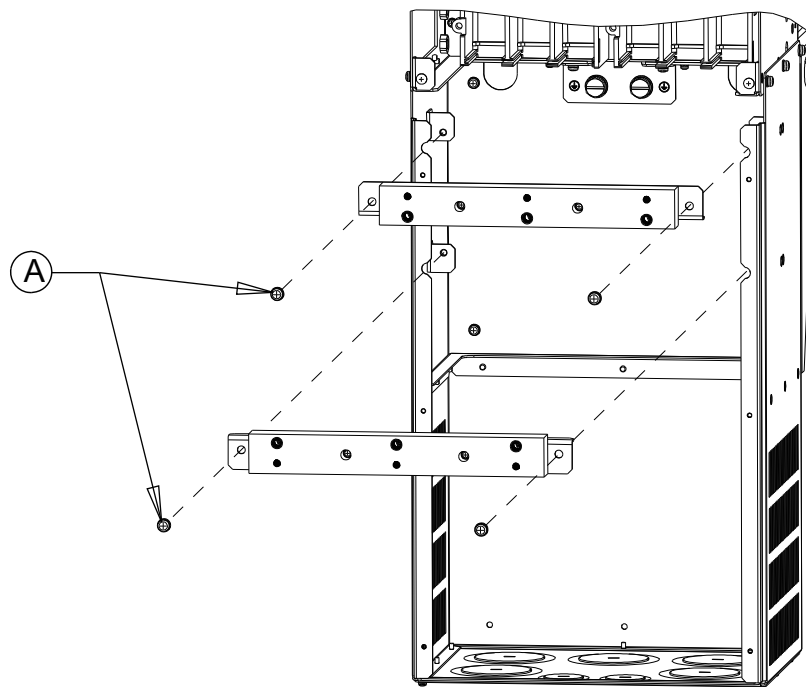


**A - Fuse Support Insulator**  
**B - Fuse Support Bracket**

**C - Screw (M4 × 16 pan head screw)**

**Figure 5.20 Assemble the Fuse Support Bracket**

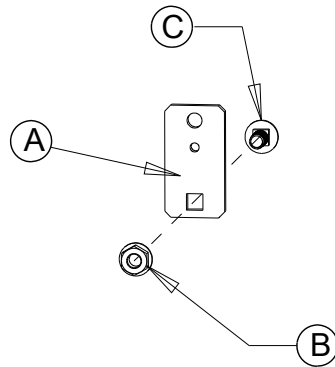
8. Install drive output wiring.
9. Use two M6 × 14 pan head screws to attach the fuse supports to the bottom housing.  
 Do not fully tighten the hardware.  
 Repeat this process twice.



**A - Screw (M6 × 14 pan head screw)**

**Figure 5.21 Attach the Fuse Support Brackets**

10. Use the M10 × 30 bolt and lock nut to assemble the customer busbars.  
 Do not fully tighten the hardware.  
 Repeat this process three times.

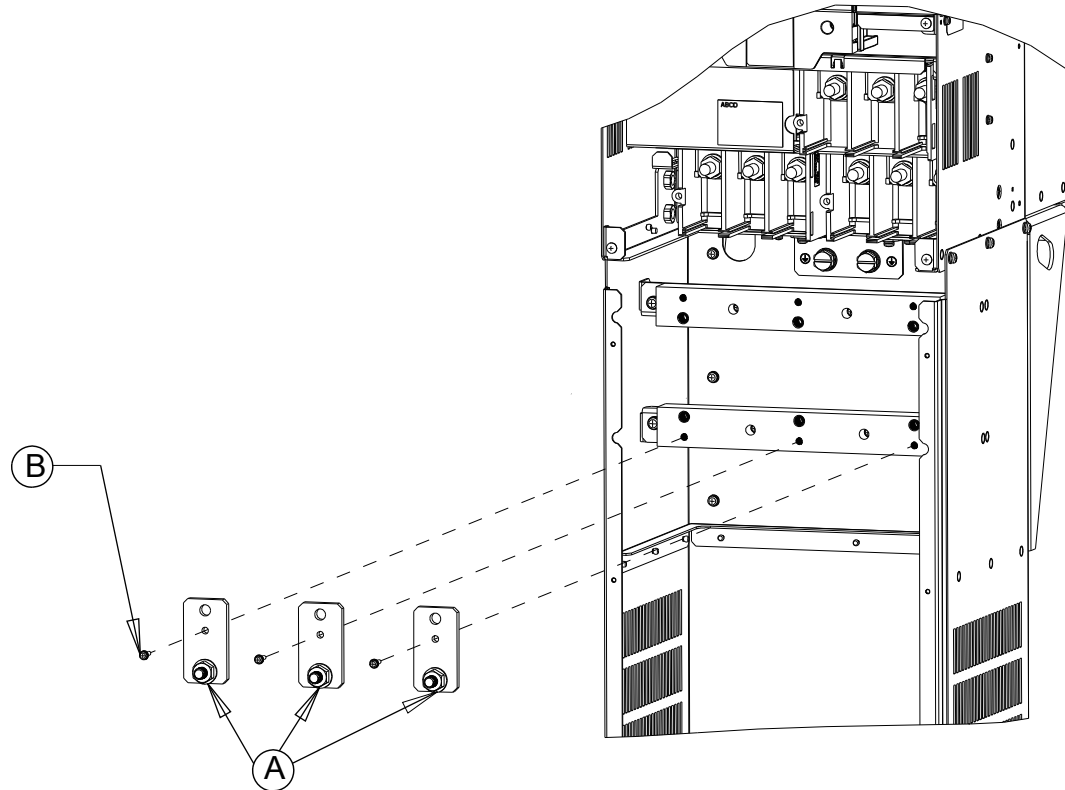


**A - Customer Busbar**  
**B - M10 Nut**

**C - Bolt (M10 × 30)**

**Figure 5.22 Assemble the Customer Busbar**

11. Use a M4 × 16 pan head screw to attach the customer busbar to the fuse support insulators.  
 Do not fully tighten the hardware.  
 Repeat this process three times.



**A - Customer Busbar Assembly**

**B - Screw (M4 × 16 pan head screw)**

**Figure 5.23 Attach the Customer Busbar Assemblies**

12. Use an M4 × 16 pan head screw to attach the remaining busbars to the fuse support insulators.  
 Use the existing terminal block hardware to attach the left busbar to Terminal R/L1. Attach the center busbar to Terminal S/L2, and attach the right busbar to Terminal T/L3.  
 Do not fully tighten the hardware.  
 Repeat this process three times.

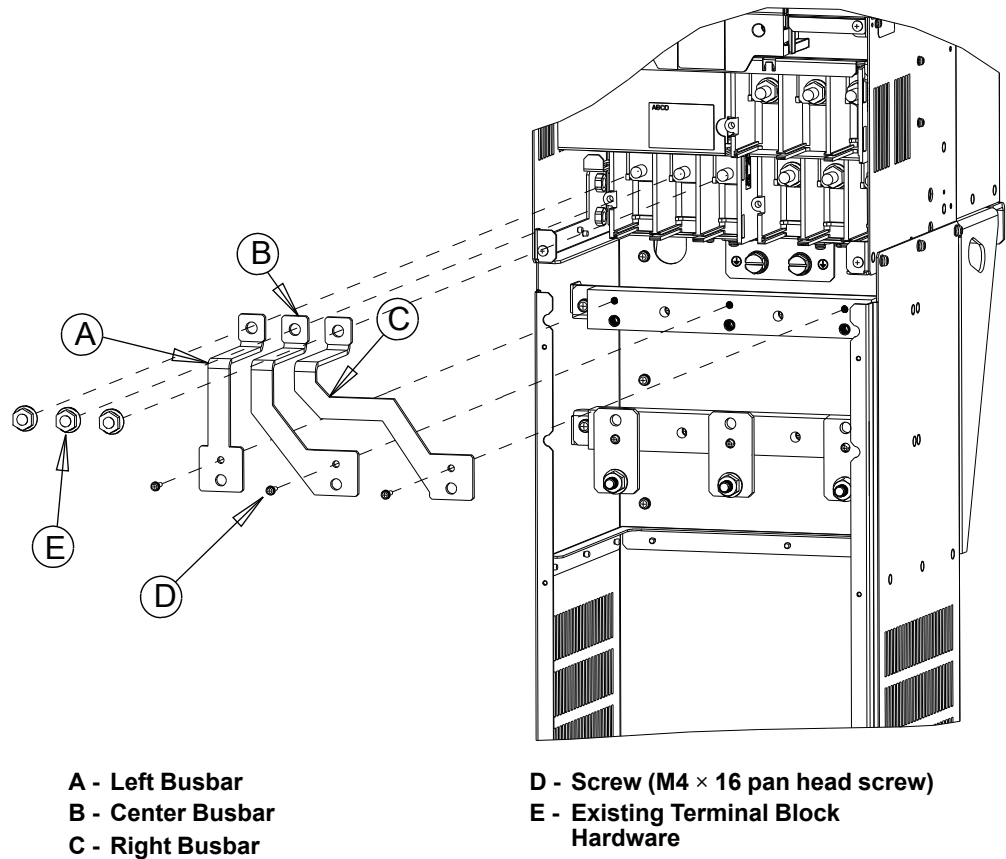


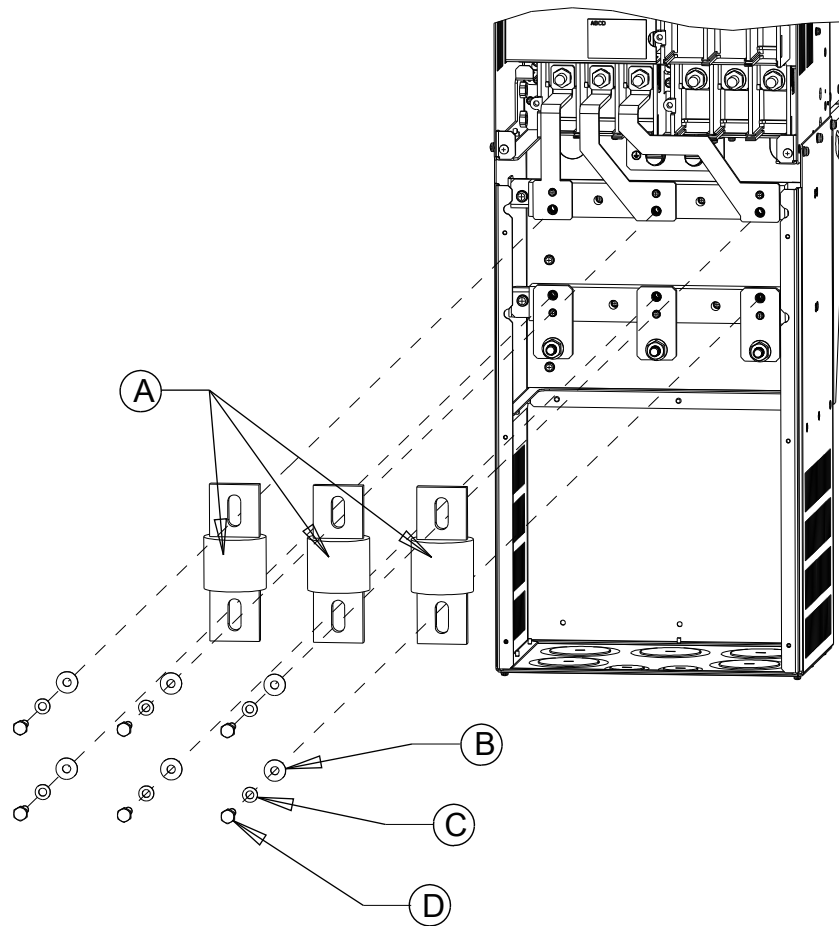
Figure 5.24 Attach the Remaining Busbars

13. Use [Table 5.3](#) to select the correct fuses for your installation. Fuses are not provided in the kit.

Table 5.3 Semiconductor Fuse Selection

| Drive Model  | Semiconductor Fuse<br>Manufacturer: EATON/Bussmann or Mersen | Yaskawa Part Number |
|--------------|--------------------------------------------------------------|---------------------|
| 4208         | FWH-500A (EATON/Bussmann)                                    | UFU000044           |
| 2257<br>4250 | FWH-600A (EATON/Bussmann)                                    | UFU000856           |
| 2313<br>4302 | FWH-700A (EATON/Bussmann)                                    | UFU000046           |
| 5125<br>5144 | A070UD31LI250 (Mersen)                                       | UFU000977           |

14. Use two M8 × 30 bolts, M8 lock washers, and M8 fender washers to attach the fuses to the busbars. Tighten the hardware to a tightening torque of 9 to 11 N·m (79 to 95 in·lb). Repeat this process three times.



**A - Fuses x 3**

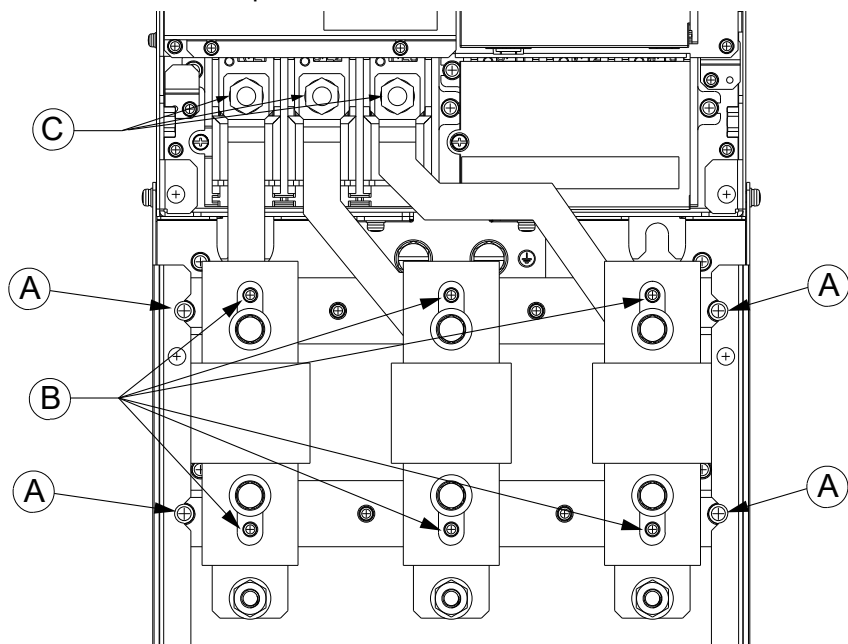
**B - Fender Washer (M8)**

**C - Lock Washer (M8)**

**D - Bolt (M8 × 30)**

**Figure 5.25 Attach the Fuses**

15. Fully tighten the hardware from Steps 9, 11, and 12.



**A - M6 × 14 screws.** Tighten these screws first. Tighten the screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).

**B - M4 × 16 screws.** Tighten these screws second. Tighten the screws to a tightening torque of 1.5 to 2 N·m (9 to 12 in·lb).

**C - Existing Terminal Hardware.** Tighten this hardware last. Tighten the hardware to a tightening torque of 20 N·m (177 in·lb).

Figure 5.26 Tighten Hardware

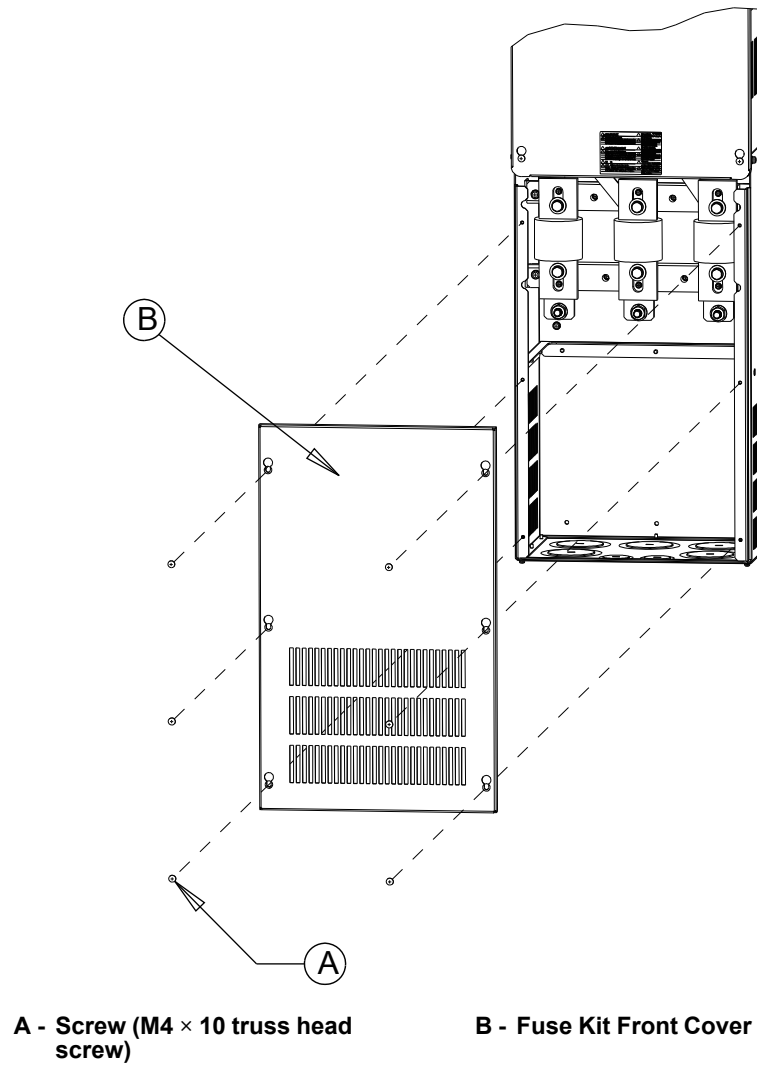
16. Select the AC conductor wire gauges, tightening torques, and closed-loop crimp terminals based on [Main Circuit Wire Gauges and Tightening Torques on page 6](#) and [Closed-Loop Crimp Terminals on page 6](#). Connect input AC conductors as specified in the drive manual. Fully tighten the hardware from step 10.

17. Reinstall the drive front cover.

18. Use six M4 × 10 truss head screws to attach the fuse kit front cover.

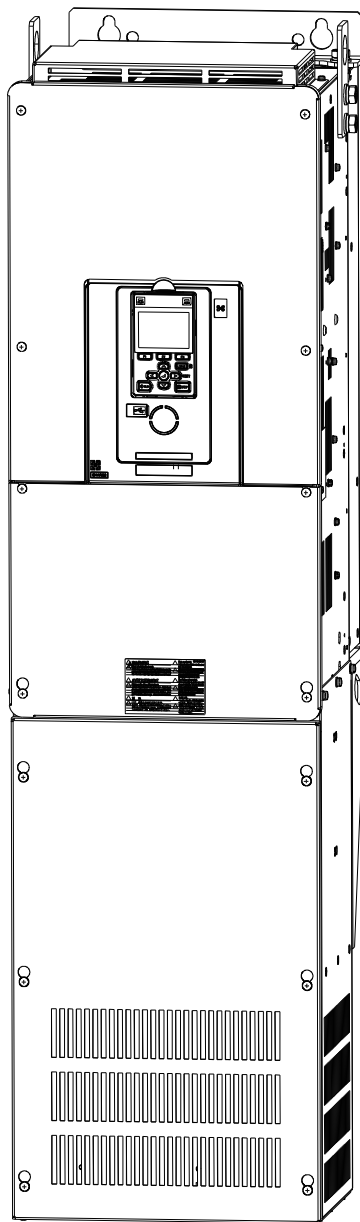
Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).





**Figure 5.27 Reattach the Kit Front Cover**

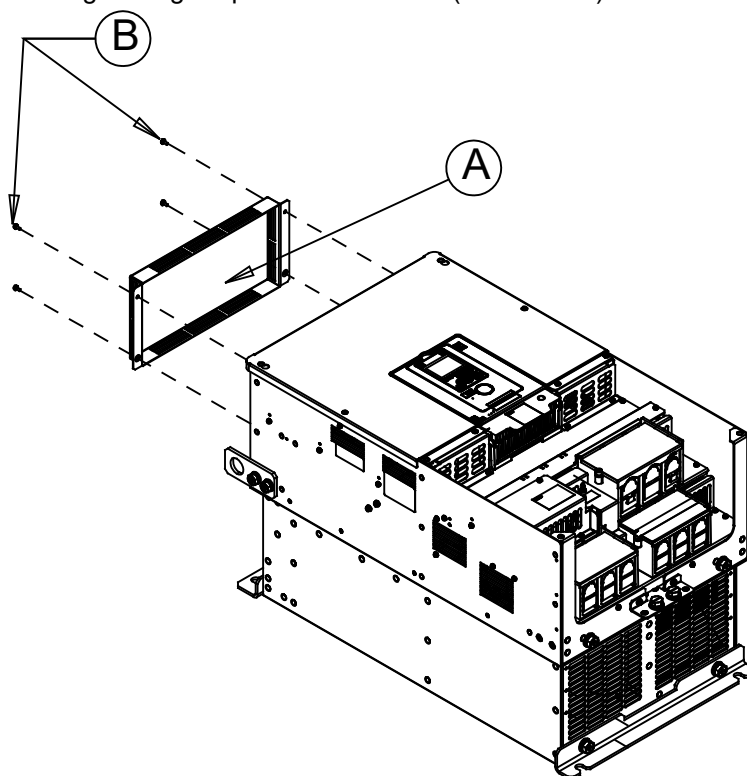
19. The kit installation is complete and the drive is now fitted with a UL Type 1 enclosure.



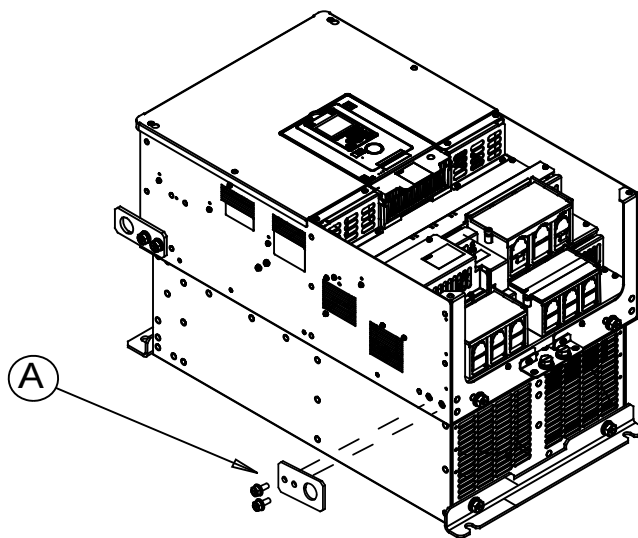
**Figure 5.28 Completed View**

**■ Models 2360, 2415, 4371, 4414, 5192 to 5289**

1. Use four M4 × 10 screws to attach the top protective cover.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).

**A - Top Protective Cover****B - Screws (M4 × 10 pan head screw)****Figure 5.29 Attach the Top Protective Cover**

2. Remove the lower hanging bracket from each side of the drive.

**A - Hanging Bracket****Figure 5.30 Hanging Bracket**

3. Use six M5 × 14 pan head screws to attach the support brackets.  
Tighten the screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).

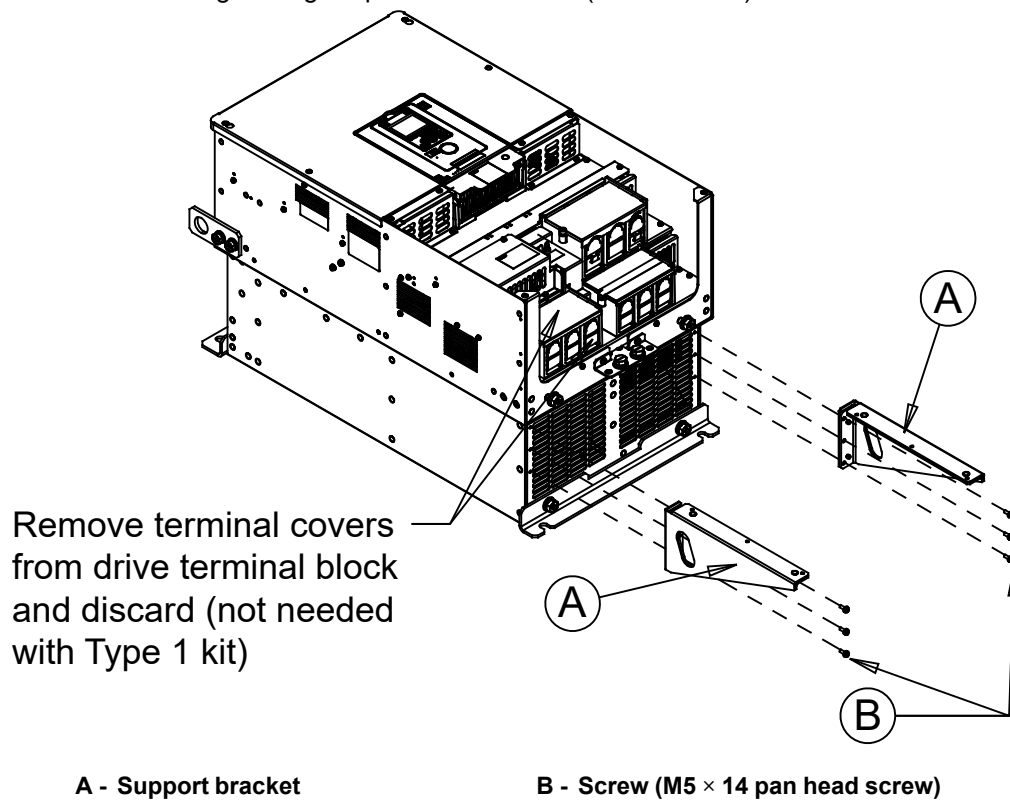
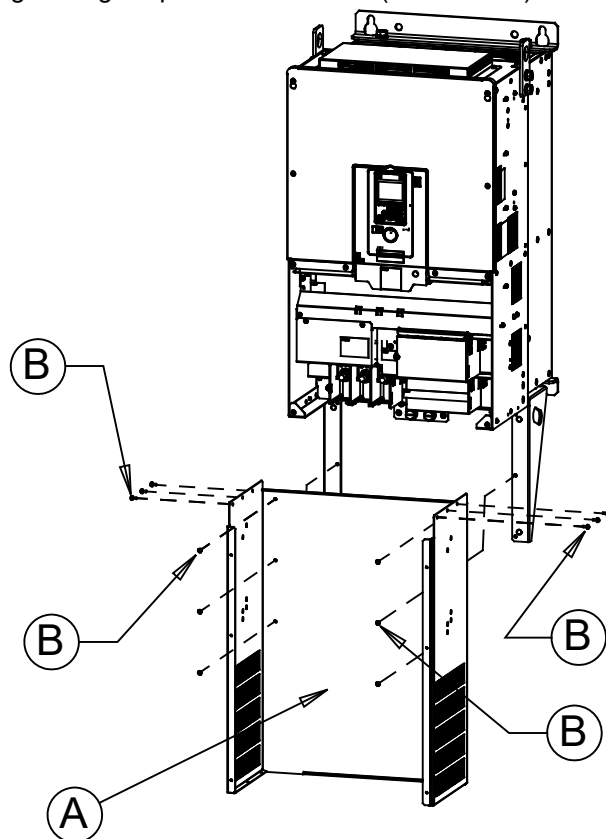


Figure 5.31 Attach the Support Brackets to the Drive

4. Use twelve M4 × 10 pan head screws to attach the bottom housing to the support brackets. Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).

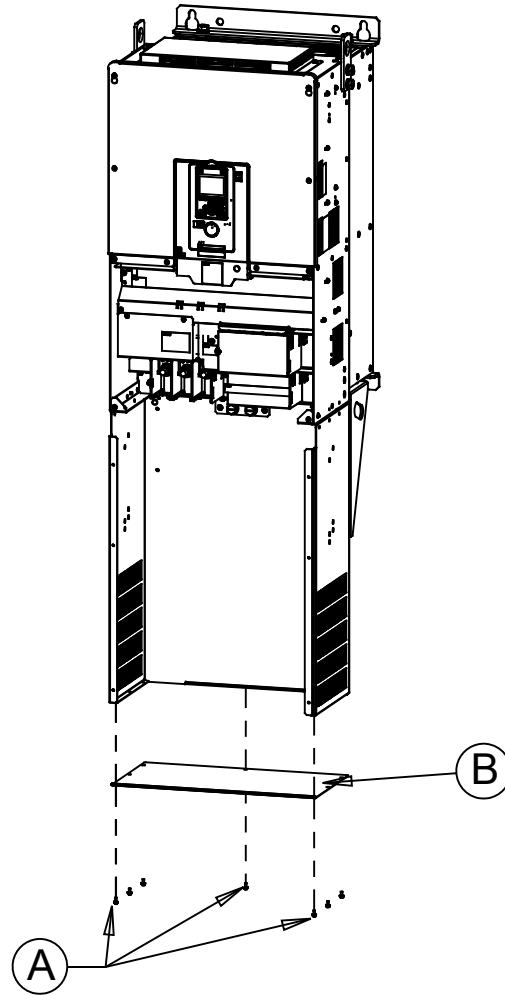


A - Bottom Housing

B - Screw (M4 × 10 pan head screw)

Figure 5.32 Attach the Bottom Housing to the Support Brackets

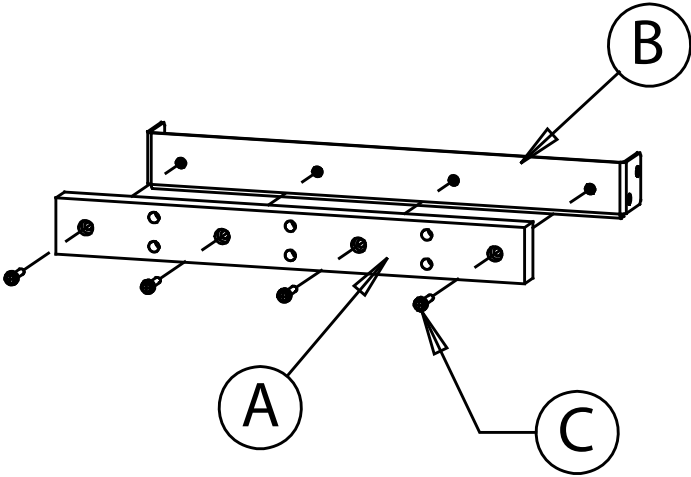
5. Use seven M4 × 10 pan head screws to attach the bottom cover to the bottom housing.  
Cut the knockout holes in the bottom cover as required.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



A - Screw (M4 × 10 pan head screw)      B - Bottom Cover

Figure 5.33 Attach the Bottom Cover

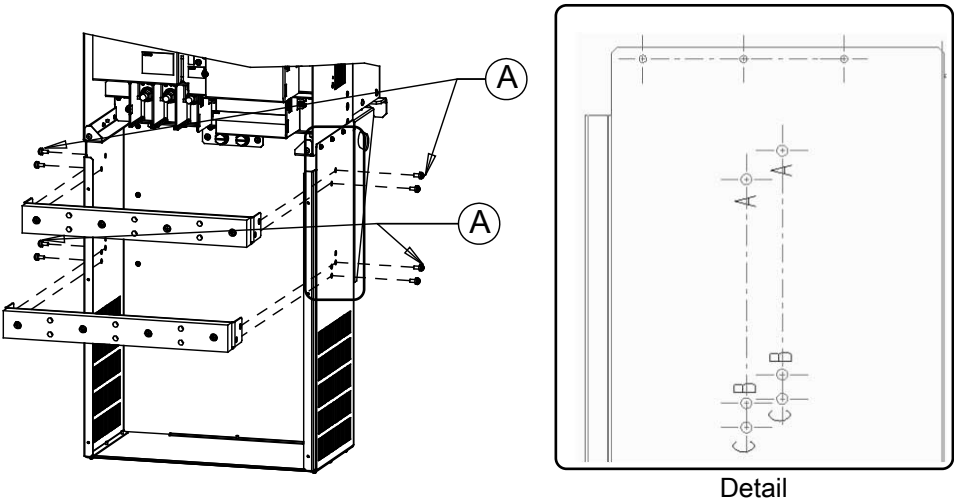
6. Use six M6 × 30 pan head screws to assemble the fuse brackets.  
Tighten the screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).  
Repeat this process twice.



A - Fuse Support Insulator  
B - Fuse Support Bracket  
C - Screw (M6 × 30 pan head screw)

Figure 5.34 Assemble the Fuse Support Bracket

7. Install drive output wiring.  
8. Use four M6 × 14 pan head screws to loosely attach the fuse bracket to the bottom housing.  
Repeat this process twice.



A - Screw (M6 × 14 pan head screw)

Figure 5.35 Attach the Fuse Support Brackets

| Upper Support Bracket                |                  |
|--------------------------------------|------------------|
| Drive Model                          | Use Holes Marked |
| 2360, 2415, 4371, 4414, 5192 to 5289 | A                |

| Lower Support Bracket                                 |                  |
|-------------------------------------------------------|------------------|
| Drive Model                                           | Use Holes Marked |
| 4371, 5192 to 5289<br>2360, 4414 (with fuse FWH-800A) | B                |
| 2415<br>2360, 4414 (with fuse FWH-1000B)              | C                |

9. Use two M12 × 32 bolts, M12 flat washers, M12 lock washers, and M12 nuts to assemble the customer busbars.  
Do not fully tighten the hardware.  
Repeat this process three times.

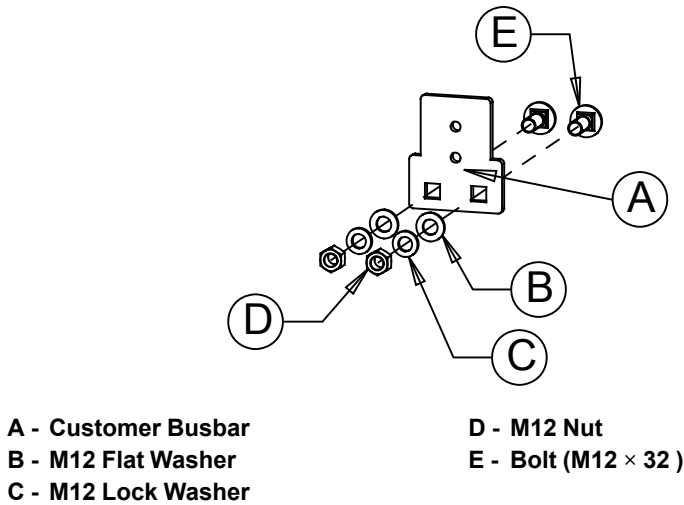
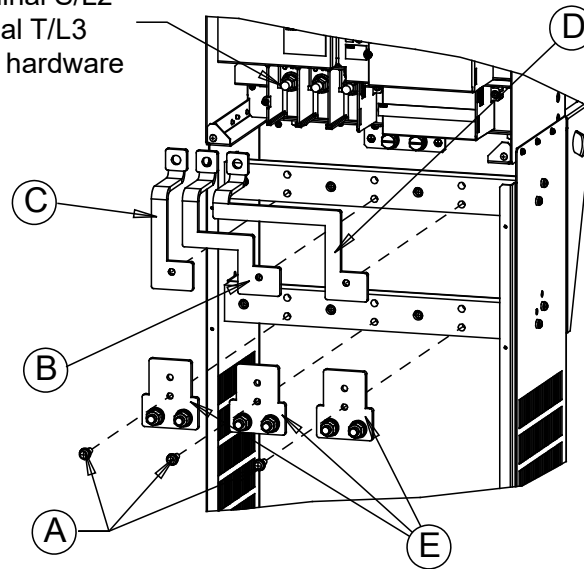


Figure 5.36 Assemble the Customer Busbar

10. Use three M8 × 25 screws to attach the customer busbars to the fuse support insulators.  
Attach the remaining busbars as shown.  
Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).  
Tighten the drive terminals (R/L1, S/L2, and T/L3) to 35 N·m (310 in·lb).  
Terminal nuts are M12.



Attach left busbar to Terminal R/L1  
 Attach center busbar to Terminal S/L2  
 Attach right busbar to Terminal T/L3  
 Using existing terminal block hardware



**A - Screw (M8 × 25)**  
**B - Center Busbar**  
**C - Left Busbar**

**D - Right Busbar**  
**E - Customer Busbar**

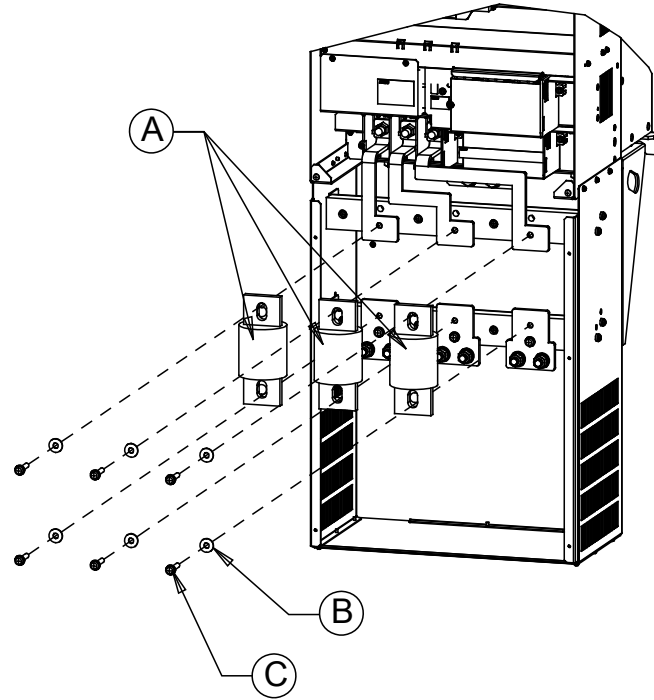
**Figure 5.37 Attach the Busbar**

11. Use [Table 5.4](#) to select the correct fuses for your installation. Fuses are not provided in the kit.

**Table 5.4 Semiconductor Fuse Selection**

| Drive Model  | Semiconductor Fuse<br>Manufacturer: Eaton/Bussmann or Mersen | Yaskawa Part Number    |
|--------------|--------------------------------------------------------------|------------------------|
| 2415         | FWH-1000B (Eaton/Bussmann)                                   | UFU000048              |
| 4371         | FWH-800A (Eaton/Bussmann)                                    | UFU000047              |
| 2360<br>4414 | FWH-800A or FWH-1000B (Eaton/Bussmann)                       | UFU000047 or UFU000048 |
| 5192         | A070UD32LI350 (Mersen)                                       | UFU000801              |
| 5242<br>5289 | A070UD32LI400 (Mersen)                                       | UFU000802              |

12. Use six M8 × 35 screws and M8 fender washers to attach the fuses to the customer busbars. Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).



A - Fuses x 3

B - Fender Washer (M8)

C - Screw (M8 × 35)

Figure 5.38 Attach the Customer Busbar

13. Select the AC conductor wire gauges, tightening torques, and closed-loop crimp terminals based on [Main Circuit Wire Gauges and Tightening Torques on page 6](#) and [Closed-Loop Crimp Terminals on page 6](#). Connect input AC conductors as specified in the drive manual. Fully tighten the hardware from step 9.
14. Use eight M4 × 10 truss head screws to attach the upper and lower front covers to the bottom housing.  
Tighten the eight M6 fuse support bracket screws from step 8.  
Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).  
Tighten the M6 screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).

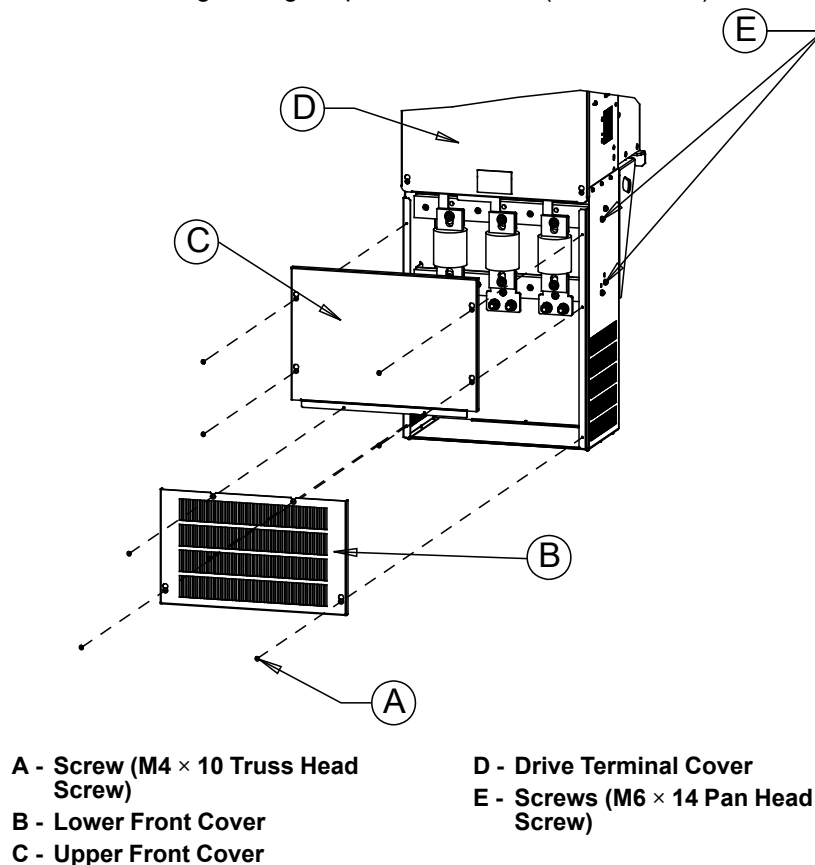
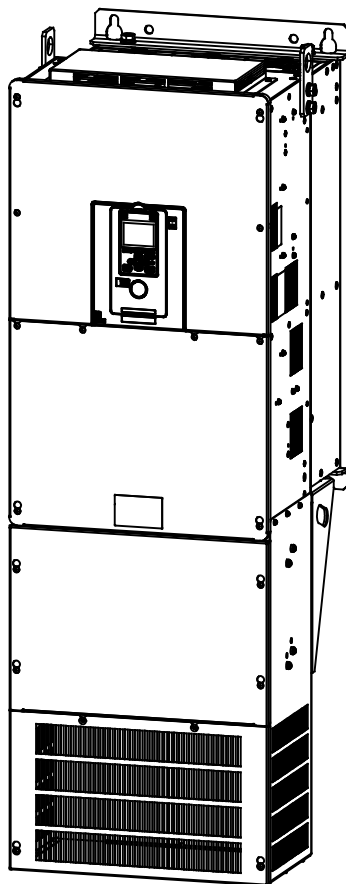


Figure 5.39 Reattach the Front Cover

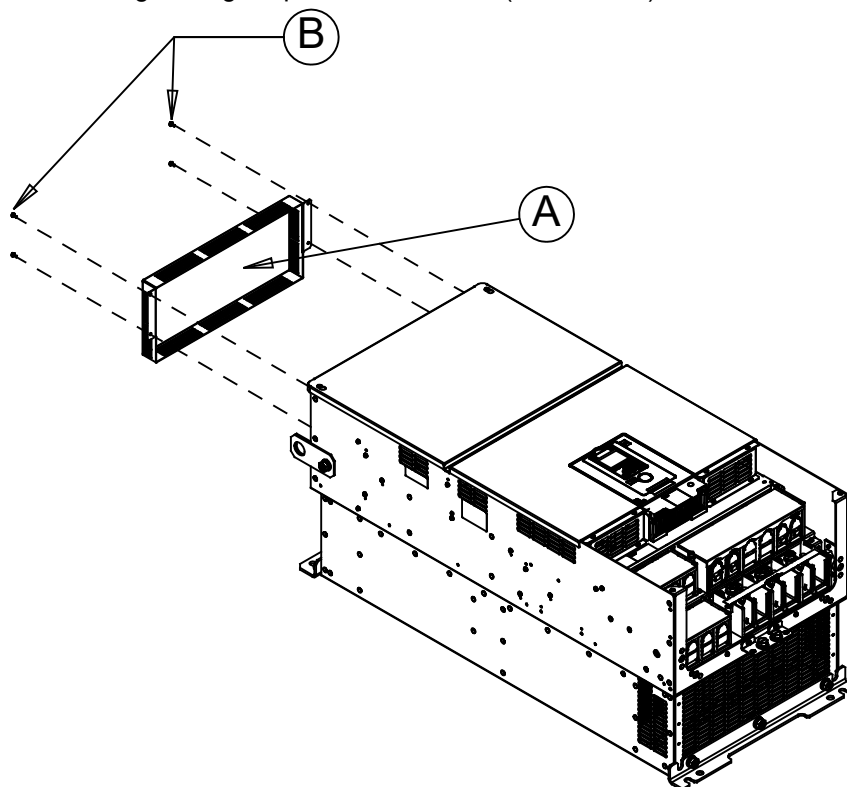
15. The kit installation is complete and the drive is now fitted with a UL Type 1 enclosure.



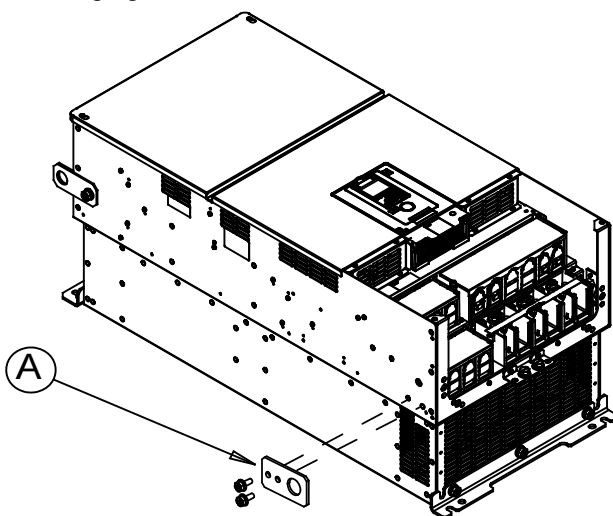
**Figure 5.40 Completed View**

**■ Models 4477 to 4720 and 5382 to 5472**

1. Use four M4 × 10 pan head screws to attach the top protective cover.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).

**A - Top Protective Cover****B - Screws (M4 × 10 pan head screw)****Figure 5.41 Attach the Top Protective Cover**

2. Remove the lower hanging bracket from each side of the drive.

**A - Hanging Bracket****Figure 5.42 Hanging Bracket**

3. Use six M5 × 14 pan head screws to attach the support brackets.  
Tighten the screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).

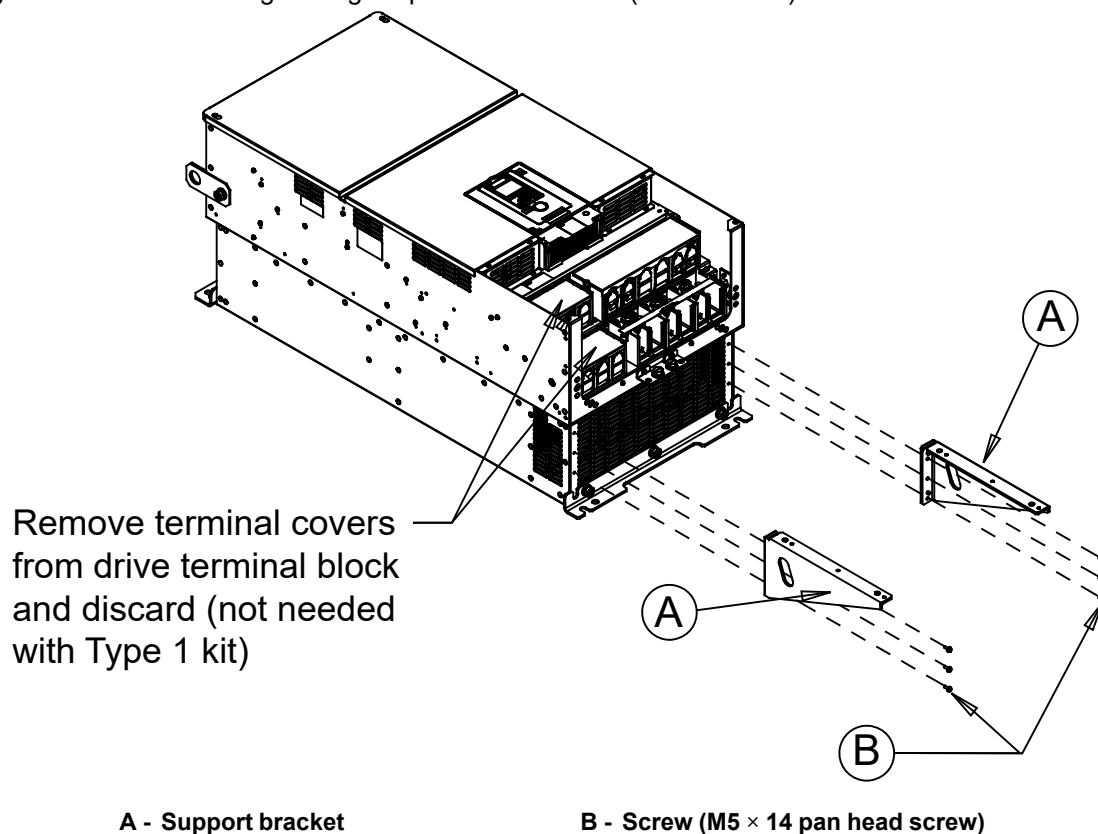
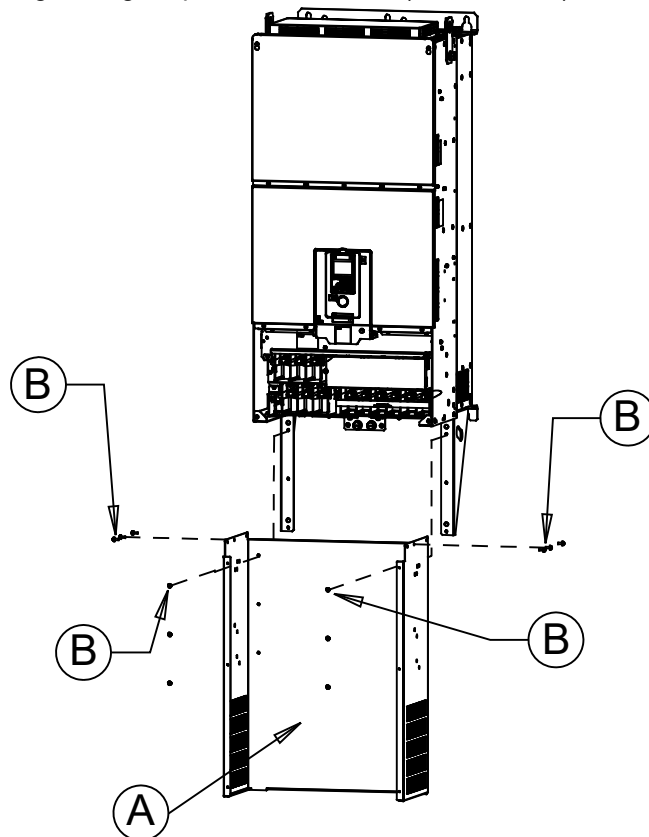


Figure 5.43 Attach the Support Brackets to the Drive

4. Use twelve M5 × 14 pan head screws to attach the bottom housing to the support brackets. Tighten the screws to a tightening torque of 2 to 2.5 N·m (18 to 22 in·lb).

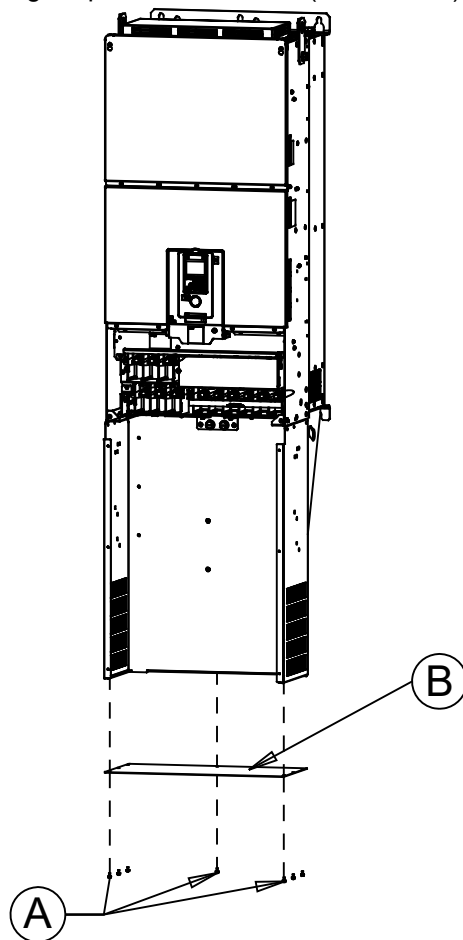


A - Bottom Housing

B - Screw (M5 × 14 pan head screw)

Figure 5.44 Attach the Bottom Housing to the Support Brackets

5. Use seven M4 × 10 pan head screws to attach the bottom cover to the bottom housing.  
Cut the knockout holes in the bottom cover as required.  
Tighten the screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).



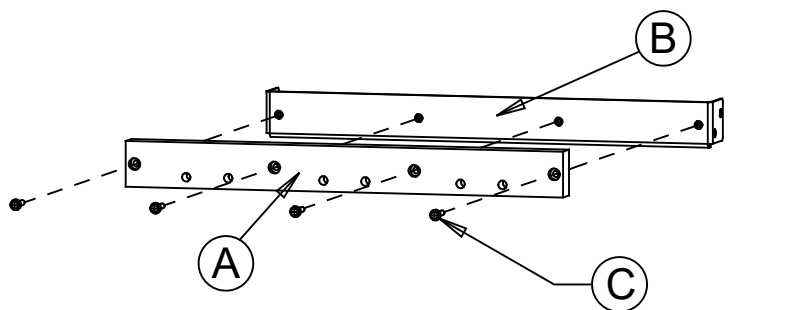
**A - Screw (M4 × 10 pan head screw)      B - Bottom Cover**

**Figure 5.45 Attach the Bottom Cover**

6. Use four M6 × 30 pan head screws to assemble the fuse brackets.  
Tighten the screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).  
Repeat this process twice.

**Note:**

Please pay close attention to the orientation of Part A and Part B in [Figure 5.46](#).



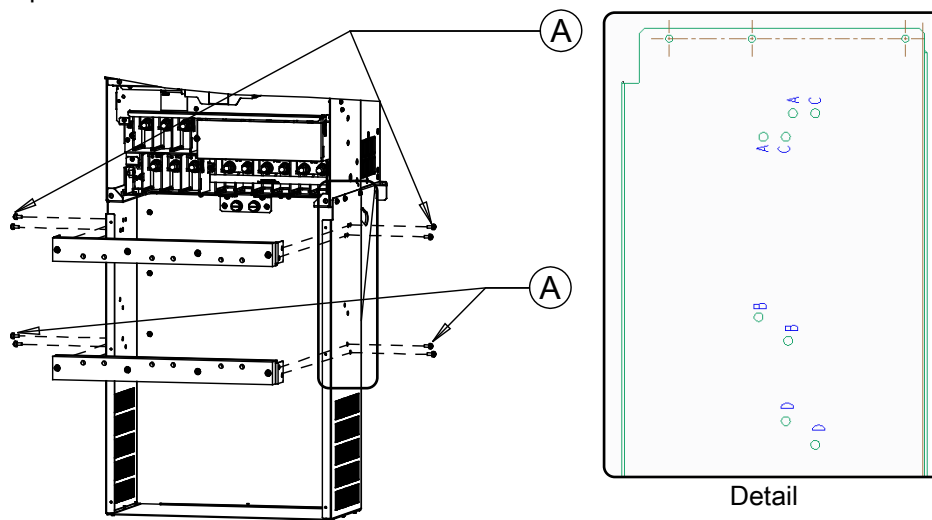
**A - Fuse Support Insulator      B - Fuse Support Bracket      C - Screw (M6 × 30 pan head screw)**

**Figure 5.46 Assemble the Fuse Support Bracket**

7. Install drive output wiring.



8. Use four M6 × 14 pan head screws to loosely attach the fuse bracket to the bottom housing. Repeat this process twice.



A - Screw (M6 × 14 pan head screw)

Figure 5.47 Attach the Fuse Support Brackets

| Upper Support Bracket               |                  |
|-------------------------------------|------------------|
| Drive Model                         | Use Holes Marked |
| 4477, 4568, 5382 to 5472            | A                |
| 4605, 4720<br>(with fuse FWH-1200B) |                  |
| 4605, 4720<br>(with fuse FWH-1400A) | C                |
| Lower Support Bracket               |                  |
| Drive Model                         | Use Holes Marked |
| 4477, 4568, 5382 to 5472            | B                |
| 4605, 4720<br>(with fuse FWH-1200B) |                  |
| 4605, 4720<br>(with fuse FWH-1400A) | D                |

9. Use two M12 × 38 bolts, M12 flat washers, M12 lock washers, and M12 nuts to assembly the customer busbars.  
Do not fully tighten the hardware.  
Repeat this process three times.

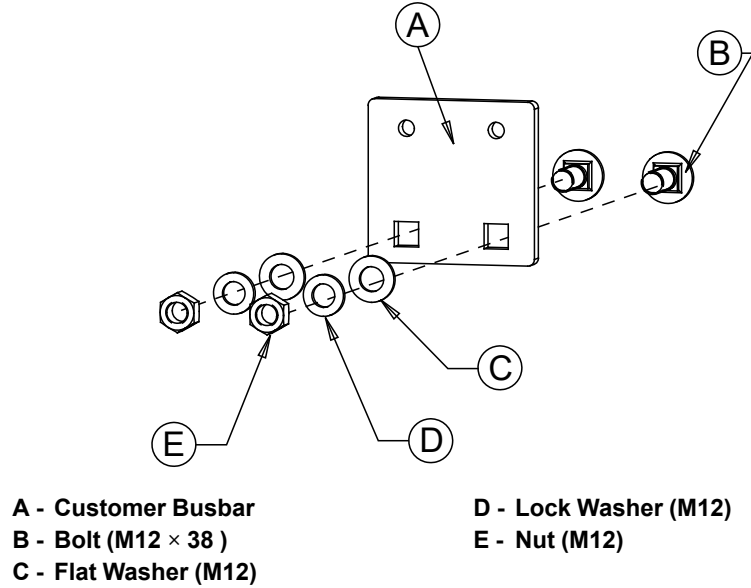


Figure 5.48 Assemble the Customer Busbar

10. Use the existing terminal hardware to attach the rear busbars to the drive terminal block.

Attach the remaining busbars as shown.

Tighten the drive terminals (R/L1, S/L2, and T/L3) to 35 N·m (310 in·lb)

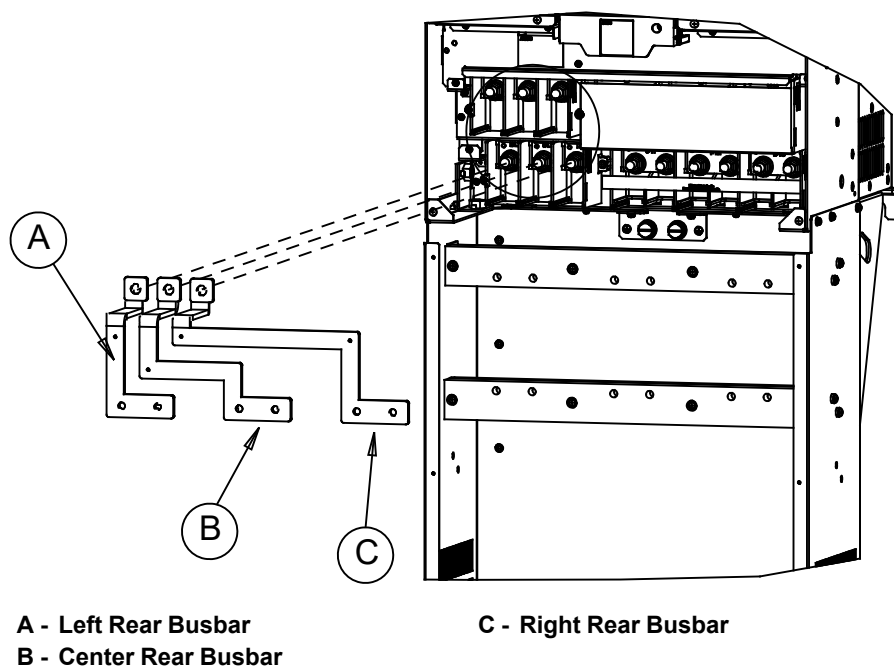
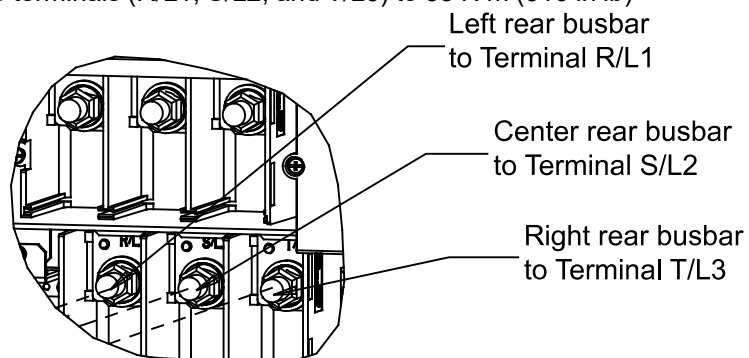


Figure 5.49 Attach the Rear Busbars

11. Use the existing terminal hardware to attach the front busbars to the drive terminal block.

Attach the remaining busbars as shown.

Use four M4 × 16 screws to attach the front busbars to the rear busbars.

Tighten the drive terminals (R/L1, S/L2, and T/L3) to 35 N·m (310 in·lb).

Terminal nuts are M12.

Tighten the M4 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).

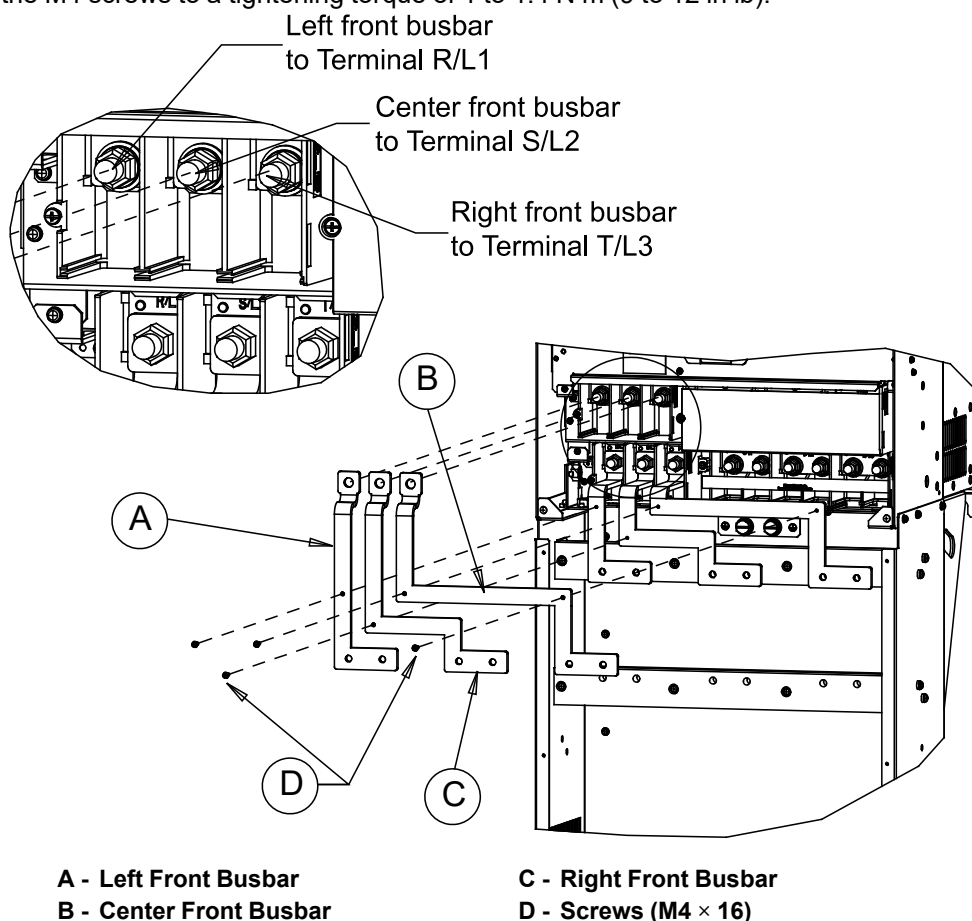


Figure 5.50 Attach the Front Busbars

12. Use [Table 5.5](#) to select the correct fuses for your installation.

Table 5.5 Semiconductor Fuse Selection

| Drive Model | Semiconductor Fuse<br>Manufacturer: EATON/Bussmann | Yaskawa Part Number    | Steps  |
|-------------|----------------------------------------------------|------------------------|--------|
| 4477, 4568  | FWH-1000B or FWH-1200B (EATON/Bussmann)            | UFU000048 or UFU000049 | 13, 14 |
| 4605, 4720  | FWH-1200B or FWH-1400A (EATON/Bussmann)            | UFU000049 or UFU000050 | 15, 16 |
| 5382, 5412  | FWP-600A (EATON/Bussmann)                          | UFU000254              | 13, 14 |
| 5472        | FWP-700A (EATON/Bussmann)                          | 05P00017-0214          | 13, 14 |

13. Use six M8 × 30 screws to attach the previously installed busbars to the upper fuse support insulator. Use the supplied screws to attach the customer busbars to the lower fuse support insulator. Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).

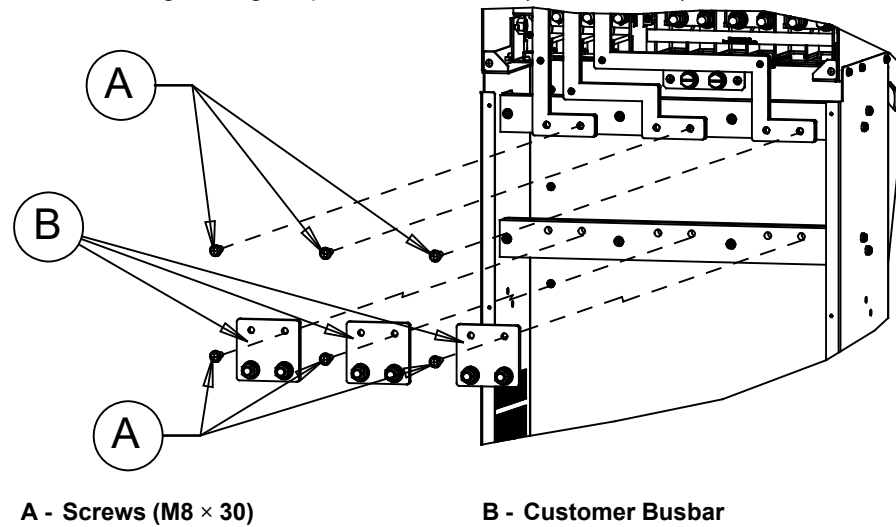


Figure 5.51 Attach the Customer Busbar

14. Use six M8 screws and M8 flat washers to attach the fuses to the customer busbars. Use Table 5.6 to select the correct length screws for your installation. Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).

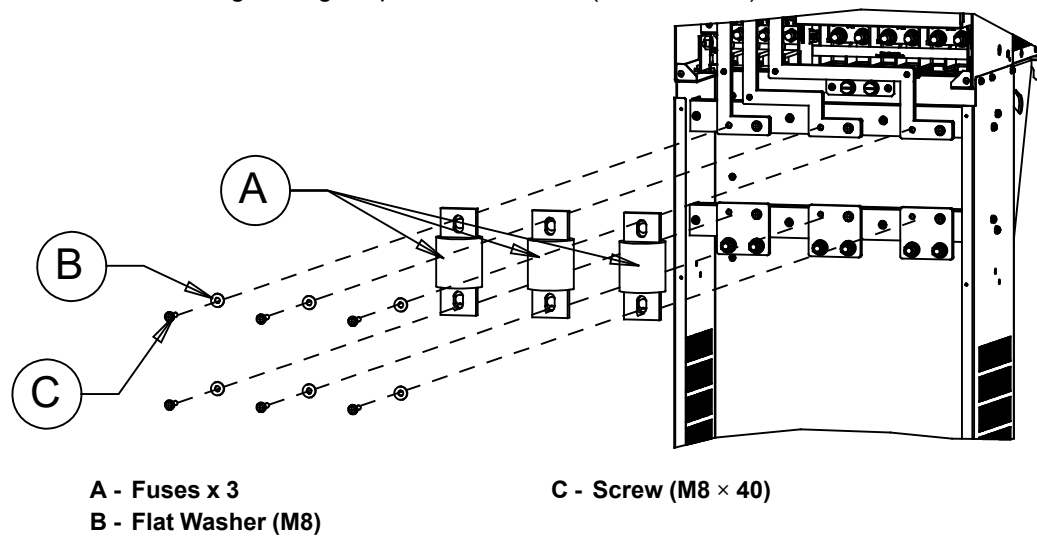
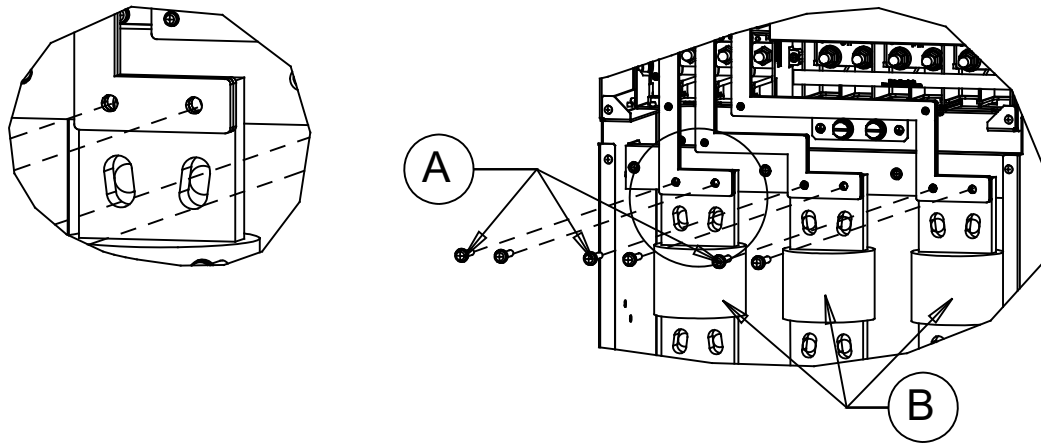


Figure 5.52 Attach the Customer Busbar

Table 5.6 Correct Screw Selection

| Drive Model            | Screw   | Bag ID |
|------------------------|---------|--------|
| 4477, 4568, 5382, 5412 | M8 x 40 | H3     |
| 5472                   | M8 x 35 | H4     |

15. Use six M8 × 45 screws to attach the FWH-1400A fuses from UFU000050 to the busbars. Put the fuses behind the busbars and in front of the upper fuse support insulator. Fuses must be between upper fuse support and busbars. Use the supplied screws to attach the busbars and fuses to the upper fuse support insulator. Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).

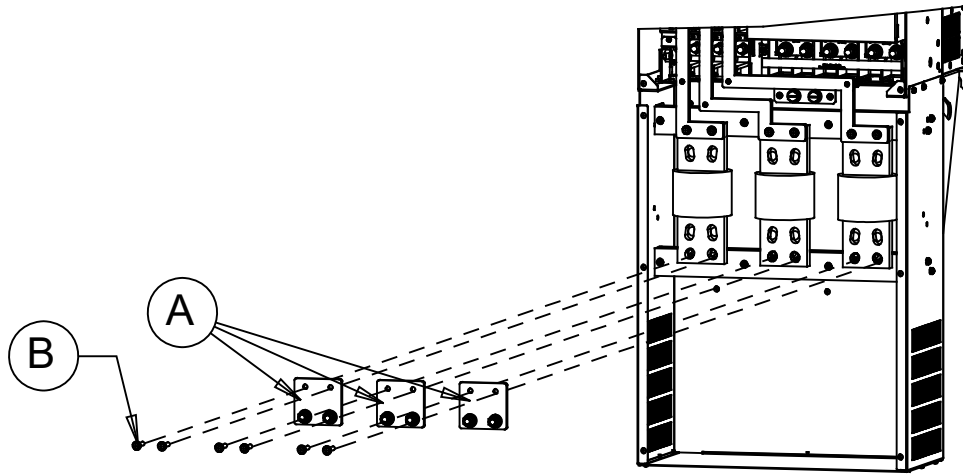


A - Screws (M8 × 45)

B - FWH-1400A Fuses x 3

**Figure 5.53 Attach Fuses to the Busbar**

16. Use six M8 × 45 screws to attach the customer busbars to the fuses.  
Tighten the screws to a tightening torque of 9 to 11 N·m (79 to 95 in·lb).



A - Fuses x 3

B - Screw (M8 × 45)

**Figure 5.54 Attach Customer Busbar to the Fuses**

17. Select the AC conductor wire gauges, tightening torques, and closed-loop crimp terminals based on [Main Circuit Wire Gauges and Tightening Torques on page 6](#) and [Closed-Loop Crimp Terminals on page 6](#). Connect input AC conductors as specified in the drive manual. Fully tighten the hardware from step 9.
18. Use eight M4 × 10 truss head screws to attach the upper and lower front covers to the bottom housing.  
 Tighten the eight M6 fuse support bracket screws from step 8.  
 Tighten the M4 × 10 screws to a tightening torque of 1 to 1.4 N·m (9 to 12 in·lb).  
 Tighten the M6 × 14 screws to a tightening torque of 4 to 5 N·m (35 to 43 in·lb).

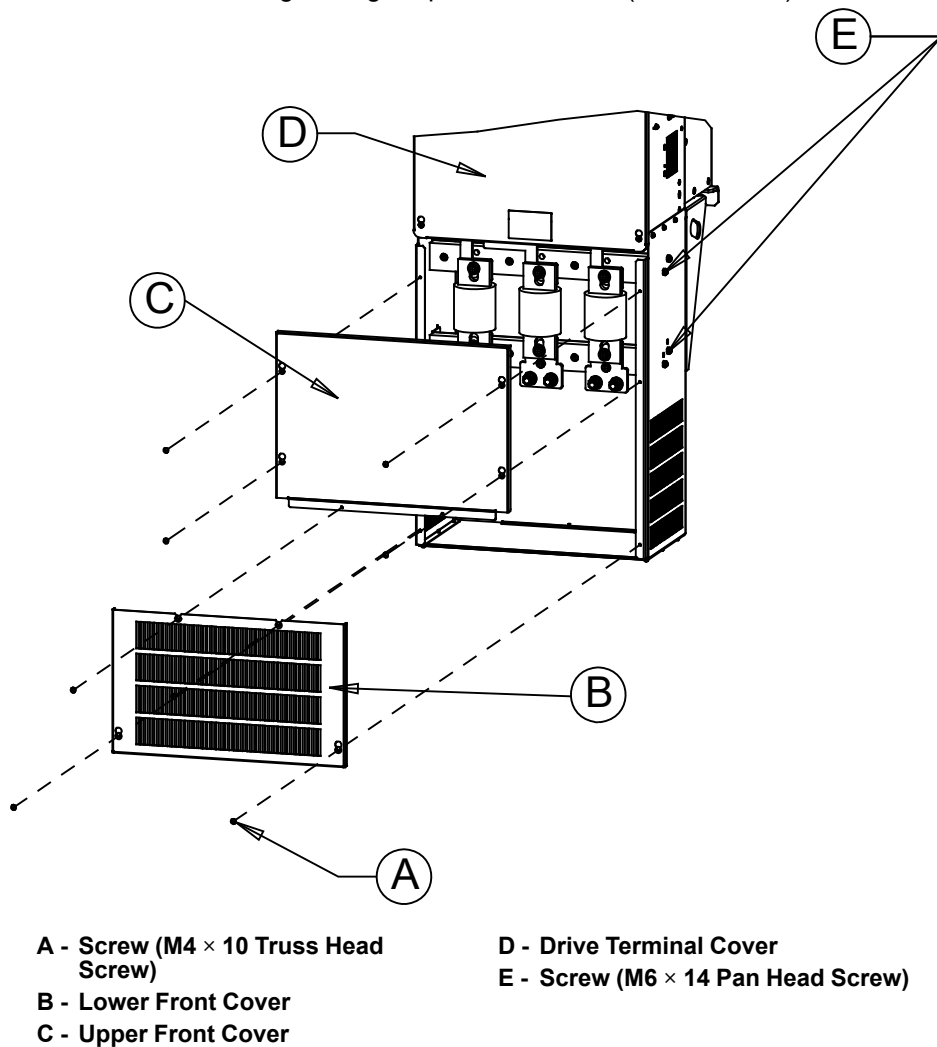
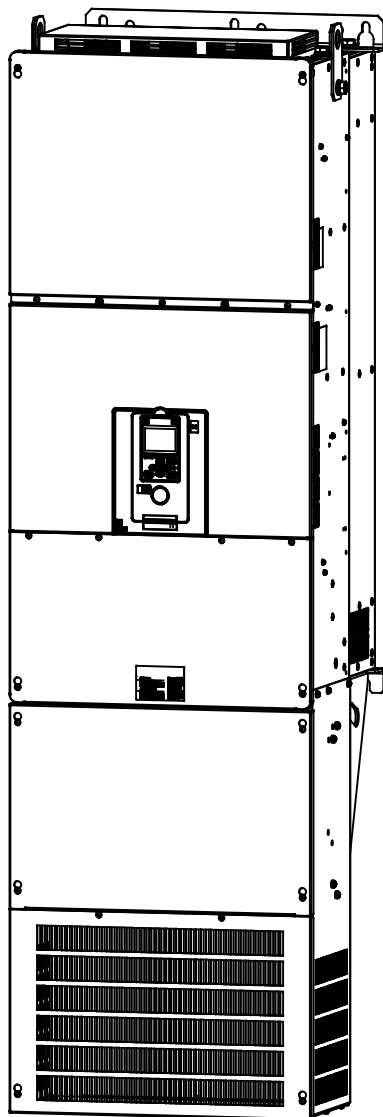


Figure 5.55 Attach the Front Covers

19. The kit installation is complete and the drive is now fitted with a UL Type 1 enclosure.



**Figure 5.56** Completed View



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## Revision History

| Date of Publication | Revision Number | Section | Revised Content                                                                                     |
|---------------------|-----------------|---------|-----------------------------------------------------------------------------------------------------|
| February 2025       | <4>             | 5       | Revision: Updated torque values.                                                                    |
| September 2024      | <3>             | All     | Addition: Kit UUX002315 to support models 2257, 2313, 2360, 2415, 4208, 4250, 4302, 5125, and 5144. |
|                     |                 |         | Addition: Models 2169, 2211, 4140, 4168, 5062, 5077, and 5099.                                      |
| April 2020          | <2>             | All     | Addition: Applicability to models 5192 to 5472.                                                     |
| June 2019           | <1>             | 5       | Addition: Semiconductor fuse part numbers.                                                          |
| January 2019        | -               | -       | First Edition                                                                                       |

# YASKAWA

## UL TYPE 1 FUSE-READY KIT INSTALLATION MANUAL

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