

# Inverting Fault Circuit Breaker Kit for FlexPak 3000 and WebPak 3000 Digital DC Drives 40-75 HP @ 230 VAC and 75-150 HP @ 460 VAC

Model Numbers: 906FK1101 and 906FK1201

## Instruction Manual D2-3330-2



**ATTENTION:** Only qualified personnel familiar with the construction and operation of this equipment and the hazards involved should install, adjust, operate, and/or service this equipment. Read and understand this instruction manual in its entirety before proceeding. Failure to observe this precaution could result in severe bodily injury or loss of life.

**ATTENTION:** The user is responsible for conforming with all applicable local, national, and international codes. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

## Product Description

This instruction manual describes how to install the optional Inverting Fault Circuit Breaker kit on regenerative FlexPak™ 3000 and WebPak™ 3000 drives (40-75 HP @ 230 VAC and 75-150 HP @ 460 VAC). Use of this kit is recommended when applying regenerative drives to high inertia loads. High inertia loads are those in which the reflected load to the motor is equal to or greater than the motor's load, or in which the drive is frequently regenerating power to the AC line, such as in unwind and pay-off applications.

An inverting fault typically occurs as a result of a loss of the AC line. If this happens, the AC input transformer becomes a short circuit across the motor. Since the SCRs in the bridge no longer turn off, the motor's stored mechanical energy is regenerated into the short circuit. The inverting fault circuit breaker interrupts the generator action, protecting the SCR bridge and the motor.

The Inverting Fault Circuit Breaker is a magnetic-only breaker with an adjustable instantaneous magnetic trip unit. The trip settings are adjusted by a sliding control on the front of the breaker. The standard interrupt rating is 25,000 amperes symmetrical at 480 VAC.

In addition to the parts included in the kit, you must supply an appropriate mounting panel for the breaker kit and provide breaker wiring.

**Important:** If any other interlocks are required for your application, they must be connected in series to the Customer Interlock Input along with the circuit breaker.

Table 1 – Verifying That the Inverting Fault Circuit Breaker Matches the Drive

Drive Horsepower/Voltage Rating	Kit Model Number
40-60 HP @ 230 VAC 75-125 HP @ 460 VAC	906FK1101
75 HP @ 230 VAC 150 HP @ 460 VAC	906FK1201

Table 2 – Contents of the Inverting Fault Circuit Breaker Option

Item No.	Description	Quantity		Reliance Part Number
		906FK1101	906FK1201	
1	Inverting Fault Circuit Breaker Assembly	1	-	802274-67R
		-	1	802274-67S
2	Mounting Bracket	1	-	610274-55R
		-	1	610274-54R
3	M6 x 10 Self-tapping Screw	6	6	419062-100PJJ
4	Insulating Barrier	1	-	77800-100RG
		-	1	77800-100RH
5	M5 x 80 Screw	4	-	419062-10AHY
	M6 x 90 Screw	-	4	419062-10AJY
6	M5 Lockwasher	4	-	419064-100SH
	M6 Lockwasher	-	4	419064-100SJ
7	Bus Bar	1	1	610274-68A
8	Wire Assembly	1	1	610273-68T
9	Ring Lug	1	-	68321-19D
		-	1	68321-19F
10	Twisted Pair Wire Harness	1	1	610273-68S

## Installing The Inverting Fault Circuit Breaker



**ATTENTION:** The drive is at line voltage when disconnected to incoming AC power. Disconnect, tag, and lock out all incoming power to the drive before performing the following procedures. Failure to observe this precaution could result in severe bodily injury or loss of life.

**ATTENTION:** The user is responsible for conforming with all applicable local, national, and international codes. Failure to observe this precaution could result in damage to, or destruction of, the equipment.

Installing the Inverting Fault Circuit Breaker Kit involves the following processes:

- Mounting the Inverting Fault Circuit Breaker Kit
- Wiring the Inverting Fault Circuit Breaker
- Removing and Replacing Fuse 11FU
- Connecting the Wire Assembly
- Checking the Circuit Breaker Settings

## Mounting the Inverting Fault Circuit Breaker Kit

- Step 1. Disconnect, tag, and lock out power to the drive.
- Step 2. Choose an appropriate location for mounting the inverting fault circuit breaker. Note that wire assemblies shipped with the kit are 152.4 cm (60 inches) in length.
- Step 3. Drill the holes (5.4 mm diameter) for the six (6) M6 self-tapping screws [Item 3] provided for the inverting fault circuit breaker mounting bracket [Item 2]. Use the mounting hole pattern shown in Figure 1.

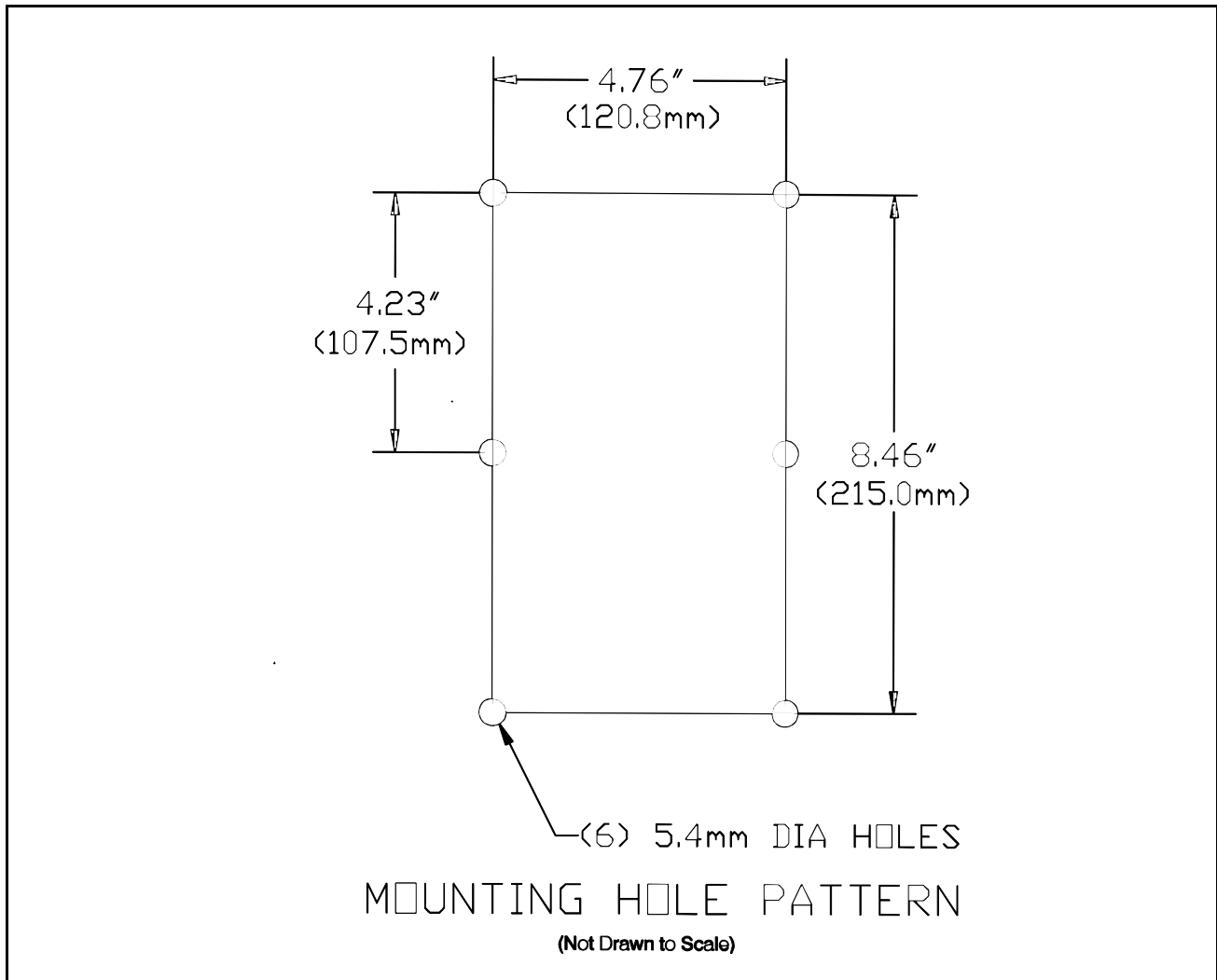


Figure 1 – Inverting Fault Circuit Breaker Mounting Bracket Hole Pattern

- Step 4. Mount the bracket [Item 2] using the six (6) M6 self-tapping screws [Item 3].
- Step 5. For the 250 A breaker, skip to step 7.  
For the 400 A breaker, continue to step 6.
- Step 6. **For the 400A breaker assembly (M/N 906FK1201) only:** Remove and set aside the 2 lug covers from the top and bottom of the breaker by unscrewing the four slotted screws. Note that the yellow and the blue/yellow striped leads coming from the breaker are routed through a slot in the bottom lug cover.

Step 7. Refer to Figure 2. Mount the circuit breaker assembly [Item 1] and the insulating barrier [Item 4] on the mounting bracket with the four (4) M5 or M6 screws [Item 5] and washers [Item 6] provided with the kit.

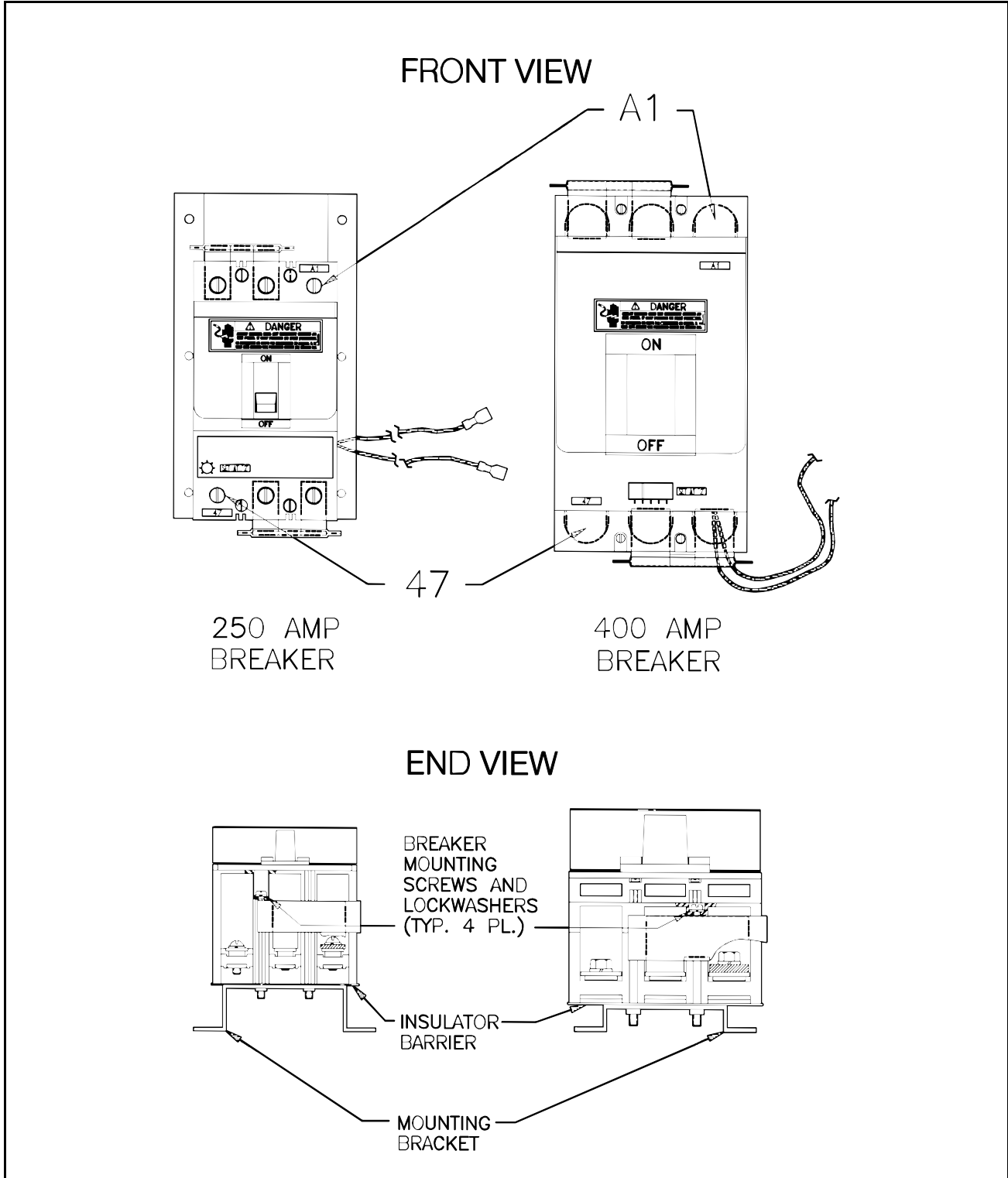


Figure 2 – Inverting Fault Circuit Breaker Mounting and Terminal Locations

## Wiring the Inverting Fault Circuit Breaker

- Step 1. Route, but do not connect, motor armature lead A1 to Inverting Fault Circuit Breaker terminal A1. See Figure 2 for the location of the breaker's A1 terminal. Terminate the breaker side of the lead with a lug of the appropriate gauge, but do not connect the lug to breaker terminal A1. The inside lug diameter should accept a 1/4" stud for the 250 A breaker or a 3/8" stud for the 400 A breaker.
- Step 2. Using wire of the same gauge as the motor leads, connect Inverting Fault Circuit Breaker terminal 47 (see Figure 2 for location) to drive motor terminal A1 (see Figure 3 for location). Terminate the breaker side of the wire with a lug of the appropriate gauge. The inside lug diameter should accept a 1/4" stud for the 250 A breaker or a 3/8" stud for the 400 A breaker.
- Step 3. Connect motor armature lead A2 to drive terminal 45 (see Figure 3 for location).

**If the motor series field is used:** Connect motor armature lead A2 to motor field lead S1. Then connect motor field lead S2 to drive terminal 45 (see Figure 3 for location).

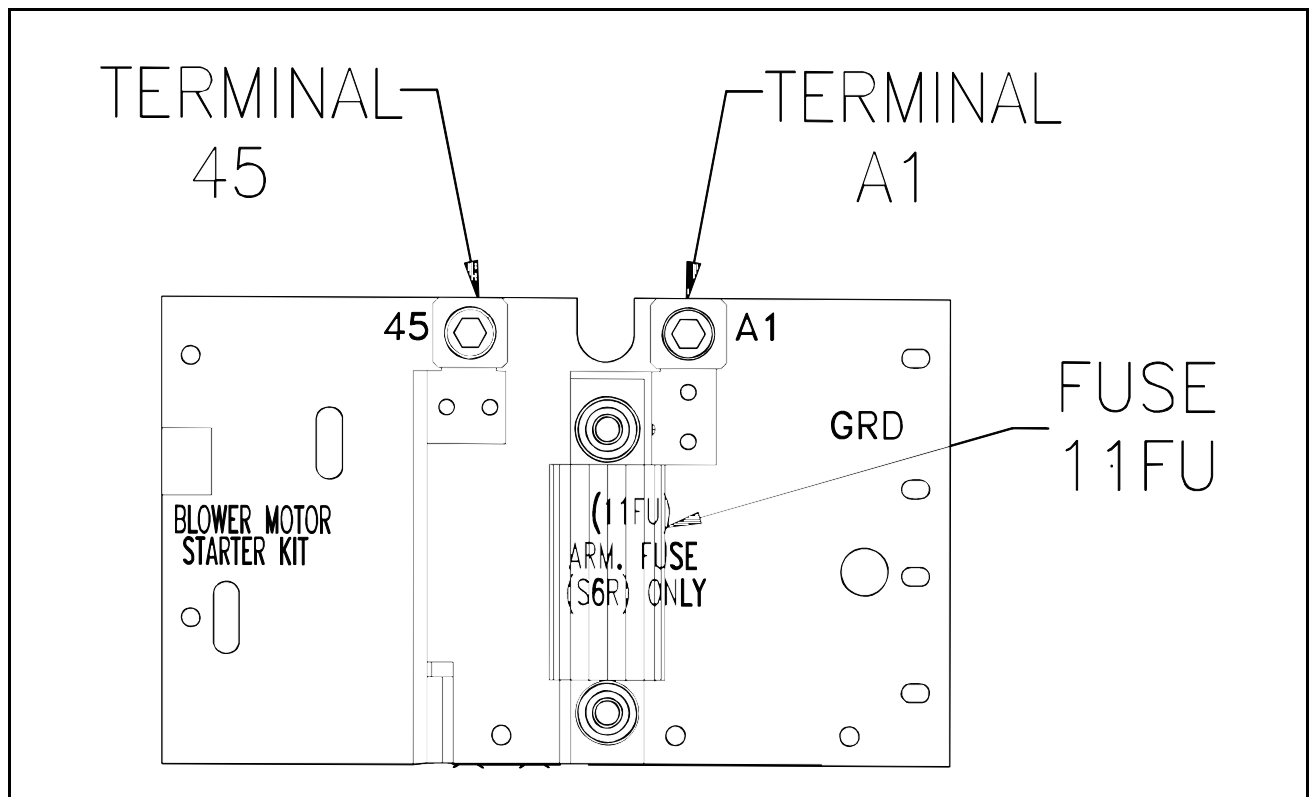


Figure 3 – Drive Motor Terminals

## Removing and Replacing Fuse 11FU

- Step 1. Remove the plastic cover over the armature fuse (labeled 11FU) on the drive. This fuse is located on the fuse panel assembly at the top front of the main chassis. Press in on the sides of the cover to slip it off the mounting hardware.
- Step 2. Remove and set aside the fasteners used to attach fuse 11FU to the drive. Remove 11FU and replace it with the bus bar [Item 7] provided with the kit. Discard the fuse. Attach the bus bar with the fasteners removed from the fuse.

## Connecting the Wire Assembly

Step 1. Locate and remove the jumper wire connecting drive terminal A1 (see Figure 3) to terminal A1 on the Power Interface board, located at the top left of the drive. (See Figure 4 for the location of the Power Interface board and for the location of terminal A1 on the Power Interface board.)

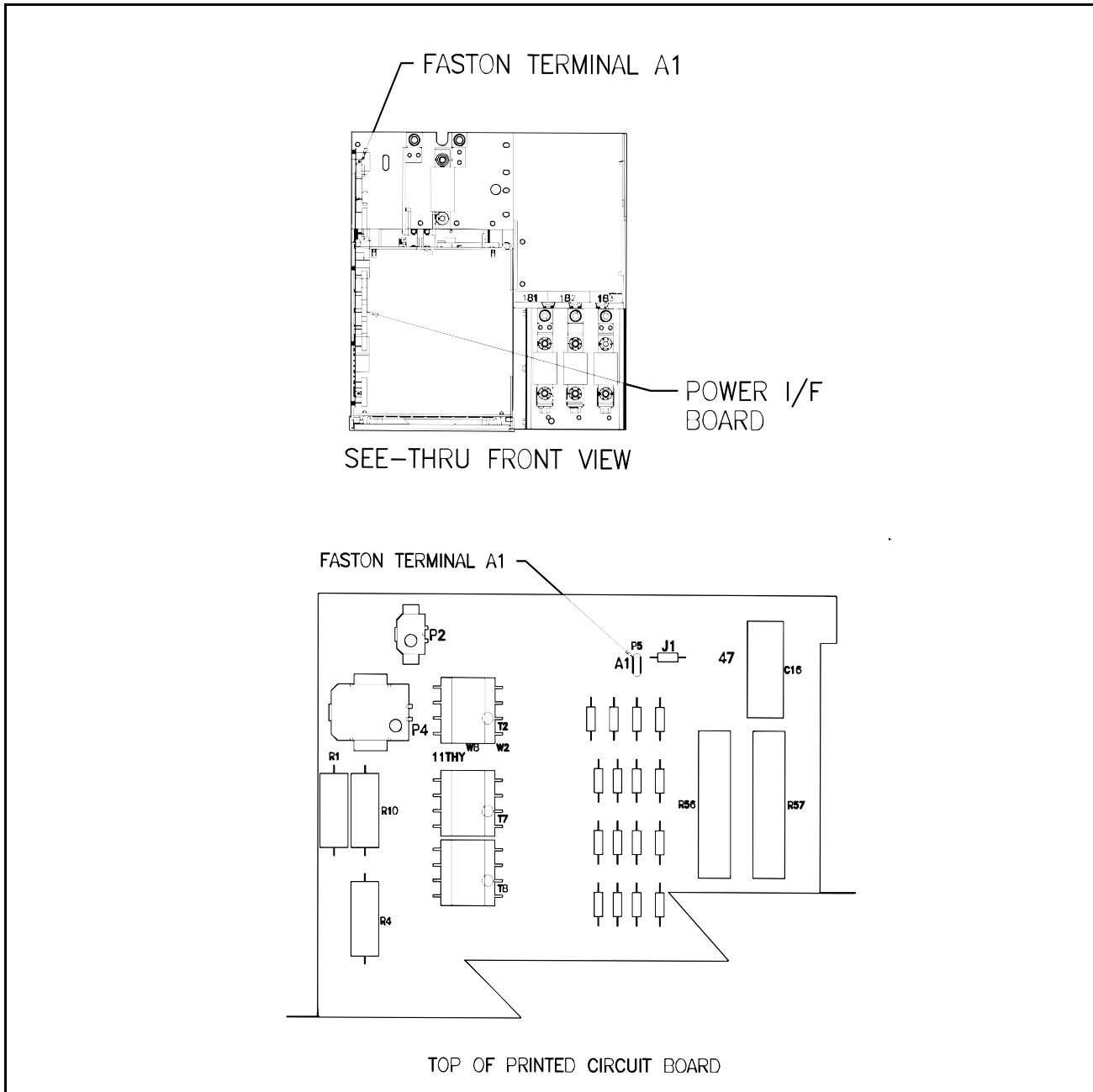


Figure 4 – Power Interface Board and Terminal A1 Locations

Step 2. Replace the fuse panel plastic cover.

Step 3. Connect the spade connector on the wire assembly [Item 8] to the A1 terminal on the Power Interface board. (See Figure 4.) Route this wire to Inverting Fault Circuit Breaker terminal A1. Cut the wire to length as required and terminate the end with the ring lug [Item 9].

- Step 4. Mount the A1 armature lead lug and the wire assembly ring lug to the A1 terminal of the Inverting Fault Circuit Breaker, using the breaker mounting screw and split ring washer. Make sure that the armature lead lug is flush against the breaker connector bar.
- Step 5. For a 250 A breaker, torque the 1/4" mounting screws at breaker terminals A1 and 47 to 9.0 Nm (80 in-lb). For a 400 A breaker, torque the 3/8" screws at breaker terminals A1 and 47 to 20.3 Nm (180 in-lb).

## Checking the Circuit Breaker Settings

- Step 1. Visually check the breaker setting. Use only the setting listed in Table 3. For the 250 A breaker, proceed to step 3. For the 400 A breaker, continue to step 2.

Table 3 – Inverting Fault Circuit Breaker Settings

Kit Model Number	Current Rating	Required Setting
906FK1101	250 A	Set at 2 (470 A)
906FK1201	400 A	Set at 2 (625 A)

- Step 2. **On the 400 A Inverting Fault Circuit Breaker assembly (M/N 906FK1201) only:** Re-route the yellow and the blue/yellow striped leads back through the slot in the bottom lug cover that was removed and set aside in step 5. Then reinstall the two lug covers on the top and bottom of the breaker. Make certain that the leads are not pinched between the bottom lug cover and the body of the breaker.
- Step 3. Connect the spade connectors of the twisted pair harness [**Item 10**] to the male connectors on the yellow and the blue/yellow striped leads coming out of the Inverting Fault Circuit Breaker (see Figure 2). Route this harness down to the bottom of the drive. Cut the wires to length as required, and connect them to terminals 9 and 11 on the regulator control terminal strip. See Figure 5.

**Important:** If any other interlocks are required for your application, they must be connected in series to the Customer Interlock Input (terminals 9 and 11) along with the circuit breaker.



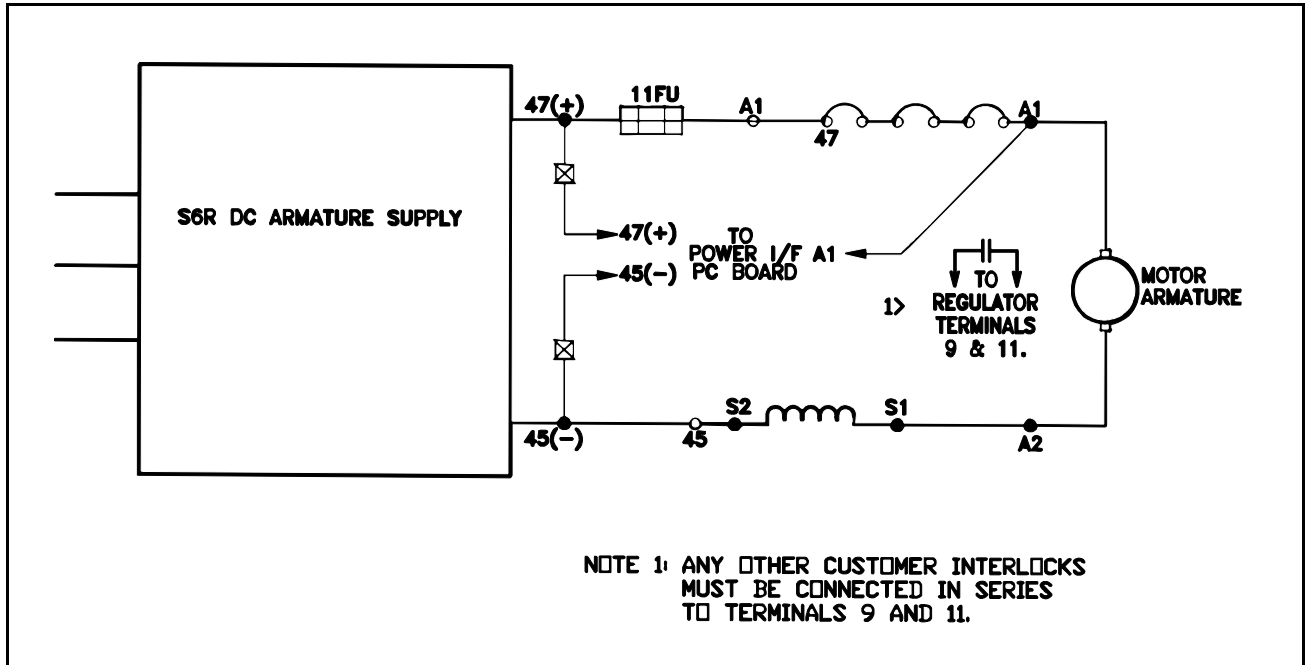


Figure 6 – Inverting Fault Circuit Breaker Connection Diagram

- Step 4. Check and verify all wiring per Figure 6 before applying power. Ensure that wires are not in contact with hot components or sharp metal edges.
  - Step 5. Set the Inverting Fault Circuit Breaker to the ON position.
  - Step 6. Remove the lockout and tag and reconnect power to the drive.
  - Step 7. Turn on power to the drive and check for proper drive operation.
- Kit installation is now complete.

# Technical Specifications

Table 4 – Replacement Circuit Breaker Part Numbers

Kit Model Number	Current Rating @ 40° C	Reliance Circuit Breaker Part Number
906FK1101	250 A	419035-200ZSA
906FK1201	400 A	419035-300FSA

Table 5 – Inverting Fault Circuit Breaker Specifications

Kit Model Number	Drive Horsepower/ Voltage	Circuit Breaker Dimensions HxWxD	Circuit Breaker Weight	Current Rating @ 40° C	Trip Amps	Max AC Volts 50/60 Hz	Max DC Volts
906FK1101	40-60 HP @ 230 VAC 75-125 HP @ 460 VAC	8.02x4.48x4.76 in 204x114x121 mm	8.5 lb 3.85 kg	250 A	400-800	600	600
906FK1201	75 HP @ 230 VAC 150 HP @ 460 VAC	11x5.98x5.83 in 280x152x148 mm	15.02 lb 6.81 kg	400 A	500-1000	600	600

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