SIEMENS

Installation Instructions
Document No. DPD01375
August 24, 2018

BT300 Variable Frequency Drive Bypass

Product Description

The Siemens BT300 Bypasses are companion packages for the family of BT300 HVAC Variable Speed Drives.

Product Numbers

BTC… BT300 VFD Conventional Bypass

BTE… BT300 VFD Electronic Bypass

Contents

The BT300 Bypass consists of a BT300 VFD and a bypass enclosure which includes:

- Step-down power transformer
- Contactors
- Overload (current) relay
- Disconnect switch with fuses (or optional circuit breaker)
- Diagnostics board

Expected Installation Time

- Frames 4 and 5: 30 minutes
- Frames 6 and 7: 45 minutes
- Frames 8 and 9: 90 minutes

Warning/Caution Notations

	**CAUTION/ATTENTION** Equipment damage or loss of data may occur if you do not follow a procedure as specified. Risque de dégâts matériels ou de perte de données, en cas de non-respect des procédures à suivre.
	**WARNING/AVERTISSEMENT** Personal injury may occur if you do not follow a procedure as specified. Risque de blessures graves en cas de non-respect des procédures à suivre.

Prerequisites

- Check for shipping damage. In the event of damage, contact the transport company.
- Locate the BT300 Bypass nameplate and confirm the unit is configured to installation requirements.
- Inverter duty motors are recommended. Install motors within their guidelines. Use dVd/dT filters, output reactors, or other load conditioners as applicable or as specified by the motor manufacturer.

Table 1. Minimum Clearance around Bypass in Inches (cm).

Frame Size	A	B	C	D
FS4	6.75 (17.15)	6.75 (17.15)	3.93 (9.98)	0
FS5	6.75 (17.15)	6.75 (17.15)	4.72 (11.99)	0
FS6	8.75 (22.23)	8.75 (22.23)	6.29 (15.98)	0
FS7	14.13 (35.89)	14.13 (35.89)	9.84 (24.99)	0
FS8	12 (30.48)	18 (45.72)	24 (60.96)	12 (30.48)
FS9	18 (45.72)	24 (60.96)	36 (91.44)	0

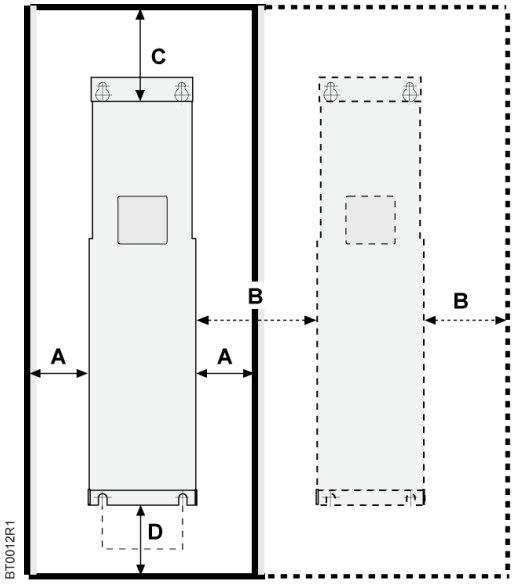


Figure 1. Installation Specifications.

A = Clearance around the frequency converter (see also B).
B = Distance from one drive to another or distance to cabinet wall.
C = Free space above the drive.
D = Free space below the drive.

Installation

CAUTION/ATTENTION:

Height above sea level:
If installing a BT300 Bypass at an altitude higher than 3,280 feet (1000 m), de-rating is required.

Élévation au-dessus du niveau de la mer. En cas d'installation d'un BT300 Bypass à une altitude supérieure à 1000 m (3280 pieds), un déclassement doit être prévu.

CAUTION/ATTENTION:

Never run control or drive input wires in the same conduit as the drive output wires.

Séparer les câbles d'entrée de commande ou de variateur des câbles de sortie de variateur.

Environmental Conditions

Install the BT300 Bypass in a heated, indoor, controlled environment that is free of moisture and conductive contaminants, such as condensation and dust.

The air entering the unit for ventilation/cooling must be clean and free from corrosive materials.

The ambient temperature must be between 14°F and 104°F (-10°C and 40°C), and the relative humidity must be 0 to 95%, non-condensing.

NOTE: Do not mount unit in direct sunlight.

Cable Length

- Place the motor cables sufficiently far from other cables.
- Avoid placing the motor cables in long parallel lines with other cables.
- If the motor cables run in parallel with other cables, see Table 2 for the minimum separation required between the motor cables and other cables.

- Table 2 also applies to the minimum separation between the motor cables and signal cables of other systems.

Table 2. Minimum Cable Separation.

Shielded cable [ft (m)]	Distance Between Cables [ft (m)]
≤ 164 (50)	1.0 (0.3)
≤ 656 (200)	3.28 (1.0)

Table 3. Maximum Motor Cable Lengths (Shielded).

Frame Size	Maximum Length (ft [m])
FS4	328 (100)
FS5	492 (150)
FS6	
FS7	656 (200)
FS8	
FS9	

- The motor cables should cross other cables at a 90-degree angle.
- Cable length is provided to ensure performance of only the drive, not the suitability of the motor when connected to a drive at this distance.
- Keep the distance between the drive and the motor as short as possible to maximize motor life.

Approximate Weights

Table 4. Approximate BT300 Bypass Weights.

Frame Size	Weight (lb [kg])
FS4	50 (23)
FS5	69 (31)
FS6	112 (51)
FS7	187 (85)
FS8	400 (181)
FS9	900 (408)

NOTE: Exact weight will be affected by the actual horsepower/voltage and selected power options.

Bypass Frame Sizes, Current Ratings, and Power Ranges

Table 5. BT300 Bypass Frame Sizes and Power Ranges per NEC Motor Tables.

		208-240	380-500	208	230-240	380-500
HP	**kW**	**Frame Size**		**NEC Motor Rating**		
1	0.75	4		4.6	4.2	
1.5	1.1		4	6.6	6.0	3
2	1.5			7.5	6.8	3.4
3	2.2			10.6	9.6	4.8
5	4	5		16.7	15.2	7.6
7.5	5.5			24.2	22.0	11
10	7.5		5	30.8	28.0	14
15	11	6		46.2	42.0	21
20	15			59.4	54.0	27
25	18.5	7	6	74.8	68.0	34
30	22			88.0	80.0	40
40	30			114.0	104.0	52
50	37	8	7	143.0	130.0	65
60	45			169.0	154.0	77
75*	55			211.0	192.0	96
100*	75	9	8	273.0	248.0	124
125*	90			343.0	310.0*	156
150	110					205*
200	132		9			261*
250	160					310*

* NEC Motor rating exceeds the drives maximum output. Check motor FLA before selection of this drive.

NOTE: Drives are current rated devices. Verify that the listing ratings are ≥ the motor full load current rating.

NOTE:
The overloads are dialed in by the factory, based on the NEC FLA rating tables, and assume a trip (activation) level at 125%. If the 125% is acceptable for your installation, dial in the overload to match the connected motor's FLA rating. If a different percentage is desired, a multiplier must be used to determine the proper setting. This is a two-step process:

First, determine the multiplier. This can be calculated by dividing 125% by the desired percentage.

Formula: Desired % ÷ 125% = Multiplier
Example: 115% ÷ 125% = 0.92

Second, the new multiplier is used with the motor's FLA to determine the dial setting of the overload. This can be calculated by multiplying the Motor FLA by the multiplier to provide the desired setting.

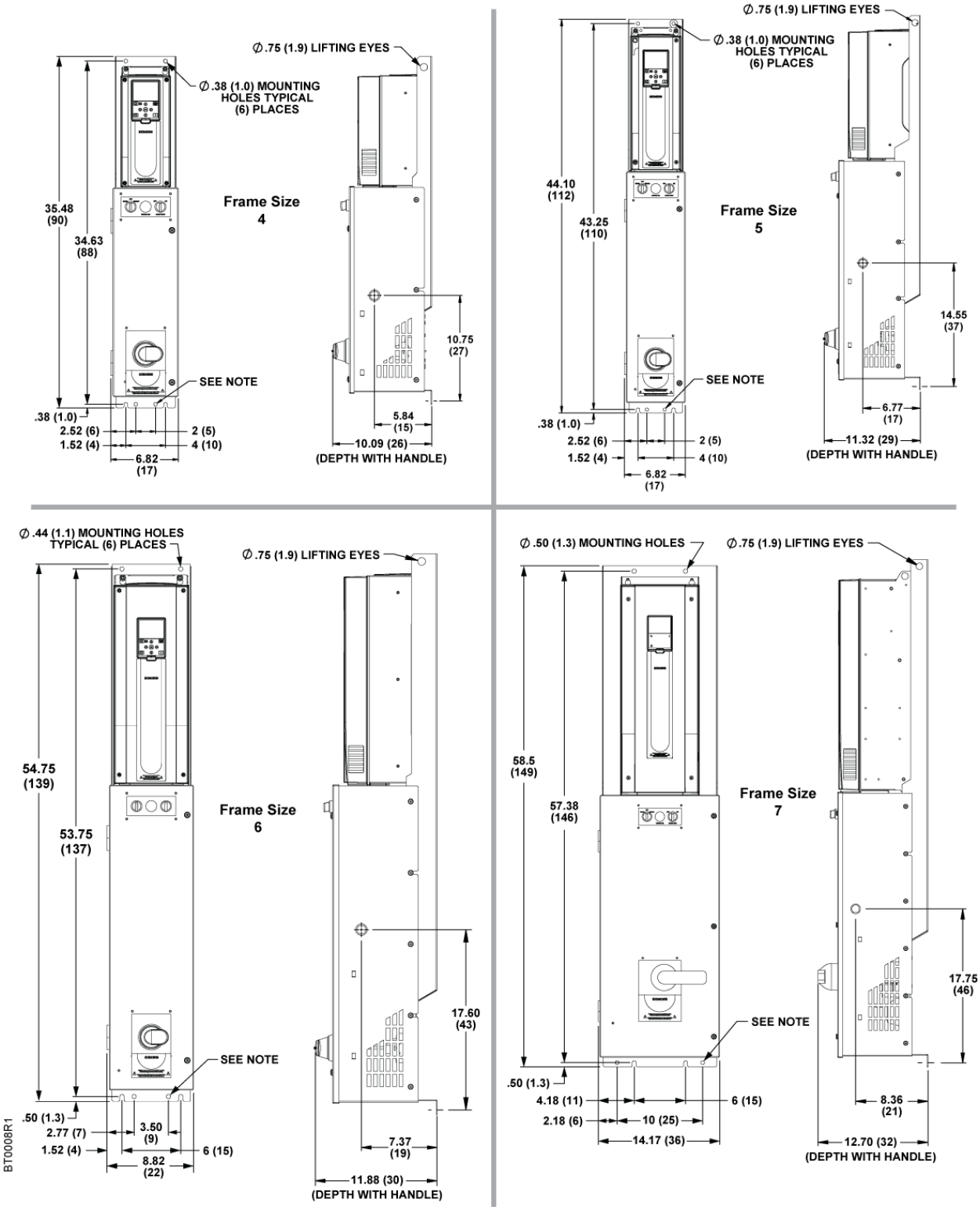
Formula: Motor FLA × multiplier = Dial Setting
Example: 24 × 0.92 = 22.08

Therefore, a motor with an FLA of 24 Amps, and a desired overload setting of 115% would require the overload dial to be set to a value of **22.08** to have the desired effect.

With some high-efficiency motors, the overload supplied with the bypass option may not be able to be dialed down low enough for the installation. When this occurs, an alternate overload relay must be installed into the bypass option.

When an overload is exchanged in the installation to a smaller size, the UL certification will remain on the unit. However, the installation will be subject to approval by the customer and/or the local electrical authority.

Mounting and Dimensions



NOTE: USE MOUNTING HOLES INSTEAD OF SLOTS IN INSTALLATIONS THAT ARE PRONE TO SEISMIC ACTIVITY.

Figure 2. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS4 through FS7.

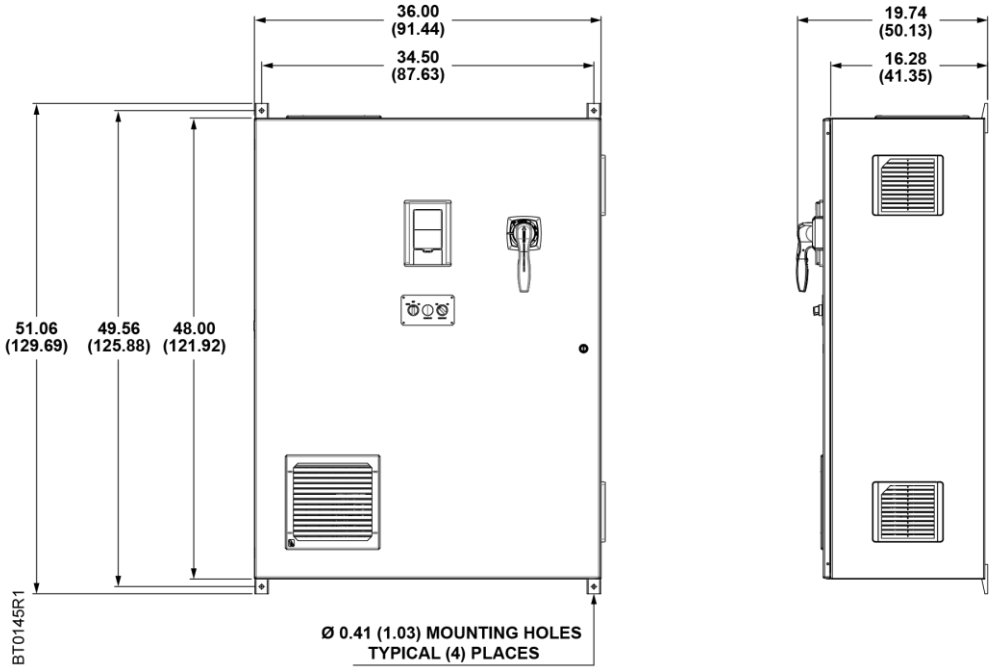


Figure 3. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS8.

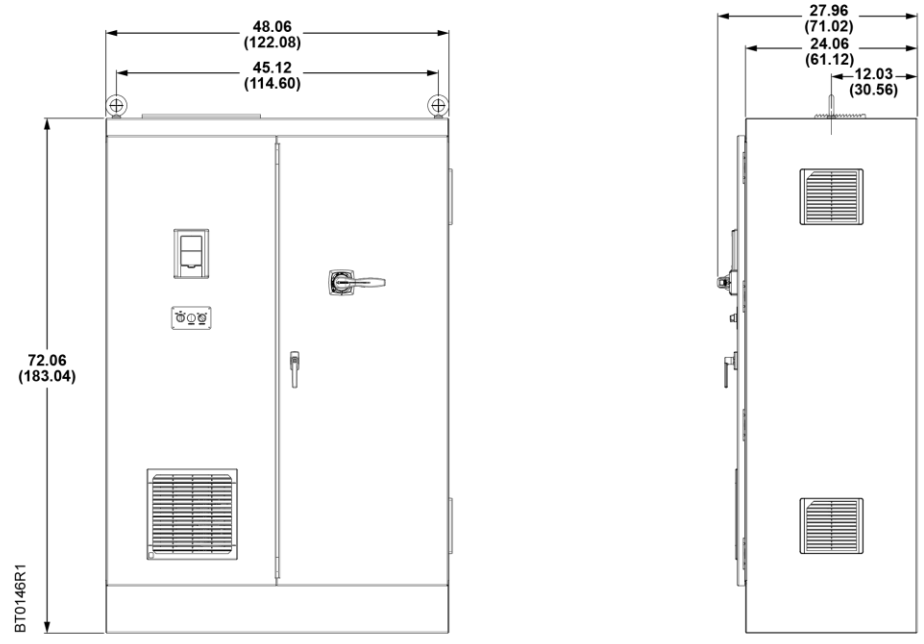


Figure 4. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS9.

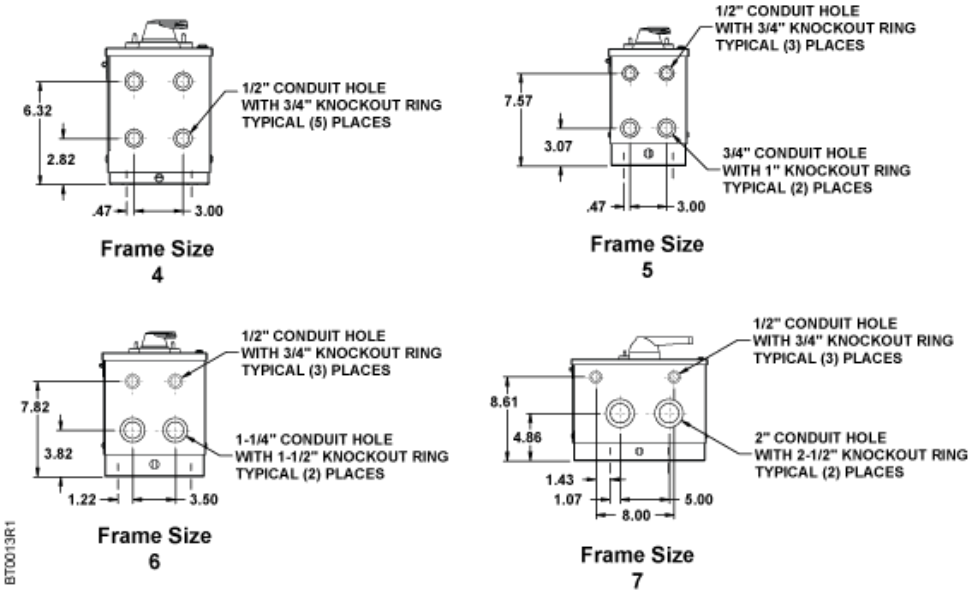


Figure 5. Conduit Locations for UL Type 1 FS4 through FS7 Bypasses.

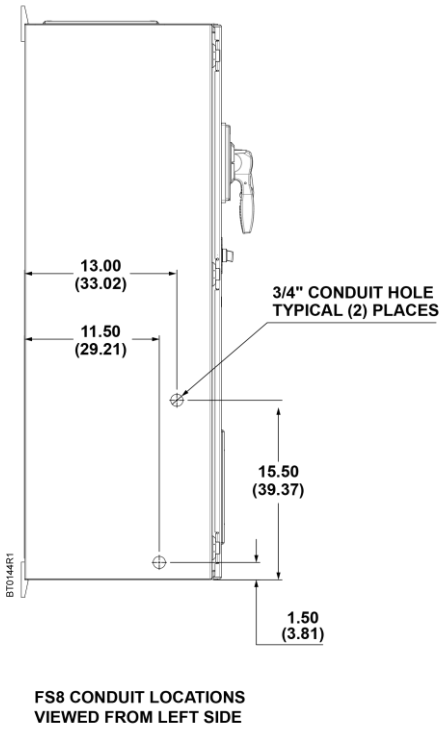


Figure 6. Conduit Locations for UL Type 1 FS8 Bypass.

NOTES:

1. Knockout locations have not been provided for the Input and/or Output power connections; connections are completed by the customer.
2. The Input and Output power connection cannot be in the same conduit.
3. The Input and Output connections must be at least 6 inches away from the control wiring.
4. Locate the Input conduit in the upper right-hand side of the cabinet, and the Output conduit in the lower right-hand side of the cabinet.

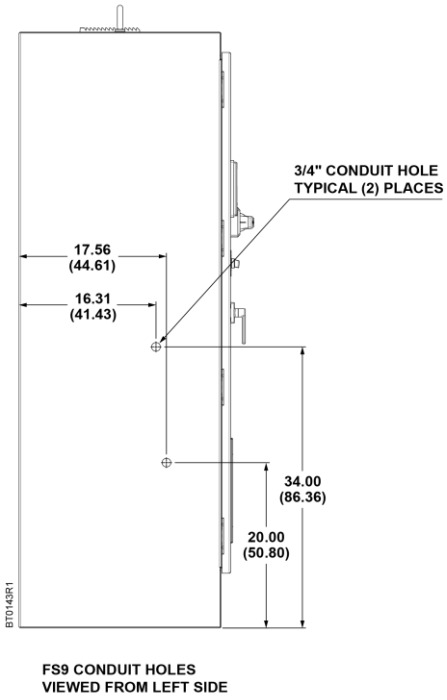


Figure 7. Conduit Locations for UL Type 1 FS9 Bypasses.

NOTES:

1. Knockout locations have not been provided for the Input and/or Output power connections; connections are completed by the customer.
2. The Input and Output power connection cannot be in the same conduit.
3. The Input and Output connections must be at least 6 inches away from the control wiring.
4. Locate the Input conduit in the upper right-hand side of the cabinet, and the Output conduit in the lower right-hand side of the cabinet.

Wiring

Wire Sizes and Tightening Torques

Table 6. Wire Sizes and Tightening Torques for Bypass with 208V to 240V Drive.

Part Number	HP	kW	Frame Size	Amps	Circuit Breaker		Disconnect Switch		Overload			Ground Lug	
					Wire Size*	Torque lb-in (Nm)	Wire Size*	Torque lb-in (Nm)	Wire Size*	Torque lb-in (Nm)	Range	Wire Size*	Torque lb-in (Nm)
BT_-001X2-…	1	0.75	4	4.8	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	3.5.5	14-6 Cu	35 (3.95)
BT_-00152-…	1.5	1.1		6.7	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	5.5-8	14-6 Cu	35 (3.95)
BT_-002X2-…	2	1.5		8.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	5.5-8	14-6 Cu	35 (3.95)
BT_-003X2-…	3	2.2		11.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	9.12-5	14-6 Cu	35 (3.95)
BT_-005X2-…	5	4	5	18.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	17-22	14-6 Cu	35 (3.95)
BT_-00752-…	7.5	5.5		24.2	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	20-25	14-6 Cu	35 (3.95)
BT_-010X2-…	10	7.5		31.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	23-28	14-6 Cu	35 (3.95)
BT_-015X2-…	15	11	6	48.0	10-1/0 Cu	20-60 (2.3-6.8)	14-2 Cu	50 (5.65)	18-1 Cu	26.6-39.8 (3-4.5)	40-50	14-2 Cu	50 (5.65)
BT_-020X2-…	20	15		62.0	10-1/0 Cu	20-60 (2.3-6.8)	14-2 Cu	50 (5.65)	18-1 Cu	26.6-39.8 (3-4.5)	47-57	14-2 Cu	50 (5.65)
BT_-025X2-…	25	18.5	7	75.0	4-350 kcmil	150-275 (16.9-31.1)	6-300 kcmil	200 (22.6)	18-1 Cu	26.6-39.8 (3-4.5)	54-65	14-2 Cu	50 (5.65)
BT_-030X2-…	30	22		88.0	4-350 kcmil	150-275 (16.9-31.1)	6-300 kcmil	200 (22.6)	18-1 Cu	26.6-39.8 (3-4.5)	70-80	14-2 Cu	50 (5.65)
BT_-040X2-…	40	30		105.0	4-350 kcmil	150-275 (16.9-31.1)	6-300 kcmil	200 (22.6)	6-250 kcmil	90-110 (10.2-12.4)	50-200	14-2 Cu	50 (5.65)
BT_-050X2-…	50	37	8	143.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-060X2-…	60	45		170.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-075X2-…	75	55		208.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-100X2-…	100	75	9	261.0	350-600 kcmil	375 (42.4)	2-600 kcmil	478 (54)	2-600 kcmil	124-210 (14.0-23.7)	160-630	4-500 Cu	275 (31.1)
BT_-125X2-…	125	90		310.0	350-600 kcmil	375 (42.4)	2-600 kcmil	478 (54)	2-600 kcmil	124-210 (14.0-23.7)	160-630	4-500 Cu	275 (31.1)

* Wire Size in AWG unless noted otherwise. Use Copper (Cu) wire that is rated 167°F (75°C) minimum, 600 Vac.

*Circuit Breaker Torque Ratings by Wire Size for ED Frame Breakers	
Wire Size *	Torque, lb-in (Nm)
10	20 (2.3)
8	36 (4.1)
6-4	45 (5.0)
3	50 (5.6)
2-1/0	60 (6.8)

*Circuit Breaker Torque Ratings by Wire Size for FG/FK Frame Breakers	
Wire Size *	Torque, lb-in (Nm)
4	150 (16.9)
3-1	200 (22.6)
1/0-350	275 (31.1)

Table 7. Wire Sizes and Tightening Torques for Bypass with 380V to 500V Drive.

Part Number	HP	kW	Frame Size	Amps	Circuit Breaker		Disconnect Switch		Overload			Ground Lug	
					Wire Size*	Torque lb-in (Nm)	Wire Size*	Torque lb-in (Nm)	Wire Size*	Torque lb-in (Nm)	Range	Wire Size*	Torque lb-in (Nm)
BT_-00154-...	1.5	1.1	4	3.4	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	2.2-3.2	14-6 Cu	35 (3.95)
BT_-002X4-...	2	1.5		4.8	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	2.8-4	14-6 Cu	35 (3.95)
BT_-003X4-...	3	2.2		5.6	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	3.5-5	14-6 Cu	35 (3.95)
BT_-005X4-...	5	4		9.6	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	5.5-8	14-6 Cu	35 (3.95)
BT_-00754-...	7.5	5.5		12.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	20-12 Cu	7-10.6 (0.8-1.2)	11-16	14-6 Cu	35 (3.95)
BT_-010X4-...	10	7.5	5	16.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	11-16	14-6 Cu	35 (3.95)
BT_-015X4-...	15	11		23.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	17-22	14-6 Cu	35 (3.95)
BT_-020X4-...	20	15		31.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	16-8 Cu	17.1-22.1 (2-2.5)	23-28	14-6 Cu	35 (3.95)
BT_-025X4-...	25	18.5	6	38.0	10-1/0 Cu	20-60 (2.3-6.8)	14-4 Cu	35 (3.95)	18-1 Cu	26.6-39.8 (3-4.5)	28-40	14-2 Cu	50 (5.65)
BT_-030X4-...	30	22		46.0	10-1/0 Cu	20-60 (2.3-6.8)	14-2 Cu	50 (5.65)	18-1 Cu	26.6-39.8 (3-4.5)	28-40	14-2 Cu	50 (5.65)
BT_-040X4-...	40	30		61.0	10-1/0 Cu	20-60 (2.3-6.8)	14-2 Cu	50 (5.65)	18-1 Cu	26.6-39.8 (3-4.5)	47-57	14-2 Cu	50 (5.65)
BT_-050X4-...	50	37	7	72.0	10-1/0 Cu	20-60 (2.3-6.8)	6-300 kcmil	200 (22.6)	18-1 Cu	26.6-39.8 (3-4.5)	54-65	14-2 Cu	50 (5.65)
BT_-060X4-...	60	45		87.0	4-350 kcmil	150-275 (16.9-31.1)	6-300 kcmil	200 (22.6)	18-1 Cu	26.6-39.8 (3-4.5)	70-80	14-2 Cu	50 (5.65)
BT_-075X4-...	75	55		105.0	4-350 kcmil	150-275 (16.9-31.1)	6-300 kcmil	200 (22.6)	6-250 kcmil	90-110 (10.2-12.4)	50-200	14-2 Cu	50 (5.65)
BT_-100X4-...	100	75	8	140.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-125X4-...	125	90		170.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-150X4-...	150	110		205.0	250-300 kcmil	275 (31.1)	4-300 kcmil	389 (44)	4-250 kcmil	90-124 (10.2-14.0)	50-200	6-2/0 Cu	120 (13.6)
BT_-200X4-...	200	132	9	261.0	350-600 kcmil	375 (42.4)	2-600 kcmil	478 (54)	2-600 kcmil	124-210 (14.0-23.7)	160-630	4-500 Cu	275 (31.1)
BT_-250X4-...	250	160		310.0	350-600 kcmil	375 (42.4)	2-600 kcmil	478 (54)	2-600 kcmil	124-210 (14.0-23.7)	160-630	4-500 Cu	275 (31.1)

* Wire Size in AWG unless noted otherwise. Use Copper (Cu) wire that is rated 167°F (75°C) minimum, 600 Vac.

*Circuit Breaker Torque Ratings by Wire Size for ED Frame Breakers	
Wire Size *	Torque, lb-in (Nm)
10	20 (2.3)
8	36 (4.1)
6-4	45 (5.0)
3	50 (5.6)
2-1/0	60 (6.8)

*Circuit Breaker Torque Ratings by Wire Size for FG/FK Frame Breakers	
Wire Size *	Torque, lb-in (Nm)
4	150 (16.9)
3-1	200 (22.6)
1/0-350	275 (31.1)

Wiring Connections

1. Route shielded twisted pair (recommended wire type) cable, 24-gauge minimum *control wiring* in conduit, through knockout, and into housing.
   - For Electronic Bypass, see Figure 8 through Figure 15.
   - For Conventional Bypass, see Figure 22 through Figure 29.
2. Connect control wiring per job-specific drawings and Figure 20 (Electronic) and Figure 34 (Conventional).

   NOTE: Terminate shield at control device. Control wiring is 12 to 24 AWG and tightening torque is 5 lb-in.
3. If applicable, route *communications wiring* in conduit, through knockout, and into housing.
   - For Electronic Bypass, see Figure 8 through Figure 15.
   - For Conventional Bypass, see Figure 22 through Figure 29.
4. Continue to route communications wiring to the VFD and terminate as shown in the *BT300 VFD Application Manual* (DPD00149).

   NOTE: Communication wiring should be run with maximum separation possible from all other wiring.
5. Route motor wiring in conduit, through knockout, and into housing (see Figure 8 through Figure 14).
   - See Figure 8 through Figure 15 for Electronic Bypass.
   - See Figure 22 through Figure 29 for Conventional Bypass.
6. Connect motor wiring to motor overload and ground lug. See Table 2 and for wire sizes and tightening torques.
7. Route input power wiring in conduit, through knockout, and into housing. See Figure 36 through Figure 42. In the two contactor configuration, the M3 contactor is installed and controlled by an internal rocker switch.
8. Connect input power wiring to the disconnect switch and ground lug or to the circuit breaker and ground lug. See Table 2 and for wire sizes and tightening torques.

WARNING/AVERTISSEMENT

Use only permanently-wired input power connections.

N’utiliser que des connexions réseau cablées.

Electronic Bypass Diagrams

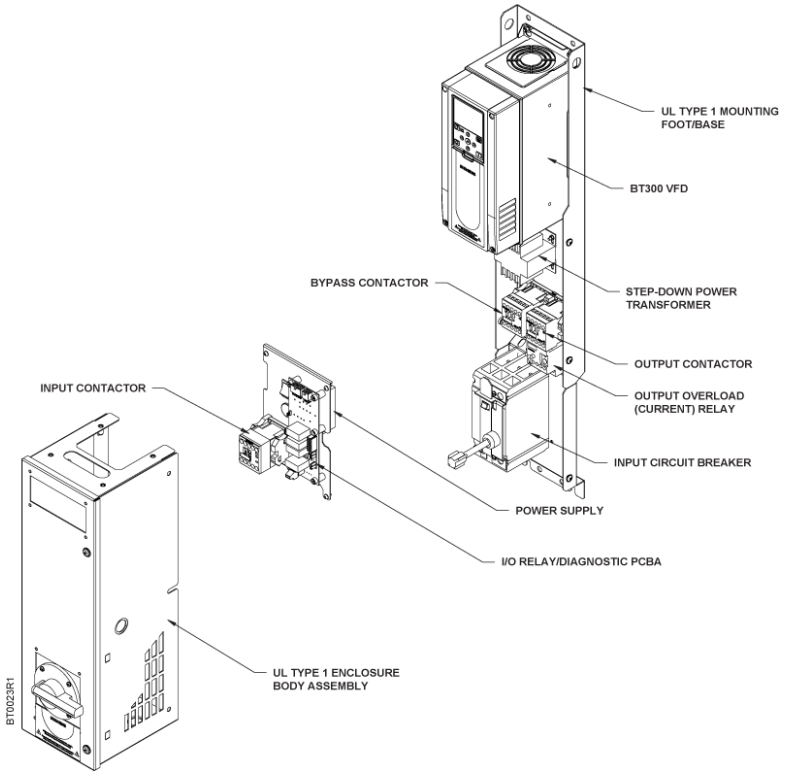


Figure 8. FS4 E-Bypass with Circuit Breaker Components.

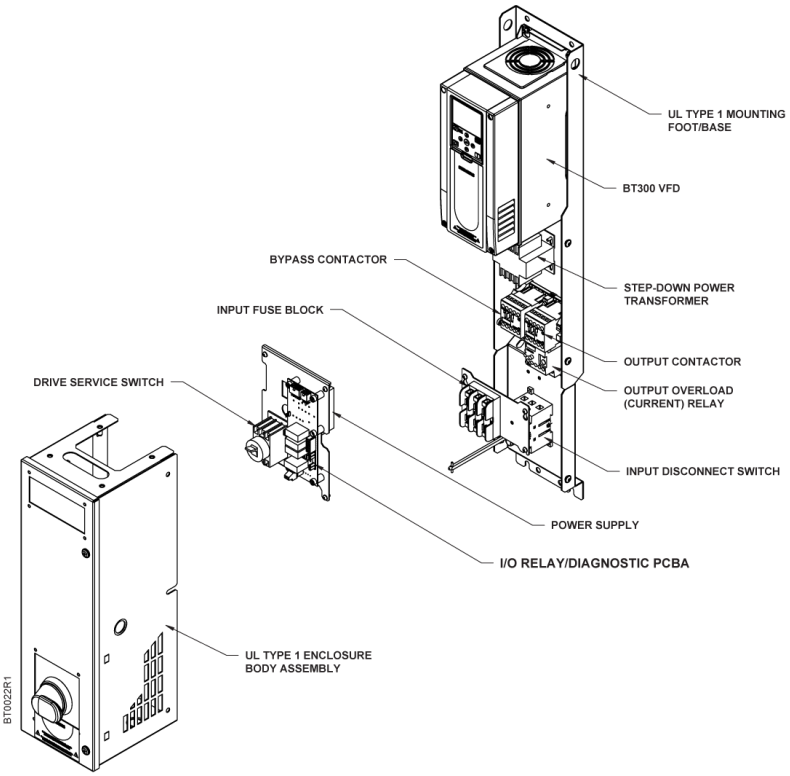


Figure 9. FS4 E-Bypass with Disconnect with Fuses Components.

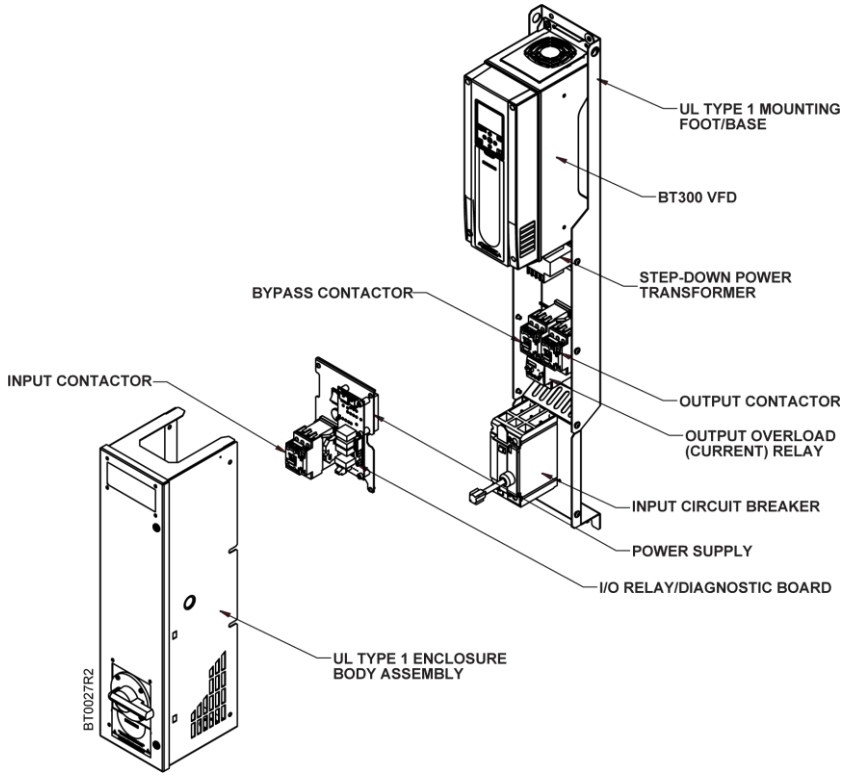


Figure 10. FS5 E-Bypass with Circuit Breaker Components.

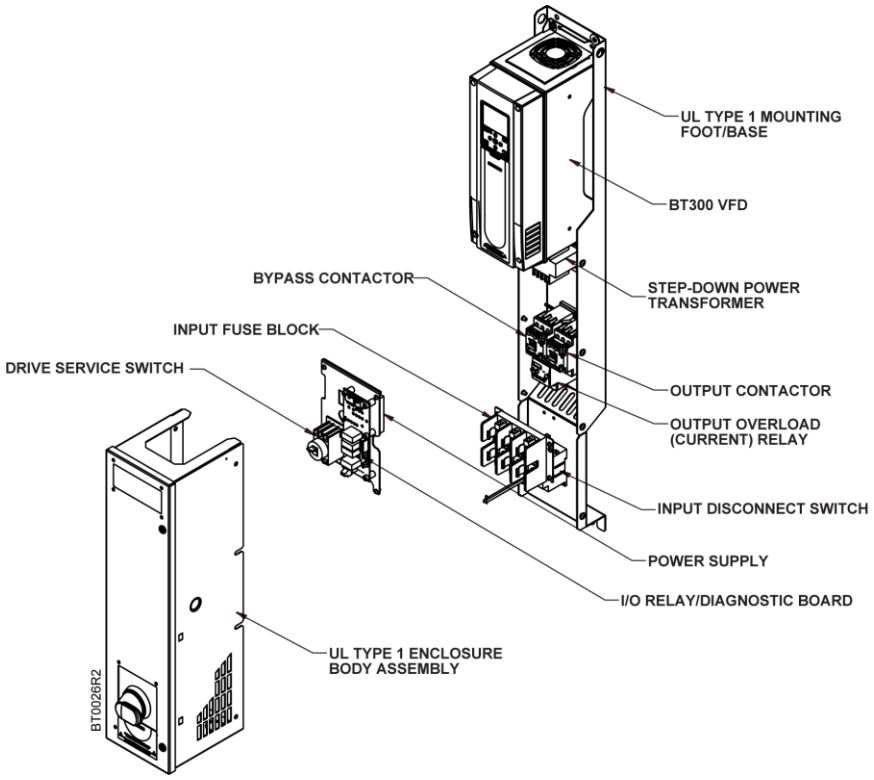


Figure 11. FS5 E-Bypass with Disconnect with Fuses Components.

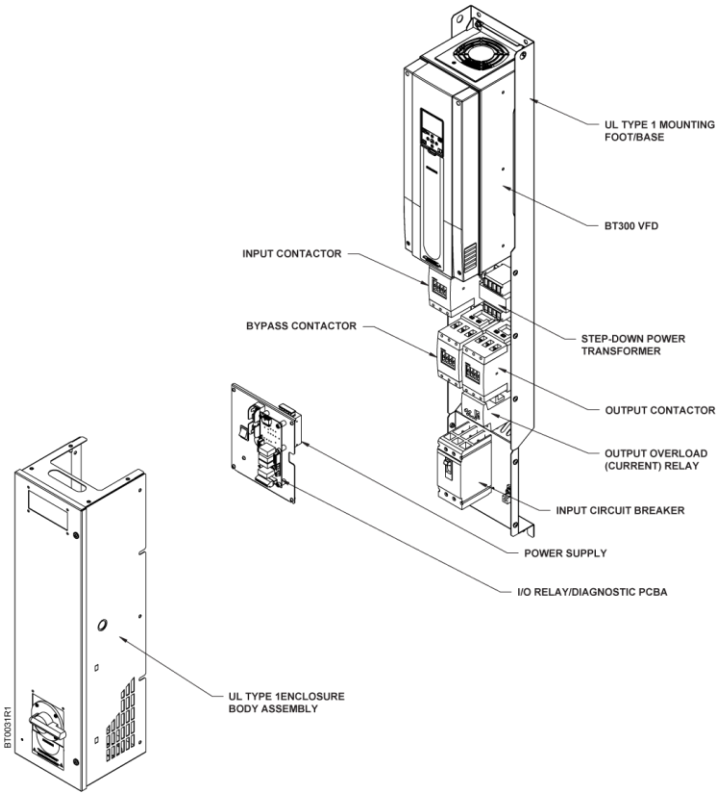


Figure 12. FS6 E-Bypass with Circuit Breaker Components.

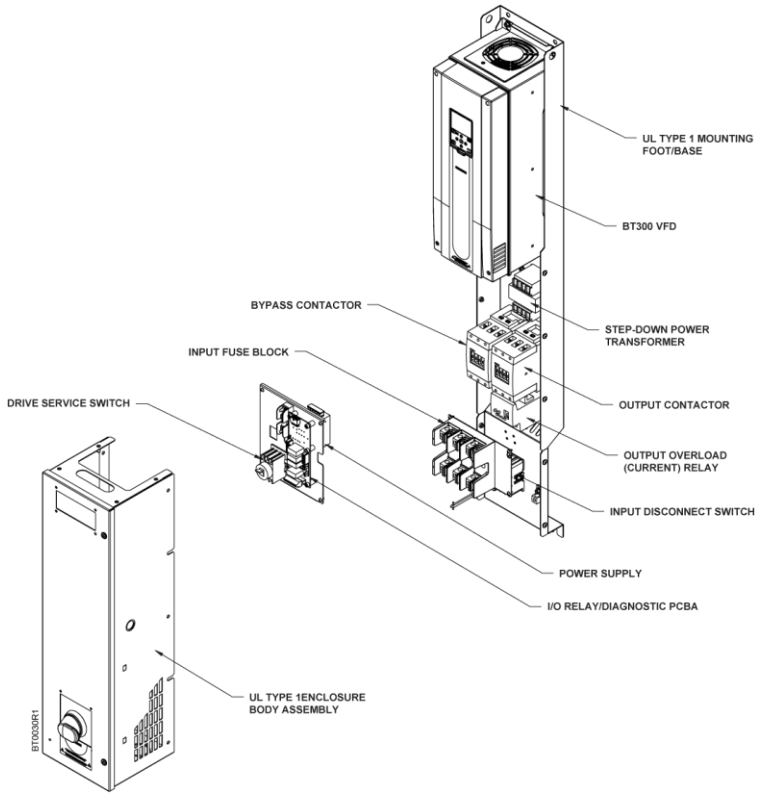


Figure 13. FS6 E-Bypass with Disconnect with Fuses Components.

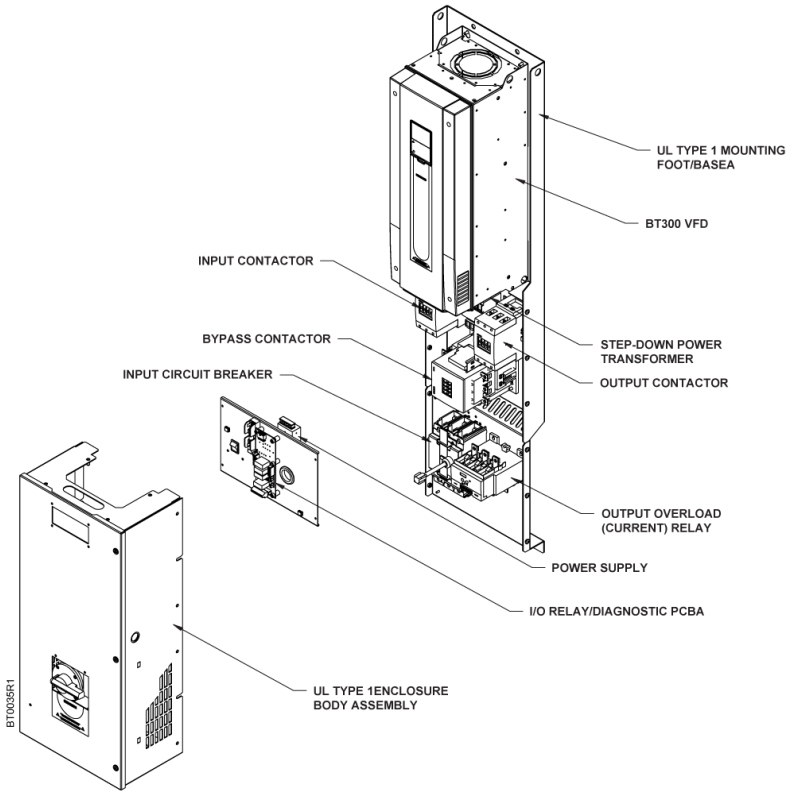


Figure 14. FS7 E-Bypass with Circuit Breaker Components.

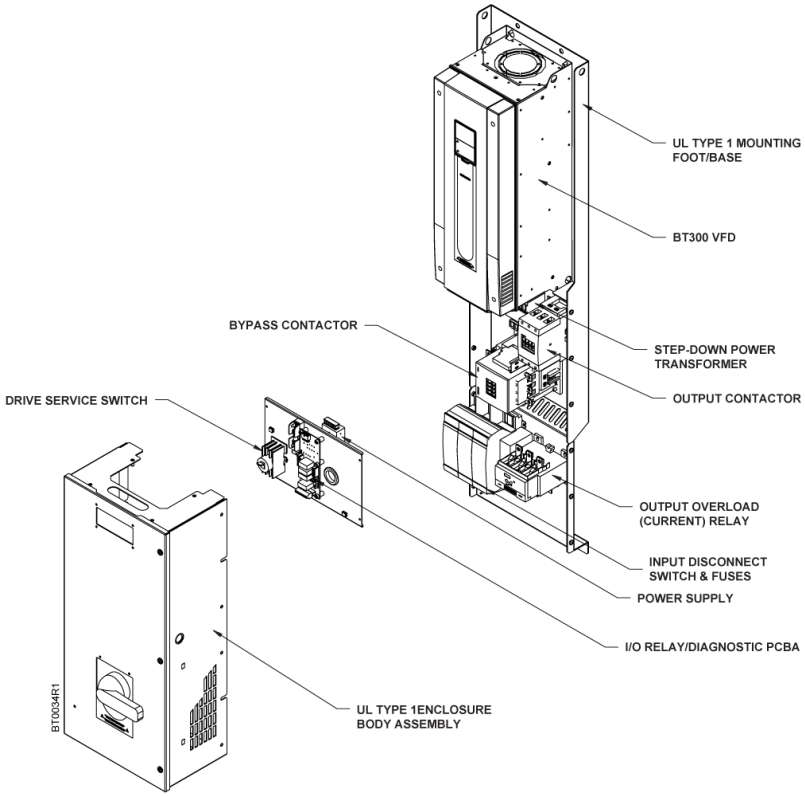


Figure 15. FS7 E-Bypass with Disconnect with Fuses Components.

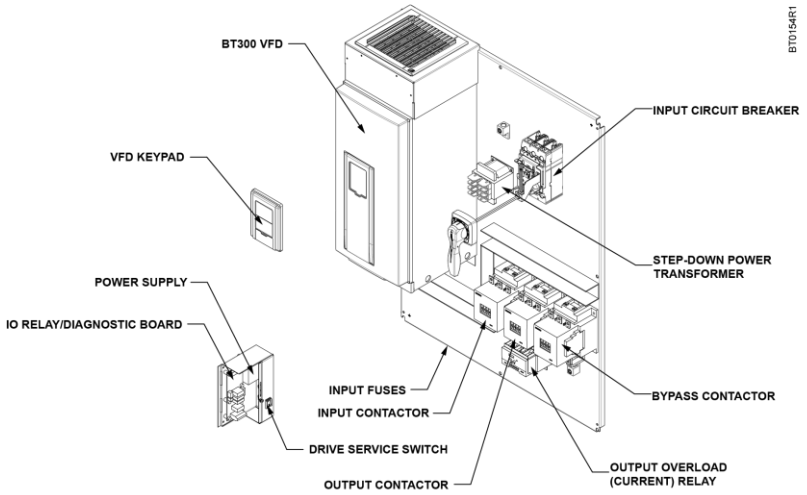


Figure 16. FS8-E-Bypass with Circuit Breaker Components.

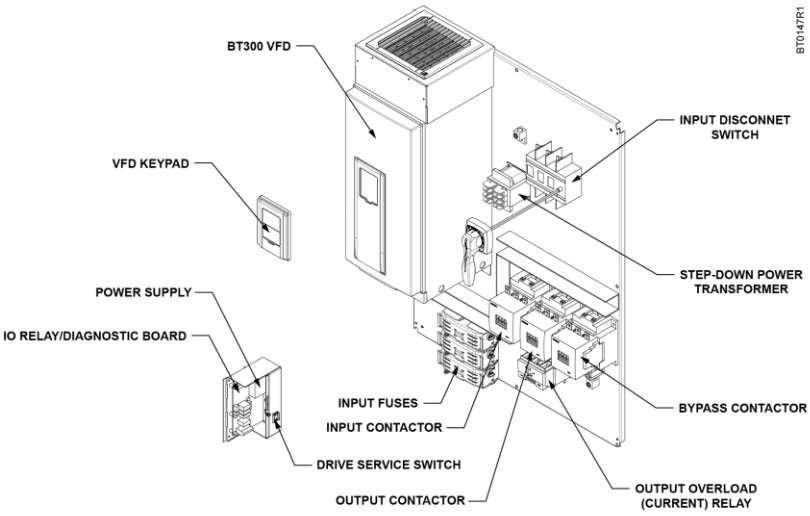


Figure 17. FS8 E-Bypass with Disconnect with Fuses Components.

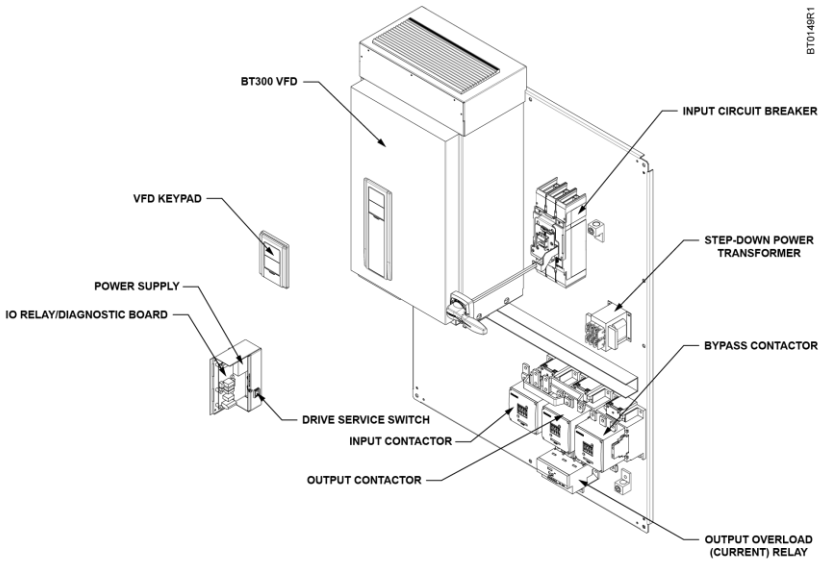


Figure 18. FS9 E-Bypass with Circuit Breaker Components.

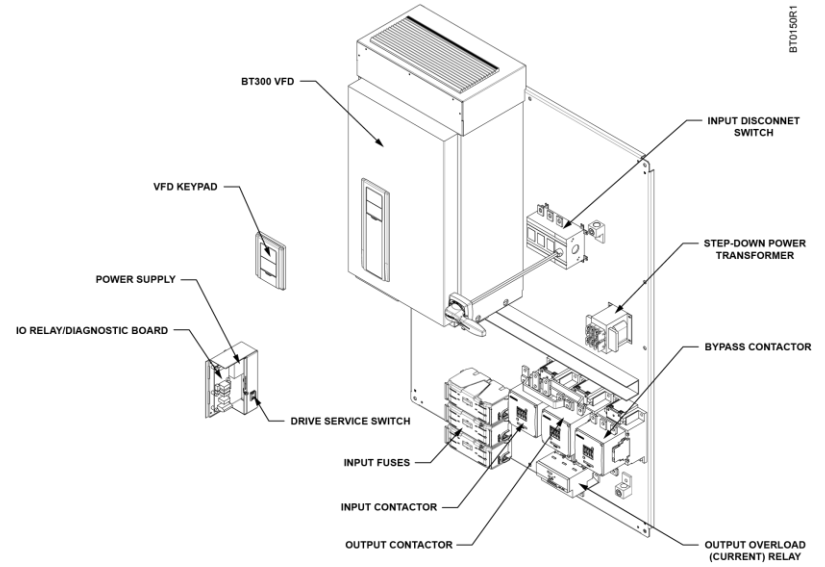


Figure 19. FS9 E-Bypass with Disconnect with Fuses Components.

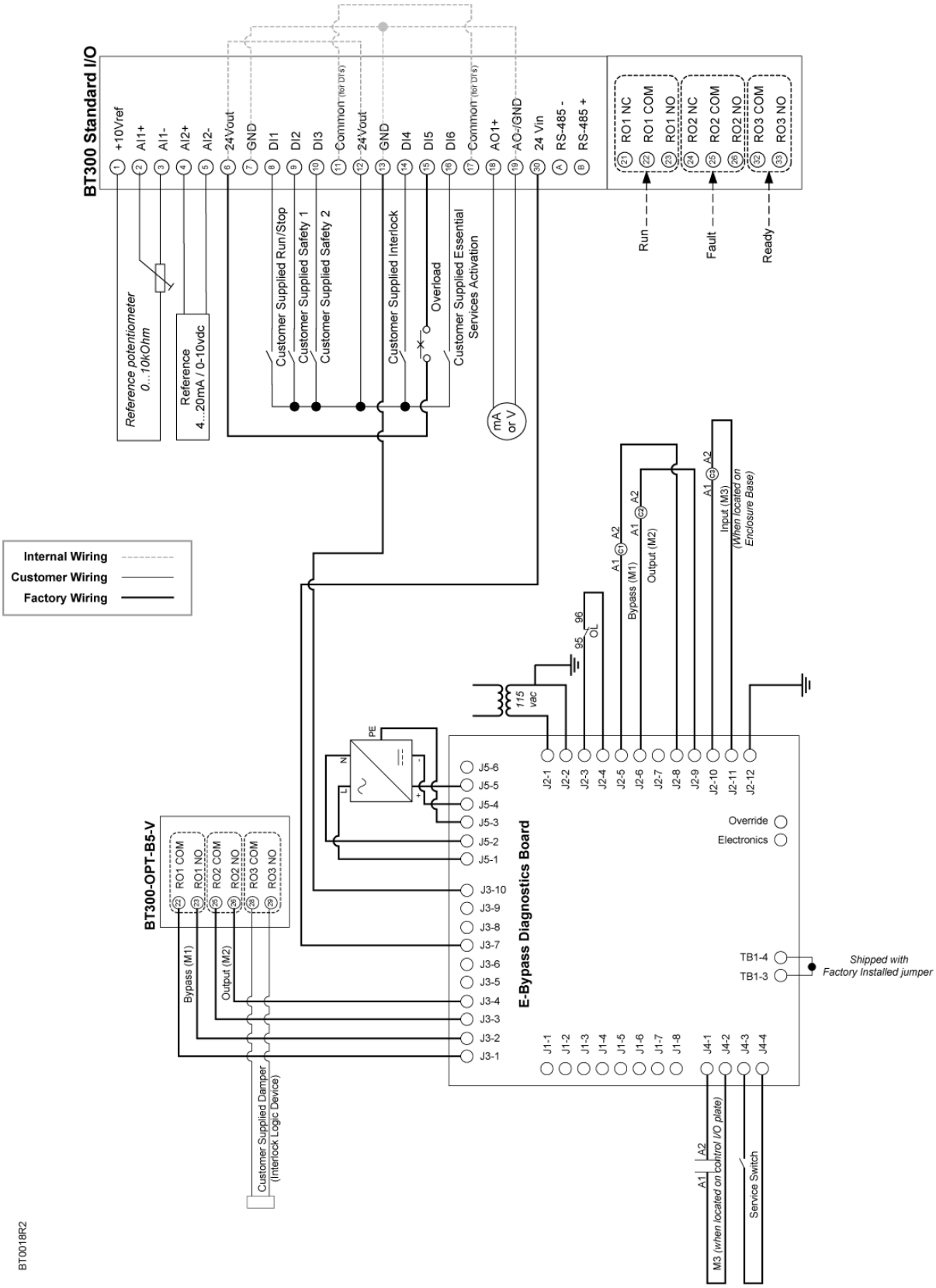
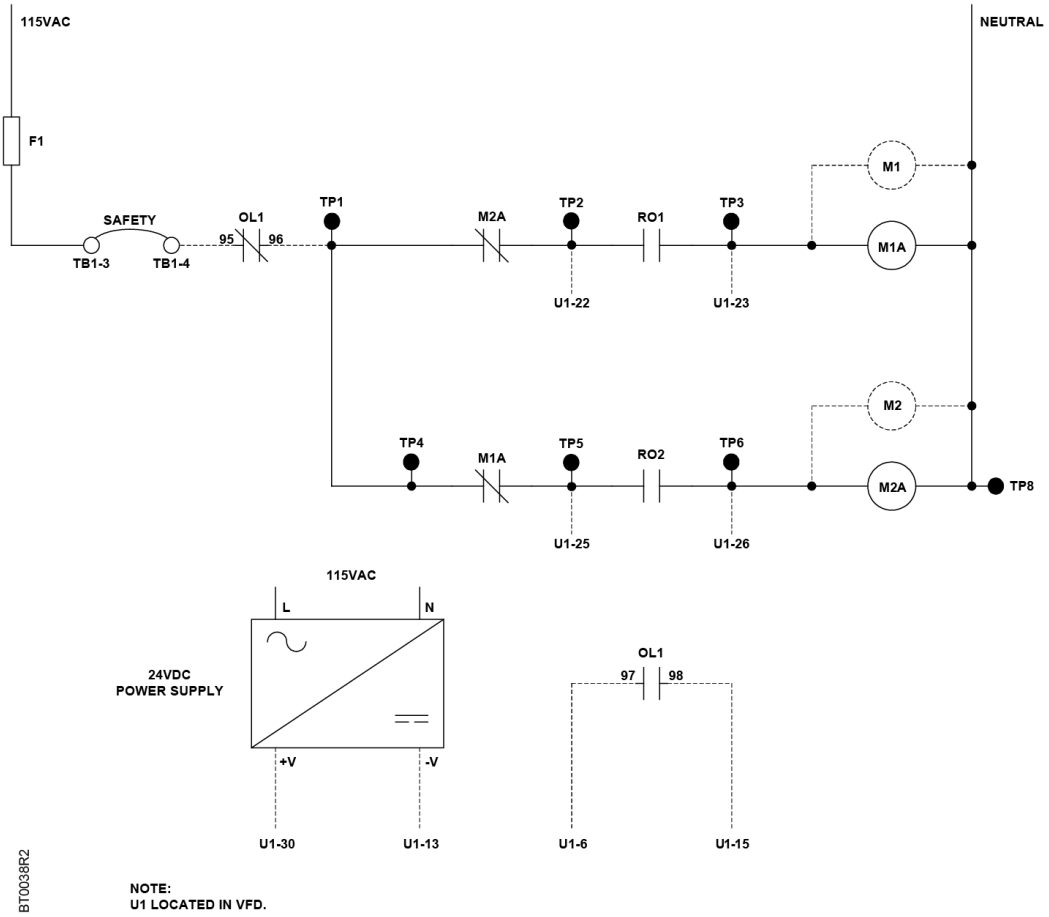


Figure 20. Electronic Bypass Drive Terminations.



NOTES:

1. Branch circuit protection to be provided by installer, per any National or local code requirements, as applicable.
2. Control and communication wiring should be 300V UL minimum.
3. Communication wiring should be run with maximum separation possible from all other wiring.
4. Essential service mode operates the motor full speed (bypass) with no protection for the motor or system.
5. See the *Siemens BT300 Variable Frequency Drive Bypass Operator's Manual* (DPD01391) for proper fuse and wire sizes.
6. See the *Siemens BT300 HVAC Operator's Manual* (DPD01809) for BT300 input/output control signal wiring details.

Figure 21. Electronic Bypass Relay/Diagnostic Board Terminations.

Conventional Bypass Diagrams

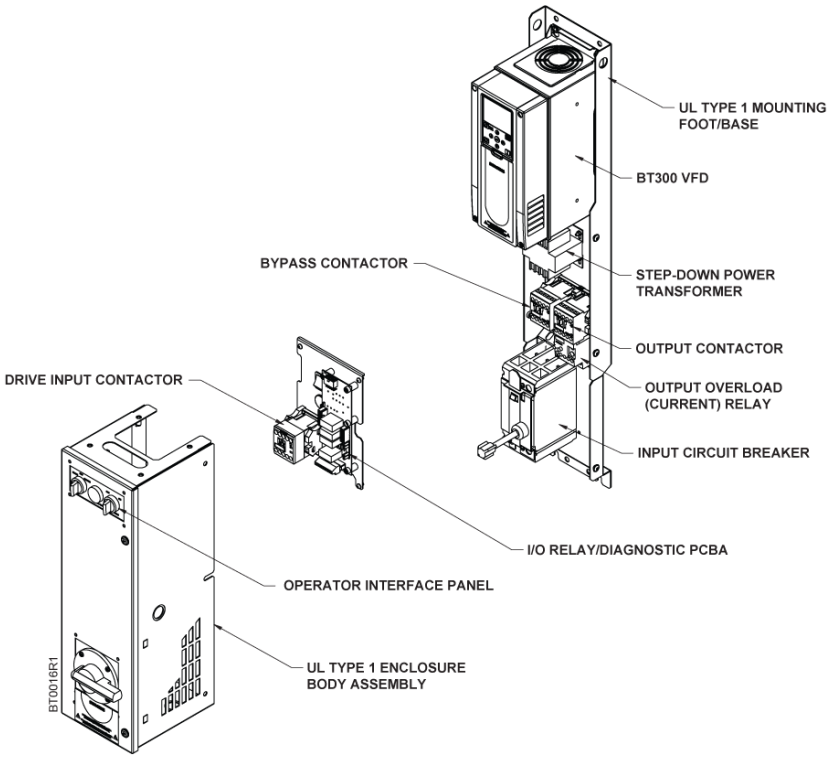


Figure 22. FS4 C-Bypass with Circuit Breaker Components.

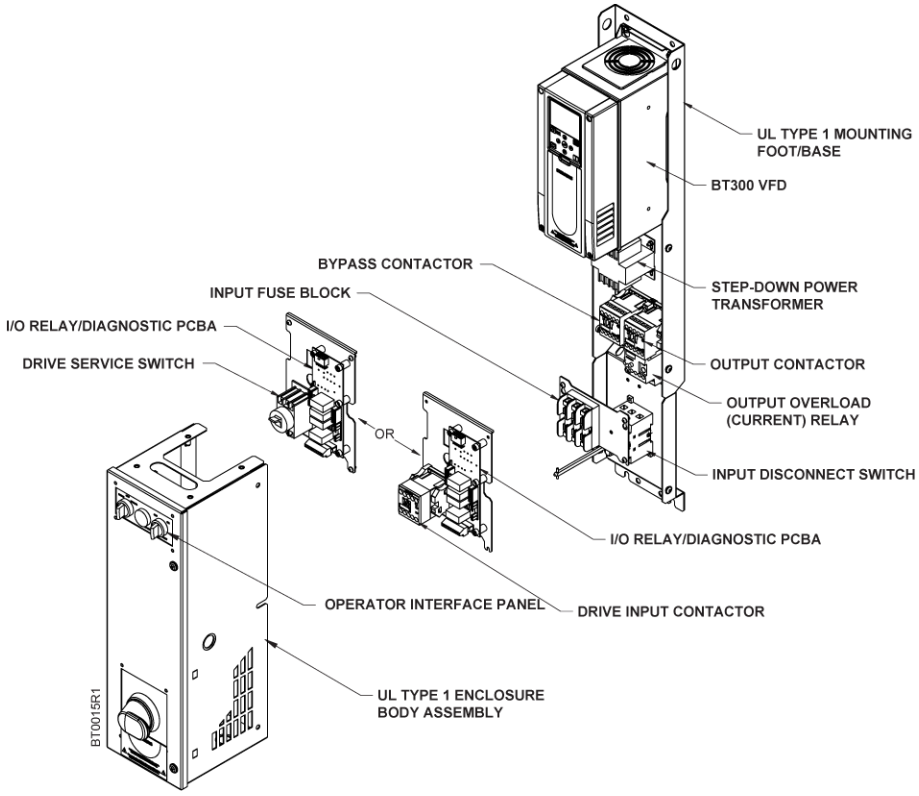


Figure 23. FS4 C-Bypass with Disconnect with Fuses Components.

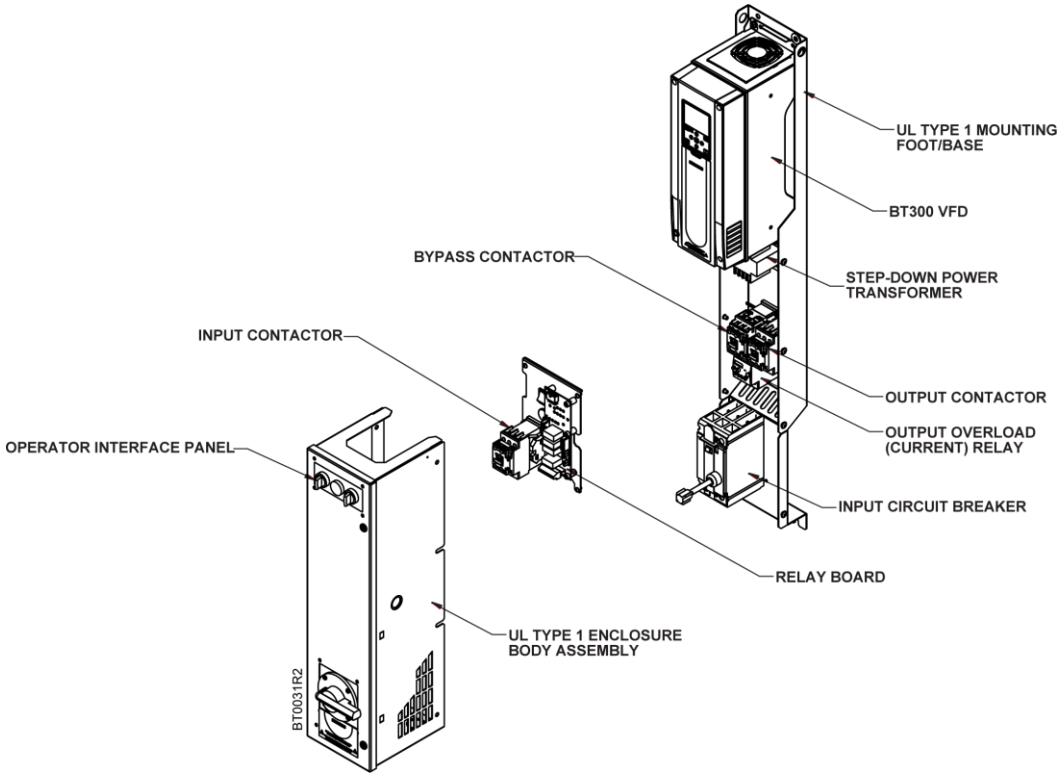


Figure 24. FS5 C-Bypass with Circuit Breaker Components.

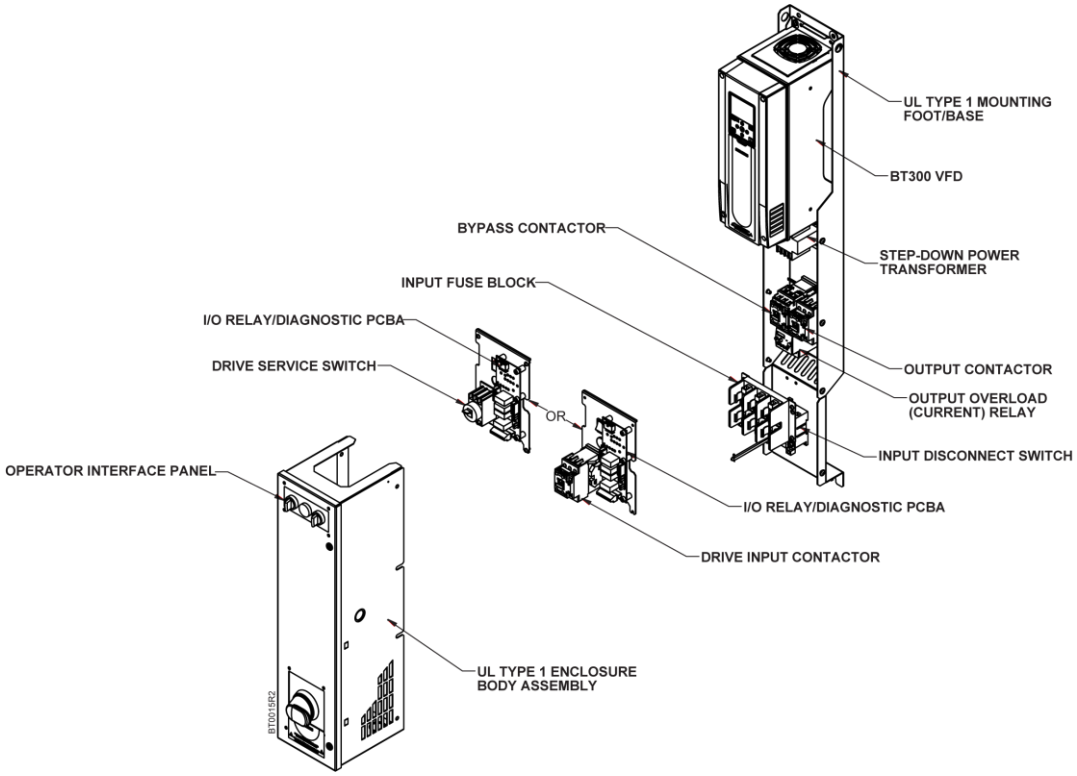


Figure 25. FS5 C-Bypass with Disconnect with Fuses Components.

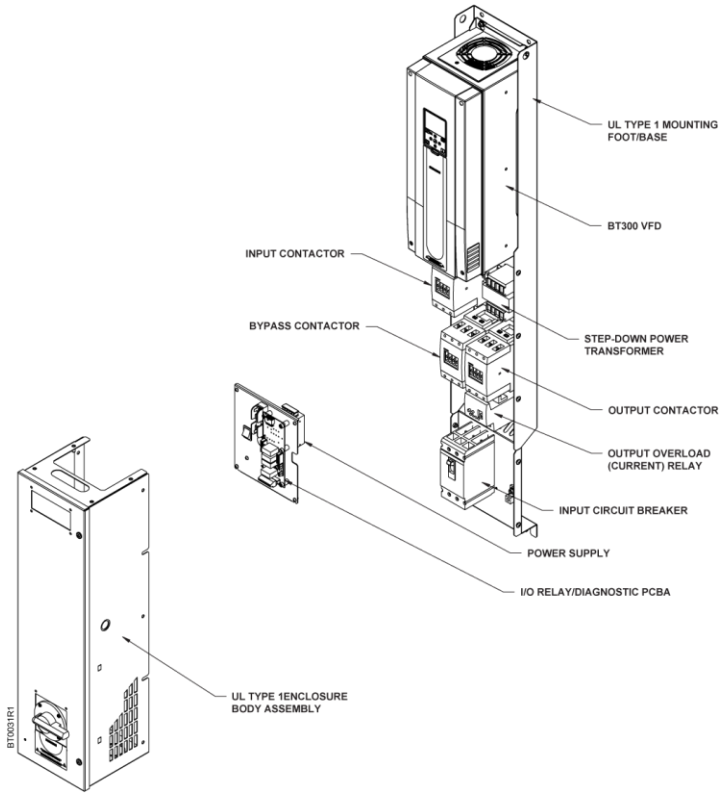


Figure 26. FS6 C-Bypass with Circuit Breaker Components.

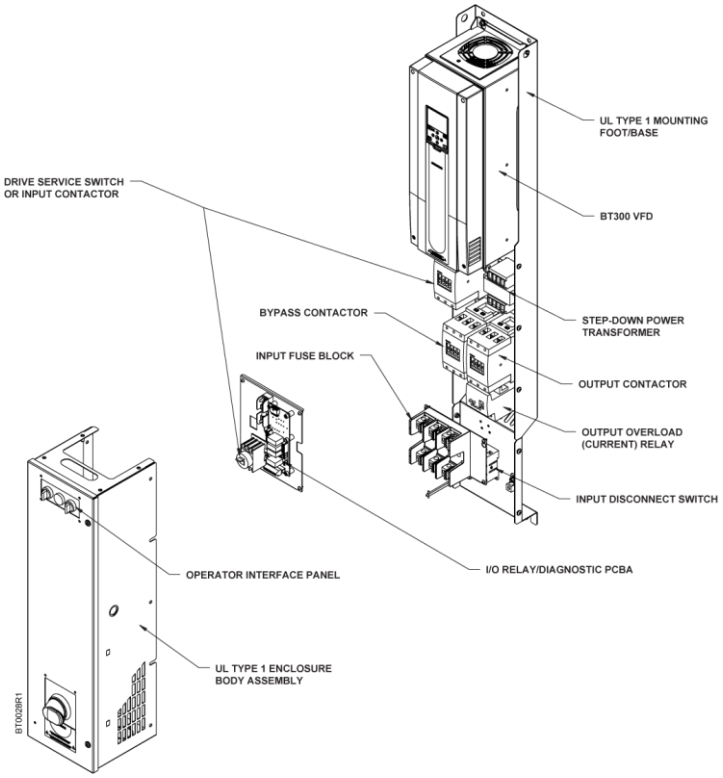


Figure 27. FS6 C-Bypass with Disconnect with Fuses Components.

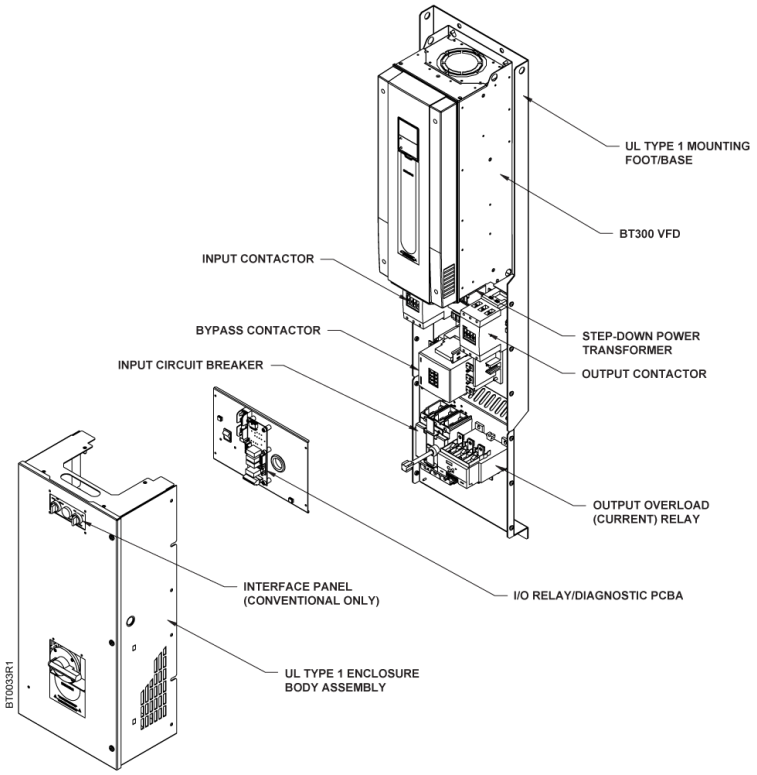


Figure 28. FS7 C-Bypass with Circuit Breaker Components.

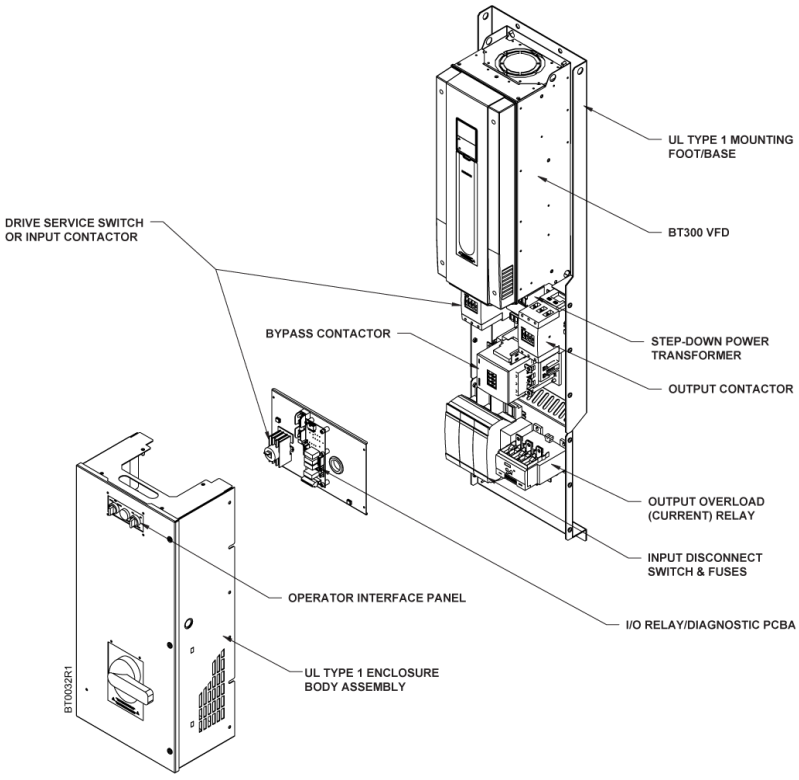


Figure 29. FS7 C-Bypass with Disconnect with Fuses Components.

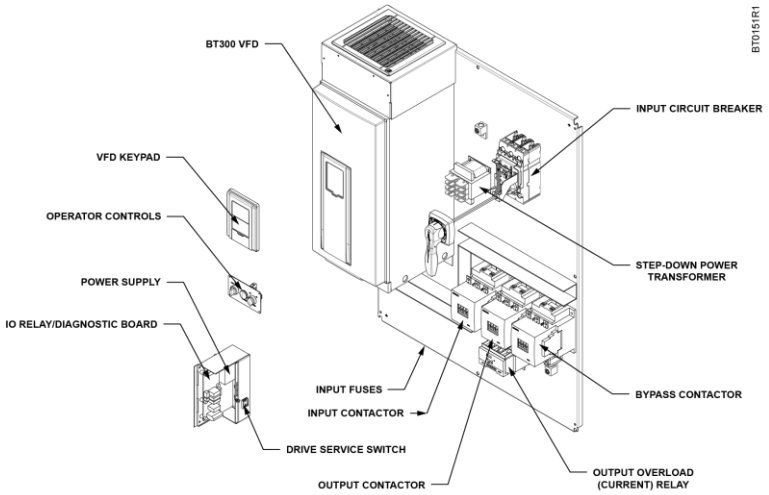


Figure 30. FS8 C-Bypass with Circuit Breaker Components.

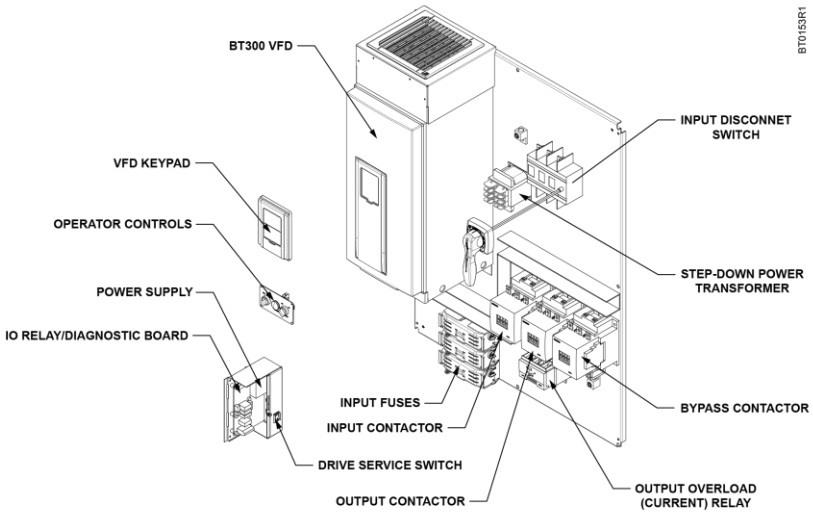


Figure 31. FS8 C-Bypass with Disconnect with Fuses Components.

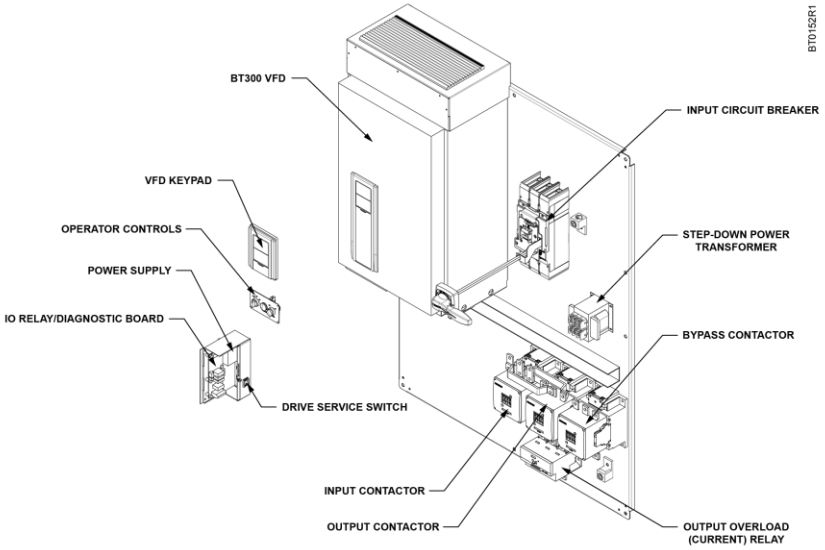


Figure 32. FS9 C-Bypass with Circuit Breaker Components.

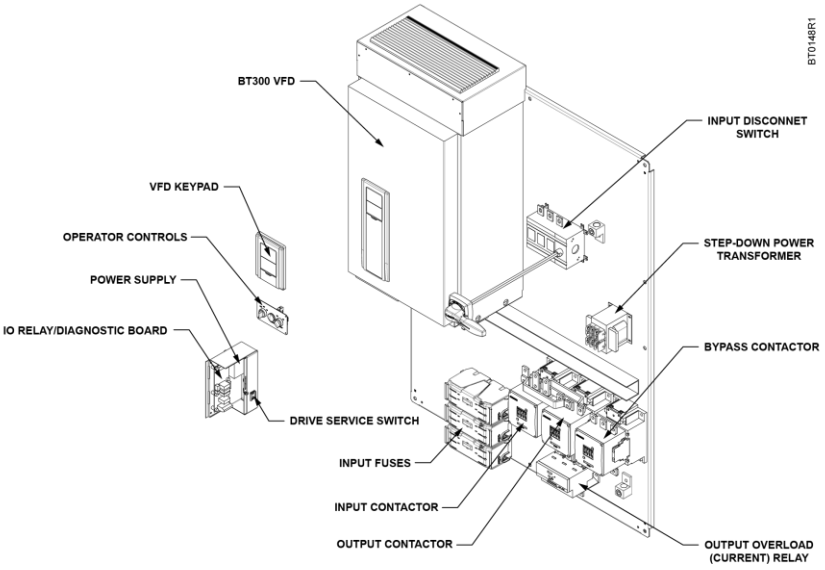


Figure 33. FS9 C-Bypass with Disconnect with Fuses Components.

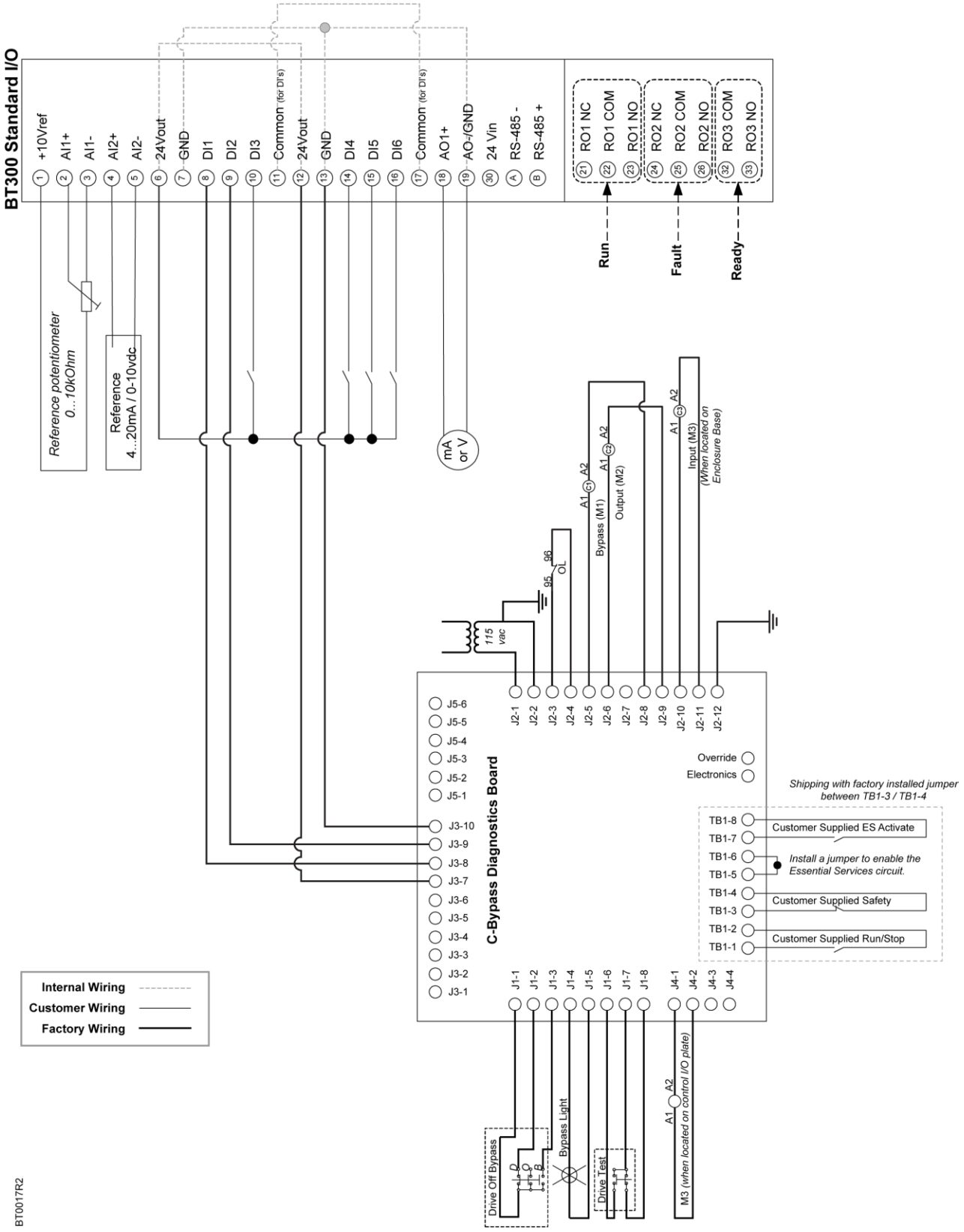
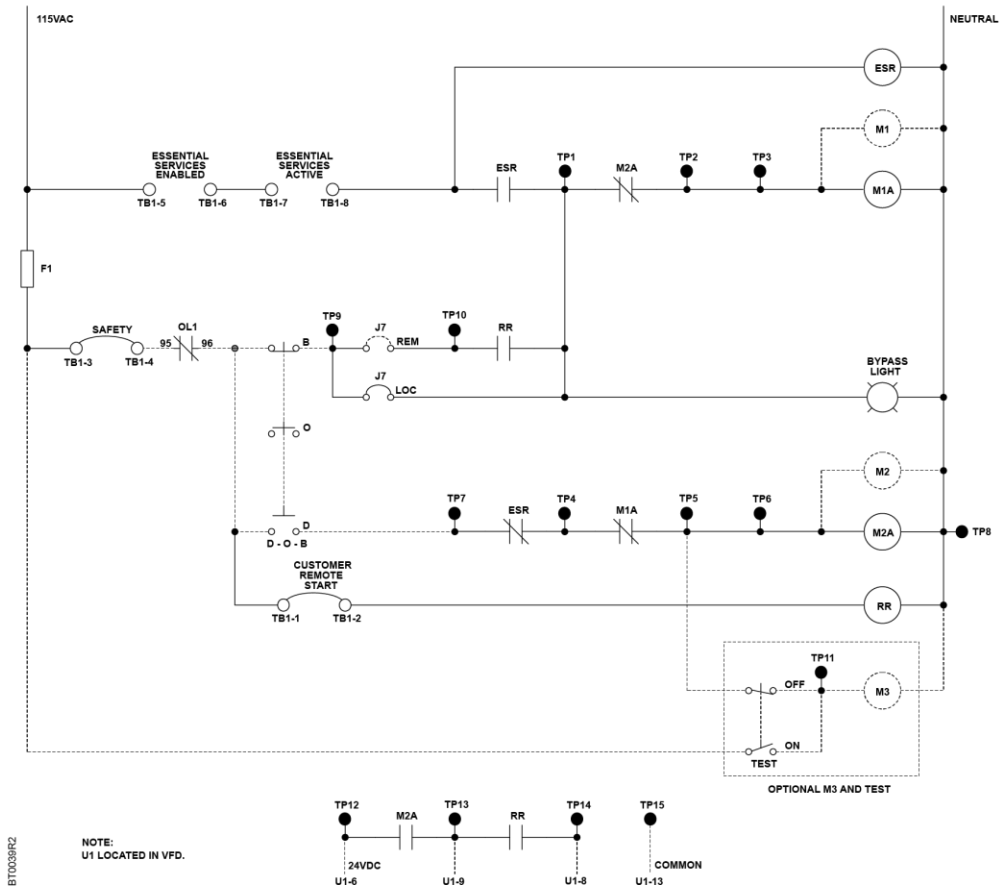


Figure 34. Conventional Bypass Drive Terminations.

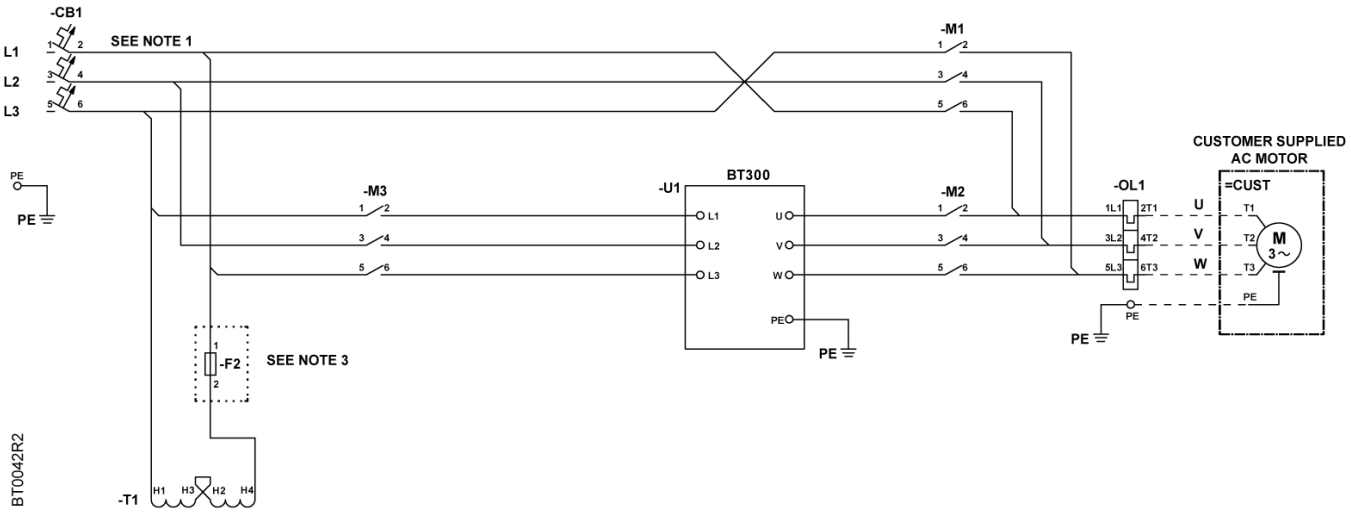


NOTES:

1. Branch circuit protection to be provided by installer, per any National or local code requirements, as applicable.
2. Control and communication wiring should be 300V UL minimum.
3. Communication wiring should be run with maximum separation possible from all other wiring.
4. Essential service mode operates the motor full speed (bypass) with no protection for the motor or system.
5. See the *Siemens BT300 Variable Frequency Drive Bypass Operator's Manual* (DPD01391) for proper fuse and wire sizes.
6. See the *Siemens BT300 HVAC Operator's Manual* (DPD01809) for BT300 input/output control signal wiring details.

Figure 35. Conventional Bypass Relay/Diagnostic Board Terminations.

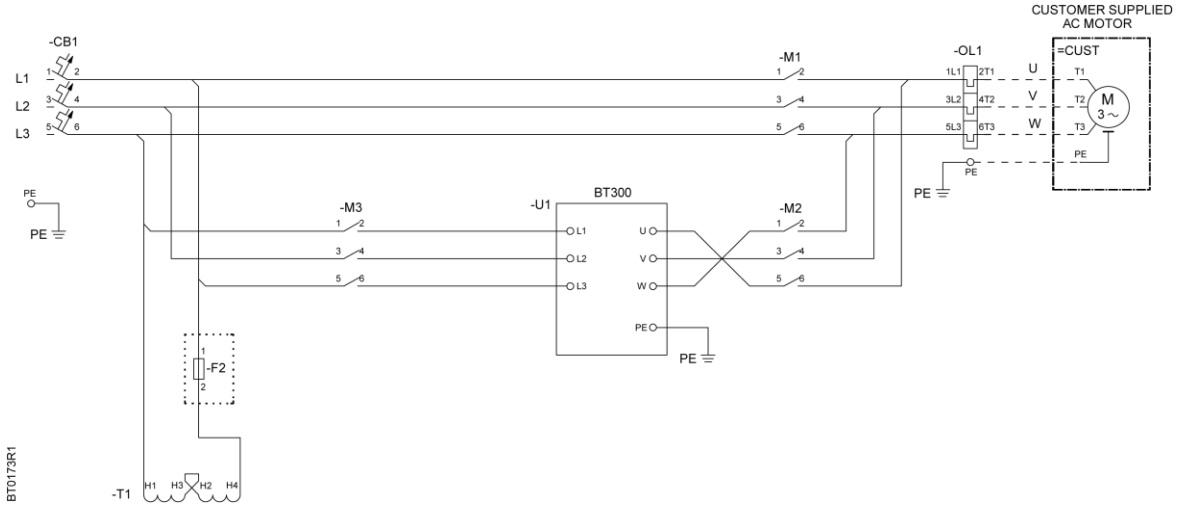
Bypass Power Circuit Wiring Diagrams



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. 100kAIC SCCR achieved only when customer branch circuit protection is installed using the specified fuses from Table 8.
3. F2 not present in FS4.

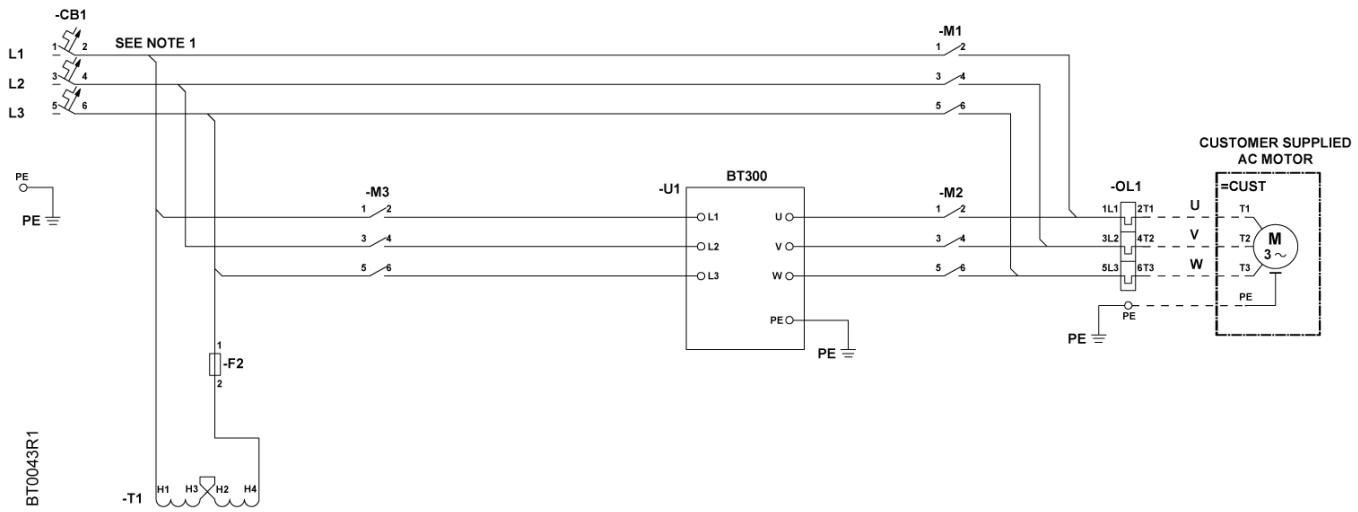
Figure 36. Bypass Power Circuit, Circuit Breaker Version, FS4 and FS6.



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. 100kAIC SCCR achieved only when customer branch circuit protection is installed using the specified fuses from Table 8.
3. F2 not present in FS5.

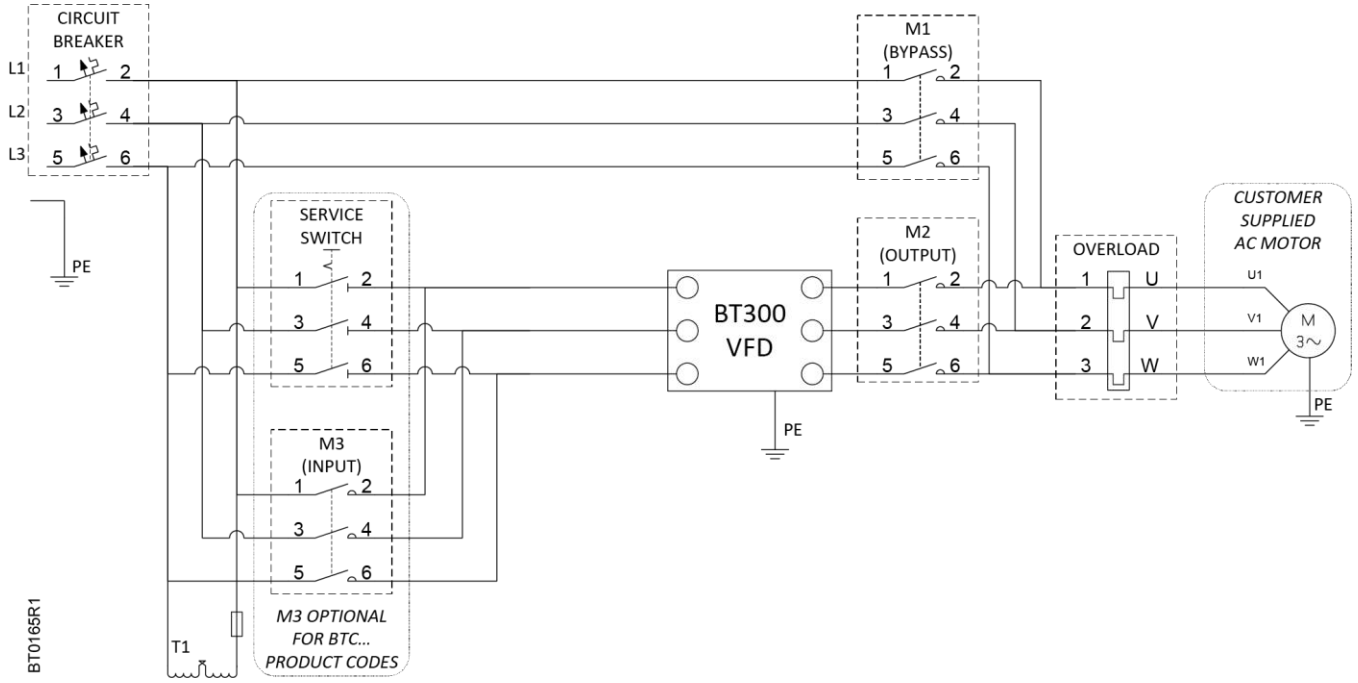
Figure 37. Bypass Power Circuit, Circuit Breaker Version, FS5.



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. In the two contactor configuration, the M3 contactor is installed and controlled by an internal rocker switch.
3. 100kAIC SCCR achieved only when customer branch circuit protection is installed using the specified fuses from Table 8.

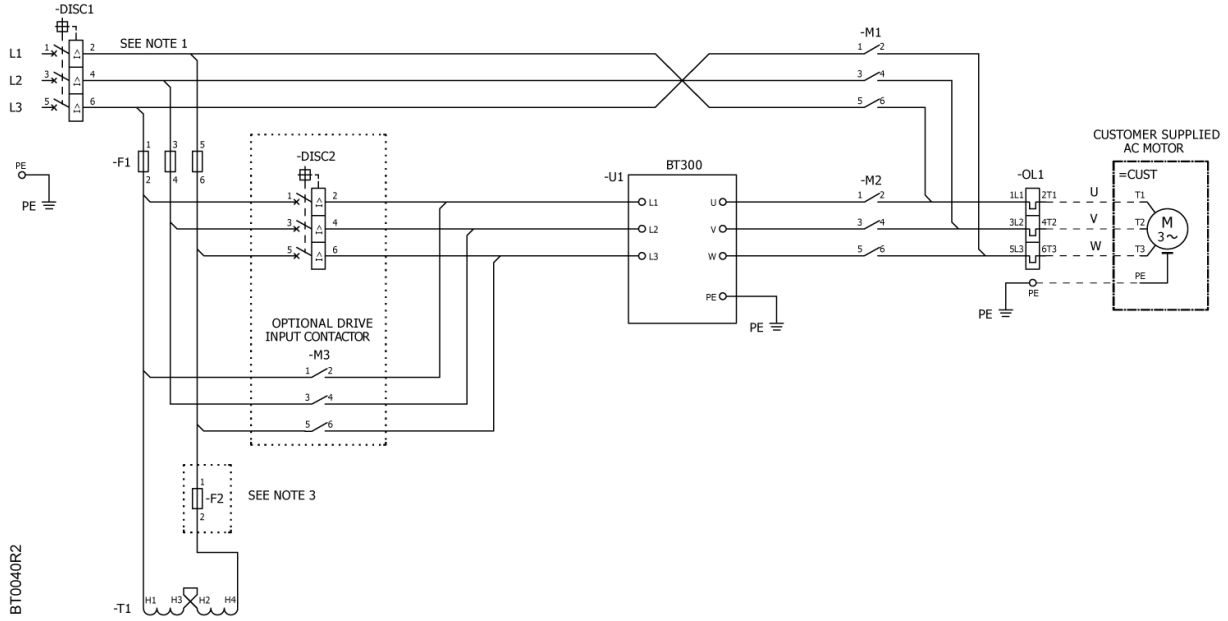
Figure 38. Bypass Power Circuit, Circuit Breaker Version, FS7.



NOTE:

Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.

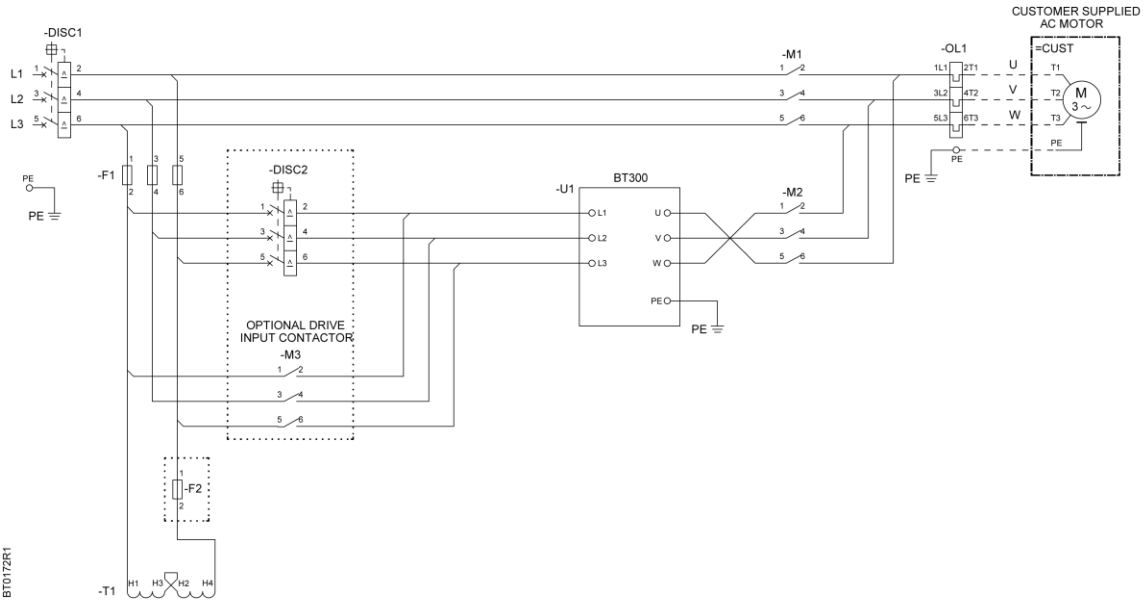
Figure 39. Bypass Power Circuit, Circuit Breaker Version, FS8 and 9.



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. 100kAIC SCCR achieved only when customer branch circuit protection is installed using the specified fuses from Table 8.
3. F2 not present in FS4.

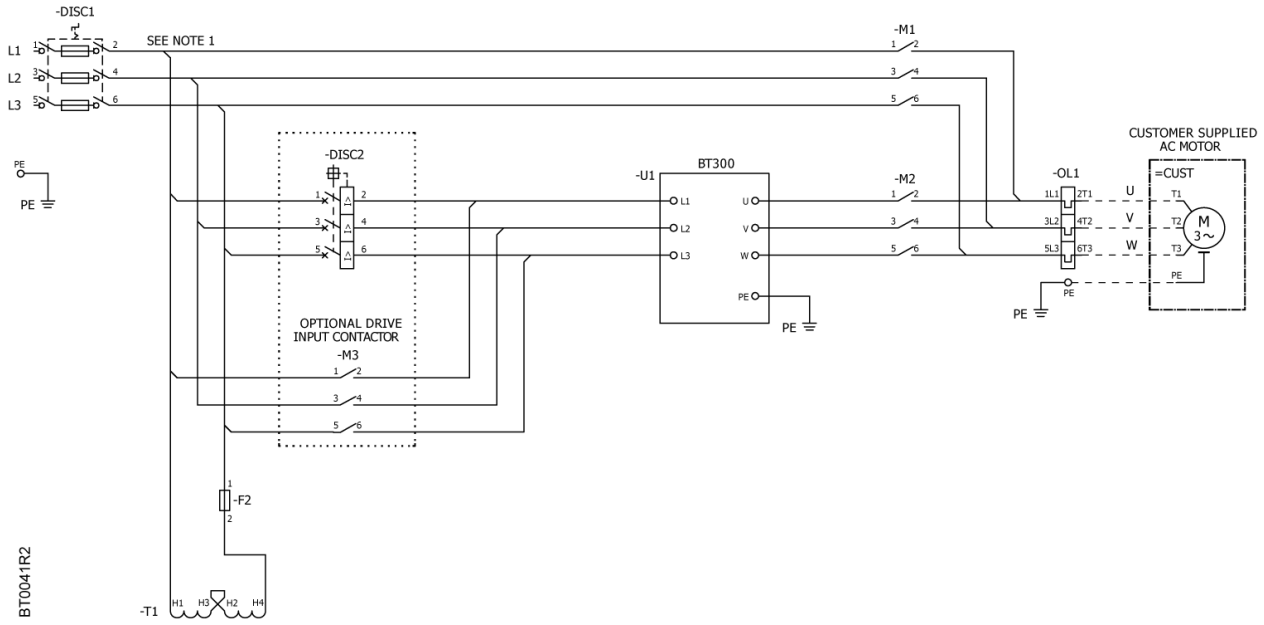
Figure 40. Bypass Power Circuit, Disconnect with Fuses Version, FS4 and FS6.



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. 100kAIC SCCR achieved only when customer branch circuit protection is installed using the specified fuses from Table 8.
3. F2 not present in FS5.

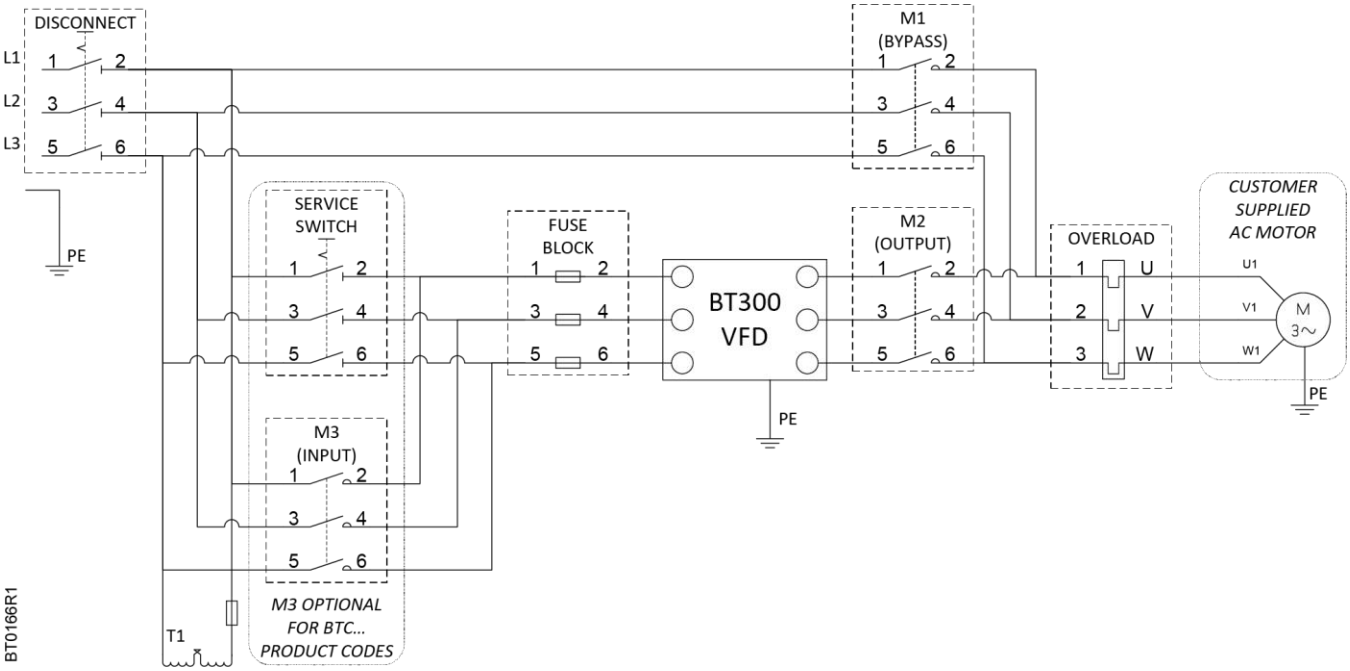
Figure 41. Bypass Power Circuit, Disconnect with Fuses Version, FS5.



NOTES:

1. Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.
2. In the two contactor configuration, the M3 contactor is installed and controlled by an internal rocker switch.

Figure 42. Bypass Power Circuit, Disconnect with Fuses Version, FS7.



NOTE:

Incoming power phase rotation should be L1, L2, L3 to match inverter forward direction phase rotation U, V, W. Connection as shown should produce clockwise direction when viewing the motor from the shaft end. Always test motor direction in both drive and bypass modes before coupling the motor to the load.

Figure 43. Bypass Power Circuit, Disconnect with Fuses Version, FS8 and 9.

Wiring Diagrams

Motor Rotation Correction Wiring

If correct rotation in VFD mode, but incorrect rotation in Bypass mode
Swap incoming power (L2 and L3) at the fuse block or circuit breaker

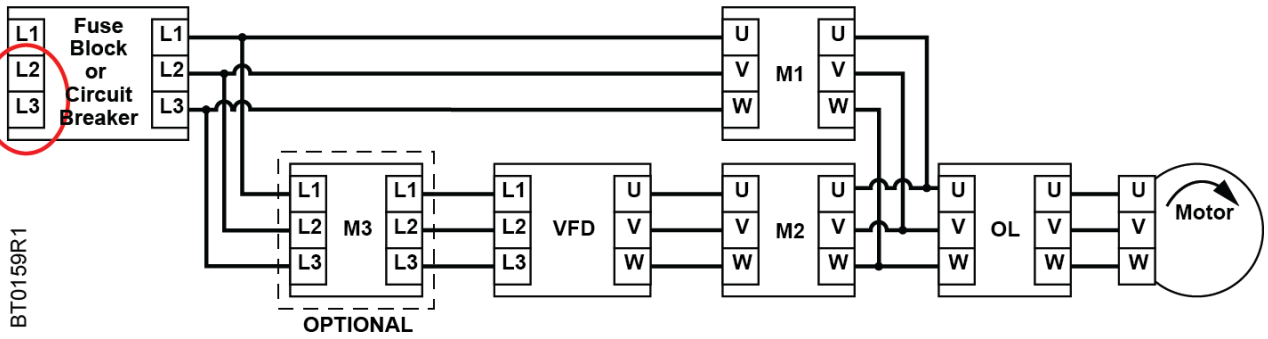


Figure 44. Rotation Correction – VFD Correct, Bypass Reversed.

If incorrect rotation in VFD mode, but correct rotation in Bypass mode
Swap incoming power (L2 and L3) at the fuse block or circuit breaker and swap motor output (U & V) at the output of the overload.

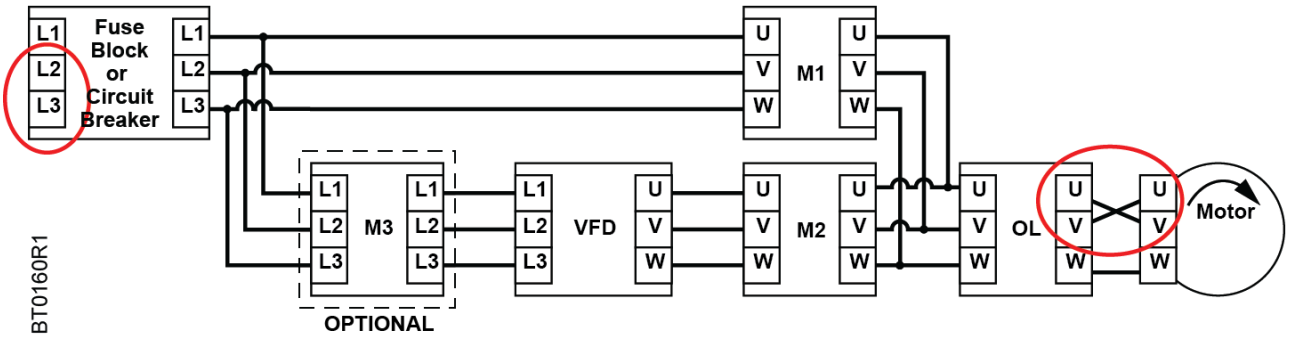


Figure 45. Rotation Correction – VFD Reversed, Bypass Correct.

If incorrect rotation in VFD mode and in Bypass mode
Swap motor output (U & V) at the output of the overload.

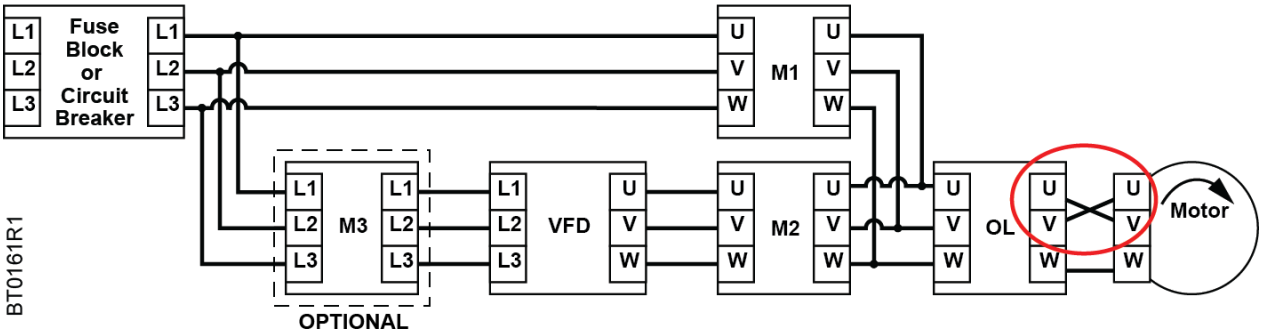


Figure 46. Rotation Correction – VFD Reversed, Bypass Reversed.

Table 8. Customer-Supplied Branch Circuit Protection Fuse Chart.

HP	kW	Frame Size		208-240 Vac		460-500 Vac	
				Current (A)	Fuse	Current (A)	Fuse
1	0.75	4		4.8	ATDR8		
1.5	1.1		4	6.7	ATDR12	3.4	ATDR5
2	1.5			8.0	ATDR12	4.8	ATDR6
3	2.2			11.0	ATDR17-1/2	5.6	ATDR8
5	4	5		18.0	ATDR25	9.6	ATDR12
7.5	5.5			24.2	AJT40	12.0	ATDR17-1/2
10	7.5		5	31.0	AJT50	16.0	ATDR25
15	11	6		48.0	AJT80	23.0	AJT30
20	15			62.0	AJT100	31.0	AJT45
25	18.5	7	6	75.0	AJT125	38.0	AJT60
30	22			88.0	AJT150	46.0	AJT70
40	30			105.0	AJT200	61.0	AJT90
50	37	8	7	143.0	AJT200	72.0	AJT110
60	45			170.0	AJT225	87.0	AJT125
75	55			208.0	AJT250	105.0	AJT150
100	75	9	8	261.0	AJT350	140.0	AJT200
125	90			310.0	AJT400	170.0	AJT225
150	110					205.0	AJT250
200	132		9			261.0	AJT350
250	160					310.0	AJT400

Table 9. Siemens Bypass Class 10 Overload Relay Setting Data – 208 Volt.

HP	kW	Frame Size	Drive FLA	NEC FLA	Overload				
					Min. Setting	Min. % FLA	Max. Setting	Max %FLA	Factory Setting
1	0.75	4	4.8	4.2	3.5	73%	5.0	104%	4.6
1.5	1.1		6.7	6	5.5	82%	8.0	119%	6.6
2	1.5		8.0	6.8	5.5	69%	8.0	100%	7.5
3	2.2		11.0	9.6	9.0	82%	12.5	114%	10.6
5	4	5	18.0	15.2	17.0	94%	22.0	122%	17.0
7.5	5.5		24.2	22	20.0	83%	25.0	103%	24.2
10	7.5		31.0	28	23.0	74%	28.0	90%	28.0
15	11	6	48.0	42	40.0	83%	50.0	104%	46.2
20	15		62.0	54	47.0	73%	57.0	92%	54.0
25	18.5	7	75.0	68	54.0	72%	65.0	87%	65.0
30	22		88.0	80	70.0	80%	80.0	91%	80.0
40	30		105.0	104	50.0	48%	200.0	190%	114.0
50	37	8	143.0	130	50	35%	200	140%	130
60	45		170.0	154	50	29%	200	118%	154
75	55		208.0	192	50	24%	200	96%	192
100	75	9	261.0	248	160	61%	630	241%	248
125	90		310.0	312	160	52%	630	203%	312

Table 10. Siemens Bypass Class 10 Overload Relay Setting Data – 460 Volt.

HP	kW	Frame Size	Drive FLA	NEC FLA	Overload				
					Min. Setting	Min. % FLA	Max. Setting	Max %FLA	Factory Setting
1.5	1.1	4	3.4	3.0	2.2	65%	3.2	94%	3.0
2	1.5		4.8	3.4	2.8	58%	4.0	83%	3.4
3	2.2		5.6	4.8	3.5	63%	5	89%	4.8
5	4		9.6	7.6	5.5	57%	8.0	83%	7.6
7.5	5.5		12.0	11.0	11	92%	16	133%	11.0
10	7.5	5	16.0	14	11	69%	16	100%	14
15	11		23.0	21	17	74%	22	96%	21
20	15		31.0	27	23	74%	28	90%	27
25	18.5	6	38.0	34	28	74%	40	105%	34
30	22		46.0	40	28	61%	40	87%	40
40	30		61.0	52	47	77%	59	97%	52
50	37	7	72.0	65	54	75%	75	90%	65
60	45		87.0	77	70	80%	100	92%	77
75	55		105.0	96	50	48%	200	190%	96
100	75	8	140.0	124	50	36%	200	143%	124
125	90		170.0	156	50	29%	200	118%	156
150	110		205.0	180	50	24%	200	98%	180
200	132	9	261.0	240	160	61%	630	241%	240
250	160		310.0	302	160	52%	630	203%	302

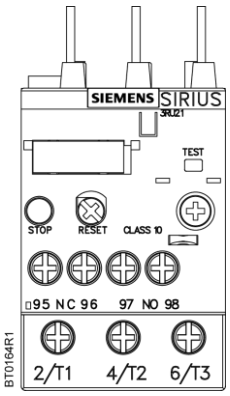


Figure 47. Standard Motor Overload.

NOTE:
Set the overload relay by rotating the adjustment knob so that the arrow is aligned with the desired overload threshold, calibrated in Amps.

The Siemens overloads provided with the bypass units are set at the factory according to the NEC motor tables. For proper protection, adjust the overload to the FLA of the connected motor. The provided overloads are designed for 125% load. If a lower rating is desired, use the following formula to determine the setting to be used on the overload:

Desired %/125 = Multiplier
Motor FLA * Multiplier = Setting for Overload.

Example:

The motor nameplate date reads that the service factor (SF) is **115**. The motor nameplate data reads that the motor FLA is **30A**. The formula would be as follows:

115/ 25 = .92
30 * .92 = 27.6

The dial would be set as close as possible to 27.6.

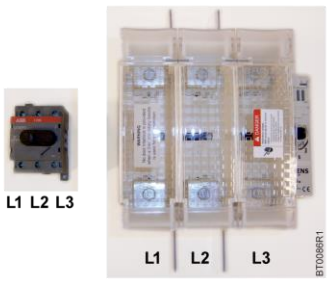


Figure 48. Customer Power Line Input Connections, Typical Disconnect with Fuses Models.

Figure 49. Customer Power Input Line Connections, Typical Circuit Breaker Models.

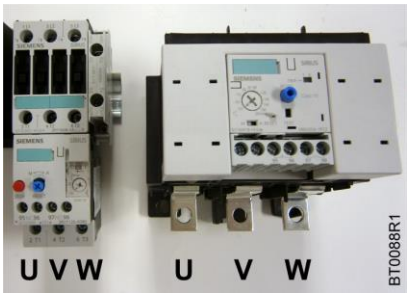


Figure 50. Customer Power Motor Connections, Typical for All Models.

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