SIEMENS

Submittal Sheet
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BT300 HVAC Drives Electronic Bypass (E-Bypass) Options

Description

The BT300 Electronic Bypass (E-Bypass) Options are companion packages for the family of BT300 Variable Frequency Drives (VFDs).

For information on the family of BT300 VFDs, see the *BT300 HVAC Drives Submittal Sheet* (154-126), and *BT300 HVAC Drives Technical Specification Sheet* (149-711).

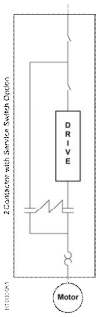
BT300 E-Bypass Features

- Bypass Start-up Wizard
- Diagnostic board with test points
- Control logic short circuit protection
- 100,000 AIC short circuit rating
- Auto Bypass
- Damper Interlock
- Essential Service Mode
- Remote Bypass
- Electronic Override
- View/Monitor bypass parameters
- Multiple Safeties
- Monitor and display which safety interlock is open
- Control external devices via serial communication
- Pass through I/O capabilities command up to 8 output points
- View status of I/O points
- Supports APOGEE P1, BACnet and Modbus protocols in bypass
- IBC 2012 Seismic Certified
- OSHPD Certified
- Compact design

E-Bypass Power Features

2-Contactor: Output and Bypass

- Overload protection in bypass mode
- Electrically interlocked



Drive Isolation

Drive Service Switch allows the drive to be disconnected from power during troubleshooting without disrupting bypass operation.

Input Device

- Disconnect with fuses.
- (*Optional*) Circuit breaker.
- All doors are interlocked and can be padlocked

5% Input Impedance

- Internal reactors lower harmonics that the drive produces.
- BT300 E-Bypass requires no additional input reactors

E-Bypass Control Features

Auto Bypass

- Relay logic allows the user to send the motor to bypass mode based on the drive's programmable fault list.
- Customer defines the events which will transfer to bypass.
- The drive's programmable relay can be set up for applications that run full speed for an extended period of time.

Damper Interlock

- Generally used for safety tie-ins; the motor will not operate the drive or bypass when open.
- Enables a circuit signaling the system is ready for bypass.

Essential Service Mode

- Also used for smoke purge; the motor goes to bypass regardless of the selected mode.
- No call to stop will have an effect, including open safety or stop commands.
- Only turning the power off or opening this contact will stop the motor.

Remote Bypass

Customer-supplied start/stop controls when running in bypass.

Electronic Override

- Full bypass control, even if the control module (intelligence) fails. As long as power is supplied to the bypass, you have full bypass capability.
- Maintains all system safeties in bypass.

Product Numbers

Example:	*BTC*	*-*	*0*	*0*	*1*	*X*	*2*	*-*	*F*	*0*	*1*	*3*
Example:	*BTE*	*-*	*0*	*0*	*7*	*5*	*4*	*-*	*B*	*0*	*1*	*2*

Bypass Model(s)	
BTC	Conventional
BTE	Electronic
Separator	
HP	
1[1], 1.5, 2, 3, 5, 7.5, 10, 15, 20, 25, 30, 40, 50, 60, 75[2], 100, 125, 150[3], 200[3], 250[3]	
X = no fraction, 5 = 1/2 hp	
Voltage	
2	208 Vac to 240 Vac
4	380 Vac to 500 Vac
Separator	
Disconnect	
F	Fused Disconnect
B	Circuit Breaker
NEMA	
01	NEMA Type 1 (IP 21)
Type	
2	2 contactors (output and bypass) w/service switch
3[4]	3 contactors (input, output, and bypass)

[1] Available only with voltage code 2.
[2] Use with voltages equal to or greater than 230 Vac.
[3] Available only with voltage code 4.
[4] Available only with BTC models.

Example Product Numbers:

BTC-001X2-F013

Conventional Bypass, 1 HP, 208-240 Vac, Fused Disconnect, NEMA Type 1, with 3 contactors.

BTE-00754-B012

Electronic Bypass, 7.5 HP, 380-500 Vac, Circuit Breaker, NEMA Type 1, with 2 contactors and service switch.

Table 1. E-Bypass Approximate Weights.

Frame	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 actual horsepower/voltage and selected power options.

Typical Specifications

BT300 E-Bypass Options shall send the motor to bypass mode based on an easily accessible door-mounted selector or based on User's desired conditions. The bypass mode shall provide overload protection. Contactors shall be electrically interlocked. An essential services mode shall send the motor to bypass regardless of the selected mode. When in safety modes it should provide indication of return state. It should indicate interlock sequence state during transition. Visually indicate faults for VFD safety/overload. In case of catastrophic failure, bypass and safeties must be provided.

Table 2. E-Bypass Frame Sizes and Power Ranges per NEC Motor Tables.

		208-240	380-500	208-240	380-500
HP	**kW**	**Frame Size**		**Output Current**	
1	0.75	**4**		4.8	
1.5	1.1		**4**	6.7	3.4
2	1.5			8.0	4.8
3	2.2			11.0	5.6
5	4	**5**		18.0	9.6
7.5	5.5			24.2	12.0
10	7.5		**5**	31.0	16.0
15	11	**6**		48.0	23.0
20	15			62.0	31.0
25	18.5	**7**	**6**	75.0	38.0
30	22			88.0	46.0
40	30			105.0	61.0
50	37	**8**	**7**	143.0	72.0
60	45			170.0	87.0
75*	55			208.0	105.0
100*	75	**9**	**8**	261.0	140.0
125*	90			310.0	170.0
150	110				205.0
200	132		**9**		261.0
250	160				310.0

*Available for 230 Vac and above.

NOTE: Drives are current (amperage) rated devices. Verify that the listed ratings are ≥ the motor full load current rating.

Dimensions

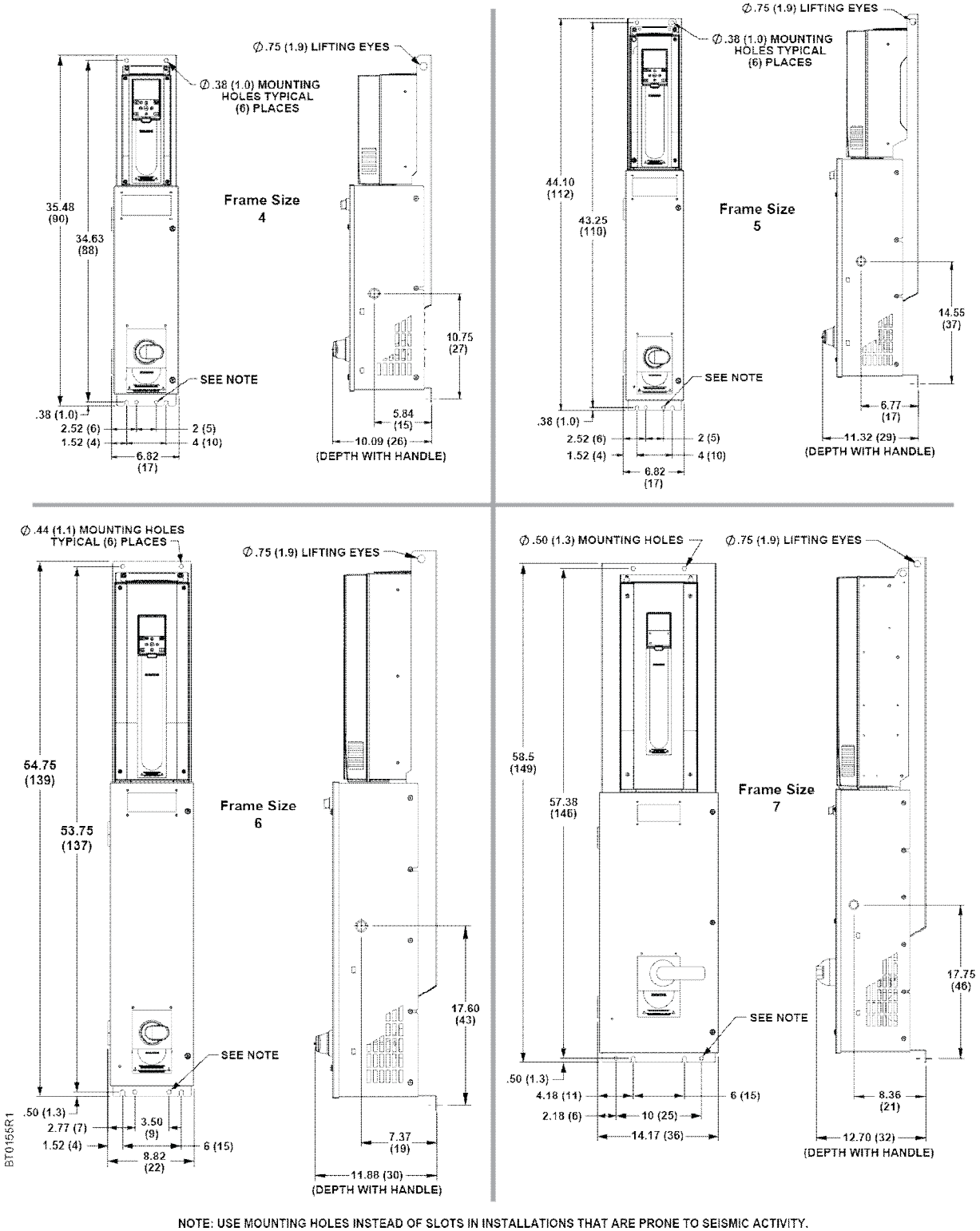


Figure 1. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS4 through FS7.

Dimensions, Continued

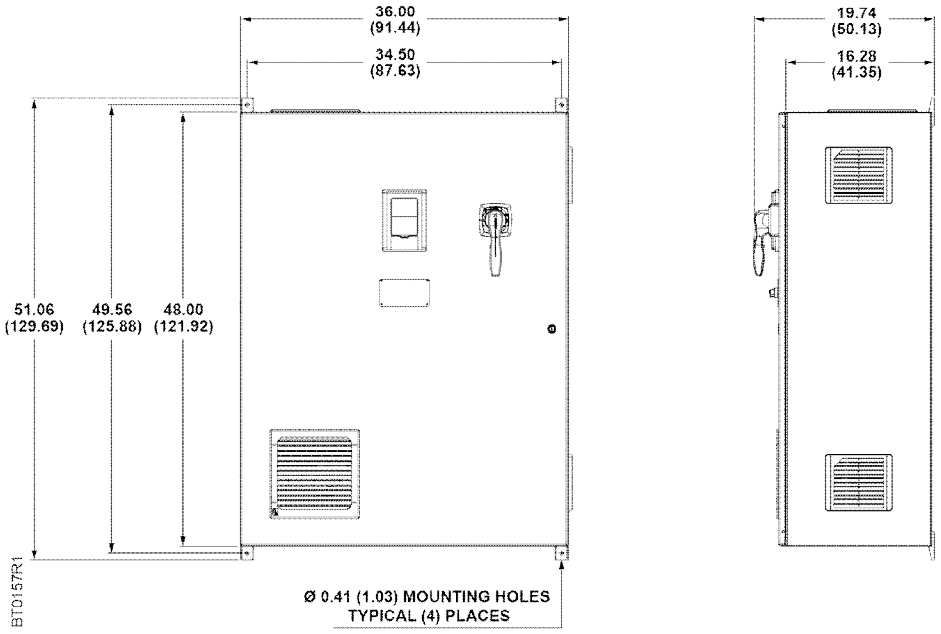


Figure 2. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS8.

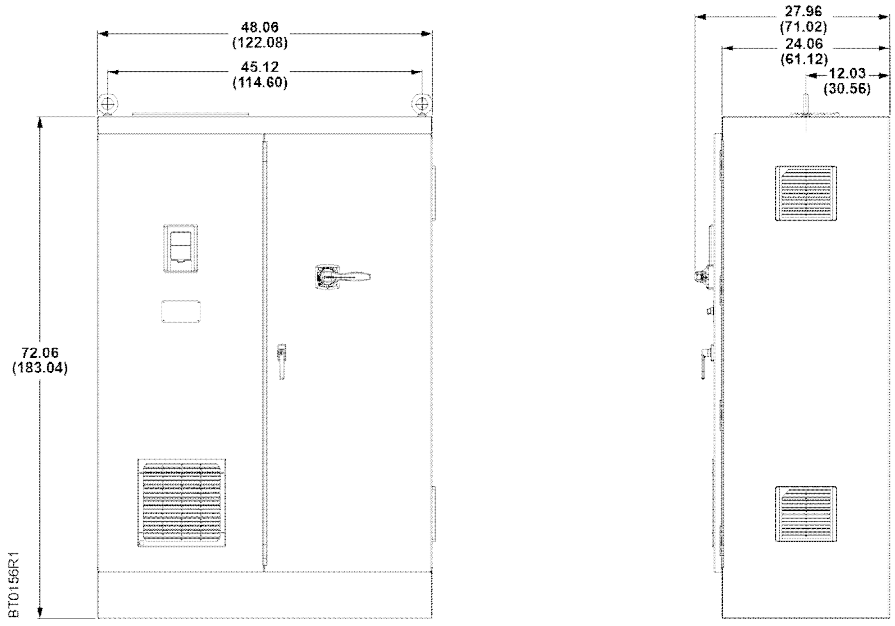
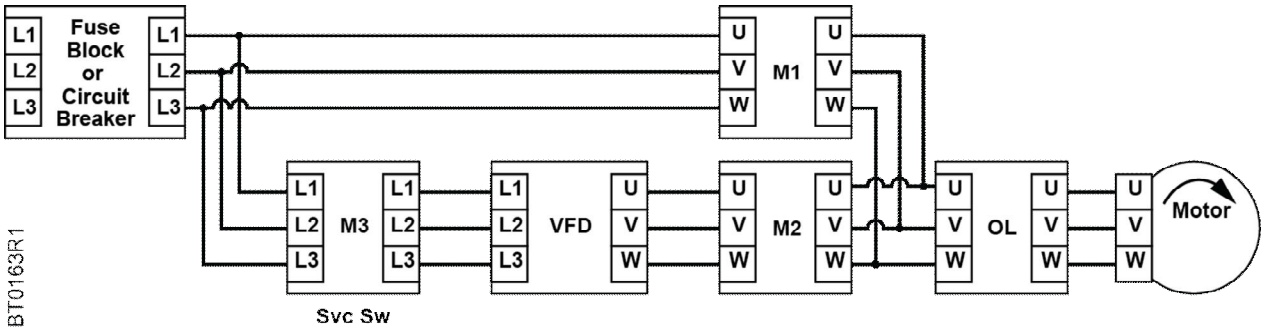


Figure 3. Dimensions in Inches (cm) for UL (NEMA) Type 1 FS9.

Wiring Diagrams



NOTES:

1. Branch circuit protection to be provided by installer, per UL508A, if not provided with drive.
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. Ensure that automatic bypass will not damage the system before activating.
6. See *Siemens BT300 Bypass Operator's Manual* (DPD01391) for proper fuse and wire sizes.
7. See *Siemens BT300 Operator's Manual* (DPD01149) for BT300 input/output control signal wiring details.

Figure 4. Factory As-Built of Power Wiring

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

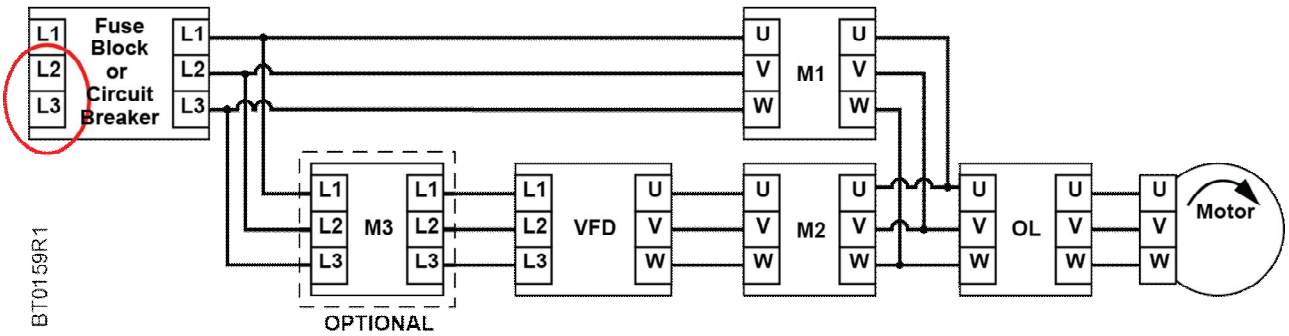


Figure 5. Rotation Correction – VFD Correct, Bypass Reversed.

Motor Rotation Correction Wiring, Continued

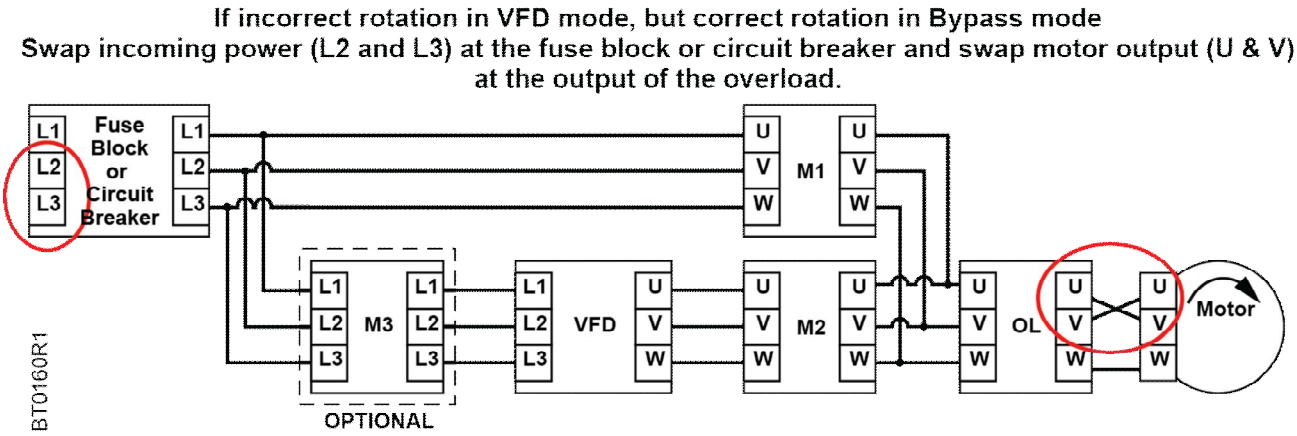


Figure 6. Rotation Correction – VFD Reversed, Bypass Correct.

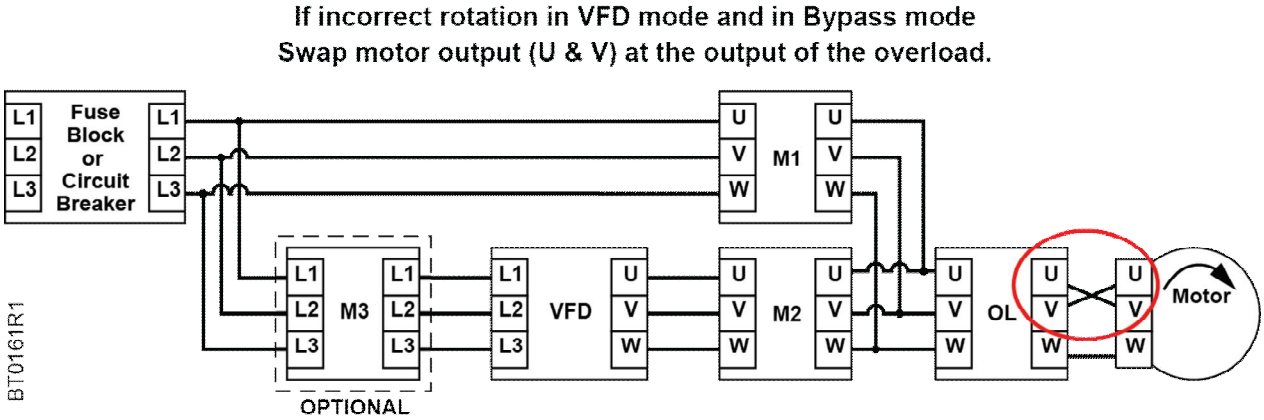


Figure 7. Rotation Correction – VFD Reversed, Bypass Reversed.

Table 3. E-Bypass Specifications.

Specification	Description
Input Voltages and Power Ranges (3-phase)	208 to 240 Vac (-10% to +10%): 1 HP to 125 HP (0.75 kW to 90 kW) 4.2 amps to 301 amps 380 to 500 Vac (-10% to +10%): 1.5 HP to 250 HP (1.1 kW to 160 kW) 3.4 amps to 303 amps
Short circuit withstand rating	Disconnect with Fuses- 100,000 AIC Circuit Breaker - 65,000 AIC @ 208/240 Vac 18,000 AIC @ 480 Vac
Frequency Reference Analog Input Keypad	 Resolution 0.01 - 0.1% (10 bit), accuracy ±1% Resolution 0.01 Hz
Ambient Operating Temperature	14°F (-10°C) (no frost) to 104°F (40°C) up to 122°F (50°C) with derating
Storage Temperature	-40°F (-40°C) (no frost) to 158°F (70°C)
Relative Humidity	0 to 95% rh, non-condensing, non-corrosive
Air quality Chemical vapors Mechanical particles	IEC 60068-2-60 (H_2S [hydrogen sulfide] and SO_2 [sulfur dioxide]). IEC 60721-3-3, unit in operation, class 3C2 IEC 60721-3-3, unit in operation, class 3S3.
Altitude	100% load capacity (no-derating) up to 3,280 ft (1,000 m) -1% derating for each 328 ft (100 m) above 3,280 ft (1,000 m) **Maximum altitude:** 208 to 240 Vac: 13,123 ft (4,000 m) 380 to 500 Vac: 13,123 ft (4,000 m) **Voltage for relay outputs:** 240 Vac: ≤9,842 ft (3,000 m) 120 Vac: ≤ 13,123 ft (4,000 m) **Corner-grounding (380 to 500 Vac systems only):** ≤ 6,562 ft (2,000 m)
Vibration	EN61800-5-1 EN60068-2-6
Seismic	2012 International Building Code (IBC), OSHPD
Shock	EN61800-5-1 EN60068-2-27
Enclosure Class	UL Type 1/IP 21 standard in entire HP/kW range.
Agency Approvals/Conformity	UL 508C (FS4 through FS7); UL-508A (FS8 and FS9); UL; cUL; CE; RoHS compliant; EN61800-5-1 (2007), BTL and OSHPD
Country Of Origin (COO)	United States of America
Control I/O: (Programmable) Analog Inputs Analog Outputs Digital Inputs Relay Outputs	 2 - voltage (0/2 to 10 Vdc) or current (0/4 to 20 mA) Resolution 0.1%; Accuracy ±1% 1 - voltage (0/2 to 10 Vdc) or current (0/4 to 20 mA) < 500 W; Resolution 0.1%; Accuracy ±1% 6 - programmable and isolated Positive or Negative logic; 5 kW; 0 to 5 Vdc = **0**; 15 to 30 Vdc = **1** 2 - Form C and 2 Normally Open (programmable) 24 Vdc @ 8A; 250 Vac @ 8A; 125 Vac @ 0.4A
Auxiliary input	24 Vdc ±10%, 250 mA
Auxiliary output	10 Vdc ±3%, 10 mA (short-circuit protected) 24 Vdc ±10%, 250 mA (short-circuit protected)

Specification	Description
Embedded Protocols	RS-485: APOGEE P1, BACnet MS/TP, Modbus RTU, Metasys N2 Ethernet: BACnet IP, Modbus TCP
Protection features	Under-voltage trip limit Over-voltage trip limit Ground fault protection Input (mains) supervision Motor phase supervision Over-current protection Unit over-temperature protection Motor overload protection Motor stall protection Motor underload protection Short-circuit protection of 10 Vdc and 24 Vdc reference voltages

Table 4. Accessories.

Accessory Description	Frame Size		
	4	5	6
EMC Filter Kit	BT300-EMCKIT-FS4	BT300-EMCKIT-FS5	BT300-EMCKIT-FS6

Accessory Description	Frame Size		
	7	8	9
EMC Filter Kit	BT300-EMCKIT-FS7	N/A	BT300-EMCKIT-FS9

Part Number	Description
BT300-DIAGBD-BTE	Electronic Bypass Diagnostic Board
BTE-SW-KIT	Electronic Bypass Override Switch Kit

Table 5. Dimensions in Inches (Millimeters).

Frame Size	Height	Width	Depth
FS4	35 (901)	7 (173)	10.09 (256)
FS5	44 (1,120)		11.32 (288)
FS6	55 (1,391)	9 (224)	11.88 (302)
FS7	59 (1486)	14 (368)	12.7 (323)
FS8	48 (1,219)	36 (914)	16.79 (426)
FS9	72 (1,830)	48 (1,221)	25.21 (640)

Table 6. Order Worksheet.

Item	Qty.	Designation	Part Number	Description