

BT300 HVAC Drives



Figure 1. BT300 HVAC Drive without and with Integral Disconnect.

Description

Siemens Industry's BT300 is designed specifically for the demands of today's HVAC systems. Increased focus on energy efficiency of variable flow systems has increased the need for easy-to-use and highly reliable variable frequency drives that reduce the cost of installation and maintenance while maximizing energy savings.

Features

- Motor Switch Ride Through – during maintenance the motor maintenance switch can be opened and closed without stopping or tripping the drive
- Thin Film Capacitors – eliminate the need to condition or reform the capacitors before applying power
- View/Monitor nine parameters at one time – User selectable, users determine the parameters for their applications
- Smallest Type 12 footprint on the market – lower shipping cost and easy installation
- Standard Integration Protocols (APOGEE® P1, BACnet, Modbus, LON (optional), Metasys N2)

Typical Specifications

This specification covers a complete Variable Frequency Drive consisting of a pulse width modulated inverter designed for use on a standard NEMA Design B induction motor:

- All VFDs shall have the same customer interface regardless of horsepower rating.
- Input voltage shall be 208-240 and 380-480 Vac +/- 10%, 3-phase, 48-63 Hz.
- VFD shall include internal reactors equivalent to 5% input impedance.
- Base VFD shall be UL listed for 100 kA SCCR.
- All circuit boards shall be coated to protect against corrosion and meet IEC 60068-2-60 Method 1.
- VFD shall utilize built-in wizards for start-up and easy-to-set-up advanced functions.
- VFD shall have a "favorite" feature to allow end user to create and save custom settings.
- VFD shall have Ethernet and RS-485 port as standard.

- The drive's overload rating shall be 110% of its normal duty current rating.
- Keypad shall be able to display and monitor nine parameters simultaneously.
- VFD shall employ thin film capacitors and require no reforming or conditioning, allowing for a shelf life of 10 years.
- VFD shall have a motor switch parameter which, when enabled, shall prevent the VFD from tripping when the motor switch is opened and closed allowing for easy maintenance.

Technical Data

Input voltage and power ranges (3-phase)	208V to 240V: -10% to +10%, 1 HP to 125 HP (0.75 kW to 90 kW) 380V to 480V: -10% to +10% 1.5 HP to 250 HP (1.1 kW to 160 kW)
Input frequency	45 Hz to 66 Hz
Output frequency	0 Hz to 320 Hz
Frequency resolution	0.01 Hz
Efficiency	>97.5%
Overload Capacity	1.1 x Nominal rated output current 110% for 1 minute/10 minutes
Switching Frequency	1.5K to 10K Hz; Automatic switching frequency de-rating in case of overheating
Short Circuit Withstand Rating	100,000 AIC
Frequency reference	Resolution 0.01 Hz
Analog Input	0.1% (10-bit)
Field weakening point	8 to 320 Hz
Acceleration time	0.1 to 3000 seconds
Deceleration time	0.1 to 3000 seconds
Ambient Operating Temperature	-14° F (-10°C) no frost to 104°F (40°C) without de-rating and 131°F (55°C) with de-rating
Storage Temperature	-40°F (-40°C) to 158°F (70°C)
Relative Humidity	0 to 95% rh, non-condensing, non-corrosive
Air Quality	IEC 60068-2-60
Chemical Vapors	IEC 60721-3-3, unit in operation, class 3C3
Mechanical Particles	IEC 60721-3-3, unit in operation, class 3S2
Altitude	100% load capacity (no de-rating) up to 3,280 Ft (1,000 m) 1% de-rating for each 328 ft (100 m) above 3,28 ft (1,000 m) Maximum altitude 14,763 ft (4,500 m)

Technical Data, Continued

Vibration	IEC 61800-5-1 and IEC 60068-2-6	Control method	Linear, parabolic and programmable V/f; and flux current control low-power mode
Shock	IEC 61800-5-1 and IEC 60068-2-27	PWM frequency	2K Hz to 16K Hz (adjustable in 2k Hz increments)
Enclosures	UL Type 1, UL Type 12	Fixed frequencies	15 programmable
EMC Immunity	Fulfills IEC 61800-3, first and second environment	Skip frequency bands	3 programmable
EMC Emissions	EN61800-3C2	Serial Interface	RS485 and Ethernet
Average Noise level (cooling fan) sound level in dB(A)	FS4: 65; FS5: 70; FS6 and FS7: 77; FR8: 86; FR9: 87	Embedded Resident Protocols	APOGEE P1, BACnet IP; BACnet MS/TP, Modbus RTU, Modbus TCP, Metasys N2
Agency Approvals	UL 508C; UL, cUL	Protection features	Under-voltage trip limit, Over-voltage trip limit, Ground fault protection, 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 +24V and +10V reference voltages.
Conformity	CE, RoHS compliant		
Analog Inputs	2: voltage or current (0 to 10 Vdc, 0/4 to 20 mA)		
Analog Output	1: selectable voltage or current		
Digital Inputs	6: programmable and isolated		
Relay Outputs	2: Form C 1: Normally Open		
Auxiliary input voltage	24 Vdc +/- 10% 250 mA maximum		
Auxiliary output voltage	24 Vdc +/- 10% 250 mA maximum, total of both outputs		

Product Numbers

Example Product Numbers	(1)	B	T	3	0	0	-	0	0	1	X	2	-	0	1	X	
	(2)	B	T	3	0	0	-	0	0	1	5	4	-	1	2	D	L
Model																	
BT300	VFD only																
Separator HP																	
1, 1.5, 2, 3, 5, 7.5, 10,15																	
20, 25, 30, 40, 50, 60, 75																	
100, 125, 150, 200, 250																	
X	No fraction HP																
5	1/2 HP																
Voltage																	
2	200 to 240																
4	380 to 480																
Separator NEMA Enclosure																	
01	Type 1																
12	Type 12																
Type																	
X	Drive only																
D	Integral Disconnect Switch (available in Type 12 only)																
Options																	
L	LON card installed																

Example (1) = 1 HP, 208V Drive in Type 1 enclosure
 (2) = 1.5 HP, 480V Drive in Type 12 enclosure with an integral disconnect switch and LON card.

Frame Sizes and Power Ranges (BT300 Type 1 and Type 12)

Voltage	KW	0.75	1.1	1.5	2.2	4	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160
	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250
208V	Frame Size	4				5			6		7			8			9				
480V		4					5			6			7		8		9				

Accessories

Flange Mounting Kits:

- BT300-FLG-FS4 Flange Mounting Kit for FS4
- BT300-FLG-FS5 Flange Mounting Kit for FS5
- BT300-FLG-FS6 Flange Mounting Kit for FS6
- BT300-FLG-FS7 Flange Mounting Kit for FS7

Option Boards (all boards are varnished):

- BT300-OPT-B1-V 6 x DI/DO, each I/O can be individually programmable as input or output
- BT300-OPT-B2-V 2 x Relay output & Thermistor
- BT300-OPT-B4-V 1 x Analog Input, 2 x Analog Output (isolated)
- BT300-OPT-B5-V 3 x Relay Output
- BT300-OPT-B9-V 1 x Relay Output, 5 x DI (42 to 240 Vac)
- BT300-OPT-BH-V Passive Input Sensor Card
- BT300-OPT-BF-V 1 x AO, 1 x DO, 1 x RO

Door Mounting Kits:

- BT300-PNL-N12 Door Panel Kit, drive side IP54 protected, cable length 9.8 ft (3 m)
- BT300-HHPANEL Hand Held Panel Kit

LON Interface Option Board

- BT300-OPT-C4-V

Miscellaneous Accessories:

- BT300-CABLE PC cable for PC Tool, USB to RS-485, cable length 9.8 ft (3 m)
- BT300-BATTERY Battery package for (5 pcs) for real time clock

SED2 to BT300 Migration Kits

(Converts your SED2 bypass into a BT300 bypass)

- SED2-BT300-AB-4 SED2 208V, 0.5 to 3 HP; 480V, 0.5 to 5 HP
- SED2-BT300-C-4 480V, 7.5 HP
- SED2-BT300-C-5 SED2 208V, 5 to 10 HP; 480V 10 to 20 HP
- SED2-BT300-D-6 SED2 208V, 15 to 20 HP; 480V, 25 to 40 HP
- SED2-BT300-D-7 SED2 208V, 25 HP
- SED2-BT300-E-7 SED2 208V, 30 HP 480V, 50 to 60 HP
- SED2-BT300-F-7 SED2 208V, 40 HP SED2 480V, 75 HP
- SED2-BT300-F-8 SED2 208V, 50 to 60 HP; 480V, 100 to 125 HP
- SED2-BT300-C-R SED2 FSC to BT300 Remote Mount
- SED2-BT300-DE-R SED2 FSD and FSE to BT300 Remote Mount

Dimensions

Table 1. Overall Dimensions for BT300 Type 1 and Type 12 in Inches (Millimeters).

Frame Size	Height	Width	Depth (without Disconnect)	Depth (with Disconnect)	Weight lb (kg)
FS4	12.9 (328)	5.0 (128)	7.5 (190)	10.6 (270)	13.0 (6)
FS5	16.5 (419)	5.7 (144)	8.4 (214)	11.6 (294)	22.0 (10)
FS6	21.9 (557)	7.7 (195)	9.0 (229)	11.9 (302)	44.0 (20)
FS7	26.0 (660)	9.3 (237)	10.2 (259)	13.1 (332)	83.0 (37.5)
FS8	38.0 (966)	11.4 (290)	13.5 (343)	N/A	145.5 (66)
FS9	45.3 (1150)	18.9 (480)	14.4 (365)	N/A	238.0 (108)

Information in this publication is based on current specifications. The company reserves the right to make changes in specifications and models as design improvements are introduced. APOGEE is a registered trademark of Siemens Industry, Inc. Other product or company names mentioned herein may be the trademarks of their respective owners. © 2014 Siemens Industry, Inc.