SIEMENS

Submittal Sheet
Document No. 154-126
February 16, 2018

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 disconnect 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, 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:

A. All VFDs shall have the same customer interface regardless of horsepower rating.

B. Input voltage shall be 208 to 240 Vac, 380 to 500 Vac, and 525 to 600 Vac +/- 10%, 3-phase, 48 to 63 Hz.

C. VFD shall have integrated DC bus chokes equivalent to 5% impedance.

D. Base VFD shall be UL listed for 100 kA SCCR.

F. All circuit boards shall be coated to protect against corrosion and meet IEC 60068-2-60 Method 1.

G. VFD shall utilize built-in wizards for start-up and easy-to-set-up advanced functions, such as PID, Bypass, and Fire Mode.

H. VFD shall have a "favorite" feature to allow the end user to create and save custom settings.

I. VFD shall have Ethernet IP, and RS-485 port as standard.

J. VFD shall include EMI/RFI filters. The entire assembly shall be CE marked and meet EMC Immunity IEC 61800-3 First and Second environment, and EMC Emissions to meet NE61800-3 (2004) Category C2.

K. Keypad shall be able to display and monitor nine parameters simultaneously.

L. VFD shall employ thin film capacitors and require no reforming or conditioning, allowing for a shelf life of 10 years.

M. VFD shall have a motor disconnect switch parameter which, when enabled, shall prevent the VFD from tripping when the motor disconnect switch is opened and closed allowing for easy maintenance.

Technical Data

Input voltage and power ranges (3-phase)	208 Vac to 240 Vac: (-10% to +10%), 1 HP to 125 HP (0.75 kW to 90 kW) 380 Vac to 500 Vac: (-10% to +10%) 1.5 HP to 250 HP (1.1 kW to 160 kW) 525 Vac to 600 Vac: (-10% to +10%) 3 HP to 200 HP (2.2 kW to 132 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 × 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 Resolution
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 122°F (50°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) to 3,280 ft (1,000 m) 1% de-rating for each 328 ft (100 m) above 3,280 ft (1,000 m) Max. altitude 13,123 ft (4,000 m)

Technical Data, Continued

Vibration	IEC 61800-5-1 and IEC 60068-2-6
Shock	IEC 61800-5-1 and IEC 60068-2-27
Enclosures	UL Type 1, UL Type 12
EMC Immunity	Fulfills IEC 61800-3, first and second environment
EMC Emissions	EN61800-3C2
Average Noise level (cooling fan) sound level in dB(A)	FS4: 65; FS5: 70; FS6 and FS7: 77 FR8: 86; FR9: 87
Agency Approvals	UL 508C; UL, cUL, BTL
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
Control method	Linear, parabolic and programmable V/f; and flux current control low-power mode
PWM frequency	1.5K Hz to 10K Hz (adjustable in .1K Hz increments)
Fixed frequencies	7 programmable
Skip frequency bands	3 programmable
Serial Interface	RS485 and Ethernet
Embedded Resident Protocols	APOGEE P1, BACnet IP; BACnet MS/TP, Modbus RTU, Modbus TCP, Metasys N2
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.

Product Numbers

Example:	*BT300*	*-*	*0*	*0*	*1*	*X*	*2*	*-*	*0*	*1*	*X*
Example:	*BT300*	*-*	*0*	*0*	*1*	*5*	*4*	*-*	*1*	*2*	*D*

Model(s)	
BT300	VFD Only
Separator	
HP	
1[1], 1.5[2], 2[2], 3, 5, 7.5, 10, 15, 20, 25, 30, 40, 50, 60, 75[3], 100[3], 125[3], 150[4], 200[4], 250[5]	
X = no fraction, 5 = 1/2 hp	
Voltage	
2	208 Vac to 240 Vac
4	380 Vac to 500 Vac
6	525 Vac to 600 Vac
Separator	
NEMA	
00[6]	Chassis Version (IP 00)
01	NEMA Type 1 (IP 21)
12	NEMA Type 12 (IP 54)
Type	
X	Drive Only
D	Disconnect[7]

[1] Available only with voltage code 2.

[2] Available only with voltage code 2 or 4.

[3] Use with voltages equal to or greater than 230 Vac.

[4] Available only with voltage code 4 or 6.

[5] Available only with voltage code 4.
[6] Available only with 50 hp and above @ 208 Vac
or 100 hp and above @ 480 Vac (FS8 and FS9).
[7] Available only with NEMA Type 12 with 30 hp and below @ 240 Vac
or 60 hp and below @ 480 Vac
or 50 hp and below @ 600 Vac.

Example Product Numbers:

BT300-001X2-01X

BT300, 1 hp, 208 to 240 Vac, NEMA Type 1, Drive Only

BT300-00154-12D

BT300, 1.5 hp, 380 to 500 Vac, NEMA Type 12, Drive with disconnect

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

Voltage	HP	1	1.5	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250
	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
208-240	Frame Size	4				5			6		7			8			9				
380-500			4					5			6			7			8			9	
525-600					5				6				7			8			9		

Table 2. Frame Size-Specific Accessories.

Accessory Description		Frame Size		
		4	5	6
NEMA 1 to NEMA 12 Upgrade	NEMA 12 Cover	BT300-CVR-54-FS4	BT300-CVR-54-FS5	BT300-CVR-54-FS6
	NEMA 12 Gland Plate	BT300-EDPLT-54-FS4	BT300-EDPLT-54-FS5	BT300-EDPLT-54-FS6
	Internal Fan (C1407xxxx and earlier)	BT300-INTFAN-FS4	BT300-INTFAN-FS5	BT300-INTFAN-FS6
	Internal Fan (C1408xxxx and later)	BT300-INTFAN-456-F	BT300-INTFAN-456-F	BT300-INTFAN-456-F
Accessories Kit		BT300-ACCKIT-FS4	BT300-ACCKIT-FS5	BT300-ACCKIT-FS6
Flange Mount Kit		BT300-FLG-FS4	BT300-FLG-FS5	BT300-FLG-FS6
Main Fan (heatsink)		BT300-MFAN-FS4	BT300-MFAN-FS5	BT300-MFAN-FS6
NEMA 1 Cover		BT300-CVR-21-FS4	BT300-CVR-21-FS5	BT300-CVR-21-FS6
NEMA 1 Gland Plate		BT300-EDPLT-N1-FS4	BT300-EDPLT-N1-FS5	BT300-EDPLT-N1-FS6
Accessory Description		**Frame Size**		
		7	8	9
NEMA 1 to NEMA 12 Upgrade	NEMA 12 Cover	BT300-CVR-2154-FS7	BT300-CVR-2154-FS8	N/A
	NEMA 12 Gland Plate	N/A	N/A	N/A
	Internal Fan (C1407xxxx and earlier)	BT300-INTFAN-FS7	BT300-INTFAN-FS8	BT300-INTFAN-FS9
	Internal Fan (C1408xxxx and later)			
Accessories Kit		BT300-ACCKIT-FS7	BT300-ACCKIT-FS8	BT300-ACCKIT-FS9
Flange Mount Kit		BT300-FLG-FS7	N/A	N/A
Main Fan (heatsink)		BT300-MFAN-FS7	BT300-MFAN-FS8	BT300-MFAN-FS9
NEMA 1 Cover		BT300-CVR-2154-FS7	BT300-CVR-2154-FS8	N/A
NEMA 1 Gland Plate		N/A	N/A	N/A

Table 3. Accessories.

Part Number	Description
BT300-BATTERY	Battery package (5 pcs)
BT300-BATTERY-F	Battery package (5 pcs) for use with s/n 1408xxx and later
BT300-BYP-DEMO	VFD and Electronic Bypass Demo with carrying case
BT300-CABLE	USB to RS422 interface cable for computer-to-drive connection
BT300-CNTLUNIT	Control Module
BT300-CNTLUNIT-F	Control Module for use with s/n 1408xxx and later
BT300-HHPANEL	Hand held panel kit with magnetic base
BT300-KEYPAD	Graphical keypad
BT300-OPT-B1-V	Option board with six bi-directional terminals (digital input or digital output)
BT300-OPT-B2-V	Option board with one thermistor input and two relay outputs
BT300-OPT-B4-V	Option board with on analog input and two analog outputs
BT300-OPT-B5-V	Option board with three relay outputs
BT300-OPT-B9-V	Option board with five digital inputs and on relay output
BT300-OPT-BF-V	Option board with one analog output, one digital output and one relay output
BT300-OPT-BH-V	Option board with three analog inputs (for PT100, PT1000, NI 1000, KTY-84)
BT300-OPT-C4-V	Option board with integration to LonWorks fieldbus
BT300-PNL-N12	NEMA 12 door keypad mounting kit

Dimensions

Table 4. 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)