



## 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.

The BT300 comes standard with unique and industry-leading 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.

### Designed for HVAC

HVAC demands are unique to other drive applications. The BT300 is singularly focused on the needs of HVAC variable flow systems:

- Built-in wizards for start-up and easy setup of advanced functions
  - PID Start-up Wizard
  - Multi-pump Wizard
  - Fire Mode Wizard
- EMI/RFI filters to meet EMC Immunity IEC 61800-3 first and second environment.
- Integrated DC bus chokes equivalent to 5% impedance.
- BT300 Thin Film Capacitors do not require conditioning. Immediate drive replacement is possible.
- Standard Integration Protocols (APOGEE® P1, BACnet, Modbus, LON (optional), Metasys N2)
- Two built-in PID controllers for fast and accurate process control
- Built-in fire mode controller
- Energy Savings with > 97.5% efficiency
- Optimized cooling fans
- UL Type 1 and Type 12 – Same Size
- 208 Vac to 240 Vac 1 hp to 125 hp
- 380 Vac to 500 Vac 1.5 hp to 250 hp
- 525 Vac to 600 Vac 3 hp to 200 hp
- Optional integrated drive disconnect
- Advanced I/O expansion capability built into the drive
- One common interface throughout all power ranges
- Intuitive graphical keypad with multilingual display.

## Ease of Use

The BT300 drives are easy to use, easy to understand and easy to program. This means installed cost and maintenance savings. Information you want for your specific operation:

- Built-in Help Menu – explains each parameter.
- Built-in Maintenance Manual - shows possible causes and suggested remedies.
- Nine user-selected values can be defined and monitored at one time – providing you with all the information you need at a glance.
- Embedded Ethernet and RS-485 - No additional hardware or cost for Ethernet. Standard HVAC protocols out-of-the-box.
  - APOGEE P1
  - BACnet IP
  - BACnet MS/TP
  - Modbus RTU
  - Modbus TCP
  - Metasys N2

## World-class Standard of Quality

Siemens Industry's VFDs are designed to operate in all types of power situations or demanding environments. The BT300's reliability is a result of extensive testing from design to deployment. This testing includes highly accelerated stress testing in extreme temperatures, vibration, and humidity as well as current and voltage variations. Not only will the BT300 withstand most power situations and demanding environmental conditions, it will provide confidence and peace of mind knowing that it will not fail, ensuring a long, trouble-free installation.

## Investment Protection

The BT300 supports Siemens Industry's long-standing, industry-leading backward compatibility tradition. The BT300 HVAC Drive is backward compatible to SED2 installations. A migration kit to mount a BT300 Drive in place of an SED2 to support the existing conventional or electronic bypass is an ideal solution to moving your technology forward at the lowest possible cost. The SED2 to BT300 Migration Kits provide you with all the components necessary to mount your BT300 quickly and easily in various locations within your facility.

## Environmentally Responsible

The BT300 saves energy, is environmentally safe and RoHS Compliant. All BT300s are constructed with lead-free circuit boards and produce no hazardous waste. They use the latest technologies for insulated-gate bipolar transistors (IGBT) and power capacitors. The thin-film power capacitors do not contain toxic electrolytes; therefore, the BT300 capacitors will not dry out. There is no need to “wake up” or condition the capacitors before installing. Your BT300 is safe to connect even after years of storage.

The BT300 IGBT design results in lower heat losses and lower operating temperatures. It weighs 40% less than competitors' models decreasing the cost of shipping and allowing for easier installation. An average BT300 generates 68% to 125% fewer CO2 emissions than heavier competitors' drives during shipping.

## Product Numbers

|                                                                                                                                                                                                                         |  |                                           |  |  |  |  |  |  |  |  |  |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------|--|--|--|--|--|--|--|--|--|--|
|                                                                                                                                                                                                                         |  | <b>Example:</b> BT300 - 0 0 1 X 2 - 0 1 X |  |  |  |  |  |  |  |  |  |  |
|                                                                                                                                                                                                                         |  | <b>Example:</b> BT300 - 0 0 1 5 4 - 1 2 D |  |  |  |  |  |  |  |  |  |  |
| <b>Model(s)</b>                                                                                                                                                                                                         |  |                                           |  |  |  |  |  |  |  |  |  |  |
| BT300                                                                                                                                                                                                                   |  | VFD Only                                  |  |  |  |  |  |  |  |  |  |  |
| <b>Separator</b>                                                                                                                                                                                                        |  |                                           |  |  |  |  |  |  |  |  |  |  |
| <b>HP</b>                                                                                                                                                                                                               |  |                                           |  |  |  |  |  |  |  |  |  |  |
| 1 <sup>1)</sup> , 1.5 <sup>2)</sup> , 2 <sup>2)</sup> , 3, 5, 7.5, 10, 15, 20, 25, 30, 40, 50, 60, 75 <sup>3)</sup> , 100 <sup>3)</sup> , 125 <sup>3)</sup> , 150 <sup>4)</sup> , 200 <sup>4)</sup> , 250 <sup>5)</sup> |  |                                           |  |  |  |  |  |  |  |  |  |  |
| X = no fraction, 5 = 1/2 hp                                                                                                                                                                                             |  |                                           |  |  |  |  |  |  |  |  |  |  |
| <b>Voltage</b>                                                                                                                                                                                                          |  |                                           |  |  |  |  |  |  |  |  |  |  |
| 2                                                                                                                                                                                                                       |  | 208 Vac to 240 Vac                        |  |  |  |  |  |  |  |  |  |  |
| 4                                                                                                                                                                                                                       |  | 380 Vac to 500 Vac                        |  |  |  |  |  |  |  |  |  |  |
| 6                                                                                                                                                                                                                       |  | 525 Vac to 600 Vac                        |  |  |  |  |  |  |  |  |  |  |
| <b>Separator</b>                                                                                                                                                                                                        |  |                                           |  |  |  |  |  |  |  |  |  |  |
| <b>NEMA</b>                                                                                                                                                                                                             |  |                                           |  |  |  |  |  |  |  |  |  |  |
| 00 <sup>6)</sup>                                                                                                                                                                                                        |  | Chassis Version (IP 00)                   |  |  |  |  |  |  |  |  |  |  |
| 01                                                                                                                                                                                                                      |  | NEMA Type 1 (IP 21)                       |  |  |  |  |  |  |  |  |  |  |
| 12                                                                                                                                                                                                                      |  | NEMA Type 12 (IP 54)                      |  |  |  |  |  |  |  |  |  |  |
| <b>Type</b>                                                                                                                                                                                                             |  |                                           |  |  |  |  |  |  |  |  |  |  |
| X                                                                                                                                                                                                                       |  | Drive Only                                |  |  |  |  |  |  |  |  |  |  |
| D                                                                                                                                                                                                                       |  | Disconnect <sup>7)</sup>                  |  |  |  |  |  |  |  |  |  |  |

<sup>1)</sup> Available only with voltage code 2.

<sup>2)</sup> Available only with voltage code 2 or 4.

<sup>3)</sup> Use with voltages equal to or greater than 230 Vac.

<sup>4)</sup> Available only with voltage code 4 or 6.

<sup>5)</sup> Available only with voltage code 4.

<sup>6)</sup> Available only with 50 hp and above @ 208 Vac  
or 100 hp and above @ 480 Vac (FS8 and FS9).

<sup>7)</sup> 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

## 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   |     |     |     |     |

# Specifications

**Table 1. Drive Specifications.**

| Specification                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltages and Power Ranges (3-phase)               | 208 to 240 Vac (-10% to +10%):<br>1 hp to 125 hp (0.75 kW to 90 kW)<br>380 to 500 Vac (-10% to +10%):<br>1.5 hp to 250 hp (1.1 kW to 160 kW)<br>525 to 600 Vac (-10% to +10%):<br>3 hp to 200 hp (2.2 kW to 132 kW)                                                                                                                                                                                                                                               |
| Input Frequency                                         | 45 to 66 Hz (50 to 60 Hz; -5% to +10%)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Output Voltage                                          | 0 to Input voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Output Frequency                                        | 0 to 320 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Output Frequency Resolution                             | 0.01 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Efficiency                                              | >97.5%                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Overload Capacity                                       | 1.1 * nominal rated output current 110% for 1 minute/10 minutes                                                                                                                                                                                                                                                                                                                                                                                                   |
| PWM (switching) frequency                               | FS4 to FS6 - 1.5 to 10 kHz<br><i>Default FS4: 6 kHz; FS5: 4 kHz; FS6 = 4 kHz</i><br>FS7 to FS9 - 1.5 to 6 kHz<br><i>Default FS7: 4 kHz; FS8: 3 kHz; FS9: 2kHz</i><br>Adjustable in .1 kHz increments<br>Automatic switching frequency derating in case of overheating                                                                                                                                                                                             |
| Short circuit withstand rating                          | 100,000 AIC                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Frequency Reference<br>Analog Input<br>Keypad           | Resolution 0.01 to 0.1% (10 bit), accuracy ±1%<br>Resolution 0.01 Hz                                                                                                                                                                                                                                                                                                                                                                                              |
| Field weakening point                                   | 8 to 320 Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Acceleration time                                       | 0.1 to 3000.0 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Deceleration time                                       | 0.1 to 3000.0 seconds                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ambient Operating Temperature                           | 14°F (-10°C) (no frost) to 104°F (40°C)<br>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:<br>Chemical vapors<br>Mechanical particles | IEC 60068-2-60 (H <sub>2</sub> S [hydrogen sulfide] and SO <sub>2</sub> [sulfur dioxide]).<br>IEC 60721-3-3, unit in operation, class 3C2<br>IEC 60721-3-3, unit in operation, class 3S3.                                                                                                                                                                                                                                                                         |
| Altitude                                                | 100% load capacity (no-derating) up to 3,280 ft (1,000 m)<br>-1% derating for each 328 ft (100 m) above 3,280 ft (1,000 m)<br><b>Maximum altitude:</b><br>208 to 240 Vac: 13,123 ft (4,000 m)<br>380 to 500 Vac: 13,123 ft (4,000 m)<br>525 to 600 Vac: 6,562 ft (2,000 m)<br><b>Voltage for relay outputs:</b><br>240 Vac: ≤ 9,842 ft (3,000 m)<br>120 Vac: ≤ 13,123 ft (4,000 m)<br><b>Corner-grounding (380-500 Vac systems only):</b><br>≤ 6,562 ft (2,000 m) |
| Fixed frequencies                                       | 7 programmable                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Skip (prohibited) frequency band                        | 3 programmable                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Vibration                                               | EN61800-5-1<br>EN60068-2-6                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Seismic                                                 | 2012 International Building Code (IBC)                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Shock                                                   | EN61800-5-1<br>EN60068-2-27                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Enclosure Class                                         | UL Type 1/IP 21 standard in entire HP/kW range.<br>UL Type 12/IP 54 options                                                                                                                                                                                                                                                                                                                                                                                       |

| Specification                                                                                  | Description                                                                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC Immunity                                                                                   | Fulfills IEC 61800-3 (2004), first and second environment                                                                                                                                                                                                                                                                                                                      |
| EMC Emissions                                                                                  | EN61800-3 (2004) Category C2<br>Can be field modified for IT networks for C3 or C4 ratings.                                                                                                                                                                                                                                                                                    |
| Embedded Protocols                                                                             | RS-485:<br>APOGEE P1, BACnet MS/TP (BTL), Modbus RTU, Metasys N2<br>Ethernet:<br>BACnet IP (BTL), Modbus TCP                                                                                                                                                                                                                                                                   |
| Heatsink cooling fan noise level in dB<br>(low speed/high speed)                               | FS4: 45/56<br>FS5: 57/65<br>FS6: 63/72<br>FS7: 43/73<br>FS8: 58/73<br>FS9: 54/75                                                                                                                                                                                                                                                                                               |
| Heatsink cooling fan output                                                                    | FS4: 49 CFM<br>FS5: 88 CFM<br>FS6: 219 CFM<br>FS7: 159 CFM<br>FS8: 426 CFM<br>FS9: 560 CFM                                                                                                                                                                                                                                                                                     |
| Agency Approvals/Conformity                                                                    | UL 508C; UL; cUL; CE; BTL,RoHS compliant; EN61800-5-1 (2007).                                                                                                                                                                                                                                                                                                                  |
| Country Of Origin (COO)                                                                        | Finland                                                                                                                                                                                                                                                                                                                                                                        |
| Control Method                                                                                 | Linear, parabolic and programmable V/f; and flux current control low-power mode.                                                                                                                                                                                                                                                                                               |
| Control I/O:<br>Analog Inputs<br><br>Analog Outputs<br><br>Digital Inputs<br><br>Relay Outputs | 2 - voltage (0/2 to 10 Vdc) or current (0/4 to 20 mA)<br>Resolution 0.1%; Accuracy ±1%<br>1 - voltage (0/2 to 10 Vdc) or current (0/4 to 20 mA)<br><500 W; Resolution 0.1%; Accuracy ±1%<br>6 - programmable and isolated<br>Positive or Negative logic; 5 kW; 0 to 5 Vdc = 0; 15 to 30 Vdc = 1<br>2 - Form C and 1 Normally Open<br>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)<br>24 Vdc ±10%, 250 mA (short-circuit protected)                                                                                                                                                                                                                                                                                   |
| Embedded Protocols                                                                             | RS-485:<br>APOGEE P1, BACnet MS/TP, Modbus RTU, Metasys N2<br>Ethernet:<br>BACnet IP, Modbus TCP                                                                                                                                                                                                                                                                               |
| Over voltage trip limit                                                                        | 208 to 240 Vac: 456 Vdc<br>380 to 500 Vac: 911 Vdc<br>525 to 600 Vac: 1094 Vdc                                                                                                                                                                                                                                                                                                 |
| Under voltage trip limit                                                                       | Depends on supply voltage (0.8775* supply voltage):<br>208 Vac: 182.5 Vdc<br>240 Vac: 210.6 Vdc<br>380 Vac: 333.5 Vdc<br>480 Vac: 421.2 Vdc<br>575 Vac: 504.6 Vdc                                                                                                                                                                                                              |
| Protection features                                                                            | Under-voltage trip limit<br>Over-voltage trip limit<br>Ground fault protection<br>Input (mains) supervision<br>Motor phase supervision<br>Over-current protection<br>Unit over-temperature protection<br>Motor overload protection<br>Motor stall protection<br>Motor underload protection<br>Short-circuit protection of 10 Vdc and 24 Vdc reference voltages                 |

## Specifications, Continued

Table 2. Control Board Technical Specifications.

| Slot A   |                                |                                                                                                                                                     |
|----------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| Terminal | Signal/Description             | Specification                                                                                                                                       |
| 1        | +10 Vdc Reference Output       | +3%; Maximum current 10 mA                                                                                                                          |
| 2        | Analog Input 1 Signal (+)      | 0 to 10 Vdc (200K Ohm) or 0 to 20 mA (250K Ohm)<br>(selection using DIP switch)<br>Resolution: 0.1%, Accuracy: $\pm 1\%$ ; Short-circuit protected. |
| 3        | Analog Input 1 Common (-)      |                                                                                                                                                     |
| 4        | Analog Input 2 Signal (+)      | 0 to 10 Vdc (200K Ohm) or 0 to 20 mA (250K Ohm)<br>(selection using DIP switch)<br>Resolution: 0.1%, Accuracy: $\pm 1\%$ ; Short-circuit protected. |
| 5        | Analog Input 2 Common (-)      |                                                                                                                                                     |
| 6        | 24 Vdc Output Voltage          | $\pm 10\%$ ; Maximum 250 mA;                                                                                                                        |
| 7        | I/O Ground                     | Short-circuit protected.                                                                                                                            |
| 8        | Digital Input 1                | Positive or negative logic;<br>0 Vdc to 5 Vdc = <b>0</b> ; 15 Vdc to 30 Vdc = <b>1</b>                                                              |
| 9        | Digital Input 2                |                                                                                                                                                     |
| 10       | Digital Input 3                |                                                                                                                                                     |
| 11       | Common for DI 1 through DI 6   | Digital inputs can be isolated from ground.                                                                                                         |
| 12       | 24 Vdc Output Voltage          | $\pm 10\%$ ; Maximum 250 mA;                                                                                                                        |
| 13       | I/O Ground                     | Short-circuit protected.                                                                                                                            |
| 14       | Digital Input 4                | Positive or negative logic;<br>0 Vdc to 5 Vdc = <b>0</b> ; 15 Vdc to 30 Vdc = <b>1</b>                                                              |
| 15       | Digital Input 5                |                                                                                                                                                     |
| 16       | Digital Input 6                |                                                                                                                                                     |
| 17       | Common for DI 1 through DI 6   | Digital inputs can be isolated from ground.                                                                                                         |
| 18       | Analog Output 1 Signal (+)     | 0 to 10 Vdc or 0 to 20 mA (selection using DIP switch)                                                                                              |
| 19       | Analog Output 1 Common (-)     | Resolution: 0.1%, Accuracy: $\pm 1\%$                                                                                                               |
| 30       | 24 Vdc Input Voltage           | $\pm 10\%$ ; Maximum 250 mA; Used for power backup of control unit.                                                                                 |
| A        | RS-485 -                       | Fieldbus Negative                                                                                                                                   |
| B        | RS-485 +                       | Fieldbus Positive                                                                                                                                   |
| Slot B   |                                |                                                                                                                                                     |
| Terminal | Signal/Description             | Specification                                                                                                                                       |
| 21       | Relay Output 1 Normally Closed | Switching capacity: 24 Vdc/8A; 250 Vac/8A; 125 Vdc/0.4A<br>Minimum switch load: 5 Vdc/10 mA                                                         |
| 22       | Relay Output 1 Common          |                                                                                                                                                     |
| 23       | Relay Output 1 Normally Open   |                                                                                                                                                     |
| 24       | Relay Output 2 Normally Closed | Switching capacity: 24 Vdc/8A; 250 Vac/8A; 125 Vdc/0.4A<br>Minimum switch load: 5 Vdc/10 mA                                                         |
| 25       | Relay Output 2 Common          |                                                                                                                                                     |
| 26       | Relay Output 2 Normally Open   |                                                                                                                                                     |
| 32       | Relay Output 2 Common          | Switching capacity: 24 Vdc/8A; 250 Vac/8A; 125 Vdc/0.4A<br>Minimum switch load: 5 Vdc/10 mA                                                         |

## Specifications, Continued

**Table 3. Embedded Protocol Technical Data.**

| Description          | APOGEE P1                                                | BACnet MS/TP              | Modbus RTU                                                                   | Metasys N2 | BACnet IP                   | Modbus TCP |
|----------------------|----------------------------------------------------------|---------------------------|------------------------------------------------------------------------------|------------|-----------------------------|------------|
| Interface            | RS-485                                                   |                           |                                                                              |            | 100BaseT, 802.3             |            |
| Data Transfer Method | RS-485, half-duplex                                      |                           |                                                                              |            | Ethernet half/full duplex   |            |
| Transfer Cable       | STP (Shielded Twisted Pair), type Belden 9841 or similar |                           |                                                                              |            | CAT5e STP                   |            |
| Connector            | 14 AWG (2.5 mm <sup>2</sup> )                            |                           |                                                                              |            | Shielded RJ45               |            |
| Baud Rate(s)         | 4800, 9600                                               | 9600, 19200, 38400, 76800 | 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200, 230400 | 9600       | 10/100 Mbps/s, auto-sensing |            |
| Address              | 0 to 127                                                 | 0 to 127                  | 1 to 247                                                                     | 1 to 255   | N/A                         |            |

**Table 4. Output Ratings.**

| Voltage (±10%)               | HP  | kW   | Frame Size | UL Type 1       | UL Type 12      | UL Type 12 w/Disconnect | Output Current |
|------------------------------|-----|------|------------|-----------------|-----------------|-------------------------|----------------|
| 208 Vac to 240 Vac (3-Phase) | 1   | 0.75 | 4          | BT300-001X2-01X | BT300-001X2-12X | BT300-001X2-12D         | 4.8            |
|                              | 1.5 | 1.1  |            | BT300-00152-01X | BT300-00152-12X | BT300-00152-12D         | 6.7            |
|                              | 2   | 1.5  |            | BT300-002X2-01X | BT300-002X2-12X | BT300-002X2-12D         | 8.0            |
|                              | 3   | 2.2  |            | BT300-003X2-01X | BT300-003X2-12X | BT300-003X2-12D         | 11.0           |
|                              | 5   | 4    | 5          | BT300-005X2-01X | BT300-005X2-12X | BT300-005X2-12D         | 18.0           |
|                              | 7.5 | 5.5  |            | BT300-00752-01X | BT300-00752-12X | BT300-00752-12D         | 24.2           |
|                              | 10  | 7.5  |            | BT300-010X2-01X | BT300-010X2-12X | BT300-010X2-12D         | 31.0           |
|                              | 15  | 11   | 6          | BT300-015X2-01X | BT300-015X2-12X | BT300-015X2-12D         | 48.0           |
|                              | 20  | 15   |            | BT300-020X2-01X | BT300-020X2-12X | BT300-020X2-12D         | 62.0           |
|                              | 25  | 18.5 | 7          | BT300-025X2-01X | BT300-025X2-12X | BT300-025X2-12D         | 75.0           |
|                              | 30  | 22   |            | BT300-030X2-01X | BT300-030X2-12X | BT300-030X2-12D         | 88.0           |
|                              | 40  | 30   |            | BT300-040X2-01X | BT300-040X2-12X | —                       | 105.0          |
|                              | 50  | 37   | 8          | BT300-050X2-01X | BT300-050X2-12X | —                       | 143.0          |
|                              | 60  | 45   |            | BT300-060X2-01X | BT300-060X2-12X | —                       | 170.0          |
| 230 Vac to 240 Vac (3-Phase) | 75  | 55   | 8          | BT300-075X2-01X | BT300-075X2-12X | —                       | 208.0          |
|                              | 100 | 75   | 9          | BT300-100X2-01X | BT300-100X2-12X | —                       | 261.0          |
|                              | 125 | 90   |            | BT300-125X2-01X | BT300-125X2-12X | —                       | 310.0          |

Table 4. Output Ratings, Continued.

| Voltage<br>(±10%)               | HP   | kW   | Frame<br>Size | UL Type 1       | UL Type 12      | UL Type 12<br>w/Disconnect | Output<br>Current |
|---------------------------------|------|------|---------------|-----------------|-----------------|----------------------------|-------------------|
| 380 Vac to 500 Vac<br>(3-Phase) | 1.5  | 1.1  | 4             | BT300-00154-01X | BT300-00154-12X | BT300-00154-12D            | 3.4               |
|                                 | 2    | 1.5  |               | BT300-002X4-01X | BT300-002X4-12X | BT300-002X4-12D            | 4.8               |
|                                 | 3    | 2.2  |               | BT300-003X4-01X | BT300-003X4-12X | BT300-003X4-12D            | 5.6               |
|                                 | 5    | 4    |               | BT300-005X4-01X | BT300-005X4-12X | BT300-005X4-12D            | 9.6               |
|                                 | 7.5  | 5.5  |               | BT300-00754-01X | BT300-00754-12X | BT300-00754-12D            | 12.0              |
|                                 | 10   | 7.5  | 5             | BT300-010X4-01X | BT300-010X4-12X | BT300-010X4-12D            | 16.0              |
|                                 | 15   | 11   |               | BT300-015X4-01X | BT300-015X4-12X | BT300-015X4-12D            | 23.0              |
|                                 | 20   | 15   |               | BT300-020X4-01X | BT300-020X4-12X | BT300-020X4-12D            | 31.0              |
|                                 | 25   | 18.5 | 6             | BT300-025X4-01X | BT300-025X4-12X | BT300-025X4-12D            | 38.0              |
|                                 | 30   | 22   |               | BT300-030X4-01X | BT300-030X4-12X | BT300-030X4-12D            | 46.0              |
|                                 | 40   | 30   |               | BT300-040X4-01X | BT300-040X4-12X | BT300-040X4-12D            | 61.0              |
|                                 | 50   | 37   | 7             | BT300-050X4-01X | BT300-050X4-12X | BT300-050X4-12D            | 72.0              |
|                                 | 60   | 45   |               | BT300-060X4-01X | BT300-060X4-12X | BT300-060X4-12D            | 87.0              |
|                                 | 75   | 55   |               | BT300-075X4-01X | BT300-075X4-12X | —                          | 105.0             |
|                                 | 100  | 75   | 8             | BT300-100X4-01X | BT300-100X4-12X | —                          | 140.0             |
|                                 | 125  | 90   |               | BT300-125X4-01X | BT300-125X4-12X | —                          | 170.0             |
|                                 | 150  | 110  |               | BT300-150X4-01X | BT300-150X4-12X | —                          | 205.0             |
|                                 | 200  | 132  | 9             | BT300-200X4-01X | BT300-200X4-12X | —                          | 261.0             |
|                                 | 250  | 160  |               | BT300-250X4-01X | BT300-250X4-12X | —                          | 310.0             |
| 525 Vac to 600 Vac<br>(3-Phase) | 3    | 2.2  | 5             | BT300-003X6-01X | BT300-003X6-12X | BT300-003X6-12D            | 3.9               |
|                                 | 5    | 4    |               | BT300-005X6-01X | BT300-005X6-12X | BT300-005X6-12D            | 6.1               |
|                                 | 7.5  | 5.5  |               | BT300-00756-01X | BT300-00756-12X | BT300-00756-12D            | 9.0               |
|                                 | 10   | 7.5  |               | BT300-010X6-01X | BT300-010X6-12X | BT300-010X6-12D            | 11.0              |
|                                 | 15   | 11   |               | BT300-015X6-01X | BT300-015X6-12X | BT300-015X6-12D            | 18.0              |
|                                 | 20   | 15   | 6             | BT300-020X6-01X | BT300-020X6-12X | BT300-020X6-12D            | 22.0              |
|                                 | 25   | 18.5 |               | BT300-025X6-01X | BT300-025X6-12X | BT300-025X6-12D            | 27.0              |
|                                 | 30   | 22   |               | BT300-030X6-01X | BT300-030X6-12X | BT300-030X6-12D            | 34.0              |
|                                 | 40   | 30   |               | BT300-040X6-01X | BT300-040X6-12X | BT300-040X6-12D            | 41.0              |
|                                 | 50   | 37   | 7             | BT300-050X6-01X | BT300-050X6-12X | BT300-050X6-12D            | 52.0              |
|                                 | 60   | 45   |               | BT300-060X6-01X | BT300-060X6-12X | —                          | 62.0              |
|                                 | 75*  | 55   |               | BT300-075X6-01X | BT300-075X6-12X | —                          | 80.0              |
|                                 | 100* | 75   | 8             | BT300-100X6-01X | BT300-100X6-12X | —                          | 100.0             |
|                                 | 125* | 90   |               | BT300-125X6-01X | BT300-125X6-12X | —                          | 125.0             |
|                                 | 150  | 110  |               | BT300-150X6-01X | BT300-150X6-12X | —                          | 144.0             |
|                                 | 200  | 132  | 9             | BT300-200X6-01X | BT300-200X6-12X | —                          | 208.0             |

## Accessories

**Table 5. Frame Size-Specific Accessories**

| Accessory Description            |                                      | Frame Size         |                    |                    |
|----------------------------------|--------------------------------------|--------------------|--------------------|--------------------|
|                                  |                                      | 4                  | 5                  | 6                  |
| <b>NEMA 1 to NEMA 12 Upgrade</b> | 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                |
| <b>NEMA 1 to NEMA 12 Upgrade</b> | 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 6. 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 one 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 one 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 7. 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)    |

Dimensions, Continued

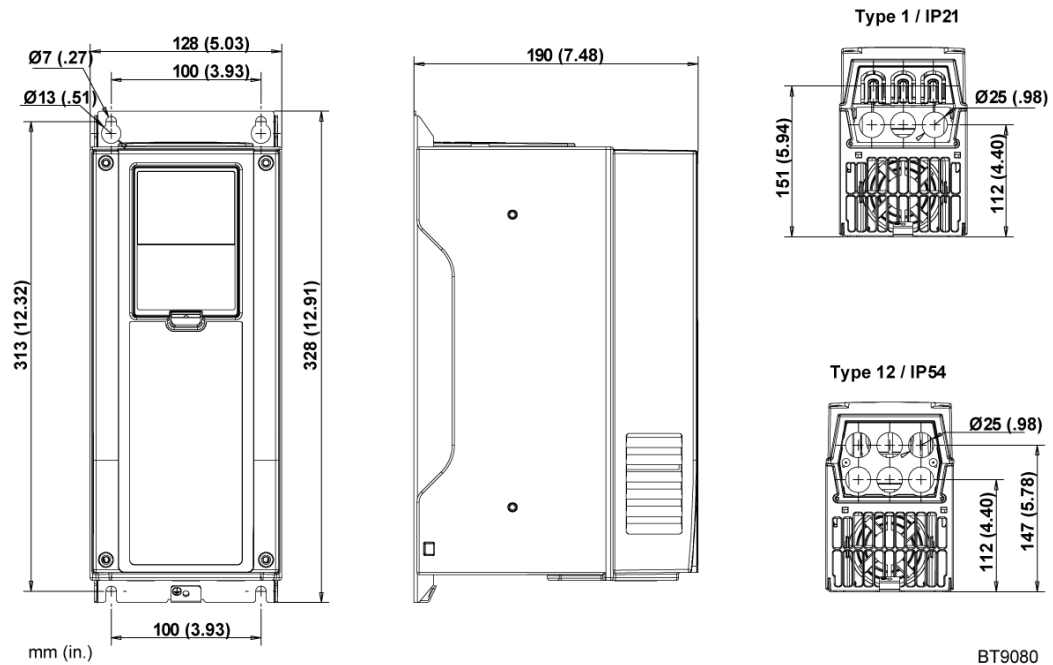


Figure 2. Siemens Drive Dimensions, FS4, Wall-Mount.

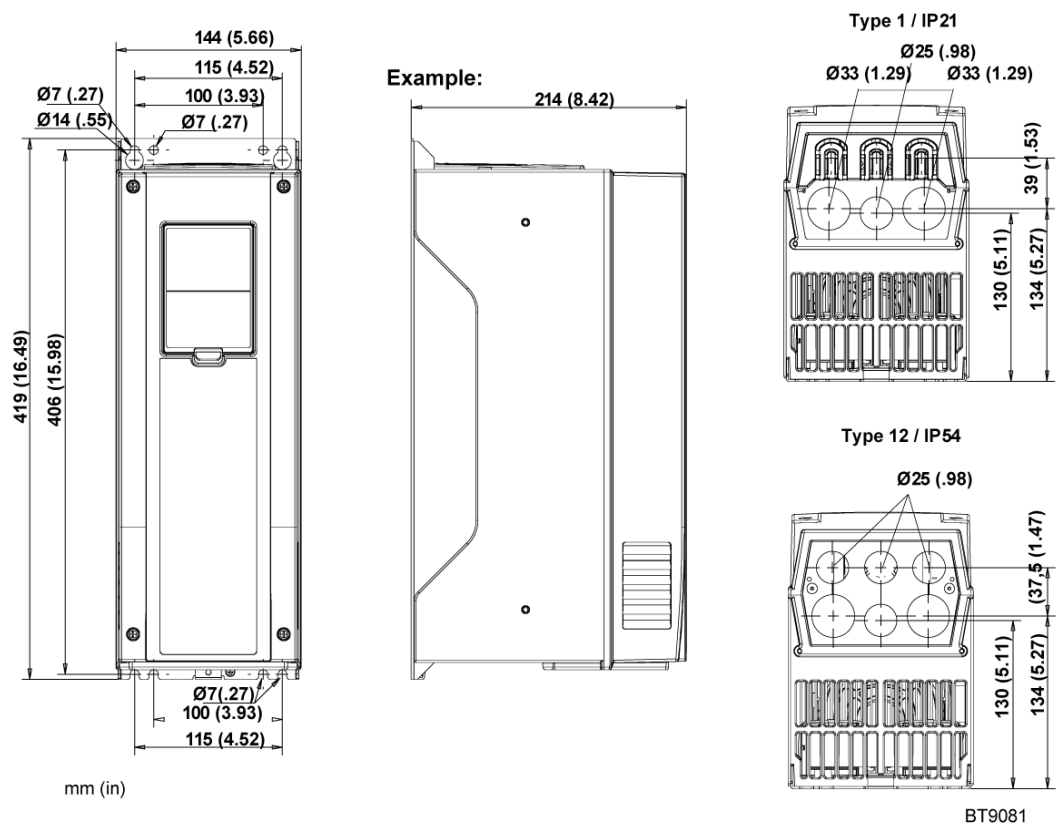


Figure 3. Siemens Drive Dimensions, FS5, Wall-Mount.

Dimensions, Continued

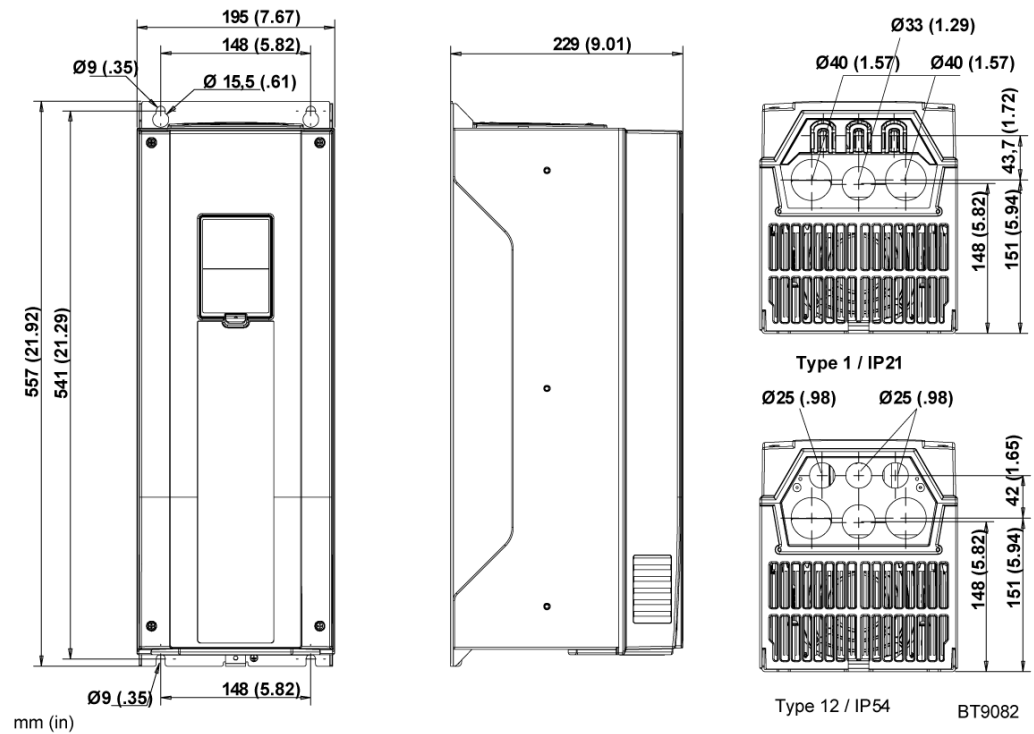


Figure 4. Siemens Drive Dimensions, FS6, Wall-Mount.

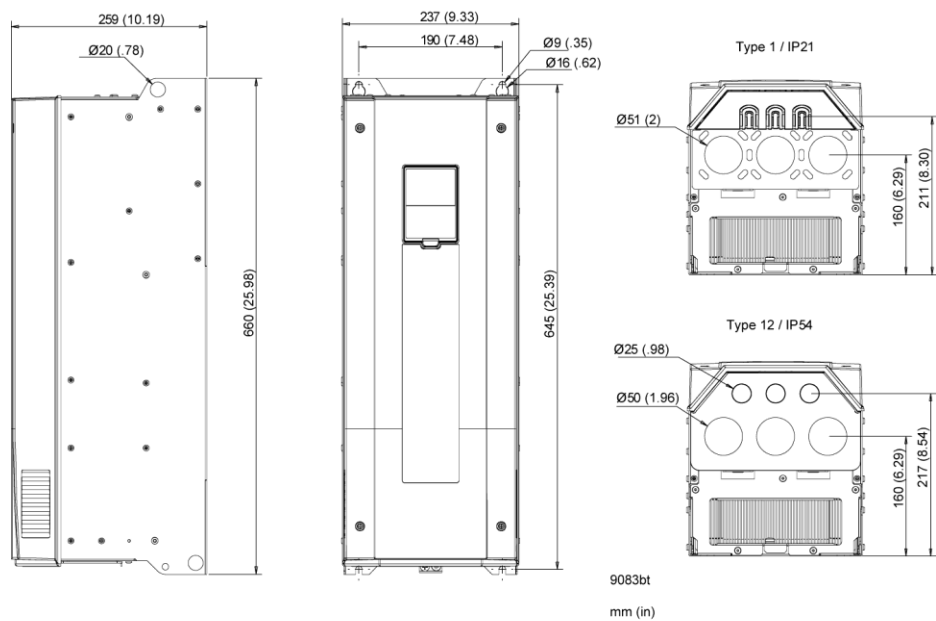


Figure 5. Siemens Drive Dimensions, FS7, Wall-Mount.

Dimensions, Continued

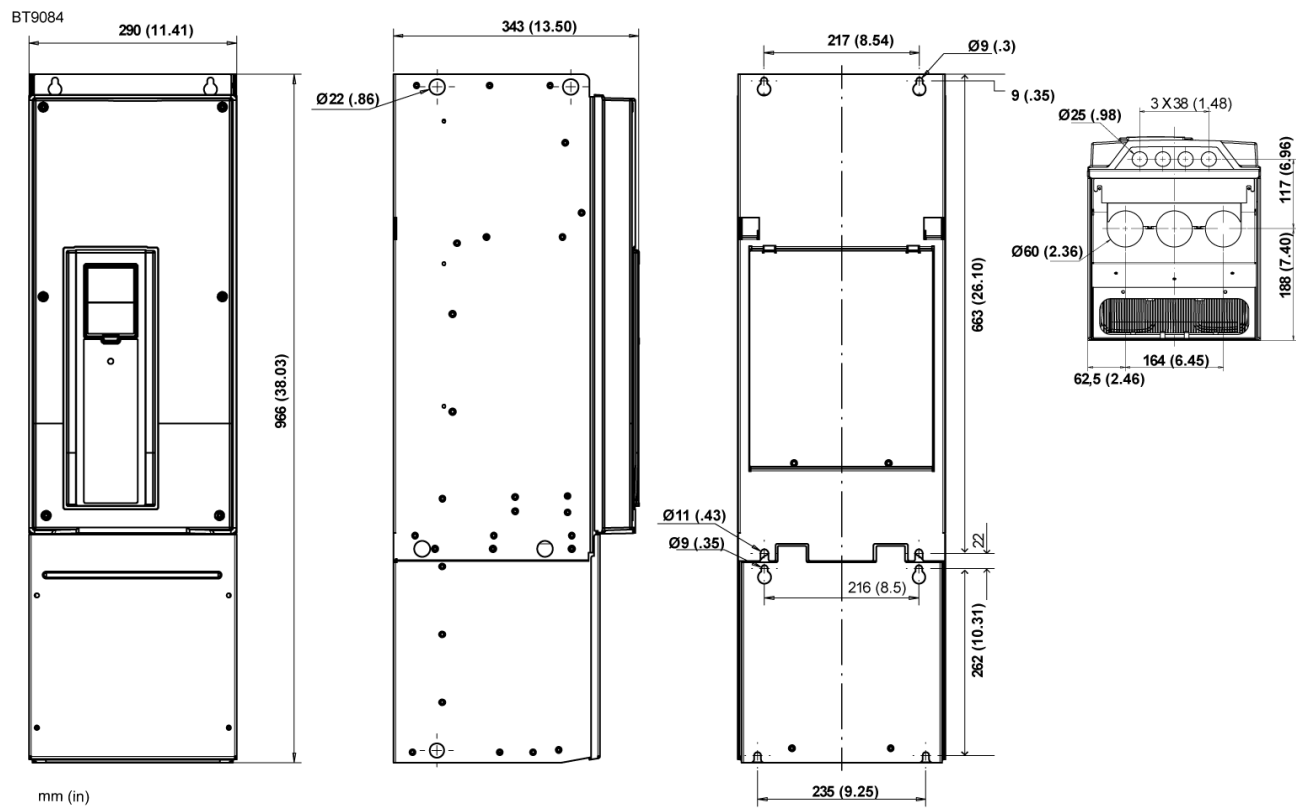


Figure 6. Siemens Drive Dimensions, FS8.

Dimensions, Continued

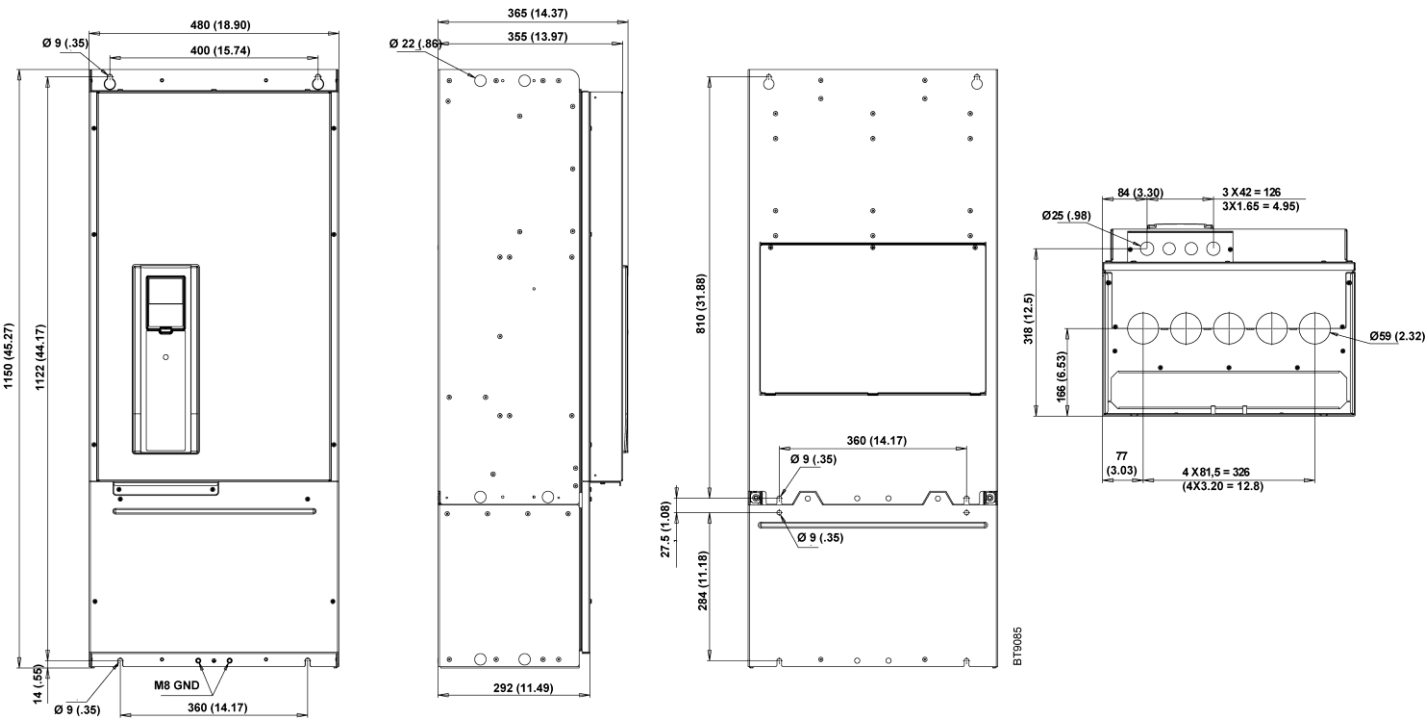
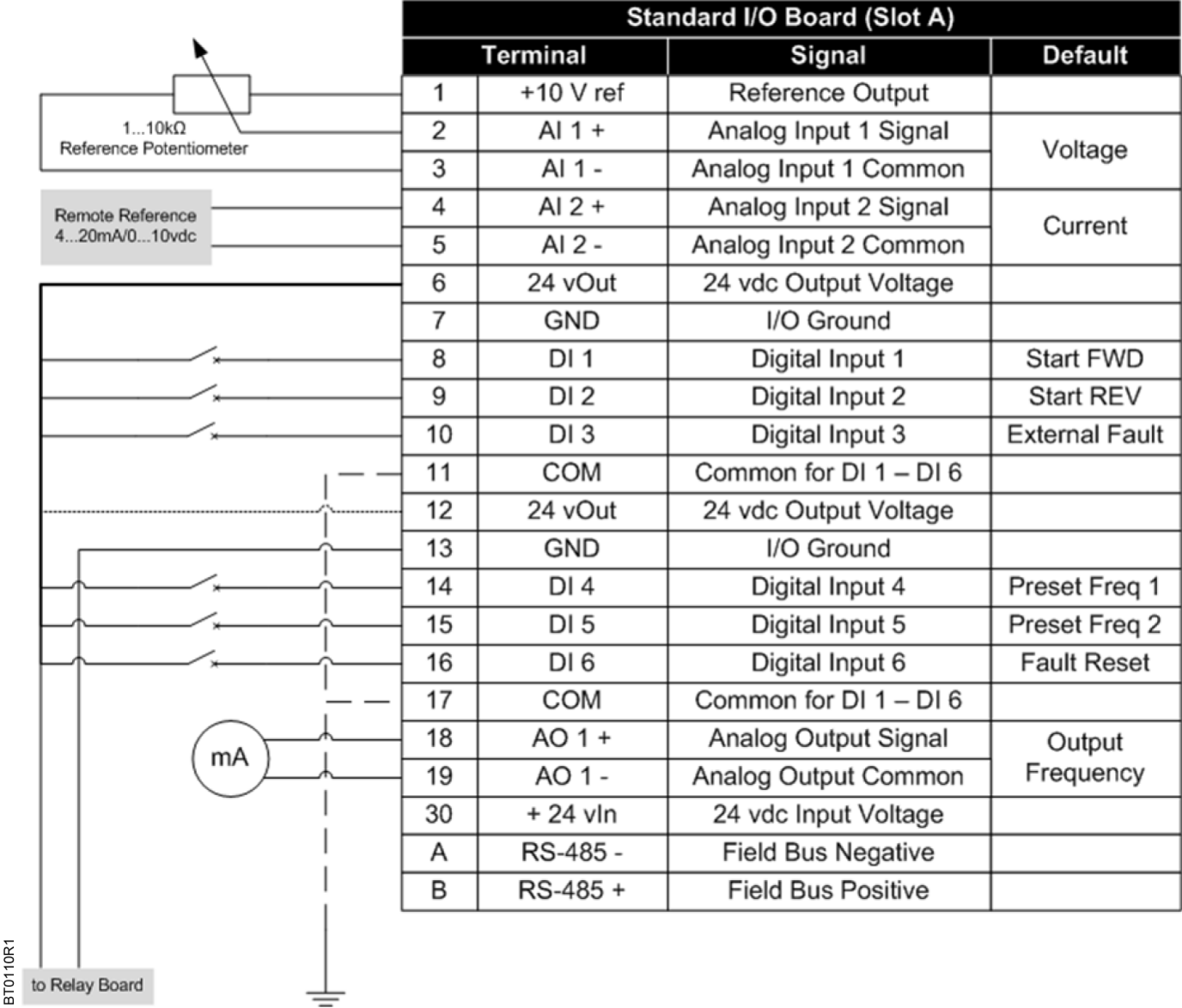


Figure 7. Siemens Drive Dimensions, FS9.

Wiring Diagrams

Table 8. Control I/O Terminal Signals on Basic IO Board and Connection Example.



\* Digital inputs can be isolated from ground.

### Table 9. Order Worksheet.

[illegible]

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