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BT300 Variable Frequency Drives

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Instructions	Complete all tabs of this workbook, when completed, e-mail to: ariane.roberson@siemens.com ***Note:*** *It is recommended to save this file with the name being the serial number of the unit covered by this certification form For example: C131088747.xlsx.*
Prerequisites	Before proceeding, familiarize yourself with Siemens BT300 Variable Frequency Drive DPD01148 E - BT300 VFD Installation Manual DPD01149 D - BT300 VFD Operators Manual DPD01162 C - BT300 VFD Protocol Manual DPD01157 E - BT300 VFD LonWorks Manual DPD01158 F - BT300 VFD I/O Option Boards Manual DPD01156 A - BT300 VFD Flange Mount Kits (FS4-FS7) DPD01159 A - BT300 VFD Panel Adapter Kit DPD01160 A - BT300 VFD Main Switch Manual DPD01161 A - BT300 VFD Door Keypad Kit 125-1004 - BT300 VFD Application Guide DPD01375 C - BT300 VFD Bypass Installation Manual DPD01391 C - BT300 VFD Bypass Operators Manual

System Information

Record the site's unit identifier

Unit's Site Identifier:	

Motor Information

Record the motor nameplate data

Manufacturer:	
Model:	
Nominal Voltage:	
Nominal Frequency:	
Nominal Speed:	
Full Load Current (FLA):	
COSPhi / Power Factor:	
Service Factor:	
Nominal Power (HP):	

Drive Information

Record the drive information

Part Number:	
Serial Number:	
Software Version: (4.8.1)	
Date Code:	

Application Information

Record the application information

Application Type:	
VFD Start/Stop via:	
VFD Speed Reference via:	

Commissioning Notes

Record any other commissioning information

Startup Company Information

Name:	
Address:	
City:	
State:	
Phone:	

Startup Technician Information

Name:	
Phone:	
E-mail:	
Certification Number:	

Site Information

Date of Startup:	
Site Name:	
Address:	
City:	
State:	
Contact Name:	
Phone:	
E-mail:	

Environmental Conditions:

Dust:	
Contaminants:	
Humidity:	
Moisture:	
Temperature:	

Environmental conditions that may occur after startup:

Compliancy:

Place an "X" in the box to indicate compliancy.

☐ I certify that start-up of the BT300 VFD has been accomplished according to instructions and procedures contained in the BT300 Start-up Procedure and Checklist, Installation Instructions, and Operators Manual.

☐ Installation and/or start-up of the BT300 VFD does not conform to the above statement for the following reason(s):

☐ Customer Notified of non-conformity

Part Number	Serial Number
Enter on Drive & Motor tab	*Enter on Drive & Motor tab*

Altitude Derating Calculator

It is required to to derate the drive when altitudes are greater than 3280 feet. The following calculator can be used to determine if the drive size is proper.

Enter the altitude		
-	3280	base value that does not require derating
	-3280	derate altitude
	-10.0000%	derate percentage
Enter drive amp rating		
	0.00	Drive derated amp rating
Enter Motor Amps (on Drive & Motor Information tab)	0	
Enter Motor Service Factor (on Drive & Motor Information tab)	0	
	0	motor amps @ service factor

Operating Temperature Derating Calculator

It is required to derate the drive when operating temperature is greater than 104°F (40°C). The following calculator can be used to determine if the drive size if proper.

Enter the operating temperature (in °F)		
-	104	base value that does not require derating
	-104	
Enter drive amp rating		
	-75.56	Drive derated amp rating
Enter Motor Amps (on Drive & Motor Information tab)	0	
Enter Motor Service Factor (on Drive & Motor Information tab)	0	
	0	motor amps @ service factor

Preparing for BT300 VFD Startup

In order to provide you with the most reliable drive available, and to avoid any extra costs related to loss or reduction of warranty coverage, a factory-certified specialist should complete the startup procedure. Please complete the checklist and maintain it in a secure location as technical service personnel may request information from this checklist. Inability to provide this information may result in delays and extra costs to the end user.

Place a "X" in the "check" column when completed.

Step	Check	Description
1		The BT300 is thoroughly tested at the factory. Verify that the drive is free of shipping and installation damage. Shipping damage is not covered by the Siemens Industry, Inc. warranty; claims must be filed directly with the shipping company as soon as possible.
2		Review the BT300 Installation Instructions and Operator's Manual. Review option intructions and schematics shipped with the drive.
3		Verify that the model numbers and the voltage ratings are as specified in the purchase order by matching the nameplate data for each unit to the purchase order.
4		Verify that the drive has been installed in accordance with the mechanical and electrical installation sections in the Siemens BT300 Installation Manual (DPD01148). **CAUTION:** Failure to comply with mechanical and electrical installation requirements may void the product warranty.
5		Inspect the security of the supply line power, ground connections, and all control circuit connections as identified in the BT300 documents. **IMPORTANT:** Confirm that the incoming line power supply connects to the drive input terminals (**L1(r), L2(s), L3(t)**) and NOT to the output motor terminals (**T1(u), T2(v), T3(w)**). **IMPORTANT:** Double check all power wires (**L1(r), L2(s), L3(t)**) and motor wires (**T1(u), T2(v), T3(w)**) to make sure that they are securely tightened down to their respective lugs. Loose wire connections may cause problems at any time, and are not covered under warranty.
6		Review the installer's "as-wired" schematic. Determine where the motor "safety circuit" is connected. Verify that the customer's emergency contacts are properly terminated in the drive's safety shutdown circuit or bypass panel.
7		Record the motor's name plate information (in the motor & drive information tab of this workbook).
8		Verify that the input voltage matches the drive's rating.
9		Verify that the motor is wired for the application voltage.
10		**IMPORTANT:** Verify that the motor rated full load amps (FLA) does NOT exceed the rated output current of the drive controlling it. When multiple motors are simultaneously operated by the drive, the sum of all motor rated FLA values must be less than or equal to that of the drive controlling them.
11		Record the application type (in the motor & drive information tab of this workbook).
12		Record any other connections to the drive by terminal number to determine if special programming is required (note any changes in the SlotA&B Terminals tab of this workbook)
13		If applicable, verify that the building automation system logic is ready to perform adequately for start, stop, and speed reference functions.

This concludes the preparation process for BT300 VFD Startup.
Keep your BT300 Installation and Operator's documentation, option schematics, and any other instructions sent with the drive easily accessible to assist you through the remainder of this startup process.

Startup Procedure for BT300 (Drive Only)

Review the *Preparing for BT300 VFD Start* (tab 2) section in this document.

Place a "X" in the check column when completed. Place a "n/a" if not used.

Step	Check	Description
1		Apply power to the drive. Make sure that all three input phases are present and that the input voltage is correct for the system being set up. Verify that the drive's keypad display is on. **NOTE:** At this time, if the display indicates a fault, press and hold (for about a second) the **Back/Reset** button to reset (acknowledge) the fault.
2		Complete the Startup Wizard to enter the motor data and essential operating parameters. Note: This should be activated when the unit is first powered up. If not , then it is recommend to reset the drive to factory default to return to a good known starting configuration. This can be completed by navigating to the following in the menu structure: ***User Settings*** (6)…***Parameter Backup*** (6.5)…***Restore Factory Defaults*** (6.5.1)... ***Activate*** *Refer to the Operator's Manual (DPD01149) for detailed information about the Startup Wizard.*
3		Complete any other required wizards found in the Quick Setup (1) menu. *Refer to the Operator's Manual (DPD01149) for detailed information about the wizards.*
4		Complete any other application specific settings for the site as required.
5		The automatic reset is configured for 30 second intervals and 10 reset attempts. If this is not acceptable, configure the automatic reset settings found in ***Parameters*** (3) …***Automatic Reset*** (3.10) menu for desired settings.
6		Configure Motor Switch (3.1.2.2) if a disconnect between the drive and the motor exists.
7		The default display has been configured automatically to wait for 2 minutes of keypad inactivity and then switch to the multi-monitor display. If this is not acceptable, then refer to ***Timeout Time*** (5.7.1) and ***Default Page*** (5.7.2) for desired settings.
8		Place the drive in HAND mode at the keypad.
9		Press the green start key. Ramp the drive speed up to ten (10) hertz. Verify that the direction of the motor rotation is correct. **Note**: If the direction of the motor rotoation is incorrect, turn the drive power off. Wait for 5 minutes. Swap wires on the motor terminals (T1(u), T2(v)) or on a bypass unit, the output terminals of the overaload relay. Tighten the terminal lugs, reapply power, and recheck the direction of the motor rotation.
10		With correct motor rotation, manually run the drive throughout its entire operation range while observing operation. If the drive trips on an over-current during acceleration, adjust the acceleration time (3.4.2). If the drive trips on an over-voltage during deceleration, adjust the deceleration time (3.4.3). If excessive vibration of the driven load is noted at specific input frequencies, use prohibited frequencies (3.7) to eliminate this vibration.
11		Determine whether the speed reference signal is a 0-10vdc or a 4-20mA. Connect signal wires and place DIP switch in the appropriate position. ***Note:*** *DIP switches need to be changed with the drive power off.*
12		Verify the speed reference signal for proper polarity and operation.
13		Place the drive in AUTO mode at the keypad. Verify the drive is controlled properly by the building automation system. Observe if the speed command can achieve the minimum and maximum speeds desired. If not, scale as required.
14		Configure Password and Access Level if desired. This prevents unauthorized parameterization via the keypad.

Startup Procedure for Conventional Bypass Options (BTC…)

Review the *Preparing for BT300 VFD Start* (tab 2) section in this document.

Place a "X" in the check column when completed. Place a "n/a" if not used.

Step	Check	Description
1		Verify that all three input phases are connected to the input fuse block (or circuit breaker depending upon model) and that the motor leads are connected to the output terminals of the overload relay only. ***Note**: The M1 (Bypass) contactor and the M2 (Output) contactor outputs are connected together at the factory.*
2		Verify that all factory connections within the bypass are tight as factory connections can loosen during shipment.
3		Record all connections to the drive in the Slot A&B Terminals sheet of this document.
4		Record all connections to the bypass diagnostics board in the Diag Terminals sheet of this document.
5		Before applying power, verify the following: - The **DRIVE/OFF/BYPASS** switch is in the ***OFF*** position. - The **DRIVE TEST** switch (if installed) is in the ***OFF*** position.
6		Dial in the current limit on the overload in accordance with the connected motor.
7		Apply power to the drive with c-bypass option via the main disconnect. Verify that all three phases are present and that the input voltage is correct fo the system.
8		Place the **DRIVE TEST** switch (if installed) to the ***ON*** position.
9		The keypad should illuminate and Startup Wizard of the drive should be active. Complete the Startup Wizard. When prompted for **Bypass Wizard**, answer ***YES***. ***Note:** This should be activated when the unit is first powered up. If not , then it is recommend to reset the drive to factory default to return to a good known starting configuration. This can be completed by navigating to the following in the menu structure:* ***User Settings** (6)…**Parameter Backup** (6.5)…**Restore Factory Defaults** (6.5.1)... **Activate*** *Refer to the Operator's Manual (DPD01149) for detailed information about the Startup Wizard.*
10		During the execution of the bypass wizard, select ***Conventional***. *Refer to the Bypass Operator's Manual (DPD01391) for detailed information about the Bypass Wizard.*
11		Place the **DRIVE/OFF/BYPASS** switch in the **DRIVE** position.
12		Place the **DRIVE TEST** switch (if installed) to the **OFF** position.
13		Press the **HAND/AUTO** button on the drive. Select ***Hand*** and press the ***OK*** button. With ***Activate*** highlighted, press the ***OK*** button. At the drives keypad, enter a setpoint greater than 5 hertz, and then press the green I button to start the motor. Verify the motor rotation is correct for the application. Press the red O button to stop the motor.
14		Place the **DRIVE/OFF/BYPASS** switch to the ***OFF*** position. The drive keypad should turn off if a Drive Test switch is installed (3 contactor versions).
15		"Bump" the **DRIVE/OFF/BYPASS** switch to the ***BYPASS*** position and quickly back to the ***OFF*** position. Verify the motor rotation is correct for the application.
16		If motor rotation was incorrect in either step 11 or 13, then leave the **DRIVE/OFF/BYPASS** switch in the ***OFF*** position. Remove input voltage from the assembly. Wait 5 minutes to allow for the drive's DC Bus to discharge. Make the required changes as listed in the *Bypass Motor Rotation* tab of this document. Repeat steps 11 through 13 to verify proper rotation again.
17		Place the **DRIVE/OFF/BYPASS** switch to the ***DRIVE*** position.
18		Complete any other required wizards found in the Quick Setup (1) menu. *Refer to the Operator's Manual (DPD01149) for detailed information about the wizards.*
19		Complete any other application specific settings for the site as required.
20		The automatic reset is configured for 30 second intervals and 10 reset attempts. If this is not acceptable, configure the automatic reset settings found in ***Parameters*** (3) …***Automatic Reset*** (3.10) menu for desired settings.

21	☐	The default display has been configured automatically to wait for 2 minutes of keypad inactivity and then switch to the multi-monitor display. If this is not acceptable, then refer to ***Timeout Time*** (5.7.1) and ***Default Page*** (5.7.2) for desired settings.
22	☐	Manually run the drive throughout its entire operation range while observing operation. If the drive trips on an over-current during acceleration, adjust the ***Accel time 1*** (3.4.2). If the drive trips on an over-voltage during deceleration, adjust the ***Decel time 1*** (3.4.3). If excessive vibration of the driven load is noted at specific input frequencies, use ***Prohibited Frequencies*** (3.7) to eliminate this vibration.
23	☐	Determine whether the speed reference signal is a 0-10vdc or a 4-20mA. Connect signal wires and place DIP switch in the appropriate position. ***Note:*** Only change the *DIP switches with the drive power off.*
24	☐	Verify the speed reference signal for proper polarity and operation.
25	☐	Place the drive in AUTO mode at the keypad. Verify the drive is controlled properly by the building automation system. Observe if the speed command can achieve the minimum and maximum speeds desired. If not, scale as required.
26	☐	Configure Password and Access Level if desired. This prevents unauthorized parameterization via the keypad.

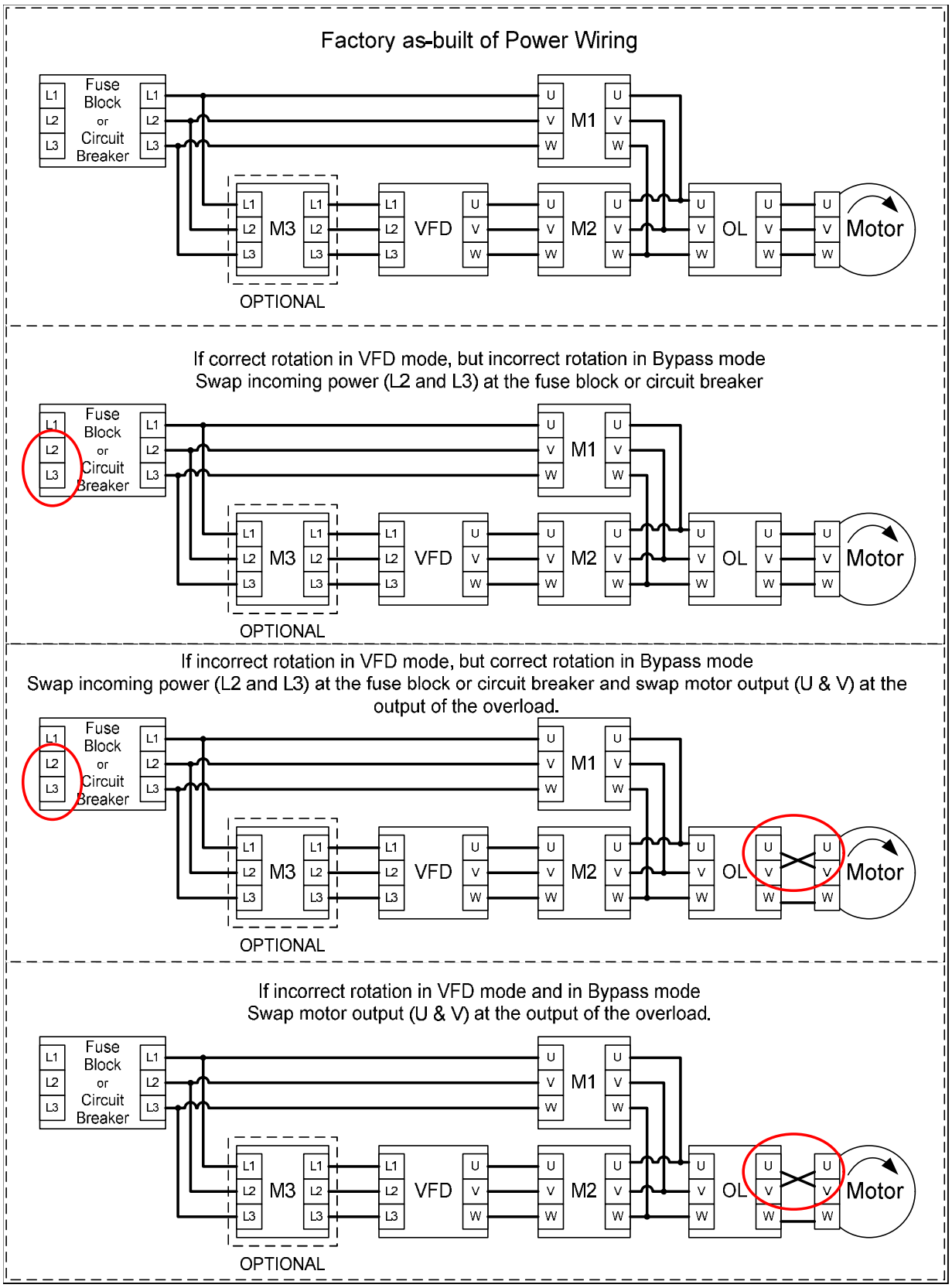
Startup Procedure for Electronic Bypass Options (BTE…)

Review the *Preparing for BT300 VFD Start* (tab 2) section in this document.

Place a "X" in the check column when completed. Place a "n/a" if not used.

Step	Check	Description
1		Verify that all three input phases are connected to the input fuse block (or circuit breaker depending upon model) and that the motor leads are connected to the output terminals of the overload relay only. ***Note**: The M1 (Bypass) contactor and the M2 (Output) contactor outputs are connected together at the factory.*
2		Verify that all factory connections within the bypass are tight as factory connections can loosen during shipment.
3		Record all connections to the drive in the Slot A&B Terminals sheet of this document.
4		Record all connections to the bypass diagnostics board in the Diag Terminals sheet of this document.
5		Dial in the current limit on the overload in accordance with the connected motor.
6		Apply power to the drive with e-bypass option. Verify that all three phases are present and that the input voltage is correct fo the system.
7		The keypad should illuminate and Startup Wizard of the drive should be active. Complete the Startup Wizard. When prompted for **Bypass Wizard**, answer ***YES***. ***Note:** This should be activated when the unit is first powered up. If not , then it is recommend to reset the drive to factory default to return to a good known starting configuration. This can be completed by navigating to the following in the menu structure:* ***User Settings** (6)…**Parameter Backup** (6.5)…**Restore Factory Defaults** (6.5.1)... **Activate*** *Refer to the Operator's Manual (DPD01149) for detailed information about the Startup Wizard.*
8		During the execution of the bypass wizard, select ***Electronic***. ***Note**: A Remote Safety 1 and Remote Safety 2 fault will occur. Press the Back/Reset button once to return to the wizard. Configure the **Remote Safety 1** (3.5.1.44) and **Remote Safety 2** (3.5.1.45) once completed with the bypass wizard. Refer to the Bypass Operator's Manual (DPD01391) for detailed information about the Bypass Wizard.*
9		Press the **HAND/AUTO** button on the drive. Select ***Drive*** and press the OK button. Select ***Hand*** and press the OK button. With ***Activate*** displayed, press the OK button. At the drives keypad, enter a setpoint greater than 5 hertz, and then press the green I button to start the motor. Verify the motor rotation is correct for the application. Press the red O button to stop the motor.
10		"Bump" the by pressing the **HAND/AUTO** button on the drive. Select ***Bypass*** and press the ***OK*** button. With **Activate** displayed, press the ***OK*** button. Then quickly press the **HAND/AUTO** button on the drive. Select ***OFF*** and press the ***OK*** button. With **Activate** displayed, press the ***OK*** button. Verify the motor rotation is correct for the application.
11		If motor rotation was incorrect in either step 9 or 10, then remove power to the bypass assembly via the disconnect switch. Wait 5 minutes to allow for the drive's DC Bus to discharge. Make the required changes as listed in the *Bypass Motor Rotation* tab of this document. Apply power and Repeat steps 9 through 10 to verify proper rotation again.
12		Press the **HAND/AUTO** button on the drive. Select ***Drive*** and press the OK button. Select ***Auto*** and press the OK button. With ***Activate*** displayed, press the OK button.
13		Complete any other required wizards found in the Quick Setup (1) menu. *Refer to the Operator's Manual (DPD01149) for detailed information about the wizards.*
14		Complete any other application specific settings for the site as required.
15		The automatic reset is configured for 30 second intervals and 10 reset attempts. If this is not acceptable, configure the automatic reset settings found in ***Parameters*** (3) …***Automatic Reset*** (3.10) menu for desired settings.
16		The default display has been configured automatically to wait for 2 minutes of keypad inactivity and then switch to the multi-monitor display. If this is not acceptable, then refer to ***Timeout Time*** (5.7.1) and ***Default Page*** (5.7.2) for desired settings.

17		Manually run the drive throughout its entire operation range while observing operation. If the drive trips on an over-current during acceleration, adjust the ***Accel time 1*** (3.4.2). If the drive trips on an over-voltage during deceleration, adjust the ***Decel time 1*** (3.4.3). If excessive vibration of the driven load is noted at specific input frequencies, use ***Prohibited Frequencies*** (3.7) to eliminate this vibration.
18		Determine whether the speed reference signal is a 0-10vdc or a 4-20mA. Connect signal wires and place DIP switch in the appropriate position. ***Note:*** Only change the *DIP switches with the drive power off.*
19		Verify the speed reference signal for proper polarity and operation.
20		Place the drive in AUTO mode at the keypad. Verify the drive is controlled properly by the building automation system. Observe if the speed command can achieve the minimum and maximum speeds desired. If not, scale as required.
21		Configure Password and Access Level if desired. This prevents unauthorized parameterization via the keypad.


Factory as-built of Power Wiring
Fuse Block or Circuit Breaker
L1
L2
L3
M1
M2
M3
VFD
OL
Motor
U
V
W
OPTIONAL
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
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.
If incorrect rotation in VFD mode and in Bypass mode
Swap motor output (U & V) at the output of the overload.

Place an "X" in the check column if there is a control wire terminaated at the associated block.

Slot A (Digital Inputs, Analog Inputs, Analog Outputs)

Check	Terminal	Description	Default Drive Only C-Bypass	Default E-Bypass	Installer Notes
	1	+10vdc Reference Output	n/a		
	2	Analog Input 1 signal (+)	Voltage (0-10vdc) *If current, AI1 dipswitch must be changed.*		
	3	Analog Input 1 common (-)			
	4	Analog Input 2 signal (+)	Current (4-20mA) *If voltage, AI2 dipswitch must be changed.*		
	5	Analog Input 2 common (-)			
	6	24vdc Auxiliary Output	n/a		
	7	I/O Ground	n/a		
	8	Digital Input 1	Start Forward		
	9	Digital Input 2	Start Reverse	Remote Safety 1	
	10	Digital Input 3	External Fault (closure)	Remote Safety 2	
	11	Digital Input Common	n/a		
	12	24vdc Auxiliary Output	n/a		
	13	I/O Ground	n/a		
	14	Digital Input 4	Preset Freq 1	Interlock Feedback	
	15	Digital Input 5	Preset Freq 2	Overload	
	16	Digital Input 6	Fault Reset	Essential Services	
	17	Digital Input Common	n/a		
	18	Analog Output 1 signal (+)	Output Frequency Current (4-20mA) *If voltage, AO1 dipswitch must be changed.*		
	19	Analog Output 1 common (-)			
	30	24vdc Auxiliary Input	n/a		
	A	RS-485 common (-)	n/a		
	B	RS-485 positive (+)	n/a		

Slot B (Relay Outputs)

Check	Terminal	Description	Default Drive Only C-Bypass	Default E-Bypass	Installer Notes
	21	RO1 NC	Default: Drive Run		
	22	RO1 Common			
	23	RO1 NO			
	24	RO2 NC	Default: Drive Fault		
	25	RO2 Common			
	26	RO2 NO			
	32	RO3 Common	Default: Drive Ready		
	33	RO3 NO			

Place an "X" in the check column if there is a control wire terminaated at the associated block. Use installer notes to define what it is, where it is from, etc…

Conventional Bypass Diagnostics Board Terminals			
Check	Terminal	Description	Installer Notes
	1	Customer Supplied Start/Stop	
	2		
	3	Customer Supplied Safety	
	4		
	5	Essential Services Enable	
	6		
	7	Customer Supplied Ess Svc Activation	
	8		

Electronic Bypass Diagnostics Board Terminals			
Check	Terminal	Description	Installer Notes
	3	Customer Supplied Safety* *Ships with jumper installed.*	
	4		

* Customer supplied safety for the electronic bypass is terminated on the VFD unless the electronics override is to be used.

	Name	**Menu**	**New Setting**
Example:	*RO1 Function*	*3.5.3.2.1*	*At Speed*