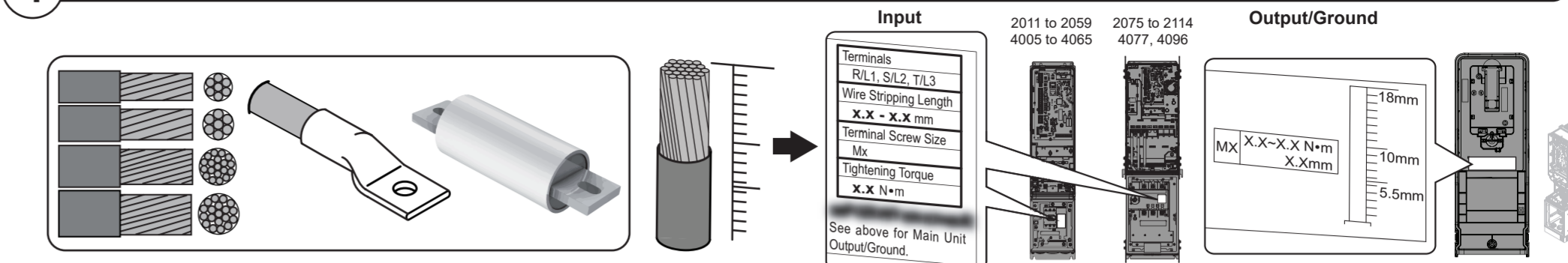


HV600 Quick Setup Procedure for IP55/UL Type 12 with Main Switch Models HV60U2011 to 2114 and 4005 to 4096

4 Select the Motor and Power Wires, Wire Strip Length, Crimp Terminals, and Branch Circuit Protection



208 V Class Wires and Crimp Terminals

Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}	Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}	Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}
2011	RL1, SL2, TL3	14 - 8 (2.5 - 10)	14	N/A	2031	RL1, SL2, TL3	14 - 4 (2.5 - 25) ⁵	8	N/A	2075	RL1, SL2, TL3	8 - 2/0 (10 - 70)	4	LCA4-56-L
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	12	LCA10-14-L		UT1, VT2, WT3	14 - 8 (2.5 - 10)	8	N/A		UT1, VT2, WT3	8 - 2/0 (10 - 70)	3 or 2	LCA4-56-L/LCA2-56-Q
2017	RL1, SL2, TL3	14 - 8 (2.5 - 10)	12	N/A	2046	RL1, SL2, TL3	8 - 1/0 (10 - 50)	8	N/A	2088	RL1, SL2, TL3	8 - 2/0 (10 - 70)	3 or 2	LCA4-56-L/LCA2-56-Q
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	10	N/A		UT1, VT2, WT3	14 - 4 (2.5 - 25)	6	N/A		UT1, VT2, WT3	8 - 2/0 (10 - 70)	2	LCA2-56-Q
2024	RL1, SL2, TL3	14 - 4 (2.5 - 25) ⁵	10	N/A	2059	RL1, SL2, TL3	8 - 1/0 (10 - 50)	4	N/A	2114	RL1, SL2, TL3	8 - 2/0 (10 - 70)	1/0	LCA1/0-56-X
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	8	N/A		UT1, VT2, WT3	14 - 4 (2.5 - 25)	4	N/A		UT1, VT2, WT3	8 - 2/0 (10 - 70)	6	LCA6-56-L

480 V Class Wires and Crimp Terminals

Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}	Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}	Drive Model [HV60UXXXX]	Terminal ^{1/2}	Wire Range AWG/kcmil (mm ²) ²	Recommended Wire Gauge AWG/kcmil	Panduit Crimp Terminal Part Number ^{3/4}
4005 4008	RL1, SL2, TL3	14 - 8 (2.5 - 10)	14	N/A	4027	RL1, SL2, TL3	14 - 4 (2.5 - 25) ⁵	10	N/A	4065	RL1, SL2, TL3	8 - 1/0 (10 - 50)	4	N/A
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	14	LCA10-14-L		UT1, VT2, WT3	14 - 8 (2.5 - 10)	8	N/A		UT1, VT2, WT3	14 - 4 (2.5 - 25)	4	N/A
4011	RL1, SL2, TL3	14 - 8 (2.5 - 10)	14	N/A	4034	RL1, SL2, TL3	14 - 4 (2.5 - 25) ⁵	8	N/A	4077	RL1, SL2, TL3	8 - 2/0 (10 - 70)	4	LCA4-56-L
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	14	N/A		UT1, VT2, WT3	14 - 8 (2.5 - 10)	8	N/A		UT1, VT2, WT3	8 - 2/0 (10 - 70)	3 or 2	LCA4-56-L/LCA2-56-Q
4014	RL1, SL2, TL3	14 - 8 (2.5 - 10)	14	N/A	4040	RL1, SL2, TL3	8 - 1/0 (10 - 50)	8	N/A	4096	RL1, SL2, TL3	8 - 2/0 (10 - 70)	2	LCA2-56-Q
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	12	N/A		UT1, VT2, WT3	14 - 4 (2.5 - 25)	8	N/A		UT1, VT2, WT3	8 - 2/0 (10 - 70)	1	LCA1-56-E
4021	RL1, SL2, TL3	14 - 4 (2.5 - 25) ⁵	10	N/A	4052	RL1, SL2, TL3	8 - 1/0 (10 - 50)	6	N/A					
	UT1, VT2, WT3	14 - 8 (2.5 - 10)	10	N/A		UT1, VT2, WT3	14 - 4 (2.5 - 25)	6	N/A					

- *1 You cannot use terminals - and +1 on IP55/UL Type 12 drives with Main Switch.
- *2 The metric wire gauge values are provided as reference information from equivalent AWG sizes and not exactly the same sizes as the AWG/kcmil value. Obey local safety regulations for wire sizes and make sure that the ferrule or crimp terminals are correct for your size.
- *3 For use with PANDUIT Corp. heat-shrinkable tubing HSTT series or an equivalent UL-recognized-heat shrinkable tubing rated 600 V minimum.
- *4 Refer to the Installation & Primary Operation (TOEPC71061793) for possible PANDUIT Type P and Type S crimp terminal alternatives.
- *5 The wire stripping length is different for different wire gauges. Refer to the Installation & Primary Operation (TOEPC71061793) for more information.

Branch Circuit Protection
Yaskawa recommends installing one of the following types of branch circuit protection to maintain compliance with UL. Semiconductor protective fuses are preferred. Alternate branch circuit protection devices are also listed. Maximum fuse rating is 175% of drive full load output amps (FLA). This covers any Class CC, J, or T class fuse.

208 V Class Factory-Recommended Fuses

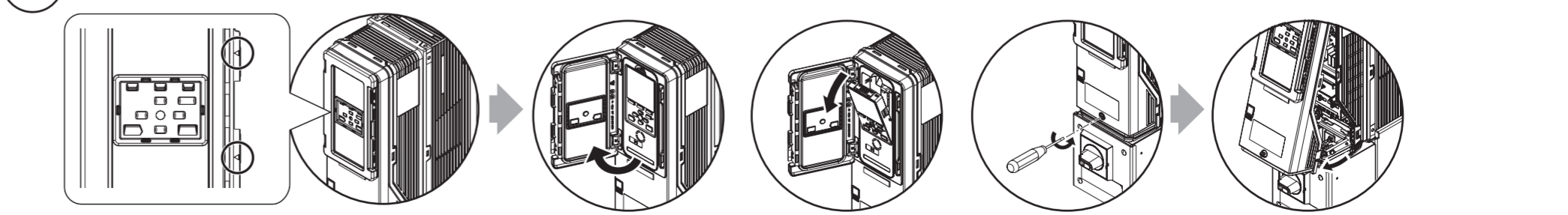
	2011	2017	2024	2031	2046	2059	2075	2088	2114
Bussmann Semiconductor^{1/2}	FWH-40B	FWH-45B	FWH-80B	FWH-125B	FWH-125B	FWH-175B	FWH-200B	FWH-225A	FWH-225A
Alternate Fusing (Class CC, J, or T)²	Max. Rating (A)	17.5	25	40	50	80	100	125	150
	Max.SCCR (kA)	100	100	100	100	100	100	100	100

480 V Class Factory-Recommended Fuses

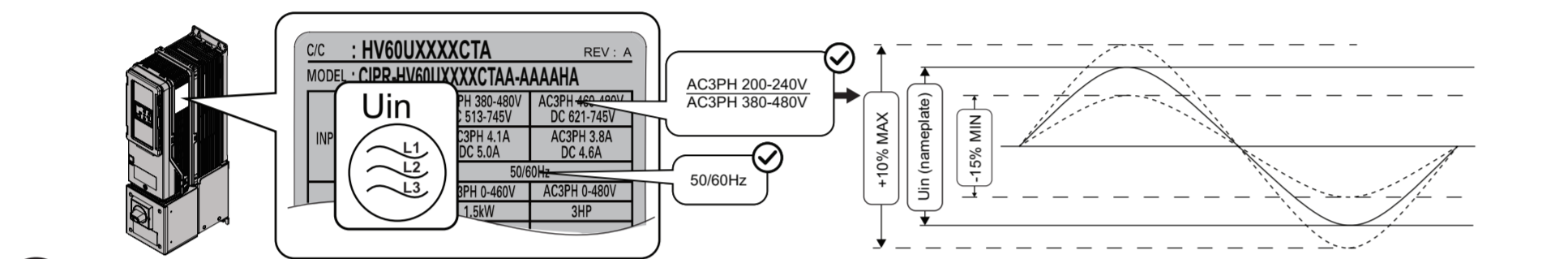
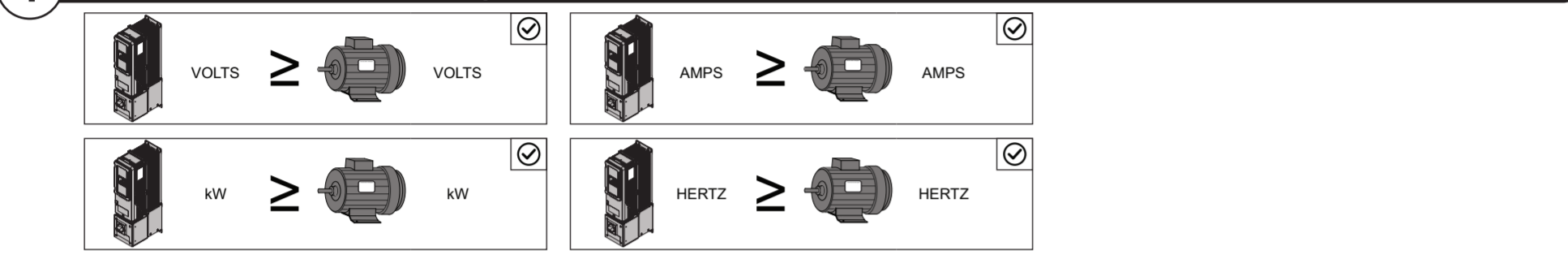
	4005	4008	4011	4014	4021	4027	4034	4040	4052	4065	4077	4096
Bussmann Semiconductor^{1/2}	FWH-25A14F	FWH-30A14F	FWH-40B	FWH-45B	FWH-60B	FWH-80B	FWH-100B	FWH-125B	FWH-150B	FWH-200B	FWH-225A	FWH-225A
Alternate Fusing (Class CC, J, or T)²	Max. Rating (A)	8	12	17.5	20	35	45	50	70	90	100	150
	Max.SCCR (kA)	100	100	100	100	100	100	100	100	100	100	100

- *1 Recommended EATON/Bussmann Semiconductor fuse model.
- *2 Class CC fuses are time-delay only. Class T fuses are fast-acting (non-time delay only). Class J fuses can be time-delay or non-time delay.

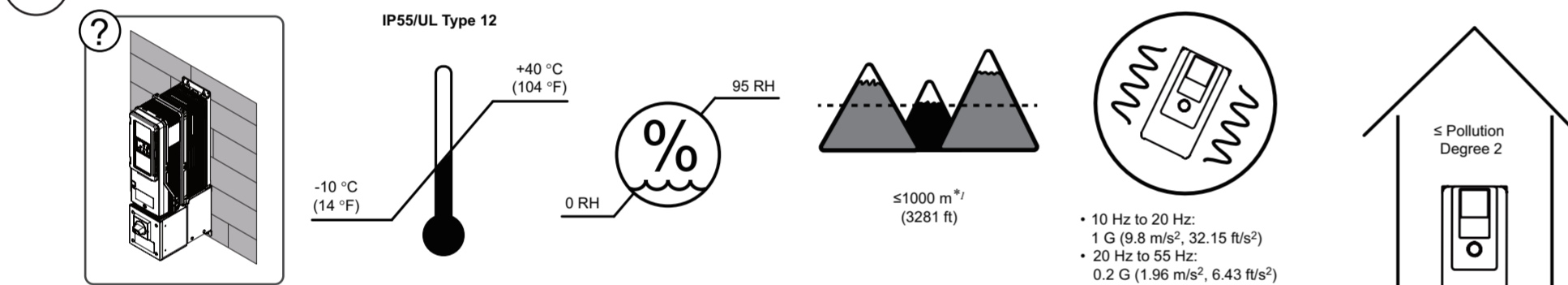
5 Remove the Front Cover and Keypad



1 Confirm the Drive and Motor Specifications

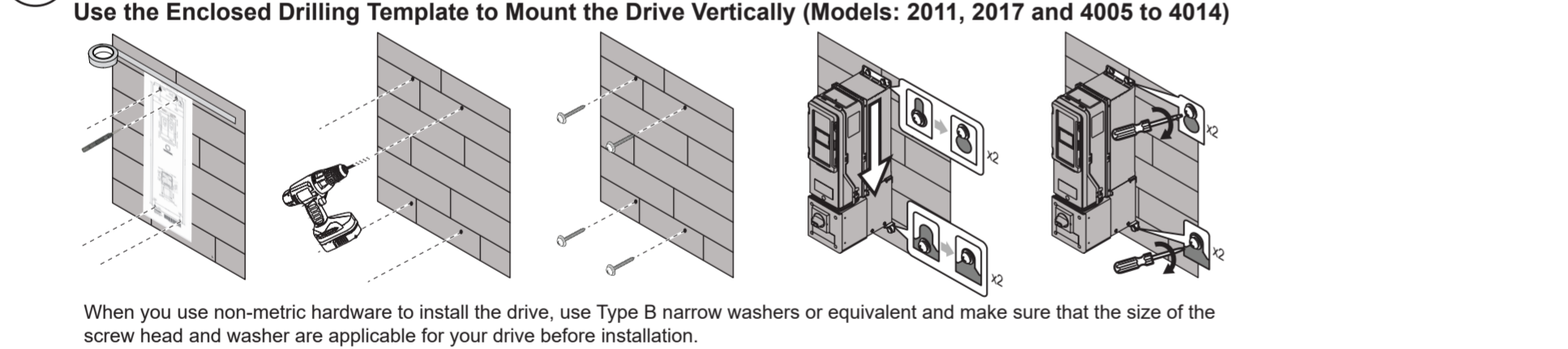


2 Confirm the Correct Drive Installation Environment

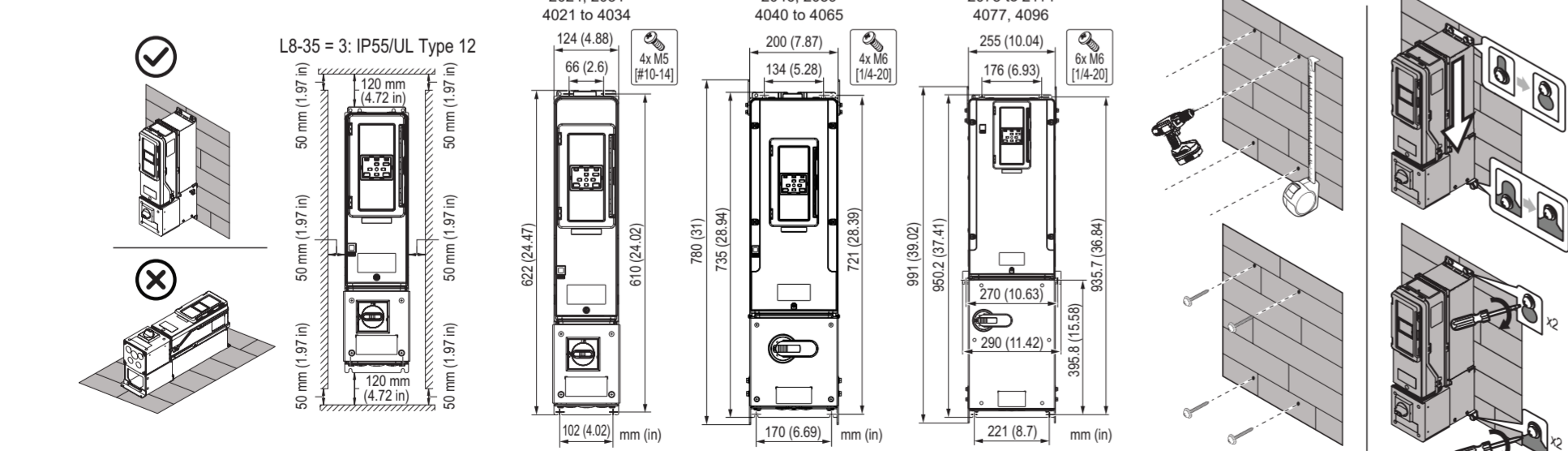


- *1 Derate the output current by 1% for each 100 m (328 ft) to install the drive in altitudes between 1000 m to 4000 m (3281 ft to 13123 ft). Refer to the Technical Reference (SIEPC71061732) for derating information.

3 Mount the Drive Vertically

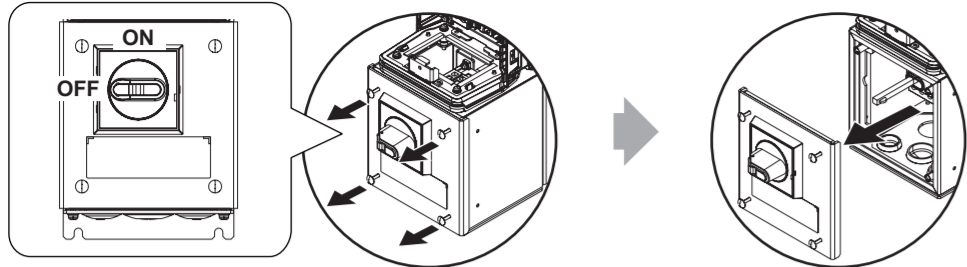


Mount the Drive Vertically without the Enclosed Drilling Template (Models: 2024 to 2114 and 4021 to 4096)



When you use non-metric hardware to install the drive, use Type B narrow washers or equivalent and make sure that the size of the screw head and washer are applicable for your drive before installation.

6 Remove the Main Switch Cover

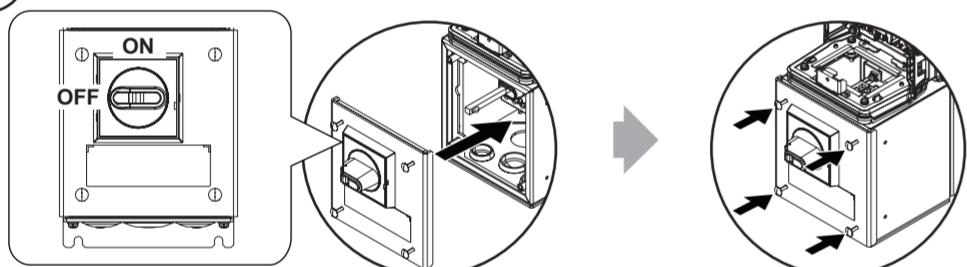


7 Install the Motor Wiring and Power Wiring

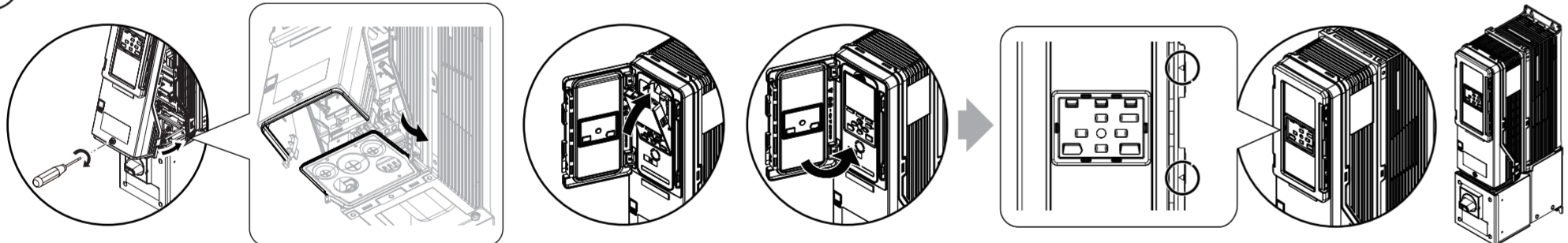
Refer to the Technical Reference (SIEPC71061732) for information about GFCIs.

The terminal screw shape is different between the input side and the output side. Refer to the Technical Reference (SIEPC71061732) for information about the screw shapes for each terminal.

8 Install the Main Switch Cover



9 Install the Front Cover and Keypad



10 Energize the Drive and Confirm It Is Ready

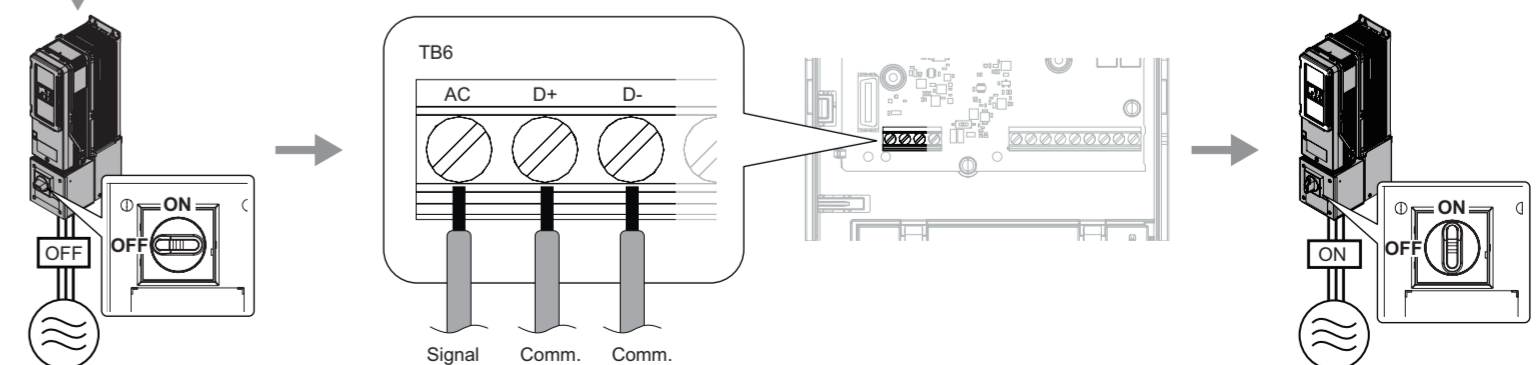
11 Set the Motor Rated Current (FLA) from the Motor Nameplate in E2-01

3 PHASE INVERTER DUTY AC INDUCTION MOTOR NAMEPLATE EXAMPLE					
MODEL	XX	123AAA123XX-X0	DES A	X	FRAME 123AX
POLES	X	ENC XXX	CODE X	TYPE	ABC INS X0
VOLTS	XXX	FL XXXX		FL	XX/XX
SF 1.0	DUTY CONT	MAX AMB °C	XX	TEMP. SENSORS	T-STATS
SERIAL		N.L. AMPS	XX.XXX.X		
MAX RPM	4200	S.E. BRG. 309	O.S.E. BRG.	XXX	ROTOR WK? X.X
HZ	kw	RPM	TORQUE (LB FT)	VOLTS (HIGH CONN)	AMPS (HIGH CONN)
1	-	0	XX.X	-	XX.X
60	XX	XXXX	XX.X	XXX	XX.X
120	XX	XXXX	XX.X	XXX	XX.X
OHMS PH.	R1: XXX	R2: XXX	X1: X.XX	X2: X.XX	XM: XX.X
	PIN XXXXXX				

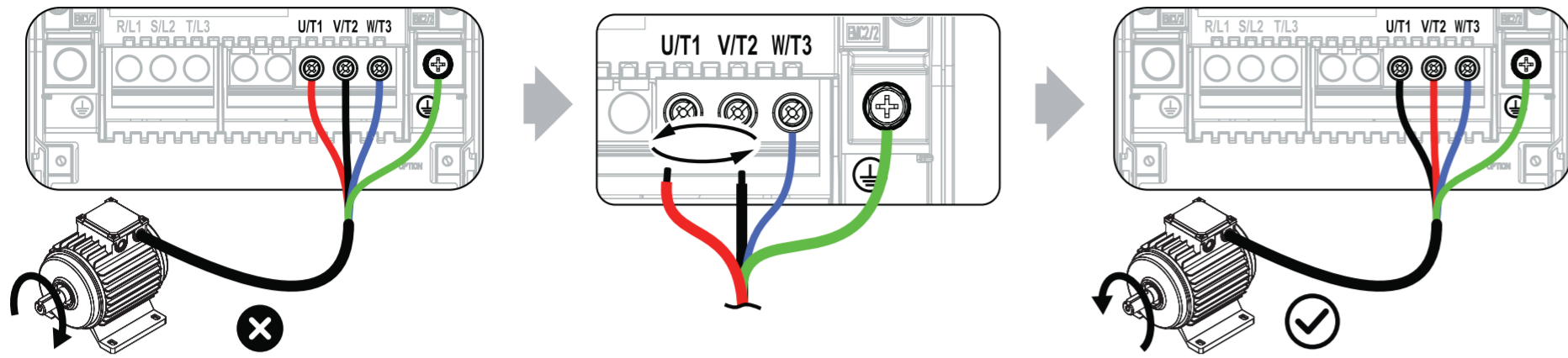
12 Set the Drive for HAND Operation and Check the Motor Rotation Direction

Additional Information for Installation and Primary Operation

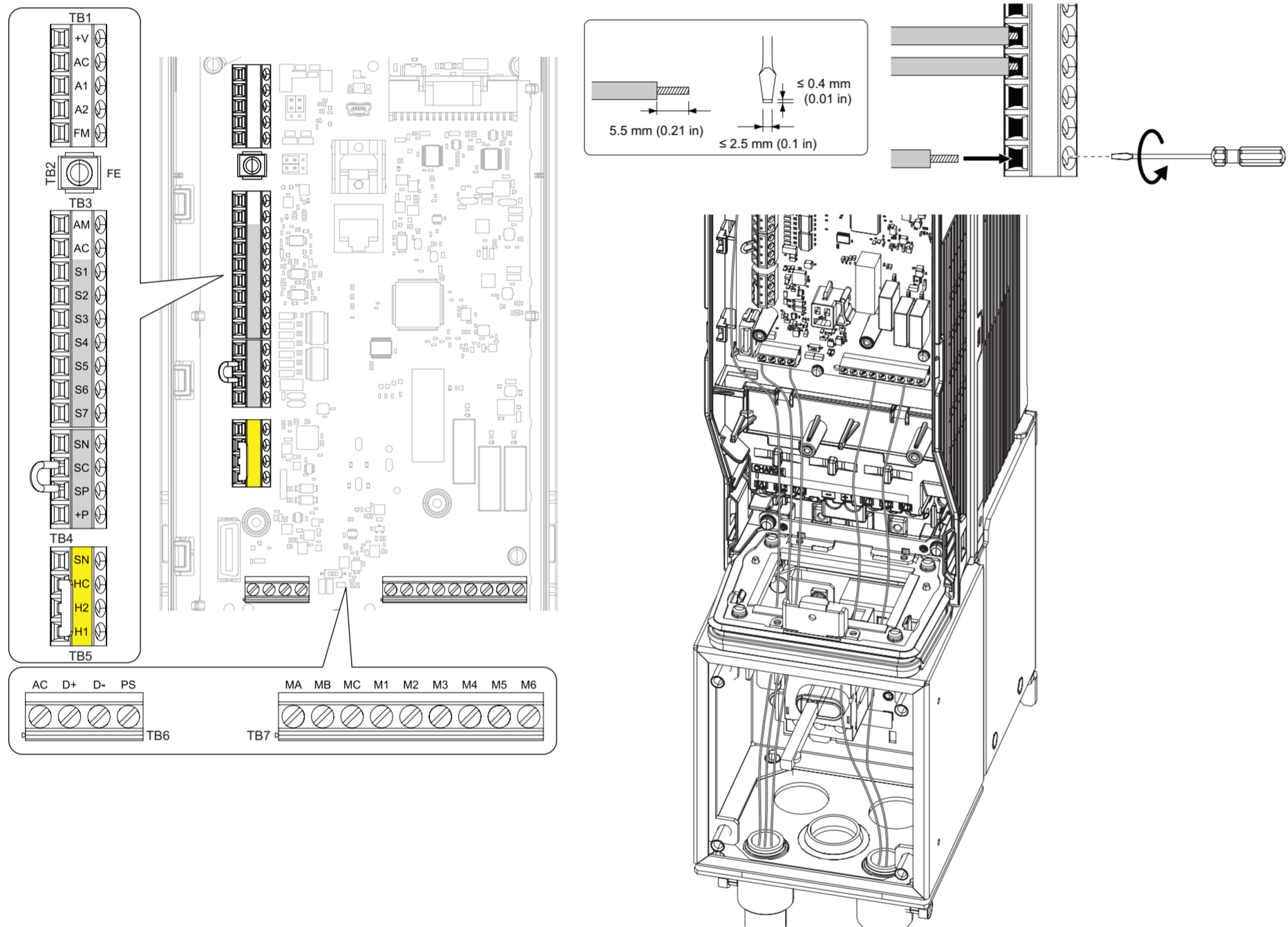
A How to Set Up the Drive for Monitoring via BACnet MS/Tp



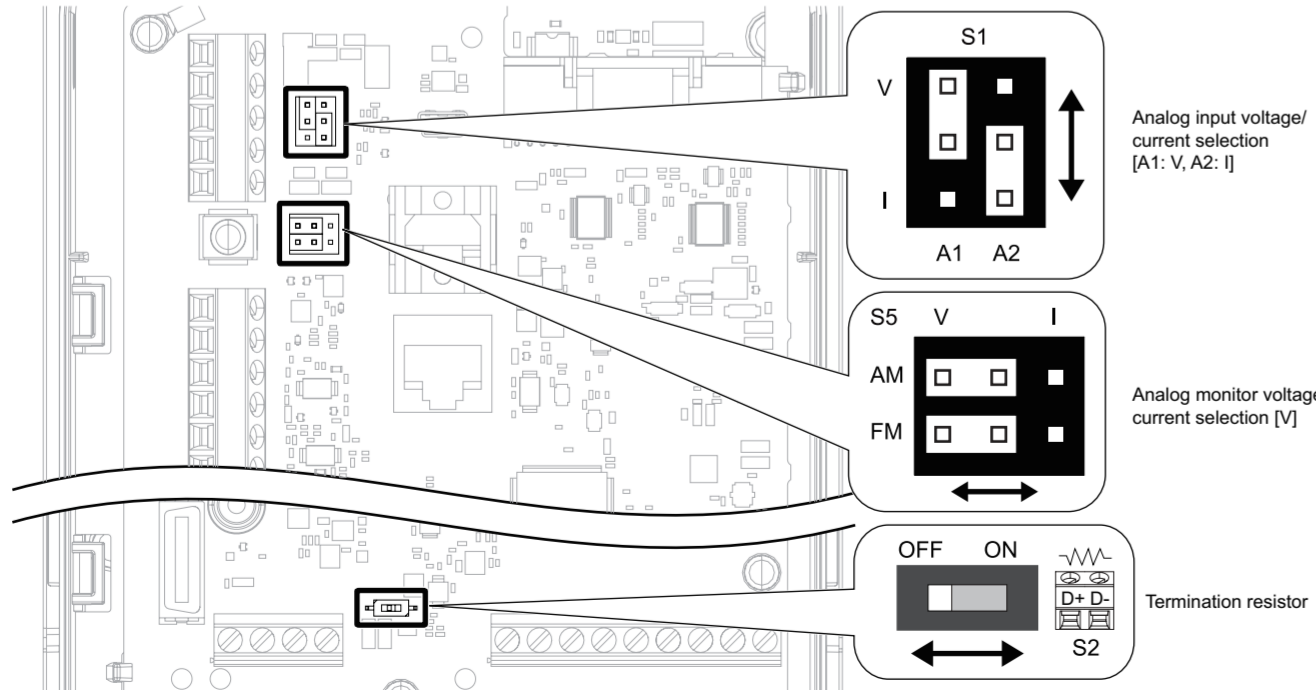
B If the Motor Does Not Rotate in the Correct Direction



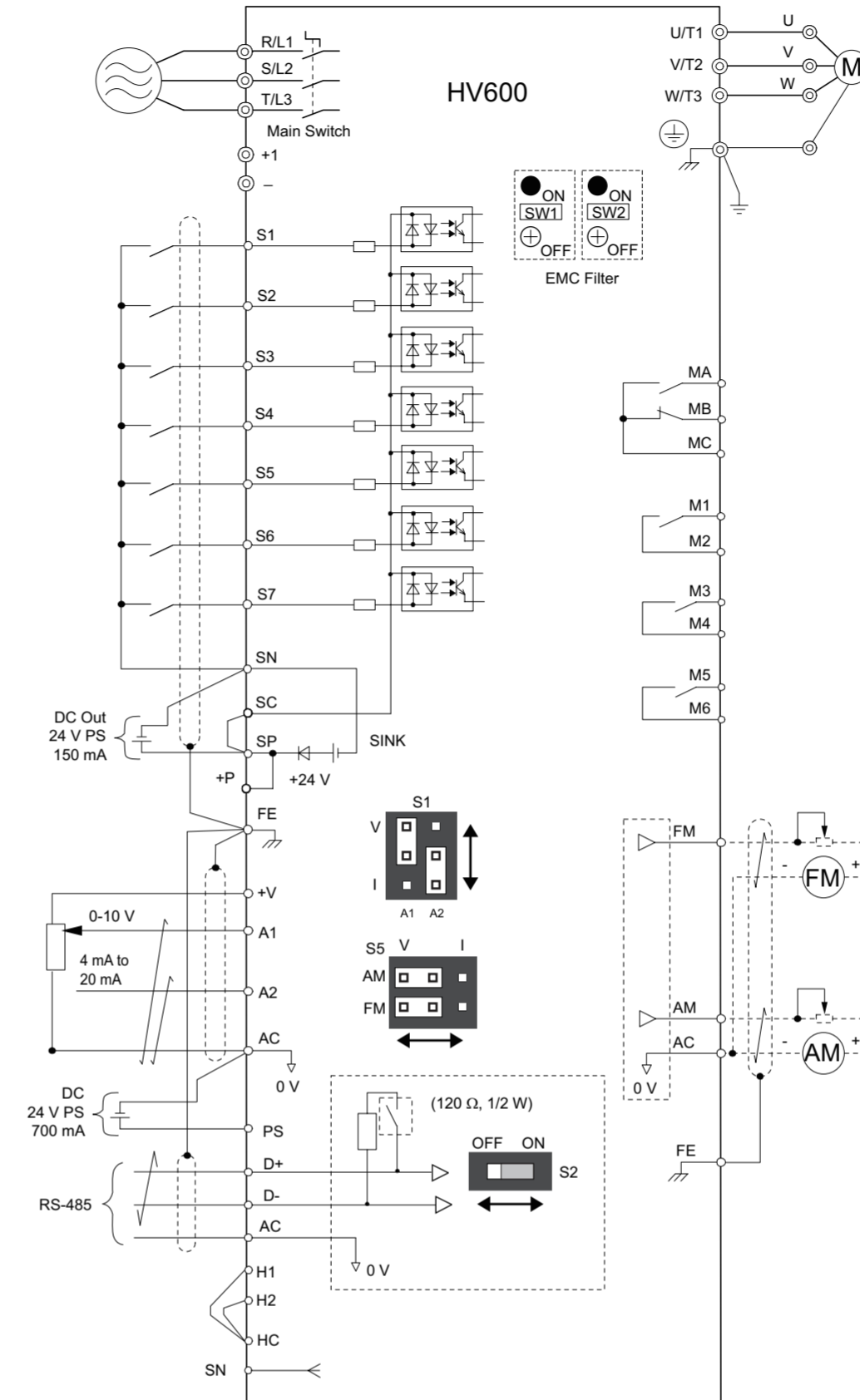
C Control Circuit Configuration



D Switches and Jumpers on the Control Board

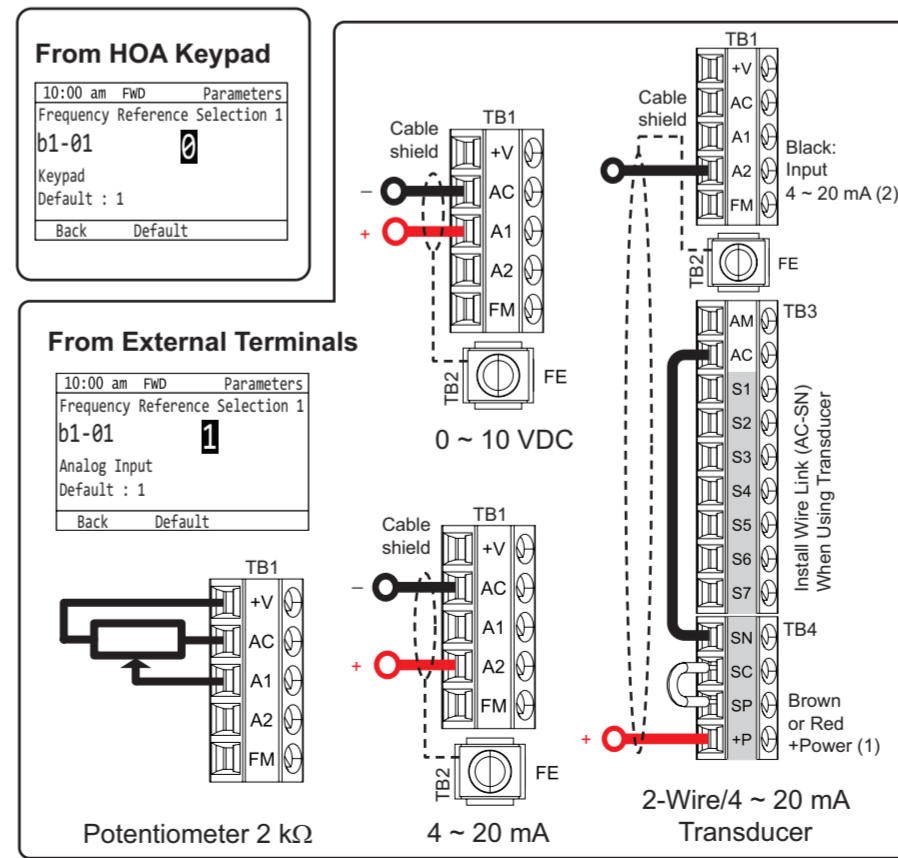


E Connection Diagram and Terminal Functions

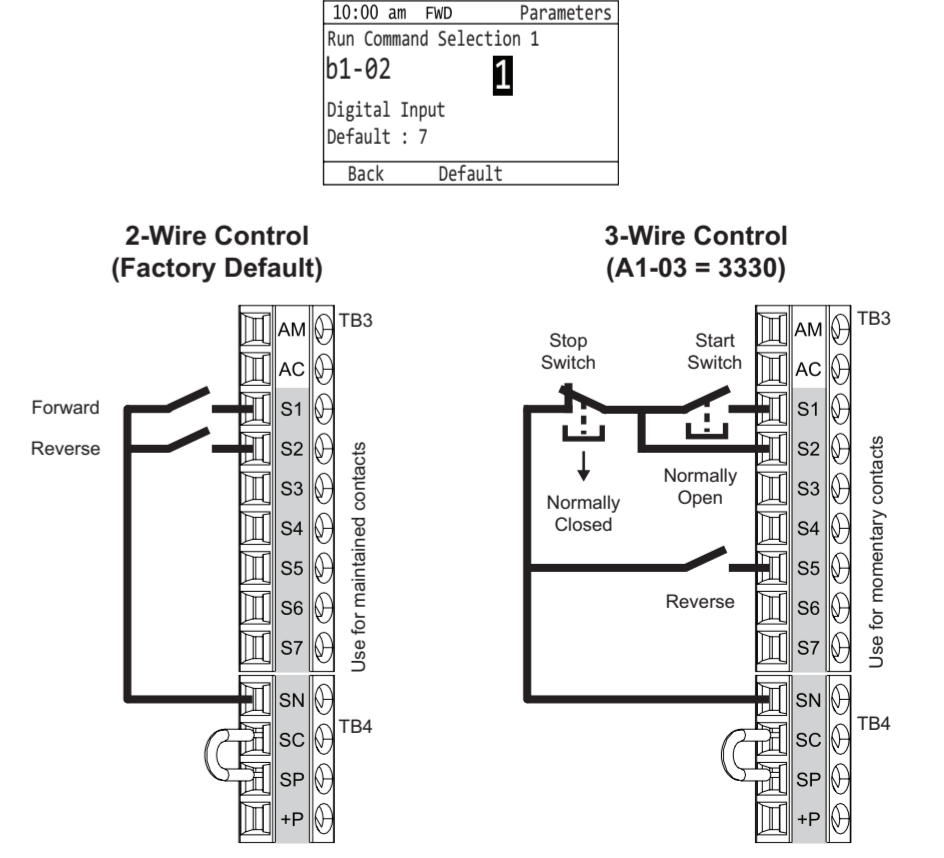


Terminal	Type	Signal Level	Default
S1	MFDI 1	Photocoupler 24 V, 6 mA Internal impedance: 4.7 kΩ	Forward run/Stop
S2	MFDI 2		Not used
S3	MFDI 3		External fault
S4	MFDI 4		Fault reset
S5	MFDI 5		Multi-step speed 1
S6	MFDI 6		Multi-step speed 2
S7	MFDI 7		Jog command
SN	MFDI power 0 V		-
SC	MFDI common	24 V, 150 mA maximum	-
SP	MFDI power + 24 VDC		-
H1	Safe disable input 1		-
H2	Safe disable input 2	Photocoupler 24 V, 6 mA Internal impedance: 4.7 kΩ	-
HC	Safe disable common		-
+V	Frequency setting power supply	10.5 V (20 mA maximum)	-
A1	MFAI 1	0 V ~ 10 V/100% (input impedance 20 kΩ) 4 mA ~ 20 mA/100% (input impedance 250 Ω)	Master frequency reference
A2	MFAI 2	0 mA ~ 20 mA/100% (input impedance 250 Ω)	Combined w/A1
AC	Common	0 V	-
FE	Connect shielded cable		-
MA	Fault relay out	30 VDC, 10 mA ~ 2 A 250 VAC, 10 mA ~ 2 A Minimum load: 5 V, 10 mA	Fault
MB			Fault
MC	Common		-
M1	MFDO		During run
M2	MFDO		Zero speed
M3	MFDO	30 VDC, 10 mA ~ 2 A 250 VAC, 10 mA ~ 2 A Minimum load: 5 V, 10 mA	
M4	MFDO		
M5	MFDO		Speed agree 1
M6	MFDO		
FM	MFAO 1	0 V ~ +10 V/0% ~ 100% 4 mA ~ 20 mA	Output frequency
AM	MFAO 2		Output current
AC	Common	0 V	-
+P	External power supply	24 V (150 mA maximum)	-
PS	External 24 V PS input	21.6 VDC ~ 26.4 VDC, 700 mA	-
AC	External 24 V PS ground	0V	-
D+	Communication +	APOGEE FLN, BACnet, MEMOBUS/Modbus, Metasys N2	-
D-	Communication -	RS-485 115.2 kbps maximum	-
AC	Common	0 V	-

F Set Frequency Reference Source



G Set Start/Stop Control Method from External Terminals



H If You Push the HAND Button but the Motor Does Not Spin

The diagram illustrates the following steps:

- Initial state: Drive menu shows Freq Reference (KPD) at 0.00 Hz and Output Frequency at 0.00 Hz. A warning icon is present.
- Pressing the HAND button leads to the 'Init Setup' menu.
- Pressing F2 returns to the main menu.
- Pressing F2 again enters the 'Parameters' menu.
- Pressing the right arrow key (>) sets the HAND Frequency Reference to 10.00 Hz.
- Pressing the left arrow key (<) returns to the main menu.
- Pressing F2 again shows 'Entry Accepted'.
- Pressing F2 again returns to the main menu, where the Output Frequency is now 10.00 Hz.

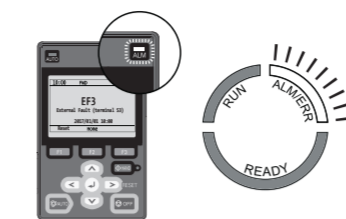
I Parameter Groups

A: Initialization	d: Reference Settings	H: Terminal Functions	n: Special Adjustment	T: Auto-Tuning
A1 Initialization	d1 Frequency Reference	H1 Digital Inputs	n1 Hunting Prevention	T0 Tuning Mode Selection
A2 User Parameters	d2 Reference Limits	H2 Digital Outputs	n3 High Slip/Overexcite Braking	T1 InductionMotor Auto-Tuning
b: Application				
b1 Operation Mode Selection	d3 Jump Frequency	H3 Analog Inputs	n7 EZ Drive	T2 PM Motor Auto-Tuning
b2 DC Injection Braking and Short Circuit Braking	d4 Freq. Ref. Up/Down & Hold	H4 Analog Outputs	n8 PM Motor Control Tuning	T4 EZ Tuning
b3 Speed Search	d6 Field Weakening	H5 Serial Communication	o: Keypad-Related Settings	
b4 Timer Function	d7 Offset Frequency	H7 Virtual Inputs/Outputs	o1 Keypad Display	Y: Application Features
b5 PID Control	E: Motor		o2 Keypad Operation	Y1 Application Basics
b8 Energy Saving	E1 V/f Pattern for Motor 1	L: Protection Functions		Y2 PID Sleep and Protection
C: Tuning				
C1 Accel & Decel Time	E2 Motor 1 Parameters	L1 Motor Protection	o3 Copy Keypad Function	Y4 Application Advanced
C2 S-Curve Characteristics	E3 V/f Pattern for Motor 2	L2 Power Loss Ride Through	o4 Maintenance Monitors	Y9 Network Multiplex Options
C3 Slip Compensation	E4 Motor 2 Parameters	L3 Stall Prevention	o5 Log Function	YA Preset Setpoint
C4 Torque Compensation	E5 PM Motor Settings	L4 Speed Detection	q: DriveWorksEZ Parameters	
C5 Auto Speed Regulator (CSR)	E9 Motor Setting	L5 Fault Restart	r: DriveWorksEZ Connections	
C6 Carrier Frequency	F: Options		S: Special Applications	
	F6 Communication Option	L6 Torque Detection	S1 Dynamic Noise Control	
	F7 Ethernet Options	L7 Torque Limit	S2 Sequence Run Timers	
		L8 Drive Protection	S3 PI2 Control	
		L9 Drive Protection 2	S5 HAND/OFF/AUTO Operation	
			S6 Protection	

Frequently Used Parameters

Parameter Number Name	Default Description	Parameter Number Name	Default Description	Parameter Number Name	Default Description
A1-06 Application Preset	0 No preset	b5-03 Integral Time (I)	0.5 s	d2-02 Frequency Reference Lower Limit	0.0%
b1-01 Frequency Reference Selection 1	1 Analog Input	b5-05 Derivative Time (D)	0.00 s	E1-01 Input AC Supply Voltage	-
b1-02 Run Command Selection 1	7 AUTO Command + Term Run	C1-01 Acceleration Time 1	30.0 s	E2-01 Motor Rated Current (FLA)	-
b1-03 Stopping Method Selection	1 Coast to Stop	C1-02 Deceleration Time 1	30.0 s	H3-09 Terminal A2 Signal Level Select	2 4 to 20 mA
b5-01 PID Mode Setting	0 Disabled	d2-01 Frequency Reference Upper Limit	100.0%	H3-10 Terminal A2 Function Selection	0 Frequency Reference
b5-02 Proportional Gain (P)	2.00				

J Troubleshooting Resources for Drive Faults and Alarms



Resource	Choose This When:	URL	QR Code
Installation & Primary Operation	You have access to the paper copy of the manual that was packaged with the drive. This manual lists all drive faults and alarms, and offers a selection of causes and solutions.	https://www.yaskawa.com/toepec71061793	PDF download
DriveWizard Mobile App	You want to use your smartphone or tablet and use the embedded help to look up the full complement of causes and solutions to all drive faults and alarms.	https://www.yaskawa.com/dwm	App download
Maintenance & Troubleshooting Manual	You want to download a PDF of the manual to your smartphone or tablet. This manual lists the full complement of causes and solutions to all drive faults and alarms and also includes detailed information about drive maintenance, wiring, and programming.	https://www.yaskawa.com/toepeiavh6001	PDF download

K Additional Resources



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