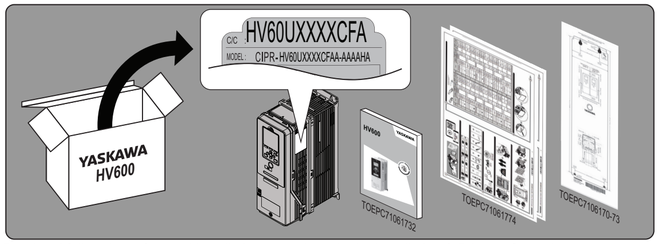
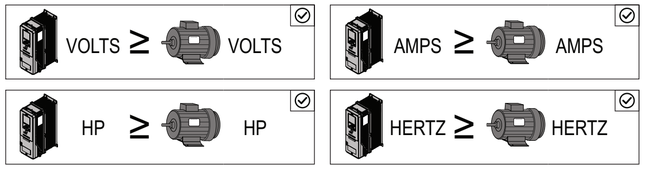
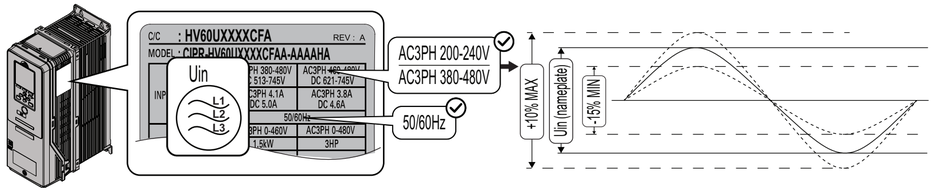
HV600 Quick Setup Procedure for IP20/UL Type 1 Models HV60U2011 to 2114 and 4005 to 4124



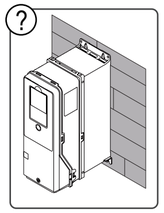
Read and follow the safety and installation procedures in the Installation & Primary Operation (TOEPC71061732) manual packaged with the drive.

1 Confirm the Drive and Motor Specifications

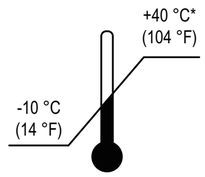


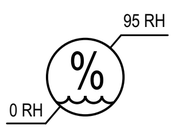


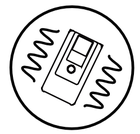
2 Confirm the Correct Drive Installation Environment



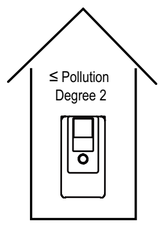
IP20/UL Type 1





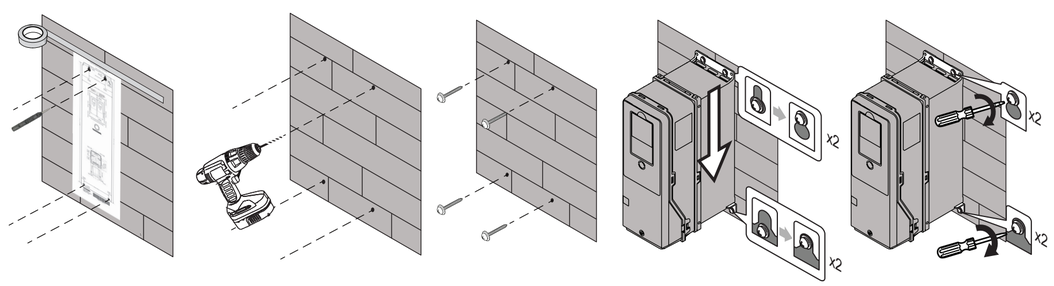


- 10 Hz to 20 Hz:
  1 G (9.8 m/s², 32.15 ft/s²)
- 20 Hz to 55 Hz:
  2011 to 2031, 4005 to 4034:
  0.6 G (5.9 m/s², 19.36 ft/s²)
  2046 to 2114, 4040 to 4124:
  0.2 G (1.96 m/s², 6.43 ft/s²)



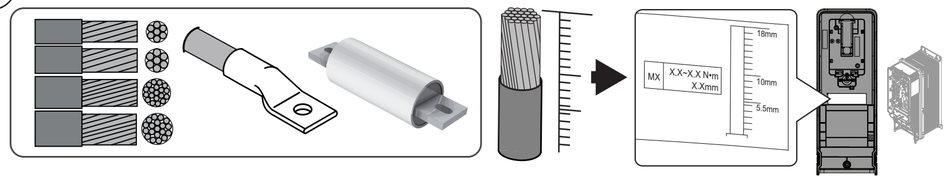
*You can use the drive at a maximum of 60 °C (140 °F) when you derate the output current.
**Derate the output current by 1% for each 100 m (328 ft) to install the drive in altitudes between 1000 m to 4000 m (3281 ft to 13123 ft).
Refer to the Technical Reference (SIEPC71061732) for derating information.

3 Use the Enclosed Drilling Template to Mount the Drive Vertically



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.

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	Wire Range AWG, kcmil (*Recommended*)	Panduit Crimp Terminal Part Number[1] [2]
2011	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***14***)	N/A
	-, +1	14 - 8 (***14***)	N/A
	⏚	14 - 8 (***12***)	LCA10-14-L
2017	R/L1, S/L2, T/L3	14 - 8 (***12***)	N/A
	U/T1, V/T2, W/T3	14 - 8 (***10***)	N/A
	-, +1	14 - 8 (***10***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
2024	R/L1, S/L2, T/L3	14 - 8 (***10***)	N/A
	U/T1, V/T2, W/T3	14 - 8 (***8***)	N/A
	-, +1	14 - 8 (***8***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
2031	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***8***)	N/A
	-, +1	14 - 8 (***8***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
2046	R/L1, S/L2, T/L3	14 - 4 (***8***)	N/A
	U/T1, V/T2, W/T3	14 - 4 (***6***)	N/A
	-, +1	14 - 4 (***6***)	N/A
	⏚	14 - 4 (***8***)	LCA8-14-L
2059	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 4 (***4***)	N/A
	-, +1	14 - 4 (***4***)	N/A
	⏚	14 - 4 (***6***)	LCA6-14-L
2075	R/L1, S/L2, T/L3	8 - 2/0 (***4***)	LCA4-56-L
	U/T1, V/T2, W/T3	8 - 2/0 (***3 or 2***)	LCA4-56-L/LCA2-56-Q
	-, +1	8 - 2/0 (***2***)	LCA2-56-Q
	⏚	8 - 2/0 (***6***)	LCA6-56-L
2088	R/L1, S/L2, T/L3	8 - 2/0 (***3 or 2***)	LCA4-56-L/LCA2-56-Q
	U/T1, V/T2, W/T3	8 - 2/0 (***2***)	LCA2-56-Q
	-, +1	8 - 2/0 (***1***)	LCA1-56-E
	⏚	8 - 2/0 (***6***)	LCA6-56-L
2114	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	8 - 2/0 (***1/0***)	LCA1/0-56-X
	-, +1	8 - 2/0 (***2/0***)	LCA2/0-56-X
	⏚	8 - 2/0 (***6***)	LCA6-56-L

480 V Class Wires and Crimp Terminals

Drive Model [HV60UXXXX]	Terminal	Wire Range AWG, kcmil (*Recommended*)	Panduit Crimp Terminal Part Number[1] [2]
4005 4008	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***14***)	N/A
	-, +1	14 - 8 (***14***)	N/A
	⏚	14 - 8 (***14***)	LCA10-14-L
4011	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***14***)	N/A
	-, +1	14 - 8 (***14***)	N/A
	⏚	14 - 8 (***12***)	LCA10-14-L
4014	R/L1, S/L2, T/L3	14 - 8 (***14***)	N/A
	U/T1, V/T2, W/T3	14 - 8 (***12***)	N/A
	-, +1	14 - 8 (***12***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
4021	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***10***)	N/A
	-, +1	14 - 8 (***10***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
4027	R/L1, S/L2, T/L3	14 - 8 (***10***)	N/A
	U/T1, V/T2, W/T3	14 - 8 (***8***)	N/A
	-, +1	14 - 8 (***8***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
4034	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 8 (***8***)	N/A
	-, +1	14 - 8 (***8***)	N/A
	⏚	14 - 8 (***10***)	LCA10-14-L
4040	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 4 (***8***)	N/A
	-, +1	14 - 4 (***6***)	N/A
	⏚	14 - 4 (***8***)	LCA8-14-L
4052	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 4 (***6***)	N/A
	-, +1	14 - 4 (***4***)	N/A
	⏚	14 - 4 (***8***)	LCA8-14-L
4065	R/L1, S/L2, T/L3 U/T1, V/T2, W/T3	14 - 4 (***4***)	N/A
	-, +1	14 - 4 (***4***)	N/A
	⏚	14 - 4 (***6***)	LCA6-14-L
4077	R/L1, S/L2, T/L3	8 - 2/0 (***4***)	LCA4-56-L
	U/T1, V/T2, W/T3	8 - 2/0 (***3 or 2***)	LCA4-56-L/LCA2-56-Q
	-, +1	8 - 2/0 (***2***)	LCA2-56-Q
	⏚	8 - 2/0 (***6***)	LCA6-56-L
4096	R/L1, S/L2, T/L3	8 - 2/0 (***2***)	LCA2-56-Q
	U/T1, V/T2, W/T3	8 - 2/0 (***1***)	LCA1-56-E
	-, +1	8 - 2/0 (***1***)	LCA1-56-E
	⏚	8 - 2/0 (***6***)	LCA6-56-L
4124	R/L1, S/L2, T/L3	8 - 2/0 (***1/0***)	LCA1/0-56-X
	U/T1, V/T2, W/T3	8 - 2/0 (***2/0***)	LCA2/0-56-X
	-, +1	8 - 2/0 (***2/0***)	LCA2/0-56-X
	⏚	8 - 2/0 (***4***)	LCA4-56-L

[1] For use with PANDUIT Corp. heat-shrinkable tubing HSTT series or an equivalent UL-recognized-heat shrinkable tubing rated 600 V minimum.
[2] Refer to the Installation & Primary Operation (TOEPC71061732) for possible PANDUIT Type P and Type S crimp terminal alternatives.

Branch Circuit Protection

Yaskawa recommends installing one of the following types of branch circuit protection to maintain compliance with UL.
Semiconductor protective type 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]		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	175
	Max.SCCR (kA)	100	100	100	100	100	100	100	100	100

480 V Class Factory-Recommended Fuses

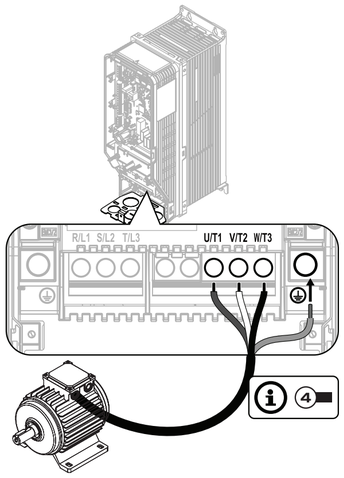
		4005	4008	4011	4014	4021	4027	4034	4040	4052	4065	4077	4096	4124
Bussmann Semiconductor[1]		FWH-25A14F	FWH-30A14F	FWH-40B	FWH-45B	FWH-60B	FWH-80B	FWH-100B	FWH-125B	FWH-150B	FWH-200B	FWH-225A	FWH-225A	FWH-225A
Alternate Fusing (Class CC, J, or T)[2]	Max. Rating (A)	8	12	17.5	20	35	45	50	70	90	110	125	150	200
	Max.SCCR (kA)	100	100	100	100	100	100	100	100	100	100	100	100	100

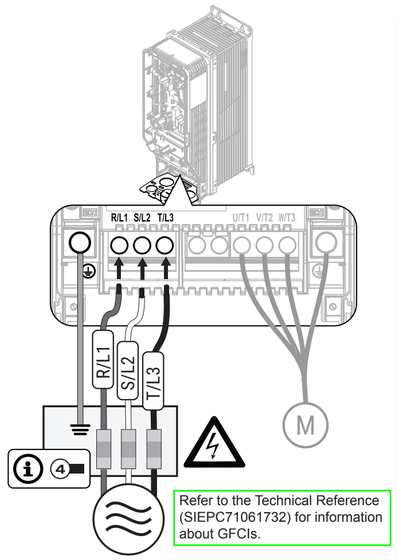
[1] Recommended EATON/Bussmann Semiconductor fuse model.
[2] Class CC fuses are time-delay only. Class T fuses are fast-acting (non-time delay only). Class J fuses can be time-delay or non-time delay.

Flip Over for Steps 5 to 10

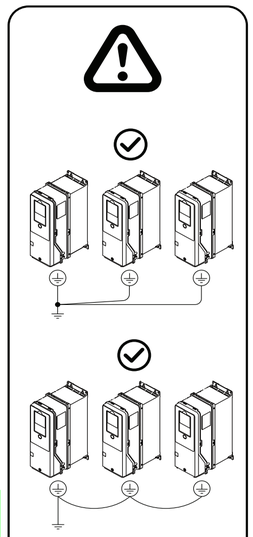
5 Remove the Keypad, Front Cover, Conduit Bracket, and Knock-Outs. Reinstall the Conduit Bracket for non-Cabinet Installations

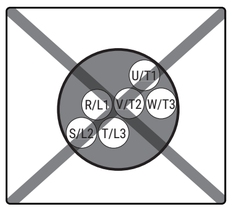
6 Install the Motor Wiring and Power Wiring

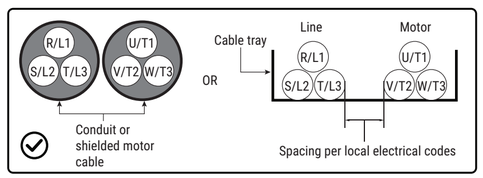


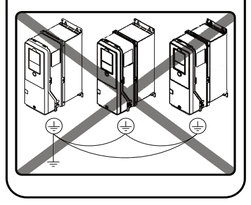


Refer to the Technical Reference (SIEPC71061732) for information about GFCIs.

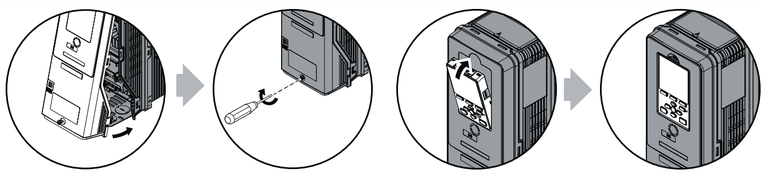




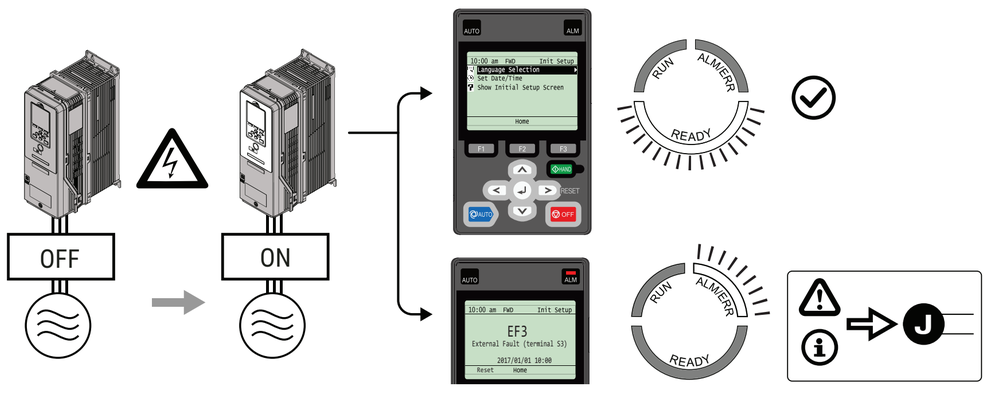




7 Install the Front Cover and Keypad

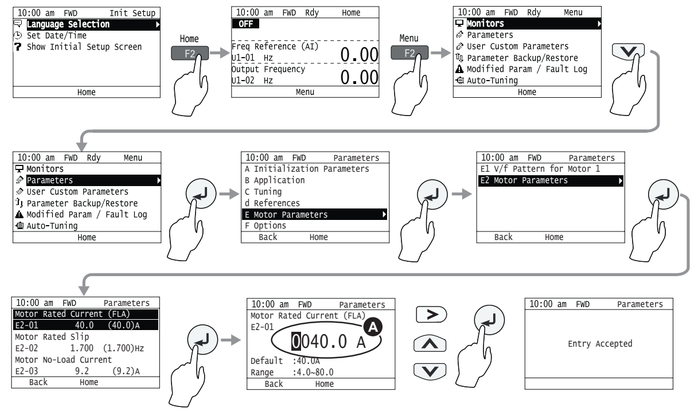


8 Energize the Drive and Confirm It Is Ready

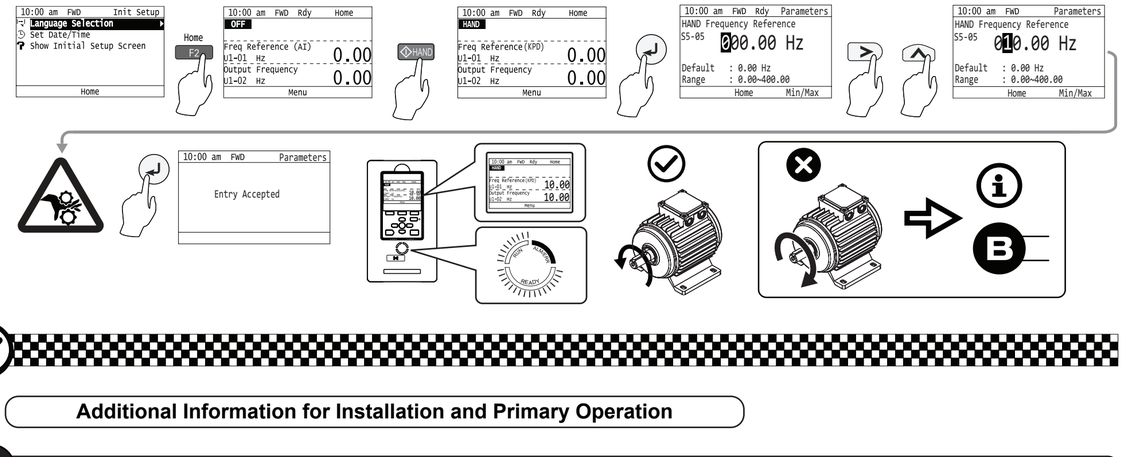


9 Set the Motor Rated Current (FLA) from the Motor Nameplate in E2-01

3 PHASE INVERTER DUTY AC INDUCTION MOTOR NAMEPLATE EXAMPLE					
MODEL XX		123AAAA123XX-X0		X FRAME 123AX	
POLES X		ENC XXX	CODE X	DES A	TYPE ABC INS X0
VOLTS XXX		FL RPM XXXX		FL AMPS XX/XX (A)	
SF 1.0	DUTY CONT	MAX AMB °C XX		TEMP SENSORS T-STATS	
SERIAL			N.L. AMPS XX.X/X.X		
MAX RPM 4200		S.E. BRG. 309	O.S.E. BRG. XXX	ROTOR WK² X.X	
HZ	HP	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
P/N XXXXXXX					

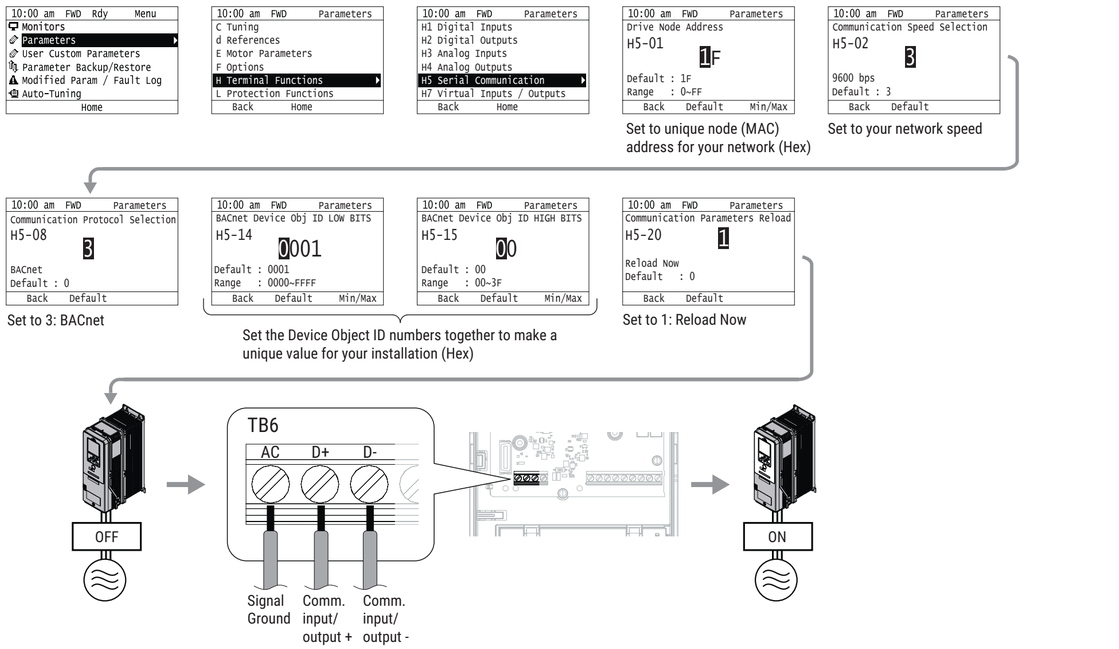


10 Set the Drive for HAND Operation and Check the Motor Rotation Direction

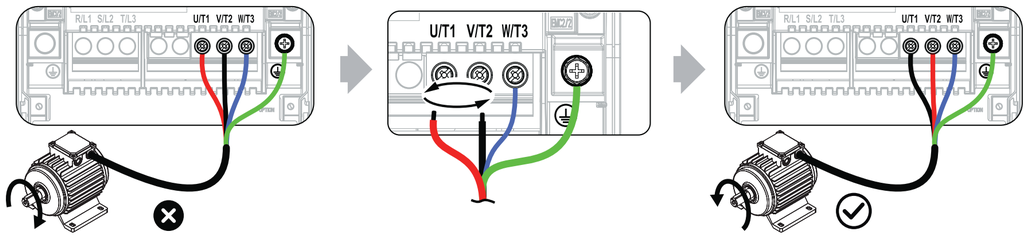


Additional Information for Installation and Primary Operation

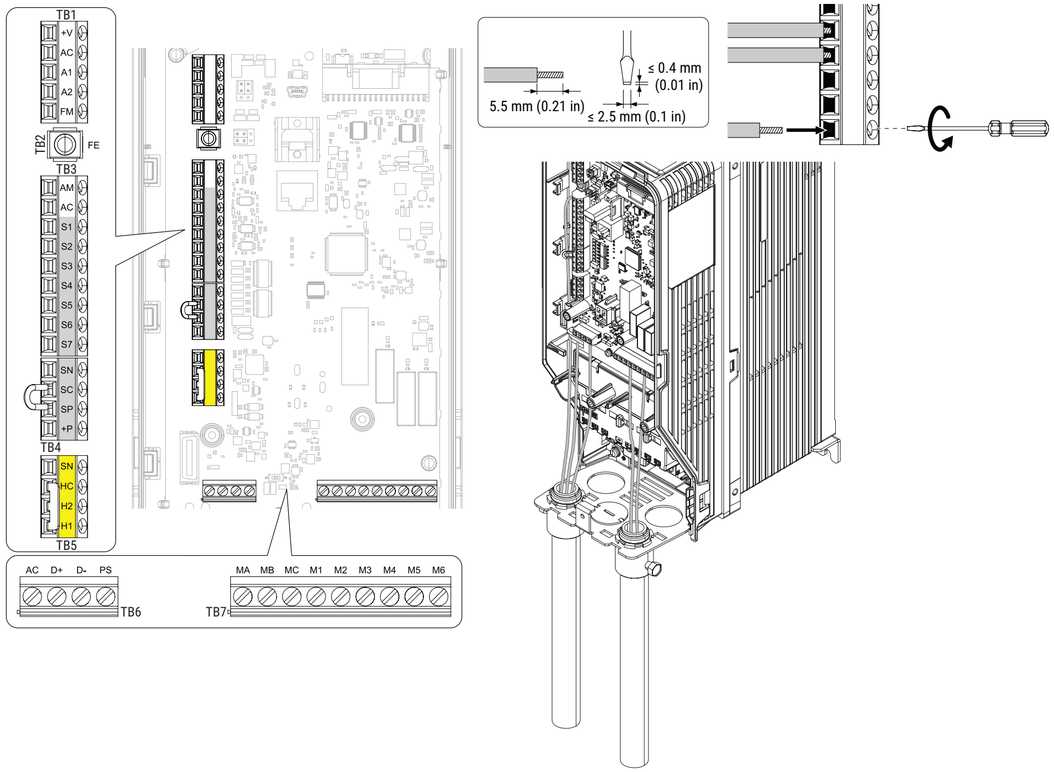
A How to Set Up the Drive for Monitoring via BACnet MS/TP



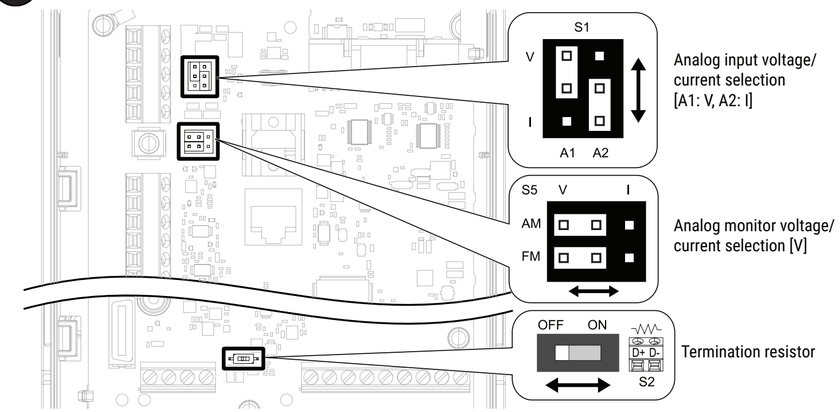
B If the Motor Does Not Rotate in the Correct Direction



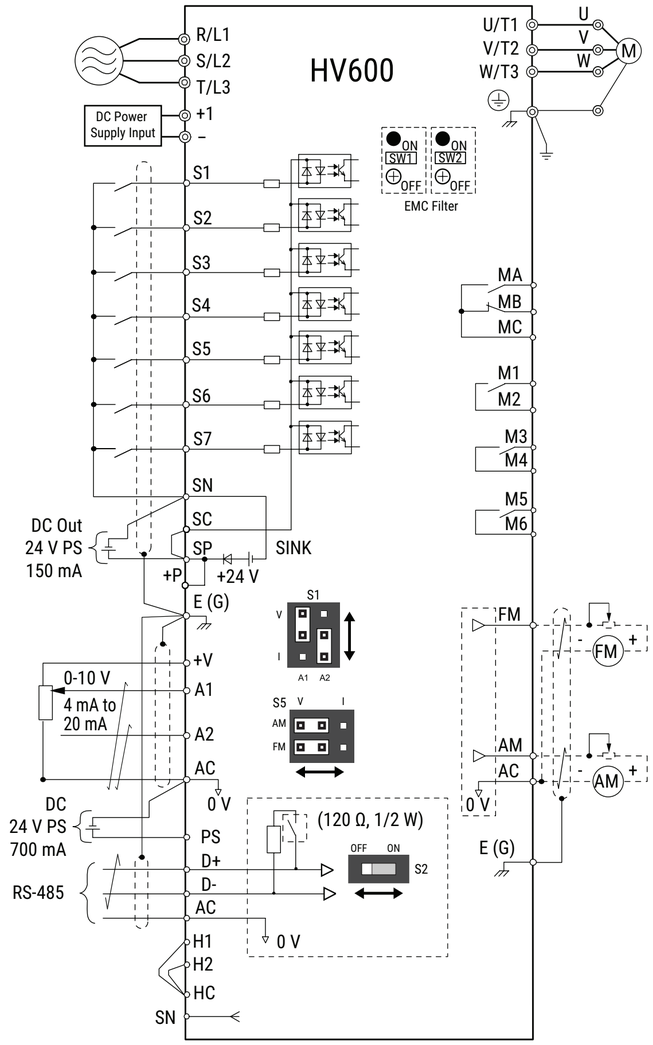
C Control Circuit Configuration



D Switches and Jumpers on the Control Board

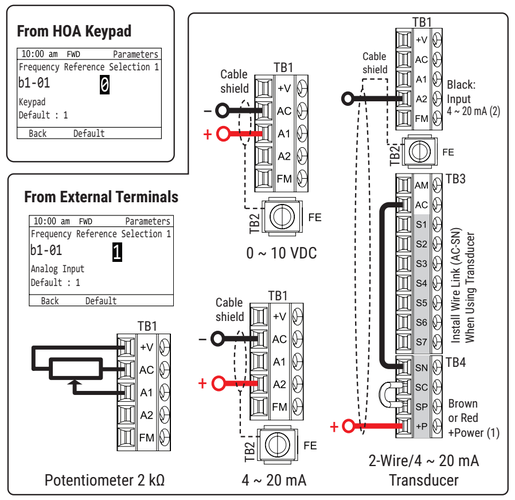


E Connection Diagram and Terminal Functions

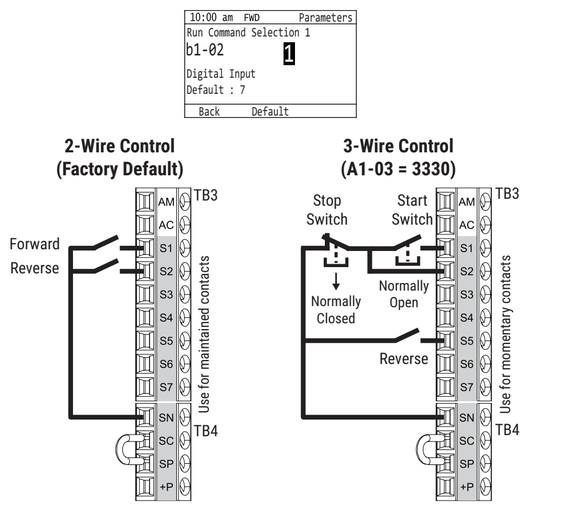


Terminal	Type	Signal Level	Default
S1	MFDI 1	Photocoupler 24 V, 6 mA Internal impedance: 4.7 kΩ	Forward run/Stop
S2	MFDI 2		User-defined
S3	MFDI 3		External fault
S4	MFDI 4		Fault reset
S5	MFDI 5		Multi-step speed 1
S6	MFDI 6		Multi-step speed 2
S7	MFDI 7		Jog command
SN	MFDI power 0 V	24 V, 150 mA maximum	-
SC	MFDI common		-
SP	MFDI power + 24 VDC		-
H1	Safe disable input 1	Photocoupler 24 V, 6 mA Internal impedance: 4.7 kΩ	-
H2	Safe disable input 2		-
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% 0 mA ~ 20 mA/100% (input impedance 250 Ω)	Master frequency reference
A2	MFAI 2		Combined w/A1
AC	Common	0 V	-
E(G)	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	30 VDC, 10 mA ~ 2 A 250 VAC, 10 mA ~ 2 A Minimum load: 5 V, 10 mA	During run
M2			
M3	MFDO		Zero speed
M4			
M5	MFDO		Speed agree 1
M6			
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 RS-485 115.2 kbps maximum	-
D-	Communication -		-
AC	Common	0 V	-

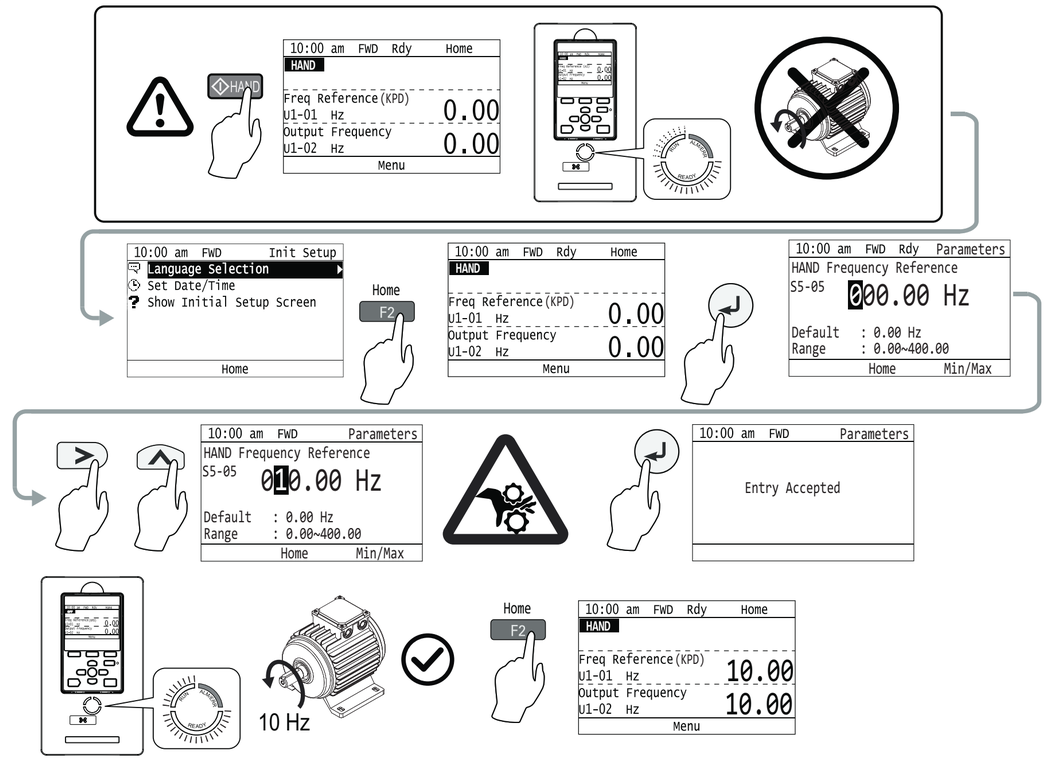
F Set Frequency Reference Source



G Set Start/Stop Control Method from External Terminals



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



I Parameter Groups

A: Initialization	
A1	Initialization
A2	User Parameters
b: Application	
b1	Operation Mode Selection
b2	DC Injection Braking and Short Circuit Braking
b3	Speed Search
b4	Timer Function
b5	PID Control
b8	Energy Saving
C: Tuning	
C1	Accel & Decel Time
C2	S-Curve Characteristics
C3	Slip Compensation
C4	Torque Compensation
C5	Auto Speed Regulator (CSR)
C6	Carrier Frequency

d: Reference Settings	
d1	Frequency Reference
d2	Reference Limits
d3	Jump Frequency
d4	Freq. Ref. Up/Down & Hold
d6	Field Weakening
d7	Offset Frequency
E: Motor	
E1	V/f Pattern for Motor 1
E2	Motor 1 Parameters
E3	V/f Pattern for Motor 2
E4	Motor 2 Parameters
E5	PM Motor Settings
E9	Motor Setting
F: Options	
F6	Communication Option
F7	Ethernet Options

H: Terminal Functions	
H1	Digital Inputs
H2	Digital Outputs
H3	Analog Inputs
H4	Analog Outputs
H5	Serial Communication
H7	Virtual Inputs/Outputs
L: Protection Functions	
L1	Motor Protection
L2	Power Loss Ride Through
L3	Stall Prevention
L4	Speed Detection
L5	Fault Restart
L6	Torque Detection
L7	Torque Limit
L8	Drive Protection
L9	Drive Protection 2

n: Special Adjustment	
n1	Hunting Prevention
n3	High Slip/Overexcite Braking
n7	EZ Drive
n8	PM Motor Control Tuning
o: Keypad-Related Settings	
o1	Keypad Display
o2	Keypad Operation
o3	Copy Keypad Function
o4	Maintenance Monitors
o5	Log Function
q: DriveWorksEZ Parameters	
r: DriveWorksEZ Connections	
S: Special Applications	
S1	Dynamic Noise Control
S2	Sequence Run Timers
S3	PI2 Control
S5	HAND/OFF/AUTO Operation
S6	Protection

T: Auto-Tuning	
T0	Tuning Mode Selection
T1	InductionMotor Auto-Tuning
T2	PM Motor Auto-Tuning
T4	EZ Tuning
Y: Application Features	
Y1	Application Basics
Y2	PID Sleep and Protection
Y4	Application Advanced
Y9	Network Multiplex Options
YA	Preset Setpoint
YC	Feedback Features
YF	PI Auxiliary Control

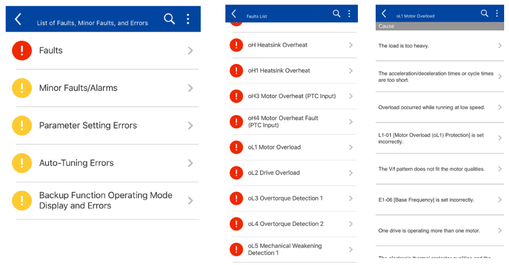
Frequently Used Parameters

Parameter Number | Name	Default | Description
A1-06 | Application Preset	0 | No preset
b1-01 | Frequency Reference Selection 1	1 | Analog Input
b1-02 | Run Command Selection 1	7 | AUTO Command + Term Run
b1-03 | Stopping Method Selection	1 | Coast to Stop
b5-01 | PID Mode Setting	0 | Disabled
b5-02 | Proportional Gain (P)	2.00

Parameter Number | Name	Default | Description
b5-03 | Integral Time (I)	0.5 s
b5-05 | Derivative Time (D)	0.00 s
C1-01 | Acceleration Time 1	30.0 s
C1-02 | Deceleration Time 1	30.0 s
d2-01 | Frequency Reference Upper Limit	100.0%

Parameter Number | Name	Default | Description
d2-02 | Frequency Reference Lower Limit	0.0%
E1-01 | Input AC Supply Voltage	-
E2-01 | Motor Rated Current (FLA)	-
H3-09 | Terminal A2 Signal Level Select	2 | 4 to 20 mA
H3-10 | Terminal A2 Function Selection	0 | Frequency Reference

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/toepc71061732	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	Download on the App Store GET IT ON Google Play 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/toepyaihv6001	PDF download

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