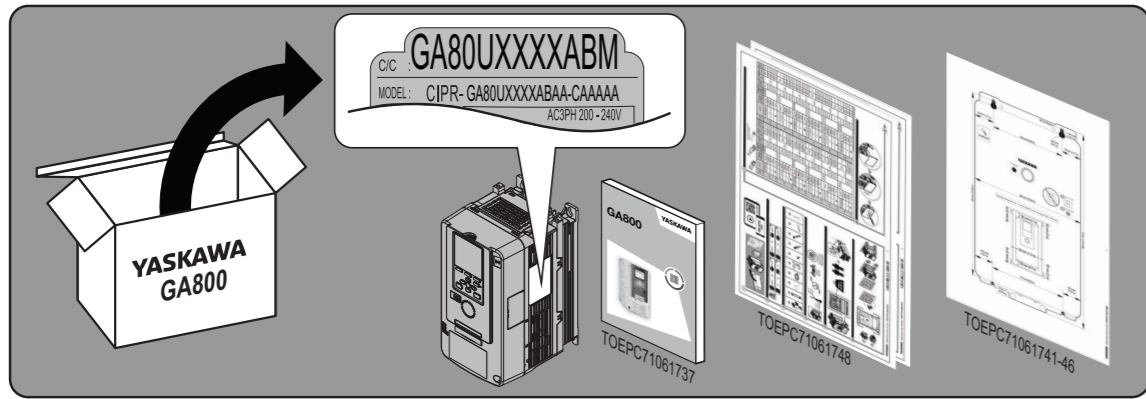
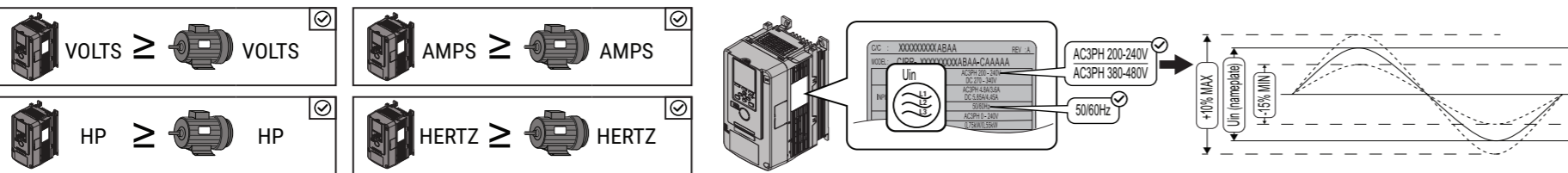


1 Procedure for Installation and Primary Operation for Models GA80U2004 to 2211 and 4002 to 4168

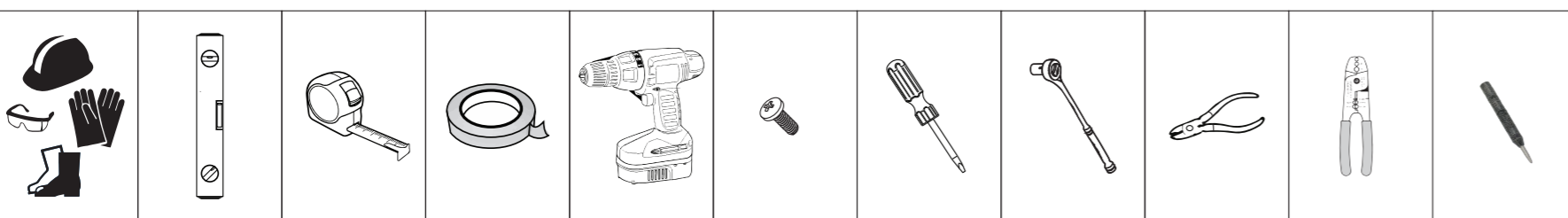


Read and follow the safety and installation procedures in the Installation & Primary Operation (TOEPC71061737) manual packaged with the drive.

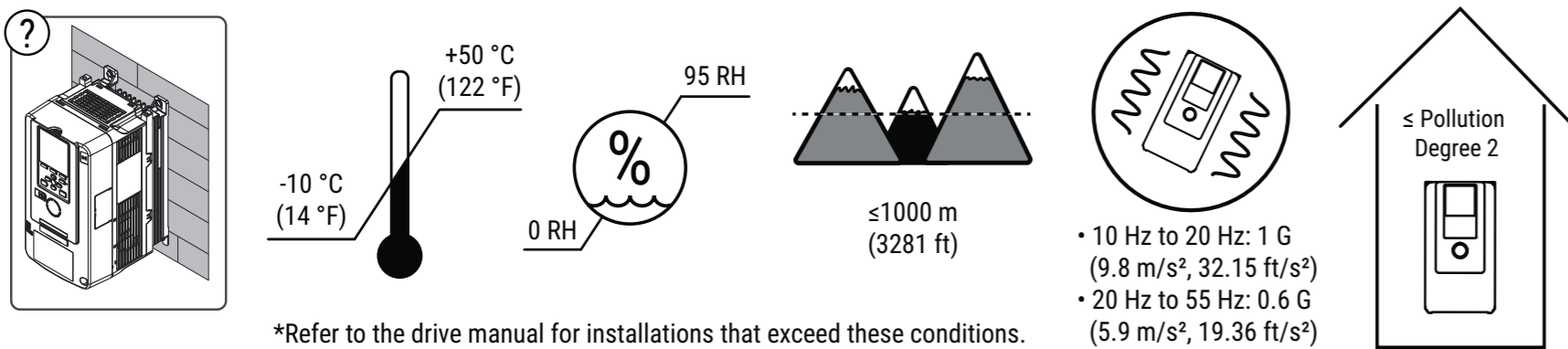
2 Confirm the Drive and Motor Specifications



3 Collect the Required Tools and Equipment

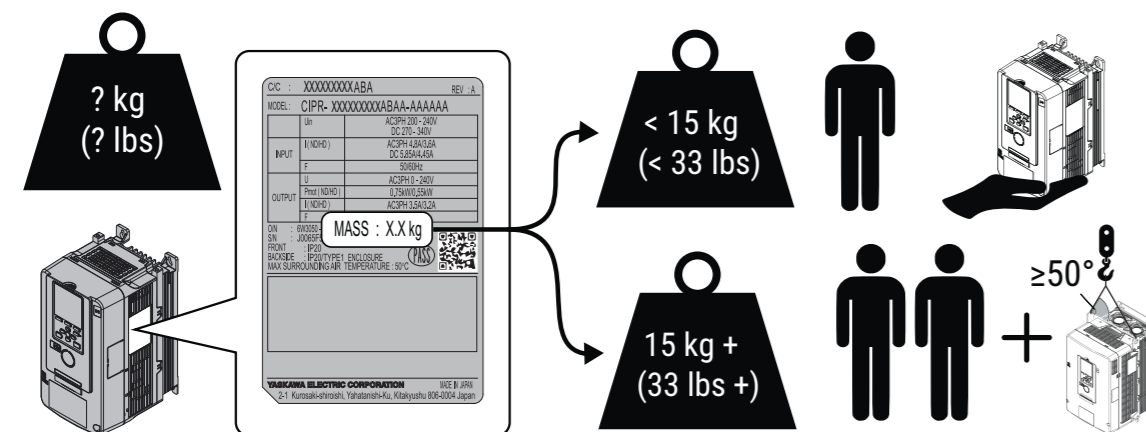


4 Confirm the Correct Drive Installation Environment*

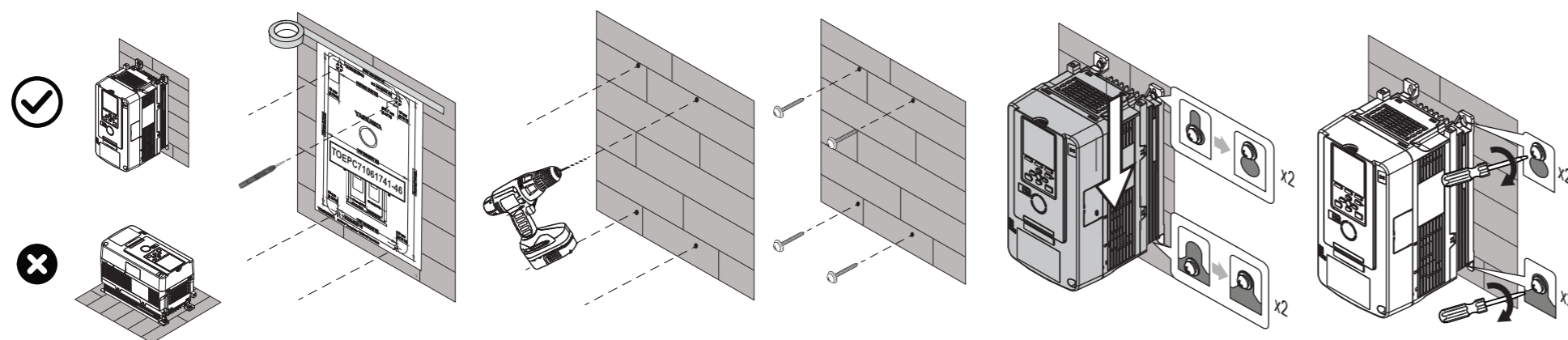


*Refer to the drive manual for installations that exceed these conditions.

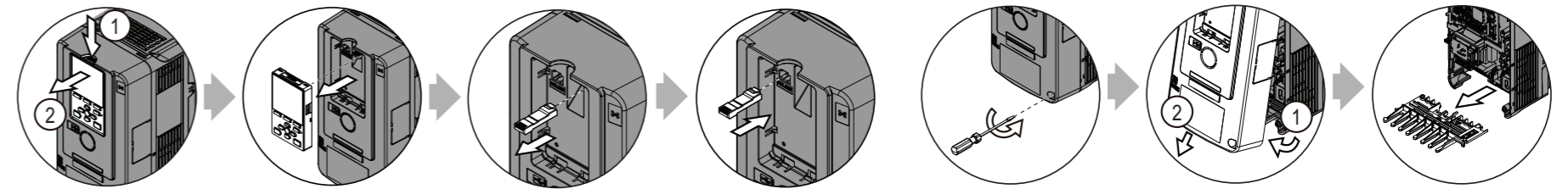
5 Correctly Lift the Drive



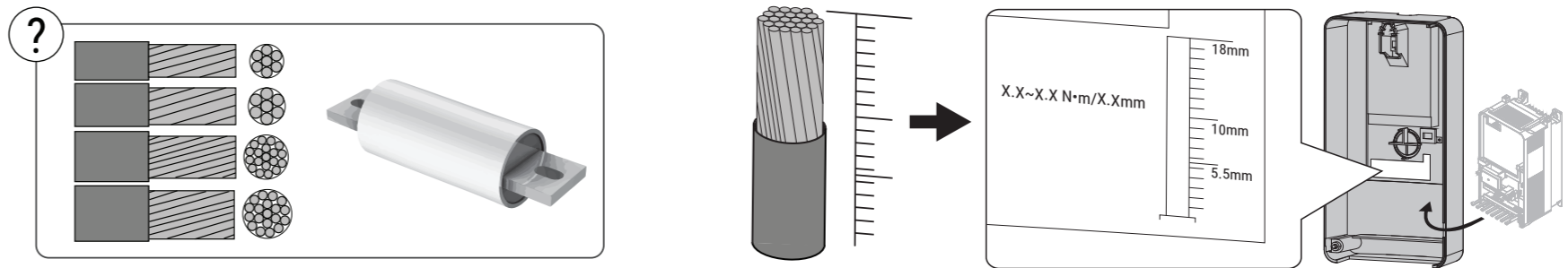
6 Mount the Drive Vertically



7 Remove the Keypad, Front Cover, and Wiring Cover



8 Select the Correct Fuses, Wires, and Wire Strip Length



Yaskawa recommends installing one of the following types of branch circuit protection to maintain compliance with UL 508C. Semiconductor protective type fuses are preferred. Alternate branch circuit protection devices are also listed. Maximum Time Delay fuse is 175% of drive full load output amps (FLA). This covers any Class CC, J or T class fuse.

200 V Class Wire Gauge Range and Branch Circuit Protection by Drive Model [GA80UXXXX] (Recommended)

Terminal	200 V Class Wire Gauge Range and Branch Circuit Protection by Drive Model [GA80UXXXX] (Recommended)													
	2004 2006 2008	2010	2012	2018	2021	2030	2042	2056	2070	2082	2110	2138	2169	2211
R/L1 S/L2 T/L3	14 - 6 (14)	14 - 6 (12)	14 - 6 (10)	14 - 6 (10)	14 - 6 (8)	14 - 6 (6)	14 - 6 (6)	8 - 3 (3)	6 - 1 (1)	6 - 1/0 (1/0)	6 - 1/0 (1/0)	2 - 2/0 (2/0)	2/0 - 250 (4/0)	2/0 - 250 (250)
U/T1 V/T2 W/T3	14 - 6 (14)	14 - 6 (14)	14 - 6 (12)	14 - 6 (10)	14 - 6 (10)	14 - 6 (8)	14 - 6 (6)	10 - 4 (4)	6 - 3 (3)	6 - 2 (2)	6 - 1/0 (1/0)	3/0 - 300 (4/0)	3/0 - 300 (4/0)	3/0 - 300 (300)
- +1 +2	- +1 +1	14 - 3 (14)	14 - 3 (12)	14 - 3 (10)	14 - 3 (8)	14 - 3 (8)	14 - 3 (6)	8 - 1 (1)	4 - 1/0 (1/0)	4 - 2/0 (2/0)	2 - 2/0 (2/0)	2 - 4/0 (4/0)	1/0 - 2/0 (1)	1/0 - 2/0 (2/0)
B1 B2	B1 B2 +3	14 - 10 (14)	14 - 10 (14)	14 - 10 (14)	14 - 10 (14)	14 - 10 (12)	14 - 10 (10)	14 - 8 (8)	14 - 8 (8)	14 - 6 (6)	10 - 4 (4)	10 - 3 (3)	1 - 2/0 (1/0)	1 - 2/0 (2/0)
⊕		14 - 8 (10)	14 - 8 (10)	14 - 8 (10)	14 - 8 (10)	12 - 8 (10)	10 - 8 (8)	8 - 6 (6)	6 - 4 (6)	6 - 4 (6)	6 - 4 (6)	4 (4)	4 - 1/0 (4)	4 - 1/0 (4)
Bussmann Semiconductor ¹		FWH-45B	FWH-45B	FWH-50B	FWH-80B	FWH-80B	FWH-125B	FWH-200B	FWH-225A	FWH-250A	FWH-225A	FWH-225A	FWH-275A	FWH-325A
Alternate Time- Delay (Class CC, J, or T) ²	Max. Rating (A) ³	6	15	20	30	35	50	70	90	110	125	175	225	350
	Max. SCCR (kA)	65	65	65	65	65	100	100	100	100	100	100	100	100

¹Recommended EATON/Bussmann Semiconductor fuse model.

²Class T fuses are fast-acting (non-time delay only).

³Maximum fuse ratings are based on ND1 or ND2 ratings, whichever is larger.

400 V Class Wire Gauge Range and Branch Circuit Protection by Drive Model [GA80UXXXX] (Recommended)

Terminal	400 V Class Wire Gauge Range and Branch Circuit Protection by Drive Model [GA80UXXXX] (Recommended)															
	4002 4004	4005 4007	4009	4012	4018	4023	4031	4038	4044	4060	4075	4089	4103	4140	4168	
R/L1 S/L2 T/L3	14 - 6 (14)	14 - 6 (14)	14 - 6 (14)	14 - 6 (12)	14 - 6 (10)	14 - 6 (8)	8 - 3 (6)	8 - 3 (6)	10 - 4 (4)	10 - 4 (4)	12 - 3 (3)	10 - 2 (2)	2 - 2/0 (1/0)	2/0 - 250 (3/0)	2/0 - 250 (4/0)	
U/T1 V/T2 W/T3	14 - 6 (14)	14 - 6 (14)	14 - 6 (14)	14 - 6 (14)	14 - 6 (10)	14 - 6 (10)	10 - 4 (8)	10 - 4 (8)	10 - 6 (6)	10 - 6 (6)	10 - 4 (4)	12 - 3 (3)	2 - 2/0 (1)	3/0 - 300 (2/0)	3/0 - 300 (4/0)	
- +1 +2	- +1 +1	14 - 3 (14)	14 - 3 (14)	14 - 3 (12)	14 - 3 (10)	14 - 3 (8)	8 - 1 (6)	8 - 1 (4)	10 - 3 (3)	10 - 3 (3)	10 - 2 (2)	6 - 1/0 (1/0)	2 - 4/0 (2/0)	1/0 - 2/0 (2)	1/0 - 2/0 (1/0)	
B1 B2	B1 B2 +3	14 - 10 (14)	14 - 10 (14)	14 - 10 (14)	14 - 10 (14)	14 - 10 (12)	14 - 8 (10)	14 - 8 (10)	14 - 8 (8)	14 - 8 (8)	14 - 6 (6)	14 - 6 (6)	10 - 3 (3)	1 - 2/0 (1)	1 - 2/0 (2/0)	
⊕		14 - 8 (12)	14 - 8 (10)	14 - 8 (10)	14 - 8 (10)	14 - 8 (10)	12 - 8 (10)	10 - 6 (8)	10 - 6 (8)	8 - 4 (6)	8 - 4 (6)	6 - 4 (4)	6 - 4 (4)	4 - 1/0 (4)	4 - 1/0 (4)	
Bussmann Semiconductor ¹		FWH-50B	FWH-50B FWH-60B	FWH-60B	FWH-60B	FWH-80B	FWH-90B	FWH-150B	FWH-200B	FWH-200B	FWH-225A	FWH-250A	FWH-275A	FWH-275A	FWH-300A	FWH-325A
Alternate Time- Delay (Class CC, J, or T) ²	Max. Rating (A) ³	3.5	9	15	20	30	40	50	60	70	100	125	150	175	225	250
	Max. SCCR (kA)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

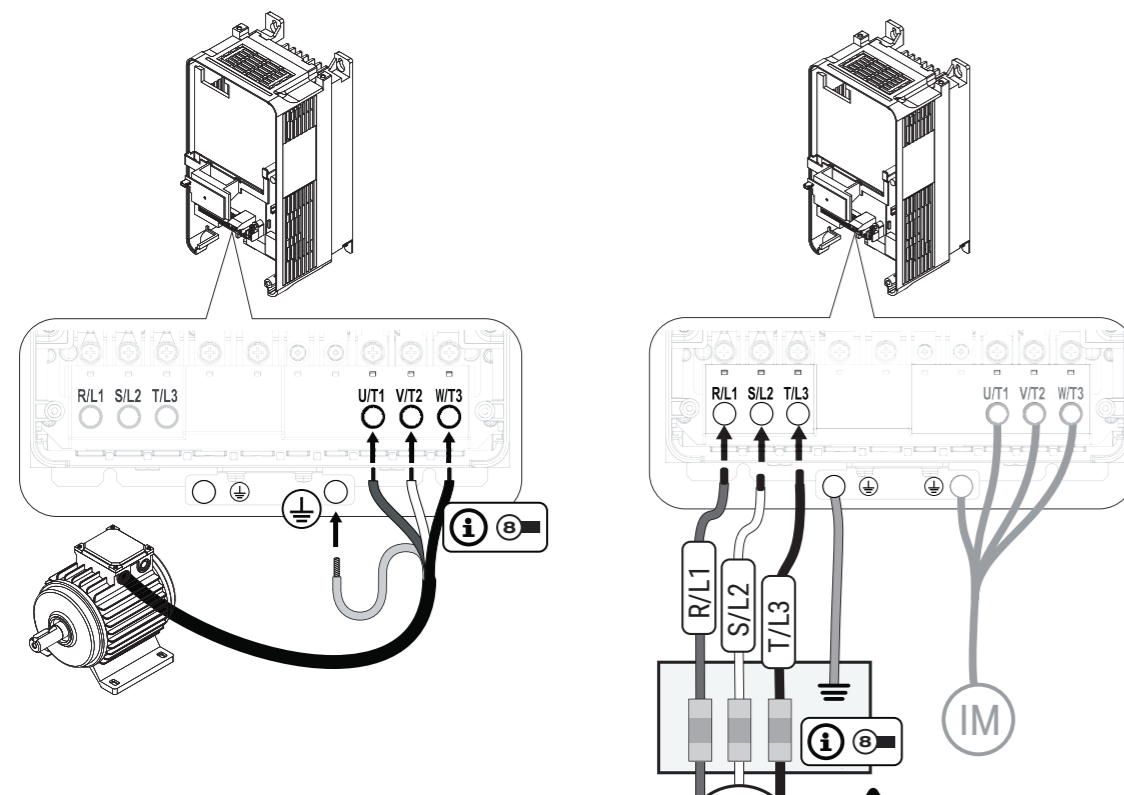
¹Recommended EATON/Bussmann Semiconductor fuse model.

²Class T fuses are fast-acting (non-time delay only).

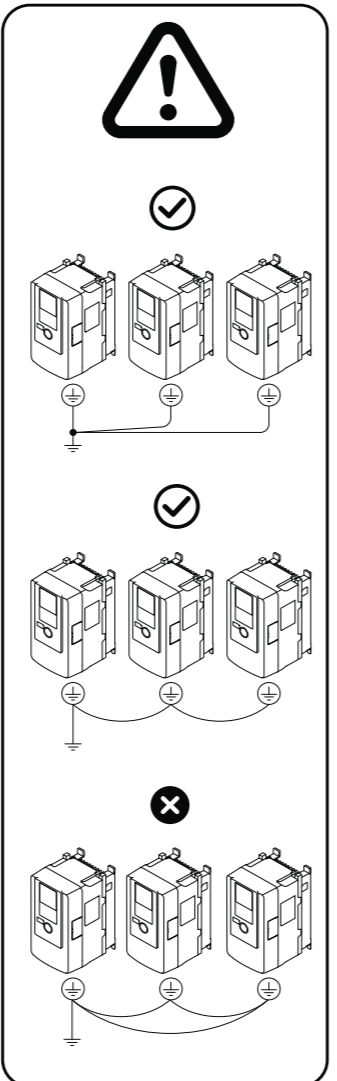
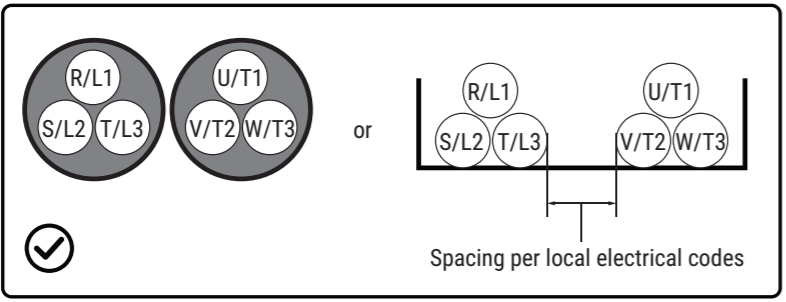
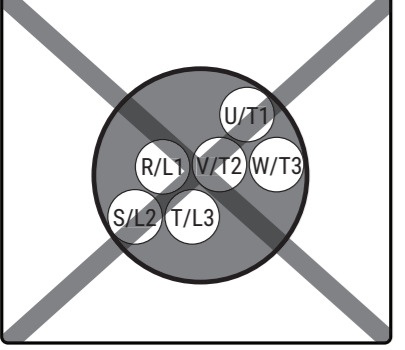
³Maximum fuse ratings are based on ND1 or ND2 ratings, whichever is larger.



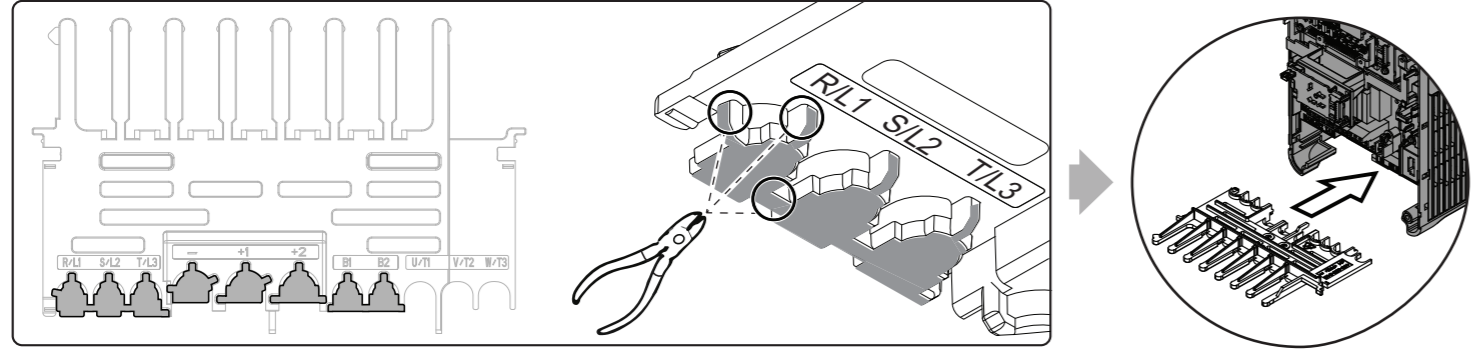
9 Install the Motor Wiring and Power Wiring



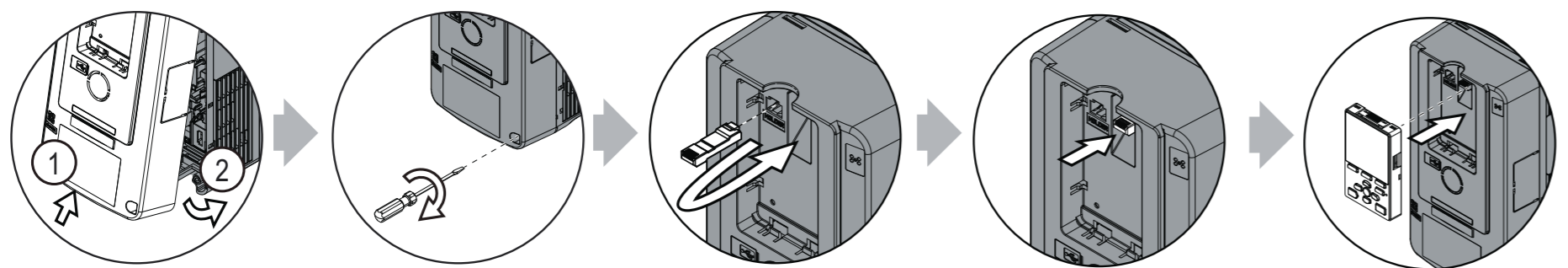
Refer to the Technical Reference (SIEPC71061737) for more information about GFCIs.



10 Remove the Tabs and Install the Wiring Cover



11 Install the Front Cover and Keypad



12 Determine the Correct Auto-Tuning Method

Motor Connection and Load Condition	
Use Stationary Auto-Tuning T1-01 = 1	Use Rotational Auto-Tuning T1-01 = 0

13 Collect and Record Auto-Tuning Data from Motor Nameplate

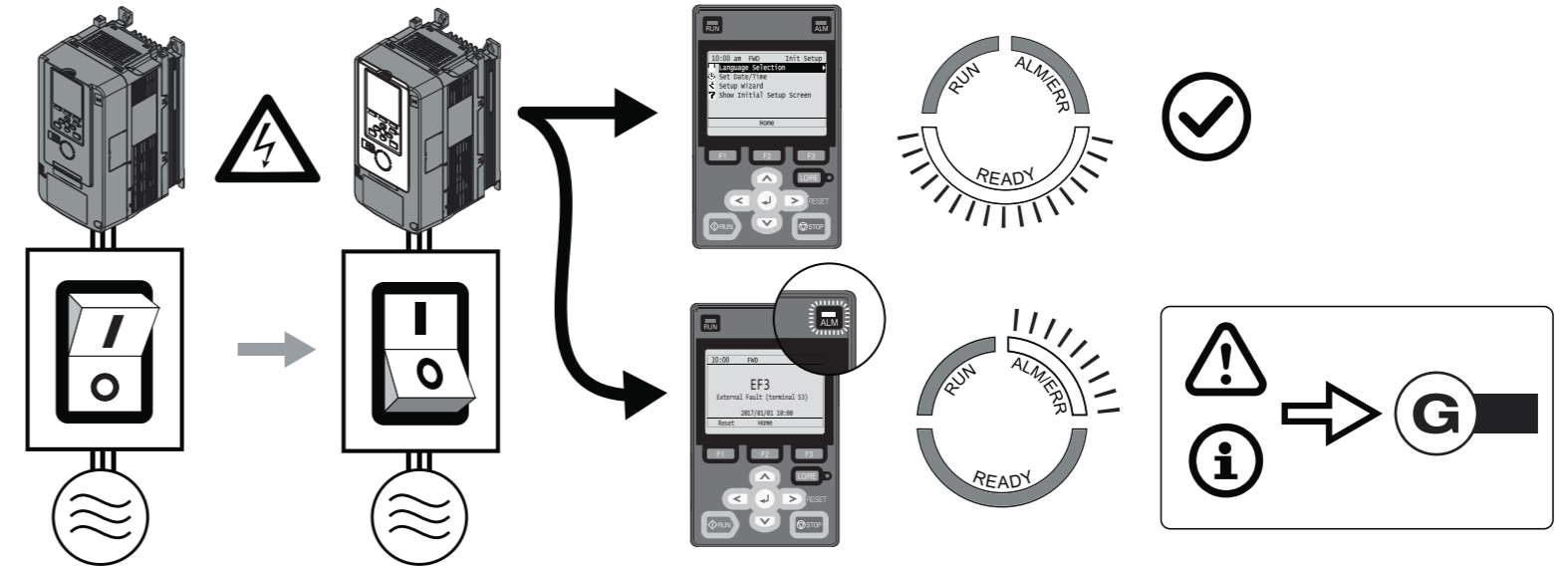
3 PHASE INVERTER DUTY AC INDUCTION MOTOR NAMEPLATE EXAMPLE

MODEL XX	123AAAA123XX-X0	X FRAME 123AX
POLES X	ENC XXX	CODE X
VOLTS XXX	FL RPM XXXX	DES A
SF 1.0	DUTY CONT	TYPE ABC
SERIAL	MAX RPM 4200	INS X0
	S.E. BRG. 309	TEMP. SENSORS T-STATS
	O.S.E. BRG. XXX	N.L. AMPS XX.X/X.X
		ROTOR WK? X.X
Hz	HP	RPM
1	0	0
60	XX	XXXX
120	XX	XXXX
OHMS PH.	R1: .XXX	R2: .XXX
	X1: X.XX	X2: X.XX
		XM: XX.X
P/N XXXXXXX		

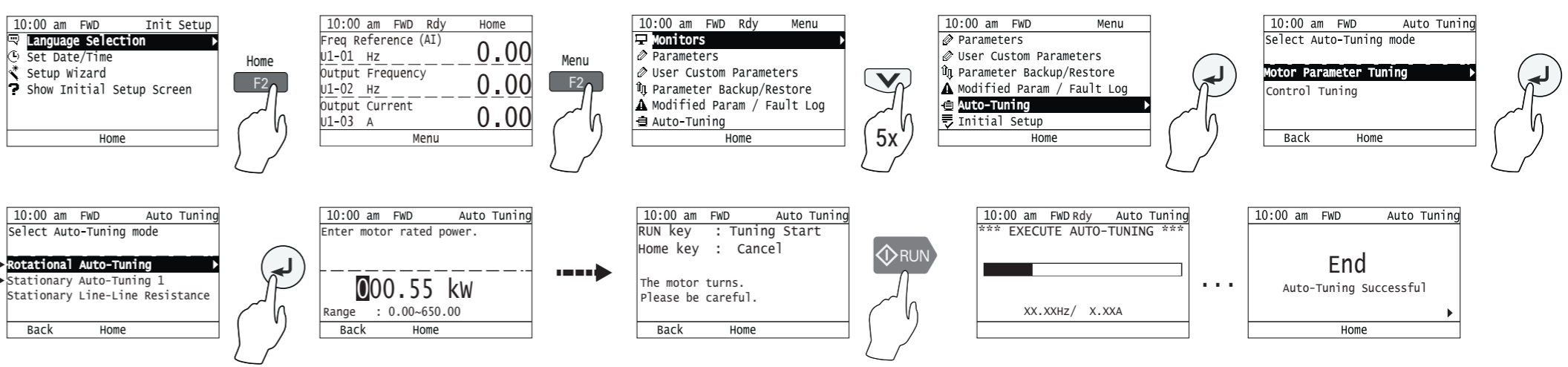
Reference	Motor Nameplate Data	Motor Nameplate Value	T1-xx Parameter (Ex-xx Parameter ¹)
A	Motor Rated Power	(HP x 0.746) kW	T1-02 (E2-11)
B	Motor Rated Voltage	V	T1-03 (E1-05)
C	Motor Rated Current (FLA)	A	T1-04 (E2-01)
D	Motor Rated Frequency (Base Frequency)	Hz	T1-05 (E1-04/E1-06)
E	Motor Pole Count	-	T1-06 (E2-04)
F	Motor Rated RPM	RPM	T1-07
G	Motor No-Load Current ²	A	T1-09 (E2-03)
-	Motor Rated Slip ³	0.000 Hz	T1-10 (E2-02)
-	Test Mode Selection ²	-	T1-12
-	Motor No-Load Voltage	V	T1-13

¹Auto-Tuning will automatically set the E1-xx and E2-xx parameters. You can manually adjust Ex-xx parameters after Auto-Tuning.
²These values are only necessary for Stationary Auto-Tuning (T1-01 = 1).
³If you do not know this value, leave at the default value of 0.000.

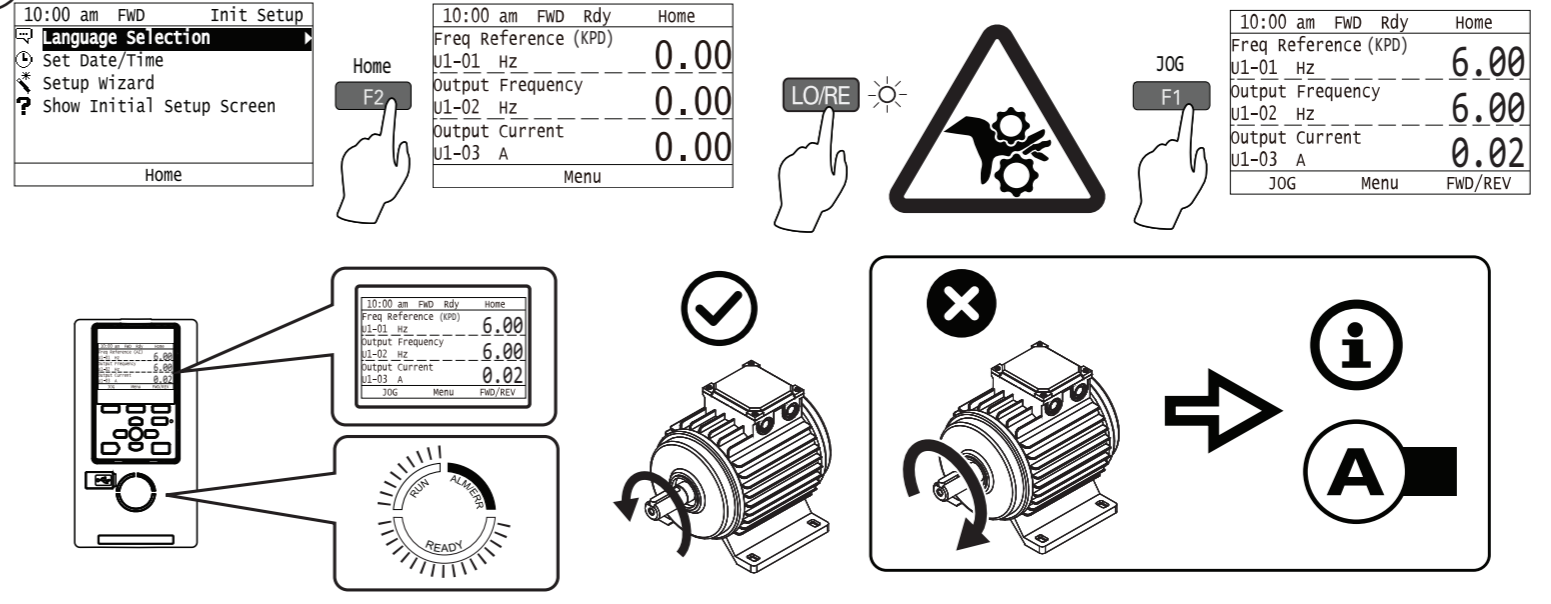
14 Energize the Drive and Confirm It Is Ready



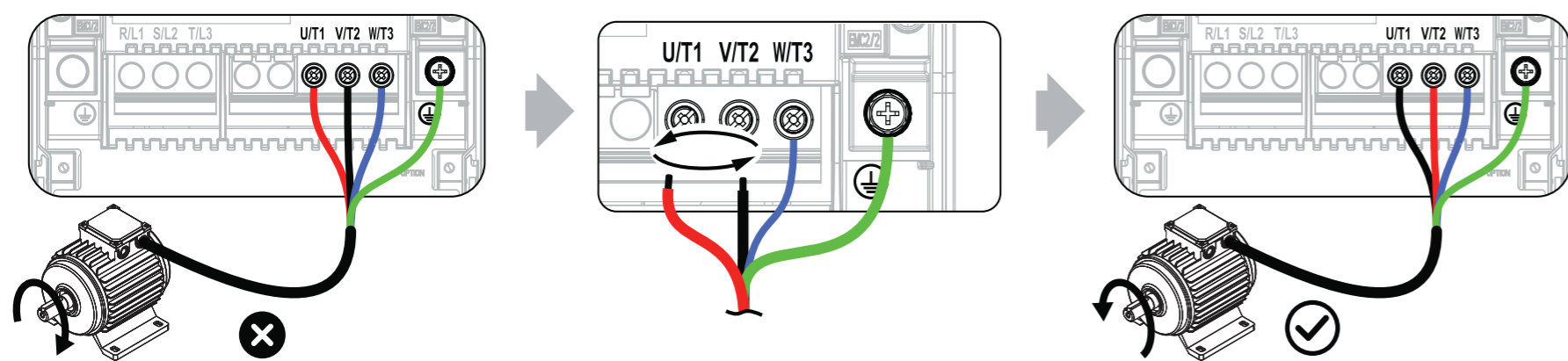
15 Use Auto-Tuning Data from Motor Nameplate to Set Parameters and Auto-Tune the Drive



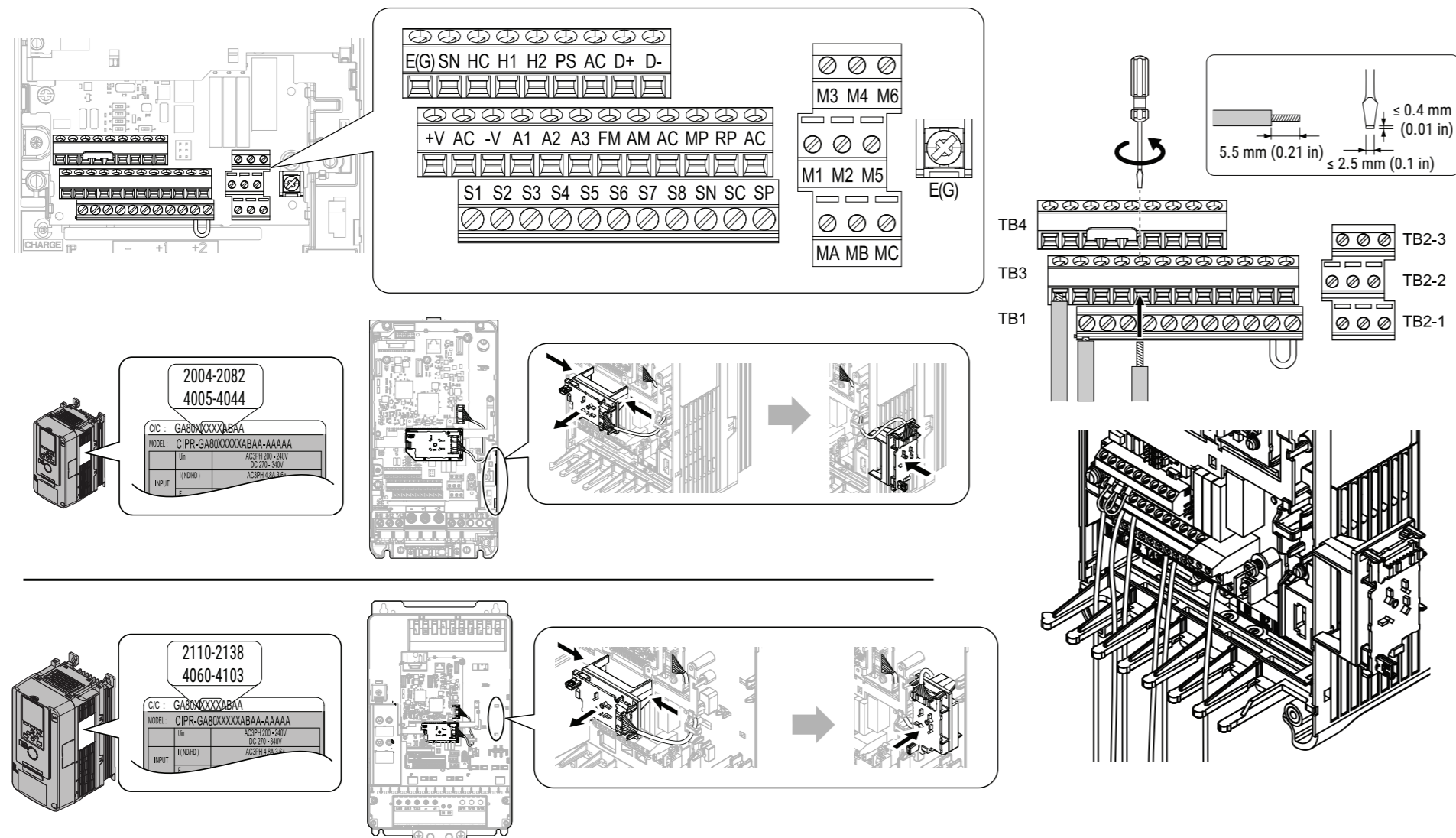
16 Set the Drive for LOCAL Control and Check the Motor Rotation Direction



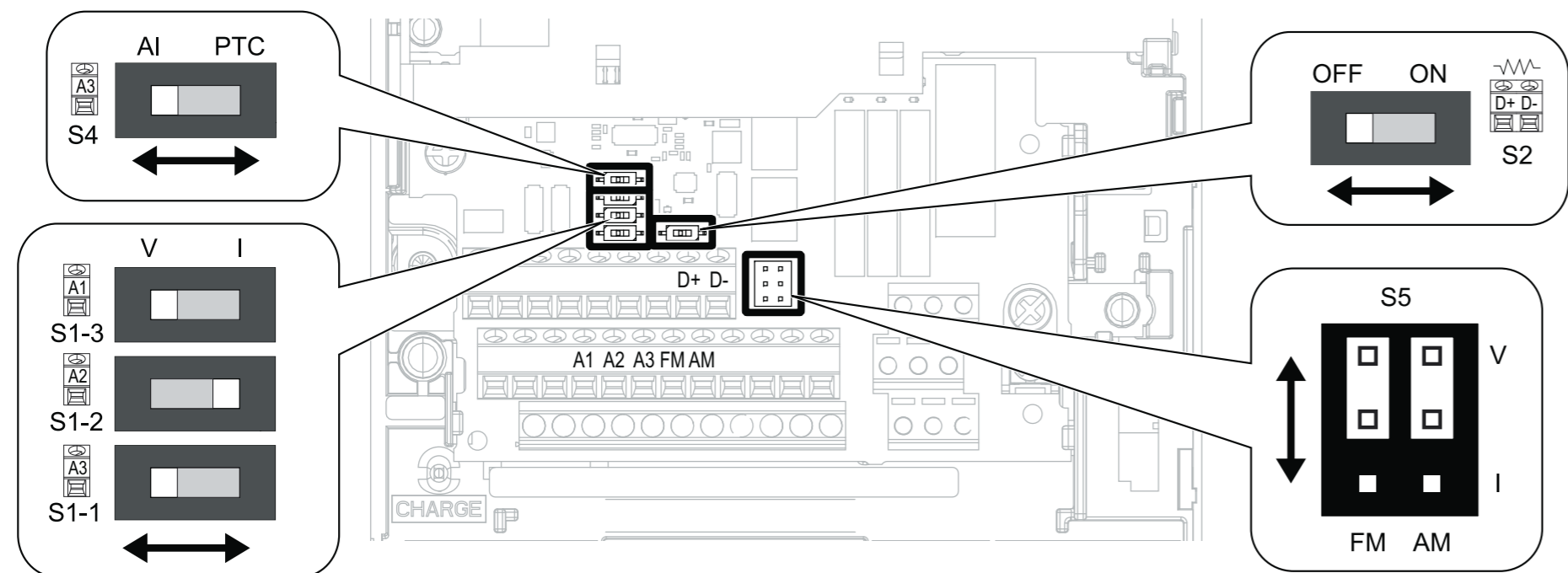
A If the Motor Does Not Rotate in the Correct Direction



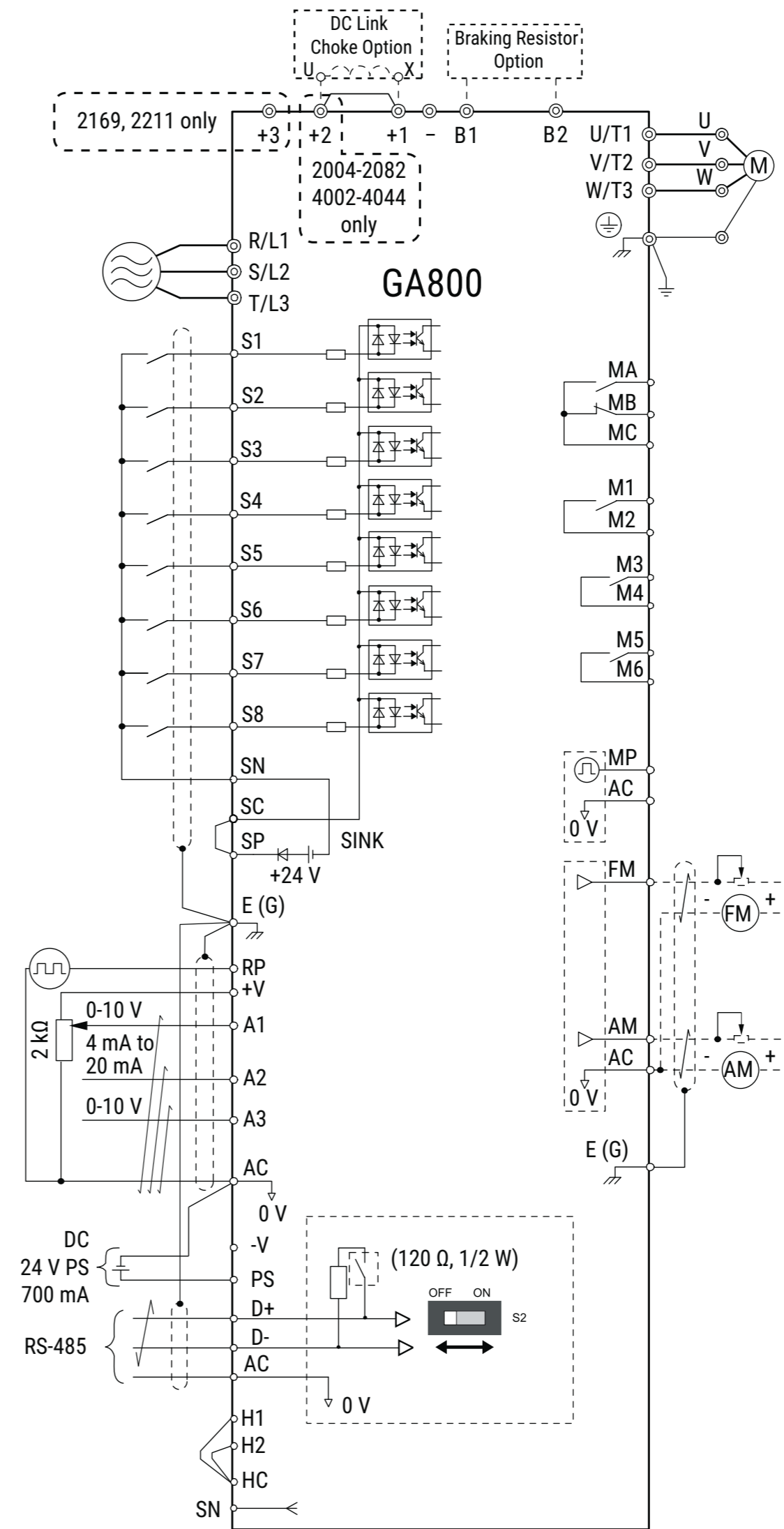
B Control Circuit Configuration and Accessibility



C Switches and Jumpers on the Control Board



D Connection Diagram and Terminal Functions



Terminal	Type	Signal Level	Default
S1	MFDI 1	Photocoupler 24 V, 6 mA	Forward run/Stop
S2	MFDI 2		Reverse run/Stop
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
S8	MFDI 8		Baseblock command
SN	MFDI power 0 V	24 V, 150 mA maximum	-
SC	MFDI common		-
SP	MFDI power + 24 VDC		-
H1	Safe disable input 1	24 V, 6 mA Internal impedance: 4.7 kΩ Minimum OFF time: 2 ms	-
H2	Safe disable input 2		-
HC	Safe disable common		-
RP	Master frequency reference pulse train input	Response frequency: 0 ~ 32 kHz H level duty: 30 ~ 70% H level voltage: 3.5 ~ 13.2 V L level voltage: 0.0 ~ 0.8 V Input impedance: 3 kΩ	-
+V	Frequency setting power supply	10.5 V (20 mA maximum)	-
-V	Frequency setting power supply	-10.5 V (20 mA maximum)	-
A1	MFAI 1	-10 V ~ +10 V/-100% ~ +100% 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	-10 V ~ +10 V/-100% ~ +100% 0 V ~ 10 V/100% (input impedance 20 kΩ) 4 mA ~ 20 mA/100% 0 mA ~ 20 mA/100% (input impedance 250 Ω)	Combined w/A1
A3	MFAI 3/PTC input	-10 V ~ +10 V/-100% ~ +100% 0 V ~ 10 V/100% (input impedance 20 kΩ) 4 mA ~ 20 mA/100% 0 mA ~ 20 mA/100% (input impedance 250 Ω) PTC input	Auxiliary frequency reference
AC	Common	0 V	-
E(G)	Connect shielded cable	-	-
MA	Fault relay out	30 VDC, 10 mA ~ 1 A 250 VAC, 10 mA ~ 1 A Minimum load: 5 V, 10 mA	Fault
MB	Fault relay out	30 VDC, 10 mA ~ 1 A 250 VAC, 10 mA ~ 1 A Minimum load: 5 V, 10 mA	Fault
MC	Common	0 V	-
M1	MFDO	30 VDC, 10 mA ~ 1 A 250 VAC, 10 mA ~ 1 A Minimum load: 5 V, 10 mA	During run
M2	MFDO		Zero speed
M3	MFDO		Speed agree 1
M4	MFDO	-	-
M5	MFDO	-	-
M6	MFDO	-	-
MP	Pulse train out	32 kHz maximum	Output frequency
FM	MFAO 1	0 V ~ +10 V/0% ~ 100%	Output frequency
AM	MFAO 2	-10 V ~ +10 V/-100% ~ +100% 4 mA ~ 20 mA	Output current
AC	Common	0 V	-
PS	External 24 V PS input	21.6 VDC ~ 26.4 VDC, 700 mA	-
AC	External 24 V PS ground	0V	-
D+	Communication +	MEMOBUS/Modbus, RS-485	-
D-	Communication -	115.2 kbps maximum	-
AC	Common	0 V	-

E If You Push the Run Button but the Motor Does Not Spin

The diagram illustrates the steps to resolve a 'no spin' issue. It shows the drive's keypad menu with parameters like Freq Reference (KPD) at 0.00 Hz and Output Frequency at 0.00 Hz. A 'LOPF' error is shown, which is resolved by setting the frequency to 10.00 Hz. The final state shows the motor spinning at 10 Hz.

F Parameter Groups

A: Initialization	d: Reference Settings	H: Terminal Functions	n: Special Adjustment	q: DriveWorksEZ Parameters
A1 Initialization	d1 Frequency Reference	H1 Digital Inputs	n1 Hunting Prevention	r: DriveWorksEZ Connections
A2 User Parameters	d2 Reference Limits	H2 Digital Outputs	n2 Auto Freq. Regulator (AFR)	T: Motor Tuning
b: Application	d3 Jump Frequency	H3 Analog Inputs	n3 High Slip/Overexcite Braking	U: Monitors
b1 Operation Mode Selection	d4 Freq. Ref. Up/Down & Hold	H4 Analog Outputs	n4 AOLV Tuning	U1 Operation Status Monitors
b2 DC Injection Braking and Short Circuit Braking	d5 Torque Control	H5 Modbus Communication	n5 Feed Forward Control	U2 Fault Trace
b3 Speed Search	d6 Field Weakening/Forcing	H6 Pulse Train Input/Output	n6 Online Tuning	U3 Fault History
b4 Timer Function	d7 Offset Frequency	H7 Virtual Inputs/Outputs	n7 EZ Drive	U4 Maintenance Monitors
b5 PID Control	E: Motor	L: Protection Functions	n8 PM Motor Control Tuning	U5 PID Monitors
b6 Dwell Function	E1 V/f Pattern for Motor 1	L1 Motor Protection	o: Keypad-Related Settings	U6 Operation Status Monitors
b7 Droop Control	E2 Motor 1 Parameters	L2 Power Loss Ride Through	o1 Keypad Display	U8 DriveWorksEZ Monitors
b8 Energy Saving	E3 V/f Pattern for Motor 2	L3 Stall Prevention	o2 Keypad Operation	
b9 Zero Servo	E4 Motor 2 Parameters	L4 Speed Detection	o3 Copy Keypad Function	
C: Tuning	E5 PM Motor Settings	L5 Fault Restart	o4 Maintenance Monitors	
C1 Accel & Decel Time	E9 Motor Setting	L6 Torque Detection	o5 Log Function	
C2 S-Curve Characteristics	F: Options	L7 Torque Limit		
C3 Slip Compensation	F1 PG Option Setup (Encoder)	L8 Drive Protection		
C4 Torque Compensation	F2 Analog Input Option	L9 Drive Protection 2		
C5 Auto Speed Regulator (CSR)	F3 Digital Input Option			
C6 Duty & Carrier Frequency	F4 Analog Output Option			
	F5 Digital Output Option			
	F6 Communication Option			
	F7 Ethernet Options			

G 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/toepc71061737	 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/toepyaiga8001	 PDF download

H Additional Resources

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