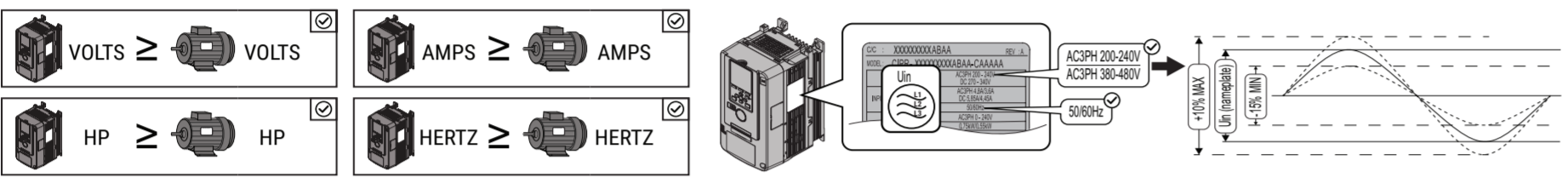
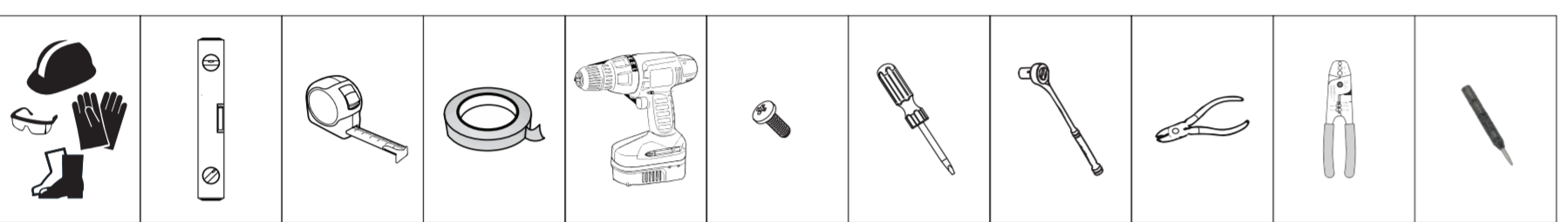


Read and follow the safety and installation procedures in the Installation & Primary Operation (TOEPC71061737) manual packaged with the drive.

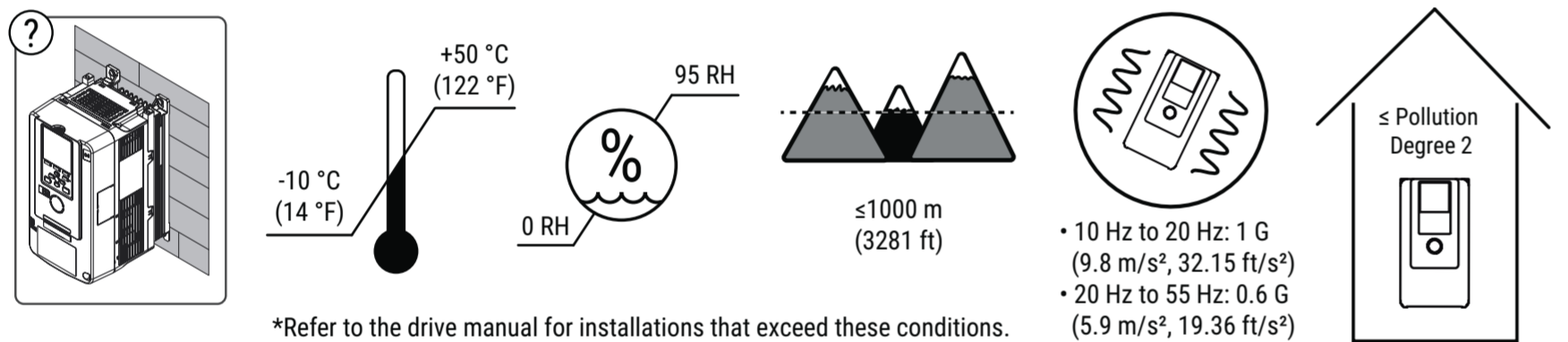
1 Confirm the Drive and Motor Specifications



2 Collect the Required Tools and Equipment

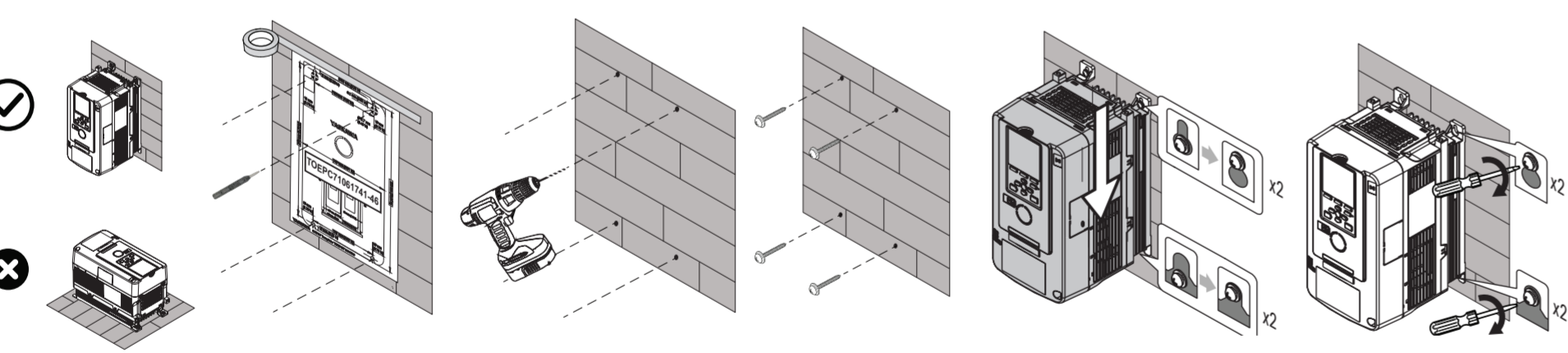


3 Confirm the Correct Drive Installation Environment*

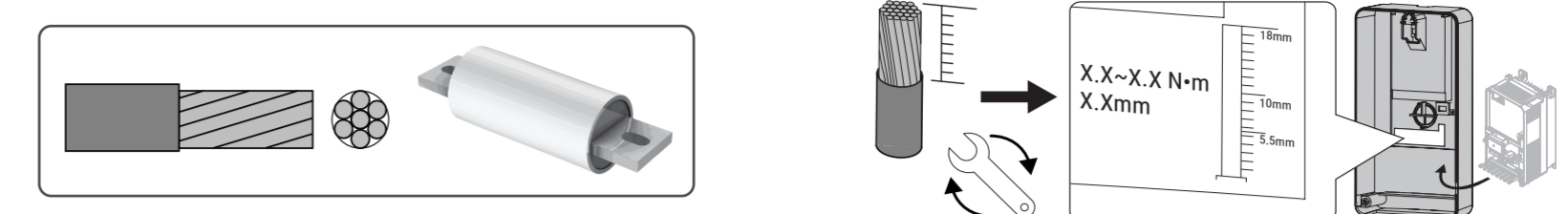
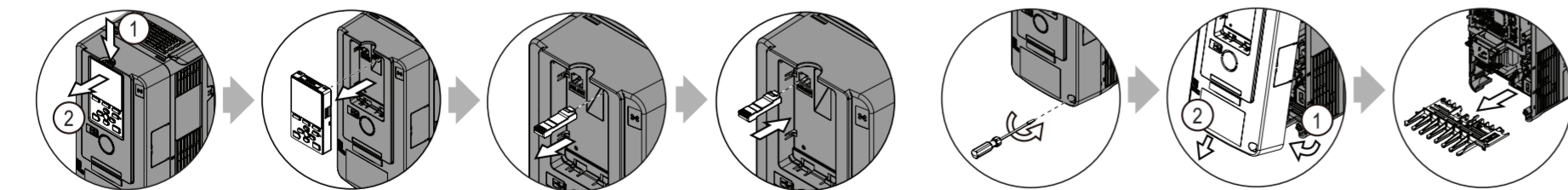


*Refer to the drive manual for installations that exceed these conditions.

4 Mount the Drive Vertically



5 Remove the Keypad, Front Cover, and Wiring Cover



UL Compliance: Install one of these types of short circuit protection devices to comply with UL 508C. Semiconductor protective type fuses are recommended, but the table also shows alternative short circuit protection devices. When you use MCCBs, RK1, or RK5 fuses as UL listed drive protection devices, you must mount the drive in a ventilated enclosure according to the minimum enclosure volume specified in this document.

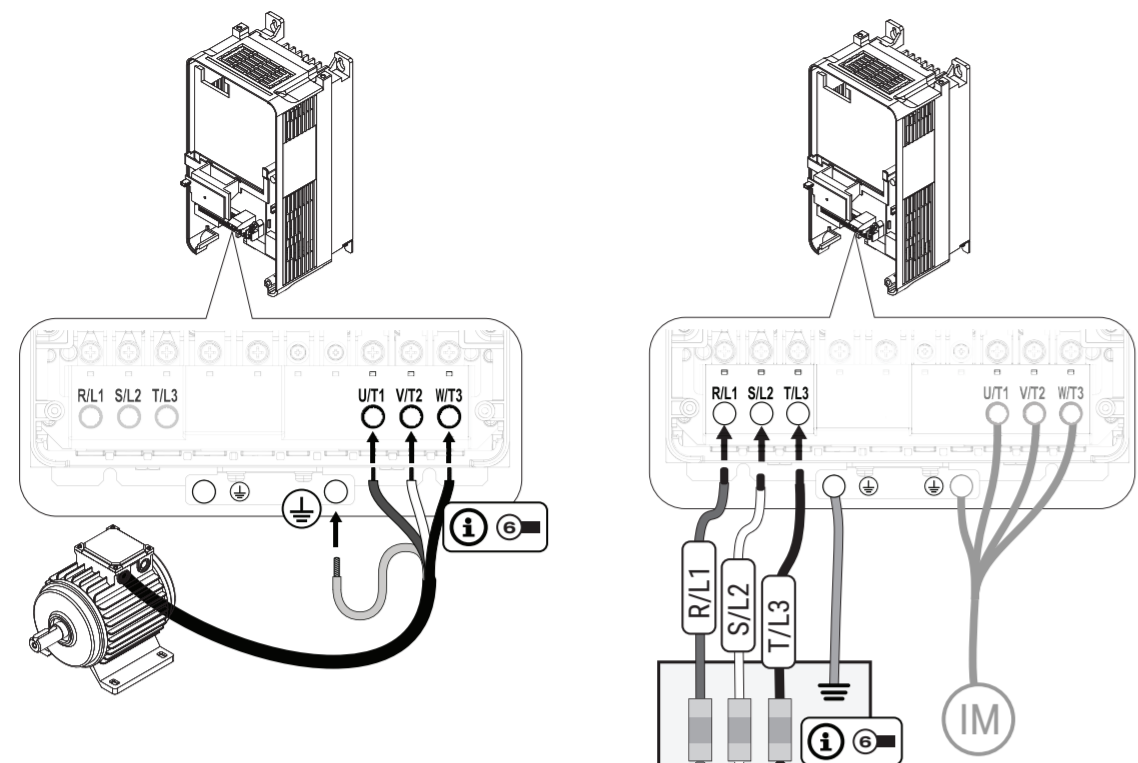
Molded Case Circuit Breaker (MCCB) and Non-Semiconductor Fuse Ratings: Maximum MCCB rating is 200% of the Normal-Duty drive full load output amp (FLA) rating. Maximum CC, J, T, RK1, or RK5 fuse rating is 175% of the Normal-Duty drive full load output amp (FLA) rating. You can substitute an alternate UL listed current limiting type MCCB where the peak let-through current and I²t of the alternate MCCB is not greater than the specified MCCB in this table.

Short Circuit Current Rating (SCCR): The maximum SCCR provided by drive and fuse, or drive and MCCB combinations in this document, is 100,000 RMS symmetrical amps. Use the protection specified in this document to prepare the drive for use on a circuit capable of delivering not more than 100,000 RMS symmetrical amps and not more than 240 Vac (240 V models) and 480 Vac (480 V models) when there is a short circuit in the power supply.

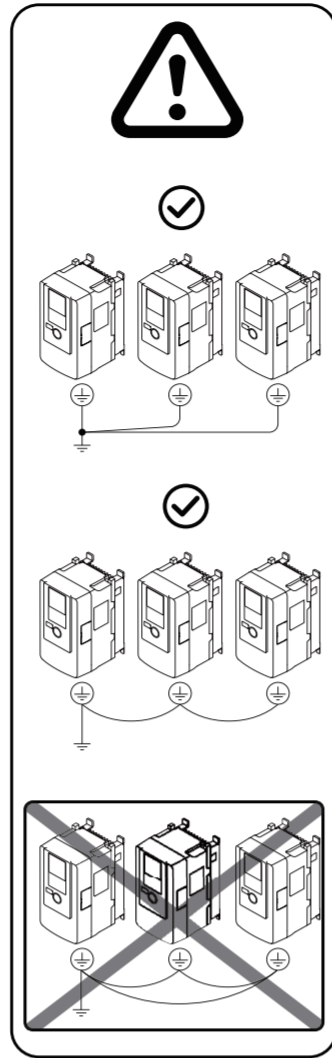
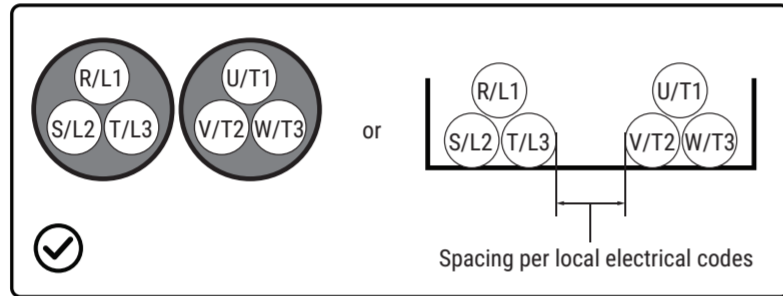
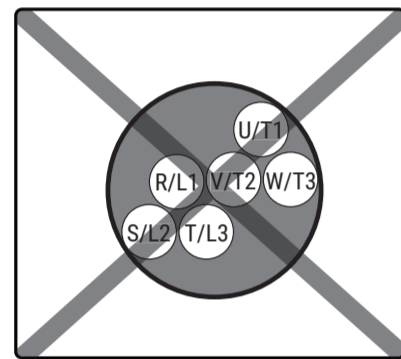
Model	R/L1, S/L2, T/L3	U/T1, V/T2, W/T3	—	+1	+2	+3	B1, B2	⊕	Semiconductor Fuse Manufacturer: Eaton/Bussmann Part Number **	Class CC, J, or T Fuse Maximum Size (Amps)	MCCB Maximum Size (Amps)	Class RK1 or RK5 Fuse Maximum Size (Amps)	Enclosure Volume Minimum Size (in ³)
Three-Phase 200 V Class													
2004									FWH-45B	7	15	7	4195
2006	14 - 6 (14)		14 - 3 (14)						FWH-45B	10	15	10	4195
2008									FWH-45B	12	15	12	4195
2010	14 - 6 (12)	14 - 6 (14)	14 - 3 (12)						FWH-45B	15	15	15	4195
2012	14 - 6 (10)	14 - 6 (12)	14 - 3 (10)				14 - 10 (14)	14 - 8 (10)	FWH-50B or FWH-80B	20	20	20	4195
2018	14 - 6 (10)	14 - 6 (10)	14 - 3 (8)						FWH-80B or FWH-100B	30	35	30	4195
2021	14 - 6 (8)	14 - 6 (10)						12 - 8 (10)	FWH-80B or FWH-100B	35	40	35	4195
2030	14 - 6 (6)	14 - 6 (8)	14 - 3 (6)			n/a	14 - 10 (12)	10 - 8 (8)	FWH-100B or FWH-125B	50	60	50	4195
2042	14 - 6 (6)		14 - 3 (3)				14 - 10 (10)		FWH-150B	70	80	70	4195
2056	8 - 3 (3)	10 - 4 (4)	8 - 1 (1)					8 - 6 (6)	FWH-200B	90	110	90	4195
2070	6 - 1 (1)	6 - 3 (3)	14 - 1/0 (1/0)				14 - 8 (8)		FWH-200B or FWH-225A	110	125	110	4195
2082	6 - 1/0 (1/0)	6 - 2 (2)	14 - 2/0 (2/0)				14 - 6 (6)	6 - 4 (6)	FWH-225A or FWH-250A	125	150	125	4195
2110	6 - 1/0 (1/0)	2 - 2/0 (2/0)					10 - 4 (4)		FWH-225A or FWH-250A	175	200	175	10121
2138	2 - 2/0 (2/0)	2 - 4/0 (4/0)				n/a	10 - 3 (3)	4 (4)	FWH-275A or FWH-300A	225	250	225	10121
2169	2/0 - 250 (4/0)	3/0 - 300 (4/0)	1/0 - 2/0 (1)				1 - 2/0 (1/0)		FWH-275A or FWH-350A	250	300	250	10121
2211	2/0 - 250 (250)	3/0 - 300 (300)	1/0 - 2/0 (2/0)				1 - 2/0 (2/0)	4 - 1/0 (4)	FWH-325A or FWH-450A	350	400	350	10121
Three-Phase 400 V Class													
4002								14 - 8 (12)	FWH-40B or FWH-50B	3.5	15	3.5	4195
4004	14 - 6 (14)		14 - 3 (14)						FWH-50B	7	15	7	4195
4005									FWH-50B	9	15	9	4195
4007									FWH-60B	12	15	12	4195
4009			14 - 3 (12)					14 - 8 (10)	FWH-60B	15	15	15	4195
4012	14 - 6 (12)	14 - 6 (14)	14 - 3 (10)						FWH-60B	20	20	20	4195
4018	14 - 6 (10)		14 - 3 (8)						FWH-80B	30	35	30	4195
4023	14 - 6 (8)	14 - 6 (10)	14 - 3 (8)				14 - 10 (12)	12 - 8 (10)	FWH-90B	40	45	40	4195
4031	8 - 3 (6)	10 - 4 (8)	8 - 1 (6)				14 - 8 (10)	10 - 6 (8)	FWH-125B or FWH-150B	50	60	50	4195
4038	8 - 3 (6)	10 - 4 (8)	8 - 1 (4)				14 - 8 (10)	10 - 6 (6)	FWH-200B	60	75	60	4195
4044	10 - 4 (4)	10 - 6 (6)	10 - 3 (3)						FWH-200B	70	80	70	4195
4060	10 - 4 (4)		10 - 3 (3)				14 - 8 (8)	8 - 4 (6)	FWH-225A	100	110	100	4195
4075	12 - 3 (3)		10 - 2 (2)					6 - 4 (6)	FWH-250A	125	150	125	10121
4089	10 - 2 (2)		6 - 1/0 (1/0)				14 - 6 (6)		FWH-250A or FWH-275A	150	175	150	10121
4103	2 - 2/0 (1/0)	2 - 2/0 (1)	2 - 4/0 (2/0)			n/a	10 - 3 (3)	6 - 4 (4)	FWH-250A or FWH-275A	175	200	175	10121
4140	2/0 - 250 (3/0)	3/0 - 300 (2/0)	1/0 - 2/0 (2)				1 - 2/0 (1)	4 - 1/0 (4)	FWH-300A	225	250	225	10121
4168	2/0 - 250 (4/0)	3/0 - 300 (4/0)	1/0 - 2/0 (1/0)				1 - 2/0 (1/0)	4 - 1/0 (4)	FWH-325A or FWH-400A	250	300	250	10121

** When you use semiconductor fuses for the drive with UL Type 1 Kit, install the drive in a supplemental enclosure. The UL Type 1 Kit does not support internal fuses for these drive models.

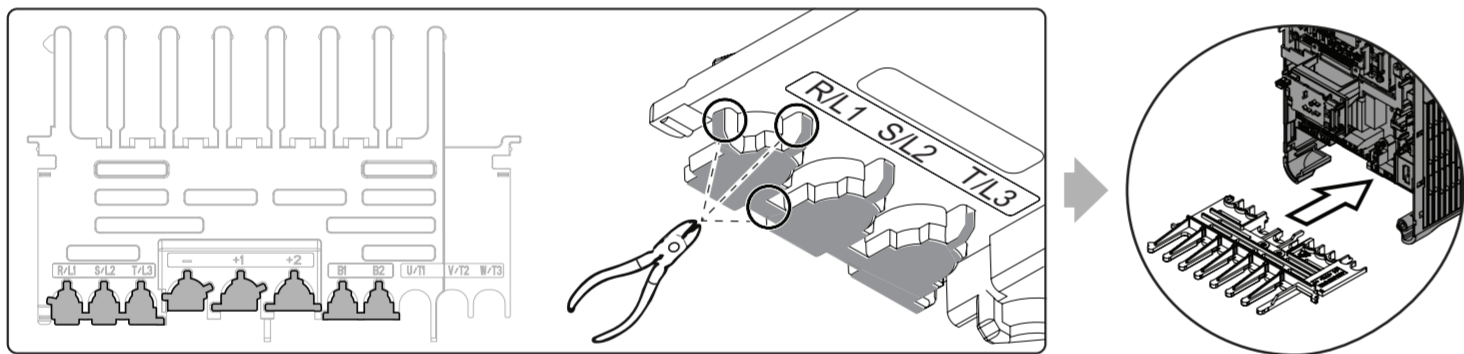
7 Install the Motor Wiring and Power Wiring



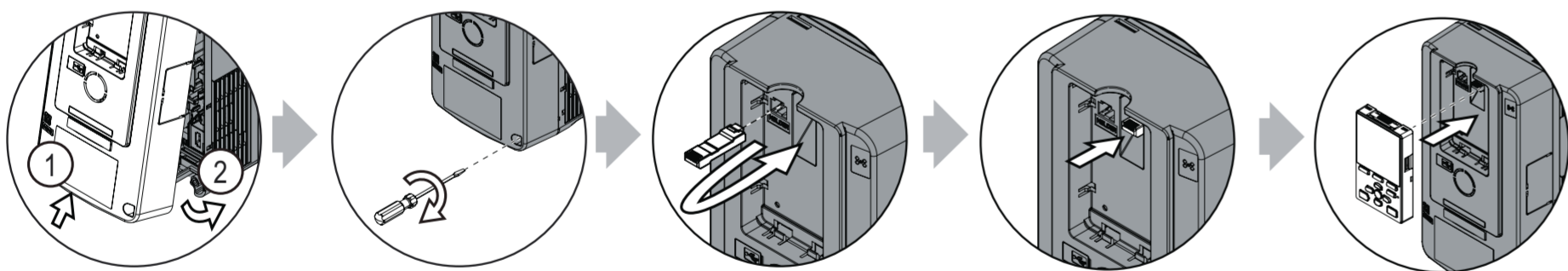
Refer to the Technical Reference (SIEPC71061737) for more information about GFCIs.



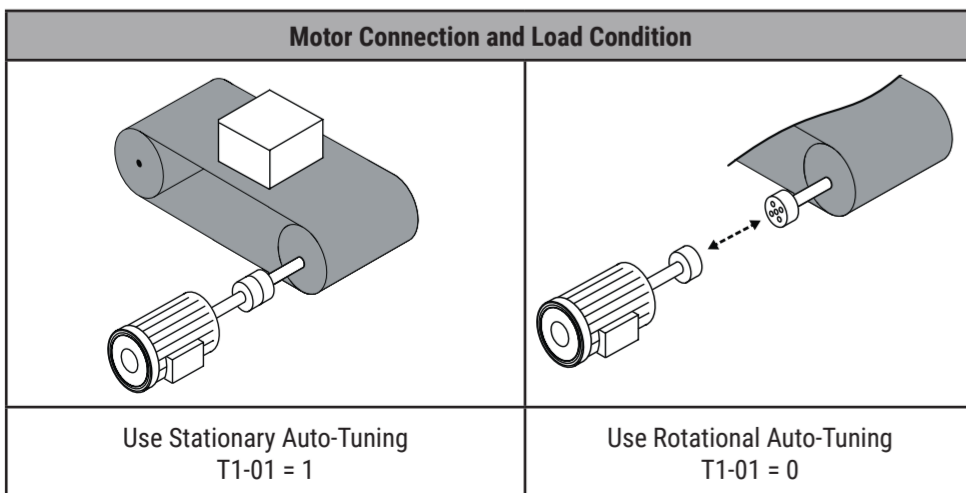
8 Remove the Tabs and Install the Wiring Cover



9 Install the Front Cover and Keypad



10 Determine the Correct Auto-Tuning Method



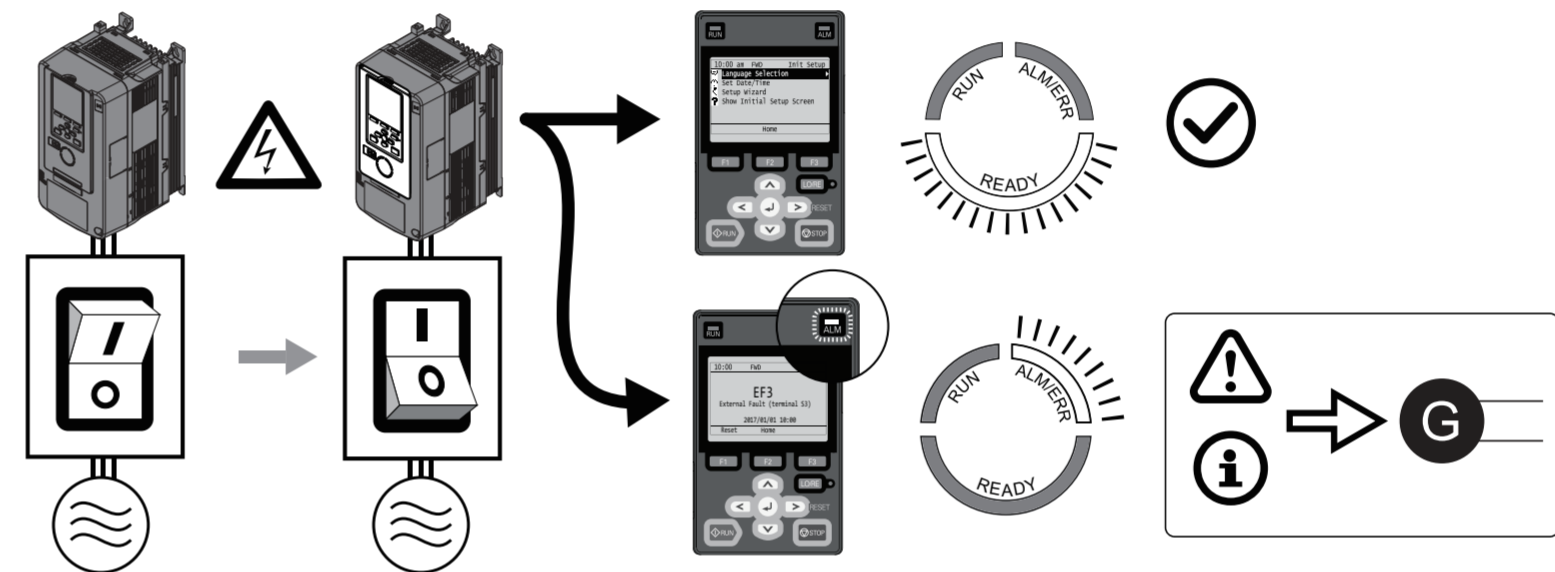
11 Collect and Record Auto-Tuning Data from Motor Nameplate

3 PHASE INVERTER DUTY AC INDUCTION MOTOR NAMEPLATE EXAMPLE					
MODEL XX	123AAAA123XX-X0	X	FRAME 123AX		
POLES X	ENC XXX	CODE X	DES A	TYPE ABC	INS X0
VOLTS XXX	FL RPM XXXX	FL AMPS XX/XX			
SF 1.0	DUTY CONT	MAX AMB °C XX	TEMP. SENSORS	T-STATS	
SERIAL		N.L. AMPS XX.X/XX.X			
MAX RPM 4200	S.E. BRG. 309	U.S.E. BRG. XXX	ROTOR WK? X.X		
HZ	HP	RPM	TORQUE (LB FT)	VOLTS (HIGH CONN)	AMPS (HIGH CONN)
1	XX	0	XX.X	XXX	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					

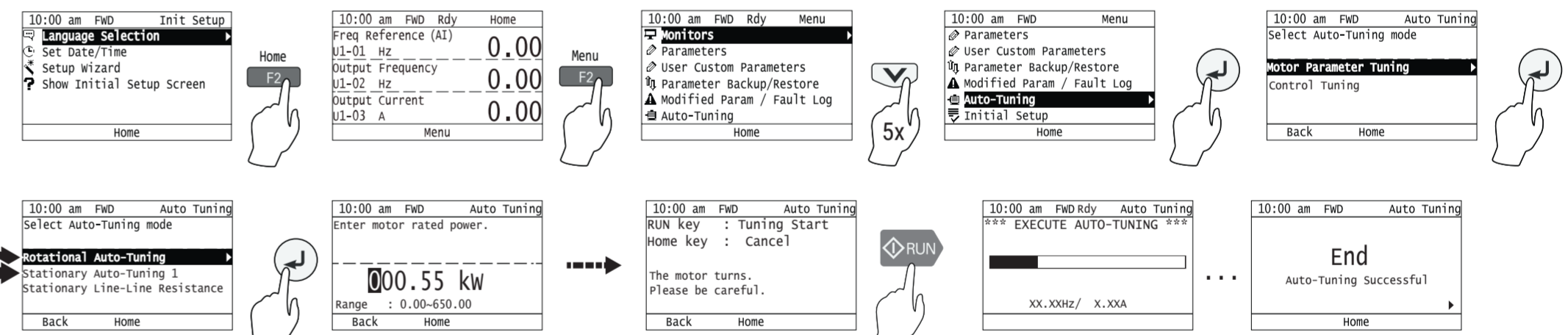
Reference	Motor Nameplate Data	Motor Nameplate Value	T1-xx Parameter (Ex-xx Parameter *)
A	Motor Rated Power	(HP x 0.746) kW	T1-02 (E2-11)
B	Motor Rated Voltage	V	T1-03 (E1-05)
C	Motor Rated Current (FLA)	A	T1-04 (E2-01)
D	Motor Rated Frequency (Base Frequency)	Hz	T1-05 (E1-04/E1-06)
E	Motor Pole Count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

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

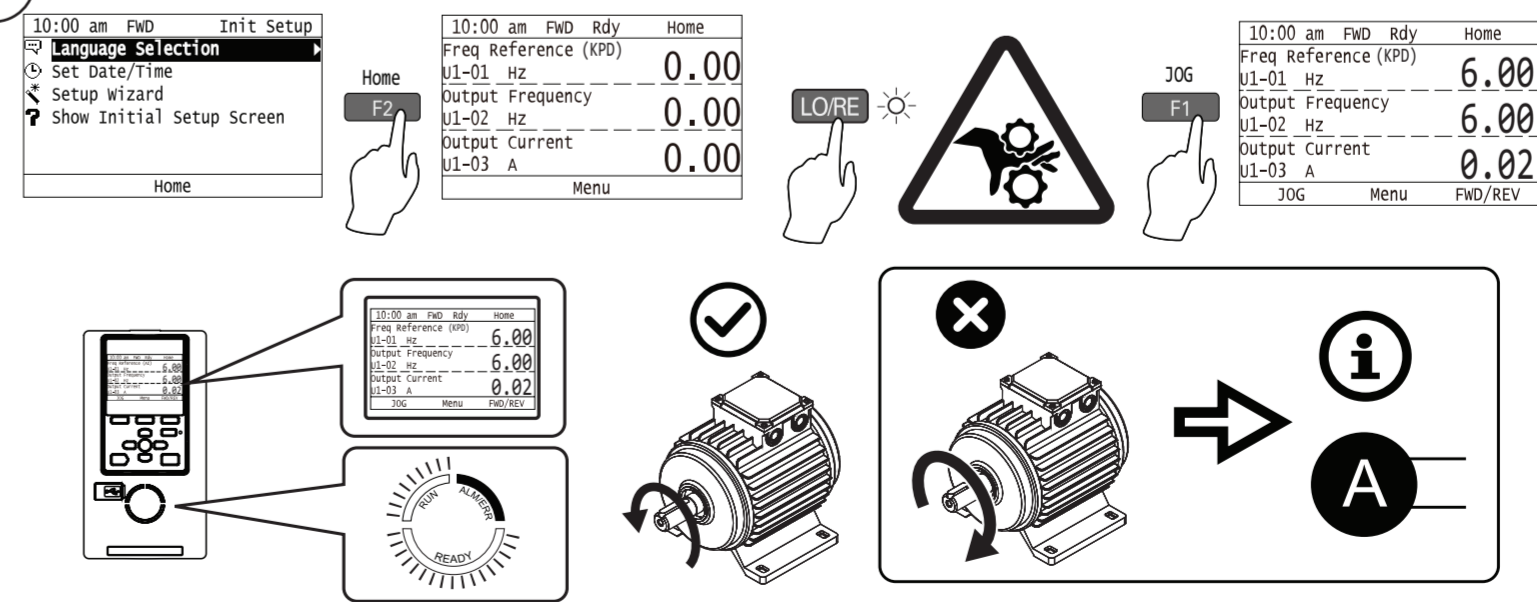
12 Energize the Drive and Confirm It Is Ready



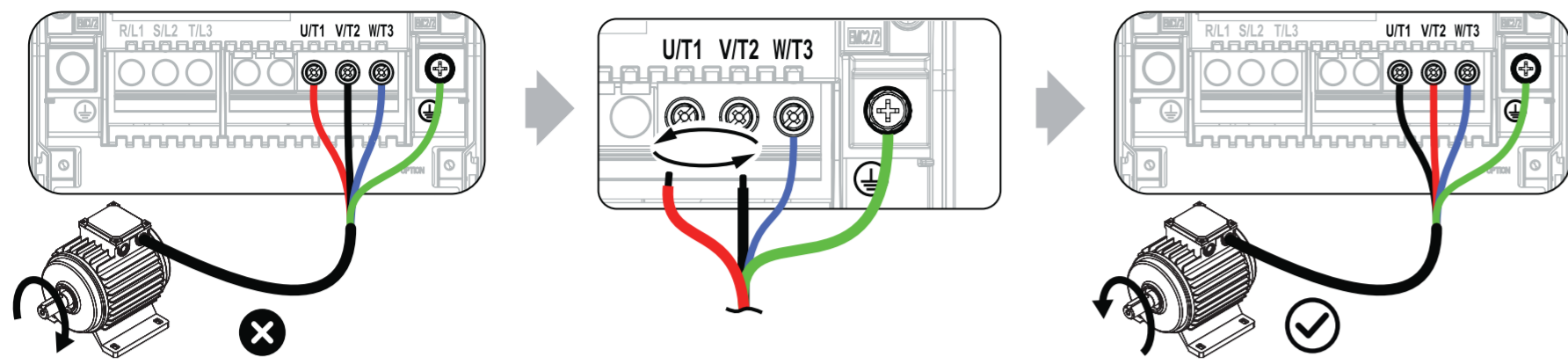
13 Use Auto-Tuning Data from Motor Nameplate to Set Parameters and Auto-Tune the Drive



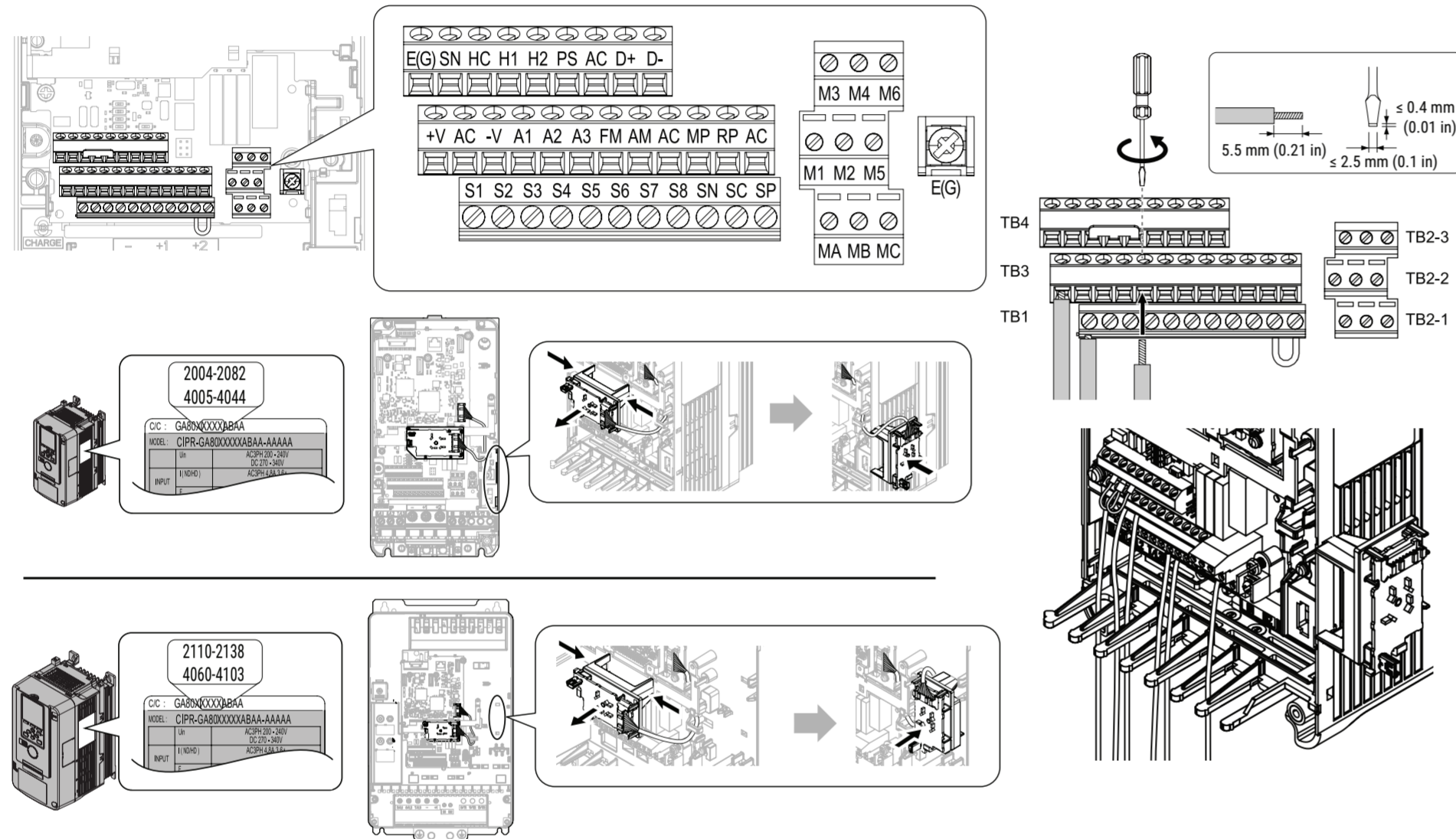
14 Set the Drive for LOCAL Control and Check the Motor Rotation Direction



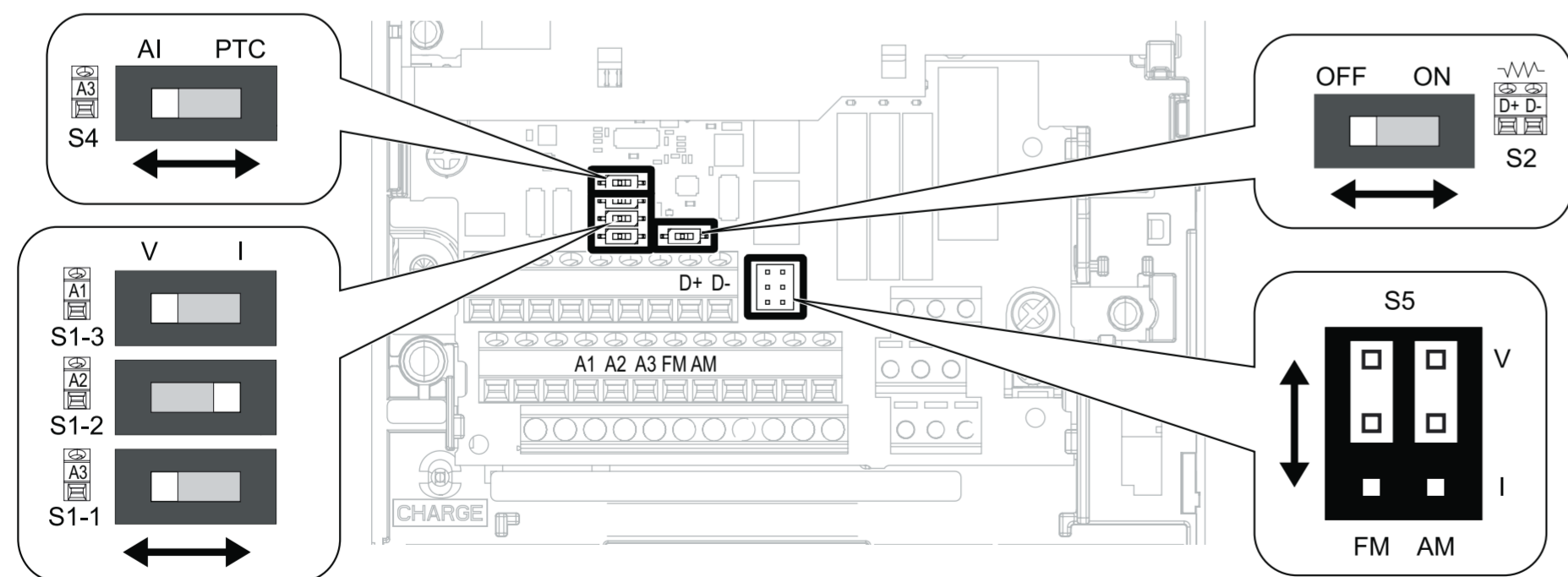
A If the Motor Does Not Rotate in the Correct Direction



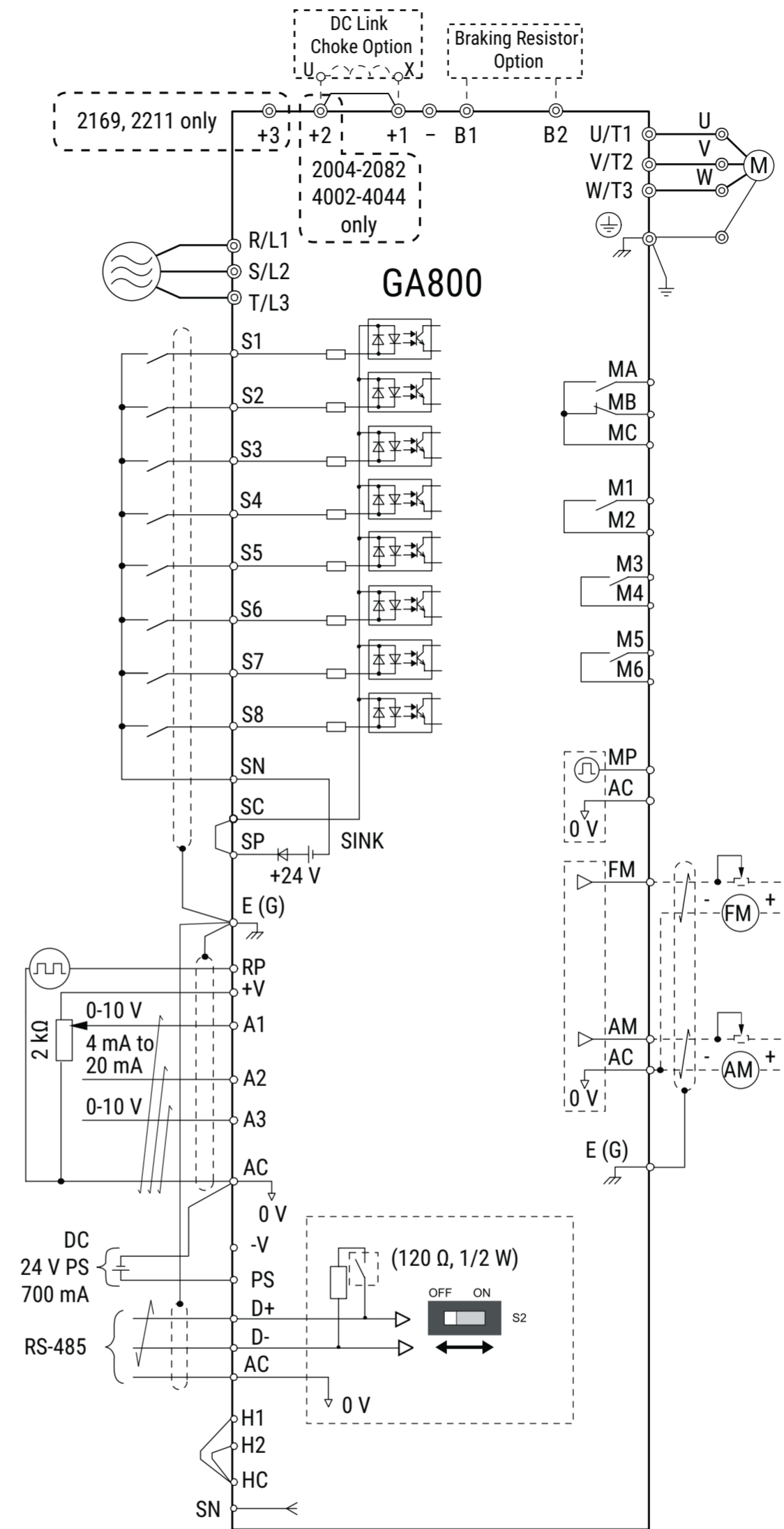
B Control Circuit Configuration and Accessibility



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%	Master frequency reference
A2	MFAI 2	4 mA ~ 20 mA/100% 0 mA ~ 20 mA/100% (input impedance 20 kΩ)	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	Fault
MB	Fault relay out	Minimum load: 5 V, 10 mA	Fault
MC	Common	-	-
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 'Run' button press without motor rotation. It shows the keypad menu with 'Language Selection' highlighted, followed by 'Init Setup' and 'Parameters' screens. The 'Parameters' screen shows 'Reference 1 d1-01' being set to '10.00 Hz'. A 'RUN' button is shown being pressed, and the motor is shown with a '10 Hz' label and a checkmark, indicating successful operation.

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