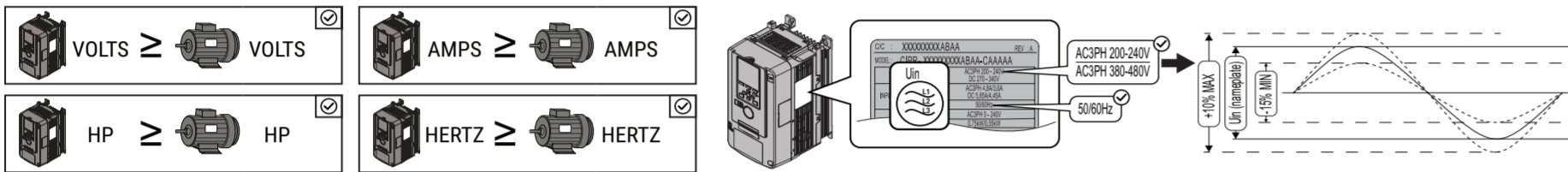
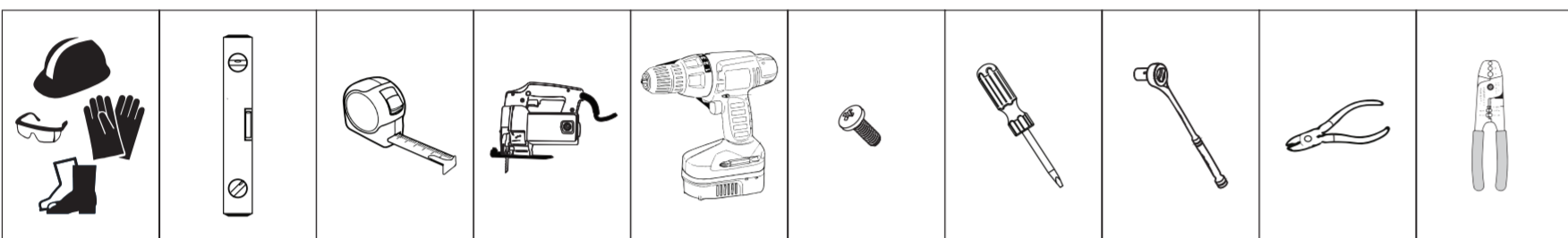


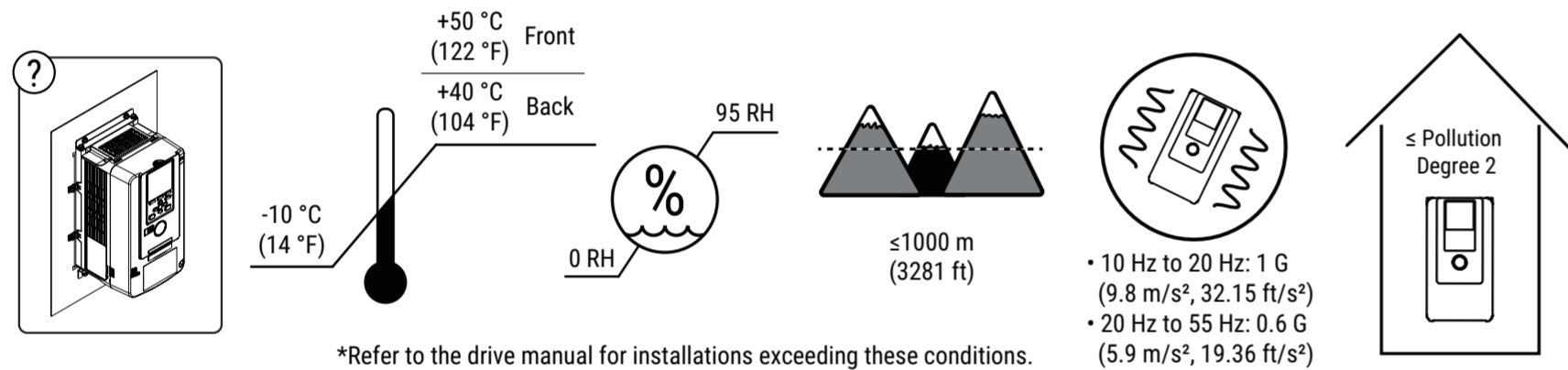
1 Confirm the Drive and Motor Specifications



2 Collect the Required Tools and Equipment

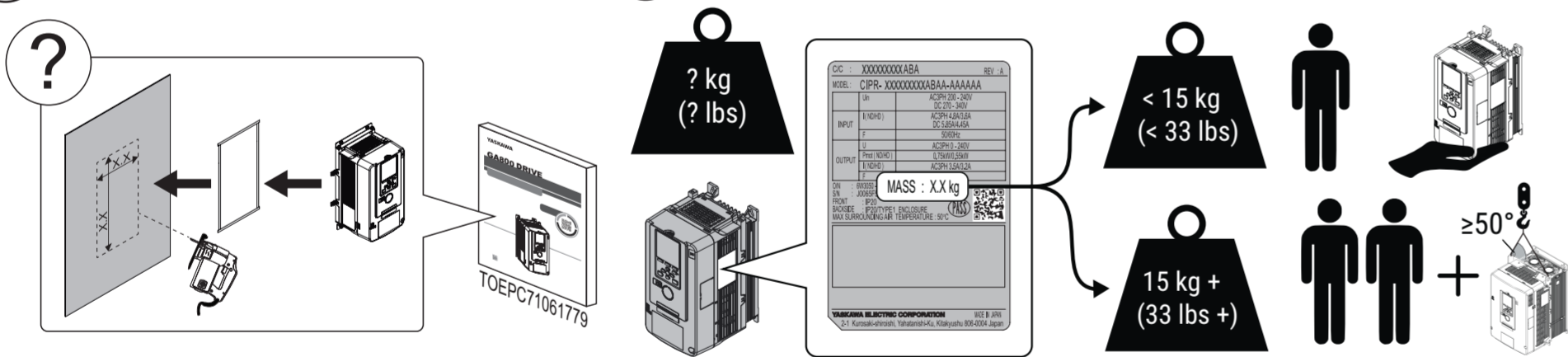


3 Confirm the Correct Drive Installation Environment

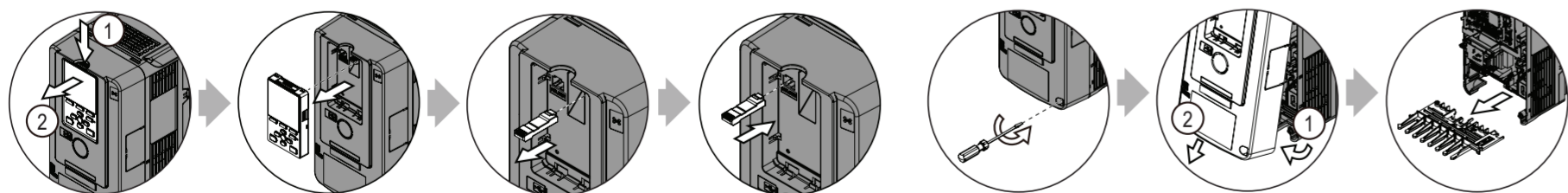


4 Cut an Opening and Install the Drive

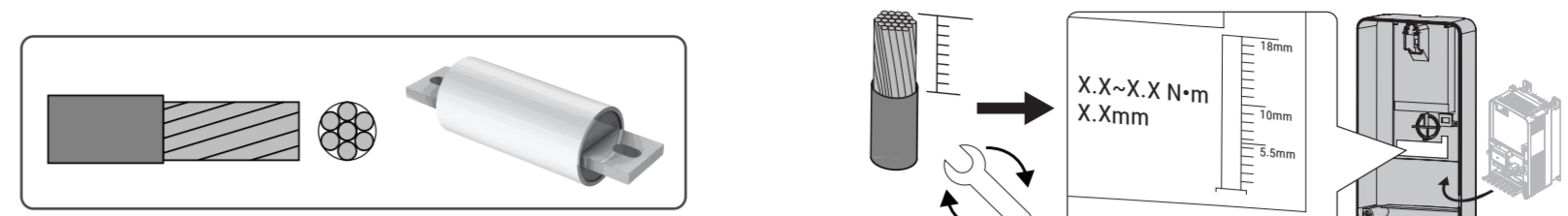
5 Correctly Lift the Drive



6 Remove the Keypad, Front Cover, and Wiring Cover



7 Select the Correct Wires, Wire Strip Length, Tightening Torque, and Branch Circuit Protection



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.

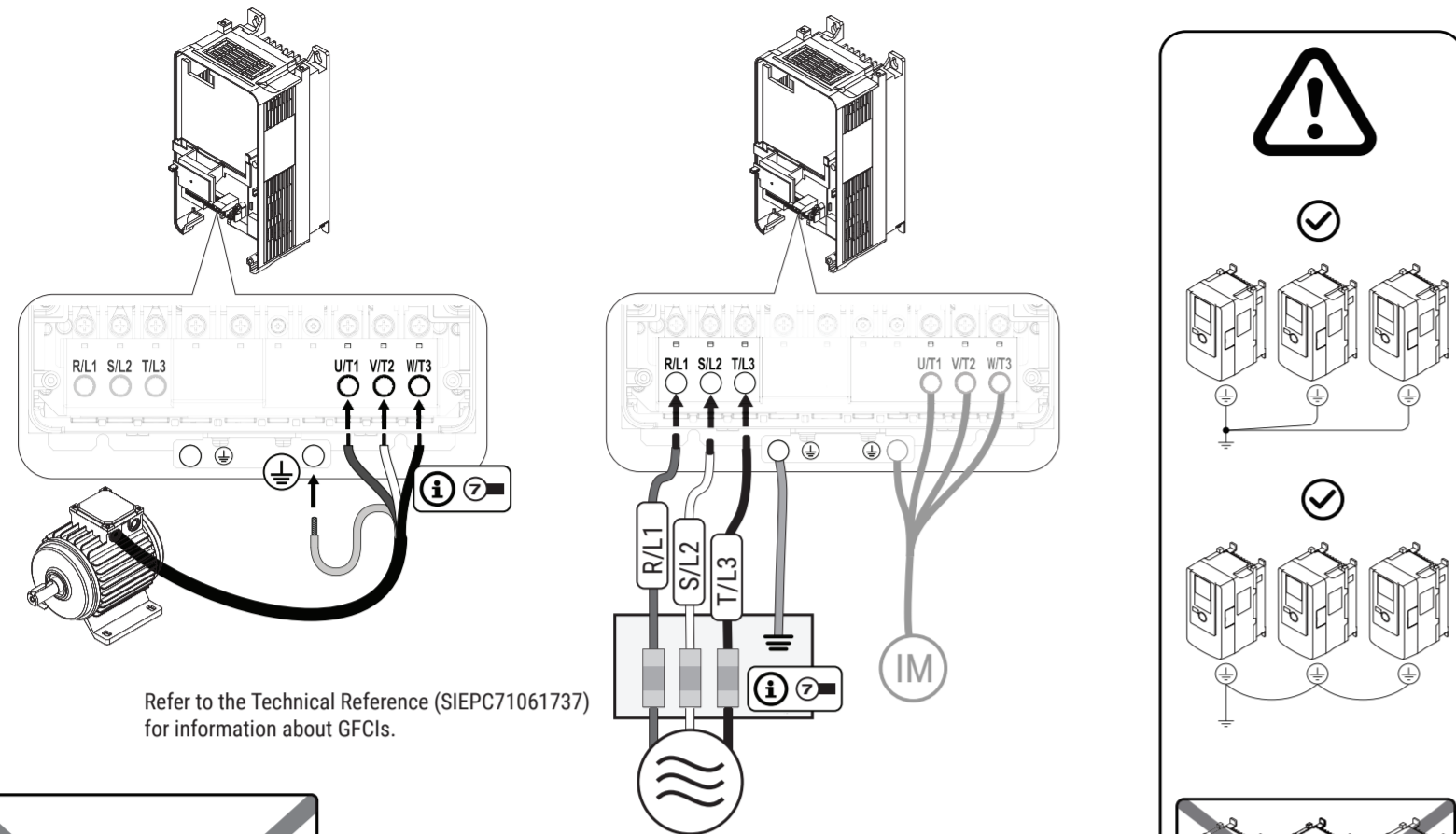
Molded Case Circuit Breaker (MCCB) and Non-Semiconductor Fuse Ratings: Maximum MCCB rating is 200% of the Normal-Duty drive full load output amp (FLA) rating. Maximum CC, J, T, RK1, or RK5 fuse rating is 175% of the Normal-Duty drive full load output amp (FLA) rating. You can substitute an alternate 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.

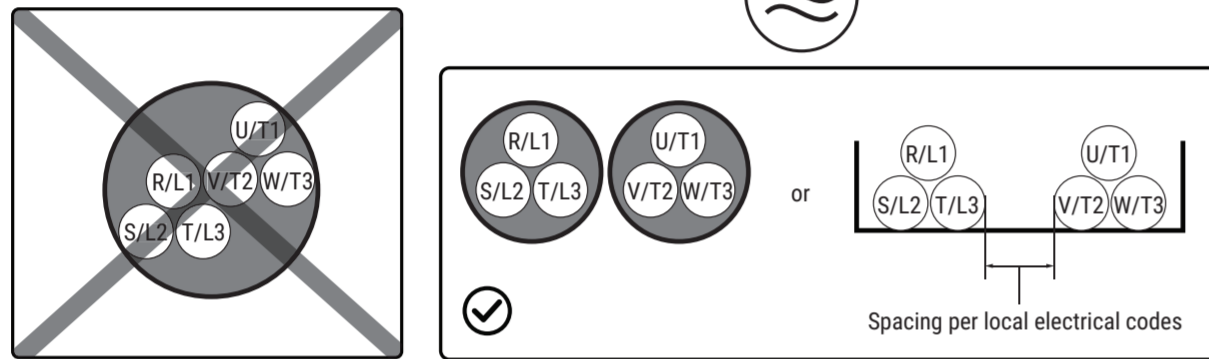
Model	R/L1, S/L2, T/L3	U/T1, V/T2, W/T3	—	+1	+2	+3	B1, B2	⊕	Semiconductor Fuse Manufacturer: Eaton/Bussmann Part Number *1	Class CC, J, or T Fuse Maximum Size (Amps)	MCCB	Class RK1 or	Enclosure Volume
											Maximum Size (Amps)	RK5 Fuse Maximum Size (Amps)	
AWG (Recommended Value in Parentheses)													
Three-Phase 200 V Class													
2004													
2006	14 - 6 (14)			14 - 3 (14)									
2008													
2010	14 - 6 (12)	14 - 6 (14)		14 - 3 (12)									
2012	14 - 6 (10)	14 - 6 (12)		14 - 3 (10)									
2018	14 - 6 (10)	14 - 6 (10)											
2021	14 - 6 (8)	14 - 6 (10)		14 - 3 (8)									
2030	14 - 6 (6)	14 - 6 (8)		14 - 3 (6)									
2042	14 - 6 (6)			14 - 3 (3)									
2056	8 - 3 (3)	10 - 4 (4)		8 - 1 (1)									
2070	6 - 1 (1)	6 - 3 (3)		14 - 1/0 (1/0)									
2082	6 - 1/0 (1/0)	6 - 2 (2)		14 - 2/0 (2/0)									
2110	6 - 1/0 (1/0)		2 - 2/0 (2/0)										
2138	2 - 2/0 (2/0)		2 - 4/0 (4/0)										
2169	2/0 - 250 (4/0)	3/0 - 300 (4/0)	1/0 - 2/0 (1)										
2211	2/0 - 250 (250)	3/0 - 300 (300)	1/0 - 2/0 (2/0)										
Three-Phase 400 V Class													
4002													
4004													
4005	14 - 6 (14)			14 - 3 (14)									
4007													
4009				14 - 3 (12)									
4012	14 - 6 (12)	14 - 6 (14)		14 - 3 (10)									
4018	14 - 6 (10)			14 - 3 (8)									
4023	14 - 6 (8)	14 - 6 (10)		14 - 3 (8)									
4031	8 - 3 (6)	10 - 4 (8)		8 - 1 (6)									
4038	8 - 3 (6)	10 - 4 (8)		8 - 1 (4)									
4044	10 - 4 (4)	10 - 6 (6)		10 - 3 (3)									
4060	10 - 4 (4)			10 - 3 (3)									
4075	12 - 3 (3)			10 - 2 (2)									
4089	10 - 2 (2)			6 - 1/0 (1/0)									
4103	2 - 2/0 (1/0)	2 - 2/0 (1)	2 - 4/0 (2/0)										
4140	2/0 - 250 (3/0)	3/0 - 300 (2/0)	1/0 - 2/0 (2)										
4168	2/0 - 250 (4/0)	3/0 - 300 (4/0)	1/0 - 2/0 (1/0)										

*1 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.

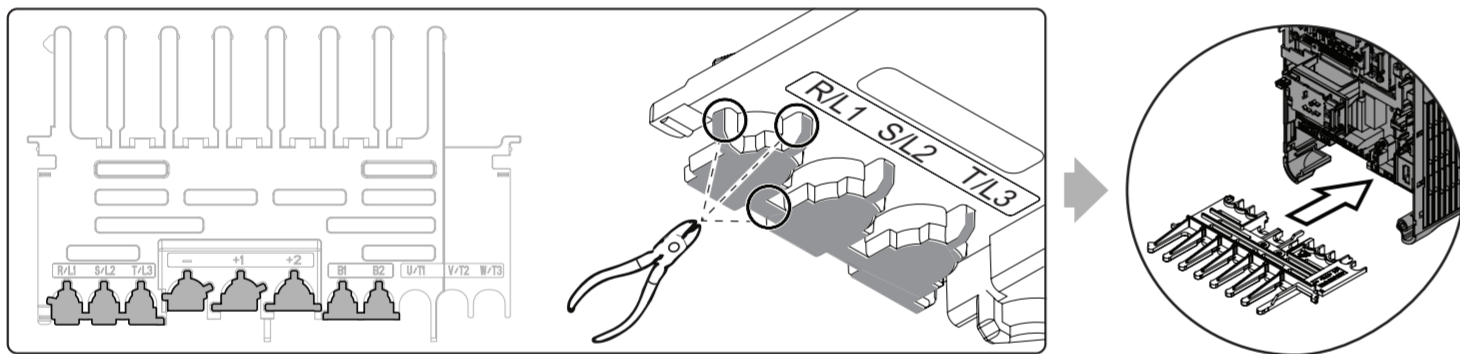
8 Install the Motor Wiring and Power Wiring



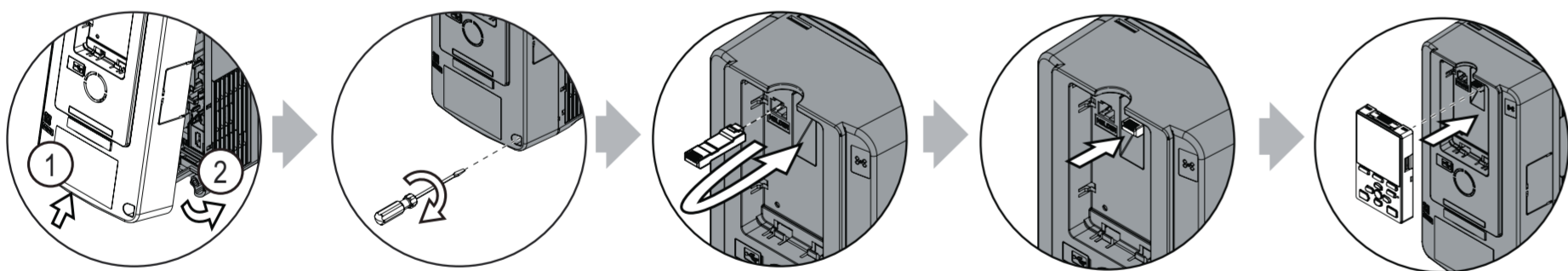
Refer to the Technical Reference (SIEPC71061737) for information about GFCIs.



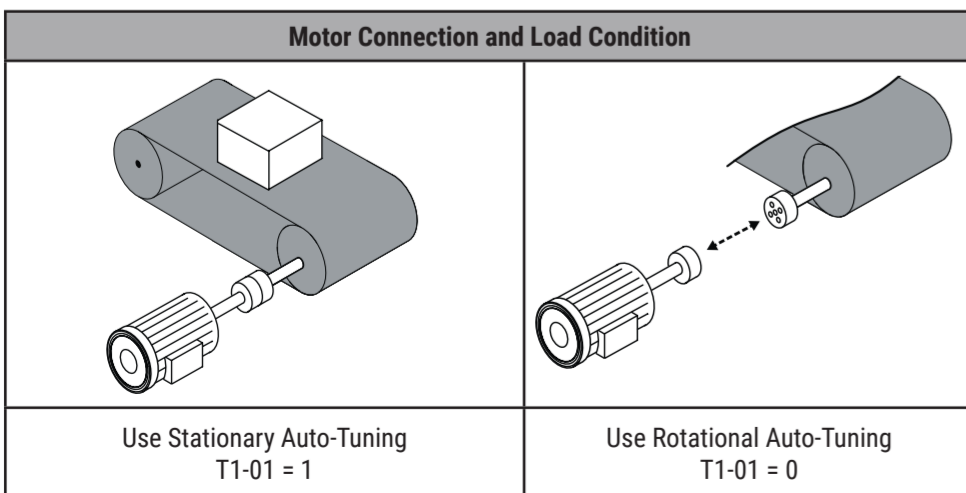
9 Remove the Tabs and Install the Wiring Cover



10 Install the Front Cover and Keypad



11 Determine the Correct Auto-Tuning Method



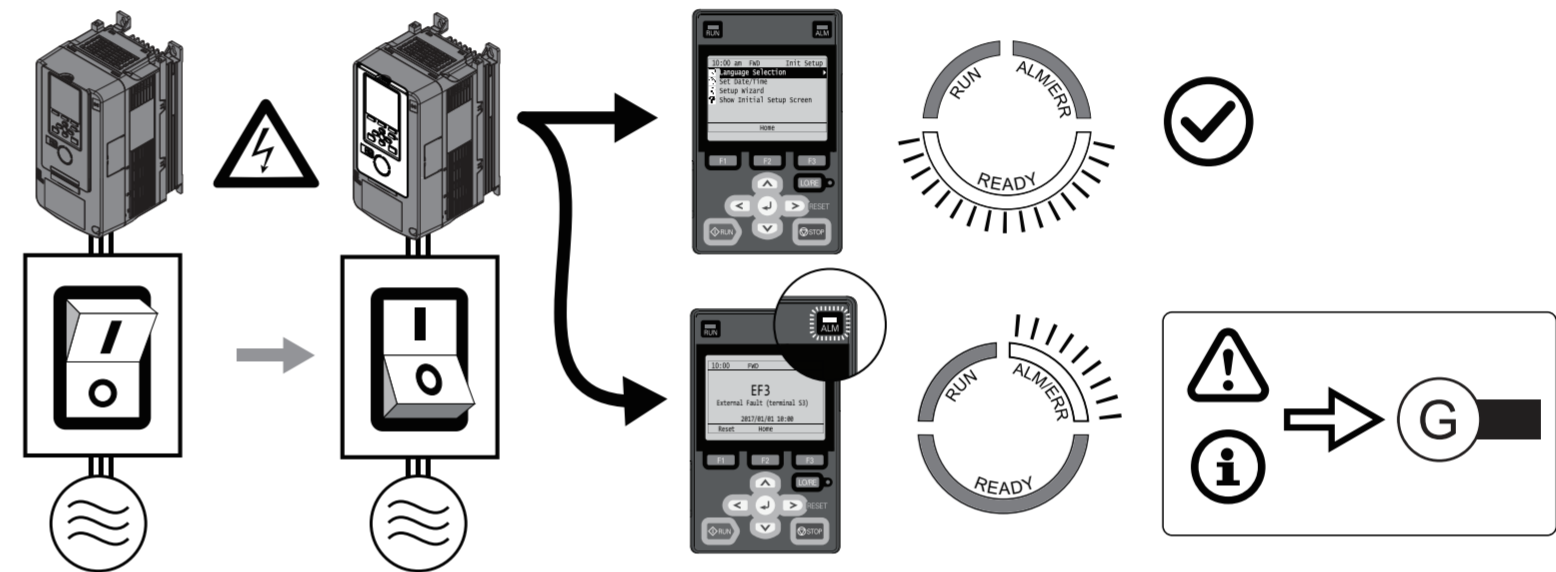
12 Collect and Record Auto-Tuning Data from Motor Nameplate

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	O.S.E. BRG. XXX	ROTOR WK² X.X		
Hz	HP	RPM	TORQUE (LB FT)	VOLTS (HIGH CONN)	AMPS (HIGH CONN)
1	0	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					

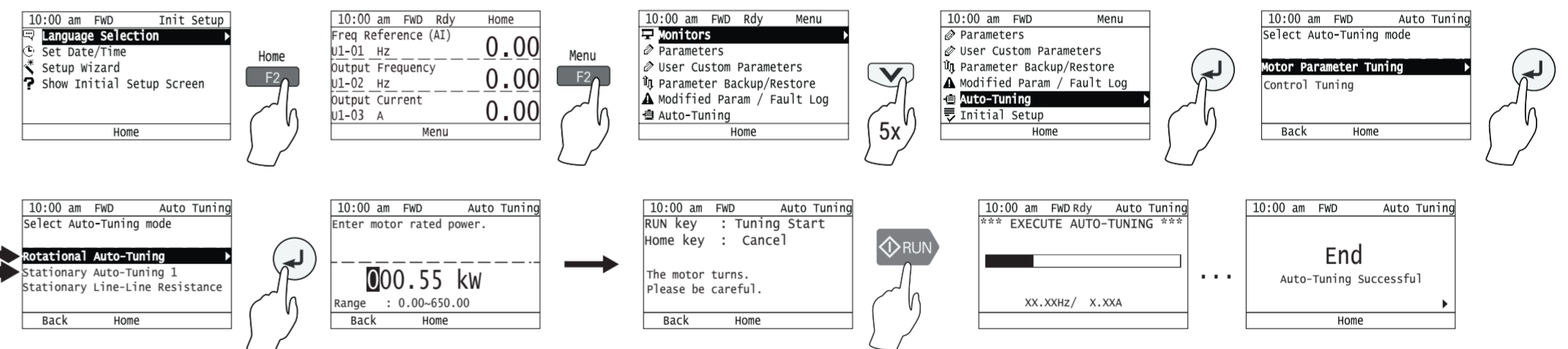
Reference	Motor Nameplate Data	Motor Nameplate Value	T1-xx Parameter (Ex-xx Parameter *)
A	Motor Rated Power	(HP x 0.746) kW	T1-02 (E2-11)
B	Motor Rated Voltage	V	T1-03 (E1-05)
C	Motor Rated Current (FLA)	A	T1-04 (E2-01)
D	Motor Rated Frequency (Base Frequency)	Hz	T1-05 (E1-04/E1-06)
E	Motor Pole Count	-	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.

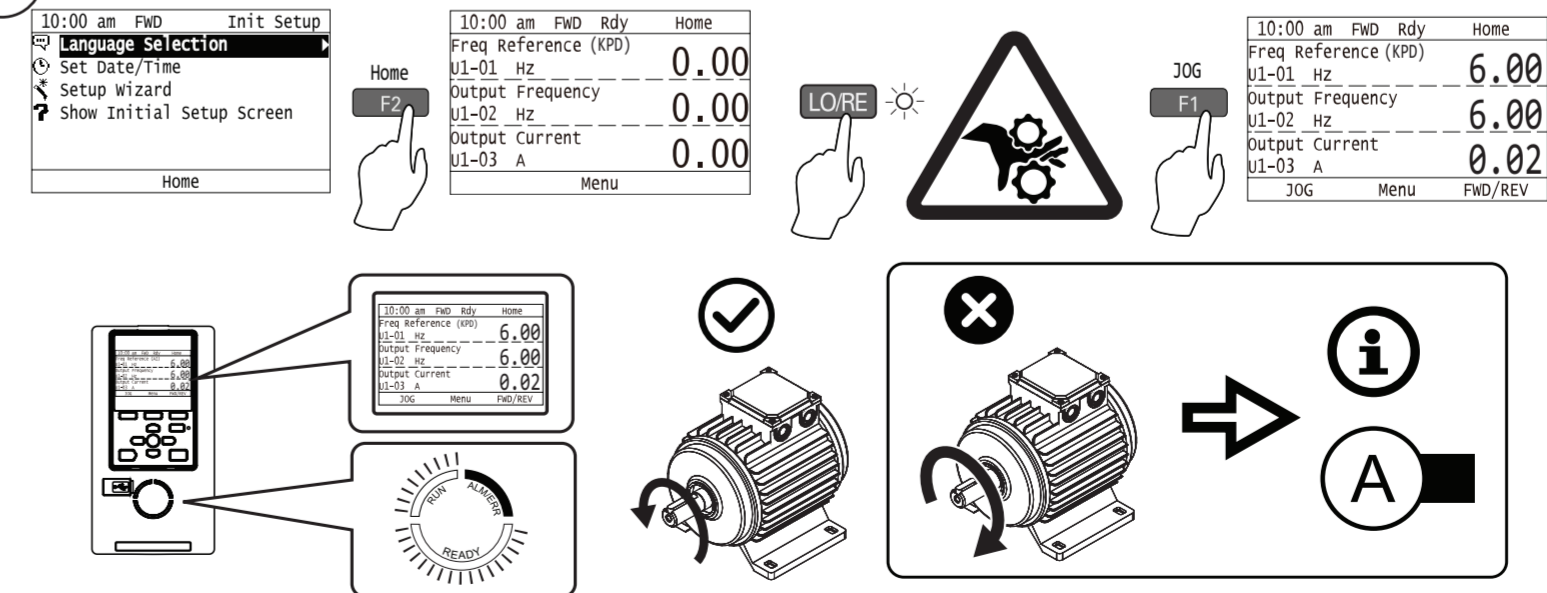
13 Energize the Drive and Confirm It Is Ready



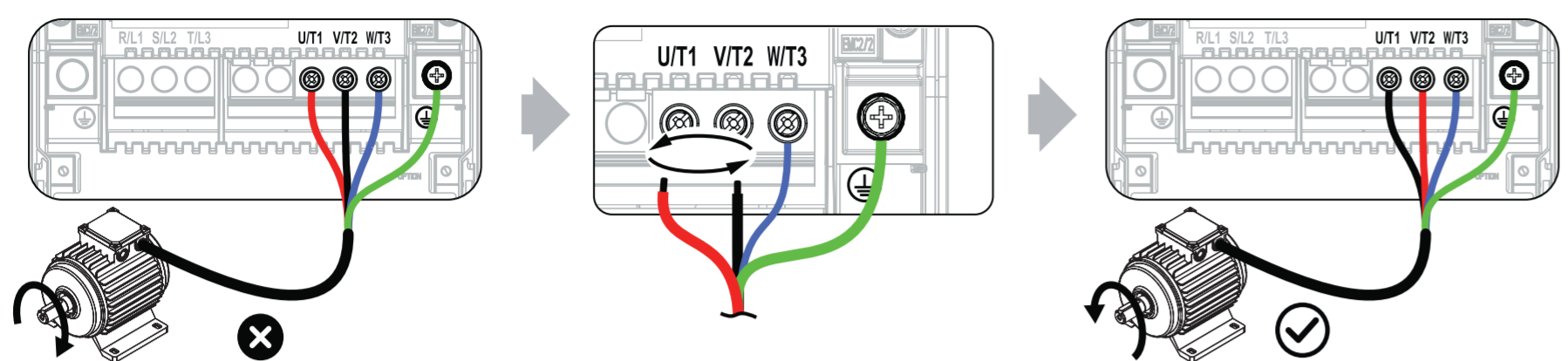
14 Use Auto-Tuning Data from Motor Nameplate to Set Parameters and Auto-Tune the Drive



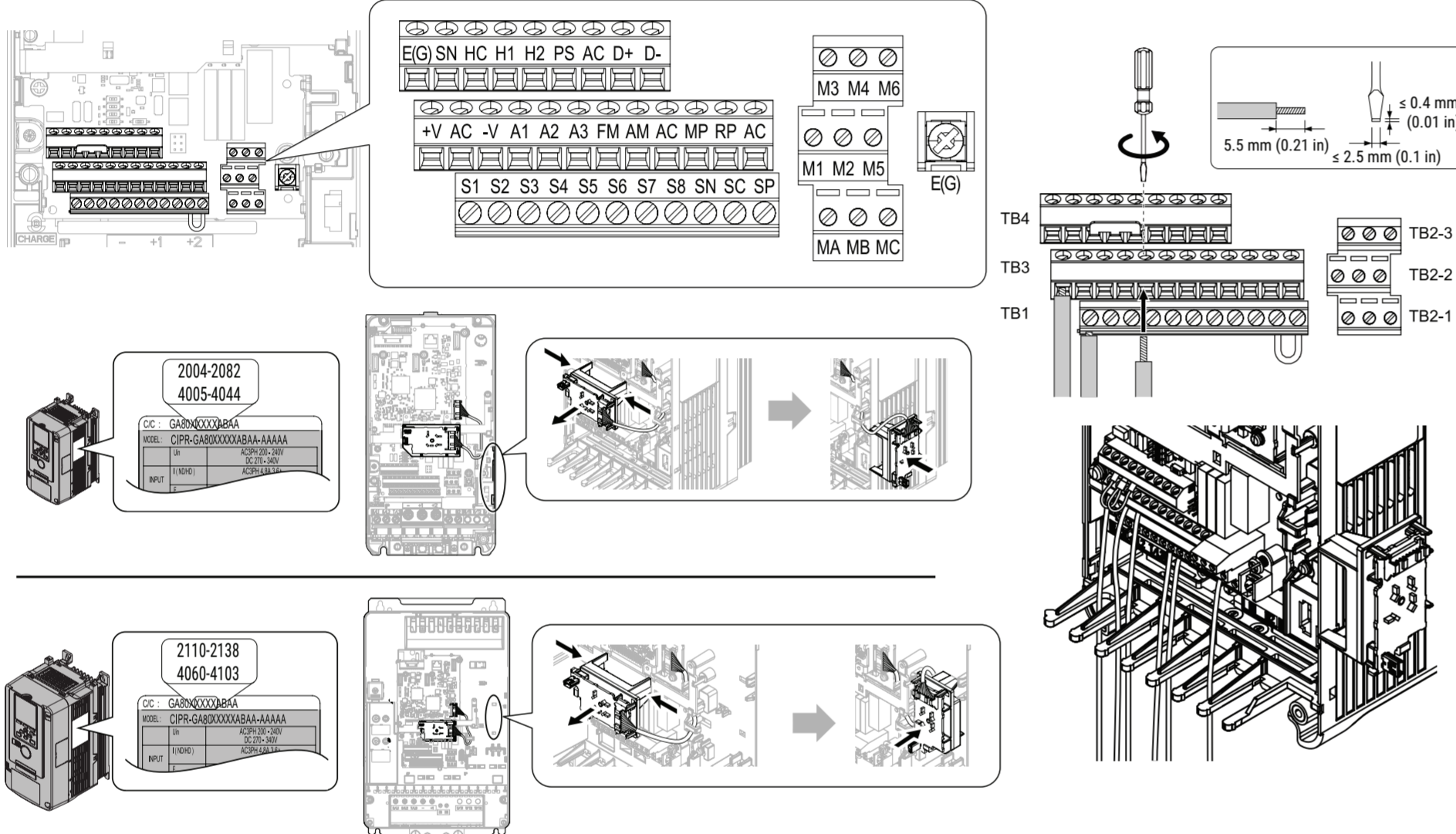
15 Set the Drive for LOCAL Control and Check the Motor Rotation Direction



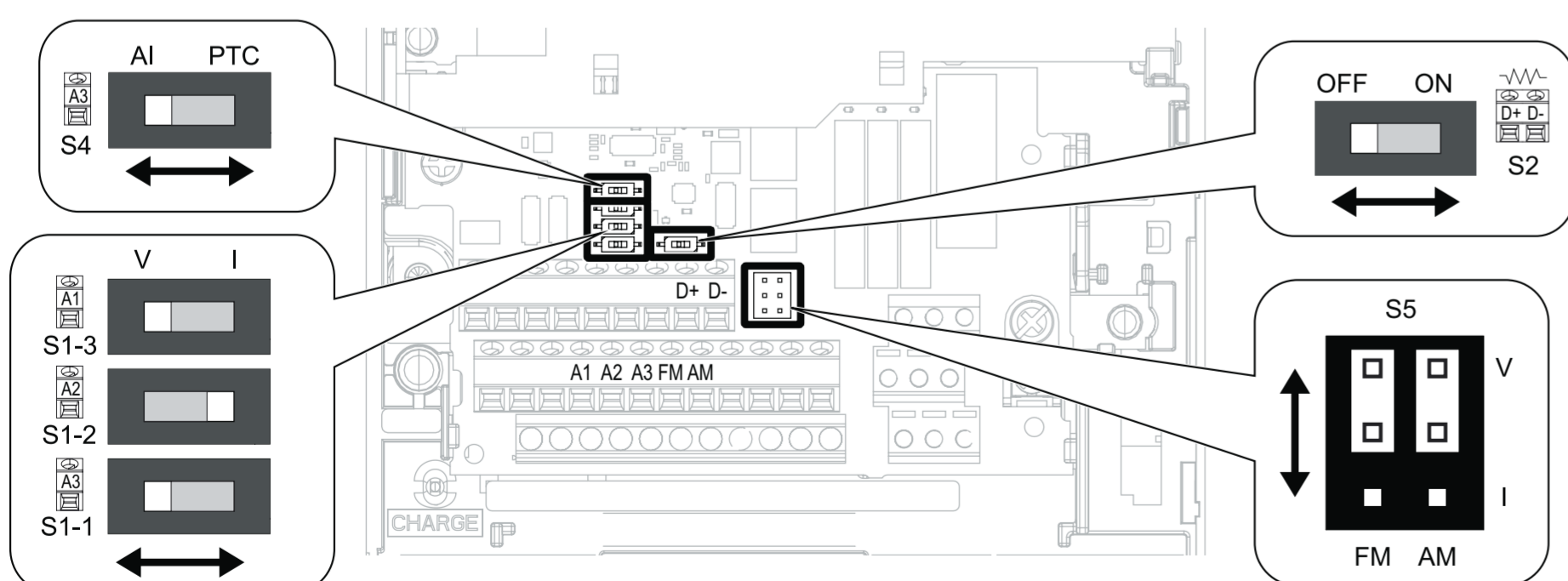
A If the Motor Does Not Rotate in the Correct Direction



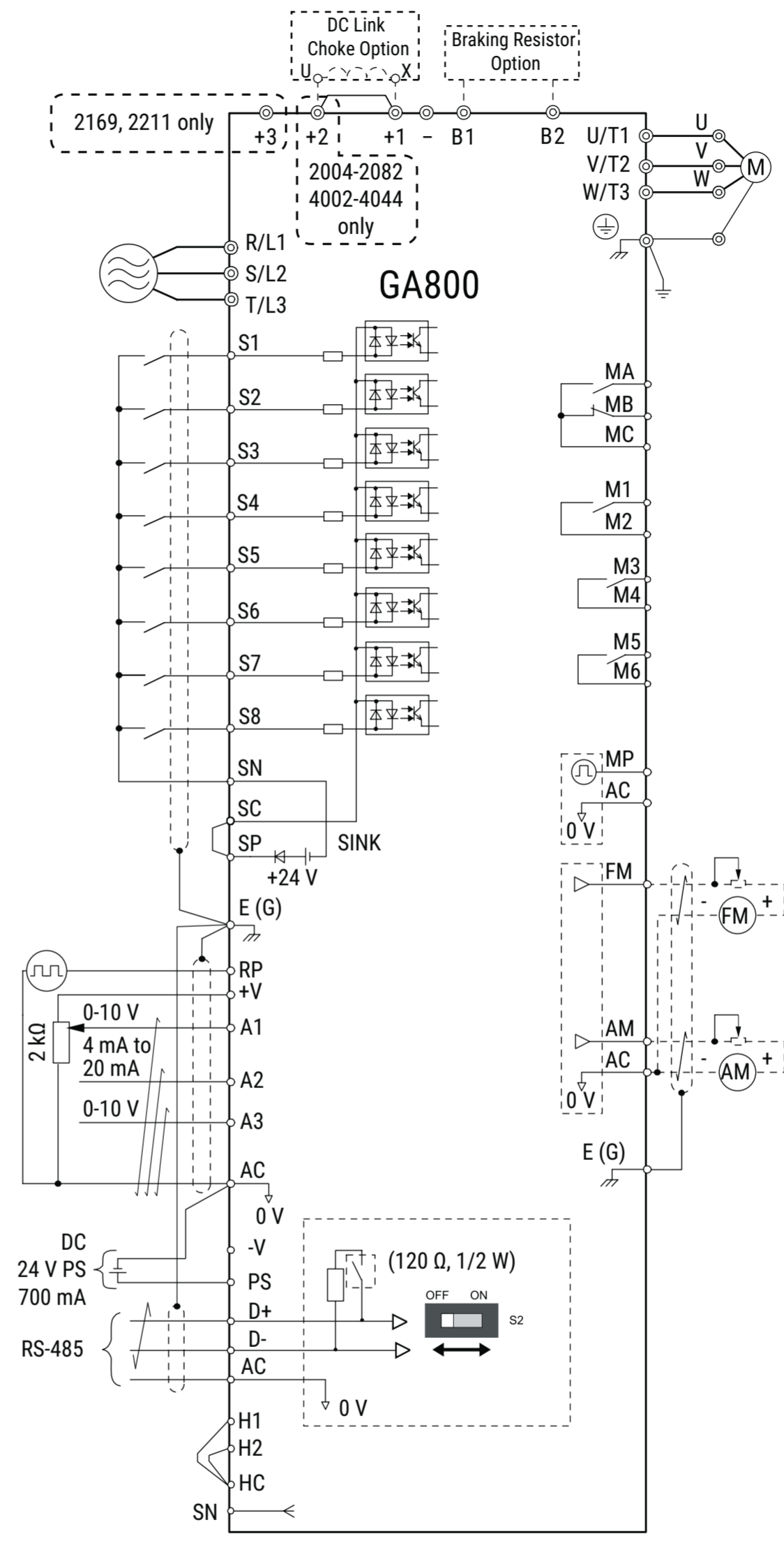
B Control Circuit Configuration and Accessibility



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%	Master frequency reference
A2	MFAI 2	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% (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	Common	-	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 motor that does not spin after pressing the Run button. It shows the drive's keypad menu with the following parameters:

- 10:00 am FWD Rdy Home
- Freq Reference (KPD) 0.00
- U1-01 Hz 0.00
- Output Frequency 0.00
- U1-02 Hz 0.00
- Output Current 0.00
- U1-03 A 0.00
- JOG Menu FWD/REV

The steps shown are:

- Press the Home button (F2) to return to the Home screen.
- Press the Run button (LOPE).
- Press the Enter button to accept the entry.
- The screen displays "Entry Accepted".
- The motor starts 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

Mobile App

 DriveWizard® Mobile Commissioning Smartphone App
<https://www.yaskawa.com/dwm>

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Headquarters Address:
YASKAWA AMERICA, INC.
 2121 Norman Drive South
 Waukegan, IL 60085
 USA