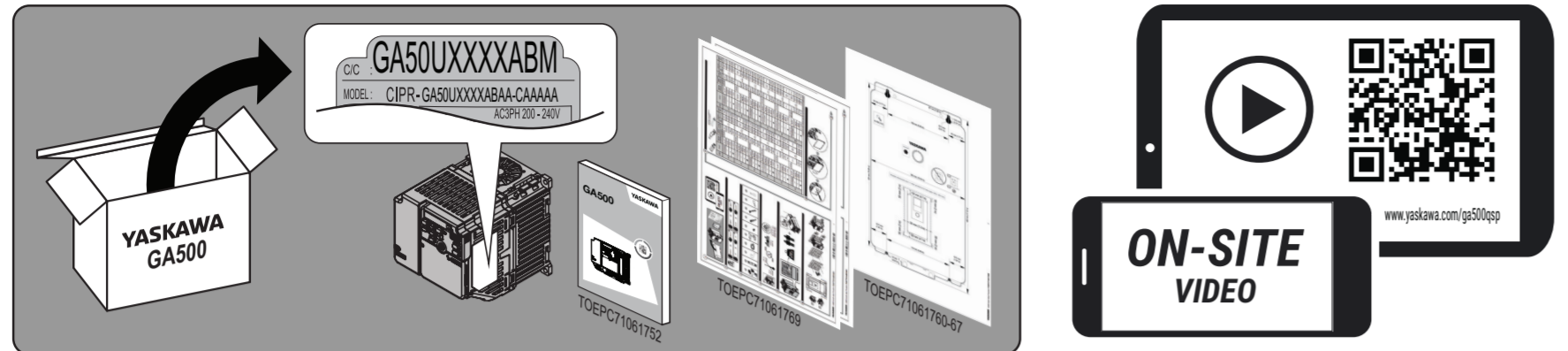
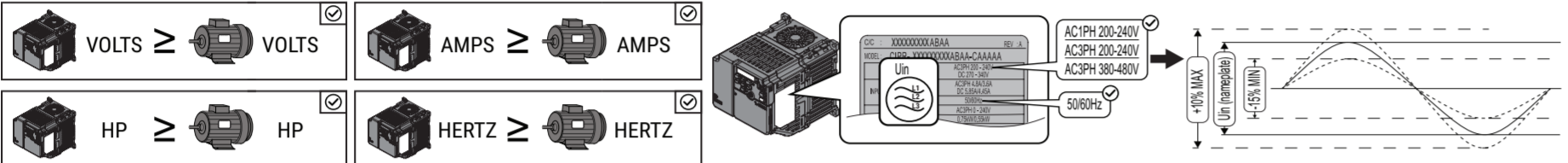


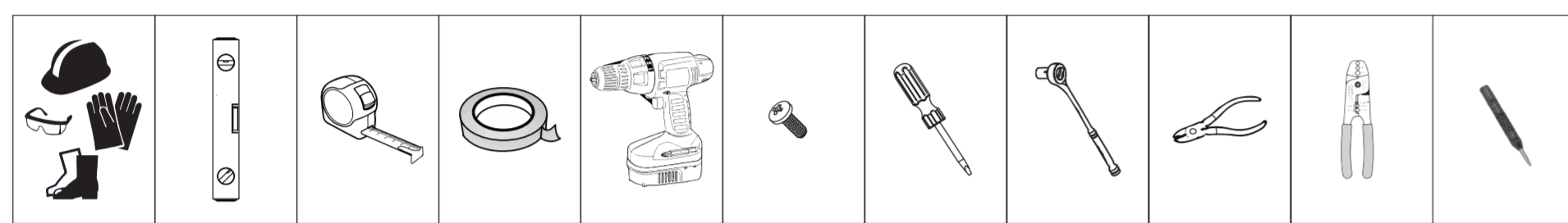
1 Procedure for Installation and Primary Operation for Models GA50UB001 to B018, 2001 to 2082, and 4001 to 4060



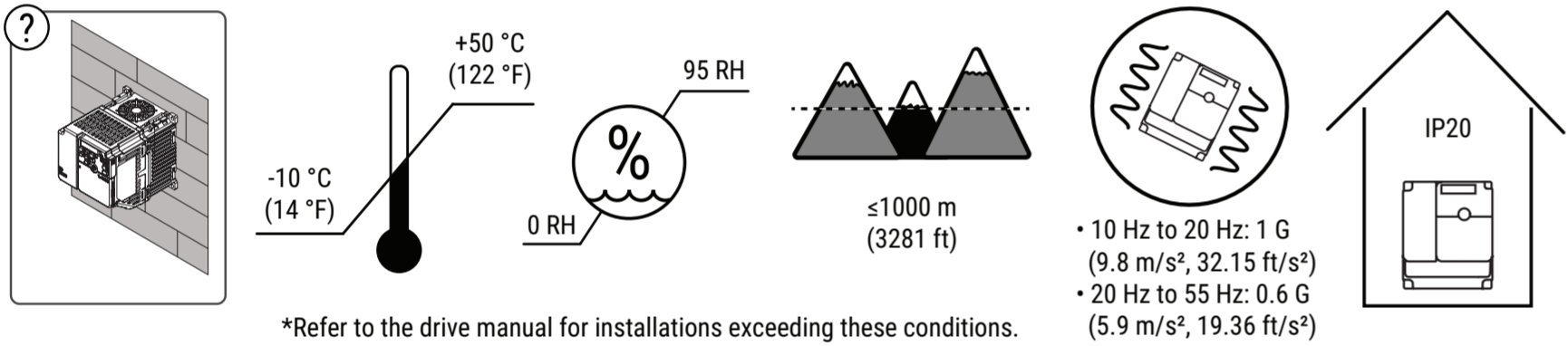
2 Confirm the Drive and Motor Specifications



3 Collect the Required Tools and Equipment

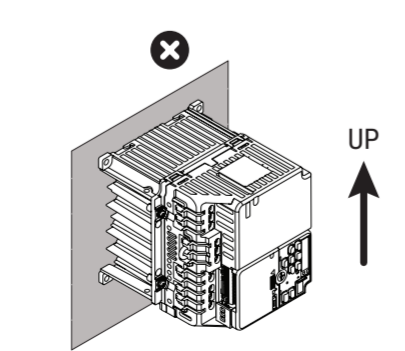
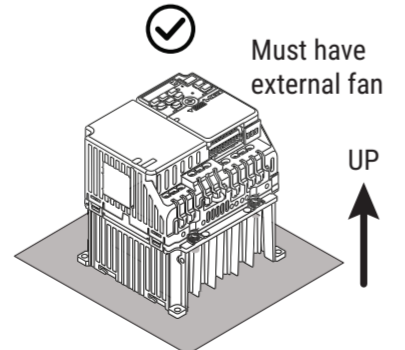
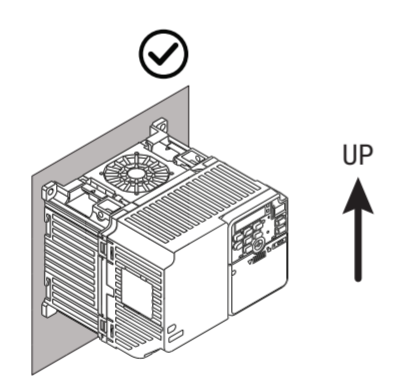
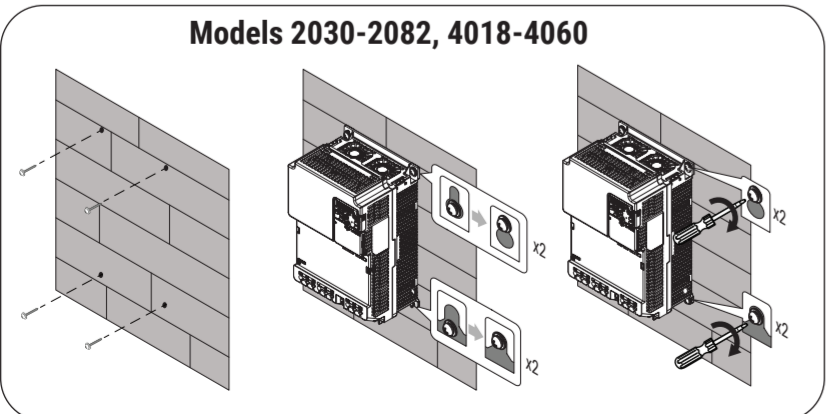
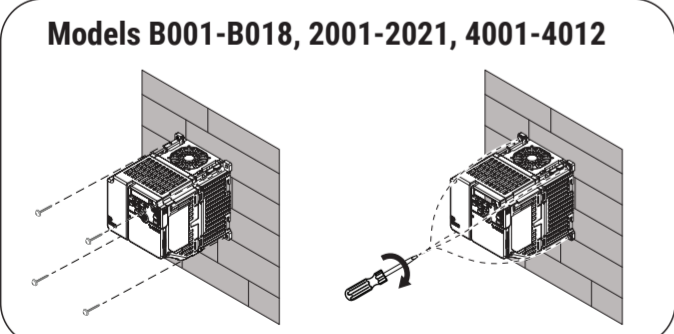
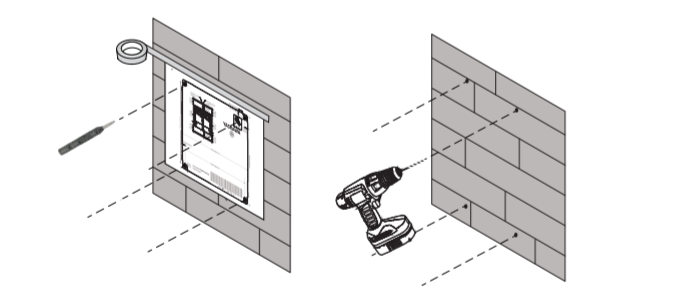


4 Confirm the Correct Drive Installation Environment

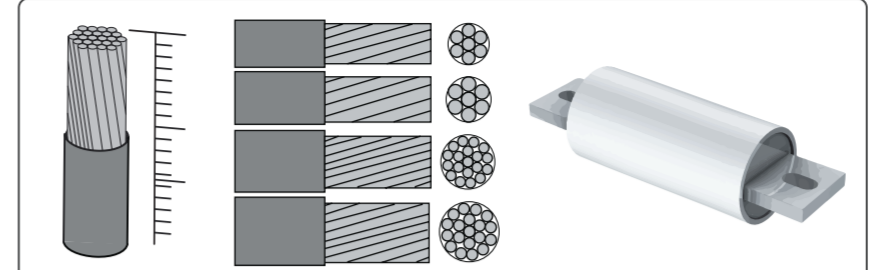


*Refer to the drive manual for installations exceeding these conditions.

5 Mount the Drive



6 Select the Correct Fuses, Wires, and Wire Strip Length, and Tightening Torque



Yaskawa recommends installing one of the following types of branch circuit protection to maintain compliance with UL61800-5-1. Semiconductor protective type fuses are preferred. Alternate branch circuit protection devices are also listed for some models. Maximum Time Delay fuse is 175% of drive input current rating.

Single-Phase 200 V Class Wires and Fuses by Model [GA50UXXXX] (Recommended)

Terminal	B001	B002	B004	B006	B010	B012	B018
L/L1 N/L2	14 (14)	14 (14)	14 (14)	14-10 (12)	12-10 (10)	14-6 (8)	12-6 (8)
U/T1 V/T2 W/T3	14 (14)	14 (14)	14 (14)	14-12 (14)	14-12 (14)	14-10 (12)	14-8 (10)
- +1	14 (14)	14 (14)	14 (14)	14-10 (12)	12-10 (10)	14-6 (8)	12-6 (8)
B1 B2	14 (14)	14 (14)	14 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)
⊕	14 (14)	14 (14)	14 (14)	14-10 (10)	14-10 (10)	14-10 (10)	12-8 (8)
Bussmann Semiconductor Fuse ¹	FWH-25A14F	FWH-25A14F	FWH-60B	FWH-80B	FWH-100B	FWH-125B	FWH-150B
Ferraz Alternate Fuse (Class J, CC, T) ²	2	3.5	9	15	20	30	40

¹Recommended EATON/Bussmann Semiconductor fuse model.
²Class T fuses are fast-acting (non-time delay only).

Single-Phase 200 V Class Tightening Torques and Terminal Screws by Model N-m (in lb)

Terminal	B001	B002	B004	B006	B010	B012	B018
L/L1 N/L2							
U/T1 V/T2 W/T3	0.5-0.6 (4.4-5.3)			0.5-0.6 (4.4-5.3)		1.5-1.7 (13.5-15)	1.5-1.7 (13.5-15)
- +1	⊖ M3			⊖ M3		⊖ M4	⊖ M4
B1 B2							
⊕	0.8-1.0 (7.1-8.9)			1.2-1.5 (10.6-13.3)		1.2-1.5 (10.6-13.3)	2.0-2.5 (17.7-22.1)
	⊕ M3.5			⊕ M4		⊕ M4	⊕ M5
mm (in)	6.5 (0.26)			8 (0.3)		10 (0.4)	10 (0.4)

Three-Phase 200 V Class Wires and Fuses by Model [GA50UXXXX] (Recommended)

Terminal	2001	2004	2010	2012	2021	2030	2042	2056	2070	2082
	2002	2006								
R/L1 S/L2 T/L3	14 (14)	14 (14)	14-12 (14)	14-10 (12)	14-6 (8)		12-6 (6)	10-2 (4)	6-1 (2)	6-1/0 (7)
U/T1 V/T2 W/T3					14-8 (10)				8-1 (2)	6-1 (2)
- +1 +2	14 (14)	14 (14)	14-10 (12)	12-10 (10)	14-6 (8)	12-6 (6)	10-2 (4)	8-2 (2)	6-1/0 (1)	2-2/0 (2/0)
B1 B2	14 (14)	14 (14)	14-12 (14)	14-12 (14)	14-10 (14)	12-8 (12)	14-6 (10)	12-6 (8)	12-6 (8)	10-6 (6)
⊕	14 (14)	14 (14)	14-10 (10)	14-10 (10)	14-8 (8)	10-6 (8)	10-6 (6)	8-4 (6)	6-4 (4)	6-4 (4)
Bussmann Semiconductor Fuse ¹	FWH-25A14F	FWH-25A14F	FWH-70B	FWH-70B	FWH-90B	FWH-100B	FWH-150B	FWH-200B	FWH-200B	FWH-225A
Ferraz Alternate Fuse (Class J, CC, T) ²	3	6	15	20	35	50	70	90	110	125

¹Recommended EATON/Bussmann Semiconductor fuse model.
²Class T fuses are fast-acting (non-time delay only).

Three-Phase 200 V Class Tightening Torques and Terminal Screws by Model N-m (in lb)

Terminal	2001	2004	2010	2021	2030	2042	2056	2070	2082
	2002	2006							
R/L1 S/L2 T/L3									
U/T1 V/T2 W/T3	0.5-0.6 (4.4-5.3)		0.5-0.6 (4.4-5.3)			1.5-1.7 (13.5-15)	2.3-2.5 (19.8-22)	5-5.5 (45-49)	
- +1 +2	⊖ M3		⊖ M3			⊖ M4	⊖ M5	⊖ M5	⊖ M5
B1 B2									
⊕	0.8-1.0 (7.1-8.9)		1.2-1.5 (10.6-13.3)			2.0-2.5 (17.7-22.1)	5.4-6.0 (47.8-53.1)		
	⊕ M3.5		⊕ M4			⊕ M5	⊕ M6		
mm (in)	6.5 (0.26)		8 (0.3)		10 (0.4)	10 (0.4) ¹	18 (0.71) ²	20 (0.79) ²	

¹Strip length for terminals -, +1, +2 is 18 mm (0.71 in).
²Strip length for terminals B1, B2 is 10 mm (0.4 in).

Three-Phase 400 V Class Wires and Fuses by Model [GA50UXXXX] (Recommended)

Terminal	4001	4002	4004	4005	4007	4009	4012	4018	4023	4031	4038	4044	4060
	R/L1 S/L2 T/L3	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-10 (12)	12-8 (10)	14-6 (8)	12-6 (8)	12-6 (6)	10-2 (4)
U/T1 V/T2 W/T3							14-12 (14)		14-8 (10)		12-6 (8)	12-4 (6)	10-2 (4)
- +1 +2	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	12-8 (10)	14-8 (10)	12-6 (8)	12-4 (6)	10-2 (4)	8-2 (2)	6-2 (2)
B1 B2	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-12 (14)	14-10 (12)	12-8 (10)	14-6 (10)	12-6 (8)	12-6 (8)
⊕	14-10 (14)	14-10 (14)	14-10 (10)	14-10 (10)	14-10 (10)	14-10 (10)	14-10 (10)	14-6 (10)	10-6 (10)	10-6 (8)	10-6 (6)	10-6 (6)	10-6 (6)
Bussmann Semiconductor Fuse ¹	FWH-40B	FWH-40B	FWH-50B	FWH-70B	FWH-70B	FWH-90B	FWH-90B	FWH-80B	FWH-100B	FWH-125B	FWH-175B	FWH-200B	FWH-200B
Ferraz Alternate Fuse (Class T) ²	3	3.5	7	9	12	15	20	30	40	50	60	70	100

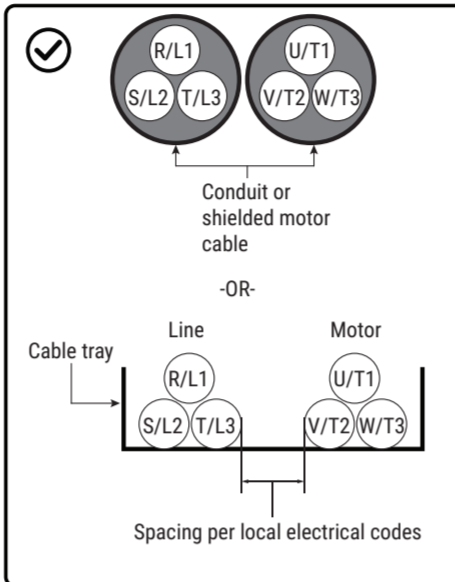
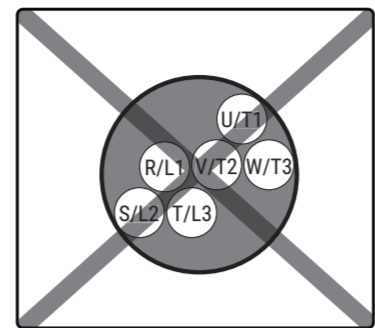
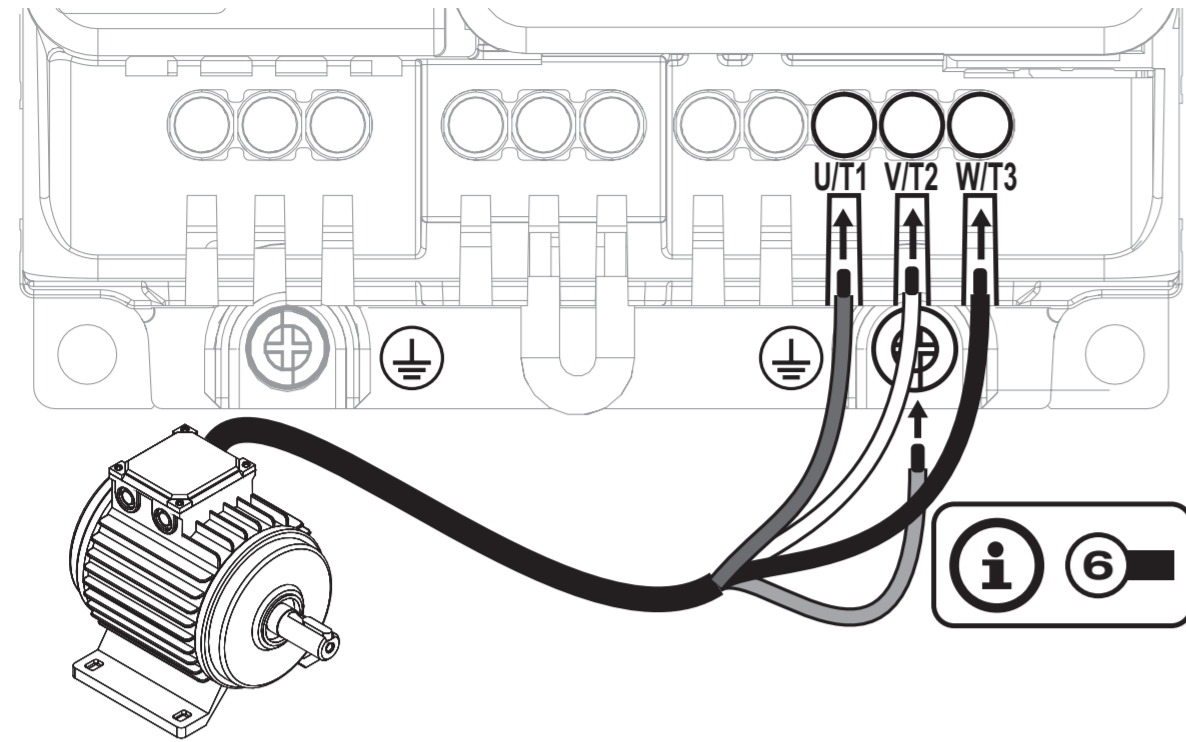
¹Recommended EATON/Bussmann Semiconductor fuse model.
²Class T fuses are fast-acting (non-time delay only).

Three-Phase 400 V Class Tightening Torques and Terminal Screws by Model N-m (in lb)

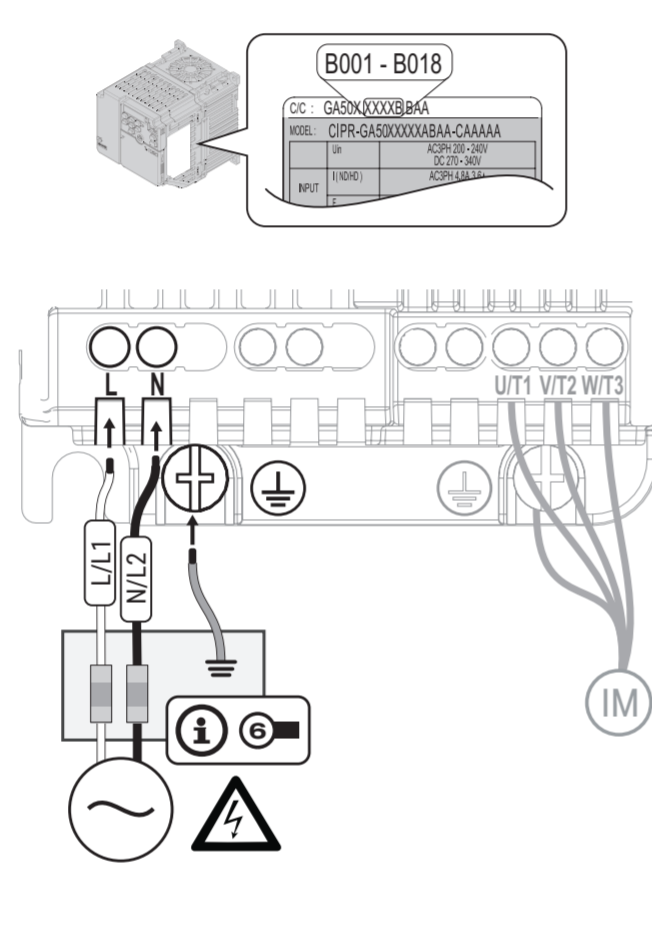
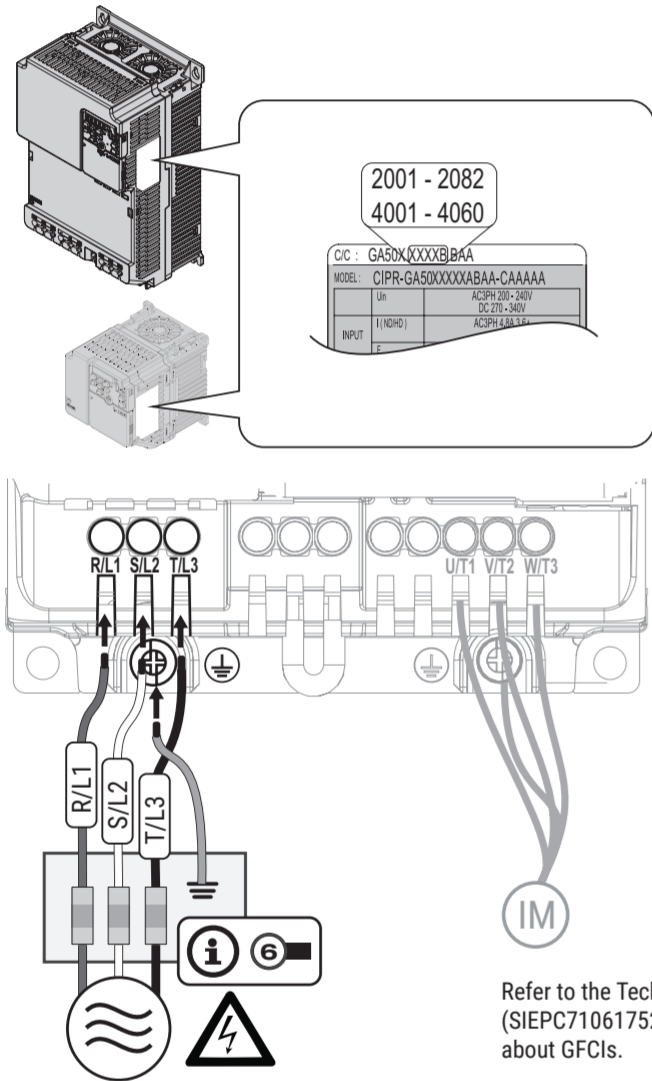
Terminal	4001	4004	4007	4012	4018	4031	4044
	4002	4005	4009				
R/L1 S/L2 T/L3							
U/T1 V/T2 W/T3	0.5-0.6 (4.4-5.3)			1.5-1.7 (13.5-15)		1.5-1.7 (13.5-15)	2.3-2.5 (19.8-22)
- +1 +2	⊖ M3			⊖ M4		⊖ M5	⊖ M5
B1 B2							
⊕	1.2-1.5 (10.6-13.3)			2.0-2.5 (17.7-22.1)		5.4-6.0 (47.8-53.1)	
	⊕ M4			⊕ M5		⊕ M6	
mm (in)	8 (0.3)			10 (0.4)		10 (0.4) ¹	18 (0.71) ²

¹Strip length for terminals -, +1, +2 is 18 mm (0.71 in).
²Strip length for terminals B1, B2 is 10 mm (0.4 in).

7 Install the Motor Wiring

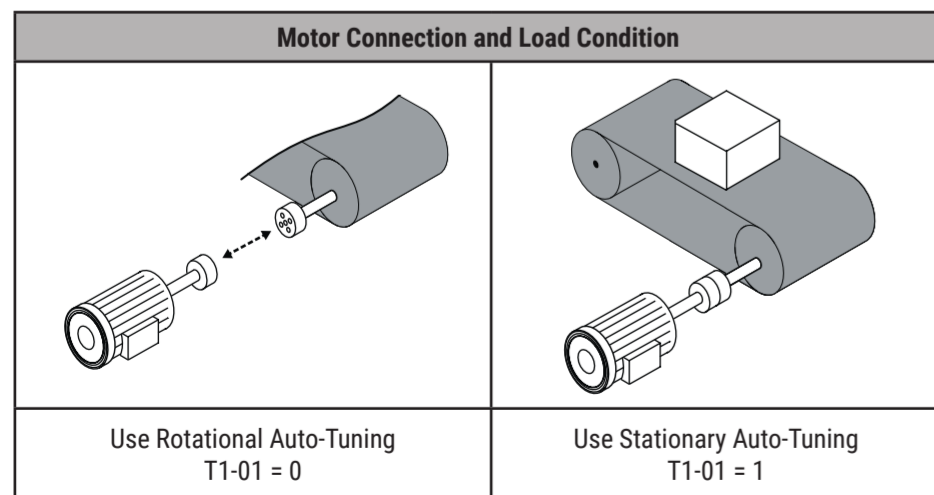


8 Install the Power Wiring



Refer to the Technical Reference (SIEPC71061752) for information about GFCIs.

9 Determine the Correct Auto-Tuning Method



10 Collect and Record Auto-Tuning Data from Motor Nameplate

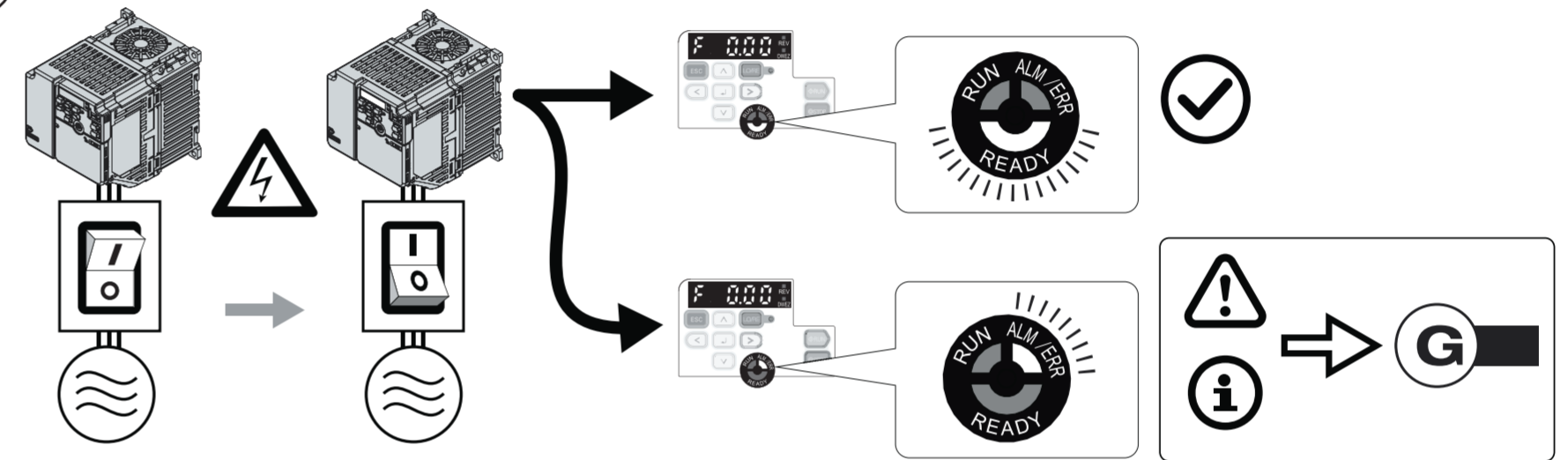
3 PHASE INVERTER DUTY AC INDUCTION MOTOR NAMEPLATE EXAMPLE

MODEL XX	123AAAA123XX-X0	X FRAME 123AX			
E POLES X	ENC XXX	DES A TYPE ABC INS X0			
B VOLTS XXX	F FL RPM XXXX	C FL AMPS XX/XX			
SF 1.0 DUTY CONT	MAX AMB °C XX	TEMP SENSORS T-STATS			
SERIAL	G 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)
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					

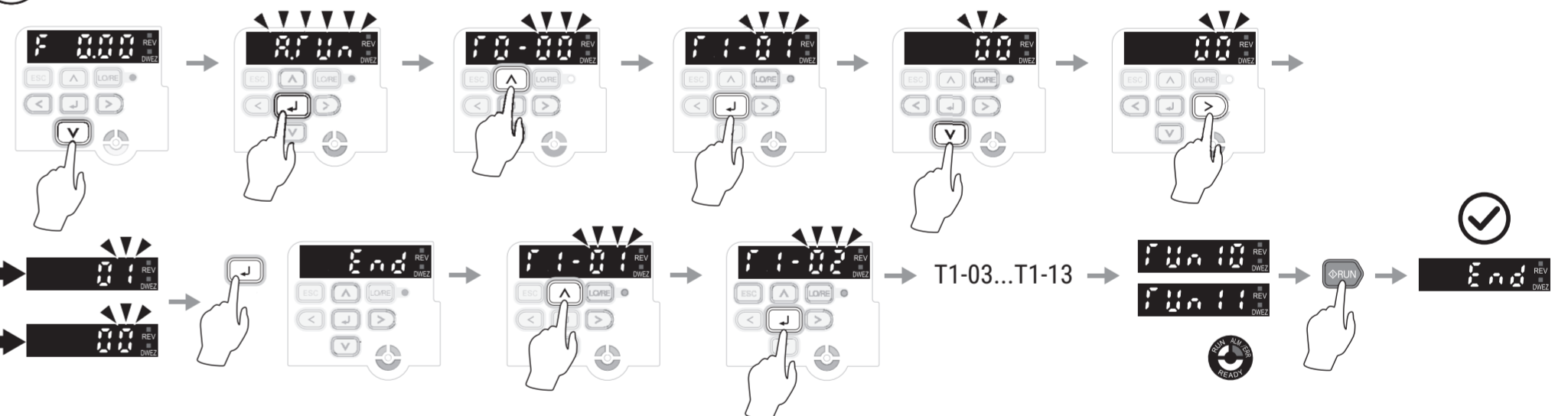
Reference	T1-xx Parameter (Ex-xx Parameter ¹)	Motor Nameplate Data	Motor Nameplate Value
A	T1-02 (E2-11)	Motor Rated Power	(HP x 0.746) kW
B	T1-03 (E1-05)	Motor Rated Voltage	V
C	T1-04 (E2-01)	Motor Rated Current (FLA)	A
D	T1-05 (E1-04/E1-06)	Motor Rated Frequency (Base Frequency)	Hz
E	T1-06 (E2-04)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

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.

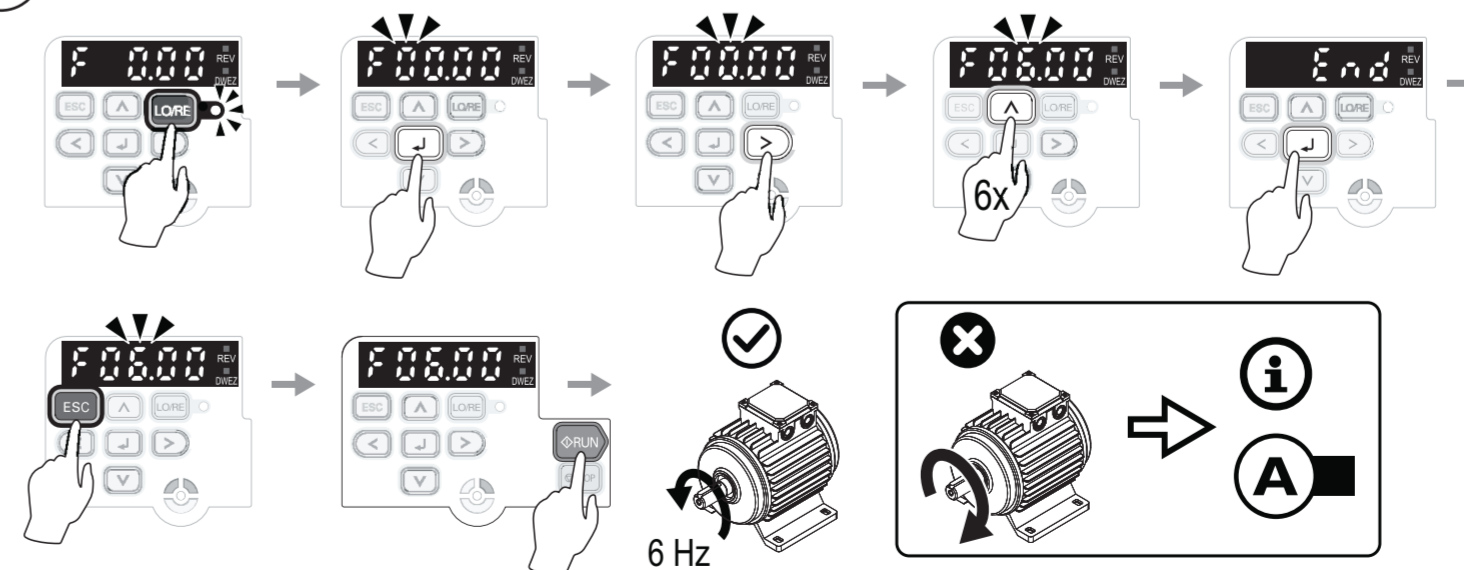
11 Energize the Drive and Confirm It Is Ready



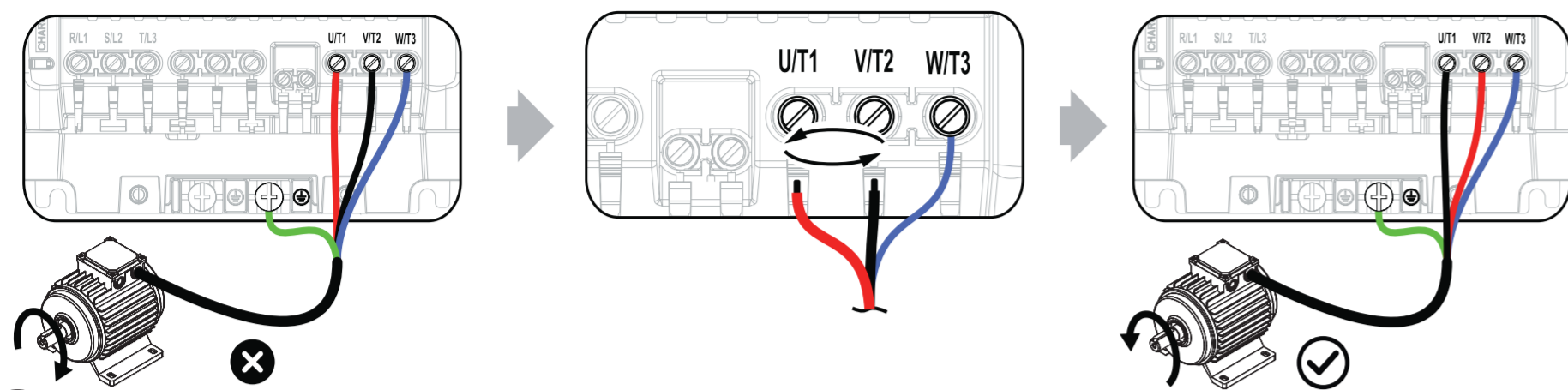
12 Use Auto-Tuning Data from Motor Nameplate to Set Parameters and Auto-Tune the Drive



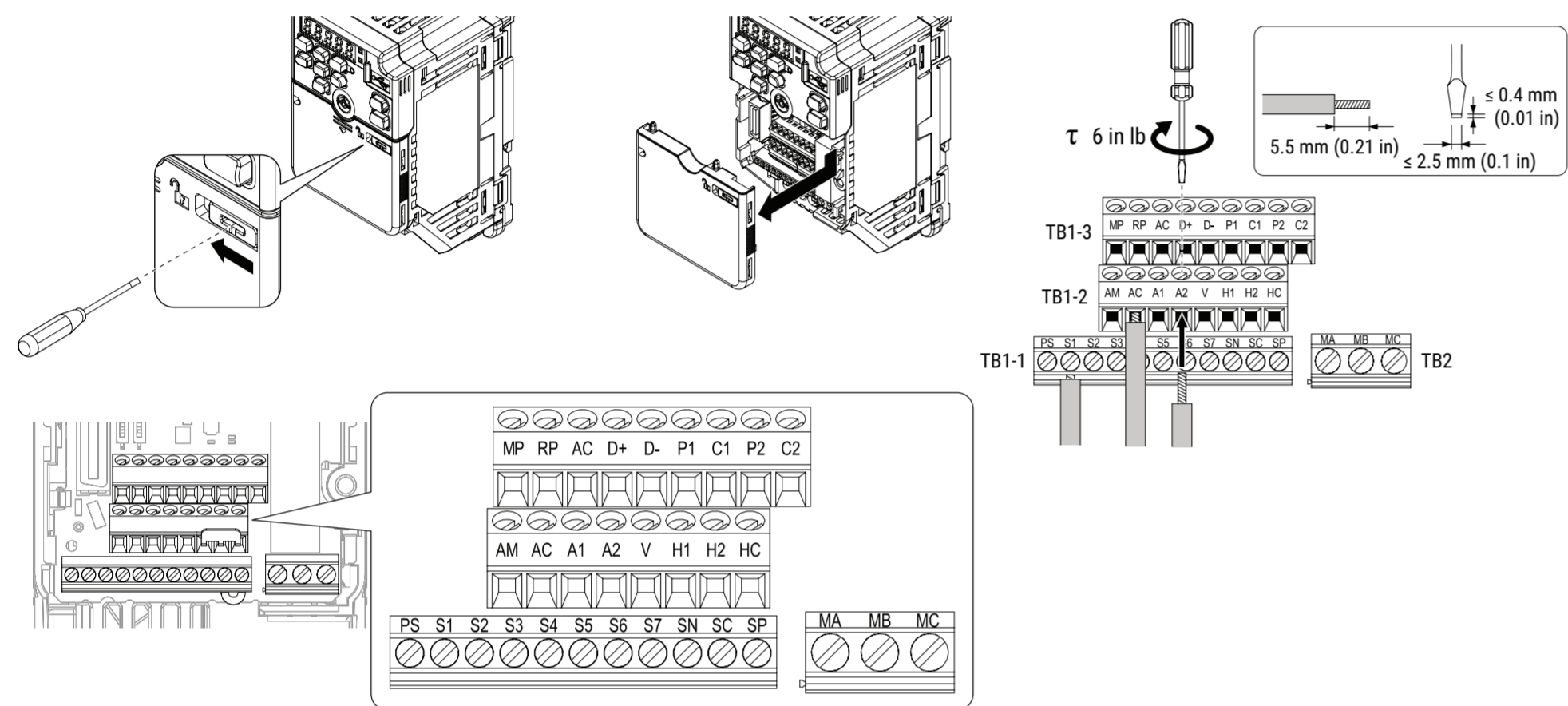
13 Set a Frequency Reference and Check the Motor Rotation Direction



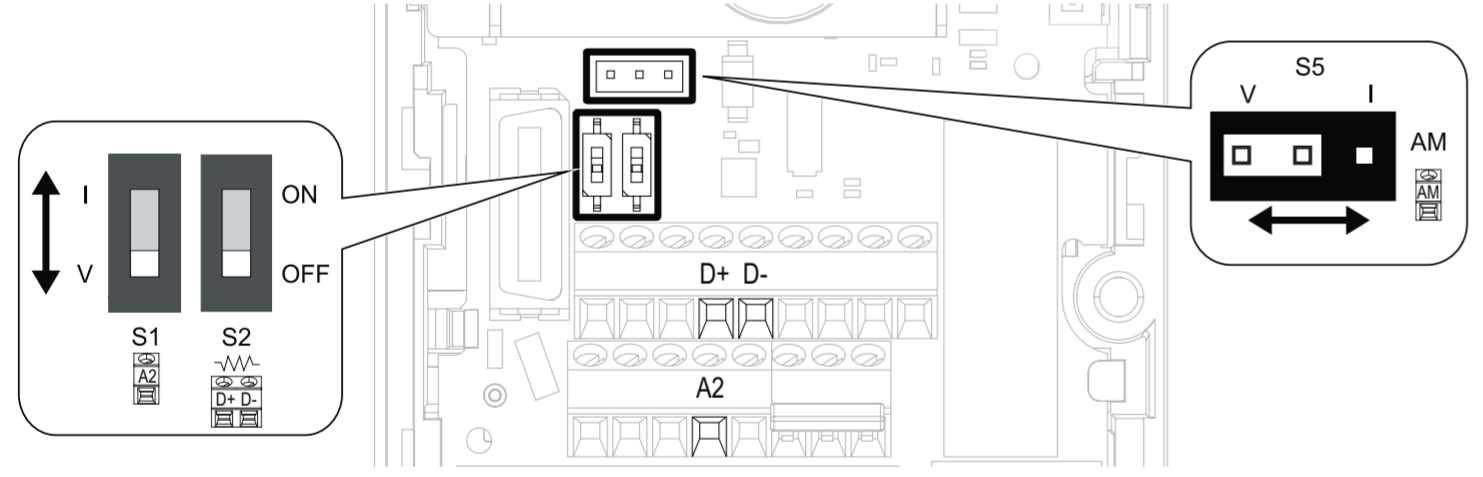
A If the Motor Does Not Rotate in the Correct Direction



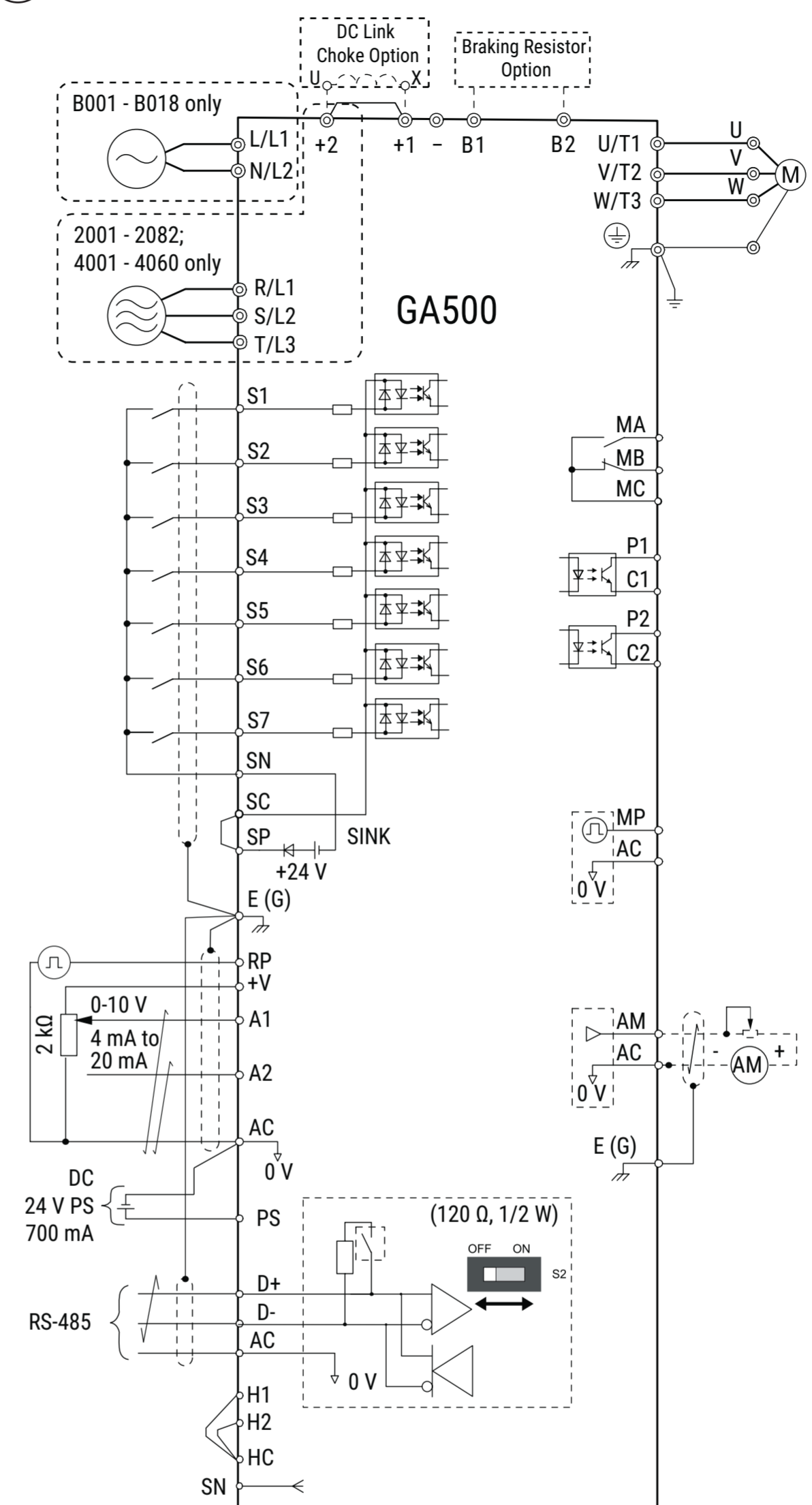
B Control Circuit Configuration and Accessibility



C Switches and Jumpers on the Control Board



D Connection Diagram and Terminal Functions

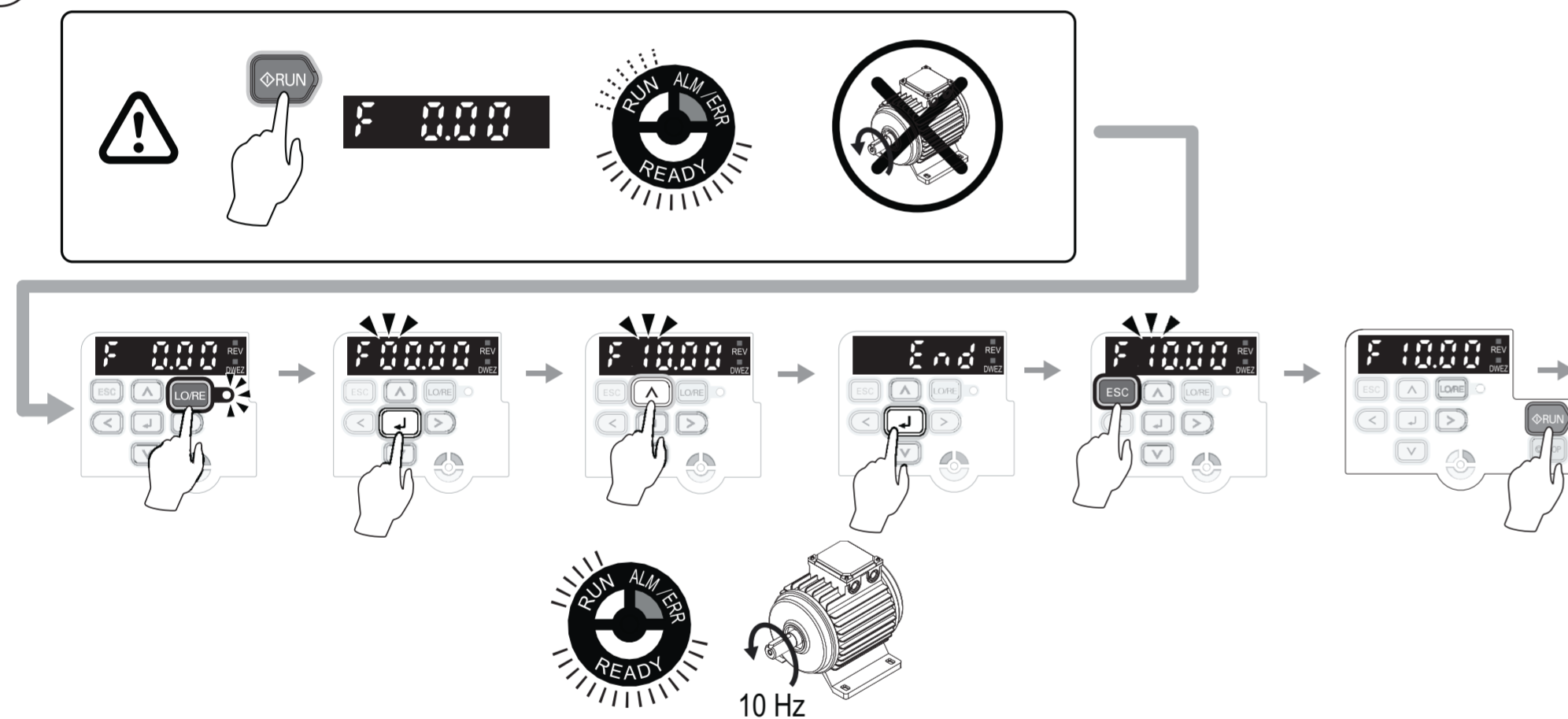


Terminal	Type	Signal Level	Default
S1	MFDI 1	Photocopler 24 V, 6 mA	Forward run/Stop
S2	MFDI 2		Reverse run/Stop
S3	MFDI 3		External fault (N.O.)
S4	MFDI 4		Fault reset
S5	MFDI 5		Multi-step speed 1
S6	MFDI 6		Multi-step speed 2
S7	MFDI 7		Jog command
SN	MFDI power 0 V	24 V, 150 mA maximum	-
SC	MFDI common		-
SP	MFDI power +24 VDC	-	-
H1	Safe disable input 1	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 V ~ 0.8 V Input impedance: 3 kΩ	-
+V	Frequency setting power supply	10.5 V (20 mA maximum)	-
A1	MFAI 1	0 V ~ 10 V/100% (input impedance: minimum 15 kΩ) -10 V ~ +10 V/-100% ~ +100% (input impedance: minimum 15 kΩ)	Master frequency reference
A2	MFAI 2	0 V ~ 10 V/100% (input impedance: minimum 15 kΩ) -10 V ~ +10 V/-100% ~ +100% (input impedance: minimum 15 kΩ) 4 mA ~ 20 mA/100%, 0 mA ~ 20 mA/100% (input impedance: 250 Ω)	Combined w/A1
AC	Common	0 V	-
E(G)	Connect shielded cable	-	-
MA	Fault relay output	30 VDC, 10 mA ~ 1 A 250 VAC, 10 mA ~ 1 A Minimum load: 5 V, 10 mA	Fault
MB	Common	-	Fault
MC	Common	-	-
P1	Multi-function photocopler output 1	Photocopler output 48 V, 2 mA ~ 50 mA	During RUN
C1	Multi-function photocopler output 1		-
P2	Multi-function photocopler output 2	-	Speed agree 1
C2	Multi-function photocopler output 2	-	-
MP	Pulse train output	32 kHz maximum	Output frequency
AM	Analog monitor output	0 V ~ +10 V/0% ~ 100% 4 mA ~ 20 mA (receiver recommended impedance: 250 Ω)	Output frequency
AC	Common	0 V	-
PS	External 24 V PS input	21.6 VDC ~ 26.4 VDC, 700 mA	-
AC	External 24 V PS ground	0 V	-
D+	Communication +	MEMOBUS/Modbus, RS-485	-
D-	Communication -	115.2 kbps maximum	-
AC	Common	0 V	-

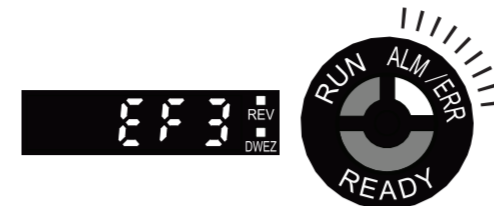
E Parameter Groups

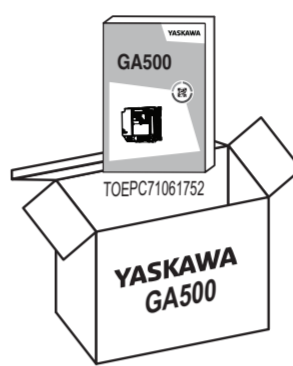

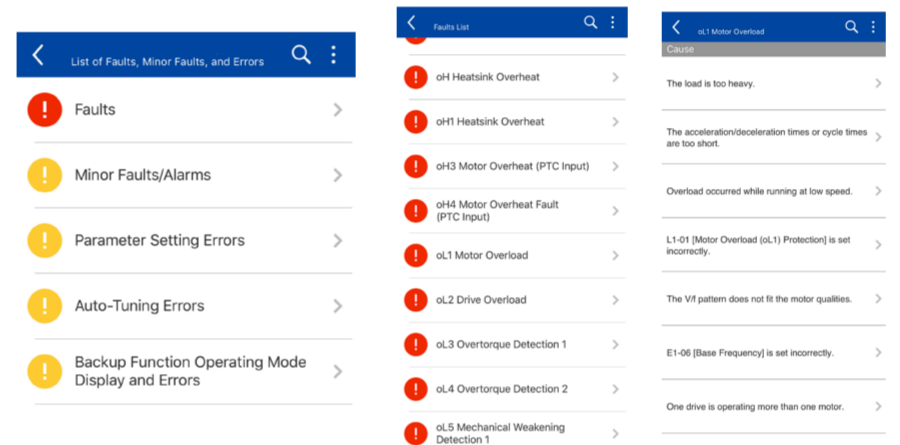

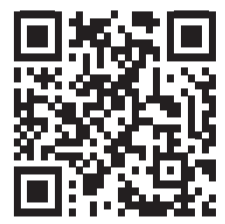
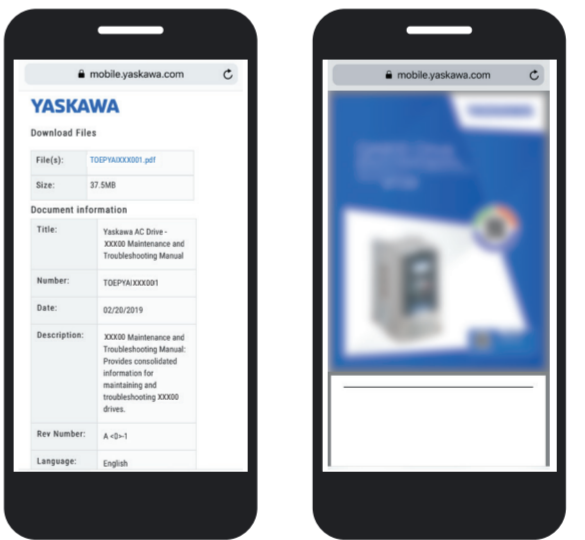

A: Initialization	d: Reference Settings	H: Terminal Functions	n: Special Adjustment	q: DriveWorksEZ Parameters
A1 Initialization	d1 Frequency Reference	H1 Digital Inputs	n1 Hunting Prevention	r: DriveWorksEZ Connections
A2 User Parameters	d2 Reference Limits	H2 Digital Outputs	n2 Auto Freq. Regulator (AFR)	T: Motor Tuning
b: Application	d3 Jump Frequency	H3 Analog Inputs	n3 High Slip/Overexcite Braking	T0 Tuning Mode Selection
b1 Operation Mode Selection	d4 Freq. Ref. Up/Down & Hold	H4 Analog Outputs	n5 Feed Forward Control	T1 Induction Motor Auto-Tuning
b2 DC Injection Braking and Short Circuit Braking	d6 Field Weakening/Forcing	H5 Modbus Communication	n6 Online Tuning	T2 PM Motor Auto-Tuning
b3 Speed Search	d7 Offset Frequency	H6 Pulse Train Input/Output	n7 EZ Drive	T3 ASR and Inertia Tuning
b4 Timer Function	E: Motor	H7 Virtual Inputs/Outputs	n8 PM Motor Control Tuning	T4 EZ Tuning
b5 PID Control	E1 V/f Pattern for Motor 1	L: Protection Functions	nA PM Motor Control Tuning	U: Monitors
b6 Dwell Function	E2 Motor 1 Parameters	L1 Motor Protection	o: Keypad-Related Settings	U1 Operation Status Monitors
b8 Energy Saving	E3 V/f Pattern for Motor 2	L2 Power Loss Ride Through	o1 Keypad Display	U2 Fault Trace
C: Tuning	E4 Motor 2 Parameters	L3 Stall Prevention	o2 Keypad Operation	U3 Fault History
C1 Accel & Decel Time	E5 PM Motor Settings	L4 Speed Detection	o3 Copy Keypad Function	U4 Maintenance Monitors
C2 S-Curve Characteristics	E9 Motor Setting	L5 Fault Restart	o4 Maintenance Monitors	U5 PID Monitors
C3 Slip Compensation	F: Options	L6 Torque Detection	o5 Log Function	U6 Operation Status Monitors
C4 Torque Compensation	F1 PG Speed Control Fault Detection	L7 Torque Limit		U8 DriveWorksEZ Monitors
C5 Auto Speed Regulator (CSR)	F6 Communication Option	L8 Drive Protection		
C6 Duty & Carrier Frequency	F7 Ethernet Options			

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



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/toepc71061752	 PDF download
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/toepyaiga5001	 PDF download

H Additional Resources



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Headquarters Address:

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

