

GA501 Quick Setup Procedure for Models GA51UB001 to B018, 2001 to 2082, and 4001 to 4060

TOEPC7106174M

GA51UXXXXXX
MODEL: CIPR-GA51UXXXXXX-CAAAA
AC3PH 200-240V

Technical Reference
SIEPC7106174M.pdf
www.yaskawa.com/siepc7106174m

VIDEO
www.yaskawa.com/ga501tqsp

Refer to the Technical Reference for a complete list of safety messages to follow for installation, operation, and maintenance of this product. The Technical Reference is available via the internet at <https://www.yaskawa.com/ga501manuals>. You can order paper copies of all manuals at 1-800-YASKAWA (800-927-5292) in the USA, or 1-847-887-7000 worldwide.

For Professional Installation Only

WARNING Operation of this equipment requires detailed operation instructions provided in the Technical Reference manual (SIEPC7106174M) intended for use with this product.

DANGER Electrical Shock Hazard
Do not examine, connect, or disconnect wiring on an energized drive. Before servicing, disconnect all power to the equipment and wait for the time specified on the warning label at a minimum. The internal capacitor stays charged after the drive is de-energized. The charge indicator LED extinguishes when the DC bus voltage decreases below 50 Vdc. When all indicators are OFF, remove the covers before measuring for dangerous voltages to make sure that the drive is safe. If you do work on the drive when it is energized, it will cause serious injury or death from electrical shock. Do not remove covers or touch circuit boards while the drive is energized. If you touch the internal components of an energized drive, it will cause death or serious injury from electrical shock.

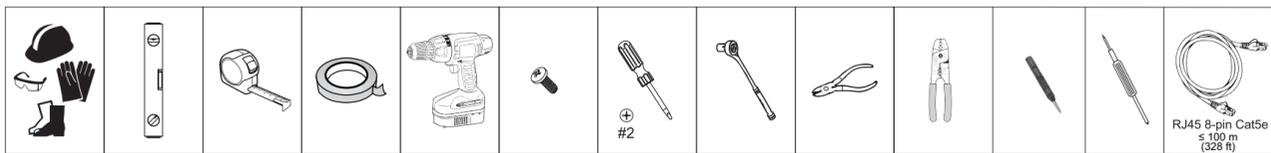
DANGER Fire Hazard
Install a Ground Fault Circuit Interrupter (GFCI) on the power supply side to prevent damage to the power supply system if there is a short circuit. A GFCI will also give overload protection of the wiring, prevent electrical shock, and give ground fault protection against earth leakage fires. You can use a molded-case circuit breaker (MCCB) as a replacement for a GFCI when there is a GFCI in the power supply system. If you do not install a GFCI or MCCB, it will cause death or serious injury from fire or electrical shock cause by electrical leakage.

1 Confirm the Drive and Motor Specifications

AC1PH 200-240V
AC3PH 200-240V
AC3PH 380-480V
50/60Hz

±10% MAX
Un (maximum)
+15% MIN

2 Collect the Required Tools and Equipment



3 Confirm the Correct Drive Installation Environment

DIN Rail Mount

IP20

• 10 Hz to 20 Hz: 1 G (9.8 m/s², 32.15 ft/s²)
• 20 Hz to 55 Hz: 0.6 G (5.9 m/s², 19.36 ft/s²)
• 10 Hz to 20 Hz: 0.4 G (3.9 m/s², 12.79 ft/s²)
• 20 Hz to 55 Hz: 0.2 G (1.9 m/s², 6.23 ft/s²)

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

4 Mount the Drive

DIN Rail Mounting for models B001-B018, 2002-2021, 4001-4012

Standard mounting Models 2030-2082, 4018-4060

35 mm (1.38 in)

Must have external fan

UP

5 Select the Correct Wires, and Wire Strip Length, and Tightening Torque

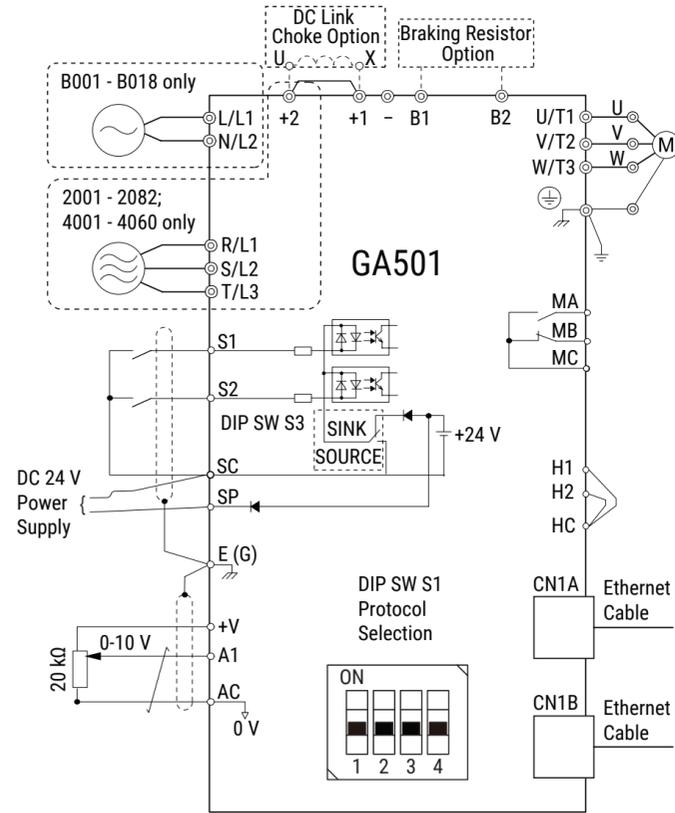
Model	R/L1 or L/L1, S/L2 or N/L2, T/L3			U/T1, V/T2, W/T3			-, +1, +2			B1, B2			mm (in)
	Wire AWG ^{*1}	Torque N-m (lbf-in)	Screw Size	Wire AWG ^{*1}	Torque N-m (lbf-in)	Screw Size	Wire AWG ^{*1}	Torque N-m (lbf-in)	Screw Size	Wire AWG ^{*1}	Torque N-m (lbf-in)	Screw Size	
B001													
B002	14 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	6.5 (0.26)
B004													
B006	14 - 10 (12)			14 - 12 (14)			14 - 10 (12)						8 (0.3)
B010	12 - 10 (10)			14 - 12 (14)			12 - 10 (10)						10 (0.4)
B012	14 - 8 (8)	1.5 - 1.7 (13.5 - 15)	M4	14 - 10 (12)	1.5 - 1.7 (13.5 - 15)	M4	14 - 8 (8)	1.5 - 1.7 (13.5 - 15)	M4	14 - 12 (14)	1.5 - 1.7 (13.5 - 15)	M4	10 (0.4)
B018	12 - 6 (8)			14 - 8 (10)			12 - 6 (8)						10 (0.4)
2001													
2002	14 (14)			14 (14)			14 (14)			14 (14)	0.8 - 1.0 (7.1 - 8.9)	M3.5	6.5 (0.26)
2004													
2006		0.5 - 0.6 (4.4 - 5.3)	M3		0.5 - 0.6 (4.4 - 5.3)	M3		0.5 - 0.6 (4.4 - 5.3)	M3		0.5 - 0.6 (4.4 - 5.3)	M3	
2010	14 - 12 (14)			14 - 12 (14)			14 - 10 (12)			14 - 12 (14)			8 (0.3)
2012	14 - 10 (12)			14 - 10 (12)			12 - 10 (10)						10 (0.4)
2021	14 - 8 (8)			14 - 8 (10)			14 - 8 (8)	1.5 - 1.7 (13.5 - 15)	M4	14 - 10 (14)			10 (0.4)
2030	12 - 6 (8)			12 - 6 (8)			12 - 6 (8)			12 - 8 (12)			10 (0.4)
2042	12 - 6 (6)	1.5 - 1.7 (13.5 - 15)	M4	12 - 6 (6)	1.5 - 1.7 (13.5 - 15)	M4	10 - 2 (4)	≤ AWG 10 (19.8 - 22) 2.3 - 2.5 (19.8 - 22) AWG 8 ≤ 4.1 - 4.5 (36 - 40)	M5	14 - 6 (10)	1.5 - 1.7 (13.5 - 15)	M4	10 (0.4) ^{*2}
2056	10 - 2 (4)	4.1 - 4.5 (36 - 40)	M5	10 - 2 (4)	4.1 - 4.5 (36 - 40)	M5	8 - 2 (2)	4.1 - 4.5 (36 - 40)	M5	12 - 6 (8)			18 (0.71) ^{*3}
2070	6 - 1 (2)	5 - 5.5 (45 - 49)	M6	8 - 1 (2)	5 - 5.5 (45 - 49)	M6	6 - 1/0 (1)	5 - 5.5 (45 - 49)	M6				20 (0.79) ^{*3}
2082	6 - 1/0 (1)			6 - 1 (2)			2 - 2/0 (2/0)			10 - 6 (6)			
4001													
4002													
4004	14 - 12 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 - 12 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 - 12 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	14 - 12 (14)	0.5 - 0.6 (4.4 - 5.3)	M3	8 (0.3)
4005													
4007													
4009													
4012	14 - 10 (12)			12 - 8 (10)			12 - 8 (10)	1.5 - 1.7 (13.5 - 15)	M4	14 - 10 (12)			10 (0.4)
4018	12 - 8 (10)			14 - 8 (10)			14 - 8 (10)						
4023	14 - 6 (8)			14 - 8 (10)			12 - 6 (8)						
4031	12 - 6 (8)	1.5 - 1.7 (13.5 - 15)	M4	12 - 6 (8)	1.5 - 1.7 (13.5 - 15)	M4	12 - 4 (6)	≤ AWG 10 (19.8 - 22) 2.3 - 2.5 (19.8 - 22) AWG 8 ≤ 4.1 - 4.5 (36 - 40)	M5	12 - 8 (10)	1.5 - 1.7 (13.5 - 15)	M4	10 (0.4) ^{*2}
4038	12 - 6 (6)						10 - 2 (4)			14 - 6 (10)			
4044	10 - 2 (4)	4.1 - 4.5 (36 - 40)	M5	12 - 4 (6)	4.1 - 4.5 (36 - 40)	M5	8 - 2 (2)	4.1 - 4.5 (36 - 40)	M5	12 - 6 (8)			18 (0.71) ^{*3}
4060	8 - 2 (2)			10 - 2 (4)			6 - 2 (2)						

*1 Values in bold parentheses are the recommended values.
*2 Strip length for terminals -, +1, +2 is 18 mm (0.71 in).
*3 Strip length for terminals B1, B2 is 10 mm (0.4 in).

6 Select the Correct Branch Circuit Protection from Appendix C

GA501 Quick Setup Procedure for Reference Material

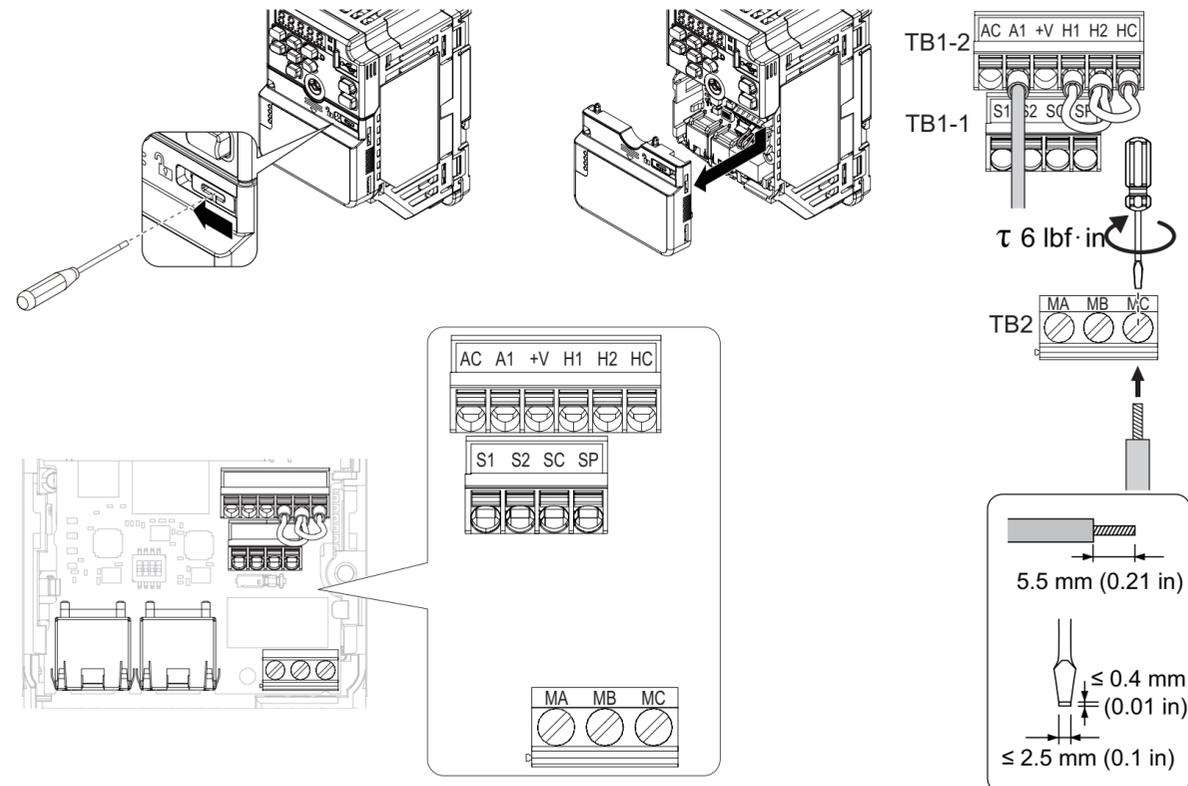
A Connection Diagram and Terminal Functions



Terminal	Type	Signal Level	Default
S1	MFDI selection 1	Photocoupler	Forward run/Stop
S2	MFDI selection 2	24 V, 6 mA	Reverse run/Stop
SP	MFDI power supply +24 Vdc	24 V, 150 mA maximum	-
SC	MFDI selection common	MFDI selection common	-
H1	Safe Disable input 1	24 V, 6 mA Internal impedance: 4.7 kΩ Minimum OFF time: 3 ms	-
H2	Safe Disable input 2	-	-
HC	Safe Disable function common	Safe Disable function common	-
+V	Power supply for frequency setting	10.5 V (20 mA maximum)	-
A1	MFAI 1	0 V ~ 10 V/100% (input impedance: 20 kΩ)	Master frequency reference
AC	Frequency reference common	0 V	-
E(G)	Connect shielded cable	-	-
MA	N.O. output	30 Vdc, 10 mA ~ 1 A	Fault
MB	N.C. output	250 Vac, 10 mA ~ 1 A	Fault
MC	Digital output common	Minimum load: 5 V, 10 mA	-

MFDI: Multi-Function Digital Input
MFAI: Multi-Function Analog Input

B Control Circuit Configuration and Accessibility



C Branch Circuit Protection

Factory-Recommended Branch Circuit Protection for UL Listing

Install one of these types of short circuit protection devices to comply with UL 61800-5-1. Yaskawa recommends semiconductor protective type fuses, but alternative short circuit protection devices are also shown. Alternate BCP fuse selection is based on UL61800-5-1. Where a minimum enclosure volume is specified you must mount the drive in a ventilated enclosure according to the minimum specified enclosure volume.

Short Circuit Current Rating (SCCR)

The maximum SCCR provided by drive and fuse combinations in this document is 100,000 RMS symmetrical amps.

200 V Models: 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.
400 V Models: 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 480 Vac.

Model	Semiconductor Fuse Ratings* ¹		Non-Semiconductor Fuse Ratings* ²			Molded Case Circuit Breaker (MCCB) Ratings* ³			Type E Manual Self Protected Combination Motor Controller (CMC) Ratings* ⁴					
	Semiconductor Fuse Maximum 100 kA SCCR (IP20/Type 1 Standard Enclosure Maximum 31 kA SCCR)		Class CC, J, or T Time Delay Fuse Maximum 100 kA SCCR (IP20/Type 1 Standard Enclosure Maximum 31 kA SCCR)		Class RK1 or RK5 Time Delay Fuse Maximum 31 kA SCCR	MCCB Maximum 31 kA SCCR			Type E Manual Self Protected CMC Rockwell Automation Maximum 65 kA SCCR		Type E Manual Self Protected CMC Schneider Electric Maximum 65 kA SCCR			
	Eaton/Bussmann Part Number	Protected Enclosure Minimum Volume (in ³)	Maximum Rating (A)	Protected Enclosure Minimum Volume (in ³)		Maximum Rating (A)	Protected Enclosure Minimum Volume (in ³)	MCCB (Non-current Limiting Type) Maximum Rating (A)	MCCB (Current Limiting Type) Schneider Electric Part Number	Protected Enclosure Minimum Volume (in ³)	MMP Rating (A)	Rockwell Automation Part Number	MMP Rating (A)	Schneider Electric Part Number
B001	FWH-25A14F	600	3.5	600	3.5	600	15	HLL36015	600	2.5	140-MT-D9E-B25	2.5	GV2P07	GV2GH7
B002	FWH-25A14F	600	6	600	6	600	15	HLL36015	600	4	140-MT-D9E-B40	4	GV2P08	GV2GH7
B004	FWH-60B	600	12	600	12	600	15	HLL36015	600	10	140-MT-D9E-C10	10	GV2P14	GV2GH7
B006	FWH-80BC	600	20	600	20	600	25	HLL36025	600	16	140-MT-D9E-C16	16	GV3P18	GV3G66 + GVAM11
B010	FWH-100BC	960	35	960	35	960	40	HLL36040	960	25	140-MT-F9E-C25	25	GV3P25	GV3G66 + GVAM11
B012	FWH-125B	960	40	960	40	960	45	HLL36045	960	32	140-MT-F9E-C25	32	GV3P32	GV3G66 + GVAM11
B018	FWH-150B	960	60	960	60	960	70	HLL36070	960	45	140-MT-F9E-C45	45	GV3P40	GV3G66 + GVAM11
2001	FWH-25A14F	600	2	600	2	600	15	HLL36015	600	1.6	140-MT-D9E-B16	2.5	GV2P07	GV2GH7
2002	FWH-25A14F	600	3.2	600	3.2	600	15	HLL36015	600	2.5	140-MT-D9E-B25	2.5	GV2P07	GV2GH7
2004	FWH-25A14F	600	6	600	6	600	15	HLL36015	600	4	140-MT-D9E-B40	4	GV2P08	GV2GH7
2006	FWH-25A14F	600	10	600	10	600	15	HLL36015	600	10	140-MT-D9E-C10	10	GV2P14	GV2GH7
2010	FWH-70BC	600	15	600	15	600	15	HLL36015	600	16	140-MT-D9E-C16	13	GV3P13	GV3G66 + GVAM11
2012	FWH-70BC	600	20	600	20	600	20	HLL36020	600	16	140-MT-D9E-C16	16	GV3P18	GV3G66 + GVAM11
2021	FWH-90BC	960	35	960	35	960	40	HLL36040	960	25	140-MT-F9E-C25	25	GV3P25	GV3G66 + GVAM11
2030	FWH-100BC	960	50	960	50	960	60	HLL36060	960	45	140-MT-F9E-C45	40	GV3P40	GV3G66 + GVAM11
2042	FWH-150B	960	70	960	70	960	80	HLL36080	960	-	-	65	GV3P65	GV3G66 + GVAM11
2056	FWH-200B	2240	90	2240	90	2560	110	HLL36110	2560	-	-	-	-	-
2070	FWH-200B	2240	110	2240	110	2560	125	HLL36125	2560	-	-	-	-	-
2082	FWH-225B	2240	125	2240	125	2560	150	HLL36150	2560	-	-	-	-	-
4001	FWH-40B	960	2	960	2	960	15	HLL36015	960	1.6	140-MT-D9E-B16	1.5	GV2P06	GV2GH7
4002	FWH-40B	960	3.5	960	3.5	960	15	HLL36015	960	2.5	140-MT-D9E-B25	2.5	GV2P07	GV2GH7
4004	FWH-50B	960	7	960	7	960	15	HLL36015	960	6.3	140-MT-D9E-B63	6.3	GV2P10	GV2GH7
4005	FWH-70BC	960	9	960	9	960	15	HLL36015	960	6.3	140-MT-D9E-B63	6.3	GV2P10	GV2GH7
4007	FWH-70BC	960	12	960	12	960	15	HLL36015	960	10	140-MT-D9E-C10	10	GV2P14	GV2GH7
4009	FWH-90BC	960	15	960	15	960	15	HLL36015	960	10	140-MT-D9E-C10	10	GV2P14	GV2GH7
4012	FWH-90BC	960	20	960	20	960	20	HLL36020	960	16	140-MT-D9E-C16	18	GV3P18	GV3G66 + GVAM11
4018	FWH-80BC	960	30	960	30	960	35	HLL36035	960	20	140-MT-D9E-C20	25	GV3P25	GV3G66 + GVAM11
4023	FWH-100BC	960	40	960	40	960	40	HLL36040	960	25	140-MT-F9E-C25	25	GV3P25	GV3G66 + GVAM11
4031	FWH-125B	2240	50	2240	50	2560	60	HLL36060	2560	45	140-MT-F9E-C45	40	GV3P40	GV3G66 + GVAM11
4038	FWH-175B	2240	60	2240	60	2560	75	HLL36075	2560	45	140-MT-F9E-C45	50	GV3P50	GV3G66 + GVAM11
4044	FWH-200B	2240	75	2240	75	2560	80	HLL36080	2560	-	-	65	GV3P65	GV3G66 + GVAM11
4060	FWH-200B	2240	100	2240	100	2560	110	HLL36110	2560	-	-	-	-	-

*¹ Yaskawa recommends connecting semiconductor fuses.

*² Maximum CC, J, T, RK1, or RK5 fuse rating is 175% of the Normal Duty VFD full load output amp (FLA) rating. Class T fuses are fast acting (non-time delay) only.

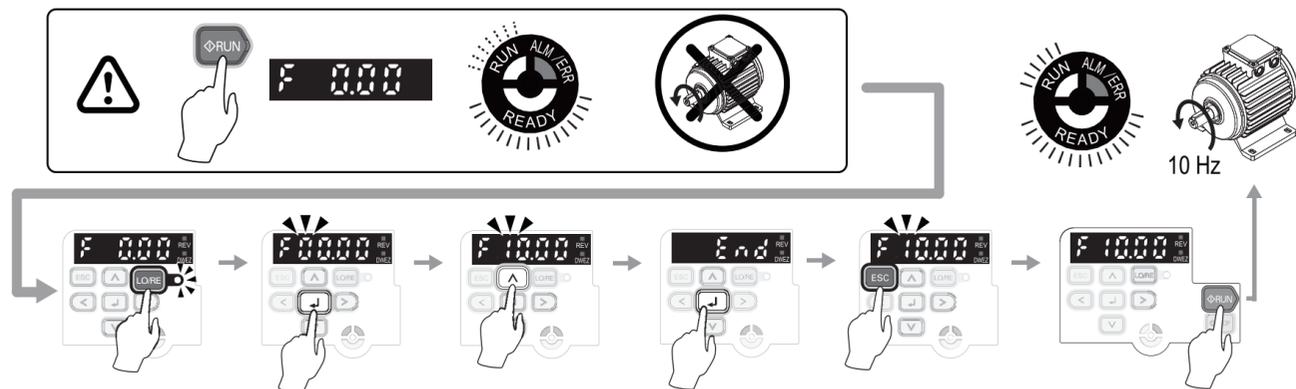
*³ Any UL listed MCCB is approved. Current limiting type MCCBs are an alternate and generally recommended over the non-current limiting type. The maximum MCCB rating is 200% of the Normal Duty VFD full load output amp (FLA) rating. For the MCCB (current limiting type) an equivalent listed current limiting type MCCB can be used where the peak let-through current and I²t of the equivalent MCCB is not greater than the specified MCCB.

*⁴ CMCs are UL Listed for 208 V or 240 V Wye or Delta and 480Y/277V. CMCs are not UL Listed for 480 V Delta, corner ground, or high impedance networks. A Schneider Electric GV2GH7 insulating barrier is required for GV2P devices. A GV3G66 insulating barrier and GVAM11 auxiliary contact/indicator are required for GV3P devices.

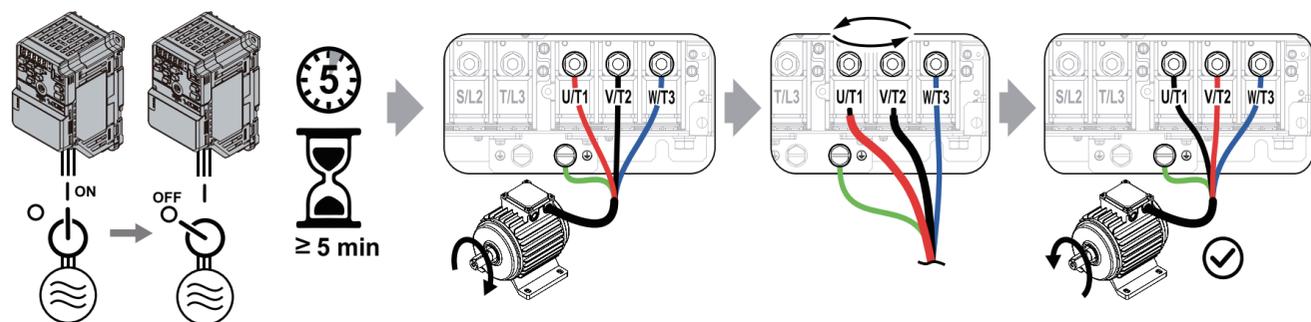
D Parameter Groups

A: Initialization Parameters		d: Reference Settings		H: Terminal Functions		n: Special Adjustment		q: DriveWorksEZ Parameters	
A1	Initialization	d1	Frequency Reference	H1	Digital Inputs	n1	Hunting Prevention	r: DWEZ Connection 1-20	
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	Frequency 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	H7	Virtual MFIO Selection	n7	EZ Drive	T3	ASR and Inertia Tuning
b4	Timer Function	E: Motor Parameters		L: Protection Functions		n8	PM Motor Control Tuning	T4	EZ Tuning
b5	PID Control	E1	V/f Pattern for Motor 1	L1	Motor Protection	nA	PM Motor Control Tuning	U: Monitors	
b6	Dwell Function	E2	Motor Parameters	L2	Power Loss Ride Through	o: Keypad-Related Settings		U1	Operation Status Monitors
b8	Energy Saving	E3	V/f Pattern for Motor 2	L3	Stall Prevention	o1	Keypad Display	U2	Fault Trace
C: Tuning		E4	Motor 2 Parameters	L4	Speed Detection	o2	Keypad Operation	U3	Fault History
C1	Accel & Decel Time	E5	PM Motor Settings	L5	Fault Restart	o3	Copy Keypad Function	U4	Maintenance Monitors
C2	S-Curve Characteristics	E9	Motor Setting	L6	Torque Detection	o4	Maintenance Monitors	U5	PID Monitors
C3	Slip Compensation	F: Ethernet		L7	Torque/Current Limit	o5	Log Function	U6	Operation Status Monitors
C4	Torque Compensation	F1	Fault Detection in PG Speed Control	L8	Drive Protection			U8	DriveWorksEZ Monitors
C5	Automatic Speed Regulator (ASR)	F6	Ethernet Settings						
C6	Duty & Carrier Frequency	F7	Ethernet Options						

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



F If the Motor Does Not Rotate in the Correct Direction



G Communication Protocol Technical Manuals

To program your drive with your selected communication protocol, use the URL or the QR code to download the appropriate protocol technical manual for your application.

	SlxPC7106174W.pdf
	SlxPC7106174S.pdf
	SlxPC7106174T.pdf
	SlxPC7106174U.pdf
	SlxPC7106174V.pdf
	SlxPC7106174X.pdf

<https://www.yaskawa.com/ga501manuals>



Web page for PDF download

H DriveWizard Mobile with Yaskawa Cloud

Start-up, adjust, and monitor Yaskawa AC drives with your smartphone or tablet. Use DriveWizard® Mobile to backup, store, and retrieve your drive settings locally or to your personal Yaskawa Drive Cloud™ account. DriveWizard Mobile is the mobile app version of Yaskawa's Drive Wizard PC Tools.



App download

<https://www.yaskawa.com/dwm>

I Additional Resources



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



Product Manuals
•PDFs
•EDS, ESI, GSDML files
<https://www.yaskawa.com/ga501manuals>

J Customer Feedback

Comments or questions about this document? Fill out our online form:



Email us: technical_documentation@yaskawa.com
Call us: 1-800-YASKAWA (927-5292)
www.yaskawa.com/DRV-F-0006

Please consider following us on social media:

www.youtube.com/yaskawayea
 www.linkedin.com/company/18822

Headquarters Address:

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

- DriveWizard is a registered trademark of Yaskawa America, Inc. and is registered in the U.S. Patent and Trademark Office.
- QR Code is a registered trademark of DENSO WAVE INCORPORATED.
- Google Play and the Google Play logo are trademarks of Google LLC.
- Apple and the Apple logo are trademarks of Apple Inc., registered in the U.S. and other countries.
- App Store is a service mark of Apple Inc.