YASKAWA

GA500 AC MICRODRIVE

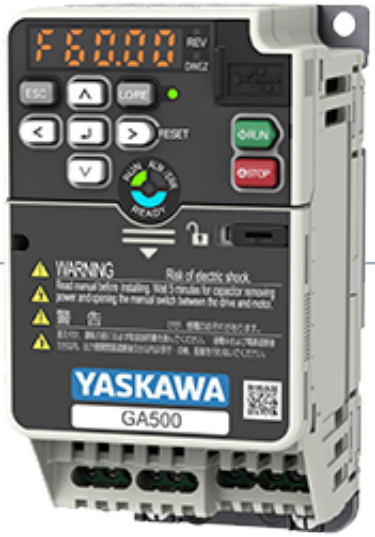
MANUAL SUPPLEMENT FOR SINGLE-PHASE DERATE BRANCH CIRCUIT PROTECTION

AC MICRODRIVE FOR INDUSTRIAL APPLICATIONS

AFFECTED DOCUMENTS:

GA500 Installation & Primary Operation (TOEPC71061752)
GA500 Technical Reference (SIEPC71061752)
GA500 Quick Setup Procedure (TOEPC71061769)

PDF
yaskawa.com/TOEPYAISUP17



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DOCUMENT NUMBER: TOEPYAISUP17

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Supplemental Information - Applicable Documents

The contents of this supplement apply to the product instructions in Table 1.1.

Table 1.1 Affected Documents

Drive Series	Document
GA500	Installation & Primary Operation (TOEPC71061752)
	Technical Reference (SIEPC71061752)
	Quick Setup Procedure (TOEPC71061769)

2

Single-Phase Input Derated Drives and Reactors

Use Table 2.1 to select the drive and/or reactors needed for the application.

Table 2.1 Drive Selection

240 Volt, Single-Phase Input, Three-Phase Output								
Drive Catalog Code GA50U. . *1 *2	No Reactor		With Reactor					
	Drive Output Capacity		Drive Output Capacity		AC Input Type		DC Bus Type	
					Open	NEMA 1 Enclosed	Open	NEMA 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Catalog Code	Catalog Code	Catalog Code	Catalog Code
2001	-	-	1/8	0.61	URX000283	URX000652	URX000033	URX000215
2002	1/8	0.61	1/4	1.16	URX000291	URX000651	URX000036	URX000207
2004	1/4	1.16	1/3	1.52	URX000295	URX000409	05P00608-3007	URX000208
2006	1/3	1.52	1/2	2.20	URX000299	URX000410	05P00608-3007	URX000208
2010	1/2	2.2	1	4.20	URX000303	URX000411	URX000043	N/A
2012	1	4.2	1.5	6.00	URX000307	URX000413	05P00620-0113	URX000435
2021	1.5	6	3	9.60	URX000315	URX000418	05P00620-0115	URX000259
2030	1.5	6	3	9.60	URX000315	URX000418	05P00620-0115	URX000259
2042	3	9.6	5	15.20	URX000323	URX000422	05P00620-0120	URX000261
2056	3	9.6	5	15.20	URX000323	URX000422	05P00620-0120	URX000261
2070	5	15.2	10	28.00	URX000329	URX000501	URX000064	URX000213
2082	7.5	22	10	28.00	URX000329	URX000501	URX000063	URX000264

*1 This information reflects derating of three phase drives for single phase input applications. Refer to the Single Phase Converter Installation and Operation Manual (TOEPYAISPC01) to achieve full power with no derating on some drives.

*2 Select partial catalog code from this single phase table. Get complete catalog code from Three Phase Drive tables based on enclosure type.

480 Volt, Single-Phase Input (-5 % to +10 %), 460V Three-Phase Output								
Drive Catalog Code GA50U. . *1 *2	No Reactor		With Reactor					
	Drive Output Capacity		Drive Output Capacity		AC Input Type		DC Bus Type	
					Open	NEMA 1 Enclosed	Open	NEMA 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Catalog Code	Catalog Code	Catalog Code	Catalog Code
4001	1/8	0.3	1/3	0.6	URX000291	URX000651	URX000036	N/A
4002	1/4	0.6	1/3	0.8	URX000291	URX000651	URX000036	N/A

480 Volt, Single-Phase Input (-5 % to +10 %), 460V Three-Phase Output								
Drive Catalog Code GA50U. . *1 *2	No Reactor		With Reactor					
	Drive Output Capacity		Drive Output Capacity		AC Input Type		DC Bus Type	
					Open	NEMA 1 Enclosed	Open	NEMA 1 Enclosed
	Motor Power (HP)	Motor FLA	Motor Power (HP)	Motor FLA	Catalog Code	Catalog Code	Catalog Code	Catalog Code
4004	1/2	1.1	1	2.1	URX000299	URX000410	URX000040	N/A
4005	1	2.1	2	3.0	URX000304	URX000504	05P00620-0110	URX000257
4007	1	2.1	2	3.4	URX000304	URX000504	05P00620-0111	URX000208
4009	2	3.4	3	4.8	URX000308	URX000414	05P00652-0213	URX000209
4012	2	3.4	3	4.8	URX000308	URX000414	05P00652-0213	URX000209
4018	2	3.4	3	5	URX000308	URX000414	05P00652-0213	URX000209
4023	3	4.8	5	8	URX000313	URX000417	URX000048	URX000210
4031	3	4.8	7.5	11	URX000316	URX000419	URX000052	URX000211
4038	5	7.6	10	14	URX000320	URX000421	URX000055	URX000223
4044	5	7.6	10	14	URX000320	URX000421	URX000055	URX000223
4060	7.5	11	15	21	URX000327	URX000425	URX000057	URX000184

*1 This information reflects derating of three phase drives for single phase input applications. Refer to the Single Phase Converter Installation and Operation Manual (TOEPYAISPC01) to achieve full power with no derating on some drives.

*2 Select partial catalog code from this single phase table. Get complete catalog code from Three Phase Drive tables based on enclosure type.

3

Wire Selection

Use this section to select the correct wires for main circuit wiring.

Wire Selection Precautions

⚠WARNING

Electrical Shock Hazard

De-energize the drive and wait 5 minutes minimum until the Charge LED turns off. Remove the front cover and terminal cover to do work on wiring, circuit boards, and other parts. Use terminals for their correct function only.

Incorrect wiring, incorrect ground connections, and incorrect repair of protective covers can cause death or serious injury.

3.1 240 V Class Recommended Wiring

Wire gauge recommendations for GA500 single-phase application of three-phase VFDs. Recommendation based on UL 61800-5-1 Table 4.3.8.8.2DV.1 for 75 °C Copper wires for an ambient temperature within 40 °C. Recommended wiring for ⊖, ⊕1, ⊕2 only when DC type additional impedance is used. For other applications of these terminals please refer to local codes for wire sizing.

Table 3.1 Recommended Wire Gauge for 240 V Models

Drive Catalog Code GA50U. .	Terminal *4	230V 3PH Motor		200V 3PH Motor		Terminal Wire Range *3 AWG, kcmil	Terminal Information			Tightening Torque N-m (lb.in.)
		Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil	Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil		Screw Size	Terminal Shape	Wire Stripping Length mm	
2001	R/L1, S/L2	-	14	-	14	30 - 12	M3	Slotted (-)	6.5	0.5 - 0.6 (4.4 - 5.3)
	U/T1, V/T2, W/T3	-	14	-	14	30 - 12	M3	Slotted (-)	6.5	
	⊖, ⊕1, ⊕2	-	14	-	14	30 - 12	M3	Slotted (-)	6.5	
	B1, B2	-	-	-	-	30 - 12	M3	Slotted (-)	6.5	
	GND	-	14	-	14	14	M3.5	Phillips / Slotted Combo	-	0.8 - 1.0 (7.1 - 8.9)
2002 2004 2006	R/L1, S/L2	14	14	14	14	30 - 12	M3	Slotted (-)	6.5	0.5 - 0.6 (4.4 - 5.3)
	U/T1, V/T2, W/T3	14	14	14	14	30 - 12	M3	Slotted (-)	6.5	
	⊖, ⊕1, ⊕2	-	14	-	14	30 - 12	M3	Slotted (-)	6.5	
	B1, B2	-	-	-	-	30 - 12	M3	Slotted (-)	6.5	
	GND	14	14	14	14	14	M3.5	Phillips / Slotted Combo	-	0.8 - 1.0 (7.1 - 8.9)
2010 2012	R/L1, S/L2	14	14	14	14	30 - 10	M3	Slotted (-)	8	0.5 - 0.6 (4.4 - 5.3)
	U/T1, V/T2, W/T3	14	14	14	14	30 - 10	M3	Slotted (-)	8	
	⊖, ⊕1, ⊕2	-	14	-	14	30 - 10	M3	Slotted (-)	8	
	B1, B2	-	-	-	-	30 - 10	M3	Slotted (-)	8	
	GND	14	14	14	14	14 - 10	M4	Phillips / Slotted Combo	-	1.2 - 1.5 (10.6 - 13.3)
2021	R/L1, S/L2	12	10	12	10	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	14	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	12	-	12	20 - 6	M4	Slotted (-)	10	
	B1, B2	-	-	-	-	20 - 6	M4	Slotted (-)	10	
	GND	12	12	12	12	14 - 10	M4	Phillips / Slotted Combo	-	1.2 - 1.5 (10.6 - 13.3)
2030	R/L1, S/L2	12	10	12	10	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	14	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	12	-	12	20 - 6	M4	Slotted (-)	10	
	B1, B2	-	-	-	-	20 - 6	M4	Slotted (-)	10	
	GND	10	10	10	10	10 - 6	M5	Phillips / Slotted Combo	-	2.0 - 2.5 (17.7 - 22.1)

Drive Catalog Code GA50U. .	Terminal *4	230V 3PH Motor		200V 3PH Motor		Terminal Wire Range *3 AWG, kcmil	Terminal Information			Tightening Torque N-m (lb.in.)
		Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil	Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil		Screw Size	Terminal Shape	Wire Stripping Length mm	
2042	R/L1, S/L2	8	8	8	8	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	12	14	10	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	8	-	8	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	10	10	10	10	10 - 6	M5	Phillips / Slotted Combo	-	2.0 - 2.5 (17.7 - 22.1)
2056	R/L1, S/L2	8	8	8	8	8 - 2	M5	Slotted (-)	18	4.1 - 4.5 (36 - 40)
	U/T1, V/T2, W/T3	14	12	14	8	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	⊖, ⊕1, ⊕2	-	8	-	8	8 - 2	M5	Slotted (-)	18	4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	8	8	8	8	8 - 4	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)
2070	R/L1, S/L2	6	4	6	4	16 - 2/0	M6	Hex Socket Cap (WAF: 5mm)	20	5 - 5.5 (45 - 49)
	U/T1, V/T2, W/T3	12	8	10	8	16 - 2/0	M6		20	
	⊖, ⊕1, ⊕2	-	6	-	6	16 - 2/0	M6		20	
	B1, B2	-	-	-	-	16 - 2/0	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	6	6	6	6	6 - 4	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)
2082	R/L1, S/L2	4	4	4	4	16 - 2/0	M6	Hex Socket Cap (WAF: 5mm)	20	5 - 5.5 (45 - 49)
	U/T1, V/T2, W/T3	10	8	8	8	16 - 2/0	M6		20	
	⊖, ⊕1, ⊕2	-	4	-	4	16 - 2/0	M6		20	
	B1, B2	-	-	-	-	16 - 2/0	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	6	6	6	6	6 - 4	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)

*1 Please refer to local codes while selecting wire size for terminals ⊖, ⊕1, ⊕2 if these terminals need to be used for other optional power devices.

*2 The wire size recommended for terminal ⊖, ⊕1, ⊕2 is for DC type additional impedance only. Please see the additional impedance type recommended in *Short Circuit Protection Requirements for UL Listing on page 13* before choosing wire size for terminals ⊖, ⊕1, ⊕2.

*3 Terminal wire range is the range of wire sizes the terminals can accept. This information is intended to keep within the wire range of the terminals while selecting a wire size for the terminals per local codes for the intended application of these terminals.

*4 The GND wire sizing recommended here is for the largest branch circuit protective device as recommended in *Short Circuit Protection Requirements for UL Listing on page 13*. Please refer to national and/or local codes while selecting equipment grounding conductor (GND)for other branch circuit protection devices.

3.2 480 V Class Recommended Wiring

Wire gauge recommendations for GA500 single-phase application of three-phase VFDs. Recommendation based on UL 61800-5-1 Table 4.3.8.8.2DV.1 for 75 °C Copper wires for an ambient temperature within 40 °C. Recommended wiring for ⊖, ⊕1, ⊕2 only when DC type additional impedance is used. For other applications of these terminals please refer to local codes for wire sizing.

Table 3.2 Recommended Wire Gauge for 480 V Models

Drive Catalog Code GA50U. .	Terminal *4	460V 3PH Motor		380-415V 3PH Motor		Terminal Wire Range *3 AWG, kcmil	Terminal Information			Tightening Torque N-m (lb.in.)
		Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil	Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil		Screw Size	Terminal Shape	Wire Stripping Length mm	
4001 4002 4004 4005 4007 4009	R/L1, S/L2	14	14	14	14	30 - 10	M3	Slotted (-)	8	0.5 - 0.6 (4.4 - 5.3)
	U/T1, V/T2, W/T3	14	14	14	14	30 - 10	M3	Slotted (-)	8	
	⊖, ⊕1, ⊕2	-	14	-	14	30 - 10	M3	Slotted (-)	8	
	B1, B2	-	-	-	-	30 - 10	M3	Slotted (-)	8	
	GND	14	14	14	14	14 - 10	M4	Phillips / Slotted Combo	-	1.2 - 1.5 (10.6 - 13.3)
4012	R/L1, S/L2	14	14	14	14	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	14	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	14	-	14	20 - 6	M4	Slotted (-)	10	
	B1, B2	-	-	-	-	20 - 6	M4	Slotted (-)	10	
	GND	14	14	14	14	14 - 10	M4	Phillips / Slotted Combo	-	1.2 - 1.5 (10.6 - 13.3)
4018	R/L1, S/L2	14	14	14	14	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	14	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	14	-	14	20 - 6	M4	Slotted (-)	10	
	B1, B2	-	-	-	-	20 - 6	M4	Slotted (-)	10	
	GND	14	14	14	14	14 - 6	M5	Phillips / Slotted Combo	-	2.0 - 2.5 (17.7 - 22.1)
4023	R/L1, S/L2	12	12	12	12	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	14	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	12	-	12	20 - 6	M4	Slotted (-)	10	
	B1, B2	-	-	-	-	20 - 6	M4	Slotted (-)	10	
	GND	10	10	10	10	10 - 6	M5	Phillips / Slotted Combo	-	2.0 - 2.5 (17.7 - 22.1)
4031	R/L1, S/L2	12	10	12	10	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	14	14	12	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	12	-	12	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	10	10	10	10	10 - 6	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)

Drive Catalog Code GA50U. .	Terminal *4	460V 3PH Motor		380-415V 3PH Motor		Terminal Wire Range *3 AWG, kcmil	Terminal Information			Tightening Torque N-m (lb.in.)
		Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil	Recomm. Gauge Without Additional Impedance *1 AWG, kcmil	Recomm. Gauge With Additional Impedance *2 AWG, kcmil		Screw Size	Terminal Shape	Wire Stripping Length mm	
4038	R/L1, S/L2	10	8	10	8	20 - 6	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	U/T1, V/T2, W/T3	14	12	14	10	20 - 6	M4	Slotted (-)	10	
	⊖, ⊕1, ⊕2	-	10	-	10	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	10	10	10	10	10 - 6	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)
4044	R/L1, S/L2	10	8	10	8	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	U/T1, V/T2, W/T3	14	12	14	10	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	⊖, ⊕1, ⊕2	-	10	-	10	8 - 2	M5	Slotted (-)	18	4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	10	10	10	10	10 - 6	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)
4060	R/L1, S/L2	8	8	8	8	8 - 2	M5	Slotted (-)	18	4.1 - 4.5 (36 - 40)
	U/T1, V/T2, W/T3	14	10	12	8	8 - 2	M5	Slotted (-)	18	• ≤ AWG 10 2.3 - 2.5 (19.8 - 22) • AWG 8 ≤ 4.1 - 4.5 (36 - 40)
	⊖, ⊕1, ⊕2	-	8	-	8	8 - 2	M5	Slotted (-)	18	4.1 - 4.5 (36 - 40)
	B1, B2	-	-	-	-	8 - 2	M4	Slotted (-)	10	1.5 - 1.7 (13.5 - 15)
	GND	10	10	10	10	10 - 6	M6	Phillips / Slotted Combo	-	5.4 - 6.0 (47.8 - 53.1)

*1 Please refer to local codes while selecting wire size for terminals ⊖, ⊕1, ⊕2 if these terminals need to be used for other optional power devices.

*2 The wire size recommended for terminal ⊖, ⊕1, ⊕2 is for DC type additional impedance only. Please see the additional impedance type recommended in *Short Circuit Protection Requirements for UL Listing on page 13* before choosing wire size for terminals ⊖, ⊕1, ⊕2.

*3 Terminal wire range is the range of wire sizes the terminals can accept. This information is intended to keep within the wire range of the terminals while selecting a wire size for the terminals per local codes for the intended application of these terminals.

*4 The GND wire sizing recommended here is for the largest branch circuit protective device as recommended in *Short Circuit Protection Requirements for UL Listing on page 13*. Please refer to national and/or local codes while selecting equipment grounding conductor (GND)for other branch circuit protection devices.

4

Short Circuit Protection Requirements for UL Listing

⚠WARNING

Electrical Shock Hazard

After the input protective device trips, do not immediately energize the drive or operate peripheral devices. Wait for the time specified on the warning label at a minimum and make sure that all indicators are OFF. Then check the wiring and peripheral device ratings to find the cause of the problem. If you do not know the cause of the problem, contact Yaskawa before you energize the drive or peripheral devices.

If you do not fix the problem before you operate the drive or peripheral devices, it can cause serious injury or death.

4.1 UL Compliance

Install one of these types of short circuit protection devices in *Short Circuit Protection Requirements for UL Listing on page 13* to comply with UL 61800-5-1. Semiconductor protective type fuses are recommended, but the table also shows alternative short circuit protection devices.

When you use MCCBs you must mount the drive in a ventilated enclosure according to the minimum enclosure volume specified in this document.

◆ Molded Case Circuit Breaker (MCCB) Ratings

- When you use MCCBs you must mount the drive in a ventilated enclosure according to the minimum enclosure volume specified in this document.

  Note:

  When you use MCCBs, current limiting type are recommended, but not required.

◆ Short Circuit Current Rating (SCCR)

The maximum SCCR provided by drive and fuse, or drive and MCCB combinations in this document, is 31,000 RMS symmetrical amps.

- **240 V models:** Use the protection specified in this document to prepare the drive for use on a circuit capable of delivering not more than 31,000 RMS symmetrical amps and not more than 240 Vac.
- **480 V models:** Use the protection specified in this document to prepare the drive for use on a circuit capable of delivering not more than 31,000 RMS symmetrical amps and not more than 480 Vac.

◆ Electric Code Compliance

The user must provide short circuit protection to protect input branch circuits as specified by the National Electric Code (NEC), the Canadian Electric Code, Part 1 (CEC), and local codes.

4.2 240 V Short Circuit Protection

Table 4.1 230 V Motors Without Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
2001	FWH-25A14F	-	-	600
2002	FWH-25A14F	2	15	600
2004	FWH-25A14F	3.2	15	600
2006	FWH-25A14F	4	15	600
2010	FWH-70B	7	15	600
2012	FWH-70B	12	15	600
2021	FWH-90B	17.5	15	960
2030	FWH-100B	17.5	15	960
2042	FWH-150B	30	20	960
2056	FWH-200B	35	20	2560
2070	FWH-200B	50	30	2560
2082	FWH-225B	70	50	2560

Table 4.2 230 V Motors With Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
2001	FWH-25A14F	1.25	15	600
2002	FWH-25A14F	2.25	15	600
2004	FWH-25A14F	3.2	15	600
2006	FWH-25A14F	4.5	15	600
2010	FWH-70B	8	15	600
2012	FWH-70B	12	15	600
2021	FWH-90B	20	20	960
2030	FWH-100B	20	20	960
2042	FWH-150B	35	30	960
2056	FWH-200B	35	30	2560
2070	FWH-200B	60	60	2560
2082	FWH-225B	70	60	2560

Table 4.3 200 V Motors Without Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
2001	FWH-25A14F	-	-	600
2002	FWH-25A14F	2	15	600
2004	FWH-25A14F	3.2	15	600
2006	FWH-25A14F	4	15	600
2010	FWH-70B	7	15	600
2012	FWH-70B	12	15	600
2021	FWH-90B	20	15	960
2030	FWH-100B	20	15	960
2042	FWH-150B	35	20	960
2056	FWH-200B	35	20	2560
2070	FWH-200B	50	35	2560
2082	FWH-225B	70	50	2560

Table 4.4 200 V Motors With Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
2001	FWH-25A14F	1.25	15	600
2002	FWH-25A14F	2.25	15	600
2004	FWH-25A14F	3.2	15	600
2006	FWH-25A14F	4.5	15	600
2010	FWH-70B	8	15	600
2012	FWH-70B	12	15	600
2021	FWH-90B	20	20	960
2030	FWH-100B	20	20	960
2042	FWH-150B	35	35	960
2056	FWH-200B	50	50	2560
2070	FWH-200B	60	60	2560
2082	FWH-225B	70	60	2560

4.3 480 V Short Circuit Protection

Table 4.5 460 V Motor Without Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
4001	FWH-40B	1	15	960
4002	FWH-40B	1.6	15	960
4004	FWH-50B	3.5	15	960
4005	FWH-70B	6	15	960
4007	FWH-70B	6	15	960
4009	FWH-90B	10	15	960
4012	FWH-90B	12	15	960
4018	FWH-80B	12	15	960
4023	FWH-100B	17.5	15	960
4031	FWH-125B	17.5	15	2560
4038	FWH-175B	25	15	2560
4044	FWH-200B	25	15	2560
4060	FWH-200B	35	25	2560

Table 4.6 460 V Motor With Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
4001	FWH-40B	1.25	15	960
4002	FWH-40B	1.8	15	960
4004	FWH-50B	4.5	15	960
4005	FWH-70B	6	15	960
4007	FWH-70B	7	15	960
4009	FWH-80B	10	15	960
4012	FWH-80B	10	15	960
4018	FWH-80B	10	15	960
4023	FWH-100B	17.5	15	960
4031	FWH-125B	25	20	2560
4038	FWH-175B	30	25	2560
4044	FWH-200B	30	25	2560
4060	FWH-200B	50	40	2560

Table 4.7 380 V Motor Without Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
4001	FWH-40B	1	15	960
4002	FWH-40B	1.6	15	960
4004	FWH-50B	3.5	15	960
4005	FWH-70B	6	15	960
4007	FWH-70B	6	15	960
4009	FWH-80B	10	15	960
4012	FWH-80B	12	15	960
4018	FWH-80B	12	15	960
4023	FWH-100B	17.5	15	960
4031	FWH-125B	17.5	15	2560
4038	FWH-175B	25	15	2560
4044	FWH-200B	25	15	2560
4060	FWH-200B	40	25	2560

Table 4.8 380 V Motor With Drive Input Impedance

Drive Catalog Code GA50U. .	Ventilated Protected Enclosure Not Required		Ventilated Protected Enclosure Required	
	Semiconductor Fuse Manuf: Bussmann	Class CC, J, or T Fuse Maximum Amps	MCCB Maximum Amps	Enclosure Volume Minimum (in)3
4001	FWH-40B	1.25	15	960
4002	FWH-40B	1.8	15	960
4004	FWH-50B	4.5	15	960
4005	FWH-70B	6	15	960
4007	FWH-70B	8	15	960
4009	FWH-80B	10	15	960
4012	FWH-80B	10	15	960
4018	FWH-80B	10	15	960
4023	FWH-100B	17.5	15	960
4031	FWH-125B	25	25	2560
4038	FWH-175B	30	30	2560
4044	FWH-200B	30	30	2560
4060	FWH-200B	50	50	2560

Revision History

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October 2021	<0>	All	Initial release

YASKAWA

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In the event that the end user of this product is to be the military and said product is to be employed in any weapons systems or the manufacture thereof, the export will fall under the relevant regulations as stipulated in the Foreign Exchange and Foreign Trade Regulations. Therefore, be sure to follow all procedures and submit all relevant documentation according to any and all rules, regulations and laws that may apply.
Specifications are subject to change without notice for ongoing product modifications and improvements.

Original Instructions

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