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APPLICATION NOTE	FEA-ACDR-AN-204

Single-Phase Power Source to a Three-Phase MEGA(G2) VFD *Model Selection, Wiring, & Function Code*

Inverter type	FRENIC-MEGA(G2) series
Software version	All versions
Required options	None
Related documentation	Instruction Manual FEA-ACDR-IN-125
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Introduction:

This application note advises the proper selection, wiring, and function code setup, to apply a three-phase **FRENIC-MEGA G2** drive fed from a single-phase input power supply.

All Fuji Mega G2 drives are three-phase output and should be connected to three-phase motors regardless of the drive's input power.

Mega G2 Model Number Selection:

Refer to Table 1, 2, 3A & 3B, 4A & 4B to select the proper Mega G2 model number & drive size to operate with a single-phase power input, whose selection is based on the input voltage, motor 3 PH amps, duty cycle, and Nominally Applied motor HP required.

Note: If you do not know the nameplated full-load Amps of the motor, refer to Table 430.250 in the NEC Handbook for typical motor FLA.

Additionally, a DC reactor is needed to be used with the drive selected. Mega G2 drives containing a W in the model number have separately mounted DC reactors included.

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Table 1: 230V single phase input for a 3 Phase VFD HND duty, 120% OL for 1 minute

model number		Specifications 230V with HND overload duty - 120% OL for 1 minute																
model # (FRN_ _ _ _G2S-2GU)		0003	0005	0008	0011	0018	0032	0046	0059	0075	0088	0115	0146	0180	0215	0288 *3	0346 *3	0432 *3
Nominally Applied motor (HP) (output rating) with 1 PH input *1		1/4	1/2	1	1.5	3	5	7.5	10	10	15	20	25	30	30	30	40	50
Output Ratings	Rated Capacity (kVA) *2	0.76	1.23	1.87	2.51	4.38	9.15	11.94	12.73	15.52	17.51	23.08	29.44	37.00	37.80	40.59	52.12	59.29
	Rated Current (A)	1.9	3.1	4.7	6.3	11	23	30	32.0	39.0	44.0	58.0	74.0	93.0	95.0	102.0	131.0	149.0
Input Ratings	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Rated Current (with DCR) (A)	3.1	5.3	9.5	13.2	22	42.7	60.7	80.1	97	112.0	151.0	185	225	223	202	258	203
	Voltage, Frequency	Single-phase, 200 to 240V, 50/60Hz																
	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%																

*1 US 4P standard induction motor
*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series
*3 Model numbers with a G2W are provided with DC reactor

Table 2: 230V single phase input for a 3 Phase VFD HHD duty, 150% OL for 1 minute

Item		Specifications 230V with HHD duty - 150% overload for 1 minute																
Model # (FRN_ _ _ _G2S-2GU)		0003	0005	0008	0011	0018	0032	0046	0059	0075	0088	0115	0146	0180	0215	0288 *3	0346 *3	0432 *3
Nominally Applied motor (HP) (output rating) with 1 PH input *1		1/4	1/2	1	1.5	3	3	5	7.5	10	10	15	20	25	30	30	40	40
Output Ratings	Rated Capacity (kVA) *2	0.76	1.23	1.87	2.51	4.38	6.76	9.15	10.35	13.13	15.12	17.91	24.27	29.84	37.00	37.80	43.37	52.12
	3 PH Rated Current (A)	1.9	3.1	4.7	6.3	11	17	23	26.0	33.0	38.0	45.0	61.0	75	93	95	109	131
Input Ratings	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	1 PH Rated Current (with DCR) (A)	3.1	5.3	9.5	13.2	22	31.5	42.7	60.7	80.1	97.0	112.0	151	185	225	228	218	252
	Voltage, Frequency	Single-phase, 200 to 240V, 50/60Hz																
	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%																

*1 US 4P standard induction motor
*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series
*3 Model numbers with a G2W are provided with a DC reactor

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Table 3A: 460V single phase input for a 3 Phase VFD HND duty, 120% OL for 1 minute

Item		Specifications - 460 V with HND duty - 120% overload for 1 minute													
Model # (FRN_ _ _ _G2S-4GU)		0002	0003	0004	0006	0009	0018	0023	0035	0041	0045	0060	0085	0105	0139
Nominally Applied motor (HP) (output rating) *1		1/4	1/2	1	1 1/2	3	5	7.5	10	10	15	20	25	30	30
Output Ratings	Rated Capacity (kVA) *2	0.72	1.19	1.91	2.39	4.46	8.75	11.94	13.53	16	18	23	29	37	43
	Rated Current (A)	0.9	1.5	2.4	3	5.6	11.0	15.0	17.0	20.0	23.0	29.0	37.0	46.0	54.0
Input Ratings	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Rated Current (with DCR) (A)	1.7	3.1	5.9	8.2	13	23.2	33	43.8	52.3	60.6	77.9	94.3	114	134
	Voltage, Frequency	Single-phase, 380 to 480V, 50/60Hz													
	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%													

*1 US 4P standard induction motor

*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series

Table 3B: 460V single phase input for a 3 Phase VFD HND duty, 120% OL for 1 minute

Item		Specifications - 460 V with HND duty - 120% overload for 1 minute										
Model # (FRN_ _ _ _G2W-4GU) *3		0179	0217	0261	0376	0431	0547	0610	0840	1039	1169	1480
Nominally Applied motor (HP) (output rating) *1		40	50	50	75	100	100	125	200	200	250	400
Output Ratings	Rated Capacity (kVA) *2	47	56	65	96	116	128	161	229	259	306	461
	Rated Current (A)	59.0	70.0	82.0	121.0	146.0	161.0	202.0	288.0	326	384	579
Input Rating	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Rated Current (with DCR) (A)	110	132	158	226	283	309	392	558	633	717	1060
	Voltage, Frequency	Single-phase, 380 to 480V, 50/60Hz										
	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%										

*1 US 4P standard induction motor

*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series

*3 Model numbers with a G2W are provided with a DC reactor

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Table 4A: 460V single phase input for a 3 Phase VFD HHD duty, 150% OL for 1 minute

Item		Specifications - 460V with HHD duty - 150% overload for 1 minute													
Model # (FRN_ _ _ _G2S-4GU)		0002	0003	0004	0006	0009	0018	0023	0035	0041	0045	0060	0085	0105	0139
Nominally Applied motor (HP) (output rating) *1		1/4	1/2	1	1 1/2	3	3	5	7.5	10	10	15	20	25	30
Output Ratings	Rated Capacity (kVA) *2	0.72	1.19	1.91	2.39	4.46	6.37	9.55	10.35	14	16	18	24	30	36
Output Ratings	Rated Current (A)	0.9	1.5	2.4	3	5.6	8.0	12.0	13.0	17.0	20.0	23.0	30.0	38.0	45.0
Input Ratings	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Input Ratings	Rated Current (with DCR) (A)	1.7	3.1	5.9	8.2	13	17.3	23.2	33	43.8	52.3	60.6	77.9	94.3	114
Input Ratings	Voltage, Frequency	Single-phase, 380 to 480V, 50/60Hz													
Input Ratings	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%													

*1 US 4P standard induction motor

*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series

Table 4B: 460V single phase input for a 3 Phase VFD HHD duty, 150% OL for 1 minute

Item		Specifications - 460V with HHD duty - 150% overload for 1 minute										
Model # (FRN_ _ _ _G2W-4GU) *3		0179	0217	0261	0376	0431	0547	0610	0840	1039	1169	1480
Nominally Applied motor (HP) (output rating) *1		30	40	50	60	75	100	100	150	150	200	300
Output Ratings	Rated Capacity (kVA) *2	36	49	57	82	97	119	133	184	259	236	373
Output Ratings	Rated Current (A)	45.0	61.0	72.0	103.0	122.0	149.0	167.0	231.0	326	297	469
Input Rating	Rated Current (w/o DCR) (A)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Input Rating	Rated Current (with DCR) (A)	140	113	137	192	234	286	319	446	512	575	892
Input Rating	Voltage, Frequency	Single-phase, 380 to 480V, 50/60Hz										
Input Rating	Allowable Voltage/Frequency	Voltage: +10 to -10%, Frequency: +5 to -5%										

*1 US 4P standard induction motor

*2 Rated capacity is calculated assuming the rated voltage as 230V for 230V and 460V for 460V series

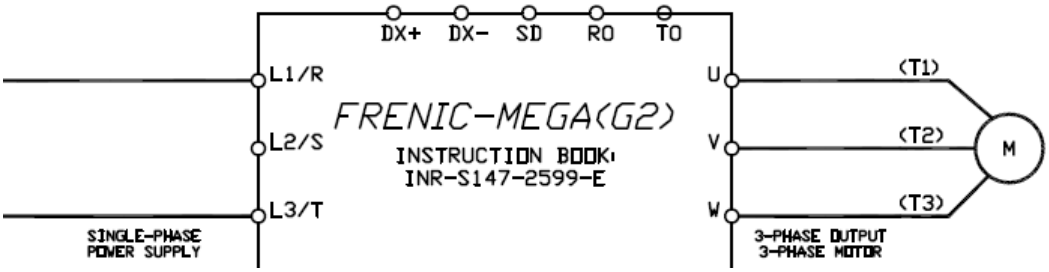
*3 Model numbers with a G2W are provided with a DC reactor

Mega G2 1 PH Wiring:

Referring to Figure 5, the single-phase power leads are to be connected to the L1/R and L3/T input terminals on the Mega G2 drive.

Take care to size the input wiring per input amp ratings shown in Table 1, 2, 3A & 3B, 4A & 4B as the single-phase input amps are much higher than the rated 3PH output amps.

Figure 5



Note: Strongly recommend using a DC reactor for this application.

Function Code Setting:

Function Code H98 combines several different detection functions into a single function code. This is accomplished by using a binary counting system in which each detection function corresponds to a bit in the binary number, and is represented as being turned “on or off” by setting that bit to 1 or 0 (“high or low”).

Detect input phase loss corresponds to Bit 1 of H98, which will need to be disabled when using single-phase input by setting this bit to 0 (low).

Note 1: Binary numbers start with Bit 0. Bit 1 is the second digit from the right.
Note 2: Refer to **FRENIC-MEGA G2 Instruction Manual FEA-ACDR-IN-125,** pages 5-27, and 5-280

H98	Protection/Maintenance function (Operation selection)	V/f PGV/f SLV PGV PM SLV PM PGV TRQ 0 to 255 (Data is displayed in decimal) 0: Disable; 1: Enable) Bit 0: Lower the carrier frequency automatically (0: Disable; 1: Enable) *17 Bit 1: Input phase loss protection (0: Disable; 1: Enable) Bit 2: Output phase loss protection (0: Disable; 1: Enable) Bit 3: DC link bus capacitor life judgment selection (0: Factory default referenced; 1: User measurement value standard) Bit 4: Judge the life of DC link bus capacitor (0: Disable; 1: Enable) Bit 5: Detect DC fan lock (0: Enable; 1: Disable) Bit 6: Braking transistor error detection (0: Disable; 1: Enable) Bit 7: IP20/IP40 switching (0: IP20 ; 1: IP40)