GE Industrial Systems

Product Specifications

AF-300 G11™

AF-300 G11™ Specifications

Category	*Item*	*Description*
Nominal Motor	230 VAC, 3 Phase	1/4 Hp to 125 Hp
	460 VAC, 3 Phase	1/2 Hp to 450 Hp
Braking Torque (Standard)	1/4 Hp to 1 Hp	150%
	2 Hp to 10 Hp	100%
	15 Hp to 30 Hp	20%
	40 Hp and Higher	10% - 15%
Braking Torque (Optional)	1 Hp to 30 Hp	150%
	40Hp and Higher	100%
Enclosure, Standard	1/4 Hp to 30 Hp	NEMA 1 Standard, NEMA 4 Optional to 10 Hp, NEMA 12 Optional all ratings
	40 Hp and Up	NEMA 1 Standard, IP00 Optional 40Hp and above
Cooling Method	Convection	1 Hp and below
	Fan Cooled	Above 1 Hp
Standards	UL/cUL	No input fuses required
	CE	EN61800-3 for EMC EN61800-2 for Low Voltage
Input	***Item***	***Description***
	Up to 30 Hp, 230 VAC	200V - 230V (+10%, -15%), 50 or 60 Hz (+/- 5%)
	Up to 30 Hp, 460 VAC	380V - 480V (+10%, -15%), 50 or 60 Hz (+/- 5%)
	40 Hp & Above, 230 VAC	200V - 220V (+10%, -15%), 50 Hz (+/- 5%) / 220V - 230V (+10%, -15%), 60 Hz (+/- 5%)
	40 Hp & Above, 460 VAC	380V - 440V (+10%, -15%), 50 Hz (+/- 5%) / 380V - 480V (+10%, -15%), 60 Hz (+/- 5%)
	Unbalance	Voltage Unbalance within 3%
	Power Dip	For input voltage greater than Vmin, the drive will operate at rated output continuously. For input voltage less than Vmin, the drive will operate at 85% of rated output for 15 Msec. Vmin (230V Series) = 165V, Vmin (460V Series) = 310V. Smooth recovery method is selectable
Condition	***Item***	***Description***
Altitude		1000 meters or less. Derate at 1% for each 100 meters from 1000 to 3000 meters (Above 3000 meters, consult factory)
Temperature	Ambient	-10 to 50°C (units less than and equal to 30Hp must have ventilation covers removed for 40°C and above)
	Storage	-20 to 65°C
Vibration		IEC61200-2
Humidity		5 - 95% Relative Humidity (Non-condensing)
Output	***Item***	***Description***
	230V, 3 Phase	3 Phase, 200V, 50Hz or 3 Phase, 200V, 220V, 230V, 60Hz
	460V, 3 Phase	3 Phase, 380V, 400V, 415V, 440V, 50Hz or 3 Phase, 380V, 400V, 440V, 460V, 60Hz
	Frequency	50 / 60 Hz
	Overload	150% of rated current for 1 min 180% of rated current for 0.5 sec => 30Hp 200% of rated current for 0.5 sec =< 30Hp
	Max Freq.	50 - 400 Hz
	Base Freq.	25 - 400 Hz
	Starting Freq.	0.1 - 60 Hz
	Carrier Freq.	0.75 - 15 kHz up to 100 Hp. 0.75 - 10 kHz 125 Hp and above. Minimum carrier frequency changes dependent on maximum output frequency
Accuracy (Stability)	Analog	+/- 0.2% of maximum frequency (speed) at 25 +/- 10°C
	Digital	+/- 0.01% of maximum frequency (speed) between -10 and 50°C
Setting Resolution	Analog	1/3000 of maximum frequency (speed)
	Digital	0.01 Hz for frequency up to 99.9 Hz (0.1 Hz for frequency > 100 Hz)

Control	Item	Description
Control Method	Sinusoidal PWM	V/Hz
		Dynamic Torque Vector Control (Sensorless)
		Flux-vector Control with Pulse Tachometer
Operation	Methods	Keypad, Digital Input, Bus Communication
Frequency Setting	Keypad	(UP or DOWN)
	Potentiometer	1-5KW (1/2 W) Optional
	Analog	0 - 5 VDC
		0 to +/– 10 VDC Bi-polar (Reversible operation by signal polarity)
		0 - 10 VDC (10 - 0 VDC selectable)
		4 - 20 MA (20 - 4 MA selectable)
	Digital	Up/Down Control (Increases with UP, decreases with DOWN)
		Multi-step (4 different frequencies via SS1 and SS2)
		Multi-step (8 different frequencies via SS1, SS2, and SS4)
		Multi-step (16 different frequencies via SS1, SS2, SS4, and SS8)
		Programmed pattern operation - 8 stages
	Serial	RS485 with Modbus RTU - Standard
	Networks	Optional network cards
Acceleration Setting	Four Modes	0.01 - 3600 seconds (Independent Acc/Dec, four times, three modes - Linear, S-Curve, Non-linear)
	Automatic	When the motor acc.(dec.) torque reaches a preset value, the acc. (dec.) time is automatically extended for tripless operation.
Frequency Limiter		High and low values are presettable
Bias Frequency		-400.0 to +400.0 Hz
Frequency Gain		Adjustable from 0 - 200 %
Jump Frequency		Jump frequency setting (3 points), jump hysteresis width (1 setting)
Catch Spinning Motor		Smoothly pick up a rotating motor without stopping (speed search method) - No DB required
Auto-Restart		Autorestart is available after a momentary power failure (speed search method) Continuous operation mode is selectable
Switching Operation		Control terminals are provided for smooth switching operation from line power to drive
Slip Compensation		Related to load torque and magnified for negative slips frequencies
Torque Limiting		Automatic overcurrent adjustments 2 torque limiting functions can be preset
Torque Control		Output torque or load factor can be controlled by analog input signal with PG option
PID Control		Process controller - standard
Automatic Deceleration		Automatic extension of deceleration time when braking torque limit is reached for tripless operation without a DB resistor
2nd Motor Settings		Settings for a second motor: base freq., rated voltage, rated current, no load current, impedances
Fan Stop Operation		Automatically manage cooling fan operation to extend life - up to 30Hp operation is preset, above 30Hp signal is preset
Motor Autotune	Offline Tuning	Selectable with motor rotating and without motor rotating
	Online Tuning	Dynamically compensates regulator for changes in motor temperature
Energy Saving		Reduces losses at light loads
Keypad	**Item**	**Description**
		Backlit LCD Display
		Smart Keypad to copy parameters from one drive to another
		Extension cable adapter for RJ45 connector

Indication	Item	Description
Operation Mode	LED	Output frequency
		Output current, Output voltage
		Motor synchronous speed (RPM)
		Line speed (M/min)
		Load shaft speed (RPM)
		Output torque (%)
		Frequency setting
		PID (Set 1 value, Set 2 value, Feedback value)
		Power consumption
		Motor load factor
	LCD	Heatsink temperature
		Drive internal temperature
		I/O Test - indicates signal existence or absence of digital I/O and signal value of analog I/O
		RMS current - 1 cycle
		%DB - 1 cycle
	Other	DC Link power charge display
Program Mode	Feature	Function Code and Function Name, Data or Data Code
	Languages	English, French, German, Italian, Japanese, Spanish
Trip Mode	OC1	Overcurrent during acceleration
	OC2	Overcurrent during deceleration
	OC3	Overcurrent running at constant speed
	FUS	Fuse blown
	OU1	Overvoltage during acceleration
	OU2	Overvoltage during deceleration
	OU3	Overvoltage running at constant speed
	LV	Low voltage
	OH1	Overheating of heatsink
	OH2	External thermal relay tripped
	OH3	Overtemperature of inside air
	dBH	Overheating of DB circuit
	OL1, OL2	Motor overload
	OUV	Drive unit overload
	EF	Ground fault
	LIM	Input Phase Loss
	FUS	DC Fuse open (40 Hp and above)
	Er1	Memory error
	Er2	KEYPAD communication error
	Er3	CPU error
	Er4	Option card error, detected by the control card
	Er5	Option card error, detected by the option card
	Er6	Operations procedure error.
	Er7	Output wiring error - impedance unbalance
	Er8	RS485 communications error
Diagnostics	History	Trip history - passed four events (Trip and Warning)

Protection	Item	Description
Overload		Detection of electronic thermal overload relay
Overvoltage		Detection of DC link circuit overvoltage (230V series - 400V, 460V series - 800V)
Incoming Surge		Drive protection from surge voltage input (Max. 1.2 x 50 usec 7KV peak)
Undervoltage		Detection of DC link circuit undervoltage (230V series - 200V, 460V series - 400V)
Overheating		Drive overheating protection by temperature detection
Short Circuit		Short circuit protection for drive output circuit
Ground Fault		Ground fault protection for drive output circuit - 3 phase circuit detection method
		Zero phase current detection method - 40 Hp and above
Motor Overload		Electronic thermal overload relay can be selected for general purpose motor or dedicated drive motor
		Calculation of thermal time constant can be preset
		2nd motor electronic thermal overload relay
DB Resistor Overheating		Internal electronic thermal overload relay - up to 10 Hp
		Overheating detection thermal overload relay installed in braking resistor unit - 15 Hp and above (option)
Motor Overheating		Overheating detection PTC thermistor can be connected to terminals 13-C1-11
Phase Loss		Drive protection for line side phase loss
		Drive protection for motor side phase loss during tuning
		Detection of output impedance unbalance during tuning
Signal Loss		Detection of loss of C1 current signal
Auto-reset		Auto reset times and reset interval can be preset
Terminal Functions	**Item**	**Description**
Main Circuit		
Power Input	L1/R, L2/S, L3/T	Connect a three phase power source
Drive Output	U, V, W	Connect to a three phase induction motor
DC Reactor	P1, P(+)	Connect the DC reactor for power factor correcting or harmonic current reduction Shipped in same carton with drive
Braking Unit	P(+), N(-)	Connect the braking unit - optional for 15 Hp and above
Ext. Braking Resistor Unit	P(+). DB	Connect the external braking resistor - 230V/460V series up to 10 Hp
Ground	G	Ground terminal for drive chassis (housing)
Aux. Control Power	R0, T0	Connect the same AC power source used for Power Input as backup for control circuit power supply - 2 Hp and above
Analog Inputs	**Item**	**Description**
Potentiometer Power	13	+10V DC power supply, maximum allowable output current 10ma
Voltage Input	12	0-10V / 0-100%, 22K ohm input impedance
		0-5V / 0-100% can be selected by signal gain setting
		Inverse mode operation by polarity
		Reversible operation can be selected by function code
		Frequency command, torque control, Tach feedback, or PID control
Common	11	Common for analog signal
Current Input	C1	4-20ma / 0-100 % (input impedance 250 ohm)
		Inverse mode operation
		Frequency command, PID feedback
Analog Input 1	V2	0 - +/- 10V / 0 - +/- 100% (input impedance 22K ohm)

Digital Inputs	Item	Description
Forward Operation	FWD	ON - Motor runs in the forward direction, OFF - Motor decelerates and stops
Reverse Operation	REV	ON - Motor runs in the reverse direction, OFF - Motor decelerates and stops
Digital Input 1	X1	Functions selected via function codes - Sink type terminal specification default with source type hardware selectable
Digital Input 2	X2	ON state - maximum input voltage 2V, maximum source current 5ma
Digital Input 3	X3	OFF state - maximum voltage 27V, maximum leakage current 0.5ma
Digital Input 4	X4	Selectable from the following
Digital Input 5	X5	
Digital Input 6	X6	
Digital Input 7	X7	
Digital Input 8	X8	
Digital Input 9	X9	
3 Wire Stop	HLD	ON - the drive latches the FWD or REV signal, OFF - the drive releases the latch
Coast Stop	BX	ON - motor will coast to a stop, no alarm signal will be issued
Trip Command	THR	OFF - OH2 trip is issued and latched, motor will coast to a stop
Alarm Reset	RST	ON - Momentary on for > 0.1 sec will reset faults
Multistep Frequency	SS1 / SS2	4 different frequencies can be selected by ON/OFF pattern on terminals SS1 and SS2
	SS4	8 different frequencies can be selected by ON/OFF pattern on terminals SS1, SS2, and SS4
	SS8	16 different frequencies can be selected by ON/OFF pattern on terminals SS1, SS2, SS4, and SS8
ACC/DEC Time Select	RT1	Second ACC/DEC time can be selected by terminal RT1
	RT2	4 different ACC/DEC times can be selected by ON/OFF pattern on terminals RT1 and RT2
JOG	JOG	ON - JOG frequency is activated
2nd Frequency Select	HZ2/HZ1	ON - drive will stop and the 2nd frequency command becomes effective
2nd Motor Select	M2/M1	ON - drive will stop and Motor 1 values are changed to Motor 2 values
DC Brake Command	DCBRK	ON - DC injection braking is active during deceleration
2nd Torque Limiter	TL2/TL1	ON - Torque Limiter 2 is active
Line/drive Switching	SW50 / SW60	ON - Motor is changed from drive operation to line operation (Main circuit signal output via Y1-Y5)
UP Command	UP	ON - drive output frequency increases (change rate determined by ACC time)
DOWN Command	DOWN	ON - drive output frequency decreases (change rate determined by DEC time)
Write Enable	WE-KP	ON - data can be changed by KEYPAD operation
PID Control Cancel	HZ/PID	ON - PID control is canceled
Inverse Mode Changeover	IVS	ON - Operation mode is toggled from Normal to Inverse or Inverse to Normal
Interlock Signal (52-2)	IL	Connection for auxiliary contact 52-2
TRQ Control Cancel	HZ/TRQ	ON - Torque control is canceled
Link Enable (RS485)	LE	ON - Bus link or RS485 link is active
Universal Digital Input	U-DI	ON - Enables input from RS485 or LAN option
Sync/Tach Enable	PG/HZ	ON - Synchronize operation or Tach feedback operation is active
Zero Speed Command	ZERO	ON - Enables stall torque function
Timed Alarm Command	STP	OFF -The drive decelerates and stops
Pre-exciting Command	EXITE	ON - The motor eneters into a pre-exciting state during flux vector control
RS485 I/O Terminal	DXA, DXB, SD	Connections for RS485 serial port communications Modbus RTU standard protocol
PLC Terminal	PLC	Connection for PLC power supply that avoids drive current loops on Sink type inputs when PLC power supply is off.
Common	CM	Common for digital inputs

Analog Outputs	Item	Description
Analog Monitor	FMA / 11	Output DC voltage is proportional to selected function's value. Functions are selected by FC31
		Slip frequency (0 - max frequency)
		Output frequency (0 - max frequency)
		Output current (0 - 200 %)
		Output voltage (0 - 200 %)
		Output torque (0 - 200 %)
		Load factor (0 - 200 %)
		Input power (0 - 200 %)
		PID feedback value (0 - 100 %)
		Tach feedback value (0 - max speed)
Universal Analog Output		Analog output pass through for process control
Pulse Rate Monitor	FMP / CM	Pulse rate is proportional to selected function's value. maximum output current: 2ma
		The average value of the pulse train is proportional to the selected function's value, output functions same as for FMA
Transistor Outputs	**Item**	**Description**
Power Supply	P24	DC power supply - +24V, 100ma
Transistor Output 1	Y1	ON state maximum output voltage 2V, sink current 50ma
Transistor Output 2	Y2	OFF state maximum allowable voltage 27V, leakage current 0.1ma
Transistor Output 3	Y3	Select from the following
Transistor Output 4	Y4	
Drive Running	RUN	ON - output frequency is larger than starting frequency
Frequency Equivalence	FAR	ON - difference between output frequency and setting frequency is smaller than FAR hysteresis width
Frequency Level Detection	FDT	ON - output frequency is larger than preset detection level
Undervoltage Detection	LV	ON - drive undervoltage stops and operation command is ON
Torque Polarity	B/D	ON - drive is in braking mode
Torque Limiting	TL2/TL1	ON - drive is in torque limiting mode
Auto-restarting	IPF	ON - drive auto restarting mode active or restart waiting mode is active
KEYPAD Operation Mode	TP	ON - drive is in KEYPAD operation mode
Drive Stopping	STOP	ON - drive is in stopping mode or DC braking mode
Overload Early Warning (Selectable)	OL	ON - electronic thermal calculated value is larger than preset protection level
		ON - output current is larger than preset detection level
Line/drive Changeover	SW88	Outputs signal 88 for line/drive changeover
	SW52-2	Outputs signal 52-2 for line/drive changeover
	SW52-1	Outputs signal 52-1 for line/drive changeover
Motor 2 / Motor 1	SWM2	Outputs motor changeover control switch for switching between motor 1 and motor 2
Auxiliary Terminal	AX	ON - drive is running
Times UP	TU	Outputs a 100ms ON pulse for time up for pattern operation
Cycle Complete	TO	Outputs a 100ms ON pulse for cycle complete for pattern operation
Stage 1 Indicator	STG-1, STG-2, STG-3	Pattern operation stage indicator (binary encoded)
Alarm 1 Indicator	AL-1, AL-2, AL-4	Trip alarm number (binary encoded)
Fan Control	FAN	Outputs the drive fan control signal for 40 Hp and larger drives
Auto-resetting	1-TRY	ON - auto resetting mode or reset waiting mode active
Universal Digital Output	U-DO	ON - Enables output from RS485 or LAN option
Overheating Early Warning	OH	ON - heatsink temperature is larger than preset detection level
Synchronization Complete	SY	Synchronization signal for synchronize operation option
Loss of C1 Current Input Signal	C1-OFF	ON - When C1 current input is smaller than 2mA
Common	CM	Common terminal for transistor output signals

AF-300 G11™ Specifications

Relay Output	Item	Description
Alarm Relay Output	30A, 30B, 30C	Activates when a protective function is activated, programmable with the default state function code settable
Programmable Relay Output	Y5A, Y5C	Selectable the same as Y1-Y4
Options	**Item**	**Description**
	LAN	GENIUS
	LAN	Profibus DP
	LAN	N2 - Metasys
	LAN	Interbus-S
	LAN	Modbus Plus
	LAN	DeviceNet
Tachometer		
KEYPAD Extension Cable		Adaptor for RJ45 cable, up to 100'

Input/Output Specifications

Three-phase 230V series

Type designation 6KG1123_ _ _X1A1 (NEMA Type1) 6KG1123_ _ _ X2A1 (NEMA Type12) 6KG1123_ _ _ X4A1 (NEMA Type4) 6KG1123_ _ _ X8A1 (Open, Type 12 Heatsink) 6KG1123_ _ _ X9A1 (Open)			F25	F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100	125
Nominal 230V system pplied motor		HP	1/4	1/2	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125
Output ratings	Rated Capacity *1)	kVA	0.59	1.1	1.9	3.1	4.3	6.7	9.9	13	18	23	29	34	45	57	71	85	112	137
	Rated Voltage *2)	V	3-phase, 200V /50Hz , 200V ,220V ,230V /60Hz																	
	Rated Current *3)	A	1.5	3.0	5.0	8.0	11	17	25	33	46	59	74	87	115	145	180	215	283	346
	Overload Capability		150% of rated current for 1min , 200% of rated current for 0.5s												150% of rated current for 1min , 180% of rated current for 0.5s					
	Rated Frequency	Hz	50, 60Hz																	
Input ratings	Phases, Voltage, Frequency		3-phase, 200 to 230V , 50/60Hz												3-phase, 200 to 220V /50Hz , 200 to 230V /60Hz * 220 to 230V /50Hz *4),					
	Voltage / frequency variations		-Voltage : +10 to -15% (Voltage unbalance *5) : 2% or less) -Frequency :+5 to -5%																	
	Momentary voltage dip capability *6)		When the input voltage is 165V or more, the inverter can be operated continuously. When the input voltage drops below 165V from rated voltage, the inverter can be operated for 15ms . (within 85% load of nominal applied motors) The smooth recovery method is selectable.																	

1) Drive output capacity [kVA] at 230V
2) Output voltage is proportional to the power supply and can't exceed the power supply voltage.
3) Current derating may be required in case of low impedence load such as high frequency motor.
4) 220 to 230 V/50 Hz: Order individually
5) Reference to the IEC 61800-3 (5.2.3)
6) Input power: 85%

Three-phase 460V series

Type designation 6KG1143_ _ _X1A1 (NEMA Type1) 6KG1143_ _ _ X2A1 (NEMA Type12) 6KG1143_ _ _ X4A1 (NEMA Type 4) 6KG1143_ _ _ X8A1 (Open, Type 12 Heatsink) 6KG1143_ _ _ X9A1 (Open)			F50	001	002	003	005	007	010	015	020	025	030	040	050	060	075	100	125	150	200	250	300	350	400	450
Norminal 460V system applied mot		HP	1/2	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	200	250	300	350	400	450
Output ratings	Rated Capacity *1)	kVA	1.1	1.9	2.9	4.3	7.1	10	14	19	23	31	35	47	59	72	89	119	140	167	201	242	300	330	414	
	Rated Voltage *2)	V	3-phase, 380V , 400V , 415V /50Hz , 380V , 400V , 440V , 460V /60Hz																							
	Rated Current *3)	A	1.5	2.5	3.7	5.5	9.0	13	18	24	30	39	45	60	75	91	112	150	176	210	253	304	377	415	520	
	Overload Capability		150% of rated current for 1min , 200% of rated current for 0.5s											150% of rated current for 1min , 180% of rated current for 0.5s												
	Rated Frequency	Hz	50, 60Hz																							
Input ratings	Phases, Voltage, Frequency		3-phase, 380 to 480V , 50/60Hz											3-phase, 380 to 440V /50Hz , 380 to 480V /60Hz * 380V/50Hz and 380 to 415V/60Hz *4)												
	Voltage / frequency variations		-Voltage : +10 to -15% (Voltage unbalance *5) : 2% or less) -Frequency :+5 to -5%																							
	Momentary voltage dip capability *6)		When the input voltage is 310V or more, the inverter can be operated continuously. When the input voltage drops below 310V from rated voltage, the inverter can be operated for 15ms . (less than 85% load of nominal applied motors) The smooth recovery method is selectable.																							

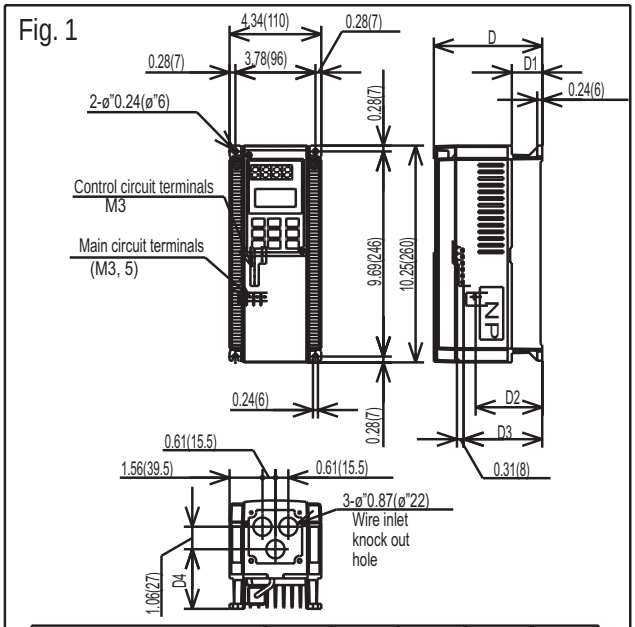
1) Drive output capacity [kVA] at 460V
2) Output voltage is proportional to the power supply and can't exceed the power supply voltage.
3) Current derating may be required in case of low impedence load such as high frequency motor.
4) Change the tap of auxiliary transformer
380/50 Hz: Change over CN UX connector from U1 part to U2 part (reference to the instruction manual)

Input Voltage	CN UX connector
400 to 440V/50 Hz, 440 to 480V/60 Hz 380V/50 Hz (398V or smaller)	U4 (factory setting)
380 to 415V/60 Hz (430V or smaller)	U2

5) Reference to the IEC 61800-3 (5.2.3)
6) Input power: 85%

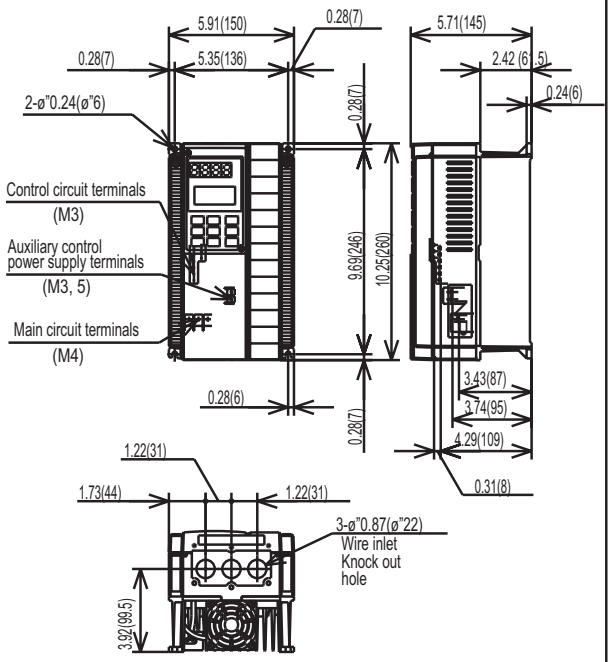
Dimensions .25 - 30 Hp

Fig. 1



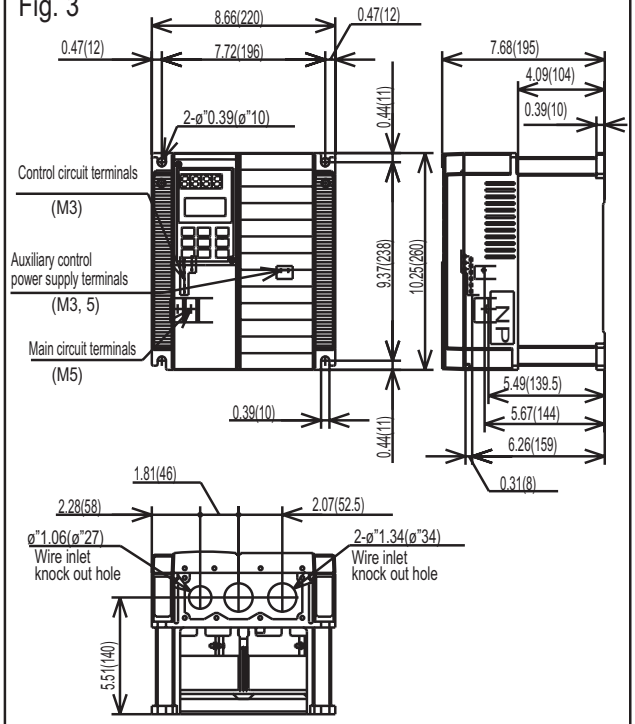
Type	D	D1	D2	D3	D4
1/4, 1/2 HP	5.12 (130)	1.44 (36.5)	3.15 (80)	3.70 (94)	2.81 (71.5)
1 HP	5.71 (145)	2.03 (51.5)	3.74 (95)	4.29 (109)	3.41 (86.5)

Fig. 2



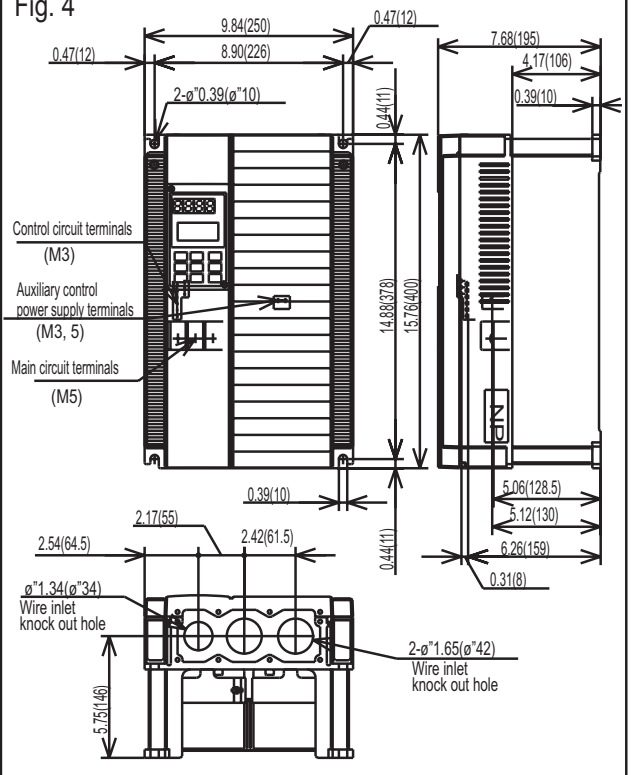
2 to 5 Hp

Fig. 3



7 to 10 Hp

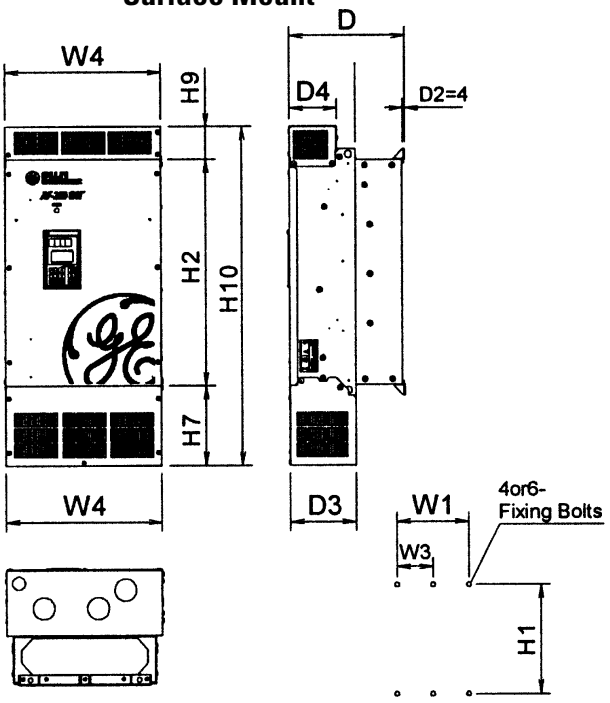
Fig. 4



15 to 30 Hp

Dimensions NEMA 1

Surface Mount



230V SERIES NEMA 1

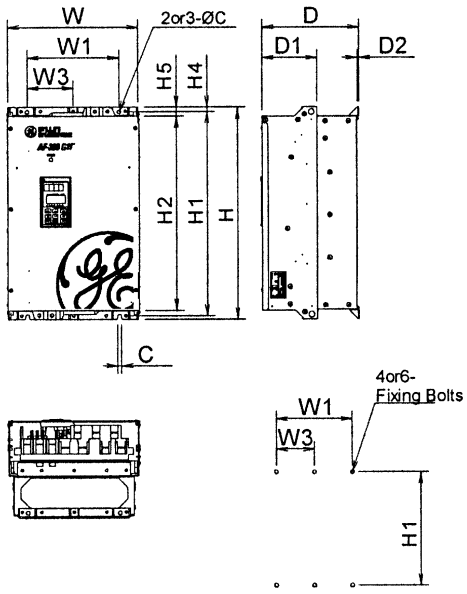
HP	DIMENSIONS inches (mm)															Mtg. Bolts	Wt. Lb (kg)
	W1	W2	W3	W4	H1	H2	H3	H6	H7	H9	H10	D	D2	D3	D4		
40 HP	9.4 (240)	12.8 (326)	–	13.5 (342)	20.9 (530)	19.7 (500)	20.2 (512)	0.4 (9)	7.1 (180)	3 (75)	29.7 (755)	10 (255)	0.2 (4)	5.7 (145)	4.1 (105)	M8	70 (32)
50 HP	10.8 (275)	14.2 (361)		14.9 (377)	23.4 (595)	22.2 (565)	22.7 (577)		7.9 (200)		33.1 (840)	10.6 (270)					86 (39)
60 HP					28.3 (720)	27.2 (690)	27.6 (702)				38 (965)						106 (48)
75 HP																	110 (50)
100 HP	16.9 (430)	20.01 (510)		21 (533)		27 (685)	27.4 (695)	0.5 (13)	11.1 (283)	3.3 (83)	41.3 (1050)	11.2 (285)			3.6 (91)	M12	172 (78)
125 HP	22.8 (580)	26 (660)	11.4 (290)	26.9 (683)	33.5 (850)	32.1 (815)	32.5 (825)		15.1 (383)		50.4 (1280)	14.2 (360)		8.7 (220)	6.5 (166)		282 (128)

460V SERIES NEMA 1

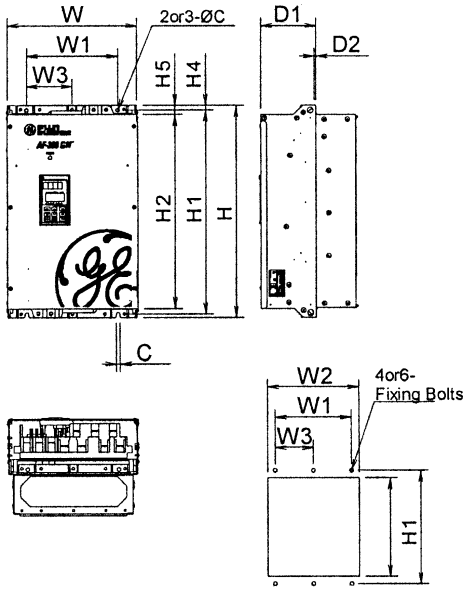
HP	DIMENSIONS inches (mm)															Mtg. Bolts	Wt. Lb (kg)
	W1	W2	W3	W4	H1	H2	H3	H6	H7	H9	H10	D	D2	D3	D4		
40 HP	9.4 (240)	12.8 (326)	–	13.5 (342)	20.9 (530)	19.7 (500)	20.2 (512)	0.4 (9)	7.1 (180)	3 (75)	29.7 (755)	10 (255)	0.2 (4)	5.7 (145)	4.1 (105)	M8	70 (32)
50 HP	10.8 (275)	14.2 (361)		14.9 (377)								10.6 (270)					82 (37)
60 HP					25.8 (655)	24.6 (625)	25.1 (637)				34.6 (880)						95 (43)
75 HP																	97 (44)
100 HP					28.3 (720)	27.2 (690)	27.6 (702)		7.9 (200)		38 (965)						115 (52)
125 HP 150 HP	16.9 (430)	20.0 (510)		21 (533)	28 (710)	26.6 (675)	27 (685)	0.5 (13)	8.2 (208)	3.3 (83)		12.4 (315)		6.9 (175)	4.7 (121)	M12	174 (79)
200 HP 250 HP					38 (970)	37 (935)	37 (945)		13 (333)		53.1 (1350)	14.2 (360)		9 (220)	7 (166)		245 (111)
300 HP 350 HP	22.8 (580)	26 (660)	11.4 (290)	26.9 (683)					15.1 (383)		55.1 (1400)						337 (153)
400 HP 450 HP																	

Dimensions Open Type

Surface Mount



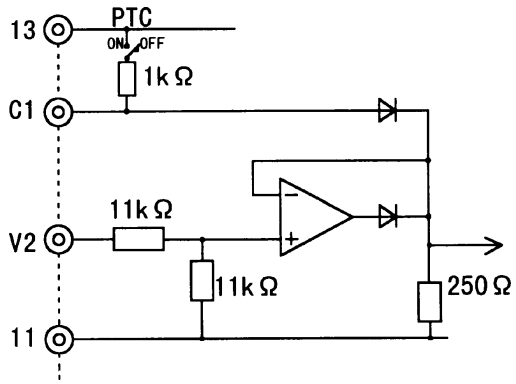
Through Panel Mount

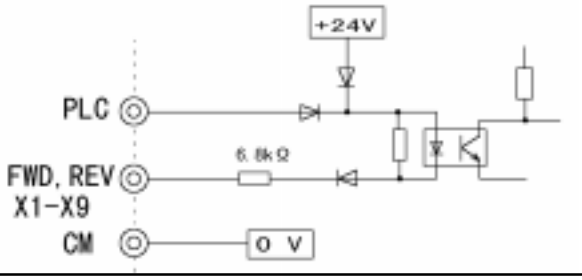


[230V SERIES]																	
HP	DIMENSION Inch (mm)															Mtg.	Weight
230V	W	W1	W2	W3	H	H1	H2	H3	H4	H5	H6	D	D1	D2	C	Bolts	Lb (kg)
40 HP	13.4 (340)	9.4 (240)	12.8 (326)		21.7 (550)	20.9 (530)	19.7 (500)	20.2 (512)	0.5 (12)	1 (25)	0.4 (9)	10 (255)	5.7 (145)	0.2 (4)	0.4 (10)	M8	64 (29)
50 HP	14.8 (375)	10.8 (275)	14.2 (361)		24.2 (615)	23.4 (595)	22.2 (565)	22.7 (577)				10.6 (270)					79 (36)
60 HP					29.1 (740)	28.3 (720)	27.2 (690)	27.6 (702)									97 (44)
75 HP																	101 (46)
100 HP	20.9 (530)	16.9 (430)	20.1 (510)		29.5 (750)		27 (685)	27.4 (695)	0.6 (16)	1.3 (33)	0.5 (13)	11.2 (285)			0.6 (15)	M12	154 (70)
125 HP	26.8 (680)	22.8 (580)	26 (660)		34.6 (880)	33.5 (850)	32.1 (815)	32.5 (825)				14.2 (360)	8.7 (220)				253 (115)
[460V SERIES]																	
HP	DIMENSION Inch (mm)															Mtg.	Weight
460V	W	W1	W2	W3	H	H1	H2	H3	H4	H5	H6	D	D1	D2	C	Bolts	Lb (kg)
40 HP	13.4 (340)	9.4 (240)	12.8 (326)		21.7 (550)	20.9 (530)	19.7 (500)	20.2 (512)	0.5 (12)	1 (25)	0.4 (9)	10 (255)	5.7 (145)	0.2 (4)	0.4 (10)	M8	64 (29)
50 HP	14.8 (375)	10.8 (275)	14.2 (361)									10.6 (270)					75 (34)
60 HP					26.6 (675)	25.8 (655)	24.6 (625)	25.1 (637)									86 (39)
75 HP																	88 (40)
100 HP					29.1 (740)	28.3 (720)	27.2 (690)	27.6 (702)									106 (48)
125 HP 150 HP	20.9 (530)	16.9 (430)	20.1 (510)			28 (710)	26.6 (675)	27 (682)	0.6 (16)	1.3 (33)	0.5 (13)	12.4 (315)	6.9 (175)		0.6 (15)	M12	154 (70)
200 HP 250 HP					39.4 (1000)	38.2 (970)	36.8 (935)	37.2 (945)				14.2 (360)	8.7 (220)				220 (100)
300 HP 350 HP	26.8 (680)	22.8 (580)	26 (660)	11.4 (290)													308 (140)
400 HP 450 HP																	

Plug-in Terminal Strip Assignments

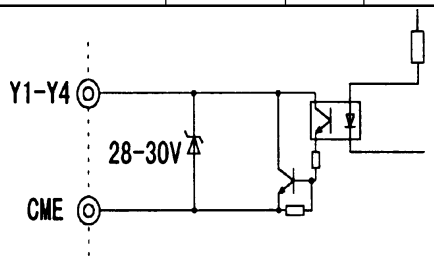
30A	Y5A	CMY	Y3	Y1	C1	FMA	FMP	PLC	X1	X2	X3	X4	X5	X6	X7	X8	X9
30C	30B	Y5C	Y4	Y2	11	12	13	V2	CM	CM	FWD	REV	P24	P24	DX	DX	SD

Classification	Terminal Symbol	Terminal Name	Function
Analog input	13	Potentiometer power supply	Used for +10V DC power supply for frequency setting POT (resistance of 1 to 5k Ohm)
	12	Voltage input	① Frequency is set according to the analog input voltage supplied from an external circuit. - 0 to +10V DC / 0 to 100% - Reversible operation using positive and negative signals: 0 to +/- 10V DC / 0 to 100% - Reverse operation: +10 to 0V DC / 0 to 100% ② The feedback signal for PID control is input. ③ The analog input value from the external circuit is used for torque control * Input resistance: 22 k Ohm
	V2	Voltage input supplied from an external circuit.	¨ Frequency is set according to the analog input voltage - 0 to +10V DC/0 to 100% - Reverse operation: +10 to 0V DC/0 to 100% * Use only one terminal - V2 or C1 alternatively. * Input resistance: 22 k Ohm
	C1	Current input	① Frequency is set according to the analog input current supplied from an external circuit. - 4 to 20mA DC / 0 to 100% - Reverse operation: 20 to 4mA DC / 0 to 100% ② The feedback signal for PID control is input. ③ PTC thermistor input  * Use only one terminal - V2 or C1 alternatively * Input resistance: 250 Ohm
	11	Analog input common	Common terminal for analog input signals

<table>
<tr><td rowspan="11">Digital input</td><td>FWD</td><td>Forward operation / Stop command</td><td>Used for forward operation (when FWD-CM is on) or deceleration and stop (when FWD-CM is off)</td></tr>
<tr><td>REV</td><td>Reverse operation / Stop command</td><td>Used for reverse operation (when REV-CM is on) or deceleration and stop (when REV-CM is off)</td></tr>
<tr><td>X1</td><td>Digital input 1</td><td rowspan="10">The coast-to-stop command, external alarm, alarm reset, multi-step frequency selection, and other functions (from an external circuit) can be assigned to terminals X1 to X9. For details, see "Setting the Terminal Functions E01 to E09" in Section 5.2 Function Explanation in the Instruction Manual.
<Specifications of digital input circuit>
<table><tr><th>Item</th><th></th><th>min.</th><th>typ.</th><th>max.</th></tr><tr><td>Operating voltage</td><td>ON</td><td>0V</td><td>-</td><td>2V</td></tr><tr><td></td><td>OFF</td><td>22V</td><td>24V</td><td>27V</td></tr><tr><td>Operating current</td><td>ON</td><td></td><td>3.2mA</td><td>4.5mA</td></tr><tr><td>Allowable leakage current</td><td>OFF</td><td></td><td></td><td>0.5mA</td></tr></table>  </td></tr>
<tr><td>X2</td><td>Digital input 2</td></tr>
<tr><td>X3</td><td>Digital input 3</td></tr>
<tr><td>X4</td><td>Digital input 4</td></tr>
<tr><td>X5</td><td>Digital input 5</td></tr>
<tr><td>X6</td><td>Digital input 6</td></tr>
<tr><td>X7</td><td>Digital input 7</td></tr>
<tr><td>X8</td><td>Digital input 8</td></tr>
<tr><td>X9</td><td>Digital input 9</td></tr>
<tr><td></td><td></td></tr>
<tr><td>P24</td><td>Control Unit power Supply</td><td>+24VDC power supply for control input. Maximum output current = 100mA</td></tr>
<tr><td>PLC</td><td>PLC signal power</td><td>Used to connect power supply for PLC output signals; rated voltage = 24 VDC (22 to 27) at sink logic operation.</td></tr>
<tr><td>CM</td><td>Digital input common</td><td>Common terminal for digital input signals and P24</td></tr>
<tr><td>Analog output</td><td>FMA

(11: common terminal)</td><td>Analog monitor</td><td>Outputs monitor signal using analog DC voltage 0 to +10V DC.
The signal indicates one of the following:
- Output frequency (before slip compensation)
- Load factor
- Output frequency (after slip compensation)
- Power consumption
- Output current
- PID feedback value
- Output voltage
- PG feedback value
- Output torque
- DC link circuit voltage
* Connectable impedance: min. 5kW</td></tr>
<tr><td>Pulse output</td><td>FMP
(CM: Common terminal)</td><td>Frequency monitor
(pulse waveform output)</td><td>Outputs a monitor signal using the pulse waveform.
This signal has the same function as the FMA signal.</td></tr>
</table>

<table>
<tr><td rowspan="6">Transistor</td><td>Y1</td><td>Transistor output 1</td><td rowspan="5">A running signal, frequency equivalence signal, overload early warning output signal, and other signals from the drive are output (as transistor output) to arbitrary ports. For details, see "Setting the Terminal Functions E20 to E23" in Section 5.2 Function Explanation In the Instruction Manual.
* <Specifications of transistor output circuit>

<table><tr><td>Item</td><td></td><td>min.</td><td>typ.</td><td>max.</td></tr><tr><td>Operating voltage</td><td>ON</td><td>–</td><td>1V</td><td>2V</td></tr><tr><td></td><td>OFF</td><td>–</td><td>24V</td><td>27V</td></tr><tr><td>Maximum load current</td><td>ON</td><td>–</td><td>–</td><td>50 mA</td></tr><tr><td>Leakage current</td><td>OFF</td><td>–</td><td>–</td><td>0.1 mA</td></tr></table>
 
</td></tr>
<tr><td>Y2</td><td>Transistor output 2</td></tr>
<tr><td>Y3</td><td>Transistor output 3</td></tr>
<tr><td>Y4</td><td>Transistor output 4</td></tr>
<tr><td colspan="2"></td></tr>
<tr><td>CME</td><td>Transistor output common</td><td>Common terminal for transistor output signals. This terminal is isolated from terminals (CM) and [11].</td></tr>
<tr><td rowspan="2">Relay output</td><td>30A,30B,30C</td><td>Alarm outputs for any fault.</td><td>If the drive is stopped by an alarm (protective function), the alarm signal is output from the relay contact output terminal (1SPDT).
Contact rating: 250 VAC, 0.3A,cosØ = 0.3, 48 VDC, 0.5A for CE Marking
An excitation mode (excitation at alarm occurrence or at normal operation) can be selected.</td></tr>
<tr><td>Y5A,Y5C</td><td>Multi-purpose signal relay outputs</td><td>These signals can be output similar to the Y1 to Y4 signals above. The contact rating for any fault is the same as that of the alarm output above.</td></tr>
<tr><td rowspan="2">Communic-ation</td><td>DX+,DX–</td><td>RTU communication</td><td>Input / output signal terminals for RTU communication input / output
Up to 31 inverters can be connected using the daisy chain method.</td></tr>
<tr><td>SD</td><td>Communication cable shield connection terminal</td><td>Terminal for connecting the cable shield. The terminal is electrically floating.-</td></tr>
</table>

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