



AF-60 LP - Micro Drives

The Micro Drive AF-60 LP is a compact but powerful and easy to use AC variable frequency drive.

The drive is available in its standard configuration that includes built-in Brake chopper for 1.5kW/2HP and above, single-turn potentiometer for speed reference and LCD keypad display that can be remotely mounted.

Following models are available:

- Single-phase, 230Vac, from 0.18 to 2.2kW, 1/4 to 3HP
- Three-phase, 230Vac, from 0.25 to 3.7kW, 1/3 to 5HP
- Three-phase, 400Vac, from 0.37 to 22kW, 1/2 to 30HP

Features

Ready to start from the beginning

- Self-protecting features
- 150% current overload up to 1 minute
- "Pick up" start (catch a spinning motor)
- Potentiometer on keypad
- Keypad is hot pluggable and can be password protected
- RS485 communication, Modbus protocol
- RFI class A1 filter built-in
- Dynamic brake incorporated from 1.5kW
- High level functions, PI for feedback systems, mechanical brake control for lifts
- Easy to use PC software
- Integrated logic control, PLC

Built-in durability

- Robust housing (IP20) protects the drive and allows side-by-side mounting
- Conformal coated circuit boards and high quality capacitors maximize uptime
- Intelligent heat management leads to long life

Built-in simplicity speeds installation and set-up

- Installation and set-up immediate
- Wiring diagram, template and quick guide
- DIN-rail kit optional, to 2.2kW

Approvals / Marking

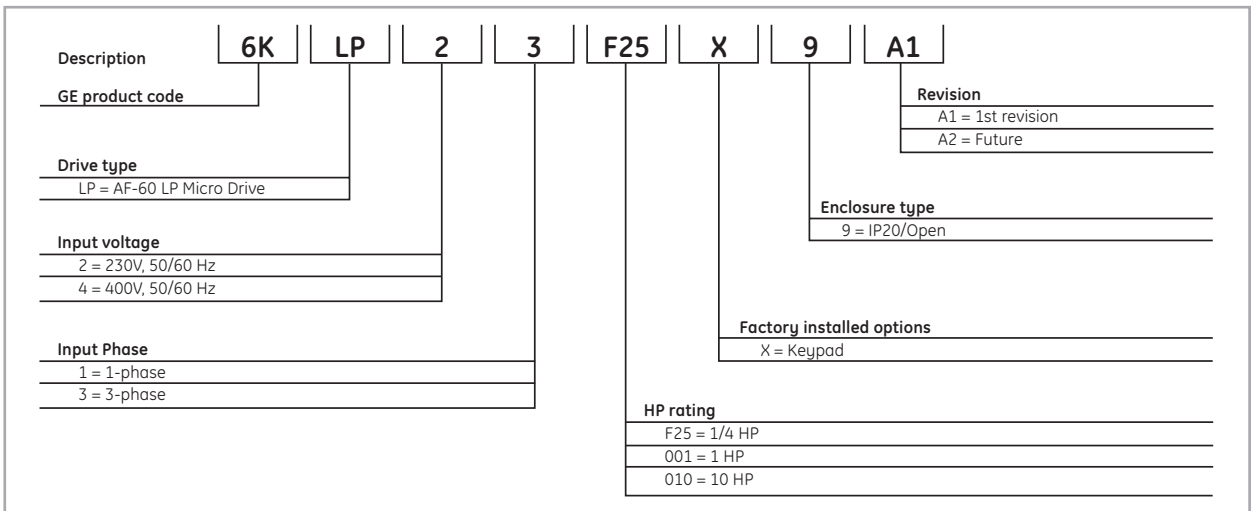


UL, cUL, C-Tick

Applications

- Fans
- Pumps
- Mixers
- Conveyors
- Material handling
- Industrial machinery, including: agitators, lathes, spinning machines, machine tools, packaging equipment, plastics and woodworking

Product numbering system diagram



Product number for illustrative purposes only

IP20

230 Vac, 1-phase, 50/60 Hz input

Nominal motor ratings			Cat. No.	Ref. No.	Unit Size	Efficiency (%) ⁽¹⁾	Losses (W) ⁽¹⁾	NEMA 1 kit	DIN-rail mounting kit
Power kW	Power HP	Current A							
0.18	1/4	1.2	6KLP21F25X9A1	404774	M1	94.5	15.5	NEMA1ACLP1	RMACLP1
0.37	1/2	2.2	6KLP21F50X9A1	404775	M1	95.6	25.0	NEMA1ACLP1	RMACLP1
0.75	1	4.2	6KLP21001X9A1	404776	M1	96.0	44.0	NEMA1ACLP1	RMACLP1
1.5	2	6.8	6KLP21002X9A1	404777	M2	96.7	67.0	NEMA1ACLP2	RMACLP1
2.2	3	9.6	6KLP21003X9A1	404778	M3	97.1	85.1	NEMA1ACLP3	N/A

230 Vac, 3-phase, 50/60 Hz input

0.25	1/3	1.5	6KLP23F33X9A1	404779	M1	94.9	20.0	NEMA1ACLP1	RMACLP1
0.37	1/2	2.2	6KLP23F50X9A1	404780	M1	95.8	24.0	NEMA1ACLP1	RMACLP1
0.75	1	4.2	6KLP23001X9A1	404781	M1	96.3	39.5	NEMA1ACLP1	RMACLP1
1.5	2	6.8	6KLP23002X9A1	404782	M2	97.2	57.0	NEMA1ACLP2	RMACLP1
2.2	3	9.6	6KLP23003X9A1	404783	M3	97.4	77.1	NEMA1ACLP3	N/A
3.7	5	15.2	6KLP23005X9A1	404784	M3	97.4	122.8	NEMA1ACLP3	N/A

400 Vac, 3-phase, 50/60 Hz input

0.37	1/2	1.2	6KLP43F50X9A1	404785	M1	95.5	25.5	NEMA1ACLP1	RMACLP1
0.75	1	2.2	6KLP43001X9A1	404786	M1	96.0	43.5	NEMA1ACLP1	RMACLP1
1.5	2	3.7	6KLP43002X9A1	404787	M2	97.2	56.5	NEMA1ACLP2	RMACLP1
2.2	3	5.3	6KLP43003X9A1	404788	M2	97.1	81.5	NEMA1ACLP2	RMACLP1
4	5	9	6KLP43005X9A1	404789	M3	98.0	133.5	NEMA1ACLP3	N/A
5.5	7.5	12	6KLP43007X9A1	404790	M3	98.0	166.8	NEMA1ACLP3	N/A
7.5	10	15.5	6KLP43010X9A1	404791	M3	98.0	217.5	NEMA1ACLP3	N/A
11	15	23	6KLP43015X9A1	404792	M4	97.4	342	NEMA1ACLP4	N/A
15	20	31	6KLP43020X9A1	404793	M4	97.4	454	NEMA1ACLP4	N/A
18.5	25	37	6KLP43025X9A1	404794	M5	98.0	428	NEMA1ACLP5	N/A
22	30	43	6KLP43030X9A1	404795	M5	97.9	520	NEMA1ACLP5	N/A

Brake chopper is included with 2HP / 1.5kW drives and above

(1) At rated load conditions

Options, accessories and replacement parts

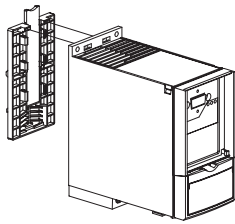


Remote mounting kit for keypad

Remote mounting kit for mounting keypad on enclosure doors. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP21.

Description	Cat. No.	Ref. No.
Remote mounting kit for keypad	RMKYPDACLP1	404797

DIN-rail mounting kit

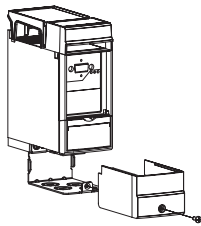


This adapter can be used to mount AF-60 LP Micro Drives at 0.75kW/1HP and below to 35mm DIN-rail.

Description	Cat. No.	Ref. No.
DIN-rail mounting kit for unit size M1 or M2 ⁽¹⁾	RMACLP1	404806

(2) Please note that these DIN-rail mounting kits only include bottom cover.

NEMA 1 kit

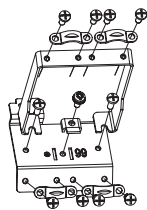


This kit can be mounted to the IP20 protected AF-60 LP Micro Drives to provide NEMA type 1 protection.

Description	Cat. No.	Ref. No.
For 0.75kW/1HP and below drives	NEMA1ACLP1	404798
For 1.5kW/2HP at 230V, 2.2kW/3HP at 400V and below drives	NEMA1ACLP2	404799
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	NEMA1ACLP3	404800
For 11kW/15HP and 15kW/20HP at 400V drives	NEMA1ACLP4 ⁽²⁾	404801
For 18.5kW/25HP and 22kW/30HP at 400V drives	NEMA1ACLP5 ⁽²⁾	404802

(2) Please note that these NEMA 1 kits only include bottom cover.

De-coupling plate kit



For EMC applications and strain relief for drive wiring.

Description	Cat. No.	Ref. No.
For 1.5kW/2HP at 230V, 2.2kW/3HP at 400V and below drives	DEPLTACL P1	404804
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	DEPLTACL P2	404805
For 11kW/15HP at 400V and above drives	DEPLTACL P3	404803

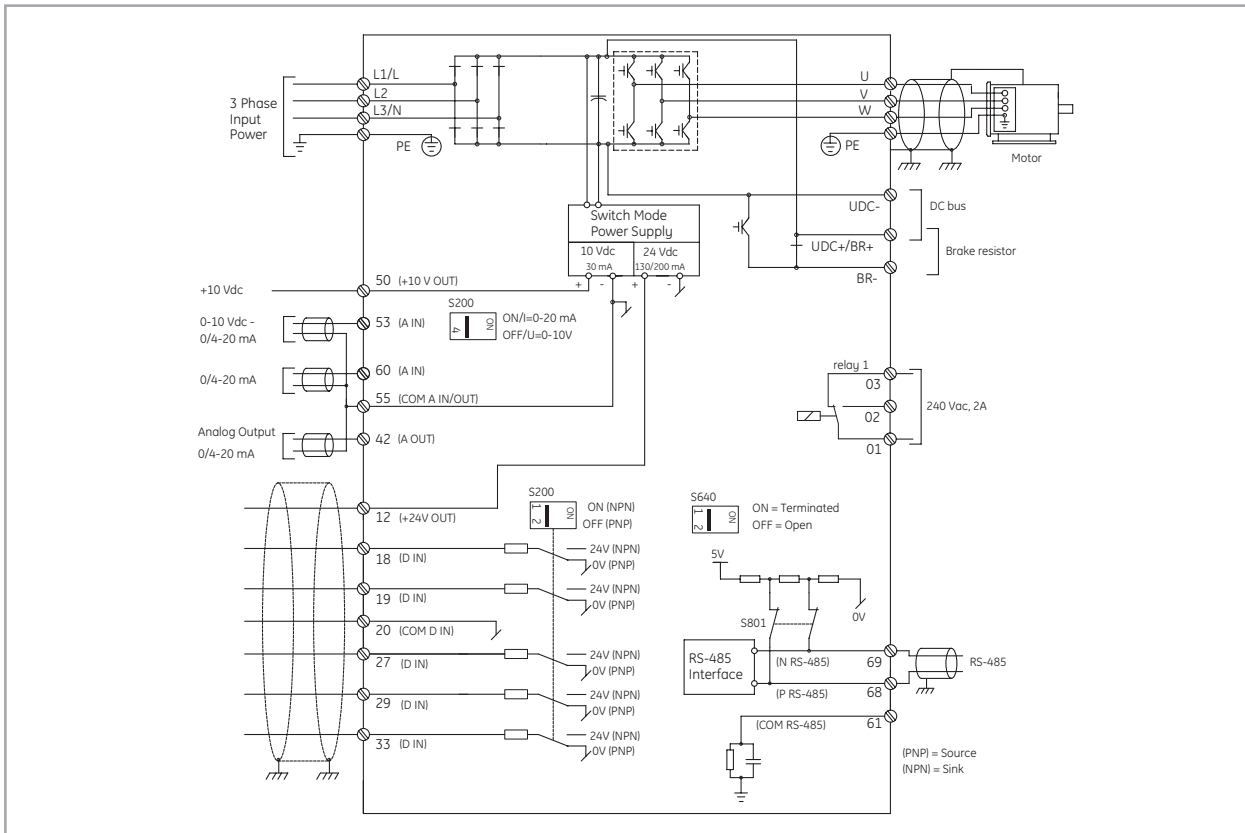
Replacement keypad with potentiometer



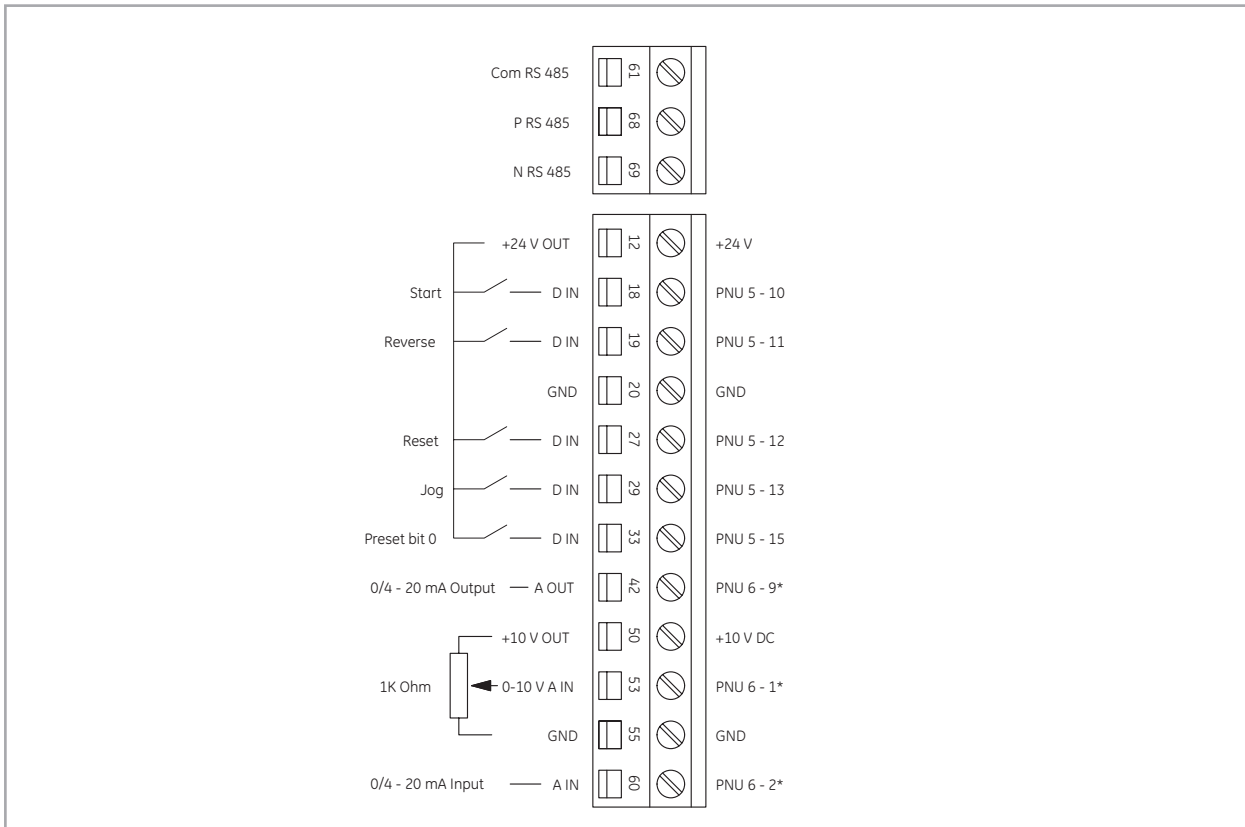
LCD keypad with potentiometer for the AF-60 LP Micro Drive. Keypad is removable under power and includes copycat feature to program multiple drives. Includes hand-off-auto keys for local control of drive and large parameter and operational data display. Menu key selects between drive status, quick menu, and main menu. LED indicators for alarms, warnings, and power are also included on each keypad. Keypad dimensions are: 85 H x 65 W x 28 D (with potentiometer) in mm.

Description	Cat. No.	Ref. No.
Replacement AF-60 LP keypad with potentiometer:	KYPDACLP1	404796

Basic wiring diagrams



Basic control terminal (PNP configuration and drive factory default settings)



Specifications

Environmental conditions

Enclosure	IP20 (NEMA 1 with optional NEMA 1 kit)
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Ambient temperature	-10° to +50° C
Ambient humidity	5 to 95% RH (non-condensing)
Vibration	1.0G
Storage temperature	-25° to 65° C

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V. WEEE and RoHS Compliant
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Input power supply

Rated Input AC voltage	200-240Vac, 1-phase, 50-60Hz, +/- 10% V 200-240Vac, 3-phase, 50-60Hz, +/- 10% V 380-480Vac, 3-phase, 50-60Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.4 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-200Hz (Adv. Vector Control Plus Mode), 0-400Hz (Volts/Hertz Mode)
Switching on output	Unlimited
Accel/decel times	0.05-3600 seconds
Overload current rating	150% of drive rated current for 1 minute

Control

Control method	Sinusoidal PWM Control (V/Hz with torque vector control)
Switching frequency select	2, 4, 8, 12, 16 kHz
Operation method	Keypad operation: Hand, Off, Auto Digital Input: Programmable for Start/Stop, Forward/Reverse, Jog Timer operation: Stop after predetermined time frame Link operation: RS-485 Modbus RTU
Frequency reference setting	Up or Down buttons on keypad or external reference
Analogue input	Built in potentiometer 0-10Vdc analogue input 4-20mA analogue input
Preset speeds	8 presets via digital inputs
Link operation	Drive RS-485 or Modbus RTU
Second reference setting	Switch from speed reference 1 to reference 2 via digital input
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
Acceleration/deceleration time	0.05-3600 seconds (two acceleration and deceleration rates are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve)
DC injection braking	Starting frequency: 0.0-400Hz Braking time: 0.0-60.0 seconds Braking level: 0-150% of rated current Braking time: 0.0-60.0 seconds Braking level: 0-150% of rated current
Frequency limit	0-400Hz
Jump frequency control	Two jump (or skip) frequencies via parameter set to avoid mechanical vibration
Jogging operation	Operation via On key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Slip compensation	Maintains motor at constant speed with load fluctuations

Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

Logic controller (LC)

Logic controller events	Over 23 types of programmable events
Comparators	Array of 4 comparators
Timers	Array of 3 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 4 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controller (PI)

Process CL feedback select	No function, analogue input 1, analogue input 2, pulse input, local bus reference
Process PI control	Normal or inverse
Process PI anti windup	Disabled or enabled
Process PI start speed	0.0-200Hz
Process PI proportional gain	0.00-10.00
Process PI integral gain	0.10-9999 seconds
Process PI feed forward factor	0-400%
On reference bandwidth	0-200%

Indication

LEDs	Green - drive is on Yellow - indicates a warning Red - indicates an alarm
Monitor Units Available	Frequency, current, voltage, power, horsepower, % load, speed, or time

Trip codes

2	Live zero error
4	Line phase loss
7	DC overvoltage
8	DC undervoltage
9	Drive overload
10	Motor overtemperature
11	Motor thermistor overtemperature
12	Torque limit
13	Overcurrent
14	Ground fault
16	Short circuit
17	Control word timeout
25	Brake resistor short-circuited
27	Brake chopper short-circuited
28	Brake check
29	Power board overtemperature
30	Missing U phase
31	Missing V phase
32	Missing W phase
38	Internal fault
47	Control voltage fault
51	Auto tune check - wrong motor parameters
52	Auto tune low inom - motor current is too low
59	Current limit
63	Mechanical brake low
80	Drive restored to factory settings

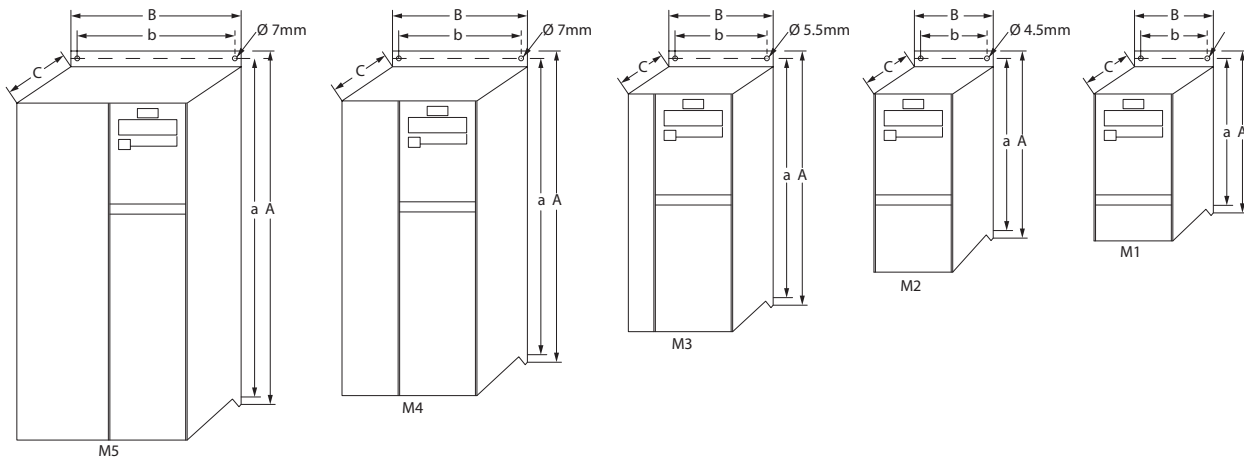
Monitoring parameters available

Power	kW
Power	HP
Motor voltage	V
Frequency	Hz
Motor current	A
Frequency	%
Motor thermal	%
DC link voltage	V
Drive current	A
Drive max current	A
Logic controller state	ON/OFF

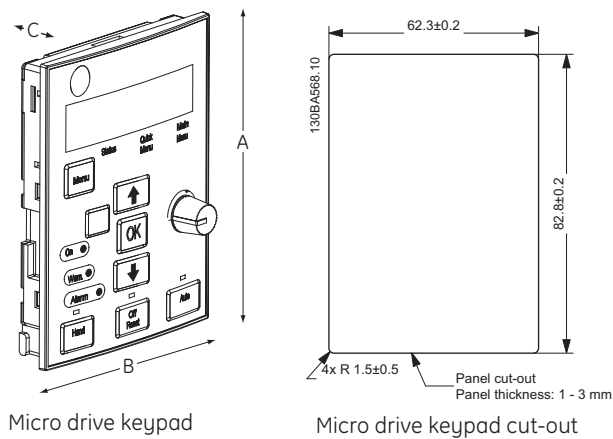
Dimensional drawings

Micro drives

Unit size	Nominal motor power ratings (kW)			Nominal motor power ratings (HP)			Height (mm)		Width (mm)		Depth (mm)	Weight (kg)	
	230 V 1ph	230 V 3ph	400 V 3ph	230 V 1ph	230 V 3ph	400 V 3ph	A (including decoupling plate)	a	B	b	C		
M1	0.18 - 0.75	0.25 - 0.75	0.37 - 0.75	1/4 - 1	1/3 - 1	1/2 - 1	150	205	140.4	70	55	148	1.1
M2	1.5	1.5	1.5 - 2.2	2	2	2 - 3	176	230	166.4	75	59	168	1.6
M3	2.2	2.2 - 3.7	4 - 7.5	3	3 - 5	5 - 10	239	294	226	90	69	194	3.0
M4	-	-	11 - 15	-	-	15 - 20	292	347.5	272.4	125	97	249	6.0
M5	-	-	18.5 - 22	-	-	25 - 30	335	387.5	315	165	140	256	9.5



Micro drive keypad



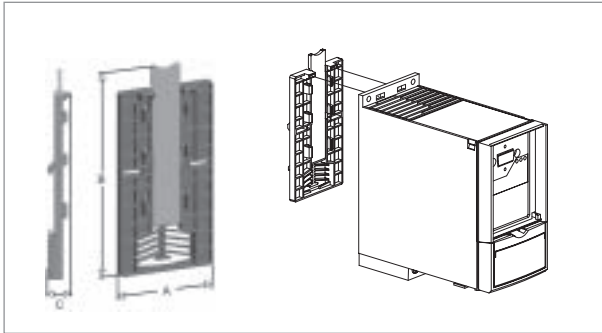
Height (mm) A	Width (mm) B	Depth (mm) C	Weight (kg)
85	65	28	0.08

Note: Please allow 5 cm between drives with field installed IP21/NEMA 1 kits. Also, please consult the relevant AF-6 Series drives Operating Instructions for recommended clearance above and below each drive rating.

Dimensional drawings

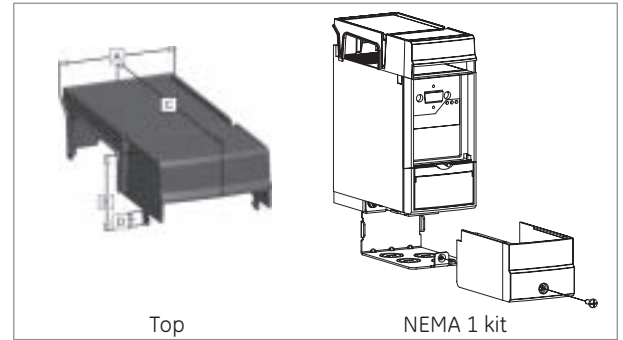
DIN-rail mounting kit for 0.75kW / 1HP and below drives

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)
RMACLP1	404806	60	129	13.5



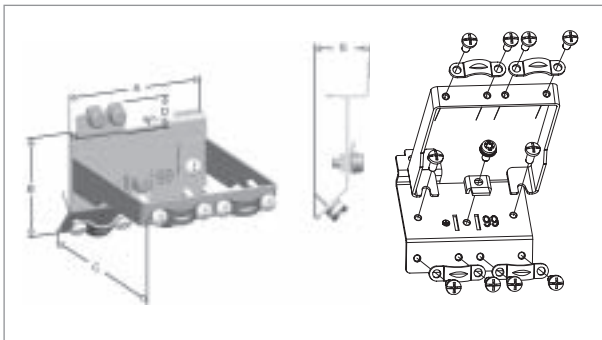
NEMA 1 field installed kit - top

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	404798	72	43	151	8
NEMA1ACLP2	404799	77	43	172	8
NEMA1ACLP3	404800	92	43	199	8



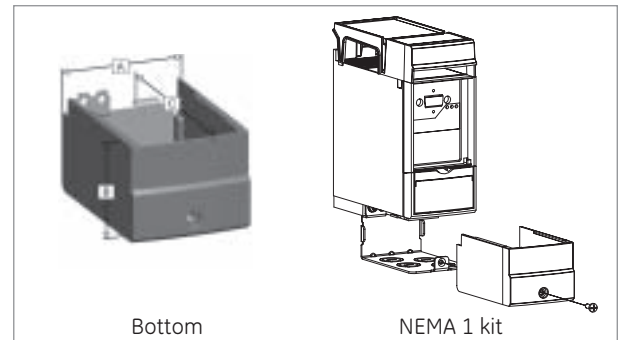
De-coupling plate kit

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
DEPLTACLP1	404804	70	52	100	14	22.6
DEPLTACLP2	404805	70	52	N/A	14	22.6



NEMA 1 field installed kit - bottom

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	404798	70	55	107	8
NEMA1ACLP2	404799	75	55	114	8
NEMA1ACLP3	404800	90	55	121	8



Notes

Grid area for notes.

Intro

A

B

C

D

E

F

G

H

I

J/X



New



AF-650 GP - General Purpose Drives

The AF-650 GP general purpose drive is a powerful, flexible and easy to use drive with many standard features. It is ideally suited for both heavy duty and light duty applications.

The drive is available in its standard configuration that includes IP20 or IP00 chassis, LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU and RFI class A2 filter. Available in IP 55 and IP 66 enclosures.

Following models are available:

- Three-phase, 230Vac, from 0.25 to 45kW, 1/3 to 60HP
- Three-phase, 400Vac, from 0.37 to 1000kW, 1/2 to 1350HP
- Three-phase, 690Vac, from 11 to 1200kW, 15 to 1600HP

Features

- Self-protecting features
- Other available configurations: RFI class A1/B1 filter, braking chopper and conformal coating.
- Configurations are available in IP55 and IP66
- RFI class A2 filter and DC link reactor as standard configuration
- Duality of power, Heavy or Light Duty
- 150% current overload for 1 minute (Heavy Duty)
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- Speed and process PID controls
- Integrated logic control, PLC
- "Pick up" start (catch a spinning motor)
- Precise stop function
- Advanced brake control
- 24V encoder feedback built-in
- Easy to use PC software
- Built-in communication networks for ModBus RTU
- Optional protocols: Profibus DP, Profinet, ModBus TPC/IP, Ethernet/IP and DeviceNet
- High standard protection class 3C2, optional class 3C3

Approvals / Marking



UL, cUL, C-Tick

Applications

Conveyors, mixers, agitators, lathes, spinning machines, machine tool, grinder, extruders, plastic injection molding machines, constant displacement pumps, woodworking machines.

Product numbering system diagram

Description	6K	GP	2	3	F50	X	2	R	B	C	A1
GE Product code											
Drive type	GP = AF-650 General purpose drive										
Input voltage	2 = 230V, 50/60 Hz 4 = 400V, 50/60 Hz 6 = 690V, 50/60 Hz										
Input phase	3 = 3-phase										
HP rating	F50 = 1/2 HP 010 = 10 HP 100 = 100 HP 1K0 = 1000 HP										
Revision	A1 = 1st revision A2 = Future										
Conformal coating	X = No Conformal coatings C = Conformal coatings										
Brake chopper	X = No factory installed brake chopper B = Factory installed brake chopper										
RFI filter	X = Only A2 RFI filter R = A1/B1 RFI filter installed										
Enclosure type	1 = IP21/NEMA 1 2 = IP55/NEMA 12 4 = IP66/NEMA 4 9 = IP20/open 8 = IP00/open										
Factory installed keypad	X = Keypad										

Product number for illustrative purposes only



New

IP66, with EMC filter Class A2, WITH braking chopper
230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Cat. No.	Ref. No.	Unit size
Nominal motor ratings				Nominal motor ratings						
Power kW	Power HP	Current A	Overload current during 60s (A)	Power kW	Power HP	Current A	Overload current during 60s (A)			
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	6KGP23F33X4XBXA1		12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4XBXA1	on request	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4XBXA1		33
22	30	88	132	30	40	115	126.5	6KGP23030X4XBXA1		33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4XBXA1		34
37	50	143	214.5	45	60	170	187	6KGP23050X4XBXA1		34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Cat. No.	Ref. No.	Unit size
Nominal motor ratings				Nominal motor ratings						
Power kW	Power HP	Current A	Overload current during 60s (A)	Power kW	Power HP	Current A	Overload current during 60s (A)			
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	6KGP43F50X4XBXA1	403187	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4XBXA1	403188	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4XBXA1	403189	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4XBXA1	403190	12
4	5	10	16	4	5	10	11	6KGP43005X4XBXA1	403191	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4XBXA1	403192	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4XBXA1	403193	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4XBXA1	403194	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4XBXA1	403195	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4XBXA1	403196	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4XBXA1	403197	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4XBXA1	403198	24
37	50	73	116.8	45	60	90	99	6KGP43050X4XBXA1	403199	33
45	60	90	144	55	75	106	116.6	6KGP43060X4XBXA1	403200	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4XBXA1	403201	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4XBXA1	403202	34

New



IP66, with EMC filter Class A2, *WITHOUT* braking chopper
230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Cat. No.	Ref. No.	Unit size
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)			
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.25	1/3	1.8	2.88	0.25	1/3	1.8	2.88	6KGP23F33X4XXXXA1	404724	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4XXXXA1	404725	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4XXXXA1	404726	12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4XXXXA1	404727	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4XXXXA1	404728	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4XXXXA1	404729	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4XXXXA1	404730	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4XXXXA1	404731	23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4XXXXA1	404732	24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4XXXXA1	404733	24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4XXXXA1	404734	33
22	30	88	132	30	40	115	126.5	6KGP23030X4XXXXA1	404735	33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4XXXXA1	404736	34
37	50	143	214.5	45	60	170	187	6KGP23050X4XXXXA1	404737	34

400V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Cat. No.	Ref. No.	Unit size
Nominal motor ratings			Overload current during 60s (A)	Nominal motor ratings			Overload current during 60s (A)			
Power kW	Power HP	Current A		Power kW	Power HP	Current A				
0.37	1/2	1.3	2.08	0.37	1/2	1.3	1.43	6KGP43F50X4XXXXA1	402919	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4XXXXA1	402920	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4XXXXA1	402921	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4XXXXA1	402922	12
4	5	10	16	4	5	10	11	6KGP43005X4XXXXA1	402923	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4XXXXA1	402924	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4XXXXA1	402925	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4XXXXA1	402926	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4XXXXA1	402927	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4XXXXA1	402928	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4XXXXA1	402929	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4XXXXA1	402930	24
37	50	73	116.8	45	60	90	99	6KGP43050X4XXXXA1	402931	33
45	60	90	144	55	75	106	116.6	6KGP43060X4XXXXA1	402932	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4XXXXA1	402933	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4XXXXA1	402934	34

AF-6 drives

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Options and accessories

Field installed IP21/NEMA 1 add-on option kits



Voltage	Rating kW	Rating HP	IP21/NEMA 1 Kit Cat. No.	Ref. No.
230	0.25	1/3	NEMA1ACA2	404831
	0.37	1/2	NEMA1ACA2	404831
	0.75	1	NEMA1ACA2	404831
	1.5	2	NEMA1ACA2	404831
	2.2	3	NEMA1ACA2	404831
	3.7	5	NEMA1ACA3	404832
	5.5	7.5	NEMA1ACB3	404833
	7.5	10	NEMA1ACB3	404833
	11	15	NEMA1ACB4	404834
	15	20	NEMA1ACB4	404834
	18.5	25	NEMA1ACC3	404835
	22	30	NEMA1ACC3	404835
	30	40	NEMA1ACC4	404836
37	50	NEMA1ACC4	404836	
400	0.37	1/2	NEMA1ACA2	404831
	0.75	1	NEMA1ACA2	404831
	1.5	2	NEMA1ACA2	404831
	2.2	3	NEMA1ACA2	404831
	3.7	5	NEMA1ACA2	404831
	5.5	7.5	NEMA1ACA3	404832
	7.5	10	NEMA1ACA3	404832
	11	15	NEMA1ACB3	404833
	15	20	NEMA1ACB3	404833
	18.5	25	NEMA1ACB4	404834
	22	30	NEMA1ACB4	404834
	30	40	NEMA1ACB4	404834
	37	50	NEMA1ACC3	404835
45	60	NEMA1ACC3	404835	
55	75	NEMA1ACC4	404836	
75	100	NEMA1ACC4	404836	

Remote mounting kit for graphical LCD keypad



Remote mounting kit for mounting graphical LCD Keypad on enclosure door. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Cat. No.	Ref. No.
Remote mounting kit for graphical LCD keypad	RMKYPDAC	404797
Remote mounting kit without cable	OPCRMKNC	404850

Communications modules



Profibus DP communications module Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	404848
DeviceNet communications module DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	404818
Ethernet IP communications module(1) Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	404820
Modbus TCP communications module Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
ProfiNet RT communications module ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	404825

(1) Requires I/O and network slots and cannot be used with any other network or I/O modules.

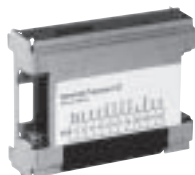


New

Options and accessories (continued)

AF-6 drives

General purpose I/O module



General purpose I/O internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Module includes: 3x digital inputs 24V
2x digital outputs PNP/NPN
2x analogue inputs 0-10V
1x analogue output 0/4-20mA

Description	Cat. No.	Ref. No.
General purpose I/O module	OPCGPIO	404821

Encoder module



Encoder internal drive mounted module for use on the AF-650 GP drive. Module supports all 5V incremental encoders. Also supports hyperface sincos encoders.

Description	Cat. No.	Ref. No.
Encoder input module	OPCENC	404819

Resolver module



Resolver internal drive mounted module for use on the AF-650 GP drive. Module supports 4-8Vrms, 2.5kHz - 15kHz, 50mA resolvers. Resolution is 10bit at 4Vrms.

Description	Cat. No.	Ref. No.
Resolver input module	OPCRES	404852

Relay output module



Relay output internal drive mounted module for use on the AF-650 GP. Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Description	Cat. No.	Ref. No.
Relay output module	OPCRLY	404849

24V DC External supply module



24V DC external supply internal drive mounted module for use on the AF-650 GP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a Line side power outage. Can be used with Communications and I/O Modules.

Description	Cat. No.	Ref. No.
24V DC External supply module	OPC24VPS	404815

Safe PLC I/O module



Safe PLC I/O internal drive mounted module for use on the AF-650 GP drive. This module provides a safety input based on a single pole 24V DC input.

Description	Cat. No.	Ref. No.
Safe PLC I/O Module	OPCSAFE	404853

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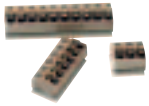
J/X



Options and accessories (continued)

Screw terminal accessory

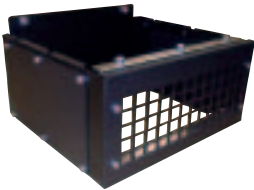
Screw terminal accessory is available for field installation on AF-650 GP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.



Description	Cat. No.	Ref. No.
Screw terminal accessory	OPCSTERM	404822

Pedestal kit

Pedestal kit allows unit size 41 and 42 drives to be floor mounted (IP21/NEMA 1 and IP55/NEMA 12, 90 to 200/315kW / 125 to 300/400HP at 400/690V for AF-650 GP).



Description	Cat. No.	Ref. No.
Pedestal kit	OPC4XPED	404845

USB kit

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.



For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

Power shields

These shields are used to cover the drive power terminals on NEMA 1 and NEMA 12 drive types.

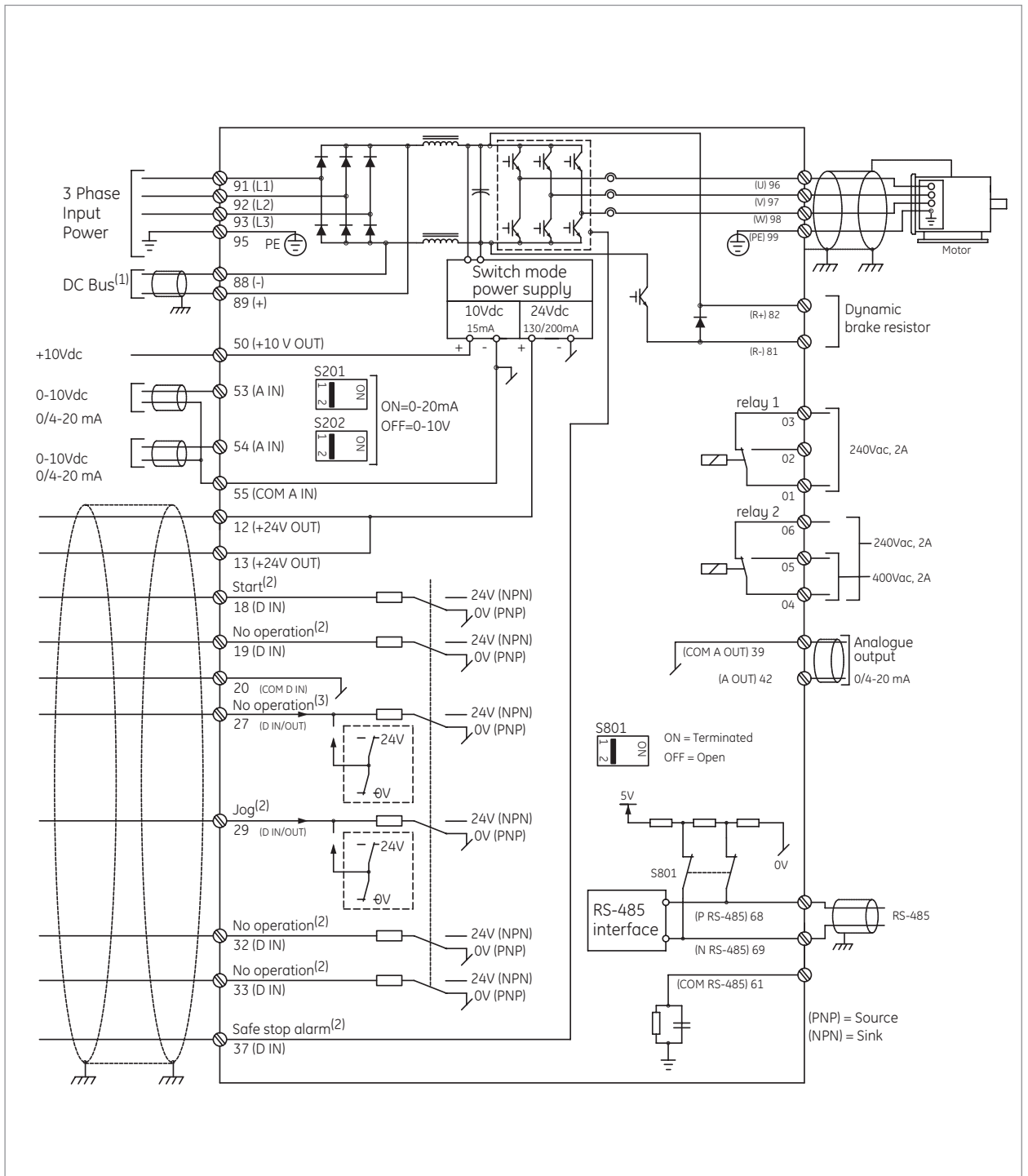
For Unit size 41 and 42 drives	OPCCOVER4142	404846
For Unit size 51 drives	OPCCOVER51	404847



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Basic wiring diagrams

AF-6 drives



- (1) These terminals are only available with optional factory installed brake chopper.
- (2) Indicates default setting; see parameter group E-## to re-program.
- (3) Indicates default setting for version 1.10 drives or higher. Prior versions are set to coast inverse, indicating that terminal #27 must be logic "high" to enable the drive to run. See parameter E-03 terminal 27 digital input to re-program.



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Specifications

Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21/NEMA 1, IP55/NEMA 12, IP54/NEMA 12, IP66/NEMA 4
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C (24 hour average max of 45° C)
Ambient humidity	5 to 95 % RH (non-condensing)
Vibration	1.0G
Cooling method	Fan cooled all ratings. Fan control auto, 50% level, 75 % level, 100% level adjustable

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V.
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Input power supply

Rated Input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-500 Vac, 3-phase, 50-60 Hz, +/- 10% V 525-690 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW/10HP, maximum once/minute above 7.5kW/10HP
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-1000 Hz; 0-800Hz for 400V above 710kW/100HP and 690V above 710kW/100HP
Switching on output	Unlimited
Accel/decel times	0.01-3600 seconds
Overload current rating	Sinusoidal PWM control (V/Hz, Adv. vector control, sensorless vector, and flux vector with motor feedback)

Control

Starting torque	160% starting torque for 1 minute (constant torque), 110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	Selectable by up to 5 individual V/Hz settings in V/Hz Mode or by 0 - 300% setting of torque boost parameter in Adv. vector mode
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or deceleration patterns can be selected from linear or S-curve)
Data protection	Passw protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 160% (0.1 and steps)
8 preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-1000 Hz, 0-800Hz for 400V above 710kW/100HP and 690V above 37kW/50HP Braking time: 0.0-60.0 seconds Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure

Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

Logic controller (LC)

Logic controller events	Up to 37 types of programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controller (PI)

Process CL feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Process PID control	Normal or inverse
Process PID anti windup	Disabled or enabled
Process PID start speed	0.0-200 Hz
Process PID proportional gain	0.00-10.00
Process PID integral time	0.1 - 10000.0 ms
Process PID differential time	0.0 - 10 s
Process PID differential gain	1.0-50.00
Process PID feed forward factor	0-500%
On reference bandwidth	0-200%

Operation

Operation method	Keypad operation: hand, off, auto digital input: programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Built-in RS-485 Modbus USB port for programming drive with optional PC software
Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10Vdc, 10 to 0Vdc 0-10Vdc analog input 0/4-20mA analog input
References	Up to 3 input references can be selected from analog input #1 or #2, frequency input #1 or #2, network, or potentiometer
Input signals	6x digital inputs, 24Vdc PNP or NPN 1x safe stop digital input suitable for category 3 installations to meet EN-954-1 2x pulse inputs rated to 110kHz or 1x pulse input and 1 - encoder Input 24Vdc rated to 4096 PPR 2x analog inputs -10 to +10V scalable or 0/4 to 20 mA scalable Digital input settings: No operation Reset after drive trip or alarm Reset after drive trip or alarm Drive at stop with no holding current Quick stop according to quick stop decel time 1 Stop on input going low Start Maintained start arfter signal applied for Minimum of 2ms Reversing Start reverse Enable start forward only Jog Multi-step frequency selection (1 to 8 Steps) Hold drive frequency Hold reference Speed up; activated by hold drive frequency or Hold reference Slow down; activated by hold drive frequency or hold reference Drive parameter setup select 1-4 Precise start or stop; activated when drive parameter precise start or stop function is selected Catch up or slow down; activated by signal to add to or subtract from input reference to control speed Pulse input selectable from 100 - 110000Hz Accel / decel time select. Set input to accel / decel times 1 to 4 Digital potentiometer Input Increase or Decrease Mechanical Brake Feedback

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Specifications

Operation (continued)

Output signals	2x digital outputs 24 Vdc (digital outputs are used in place of 2 of the digital inputs) 2x form C relays rated to 2A at 230 Vac 1x analog output 0/4 to 20mA Relay output settings: No operation Control ready Drive ready Drive ready in remote Standby no drive warnings Drive running Drive running no drive warnings Drive running on remote Alarm Alarm or warning At torque limit Out of current range Below current Above current Out of speed range Below speed Above speed Out of feedback range Below feedback Above feedback Thermal overload warning Reverse Bus OK Torque limit and stopped Brake and no warning Brake ready and no faults Brake chopper fault External interlock Out of external reference range Below external reference Above external reference Fieldbus controlling drive No alarm Running in reverse Local mode active Remote mode active Start command active Hand mode active Auto mode active
Protective functions	Line phase loss DC overvoltage DC undervoltage Drive overload Motor overtemperature Motor thermistor overtemperature Torque limit Overcurrent Ground fault Short circuit Control word timeout Brake resistor short-circuited Brake chopper short-circuited Brake check DC Link voltage high DC Link voltage low Internal fan fault External fan fault Power board overtemperature Missing U phase Missing V phase Missing W phase Internal fault Control voltage fault Auto tune check - wrong motor parameters Auto Tune low inom - motor current is too low Current limit Mechanical brake low Drive initialized to default value Keypad error No motor Soft charge fault Auto tuning fault Serial comms bus fault Hardware mismatch Speed limit

Keypad

Keypad features	LCD display with 6 alpha-numeric lines. multi-language support Hot pluggable, remote mount option, and copy-cat feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and h-o-a keys
Keypad keys	Status - shows status of drive Quick Menu - enters quick start, parameter data check, or trending modes Alarm log - used to display alarm list Back - reverts to previous step or layer in parameter structure Cancel - used to cancel last change or command Info - displays information about a command, parameter, or function in any display. Hand/off/auto - used to control drive locally or put drive in remote mode Reset - used to reset warnings or alarms
Password	2 level password protection
Alternate motor parameters	Up to 4 separate complete parameter set-ups are available
Graphical trending	Trend speed, power, frequency or any value programmed in status display

RS485 modbus RTU serial communications

Physical level	EIA/RS485
Transmission distance	1640 ft (500m)
Node address	32
Transmission speed	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
Transmission mode	Half duplex
Transmission protocol	Modbus RTU
Character code	Binary
Character length	8 bits
Error check	CRC

Mounting clearance

Starting torque	All AF-650 GP drives can be mounted side-by-side without spacing. For all drives rated 75kW/100HP or below allow 3.4 inches (100 mm) free space above and below. For all drives rated 90kW/125HP and above allow 8.9 inches (225 mm) free space above and below.
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Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

230 Vac

Nominal motor ratings			Efficiency			Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)							
0.25	1/3	1.8	94			21	12	IP20 chassis	375	90	220	5
0.37	1/2	2.4	94			29	12	IP20 chassis	375	90	220	5
0.75	1	4.6	95			54	12	IP20 chassis	375	90	220	5
1.5	2	7.5	96			82	12	IP20 chassis	375	90	220	5
2.2	3	10.6	96			115	12	IP20 chassis	374	130	220	7
3.7	5	16.7	96			185	13	IP20 chassis	420	165	262	12
5.5	7.5	24.2		96.4		239	23	IP20 chassis	420	165	262	12
7.5	10	30.8		95.9		371	23	IP20 chassis	595	230	242	24
11	15	46.2		96.4		463	24	IP20 chassis	595	230	242	24
15	20	59.4		96		621	24	IP20 chassis	630	308	334	35
18.5	25	74.8			97	740	33	IP20 chassis	630	308	334	35
22	30	88			97	874	33	IP20 chassis	800	370	334	50
30	40	115			97	1143	34	IP20 chassis	800	370	334	50
37	50	143			97	1400	34	IP20 chassis	31.5	14.57	13.15	110.2

400 Vac

Nominal motor ratings			Efficiency				Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)							
0.37	1/2	1.3	93				35	12	IP20 chassis	375	90	220	5
0.75	1	2.4	96				46	12	IP20 chassis	375	90	220	5
1.5	2	4.1	97				62	12	IP20 chassis	375	90	220	5
2.2	3	5.6	97				88	12	IP20 chassis	375	90	220	5
3.7	5	10	97				124	12	IP20 chassis	375	90	220	5
5.5	7.5	13	97				187	13	IP20 chassis	375	130	220	7
7.5	10	16	97				255	13	IP20 chassis	375	130	220	7
11	15	24		98			291	23	IP20 chassis	420	165	262	12
15	20	32		98			379	23	IP20 chassis	420	165	262	12
18.5	25	37.5		98			444	24	IP20 chassis	595	230	242	24
22	30	44		98			547	24	IP20 chassis	595	230	242	24
30	40	61			98		570	24	IP20 chassis	595	230	242	24
37	50	73			98		697	33	IP20 chassis	630	308	334	35
45	60	90			98		891	33	IP20 chassis	630	308	334	35
55	75	106			98		1022	34	IP20 chassis	800	370	334	50
75	100	147			99		1232	34	IP20 chassis	800	370	334	50
90	125	177			98		2641	43	IP00 chassis	1046	407.9	374.9	91
110	150	212			98		2995	43	IP00 chassis	1046	407.9	374.9	91
132	200	260			98		3425	44	IP00 chassis	1327	407.9	374.9	138
160	250	315			98		3910	44	IP00 chassis	1327	407.9	374.9	138
200	300	395			98		4625	44	IP00 chassis	1327	407.9	374.9	138
250	350	480			98		5165	52	IP00 chassis	1547	585	497.8	313
315	450	600			98		6960	52	IP00 chassis	1547	585	497.8	313
355	500	658			98		7691	52	IP00 chassis	1547	585	497.8	313
400	550	745			98		8636	52	IP00 chassis	1547	585	497.8	313
450	600	800			98		9492	61	IP21/NEMA 1	2282	1400	606	1004
500	650	80			98		10631	61	IP21/NEMA 1	2282	1400	606	1004
560	750	990			98		11263	61	IP21/NEMA 1	2282	1400	606	1004
630	900	1120			98		13172	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	1260			98		14967	62	IP21/NEMA 1	2282	1800	606	1262
800	1200	1460			98		16392	62	IP21/NEMA 1	2282	1800	606	1262

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New



Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

690 Vac

Nominal motor ratings			Efficiency			Watt Loss (W)	Unit size	Type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Power HP	Current A	at 3 kHz (%)	at 2 kHz (%)	at 1.5 kHz (%)							
11	15	13	98			228	22	IP21/NEMA 1	650	242	260	27
15	20	18	98			285	22	IP21/NEMA 1	650	242	260	27
18.5	25	22	98			335	22	IP21/NEMA 1	650	242	260	27
22	30	27	98			375	22	IP21/NEMA 1	650	242	260	27
30	40	34	98			480	32	IP21/NEMA 1	770	370	335	65
37	50	41	98			592	32	IP21/NEMA 1	770	370	335	65
45	60	51	98			720	32	IP21/NEMA 1	770	370	335	65
55	75	62	98			880	32	IP21/NEMA 1	770	370	335	65
75	100	83	98			1800	32	IP21/NEMA 1	770	370	335	65
90	125	108		98		2264	43	IP00 chassis	1046	407.9	374.9	91
110	150	131		98		2664	43	IP00 chassis	1046	407.9	374.9	91
132	200	155		98		2953	43	IP00 chassis	1046	407.9	374.9	91
160	250	192		98		3451	44	IP00 chassis	1327	407.9	374.9	138
200	300	242		98		4275	44	IP00 chassis	1327	407.9	374.9	138
250	350	290		98		4875	44	IP00 chassis	1327	407.9	374.9	138
315	400	344			98	5185	44	IP00 chassis	1327	407.9	374.9	138
355	500	380			98	5385	52	IP00 chassis	1547	585	497.8	313
400	600	410			98	5818	52	IP00 chassis	1547	585	497.8	313
500	650	500			98	7671	52	IP00 chassis	1547	585	497.8	313
560	750	570			98	8715	52	IP00 chassis	1547	585	497.8	313
630	900	630	98			9674	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	730	98			10965	61	IP21/NEMA 1	2282	1400	606	1004
800	1150	850	98			12890	61	IP21/NEMA 1	2282	1400	606	1004
900	1250	945	98			14457	62	IP21/NEMA 1	2282	1800	606	1262
1000	1350	1060	98			15899	62	IP21/NEMA 1	2282	1800	606	1262

AF-6 drives

Intro

A

B

C

D

E

F

G

H

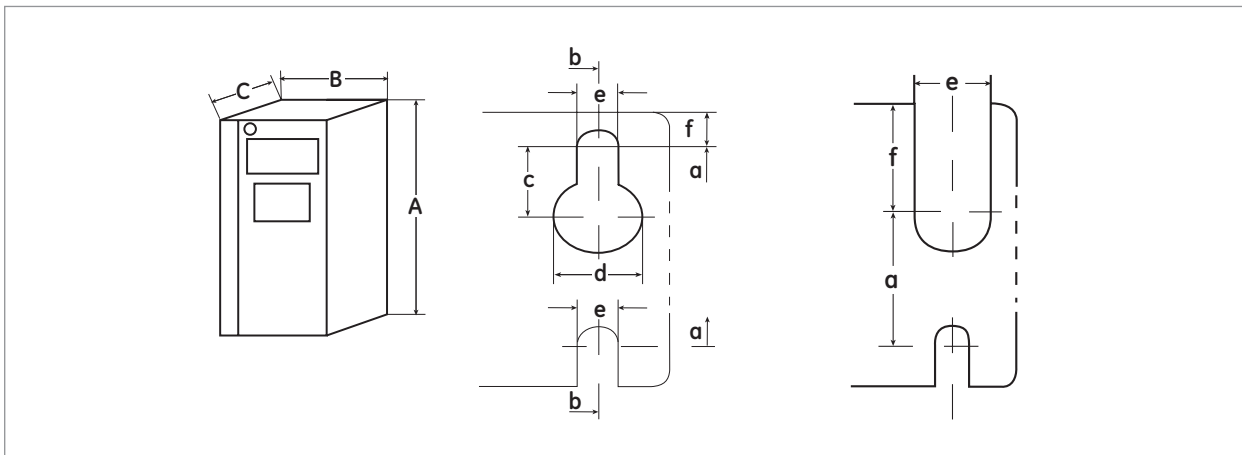
I

J/X

New



Dimensional drawings



Dimensions, 1X unit sizes (mm)

Unit size		Dimensions	12	13	15
Enclosure type			IP20 Open chassis	IP20 Open chassis	IP55/IP66 NEMA 12/NEMA 4
Voltage	230V		0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	0.25 to 3.7kW 1/3 to 5HP
	400V		0.37 to 3.7kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.37 to 7.5kW 1/2 to 10HP
Height	Height of backplate	A	268	268	420
	Height with de-coupling plate	A	375	375	-
	Distance between mounting holes	a	257	257	402
Width	Width of backplate	B	90	130	242
	Distance between mounting holes	b	70	110	215
Depth	Depth without I/O and/or network option	C	205	205	195
	Depth with I/O and/or network option	C	220	220	195
Screw holes		c	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
Weight (kg)			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21	22	23	24
Enclosure type			IP55/IP66 NEMA 12/NEMA 4	IP55/IP66 NEMA 12/NEMA 4	IP20 Open chassis	IP20 Open chassis
Voltage	230V		5.5 to 7.5kW 7.5 to 10HP	11kW 15HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP
	400V		11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP
Height	Height of backplate	A	480	650	399	521
	Height with de-coupling plate	A	-	-	420	595
	Distance between mounting holes	a	455	625	380	495
Width	Width of backplate	B	242	242	165	230
	Distance between mounting holes	b	210	210	140	200
Depth	Depth without I/O and/or network option	C	260	260	249	242
	Depth with I/O and/or network option	C	260	260	262	242
Screw holes		c	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
Weight (kg)			23.0	27.0	12.0	23.5



New

Dimensional drawings

Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31	32	33	34
Enclosure type			IP55/IP66	IP55/IP66	IP20	IP20
			NEMA 12/NEMA 4	NEMA 12/NEMA 4	Open chassis	Open chassis
Voltage	230V		15 to 22kW 20 to 30HP	30 to 37kW 40 to 50HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
	400V		30 to 45kW 40 to 60HP	55 to 75kW 75 to 100HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
Height	Height of backplate	A	680	770	550	660
	Height with de-coupling plate	A	-	-	630	800
	Distance between mounting holes	a	648	739	521	631
Width	Width of backplate	B	308	370	308	370
	Distance between mounting holes	b	272	334	270	330
Depth	Depth without I/O and/or network option	C	310	335	333	333
	Depth with I/O and/or network option	C	310	335	333	333
Screw holes		c	12.5	12.5	-	-
		d	19.0	19.0	-	-
		e	9.0	9.0	8.5	8.5
		f	9.8	9.8	17.0	17.0
Weight (kg)			45	65	35	50

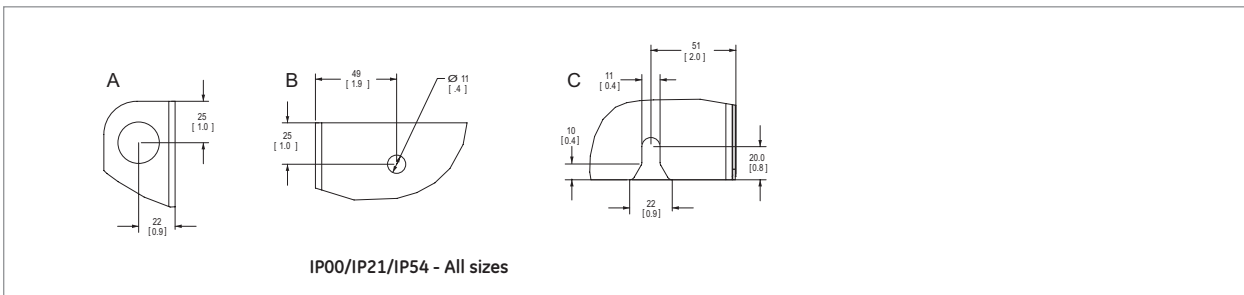
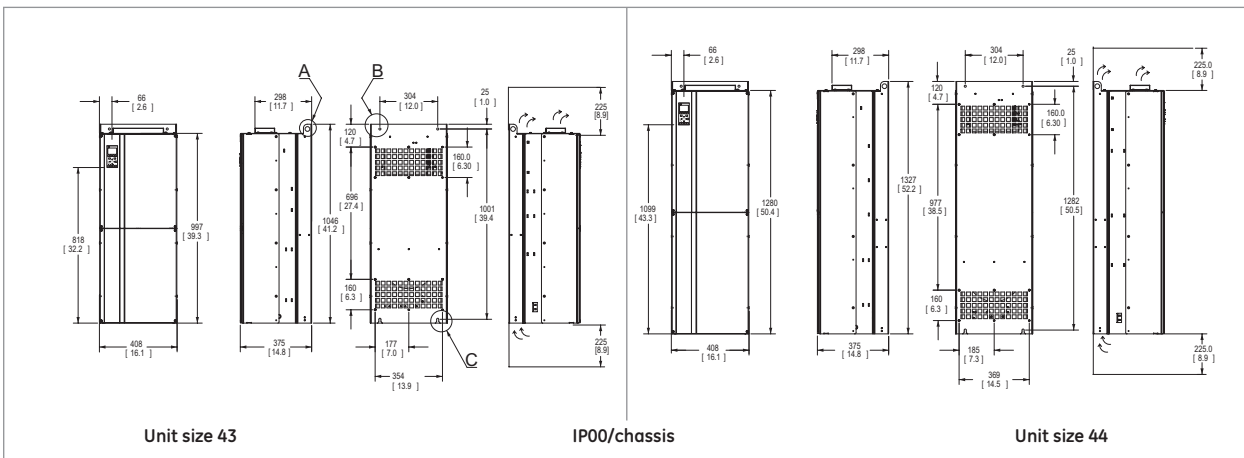
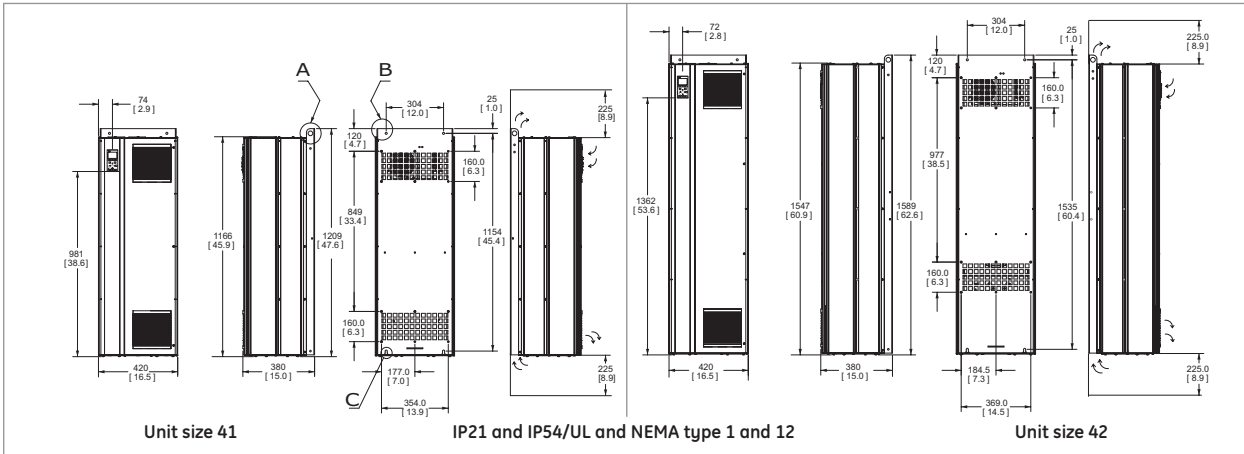
Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits⁽¹⁾ (mm)

Unit Size	12	13	23	24	33	34	
Enclosure type	IP20 open chassis with IP21/NEMA 1 kit						
Voltage	230V	0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
	400V	0.25 to 2.2kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
Height							
Height with kit	375	375	475	671	754	950	
Width							
Width of backplate	94	130	165	231	397	371	
Distance between mounting holes	70	110	140	201	269	330	
Depth							
Depth without I/O and/or network option	205	205	249	242	338	338	
Depth with I/O and/or network option	220	220	262	242	338	338	

(1) Please consult IP21/NEMA 1 kit Instructions for further mounting details and dimensions.

Note: please allow 5cm /2" between drives with field installed IP21/NEMA 1 kits. Also, please consult the relevant AF-6 Series drives operating instructions for recommended clearance above and below each drive rating.

Dimensional drawings in mm (inches)

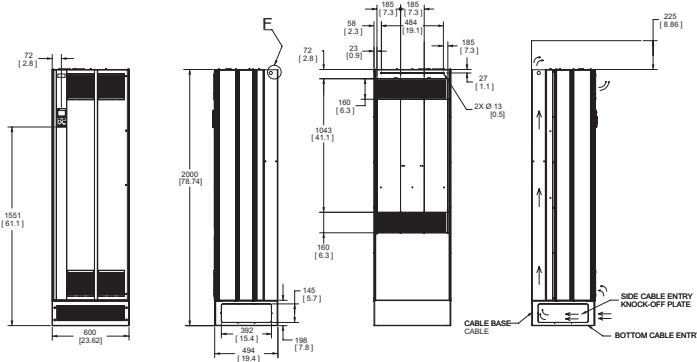


Unit size	41	42	43	44
Enclosure type	IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00	IP00
Voltage	400V 90 to 110kW 125 to 150HP	690V 90 to 132kW 125 to 200HP	Open chassis 90 to 110kW 125 to 150HP	Open chassis 132 to 200kW 200 to 300HP
Shipping dimensions	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1220 Depth: 570	Height: 650 Width: 1490 Depth: 570
Drive dimensions	Height: 1209 Width: 420 Depth: 380	Height: 1589 Width: 420 Depth: 380	Height: 1046 Width: 408 Depth: 375	Height: 1327 Width: 408 Depth: 375
Weight (kg)	104	106	91	138



New

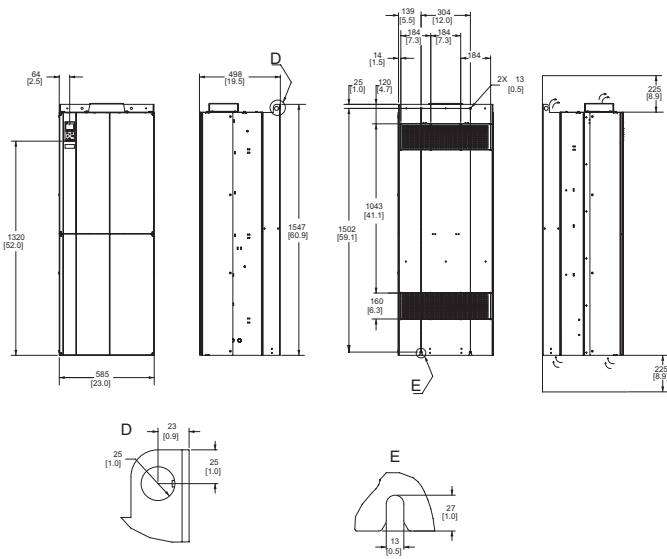
Dimensional drawings in mm (inches)



Unit size 51, IP21 and IP54/UL and NEMA type 1 and 12

Unit size 51

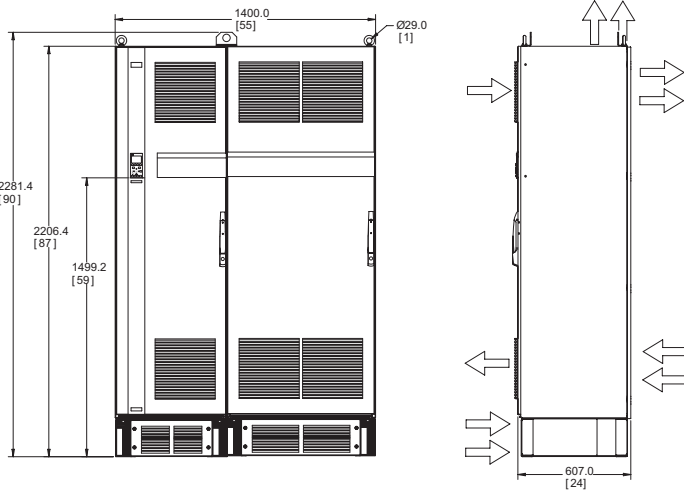
Enclosure type	IP21/IP54 NEMA 1/NEMA 12
Voltage	400V 250 to 400kW 350 to 550HP
	690V 355 to 560kW 500 to 750HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313



Unit size 52, IP00/Chassis

Unit size 52

Enclosure type	IP00 Open chassis
Voltage	400V 250 to 400kW 350 to 550HP
	690V 355 to 560kW 500 to 750HP
Shipping dimensions	
Height	831
Width	1704
Depth	734
Drive dimensions	
Height	1547
Width	585
Depth	498
Weight (kg)	313



Unit Size 61

Unit size 61

Enclosure type	IP21/IP54 NEMA 1/NEMA 12
Voltage	400V 450 to 630kW 600 to 900HP
	690V 630 to 800kW 900 to 1150HP
Shipping dimensions	
Height	2324
Width	1570
Depth	927
Drive dimensions	
Height	2282
Width	1400
Depth	606
Weight (kg)	1004

Dimensional drawings in mm (inches)

New



Unit size 62

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 710 to 800kW 1000 to 1200HP
	690V 900 to 1000kW 1250 to 1350HP
Shipping dimensions	
Height	2324
Width	1961
Depth	419
Drive dimensions	
Height	2282
Width	1800
Depth	606
Weight (kg)	1262

Unit size 63

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 450 to 630kW 600 to 900HP
	690V 630 to 800kW 900 to 1150HP
Shipping dimensions	
Height	2324
Width	2159
Depth	927
Drive dimensions	
Height	2282
Width	2000
Depth	606
Weight (kg)	1300

Unit size 64

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 710 to 800kW 1000 to 1200HP
	690V 900 to 1000kW 1250 to 1350HP
Shipping dimensions	
Height	2324
Width	2543
Depth	927
Drive dimensions	
Height	2282
Width	2400
Depth	606
Weight (kg)	1541



AF-600 FP - Fan and Pump Drives

The AF-600 FP Fan and Pump Drive is a powerful, flexible and easy to use AC variable torque drive.

The drive is available in its standard configuration that includes LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU, Metasys N2, Apogee FLN P1 and RFI Class A2 filter. Available in IP55 enclosure.

Following models are available:

- Three-phase, 230Vac, from 1.1 to 45kW, 1 to 60HP
- Three-phase, 400Vac, from 1.1 to 1000kW, 1 to 1350HP
- Three-phase, 690Vac, from 1.1 to 1000kW, 1 to 1350HP

Features

All features HVAC needs

- RFI class A2 filter and DC link reactor as standard configuration.
- Built-in communication networks for ModBus RTU, Metasys N2 and Apogee FLN P1
- Field installed network options: BACnet, LonWorks, Profibus DP, Profinet, Modbus TCP/IP, Ethernet/IP and DeviceNet
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- 4 auto-tuning PID controllers
- Integrated logic control, PLC
- "Pick up" start (catch a spinning motor)
- Easy to use PC software
- Energy monitoring feature
- Flow compensation
- Pump cascade controller
- Sleep mode
- Fan belt monitoring
- Stairwell pressurization
- Fire override mode
- High standard protection Class 3C2, optional class 3C3

Approvals / Marking



UL, cUL, C-Tick

Applications

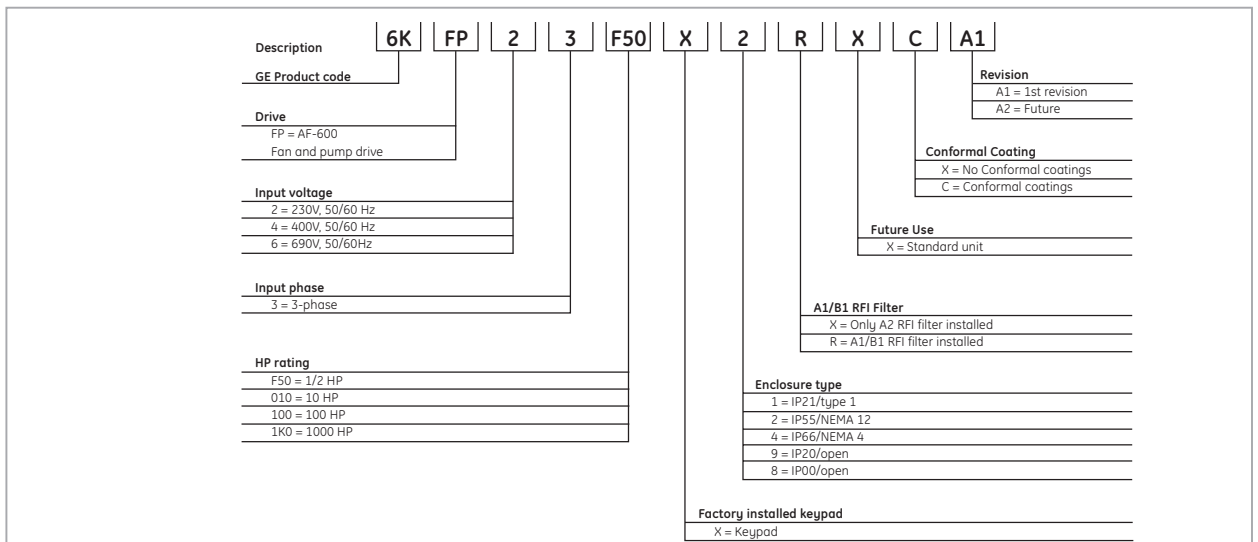
Fan

HVAC, cooling towers, VAV, supply and return, exhaust, fume hood, make-up air, induced and forced draft, furnace temperature control.

Pump

Chilled water, pressure boosting, cooling tower, wastewater, chiller, irrigation, hydro-storage.

Product numbering system diagram



Product number for illustrative purposes only



**IP00 / IP20 / IP21, with EMC filter Class A2, without braking chopper
230V, 3-phase, 50/60Hz input**

Nominal motor ratings				Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)				
0.75	1	4.6	5.1	IP20	6KFP23001X9XXXA1	404684	12
1.5	2	7.5	8.3		6KFP23002X9XXXA1	404685	12
2.2	3	10.6	11.7		6KFP23003X9XXXA1	404686	12
3.7	5	16.7	18.4		6KFP23005X9XXXA1	404687	13
5.5	7.5	24.2	26.6		6KFP23007X9XXXA1	404688	23
7.5	10	30.8	33.9		6KFP23010X9XXXA1	404689	23
11	15	46.2	50.8		6KFP23015X9XXXA1	404690	23
15	20	59.4	65.3		6KFP23020X9XXXA1	404691	24
18.5	25	74.8	82.3		6KFP23025X9XXXA1	404692	24
22	30	88	96.8		6KFP23030X9XXXA1	404693	33
30	40	115	126.5		6KFP23040X9XXXA1	404694	33
37	50	143	157		6KFP23050X9XXXA1	404695	34
45	60	170	187		6KFP23060X9XXXA1	404696	34

400V, 3-phase, 50/60Hz input

Nominal motor ratings				Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size	
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)					
0.75	1	1.3	1.43	IP20	6KFP43001X9XXXA1	403855	12	
1.5	2	2.4	2.64		6KFP43002X9XXXA1	403856	12	
2.2	3	4.1	4.51		6KFP43003X9XXXA1	403857	12	
4	5	5.6	6.16		6KFP43005X9XXXA1	403858	12	
5.5	7.5	10	11		6KFP43007X9XXXA1	403859	13	
7.5	10	13	14.3		6KFP43010X9XXXA1	403860	13	
11	15	16	17.6		6KFP43015X9XXXA1	403861	23	
15	20	32	35.2		6KFP43020X9XXXA1	403862	23	
18.5	25	37.5	41.25		6KFP43025X9XXXA1	403863	23	
22	30	44	48.4		6KFP43030X9XXXA1	403864	24	
30	40	61	67.1		6KFP43040X9XXXA1	403865	24	
37	50	73	80.3		6KFP43050X9XXXA1	403866	24	
45	60	90	99		6KFP43060X9XXXA1	403867	33	
55	75	106	116.6		6KFP43075X9XXXA1	403868	33	
75	100	147	161.7		6KFP43100X9XXXA1	403869	34	
90	125	177	194.7		6KFP43125X9XXXA1	403870	34	
110	150	212	233.2	IP00	6KFP43150X8XXXA1	403871	43	
132	200	260	286		6KFP43200X8XXXA1	403872	43	
160	250	315	346.5		6KFP43250X8XXXA1	403873	44	
200	300	395	434.5		6KFP43300X8XXXA1	403874	44	
250	350	480	528		6KFP43350X8XXXA1	403875	44	
315	450	600	660		IP00 conformal coated	6KFP43450X8XXCA1	403876	52
355	500	658	723.8			6KFP43500X8XXCA1	403877	52
400	550	745	819.5		6KFP43550X8XXCA1	403878	52	
450	600	800	880		6KFP43600X8XXCA1	403879	52	
500	650	880	968		6KFP43650X1XXCA1	403880	61	
560	750	990	1089	IP21/NEMA 1 conformal coated	6KFP43750X1XXCA1	403881	61	
630	900	1120	1232		6KFP43900X1XXCA1	403882	61	
710	1000	1260	1386		6KFP431K0X1XXCA1	403883	61	
800	1200	1460	1606		6KFP431K2X1XXCA1	403884	62	
1000	1350	1700	1870	6KFP431K3X1XXCA1	403885	62		

690V, 3-phase, 50/60Hz input

Nominal motor ratings				Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size			
Power kW	Power HP	Current A	Overload current (A) (110% 1 Min)							
11	15	13	14	IP21/NEMA 1	6KFP63015X1XXCA1	on request				
15	20	18	20		6KFP63020X1XXCA1					
18.5	25	22	24		6KFP63025X1XXCA1					
22	30	27	30		6KFP63030X1XXCA1					
30	40	34	37		6KFP63040X1XXCA1					
37	50	41	45		6KFP63050X1XXCA1					
45	60	52	57		6KFP63060X1XXCA1					
55	75	62	68		6KFP63075X1XXCA1					
75	100	83	91		6KFP63100X1XXCA1					
90	125	100	110		6KFP63125X1XXCA1					
110	150	131	144		6KFP63150X8XXCA1					
132	200	155	171		6KFP63200X8XXCA1					
160	250	192	211		6KFP63250X8XXCA1					
200	300	242	266		IP00 conformal coated			6KFP63300X8XXCA1	on request	
250	350	290	319					6KFP63350X8XXCA1		
315	400	344	378					6KFP63450X8XXCA1		
355	500	400	440	6KFP63550X8XXCA1						
400	550	450	495	IP21/NEMA 1 conformal coated	6KFP63600X8XXCA1	on request				
500	650	500	550		6KFP63650X8XXCA1					
560	750	570	627		6KFP63750X8XXCA1					
630	900	630	693		6KFP63900X8XXCA1					
710	1000	730	803		6KFP631K0X1XXCA1					
800	1150	850	935		6KFP631K1X1XXCA1					
900	1250	945	1040		6KFP631K2X1XXCA1					
1000	1350	1060	1166		6KFP631K3X1XXCA1					
1200	1600	1260	1386	6KFP631K6X1XXCA1						
1400	1900	1415	1557	6KFP631K9X1XXCA1						

(1) Drives are rated NEMA 1 without the need for a separate kit.

(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.



New

IP54 / IP55, with EMC filter Class A2, without Braking Chopper 230V, 3-phase, 50/60Hz input

Nominal motor ratings				Overload current (A) (110% 1 Min)	Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A						
0.75	1	4.6	5.1	IP55/NEMA 12	6KFP23001X2XXXXA1	404697	12	
1.5	2	7.5	8.3		6KFP23002X2XXXXA1	404698	12	
2.2	3	10.6	11.7		6KFP23003X2XXXXA1	404699	12	
3.7	5	16.7	18.4		6KFP23005X2XXXXA1	404700	13	
5.5	7.5	24.2	26.6		6KFP23007X2XXXXA1	404701	23	
7.5	10	30.8	33.9		6KFP23010X2XXXXA1	404702	23	
11	15	46.2	50.8		6KFP23015X2XXXXA1	404703	23	
15	20	59.4	65.3		6KFP23020X2XXXXA1	404704	24	
18.5	25	74.8	82.3		6KFP23025X2XXXXA1	404705	24	
22	30	88	96.8		6KFP23030X2XXXXA1	404706	33	
30	40	115	126.5		6KFP23040X2XXXXA1	404707	33	
37	50	143	157		6KFP23050X2XXXXA1	404708	34	
45	60	170	187		6KFP23060X2XXXXA1	404709	34	

400V, 3-phase, 50/60Hz input

Nominal motor ratings				Overload current (A) (110% 1 Min)	Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A						
0.75	1	1.3	1.43	IP55/NEMA 12	6KFP43001X2XXXXA1	403886	12	
1.5	2	2.4	2.64		6KFP43002X2XXXXA1	403887	12	
2.2	3	4.1	4.51		6KFP43003X2XXXXA1	403888	12	
4	5	5.6	6.16		6KFP43005X2XXXXA1	403889	12	
5.5	7.5	10	11		6KFP43007X2XXXXA1	403890	13	
7.5	10	13	14.3		6KFP43010X2XXXXA1	403891	13	
11	15	16	17.6		6KFP43015X2XXXXA1	403892	23	
15	20	32	35.2		6KFP43020X2XXXXA1	403893	23	
18.5	25	37.5	41.25		6KFP43025X2XXXXA1	403894	23	
22	30	44	48.4		6KFP43030X2XXXXA1	403895	24	
30	40	61	67.1		6KFP43040X2XXXXA1	403896	24	
37	50	73	80.3		6KFP43050X2XXXXA1	403897	24	
45	60	90	99		6KFP43060X2XXXXA1	403898	33	
55	75	106	116.6		6KFP43075X2XXXXA1	403899	33	
75	100	147	161.7		6KFP43100X2XXXXA1	403900	34	
90	125	177	194.7		6KFP43125X2XXXXA1	403901	34	
110	150	212	233.2	IP54/NEMA 12	6KFP43150X2XXXXA1	403902	43	
132	200	260	286		6KFP43200X2XXXXA1	403903	43	
160	250	315	346.5		6KFP43250X2XXXXA1	403904	44	
200	300	395	434.5		6KFP43300X2XXXXA1	403905	44	
250	350	480	528		6KFP43350X2XXXXA1	403906	44	
315	450	600	660		6KFP43450X2XXXXA1	403907	52	
355	500	658	723.8		6KFP43500X2XXXXA1	403908	52	
400	550	745	819.5		6KFP43550X2XXXXA1	403909	52	
450	600	800	880	IP54/NEMA 12 conformal coated	6KFP43600X2XXXXA1	403910	52	
500	650	880	968		6KFP43650X2XXXXA1	403911	61	
560	750	990	1089		6KFP43750X2XXXXA1	403912	61	
630	900	1120	1232		6KFP43900X2XXXXA1	403913	61	
710	1000	1260	1386		6KFP431K0X2XXXXA1	403914	61	
800	1200	1460	1606		6KFP431K2X2XXXXA1	403915	62	
1000	1350	1700	1870		6KFP431K3X2XXXXA1	403916	62	

690V, 3-phase, 50/60Hz input

Nominal motor ratings				Overload current (A) (110% 1 Min)	Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A						
15	20	18	20	IP55/NEMA 12 conformal coated	6KFP63015X2XXCA1			
18.5	25	22	24		6KFP63020X2XXCA1			
22	30	27	30		6KFP63025X2XXCA1			
30	40	34	37		6KFP63030X2XXCA1			
37	50	41	45		6KFP63040X2XXCA1			
45	60	52	57		6KFP63050X2XXCA1			
55	75	62	68		6KFP63060X2XXCA1			
75	100	83	91		6KFP63075X2XXCA1			
90	125	100	110		6KFP63100X2XXCA1			
110	150	131	144		6KFP63125X2XXCA1			
132	200	155	171		6KFP63150X2XXCA1			
160	250	192	211		6KFP63200X2XXCA1			
200	300	242	266		6KFP63250X2XXCA1			
250	350	290	319		6KFP63300X2XXCA1			
315	400	344	378		6KFP63350X2XXCA1			
355	500	400	440		IP54/NEMA 12 conformal coated	6KFP63400X2XXCA1		
400	550	450	495	6KFP63500X2XXCA1				
500	650	500	550	6KFP63550X2XXCA1				
560	750	570	627	6KFP63650X2XXCA1				
630	900	630	693	6KFP63750X2XXCA1				
710	1000	730	803	6KFP63900X2XXCA1				
800	1150	850	935	6KFP631K0X2XXCA1				
900	1250	945	1040	6KFP631K1X2XXCA1				
1000	1350	1060	1166	6KFP631K2X2XXCA1				
1200	1600	1260	1386	6KFP631K3X2XXCA1				
1400	1900	1415	1557	6KFP631K6X2XXCA1				

(1) Drives are rated NEMA 1 without the need for a separate kit.

(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.

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New



IP66, with EMC filter Class A2, without braking chopper
230V, 3-phase, 50/60Hz input

Nominal motor ratings				Overload current (A) (110% 1 Min)	Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A						
0.75	1	4.6	5.1	IP66/NEMA 12	6KFP23001X4XXXXA1	on request		
1.5	2	7.5	8.3		6KFP23002X4XXXXA1			
2.2	3	10.6	11.7		6KFP23003X4XXXXA1			
3.7	5	16.7	18.4		6KFP23005X4XXXXA1			
5.5	7.5	24.2	26.6		6KFP23007X4XXXXA1			
7.5	10	30.8	33.9		6KFP23010X4XXXXA1			
11	15	46.2	50.8		6KFP23015X4XXXXA1			
15	20	59.4	65.3		6KFP23020X4XXXXA1			
18.5	25	74.8	82.3		6KFP23025X4XXXXA1			
22	30	88	96.8		6KFP23030X4XXXXA1			
30	40	115	126.5		6KFP23040X4XXXXA1			
37	50	143	157		6KFP23050X4XXXXA1			
45	60	170	187		6KFP23060X4XXXXA1			

400V, 3-phase, 50/60Hz input

Nominal motor ratings				Overload current (A) (110% 1 Min)	Enclosure type ⁽²⁾ :	Cat. No.	Ref. No.	Unit size
Power kW	Power HP	Current A						
0.75	1	1.3	1.43	IP66/NEMA 12	6KFP43001X4XXXXA1	on request		
1.5	2	2.4	2.64		6KFP43002X4XXXXA1			
2.2	3	4.1	4.51		6KFP43003X4XXXXA1			
4	5	5.6	6.16		6KFP43005X4XXXXA1			
5.5	7.5	10	11		6KFP43007X4XXXXA1			
7.5	10	13	14.3		6KFP43010X4XXXXA1			
11	15	16	17.6		6KFP43015X4XXXXA1			
15	20	32	35.2		6KFP43020X4XXXXA1			
18.5	25	37.5	41.25		6KFP43025X4XXXXA1			
22	30	44	48.4		6KFP43030X4XXXXA1			
30	40	61	67.1		6KFP43040X4XXXXA1			
37	50	73	80.3		6KFP43050X4XXXXA1			
45	60	90	99		6KFP43060X4XXXXA1			
55	75	106	116.6		6KFP43075X4XXXXA1			
75	100	147	161.7		6KFP43100X4XXXXA1			
90	125	177	194.7		6KFP43125X4XXXXA1			
110	150	212	233.2	6KFP43150X4XXXXA1				
132	200	260	286	IP66/NEMA 12	6KFP43200X4XXXXA1			
160	250	315	346.5		6KFP43250X4XXXXA1			
200	300	395	434.5		6KFP43300X4XXXXA1			
250	350	480	528		6KFP43350X4XXXXA1			
315	450	600	660		6KFP43450X4XXXXA1			
355	500	658	723.8		6KFP43500X4XXXXA1			
400	550	745	819.5		6KFP43550X4XXXXA1			
450	600	800	880		IP66/NEMA 12 conformal coated		6KFP43600X4XXXXA1	
500	650	880	968				6KFP43650X4XXXXA1	
560	750	990	1089				6KFP43750X4XXXXA1	
630	900	1120	1232	6KFP43900X4XXXXA1				
710	1000	1260	1386	6KFP431K0X4XXXXA1				
800	1200	1460	1606	6KFP431K2X4XXXXA1				
1000	1350	1700	1870	6KFP431K3X4XXXXA1				

(1) Drives are rated NEMA 1 without the need for a separate kit.

(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.



New

Options and accessories

Field installed IP21/NEMA 1 add-on option kits



Voltage	Power kW	Power HP	IP21/NEMA 1 kit Cat. No.	Ref. No.
230	0,75	1	NEMA1ACA2	404831
	1,5	2	NEMA1ACA2	404831
	2,2	3	NEMA1ACA2	404831
	3,7	5	NEMA1ACA3	404832
	5,5	7,5	NEMA1ACB3	404833
	7,5	10	NEMA1ACB3	404833
	11	15	NEMA1ACB3	404833
	15	20	NEMA1ACB4	404834
	18,5	25	NEMA1ACB4	404834
	22	30	NEMA1ACC3	404835
	30	40	NEMA1ACC3	404835
	37	50	NEMA1ACC4	404836
	45	60	NEMA1ACC4	404836
400	0,75	1	NEMA1ACA2	404831
	1,5	2	NEMA1ACA2	404831
	2,2	3	NEMA1ACA2	404831
	3,7	5	NEMA1ACA2	404831
	5,5	7,5	NEMA1ACA3	404832
	7,5	10	NEMA1ACA3	404832
	11	15	NEMA1ACB3	404833
	15	20	NEMA1ACB3	404833
	18,5	25	NEMA1ACB3	404833
	22	30	NEMA1ACB4	404834
	30	40	NEMA1ACB4	404834
	37	50	NEMA1ACB4	404834
	45	60	NEMA1ACC3	404835
	55	75	NEMA1ACC3	404835
	75	100	NEMA1ACC4	404836
90	125	NEMA1ACC4	404836	

Remote mounting kit for graphical LCD keypad

Remote mounting Kit for mounting graphical LCD Keypad on enclosure door. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.



Description	Cat. No.	Ref. No.
Remote mounting kit for graphical LCD keypad	RMKYPDAC	404851
Remote mounting kit without cable	OPCRMKNC	404850

Communications modules



Profibus DP communications module Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	404848
DeviceNet communications module DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	404818
Ethernet IP communications module(1) Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	404820
Modbus TCP communications module Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
ProfiNet RT communications module ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	404825
LonWorks communications module LonWorks internal drive mounted module for use on AF-600 FP drives only. Supports LonWorks building automation communications networks.	OPCLON	404823
BacNet communications module BacNet internal drive mounted module for use on AF-60 FP drives only. Supports BacNet MSTP building automation communications networks.	OPCBAC	404817

(1) Requires I/O and network slots and cannot be used with any other network or I/O modules.

Options and accessories (continued)

Relay output module



Relay output internal drive mounted module for use on AF-600 drives. Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Description	Cat. No.	Ref. No.
Relay output module	OPCRLY	404849

Analog I/O module



Analog I/O internal drive mounted module for use on the AF-600 FP drive only. Module includes: 3) Analogue inputs 0-10V, 0/4-20mA
3) Analogue outputs 0-10V
Battery back-up power for AF-600 FP's internal real time clock

Analog I/O module	OPCAIO	404816
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24V DC external supply module



24V DC external supply internal drive mounted module for use on AF-600 FP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a line side power outage. Can be used with communications and I/O modules.

24V DC external supply module	OPC24VPS	404815
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General purpose I/O module



General purpose I/O internal drive mounted module for use on AF-600 FP drives. Module includes: 3x digital inputs 24V
2x digital outputs PNP/NPN
2x analogue inputs 0-10V
1x analogue output 0/4-20mA

General purpose I/O module	OPCGPIO	404821
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Screw terminal accessory



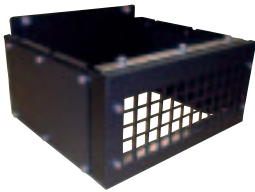
Screw terminal accessory is available for field installation on AF-600 FP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Screw terminal accessory	OPCSTERM	404822
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New

Options and accessories (continued)



Pedestal kit

Pedestal kit allows Unit Size 41 and 42 drives to be floor mounted (IP21/54/55, NEMA 1 and 12, 110 to 250/315kW / 150 to 350/400HP at 400V for AF-600 FP).

Description	Cat. No.	Ref. No.
Pedestal kit	OPC4XPED	404845

USB kit

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.



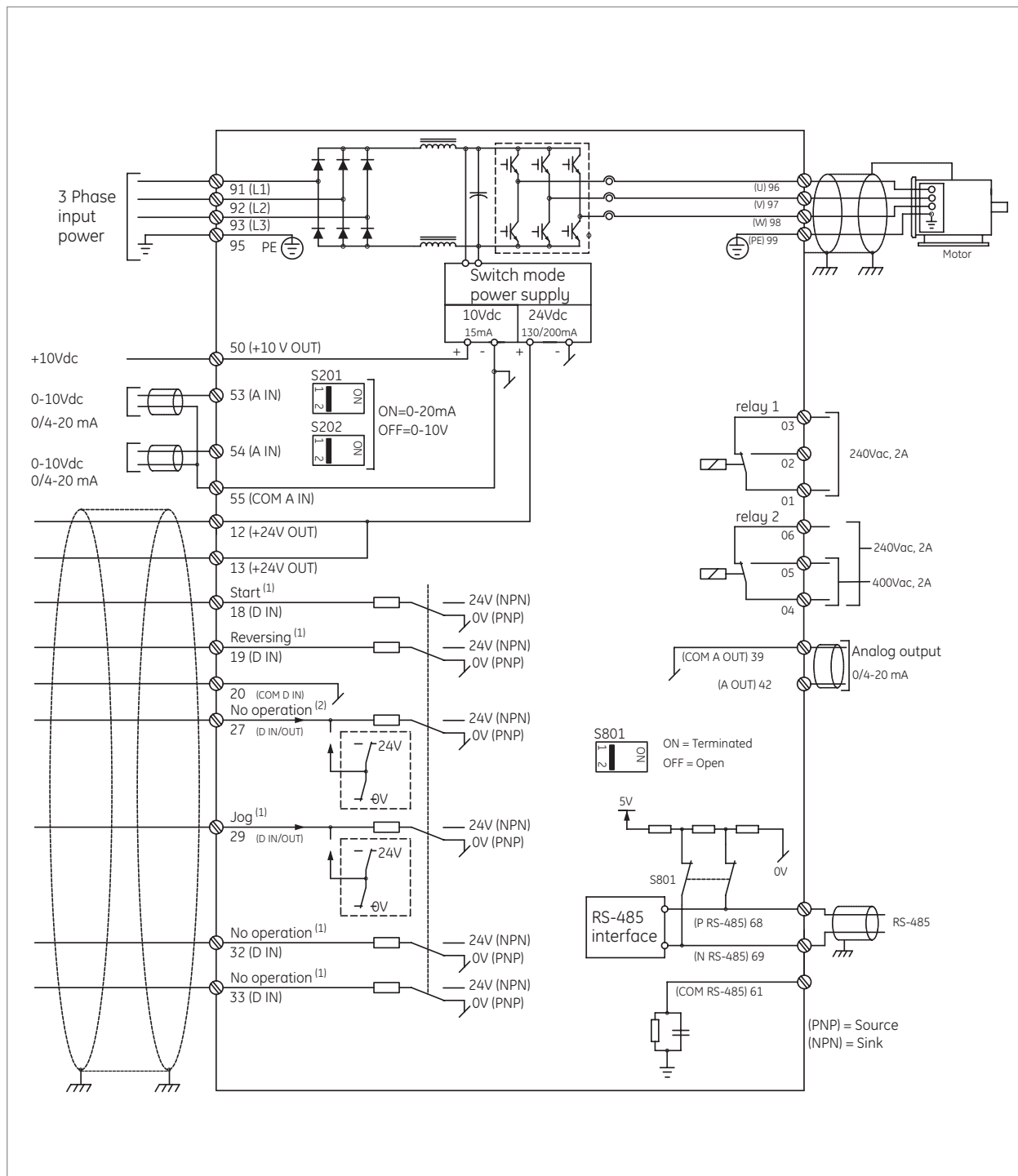
Description	Cat. No.	Ref. No.
For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

Power shields

These shields are used to cover the drive power terminals on NEMA 1 and NEMA 12 drive types.

For unit size 41 and 42 drives	OPCCOVER4142	404846
For unit size 51 drives	OPCCOVER51	404847

Basic wiring diagrams



- (1) Indicates default setting; see parameter group E-## to re-program.
- (2) Indicates default setting for version 1.10 drives or higher. Prior versions are set to coast inverse, indicating that terminal #27 must be Logic "high" to enable the drive to run. See parameter E-03 terminal 27 digital input to re-program.

Specifications

Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21/NEMA 1, IP55/NEMA 12, IP54/NEMA 12
Plenum ratings	Drives and options are UL rated for installation inside air handling ducts and plenums
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C (24 hour average max of 45° C)
Ambient humidity	5 to 95 % RH (non-condensing)
Vibration	1.0 G
Cooling method	Fan cooled all ratings. Fan control auto, 50% level, 75 % level, 100 % level adjustable

Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V.
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Input power supply

Rated input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW/10HP, maximum once/minute above 7.5kW/10HP
Environment according to EN60664-1	Overvoltage category III/pollution degree 2
DC link reactors	Built-In DC Link Reactors on all ratings
RFI filters	Built-In RFI Filters to reduce noise generated by the drive. Meets industrial standards.

Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-1000 Hz; 0-800Hz for 400V above 90kW/ 125HP
Switching on output	Unlimited
Accel/decel times	1-3600 seconds
Control method	Sinusoidal PWM control (V/Hz, Avd. vector control)

Control

Starting torque	110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	0 - 300% setting to compensate voltage in relation to the load at low speed
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve)
Data protection	Password protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 110% (0.1 and steps)
8 preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Preset speeds	8 presets via digital inputs
Built-in communications	Drive RS-485, Modbus RTU, Metasys N2, or Apogee FLN P1
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-1000 Hz, 0-800Hz for 400V above 90kW/125HP Braking time: 0.0-60.0 seconds Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (fwd or rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor
Fire override mode	Overrides drive's protective features and keeps motor running
Pump cascade controller	Distributes running hours evenly over up to 4 pumps
Sleep mode	Drive detects low or no flow conditions and adjusts output
Dry pump detection	Detects pump operation and can set off alarm, shuts off, or other programmed actions
Belt monitoring	Drive can detect relationship between current and speed to recognize a broken belt
Real time clock	With programmable timed actions

Logic controller (LC) sequencer

Logic controller events	Up to 38 programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

Process controller (PID)

Process PID controller	4 auto tune PID controllers built-in
Process CL feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Process PID control	Normal or inverse
Process PID anti windup	Disabled or enabled
Process PID start speed	0.0-200Hz
Process PID proportional gain	0.00-10.00
Process PID integral time	0.1 - 10000.0 ms
Process PID differential time	0.0 - 10 s
Process PID differential gain	1.0-50.00
Process PID feed forward factor	0-500%
On reference bandwidth	0-200%

Specifications

Operation

Operation method	Keypad operation: hand, off, auto digital input: programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Communications: RS-485 Modbus RTU, Metasys N2, and Apogee FLN P1 USB port for programming drive with optional PC software
Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10Vdc, 10 to 0Vdc 0-10Vdc analog input 0/4-20ma analog input
References	Up to 3 Input references can be selected from analogue input #1 or #2, frequency input #1 or #2, network, or potentiometer
Input signals	No operation Reset after drive trip or alarm Drive at stop with no holding current Quick stop according to quick stop decel time 1 Stop on input going low Start Maintained start after signal applied for minimum of 2ms Reversing Start reverse Enable start forward only Enable start reverse only Jog Multi-step frequency selection (1 to 8 Steps) Hold drive frequency Hold reference Speed up; activated by hold drive frequency or hold reference Slow down; activated by hold drive frequency or hold reference Drive parameter setup select 1-4 Precise start or stop; activated when drive parameter precise start or stop function is selected catch up or slow down; activated by signal to add to or subtract from input reference to control speed Pulse input selectable from 100 - 110kHz Accel / decel time select. Set input to Accel / decel times 1 to 4 Digital potentiometer input increase or decrease Mechanical brake feedback

Keypad

Keypad features	LCD display with 6 alpha-numeric lines. Multi-language support Hot pluggable, remote mount option, and copy-cat Feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and H-O-A keys
Keypad keys	Status - shows status of drive Quick menu - enters quick start, parameter data check, or trending modes Main menu - used for programming all drive parameters Alarm log - used to display alarm list Back - reverts to previous step or layer in parameter structure Cancel - used to cancel last change or command Info - displays information about a command, parameter, or function in any display. Hand/off/auto - used to control drive locally or put drive in remote mode Reset - used to reset warnings or alarms
Password	2 level password protection
Alternate motor parameters	Up to 4 separate complete parameter set-ups are available
Graphical trending	Trend speed, power, frequency

RS485 Modbus RTU serial communications

Physical level	EIA/RS485
Transmission distance	1640 ft (500m)
Node address	32
Transmission speed	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
Transmission mode	Half Duplex
Transmission protocol	Modbus RTU
Character code	Binary
Character length	8 bits
Error check	CRC

Mounting clearance

All AF-600 FP drives can be mounted side-by-side without spacing. For all drives rated 90kW /125HP or below allow 3.4 inches (100mm) free space above and below. For all drives rated 110kW/150HP and above allow 8.9 inches (225mm) free space above and below.



New

Efficiency, Watt loss, unit size, dimensions and weights

230 Vac, 3-phase, 50/60Hz

Nominal motor ratings			Efficiency			Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)							
0.75	1	6.6	96			63	12	IP20 Chassis	375	90	220	5
1.5	2	7.5	96			82	12	IP20 Chassis	375	90	220	5
2.2	3	10.6	96			116	12	IP20 Chassis	375	90	220	5
4	5	16.7	96			185	13	IP20 Chassis	375	90	220	5
5.5	7.5	24.2		96		269	23	IP20 Chassis	375	130	220	7
7.5	10	30.8		96		310	23	IP20 Chassis	375	130	220	7
11	15	46.2		96		447	23	IP20 Chassis	420	165	262	12
15	20	59.4		96		602	24	IP20 Chassis	420	165	262	12
18.5	25	74.8		96		737	24	IP20 Chassis	595	230	242	24
22	30	88			97	845	33	IP20 Chassis	595	230	242	24
30	40	115			97	1140	33	IP20 Chassis	595	230	242	24
37	50	143			97	1353	34	IP20 Chassis	630	308	334	35
45	60	170			97	1636	34	IP20 Chassis	630	308	334	35

400 Vac, 3-phase, 50/60Hz

Nominal motor ratings			Efficiency				Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Power HP	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)							
0.75	1	2.4	96				58	12	IP20 Chassis	375	90	220	5
1.5	2	4.1	97				62	12	IP20 Chassis	375	90	220	5
2.2	3	5.6	97				88	12	IP20 Chassis	375	90	220	5
4	5	10	97				124	12	IP20 Chassis	375	90	220	5
5.5	7.5	13	97				187	13	IP20 Chassis	375	90	220	5
7.5	10	16	97				255	13	IP20 Chassis	375	130	220	7
11	15	24		98			278	23	IP20 Chassis	375	130	220	7
15	20	32		98			392	23	IP20 Chassis	420	165	262	12
18.5	25	37.5		98			465	23	IP20 Chassis	420	165	262	12
22	30	44		98			525	24	IP20 Chassis	595	230	242	24
30	40	61		98			698	24	IP20 Chassis	595	230	242	24
37	50	73		98			739	24	IP20 Chassis	595	230	242	24
45	60	90			98		843	33	IP20 Chassis	630	308	334	35
55	75	106			98		1083	33	IP20 Chassis	630	308	334	35
75	100	147			98		1384	34	IP20 Chassis	800	370	334	50
90	125	177			99		1474	34	IP20 Chassis	800	370	334	50
110	150	212			98		3234	43	IP00 Chassis	1046	407.9	374.9	91
132	200	260			98		3782	43	IP00 Chassis	1046	407.9	374.9	91
160	250	315			98		4213	44	IP00 Chassis	1327	407.9	374.9	138
200	300	395			98		5119	44	IP00 Chassis	1327	407.9	374.9	138
250	350	480			98		5893	44	IP00 Chassis	1327	407.9	374.9	138
315	450	600				98	7630	52	IP00 Chassis	1547	585	497.8	313
355	500	658				98	7701	52	IP00 Chassis	1547	585	497.8	313
400	550	745				98	8879	52	IP00 Chassis	1547	585	497.8	313
450	600	800				98	9428	52	IP00 Chassis	1547	585	497.8	313
500	650	80				98	10647	61	IP21/NEMA 1	2282	1400	606	1004
560	750	990				98	12338	61	IP21/NEMA 1	2282	1400	606	1004
630	900	1120				98	13201	61	IP21/NEMA 1	2282	1400	606	1004
710	1000	1260				98	15436	61	IP21/NEMA 1	2282	1400	606	1004
800	1200	1460				98	18084	62	IP21/NEMA 1	2282	1800	606	1262
1000	1350	1720				98	20358	62	IP21/NEMA 1	2282	1800	606	1262

AF-6 drives

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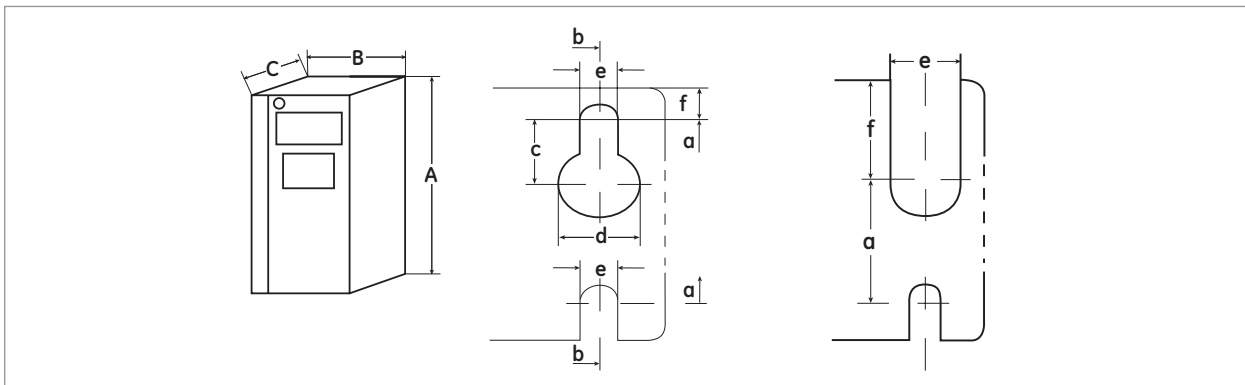
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New



Dimensional drawings



Dimensions, 1X unit sizes (mm)

Unit size		Dimensions	12	13	15
Enclosure type			IP20 Open chassis	IP20 Open chassis	IP55 NEMA 12
Voltage	230V		0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	0.75 to 3.7kW 1 to 5HP
	400V		0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.75 to 7.5kW 1 to 10HP
Height	Height of backplate	A	268	268	420
	Height with de-coupling plate	A	375	375	
	Distance between mounting holes	a	257	257	402
Width	Width of backplate	B	90	130	242
	Distance between mounting holes	b	70	110	215
Depth	Depth without I/O and/or network option	C	205	205	195
	Depth with I/O and/or network option	C	220	220	195
Screw holes		c	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
Weight (kg)			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21	22	23	24
Enclosure type			IP55 NEMA 12	IP55 NEMA 12	IP20 Open chassis	IP20 Open chassis
Voltage	230V		5.5 to 11kW 7.5 to 15HP	15kW 20HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP
	400V		11 to 15kW 15 to 25HP	22 to 30kW 30 to 40HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP
Height	Height of backplate	A	480	650	399	521
	Height with de-coupling plate	A	-	-	420	595
	Distance between mounting holes	a	455	625	380	495
Width	Width of backplate	B	242	242	165	230
	Distance between mounting holes	b	210	210	140	200
Depth	Depth without I/O and/or network option	C	260	260	249	242
	Depth with I/O and/or network option	C	260	260	262	242
Screw holes		c	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
Weight (kg)			23.0	27.0	12.0	23.5



New

Dimensional drawings

Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31	32	33	34
Enclosure type			IP55 NEMA 12	IP55 NEMA 12	IP20 Open chassis	IP20 Open chassis
Voltage	230V		18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V		37 to 55kW 50 to 75HP	75 to 90kW 100 to 125HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
Height	Height of backplate	A	680	770	550	660
	Height with de-coupling plate	A	-	-	630	800
	Distance between mounting holes	a	648	739	521	631
Width	Width of backplate	B	308	370	308	370
	Distance between mounting holes	b	272	334	270	330
Depth	Depth without I/O and/or network option	C	310	335	333	333
	Depth with I/O and/or network option	C	310	335	333	333
Screw holes		c	12.5	12.5	-	-
		d	19.0	19.0	-	-
		e	9.0	9.0	8.5	8.5
		f	9.8	9.8	17.0	17.0
Weight (kg)			45	65	35	50

AF-6 drives

Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits⁽¹⁾ (mm)

Unit size		12	13	23	24	33	34
Enclosure type		IP20 open chassis with IP21/NEMA 1 Kit					
Voltage	230V	0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V	0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
Height	Height with kit	375	375	475	671	754	950
Width	Width of backplate	94	130	165	231	397	371
	Distance between mounting holes	70	110	140	201	269	330
Depth	Depth without I/O and/or network option	205	205	249	242	338	338
	Depth with I/O and/or network option	220	220	262	242	338	338

(1) Please consult IP21/NEMA 1 kit instructions for further mounting details and dimensions.

Note: Please allow 5cm / 2" between drives with field installed IP21/NEMA 1 Kits. Also, please consult the relevant AF-6 Series drives operating Instructions for recommended clearance above and below each drive rating.

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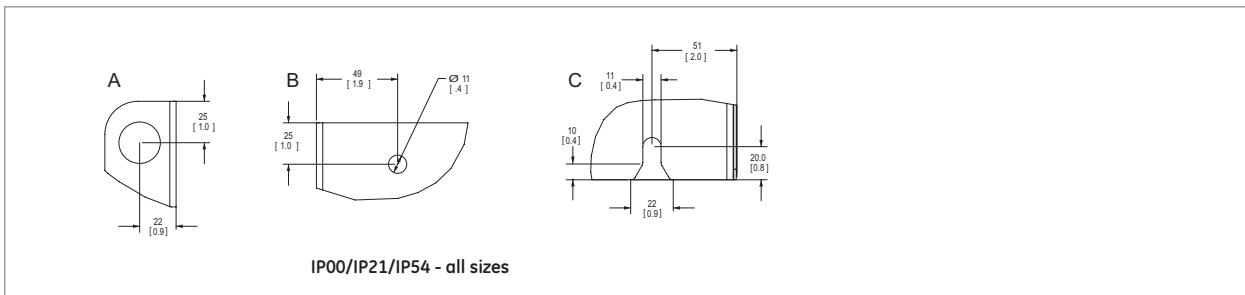
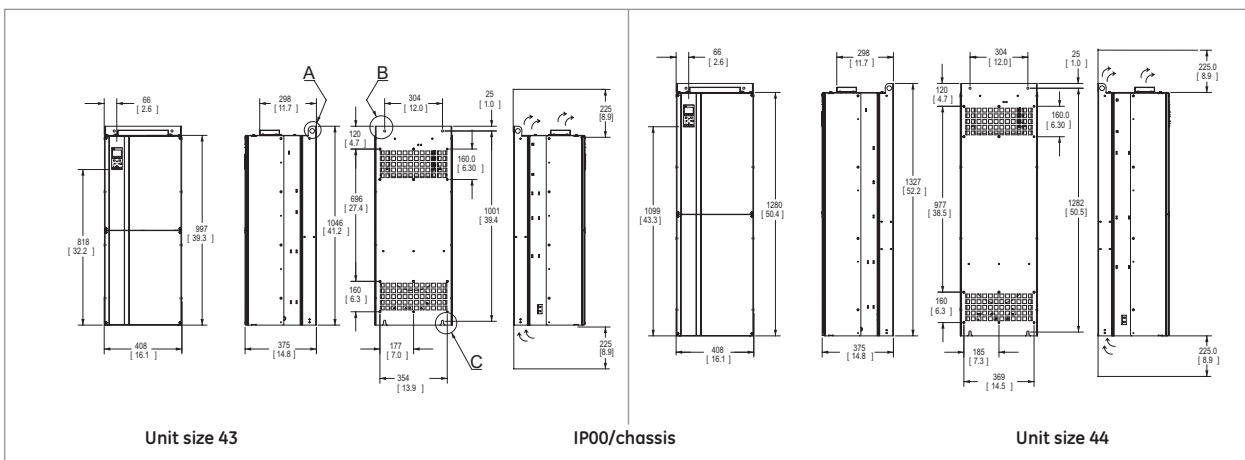
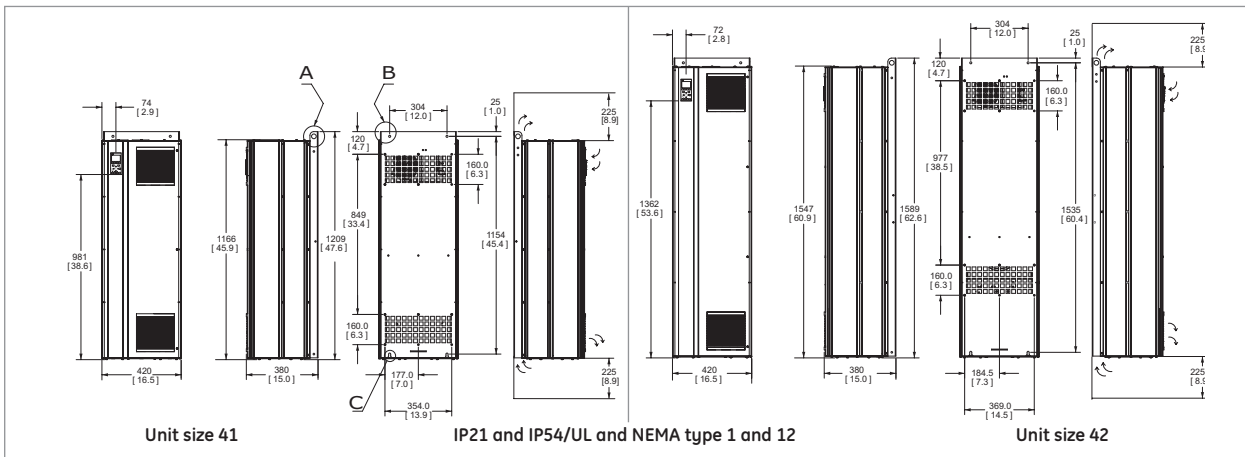
I

J/X



New

Dimensional drawings in mm (inches)



Unit size	41	42	43	44
Enclosure type	IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00 Open chassis	IP00 Open chassis
Voltage	400V 110 to 132kW 150 to 200HP	400V 160 to 250kW 250 to 350HP	400V 110 to 132kW 150 to 200HP	400V 160 to 250kW 250 to 350HP
Shipping dimensions	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1220 Depth: 570	Height: 650 Width: 1490 Depth: 570
Drive dimensions	Height: 1209 Width: 420 Depth: 380	Height: 1589 Width: 420 Depth: 380	Height: 1046 Width: 408 Depth: 375	Height: 1327 Width: 408 Depth: 375
Weight (kg)	104	106	91	138



New

Dimensional drawings in mm (inches)

Unit size 51, IP21 and IP54/UL and NEMA type 1 and 12

Unit size 51	
Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 315 to 450kW 450 to 600HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313

Unit size 52, IP00/chassis

Unit size 52	
Enclosure type	IP00 Open chassis
Voltage	400V 315 to 450kW 450 to 600HP
Shipping dimensions	
Height	831
Width	1704
Depth	734
Drive dimensions	
Height	1547
Width	585
Depth	498
Weight (kg)	313

Unit size 61

Unit size 61	
Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 500 to 710kW 650 to 1000HP
Shipping dimensions	
Height	2324
Width	1570
Depth	927
Drive dimensions	
Height	2282
Width	1400
Depth	607
Weight (kg)	1004

Dimensional drawings in mm (inches)

Unit size 62

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 800 to 1000kW 1200 to 1350HP
Shipping dimensions	
Height	2324
Width	1961
Depth	419
Drive dimensions	
Height	2282
Width	1800
Depth	606
Weight (kg)	1262

Unit size 63

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 500 to 710kW 650 to 1000HP
Shipping Dimensions	
Height	2324
Width	2159
Depth	927
Drive Dimensions	
Height	2282
Width	2000
Depth	606
Weight (kg)	1300

Unit size 64

Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage	400V 800 to 1000kW 1200 to 1350HP
Shipping dimensions	
Height	2324
Width	2543
Depth	927
Drive dimensions	
Height	2282
Width	2400
Depth	606
Weight (kg)	1541

Dynamic Braking Resistors

dynamic braking allows for faster deceleration rates than could be achieved via a coast to stop. Dynamic braking consists of the internal drive brake chopper and separate add-on dynamic braking resistors.

Important application notes:

- The AF-60 LP Micro Drive dynamic braking can be used for stopping a load with an inertia equal to or less than the applied motor's rotor inertia.
- High inertia or overhauling loads may cause extended deceleration times which could cause overheating and tripping of the drive.
- The dynamic braking is not a holding brake. It does not prevent a motor at rest from rotating.

Note: refer to the drives' Operating Instruction for installation and connection details.

Dynamic braking resistors- AF-60 LP drives

230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommended dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle			10% duty cycle	40% duty cycle
				Cat. No.	Ref. No.	Cat. No.	Ref. No.			
0.18	1/4	-	N/A	-	-	-	-	-	-	
0.37	1/2	-	N/A	-	-	-	-	-	-	
0.75	1	-	N/A	-	-	-	-	-	-	
1.5	2	150	Built-in	TLR74P200	129870	4 x TLR74P200	4 x 129870	74	0.2	0.8
2.2	3	150	Built-in	TLR44P600	129166	TLR43P1000	129177	44	0.6	1
3.7	5	150	Built-in	TLR29P600	129167	TLR22P2500	129879	29	0.6	2.5

400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommended dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle			10% duty cycle	40% duty cycle
				Cat. No.	Ref. No.	Cat. No.	Ref. No.			
0.37	1/2	-	N/A	-	-	-	-	-	-	
0.75	1	-	N/A	-	-	-	-	-	-	
1.5	2	150	Built-in	TLR295P200	129876	4 x TLR295P200	4 x 129876	295	0.2	0.8
2.2	3	150	Built-in	TLR216P200	129868	4 x TLR216P200	4 x 129868	216	0.2	0.8
4	5	150	Built-in	TLR118P600	129174	4 x TLR118P600	4 x 129174	118	0.6	2.4
5.5	8	150	Built-in	TLR86P600	129175	4 x TLR86P600	4 x 129175	86	0.6	2.4
7.5	10	150	Built-in	TLR59P1000	129176	4 x TLR59P1000	4 x 129176	59	1	4
11	15	150	Built-in	TLR43P1000	129177			43	1	-
15	20	150	Built-in	TLR35P1500	129877			35	1.5	-
18.5	25	150	Built-in	TLR29P1800	129878	On request		29	1.8	-
22	30	150	Built-in	TLR22P2500	129879			22	2.5	-



Dynamic braking resistors - AF-650 GP drives

230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty - 10%					Repetitive braking torque duty - 40%				
			(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.25	1/3	160	0.2	405	12	TLR405P200	129867	0.43	425	120	TLR405P200	129867
0.37	1/2	160	0.2	295	12	TLR295P200	129876	0.80	310	120	4 x TLR295P200	4 x 129876
0.75	1	160	0.6	118	12	TLR118P600	129174	0.26	145	120	TLR118P600	129174
1.5	2	160	1	59	12	TLR59P1000	129176	0.80	65	120	TLR59P1000	129176
2.2	3	160	1	43	12	TLR43P1000	129177	1.00	50	120	TLR43P1000	129177
3.7	5	160	1.8	29	12	TLR29P1800	129878	3.00	25	120	TLR22P2500	129879
5.5	7.5	158	2.5	22	12	TLR22P2500	129879	-	-	-	-	-
7.5	10	153	3	17.6	12	2 x TLR8,8P1500	2 x 129171	-	-	-	-	-
11	15	154	5	10	12	2 x TLR5P2500	2 x 129871	-	-	-	-	-
15	20	150	6	8	12	2 x TLR4P3000	2 x 129872	-	-	-	-	-
18.5	25	150	6	8	12	2 x TLR4P3000	2 x 129872	-	-	-	-	-
22	30	150	6	4.7	30	-	-	-	-	-	-	-
30	40	150	8	3.3	30	-	-	-	-	-	-	-
37	50	150	10	2.7	30	On request	-	-	-	-	-	-

400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty - 10%					Repetitive braking torque duty - 40%				
			(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.37	0.5	160	0.2	750	12	TLR750P200	116301	0.2	620	120	TLR750P200	116301
0.75	1	160	0.2	750	12	TLR750P200	116301	0.2	620	120	TLR750P200	116301
1.5	2	160	0.2	295	12	TLR295P200	129876	0.4	310	120	2 x TLR750P200	2 x 116301
2.2	3	160	0.2	216	12	TLR216P200	129868	0.4	210	120	2 x TLR43P200	2 x 129875
4	5	160	0.6	118	12	TLR118P600	129174	2	110	120	2 x TLR59P1000	2 x 129176
5.5	7.5	160	0.6	86	12	TLR86P600	129175	3	80	120	2 x TLR35P1500	2 x 129877
7.5	10	160	1	59	12	TLR59P1000	129176	6	65	120	2 x TLR35P3000	2 x 129888
11	15	160	1	43	12	TLR43P1000	129177	5	40	120	2 x TLR22P2500	2 x 129879
15	20	160	1.5	35	12	TLR35P1500	129877	7.4	30	120	2 x TLR15P3700	2 x 129881
18.5	25	160	1.8	29	12	TLR29P1800	129878	10	25	120	4 x TLR22P2500	4 x 129879
22	30	160	2.5	22	12	TLR22P2500	129879	10	20	120	4 x TLR22P2500	4 x 129879
30	40	150	3.7	15	12	TLR15P3700	129881	14.8	15	120	4 x TLR15P3700	4 x 129881
37	50	150	4.7	12.5	12	-	-	-	-	-	-	-
45	60	150	6.4	9.2	12	-	-	-	-	-	-	-
55	75	150	7.7	4.3	12	-	-	-	-	-	-	-
75	100	150	13.6	4.3	12	-	-	-	-	-	-	-
90	125	150	17	3.4	30	-	-	-	-	-	-	-
110	150	150	17	3.4	30	-	-	-	-	-	-	-
132	200	150	22.5	10.4	30	-	-	-	-	-	-	-
160	250	150	27.2	8.6	30	-	-	-	-	-	-	-
200	300	150	17	3.3	30	-	-	-	-	-	-	-
250	350	150	22.4	10.4	30	-	-	-	-	-	-	-
355	450	150	27.2	8.6	30	-	-	-	-	-	-	-
400	550	150	14.4	1.3	30	-	-	-	-	-	-	-
450	600	150	14.4	1.3	30	-	-	-	-	-	-	-
500	650	150	14.4	1.3	30	-	-	-	-	-	-	-
560	750	150	14.4	1.3	30	-	-	-	-	-	-	-
630	900	150	14.4	1.3	30	-	-	-	-	-	-	-
710	1000	150	14.4	1.3	30	-	-	-	-	-	-	-
800	1200	150	14.4	1.3	30	-	-	-	-	-	-	-

690 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty - 10%					Repetitive braking torque duty - 40%				
			(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
90	125	160	126	9.8	60	DB6101TBNC	-	77	9.8	120	DB6401TBNC	-
110	150	160	153	7.3	60	DB6102TBNC	-	93	7.3	120	DB6402TBNC	-
132	200	160	185	4.7	60	DB6103TBNC	-	113	4.7	120	DB6403TBNC	-
160	250	160	224	4.7	60	DB6104TBNC	On request	137	4.7	120	DB6404TBNC	On request
200	300	160	147	3.8	60	DB6105TBNC	-	90	3.8	120	DB6405TBNC	-
250	350	160	173	2.6	60	DB6106TBNC	-	106	2.6	120	DB6406TBNC	-
315	400	160	212	2.6	60	DB6107TBNC	-	130	2.6	120	DB6407TBNC	-

For higher motor power please contact GE



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