

New



AF-6 Series Drives

Built-in features
Built-in simplicity



GE imagination at work

AF-6 Series Drives

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Highlight of benefits

One family

- Designed for general purpose applications
- For both constant and variable torque applications
- Just one drive series to run an entire production line
- Broad range: 180W to 1.4 MW, 230 V – 690 V

Designed for lifetime

- Built-in DC chokes increase the lifetime of the capacitors
- Conformal coating available

Low operating costs

- Low energy consumption – up to 98% efficiency
- Less energy needed for cooling
- Automatic Energy Optimizer (AEO) potentially saves up to 5% energy compared to standard drives
- Low cost of ownership – no periodic maintenance/replacement cost
- Energy saving up to 40% depending on the application

Constant torque applications Heavy Duty

Constant torque applications include those where the load does not change significantly with the speed as conveyors, lifting gear and mixers.

A motor block on a conveyor will always weight the same, regardless of whether the conveyor is running at low or high speed.

The torque required to move this motor block is always the same. Although friction and acceleration torques will vary depending on the operating state, the torque requirement for the load remains constant.

The power required by a system of this type is proportional to the torque required and to the speed of the motor.

Savings can be achieved directly if the speed can be reduced at constant load. Adapting the speed of the belt to the quantity of goods to be transported not only enables those goods to be processed without interruption but also leads to a reduction on the energy required.

Even if it is not possible or desirable to adapt the speed, most speed drives will still bring about reductions in energy consumption, since they regulate the motor's output voltage depending on load and as the load rises, it will increase the voltage.



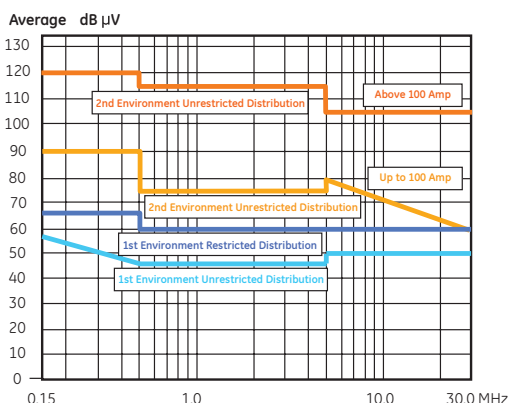
Variable torque applications Light Duty

Often involve pumps and fans. However, a distinction has to be made in the case of pumps. Although the most popular types of centrifugal pump have a quadratic torque characteristic but eccentric, vacuum or positive displacement pumps have a constant torque characteristic. Pumps and fans have a significant share of all power consumed by industrial applications, with consumption levels approximately at 40%. Speed control is a simple yet very effective way of saving energy where fans and pumps with variable load torques are concerned.

Reducing the speed generates a cubic reduction in energy requirements. This significant potential for savings makes all applications with variable torque ideal candidates for the implementation of energy saving. Operators need to take into account that changes in speed alter the operating point and affect the efficiency. If the difference between the maximum power required and average part-load operation is too great, systems should be cascaded. It is often the case that investments pay for themselves relatively quickly when existing systems are converted.

Built-in class A2 RFI filter

- Drive is ready to use and faults due to incorrect installation or wrong filter selection are avoided
- No over sizing of drive necessary – with motor cables of up to 300m
- Immunity from electrical interference and minimal emission
- Saves panel space and installation costs
- A1 and B1 Filter available as factory option
- Facilitates meeting CE EMC directives (requirement for EU markets)



Built-in DC link reactor

- Low harmonic emission: THDi < 48%
- No voltage drop => full output voltage
- Reduces installation cost
- Fulfills EN 61000-3-2/3-12
- True power factor 0.9

Reliable operation in harsh environment

- Protection against environmental pollution, aggressive gasses, moisture and dust
- Reduces the probability of failure resulting in less down-time
- Increases the lifetime of the drive
- High protection Class 3C2 **as standard** and increased protection in harsh environments with Class 3C3 **as optional**
- Optional conformal coating is tested to ANSI/ISA S71.04-1985 Class G3 (airborne gasses - harsh) and Class GX (airborne gasses - severe)

Intelligent heat management

- Cooling fans are easily cleaned without touching the electronics
- 100% cooling air via segregated rear heat-sink – protects the electronic against aggressive environments
- Temperature controlled fan

High immunity

- Immunity to fluctuating supply voltage (+/- 10%)
- Efficient overvoltage protection
- Fully short-circuit- and earth-leakage proof
- 100kA prospective short-circuit current capability
- No voltage drop and unnecessary de-rating of motor – no external line chokes needed

AF-600 FP - Special pump functions

No flow detection

- No flow detection is based on speed and power
- Two sets of data must be programmed into the drive
- Manual or auto set up
- Used to enable sleep mode in closed loop systems for energy savings

End-of-curve protection

- If there is a water leak in the pipe, it will not produce pressure
- The pump is delivering a large volume of water but cannot maintain the static head
- Drive will go to full flow to try producing pressure (set point)
- The drive running at high speed with a feedback signal less than 97.5% of the set point pressure causes End of Curve action

Dry pump protection

- Special no-flow condition, where pressure can not be produced, if there is no water
- Drive will go to full speed to try producing full pressure
- Low power consumption at high speed causes Dry Pump action



PC software tool DCT-10

One PC tool for all tasks

- Explorer-like view
- On and offline commission
- Help description for each drive parameter
- Oscilloscope function
- Option programming
- Logging of alarms and warnings for improved system performance and documentation

Interacts with process management

Communicates through USB, RS485 or Network

Plug-in option modules

- Tailored for specific application needs
- Low handling cost
- Easy service/ upgrade with a wide range of options
- Field installable Plug n' Play and self configuring



- 1** A slot : Network option modules
- 2** B slot : I/O option modules
- 3** 24Vdc External supply option module

Control wiring and PC connections

- Reduced installation time - Pluggable terminal block for easy installation
- Improved installation quality
- Spring terminals provide better contact than screw terminals
- Thin or thick wires (1.5mm² solid/1.0mm² stranded wire)

Built-in control card I/O

Inputs / Outputs

- 6 digital I/O (0-24Vdc)
 - 2 configurable as Digital Outputs
 - 2 configurable as Pulse I/O
 - Configurable as PNP or NPN
- 2 form C relay outputs with on/off delays
- 2 analogue Input (10V or 0/4-20mA)
- 1 analogue Output (0/4-20mA)

Serial ports

- RS 485 Port
 - Supports multi-drop connections
 - Supports 1.2 km cables
 - Switchable network termination
 - Modbus RTU
- USB Port
 - Simple USB direct cable connection ~3m max.
 - Point - to - point

Network option modules

- Support for all leading protocols
- Easy installation and commissioning
 - Top cable entry -or-
 - Bottom cable entry (if used you cannot add I/O option modules)
- Built-in Networks: Modbus RTU
- Network option modules: Profibus DP, DeviceNet, Ethernet IP, Modbus TCP, Profinet RT
- Additional Option Modules for AF-600 FP: BACnet and LonWorks



Inquiry customer data for dimensioning of variable speed drives

Nominal Motor Data (Type Plate)

Motor Type :	Manufacturer:		
Nominal Power P _n :	kW		
Nominal Voltage U _n (Y/Δ):	V	Nominal Current I _N (Y/Δ):	A
Nominal Speed:	min ⁻¹	cos φ	
Specifications:			
Grid Voltage:		Grid Type (IT/TT/TN):	
Length of Motorcable:		Degree of EMC :	
Application Area (Industry / Residential) :			
Special Exigencies:			

Application Description:

Torque characteristics (Constant/Quadratic):

Overload (110/160%):

Speed Range:

Braking Torque:

Desired Functionalities:

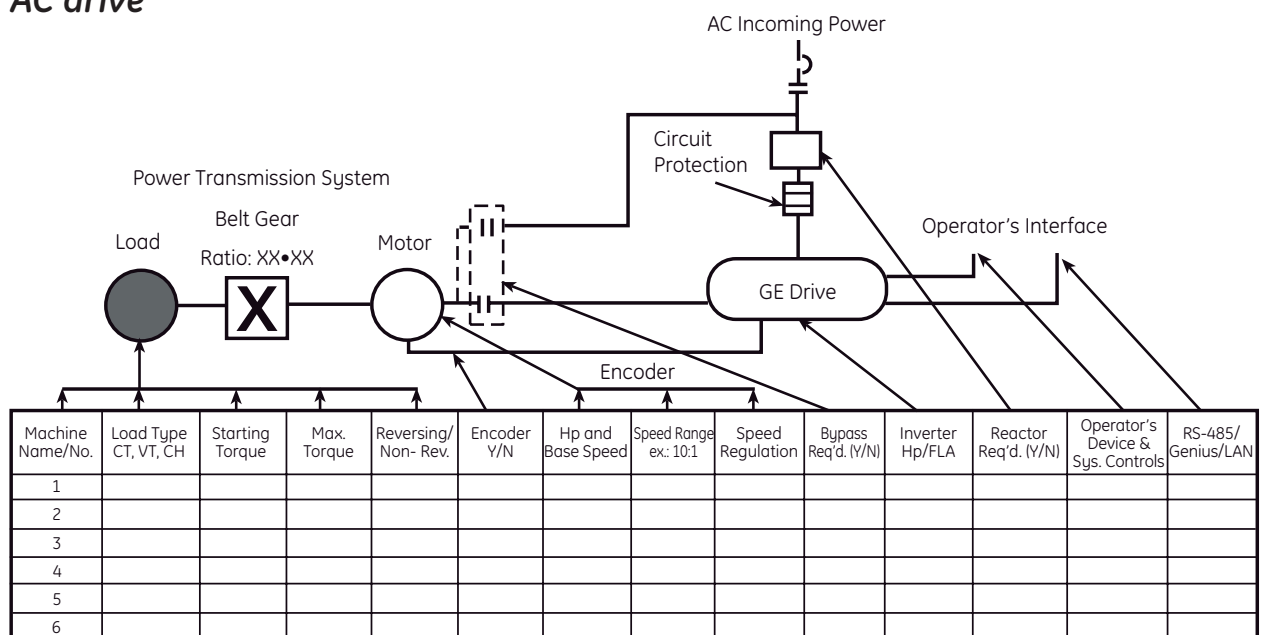
Specification:

Communication System:

Protection Degree: IP

Special Ambient Conditions

AC drive



General information: Circuit protection guidelines

For some products, incoming line fuses are required to meet the basic UL listing requirements.

Consult AF-6 Series individual drive design guides for fuse recommendations.

The NEC defines several types of control circuits and the overcurrent protection required for each type.

Type enclosures: IP00, IP20, IP21, IP54, IP55 and IP66 - IEC 60529 - ingress protection (IP) codes

First digit	Protection against foreign objects	Second digit	Protection against moisture
0	Not protected	0	Not protected
1	Protected against objects greater than 50 mm	1	Protected against dripping water
2	Protected against objects greater than 12 mm	2	Protected against dripping water when tilted up to 15°
3	Protected against objects greater than 2.5 mm	3	Protected against spraying water
4	Protected against objects greater than 1.0 mm	4	Protected against splashing water
5	Dust protected	5	Protected against water jets
6	Dust tight	6	Protected against heavy seas
-		7	Protection against the effects of immersion
-		8	Protection against submersion

Type enclosures: NEMA 1, NEMA 4, NEMA 12 - UL50 and CSAC22.2 no. 94-M91

NEMA 1	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment and to provide a degree of protection against falling dirt.
NEMA 4	Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, wind-blown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by external formation of ice on the enclosure.
NEMA 12	Enclosures constructed (without knockouts) for indoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt; against circulating dust, lint, fibers, and flyings; and against dripping and light splashing of liquids.



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

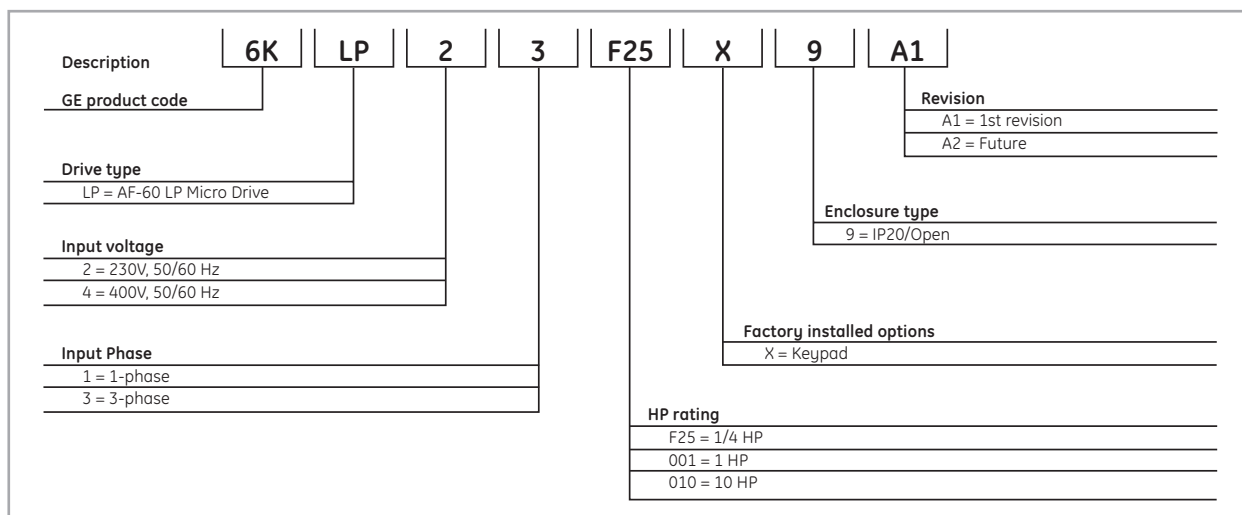


UL, cUL, C-Tick

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

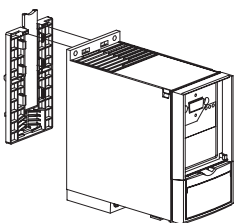
Remote mounting kit for keypad



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

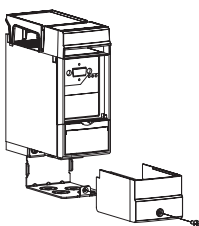


This adapter can be used to mount AF-60 LP Micro Drives at 0.75kW/1HP and below to 35mm DIN-rail.

Description	Cat. No.	Ref. No.
DIN-rail mounting kit for unit size M1 or M2 ⁽²⁾	RMACLP1	404806

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

NEMA 1 kit

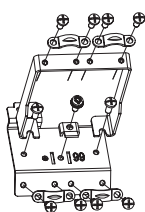


This kit can be mounted to the IP20 protected AF-60 LP Micro Drives to provide NEMA type 1 protection.

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	DEPLTACLP1	404804
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	DEPLTACLP2	404805
For 11kW/15HP at 400V and above drives	DEPLTACLP3	404803

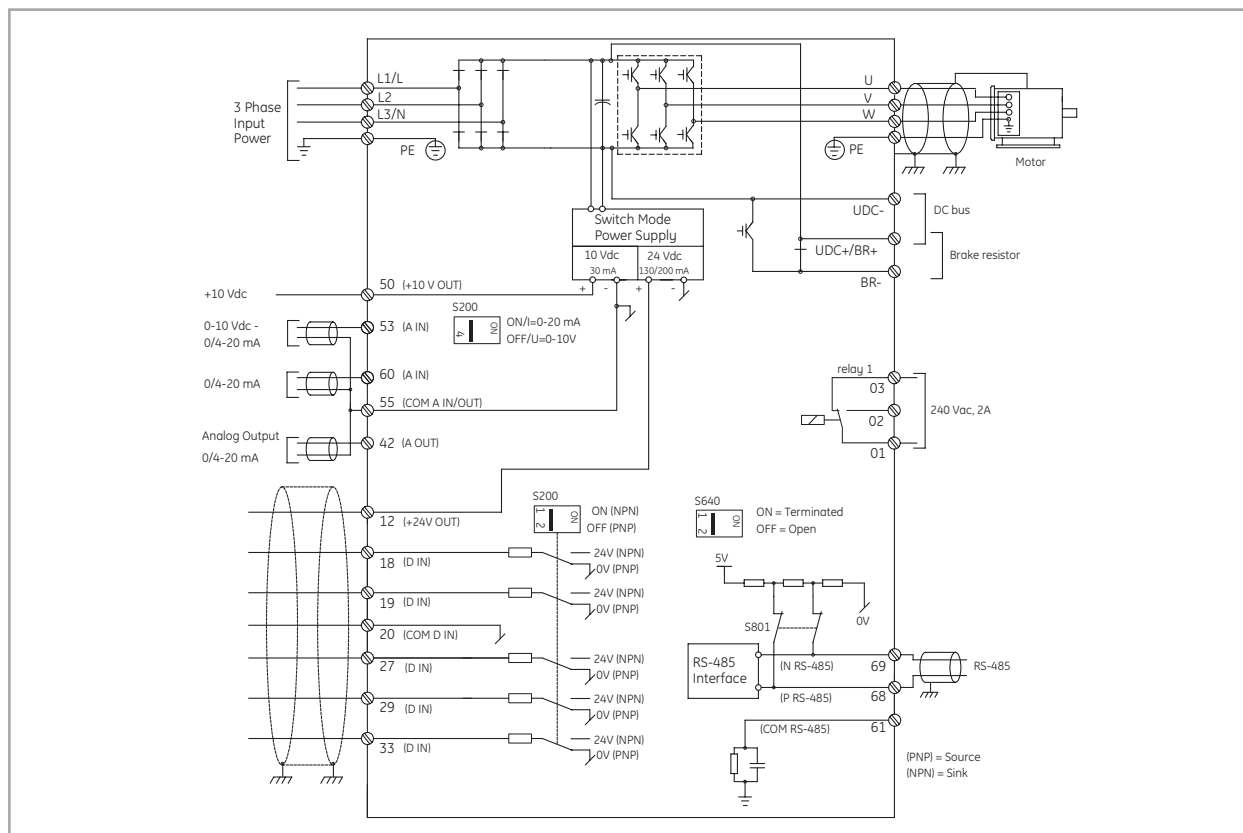
Replacement keypad with potentiometer



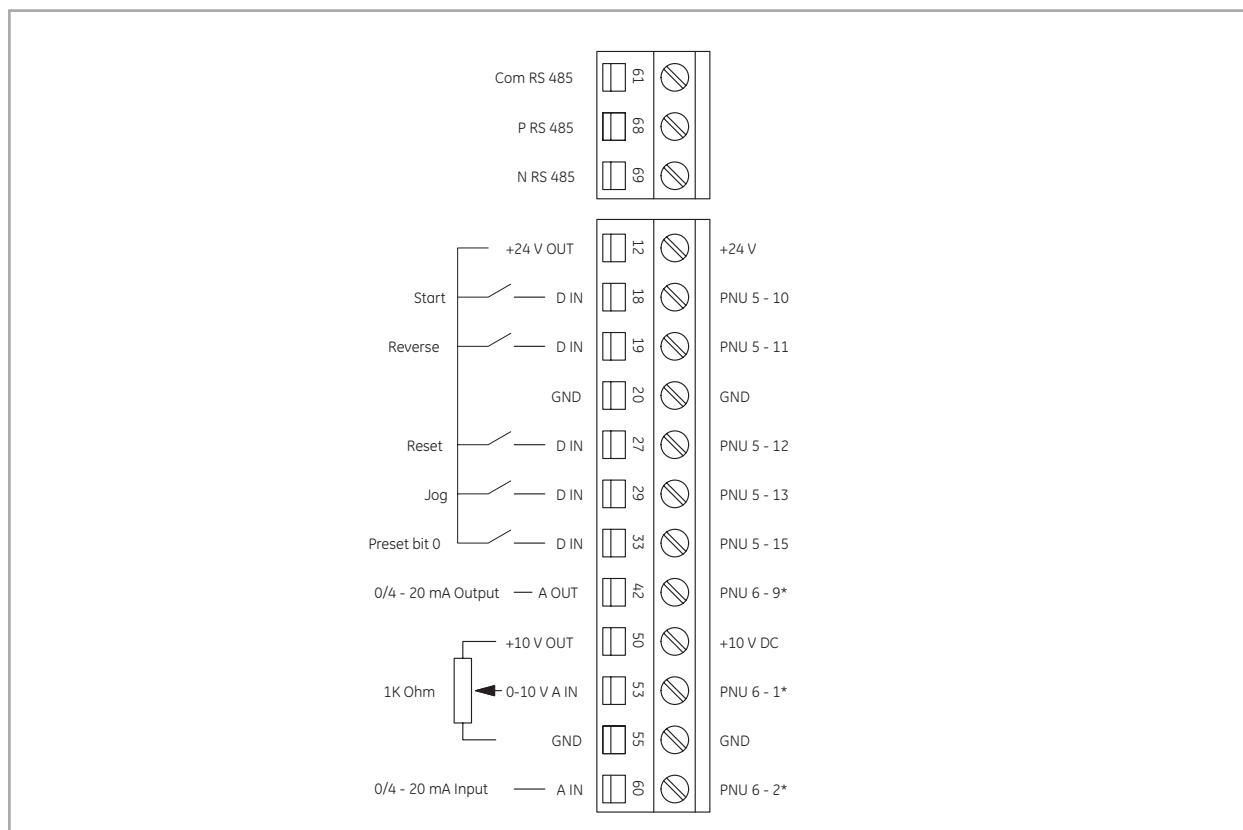
LCD keypad with potentiometer for the AF-60 LP Micro Drive. Keypad is removable under power and includes copycat feature to program multiple drives. Includes hand-off-auto keys for local control of drive and large parameter and operational data display. Menu key selects between drive status, quick menu, 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	0-200 Hz (Adv. Vector Control Plus Model), 0-400 Hz (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	0-400 Hz
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

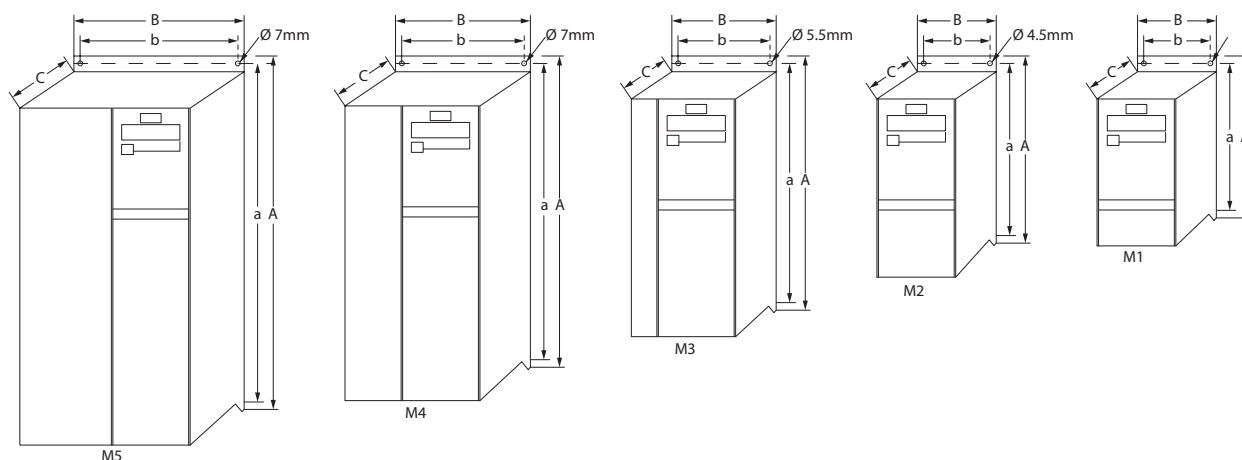
Power	kW
Power	HP
Motor voltage	V
Frequency	Hz
Motor current	A
Frequency	%
Motor thermal	%
DC link voltage	V
Drive current	A
Drive max current	A
Logic controller state	ON/OFF



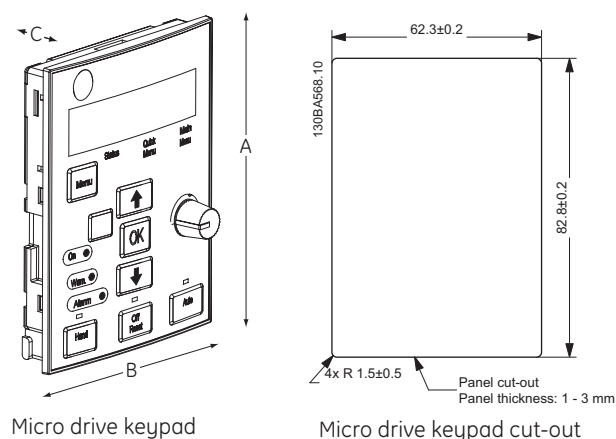
Dimensional drawings

Micro drives

Unit size	Nominal motor power ratings (kW)			Nominal motor power ratings (HP)			Height (mm)			Width (mm)		Depth (mm)	Weight
	230 V 1ph	230 V 3ph	400 V 3ph	230 V 1ph	230 V 3ph	400 V 3ph	A	A (including decoupling plate)	a	B	b	C	kg
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



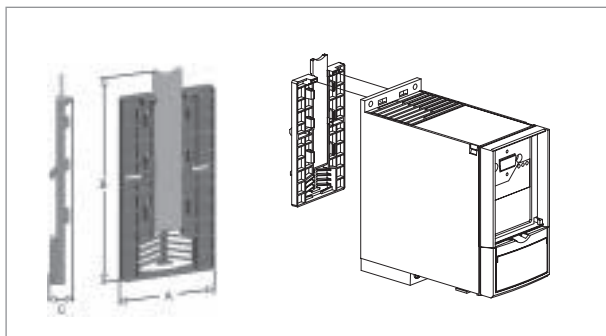
Height (mm) A	Width (mm) B	Depth (mm) C	Weight kg
85	65	28	0.08

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

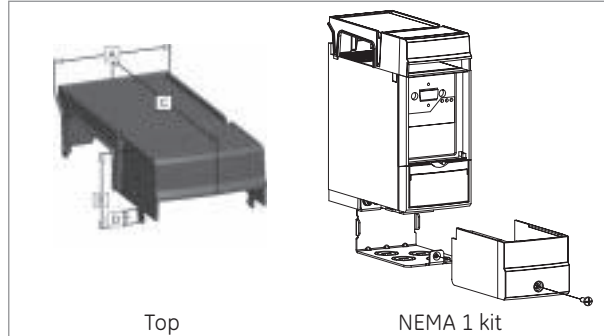
DIN-rail mounting kit for 0.75kW / 1HP and below drives

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



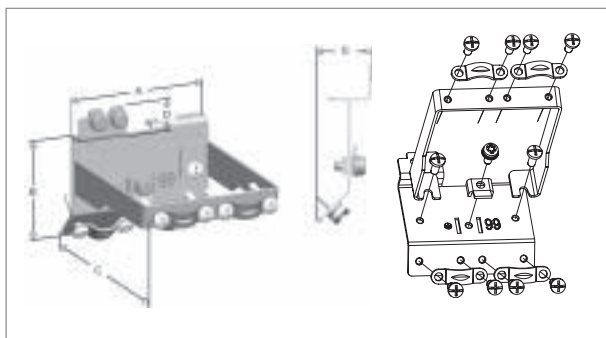
NEMA 1 field installed kit – top

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



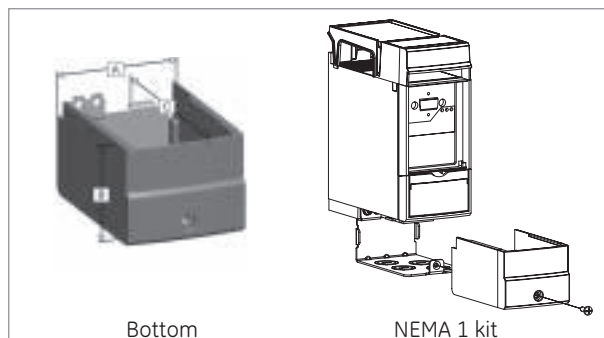
De-coupling plate kit

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



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

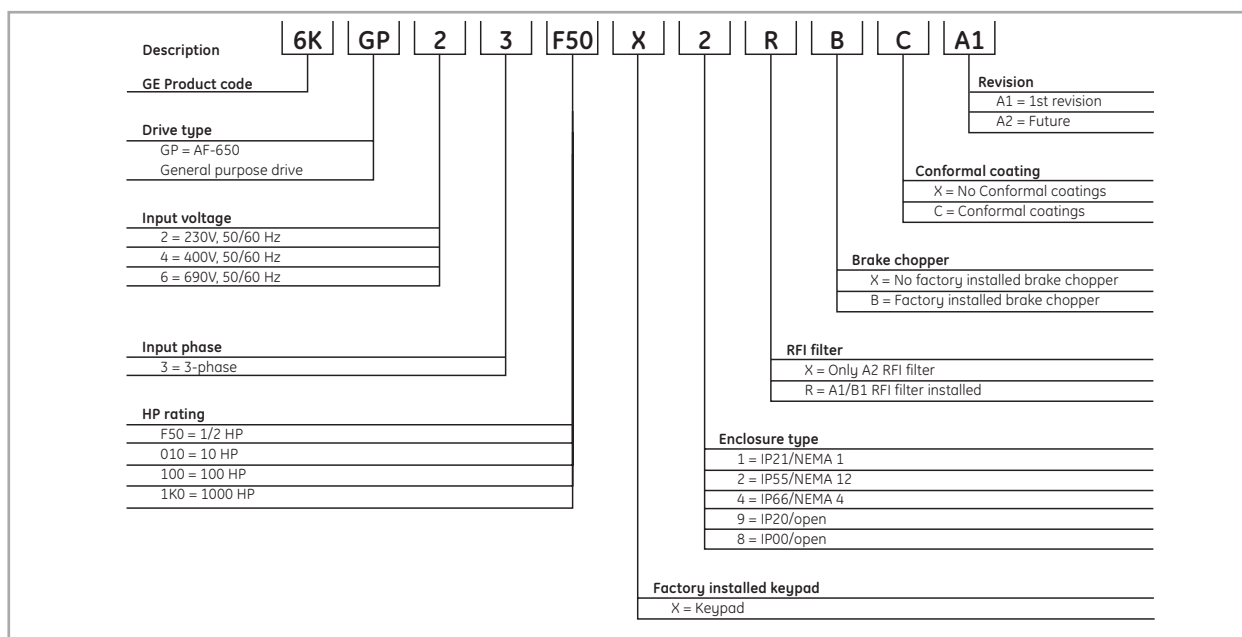


UL, cUL, C-Tick

Applications

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

Product numbering system diagram



Product number for illustrative purposes only

IP00 / IP20 / IP21, with EMC filter Class A2, *WITH* braking chopper
230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type ^{1):}	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	IP20	6KGP23F33X9XBXA1	On request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9XBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9XBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X9XBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9XBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X9XBXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	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	IP20	6KGP43F50X9XBXA1	403116	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9XBXA1	403117	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9XBXA1	403118	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9XBXA1	403119	12
4	5	10	16	4	5	10	11		6KGP43005X9XBXA1	403120	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9XBXA1	403121	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9XBXA1	403122	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9XBXA1	403123	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9XBXA1	403124	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9XBXA1	403125	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9XBXA1	403126	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9XBXA1	403127	24
37	50	73	116.8	45	60	90	99		6KGP43050X9XBXA1	403128	33
45	60	90	144	55	75	106	116.6		6KGP43060X9XBXA1	403129	33
55	75	105	168	75	100	147	161.7		6KGP43075X9XBXA1	403130	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X9XBXA1	403131	34	
90	125	177	265.5	110	150	212	233.2	6KGP43125X8XBXA1	403132	43	
110	150	212	318	132	200	260	286	6KGP43150X8XBXA1	403133	43	
132	200	260	390	160	250	315	346.5	6KGP43200X8XBXA1	403134	44	
160	250	315	472.5	200	300	395	434.5	6KGP43250X8XBXA1	403135	44	
200	300	395	592.5	250	350	480	528	6KGP43300X8XBXA1	403136	44	
250	350	480	720	315	450	600	660	6KGP43350X8XBCA1	403137	52	
315	450	600	900	355	500	658	723.8	6KGP43450X8XBCA1	403138	52	
355	500	658	987	400	550	745	819.5	IP00 conformal coated	6KGP43500X8XBCA1	403139	52
400	550	745	1117.5	450	600	800	880		6KGP43550X8XBCA1	403140	52
450	600	800	1200	500	650	880	968		6KGP43600X1XBCA1	403141	61
500	650	880	1320	560	750	990	1089		6KGP43650X1XBCA1	403142	61
560	750	990	1485	630	900	1120	1232	IP21/NEMA 1 conformal coated	6KGP43750X1XBCA1	403143	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1XBCA1	403144	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1XBCA1	403145	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1XBCA1	403146	62

690V²⁾, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1XBXA1	403642	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1XBXA1	403643	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1XBXA1	403644	22
22	30	27	43.2	30	40	34	37		6KGP63030X1XBXA1	403645	22
30	40	34	51	37	50	41	45		6KGP63040X1XBXA1	403646	32
37	50	41	61.5	45	60	52	56		6KGP63050X1XBXA1	403647	32
45	60	52	76.5	55	75	62	68		6KGP63060X1XBXA1	403648	32
55	75	62	93	75	100	83	91		6KGP63075X1XBXA1	403649	32
75	100	83	124.5	90	125	100	110		6KGP63100X1XBXA1	403650	32
90	125	108	162	110	150	131	144	IP00 conformal coated	6KGP63125X8XBCA1	403651	43
110	150	131	196.5	132	200	155	171		6KGP63150X8XBCA1	403652	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XBCA1	403653	43
160	250	192	288	200	300	242	266		6KGP63250X8XBCA1	403654	44
200	300	242	363	250	350	290	319		6KGP63300X8XBCA1	403655	44
250	350	290	435	315	400	344	378		6KGP63350X8XBCA1	403656	44
315	400	344	516	400	500	400	440		6KGP63400X8XBCA1	403657	44
355	500	380	570	450	600	450	495		6KGP63500X8XBCA1	403658	52
400	550	410	615	500	650	500	550		6KGP63550X8XBCA1	403659	52
500	650	500	750	560	750	570	627		6KGP63650X8XBCA1	403660	52
560	750	570	855	630	800	630	693		6KGP63750X8XBCA1	403661	52
630	900	630	945	710	1000	730	803	IP21/NEMA 1 conformal coated	6KGP63900X1XBCA1	403662	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X1XBCA1	403663	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X1XBCA1	403664	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X1XBCA1	403665	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X1XBCA1	403666	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XBCA1	404738	62

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page 17.
(2) 690V horsepower ratings.



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

Heavy Duty rating			Overload current during 60s (A)	Light Duty rating			Overload current during 60s (A)	Enclosure type ¹⁾ :	Cat. No.	Ref. No.	Unit size
Nominal motor ratings				Nominal motor ratings							
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	IP20	6KGP23F33X9XXXA1	404670	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9XXXA1	404671	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9XXXA1	404672	12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9XXXA1	404673	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9XXXA1	404674	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9XXXA1	404675	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9XXXA1	404676	23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9XXXA1	404677	23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9XXXA1	404678	24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9XXXA1	404679	24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9XXXA1	404680	33
22	30	88	132	30	40	115	126.5		6KGP23030X9XXXA1	404681	33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9XXXA1	404682	34
37	50	143	214.5	45	60	170	187		6KGP23050X9XXXA1	404683	34

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

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	Cat. No.	Ref. No.	
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	IP20	6KGP43F50X9XXXA1	400412	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9XXXA1	400451	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9XXXA1	401212	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9XXXA1	401362	12
4	5	10	16	4	5	10	11		6KGP43005X9XXXA1	402735	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9XXXA1	402738	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9XXXA1	402746	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9XXXA1	402747	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9XXXA1	402748	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9XXXA1	402765	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9XXXA1	402766	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9XXXA1	402767	24
37	50	73	116.8	45	60	90	99		6KGP43050X9XXXA1	402768	33
45	60	90	144	55	75	106	116.6		6KGP43060X9XXXA1	402769	33
55	75	105	168	75	100	147	161.7		6KGP43075X9XXXA1	402857	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X9XXXA1	402863	34
90	125	177	265.5	110	150	212	233.2	IP00	6KGP43125X8XXXA1	402864	43
110	150	212	318	132	200	260	286		6KGP43150X8XXXA1	402865	43
132	200	260	390	160	250	315	346.5		6KGP43200X8XXXA1	402866	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X8XXXA1	402867	44
200	300	395	592.5	250	350	480	528		6KGP43300X8XXXA1	402868	44
250	350	480	720	315	450	600	660		6KGP43350X8XXCA1	402869	52
315	450	600	900	355	500	658	723.8	IP00 conformal coated	6KGP43450X8XXCA1	402870	52
355	500	658	987	400	550	745	819.5		6KGP43500X8XXCA1	402871	52
400	550	745	1117.5	450	600	800	880	IP21/NEMA 1 conformal coated	6KGP43550X8XXCA1	402872	52
450	600	800	1200	500	650	880	968		6KGP43600X1XXCA1	402873	61
500	650	880	1320	560	750	990	1089		6KGP43650X1XXCA1	402874	61
560	750	990	1485	630	900	1120	1232		6KGP43750X1XXCA1	402875	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1XXCA1	402876	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1XXCA1	402877	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1XXCA1	402878	62

690V²⁾, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1XXXA1	403545	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1XXXA1	403546	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1XXXA1	403547	22
22	30	27	43.2	30	40	34	37		6KGP63030X1XXXA1	403548	22
30	40	34	51	37	50	41	45		6KGP63040X1XXXA1	403549	32
37	50	41	61.5	45	60	52	56		6KGP63050X1XXXA1	403550	32
45	60	52	76.5	55	75	62	68		6KGP63060X1XXXA1	403551	32
55	75	62	93	75	100	83	91		6KGP63075X1XXXA1	403552	32
75	100	83	124.5	90	125	100	110		6KGP63100X1XXXA1	403553	32
90	125	108	162	110	150	131	144		6KGP63125X8XXCA1	403554	43
110	150	131	196.5	132	200	155	171	IP00 conformal coated	6KGP63150X8XXCA1	403555	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XXCA1	403556	43
160	250	192	288	200	300	242	266		6KGP63250X8XXCA1	403557	44
200	300	242	363	250	350	290	319		6KGP63300X8XXCA1	403558	44
250	350	290	435	315	400	344	378		6KGP63350X8XXCA1	403559	44
315	400	344	516	400	500	400	440		6KGP63400X8XXCA1	403560	44
355	500	380	570	450	600	450	495		6KGP63500X8XXCA1	403561	52
400	550	410	615	500	650	500	550		6KGP63550X8XXCA1	403562	52
500	650	500	750	560	750	570	627		6KGP63650X8XXCA1	403563	52
560	750	570	855	630	800	630	693		6KGP63750X8XXCA1	403564	52
630	900	630	945	710	1000	730	803	IP21/NEMA 1 conformal coated	6KGP63900X1XXCA1	403565	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X1XXCA1	403566	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X1XXCA1	403567	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X1XXCA1	403568	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X1XXCA1	403569	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XXCA1	404739	62

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page 17.

(2) 690V horsepower ratings.



IP00 / IP20 / IP21, with EMC filter Class A1/B1, WITH braking chopper
230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	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	IP20	6KGP23F33X9RBXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9RBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9RBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9RBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9RBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9RBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9RBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9RBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9RBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9RBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9RBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X9RBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9RBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X9RBXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	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	IP20	6KGP43F50X9RBXA1	403203	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9RBXA1	403204	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9RBXA1	403205	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9RBXA1	403206	12
4	5	10	16	4	5	10	11		6KGP43005X9RBXA1	403207	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9RBXA1	403208	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9RBXA1	403209	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9RBXA1	403210	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9RBXA1	403211	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9RBXA1	403212	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9RBXA1	403213	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9RBXA1	403214	24
37	50	73	116.8	45	60	90	99		6KGP43050X9RBXA1	403215	33
45	60	90	144	55	75	106	116.6		6KGP43060X9RBXA1	403216	33
55	75	105	168	75	100	147	161.7		6KGP43075X9RBXA1	403217	34
75	100	147	235.2	90	125	177	194.7	IP00	6KGP43100X9RBXA1	403218	34
90	125	177	265.5	110	150	212	233.2		6KGP43125X8RBXA1	403219	43
110	150	212	318	132	200	260	286		6KGP43150X8RBXA1	403220	43
132	200	260	390	160	250	315	346.5		6KGP43200X8RBXA1	403221	44
160	250	315	472.5	200	300	395	434.5	IP00 conformal coated	6KGP43250X8RBXA1	403222	44
200	300	395	592.5	250	350	480	528		6KGP43300X8RBXA1	403223	44
250	350	480	720	315	450	600	660		6KGP43350X8RBCA1	403224	52
315	450	600	900	355	500	658	723.8		6KGP43450X8RBCA1	403225	52
355	500	658	987	400	550	745	819.5	IP21/NEMA 1 conformal coated	6KGP43500X8RBCA1	403226	52
400	550	745	1117.5	450	600	800	880		6KGP43550X8RBCA1	403227	52
450	600	800	1200	500	650	880	968		6KGP43600X1RBCA1	403228	61
500	650	880	1320	560	750	990	1089		6KGP43650X1RBCA1	403229	61
560	750	990	1485	630	900	1120	1232		6KGP43750X1RBCA1	403230	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1RBCA1	403231	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1RBCA1	403232	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1RBCA1	403233	62

690V²⁾, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1RBXA1	403714	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1RBXA1	403715	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1RBXA1	403716	22
22	30	27	43.2	30	40	34	37		6KGP63030X1RBXA1	403717	22
30	40	34	51	37	50	41	45		6KGP63040X1RBXA1	403718	32
37	50	41	61.5	45	60	52	56		6KGP63050X1RBXA1	403719	32
45	60	52	76.5	55	75	62	68		6KGP63060X1RBXA1	403720	32
55	75	62	93	75	100	83	91		6KGP63075X1RBXA1	403721	32
75	100	83	124.5	90	125	100	110		6KGP63100X1RBXA1	403722	32
90	125	108	162	110	150	131	144	IP00 conformal coated	6KGP63125X8RBCA1	on request	
110	150	131	196.5	132	200	155	171		6KGP63150X8RBCA1		
132	200	155	232.5	160	250	192	211		6KGP63200X8RBCA1		
160	250	192	288	200	300	242	266		6KGP63250X8RBCA1		
200	300	242	363	250	350	290	319		6KGP63300X8RBCA1		
250	350	290	435	315	400	344	378		6KGP63350X8RBCA1		
315	400	344	516	400	500	400	440		6KGP63400X8RBCA1		
355	500	380	570	450	600	450	495		6KGP63500X8RBCA1		
400	550	410	615	500	650	500	550		6KGP63650X8RBCA1		
500	650	500	750	560	750	570	627	IP21/NEMA 1 conformal coated	6KGP63750X8RBCA1		
560	750	570	855	630	800	630	693		6KGP63900X1RBCA1		
630	900	630	945	710	1000	730	803		6KGP631K0X1RBCA1		
710	1000	730	1095	800	1200	850	935		6KGP631K1X1RBCA1		
800	1150	850	1275	900	1300	945	1040		6KGP631K2X1RBCA1		
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K3X1RBCA1		
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K6X1RBCA1		
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K9X1RBCA1		

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page 17.
(2) 690V horsepower ratings.



IP00 / IP20 / IP21, with EMC filter Class A1/B1, *WITHOUT* braking chopper
230V, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	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	IP20	6KGP23F33X9RXXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X9RXXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X9RXXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X9RXXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X9RXXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X9RXXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X9RXXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X9RXXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X9RXXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X9RXXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X9RXXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X9RXXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X9RXXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X9RXXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type ¹⁾ :	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	IP20	6KGP43F50X9RXXA1	402935	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X9RXXA1	402936	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X9RXXA1	402937	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X9RXXA1	402938	12
4	5	10	16	4	5	10	11		6KGP43005X9RXXA1	402939	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X9RXXA1	402940	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X9RXXA1	402941	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X9RXXA1	402942	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X9RXXA1	402943	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X9RXXA1	402944	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X9RXXA1	402945	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X9RXXA1	402946	24
37	50	73	116.8	45	60	90	99		6KGP43050X9RXXA1	402947	33
45	60	90	144	55	75	106	116.6		6KGP43060X9RXXA1	402948	33
55	75	105	168	75	100	147	161.7		6KGP43075X9RXXA1	402949	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X9RXXA1	402950	34	
90	125	177	265.5	110	150	212	233.2	IP00	6KGP43125X8RXXA1	402951	43
110	150	212	318	132	200	260	286		6KGP43150X8RXXA1	402952	43
132	200	260	390	160	250	315	346.5		6KGP43200X8RXXA1	402953	44
160	250	315	472.5	200	300	395	434.5		6KGP43250X8RXXA1	402954	44
200	300	395	592.5	250	350	480	528	IP00 conformal coated	6KGP43300X8RXXA1	402955	44
250	350	480	720	315	450	600	660		6KGP43350X8RXXA1	402956	52
315	450	600	900	355	500	658	723.8		6KGP43450X8RXXA1	402957	52
355	500	658	987	400	550	745	819.5		6KGP43500X8RXXA1	402958	52
400	550	745	1117.5	450	600	800	880	IP21/NEMA 1 conformal coated	6KGP43550X8RXXA1	402959	52
450	600	800	1200	500	650	880	968		6KGP43600X1RXCA1	402960	61
500	650	880	1320	560	750	990	1089		6KGP43650X1RXCA1	402961	61
560	750	990	1485	630	900	1120	1232		6KGP43750X1RXCA1	402962	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X1RXCA1	402963	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X1RXCA1	402964	62
800	1200	1460	2190	1000	1350	1700	1870		6KGP431K2X1RXCA1	402965	62

690V²⁾, 3-phase, 50/60Hz input

Heavy Duty rating				Light Duty rating				Enclosure type:	Standard Unit 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					
11	15	13	20.8	15	20	18	20	IP21/NEMA 1	6KGP63015X1RXXA1	403615	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X1RXXA1	403616	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X1RXXA1	403617	22
22	30	27	43.2	30	40	34	37		6KGP63030X1RXXA1	403618	22
30	40	34	51	37	50	41	45		6KGP63040X1RXXA1	403619	32
37	50	41	61.5	45	60	52	56		6KGP63050X1RXXA1	403620	32
45	60	52	76.5	55	75	62	68		6KGP63060X1RXXA1	403621	32
55	75	62	93	75	100	83	91	IP00 conformal coated	6KGP63075X1RXXA1	403622	32
75	100	83	124.5	90	125	100	110		6KGP63100X1RXXA1	403623	32
90	125	108	162	110	150	131	144		6KGP63125X8RXXCA1		
110	150	131	196.5	132	200	155	171		6KGP63150X8RXXCA1		
132	200	155	232.5	160	250	192	211		6KGP63200X8RXXCA1		
160	250	192	288	200	300	242	266		6KGP63250X8RXXCA1		
200	300	242	363	250	350	290	319		6KGP63300X8RXXCA1		
250	350	290	435	315	400	344	378		6KGP63350X8RXXCA1		
315	400	344	516	400	500	400	440		6KGP63400X8RXXCA1		on request
355	500	380	570	450	600	450	495		6KGP63500X8RXXCA1		
400	550	410	615	500	650	500	550		6KGP63650X8RXXCA1		
500	650	500	750	560	750	570	627		6KGP63750X8RXXCA1		
560	750	570	855	630	800	630	693		6KGP63900X1RXCA1		
630	900	630	945	710	1000	730	803		6KGP631K0X1RXCA1		
710	1000	730	1095	800	1200	850	935	6KGP631K1X1RXCA1			
800	1150	850	1275	900	1300	945	1040	6KGP631K2X1RXCA1			
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K3X1RXCA1			
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K6X1RXCA1			
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K9X1RXCA1			

(1) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 0.25 to 37kW / 1/3 to 50HP for all 400V drives from 0.37 to 75kW / 1/2 to 100HP. See Page 17.

(2) 690V horsepower ratings.



IP54 / IP55, with EMC filter Class A2, *WITH* braking chopper
230V, 3-phase, 50/60Hz input

Heavy duty rating				Light duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP23F3X2XBXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2XBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2XBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2XBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2XBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2XBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2XBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2XBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2XBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2XBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2XBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X2XBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2XBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X2XBXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP43F50X2XBXA1	403156	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2XBXA1	403157	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2XBXA1	403158	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2XBXA1	403159	12
4	5	10	16	4	5	10	11		6KGP43005X2XBXA1	403160	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2XBXA1	403161	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2XBXA1	403162	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2XBXA1	403163	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2XBXA1	403164	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2XBXA1	403165	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2XBXA1	403166	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2XBXA1	403167	24
37	50	73	116.8	45	60	90	99		6KGP43050X2XBXA1	403168	33
45	60	90	144	55	75	106	116.6		6KGP43060X2XBXA1	403169	33
55	75	105	168	75	100	147	161.7		6KGP43075X2XBXA1	403170	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X2XBXA1	403171	34	
90	125	177	265.5	110	150	212	233.2	6KGP43125X2XBXA1	403172	43	
110	150	212	318	132	200	260	286	6KGP43150X2XBXA1	403173	43	
132	200	260	390	160	250	315	346.5	6KGP43200X2XBXA1	403174	44	
160	250	315	472.5	200	300	395	434.5	6KGP43250X2XBXA1	403175	44	
200	300	395	592.5	250	350	480	528	6KGP43300X2XBXA1	403176	44	
250	350	480	720	315	450	600	660	6KGP43350X2XBCA1	403177	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2XBCA1	403178	52	
355	500	658	987	400	550	745	819.5	IP54/NEMA 12 conformal coated	6KGP43500X2XBCA1	403179	52
400	550	745	1117.5	450	600	800	880		6KGP43550X2XBCA1	403180	52
450	600	800	1200	500	650	880	968		6KGP43600X2XBCA1	403181	61
500	650	880	1320	560	750	990	1089		6KGP43650X2XBCA1	403182	61
560	750	990	1485	630	900	1120	1232		6KGP43750X2XBCA1	403183	61
630	900	1120	1680	710	1000	1260	1386		6KGP43900X2XBCA1	403184	61
710	1000	1260	1890	800	1200	1460	1606		6KGP431K0X2XBCA1	403185	62
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2XBCA1	403186	62	

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2XBXA1	403678	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2XBXA1	403679	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2XBXA1	403682	22
22	30	27	43.2	30	40	34	37		6KGP63030X2XBXA1	403683	22
30	40	34	51	37	50	41	45		6KGP63040X2XBXA1	403684	32
37	50	41	61.5	45	60	52	56		6KGP63050X2XBXA1	403685	32
45	60	52	76.5	55	75	62	68		6KGP63060X2XBXA1	403686	32
55	75	62	93	75	100	83	91		6KGP63075X2XBXA1	403687	32
75	100	83	124.5	90	125	100	110		6KGP63100X2XBXA1	403688	32
90	125	108	162	110	150	131	144		6KGP63125X2XBCA1	403689	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XBCA1	403690	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XBCA1	403691	43
160	250	192	288	200	300	242	266		6KGP63250X2XBCA1	403692	44
200	300	242	363	250	350	290	319		6KGP63300X2XBCA1	403693	44
250	350	290	435	315	400	344	378	IP54/NEMA 12 conformal Coated	6KGP63350X2XBCA1	403694	44
315	450	344	516	400	500	400	440		6KGP63400X2XBCA1	403695	44
355	500	380	570	450	600	450	495		6KGP63500X2XBCA1	403696	52
400	550	410	615	500	650	500	550		6KGP63550X2XBCA1	403697	52
500	650	500	750	560	750	570	627		6KGP63650X2XBCA1	403698	52
560	750	570	855	630	800	630	693		6KGP63750X2XBCA1	403699	52
630	900	630	945	710	1000	730	803		6KGP63900X2XBCA1	403700	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X2XBCA1	403701	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X2XBCA1	403702	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X2XBCA1	403703	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X2XBCA1	403704	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X2XBCA1	404740	62

IP54 / IP55, with EMC filter Class A2, *WITHOUT* braking chopper
230V, 3-phase, 50/60Hz input

Heavy duty rating			Overload current during 60s (A)	Light duty rating			Overload current during 60s (A)	Enclosure type:	Cat. No.	Ref. No.	Unit size
Nominal motor ratings				Nominal motor ratings							
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	IP55/NEMA 12	6KGP23F33X2XXXA1	404710	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2XXXA1	404711	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2XXXA1	404712	12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2XXXA1	404713	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2XXXA1	404714	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2XXXA1	404715	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2XXXA1	404716	23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2XXXA1	404717	23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2XXXA1	404718	24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2XXXA1	404719	24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2XXXA1	404720	33
22	30	88	132	30	40	115	126.5		6KGP23030X2XXXA1	404721	33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2XXXA1	404722	34
37	50	143	214.5	45	60	170	187		6KGP23050X2XXXA1	404723	34

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP43F50X2XXXA1	402888	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2XXXA1	402889	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2XXXA1	402890	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2XXXA1	402891	12
4	5	10	16	4	5	10	11		6KGP43005X2XXXA1	402892	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2XXXA1	402893	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2XXXA1	402894	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2XXXA1	402895	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2XXXA1	402896	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2XXXA1	402897	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2XXXA1	402898	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2XXXA1	402899	24
37	50	73	116.8	45	60	90	99		6KGP43050X2XXXA1	402900	33
45	60	90	144	55	75	106	116.6		6KGP43060X2XXXA1	402901	33
55	75	105	168	75	100	147	161.7		6KGP43075X2XXXA1	402902	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X2XXXA1	402903	34	
90	125	177	265.5	110	150	212	233.2	6KGP43125X2XXCA1	403332	43	
110	150	212	318	132	200	260	286	6KGP43150X2XXCA1	403333	43	
132	200	260	390	160	250	315	346.5	6KGP43200X2XXCA1	403334	44	
160	250	315	472.5	200	300	395	434.5	6KGP43250X2XXCA1	403335	44	
200	300	395	592.5	250	350	480	528	6KGP43300X2XXCA1	403336	44	
250	350	480	720	315	450	600	660	6KGP43350X2XXCA1	402909	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2XXCA1	402910	52	
355	500	658	987	400	550	745	819.5	6KGP43500X2XXCA1	402911	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X2XXCA1	402912	52	
450	600	800	1200	500	650	880	968	6KGP43600X2XXCA1	402913	61	
500	650	880	1320	560	750	990	1089	6KGP43650X2XXCA1	402914	61	
560	750	990	1485	630	900	1120	1232	6KGP43750X2XXCA1	402915	61	
630	900	1120	1680	710	1000	1260	1386	6KGP43900X2XXCA1	402916	61	
710	1000	1260	1890	800	1200	1460	1606	6KGP431K0X2XXCA1	402917	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2XXCA1	402918	62	

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2XXXA1	403581	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2XXXA1	403582	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2XXXA1	403583	22
22	30	27	43.2	30	40	34	37		6KGP63030X2XXXA1	403584	22
30	40	34	51	37	50	41	45		6KGP63040X2XXXA1	403585	32
37	50	41	61.5	45	60	52	56		6KGP63050X2XXXA1	403586	32
45	60	52	76.5	55	75	62	68		6KGP63060X2XXXA1	403587	32
55	75	62	93	75	100	83	91		6KGP63075X2XXXA1	403588	32
75	100	83	124.5	90	125	100	110		6KGP63100X2XXXA1	403589	32
90	125	108	162	110	150	131	144		6KGP63125X2XXCA1	403590	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XXCA1	403591	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XXCA1	403592	43
160	250	192	288	200	300	242	266		6KGP63250X2XXCA1	403593	44
200	300	242	363	250	350	290	319		6KGP63300X2XXCA1	403594	44
250	350	290	435	315	400	344	378	IP54/NEMA 12 conformal Coated	6KGP63350X2XXCA1	403595	44
315	450	344	516	400	500	400	440		6KGP63400X2XXCA1	403596	44
355	500	380	570	450	600	450	495		6KGP63500X2XXCA1	403597	52
400	550	410	615	500	650	500	550		6KGP63550X2XXCA1	403598	52
500	650	500	750	560	750	570	627		6KGP63650X2XXCA1	403599	52
560	750	570	855	630	800	630	693		6KGP63750X2XXCA1	403600	52
630	900	630	945	710	1000	730	803		6KGP63900X2XXCA1	403601	61
710	1000	730	1095	800	1200	850	935		6KGP631K0X2XXCA1	403602	61
800	1150	850	1275	900	1300	945	1040		6KGP631K1X2XXCA1	403603	61
900	1250	945	1417.5	1000	1400	1060	1166		6KGP631K2X2XXCA1	403604	62
1000	1350	1060	1590	1200	1600	1260	1386		6KGP631K3X2XXCA1	403605	62
1200	1600	1260	1890	1400	1900	1415	1557		6KGP631K6X1XXCA1	404741	62



IP54 / IP55, with EMC filter A1/B1, **WITH** braking chopper 230V, 3-phase, 50/60Hz input

Heavy duty rating				Light duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP23F33X2RBXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2RBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2RBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2RBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2RBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2RBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2RBXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2RBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2RBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2RBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2RBXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X2RBXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2RBXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X2RBXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP43F50X2RBXA1	403243	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2RBXA1	403244	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2RBXA1	403245	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2RBXA1	403246	12
4	5	10	16	4	5	10	11		6KGP43005X2RBXA1	403247	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2RBXA1	403248	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2RBXA1	403249	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2RBXA1	403250	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2RBXA1	403251	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2RBXA1	403252	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2RBXA1	403253	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2RBXA1	403254	24
37	50	73	116.8	45	60	90	99		6KGP43050X2RBXA1	403255	33
45	60	90	144	55	75	106	116.6		6KGP43060X2RBXA1	403256	33
55	75	105	168	75	100	147	161.7		6KGP43075X2RBXA1	403257	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X2RBXA1	403258	34	
90	125	177	265.5	110	150	212	233.2	6KGP43125X2RBXA1	403259	43	
110	150	212	318	132	200	260	286	6KGP43150X2RBXA1	403260	43	
132	200	260	390	160	250	315	346.5	6KGP43200X2RBXA1	403261	44	
160	250	315	472.5	200	300	395	434.5	6KGP43250X2RBXA1	403262	44	
200	300	395	592.5	250	350	480	528	6KGP43300X2RBXA1	403263	44	
250	350	480	720	315	450	600	660	6KGP43350X2RBXA1	403264	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2RBXA1	403265	52	
355	500	658	987	400	550	745	819.5	6KGP43500X2RBXA1	403266	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X2RBXA1	403267	52	
450	600	800	1200	500	650	880	968	6KGP43600X2RBXA1	403268	61	
500	650	880	1320	560	750	990	1089	6KGP43650X2RBXA1	403269	61	
560	750	990	1485	630	900	1120	1232	6KGP43750X2RBXA1	403270	61	
630	900	1120	1680	710	1000	1260	1386	6KGP43900X2RBXA1	403271	61	
710	1000	1260	1890	800	1200	1460	1606	6KGP431K0X2RBXA1	403272	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2RBXA1	403273	62	

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2RBXA1	403723	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2RBXA1	403724	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2RBXA1	403725	22
22	30	27	43.2	30	40	34	37		6KGP63030X2RBXA1	403726	22
30	40	34	51	37	50	41	45		6KGP63040X2RBXA1	403727	32
37	50	41	61.5	45	60	52	56		6KGP63050X2RBXA1	403728	32
45	60	52	76.5	55	75	62	68		6KGP63060X2RBXA1	403729	32
55	75	62	93	75	100	83	91		6KGP63075X2RBXA1	403730	32
75	100	83	124.5	90	125	100	110		6KGP63100X2RBXA1	403731	32
90	125	108	162	110	150	131	144		6KGP63125X2RBCA1		
110	150	131	196.5	132	200	155	171	6KGP63150X2RBCA1			
132	200	155	232.5	160	250	192	211	6KGP63200X2RBCA1			
160	250	192	288	200	300	242	266	6KGP63250X2RBCA1			
200	300	242	363	250	350	290	319	6KGP63300X2RBCA1			
250	350	290	435	315	400	344	378	6KGP63350X2RBCA1			
315	450	344	516	400	500	400	440	6KGP63400X2RBCA1			
355	500	380	570	450	600	450	495	6KGP63500X2RBCA1			
400	550	410	615	500	650	500	550	6KGP63650X2RBCA1			
500	650	500	750	560	750	570	627	6KGP63750X2RBCA1			
560	750	570	855	630	800	630	693	6KGP63900X2RBCA1			
630	900	630	945	710	1000	730	803	6KGP631K0X2RBCA1			
710	1000	730	1095	800	1200	850	935	6KGP631K1X2RBCA1			
800	1150	850	1275	900	1300	945	1040	6KGP631K2X2RBCA1			
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K3X2RBCA1			
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K6X2RBCA1			
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K9X2RBCA1			

IP54 / IP55, with EMC filter Class A1/B1, *WITHOUT* braking chopper
230V, 3-phase, 50/60Hz input

Heavy duty rating				Light duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP23F33X2RXXA1	on request	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84		6KGP23F50X2RXXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36		6KGP23001X2RXXA1		12
1.5	2	7.5	12	1.5	2	7.5	12		6KGP23002X2RXXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96		6KGP23003X2RXXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72		6KGP23005X2RXXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88		6KGP23007X2RXXA1		23
7.5	10	30.8	49.28	11	15	46.2	50.82		6KGP23010X2RXXA1		23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP23015X2RXXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23020X2RXXA1		24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP23025X2RXXA1		33
22	30	88	132	30	40	115	126.5		6KGP23030X2RXXA1		33
30	40	115	172.5	37	50	143	157.3		6KGP23040X2RXXA1		34
37	50	143	214.5	45	60	170	187		6KGP23050X2RXXA1		34

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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	IP55/NEMA 12	6KGP43F50X2RXXA1	402975	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64		6KGP43001X2RXXA1	402976	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51		6KGP43002X2RXXA1	402977	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16		6KGP43003X2RXXA1	402978	12
4	5	10	16	4	5	10	11		6KGP43005X2RXXA1	402979	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3		6KGP43007X2RXXA1	402980	13
7.5	10	16	25.6	7.5	10	16	17.6		6KGP43010X2RXXA1	402981	13
11	15	24	38.4	11/15	15/20	32	35.2		6KGP43015X2RXXA1	402982	23
15	20	32	51.2	18.5	25	37.5	41.25		6KGP43020X2RXXA1	402983	23
18.5	25	37.5	60	22	30	44	48.4		6KGP43025X2RXXA1	402984	24
22	30	44	70.4	30	40	61	67.1		6KGP43030X2RXXA1	402985	24
30	40	61	97.6	37	50	73	80.3		6KGP43040X2RXXA1	402986	24
37	50	73	116.8	45	60	90	99		6KGP43050X2RXXA1	402987	33
45	60	90	144	55	75	106	116.6		6KGP43060X2RXXA1	402988	33
55	75	105	168	75	100	147	161.7		6KGP43075X2RXXA1	402989	34
75	100	147	235.2	90	125	177	194.7		6KGP43100X2RXXA1	402990	34
90	125	177	265.5	110	150	212	233.2	6KGP43125X2RXXA1	402991	43	
110	150	212	318	132	200	260	286	6KGP43150X2RXXA1	402992	43	
132	200	260	390	160	250	315	346.5	6KGP43200X2RXXA1	402993	44	
160	250	315	472.5	200	300	395	434.5	6KGP43250X2RXXA1	402994	44	
200	300	395	592.5	250	350	480	528	6KGP43300X2RXXA1	402995	44	
250	350	480	720	315	450	600	660	6KGP43350X2RXXA1	402996	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2RXXA1	402997	52	
355	500	658	987	400	550	745	819.5	6KGP43500X2RXXA1	402998	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X2RXXA1	402999	52	
450	600	800	1200	500	650	880	968	6KGP43600X2RXXA1	403094	61	
500	650	880	1320	560	750	990	1089	6KGP43650X2RXXA1	403095	61	
560	750	990	1485	630	900	1120	1232	6KGP43750X2RXXA1	403096	61	
630	900	1120	1680	710	1000	1260	1386	6KGP43900X2RXXA1	403097	61	
710	1000	1260	1890	800	1200	1460	1606	6KGP431K0X2RXXA1	403098	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2RXXA1	403099	62	

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

Heavy Duty rating				Light Duty rating				Enclosure type:	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					
11	15	13	20.8	15	20	18	20	IP55/NEMA 12	6KGP63015X2RXXA1	403624	22
15	20	18	28.8	18.5	25	22	24		6KGP63020X2RXXA1	403625	22
18.5	25	22	35.2	22	30	27	30		6KGP63025X2RXXA1	403626	22
22	30	27	43.2	30	40	34	37		6KGP63030X2RXXA1	403627	22
30	40	34	51	37	50	41	45		6KGP63040X2RXXA1	403628	32
37	50	41	61.5	45	60	52	56		6KGP63050X2RXXA1	403629	32
45	60	52	76.5	55	75	62	68		6KGP63060X2RXXA1	403630	32
55	75	62	93	75	100	83	91		6KGP63075X2RXXA1	403631	32
75	100	83	124.5	90	125	100	110		6KGP63100X2RXXA1	403632	32
90	125	108	162	110	150	131	144		6KGP63125X2RXXA1	on request	
110	150	131	196.5	132	200	155	171	6KGP63150X2RXXA1			
132	200	155	232.5	160	250	192	211	6KGP63200X2RXXA1			
160	250	192	288	200	300	242	266	6KGP63250X2RXXA1			
200	300	242	363	250	350	290	319	6KGP63300X2RXXA1			
250	350	290	435	315	400	344	378	6KGP63350X2RXXA1			
315	450	344	516	400	500	400	440	6KGP63400X2RXXA1			
355	500	380	570	450	600	450	495	6KGP63500X2RXXA1			
400	550	410	615	500	650	500	550	6KGP63650X2RXXA1			
500	650	500	750	560	750	570	627	6KGP63750X2RXXA1			
560	750	570	855	630	800	630	693	6KGP63900X2RXXA1			
630	900	630	945	710	1000	730	803	6KGP631K0X2RXXA1			
710	1000	730	1095	800	1200	850	935	6KGP631K1X2RXXA1			
800	1150	850	1275	900	1300	945	1040	6KGP631K2X2RXXA1			
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K3X2RXXA1			
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K6X2RXXA1			
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K9X2RXXA1			



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			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	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			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	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

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	6KGP23F33X4XXXA1	404724	12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4XXXA1	404725	12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4XXXA1	404726	12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4XXXA1	404727	12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4XXXA1	404728	12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4XXXA1	404729	13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4XXXA1	404730	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4XXXA1	404731	23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4XXXA1	404732	24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4XXXA1	404733	24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4XXXA1	404734	33
22	30	88	132	30	40	115	126.5	6KGP23030X4XXXA1	404735	33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4XXXA1	404736	34
37	50	143	214.5	45	60	170	187	6KGP23050X4XXXA1	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	6KGP43F50X4XXXA1	402919	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4XXXA1	402920	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4XXXA1	402921	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4XXXA1	402922	12
4	5	10	16	4	5	10	11	6KGP43005X4XXXA1	402923	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4XXXA1	402924	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4XXXA1	402925	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4XXXA1	402926	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4XXXA1	402927	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4XXXA1	402928	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4XXXA1	402929	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4XXXA1	402930	24
37	50	73	116.8	45	60	90	99	6KGP43050X4XXXA1	402931	33
45	60	90	144	55	75	106	116.6	6KGP43060X4XXXA1	402932	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4XXXA1	402933	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4XXXA1	402934	34

IP66, with EMC filter Class A1/B1, *WITH* 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	6KGP23F33X4RBXA1		12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4RBXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4RBXA1		12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4RBXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4RBXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4RBXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4RBXA1	on request	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4RBXA1		23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4RBXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4RBXA1		24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4RBXA1		33
22	30	88	132	30	40	115	126.5	6KGP23030X4RBXA1		33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4RBXA1		34
37	50	143	214.5	45	60	170	187	6KGP23050X4RBXA1		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	6KGP43F50X4RBXA1	403274	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4RBXA1	403275	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4RBXA1	403276	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4RBXA1	403277	12
4	5	10	16	4	5	10	11	6KGP43005X4RBXA1	403278	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4RBXA1	403279	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4RBXA1	403280	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4RBXA1	403281	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4RBXA1	403282	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4RBXA1	403283	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4RBXA1	403284	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4RBXA1	403285	24
37	50	73	116.8	45	60	90	99	6KGP43050X4RBXA1	403286	33
45	60	90	144	55	75	106	116.6	6KGP43060X4RBXA1	403287	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4RBXA1	403288	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4RBXA1	403289	34

IP66, with EMC filter Class A1/B1, *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	6KGP23F33X4RXXA1		12
0.37	1/2	2.4	3.84	0.37	1/2	2.4	3.84	6KGP23F50X4RXXA1		12
0.75	1	4.6	7.36	0.75	1	4.6	7.36	6KGP23001X4RXXA1		12
1.5	2	7.5	12	1.5	2	7.5	12	6KGP23002X4RXXA1		12
2.2	3	10.6	16.96	2.2	3	10.6	16.96	6KGP23003X4RXXA1		12
3.7	5	16.7	26.72	3.7	5	16.7	26.72	6KGP23005X4RXXA1		13
5.5	7.5	24.2	38.72	5.5/7.5	7.5/10	30.8	33.88	6KGP23007X4RXXA1	on request	23
7.5	10	30.8	49.28	11	15	46.2	50.82	6KGP23010X4RXXA1		23
11	15	46.2	73.92	15	20	59.4	65.34	6KGP23015X4RXXA1		24
15	20	59.4	89.1	18.5	25	74.8	82.28	6KGP23020X4RXXA1		24
18.5	25	74.8	112.2	22	30	88	96.8	6KGP23025X4RXXA1		33
22	30	88	132	30	40	115	126.5	6KGP23030X4RXXA1		33
30	40	115	172.5	37	50	143	157.3	6KGP23040X4RXXA1		34
37	50	143	214.5	45	60	170	187	6KGP23050X4RXXA1		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	6KGP43F50X4RXXA1	403100	12
0.75	1	2.4	3.84	0.75	1	2.4	2.64	6KGP43001X4RXXA1	403101	12
1.5	2	4.1	6.56	1.5	2	4.1	4.51	6KGP43002X4RXXA1	403102	12
2.2	3	5.6	8.96	2.2	3	5.6	6.16	6KGP43003X4RXXA1	403103	12
4	5	10	16	4	5	10	11	6KGP43005X4RXXA1	403104	12
5.5	7.5	13	20.8	5.5	7.5	13	14.3	6KGP43007X4RXXA1	403105	13
7.5	10	16	25.6	7.5	10	16	17.6	6KGP43010X4RXXA1	403106	13
11	15	24	38.4	11/15	15/20	32	35.2	6KGP43015X4RXXA1	403107	23
15	20	32	51.2	18.5	25	37.5	41.25	6KGP43020X4RXXA1	403108	23
18.5	25	37.5	60	22	30	44	48.4	6KGP43025X4RXXA1	403109	24
22	30	44	70.4	30	40	61	67.1	6KGP43030X4RXXA1	403110	24
30	40	61	97.6	37	50	73	80.3	6KGP43040X4RXXA1	403111	24
37	50	73	116.8	45	60	90	99	6KGP43050X4RXXA1	403112	33
45	60	90	144	55	75	106	116.6	6KGP43060X4RXXA1	403113	33
55	75	106	169.6	75	100	147	161.7	6KGP43075X4RXXA1	403114	34
75	100	147	235.2	90	125	177	194.7	6KGP43100X4RXXA1	403115	34

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

	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. ODA 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. ODA 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.	OPCMTCP	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.

Options and accessories (continued)**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.

Encoder input module	OPCENC	404819
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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.

Resolver input module	OPCRES	404852
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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.

Relay output module	OPCRLY	404849
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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.

24V DC External supply module	OPC24VPS	404815
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Safe PLC I/O module

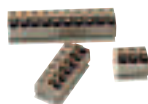
Safe PLC I/O internal drive mounted module for use on the AF-650 GP drive. This module provides a safety input based on a single pole 24V DC input.

Safe PLC I/O Module	OPCSAFE	404853
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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.



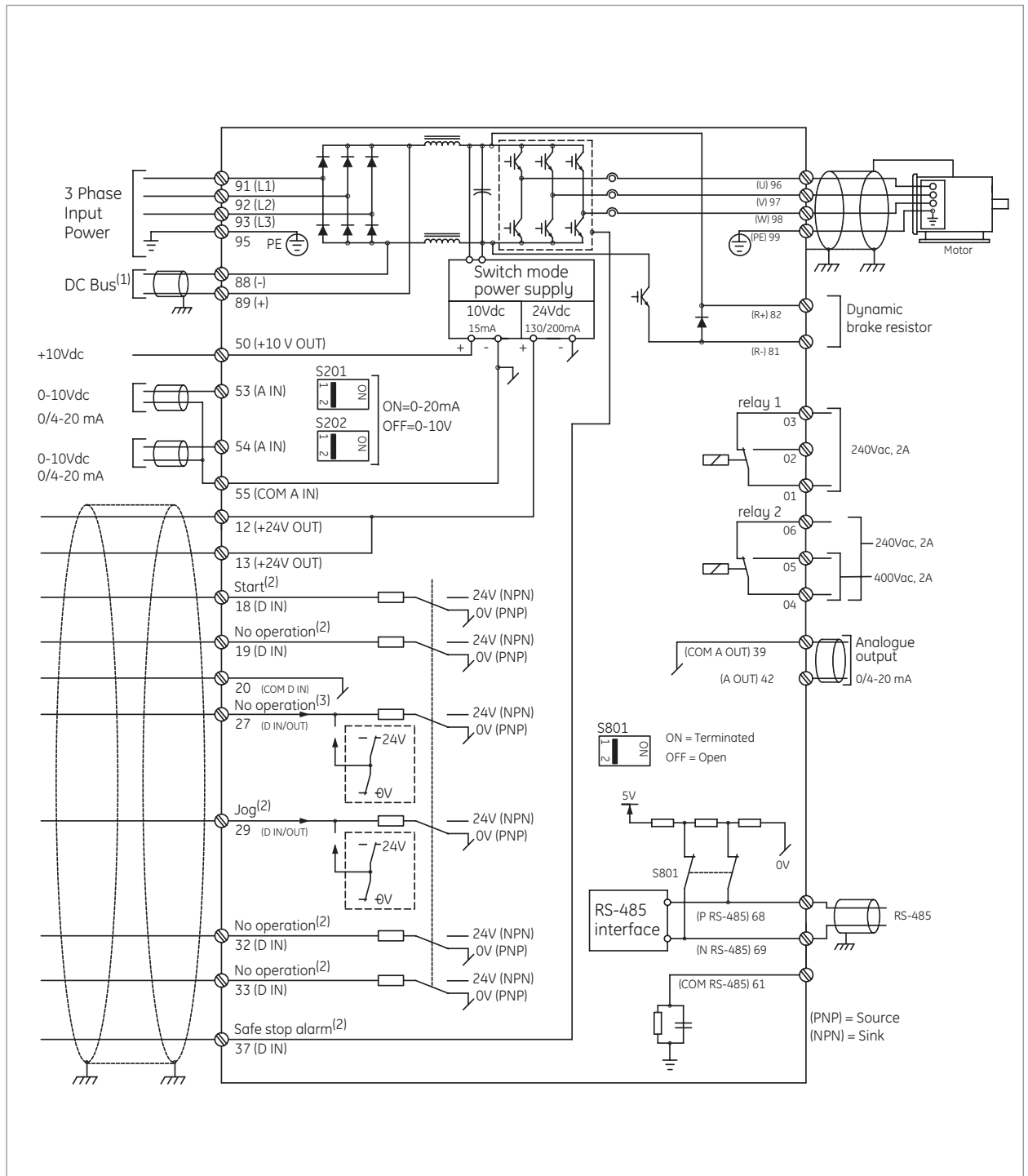
For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

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

Basic wiring diagrams



- (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.

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	1.0 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 380-500 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 +10 Vdc, 10 to 0 Vdc 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, 24 Vdc 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 24 Vdc 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 after 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

Continued on next page



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

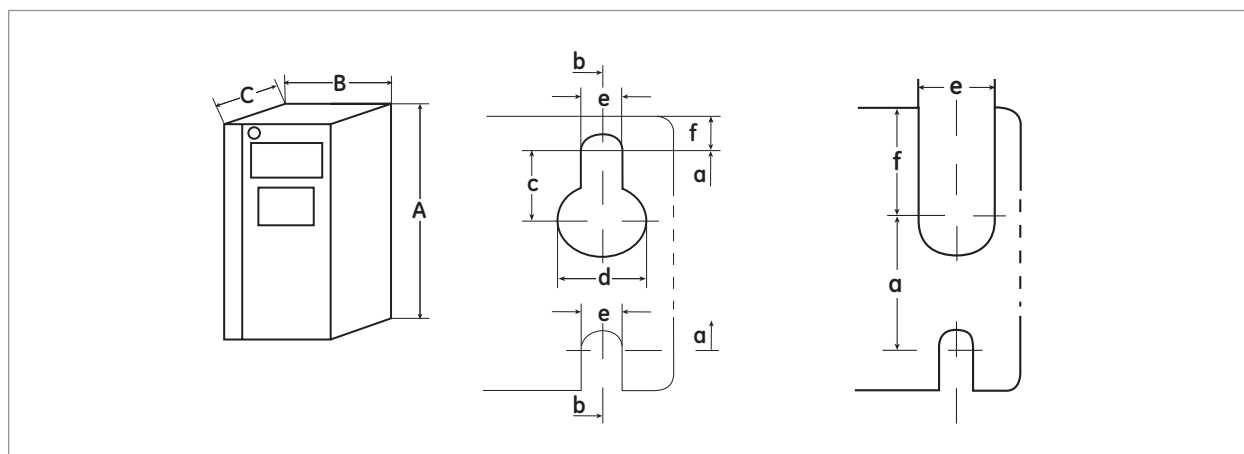
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Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

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

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

Dimensional drawings

Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31	32	33	34
Enclosure type			IP55/IP66 NEMA 12/NEMA 4	IP55/IP66 NEMA 12/NEMA 4	IP20 Open chassis	IP20 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

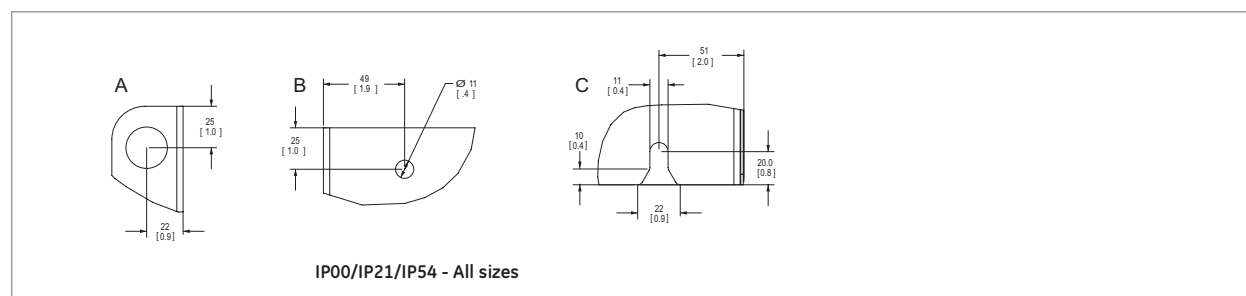
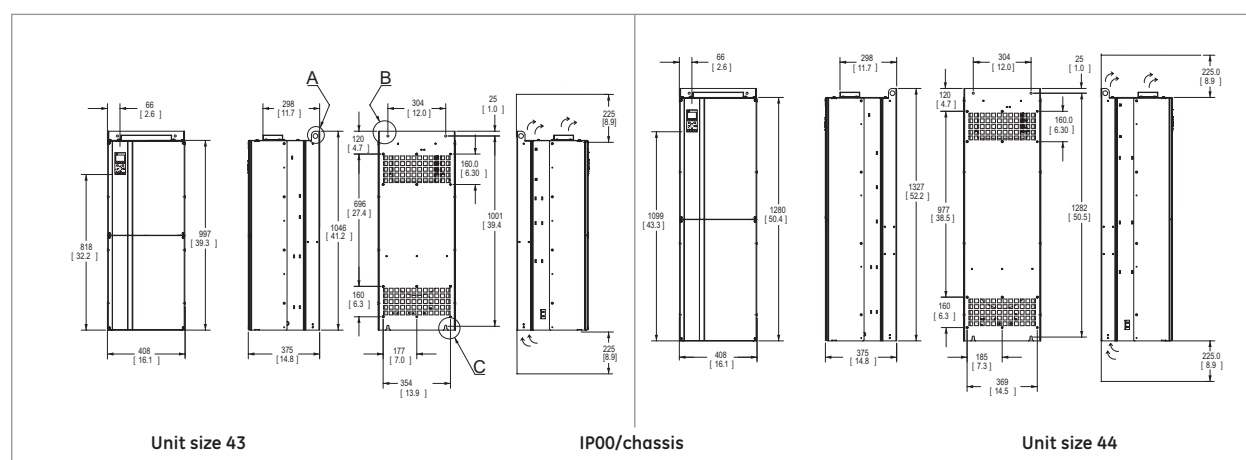
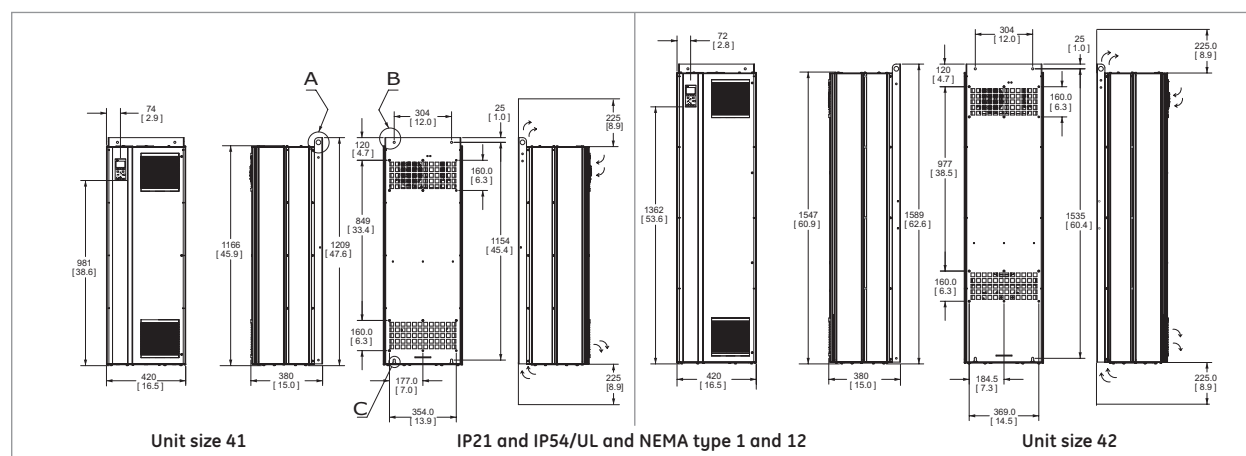
Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits⁽¹⁾ (mm)

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.

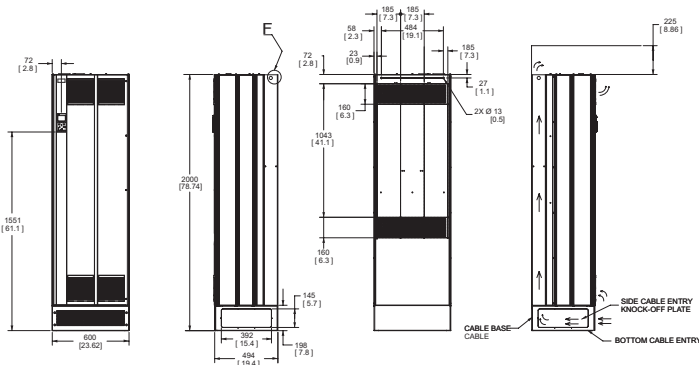
Dimensional drawings in mm (inches)



Unit size	41	42	43	44
Enclosure type	IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00 Open chassis	IP00 Open chassis
Voltage	400V 90 to 110kW 125 to 150HP 690V 90 to 132kW 125 to 200HP	132 to 200kW 200 to 300HP 160 to 315kW 250 to 400HP	90 to 110kW 125 to 150HP 15 to 22kW 125 to 200HP	132 to 200kW 200 to 300HP 160 to 315kW 250 to 400HP
Shipping dimensions	Height Width Depth	650 1730 570	650 1220 570	650 1490 570
Drive dimensions	Height Width Depth	1209 420 380	1589 420 375	1327 408 375
Weight (kg)	104	106	91	138

AF-650 GP

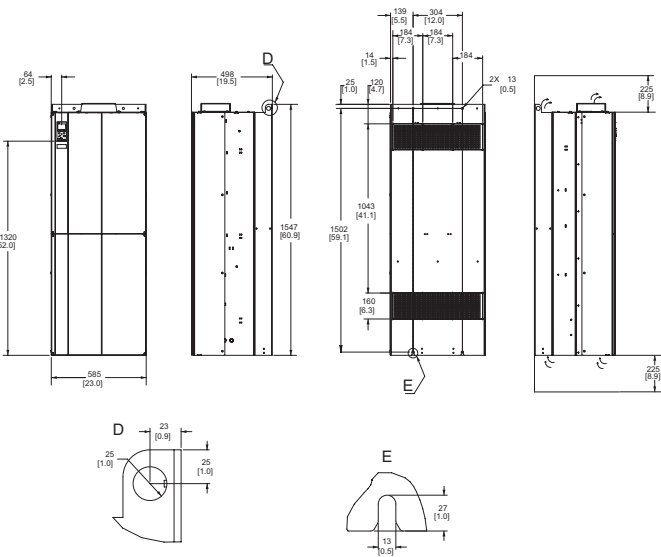
Dimensional drawings in mm (inches)



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

Unit size 51

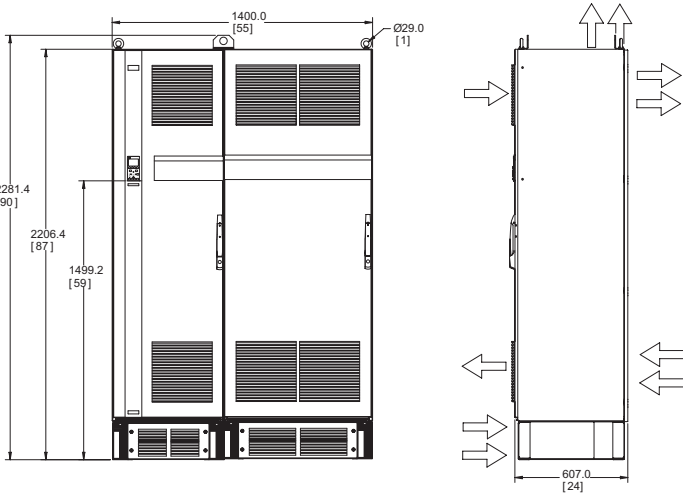
Enclosure type	IP21/IP54 NEMA 1/NEMA 12
Voltage 400V	250 to 400kW 350 to 550HP
690V	355 to 560kW 500 to 750HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313



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



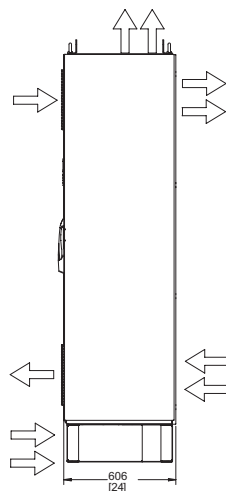
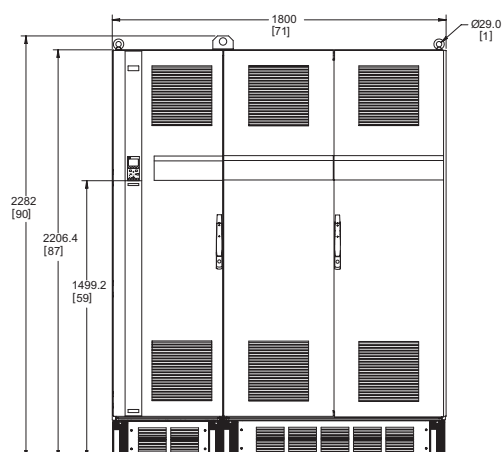
Unit Size 61

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



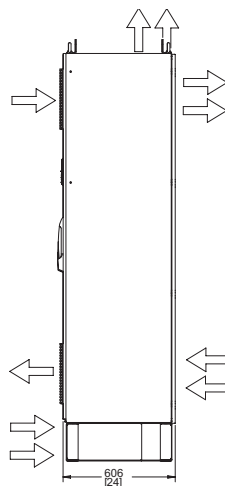
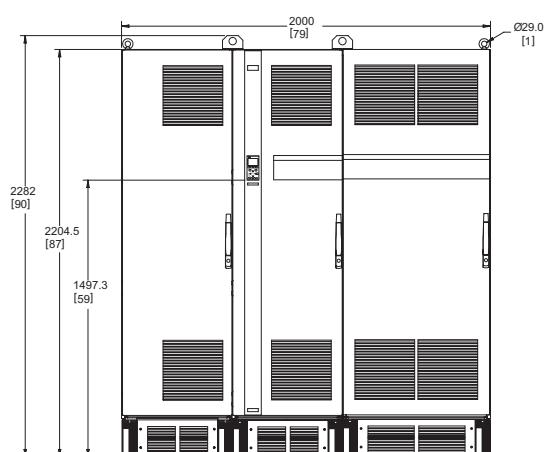
Dimensional drawings in mm (inches)



Unit size 62

Enclosure type	IP21/IP55
Voltage	400V NEMA 1/NEMA 12 710 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

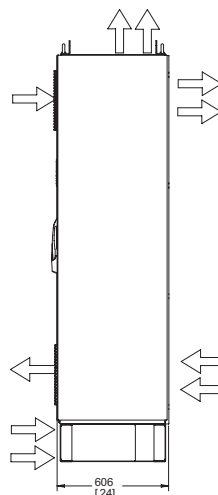
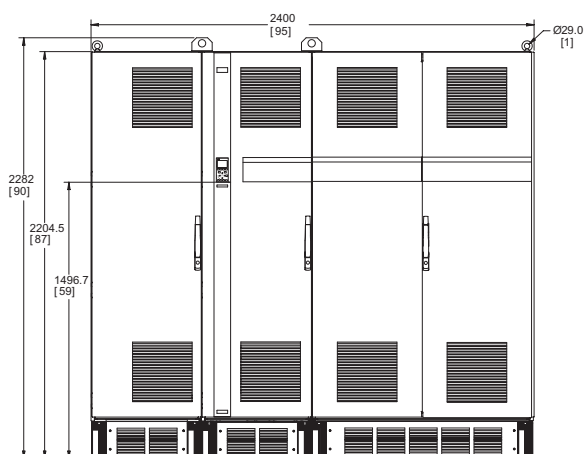
Unit size 62



Unit size 63

Enclosure type	IP21/IP55
Voltage	400V NEMA 1/NEMA 12 450 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 63



Unit size 64

Enclosure type	IP21/IP55
Voltage	400V NEMA 1/NEMA 12 710 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

Unit size 64



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

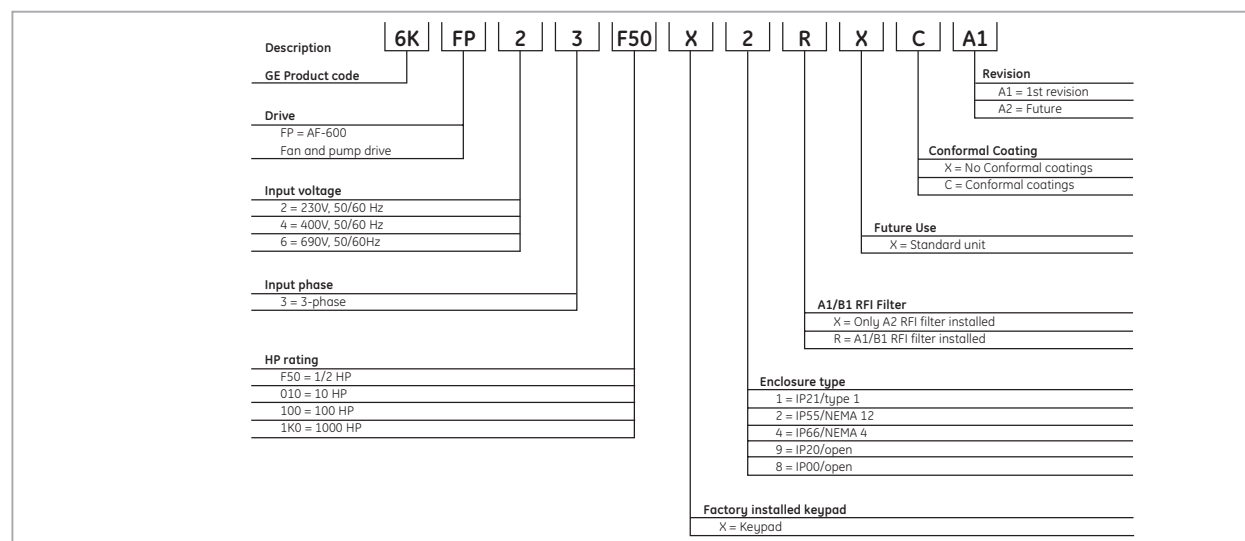
Fan

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	6KFP23001X9XXA1	404684	12
1.5	2	7.5	8.3		6KFP23002X9XXA1	404685	12
2.2	3	10.6	11.7		6KFP23003X9XXA1	404686	12
3.7	5	16.7	18.4		6KFP23005X9XXA1	404687	13
5.5	7.5	24.2	26.6		6KFP23007X9XXA1	404688	23
7.5	10	30.8	33.9		6KFP23010X9XXA1	404689	23
11	15	46.2	50.8		6KFP23015X9XXA1	404690	23
15	20	59.4	65.3		6KFP23020X9XXA1	404691	24
18.5	25	74.8	82.3		6KFP23025X9XXA1	404692	24
22	30	88	96.8		6KFP23030X9XXA1	404693	33
30	40	115	126.5		6KFP23040X9XXA1	404694	33
37	50	143	157		6KFP23050X9XXA1	404695	34
45	60	170	187		6KFP23060X9XXA1	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	6KFP43001X9XXA1	403855	12
1.5	2	2.4	2.64		6KFP43002X9XXA1	403856	12
2.2	3	4.1	4.51		6KFP43003X9XXA1	403857	12
4	5	5.6	6.16		6KFP43005X9XXA1	403858	12
5.5	7.5	10	11		6KFP43007X9XXA1	403859	13
7.5	10	13	14.3		6KFP43010X9XXA1	403860	13
11	15	16	17.6		6KFP43015X9XXA1	403861	23
15	20	32	35.2		6KFP43020X9XXA1	403862	23
18.5	25	37.5	41.25		6KFP43025X9XXA1	403863	23
22	30	44	48.4		6KFP43030X9XXA1	403864	24
30	40	61	67.1		6KFP43040X9XXA1	403865	24
37	50	73	80.3		6KFP43050X9XXA1	403866	24
45	60	90	99		6KFP43060X9XXA1	403867	33
55	75	106	116.6		6KFP43075X9XXA1	403868	33
75	100	147	161.7		6KFP43100X9XXA1	403869	34
90	125	177	194.7	IP00	6KFP43125X9XXA1	403870	34
110	150	212	233.2		6KFP43150X8XXA1	403871	43
132	200	260	286		6KFP43200X8XXA1	403872	43
160	250	315	346.5		6KFP43250X8XXA1	403873	44
200	300	395	434.5	IP00 conformal coated	6KFP43300X8XXA1	403874	44
250	350	480	528		6KFP43350X8XXA1	403875	44
315	450	600	660		6KFP43450X8XXA1	403876	52
355	500	658	723.8		6KFP43500X8XXA1	403877	52
400	550	745	819.5	IP21/NEMA 1 conformal coated	6KFP43550X8XXA1	403878	52
450	600	800	880		6KFP43600X8XXA1	403879	52
500	650	880	968		6KFP43650X1XXA1	403880	61
560	750	990	1089		6KFP43750X1XXA1	403881	61
630	900	1120	1232		6KFP43900X1XXA1	403882	61
710	1000	1260	1386		6KFP431K0X1XXA1	403883	61
800	1200	1460	1606		6KFP431K2X1XXA1	403884	62
1000	1350	1700	1870		6KFP431K3X1XXA1	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	6KFP63015X1XXA1	on request	
15	20	18	20		6KFP63020X1XXA1		
18.5	25	22	24		6KFP63025X1XXA1		
22	30	27	30		6KFP63030X1XXA1		
30	40	34	37		6KFP63040X1XXA1		
37	50	41	45		6KFP63050X1XXA1		
45	60	52	57		6KFP63060X1XXA1		
55	75	62	68		6KFP63075X1XXA1		
75	100	83	91		6KFP63100X1XXA1		
90	125	100	110		6KFP63125X1XXA1		
110	150	131	144		6KFP63150X8XXA1		
132	200	155	171		6KFP63200X8XXA1		
160	250	192	211		6KFP63250X8XXA1		
200	300	242	266	IP00 conformal coated	6KFP63300X8XXA1		
250	350	290	319		6KFP63350X8XXA1		
315	400	344	378		6KFP63450X8XXA1		
355	500	400	440		6KFP63550X8XXA1		
400	550	450	495	IP21/NEMA 1 conformal coated	6KFP63600X8XXA1		
500	650	500	550		6KFP63650X8XXA1		
560	750	570	627		6KFP63750X8XXA1		
630	900	630	693		6KFP63900X8XXA1		
710	1000	730	803		6KFP631K0X1XXA1		
800	1150	850	935		6KFP631K1X1XXA1		
900	1250	945	1040		6KFP631K2X1XXA1		
1000	1350	1060	1166		6KFP631K3X1XXA1		
1200	1600	1260	1386		6KFP631K6X1XXA1		
1400	1900	1415	1557		6KFP631K9X1XXA1		

(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 41.



IP00 / IP20 / IP21, with EMC filter Class A1/B1, 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	6KFP23001X9RXXA1	on request	12
1.5	2	7.5	8.3		6KFP23002X9RXXA1		12
2.2	3	10.6	11.7		6KFP23003X9RXXA1		12
3.7	5	16.7	18.4		6KFP23005X9RXXA1		13
5.5	7.5	24.2	26.6		6KFP23007X9RXXA1		23
7.5	10	30.8	33.9		6KFP23010X9RXXA1		23
11	15	46.2	50.8		6KFP23015X9RXXA1		23
15	20	59.4	65.3		6KFP23020X9RXXA1		24
18.5	25	74.8	82.3		6KFP23025X9RXXA1		24
22	30	88	96.8		6KFP23030X9RXXA1		33
30	40	115	126.5		6KFP23040X9RXXA1		33
37	50	143	157		6KFP23050X9RXXA1		34
45	60	170	187		6KFP23060X9RXXA1		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	6KFP43001X9RXXA1	403973	12
1.5	2	2.4	2.64		6KFP43002X9RXXA1	403974	12
2.2	3	4.1	4.51		6KFP43003X9RXXA1	403975	12
4	5	5.6	6.16		6KFP43005X9RXXA1	403976	12
5.5	7.5	10	11		6KFP43007X9RXXA1	403977	13
7.5	10	13	14.3		6KFP43010X9RXXA1	403978	13
11	15	16	17.6		6KFP43015X9RXXA1	403979	23
15	20	32	35.2		6KFP43020X9RXXA1	403980	23
18.5	25	37.5	41.25		6KFP43025X9RXXA1	403981	23
22	30	44	48.4		6KFP43030X9RXXA1	403982	24
30	40	61	67.1		6KFP43040X9RXXA1	403983	24
37	50	73	80.3		6KFP43050X9RXXA1	403984	24
45	60	90	99		6KFP43060X9RXXA1	403985	33
55	75	106	116.6		6KFP43075X9RXXA1	403986	33
75	100	147	161.7		6KFP43100X9RXXA1	403987	34
90	125	177	194.7		6KFP43125X9RXXA1	403988	34
110	150	212	233.2	IP00	6KFP43150X8RXXA1	403989	43
132	200	260	286		6KFP43200X8RXXA1	403990	43
160	250	315	346.5		6KFP43250X8RXXA1	403991	44
200	300	395	434.5		6KFP43300X8RXXA1	403992	44
250	350	480	528	IP00 conformal coated	6KFP43350X8RXXA1	403993	44
315	450	600	660		6KFP43400X8RXXA1	403994	52
355	500	658	723.8		6KFP43500X8RXXA1	403995	52
400	550	745	819.5		6KFP43550X8RXXA1	403996	52
450	600	800	880	IP21/NEMA 1 conformal coated	6KFP43600X8RXXA1	403997	52
500	650	880	968		6KFP43650X1RXCA1	403998	61
560	750	990	1089		6KFP43750X1RXCA1	403999	61
630	900	1120	1232		6KFP43900X1RXCA1	404000	61
710	1000	1260	1386		6KFP431K0X1RXCA1	404205	61
800	1200	1460	1606		6KFP431K2X1RXCA1	404206	62
1000	1350	1700	1870		6KFP431K3X1RXCA1	404208	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	6KFP63015X1RXCA1	on request	
15	20	18	20		6KFP63020X1RXCA1		
18.5	25	22	24		6KFP63025X1RXCA1		
22	30	27	30		6KFP63030X1RXCA1		
30	40	34	37		6KFP63040X1RXCA1		
37	50	41	45		6KFP63050X1RXCA1		
45	60	52	57		6KFP63060X1RXCA1		
55	75	62	68		6KFP63075X1RXCA1		
75	100	83	91		6KFP63100X1RXCA1		
90	125	100	110		6KFP63125X1RXCA1		
110	150	131	144		6KFP63150X8RXXA1		
132	200	155	171		6KFP63200X8RXXA1		
160	250	192	211		6KFP63250X8RXXA1		
200	300	242	266		6KFP63300X8RXXA1		
250	350	290	319	IP00 conformal coated	6KFP63350X8RXXA1		
315	400	344	378		6KFP63400X8RXXA1		
355	500	400	440		6KFP63500X8RXXA1		
400	550	450	495		6KFP63600X8RXXA1		
500	650	500	550	IP21/NEMA 1 conformal coated	6KFP63650X8RXXA1		
560	750	570	627		6KFP63750X8RXXA1		
630	900	630	693		6KFP63900X8RXXA1		
710	1000	730	803		6KFP631K0X1RXCA1		
800	1150	850	935		6KFP631K1X1RXCA1		
900	1250	945	1040		6KFP631K2X1RXCA1		
1000	1350	1060	1166		6KFP631K3X1RXCA1		
1200	1600	1260	1386		6KFP631K6X1RXCA1		
1400	1900	1415	1557		6KFP631K9X1RXCA1		

(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 41.



IP54 / IP55, 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	IP55/NEMA 12	6KFP23001X2XXXA1	404697	12
1.5	2	7.5	8.3		6KFP23002X2XXXA1	404698	12
2.2	3	10.6	11.7		6KFP23003X2XXXA1	404699	12
3.7	5	16.7	18.4		6KFP23005X2XXXA1	404700	13
5.5	7.5	24.2	26.6		6KFP23007X2XXXA1	404701	23
7.5	10	30.8	33.9		6KFP23010X2XXXA1	404702	23
11	15	46.2	50.8		6KFP23015X2XXXA1	404703	23
15	20	59.4	65.3		6KFP23020X2XXXA1	404704	24
18.5	25	74.8	82.3		6KFP23025X2XXXA1	404705	24
22	30	88	96.8		6KFP23030X2XXXA1	404706	33
30	40	115	126.5		6KFP23040X2XXXA1	404707	33
37	50	143	157		6KFP23050X2XXXA1	404708	34
45	60	170	187		6KFP23060X2XXXA1	404709	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	IP55/NEMA 12	6KFP43001X2XXXA1	403886	12
1.5	2	2.4	2.64		6KFP43002X2XXXA1	403887	12
2.2	3	4.1	4.51		6KFP43003X2XXXA1	403888	12
4	5	5.6	6.16		6KFP43005X2XXXA1	403889	12
5.5	7.5	10	11		6KFP43007X2XXXA1	403890	13
7.5	10	13	14.3		6KFP43010X2XXXA1	403891	13
11	15	16	17.6		6KFP43015X2XXXA1	403892	23
15	20	32	35.2		6KFP43020X2XXXA1	403893	23
18.5	25	37.5	41.25		6KFP43025X2XXXA1	403894	23
22	30	44	48.4		6KFP43030X2XXXA1	403895	24
30	40	61	67.1		6KFP43040X2XXXA1	403896	24
37	50	73	80.3		6KFP43050X2XXXA1	403897	24
45	60	90	99		6KFP43060X2XXXA1	403898	33
55	75	106	116.6		6KFP43075X2XXXA1	403899	33
75	100	147	161.7		6KFP43100X2XXXA1	403900	34
90	125	177	194.7	IP54/NEMA 12	6KFP43125X2XXXA1	403901	34
110	150	212	233.2		6KFP43150X2XXXA1	403902	43
132	200	260	286		6KFP43200X2XXXA1	403903	43
160	250	315	346.5		6KFP43250X2XXXA1	403904	44
200	300	395	434.5		6KFP43300X2XXXA1	403905	44
250	350	480	528		6KFP43350X2XXXA1	403906	44
315	450	600	660		6KFP43450X2XXCA1	403907	52
355	500	658	723.8		6KFP43500X2XXCA1	403908	52
400	550	745	819.5	IP54/NEMA 12 conformal coated	6KFP43550X2XXCA1	403909	52
450	600	800	880		6KFP43600X2XXCA1	403910	52
500	650	880	968		6KFP43650X2XXCA1	403911	61
560	750	990	1089		6KFP43750X2XXCA1	403912	61
630	900	1120	1232		6KFP43900X2XXCA1	403913	61
710	1000	1260	1386		6KFP431K0X2XXCA1	403914	61
800	1200	1460	1606		6KFP431K2X2XXCA1	403915	62
1000	1350	1700	1870		6KFP431K3X2XXCA1	403916	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)				
15	20	18	20	IP55/NEMA 12 conformal coated	6KFP63015X2XXCA1	on request	
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 41.



IP54 / IP55, with EMC filter Class A1/B1, 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	6KFP23001X2RXXA1	on request	12
1.5	2	7.5	8.3		6KFP23002X2RXXA1		12
2.2	3	10.6	11.7		6KFP23003X2RXXA1		12
3.7	5	16.7	18.4		6KFP23005X2RXXA1		13
5.5	7.5	24.2	26.6		6KFP23007X2RXXA1		23
7.5	10	30.8	33.9		6KFP23010X2RXXA1		23
11	15	46.2	50.8		6KFP23015X2RXXA1		23
15	20	59.4	65.3		6KFP23020X2RXXA1		24
18.5	25	74.8	82.3		6KFP23025X2RXXA1		24
22	30	88	96.8		6KFP23030X2RXXA1		33
30	40	115	126.5		6KFP23040X2RXXA1		33
37	50	143	157		6KFP23050X2RXXA1		34
45	60	170	187		6KFP23060X2RXXA1		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	6KFP43001X2RXXA1	404209	12
1.5	2	2.4	2.64		6KFP43002X2RXXA1	404210	12
2.2	3	4.1	4.51		6KFP43003X2RXXA1	404263	12
4	5	5.6	6.16		6KFP43005X2RXXA1	404293	12
5.5	7.5	10	11		6KFP43007X2RXXA1	404387	13
7.5	10	13	14.3		6KFP43010X2RXXA1	404388	13
11	15	16	17.6		6KFP43015X2RXXA1	404389	23
15	20	32	35.2		6KFP43020X2RXXA1	404464	23
18.5	25	37.5	41.25		6KFP43025X2RXXA1	404465	23
22	30	44	48.4		6KFP43030X2RXXA1	404466	24
30	40	61	67.1		6KFP43040X2RXXA1	404467	24
37	50	73	80.3		6KFP43050X2RXXA1	404468	24
45	60	90	99		6KFP43060X2RXXA1	404469	33
55	75	106	116.6	IP54/NEMA 12 conformal coated	6KFP43075X2RXXA1	404470	33
75	100	147	161.7		6KFP43100X2RXXA1	404471	34
90	125	177	194.7		6KFP43125X2RXXA1	404472	34
110	150	212	233.2		6KFP43150X2RXXA1	404515	43
132	200	260	286		6KFP43200X2RXXA1	404516	43
160	250	315	346.5		6KFP43250X2RXXA1	404517	44
200	300	395	434.5		6KFP43300X2RXXA1	404524	44
250	350	480	528		6KFP43350X2RXXA1	404525	44
315	450	600	660		6KFP43450X2RXXA1	404526	52
355	500	658	723.8		6KFP43500X2RXXA1	404528	52
400	550	745	819.5		6KFP43550X2RXXA1	404529	52
450	600	800	880		6KFP43600X2RXXA1	404532	52
500	650	880	968		6KFP43650X2RXXA1	404533	61
560	750	990	1089		6KFP43750X2RXXA1	404534	61
630	900	1120	1232		6KFP43900X2RXXA1	404535	61
710	1000	1260	1386		6KFP431K0X2RXXA1	404536	61
800	1200	1460	1606		6KFP431K2X2RXXA1	404537	62
1000	1350	1700	1870		6KFP431K3X2RXXA1	404538	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	6KFP63015X2RXXA1	on request	
18.5	25	22	24		6KFP63020X2RXXA1		
22	30	27	30		6KFP63025X2RXXA1		
30	40	34	37		6KFP63030X2RXXA1		
37	50	41	45		6KFP63040X2RXXA1		
45	60	52	57		6KFP63050X2RXXA1		
55	75	62	68		6KFP63060X2RXXA1		
75	100	83	91		6KFP63075X2RXXA1		
90	125	100	110		6KFP63100X2RXXA1		
110	150	131	144		6KFP63125X2RXXA1		
132	200	155	171		6KFP63150X2RXXA1		
160	250	192	211		6KFP63200X2RXXA1		
200	300	242	266		6KFP63250X2RXXA1		
250	350	290	319	IP54/NEMA 12 conformal coated	6KFP63300X2RXXA1		
315	400	344	378		6KFP63350X2RXXA1		
355	500	400	440		6KFP63400X2RXXA1		
400	550	450	495		6KFP63500X2RXXA1		
500	650	500	550		6KFP63550X2RXXA1		
560	750	570	627		6KFP63650X2RXXA1		
630	900	630	693		6KFP63750X2RXXA1		
710	1000	730	803		6KFP63900X2RXXA1		
800	1150	850	935		6KFP631K0X2RXXA1		
900	1250	945	1040		6KFP631K1X2RXXA1		
1000	1350	1060	1166		6KFP631K2X2RXXA1		
1200	1600	1260	1386		6KFP631K3X2RXXA1		
1400	1900	1415	1557		6KFP631K6X2RXXA1		

(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 41.



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	IP66/NEMA 12	6KFP43125X4XXXXA1		
110	150	212	233.2		6KFP43150X4XXXXA1		
132	200	260	286		6KFP43200X4XXXXA1		
160	250	315	346.5		6KFP43250X4XXXXA1		
200	300	395	434.5	IP66/NEMA 12 conformal coated	6KFP43300X4XXXXA1	on request	
250	350	480	528		6KFP43350X4XXXXA1		
315	450	600	660		6KFP43450X4XXCA1		
355	500	658	723.8		6KFP43500X4XXCA1		
400	550	745	819.5		6KFP43550X4XXCA1		
450	600	800	880		6KFP43600X4XXCA1		
500	650	880	968		6KFP43650X4XXCA1		
560	750	990	1089		6KFP43750X4XXCA1		
630	900	1120	1232		6KFP43900X4XXCA1		
710	1000	1260	1386		6KFP431K0X4XXCA1		
800	1200	1460	1606		6KFP431K2X4XXCA1		
1000	1350	1700	1870		6KFP431K3X4XXCA1		

(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 41.

IP66, with EMC filter Class A1/B1, 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	6KFP23001X4RXXA1	on request	
1.5	2	7.5	8.3		6KFP23002X4RXXA1		
2.2	3	10.6	11.7		6KFP23003X4RXXA1		
3.7	5	16.7	18.4		6KFP23005X4RXXA1		
5.5	7.5	24.2	26.6		6KFP23007X4RXXA1		
7.5	10	30.8	33.9		6KFP23010X4RXXA1		
11	15	46.2	50.8		6KFP23015X4RXXA1		
15	20	59.4	65.3		6KFP23020X4RXXA1		
18.5	25	74.8	82.3		6KFP23025X4RXXA1		
22	30	88	96.8		6KFP23030X4RXXA1		
30	40	115	126.5		6KFP23040X4RXXA1		
37	50	143	157		6KFP23050X4RXXA1		
45	60	170	187		6KFP23060X4RXXA1		

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	6KFP43001X4RXXA1	on request	
1.5	2	2.4	2.64		6KFP43002X4RXXA1		
2.2	3	4.1	4.51		6KFP43003X4RXXA1		
4	5	5.6	6.16		6KFP43005X4RXXA1		
5.5	7.5	10	11		6KFP43007X4RXXA1		
7.5	10	13	14.3		6KFP43010X4RXXA1		
11	15	16	17.6		6KFP43015X4RXXA1		
15	20	32	35.2		6KFP43020X4RXXA1		
18.5	25	37.5	41.25		6KFP43025X4RXXA1		
22	30	44	48.4		6KFP43030X4RXXA1		
30	40	61	67.1		6KFP43040X4RXXA1		
37	50	73	80.3		6KFP43050X4RXXA1		
45	60	90	99		6KFP43060X4RXXA1		
55	75	106	116.6		6KFP43075X4RXXA1		
75	100	147	161.7		6KFP43100X4RXXA1		
90	125	177	194.7	IP66/NEMA 12	6KFP43125X4RXXA1		
110	150	212	233.2		6KFP43150X4RXXA1		
132	200	260	286		6KFP43200X4RXXA1		
160	250	315	346.5		6KFP43250X4RXXA1		
200	300	395	434.5	IP66/NEMA 12 conformal coated	6KFP43300X4RXXA1	on request	
250	350	480	528		6KFP43350X4RXXA1		
315	450	600	660		6KFP43450X4RXXA1		
355	500	658	723.8		6KFP43500X4RXXA1		
400	550	745	819.5		6KFP43550X4RXXA1		
450	600	800	880		6KFP43600X4RXXA1		
500	650	880	968		6KFP43650X4RXXA1		
560	750	990	1089		6KFP43750X4RXXA1		
630	900	1120	1232		6KFP43900X4RXXA1		
710	1000	1260	1386		6KFP431K0X4RXXA1		
800	1200	1460	1606		6KFP431K2X4RXXA1		
1000	1350	1700	1870		6KFP431K3X4RXXA1		

(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 41.

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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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.

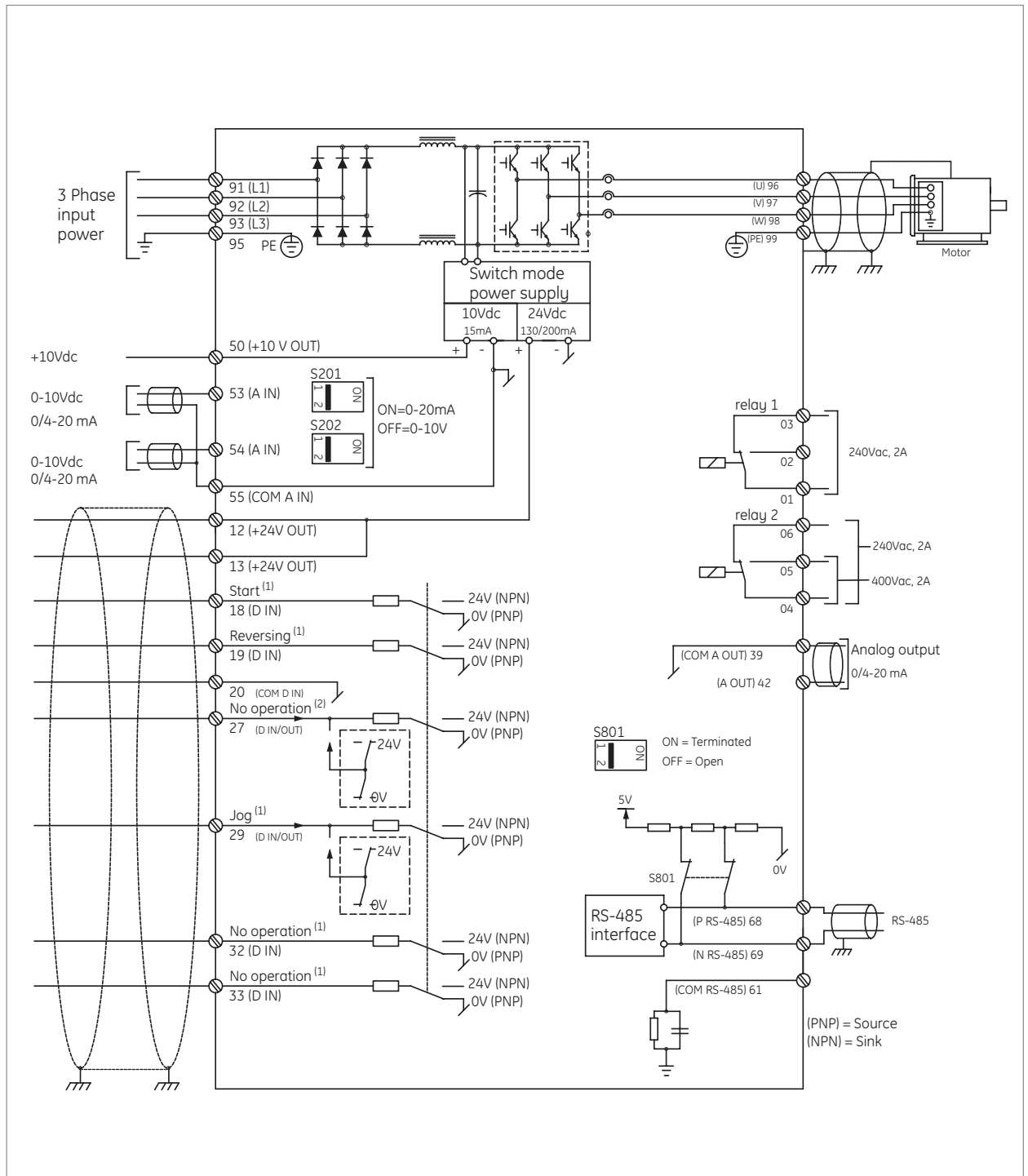
Description	Cat. No.	Ref. No.
For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

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.

Efficiency, Watt loss, unit size, dimensions and weights

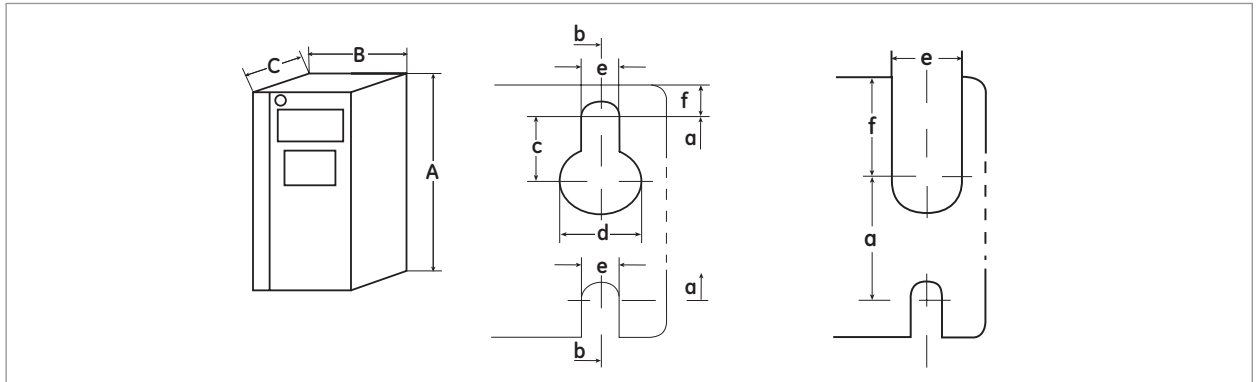
230 Vac, 3-phase, 50/60Hz

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 (%)							
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

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

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

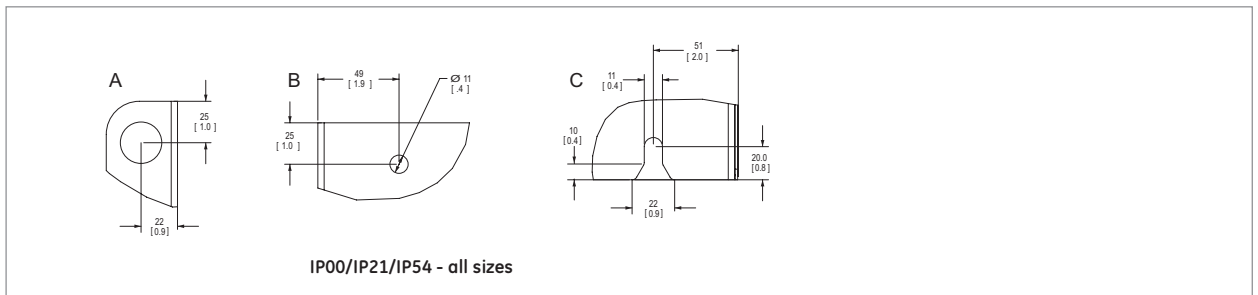
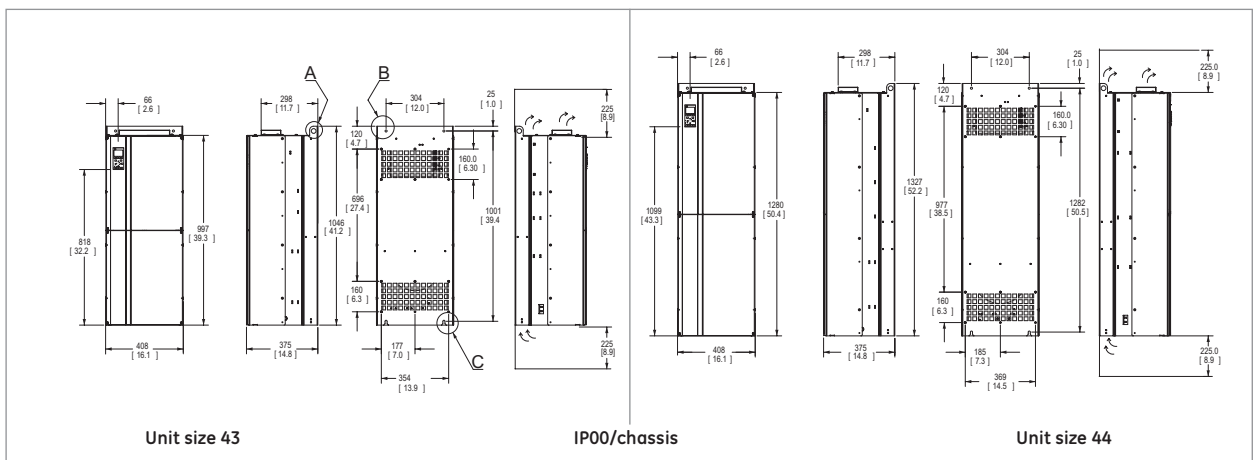
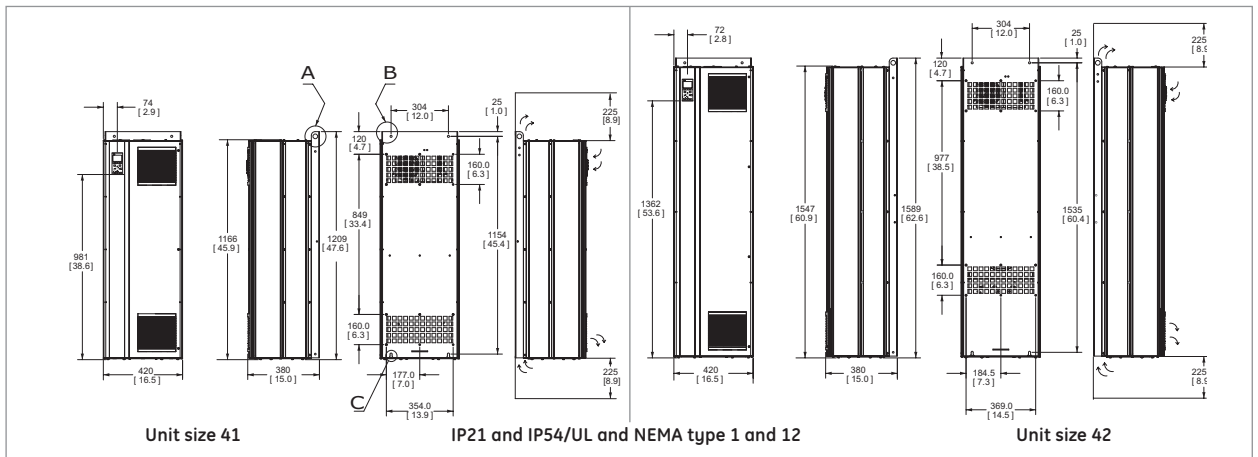
Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits⁽¹⁾ (mm)

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.

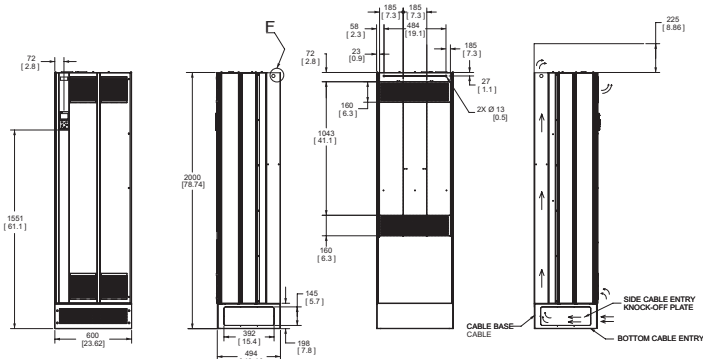
Note: Please allow 5cm / 2" between drives with field installed IP21/NEMA 1 kits. Also, please consult the relevant AF-6 Series drives operating Instructions for recommended clearance above and below each drive rating.

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	160 to 250kW 250 to 350HP	110 to 132kW 150 to 200HP	160 to 250kW 250 to 350HP
Shipping dimensions	Height	650	650	650	650
	Width	1730	1730	1220	1490
	Depth	570	570	570	570
Drive dimensions	Height	1209	1589	1046	1327
	Width	420	420	408	408
	Depth	380	380	375	375
Weight (kg)		104	106	91	138

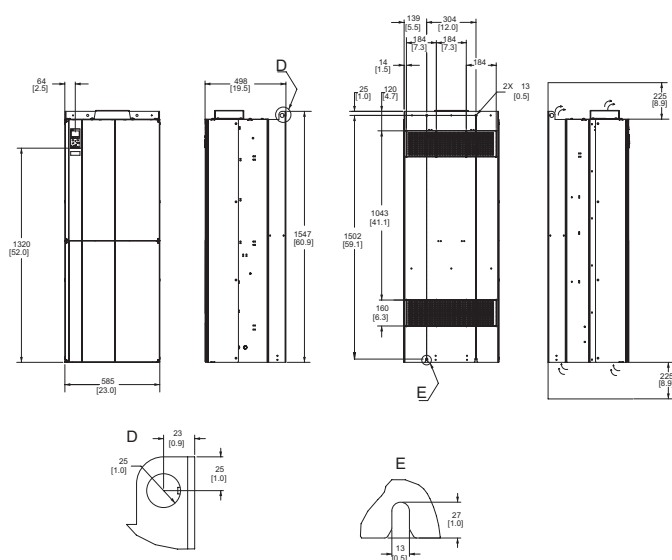
Dimensional drawings in mm (inches)



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

Unit size 51

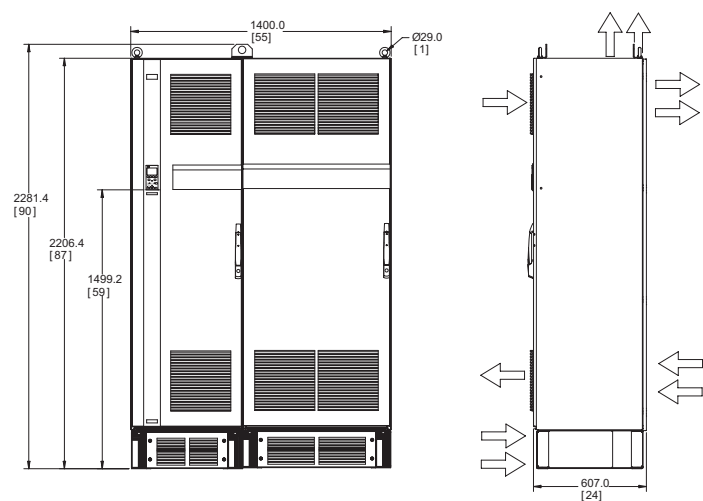
Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage 400V	315 to 450kW 450 to 600HP
Shipping dimensions	
Height	841
Width	2197
Depth	734
Drive dimensions	
Height	2000
Width	600
Depth	494
Weight (kg)	313



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

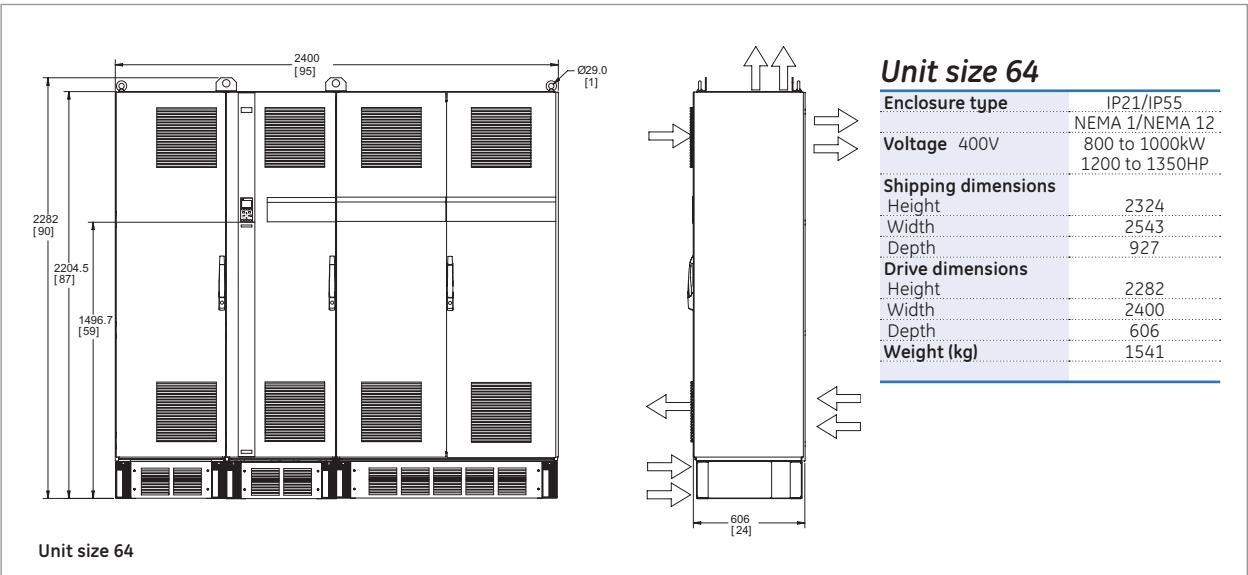
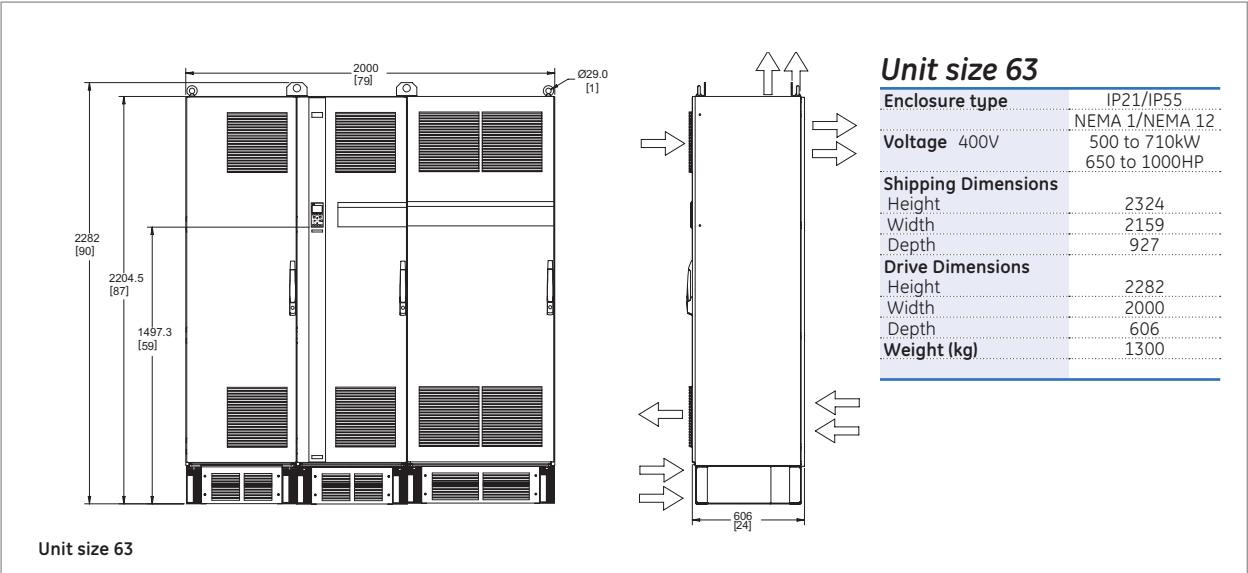
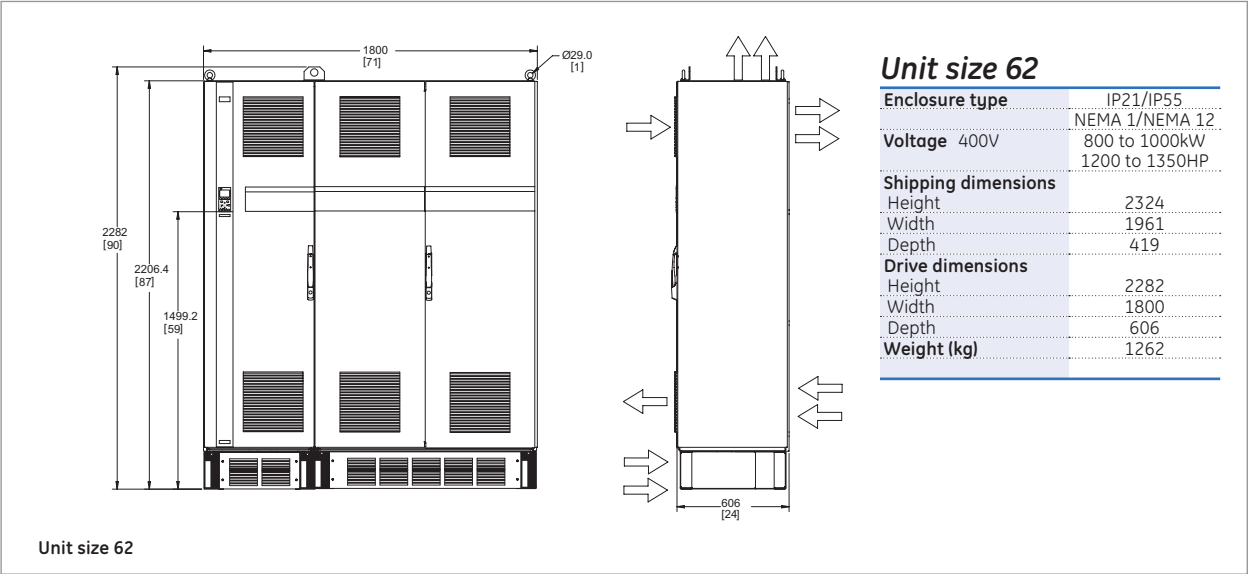


Unit size 61

Unit size 61

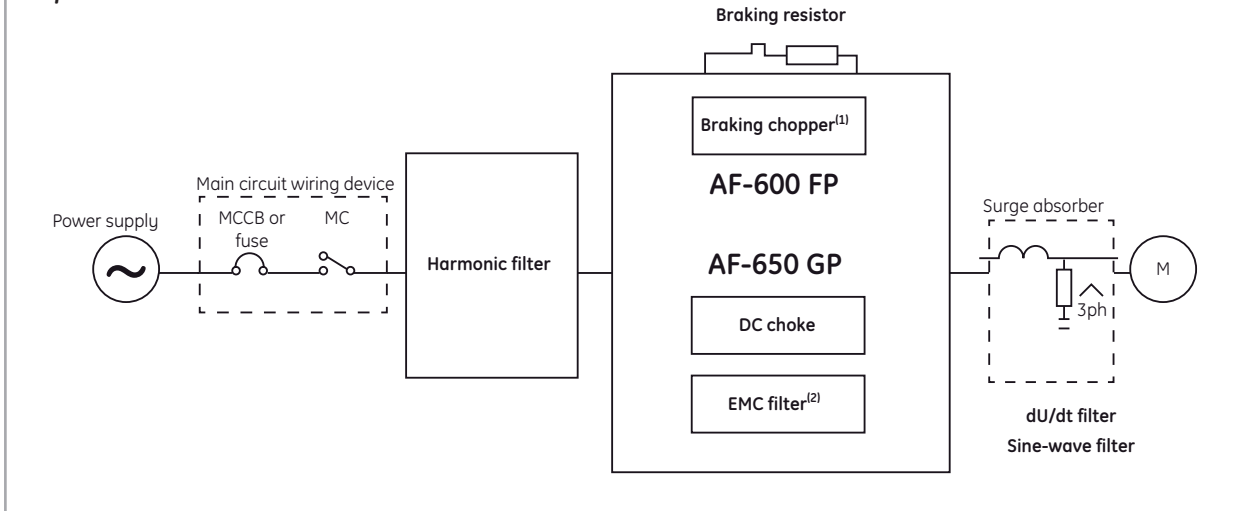
Enclosure type	IP21/IP55 NEMA 1/NEMA 12
Voltage 400V	500 to 710kW 650 to 1000HP
Shipping dimensions	
Height	2324
Width	1570
Depth	927
Drive dimensions	
Height	2282
Width	1400
Depth	607
Weight (kg)	1004

Dimensional drawings in mm (inches)



Common accessories

Simplified schematics



(1) If a braking chopper is required, it has to be requested during the order. It is not an external option (only available for AF-650 GP).

(2) EMC filter are built inside all drives. It is not an external option.

Harmonic filter

- Available from 10 to 613A at 380 – 415V 50Hz and from 43 to 370A at 690V
- Comply with IEEE 519-1992 and stage 1 of EN 61000-3-12
- Specially designed for unmatched harmonic performance.
- Small foot print and high harmonic reduction

The harmonic current distortion generated back to the mains is reduced to 5 and 10% total harmonic current distortion at full load. With an efficiency higher than 98%, those passive filter are compact and very robust harmonic solution specifically for power up to 400kW.

Reliable

Fully tested and based on proven filter concept... low failure rate

Savings

High efficiency... low running expenses

Design

Side-by-side mounting... less space needed

Easy commissioning... reduce costs

Specifications

Mains voltage	±10%
Frequency	±5%
Overload current	160% for 60s
Ambient temperature	5° to 40°C without derating

What accessory for the drive output?

Specifications

Performance criteria	dU/dt filter	Sine-wave filter
Motor insulation stress	Up to 100m cable (shielded/unshielded) complies with the requirements of IEC60034-17*. Above this length, the risk of double pulsing increases.	Provides a sinusoidal phase-to-phase motor terminal voltage. Complies with the requirements of IEC60034-17* with cables up to 500m (1km for frame size 4x and above)
Motor bearing stress	Slightly reduced, mainly in high power motors.	Reduces bearing currents caused by circulating currents. Does not reduce common-mode currents (shaft currents).
EMC performance	Eliminates motor cable ringing. Does not change the emission class. Does not allow longer motor cable as specified for the speed drive's built-in RFI filter.	
Max. motor cable length	100 - 150m With guaranteed EMC performance: 150m shielded Without guaranteed EMC performance: 150m unshielded	With guaranteed EMC performance: 150m shielded and 300m unshielded (only conducted emissions) Without guaranteed EMC performance: up to 500m (1km for frame size 4x and above)
Acoustic motor switching noise	Does not eliminate acoustic switching noise from the motor.	Eliminate acoustic switching noise from the motor caused by magnetostriction.
Size	15 - 50% (depending on power size)	100%
Price	50%	100%

dU/dt filter

dU/dt filters reduce the dU/dt values on the motor terminal phase-to-phase voltage – an issue that is important for short motor cables. Available from 27 to 880A

Perfect match for applications with older motors, with frequent braking and for short motor cable length (up to 150m)
dU/dt filters are differential-mode filters which reduce motor terminal phase-to-phase peak voltages spikes and reduce the rise time to a level that lowers the stress on the insulation of motor windings. They have a cut-off frequency above the switching frequency. The voltage at the motor is still PWM pulse shaped but the rise time and Upeak are reduced. Since they have smaller inductance and capacitance, the dU/dt filters introduce a negligible reactance between the speed drive and the motor, therefore suitable for high dynamic applications.
Output chokes cause undamped oscillations at the motor terminals which increase the risk of double pulsing and overvoltages higher than twice the DC link voltage. The dU/dt filters are low-pass L-C filters with a well defined cut-off frequency, therefore, the ringing oscillations are damped and there is a reduced risk of double pulsing and voltage peaks.

Benefits

Reduces dU/dt stresses... increase motor service interventions
Ideal for highly dynamic applications with flux vector regulation... smaller and less expensive than sine-wave filters
Side-by-side mounting... less space needed

Specifications

Mains voltage	3 x 200 - 690V
Frequency	0-60Hz without derating Max 100Hz (with derating)
Overload current	160% for 60s, every 10 minutes
Minimum/Maximum switching frequency	fmin = 1.5 to 5kHz (depending on filter type) fmax = 8kHz
Ambient temperature	-25° to 45°C without derating

Sine-wave filter

Sine-wave output filters are low-pass filters that suppress the switching frequency from the drive and smooth out the phase-to-phase output voltage to become sinusoidal. This reduces the motor insulation stress and bearing currents.
Available from 2.5 to 800A.
Perfect match for applications with older motors, with frequent braking, for 690V applications and for motor cable length above 150m.

Benefits

The switching acoustic noise from the motor is eliminated.
Reduces hysteresis thermal losses in the motor... prolongs the lifetime of the motor.
Suppress any bearing currents in the motor... reduces risk of flashover in the motor bearings and also contributes to extend motor lifetime and increase service intervals.

Specifications

Mains voltage	3 x 200 - 690V
Frequency	0-60Hz without derating
Overload current	160% for 60s, every 10 minutes
Minimum/Maximum switching frequency	fmin = 1.5 to 5kHz (depending on filter type) fmax = 8kHz
Ambient temperature	-25° to 45°C without derating



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	On request		43	1	-
15	20	150	Built-in	TLR35P1500	129877			35	1.5	-
18.5	25	150	Built-in	TLR29P1800	129878			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 TLR432P200	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	144	1.3	30							
450	600	150	144	1.3	30							
500	650	150	144	1.3	30							
560	750	150	144	1.3	30							
630	900	150	144	1.3	30							
710	1000	150	144	1.3	30							
800	1200	150	144	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		137	4.7	120	DB6404TBNC	
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



Glossary – Drives terminology

The following are standard definitions of terms that are used when discussing adjustable frequency drives.

+BUS: The portion of the dc bus that is at a positive potential.

-BUS: The portion of the dc bus that is at a negative potential.

AC Contactor: Contactor designed for the specific purpose of establishing or interrupting an ac power circuit.

Adjustable Speed: The concept of varying the speed of a motor, either manually or automatically. The desired operating speed (set speed) is relatively constant regardless of load.

Adjustable Speed Drive (Electrical): Comprised of the motor, drive controller, and operator's controls (either manual or automatic).

Ambient Temperature: The temperature of air, water, or a surrounding medium where equipment is operated or stored.

Axis: A principal direction along which movement of the tool or workpiece occurs. Also refers to one of the reference lines of a coordinate system.

Bandwidth: Generally, frequency range of system input over which the system will respond satisfactorily to a command.

Base Speed: The manufacturer's nameplate rating where the motor will develop the rated horsepower at the rated load and voltage. With dc drives, it is commonly the point where full armature voltage is applied with full rated field excitation. With ac systems, it is commonly the point where 50 or 60 Hz is applied to the induction motor.

Bias: The steady state deviation of a controlled variable from a fixed setpoint.

Braking: Provides a means of stopping an ac or dc motor and can be accomplished in several ways.

- A. Dynamic Braking (ac drives) - Accomplished by continuing to excite the motor from the drive. This causes a regenerative current to the drive's dc intermediate bus circuit. The dynamic brake resistors are then placed across the dc bus to dissipate the power returned. The brake resistor is usually switched by a transistor or other power switch controlled by the drive.
- B. Regenerative Braking - Similar to dynamic braking, but accomplished electronically. The generated power is returned to the line through the power converter. It may also be dissipated as losses in the converter (within its limitations).
- C. Squirrel-Cage Motor Dynamic Braking/"DC Injection Braking" (This form is not the same as that noted for ac drives.) - Another form of braking which uses a control circuit that applies a dc voltage across the ac motor's stator windings at a set frequency point for a set duration of time. This type of braking results in a low amount of braking torque until the motor reaches a speed well below 50%. At a speed below 7 Hz, the available braking torque increases sharply.
- D. Motor-Mounted or Separately Mounted brake - A positive action, mechanical, friction device. Normal configuration is such that when the power is removed, the brake set is set. This can be used as a holding brake. (Note: A separately mounted brake is one which is located on some part of the mechanical drive train other than the motor.)

Breakaway Torque: The torque to start a machine from standstill. It is always greater than the torque needed to maintain motion.

Breakdown Torque: The ac motor maximum torque which is developed with rated voltage applied at rated frequency.

Bridge Rectifier: A full-wave rectifier that conducts current in only one direction. AC applied to the input results in approximate dc at the output.

Bridge Rectifier (Diode): A diode rectifier is a non-controlled, full-wave rectifier that produces a constant rectified dc voltage.

Closed Loop: A regulator circuit in which the actual value of the controlled variable (ex. speed) is sensed and a signal proportional to this value (feedback signal) is compared with a signal proportional to the desired value (reference signal). The difference between these signals (error signal) causes the actual value to change in the direction that will reduce the difference in signals to zero.

Cogging: A condition in which a motor does not rotate smoothly but steps or jerks from one position to another during shaft revolution. Cogging is most pronounced at low motor speeds and can cause objectionable vibrations in the driven machine.

Commutation (Inverter): The process by which forward current is interrupted or transferred from one switching device to the other. In most circuits where power is supplied from an ac source, turn-on control is adequate and turnoff occurs naturally when the ac cycle causes the polarity across a given device to reverse.

Constant Horsepower Range: A range of motor operation where motor speed is greater than base rating of the motor. In the case of the ac motor operation, this usually occurs above 60 Hz, where the voltage remains constant as the frequency is increased.

Constant Torque Range: A speed range in which the motor is capable of delivering a constant torque, subject to motor thermal characteristics. This is essentially when the drive/motor combination is operating at constant volts/Hz.

Constant Voltage Range (ac drives): The range of motor operation where the drive's output voltage is held constant as output frequency is varied. This speed range produces motor performance similar to a dc drive's constant horsepower range.

Constant Volts per Hertz (V/Hz): This relationship exists in ac drives where the output voltage is varied directly proportional to frequency. This type of operation is required to allow the motor to produce constant rated torque as speed is varied.

Continuous Duty (CONT): A motor that can continue to operate within the insulation temperature limits after it has reached normal operating (equilibrium) temperature.

Converter: The process of changing ac to dc. This is accomplished through the use of a diode rectifier circuit. The term may also refer to the process of changing ac to dc to ac (ex. adjustable frequency drive). A frequency converter, such as that found in an adjustable frequency drive, consists of a rectifier, a dc intermediate circuit, an inverter, and a control circuit.

Current Limiting: An electronic method of limiting the maximum current available to the motor. This is adjustable so that the motor's maximum current can be controlled. It can also be preset as a protective device to protect both the motor and control from extended overloads.

Damping: The reduction in amplitude on an oscillation in the system.

Dead Band: The range of values through which a system input can be changed without causing a corresponding change in system output.

Deviation: Difference between an instantaneous value of a controlled variable and the desired value of the controlled variable corresponding to the set point. Also called "error."

di/dt: The rate of change in current versus a rate of change in time. Line reactors and isolation transformers can be used to provide the impedance necessary to reduce the harmful effects that unlimited current sources can have on phase controlled rectifiers (SCRs).

Diode: A device that passes current in one direction but blocks current in the reversed direction.

Drift: The deviation from the initial set speed with no load change over a specific time period. Normally, the drive must be operated for a specified warm-up time at a specified ambient temperature before drift specifications apply. Drift is normally caused by random changes in operating characteristics of various control components.

Drive Controller (variable speed/frequency drive): An electronic device that can control the speed, torque, horsepower, and direction of an ac motor.

Duty Cycle: The relationship between the operating and rest times or repeatable operation at different loads.

dv/dt: The rate of change in voltage versus a rate of change in time. Specially designed resistor-capacitor networks can help protect the diodes from excessive dv/dt which can result from line voltage spikes, line disturbances, and circuit configurations with extreme forward conducting or reverse blocking requirements.

Dwell: The time spent in one state before moving to the next motion control applications, for example, a dwell time may be programmed to allow time for a tool change or part clamping operation.

Eddy Current: Currents induced in motor components from the movement of magnetic fields. Eddy currents produce waste heat and are minimized by lamination of the motor poles and armature.

Efficiency: Ratio of mechanical output to electrical input indicated by a percent. In motors, it is the effectiveness with which a motor converts electrical energy into mechanical energy. In electrical drives, it is the effectiveness with which the drive converts electrical power into adjustable frequency operation at various operating points.

EMF: Electromotive force which is another term for voltage or potential difference.

Enable: To allow an action or acceptance of data by applying an appropriate signal to the appropriate input.

Enclosure: The housing in which the control is mounted. Enclosures are available in different designs for various environmental conditions.

Encoder: An electromechanical transducer that produces a serial or parallel digital indication of mechanical angle or displacement. Essentially, an encoder provides high resolution feedback data related to shaft position and is used with other circuitry to indicate velocity and direction. The encoder produces discrete electrical pulses during each increment of shaft rotation.

Error: Difference between the set point signal and the feedback

Glossary – Drives terminology (continued)

signal. An error is necessary before a correction can be made in a controlled system.

Feedback: The element of a control system that provides an actual operation signal for comparison with the set point to establish an error signal used by the regulator circuit.

Filter: A device that passes a signal or a range of signals and eliminates all others.

Floating Ground: A circuit in which the electrical common point is not at earth ground potential or the same ground potential as the circuitry with which it is associated. A voltage difference can exist between the floating ground and earth ground.

Flux: The electromagnetic field created by passing current through a conductor. For motors, the magnetic field created by energizing the motor windings.

Flux Vector: The mathematical representation of flux indicating both filed strength and orientation.

Force: The tendency to change the motion or position of an object with a push or pull.

Four-Quadrant Operation: The four combinations of forward and reverse rotation and forward and reverse torque of which a regenerative drive is capable. The four combinations are as follows:

1. Forward rotation/forward torque (motoring)
2. Forward rotation/reverse torque (regeneration)
3. Reverse rotation/reverse torque (motoring)
4. Reverse rotation/forward torque (regeneration)

Full-Load Torque: The torque necessary to produce rated horsepower at full-load speed.

GTO: Gate turn-off power semiconductor device.

Harmonics: A sinusoidal component of a periodic wave or quantity having a frequency that is an integral multiple of the fundamental frequency.

Head: A measurement of pressure, usually in feet of water.

Horsepower: A measure of the amount of work that a motor can perform in a given period of time. Refer to power for kW equivalent.

Hunting: Undesirable fluctuations in motor speed that can occur after a step change in speed reference (either acceleration or deceleration) or load.

Hysteresis Loss: The resistance offered by materials to becoming magnetized results in energy being expended and corresponding loss. Hysteresis loss in a magnetic circuit is the energy expended to magnetize and demagnetize the core.

IGBT (Insulated Gate Bipolar Transistor): Semiconductor devices used for power circuits that are capable of high power output that operate at carrier frequencies of 20 kHz or more. IGBTs have a faster rate of rise resulting in high di/dt that occurs when the device is turned off.

Induction Motor: An alternating current motor in which the primary winding on one member (usually the stator) is connected to the power source. A secondary winding on the other member (usually the rotor) carries the induced current. For a squirrel cage induction motor, there is no physical electrical connection to the secondary winding; its current is induced.

Inertia: A measure of a body's resistance to changes in velocity, whether the body is at rest or moving at a constant velocity. The velocity can be either linear or rotational. The moment of inertia (WK^2) is the product of the weight (W) of an object and the square of the radius of gyration (K²). The radius of gyration is a measure of how the mass of the object is distributed about the axis of rotation. WK^2 is usually expressed in units of lb/ft².

Instability: A situation where the output of a system does not track the input. For closed loop systems, the control system error is either increasing or oscillating.

Intermittent Duty (INT): A motor that never reaches equilibrium temperature (equilibrium), but is permitted to cool down between operations. For example, a crane, hoist, or machine tool motor is often rated for 15 or 30 minute duty.

Interposing Relay: A relay that accepts control signals of one logic level in order to provide isolated contact signals in a circuit operating a different logic level.

Inverter: A term commonly used for an ac adjustable frequency drive. An inverter is also used to describe a particular section of an ac drive. This section uses the dc voltage from a previous circuit stage (intermediate dc circuit) to produce an ac current or voltage having the desired frequency.

Isolation Transformer: A transformer that electrically separates the

drive from the ac power line. An isolation transformer provides the following advantages:

1. Guards against inadvertent grounding of plant power lines through grounds in the drive.
2. Enhances protection of semiconductors from line voltage transients.
3. Reduces disturbances from other solid-state control equipment, such as drives without isolation transformers, time clock systems, electronic counters, etc.

Jogging: Means of accomplishing momentary motor movement by repetitive closure of a circuit using a single push button or contact element.

Kinetic Energy: The energy of motion possessed by a body.

Linear Acceleration/Deceleration: A circuit that controls the rate at which the motor is allowed to accelerate to a set speed or decelerate to zero speed. On most drives, this circuit is adjustable and can be set to accommodate a particular application.

Linearity: A measure of how closely a characteristic follows a straight line function.

Locked-Rotor Current: Steady-state current taken from the line with the rotor at standstill (at rated voltage and frequency). This is the current when starting the motor and load.

Locked-Rotor Torque: The minimum torque that a motor will develop at rest for all angular positions of the rotor (with rated voltage applied at rated frequency).

Mechanical Safe Speed: Defined by the operating limits of the driven equipment being controlled by the adjustable frequency drive which should not be exceeded. The manufacturer's specification is to be followed carefully.

Megger Test: A test used to measure an insulation system's resistance. This is usually measured in megohms and tested by passing a high voltage at low current through the motor windings and measuring the resistance of the various insulation systems.

NEC: The National Electric Code contains recommendations of the National Fire Protection Association and is revised every three years. City or state regulations may differ from code regulations and take precedence over NEC rules.

Negative Feedback: A condition where feedback is subtractive to the input reference signal. Negative feedback forms the basis for automatic systems.

NEMA: The National Electrical Manufacturers Association is a non-profit organization organized and supported by manufacturers of electrical equipment and supplies. Some of the standards

NEMA specifies are: horsepower ratings, speeds, frame sizes and dimensions, torques, and enclosures.

Open Loop: A control system that lacks feedback.

Operating/Service Deviation: A means of specifying the speed regulating performance of a drive controller, generally in percent of base speed. Operating deviation defines speed change due to load change and typically assumes:

1. A change from one steady-state load value to another (not transient).
2. A 95% maximum load change.

Service deviation defines speed change due to changes in ambient conditions greater than typical variations (noted in basic adjustable frequency drive specifications).

Overload Capacity: The ability of the drive to withstand currents beyond the system's continuous rating. It is normally specified as a percentage of full-load current for a specified time period. Overload capacity is defined by NEMA as 150% of rated full-load current for one minute.

Overshoot: The amount that a controlled variable exceeds desired value after a change of input.

PCC (Point of Common Coupling): The electrical connecting point or interface between the utility distribution system and the user's electrical distribution system. The selection of the PCC within the system is often done by the utility.

PLC (Programmable Logic Controller): Solid-state control logic for machines and processes where a sequence of operations can be changed easily with programming (software).

Plugging: A type of motor braking provided by reversing either line voltage polarity or phase sequence so that the motor develops a counter torque which exerts a retarding force to brake the motor.

Position Transducer: An electronic device (ex. encoder or resolver) that measures actual position and converts this measurement into a feedback signal convenient for transmission. This signal may then



Glossary – Drives terminology (continued)

be used as an input to a programmable controller which controls the parameters of the positioning system.

Positive Feedback: A condition where the feedback is additive to the input signal. This generally results in an unstable system.

Power: Work done per unit of time. Measured in horsepower or Watts: 1 Hp = 33,000 ft/lbs = 746 Watts.

Power Factor: A measurement of the time phase difference between the voltage and current in an ac circuit. It is represented by the cosine of the angle of this phase difference. Power factor is the ratio of real power (kW) to total kVA, or the ratio of actual power (W) to apparent power (VA).

Displacement Power Factor - The displacement component of power factor. The ratio of the active power of the fundamental wave, in Watts, to the apparent power of the fundamental wave, in volt-amperes.

Total Power Factor - The ratio of the total power input, in Watts, to the total volt-ampere input to the converter. The power factor is determined at the ac line terminals of the converter.

Distortion Factor - The ratio of the root-mean square of the harmonic content to the root-mean-square value of the fundamental quantity, expressed as a percent of the fundamental.

Preset Speed: One or more fixed speeds at which the drive will operate.

Pull-Up Torque: The torque required to accelerate the load from standstill to full speed (where breakdown torque occurs), expressed in percent of running torque. It is the torque required not only to overcome friction, windage, and product loading, but also to overcome the inertia of the machine. The torque required by a machine may not be constant after the machine has started to turn. This load type is characteristic of fans, centrifugal pumps, and certain machine tools.

PWM (Pulse Width Modulated): A type of ac adjustable frequency drive that accomplishes frequency and voltage control at the output section (inverter) of the drive. The drive's output voltage is always a constant amplitude and by "chopping" (pulse width modulating) the average, voltage is controlled.

Reactance: Any force that opposes changes in current or voltage. The inertia of electrons causes them to oppose sudden changes in current flow or voltage.

Rectifier: A device that transforms alternating current to direct current.

Regeneration: The characteristic of a motor to act as a generator when the rotor synchronous frequency is greater than the applied frequency.

Regenerative Braking: The technique of slowing or stopping a drive by regeneration.

Regenerative Control: A regenerative drive contains the inherent capability and/or power semiconductors to control the flow of power to and from the motor.

Regulation: The ability of a control system to hold a speed once it has been set. Regulation is given in percentages of either base speed or set speed. Regulation is rated upon two separate sets of conditions:

- A. Load regulation (speed regulation) is the percentage of speed change with a defined change in load. Assuming all other parameters to be constant.
- B. Line regulation is the percentage of speed change with a given line voltage change, assuming all other parameters to be constant.

Resolution: The smallest distinguishable increment into which a quantity can be divided (ex. position or shaft speed). It is also the degree to which nearly equal values of a quantity can be discriminated. For encoders, it is the number of unique electrically identified positions occurring in 360 degrees of input shaft rotation.

SCR (Silicon Control Rectifier): A solid-state device that has an anode, a cathode, and gate which controls when it allows conduction.

Service Factor: When used on a motor nameplate, a number that indicates how much above the nameplate rating a motor can be loaded without causing serious degradation (ex. A motor with 1.15 S.F. can produce 15% greater torque than one with 1.0 S.F.). When used in applying motors or gearmotors, it is a figure of merit which is used to adjust measured loads in an attempt to compensate for conditions which are difficult to measure or define.

Set Speed: The desired operating speed.

Shock Load: The load seen by a clutch, brake, or motor in a system which transmits high peak loads. This type of load is present in crushers, separators, grinders, conveyors, winches, and cranes.

Slewing: An incremental motion of the motor shaft or machine table from one position to another at maximum speed without losing position control.

Slip: The difference between rotating magnetic field speed (synchronous speed) and rotor speed of ac induction motors. Usually expressed as a percentage of synchronous speed.

Speed Range: The speed minimum and maximum at which a motor must operate under constant or variable torque load conditions.

A 10:1 speed range for a motor with top speed of 1800 rpm means the motor must operate as low as 180 rpm and still remain within regulation specifications. Controllers are capable of wider controllable speed ranges than motors because there is no thermal limitation, only electrical. Controllable speed range of a motor is limited by the ability to deliver 100% torque below base speed without additional cooling.

Speed Regulation: The numerical measure, in percent, of how accurately the motor speed can be maintained. It is the percentage of change in speed between full load and no load.

Stability: The ability of a drive to operate a motor at constant speed (under varying load) without "hunting" (alternately speeding up and slowing down). It is related to both the characteristics of the load being driven and electrical time constants in the drive regulator circuits.

Surge Protection: The process of absorbing and clipping voltage transients on an incoming ac line or control circuit. MOVs (Metal Oxide Varistors) and specially designed R-C networks are usually used to accomplish this.

Synchronous Speed: The speed of an ac induction motor's rotating magnetic field. It is determined by the frequency applied to the stator and the number of magnetic poles present in each phase of the stator windings. Mathematically, it is expressed as:

Sync speed (rpm) = 120 x applied frequency (Hz)/number of poles per phase.

Tachometer - Generator (Tach): A small generator normally used as a rotational speed sensing device. Tachometers are typically coupled to the shaft of dc or ac motors requiring close speed regulation. The tach feeds a signal to a controller which then adjusts the output voltage or frequency to the motor. This feedback signal can be either an analog dc signal (V/rpm) or digital (pulses/ revolution).

Thread Speed: A fixed low speed, usually adjustable, supplied to provide a convenient method for loading and threading machines. May also be called a preset speed.

Torque: A turning force applied to a shaft, tending to cause rotation. Torque is normally measured in ounces/inches or pounds/feet and is equal to the force applied times the radius through which it acts.

Torque Constant (in/lbs): This motor parameter provides a relationship between input current and output torque. For each ampere of current applied to the rotor, a fixed amount of torque will result.

Torque Control: A method of using current limit circuitry to regulate torque instead of speed.

Transducer: A device that converts one energy form to another (ex. mechanical to electrical). Also, a device that when actuated by signals from one or more systems or media can supply related signals to one or more other systems or media.

Transient: A momentary deviation in an electrical or mechanical system.

Transistor: A solid-state, three-terminal device that allows amplification of signals and can be used for switching and control. The terminals are called the emitter, base, and collector.

Vector: A quantity that has magnitude, direction, and sense. This quantity is commonly represented by a directed line segment of which the length represents the magnitude and worse orientation in space represents the direction.

VVI: A type of ac adjustable frequency drive that controls the voltage and frequency of the motor to produce variable speed operation. A VVI-type drive controls the voltage in a section other than the output section where frequency generation takes place. The frequency control is accomplished by an output bridge circuit which switches the variable voltage to the motor at the desired frequency.

X-Axis: The axis of motion that is always horizontal and parallel to the work-holding surface.

Y-Axis: The axis of motion that is perpendicular to both the X and Z axes.

Z-Axis: The axis of motion that is always parallel to the principal spindle of the machine.

By reference number

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116000			402934	6KGP43100X4XXXXA1	26	403133	6KGP43150X8XBXA1	17	403248	6KGP43007X2R8XA1	23
116301	TLR750P200	64	402935	6KGP43F50X9RXXA1	20	403134	6KGP43200X8XBXA1	17	403249	6KGP43010X2R8XA1	23
129000			402936	6KGP43001X9RXXA1	20	403135	6KGP43250X8XBXA1	17	403250	6KGP43015X2R8XA1	23
129166	TLR44P600	63	402937	6KGP43002X9RXXA1	20	403136	6KGP43300X8XBXA1	17	403251	6KGP43020X2R8XA1	23
129167	TLR29P600	63	402938	6KGP43003X9RXXA1	20	403137	6KGP43350X8XBXA1	17	403252	6KGP43025X2R8XA1	23
129171	TLR8,8P1500	64	402939	6KGP43005X9RXXA1	20	403138	6KGP43450X8XBXA1	17	403253	6KGP43030X2R8XA1	23
129174	TLR118P600	63	402940	6KGP43007X9RXXA1	20	403139	6KGP43500X8XBXA1	17	403254	6KGP43040X2R8XA1	23
129175	TLR86P600	63	402941	6KGP43010X9RXXA1	20	403140	6KGP43550X8XBXA1	17	403255	6KGP43050X2R8XA1	23
129176	TLR59P1000	63	402942	6KGP43015X9RXXA1	20	403141	6KGP43600X1XBXA1	17	403256	6KGP43060X2R8XA1	23
129177	TLR43P1000	63	402943	6KGP43202X9RXXA1	20	403142	6KGP43650X1XBXA1	17	403257	6KGP43075X2R8XA1	23
129867	TLR405P200	64	402944	6KGP43025X9RXXA1	20	403143	6KGP43750X1XBXA1	17	403258	6KGP43100X2R8XA1	23
129868	TLR216P200	63	402945	6KGP43030X9RXXA1	20	403144	6KGP43900X1XBXA1	17	403259	6KGP43125X2R8XA1	23
129870	TLR74P200	63	402946	6KGP43040X9RXXA1	20	403145	6KGP431K0X1XBXA1	17	403260	6KGP43150X2R8XA1	23
129871	TLR52P2500	64	402947	6KGP43050X9RXXA1	20	403146	6KGP431K2X1XBXA1	17	403261	6KGP43200X2R8XA1	23
129872	TLR4P3000	64	402948	6KGP43060X9RXXA1	20	403156	6KGP43F50X2XBXA1	21	403262	6KGP43250X2R8XA1	23
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129876	TLR295P200	63	402950	6KGP43100X9RXXA1	20	403158	6KGP43002X2XBXA1	21	403264	6KGP43350X2R8XA1	23
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129878	TLR29P1800	63	402952	6KGP43150X8RXXA1	20	403160	6KGP43005X2XBXA1	21	403266	6KGP43500X2R8XA1	23
129879	TLR22P2500	63	402953	6KGP43200X8RXXA1	20	403161	6KGP43007X2XBXA1	21	403267	6KGP43550X2R8XA1	23
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401362	6KGP43003X9XXXXA1	18	402961	6KGP43650X1RXXA1	20	403169	6KGP43060X2XBXA1	21	403275	6KGP43001X4RXXA1	27
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402919	6KGP43F50X4XXXXA1										

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403615	6KGP63015X1RXA1	20	403866	6KFP43050X9XXXA1	43	404471	6KFP43100X2RXXA1	46	404782	6KLP23002X9A1	9
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403627	6KGP63030X2RXXA1	24	403878	6KFP43550X8XXXA1	43	404534	6KFP43700X2RXXA1	46	404794	6KLP43025X9A1	9
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