



## Micro AC variable speed drives

- Single-phase or three-phase digital inverters for controlling the speed of three-phase induction AC motors from 0.2 to 2.2kW
- Built-in keypad and display
- IP20 or IP65 protection degree
- Built-in EMC filter for industrial environment (class A)
- DIN rail mountable by optional kit
- Global standards CE and cUL



### Technical data

#### Control specifications

Control system	Sinusoidal wave PWM inverter
Output frequency	0 - 200Hz
Voltage / Frequency	Constant torque, Constant power, Torque boost
	Six selectable pre-set patterns
Overload capacity	150%, 60 sec.
Carrier frequency	Selectable 4 - 16kHz
Frequency setting resolution	
Digital	0.1Hz(0-99.9Hz), 1Hz(100-200Hz)
Analogic	0.1Hz/ 60Hz
Acceleration/deceleration	0.1 - 999 sec.
	Acceleration and deceleration set individually
Operating system	Two mode selection: forward run by FWD input, Reverse run by REV input Run by FWD input, forward/reverse command by REV input
Stopping system	Selectable either ramp down or coast to stop
DC braking	DC brake starting frequency 1-10Hz DC braking level 0-20%, DC braking time 0-25.5s
Frequency limit	Upper limit (1-200Hz), lower limit (0-200Hz)
Other functions	Auto re-start, Auto reset, Flying start, Jog Slow speeds

#### I/O configuration

Operation panel	3 digits, 7 segment display with 5 operation keys
Sequence input	Four digital inputs (2 are programmable)
Sequence output	One programmable relay output
Frequency setting input	One analogue either 0-10V, 4-20mA or 0-20mA configurable
Source for potentiometer	10 VDC source for 2-10kΩ potentiometer
Analogue outputs	0-10VDC for frequency output display

#### Protection features




Prevention	Overcurrent limitation, Overvoltage limitation, Stall prevention
Trip	Overload, Overvoltage, Undervoltage, Overcurrent, Powerloss, Output short-circuit, Grounding fault, Overtemperature
Fault history	The last three faults are recorded

#### Operating environment

Installation	Indoor, with atmosphere free from corrosive or explosive gases, dust, steam or oil mist.
Protection degree	IP20 and IP65
Temperature range	from -10 to 50 °C
Relative humidity	0-95% without condensation
Vibrations	Under 1G (9.8 m/s <sup>2</sup> )
Standards	cUL, CE



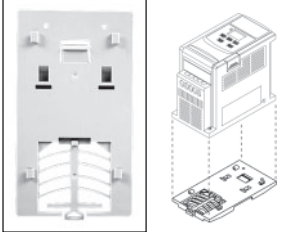
1 and 3 phase speed drives

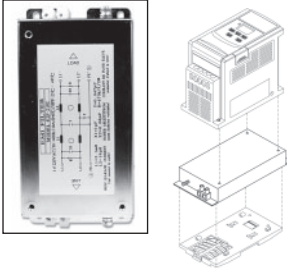
Input voltage		Input power kVA	Output current A	Max. motor power kW (1)	Cooling convection	Losses W	Protection degree	Cat. no.	Ref. no.	Pack
+ 10%, -15%, 50/60 Hz (± 5%)										
	1ph 200V - 240V	0.53	1.4	0.2	natural	21	IP20	U20N0K2S	167075	1
		0.88	2.3	0.4	forced	38	IP20	U20N0K4S	167076	1
		1.6	4.2	0.75	forced	60	IP20	U20N0K7S	167077	1
	1ph / 3ph 200V - 240V	2.9	7.5	1.5	forced	103	IP20	U20N1K5S (2)	167078	1
		4.0	10.5	2.2	forced	149	IP20	U20N2K2S (2)	167079	1
	3ph 380V - 480V	1.6	2.3	0.75	forced	61	IP20	U20X0K7S (2)	167080	1
		2.9	3.8	1.5	forced	79	IP20	U20X1K5S (2)	167081	1
		4.0	5.2	2.2	forced	94	IP20	U20X2K2S (2)	167082	1
		1ph 200V - 240V	0.53	1.4	0.2	natural	21	IP65	U20N0K2P (3)	167088
0.88			2.3	0.4	natural	38	IP65	U20N0K4P (3)	167089	1
1.6			4.2	0.75	natural	60	IP65	U20N0K7P (3)	167090	1
0.53			1.4	0.2	natural	21	IP65	U20N0K2PS (4)	167132	1
0.88			2.3	0.4	natural	38	IP65	U20N0K4PS (4)	167133	1
1.6			4.2	0.75	natural	60	IP65	U20N0K7PS (4)	167134	1
1ph / 3ph 200V - 240V		2.9	7.5	1.5	natural	103	IP65	U20N1K5P (3)	167091	1
		4.0	10.5	2.2	natural	149	IP65	U20N2K2P (3)	167092	1
		2.9	7.5	1.5	natural	103	IP65	U20N1K5PS (4)	167135	1
		4.0	10.5	2.2	natural	149	IP65	U20N2K2PS (4)	167136	1
3ph 380V - 480V		1.6	2.3	0.75	natural	61	IP65	U20X0K7P (3)	167093	1
		2.9	3.8	1.5	natural	79	IP65	U20X1K5P (3)	167094	1
	4.0	5.2	2.2	natural	94	IP65	U20X2K2P (3)	167095	1	
	1.6	2.3	0.75	natural	61	IP65	U20X0K7PS (4)	167137	1	
	2.9	3.8	1.5	natural	79	IP65	U20X1K5PS (4)	167138	1	
	4.0	5.2	2.2	natural	94	IP65	U20X2K2PS (4)	167139	1	

(1) Ratings for standard tree-pole induction motors with four poles.  
 (2) Units including dynamic braking function. An external braking resistor is needed to perform operation.  
 (3) IP65 models type U20\_\_P include only keypad in the front cover.  
 (4) IP65 models type U20\_\_PS include power switch, forward/reverse switch and potentiometer in the front cover.



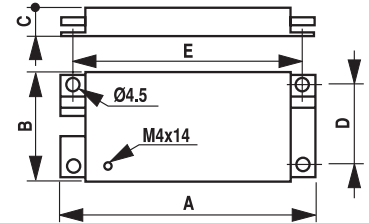
Options and accessories

	DIN rail kit	Applicable to drive	Cat. no.	Ref. no.	Pack
		All drives	U20AR0K7 (pack of 10 pieces)	167087	1

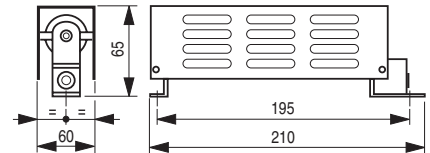
	EMC filters	U20N0K2S U20N0K4S U20N0K7S	U20AF0K7	167085	1
		U20N1K5S U20N2K2S	U20AF2K2	167086	1
		U20X0K7S U20X1K5S U20X2K2S	U20AF2K2X	167084	1

VAT 20 includes as standard a Class A EMC filter, for industrial environment.  
For residential environment, the use of external Class B EMC foot print filter is recommended.

Cat. No.	A	B	C	D	E
U20AF0K7	156	76	25	60	145
U20AF2K2	170	221	38	108	156
U20AF2K2X	170	221	38	108	156



<p>Braking resistors 100% braking torque, 10% ED</p>	Motor (kW)	Applicable to drive	Cat. no.	Ref. no.	Pack
	1.5	U20N1K5	TLR100P200	108223	1
	2.2	U20N2K2	TLR75P200	116300	1
	0.75	U20X0K7	TLR750P200	116301	1
	1.5	U20X1K5	TLR400P200	116302	1
	2.2	U20X2K2	TLR250P200	108227	1



<p>Reactors</p>	Input reactors for single phase drives	Losses (W)	Applicable to drive	Cat. no.	Ref. no.	Pack
		2.5	U20N0K2S	ACRP3A7H0	168490	1
		5	U20N0K4S	ACRP8A2H5	168491	1
		7	U20N0K7S	ACRP12A2H5	168492	1
		7.5	U20N1K5S	ACRP18A1H3	168493	1
		8	U20N2K2S	ACRP22A0H84	168494	1
	Input reactors for three phase drives	11	U20N1K5S	ACRP6A2H5	168496	1
		14	U20N2K2S	ACRP9A1H3	168497	1
		8	U20X0K7S	ACRP3A8H1	168509	1
		9	U20X1K5S	ACRP4A5H1	168510	1
		11	U20X2K2S	ACRP6A3H4	168511	1

Cat.No.	Losses W	Fig.	A	B	C	D	E	Ø	Weight (kg)
ACRP3A7H0	2.4	4	75	96	85	80	56	6	1.3
ACRP8A2H5	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	8	4	96	112	116	96	77	6	3.7
ACRP6A2H5	17	1	120	80	152	41	100	6	1.5
ACRP9A1H3	18	1	120	80	152	41	100	6	1.6
ACRP3A8H1	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	19	1	120	80	152	41	100	6	1.7

Fig. 4

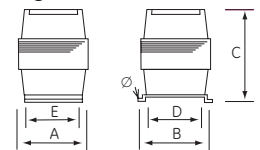
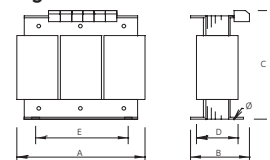


Fig. 1



Dimensions in mm



## I/O terminal board specifications

### Digital inputs

Symbol	Description	Function
12V	Common digital inputs	12V DC supply for all digital inputs
FWD	Forward run	Used for forward run command
REV	Reverse run	Used for reverse run command
SP1	Multifunction input	This is a programmable digital input Either jog, slow speed, emergency stop, output shut off or reset function are allowed
RST	Fault reset	This is a programmable input set to reset function as default Either jog, slow speed, emergency and output shut off are allowed as well

### Digital outputs

Trip relay	Multifunction output	This is a programmable output relay set to fault function as default
1, 2		Run status and frequency reached are allowed as well

### Analogue inputs

MVI	Frequency setting	Programmable analogue frequency signal input 0-10V, 4-20mA or 0-20mA allowed
0V	Common analogue I/O	

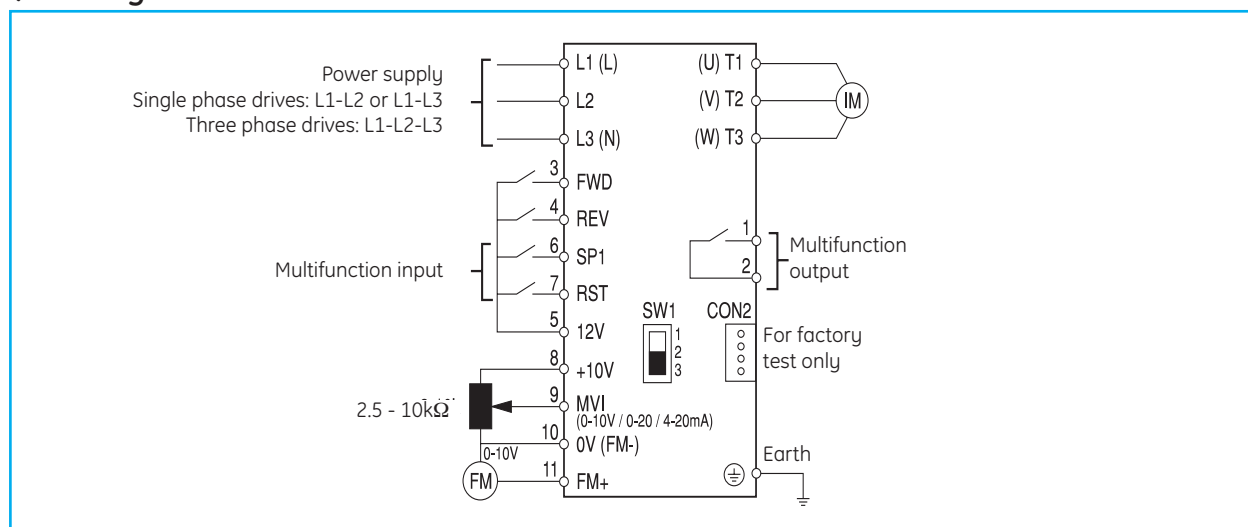
### Analogue outputs

FM	Frequency output	Analogue output 0-10V. May be used as speed meter
0V	Common analogue I/O	

### Other

+10V	10V DC source	10V DC power supply for potentiometer 2-10KΩ (2W)
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### I/O wiring



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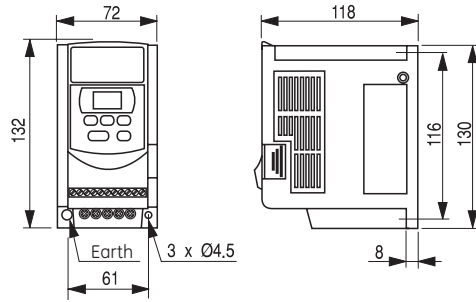
I

J/X



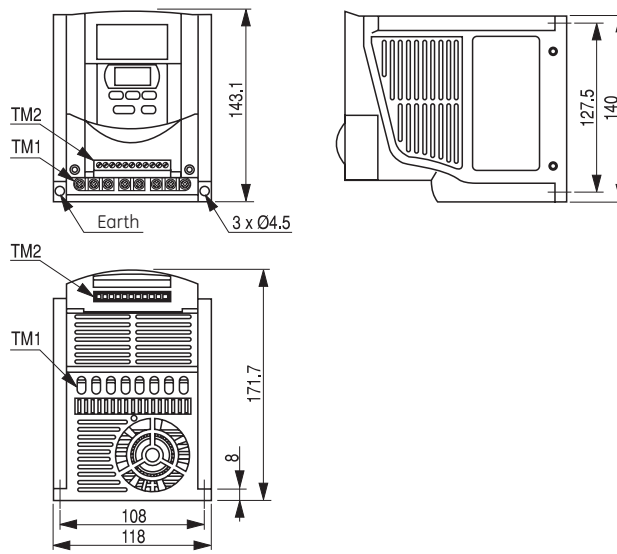
**Dimensional drawings**

**Protection IP20**



Cat. no.	Ref. no.	Weight (kg)
U20N0K2S	167075	0.76
U20N0K4S	167076	0.77
U20N0K7S	167077	0.8

Dimensions in mm

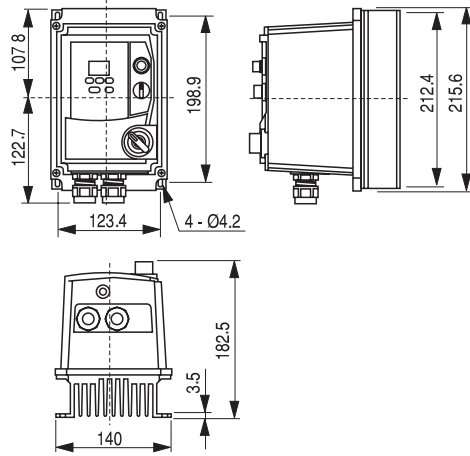


Cat. no.	Ref. no.	Weight (kg)
U20N1K5S	167078	1.66
U20N2K2S	167079	1.76
U20X0K7S	167080	1.60
U20X1K5S	167081	1.60
U20X2K2S	167082	1.63

Dimensions in mm

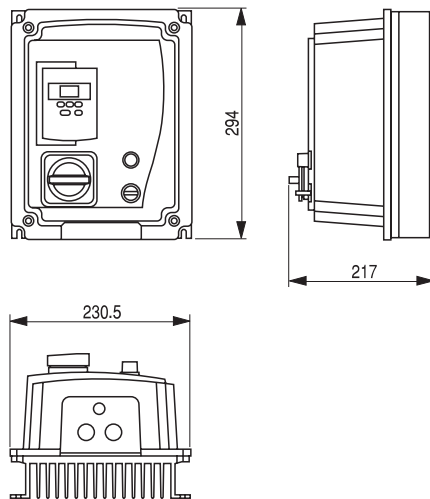
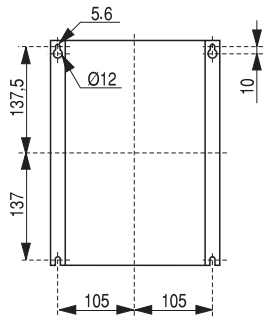


Protection IP65



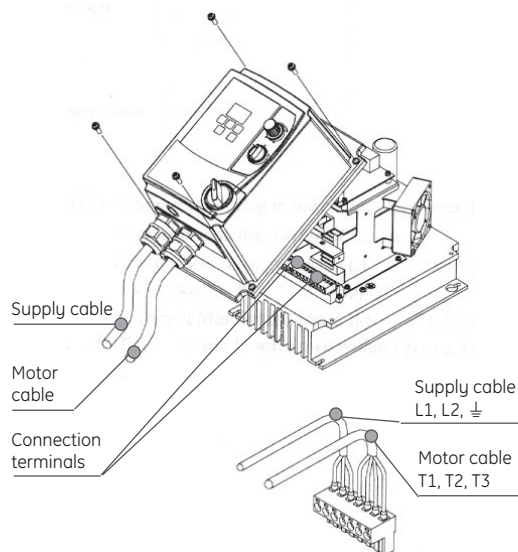
Cat. no.	Ref. no.	Weight (kg)
U20N0K2P	167088	2.9
U20N0K4P	167089	2.9
U20N0K7P	167090	2.9
U20N0K2PS	167132	2.9
U20N0K4PS	167133	2.9
U20N0K7PS	167134	2.9

Dimensions in mm



Cat. no.	Ref. no.	Weight (kg)
U20N1K5P	167091	4.8
U20N2K2P	167092	4.9
U20X0K7P	167093	4.9
U20X1K5P	167094	4.9
U20X2K2P	167095	4.9
U20N1K5PS	167135	5.2
U20N2K2PS	167136	5.3
U20X0K7PS	167137	5.2
U20X1K5PS	167138	5.2
U20X2K2PS	167139	5.2

Dimensions in mm



Intro

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## Mini AC variable speed drives

The VAT200 is a well performed, sensorless vector VSD for AC standard motors available in the following ranges:

- From 0.4 to 2.2 kW at 200V, single phase power supply
- From 0.4 to 7.5 kW at 200V, three phase power supply
- From 0.75 to 55 kW at 400V, three phase power supply

## Advantages

- Compact size
- Built-in removable LED keypad
- Optional multilanguage LCD keypad
- Sensorless vector control or V/f control, selectable
- Built-in with ModBus RTU communications
- Optional Field bus communication DeviceNet, ProfibusDP
- Integrated EMC filters for U20...FS series
- Built-in with dynamic braking up to 15kW
- Performed with simple PLC and PID functions
- Easy start-up & tuning by PC or keypad
- Advanced programming and drive control by built-in PLC function
- Easy maintenance

## Approvals

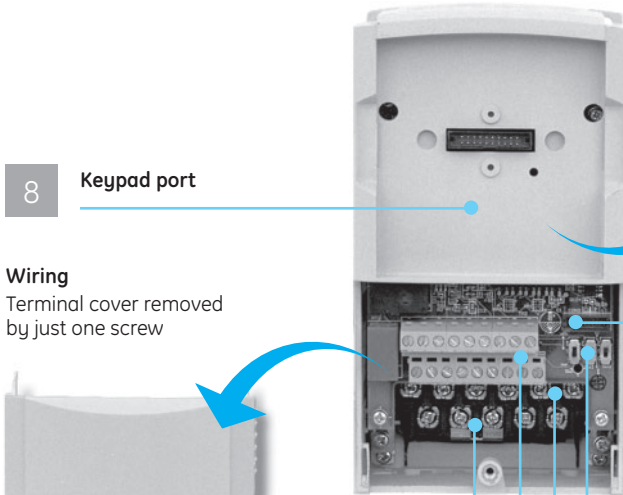


## Simple and reliable

### Removable keypad

- LED keypad as standard
- LCD keypad as option

1



8 Keypad port

7 Wiring  
Terminal cover removed by just one screw



Serial port  
For copy unit and communications

2

### Configuration switches

- For analogue I/O
- For PNP/NPN digital input selection

3

### I/O terminals

Supply and motor

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### I/O terminals

Control

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### I/O terminal

DC reactor

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J/X



1 and 3 phase speed drives

Input voltage + 10%, -15%, 50/60 Hz (± 5%)		Suitable motor capacity (kW)	Rated output de current (A)	Rated capacity (KVA)	Frame	Cat. no.	Ref. no.	Pack.
<b>With EMC filter</b>								
 Frame 1	1ph 200V - 240V	0.4	3.1	1.2	1	U201N00K4FS	167400	1
		0.75	4.5	1.7	1	U201N00K7FS	167401	1
		1.5	7.5	2.9	2	U201N01K5FS	167402	1
		2.2	10.5	4.0	2	U201N02K2FS	167403	1
<b>Without EMC filter</b>								
 Frame 2	1ph 200V - 240V	0.4	3.1	1.2	1	U201N00K4SS	167411	1
		0.75	4.5	1.7	1	U201N00K7SS	167412	1
		1.5	7.5	2.9	2	U201N01K5SS	167413	1
		2.2	10.5	4.0	2	U201N02K2SS	167414	1
<b>Without EMC filter</b>								
 Frame 3	3ph 200V - 240V	0.4	3.1	1.2	1	U203N00K4SS	167415	1
		0.75	4.5	1.7	1	U203N00K7SS	167416	1
		1.5	7.5	2.9	1	U203N01K5SS	167417	1
		2.2	10.5	4	2	U203N02K2SS	167418	1
		3.7	17.5	6.7	2	U203N04K0SS	167419	1
		5.5	26	9.9	3	U203N05K5SS	167420	1
		7.5	35	13.3	3	U203N07K5SS	167422	1
		<b>With EMC filter</b>						
 Frame 4	3ph 380V - 480V	0.75	2.3	1.7	1	U203X00K7FS	167404	1
		1.5	3.8	2.9	1	U203X01K5FS	167405	1
		2.2	5.2	4	2	U203X02K2FS	167406	1
		3.7	8.8	6.7	2	U203X04K0FS	167407	1
		5.5	13	9.9	3	U203X05K5FS	167408	1
		7.5	17.5	13.3	3	U203X07K5FS	167409	1
		11	25	19.1	3	U203X11K0FS	167410	1
		<b>Without EMC filter</b>						
 Frame 4	3ph 380V - 480V	0.75	2.3	1.7	1	U203X00K7SS	167424	1
		1.5	3.8	2.9	1	U203X01K5SS	167425	1
		2.2	5.2	4	2	U203X02K2SS	167426	1
		3.7	8.8	6.7	2	U203X04K0SS	167427	1
		5.5	13	9.9	3	U203X05K5SS	167428	1
		7.5	17.5	13.3	3	U203X07K5SS	167429	1
		11	25	19.1	3	U203X11K0SS	167430	1
		15	32	27.4	4	U203X15K0SS	167481	1
		18.5	40	34	4	U203X18K5SS	167482	1
		22	48	41	4	U203X22K0SS	167483	1
		30	64	54	5	U203X30K0SS	167484	1
		37	80	68	5	U203X37K0SS	167485	1
45	96	82	6	U203X45K0SS	167486	1		
55	128	110	6	U203X55K0SS	167487	1		

Accessories

Description	Details	Cat. no.	Ref. no.	Pack.
 U200ARS485 / 167435	External dynamic braking unit	U200ABU430	167468	1
 U200ARS232 / 167436	Communication interface	Profibus-DP	U200APB	167433
		DeviceNet	U200ADN	167434
		RS485	U200ARS485	167435
		RS232 for PC to drive	U200ARS232	167436
 U200AMP / 167437	NEMA1 boxes	For frame 1 drives	U200AN101	167446
		For frame 2 drives	U200AN102	167447
		For frame 3 drives	U200AN103	167448
Memory pack	Program copy	U200AMP	167437	1
Keypad	LED <sup>(1)</sup>	U200ALEDK	167438	1
	LCD multilanguage	U200ALCDK	167439	1
	Blank cover	U200ABK	167440	1
Remote wire for keypad	0.5m	U200AW05	167441	1
	1.0m	U200AW10	167442	1
	2.0m	U200AW20	167443	1
	3.0m	U200AW30	167444	1
	5.0m	U200AW50	167445	1

(1) All VAT200 include a LED keypad U200ALEDK as standard.





Technical data

General specifications

		1ph 200-240V (with / without EMC filter)				3ph 200-240V (without EMC filter)						
		U 2 0 1 N _ _ _ _ _ S				U 2 0 3 N _ _ _ _ _ S S						
		00K4	00K7	01K5	02K2	00K4	00K7	01K5	02K2	04K0	05K5	07K5
Motor ratings	(HP)	0.5	1	2	3	0.5	1	2	3	5.5	7.5	10
	(kW)	0.4	0.75	1.5	2.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
Rated output current	(A)	3.1	4.5	7.5	10.5	3.1	4.5	7.5	10.5	17.5	26	35
Rated capacity	(kVA)	1.2	1.7	2.9	4	1.2	1.7	2.9	4	6.7	9.9	13.3
Max. input voltage		Single phase: 200-240V +10 -15%, 50/60Hz ±5%				Three phase: 380-480V, +10 -15%, 50/60Hz ±5%						
Max. output voltage		Three phase: 0 - 240V				Three phase: 0 - 240V						
Input current	(A)	8.5	12	19	27	4.5	6.5	11	15.4	20	29	40

		3ph 380-480V (with / without EMC filter)							3ph 380-480V (without EMC filter)						
		U 2 0 3 X _ _ _ _ _ S							U 2 0 3 X _ _ _ _ _ S S						
		00K7	01K5	02K2	04K0	05K5	07K5	11K0	15K0	18K5	22K0	30K0	37K0	45K0	55K0
Motor ratings	(HP)	1	2	3	5.5	7.5	10	15	20	25	30	40	50	60	75
	(kW)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated output current	(A)	2.3	3.8	5.2	8.8	13	17.5	25	32	40	48	64	80	96	128
Rated capacity	(kVA)	1.7	2.9	4	6.7	9.9	13.3	19.1	27.4	34	41	54	68	82	110
Max. input voltage		Three phase: 380-480V, +10 -15%, 50/60Hz ±5%							Three phase: 380-480V, +10 -15%, 50/60Hz ±5%						
Max. output voltage		Three phase: 0 - 480V							Three phase: 0 - 480V						
Input current	(A)	4.2	5.6	7.3	11.6	17	23	31	38	48	56	75	92	112	142

Frequency control

Control mode	V / f or sensorless vector control
Range	0.1 to 650.0Hz
Starting torque	150% / 1Hz (sensorless vector)
Speed control range	1 : 50 (sensorless vector)
Speed control accuracy	±0.5% (sensorless vector)
Setting resolution	Digital: 0.01 Hz Analogue: 0.06Hz / 60Hz (10 bits)
Keypad setting	Set directly by $\Delta$ $\nabla$ keys or by potentiometer on the keypad
Display function	Four digital LED (or 2x16 LCD) and status indicator; display frequency / speed / line speed / DC voltage / output voltage / current / rotation direction / inverter parameter / trouble log / program version
Frequency setting	1. External potentiometer 0-5V / 0-10V / 4-20mA / 5-0V / 10-0V / 20-4mA 2. Performs up/down controls, speed control or automatic procedure control with multifunctional contacts on the terminal block (TM2)
Frequency limit function	Respectively setting upper/lower frequency limits and three-stage skip frequencies

Control

Carrier frequency	2 to 16kHz
V / F pattern	18 fixable patterns, 1 programmable pattern
Acc./Dec. control	Two-stage Acc./Dec. time (0.1 to 3,600 seconds) and two-stage S curve
Multifunctional analog output	5 different functions
Multifunctional input	Assigned to 28 different functions
Multifunctional output	Assigned to 15 different functions
Digital input signal	NPN / PNP toggle
Other functions	Momentary power loss restart, Speed search, Overload detection, Torque detection, 8 preset speeds, Acc./Dec. switch (2 stages), S curve, 3-wire control, PID control, Torque boost, Slip compensation, Frequency upper/lower limit, Auto energy saving, Modbus slave and control link, Abnormal restart, Sequence control, Built-in simple PLC function

Speed drive units

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## Technical data (continued)

### Others

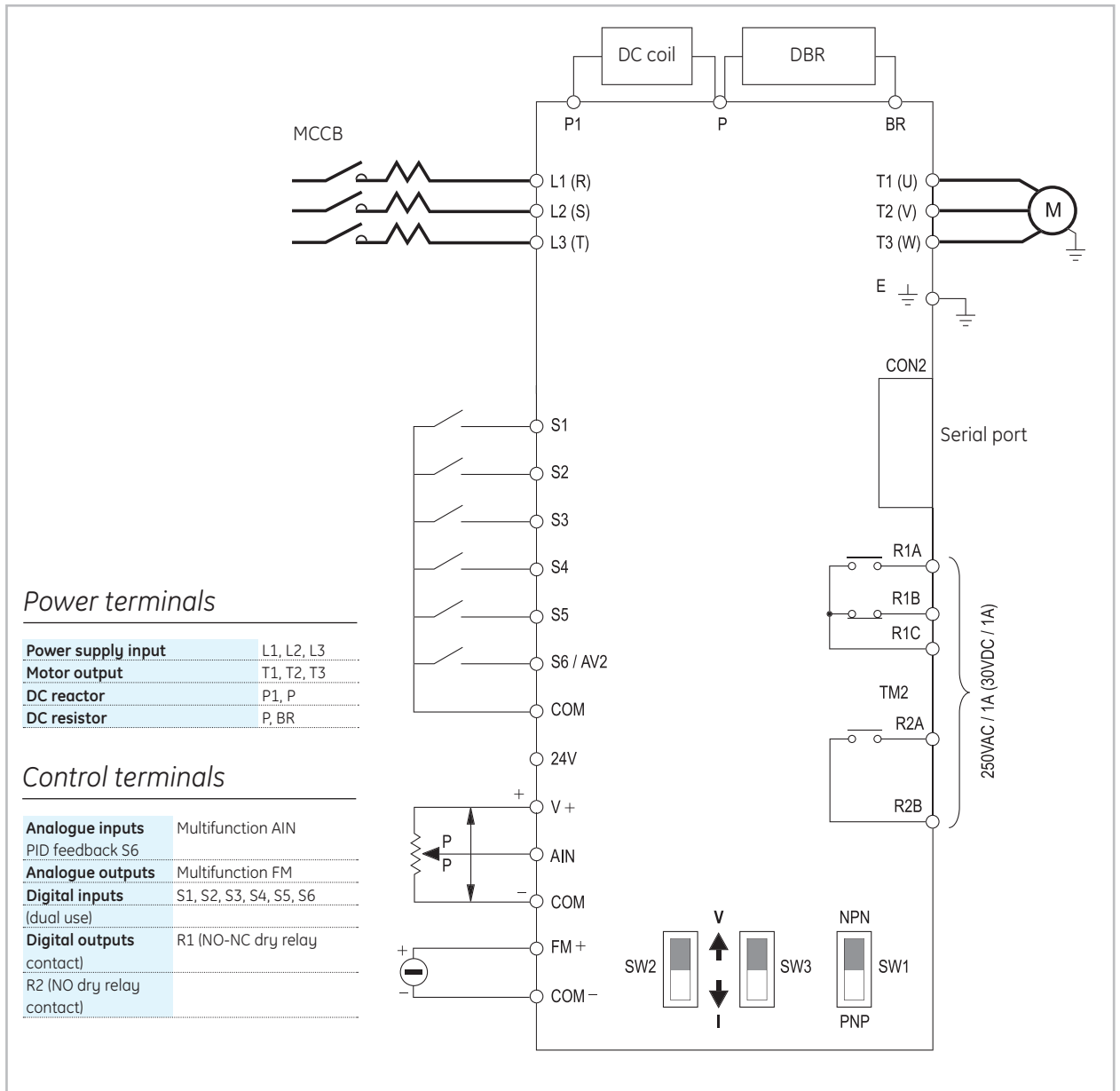
Communication control	Control by RS232 or RS485 One to one or multilink up to 254 stations (RS485 only) Can be set Baud rate, Stop bit and Parity bit
Braking torque	About 100% with braking resistor (20% without braking resistor)
Operation temperature	-10 to +50°C
Storage temperature	-20 to +60°C
Humidity	0 to 95% relative humidity (without condensation)
Vibration	1G (9.8m/S <sup>2</sup> )
EMC	Comply with requirement EN 61800-3 with optional filter
LVD	Comply with requirement EN 50178
Enclosure	IP20 (NEMA 1 by external box attached)
Safety level	UL 508C

### Protective functions

Overload protection	Inverse characteristic overload protection. Max. 150% inverter current rating / 60 sec.
Fuse protection	The motor stops after FUSE melt
Overvoltage	<b>200V class:</b> DC voltage > 410V <b>400V class:</b> DC voltage > 820V
Undervoltage	<b>200V class:</b> DC voltage < 190V <b>400V class:</b> DC voltage < 380V
Momentary power loss restart	Restart after more than 15ms-power loss possible. Programmed up to 2 sec.
Stall prevention	Stall prevention for Acceleration / Deceleration / Operation
Short-circuit output terminal	Electronic circuit protection
Grounding fault	Electronic circuit protection
Other protections	Heatsink overtemperature, overtorque detection, error contact control, reverse run restriction, restrictions for direct start after power up, error recovery and parameter lock out



I/O power and control layout



I/O control terminal description

Symbol	Description
R2A	Multifunctional terminals - Normally Open
R2B	
R1C	Common contact
R1B	Normally Closed contact
R1A	Normally Open contact
10V	Frequency knob (VR) power source terminal
AIN	Analogue frequency signal input terminal
24V	Common source for S1 to S5 in PNP input. Selectable by switch on main PCB
COM	Common terminal for S1 to S5 in NPN input. Selectable by switch on main PCB
FM +	Multifunction analog output, 0-10V DC
S1	Multifunction input terminals
S2	
S3	
S4	
S5	
S6 / AV2	Digital input or PID input terminal (selectable)

Contact rated capacity: 250 VAC/1A or 30 VDC/1A



External accessories

	VAT200	Losses W	AC reactors	DC reactors	Tubular resistors		
1ph 200-240V	U201N00K4FS	167400	32	ACRP8A2H5 168491	DCR4A5H7 168387	TLR200P200 129165	
	U201N00K7FS	167401	50	ACRP12A2H5 168492	DCR6A3H9 168388	TLR200P200 129165	
	With EMC filter	U201N01K5FS	167402	85	ACRP18A1H3 168493	DCR9A2H4 168389	TLR100P200 108223
	U201N02K2FS	167403	157	ACRP22A0H84 168494	DCR12A1H7 168390	TLR75P200 116300	
	U201N00K4SS	167411	28	ACRP8A2H5 168491	DCR4A5H7 168387	TLR200P200 129165	
	Without EMC filter	U201N00K7SS	167412	45	ACRP12A2H5 168492	DCR6A3H9 168388	TLR200P200 129165
	U201N01K5SS	167413	77	ACRP18A1H3 168493	DCR9A2H4 168389	TLR100P200 108223	
	U201N02K2SS	167414	142	ACRP22A0H84 168494	DCR12A1H7 168390	TLR75P200 116300	
3ph 200-240V	U203N00K4SS	167415	28	ACRP4A2H5 168495	DCR4A5H7 168387	TLR200P200 129165	
	U203N00K7SS	167416	44	ACRP6A2H5 168496	DCR6A3H9 168388	TLR200P200 129165	
	Without EMC filter	U203N01K5SS	167417	74	ACRP9A1H3 168497	DCR9A2H4 168389	TLR100P200 108223
	U203N02K2SS	167418	140	ACRP12A0H84 168498	DCR12A1H7 168390	TLR75P200 116300	
	U203N04K0SS	167419	247	ACRP18A0H56 168499	DCR18A1H0 168391	TLR44P600 129166	
	U203N05K5SS	167420	274	ACRP27A0H37 168500	DCRP32A0H78 168542	TLR29P600 129167	
	U203N07K5SS	167422	372	ACRP35A0H27 168501	DCRP45A0H55 168543	TLR22P600 129168	
3ph 380-480V	U203X00K7FS	167404	45	ACRP3A8H1 168509	DCR3A15H2 168392	TLR750P200 116301	
	With EMC filter	U203X01K5FS	167405	69	ACRP4A5H1 168510	DCR4A9H2 168393	TLR400P200 116302
	U203X02K2FS	167406	137	ACRP6A3H4 168511	DCR6A6H8 168394	TLR240P200 108227	
	U203X04K0FS	167407	231	ACRP10A2H 168512	DCR9A4H0 168395	TLR175P600 129173	
	U203X05K5FS	167408	361	ACRP14A1H4 168513	DCRP18A2H9 168555	TLR118P600 129174	
	U203X07K5FS	167409	446	ACRP18A1H1 168514	DCRP25A2H1 168556	TLR86P600 129175	
	U203X11K0FS	167410	656	ACRP27A0H75 168515	DCRP32A1H6 168557	TLR43P1000 129177	
	Without EMC filter	U203X00K7SS	167424	40	ACRP3A8H1 168509	DCR3A15H2 168392	TLR750P200 116301
	U203X01K5SS	167425	62	ACRP4A5H1 168510	DCR4A9H2 168393	TLR400P200 116302	
	U203X02K2SS	167426	123	ACRP6A3H4 168511	DCR6A6H8 168394	TLR240P200 108227	
	U203X04K0SS	167427	208	ACRP10A2H 168512	DCR9A4H0 168395	TLR175P600 129173	
	U203X05K5SS	167428	325	ACRP14A1H4 168513	DCRP18A2H9 168555	TLR118P600 129174	
	U203X07K5SS	167429	402	ACRP18A1H1 168514	DCRP25A2H1 168556	TLR86P600 129175	
	U203X11K0SS	167430	591	ACRP27A0H75 168515	DCRP32A1H6 168557	TLR43P1000 129177	
	U203X15K0SS	167481	1051	ACRP35A0H58 168516	-	TLR43P1000 129177	
	U203X18K0SS <sup>(1)</sup>	167482	1218	ACRP38A0H58 168517	-	TLR35P1500 129877	
	U203X22K0SS <sup>(1)</sup>	167483	1449	ACRP45A0H45 168518	-	TLR29P1800 129878	
	U203X30K0SS <sup>(1)</sup>	167484	1608	ACRP70A0H29 168519	included	TLR22P2500 129879	
	U203X37K0SS <sup>(2)</sup>	167485	1993	ACRP90A0H22 168520	included	TLR35P1500 <sup>(3)</sup> 129877	
	U203X45K0SS <sup>(2)</sup>	167486	2270	ACRP115A0H18 168521	included	TLR29P1800 <sup>(3)</sup> 129878	
U203X55K0SS <sup>(2)</sup>	167487	2957	ACRP160A0H14 168522	included	TLR22P2500 <sup>(3)</sup> 129879		

(1) (2) Drives 18.5kW and above do not built dynamic braking. In case this is needed, use external braking unit U200ABU430.

(2) (3) Dynamic braking for drives 45kW, 55kW may need the use of two sets of braking units U200ABU430 in parallel with two sets of braking resistors (one resistor per braking unit).



## EMC compliance

Drives with built-in filter type U20...FS, comply with EN 618000-3 second environment.  
To comply with first environment restricted sector, or to allow EMC compliance to U20...SS drives, an external filter has to be used according following table

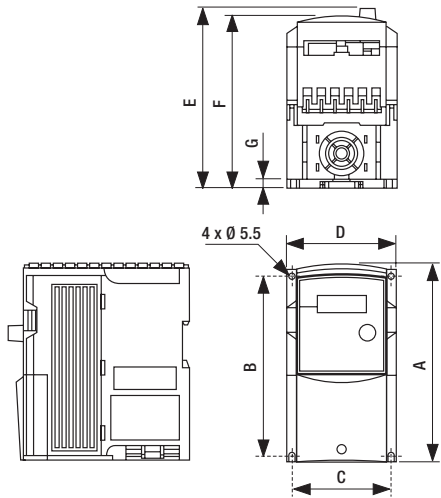
		VAT200		Second environment		First environment		
Speed drive units	1ph 200-240V	With EMC filter	U201N00K4FS	167400	Not needed		U200F611TA1	167453
			U201N00K7FS	167401	Not needed		U200F611TA1	167453
			U201N01K5FS	167402	Not needed		U200F627TA2	167454
			U201N02K2FS	167403	Not needed		U200F627TA2	167454
		Without EMC filter	U201N00K4SS	167411	U200F611TA1	167453		
			U201N00K7SS	167412	U200F611TA1	167453		
			U201N01K5SS	167413	U200F627TA2	167454		
			U201N02K2SS	167414	U200F627TA2	167454		
	3ph 200-240V	Without EMC filter	U203N00K4SS	167415	U200F709TA1	167456		
			U203N00K7SS	167416	U200F709TA1	167456		
			U203N01K5SS	167417	U200F709TA1	167456		
			U203N02K2SS	167418	U200F719TA2	167457		
			U203N04K0SS	167419	U200F719TA2	167457		
			U203N05K5SS	167420	U200F739TA3	167458		
			U203N07K5SS	167422	U200F739TA3	167458		
	3ph 380-480V	With EMC filter	U203X00K7FS	167404	Not needed		U200F905TA1	167459
U203X01K5FS			167405	Not needed		U200F905TA1	167459	
U203X02K2FS			167406	Not needed		U200F910TA2	167460	
U203X04K0FS			167407	Not needed		U200F910TA2	167460	
U203X05K5FS			167408	Not needed		U200F928TA3	167461	
U203X07K5FS			167409	Not needed		U200F928TA3	167461	
U203X11K0FS			167410	Not needed		U200F928TA3	167461	
Without EMC filter			U203X00K7SS	167424	U200F905TA1	167459		
		U203X01K5SS	167425	U200F905TA1	167459			
		U203X02K2SS	167426	U200F910TA2	167460			
		U203X04K0SS	167427	U200F910TA2	167460			
		U203X05K5SS	167428	U200F928TA3	167461			
		U203X07K5SS	167429	U200F928TA3	167461			
		U203X11K0SS	167430	U200F928TA3	167461			
		U203X15K0SS	167481	U200F34048SMA	167474			
		U203X18K0SS	167482	U200F370A	167475			
		U203X22K0SS	167483	U200F370A	167475			
		U203X30K0SS	167484	U200F3100A	167476			
		U203X37K0SS	167485	U200F3100A	167476			
U203X45K0SS		167486	U200F3150A	167477				
U203X55K0SS	167487	U200F3180A	167478					

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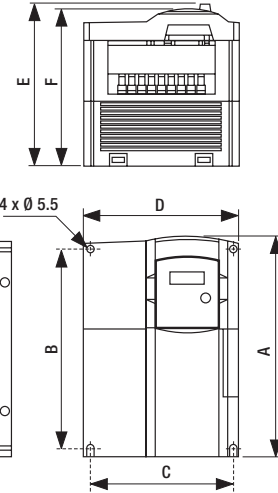


## Dimensions

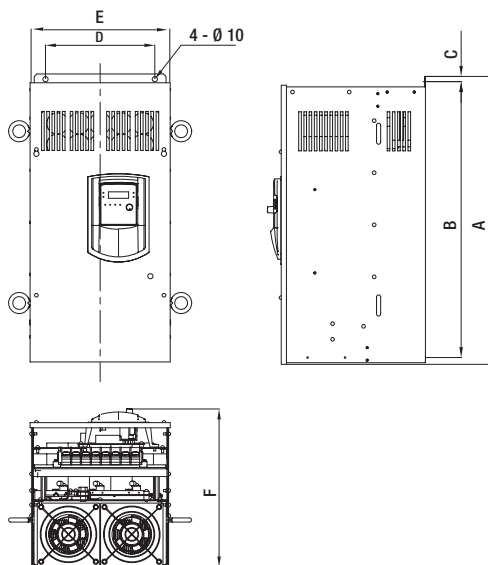
### Speed drive



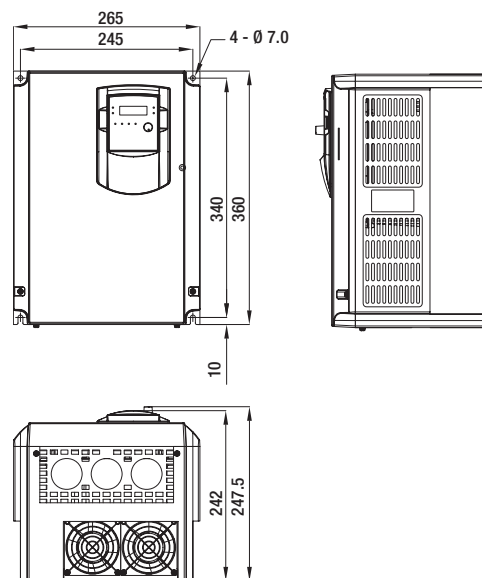
Series	Weight (kg)		Dimensions (mm)						
	SS	FS	A	B	C	D	E	F	G
U201N00K4..	1.2	1.3	163	150	78	90	147	141	7
U201N00K7..	1.2	1.3							
U203N00K4..	1.2	-							
U203N00K7..	1.2	-							
U203N01K5..	1.2	-							
U203X00K7..	1.2	1.3							
U203X01K5..	1.2	1.3							
U201N01K5..	1.5	1.8	187	170.5	114.5	128	148	142	7
U201N02K2..	1.9	2.3							
U203N02K2..	1.75	-							
U203N04K0..	1.9	-							
U203X02K2..	1.8	2.2							
U203X04K0..	1.9	2.3							



Series	Weight (kg)		Dimensions (mm)					
	SS	FS	A	B	C	D	E	F
U203N05K5..	5.6	-	260	244	173	186	195	188
U203N07K5..	5.6	-						
U203X05K5..	5.6	6.6						
U203X07K5..	5.6	6.6						
U203X11K0..	5.6	6.6						



Series	Weight (kg)	Dimensions (mm)					
		A	B	C	D	E	F
U203X30K0SS	33	553	530	10	210	269	303
U203X37K0SS	33	553	530	10	210	269	303
U203X45K0SS	50	653	630	10	250	308	308
U203X55K0SS	50	653	630	10	250	308	308

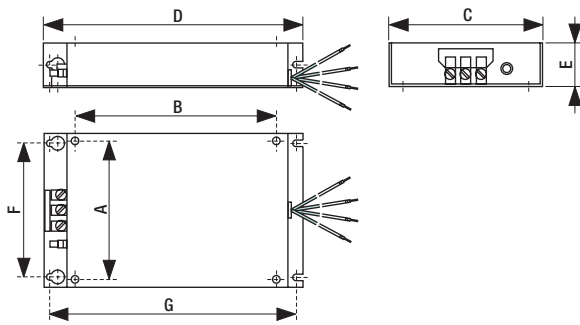


Series	Weight (kg)
U203X15K0SS	15
U203X18K5SS	15
U203X22K0SS	15

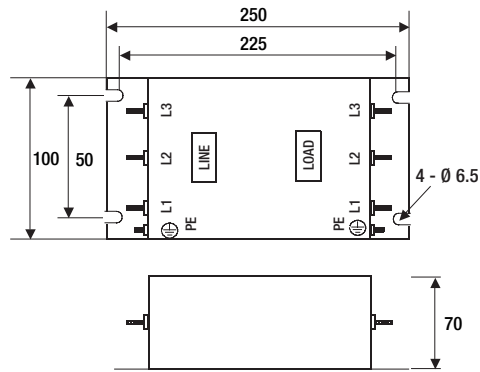


Dimensions (continued)

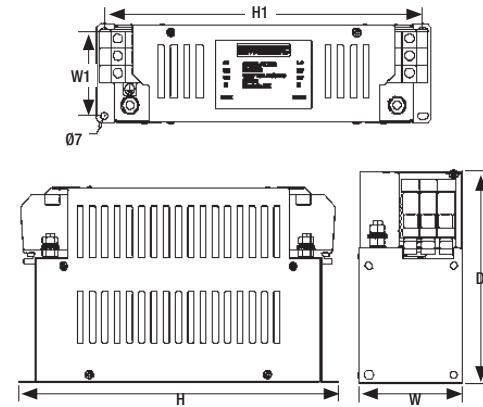
EMC external filter



		Inverter mounting		External filter size			External filter mount.	
		A	B	C	D	E	F	G
U200F611TA1	167453	78	150	91	192	28	74	181
U200F709TA1	167456							
U200F905TA1	167459							
U200F627TA2	167454	114.5	170.5	128	215	37	111	204
U200F719TA2	167457							
U200F910TA2	167460							
U200F739TA3	167458	173	244	188	289	42	165	278
U200F928TA3	167461							

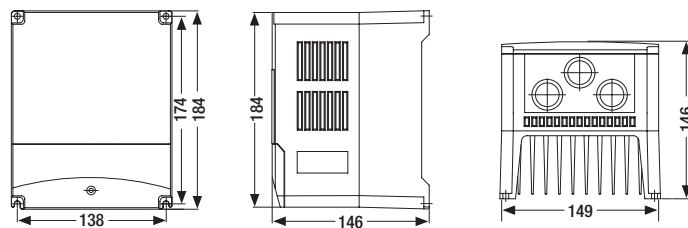


U200F34048SMA 167474



		Dimensions (mm)						
		W	W1	H	H1	D	d	M
U200F370A	167475	93	79	312	298	190	7	M6
U200F3100A	167476	93	79	312	298	190	7	M6
U200F3150A	167477	126	112	312	298	224	7	M6
U200F3180A	167478	126	112	312	298	224	7	M6

External dynamic braking unit



		Weight (kg)
U200ABU430	167468	2.3



Dimensions (continued)

AC input reactors

Fig. 1

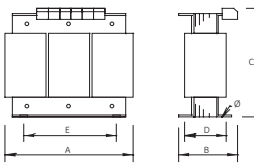


Fig. 3

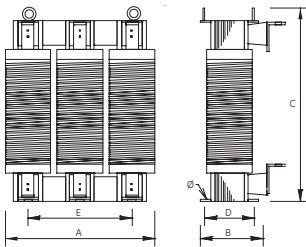
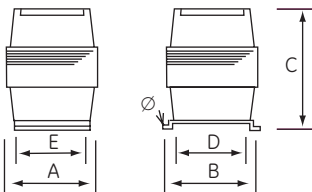


Fig. 4



Cat. No.	Ref.No.	Losses W	Fig.	Dimensions (mm)						Weight (kg)
				A	B	C	D	E	Ø	
ACRP8A2H5	168491	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	168492	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	168493	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	168494	8	4	96	112	116	96	77	6	3.7
ACRP4A2H5	168495	16	1	120	80	152	41	100	6	1.3
ACRP6A2H5	168496	18	1	120	80	152	41	100	6	1.5
ACRP9A1H3	168497	17	1	120	80	152	41	100	6	1.6
ACRP12A0H84	168498	18	1	120	80	152	41	100	6	1.7
ACRP18A0H56	168499	21	1	120	90	152	51	100	6	2.4
ACRP27A0H37	168500	32	1	150	95	183	46	125	6	3.3
ACRP35A0H27	168501	35	1	150	95	183	46	125	6	3.7
ACRP3A8H1	168509	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	168510	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	168511	19	1	120	80	152	41	100	6	1.7
ACRP10A2H	168512	23	1	120	90	152	51	100	6	2.5
ACRP14A1H4	168513	29	1	150	95	178	46	125	6	3.2
ACRP18A1H1	168514	35	1	150	95	178	46	125	6	4
ACRP27A0H75	168515	77	1	150	106	233	72	100	9	4.8
ACRP35A0H58	168516	98	1	150	111	233	77	100	9	5.5
ACRP38A0H58	168517	96	1	150	116	233	82	100	9	6.4
ACRP45A0H45	168518	102	1	150	121	233	87	100	9	7.1
ACRP70A0H29	168519	147	1	150	151	250	117	100	9	11
ACRP90A0H22	168520	158	1	180	136	286	102	120	9	13.1
ACRP115A0H18	168521	186	1	180	156	301	122	120	9	16.9
ACRP160A0H14	168522	268	3	240	181	288	107	160	9	25.7

DC reactors

Fig. 2

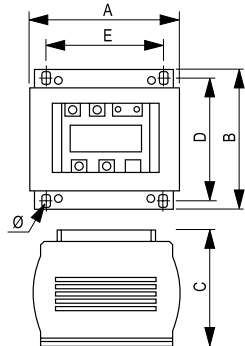
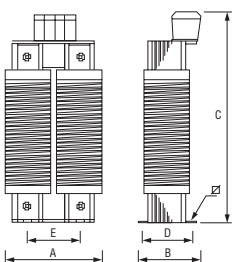


Fig. 5



Cat. No.	Ref.No.	Losses W	Fig.	Dimensions (mm)						Weight (kg)
				A	B	C	D	E	Ø	
DCR4A5H7	168387	4	2	50	97	84	80	34	6	0.78
DCR6A3H9	168388	6	2	50	97	94	80	34	6	0.94
DCR9A2H4	168389	9	2	75	96	95	80	56	6	1.3
DCR12A1H7	168390	15	2	75	96	95	80	56	6	1.3
DCR18A1H0	168391	22	2	75	96	110	80	56	6	1.8
DCR3A15H2	168392	4	2	50	97	94	80	34	6	0.94
DCR4A9H2	168393	4	2	75	96	95	80	56	6	1.3
DCR6A6H8	168394	6	2	75	96	95	80	56	6	1.3
DCR9A4H0	168395	9	2	75	96	95	80	56	6	1.3
DCRP32A0H78	168542	37	5	100	110	173	91	75	6	3.9
DCRP45A0H55	168543	33	5	120	110	203	86	90	6	6.1
DCRP18A2H9	168555	42	5	100	95	178	76	75	6	3.5
DCRP25A2H1	168556	54	5	100	95	183	76	75	6	3.5
DCRP32A1H6	168557	59	5	100	110	183	91	75	6	3.9



## 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.

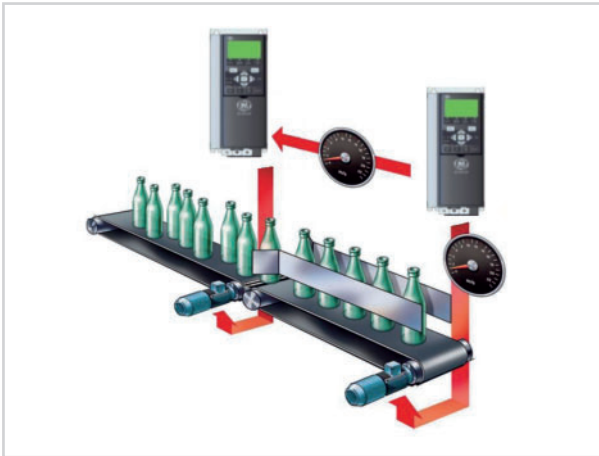
A motor block on a conveyor will always weight the same, regardless of whether the conveyor is running at low or high speed.

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.



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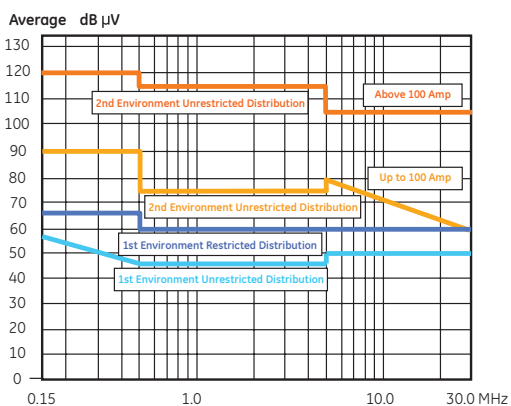
## Variable torque applications Light Duty

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)



Domestic - 1st Environment	EN55011 cl. B EN55011 cl. A1
Industrial - 2nd Environment	EN55011 cl. A2 EN55011 cl. A2

## Built-in DC link reactor

- Low harmonic emission: THDi < 48%
- No voltage drop => full output voltage
- Reduces installation cost
- Fulfils 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

AF-6 drives

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## 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 (1.5mm<sup>2</sup> solid/1.0mm<sup>2</sup> 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 <sub>n</sub> :	kW		
Nominal Voltage U <sub>n</sub> (Y/Δ):	V	Nominal Current I <sub>N</sub> (Y/Δ):	A
Nominal Speed:	min <sup>-1</sup>	cos φ	
Specifications:			
<b>Grid Voltage:</b>		Grid Type (IT/TT/TN):	
Length of Motorcable:		Degree of EMC :	
Application Area (Industry / Residential) :			
Special Exigencies:			

**Application Description:**

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Torque characteristics (Constant/Quadratic):

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Overload (110/160%):

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Speed Range:

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Braking Torque:

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Desired Functionalities:

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Specification:

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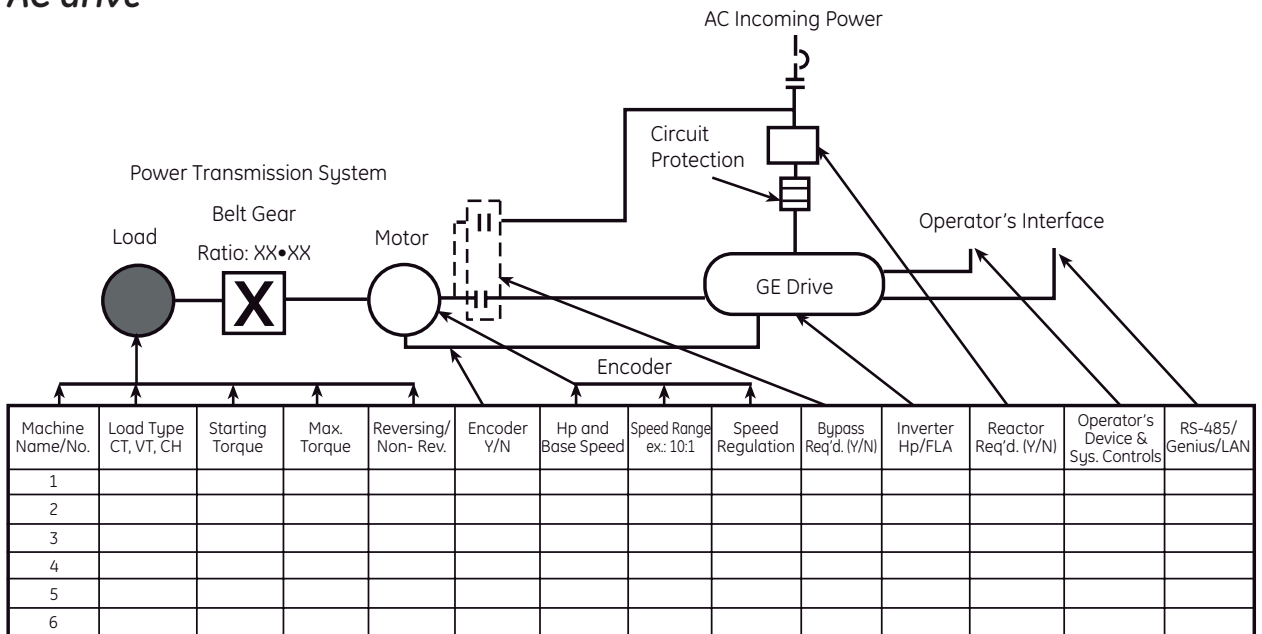
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**Communication System:**

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**Protection Degree:** IP \_\_\_\_\_ Special Ambient Conditions \_\_\_\_\_

### AC drive



New

## 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

<b>NEMA 1</b>	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.
<b>NEMA 4</b>	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.
<b>NEMA 12</b>	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.



New



## 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

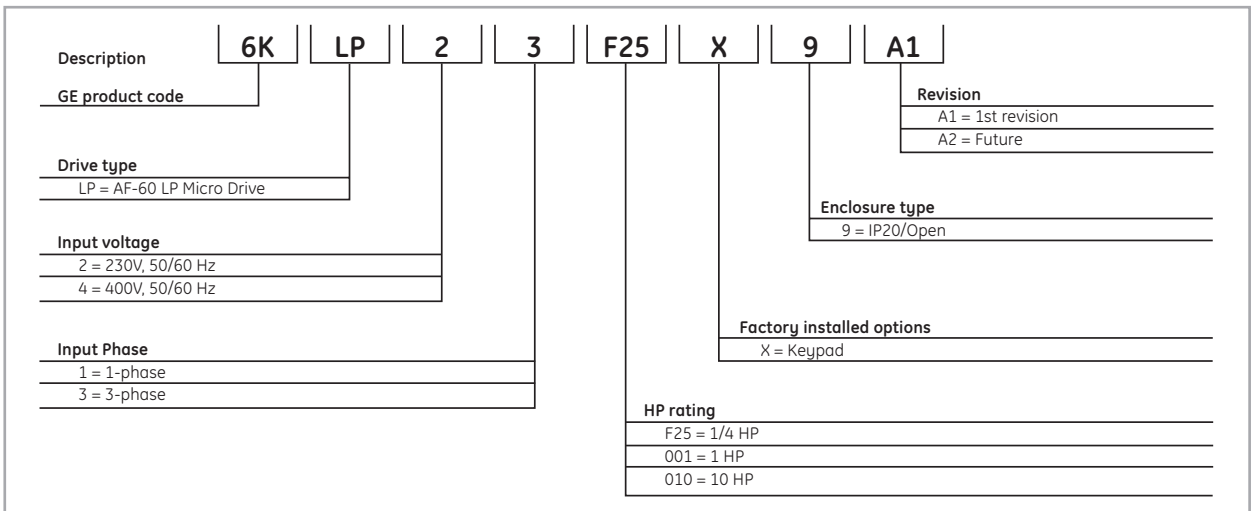


UL, cUL, C-Tick

### 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 (%) <sup>(1)</sup>	Losses (W) <sup>(1)</sup>	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



New



## Options, accessories and replacement parts

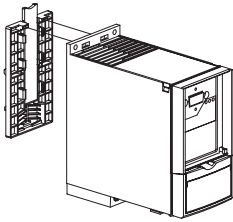
AF-6 drives



### 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

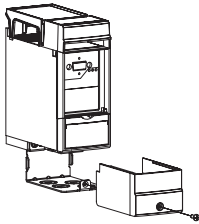


### DIN-rail mounting kit

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 <sup>(1)</sup>	RMACLP1	404806

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

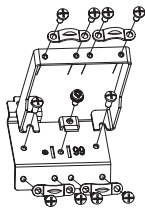


### NEMA 1 kit

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 <sup>(2)</sup>	404801
For 18.5kW/25HP and 22kW/30HP at 400V drives	NEMA1ACLP5 <sup>(2)</sup>	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	DEPLTACL1	404804
For 2.2kW/3HP at 230V, 3.7kW/5HP at 400V and above drives	DEPLTACL2	404805
For 11kW/15HP at 400V and above drives	DEPLTACL3	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

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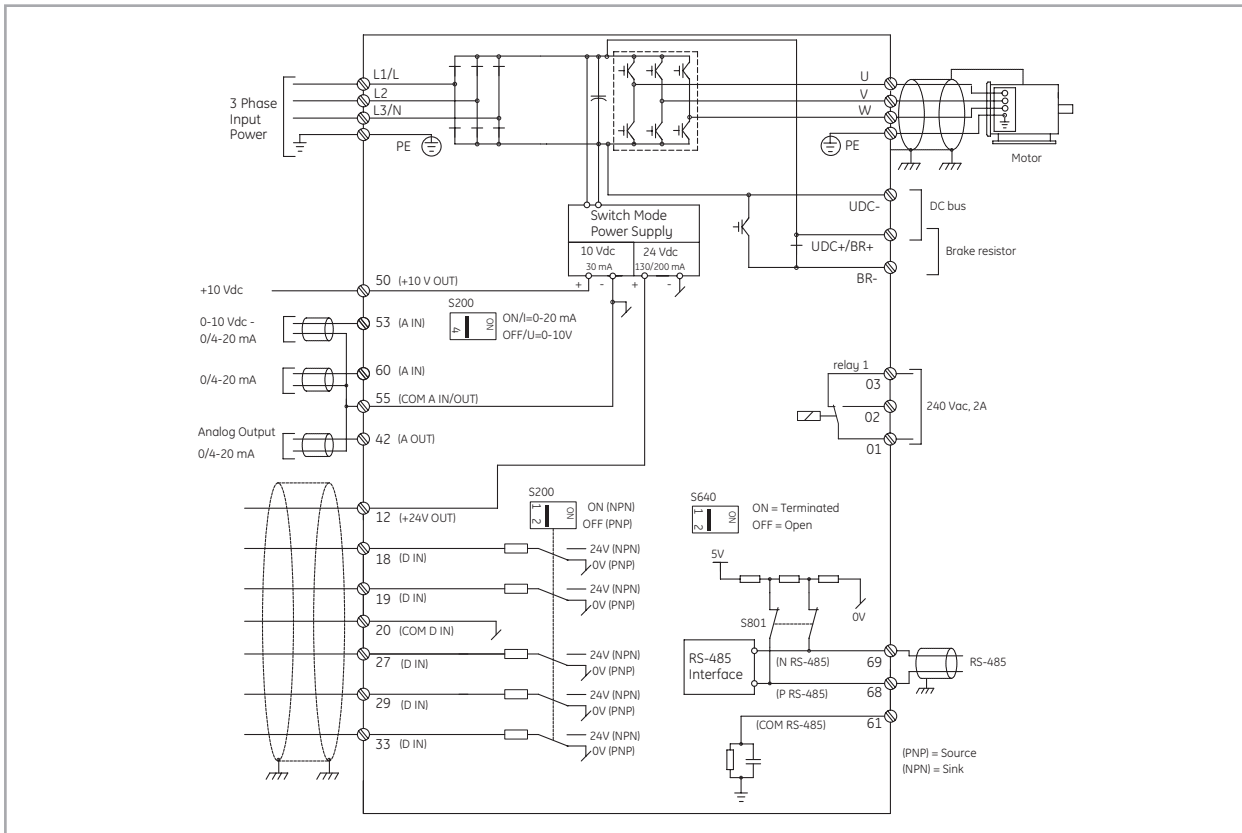
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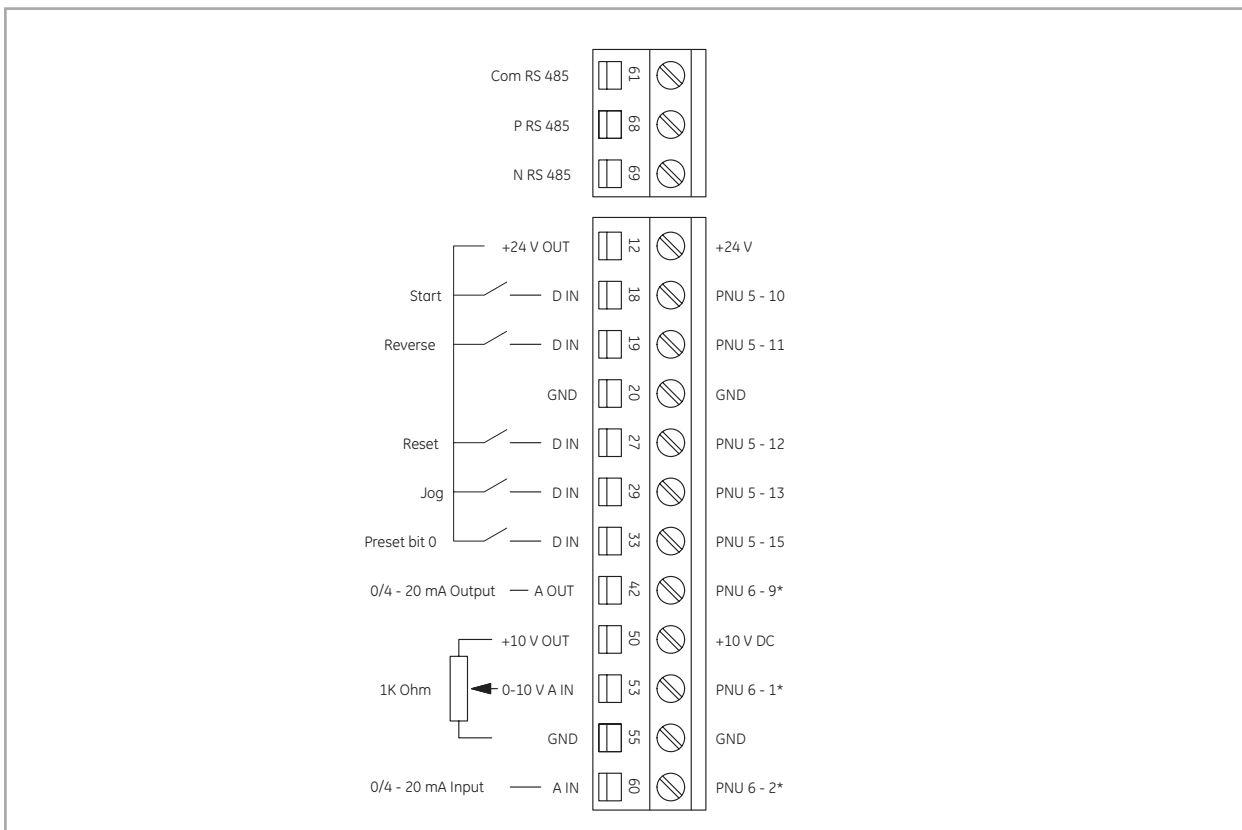


New

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 Mode), 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

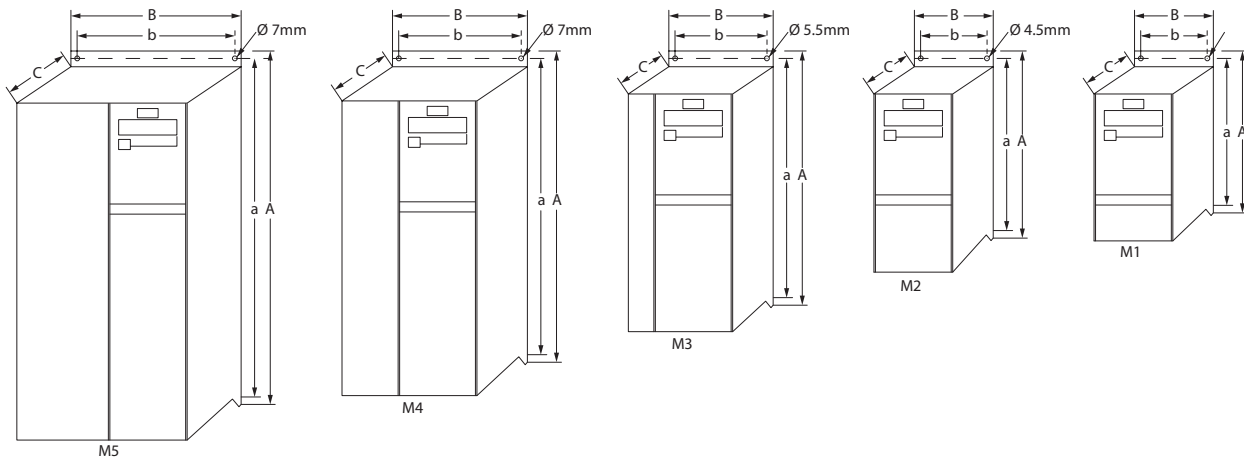
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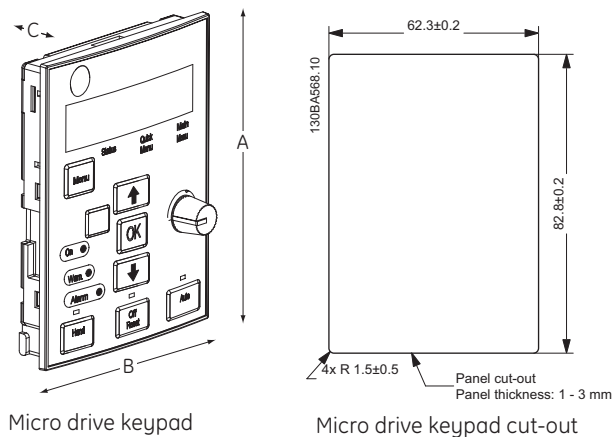
## Dimensional drawings

### Micro drives

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



### Micro drive keypad



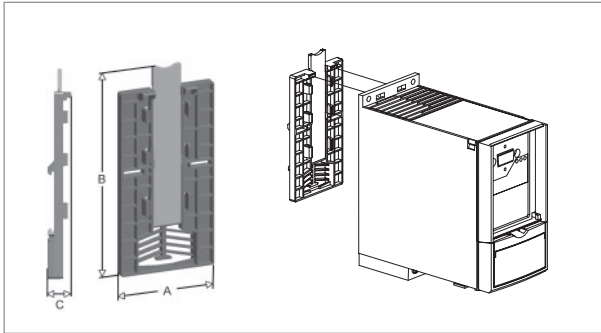
Height (mm) A	Width (mm) B	Depth (mm) C	Weight (kg)
85	65	28	0.08

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

## Dimensional drawings

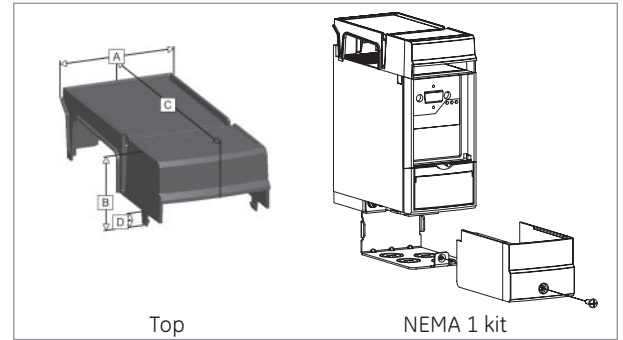
### DIN-rail mounting kit for 0.75kW / 1HP and below drives

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



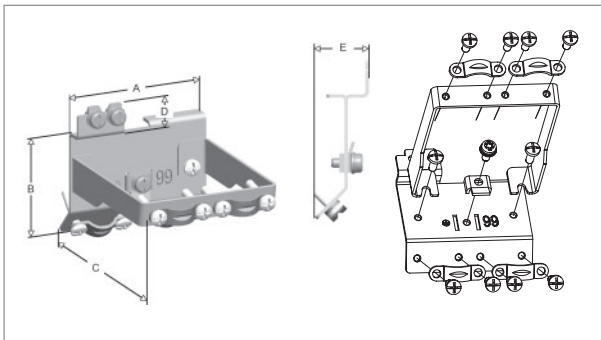
### NEMA 1 field installed kit - top

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



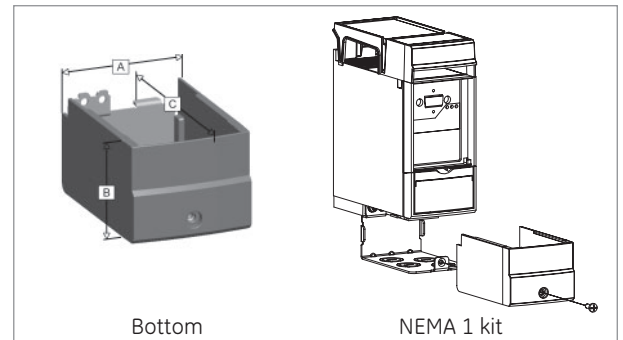
### De-coupling plate kit

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



### NEMA 1 field installed kit - bottom

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



Notes

Grid area for notes.

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New



## AF-650 GP - General Purpose Drives

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

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

Following models are available:

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

### Features

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

### Approvals / Marking



UL, cUL, C-Tick

### Applications

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

### Product numbering system diagram

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

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 <sup>1)</sup> :	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 <sup>1)</sup> :	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	6KGP43350X8XBXA1	403137	52		
315	450	600	900	355	500	658	723.8	6KGP43450X8XBXA1	403138	52		
355	500	658	987	400	550	745	819.5	6KGP43500X8XBXA1	403139	52		
400	550	745	1117.5	450	600	800	880	6KGP43550X8XBXA1	403140	52		
450	600	800	1200	500	650	880	968	6KGP43600X1XBXA1	403141	61		
500	650	880	1320	560	750	990	1089	6KGP43650X1XBXA1	403142	61		
560	750	990	1485	630	900	1120	1232	6KGP43750X1XBXA1	403143	61		
630	900	1120	1680	710	1000	1260	1386	6KGP43900X1XBXA1	403144	61		
710	1000	1260	1890	800	1000	1460	1606	6KGP431K0X1XBXA1	403145	62		
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X1XBXA1	403146	62		

**690V<sup>(2)</sup>, 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		6KGP63125X8XBXA1		403651	43
110	150	131	196.5	132	200	155	171		6KGP63150X8XBXA1		403652	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XBXA1		403653	43
160	250	192	288	200	300	242	266		6KGP63250X8XBXA1		403654	44
200	300	242	363	250	350	290	319		6KGP63300X8XBXA1		403655	44
250	350	290	435	315	400	344	378		6KGP63350X8XBXA1		403656	44
315	400	344	516	400	500	400	440		6KGP63400X8XBXA1		403657	44
355	500	380	570	450	600	450	495	6KGP63500X8XBXA1	403658	52		
400	550	410	615	500	650	500	550	6KGP63550X8XBXA1	403659	52		
500	650	500	750	560	750	570	627	6KGP63650X8XBXA1	403660	52		
560	750	570	855	630	800	630	693	6KGP63750X8XBXA1	403661	52		
630	900	630	945	710	1000	730	803	6KGP63900X1XBXA1	403662	61		
710	1000	730	1095	800	1200	850	935	6KGP631K0X1XBXA1	403663	61		
800	1150	850	1275	900	1300	945	1040	6KGP631K1X1XBXA1	403664	61		
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K2X1XBXA1	403665	62		
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K3X1XBXA1	403666	62		
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K6X1XBXA1	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 H.33.  
 (2) 690V horsepower ratings.





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

Heavy Duty rating				Light Duty rating				Enclosure type <sup>1):</sup>	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	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		6KGP23101X9XXXA1	404677	23
11	15	46.2	73.92	15	20	59.4	65.34		6KGP231015X9XXXA1	404678	24
15	20	59.4	89.1	18.5	25	74.8	82.28		6KGP23202X9XXXA1	404679	24
18.5	25	74.8	112.2	22	30	88	96.8		6KGP232025X9XXXA1	404680	33
22	30	88	132	30	40	115	126.5		6KGP23303X9XXXA1	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 <sup>1):</sup>	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	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		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	6KGP43350X8XXXA1	402869	52	
315	450	600	900	355	500	658	723.8	6KGP43450X8XXXA1	402870	52	
355	500	658	987	400	550	745	819.5	6KGP43500X8XXXA1	402871	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X8XXXA1	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	6KGP431KX1XXCA1	402877	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X1XXCA1	402878	62	

690V<sup>2)</sup>, 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		6KGP63125X8XXXA1	403554	43
110	150	131	196.5	132	200	155	171		6KGP63150X8XXXA1	403555	43
132	200	155	232.5	160	250	192	211		6KGP63200X8XXXA1	403556	43
160	250	192	288	200	300	242	266		6KGP63250X8XXXA1	403557	44
200	300	242	363	250	350	290	319		6KGP63300X8XXXA1	403558	44
250	350	290	435	315	400	344	378		6KGP63350X8XXXA1	403559	44
315	400	344	516	400	500	400	440		6KGP63400X8XXXA1	403560	44
355	500	380	570	450	600	450	495		6KGP63500X8XXXA1	403561	52
400	550	410	615	500	650	500	550		6KGP63550X8XXXA1	403562	52
500	650	500	750	560	750	570	627	6KGP63650X8XXXA1	403563	52	
560	750	570	855	630	800	630	693	6KGP63750X8XXXA1	403564	52	
630	900	630	945	710	1000	730	803	6KGP63900X1XXCA1	403565	61	
710	1000	730	1095	800	1200	850	935	6KGP631KX1XXCA1	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 H.33.  
(2) 690V horsepower ratings.

AF-6 drives

Intro

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I

J/X

New



**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	6KGP23F33X2XBXA1	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	6KGP43350X2XBXA1	403177	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2XBXA1	403178	52	
355	500	658	987	400	550	745	819.5	6KGP43500X2XBXA1	403179	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X2XBXA1	403180	52	
450	600	800	1200	500	650	880	968	6KGP43600X2XBXA1	403181	61	
500	650	880	1320	560	750	990	1089	6KGP43650X2XBXA1	403182	61	
560	750	990	1485	630	900	1120	1232	6KGP43750X2XBXA1	403183	61	
630	900	1120	1680	710	1000	1260	1386	6KGP43900X2XBXA1	403184	61	
710	1000	1260	1890	800	1200	1460	1606	6KGP431K0X2XBXA1	403185	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2XBXA1	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		6KGP63125X2XBXA1	403689	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XBXA1	403690	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XBXA1	403691	43
160	250	192	288	200	300	242	266		6KGP63250X2XBXA1	403692	44
200	300	242	363	250	350	290	319		6KGP63300X2XBXA1	403693	44
250	350	290	435	315	400	344	378		6KGP63350X2XBXA1	403694	44
315	450	344	516	400	500	400	440		6KGP63400X2XBXA1	403695	44
355	500	380	570	450	600	450	495		6KGP63500X2XBXA1	403696	52
400	550	410	615	500	650	500	550		6KGP63550X2XBXA1	403697	52
500	650	500	750	560	750	570	627	6KGP63650X2XBXA1	403698	52	
560	750	570	855	630	800	630	693	6KGP63750X2XBXA1	403699	52	
630	900	630	945	710	1000	730	803	6KGP63900X2XBXA1	403700	61	
710	1000	730	1095	800	1200	850	935	6KGP631K0X2XBXA1	403701	61	
800	1150	850	1275	900	1300	945	1040	6KGP631K1X2XBXA1	403702	61	
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K2X2XBXA1	403703	62	
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K3X2XBXA1	403704	62	
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K6X2XBXA1	404740	62	



## IP54 / IP55, with EMC filter Class A2, **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	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		6KGP43125X2XXXA1	403332	43
110	150	212	318	132	200	260	286		6KGP43150X2XXXA1	403333	43
132	200	260	390	160	250	315	346.5		6KGP43200X2XXXA1	403334	44
160	250	315	472.5	200	300	395	434.5	6KGP43250X2XXXA1	403335	44	
200	300	395	592.5	250	350	480	528	6KGP43300X2XXXA1	403336	44	
250	350	480	720	315	450	600	660	6KGP43350X2XXXA1	402909	52	
315	450	600	900	355	500	658	723.8	6KGP43450X2XXXA1	402910	52	
355	500	658	987	400	550	745	819.5	6KGP43500X2XXXA1	402911	52	
400	550	745	1117.5	450	600	800	880	6KGP43550X2XXXA1	402912	52	
450	600	800	1200	500	650	880	968	6KGP43600X2XXXA1	402913	61	
500	650	880	1320	560	750	990	1089	6KGP43650X2XXXA1	402914	61	
560	750	990	1485	630	900	1120	1232	6KGP43750X2XXXA1	402915	61	
630	900	1120	1680	710	1000	1260	1386	6KGP43900X2XXXA1	402916	61	
710	1000	1260	1890	800	1200	1460	1606	6KGP431KX2XXXA1	402917	62	
800	1200	1460	2190	1000	1350	1700	1870	6KGP431K2X2XXXA1	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		6KGP63125X2XXXA1	403590	43
110	150	131	196.5	132	200	155	171		6KGP63150X2XXXA1	403591	43
132	200	155	232.5	160	250	192	211		6KGP63200X2XXXA1	403592	43
160	250	192	288	200	300	242	266		6KGP63250X2XXXA1	403593	44
200	300	242	363	250	350	290	319		6KGP63300X2XXXA1	403594	44
250	350	290	435	315	400	344	378		6KGP63350X2XXXA1	403595	44
315	450	344	516	400	500	400	440		6KGP63400X2XXXA1	403596	44
355	500	380	570	450	600	450	495		6KGP63500X2XXXA1	403597	52
400	550	410	615	500	650	500	550		6KGP63550X2XXXA1	403598	52
500	650	500	750	560	750	570	627		6KGP63650X2XXXA1	403599	52
560	750	570	855	630	800	630	693	6KGP63750X2XXXA1	403600	52	
630	900	630	945	710	1000	730	803	6KGP63900X2XXXA1	403601	61	
710	1000	730	1095	800	1200	850	935	6KGP631KX2XXXA1	403602	61	
800	1150	850	1275	900	1300	945	1040	6KGP631K1X2XXXA1	403603	61	
900	1250	945	1417.5	1000	1400	1060	1166	6KGP631K2X2XXXA1	403604	62	
1000	1350	1060	1590	1200	1600	1260	1386	6KGP631K3X2XXXA1	403605	62	
1200	1600	1260	1890	1400	1900	1415	1557	6KGP631K61X1XXA1	404741	62	

AF-6 drives

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New



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

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

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

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

New



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

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

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

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

AF-6 drives

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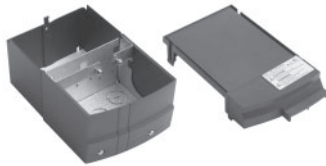
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Options and accessories

Field installed IP21/NEMA 1 add-on option kits



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

Remote mounting kit for graphical LCD keypad



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

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

Communications modules



<b>Profibus DP communications module</b> 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
<b>DeviceNet communications module</b> DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	404818
<b>Ethernet IP communications module(1)</b> 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
<b>Modbus TCP communications module</b> Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
<b>ProfiNet RT communications module</b> 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.

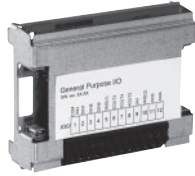


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## Options and accessories (continued)

AF-6 drives

### General purpose I/O module

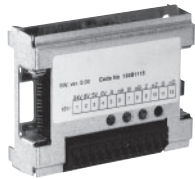


General purpose I/O internal drive mounted module for use on AF-650 GP and AF-600 FP drives.

Module includes: 3x digital inputs 24V  
2x digital outputs PNP/NPN  
2x analogue inputs 0-10V  
1x analogue output 0/4-20mA

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

### Encoder module



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

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

### Resolver module



Resolver internal drive mounted module for use on the AF-650 GP drive.

Module supports 4-8Vrms, 2.5kHz - 15kHz, 50mA resolvers. Resolution is 10bit at 4Vrms.

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

### Relay output module



Relay output internal drive mounted module for use on the AF-650 GP.

Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

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

### 24V DC External supply module



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

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

### Safe PLC I/O module



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

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

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Options and accessories (continued)

**Screw terminal accessory**

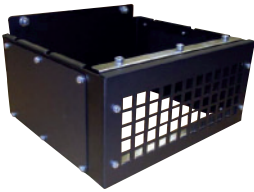
Screw terminal accessory is available for field installation on AF-650 GP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.



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

**Pedestal kit**

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



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

**USB kit**

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



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

**Power shields**

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

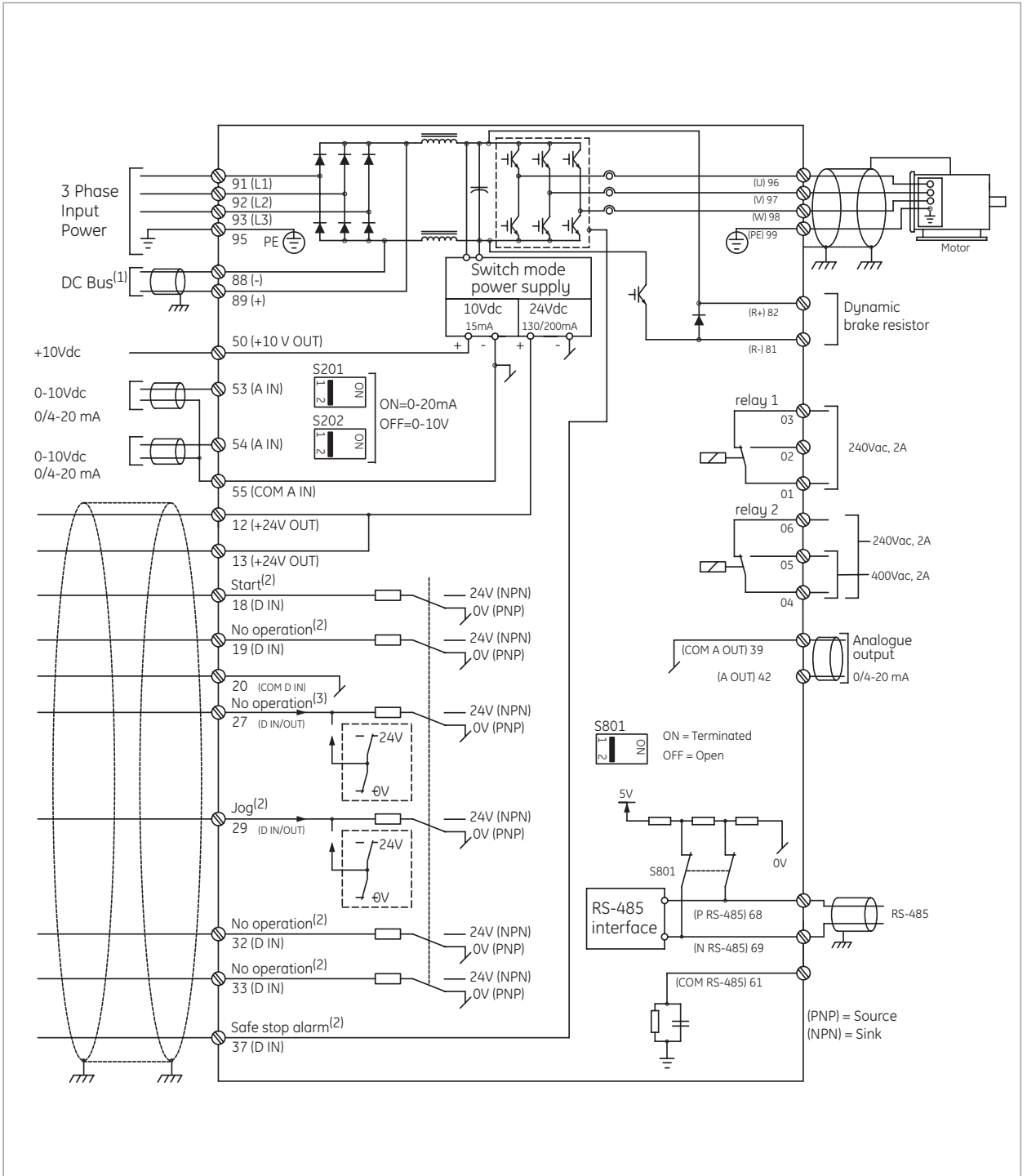
For Unit size 41 and 42 drives	OPCCOVER4142	404846
For Unit size 51 drives	OPCCOVER51	404847



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## Basic wiring diagrams



- (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.



New

# Specifications

## Environmental conditions

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

## Standards

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

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

## Output

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

## Control

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

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

## Logic controller (LC)

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

## Process controller (PI)

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

## Operation

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

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## Specifications

### Operation (continued)

<b>Output signals</b>	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
<b>Protective functions</b>	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

<b>Keypad features</b>	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
<b>Keypad keys</b>	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
<b>Password</b>	2 level password protection
<b>Alternate motor parameters</b>	Up to 4 separate complete parameter set-ups are available
<b>Graphical trending</b>	Trend speed, power, frequency or any value programmed in status display

### RS485 modbus RTU serial communications

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

### Mounting clearance

<b>Starting torque</b>	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

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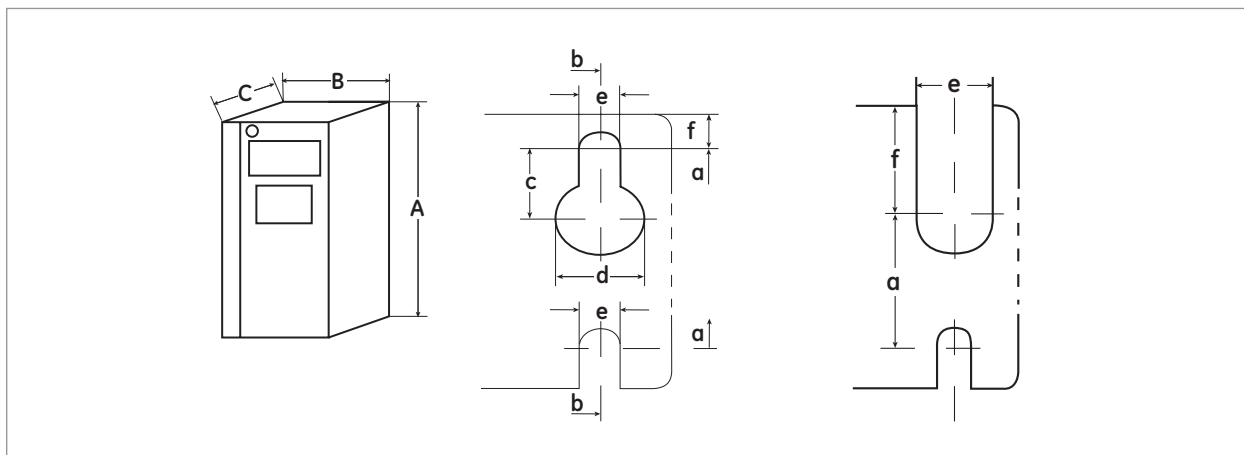
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Dimensional drawings



Dimensions, 1X unit sizes (mm)

Unit size		Dimensions	12	13	15
<b>Enclosure type</b>			IP20 Open chassis	IP20 Open chassis	IP55/IP66 NEMA 12/NEMA 4
<b>Voltage</b>	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
<b>Height</b>	Height of backplate	A	268	268	420
	Height with de-coupling plate	A	375	375	-
	Distance between mounting holes	a	257	257	402
<b>Width</b>	Width of backplate	B	90	130	242
	Distance between mounting holes	b	70	110	215
<b>Depth</b>	Depth without I/O and/or network option	C	205	205	195
	Depth with I/O and/or network option	C	220	220	195
<b>Screw holes</b>		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
<b>Weight (kg)</b>			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21	22	23	24
<b>Enclosure type</b>			IP55/IP66 NEMA 12/NEMA 4	IP55/IP66 NEMA 12/NEMA 4	IP20 Open chassis	IP20 Open chassis
<b>Voltage</b>	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
<b>Height</b>	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
<b>Width</b>	Width of backplate	B	242	242	165	230
	Distance between mounting holes	b	210	210	140	200
<b>Depth</b>	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
<b>Screw holes</b>		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
<b>Weight (kg)</b>			23.0	27.0	12.0	23.5



New

## Dimensional drawings

### Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31	32	33	34
<b>Enclosure type</b>			IP55/IP66	IP55/IP66	IP20	IP20
			NEMA 12/NEMA 4	NEMA 12/NEMA 4	Open chassis	Open chassis
<b>Voltage</b>	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
<b>Height</b>	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
<b>Width</b>	Width of backplate	B	308	370	308	370
	Distance between mounting holes	b	272	334	270	330
<b>Depth</b>	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
<b>Screw holes</b>		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
<b>Weight (kg)</b>			45	65	35	50

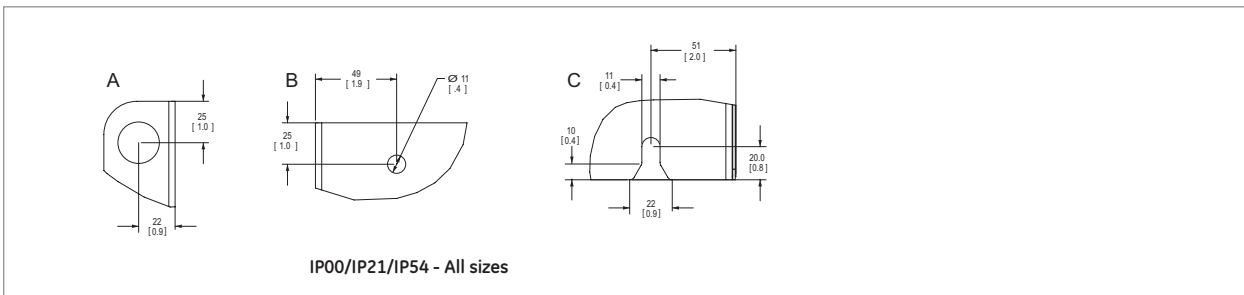
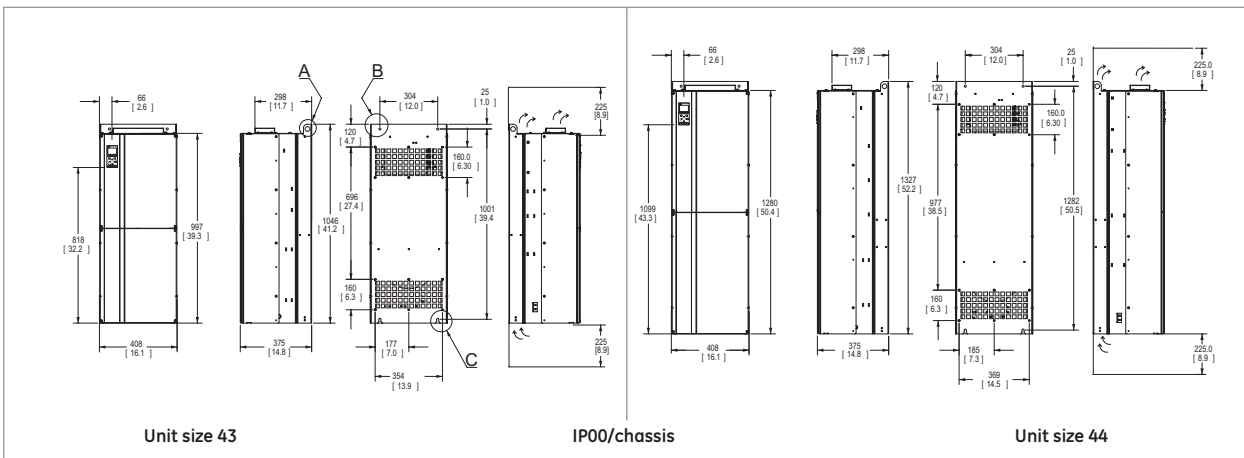
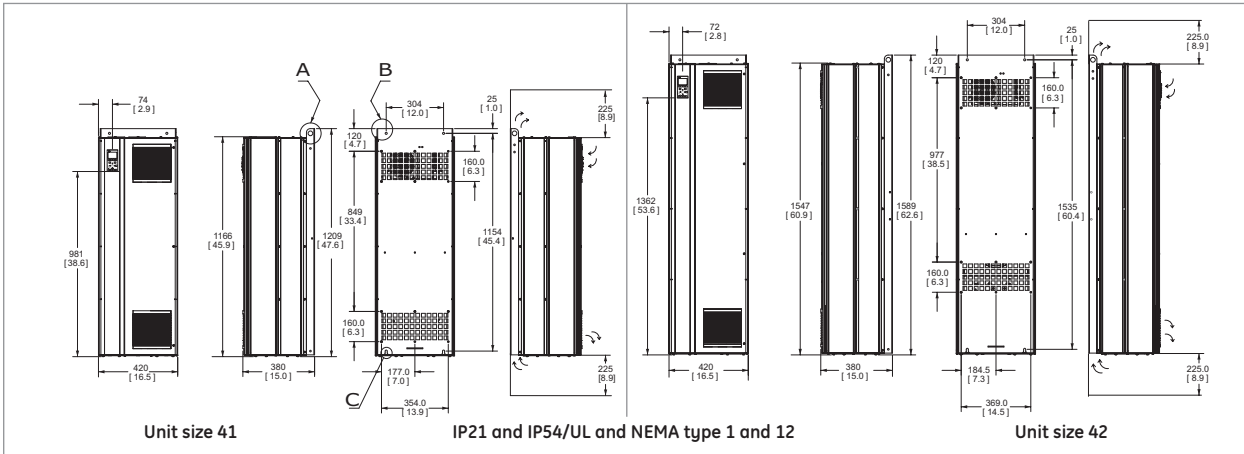
### Dimensions IP20 open chassis drives with field installed IP21/NEMA 1 kits<sup>(1)</sup> (mm)

Unit Size	12	13	23	24	33	34	
<b>Enclosure type</b>	IP20 open chassis with IP21/NEMA 1 kit						
<b>Voltage</b>	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
<b>Height</b>							
Height with kit	375	375	475	671	754	950	
<b>Width</b>							
Width of backplate	94	130	165	231	397	371	
Distance between mounting holes	70	110	140	201	269	330	
<b>Depth</b>							
Depth without I/O and/or network option	205	205	249	242	338	338	
Depth with I/O and/or network option	220	220	262	242	338	338	

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

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

Dimensional drawings in mm (inches)



Unit size	41	42	43	44
Enclosure type	IP21/IP54 NEMA 1/NEMA 12	IP21/IP54 NEMA 1/NEMA 12	IP00	IP00
Voltage	400V 90 to 110kW 125 to 150HP	400V 132 to 200kW 200 to 300HP	400V 90 to 110kW 125 to 150HP	400V 132 to 200kW 200 to 300HP
	690V 90 to 132kW 125 to 200HP	690V 160 to 315kW 250 to 400HP	690V 15 to 22kW 125 to 200HP	690V 160 to 315kW 250 to 400HP
Shipping dimensions	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1730 Depth: 570	Height: 650 Width: 1220 Depth: 570	Height: 650 Width: 1490 Depth: 570
Drive dimensions	Height: 1209 Width: 420 Depth: 380	Height: 1589 Width: 420 Depth: 380	Height: 1046 Width: 408 Depth: 375	Height: 1327 Width: 408 Depth: 375
Weight (kg)	104	106	91	138



New



## Dimensional drawings in mm (inches)

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

<b>Unit size 51</b>	
<b>Enclosure type</b>	IP21/IP54 NEMA 1/NEMA 12
<b>Voltage</b>	400V 250 to 400kW 350 to 550HP
	690V 355 to 560kW 500 to 750HP
<b>Shipping dimensions</b>	
Height	841
Width	2197
Depth	734
<b>Drive dimensions</b>	
Height	2000
Width	600
Depth	494
<b>Weight (kg)</b>	313

**Unit size 52, IP00/Chassis**

<b>Unit size 52</b>	
<b>Enclosure type</b>	IP00 Open chassis
<b>Voltage</b>	400V 250 to 400kW 350 to 550HP
	690V 355 to 560kW 500 to 750HP
<b>Shipping dimensions</b>	
Height	831
Width	1704
Depth	734
<b>Drive dimensions</b>	
Height	1547
Width	585
Depth	498
<b>Weight (kg)</b>	313

**Unit Size 61**

<b>Unit size 61</b>	
<b>Enclosure type</b>	IP21/IP54 NEMA 1/NEMA 12
<b>Voltage</b>	400V 450 to 630kW 600 to 900HP
	690V 630 to 800kW 900 to 1150HP
<b>Shipping dimensions</b>	
Height	2324
Width	1570
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	1400
Depth	606
<b>Weight (kg)</b>	1004

Dimensional drawings in mm (inches)

New



**Unit size 62**

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

**Unit size 63**

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

**Unit size 64**

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



## AF-600 FP - Fan and Pump Drives

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

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

Following models are available:

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

### Features

All features HVAC needs

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

### Approvals / Marking



UL, cUL, C-Tick

### Applications

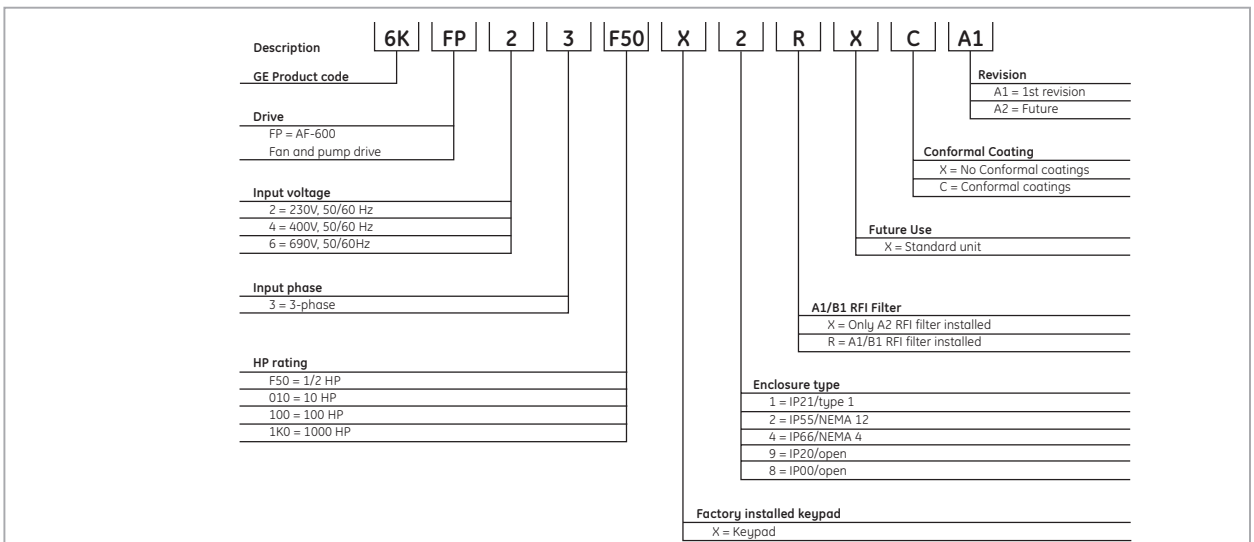
#### Fan

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

#### Pump

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

### Product numbering system diagram



Product number for illustrative purposes only



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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

AF-6 drives

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**New**



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

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

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

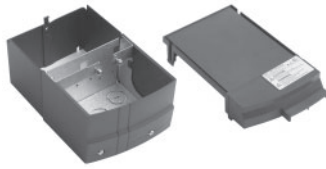
(2) IP21/NEMA 1 kits are available as field installed options for all 230V drives from 1.1 to 45kW / 1 to 60HP and for all 400V drives from 1.1 to 90kW / 1 to 125HP. See page H.51.



New

## Options and accessories

### Field installed IP21/NEMA 1 add-on option kits



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

### Remote mounting kit for graphical LCD keypad

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



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

### Communications modules



<b>Profibus DP communications module</b> 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
<b>DeviceNet communications module</b> DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	404818
<b>Ethernet IP communications module(1)</b> 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
<b>Modbus TCP communications module</b> Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
<b>ProfiNet RT communications module</b> ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	404825
<b>LonWorks communications module</b> LonWorks internal drive mounted module for use on AF-600 FP drives only. Supports LonWorks building automation communications networks.	OPCLON	404823
<b>BacNet communications module</b> BacNet internal drive mounted module for use on AF-60 FP drives only. Supports BacNet MSTP building automation communications networks.	OPCBAC	404817

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

Options and accessories (continued)

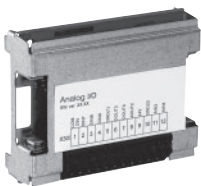
**Relay output module**



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

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

**Analog I/O module**



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

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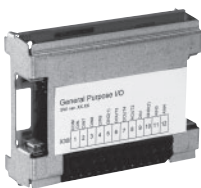
**24V DC external supply module**



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

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



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

General purpose I/O module	OPCGPIO	404821
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**Screw terminal accessory**



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

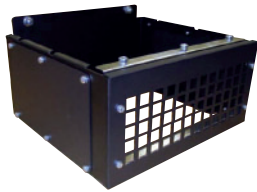
Screw terminal accessory	OPCSTERM	404822
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New



## Options and accessories (continued)



### Pedestal kit

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

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

### USB kit

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



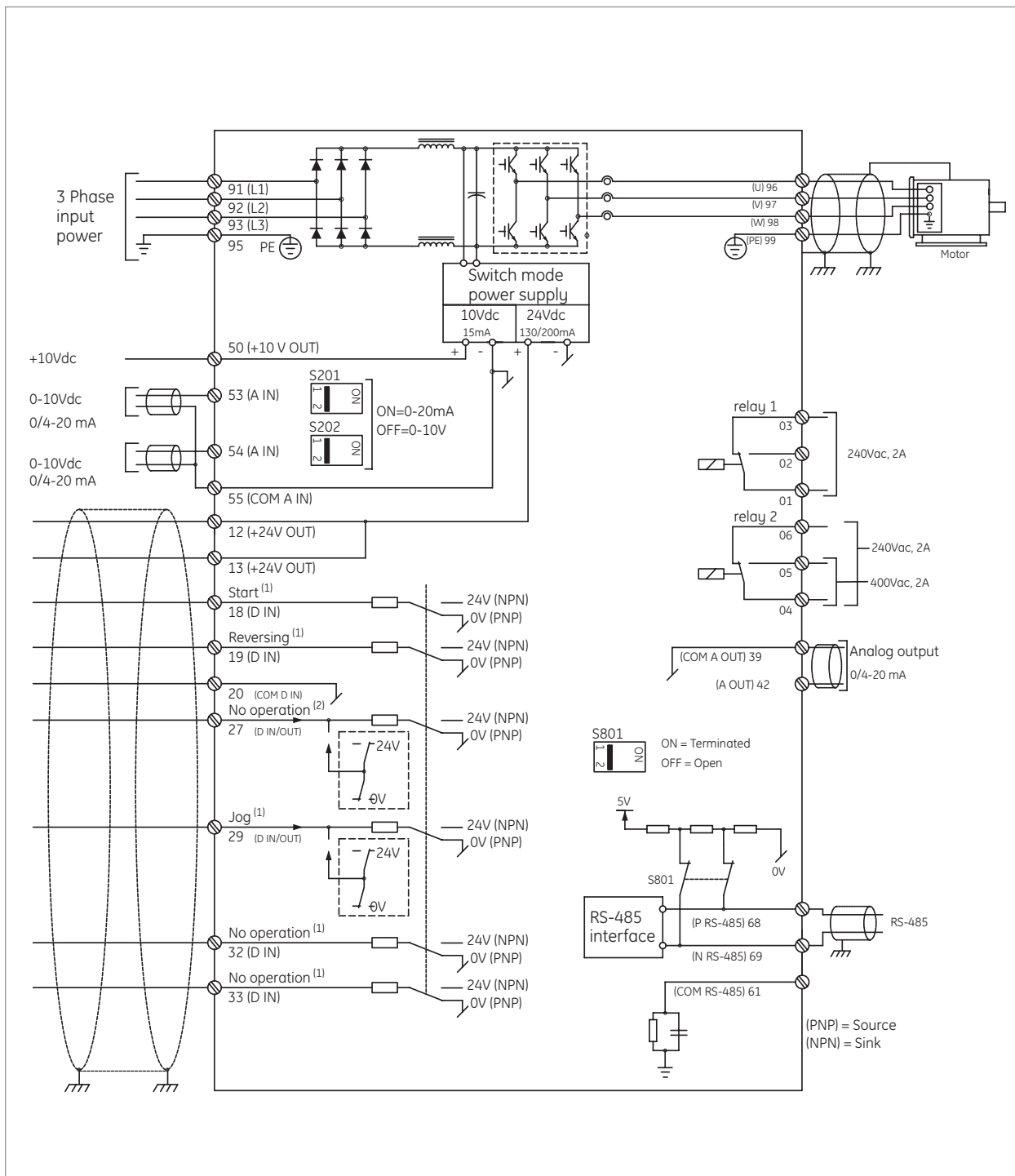
Description	Cat. No.	Ref. No.
For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

### Power shields

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

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

### Basic wiring diagrams



(1) Indicates default setting; see parameter group E-## to re-program.

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

## Specifications

### Environmental conditions

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

### Standards

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

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

### Output

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

### Control

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

### Logic controller (LC) sequencer

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

### Process controller (PID)

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

## Specifications

### Operation

<b>Operation method</b>	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
<b>Frequency reference signal</b>	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10Vdc, 10 to 0 Vdc 0-10 Vdc analog input 0/4-20 ma analog input
<b>References</b>	Up to 3 Input references can be selected from analogue input #1 or #2, frequency input #1 or #2, network, or potentiometer
<b>Input signals</b>	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

<b>Keypad features</b>	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
<b>Keypad keys</b>	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
<b>Password</b>	2 level password protection
<b>Alternate motor parameters</b>	Up to 4 separate complete parameter set-ups are available
<b>Graphical trending</b>	Trend speed, power, frequency

### RS485 Modbus RTU serial communications

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

## Efficiency, Watt loss, unit size, dimensions and weights

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

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

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

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

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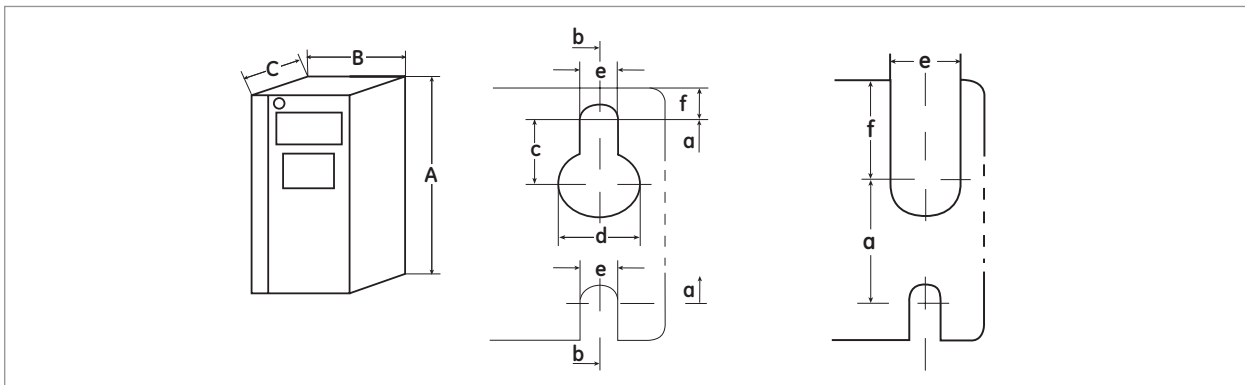
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Dimensional drawings



Dimensions, 1X unit sizes (mm)

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

Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21	22	23	24
<b>Enclosure type</b>			IP55	IP55	IP20	IP20
<b>Voltage</b>	230V		NEMA 12 5.5 to 11kW 7.5 to 15HP	NEMA 12 15kW 20HP	Open chassis 5.5 to 11kW 7.5 to 15HP	Open chassis 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
<b>Height</b>	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
<b>Width</b>	Width of backplate	B	242	242	165	230
	Distance between mounting holes	b	210	210	140	200
<b>Depth</b>	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
<b>Screw holes</b>		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
<b>Weight (kg)</b>			23.0	27.0	12.0	23.5



New

## Dimensional drawings

### Dimensions, 3X unit sizes (mm)

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

AF-6 drives

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

Unit size		12	13	23	24	33	34
<b>Enclosure type</b>		IP20 open chassis with IP21/NEMA 1 Kit					
<b>Voltage</b>	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
<b>Height</b>	Height with kit	375	375	475	671	754	950
<b>Width</b>	Width of backplate	94	130	165	231	397	371
	Distance between mounting holes	70	110	140	201	269	330
<b>Depth</b>	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.

Intro

A

B

C

D

E

F

G

H

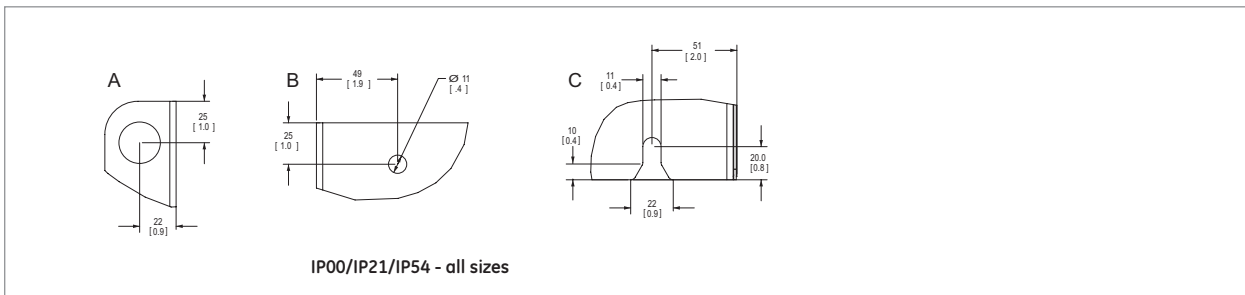
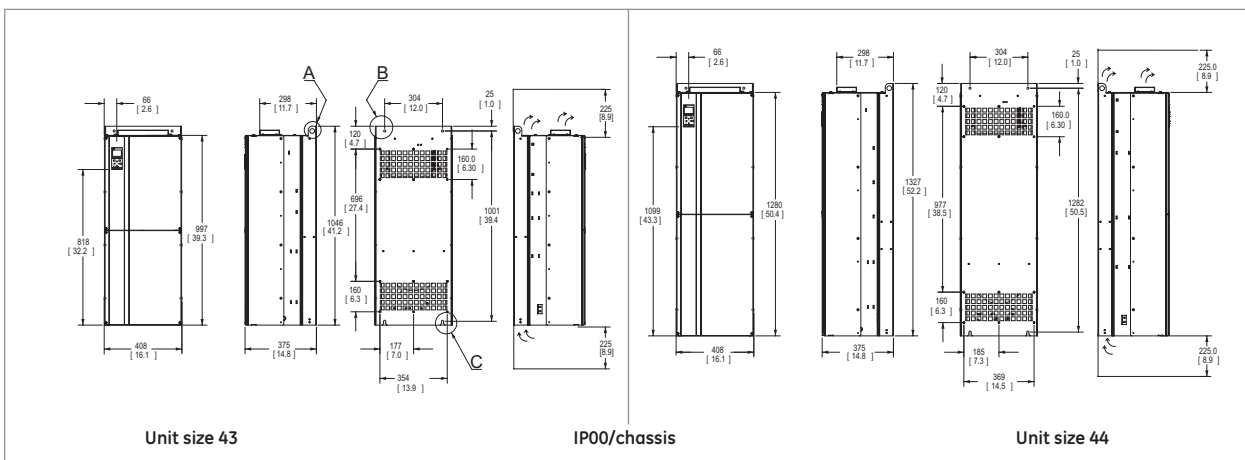
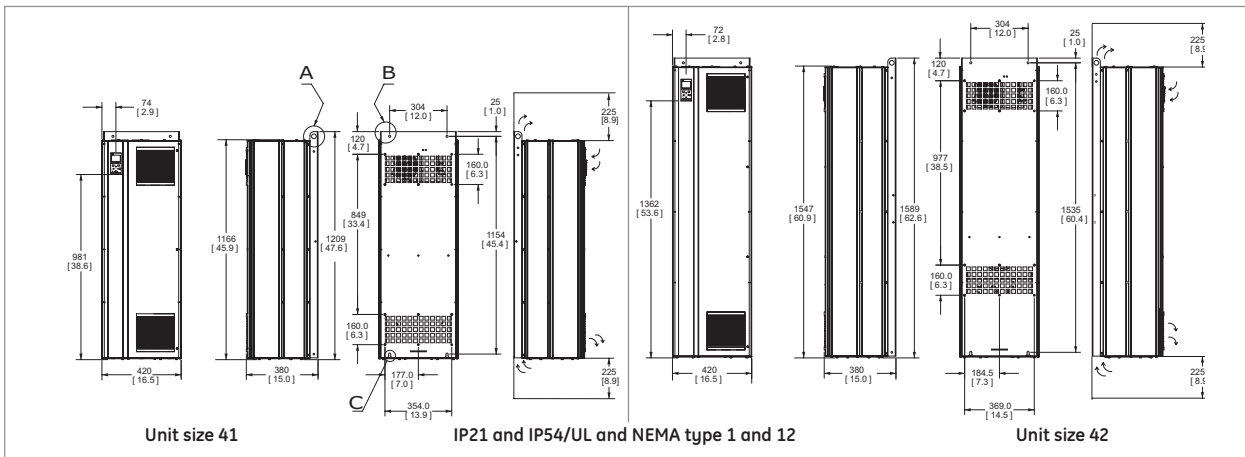
I

J/X



New

Dimensional drawings in mm (inches)



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



## Dimensional drawings in mm (inches)

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

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

**Unit size 52, IP00/chassis**

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

**Unit size 61**

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

Dimensional drawings in mm (inches)

New



**Unit size 62**

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

**Unit size 63**

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

**Unit size 64**

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

## Dynamic Braking Resistors

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

Important application notes:

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

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

### Dynamic braking resistors- AF-60 LP drives 230 Vac

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

### 400 Vac

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

## Dynamic braking resistors - AF-650 GP drives

## 230 Vac

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

## 400 Vac

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

## 690 Vac

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

For higher motor power please contact GE