

GE Energy

Built-in features Built-in simplicity Built-in dependability

AF-600 FP™ Panel for Fan & Pump Applications

a product of
ecomagination



imagination at work

AF-600 FP™ Fan & Pump Drives Built for variable torque



Specifically designed for fan and pump applications, the AF-600 FP drive has been optimized to make it run your applications right out of the box.

- Fans: HVAC, cooling towers, VAV, supply and return, exhaust, fume hood, make-up air, induced and forced draft, furnace temperature control
- Pumps: chilled water, pressure boosting, cooling tower, wastewater, chiller, irrigation, hydro-storage

A full range of enclosed drives are available in NEMA Type 1 (Slimline up to 75HP @ 460Vac) or traditional style NEMA 12 enclosures.

- 2-60HP @ 208Vac
- 2-300HP @ 460Vac
- 2-150HP @ 575Vac

NEMA 3R enclosures are also available.

- 2-60HP @ 208Vac
- 2-150HP @ 460Vac
- 2-150HP @ 575Vac

Power schemes include:

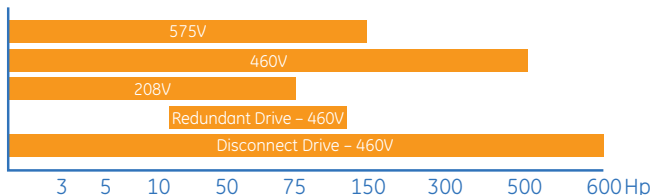
- Disconnect, when space and simplicity are needed
- Non-bypass, with full range of options
- 2 contactor bypass
- 3 contactor bypass
- Redundant drive bypass, for critical operations when variable speed is always needed

This gives electrical contractors a one-stop-shop source for their needs.

Dedicated features include sophisticated controls that lower your overall costs. That includes an Energy Savings Optimizer that can boost energy savings by 5-15% at partial loads.

- Energy monitoring and analysis reports provide payback analysis for your drives
- Compliance with major standards UL and cUL

AF-600 FP Panel



Built-in features lower your total cost

- Self protecting features
- 110% current overload for 1 minute
- Flying start (catch a spinning motor)
- Precise stop function
- Electronic thermal overload
- Easy to use PC software
- Energy monitoring feature
- Flow compensation
- Pump cascade controller
- Sleep mode
- Automated resonance monitoring
- Fan belt monitoring
- Stairwell pressurization
- Fire override mode
- Dry pump protection
- 4 auto-tune PID controllers
- Resonance monitoring
- Belt monitoring
- Real time clock

AF-600 FP Fan & Pump Drives

Built-in simplicity speeds set-up

The removable keypad, common to all AF-6 Series drives, is your window into all programming and information elements.

The keypad INFO key provides full-text, context-sensitive information to make programming easier and can eliminate the need for printed manuals. In most cases, start-up can be completed in less than 5 minutes – saving you valuable time.

You can set up one drive and then copy settings to other drives using the hot pluggable feature, eliminating the need for duplicate programming.

The Quick Menu provides easy access to all the basic settings and the controller.

- Hot pluggable
- Illuminated LCD display
- Parameters & their values
- Unit indications
- Rotation direction indication
- Set-up indication
- Custom user displays
- Trended charts display speed, torque, current
- Full alarm messages & descriptions



AF-600 FP Fan & Pump Drives

Standard features

Control card

Terminal blocks	Pluggable, spring-loaded
Serial ports	RS485 and USB ports
Control inputs	4/6 digital, 2 analog, 2 pulse
Control outputs	2 relay, 1 analog, 2 pulse



Fieldbus

Built-in Modbus RTU, Metasys N2, Apogee FLN P1

Logic controller

Built-in sequencer that can eliminate the need for PLCs or timers
Easy to learn, program and debug

DCT-10 software

Familiar, intuitive interface
Option programming
On- and off-line utility
Real-time data collection
Process management interaction
USB, RS485 or Fieldbus communication
On-board help for each parameter
Logging of alarms and warnings
Easy fault history documentation



RFI filter

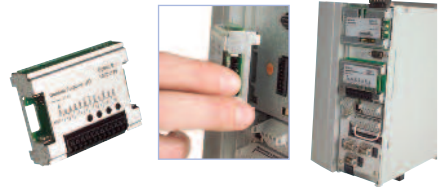
Reduces interference
A2 standard

DC link reactor

Low harmonic emission: THID <35%
No voltage drop, full output voltage
Fulfills EN 61000-3-2/3-12
Displacement power factor ($\cos \phi \sim 1$)
True power factor 0.9

Optional features

Plug-and-play option modules deliver application versatility so you can maximize performance and energy savings.



Drive communication options

Bacnet, DeviceNet, Ethernet IP, LonWorks®, Modbus TCP/IP, Profibus DP, ProfiNet

Analog I/O

3 analog inputs, 3 analog outputs
Battery back-up power for internal real-time clock

General purpose I/O

3 digital and 3 analog inputs
2 digital and 1 analog outputs

Relay output

Adds 3 relay outputs

Line / load reactors

Line reactor

- Additional 3% impedance as an option
- Low harmonic emission: THID <28%

Load reactor

- Filters switching frequency from drive output
 - Reduces motor's audible noise
 - Eliminates dV/dt and V_{peak} motor insulation stresses
 - Allows use of non-VFD rated motors
- MultiPulse, i.e., 12, 18 or 24 pulse configurations available for IEEE-519 requirements

Conformal coating

Protects electronics from aggressive atmospheres, tested to ANSI/ISA S71.04-1985, Classes G3 and GX

GE Fastrac Program

The AF-600 FP Drive Panels are available as part GE's Fastrac program. This cuts normal cycle times in half, so you get the same product faster and meet your construction cycle needs.

The following products and configurations are available with the Drive Panel Fastrac program:

- AF-600 FP NEMA Type 1 panels
- Non-bypass and 2 or 3 contactor bypass
- Up to 30hp @ 208 Vac and 75hp @ 460 Vac or 575 Vac
- Fusible disconnect or circuit breaker
- 5% or 8% line impedance
- HOA operator, Drive Run and Fault Pilot Lights, and/or a Speed Potentiometer
- Modbus RTU, Metasys N2 and Apogee FLN P1 communications

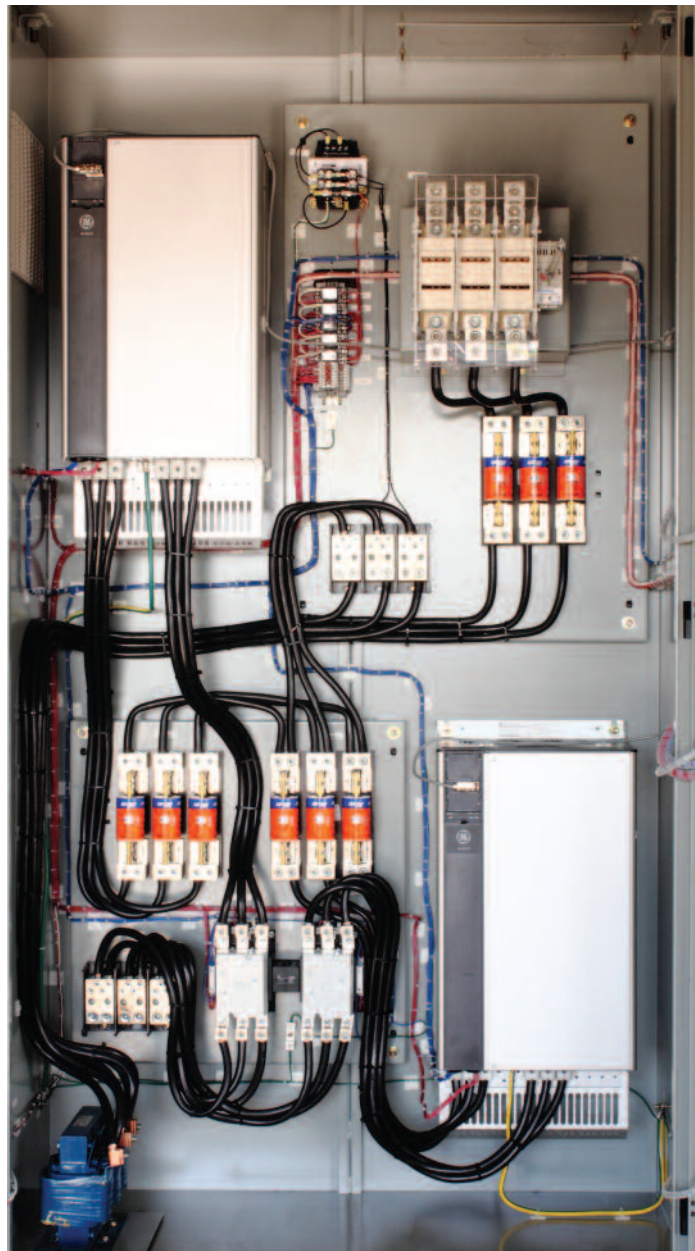
Contact your local GE Sales office for specifics on this program, the premium and for ordering assistance.

AF-600 FP Fan & Pump Drives Redundant Drive

In certain applications a full voltage or reduced voltage bypass cannot be used because the functionality and control that only an adjustable speed drive can provide is required all of the time. Whether your process (e.g., fan walls, pre-set speeds, setpoint control, etc.), your system (e.g., unable to line start due to air or fluid pressure limitations) or your environment (e.g., clean rooms, hospital rooms, etc.) demands it, GE's AF-600 Redundant Drive Panel suits such critical installations where variable speed is always needed even in bypass operation.

Incorporating two drives in a common enclosure, the Redundant Drive's features include:

- 15 through 125hp @ 460Vac
- NEMA 1 Enclosure
- Slimline or traditional (as shown) enclosure styles available up to 50Hp
- Output isolation (for off mode)
- Electrical and mechanical interlocks
- Drive selector switch with off position
- HOA operation via keypads
- Separate power fusing to maximize run time
- Optional 8% input impedance



AF-600 FP Fan & Pump Drives

Redundant Drive Advantages

Feature	Bypass Method				
	3 Contactor Drive with Full Voltage Starter*	3 Contactor Drive with Full Voltage Starter & Spare Core	Solid State Starter	Two Stand Alone Drives	Redundant Drive Bypass
Price	\$ (Base line for comparisons)	1.8 X \$ - Requires installation of replacement drive	1.6 X \$	2.2 X \$ - Requires addition of isolation switch	1.7 X \$
Process Operation in Bypass	60hz operation only. Manually change dampers or valves to handle pressure or flow differences. Loss of "comfort control"	60hz operation only. Manually change dampers or valves to handle pressure or flow differences until drive is replaced. Loss of "comfort control"	60hz operation only. Manually change dampers or valves to handle pressure or flow differences. Loss of "comfort control"	Same process control in bypass but requires manually alternating between drives (e.g., isolation switch).	Same process control in bypass
Controls / Limits Bypass Starting Current	6 to 10X running current	6 to 10X running current until drive is replaced	4 to 6X running current	No inrush current	No inrush current
Controls Bypass Starting Torque / Mechanical Surge	Low level of control	Low level of control until drive is replaced	Medium level of control	High level of control	High level of control
Adjustable Speed	Not available	Not available until drive is replaced	Only available during ramps	Available in bypass	Available in bypass
Overspeed Operation	Not available	Not available until drive is replaced	Not available	Available in bypass	Available in bypass
Overall Performance Ranking	5th	4th	3rd	2nd	1st

*Base line for comparisons



AF-600 FP Fan & Pump Drives Panel Data

		Disconnect	Enclosed	2 Contactor Bypass	3 Contactor Bypass	Redundant Drive Bypass
HP Ratings	208Vac, 3PH, 60Hz	1 - 60hp	2 - 60hp	2 - 60hp	2 - 60hp	-
	460Vac, 3PH, 60Hz	1 - 600hp	2 - 500hp	2 - 500hp	2 - 500hp	15 - 125hp
	575Vac, 3PH, 60Hz	1 - 650hp	2 - 150hp	2 - 150hp	2 - 150hp	-
Environment	Ambient Temperature	-10°C to 40°C	-10°C to 40°C	-10°C to 40°C	-10°C to 40°C	-10°C to 40°C
	Humidity (RH, non-condensing)	5% to 95%	5% to 95%	5% to 95%	5% to 95% RH	5% to 95% RH
	Elevation	0 to 3,300 ft	0 to 3,300 ft	0 to 3,300 ft	0 to 3,300 ft	0 to 3,300 ft
Enclosure Type, Style	NEMA 1, Slimline Style	Std. (1 - 60hp @ 208Vac) (1 - 125hp @ 460Vac) (1 - 125hp @ 575Vac)	Std. (2 - 30hp @ 208Vac) (2 - 75hp @ 460Vac) (2 - 75hp @ 575Vac)	Std. (2 - 30hp @ 208Vac) (2 - 75hp @ 460Vac) (2 - 75hp @ 575Vac)	Std. (2 - 30hp @ 208Vac) (2 - 75hp @ 460Vac) (2 - 75hp @ 575Vac)	Std. (15 - 50hp)
	NEMA 1, Traditional Style	Std. (150 - 600hp @ 460Vac) (150 - 650hp @ 575Vac)	Std. (40 - 60hp @ 208Vac) (100 - 500hp @ 460Vac) (100 - 150hp @ 575Vac)	Std. (40 - 60hp @ 208Vac) (100 - 500hp @ 460Vac) (100 - 150hp @ 575Vac)	Std. (40 - 60hp @ 208Vac) (100 - 500hp @ 460Vac) (100 - 150hp @ 575Vac)	Opt. (15 - 50hp) Std. (60 - 125hp)
	NEMA Type 12	-	Opt. (2 - 60hp @ 208Vac) (2 - 300hp @ 460Vac) (2 - 150hp @ 575Vac)	Opt. (2 - 60hp @ 208Vac) (2 - 300hp @ 460Vac) (2 - 150hp @ 575Vac)	Opt. (2 - 60hp @ 208Vac) (2 - 300hp @ 460Vac) (2 - 150hp @ 575Vac)	-
	NEMA Type 3R	-	Opt. (2 - 60hp @ 208Vac) (2 - 150hp @ 460Vac) (2 - 150hp @ 575Vac)	Opt. (2 - 60hp @ 208Vac) (2 - 150hp @ 460Vac) (2 - 150hp @ 575Vac)	Opt. (2 - 60hp @ 208Vac) (2 - 150hp @ 460Vac) (2 - 150hp @ 575Vac)	-
	Conformal Coating (for All NEMA Types)	Opt.	Opt.	Opt.	Opt.	-
Codes & Standards	UL & cUL	Std.	Std.	Std.	Std.	Std.
Power Circuit Features	Fused Disconnect (panel short circuit current rating = 100kA)	Std.	Std.	Std.	Std.	Std.
	Mag-Break Circuit Breaker (panel short circuit current rating = 65kA)	Opt. (all hp @ 208Vac) (up to 600hp @ 460Vac) (up to 650hp @ 575Vac)	Opt.	Opt.	Opt.	-
	5% Line Impedance	Std. (via DC link reactor)	Std. (via DC link reactor)	Std. (via DC link reactor)	Std. (via DC link reactor)	Std. (via DC link reactor)
	8% Line Impedance (via line & link reactors)	Opt. (all hp @ 208Vac) (up to 600hp @ 460Vac) (up to 650hp @ 575Vac); Opt. for 6.5% impedance	Opt.	Opt.	Opt.	Opt.
	3% Load Reactor	Opt. (all hp @ 208Vac) (up to 600hp @ 460Vac) (up to 650hp @ 575Vac); Opt. for 1.5% impedance	Opt.	Opt.	Opt.	-
	MultiPulse configurations	-	Opt.	Opt.	Opt.	-
	Line Isolation Contactor	-	-	-	Std.	Std. (1 per drive)
	Drive Output Contactor	-	-	Std.	Std.	-
	Bypass Contactor	-	-	Std.	Std.	-
Class 20/30 Overload Relay	-	-	Std.	Std.	-	
Door Mounted Indicators & Operators	Hand-Off-Auto Switch	via keypad	Std.	Std.	Std.	via keypads (1 per drive)
	Drive-Off-Bypass Switch	-	-	Std.	Std.	Std. (Drive 1-Off-Drive 2)
	Test-Isolate-Normal Switch	-	-	-	Std.	-
	Elapsed Time Meter	via keypad	Std. (via keypad); Opt. (via ETM)	Std. (via keypad); Opt. (via ETM)	Std. (via keypad); Opt. (via ETM)	via keypads
	Bypass Status	-	-	Std. (via light)	Std. (via light)	-
	Drive Run & Fault Status	via keypad	Opt.	Std. (via keypad); Opt. (via lights)	Std. (via keypad); Opt. (via lights)	via keypads
	Enable Status	via keypad	Std. (via keypad & light)	Std. (via keypad & light)	Std. (via keypad & light)	via keypads
	Motor Overload Status	via keypad	via keypad	Std. (via keypad & light)	Std. (via keypad & light)	via keypads
	Normal Status	via keypad	via keypad	via keypad	Std. (via keypad & light)	via keypad
	Power On Status	via keypad	Std. (via keypad & light)	Std. (via keypad & light)	Std. (via keypad & light)	Std. (via keypads & lights)
	Speed Potentiometer	via keypad	Std. (via keypad); Opt. (via potentiometer)	Std. (via keypad); Opt. (via potentiometer)	Std. (via keypad); Opt. (via potentiometer)	via keypads
Control Circuit Features	Customer I/O Terminal Board	Std.	Std.	Std.	Std.	Std.
	Control Power Transformer	-	Std.	Std.	Std.	Std.
	Quantity 2 Enable Inputs	-	Std.	Std.	Std.	Std.
	Drive Run Output (1NO-1NC)	Std.	Std.	Std.	Std.	Std. (1 per drive)
	Drive Fault Output (1NO-1NC)	Std.	Std.	Std.	Std.	Std. (1 per drive)
	4-20mA Output	Std.	Std.	Std.	Std.	Std. (1 per drive)
	Remote Bypass Input	-	-	Std.	Std.	Std.
	Bypass Output (NO)	-	-	Std.	Std.	-
	Smoke Purge Relay	-	Opt.	Opt.	Opt.	-
	Loss of 4-20mA Speed Ref (go to fix speed)	-	Opt.	Opt.	Opt.	-
Automatic Bypass	-	-	Opt.	Opt.	-	
Communication & Control Option Modules	Modbus RTU / Apogee® FLN / Metasys® N2	Std.	Std.	Std.	Std.	Std.
	Bacnet, DeviceNet, Ethernet IP, LonWorks®, Modbus TCP/IP, Profibus DP or ProfiNet	Field Installable	Opt.	Opt.	Opt.	Opt.
	Analog I/O	Field Installable	Opt.	Opt.	Opt.	Field Installable
	General Purpose I/O	Field Installable	Opt.	Opt.	Opt.	Field Installable
	Relay Output	Field Installable	Opt.	Opt.	Opt.	Field Installable

AF-600 FP Fan & Pump Drives

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www.geindustrial.com/drives

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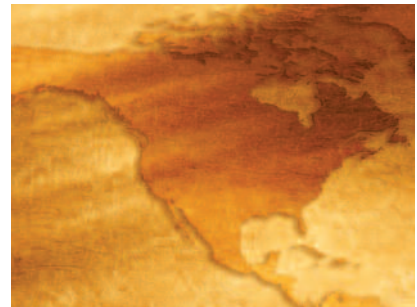
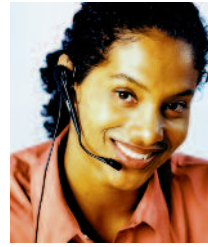
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