

Drives

AF-600FP™ Fan and Pump Drive

Standard 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. (1000M) 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

Standard

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 208/230V and 460V.
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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 525-600 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 10HP, Maximum once/minute above 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 460V above 125HP and 525-690 V above 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 460V above 125HP and 525-690 V above 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	Upto 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	0.0-200 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%



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Section 15

Operation

Operation Method	Keypad operation: Hand, Off, Auto Digital Input: Programmable for Start/Stop, Forward/Reverse, Jog Timer operation: Stop after predetermined time frame Communications: RS-485 Modbus RTU, Metasys N2, and Apogee FLN P1 USB Port for programming drive with optional PC Software
Frequency Reference Signal	Left or Right Arrow buttons on keypad in Manual Mode Speed Potentiometer: 0 to +10 Vdc, 10 to 0 Vdc 0-10Vdc analog input 0/4-20ma analog input
References	Up to 3 Input References can be selected from Analog Input #1 or #2, Frequency Input #1 or #2, Network, or Potentiometer
Digital Input Signal	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 - 110000Hz Accel / Decel Time select. Set Input to Accel / Decel Times 1 to 4 Digital Potentiometer Input Increase or Decrease Mechanical Brake Feedback

Keypad

Keypad Features	LCD Display with 6 Alpha-numeric lines. Multi-Language Support Hot Pluggable, Remote Mount Option, and CopyCat 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 Menukeys and H-O-A keys
Keypad Keys	Status - shows status of drive Quick Menu - Enters Quick Start, Parameter Data Check, or Trending Modes Main Menu - Used for programming all drive parameters Alarm Log - Used to display Alarm list Back - Reverts to previous step or layer in parameter structure Cancel - Used to cancel last change or command Info - Displays information about a command, parameter, or function in any display. Hand/Off/Auto - Used to control drive locally or put drive in remote mode Reset - Used to reset Warnings or Alarms
Password	2 Level Password Protection
Alternate Motor Parameters	Up to 4 Separate complete parameter set-ups are available
Graphical Trending	Trend - Speed, Power, or Frequency

RS485 Modbus RTU Serial Communications

Physical Level:	EIA/RS485
Transmission distance:	1640 ft (500m)
Node Address:	32
Transmission Speed:	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
Transmission Mode:	Half Duplex
Transmission Protocol:	Modbus RTU
Character Code:	Binary
Character Length:	8 Bits
Error Check:	CRC

Mounting Clearance

All AF-650GP™ drives can be mounted Side-by-Side without spacing. For all drives rated 125HP or below allow 3.4 inches (100mm) free space above and below. For all drives rated 150HP and above allow 8.9 inches (225mm) free space above and below.

