

GE Energy

Built-in features
Built-in simplicity
Built-in ruggedness

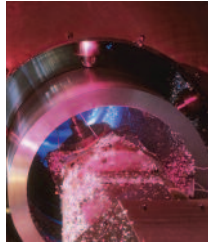
AF-650 GP™ Panel for Constant Torque Applications

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AF-650 GP™ Constant Torque Drives Built for constant torque



The AF-650 GP drive is designed for light and heavy duty control of mixers and material handling applications. It also provides vector modes (advanced, sensorless and closed loop) for those demanding torque and speed applications. It's just right for:

- Conveyors
- Mixers
- Agitators
- Lathes
- Spinning machines
- Machine tool
- Grinders
- Extruders
- Plastic injection molding machines
- Woodworking machines
- Constant displacement pumps

A full range of enclosed drives are available in NEMA Type 1 (Slimline up to 60HP & 460Vac) or traditional style NEMA 12 enclosures.

- 1–50HP @ 208Vac
- 1–500HP @ 460Vac
- 1–100HP @ 575Vac

NEMA 3R enclosures are also available.

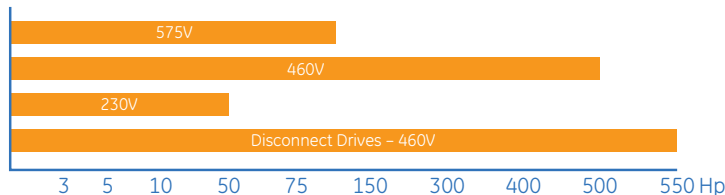
- 1–50HP @ 208Vac
- 1–150HP @ 460Vac
- 1–100HP @ 575Vac

Power schemes include:

- Disconnect, when space and simplicity are needed
- Non-bypass, with full range of options
- 2 contactor bypass
- 3 contactor bypass

These power ratings, combined with our product features, allow us to meet your standard drive needs.

AF-650 GP Panel



Fully functional, fully ready

- Self protecting features
- Electronic thermal overload
- 150% current overload up to 1 minute
- Flying start (catch a spinning motor)
- Speed and process PID controls
- 24V encoder feedback built-in
- Precise stop function
- Advanced brake control
- Energy monitoring feature
- Easy to use PC software
- Modbus RTU built-in

AF-650 GP Constant Torque 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-650 GP Constant Torque 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, 1 encoder, 24 Vdc
Control outputs	2 relay, 1 analog, 2 pulse



Fieldbus

Built-in Modbus RTU

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

Equivalent to 3 phase 3% line reactor

- Smaller in size and integral to drive

Low harmonic emission: THID < 48%
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

Ethernet IP, DeviceNet, Modbus TCP/IP, Profibus DP, ProfiNet

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

- up to 6% impedance as an option

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
- Matrix Series D harmonic filter
- Integrated in drive enclosure
 - Achieves 5% THID at rated load
- 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

AF-650 GP Constant Torque Drives Panel Data

		Disconnect	Enclosed	2 Contactor Bypass	3 Contactor Bypass
HP Ratings	208Vac, 3PH, 60Hz	1 - 50hp	1 - 50hp	1 - 50hp	1 - 50hp
	460Vac, 3PH, 60Hz	1 - 550hp	1 - 500hp	1 - 500hp	1 - 500hp
	575Vac, 3PH, 60Hz	1 - 600hp	1 - 100hp	1 - 100hp	1 - 100hp
Environment	Ambient Temperature	-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
	Elevation	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 - 50hp @ 208Vac) (1 - 100hp @ 460Vac) (1 - 100hp @ 575Vac)	Std (1 - 30hp @ 208Vac) (1 - 60hp @ 460Vac) (1 - 60hp @ 575Vac)	Std (1 - 30hp @ 208Vac) (1 - 60hp @ 460Vac) (1 - 60hp @ 575Vac)	Std (1 - 30hp @ 208Vac) (1 - 60hp @ 460Vac) (1 - 60hp @ 575Vac)
	NEMA 1, Traditional Style	Std (125 - 550hp @ 460Vac) (100 - 600hp @ 575Vac)	Std (40 - 50hp @ 208Vac) (75 - 500hp @ 460Vac) (75 - 100hp @ 575Vac)	Std (40 - 50hp @ 208Vac) (75 - 500hp @ 460Vac) (75 - 100hp @ 575Vac)	Std (40 - 50hp @ 208Vac) (75 - 500hp @ 460Vac) (75 - 100hp @ 575Vac)
	NEMA Type 12	-	Opt. (1 - 50hp @ 208Vac) (1 - 300hp @ 460Vac) (1 - 100hp @ 575Vac)	Opt. (1 - 50hp @ 208Vac) (1 - 300hp @ 460Vac) (1 - 100hp @ 575Vac)	Opt. (1 - 50hp @ 208Vac) (1 - 300hp @ 460Vac) (1 - 100hp @ 575Vac)
	NEMA Type 3R	-	Opt. (1 - 50hp @ 208Vac) (1 - 150hp @ 460Vac) (1 - 100hp @ 575Vac)	Opt. (1 - 50hp @ 208Vac) (1 - 150hp @ 460Vac) (1 - 100hp @ 575Vac)	Opt. (1 - 50hp @ 208Vac) (1 - 150hp @ 460Vac) (1 - 100hp @ 575Vac)
	Conformal Coating (for All NEMA Types)	Opt.	Opt.	Opt.	Opt.
Codes & Standards	UL & cUL	Std.	Std.	Std.	Std.
Power Circuit Features	Fused Disconnect (panel short circuit current rating = 100kA)	Std.	Std.	Std.	Std.
	Mag-Break Circuit Breaker (panel short circuit current rating = 65kA)	Opt. (all hp @ 208Vac) (up to 550hp @ 460Vac) (up to 600hp @ 575Vac)	Opt.	Opt.	Opt.
	3% Line Impedance	Std. (via DC link reactor)	Std. (via DC link reactor)	Std. (via DC link reactor)	Std. (via DC link reactor)
	6% Line Impedance (via line & link reactors)	Opt. (all hp @ 208Vac) (up to 550hp @ 460Vac) (up to 600hp @ 575Vac); Opt. for 4.5% impedance	Opt.	Opt.	Opt.
	3% Load Reactor	Opt. (all hp @ 208Vac) (up to 550hp @ 460Vac) (up to 600hp @ 575Vac); Opt. for 1.5% impedance	Opt.	Opt.	Opt.
	Matrix filter	-	Opt. (all hp @ 208Vac) (up to 100hp @ 460Vac)	Opt. (all hp @ 208Vac) (up to 100hp @ 460Vac)	Opt. (all hp @ 208Vac) (up to 100hp @ 460Vac)
	MultiPulse configurations	-	Opt.	Opt.	Opt.
	Line Isolation Contactor	-	-	-	Std.
	Drive Output Contactor	-	Opt.	Std.	Std.
	Bypass Contactor	-	-	Std.	Std.
	Class 20/30 Overload Relay	-	-	Std.	Std.
Dynamic Brake Chopper	Opt.	Opt.	Opt.	Opt.	
Door Mounted Indicators & Operators	Hand-Off-Auto Switch	via keypad	Std.	Std.	Std.
	Forward / Reverse Switch	-	Opt.	-	-
	Start / Stop Pushbuttons	-	Opt.	Opt.	Opt.
	Drive-Off-Bypass Switch	-	-	Std.	Std.
	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)
	Bypass Status	-	-	Std. (via light)	Std. (via light)
	Drive Run & Fault Status	via keypad	Std. (via keypad); Opt. (via light)	Std. (via keypad); Opt. (via light)	Std. (via keypad); Opt. (via light)
	Enable Status	via keypad	Std. (via keypad & light)	Std. (via keypad & light)	Std. (via keypad & light)
	Motor Overload Status	via keypad	via keypad	Std. (via keypad & light)	Std. (via keypad & light)
	Normal Status	via keypad	via keypad	Std. (via keypad & light)	Std. (via keypad & light)
	Power On Status	via keypad	Std. (via keypad & light)	Std. (via keypad & light)	Std. (via keypad & light)
	Speed Potentiometer	via keypad	Std. (via keypad); Opt. (via potentiometer)	Std. (via keypad); Opt. (via potentiometer)	Std. (via keypad); Opt. (via potentiometer)
Control Circuit Features	Customer I/O Terminal Board	Std.	Std.	Std.	Std.
	Control Power Transformer	-	Std.	Std.	Std.
	Extra VA CPT & Motor Space Heater	-	Opt.	Opt.	Opt.
	Quantity 2 Enable Inputs	-	Std.	Std.	Std.
	Drive Run Output (1NO-1NC)	Std.	Std.	Std.	Std.
	Drive Fault Output (1NO-1NC)	Std.	Std.	Std.	Std.
	4-20mA Output	Std.	Std.	Std.	Std.
	Remote Bypass Input	-	-	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	Std.	Std.	Std.	Std.
	DeviceNet, Ethernet IP, Modbus TCP/IP, ProfiBus DP or ProfiNet	Field Installable	Opt.	Opt.	Opt.
	Relay Output	Field Installable	Opt.	Opt.	Opt.
	Encoder Module	Field Installable	Opt.	Opt.	Opt.
	Resolver Module3	Field Installable	Opt.	Opt.	Opt.

AF-650 GP Constant Torque Drives

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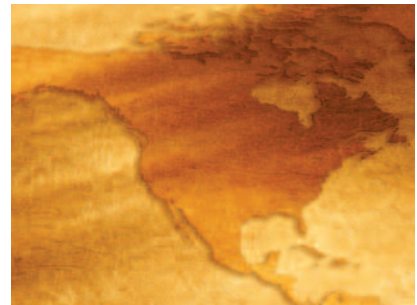
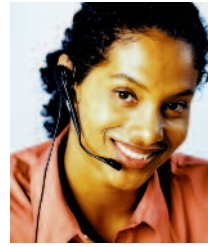
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