



GVX9000 Adjustable Frequency Drives

Product Focus



GVX9000.
Drives for global
applications.



GVX9000 AF Drive is your global solution.

Total drive solutions for every industry and application. That's Eaton's Electrical Business.

Eaton's GVX9000 Adjustable Frequency Drives meet the needs of every user and application—for every reason. It all starts with a commitment to building the right product for unique applications, with capability matched to individual needs. Whether it is a standard solution available from the catalog or a custom solution, Eaton can deliver what you need. You can't just call a product the total solution for every application. You have to prove it. And that's exactly what you'll find in every product we bring to market. The GVX9000 is truly a global product that offers OEMs the flexibility to deliver their equipment worldwide.

GVX9000, your global AF vector drive solution, is available with both open-loop and closed-loop capability enabling speed control of three-phase motors. Ideal for 0.75 kW to 160 kW applications, this programmable microprocessor drive suits a wide variety of applications from simple fans and pumps, to complex applications such as manufacturing and material handling.

Customers no longer have to choose between power and functionality as Eaton's newest drive strikes a balance between the two, offering accurate speed and torque control for smooth motor starting and stopping as well as precise operation of associated machinery.

- High- and low-overload settings (150% overload or 110% overload for 1 minute, respectively)
- IP21-rated for installation flexibility
- Small size facilitates fast and easy mounting in open or enclosed applications
- Easy-to-use programming: automatic restart, full motor protection, torque compensation, electronic motor overload, and a built-in EMI filter
- Configurable start and stop ramps save energy and reduce motor and machinery wear
- 32-bit microprocessor and insulated gate bipolar transistors enable smooth, low-speed motor performance



Description	Page
GVX9000	
Technical Data and Specifications	2
Wiring Diagrams	5
Dimensions	7
Catalog Number Selection	11
Product Selection	11

Dimensions, Weights and Ratings

*Dimensions, weights and ratings given in this Product Guide **are approximate and should** not be used for construction purposes. Drawings giving exact dimensions are available upon request. All listed product specifications and ratings are subject to change without notice. Photographs are representative of production units.*

Terms and Conditions

All orders accepted by Eaton are subject to the general terms and conditions as set forth in Sellers Policy 25-000.

Other Cutler-Hammer® Products

Eaton's electrical business is a leader in the development and manufacturing of power distribution equipment, electrical control products and advanced industrial automation solutions.

For more information on Cutler-Hammer products and services, visit our Web site at www.EatonElectrical.com.



WARNING

The installation and use of Cutler-Hammer products should be in accordance with the provisions of the U.S. National Electrical Code and/or other local codes or industry standards that are pertinent to the particular end use. Installation or use not in accordance with these codes and standards could be hazardous to personnel and/or equipment.

Open Drives

Technical Data and Specifications

Output Ratings

- Horsepower;
 - 200 – 240V: 0.75 – 37 kW
 - 380 – 480V: 0.75 – 75 kW
 - 500 – 600V: 0.75 – 75 kW
- Frequency Range: 0.1 – 400 Hz
- Overload Rating: 150% for 60 seconds
- Frequency Resolution:
 - Digital: 0.1 Hz
 - Analog: Max. (Set Frequency/1000) Hz
- Frequency Accuracy
 - Digital: $\pm 0.01\%$ of max. frequency
 - Analog: $\pm 0.2\%$ of max. frequency
- Undervoltage Carryover Limit: 0.3 to 25 seconds

Motor Performance

- Motor Control: Sensorless Vector
- Constant and Variable Torque: Standard
- Speed Regulation: 0.5% of base speed

Input Power

- Voltage at 50/60 Hz ± 3 Hz
 - 200V – 240V, -10% +5% / 3-phase
 - 380V – 480V, -10% +10% / 3-phase
 - 500V – 600V, -15% +10% / 3-phase
- Displacement Power Factor: Better than 0.95
- Efficiency: Typically greater than 95%

Design Type

- Microprocessor: 32-Bit
- Converter Type: Diode
- Inverter Type: Insulated Gate Bipolar Transistor
- Waveform: Sensorless Vector

Environment

- Operating Temperature:
 - -10°C to +50°C
- Humidity: 0 to 90% non-condensing
- Maximum Elevation: 1000 meters

Codes and Standards

- NEMA, IEEE, NEC: Design Standards
- UL Listed
- cUL Listed
- CE Marked (Requires EMI filter)

Enclosure

- Standard: Protected Chassis (IP20)

Protective Features

- Ground Fault: Standard
- Overload Protection: Standard
- Overcurrent: Standard
- Overvoltage: Standard
- Undervoltage: Standard
- Overtemperature: Standard
- Overload Limit: Standard

Set Up Adjustments, Performance Features, Operator Control and External Interface

Keypad

- Alphanumeric Display: Standard, 1 x 4 character
- Digital Indications: Frequency (Hz), Motor Current (amps), User-Defined RUN/STOP, FORWARD/REVERSE and Parameters
- Diagnostics: Last 3 trips with cause
- LED Status Indicators: 5 (RUN/STOP, FORWARD/REVERSE and LOCAL/REMOTE)
- Operator Functions: START/STOP, Speed control (digital) RESET, SETUP Keys, ENTER, FORWARD/REVERSE and LOCAL/REMOTE

I/O Terminal Block

- Analog Inputs:
 - 3 Inputs: 0 – 10V DC, 4 – 20 mA
 - Analog Voltage: Nominal 10V DC (10K ohm input impedance)
 - Analog Current: Nominal 4 – 20 mA (250 ohm)
- Digital Inputs: 10 Programmable Inputs
- Digital Outputs: 2 Programmable
- Relay Outputs: 2 Programmable

- Analog Monitor Output:
 - Analog meter – frequency or output current

- Dynamic Brake Chopper

Programmable Parameters

- Out of the Box: Factory settings loaded for quick start-up.
- Accel. and Decel.: 2 separately adjustable Linear or S Curve times: 0.1 – 3000 seconds
- Auto Restart: Overcurrent, overvoltage and undervoltage with 4 selectable retry restart modes
- DC Injection Braking
- External Fault: Terminal input
- Jog: Terminal input
- Fault Reset: STOP/RESET or terminal input
- I/O: NO/NC Selectable
- Jump Frequencies: 3 (with adjustable width)
- Parameter Security: Programmable software lock
- Preset Speeds: 7 preset speeds
- PID Controller: PID process control
- Reversing: Keypad or terminal
- Speed Setting: Keypad, terminal or pot
- START/STOP Control: Keypad or terminal
- Stop Modes: Decel, coast or DC injection

Reliability

- Pretested Components: Standard
- Surface Mount Technology: Standard (PCBs)
- Computerized Testing: Standard
- Final Test with Full Load: Standard
- Eaton's Cutler-Hammer Engineering Systems and Service: National network of AF drive specialists

Table 1. Fuse Specifications — 575V

Model	I (A) Input	I (A) Output	Line Fuse		MMP	Recommend
			I (A)	Bussmann P/N		
GVX001A1-5	2.0	1.7	6	JJS-6	Consult factory	Consult factory
GVX002A1-5	3.6	3.5	6	JJS-6		
GVX003A1-5	4.9	4.5	10	JJS-10		
GVX005A1-5	9.9	7.5	20	JJS-20	Consult factory	Consult factory
GVX007A1-5	10.8	10	20	JJS-20		
GVX010A1-5	14.3	13.5	30	JJS-30		
GVX015A1-5	19.8	19	40	JJS-40	Consult factory	Consult factory
GVX020A1-5	22	22	40	JJS-40		
GVX025A1-5	27.7	27	50	JJS-50		
GVX030A1-5	37	34	70	JJS-70	Consult factory	Consult factory
GVX040A1-5	41	41	70	JJS-70		
GVX050A1-5	52	52	100	JJS-100		
GVX060A1-5	62	62	125	JJS-125	Consult factory	Consult factory
GVX075A1-5	95	80	175	JJS-175		
GVX100A1-5	117	100	200	JJS-200		

Note: Smaller fuses than those shown in the table are permitted.

Wiring

Table 2. Wiring Items

Items	Explanations
Input Power	Please follow the specific power supply requirement shown in user manual.
Fuse	Please check the Fuse Specification tables in user manual for proper fuse selection.
Magnetic Contactor (Optional)	Please do not use a Magnetic Contactor as the ON/OFF switch of the AC drive, this will reduce the operating life of the AC drive. The contactor should only be used as a safety device for disconnecting power to the drive.
Line/Load Reactor (Optional)	To improve the power factor. An AC Reactor may be necessary when capacity is above 1000 kVA, and the wiring distance is within 10m.
EMI Filter (Optional)	Used to reduce the electromagnetic interference.
Braking Resistor (Optional)	Used to reduce stopping time of the motor. Please refer to the Braking Resistor tables below for specific Braking Resistors.

Braking

All Braking Resistors and Braking Units Used in AC Motor Drives

Note: Please only use Eaton resistors and recommended values. Other resistors and values will void Eaton's warranty. Please contact your nearest

Eaton representative for use of special resistors. For instance, in 460V Series, 75 kW, the AC motor drive needs 2 braking units with total of 16 braking resistors, so each braking unit uses 8 braking resistors. The braking unit

should be at least 10 cm away from AC motor drive to avoid possible interference. Refer to the *Braking Unit Module User Manual* for further details.

Table 3. Braking Specifications — 230V and 460V

Applicable Motor (kW)	Full Load Torque of System Nm	Total Resistance and Wattage Applied to Drive	Braking Unit/No. of Units Used	Braking Resistor Kit P/N and No. of Units in Kit	Braking Torque @ 10% ED with Kit
230 Voltage					
0.75	0.427	80W 200 Ω	①	① K13-000034-0821	1 125%
1.5	0.849	300W 100 Ω	①	① K13-000034-0861	1 125%
2.2	1.262	300W 100 Ω	①	① K13-000034-0861	1 125%
3.7	2.080	400W 40 Ω	①	① K13-000034-0825	1 125%
5.5	3.111	500W 30 Ω	①	① K13-000034-0826	2 125%
7.5	4.148	1000W 20 Ω	①	① K13-000034-0862	① 125%
11	6.186	2400W 13.6 Ω	①	① K13-000034-0863	① 125%
15	8.248	3000W 10 Ω	GBM2022	1 K13-000034-0864	1 125%
18.5	10.281	4800W 8 Ω	GBM2022	1 K13-000034-0865	1 125%
22	12.338	4800W 6.8 Ω	GBM2022	1 K13-000034-0866	1 125%
30	16.497	6000W 5 Ω	GBM2022	2 K13-000034-0867	2 125%
37	20.6	9600W 4 Ω	GBM2022	2 K13-000034-0868	2 125%
460 Voltage					
0.75	0.427	80W 750 Ω	①	① K13-000034-0841	1 125%
1.5	0.849	300W 400 Ω	①	① K13-000034-0843	1 125%
2.2	1.262	300W 250 Ω	①	① K13-000034-0843	1 125%
3.7	2.080	400W 150 Ω	①	① K13-000034-0844	1 125%
5.5	3.111	500W 100 Ω	①	① K13-000034-0845	2 125%
7.5	4.148	1000W 75 Ω	①	① K13-000034-0846	3 125%
11	6.186	1000W 50 Ω	①	① K13-000034-0869	① 125%
15	8.248	1500W 40 Ω	GBM4045	1 K13-000034-0870	1 125%
18.5	10.281	4800W 32 Ω	GBM4045	1 K13-000034-0871	1 125%
22	12.338	4800W 27.2 Ω	GBM4045	1 K13-000034-0872	1 125%
30	16.497	6000W 20 Ω	GBM4045	1 K13-000034-0873	1 125%
37	20.6	9600W 16 Ω	GBM4045	1 K13-000034-0874	1 125%
45	24.745	9600W 13.6 Ω	GBM4045	1 K13-000034-0875	1 125%
55	31.11	12000W 10 Ω	GBM4045	2 K13-000034-0876	2 125%
75	42.7	19200W 6.8 Ω	GBM4045	2 K13-000034-0877	2 125%

① Contact Eaton.

Open Drives

Table 4. Braking Specifications — 575V

Applicable Motor (kW)	Full Load Torque of System Nm	Total Resistance and Wattage Applied to Drive	Braking Unit/No. of Units Used	Braking Resistor Kit P/N and No. of Units in Kit	Braking Torque @ 10% ED with Kit
575 Voltage					
0.75	0.427	300W 400 Ω	①	① ①	1 125%
1.5	0.849	300W 250 Ω	①	① ①	1 125%
2.2	1.262	400W 150 Ω	①	① ①	2 125%
3.7	2.08	400W 150 Ω	①	① ①	2 125%
5.5	3.111	500W 100 Ω	①	① ①	2 125%
7.5	4.148	500W 100 Ω	①	① ①	1 125%
11	6.186	500W 100 Ω	①	① ①	① 125%
15	8.248	4000W 75 Ω	GBM5055	1 ①	1 125%
18.5	10.281	4000W 50 Ω	GBM5055	1 ①	1 125%
22	12.338	6000W 40 Ω	GBM5055	1 ①	1 125%
30	16.497	6000W 40 Ω	GBM5055	1 ①	1 125%
37	20.6	8000W 25 Ω	GBM5055	1 ①	1 125%
45	24.75	8000W 25 Ω	GBM5055	1 ①	1 125%
55	31.11	12000W 20 Ω	GBM5055	1 ①	1 125%
75	42.7	16000W 12.5 Ω	GBM5055	2 ①	2 125%

① Contact Eaton.

Notes:

- Please select the factory setting resistance value (Watt) and the duty-cycle value (ED%).
- If damage to the drive or other equipment are due to the fact that the braking resistors and the braking modules in use are not provided by Eaton, the warranty will be void.
- Take into consideration the safety of the environment when installing the braking resistors.
- If the minimum resistance value is to be utilized, consult local dealers for the calculation of the Watt figures.
- Please select thermal relay trip contact to prevent resistor over load. **Use the contact to switch power off to the AC motor drive!**
- When using more than 2 braking units, equivalent resistor value of parallel braking unit can't be less than the value in the column **"Minimum Equivalent Resistor Value for Each AC Drive" (the right-most column in the table).**
- Please read the wiring information in the user manual of braking unit thoroughly prior to taking into operation.

Wiring Diagrams

For Models of GVX9000 Series — 0.75 to 3.7 kW

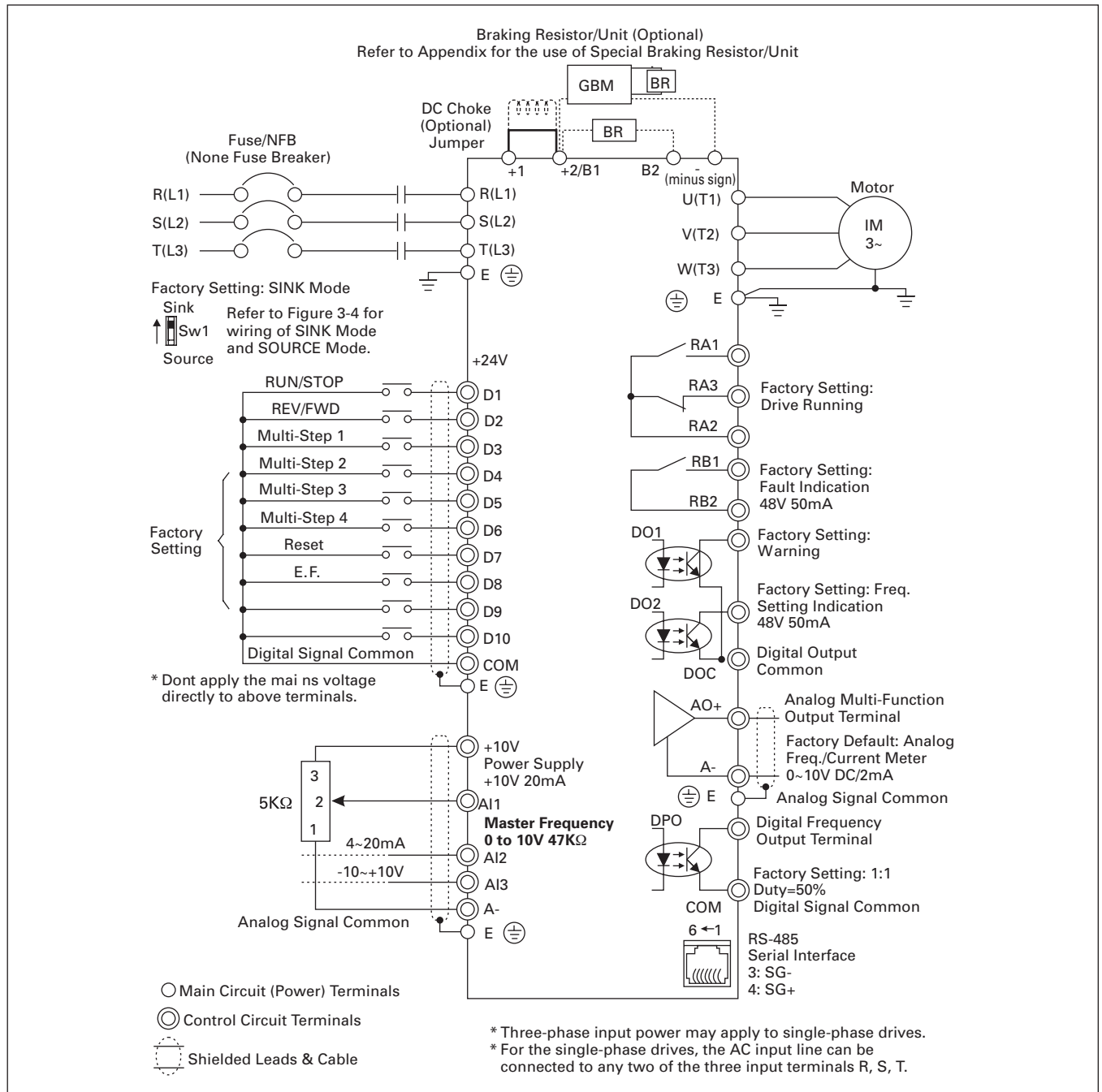


Figure 1. Wiring Diagram — 0.75 to 3.7 kW

For Models of GVX9000 Series — 5.5 to 75 kW

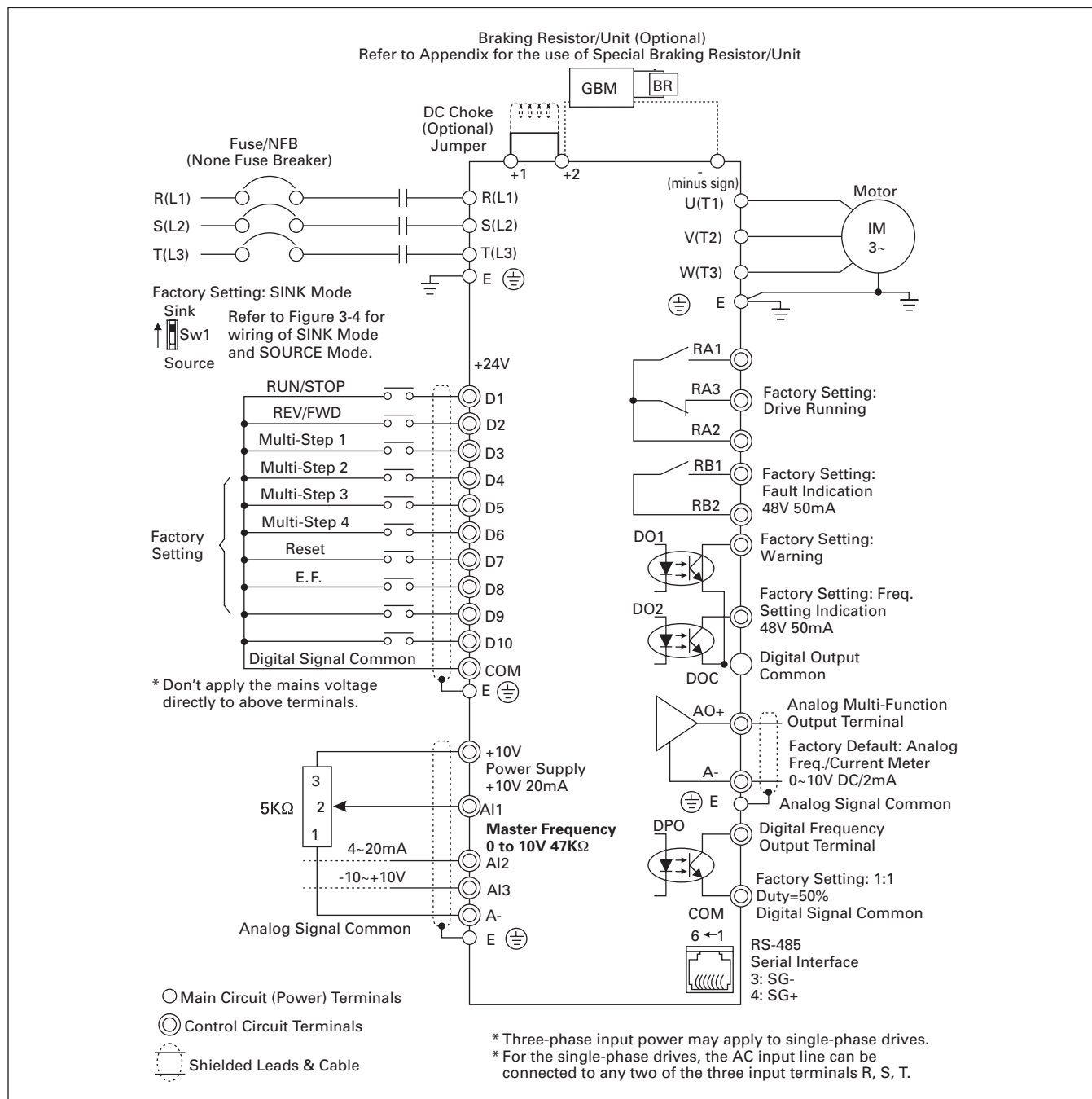


Figure 2. Wiring Diagram — 5.5 to 75 kW

Dimensions

Table 5. GVX9000 Approximate Dimensions

kW	Width (mm)	Height (mm)	Depth (mm)
230V			
0.75	150.0	260.0	173.7
1.5	150.0	260.0	173.7
2.2	150.0	260.0	173.7
3.7	150.0	260.0	173.7
5.5	200.0	323.0	196.6
7.5	200.0	323.0	196.6
11	200.0	323.0	196.6
15	250.0	403.8	219.4
18.5	250.0	403.8	219.4
22	250.0	403.8	219.4
30	370.0	589.0	260.0
37	370.0	589.0	260.0
460V			
0.75	150.0	260.0	173.7
1.5	150.0	260.0	173.7
2.2	150.0	260.0	173.7
3.7	150.0	260.0	173.7
5.5	200.0	323.0	196.6
7.5	200.0	323.0	196.6
11	200.0	323.0	196.6
15	250.0	403.8	219.4
18.5	250.0	403.8	219.4
22	250.0	403.8	219.4
30	370.0	589.0	260.0
37	370.0	589.0	260.0
45	370.0	589.0	260.0
55	370.0	589.0	260.0
75	370.0	589.0	260.0
575V			
0.75	150.0	260.0	173.7
1.5	150.0	260.0	173.7
2.2	150.0	260.0	173.7
3.7	150.0	260.0	173.7
5.5	200.0	323.0	196.6
7.5	200.0	323.0	196.6
11	200.0	323.0	196.6
15	250.0	403.8	219.4
18.5	250.0	403.8	219.4
22	250.0	403.8	219.4
30	370.0	589.0	260.0
37	370.0	589.0	260.0
45	370.0	589.0	260.0
55	370.0	589.0	260.0
75	370.0	589.0	260.0

Open Drives

Drives

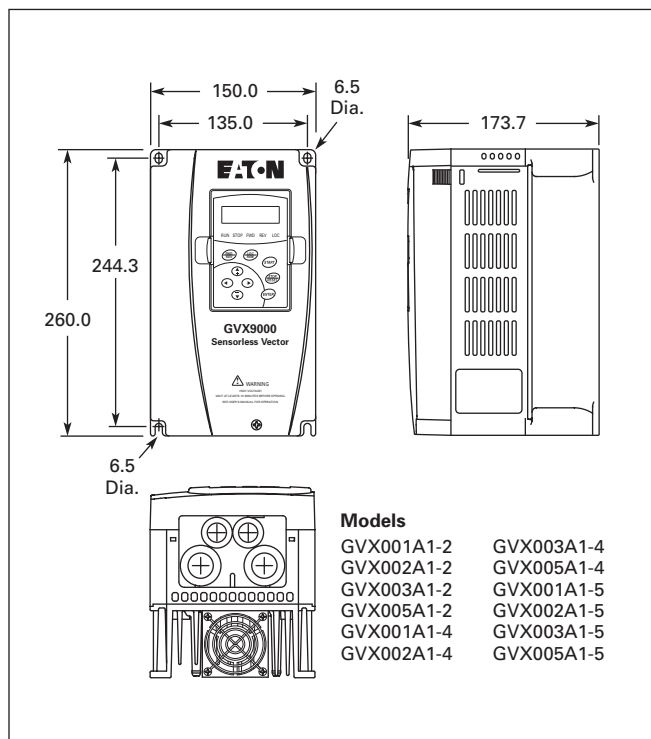


Figure 3. 0.75 – 3.7 kW — Approximate Dimensions in mm

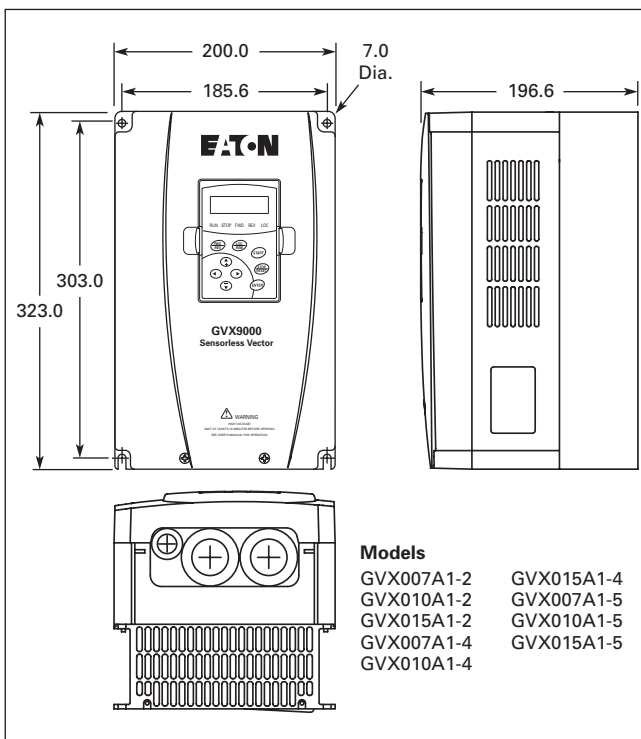


Figure 4. 5.5 – 11 kW — Approximate Dimensions in mm

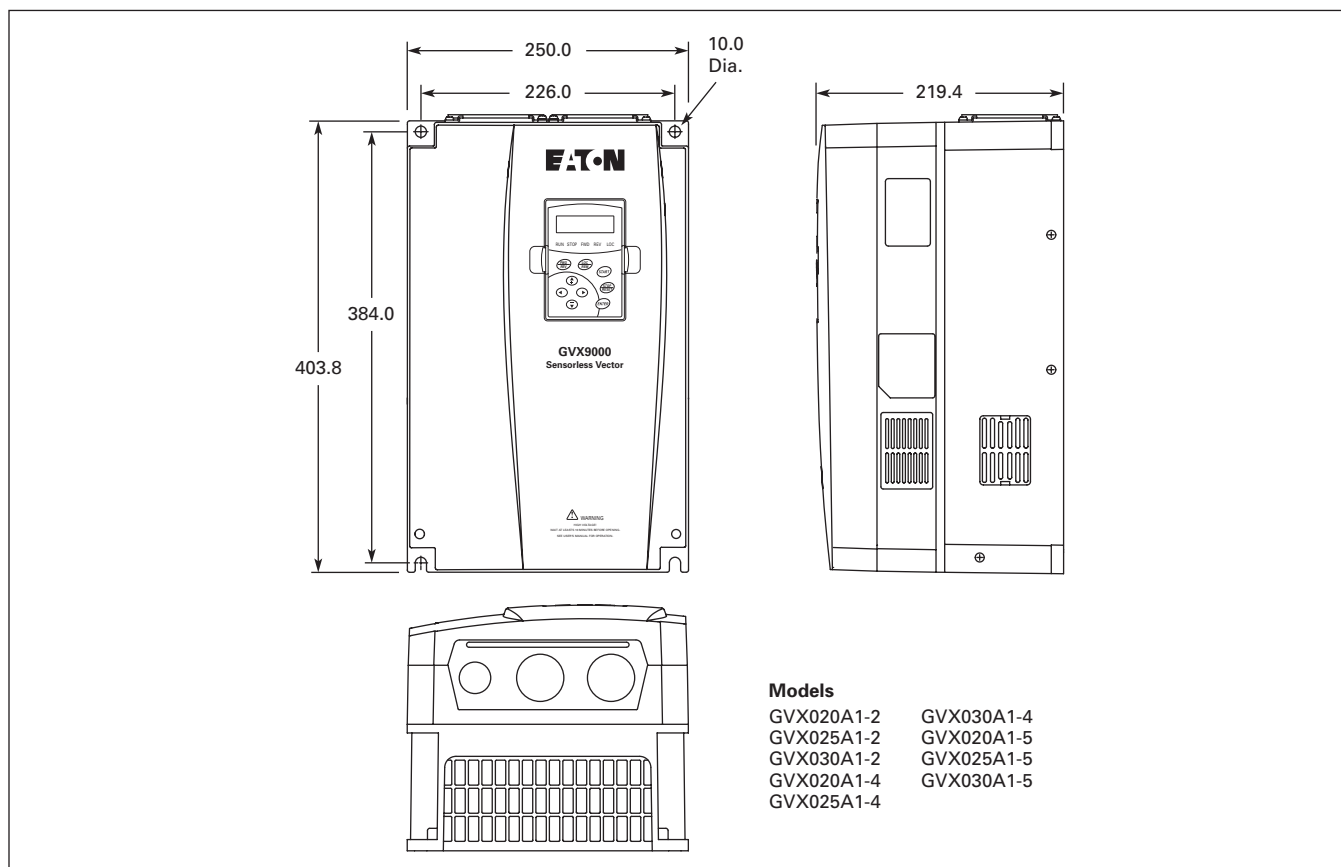


Figure 5. 15 – 22 kW — Approximate Dimensions in mm

Open Drives

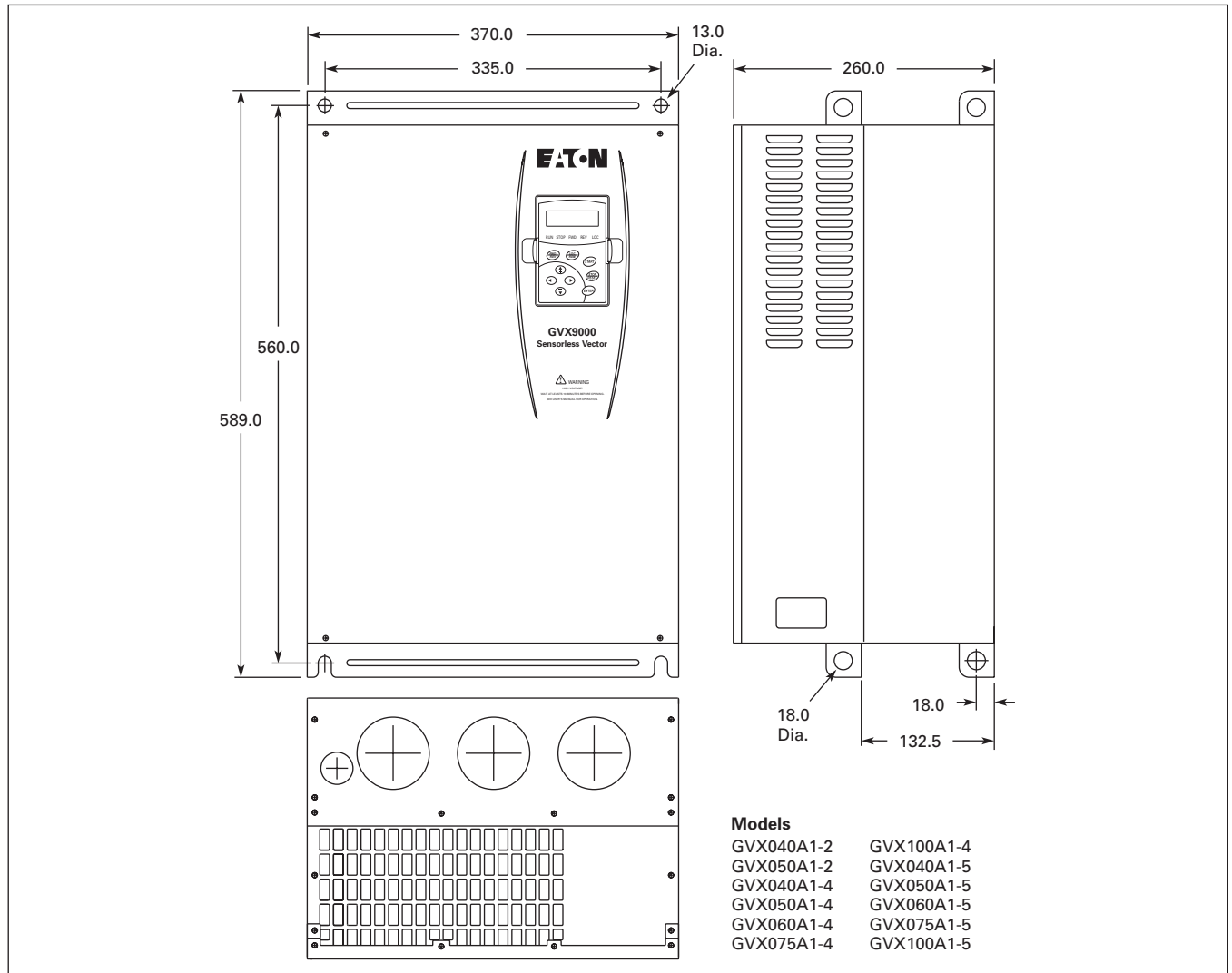


Figure 6.30 – 75 kW — Approximate Dimensions in mm

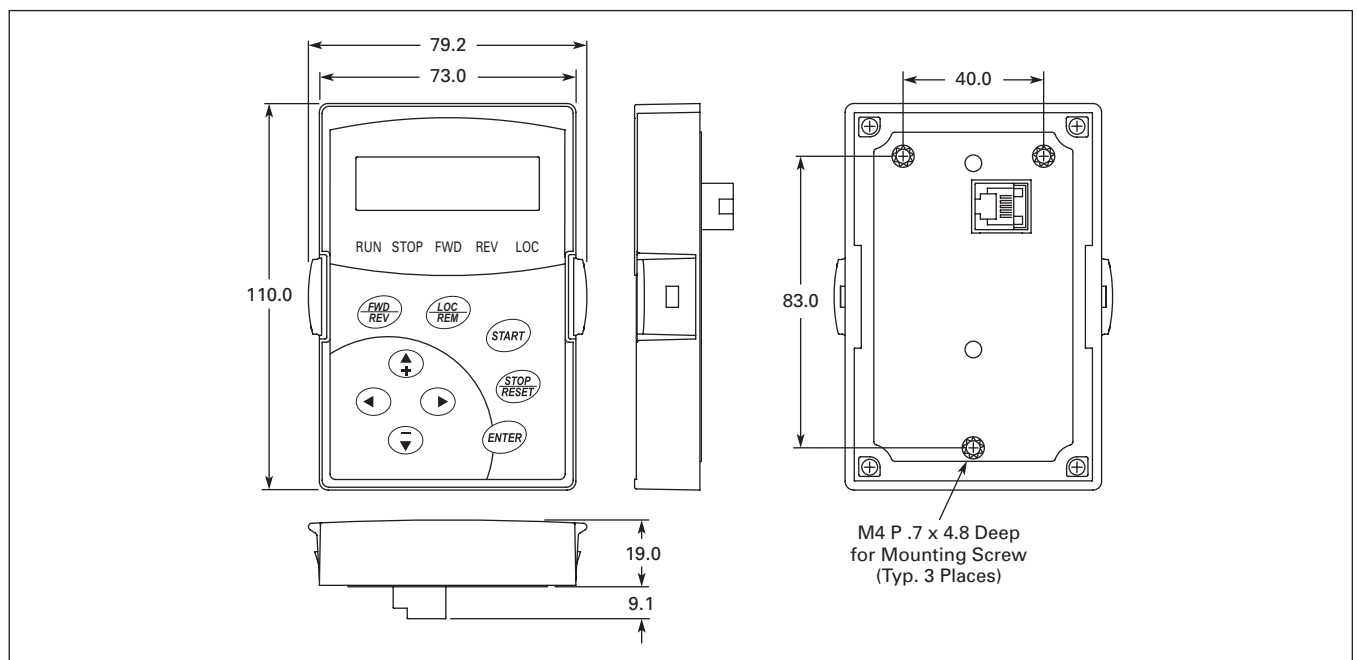


Figure 7. Digital Keypad — Approximate Dimensions in mm

Digital Keypad Operation

The digital keypad includes the display panel and the keypad. The display panel provides the parameter display and shows the operation status of the AC drive. The keypad provides programming and control interface.

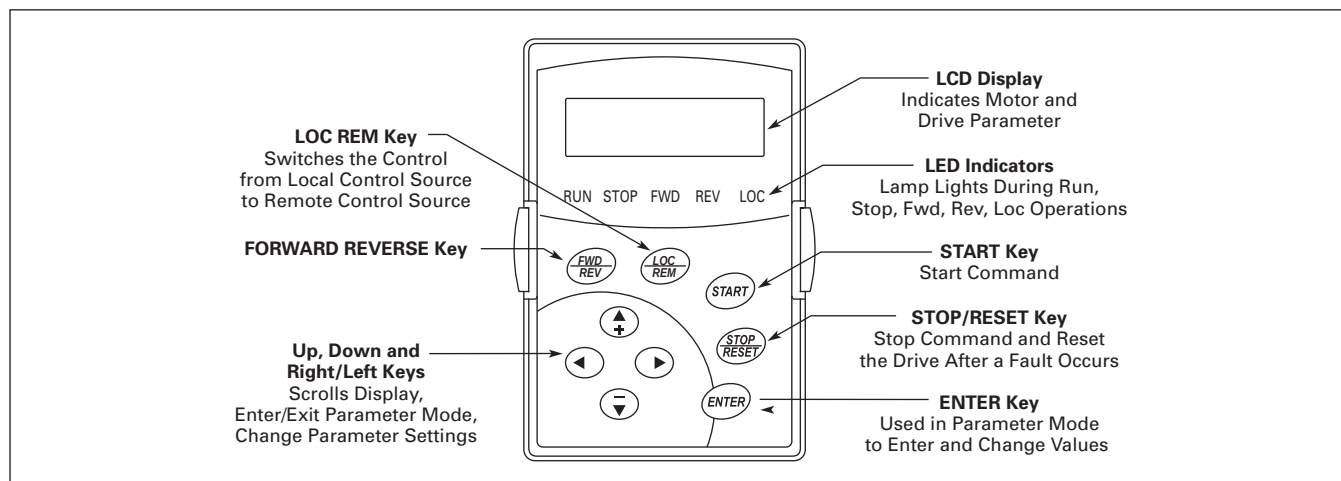


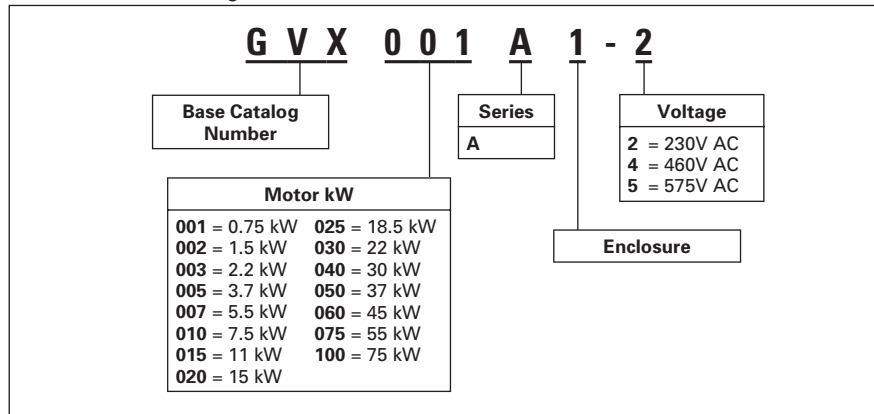
Figure 8. Description of Digital Keypad

Table 6. Keypad Operators

	START This button operates as Start button for normal operation ■ Motor START from the panel; active control place has to be selected at "Panel"
	ENTER This button in the parameter edit mode is used to enter the programming mode and enter the parameter selection. ■ used for parameter edit confirmation, acceptance (confirmation) of the edited parameter value with exit from parameter edit mode
	STOP / RESET This button has two integrated operations. The button operates as Stop button for normal operation. In the parameter edit mode it is used to cancel previous action and back-up one step, and in fault mode it is used to reset the fault. STOP ■ motor STOP from the panel; active control place has to be selected at "Panel" RESET ■ used to reset an Active Fault on the drive and shown in the display
	This button switches the Control Location from the Local Source to the Remote Source.
	This button changes the direction of the motor connected to the GVX9000 drive.
	LEFT Arrow ■ navigation button, movement to left ■ in display mode, enter parameter group mode ■ in parameter edit mode, exits mode, backs up one step ■ cancels edited parameter (exit from a parameter edit mode)
	RIGHT Arrow ■ navigation button, movement to right ■ enter parameter group mode ■ enter parameter mode from group mode ■ Changes the cursor location when entering data into a parameter
 	UP and DOWN Arrows ■ move either up or down the group list in order to select the desired group menu. ■ move either up or down the parameter list in order to select the desired parameter in the group. ■ increasing/decreasing of reference value on the keyboard (when selected).

Catalog Number Selection

Table 7. GVX9000 Catalog Number Selection



Product Selection

Table 8. GVX9000 Product Selection

kW	Input Amp. Single-/3-Phase Rating	Continuous Output Amp Rating	Catalog Number	*
230V				
0.75	11.9/7.0	5	GVX-001A1-2	
1.5	15.3/9.4	7	GVX-002A1-2	
2.2	22/14.0	11	GVX-003A1-2	
3.7	—/20.6	17	GVX-005A1-2	
5.5	—/26	25	GVX-007A1-2	
7.5	—/34	33	GVX-010A1-2	
11	—/50	49	GVX-015A1-2	
15	—/60	65	GVX-020A1-2	
18.5	—/75	75	GVX-025A1-2	
22	—/90	90	GVX-030A1-2	
30	—/110	120	GVX-040A1-2	
37	—/142	145	GVX-050A1-2	
460V				
0.75	—/3.2	2.7	GVX-001A1-4	
1.5	—/4.3	4.2	GVX-002A1-4	
2.2	—/5.9	5.5	GVX-003A1-4	
3.7	—/11.2	8.5	GVX-005A1-4	
5.5	—/19	13	GVX-007A1-4	
7.5	—/25	18	GVX-010A1-4	
11	—/33	24	GVX-015A1-4	
15	—/46	32	GVX-020A1-4	
18.5	—/56	38	GVX-025A1-4	
22	—/70	45	GVX-030A1-4	
30	—/75	60	GVX-040A1-4	
37	—/95	73	GVX-050A1-4	
45	—/110	91	GVX-060A1-4	
55	—/150	110	GVX-075A1-4	
75	—/180	150	GVX-100A1-4	
575V				
0.75	—/2.0	1.7	GVX-001A1-5	
1.5	—/3.6	3.5	GVX-002A1-5	
2.2	—/4.9	4.5	GVX-003A1-5	
3.7	—/9.9	7.5	GVX-005A1-5	
5.5	—/10.8	10	GVX-007A1-5	
7.5	—/14.3	13.5	GVX-010A1-5	
11	—/19.8	19	GVX-015A1-5	
15	—/22	22	GVX-020A1-5	
18.5	—/27.7	27	GVX-025A1-5	
22	—/37	34	GVX-030A1-5	
30	—/41	41	GVX-040A1-5	
37	—/52	52	GVX-050A1-5	
45	—/62	62	GVX-060A1-5	
55	—/95	80	GVX-075A1-5	
75	—/117	100	GVX-100A1-5	

* Consult Sales Office for Pricing.

The perfect solution goes beyond product. It's engineering, technical expertise, service support and marketplace understanding. This balance between product and service assures you that Eaton is the one source for every Adjustable Frequency Drive requirement. Backed by the power and breadth of Eaton, as well as over 50 years of experience with drives, Eaton is your risk-free choice for your next project. Eaton has industry-leading drive specialists and application engineers who

know the intricacies of any adjustable frequency drive application. They are available to assist with configuration questions, software customization, design and specification writing and any other drives questions you may have. Our unique combination simplifies processes, ensures connectivity and helps keep you competitive. For every drive and application requirement, as well as a full suite of industrial control drives, no one drives more complete electrical control solutions than Eaton's Electrical Business.

Engineering, manufacturing, support. One source.

One touch
Forward/
Reverse
Control

One touch
local remote



Brightly colored
and easily
recognized start
button and stop/
reset button.

GVX9000 at a glance.

- Global voltage options
- Communication option cards
- Large Hp range
- English language keypad with copy/paste capability
- High reliability
- Extension I/O and embedded PLC
- Simple keypad operation
- Start-up wizard for easy installation
- Varied application parameter sets
- Standard Modbus communication



Eaton's electrical business is a global leader in electrical control, power distribution, and industrial automation products and services. Through advanced product development, world-class manufacturing methods, and global engineering services and support, Eaton's electrical business provides customer-driven solutions under brand names such as Cutler-Hammer®, Powerware®, Durant®, Heinemann®, Holec® and MEM®, which globally serve the changing needs of the industrial, utility, light commercial, residential, and OEM markets. For more information, visit www.EatonElectrical.com.

Eaton Corporation is a diversified industrial manufacturer with 2006 sales of \$12.4 billion. Eaton is a global leader in electrical systems and components for power quality, distribution and control; fluid power systems and services for industrial, mobile and aircraft equipment; intelligent truck drivetrain systems for safety and fuel economy; and automotive engine air management systems, powertrain solutions and specialty controls for performance, fuel economy and safety. Eaton has 60,000 employees and sells products to customers in more than 125 countries. For more information, visit www.eaton.com.

Eaton Electrical, Inc.
1000 Cherrington Parkway
Moon Township, PA 15108
United States

For more information or to
locate regional product
support, please visit us at
www.EatonElectrical.com

