Accessories

Appendix A

Table of Contents

Appendix A: Accessories

Fuses/Circuit Breakers A–2
Recommended Fuse Specifications for the DC-side of Common DC-Bus A–3
Standard Footprint EMC Filter and Zero Phase Reactor A–4
Filter Dimensions A–5
High Performance EMI Input Filters A–6
EMI Filter Installation A–6
Recommended Motor Cable Length. A–8
Line Reactors / Voltage Time Filters A–9
Line/Load Reactors Selection Charts. A–11
Line Reactor Applications and Wiring Connections A–12
Recommended Cable Length. A–14
Dynamic Braking A–16
Braking Units A–16
Choosing and Installing a Braking Resistor A–17
EMC Shield & Earthing Plates A–18
GS10 EMC Shield Plates. A–18
Capacitive Filter (GS20A-CAPF) A–21
Conduit Box A–23
Conduit Box Installation A–26
Replacement Fan Kit A–28
DIN Rail Mounting A–30
GS10 DIN Rail Installation A–31
Mounting Adapter Plate A–32
Mounting Adapter Plate Dimensions A–33
Mounting Adapter Plate Installation. A–35
Optional Advanced Keypad A–37
GS10 Display Screens for GS4-KPD A–40
Keypad Fault Codes A–46
Keypad Panel Mounting Kit GS4-BZL A–47

Fuses/Circuit Breakers

Protection devices are essential to prevent damage to your GS10 drive and application equipment. Please use the fuse specification chart below to select fuses that are applicable to your GS10 drive. Only use UL-certified fuses which comply with your local regulations.

Fuse Specification Chart GS10 *DURAPULSE* Drives									
		Input Power			Input Fuse			Circuit Breaker	
Drive Model	HP	Ø	Volts	GS10 Input Amps	Fuse Amps	Fast Acting Class T	Edison Class J*	Size	Note
GS11N-10P2	1/4	1	120	6	7.2	TJN10	JHL10	20	G3P-020
GS11N-10P5	1/2	1	120	9.4	10.8	TJN10	JHL10	25	G3P-025
GS11N-11P0	1	1	120	18	22	TJN25	JHL25	50	G3P-050
GS11N-20P2	1/4	1	230	5.1	7.2	TJN10	JHL10	15	G3P-015
GS11N-20P5	1/2	1	230	7.3	12.8	TJN15	JHL15	20	G3P-020
GS11N-21P0	1	1	230	10.8	20	TJN20	JHL20	30	G3P-030
GS11N-22P0	2	1	230	16.5	34	TJN35	JHL35	45	G3P-045
GS11N-23P0	3	1	230	24.2	50	TJN50	JHL50	70	G3P-070
GS13N-20P2	1/4	3	230	1.9	7.2	TJN10	JHL10	15	G3P-015
GS13N-20P5	1/2	3	230	3.4	12.8	TJN15	JHL15	15	G3P-015
GS13N-21P0	1	3	230	5.8	20	TJN20	JHL20	15	G3P-015
GS13N-22P0	2	3	230	9	32	TJN35	JHL35	25	G3P-025
GS13N-23P0	3	3	230	13.2	50	TJN50	JHL50	40	G3P-040
GS13N-25P0	5	3	230	20	78	TJN80	JHL80	60	G3P-060
GS13N-27P5	7 1/2	3	230	30	59.4	TJN60	JHL60	63	G3P-060
GS13N-40P5	1/2	3	460	2.1	7.2	TJS10	JHL10	15	G3P-015
GS13N-41P0	1	3	460	3.7	12	TJS15	JHL15	15	G3P-015
GS13N-42P0	2	3	460	5.8	18.4	TJS20	JHL20	15	G3P-015
GS13N-43P0	3	3	460	6.1	26	TJS25	JHL25	20	G3P-020
GS13N-45P0	5	3	460	9.9	42	TJS45	JHL45	30	G3P-030
GS13N-47P5	7 1/2	3	460	14.3	34.5	TJS35	JHL35	32	G3P-030
GS13N-4010	10	3	460	19.3	45.1	TJS45	JHL45	45	G3P-040

** High-speed Class J.*

Note: JHL fuses can be used with GS and DURAPULSE drives in non-UL applications. Fuse the drive according to NEC guidelines (NEC Article 430). For UL applications DURAPULSE drives require Class T fuses (refer to the drive's user manual for details).

Recommended Fuse Specifications for the DC-side of Common DC-Bus

These fuses are applicable only when connecting input power directly to the DC bus with terminals DC+ and DC-.

- *The fuse current specifications in table below are based on overloading. If there is no possibility of overloading during use then fuses with a lower rating than the table below are allowed. The DC-side current calculation method described in Chapter 3.1 DC Power Supply Applications can be used to calculate a suitable fuse rating for a drive with DC current. Special cases such as overload or emergency stop must be considered however.*
- *For the DC-side fuse, please select a DC fuse or refer to the DC voltage specifications from the fuse parameters. The DC voltage rating must be higher than the operating voltage.*
- *Fuse selection should take into account operating class (e.g. High-speed or general purpose) and overloading.*
  a) If the drive is subject to overloading and high-speed fuse is used: Due to the speed of response the chosen fuse should be rated double that of the calculated maximum instantaneous DC current.
  b) If the drive is subject to overloading and normal fuse is used: Fuse selection should be based on the calculated maximum instantaneous current during overloading.
  c) If drive is not subject to overloading: Select a fuse with a current rating close to that of the calculated DC current.
- *UL-listed fuse suitable for short-circuit protection of inputs. "In the United States, branch circuits must comply with the US National Electrical Code (NEC) and its local directives." Please select a UL-listed fuse to comply with local regulations.*
- *"In Canada, branch circuits must comply with the Canadian Electrical Code and its local directives." Please select a UL-listed fuse to comply with local regulations.*

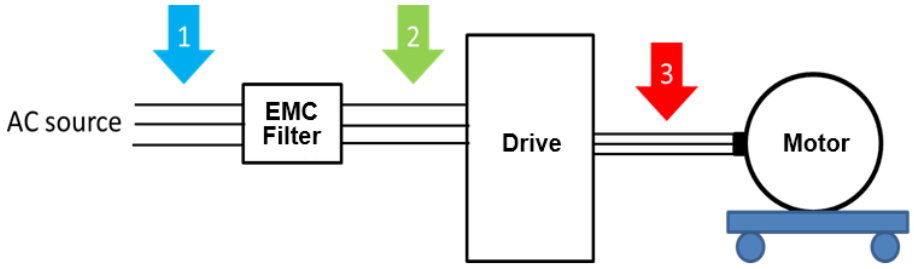
GS10 - DC Bus Fusing			
Requirement	***Drive Model***	***230V Drives***	***460V Drives***
DC Bus Voltage Level	all models	350	700
DC Bus Fuse Voltage Rating	all models	690	1250
DC Bus Fuse (amps)	1P2 (1/4HP)	10	n/a
	1P5 (1/2HP)	10	10
	1P0 (1HP)	16	10
	2P0 (2HP)	25	16
	3P0 (3HP)	40	20
	5P0 (5HP)	63	30
	7P5 (7.5HP)	80	40
	010 (10HP)	n/a	55

Standard Footprint EMC Filter and Zero Phase Reactor

Use EMC filters to enhance the EMC performance for the environment and machines and to comply with EMC regulations, further reducing EMC problems. If you purchase a motor drive without a built-in EMC filter, we recommend that you select an EMC filter as shown below. GS10 drives will mount on top of these footprint filters for Frames A–D. For some motor drive models, you need to use zero phase reactors to be compliant with EMC regulations. Refer to the table and figure below for the recommended model, setting method, and maximum motor cable length of the EMC filter and zero phase reactor.

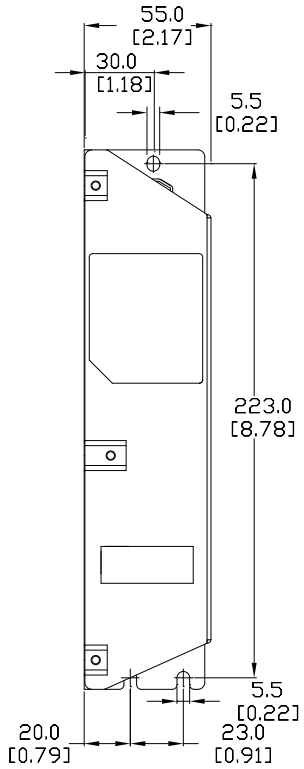
GS10 EMC Filter and Zero Phase Reactor												
Frame	*Drive Model*	*Input Current (A)*	*Footprint Filter Model #*	*Recommended Zero Phase Reactor*	*Conducted Emission*				*Radiated Emission*		
					C1-motor cable length-30m			C2-motor cable length-100m	C2-motor cable length-100m		
					Position to Install a Zero Phase Reactor						
					1	*2*	*3*	*n/a*	*1*	*2*	*3*
A	***GS11N-10P2***	6	EMF11AM21A	RF008X00A				N/A			
	GS11N-10P5	9.4						N/A			
	GS11N-20P2	5.1				✓	✓	N/A		✓	✓
	GS11N-20P5	7.3				✓	✓	N/A		✓	✓
	GS13N-20P2	1.9	EMF10AM23A			✓	✓	N/A		✓	✓
	GS13N-20P5	3.4				✓	✓	N/A		✓	✓
	GS13N-21P0	5.8				✓	✓	N/A		✓	✓
	GS13N-40P5	2.1	EMF6A0M43A				✓	N/A			✓
	GS13N-41P0	3.7					✓	N/A			✓
B	***GS11N-21P0***	10.8	EMF11AM21A			✓	✓	N/A		✓	✓
	GS13N-22P0	9	EMF10AM23A			✓	✓	N/A		✓	✓
	GS13N-42P0	5.8	EMF6A0M43A				✓	N/A			✓
C	***GS11N-11P0***	18	EMF27AM21B					N/A			
	GS11N-22P0	16.5					✓	N/A			✓
	GS11N-23P0	24.2					✓	N/A			✓
	GS13N-23P0	13.2	EMF24AM23B			✓	✓	N/A		✓	✓
	GS13N-25P0	20				✓	✓	N/A		✓	✓
	GS13N-43P0	6.1	EMF12AM43B					N/A			
	GS13N-45P0	9.9				✓	✓	N/A		✓	✓
D	***GS13N-27P5***	30	EMF33AM23B		✓	✓		N/A	✓	✓	
	GS13N-47P5	14.3	EMF23AM43B		✓	✓	✓	N/A	✓	✓	✓
	GS13N-4010	19.3			✓	✓	✓	N/A	✓	✓	✓
Note: It is not necessary to add a zero phase reactor for passing the C2 conducted emission test. *** *See diagram below for installation positions.*											

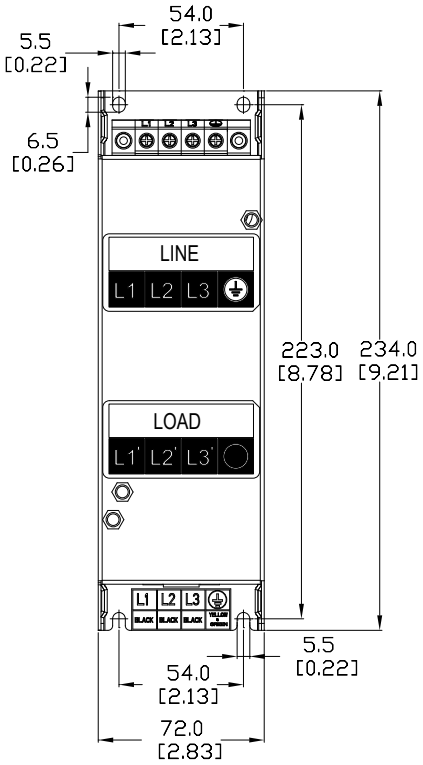
Zero phase reactor installation position diagram:



1: Install at the cable between the power supply and the EMC filter.
2: Install at the cable between the EMC filter and the drive.
3: Install at the cable between the drive and the motor.

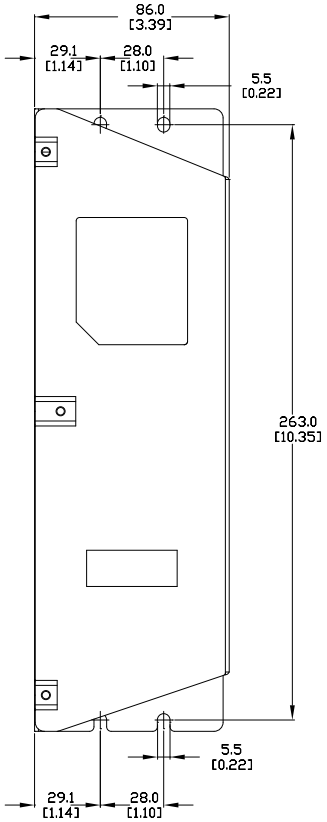
Filter Dimensions

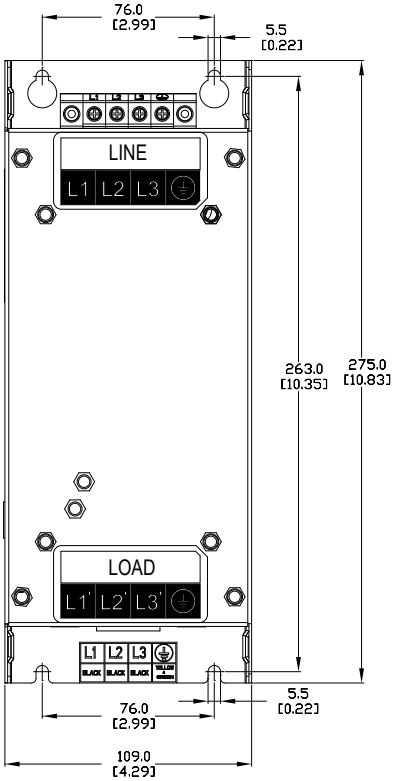




EMF11AM21A
EMF10AM23A
EMF6A0M43A

Screw	Torque
M5 x 2	16–20 kg-cm / 13.9–17.3 lb-in / 1.56–1.96 N•m
M4 x 2	14–16 kg-cm / 12.2–13.8 lb-in. / 1.38–1.56 N•m





EMF27AM21B; EMF24AM23B
EMF33AM23B; EMF12AM43B
EMF23AM43B

Screw	Torque
M5 x 4	16–20 kg-cm / 13.9–17.3 lb-in. / 1.56–1.96 N•m

High Performance EMI Input Filters

The optional accessories listed in this chapter are available for use with the GS10 drive. Selection of these accessories is application specific and may improve drive performance. Additional information regarding filter installation and operation is available in the AutomationDirect white paper, "Applied EMI/RFI Techniques Overview."

EMI Filters Selection			
Model	**Description**	**EMI Filter***	
		Roxburgh Filters Chassis 1ph	**Roxburgh Filters C2 Rated**
GS11N-10P2	120V 1ph, 1/4 HP	**RES90F10**	**MIF10**
GS11N-10P5	120V 1ph, 1/2 HP	**RES90F16**	**MIF16**
GS11N-11P0	120V 1ph, 1 HP	**RES90S30**	**MIF23**
GS11N-20P2	230V 1ph, 1/4 HP	**RES90F06**	**MIF06**
GS11N-20P5	230V 1ph, 1/2 HP	**RES90F10**	**MIF10**
GS11N-21P0	230V 1ph, 1 HP	**RES90F16**	**MIF16**
GS11N-22P0	230V 1ph, 2 HP	**RES90S20**	**MIF23**
GS11N-23P0	230V 1ph, 3 HP	**RES90S30**	**MIF330B**
GS13N-20P2	230V 3ph, 1/4 HP	**n/a**	**KMF306A**
GS13N-20P5	230V 3ph, 1/2 HP		**KMF306A**
GS13N-21P0	230V 3ph, 1 HP		**KMF306A**
GS13N-22P0	230V 3ph, 2 HP		**KMF318A**
GS13N-23P0	230V 3ph, 3 HP		**KMF318A**
GS13N-25P0	230V 3ph, 5 HP		**KMF325A**
GS13N-27P5	230V 3ph, 7.5 HP		**KMF336A**
GS13N-40P5	460V 3ph, 1/2 HP		**KMF306A**
GS13N-41P0	460V 3ph, 1 HP		**KMF306A**
GS13N-42P0	460V 3ph, 2 HP		**KMF306A**
GS13N-43P0	460V 3ph, 3 HP		**KMF310A**
GS13N-45P0	460V 3ph, 5 HP		**KMF318A**
GS13N-47P5	460V 3ph, 7.5 HP		**KMF318A**
GS13N-4010	460V 3ph, 10 HP		**KMF325A**

** All specs for the EMI filters can be found at www.automationdirect.com or by clicking the following links: -KMF Series Filters*
-MIF Series Filters
-RES90 Series Filters

EMI Filter Installation

Electrical equipment like the GS10 drive, will generate electrical noise when in operation and may interfere with the normal operation of peripheral equipment. The use of an EMI filter will mitigate this type of power supply interference. Other measures may be required for reduction or mitigation of radiated emissions. Roxburgh EMI filters have been tested with the GS10 family of drives and are recommended for the mitigation of interference and the highest performance When the GS10 drive and Roxburgh EMI filter are installed and wired according to the user manual, the installation will conform to the following rules:

- *EN61000-6-4*
- *EN61800-3: 1996*
- *EN55011 (1991) Class A Group 1 (1st Environment, restricted distribution)*

General precaution

1) *Install the EMI filter and GS10 drive on the same subpanel or metal plate.*
2) *Install the EMI filter as close as possible to the GS10 drive.*
3) *Keep wiring between the EMI filter and GS10 drive as short as possible.*
4) *The subpanel or metal plate used to support the EMI filter and GS10 drive should be well grounded (minimal resistance to ground is typically less then 1Ω).*

5) *To insure that the EMI filter and GS10 drive are adequately grounded, insure that both are securely attached to the subpanel or plate.*

Choose suitable motor cable and precautions

Proper installation and the the choice of good motor cable will positively affect the performance of the filter. When selecting motor cable, please observe the following precautions.

1) *Cable shielding (double shielding is best).*
2) *Ground the shield on both ends of the motor cable. Maintain minimum length and employ strong mechanical connection to ground.*
3) *Remove paint on the metal saddle, subpanel or plate to insure good contact to ground.*

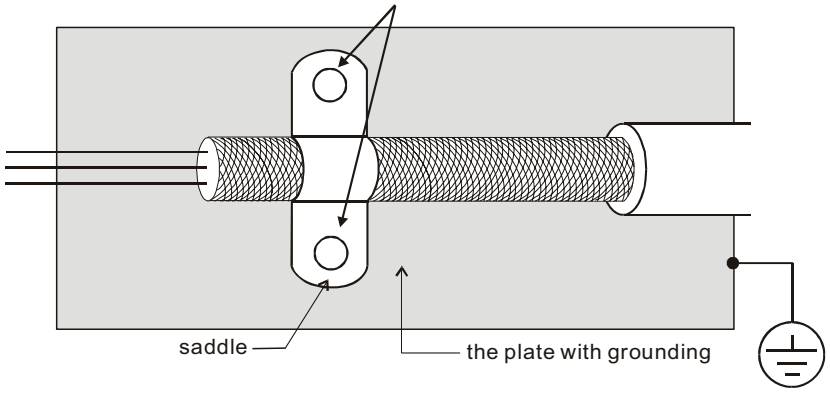


Figure 1

EMI Filter Installation (continued)

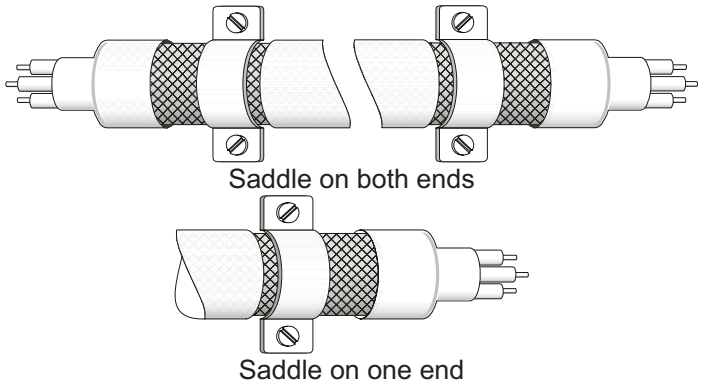


Figure 2

Reflective Wave Phenomenon

The inverter section of a PWM drive like the GS10 does not produce sinusoidal output voltage wave forms. Rather, the output voltage produced is a continuous train of width modulated pulses, sent to the motor terminals via the motor cable.

Peak pulse voltage at the GS10 drive is equal to the drive DC bus voltage and contains steep rise and fall times, the result of the IGBT switching device used in the drive inverter section.

Peak pulse voltage at the motor terminals may exceed the drive DC bus voltage and is dependent on the dynamics of the drive output voltage rise time, cable transmission line characteristics, cable length and motor impedance.

The voltage pulse train at the motor terminals experiences momentary transient over voltage as the IGBT transistors switch. The result being voltage levels at the motor terminals double that of the drive bus voltage.

Over voltage of this type has the potential to stress the motor insulation, damaging the motor.

Recommended Motor Cable Length

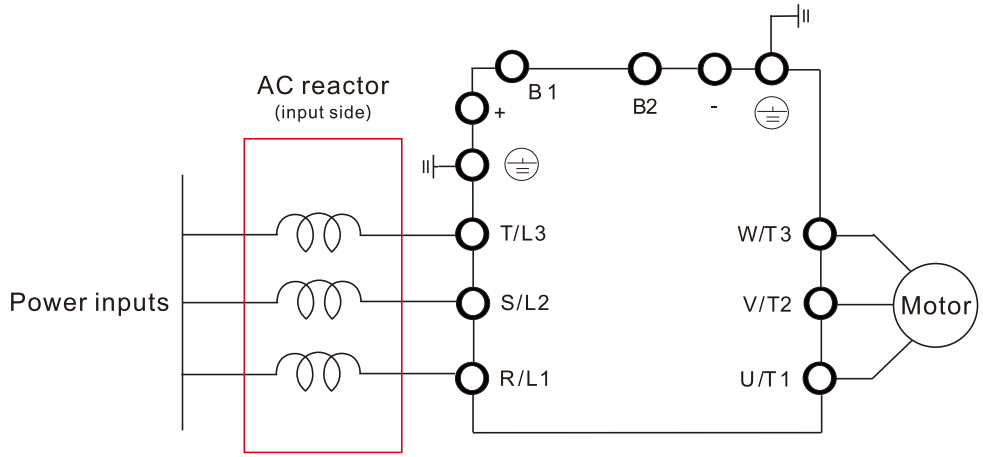
1) Never connect phase lead capacitors or surge absorbers to the output terminals of the drive.
2) As cable length increases, capacitance between cables will increase and may result in leakage current and over current faults with the possibility of damage to the GS10 drive.
3) If more than one motor is connected to the drive, the total cable length is the sum of the cable lengths from the GS10 drive to each motor.
4) Should an overload relay malfunction occur, lower the GS10 drive carrier frequency (P2.10) or install an output reactor.
5) When operating an AC motor with a PWM drive like the GS10, the motor may experience reflective wave as described above. To prevent this situation, please observe the recommendations below:
   a) Use a motor with enhanced insulation. (1000V, 1200V, 1600V, higher is better)
   b) Connect an output reactor (optional) to the output terminals of the drive.
   c) Keep motor cable length as short as possible. (65ft, 20m, or less)
   d) Where motor cable lengths will exceed 65ft (20m), refer to "Maximum Recommended Cable Length - GS10" on page A–15.

Line Reactors / Voltage Time Filters

Line Reactor

Installing an AC reactor on the input side of an AC motor drive can increase line impedance, improve the power factor, reduce input current, increase system capacity, and reduce interference generated from the motor drive. It also reduces momentary voltage surges or abnormal current spikes from the mains power, further protecting the drive. For example, when the main power capacity is higher than 500 kVA, or when using a phase-compensation capacitor, momentary voltage and current spikes may damage the AC motor drive's internal circuit. An AC reactor on the input side of the AC motor drive protects it by suppressing surges.

Install an AC input reactor in series between the main power and the three input phases R S T, as shown in the figure below:

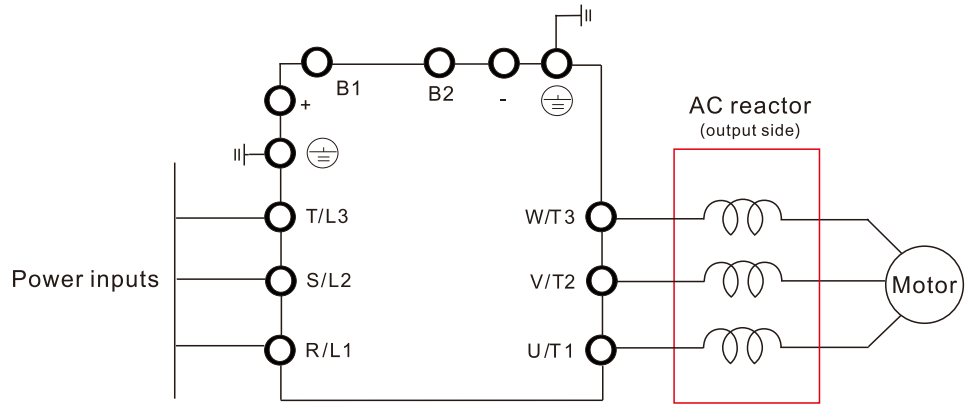


Load Reactor/Voltage Time Filter

When using drives in long wiring output application, ground fault (GFF), over-current (OC) and motor over-voltage (OV) often occur. GFF and OC cause errors due to the drive's self-protective mechanism; over-voltage damages motor insulation.

The excessive length of the output wires makes the grounded stray capacitance too large, increases the three-phase output common mode current, and the reflected wave of the long wires makes the motor dv / dt and the motor terminal voltage too high. Thus, installing a reactor on the drive's output side can increase the high-frequency impedance to reduce the dv / dt and terminal voltage to protect the motor. For distances greater than 100 feet, a dV/dT filter (VTF Series) is recommended for best performance.

Install an AC output reactor or voltage time filter in series between the three output phases U V W and the motor, as shown in the figure below:

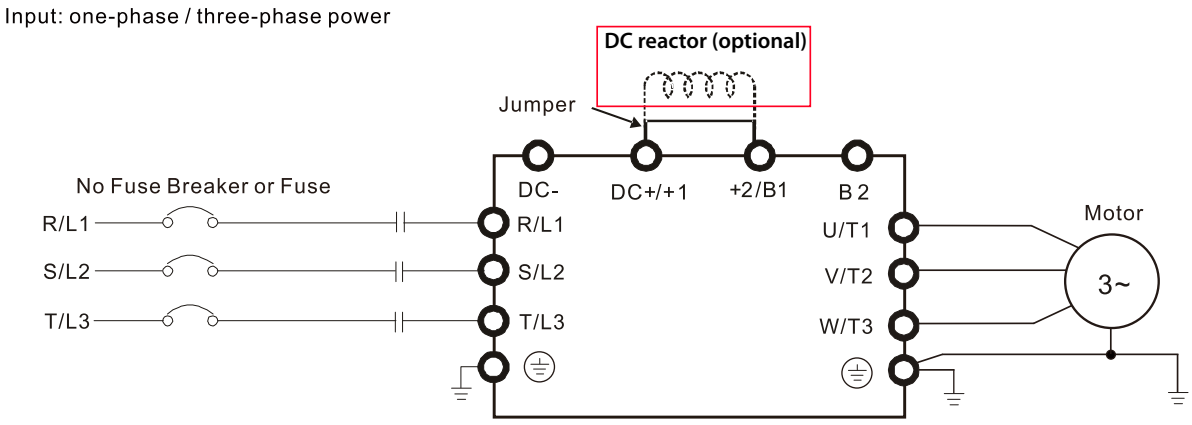


DC Reactor

A DC reactor can also increase line impedance, improve the power factor, reduce input current, increase system power, and reduce interference generated from the motor drive. A DC reactor stabilizes the DC bus voltage. Compared with an AC input reactor, a DC reactor is in smaller size, lower price, and lower voltage drop (lower power dissipation).

Install a DC reactor between terminals +1 and +2. Remove the jumper, as shown in the figure below, before installing a DC reactor.

Note: 120V models have no DC reactor/choke terminals.



When the GS10 drive is connected directly to a large-capacity power transformer (600kVA or above) or when a power correction capacitor is switched on, excessive peak currents may occur in the input power circuit resulting in damage to the GS10 drive.

To avoid this, install a line reactor in series with the GS10 drive on the input side. The installation of a line reactor will reduce input current peaks and improve the output power efficiency.

Line (load) reactors installed on the output side protect the motor insulation against AC drive short circuits and IGBT reflective wave damage, and also allow the motor to run cooler by "smoothing" the motor current waveform. They are recommended for operating "non-inverter-duty" motors, and for any motors where the length of wiring between the AC drive and motor is less than or equal to 100 feet. For AC drive-to-motor wiring distances over 100 feet, use of the VTF series output filter is recommended.

Line/Load Reactors Selection Charts

GS10 Line/Load Reactor, AC Output Filter, & DC Reactor Selections							
GS10 Model	**CT Output Amps (rms)**	**Saturation Amps (rms)**	**Motor HP**	**Line Reactor (Drive Input) (LR2)****	**Load Reactor (Drive Output) (LR2)****	**AC Output Filter (VTF)****	**DC Reactor Delta P/N***
GS11N-10P2	1.6	3.2	0.25	LR2-10P2-1PH	LR2-20P2	VTF-46-DE	DR005L0254
GS11N-10P5	2.5	5	0.5	LR2-10P5-1PH	LR2-20P5	VTF-246-CFG	
GS11N-11P0	4.8	9.6	1.0	LR2-11P5-1PH	LR2-21P0	VTF-24-FH	
GS11N-20P2	1.6	3.2	0.25	LR2-20P5-1PH	LR2-20P2	VTF-46-DE	
GS11N-20P5	2.8	5.6	0.5	LR2-20P5-1PH	LR2-20P5	VTF-246-CFG	
GS11N-21P0	4.8	9.6	1.0	LR2-21P5-1PH	LR2-21P0	VTF-24-FH	
GS11N-22P0	7.5	15	2.0	LR2-22P0-1PH	LR2-22P0	VTF-246-HKL	DR008L0159
GS11N-23P0	11	22	3.0	LR-27P5	LR-25P0	VTF-24-JL	DR011L0115
GS13N-20P2	1.6	3.2	0.25	LR2-20P2	LR2-20P2	VTF-46-DE	DR005D0585
GS13N-20P5	2.8	5.6	0.5	LR2-20P5	LR2-20P5	VTF-246-DGH	
GS13N-21P0	4.8	9.6	1.0	LR2-20P7	LR2-20P7	VTF-24-FH	
GS13N-22P0	7.5	15	2.0	LR2-22P0	LR2-22P0	VTF-246-HKL	DR008D0366
GS13N-23P0	11	22	3.0	LR-25P0	LR-23P0	VTF-24-JL	DR011D0266
GS13N-25P0	17	34	5.0	LR-27P5	LR-25P0	VTF-46-LM	DR017D0172
GS13N-27P5	25	50	7.5	LR-2010	LR-27P5	VTF-46-NP	DR025D0117
GS13N-40P5	1.5	3	0.5	LR2-40P5	LR2-40P5	VTF-46-DE	DR003D1870
GS13N-41P0	2.7	5.4	1.0	LR2-42P0	LR2-41P0	VTF-246-CFG	
GS13N-42P0	4.2	8.4	2.0	LR2-45P0	LR2-42P0	VTF-24-FH	DR004D1403
GS13N-43P0	5.5	11	3.0	LR2-45P0	LR2-43P0	VTF-24-FH	DR006D0935
GS13N-45P0	9	18	5.0	LR2-47P5	LR2-45P0	VTF-246-HKL	DR009D0623
GS13N-47P5	13	26	7.5	LR-4010	LR2-47P5	VTF-24-JL	DR012D0467
GS13N-4010	17.5	34	10.0	LR-4015	LR-4010	VTF-24-JL	DR018D0311

** Not available at AutomationDirect.com*

*** Reactor sizing is based on rated HP NEMA motor load, not drive output amp load. Size the reactor based on the motor nameplate current. All specs for the LR2 and VTF can be found at www.automationdirect.com or by clicking the following links:*

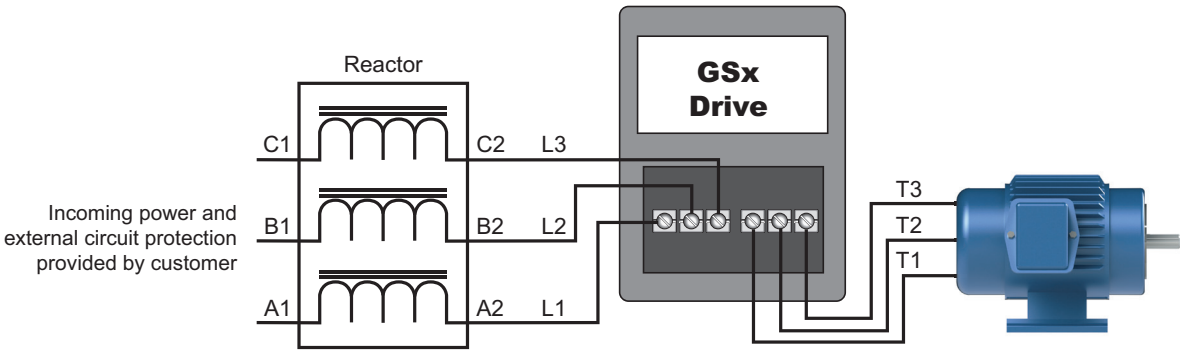
-LR2 Line Reactors

-VTF Output Filters

Line Reactor Applications and Wiring Connections

Input Side of AC Drive

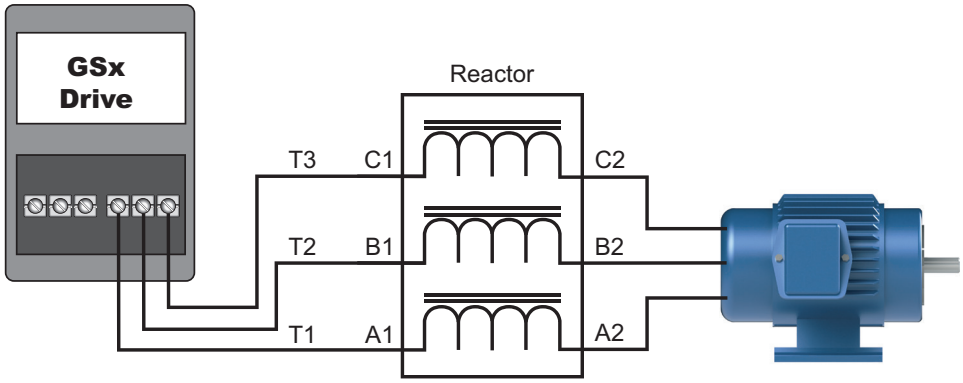
When installed on the input side of the GS10 drive, a line reactor will reduce line notching, current peaks, voltage spikes and surges from the incoming line, as well as reduce the available short circuit current. A line reactor will also reduce harmonic distortion from the GS10 drive onto the line. The line reactor is installed in front of the GS10 drive as shown.



Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS10 drive.

Output Side of AC Drive

When installed on the output side of the GS10 drive, line (load) reactors help to protect the GS10 drive from short circuits at the load. Voltage and current waveforms from the GS10 drive are enhanced, reducing motor overheating and noise emissions.

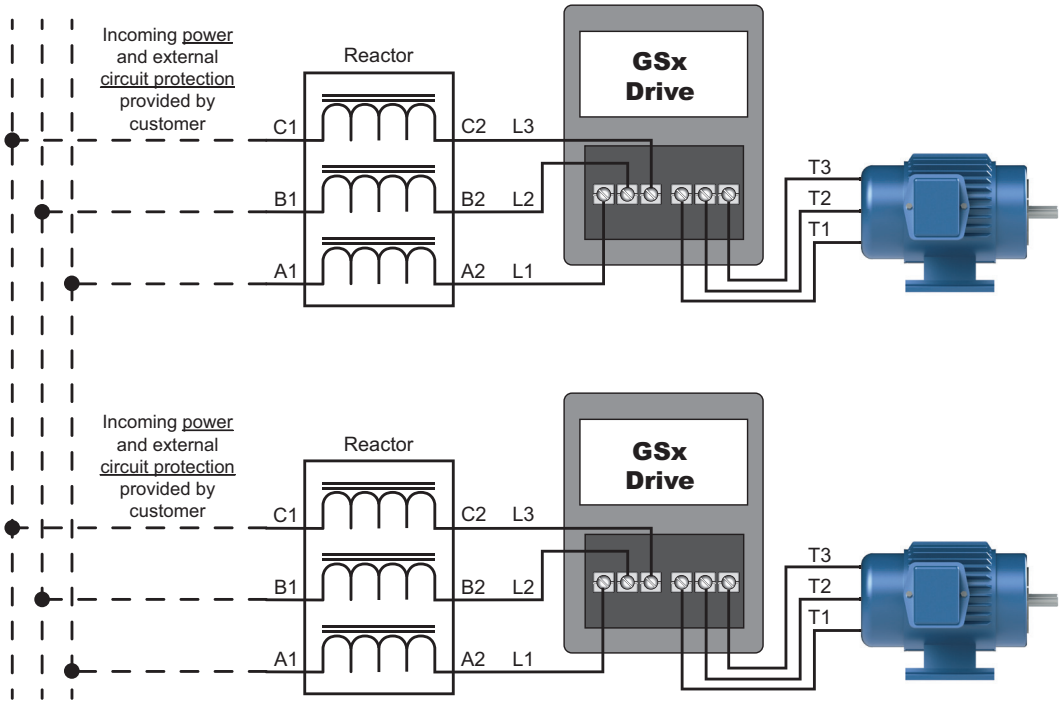


Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS10 drive.

Single phase line reactors should NOT be installed on the output side of an AC Drive. Use only three-phase reactors on drive outputs, and only for three-phase motors.

Multiple AC Drives

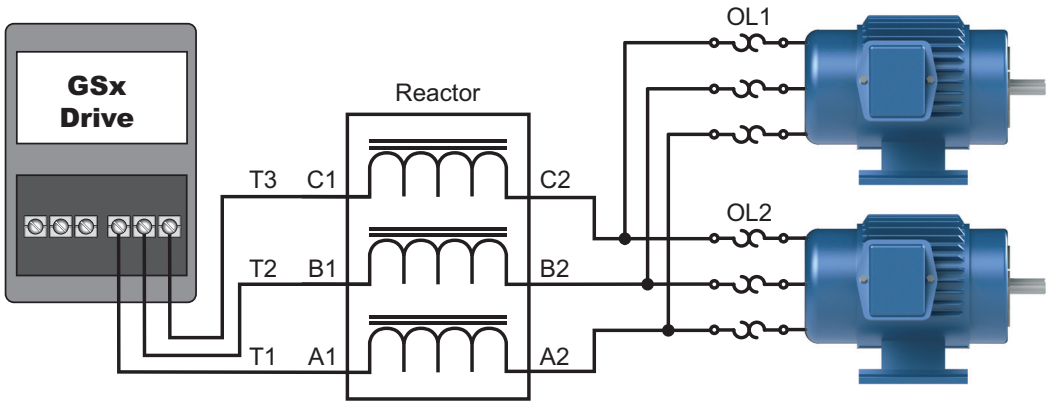
Individual line reactors are recommended when installing multiple GS10 drives on the same power line. Individual line reactors eliminate cross-talk between multiple GS10 drives and provide isolated protection for each GS10 drive for its own specific load.



Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS10 drive.

Multiple Motors

A single output (load) reactor can be used with multiple motors on the same GS10 drive, but only if the motors operate simultaneously. Size the reactor based upon the total horsepower of all the motors, and select a reactor with a current rating greater than the sum of the motor full-load currents. Overload relays are required for use in multi-motor applications.

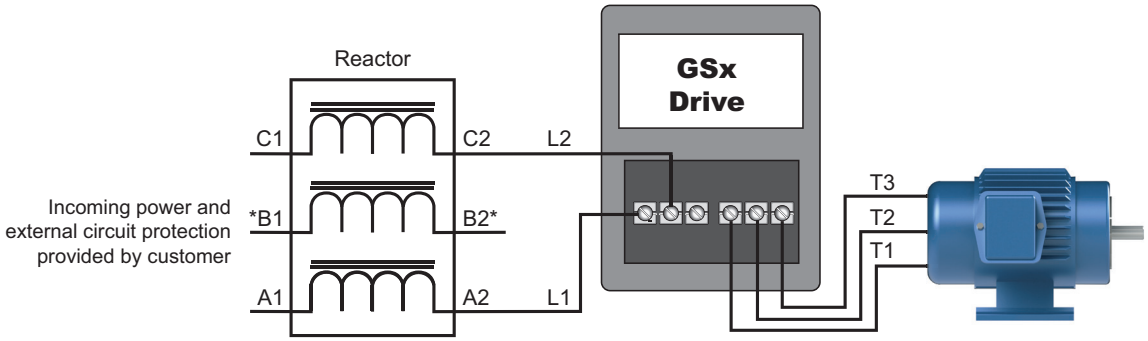


Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS10 drive.

A single reactor should be used with multiple motors ONLY when the motors will operate simultaneously from a single AC drive. OVERLOAD RELAYS are required for use in multiple motor applications.

Single-Phase Applications

Some three-phase line reactors are listed for use with single-phase input power. Follow the connection diagram shown below. Make sure that terminals B1 and B2, if present, are properly insulated before any connections are made. If a 3-phase reactor is used on the line side of a single-phase input drive application, ensure that the actual single-phase current does not exceed the Line Reactor's current rating (example: a 3-phase, 5hp Line Reactor and 3-phase 5hp drive will not handle enough current to power a 5hp motor on a single-phase supply - both the drive and the Line Reactor will have to be upsized).



*LR series 1-phase reactors do not include a B-phase winding.

Please refer to "Chapter 2: Installation and Wiring" for detailed wiring information for the GS10 drive.

ENSURE THAT YOU PROPERLY INSULATE TERMINALS B1 AND B2 BEFORE MAKING ANY CONNECTIONS TO SINGLE-PHASE POWER.

Recommended Cable Length

Motor Leakage Current

If the cable length is too long, the stray capacitance between cables increases and may cause leakage current. This activates over-current protection, increases leakage current, or may affect the current display. In the worst case, it may damage the AC motor drive. If more than one motor is connected to one AC motor drive, the total wiring length should be the sum of the wiring length from AC motor drive to each motor.

For the 460V series AC motor drive, when you install an overload thermal relay between the drive and the motor to protect the motor from overheating, the connecting cable must be shorter than 50m; however, an overload thermal relay malfunction may still occur. To prevent the malfunction, install an output reactor (optional) to the drive or lower the carrier frequency setting (see P00.17 Carrier Frequency).

Motor Surge Voltage

When a motor is driven by a PWM-type AC drive, the motor terminals experience surge voltages (dv/dt) due to power transistor conversion of the drive. For very long motor cable (especially for the 460V series), surge voltages (dv/dt) may damage the motor insulation and bearing. To prevent this, follow these rules:

A) Use a motor with enhanced insulation.
B) Reduce the cable length between the AC drive and motor to suggested values.
C) Connect an output reactor (optional) to the output terminals of the AC drive.

Refer to the following tables for the suggested motor shielded cable length. For drive models < 480V, use a motor with a rated voltage ≤ 500 VAC and an insulation level ≥ 1.35 kVp-p in accordance with IEC 60034-17.

Maximum Recommended Cable Length - GS10							
GS10 Model	Input Power		VT Rated Current (Arms)	Without Output AC Reactor (meters)		With Output AC Reactor (meters)	
	Ø	Volts		Shielded Cable	Unshielded Cable	Shielded Cable	Unshielded Cable
GS11N-10P2	1	120	1.8	50	75	75	115
GS11N-10P5			2.7				
GS11N-11P0			5.5				
GS11N-20P2		230	1.8				
GS11N-20P5			3.2				
GS11N-21P0			5				
GS11N-22P0			8.5				
GS11N-23P0			12.5				
GS13N-20P2	3	230	1.8				
GS13N-20P5			3.2				
GS13N-21P0			5				
GS13N-22P0			8				
GS13N-23P0			12.5				
GS13N-25P0			19.5				
GS13N-27P5			27				
GS13N-40P5		460	1.8	35	50	50	90
GS13N-41P0			3				
GS13N-42P0			4.6				
GS13N-43P0			6.5	50	75	75	115
GS13N-45P0			10.5				
GS13N-47P5			15.7				
GS13N-4010			20.5	100	150	150	225

Dynamic Braking

Dynamic braking resistors dissipate the regeneration energy of AC motors when they are being controlled to a stop faster than a coasting stop. All GS10 drives have the braking function circuitry built-in and do not require a separate dynamic braking unit.

To utilize dynamic braking:

1) Wire the appropriate braking resistor to terminals B1/B2 (refer to page 2–15).
2) Set parameter P07.00 Software Brake Chopper Action Level for the application. When the DC bus voltage rises above this setpoint, the dynamic braking circuit will activate.

To avoid possible injury, please refer to Chapter 2 of this manual for correct wiring of the braking resistors.

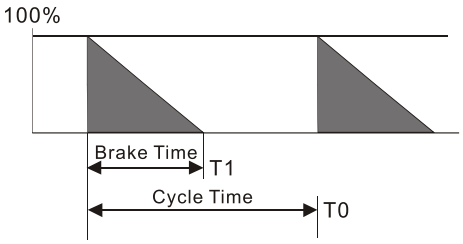
Drive Unit Dynamic Braking Specifications

GS10 AC Drive Dynamic Braking Specifications							
Drive Voltage	Motor Power		Drive Model	Drive Braking Circuit B1/B2			Compatible Brake Resistors* (125% Torque, 10% Duty Cycle)
	(hp)	(kW)		Min Resistor Value (Ω)	Max Total Brake Current (A)	Peak Power (kW)	
120V	1/4	0.2	GS11N-10P2	190.0	2	0.8	Click here
	1/2	0.4	GS11N-10P5	95.0	4	1.5	
	1	0.75	GS11N-11P0	63.3	6	2.3	
230V	1/4	0.2	GS11N-20P2	190.0	2	0.8	
	1/2	0.4	GS11N-20P5	95.0	4	1.5	
	1	0.75	GS11N-21P0	63.3	6	2.3	
	2	1.5	GS11N-22P0	47.5	8	3.0	
	3	2.2	GS11N-23P0	38.0	10	3.8	
	1/4	0.2	GS13N-20P2	190.0	2	0.8	
	1/2	0.4	GS13N-20P5	95.0	4	1.5	
	1	0.75	GS13N-21P0	63.3	6	2.3	
	2	1.5	GS13N-22P0	47.5	8	3.0	
	3	2.2	GS13N-23P0	38.0	10	3.8	
	5	3.7	GS13N-25P0	19.0	20	7.6	
	7 1/2	5.5	GS13N-27P5	16.5	23	8.7	
460V	1/2	0.4	GS13N-40P5	380.0	2	1.5	
	1	0.75	GS13N-41P0	190.0	4	3.0	
	2	1.5	GS13N-42P0	126.7	6	4.6	
	3	2.2	GS13N-43P0	108.6	7	5.3	
	5	3.7	GS13N-45P0	84.4	9	6.8	
	7.5	5.5	GS13N-47P5	50.7	15	11.4	
	10	7.5	GS13N-4010	40.0	19	14.4	
** 10% Duty Cycle with maximum ON (braking) time for 10 seconds.*							

For a full list of all brake resistors compatible with GS10 drives, please see the GS10 series braking technical specification: https://cdn.automationdirect.com/static/specs/gs10braking.pdf

Choosing and Installing a Braking Resistor

1) Select the resistance value, power and brake usage (ED %).
Definition for Brake Usage ED%:



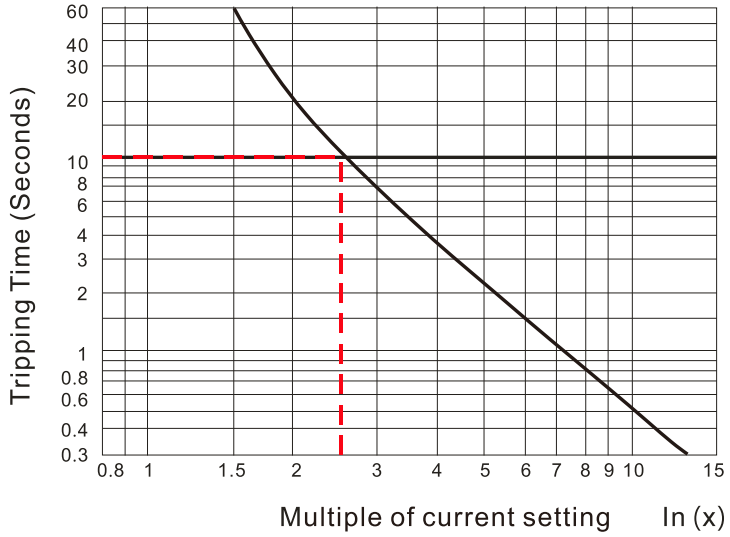
ED% = T1 / T0 x 100(%)

Explanation:
Brake usage ED (%) is the amount of time needed for the brake unit and brake resistor to dissipate heat generated by braking. When the brake resistor heats up, the resistance increases with temperature, and braking torque decreases accordingly.

For safety, install a thermal overload relay (O.L) between the brake unit and the brake resistor in conjunction with the magnetic contactor (MC) before the drive for additional protection. The thermal overload relay protects the brake resistor from damage due to frequent or continuous braking. Under such circumstances, turn off the power to prevent damage to the brake resistor and drive.

Note: Never use the thermal overload relay to disconnect the brake resistor.

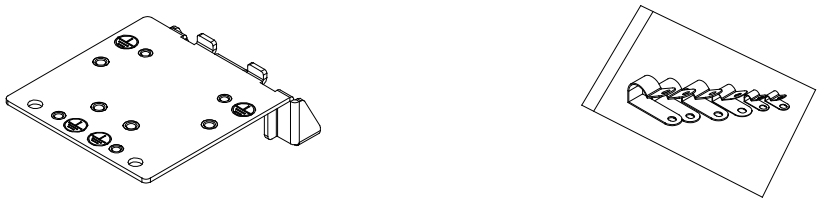
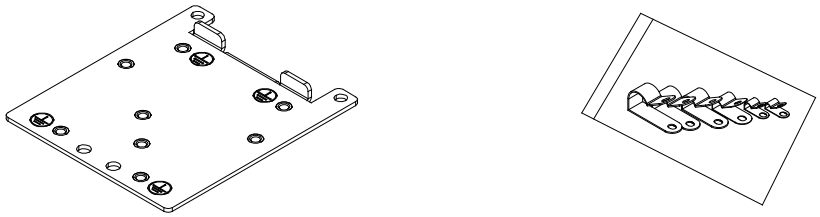
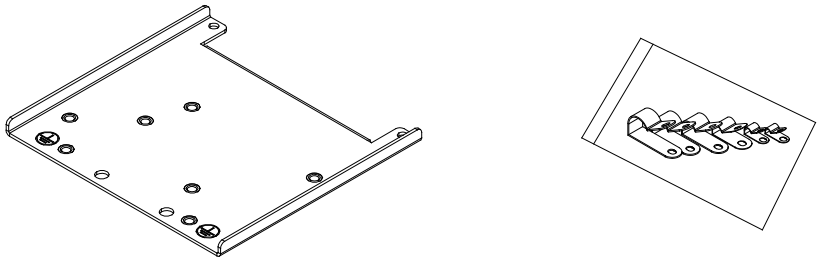
2) Any damage to the drive or other equipment caused by using brake resistors and brake modules that are not provided by AutomationDirect voids the warranty.
3) Consider environmental safety factors when installing the brake resistors. If you use the minimum resistance value, consult AutomationDirect tech support for the power calculation.
4) Refer to the ADC Dynamic Braking unit User Manual for more detail on braking resistors (https://cdn.automationdirect.com/static/manuals/gs3dbm/gs-db_ump.pdf)
5) The selection tables are for 10% duty cycle. If the AC motor drive requires frequent braking, increase the Watts by two to three times.
6) Thermal Overload Relay (TOR):
Thermal overload relay selection is based on its overload capacity. A standard braking capacity of the GS10 is 10% ED (Tripping time=10 s). As shown in the figure below, a 460V, 1kw GS10 required the thermal relay to take 260% overload capacity for 10 seconds (hot starting) and the braking current is 24A. In this case, select a thermal overload relay rated at 10A (10 * 260% = 26 A > 24 A). The property of each thermal relay may vary among different manufacturers. Carefully read the specification before using it.



EMC Shield & Earthing Plates

GS10 EMC Shield Plates

EMC shield plates are available for use with shielded cable and your GS10 drive. Find the frame type from the specification tables of your GS10 and reference the table below:

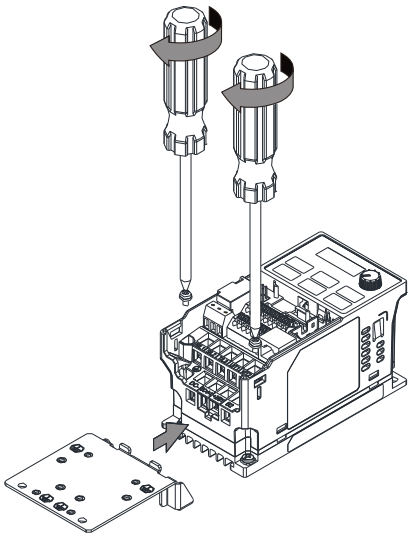
GS10 EMC Shield Plate Selection		
Frame	***EMC Shield Plate Model***	***Reference Drawing***
A	GS20A-ESP-A	
B	GS20A-ESP-B	
C	GS20A-ESP-C	
D	GS20A-ESP-D	

EMC Shield Plate Installation

The steps below show how to install the EMC shield plate on a GS10 drive. The diagram examples use an A frame model.

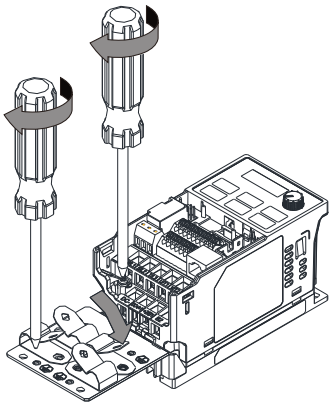
1) Attach the shield plate to the GS10 drive as shown in the diagram to the right.
Torque the screws per the table below:

Frame	Screw	Torque
A	M3.5	6–8 kg-cm (5.2–6.9 lb-in.) [0.59–0.78 N•m]
B	M4	6–8 kg-cm (5.2–6.9 lb-in.) [0.59–0.78 N•m]
C	M4	6–8 kg-cm (5.2–6.9 lb-in.) [0.59–0.78 N•m]
D	M3	4–6 kg-cm (3.5–5.2 lb-in.) [0.39–0.59 N•m]



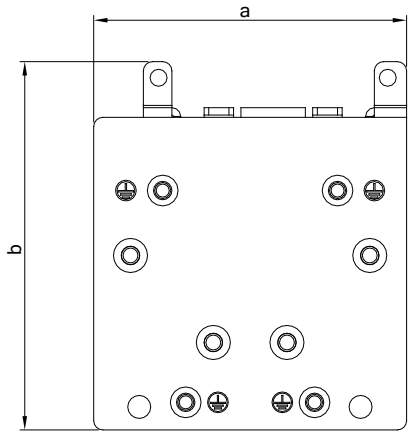
2) Select an R-clip suitable for the wire gauge used and then fix the R-clip to the shield plate as shown in the diagram to the right.
Torque the R-clip screws per the table below:

Screw	Torque
M4	6–8 kg-cm (5.2–6.9 lb-in.) [0.59–0.78 N•m]



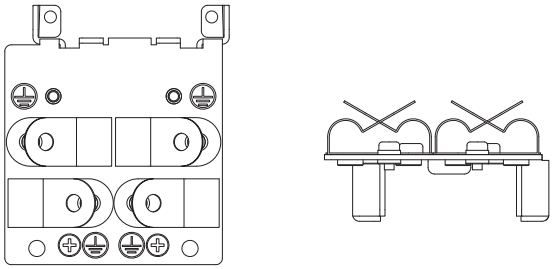
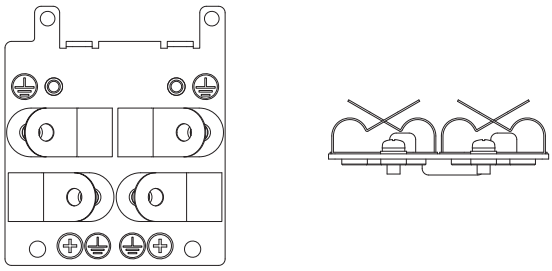
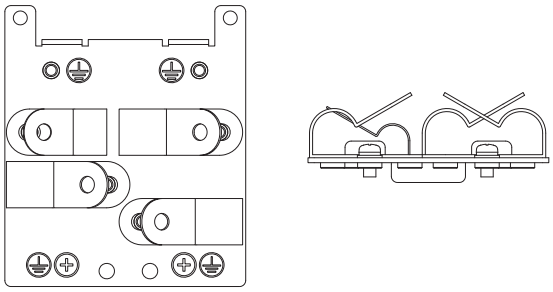
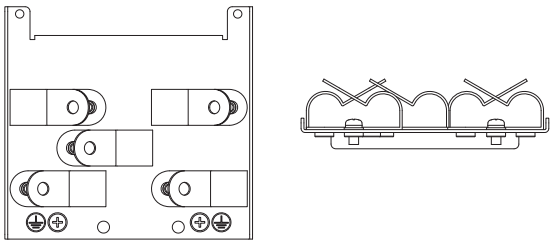
EMC Shield Plate Dimensions

EMC Shield Plate Dimensions		
Model	Dimensions mm [inch]	
	a	b
GS20-ESP-A	69.3 [2.73]	80.0 [3.15]
GS20-ESP-B	67.7 [2.67]	79.7 [3.14]
GS20-ESP-C	78.0 [3.07]	91.0 [3.58]
GS20-ESP-D	103.4 [4.07]	97.0 [3.82]



Recommended Wiring Method

The diagrams below show the recommended R-clip configuration for wiring shielded cable to each frame type/EMC shield plate model.

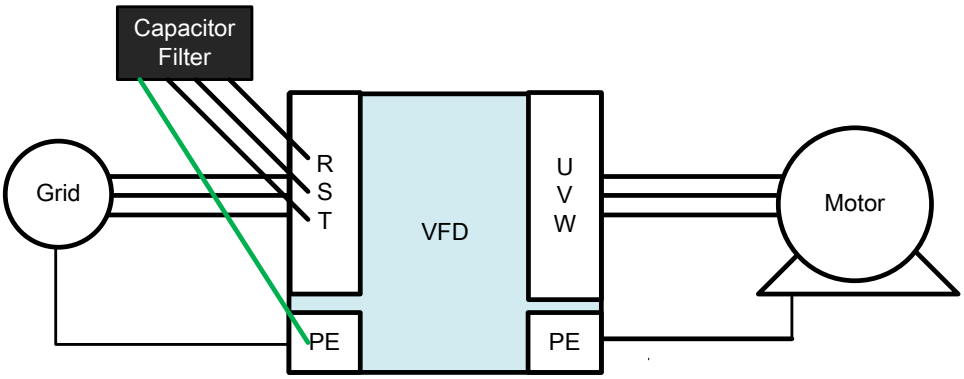
EMC Shield Plate Wiring Methods		
Frame	***EMC Shield Plate Model***	***Reference Drawing***
A	GS20A-ESP-A	
B	GS20A-ESP-B	
C	GS20A-ESP-C	
D	GS20A-ESP-D	

Capacitive Filter (GS20A-CAPF)

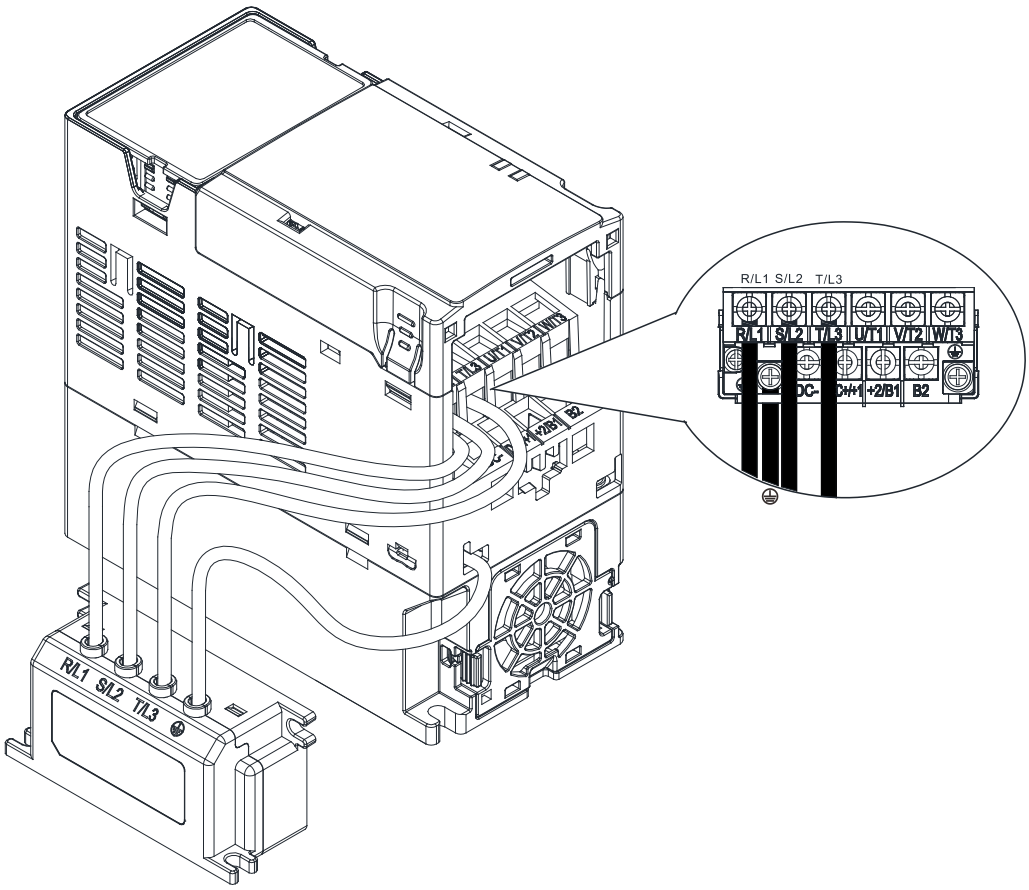
The GS20A-CAPF capacitive filter supports basic filtering and noise interference reduction for models 460V and below.

GS10A-CAPF Specifications			
Model	***Applicable Voltage***	***Temperature Range***	***Capacitance***
GS20A-CAPF	110–480 VAC	-40–85°C	Cx: 1uF ± 20% Cy: 0.1uF ± 20%

Installation diagram:

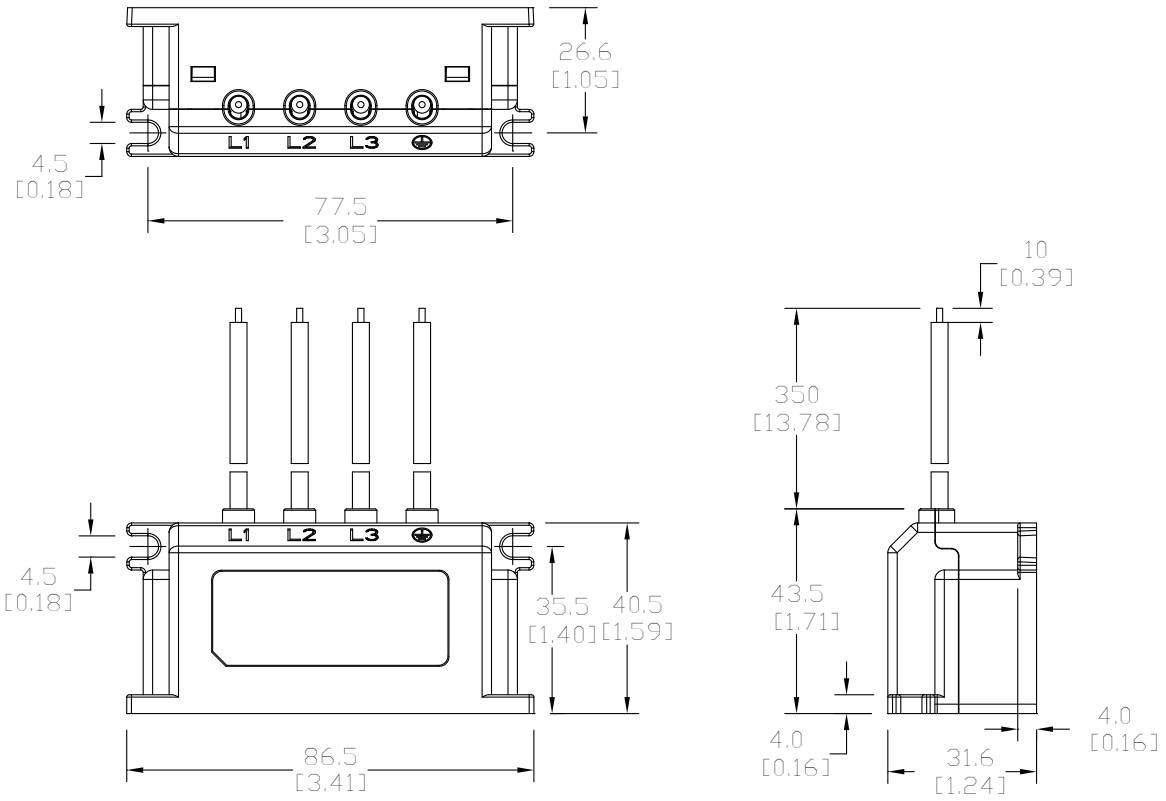


Filter and Drive Wiring



GS20A-CAPF Dimensions

Units = mm [inch]



Conduit Box

NEMA 1 / UL Type 1 compliant conduit boxes are available for all frame sizes (A–D).

Conduit Box Dimensions

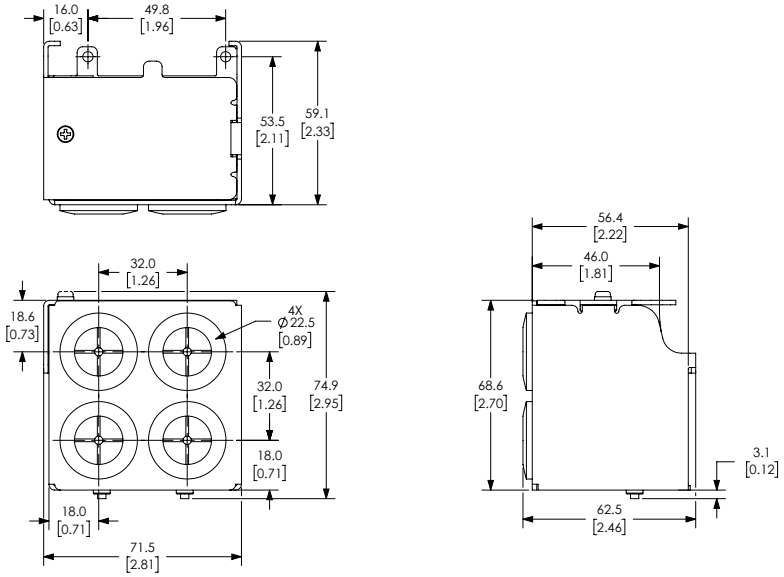
Units = mm [inch]

Frame A1, A2

Applicable models

GS11N-10P2, GS11N-20P2, GS13N-20P2, GS13N-20P5

Conduit Box GS10-N1A1

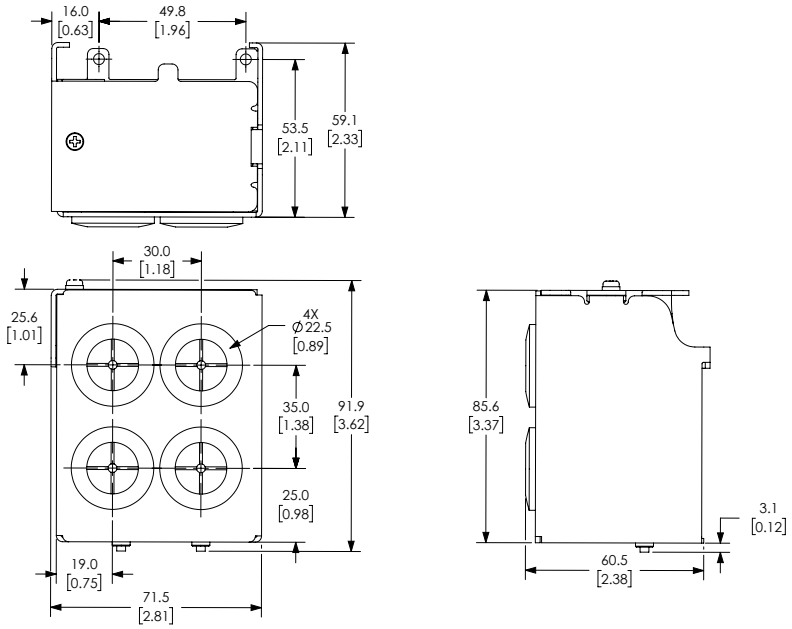


Frame A3–A6

Applicable models

GS11N-10P5, GS11N-20P5, GS13N-21P0, GS13N-40P5, GS13N-41P0

Conduit Box GS10-N1A3



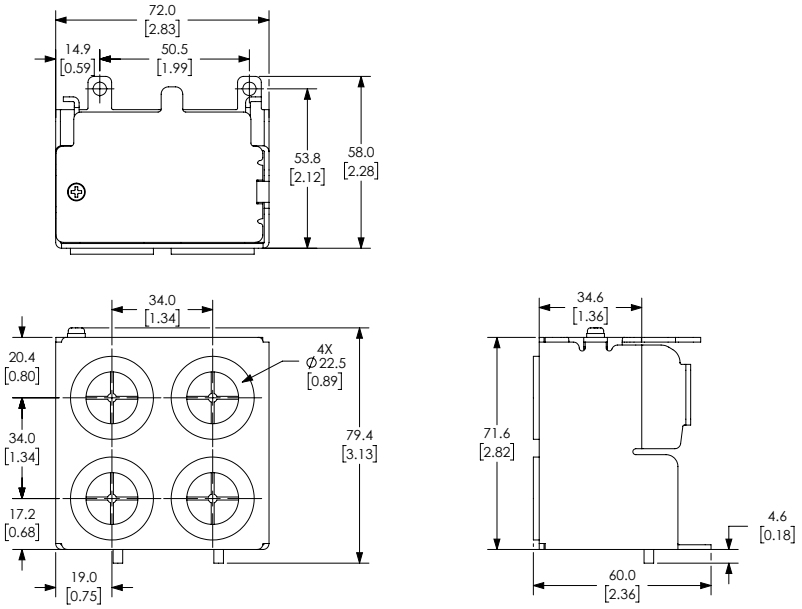
Units = mm [inch]

Frame B

Applicable models

GS11N-21P0, GS13N-22P0, GS13N-41P0

Conduit Box GS10-N1B

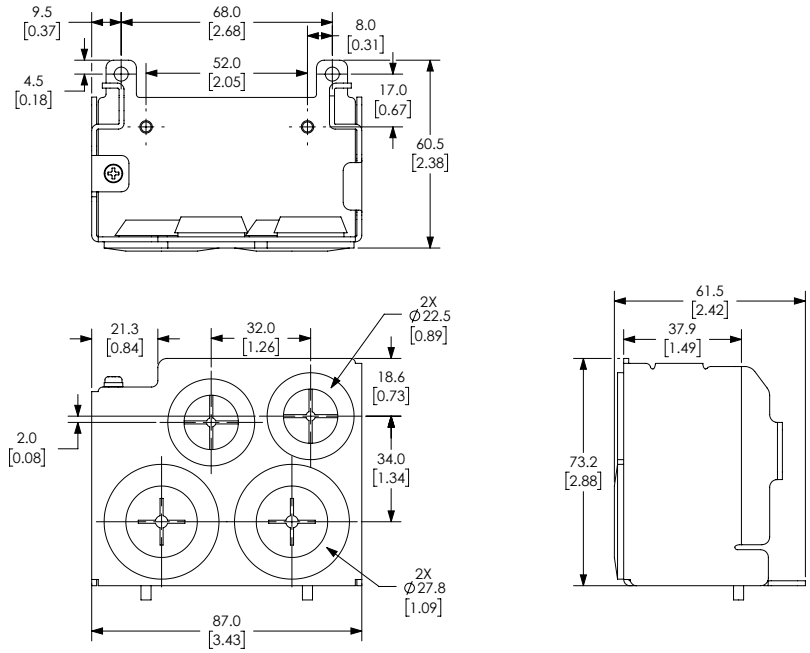


Frame C

Applicable models

GS11N-11P0, GS11N-22P0, GS11N-23P0, GS13N-23P0, GS13N-25P0, GS13N-43P0, GS13N-45P0

Conduit Box GS10-N1C



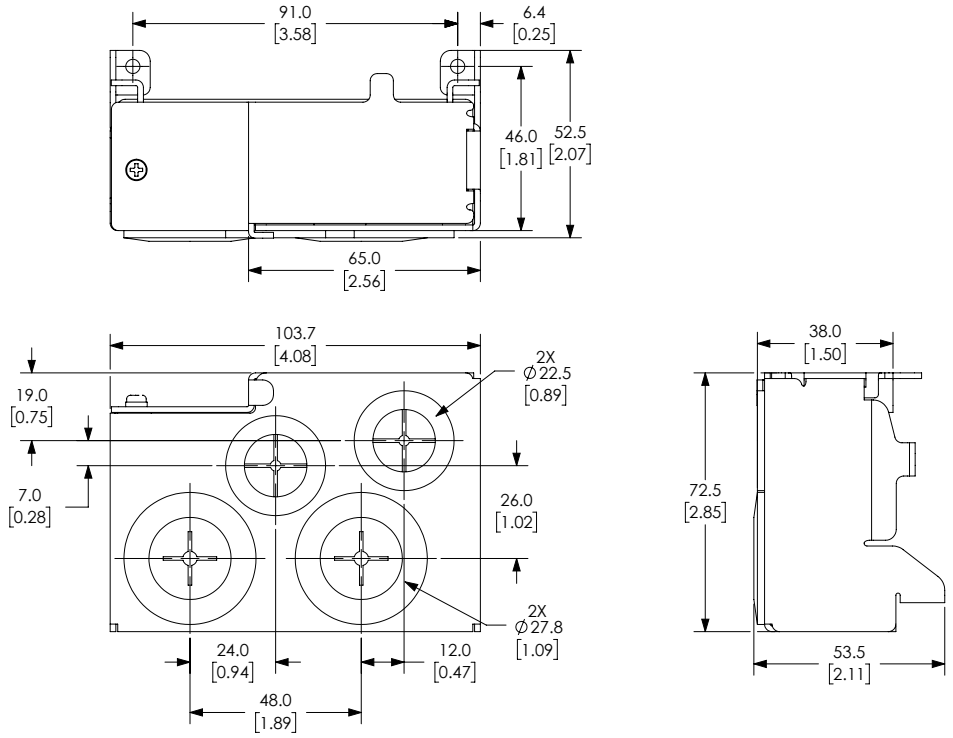
Units = mm [inch]

Frame D

Applicable models

GS13N-27P5, GS13N-47P5, GS13N-4010

Conduit Box GS10-N1D



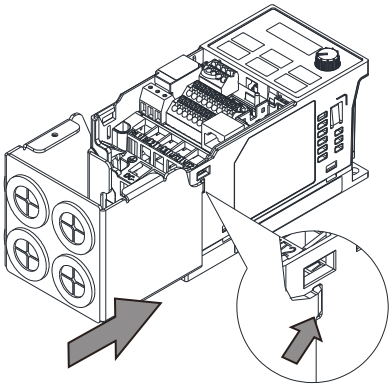
Conduit Box Installation

Follow the steps below to install a conduit box to your GS10 drive. The first set of instructions are for Frame A drives, the second set of instructions is for Frame B–D drives.

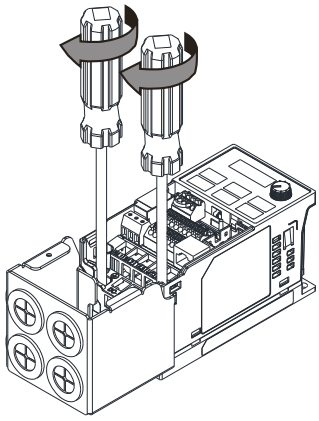
Recommended Screw Size and Torque Value	
Screw	***Torque***
M3	4–6 kg-cm (3.5–5.2 lb-in.) [0.39–0.59 N•m]
M3.5	4–6 kg-cm (3.5–5.2 lb-in.) [0.39–0.59 N•m]
M4	6–8 kg-cm (5.2–6.9 lb-in.) [0.59–0.78 N•m]

Frame A Conduit Box Installation:

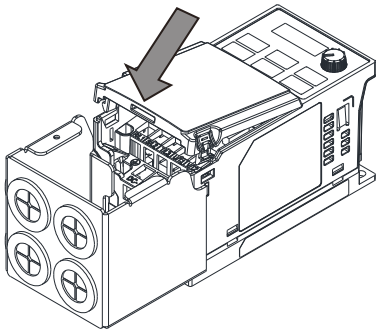
1)



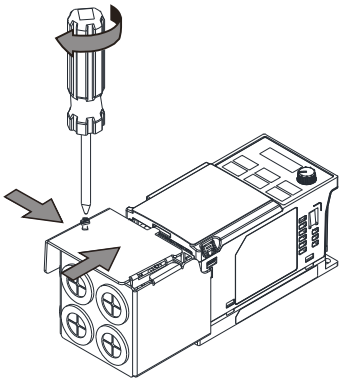
2)



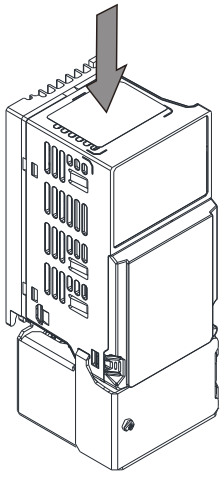
3)



4)

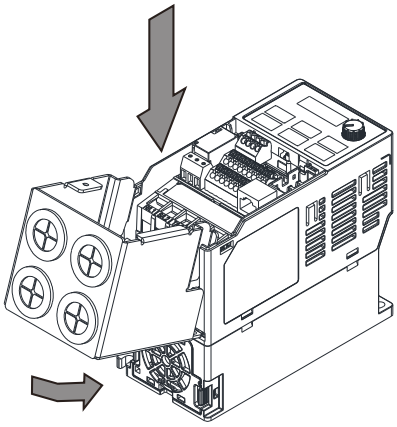


5)

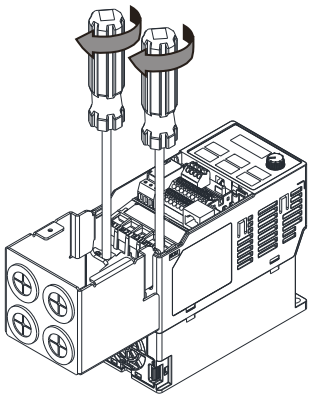


Frame B–D Conduit Box Installation:

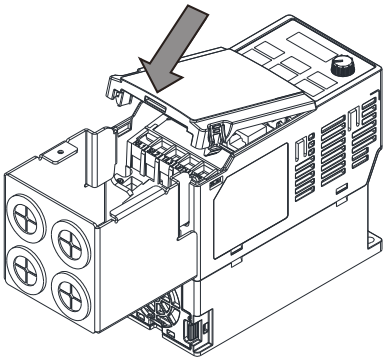
1)



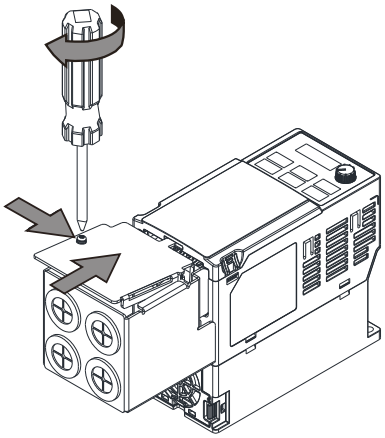
2)



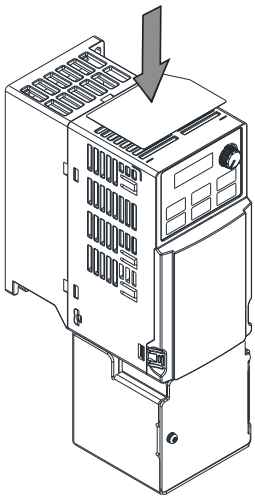
3)



4)

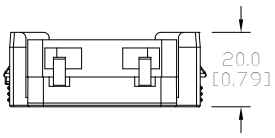
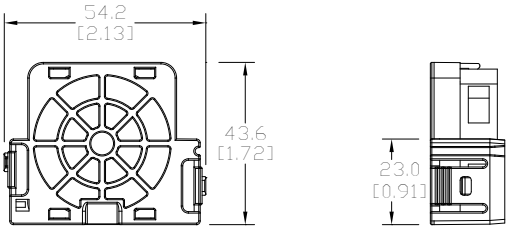
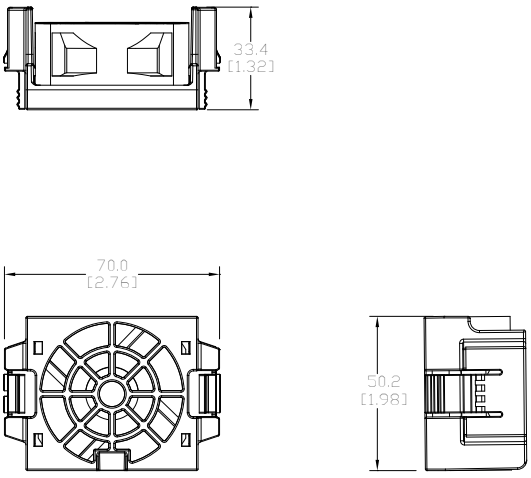
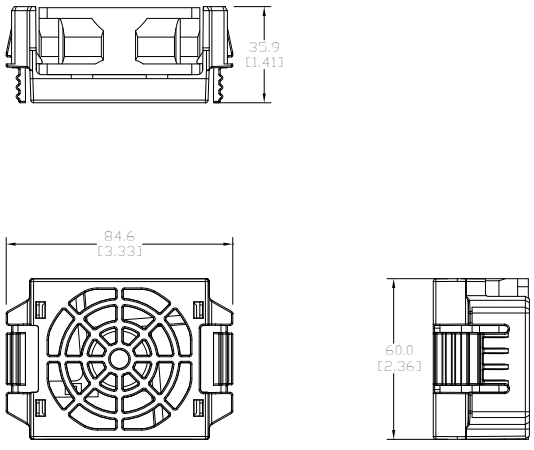


5)

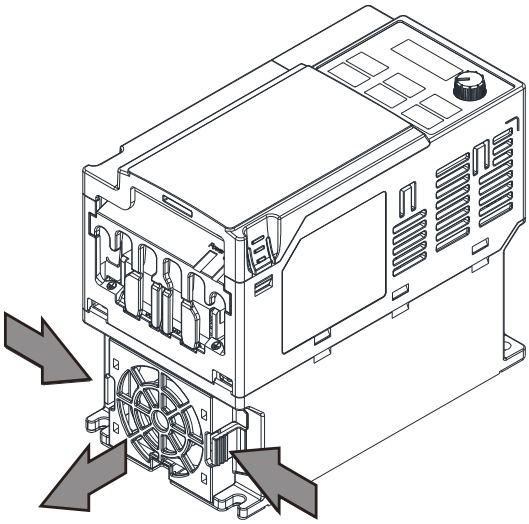
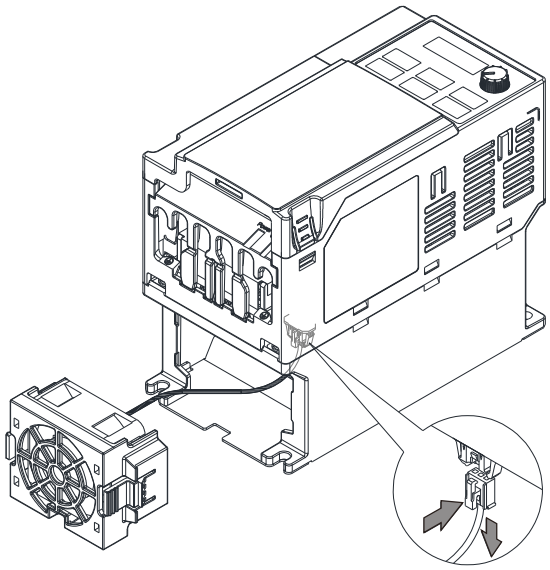


Replacement Fan Kit

Most GS10 drives come equipped with a fan that can be replaced if needed. Use the table below to select the right fan for your drive, then remove and replace the existing fan.

GS10 Fan Kit Selector			
Frame	***Drive Series***	***Fan Kit Model***	***Reference Drawing (units = mm [inch])***
A	GS10	n/a	
B	GS10	GS20A-FAN-B	
C	GS10	GS20A-FAN-C	
D	GS10	GS20A-FAN-D	

GS10 Series Fan Removal

1) As shown in the figure below, press the tabs on both sides of the fan to remove it.	2) Disconnect the power cable while removing the fan.
	

DIN Rail Mounting

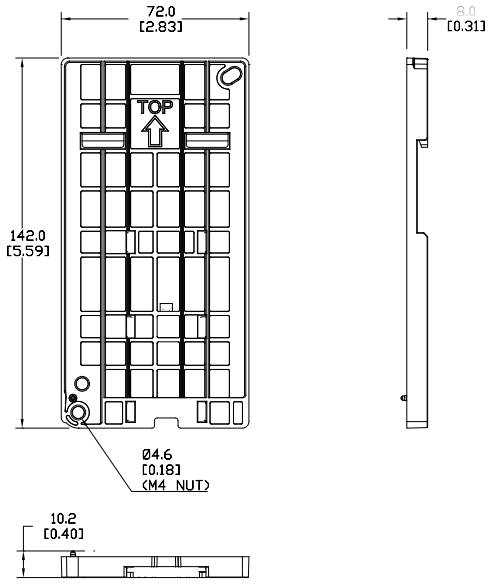
Frame A, B, and C GS10 drives can be DIN rail mounted using a DIN rail mounting kit. One kit is used for A and B frame drives, while a second kit is used for C frame drives.

GS10 DIN Rail Mounting Compatibility		
Drive Model	***Frame***	***Mounting Plate***
GS11N-10P2	A1	GS20A-DR-AB
GS11N-20P2		
GS13N-20P2		
GS13N-20P5	A2	
GS11N-10P5	A3	
GS11N-20P5		
GS13N-40P5	A4	
GS13N-21P0	A5	
GS13N-41P0	A6	
GS13N-22P0	B1	
GS13N-42P0		
GS11N-21P0	B2	
GS11N-22P0	C1	GS20A-DR-C
GS11N-23P0		
GS13N-23P0		
GS13N-25P0		
GS11N-11P0		
GS13N-43P0		
GS13N-45P0		

GS20A-DR-AB

Used with Frame A and B GS10 drives.

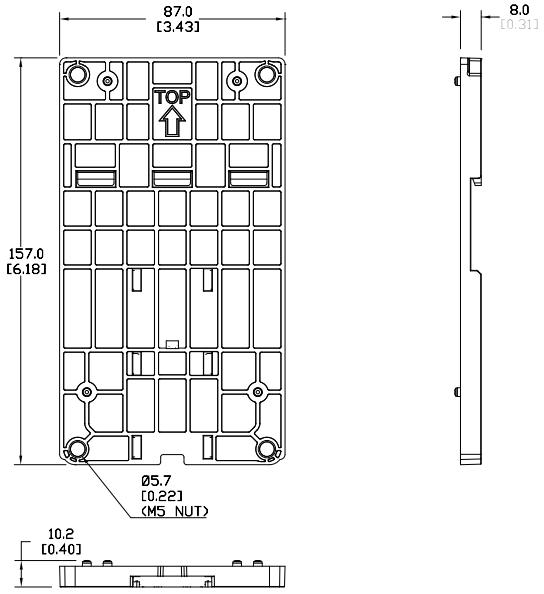
Screw	***Torque***
M4 x 2	8–10 kg-cm (6.9–8.7 lb-in.) [0.78–0.98 N•m]



GS20A-DR-C

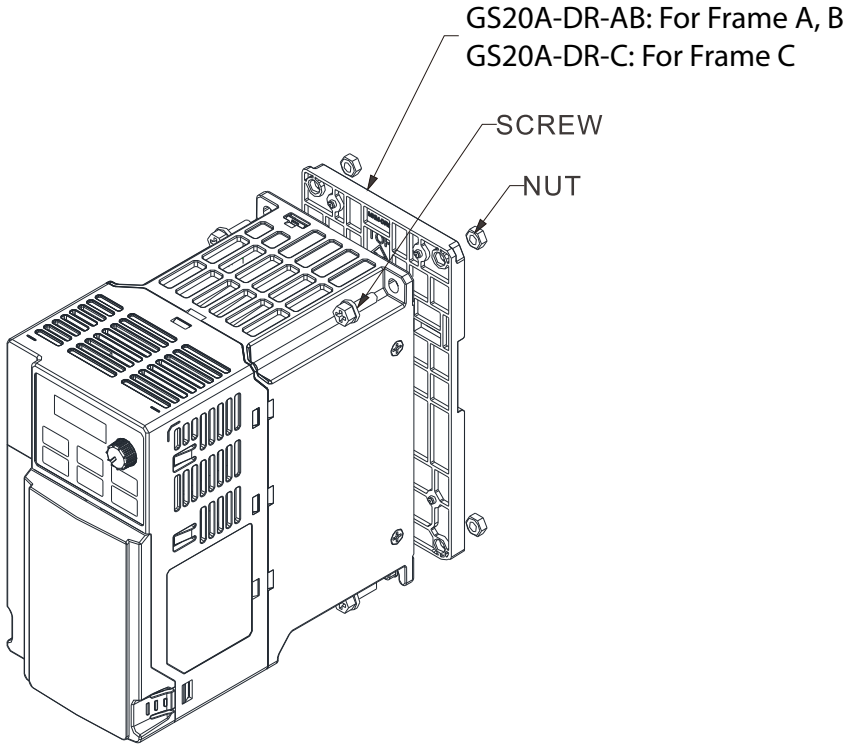
Used with Frame C GS10 drives.

Screw	*Torque*
M5 x 4	10–12 kg-cm (8.7–10.4 lb-in.) [0.98–1.18 N•m]



GS10 DIN Rail Installation

Attach the GS10 drive to the DIN rail kit mounting bracket as shown below. The diagram is for a Frame C drive, for Frame A or B, use one screw at the top and one at the bottom.



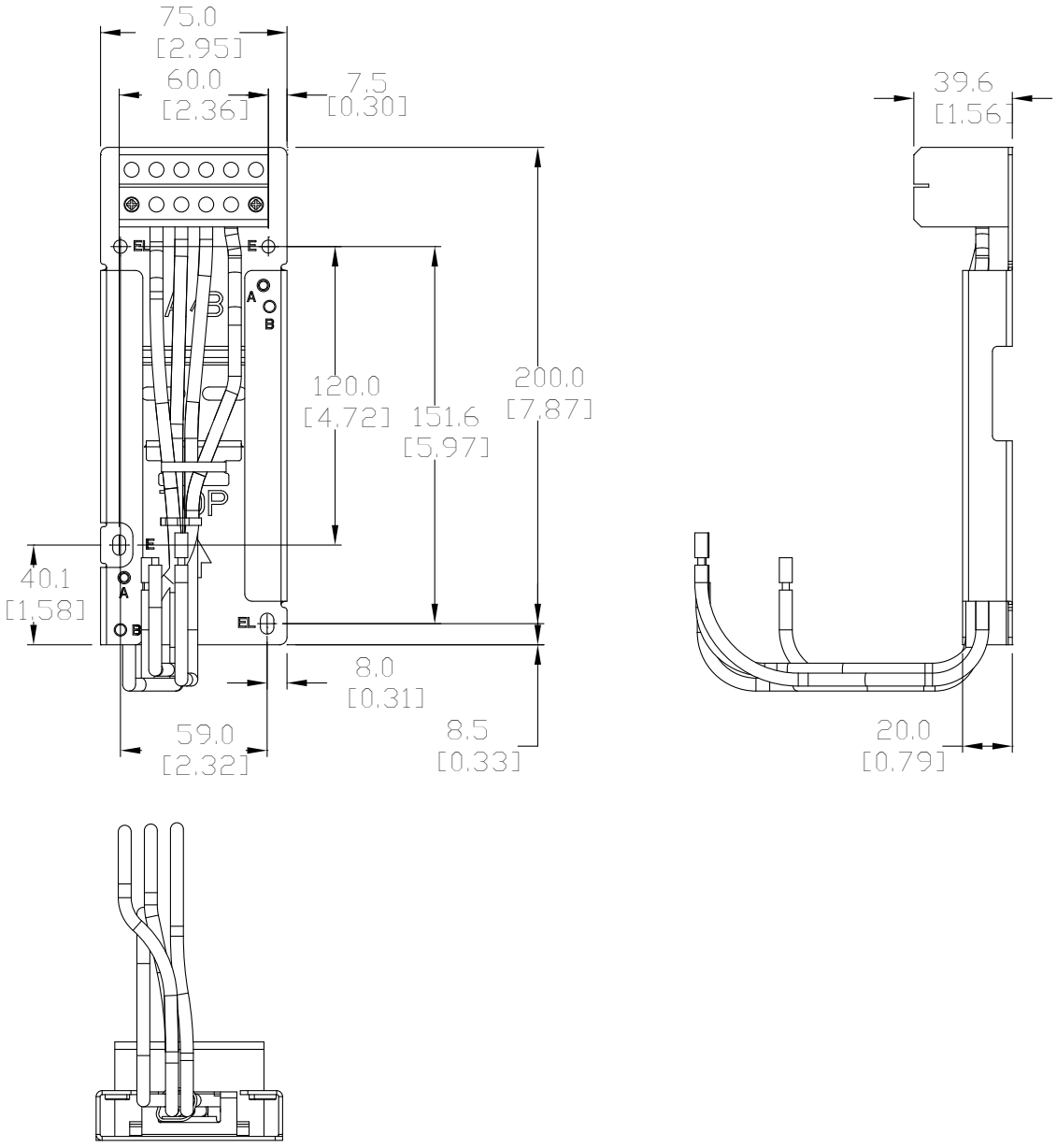
Mounting Adapter Plate

The mounting adapter plate can be used to change the wiring method for the GS10 series and provides flexibility for installation. This accessory changes the wiring method from the “bottom-mains input/ bottom-motor output" to the “top-mains input/bottom-motor output" for GS10. Use the table below to select the correct mounting plate for your drive.

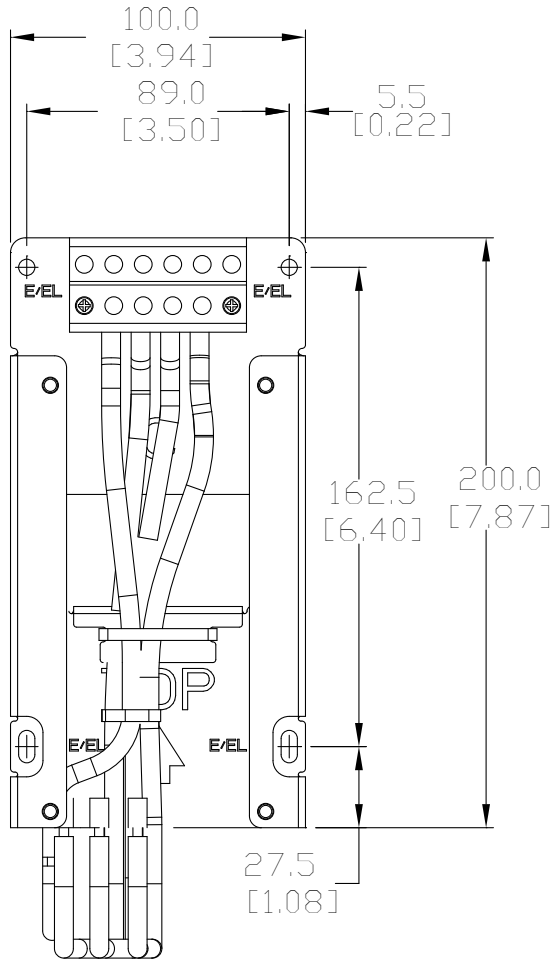
GS10 Mounting Adapter Compatibility		
Drive Model	***Frame***	***Mounting Plate***
GS11N-10P2	A1	GS20A-MP-AB
GS11N-20P2		
GS13N-20P2		
GS13N-20P5	A2	
GS11N-10P5	A3	
GS11N-20P5		
GS13N-40P5	A4	
GS13N-21P0	A5	
GS13N-41P0	A6	
GS13N-22P0	B1	
GS13N-42P0		
GS11N-21P0	B2	
GS11N-22P0	C1	GS20A-MP-C
GS11N-23P0		
GS13N-23P0		
GS13N-25P0		
GS11N-11P0		
GS13N-43P0		
GS13N-45P0		

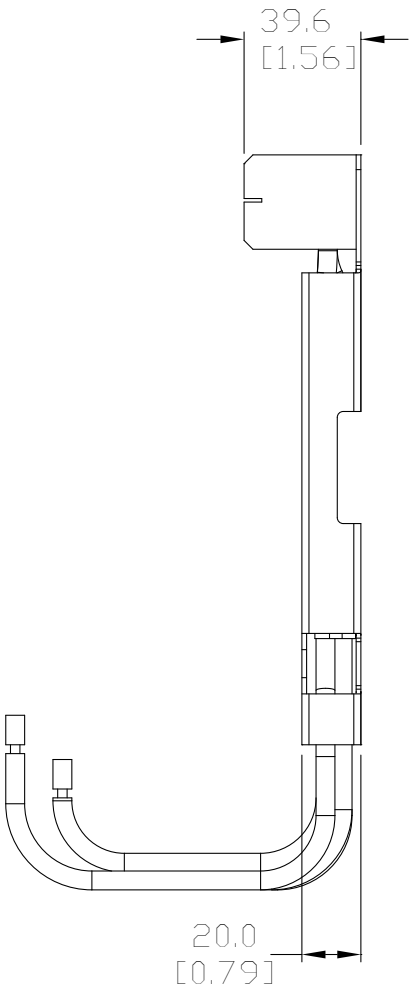
Mounting Adapter Plate Dimensions

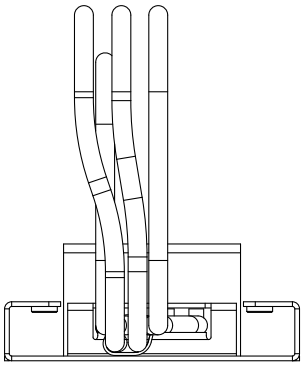
GS20A-MP-AB



GS20A-MP-C


100.0
[3.94]
89.0
[3.50]
5.5
[0.22]
162.5
[6.40]
200.0
[7.87]
27.5
[1.08]
E/EL
E/EL
E/EL
E/EL
DP


39.6
[1.56]
20.0
[0.79]

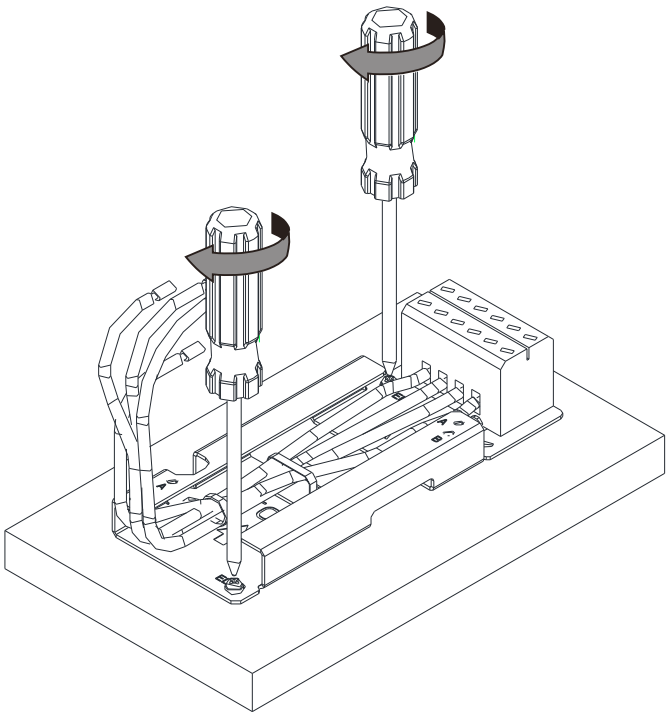


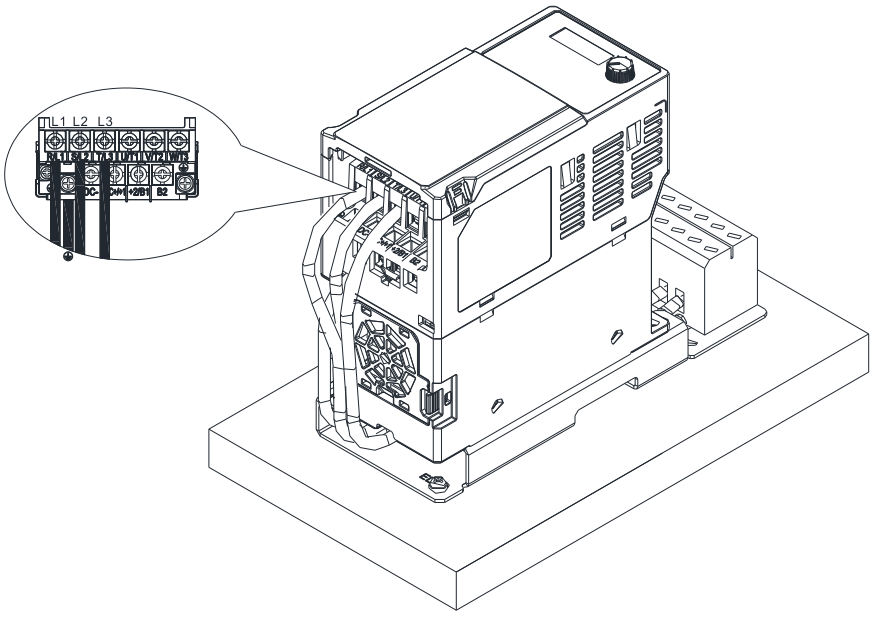
Mounting Adapter Plate Installation

Use the diagrams below and on the following page to install the mounting adapter plate and reroute the wiring.

GS20A-MP-AB

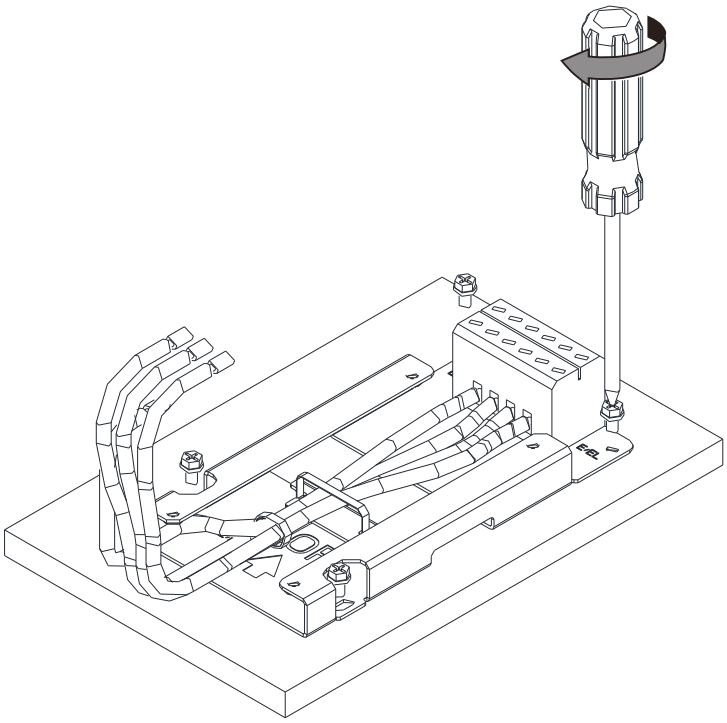
GS10A-MP-AB Screw Size and Torque Value	
Screw	***Torque***
M4	14–16 kg-cm (12.4–13.9 lb-in.) [1.37–1.57 N•m]
M5	16–20 kg-cm (13.9–17.4 lb-in.) [1.57–1.96 N•m]

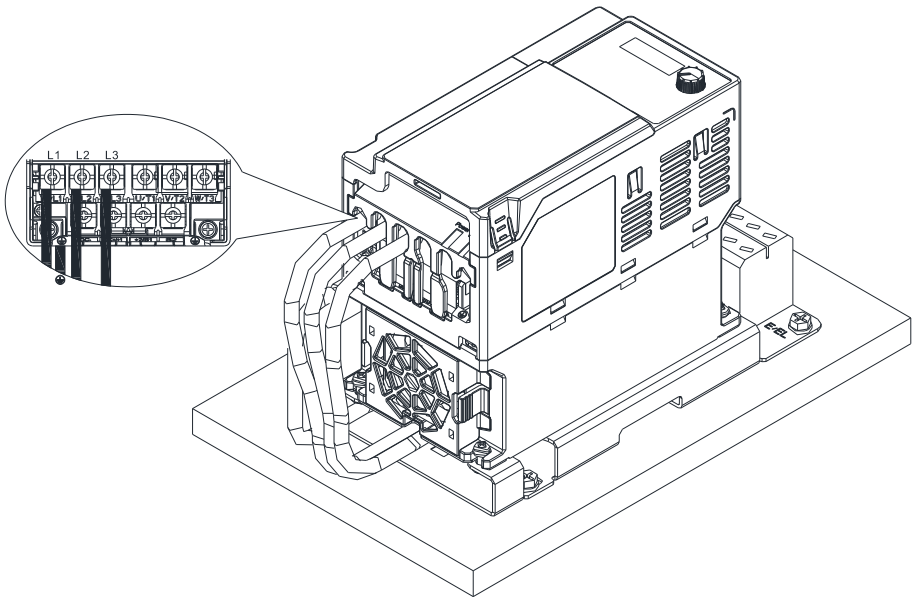




GS20A-MP-C

GS10A-MP-C Screw Size and Torque Value	
Screw	***Torque***
M4	14–16 kg-cm (12.4–13.9 lb-in.) [1.37–1.57 N•m]
M5	16–20 kg-cm (13.9–17.4 lb-in.) [1.57–1.96 N•m]





Optional Advanced Keypad

GS4-KPD

The GS4-KPD can be used with GS10 drives and offers a more advanced interface with additional features. The keypad can be installed flat on the surface any control panel (with or without bezel GS4-BZL). The front cover is IP56 rated.

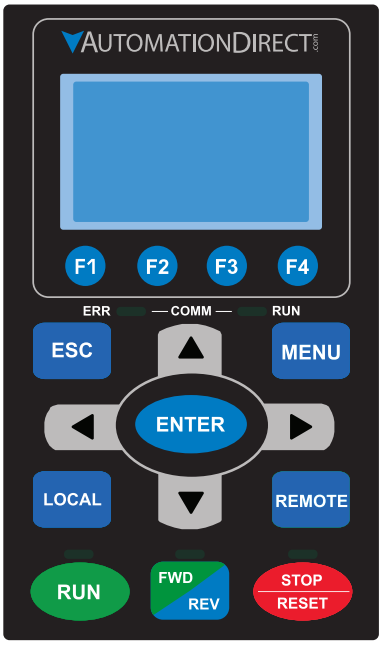
The maximum RJ45 extension lead is 5m (16ft). The keypad communication connection to the drive when mounted remotely can be accomplished by using a standard RJ45 CAT5e straight through patch cable. No other wiring is required. The small RJ45 plastic connector that comes standard with each GS4-KPD kit is not used on GS10.

The communication protocol for GS4-KPD is RTU 19200, 8, N, 2. Therefore, you must set GS10 communication parameters so as to connect with the digital keypad GS4-KPD. The setting steps are as follows:

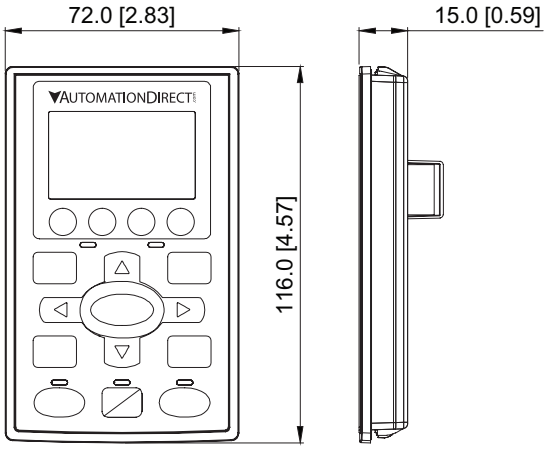
1) Set P09.00 communication address = 1
2) Set P09.01 COM1 transmission speed (Baud rate) = 19.2 Kbps
3) Set P09.04 COM1 communication protocol = 13: 8N2 (RTU)

To control the GS10 drive motion and speed with the keypad, the setting steps are as follows:

1) Frequency control - Parameter P00.20 and/or P00.30 to 1:RS-485 input
2) Operation control- Parameter P00.21 and/or P00.31 to 2: RS-485 input.



RJ45 Connector (included, not used)



Dimensions mm [in]

Descriptions of Keypad Functions	
RUN	**RUN Key** 1) It is only valid when the source of operation command is from the advanced keypad via RS-485. 2) It can operate the AC motor drive by the function setting and the RUN LED will be ON. 3) RUN can be pressed even when drive is in process of stopping. 4) When enabling "LOCAL" mode, it is only valid when the source of operation command is from the advanced keypad via RS-485.
STOP RESET	**STOP/RESET Key** *This key has the highest processing priority in any situation.* 1) When it receives STOP command, whether or not the AC drive is in operation or stop status, the AC motor drive will execute a "STOP" command. 2) The RESET key can be used to reset the drive after the fault occurs. For those faults that can't be reset by the RESET key, see the fault records after pressing MENU key for details.

Continued on next page.

Descriptions of Keypad Functions (*continued*)	
FWD / REV	**Operation Direction Key** 1) This key only controls the operation direction and does NOT activate the drive. FWD: forward. REV: reverse. 2) Refer to the LED descriptions for more details.
ENTER	**ENTER Key** Press ENTER and go to the next menu level. If it is the last level, then press ENTER to execute the command.
ESC	**ESC Key** The ESC key function serves to leave the current menu and return to the last menu. It also functions as a return key while in the sub-menu.
MENU	**MENU Key** Press MENU to return to the main menu. Menu Content: 1) Param Setup 2) Quick Start (Function not Available) 3) Keypad Lock 4) Fault Record 5) PLC (Function not Available) 6) Copy Param 7) Copy PLC (Function not Available) 8) Displ Setup 9) Time Setup 10) Language 11) Start-up
◄ ▲ ▼ ►	**Direction: Left/Right/Up/Down** 1) In the numeric value setting mode, it is used to move the cursor and change the numeric value. 2) In the menu/text selection mode, it is used for item selection.
F1 F2 F3 F4	**Function Keys** 1) F1 is JOG function 2) The F2, F3, F4 keys are reserved for future use.
LOCAL	**LOCAL Key** 1) This key is executed by the parameter settings of the source of Local frequency and Local operation. The factory settings of both source of Local frequency and Local operation are the digital keypad. 2) Pressing the LOCAL key with the drive stopped will switch the operation and frequency to the LOCAL source. Pressing the LOCAL key with the drive running will stop the drive, with "AHSP" warning displayed and when stopped, will switch the operation and frequency source to the LOCAL source. 3) The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD. 4) When P00.29=0 then LOCAL correlates to HAND mode. The Digital Input Definition must not be set to 56 (LOC/REM Switch). *Refer to P00.29 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE.*
REMOTE	**REMOTE Key** 1) This key is executed by the parameter settings of the source of Remote frequency and Remote operation. The digital keypad is the the factory default source for both Remote frequency and Remote operation. 2) Pressing the REMOTE key with the drive stopped will switch the operation and frequency to the REMOTE source. Pressing the REMOTE key with the drive running will stop the drive, with "AHSP" warning displayed and when stopped, will switch the operation and frequency source to the REMOTE source. 3) The selected mode, LOCAL or REMOTE, will be displayed on the GS4-KPD. 4) When P00.29=0 then LOCAL correlates to HAND mode. The Digital Input definition must not be set to 56 (LOC/REM Switch). *Refer to P00.29 for more detail and other options on how the drive behaves when switching between LOCAL and REMOTE.*

Descriptions of LED Functions	
	**Steady ON**: Operation indicator of the AC motor drive, including DC brake, zero speed, standby, restart after fault and speed search. **Blinking**: Drive is decelerating to stop or in the status of base block. **Steady OFF**: Drive is not currently executing an operational (RUN) command.
	**Steady ON**: Stop indicator of the AC motor drive. **Blinking**: Drive is in the standby status. **Steady OFF**: Drive is not currently executing an operational (STOP) command.
	**Operation Direction LED** 1) Green light is on, the drive is running forward or will run forward when given a run command. 2) Red light is on, the drive is running backwards or will run backwards when given a run command. 3) Alternating green/red light: the drive is changing direction.
	**ERR_COMM_RUN** Descriptions reserved for future use.

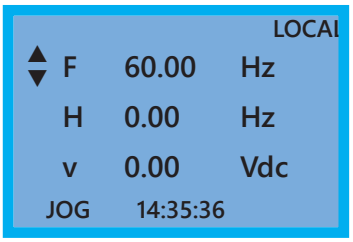
GS10 Display Screens for GS4-KPD

Start-Up Display

At power up, the Start-up Page displays the *DURApulse*, GS10 logo. This page is replaced by the Status Page in 3 seconds.

Pressing the UP Arrow while the Start-up Page is displayed will show the current keypad firmware.

Status Page



Drive status:
Press the LOCAL key to allow local control of the drive.
Press the REMOTE key to allow remote control of the drive.
Pressing the Up and Down Direction keys allow the user to scroll through the Status Page items.
F X.xx Hz (actual GS10 command frequency)
H X.xx Hz (actual GS10 output frequency)
U XXX.x User defined value (in this example P00.04 = 3 DC bus voltage*
A X.xx Amp (output amperage)
JOG and time:
JOG appears above the F1 key and is the function assigned to that key.
The internal clock is displayed, center bottom.

NOTE: When Power is applied, the keypad will display the startup Page followed by the Status Page. The Status Page displays the GS10 default settings F/H/U/A. While the order F/H/U/A is always fixed, P00.03 can be used to set which value appears on the top row at power-up. The UP and DOWN Arrows will scroll through the display options.

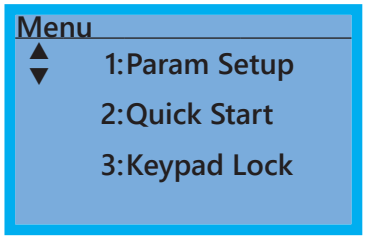
NOTE: If an "Err" appears on the keypad after pressing <Enter> in any menu or parameter, then the action did not take affect. The keypad will report back "End" if the action was performed correctly. Ex: writing a value out of range to a parameter will cause a "Err" message.

** NOTE: Refer to Parameter P00.04 in Chapter 4, AC Drive Parameters for a complete list of the values that can be displayed on line 3 of the keypad display. The value in P00.04 is the value that will be shown when the drive powers up. By scrolling to the User Defined row, the Left and Right Direction keys can be used to display any of the other selections available.*

NOTE: The GS4-KPD is connected to the GS10 by the RJ45 communiations port with a standard ethernet cable. The following communications settings must be used: P09.01=19.2 (kBps) and P09.04=13 (8N2 RTU).

Menu Page

Press the Menu button from any page to access the Menu Page. Use the Up and Down Direction keys to scroll through the Menu content. Press the Enter key to open the selected Menu content item.

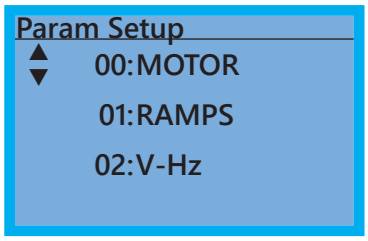


1: Param Setup - Parameter Setup
   Set up the individual drive parameters.
2: Quick Start - This function not available for GS10.
3: Keypad Lock
   Lock the Keypad.
4: Fault Record
   Display fault information for the drive.
5: PLC - This function not available for GS10.
6: Copy Param - Copy Parameters
   Save drive parameters to the keypad or drive.
7: Copy PLC - This function not available for GS10.
8: Displ Setup
   Adjust contrast and backlight settings for the display.
9: Time Setup
   Set the time.
10: Language*
    Set the display language.
11: Start-up
    Set the Start-up Page display.

**NOTE: Language is only for the Menu level. Parameters and Parameter options remain in English.*

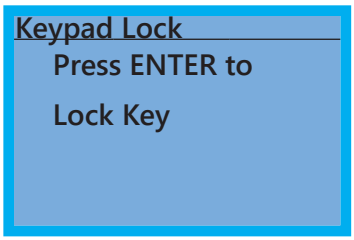
Param Setup - Parameter Setup Page

See the individual parameter summary tables in *Chapter 4 - AC Drive Parameters* for specific parameter explanations and settings.



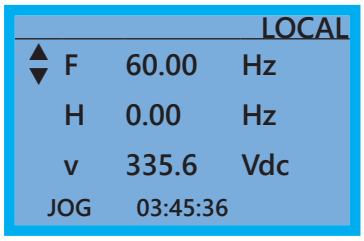
00: DRIVE
01: BASIC
02: DIGITAL
03: ANALOG
04: SPEED
05: MOTOR
06: PROTECT
07: SPECIAL
08: PID
09: COMMUNICATION
10: FEEDBACK
11: ADVANCED
12: FUNCTION
13: USER
14: PROTECT(2)

Keypad Lock - Keypad Lock Page

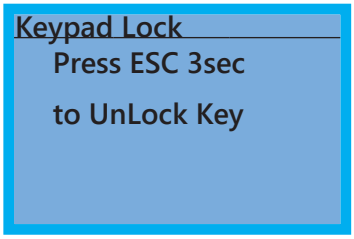


Keypad Lock is used to lock the keypad from unintentional activation during operation.

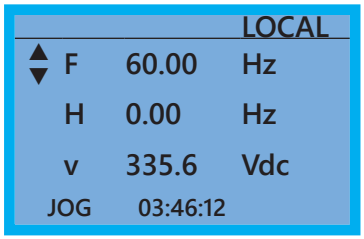
Press the Enter key to lock the keypad.



The Status Page will again display.

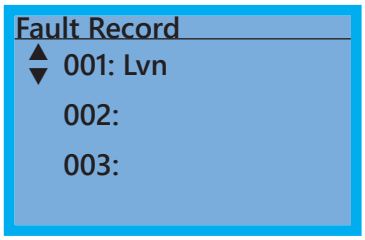


Pressing ANY key will display the message Press ESC to UnLock Key.



Press and hold the ESC key for 3 seconds to unlock the keypad. The display will return to the Status Page.

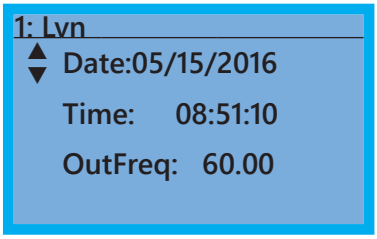
Fault Record - Fault Record Page



GS10 drive faults are stored from 1: to 20:. Refer to *Chapter 6: Maintenance and Troubleshooting* for a complete list of fault messages that may appear. Use the Up and Down Direction keys to scroll through the list.

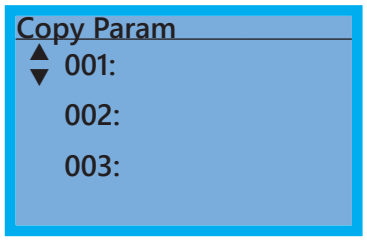
1:
2:
3:
▲
▼
18:
19:
20:

Press the Enter key to display information about the drive status when the fault occurred.



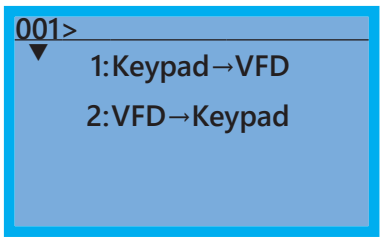
Date: 00/00/0000
Time: 00:00:00
OutFreq: 0.00
OutAmp: 0.00
OutVolt 0.0
DCBus: 0.0

Copy Param - Copy Parameters Page (Keypad Copy)



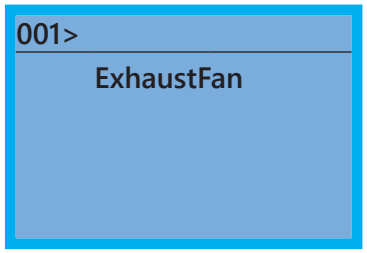
Copy Parameters is used to save up to four drive configurations into the keypad. The keypad can then download any of these configurations into the drive, or it can be moved to a different drive and download the parameter settings of the original drive. Use the Up and Down Direction keys to scroll through the four available copy parameter locations. If a field is blank, then no copy has been made to that location.
001: ExhaustFan
002: IntakeFan1
003: Filename02
004:

Press the Enter key to select the desired location for writing the current parameter settings.



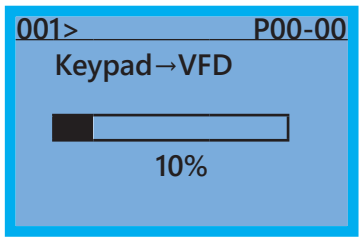
Use the Up and Down Direction keys to select Keypad→VFD to copy the current parameter settings from the keypad to the drive or VFD→Keypad to write the current parameter settings from the drive to the keypad. Press the Enter key.

VFD→ Keypad



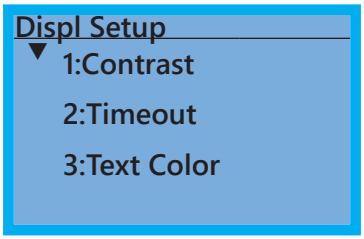
After VFD→Keypad is selected, the keypad will prompt you for a filename to save the existing configuration into. Use the Left/Right Arrows to scroll from character to character and the Up/Down Arrows to change the alphanumeric character. Pressing Enter will begin the transfer of parameters from the drive into the keypad.

Keypad→ VFD



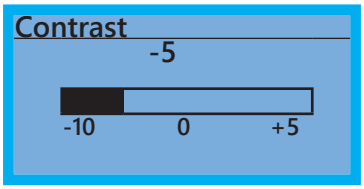
When Keypad→VFD is selected, the keypad will begin the transfer of the preselected file parameters from the keypad into the drive.
As shown in the example to the left, “001” is the file to be transferred.
Pressing F4 while in the Copy Param menu will prompt you to Delete All 4 saved programs (“Press ENTER to clear”).

Displ Setup - Display Setup Page

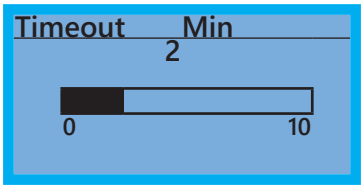


The Display Setup Page allows the user to adjust the Contrast, Backlight time and Text Color of the display.

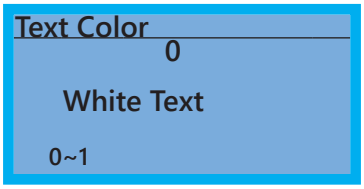
1: Contrast
2: Timeout
3: Text Color



Use the Up and Down direction arrows to adjust the Contrast to the desired setting.
The range of adjustment is from -20 to +20.
The default value is 0.
Entering a value of 0 will keep the backlight ON all the time.

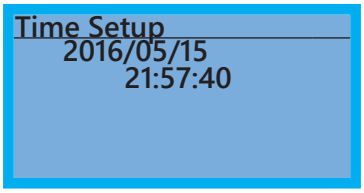


Use the Up and Down direction arrows to adjust the time when the display backlight turns off. The range of adjustment is from 0 to 10 minutes. The default value is 5 minutes.



Use the Up and Down direction arrows to select from white text or blue text for the display.

Time Setup - Time Setup Page

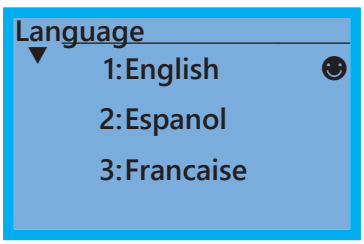


The Time Setup Page allows the user to change the date and time. The date format is Year/Month/Day. Time is displayed in 24-hour clock format and is displayed as Hours:Minutes:Seconds. Use the Right and Left Arrow keys to move the cursor to the desired location and use the Up and Down Arrow keys to adjust the setting.

After adjusting the time, move the cursor to the Seconds entry before pressing the Enter Key.

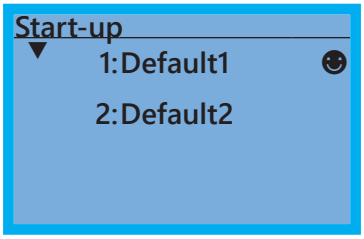
The real time clock (RTC) is maintained in the keypad. A capacitor is used to provide power for the RTC during power loss. The capacitor can maintain power for the RTC for 7 days with no drive power applied.

Language - Language Page



The Language Page sets the language shown on the display. Select from English, Spanish or French. The translation applies to the keypad menu structure only. The Detailed parameter settings will remain in English.

START-UP - START-UP PAGE



The Start-up Page allows the user to select from two different screens that display during initial start-up. Default1 setting displays the GS10 logo screen, Default2 setting displays "Initializing, Please Wait."

KEYPAD FAULT CODES

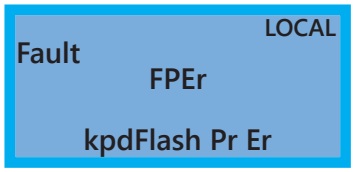
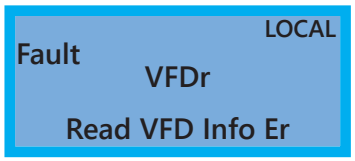
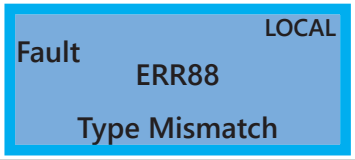
Following are the fault codes and descriptions for the GS4-KPD. To reset the fault codes press the Enter and Reset buttons simultaneously. These faults indicate either a communication error between the keypad and the drive or a keypad failure. To correct: 1) Inspect and clean the RJ45 connectors on the back of the keypad and the RJ45 connector leading into the drive. 2) Replace the cable and/or RJ45 M-M adapter with a standard Ethernet patch cable. 3) If the RJ45 connections are OK, replace the keypad.

① Display error signal

① ② ③

② Abbreviated error code
The code is displayed as shown on GS4-KPD

③ Display error description

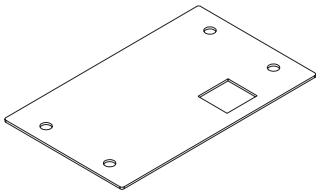
ID No.	Description	Corrective Actions
	Keypad flash memory read error.	An error has occurred on keypad's flash memory. 1. Press RESET on the keypad to clear the error. 2. Verify what kind of error has occurred on keypad's flash memory. 3. Shut down the system, wait 10 minutes and power up the system. If the error remains contact technical support.
	Keypad flash memory save error.	An error has occurred on keypad's flash memory. 1. Press RESET on the keypad to clear the error. 2. Verify what kind of error has occurred on keypad's flash memory. 3. Shut down the system, wait 10 minutes and power up the system. If the error remains contact technical support.
	Keypad flash memory parameter error.	Errors occurred on factory setting parameters possibly caused by firmware update. 1. Press RESET on the keypad to clear the error. 2. Verify if there is a problem on the FLASH IC. 3. Shut down the system, wait 10 minutes and power up the system. If the error remains contact technical support.
	Keypad flash memory when read AC data error.	Keypad can't read data from drive. 1. Verify if the keypad is properly connected to the drive with the RJ45 connector. 2. Press RESET on the keypad to clear the error. 3. Shut down the system, wait 10 minutes and power up the system. If the error remains contact technical support.
	Keypad/Drive parameter file mismatch.	There has been an attempt to copy an incorrect file between the keypad and the drive. Ensure that there is a valid file in the keypad (if attempting Keypad → VFD transfer).

Keypad Panel Mounting Kit GS4-BZL

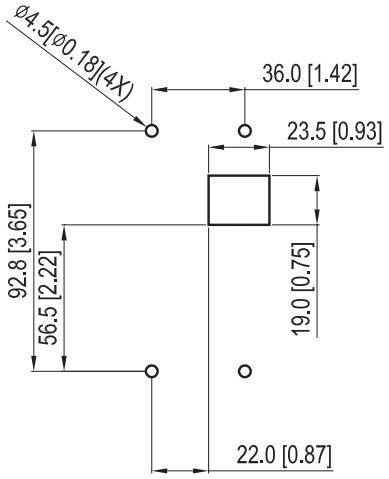
This panel mounting kit can be used for wall mounting or embedded mounting of the GS4-KPD.

Wall Mounting

Accessory 1



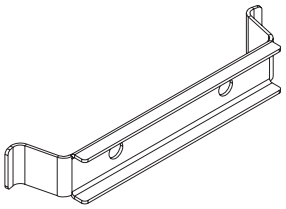
Screws: (4) M4*p 0.7 *L8mm
Torque: 10-12 kg·cm (8.7-10.4lb-in.)



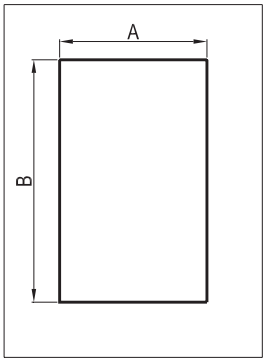
Panel cutout dimensions mm [in]

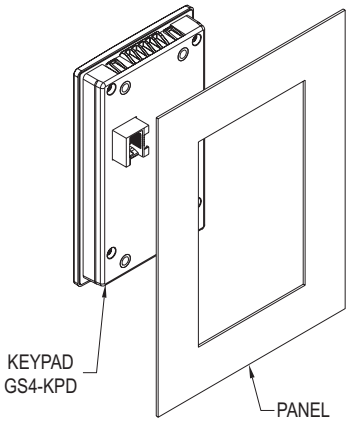
Embedded Mounting

Accessory 2



Screws: (4) M4*p 0.7 *L8mm
Torque: 10-12 kg·cm (8.7-10.4 lb·in)





Normal cutout dimension

Panel Thickness	1.2 mm	1.6 mm	2.0 mm
A	66.4 [2.614]		
B	110.2 [4.339]	111.3 [4.382]	112.5 [4.429]

* Deviation: ± 0.15 mm / ± 0.0059 in

Cutout dimension (Waterproof level: IP56)

Panel Thickness	1.2 mm	1.6 mm	2.0 mm
A	66.4 [2.614]		
B	110.8 [4.362]		

* Deviation: ± 0.15 mm / ± 0.0059 in

Continued on next page.

Wall Mounting	Embedded Mounting