

# DURAPULSE GS10 AC Drives – Introduction



DURAPULSE GS10 AC Drives									
Motor Rating	HP	1/4	1/2	1	2	3	5	7.5	10
	kW	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5
120V Single-phase		✓	✓	✓					
230V Single-phase		✓	✓	✓	✓	✓			
230V Three-phase		✓	✓	✓	✓	✓	✓	✓	
460V Three-phase			✓	✓	✓	✓	✓	✓	✓

✓ = GS10 model available

## Overview

The DURAPulse GS10 new generation of Micro drives with vector control provides many standard and advanced functions—all in a compact size and cost effective price.

The drives include many of the same standard features as our GS family of drives including dynamic braking, PID, and RS-485 Modbus communication.

The GS10 drive includes 230VAC models for 1-phase or 3-phase applications. The drive supports parameter sets for up to two (2) independent induction AC motors (IM) or a single permanent magnet AC motor (PM).

DURApulse GS10 AC drives offers two control modes: standard V/Hz and sensorless vector (SVC) for IM or PM motors..

DURApulse GS10 provides one analog input, one analog output, five digital inputs (including one pulse train input up to 10kHz), one digital output, and one SPDT relay output. All of the analog and digital I/O can be configured for a wide variety of input or output functions.

The drive parameter set also includes function groups to provide multi-pump control, automatic operation programming, and simple positioning stop.

## Features

- Broad offering from 1/4 to 10 hp
- Single-phase 120VAC up to 1hp
- Single-phase 230VAC up to 3hp
- Three-phase 230VAC up to 7.5 hp (also 1-phase capable with derating, see selection tables)
- Three-phase 460VAC up to 10hp
- Dual rating design – CT/VT Ratings (Normal & Heavy Duty)
- “Zero Stack” side-by-side zero gap installation
- Compact Design
- Spring clamp terminal blocks
- Speed control potentiometer built in
- Flexible carrier frequency to 15kHz and output frequency to 599Hz
- Free downloadable software for drive configuration
- Field-upgradable drive firmware
- Optional LCD text-based advanced keypad (IP66/NEMA 1) can be remotely mounted
- Local/Remote control mode selection or digital/comm input with Hand/Off/Auto control
- Display custom values on keypad
- Momentary power loss restarts
- 100kA Short Circuit Current Rating
- DC Bus Connection Terminals (except 120VAC models)
- Conduit Box(s) for NEMA 1
- Analog I/O – configurable 1 Input/1 Output
- Multi-Motor Control (2 total)
- PID Controller – including sleep and wake
- Built-in functions include multi-pump control, auto sequence, and simple position stop
- Password protection
- RTD and/or PTC input motor protection
- Modular Cooling Fan with quick disconnect for easy replacement
- High speed communication interfaces with MODBUS RTU built in
- Circuit boards have conformal coating for improved environmental tolerance
- Excellent heat-sink design; able to operate at 50°C ambient temperature
- Fire Mode – Run fire mode during emergencies to have uninterrupted smoke removal and system pressure
- Two-year warranty
- CE, UL, cUL

## Accessories

- AC line reactors
- EMI filters
- Braking resistors
- Fuses
- Conduit boxes
- Mounting Kits
- Replacement cooling fans
- Optional advanced LCD keypad (and remote-mount bezel kit)
- GSoft2 drive configuration software
- USB-485M USB to Serial Converter (needed for software connection)
- Detailed descriptions and specifications for GS accessories are available in the “GS/ DURApulse Accessories” section.

## Typical Applications

- Conveyors
- Compressors
- Material handling
- Extruding
- Grinding
- Shop tools
- Fans
- Pumps
- HVAC
- Mixing

# DURAPULSE GS10 AC Drives – Selection

## Selecting the Proper Drive Rating

Selecting the Proper Drive Rating													
<b>Determine Motor Voltage and Full-Load Amperage (FLA)</b>													
Motor voltage and FLA are located on the nameplate of the motor. <i>NOTE: FLA of motors that have been rewound may be higher than stated.</i>													
<b>Determine Motor Overload Requirements</b>													
Many applications experience temporary overload conditions due to starting requirements or impact loading. Most AC drives are designed to operate at 150% overload for 60 seconds. If the application requires an overload greater than 150% or longer than 60 seconds, the AC drive must be oversized. <i>NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.</i>													
<b>Determine Application Type: Constant Torque or Variable Torque</b>													
This torque requirement has a direct effect on which drive to select. Variable Torque applications are generally easier to start; typically fans and pumps. Most other applications outside fans and pumps fall into the Constant Torque category (machine control, conveyors, etc.). If you are unsure of the application, assume Constant Torque. The specification, derating, and selection tables are generally segregated by Constant Torque and Variable Torque.													
<b>Installation Altitude</b>													
AC drives rely on air flow for cooling. As the altitude increases, the air becomes less dense, and this drop in air density decreases the cooling properties of the air. Therefore, the AC drive must be oversized to compensate for the decrease in cooling. GS10 drives are designed to operate at 100% capacity at altitudes up to 1000 meters. <i>NOTE: For use above 1000m, the AC drive must be derated as described below.</i>													
<b>Derate Output Current Based on Altitude Above 1000 Meters</b>													
<ul style="list-style-type: none"> <li>• If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.</li> <li>• If installed at an altitude of 1000–2000m, decrease 1% of the rated current or lower 0.5°C of temperature for every 100m increase in altitude.</li> <li>• Maximum altitude for Corner Grounded is 2000m. If installation at an altitude higher than 2000m is required, please contact AutomationDirect.</li> </ul>													
<b>Derating for Altitude</b>													
<table border="1"> <caption>Derating for Altitude Data</caption> <thead> <tr> <th>Altitude (m)</th> <th>Current Rated Ratio (%) - 50°C (IP20/UL Open Type)</th> <th>Current Rated Ratio (%) - 40°C (NEMA 1/UL Type 1)</th> </tr> </thead> <tbody> <tr> <td>0 - 1000</td> <td>100</td> <td>100</td> </tr> <tr> <td>1000 - 2000</td> <td>90</td> <td>90</td> </tr> <tr> <td>2000 - 2500</td> <td>70</td> <td>70</td> </tr> </tbody> </table>		Altitude (m)	Current Rated Ratio (%) - 50°C (IP20/UL Open Type)	Current Rated Ratio (%) - 40°C (NEMA 1/UL Type 1)	0 - 1000	100	100	1000 - 2000	90	90	2000 - 2500	70	70
Altitude (m)	Current Rated Ratio (%) - 50°C (IP20/UL Open Type)	Current Rated Ratio (%) - 40°C (NEMA 1/UL Type 1)											
0 - 1000	100	100											
1000 - 2000	90	90											
2000 - 2500	70	70											

# DURAPULSE GS10 AC Drives – Selection

## Selecting the Proper Drive Rating, continued

### Determine Maximum Enclosure Internal Temperature

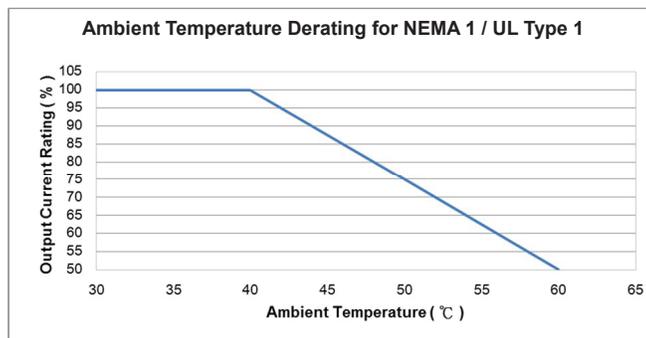
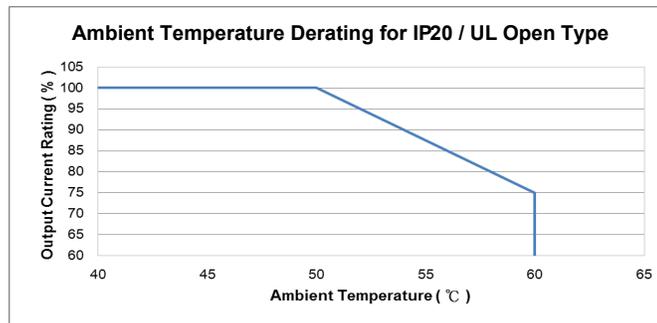
AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS10 drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to 104°F (40°C) or less. Ambient temperature measurements/calculations should be made for the maximum expected temperature.

**NOTE:** For use above 104°F (40°C), the AC drive must be derated as described below.

### Derate Output Current Based on Temperature Above 104°F (40°C) or 122°F (50°C)

Drive Derating by Temperature and Protection Level	
Protection Level	Derating
<b>UL Open Type / IP20*</b>	If the GS10 drive operates at the rated current, the ambient temperature needs to be between -20–50°C. If the temperature is above 50°C, decrease 2.5% of the rated current for every 1°C increase in temperature. The maximum allowable temperature is 60°C.
<b>NEMA 1 / UL Type 1*</b>	When the GS10 drive is operating at the rated current, the ambient temperature must be between -20–40°C. When the temperature is over 40 °C, for every increase by 1°C, decrease the rated current 2.5%. The maximum allowable temperature is 60°C.

\* For more information about environmental ratings, refer to the "Operating Temperature and Protection Level" table (pg.tGSX-37).



# DURAPULSE GS10 AC Drives – Selection

## Selecting the Proper Drive Rating, continued

<b>Derate Output Current Based on Carrier Frequency (if necessary)</b>	
<b>Carrier Frequency Effects</b>	
AC Drives rectify the incoming 50 or 60Hz line power resulting in DC power at 0Hz. The resulting DC power is then pulse-width modulated and supplied to the motor by the drive's power electronics. IGBTs invert the DC power, simulating a sine wave at the desired frequency (that's what allows variable speed in AC induction motors). The speed at which the IGBTs are turned ON and OFF is called Carrier Frequency. In GS10 drives, the Carrier Frequency can range from 2kHz to 15kHz. Though Carrier Frequency can be adjusted, there are trade-offs between high Carrier Frequencies and low Carrier Frequencies.	
<b>Benefits of Higher Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency (lower harmonic losses) in the motor</li> <li>• Lower audible noise</li> </ul>	
<b>Benefits of Lower Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency in the drive</li> <li>• Lower EMI (electrical noise)</li> <li>• Reduced reflective wave peak voltage</li> </ul> <p>As a general rule, the Carrier Frequency should be set as low as possible without creating unacceptable audible noise in the motor. Smaller systems can have higher Carrier Frequencies, but larger drives (&gt;20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy duty applications typically run around 2–4 kHz.</p>	
<b>Derating Tables</b>	
<p>The tables below show the derating curves for GS10 drives running in two different modes under variable torque and constant torque conditions.</p> <p>Line 1: Ta = 50°C / Load = 100%</p> <p>Line 2: Ta = 50°C / Load = 75% or Ta = 40°C / Load = 100%</p> <p>Line 3: Ta = 50°C / Load = 50% or Ta = 35°C / Load = 100%</p> <p>Set PWM mode via P11.41.                      SVPWM = Space Vector Pulse Width Modulation mode                      DPWM = Two Phase Pulse Width Modulation mode</p>	
<b>Variable Torque Carrier Frequency Derating</b>	
<b>SVPWM Mode</b>	<b>DPWM Mode</b>
<p>A line graph showing the percentage of rated current versus carrier frequency (kHz) for SVPWM mode in variable torque. The y-axis ranges from 20% to 110% in increments of 10%. The x-axis ranges from 2 to 16 kHz in increments of 2. Three curves are shown: Line 1 (blue) starts at 100% at 4 kHz and drops to ~30% at 16 kHz; Line 2 (red) starts at 100% at 6 kHz and drops to ~40% at 16 kHz; Line 3 (green) starts at 100% at 8 kHz and drops to ~50% at 16 kHz.</p>	<p>A line graph showing the percentage of rated current versus carrier frequency (kHz) for DPWM mode in variable torque. The y-axis ranges from 20% to 110% in increments of 10%. The x-axis ranges from 2 to 16 kHz in increments of 2. Three curves are shown: Line 1 (blue) starts at 100% at 6 kHz and drops to ~50% at 16 kHz; Line 2 (red) starts at 100% at 8 kHz and drops to ~65% at 16 kHz; Line 3 (green) starts at 100% at 10 kHz and drops to ~70% at 16 kHz.</p>
<b>Constant Torque Carrier Frequency Derating</b>	
<b>SVPWM Mode</b>	<b>DPWM Mode</b>
<p>A line graph showing the percentage of rated current versus carrier frequency (kHz) for SVPWM mode in constant torque. The y-axis ranges from 20% to 110% in increments of 10%. The x-axis ranges from 2 to 16 kHz in increments of 2. Three curves are shown: Line 1 (blue) starts at 100% at 6 kHz and drops to ~35% at 16 kHz; Line 2 (red) starts at 100% at 8 kHz and drops to ~45% at 16 kHz; Line 3 (green) starts at 100% at 10 kHz and drops to ~55% at 16 kHz.</p>	<p>A line graph showing the percentage of rated current versus carrier frequency (kHz) for DPWM mode in constant torque. The y-axis ranges from 20% to 110% in increments of 10%. The x-axis ranges from 2 to 16 kHz in increments of 2. Three curves are shown: Line 1 (blue) starts at 100% at 8 kHz and drops to ~60% at 16 kHz; Line 2 (red) starts at 100% at 10 kHz and drops to ~75% at 16 kHz; Line 3 (green) starts at 100% at 12 kHz and drops to ~80% at 16 kHz.</p>

# DURAPULSE GS10 AC Drives – Selection Specifications

## GS10 Drive Model Selection Tables

GS10 120V <sup>1,4</sup> 1-Phase Specifications – Frame Sizes A, C						
<b>Model Name</b>			<b>GS11N-10P2</b>	<b>GS11N-10P5</b>	<b>GS11N-11P0</b>	
<b>Price</b>			\$127.00	\$135.00	\$151.00	
<b>Frame Size</b>			A	A	C	
<b>Dimensional Drawing</b>			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
<b>Output Rating</b>	<b>Max Motor Output</b>	<b>hp</b>	1/4	1/2	1	
		<b>kW</b>	0.2	0.4	0.75	
	<b>CT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.6	1.0	1.8
		<b>Rated Output Current</b>	<b>A</b>	1.6	2.5	4.8
		<b>Carrier Frequency<sup>3</sup></b>	<b>kHz</b>	2–15 (default 4)		
	<b>VT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.7	1.0	2.1
<b>Rated Output Current</b>		<b>A</b>	1.8	2.7	5.5	
<b>Carrier Frequency<sup>3</sup></b>		<b>kHz</b>	2–15 (default 4)			
<b>Input Rating<sup>2</sup></b>	<b>CT Rated Input Current</b>	<b>A</b>	6	9.4	18	
	<b>VT Rated Input Current</b>	<b>A</b>	6.8	10.1	20.6	
	<b>Rated Voltage/Frequency</b>		One-phase: 100–120 VAC (-15% to +10%), 50/60 Hz			
	<b>Operating Voltage Range (VAC)</b>		85–132			
	<b>Frequency Tolerance (Hz)</b>		47–63			
<b>IE2 Efficiency - Relative Power Loss</b>			4.3%	3.2%	2.9%	
<b>Weight (kg [lb])</b>			0.4 [0.88]	0.5 [1.10]	1 [2.20]	
<b>Cooling Method</b>			Convective		Fan	
<b>IP Rating</b>			IP20			
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS10 AC Drives User Manual, Chapter 2. Please refer to "GS10 DURApulse Accessories – Fusing" (pg.tGSX-54) for input fusing information.</p> <p>3 - The carrier frequency value is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p> <p>4 - No DC bus connection terminals (DC+,DC-) are provided on 120V models.</p>						

GS10 230V <sup>1</sup> 1-Phase Specifications – Frame Sizes A, B, C								
<b>Model Name</b>			<b>GS11N-20P2</b>	<b>GS11N-20P5</b>	<b>GS11N-21P0</b>	<b>GS11N-22P0</b>	<b>GS11N-23P0</b>	
<b>Price</b>			\$119.00	\$121.00	\$131.00	\$167.00	\$198.00	
<b>Frame Size</b>			A	A	B	C	C	
<b>Dimensional Drawing</b>			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
<b>Output Rating</b>	<b>Max Motor Output</b>	<b>hp</b>	1/4	1/2	1	2	3	
		<b>kW</b>	0.2	0.4	0.75	1.5	2.2	
	<b>CT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.6	1.1	1.8	2.9	4.2
		<b>Rated Output Current</b>	<b>A</b>	1.6	2.8	4.8	7.5	11
		<b>Carrier Frequency<sup>3</sup></b>	<b>kHz</b>	2–15 (default 4)				
	<b>VT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.7	1.2	1.9	3.2	4.8
<b>Rated Output Current</b>		<b>A</b>	1.8	3.2	5	8.5	12.5	
<b>Carrier Frequency<sup>3</sup></b>		<b>kHz</b>	2–15 (default 4)					
<b>Input Rating<sup>2</sup></b>	<b>CT Rated Input Current</b>	<b>A</b>	5.1	7.3	10.8	16.5	24.2	
	<b>VT Rated Input Current</b>	<b>A</b>	5.8	8.3	11.3	18.5	27.5	
	<b>Rated Voltage/Frequency</b>		One-phase 200-240 VAC (-15% to +10%) 50/60 Hz					
	<b>Operating Voltage Range (VAC)</b>		170–265					
	<b>Frequency Tolerance (Hz)</b>		47–63					
<b>IE2 Efficiency - Relative Power Loss</b>			4.7%	3.1%	2.7%	2.5%	2.4%	
<b>Weight (kg [lb])</b>			0.4 [0.88]	0.5 [1.10]	0.8 [1.76]	1 [2.20]	1 [2.20]	
<b>Cooling Method</b>			Convective				Fan	
<b>IP Rating</b>			IP20					
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS10 AC Drives User Manual, Chapter 2. Please refer to "GS10 DURApulse Accessories – Fusing" (pg.tGSX-54) for input fusing information.</p> <p>3 - The carrier frequency value is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>								

# DURAPULSE GS10 AC Drives – Selection Specifications

## GS10 Drive Model Selection Tables, continued

GS10 230V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B							
Model Name			GS13N-20P2	GS13N-20P5	GS13N-21P0	GS13N-22P0	
Price			\$127.00	\$129.00	\$142.00	\$170.00	
Frame Size			A	A	A	B	
Dimensional Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output (3-phase [1-phase]) <sup>4</sup>	hp	0.25 [0.1]	0.5 [0.25]	1 [0.5]	2 [1]	
		kW	0.2 [0.1]	0.4 [0.2]	0.75 [0.375]	1.5 [0.75]	
	CT	Rated Output Capacity (3-phase [1-phase])	kVA	0.6 [0.3]	1.1 [0.55]	1.8 [0.9]	2.9 [1.5]
		Rated Output Current (3-phase [1-phase])	A	1.6 [0.8]	2.8 [1.4]	4.8 [2.4]	7.5 [3.75]
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	0.7	1.2	1.9	3.0
Rated Output Current		A	1.8	3.0	5.0	8.0	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)				
Input Rating <sup>2</sup>	CT	Rated Input Current	A	1.9	3.4	5.8	9.0
		Rated Input Current	A	2.2	3.8	6.0	9.6
	Rated Voltage/Frequency		3-phase or 1-phase 200–240 VAC (-15% to +10%), 50/60 Hz				
	Operating Voltage Range (VAC)		170–265				
Frequency Tolerance (Hz)		47–63					
IE2 Efficiency - Relative Power Loss			4.7%	3.1%	2.7%	2.4%	
Weight (kg [lb])			0.4 [0.88]	0.5 [1.10]	0.6 [1.32]	0.8 [1.76]	
Cooling Method			Convective			Fan	
IP Rating			IP20				
See table below for notes.							

GS10 230V <sup>1</sup> 3-Phase Specifications – Frame Sizes C, D							
Model Name			GS13N-23P0	GS13N-25P0	GS13N-27P5		
Price			\$209.00	\$222.00	\$338.00		
Frame Size			C	C	D		
Dimensional Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output (3-phase [1-phase]) <sup>4</sup>	hp	3 [1.5]	5 [2.5]	7.5 [3.5]		
		kW	2.2 [1.1]	3.7 [1.85]	5.5 [2.75]		
	CT	Rated Output Capacity (3-phase [1-phase])	kVA	4.2 [2.1]	6.5 [3.25]	9.5 [4.75]	
		Rated Output Current (3-phase [1-phase])	A	11 [5.5]	17 [8.5]	25 [12.5]	
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	4.8	7.4	10.3	
Rated Output Current		A	12.5	19.5	27		
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)				
Input Rating <sup>2</sup>	CT	Rated Input Current	A	13.2	20.4	30	
		Rated Input Current	A	15	23.4	32.4	
	Rated Voltage/Frequency		3-phase or 1-phase 200–240 VAC (-15% to +10%), 50/60 Hz				
	Operating Voltage Range (VAC)		170–265				
Frequency Tolerance (Hz)		47–63					
IE2 Efficiency - Relative Power Loss			2.4%	2.2%	2.3%		
Weight (kg [lb])			1 [2.20]	1 [2.20]	2 [4.41]		
Cooling Method			Fan				
IP Rating			IP20				

1 - For Use With Three-Phase Motors Only.

2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS10 AC Drives User Manual, Chapter 2.

Please refer to "GS10 DURApulse Accessories – Fusing" (pg.tGSX-54) for input fusing information.

3 - The carrier frequency value is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".

4 - Three phase models can be powered with 1-phase or 3-phase input power. If using 1-phase input power, GS11 models up to 3HP provide higher output power than equivalent GS13 models with 1-phase.

# DURAPULSE GS10 AC Drives – Selection Specifications

## GS10 Drive Model Selection Tables, continued

GS10 460V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B							
Model Name			<u>GS13N-40P5</u>	<u>GS13N-41P0</u>	<u>GS13N-42P0</u>		
Price			\$156.00	\$157.00	\$181.00		
Frame Size			A	A	B		
Dimensional Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output	hp	1/2	1	2		
		kW	0.4	0.75	1.5		
	CT	Rated Output Capacity	kVA	1.1	2.1	3.2	
		Rated Output Current	A	1.5	2.7	4.2	
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	1.4	2.3	3.5	
Rated Output Current		A	1.8	3.0	4.6		
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)				
Input Rating <sup>2</sup>	CT	Rated Input Current	A	2.1	3.7	5.8	
	VT	Rated Input Current	A	2.5	4.2	6.4	
	Rated Voltage/Frequency		Three-phase 380-480 VAC (-15% to +10%), 50/60 Hz				
	Operating Voltage Range (VAC)		323–528				
Frequency Tolerance (Hz)		47–63					
IE2 Efficiency - Relative Power Loss		3.7%		2.5%		2.2%	
Weight (kg [lb])		0.6 [1.32]		0.7 [1.54]		0.8 [1.76]	
Cooling Method		Convective			Fan		
IP Rating		IP20					
See table below for notes.							

GS10 460V <sup>1</sup> 3-Phase Specifications – Frame Sizes C, D							
Model Name			<u>GS13N-43P0</u>	<u>GS13N-45P0</u>	<u>GS13N-45P0</u>	<u>GS13N-4010</u>	
Price			\$202.00	\$238.00	\$327.00	\$369.00	
Frame Size			C	C	D	D	
Dimensional Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output	hp	3	5	7 1/2	10	
		kW	2.2	3.7	5.5	7.5	
	CT	Rated Output Capacity	kVA	4.2	6.9	9.9	13
		Rated Output Current	A	5.5	9	13	17.5
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	5.0	8.0	12	15.6
Rated Output Current		A	6.5	10.5	14.5	19.8	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)				
Input Rating <sup>2</sup>	CT	Rated Input Current	A	6.1	9.9	14.3	19.3
	VT	Rated Input Current	A	7.2	11.6	16.0	21.8
	Rated Voltage/Frequency		Three-phase 380-480 VAC (-15% to +10%), 50/60 Hz				
	Operating Voltage Range (VAC)		323–528				
Frequency Tolerance (Hz)		47–63					
IE2 Efficiency - Relative Power Loss		2.3%		2.0%		1.9%	
Weight (kg [lb])		1 [2.20]		1 [2.20]		2 [4.41]	
Cooling Method		Fan					
IP Rating		IP20					
1 - For Use With Three-Phase Motors Only.							
2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS10 AC Drives User Manual, Chapter 2.							
Please refer to "GS10 DURApulse Accessories Fusing" (pg.tGSX-54) for input fusing information.							
3 - The carrier frequency value is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".							

# DURAPULSE GS10 AC Drives – General Specifications

## GS10 Drive Model Selection Tables, continued

GS10 General Specifications (Applicable to All Models)			
<b>Control Characteristics</b>	<b>Control Method</b>	V/F, Sensorless Vector (SVC)	
	<b>Applicable Motor</b>	IM (Induction Motor), Permanent Magnet AC (IPM and SPM)	
	<b>Starting Torque<sup>1</sup></b>	150% / 3Hz	(V/F, SVC control for IM, CT)
		100% / (motor rated frequency/20)	(SVC control for PM, CT)
	<b>Speed Control Range<sup>1</sup></b>	1: 50 (V/F, SVC control for IM, CT) 1: 20 (SVC control for PM, CT)	
	<b>Max. Output Frequency</b>	0.00–599.00 Hz	
	<b>Overload Capacity</b>	VT: rated output current of 120% 60 sec, 150% 3 sec. CT: rated output current of 150% 60 sec, 200% 3 sec.	
	<b>Frequency Setting Signal</b>	0–10 V / 4(0)–20 mA Pulse input: Single Pulse (10kHz), PWM (1kHz),	
	<b>Digital Inputs</b>	Five (5) - 24VDC NPN or PNP, includes 1 frequency input 10kHz	
	<b>Digital Outputs</b>	Two (2) - (1)-48VDC, (1) Relay-250VAC/30VDC	
	<b>Analog Inputs</b>	One (1) - selectable Voltage or Current	
	<b>Analog Outputs</b>	One (1) - voltage	
	<b>Main Functions</b>	<ul style="list-style-type: none"> <li>• Multiple motor switching (max 2 motor settings)</li> <li>• Fast start-up</li> <li>• Deceleration Energy Back (DEB) function</li> <li>• Fast deceleration function</li> <li>• Master and Auxiliary frequency source selectable</li> <li>• Restart after momentary power loss</li> <li>• Speed tracking</li> <li>• Over-torque detection</li> <li>• 16-step speed (including the master speed)</li> <li>• Accel./decel. time switch</li> <li>• S-curve accel./decel</li> <li>• Three-wire operation control</li> <li>• JOG frequency</li> <li>• Frequency upper/lower limit settings</li> <li>• DC brake at start-up and stop</li> <li>• PID control</li> <li>• Simple Positioning Function</li> <li>• Multi Pump Sequence</li> <li>• RS-485 Serial Communications (38.4kps max)</li> </ul>	
	<b>Application Macro</b>	Built-in application parameter groups (selected by industry) and user-defined application parameter groups.	
<b>Protection Characteristics</b>	<b>Motor Protection</b>	Over-current, over-voltage, over-heating, phase loss, over-load	
	<b>Stall Prevention</b>	Stall prevention during acceleration, deceleration, and running (independent settings).	
<b>Agency Approvals</b>	UL, cUL, CE, REACH		

<sup>1</sup>: Control accuracy may vary depending on the environment, application conditions, or different motors. For more information, contact AutomationDirect.

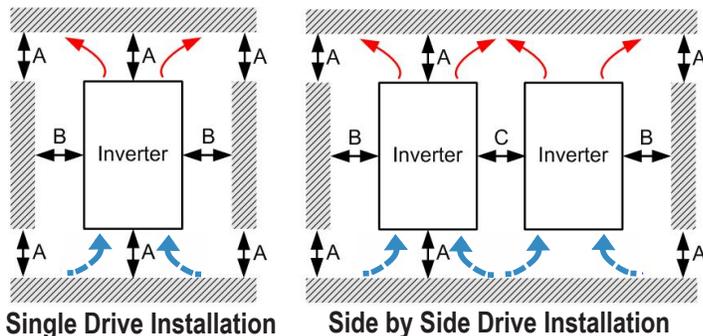
# DURAPULSE GS10 AC Drives – Environmental Specifications

## GS10 Environmental Specifications

Environmental Conditions for GS10 AC Drives			
Condition	Operation	Storage	Transportation
<b>Installation Location</b>	IEC 60364-1/ IEC 60664-1 Pollution degree 2, Indoor use only.	n/a	n/a
<b>Ambient Temperature</b>	IP20/UL Open Type: -20–50°C (-20–60°C w/derating)	-40–85°C	-20–70°C
	Non-condensing, non-freezing		
<b>Relative Humidity</b>	90%, no water condensation	95%, no water condensation	
<b>Air Pressure</b>	86–106 kPa	70–106 kPa	
<b>Pollution Level</b>	Concentrate prohibited		
	Class 3C2; Class 3S2	Class 2C2; Class 2S2	Class 1C2; Class 1S2
<b>Environmental Air</b>	No corrosive/inflammable gases permitted		
<b>Altitude</b>	<1000 m (For altitudes > 1000 m, derate to use it.)		
<b>Package Drop</b>	n/a	ISTA procedure 1A (according to weight) IEC 60068-2-31	
<b>Vibration</b>	1.0 mm, peak to peak value range from 2–13.2 Hz; 0.7–2.0 G range from 13.2–55 Hz; 2.0 G range from 55–512 Hz. Compliance with IEC 60068-2-6	2.5 G peak, 5 Hz–2 kHz 0.015" maximum displacement	
<b>Impact</b>	15G, 11ms Compliance with IEC/EN60068-2-27	30G	
<b>DO NOT</b> expose the GS10 AC Drive to harsh environments such as dust, direct sunlight, corrosive/flammable gases, humidity, liquid, or vibrations. The salts in the air must be less than 0.01 mg/cm <sup>2</sup> every year.			

# DURAPULSE GS10 AC Drives Specifications – Air Flow and Power (Heat) Dissipation

## Minimum Clearances and Air Flow for GS10 Series Drives



GS10 Minimum Mounting Clearances*					
Installation Method	A (mm)	B (mm)	C (mm)	Operation Temperature (°C)	
				Max (w/out derating)	Max (Derating)
Single drive installation	50	30	-	50	60
Side-by-side horizontal installation	50	30	30	50	60
Zero stack installation	50	30	0	40	50

\* Failure to follow the minimum mounting clearances may cause the fan to malfunction and cause a heat dissipation problem.

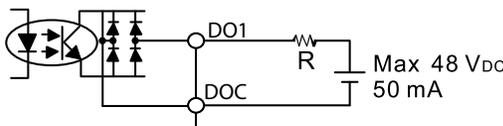
## GS10 Airflow and Power Dissipation

Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m <sup>3</sup> /hr)	Loss External (Heat sink)	Internal	Total
GS11N-10P2	A	0	0	8	10	18
GS11N-10P5				14.2	13.1	27.3
GS11N-11P0	C	16.0	27.2	29.1	23.9	53
GS11N-20P2	A	0	0	8.6	10	18.6
GS11N-20P5				16.3	14.5	30.8
GS11N-21P0	B	10	16.99	29.1	20.1	49.2
GS11N-22P0	C	16.0	27.2	46.5	31	77.5
GS11N-23P0				70	35	105
GS13N-20P2	A	0	0	8.6	10	18.6
GS13N-20P5				16.5	12.6	29.1
GS13N-21P0	B	10	16.99	31	13.2	44.2
GS13N-22P0				50.1	24.2	74.3
GS13N-23P0	C	16	27.2	76	30.7	106.7
GS13N-25P0				108.2	40.1	148.3
GS13N-27P5	D	23.4	39.7	192.8	53.3	246.1
GS13N-40P5	A	0	0	17.6	11.1	28.7
GS13N-41P0				30.5	17.8	48.3
GS13N-42P0	B	10	16.99	45.9	21.7	67.6
GS13N-43P0	C	16	27.2	60.6	22.8	83.4
GS13N-45P0				93.1	42	135.1
GS13N-47P5	D	23.4	39.7	132.8	39.5	172.3
GS13N-4010				164.7	55.8	220.5

- Published flow rates are the result of active cooling using fans, factory installed in the drive.
- Unpublished flow rates (0.0) are the result of passive cooling in drives without factory installed fans.
- The required airflow shown in the chart is for installing a single GS10 drive in a confined space.
- When installing multiple GS10 drives, the required air volume would be the required air volume for a single GS10 drive multiplied by the number of GS10 drives.
- When calculating power dissipation (Watt Loss), use the Total value. Heat dissipation shown in the chart is for installing a single GS10 drive in a confined space.
- When installing multiple drives, the volume of heat/power dissipation should be the heat/power dissipated by a single GS10 drive multiplied by the number of GS10 drives.
- Heat dissipation for each model is calculated by rated voltage, current and default carrier frequency.

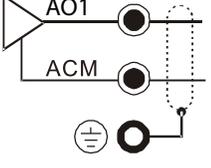
# DURAPULSE GS10 AC Drives Specifications – Terminals

## Control Circuit Terminal Names and Definitions

Control Circuit Terminals		
Terminal Symbol	Terminal Function	Description
<b>+24V</b>	Digital control signal common (Source)	+24V ± 10% 100mA
<b>DCM</b>	Digital control / Frequency signal common (Sink)	Digital control common
<b>FWD (DI1) REV (DI2) DI3 - DI5</b>	Digital input 1-5	<p><b>Source Mode:</b> ON: activation current 3.3 mA ≥ 11 VDC OFF: cut-off voltage ≤ 5 VDC</p> <p><b>Sink Mode:</b> ON: activation current 3.3 mA ≤ 13 VDC OFF: cut-off voltage ≥ 19 VDC</p> <p>DI5: Single pulse input, the maximum input frequency=10kHz. PWM pulse input, the maximum input frequency=1kHz.</p> <p>Digital inputs can be configured by the user for many different functions. Refer to P02.00–02.05 to program the digital inputs FWD (DI1), REV (DI2), DI3–DI5.</p> <ul style="list-style-type: none"> <li>When P02.00=0, FWD (DI1) and REV (DI2) can be programmed.</li> <li>When P02.00≠0, the functions of FWD (DI1) and REV (DI2) act according to P02.00 setting.</li> <li>When P02.05=0, DI5 is pulse input terminal.</li> <li>When P00.20 = 4, DI5 is the speed command source.</li> <li>Refer to P10.16 for DI5 pulse configuration.</li> </ul>
<b>DO1</b>	Digital Output 1 (photo coupler)	<p>The AC motor drive outputs various monitoring signals through a transistor (open collector). Refer to P2.16 to program the output.</p> 
<b>DOC</b>	Digital Output Common (photo coupler)	
<b>R10</b>	Relay Output 1 (N.O.)	<p>The AC motor drive outputs various monitoring signals through a relay output. Refer to P2.13 to program the output.</p> <p><b>Resistive Load</b></p> <ul style="list-style-type: none"> <li>3A (N.O.) / 3A (N.C.) 250VAC</li> <li>5A (N.O.) / 3A (N.C.) 30VDC</li> </ul> <p><b>Inductive Load (COS 0.4)</b></p> <ul style="list-style-type: none"> <li>1.2 A (N.O.) / 1.2 A (N.C.) 250VAC</li> <li>2.0 A (N.O.) / 1.2 A (N.C.) 30VDC</li> </ul>
<b>R1C</b>	Relay Output 1 (N.C.)	
<b>R1</b>	Relay Output 1 Common	
<b>+10V</b>	Potentiometer power supply	Power supply for analog frequency setting: +10.5 ± 0.5 VDC / 20mA
<b>AI</b>	Analog voltage frequency command	<p>The AI default is 0–10 V (AI-V, voltage mode). To switch to current mode, two steps are required:</p> <ol style="list-style-type: none"> <li>A dip switch must be configured (follow the instructions on the inner side of the front cover or see page 2-xx)</li> <li>Change P03.28 to 1 (0mA) or 2 (4mA)</li> </ol> <p>Use P03.00 to program AI functionality for either Voltage or Current mode.</p> <p>AI resolution=12 bits</p> <p><b>Voltage (AI-V) mode</b></p> <ul style="list-style-type: none"> <li>Impedance: 20 kΩ</li> <li>Range 0–Max. Output Frequency (P01.00): 0 to 10 V</li> <li>P03.28 = 0</li> </ul> <p><b>Current (AI-C) mode</b></p> <ul style="list-style-type: none"> <li>Impedance: 250 Ω</li> <li>Range 0– Maximum Output Frequency (P01.00): 0–20 mA/4–20 mA</li> <li>Range switching according to P03.28 = 1 (0mA) or 2 (4mA)</li> </ul>

# DURAPULSE GS10 AC Drives Specifications – Terminals

## Control Circuit Terminal Names and Definitions

Control Circuit Terminals (continued)		
Terminal Symbol	Terminal Function	Description
<b>A01</b>	Multi-function analog voltage output  	<p>A01 outputs an analog voltage signal based on P03.20.</p> <ul style="list-style-type: none"> <li>• Range: 0–10 V (P03.21=0) corresponds to the maximum operating range of the control target</li> <li>• Max. output current: 2 mA</li> <li>• Max. Load: 5 kΩ</li> <li>• A01 resolution=12 bits</li> </ul>
<b>ACM</b>	Analog Signal Common	Analog signal common terminal
<b>PE</b>	RS485	The PE terminal is for shielded cable to ground to decrease interference when you use RS485 communication.
<b>RJ45</b>	PIN 1, 2, 6: Reserved PIN 3, 7: SGND PIN 4: SG- PIN 5: SG+ PIN 8: +10V supply GS4-KPD (provides optional) power supply)	The RJ45 port provides a serial communications connection. Max Baud Rate = 38.4kbps

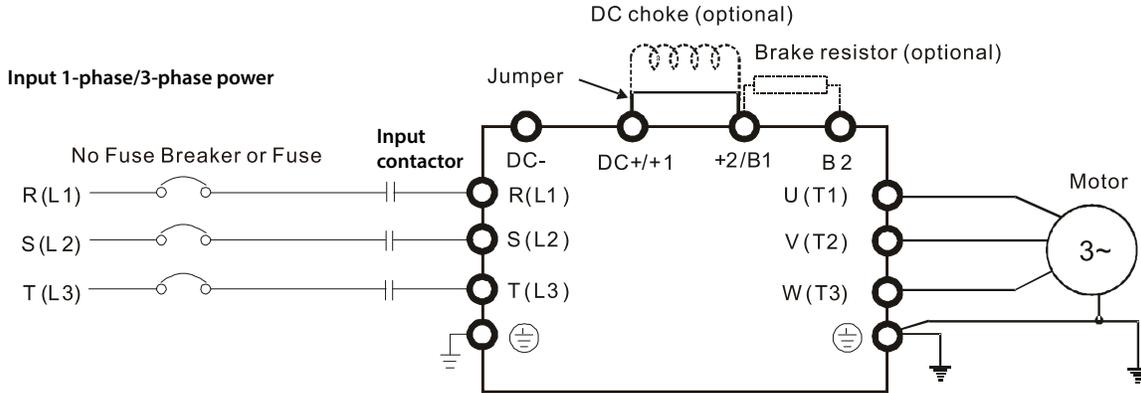
# DURAPULSE GS10 AC Drives – Basic Wiring Diagram

## Main Circuit Wiring Diagram: GS10 All Models

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to GS10 User Manual for additional specific wiring information.)

Note: DC reactors (chokes) are specified but not stocked by AutomationDirect.

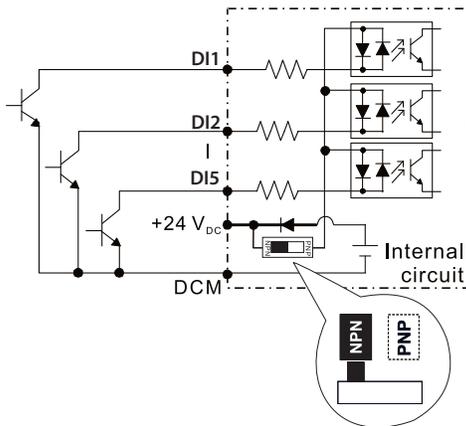
Note: DC- and DC+/+1 terminals not provided on 120V models.



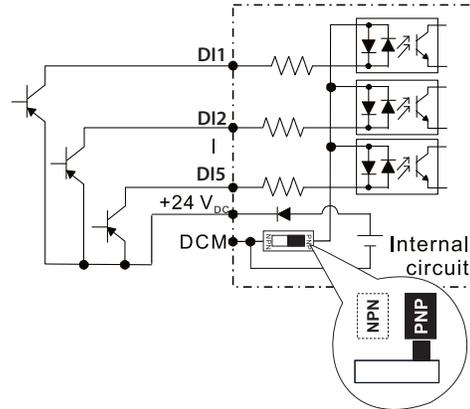
## Control Circuit Wiring Diagram: Digital Inputs - Internal Power

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to GS10 User Manual for additional specific wiring information.)

- ① Sink Mode with internal power (+24 V<sub>DC</sub>)



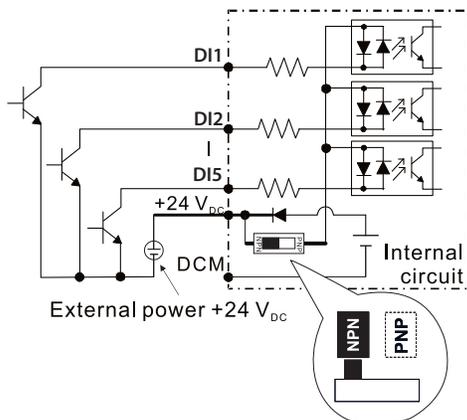
- ② Source Mode with internal power (+24 V<sub>DC</sub>)



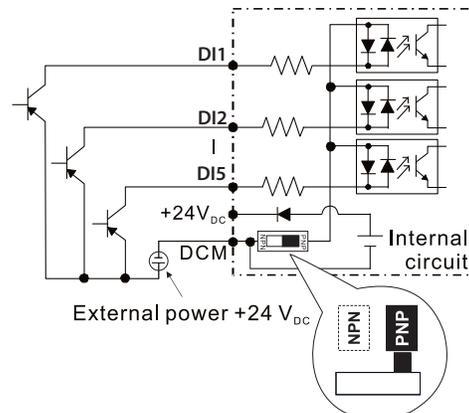
## Control Circuit Wiring Diagram: Digital Inputs - External Power

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to GS10 User Manual for additional specific wiring information.)

- ③ Sink Mode with external power



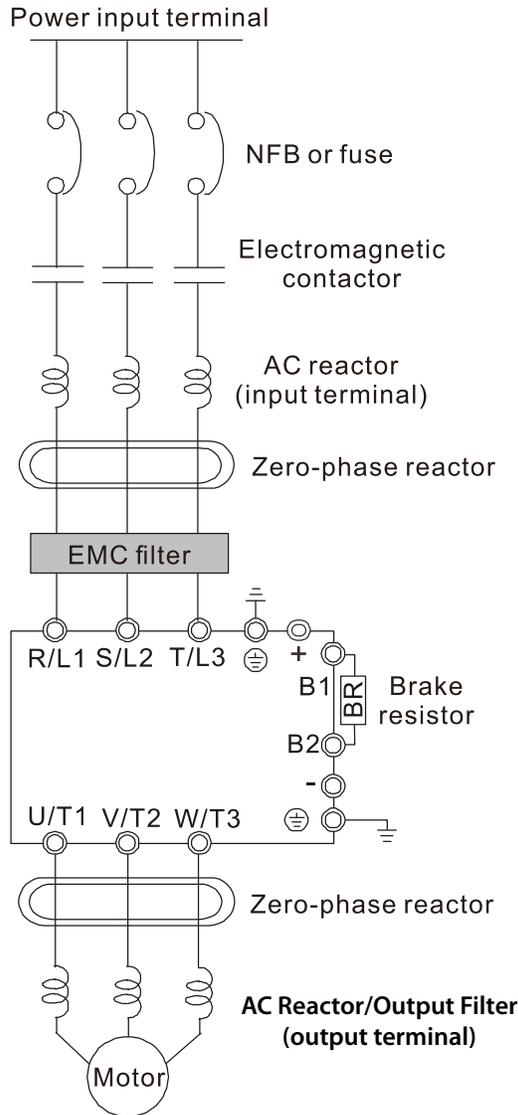
- ④ Source Mode with external power



# DURAPULSE GS10 AC Drives – Basic Wiring Diagram

## System Wiring Diagram:

*Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user G10 User Manual for additional specific wiring information.)*

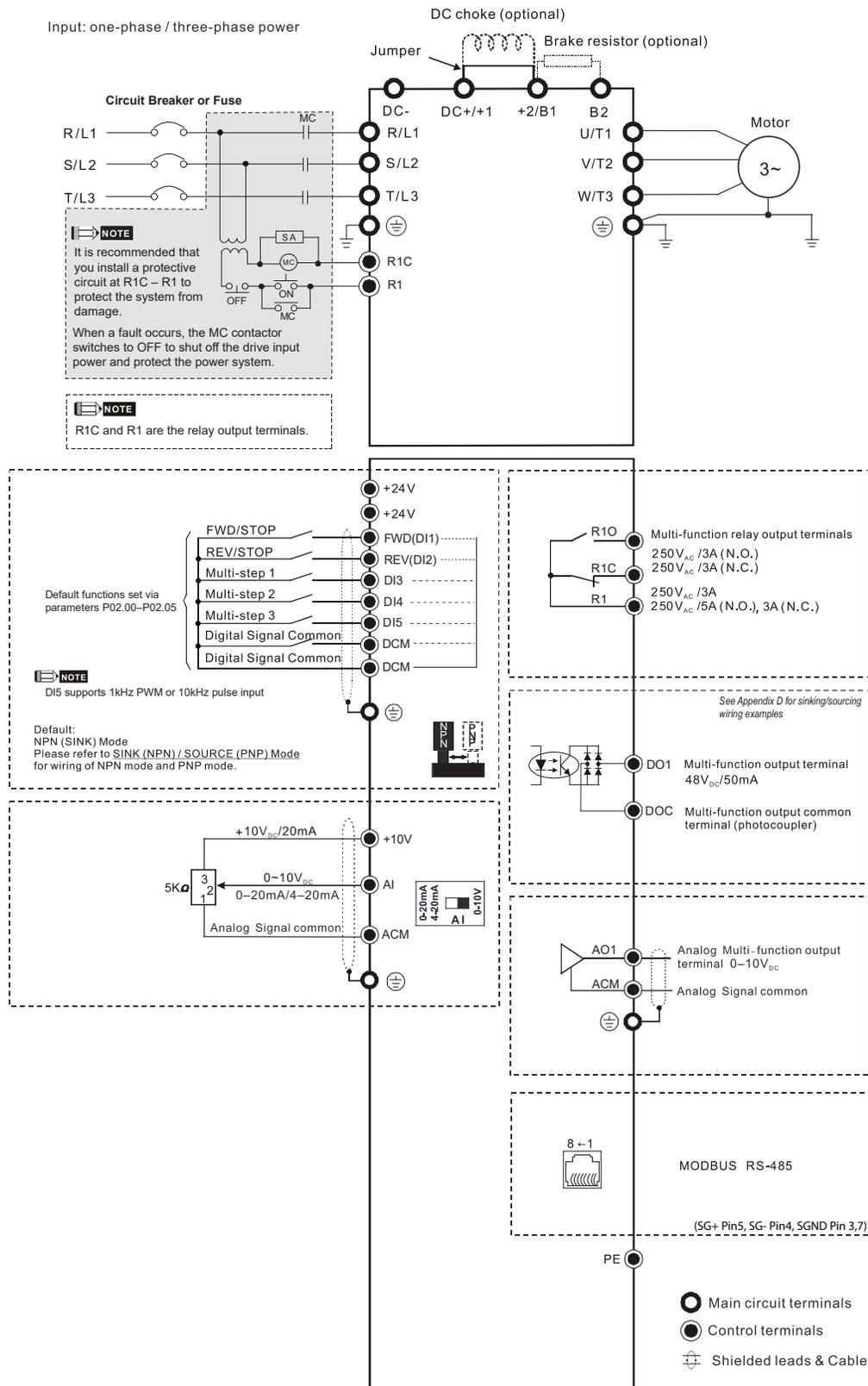


System Wiring Components	
Component	Function
Power input terminal	Supply power according to the rated power specifications indicated in the manual
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB (Non Fuse Breaker or Circuit Breaker) or Fuse.
Electromagnetic contactor	Switching the power ON/OFF on the primary side of the electromagnetic contactor can turn the drive ON/OFF, but frequent switching can cause machine failure. Do not switch ON/OFF more than once an hour. Do not use the electromagnetic contactor as the power switch for the drive; doing so shortens the life of the drive.
AC reactor (input terminal)	When the main power supply capacity is greater than 500 kVA, or when it switches into the phase capacitor, the instantaneous peak voltage and current generated may destroy the internal circuit of the drive. It is recommended that you install an input side AC reactor in the drive. This also improves the power factor and reduces power harmonics. The wiring distance should be within 10 m.
Zero phase reactor	Used to reduce radiated interference, especially in environments with audio devices, and reduce input and output side interference. The effective range is AM band to 10 MHz.
EMC filter	Can be used to reduce electromagnetic interference.
Brake module and Brake resistor (BR)	Used to shorten the deceleration time of the motor.
AC reactor (output terminal)	The motor cable length affects the size of the reflected wave on the motor end.

# DURAPULSE GS10 AC Drives – Basic Wiring Diagram

## Control Wiring Diagram: Full I/O

**Note:** Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to the GS10 user manual for additional specific wiring information.)



# DURAPULSE GS10 AC Drives – Optional Accessories

## Accessories Available for GS10 AC Drives

The table below lists types of accessories available for your GS10 series drive. GS10 uses many of the same accessories as the GS20(X) series drives—GS20 numbered parts that can be used with GS10 are noted in the table below. To see if your specific model can use a particular accessory, please click the reference link to go to the accessory page.

<b>GS10 AC Drives Available Software and Accessories</b>			
<i>Accessory</i>	<i>GS10 Accessory</i>	<i>GS20 Accessory used by GS10</i>	<i>Reference</i>
<b>GSofT 2 Drive Software</b>	✓		<a href="#">GSOFT2</a>
<b>Braking Resistors</b>	✓		<a href="#">GS-BR-xxxxxx</a>
<b>Capacitive Filter</b>		✓	<a href="#">GS20A-CAPF</a>
<b>Conduit Boxes</b>	✓		<a href="#">GS10-N1x</a>
<b>DIN Rail Mounting (A–C frame only)</b>		✓	<a href="#">GS20A-DR-xx</a>
<b>EMC Filter</b>	✓		<a href="#">EMC Filters</a>
<b>EMC Shield Plates</b>		✓	<a href="#">GS20A-ESP-x</a>
<b>EMI Filters</b>	✓		<a href="#">EMI Filters</a>
<b>Fuses/Circuit Breakers</b>	✓		<a href="#">Fuses</a>
<b>Line/Load Reactor/Voltage Time Filter</b>	✓		<a href="#">Line Reactor/VTF</a>
<b>Mounting Adapter Plate (A–C frame only)</b>		✓	<a href="#">GS20A-MP-xx</a>
<b>Optional Advanced Keypad</b>		✓	<a href="#">GS4-KPD</a>
<b>Replacement Fan Kit</b>		✓	<a href="#">GS20A-FAN-x</a>
<b>RF Filter</b>	✓		<a href="#">RF008X00A</a>

# GS1 Series Introduction



## GS1 Series Drives

Motor Rating	hp	0.25	0.5	1	2
	kW	0.2	0.4	0.75	1.5
115V Single-Phase Input / 230V Three-Phase Output		✓	✓		
230V Single-Phase Input / 230V Three-Phase Output		✓	✓	✓	
230V Three-Phase Input / Output		✓	✓	✓	✓

## Overview

The GS1 series of AC drives is our most affordable and compact inverter, offering V/Hz control with general purpose application features. These drives can be configured using the built-in digital keypad (which also allows you to set the drive speed, start and stop, and monitor specific parameters) or with the standard RS-485 serial communications port. Standard GS1 features include one analog input, four programmable digital inputs and one programmable normally open relay output.

## Features

- Simple Volts/Hertz control
- Pulse Width Modulation (PWM)
- 3–10 kHz carrier frequency
- IGBT technology
- 130% starting torque at 5Hz
- 150% rated current for one minute
- Electronic overload protection
- Stall prevention
- Adjustable accel and decel ramps
- S-curve settings for acceleration and deceleration
- Manual torque boost
- Automatic slip compensation
- DC braking
- Three skip frequencies
- Trip history
- Integral keypad and speed potentiometer
- Programmable jog speed
- Three programmable preset speeds
- Four programmable digital inputs
- One programmable analog input
- One programmable relay output
- RS-485 Modbus communications up to 19.2K
- Optional Ethernet communications
- DIN rail or panel mountable
- Two-year warranty
- UL/cUL/CE listed

## Accessories

- AC line reactors
- RF filter
- Fuse kits and replacement fuses
- Ethernet interface
- Four and eight-port RS-485 multi-drop termination board
- Serial communication cables available for creating plug and play RS-232/RS-485 networks with AutomationDirect PLCs. See the comm cable matrix ([pg.tGSX-169](#)).
- GSoft drive configuration software
- USB-485M – USB to RS-485 PC adapter (see “Communications Products” chapter for detailed information)
- Detailed descriptions and specifications for GS accessories are available in the “GS/DURApulse Accessories” section.

## Typical Applications

- Conveyors
- Fans
- Pumps
- Shop tools

# GS1 Series Specifications

115V/230V CLASS GS1 Series				
Model	<b><u>GS1-20P2</u></b>		<b><u>GS1-21P0</u></b>	
Price	Retired		Retired	
Motor Rating	HP	1/4 hp	1hp	
	kW	0.2 kW	0.7 kW	
Rated Output Capacity (200V) kVA	0.6		1.6	
Rated Input Voltage	Single/three-phase: 200–240 VAC ±10%; 50/60 Hz ±5%			
Rated Output Voltage	Three-phase corresponds to the input voltage			
Rated Input Current (A)	4.9/1.9		9.7/5.1	
Rated Output Current (A)	1.6		4.2	
Watt Loss @ 100% I (W)	18.4		44.6	
Cooling Fan	no		yes	
Weight: kg (lb)	2.20		2.20	
Dimensions (HxWxD) (mm [in])	132.0 x 68.0 x128.1 [5.20 x 2.68 x 5.04]			
Accessories				
Line Reactor *	LR-1xxPx-xxx (refer to "GS/DURApulse Drives Accessories – Line Reactors" section for exact part #)			
RF Filter	RF220X00A			
Fuse Kit **	Single-Phase**	<a href="#">GS-20P2-FKIT-1P</a>	<a href="#">GS-21P0-FKIT-1P</a>	
	Three-Phase	<a href="#">GS-20P2-FKIT-3P</a>	<a href="#">GS-21P0-FKIT-3P</a>	
Replacement Fuses	Single-Phase	<a href="#">GS-20P2-FUSE-1P</a>	<a href="#">GS-21P0-FUSE-1P</a>	
	Three-Phase	<a href="#">GS-20P2-FUSE-3P</a>	<a href="#">GS-21P0-FUSE-3P</a>	
Ethernet Communications module for GS Series Drives (DIN rail mounted)	<a href="#">GS-EDRV100</a>			
USB to RS-485 PC Communication Adapter	<a href="#">USB-485M</a>			
RS-485 Communication Distribution Module (for creating plug and play RS-485 networks)	<a href="#">ZL-CDM-RJ12X4</a> / <a href="#">ZL-CDM-RJ12X10</a>			
RS-485 Serial Cable, GS Drive to DL06/D2-260	<a href="#">GS-485HD15-CBL-2</a>			
RS-485 Serial Cable, GS Drive to ZIPLink CDM Module	<a href="#">GS-485RJ12-CBL-2</a>			
Software	<a href="#">GSOFT</a>			
* GS1-1xxx drives require 115V class input line reactors and 230V class output line reactors.				
** Single-phase fuse kits and fuses are used only with GS1-1xxx drives.				

# GS1 General Specifications

General Specifications			
Control Characteristics			
<b>Control System</b>		Sinusoidal Pulse Width Modulation, carrier frequency 3kHz–10kHz	
<b>Rated Output Frequency</b>		1.0 to 400.0 Hz limited to 9999 motor rpm	
<b>Output Frequency Resolution</b>		0.1 Hz	
<b>Overload Capacity</b>		150% of rated current for 1 minute	
<b>Torque Characteristics</b>		Includes manual torque boost, auto-slip compensation, starting torque 130% @ 5.0Hz	
<b>DC Braking</b>		Operation frequency 60–0Hz, 0–30% rated voltage. Start time 0.0–5.0 seconds. Stop time 0.0–25.0 seconds	
<b>Acceleration/Deceleration Time</b>		0.1 to 600 seconds (can be set individually)	
<b>Voltage/Frequency Pattern</b>		V/F pattern adjustable. Settings available for Constant Torque – low and high starting torque, Variable Torque – low and high starting torque, and user configured	
<b>Stall Prevention Level</b>		20 to 200% of rated current	
Operation Specification			
<b>Inputs</b>	<b>Frequency Setting</b>	<b>Keypad</b>	Setting by <UP> or <DOWN> buttons or potentiometer
		<b>External Signal</b>	Potentiometer - 5kΩ 0.5W, 0 to 10 VDC (input impedance 47kΩ), 0 to 20 mA / 4 to 20 mA (input impedance 250Ω), Multi-function inputs 1 to 3 (3 steps, JOG, UP/DOWN command), RS485 communication setting
	<b>Operation Setting</b>	<b>Keypad</b>	Setting by <RUN>, <STOP> buttons
		<b>External Signal</b>	DI1, DI2, DI3, DI4 can be combined to offer various modes of operation, RS485 communication port
<b>Outputs</b>	<b>Multi-Function Input Signal</b>		Multi-step selection 0 to 3, Jog, Accel/decel inhibit, First/second accel/decel switch, Counter, PLC operation, External base block (N.C., N.O.) selection
	<b>Multi-Function Output Signal</b>		AC drive operating, Frequency attained, Non zero speed, Base Block, Fault indication, Local/remote indication, PLC operation indication
	<b>Operating Functions</b>		Automatic voltage regulation, S-curve, Over-voltage stall prevention, DC braking, Fault records, Adjustable carried frequency, Starting frequency setting of DC braking, Over-current stall prevention, Momentary power loss restart, Reverse inhibition, Frequency limits, Parameter lock/reset
<b>Protective Functions</b>		Overcurrent, overvoltage, undervoltage, electronic thermal motor overload, Overheating, Overload, Self testing	
<b>Operator Interface</b>	<b>Operator Devices</b>		5-key, 4-digit, 7-segment LED, 3 status LEDs, potentiometer
	<b>Programming</b>		Parameter values for setup and review, fault codes
	<b>Parameter Monitor</b>		Master Frequency, Output Frequency, Scaled Output Frequency, Output Voltage, DC Bus Voltage, Output Direction, Trip Event Monitor, Trip History Monitor
	<b>Key Functions</b>		RUN/STOP, DISPLAY/RESET, PROGRAM/ENTER, <UP>, <DOWN>
<b>Environment</b>	<b>Enclosure Rating</b>		Protected chassis, IP20
	<b>Ambient Operating Temperature</b>		-10° to 40°C (14°F to 104°F) w/o derating
	<b>Storage Temperature</b>		-20° to 60 °C (-4°F to 140°F) during short-term transportation period)
	<b>Ambient Humidity</b>		0 to 90% RH (non-condensing)
	<b>Vibration</b>		9.8 m/s <sup>2</sup> (1G), less than 10Hz; 5.88 m/s <sup>2</sup> (0.6G) 20 to 50 Hz
<b>Installation Location</b>		Altitude 1000m or lower above sea level, keep from corrosive gas, liquid and dust	
<b>Options</b>		Programming Software (GSOFT)	

# GS1 Specifications - Installation

Understanding the installation requirements for your GS1 drive will help to ensure that it will operate within its environmental and electrical limits.

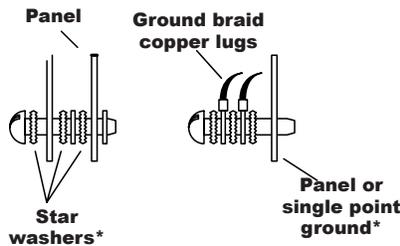
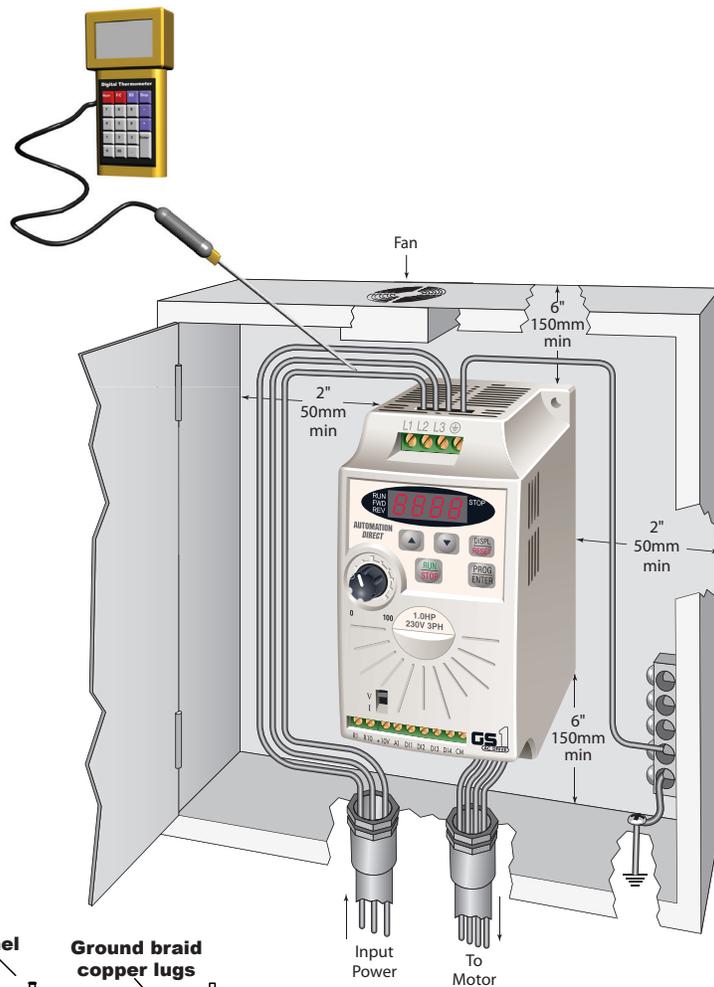
**NOTE:**

Never use only this catalog for installation instructions or operation of equipment; refer to the user manual, GS1-M.

Environmental Specifications	
<b>Protective Structure</b> <sup>1</sup>	IP20
<b>Ambient Operating Temperature</b> <sup>2</sup>	-10 to 40 °C (14 to 104 °F)
<b>Storage Temperature</b> <sup>3</sup>	-20 to 60°C (-4 to 140 °F)
<b>Humidity</b>	up to 90% (no condensation)
<b>Vibration</b> <sup>4</sup>	5.9 m/s <sup>2</sup> (0.6g), 10 to 55 Hz
<b>Location</b>	Altitude 1,000 m or less, indoors (no corrosive gases or dust)

1: Protective structure is based upon EN60529  
 2: The ambient temperature must be in the range of -10 to 40 °C (14 to 104 °F). If the range will be up to 50 °C (122°F), you will need to set the carrier frequency to 3.0 kHz and derate the output current to 80% or less. See our web site for derating curves.  
 3: The storage temperature refers to the short-term temperature during transport.  
 4: Conforms to the test method specified in JIS C0911 (1984)

Watt Loss Chart	
<b>GS1 Drive Model</b>	<b>At full load</b>
GS1-20P2	18.4
GS1-21P0	44.6



\* For painted sub-panels, scrape the paint from underneath the star washers before tightening them.

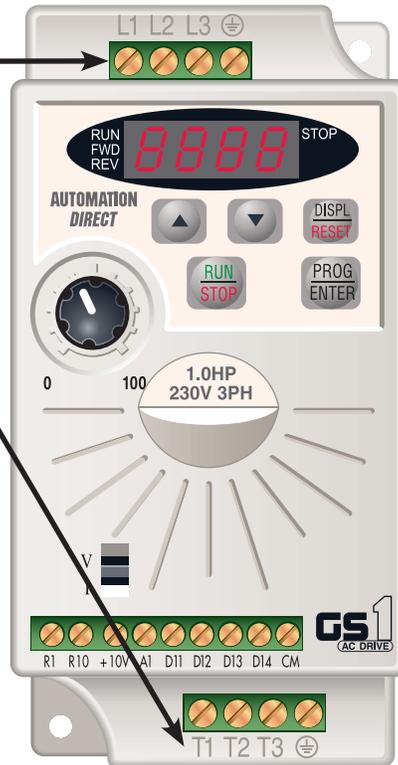
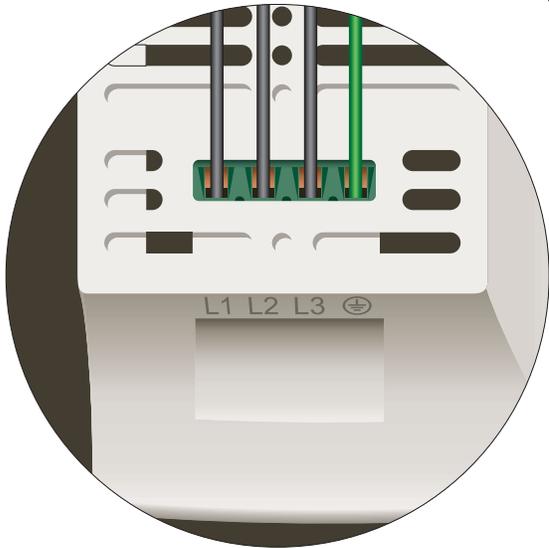


**WARNING: AC DRIVES GENERATE A LARGE AMOUNT OF HEAT, WHICH MAY DAMAGE THE AC DRIVE. AUXILIARY COOLING METHODS ARE TYPICALLY REQUIRED IN ORDER TO NOT EXCEED MAXIMUM AMBIENT TEMPERATURES.**

# GS1 Specifications - Terminals

## Main Circuit Wiring

Terminal	Description
L1, L2, L3	Input power
T1, T2, T3	AC drive output
⊕	Ground



## Control Circuit Terminals

Terminal Symbol	Description
R10	Relay output 1 normally open
R1	Relay output 1 common
D11	Digital input 1
D12	Digital input 2
D13	Digital input 3
D14	Digital input 4
AI <sup>1</sup>	Analog input
+10V	Internal power supply (10 mA @ 10 VDC)
CM	Common

<sup>1</sup> 0 to +10 VDC, 0 to 20 mA, or 4 to 20 mA input represents zero to maximum output frequency.

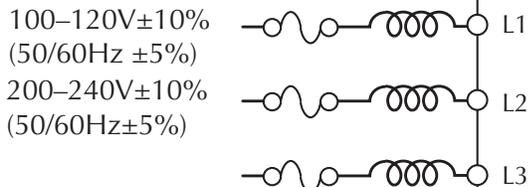
Note: Use twisted-shielded, twisted-pair or shielded-lead wires for the control signal wiring. It is recommended all signal wiring be run in a separate steel conduit. The shield wire should only be connected at the drive. Do not connect shield wire on both ends.

# GS1 Specifications - Basic Wiring Diagram

**Note:** Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user manual GS1-M for additional specific wiring information.)

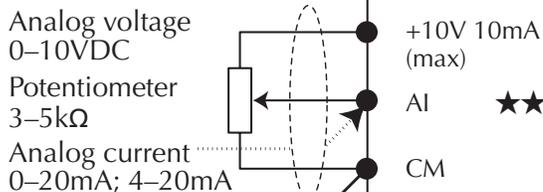
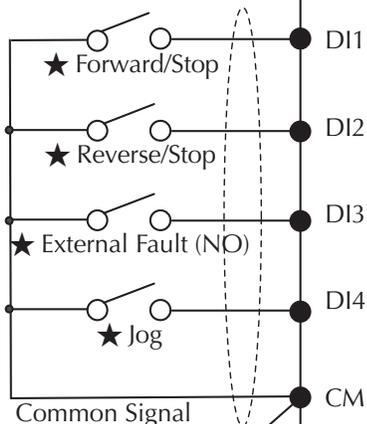
**Note:** Please refer to the following pages for explanations and information regarding line reactors (pg.tGSX-117) and RF filters (pg.tGSX-158).

## Power Source 3-phase\*

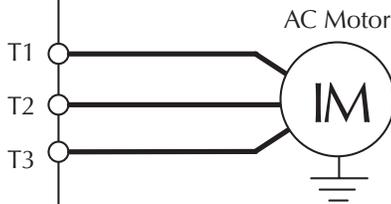


\* Use terminals L1 and L2 for 115V, or select any two of the power terminals for 230V single-phase models

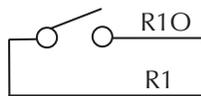
Grounding resistance less than 0.1Ω



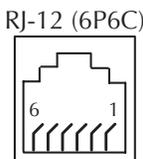
GS1-xxxx



Multi-function output contacts  
120VAC/24VDC @5A  
230VAC @2.5A



★ AC Drive Running



RJ-12 Serial Comm Port

**RS-485**

- 1: +17V
- 2: GND
- 3: SG-
- 4: SG+
- 5: +5V

Communication Port



\*Optional ZIPLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix on page pg.tGSX-17.

★ Factory default setting

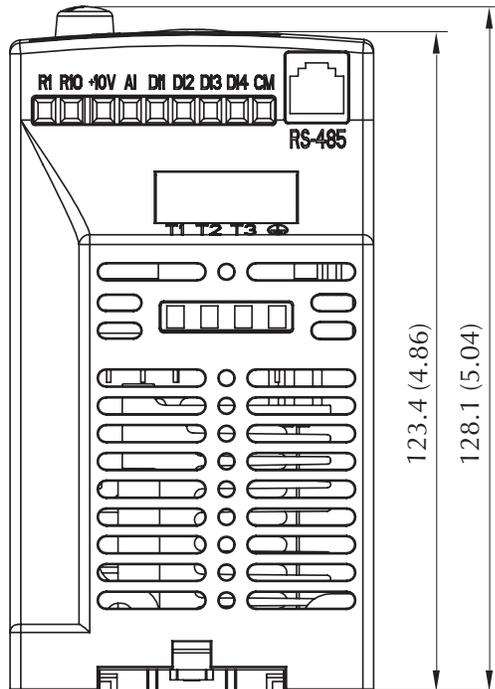
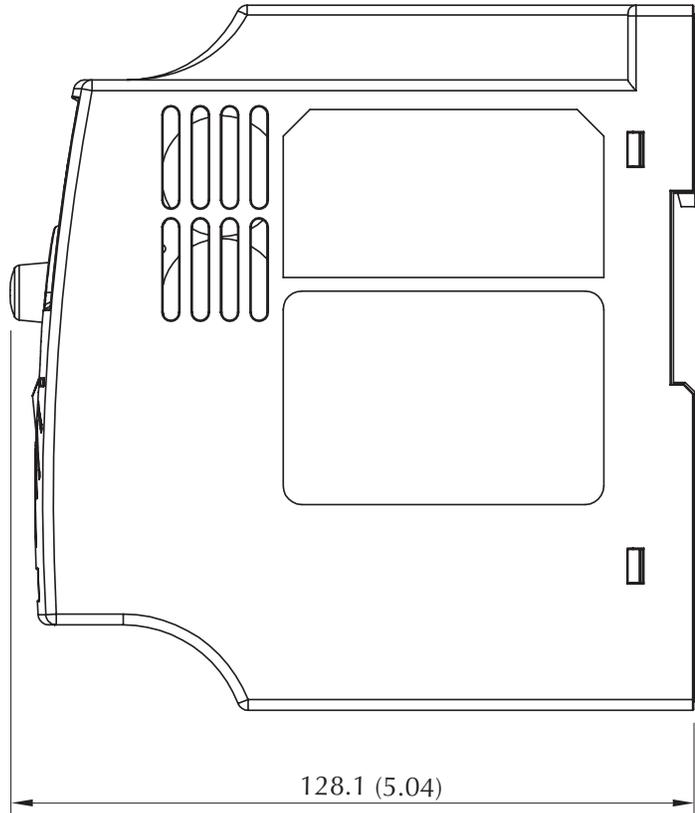
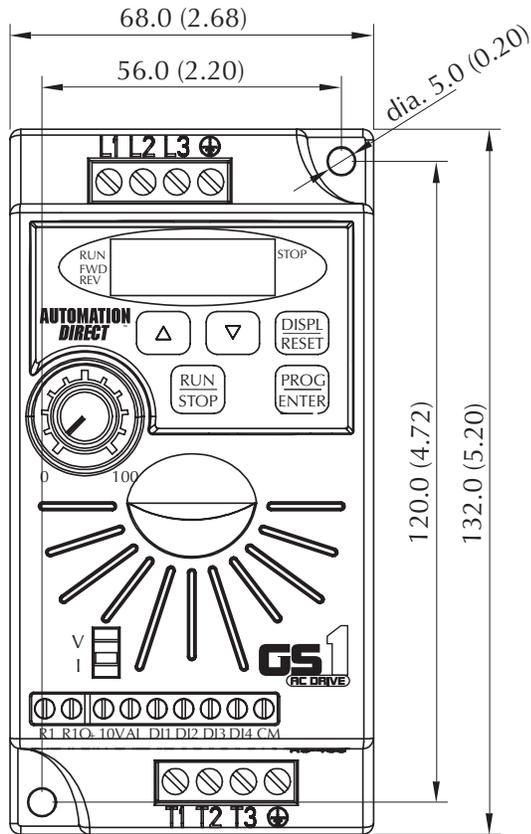
★★ Factory default source of frequency command is via the keypad potentiometer

○ Main circuit (power) terminals ● Control circuit terminal ⊕ Shielded leads



**DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS1 RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT. TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.**

# GS1 Specifications - Dimensions



Unit: mm (in)

# DURAPULSE GS20(X) AC Drives – Introduction



DURAPULSE GS20(X) AC Drives													
Motor Rating	HP	1/4	1/2	1	2	3	5	7.5	10	15	20	25	30
	kW	0.2	0.4	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22
120V Single-phase		✓	✓	✓									
230V Single-phase		✓	★	★	★	★							
230V Three-phase		✓	★	★	★	★	★	★	✓	✓	✓		
460V Three-phase			★	★	★	★	★	★	✓	✓	✓	✓	✓
575V Three phase				✓	✓	✓	✓	✓	✓	✓			

✓ = GS20 model available    ★ = GS20 and GS20X models available

## Overview

The DuraPulse GS20(X) new generation high performance vector control drives provide many standard and advanced functions—all in a compact unit that has been reduced 40% in size. A NEMA 4X version provides service in the harshest of environments.

The drives include many of the same standard features as our GS family of drives including dynamic braking, PID, removable keypad, and RS-485 Modbus communication.

The GS20(X) drive expands the *DURAPULSE* family by adding single-phase input capability (ALL 230VAC drives can be supplied single-phase), a built-in PLC, and optional EtherNet/IP and ModbusTCP communication card. The drive supports up to four (4) independent IM motor parameter sets or supports control of a single AC PM motor.

*DURAPULSE* GS20(X) AC drives offer several different speed control modes: standard V/Hz with pulse input feedback, sensorless vector (SVC) for Induction Motors (IM) and Permanent Motors (PM), and ultra precise Field Oriented Vector control (FOC) for maximum open loop speed regulation control.

*DURAPULSE* GS20(X) offers two analog inputs, one analog output, one frequency output, seven digital inputs (including one pulse train input up to 33kHz), two digital outputs, one SPDT relay output, and two STO inputs. All of the analog and digital I/O can be configured for a wide variety of input or output functions. One option card slot is available for either the backup control power option card or Ethernet/IP and Modbus TCP communication option card.

## Features

- Broad offering from 1/4 to 30 hp
- NEMA 4X available up to 10hp
- Single-phase 120VAC up to 1hp
- Single-phase/three-Phase 230VAC up to 20HP
- Three-phase 460VAC and 575VAC
- Single-phase UL Ratings – 230VAC input for 1 to 20 hp models (see selection tables for derated output)
- Dual rating design – CT/VT Ratings (Light & Heavy Duty)
- “Zero Stack” side-by-side zero gap installation
- Compact Design
- Spring clamp terminal blocks
- Speed control potentiometer built in
- Flexible carrier frequency to 15khz and output frequency to 600Hz
- STO – Safe Torque Off (TUV Certified)
- Built-in PLC to support up to 2K steps
- Built-in USB port for fast & easy programming
- Free downloadable software for drive configuration and PLC programming
- Field-upgradable firmware (drive & communication option card)
- Optional LCD text-based advanced keypad (IP66/NEMA 1) can be remotely mounted
- Local/Remote control mode selection or digital/comm input with Hand/Off/Auto control
- Display custom values on keypad
- Momentary power loss restarts
- 100kA Short Circuit Current Rating
- DC Bus Connection Terminals (except 120VAC models)
- Conduit Box(s) for NEMA 1
- Analog I/O – configurable 2 Inputs and 1 Output
- Multi-Motor Control (4 total)
- Built-in Dynamic Braking – optional resistors
- PID Controller – including sleep and wake
- Password protection
- RTD and/or PTC input motor protection
- GS2 mode duplicates exact parameter configuration of GS2
- Modularized design eases maintenance and expansion, including quick replacement of cooling fan
- High speed communication interfaces

with MODBUS RTU built in, with optional EtherNet/IP and ModbusTCP Communication Card

- Circuit boards have conformal coating for improved environmental tolerance
- Excellent heat-sink design; able to operate at 50°C ambient temperature
- Fire Mode – Run fire mode during emergencies to have uninterrupted smoke removal and system pressure
- Two-year warranty
- CE, TUV, UL, cUL

## Accessories

- AC line reactors
- dV/dT output filters
- EMI filters
- RF filter
- Braking resistors
- Fuses
- Conduit boxes
- Mounting Kits
- Replacement cooling fans
- Replacement keypad
- Extension cable for remote keypad placement
- Optional advanced LCD keypad (and remote-mount bezel kit)
- EtherNet/IP and ModbusTCP comm card
- Four and eight-port RS-485 multi-drop termination boards
- GSoft2 drive configuration software
- GSLogic PLC programming software
- Type A to B USB cable
- Detailed descriptions and specifications for GS accessories are available in the “GS/ DURAPulse Accessories” section.

## Typical Applications

- Conveyors
- Compressors
- Material handling
- Extruding
- Grinding
- Shop tools
- Fans
- Pumps
- HVAC
- Mixing

# DURAPULSE GS20(X) AC Drives – Selection

## Selecting the Proper Drive Rating

Selecting the Proper Drive Rating													
<b>Determine Motor Voltage and Full-Load Amperage (FLA)</b>													
Motor voltage and FLA are located on the nameplate of the motor. <i>NOTE: FLA of motors that have been rewound may be higher than stated.</i>													
<b>Determine Motor Overload Requirements</b>													
Many applications experience temporary overload conditions due to starting requirements or impact loading. Most AC drives are designed to operate at 150% overload for 60 seconds. If the application requires an overload greater than 150% or longer than 60 seconds, the AC drive must be oversized. <i>NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.</i>													
<b>Determine Application Type: Constant Torque or Variable Torque</b>													
This torque requirement has a direct effect on which drive to select. Variable Torque applications are generally easier to start; typically fans and pumps. Most other applications outside fans and pumps fall into the Constant Torque category (machine control, conveyors, etc.). If you are unsure of the application, assume Constant Torque. The specification, derating, and selection tables are generally segregated by Constant Torque and Variable Torque.													
<b>Installation Altitude</b>													
AC drives rely on air flow for cooling. As the altitude increases, the air becomes less dense, and this drop in air density decreases the cooling properties of the air. Therefore, the AC drive must be oversized to compensate for the decrease in cooling. GS20(X) drives are designed to operate at 100% capacity at altitudes up to 1000 meters. <i>NOTE: For use above 1000m, the AC drive must be derated as described below.</i>													
<b>Derate Output Current Based on Altitude Above 1000 Meters</b>													
<ul style="list-style-type: none"> <li>• If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.</li> <li>• If installed at an altitude of 1000–2000m, decrease 1% of the rated current or lower 0.5°C of temperature for every 100m increase in altitude.</li> <li>• Maximum altitude for Corner Grounded is 2000m. If installation at an altitude higher than 2000m is required, please contact AutomationDirect.</li> </ul>													
<b>Derating for Altitude</b>													
<table border="1" style="margin: 10px auto;"> <caption>Derating for Altitude Data</caption> <thead> <tr> <th>Altitude (m)</th> <th>Current Rated Ratio (%) - 50°C (IP20/UL Open Type)</th> <th>Current Rated Ratio (%) - 40°C (IP66/NEMA 4X/UL Type 4X)</th> </tr> </thead> <tbody> <tr> <td>0 - 1000</td> <td>100</td> <td>100</td> </tr> <tr> <td>1000 - 2000</td> <td>90</td> <td>90</td> </tr> <tr> <td>2000</td> <td>90</td> <td>70</td> </tr> </tbody> </table>		Altitude (m)	Current Rated Ratio (%) - 50°C (IP20/UL Open Type)	Current Rated Ratio (%) - 40°C (IP66/NEMA 4X/UL Type 4X)	0 - 1000	100	100	1000 - 2000	90	90	2000	90	70
Altitude (m)	Current Rated Ratio (%) - 50°C (IP20/UL Open Type)	Current Rated Ratio (%) - 40°C (IP66/NEMA 4X/UL Type 4X)											
0 - 1000	100	100											
1000 - 2000	90	90											
2000	90	70											

# DURAPULSE GS20(X) AC Drives – Selection

## Selecting the Proper Drive Rating, continued

### Determine Maximum Enclosure Internal Temperature

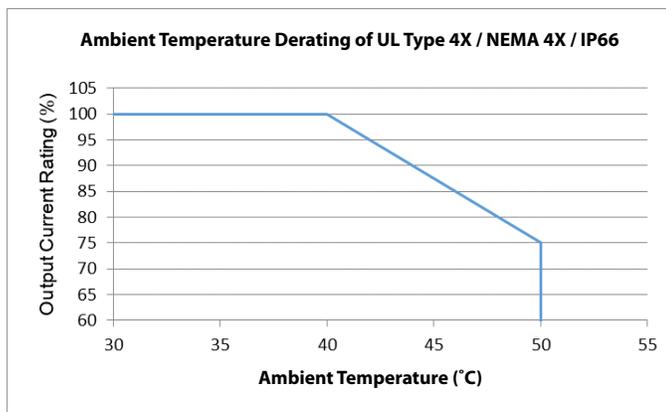
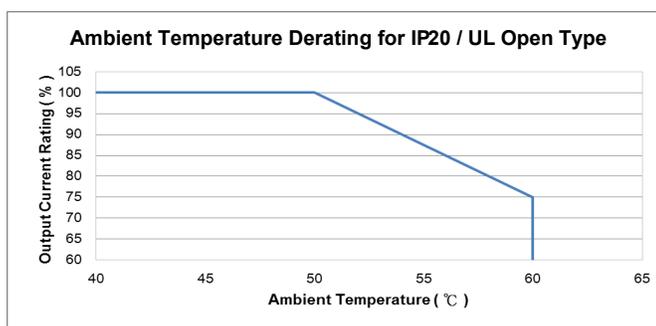
AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS20(X) drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to 104°F (40°C) or less. Ambient temperature measurements/calculations should be made for the maximum expected temperature.

**NOTE:** For use above 104°F (40°C), the AC drive must be derated as described below.

### Derate Output Current Based on Temperature Above 104°F (40°C) or 122°F (50°C)

Drive Derating by Temperature and Protection Level	
Protection Level	Derating
UL Open Type / IP20*	When the GS20(X) drive is operating at rated current, the ambient temperature has to be between -10°C and +50°C. When ambient temperature exceeds 50°C, decrease the rated current by 2.5% for every 1°C temperature increase. Maximum allowable temperature is 60°C.
UL Type 4X / NEMA 4X / IP66*	When the GS20(X) drive is operating at rated current, the ambient temperature has to be between -10°C and +40°C. When ambient temperature exceeds 40°C, decrease the rated current by 2.5% for every 1°C temperature increase. Maximum allowable temperature is 50°C.

\* For more information about environmental ratings, refer to the "Operating Temperature and Protection Level" table (pg.tGSX-37).



# DURAPULSE GS20(X) AC Drives – Selection

## Selecting the Proper Drive Rating, continued

<b>Derate Output Current Based on Carrier Frequency (if necessary)</b>	
<b>Carrier Frequency Effects</b>	
AC Drives rectify the incoming 50 or 60Hz line power resulting in DC power at 0Hz. The resulting DC power is then pulse-width modulated and supplied to the motor by the drive's power electronics. IGBTs invert the DC power, simulating a sine wave at the desired frequency (that's what allows variable speed in AC induction motors). The speed at which the IGBTs are turned ON and OFF is called Carrier Frequency. In GS20(X) drives, the Carrier Frequency can range from 2kHz to 15kHz. Though Carrier Frequency can be adjusted, there are trade-offs between high Carrier Frequencies and low Carrier Frequencies.	
<b>Benefits of Higher Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency (lower harmonic losses) in the motor</li> <li>• Lower audible noise</li> </ul>	
<b>Benefits of Lower Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency in the drive</li> <li>• Lower EMI (electrical noise)</li> <li>• Reduced reflective wave peak voltage</li> </ul> <p>As a general rule, the Carrier Frequency should be set as low as possible without creating unacceptable audible noise in the motor. Smaller systems can have higher Carrier Frequencies, but larger drives (&gt;20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy duty applications typically run around 2–4 kHz.</p>	
<b>Derating Tables</b>	
<p>The tables below show the derating curves for both GS20 and GS20X drives running in two different modes under variable torque and constant torque conditions.</p> <p>Line 1: Ta = 50°C / Load = 100%</p> <p>Line 2: Ta = 50°C / Load = 75% or Ta = 40°C / Load = 100%</p> <p>Line 3: Ta = 50°C / Load = 50% or Ta = 35°C / Load = 100%</p> <p>Set PWM mode via P11.41.                      SVPWM = Space Vector Pulse Width Modulation mode                      DPWM = Two Phase Pulse Width Modulation mode</p>	
<b>Variable Torque Carrier Frequency Derating</b>	
<b>SVPWM Mode</b>	<b>DPWM Mode</b>
<b>Constant Torque Carrier Frequency Derating</b>	
<b>SVPWM Mode</b>	<b>DPWM Mode</b>

# DURAPULSE GS20(X) AC Drives – Selection

## Replacing GS2 with GS20

If using the GS20 as a replacement for existing GS2 drives, review the following requirements to ensure compatibility.

- Use the chart below to match the GS2 model with equivalent GS20 model.
- Only models specified in chart below allow “GS2-mode” parameter setup.
- 230V GS2 models using single-phase input power should be replaced with GS21 single-phase input models for equivalent power output. See chart below.
- Some GS20 models can be up to 12mm deeper than prior GS2 models. Check depth dimensions if depth is tight in existing panel space.
- GS2 and GS20 footprints do not match. New mounting holes will be required.
- GS2 has top entry power vs GS20 bottom entry power. Use GS20A-MPx accessory for top entry.
- GS2 has 2 relay outputs vs GS20 1 relay output and 2 transistor outputs.
- GS20 control wire terminal accepts 18 AWG maximum.
- See GS20 fusing chart for required fuse changes.
- If remote mounting a keypad, GS2 keypad is larger than GS20 keypad.



Replace this GS2 . . .



. . . with this GS20

GS2 Model	GS2 Input Amp Rating	GS2 Fuse Rating	GS2 Output VT Amp Rating	Compatible GS20 Model	GS20 Input Amp Rating	GS20 Fuse Rating	GS20 Output VT Amp Rating
<a href="#">GS2-10P2</a>	6.0	20	1.6	<a href="#">GS21-10P2</a>	6.8	10	1.8
<a href="#">GS2-10P5</a>	9.0	20	2.5	<a href="#">GS21-10P5</a>	10.1	10	2.7
<a href="#">GS2-11P0</a>	16.0	20	4.2	<a href="#">GS21-11P0</a>	20.6	25	5.5
<a href="#">GS2-20P5 (1PH)</a>	6.3	20	2.5	<a href="#">GS21-20P5</a>	8.3	15	3.2
<a href="#">GS2-20P5 (3PH)</a>	3.2	10	2.5	<a href="#">GS23-20P5</a>	3.8	15	3.2
<a href="#">GS2-21P0 (1PH)</a>	11.5	30	5.0	<a href="#">GS21-21P0</a>	11.3	20	5.0
<a href="#">GS2-21P0 (3PH)</a>	6.3	20	5.0	<a href="#">GS23-21P0</a>	6.0	20	5.0
<a href="#">GS2-22P0 (1PH)</a>	15.7	45	7.0	<a href="#">GS21-22P0</a>	18.5	35	8.5
<a href="#">GS2-22P0 (3PH)</a>	9.0	25	7.0	<a href="#">GS23-22P0</a>	9.6	35	8.5
<a href="#">GS2-23P0 (1PH)</a>	27.0	60	10.0	<a href="#">GS21-23P0</a>	27.5	50	12.5
<a href="#">GS2-23P0 (3PH)</a>	12.5	40	10.0	<a href="#">GS23-23P0</a>	15.0	50	12.5
<a href="#">GS2-25P0</a>	19.6	60	17.0	<a href="#">GS23-25P0</a>	23.4	80	19.5
<a href="#">GS2-27P5</a>	28.0	100	25.0	<a href="#">GS23-27P5</a>	32.4	60	27.0
<a href="#">GS2-41P0</a>	4.2	10	3.0	<a href="#">GS23-41P0</a>	3.3	15	3.0
<a href="#">GS2-42P0</a>	5.7	15	4.0	<a href="#">GS23-42P0</a>	5.1	20	4.6
<a href="#">GS2-43P0</a>	6.0	20	5.0	<a href="#">GS23-43P0</a>	7.2	25	6.5
<a href="#">GS2-45P0</a>	8.5	30	8.2	<a href="#">GS23-45P0</a>	11.6	45	10.5
<a href="#">GS2-47P5</a>	14.0	50	13.0	<a href="#">GS23-47P5</a>	17.3	35	15.7
<a href="#">GS2-4010</a>	23.0	70	18.0	<a href="#">GS23-4010</a>	22.6	45	20.5
<a href="#">GS2-51P0</a>	2.4	6	1.7	<a href="#">GS23-51P0</a>	2.4	6	2.1
<a href="#">GS2-52P0</a>	4.2	10	3.0	<a href="#">GS23-52P0</a>	4.2	10	3.6
<a href="#">GS2-53P0</a>	5.9	15	4.2	<a href="#">GS23-53P0</a>	5.8	10	5.0
<a href="#">GS2-55P0</a>	7.0	15	6.6	<a href="#">GS23-55P0</a>	9.3	20	8.0
<a href="#">GS2-57P5</a>	10.5	20	9.9	<a href="#">GS23-57P5</a>	13.4	25	11.5
<a href="#">GS2-5010</a>	12.9	30	12.2	<a href="#">GS23-5010</a>	17.5	30	15.0

# DURAPULSE GS20 AC Drives – Selection Specifications

## GS20 Drive Model Selection Tables

GS20 120V <sup>1,4</sup> 1-Phase Specifications – Frame Sizes A, C							
<b>Model Name</b>		<b>GS21-10P2</b>		<b>GS21-10P5</b>		<b>GS21-11P0</b>	
<b>Price</b>		\$157.00		\$167.00		\$187.00	
<b>Frame Size</b>		A		A		C	
<b>Drawing</b>		<a href="#">PDF</a>		<a href="#">PDF</a>		<a href="#">PDF</a>	
<b>Output Rating</b>	<b>Max Motor Output</b>	<b>hp</b>	1/4	1/2	1		
		<b>kW</b>	0.2	0.4	0.75		
	<b>CT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.6	1	1.8	
		<b>Rated Output Current</b>	<b>A</b>	1.6	2.5	4.8	
		<b>Carrier Frequency<sup>3</sup></b>	<b>kHz</b>	2–15 (default 4)			
	<b>VT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.7	1	2.1	
<b>Rated Output Current</b>		<b>A</b>	1.8	2.7	5.5		
<b>Carrier Frequency<sup>3</sup></b>		<b>kHz</b>	2–15 (default 4)				
<b>Input Rating<sup>2</sup></b>	<b>CT Rated Input Current</b>	<b>A</b>	6	9.4	18		
	<b>VT Rated Input Current</b>	<b>A</b>	6.8	10.1	20.6		
	<b>Rated Voltage/Frequency</b>		One-phase: 100–120 VAC (-15% to +10%), 50/60 Hz				
	<b>Operating Voltage Range (VAC)</b>		85–132				
<b>Frequency Tolerance (Hz)</b>		47–63					
<b>IE2 Efficiency - Relative Power Loss</b>		4.9%		3.5%		3.0%	
<b>Weight (kg [lb])</b>		0.65 [1.43]		0.74 [1.63]		1.24 [2.73]	
<b>Cooling Method</b>		Convective				Fan	
<b>IP Rating</b>		IP20					

1 - For Use With Three-Phase Motors Only.  
 2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.  
 3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".  
 4 - DC Common bus and DC reactor terminals are not available on 120V models. See the GS20(X) User Manual "Main Terminals" section for more details.  
 Note: DC Common bus and DC reactor terminals are not available on 120V models.

GS20 230V <sup>1</sup> 1-Phase Specifications – Frame Sizes A, B, C												
<b>Model Name</b>		<b>GS21-20P2</b>		<b>GS21-20P5</b>		<b>GS21-21P0</b>		<b>GS21-22P0</b>		<b>GS21-23P0</b>		
<b>Price</b>		\$147.00		\$151.00		\$168.00		\$204.00		\$253.00		
<b>Frame Size</b>		A		A		B		C		C		
<b>Drawing</b>		<a href="#">PDF</a>		<a href="#">PDF</a>		<a href="#">PDF</a>		<a href="#">PDF</a>		<a href="#">PDF</a>		
<b>Output Rating</b>	<b>Max Motor Output</b>	<b>hp</b>	1/4	1/2	1	2	3					
		<b>kW</b>	0.2	0.4	0.75	1.5	2.2					
	<b>CT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.6	1.1	1.8	2.9	4.2				
		<b>Rated Output Current</b>	<b>A</b>	1.6	2.8	4.8	7.5	11				
		<b>Carrier Frequency<sup>3</sup></b>	<b>kHz</b>	2–15 (default 4)								
	<b>VT</b>	<b>Rated Output Capacity</b>	<b>kVA</b>	0.7	1.2	1.9	3.2	4.8				
<b>Rated Output Current</b>		<b>A</b>	1.8	3.2	5	8.5	12.5					
<b>Carrier Frequency<sup>3</sup></b>		<b>kHz</b>	2–15 (default 4)									
<b>Input Rating<sup>2</sup></b>	<b>CT Rated Input Current</b>	<b>A</b>	5.1	7.3	10.8	16.5	24.2					
	<b>VT Rated Input Current</b>	<b>A</b>	5.8	8.3	11.3	18.5	27.5					
	<b>Rated Voltage/Frequency</b>		One-phase 200-240 VAC (-15% to +10%) 50/60 Hz									
	<b>Operating Voltage Range (VAC)</b>		170–265									
<b>Frequency Tolerance (Hz)</b>		47–63										
<b>IE2 Efficiency - Relative Power Loss</b>		5.2%		3.4%		2.9%		2.6%		2.4%		
<b>Weight (kg [lb])</b>		0.65 [1.43]		0.76 [1.68]		0.95 [2.09]		1.24 [2.73]		1.24 [2.73]		
<b>Cooling Method</b>		Convective						Fan				
<b>IP Rating</b>		IP20										

1 - For Use With Three-Phase Motors Only.  
 2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.  
 3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".

# DURAPULSE GS20 AC Drives – Selection Specifications

## GS20 Drive Model Selection Tables, continued

GS20 230V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B, C								
Model Name			<b>GS23-20P2</b>	<b>GS23-20P5</b>	<b>GS23-21P0</b>	<b>GS23-22P0</b>	<b>GS23-23P0</b>	
Price			\$171.00	\$179.00	\$184.00	\$213.00	\$266.00	
Frame Size			A	A	A	B	C	
Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output (3-phase [1-phase]) <sup>4</sup>	hp	0.25 [0.1]	0.5 [0.25]	1 [0.5]	2 [1]	3 [1.5]	
		kW	0.2 [0.1]	0.4 [0.2]	0.75 [0.375]	1.5 [0.75]	2.2 [1.1]	
	CT	Rated Output Capacity (3-phase [1-phase])	kVA	0.6 [0.3]	1.1 [0.55]	1.8 [0.9]	2.9 [1.5]	4.2 [2.1]
		Rated Output Current (3-phase [1-phase])	A	1.6 [0.8]	2.8 [1.4]	4.8 [2.4]	7.5 [3.75]	11 [5.5]
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	0.7	1.2	1.9	3	4.8
Rated Output Current		A	1.8	3.2	5	8	12.5	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)					
Input Rating <sup>2</sup>	CT	Rated Input Current	A	1.9	3.4	5.8	9	13.2
	VT	Rated Input Current	A	2.2	3.8	6	9.6	15
	Rated Voltage/Frequency		3-phase or 1-phase 200–240 VAC (-15% to +10%), 50/60 Hz					
	Operating Voltage Range (VAC)		170–265					
Frequency Tolerance (Hz)		47-63						
IE2 Efficiency - Relative Power Loss			5.2%	3.4%	2.9%	2.5%	2.5%	
Weight (kg [lb])			0.65 [1.43]	0.65 [1.43]	0.81 [1.79]	1.05 [2.31]	1.24 [2.73]	
Cooling Method			Convective			Fan		
IP Rating			IP20					
See table below for notes.								

GS20 230V <sup>1</sup> 3-Phase Specifications – Frame Sizes C, D, E, F								
Model Name			<b>GS23-25P0</b>	<b>GS23-27P5</b>	<b>GS23-2010</b>	<b>GS23-2015</b>	<b>GS23-2020</b>	
Price			\$276.00	\$418.00	\$511.00	\$635.00	\$887.00	
Frame Size			C	D	E	E	F	
Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output (3-phase [1-phase]) <sup>4</sup>	hp	5 [2.5]	7.5 [3.5]	10 [5]	15 [7.5]	20 [10]	
		kW	3.7 [1.85]	5.5 [2.75]	7.5 [3.75]	11 [5.5]	15 [7.5]	
	CT	Rated Output Capacity (3-phase [1-phase])	kVA	6.5 [3.25]	9.5 [4.75]	12.6 [6.3]	18.7 [9.35]	24.8 [12.4]
		Rated Output Current (3-phase [1-phase])	A	17 [8.5]	25 [12.5]	33 [16.5]	49 [24.5]	65 [32.5]
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	7.4	10.3	13.7	19.4	26.3
Rated Output Current		A	19.5	27	36	51	69	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)					
Input Rating <sup>2</sup>	CT	Rated Input Current	A	20.4	30	39.6	58.8	78
	VT	Rated Input Current	A	23.4	32.4	43.2	61.2	82.8
	Rated Voltage/Frequency		3-phase or 1-phase 200–240 VAC (-15% to +10%), 50/60 Hz					
	Operating Voltage Range (VAC)		170–265					
Frequency Tolerance (Hz)		47-63						
IE2 Efficiency - Relative Power Loss			2.2%	2.3%	2.5%	2.2%	2.1%	
Weight (kg [lb])			1.24 [2.73]	2.07 [4.56]	3.97 [8.75]	3.97 [8.75]	6.25 [13.78]	
Cooling Method			Fan					
IP Rating			IP20					

1 - For Use With Three-Phase Motors Only.  
 2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.  
 3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".  
 4 - Three phase models can be powered with 1-phase or 3-phase input power. If using 1-phase input power, GS21 models up to 3HP provide higher output power than equivalent GS23 models with 1-phase.

# DURAPULSE GS20 AC Drives – Selection Specifications

## GS20 Drive Model Selection Tables, continued

GS20 460V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B, C								
Model Name			GS23-40P5	GS23-41P0	GS23-42P0	GS23-43P0	GS23-45P0	
Price			\$193.00	\$198.00	\$228.00	\$255.00	\$310.00	
Frame Size			A	A	B	C	C	
Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output	hp	1/2	1	2	3	5	
		kW	0.4	0.75	1.5	2.2	3.7	
	CT	Rated Output Capacity	kVA	1.1	2.1	3.2	4.2	6.9
		Rated Output Current	A	1.5	2.7	4.2	5.5	9
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	1.4	2.3	3.5	5	8
Rated Output Current		A	1.8	3	4.6	6.5	10.5	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)					
Input Rating <sup>2</sup>	CT	Rated Input Current	A	1.7	3	5.6	6.1	9.9
	VT	Rated Input Current	A	2	3.3	5.1	7.2	11.6
	Rated Voltage/Frequency		Three-phase 380-480 VAC (-15% to +10%), 50/60 Hz					
	Operating Voltage Range (VAC)		323–528					
Frequency Tolerance (Hz)		47–63						
IE2 Efficiency - Relative Power Loss			4.0%	2.6%	2.3%	2.3%	2.0%	
Weight (kg [lb])			0.75 [1.65]	0.81 [1.79]	1 [2.20]	1.24 [2.73]	1.24 [2.73]	
Cooling Method			Convective		Fan			
IP Rating			IP20					
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>								

GS20 460V <sup>1</sup> 3-Phase Specifications – Frame Sizes D, E, F									
Model Name			GS23-47P5	GS23-4010	GS23-4015	GS23-4020	GS23-4025	GS23-4030	
Price			\$425.00	\$480.00	\$635.00	\$756.00	\$935.00	\$1,069.00	
Frame Size			D	D	E	E	F	F	
Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output	hp	7 1/2	10	15	20	25	30	
		kW	5.5	7.5	11	15	18.5	22	
	CT	Rated Output Capacity	kVA	9.9	13	19.1	24.4	29	34.3
		Rated Output Current	A	12	17	25	32	38	45
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)					
	VT	Rated Output Capacity	kVA	12	15.6	21.3	27.4	31.6	37.3
Rated Output Current		A	15.7	20.5	28	36	41.5	49	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)						
Input Rating <sup>2</sup>	CT	Rated Input Current	A	14.3	18.7	27.5	35.2	41.8	49.5
	VT	Rated Input Current	A	17.3	22.6	30.8	39.6	45.7	53.9
	Rated Voltage/Frequency		Three-phase 380-480 VAC (-15% to +10%), 50/60 Hz						
	Operating Voltage Range (VAC)		323–528						
Frequency Tolerance (Hz)		47–63							
IE2 Efficiency - Relative Power Loss			2.0%	1.9%	1.8%	1.7%	1.5%	1.5%	
Weight (kg [lb])			2.07 [4.56]	2.07 [4.56]	3.97 [8.75]	3.97 [8.75]	6.25 [13.78]	6.25 [13.78]	
Cooling Method			Fan						
IP Rating			IP20						
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>									

# DURAPULSE GS20 AC Drives – Selection Specifications

## GS20 Drive Model Selection Tables, continued

GS20 575V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B, C, D									
Model Name			<a href="#">GS23-51P0</a>	<a href="#">GS23-52P0</a>	<a href="#">GS23-53P0</a>	<a href="#">GS23-55P0</a>	<a href="#">GS23-57P5</a>	<a href="#">GS23-5010</a>	
Price			\$227.00	\$261.00	\$308.00	\$398.00	\$522.00	\$590.00	
Frame Size			A	B	C	C	D	D	
Drawing			<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	
Output Rating	Max Motor Output	hp	1	2	3	5	7 1/2	10	
		kW	0.75	1.5	2.2	3.7	5.5	7.5	
	CT	Rated Output Capacity	kVA	1.7	3	4.2	6.6	9.9	12.2
		Rated Output Current	A	1.7	3	4.2	6.6	9.9	12.2
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)					
	VT	Rated Output Capacity	kVA	2.1	3.6	5	8	11.5	15
Rated Output Current		A	2.1	3.6	5	8	11.5	15	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)						
Input Rating <sup>2</sup>	CT	Rated Input Current	A	2	3.5	4.9	7.7	11.5	14.2
	VT	Rated Input Current	A	2.4	4.2	5.8	9.3	13.4	17.5
	Rated Voltage/Frequency		Three-phase 500–600 VAC (-15% to +10%), 50/60 Hz						
	Operating Voltage Range (VAC)		425–660						
Frequency Tolerance (Hz)		47–63							
IE2 Efficiency - Relative Power Loss			3.9%	2.7%	2.3%	1.9%	2.0%	1.9%	
Weight (kg [lb])			0.85 [1.87]	0.87 [1.92]	1.18 [2.60]	1.29 [2.84]	2.04 [4.50]	2.04 [4.50]	
Cooling Method			Convective		Fan				
IP Rating			IP20						
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>									

# DURAPULSE GS20X AC Drives – Selection Specifications

## GS20X Drive Model Selection Tables

GS20X 230V <sup>1</sup> 1-Phase Specifications – Frame Sizes A, B							
Model Name		GS21X-20P5	GS21X-21P0	GS21X-22P0	GS21X-23P0		
Price		\$242.00	\$270.00	\$326.00	\$405.00		
Frame Size		A	A	A	B		
Drawing		<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output	hp	1/2	1	2	3	
		kW	0.4	0.75	1.5	2.2	
	CT	Rated Output Capacity	kVA	1.1	1.7	2.9	4.2
		Rated Output Current	A	2.8	4.8	7.5	11
	Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	1.2	1.9	3.2	4.8
Rated Output Current		A	3.2	5	8.5	12.5	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)				
Input Rating <sup>2</sup>	CT	Rated Input Current	A	7.3	10.8	16.5	24.2
	VT	Rated Input Current	A	8.3	11.3	18.5	27.5
	Rated Voltage/Frequency		One-phase 200–240 VAC (-15% to +10%), 50/60 Hz				
	Operating Voltage Range (VAC)		170–264				
Frequency Tolerance (Hz)		47–63					
IE2 Efficiency - Relative Power Loss		3.4%	2.9%	2.6%	2.4%		
Weight (kg [lb])		2.25 [4.96]	2.6 [5.73]	3.1 [6.83]	3.5 [7.72]		
Cooling Method		Convective			Fan		
IP Rating		IP66 / NEMA 4X					
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>							

# DURAPULSE GS20X AC Drives – Selection Specifications

## GS20X Drive Model Selection Tables, continued

GS20X 230V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B, C									
Model Name		GS23X-20P5	GS23X-21P0	GS23X-22P0	GS23X-23P0	GS23X-25P0	GS23X-27P5		
Price		\$259.00	\$274.00	\$342.00	\$398.00	\$440.00	\$670.00		
Frame Size		A	A	A	B	B	C		
Drawing		<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output (3-phase [1-phase]) <sup>4</sup>	hp	0.5 [0.25]	1 [0.5]	2 [1]	3 [1.5]	5 [2.5]	7.5 [3.5]	
		kW	0.4 [0.2]	0.75 [0.375]	1.5 [0.75]	2.2 [1.1]	3.7 [1.85]	5.5 [2.75]	
	CT	Rated Output Capacity 3-phase [1-phase]	kVA	1.1 [0.55]	1.8 [0.9]	2.9 [1.5]	4.2 [2.1]	6.5 [3.25]	9.5 [4.75]
		Rated Output Current 3-phase [1-phase]	A	2.8 [1.4]	4.8 [2.4]	7.5 [3.75]	11 [5.5]	17 [8.5]	25 [12.5]
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)					
	VT	Rated Output Capacity	kVA	1.2	1.9	3.	4.8	7.4	10.3
		Rated Output Current	A	3.2	5	8	12.5	19.5	27
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)					
Input Rating <sup>2</sup>	CT	Rated Input Current	A	3.4	5.8	9	13.2	20.4	30
	VT	Rated Input Current	A	3.8	6	9.6	15	23.4	32.4
	Rated Voltage/Frequency		3-phase or 1-phase 200–240 VAC (-15% to +10%), 50/60 Hz						
	Operating Voltage Range (VAC)		170–264						
	Frequency Tolerance (Hz)		47–63						
IE2 Efficiency - Relative Power Loss		3.4%	2.9%	2.5%	2.5%	2.2%	2.3%		
Weight (kg [lb])		2.3 [5.07]	2.45 [5.40]	2.75 [6.06]	3.4 [7.50]	3.5 [7.72]	4.25 [9.37]		
Cooling Method		Convective			Fan				
IP Rating		IP66 / NEMA 4X							
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p> <p>4 - Three phase models can be powered with 1-phase or 3-phase input power. If using 1-phase input power, GS21 models up to 3HP provide higher output power than equivalent GS23 models with 1-phase.</p>									

# DURAPULSE GS20(X) AC Drives – Selection Specifications

## GS20X Drive Model Selection Tables, continued

GS20X 460V <sup>1</sup> 3-Phase Specifications – Frame Sizes A, B, C										
Model Name		GS23X-40P5	GS23X-41P0	GS23X-42P0	GS23X-43P0	GS23X-45P0	GS23X-47P5	GS23X-4010		
Price		\$309.00	\$318.00	\$366.00	\$407.00	\$495.00	\$680.00	\$768.00		
Frame Size		A	A	A	A	B	C	C		
Drawing		<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output	hp	1/2	1	2	3	5	7 1/2	10	
		kW	0.4	0.75	1.5	2.2	3.7	5.5	7.5	
	CT	Rated Output Capacity	kVA	1.1	2.1	3.2	4.2	6.9	9.9	13
		Rated Output Current	A	1.5	2.7	4.2	5.5	9	13	17
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)						
	VT	Rated Output Capacity	kVA	1.4	2.3	3.5	5	8	12	15.6
Rated Output Current		A	1.8	3	5.6	6.5	10.5	15.7	20.5	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)							
Input Rating <sup>2</sup>	CT	Rated Input Current	A	2.1	3.7	5.8	6.2	9.9	14.3	18.7
	VT	Rated Input Current	A	2.5	4.2	6.4	7.2	11.6	17.3	22.6
	Rated Voltage/Frequency		Three-phase 380–480 VAC (-15% to +10%), 50/60 Hz							
	Operating Voltage Range (VAC)		323–528							
	Frequency Tolerance (Hz)		47–63							
IE2 Efficiency - Relative Power Loss		4.0%	2.6%	2.3%	2.3%	2.0%	2.0%	1.9%		
Weight (kg [lb])		2.35 [5.18]	2.6 [5.73]	2.8 [6.17]	3.6 [7.94]	3.45 [7.61]	4.25 [9.37]	4.25 [9.37]		
Cooling Method		Convective				Fan				
IP Rating		IP66 / NEMA 4X								
<p>1 - For Use With Three-Phase Motors Only.</p> <p>2 - If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS20(X) AC Drives User Manual, Chapter 2. Please refer to "GS20(X) DURApulse Accessories – Fusing" (pg.tGSX-55) for input fusing information.</p> <p>3 - The carrier frequency is a factory default. Decrease the current value if you need to increase the carrier frequency. Refer to "Derate Output Current Based on Carrier Frequency".</p>										

# DURAPULSE GS20(X) AC Drives – General Specifications

## GS20(X) Drive Model Selection Tables, continued

GS20(X) General Specifications (Applicable to All Models)			
<b>Control Characteristics</b>	<b>Control Method</b>	V/F, Sensorless Vector (SVC), Field Oriented Control (FOC) Sensorless, Volt/Frequency with Pulse Generator input (VFPG), Torque (TQC Sensorless)	
	<b>Applicable Motor</b>	3-phase AC Induction Motor, 3-phase Permanent Magnet AC motor	
	<b>Starting Torque<sup>1</sup></b>	150% / 3Hz 100% / (motor rated frequency/20) 200% / 0.5 Hz	(V/F, SVC control for IM, CT, rated) (SVC control for PM, CT, rated) (FOC control for IM, CT, rated)
	<b>Torque Accuracy</b>	± 15% TQC Sensorless	
	<b>Torque Limits</b>	<b>120/230/460V</b>	VT: 160% of output current, max CT: 180% of output current, max
		<b>575V</b>	200% of output current, max
	<b>Speed Control Range<sup>1</sup></b>	1: 50 (V/F, SVC control for IM, CT, rated) 1: 20 (SVC control for PM, CT, rated) 1: 100 (FOC control for IM, CT, rated)	
	<b>Max. Output Frequency</b>	0.00–599.00 Hz	
	<b>Overload Capacity</b>	VT: rated output current of 120% 60 sec, 150% 3 sec. CT: rated output current of 150% 60 sec, 200% 3 sec.	
	<b>Frequency Setting Signal</b>	0–10 V / -10–10 V 4–20 mA / 0–10 V 1 channel pulse input (33kHz), 1 channel pulse output (33kHz)	
	<b>Digital Inputs</b>	Seven (7) - 24VDC NPN or PNP, includes 1 pulse train frequency input 33kHz	
	<b>Digital Outputs</b>	Three (3) - (2)-48VDC, (1) Relay-250VAC/30VDC	
	<b>Analog Inputs</b>	Two (2) - (1) voltage, (1) selectable Voltage or Current	
	<b>Analog Outputs</b>	One (1) - selectable voltage or current	
	<b>Frequency Output</b>	One (1) - 30VDC, 33kHz	
<b>Safe Torque Off</b>	STO1 and STO2 inputs- 24VDC		
	<b>Main Functions</b>	Multiple motor switching (a maximum of four independent motor parameter settings), Fast start-up, Deceleration Energy Back (DEB) function, Wobble frequency function, Fast deceleration function, Master and Auxiliary frequency source selectable, Restart after momentary power loss, Speed tracking, Over-torque detection, 16-step speed (including the master speed), Accel./decel. time switch, S-curve accel./decel., three-wire operation control, JOG frequency, Frequency upper/lower limit settings, DC brake at start-up and stop, PID control, Built-in PLC (2000 steps), and Simple positioning function.	
	<b>Application Macro</b>	Built-in application parameter groups (selected by industry) and user-defined application parameter groups.	
<b>Protection Characteristics</b>	<b>Motor Protection</b>	Over-current, over-voltage, over-heating, phase loss.	
	<b>Stall Prevention</b>	Stall prevention during acceleration, deceleration, and running (independent settings).	
<b>Accessory</b>	<b>Communication Card</b>	GS20A-CM-ENETIP (EtherNet/IP and Modbus TCP)	
	<b>External DC Power Supply</b>	GS20A-BPS (24V power backup supply card)	
<b>Agency Approvals</b>	UL, CE <sup>2</sup> , TUV (SIL 2), RoHS, REACH		
1: Control accuracy may vary depending on the environment, application conditions, or different motors. For more information, contact AutomationDirect.			
2: See CE declaration here: <a href="https://support.automationdirect.com/docs/GS20A-GS20AX-CE.pdf">https://support.automationdirect.com/docs/GS20A-GS20AX-CE.pdf</a>			

# DURAPULSE GS20(X) AC Drives – Environmental Specifications

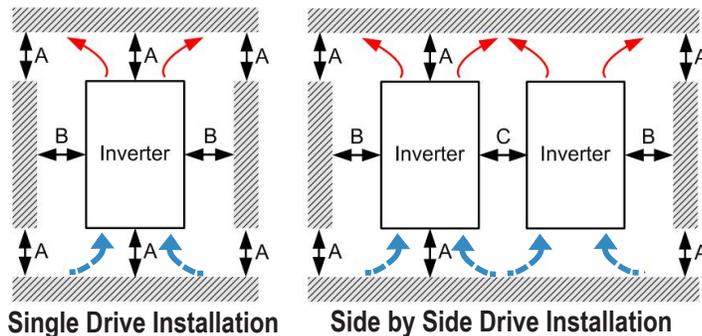
## GS20(X) Environmental Specifications

Environmental Conditions for GS20 AC Drives			
Condition	Operation	Storage	Transportation
Installation Location	IEC 60364-1/ IEC 60664-1 Pollution degree 2, Indoor use only.	n/a	n/a
Ambient Temperature	IP20/UL Open Type: -20–50°C (-20–60°C w/derating)	-40–85°C	-20–70°C
	Non-condensing, non-freezing		
Relative Humidity	90%, no water condensation	95%, no water condensation	
Air Pressure	86–106 kPa	70–106 kPa	
Pollution Level	IEC 60721-3, concentrate prohibited		
	Class 3C2; Class 3S2	Class 2C2; Class 2S2	Class 1C2; Class 1S2
Environmental Air	No corrosive/inflammable gases permitted		
Altitude	<1000 m (For altitudes > 1000 m, derate to use it.)		
Package Drop	n/a	ISTA procedure 1A (according to weight) IEC 60068-2-31	
Vibration	1.0 mm, peak to peak value range from 2–13.2 Hz; 0.7–2.0 G range from 13.2–55 Hz; 2.0 G range from 55–512 Hz. Compliance with IEC 60068-2-6	2.5 G peak, 5 Hz–2 kHz 0.015" maximum displacement	
Impact	15G, 11ms Compliance with IEC/EN60068-2-27	30G	
<b>DO NOT expose the GS20 AC Drive to harsh environments such as dust, direct sunlight, corrosive/flammable gases, humidity, liquid, or vibrations. The salts in the air must be less than 0.01 mg/cm<sup>2</sup> every year.</b>			

Environmental Conditions for GS20X AC Drives			
Condition	Operation	Storage	Transportation
Installation Location	PCB design is compliant with IEC 60364-1 / IEC 60664-1 Pollution Degree 2. The outer case meets IP66 standard for indoor use. If the drive is for outdoor application, avoid direct sunlight.	n/a	n/a
Ambient Temperature	IP66 / NEMA 4X / UL Type 4X: -20–40°C (-20–50°C w/derating)	-40–85°C	-20–70°C
	Non-condensing, non-freezing		
Relative Humidity	0-100%, no water condensation	95%, no water condensation	
Air Pressure	86–106 kPa	70–106 kPa	
Pollution Level	IEC 60721-3, concentrate prohibited		
	Class 3C2; Class 3S2	Class 2C2; Class 2S2	Class 1C2; Class 1S2
Altitude	<1000m (For altitudes > 1000m, derate to use it.)		
Package Drop	n/a	ISTA procedure 1A (according to weight) IEC 60068-2-31	
Vibration	1.0 mm, peak to peak value range from 2–13.2 Hz; 0.7–2.0 G range from 13.2–55 Hz; 2.0 G range from 55–512 Hz; complies with IEC 60068-2-6.	2.5 G peak, 5 Hz–2 kHz 0.015" maximum displacement	
Impact	15G, 11ms Compliance with IEC/EN60068-2-27	30G	
<b>DO NOT expose the GS20X AC Drive to harsh environments such as direct contact with chemical substance and solvent, and exposure to direct sunlight.</b>			

# DURAPULSE GS20(X) AC Drives Specifications – Air Flow and Power (Heat) Dissipation

## Minimum Clearances and Air Flow for GS20 Series Drives



GS20 Minimum Mounting Clearances*					
Installation Method	A (mm)	B (mm)	C (mm)	Operation Temperature (°C)	
				Max (w/out derating)	Max (Derating)
Single drive installation	50	30	–	50	60
Side-by-side horizontal installation	50	30	30	50	60
Zero stack installation	50	30	0	40	50

\* Failure to follow the minimum mounting clearances may cause the fan to malfunction and cause a heat dissipation problem.

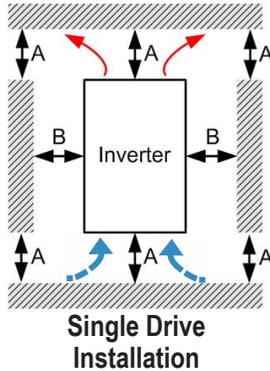
## GS20 Airflow and Power Dissipation

Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m³/hr)	Loss External (Heat sink)	Internal	Total
GS21-10P2	A	0.0	0.0	8.0	10.0	18.0
GS21-10P5				14.2	13.1	27.3
GS21-11P0	C	16.0	27.2	29.1	23.9	53.0
GS21-20P2	A	0.0	0.0	8.0	10.3	18.3
GS21-20P5				16.3	14.5	30.8
GS21-21P0	B	16.0	27.2	29.1	20.1	49.2
GS21-22P0	C			29.1	23.9	53.0
GS21-23P0	E	53.7	91.2	70.0	35	105
GS23-2010				244.5	79.6	324.1
GS23-2015	F	67.9	115.2	374.2	86.2	460.4
GS23-2020				492.0	198.2	690.2
GS23-20P2	A	0.0	0.0	8.6	10.0	18.6
GS23-20P5				16.5	12.6	29.1
GS23-21P0	B	10.0	16.99	31.0	13.2	44.2
GS23-22P0				50.1	24.2	74.3
GS23-23P0	C	16.0	27.2	76.0	30.7	106.7
GS23-25P0				108.2	40.1	148.3
GS23-27P5	D	23.4	39.7	192.8	53.3	246.1
GS23-4010				164.7	55.8	220.5
GS23-4015	E	53.7	91.2	234.5	69.8	304.3
GS23-4020				319.8	74.3	394.1
GS23-4025	F	67.9	115.2	423.5	181.6	605.1
GS23-4030				501.1	200.3	701.4
GS23-40P5	A	10.0	16.99	17.6	11.1	28.7
GS23-41P0				30.5	17.8	48.3
GS23-42P0	B	16.0	27.2	45.9	21.7	67.6
GS23-43P0	60.6			22.8	83.4	
GS23-45P0	C	23.4	39.7	93.1	42	135.1
GS23-47P5				132.8	39.5	172.3
GS23-5010	D	0.0	0.0	108.4	51	159.4
GS23-51P0				23.5	12.5	36
GS23-52P0	B	10.0	16.99	38.1	19	57.1
GS23-53P0	C	16.0	27.2	56.6	22.2	68.8
GS23-55P0				76.1	30	106.1
GS23-57P5	D	23.4	39.7	93.9	37	130.9

- Published flow rates are the result of active cooling using factory installed fans.
- Flow rates of (0.0) are the result of passive cooling in drives without fans.
- The required airflow shown in the chart is for installing a single GS20 drive in a confined space.
- When installing multiple GS20 drives, the required air volume would be the required air volume for a single GS20 drive multiplied by the number of GS20 drives.
- When calculating power dissipation (Watt Loss), use the Total value. Heat dissipation shown in the chart is for installing a single GS20 drive in a confined space.
- When installing multiple drives, the volume of heat/power dissipation should be the heat/power dissipated by a single GS20 drive multiplied by the number of GS20 drives.
- Heat dissipation for each model is calculated by rated voltage, current and default carrier frequency.

# DURAPULSE GS20(X) AC Drives Specifications – Air Flow and Power (Heat) Dissipation

## Minimum Clearances and Air Flow for GS20X Series Drives



GS20X Minimum Mounting Clearances*				
Installation Method	A (mm)	B (mm)	Operation Temperature	
			Max (w/out derating)	Max (Derating)
Single drive installation	50	30	40	50

\* The minimum mounting clearances stated in this table apply to GS20X drives frames A to C. Failure to follow the minimum mounting clearances may cause a heat dissipation problem.

GS20X Airflow and Power Dissipation						
Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m <sup>3</sup> /hr)	Loss External (Heat sink)	Internal	Total
<a href="#">GS21X-20P5</a>	A	0.0	0.0	16.3	14.5	30.8
<a href="#">GS21X-21P0</a>				29.1	20.1	49.2
<a href="#">GS23X-20P5</a>				16.5	12.6	29.1
<a href="#">GS23X-21P0</a>				29.1	20.1	49.2
<a href="#">GS23X-40P5</a>				17.6	11.1	28.7
<a href="#">GS23X-41P0</a>				30.5	17.8	48.3
<a href="#">GS21X-22P0</a>				46.5	31	77.5
<a href="#">GS23X-22P0</a>				50.1	24.2	74.3
<a href="#">GS23X-42P0</a>				45.9	21.7	67.6
<a href="#">GS23X-43P0</a>				60.6	22.8	83.4
<a href="#">GS21X-23P0</a>	B	27.3	46.4	70.0	35.0	105.0
<a href="#">GS23X-23P0</a>				76.0	30.7	106.7
<a href="#">GS23X-25P0</a>				108.2	40.1	148.3
<a href="#">GS23X-45P0</a>				93.1	42.0	135.1
<a href="#">GS23X-27P5</a>	C	33.5	56.6	192.8	53.3	246.1
<a href="#">GS23X-47P5</a>				132.8	39.5	172.3
<a href="#">GS23X-4010</a>				164.7	53.3	246.1

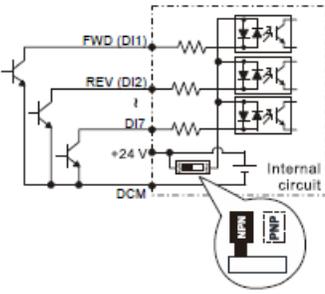
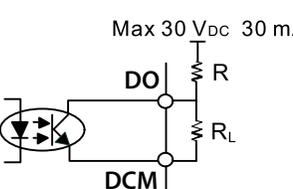
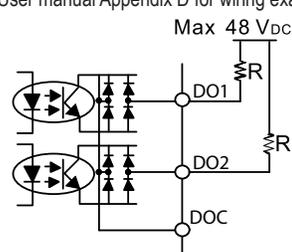
- Published flow rates are the result of active cooling using fans, factory installed in the drive.
- Unpublished flow rates (-) are the result of passive cooling in drives without factory installed fans.
- The required airflow shown in the chart is for installing a single GS20X drive in a confined space.

- When calculating power dissipation (Watt Loss), use the Total value. Heat dissipation shown in the chart is for installing a single GS20X drive in a confined space.
- Heat dissipation for each model is calculated by rated voltage, current and default carrier frequency.

# DURAPULSE GS20(X) AC Drives Specifications

## - Terminals

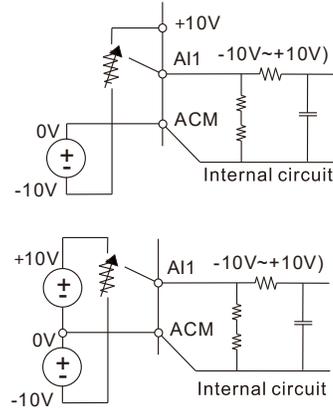
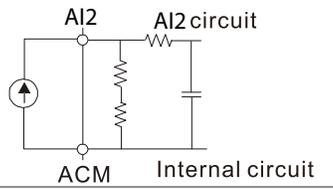
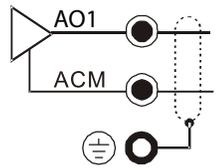
### Control Circuit Terminal Names and Definitions

Control Circuit Terminals		
Terminal Symbol	Terminal Function	Description
<b>+24V</b>	Digital control signal common (Source)	+24V ± 10% 100mA
<b>FWD (DI1) REV (DI2) DI3 - DI7</b>	Digital input 1-7 ① Sink Mode with internal power (+24 V <sub>DC</sub> ) 	<b>Source Mode:</b> ON: activation current 3.3 mA ≥ 11VDC OFF: cut-off voltage ≤ 5VDC <b>Sink Mode:</b> ON: activation current 3.3 mA ≤ 13VDC OFF: cut-off voltage ≥ 19VDC  DI7: Single pulse input, maximum input frequency=33kHz.  Digital inputs can be configured by the user for many different functions. Refer to P02.01-02.07 to program the digital inputs FWD (DI1), REV (DI2), DI3-DI7. When P02.00=0, FWD (DI1) and REV (DI2) can be programmed. • When P02.00≠0, the functions of FWD (DI1) and REV (DI2) act according to P02.00 setting. • When P02.07=0, DI7 is pulse input terminal. • DI7 uses pulse input can be used as frequency command source or connect it to the encoder for motor closed-loop control. • DI7 motor closed-loop control only supports VFGP control mode.  See pg.tGSX-42 for sinking/sourcing wiring examples.
<b>DO</b>	Digital frequency signal output 	DO uses pulse voltage as an output monitoring signal; Duty-cycle: 50% Min. load impedance RL: 1kΩ / 100pF Max. current endurance: 30 mA Max. voltage: 30VDC ± 1% (when 30VDC / 30mA / RL=100pF) Max. output frequency: 33kHz Current-limiting resistor R: ≥ 1KΩ Output load impedance RL Capacitive load ≤ 100pF
<b>DCM</b>	Digital control / Frequency signal common (Sink)	Resistive load ≥ 1kΩ, resistance determines the output voltage value. DO-DCM voltage = external voltage * ( RL / (RL+R) )
<b>DO1</b>	Digital Output 1 (photo coupler)	The AC motor drive outputs various monitoring signals, such as drive in operation, frequency reached, and overload indication through a transistor (open collector). Outputs can be wired as sinking or sourcing. See User manual Appendix D for wiring examples.
<b>DO2</b>	Digital Output 2 (photo coupler)	
<b>DOC</b>	Digital Output Common (photo coupler)	
<b>R10</b>	Relay Output 1 (N.O.)	<b>Resistive Load</b> • 3A (N.O.) / 3A (N.C.) 250VAC • 5A (N.O.) / 3A (N.C.) 30VDC <b>Inductive Load (COS 0.4)</b> • 1.2 A (N.O.) / 1.2 A (N.C.) 250VAC • 2.0 A (N.O.) / 1.2 A (N.C.) 30VDC To output different kinds of monitoring signals such as motor drive in operation, frequency reached, and overload indication.
<b>R1C</b>	Relay Output 1 (N.C.)	
<b>R1</b>	Relay Output 1 Common	
<b>+10V</b>	Potentiometer power supply	Power supply for analog frequency setting: +10.5 ± 0.5 VDC / 20mA

# DURAPULSE GS20(X) AC Drives Specifications

## - Terminals

### Control Circuit Terminal Names and Definitions

Control Circuit Terminals (continued)		
Terminal Symbol	Terminal Function	Description
<b>AI1</b>	Analog voltage frequency command 	Impedance: 20kΩ Range: 0-10 V / -10-10 V = 0-Maximum Operation Frequency (P01.00) Mode switching by setting P03.00, P03.28 AI1 resolution=10 bits
<b>AI2</b>	Analog current frequency command 	Impedance: Current mode=250 Ω, Voltage mode=20kΩ Range: 0-20 mA / 4-20 mA / 0-10 V = 0-Maximum Operation Frequency (P01.00) Mode switching by setting P03.01, P03.29 Switch: The AI2 default is 0-20 mA / 4-20 mA (current mode) AI2 resolution = 12 bits
<b>AO1</b>	Multi-function analog voltage output 	Switch: The AO1 default is 0-10 V (voltage mode). To switch to the current mode, two steps are required: 1. A dip switch must be configured (follow the instructions on the inner side of the front cover). 2. Change P03.31 to 1 or 2 (see Chapter 4 of the GS20(X) User Manual). <b>Voltage mode</b> Range: 0-10 V (P03.31=0) corresponds to the maximum operating range of the control target Max. output current: 2mA Max. Load: 5kΩ <b>Current mode</b> Range: 0-20 mA (P03.31=1) / 4-20 mA (P03.31=2) corresponds to the maximum operating range of the control target, maximum load 500Ω AO1 resolution=10 bits
<b>ACM</b>	Analog Signal Common	Analog signal common terminal
<b>+24V (red)</b>	STO 24V power terminal	
<b>STO1, STO2 (red)</b>	Default: STO1 / STO2 short-circuited to +24V Rated voltage: 24VDC ± 10 %; maximum voltage: 30VDC ± 10 % Rated current: 6.67 mA ± 10 % <b>STO activation mode</b> Input voltage level: 0VDC < STO1-SCM or STO2-SCM < 5VDC STO response time ≤ 20ms (STO1 / STO2 operates until the AC motor drive stops outputting current) <b>STO cut-off mode</b> Input voltage level: 11VDC < STO1-SCM and STO2-SCM < 30VDC Power removal safety function per EN 954-1 and IEC / EN 61508 <b>Note:</b> Refer to Chapter 17 SAFE TORQUE OFF FUNCTION for details.	
<b>SCM (red)</b>	STO Common - Signal Terminal	
<b>SG+</b>	Modbus RS-485	
<b>SG-</b>	<b>Note:</b> Refer to GS20(X) User Manual Chapter 4 Descriptions of Parameter Settings, Parameter Group 09: Communication Parameters for details.	
<b>SGND</b>		
<b>RJ45</b>	PIN 1, 2, 6: Reserved PIN 3, 7: SGND PIN 4: SG- PIN 5: SG+ PIN 8: +10V supply GS4-KPD (provides optional power supply)	The RJ45 port provides a serial communications connection. Max Baud Rate = 115.2 kbps

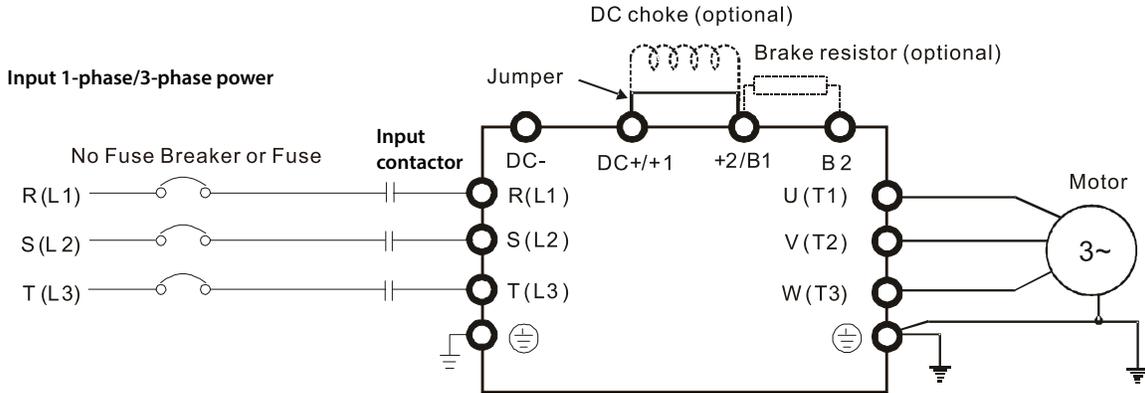
# DURAPULSE GS20(X) AC Drives – Basic Wiring Diagram

## Main Circuit Wiring Diagram: GS20(X) All Models

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to GS20(X) User Manual for additional specific wiring information.)

Note: DC reactors (chokes) are specified but not stocked by AutomationDirect.

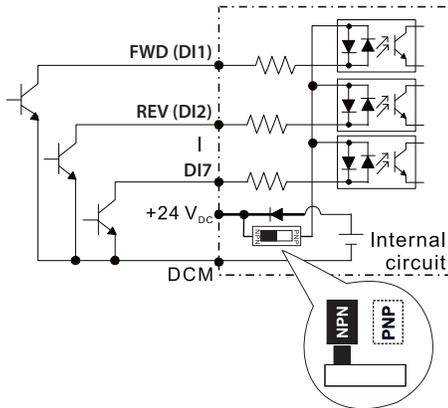
Note: DC- and DC+/+1 terminals are not available on 120V series drives.



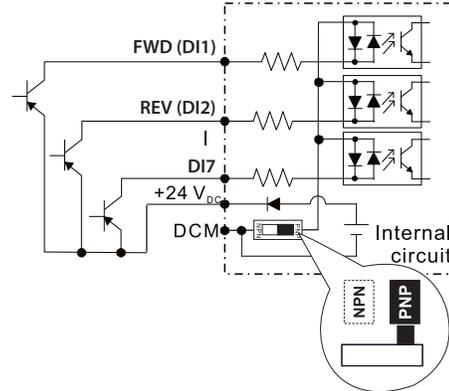
## Control Circuit Wiring Diagram: Digital Inputs - Internal Power

Note: Users **MUST** connect wiring according to the the circuit diagram shown below. (Refer to GS20(X) User Manual for additional specific wiring information.)

① Sink Mode with internal power (+24 V<sub>DC</sub>)



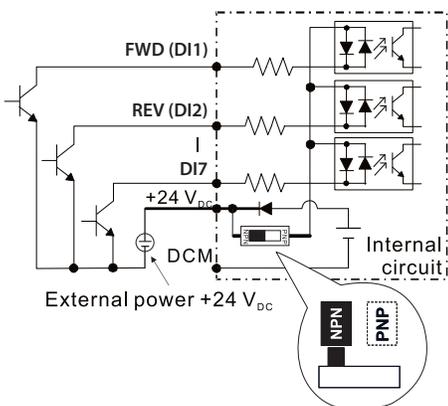
② Source Mode with internal power (+24 V<sub>DC</sub>)



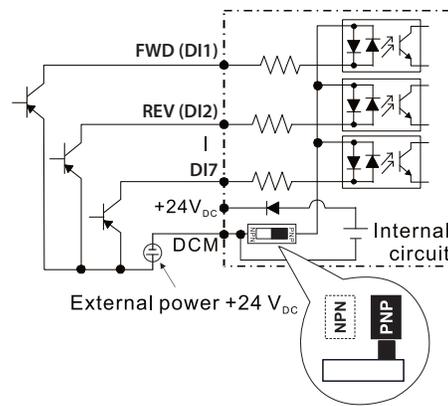
## Control Circuit Wiring Diagram: Digital Inputs - External Power

Note: Users **MUST** connect wiring according to the the circuit diagram shown below. (Refer to GS20(X) User Manual for additional specific wiring information.)

③ Sink Mode with external power



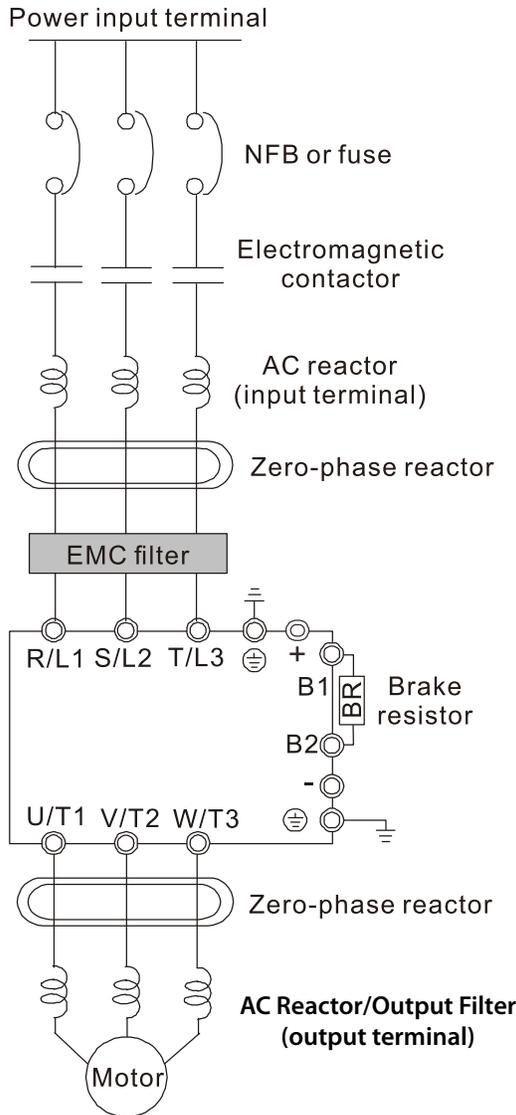
④ Source Mode with external power



# DURAPULSE GS20(X) AC Drives – Basic Wiring Diagram

## System Wiring Diagram:

Note: Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user GS20(X) User Manual for additional specific wiring information.)

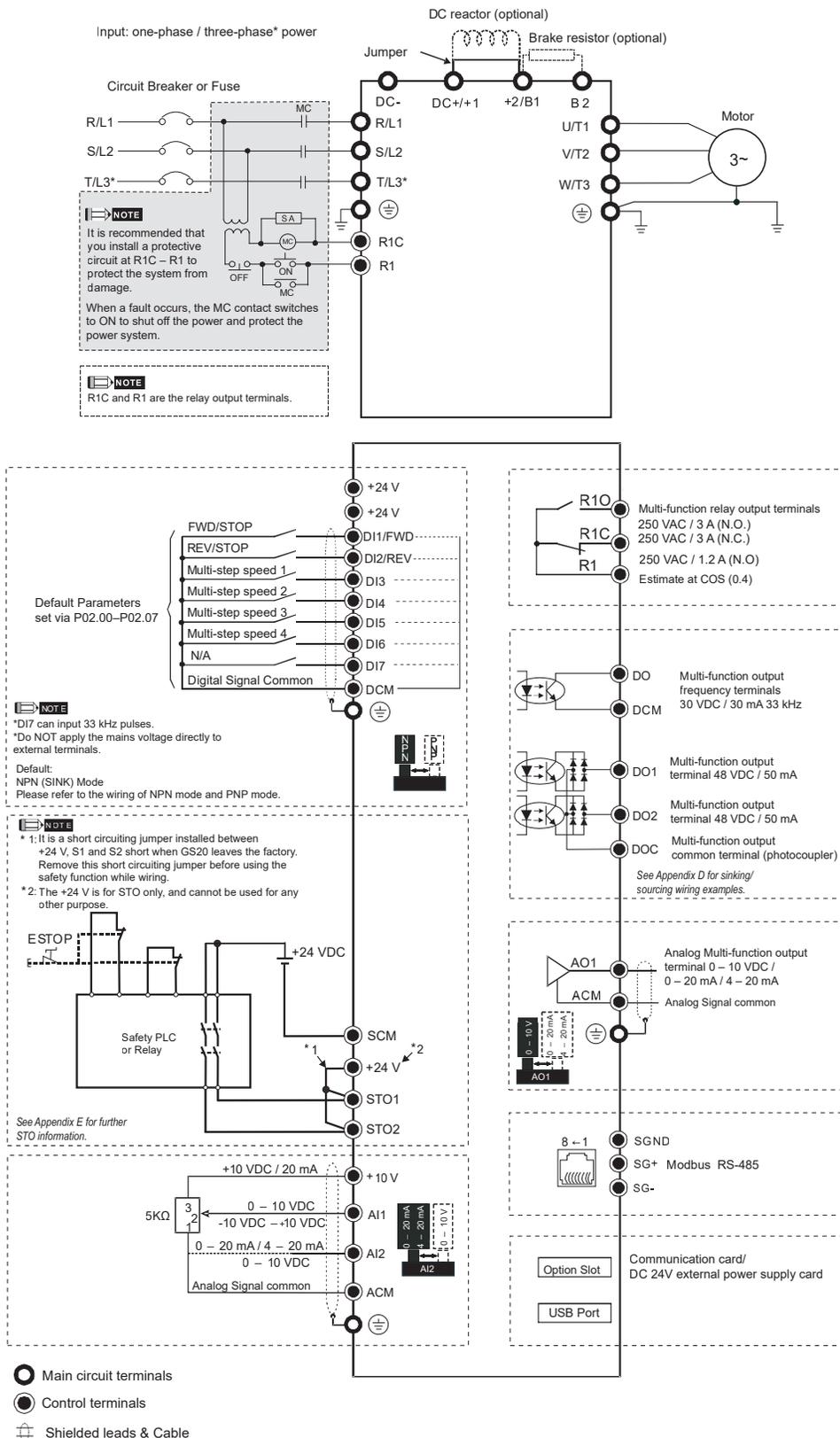


System Wiring Components	
Component	Function
Power input terminal	Supply power according to the rated power specifications indicated in the manual
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB or Fuse.
Electromagnetic contactor	Switching the power ON/OFF on the primary side of the electromagnetic contactor can turn the drive ON/OFF, but frequent switching can cause drive failure. Do not switch ON/OFF more than once an hour. Do not use the electromagnetic contactor as the power switch for the drive; doing so shortens the life of the drive.
AC reactor (input terminal)	When the main power supply capacity is greater than 500kVA, or when it switches into the phase capacitor, the instantaneous peak voltage and current generated may destroy the internal circuit of the drive. It is recommended that you install an input side AC reactor in the drive. This also improves the power factor and reduces power harmonics. The wiring distance should be within 10 m.
Zero phase reactor	Used to reduce radiated interference, especially in environments with audio devices, and reduce input and output side interference. The effective range is AM band to 10MHz.
EMC filter	Can be used to reduce electromagnetic interference.
Brake module and Brake resistor (BR)	Used to shorten the deceleration time of the motor.
AC Reactor/Output Filter (output terminal)	The motor cable length affects the size of the reflected wave on the motor end. For motor distances greater than 100feet, the VTF series dV/dT filter is recommended.

# DURAPULSE GS20(X) AC Drives – Basic Wiring Diagram

## Control Wiring Diagram: Full I/O

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS20-UMW for additional specific wiring information.)



# DURAPULSE GS20(X) AC Drives – Optional Accessories

## Accessories Available for GS20(X) AC Drives

The table below lists types of accessories available for your GS20 or GS20X series drive. To see if your specific model can use a particular accessory, please click the reference link to go to the accessory page.

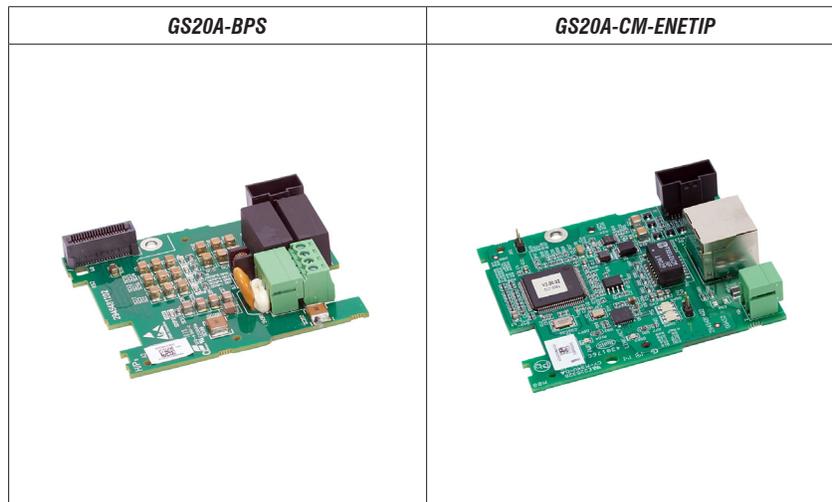
<b>GS20(X) AC Drives Available Software and Accessories</b>			
<b>Accessory</b>	<b>GS20 Series Drives</b>	<b>GS20X Series Drives</b>	<b>Reference</b>
<b>GSoft 2 Drive Software</b>	✓	✓	<a href="#">GSOFT2</a>
<b>GSLogic PLC Software</b>	✓	✓	<a href="#">GSLOGIC</a>
<b>Backup Power Supply</b>	✓	✓	<a href="#">GS20A-BPS</a>
<b>Braking Resistors</b>	✓	✓	<a href="#">Braking Resistors</a>
<b>Capacitive Filter</b>	✓	✓	<a href="#">GS20A-CAPF</a>
<b>Communication Module</b>	✓	✓	<a href="#">GS20A-CM-ENETIP</a>
<b>Conduit Boxes</b>	✓		<a href="#">GS20A-N1xx</a>
<b>DIN Rail Mounting (A–C frame only)</b>	✓		<a href="#">GS20A-DR-xx</a>
<b>Disconnect Switch</b>		✓	<a href="#">GS20XA-DSx</a>
<b>Earthing Plates</b>		✓	<a href="#">GS20XA-EPx</a>
<b>EMC Filter</b>	✓	✓	<a href="#">EMC Filters</a>
<b>EMC Shield Plates</b>	✓		<a href="#">GS20A-ESP-x</a>
<b>EMI Filters</b>	✓	✓	<a href="#">EMI Filters</a>
<b>Fuses/Circuit Breakers</b>	✓	✓	<a href="#">Fuses</a>
<b>Keypad Extension Cables</b>	✓		<a href="#">GS-CBL2-xL</a>
<b>Line/Load Reactor/Voltage Time Filter</b>	✓	✓	<a href="#">Line Reactor/VTF</a>
<b>Mounting Adapter Plate (A–C frame only)</b>	✓		<a href="#">GS20A-MP-xx</a>
<b>Optional Advanced Keypad</b>	✓	✓	<a href="#">GS4-KPD</a>
<b>Replacement Fan Kit</b>	✓	✓	<a href="#">GS20A-FAN-x</a>
<b>Replacement Keypad</b>	✓		<a href="#">GS20A-KPD</a>

# GS20(X) Optional Accessories – Expansion Cards

## Optional Modules

The GS20A-BPS is a backup power supply option card that can be used to maintain functionality to your GS20 or GS20X drive when external power is unavailable. The GS20A-CM-ENETIP is a communication module that can be used to enable Modbus TCP and EtherNet/IP communication. Note that only one option module can be installed at a time. Please see the GS20(X) User Manual for additional information and installation instructions.

GS20(X) DURAPULSE Drives I/O and Communication Cards					
Part Number	Price	Description	Features/Specifications	Placement*	GS Drive
<b><u>GS20A-BPS</u></b>	\$137.00	DURAPULSE GS20(X) series Backup Power Supply Module	Provides external power supply and supports 24VDC input. Supports parameter read/write and drive status monitoring. When providing backup power, the following functions work normally: Parameter reading and writing Keypad display Keys on the keyboard panel (except the RUN key) Analog input with +10V terminal supply power Multi-function inputs with +24V terminal or external power supply Relay output Pulse sequence frequency command	Slot 1	GS20(X) – all
<b><u>GS20A-CM-ENETIP</u></b>	\$78.00	DURAPULSE GS20(X) series communication module, EtherNet/IP and Modbus TCP	<b>Features:</b> Supports Modbus TCP and EtherNet/IP protocol. User-defined corresponding parameters. MDI/MDI-X auto-detect E-mail alarm IP filter simple firewall function. <b>Specifications:</b> RJ45 with Auto MDI/MDIX interface 1 port IEEE 802.3, IEEE 802.3u transmission method Cat 5e shielding 100MHz transmission cable 10/100 Mbps Auto-detect transmission speed Network protocol: ICMP, IP, TCP, UDP, DHCP, HTTP, SMTP, Modbus over TCP/IP, EtherNet/IP Requires 15VDC provided by AC drive 500VDC insulation voltate 0.8 W power consumption 25g weight	Slot 1	GS20(X) – all



# GS10/GS20 Series Optional Accessories - Braking

## Braking Resistors Available for GS10/GS20(X) AC Drives

Use the table below to find the appropriate braking resistor model for your GS10 or GS20 series AC drive. For more information and installation instructions, please see the GSx series User Manual. All listed resistors are available for purchase at [www.automationdirect.com](http://www.automationdirect.com).

GS10 and GS20(X) AC Drive Braking Component Selection											
Drive Voltage	Motor Power		Drive Model		125% Braking Torque @ 10% Duty Cycle*				Max Braking Torque		
					Braking Resistor		Brake Torque (kg•m)	Total Brake Current (A)	Min Resistor Value (Ω)	Max Total Brake Current (A)	Peak Power (kW)
	GS10	GS20(X)	Qty.	Part #							
120V	1/4	0.2	<a href="#">GS11N-10P2</a>	<a href="#">GS21-10P2</a>	1	<a href="#">GS-BR-080W750</a>	0.1	0.5	190.0	2	0.8
	1/2	0.4	<a href="#">GS11N-10P5</a>	<a href="#">GS21-10P5</a>	1	<a href="#">GS-BR-080W200</a>	0.3	1.9	95.0	4	1.5
	1	0.75	<a href="#">GS11N-11P0</a>	<a href="#">GS21-11P0</a>	1	<a href="#">GS-BR-080W200</a>	0.5	1.9	63.3	6	2.3
230V	1/4	0.2	<a href="#">GS11N-20P2</a>	<a href="#">GS21-20P2</a>	1	<a href="#">GS-BR-080W750</a>	0.1	0.5	190.0	2	0.8
	1/2	0.4	<a href="#">GS11N-20P5</a>	<a href="#">GS21-20P5</a>	1	<a href="#">GS-BR-080W200</a>	0.3	1.9	95.0	4	1.5
	1	0.75	<a href="#">GS11N-21P0</a>	<a href="#">GS21-21P0</a>	1	<a href="#">GS-BR-080W200</a>	0.5	1.9	63.3	6	2.3
	2	1.5	<a href="#">GS11N-22P0</a>	<a href="#">GS21-22P0</a>	1	<a href="#">GS-BR-200W091</a>	1	4.2	47.5	8	3.0
	3	2.2	<a href="#">GS11N-23P0</a>	<a href="#">GS21-23P0</a>	1	<a href="#">GS-BR-300W070</a>	1.5	5.4	38.0	10	3.8
	1/4	0.2	<a href="#">GS13N-20P2</a>	<a href="#">GS23-20P2</a>	1	<a href="#">GS-BR-080W750</a>	0.1	0.5	190.0	2	0.8
	1/2	0.4	<a href="#">GS13N-20P5</a>	<a href="#">GS23-20P5</a>	1	<a href="#">GS-BR-080W200</a>	0.3	1.9	95.0	4	1.5
	1	0.75	<a href="#">GS13N-21P0</a>	<a href="#">GS23-21P0</a>	1	<a href="#">GS-BR-080W200</a>	0.5	1.9	63.3	6	2.3
	2	1.5	<a href="#">GS13N-22P0</a>	<a href="#">GS23-22P0</a>	1	<a href="#">GS-BR-200W091</a>	1	4.2	47.5	8	3.0
	3	2.2	<a href="#">GS13N-23P0</a>	<a href="#">GS23-23P0</a>	1	<a href="#">GS-BR-300W070</a>	1.5	5.4	38.0	10	3.8
	5	3.7	<a href="#">GS13N-25P0</a>	<a href="#">GS23-25P0</a>	1	<a href="#">GS-BR-400W040</a>	2.5	9.5	19.0	20	7.6
	7 1/2	5.5	<a href="#">GS13N-27P5</a>	<a href="#">GS23-27P5</a>	1	<a href="#">GS-BR-1K0W020</a>	3.7	19	16.5	23	8.7
	10	7.5	-	<a href="#">GS23-2010</a>	1	<a href="#">GS-BR-1K0W020</a>	5.1	19	14.6	26	9.9
	15	11	-	<a href="#">GS23-2015</a>	1	<a href="#">GS-BR-1K5W013</a>	7.4	29	12.6	29	11.0
	20	15	-	<a href="#">GS23-2020</a>	2	<a href="#">GS-BR-1K0W4P3 (x2 series)</a>	10.2	44	8.3	46	17.5
460V	1/2	0.4	<a href="#">GS13N-40P5</a>	<a href="#">GS23-40P5</a>	1	<a href="#">GS-BR-080W750</a>	0.3	1	380.0	2	1.5
	1	0.75	<a href="#">GS13N-41P0</a>	<a href="#">GS23-41P0</a>	1	<a href="#">GS-BR-080W750</a>	0.5	1	190.0	4	3.0
	2	1.5	<a href="#">GS13N-42P0</a>	<a href="#">GS23-42P0</a>	1	<a href="#">GS-BR-200W360</a>	1	2.1	126.7	6	4.6
	3	2.2	<a href="#">GS13N-43P0</a>	<a href="#">GS23-43P0</a>	1	<a href="#">GS-BR-300W250</a>	1.5	3	108.6	7	5.3
	5	3.7	<a href="#">GS13N-45P0</a>	<a href="#">GS23-45P0</a>	1	<a href="#">GS-BR-400W150</a>	2.5	5.1	84.4	9	6.8
	7 1/2	5.5	<a href="#">GS13N-47P5</a>	<a href="#">GS23-47P5</a>	1	<a href="#">GS-BR-1K0W075</a>	3.7	10.2	50.7	15	11.4
	10	7.5	<a href="#">GS13N-4010</a>	<a href="#">GS23-4010</a>	1	<a href="#">GS-BR-1K0W075</a>	5.1	10.2	40.0	19	14.4
	15	11	-	<a href="#">GS23-4015</a>	1	<a href="#">GS-BR-1K5W043</a>	7.4	17.6	33.0	23	17.5
	20	15	-	<a href="#">GS23-4020</a>	2	<a href="#">GS-BR-1K0W016(x2 series)</a>	10.2	24	26.2	29	22.0
	25	18	-	<a href="#">GS23-4025</a>	2	<a href="#">GS-BR-1K0W016 (x2 series)</a>	12.2	24	26.2	29	22.0
30	22	-	<a href="#">GS23-4030</a>	2	<a href="#">GS-BR-1K5W013 (x2 series)</a>	14.9	29	23.0	33	25.1	
575V	1	0.75	-	<a href="#">GS23-51P0</a>	1	<a href="#">GS-BR-080W750</a>	0.5	1.2	280.0	4	4.5
	2	1.5	-	<a href="#">GS23-52P0</a>	1	<a href="#">GS-BR-200W360</a>	1	2.6	186.7	6	6.7
	3	2.2	-	<a href="#">GS23-53P0</a>	1	<a href="#">GS-BR-300W400</a>	1.5	2.3	160.0	7	7.8
	5	3.7	-	<a href="#">GS23-55P0</a>	1	<a href="#">GS-BR-500W100</a>	2.5	9.2	93.3	12	13.4
	7 1/2	5.5	-	<a href="#">GS23-57P5</a>	1	<a href="#">GS-BR-750W140</a>	3.7	6.6	80.0	14	15.7
	10	7.5	-	<a href="#">GS23-5010</a>	1	<a href="#">GS-BR-1K0W075</a>	5.1	12.3	70.0	16	17.9
GS20X - 230V	1/2	0.4	-	<a href="#">GS21X-20P5</a>	1	<a href="#">GS-BR-080W200</a>	0.3	1.9	95.0	4	1.5
	1	0.75	-	<a href="#">GS21X-21P0</a>	1	<a href="#">GS-BR-080W200</a>	0.5	1.9	63.3	6	2.3
	2	1.5	-	<a href="#">GS21X-22P0</a>	1	<a href="#">GS-BR-200W091</a>	1	4.2	47.5	8	3.0
	3	2.2	-	<a href="#">GS21X-23P0</a>	1	<a href="#">GS-BR-300W070</a>	1.5	5.4	38.0	10	3.8
	1/2	0.2	-	<a href="#">GS23X-20P5</a>	1	<a href="#">GS-BR-080W200</a>	0.1	0.5	190.0	2	0.8
	1	0.4	-	<a href="#">GS23X-21P0</a>	1	<a href="#">GS-BR-080W200</a>	0.3	1.9	95.0	4	1.5
	2	0.75	-	<a href="#">GS23X-22P0</a>	1	<a href="#">GS-BR-200W091</a>	0.5	1.9	63.3	6	2.3
	3	1.5	-	<a href="#">GS23X-23P0</a>	1	<a href="#">GS-BR-300W070</a>	1	4.2	47.5	8	3.0
5	2.2	-	<a href="#">GS23X-25P0</a>	1	<a href="#">GS-BR-400W040</a>	1.5	5.4	38.0	10	3.8	
7 1/2	3.7	-	<a href="#">GS23X-27P5</a>	1	<a href="#">GS-BR-1K0W020</a>	2.5	9.5	19.0	20	7.6	
GS20X - 460V	1/2	0.4	-	<a href="#">GS23X-40P5</a>	1	<a href="#">GS-BR-080W750</a>	0.3	1	380.0	2	1.5
	1	0.75	-	<a href="#">GS23X-41P0</a>	1	<a href="#">GS-BR-080W750</a>	0.5	1	190.0	4	3.0
	2	1.5	-	<a href="#">GS23X-42P0</a>	1	<a href="#">GS-BR-200W360</a>	1	2.1	126.7	6	4.6
	3	2.2	-	<a href="#">GS23X-43P0</a>	1	<a href="#">GS-BR-300W250</a>	1.5	3	108.6	7	5.3
	5	3.7	-	<a href="#">GS23X-45P0</a>	1	<a href="#">GS-BR-400W150</a>	2.5	5.1	84.4	9	6.8
	7 1/2	5.5	-	<a href="#">GS23X-47P5</a>	1	<a href="#">GS-BR-1K0W075</a>	3.7	10.2	50.7	15	11.4
10	7.5	-	<a href="#">GS23X-4010</a>	1	<a href="#">GS-BR-1K0W075</a>	5.1	10.2	40.0	19	14.4	

\* 10% Duty Cycle with maximum ON (braking) time for 10 seconds.

# GS10 Series Optional Accessories – Conduit Boxes

GS10 – Conduit Box Selection Table					
Drive		Conduit Box*			Description
Model	Frame	Part #	Price	Drawing	
GS11N-10P2 GS11N-20P2 GS13N-20P2 GS13N-20P5	A1, A2	<a href="#">GS10A-N1A1</a>	\$22.00	<a href="#">PDF</a>	GS10 series conduit box, NEMA1
GS11N-10P5 GS11N-20P5 GS13N-21P0 GS13N-40P5 GS13N-41P0	A3–A6	<a href="#">GS10A-N1A3</a>	\$23.50	<a href="#">PDF</a>	
GS11N-21P0 GS13N-22P0 GS13N-41P0	B	<a href="#">GS10A-N1B</a>	\$25.00	<a href="#">PDF</a>	
GS11N-11P0 GS11N-22P0 GS11N-23P0 GS13N-23P0 GS13N-25P0 GS13N-43P0 GS13N-45P0	C	<a href="#">GS10A-N1C</a>	\$27.50	<a href="#">PDF</a>	
GS13N-25P5 GS13N-47P5 GS13N-4010	D	<a href="#">GS10A-N1D</a>	\$27.00	<a href="#">PDF</a>	
* Conduit Box Kits include mounting hardware; box base, box cover, bushings, and screws. Conduit box dimensions are shown below and on the following page.					

## GS10 Conduit Boxes

Optional Conduit Box Kits can be ordered separately. These kits bolt onto the bottom of the applicable GS10 drive to provide a convenient connection point for conduit entry, allowing the GS10 to achieve a NEMA 1/UL type 1 environmental protection rating; especially useful for GS10 drives mounted outside of an electrical control panel.



Example GS10 Conduit  
Box

# GS20 Series Optional Accessories – Conduit Boxes

GS20 – Conduit Selection Table					
Drive		Conduit Box*			Description
Model	Frame	Part #	Price	Drawing	
GS21-10P2 GS21-20P2 GS23-20P2 GS23-20P5	A1, A2	<a href="#">GS20A-N1A1</a>	\$25.50	<a href="#">PDF</a>	GS20 series conduit box, NEMA1
GS21-10P5 GS21-20P5 GS23-40P5 GS23-21P0 GS23-41P0 GS23-51P0	A3-A5	<a href="#">GS20A-N1A3</a>	\$28.00	<a href="#">PDF</a>	
GS23-22P0 GS23-42P0 GS23-52P0 GS21-21P0	B1, B2	<a href="#">GS20A-N1B</a>	\$28.50	<a href="#">PDF</a>	
GS21-11P0 GS21-22P0 GS21-23P0 GS23-23P0 GS23-25P0 GS23-43P0 GS23-45P0 GS23-53P0 GS23-55P0	C1	<a href="#">GS20A-N1C</a>	\$30.00	<a href="#">PDF</a>	
GS23-27P5 GS23-47P5 GS23-4010 GS23-57P5 GS23-5010	D1	<a href="#">GS20A-N1D</a>	\$30.50	<a href="#">PDF</a>	
GS23-2010 GS23-2015 GS23-4015 GS23-4020	E1	<a href="#">GS20A-N1E</a>	\$30.50	<a href="#">PDF</a>	
GS23-2020 GS23-4025 GS23-4030	F1	<a href="#">GS20A-N1F</a>	\$33.00	<a href="#">PDF</a>	

\* Conduit Box Kits include mounting hardware; box base, box cover, bushings, and screws.  
Conduit box dimensions are shown below and on the following page.

## GS20 Conduit Boxes

Optional Conduit Box Kits can be ordered separately. These kits bolt onto the bottom of the applicable GS20 drive to provide a convenient connection point for conduit entry, allowing the GS20 to achieve a NEMA 1/UL type 1 environmental protection rating; especially useful for GS20 drives mounted outside of an electrical control panel.



Example GS20 Conduit Box

# GS10 Series Optional Accessories – EMC Filter & Zero Phase Reactor

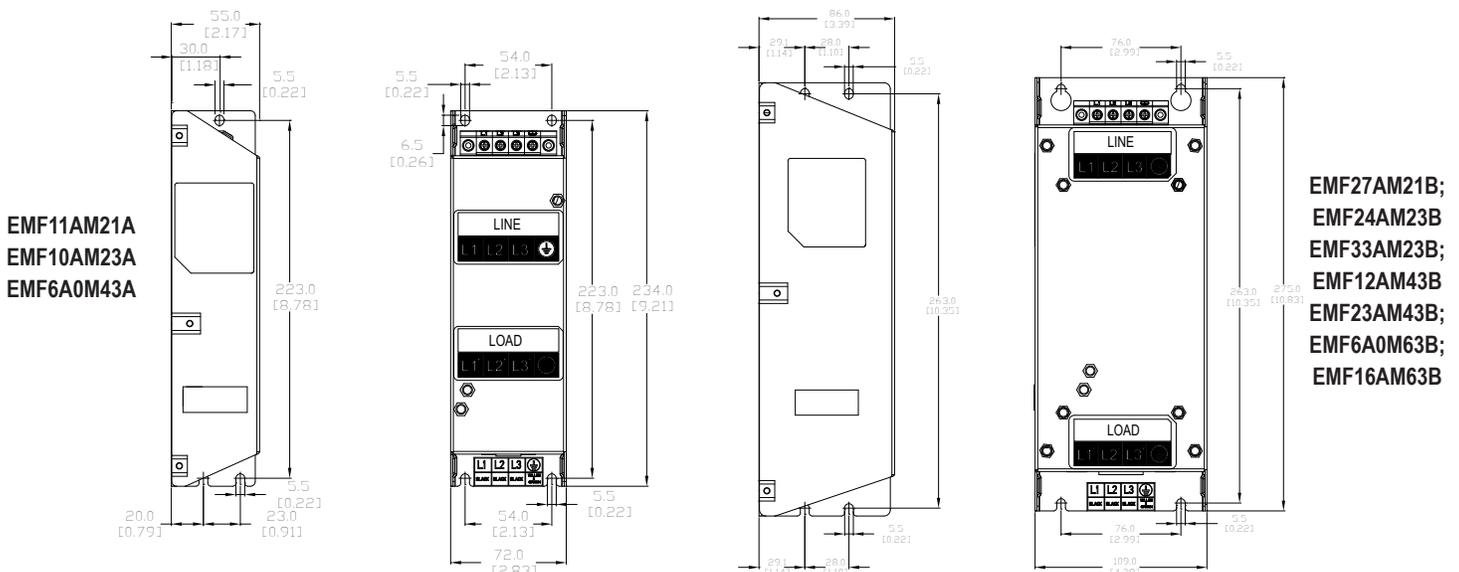
## Standard Footprint EMC Filter and Zero Phase Reactor

If electromagnetic noise is harmful to your manufacturing environment, we recommend that you select an EMC filter as shown below. For some motor drive models, you need to work with 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. The footprint filter allows mounting of the drive on top of the recommended filter, saving panel space and wiring. For more information and installation instructions, please see your GS10 series User Manual.

GS10 EMC Filter and Zero Phase Reactor													
Frame	Drive Model	Input Current (A)	Footprint Filter Model #	Price	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
1	2	3	n/a	1	2	3							
A	<a href="#">GS11N-10P2</a>	6	EMF11AM21A	\$53.00	RF008X00A				N/A				
	<a href="#">GS11N-10P5</a>	9.4									N/A		
	<a href="#">GS11N-20P2</a>	5.1					✓	✓			N/A	✓	✓
	<a href="#">GS11N-20P5</a>	7.3					✓	✓			N/A	✓	✓
	<a href="#">GS13N-20P2</a>	1.9	EMF10AM23A	\$73.00			✓	✓			✓	✓	
	<a href="#">GS13N-20P5</a>	3.4					✓	✓			N/A	✓	✓
	<a href="#">GS13N-21P0</a>	5.8					✓	✓			N/A	✓	✓
	<a href="#">GS13N-40P5</a>	2.1						✓			N/A		✓
B	<a href="#">GS13N-41P0</a>	3.7	EMF6A0M43A	\$67.00			✓	N/A*			✓		
	<a href="#">GS11N-21P0</a>	10.8	EMF11AM21A	\$53.00		✓	✓	N/A		✓	✓		
	<a href="#">GS13N-22P0</a>	9	EMF10AM23A	\$73.00		✓	✓	N/A		✓	✓		
C	<a href="#">GS13N-42P0</a>	5.8	EMF6A0M43A	\$67.00			✓	N/A			✓		
	<a href="#">GS11N-11P0</a>	18	EMF27AM21B	\$94.00									
	<a href="#">GS11N-22P0</a>	16.5					✓		N/A			✓	
	<a href="#">GS11N-23P0</a>	24.2					✓		N/A			✓	
	<a href="#">GS13N-23P0</a>	13.2	EMF24AM23B	\$115.00			✓	✓	N/A		✓	✓	
	<a href="#">GS13N-25P0</a>	20				✓	✓		N/A		✓	✓	
	<a href="#">GS13N-43P0</a>	6.1								N/A			
<a href="#">GS13N-45P0</a>	9.9	EMF12AM43B			\$118.00		✓	✓		N/A		✓	✓
D	<a href="#">GS13N-27P5</a>	30	EMF33AM23B	\$167.00		✓	✓		N/A	✓	✓		
	<a href="#">GS13N-47P5</a>	14.3	EMF23AM43B	\$161.00		✓	✓	✓	N/A	✓	✓	✓	
	<a href="#">GS13N-4010</a>	19.3				✓	✓	✓		N/A	✓	✓	✓

### EMF Series Filter Dimensions

( Units = mm [in] )



# GS20(X) Optional Accessories – EMC Filter & Zero Phase Reactor

## Standard Footprint EMC Filter and Zero Phase Reactor

If electromagnetic noise is harmful to your manufacturing environment, we recommend that you select an EMC filter as shown below. For some motor drive models, you need to work with 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. The footprint filter allows mounting of the drive on top of the recommended filter, saving panel space and wiring. For more information and installation instructions, please see the GS20(X) User Manual.

GS20(X) EMC Filter and Zero Phase Reactor													
Frame	Drive Model	Input Current (A)	Footprint Filter Model #	Price	Recommended Zero Phase Reactor	Conducted Emission			Radiated Emission				
						C1-motor cable length-30m			C2-motor cable length-100m				
						Position to Install a Zero Phase Reactor							
1			2			3							
A	<a href="#">GS21-10P2</a>	6.8	<a href="#">EMF11AM21A</a>	\$53.00	RF008X00A				N/A				
	<a href="#">GS21-20P2</a>	3.8	<a href="#">EMF11AM21A</a>	\$53.00			✓	✓	N/A		✓	✓	
	<a href="#">GS21-20P5</a>	6.7	<a href="#">EMF11AM21A</a>	\$53.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-20P2</a>	2.2	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-20P5</a>	3.8	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-21P0</a>	6	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-40P5</a>	2.5	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
	<a href="#">GS23-41P0</a>	4.2	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
	<a href="#">GS23-51P0</a>	2.4	<a href="#">EMF6A0M63B</a>	\$154.00					N/A*				
	<a href="#">GS21-10P5</a>	10.1	<a href="#">EMF11AM21A</a>	\$53.00					N/A				
GS20X A	<a href="#">GS21X-20P5</a>	8.3	<a href="#">EMF11AM21A</a>	\$53.00	RF008X00A		✓	✓	N/A		✓	✓	
	<a href="#">GS21X-21P0</a>	11.3	<a href="#">EMF11AM21A</a>	\$53.00			✓	✓	N/A		✓	✓	
	<a href="#">GS21X-22P0</a>	18.5	<a href="#">EMF27AM21B</a>	\$94.00				✓	N/A			✓	
	<a href="#">GS23X-20P5</a>	3.8	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-21P0</a>	6	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-22P0</a>	9.6	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-40P5</a>	2.5	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
	<a href="#">GS23X-41P0</a>	4.2	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
	<a href="#">GS23X-42P0</a>	6.4	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
	<a href="#">GS23X-43P0</a>	7.2	<a href="#">EMF12AM43B</a>	\$118.00					N/A				
B	<a href="#">GS21-21P0</a>	10.5	<a href="#">EMF11AM21A</a>	\$53.00	RF008X00A		✓	✓	N/A		✓	✓	
	<a href="#">GS23-22P0</a>	9.6	<a href="#">EMF10AM23A</a>	\$73.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-52P0</a>	4.2	<a href="#">EMF6A0M63B</a>	\$154.00					N/A*				
	<a href="#">GS23-42P0</a>	6.4	<a href="#">EMF6A0M43A</a>	\$67.00				✓	N/A			✓	
GS20X B	<a href="#">GS21X-23P0</a>	27.5	<a href="#">EMF27AM21B</a>	\$94.00	RF008X00A			✓	N/A			✓	
	<a href="#">GS23X-23P0</a>	15	<a href="#">EMF24AM23B</a>	\$115.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-25P0</a>	23.4	<a href="#">EMF24AM23B</a>	\$115.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-45P0</a>	11.6	<a href="#">EMF12AM43B</a>	\$118.00			✓	✓	N/A		✓	✓	
C	<a href="#">GS21-11P0</a>	20.6	<a href="#">EMF27AM21B</a>	\$94.00	RF008X00A			✓	N/A			✓	
	<a href="#">GS21-22P0</a>	17.9	<a href="#">EMF27AM21B</a>	\$94.00				✓	N/A			✓	
	<a href="#">GS21-23P0</a>	26.3	<a href="#">EMF27AM21B</a>	\$94.00				✓	N/A			✓	
	<a href="#">GS23-23P0</a>	15	<a href="#">EMF24AM23B</a>	\$115.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-25P0</a>	23.4	<a href="#">EMF24AM23B</a>	\$115.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23-43P0</a>	7.2	<a href="#">EMF12AM43B</a>	\$118.00					N/A				
	<a href="#">GS23-53P0</a>	5.8	<a href="#">EMF16AM63B</a>	\$157.00					N/A*				
	<a href="#">GS23-55P0</a>	9.3	<a href="#">EMF16AM63B</a>	\$157.00					N/A				
	<a href="#">GS23-45P0</a>	11.6	<a href="#">EMF12AM43B</a>	\$118.00			✓	✓	N/A		✓	✓	
	<a href="#">GS23X-27P5</a>	32.4	<a href="#">EMF33AM23B</a>	\$167.00			✓	✓	N/A		✓	✓	
GS20X C	<a href="#">GS23X-47P5</a>	17.3	<a href="#">EMF23AM43B</a>	\$161.00	RF008X00A	✓	✓	✓	N/A	✓	✓	✓	
	<a href="#">GS23X-4010</a>	22.6	<a href="#">EMF23AM43B</a>	\$161.00		✓	✓	✓	N/A	✓	✓	✓	

Continued on next page

# GS20(X) Optional Accessories – EMC Filter & Zero Phase Reactor

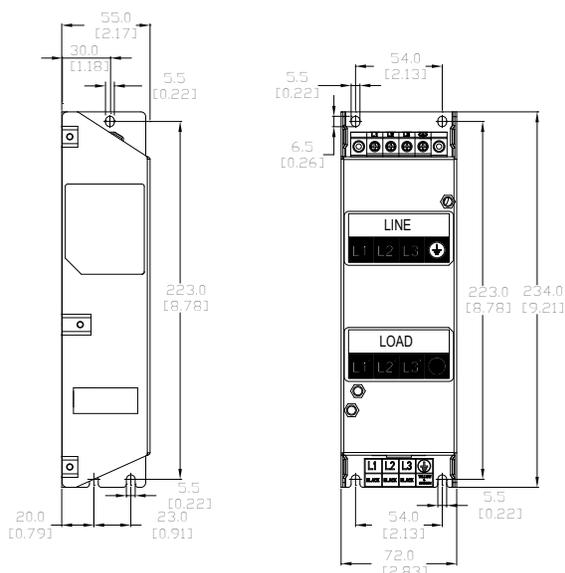
## Standard Footprint EMC Filter and Zero Phase Reactor, continued

GS20(X) EMC Filter and Zero Phase Reactor (continued)												
Frame	Drive Model	Input Current (A)	Footprint Filter Model #	Price	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	1	2	3	
D	<a href="#">GS23-27P5</a>	32.4	<a href="#">EMF33AM23B</a>	\$167.00	RF008X00A	✓	✓		N/A	✓	✓	
	<a href="#">GS23-47P5</a>	17.3	<a href="#">EMF23AM43B</a>	\$161.00		✓	✓	✓	N/A	✓	✓	
	<a href="#">GS23-57P5</a>	13.4	<a href="#">EMF16AM63B</a>	\$157.00					N/A			
	<a href="#">GS23-5010</a>	17.5	<a href="#">EMF16AM63B</a>	\$157.00					N/A			
	<a href="#">GS23-4010</a>	22.6	<a href="#">EMF23AM43B</a>	\$161.00		✓	✓	✓	N/A	✓	✓	
E	<a href="#">GS23-2010</a>	43.2	n/a	-			✓	✓	N/A		✓	✓
	<a href="#">GS23-2015</a>	61.2	n/a	-			✓	✓	N/A		✓	✓
	<a href="#">GS23-4015</a>	30.8	n/a	-					N/A			
	<a href="#">GS23-4020</a>	39.6	n/a	-			✓	✓	N/A		✓	✓
F	<a href="#">GS23-2020</a>	82.8	n/a	-			✓	✓	N/A		✓	✓
	<a href="#">GS23-4025</a>	45.7	n/a	-		✓	✓	N/A		✓	✓	
	<a href="#">GS23-4030</a>	53.9	n/a	-		✓	✓	N/A		✓	✓	

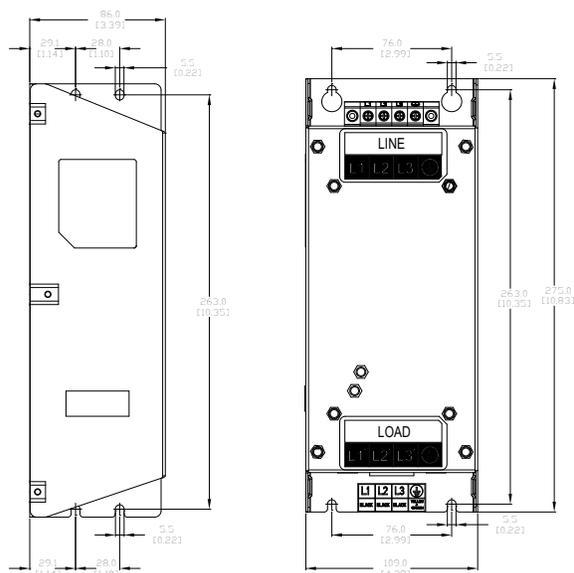
Note: It is not necessary to add a zero phase reactor for passing the C2 conducted emission test.  
 \* The maximum motor cable length of the conducted emission C2 class for GS23-51P0, GS23-52P0, and GS23-53P0 is 75 meters. All others are 100 meters.  
 \*\* See diagram below for installation positions.

### EMF Series Filter Dimensions

( Units = mm [in] )



**EMF11AM21A  
EMF10AM23A  
EMF6A0M43A**



**EMF27AM21B; EMF24AM23B  
EMF33AM23B; EMF12AM43B  
EMF23AM43B; EMF6A0M63B;  
EMF16AM63B**

# GS10/GS20 Series Optional Accessories – EMI Input Filters

## High Performance EMI Input Filters

High performance EMI filters may improve drive performance for certain applications. Use the table below to select the correct filter for your drive. For additional information and installation instructions, please see your GSx series User Manual.

Model		Description	EMI Filter*	
GS10 Drives	GS20(X) Drives		Roxburgh Filters Chassis 1ph	Roxburgh Filters C2 Rated
<a href="#">GS11N-10P2</a>	<a href="#">GS21-10P2</a>	120V 1ph 0.25 hp	<a href="#">RES90F10</a>	<a href="#">MIF10</a>
<a href="#">GS11N-10P5</a>	<a href="#">GS21-10P5</a>	120V 1ph 0.5 hp	<a href="#">RES90F16</a>	<a href="#">MIF16</a>
<a href="#">GS11N-11P0</a>	<a href="#">GS21-11P0</a>	120V 1ph 1.0 hp	<a href="#">RES90S30</a>	<a href="#">MIF23</a>
<a href="#">GS11N-20P2</a>	<a href="#">GS21-20P2</a>	230V 1ph 0.25 hp	<a href="#">RES90F06</a>	<a href="#">MIF06</a>
<a href="#">GS11N-20P5</a>	<a href="#">GS21-20P5</a>	230V 1ph 0.5 hp	<a href="#">RES90F10</a>	<a href="#">MIF10</a>
<a href="#">GS11N-21P0</a>	<a href="#">GS21-21P0</a>	230V 1ph 1.0 hp	<a href="#">RES90F16</a>	<a href="#">MIF16</a>
<a href="#">GS11N-22P0</a>	<a href="#">GS21-22P0</a>	230V 1ph 2.0 hp	<a href="#">RES90S20</a>	<a href="#">MIF23</a>
<a href="#">GS11N-23P0</a>	<a href="#">GS21-23P0</a>	230V 1ph 3.0 hp	<a href="#">RES90S30</a>	<a href="#">MIF330B</a>
<a href="#">GS13N-20P2</a>	<a href="#">GS23-20P2</a>	230V 3ph 0.25 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-20P5</a>	<a href="#">GS23-20P5</a>	230V 3ph 0.5 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-21P0</a>	<a href="#">GS23-21P0</a>	230V 3ph 1.0 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-22P0</a>	<a href="#">GS23-22P0</a>	230V 3ph 2.0 hp	-	<a href="#">KMF318A</a>
<a href="#">GS13N-23P0</a>	<a href="#">GS23-23P0</a>	230V 3ph 3.0 hp	-	<a href="#">KMF318A</a>
<a href="#">GS13N-25P0</a>	<a href="#">GS23-25P0</a>	230V 3ph 5.0 hp	-	<a href="#">KMF325A</a>
<a href="#">GS13N-27P5</a>	<a href="#">GS23-27P5</a>	230V 3ph 7.5 hp	-	<a href="#">KMF336A</a>
n/a	<a href="#">GS23-2010</a>	230V 3ph 10hp	-	<a href="#">KMF350A</a>
	<a href="#">GS23-2015</a>	230V 3ph 15hp	-	<a href="#">KMF370A</a>
	<a href="#">GS23-2020</a>	230V 3ph 20hp	-	<a href="#">KMF3100A</a>
<a href="#">GS13N-40P5</a>	<a href="#">GS23-40P5</a>	460V 3ph 0.5 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-41P0</a>	<a href="#">GS23-41P0</a>	460V 3ph 1.0 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-42P0</a>	<a href="#">GS23-42P0</a>	460V 3ph 2.0 hp	-	<a href="#">KMF306A</a>
<a href="#">GS13N-43P0</a>	<a href="#">GS23-43P0</a>	460V 3ph 3.0 hp	-	<a href="#">KMF310A</a>
<a href="#">GS13N-45P0</a>	<a href="#">GS23-45P0</a>	460V 3ph 5.0 hp	-	<a href="#">KMF318A</a>
<a href="#">GS13N-47P5</a>	<a href="#">GS23-47P5</a>	460V 3ph 7.5 hp	-	<a href="#">KMF318A</a>
<a href="#">GS13N-4010</a>	<a href="#">GS23-4010</a>	460V 3ph 10hp	-	<a href="#">KMF325A</a>
n/a	<a href="#">GS23-4015</a>	460V 3ph 15hp	-	<a href="#">KMF336A</a>
	<a href="#">GS23-4020</a>	460V 3ph 20hp	-	<a href="#">KMF350A</a>
	<a href="#">GS23-4025</a>	460V 3ph 25hp	-	<a href="#">KMF350A</a>
	<a href="#">GS23-4030</a>	460V 3ph 30hp	-	<a href="#">KMF370A</a>
	<a href="#">GS23-51P0</a>	575V 3ph 1.0 hp	-	<a href="#">KMF306V</a>
	<a href="#">GS23-52P0</a>	575V 3ph 2.0 hp	-	<a href="#">KMF306V</a>
	<a href="#">GS23-53P0</a>	575V 3ph 3.0 hp	-	<a href="#">KMF306V</a>
	<a href="#">GS23-55P0</a>	575V 3ph 5.0 hp	-	<a href="#">KMF310V</a>
	<a href="#">GS23-57P5</a>	575V 3ph 7.5 hp	-	<a href="#">KMF318V</a>
	<a href="#">GS23-5010</a>	575V 3ph 10hp	-	<a href="#">KMF318V</a>
	<a href="#">GS21X-20P5</a>	230V 1ph 0.5 hp	<a href="#">RES90F10</a>	<a href="#">MIF10</a>
	<a href="#">GS21X-21P0</a>	230V 1ph 1.0 hp	<a href="#">RES90F16</a>	<a href="#">MIF16</a>
	<a href="#">GS21X-22P0</a>	230V 1ph 2.0 hp	<a href="#">RES90S20</a>	<a href="#">MIF23</a>
	<a href="#">GS21X-23P0</a>	230V 1ph 3.0 hp	<a href="#">RES90S30</a>	<a href="#">MIF330B</a>
	<a href="#">GS23X-20P5</a>	230V 3ph 0.5 hp	-	<a href="#">KMF306A</a>
	<a href="#">GS23X-21P0</a>	230V 3ph 1.0 hp	-	<a href="#">KMF306A</a>
	<a href="#">GS23X-22P0</a>	230V 3ph 2.0 hp	-	<a href="#">KMF310A</a>
	<a href="#">GS23X-23P0</a>	230V 3ph 3.0 hp	-	<a href="#">KMF318A</a>
	<a href="#">GS23X-25P0</a>	230V 3ph 5.0 hp	-	<a href="#">KMF325A</a>
	<a href="#">GS23X-27P5</a>	230V 3ph 7.5 hp	-	<a href="#">KMF336A</a>
<a href="#">GS23X-40P5</a>	460V 3ph 0.5 hp	-	<a href="#">KMF306A</a>	
<a href="#">GS23X-41P0</a>	460V 3ph 1.0 hp	-	<a href="#">KMF306A</a>	
<a href="#">GS23X-42P0</a>	460V 3ph 2.0 hp	-	<a href="#">KMF306A</a>	
<a href="#">GS23X-43P0</a>	460V 3ph 3.0 hp	-	<a href="#">KMF310A</a>	
<a href="#">GS23X-45P0</a>	460V 3ph 5.0 hp	-	<a href="#">KMF318A</a>	
<a href="#">GS23X-47P5</a>	460V 3ph 7.5 hp	-	<a href="#">KMF318A</a>	
<a href="#">GS23X-4010</a>	460V 3ph 10hp	-	<a href="#">KMF325A</a>	

\* All specs for the EMI filters can be found at [www.automationdirect.com](http://www.automationdirect.com) or by clicking the following links: [-KMF Series Filters](#), [-MIF Series Filters](#), [-RES90 Series Filters](#)

# GS10 Series Optional Accessories – Fuses/Circuit Breakers

## GS10 Fuses/Circuit Breakers

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

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

\* 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, GS, and DURAPULSE drives require Class T fuses (refer to the drive's user manual for details).

# GS20(X) Optional Accessories – Fuses/Circuit Breakers

## GS20X Fuses/Circuit Breakers

Protection devices are essential to prevent damage to your GS20(X) drive and application equipment. Please use the fuse specification chart below to select fuses that are applicable to your GS20(X) drive. Only use UL-certified fuses which comply with your local regulations.

Fuse Specification Chart GS20(X) DURAPULSE Drives									
Drive Model	HP	Input Power			Input Fuse			Circuit Breaker	
		Ø	Volts	GS20(X) Input Amps	Fuse Amps	Fast Acting Class T	Edison Class J*	Size	Molded Case CB
GS21-10P2	1/4	1	120	6.8	10	TJN10	JHL10	20	G3P-020
GS21-10P5	1/2	1	120	10.1	10	TJN10	JHL10	25	G3P-025
GS21-11P0	1	1	120	20.6	25	TJN25	JHL25	50	G3P-050
GS21-20P2	1/4	1	230	5.8	10	TJN10	JHL10	15	G3P-015
GS21-20P5	1/2	1	230	8.3	15	TJN15	JHL15	20	G3P-020
GS21-21P0	1	1	230	11.3	20	TJN20	JHL20	30	G3P-030
GS21-22P0	2	1	230	18.5	35	TJN35	JHL35	45	G3P-040
GS21-23P0	3	1	230	27.5	50	TJN50	JHL50	70	G3P-070
GS23-20P2	1/4	3	230	2.2	10	TJN10	JHL10	15	G3P-015
GS23-20P5	1/2	3	230	3.8	15	TJN15	JHL15	15	G3P-015
GS23-21P0	1	3	230	6	20	TJN20	JHL20	15	G3P-015
GS23-22P0	2	3	230	9.6	35	TJN35	JHL35	25	G3P-025
GS23-23P0	3	3	230	15	50	TJN50	JHL50	40	G3P-040
GS23-25P0	5	3	230	23.4	80	TJN80	JHL80	60	G3P-060
GS23-27P5	7 1/2	3	230	32.4	60	TJN60	JHL60	63	G3P-060
GS23-2010	10	3	230	43.2	80	TJN80	JHL80	90	G3P-090
GS23-2015	15	3	230	61.2	110	TJN110	JHL110	125	F3P-125
GS23-2020	20	3	230	82.8	150	TJN150	JHL150	160	BW250JAGU-3P160SB
GS23-40P5	1/2	3	460	2	10	TJS10	JHL10	15	G3P-015
GS23-41P0	1	3	460	3.3	15	TJS15	JHL15	15	G3P-015
GS23-42P0	2	3	460	5.1	20	TJS20	JHL20	15	G3P-015
GS23-43P0	3	3	460	7.2	25	TJS25	JHL25	20	G3P-020
GS23-45P0	5	3	460	11.6	45	TJS45	JHL45	30	G3P-030
GS23-47P5	7 1/2	3	460	17.3	35	TJS35	JHL35	32	G3P-030
GS23-4010	10	3	460	22.6	45	TJS45	JHL45	45	G3P-040
GS23-4015	15	3	460	30.8	60	TJS60	JHL60	60	G3P-060
GS23-4020	20	3	460	39.6	80	TJS80	JHL80	80	G3P-080
GS23-4025	25	3	460	45.7	90	TJS90	JHL90	90	G3P-090
GS23-4030	30	3	460	53.9	110	TJS110	JHL110	100	G3P-100
GS23-51P0	1	3	575	2.4	6	TJS6	JHL6	6	n/a
GS23-52P0	2	3	575	4.2	10	TJS10	JHL10	10	n/a
GS23-53P0	3	3	575	5.8	10	TJS10	JHL10	15	BW125JAGU-3P015SB
GS23-55P0	5	3	575	9.3	20	TJS20	JHL20	30	BW125JAGU-3P030SB
GS23-57P5	7 1/2	3	575	13.4	25	TJS25	JHL25	30	BW125JAGU-3P030SB
GS23-5010	10	3	575	17.5	30	TJS30	JHL30	30	BW125JAGU-3P030SB
GS21X-20P5	1/2	1	230	8.3	15	TJN15	JHL15	16	G3P-015
GS21X-21P0	1	1	230	11.3	20	TJN20	JHL20	25	G3P-025
GS21X-22P0	2	1	230	18.5	35	TJN35	JHL35	45	G3P-040
GS21X-23P0	3	1	230	27.5	50	TJN50	JHL50	63	G3P-060
GS23X-20P5	1/2	3	230	3.8	15	TJN15	JHL15	10	FAZ-C10-3-NA
GS23X-21P0	1	3	230	6	20	TJN20	JHL20	15	G3P-015
GS23X-22P0	2	3	230	9.6	35	TJN35	JHL35	25	G3P-025
GS23X-23P0	3	3	230	15	50	TJN50	JHL50	40	G3P-040
GS23X-25P0	5	3	230	23.4	80	TJN80	JHL80	60	G3P-060
GS23X-27P5	7 1/2	3	230	32.4	60	TJN60	JHL60	63	G3P-060
GS23X-40P5	1/2	3	460	2.5	10	TJS10	JHL10	6	FAZ-C5-3-NA
GS23X-41P0	1	3	460	4.2	15	TJS15	JHL15	10	FAZ-C10-3-NA
GS23X-42P0	2	3	460	6.4	20	TJS20	JHL20	16	G3P-015
GS23X-43P0	3	3	460	7.2	25	TJS25	JHL25	16	G3P-015
GS23X-45P0	5	3	460	11.6	35	TJS35	JHL35	30	G3P-030
GS23X-47P5	7 1/2	3	460	17.3	35	TJS35	JHL35	30	G3P-030
GS23X-4010	10	3	460	22.6	45	TJS45	JHL45	45	G3P-040

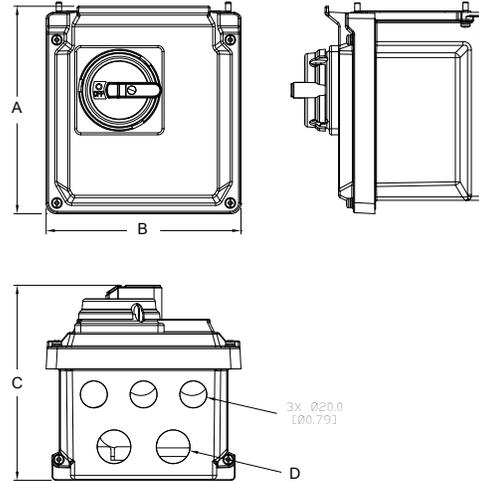
\* High-speed Class J.

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, GS, and DURAPULSE drives require Class T fuses (refer to the drive's user manual for details).

# GS20(X) Series Optional Accessories – General

## Disconnect Switch

The GS20XA-DSx series disconnect switch provides a local on/off disconnect switch that is easily mounted to the GS20(X) drive. This accessory provides an easy, quick, single hasp lockout point to isolate power to the drive. For more information and installation instructions, see the GS20(X) User Manual.

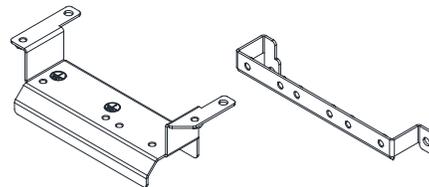


GS20X Disconnect Switch Selection						
Frame	Part Number	Price	Dimensions (mm [in])			
			A	B	C	D
A	<a href="#">GS20XA-DSA</a>	\$127.00	154.5 [6.08]	145.0 [5.71]	145.2 [5.72]	2x Ø25.0 [Ø0.98]
B	<a href="#">GS20XA-DSB</a>	\$132.00	164.5 [6.48]	165.0 [6.50]	152.5 [6.01]	2x Ø32.4 [Ø1.28]
C	<a href="#">GS20XA-DSC</a>	\$219.00				

## Earthing Plate

Earthing plates are available for use with shielded cable and your GS20X drive. For GS20 drives, please use EMC shield plates. Each earthing plate is compatible with all GS20X drives of that frame size. For more information and installation instructions, see the GS20(X) User Manual.

Earthing Plate Selection			
Drive Series	Frame	Earthing Plate Model	Price
GS20X	A	<a href="#">GS20XA-EPA</a>	\$40.00
GS20X	B	<a href="#">GS20XA-EPB</a>	\$46.00
GS20X	C	<a href="#">GS20XA-EPC</a>	\$46.50



Example Earthing Plate - GS20XA-EPA

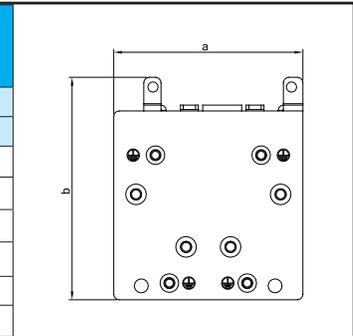
# GS10/GS20 Series Optional Accessories – General

## EMC Shield Plate

EMC Shield Plates are available for use with shielded cable and your GS10/GS20 drive. For GS20X drives, please use Earthing Plates. Each shield plate is compatible with all GS10 and GS20 drives of that frame size. For more information and installation instructions, see your GSx series User Manual.

EMC Shield Plate Selection			
Drive Series	Frame	EMC Shield Plate Model	Price
GS10/GS20	A	<a href="#">GS20A-ESP-A</a>	\$25.00
GS10/GS20	B	<a href="#">GS20A-ESP-B</a>	\$26.00
GS10/GS20	C	<a href="#">GS20A-ESP-C</a>	\$26.50
GS10/GS20	D	<a href="#">GS20A-ESP-D</a>	\$27.50
GS20	E	<a href="#">GS20A-ESP-E</a>	\$38.50
GS20	F	<a href="#">GS20A-ESP-F</a>	\$39.00

EMC Shield Plate Dimensions		
Model	Dimensions mm [inch]	
	a	b
<a href="#">GS20A-ESP-A</a>	69.3 [2.73]	80.0 [3.15]
<a href="#">GS20A-ESP-B</a>	67.7 [2.67]	79.7 [3.14]
<a href="#">GS20A-ESP-C</a>	78.0 [3.07]	91.0 [3.58]
<a href="#">GS20A-ESP-D</a>	103.4 [4.07]	97.0 [3.82]
<a href="#">GS20A-ESP-E</a>	124.3 [4.89]	77.4 [3.05]
<a href="#">GS20A-ESP-F</a>	168.0 [6.61]	80.0 [3.15]

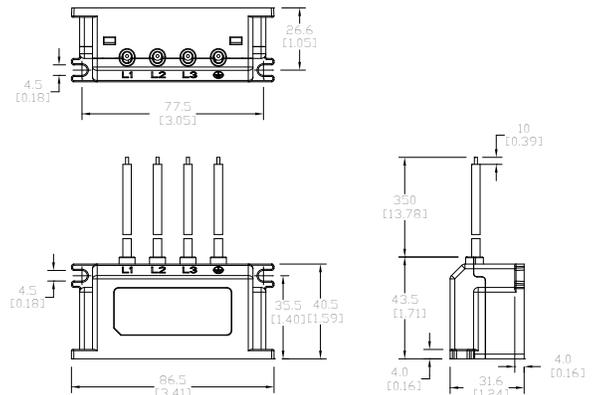


## Capacitive Filter

The GS20A-CAPF capacitive filter supports basic filtering and noise interference reduction for all GS10, GS20, and GS20X models 460V and below. For more information and installation instructions, please see your GSx series User Manual.

The GS20A-CAPF cannot be used with 575V models.

Capacitive Filter					
Drive Series	Model	Price	Applicable Voltage	Temperature Range	Capacitance
GS10/GS20(X)	<a href="#">GS20A-CAPE</a>	\$21.50	110–480 VAC	-40–85°C	Cx: 1uF ± 20% Cy: 0.1uF ± 20%



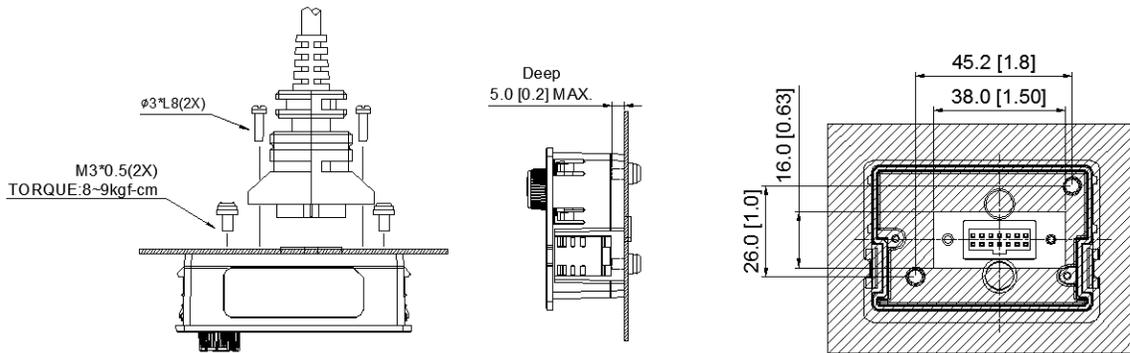
# GS20(X) Optional Accessories – Keypad

## Replacement Keypad

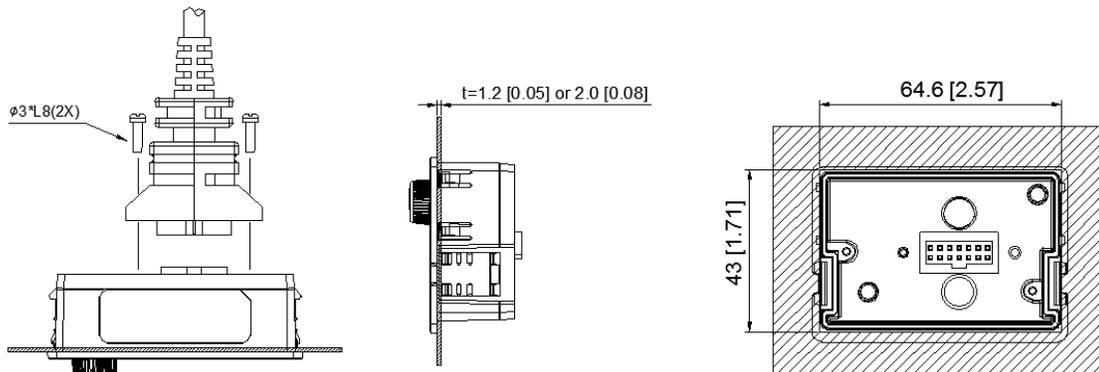
The GS20A-KPD can be used to replace the keypad that comes with each GS20 drive. The replacement keypad can be plugged directly into the drive (no screws needed) or mounted remotely using M3 screws and a keypad extension cable.



GS20-KPD Replacement Keypad			
Price	Part	Screw	Torque
\$26.00	<a href="#">GS20A-KPD</a>	M3	8–9 kg·cm (6.947.81 lb-in.) [0.78–0.88 N·m]



Direct Mounting on Plate



Embedded Mounting in Plate

## Keypad Extension Cables

The default GS20 keypad is removable and can be remote installed if desired. Use one of the cables below to connect the remotely installed keypad back to the GS20 drive.

GS20 Keypad Compatible Extension Cables		
Price	Cable	Length (m [ft])
\$18.00	<a href="#">GS-CBL2-1L</a>	1 [3.28]
\$23.50	<a href="#">GS-CBL2-3L</a>	3 [9.84]
\$28.00	<a href="#">GS-CBL2-5L</a>	5 [16.4]

# GS10 Series Optional Accessories – Line Reactors/ VTF Filters

## GS10 Line Reactors/Voltage Time Filters

Installing an AC Line 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.

Installing a load reactor or voltage time filter on the drive's output side can increase the high-frequency impedance to reduce the dV/dT and terminal voltage to protect the motor. Use output filters if the motor cable length exceeds 100ft.

GS10 Line/Load Reactor and AC Output Filter Selections						
GS10 Model	CT Input Amps (rms)	Saturation Amps (rms)	Motor HP	Line Reactor (LR2)**	Load Reactor (LR2)**	AC Output Filter (VTF)**
<a href="#">GS11N-10P2</a>	1.6	3.2	0.25	<a href="#">LR2-10P2-1PH</a>	<a href="#">LR2-20P2</a>	<a href="#">VTF-46-DE</a>
<a href="#">GS11N-10P5</a>	2.5	5	0.5	<a href="#">LR2-10P5-1PH</a>	<a href="#">LR2-20P5</a>	<a href="#">VTF-246-CFG</a>
<a href="#">GS11N-11P0</a>	4.8	9.6	1.0	<a href="#">LR2-11P5-1PH</a>	<a href="#">LR2-21P0</a>	<a href="#">VTF-24-FH</a>
<a href="#">GS11N-20P2</a>	1.6	3.2	0.25	<a href="#">LR2-20P5-1PH</a>	<a href="#">LR2-20P2</a>	<a href="#">VTF-46-DE</a>
<a href="#">GS11N-20P5</a>	2.8	5.6	0.5	<a href="#">LR2-20P5-1PH</a>	<a href="#">LR2-20P5</a>	<a href="#">VTF-246-CFG</a>
<a href="#">GS11N-21P0</a>	4.8	9.6	1.0	<a href="#">LR2-21P5-1PH</a>	<a href="#">LR2-21P0</a>	<a href="#">VTF-24-FH</a>
<a href="#">GS11N-22P0</a>	7.5	15	2.0	<a href="#">LR2-22P0-1PH</a>	<a href="#">LR2-22P0</a>	<a href="#">VTF-246-HKL</a>
<a href="#">GS11N-23P0</a>	11	22	3.0	<a href="#">LR-27P5</a>	<a href="#">LR-25P0</a>	<a href="#">VTF-24-JL</a>
<a href="#">GS13N-20P2</a>	1.6	3.2	0.25	<a href="#">LR2-20P2</a>	<a href="#">LR2-20P2</a>	<a href="#">VTF-46-DE</a>
<a href="#">GS13N-20P5</a>	2.8	5.6	0.5	<a href="#">LR2-20P5</a>	<a href="#">LR2-20P5</a>	<a href="#">VTF-246-DGH</a>
<a href="#">GS13N-21P0</a>	4.8	9.6	1.0	<a href="#">LR2-20P7</a>	<a href="#">LR2-20P7</a>	<a href="#">VTF-24-FH</a>
<a href="#">GS13N-22P0</a>	7.5	15	2.0	<a href="#">LR2-22P0</a>	<a href="#">LR2-22P0</a>	<a href="#">VTF-246-HKL</a>
<a href="#">GS13N-23P0</a>	11	22	3.0	<a href="#">LR-25P0</a>	<a href="#">LR-23P0</a>	<a href="#">VTF-24-JL</a>
<a href="#">GS13N-25P0</a>	17	34	5.0	<a href="#">LR-27P5</a>	<a href="#">LR-25P0</a>	<a href="#">VTF-46-LM</a>
<a href="#">GS13N-27P5</a>	25	50	7.5	<a href="#">LR-2010</a>	<a href="#">LR-27P5</a>	<a href="#">VTF-46-NP</a>
<a href="#">GS13N-40P5</a>	1.5	3	0.5	<a href="#">LR2-40P5</a>	<a href="#">LR2-40P5</a>	<a href="#">VTF-46-DE</a>
<a href="#">GS13N-41P0</a>	2.7	5.4	1.0	<a href="#">LR2-42P0</a>	<a href="#">LR2-41P0</a>	<a href="#">VTF-246-CFG</a>
<a href="#">GS13N-42P0</a>	4.2	8.4	2.0	<a href="#">LR2-45P0</a>	<a href="#">LR2-42P0</a>	<a href="#">VTF-24-FH</a>
<a href="#">GS13N-43P0</a>	5.5	11	3.0	<a href="#">LR2-45P0</a>	<a href="#">LR2-43P0</a>	<a href="#">VTF-24-FH</a>
<a href="#">GS13N-45P0</a>	9	18	5.0	<a href="#">LR2-47P5</a>	<a href="#">LR2-45P0</a>	<a href="#">VTF-246-HKL</a>
<a href="#">GS13N-47P5</a>	13	26	7.5	<a href="#">LR-4010</a>	<a href="#">LR2-47P5</a>	<a href="#">VTF-24-JL</a>
<a href="#">GS13N-4010</a>	17.5	34	10.0	<a href="#">LR-4015</a>	<a href="#">LR-4010</a>	<a href="#">VTF-24-JL</a>

\* Not available at AutomationDirect.com  
 \*\* All specs for the LR2 and VTF can be found at [www.automationdirect.com](http://www.automationdirect.com)

# GS20(X) Optional Accessories – Line Reactors/ VTF Filters

## GS20 Line Reactors/Voltage Time Filters

Installing an AC Line 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.

Installing a load reactor or voltage time filter on the drive's output side can increase the high-frequency impedance to reduce the dV/dT and terminal voltage to protect the motor. Use output filters if the motor cable length exceeds 100ft.

GS20(X) Line/Load Reactor, AC Output Filter, & DC Reactor Selections						
GS20(X) Model	CT Input Amps (rms)	Saturation Amps (rms)	Motor HP	Line Reactor (LR2)**	Load Reactor (LR2)**	AC Output Filter (VTF)**
GS21-10P2	1.6	3.2	1/4	LR2-10P2-1PH	LR2-20P2	VTF-46-DE
GS21-10P5	2.5	5	1/2	LR2-10P5-1PH	LR2-20P5	VTF-246-CFG
GS21-11P0	5	9.6	1	LR2-11P5-1PH	LR2-21P0	VTF-24-FH
GS21-20P2	1.6	3.2	1/4	LR2-20P5-1PH	LR2-20P2	VTF-46-DE
GS21-20P5	2.8	5.6	1/2	LR2-20P5-1PH	LR2-20P5	VTF-246-CFG
GS21-21P0	4.8	9.6	1	LR-23P0	LR2-21P0	VTF-24-FH
GS21-22P0	7.5	15	2	LR2-22P0-1PH	LR-22P0	VTF-246-HKL
GS21-23P0	11	22	3	LR-27P5	LR-25P0	VTF-24-JL
GS23-20P2	1.6	3.2	1/4	LR2-20P2	LR2-20P2	VTF-46-DE
GS23-20P5	2.8	5.6	1/2	LR2-20P5	LR2-20P5	VTF-246-DGH
GS23-21P0	4.8	9.6	1	LR2-20P7	LR2-20P7	VTF-24-FH
GS23-22P0	7.5	15	2	LR-22P0	LR-22P0	VTF-246-HKL
GS23-23P0	11	22	3	LR-25P0	LR-25P0	VTF-24-JL
GS23-25P0	17	34	5	LR-27P5	LR-25P0	VTF-46-LM
GS23-27P5	25	50	7 1/2	LR-2010	LR-2010	VTF-46-NP
GS23-2010	33	66	10	LR-2015	LR-2010	VTF-246-LPQ
GS23-2015	46	92	15	LR-2020	LR-2020	VTF-246-NRS
GS23-2020	65	130	20	LR-2025	LR-2025	VTF-246-PSU
GS23-40P5	1.5	3	1/2	LR2-40P5	LR2-40P5	VTF-46-DE
GS23-41P0	2.7	5.4	1	LR2-41P0	LR2-41P0	VTF-246-CFG
GS23-42P0	4.2	8.4	2	LR2-43P0	LR2-42P0	VTF-24-FH
GS23-43P0	5.5	11	3	LR2-45P0	LR2-43P0	VTF-24-FH
GS23-45P0	9	18	5	LR2-47P5	LR2-45P0	VTF-246-HKL
GS23-47P5	13	26	7 1/2	LR-4010	LR2-47P5	VTF-24-JL
GS23-4010	17	34	10	LR-4015	LR-4010	VTF-24-JL
GS23-4015	25	50	15	LR-4015	LR-4015	VTF-246-LPQ
GS23-4020	32	64	20	LR-4020	LR-4020	VTF-246-LPQ
GS23-4025	38	76	25	LR-4025	LR-4025	VTF-246-MQR
GS23-4030	45	90	30	LR-4030	LR-4030	VTF-246-NRS
GS23-51P0	1.7	3.4	1	LR2-51P0	LR2-51P0	VTF-46-DE
GS23-52P0	3	6	2	LR2-52P0	LR2-52P0	VTF-246-CFG
GS23-53P0	4.2	8.4	3	LR2-53P0	LR2-53P0	VTF-246-DGH
GS23-55P0	6.6	13.2	5	LR2-55P0	LR2-55P0	VTF-246-GJJ
GS23-57P5	9.9	19.8	7 1/2	LR-5010	LR2-57P5	VTF-246-HKL
GS23-5010	12.2	24.4	10	LR-4010	LR-5010	VTF-246-HKL
GS21X-20P5	2.8	5.6	1/2	LR2-20P5-1PH	LR2-20P2	VTF-246-DGH
GS21X-21P0	4.8	9.6	1	LR2-21P0-1PH	LR2-20P7	VTF-24-FH
GS21X-22P0	7.5	15.0	2	LR2-22P0-1PH	LR2-22P0	VTF-246-HKL
GS21X-23P0	11.0	22.0	3	LR-27P5	LR-25P0	VTF-24-JL
GS23X-20P5	2.8	5.6	1/2	LR2-20P2	LR2-20P2	VTF-246-DGH
GS23X-21P0	4.8	9.6	1	LR2-21P5	LR2-21P0	VTF-24-FH
GS23X-22P0	7.5	15.0	2	LR2-22P0	LR2-22P0	VTF-246-GJJ
GS23X-23P0	11.0	22.0	3	LR-25P0	LR-25P0	VTF-24-JL
GS23X-25P0	17.0	34.0	5	LR-27P5	LR-27P5	VTF-4-M
GS23X-27P5	25.0	50.0	7 1/2	LR-2010	LR-2010	VTF-246-KMN
GS23X-40P5	1.5	3.0	1/2	LR2-40P5	LR2-40P5	VTF-46-DE
GS23X-41P0	2.7	5.4	1	LR2-41P5	LR2-41P0	VTF-246-CFG
GS23X-42P0	4.2	8.4	2	LR2-43P0	LR2-42P0	VTF-24-FH
GS23X-43P0	5.5	11.0	3	LR2-44P0	LR2-43P0	VTF-24-FH
GS23X-45P0	9.0	18.0	5	LR2-47P5	LR2-45P0	VTF-246-HKL
GS23X-47P5	13.0	26.0	7 1/2	LR-4010	LR2-47P5	VTF-24-JL
GS23X-4010	17.0	34.0	10	LR-4015	LR-4010	VTF-46-LM

\* Not available at AutomationDirect.com

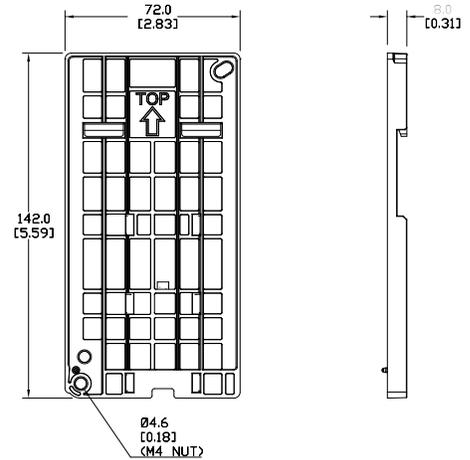
\*\* Reactor sizing is based on rated HP NEMA motor load, not drive output amp load. Size the reactor based on the motor nameplate current. All specs for the LR2 and VTF can be found at [www.automationdirect.com](http://www.automationdirect.com)

# GS10/GS20 Series Optional Accessories – Mounting Kits

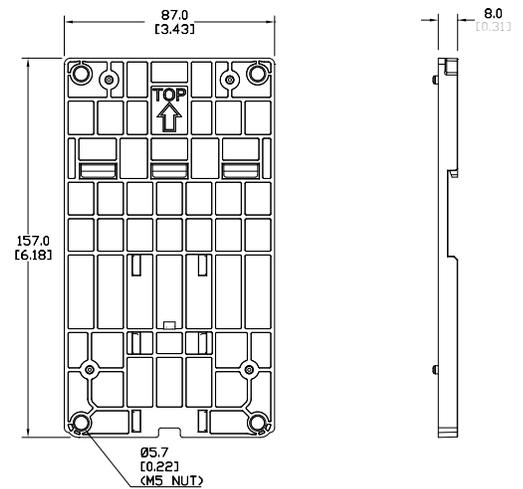
## DIN Rail Mounting

Frame A, B, and C GS10 and GS20 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. Please see the your GSx series User Manual for additional information and installation instructions.

GS20 DIN Rail Mounting Compatibility				
Drive Model		Frame	DIN Rail Kit	Price
GS10 Series	GS20 Series			
<a href="#">GS11N-10P2</a>	<a href="#">GS21-10P2</a>	A1	GS20A-DR-AB	\$5.25
<a href="#">GS11N-20P2</a>	<a href="#">GS21-20P2</a>	A1		
<a href="#">GS13N-20P2</a>	<a href="#">GS23-20P2</a>	A1		
<a href="#">GS13N-20P5</a>	<a href="#">GS23-20P5</a>	A2		
<a href="#">GS11N-10P5</a>	<a href="#">GS21-10P5</a>	A3		
<a href="#">GS11N-20P5</a>	<a href="#">GS21-20P5</a>	A3		
<a href="#">GS13N-40P5</a>	<a href="#">GS23-40P5</a>	A4		
<a href="#">GS13N-21P0</a>	<a href="#">GS23-21P0</a>	A5		
-	<a href="#">GS23-41P0</a>	A5		
-	<a href="#">GS23-51P0</a>	A5		
<a href="#">GS13N-41P0</a>	-	A6		
<a href="#">GS13N-22P0</a>	<a href="#">GS23-22P0</a>	B1		
<a href="#">GS13N-42P0</a>	<a href="#">GS23-42P0</a>	B1		
-	<a href="#">GS23-52P0</a>	B1		
<a href="#">GS11N-21P0</a>	<a href="#">GS21-21P0</a>	B2	GS20A-DR-C	\$5.25
<a href="#">GS11N-22P0</a>	<a href="#">GS21-11P0</a>	C1		
<a href="#">GS11N-23P0</a>	<a href="#">GS21-22P0</a>	C1		
<a href="#">GS13N-23P0</a>	<a href="#">GS21-23P0</a>	C1		
<a href="#">GS13N-25P0</a>	<a href="#">GS23-23P0</a>	C1		
<a href="#">GS11N-11P0</a>	<a href="#">GS23-25P0</a>	C1		
<a href="#">GS13N-43P0</a>	<a href="#">GS23-43P0</a>	C1		
<a href="#">GS13N-45P0</a>	<a href="#">GS23-45P0</a>	C1		
-	<a href="#">GS23-53P0</a>	C1		
-	<a href="#">GS23-55P0</a>	C1		



GS20A-DR-AB



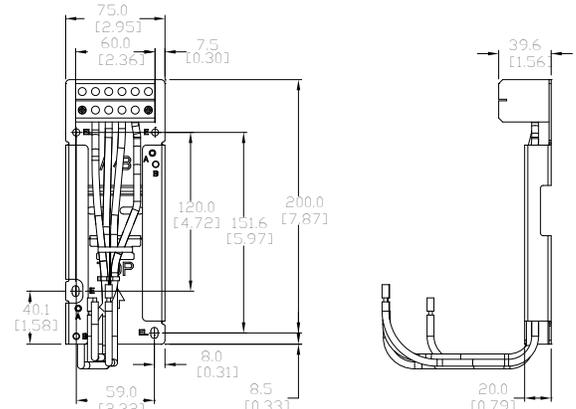
GS20A-DR-C

# GS10/GS20 Series Optional Accessories – Mounting Kits

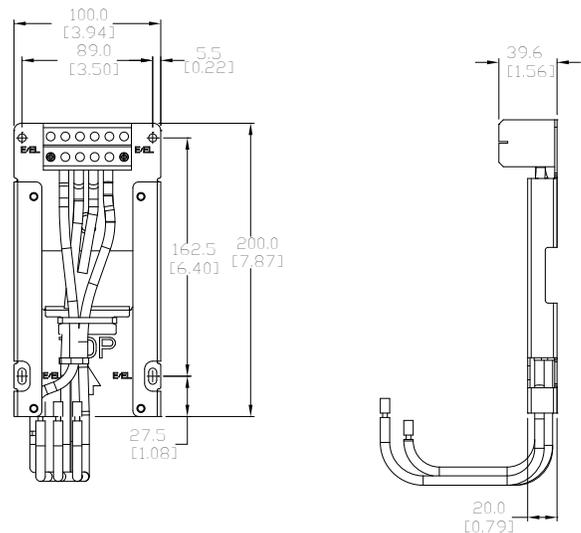
## Mounting Adapter Plate

The mounting adapter plate can be used to change the wiring orientation for the GS10 and GS20 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/GS20. Use the table below to select the correct mounting plate for your drive. Please see your GSx series User Manual for additional information and installation instructions.

GS10 and GS20 Mounting Adapter Compatibility				
Drive Model		Frame	Mounting Plate	Price
GS10 Series	GS20 Series			
<a href="#">GS11N-10P2</a>	<a href="#">GS21-10P2</a>	A1	GS20A-MP-AB	\$46.00
<a href="#">GS11N-20P2</a>	<a href="#">GS21-20P2</a>	A1		
<a href="#">GS13N-20P2</a>	<a href="#">GS23-20P2</a>	A1		
<a href="#">GS13N-20P5</a>	<a href="#">GS23-20P5</a>	A2		
<a href="#">GS11N-10P5</a>	<a href="#">GS21-10P5</a>	A3		
<a href="#">GS11N-20P5</a>	<a href="#">GS21-20P5</a>	A3		
<a href="#">GS13N-40P5</a>	<a href="#">GS23-40P5</a>	A4		
<a href="#">GS13N-21P0</a>	<a href="#">GS23-21P0</a>	A5		
-	<a href="#">GS23-41P0</a>	A5		
-	<a href="#">GS23-51P0</a>	A5		
<a href="#">GS13N-41P0</a>	-	A6		
<a href="#">GS13N-22P0</a>	<a href="#">GS23-22P0</a>	B1		
<a href="#">GS13N-42P0</a>	<a href="#">GS23-42P0</a>	B1		
-	<a href="#">GS23-52P0</a>	B1		
<a href="#">GS11N-21P0</a>	<a href="#">GS21-21P0</a>	B2		
<a href="#">GS11N-22P0</a>	<a href="#">GS21-11P0</a>	C1		
<a href="#">GS11N-23P0</a>	<a href="#">GS21-22P0</a>	C1		
<a href="#">GS13N-23P0</a>	<a href="#">GS21-23P0</a>	C1		
<a href="#">GS13N-25P0</a>	<a href="#">GS23-23P0</a>	C1		
<a href="#">GS11N-11P0</a>	<a href="#">GS23-25P0</a>	C1		
<a href="#">GS13N-43P0</a>	<a href="#">GS23-43P0</a>	C1		
-	<a href="#">GS23-45P0</a>	C1		
-	<a href="#">GS23-53P0</a>	C1		
-	<a href="#">GS23-55P0</a>	C1		



GS20A-MP-AB



GS20A-MP-C

# GS10/GS20 Series Optional Accessories – Replacement Cooling Fans

## Cooling Fans for GSx Series Drives (Spare/Replacement)

NOTE: The fans described below are included with the applicable GS10 and GS20(X) AC Drive, and are also available for purchase separately as spare/replacement components.

GS10 and GS20(X) – Fan Selection Table						
Drive Model		Fan Model *		Description	Size	Voltage
GS10 Series	GS20(X) Series	Part #	Price			
GS13N-22P0 GS13N-42P0	GS23-22P0 GS23-42P0 GS23-52P0	<a href="#"><u>GS20A-FAN-B</u></a>	\$21.50	GS20 series main cooling fan, replacement.	40x40x15 mm	12VDC
—	GS21X-23P0 GS23X-23P0 GS23X-25P0 GS23X-45P0	<a href="#"><u>GS20XA-FAN-B</u></a>	\$51.00	GS20X series main cooling fan, replacement	60x60x25 mm	12VDC
GS11N-11P0 GS11N-23P0 GS13N-23P0 GS13N-25P0 GS13N-43P0 GS13N-45P0	GS21-11P0 GS21-22P0 GS21-23P0 GS23-23P0 GS23-25P0 GS23-43P0 GS23-45P0 GS23-53P0 GS23-55P0	<a href="#"><u>GS20A-FAN-C</u></a>	\$23.50	GS20 series main cooling fan, replacement.	50x50x20 mm	12VDC
—	GS23X-27P5 GS23X-47P5 GS23X-4010	<a href="#"><u>GS20XA-FAN-C</u></a>	\$52.00	GS20X series main cooling fan, replacement	60x60x25 mm	12VDC
GS13N-27P5 GS13N-47P5 GS13N-4010	GS23-27P5 GS23-47P5 GS23-4010 GS23-57P5 GS23-5010	<a href="#"><u>GS20A-FAN-D</u></a>	\$27.00	GS20 series main cooling fan, replacement.	60x60x25 mm	12VDC
—	GS23-2010 GS23-2015 GS23-4015 GS23-4020	<a href="#"><u>GS20A-FAN-E</u></a>	\$37.50	GS20 series main cooling fan, replacement.	92x92x28 mm	12VDC
—	GS23-2020 GS23-4025 GS23-4030	<a href="#"><u>GS20A-FAN-F</u></a>	\$41.00	GS20 series main cooling fan, replacement.	92x92x38 mm	12VDC

\* These fans are included with the GSx series drive, and also available separately as spare or replacement components. Electrical connectors are included.



Example GS20A replacement Fan

# GS10/GS20 Series Optional Accessories – RF Filter

## Description

Zero phase reactors, (aka RF noise filters) help reduce radiated noise from the inverter wiring. The wiring must go through the opening to reduce the RF component of the electrical noise. Loop the wires three times (four turns) to attain the full RF filtering effect. For larger wire sizes, place multiple zero-phase reactors (up to four) side by side for a greater filtering effect. These are effective for noise reduction on both the input and output sides of the inverter. Attenuation quality is good in a wide range from AM band to 10 Mhz.

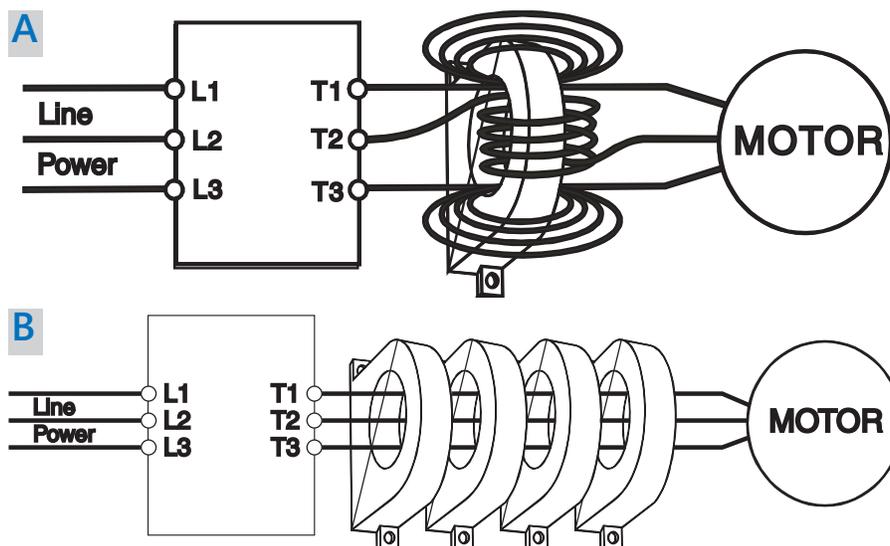


## Wiring Method

Wind each wire four times around the core, as shown in diagram A to the right. The reactor must be put at inverter side as closely as possible.

If you are unable to wire as above due to wire size or another aspect of your application, put all wires through four cores in series without winding, as in diagram B to the right.

RF Filter Selection			
Drive Series	Filter Model	Drawing	Price
GS10 / GS20(X)	RF008X00A	PDF	\$32.00



# DURAPULSE GS3 AC Drives – Introduction

GS3 AC Drives																
Motor Rating	HP	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100
	kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
230V Single-Phase Input / 230V Three-Phase Output		✓	✓	✓												
230V Three-Phase Input / Output		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
460V Three-Phase Input / Output		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

## Overview

The *DURAPULSE* series of AC drives offers all of the features of our GS2 series of drives including dynamic braking, PID, removable keypad and RS-485 Modbus communication. The *DURAPULSE* AC drive also offers sensorless vector control with the option of encoder feedback for enhanced speed control. The standard **smart** keypad (or Human Interface Module) is designed with defaults for the North American customer and allows you to configure the drive, set the speed, start and stop the drive, and monitor critical parameters for your application. In addition, this keypad has internal memory that allows **four** complete programs to be stored and transferred to any *DURAPULSE* drive. The *DURAPULSE* series offers three analog inputs, eleven digital inputs, and one SPDT relay output.



## Features

- Simple Volts/Hertz control
- Sensorless vector control with autotune
- Sensorless vector control with optional encoder feedback card, for better speed control
- Sinusoidal pulse width modulation (PWM)
- Variable carrier frequency, depending on model
- IGBT technology
- Starting torque: 125% @ 0.5 Hz/150% @ 1Hz
- 150% rated current for one minute
- Electronic overload protection
- Stall prevention
- Adjustable accel and decel ramps with linear and S-curve settings
- Automatic torque and slip compensation
- Internal dynamic braking circuit for models under 20 hp; optional braking units available for models 20 hp and above
- DC braking
- Five skip frequencies
- Trip history
- Programmable jog speed
- Integral PID control
- Removable **smart** keypad with parameter upload/download
- Keypad with memory to store up to four programs of any *DURAPULSE* drive
- Eleven programmable digital inputs
- Three programmable analog inputs
- Three digital and one SPDT relay programmable outputs
- One programmable analog output
- One digital frequency output
- RS-485 Modbus communications
- Ethernet communication optional
- Two-year warranty
- UL/cUL/CE listed

## Accessories

- AC line reactors
- EMI filters
- RF filter
- Braking resistors
- Braking units (for models 20 hp and above)
- Fuse kits and replacement fuses
- Replacement cooling fans
- Remote panel adapter
- Replacement keypad
- Keypad cables in 1, 3, and 5-meter lengths
- Ethernet interface
- Four and eight-port RS-485 multi-drop termination boards
- GSoft drive configuration software
- GS3-FB – feedback card
- GS-485HD15-CBL – **ZIPLink** RS485 communication cable for connection to the DL06 and D2-260 15-pin ports
- USB-485M – USB to RS-485 PC adapter (see “Communications Products” chapter for detailed information)
- **Detailed descriptions and specifications for GS accessories are available in the “GS/DURAPULSE Accessories” section.**

## Typical Applications

- Conveyors
- Fans
- Pumps
- Compressors
- HVAC
- Material handling
- Mixing
- Shop tools
- Extruding
- Grinding

# DURAPULSE GS3 AC Drives Specifications

230V Class							
Model Name		<u>GS3-23P0</u>	<u>GS3-2020</u>	<u>GS3-2030</u>	<u>GS3-2040</u>	<u>GS3-2050</u>	
Price		Retired	Retired	Retired	Retired	Retired	
Output Rating	Max Motor Output	HP	20	30	40	50	
		kW	2.2	15	22	30	37
	Rated Output Current (A)		11	65	90	120	145
	Max Output Voltage		Three-phase 200 to 240V (proportional to input voltage)				
Rated Frequency		0.1 to 400 Hz					
* Input Rating	Rated Voltage/Frequency		Single/Three-phase	Three-phase			
	Rated Input Current (A)		200/208/220/230/240 VAC, 50/60Hz				
Voltage/Frequency Tolerance		Voltage: ± 10% Frequency: ± 5%					
Watt Loss @ 100% I (W)		130	750	1300	1340	1430	
Weight (lb [kg])		9.4 [4.24]	26.5 [12]	26.5 [12]	77.2 [35]	77.2 [35]	
* All 3-phase power sources must be symmetrical. Do not connect any DURAPULSE drives to grounded, center-tapped delta transformers (which are typically used for lighting circuits).							

460V Class – Three-Phase							
Model Name		<u>GS3-4010</u>	<u>GS3-4020</u>	<u>GS3-4040</u>	<u>GS3-4060</u>	<u>GS3-4100</u>	
Price		Retired	Retired	Retired	Retired	Retired	
Output Rating	Maximum Motor Output	HP	20	40	60	100	
		kW	7.5	15	30	45	75
	Rated Output Current (A)		18	32	60	91	150
	Maximum Output Voltage		Three-phase 380 to 480V (proportional to input voltage)				
Rated Frequency		0.1 to 400 Hz					
* Input Rating	Rated Voltage/Frequency		Three-phase, 380/400/415/440/460/480VAC, 50/60Hz				
	Rated Input Current (A)		19	32	60	90	160
Voltage/Frequency Tolerance		Voltage: ± 10% Frequency: ± 5%					
Watt Loss @ 100% I (W)		345	620	1420	2020	3840	
Weight (lb [kg])		13.5 [6.106]	26.5 [12]	77.2 [35]	77.2 [35]	116.8 [53]	
* All 3-phase power sources must be symmetrical. Do not connect any DURAPULSE drives to grounded, center-tapped delta transformers (which are typically used for lighting circuits).							

# DURAPULSE GS3 AC Drives General Specifications

General Specifications			
<b>Control Characteristics</b>			
<b>Control System</b>	Pulse Width Modulation, Carrier frequency adjustable from 1–15 kHz depending on the model. This system determines the control methods of the AC drive. 00: V/Hz open loop control 01: V/Hz closed loop control 02: Sensorless Vector 03: Sensorless Vector with external feedback		
<b>Rated Output Frequency</b>	0.1 to 400.0 Hz		
<b>Output Frequency Resolution</b>	0.1 Hz		
<b>Overload Capacity</b>	150% of rated current for 1 minute		
<b>Torque Characteristics</b>	Includes auto-torque boost, auto-slip compensation, starting torque 125% @ 0.5 Hz / 150% @ 1.0 Hz		
<b>Braking Torque</b>	20% without braking resistor, 125% with optional braking resistor (braking circuit built-in only for units under 20 hp)		
<b>DC Braking</b>	Operation frequency 60–0 Hz, 0–100% rated current, Start time 0.0–5.0 seconds, Stop time 0.0–25.0 seconds		
<b>Acceleration/Deceleration Time</b>	0.1 to 600 seconds (linear or non-linear acceleration/deceleration), second acceleration/deceleration available		
<b>Voltage/Frequency Pattern</b>	Settings available for Constant Torque - low & high starting torque, Variable Torque - low & high starting torque, and user configured		
<b>Stall Prevention Level</b>	20 to 200% of rated current		
<b>Operation Specifications</b>			
<b>Inputs</b>	<b>Frequency Setting</b>	<b>Keypad</b>	Setting by <UP> or <DOWN> buttons
		<b>External Signal</b>	Potentiometer - 3 to 5 kΩ, 0 to 10 VDC (input impedance 10 kΩ), -10 to +10 VDC, 4 to 20 mA (input impedance 250Ω), 0 to 20 mA; Multi-Speed Inputs 1 to 4, RS-232C/RS-485 communication interface
	<b>Operation Setting</b>	<b>Keypad</b>	Setting by <RUN>, <STOP>, <JOG>, <FWD>, <REV> buttons
		<b>External Signal</b>	Forward/Stop, Reverse/Stop (run/stop, fwd/rev), 3-wire control, Serial Communication RS-232C & RS-485 (Modbus RTU)
	<b>Input Terminals</b>	<b>Digital Sink/Source Selectable</b>	11 user-programmable: FWD/STOP, REV/STOP, RUN/STOP, REV/FWD, RUN momentary (N.O.), STOP momentary (N.C.), External Fault (N.O./N.C.), External Reset, Multi-Speed Bit (1-4), Manual Keyboard Control, Jog, External Base Block (N.O./N.C.), Second Accel/Decel Time, Speed Hold, Increase Speed, Decrease Speed, Reset Speed to Zero, PID Disable (N.O.), PID Disable (N.C.), Input Disable
		<b>Analog</b>	3 user-configurable, 0 to 10V (input impedance 10 kΩ), 0 to 20 mA, 4 to 20 mA (input impedance 250Ω), 10 bit resolution -10V to +10V, 10 bit resolution
<b>Outputs</b>	<b>Output Terminals</b>	<b>Digital 3 transistors 1 relay</b>	4 user-programmable: Inverter Running, Inverter Fault, At Speed, Zero Speed, Above Desired Frequency, Below Desired Frequency, At Maximum Speed, Over Torque Detected, Above Desired Current, Below Desired Current, PID Deviation Alarm, Heatsink Overheat Warning (OH), Soft Braking Signal, Above desired Frequency 2, Below desired Frequency 2, Encoder Loss
		<b>Digital Square Wave</b>	One digital square wave output representing drive frequency
		<b>Analog</b>	1 user-programmable, 0 to 10V, 8 bit resolution frequency, current, process variable PV
<b>Operating Functions</b>		Automatic voltage regulation, voltage/frequency characteristics selection, non-linear acceleration/deceleration, upper and lower frequency limiters, 15-stage speed operation, adjustable carrier frequency (1 to 15 kHz), PID control, 5 skip frequencies, analog gain & bias adjustment, jog, electronic thermal relay, automatic torque boost, trip history, software protection	
<b>Protective Functions</b>		Electronic Thermal, Overload Relay, Auto Restart after Fault, Momentary Power Loss, Reverse Operation Inhibit, Auto Voltage Regulation, Over-Voltage Stall Prevention, Auto Adjustable Accel/Decel, Over-Torque Detection Mode, Over-Torque Detection Level, Over-Torque Detection Time, Over-Current Stall Prevention during Acceleration, Over-Current Stall Prevention during Operation	
<b>Operator Interface</b>	<b>Operator Devices</b>		9-key, 2 line x 16 character LCD display, 5 status LEDs
	<b>Programming</b>		Parameter values for setup and review, fault codes
	<b>Status Display</b>		Output Frequency, Motor Speed, Scaled Frequency, Output Current, Motor Load, Output Voltage, DC Bus Voltage, PID Setpoint, PID Feedback, Frequency Setpoint
	<b>Key Functions</b>		RUN, STOP/RESET, FWD/REV, PROGRAM, DISPLAY, <UP>, <DOWN>, ENTER
<b>Environment</b>	<b>Enclosure Rating</b>		Protected Chassis, IP20
	<b>Ambient Temperature</b>		-10°C to 40°C (14°F to 104°F)
	<b>Storage Temperature</b>		-20°C to 60°C (-4°F to 140°F) – during short term transportation period
	<b>Ambient Humidity</b>		20 to 90% RH (non-condensing)
	<b>Vibration</b>		9.8 m/s <sup>2</sup> (1G) less than 10 Hz; 5.9 m/s <sup>2</sup> (0.6G) 10 to 60 Hz
<b>Installation Location</b>		Altitude 1000m or lower above sea level, keep from corrosive gas, liquid and dust	
<b>Options</b>		Noise filter, input AC reactor, output AC reactor, cable for remote operator, programming software, dynamic braking resistor, dynamic braking unit; RF filter; remote panel adapter; Ethernet interface; four and eight port RS-485 multi-drop termination boards, replacement keypads, fuse kits and replacement fuses	

# DURAPULSE GS3 AC Drives Specifications – Installation

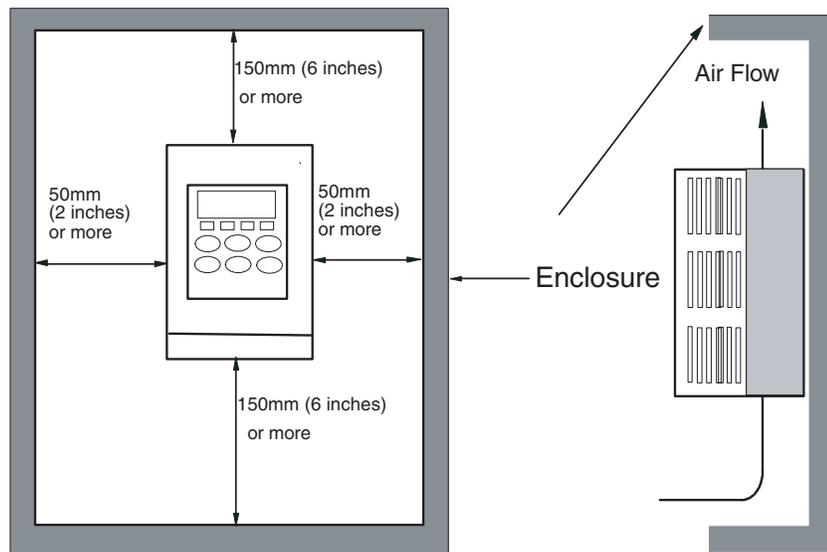
Understanding the installation requirements for your DURAPULSE AC drive will help to ensure that it operates within its environmental and electrical limits.

*Note: Never use only this catalog for installation instructions or operation of equipment; refer to the user manual, GS3-M.*

Environmental Specifications	
<b>Protective Structure <sup>1</sup></b>	IP20
<b>Ambient Operating Temperature <sup>2</sup></b>	-10 to 40°C (14°F to 104°F)
<b>Storage Temperature <sup>3</sup></b>	-20 to 60°C (-4°F to 140°F)
<b>Humidity</b>	To 90% (no condensation)
<b>Vibration <sup>4</sup></b>	9.8 m/s <sup>2</sup> (1g), less than 10 Hz 5.9 m/s <sup>2</sup> (0.6g), 10 to 60 Hz
<b>Location</b>	Altitude 1,000 m or less, indoors (no corrosive gases, liquids or dust)

1: Protective structure is based upon EN60529  
 2: The ambient temperature must be in the range of -10° to 40°C. If the range will be up to 50°C, you will need to set the carrier frequency to 2.1 kHz or less and derate the output current to 80% or less.  
 3: The storage temperature refers to the short-term temperature during transport.  
 4: Conforms to the test method specified in JIS CO911 (1984)

Watt-loss Chart	
GS3 Drive Model	At full load
<b>GS3-23P0</b>	130
<b>GS3-2020</b>	750
<b>GS3-2030</b>	1300
<b>GS3-2040</b>	1340
<b>GS3-2050</b>	1430
<b>GS3-4010</b>	345
<b>GS3-4020</b>	620
<b>GS3-4040</b>	1420
<b>GS3-4060</b>	2020
<b>GS3-4100</b>	3840



## Minimum Clearances and Air Flow



**WARNING: AC DRIVES GENERATE A LARGE AMOUNT OF HEAT WHICH MAY DAMAGE THE AC DRIVE. AUXILIARY COOLING METHODS ARE TYPICALLY REQUIRED IN ORDER NOT TO EXCEED MAXIMUM AMBIENT TEMPERATURES.**



**WARNING: MAXIMUM AMBIENT TEMPERATURES MUST NOT EXCEED 50°C (122°F), OR 40°C (104°F) FOR MODELS 7.5 HP (5.5 KW) AND HIGHER!**

# DURAPULSE GS3 AC Drives Specifications — Terminals

Main Circuit Terminals	
Terminal	Description
L1, L2, L3	Input Power
T1, T2, T3	AC Drive Output
B1, B2	Braking Resistor Connection (Under 20HP)
+2, - (negative)	External Dynamic Brake Unit (20HP & Over)
	Ground



Control Circuit Terminals		
Terminal Symbol	Description	Remarks
+24V	DC Voltage Source	(+24V, 20mA), used only for AC drive digital inputs wired for source mode operation
DI1	Digital Input 1	Input Voltage: Internally Supplied (see Warning below) Sink Mode: Low active, $V_{inL} \text{ Min} = 0V, V_{inL} \text{ Max} = 15V,$ $I_{in} \text{ Min} = 2.1mA, I_{in} \text{ Max} = 7.0mA$ Source Mode: High active, $V_{inH} \text{ Min} = 8.5V, V_{inH} \text{ Max} = 24V, I_{in} \text{ Min} = 2.1mA, I_{in} \text{ Max} = 7.0mA$ Input response: 12–15 msec Also see “Basic Wiring Diagram” on the next pages.
DI2	Digital Input 2	
DI3	Digital Input 3	
DI4	Digital Input 4	
DI5	Digital Input 5	
DI6	Digital Input 6	
DI7	Digital Input 7	
DI8	Digital Input 8	
DI9	Digital Input 9	
DI10	Digital Input 10	
DI11	Digital Input 11	
DCM	Digital Common	
+10V	Internal Power Supply	+10VDC (10mA maximum load)
AI1	Analog Input	0 to +10 V input only
AI2	Analog Input	0 to 20mA / 4 to 20mA input
AI3	Analog Input	-10 to +10 V input only
ACM	Analog Common	
R10	Relay Output 1 Normally Open	Resistor Load: 240VAC - 5A (N.O.) / 3A (N.C.)
R1C	Relay Output 1 Normally Closed	24VDC - 5A (N.O.) / 3A (N.C.)
R1	Relay Output 1 Common	Inductive Load: 240VAC - 1.5A (N.O.) / 0.5A (N.C.) 24VDC - 1.5A (N.O.) / 0.5A (N.C.) See P 3.01 to P 3.03
DO1	Photocoupled digital output	Maximum 48VDC, 50mA
DO2	Photocoupled digital output	
DO3	Photocoupled digital output	
DOC	Digital Output Common	
AO	Analog Output	0 to +10 V 2mA Output
FO	Digital Frequency Output	Square wave pulse train output



**WARNING: DO NOT CONNECT EXTERNAL VOLTAGE SOURCES TO THE DIGITAL INPUTS. PERMANENT DAMAGE MAY RESULT.**



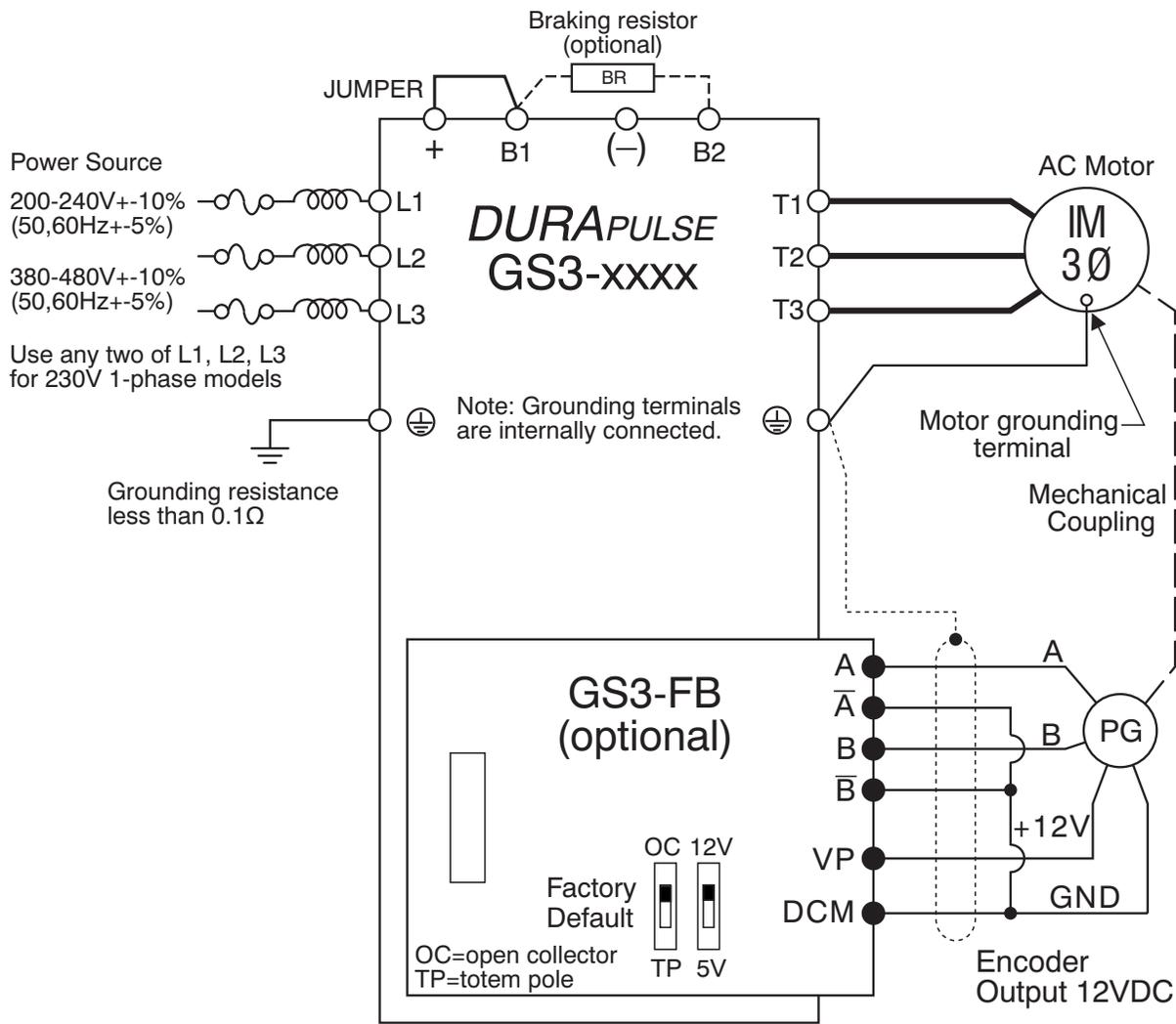
Note: Use twisted-shielded, twisted-pair or shielded-lead wires for the control signal wiring. It is recommended to run all signal wiring in a separate steel conduit. The shield wire should only be connected at the AC drive. Do not connect shield wire on both ends.

# DURAPULSE GS3 AC Drives – Basic Wiring Diagram

## Power Wiring Diagram – drives under 20 hp

**Note:** Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user manual GS3-M for additional specific wiring information.)

**Note:** Please refer to the following pages for explanations and information regarding feedback cards (pg.tGSX-115), line reactors (pg.tGSX-117), braking components (pg.tGSX-17), EMI filters (pg.tGSX-149), RF filters (pg.tGSX-158), and fuses (pg.tGSX-159).



○ Main circuit (power) terminals      ● Control circuit terminal      ⊕ Shielded leads



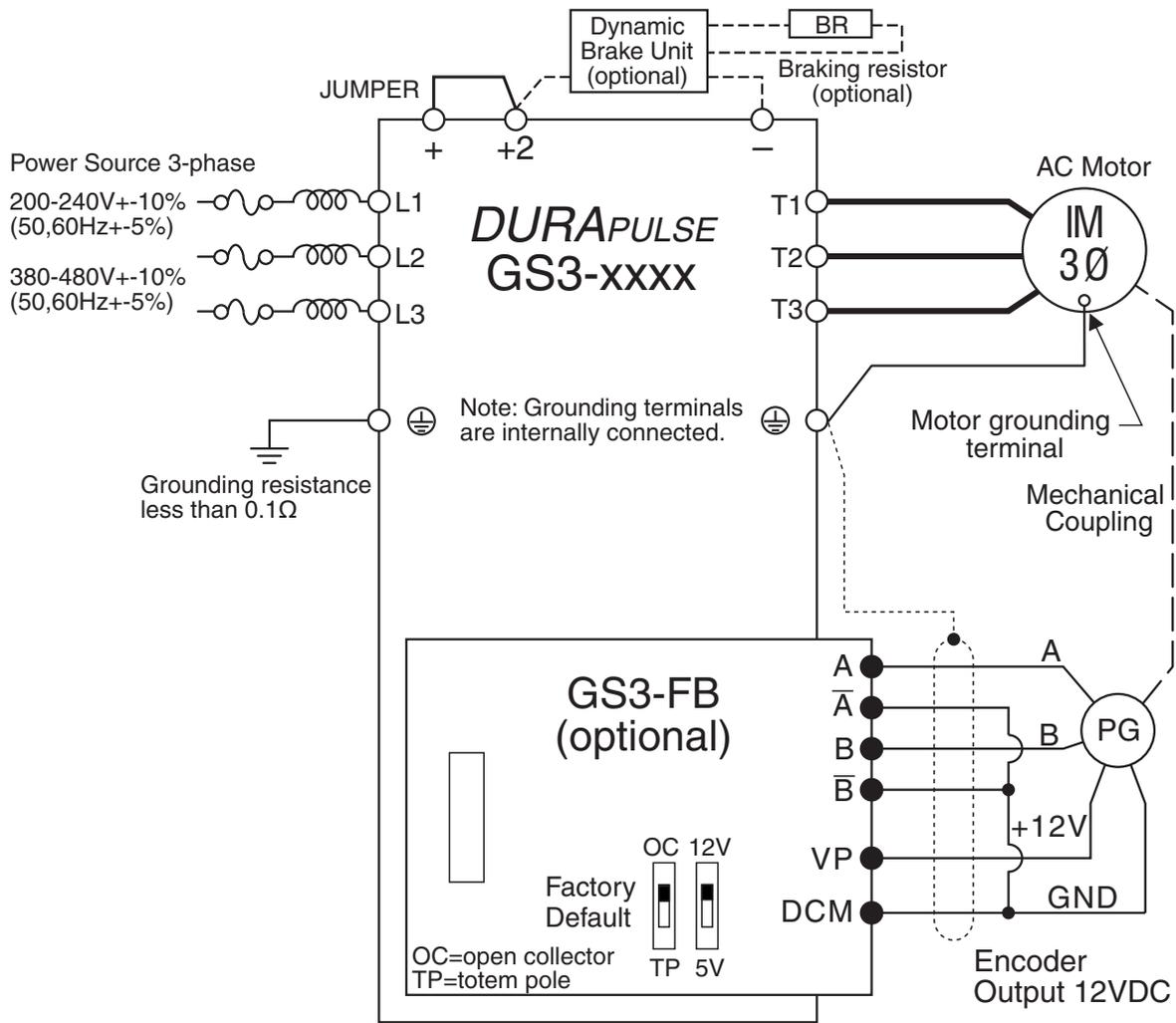
**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT. TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.**

# DURAPULSE GS3 AC Drives – Basic Wiring Diagram

## Power Wiring Diagram – 20 to 30 hp (230 VAC) & 20 to 60 hp (460 VAC)

**Note:** Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user manual GS3-M for additional specific wiring information.)

**Note:** Please refer to the following pages for explanations and information regarding feedback cards (pg.tGSX-115), line reactors (pg.tGSX-117), braking components (pg.tGSX-17), EMI filters (pg.tGSX-149), RF filters (pg.tGSX-158), and fuses (pg.tGSX-159).



○ Main circuit (power) terminals      ● Control circuit terminal      ⊕ Shielded leads



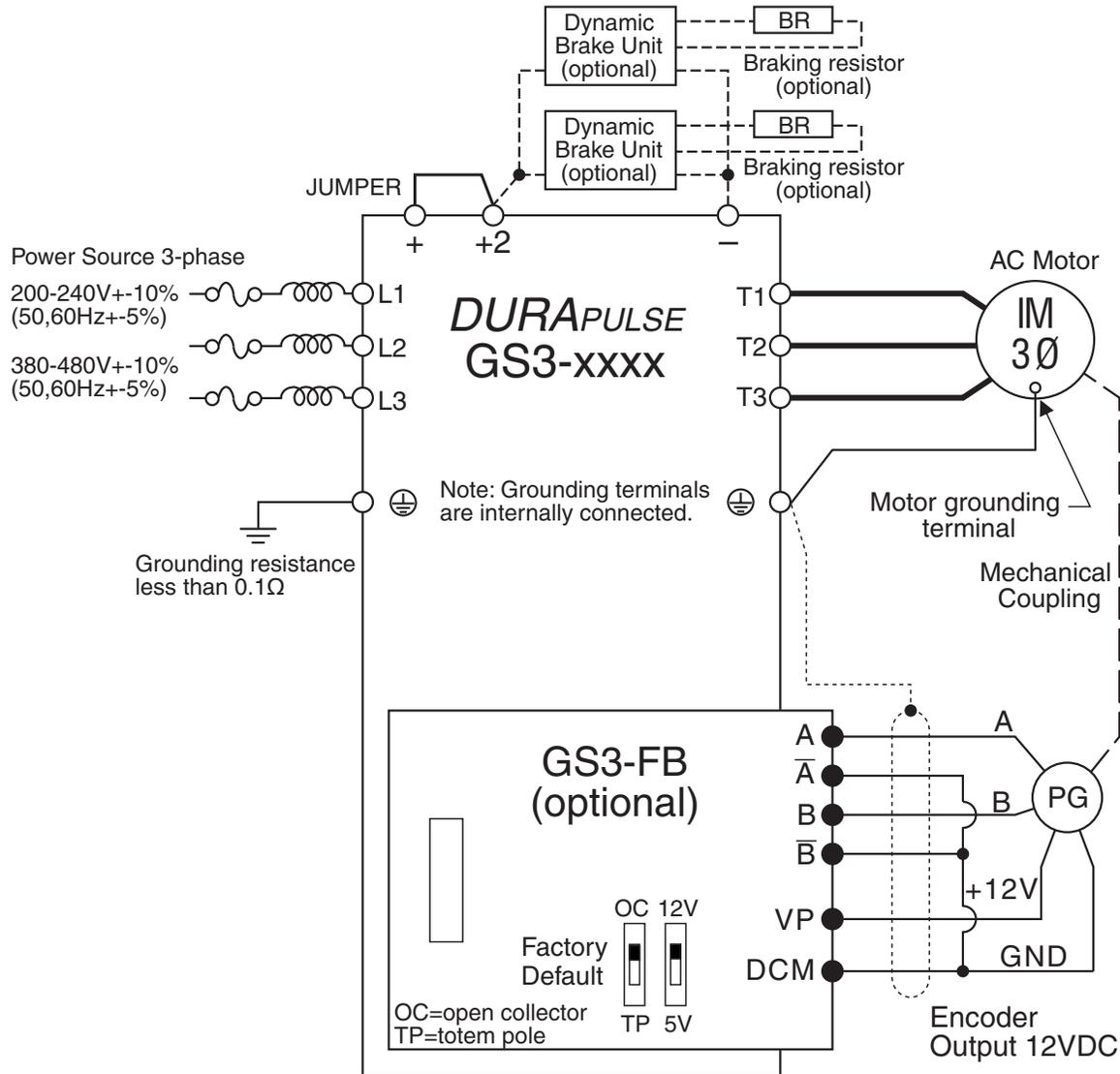
**WARNING:** DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT. TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.

# DURAPULSE GS3 AC Drives – Basic Wiring Diagram

## Power Wiring Diagram - 40 to 50 hp (230 VAC) & 75 to 100 hp (460 VAC)

**Note:** Users **MUST** connect wiring according to the circuit diagram shown below. (Refer to user manual GS3-UMP for additional specific wiring information.)

**Note:** Please refer to the following catalog pages in the Drives section of our catalog for explanations and information regarding feedback cards (X), line reactors (X), braking units (X) and resistors (X), EMI (X) and RF (X) filters, and fuses (X).



○ Main circuit (power) terminals      ● Control circuit terminal      ⊕ Shielded leads



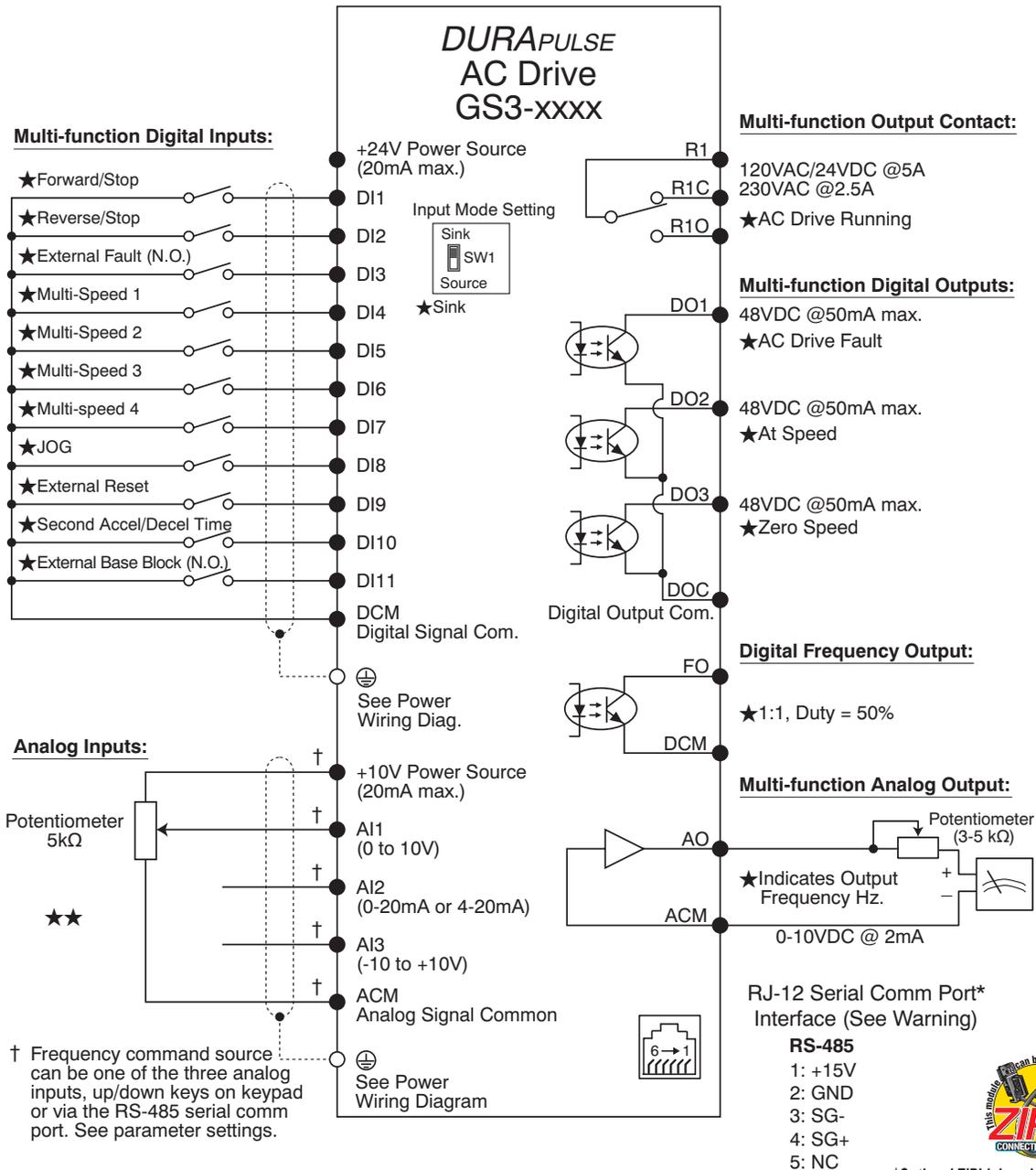
**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT. TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.**

# DURAPULSE GS3 AC Drives – Control Wiring Diagram – DI Connection to Sinking Outputs

## Control Wiring Diagram - Digital Input Connections to Sinking Output Devices



Note: Users must connect wiring according to the circuit diagram shown below.



- ★ Factory default setting
- ★★ Factory default source of frequency command is via the keypad up/down keys
- Main circuit (power) terminals ● Control circuit terminal ⚡ Shielded leads



**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.**



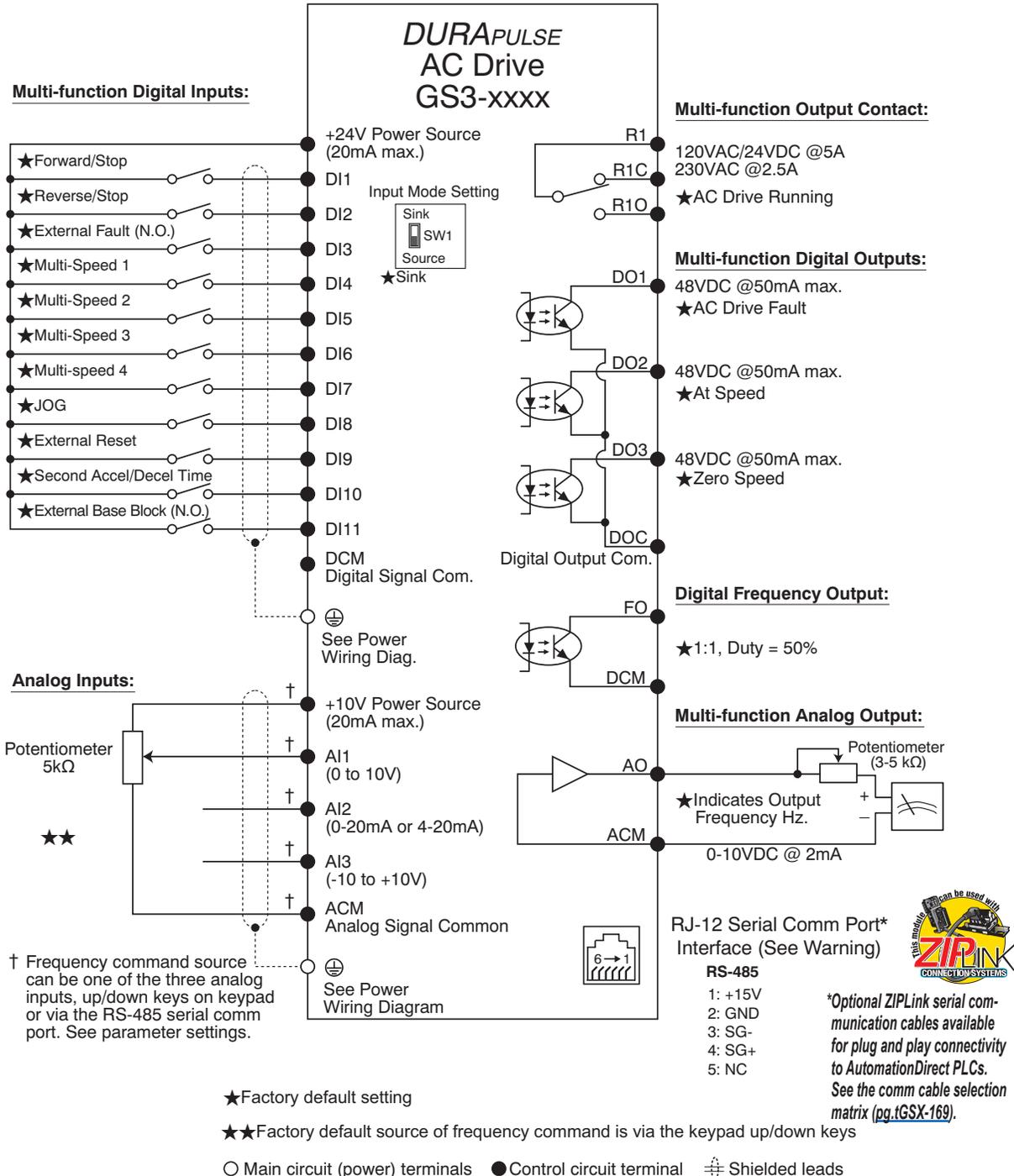
\*Optional ZIPLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix (pg.tGSX-169).

# DURAPULSE GS3 AC Drives – Control Wiring Diagram – DI Connections to Sourcing Outputs

## Control Wiring Diagram - Digital Input Connections to Sourcing Output Devices



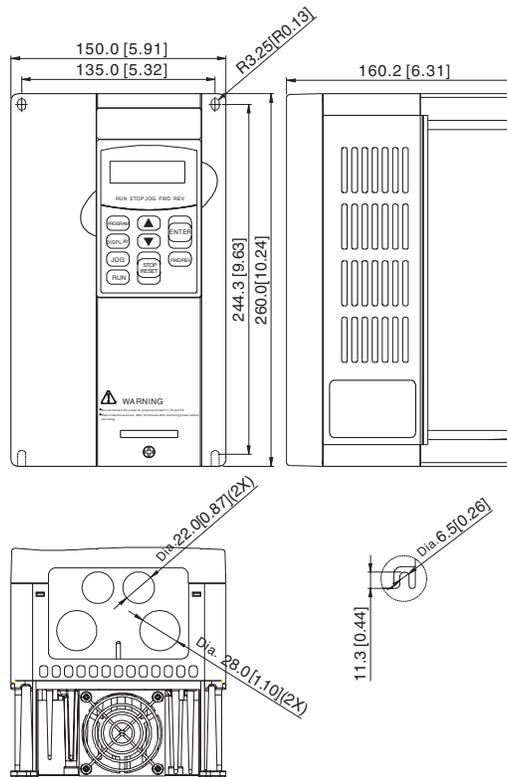
Note: Users MUST connect wiring according to the circuit diagram shown below.



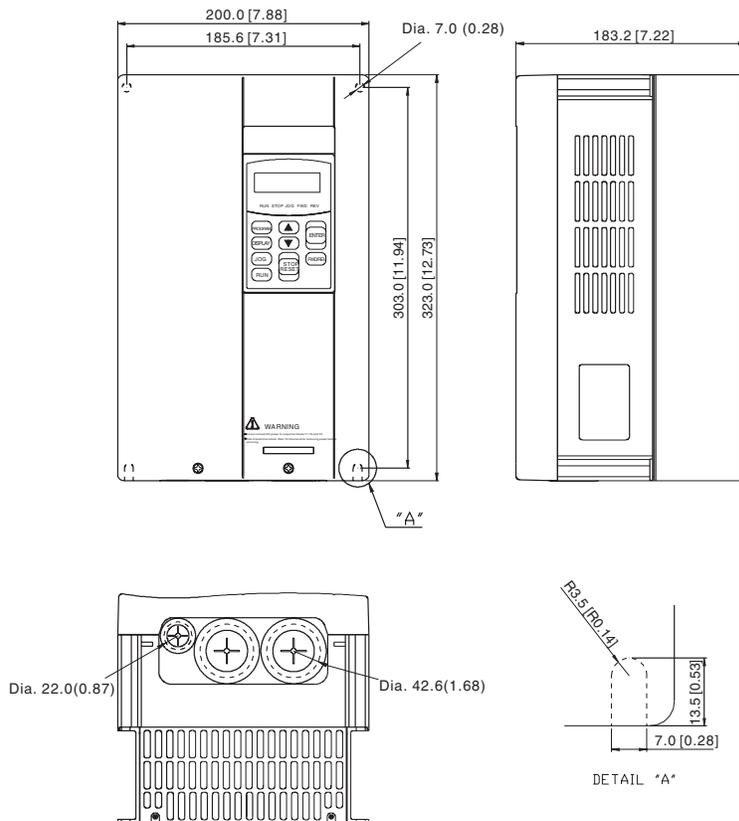
**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.**

# DURAPULSE GS3 AC Drives – Dimensions

## GS3-23P0



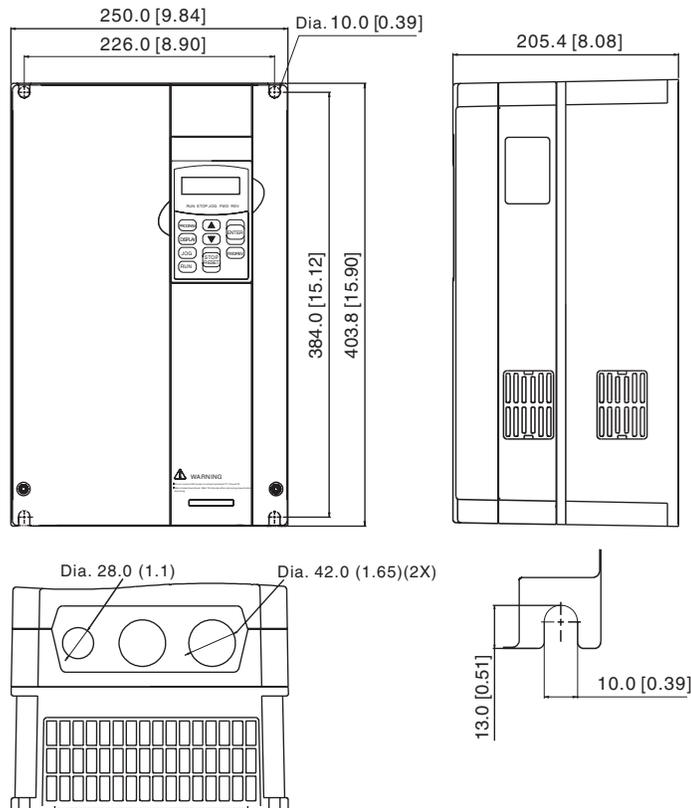
## GS3-4010



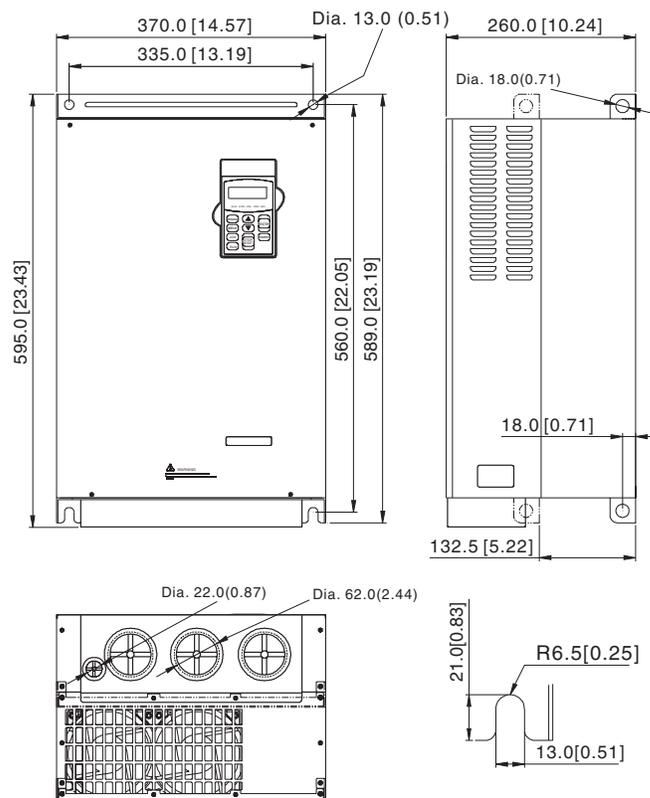
unit: mm(in)

# DURAPULSE GS3 AC Drives – Dimensions

## GS3-2020, GS3-2030, GS3-4020



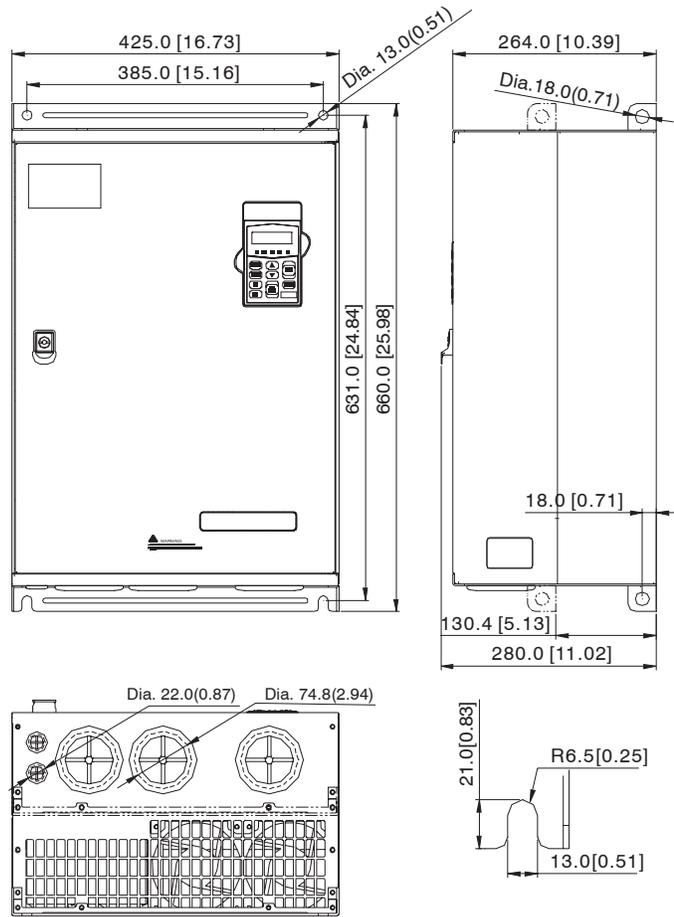
## GS3-2040, GS3-2050, GS3-4040, GS3-4060



unit: mm(in)

# DURAPULSE GS3 AC Drives – Dimensions

GS3-4100



unit: mm(in)

# DURAPULSE GS4 AC Drives – Introduction

DURAPULSE GS4 AC Drives																							
Motor Rating	HP	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100	125	150	175	215	250	300	
	kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75	90	110	132	160	185	220	
230V Single-Phase Input / 230V Three-Phase Output		✓	✓	✓	✓	✓	✓	✓	✓	✓													
230V Three-Phase Input/Output		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
460V Three-Phase Input/Output		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



## Overview

The DURAPULSE GS4 series of AC drives includes many of the same standard features as our GS family of drives including dynamic braking, PID, removable keypad, and RS-485 Modbus communication.

The GS4 drive expands the DURAPULSE family by adding single-phase input capability (ALL 230VAC drives can be supplied single-phase), a built-in PLC, serial BACnet, and optional EtherNet/IP and ModTCP cards. GS4 QuickStart menus simplify configuration by consolidating the most-often-used parameters into concise groups.

DURAPULSE GS4 AC drives also offer sensorless vector control for improved speed regulation. The smart keypad is designed with defaults to quickly allow you to configure the drive, set the speed, start and stop the drive, and monitor critical parameters of your application. In addition, up to four drive configurations can be stored in the keypad, and transferred to additional DURAPULSE GS4 drives of the same model. Users can also store up to 32 parameters of their choice in a custom Quick-Start menu.

DURAPULSE GS4 offers three analog inputs, two analog outputs, one frequency output, ten digital inputs, two digital outputs, two SPDT relay outputs, and two STO inputs. All of the analog and digital I/O (except the Start/Stop and STO inputs) can be configured for a wide variety of input or output functions. Three option cards expand the I/O offering with a relay output card, an AC input card, and a combo DC I/O card.

## Features

- Wide Offering from 1 to 300 hp
- Single-Phase/Three-Phase 230VAC Three-Phase 460VAC
- Single-Phase UL Ratings – 230VAC input for 1 to 100 hp models (see selection tables for derated output)
- Dual Rating Design – CT/VT Ratings (Light & Heavy Duty)
- Flexible Carrier Frequency to 15kHz and Output Frequency to 600Hz
- STO – Safe Torque Off (TUV Certified)
- Built-in PLC to support up to 10k steps
- Free downloadable software for Drive Configuration and PLC Programming
- Field-upgradable Firmware via USB port (Drive, Keypad, & Communication Option Cards)
- Hot-Pluggable LCD Text-Based Keypad (IP20/NEMA 1) can be remotely mounted
- Embedded Quick-Start Menus
- Local/Remote control mode selection from the Keypad or digital/comm input with Hand/Off/Auto Control
- Display Units of Measure of your choice (GPM, FPM, etc.)
- Momentary Power Loss Restarts
- 100kA Short Circuit Current Rating
- Built-In DC Choke (some models)
- Flange-Mount Capability for frame sizes A to F (1 to 215 hp)
- Conduit Box(s) for NEMA 1 (Frame sizes D0 to G)
- Expanded I/O capability – 110V Inputs, Relay Outputs, combo DC I/O card
- Analog I/O – Configurable 3 Inputs and 2 Outputs
- Auto Speed Search capability
- Multi-Motor (Motor#1,#2) Control
- Dynamic Braking – Optional Dynamic Braking Units and Comprehensive offering of Resistors
- PID Controller – Including Sleep and Wake
- Password Protection
- RTD and/or PTC Input Motor Protection
- Parameter Organization similar to GS3 – GS3 Operational (External User PLC) control will work with minimal changes required.
- Calendar function allows a user to program the PLC with ON/OFF control in chronological order, daylight savings time, etc.
- Modularized design eases maintenance and expansion, including quick replacement of fans
- High speed communication interfaces with MODBUS RTU and BACnet protocols built in, with optional communication cards: MODBUS TCP, EtherNet/IP
- Circuit boards have conformal coating for improved environmental tolerance
- Excellent heat-sink design; able to operate at 50°C ambient temperature
- Fire Mode – Run fire mode during emergencies to have uninterrupted smoke removal and system pressure
- Multi-pump control: fixed quantity, fixed displacement, and fixed time-circulating control; able to control up to 8 pumps (Optional multi-control relay output card is required.)
- Two-year warranty
- CE, TUV, UL, cUL

## Accessories

- AC line reactors
- EMI filters
- RF filter
- Braking resistors
- Braking units (for models 20hp and above)
- Fuses
- Conduit boxes
- Flange-Mount Kits
- Replacement cooling fans
- Replacement keypad (and remote-mount bezel kit)
- I/O Option Cards
- EtherNet/IP comm card
- Modbus TCP comm card
- Four and eight-port RS-485 multi-drop termination boards
- GSoft2 drive configuration software
- GSLogic PLC programming software
- USB-485M – USB to RS-485 PC adapter (see “Communications Products” chapter for detailed information)
- Detailed descriptions and specifications for GS accessories are available in the “GS/ DURApulse Accessories” section.

## Typical Applications

- Conveyors
- Compressors
- Material handling
- Extruding
- Grinding
- Shop tools
- Fans
- Pumps
- HVAC
- Mixing

# DURAPULSE GS4 AC Drives – Selection

## Selecting the Proper Drive Rating

Selecting the Proper Drive Rating																	
<b>Determine Motor Voltage and Full-Load Amperage (FLA)</b>																	
Motor voltage and FLA are located on the nameplate of the motor. <b>NOTE: FLA of motors that have been rewound may be higher than stated.</b>																	
<b>Determine Motor Overload Requirements</b>																	
Many applications experience temporary overload conditions due to starting requirements or impact loading. Most AC drives are designed to operate at 150% overload for 60 seconds. If the application requires an overload greater than 150% or longer than 60 seconds, the AC drive must be oversized. <b>NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.</b>																	
<b>Determine Application Type: Constant Torque or Variable Torque</b>																	
This torque requirement has a direct effect on which drive to select. Variable Torque applications are generally easier to start; typically fans and pumps. Most other applications outside fans and pumps fall into the Constant Torque category (machine control, conveyors, etc.). If you are unsure of the application, assume Constant Torque. The specification, derating, and selection tables (beginning pg.tGSX-83) are generally segregated by Constant Torque and Variable Torque.																	
<b>Installation Altitude</b>																	
AC drives rely on air flow for cooling. As the altitude increases, the air becomes less dense, and this drop in air density decreases the cooling properties of the air. Therefore, the AC drive must be oversized to compensate for the decrease in cooling. GS4 drives are designed to operate at 100% capacity at altitudes up to 1000 meters. <b>NOTE: For use above 1000m, the AC drive must be derated as described below.</b>																	
<b>Derate Output Current Based on Altitude Above 1000 Meters</b>																	
<ul style="list-style-type: none"> <li>• If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.</li> <li>• If installed at an altitude of 1000–3000m, decrease 1% of the rated current or lower 0.5°C of temperature for every 100m increase in altitude.</li> <li>• Maximum altitude for Corner Grounded is 2000m.</li> </ul>																	
<p><b>GS4 Derating for Altitude</b></p> <p>Rating (%) at Standard Ambient Temperature*      T<sub>a</sub> at Rating = 100%</p> <table border="1" style="margin: 10px auto;"> <caption>GS4 Derating Data</caption> <thead> <tr> <th>Altitude (m)</th> <th>Rating (%)</th> <th>T<sub>a</sub> (°C) - UL Type 1 / IP20</th> <th>T<sub>a</sub> (°C) - UL Open Type / IP20 Side-by-Side</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>100</td> <td>-</td> <td>-</td> </tr> <tr> <td>1000</td> <td>100</td> <td>40</td> <td>30</td> </tr> <tr> <td>3000</td> <td>80</td> <td>50</td> <td>40</td> </tr> </tbody> </table> <p>*Standard Ambient Temperature = 50°C for UL Open Type / IP20                      *Standard Ambient Temperature = 40°C for UL Type 1 / IP 20 &amp; UL Open Type / IP20 Side-by-Side</p>		Altitude (m)	Rating (%)	T <sub>a</sub> (°C) - UL Type 1 / IP20	T <sub>a</sub> (°C) - UL Open Type / IP20 Side-by-Side	0	100	-	-	1000	100	40	30	3000	80	50	40
Altitude (m)	Rating (%)	T <sub>a</sub> (°C) - UL Type 1 / IP20	T <sub>a</sub> (°C) - UL Open Type / IP20 Side-by-Side														
0	100	-	-														
1000	100	40	30														
3000	80	50	40														
(continued next page)																	

# DURAPULSE GS4 AC Drives – Selection

## Selecting the Proper Drive Rating (continued from previous page)

### Determine Maximum Enclosure Internal Temperature

AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS4 drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to 104°F (40°C) or less. Ambient temperature measurements/calculations should be made for the maximum expected temperature. When permissible, flange mounting the AC drive (mounting with the drive heatsink in open ambient air) can greatly reduce heating in the enclosure.

**NOTE: For use above 104°F (40°C), the AC drive must be derated as described below.**

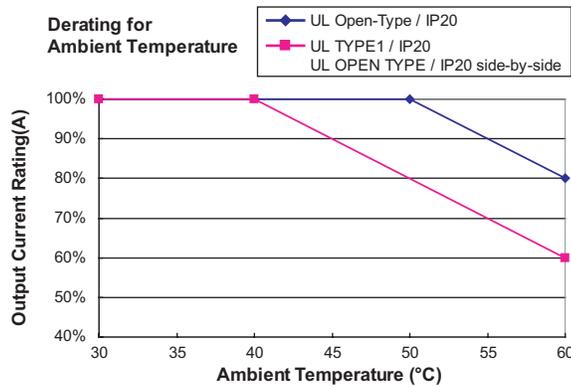
### Derate Output Current Based on Temperature Above 104°F (40°C) or 122°F (50°C)

#### Drive Derating by Temperature and Protection Level

Protection Level *	Derating
<b>UL Type I / IP20</b>	When the GS4 drive is operating at rated current, the ambient temperature has to be between -10°C and +40°C. When ambient temperature exceeds 40°C, decrease the rated current by 2% for every 1°C temperature increase. Maximum allowable temperature is 60°C.
<b>UL Open Type ** / IP00/IP20</b>	When the GS4 drive is operating at rated current, the ambient temperature has to be between -10°C and +50°C. When ambient temperature exceeds 50°C, decrease the rated current by 2% for every 1°C temperature increase. Maximum allowable temperature is 60°C.

\* For more information about environmental ratings, refer to the "Operating Temperature and Protection Level" table (pg.tGSX-100).

\*\* Open Type temperature ratings apply to GS4 frame sizes A-C with top covers removed, and frame sizes D0-G without conduit boxes (pg.tGSX-100).



(continued next page)

# DURAPULSE GS4 AC Drives – Selection

<b>Selecting the Proper Drive Rating (continued from previous page)</b>	
<b>Derate Output Current Based on Carrier Frequency (if necessary)</b>	
<b>Carrier Frequency Effects</b>	
<p>AC Drives rectify the incoming 50 or 60Hz line power resulting in DC power at 0Hz. The resulting DC power is then pulse-width modulated and supplied to the motor by the drive's power electronics. IGBTs invert the DC power, simulating a sine wave at the desired frequency (that's what allows variable speed in AC induction motors). The speed at which the IGBTs are turned ON and OFF is called Carrier Frequency. In GS4 drives, the Carrier Frequency can range from 2kHz to 15kHz. Though Carrier Frequency can be adjusted, there are trade-offs between High Carrier Frequencies and Low Carrier Frequencies.</p>	
<b>Benefits of Higher Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency (lower harmonic losses) in the motor</li> <li>• Lower audible noise</li> </ul>	
<b>Benefits of Lower Carrier Frequencies:</b>	
<ul style="list-style-type: none"> <li>• Better efficiency in the drive</li> <li>• Lower EMI (electrical noise)</li> <li>• Reduced reflective wave peak voltage</li> </ul> <p>As a general rule, the Carrier Frequency should be set as low as possible without creating unacceptable audible noise in the motor. Smaller systems can have higher Carrier Frequencies, but larger drives (&gt;20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy Duty applications typically run around 2–4 kHz.</p>	
<p><b>The following Variable Torque (VT) and Constant Torque (CT) derating curves are for drives with 3-phase input power. The 230VAC, CT curves also apply equally whether the drive is supplied with 3-phase or 1-phase input power.</b></p>	
<b>230V Variable Torque Carrier Frequency Derating</b>	
<p>For 230V Variable Torque 50°C UL Open Type 40°C UL Type 1 or Open Type side-by-side</p>	<p>For 230V Variable Torque 40°C UL Open Type 30°C UL Type 1 or Open Type side-by-side</p>
<b>460V Variable Torque Carrier Frequency Derating</b>	
<p>For 460V Variable Torque 50°C UL Open Type 40°C UL Type 1 or Open Type side-by-side</p>	<p>For 460V Variable Torque 40°C UL Open Type 30°C UL Type 1 or Open Type side-by-side</p>
<i>(continued next page)</i>	

# DURAPULSE GS4 AC Drives – Selection

Selecting the Proper Drive Rating (continued from previous page)	
230V Constant Torque Carrier Frequency Derating	
For 230V Constant Torque 50°C UL Open Type 40°C UL Type 1 or Open Type side-by-side	For 230V Constant Torque 40°C UL Open Type 30°C UL Type 1 or Open Type side-by-side
460V Constant Torque Carrier Frequency Derating	
For 460V Constant Torque 50°C UL Open Type 40°C UL Type 1 or Open Type side-by-side	For 460V Constant Torque 40°C UL Open Type 30°C UL Type 1 or Open Type side-by-side

# DURAPULSE GS4 AC Drives – Selection Specs

## GS4 Drive Model Selection Tables

230V Class GS4 Specifications – Constant & Variable Torque Frame Sizes A, B (1hp–15hp)											
Model Name				GS4-21P0	GS4-22P0	GS4-23P0	GS4-25P0	GS4-27P5	GS4-2010	GS4-2015	
Price				\$525.00	\$578.00	\$653.00	\$739.00	\$835.00	\$932.00	\$1,125.00	
Frame Size				A				B			
Output Rating	Constant Torque (CT)	Max Motor Output (1-phase / 3-phase)	hp	0.5 / 1	0.75 / 2	1 / 3	2 / 5	3 / 7.5	3 / 10	5 / 15	
			kW	0.37 / 0.75	0.55 / 1.5	0.75 / 2.2	1.5 / 3.7	2.2 / 5.5	2.2 / 7.5	3.7 / 11	
		Rated Output Capacity (1-phase / 3-phase)	kVA	1.0 / 1.9	1.3 / 2.8	2.0 / 4.0	3.2 / 6.4	4.4 / 9.6	4.4 / 12	6.8 / 19	
		Rated Output Current (1-phase / 3-phase)	A	2.4 / 4.8	3.2 / 7.1	5 / 10	8 / 16	11 / 24	11 / 31	17 / 47	
		Carrier Frequency	kHz	2 to 6							
	Variable Torque (VT)	Max Motor Output	hp	1	2	3	5	7.5	10	15	
			kW	0.75	1.5	2.2	3.7	5.5	7.5	11	
		Rated Output Capacity	kVA	2.0	3.2	4.4	6.8	10	13	20	
		Rated Output Current	A	5	8	11	17	25	33	49	
		Carrier Frequency	kHz	2 to 15							
Input Rating *	CT	Rated Input Current *	A	6.4 / 6.1	9.7 / 11	15 / 15	20 / 18.5	26 / 26	26 / 34	40 / 50	
	VT	(1-phase / 3-phase)		6.4	12	16	20	28	36	52	
	Rated Voltage/Frequency		1-phase/3-phase 200–240 VAC (-15% to +10%), 50/60Hz								
	Operating Voltage Range		170–265 VAC								
	Frequency Tolerance		47–63 Hz								
	Short Circuit Withstand (SCCR) (A, rms symmetrical)		100kA								
IE2 Efficiency - Relative Power Loss				3.1%	2.8%	2.5%	2.1%	2.3%	2.1%	2.2%	
Weight (kg [lb])				2.6 [5.7]				5.4 [11.9]			
Watt Loss @ 100% I (W) **				61	88	115	159	264	335	529	
Cooling Method				natural convection	fan						
Dynamic Braking				built in							
DC Choke				optional							
EMI Filter				optional							
<p>* For Use With Three-Phase Motors Only. If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS4 AC Drives User Manual, Chapter 2 (<a href="http://www.automationdirect.com">www.automationdirect.com</a>). Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-162) for input fusing information.</p> <p>** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).</p>											

# DURAPULSE GS4 AC Drives – Selection Specifications

230V Class GS4 Specifications – Constant & Variable Torque Frame Sizes C–E (7.5 hp–100hp)											
Model Name				GS4-2020	GS4-2025	GS4-2030	GS4-2040	GS4-2050	GS4-2060	GS4-2075	GS4-2100
Price				\$1,586.00	\$1,723.00	\$1,953.00	\$3,449.00	\$3,961.00	\$5,282.00	\$5,932.00	\$6,913.00
Frame Size				C			D		E		
Output Rating	Constant Torque (CT)	Max Motor Output (1-phase / 3-phase)	hp	7.5/20	10/25	10/30	10/40	10/50	15/60	20/75	25/100
			kW	5.5/15	7.5/18.5	7.5/22	7.5/30	7.5/37	11/45	15/55	18.5/75
		Rated Output Capacity (1-phase / 3-phase)	kVA	10/25	13/28	13/34	13/45	13/55	20/68	26/81	30/96
		Rated Output Current (1-phase / 3-phase)	A	25/62	33/71	33/86	33/114	33/139	49/171	65/204	75/242
		Carrier Frequency	kHz	2 to 6							
	Variable Torque (VT)	Max Motor Output	hp	20	25	30	40	50	60	75	100
			kW	15	18.5	22	30	37	45	55	75
		Rated Output Capacity	kVA	26	30	36	48	58	72	86	102
		Rated Output Current	A	65	75	90	120	146	180	215	255
		Carrier Frequency	kHz	2 to 10			2 to 6				
Input Rating *	CT	Rated Input Current * (1-phase / 3-phase)	A	58/68	76/78	76/95	63/118	63/136	94/162	124/196	143/233
	VT		A	72	83	99	124	143	171	206	245
	Rated Voltage/Frequency		1-phase/3-phase 200–240 VAC (-15% to +10%), 50/60Hz								
	Operating Voltage Range		170–265 VAC								
	Frequency Tolerance		47–63 Hz								
	Short Circuit Withstand (SCCR) (A, rms symmetrical)		100kA								
IE2 Efficiency - Relative Power Loss				2.3%	2.4%	2.3%	1.9%	2.1%	1.9%	1.9%	2.7%
Weight (kg [lb])				9.8 [21.6]			38.5 [84.9]		64.8 [143]		
Watt Loss @ 100% I (W) **				616	733	865	1099	1311	1518	1709	2139
Cooling Method				fan							
Dynamic Braking				built in			optional Dynamic Braking Unit (DBU)				
DC Choke				optional			built in				
EMI Filter				optional							
<p>* For Use With Three-Phase Motors Only. If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS4 AC Drives User Manual, Chapter 2 (<a href="http://www.automationdirect.com">www.automationdirect.com</a>). Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-162) for input fusing information.</p> <p>** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).</p>											

# DURAPULSE GS4 AC Drives – Selection Specifications

460V Class GS4 Specifications – Constant & Variable Torque Frame Sizes A, B (1hp–20hp)												
Model Name				GS4-41P0	GS4-42P0	GS4-43P0	GS4-45P0	GS4-47P5	GS4-40T0	GS4-40T5	GS4-40T0	
Price				\$535.00	\$578.00	\$643.00	\$750.00	\$835.00	\$920.00	\$1,095.00	\$1,388.00	
Frame Size				A					B			
Output Rating	Constant Torque (CT)	Max Motor Output	hp	1	2	3	5	7.5	10	15	20	
			kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	
		Rated Output Capacity	kVA	2.3	3.0	4.5	6.5	8.8	14	18	24	
		Rated Output Current	A	2.9	3.8	5.7	8.1	11	17	23	30	
		Carrier Frequency	kHz	2 to 6								
	Variable Torque (VT)	Max Motor Output	hp	1	2	3	5	7.5	10	15	20	
			kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	
		Rated Output Capacity	kVA	2.4	3.2	4.8	7.2	9.6	14	19	25	
Rated Output Current		A	3	4	6	9	12	18	24	32		
	Carrier Frequency	kHz	2 to 15									
Input Rating *	CT	Rated Input Current	A	4.1	5.6	8.3	13	16	19	25	33	
	VT		A	4.3	5.9	8.7	14	17	20	26	35	
	Rated Voltage/Frequency		3-phase 380–480 VAC (-15% to +10%), 50/60Hz									
	Operating Voltage Range		323–528 VAC									
	Frequency Tolerance		47–63 Hz									
	Short Circuit Withstand (SCCR) (A, rms symmetrical)		100kA									
IE2 Efficiency - Relative Power Loss				2.6%	2.3%	2.2%	2.0%	1.9%	2.1%	2.0%	1.8%	
Weight (kg [lb])				2.6 [5.7]					5.4 [11.9]			
Watt Loss @ 100% I (W) **				59	74	104	141	180	292	380	518	
Cooling Method				natural convection		fan						
Dynamic Braking				built in								
DC Choke				optional								
EMI Filter				optional								
<p>* For Use With Three-Phase Motors Only.                      If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS4 AC Drives User Manual, Chapter 2 (<a href="http://www.automationdirect.com">www.automationdirect.com</a>).                      Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-162) for input fusing information.                      ** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).</p>												

# DURAPULSE GS4 AC Drives – Selection Specifications

460V Class GS4 Specifications – Constant & Variable Torque Frame Sizes C, D0, D (25hp–100hp)										
Model Name		GS4-4025	GS4-4030	GS4-4040	GS4-4050	GS4-4060	GS4-4075	GS4-4100		
Price		\$1,674.00	\$1,914.00	\$2,406.00	\$2,907.00	\$3,400.00	\$3,942.00	\$5,400.00		
Frame Size		C			D0		D			
Output Rating	Constant Torque (CT)	Max Motor Output	hp	25	30	40	50	60	75	100
			kW	18.5	22	30	37	45	55	75
		Rated Output Capacity	kVA	29	34	45	55	69	84	114
		Rated Output Current	A	36	43	57	69	86	105	143
		Carrier Frequency	kHz	2 to 6						
	Variable Torque (VT)	Max Motor Output	hp	25	30	40	50	60	75	100
			kW	18.5	22	30	37	45	55	75
		Rated Output Capacity	kVA	30	36	48	58	73	88	120
Rated Output Current		A	38	45	60	73	91	110	150	
	Carrier Frequency	kHz	2 to 10							
Input Rating *	CT	Rated Input Current	A	38	45	60	70	96	108	149
	VT		A	40	47	63	74	101	114	157
	Rated Voltage/Frequency		3-phase 380–480 VAC (-15% to +10%), 50/60Hz							
	Operating Voltage Range		323–528 VAC							
	Frequency Tolerance		47–63 Hz							
	Short Circuit Withstand (SCCR) (A, rms symmetrical)		100kA							
IE2 Efficiency - Relative Power Loss		1.6%	1.6%	1.6%	1.6%	1.6%	1.4%	1.3%		
Weight (kg [lb])		9.8 [21.6]			27.0 [59.5]		38.5 [84.9]			
Watt Loss @ 100% I (W) **		507	635	866	993	1147	1413	1742		
Cooling Method		fan								
Dynamic Braking		built in			optional Dynamic Braking Unit (DBU)					
DC Choke		optional			built in					
EMI Filter		optional								
<p>* For Use With Three-Phase Motors Only.            If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS4 AC Drives User Manual, Chapter 2 (<a href="http://www.automationdirect.com">www.automationdirect.com</a>).            Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-162) for input fusing information.            ** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).</p>										

# DURAPULSE GS4 AC Drives – Selection Specifications

460V Class GS4 Specifications – Constant & Variable Torque Frame Sizes E, F, G (125hp–300hp)										
Model Name				GS4-4125	GS4-4150	GS4-4175	GS4-4200	GS4-4250	GS4-4300	
Price				\$7,389.00	\$8,315.00	\$9,902.00	\$11,338.00	\$15,529.00	\$18,129.00	
Frame Size				E			F		G	
Output Rating	Constant Torque (CT)	Max Motor Output	hp	125	150	175	215	250	300	
			kW	90	110	132	160	185	220	
		Rated Output Capacity	kVA	136	167	197	235	280	348	
		Rated Output Current	A	171	209	247	295	352	437	
		Carrier Frequency	kHz	2 to 6						
	Variable Torque (VT)	Max Motor Output	hp	125	150	175	215	250	300	
			kW	90	110	132	160	185	220	
		Rated Output Capacity	kVA	143	175	207	247	295	367	
		Rated Output Current	A	180	220	260	310	370	460	
		Carrier Frequency	kHz	2 to 9						
Input Rating *	CT	Rated Input Current	A	159	197	228	285	361	380	
	VT		A	167	207	240	300	380	400	
	Rated Voltage/Frequency		3-phase 380–480 VAC (-15% to +10%), 50/60Hz							
	Operating Voltage Range		323–528 VAC							
	Frequency Tolerance		47–63 Hz							
	Short Circuit Withstand (SCCR) (A, rms symmetrical)		100kA							
IE2 Efficiency - Relative Power Loss				1.2%	1.2%	1.3%	1.3%	1.4%	1.5%	
Weight (kg [lb])				64.8 [143]			86.5 [191]		134 [295]	
Watt Loss @ 100% I (W) **				2092	2599	3081	3783	4589	5772	
Cooling Method				fan						
Dynamic Braking				optional						
DC Choke				built in						
EMI Filter				optional						
<p>* For Use With Three-Phase Motors Only.            If 3-phase power source is non-symmetrical, refer to "Circuit Connections – RFI Jumper" in the GS4 AC Drives User Manual, Chapter 2 (<a href="http://www.automationdirect.com">www.automationdirect.com</a>).            Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-162) for input fusing information.            ** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F; frame G is not capable of flange mounting).</p>										

# DURAPULSE GS4 AC Drives – General Specifications

<b>GS4 General Specifications (Applicable to All Models)</b>		
<b>Control Characteristics</b>	<b>Control Method</b>	1: V/F (V/Hz control); 2: SVC (sensorless vector control)
	<b>Starting Torque</b>	Up to 120% Variable Torque (VT) or 150% Constant Torque (CT) for one minute
	<b>V/F Curve</b>	4 point adjustable V/Hz curve and square curve
	<b>Speed Response Ability</b>	5Hz
	<b>Torque Limit</b>	VT: 170% output current CT: 180% output current
	<b>Torque Accuracy</b>	±5%
	<b>Max Output Frequency (Hz)</b>	230V series: 600.00 Hz (75hp & above: 400.00 Hz) 460V series: 600.00 Hz (125hp & above: 400.00 Hz)
	<b>Output Frequency Accuracy</b>	Digital command: ±0.01%, -10°C to +40°C Analog command: ±0.1%, 25±10°C
	<b>Output Frequency Resolution</b>	Digital command: 0.01Hz Analog command: (0.03) x (max output frequency) / 60Hz [±11 bit]
	<b>Overload Tolerance</b>	VT duty: rated output current is 120% for 60 seconds CT duty: rated output current is 150% for 60 seconds
	<b>Frequency Setting Signal</b>	+10V to -10V, 0 to 10V, 4–20mA, 0–20mA
	<b>Accel/Decel Time</b>	0.00–600.00 / 0.0–6000.0 seconds
	<b>Main Control Function</b>	Fault restart; Parameter copy; Dwell; BACnet communication; Momentary power loss ride-through; Speed search; Over-torque detection; Torque limit; 16-step speed (max); Accel/Decel time switch; S-curve accel/decel; 3-wire sequence; Auto-Tuning (rotational, stationary); Frequency upper/lower limit settings; Cooling fan on/off switch; Slip compensation; Torque compensation; JOG frequency; MODBUS communication (RS-485 RJ45, max 115.2 kbps); DC injection braking at start/stop; Smart stall; PID control (with sleep function); Energy saving control; Optional ModbusTCP or EtherNet/IP communication/control
<b>Fan Control</b>	230V model GS4-2020 and above: PMW control 230V model GS4-2015 and below: ON/OFF switch control 460V model GS4-4025 and above: PMW control 460V model GS4-4020 and below: ON/OFF switch control	
<b>Protection Characteristics</b>	<b>Motor Protection</b>	Electronic thermal relay protection
	<b>Over-current Protection</b>	For drive model 230V and 460V: Over-current protection for 240% rated current Current clamp: VT duty 170–175%; CT duty 180–185%
	<b>Over-voltage Protection</b>	230V: drive will stop when DC-BUS voltage exceeds 410V 460V: drive will stop when DC-BUS voltage exceeds 820V
	<b>Over-temperature Protection</b>	Built-in temperature sensor
	<b>Stall Prevention</b>	Independent stall prevention during acceleration, deceleration, and running
	<b>Restart After Instantaneous Power Failure</b>	Up to 20 seconds (parameter settable)
	<b>Ground Leakage Current Protection</b>	Leakage current is higher than 50% of rated current of the AC motor drive
	<b>Hi-Pot Test</b>	UL508C; EN 61800-5-1
<b>Conformal Coating</b>	IEC-60721-3-3	
<b>Agency Approvals</b>	CE, Reach, RoHS, TUV, cULus; (Accessories are CE; Agency approvals other than CE do not apply to accessory conduit box kits, fan kits, flange mount kits, and braking resistors.) <i>To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.</i>	

# DURAPULSE GS4 AC Drives – Optional GS4-Specific Internal Accessories List

## Accessories Available for GS4 AC Drives Only

GS4 AC Drives Software and Accessories Internal or Attached to GS4 Drive										
Model Number	Frame Size	GS4 Drive Software	GS4 PLC Software	Drive Keypad*	Keypad Mounting Bezel	I/O Modules	Communication Modules	Conduit Boxes	Cooling Fans*	Flange Mount Kits
		<a href="#">pg.tGSX-93</a>	<a href="#">pg.tGSX-94</a>	<a href="#">pg.tGSX-95</a>	<a href="#">pg.tGSX-95</a>	<a href="#">pg.tGSX-91</a>	<a href="#">pg.tGSX-92</a>	<a href="#">pg.tGSX-98</a>	230V <a href="#">pg.tGSX-96</a> 460V <a href="#">pg.tGSX-97</a>	<a href="#">pg.tGSX-99</a>
<a href="#">GS4-21P0</a>	A							n/a	n/a	<a href="#">GS4-FMKIT-A</a>
<a href="#">GS4-22P0</a>										<a href="#">GS4-FMKIT-1</a>
<a href="#">GS4-23P0</a>									<a href="#">GS4-FAN-AM</a>	<a href="#">GS4-FMKIT-A</a>
<a href="#">GS4-25P0</a>										<a href="#">GS4-FMKIT-A</a>
<a href="#">GS4-27P5</a>	B							n/a	<a href="#">GS4-FAN-BM1</a> <a href="#">GS4-FAN-BB</a>	<a href="#">GS4-FMKIT-B</a>
<a href="#">GS4-2010</a>									<a href="#">GS4-FAN-BM2</a> <a href="#">GS4-FAN-BB</a>	
<a href="#">GS4-2015</a>										
<a href="#">GS4-2020</a>	C							n/a	<a href="#">GS4-FAN-CM</a> <a href="#">GS4-FAN-CB1</a>	<a href="#">GS4-FMKIT-C</a>
<a href="#">GS4-2025</a>										
<a href="#">GS4-2030</a>	D**							<a href="#">GS4-CBX-D</a>	<a href="#">GS4-FAN-DM</a> <a href="#">GS4-FAN-DB</a>	n/a
<a href="#">GS4-2040</a>										
<a href="#">GS4-2050</a>	E**							<a href="#">GS4-CBX-E</a>	<a href="#">GS4-FAN-EM1</a> <a href="#">GS4-FAN-EB</a>	n/a
<a href="#">GS4-2060</a>									<a href="#">GS4-FAN-EM2</a> <a href="#">GS4-FAN-EB</a>	
<a href="#">GS4-2075</a>										
<a href="#">GS4-2100</a>	A	GSOFT2	GSLOGIC	GS4-KPD	GS4-BZL	GS4-06CDD GS4-06NA GS4-06TR	GS4-CM-ENETIP GS4-CM-MODTCP	n/a	n/a	<a href="#">GS4-FMKIT-A</a>
<a href="#">GS4-41P0</a>										<a href="#">GS4-FMKIT-1</a>
<a href="#">GS4-42P0</a>										<a href="#">GS4-FMKIT-A</a>
<a href="#">GS4-43P0</a>										
<a href="#">GS4-45P0</a>										
<a href="#">GS4-47P5</a>										
<a href="#">GS4-4010</a>	B							n/a	<a href="#">GS4-FAN-BM1</a> <a href="#">GS4-FAN-BB</a>	<a href="#">GS4-FMKIT-B</a>
<a href="#">GS4-4015</a>									<a href="#">GS4-FAN-BM2</a> <a href="#">GS4-FAN-BB</a>	
<a href="#">GS4-4020</a>	C							n/a	<a href="#">GS4-FAN-CM</a> <a href="#">GS4-FAN-CB2</a>	<a href="#">GS4-FMKIT-C</a>
<a href="#">GS4-4025</a>										
<a href="#">GS4-4030</a>	D0**							<a href="#">GS4-CBX-D0</a>	<a href="#">GS4-FAN-D0M</a> <a href="#">GS4-FAN-DB</a>	n/a
<a href="#">GS4-4060</a>										
<a href="#">GS4-4075</a>	D**							<a href="#">GS4-CBX-D</a>	<a href="#">GS4-FAN-DM</a> <a href="#">GS4-FAN-DB</a>	n/a
<a href="#">GS4-4100</a>										
<a href="#">GS4-4125</a>	E**							<a href="#">GS4-CBX-E</a>	<a href="#">GS4-FAN-EM2</a> <a href="#">GS4-FAN-DB</a>	n/a
<a href="#">GS4-4150</a>										
<a href="#">GS4-4175</a>	F**							<a href="#">GS4-CBX-F</a>	<a href="#">GS4-FAN-FM</a> <a href="#">GS4-FAN-FB</a>	n/a
<a href="#">GS4-4200</a>										
<a href="#">GS4-4250</a>	G							<a href="#">GS4-CBX-G</a>	<a href="#">GS4-FAN-GM</a>	n/a
<a href="#">GS4-4300</a>										

\* Keypads and Cooling Fans are pre-installed and included with the GS4 Drives.  
They are field-replaceable and available for purchase separately as spare or replacement parts.  
\*\* GS4 drives in D0, D, E and F frames can be flanged mounted and do not require a flange mount kit.



Note: Refer to the page numbers shown above for more complete information about the accessory products.

# DURAPULSE GS4 AC Drives – Optional External Accessories List

## Accessories Available for GS4 AC Drives

GS4 AC Drives Accessories External or Remote from GS4 Drive								
Model Number	Frame Size	Braking Units		Braking Resistors		Reactors	EMI Filters	Fusing
		Quantity	pg.tGSX-138	Quantity	pg.tGSX-138	pg.tGSX-119	pg.tGSX-155	pg.tGSX-162
<a href="#">GS4-21P0</a>	A	n/a		1	<a href="#">GS-BR-080W200</a>		<a href="#">KMF325A</a>	
<a href="#">GS4-22P0</a>			1	<a href="#">GS-BR-200W091</a>				
<a href="#">GS4-23P0</a>			1	<a href="#">GS-BR-300W070</a>				
<a href="#">GS4-25P0</a>			1	<a href="#">GS-BR-400W040</a>				
<a href="#">GS4-27P5</a>	B	n/a		1	<a href="#">GS-BR-1K0W020</a>		<a href="#">KMF370A</a>	
<a href="#">GS4-2010</a>			1	<a href="#">GS-BR-1K0W020</a>				
<a href="#">GS4-2015</a>			1	<a href="#">GS-BR-1K5W013</a>				
<a href="#">GS4-2020</a>	C	n/a		2	<a href="#">GS-BR-1K0W4P3</a>		<a href="#">KMF3100A</a>	
<a href="#">GS4-2025</a>			2	<a href="#">GS-BR-1K0W4P3</a>				
<a href="#">GS4-2030</a>			2	<a href="#">GS-BR-1K5W3P3</a>				
<a href="#">GS4-2040</a>	D	2	<a href="#">GS-1DBU</a>	4	<a href="#">GS-BR-1K0W5P1</a>		<a href="#">MIF3150</a>	
<a href="#">GS4-2050</a>		2	<a href="#">GS-2DBU</a>	4	<a href="#">GS-BR-1K2W3P9</a>			
<a href="#">GS4-2060</a>	E	2	<a href="#">GS-2DBU</a>	4	<a href="#">GS-BR-1K5W3P3</a>		<a href="#">MIF3400B</a>	
<a href="#">GS4-2075</a>		3	<a href="#">GS-2DBU</a>	6	<a href="#">GS-BR-1K2W3P9</a>			
<a href="#">GS4-2100</a>		4	<a href="#">GS-2DBU</a>	8	<a href="#">GS-BR-1K2W3P9</a>			
<a href="#">GS4-41P0</a>	A	n/a		1	<a href="#">GS-BR-080W750</a>	Refer to Reactors Specification pages due to multiple factors of variability	<a href="#">KMF318A</a>	Refer to Fusing Specification pages due to multiple factors of variability
<a href="#">GS4-42P0</a>			1	<a href="#">GS-BR-200W360</a>				
<a href="#">GS4-43P0</a>			1	<a href="#">GS-BR-300W250</a>				
<a href="#">GS4-45P0</a>			1	<a href="#">GS-BR-400W150</a>				
<a href="#">GS4-47P5</a>			1	<a href="#">GS-BR-1K0W075</a>				
<a href="#">GS4-4010</a>	B	n/a		1	<a href="#">GS-BR-1K0W075</a>		<a href="#">KMF350A</a>	
<a href="#">GS4-4015</a>			1	<a href="#">GS-BR-1K5W043</a>				
<a href="#">GS4-4020</a>			2	<a href="#">GS-BR-1K0W016</a>				
<a href="#">GS4-4025</a>	C	n/a		2	<a href="#">GS-BR-1K0W016</a>		<a href="#">KMF370A</a>	
<a href="#">GS4-4030</a>			2	<a href="#">GS-BR-1K5W013</a>				
<a href="#">GS4-4040</a>			4	<a href="#">GS-BR-1K0W016</a>				
<a href="#">GS4-4050</a>			1	<a href="#">GS-4DBU</a>	4			
<a href="#">GS4-4060</a>	DO	1	<a href="#">GS-4DBU</a>	4	<a href="#">GS-BR-1K5W013</a>		<a href="#">MIF3150</a>	
<a href="#">GS4-4075</a>	D	2	<a href="#">GS-3DBU</a>	8	<a href="#">GS-BR-1K0W5P1</a>		<a href="#">MIF3150</a>	
<a href="#">GS4-4100</a>		2	<a href="#">GS-4DBU</a>	8	<a href="#">GS-BR-1K2W015</a>			
<a href="#">GS4-4125</a>	E	2	<a href="#">GS-4DBU</a>	8	<a href="#">GS-BR-1K5W013</a>		<a href="#">MIF3400B</a>	
<a href="#">GS4-4150</a>		1	<a href="#">GS-5DBU</a>	10	<a href="#">GS-BR-1K2W015</a>			
<a href="#">GS4-4175</a>	F	1	<a href="#">GS-6DBU</a>	12	<a href="#">GS-BR-1K5W012</a>		<a href="#">MIF3400B</a>	
<a href="#">GS4-4200</a>		1	<a href="#">GS-6DBU</a>	12	<a href="#">GS-BR-1K5W012</a>			
<a href="#">GS4-4250</a>	G	1	<a href="#">GS-7DBU</a>	14	<a href="#">GS-BR-1K5W012</a>		<a href="#">MIF3800 + (3) TOR254</a>	
<a href="#">GS4-4300</a>		2	<a href="#">GS-5DBU</a>	20	<a href="#">GS-BR-1K2W015</a>			



**WARNING: REFER TO THE PAGE NUMBERS SHOWN ABOVE FOR INFORMATION ABOUT THE PRODUCT SPECIFICATIONS AND THE CONDITIONS UNDER WHICH THE PRODUCT SELECTIONS ARE APPLICABLE.**

# GS4-Specific Optional Accessories – Input/Output Expansion Cards

## Accessories Applicable Only to GS4 AC Drives

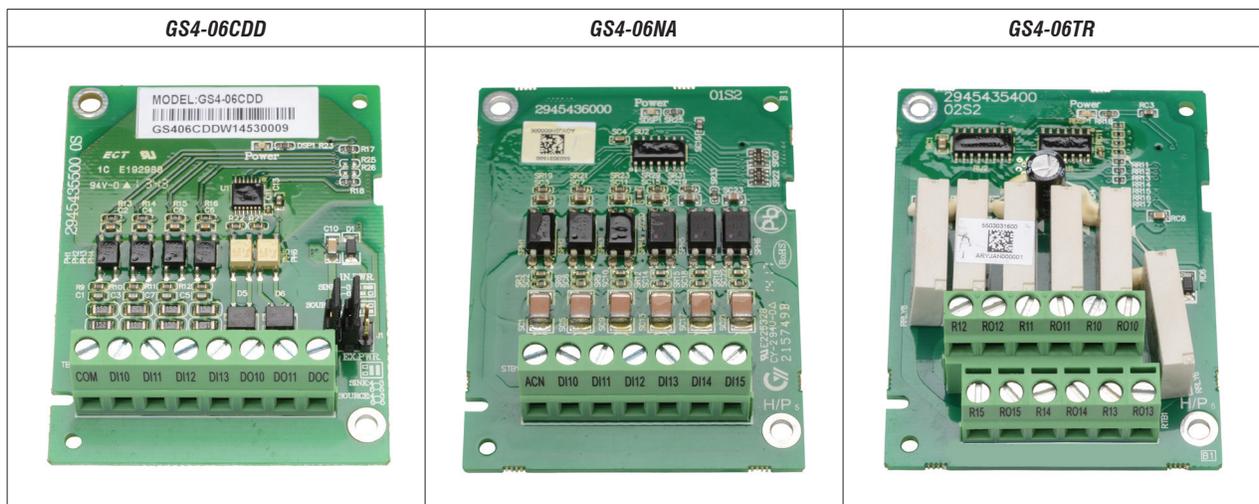
Please refer to the "GS/DURApulse AC Drives – Accessories" section for accessories applicable to multiple families of GS/DURApulse AC Drives, including GS4.

## Input/Output Expansion Cards

Optional I/O cards allow additional inputs and outputs to be added to the GS4 internal I/O. (Only one I/O card can be installed at a time.)

GS4 DURAPULSE Drives Input/Output Expansion Cards							
Part Number	Price	Description	Terminals	Specifications	Wire Size	Placement*	GS Drive
<b>GS4-06CDD*</b>	\$33.50	DURAPULSE combination discrete I/O module, selectable sinking or sourcing 24VDC input, 24VDC output, 4-point input, 2-point output, 1 input common(s), 1 output common(s), 50mA resistive output current.	COM	(1) Common for Input Terminals	20~24 AWG	slot #3	GS4 – all
			DI10–DI13	(4) Discrete Inputs; selectable sinking or sourcing Internal power available: 24VDC ±5% 200mA, 5W External power: 24VDC (30V max, 19V min), 30W ON: activation 6.5mA @ ≥ 9VDC OFF: leakage 10µA ≤ 3VDC			
			DO10–DO11	(2) Discrete Outputs (photocoupler) Duty-cycle: 50% Max. output frequency: 100Hz Max. current: 50mA resistive Max. voltage: 48VDC			
			DOC	(1) Common for Output Terminals			
<b>GS4-06NA*</b>	\$36.00	DURAPULSE discrete input module, sinking 120VAC input, 6-point input, 1 input common(s).	ACN	(1) AC power common for Input Terminal (Neutral)	20~24 AWG	slot #3	GS4 – all
			DI10–DI15	(6) Discrete Inputs; sinking Input voltage: 100–130 VAC Input frequency: 47–63 Hz Input impedance: 27kΩ Terminal response time: ON: 10ms OFF: 20ms			
<b>GS4-06TR*</b>	\$55.00	DURAPULSE relay output module, Form A (SPST-NO) relays, 6-point output, 6 output common(s), 3 Amps resistive output current, 1.2 Amps inductive output current, 250VAC/30VDC input.	R10–R15	(6) separate commons for each relay	20~26 AWG	slot #3	GS4 – all
			RO10–RO15	(6) normally open relay output Resistive load: 5A(NO) / 250VAC 5A(NO) / 30VDC Inductive load (COSØ 0.4) 2A(NO) / 250VAC			

\* GS4 AC drives have three option card slots; each slot will hold only one option card designed for that particular slot. I/O cards are designed for slot #3, and will not fit in any other slot.



# GS4-Specific Optional Accessories – Communication Interface Cards

## Accessories Applicable Only to GS4 AC Drives

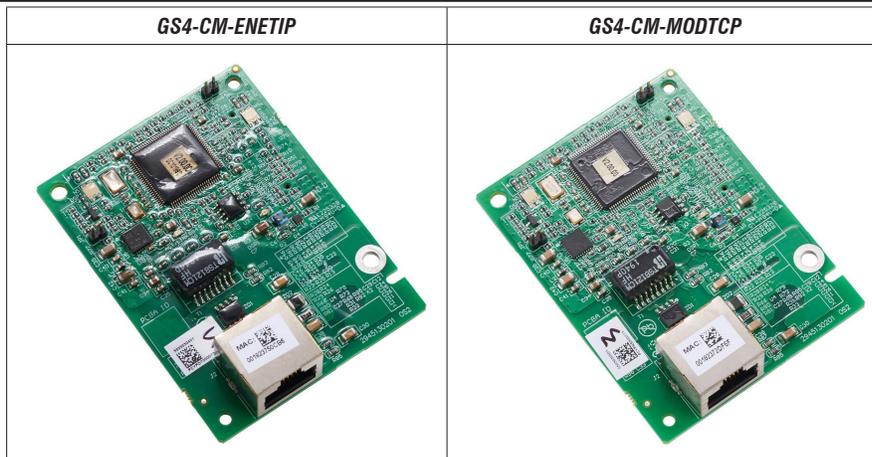
Please refer to the “GS/DURApulse AC Drives – Accessories” section for accessories applicable to multiple families of GS/DURApulse AC Drives, including GS4.

### Communication Cards

Communication interface cards provide EtherNet/IP™ or ModbusTCP communication capability. Only one communication card can be installed at a time.

GS4 DURAPULSE Drives Communication Interface Cards					
Part Number	Price	Description	Specifications	Placement*	GS Drive
<b>GS4-CM-ENETIP*</b>	\$110.00	DURAPULSE communication card, EtherNet/IP	Interface: EtherNet/IP RJ45 with MDI/MDIX auto-detect Number of ports: 1 (16 connections max) Transmission method: IEEE 802.3, IEEE 802.3u Transmission cable: Category 5e shielding 100MHz Transmission speed: 10/100 Mbps Auto-Detect Network protocol: ICMP, IP, TCP, UDP, DHCP, Modbus TCP, EtherNet/IP Power supply voltage: 5VDC (supplied by the GS4 AC drive) Insulation voltage: 500VDC Power consumption: 0.8W Weight: 25g Noise immunity ESD (IEC 61800-5-1, IEC 61000-4-2) EFT (IEC 61800-5-1, IEC 61000-4-4) Surge Test (IEC 61800-5-1, IEC 61000-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 61000-4-6) Operation: -10°C to +50°C [14°F to 122°F] (temperature), 90% (humidity) Storage: -25°C to +70°C [-13°F to +158°F] (temperature), 95% (humidity) Vibration / Shock immunity: IEC 61800-5-1, IEC 60068-2-6/IEC 61800-5-1, IEC 60068-2-27 Ethernet timeout functionality for EtherNet/IP connections GS4-CM-ENETIP supports 4 EtherNet/IP connections and also supports 4 ModTCP connections. These ModTCP connections cannot start/stop or change command frequency in the drive, but can be used to monitor the drive and change Parameters. Ethernet timeout functionality <u>for ModTCP connections</u> is <u>not</u> supported on the EtherNet/IP card.	slot #1	GS4 – all
<b>GS4-CM-MODTCP*</b>	\$97.00	DURAPULSE communication card, ModbusTCP	Interface: Ethernet RJ45 with MDI/MDX auto-detect Number of ports: 1 (4 connections max) Transmission method: IEEE 802.3, IEEE 802.3u Transmission cable: Category 5e shielding 100MHz Transmission speed: 10/100 Mbps Auto-Detect Network protocol: ICMP, IP, TCP, UDP, DHCP, Modbus TCP Power supply voltage: 5VDC (supplied by the GS4 AC drive) Insulation voltage: 500VDC Power consumption: 0.8W Weight: 25g Noise immunity ESD (IEC 61800-5-1, IEC 61000-4-2) EFT (IEC 61800-5-1, IEC 61000-4-4) Surge Test (IEC 61800-5-1, IEC 61000-4-5) Conducted Susceptibility Test (IEC 61800-5-1, IEC 61000-4-6) Operation: -10°C to +50°C [14°F to 122°F] (temperature), 90% (humidity) Storage: -25°C to +70°C [-13°F to +158°F] (temperature), 95% (humidity) Vibration / Shock immunity: IEC 61800-5-1, IEC 60068-2-6/IEC 61800-5-1, IEC 60068-2-27 Ethernet Timeout functionality for ModTCP connections	slot #1	GS4 – all

\* GS4 AC drives have three option card slots; each slot will hold only one option card designed for that particular slot. Communication interface cards are designed for slot #1, and will not fit in any other slot.



# GS4/GS10/GS20(X) Accessories – Software

## GSoft2 Drive Configuration Software

Optional Accessory Software Applicable Only to AC Drive Series:

- GS4
- GS10
- GS20(X)

GSoft2 Drive Configuration Software – Available for *FREE* Download

GS20(X) DURAPULSE Drives GSOFT2 Drive Configuration Software			
Part Number	Price*	Description	For GS Drive
<b>GSOFT2</b>	\$10.50	Drive Configuration Software for GS4 and GS20(X) AC drives	GS4 – all GS10 – all GS20(X) – all
<b>USB-485M</b>	\$60.00	PC adapter, USB A to RS-485 (RJ45/RJ12).	GS4/GS10
<b>USB-CBL-AB3</b>	\$12.00	Programming cable, USB A to USB B, 3ft cable length.	GS4 – all (for Drive FW only) GS20(X)
* GSOFT2 can be downloaded for <u>free</u> or purchased on USB from AutomationDirect.com (search for GSOFT2).			

## GSOFT2 Drive Configuration Software

GSoft2 is the configuration software for the Automation Direct GS4 and GS10/GS20(X) family of drives. It is designed to allow you to connect a personal computer to the drive, and perform a variety of functions.

GSoft2 includes an integral help file with software instructions. GSoft2 can be downloaded for free or purchased on USB from AutomationDirect.com (search for GSoft2).

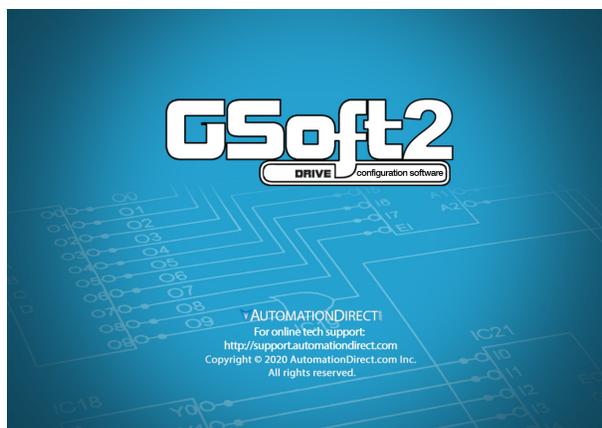
## Functions

- Create new drive configurations
- Upload/download drive configurations
- Edit drive configurations
- Archive/store multiple drive configurations on your PC
- Trend drive operation parameters (not available with GS10)
- Tune the drive PID loop
- View real time key operating parameters
- Start/Stop drive and switch directions, provided drive is set up for remote operation
- View drive faults

## Computer System Requirements

GSoft2 will run on PCs that meet the following requirements:

- Windows OS: **7**: 32 & 64 bit, **8**: 32 & 64 bit, **8.1**: 32 & 64 bit, **10**: 64 bit, 11
- Internet Explorer 9.0 or higher (for HTML help support)
- 32 Mb of available memory
- 10 Mb hard drive space
- Available USB port



# GS4/GS20(X) Accessories – Software

## GSLogic PLC Programming Software

Optional Accessory Software Applicable Only to AC Drive Series:

- GS4
- GS20(X)

GSLOGIC Drive Configuration Software – Available for *FREE* Download

GS20(X) DURAPULSE Drives GSLogic PLC Programming Software			
Part Number	Price*	Description	For GS Drive
<b>GSLOGIC</b>	\$10.50	Windows PLC Logic Software for GS4 and GS20(X) AC drives	GS4 - all GS20(X) – all
<b>USB-485M</b>	\$60.00	PC adapter, USB A to RS-485 (RJ45/RJ12).	GS4
<b>USB-CBL-AB3</b>	\$12.00	Programming cable, USB A to USB B, 3ft cable length.	GS20(X)

\* GSLOGIC can be downloaded for free or purchased on USB from AutomationDirect.com (search for GSLOGIC).

### PLC Summary

The GS4 and GS20(X) drives include a built-in PLC. Programmed in ladder logic, the PLC provides a comprehensive set of instructions and 2,000 (GS20(X)) or 10,000 (GS4) steps of programming capacity. GSLogic PLC software includes a Help File which contains the detailed information needed to use the PLC.

The PLC functionality is included with every GS4 and GS20(X) drive, and can be accessed over communications by external PLCs (over serial Modbus), or by the drive (using built-in PLC instructions). The PLC is perfectly suited for applications where digital and analog I/O requirements are small. For applications with complex PLC programming or large I/O requirements, please consider Click, Productivity, or Do-More/BRX. All of these PLCs can be easily integrated with the GS drive family or PLC. The GS4-KPD keypad is capable of storing multiple PLC programs.

There are two methods for communicating from the PLC to the drive. The first method is to use the WPR and RPR instructions available in the PLC's library. These two instructions can read from or write to any AC drive parameter in the same physical drive. The second method is to use Modbus RTU. The PLC is a Serial Modbus slave only. A Modbus RTU master can communicate with the PLC via serial only; optional communication cards cannot address the PLC. If communication cards (EtherNet/IP or Modbus TCP) are the desired method of communication, the drive includes PLC Buffers parameters that can be used. Simply write the needed information from the PLC into the drive's PLC buffer parameters using the WPR instruction. The Modbus TCP or EtherNet/IP cards can then read the VFD parameters.

### GSLogic Introduction

GSLogic is the drive PLC programming software for the AutomationDirect GS4 and GS20(X) family of drives. It is designed to enable you to perform a variety of drive PLC programming functions. Windows editing functions like cut, copy, paste, multiple windows, etc., are supported. GSLogic also provides for register editing, settings, file reading, saving, online monitoring settings, and other convenience functions, such as:

- Upload/download drive PLC program files to the onboard PLC
- Create new drive PLC programs
- Edit drive PLC programs
- Archive/store multiple drive PLC programs on your PC or the GS4-KPD

drive keypad

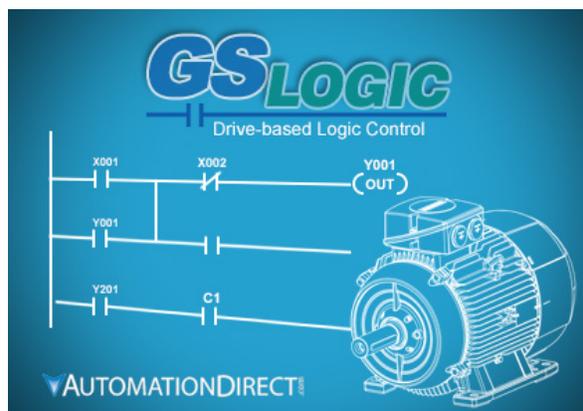
- Control drive PID loops (FPID instructions)
- View in real time all drive PLC registers
- Print drive PLC program files

GSLogic includes an integral help file that includes software instructions, how to use GSLogic, and how to use the GS drive PLC.

### GSLogic System Requirements

GSLogic is a Windows-based programming software environment. Please check the following requirements when choosing your PC configuration:

- Windows OS: **Z**: 32 & 64 bit, **8**: 32 & 64 bit, **8.1**: 32 & 64 bit, **10**: 64 bit
- SVGA 1024x768 pixels resolution (1280x1024 pixels resolution recommended)
- 300MB free hard-disk space
- RAM: Windows 7 & higher with GUI version 2.0.0.x or higher; RAM = 2GB memory (4GB recommended) with GUI version 1.1.0 or lower; RAM = 512MB free RAM (1GB recommended)
- USB Port required for project transfer to drive
- USB-485M serial adapter required (GS4 only)



# GS4/GS10/GS20(X) Optional Accessories – External Keypad Mounting Kit / Spare Keypad

## Accessories Applicable Only to GS4, GS10, and GS20(X) AC Drives

Please refer to the "GS/DURApulse AC Drives – Accessories" section for accessories applicable to multiple families of GS/DURApulse AC Drives,

### Keypad (Spare/Replacement)

NOTE: The keypad described below is included with the GS4 AC Drive, and is also available for purchase separately as a spare/replacement component for GS4, or an optional upgrade for GS10/GS20(X).

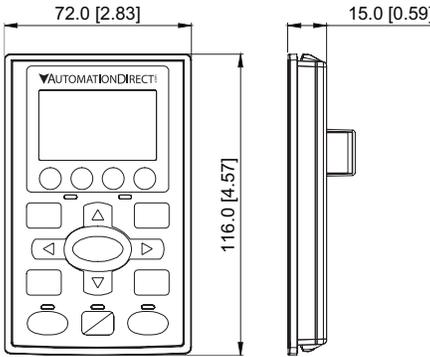
### Keypad Panel-Mounting Kit

NOTE: The keypad panel-mounting kit described below is an optional accessory that is NOT included with the GS10/GS20(X) AC drive.

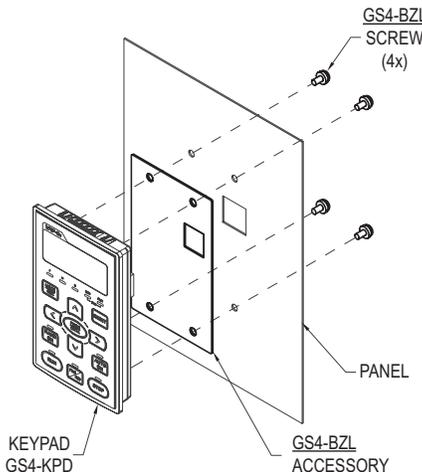
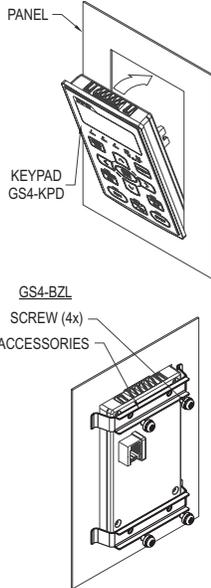
GSx Series DURAPULSE Drives Keypad and Keypad Panel-Mounting Kit			
Part Number	Price	Description	For GS Drive
<b>GS4-KPD*</b>	\$107.00	Spare or replacement keypad for GS4 AC drives; optional advanced keypad for GS20(X) drives; includes RJ45 connector; great for maintenance or back-up programs.	GS4 – all GS10 – all GS20(X) – all
<b>GS4-BZL**</b>	\$29.50	Keypad Panel-Mounting Kit for remote surface mounting or embedded mounting of the AC drive removable keypad; hardware included. Use a standard Cat5e RJ45 patch cable (not included) to connect a remote-mounted keypad to the drive. Max cable length for remote-mounted keypad = 5m.	GS4 – all GS10 – all GS20(X) – all

\* A keypad is included with each GS4 AC Drive; additional keypads are available for spare/replacement components.  
 \*\* The keypad mounting kit is an optional accessory that is NOT included with the GS4 AC drive; for mounting the keypad remotely from the drive.  
 Note: Keypad firmware can only be upgraded when connected to a GS4 drive.

**GS4-KPD**

	RJ45 Connector	Dimensions (mm [in])
		

**GS4-BZL**

	Wall Mounting	Embedded Mounting
		

# GS4-Specific Optional Accessories – Spare/Replacement Cooling Fans

## Accessories Applicable Only to GS4 AC Drives

Please refer to the "GS/DURApulse AC Drives – Accessories" section for accessories applicable to multiple families of GS/DURApulse AC Drives, including GS4.

### Cooling Fans for 230V GS4 Drives (Spare/Replacement)

NOTE: The fans described below are included with the applicable GS4 AC Drive, and are also available for purchase separately as spare/replacement components.

GS4 230V Models – (GS4-2xxx) – Fan Selection Table								
Drive Model	Fan Model *			Description	Size	Voltage	Amps / Fan	Fans / Kit
	Part #	Price	Photo					
GS4-22P0 GS4-23P0 GS4-25P0	<a href="#"><u>GS4-FAN-AM</u></a>	\$28.00		Frame A main	40mm	24	0.15	1
GS4-27P5	<a href="#"><u>GS4-FAN-BM1</u></a>	\$34.50		Frame B main	80mm	24	0.33	1
	<a href="#"><u>GS4-FAN-BB</u></a>	\$27.00		Frame B board level	40mm	24	0.18	1
GS4-2010 GS4-2015	<a href="#"><u>GS4-FAN-BM2</u></a>	\$52.00		Frame B main	80mm	24	0.51	1
	<a href="#"><u>GS4-FAN-BB</u></a>	\$27.00		Frame B board level	40mm	24	0.18	1
GS4-2020 GS4-2025 GS4-2030	<a href="#"><u>GS4-FAN-CM</u></a>	\$49.00		Frame C main	92mm	24	0.75	1
	<a href="#"><u>GS4-FAN-CB1</u></a>	\$28.00		Frame C board level	40mm	24	0.18	1
GS4-2040 GS4-2050	<a href="#"><u>GS4-FAN-DM</u></a>	\$174.00		Frame D main	92mm	24	0.75	2
	<a href="#"><u>GS4-FAN-DB</u></a>	\$58.00		Frame D board level	70mm	24	0.33	1
GS4-2060 GS4-2075	<a href="#"><u>GS4-FAN-EM1</u></a>	\$239.00		Frame E main	120mm	24	1.08	2
	<a href="#"><u>GS4-FAN-EB</u></a>	\$119.00		Frame E board level	120mm	24	0.76	1
GS4-2100	<a href="#"><u>GS4-FAN-EM2</u></a>	\$303.00		Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
	<a href="#"><u>GS4-FAN-EB</u></a>	\$119.00		Frame E board level	120mm	24	0.76	1

\* These fans are included with the GS4 drive, and also available separately as spare or replacement components. Electrical connectors are included.

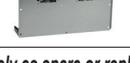
# GS4-Specific Optional Accessories – Spare/Replacement Cooling Fans

## Accessories Applicable Only to GS4 AC Drives

Please refer to the "GS/DURApulse AC Drives – Accessories" section for accessories applicable to multiple families of GS/DURApulse AC Drives, including GS4.

### Cooling Fans for 460V GS4 Drives (Spare/Replacement)

NOTE: The fans described below are included with the applicable GS4 AC Drive, and are also available for purchase separately as spare/replacement components.

GS4 460V Models – (GS4-4xxx) – Fan Selection Table								
Drive Model	Fan Model *			Description	Size	Voltage	Amps / Fan	Fans / Kit
	Part #	Price	Photo					
GS4-43P0 GS4-45P0 GS4-47P5	<b>GS4-FAN-AM</b>	\$28.00		Frame A main	40mm	24	0.15	1
GS4-4010	<b>GS4-FAN-BM1</b>	\$34.50		Frame B main	80mm	24	0.33	1
	<b>GS4-FAN-BB</b>	\$27.00		Frame B board level	40mm	24	0.18	1
GS4-4015 GS4-4020	<b>GS4-FAN-BM2</b>	\$52.00		Frame B main	80mm	24	0.51	1
	<b>GS4-FAN-BB</b>	\$27.00		Frame B board level	40mm	24	0.18	1
GS4-4025 GS4-4030 GS4-4040	<b>GS4-FAN-CM</b>	\$49.00		Frame C main	92mm	24	0.75	1
	<b>GS4-FAN-CB2</b>	\$34.50		Frame C board level	40mm	12	0.60	1
GS4-4050 GS4-4060	<b>GS4-FAN-DM0</b>	\$98.00		Frame D0 main	80mm	24	0.75	2
	<b>GS4-FAN-DB</b>	\$58.00		Frame D board level	70mm	24	0.33	1
GS4-4075 GS4-4100	<b>GS4-FAN-DM</b>	\$174.00		Frame D main	92mm	24	0.75	2
	<b>GS4-FAN-DB</b>	\$58.00		Frame D board level	70mm	24	0.33	1
GS4-4125 GS4-4150	<b>GS4-FAN-EM2</b>	\$303.00		Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
	<b>GS4-FAN-EB</b>	\$119.00		Frame E board level	120mm	24	0.76	1
GS4-4175 GS4-4200	<b>GS4-FAN-FM</b>	\$431.00		Frame F main	92mm	24	0.76	4
	<b>GS4-FAN-FB</b>	\$126.00		Frame F board level	120mm	24	1.08	1
GS4-4250 GS4-4300	<b>GS4-FAN-GM</b>	\$902.00		Frame G main	250mm	48	2.2	2

\* These fans are included with the GS4 drive, and also available separately as spare or replacement components. Electrical connectors are included.

# GS4-Specific Optional Accessories – Conduit Boxes

## Accessories Applicable Only to GS4 AC Drives

Please refer to the “GS/DURApulse AC Drives – Accessories” section for accessories applicable to multiple families of GS/DURApulse AC Drives, including GS4.

### Conduit Boxes

Optional Conduit Box Kits can be ordered separately. These kits bolt onto the bottom of the applicable GS4 drive to provide a convenient connection point for conduit entry, allowing the GS4 to maintain a IP20/NEMA 1 environmental protection rating; especially useful for GS4 drives mounted outside of an electrical control panel.

**Note:** GS4 Frames A through C have integral conduit box space built into the drive. No separate conduit boxes are necessary or available.

GS4 Frame Sizes D0–G – Conduit Box Selection Table					
Drive		Conduit Box **			Description
Model	Frame*	Part #	Price	Photo	
GS4-4060, GS4-4050	D0	<a href="#"><u>GS4-CBX-D0</u></a>	\$163.00		NEMA 1 conduit box kit for use with GS4 frame size D0 AC drive; mounting hardware included
GS4-2040, GS4-2050; GS4-4075, GS4-4100	D	<a href="#"><u>GS4-CBX-D</u></a>	\$163.00		NEMA 1 conduit box kit for use with GS4 frame size D AC drive; mounting hardware included
GS4-2060, GS4-2075, GS4-2100; GS4-4125, GS4-4150	E	<a href="#"><u>GS4-CBX-E</u></a>	\$188.00		NEMA 1 conduit box kit for use with GS4 frame size E AC drive; mounting hardware included
GS4-4150, GS4-4200	F	<a href="#"><u>GS4-CBX-F</u></a>	\$271.00		NEMA 1 conduit box kit for use with GS4 frame size F AC drive; mounting hardware included
GS4-4250, GS4-4300	G	<a href="#"><u>GS4-CBX-G</u></a>	\$513.00		NEMA 1 conduit box kit for use with GS4 frame size G AC drive; mounting hardware included

\* GS4 Frame Sizes A through C have integral conduit box space built into the drive; separate conduit boxes are not necessary nor available.  
 \*\* Conduit Box Kits include mounting hardware; box base, box cover, bushings, and screws.  
 Conduit box dimensions are shown with the AC drive dimensions, as mounted on the drive.

# GS4-Specific Optional Accessories – Flange Mounting Kits

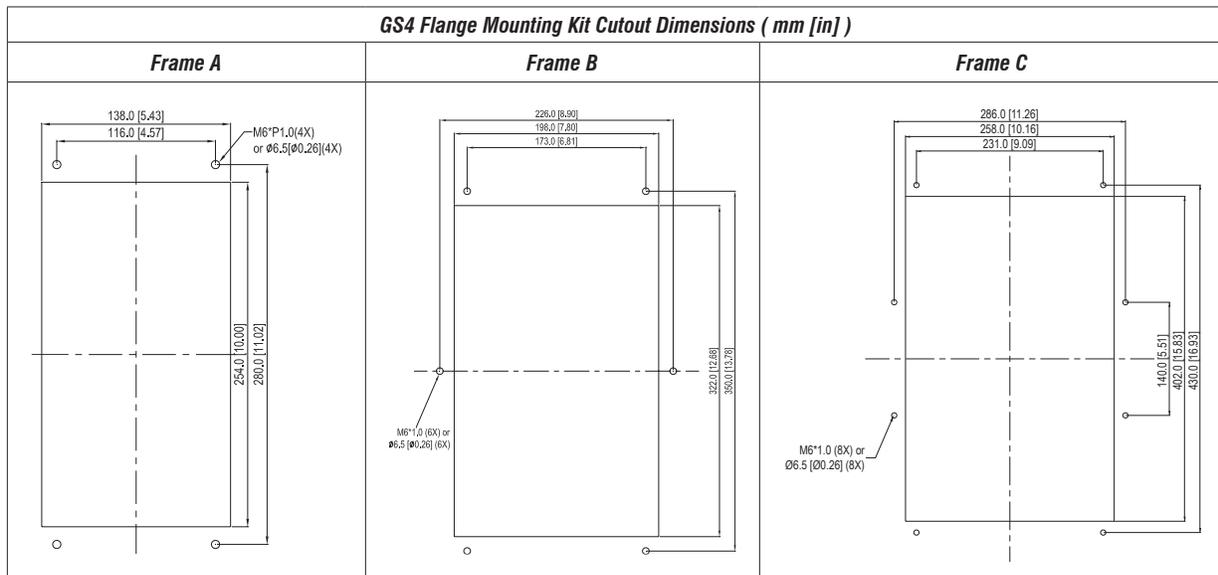
## Flange Mounting Kits

Optional GS4 drive flange mounting kits allow the heat sinks on the back of select GS4 drives to be positioned through the back of the control enclosure. Since a majority of the heat generated by the GS4 drive will be outside the enclosure, heat load will be reduced and a smaller enclosure may possibly be used. These flange mounting kits are applicable to GS4 drive frame sizes A through C.

**NOTE:** GS4 Frames D0, D, E, and F have integral flange mounting hardware; additional Flange Mounting Kit not required (see cutout dimensions below).  
Frame size G cannot be flange-mounted.

GS4 Frame Sizes A–C – Flange Mounting Kit Selection Table					
Drive		Flange Mounting Kit **			Description
Model	Frame*	Part #	Price	Photo	
GS4-22P0 GS4-23P0 GS4-43P0	A	<b><u>GS4-FMKIT-1</u></b>	\$74.00		GS4 series Flange Mounting Kit, NEMA 1; for use with multiple GS4 Frame A drives; adapter plate and mounting hardware included
GS4-21P0 GS4-25P0 GS4-41P0 GS4-42P0 GS4-45P0 GS4-47P5	A	<b><u>GS4-FMKIT-A</u></b>	\$62.00		GS4 series Flange Mounting Kit, NEMA 1; for use with multiple GS4 Frame A drives; mounting hardware included
GS4-27P5 GS4-2010 GS4-2015 GS4-4010 GS4-4015 GS4-4020	B	<b><u>GS4-FMKIT-B</u></b>	\$70.00		GS4 series Flange Mounting Kit, NEMA 1; for use with GS4 Frame B drives; mounting hardware included
GS4-2020 GS4-2025 GS4-2030 GS4-4025 GS4-4030 GS4-4040	C	<b><u>GS4-FMKIT-C</u></b>	\$79.00		GS4 series Flange Mounting Kit, NEMA 1; for use with GS4 Frame C drives; mounting hardware included

\* See panel cutout dimensions below for GS4 Frames A, B, C.  
\* GS4 Frames D0, D, E, and F have integral flange mounting hardware; additional Flange Mounting Kit not required. See Appendix A of the GS4 User Manual for panel cut-out dimensions for frames D0, E, F.  
\* Frame size G cannot be flange-mounted.



# DURAPULSE GS4 AC Drives Specifications – Installation

Understanding the installation requirements for your DURAPULSE AC drive will help to ensure that it operates within its environmental and electrical limits.

*Note: Never use only this catalog for installation instructions or operation of equipment; refer to the User Manual, GS4\_UMW.*

Environmental Conditions for GS4 AC Drives			
<b>Condition</b>	Operation	Storage	Transportation
<b>Installation Location</b>	IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only	n/a	n/a
<b>Ambient Temperature</b>	see separate Operating Temperature table below		
<b>Relative Humidity</b>	Max 90%, non-condensing, non-frozen	Max 95%, non-condensing, non-frozen	
<b>Air Pressure</b>	86 to 106 kPa		70 to 106 kPa
<b>Pollution Level</b>	IEC721-3-3, no concentrate		
	Class 3C2; Class 3S2	Class 2C2; Class 2S2	Class 1C2; Class 1S2
<b>Altitude</b>	0–1000m (see separate derating section for altitudes of 1000–3000m)	n/a	n/a
<b>Package Drop</b>	n/a	ISTA procedure 1A (according to weight) IEC60068-2-31	
<b>Vibration</b>	1.0mm, peak to peak value range from 2Hz to 13.2Hz; 0.7G–1.0G range from 13.2Hz to 55Hz; 1.0G range from 55Hz to 512Hz. Comply with IEC 60068-2-6		
<b>Impact</b>	IEC/EN 60068-2-27		
<b>Installation Orientation</b>	<div style="text-align: center;"> <p>Max allowed offset angle <math>\pm 10^\circ</math> (from vertical installation position)</p> </div>		

Operating Temperature and Protection Level					
Frame Size	Top cover	Conduit Box	Protection Level	Operating Temperature	
A–C	230V: 1.0–30 hp 460V: 1.0–40 hp	With top cover removed	Standard conduit plate	IP20 / UL Open Type	-10–50°C [14–122°F]
		With top cover in place		IP20 / UL Type1 / NEMA 1	-10–40°C [14–104°F]
D0–G	230V: >30hp 460V: >40hp	N/A	With conduit box	IP20 / UL Type1 / NEMA 1	-10–40°C [14–104°F]
	230V: >30hp 460V: >40hp	N/A	Without conduit box	IP00 / IP20 / UL Open Type * <b>Only the circled area is IP00. Other parts are IP20.</b>	-10–50°C [14–122°F]

\* Only the exposed terminal blocks are IP00; the other components are IP20



**WARNING:** AC DRIVES GENERATE A LARGE AMOUNT OF HEAT WHICH MAY DAMAGE THE AC DRIVE. AUXILIARY COOLING METHODS MAY BE REQUIRED TO AVOID EXCEEDING MAXIMUM OPERATING TEMPERATURE. WHEN POSSIBLE, CONSIDER FLANGE MOUNTING TO LOWER ENCLOSURE TEMPERATURES.



**WARNING:** MAXIMUM AMBIENT TEMPERATURES MUST NOT EXCEED 50°C (122°F), OR 40°C (104°F), FOR ALL GS4 MODELS.

# DURAPULSE GS4 AC Drives Specifications – Air Flow and Power (Heat) Dissipation

GS4 AC Drives Air Flow and Power (Heat) Dissipation									
Model Number	Airflow Rate <sup>1)</sup> for Cooling						Power (Heat) Dissipation <sup>2)</sup>		
	Flow Rate <sup>1)</sup> (cfm)			Flow Rate <sup>1)</sup> (m <sup>3</sup> /hr)			Power Dissipation <sup>2)</sup> (Watt)		
	External	Internal	Total	External	Internal	Total	External (Heat sink)	Internal	Total
<a href="#">GS4-21P0</a>	-	-	-	-	-	-	33	27	60
<a href="#">GS4-22P0</a>	14	-	14	24	-	24	56	31	87
<a href="#">GS4-23P0</a>	14	-	14	24	-	24	79	36	115
<a href="#">GS4-25P0</a>	10	-	10	17	-	17	113	46	159
<a href="#">GS4-27P5</a>	40	14	54	68	24	92	197	67	264
<a href="#">GS4-2010</a>	66	14	80	112	24	136	249	86	335
<a href="#">GS4-2015</a>	58	14	73	99	24	123	409	121	530
<a href="#">GS4-2020</a>	166	12	178	282	20	302	455	161	616
<a href="#">GS4-2025</a>	166	12	178	282	20	302	549	184	733
<a href="#">GS4-2030</a>	166	12	178	282	20	302	649	216	865
<a href="#">GS4-2040</a>	179	30	209	304	51	355	913	186	1099
<a href="#">GS4-2050</a>	179	30	209	304	51	355	1091	220	1311
<a href="#">GS4-2060</a>	228	73	301	387	124	511	1251	267	1518
<a href="#">GS4-2075</a>	228	73	301	387	124	511	1401	308	1709
<a href="#">GS4-2100</a>	246	73	319	418	124	542	1770	369	2139
<a href="#">GS4-41P0</a>	-	-	-	-	-	-	33	25	58
<a href="#">GS4-42P0</a>	-	-	-	-	-	-	45	29	74
<a href="#">GS4-43P0</a>	14	-	14	24	-	24	71	33	104
<a href="#">GS4-45P0</a>	10	-	10	17	-	17	103	38	141
<a href="#">GS4-47P5</a>	10	-	10	17	-	17	134	46	180
<a href="#">GS4-4010</a>	40	14	54	68	24	92	216	76	292
<a href="#">GS4-4015</a>	66	14	80	112	24	136	287	93	380
<a href="#">GS4-4020</a>	58	14	73	99	24	123	396	122	518
<a href="#">GS4-4025</a>	99	21	120	168	36	204	369	138	507
<a href="#">GS4-4030</a>	99	21	120	168	36	204	476	158	634
<a href="#">GS4-4040</a>	126	21	147	214	36	250	655	211	866
<a href="#">GS4-4050</a>	179	30	209	304	51	355	809	184	993
<a href="#">GS4-4060</a>	179	30	209	304	51	355	929	218	1147
<a href="#">GS4-4075</a>	179	30	209	304	51	355	1156	257	1413
<a href="#">GS4-4100</a>	186	30	216	316	51	367	1408	334	1742
<a href="#">GS4-4125</a>	257	73	330	437	124	561	1693	399	2092
<a href="#">GS4-4150</a>	223	73	296	379	124	503	2107	491	2598
<a href="#">GS4-4175</a>	224	112	336	381	190	571	2502	579	3081
<a href="#">GS4-4200</a>	289	112	401	491	190	681	3096	687	3783
<a href="#">GS4-4250</a>			454			771			4589
<a href="#">GS4-4300</a>			454			771			5772

The required airflow shown in chart is for installing a single GS4 drive in a confined space. When installing multiple GS4 drives, the required air volume would be the cumulative air volume for all drives in the enclosure.

Heat dissipation shown in the chart is for installing a single GS4 drive in a confined space. When installing multiple drives, the volume of heat dissipation should be the cumulative heat dissipation of all drives in the enclosure. Heat dissipation for each model is calculated by rated voltage, current and default carrier frequency.

- 1) External flow rate is across the heat sink. Internal flow rate is through the chassis. Published flow rates are the result of active cooling using fans; factory-installed in the drive. Unpublished flow rates (-) are the result of passive cooling in drives without factory-installed fans.
- 2) When calculating power dissipation (Watt Loss) use the total value if the drive is foot mounted, or the internal value if the drive is flange mounted. Where only a total value is published, these models cannot be flange mounted.

Dimensions for Minimum Clearance * ( mm / in )				
Frame Size	Above & Below	Side to Non-Heat Source	Side to Heat Source	Front
A-C	60 / 2.4	30 / 1.2	10 / 0.4	0 / 0
D(0)-F	100 / 4.0	50 / 2.0	n/a	0 / 0
G	200 / 7.9	100 / 4.0	2 x B	0 / 0

\* The minimum mounting clearances stated in this table applies to GS4 drives frames A to G. Failure to follow the minimum mounting clearances may cause the fan to malfunction and cause a heat dissipation problem.

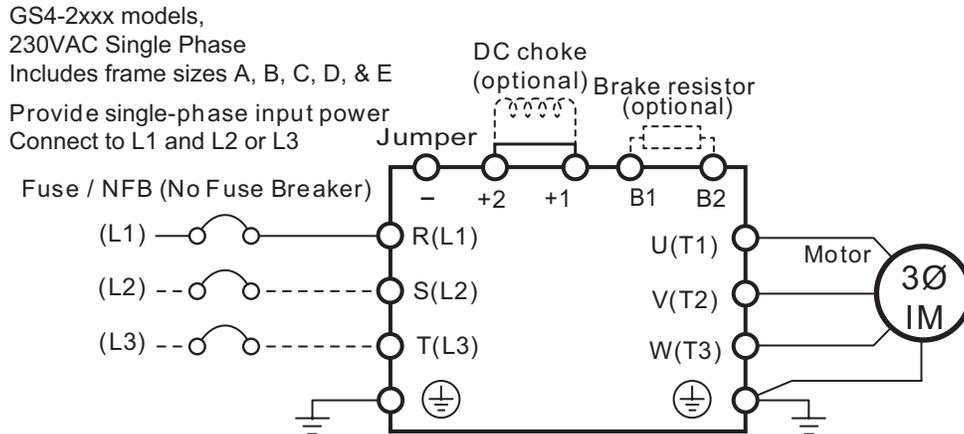
# DURAPULSE GS4 AC Drives Specifications – Terminals

Control Circuit Terminals			Main Circuit Terminals	
Terminal	Description	Remarks	Terminal	Description
+10V	Potentiometer Power Supply	Analog frequency setting: +10VDC 20mA max output	R/L1	Input Power – phase 1
-10V		Analog frequency setting: -10VDC 20mA max output	S/L2	Input Power – phase 2
+24V	Digital Control Signal Source	+24V±5%, 200mA max output; use with DCM	T/L3	Input Power – phase 3
AI1	Analog Input 1	Range: 0–10V or 0/4–20mA = 0–Max Output Frequency AI1 switch = SW3; factory setting is 0–10V Impedance: 20kΩ (SW3 = 0–10V); 250Ω (SW3 = 0/4–20mA)	U/T1, V/T2, W/T3	AC Drive Output
AI2	Analog Input 2	Range: 0/4–20mA or 0–10V = 0–Max Output Frequency AI2 Switch = SW4; factory setting is 0–20mA Impedance: 250Ω (SW4 = 0/4–20mA); 20kΩ (SW4 = 0–10V);	+1, +2	DC Choke Connection (frames A–C)
AI3	Analog Input 3	Impedance: 20kΩ Range: -10VDC to +10 VDC = 0–Max Output Frequency <i>Note: For -10V to +10V operation, connect the pot to +10V and -10V. Keep the pot wiper connected to AI3.</i>	B1, B2	Braking Resistor Connection (frames A–C)
ACM	Analog Common	Common for analog terminals	+1/DC+, -/DC-	External Dynamic Brake Unit (frames D–G)
AO1	Analog Output 1	-10 to +10V max output current 2mA; max load 5kΩ Resolution: 0–10V corresponds to max operation frequency Range: 0–10V or -10 to +10V AO1 Switch = SW1, factory setting is 0–10V	⏏	Ground
AO2	Analog Output 2 (internal circuit same as AO1)	0–10V max output current 2mA; max load 5kΩ 0–20mA max output current 20mA; max load 500Ω Resolution: 0–10V corresponds to max operation frequency Range: 0–10V or 0/4–20mA AO2 Switch = SW2; factory setting is 0–10V		
DIC	Digital Input Common Rail	Common terminal for multi-function inputs; Can be tied to DCM (for sinking) or to +24V (for sourcing)		
DI1–DI8	Digital Inputs 1 thru 8	ON: the activation current is 3.3mA ≥ 11VDC OFF: leakage current tolerance is 1.4mA ≤ 5VDC		
DCM	Digital Signal Common	Refer to terminals FO, FWD, REV		
DO1	Digital Output 1	The AC motor drive releases various monitor signals such as drive in operation, frequency attained, and overload indication via transistor (open collector). Range: 5–48 VDC. Use with DOC.		
DO2	Digital Output 2 (internal circuit same as DO1)	Multi-function Output 2 (photocoupler). Range: 5–48 VDC. Use with DOC.		
DOC	Digital Output Common	Max 5–48 VDC, 50mA (user supplied)		
+24V	STO Control Signal Source			
ECM	EStop Common			
SCM1	STO Input 1 Common	Safe Torque Off function.		
SCM2	STO Input 2 Common	Refer to Appendix E: Safe Torque Off for more details.		
STO1	STO Input 1			
STO2	STO Input 2			
FO	Digital Frequency Output	High-speed pulse output. Use with DCM. Digital Frequency Out = Drive Output Frequency [Hz] × P3.38 [Frequency Output Multiplier]. Duty-cycle: 50% ±1% Min load impedance: 1kΩ/100pf Max current: 30mA Max voltage: 30VDC		
FWD	Forward Command	Use with DCM. ON = forward running OFF = deceleration to stop		
R1	R1 Relay Common	Resistive Load: 3A(N.O.) / 3A(N.C.); 250VAC 5A(N.O.) / 3A(N.C.); 30VDC Inductive Load (COS 0.4): 1.2A(N.O.) / 1.2A(N.C.); 250VAC These terminals are to output monitoring signals, such as drive in operation, frequency attained, or overload indication. Note: R1 and R2 have N.O. and N.C. contacts.		
R1C	R1 Relay N.C.			
R1O	R1 Relay N.O.			
R2	R2 Relay Common			
R2C	R2 Relay N.C.			
R2O	R2 Relay N.O.			
REV	Reverse Command	Use with DCM. ON = reverse running OFF = deceleration to stop		
RJ45-1	RJ45 Port 1 (RS-485)	Pins 1,2,7,8: Reserved Pins 3,6: SGND		
RJ45-2	RJ45 Port 2 (RS-485)	Pin 4: SG- Pin 5: SG+ (RJ45-1 and RJ45-2 are connected internally to ports SG+ and SG- below)		
SG+, SG-, SGND	Modbus RS-485 (SG+ and SG- are connected internally to the two RJ45 ports above)			
⏏	Digital Control Ground			

# DURAPULSE GS4 AC Drives – Basic Wiring Diagram

## Power Wiring Diagram: GS4 230V Models – Single-Phase

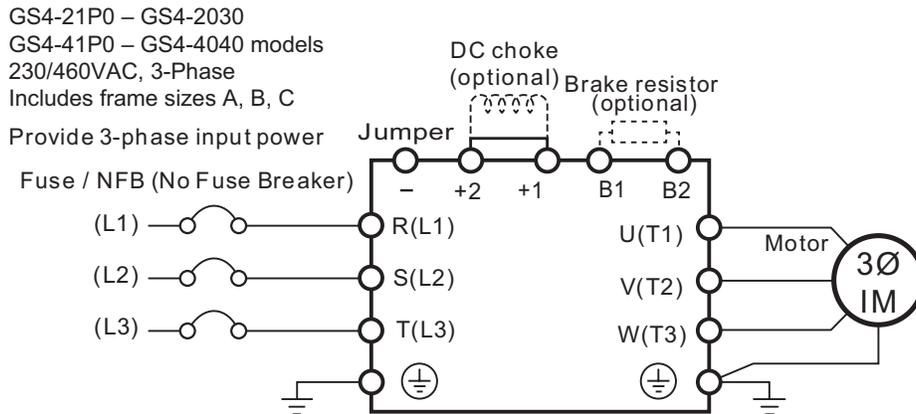
*Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS4-UMW for additional specific wiring information.)*  
*Note: We specify DC chokes, but we do not stock them.*



Connect 230VAC, Single-Phase power to any two of the R, S, or T terminals

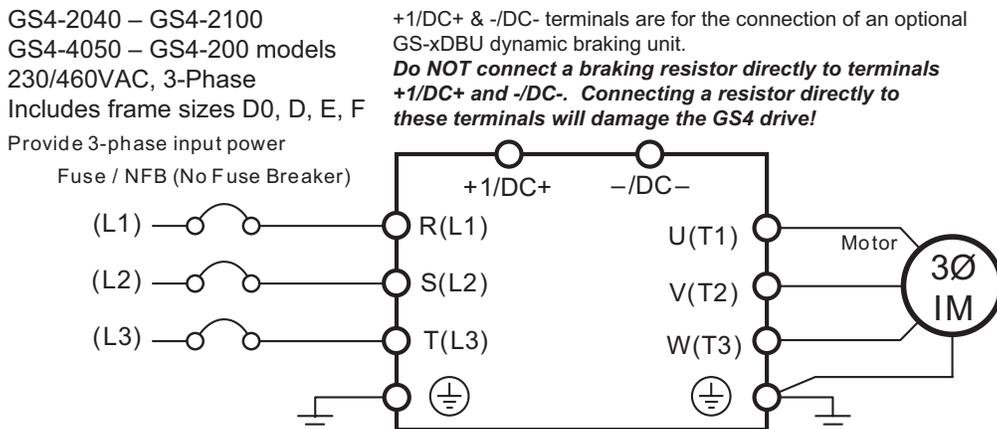
## Power Wiring Diagram: GS4 Frame Size A, B, C Models – Three-Phase

*Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS4-UMW for additional specific wiring information.)*  
*Note: We specify DC chokes, but we do not stock them.*



## Power Wiring Diagram: GS4 Frame Size D0, D, E, F Models – Three-Phase

*Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS4-UMW for additional specific wiring information.)*



# DURAPULSE GS4 AC Drives – Basic Wiring Diagram

## Power Wiring Diagram: GS4 Frame Size G Models – Three-Phase

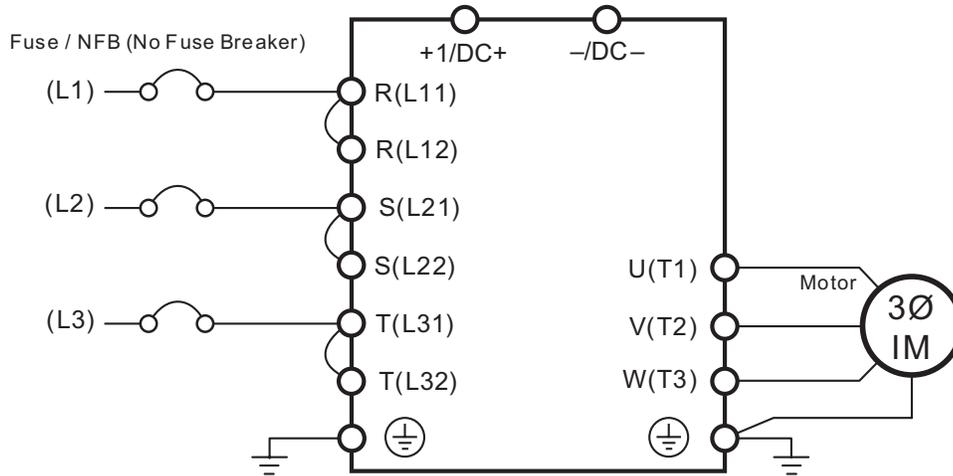
*Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS4-UMW for additional specific wiring information.)*

GS4-4250 &  
GS4-4300 models  
460VAC, 3-Phase

Provide 3-phase input power

+1/DC+ & -/DC- terminals are for the connection of an optional GS-xDBU dynamic braking unit.

**Do NOT connect a braking resistor directly to terminals +1/DC+ and -/DC-. Connecting a resistor directly to these terminals will damage the GS4 drive!**



# DURAPULSE GS4 AC Drives – Basic Wiring Diagram

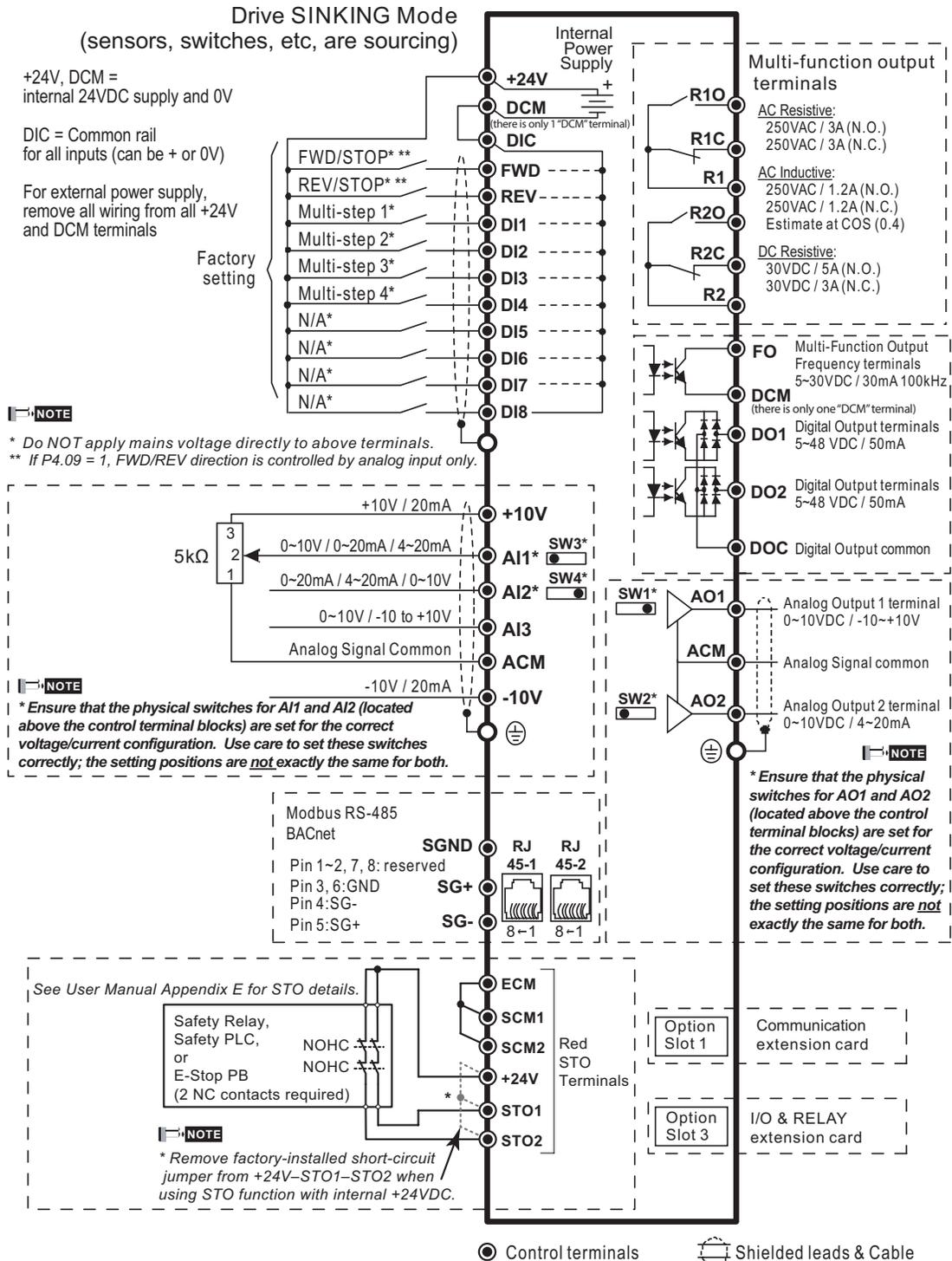
## Control Wiring Diagram: Full I/O with Sinking Inputs (field devices are sourcing)



Note: Users must connect wiring according to the circuit diagram shown below.



**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE DURAPULSE RJ45 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.**



**NOTE**

\* Do NOT apply mains voltage directly to above terminals.  
\*\* If P4.09 = 1, FWD/REV direction is controlled by analog input only.

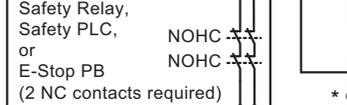
**NOTE**

\* Ensure that the physical switches for AI1 and AI2 (located above the control terminal blocks) are set for the correct voltage/current configuration. Use care to set these switches correctly; the setting positions are not exactly the same for both.

**NOTE**

\* Ensure that the physical switches for AO1 and AO2 (located above the control terminal blocks) are set for the correct voltage/current configuration. Use care to set these switches correctly; the setting positions are not exactly the same for both.

See User Manual Appendix E for STO details.



**NOTE**

\* Remove factory-installed short-circuit jumper from +24V-STO1-STO2 when using STO function with internal +24VDC.

# DURAPULSE GS4 AC Drives – Basic Wiring Diagram

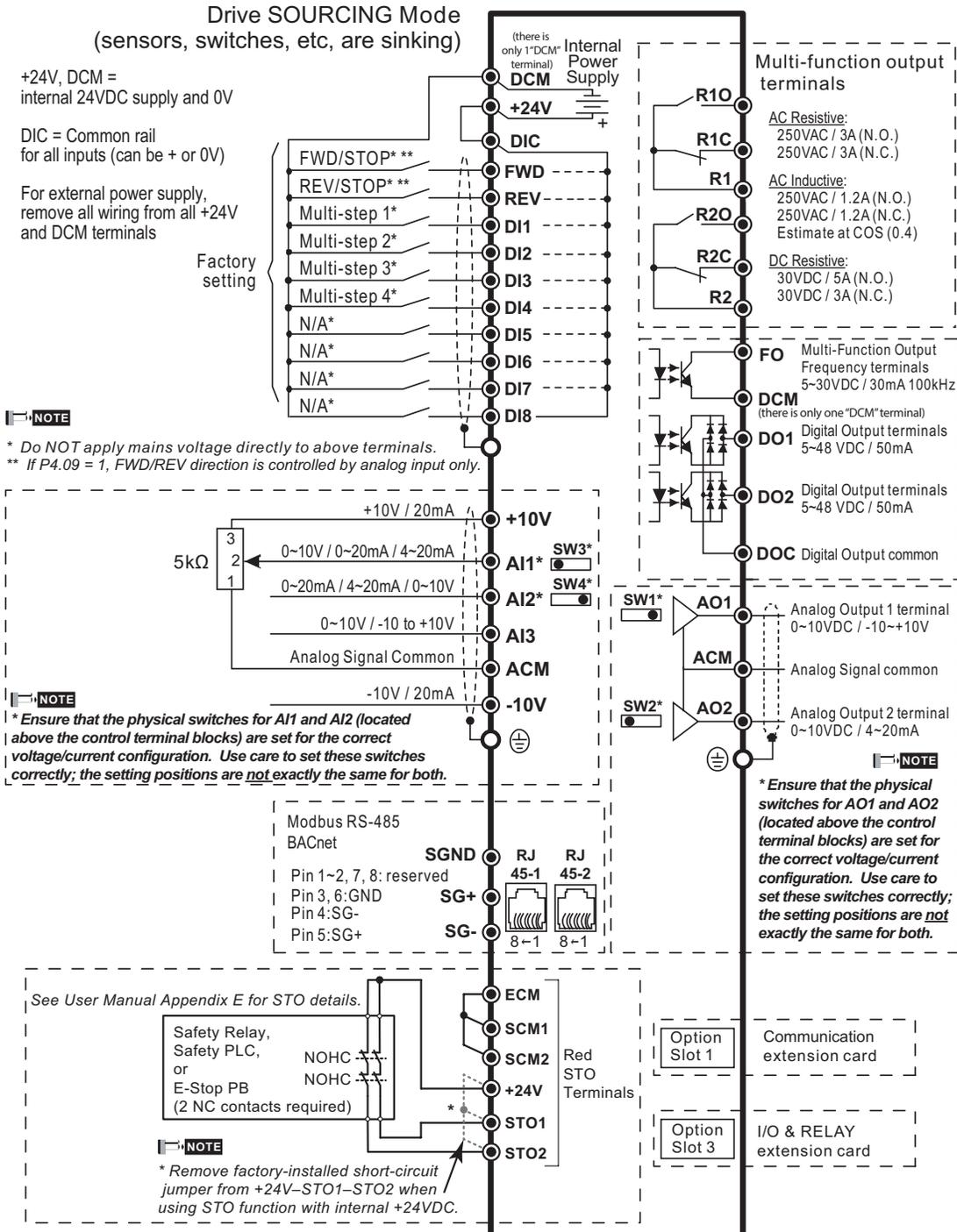
## Control Wiring Diagram: Full I/O with Sourcing Inputs (field devices are sinking)



Note: Users must connect wiring according to the circuit diagram shown below.



**WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE DURAPULSE RJ45 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.**



● Control terminals

⊖ Shielded leads & Cable

# DURAPULSE GS4 AC Drives – Dimensions

## GS4 DURAPULSE Frame Sizes by Drive Model

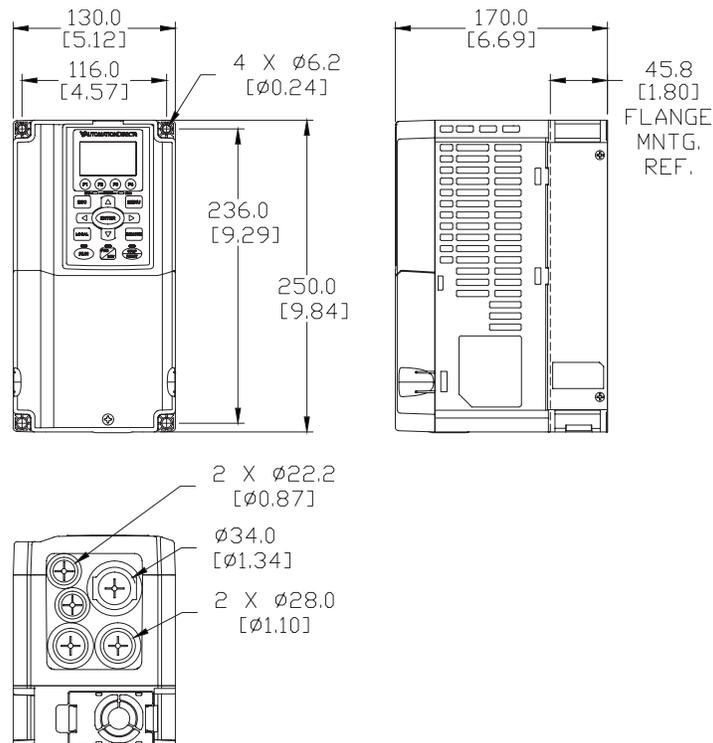
GS4 DURAPULSE Frame Sizes by Drive Model												
A		B		C		DO	D		E		F	G
230V	460V	230V	460V	230V	460V	460V	230V	460V	230V	460V	460V	460V
GS4-21P0	GS4-41P0	GS4-27P5	GS4-4010	GS4-2020	GS4-4025	GS4-4050	GS4-2040	GS4-4075	GS4-2060	GS4-4125	GS4-4175	GS4-4250
GS4-22P0	GS4-42P0	GS4-2010	GS4-4015	GS4-2025	GS4-4030	GS4-4060	GS4-2050	GS4-4100	GS4-2075	GS4-4150	GS4-4200	GS4-4300
GS4-23P0	GS4-43P0	GS4-2015	GS4-4020	GS4-2030	GS4-4040	-	-	-	GS4-2100	-	-	-
GS4-25P0	GS4-45P0	-	-	-	-	-	-	-	-	-	-	-
-	GS4-47P5	-	-	-	-	-	-	-	-	-	-	-

### Dimensions – GS4 AC Drives

Units = (mm [in])

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### Dimensions – Frame Size A



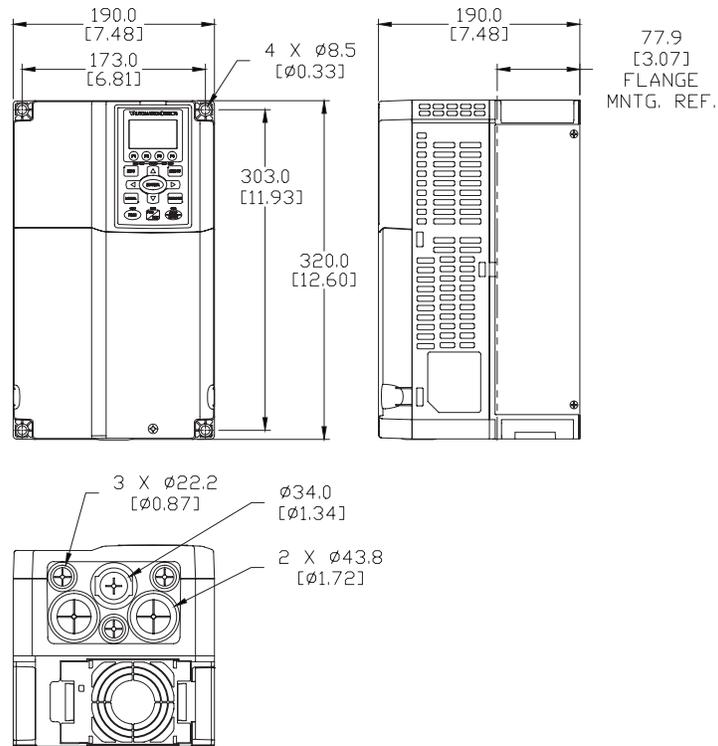
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

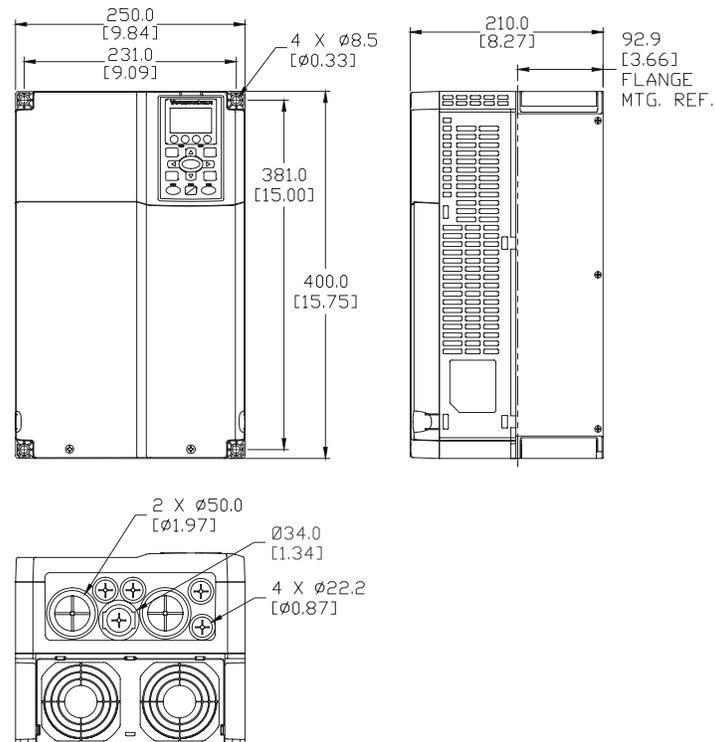
( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### Dimensions – Frame Size B



### Dimensions – Frame Size C



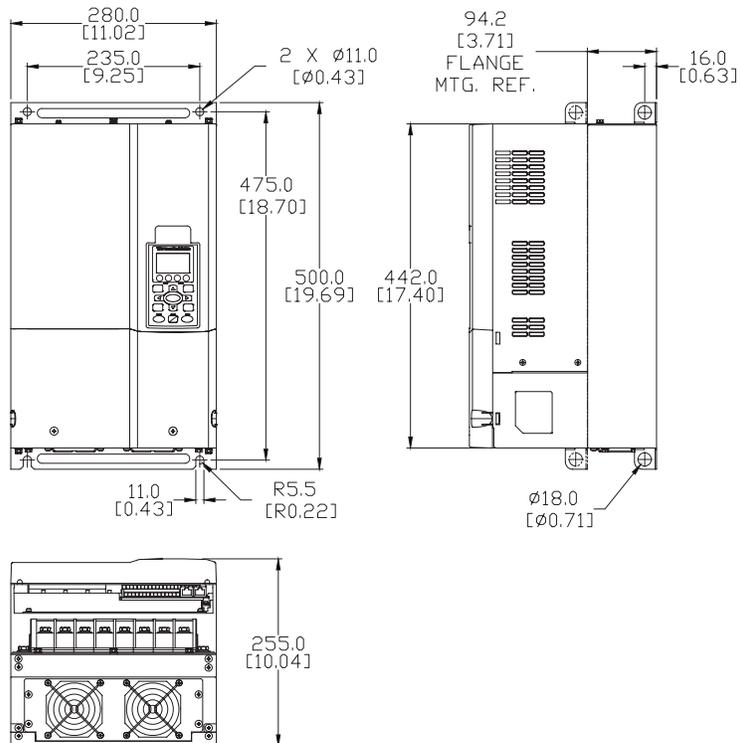
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

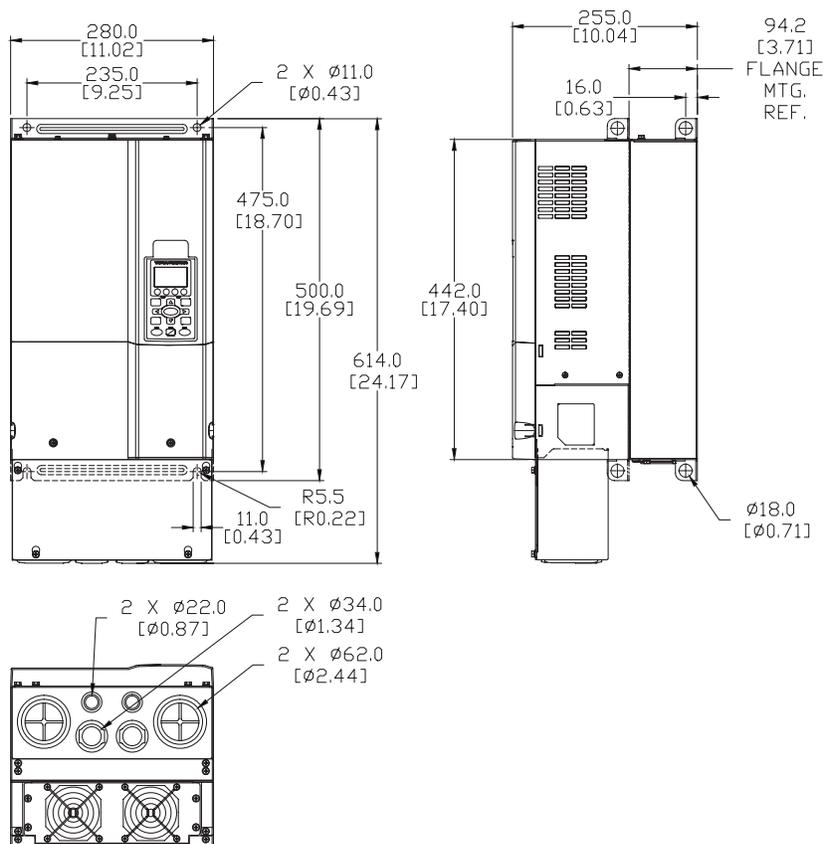
( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### Dimensions – Frame Size D0



### Dimensions – Frame Size D0 with Conduit Box



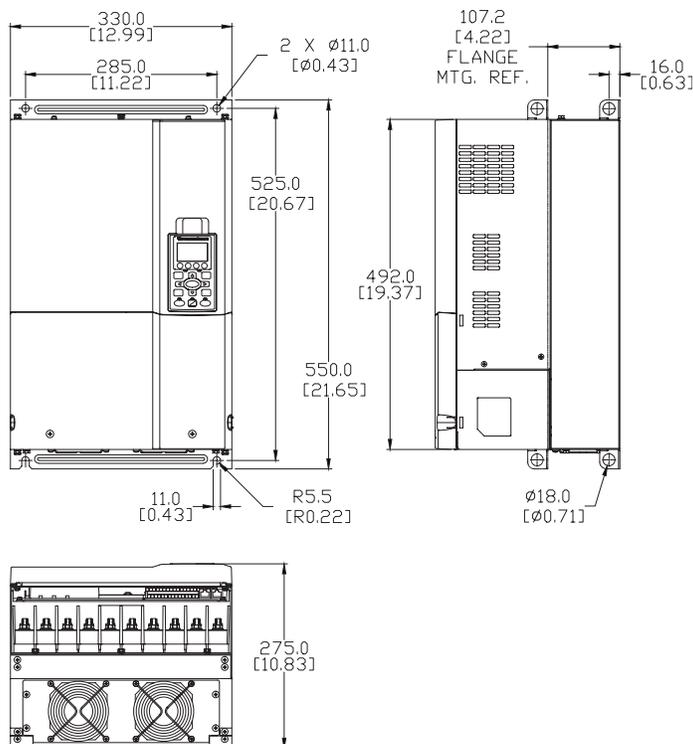
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

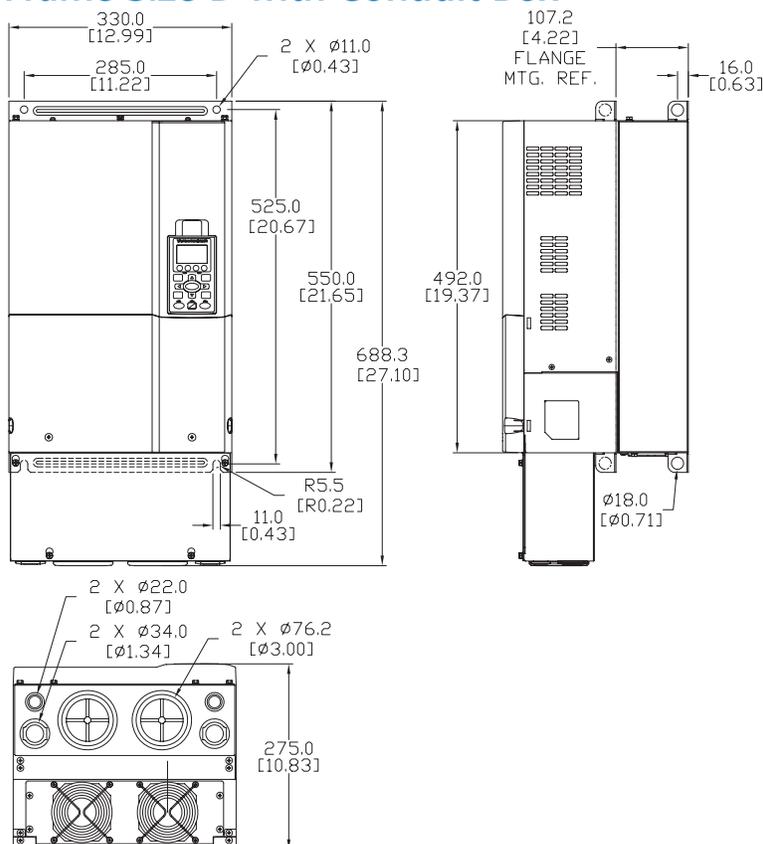
( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

## Dimensions – Frame Size D



## Dimensions – Frame Size D with Conduit Box



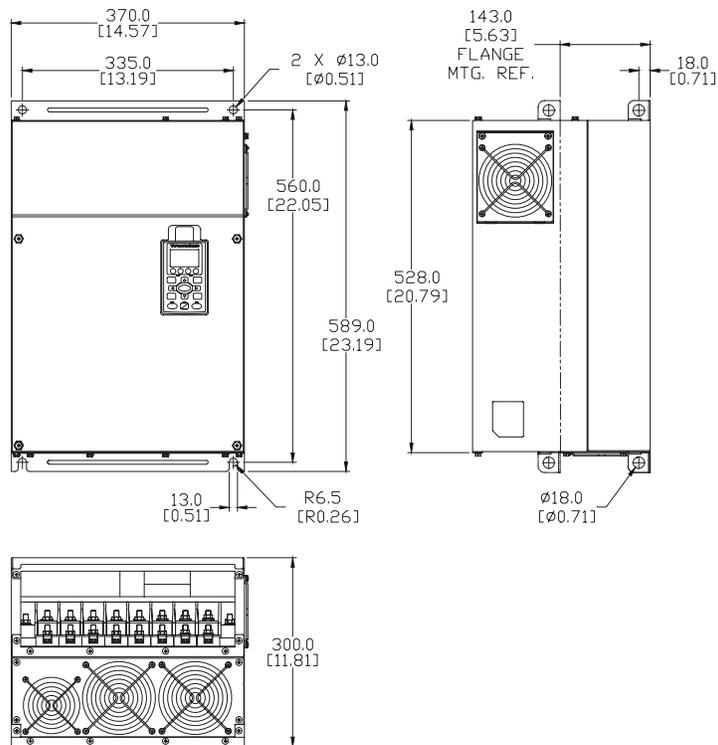
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

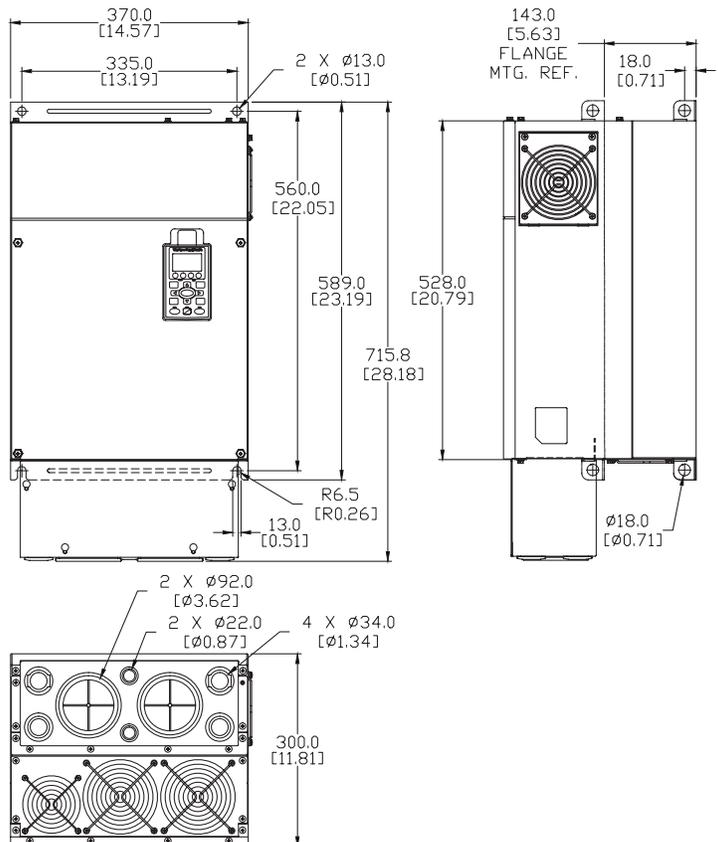
( Units = mm [in ] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

## Dimensions – Frame Size E



## Dimensions – Frame Size E with Conduit Box



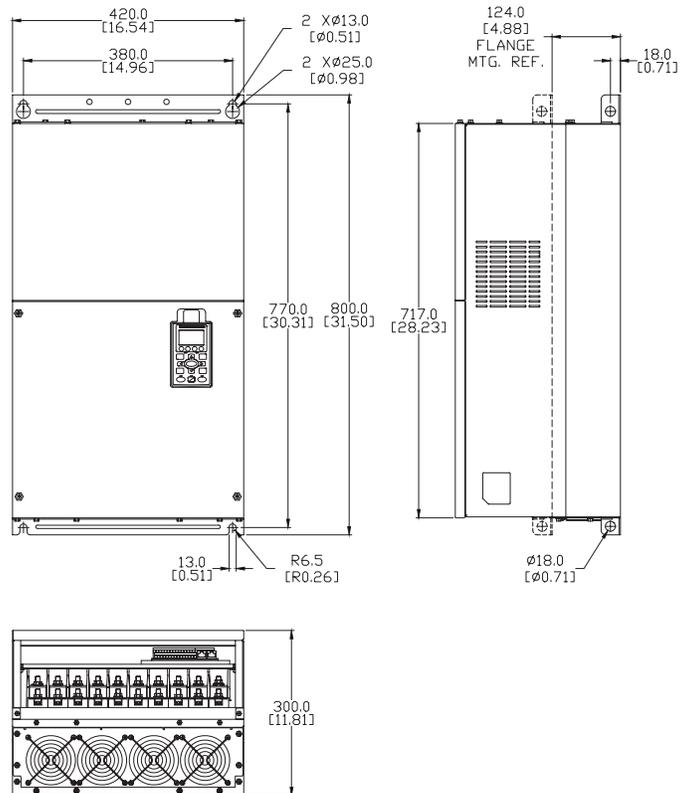
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

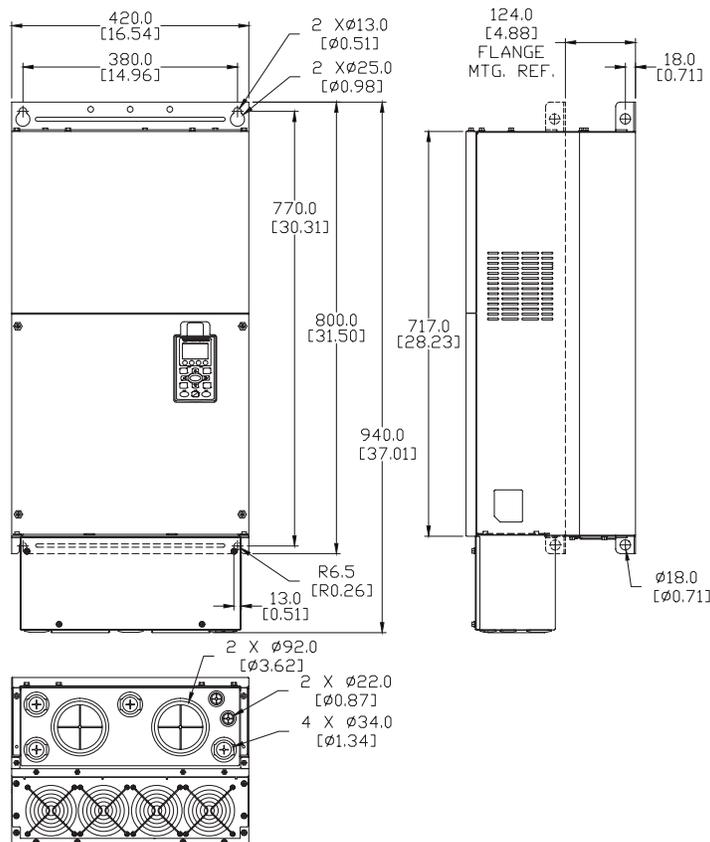
( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### Dimensions – Frame Size F



### Dimensions – Frame Size F with Conduit Box



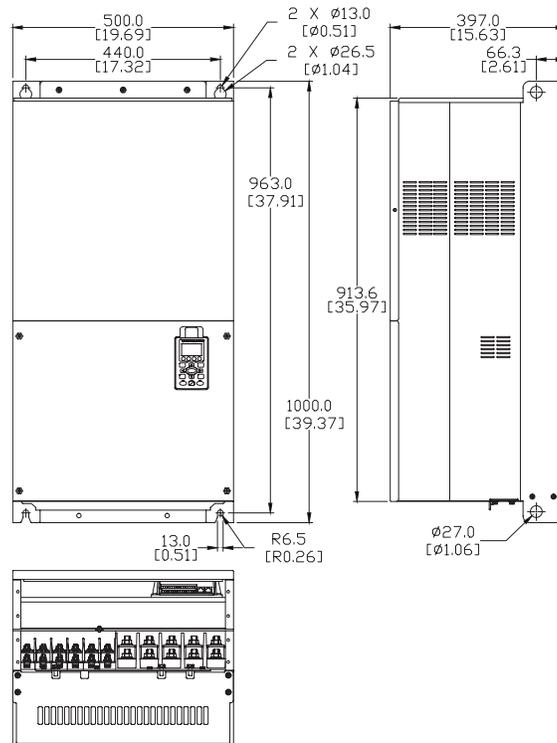
# DURAPULSE GS4 AC Drives – Dimensions

## Dimensions – GS4 AC Drives

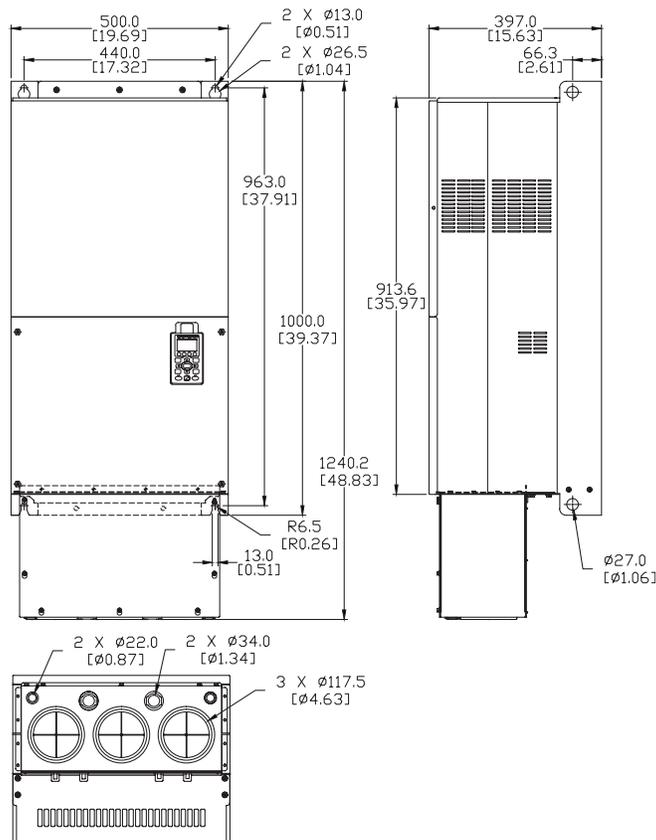
( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

## Dimensions – Frame Size G

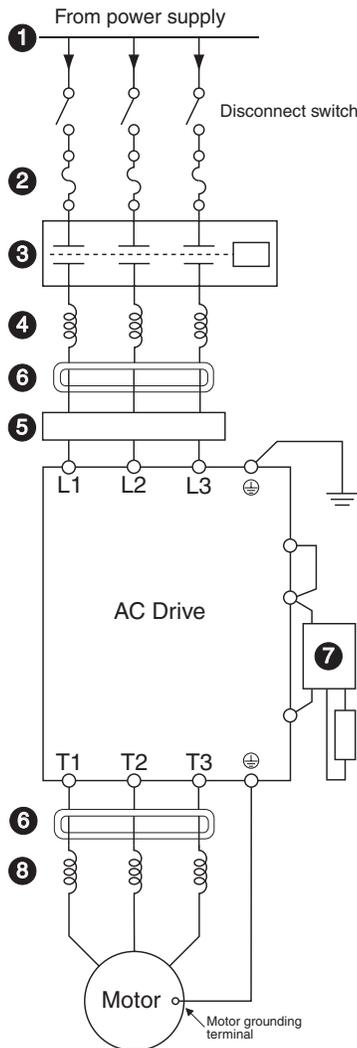


## Dimensions – Frame Size G with Conduit Box



# AC Drives Optional Accessories – Overview

*Drive Accessories*  
(not all accessories are applicable for every drive model)



## 1 Power Supply

Please follow the specific power supply requirements as detailed in the specific drive manual.

## 2 Fuses

Input fuses protect the AC drive from excessive input current due to line surges, short circuits, and ground faults. They are recommended for all installations and may be required for UL-listed installations.

## 3 Contactor (Optional)

Do not use a contactor or disconnect switch for run/stop control of the AC drive and motor. This will reduce the operating life cycle of the AC drive. Cycling a power circuit switching device while the AC drive is in run mode should be done only in emergency situations.

## 4 Input Line Reactor (Optional)

See the Line Reactors section at [www.automationdirect.com](http://www.automationdirect.com) for more information.

Input line reactors protect the AC drive from transient overvoltage conditions, typically caused by utility capacitor switching. The input line reactor also reduces the harmonics associated with AC drives. Input line reactors are recommended for all installations.

## 5 EMI filter (Optional)

See the EMI Filters section at [www.automationdirect.com](http://www.automationdirect.com) for more information.

Input EMI filters reduce electromagnetic interference or noise on the input side of the AC drive. They are required for CE compliance and recommended for installations prone to or sensitive to electromagnetic interference.

## 6 RF filter (Optional)

RF filters reduce the radio frequency interference or noise on the input or output side of the inverter.

## 7 Braking Unit and/or Braking Resistor (Optional)

Dynamic braking allows the AC drive to produce additional braking (stopping) torque. AC drives can typically produce between 15% & 20% braking torque without the addition of any external components. The addition of optional braking may be required for applications that require rapid deceleration or high inertia loads.

## 8 Output Load Reactor or Voltage Time (dV/dT) Filter (Optional)

Output line reactors protect the motor insulation against AC drive short circuits and IGBT reflective wave damage, and also "smooth" the motor current waveform, allowing the motor to run cooler. They are **recommended for operating "noninverter-duty" motors and when the length of wiring between the AC drive and motor is less than 100 feet.**

**Voltage Time filters provide enhanced protection for motors with distances up to 1,000 feet.**

Voltage Time filters provide even more protection against wave reflection and reduce common mode noise. They are recommended when the length of wiring between the AC drive and motor is from 100 feet up to 1,000 feet.

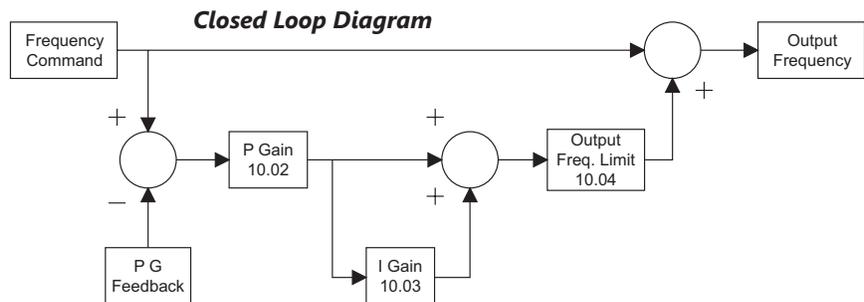
See [www.automationdirect.com](http://www.automationdirect.com) for specific product offerings.

# GS3 DURAPULSE Accessories – Feedback Card

Feedback Card for <i>DURApulse</i> AC Drives		
Part Number	Price	Drive Model
<b>GS3-FB</b>	\$66.00	GS3-xxxx
The GS3-FB feedback card is for use only with <i>DURAPULSE</i> AC drives.		

## Description

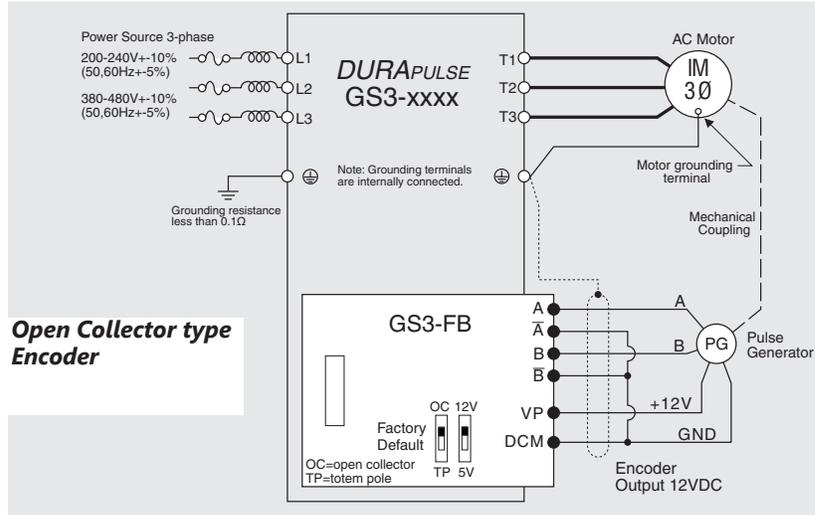
The GS3-FB card is used to add another layer of precision control to the already precise control algorithm utilized in the *DURAPULSE* drive series. This added control is activated by selecting control modes V/Hz closed loop control or sensorless vector with external feedback. The feedback mechanism uses pulses generated by an external encoder or pulse generator. Unlike other feedback types, the GS3-FB accommodates the four most common encoder signal types: output voltage, open collector, line driver, and complimentary.



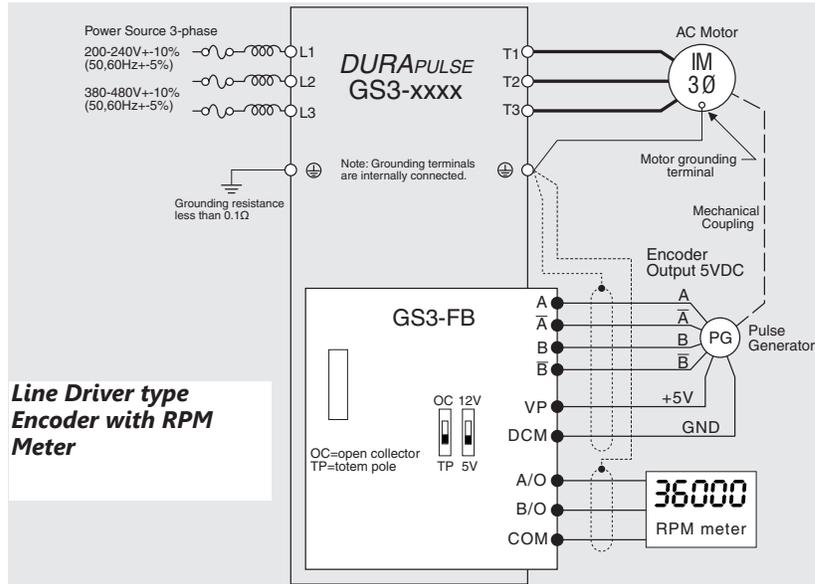
Types of Encoders		SW1 and SW2 switches	
		5V	12V
Output Voltage			
Open collector			
Line driver			
Complimentary			

# GS3 DURAPULSE Accessories – Feedback Card

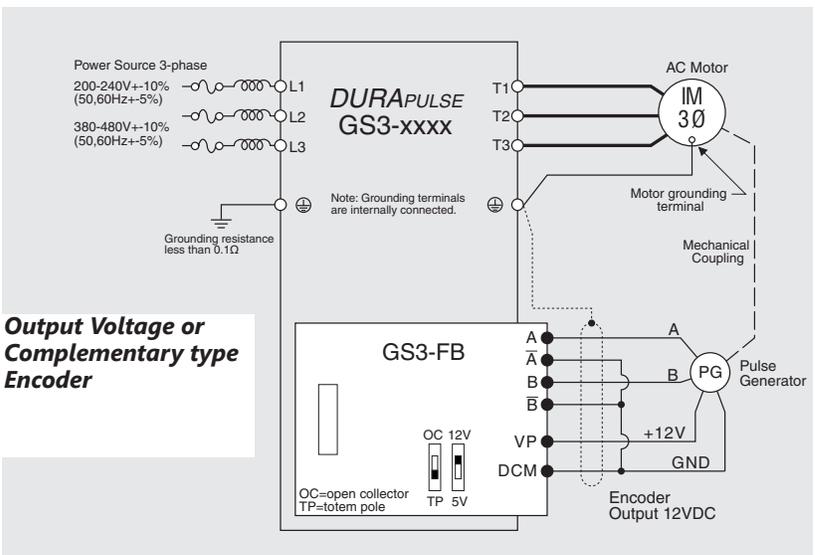
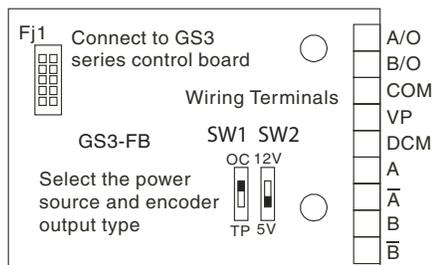
## Wiring Diagrams



Terminal Symbols	Description
<b>VP</b>	Power source of GS3-FB (SW1 can be switched to 12V or 5V) Output Voltage: (+12VDC ±5% 200mA) or (+5VDC ±2% 400mA)
<b>DCM</b>	Power source (VP) and input signal (A, B) common
<b>A, NOT A, B, NOT B</b>	Input signal from Encoder. Input type is selected by SW2; Maximum 500kp/sec
<b>A/O, B/O</b>	GS3-FB output signal for use with RPM Meter. (Open Collector) Maximum DC24V 100mA
<b>COM</b>	GS3-FB output signal (A/O, B/O) common



### Control Terminals Block Designations



# GS/DURApulse Drives Accessories – Line/Load Reactors

## LR Series Line Reactors

Input line reactors protect the AC drive from transient overvoltage conditions typically caused by utility capacitor switching. Input line reactors also reduce the harmonics associated with AC drives, and are recommended for all installations.

Output line (load) reactors 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 exceeds 75 feet.

**Features:**

- Universal mounting feet with multiple mounting slots; can replace most reactors using existing mounting holes
- Short-term overload rating: 200% of rated current for 3 minutes maximum
- Overload inductance: 95% @ 110% load; 80% @ 150% load
- 10-year warranty

**Agency Approvals:**

- cUL<sub>US</sub> listed (E197592)
- CE marked
- RoHS

## Line/Load Reactors for GS1, GS2, GS3/DURAPULSE AC Drives – Selection Specifications

Line/Load Reactors – LR Series – for GS1, GS2, GS3/DURAPULSE								
Part Number	Rated Amps	Impedance	Inductance	Watt Loss	System Voltage	Phase – Use (1)	GS Drive Model	Drive hp
1) Use (side of drive): In = input only; Out = output only; I/O = input or output. 2) Single-phase line reactors should NOT be installed on the output side of AC drives.								
<a href="#">LR-20P5</a>	2.4	3%	4.2 mH	7	208/240	3 – I/O	<a href="#">GS1-20P2</a>	0.25
<a href="#">LR-21P0-1PH</a> (2)	8		2.29 mH	15.9	115	1 – In	<a href="#">GS1-21P0</a>	0.33
<a href="#">LR-22P0-1PH</a> (2)	12		1.53 mH	24.3	115	1 – In 1 – In	<a href="#">GS2-22P0</a>	0.5
<a href="#">LR-23P0-1PH</a> (2)	17		1.08 mH	27.3	115	1 – In 1 – In	<a href="#">GS2-23P0</a> <a href="#">GS3-23P0</a>	1 1
<a href="#">LR-23P0</a>	10.6		0.97 mH	38	208/240	3 – I/O 3 – I/O	<a href="#">GS2-23P0</a> <a href="#">GS3-23P0</a>	3 3
<a href="#">LR-25P0</a>	16.7		0.626 mH	48		3 – I/O 3 – I/O	<a href="#">GS3-25P0</a> <a href="#">GS2-25P0</a>	5 5
<a href="#">LR-27P5</a>	24.2		0.434 mH	65		3 – I/O 3 – I/O	<a href="#">GS2-27P5</a> <a href="#">GS3-27P5</a>	7.5 7.5
<a href="#">LR-2010</a>	30.8		0.342 mH	96	208/240	3 – I/O	<a href="#">GS3-2010</a>	10
<a href="#">LR-2015</a>	46.2		0.22 mH	64			<a href="#">GS3-2015</a>	15
<a href="#">LR-2020</a>	59.4		0.172 mH	85			<a href="#">GS3-2020</a>	20
<a href="#">LR-2030</a>	88		0.116 mH	135			<a href="#">GS3-2030</a>	30
<a href="#">LR-2040</a>	114		0.0886 mH	149			<a href="#">GS3-2040</a>	40
<a href="#">LR-2050</a>	143		0.0699 mH	154			<a href="#">GS3-2050</a>	50
<i>(table continued next page)</i>								

# GS/DURApulse Drives Accessories – Line/Load Reactors

## Line/Load Reactors for GS1, GS2, GS3/DURAPULSE AC Drives – Selection Specifications

Line/Load Reactors – LR Series – for GS1, GS2, GS3/DURAPULSE									
Part Number	Rated Amps	Impedance	Inductance	Watt Loss	System Voltage	Phase – Use (1)	GS Drive Model	Drive hp	
1) Use (side of drive): In = input only; Out = output only; I/O = input or output.									
2) Single-phase line reactors should NOT be installed on the output side of AC drives.									
<b>LR-20P5</b>	2.4		4.2 mH	7	208/240	3 – I/O	<b>GS1-20P2</b>	0.25	
<b>LR-21P0-1PH</b> (2)	8		2.29 mH	15.9	115	1 – In	<b>GS1-21P0</b>	0.33	
<b>LR-23P0-1PH</b> (2)	17		1.08 mH	27.3	115	1 – In	<b>GS3-23P0</b>	1	
<b>LR-23P0</b>	10.6		0.97 mH	38	208/240	3 – I/O	<b>GS3-23P0</b>	3	
<b>LR-25P0</b>	16.7		0.626 mH	48		3 – I/O	<b>GS3-25P0</b>	5	
<b>LR-27P5</b>	24.2		0.434 mH	65		3 – I/O	<b>GS3-27P5</b>	7.5	
<b>LR-2010</b>	30.8		0.342 mH	96	208/240	3 – I/O	<b>GS3-2010</b>	10	
<b>LR-2015</b>	46.2		0.22 mH	64			<b>GS3-2015</b>	15	
<b>LR-2020</b>	59.4		0.172 mH	85			<b>GS3-2020</b>	20	
<b>LR-2030</b>	88		0.116 mH	135			<b>GS3-2030</b>	30	
<b>LR-2040</b>	114		0.0886 mH	149			<b>GS3-2040</b>	40	
<b>LR-2050</b>	143		0.0699 mH	154			<b>GS3-2050</b>	50	
<b>LR-4010</b>	14		1.29 mH	64			480	<b>GS3-4010</b>	10
<b>LR-4020</b>	27		0.694 mH	79				<b>GS3-4020</b>	20
<b>LR-4040</b>	52		0.387 mH	114	<b>GS3-4040</b>	40			
<b>LR-4060</b>	77		0.227 mH	169	<b>GS3-4060</b>	60			
<b>LR-4100</b>	124		0.152 mH	225	-	<b>GS3-4100</b>		100	
<b>LR-4125</b>	156		0.117 mH	254		125			
<b>LR-4150</b>	180		0.103 mH	299		150			
<b>LR-4200</b>	240		0.0839 mH	280		200			
<b>LR-4250</b>	302		0.0654 mH	337		250			
<b>LR-4300</b>	361		0.0565 mH	381		300			
<b>LR-5010</b>	11		2.47 mH	43.8	575/600	-	7.5		
1) Use (side of drive): In = input only; Out = output only; I/O = input or output.									
2) Single-phase line reactors should NOT be installed on the output side of AC drives.									

# GS4 DURApulse Drives Accessories – Line-Side Reactors

## Line-Side Reactors for GS4/DURAPULSE AC Drives – Selection Specifications

Supply: 230V, 1Ø, 50/60 Hz ( <i>Constant</i> Torque; reactor installed <i>Line</i> Side)									
GS4 Model	Derated Output (hp)*	CT: 1Ø Input Amps (rms)**	Saturation Amps (rms)	Inductance (mH)		Max Motor kW	LR Model	Rated Amps	LR 3% Inductance
				3% Impedance	5% Impedance				
<a href="#">GS4-21P0</a>	0.5	4.2	7.6	2.506	4.176	0.37	<a href="#">LR2-20P5-1PH</a>	4.9	3.74
<a href="#">GS4-22P0</a>	0.75	5.6	10.1	1.879	3.132	0.25	<a href="#">LR-21P0-1PH</a>	8	2.29
<a href="#">GS4-23P0</a>	1	8.7	15.7	1.210	2.016	0.25	<a href="#">LR-21P0-1PH</a>	8	2.29
<a href="#">GS4-25P0</a>	2	14	25	0.752	1.253	0.37	<a href="#">LR-22P0-1PH</a>	12.0	1.53
<a href="#">GS4-27P5</a>	3	19	34	0.554	0.923	0.75	<a href="#">LR-23P0-1PH</a>	17.0	1.08
<a href="#">GS4-2010</a>	3	19	34	0.554	0.923	0.75	<a href="#">LR-23P0-1PH</a>	17.0	1.08
<a href="#">GS4-2015</a>	5	30	54	0.351	0.585	3.7	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2020</a>	7.5	43	77	0.245	0.408	5.5	<a href="#">LR-2015</a>	46.2	0.220
<a href="#">GS4-2025</a>	10	57	103	0.184	0.307	7.5	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2030</a>	10	57	103	0.184	0.307	7.5	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2040</a>	10	57	103	0.184	0.307	7.5	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2050</a>	10	57	103	0.184	0.307	7.5	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2060</a>	15	85	153	0.124	0.206	11	<a href="#">LR-2025</a>	74.8	0.138
<a href="#">GS4-2075</a>	20	113	203	0.093	0.155	15	<a href="#">LR-2040</a>	114	0.0886
<a href="#">GS4-2100</a>	25	130	234	0.081	0.135	18.5	<a href="#">LR-2050</a>	143	0.0699

\* Drive output HP is derated when supplied single phase.  
\*\* Amperage ratings expressed in the column CT: 1Ph Input Amps (rms) are with a line reactor installed on the line side of the drive.

# GS4 DURApulse Drives Accessories – Load-Side Reactors

## Load-Side Reactors for GS4/DURAPULSE AC Drives – Selection Specifications

Supply: 230V, 1Ø, 50/60 Hz ( <i>Constant</i> Torque; reactor installed <i>Load</i> Side)									
GS4 Model	HP	CT: 3Ø Output Amps (rms)*	Saturation Amps (rms)	Inductance (mH)		Max Motor kW	LR Model	Rated Amps	LR 3% Inductance
				3% Impedance	5% Impedance				
<a href="#">GS4-21P0</a>	0.5	2.4	4.3	2.893	4.822	0.37	<a href="#">LR-20P5</a>	2.4	4.2
<a href="#">GS4-22P0</a>	0.75	3.2	5.8	2.170	3.617	0.55	<a href="#">LR-21P0</a>	4.6	2.46
<a href="#">GS4-23P0</a>	1	5.0	9.0	1.397	2.328	0.75	<a href="#">LR-21P0</a>	4.6	2.46
<a href="#">GS4-25P0</a>	2	8	14	0.868	1.447	1.5	<a href="#">LR-23P0</a>	10.6	0.97
<a href="#">GS4-27P5</a>	3	11	20	0.640	1.066	2.2	<a href="#">LR-23P0</a>	10.6	0.97
<a href="#">GS4-2010</a>	3	11	20	0.640	1.066	2.2	<a href="#">LR-23P0</a>	10.6	0.97
<a href="#">GS4-2015</a>	5	17	31	0.405	0.675	3.7	<a href="#">LR-25P0</a>	16.7	0.626
<a href="#">GS4-2020</a>	7.5	25	45	0.283	0.471	5.5	<a href="#">LR-27P5</a>	24.2	0.434
<a href="#">GS4-2025</a>	10	33	59	0.213	0.354	7.5	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2030</a>	10	33	59	0.213	0.354	7.5	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2040</a>	10	33	59	0.213	0.354	7.5	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2050</a>	10	33	59	0.213	0.354	7.5	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2060</a>	15	49	88	0.143	0.238	11	<a href="#">LR-2015</a>	46.2	0.22
<a href="#">GS4-2075</a>	20	65	117	0.108	0.179	15	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2100</a>	25	75	135	0.093	0.156	18.5	<a href="#">LR-2025</a>	74.8	0.138

\* Amperage ratings are 3-phase output reactor ratings when the drive is supplied with a single-phase input.

# GS4 DURAPULSE Drives Accessories – Line/Load Reactors

## Line/Load Reactors for GS4/DURAPULSE AC Drives – Selection Specifications

Supply: 230V, 3Ø, 50/60 Hz (Variable Torque; reactor installed <u>Line</u> or <u>Load</u> Side)									
GS4 Model	hp	VT: 3Ø Output Amps (rms)	Saturation Amps (rms)	Inductance (mH)		Max Motor kW	LR Model*	Rated Amps	LR 3% Inductance
				3% Impedance	5% Impedance				
<a href="#">GS4-21P0</a>	1	5	8.7	2.536	4.226	0.75	<a href="#">LR-21P0</a>	4.6	2.46
<a href="#">GS4-22P0</a>	2	8	12.8	1.585	2.641	1.5	<a href="#">LR-23P0*</a>	10.6	0.97
<a href="#">GS4-23P0</a>	3	11	18	1.152	1.921	2.2	<a href="#">LR-23P0</a>	10.6	0.97
<a href="#">GS4-25P0</a>	5	17	29	0.746	1.244	3.7	<a href="#">LR-25P0</a>	16.7	0.626
<a href="#">GS4-27P5</a>	7.5	25	43	0.507	0.845	5.5	<a href="#">LR-27P5</a>	24.2	0.434
<a href="#">GS4-2010</a>	10	33	56	0.320	0.534	7.5	<a href="#">LR-2010</a>	30.8	0.342
<a href="#">GS4-2015</a>	15	49	85	0.216	0.359	11	<a href="#">LR-2015</a>	46.2	0.22
<a href="#">GS4-2020</a>	20	65	112	0.163	0.271	15	<a href="#">LR-2020</a>	59.4	0.172
<a href="#">GS4-2025</a>	25	75	128	0.169	0.282	18.5	<a href="#">LR-2025</a>	74.8	0.138
<a href="#">GS4-2030</a>	30	90	155	0.141	0.236	22	<a href="#">LR-2040*</a>	114	0.0886
<a href="#">GS4-2040</a>	40	120	205	0.106	0.176	30	<a href="#">LR-2040</a>	114	0.0886
<a href="#">GS4-2050</a>	50	146	250	0.087	0.146	37	<a href="#">LR-2050</a>	143	0.0699
<a href="#">GS4-2060</a>	60	180	308	0.070	0.117	45	not available*	169	0.0624
<a href="#">GS4-2075</a>	75	215	367	0.059	0.098	55		211	0.0487
<a href="#">GS4-2100</a>	100	255	436	0.049	0.082	75		273	0.0364

\* Some GS4 drive and reactor combinations do not fit the typical "pattern" of having similar part numbers, due to some GS4 models having higher outputs than previous GS DURApulse drives.

Supply: 460V, 3Ø, 50/60 Hz (Variable Torque; reactor installed <u>Line</u> or <u>Load</u> Side)									
GS4 Model	hp	VT: 3Ø Output Amps (rms)	Saturation Amps (rms)	Inductance (mH)		Max Motor kW	LR Model	Rated Amps	LR 3% Inductance
				3% Impedance	5% Impedance				
<a href="#">GS4-41P0</a>	1	3	5.2	8.102	13.503	0.75	<a href="#">LR-41P0</a>	2.1	8.927
<a href="#">GS4-42P0</a>	2	4	6.8	6.077	10.128	1.5	<a href="#">LR-42P0</a>	3.4	5.790
<a href="#">GS4-43P0</a>	3	6	10.3	4.050	6.751	2.2	<a href="#">LR-43P0</a>	4.8	4.270
<a href="#">GS4-45P0</a>	5	9	14.6	2.700	4.500	3.7	<a href="#">LR-45P0</a>	7.6	2.770
<a href="#">GS4-47P5</a>	7.5	12	20	2.025	3.375	5.5	<a href="#">LR-47P5</a>	11	1.680
<a href="#">GS4-4010</a>	10	18	31	1.174	1.957	7.5	<a href="#">LR-4010</a>	14	1.290
<a href="#">GS4-4015</a>	15	24	41	0.881	1.468	11	<a href="#">LR-4015</a>	21	0.912
<a href="#">GS4-4020</a>	20	32	54	0.660	1.101	15	<a href="#">LR-4020</a>	27	0.694
<a href="#">GS4-4025</a>	25	38	65	0.639	1.066	18.5	<a href="#">LR-4025</a>	34	0.569
<a href="#">GS4-4030</a>	30	45	77	0.541	0.901	22	<a href="#">LR-4030</a>	40	0.469
<a href="#">GS4-4040</a>	40	60	103	0.405	0.675	30	<a href="#">LR-4040</a>	52	0.387
<a href="#">GS4-4050</a>	50	73	124	0.334	0.556	37	<a href="#">LR-4050</a>	65	0.295
<a href="#">GS4-4060</a>	60	91	155	0.267	0.445	45	<a href="#">LR-4060</a>	77	0.227
<a href="#">GS4-4075</a>	75	110	189	0.221	0.368	55	<a href="#">LR-4075</a>	96	0.196
<a href="#">GS4-4100</a>	100	150	257	0.162	0.270	75	<a href="#">LR-4100</a>	124	0.152
<a href="#">GS4-4125</a>	125	180	308	0.135	0.224	90	<a href="#">LR-4125</a>	156	0.117
<a href="#">GS4-4150</a>	150	220	376	0.110	0.184	110	<a href="#">LR-4150</a>	180	0.103
<a href="#">GS4-4175</a>	175	260	445	0.098	0.163	132	<a href="#">LR-4200</a>	240	0.0839
<a href="#">GS4-4200</a>	215	310	531	0.078	0.130	160	<a href="#">LR-4250</a>	302	0.0654
<a href="#">GS4-4250</a>	250	370	634	0.066	0.109	185	<a href="#">LR-4250</a>	302	0.0654
<a href="#">GS4-4300</a>	300	460	787	0.054	0.090	220	<a href="#">LR-4300</a>	361	0.0565

# GS/DURAPULSE Drives Accessories – Line/Load Reactors

## Line/Load Reactors for GS/DURAPULSE AC Drives – Additional Specifications

Line Reactors – LR Series – Additional Specifications							
Part Number	Price	Product Weight	Wire Range	Terminal Torque	Temperature Range		Environment
					Operating	Storage	
<a href="#">LR-20P5</a>	Retired	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in	-40 – 104 °F [-40 – 40 °C]	-40 – 149 °F [-40 – 65 °C]	NEMA: open IP00 no corrosive gases
<a href="#">LR-21P0-1PH</a>	\$78.00	2.8 lb [1.3 kg]	#12–#18 AWG	10 lb·in			
<a href="#">LR-22P0-1PH</a>	\$86.00	4.3 lb [2.0 kg]	#12–#18 AWG	20 lb·in			
<a href="#">LR-23P0-1PH</a>	\$187.00	4.3 lb [2.0 kg]	#12–#18 AWG	20 lb·in			
<a href="#">LR-23P0</a>	Retired	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in			
<a href="#">LR-25P0</a>	\$194.00	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-27P5</a>	\$206.00	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-2010</a>	\$242.00	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-2015</a>	\$285.00	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-2020</a>	\$312.00	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-2025</a>	\$460.00	15 lb [6.8 kg]	#18–#4 AWG	#18–#16 AWG: 25 lb·in #14–#6 AWG: 30 lb·in #4 AWG: 35 lb·in			
<a href="#">LR-2030</a>	\$490.00	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120			
<a href="#">LR-2040</a>	\$574.00	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120			
<a href="#">LR-2050</a>	\$670.00	36 lb [16 kg]	250kcmil – #6AWG (AL or CU)	275			
<a href="#">LR-4010</a>	\$196.00	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in			
<a href="#">LR-4015</a>	\$237.00	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-4020</a>	\$276.00	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-4025</a>	\$290.00	10 lb [4.5 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-4030</a>	\$347.00	10 lb [4.5 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-4040</a>	\$382.00	15 lb [6.8 kg]	#18–#4 AWG	20 lb·in			
<a href="#">LR-4050</a>	\$448.00	25 lb [11 kg]	#22–#4 AWG	#22–#16 AWG: 25 lb·in #14–#6 AWG: 30 lb·in #4 AWG: 35 lb·in			
<a href="#">LR-4060</a>	\$462.00						
<a href="#">LR-4075</a>	\$700.00	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120 lb·in			
<a href="#">LR-4100</a>	\$840.00	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
<a href="#">LR-4125</a>	\$962.00	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
<a href="#">LR-4150</a>	\$1,114.00	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
<a href="#">LR-4200</a>	\$1,238.00	74 lb [34 kg]	(1) 600kcmil – #4 AWG (2) 250kcmil – 1/0	500 lb·in			
<a href="#">LR-4250</a>	\$1,403.00	74 lb [34 kg]	(2)* 350kcmil – #4 AWG (AL or CU)	275 lb·in			
<a href="#">LR-4300</a>	\$1,546.00	74 lb [34 kg]	(2)* 350kcmil – #4 AWG (AL or CU)	275 lb·in			
<a href="#">LR-5010</a>	Retired	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in			

\* LR-4250 & LR-4300 have dual-connector lugs, and will require multiple conductors per phase of the appropriate size to fit the lugs.

# GS/DURAPULSE Drives Accessories – Line/Load Reactors

## Line/Load Reactors Part Number Cross Reference for GS/DURAPULSE AC Drives

Line Reactors – LR Series – Part Number Cross Reference					
<i>AutomationDirect LR Series</i>	<i>AutomationDirect GS Series (legacy)</i>	<i>AB-1321</i>	<i>Hammond</i>	<i>MTE-RL</i>	<i>MTE-RLW</i>
<a href="#"><u>LR-20P5</u></a>	GS-20P5-LR-3PH	NA	NA	NA	NA
<a href="#"><u>LR-21P0-1PH</u></a>	GS-21P0-LR-1PH	NA	NA	NA	NA
<a href="#"><u>LR-22P0-1PH</u></a>	GS-22P0-LR-1PH	NA	NA	NA	NA
<a href="#"><u>LR-23P0-1PH</u></a>	GS-23P0-LR-1PH	NA	NA	NA	NA
<a href="#"><u>LR-23P0</u></a>	GS-23P0-LR-3PH	1321-3R12-A	RM0012N13	RL-01201	RLW-001101
<a href="#"><u>LR-25P0</u></a>	GS-25P0-LR	1321-3R18-A	RM0018P80	RL-01801	RLW-001401
<a href="#"><u>LR-27P5</u></a>	GS-27P5-LR	1321-3R25-A	RM0025P50	RL-02501	RLW-002101
<a href="#"><u>LR-2010</u></a>	GS-2010-LR	1321-3R35-A	RM0035P40	RL-03501	RLW-003501
<a href="#"><u>LR-2015</u></a>	GS-2015-LR	1321-3R45-A	RM0045P30	RL-04501	RLW-004601
<a href="#"><u>LR-2020</u></a>	GS-2020-LR	1321-3R55-A	RM0055P25	RL-05501	RLW-005501
<a href="#"><u>LR-2025</u></a>	GS-2025-LR	1321-3R80-A	RM0080P20	RL-08001	RLW-008301
<a href="#"><u>LR-2030</u></a>	GS-2030-LR	1321-3R100-A	RM0080P20	RL-10001	RLW-010401
<a href="#"><u>LR-2040</u></a>	GS-2040-LR	1321-3R130-A	RM0130P10	RL-13001	RLW-013001
<a href="#"><u>LR-2050</u></a>	GS-2050-LR	1321-3R130-A	RM0130P10	RL-13001	RLW-013001
<a href="#"><u>LR-4010</u></a>	GS-4010-LR	1321-3R18-B	RM0018N15	RL-01802	RLW-001403
<a href="#"><u>LR-4015</u></a>	GS-4015-LR	1321-3R25-B	RM0025N12	RL-02502	RLW-002103
<a href="#"><u>LR-4020</u></a>	GS-4020-LR	1321-3R35-B	RM0035P80	RL-03502	RLW-003503
<a href="#"><u>LR-4025</u></a>	GS-4025-LR	1321-3R35-B	RM0035P80	RL-03502	RLW-003503
<a href="#"><u>LR-4030</u></a>	GS-4030-LR	1321-3R45-B	RM0045P70	RL-04502	RLW-004603
<a href="#"><u>LR-4040</u></a>	GS-4040-LR	1321-3R55-B	RM0055P50	RL-05502	RLW-005503
<a href="#"><u>LR-4050</u></a>	GS-4050-LR	1321-3R80-B	RM0080P40	RL-08002	RLW-008305
<a href="#"><u>LR-4060</u></a>	GS-4060-LR	1321-3R80-B	RM0080P40	RL-08002	RLW-008305
<a href="#"><u>LR-4075</u></a>	GS-4075-LR	1321-3R100-B	RM0110P30	RL-10002	RLW-010403
<a href="#"><u>LR-4100</u></a>	GS-4100-LR	1321-3R130-B	RM0130P20	RL-13002	RLW-013003
<a href="#"><u>LR-5010</u></a>	N/A	1321-3R12-B	RM0012N25	RL-01202	RLW-001103
<a href="#"><u>LR-4125</u></a>	N/A	1321-3R160-B	RM0160P15	RL-16002	RLW-016003
<a href="#"><u>LR-4150</u></a>	N/A	1321-3R200-B	RM0200P11	RL-20002B14	RLW-020003
<a href="#"><u>LR-4200</u></a>	N/A	1321-3RB250-B	RM0250U90	RL-25002B14	RLW-025003
<a href="#"><u>LR-4250</u></a>	N/A	1321-3RB320-B	RM0320U75	RL-32002B14	RLW-032203
<a href="#"><u>LR-4300</u></a>	N/A	1321-3RB400-B	RM0400U61	RL-40002B14	RLW-041403

# GS/DURAPULSE Drives Accessories – Line/Load Reactors

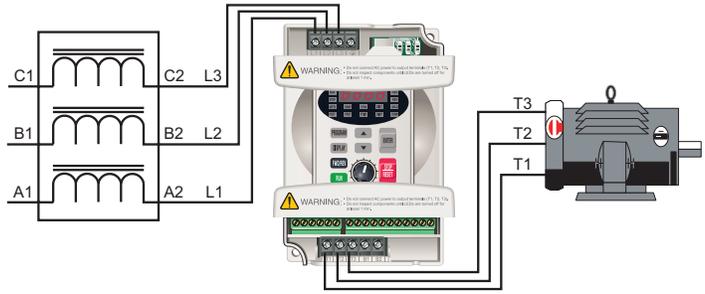
## Line/Load Reactors for GS/DURAPULSE AC Drives – Generic One-Line Wiring Examples



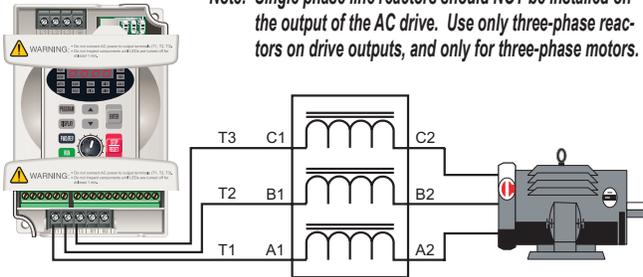
**WARNING: CONSULT THE APPLICABLE GS DRIVE USER MANUAL BEFORE ACTUALLY WIRING THE DRIVE!**

### Input side of the drive

When installed on the input side of the AC drive, line reactors will reduce line notching, and limit current and voltage spikes and surges from the incoming line. The line reactor will also reduce harmonic distortion from the drive onto the line. Units are installed in front of the AC drive as shown.



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



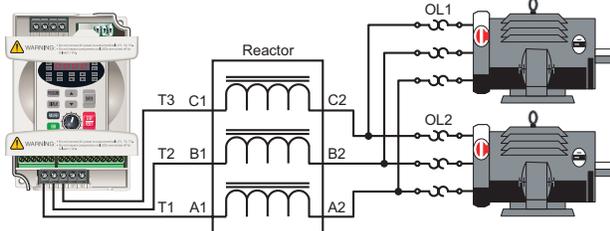
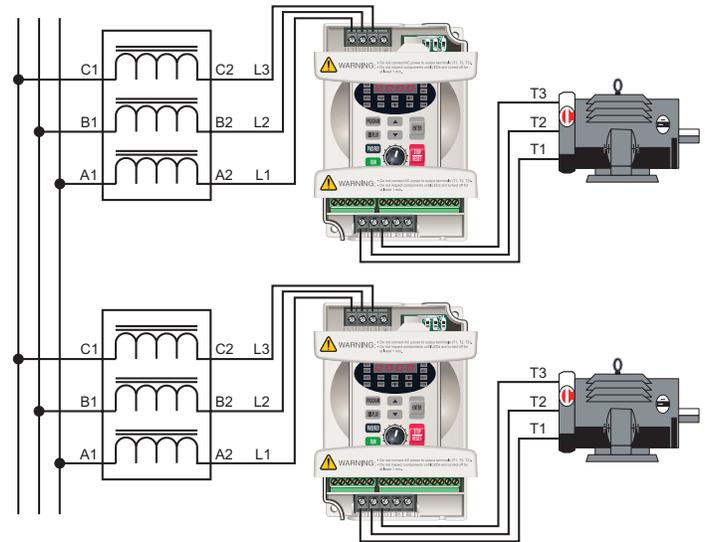
### Output side of the drive

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

**Note: If installing a line reactor on the output side of the drive, especially with motor lead lengths in excess of 75 feet, lower the drive PWM output carrier frequency to 4kHz in order to protect the line reactor from excess heating and possible damage.**

### Multiple drives

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



### Multiple motors

A single reactor can be used for multiple motors on the same drive, **if the motors operate simultaneously**. Size the reactor based upon the total horsepower of all the motors. Select a reactor with a current rating greater than the sum of the motor full-load currents. **Overload relays are recommended** for use in multi-motor applications.

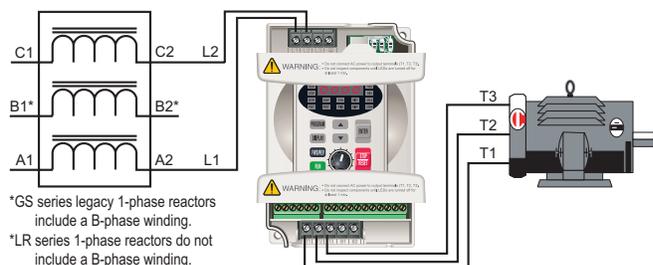
**Note: A single reactor should be used with multiple motors only when the motors will always operate simultaneously.**

### Single phase applications

Some of the line reactors are listed for use with single-phase input power. Make sure that terminals B1 and B2, if present, are properly insulated before any connections are made.



**WARNING: ENSURE THAT TERMINALS B1 AND B2 ARE PROPERLY INSULATED BEFORE MAKING ANY CONNECTIONS TO SINGLE-PHASE POWER.**



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



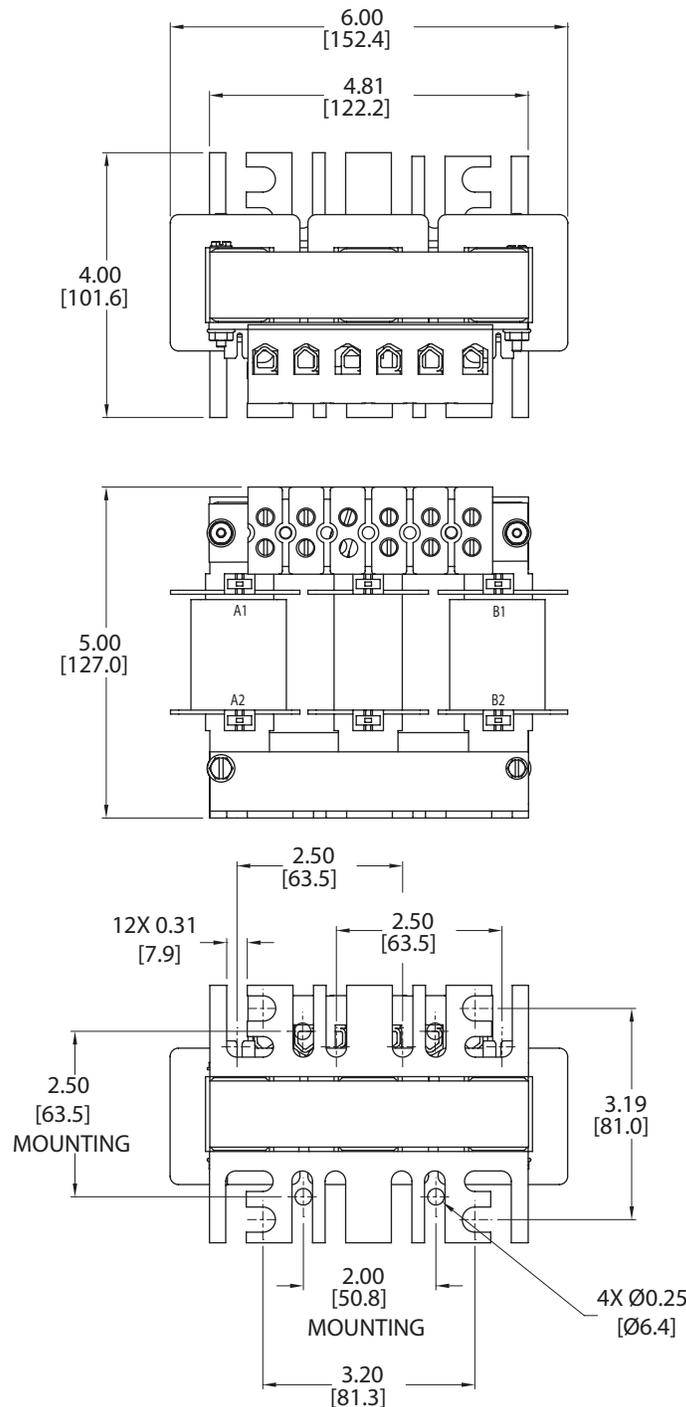
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

**LR-11P0-1PH, LR-22P0-1PH, LR-23P0-1PH**

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



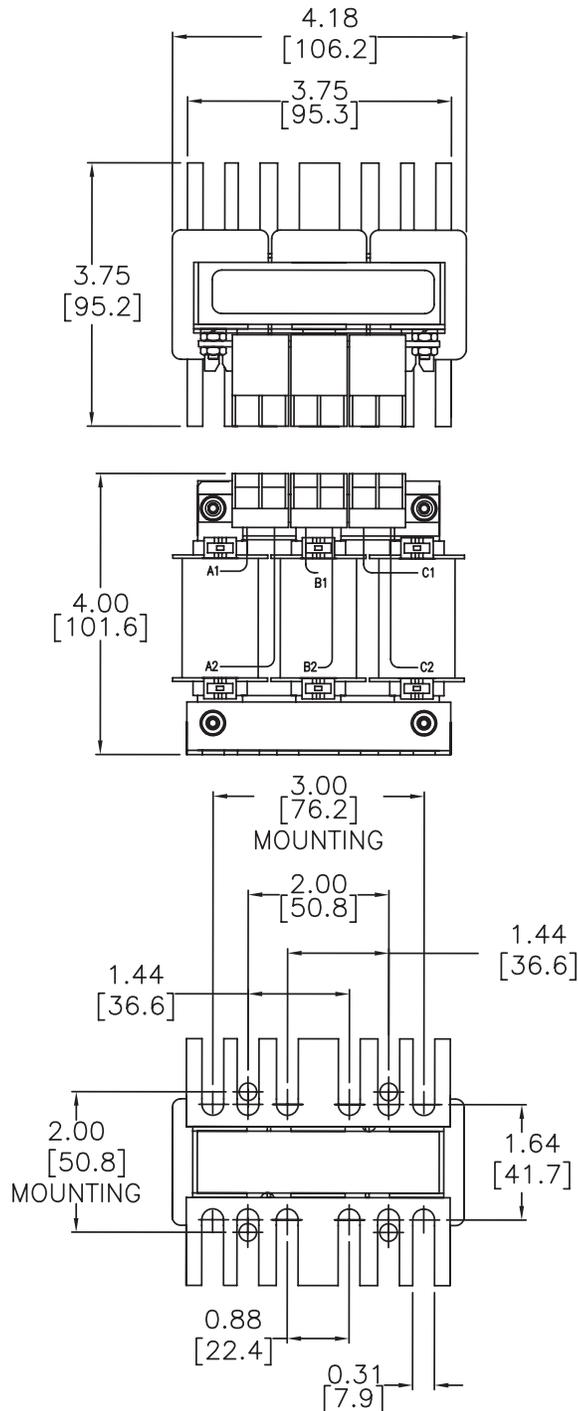
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

**LR-20P5, LR-23P0, LR-4010, LR-5010**

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



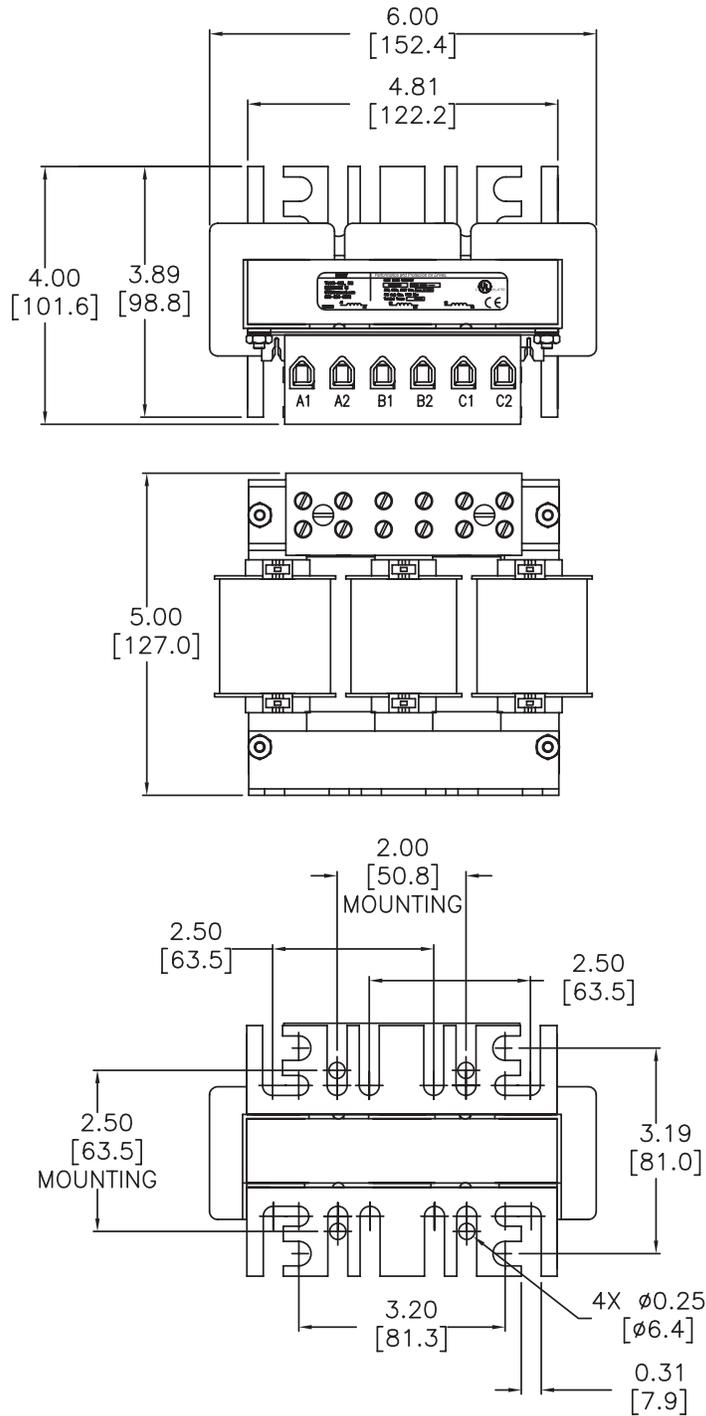
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

**LR-25P0, LR-27P5, LR-4015, LR-4020**

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**





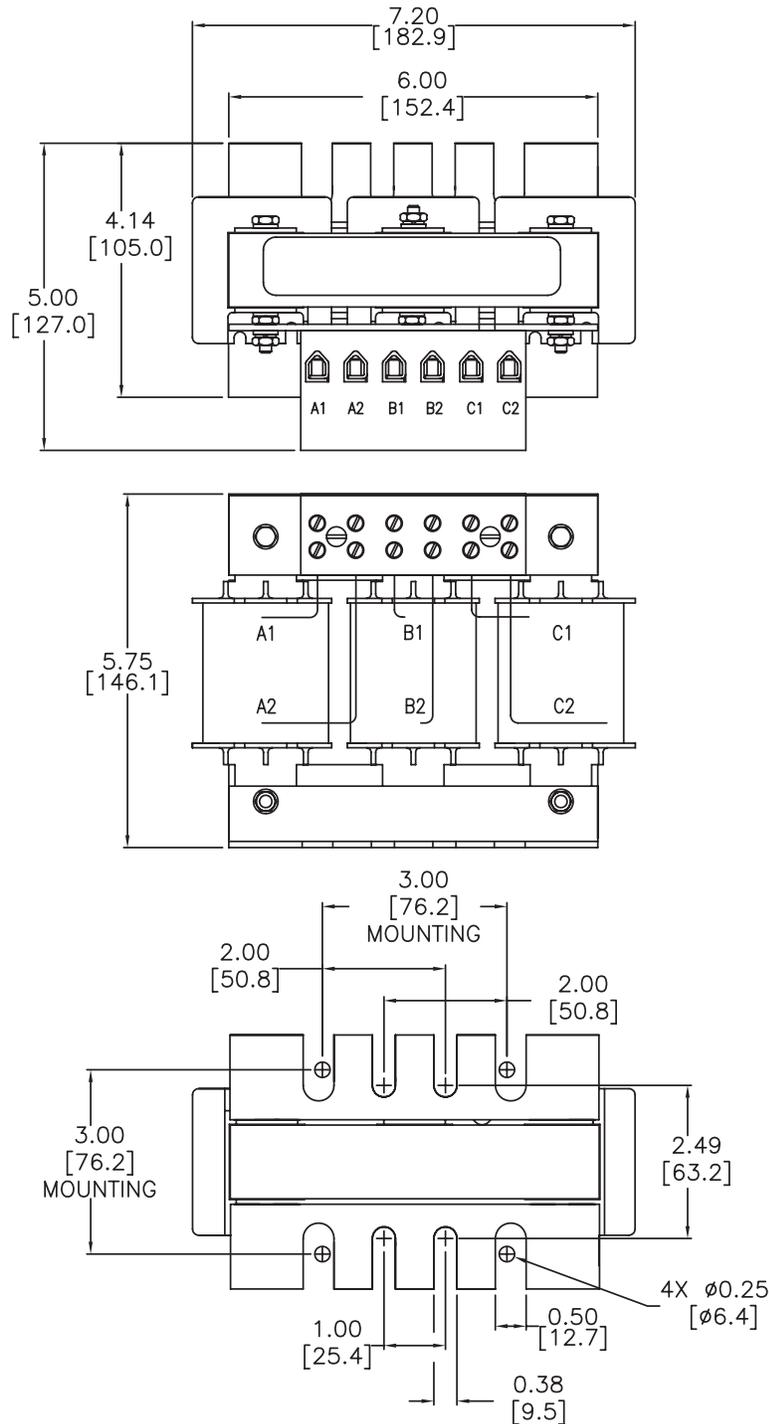
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-2025, LR-4040

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



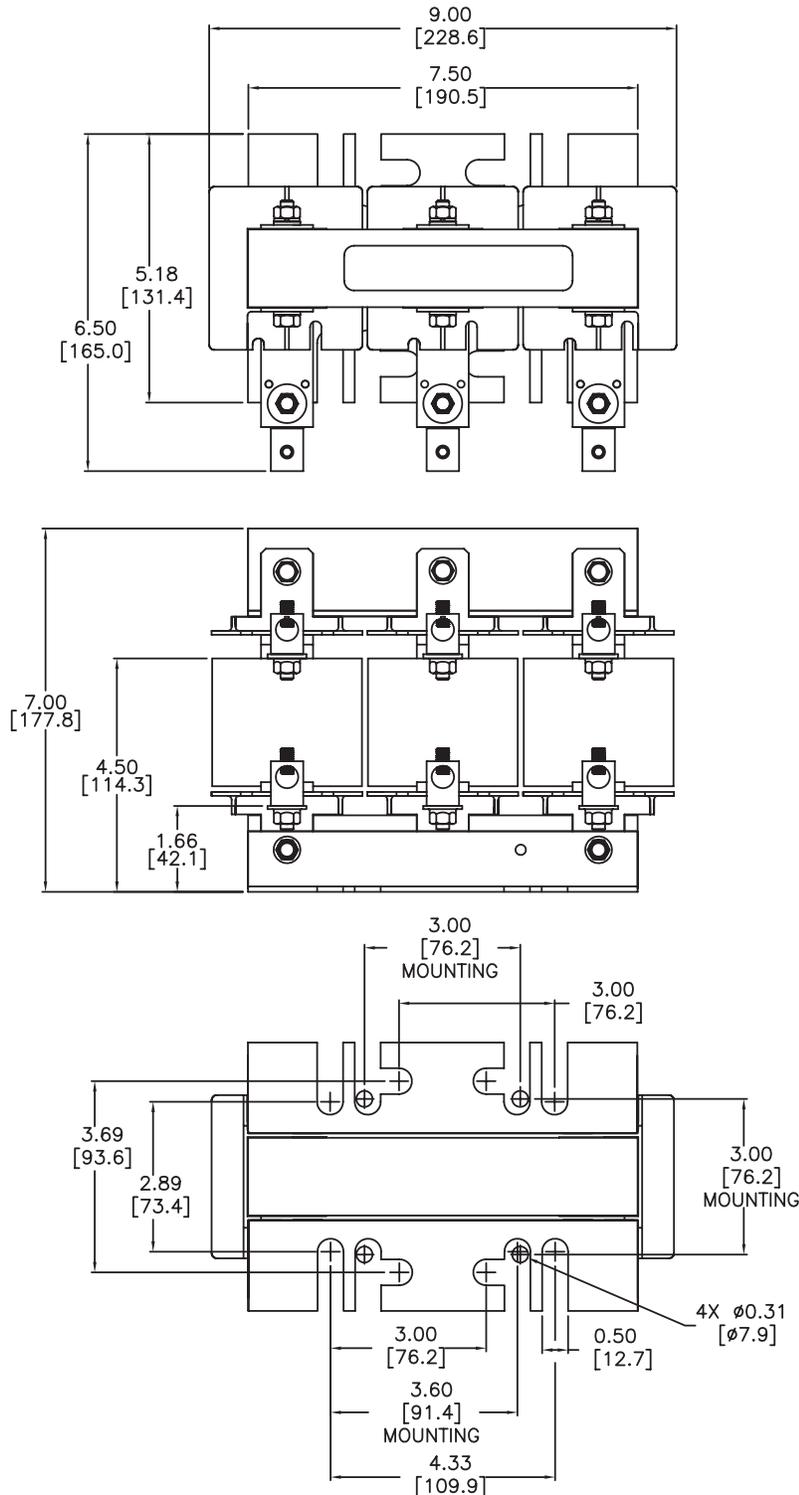
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

**LR-2030, LR-2040, LR-4075**

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



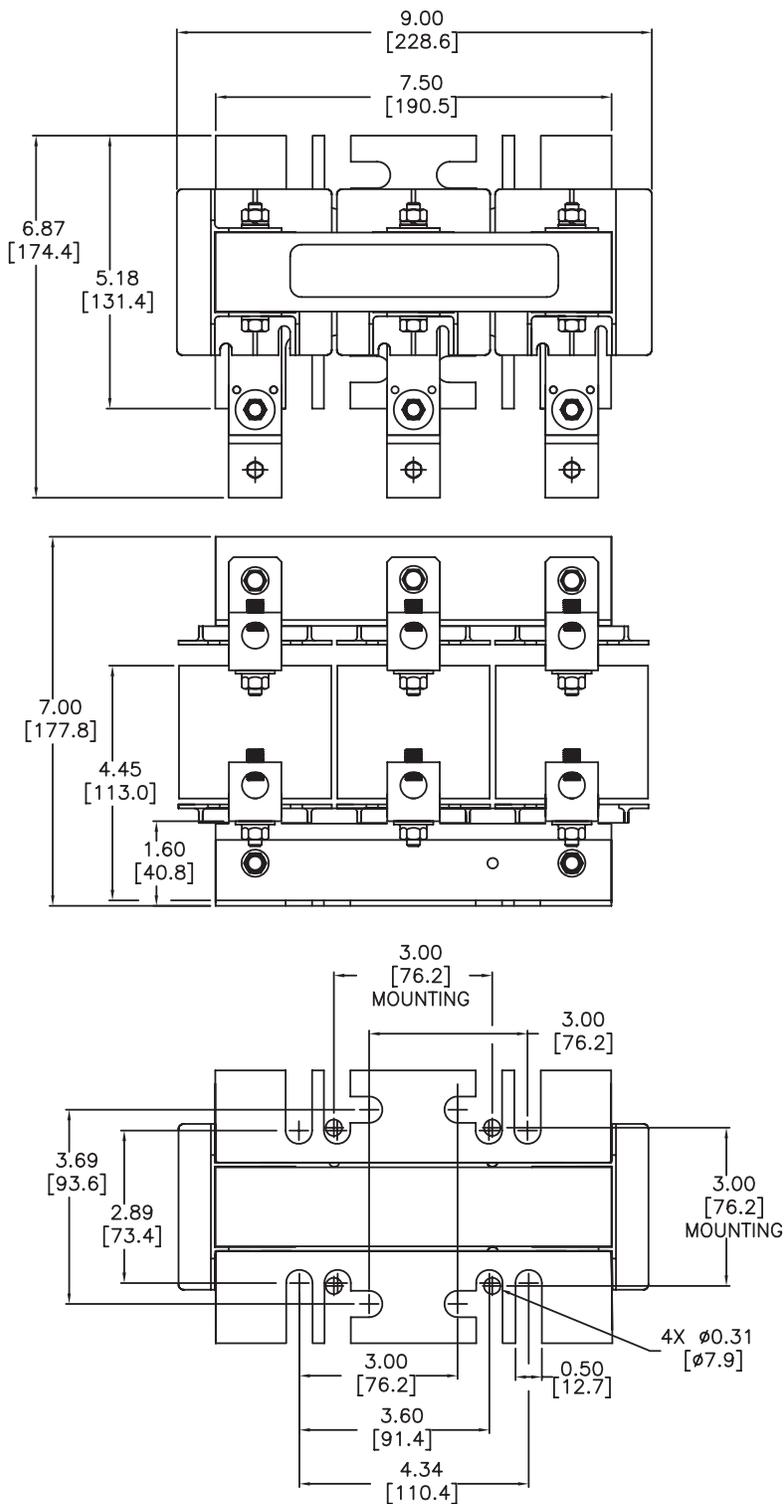
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-2050

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

(Units = inches [mm])



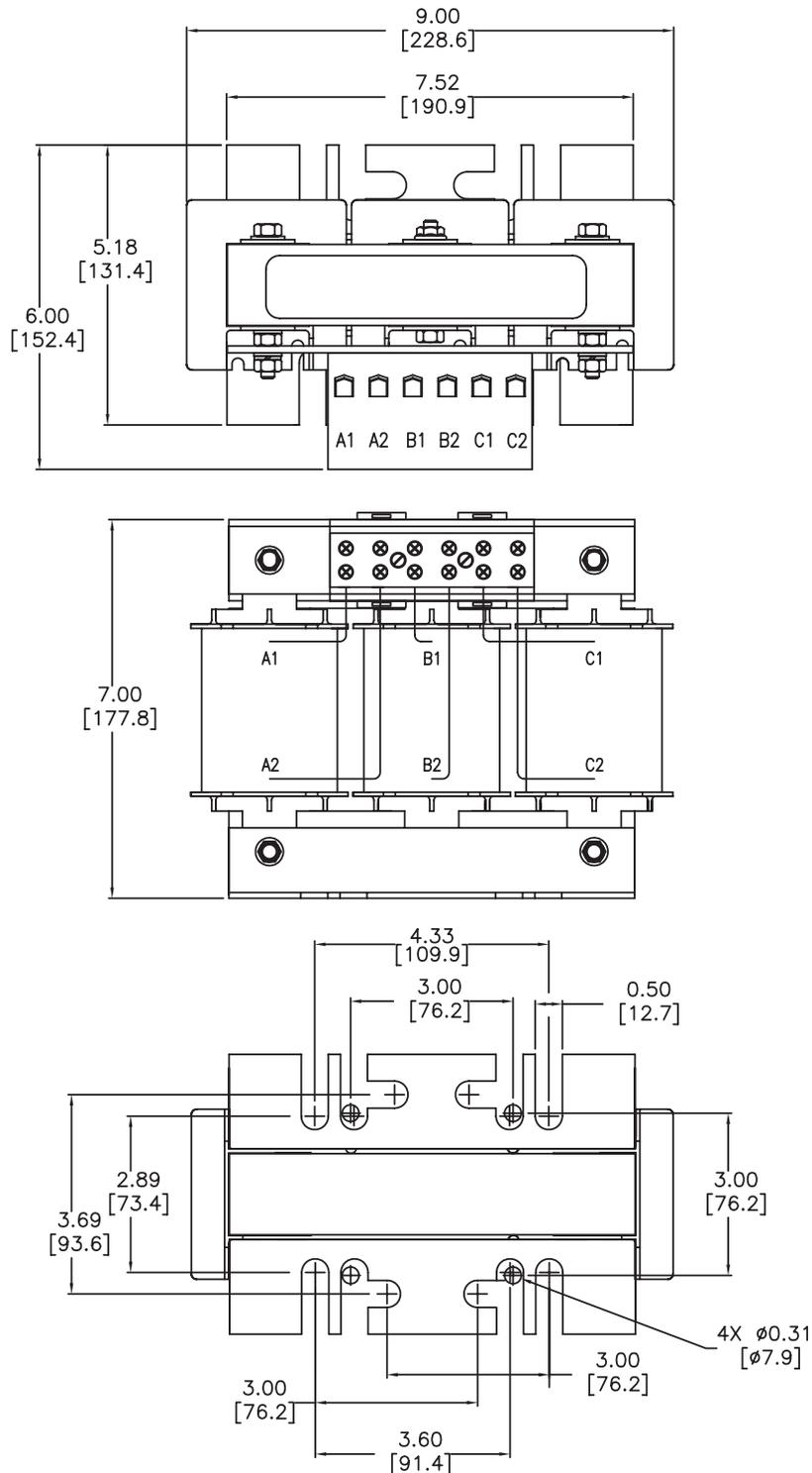
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-4050, LR-4060

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



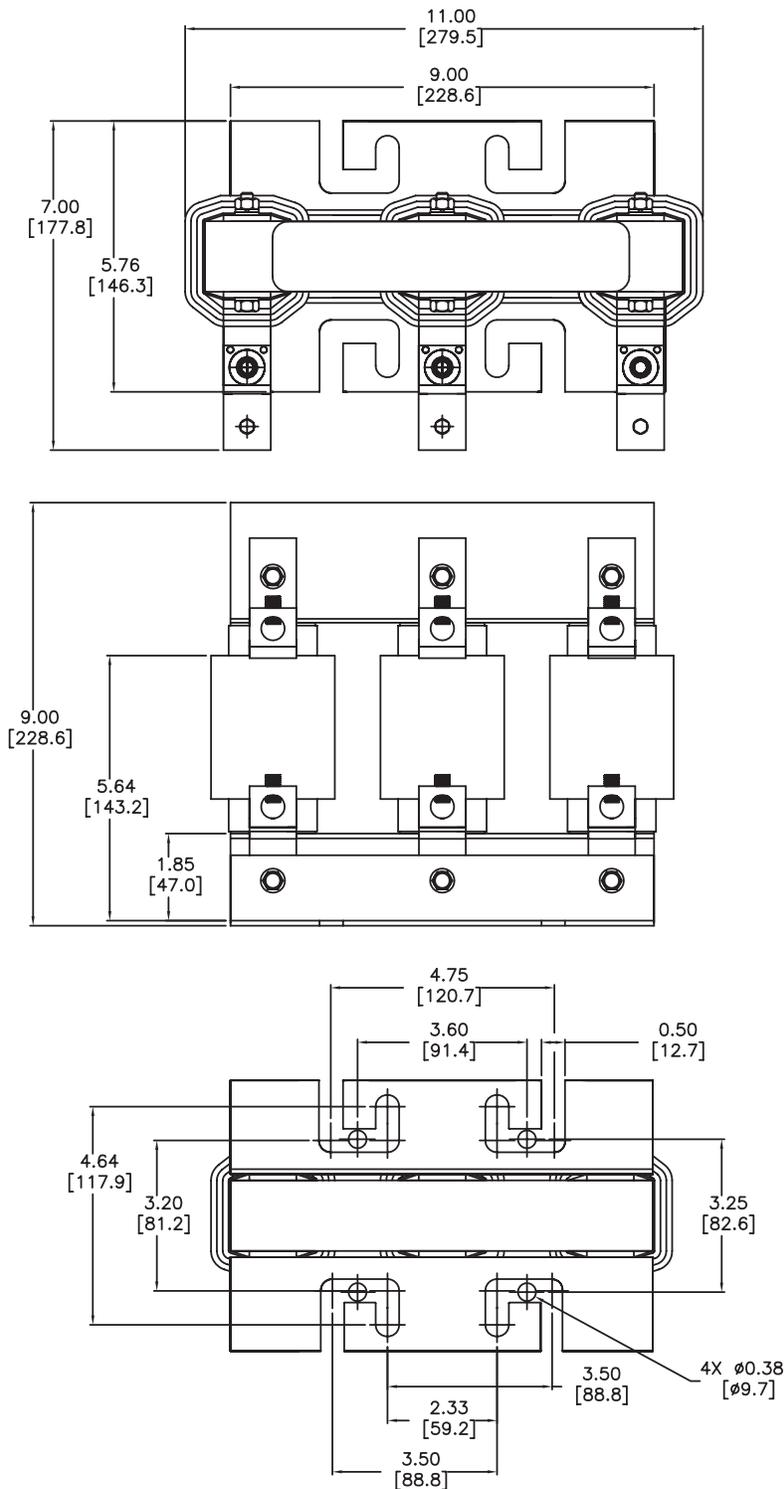
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-4100, LR-4125, LR-4150

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

(Units = inches [mm])



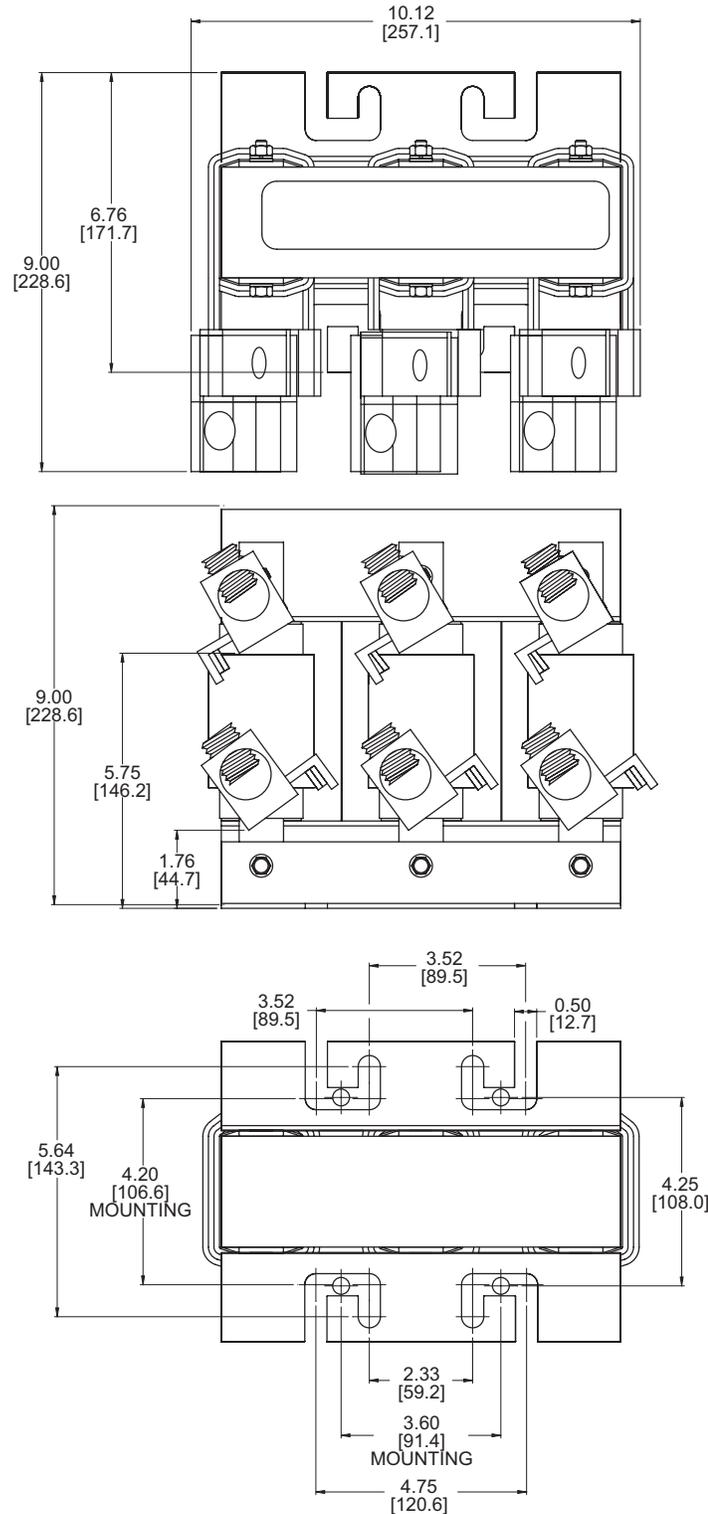
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-4200

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



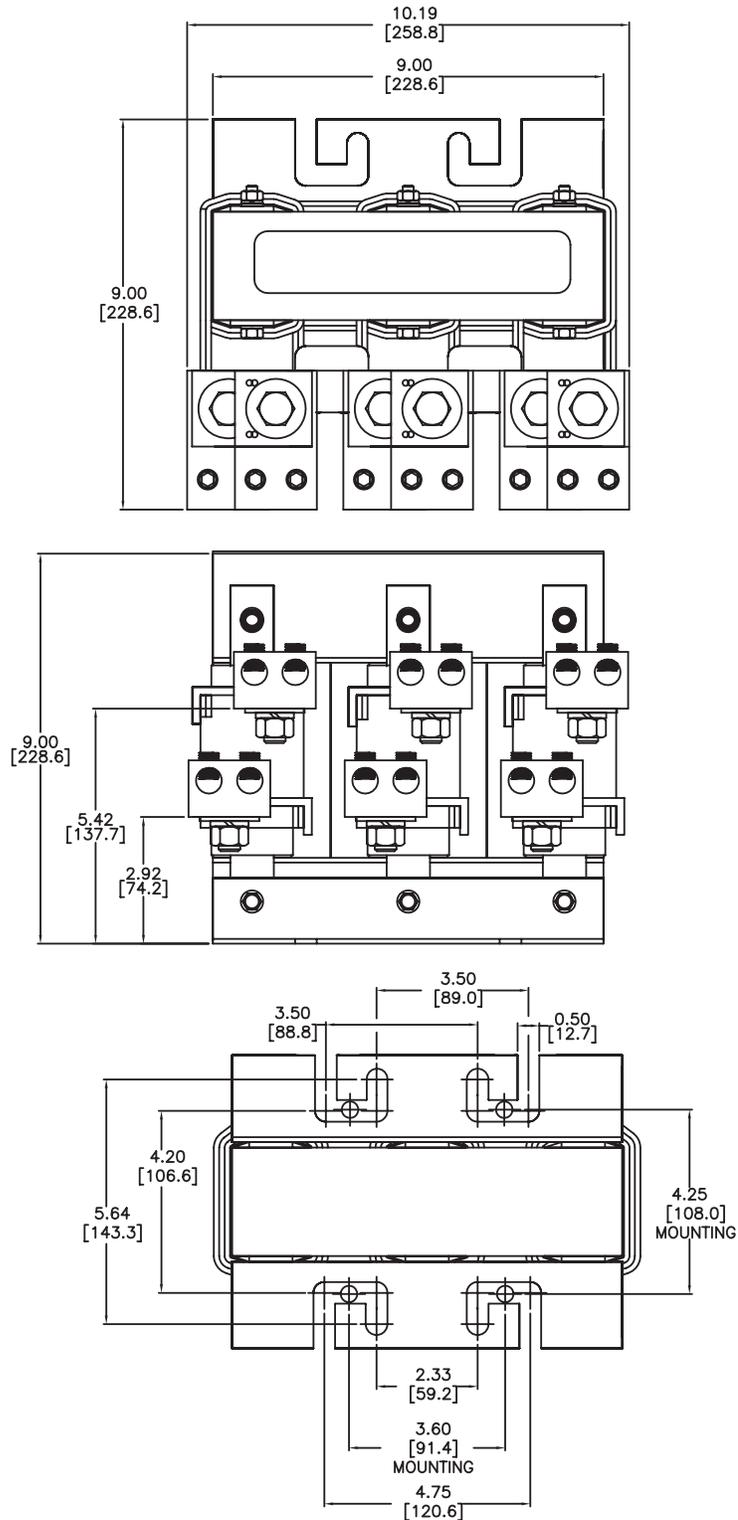
# GS/DURAPULSE Drives Accessories – Line Reactors

## Line Reactor Dimensions

### LR-4250, LR-4300

LR series reactors have universal mounting feet with multiple mounting slots, and they can replace most reactors using the existing mounting holes. Use four bolts to mount the reactors to the mounting panel.

**(Units = inches [mm])**



# GS/DURAPULSE Drives Accessories – Dynamic Braking Component Selection – GS2

## Braking Resistor Selection for GS2 AC Drives

Dynamic Braking Resistor Selection – GS2 AC Drives								
Part Number	Quantity Required and Wiring	Price	Drive Model	Motor V / hp	Braking Torque ED 10%	Resistance (Ω)	Power (W)	Duty Cycle
<a href="#"><u>GS-22P0-BR</u></a>	1	\$41.50	<a href="#"><u>GS2-22P0</u></a>	230 / 2	125%	100	300	10%
<a href="#"><u>GS-23P0-BR</u></a>	1	\$41.50	<a href="#"><u>GS2-23P0</u></a>	230 / 3	125%	70	300	10%
<a href="#"><u>GS-25P0-BR</u></a> *	1	\$49.50	<a href="#"><u>GS2-25P0</u></a>	230 / 5	125%	40	400	10%
<a href="#"><u>GS-27P5-BR</u></a>	1	\$49.50	<a href="#"><u>GS2-27P5</u></a>	230 / 7.5	125%	30	500	10%
<a href="#"><u>GS-41P0-BR</u></a>	1	\$26.00	<a href="#"><u>GS2-41P0</u></a>	460 / 1	125%	750	80	10%
<a href="#"><u>GS-42P0-BR</u></a>	1	\$58.00	<a href="#"><u>GS2-42P0</u></a>	460 / 2	125%	400	300	10%
	2 / parallel		<a href="#"><u>GS2-51P0</u></a>	575 / 1				
			<a href="#"><u>GS2-53P0</u></a>	575 / 3				
			<a href="#"><u>GS2-57P5</u></a>	575 / 7.5				
<a href="#"><u>GS-43P0-BR</u></a>	1	\$58.00	<a href="#"><u>GS2-43P0</u></a>	460 / 3	125%	250	300	10%
<a href="#"><u>GS-45P0-BR</u></a>	1	\$70.00	<a href="#"><u>GS2-45P0</u></a>	460 / 5	125%	150	400	10%
<a href="#"><u>GS-47P5-BR</u></a>	1	\$70.00	<a href="#"><u>GS2-47P5</u></a>	460 / 7.5	125%	100	500	10%
<a href="#"><u>GS-4010-BR</u></a>	1	\$165.00	<a href="#"><u>GS2-4010</u></a>	460 / 10	125%	75	1000	10%
	2 / series		<a href="#"><u>GS2-5010</u></a>	575 / 10				

NOTE: Dynamic braking resistors not available for GS1 series AC drives.  
NOTE: The use of dynamic braking resistors with GS2 series AC drives requires no parameter setup. The AC drive will automatically sense the presence of a braking resistor.

\* GS-25P0-BR can be also be used with SureServo AC Servo Drive # SVA-2040.

# GS/DURAPULSE Drives Accessories – Dynamic Braking Component Selection – GS3

## Braking Component Selection for GS3 DURApulse AC Drives

GS3 AC Drive Braking Component Selection												
Drive Voltage	Motor Power		125% Braking Torque @ 10% Duty cycle**							Max Braking Torque		
			AC Drive Model #	Braking Unit		Braking Resistor		Brake Torque (kg·m)	Total Brake Current (A)	Min Resistor Value (Ω)	Max Total Brake Current (A)	Peak Power (W)
	GS3-	Quantity		Part # GS-	Quantity	Part # GS-						
230V	1	0.7	21P0	0	n/a	1	21P0-BR	0.5	1.9	82	4.6	1.8
	2	1.5	22P0			1	22P0-BR	1.0	3.8	82	4.6	1.8
	3	2.2	23P0			1	23P0-BR	1.5	5.4	82	4.6	1.8
	5	3.7	25P0			1	25P0-BR***	2.5	9.5	33	11.5	4.4
	7.5	5.5	27P5			1	27P5-BR	3.7	12.7	30	12.7	4.8
	10	7.5	2010			1	2010-BR-ENC	5.1	19.0	20	19.0	7.2
	15	11	2015			1	2015-BR-ENC	7.5	27.9	13.6	27.9	10.6
	20	15	2020	1	2DBU	1	2020-BR-ENC	10.2	38.0*	10*	38.0*	14.4*
	25	18	2025	1	2DBU	1	2025-BR-ENC	12.2	47.5*	8*	47.5*	18.1*
	30	22	2030	1	2DBU	1	2030-BR-ENC	14.9	55.9*	6.8*	55.9*	21.2*
	40	30	2040	2	2DBU	2	2040-BR-ENC	20.3	38.0*	10*	38.0*	14.5*
	50	37	2050	2	2DBU	2	2050-BR-ENC	25.1	47.5*	8*	47.5*	18.1*
460V	1	0.7	41P0	0	n/a	1	41P0-BR	0.5	1.0	160	4.8	3.6
	2	1.5	42P0			1	42P0-BR	1.0	1.9	160	4.8	3.6
	3	2.2	43P0			1	43P0-BR	1.5	3.0	160	4.8	3.6
	5	3.7	45P0			1	45P0-BR	2.5	5.1	130	5.8	4.4
	7.5	5.5	47P5			1	47P5-BR	3.7	7.6	91	8.4	6.3
	10	7.5	4010			1	4010-BR	5.1	10.1	62	12.3	9.3
	15	11	4015			1	4015-BR-ENC	7.5	15.2	39	19.5	14.8
	20	15	4020	1	4DBU	1	4020-BR-ENC	10.2	19.0*	40*	19.0*	14.4*
	25	18	4025	1	4DBU	1	4025-BR-ENC	12.2	23.8*	32*	23.8*	18.1*
	30	22	4030	1	4DBU	1	4030-BR-ENC	14.9	27.9*	27.2*	27.9*	21.2*
	40	30	4040	1	4DBU	1	4040-BR-ENC	20.3	38.0*	20*	38.0*	28.9*
	50	40	4050	1	4DBU	1	4050-BR-ENC	25.1	47.5*	16*	47.5*	36.1*
	60	45	4060	1	4DBU	1	4060-BR-ENC	30.5	55.9*	13.6*	55.9*	42.5*
	75	55	4075	2	4DBU	2	4075-BR-ENC	37.2	38.0*	20*	38.0*	28.9*
100	75	4100	2	4DBU	2	4100-BR-ENC	50.8	55.9*	13.6*	55.9*	42.5*	

\* These values are per individual DBU, as seen between DBU terminals B1 and B2.  
 \*\* 10% Duty Cycle with maximum ON (braking) time of 10 seconds.  
 \*\*\* GS-25P0-BR can be also be used with SureServo AC Servo Drive # SVA-2040.

NOTE: For DURAPULSE GS3 series AC drives 20 hp and above, dynamic braking units must be used in conjunction with braking resistors.

# GS4 DURAPULSE Drives Accessories – Dynamic Braking Component Selection – GS4

## Braking Component Selection for GS4 DURApulse AC Drives

GS4 AC Drive Braking Component Selection														
Drive Voltage	Motor Power		125% Braking Torque @ 10% Duty Cycle**							Max Braking Torque				
			AC Drive Model # GS4-	Braking Unit		Braking Resistor		Total Brake Current (A)	Min Resistor Value (Ω)	Max Total Brake Current (A)	Peak Power (kW)			
	Quantity	Part # GS-		Quantity	Part # GS-BR-	Brake Torque (kg·m)								
230V	1	0.7	21P0	0	n/a	1	080W200	0.5	1.9	63.3	6	2.3		
	2	1.5	22P0			1	200W091	1.0	4.2	47.5	8	3.0		
	3	2.2	23P0			1	300W070	1.5	5.4	38.0	10	3.8		
	5	3.7	25P0			1	400W040	2.5	9.5	19.0	20	7.6		
	7.5	5.5	27P5			1	1K0W020	3.7	19	14.6	26	9.9		
	10	7.5	2010			1	1K0W020	5.1	19	14.6	26	9.9		
	15	11	2015			1	1K5W013	7.5	29	12.6	28	10.6		
	20	15	2020			2	1K0W4P3	10.2	44	8.3	46	17.5		
	25	18	2025			2	1K0W4P3	12.2	44	8.3	46	17.5		
	30	22	2030			2	1K5W3P3	14.9	58	5.8	66	25.1		
	40	30	2040			2	1DBU	4	1K0W5P1	20.3	75*	4.8*	80*	30.4*
	50	37	2050			2	2DBU	4	1K2W3P9	25.1	97*	3.2*	120*	45.6*
	60	45	2060			2	2DBU	4	1K5W3P3	30.5	118*	3.2*	120*	45.6*
	75	55	2075			3	2DBU	6	1K2W3P9	37.2	145*	2.1*	180*	68.4*
100	75	2100	4	2DBU	8	1K2W3P9	50.8	190*	1.6*	240*	91.2*			
460V	1	0.7	41P0	0	n/a	1	080W750	0.5	1	190	4	3.0		
	2	1.5	42P0			1	200W360	1	2.1	126.7	6	4.6		
	3	2.2	43P0			1	300W250	1.5	3	108.6	7	5.3		
	5	3.7	45P0			1	400W150	2.5	5.1	84.4	9	6.8		
	7.5	5.5	47P5			1	1K0W075	3.7	10.2	54.3	14	10.6		
	10	7.5	4010			1	1K0W075	5.1	10.2	47.5	16	12.2		
	15	11	4015			1	1K5W043	7.5	17.6	42.2	18	13.7		
	20	15	4020			2	1K0W016	10.2	24	26.2	29	22.0		
	25	18	4025			2	1K0W016	12.2	24	23.0	33	25.1		
	30	22	4030			2	1K5W013	14.9	29	23.0	33	25.1		
	40	30	4040			4	1K0W016	20.3	47.5	14.1	54	41.0		
	50	40	4050			1	4DBU	4	1K2W015	25.1	50*	12.7*	60*	45.6*
	60	45	4060			1	4DBU	4	1K5W013	30.5	59*	12.7*	60*	45.6*
	75	55	4075			2	3DBU	8	1K0W5P1	37.2	76*	9.5*	80*	60.8*
	100	75	4100	2	4DBU	8	1K2W015	50.8	100*	6.3*	120*	91.2*		
	125	90	4125	2	4DBU	8	1K5W013	60.9	117*	6.3*	120*	91.2*		
	150	110	4150	1	5DBU	10	1K2W015	74.5	126*	6.0*	126*	95.8*		
	175	132	4175	1	6DBU	12	1K5W012	89.4	190*	4.0*	190*	144.4*		
	200	160	4200	1	6DBU	12	1K5W012	108.3	190*	4.0*	190*	144.4*		
	250	185	4250	1	7DBU	14	1K5W012	125.3	225*	3.4*	225*	172.1*		
300	220	4300	2	5DBU	20	1K2W015	148.9	252*	3.0*	252*	190.5*			

\* These values are per individual DBU, as seen between DBU terminals B1 and B2.  
 \*\* 10% Duty Cycle with maximum ON (braking) time of 10 seconds.

# GS/DURAPULSE Drives Accessories – Braking Unit Specifications for GS3 & GS4 DURAPULSE AC Drives

## Braking Units for GS3 & GS4 DURApulse AC Drives

### Overview

Braking units are applied to absorb the motor regeneration energy when the three-phase induction motor stops by deceleration.

GS-xDBU braking units, used with GS series braking resistors, provide optimum braking performance.



Note: Braking units are available ONLY for DURApulse drives.



**WARNING: TO AVOID INJURY OR MECHANICAL DAMAGE, PLEASE REFER TO USER MANUAL GS-DB\_UMP BEFORE WIRING.**



Dynamic Braking Unit Specifications – for GS3 & GS4 DURAPULSE AC Drives							
Braking Unit Part Number	GS-1DBU	GS-2DBU	GS-3DBU	GS-4DBU	GS-5DBU	GS-6DBU	GS-7DBU
Price	\$269.00	\$269.00	\$364.00	\$364.00	\$1,517.00	\$1,578.00	\$1,732.00
Nominal Voltage (VAC)	230			460			
Max Motor Capacity (hp/[kW])	20 [15]	30 [22]	40 [30]	60 [45]	150 [110]	200 [160]	250 [185]
Output Rating	Max Discharge Current (A) @ 10% Duty Cycle*	40	60	40	60	126	225
	Continuous Discharge Current (A)	15	20	15	18	45	100
	Braking Startup Voltage (VDC)	330/345/360/ 380/400/415 ±3V		600/690/720/ 760/800/830 ±6V		618/642/667/690/ 725/750 ±6V	
	Maximum On-Time (s)	10					
Input DC Voltage (VDC)	200–400		400–800		400–750		
Min Equivalent Resistor for Each Braking Unit (Ω)	10	6.8	20	13.6	6	4	3.4
Protection	Power CHARGE Lamp/LED	Comes ON until DC bus voltage (+P – -N) drops below 50VDC			Comes ON when DC bus voltage (DC+ – DC-) rises above 300VDC. Goes OFF when DC bus voltage (DC+ – DC-) drops below 100VDC.		
	Braking ACT Lamp/LED	ON during braking					
	Fault ERR Lamp	ON if a fault has occurred				n/a	
	Overcurrent Level LED (A)	n/a			190	290	340
	Overheat LED	n/a			Comes ON > 176°F [80°C]; Goes OFF < 149°F [65°C]		
	Heat Sink Overheat Temperature	203°F [95°C]			n/a		
Alarm Output Relay Contact	5A @ 120VAC/28VDC (RA,RB,RC)				3A @ 250VAC/28VDC (RA,RC)		
Environment	Installation Location	indoor (no corrosive gases; no metallic dust)					
	Operating Temperature	14°F to 122 °F [-10 to +50 °C]					
	Storage Temperature	-4 to +140 °F [-20 to +60 °C]					
	Humidity	less than 90% RH, non-condensing					
	Vibration	9.8 m/s <sup>2</sup> [1G] under 20Hz ; 2m/s <sup>2</sup> [0.2G] at 20–50 Hz					
Mechanical Configuration	IP50 wall-mount enclosed				IP10 wall-mount enclosed		

\* 10% Duty Cycle with maximum ON (braking) time of 10 seconds

# GS/DURAPULSE Drives Accessories – Braking Unit Basic Wiring for GS3 & GS4 DURAPULSE AC Drives

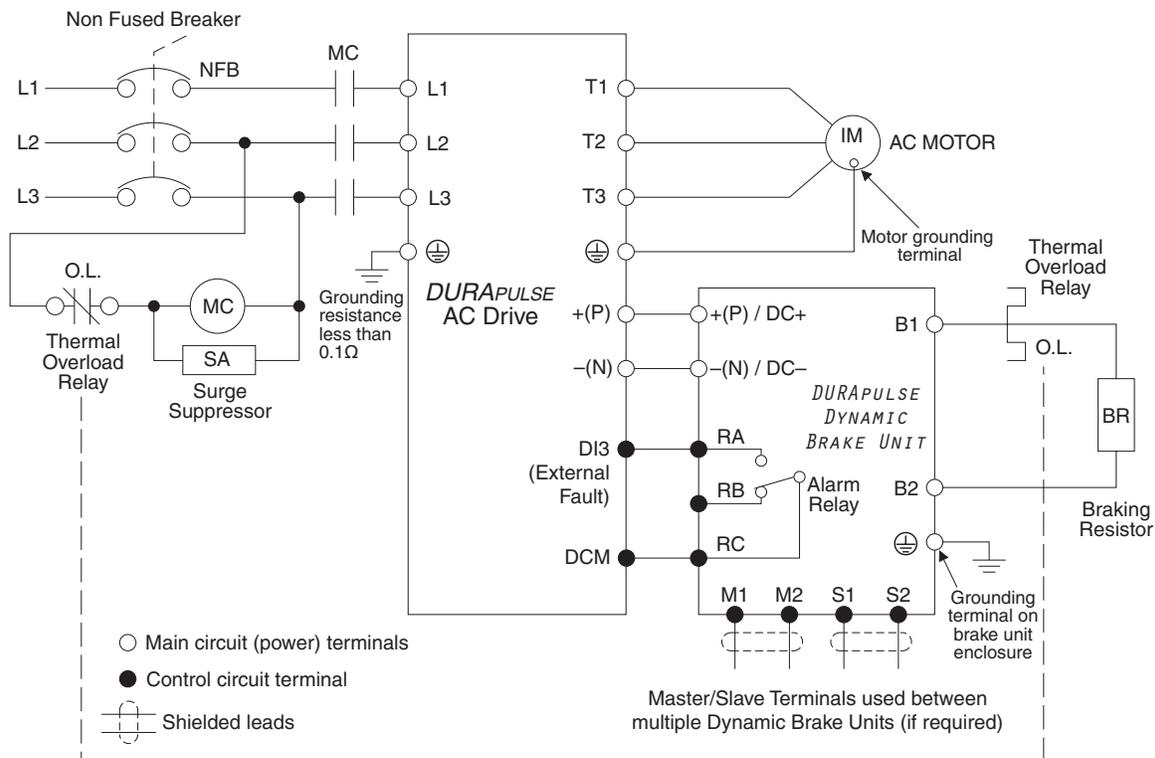
## Basic Dynamic Braking Wiring Diagram for GS3 & GS4 DURAPULSE AC Drives



Note: GS2 series AC Drives can connect directly to braking resistors, and do not require Dynamic Braking Units for braking.



Note: Smaller-capacity DURApulse AC Drives can connect directly to braking resistors, and do not require Dynamic Braking Units for braking. Other applications require multiple Resistors and/or multiple Dynamic Braking Units. Refer to “Dynamic Braking Component Selection” to determine which braking components are required for your application(s), and to the DURApulse Drives Dynamic Braking User Manual for complete wiring diagrams.

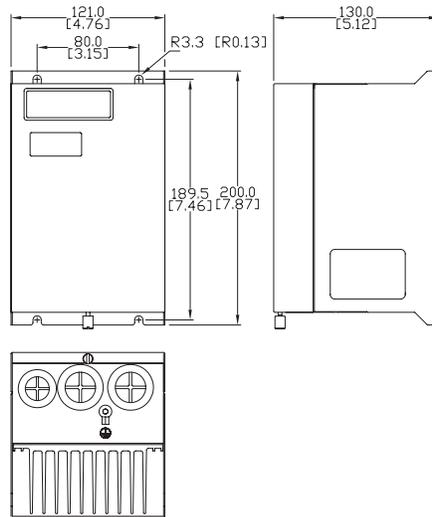


# GS/DURAPULSE Drives Accessories – Braking Unit Dimensions for GS3 & GS4 DURAPULSE AC Drives

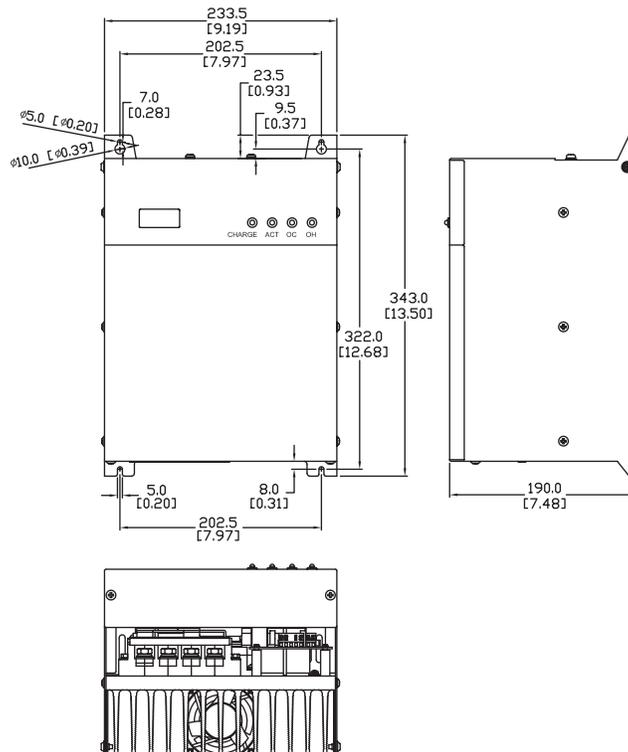
## Braking Unit Dimensions ( Dimensions = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### A) DBU ≤ 100hp (GS-1DBU, GS-2DBU, GS-3DBU, GS-4DBU)



### B) DBU > 100hp (GS-5DBU, GS-6DBU, GS-7DBU)



# GS/DURAPULSE Accessories – Braking Resistors for AC Drives

## Overview

Braking resistors are used to increase the control torque of the AC drive, for frequently repeated ON-OFF cycles of the AC drive, or for decelerating a load with large inertia.



For GS3 Durapulse drive models 20 hp and above, a dynamic braking unit must be used in conjunction with the braking resistor, as shown in the Durapulse AC drive Braking Units table.

For additional information, please refer to the dynamic braking manual, GS-DB\_UMP.



**GS-25P0-BR**



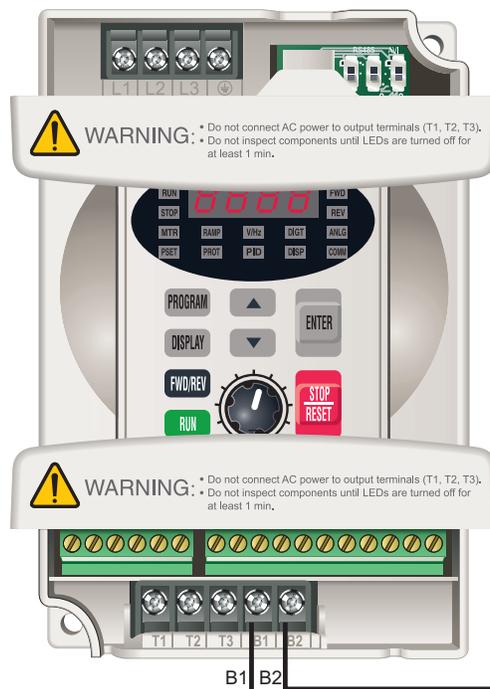
**GS-27P5-BR**



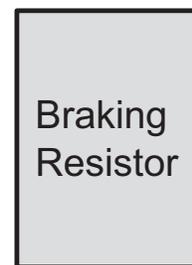
**GS-2020-BR-ENC**



**GS-2020-BR-ENC  
without Cover**



**GS2 braking resistor connection;**  
**Refer to user Dynamic Braking user manual GS-DB\_UMP for DURAPULSE resistor connection information.**



# GS/DURAPULSE Drives Accessories – Braking Resistor Specs for AC Drives

Braking Resistor Specifications				
Part Number	Price	Power (W)	Resistance (Ω)	Type
<a href="#"><u>GS-20P5-BR</u></a>	\$17.00	80	200	open
<a href="#"><u>GS-21P0-BR</u></a>	\$17.00	80	200	
<a href="#"><u>GS-22P0-BR</u></a>	\$41.50	300	100	
<a href="#"><u>GS-23P0-BR</u></a>	\$41.50	300	70	
<a href="#"><u>GS-25P0-BR</u></a>	\$49.50	400	40	
<a href="#"><u>GS-27P5-BR</u></a>	\$49.50	500	30	
<a href="#"><u>GS-2010-BR-ENC</u></a>	\$358.00	1000	20	enclosed
<a href="#"><u>GS-2015-BR-ENC</u></a>	\$621.00	2400	13.6	
<a href="#"><u>GS-2020-BR-ENC</u></a>	\$689.00	3000	10	
<a href="#"><u>GS-2025-BR-ENC</u></a>	\$842.00	4800	8	
<a href="#"><u>GS-2030-BR-ENC</u></a>	\$827.00	4800	6.8	
<a href="#"><u>GS-2040-BR-ENC</u></a>	\$689.00	3000	10	
<a href="#"><u>GS-2050-BR-ENC</u></a>	\$842.00	4800	8	open
<a href="#"><u>GS-41P0-BR</u></a>	\$26.00	80	750	
<a href="#"><u>GS-42P0-BR</u></a>	\$58.00	300	400	
<a href="#"><u>GS-43P0-BR</u></a>	\$58.00	300	250	
<a href="#"><u>GS-45P0-BR</u></a>	\$70.00	400	150	
<a href="#"><u>GS-47P5-BR</u></a>	\$70.00	500	100	
<a href="#"><u>GS-4010-BR</u></a>	\$165.00	1000	75	enclosed
<a href="#"><u>GS-4015-BR-ENC</u></a>	\$358.00	1000	50	
<a href="#"><u>GS-4020-BR-ENC</u></a>	\$445.00	1500	40	
<a href="#"><u>GS-4025-BR-ENC</u></a>	\$1,058.00	4800	32	
<a href="#"><u>GS-4030-BR-ENC</u></a>	\$1,058.00	4800	27.2	
<a href="#"><u>GS-4040-BR-ENC</u></a>	\$1,058.00	6000	20	
<a href="#"><u>GS-4050-BR-ENC</u></a>	\$1,246.00	9600	16	
<a href="#"><u>GS-4060-BR-ENC</u></a>	\$1,246.00	9600	13.6	
<a href="#"><u>GS-4075-BR-ENC</u></a>	\$1,058.00	6000	20	
<a href="#"><u>GS-4100-BR-ENC</u></a>	\$1,246.00	9600	13.6	open
<a href="#"><u>GS-BR-080W200</u></a>	\$17.00	80	200	
<a href="#"><u>GS-BR-080W750</u></a>	\$17.00	80	750	
<a href="#"><u>GS-BR-200W091</u></a>	\$34.50	200	91	
<a href="#"><u>GS-BR-200W360</u></a>	\$34.50	200	360	
<a href="#"><u>GS-BR-300W070</u></a>	\$41.50	300	70	
<a href="#"><u>GS-BR-300W250</u></a>	\$39.00	300	250	
<a href="#"><u>GS-BR-300W400</u></a>	\$32.00	300	400	
<a href="#"><u>GS-BR-400W040</u></a>	\$49.50	400	40	
<a href="#"><u>GS-BR-400W150</u></a>	\$46.50	400	150	
<a href="#"><u>GS-BR-500W100</u></a>	\$38.50	500	100	
<a href="#"><u>GS-BR-750W140</u></a>	\$68.00	750	140	
<a href="#"><u>GS-BR-1K0W4P3</u></a>	\$110.00	1000	4.3	
<a href="#"><u>GS-BR-1K0W5P1</u></a>	\$110.00	1000	5.1	
<a href="#"><u>GS-BR-1K0W016</u></a>	\$110.00	1000	16	
<a href="#"><u>GS-BR-1K0W020</u></a>	\$110.00	1000	20	
<a href="#"><u>GS-BR-1K0W075</u></a>	\$110.00	1000	75	
<a href="#"><u>GS-BR-1K2W3P9</u></a>	\$121.00	1200	3.9	
<a href="#"><u>GS-BR-1K2W015</u></a>	\$121.00	1200	15	
<a href="#"><u>GS-BR-1K5W3P3</u></a>	\$144.00	1500	3.3	
<a href="#"><u>GS-BR-1K5W012</u></a>	\$144.00	1500	12	
<a href="#"><u>GS-BR-1K5W013</u></a>	\$144.00	1500	13	
<a href="#"><u>GS-BR-1K5W043</u></a>	\$144.00	1500	43	

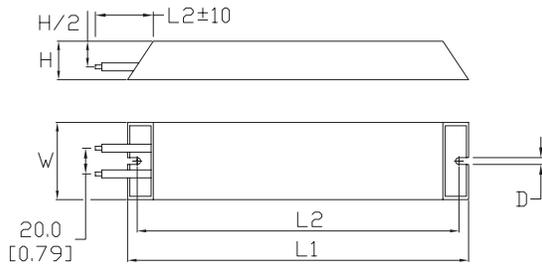
# GS/DURAPULSE Drives Accessories – Braking Resistor Dimensions for AC Drives

## Braking Resistor Dimensions ( Dimensions = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

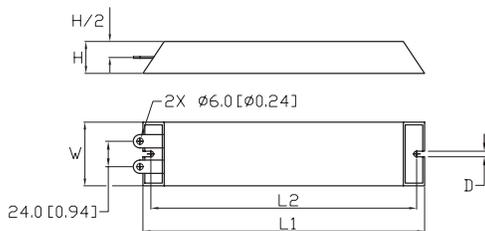
Braking Resistor Dimension Drawing Index							
Resistor	Drawing #	Resistor	Drawing #	Resistor	Drawing #	Resistor	Drawing #
GS-20P5-BR	1	GS-41P0-BR	1	GS-BR-080W200	10	GS-BR-1K0W4P3	11
GS-21P0-BR	1	GS-42P0-BR	1	GS-BR-080W750	10	GS-BR-1K0W5P1	11
GS-22P0-BR	1	GS-43P0-BR	1	GS-BR-200W091	10	GS-BR-1K0W016	11
GS-23P0-BR	1	GS-45P0-BR	1	GS-BR-200W360	10	GS-BR-1K0W020	11
GS-25P0-BR	1	GS-47P5-BR	2	GS-BR-300W070	10	GS-BR-1K0W075	11
GS-27P5-BR	2	GS-4010-BR	3	GS-BR-300W250	10	GS-BR-1K2W3P9	11
GS-2010-BR-ENC	4	GS-4015-BR-ENC	4	GS-BR-300W400	10	GS-BR-1K2W015	11
GS-2015-BR-ENC	5	GS-4020-BR-ENC	7	GS-BR-400W040	10	GS-BR-1K5W3P3	11
GS-2020-BR-ENC	5	GS-4025-BR-ENC	8	GS-BR-400W150	10	GS-BR-1K5W012	11
GS-2025-BR-ENC	6	GS-4030-BR-ENC	8	GS-BR-500W100	2	GS-BR-1K5W013	11
GS-2030-BR-ENC	6	GS-4040-BR-ENC	8	GS-BR-750W140	12	GS-BR-1K5W043	11
GS-2040-BR-ENC	5	GS-4050-BR-ENC	9				
GS-2050-BR-ENC	6	GS-4060-BR-ENC	9				
		GS-4075-BR-ENC	8				
		GS-4100-BR-ENC	9				

#1) GS-20P5-BR, GS-21P0-BR, GS-22P0-BR, GS-23P0-BR, GS-25P0-BR, GS-41P0-BR, GS-42P0-BR, GS-43P0-BR, GS-45P0-BR



Resistor #	L1	L2	H	D	W
GS-20P5-BR	140 [5.51]	125 [4.92]	20 [0.79]	5.3 [0.21]	40 [1.57]
GS-21P0-BR					
GS-22P0-BR	215 [8.46]	200 [7.87]	30 [1.18]		60 [2.36]
GS-23P0-BR					
GS-25P0-BR	265 [10.43]	250 [9.84]			
GS-41P0-BR	140 [5.51]	125 [4.92]	20 [0.79]		40 [1.57]
GS-42P0-BR					
GS-43P0-BR	215 [8.46]	200 [7.87]	30 [1.18]	60 [2.36]	
GS-45P0-BR	265 [10.43]	250 [9.84]			

#2) GS-27P5-BR, GS-47P5-BR, GS-BR-500W100



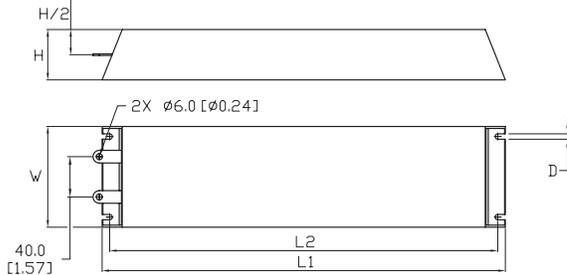
Resistor #	L1	L2	H	D	W
GS-27P5-BR	335 [13.19]	320 [12.60]	30 [1.18]	5.3 [0.21]	60 [2.36]
GS-47P5-BR					
GS-BR-500W100					

# GS/DURAPULSE Drives Accessories – Braking Resistor Dimensions for AC Drives

## Braking Resistor Dimensions ( Dimensions = mm [in] )

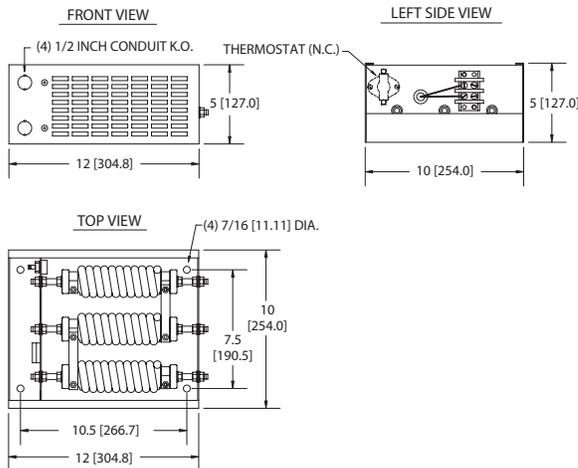
See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### #3) GS-4010-BR

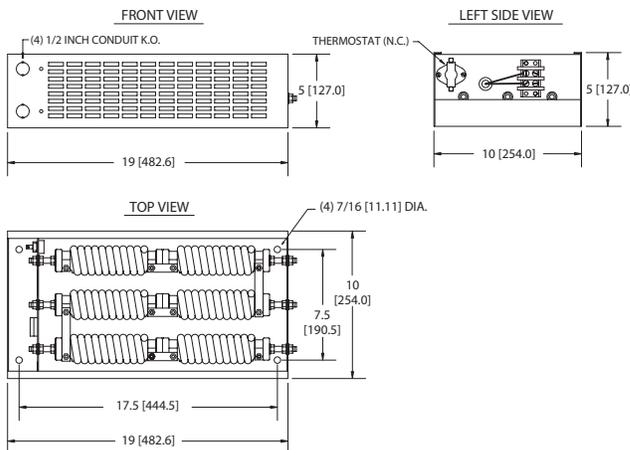


Resistor #	L1	L2	H	D	W
<b>GS-4010-BR</b>	400 [15.75]	385 [15.16]	50 [1.97]	5.3 [0.21]	100 [3.94]

### #4) GS-2010-BR-ENC, GS-4015-BR-ENC



### #5) GS-2015-BR-ENC, GS-2020-BR-ENC, GS-2040-BR-ENC

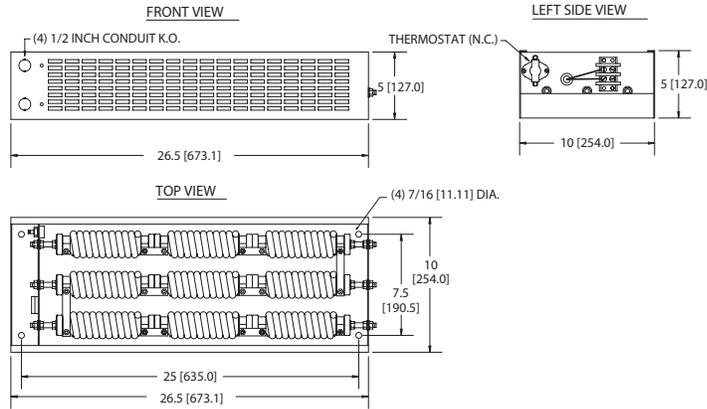


# GS/DURAPULSE Drives Accessories – Braking Resistor Dimensions for AC Drives

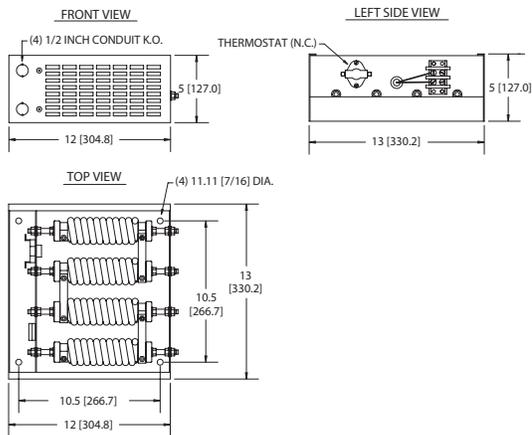
## Braking Resistor Dimensions ( Dimensions = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

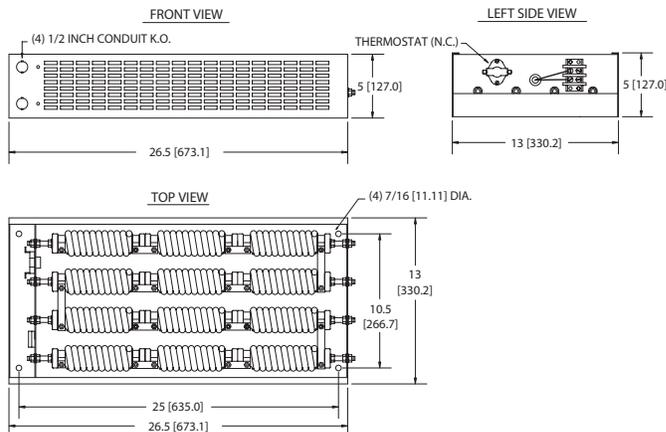
### #6) GS-2025-BR-ENC, GS-2030-BR-ENC, GS-2050-BR-ENC



### #7) GS-4020-BR-ENC



### #8) GS-4025-BR-ENC, GS-4030-BR-ENC, GS-4040-BR-ENC, GS-4075-BR-ENC

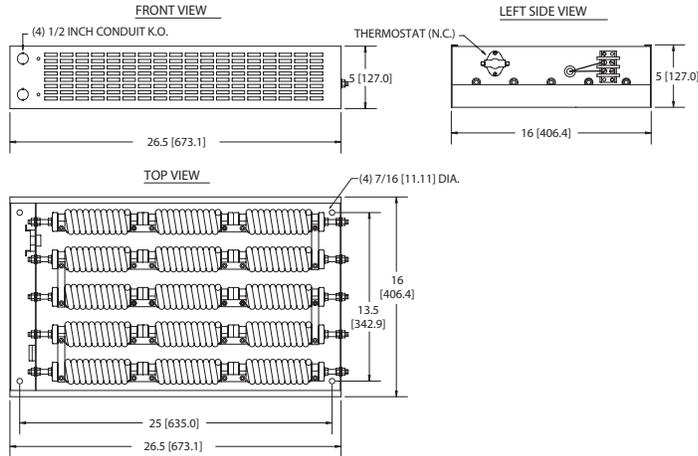


# GS/DURAPULSE Drives Accessories – Braking Resistor Dimensions for AC Drives

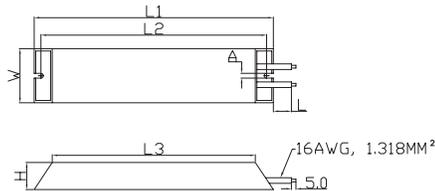
## Braking Resistor Dimensions ( Dimensions = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### #9) GS-4050-BR-ENC, GS-4060-BR-ENC, GS-4100-BR-ENC

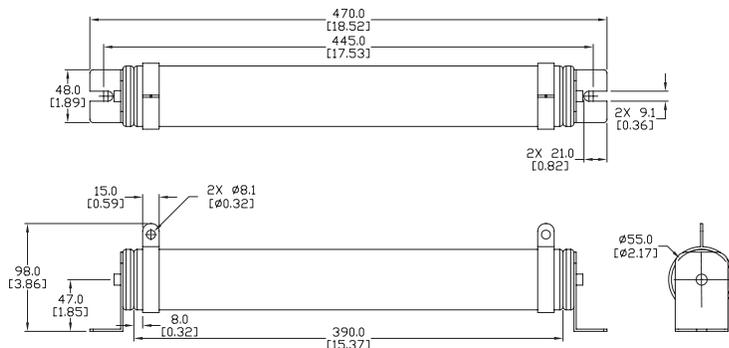


### #10) GS-BR-080W200, GS-BR-080W750, GS-BR-200W091, GS-BR-200W360, GS-BR-300W070, GS-BR-300W250, GS-BR-300W400, GS-BR-400W040, GS-BR-400W150



Resistor #	L1	L2	L3	W	H	A	L
GS-BR-080W200	140 [5.46]	125 [4.92]	100 [3.94]	40.0 [1.57]	20.0 [0.79]	5.3 [0.21]	200 [7.87]
GS-BR-080W750							
GS-BR-200W091	165 [6.50]	150 [5.91]	125 [4.92]				
GS-BR-200W360							
GS-BR-300W070							
GS-BR-300W250	215 [8.46]	200 [7.87]	175 [6.89]	60.0 [2.36]	30.0 [1.18]		
GS-BR-300W400							
GS-BR-400W040	265.34 [10.43]	250 [9.84]	225 [8.86]				
GS-BR-400W150							

### #11) GS-BR-1K0W4P3, GS-BR-1K0W5P1, GS-BR-1K0W016, GS-BR-1K0W020, GS-BR-1K0W075, GS-BR-1K2W3P9, GS-BR-1K2W015, GS-BR-1K5W3P3, GS-BR-1K5W012, GS-BR-1K5W013, GS-BR-1K5W043

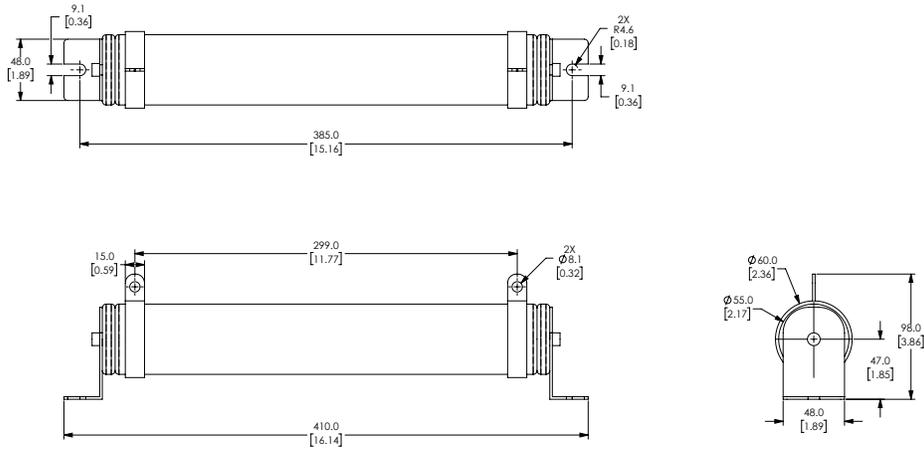


# GS/DURAPULSE Drives Accessories – Braking Resistor Dimensions for AC Drives

## Braking Resistor Dimensions ( Dimensions = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.

### #12) GS-BR-750W140

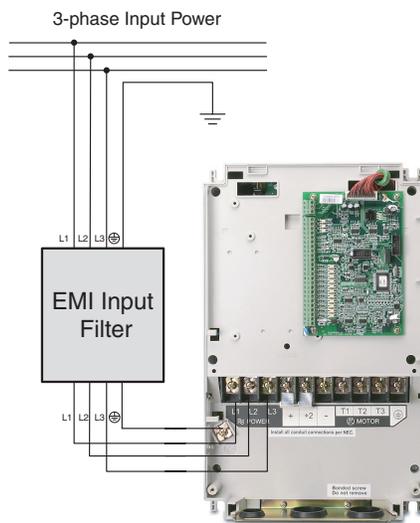


# GS2 & GS3 DURAPULSE Accessories – EMI Filters

## Overview

The CE Declaration of Conformity for the DURAPULSE GS3 AC drives was completed in conjunction with the EMI filters listed. Use the following table to specify the corresponding EMI filter for each AC drive model.

CE compliance requires the use of EMI filters for DURAPULSE GS3 AC drives. GS1 AC drives have internal EMI filtering, and do not require separate filters.



EMI Input Filter Specifications						
GS AC Drive 115V / 230V	GS AC Drive 460V / 575V	AC Servo Drive	EMI Filter	Price	Input Power	Dimensions
GS2-1xxx	–	SVA-2040 (1-ph) *	<a href="#">20DRT1W3S</a>	\$73.00	1-phase, 20A	Figure 1
GS3-23P0 (1-ph)			<a href="#">32DRT1W3C</a>	\$109.00	1-phase, 32A	Figure 2
GS3-23P0		–	<a href="#">26TDT1W4C</a>	\$114.00	3-phase, 26A	Figure 6
–	GS3-4020	–	<a href="#">50TDS4W4C</a>	\$197.00	3-phase, 50A	Figure 7
GS3-2020	GS3-4040	–	<a href="#">100TDS84C</a>	\$364.00	3-phase, 100A	Figure 8
GS3-2030	GS3-4060	–	<a href="#">150TDS84C</a>	\$384.00	3-phase, 150A	Figure 9
GS3-2040						
GS3-2050	–	–	<a href="#">180TDS84C</a>	\$394.00	3-phase, 180A	Figure 10
–	GS3-4010	–	<a href="#">RF110B43CA</a>	\$158.00	3-phase, 25A	Figure 13
–	GS3-4100	–	<a href="#">200TDDS84C</a>	\$991.00	3-phase, 200A	Figure 13

\* EMI filters 10TDT1W4C and 26TDT1W4C mount underneath DURApulse drives, but do NOT mount underneath GS2 drives. They also do NOT mount underneath SureServo AC Servo drives.

# GS2 & GS3 DURAPULSE Accessories – EMI Fil- ters

## Dimensions

Figure 1 [ units = mm ]

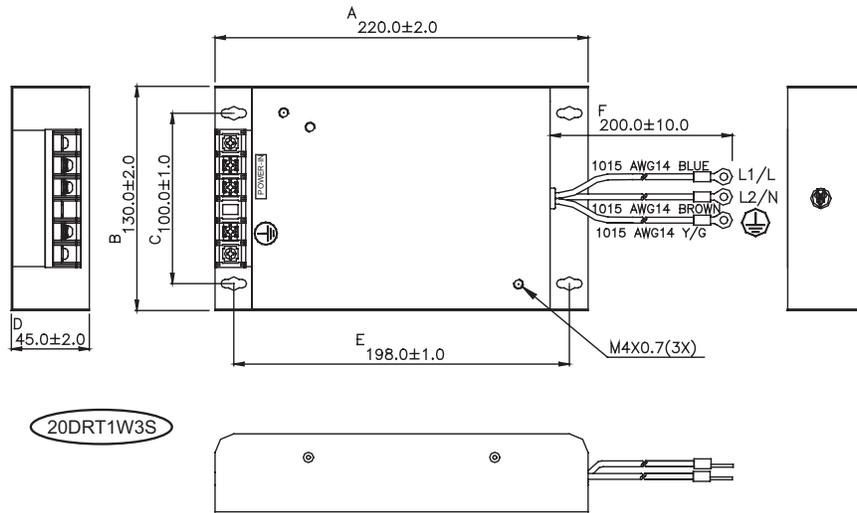
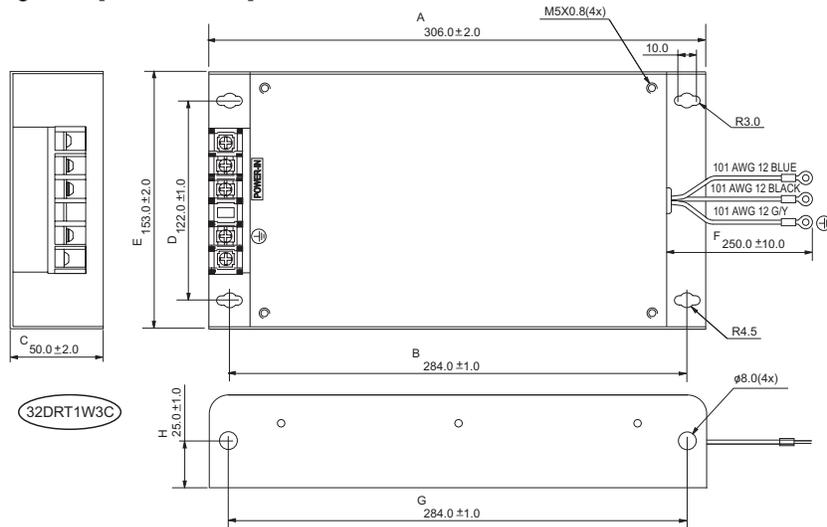


Figure 2 [ units = mm ]



# GS2 & GS3 DURAPULSE Accessories – EMI Filters

Figure 3 [ units = mm ]

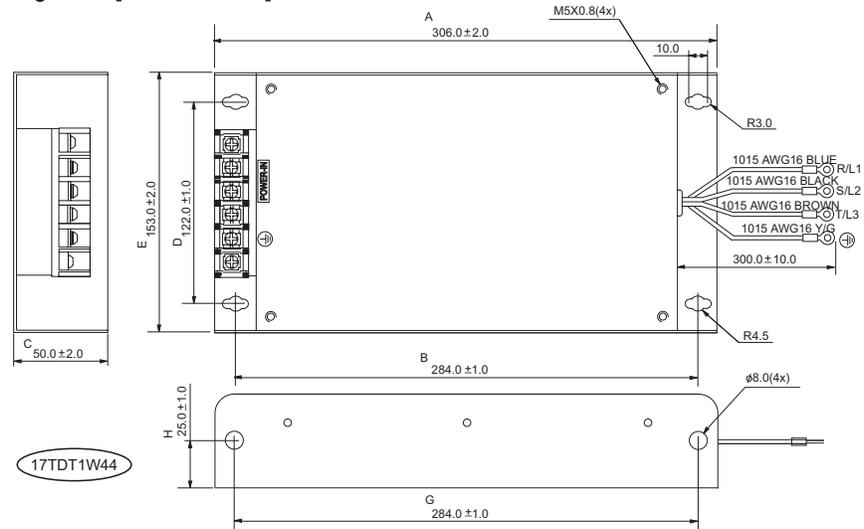
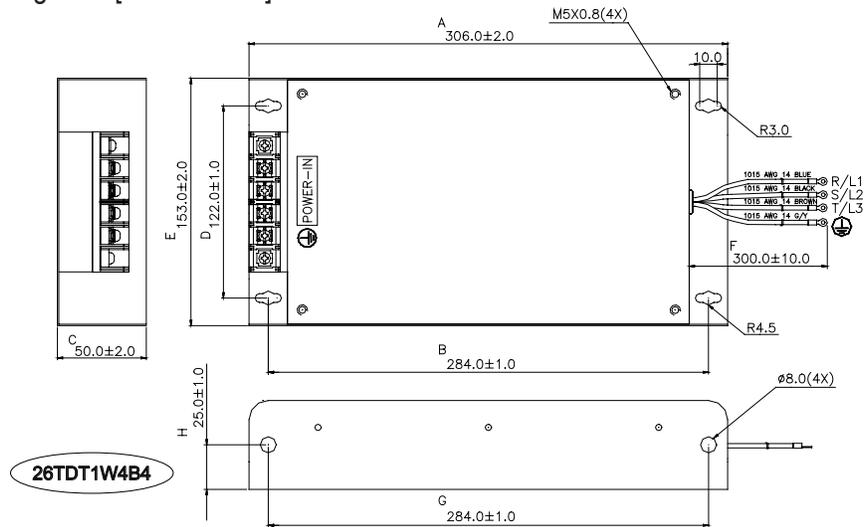


Figure 4 [ units = mm ]



# GS2 & GS3 DURAPULSE Accessories – EMI Filters

Figure 5 [ units = mm (in) ]

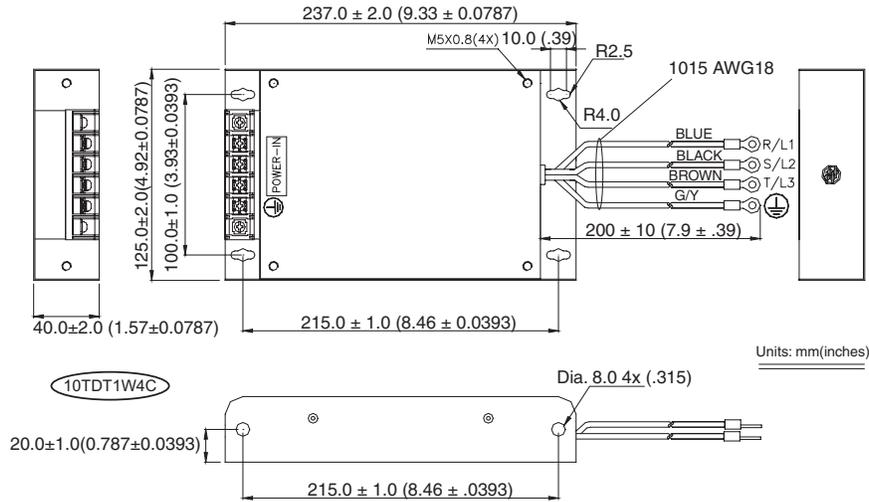


Figure 6 [ units = mm (in) ]

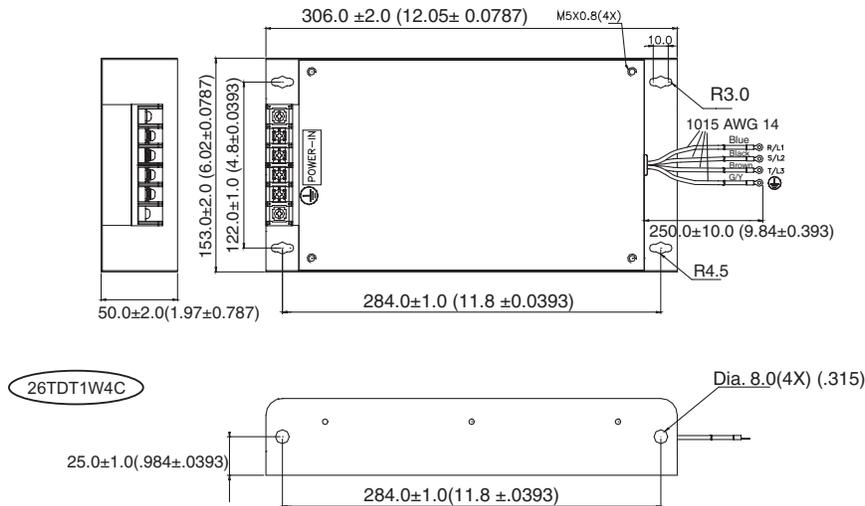
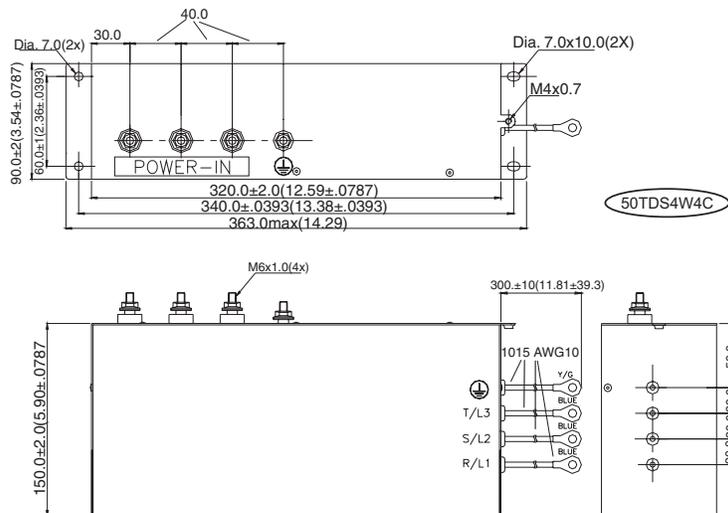


Figure 7 [ units = mm (in) ]



# GS2 & GS3 DURAPULSE Accessories – EMI Filters

Figure 8 [ units = mm (in) ]

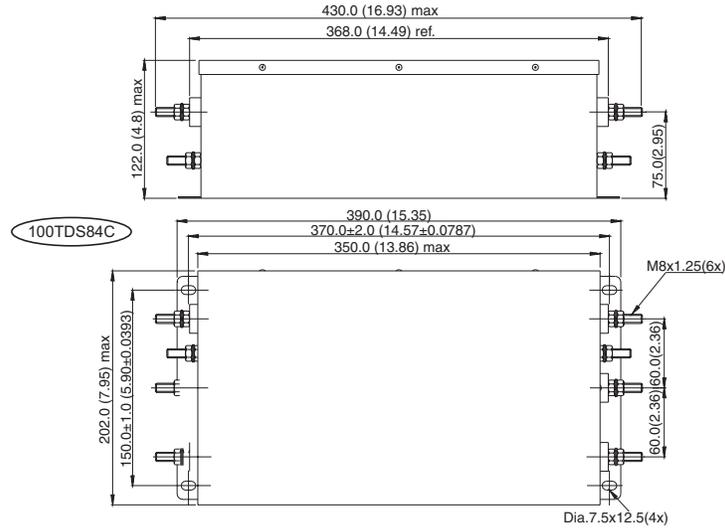


Figure 9 [ units = mm (in) ]

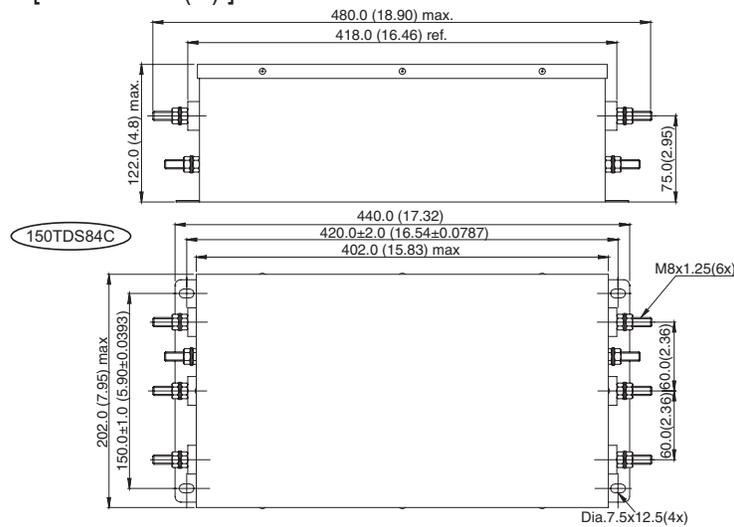
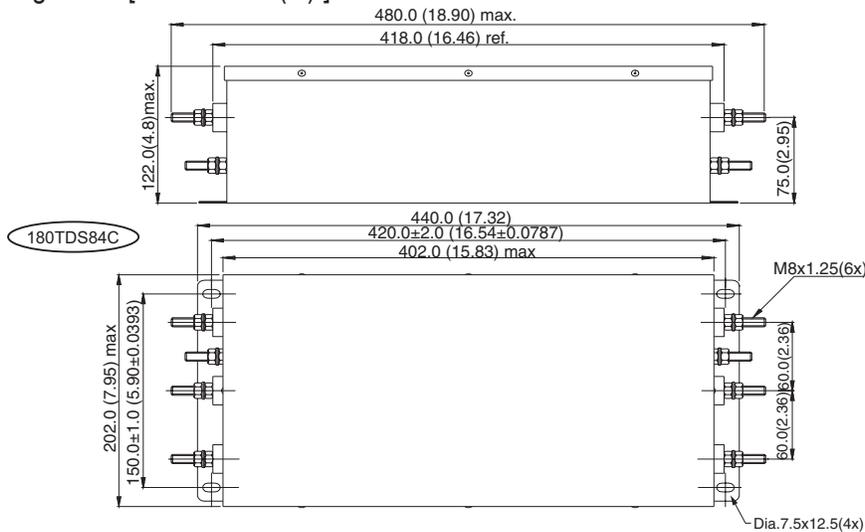


Figure 10 [ units = mm (in) ]



# GS2 & GS3 DURAPULSE Accessories – EMI Filters

Figure 11 [ units = mm (in) ]

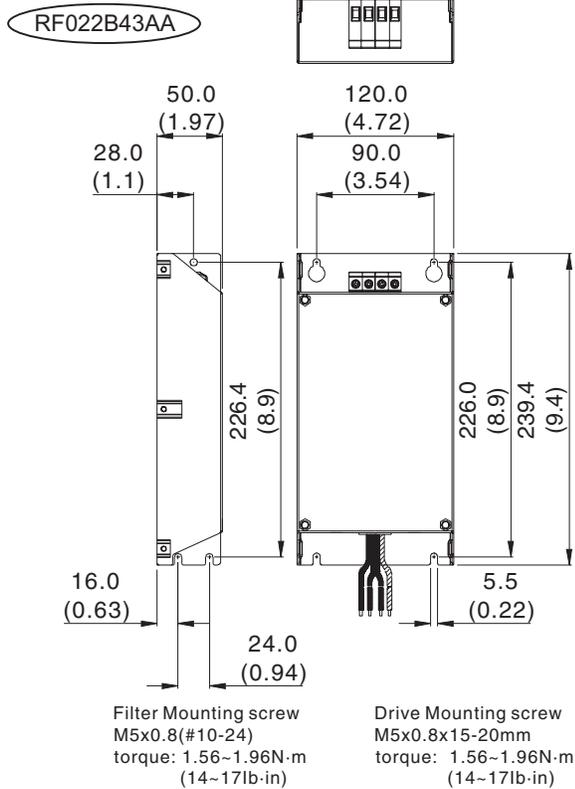


Figure 12 [ units = mm (in) ]

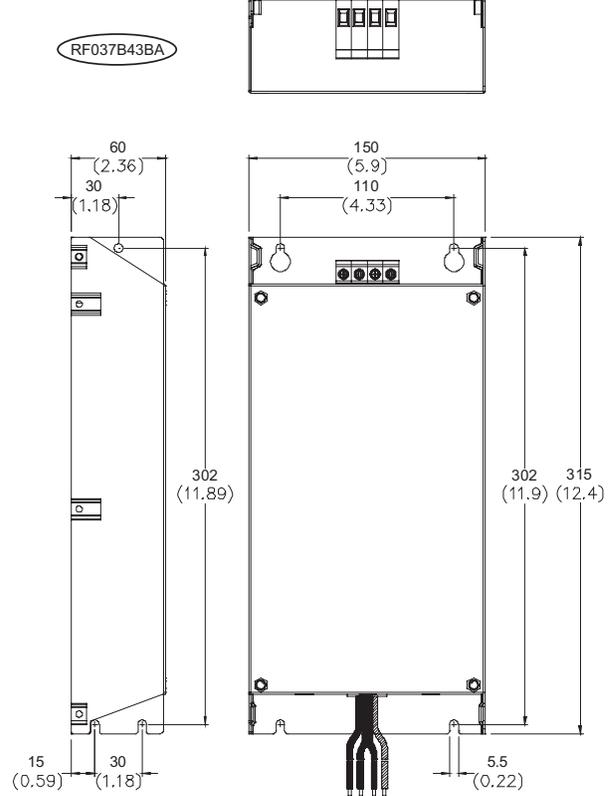


Figure 13 [ units = mm (in) ]

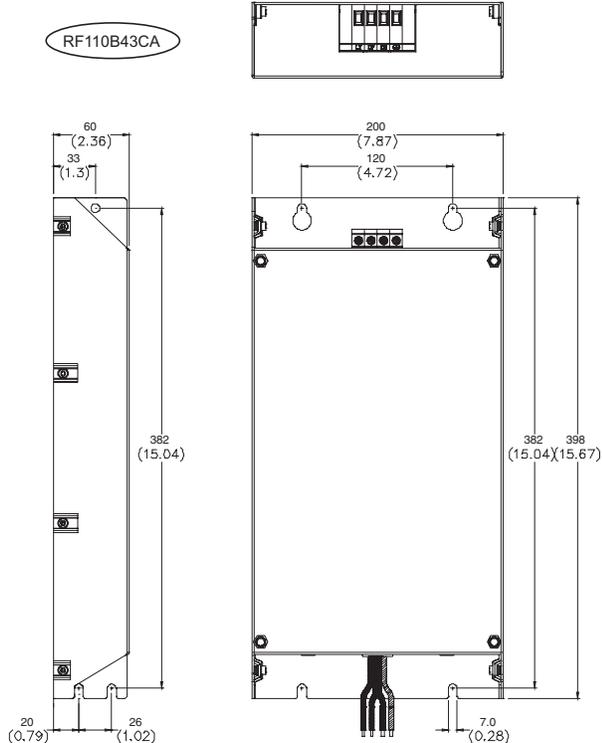
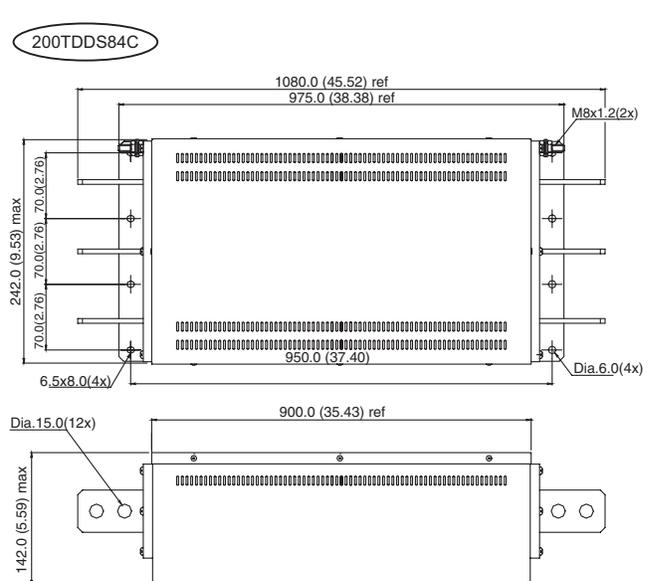


Figure 14 [ units = mm (in) ]



# GS4 DURAPULSE Accessories – EMI Filters Selection

## Selection (GS4)

The optional EMI Filters listed here are available for use with the GS4 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," downloadable from [AutomationDirect.com](http://AutomationDirect.com).

EMI Filters Selection for GS4 AC Drives					
Model*	Description	EMI Filter **	Max Power kW [max/ph]	Max Torque kg-cm [lb-in]	SCCR Rating (kA)
<a href="#">GS4-21P0</a>	230V 1ph/3ph 1.0 hp	<a href="#">KMF325A</a>	20.8 [6]	17.7 [2]	5
<a href="#">GS4-22P0</a>	230V 1ph/3ph 2.0 hp				
<a href="#">GS4-23P0</a>	230V 1ph/3ph 3.0 hp				
<a href="#">GS4-25P0</a>	230V 1ph/3ph 5.0 hp				
<a href="#">GS4-27P5</a>	230V 1ph/3ph 7.5 hp	<a href="#">KMF370A</a>	58.1 [16.8]	44.2 [5]	5
<a href="#">GS4-2010</a>	230V 1ph/3ph 10hp				
<a href="#">GS4-2015</a>	230V 1ph/3ph 15hp				
<a href="#">GS4-4025</a>	460V 3ph 25hp				
<a href="#">GS4-4030</a>	460V 3ph 30hp				
<a href="#">GS4-4040</a>	460V 3ph 40hp				
<a href="#">GS4-2020</a>	230V 3ph 20hp	<a href="#">KMF3100A</a>	83 [24]	44.2 [5]	10
<a href="#">GS4-2025</a>	230V 3ph 25hp				
<a href="#">GS4-2030</a>	230V 3ph 30hp				
<a href="#">GS4-41P0</a>	460V 3ph 1.0 hp	<a href="#">KMF318A</a>	14.9 [4.3]	17.7 [2]	5
<a href="#">GS4-42P0</a>	460V 3ph 2.0 hp				
<a href="#">GS4-43P0</a>	460V 3ph 3.0 hp				
<a href="#">GS4-45P0</a>	460V 3ph 5.0 hp				
<a href="#">GS4-47P5</a>	460V 3ph 7.5 hp				
<a href="#">GS4-4010</a>	460V 3ph 10hp				
<a href="#">GS4-4015</a>	460V 3ph 15hp	<a href="#">KMF350A</a>	41.5 [12]	44.2 [5]	10
<a href="#">GS4-4020</a>	460V 3ph 20hp				
<a href="#">GS4-4050</a>	460V 3ph 50hp	<a href="#">MIF375</a>	62.3 [18]	53.1 [6]	10
<a href="#">GS4-2040</a>	230V 3ph 40hp	<a href="#">MIF3150</a>	124.6 [36]	177 [20]	10
<a href="#">GS4-2050</a>	230V 3ph 50hp				
<a href="#">GS4-4060</a>	460V 3ph 60hp				
<a href="#">GS4-4075</a>	460V 3ph 75hp				
<a href="#">GS4-4100</a>	460V 3ph 100hp				
<a href="#">GS4-2060</a>	230V 3ph 60hp	<a href="#">MIF3400B</a>	332.2 [96]	265.5 [30]	30
<a href="#">GS4-2075</a>	230V 3ph 75hp				
<a href="#">GS4-2100</a>	230V 3ph 100hp				
<a href="#">GS4-4125</a>	460V 3ph 125hp				
<a href="#">GS4-4150</a>	460V 3ph 150hp				
<a href="#">GS4-4175</a>	460V 3ph 175hp				
<a href="#">GS4-4200</a>	460V 3ph 200hp				
<a href="#">GS4-4250</a>	460V 3ph 250hp	<a href="#">MIF3800 &amp; Qty. 3 TOR254</a>	664.3 [192]	265.5 [30]	30
<a href="#">GS4-4300</a>	460V 3ph 300hp				

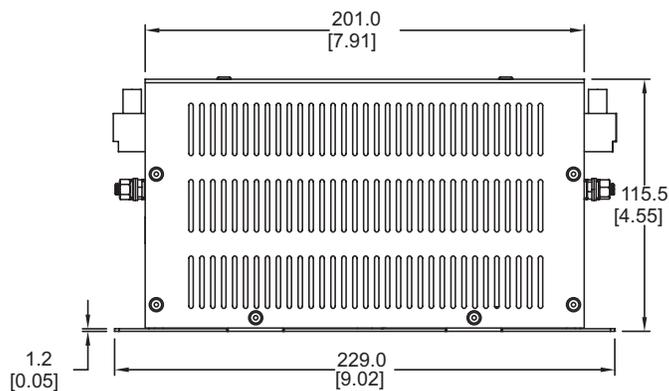
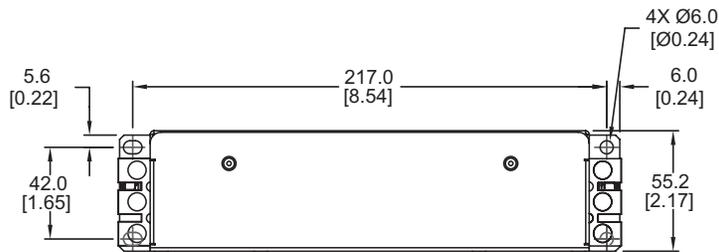
\* EMI filter selections for GS4-2xxx models are the same whether that particular model is supplied 1-Phase or 3-Phase 230VAC.

\*\* Part numbers are Roxburgh EMI Filters available from AutomationDirect at the web link embedded with each part number listed above.

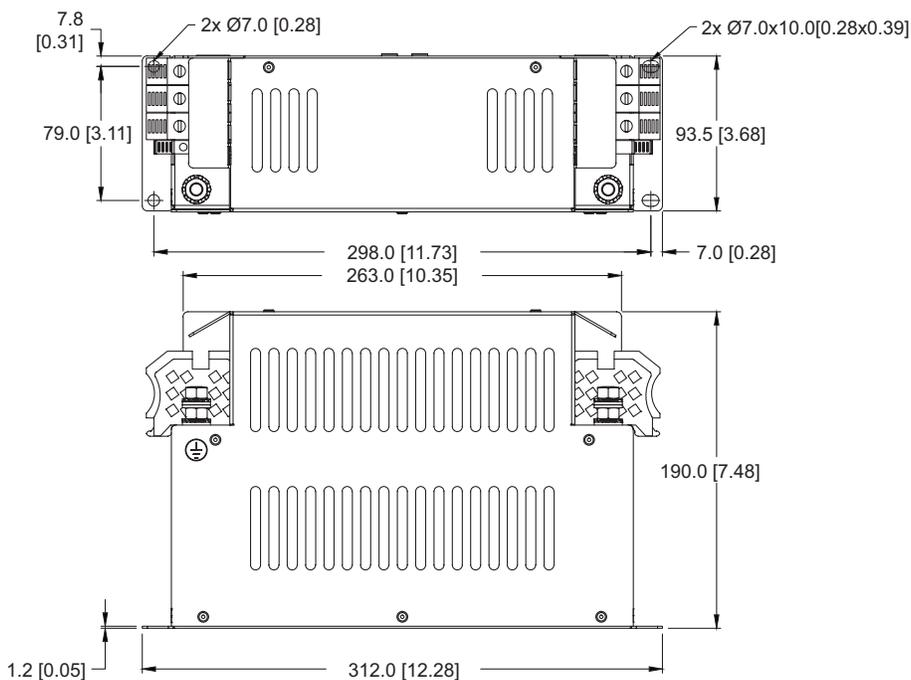
# GS4 DURAPULSE Accessories – EMI Filters

## Dimensions ( Units = mm [in] )

See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.



**KMF318A KMF325A**

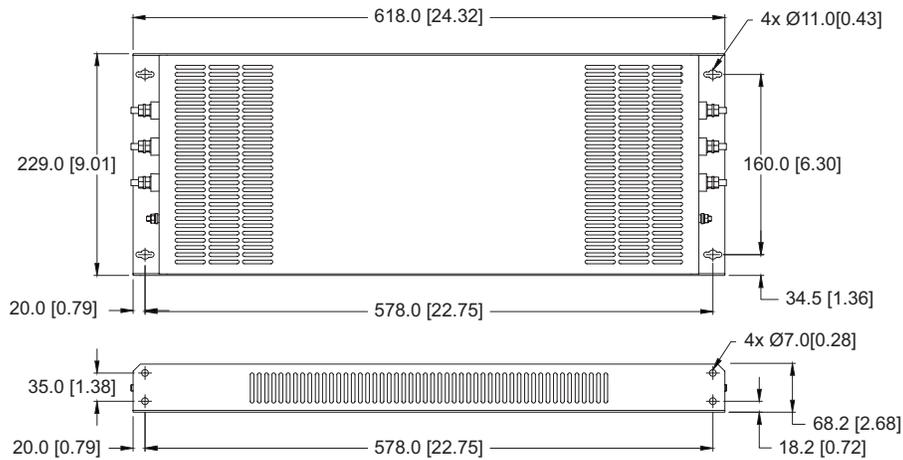


**KMF350A KMF370A KMF3100A**

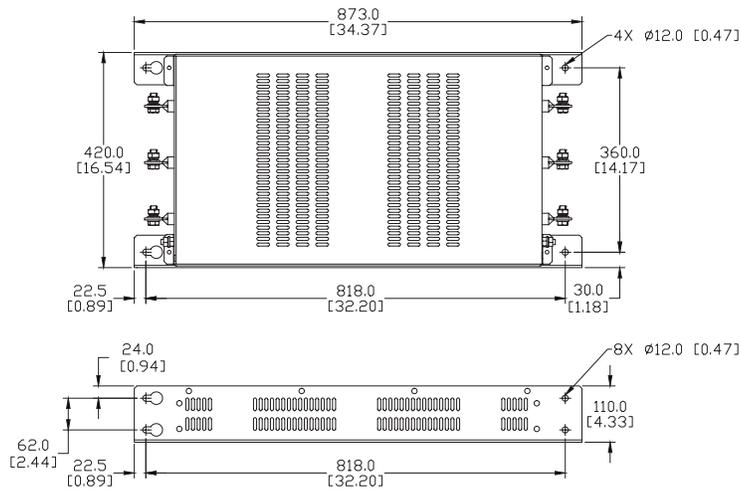
# GS4 DURAPULSE Accessories – EMI Filters

## Dimensions (Units = mm [in])

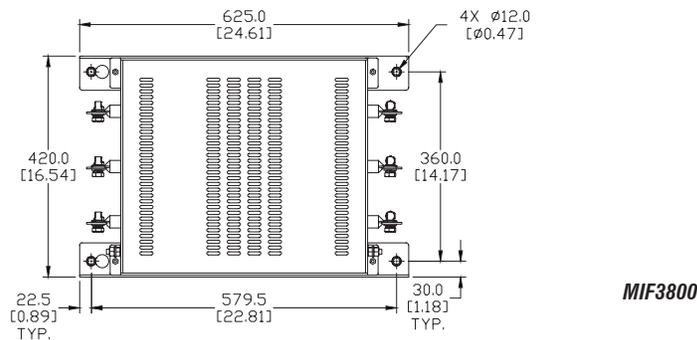
See our website: [www.AutomationDirect.com](http://www.AutomationDirect.com) for complete engineering drawings.



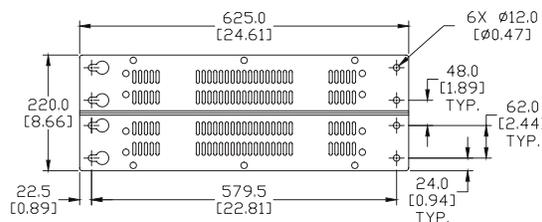
**MIF3150**



**MIF3400B**



**MIF3800**

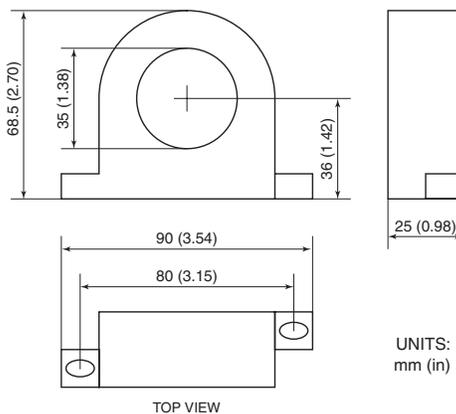


# GS/DURAPULSE Accessories – RF Filter

RF Filter for GS1,GS2,GS3/DURAPULSE AC Drives		
Part Number	Price	Drive Model
<b>RF220X00A</b>	\$26.50	GS1-xxxx GS2-xxxx GS3-xxxx

## Description

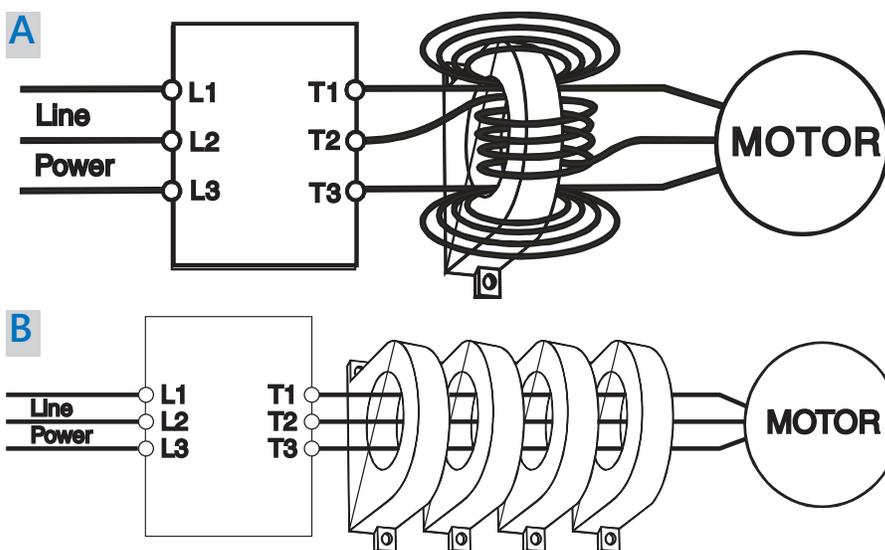
Zero phase reactors, (aka RF noise filters) help reduce radiated noise from the inverter wiring. The wiring must go through the opening to reduce the RF component of the electrical noise. Loop the wires three times (four turns) to attain the full RF filtering effect. For larger wire sizes, place multiple zero-phase reactors (up to four) side by side for a greater filtering effect. These are effective for noise reduction on both the input and output sides of the inverter. Attenuation quality is good in a wide range from AM band to 10 Mhz.



## Wiring Method

Wind each wire four times around the core, as shown in diagram A to the right. The reactor must be put at inverter side as closely as possible.

If you are unable to wire as above due to wire size or another aspect of your application, put all wires through four cores in series without winding, as in diagram B to the right.



# GS1, GS2, and GS3/DURAPULSE Accessories – Fusing

## Fusing Overview

Circuit protection devices are essential to prevent costly damage to your AC drive application equipment. Fuses and fuse kits are available from AUTOMATIONDIRECT for the GS1, GS2, and GS3/DURAPULSE AC drives.

The fuse specifications are shown in the table below. Each fuse kit consists of one fuse block and fuses sized to handle the inrush current while providing superior protection for the corresponding GS2 or DURAPULSE AC drive. The larger drives in the DURAPULSE family require three fuse kits (one per phase). Their part numbers are marked in the table with a double

asterisk.

Replacement fuses are also available, and listed in the table next to their companion fuse kits.

Fuse Kit Specifications for GS1, GS2, and GS3/DURApulse 115–460V Drives													
Fuse Kit	Price	Fuse					Wire Range	SCCR	Replacement Fuses (5 fuses per package)	Price			
		Block Type	Type	Rating	Bolt Torque (lb-in)	Block Dimensions							
<a href="#">GS-10P2-FKIT-1P*</a>	Retired	Two-pole	A3T	300V@20A	n/a (spring clips)	Figure 1	Al/Cu #2-14	200 kA	<a href="#">GS-10P2-FUSE-1P</a>	\$64.00			
<a href="#">GS-10P5-FKIT-1P*</a>	Retired			300V@30A					<a href="#">GS-10P5-FUSE-1P</a>	\$61.00			
<a href="#">GS-11P0-FKIT-1P*</a>	\$52.00			300V@50A					<a href="#">GS-11P0-FUSE-1P</a>	\$64.00			
<a href="#">GS-20P2-FKIT-1P</a>	\$52.00			300V@15A					<a href="#">GS-20P2-FUSE-1P</a>	\$57.00			
<a href="#">GS-20P2-FKIT-3P</a>	\$54.00	Three-pole		300V@10A		Figure 2			<a href="#">GS-20P2-FUSE-3P</a>	\$64.00			
<a href="#">GS-20P5-FKIT-1P</a>	\$52.00	Two-pole		300V@20A		Figure 1			<a href="#">GS-20P5-FUSE-1P</a>	Retired			
<a href="#">GS-20P5-FKIT-3P</a>	Retired	Three-pole		300V@10A		Figure 2			<a href="#">GS-20P5-FUSE-3P</a>	\$61.00			
<a href="#">GS-21P0-FKIT-1P</a>	Retired	Two-pole		300V@30A		Figure 1			<a href="#">GS-21P0-FUSE-1P</a>	\$64.00			
<a href="#">GS-21P0-FKIT-3P</a>	Retired	Three-pole		300V@20A		Figure 2			<a href="#">GS-21P0-FUSE-3P</a>	Retired			
<a href="#">GS-22P0-FKIT-1P</a>	Retired	Two-pole		300V@45A		Figure 1			<a href="#">GS-22P0-FUSE-1P</a>	\$64.00			
<a href="#">GS-22P0-FKIT-3P</a>	\$61.00	Three-pole		300V@25A		Figure 2			<a href="#">GS-22P0-FUSE-3P</a>	Retired			
<a href="#">GS-23P0-FKIT-1P</a>	Retired	Two-pole		300V@60A		Figure 1			<a href="#">GS-23P0-FUSE-1P</a>	\$64.00			
<a href="#">GS-23P0-FKIT-3P</a>	\$67.00	Three-pole		300V@40A		Figure 2			<a href="#">GS-23P0-FUSE-3P</a>	\$64.00			
<a href="#">GS-25P0-FKIT</a>	\$72.00			300V@60A		<a href="#">GS-25P0-FUSE</a>			Retired				
<a href="#">GS-27P5-FKIT †</a>	\$120.00			300V@100A		72			Figure 9	<a href="#">GS-27P5-FUSE</a>	\$67.00		
<a href="#">- †</a>				300V@125A						<a href="#">GS-2010-FUSE</a>	\$81.00		
<a href="#">- †</a>			300V@175A	<a href="#">GS-2015-FUSE</a>	\$81.00								
<a href="#">GS-2020-FKIT</a>	\$306.00		300V@250A	228	Figure 5	Al/Cu: 600kcmil-#2	<a href="#">GS-2020-FUSE</a>	\$164.00					
<a href="#">GS-2025-FKIT</a>	\$327.00		300V@300A	228		<a href="#">GS-2025-FUSE</a>	Retired						
<a href="#">GS-2030-FKIT</a>	\$327.00		300V@350A	228		<a href="#">GS-2030-FUSE</a>	\$155.00						
<a href="#">GS-2040-FKIT **</a>	\$339.00		One-pole	300V@450A	360	Figure 6 **	Al/Cu: (2) 600kcmil-#2	<a href="#">GS-2040-FUSE</a>	\$84.00				
<a href="#">GS-2050-FKIT **</a>	\$357.00		One-pole	300V@500A	360		<a href="#">GS-2050-FUSE</a>	\$223.00					
<a href="#">GS-41P0-FKIT</a>	\$54.00	Three-pole	A6T	600V@10A	n/a (spring clips)	Figure 7	Al/Cu #2-14	<a href="#">GS-41P0-FUSE</a>	\$59.00				
<a href="#">GS-42P0-FKIT</a>	\$57.00			600V@15A				<a href="#">GS-42P0-FUSE</a>	\$49.00				
<a href="#">GS-43P0-FKIT</a>	\$61.00			600V@20A				<a href="#">GS-43P0-FUSE</a>	\$80.00				
<a href="#">GS-45P0-FKIT</a>	\$64.00			600V@30A				<a href="#">GS-45P0-FUSE</a>	Retired				
<a href="#">GS-47P5-FKIT</a>	Retired			600V@50A		Figure 8		<a href="#">GS-47P5-FUSE</a>	\$88.00				
<a href="#">GS-4010-FKIT</a>	\$133.00			600V@70A		72		Figure 9	Al/Cu: Al/Cu 2/0-#6	<a href="#">GS-4010-FUSE</a>	\$97.00		
<a href="#">GS-4015-FKIT</a>	\$143.00			600V@90A		72			<a href="#">GS-4015-FUSE</a>	\$47.50			
<a href="#">GS-4020-FKIT</a>	\$169.00			600V@125A		132		Figure 10	Al/Cu: 350kcmil-#6	<a href="#">GS-4020-FUSE</a>	\$97.00		
<a href="#">GS-4025-FKIT</a>	Retired			600V@150A		132			<a href="#">GS-4025-FUSE</a>	\$105.00			
<a href="#">GS-4030-FKIT</a>	\$169.00			600V@175A		132			<a href="#">GS-4030-FUSE</a>	\$102.00			
<a href="#">GS-4040-FKIT **</a>	\$307.00	One-pole		600V@225A		228		Figure 11 **	Al/Cu: 600kcmil-#2	<a href="#">GS-4040-FUSE</a>	\$244.00		
<a href="#">GS-4050-FKIT **</a>	\$307.00			600V@250A		228				<a href="#">GS-4050-FUSE</a>	\$239.00		
<a href="#">GS-4060-FKIT **</a>	\$327.00			600V@350A		228				<a href="#">GS-4060-FUSE</a>	Retired		
<a href="#">GS-4075-FKIT **</a>	Retired			600V@400A		228				<a href="#">GS-4075-FUSE</a>	\$250.00		
<a href="#">GS-4100-FKIT **</a>	\$652.00			600V@600A		360				Figure 12 **	Al/Cu: (2) 600kcmil-#2	<a href="#">GS-4100-FUSE</a>	\$568.00

**NOTES:**

- \* - Single phase 115V fuse kits are for use only with GS1 and GS2 drives.
- \*\* - Kit includes three single-pole fuse blocks and three fuses.
- † - GS-2010-FKIT and GS-2015-FKIT are no longer available. Please use GS-27P5-FKIT instead.

# GS2 and GS3/DURAPULSE Accessories – Fusing

## Fuse Block Dimensions

Units = inches

Figure 1

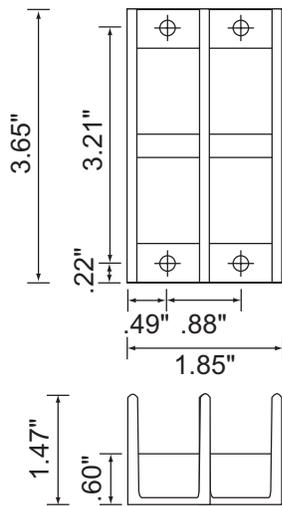


Figure 2

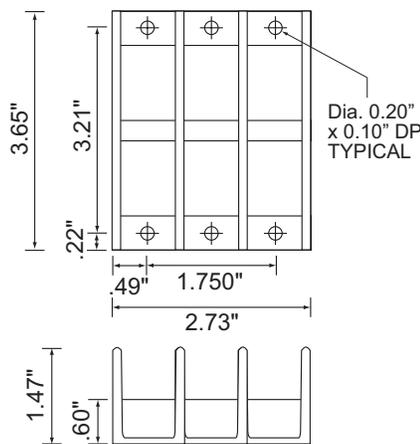


Figure 3

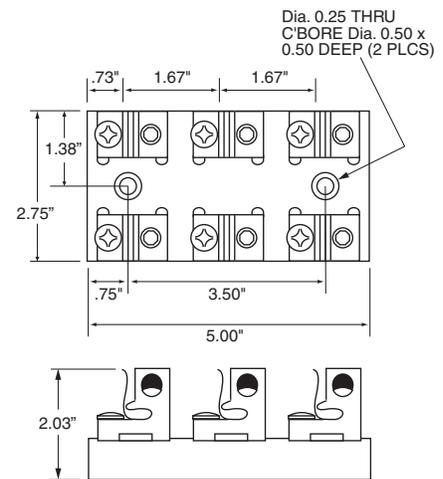


Figure 4

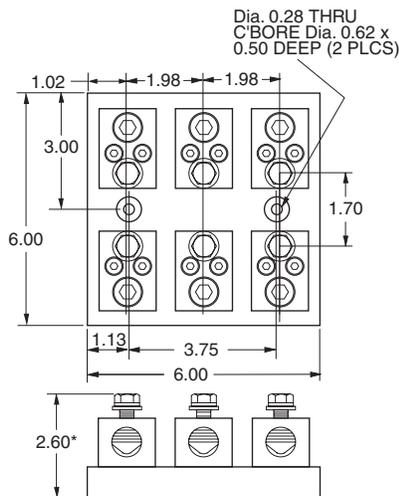


Figure 5

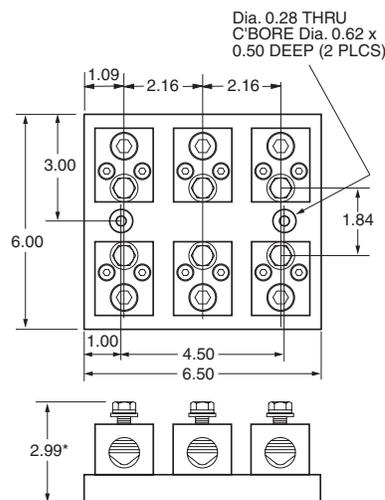
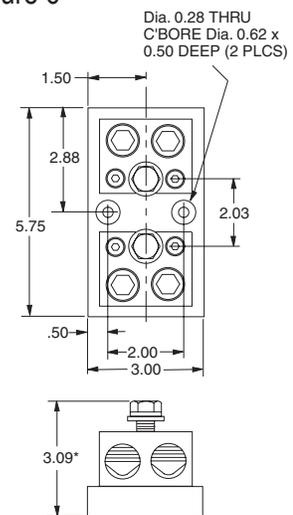


Figure 6



# GS2 and GS3/DURAPULSE Accessories – Fusing

## Fuse Block Dimensions

Units = inches

Figure 7

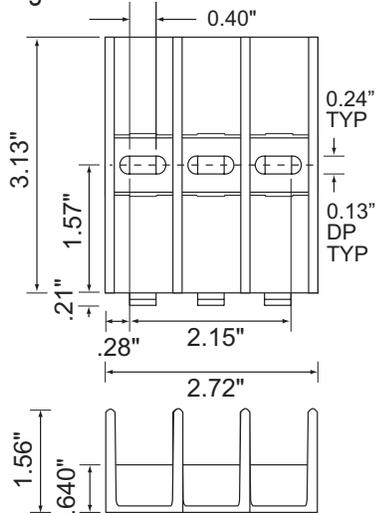


Figure 8

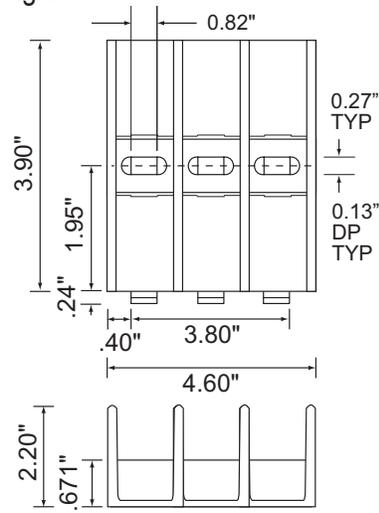


Figure 9

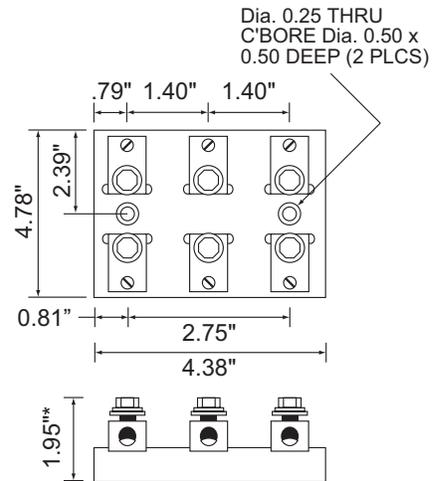


Figure 10

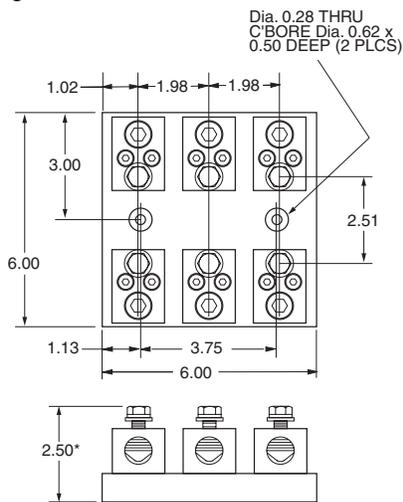


Figure 11

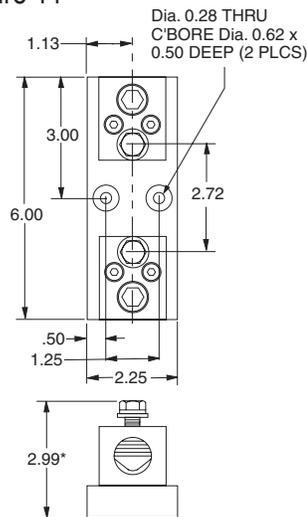
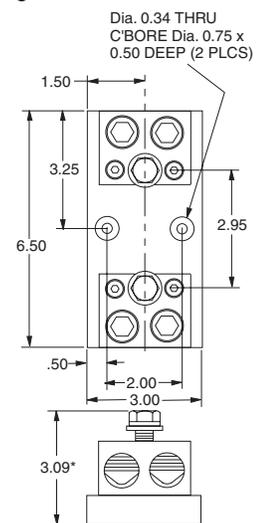


Figure 12



\* Height includes nominal fuse blade thickness.

# GS4 DURAPULSE Accessories – Fusing

## Fuse Selection for GS4 AC Drives

The fuses shown in the table below are available from AutomationDirect. Further information, including dimensional information, is available at [AutomationDirect.com](http://AutomationDirect.com).

Fuse Specification Chart GS4 DURAPULSE Drives														
Drive Model	For Three-Phase Input Power						For Single-Phase Input Power							
	HP	Input Power			Input Fuse ***			HP	Input Power			Input Fuse ***		
		Ø	Volts	GS4 Amps	Fuse Amps	Fast Acting Class T	Edison Class J*		Ø	Volts	GS4 Amps	Fuse Amps	Fast Acting Class T	Edison Class J*
<a href="#">GS4-21P0</a>	1	3	230	6.4	10	<a href="#">TJN10</a>	<a href="#">JHL10</a>	0.5	1	230	6.4	10	<a href="#">TJN10</a>	<a href="#">JHL10</a>
<a href="#">GS4-22P0</a>	2	3	230	12	15	<a href="#">TJN15</a>	<a href="#">JHL15</a>	0.75	1	230	9.7	15	<a href="#">TJN15</a>	<a href="#">JHL15</a>
<a href="#">GS4-23P0</a>	3	3	230	16	25	<a href="#">TJN25</a>	<a href="#">JHL25</a>	1	1	230	15	20	<a href="#">TJN20</a>	<a href="#">JHL20</a>
<a href="#">GS4-25P0</a>	5	3	230	20	35	<a href="#">TJN35</a>	<a href="#">JHL35</a>	2	1	230	20	30	<a href="#">TJN30</a>	<a href="#">JHL30</a>
<a href="#">GS4-27P5</a>	7.5	3	230	28	50	<a href="#">TJN50</a>	<a href="#">JHL50</a>	3	1	230	26	40	<a href="#">TJN40</a>	<a href="#">JHL40</a>
<a href="#">GS4-2010</a>	10	3	230	36	70	<a href="#">TJN70</a>	<a href="#">JHL70</a>	3	1	230	26	40	<a href="#">TJN40</a>	<a href="#">JHL40</a>
<a href="#">GS4-2015</a>	15	3	230	52	100	<a href="#">TJN100</a>	<a href="#">JHL100</a>	5	1	230	40	70	<a href="#">TJN70</a>	<a href="#">JHL70</a>
<a href="#">GS4-2020</a>	20	3	230	72	125	<a href="#">TJN125</a>	<a href="#">JHL125</a>	7.5	1	230	58	100	<a href="#">TJN100</a>	<a href="#">JHL100</a>
<a href="#">GS4-2025</a>	25	3	230	83	150	<a href="#">TJN150</a>	<a href="#">JHL150</a>	10	1	230	76	125	<a href="#">TJN125</a>	<a href="#">JHL125</a>
<a href="#">GS4-2030</a>	30	3	230	99	175	<a href="#">TJN175</a>	<a href="#">JHL175</a>	10	1	230	76	125	<a href="#">TJN125</a>	<a href="#">JHL125</a>
<a href="#">GS4-2040**</a>	40	3	230	124	175	<a href="#">TJN175</a>	<a href="#">JHL175</a>	10	1	230	63	90	<a href="#">TJN90</a>	<a href="#">JHL90</a>
<a href="#">GS4-2050**</a>	50	3	230	143	200	<a href="#">TJN200</a>	<a href="#">JHL200</a>	10	1	230	63	90	<a href="#">TJN90</a>	<a href="#">JHL90</a>
<a href="#">GS4-2060</a>	60	3	230	171	250	<a href="#">TJN250</a>	<a href="#">JHL250</a>	15	1	230	94	150	<a href="#">TJN150</a>	<a href="#">JHL150</a>
<a href="#">GS4-2075</a>	75	3	230	206	300	<a href="#">TJN300</a>	<a href="#">JHL300</a>	20	1	230	124	175	<a href="#">TJN175</a>	<a href="#">JHL175</a>
<a href="#">GS4-2100</a>	100	3	230	245	350	<a href="#">TJN350</a>	<a href="#">JHL350</a>	25	1	230	143	200	<a href="#">TJN200</a>	<a href="#">JHL200</a>
<a href="#">GS4-41P0</a>	1	3	460	4.3	6	<a href="#">TJS6</a>	<a href="#">JHL6</a>	single-phase input power not applicable for 460V						
<a href="#">GS4-42P0</a>	2	3	460	5.9	10	<a href="#">TJS10</a>	<a href="#">JHL10</a>							
<a href="#">GS4-43P0</a>	3	3	460	8.7	15	<a href="#">TJS15</a>	<a href="#">JHL15</a>							
<a href="#">GS4-45P0</a>	5	3	460	14	20	<a href="#">TJS20</a>	<a href="#">JHL20</a>							
<a href="#">GS4-47P5</a>	7.5	3	460	17	25	<a href="#">TJS25</a>	<a href="#">JHL25</a>							
<a href="#">GS4-4010</a>	10	3	460	20	35	<a href="#">TJS35</a>	<a href="#">JHL35</a>							
<a href="#">GS4-4015</a>	15	3	460	26	45	<a href="#">TJS45</a>	<a href="#">JHL45</a>							
<a href="#">GS4-4020</a>	20	3	460	35	60	<a href="#">TJS60</a>	<a href="#">JHL60</a>							
<a href="#">GS4-4025</a>	25	3	460	40	70	<a href="#">TJS70</a>	<a href="#">JHL70</a>							
<a href="#">GS4-4030</a>	30	3	460	47	90	<a href="#">TJS90</a>	<a href="#">JHL90</a>							
<a href="#">GS4-4040**</a>	40	3	460	63	125	<a href="#">TJS100</a>	<a href="#">JHL100</a>							
<a href="#">GS4-4050</a>	50	3	460	74	100	<a href="#">TJS110</a>	<a href="#">JHL110</a>							
<a href="#">GS4-4060</a>	60	3	460	101	125	<a href="#">TJS150</a>	<a href="#">JHL150</a>							
<a href="#">GS4-4075</a>	75	3	460	114	150	<a href="#">TJS150</a>	<a href="#">JHL150</a>							
<a href="#">GS4-4100</a>	100	3	460	157	200	<a href="#">TJS200</a>	<a href="#">JHL200</a>							
<a href="#">GS4-4125</a>	125	3	460	167	250	<a href="#">TJS250</a>	<a href="#">JHL250</a>							
<a href="#">GS4-4150</a>	150	3	460	207	300	<a href="#">TJS300</a>	<a href="#">JHL300</a>							
<a href="#">GS4-4175</a>	175	3	460	240	350	<a href="#">TJS350</a>	<a href="#">JHL350</a>							
<a href="#">GS4-4200</a>	200	3	460	300	450	<a href="#">TJS450</a>	<a href="#">JHL450</a>							
<a href="#">GS4-4250</a>	250	3	460	380	500	<a href="#">TJS500</a>	<a href="#">JHL500</a>							
–	–						Fast Acting Current Limiting Class L							
<a href="#">GS4-4300</a>	300	3	460	400	700	<a href="#">LCU700</a>								

\* High-speed Class J

\*\* Includes DC choke

\*\*\* The fuses listed above are available from [AutomationDirect.com](http://AutomationDirect.com). (Individual web links are associated with each part number listed above.)

# GS1,GS2,GS3/DURAPULSE Accessories – Ethernet Interface



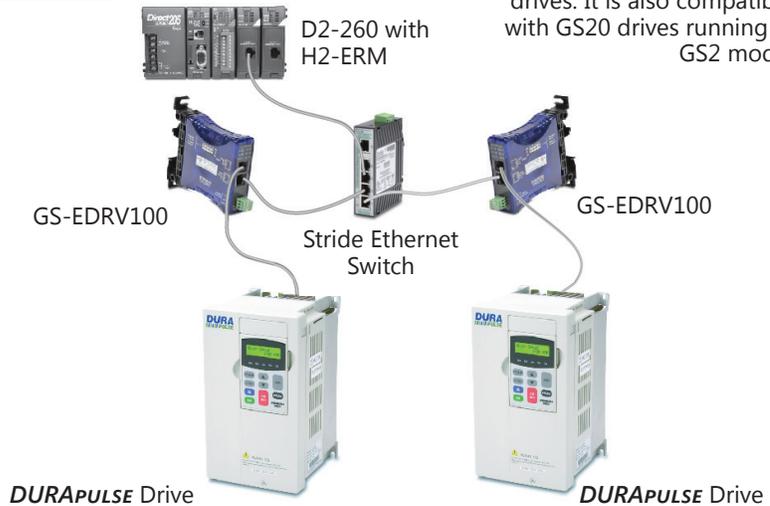
Note: GS1, GS2, GS3, & GS4 AC Drives only

GS-EDRV100 works with GS1, GS2, GS3, & GS4 **DURAPULSE** drives. It is also compatible with GS20 drives running in GS2 mode.

## GS-EDRV100 Overview

The GS-EDRV100 Ethernet interface provides a high-performance Ethernet link between a control system for legacy GS1, GS2, GS3, or GS4 drives. The module will also work with GS20 drives that are running in GS2 mode. The GS-EDRV100 processes signals to and from the drive, mounts on 35mm DIN rail, and connects the drive to an Ethernet hub or PC. It formats drive signals to conform with the Ethernet standard and transmits these signals to the H2-ERM or H4-ERM, Productivity3000, or independent controller with a Modbus TCP/IP driver. This allows for greater connectivity to many control system architectures.

An additional feature is the built-in Web server which allows users to configure and control the drive from any Web browser via the IP address of the GS-EDRV100 card.

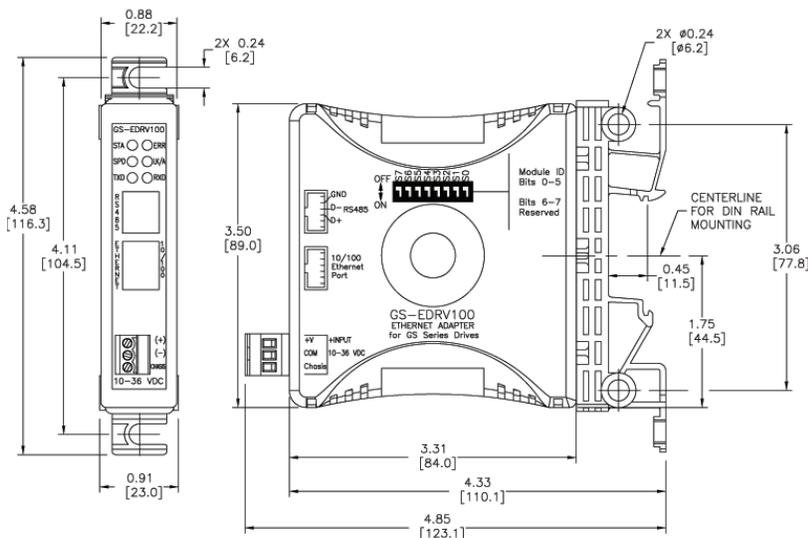


Note: The GS-EDRV100 requires an external 24 VDC power supply.

## Automatic power shut-down

The GS series drives have a provision for shutting down control or power to the inverter in the event of a communications time-out. This function can be set up through the drive's parameter group 9.

### Dimensions: inches[mm]



- LED Indicators
- STA - Status
- SPD - 100Mbps
- TXD - Transmit
- ERR - Module Error
- LK/A - Link/Active
- RXD - Receive

DIP Switches (under cover)

Serial Port

Ethernet Port

Power Terminals (Class 2 power recommended)

- Positive connection (+) or +10-36VDC
- Negative connection (-) or 0VDC
- Chassis or system ground connection



## GS-EDRV100 Specifications

Part Number	GS-EDRV100
Price	\$261.00
Approvals	cUL Listed, file number E185989
Input Voltage	10-36 VDC
Input Current	50-220 mA
NOTE: Can be used with GS1, GS2, GS3, & GS4 series AC drives (also compatible with GS20 but only when in GS2 mode).	
NOTE: Package includes 2-ft. serial communications cable.	
NOTE: Mounts on 35mm DIN rail.	

# GS1, GS2, GS3/DURAPULSE Accessories – Software

## Overview

GSoft, the configuration software for the GS1, GS2, GS3/DURAPULSE drives, allows a personal computer to be directly connected to the drives via RS-232 or RS-485 (PC serial port, USB-RS232, USB-485M, or customer supplied converter required). You can perform a variety of functions to allow easy, intuitive, and secure set-up of any application that is required using GSoft.

GSOFT is available as a free downloaded at: <http://support.automationdirect.com/products/gsoft.html>.

## System Requirements

To run GSoft, your PC must meet the following requirements:

- Windows 95, 98, Me, NT, 2000, XP, or Windows 7
- Internet Explorer 4.0 or higher (for HTML help support)
- 24 Mb of available memory
- 8Mb hard drive space
- Available RS-232 serial port (or USB-RS232, USB-485M converters)

## Features

- Create new drive configurations using one of three views:
  - Quick Start - Allows for just the basic set-up to get quick and simple applications up and running ASAP.
  - Detailed - The complete set-up of all parameters in the drive.
  - Schematic Views - Set up the drive using the interactive schematic view. Create a printable cad-like drawing at the same time for future documentation and maintenance-friendly activities.
- Upload/download drive configurations.
- Edit drive configuration .
- Archive/store multiple drive configurations on your PC .
- Trend drive operation parameters in real time.
- Maintenance keypad will allow the user to commission the drive from the PC, check rotation, and run a basic cycle.
- Live PID tuning with active tuning control. Take the difficulty out of PID tuning with a real time trend.
- View drive faults.
- OPC Server over the Ethernet with the GS-EDRV100 option card

GS1, GS2, GS3/DURAPULSE AC Drive Software		
Part Number	Price	Description
GSOFT *	Free	configuration software*
USB-485M	\$60.00	USB to RS-485 converter
GS-232CBL	Retired	RS-232 cable
USB-RS232	\$37.00	USB to RS232 converter

\* GSOFT can be used with GS1, GS2, & GS3/DURAPULSE drives; USB-485M or FA-ISOCAN required for GS1 and GS3/DURAPULSE drives.  
\* GSOFT can be downloaded for free: [www.automationdirect.com](http://www.automationdirect.com)

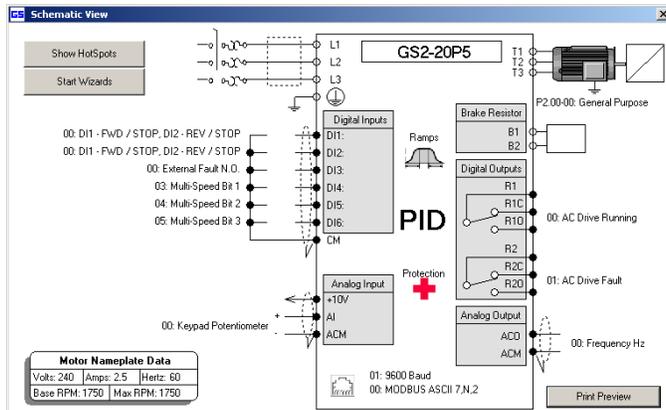
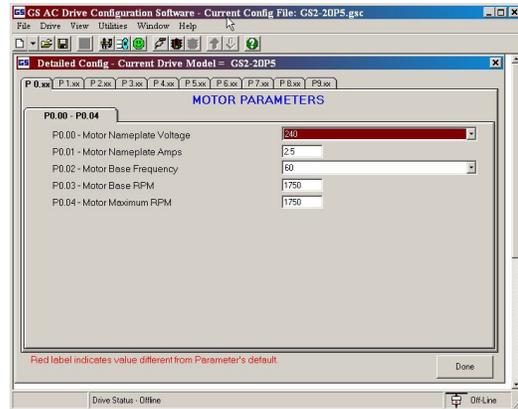
## GSoft offers three software configuration methods

### Detailed Configuration

The Detailed Configuration method provides AC drive parameter access in a tabbed dialog format. Detailed Configuration can be used for new or existing configurations.

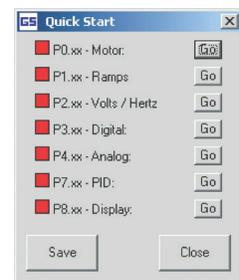
### Schematic View Configuration

The Schematic View Configuration method uses a schematic picture of the AC drive and external connections to guide you through the setup of the AC drive. The Schematic View method can be used for new or existing configurations.

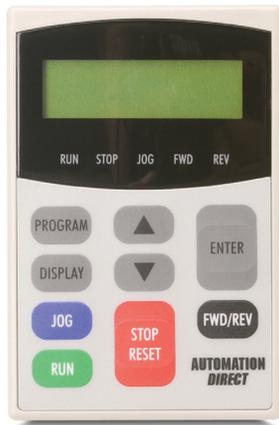


### Quick Start Configuration

The Quick Start Configuration method guides you through the most commonly used AC drive parameters. Quick Start Configuration may ONLY be used to create a new configuration. Once created and saved, subsequent editing is done using the Detailed or Schematic View methods.



# GS1,GS2,GS3/DURApulse Accessories – Miscellaneous



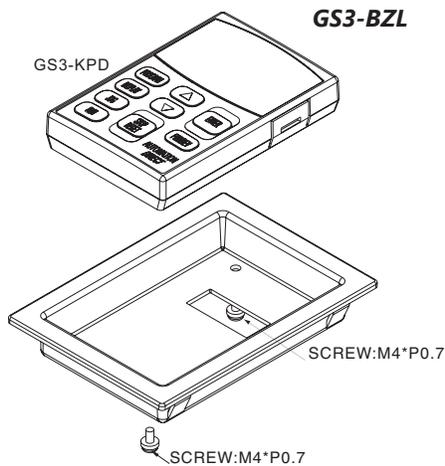
**GS3-KPD**



**ZL-CDM-RJ12x4**



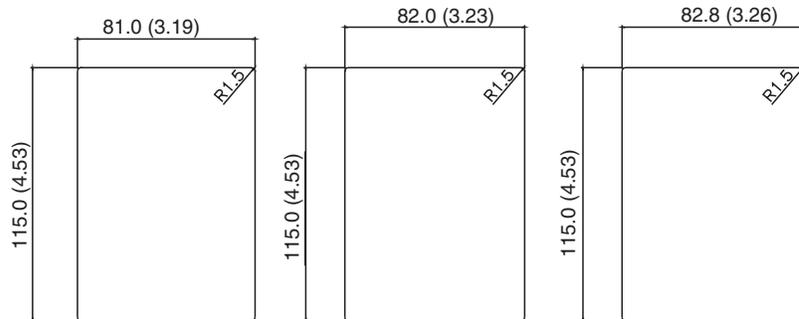
**ZL-CDM-RJ12x10**



**GS3-BZL**

The GS3-BZL Flush Mount Bezel Kit allows remote mounting of the DURApulse removable keypad. The Bezel Kit has a Protected Chassis, IP20 enclosure rating. The thickness of the panel will determine required hole dimensions:

t = 1.0 (.0393) - 1.4 (.0551)      t = 1.6 (.629) - 2.0 (.0787)      t = 2.2 (.0866) - 3.0 (.1181)



**GS-CBL2-1L**



**GS-CBL2-3L**



**GS-CBL2-5L**

GS1, GS2, GS3/DURApulse Drives Miscellaneous Accessories			
Part Number	Drive Model	Description	Price
<b>GS-232CBL</b>	GS1, GS2, GS3/DURApulse	Configuration Cable required for GSoft configuration software	Retired
<b>GS-CBL2-1L</b>	GS2, GS3/DURApulse	One meter keypad cable (installation screws included)	\$18.00
<b>GS-CBL2-3L</b>	GS2, GS3/DURApulse	Three meter keypad cable (installation screws included)	\$23.50
<b>GS-CBL2-5L</b>	GS2, GS3/DURApulse	Five meter keypad cable (installation screws included)	\$28.00
<b>GS3-KPD</b>	GS3/DURApulse	Spare or replacement keypad for DURApulse AC drives; great for maintenance or back-up programs	\$78.00
<b>GS3-BZL</b>	GS3/DURApulse	Flush Mount Bezel Kit for remote mounting of the DURApulse removable keypad	\$16.00
<b>ZL-CDM-RJ12X4</b>	GS1, GS2, GS3/DURApulse	ZIPLink 4-port communication distribution module, 4 RJ12 ports, and 1 screw terminal port	\$29.00
<b>ZL-CDM-RJ12X10</b>	GS1, GS2, GS3/DURApulse	ZIPLink 10-port communication distribution module, 10 RJ12 ports, and 1 screw terminal port	\$36.50

*Optional ZipLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix on page [pg.tGSX-169](#).*

# GS3/DURAPULSE Accessories – Replacement Parts

GS3/DURAPULSE AC drives 3 hp and larger have built-in cooling fans, and replacement fans are also available. These fans are direct replacements for the internal factory-installed fans.



**WARNING: FAN REPLACEMENT SHOULD ONLY BE PERFORMED BY PERSONNEL SKILLED IN THE DISASSEMBLY AND REPAIR OF VARIABLE FREQUENCY AC DRIVES.**



Note: Installation instructions are included with the fans.

Replacement Fans for DURApulse (GS3 Series) AC Drives					
Part Number <sup>(1)</sup>	Price	Specifications <sup>(2)</sup>	Fans / Drive <sup>(3)</sup>	GS3 Drive Model <sup>(4)</sup>	Drive V / HP
<b>GS-FAN-1</b>	\$27.50	50 mm, 12 VDC, 0.25A	1	GS3-43P0	460 / 3
<b>GS-FAN-2</b>	\$30.00	60 mm, 12 VDC, 0.25A	1	GS3-23P0	230 / 3
<b>GS-FAN-3</b>	\$30.00	80 mm, 12 VDC, 0.42A	2	GS3-4010	460 / 10
<b>GS-FAN-4</b>	\$44.50	92 mm, 24 VDC, 0.30A	2	GS3-2020 GS3-2030 GS3-4020	230 / 20 230 / 30 460 / 20
<b>GS-FAN-5</b>	\$111.00	120 mm, 24 VDC, 1.2A	2	GS3-2040 GS3-2050 GS3-4040 GS3-4060 GS3-4100	230 / 40 230 / 50 460 / 40 460 / 60 460 / 100

1) One fan per part number. Includes connectorized electrical cable and installation instructions.  
 2) Fans are replacements for the internal fans in GS3 drives, are dimensionally and electrically equivalent to the originals, and are not intended for other use. Fan electrical loading is included in the input amperage ratings of the drives, and DC voltage is internally provided by the drives.  
 3) Some drives require multiple fans.  
 4) Can be used only with applicable DURAPULSE AC drive.



# Wiring Solutions

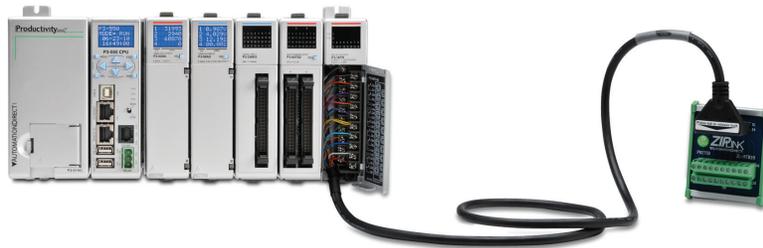
## Wiring Solutions using the ZIPLink Wiring System

ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the ZIPLink System ranging from PLC I/O-to-ZIPLink Connector Modules that are ready for field

termination, options for connecting to third party devices, GS, DuraPulse and SureServo Drives, and specialty relay, transorb and communications modules. Pre-printed I/O-specific adhesive label strips for quick marking of ZIPLink modules are provided with ZIPLink cables. See the following solutions to help determine the best ZIPLink system for your application.

### **Solution 1: DirectLOGIC, CLICK and Productivity I/O Modules to ZIPLink Connector Modules**

When looking for quick and easy I/O-to-field termination, a ZIPLink connector module used in conjunction with a prewired ZIPLink cable, consisting of an I/O terminal block at one end and a multi-pin connector at the other end, is the best solution.



Using the PLC I/O Modules to ZIPLink Connector Modules selector tables located in this section,

- 1. Locate your I/O module/PLC.
- 2. Select a ZIPLink Module.
- 3. Select a corresponding ZIPLink Cable.

### **Solution 2: DirectLOGIC, CLICK and Productivity I/O Modules to 3rd Party Devices**

When wanting to connect I/O to another device within close proximity of the I/O modules, no extra terminal blocks are necessary when using the ZIPLink Pigtail Cables. ZIPLink Pigtail Cables are prewired to an I/O terminal block with color-coded pigtail with soldered-tip wires on the other end.



Using the I/O Modules to 3rd Party Devices selector tables located in this section,

- 1. Locate your PLC I/O module.
- 2. Select a ZIPLink Pigtail Cable that is compatible with your 3rd party device.

### **Solution 3: GS Series and DURAPULSE Drives Communication Cables**

Need to communicate via Modbus RTU to a drive or a network of drives?

ZIPLink cables are available in a wide range of configurations for connecting to PLCs and SureServo, SureStep, Stellar Soft Starter and AC drives. Add a ZIPLink communications module to quickly and easily set up a multi-device network.

Using the Drives Communication selector tables located in this section,

- 1. Locate your Drive and type of communications.
- 2. Select a ZIPLink cable and other associated hardware.





# Wiring Solutions

## **Solution 4: Serial Communications Cables**

ZIPLink offers communications cables for use with *DirectLOGIC*, *CLICK*, and *Productivity CPUs*, that can also be used with other communications devices. Connections include a 6-pin RJ12 or 9-pin, 15-pin and 25-pin D-sub connectors which can be used in conjunction with the RJ12 or D-Sub Feedthrough modules.

Using the **Serial Communications Cables** selector table located in this section,

- 1. Locate your connector type
- 2. Select a cable.



## **Solution 5: Specialty ZIPLink Modules**

For additional application solutions, *ZIPLink* modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

Using the **ZIPLink Specialty Modules** selector table located in this section,

- 1. Locate the type of application.
- 2. Select a ZIPLink module.



## **Solution 6: ZIPLink Connector Modules to 3rd Party Devices**

If you need a way to connect your device to terminal blocks without all that wiring time, then our pigtail cables with color-coded soldered-tip wires are a good solution. Used in conjunction with any compatible *ZIPLink* Connector Modules, a pigtail cable keeps wiring clean and easy and reduces troubleshooting time.

Using the **Universal Connector Modules and Pigtail Cables** table located in this section,

- 1. Select module type.
- 2. Select the number of pins.
- 3. Select cable.





# Motor Controller Communication

AC Drive / Motor Controller (GS/DuraPulse) ZIPLink Selector							
AC Drive / Controller		Communications			ZIPLink Cable		
Controller	Comm Port Type	Network/Protocol	Connects to	Comm Port Type	Cable (2 meter length)	Cable Connectors	Other Hardware Required
GS1	RJ12	RS-485 Modbus RTU	BRX MPUs	RS-485, 3-Pin	ZL-RJ12-CBL-2P	RJ12 to pigtail	N/A
			P1 CPUs	RS-485			
			P2 CPUs				
			P3 CPUs				
			P2-SCM	RS-485, 4-Pin			
			P3-SCM				
			DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	
			D2-260, D2-262 CPU	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
			GS-EDRV100				
			ZL-CDM-RJ12Xxx *		GS-485RJ12-CBL-2		
FA-ISOCOCON	5-pin connector	GS-ISOCOCON-CBL-2	RJ12 to 5-pin plug				
GS2	RJ12	RS-232 Modbus RTU	BRX MPUs	RS-232/485, 3-Pin	ZL-RJ12-CBL-2P	RJ12 to pigtail	N/A
			P1 CPUs	RS-485			
			P2 CPUs				
			P3 CPUs				
			P2-SCM	Ports 1, 2 & 3			
			P3-SCM	Ports 1 to 4			
			CLICK PLCs	Port 2 (RJ12)	GS-RJ12-CBL-2	RJ12 to RJ12	
			DL05 PLCs				
			DL06 PLCs				
			D2-250-1 CPU	Port 2 (HD15)	FA-15HD		
		D2-260, D2-262 CPU	Port 3 (25-pin)	FA-CABKIT			
		D4-450, D4-454 CPU					
		RS-485 Modbus RTU	BRX MPUs	RS-232/485, 3-Pin	ZL-RJ12-CBL-2P	RJ12 to pigtail	N/A
			P1 CPUs	RS-485			
			P2 CPUs				
			P3 CPUs				
			P2-SCM	RS-485, 4-Pin			
			P3-SCM				
			DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	
			D2-260, D2-262 CPU	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
GS-EDRV100							
ZL-CDM-RJ12Xxx *	GS-485RJ12-CBL-2						
FA-ISOCOCON	5-pin connector	GS-ISOCOCON-CBL-2	RJ12 to 5-pin plug				
DuraPulse (GS3)	RJ12	RS-485 Modbus RTU	BRX MPUs	RS-485, 3-Pin	ZL-RJ12-CBL-2P	RJ12 to pigtail	N/A
			P1 CPUs	RS-485			
			P2 CPUs				
			P3 CPUs				
			P2-SCM	RS-485, 4-Pin			
			P3-SCM				
			DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	
			D2-260, D2-262 CPU	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
			GS-EDRV100				
			ZL-CDM-RJ12Xxx *		GS-485RJ12-CBL-2		
FA-ISOCOCON	5-pin Connector	GS-ISOCOCON-CBL-2	RJ12 to 5-pin plug				

\* When using the ZL-CDM-RJ12Xxx ZIPLink Communication Distribution Module, replace the lowercase xx with the number of RJ12 ports, i.e. 4 for four ports or 10 for ten ports. (ex: ZL-CDM-RJ12X4 or ZL-CDM-RJ12X10)

# Hitachi Drives Cross References

To find a suitable replacement for an SJ300 Hitachi drive, use the chart to the right to determine control mode(s) required, and the tables below to determine possible replacement part numbers. Suggested replacements do not necessarily have all control modes of the original, so appropriate drives will be application-dependent. Please call Tech Support if there are any replacement questions.

Drive Series	Volts/Hz	PID	Sensorless Vector	Full Flux Vector
L100	✓	✓		
SJ100	✓	✓	✓	
GS1	✓			
GS2	✓	✓		
DURAPULSE (GS3)	✓	✓	✓	
SJ300	✓	✓	✓	✓

## Hitachi SJ300 Cross Reference

Hitachi SJ300 AC Drives			Possible Replacements			
	Part No.	Horsepower	GS1	Price	DURAPULSE (GS3)	Price
230V	SJ300-022LFU	3.0 hp	-	-	GS3-23P0	Retired
	SJ300-150LFU	20 hp	-	-	GS3-2020 *	Retired
	SJ300-220LFU	30 hp	-	-	GS3-2030 *	Retired
460V	SJ300-075HFU	10 hp	-	-	GS3-4010 *	Retired
	SJ300-150HFU	20 hp	-	-	GS3-4020 *	Retired

Notes: Replacement drives do not necessarily have the same physical dimensions, mounting hole patterns or wiring terminal arrangements.  
 \* All SJ300 drives are specified for use with 3-phase power (but can be installed in single-phase applications). Replacement drive requires 3-phase power. Ensure that the existing SJ application uses 3-phase input power, or that 3-phase power is available.  
 \*\* Replacement drive is higher horsepower than existing drive. Output power of new drive can be parameter-limited to the smaller horsepower.

# Hitachi Drives Cross References

To find a suitable replacement for an L100 or SJ100 Hitachi drive, use the chart to the right to determine control mode(s) required, and the tables below to determine possible replacement part numbers. Suggested replacements do not necessarily have all control modes of the original, so appropriate drives will be application-dependent. Please call Tech Support if there are any replacement questions.

Drive Series	Volts/Hz	PID	Sensorless Vector	Full Flux Vector
L100	✓	✓		
SJ100	✓	✓	✓	
GS1	✓			
GS2	✓	✓		
DURAPULSE	✓	✓	✓	
SJ300	✓	✓	✓	✓

## Hitachi L100 Cross Reference

Hitachi L100 AC Drives			Possible Replacements			
	Part No.	Horsepower	GS1	Price	DURAPULSE	Price
230V	L100-022NFU	3.0 hp	-	-	<a href="#">GS3-23P0</a>	Retired
460V	L100-075HFU	10 hp	-	-	<a href="#">GS3-4010 *</a>	Retired

Notes: Replacement drives do not necessarily have the same physical dimensions, mounting hole patterns or wiring terminal arrangements.  
 \* = Replacement drive requires 3-phase input power. Ensure that the existing application uses 3-phase input power, or that 3-phase power is available.  
 \*\* = Replacement drive is higher horsepower than existing drive. Output power of new drive can be parameter-limited to the smaller horsepower.

## Hitachi SJ100 Cross Reference

Hitachi SJ100 AC Drives			Possible Replacements			
	Part No.	Horsepower	GS1	Price	DURAPULSE	Price
230V	SJ100-022NFU	3.0 hp	-	-	<a href="#">GS3-23P0</a>	Retired
460V	SJ100-075HFU	10 hp	-	-	<a href="#">GS3-4010 *</a>	Retired

Notes: Replacement drives do not necessarily have the same physical dimensions, mounting hole patterns or wiring terminal arrangements.  
 \* = Replacement drive requires 3-phase input power. Ensure that the existing application uses 3-phase input power, or that 3-phase power is available.  
 \*\* = Replacement drive is higher horsepower than existing drive. Output power of new drive can be parameter-limited to the smaller horsepower.