

# 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. <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 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. <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 1000–2000m, 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>												
<p><b>Derating for Altitude</b></p> <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

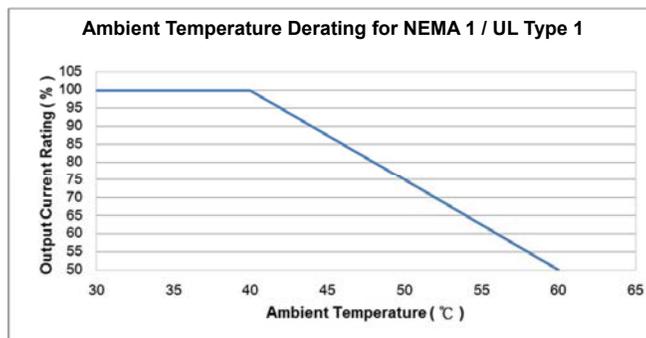
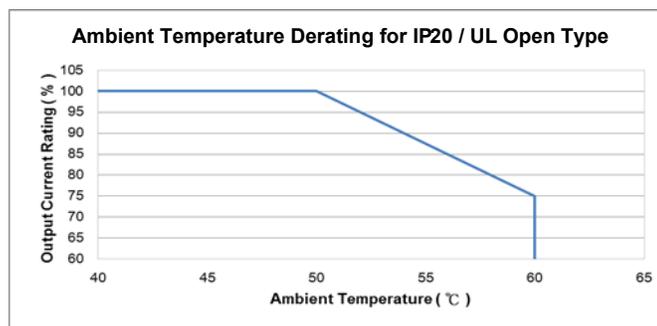
AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS10 drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to 104°F (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>	
<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 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.</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>	
<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%                      Line 2: Ta = 50°C / Load = 75% or Ta = 40°C / Load = 100%                      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>This graph shows 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 ~35% at 16 kHz; Line 2 (red) starts at 100% at 6 kHz and drops to ~45% at 16 kHz; Line 3 (green) starts at 100% at 8 kHz and drops to ~55% at 16 kHz.</p>	<p>This graph shows 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 ~75% at 16 kHz.</p>
<b>Constant Torque Carrier Frequency Derating</b>	
<b>SVPWM Mode</b>	<b>DPWM Mode</b>
<p>This graph shows 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 ~40% at 16 kHz; Line 2 (red) starts at 100% at 8 kHz and drops to ~50% at 16 kHz; Line 3 (green) starts at 100% at 10 kHz and drops to ~60% at 16 kHz.</p>	<p>This graph shows 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 ~85% 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						
Model Name		GS11N-10P2	GS11N-10P5	GS11N-11P0		
Price		\$127.00	\$135.00	\$151.00		
Frame Size		A	A	C		
Dimensional Drawing		<a href="#">PDF</a>	<a href="#">PDF</a>	<a href="#">PDF</a>		
Output Rating	Max Motor Output	hp	1/4	1/2	1	
		kW	0.2	0.4	0.75	
	CT	Rated Output Capacity	kVA	0.6	1.0	1.8
		Rated Output Current	A	1.6	2.5	4.8
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)		
	VT	Rated Output Capacity	kVA	0.7	1.0	2.1
Rated Output Current		A	1.8	2.7	5.5	
Carrier Frequency <sup>3</sup>		kHz	2–15 (default 4)			
Input Rating <sup>2</sup>	CT	Rated Input Current	A	6	9.4	18
	VT	Rated Input Current	A	6.8	10.1	20.6
	Rated Voltage/Frequency		One-phase: 100–120 VAC (-15% to +10%), 50/60 Hz			
	Operating Voltage Range (VAC)		85–132			
Frequency Tolerance (Hz)		47–63				
IE2 Efficiency - Relative Power Loss		4.3%	3.2%	2.9%		
Weight (kg [lb])		0.4 [0.88]	0.5 [1.10]	1 [2.20]		
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 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								
Model Name		GS11N-20P2	GS11N-20P5	GS11N-21P0	GS11N-22P0	GS11N-23P0		
Price		\$119.00	\$121.00	\$131.00	\$167.00	\$198.00		
Frame Size		A	A	B	C	C		
Dimensional 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	1/4	1/2	1	2	3	
		kW	0.2	0.4	0.75	1.5	2.2	
	CT	Rated Output Capacity	kVA	0.6	1.1	1.8	2.9	4.2
		Rated Output Current	A	1.6	2.8	4.8	7.5	11
		Carrier Frequency <sup>3</sup>	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	0.7	1.2	1.9	3.2	4.8
Rated Output Current		A	1.8	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	5.1	7.3	10.8	16.5	24.2
	VT	Rated Input Current	A	5.8	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)		170–265					
Frequency Tolerance (Hz)		47–63						
IE2 Efficiency - Relative Power Loss		4.7%	3.1%	2.7%	2.5%	2.4%		
Weight (kg [lb])		0.4 [0.88]	0.5 [1.10]	0.8 [1.76]	1 [2.20]	1 [2.20]		
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 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
	VT	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
	VT	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			<b>GS13N-40P5</b>	<b>GS13N-41P0</b>	<b>GS13N-42P0</b>		
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			<b>GS13N-43P0</b>	<b>GS13N-45P0</b>	<b>GS13N-45P0</b>	<b>GS13N-4010</b>	
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.

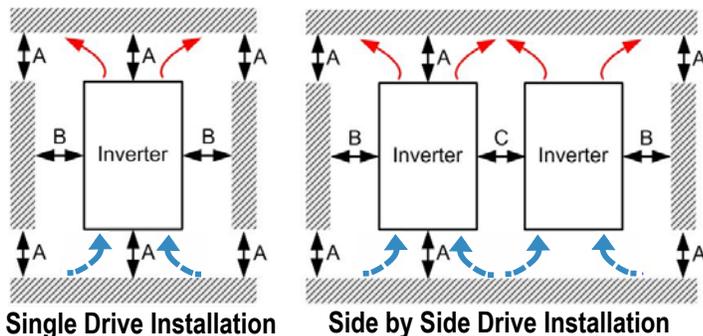
# DURAPULSE GS10 AC Drives – Environmental Specifications

## 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.

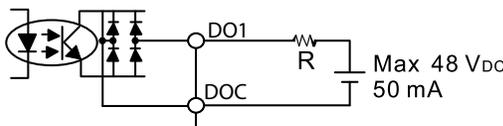
## GS10 Airflow and Power Dissipation

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				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				8.6	10	18.6
GS13N-20P5	A	0	0	16.5	12.6	29.1
GS13N-21P0				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				132.8	39.5	172.3
GS13N-4010	D	23.4	39.7	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.

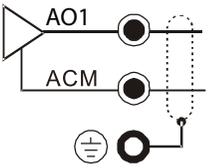
# DURAPULSE GS10 AC Drives Specifications – Terminals

## 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

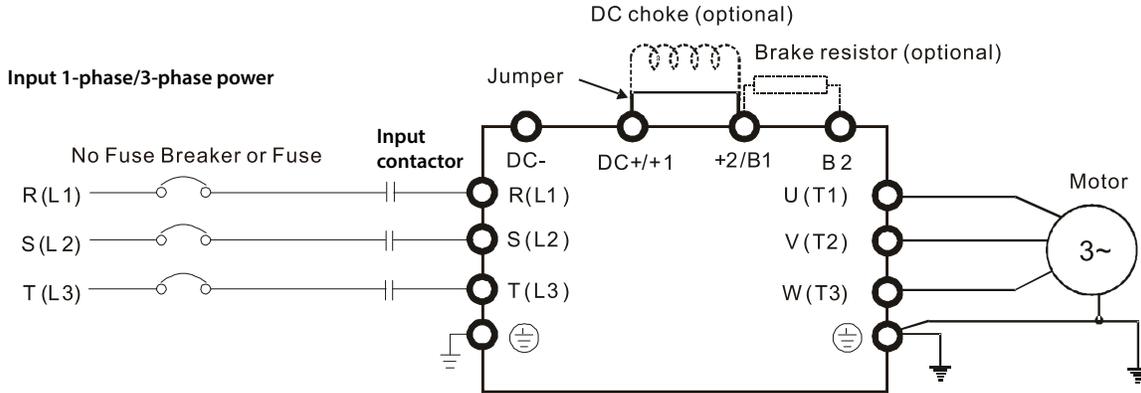
# DURAPULSE GS10 AC Drives – Basic Wiring Diagram

## 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.

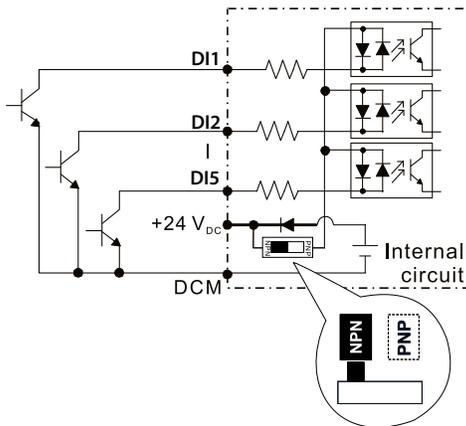
Note: DC- and DC+/+1 terminals not provided on 120V models.



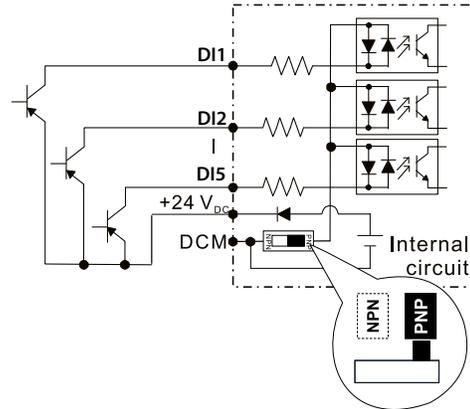
## Control Circuit Wiring Diagram: Digital Inputs - Internal Power

Note: Users **MUST** connect wiring according to the 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>)



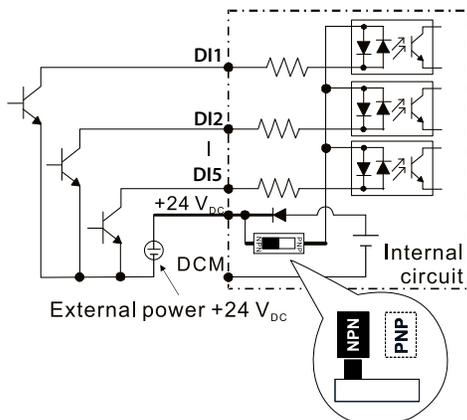
- ② Source Mode with internal power (+24 V<sub>DC</sub>)



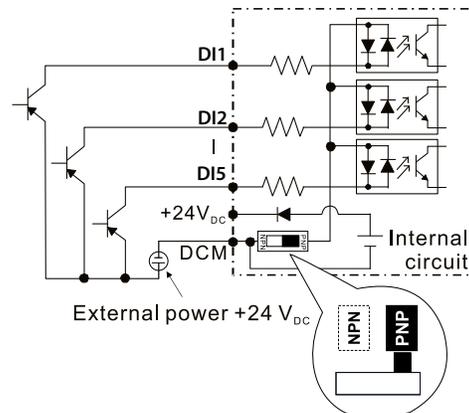
## Control Circuit Wiring Diagram: Digital Inputs - External Power

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

- ③ Sink Mode with external power



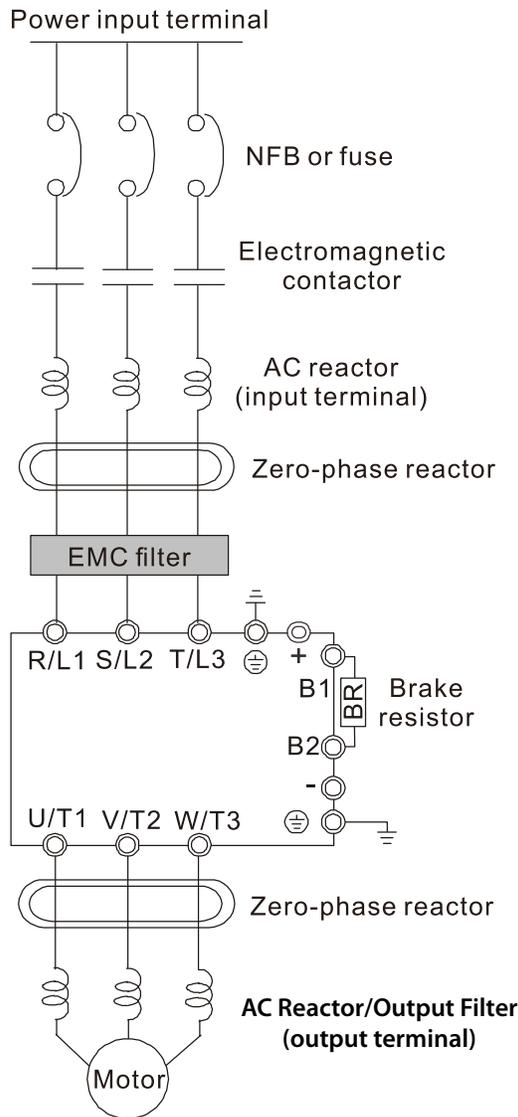
- ④ Source Mode with external power



# 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.)*

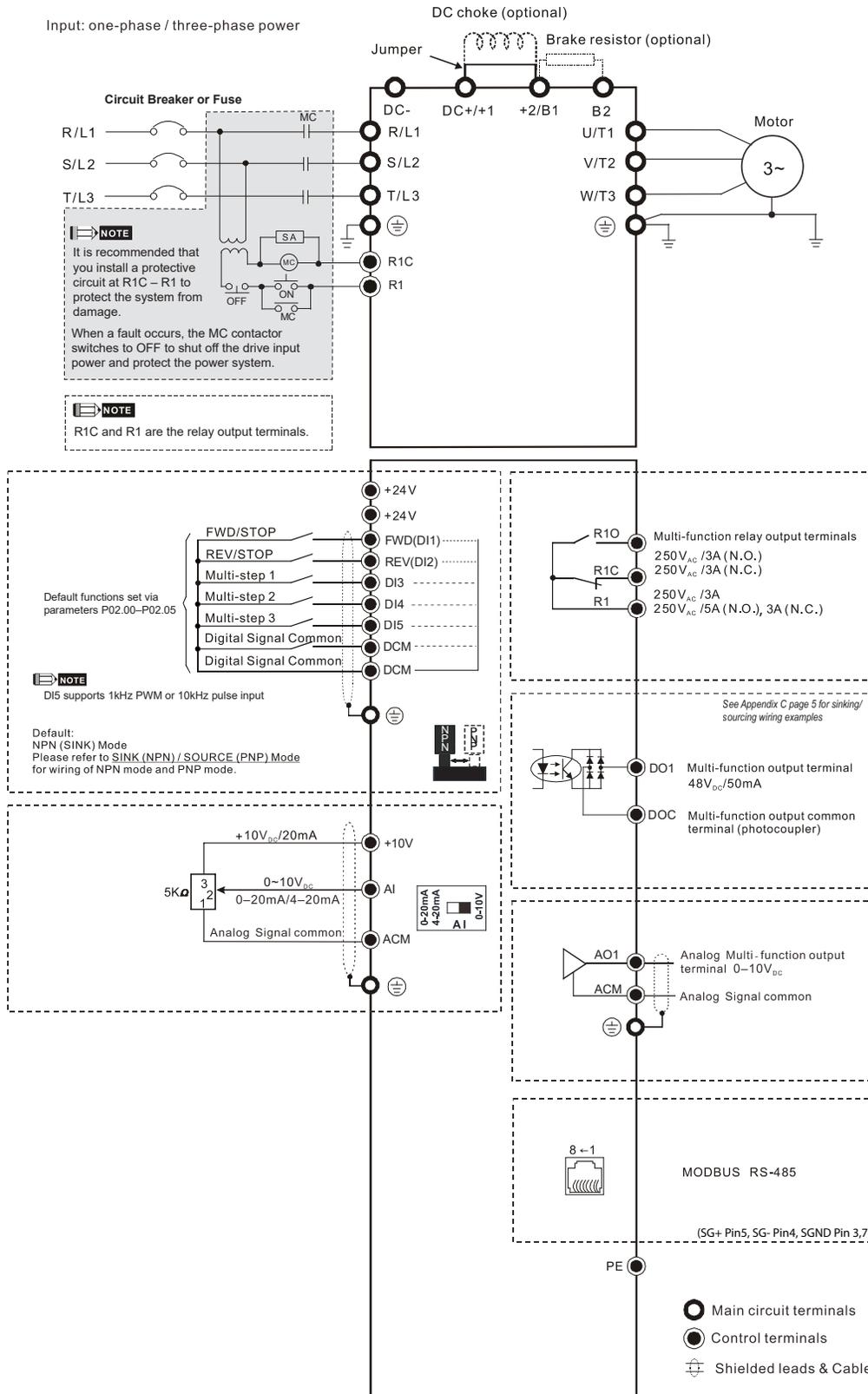


System Wiring Components	
Component	Function
Power input terminal	Supply power according to the rated power specifications indicated in the manual
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB (Non Fuse Breaker or Circuit Breaker) or Fuse.
Electromagnetic contactor	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>			
<b>Accessory</b>	<b>GS10 Accessory</b>	<b>GS20 Accessory used by GS10</b>	<b>Reference</b>
<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>

# 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

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

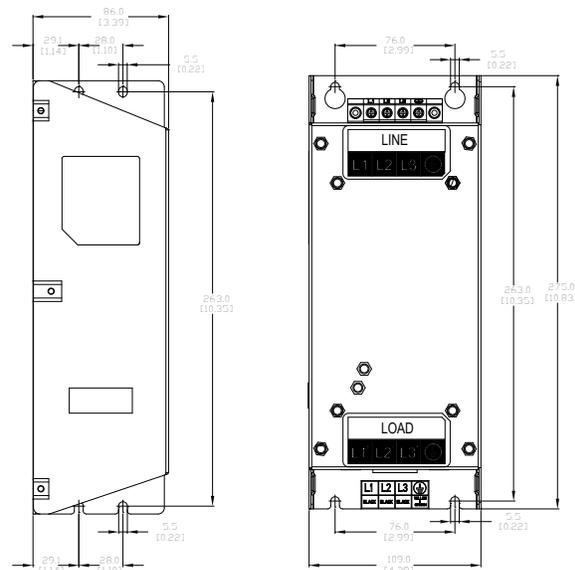
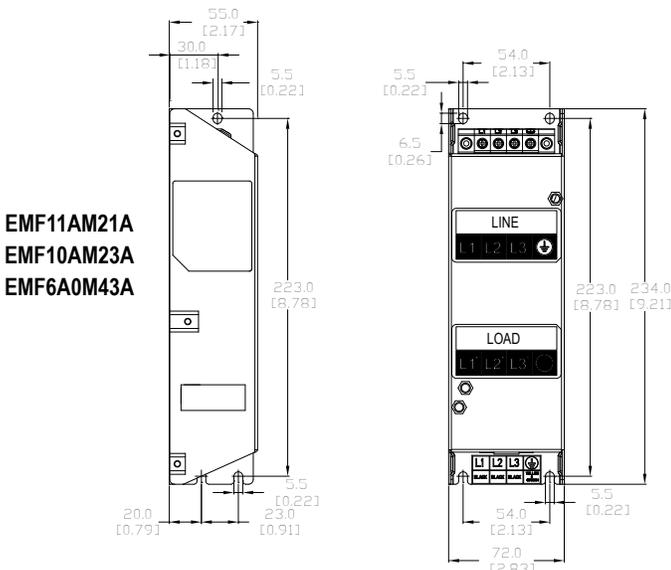
## Standard Footprint EMC Filter and Zero Phase Reactor

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	3
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				EMF6A0M43A	\$67.00			✓				✓
<a href="#">GS13N-41P0</a>	3.7			✓					N/A*		✓			
B	<a href="#">GS11N-21P0</a>	10.8	EMF11AM21A	\$53.00		✓	✓			✓	✓			
	<a href="#">GS13N-22P0</a>	9	EMF10AM23A	\$73.00		✓	✓			✓	✓			
	<a href="#">GS13N-42P0</a>	5.8	EMF6A0M43A	\$67.00			✓				✓			
C	<a href="#">GS11N-11P0</a>	18	EMF27AM21B	\$94.00										
	<a href="#">GS11N-22P0</a>	16.5					✓					✓		
	<a href="#">GS11N-23P0</a>	24.2					✓					✓		
	<a href="#">GS13N-23P0</a>	13.2	EMF24AM23B	\$115.00			✓	✓			✓	✓		
	<a href="#">GS13N-25P0</a>	20				✓	✓				✓	✓		
	<a href="#">GS13N-43P0</a>	6.1			EMF12AM43B	\$118.00								
	<a href="#">GS13N-45P0</a>	9.9						✓	✓				✓	✓
D	<a href="#">GS13N-27P5</a>	30	EMF33AM23B	\$167.00		✓	✓			✓	✓			
	<a href="#">GS13N-47P5</a>	14.3	EMF23AM43B	\$161.00		✓	✓	✓		✓	✓	✓		
	<a href="#">GS13N-40I0</a>	19.3				✓	✓	✓			✓	✓	✓	

### EMF Series Filter Dimensions

( Units = mm [in] )



# 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.

EMI Filters Selection				
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).

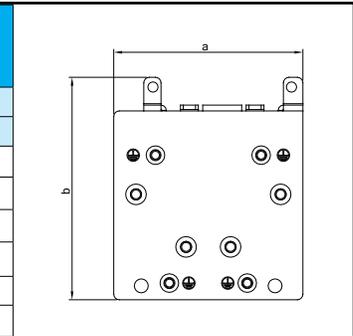
# GS10/GS20 Series Optional Accessories – General

## 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	GS20A-ESP-A	\$25.00
GS10/GS20	B	GS20A-ESP-B	\$26.00
GS10/GS20	C	GS20A-ESP-C	\$26.50
GS10/GS20	D	GS20A-ESP-D	\$27.50
GS20	E	GS20A-ESP-E	\$38.50
GS20	F	GS20A-ESP-F	\$39.00

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

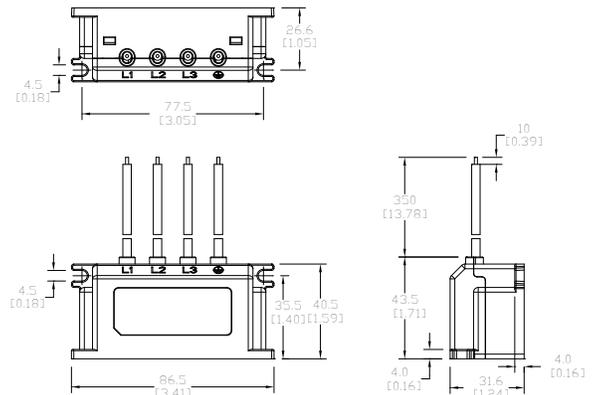


## Capacitive Filter

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)	GS20A-CAPF	\$21.50	110–480 VAC	-40–85°C	Cx: 1uF ± 20% Cy: 0.1uF ± 20%



# 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</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>

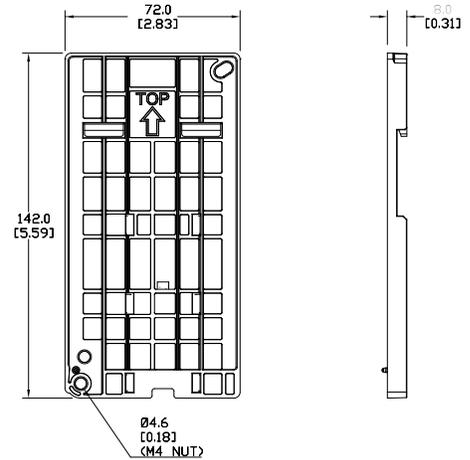
\* Not available at AutomationDirect.com  
 \*\* All specs for the LR2 and VTF can be found at [www.automationdirect.com](http://www.automationdirect.com)

# GS10/GS20 Series Optional Accessories – Mounting Kits

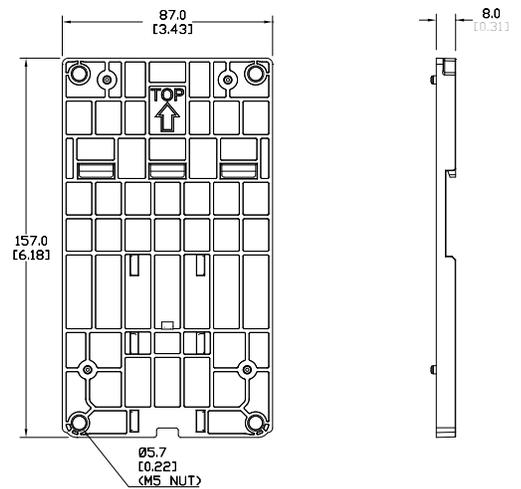
## DIN Rail Mounting

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



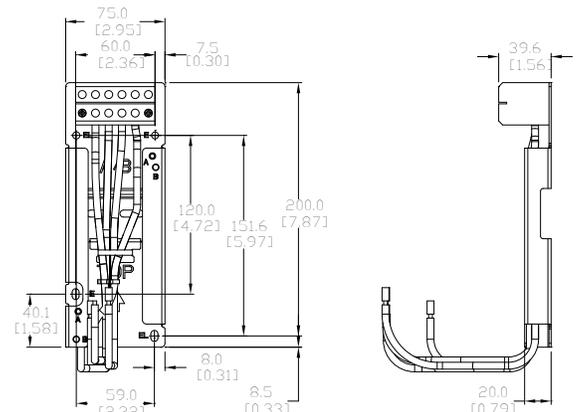
GS20A-DR-C

# GS10/GS20 Series Optional Accessories – Mounting Kits

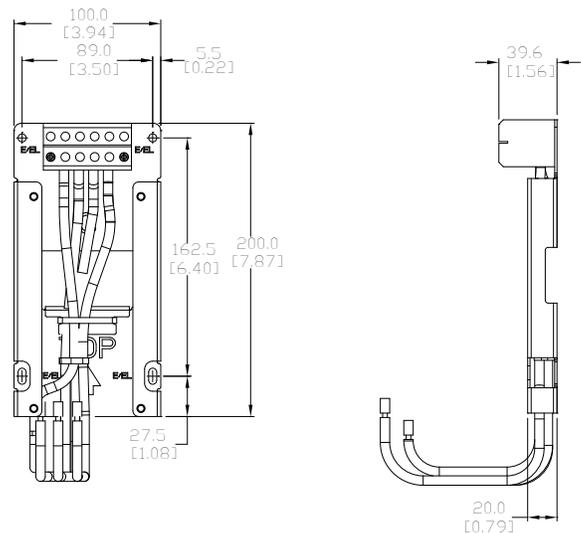
## Mounting Adapter Plate

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="#">GS13N-45P0</a>	<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	<b><u>GS20A-FAN-B</u></b>	\$21.50	GS20 series main cooling fan, replacement.	40x40x15 mm	12VDC
—	GS21X-23P0 GS23X-23P0 GS23X-25P0 GS23X-45P0	<b><u>GS20XA-FAN-B</u></b>	\$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	<b><u>GS20A-FAN-C</u></b>	\$23.50	GS20 series main cooling fan, replacement.	50x50x20 mm	12VDC
—	GS23X-27P5 GS23X-47P5 GS23X-4010	<b><u>GS20XA-FAN-C</u></b>	\$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	<b><u>GS20A-FAN-D</u></b>	\$27.00	GS20 series main cooling fan, replacement.	60x60x25 mm	12VDC
—	GS23-2010 GS23-2015 GS23-4015 GS23-4020	<b><u>GS20A-FAN-E</u></b>	\$37.50	GS20 series main cooling fan, replacement.	92x92x28 mm	12VDC
—	GS23-2020 GS23-4025 GS23-4030	<b><u>GS20A-FAN-F</u></b>	\$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.

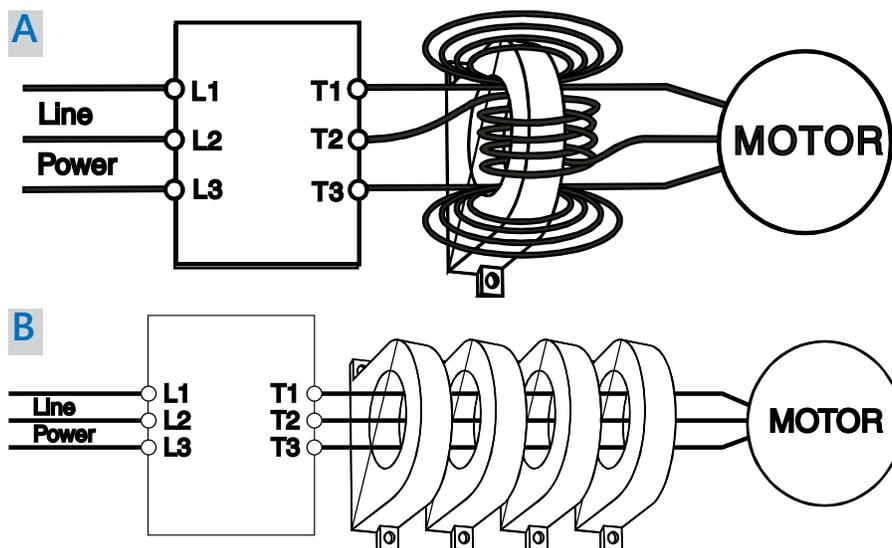


## Wiring Method

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



# 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 <b>free</b> 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/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

# 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**



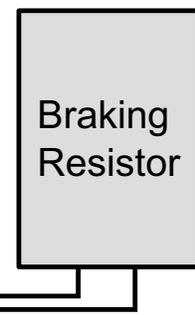
**GS-2020-BR-ENC**



**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 ( $\Omega$ )	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>	\$344.00	1000	20	enclosed
<a href="#"><u>GS-2015-BR-ENC</u></a>	\$597.00	2400	13.6	
<a href="#"><u>GS-2020-BR-ENC</u></a>	\$662.00	3000	10	
<a href="#"><u>GS-2025-BR-ENC</u></a>	\$809.00	4800	8	
<a href="#"><u>GS-2030-BR-ENC</u></a>	\$795.00	4800	6.8	
<a href="#"><u>GS-2040-BR-ENC</u></a>	\$662.00	3000	10	
<a href="#"><u>GS-2050-BR-ENC</u></a>	\$809.00	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>	\$344.00	1000	50	
<a href="#"><u>GS-4020-BR-ENC</u></a>	\$427.00	1500	40	
<a href="#"><u>GS-4025-BR-ENC</u></a>	\$1,017.00	4800	32	
<a href="#"><u>GS-4030-BR-ENC</u></a>	\$1,017.00	4800	27.2	
<a href="#"><u>GS-4040-BR-ENC</u></a>	\$1,017.00	6000	20	
<a href="#"><u>GS-4050-BR-ENC</u></a>	\$1,198.00	9600	16	
<a href="#"><u>GS-4060-BR-ENC</u></a>	\$1,198.00	9600	13.6	
<a href="#"><u>GS-4075-BR-ENC</u></a>	\$1,017.00	6000	20	
<a href="#"><u>GS-4100-BR-ENC</u></a>	\$1,198.00	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	