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

Selecting the Proper Drive Rating

Selecting the Proper Drive Rating

Determine Motor Voltage and Full-Load Amperage (FLA)

Motor voltage and FLA are located on the nameplate of the motor.
NOTE: FLA of motors that have been rewound may be higher than stated.

Determine Motor Overload Requirements

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.
NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.

Determine Application Type: Constant Torque or Variable Torque

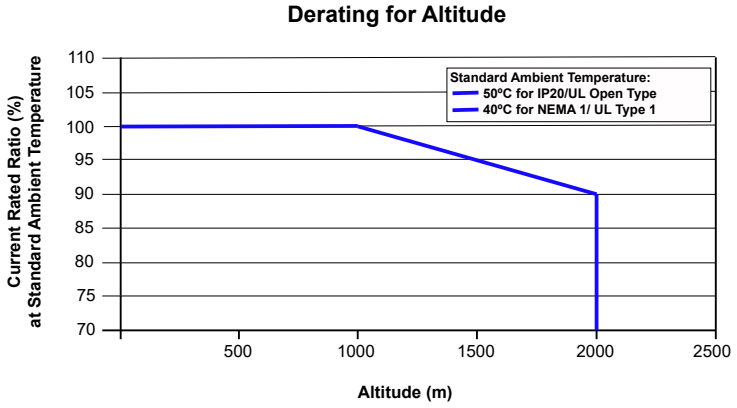
This torque requirement has a direct effect on which drive to select. Variable Torque applications are generally easier to start; typically fans and pumps. Most other applications outside fans and pumps fall into the Constant Torque category (machine control, conveyors, etc.). If you are unsure of the application, assume Constant Torque. The specification, derating, and selection tables are generally segregated by Constant Torque and Variable Torque.

Installation Altitude

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.
NOTE: For use above 1000m, the AC drive must be derated as described below.

Derate Output Current Based on Altitude Above 1000 Meters

- If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.
- 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.
- Maximum altitude for Corner Grounded is 2000m. If installation at an altitude higher than 2000m is required, please contact AutomationDirect.



DURAPULSE GS10 AC Drives – Selection

Selecting the Proper Drive Rating, continued

Determine Maximum Enclosure Internal Temperature

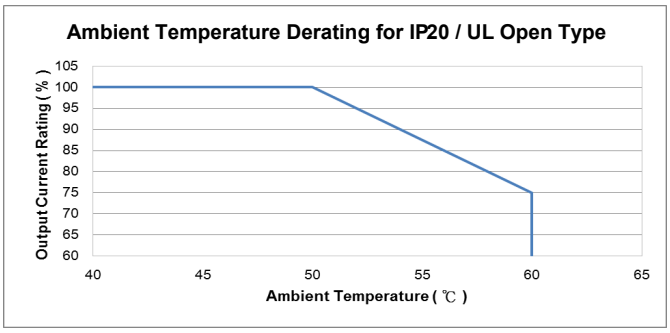
AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS10 drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to 104°F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

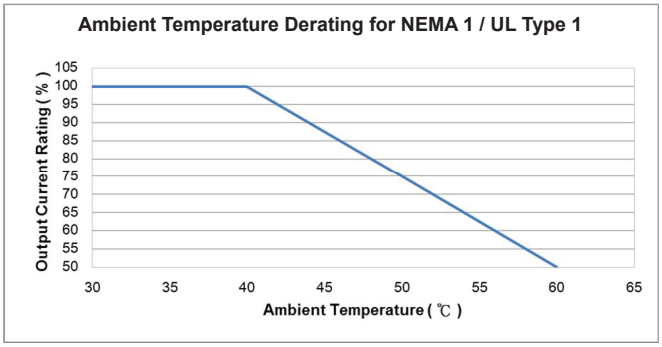
NOTE: For use above 104°F (40°C), the AC drive must be derated as described below.

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***
UL Open Type / IP20*	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.
NEMA 1 / UL Type 1*	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 "Environmental Conditions for GS10 AC Drives" on page tGSX-9.*





DURAPULSE GS10 AC Drives – Selection

Selecting the Proper Drive Rating, continued

Derate Output Current Based on Carrier Frequency (if necessary)

Carrier Frequency Effects

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.

Benefits of Higher Carrier Frequencies:

- Better efficiency (lower harmonic losses) in the motor
- Lower audible noise

Benefits of Lower Carrier Frequencies:

- Better efficiency in the drive
- Lower EMI (electrical noise)
- Reduced reflective wave peak voltage

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 (>20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy duty applications typically run around 2–4 kHz.

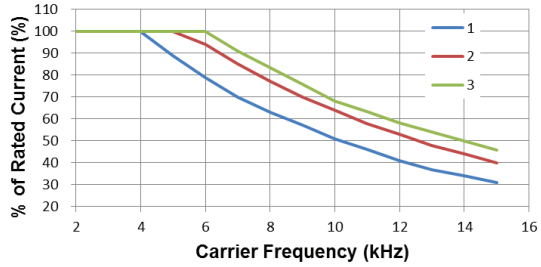
Derating Tables

The tables below show the derating curves for GS10 drives running in two different modes under variable torque and constant torque conditions.
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%

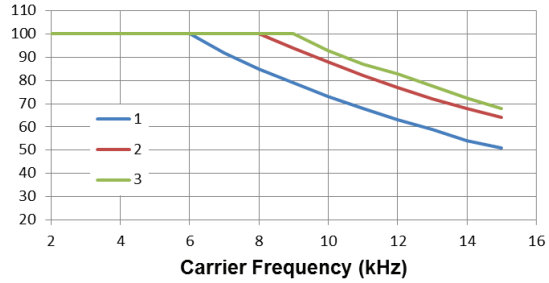
Set PWM mode via P11.41.
SVPWM = Space Vector Pulse Width Modulation mode
DPWM = Two Phase Pulse Width Modulation mode

Variable Torque Carrier Frequency Derating

SVPWM Mode

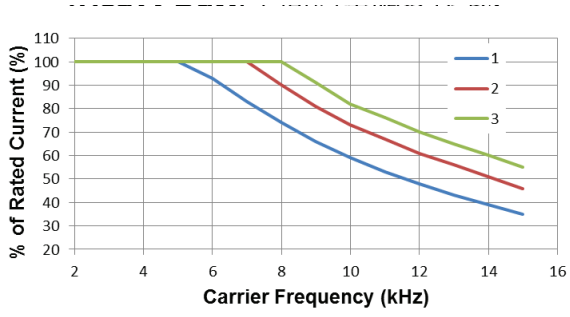


DPWM Mode

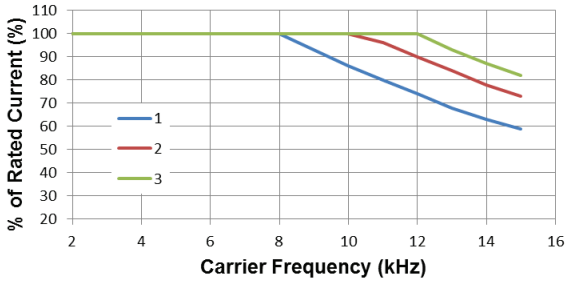


Constant Torque Carrier Frequency Derating

SVPWM Mode



DPWM Mode



DURAPULSE GS10 AC Drives – Selection Specifications

GS10 Drive Model Selection Tables

GS10 120V[1,4] 1-Phase Specifications – Frame Sizes A, C

Model Name				GS11N-10P2	GS11N-10P5	GS11N-11P0
Price				$;-054l,:	$054n0:	$054n1:
Frame Size				A	A	C
Dimensional Drawing				PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)		
Input Rating[2]	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		

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-75) 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 - No DC bus connection terminals (DC+,DC-) are provided on 120V models.

GS10 230V[1] 1-Phase Specifications – Frame Sizes A, B, C

Model Name				GS11N-20P2	GS11N-20P5	GS11N-21P0	GS11N-22P0	GS11N-23P0
Price				$054n2:	$054n3:	$;-054l[:	$-054l_:	$-054l#:
Frame Size				A	A	B	C	C
Dimensional Drawing				PDF	PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)				
Input Rating[2]	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				

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-75) 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 – Selection Specifications

GS10 Drive Model Selection Tables, continued

GS10 230V[1] 3-Phase Specifications – Frame Sizes A, B							
Model Name				GS13N-20P2	GS13N-20P5	GS13N-21P0	GS13N-22P0
Price				$;-054l!:	$-054l?:	$054n4:	$054n5:
Frame Size				A	A	A	B
Dimensional Drawing				PDF	PDF	PDF	PDF
Output Rating	Max Motor Output (3-phase [1-phase])[4]		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[3]	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[3]	kHz	2–15 (default 4)			
Input Rating[2]	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[1] 3-Phase Specifications – Frame Sizes C, D						
Model Name				GS13N-23P0	GS13N-25P0	GS13N-27P5
Price				$054n6:	$054n7:	$054n8:
Frame Size				C	C	D
Dimensional Drawing				PDF	PDF	PDF
Output Rating	Max Motor Output (3-phase [1-phase])[4]		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[3]	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[3]	kHz	2–15 (default 4)		
Input Rating[2]	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-75) 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[1] 3-Phase Specifications – Frame Sizes A, B						
Model Name				GS13N-40P5	GS13N-41P0	GS13N-42P0
Price				$054n9:	$054na:	$054nb:
Frame Size				A	A	B
Dimensional Drawing				PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)		
Input Rating[2]	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[1] 3-Phase Specifications – Frame Sizes C, D							
Model Name				GS13N-43P0	GS13N-45P0	GS13N-47P5	GS13N-4010
Price				$054nc:	$054nd:	$054ne:	$;054nf:
Frame Size				C	C	D	D
Dimensional Drawing				PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)			
Input Rating[2]	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%	1.9%
Weight (kg [lb])				1 [2.20]	1 [2.20]	2 [4.41]	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 AccessoriesFusing" (pg.tGSX-75) 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)			
Control Characteristics	Control Method	V/F, Sensorless Vector (SVC)	
	Applicable Motor	IM (Induction Motor), Permanent Magnet AC (IPM and SPM)	
	Starting Torque[1]	150% / 3Hz 100% / (motor rated frequency/20)	(V/F, SVC control for IM, CT) (SVC control for PM, CT)
	Speed Control Range[1]	1: 50 (V/F, SVC control for IM, CT) 1: 20 (SVC control for PM, CT)	
	Max. Output Frequency	0.00–599.00 Hz	
	Overload Capacity	VT: rated output current of 120% 60 sec, 150% 3 sec. CT: rated output current of 150% 60 sec, 200% 3 sec.	
	Frequency Setting Signal	0–10 V / 4(0)–20 mA Pulse input: Single Pulse (10kHz), PWM (1kHz),	
	Digital Inputs	Five (5) - 24VDC NPN or PNP, includes 1 frequency input 10kHz	
	Digital Outputs	Two (2) - (1)-48VDC, (1) Relay-250VAC/30VDC	
	Analog Inputs	One (1) - selectable Voltage or Current	
	Analog Outputs	One (1) - voltage	
	Main Functions	• Multiple motor switching (max 2 motor settings) • Fast start-up • Deceleration Energy Back (DEB) 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 • Simple Positioning Function • Multi Pump Sequence • RS-485 Serial Communications (38.4kps max)	
	Application Macro	Built-in application parameter groups (selected by industry) and user-defined application parameter groups.	
Protection Characteristics	Motor Protection	Over-current, over-voltage, over-heating, phase loss, over-load	
	Stall Prevention	Stall prevention during acceleration, deceleration, and running (independent settings).	
Agency Approvals		*UL, cUL, CE, REACH*	
1: Control accuracy may vary depending on the environment, application conditions, or different motors. For more information, contact AutomationDirect.			

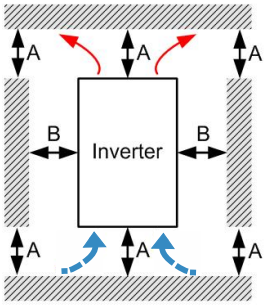
DURAPULSE GS10 AC Drives – Environmental Specifications

GS10 Environmental Specifications

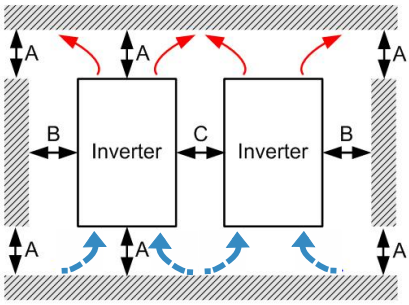
Environmental Conditions for GS10 AC Drives			
Condition	Operation	Storage	Transportation
Installation Location	IEC 60364-1/ IEC 60664-1 Pollution degree 2, Indoor use only.	n/a	n/a
Ambient Temperature	IP20/UL Open Type: -20–50°C (-20–60°C w/derating)	-40–85°C	-20–70°C
	Non-condensing, non-freezing		
Relative Humidity	90%, no water condensation	95%, no water condensation	
Air Pressure	86–106 kPa	70–106 kPA	
Pollution Level	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	
DO NOT 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^2 every year.			

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

Minimum Clearances and Air Flow for GS10 Series Drives



Single Drive Installation



Side by Side Drive Installation

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.*

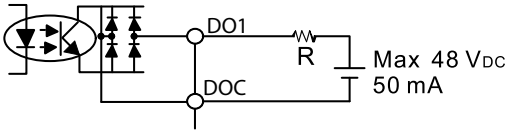
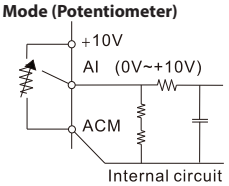
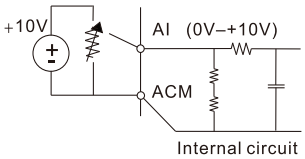
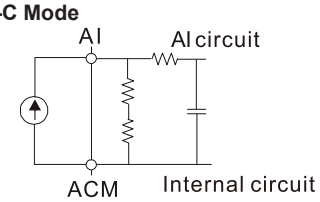
GS10 Airflow and Power Dissipation

Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m^3/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				31	13.2	44.2
GS13N-22P0	B	10	16.99	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.

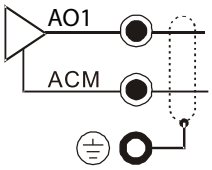
DURAPULSE GS10 AC Drives Specifications – Terminals

Control Circuit Terminal Names and Definitions

Control Circuit Terminals		
Terminal Symbol	***Terminal Function***	***Description***
+24V	Digital control signal common (Source)	+24V ± 10% 100mA
DCM	Digital control / Frequency signal common (Sink)	Digital control common
FWD (DI1) REV (DI2) DI3 - DI5	Digital input 1–5	***Source Mode:*** ON: activation current 3.3 mA ≥ 11 VDC OFF: cut-off voltage ≤ 5 VDC ***Sink Mode:*** ON: activation current 3.3 mA ≤ 13 VDC OFF: cut-off voltage ≥ 19 VDC DI5: Single pulse input, the maximum input frequency=10kHz. PWM pulse input, the maximum input frequency=1kHz. 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. • 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 P02.05=0, DI5 is pulse input terminal. • When P00.20 = 4, DI5 is the speed command source. • Refer to P10.16 for DI5 pulse configuration.
DO1	Digital Output 1 (photo coupler)	The AC motor drive outputs various monitoring signals through a transistor (open collector). Refer to P2.16 to program the output. 
DOC	Digital Output Common (photo coupler)	
R1O	Relay Output 1 (N.O.)	The AC motor drive outputs various monitoring signals through a relay output. Refer to P2.13 to program the output. **Resistive Load** • 3.0 A (NO), 3.0 A (NC) @250VAC • 5.0 A (NO), 3.0 A (NC) @30VDC **Inductive Load (COS 0.4)** • 1.2 A (NO), 1.2 A (NC) @250VAC • 2.0 A (NO), 1.2 A (NC) @30VDC
R1C	Relay Output 1 (N.C.)	
R1	Relay Output 1 Common	
+10V	Potentiometer power supply	Power supply for analog frequency setting: +10.5 ± 0.5 VDC / 20mA
AI	Analog voltage frequency command **AI-V Mode (Potentiometer)**  **AI-V Mode (voltage input)**  **AI-C Mode** 	The AI default is 0–10 V (AI-V, voltage mode). To switch to current mode, two steps are required: 1. A dip switch must be configured (follow the instructions on the inner side of the front cover or see page 2–xx) 2. Change P03.28 to 1 (0mA) or 2 (4mA) Use P03.00 to program AI functionality for either Voltage or Current mode. AI resolution=12 bits **Voltage (AI-V) mode** • Impedance: 20 kΩ • Range 0–Max. Output Frequency (P01.00): 0 to 10 V • P03.28 = 0 **Current (AI-C) mode** • Impedance: 250 Ω • Range 0– Maximum Output Frequency (P01.00): 0–20 mA/4–20 mA • Range switching according to P03.28 = 1 (0mA) or 2 (4mA)

DURAPULSE GS10 AC Drives Specifications – Terminals

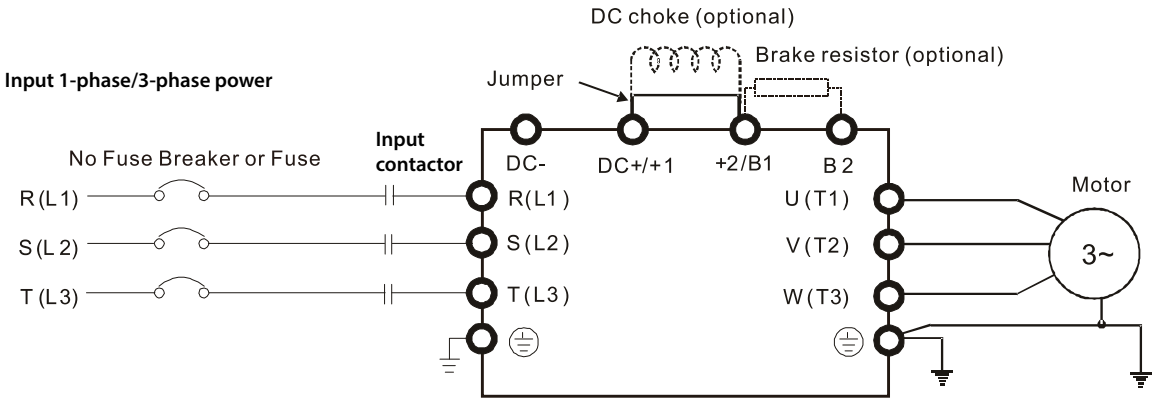
Control Circuit Terminal Names and Definitions

Control Circuit Terminals (continued)		
Terminal Symbol	***Terminal Function***	***Description***
AO1	Multi-function analog voltage output 	AO1 outputs an analog voltage signal based on P03.20. • Range: 0–10 V (P03.21=0) corresponds to the maximum operating range of the control target • Max. output current: 2 mA • Max. Load: 5 kΩ • AO1 resolution=12 bits
ACM	Analog Signal Common	Analog signal common terminal
PE	RS485	The PE terminal is for shielded cable to ground to decrease interference when you use RS485 communication.
RJ45	PIN 1, 2, 6: Reserved	The RJ45 port provides a serial communications connection. Max Baud Rate = 38.4kbps
	PIN 3, 7: SGND	
	PIN 4: SG-	
	PIN 5: SG+	
	PIN 8: +10V supply GS4-KPD (provides (optional) power supply)	

DURAPULSE GS10 AC Drives – Basic Wiring Diagram

Main Circuit Wiring Diagram: GS10 All Models

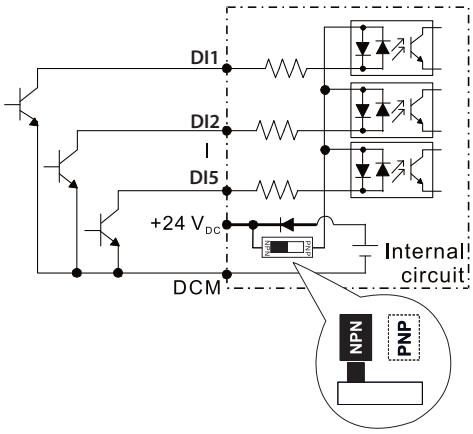
Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to GS10 User Manual for additional specific wiring information.)
Note: DC reactors (chokes) are specified but not stocked by AutomationDirect.
Note: DC- and DC+/+1 terminals not provided on 120V models.



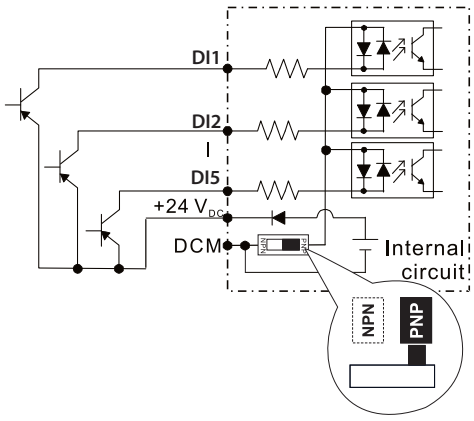
Control Circuit Wiring Diagram: Digital Inputs - Internal Power

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_{DC})



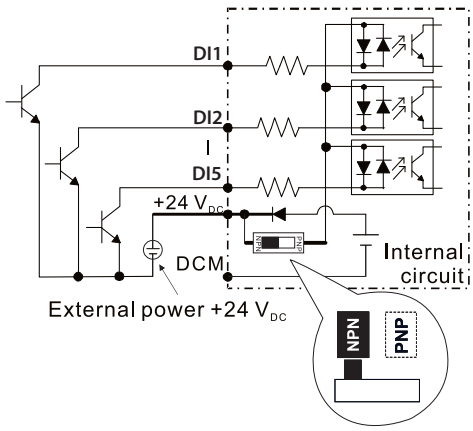
② Source Mode
with internal power (+24 V_{DC})



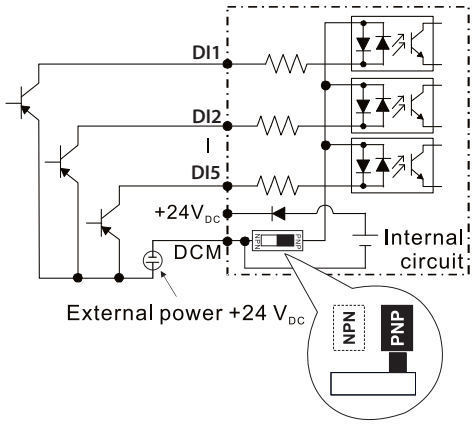
Control Circuit Wiring Diagram: Digital Inputs - External Power

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



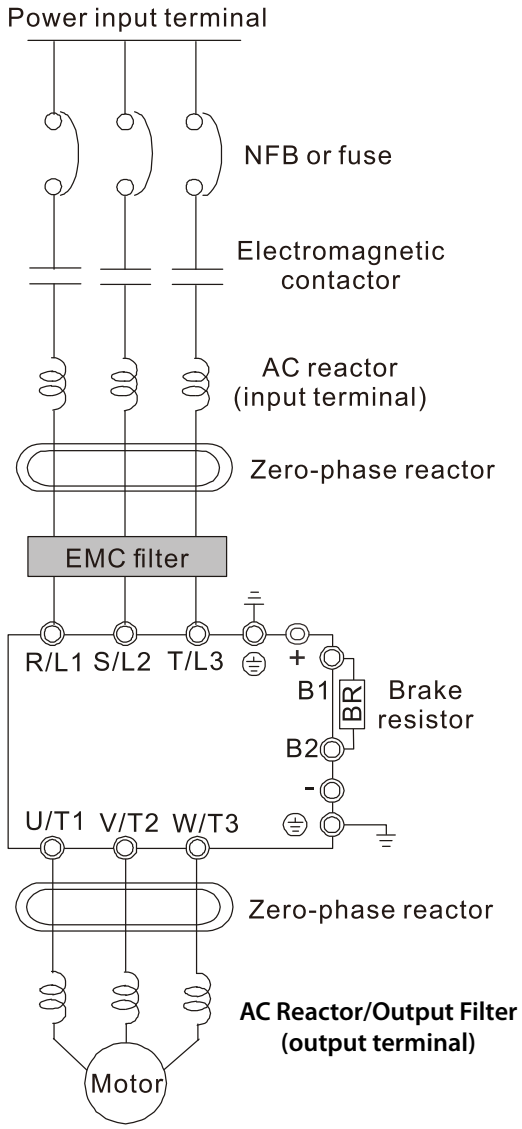
④ Source Mode
with external power



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.)

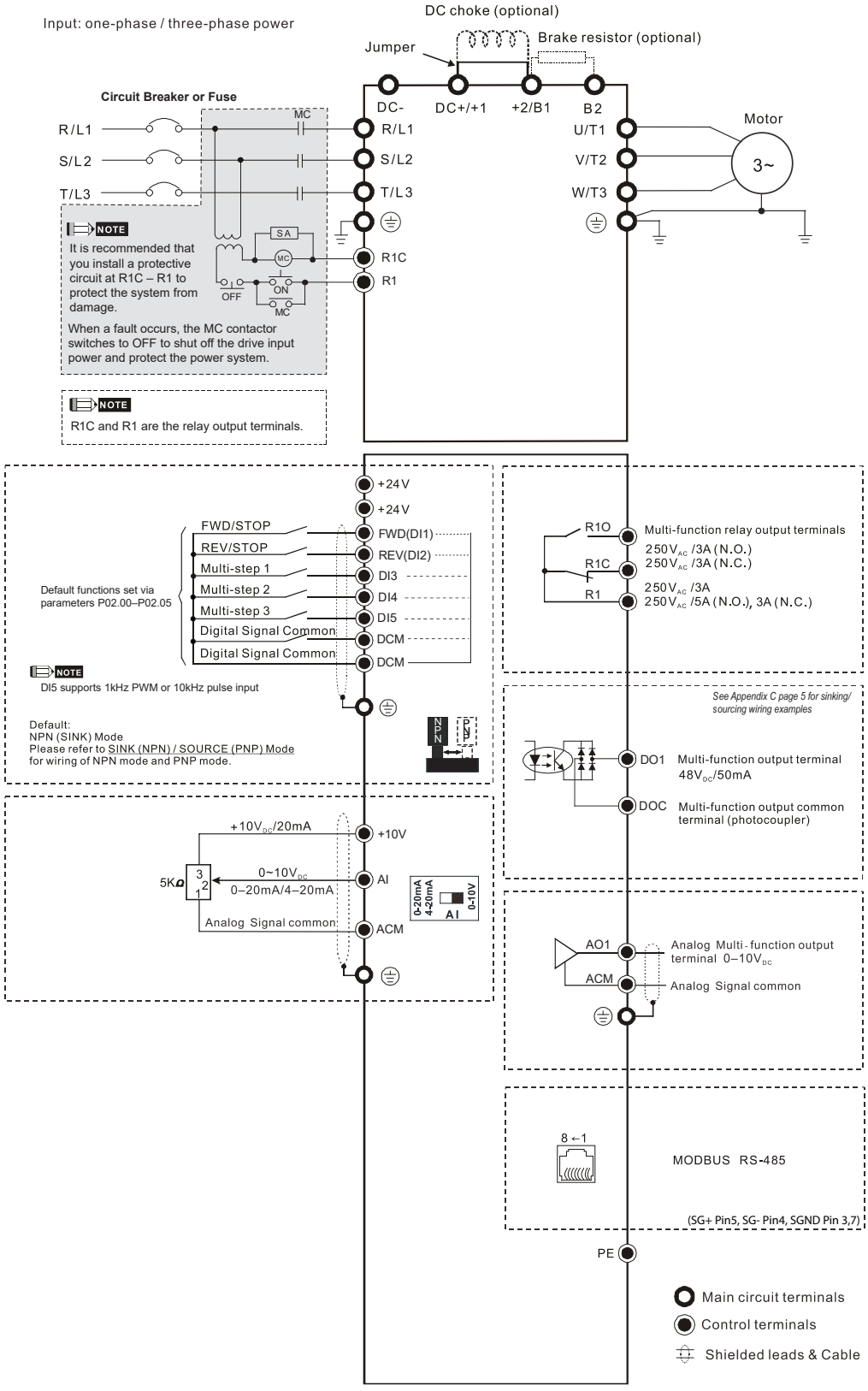


System Wiring Components	
Component	***Function***
Power input terminal	Supply power according to the rated power specifications indicated in the manual
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB (Non Fuse Breaker or Circuit Breaker) or Fuse.
Electromagnetic 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.

GS10 AC Drives Available Software and Accessories			
Accessory	***GS10 Accessory***	***GS20 Accessory used by GS10***	***Reference***
GSoft 2 Drive Software	✓		"GSoft2 Drive Configuration Software" on page tGSX-103
Braking Resistors	✓		"GS10/GS20 Braking Resistors" on page tGSX-64
Capacitive Filter		✓	"Capacitive Filter" on page tGSX-79
Conduit Boxes	✓		"GS10 Conduit Boxes" on page tGSX-66
DIN Rail Mounting (A–C frame only)		✓	"DIN Rail Mounting" on page tGSX-85
EMC Filter	✓		"GS10 Standard Footprint EMC Filter and Zero Phase Reactor" on page tGSX-69
EMC Shield Plates		✓	"EMC Shield Plate" on page tGSX-79
EMI Filters	✓		"GS10/GS20 High Performance EMI Input Filters" on page tGSX-73
Fuses/Circuit Breakers	✓		"GS10 Fuses/Circuit Breakers" on page tGSX-75
Line/Load Reactor/Voltage Time Filter	✓		"GS10 Line Reactors/Voltage Time Filters" on page tGSX-82
Mounting Adapter Plate (A–C frame only)		✓	"Mounting Adapter Plate" on page tGSX-86
Optional Advanced Keypad		✓	"Advanced Keypad" on page tGSX-105
Replacement Fan Kit		✓	"Cooling Fans for GSxx Series Drives (Spare/Replacement)" on page tGSX-87
RF Filter	✓		"RF Filter" on page tGSX-88

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 *DURA*PULSE 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.

*DURA*PULSE 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.

*DURA*PULSE 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

Determine Motor Voltage and Full-Load Amperage (FLA)

Motor voltage and FLA are located on the nameplate of the motor.
NOTE: FLA of motors that have been rewound may be higher than stated.

Determine Motor Overload Requirements

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.
NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.

Determine Application Type: Constant Torque or Variable Torque

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.

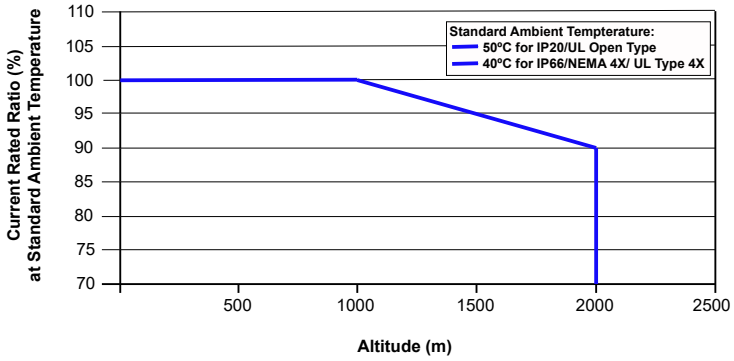
Installation Altitude

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.
NOTE: For use above 1000m, the AC drive must be derated as described below.

Derate Output Current Based on Altitude Above 1000 Meters

- If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.
- 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.
- Maximum altitude for Corner Grounded is 2000m. If installation at an altitude higher than 2000m is required, please contact AutomationDirect.

Derating for Altitude



DURAPULSE GS20(X) AC Drives – Selection

Selecting the Proper Drive Rating, continued

Determine Maximum Enclosure Internal Temperature

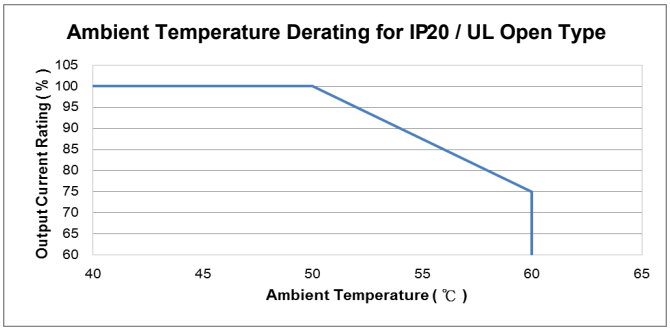
AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS20(X) drive, even when the ambient temperature is less than 104°F (40°C). Enclosure ventilation and/or cooling may be required to reduce maximum internal temperature to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

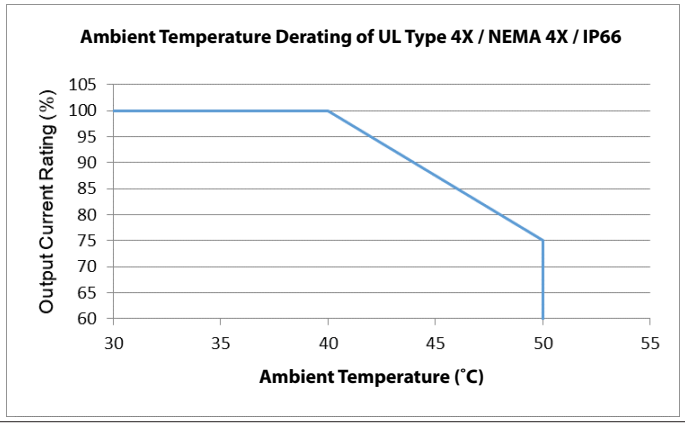
Derate Output Current Based on Temperature Above 104°F (40°C) or 122°F (50°C)

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 "Environmental Conditions for GS20 AC Drives" on page tGSX-30 and "Environmental Conditions for GS20X AC Drives" on page tGSX-30.*





DURAPULSE GS20(X) AC Drives – Selection

Selecting the Proper Drive Rating, continued

Derate Output Current Based on Carrier Frequency (if necessary)

Carrier Frequency Effects

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.

Benefits of Higher Carrier Frequencies:

- Better efficiency (lower harmonic losses) in the motor
- Lower audible noise

Benefits of Lower Carrier Frequencies:

- Better efficiency in the drive
- Lower EMI (electrical noise)
- Reduced reflective wave peak voltage

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 (>20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy duty applications typically run around 2–4 kHz.

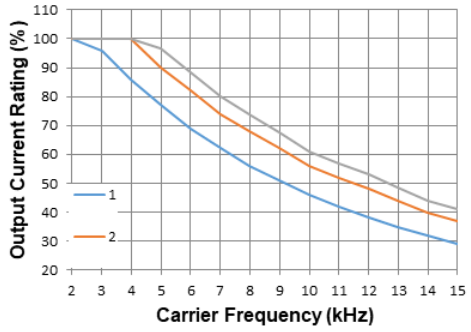
Derating Tables

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.
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%

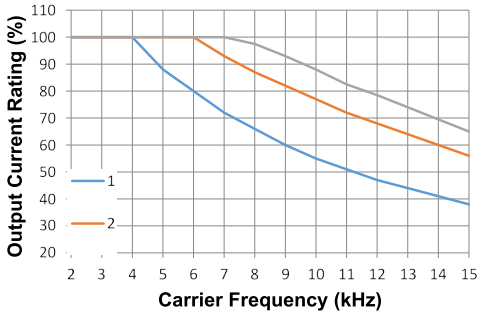
Set PWM mode via P11.41.
SVPWM = Space Vector Pulse Width Modulation mode
DPWM = Two Phase Pulse Width Modulation mode

Variable Torque Carrier Frequency Derating

SVPWM Mode

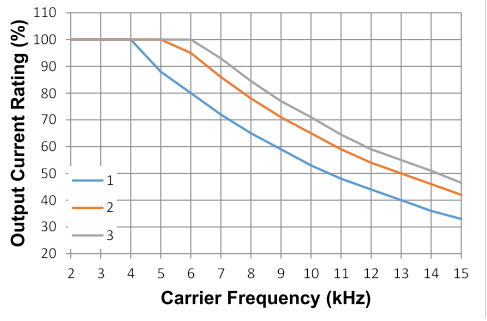


DPWM Mode

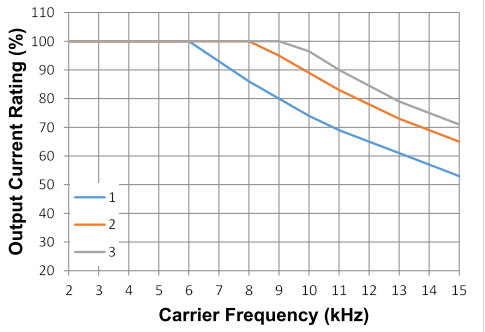


Constant Torque Carrier Frequency Derating

SVPWM Mode



DPWM Mode



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

DURApulse GS20 AC Drives – Selection Specifications

GS20 Drive Model Selection Tables

GS20 120V[1,4] 1-Phase Specifications – Frame Sizes A, C

Model Name				GS21-10P2	GS21-10P5	GS21-11P0
Price				$04chp:	$04chq:	$04chs:
Frame Size				A	A	C
Drawing				PDF	PDF	PDF
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	1.8
		Rated Output Current	A	1.6	2.5	4.8
		Carrier Frequency[3]	kHz	2–15 (default 4)		
	VT	Rated Output Capacity	kVA	0.7	1	2.1
		Rated Output Current	A	1.8	2.7	5.5
		Carrier Frequency[3]	kHz	2–15 (default 4)		
Input Rating[2]	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				4.9%	3.5%	3.0%
Weight (kg [lb])				0.65 [1.43]	0.74 [1.63]	1.24 [2.73]
Cooling Method				Convective		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-76) 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[1] 1-Phase Specifications – Frame Sizes A, B, C

Model Name				GS21-20P2	GS21-20P5	GS21-21P0	GS21-22P0	GS21-23P0
Price				$;04cht:	$04chu:	$-04chj:	$04chk:	$-04chl:
Frame Size				A	A	B	C	C
Drawing				PDF	PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)				
Input Rating[2]	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				5.2%	3.4%	2.9%	2.6%	2.4%
Weight (kg [lb])				0.65 [1.43]	0.76 [1.68]	0.95 [2.09]	1.24 [2.73]	1.24 [2.73]
Cooling Method				Convective			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-76) 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[1] 3-Phase Specifications – Frame Sizes A, B, C

Model Name				GS23-20P2	GS23-20P5	GS23-21P0	GS23-22P0	GS23-23P0
Price				$04chn:	$04cho:	$04chv:	$04chx:	$04chy:
Frame Size				A	A	A	B	C
Drawing				PDF	PDF	PDF	PDF	PDF
Output Rating	Max Motor Output (3-phase [1-phase])[4]		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[3]	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[3]	kHz	2–15 (default 4)				
Input Rating[2]	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[1] 3-Phase Specifications – Frame Sizes C, D, E, F

Model Name				GS23-25P0	GS23-27P5	GS23-2010	GS23-2015	GS23-2020
Price				$04chz:	$;04ch]:	$;04ch[:	$04ch_:	$04ch#:
Frame Size				C	D	E	E	F
Drawing				PDF	PDF	PDF	PDF	PDF
Output Rating	Max Motor Output (3-phase [1-phase])[4]		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[3]	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[3]	kHz	2–15 (default 4)				
Input Rating[2]	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-76) 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[1] 3-Phase Specifications – Frame Sizes A, B, C								
Model Name				GS23-40P5	GS23-41P0	GS23-42P0	GS23-43P0	GS23-45P0
Price				$;04ch!:	$04ch?:	$;04ch,:	$-04ci0:	$-04ci1:
Frame Size				A	A	B	C	C
Drawing				PDF	PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)				
Input Rating[2]	CT	Rated Input Current	A	1.7	3	5.8	6.1	9.9
	VT	Rated Input Current	A	2	3.3	6.4	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				

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-76) 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".

GS20 460V[1] 3-Phase Specifications – Frame Sizes D, E, F									
Model Name				GS23-47P5	GS23-4010	GS23-4015	GS23-4020	GS23-4025	GS23-4030
Price				$-04ci2:	$-04ci3:	$-04ci4:	$-04ci5:	$;-004ci6:	$;-004ci7:
Frame Size				D	D	E	E	F	F
Drawing				PDF	PDF	PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)					
Input Rating[2]	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					

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-76) 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 575V[1] 3-Phase Specifications – Frame Sizes A, B, C, D									
Model Name				GS23-51P0	GS23-52P0	GS23-53P0	GS23-55P0	GS23-57P5	GS23-5010
Price				$-04ci8:	$-04ci9:	$-04cia:	$-04cib:	$-04cic:	$-04cid:
Frame Size				A	B	C	C	D	D
Drawing				PDF	PDF	PDF	PDF	PDF	PDF
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[3]	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[3]	kHz	2–15 (default 4)					
Input Rating[2]	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					

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-76) 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 GS20X AC Drives – Selection Specifications

GS20X Drive Model Selection Tables

GS20X 230V[1] 1-Phase Specifications – Frame Sizes A, B							
Model Name				GS21X-20P5	GS21X-21P0	GS21X-22P0	GS21X-23P0
Price				$-04cie:	$;-04cif:	$-04cig:	$-04cih:
Frame Size				A	A	A	B
Drawing				PDF	PDF	PDF	PDF
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[3]	**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[3]	**kHz**	2–15 (default 4)			
Input Rating[2]	**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			

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-76) 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 GS20X AC Drives – Selection Specifications

GS20X Drive Model Selection Tables, continued

GS20X 230V[1] 3-Phase Specifications – Frame Sizes A, B, C									
Model Name				GS23X-20P5	GS23X-21P0	GS23X-22P0	GS23X-23P0	GS23X-25P0	GS23X-27P5
Price				$--04cii:	$--04cij:	$-04cik:	$--04cil:	$-04cin:	$-04cio:
Frame Size				A	A	A	B	B	C
Drawing				PDF	PDF	PDF	PDF	PDF	PDF
Output Rating	Max Motor Output (3-phase [1-phase])[4]		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[3]	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[3]	kHz	2–15 (default 4)					
Input Rating[2]	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					

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-76) 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(X) AC Drives – Selection Specifications

GS20X Drive Model Selection Tables, continued

GS20X 460V[1] 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				$-04cip:	$-04ciq:	$-04cis:	$;-04cit:	$-04ciu:	$-04civ:	$-04cix:
Frame Size				A	A	A	A	B	C	C
Drawing				PDF	PDF	PDF	PDF	PDF	PDF	PDF
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[3]	**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[3]	**kHz**	2–15 (default 4)						
Input Rating[2]	**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						

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-76) 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(X) AC Drives – General Specifications

GS20(X) Drive Model Selection Tables, continued

GS20(X) General Specifications (Applicable to All Models)				
Control Characteristics	Control Method		V/F, Sensorless Vector (SVC), Field Oriented Control (FOC) Sensorless, Volt/Frequency with Pulse Generator intput (VFPG), Torque (TQC Sensorless)	
	Applicable Motor		3-phase AC Induction Motor, 3-phase Permanent Magnet AC motor	
	Starting Torque[1]		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)
	Torque Accuracy		± 15% TQC Sensorless	
	Torque Limits	120/230/460V	VT: 160% of output current, max CT: 180% of output current, max	
		575V	200% of output current, max	
	Speed Control Range[1]		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)	
	Max. Output Frequency		0.00–599.00 Hz	
	Overload Capacity		VT: rated output current of 120% 60 sec, 150% 3 sec. CT: rated output current of 150% 60 sec, 200% 3 sec.	
	Frequency Setting Signal		0–10 V / -10–10 V 4–20 mA / 0–10 V 1 channel pulse input (33kHz), 1 channel pulse output (33kHz)	
	Digital Inputs		Seven (7) - 24VDC NPN or PNP, includes 1 pulse train frequency input 33kHz	
	Digital Outputs		Three (3) - (2)-48VDC, (1) Relay-250VAC/30VDC	
	Analog Inputs		Two (2) - (1) voltage, (1) selectable Voltage or Current	
	Analog Outputs		One (1) - selectable voltage or current	
	Frequency Output		One (1) - 30VDC, 33kHz	
	Safe Torque Off		STO1 and STO2 inputs- 24VDC	
	Main Functions		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.	
	Application Macro		Built-in application parameter groups (selected by industry) and user-defined application parameter groups.	
Protection Characteristics	Motor Protection		Over-current, over-voltage, over-heating, phase loss.	
	Stall Prevention		Stall prevention during acceleration, deceleration, and running (independent settings).	
Accessory	Communication Card		GS20A-CM-ENETIP (EtherNet/IP and Modbus TCP)	
	External DC Power Supply		GS20A-BPS (24V power backup supply card)	
Agency Approvals			*UL, CE[2], 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: https://support.automationdirect.com/docs/GS20A-GS20AX-CE.pdf

DURAPULSE GS20(X) AC Drives – Environmental Specifications

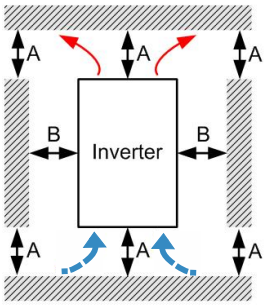
GS20(X) Environmental Specifications

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	
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^2 every year.			

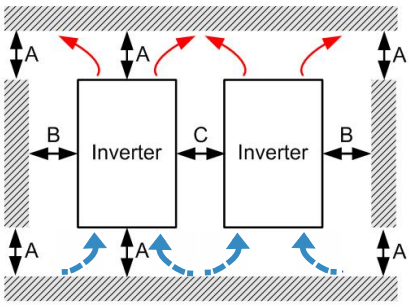
Environmental Conditions for GS20X AC Drives			
Condition	Operation	Storage	Transportation
Installation Location	PCB design is compliant with IEC 60364-1 / IEC 60664-1 Pollution Degree 2. The outer case meets IP66 standard for indoor use. If the drive is for outdoor application, avoid direct sunlight.	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	
DO NOT expose the GS20X AC Drive to harsh environments such as direct contact with chemical substance and solvent, and exposure to direct sunlight.			

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

Minimum Clearances and Air Flow for GS20 Series Drives



Single Drive Installation



Side by Side Drive Installation

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.*

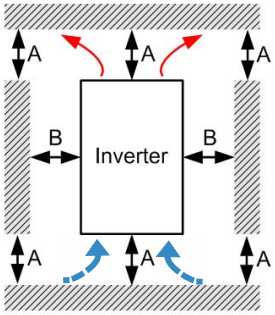
GS20 Airflow and Power Dissipation

Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m^3/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			29.1	20.1	49.2
GS21-22P0	C	16.0	27.2	29.1	23.9	53.0
GS21-23P0				70.0	35	105
GS23-2010	E	53.7	91.2	244.5	79.6	324.1
GS23-2015				374.2	86.2	460.4
GS23-2020	F	67.9	115.2	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				31.0	13.2	44.2
GS23-22P0	B	10.0	16.99	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			45.9	21.7	67.6
GS23-43P0	C	16.0	27.2	60.6	22.8	83.4
GS23-45P0				93.1	42	135.1
GS23-47P5	D	23.4	39.7	132.8	39.5	172.3
GS23-5010				108.4	51	159.4
GS23-51P0	A	0.0	0.0	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



Single Drive Installation

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.*

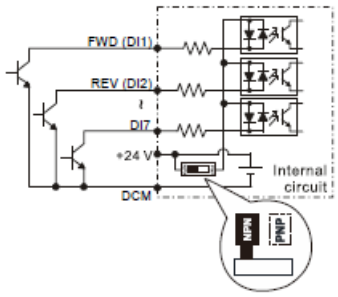
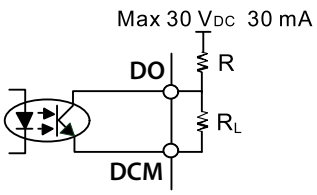
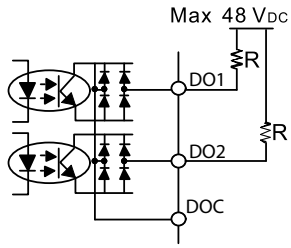
GS20X Airflow and Power Dissipation						
Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m^3/hr)	Loss External (Heat sink)	Internal	Total
GS21X-20P5	A	0.0	0.0	16.3	14.5	30.8
GS21X-21P0				29.1	20.1	49.2
GS23X-20P5				16.5	12.6	29.1
GS23X-21P0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

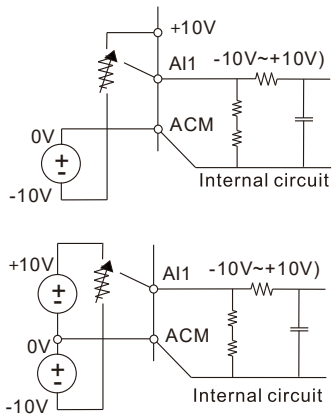
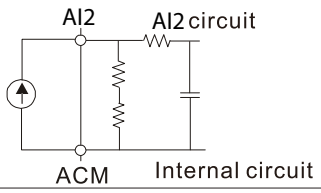
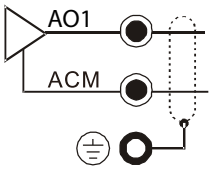
DURAPULSE GS20(X) AC Drives Specifications – Terminals

Control Circuit Terminal Names and Definitions

Control Circuit Terminals		
Terminal Symbol	***Terminal Function***	***Description***
+24V	Digital control signal common (Source)	+24V ± 10% 100mA
FWD (DI1) ***REV (DI2)*** ***DI3 - DI7***	Digital input 1–7 ① Sink Mode with internal power (+24 VDC)  See pg.tGSX-35 for sinking/sourcing wiring examples.	**Source Mode:** ON: activation current 3.3 mA ≥ 11VDC OFF: cut-off voltage ≤ 5VDC **Sink Mode:** 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 VFPG control mode.
DO	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 Resistive load ≥ 1kΩ, resistance determines the output voltage value. DO-DCM voltage = external voltage * (RL/ (RL+R))
DCM	Digital control / Frequency signal common (Sink)	
DO1	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. 
DO2	Digital Output 2 (photo coupler)	
DOC	Digital Output Common (photo coupler)	
R1O	Relay Output 1 (N.O.)	**Resistive Load** • 3.0 A (NO), 3.0 A (NC) @250VAC • 5.0 A (NO), 3.0 A (NC) @30VDC **Inductive Load (COS 0.4)** • 1.2 A (NO), 1.2 A (NC) @250VAC • 2.0 A (NO), 1.2 A (NC) @30VDC To output different kinds of monitoring signals such as motor drive in operation, frequency reached, and overload indication.
R1C	Relay Output 1 (N.C.)	
R1	Relay Output 1 Common	
+10V	Potentiometer power supply	Power supply for analog frequency setting: +10.5 ± 0.5 VDC / 20mA

DURAPULSE GS20(X) AC Drives Specifications – Terminals

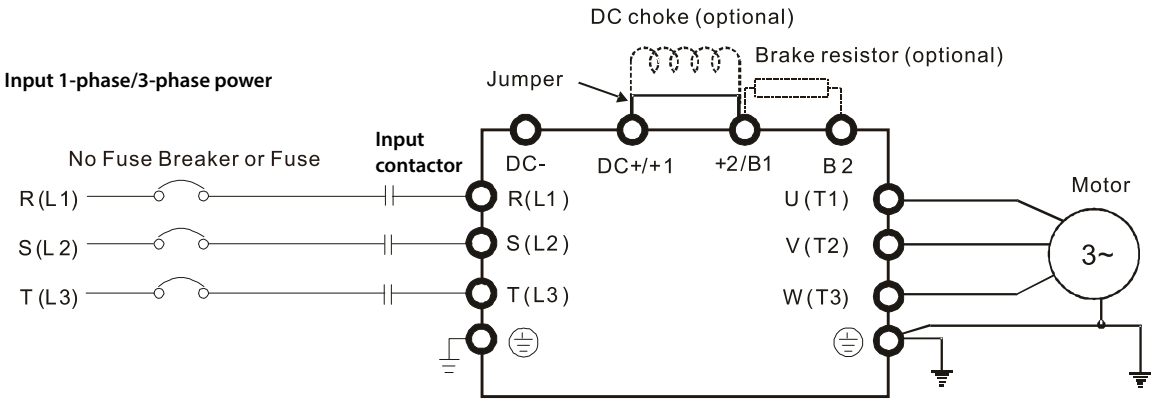
Control Circuit Terminal Names and Definitions

Control Circuit Terminals (continued)		
Terminal Symbol	***Terminal Function***	***Description***
AI1	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
AI2	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
AO1	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). **Voltage mode** Range: 0–10 V (P03.31=0) corresponds to the maximum operating range of the control target Max. output current: 2mA Max. Load: 5kΩ **Current mode** 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
ACM	Analog Signal Common	Analog signal common terminal
+24V (red)	STO 24V power terminal	
STO1, STO2 (red)	Default: STO1 / STO2 short-circuited to +24V Rated voltage: 24VDC ± 10 %; maximum voltage: 30VDC ±10 % Rated current: 6.67 mA ± 10 % **STO activation mode** 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) **STO cut-off mode** Input voltage level: 11VDC < STO1-SCM and STO2-SCM < 30VDC Power removal safety function per EN 954-1 and IEC / EN 61508 **Note:** Refer to Chapter 17 SAFE TORQUE OFF FUNCTION for details.	
SCM (red)	STO Common - Signal Terminal	
SG+ ***SG-*** ***SGND***	Modbus RS-485 **Note:** Refer to GS20(X) User Manual Chapter 4 Descriptions of Parameter Settings, Parameter Group 09: Communication Parameters for details.	
RJ45	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

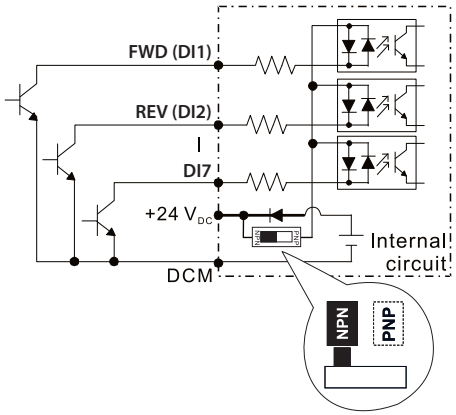
Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to GS20(X) User Manual for additional specific wiring information.)
Note: DC reactors (chokes) are specified but not stocked by AutomationDirect.
Note: DC- and DC+/+1 terminals are not available on 120V series drives.



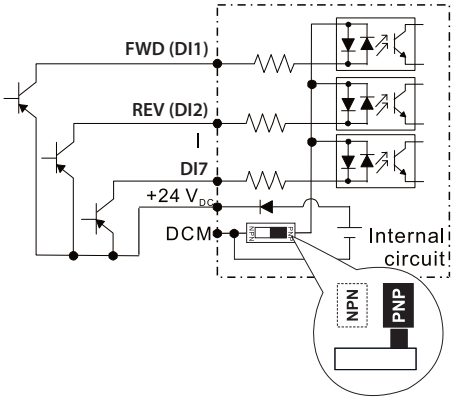
Control Circuit Wiring Diagram: Digital Inputs - Internal Power

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

① Sink Mode
with internal power (+24 V_{DC})



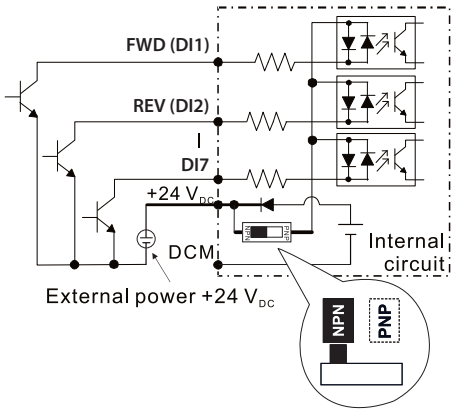
② Source Mode
with internal power (+24 V_{DC})



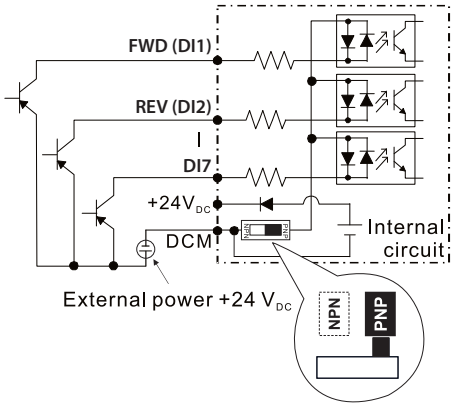
Control Circuit Wiring Diagram: Digital Inputs - External Power

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

③ Sink Mode
with external power



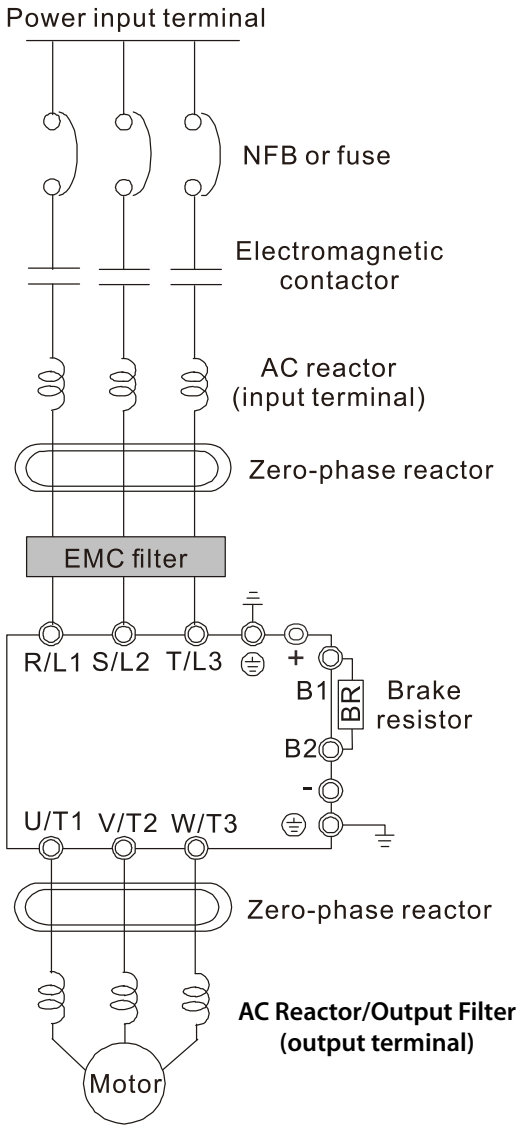
④ Source Mode
with external power



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.)

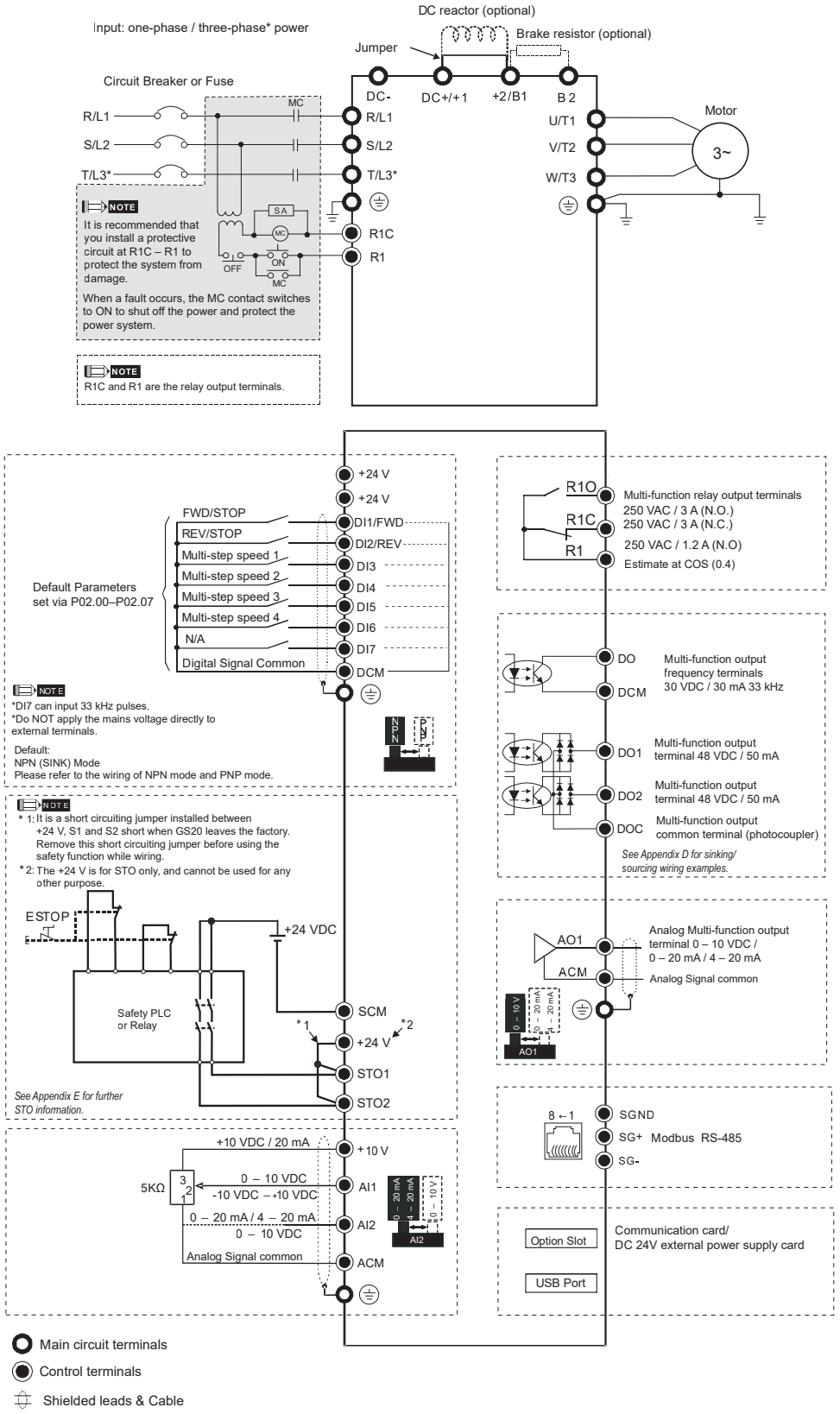


System Wiring Components	
Component	***Function***
Power input terminal	Supply power according to the rated power specifications indicated in the manual
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB or Fuse.
Electromagnetic contactor	Switching the power ON/OFF 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.

GS20(X) AC Drives Available Software and Accessories			
Accessory	***GS20 Series Drives***	***GS20X Series Drives***	***Reference***
GSoft 2 Drive Software	✓	✓	"GSoft2 Drive Configuration Software" on page tGSX-103
GSLogic PLC Software	✓	✓	"GSLOGIC Drive Configuration Software" on page tGSX-104
Backup Power Supply	✓	✓	"GS20A-BPS" on page tGSX-59
Braking Resistors	✓	✓	"GS10/GS20 Braking Resistors" on page tGSX-64
Capacitive Filter	✓	✓	"Capacitive Filter" on page tGSX-79
Communication Module	✓	✓	"GS20A-CM-ENETIP" on page tGSX-59
Conduit Boxes	✓		"GS20 Conduit Boxes" on page tGSX-67
DIN Rail Mounting (A–C frame only)	✓		"DIN Rail Mounting" on page tGSX-85
Disconnect Switch		✓	"GS20(X) Disconnect Switch" on page tGSX-78
Earthing Plates		✓	"GS20X Earthing Plate" on page tGSX-78
EMC Filter	✓	✓	"GS10/GS20 High Performance EMI Input Filters" on page tGSX-73
EMC Shield Plates	✓		"EMC Shield Plate" on page tGSX-79
EMI Filters	✓	✓	"GS10/GS20 High Performance EMI Input Filters" on page tGSX-73
Fuses/Circuit Breakers	✓	✓	"GS20X Fuses/Circuit Breakers" on page tGSX-76
Keypad Extension Cables	✓		"GS20 Keypad Extension Cables" on page tGSX-80
Line/Load Reactor/Voltage Time Filter	✓	✓	"GS20(X) Line Reactors/Voltage Time Filters" on page tGSX-83
Mounting Adapter Plate (A–C frame only)	✓		"Mounting Adapter Plate" on page tGSX-86
Optional Advanced Keypad	✓	✓	"Advanced Keypad" on page tGSX-105
Replacement Fan Kit	✓	✓	"Cooling Fans for GSxx Series Drives (Spare/Replacement)" on page tGSX-87
Replacement Keypad	✓		"GS20(X) Replacement Keypad" on page tGSX-80
RF Filter	✓	✓	"RF Filter" on page tGSX-88

*DURA*PULSE GS30 AC Drives – Introduction

*DURA*PULSE GS30 AC Drives																	
Motor Rating	*HP*	*1/2*	*1*	*2*	*3*	*5*	*7.5*	*10*	*15*	*20*	*25*	*30*	*40*	*50*	*60*	*75*	*100*
	kW	*0.4*	*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		✓	✓	✓	✓												
230V Three-phase		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
460V Three-phase		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓ = GS30 model available																	

Overview

The DURAPulse GS30 high performance flux-vector drives provide advanced drive functionality—all in a compact unit that has been reduced 40% in size compared to its predecessor.

These new drives include the same standard features as our GS family of drives: dynamic braking, built-in PID control, removable keypad, and RS-485 Modbus communication.

The GS30 drive expands the DURApulse family by adding internal tension control loop expanded parameter sets for greater versatility. Optional EtherCAT® and single- or dual-port EtherNet/IP communication cards. Support for up to four (4) independent IM motor parameter sets or control of a single AC PM motor.

*DURA*pulse GS30 AC drives offer several control modes for induction or permanent magnet AC motors. Standard V/Hz and sensorless vector (SVC) modes provide quick setup and control. Field Oriented Vector control (FOC) provides high precision open loop control. For full closed loop vector control, FOCPG provides 1:1000 precision. Torque control mode, with open or closed loop control, is also available.

*DURA*PULSE GS30 offers two analog inputs, one analog 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. Two option card slots are available on all models so you can add additional I/O AND a communication card or backup power supply. This provides greater flexibility to equip the new GS30 to your specific needs.

Features

- Broad offering from 1/2 to 100 hp
- Single-phase 230VAC up to 3HP
- Three-phase 230VAC up to 50hp and 460VAC up to 100hp
- Dual rating design – CT/VT Ratings
- "Zero Stack" side-by-side zero gap installation
- Compact Design
- Advanced LCD keypad with parameter descriptions
- Spring clamp terminal blocks
- Quick setting wheel dial for quick speed changes and parameter scrolling
- Flexible carrier frequency to 15khz and output frequency to 599.0 Hz
- STO – Safe Torque Off (TÜV Certified)
- Built-in PLC to support up to 5K steps
- Built-in USB port for fast & easy programming
- Free downloadable software for drive configuration and PLC programming
- Field-upgradable firmware (drive & communication option cards)
- Local/Remote control mode selection or digital/comm input with Hand/Off/Auto control
- Display custom values/units on keypad
- Momentary power loss restarts
- 100kA Short Circuit Current Rating (Frames A-F)
- DC Bus Connection Terminals
- Analog I/O – configurable 2 Inputs and 1 Output
- Multi-Motor Control (4 total)
- Built-in Dynamic Braking (up to 30hp@230VAC, 40hp@460VAC) – optional resistors
- PID Controller – including sleep and wake
- Password protection
- RTD and/or PTC input motor protection
- Modularized design eases maintenance and expansion, including quick replacement of cooling fan
- High speed communication interfaces with MODBUS RTU built in, plus optional cards with additional interface types
- 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, TÜV, UL, cUL approvals

Option Cards

- Ethernet communication interface – single or dual port cards supports both EtherNet/IP and ModbusTCP
- EtherCAT communication interface
- Encoder interface - open collector or line driver
- Extension I/O - discrete, relay, and analog
- Backup I/O power supply

Accessories

- AC line reactors
- dV/dT output filters
- EMI filters
- RF filter
- Braking resistors
- Fuses
- NEMA 1 Conduit boxes
- DIN rail mounting kits for drives up to 5hp
- Replacement cooling fans
- Replacement keypad
- Optional advanced LCD keypad (and remote-mount bezel kit)
- GSoft2 drive configuration software
- GSLogic PLC programming software
- Type A to B USB cable
- Detailed descriptions and specifications for GS30 accessories are available in the "GS/ DURApulse Accessories" section.

Typical Applications

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

Selecting the Proper Drive Rating

Selecting the Proper Drive Rating

Determine Motor Voltage and Full-Load Amperage (FLA)

Motor voltage and FLA are located on the nameplate of the motor.
NOTE: FLA of motors that have been rewound may be higher than stated.

Determine Motor Overload Requirements

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.
NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.

Determine Application Type: Constant Torque or Variable Torque

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.

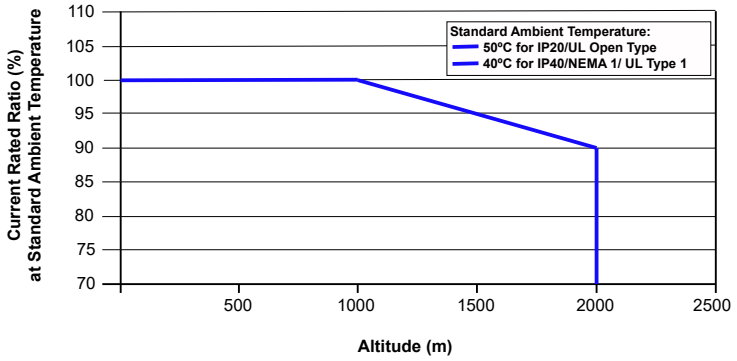
Installation Altitude

AC drives rely on air flow for cooling. As altitude increases, air becomes less dense. This decrease in air density derates the cooling properties of ambient air. Therefore, the AC drive must be oversized to compensate for the decrease in cooling. GS30 drives are designed to operate at 100% capacity at altitudes up to 1000 meters.
NOTE: For use above 1000m, the AC drive must be derated as described below.

Derate Output Current Based on Altitude Above 1000 Meters

- If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.
- 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.
- Maximum altitude for Corner Grounded is 2000m. If installation at an altitude higher than 2000m is required, please contact AutomationDirect.

Derating for Altitude



DURAPULSE GS30 AC Drives – Selection

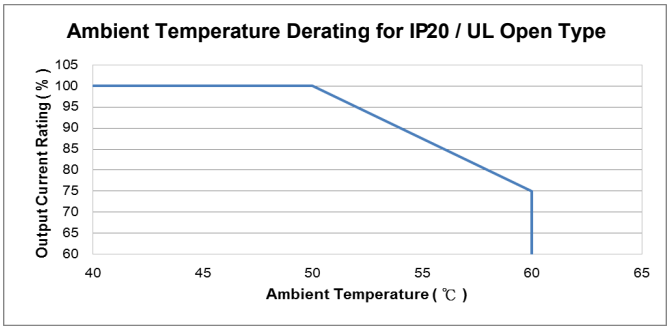
Selecting the Proper Drive Rating, *continued*

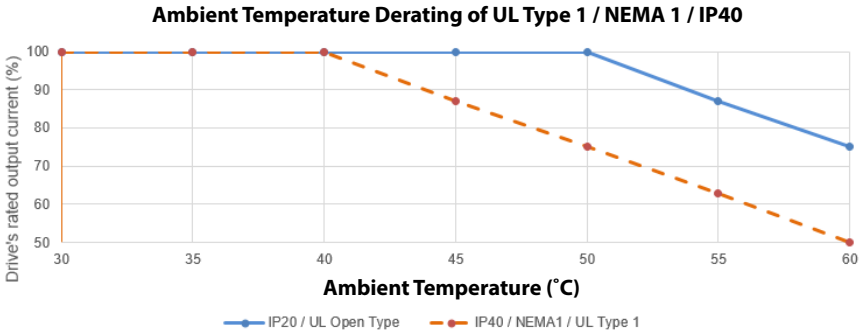
Determine Maximum Enclosure Internal Temperature

AC drives generate a significant amount of heat and can cause the internal temperature of an enclosure to exceed the rating of the GS30 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 GS30 drive is operating at rated current, the ambient temperature has to be between -20°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 1 / NEMA 1 / IP40*	When the GS30 drive is operating at rated current, the ambient temperature has to be between -20°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 "Environmental Conditions for GS30 AC Drives" on page tGSX-49.*	





DURAPULSE GS30 AC Drives – Selection

Selecting the Proper Drive Rating, *continued*

Derate Output Current Based on Carrier Frequency (if necessary)

Carrier Frequency Effects

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 GS30 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.

Benefits of Higher Carrier Frequencies:

- Better efficiency (lower harmonic losses) in the motor
- Lower audible noise

Benefits of Lower Carrier Frequencies:

- Better efficiency in the drive
- Lower EMI (electrical noise)
- Reduced reflective wave peak voltage

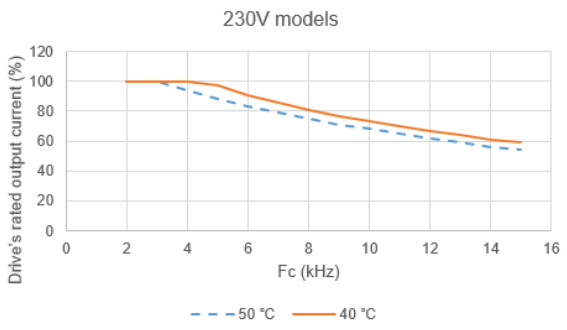
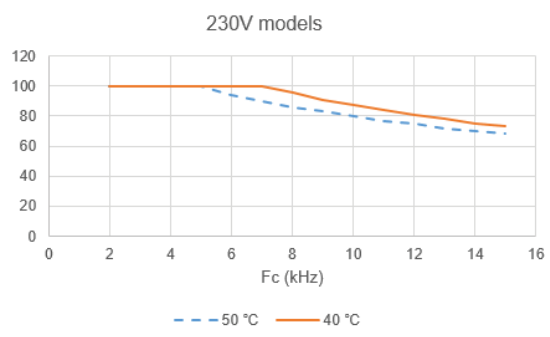
As a general rule, the Carrier Frequency should be set as low as possible without creating unacceptable audible noise in the motor. Smaller systems can have higher Carrier Frequencies, but larger drives (>20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy duty applications typically run around 2–4 kHz.

Derating Tables

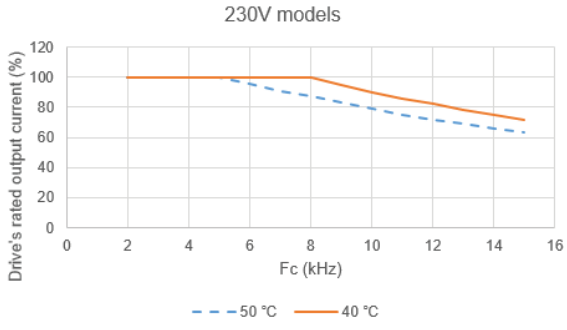
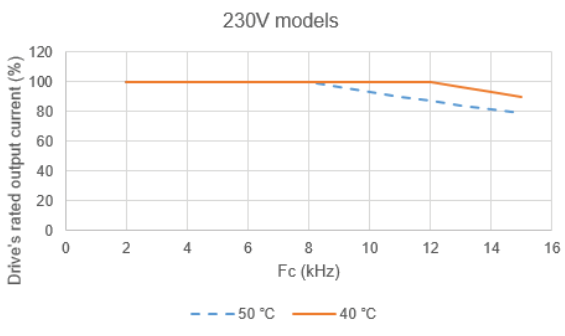
The tables below show the derating curves for 230V GS30 drives running in two different modes under variable torque and constant torque conditions.
Line 1: Ta = 50°C / Load = 100%
Line 2: Ta = 50°C / Load = 75% or Ta = 40°C / Load = 100%
Line 3: Ta = 50°C / Load = 50% or Ta = 35°C / Load = 100%

Set PWM mode via P11.41.
SVPWM = Space Vector Pulse Width Modulation mode
DPWM = Two Phase Pulse Width Modulation mode

230V Drive Variable Torque Carrier Frequency Derating

SVPWM Mode	*DPWM Mode*
	

230V Drive Constant Torque Carrier Frequency Derating

SVPWM Mode	*DPWM Mode*
	

DURAPULSE GS30 AC Drives – Selection

Selecting the Proper Drive Rating, *continued*

Derate Output Current Based on Carrier Frequency (if necessary)

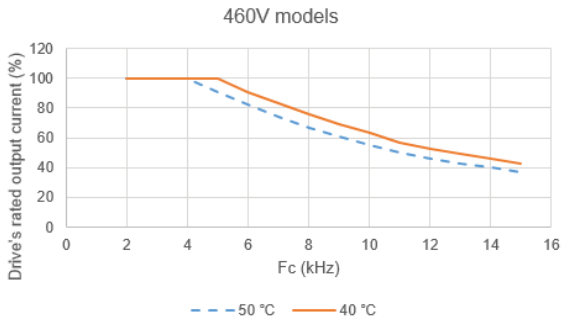
Derating Tables, continued

The tables below show the derating curves for 460V GS30 drives running in two different modes under variable torque and constant torque conditions.
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%

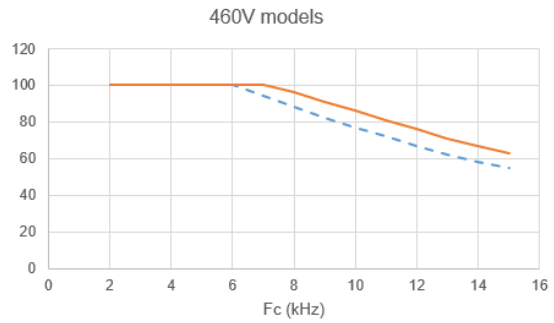
Set PWM mode via P11.41.
SVPWM = Space Vector Pulse Width Modulation mode
DPWM = Two Phase Pulse Width Modulation mode

460V Drive Variable Torque Carrier Frequency Derating

SVPWM Mode

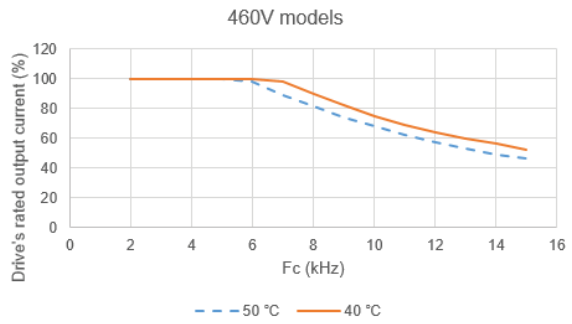


DPWM Mode

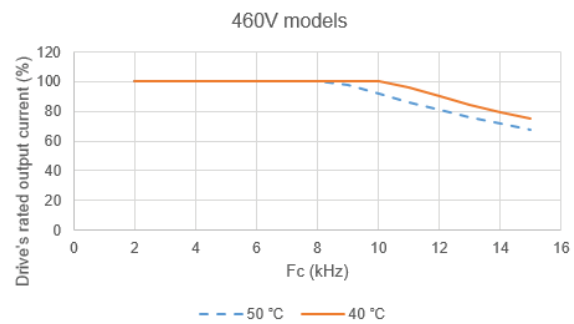


460V Drive Constant Torque Carrier Frequency Derating

SVPWM Mode



DPWM Mode



DURApulse GS30 AC Drives – Selection Specifications

GS30 Drive Model Selection Tables

GS30 230V[1] 1-Phase Specifications – Frame Sizes A, B, C							
Model Name				GS31-20P5	GS31-21P0	GS31-22P0	GS31-23P0
Price				$05_zg:	$05_zh:	$-05_zi:	$-05_zj:
Frame Size				A	B	C	C
Drawing				PDF	PDF	PDF	PDF
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	1.9	2.9	4.2
		Rated Output Current	A	2.8	5.0	7.5	11
		Carrier Frequency[3]	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	1.2	2.0	3.2	4.8
		Rated Output Current	A	3.2	5.2	8.5	12.5
		Carrier Frequency[3]	kHz	2–15 (default 4)			
Input Rating[2]	CT	Rated Input Current	A	7.3	11.2	16.5	24.2
	VT	Rated Input Current	A	8.3	11.7	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				3.5	2.8	2.7	2.5
SCCR Rating				100kA			
Weight (kg [lb])				0.76 [1.7]	0.81 [1.8]	1.05 [2.3]	1.24 [2.7]
Cooling Method				Convective		Fan	
IP Rating				IP20			
See table below for notes.							

GS30 230V[1] 3-Phase Specifications – Frame Sizes A, B, C								
Model Name				GS33-20P5	GS33-21P0	GS33-22P0	GS33-23P0	GS33-25P0
Price				$05_zk:	$-05_zl:	$05_zn:	$05_zo:	$05_zp:
Frame Size				A	A	B	C	C
Drawing				PDF	PDF	PDF	PDF	PDF
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	1.9	1.9	2.9	4.2	6.5
		Rated Output Current	A	5.0	5.0	7.5	11.0	17.0
		Carrier Frequency[3]	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	1.2	2.0	3.0	4.8	7.4
		Rated Output Current	A	3.2	5.2	8.0	12.5	19.5
		Carrier Frequency[3]	kHz	2–15 (default 4)				
Input Rating[2]	CT	Rated Input Current	A	3.4	6.0	9.0	13.2	20.4
	VT	Rated Input Current	A	3.8	6.2	9.6	15.0	23.4
	Rated Voltage/Frequency			3-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				3.5	3.0	2.6	2.5	2.3
SCCR Rating				100kA				
Weight (kg [lb])				0.76 [1.7]	0.81 [1.8]	1.05 [2.3]	1.24 [2.7]	1.24 [2.7]
Cooling Method				Convective		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 GS30 AC Drives User Manual, Chapter 2.
Please refer to "GS30 DURApulse Accessories – Fusing" (pg.tGSX-77) 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 GS30 AC Drives – Selection Specifications

GS30 Drive Model Selection Tables, *continued*

GS30 230V[1] 3-Phase Specifications – Frame Sizes D, E, F							
Model Name				GS33-27P5	GS33-2010	GS33-2015	GS33-2020
Price				$05_zq:	$05_zs:	$;05_zt:	$;005_zu:
Frame Size				D	E	E	F
Drawing				PDF	PDF	PDF	PDF
Output Rating	Max Motor Output		hp	7.5	10	15	20
			kW	5.5	7.5	11	15
	CT	Rated Output Capacity	kVA	9.5	12.6	18.7	24.8
		Rated Output Current	A	25.0	33.0	49.0	65.0
		Carrier Frequency[3]	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	10.3	13.7	19.4	26.3
		Rated Output Current	A	27.0	36.0	51.0	69.0
		Carrier Frequency[3]	kHz	2–15 (default 4)			
Input Rating[2]	CT	Rated Input Current	A	30.0	39.6	58.8	78.0
	VT	Rated Input Current	A	32.4	43.2	61.2	82.8
	Rated Voltage/Frequency			3-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	2.4	2.3	2.1
SCCR Rating				100kA			
Weight (kg [lb])				2.07 [4.6]	3.97 [8.8]	3.97 [8.8]	6.30 [13.9]
Cooling Method				Fan			
IP Rating				IP20			
See table below for notes.							

GS30 230V[1] 3-Phase Specifications – Frame Sizes G, I							
Model Name				GS33-2025	GS33-2030	GS33-2040	GS33-2050
Price				$;005_zv:	$;005_zx:	$;005_zy:	$;005_zz:
Frame Size				G	G	I	I
Drawing				PDF	PDF	PDF	PDF
Output Rating	Max Motor Output		hp	25	30	40	50
			kW	18.5	22	30	37
	CT	Rated Output Capacity	kVA	28.9	34.4	46.9	57.8
		Rated Output Current	A	75	90	120	146
		Carrier Frequency[3]	kHz	2–15 (default 4)			
	VT	Rated Output Capacity	kVA	31.6	37.6	51.3	63.3
		Rated Output Current	A	81	102	134	160
		Carrier Frequency[3]	kHz	2–15 (default 4)			
Input Rating[2]	CT	Rated Input Current	A	77	92	117	143
	VT	Rated Input Current	A	85	103	126	161
	Rated Voltage/Frequency			3-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				2.3	2.4	2.3	2.3
SCCR Rating				5kA			10kA
Weight (kg [lb])				11.8 [26.0]	11.8 [26.0]	29.1 [64.2]	30.4 [67.0]
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 GS30 AC Drives User Manual, Chapter 2.
Please refer to "GS30 DURApulse Accessories – Fusing" (pg.tGSX-77) 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 GS30 AC Drives – Selection Specifications

GS30 Drive Model Selection Tables, *continued*

GS30 460V[1] 3-Phase Specifications – Frame Sizes A, B, C								
Model Name				GS33-40P5	GS33-41P0	GS33-42P0	GS33-43P0	GS33-45P0
Price				$;05_z]:	$;05_z[:	$05_z_:	$05_z#:	$;05_z!:
Frame Size				A	A	B	C	C
Drawing				PDF	PDF	PDF	PDF	PDF
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	2.3	3.2	4.3	6.9
		Rated Output Current	A	1.5	3.0	4.2	5.7	9.0
		Carrier Frequency[3]	kHz	2–15 (default 4)				
	VT	Rated Output Capacity	kVA	1.4	2.5	3.5	5.0	8.0
		Rated Output Current	A	1.8	3.3	4.6	6.5	10.5
		Carrier Frequency[3]	kHz	2–15 (default 4)				
Input Rating[2]	CT	Rated Input Current	A	2.1	4.2	5.8	6.1	9.9
	VT	Rated Input Current	A	2.5	4.6	6.4	7.2	11.6
	Rated Voltage/Frequency			3-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				4.4	2.8	2.4	2.3	3.1
SCCR Rating				100kA				
Weight (kg [lb])				0.76 [1.7]	0.77 [1.7]	1.05 [2.3]	1.24 [2.7]	1.24 [2.7]
Cooling Method				Convective		Fan		
IP Rating				IP20				
See table below for notes.								

GS30 230V[1] 3-Phase Specifications – Frame Sizes D, E, F									
Model Name				GS33-47P5	GS33-4010	GS33-4015	GS33-4020	GS33-4025	GS33-4030
Price				$05_z?:	$;05_z,:	$;05_]0:	$;;005_]1:	$;;005_]2:	$;;005_]3:
Frame Size				D	D	E	E	F	F
Drawing				PDF	PDF	PDF	PDF	PDF	PDF
Output Rating	Max Motor Output		hp	7.5	10	15	20	25	30
			kW	5.5	.75	11	15	18.5	22
	CT	Rated Output Capacity	kVA	9.9	13.3	19.1	24.4	29	34.3
		Rated Output Current	A	13.0	17.5	25.0	32.0	38.0	45.0
		Carrier Frequency[3]	kHz	2–15 (default 4)					
	VT	Rated Output Capacity	kVA	11.1	15.1	21.3	27.4	31.6	37.3
		Rated Output Current	A	14.5	19.8	28.0	36.0	41.5	49.0
		Carrier Frequency[3]	kHz	2–15 (default 4)					
Input Rating[2]	CT	Rated Input Current	A	14.3	19.3	27.5	35.2	41.8	49.5
	VT	Rated Input Current	A	16.0	21.8	30.8	39.6	45.7	53.9
	Rated Voltage/Frequency			3-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	1.7	1.6	1.5	1.4
SCCR Rating				100kA					
Weight (kg [lb])				2.07 [4.6]	2.07 [4.6]	3.97 [8.8]	3.97 [8.8]	6.30 [13.9]	6.30 [13.9]
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 GS30 AC Drives User Manual, Chapter 2. Please refer to "GS30 DURApulse Accessories – Fusing" (pg.tGSX-77) 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 GS30 AC Drives – Selection Specifications

GS30 Drive Model Selection Tables, *continued*

GS30 460V[1] 3-Phase Specifications – Frame Sizes G, H, I								
Model Name				GS33-4040	GS33-4050	GS33-4060	GS33-4075	GS33-4100
Price				$;;005_]4:	$;;005_]5:	$;;005_]6:	$;;005_]7:	$;;005_]8:
Frame Size				G	H	H	I	I
Drawing				PDF	PDF	PDF	PDF	PDF
Output Rating	**Max Motor Output**		**hp**	40	50	60	75	100
			kW	30	37	45	55	75
	CT	**Rated Output Capacity**	**kVA**	46.9	57.8	70.3	85.9	117.2
		Rated Output Current	**A**	60	75	91	112	150
		Carrier Frequency[3]	**kHz**	2–15 (default 4)				
	VT	**Rated Output Capacity**	**kVA**	51.3	63.3	76.9	94	128.2
		Rated Output Current	**A**	69	85	108	128	180
		Carrier Frequency[3]	**kHz**	2–15 (default 4)				
Input Rating[2]	**CT**	**Rated Input Current**	**A**	63	66	80	110	147
	VT	**Rated Input Current**	**A**	72.5	77	97	123	173
	Rated Voltage/Frequency			3-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				1.4	2.0	1.8	1.7	1.7
SCCR Rating				5kA		10kA		
Weight (kg [lb])				11.7 [25.8]	25.1 [55.3]	28.6 [63.1]	32.6 [71.9]	36 [79.4]
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 GS30 AC Drives User Manual, Chapter 2.
Please refer to "GS30 DURApulse Accessories – Fusing" (pg.tGSX-77) 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 GS30 AC Drives – General Specifications

GS30 Drive Model Selection Tables, *continued*

GS30 General Specifications (Applicable to All Models)		
Control Characteristics	Control Method	See GS30 Motor Control table (below)
	Applicable Motor	IM (Induction Motor), PM motor control (IPM and SPM)
	Speed Control Range[1]	See GS30 Motor Control table (below)
	Torque Limits	VT: 160% of output current, max CT: 180% of output current, max
	Max. Output Frequency	0.00–599.00 Hz
	Overload Capacity	VT: rated output current of 120% 60 sec. every 5 minutes, 150% 3 sec. every 30 seconds CT: rated output current of 150% 60 sec. every 5 minutes, 200% 3 sec. every 30 seconds
	Frequency Setting Signal	0–10 V / -10–10 V 4–20 mA / 0–10 V 1 channel pulse input (33kHz), 1 channel pulse output (33kHz)
	Digital Inputs	Seven (7) - 24VDC NPN or PNP, includes 1 frequency input 33kHz
	Digital Outputs	Three (3) - (2)-48VDC, (1) Relay-250VAC/30VDC
	Analog Inputs	Two (2) - (1) voltage, (1) selectable Voltage or Current
	Analog Outputs	One (1) - selectable voltage or current
	Frequency Output	One (1) - 30VDC, 33kHz
	Safe Torque Off	STO1 and STO2 inputs- 24VDC
	Main Functions	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, Torque limit, 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 (5000 steps), Tension control function, Built-in RS-485 (Modbus).
	Application Macro	Built-in application parameter groups (pump, fan, etc.) and user-defined application parameter groups. Tension Control Parameter Group.
Protection Characteristics	Motor Protection	Over-current, over-voltage, over-heating, phase loss, over-load.
	Stall Prevention	Stall prevention during acceleration, deceleration, and running (independent settings).
Option Cards	Communication	GS30A-CM-EIP1, GS30A-CM-EIP2, GS30A-CM-ECAT, GS30A-CM-EIPKITP2
	Encoder	GS30A-FB-LD, GS30A-FB-OC
	Extension I/O	GS30A-06CDD, GS30A-2AD2DA, GS30A-02TRC, GS30A-03TRA
	24V Power	GS30-BPS
Agency Approvals		*UL, CE[2], TÜV (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: https://support.automationdirect.com/docs/GS30A-CE-2024.pdf

GS30 Motor Control (Applicable to All Models)					
Motor Control	Motor Type	Control Mode		Start Torque	Speed Control Range (Turndown/Accuracy)
		Description	Symbol		
	Induction Motor (IM)	Volts/Hz	IMVF	150% @ 3Hz	1:50
		Volts/Hz+encoder	IMVFPG		
		Sensorless vector	IMSVC		
		Field oriented control sensorless	IMFOC	200% @ 0.5 Hz	1:100
		Torque sensorless	IMTQC		±15%
		Field oriented control+encoder	IMFOCPG	200% @ 0Hz	1:1000
		Torque+encoder	IMTQCPG		±5%
	Permanent Magnet AC Motor (PM)	Sensorless vector	PMSVC	100% @ 1/20th motor frequency	1:20
		Field oriented control sensorless	PMSVC or IPM	150% @ 0Hz	1:100
		Field oriented control+encoder	PMFOCPG	200% @ 0Hz	1:1000
		Torque+encoder	PMTQCPG		±5%

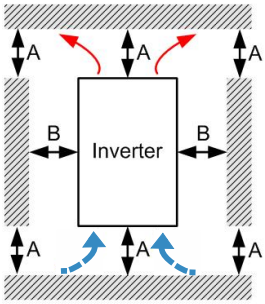
DURAPULSE GS30 AC Drives – Environmental Specifications

GS30 Environmental Specifications

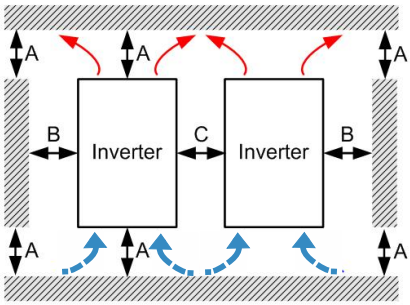
Environmental Conditions for GS30 AC Drives			
Condition	Operation	Storage	Transportation
Installation Location	IEC 60364-1/ IEC 60664-1 Pollution degree 2, Indoor use only.	n/a	n/a
Ambient Temperature	IP20/UL Open Type: -20 to 50°C (-20 to 60°C w/derating) [-4 to 122°F (-4 to 140°F w/derating)]	-40 to 85°C [-40 to 185°F]	-20 to 70°C [-4 to 158°F]
	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	
DO NOT expose the GS30 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^2 every year.			

DURAPULSE GS30 AC Drives Specifications – Air Flow and Power (Heat) Dissipation

Minimum Clearances and Air Flow for GS30 Series Drives



Single Drive Installation



Side by Side Drive Installation

GS30 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.*

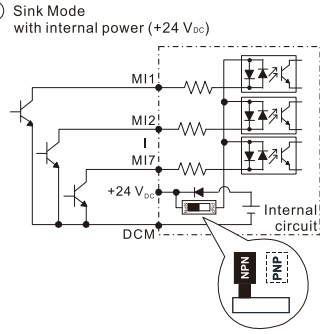
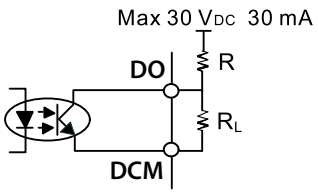
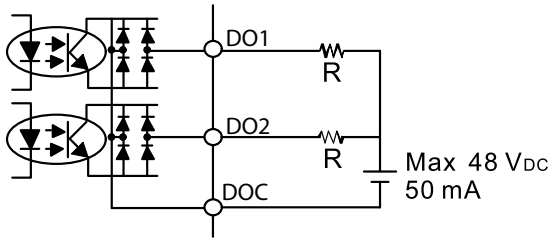
GS30 Airflow and Power Dissipation

Model Number	Frame Size	Airflow Rate for Cooling		Power Dissipation (Watts)		
		Flow Rate (cfm)	Flow Rate (m^3/hr)	Loss External (Heat sink)	Internal	Total
GS31-20P5	A	0.0 b	0.0	16.3	14.5	30.8
GS31-21P0	B	0.0 b	0.0	31.1	22.5	53.6
GS31-22P0	C	16.0 b	27.2	46.5	31.0	77.5
GS31-23P0	C	16.0 b	27.2	70.0	35.0	105.0
GS33-20P5	A	0.0 b	0.0	16.5	12.6	29.1
GS33-21P0	A	10.0 b	17.0	33.2	15.0	48.2
GS33-22P0	B	10.0 b	17.0	50.1	24.2	74.3
GS33-23P0	C	16.0 b	27.2	76.0	30.7	106.7
GS33-25P0	C	16.0 b	27.2	108.2	40.1	148.3
GS33-27P5	D	23.4 b	39.7	192.8	53.3	246.1
GS33-2010	E	53.7 b	91.2	244.5	79.6	324.1
GS33-2015	E	53.7 b	91.2	374.2	86.2	460.4
GS33-2020	F	67.9 b	115.2	492.0	198.2	690.3
GS33-2025	G	232.0 b	394.2	581.3	100.0	681.3
GS33-2030	G	266.0 b	451.9	732.5	107.0	839.5
GS33-2040	I	455.0 b	773.1	926.0	124.0	1050.0
GS33-2050	I	493.0 b	837.6	1144.9	132.0	1276.9
GS33-40P5	A	0.0 b	0.0	17.6	11.1	28.7
GS33-41P0	A	10.0 b	17.0	32.6	20.0	52.6
GS33-42P0	B	10.0 b	17.0	45.9	21.7	67.6
GS33-43P0	C	16.0 b	27.2	60.6	22.8	83.4
GS33-45P0	C	16.0 b	27.2	93.1	42.0	135.1
GS33-47P5	D	23.4 b	39.7	132.8	39.5	172.3
GS33-4010	D	23.4 b	39.7	164.7	55.8	220.5
GS33-4015	E	53.7 b	91.2	234.5	69.8	304.3
GS33-4020	E	53.7 b	91.2	319.8	74.3	394.1
GS33-4025	F	67.9 b	115.2	423.5	181.6	605.1
GS33-4030	F	67.9 b	115.2	501.1	200.3	701.4
GS33-4040	G	266.0 b	451.9	655.3	122.0	777.3
GS33-4050	H	322.0 b	547.1	896.8	135.0	1031.8
GS33-4060	H	322.0 b	547.1	1029.0	150.0	1179.0
GS33-4075	I	455.0 b	773.1	1219.9	165.0	1384.9
GS33-4100	I	493.0 b	837.6	1495.0	180.0	1675.0

- 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 GS30 drive in a confined space.
- When installing multiple GS30 drives, the required air volume would be the required air volume for a single drive multiplied by the number of drives.
- When calculating power dissipation (Watt Loss), use the Total value. Heat dissipation shown in the chart is for installing a single GS30 drive in a confined space.
- When installing multiple drives, the volume of heat/power dissipation should be the heat/power dissipated by a single drive multiplied by the number of drives.
- Heat dissipation for each model is calculated by rated voltage, current and default carrier frequency.

DURAPULSE GS30 AC Drives Specifications – Terminals

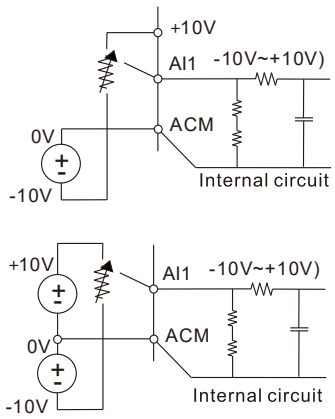
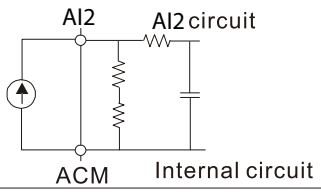
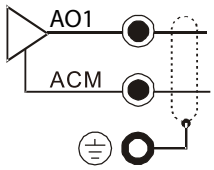
Control Circuit Terminal Names and Definitions

Control Circuit Terminals		
Terminal Symbol	***Terminal Function***	***Description***
+24V	Digital control signal common (Source)	+24V ± 10% 100mA **Note:** When used in parallel, if the +24V terminal is used with a feedback sensor, unequal current may occur, and there will be a risk of failure.
FWD (DI1) REV (DI2) DI3 - DI7	Digital input 1–7 ① Sink Mode with internal power (+24 V_{DC})  See pg. <?> for sinking/sourcing wiring examples.	**Source Mode:** ON: activation current 3.3 mA ≥ 11VDC OFF: cut-off voltage ≤ 5VDC **Sink Mode:** 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 VFPG control mode.
DO	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 Resistive load ≥ 1kΩ, resistance determines the output voltage value. DO-DCM voltage = external voltage * (RL/ (RL+R))
DCM	Digital control / Frequency signal common (Sink)	
DO1	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. 
DO2	Digital Output 2 (photo coupler)	
DOC	Digital Output Common (photo coupler)	
R1O	Relay Output 1 (N.O.)	**Resistive Load** • 3.0 A (NO), 3.0 A (NC) @250VAC • 5.0 A (NO), 3.0 A (NC) @30VDC **Inductive Load (COS 0.4)** • 1.2 A (NO), 1.2 A (NC) @250VAC • 2.0 A (NO), 1.2 A (NC) @30VDC To output different kinds of monitoring signals such as motor drive in operation, frequency reached, and overload indication.
R1C	Relay Output 1 (N.C.)	
R1	Relay Output 1 Common	
+10V	Potentiometer power supply	Power supply for analog frequency setting: +10.5 ± 0.5 VDC / 20mA

DURAPULSE GS30 AC Drives Specifications – Terminals

Control Circuit Terminal Names and Definitions

Control Circuit Terminals (continued)

Terminal Symbol	Terminal Function	Description
AI1	Analog voltage frequency command 	Circuit Impedance: 20kΩ Potentiometer Rating: 5kΩ 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
AI2	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
AO1	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). **Voltage mode** Range: 0–10 V (P03.31=0) corresponds to the maximum operating range of the control target Max. output current: 2mA Max. Load: 5kΩ **Current mode** 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
ACM	Analog Signal Common	Analog signal common terminal
STO1, STO2, SCM	Default: STO1 / STO2 short-circuited to +24V Rated voltage: 24VDC ± 10 %; maximum voltage: 30VDC ±10 % Rated current: 6.67 mA ± 10 % **STO activation mode** 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) **STO cut-off mode** Input voltage level: 11VDC < STO1-SCM and STO2-SCM < 30VDC Power removal safety function per EN 954-1 and IEC / EN 61508 **Note:** Refer to Appendix E of the GS30 User Manuals for details.	
SG+ *SG-* *SGND**	Modbus RS-485 **Note:** Refer to GS30 User Manual Chapter 4 Descriptions of Parameter Settings, Parameter Group 09: Communication Parameters for details.	
RJ45	PIN 1, 2, 6: Reserved PIN 3, 7: SGND PIN 4: SG- PIN 5: SG+ PIN 8: +10V supply GS4-KPD (provides GS4-KPD power)	The RJ45 port provides a serial communications connection. Max Baud Rate = 115.2 kbps
USB	Type B	Port for connecting the drive to GSoft2 and GSLogic for parameter, PLC, and firmware updates.

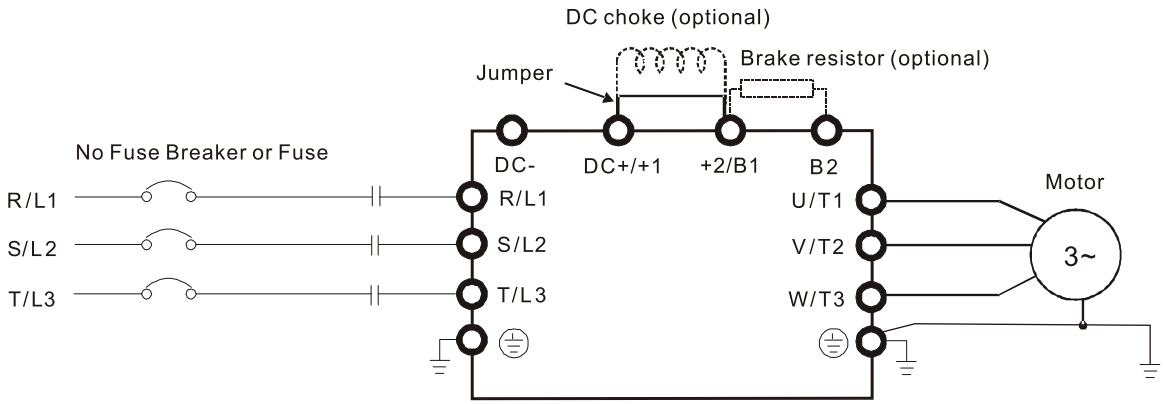
** The GS30 drive does not have a dedicated SGND terminal. To use RS-485, connect to the right-hand DCM terminal and use the DIP switch to set SGND function.*

DURAPULSE GS30 AC Drives – Basic Wiring Diagram

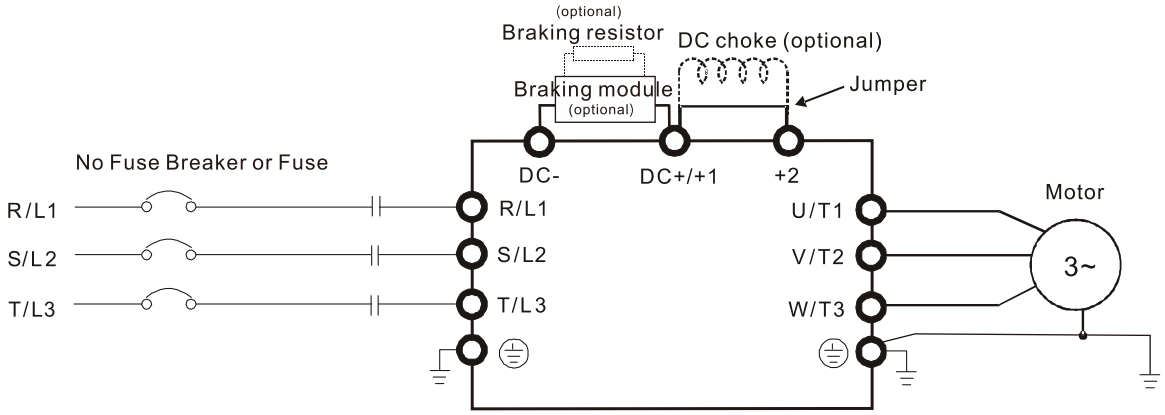
Main Circuit Wiring Diagram:

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to GS30 User Manual for additional specific wiring information.)
Note: DC reactors (chokes) are specified but not stocked by AutomationDirect.

GS30 Frame Sizes A-G



GS30 Frame Sizes H-I



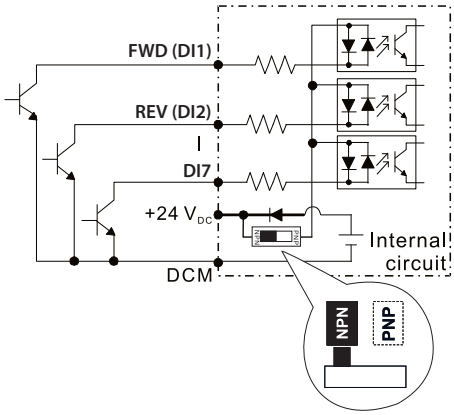
Note: For frame size H and I drives, braking resistor(s) must be connected to a dedicated braking module and cannot be connected directly to the DC-/DC+/+1 terminals.

DURAPULSE GS30 AC Drives – Basic Wiring Diagram

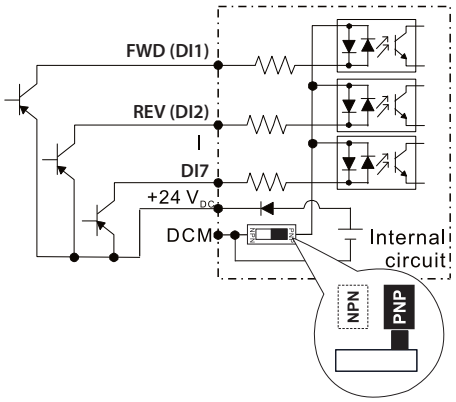
Control Circuit Wiring Diagram: Digital Inputs - Internal Power

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to GS30 User Manual for additional specific wiring information.)

① Sink Mode
with internal power (+24 V_{DC})



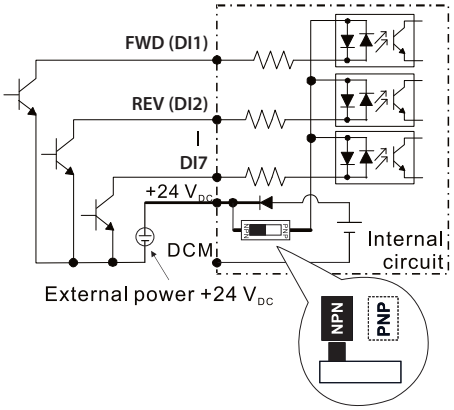
② Source Mode
with internal power (+24 V_{DC})



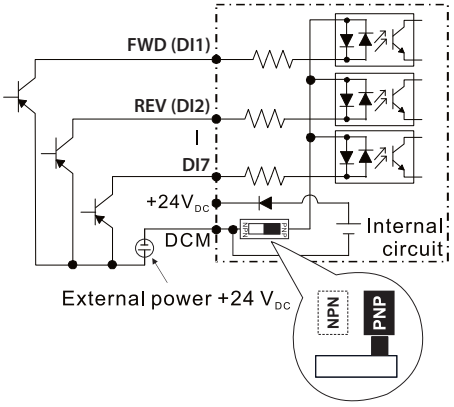
Control Circuit Wiring Diagram: Digital Inputs - External Power

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to GS30 User Manual for additional specific wiring information.)

③ Sink Mode
with external power



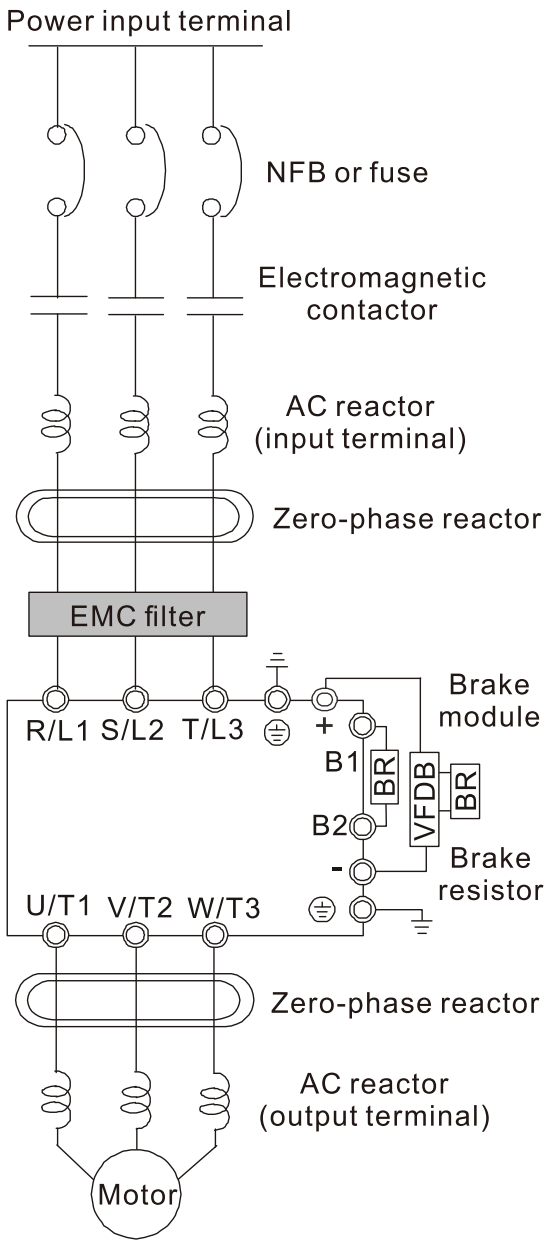
④ Source Mode
with external power



DURAPULSE GS30 AC Drives – Basic Wiring Diagram

System Wiring Diagram:

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user GS30 User Manual for additional specific wiring information.)

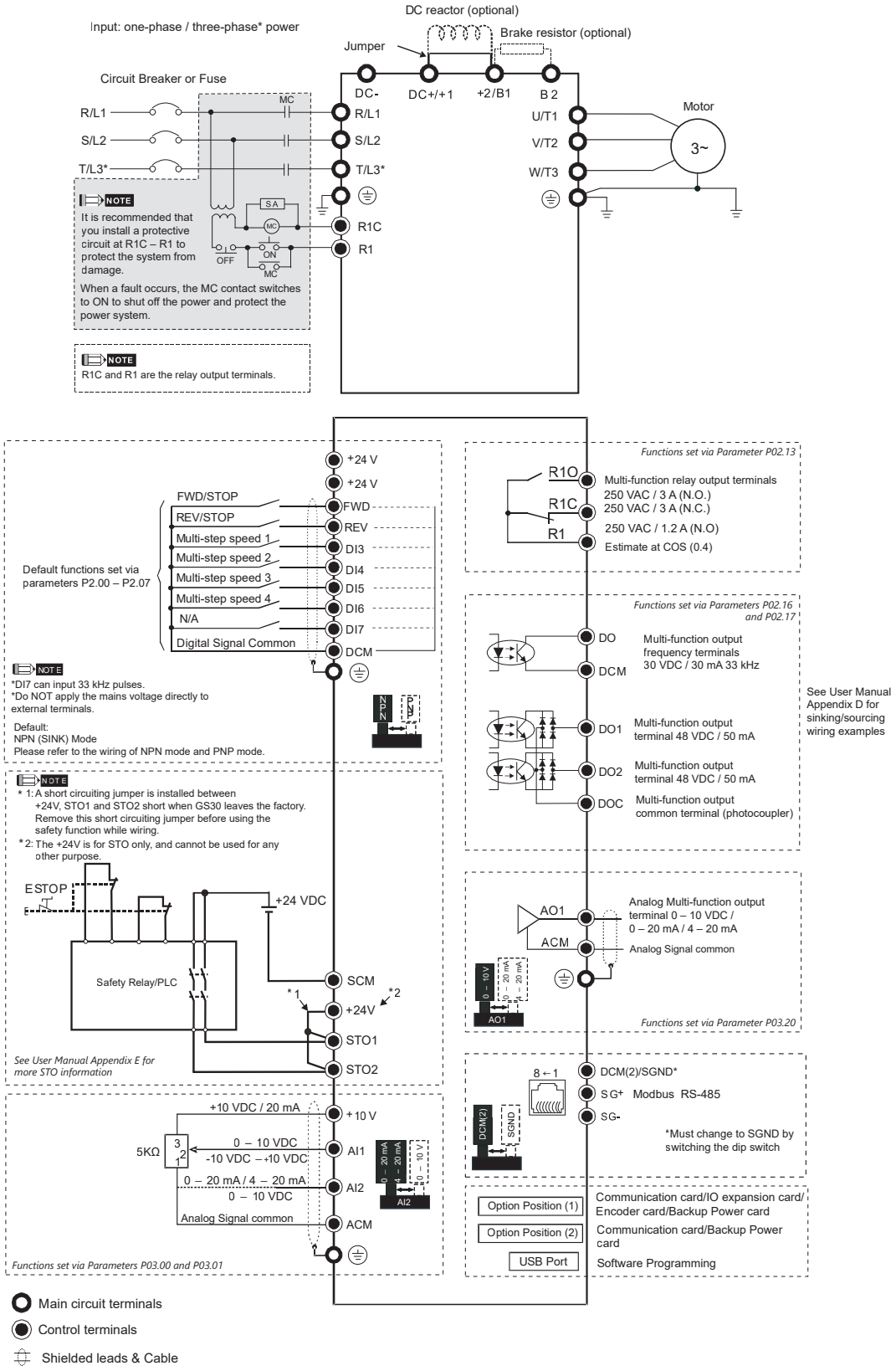


System Wiring Components	
Component	***Function***
Power input terminal	Supply power according to the rated power specifications indicated in the manual.
NFB or fuse	There may be a large inrush current during power on. Select a suitable NFB (Non Fuse Breaker or Circuit Breaker) or Fuse.
Electromagnetic 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 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 500 kVA, or when it switches into a 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 meters of the drive.
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 Filter (output terminal)	The motor cable length affects the size of the reflected wave on the motor end. For motor distances greater than 100 feet, the VTF series dV/dT filter is recommended.

DURAPULSE GS30 AC Drives – Basic Wiring Diagram

Control Wiring Diagram: Frame Size A-G Full I/O

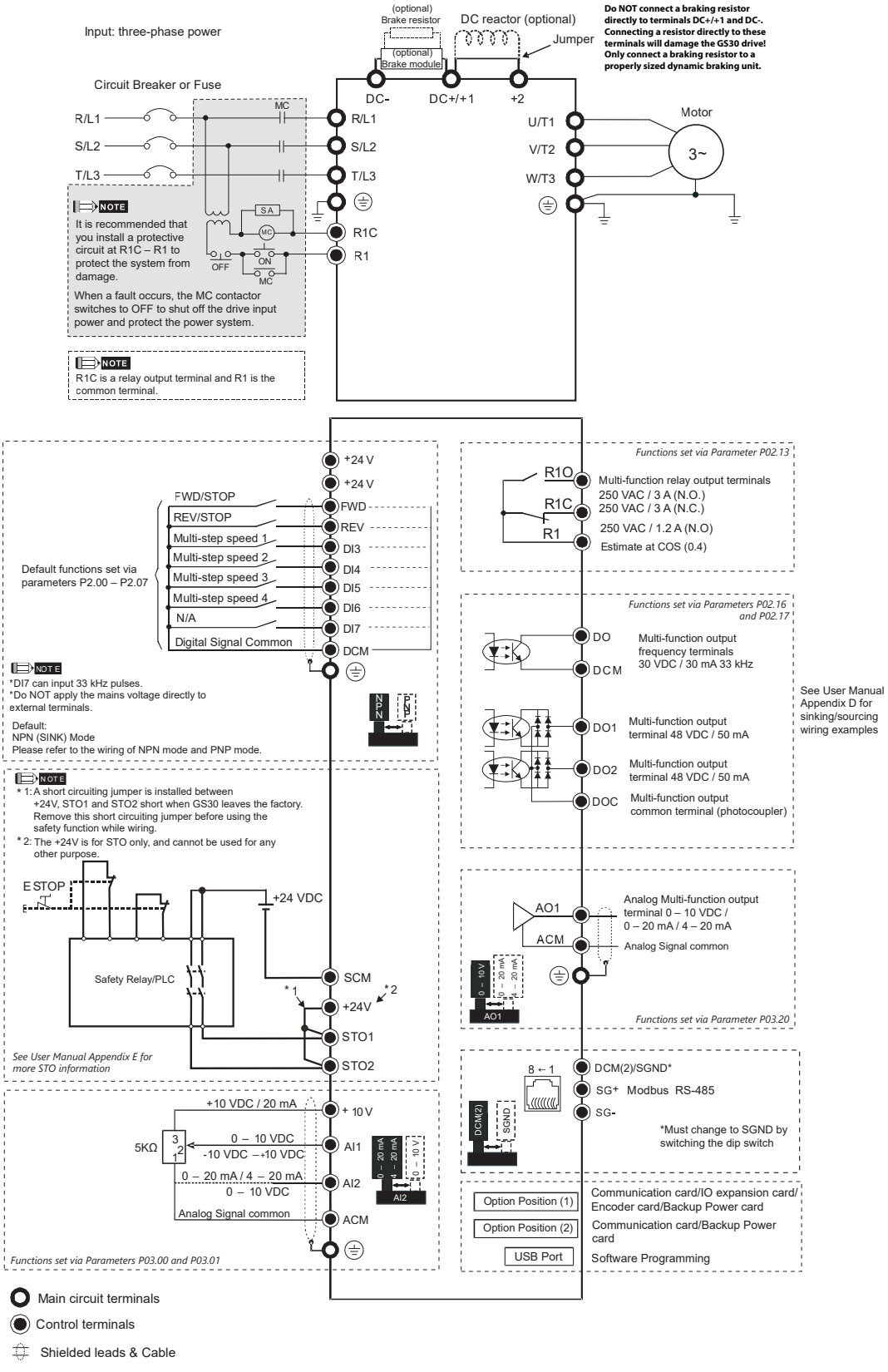
Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to the GS30 User Manual for additional specific wiring information.)



DURAPULSE GS30 AC Drives – Basic Wiring Diagram

Control Wiring Diagram: Frame Size H-I Full I/O

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to the GS30 User Manual for additional specific wiring information.)



DURAPULSE GS30 AC Drives – Optional Accessories

Accessories Available for GS30 AC Drives

The table below lists types of accessories available for your GS30 series drive. GS30 uses many of the same accessories as the GS20(X) series drives–GS20 numbered parts that can be used with GS30 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.

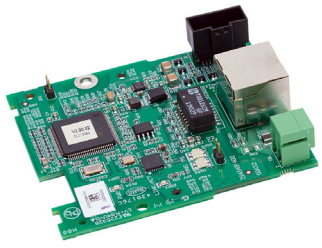
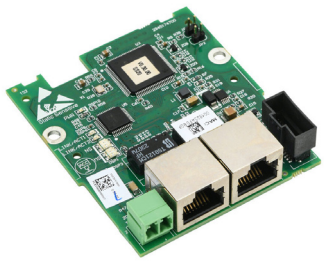
GS30 AC Drives Available Software and Accessories			
Accessory	***GS30 Accessory***	***GS20 Accessory used by GS30***	***Reference***
GSoft 2 Drive Software	✓		"GSoft2 Drive Configuration Software" on page tGSX-103
GSLogic Software	✓		"GSLOGIC Drive Configuration Software" on page tGSX-104
Backup Power Supply	✓		"GS30A-BPS" on page tGSX-60
Braking Resistors	✓	✓	"GS4/GS30 DURApulse Drives Accessories – Dynamic Braking Component Selection – GS30" on page tGSX-149
Capacitive Filter		✓	"Capacitive Filter" on page tGSX-79
Communication Modules	✓		"GS30 Optional Modules" on page tGSX-60
Conduit Boxes	✓		"GS30 Conduit Boxes" on page tGSX-68
DIN Rail Mounting (A–C frame only)		✓	"DIN Rail Mounting" on page tGSX-85
EMC Filter	✓		"GS30 Standard Footprint EMC Filter and Zero-Phase Reactor" on page tGSX-72
EMC Shield Plates (A-F frame)		✓	"EMC Shield Plate" on page tGSX-79
EMC Shield Plates (G-I frame)	✓		
EMI Filters	✓		"GS30 High Performance EMI Input Filters" on page tGSX-74
Encoder and PLC Modules	✓		"GS30 Optional I/O Cards" on page tGSX-62
Fuses/Circuit Breakers	✓		"GS30 Fuses/Circuit Breakers" on page tGSX-77
Line/Load Reactor/Voltage Time Filter		✓	"GS30 Line Reactors/Voltage Time Filters" on page tGSX-84
Mounting Adapter Plate (A–C frame only)		✓	"Mounting Adapter Plate" on page tGSX-86
Communication Card Mounting Cover	✓		"GS30A-CM-EIPKITP2" on page tGSX-61
Optional Advanced Keypad		✓	"Advanced Keypad" on page tGSX-105
Replacement Key Pad	✓		"GS30 Replacement Keypad" on page tGSX-81
Replacement Fan Kit (A-F frame)		✓	"Cooling Fans for GSxx Series Drives (Spare/Replacement)" on page tGSX-87
Replacement Fan Kit (G-I frame)	✓		
RF Filter	✓		"RF Filter" on page tGSX-88

GS20(X) Optional Accessories – Expansion Cards

GS20(X) 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.

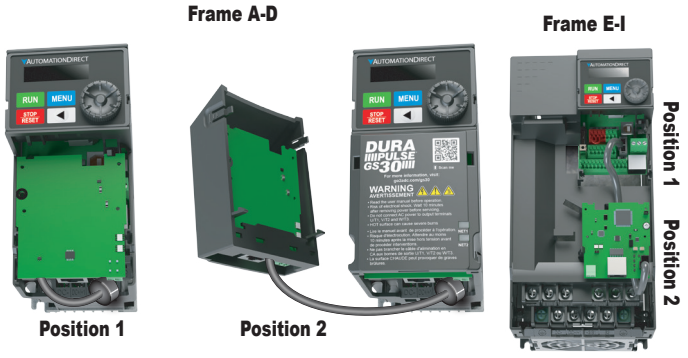
GS20(X) *DURA*PULSE Drives I/O and Communication Cards					
Part Number	***Price***	***Description***	***Features/Specifications***	***Placement****	***GS Drive***
GS20A-BPS	$;04c6t:	DURAPULSE GS20(X) series Backup Power Supply Module	Provides external power supply and supports 24VDC input. Supports 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 • Testing RS485 communications	Slot 1	GS20(X) – all
GS20A-CM-ENETIP	$;4c6f:	DURAPULSE GS20(X) series communication module, EtherNet/IP and Modbus TCP	**Features:** • Supports Modbus TCP and EtherNet/IP protocol • 32/32 words read/write parameters correspondence • User-defined corresponding parameters • MDI/MDI-X auto-detect • IP filter simple firewall function **Specifications:** • RJ45 with Auto MDI/MDIX interface • 1 port (ENETIP) or 2 ports (EIP2) • IEEE 802.3, IEEE 802.3u transmission method with Cat 5e shielding 100MHz cable at 10/100 Mbps Auto-detect transmission speed • Network protocol: ICMP, IP, TCP, UDP, DHCP, HTTP, SMTP, Modbus over TCP/IP, EtherNet/IP, BOOTP • Requires 15VDC provided by AC drive • 500VDC insulation voltage • 0.8 W power consumption • 25g (ENETIP) or 30g (EIP2) weight	Slot 1	GS20(X) – all
GS20A-CM-EIP2	$5_zd:	DURApulse GS20 series communication module, EtherNet/IP and Modbus TCP, 2 ports, (2) Ethernet (RJ45) port(s).		Slot 1	GS20(X) – all

GS20A-BPS	***GS20A-CM-ENETIP***	***GS20A-CM-EIP2***
		

GS30 Optional Accessories – Expansion Cards

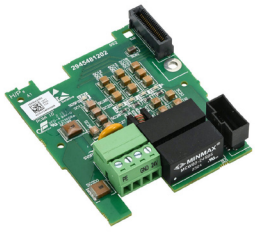
GS30 Optional Modules

The GS30A-CM-EIP1 and GS30A-CM-EIP2 are communication modules that can be used for either Modbus TCP or EtherNet/IP communication. The GS30A-CM-ECAT module is used for EtherCAT communications. The GS30A-BPS is a backup power supply option card that can maintain basic drive (not motor) functionality when external power is unavailable. Note that only one communication module can be installed at a time, but the BPS card can be installed with a communication card or any of the I/O cards. Please see the GS30 User Manual for additional information and installation instructions.



GS30 *DURA*PULSE Drives I/O and Communication Cards

Part Number	Price	Description	Features/Specifications	Position
GS30A-CM-EIP1	$5_ze:	DURApulse GS30 series communication module, EtherNet/IP and Modbus TCP, 1 port, (1) Ethernet (RJ45) port(s). For use with GS30 series AC drives.	**Features:** • Supports Modbus TCP and EtherNet/IP protocol • 32/32 words read/write parameters correspondence • User-defined corresponding parameters • MDI/MDI-X auto-detect • IP filter simple firewall function **Specifications:** • RJ45 with Auto MDI/MDIX interface • 1 port (EIP1) or 2 ports (EIP2) • IEEE 802.3, IEEE 802.3u transmission method with Cat 5e shielding 100MHz cable at 10/100 Mbps Auto-detect transmission speed • Network protocol: ICMP, IP, TCP, UDP, DHCP, HTTP, SMTP, Modbus over TCP/IP, EtherNet/IP, BOOTP • Requires 15VDC provided by AC drive • 500VDC insulation voltage • 0.8 W power consumption • 25g (EIP1) or 30g (EIP2) weight	1 or 2
GS30A-CM-EIP2	$;5_zf:	DURApulse GS30 series communication module, EtherNet/IP and Modbus TCP, 2 ports, (2) Ethernet (RJ45) port(s). For use with GS30 series AC drives.		
GS30A-CM-ECAT	$05_zc:	DURApulse GS30 series communication module, EtherCAT Slave, 2 ports, (2) Ethernet (RJ45) port(s). For use with GS30 series AC drives.	**Features:** • Enables EtherCAT communications • Supports speed mode • Supports reading and writing parameters • Supports stop during disconnection **Specifications:** • RJ45 interface • 2 ports • IEEE 802.3, IEEE 802.3u transmission method with Cat 5e shielding 100MHz cable at 100 Mbps transmission speed • Requires 15VDC provided by AC drive • 500VDC insulation voltage • 0.8 W power consumption • 27g weight	1 or 2
GS30A-BPS	$05_z7:	DURApulse GS30 series backup power supply module, for use with GS30 series AC drives.	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 • Testing RS485 and Ethernet communications	1 or 2



GS30A-BPS

GS30A-CM-EIPx

GS30A-CM-ECAT

GS20/GS30 Optional Accessories – Expansion Cards

GS20/GS30 Optional Modules

The GS30A-CM-EIPKITP2 allows mounting of GS20 and GS30 series communication and expansion cards in Position 2 (on the outside of the drive) for Frames A - D. This gives the benefit of quick removal of the communication card for access to the main power and control terminals. It does add overall depth to the drive unit. The front cover of the kit must be removed to see the comm card status LEDs.

GS20/GS30 *DURA*PULSE Drives Communication Card Mounting				
Part Number	***Price***	***Description***	***Features/Specifications***	***Position***
GS30A-CM-EIPKITP2	$5_zb:	DURApulse GS30 mounting cover, for use with GS20 and GS30 series communication modules. Used when communication module is installed in position 2.	Mounting kit for mounting GS20/GS30 EtherNet/IP communication cards in Position 2 for frames A through D. Not needed for larger frames. GS30A-CM-ECAT comes with a mounting cover.	2

GS30A-CM-EIPKITP2

Drive with GS30A-CM-EIPKITP2 installed

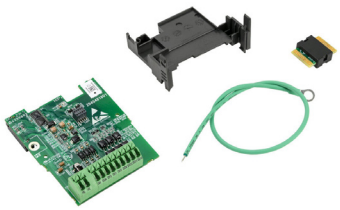
GS30 Optional Accessories – I/O Cards

GS30 Optional I/O Cards

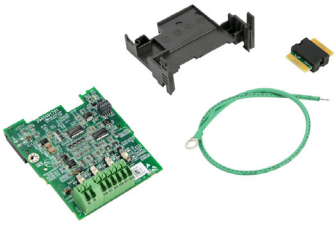
GS30 series drives support a variety of optional input/output cards that can be used to provide additional connection terminals or encoder support.

GS30 *DURA*PULSE Drives I/O Cards

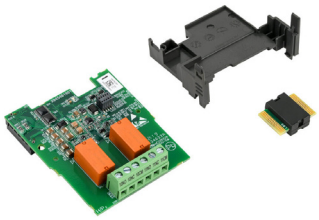
Part Number	Price	Description	Terminals	Descriptions	Position
GS30A-06CDD	$5_z0:	DURApulse GS30 series discrete combo module, Input: 3-point, 24 VDC, sinking/sourcing selectable, Output: 3-point, 48 VDC, sinking/sourcing selectable, 30 mA/point, 50 mA resistive output current. For use with GS30 series AC drives.	24V, DCM	Output power: +24VDC ±5% < 30mA	1
			DI10-DI12	• Choose SINK (NPN) / SOURCE (PNP) by SWW1 • Internal power is supplied by terminal 24V: +24VDC ±5% • If external power is +24VDC, the maximum voltage is 30VDC and the minimum voltage is 19VDC • ON: activation current is 6.5 mA • OFF: leakage current tolerance is 10μA	
			DO10-DO12	• The motor drive outputs various monitor signals, such as drive in operation, frequency reached and overload indication through the transistor (open collector) • DO output signal: each DO terminal needs a pull-up resistor, the maximum external power voltage is 48VDC / 50mA	
			DCM	Common for digital output terminals DO10–DO12 (photocoupler)	
			PE	Grounding terminals. To decrease noise, properly ground this terminal.	
GS30A-2AD2DA	$-5_yl:	DURApulse GS30 series analog combo module, Input: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-10 VDC, Output: 2-channel, current/voltage, 0-20 mA and 4-20 mA, 0-10 VDC.	ACM	Common output signal and input signal terminals	1
			AI10, AI11	Two sets of AI ports: SSW3, SSW4 switch for AI1, AI2 (default is AI1) • AI1: input 0–10 V • AI2: input 0–20 mA	
			AO10–AO11	Two sets of AO ports: SSW1, SSW2 switch for current (default) or voltage. • Voltage output: 0–10 V • Current output: 0–20 mA	
			PE	Grounding terminal. to decrease noise, properly ground this terminal.	
GS30A-02TRC	$5_y_:	DURApulse GS30 series relay output module, 2-point, 240 VAC/30 VDC, (2) Form C, 2 isolated common(s), 1 point(s) per common. Screw terminal blocks included.	10NO-10NC-10CM (DO10) 11NO-11NC-11CM (DO11)	Resistive load: 5A (N.O.) / 250VAC Function: outputs the monitor signals, such as drive in operation, frequency reached, or overload indication.	1
GS30A-03TRA	$5_y#:	DURApulse GS30 series relay output module, 3-point, 250 VAC/30 VDC, (3) Form A, 2 isolated common(s), 1 point(s) per common. Screw terminal blocks included.	10NO-10CM (DO10) 11NO -11CM (DO11) 12NO -12CM (DO12)	Resistive load: 6A (N.O.) / 250VAC Function: outputs the monitor signals, such as drive in operation, frequency reached, or overload indication.	1



GS30A-06CDD



GS30A-2AD2DA



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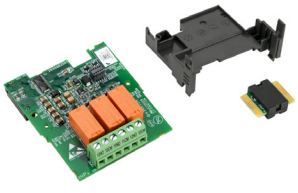
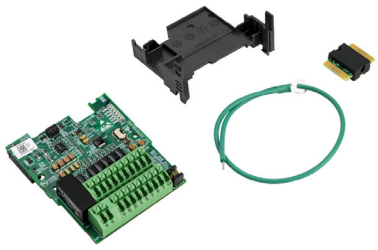


GS30A-03TRA

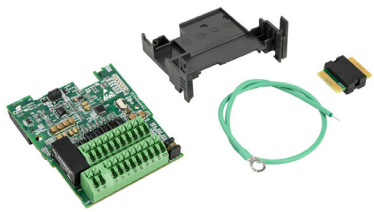
GS30 Optional Accessories – I/O Cards

GS30 Optional I/O Cards, *continued*

GS30 *DURA*PULSE Drives I/O Cards						
Part Number	***Price***	***Description***	***Terminals***		***Descriptions***	***Position***
GS30A-FB-LD	$05_z8:	DURApulse GS30 series encoder module, line driver (differential) encoder input. For use with GS30 series AC drives. Supports 1-phase and 2-phase input and output.	PG1	VP	• Power output voltage: +5V ±5% or +12V ±5% • Maximum output current: 200mA (+5V)	1
				DCM	Common for power and signal	
				A1, $\overline{A1}$, B1, $\overline{B1}$, Z1, $\overline{Z1}$	• Encoder input signal (applicable for line driver or open collector • Open collector input voltage +5–24 VDC • Supports 1-phase and 2-phase input • Maximum input signal: 300kHz	
			PG2	A2, $\overline{A2}$, B2, $\overline{B2}$	• Pulse input signal (applicable for line driver or open collector) • Open collector input voltage +5–24 VDC • Supports 1-phase and 2-phase input • Maximum input signal: 300kHz	
			PG OUT	AO, $\overline{AO}$, BO, $\overline{BO}$, ZO, $\overline{ZO}$, SG	• Encoder feedback signal output, supports frequency elimination: 1–255 times • Maximum output voltage of the line driver: 5VDC • Maximum output current: 15mA • Maximum output frequency: 300kHz • SG, the referenced electric potential for encoder output signal, serves as the ground for host controller or PLC to make the output signal become the common point. Do not use common grounding with SG and DCM as it may influence the signal quality	
			Ground	PE	Grounding terminal. To decrease noise, properly ground this terminal.	
GS30A-FB-OC	$05_z9:	DURApulse GS30 series encoder module, NPN open collector and PNP open collector encoder input. For use with GS30 series AC drives. Supports 1-phase and 2-phase input and output.	PG1	VP	• Power output voltage: +5V ±5% or +12V ±5% (Use SSW320 to switch +5V or +12V, the default is +5V) • Maximum output current: 200mA (+5V)	1
				DCM	Common for power and signal	
				A1, $\overline{A1}$, B1, $\overline{B1}$, Z1, $\overline{Z1}$	• Encoder input signal (applicable for line driver or open collector • Open collector input voltage +5–24 VDC • Supports 1-phase and 2-phase input • Maximum input signal: 300kHz	
			PG2	A2, $\overline{A2}$ B2, $\overline{B2}$	• Pulse input signal (applicable for line driver or open collector) • Open collector input voltage +5–24 VDC • Supports 1-phase and 2-phase input • Maximum input signal: 300kHz	
			PG OUT	V+, V+	• Needs an external power source for the PG OUT circuit • Input voltage: +7–24 V	
				V-	The negative side for external power supply	
				$\overline{AO}$, $\overline{BO}$, $\overline{ZO}$	• PG feedback signal output: supports frequency elimination: 1–255 times • Open collector's output signal: add a pull-up resistor on each PG out external power • Maximum input frequency: 300kHz	



GS30A-FB-LD



GS30A-FB-OC

GS10 Series Optional Accessories - Braking

GS10 Braking Resistors

Use the table below to find the appropriate braking resistor model for your GS10 series AC drive. For more information and installation instructions, please see the GS10 series User Manual. All listed resistors are available for purchase at www.automationdirect.com.

GS10 AC Drive Braking Component Selection

Drive Voltage	Drive Model	Motor Power (hp)	Drive Brake Capacity - Max Torque		125% Braking Torque @ 10% Duty Cycle*						
					Open Type Braking Resistor				NEMA1 Resistors with Thermal Switch		
			Min Resistor Value (Ω)	Max Total Brake Current (A)	Part #	Qty.	Brake Torque (kg•m)	Total Brake Current (A)	Part #	Qty.	Total Brake Current (A)
120V	GS11N-10P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS11N-10P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS11N-11P0	1	63.3	6		1	0.5			1	
230V	GS11N-20P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS11N-20P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS11N-21P0	1	63.3	6		1	0.5			1	
	GS11N-22P0	2	47.5	8	GS-BR-200W091	1	1	4.2	BR-N1-280W50	1	7.8
	GS11N-23P0	3	38.0	10	GS-BR-300W070	1	1.5	5.4		1	
	GS13N-20P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS13N-20P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS13N-21P0	1	63.3	6		1	0.5		BR-N1-240W150	1	
	GS13N-22P0	2	47.5	8	GS-BR-200W091	1	1	4.2	BR-N1-280W50	1	7.8
	GS13N-23P0	3	38.0	10	GS-BR-300W070	1	1.5	5.4		1	
	GS13N-25P0	5	19.0	20	GS-BR-400W040	1	2.5	9.5	BR-N1-800W25	1	15.6
	GS13N-27P5	7 1/2	16.5	23	GS-BR-1K0W020	1	3.7	19	BR-N1-800W18P0	1	21.7
460V	GS13N-40P5	1/2	380.0	2	GS-BR-080W750	1	0.3	1	BR-N1-250W400	1	2.0
	GS13N-41P0	1	190.0	4		1	0.5		BR-N1-240W200	1	3.9
	GS13N-42P0	2	126.7	6	GS-BR-200W360	1	1	2.1	BR-N1-240W150	1	5.2
	GS13N-43P0	3	108.6	7	GS-BR-300W250	1	1.5	3	BR-N1-500W200	1	3.9
	GS13N-45P0	5	84.4	9	GS-BR-400W150	1	2.5	5.1	BR-N1-500W130	1	6.0
	GS13N-47P5	7 1/2	50.7	15	GS-BR-1K0W075	1	3.7	10.2	BR-N1-720W85	1	9.2
	GS13N-4010	10	40.0	19		1	5.1		BR-N1-1K2W50	1	15.6

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

GS20(X) Series Optional Accessories - Braking

GS20(X) Braking Resistors

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

GS20(X) AC Drive Braking Component Selection

Drive Voltage	Drive Model	Motor Power (hp)	Drive Brake Capacity - Max Torque		125% Braking Torque @ 10% Duty Cycle*						
					Open Type Braking Resistor				NEMA1 Resistors with Thermal Switch		
			Min Resistor Value (Ω)	Max Total Brake Current (A)	Part #	Qty.	Brake Torque (kg•m)	Total Brake Current (A)	Part #	Qty.	Total Brake Current (A)
120V	GS21-10P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS21-10P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS21-11P0	1	63.3	6		1	0.5			1	
230V	GS21-20P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS21-20P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS21-21P0	1	63.3	6		1	0.5			1	
	GS21-22P0	2	47.5	8	GS-BR-200W091	1	1	4.2	BR-N1-280W50	1	7.8
	GS21-23P0	3	38.0	10	GS-BR-300W070	1	1.5	5.4		1	
	GS23-20P2	1/4	190.0	2	GS-BR-080W750	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS23-20P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS23-21P0	1	63.3	6		1	0.5			1	
	GS23-22P0	2	47.5	8	GS-BR-200W091	1	1	4.2	BR-N1-280W50	1	7.8
	GS23-23P0	3	38.0	10	GS-BR-300W070	1	1.5	5.4		1	
	GS23-25P0	5	19.0	20	GS-BR-400W040	1	2.5	9.5	BR-N1-800W25	1	15.6
	GS23-27P5	7 1/2	16.5	23	GS-BR-1K0W020	1	3.7	19	BR-N1-800W18P0	1	21.7
	GS23-2010	10	14.6	26		1	5.1		BR-N1-1K1W15P0	1	26.0
	GS23-2015	15	12.6	29	GS-BR-1K5W013	1	7.4	29	BR-N1-1K5W14P0	1	27.9
	GS23-2020	20	8.3	46	GS-BR-1K0W4P3 (x2 series)	2	10.2	44	BR-N1-2K2W08P6	1	45.3
460V	GS23-40P5	1/2	380.0	2	GS-BR-080W750	1	0.3	1	BR-N1-250W400	1	2.0
	GS23-41P0	1	190.0	4		1	0.5		BR-N1-240W200	1	3.9
	GS23-42P0	2	126.7	6	GS-BR-200W360	1	1	2.1	BR-N1-240W150	1	5.2
	GS23-43P0	3	108.6	7	GS-BR-300W250	1	1.5	3	BR-N1-500W200	1	3.9
	GS23-45P0	5	84.4	9	GS-BR-400W150	1	2.5	5.1	BR-N1-500W130	1	6.0
	GS23-47P5	7 1/2	50.7	15	GS-BR-1K0W075	1	3.7	10.2	BR-N1-720W85	1	9.2
	GS23-4010	10	40.0	19		1	5.1		BR-N1-1K2W50	1	15.6
	GS23-4015	15	33.0	23	GS-BR-1K5W043	1	7.4	17.6	BR-N1-1K5W40	1	19.5
	GS23-4020	20	26.2	29	GS-BR-1K0W016(x2 series)	2	10.2	24	BR-N1-1K7W30	1	26.0
	GS23-4025	25	26.2	29	GS-BR-1K0W016 (x2 series)	2	12.2		BR-N1-2K3W26	1	30.0
	GS23-4030	30	23.0	33	GS-BR-1K5W013 (x2 series)	2	14.9	29	BR-N1-2K8W25	1	31.2
575V	GS23-51P0	1	280.0	4	GS-BR-080W750	1	0.5	1.2	BR-N1-250W400	1	2.8
	GS23-52P0	2	186.7	6	GS-BR-200W360	1	1	2.6	BR-N1-240W200	1	5.6
	GS23-53P0	3	160.0	7	GS-BR-300W400	1	1.5	2.3	BR-N1-500W200	1	
	GS23-55P0	5	93.3	12	GS-BR-500W100	1	2.5	9.2	BR-N1-500W130	1	8.6
	GS23-57P5	7 1/2	80.0	14	GS-BR-750W140	1	3.7	6.6	BR-N1-720W85	1	13.2
	GS23-5010	10	70.0	16	GS-BR-1K0W075	1	5.1	12.3	BR-N1-1K2W75	1	14.9
GS20X - 230V	GS21X-20P5	1/2	95.0	4	GS-BR-080W200	1	0.3	1.9	BR-N1-240W150	1	2.6
	GS21X-21P0	1	63.3	6		1	0.5			1	
	GS21X-22P0	2	47.5	8	GS-BR-200W091	1	1	4.2	BR-N1-280W50	1	7.8
	GS21X-23P0	3	38.0	10	GS-BR-300W070	1	1.5	5.4		1	
	GS23X-20P5	1/2	190.0	2	GS-BR-080W200	1	0.1	0.5	BR-N1-240W200	1	2.0
	GS23X-21P0	1	95.0	4		1	0.3	1.9	BR-N1-240W150	1	2.6
	GS23X-22P0	2	63.3	6	GS-BR-200W091	1	0.5			1	
	GS23X-23P0	3	47.5	8	GS-BR-300W070	1	1	4.2	BR-N1-280W50	1	7.8
	GS23X-25P0	5	38.0	10	GS-BR-400W040	1	1.5	5.4		1	
	GS23X-27P5	7 1/2	19.0	20	GS-BR-1K0W020	1	2.5	9.5	BR-N1-800W25	1	15.6
GS20X - 460V	GS23X-40P5	1/2	380.0	2	GS-BR-080W750	1	0.3	1	BR-N1-800W18P0	1	21.7
	GS23X-41P0	1	190.0	4		1	0.5		BR-N1-240W200	1	3.9
	GS23X-42P0	2	126.7	6	GS-BR-200W360	1	1	2.1	BR-N1-240W150	1	5.2
	GS23X-43P0	3	108.6	7	GS-BR-300W250	1	1.5	3	BR-N1-500W200	1	3.9
	GS23X-45P0	5	84.4	9	GS-BR-400W150	1	2.5	5.1	BR-N1-500W130	1	6.0
	GS23X-47P5	7 1/2	50.7	15	GS-BR-1K0W075	1	3.7	10.2	BR-N1-720W85	1	9.2
	GS23X-4010	10	40.0	19		1	5.1		BR-N1-1K2W50	1	15.6

** 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	GS10A-N1A1	$-54ls:	PDF	GS10 series conduit box, NEMA1
GS11N-10P5 GS11N-20P5 GS13N-21P0 GS13N-40P5 GS13N-41P0	A3–A6	GS10A-N1A3	$;-54lt:	PDF	
GS11N-21P0 GS13N-22P0 GS13N-41P0	B	GS10A-N1B	$-54lu:	PDF	
GS11N-11P0 GS11N-22P0 GS11N-23P0 GS13N-23P0 GS13N-25P0 GS13N-43P0 GS13N-45P0	C	GS10A-N1C	$-54lv:	PDF	
GS13N-25P5 GS13N-47P5 GS13N-4010	D	GS10A-N1D	$-54lx:	PDF	

** 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	GS20A-N1A1	$4c6x:	PDF	GS20 series conduit box, NEMA1
GS21-10P5 GS21-20P5 GS23-40P5 GS23-21P0 GS23-41P0 GS23-51P0	A3–A5	GS20A-N1A3	$4c6y:	PDF	
GS23-22P0 GS23-42P0 GS23-52P0 GS21-21P0	B1, B2	GS20A-N1B	$4c6z:	PDF	
GS21-11P0 GS21-22P0 GS21-23P0 GS23-23P0 GS23-25P0 GS23-43P0 GS23-45P0 GS23-53P0 GS23-55P0	C1	GS20A-N1C	$;4c6]:	PDF	
GS23-27P5 GS23-47P5 GS23-4010 GS23-57P5 GS23-5010	D1	GS20A-N1D	$;4c6[:	PDF	
GS23-2010 GS23-2015 GS23-4015 GS23-4020	E1	GS20A-N1E	$4c6u:	PDF	
GS23-2020 GS23-4025 GS23-4030	F1	GS20A-N1F	$4c6v:	PDF	

** 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 acheive 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

GS30 Series Optional Accessories – Conduit Boxes

GS30 – Conduit Selection Table					
Drive		Conduit Box*			Description
Model	Frame	Part #	Price	Drawing	
GS31-20P5 GS33-20P5 GS33-21P0 GS33-40P5 GS33-41P0	A1, A2, A3	GS30A-N1A	$;5_yt:	PDF	GS30 series conduit box, NEMA1
GS31-21P0 GS33-22P0 GS33-42P0	B1, B2	GS30A-N1B	$5_yu:	PDF	
GS31-22P0 GS33-23P0 GS33-25P0 GS33-43P0 GS33-45P0	C	GS30A-N1C	$5_yv:	PDF	
GS33-27P5 GS33-47P5 GS33-4010	D	GS30A-N1D	$5_yx:	PDF	
GS33-2010 GS33-2015 GS33-4015 GS33-4020	E	GS30A-N1E	$5_yy:	PDF	
GS33-2020 GS33-4025 GS33-4030	F	GS30A-N1F	$5_yo:	PDF	
GS33-2025 GS33-2030 GS33-4040	G	GS30A-N1G	$5_yp:	PDF	
GS33-4050 GS33-4060	H	GS30A-N1H	$5_yq:	PDF	
GS33-2040 GS33-2050 GS33-4075 GS33-4100	I	GS30A-N1I	$5_ys:	PDF	

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

GS30 Conduit Boxes

Optional Conduit Box Kits can be ordered separately. These kits bolt onto the bottom of the applicable GS30 drive to provide a convenient connection point for conduit entry, allowing the GS30 to achieve a NEMA 1/UL type 1 environmental protection rating; especially useful for GS30 drives mounted outside of an electrical control panel.

Example GS30 Conduit Box

GS10 Series Optional Accessories – EMC Filter & Zero Phase Reactor

GS10 Standard Footprint EMC Filter and Zero Phase Reactor

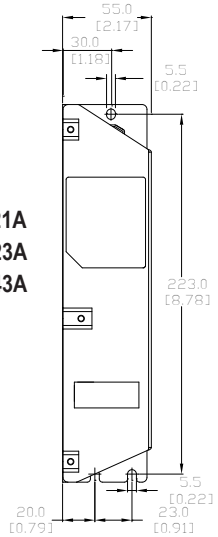
If electromagnetic noise is harmful to your manufacturing environment, we recommend that you select an EMC filter as shown below. For some motor drive models, you need to work with zero phase reactors to be compliant with EMC regulations. Refer to the table and figure below for the recommended model, 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.

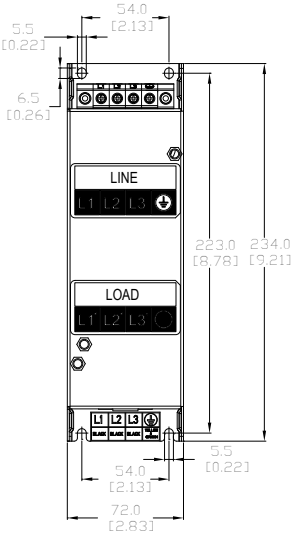
GS10 EMC Filter and Zero Phase Reactor

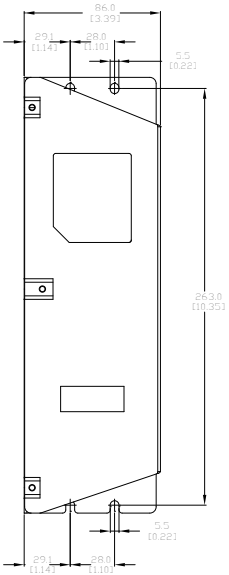
Frame	Drive Model	Input Current (A)	Footprint Filter Model #	Price	Recommended Zero Phase Reactor	Conducted Emission				Radiated Emission		
						C1-motor cable length-30m			C2-motor cable length-100m	C2-motor cable length-100m		
						Position to Install a Zero Phase Reactor						
						1	2	3	n/a	1	2	3
A	GS11N-10P2	6	EMF11AM21A	$4c62:	RF008X00A				N/A			
	GS11N-10P5	9.4							N/A			
	GS11N-20P2	5.1					✓	✓	N/A		✓	✓
	GS11N-20P5	7.3					✓	✓	N/A		✓	✓
	GS13N-20P2	1.9	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS13N-20P5	3.4					✓	✓	N/A		✓	✓
	GS13N-21P0	5.8					✓	✓	N/A		✓	✓
	GS13N-40P5	2.1	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS13N-41P0	3.7						✓	N/A*			✓
B	GS11N-21P0	10.8	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS13N-22P0	9	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS13N-42P0	5.8	EMF6A0M43A	$4c68:				✓	N/A			✓
C	GS11N-11P0	18	EMF27AM21B	$04c66:					N/A			
	GS11N-22P0	16.5						✓	N/A			✓
	GS11N-23P0	24.2						✓	N/A			✓
	GS13N-23P0	13.2	EMF24AM23B	$04c65:			✓	✓	N/A		✓	✓
	GS13N-25P0	20					✓	✓	N/A		✓	✓
	GS13N-43P0	6.1	EMF12AM43B	$04c63:					N/A			
	GS13N-45P0	9.9					✓	✓	N/A		✓	✓
D	GS13N-27P5	30	EMF33AM23B	$04c67:		✓	✓		N/A	✓	✓	
	GS13N-47P5	14.3	EMF23AM43B	$04c64:		✓	✓	✓	N/A	✓	✓	✓
	GS13N-4010	19.3				✓	✓	✓	N/A	✓	✓	✓

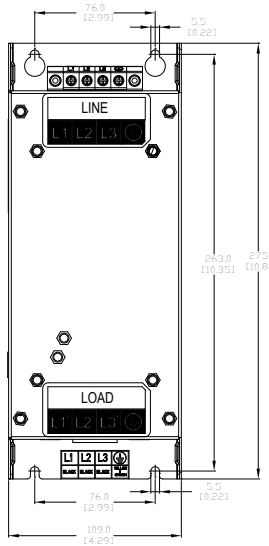
EMF Series Filter Dimensions (Units = mm [in])

EMF11AM21A
EMF10AM23A
EMF6A0M43A









EMF27AM21B;
EMF24AM23B
EMF33AM23B;
EMF12AM43B
EMF23AM43B;
EMF6A0M63B;
EMF16AM63B

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

GS20(X) 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	C2-motor cable length- 100m		
						Position to Install a Zero Phase Reactor						
						1	2	3	n/a	1	2	3
A	GS21-10P2	6.8	EMF11AM21A	$4c62:	RF008X00A				N/A			
	GS21-20P2	3.8	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS21-20P5	6.7	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS23-20P2	2.2	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23-20P5	3.8	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23-21P0	6	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23-40P5	2.5	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS23-41P0	4.2	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS23-51P0	2.4	EMF6A0M63B	$04c69:					N/A*			
	GS21-10P5	10.1	EMF11AM21A	$4c62:					N/A			
GS20X A	GS21X-20P5	8.3	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS21X-21P0	11.3	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS21X-22P0	18.5	EMF27AM21B	$04c66:				✓	N/A			✓
	GS23X-20P5	3.8	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23X-21P0	6	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23X-22P0	9.6	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23X-40P5	2.5	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS23X-41P0	4.2	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS23X-42P0	6.4	EMF6A0M43A	$4c68:				✓	N/A			✓
	GS23X-43P0	7.2	EMF12AM43B	$04c63:					N/A			
B	GS21-21P0	10.5	EMF11AM21A	$4c62:			✓	✓	N/A		✓	✓
	GS23-22P0	9.6	EMF10AM23A	$4c61:			✓	✓	N/A		✓	✓
	GS23-52P0	4.2	EMF6A0M63B	$04c69:					N/A*			
	GS23-42P0	6.4	EMF6A0M43A	$4c68:				✓	N/A			✓
GS20X B	GS21X-23P0	27.5	EMF27AM21B	$04c66:				✓	N/A			✓
	GS23X-23P0	15	EMF24AM23B	$04c65:			✓	✓	N/A		✓	✓
	GS23X-25P0	23.4	EMF24AM23B	$04c65:			✓	✓	N/A		✓	✓
	GS23X-45P0	11.6	EMF12AM43B	$04c63:			✓	✓	N/A		✓	✓
C	GS21-11P0	20.6	EMF27AM21B	$04c66:					N/A			
	GS21-22P0	17.9	EMF27AM21B	$04c66:				✓	N/A			✓
	GS21-23P0	26.3	EMF27AM21B	$04c66:				✓	N/A			✓
	GS23-23P0	15	EMF24AM23B	$04c65:			✓	✓	N/A		✓	✓
	GS23-25P0	23.4	EMF24AM23B	$04c65:			✓	✓	N/A		✓	✓
	GS23-43P0	7.2	EMF12AM43B	$04c63:					N/A			
	GS23-53P0	5.8	EMF16AM63B	$04c6a:					N/A*			
	GS23-55P0	9.3	EMF16AM63B	$04c6a:					N/A			
	GS23-45P0	11.6	EMF12AM43B	$04c63:			✓	✓	N/A		✓	✓
	GS23X-27P5	32.4	EMF33AM23B	$04c67:		✓	✓		N/A	✓	✓	
GS20X C	GS23X-47P5	17.3	EMF23AM43B	$04c64:		✓	✓	✓	N/A	✓	✓	✓
	GS23X-4010	22.6	EMF23AM43B	$04c64:		✓	✓	✓	N/A	✓	✓	✓

Continued on next page

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

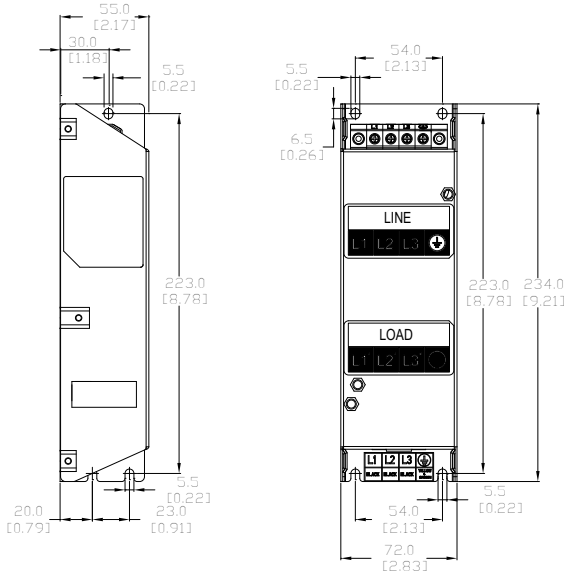
GS20(X) Standard Footprint EMC Filter and Zero Phase Reactor, continued

GS20(X) EMC Filter and Zero Phase Reactor (continued)

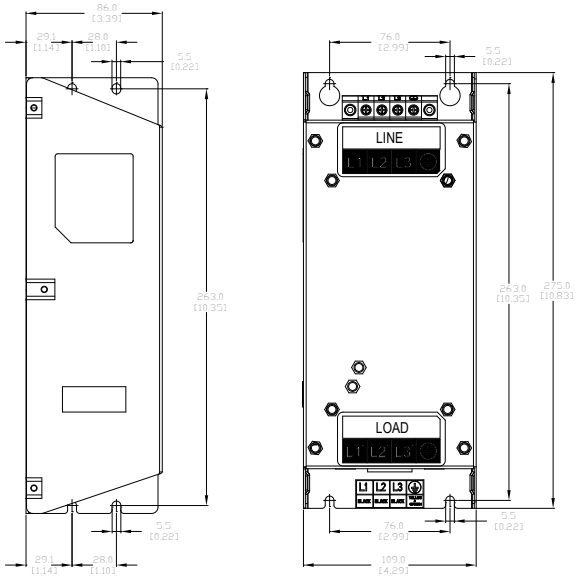
Frame	Drive Model	Input Current (A)	Footprint Filter Model #	Price	Recommended Zero Phase Reactor	Conducted Emission				Radiated Emission		
						C1-motor cable length-30m			C2-motor cable length-100m	C2-motor cable length- 100m		
						Position to Install a Zero Phase Reactor						
						1	2	3	n/a	1	2	3
D	GS23-27P5	32.4	EMF33AM23B	$04c67:	RF008X00A	✓	✓		N/A	✓	✓	
	GS23-47P5	17.3	EMF23AM43B	$04c64:		✓	✓	✓	N/A	✓	✓	✓
	GS23-57P5	13.4	EMF16AM63B	$04c6a:					N/A			
	GS23-5010	17.5	EMF16AM63B	$04c6a:					N/A			
	GS23-4010	22.6	EMF23AM43B	$04c64:		✓	✓	✓	N/A	✓	✓	✓
E	GS23-2010	43.2	n/a	–			✓	✓	N/A		✓	✓
	GS23-2015	61.2	n/a	–			✓	✓	N/A		✓	✓
	GS23-4015	30.8	n/a	–					N/A			
	GS23-4020	39.6	n/a	–			✓	✓	N/A		✓	✓
F	GS23-2020	82.8	n/a	–			✓	✓	N/A		✓	✓
	GS23-4025	45.7	n/a	–			✓	✓	N/A		✓	✓
	GS23-4030	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

GS30 Optional Accessories – EMC Filter & Zero-Phase Reactor

GS30 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 drive models, you may need to use zero-phase reactors to be compliant with EMC regulations. Refer to the table and figures below for the recommended model, setting method, and maximum motor cable length of the EMC filter and zero-phase reactor. The filter's footprint 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 GS30 User Manual.

GS30 EMC Filter and Zero-Phase Reactor, Frames A-F

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		
						Zero-Phase Reactor Position						
						1	2	3	n/a	1	2	3
A	GS31-20P5	6.7	EMF11AM21A	$4c62:	RF008X00A		✓	✓	N/A		✓	✓
	GS33-20P5	3.8	EMF10AM23A	$4c61:			✓	✓			✓	✓
	GS33-21P0	6	EMF10AM23A	$4c61:			✓	✓			✓	✓
	GS33-40P5	2.5	EMF6A0M43A	$4c68:				✓				✓
	GS33-41P0	4.2	EMF6A0M43A	$4c68:				✓				✓
B	GS31-21P0	10.5	EMF11AM21A	$4c62:			✓	✓			✓	✓
	GS33-22P0	9.6	EMF10AM23A	$4c61:			✓	✓			✓	✓
	GS33-42P0	6.4	EMF6A0M43A	$4c68:				✓				✓
C	GS31-22P0	17.9	EMF27AM21B	$04c66:				✓				✓
	GS31-23P0	26.3	EMF27AM21B	$04c66:				✓				✓
	GS33-23P0	15	EMF24AM23B	$04c65:			✓	✓			✓	✓
	GS33-25P0	23.4	EMF24AM23B	$04c65:			✓	✓			✓	✓
	GS33-43P0	7.2	EMF12AM43B	$04c63:								
	GS33-45P0	11.6	EMF12AM43B	$04c63:			✓	✓			✓	✓
D	GS33-27P5	32.4	EMF33AM23B	$04c67:		✓	✓			✓	✓	
	GS33-47P5	17.3	EMF23AM43B	$04c64:		✓	✓	✓		✓	✓	✓
	GS33-4010	22.6	EMF23AM43B	$04c64:		✓	✓	✓		✓	✓	✓
E	GS33-2010	43.2	B84143D0050R127	$05_z2:			✓	✓			✓	✓
	GS33-2015	61.2	B84143D0075R127	$05_z3:			✓	✓			✓	✓
	GS33-4015	30.8	B84143D0050R127	$05_z2:								
	GS33-4020	39.6	B84143D0050R127	$05_z2:			✓	✓			✓	✓
F	GS33-2020	82.8	B84143D0090R127	$;005_z4:			✓	✓			✓	✓
	GS33-4025	45.7	B84143D0050R127	$05_z2:			✓	✓			✓	✓
	GS33-4030	53.9	B84143D0075R127	$05_z3:			✓	✓			✓	✓

Note: It is not necessary to add a zero-phase reactor to pass the C2 conducted emission test.
** The B8xxx series filters are not footprint filters and must be mounted separately.*

GS30 EMC Filter and Zero-Phase Reactor, Frames G-I

Frame	Drive Model	Input Current (A)	Filter Model #	Price	Recommended Zero-Phase Reactor	Conducted Emission									Radiated Emission		
						C1-motor cable length-10m			C2-motor cable length-20m			C3-motor cable length 100m			C2-motor cable length-100m		
						Zero-Phase Reactor Position											
						1	2	3	1	2	3	1	2	3	1	2	3
G	GS33-2025	85	B84143A0120R105	$05_z5:	RF008X00A		✓	✓			✓					✓	✓
	GS33-2030	103	B84143A0120R105	$05_z5:			✓	✓			✓					✓	✓
	GS33-4040	72.5	B84143A0120R105	$05_z5:		✓		✓			✓						
H	GS33-4050	77	B84143D0150R127	$;005_z6:	RF002X00A	✓		✓			✓					✓	✓
	GS33-4060	97	B84143D0150R127	$;005_z6:		✓		✓			✓					✓	✓
I	GS33-2040	126	B84143D0200R127	$;005_z1:		✓	✓	✓								✓	✓
	GS33-2050	151	B84143D0200R127	$;005_z1:		✓	✓									✓	✓
	GS33-4075	123	B84143D0200R127	$;005_z1:			✓										
	GS33-4100	173	B84143D0200R127	$;005_z1:			✓										

Note: It is not necessary to add a zero-phase reactor to pass the C2 conducted emission test.

GS10/GS20 Series Optional Accessories – EMI Input Filters

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

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

GS30 Series Optional Accessories – EMI Input Filters

GS30 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 GS30 series User Manual.

EMI Filters Selection

Model	Description	EMI Filter*	
GS30 Drives		Roxburgh Filters Chassis 1ph	Roxburgh Filters C2 Rated
GS31-20P5	230V 1ph 0.5 hp	RES90F10	MIF10
GS31-21P0	230V 1ph 1.0 hp	RES90F16	MIF16
GS31-22P0	230V 1ph 2.0 hp	RES90S20	MIF23
GS31-23P0	230V 1ph 3.0 hp	RES90S30	MIF330B
GS33-20P5	230V 3ph 0.5 hp	-	KMF306A
GS33-21P0	230V 3ph 1.0 hp	-	KMF306A
GS33-22P0	230V 3ph 2.0 hp	-	KMF318A
GS33-23P0	230V 3ph 3.0 hp	-	KMF318A
GS33-25P0	230V 3ph 5.0 hp	-	KMF325A
GS33-27P5	230V 3ph 7.5 hp	-	KMF336A
GS33-2010	230V 3ph 10hp	-	KMF350A
GS33-2015	230V 3ph 15hp	-	KMF370A
GS33-2020	230V 3ph 20hp	-	KMF3100A
GS33-2025	230V 3ph 25hp	-	KMF3100A
GS33-2030	230V 3ph 30hp	-	KMF3100A
GS33-2040	230V 3ph 40hp	-	MIF3150
GS33-2050	230V 3ph 50hp	-	MIF3150
GS33-40P5	460V 3ph 0.5 hp	-	KMF306A
GS33-41P0	460V 3ph 1.0 hp	-	KMF306A
GS33-42P0	460V 3ph 2.0 hp	-	KMF306A
GS33-43P0	460V 3ph 3.0 hp	-	KMF310A
GS33-45P0	460V 3ph 5.0 hp	-	KMF318A
GS33-47P5	460V 3ph 7.5 hp	-	KMF318A
GS33-4010	460V 3ph 10hp	-	KMF325A
GS33-4015	460V 3ph 15hp	-	KMF336A
GS33-4020	460V 3ph 20hp	-	KMF350A
GS33-4025	460V 3ph 25hp	-	KMF350A
GS33-4030	460V 3ph 30hp	-	KMF370A
GS33-4040	460V 3ph 40hp	-	KMF370A
GS33-4050	460V 3ph 50hp	-	KMF370A
GS33-4060	460V 3ph 60hp	-	KMF3100A
GS33-4075	460V 3ph 75hp	-	MIF3150
GS33-4100	460V 3ph 100hp	-	MIF3150

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

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
GS11N-10P2	1/4	1	120	6	7.2	TJN10	JHL10	20	G3P-020
GS11N-10P5	1/2	1	120	9.4	10.8	TJN10	JHL10	25	G3P-025
GS11N-11P0	1	1	120	18	22	TJN25	JHL25	50	G3P-050
GS11N-20P2	1/4	1	230	5.1	7.2	TJN10	JHL10	15	G3P-015
GS11N-20P5	1/2	1	230	7.3	12.8	TJN15	JHL15	20	G3P-020
GS11N-21P0	1	1	230	10.8	20	TJN20	JHL20	30	G3P-030
GS11N-22P0	2	1	230	16.5	34	TJN35	JHL35	45	G3P-030
GS11N-23P0	3	1	230	24.2	50	TJN50	JHL50	70	G3P-070
GS13N-20P2	1/4	3	230	1.9	7.2	TJN10	JHL10	15	G3P-015
GS13N-20P5	1/2	3	230	3.4	12.8	TJN15	JHL15	15	G3P-015
GS13N-21P0	1	3	230	5.8	20	TJN20	JHL20	15	G3P-015
GS13N-22P0	2	3	230	9	32	TJN35	JHL35	25	G3P-025
GS13N-23P0	3	3	230	13.2	50	TJN50	JHL50	40	G3P-040
GS13N-25P0	5	3	230	20	78	TJN80	JHL80	60	G3P-060
GS13N-27P5	7 1/2	3	230	30	59.4	TJN60	JHL60	63	G3P-060
GS13N-40P5	1/2	3	460	2.1	7.2	TJS10	JHL10	15	G3P-015
GS13N-41P0	1	3	460	3.7	12	TJS15	JHL15	15	G3P-015
GS13N-42P0	2	3	460	5.8	18.4	TJS20	JHL20	15	G3P-015
GS13N-43P0	3	3	460	6.1	26	TJS25	JHL25	20	G3P-020
GS13N-45P0	5	3	460	9.9	42	TJS45	JHL45	30	G3P-030
GS13N-47P5	7 1/2	3	460	14.3	34.5	TJS35	JHL35	32	G3P-030
GS13N-4010	10	3	460	19.3	45.1	TJS45	JHL45	45	G3P-040

** High-speed Class J.*

Note: JHL fuses can be used with GS and DURAPULSE drives in non-UL applications. Fuse the drive according to NEC guidelines (NEC Article 430). For UL applications, 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).

GS30 Series Optional Accessories – Fuses/Circuit Breakers

GS30 Fuses/Circuit Breakers

Protection devices are essential to prevent damage to your GS30 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 GS30 *DURAPULSE* Drives

Drive Model	HP	Input Power			Input Fuse			Circuit Breaker	
		Ø	Volts	GS30 Input Amps	Fuse Amps	Fast Acting Class T	Edison Class J*	Size	Note
GS31-20P5	1/2	1	230	8.3	15	TJN15	JHL15	20	GCB100S-3FF20LL
GS31-21P0	1			11.3	20	TJN20	JHL20	30	GCB100S-3FF30LL
GS31-22P0	2			18.5	35	TJN35	JHL35	45	GCB100S-3FF40LL
GS31-23P0	3			27.5	50	TJN50	JHL50	70	GCB100S-3FF70LL
GS33-20P5	1/2	3		3.8	15	TJN15	JHL15	15	GCB100S-3FF15LL
GS33-21P0	1			6	20	TJN20	JHL20	16	GCB100S-3FF15LL
GS33-22P0	2			9.6	35	TJN35	JHL35	25	GCB100S-3FF25LL
GS33-23P0	3			15	50	TJN50	JHL50	40	GCB100S-3FF40LL
GS33-25P0	5			23.4	80	TJN80	JHL80	60	GCB100S-3FF60LL
GS33-27P5	7 1/2			32.4	60	TJN60	JHL60	63	GCB100S-3FF60LL
GS33-2010	10			43.2	80	TJN80	JHL80	90	GCB100S-3FF90LL
GS33-2015	15			61.2	110	TJN110	JHL110	125	GCB150S-3FF125LL
GS33-2020	20			82.8	150	TJN150	JHL150	160	BW250JAGU-3P160SB
GS33-2025	25			85.0	170	TJN175	JHL175	175	GCB250S-3FF175LL
GS33-2030	30			103.0	206	TJN200	JHL200	200	GCB250S-3FF200LL
GS33-2040	40			126.0	252	TJN250	JHL250	225	GCB250S-3FF225LL
GS33-2050	50			151.0	302	TJN300	JHL300	300	GCB400S-3FF300LL
GS33-40P5	1/2		460	2	10	TJS10	JHL10	15	GCB100S-3FF15LL
GS33-41P0	1			3.3	15	TJS15	JHL15	15	GCB100S-3FF15LL
GS33-42P0	2			5.1	20	TJS20	JHL20	15	GCB100S-3FF15LL
GS33-43P0	3			7.2	25	TJS25	JHL25	20	GCB100S-3FF20LL
GS33-45P0	5			11.6	45	TJS45	JHL45	30	GCB100S-3FF30LL
GS33-47P5	7 1/2			17.3	35	TJS35	JHL35	32	GCB100S-3FF30LL
GS33-4010	10			22.6	45	TJS45	JHL45	45	GCB100S-3FF40LL
GS33-4015	15			30.8	60	TJS60	JHL60	60	GCB100S-3FF60LL
GS33-4020	20			39.6	80	TJS80	JHL80	80	GCB100S-3FF80LL
GS33-4025	25			45.7	90	TJS90	JHL90	90	GCB100S-3FF90LL
GS33-4030	30			53.9	110	TJS110	JHL110	100	GCB100S-3FF100LL
GS33-4040	40			72.5	150	TJN150	JHL150	125	GCB150S-3FF125LL
GS33-4050	50			77.0	160	TJN175	JHL175	150	GCB150S-3FF150LL
GS33-4060	60			97.0	200	TJN200	JHL200	175	GCB250S-3FF175LL
GS33-4075	75			123.0	250	TJN250	JHL250	225	GCB250S-3FF225LL
GS33-4100	100			173.0	350	TJN300	JHL350	300	GCB400S-3FF300LL

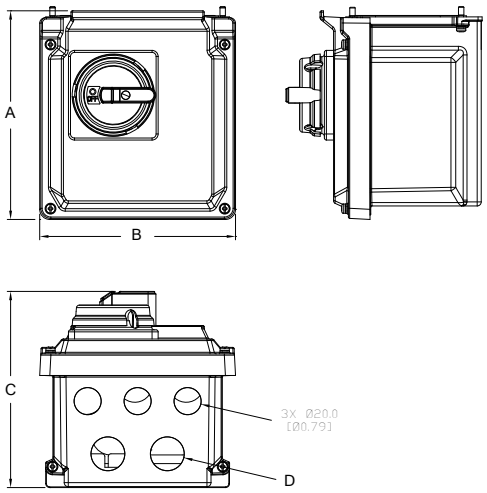
** High-speed Class J.*

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

GS20(X) 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

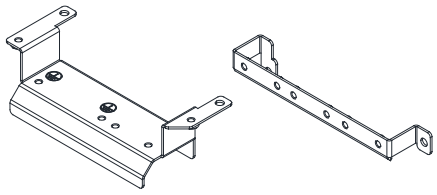
Frame	Part Number	Price	Dimensions (mm [in])			
			A	B	C	D
A	GS20XA-DSA	$04c6c:	154.5 [6.08]	145.0 [5.71]	145.2 [5.72]	2x Ø25.0 [Ø0.98]
B	GS20XA-DSB	$04c6d:	164.5 [6.48]	165.0 [6.50]	152.5 [6.01]	2x Ø32.4 [Ø1.28]
C	GS20XA-DSC	$04c6e:				

GS20X 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	GS20XA-EPA	$4cou:
GS20X	B	GS20XA-EPB	$4cov:
GS20X	C	GS20XA-EPC	$4cox:



Example Earthing Plate - GS20XA-EPA

*Dura*Pulse Optional Accessories – General

EMC Shield Plate

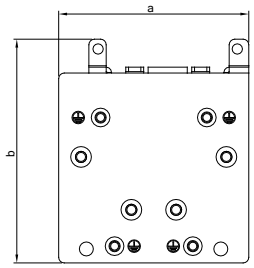
EMC Shield Plates are available for use with shielded cable and your GS10/GS20/GS30 drive. For GS20X drives, please use Earthing Plates. Each shield plate is compatible with all GS10, GS20, and GS30 drives of that frame size. For more information and installation instructions, see your GSxx series User Manual.

EMC Shield Plate Selection

Drive Series	Frame	EMC Shield Plate Model	Price
GS10/20/30	A	GS20A-ESP-A	$4c6h:
GS10/20/30	B	GS20A-ESP-B	$-4c6i:
GS10/20/30	C	GS20A-ESP-C	$-4c6j:
GS10/20/30	D	GS20A-ESP-D	$4c6k:
GS20/30	E	GS20A-ESP-E	$-4c6l:
GS20/30	F	GS20A-ESP-F	$4c6n:
GS30	G	GS30A-ESP-G	$5_yz:
GS30	H	GS30A-ESP-H	$;5_y]:
GS30	I	GS30A-ESP-I	$;5_y[:

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]
GS30A-ESP-G	243.5 [9.59]	154.9 [6.10]
GS30A-ESP-H	262.0 [10.31]	201.9 [7.95]
GS30A-ESP-I	304.0 [11.97]	260.7 [10.26]



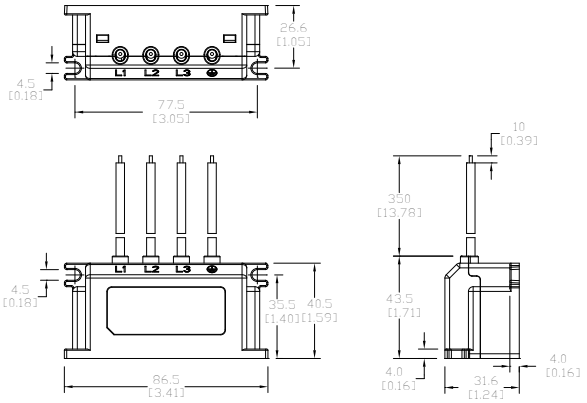
Capacitive Filter

The GS20A-CAPF capacitive filter supports basic filtering and noise interference reduction for all GS10, GS20(X), and G30 models, 460V and below. For more information and installation instructions, please see your GSxx 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)/ GS30	GS20A-CAPF	$4c6b:	110–480 VAC	-40–85°C	Cx: 1uF ± 20% Cy: 0.1uF ± 20%

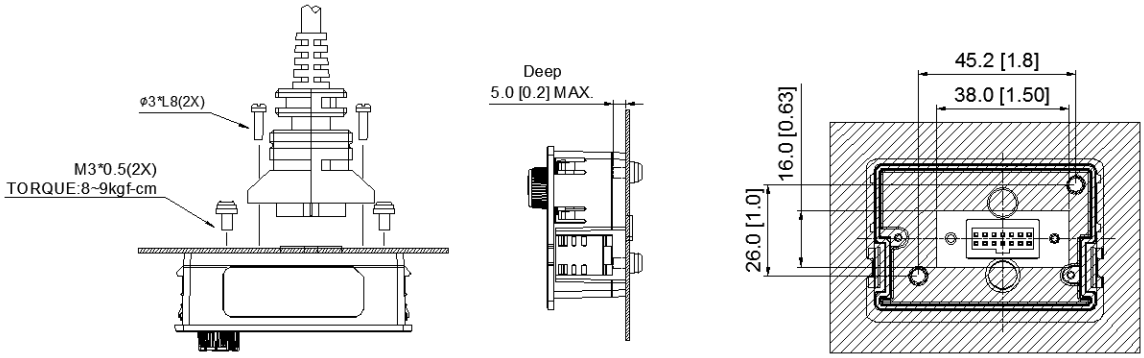


GS20(X) Optional Accessories – Keypad

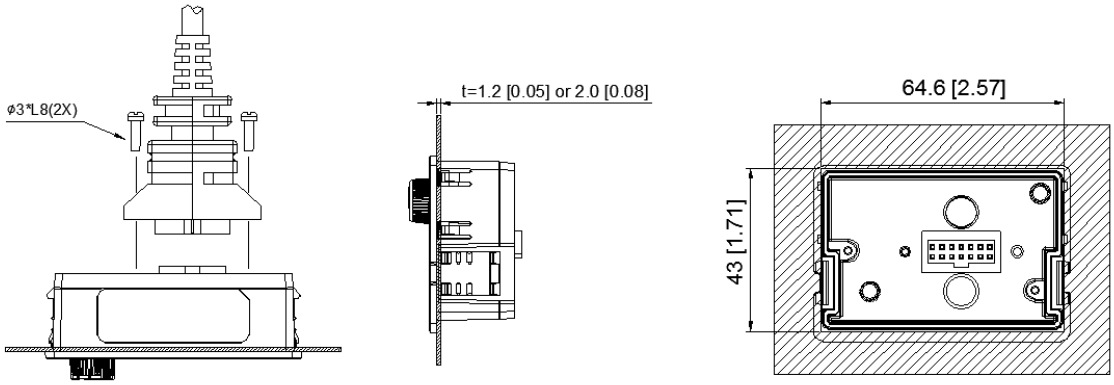
GS20(X) Replacement Keypad

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*
$4c6g:	GS20A-KPD	M3	8–9 kg·cm (6.947.81 lb-in.) [0.78–0.88 N·m]



Direct Mounting on Plate



Embedded Mounting in Plate

GS20 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.

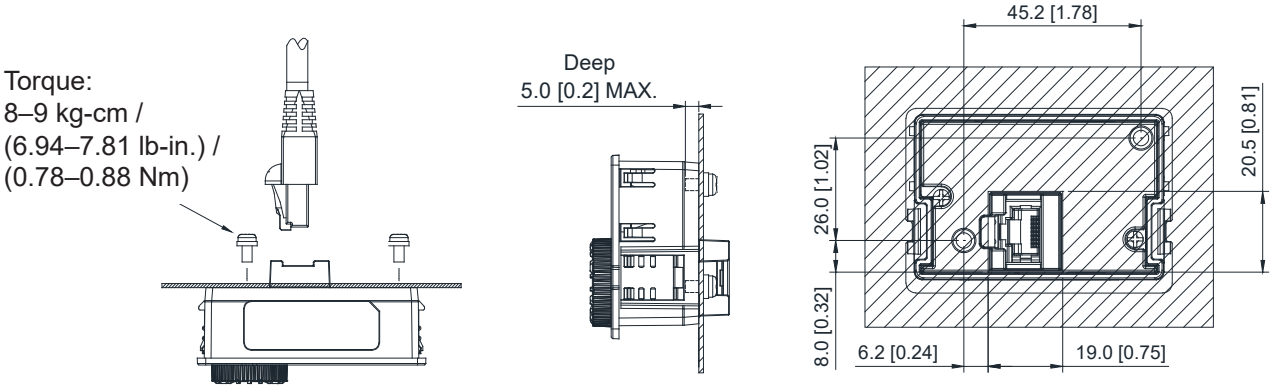
GS20 Keypad Compatible Extension Cables		
Price	*Cable*	*Length (m [ft])*
$04yo:	GS-CBL2-1L	1 [3.28]
$04yp:	GS-CBL2-3L	3 [9.84]
$04yq:	GS-CBL2-5L	5 [16.4]

GS30 Optional Accessories – Keypad

GS30 Replacement Keypad

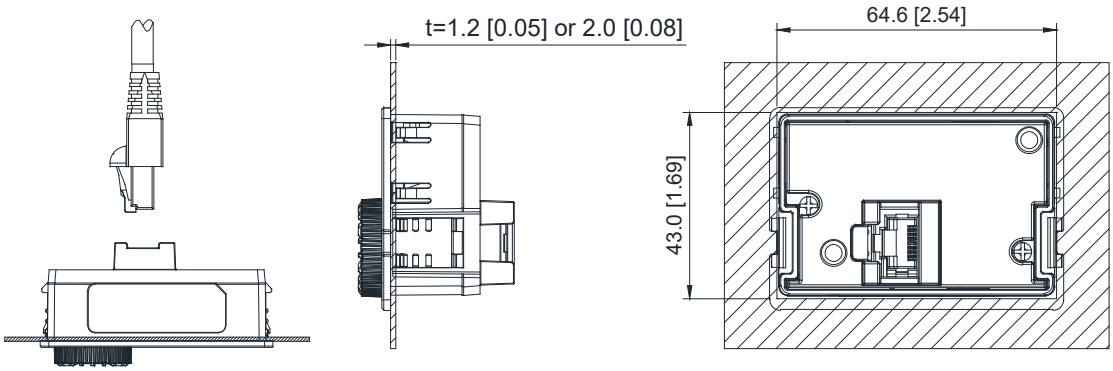
The GS30A-KPD can be used to replace the keypad that comes with each GS30 drive. The replacement keypad can be plugged directly into the drive (no screws needed) or mounted remotely using M3 screws and a standard Cat5E ethernet cable.

GS3A-KPD Replacement Keypad			
Part	*Price*	*Screw*	*Torque*
GS30A-KPD	$;5_y,:	M3	8–9 kg·cm (6.947.81 lb-in.) [0.78–0.88 N·m]



Direct Mounting on Plate

Unit: mm [inch]



Embedded Mounting in Plate

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)**
GS11N-10P2	1.6	3.2	0.25	LR2-10P2-1PH	LR2-20P2	VTF-46-DE
GS11N-10P5	2.5	5	0.5	LR2-10P5-1PH	LR2-20P5	VTF-246-CFG
GS11N-11P0	4.8	9.6	1.0	LR2-11P5-1PH	LR2-21P0	VTF-24-FH
GS11N-20P2	1.6	3.2	0.25	LR2-20P5-1PH	LR2-20P2	VTF-46-DE
GS11N-20P5	2.8	5.6	0.5	LR2-20P5-1PH	LR2-20P5	VTF-246-CFG
GS11N-21P0	4.8	9.6	1.0	LR2-21P5	LR2-21P0	VTF-24-FH
GS11N-22P0	7.5	15	2.0	LR2-22P0-1PH	LR2-22P0	VTF-246-HKL
GS11N-23P0	11	22	3.0	LR-27P5	LR-25P0	VTF-24-JL
GS13N-20P2	1.6	3.2	0.25	LR2-20P2	LR2-20P2	VTF-46-DE
GS13N-20P5	2.8	5.6	0.5	LR2-20P5	LR2-20P5	VTF-246-DGH
GS13N-21P0	4.8	9.6	1.0	LR2-20P7	LR2-20P7	VTF-24-FH
GS13N-22P0	7.5	15	2.0	LR2-22P0	LR2-22P0	VTF-246-HKL
GS13N-23P0	11	22	3.0	LR-25P0	LR-23P0	VTF-24-JL
GS13N-25P0	17	34	5.0	LR-27P5	LR-25P0	VTF-46-LM
GS13N-27P5	25	50	7.5	LR-2010	LR-27P5	VTF-46-NP
GS13N-40P5	1.5	3	0.5	LR2-40P5	LR2-40P5	VTF-46-DE
GS13N-41P0	2.7	5.4	1.0	LR2-42P0	LR2-41P0	VTF-246-CFG
GS13N-42P0	4.2	8.4	2.0	LR2-45P0	LR2-42P0	VTF-24-FH
GS13N-43P0	5.5	11	3.0	LR2-45P0	LR2-43P0	VTF-24-FH
GS13N-45P0	9	18	5.0	LR2-47P5	LR2-45P0	VTF-246-HKL
GS13N-47P5	13	26	7.5	LR-4010	LR2-47P5	VTF-24-JL
GS13N-4010	17.5	34	10.0	LR-4015	LR-4010	VTF-24-JL

** Not available at AutomationDirect.com*
*** All specs for the LR2 and VTF can be found at www.automationdirect.com*

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

GS20(X) 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*

GS30 Series Optional Accessories – Line Reactors/ VTF Filters

GS30 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.

GS30 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)*
GS31-20P5	2.8	5.6	1/2	LR2-20P5-1PH	LR2-20P5	VTF-246-CFG
GS31-21P0	4.8	9.6	1	LR-23P0	LR2-21P0	VTF-24-FH
GS31-22P0	7.5	15	2	LR2-22P0-1PH	LR-22P0	VTF-246-HKL
GS31-23P0	11	22	3	LR-27P5	LR-25P0	VTF-24-JL
GS33-20P5	2.8	5.6	1/2	LR2-20P5	LR2-20P5	VTF-246-DGH
GS33-21P0	4.8	9.6	1	LR2-20P7	LR2-20P7	VTF-24-FH
GS33-22P0	7.5	15	2	LR-22P0	LR-22P0	VTF-246-HKL
GS33-23P0	11	22	3	LR-25P0	LR-25P0	VTF-24-JL
GS33-25P0	17	34	5	LR-27P5	LR-25P0	VTF-46-LM
GS33-27P5	25	50	7 1/2	LR-2010	LR-2010	VTF-46-NP
GS33-2010	33	66	10	LR-2015	LR-2010	VTF-246-LPQ
GS33-2015	46	92	15	LR-2020	LR-2015	VTF-246-NRS
GS33-2020	65	130	20	LR-2030	LR-2020	VTF-246-PSU
GS33-2025	75	140	25	LR-2030	LR-2025	VTF-246-PSU
GS33-2030	90	180	30	LR-2030	LR-2030	VTF-246-RUV
GS33-2040	120	240	40	LR-2040	LR-2040	VTF-246-RUV
GS33-2050	146	292	50	LR-2050	LR-2050	VTF-246-SVW
GS33-40P5	1.5	3	1/2	LR2-40P5	LR2-40P5	VTF-46-DE
GS33-41P0	2.7	5.4	1	LR2-41P0	LR2-41P0	VTF-246-CFG
GS33-42P0	4.2	8.4	2	LR2-43P0	LR2-42P0	VTF-24-FH
GS33-43P0	5.5	11	3	LR2-45P0	LR2-43P0	VTF-24-FH
GS33-45P0	9	18	5	LR2-47P5	LR2-45P0	VTF-246-HKL
GS33-47P5	13	26	7 1/2	LR-4010	LR2-47P5	VTF-24-JL
GS33-4010	17	34	10	LR-4015	LR-4010	VTF-24-JL
GS33-4015	25	50	15	LR-4015	LR-4015	VTF-246-LPQ
GS33-4020	32	64	20	LR-4020	LR-4020	VTF-246-LPQ
GS33-4025	38	76	25	LR-4030	LR-4025	VTF-246-MQR
GS33-4030	45	90	30	LR-4040	LR-4030	VTF-246-NRS
GS33-4040	60	120	40	LR-4050	LR-4040	VTF-246-NRS
GS33-4050	75	150	50	LR-4050	LR-4050	VTF-246-PSU
GS33-4060	91	182	60	LR-4060	LR-4060	VTF-246-PSU
GS33-4075	112	224	75	LR-4100	LR-4075	VTF-246-RUV
GS33-4100	150	300	100	LR-4100	LR-4100	VTF-246-SVW

** All specs for the LR2 and VTF can be found at www.automationdirect.com*

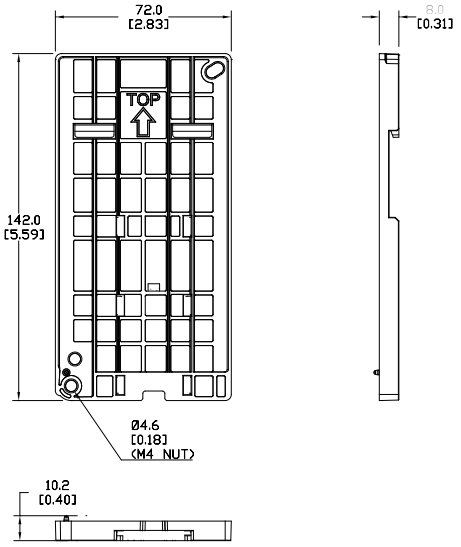
*Dura*Pulse Optional Accessories – Mounting Kits

DIN Rail Mounting

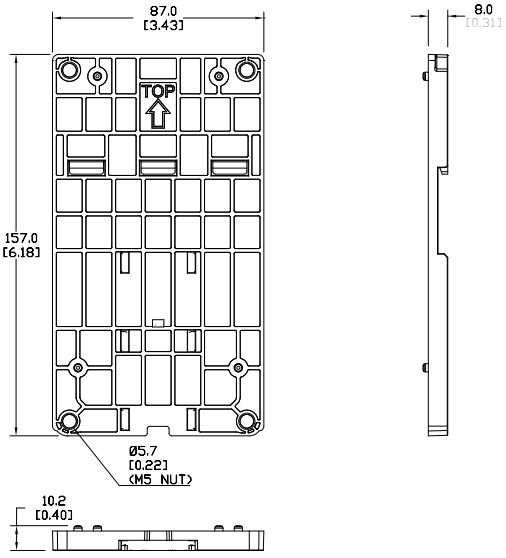
Frame A, B, and C GS10, GS20, and GS30 drives can be DIN rail mounted using a DIN rail mounting kit. One kit is used for A and B frame drives, while a second kit is used for C frame drives. Please see the GSxx series User Manual for additional information and installation instructions.

GSxx DIN Rail Mounting Compatibility

Drive Model			Frame	DIN Rail Kit	Price
GS10 Series	GS20 Series	GS30 Series			
GS11N-10P2	GS21-10P2	–	A1		
GS11N-20P2	GS21-20P2	–	A1		
GS13N-20P2	GS23-20P2	–	A1		
GS13N-20P5	GS23-20P5	GS31-20P5	A2		
–	–	GS33-20P5	A2		
–	–	GS33-40P5	A2		
GS11N-10P5	GS21-10P5	GS33-21P0	A3		
GS11N-20P5	GS21-20P5	GS33-41P0	A3		
GS13N-40P5	GS23-40P5	–	A4	GS20A-DR-AB	$4c6o:
GS13N-21P0	GS23-21P0	–	A5		
–	GS23-41P0	–	A5		
–	GS23-51P0	–	A5		
GS13N-41P0	–	–	A6		
GS13N-22P0	GS23-22P0	GS33-22P0	B1		
GS13N-42P0	GS23-42P0	GS33-42P0	B1		
–	GS23-52P0	–	B1		
GS11N-21P0	GS21-21P0	GS31-21P0	B2		
GS11N-22P0	GS21-11P0	GS31-22P0	C1		
GS11N-23P0	GS21-22P0	GS33-23P0	C1		
GS13N-23P0	GS21-23P0	GS33-25P0	C1		
GS13N-25P0	GS23-23P0	GS33-43P0	C1		
GS11N-11P0	GS23-25P0	GS33-45P0	C1	GS20A-DR-C	$4c6p:
GS13N-43P0	GS23-43P0	–	C1		
GS13N-45P0	GS23-45P0	–	C1		
–	GS23-53P0	–	C1		
–	GS23-55P0	–	C1		



GS20A-DR-AB



GS20A-DR-C

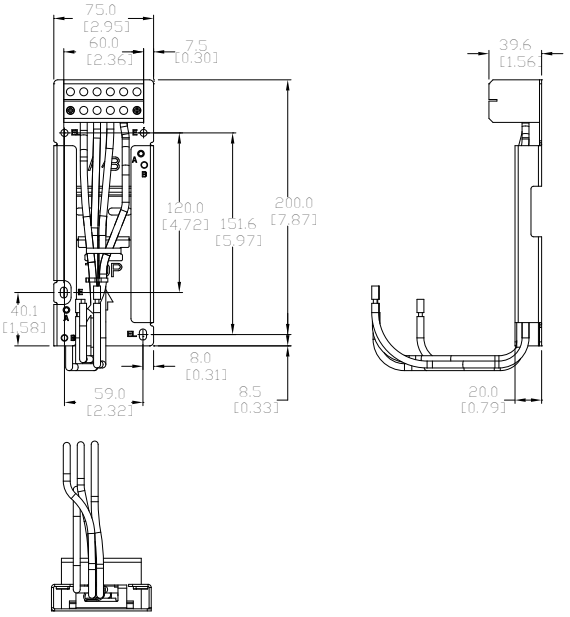
*Dura*Pulse Optional Accessories – Mounting Kits

Mounting Adapter Plate

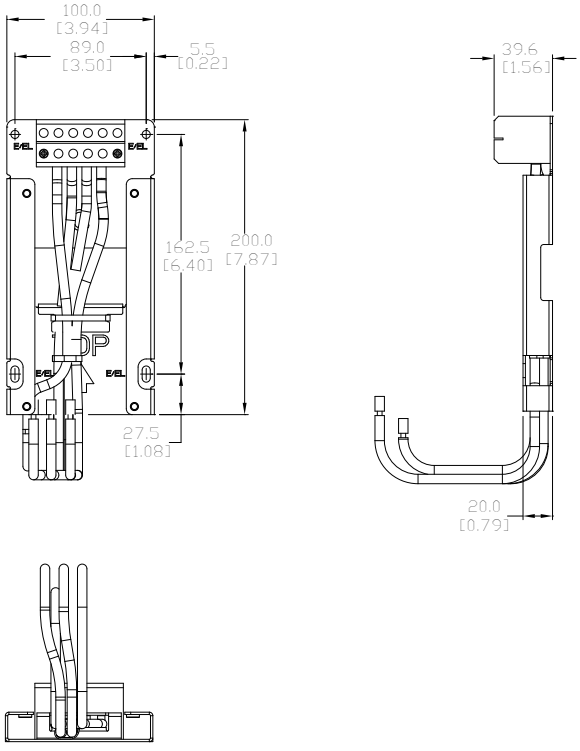
The mounting adapter plate can be used to change the wiring orientation for the GS10, GS20, and GS30 series and provides flexibility for installation. This accessory changes the wiring method from the "bottom-mains input/ bottom-motor output" to the "top-mains input/bottom-motor output" for GS10/GS20/GS30. Use the table below to select the correct mounting plate for your drive. Please see your GSxx series User Manual for additional information and installation instructions.

GSxx Mounting Adapter Compatibility

Drive Model			Frame	Mounting Plate	Price
GS10 Series	GS20 Series	GS30 Series			
GS11N-10P2	GS21-10P2	–	A1	GS20A-MP-AB	$4c6q:
GS11N-20P2	GS21-20P2	–	A1		
GS13N-20P2	GS23-20P2	–	A1		
GS13N-20P5	GS23-20P5	GS31-20P5	A2		
–	–	GS33-20P5	A2		
–	–	GS33-40P5	A2		
GS11N-10P5	GS21-10P5	GS33-21P0	A3		
GS11N-20P5	GS21-20P5	GS33-41P0	A3		
GS13N-40P5	GS23-40P5	–	A4		
GS13N-21P0	GS23-21P0	–	A5		
–	GS23-41P0	–	A5		
–	GS23-51P0	–	A5		
GS13N-41P0	–	–	A6		
GS13N-22P0	GS23-22P0	GS33-22P0	B1		
GS13N-42P0	GS23-42P0	GS33-42P0	B1		
–	GS23-52P0	–	B1		
GS11N-21P0	GS21-21P0	GS31-21P0	B2		
GS11N-22P0	GS21-11P0	GS31-22P0	C1	GS20A-MP-C	$4c6s:
GS11N-23P0	GS21-22P0	GS33-23P0	C1		
GS13N-23P0	GS21-23P0	GS33-25P0	C1		
GS13N-25P0	GS23-23P0	GS33-43P0	C1		
GS11N-11P0	GS23-25P0	GS33-45P0	C1		
GS13N-43P0	GS23-43P0	–	C1		
GS13N-45P0	GS23-45P0	–	C1		
–	GS23-53P0	–	C1		
–	GS23-55P0	–	C1		



GS20A-MP-AB



GS20A-MP-C

*Dura*Pulse Optional Accessories – Replacement Cooling Fans

Cooling Fans for GSxx Series Drives (Spare/Replacement)

NOTE: The fans described below are included with the applicable GS10, GS20(X), and GS30 AC Drive, and are also available for purchase separately as spare/replacement components.

GS10, GS20(X), GS30 – Fan Selection Table							
Drive Model			Fan Model *		Description	Size	Voltage
GS10 Series	GS20(X) Series	GS30 Series	Part #	Price			
GS13N-22P0 GS13N-42P0	GS23-22P0 GS23-42P0 GS23-52P0	GS31-21P0 GS33-22P0 GS33-42P0	GS20A-FAN-B	$4c6#:	GS20 series main cooling fan, replacement.	40x40x15 mm	12VDC
–	GS21X-23P0 GS23X-23P0 GS23X-25P0 GS23X-45P0	–	GS20XA-FAN-B	$4c71:	GS20X series main cooling fan, replacement	60x60x25 mm	
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	GS31-22P0 GS31-23P0 GS33-23P0 GS33-25P0 GS33-43P0 GS33-45P0	GS20A-FAN-C	$;4c6!:	GS20 series main cooling fan, replacement.	50x50x20 mm	
–	GS23X-27P5 GS23X-47P5 GS23X-4010	–	GS20XA-FAN-C	$4c72:	GS20X series main cooling fan, replacement	60x60x25 mm	
GS13N-27P5 GS13N-47P5 GS13N-4010	GS23-27P5 GS23-47P5 GS23-4010 GS23-57P5 GS23-5010	GS33-27P5 GS33-47P5 GS33-4010	GS20A-FAN-D	$4c6?:	GS20 series main cooling fan, replacement.	60x60x25 mm	
–	GS23-2010 GS23-2015 GS23-4015 GS23-4020	GS33-2010 GS33-2015 GS33-4020	GS20A-FAN-E	$;4c6,:	GS20 series main cooling fan, replacement.	92x92x28 mm	24VDC
–	GS23-2020 GS23-4025 GS23-4030	GS33-2020 GS33-4025 GS33-4030	GS20A-FAN-F	$4c70:	GS20 series main cooling fan, replacement.	92x92x38 mm	
–	–	GS33-2025 GS33-2030 GS33-4040	GS30A-FAN-G	$;5_[h:	GS30 series main cooling fan, replacement	204x87x50 mm	
–	–	GS33-4050 GS33-4060	GS30A-FAN-H	$;-05_[i:	GS30 series main cooling fan, replacement	206x95x50 mm	
–	–	GS33-2040 GS33-2050 GS33-4075 GS33-4100	GS30A-FAN-I	$;-05_[j:	GS30 series main cooling fan, replacement	260x121x50 mm	

** 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

*Dura*Pulse Optional Accessories – RF Filter

RF Filter

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 500kHz to 10MHz.

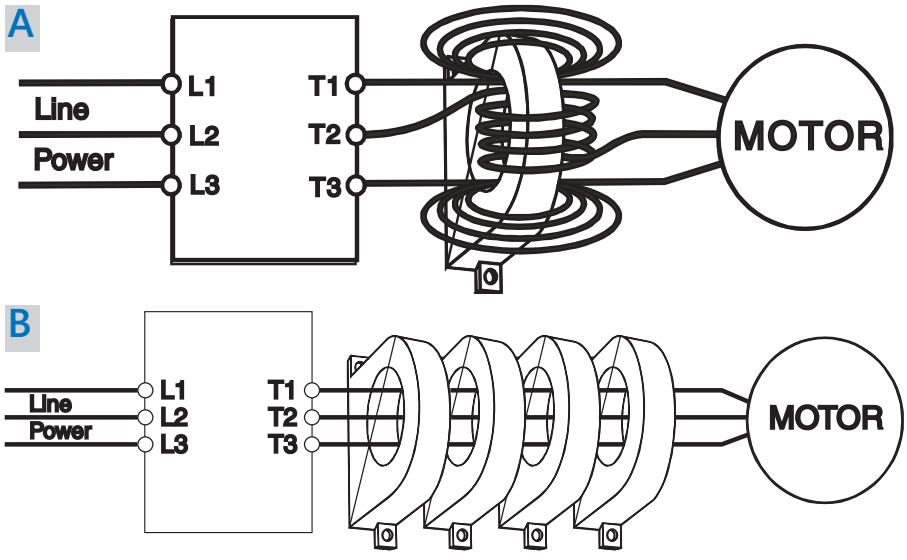
Wiring Method

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) / GS30	RF008X00A	PDF	$-54lq:
GS30	RF004X00A	PDF	$;5_y!:
GS30 (Frame H-I)	RF002X00A	PDF	$05_y?:



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 *DURA*PULSE 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 *DURA*PULSE 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.

*DURA*PULSE 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 *DURA*PULSE GS4 drives of the same model. Users can also store up to 32 parameters of their choice in a custom Quick-Start menu.

*DURA*PULSE 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 599Hz
- 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

Determine Motor Voltage and Full-Load Amperage (FLA)

Motor voltage and FLA are located on the nameplate of the motor.
NOTE: FLA of motors that have been rewound may be higher than stated.

Determine Motor Overload Requirements

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.
NOTE: Applications that require replacement of existing motor starters with AC drives may require up to 600% overload.

Determine Application Type: Constant Torque or Variable Torque

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 (begining pg.tGSX-94) are generally segregated by Constant Torque and Variable Torque.

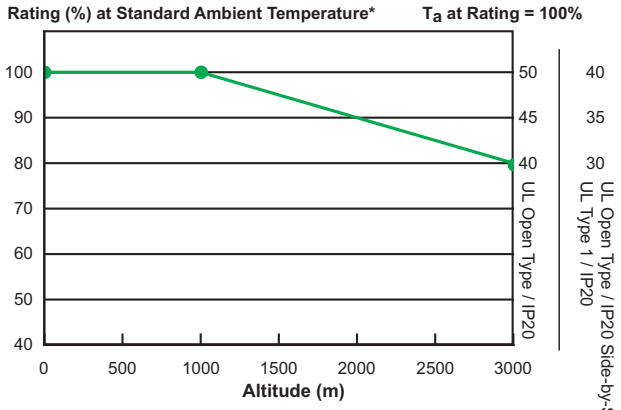
Installation Altitude

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.
NOTE: For use above 1000m, the AC drive must be derated as described below.

Derate Output Current Based on Altitude Above 1000 Meters

- If the AC drive is installed at an altitude of 0–1000m, follow normal operation restrictions.
- 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.
- Maximum altitude for Corner Grounded is 2000m.

GS4 Derating for Altitude



*Standard Ambient Temperature = 50°C for UL Open Type / IP20
*Standard Ambient Temperature = 40°C for UL Type 1 / IP 20 & UL Open Type / IP20 Side-by-Side

(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.

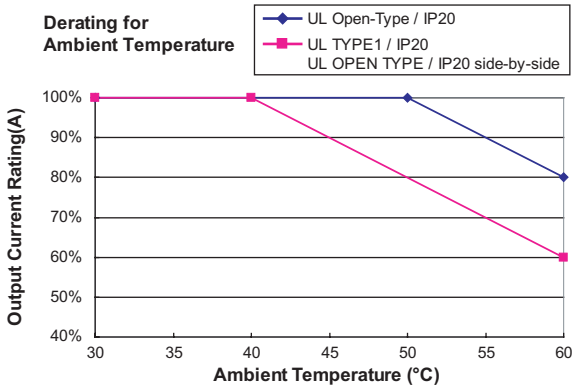
NOTE: For use above 104°F (40°C), the AC drive must be derated as described below.

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***
UL Type I / IP20	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.
UL Open Type ** / IP00/IP20	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-110).*
*** 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-110).*



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DURAPULSE GS4 AC Drives – Selection

Selecting the Proper Drive Rating (continued from previous page)

Derate Output Current Based on Carrier Frequency (if necessary)

Carrier Frequency Effects

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.

Benefits of Higher Carrier Frequencies:

- Better efficiency (lower harmonic losses) in the motor
- Lower audible noise

Benefits of Lower Carrier Frequencies:

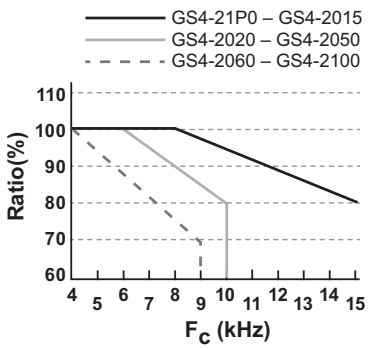
- Better efficiency in the drive
- Lower EMI (electrical noise)
- Reduced reflective wave peak voltage

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 (>20 or 30hp) should not have Carrier Frequencies set higher than 6kHz. Heavy Duty applications typically run around 2–4 kHz.

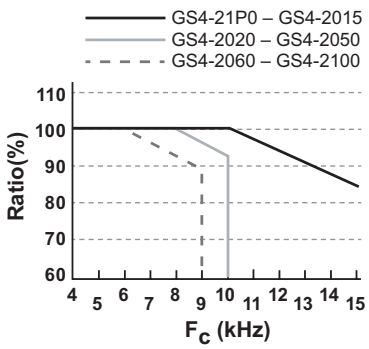
The following Variable Torque (VT) and Constant Torque (CT) derating curves are for drives with 3-phase input power. The 230VAC, CT curves also apply equally whether the drive is supplied with 3-phase or 1-phase input power.

230V Variable Torque Carrier Frequency Derating

For 230V Variable Torque
50°C UL Open Type
40°C UL Type 1 or Open Type side-by-side

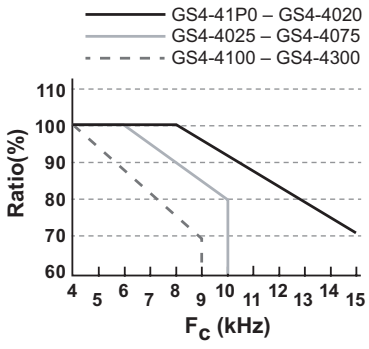


For 230V Variable Torque
40°C UL Open Type
30°C UL Type 1 or Open Type side-by-side

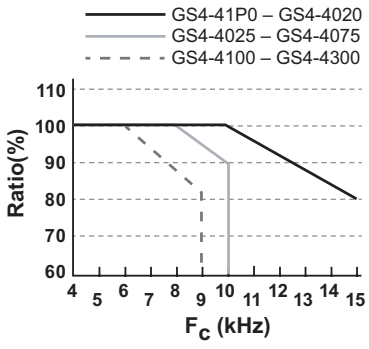


460V Variable Torque Carrier Frequency Derating

For 460V Variable Torque
50°C UL Open Type
40°C UL Type 1 or Open Type side-by-side



For 460V Variable Torque
40°C UL Open Type
30°C UL Type 1 or Open Type side-by-side



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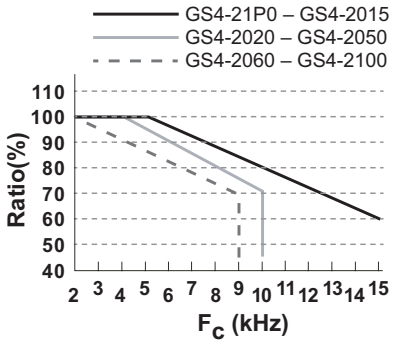
DURAPULSE GS4 AC Drives – Selection

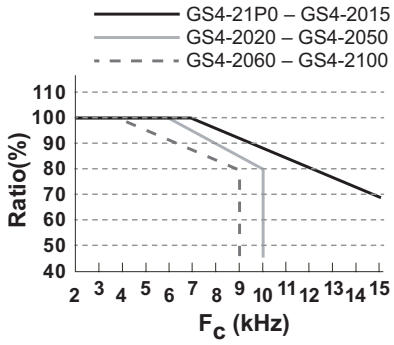
Selecting the Proper Drive Rating (continued from previous page)

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

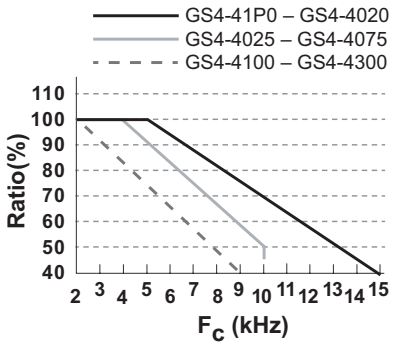


For 230V Constant Torque
40°C UL Open Type
30°C UL Type 1 or Open Type side-by-side

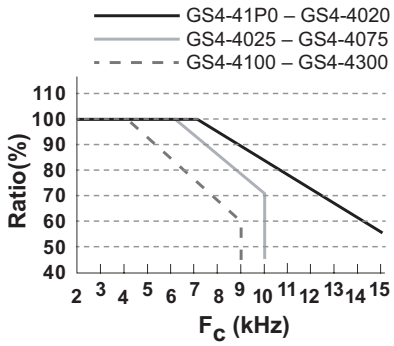


460V Constant Torque Carrier Frequency Derating

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				$010bx:	$010by:	$010bz:	$;010b]:	$010bk:	$;-0010bl:	$;0010bn:
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 * (1-phase / 3-phase)**	**A**	6.4 / 6.1	9.7 / 11	15 / 15	20 / 18.5	26 / 26	26 / 34	40 / 50
	VT			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						

** 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 (www.automationdirect.com). Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-164) for input fusing information.*

*** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).*

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				$;0010bo:	$;0010bp:	$;;0010b[:	$;0010cd:	$;0010ce:	$;0010c1:	$;0010c5:	$;0010bq:
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			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							

** 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 (www.automationdirect.com). Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-164) for input fusing information.*

*** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).*

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	GS4-4010	GS4-4015	GS4-4020
Price				$010bs:	$;010bt:	$010bu:	$010bv:	$010b_:	$;;0010cf:	$;;0010b,:	$;0010c3:
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			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							

** 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 (www.automationdirect.com).
Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-164) for input fusing information.
*** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).*

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				$;0010c7:	$;0010b#:	$;0010b?:	$;0010c2:	$;0010c6:	$;0010c9:	$;;0010b!:
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			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						

** 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 (www.automationdirect.com).
Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-164) for input fusing information.
*** Watt loss is reduced if the GS4 drive is flange mounted (frame sizes A through F).*

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				$;0010c0:	$;0010c4:	$;00010c8:	$;00010cc:	$;00010ca:	$;00010cb:
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			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					

** 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 (www.automationdirect.com).
Please refer to "GS4 DURApulse Accessories – Fusing" (pg.tGSX-164) 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).*

DURAPULSE GS4 AC Drives – General Specifications

GS4 General Specifications (Applicable to All Models)		
Control Characteristics	Control Method	1: V/F (V/Hz control); 2: SVC (sensorless vector control)
	Starting Torque	Up to 120% Variable Torque (VT) or 150% Constant Torque (CT) for one minute
	V/F Curve	4 point adjustable V/Hz curve and square curve
	Speed Response Ability	5Hz
	Torque Limit	VT: 170% output current CT: 180% output current
	Torque Accuracy	±5%
	Max Output Frequency (Hz)	230V series: 599.00 Hz (75hp & above: 400.00 Hz) 460V series: 599.00 Hz (125hp & above: 400.00 Hz)
	Output Frequency Accuracy	Digital command: ±0.01%, -10°C to +40°C Analog command: ±0.1%, 25±10°C
	Output Frequency Resolution	Digital command: 0.01Hz Analog command: (0.03) x (max output frequency) / 60Hz [±11 bit]
	Overload Tolerance	VT duty: rated output current is 120% for 60 seconds CT duty: rated output current is 150% for 60 seconds
	Frequency Setting Signal	+10V to -10V, 0 to 10V, 4–20mA, 0–20mA
	Accel/Decel Time	0.00–600.00 / 0.0–6000.0 seconds
	Main Control Function	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
	Fan Control	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
Protection Characteristics	Motor Protection	Electronic thermal relay protection
	Over-current Protection	For drive model 230V and 460V: Over-current protection for 240% rated current Current clamp: VT duty 170–175%; CT duty 180–185%
	Over-voltage Protection	230V: drive will stop when DC-BUS voltage exceeds 410V 460V: drive will stop when DC-BUS voltage exceeds 820V
	Over-temperature Protection	Built-in temperature sensor
	Stall Prevention	Independent stall prevention during acceleration, deceleration, and running
	Restart After Instantaneous Power Failure	Up to 20 seconds (parameter settable)
	Ground Leakage Current Protection	Leakage current is higher than 50% of rated current of the AC motor drive
	Hi-Pot Test	UL508C; EN 61800-5-1
	Conformal Coating	IEC-60721-3-3
Agency Approvals		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.) *To obtain the most current agency approval information, see the Agency Approval Checklist section on the specific part number's web page.*

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
		pg.tGSX-103	pg.tGSX-104	pg.tGSX-105	pg.tGSX-105	pg.tGSX-101	pg.tGSX-102	pg.tGSX-108	230V pg.tGSX-106 460V pg.tGSX-107	pg.tGSX-109
GS4-21P0	A	GSOFT2	GSLOGIC	GS4-KPD	GS4-BZL	GS4-06CDD GS4-06NA GS4-06TR	GS4-CM-ENETIP GS4-CM-MODTCP	n/a	n/a	GS4-FMKIT-A
GS4-22P0									GS4-FAN-AM	GS4-FMKIT-1
GS4-23P0										
GS4-25P0										GS4-FMKIT-A
GS4-27P5	B							n/a	GS4-FAN-BM1 GS4-FAN-BB	GS4-FMKIT-B
GS4-2010									GS4-FAN-BM2 GS4-FAN-BB	
GS4-2015										
GS4-2020	C							n/a	GS4-FAN-CM GS4-FAN-CB1	GS4-FMKIT-C
GS4-2025										
GS4-2030										
GS4-2040	D**							GS4-CBX-D	GS4-FAN-DM GS4-FAN-DB	n/a
GS4-2050										
GS4-2060	E**							GS4-CBX-E	GS4-FAN-EM1 GS4-FAN-EB	n/a
GS4-2075										
GS4-2100									GS4-FAN-EM2 GS4-FAN-EB	
GS4-41P0	A							n/a	n/a	GS4-FMKIT-A
GS4-42P0										
GS4-43P0									GS4-FAN-AM	GS4-FMKIT-1
GS4-45P0										GS4-FMKIT-A
GS4-47P5										
GS4-4010	B							n/a	GS4-FAN-BM1 GS4-FAN-BB	GS4-FMKIT-B
GS4-4015									GS4-FAN-BM2 GS4-FAN-BB	
GS4-4020										
GS4-4025	C							n/a	GS4-FAN-CM GS4-FAN-CB2	GS4-FMKIT-C
GS4-4030										
GS4-4040										
GS4-4050	D0**							GS4-CBX-D0	GS4-FAN-D0M GS4-FAN-DB	n/a
GS4-4060										
GS4-4075	D**							GS4-CBX-D	GS4-FAN-DM GS4-FAN-DB	n/a
GS4-4100										
GS4-4125	E**							GS4-CBX-E	GS4-FAN-EM2 GS4-FAN-DB	n/a
GS4-4150										
GS4-4175	F**							GS4-CBX-F	GS4-FAN-FM GS4-FAN-FB	n/a
GS4-4200										
GS4-4250	G							GS4-CBX-G	GS4-FAN-GM	n/a
GS4-4300										

** 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.

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.

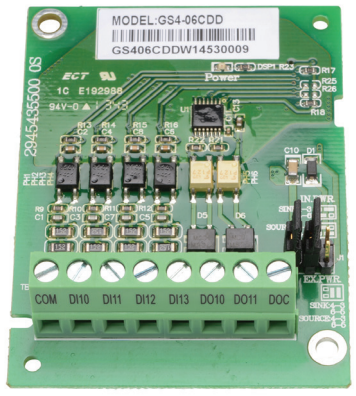
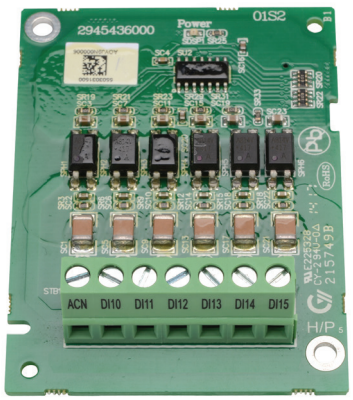
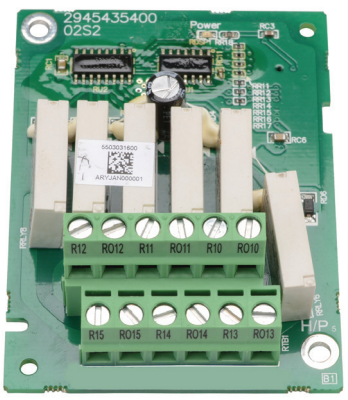
Input/Output Expansion Cards

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 *DURA*PULSE Drives Input/Output Expansion Cards

Part Number	Price	Description	Terminals	Specifications	Wire Size	Placement*	GS Drive
GS4-06CDD*	$10_9:	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			
GS4-06NA*	$10_5:	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			
GS4-06TR*	$10_6:	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.*

GS4-06CDD	GS4-06NA	GS4-06TR
		

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 *DURA*PULSE Drives Communication Interface Cards					
Part Number	**Price**	**Description**	**Specifications**	**Placement***	**GS Drive**
GS4-CM-ENETIP*	$010_7:	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 *for ModTCP connections* is *not* supported on the EtherNet/IP card.	slot #1	GS4 – all
GS4-CM-MODTCP*	$010_8:	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-CM-ENETIP	*GS4-CM-MODTCP*
	

*Dura*Pulse Accessories – Software
GSoft2 Drive Configuration Software

GSoft2 Drive Configuration Software

Available for *FREE* Download

***DURA*PULSE Drives GSOFT2 Drive Configuration Software**			
Part Number	***Price****	***Description***	***For GS Drive***
GSOFT2	$1nvq:	GSOFT2 Windows configuration software, USB or free download. For use with DURApulse GS4, GS10, GS20, GS20X and GS30 series AC drives. Requires PC serial port or USB-485M serial adapter.	GS4 – all GS10 – all GS20(X) – all GS30 – all
USB-485M	$02_o:	PC adapter, USB A to RS-485 (RJ45/RJ12).	GS4/GS10
USB-CBL-AB3	$04kd:	Programming cable, USB A to USB B, 3ft cable length.	GS4 – all (for Drive FW only) GS20(X) – all GS30 – all
**** GSOFT2 can be downloaded for free or purchased on USB from AutomationDirect.com (search for GSOFT2).***			

GSOFT2 Drive Configuration Software

GSoft2 is the configuration software for the Automation *Dura*Pulse 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
- Real-time trending
- Start/Stop drive and switch directions, provided drive is set up for remote operation
- View drive faults

Computer System Requirements

GSoft2 will run on Windows PCs that meet the following requirements:

- Windows OS: ***8***: 32 & 64 bit, ***8.1***: 32 & 64 bit, ***10***: 64 bit, 11
- Edge or Chrome (for HTML help support)
- 32 Mb of available memory
- 10 Mb hard drive space
- Available USB port
- USB to RS485 adapter needed for GS4 and GS10 models

GS4/GS20(X)/GS30 Accessories – Software
GSLogic PLC Programming Software

Optional Accessory Software Applicable Only to AC Drive Series:

- *GS4*
- *GS20(X)*
- *GS30*

GSLOGIC Drive Configuration Software

Available for *FREE* Download

GS4/GS20(X)/GS30 *DURA*PULSE Drives GSLogic PLC Programming Software

Part Number	*Price**	*Description*	*For GS Drive*
GSLOGIC	$1nvs:	GSLOGIC Windows logic software, USB or free download. For use with DURApulse GS4, GS20, GS20X and GS30 series AC drives. Requires PC serial port or USB-485M serial adapter.	GS4 - all GS20(X) – all GS30 – all
USB-485M	$02_o:	PC adapter, USB A to RS-485 (RJ45/RJ12).	GS4 – all
USB-CBL-AB3	$04kd:	Programming cable, USB A to USB B, 3ft cable length.	GS20(X) – all GS30 – all

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

PLC Summary

The GS4, GS20(X), and GS30 drives include a built-in PLC. Programmed in ladder logic, the PLC provides a comprehensive set of instructions and 2,000 (GS20(X)), 5,000 (GS30), 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, GS20(X), and GS30 drive, and can be accessed over communications by external PLCs (via serial Modbus), or by the drive itself (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, GS20(X), and GS30 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:

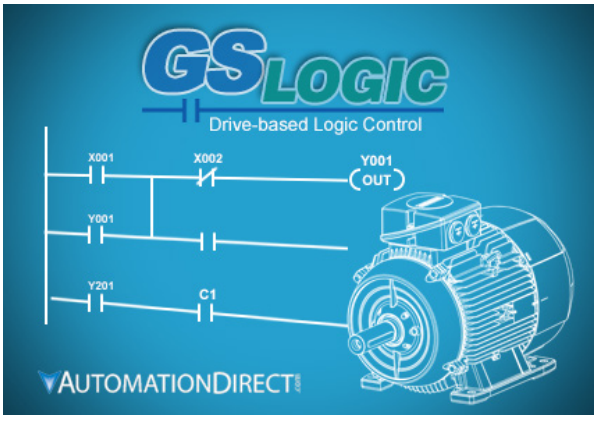
- Upload/download drive PLC program files to the onboard PLC
- Create new drive PLC programs
- Edit drive PLC programs
- Archive/store multiple drive PLC programs on your PC or the GS4-KPD drive keypad
- Control drive PID loops (FPID instructions)
- View in real time all drive PLC registers
- Print drive 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: ***8***: 32 & 64 bit, ***8.1***: 32 & 64 bit, ***10***: 64 bit, ***11***
- 300MB free hard-disk space
- USB Port required for project transfer to drive
- USB-485M serial adapter required for GS4 models



*Dura*Pulse Optional Accessories – Advanced LCD Keypad

Advanced Keypad

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)/GS30.

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)/GS30 AC drive.

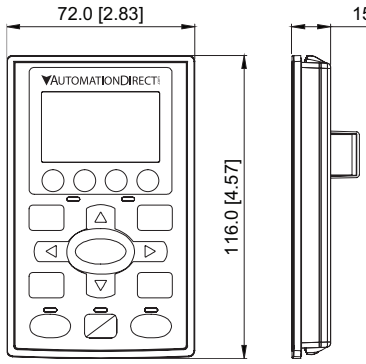
GSx Series *DURA*PULSE Drives Keypad and Keypad Panel-Mounting Kit			
Part Number	***Price***	***Description***	***For GS Drive***
GS4-KPD*	$;;010[[:	Spare or replacement keypad for GS4 AC drives; optional advanced keypad for GS20(X) drives; includes RJ45 connector; great for maintenance or back-up programs.	GS4 – all GS10 – all GS20(X) – all GS30 – all
GS4-BZL*	$10_4:	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 GS30 – 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

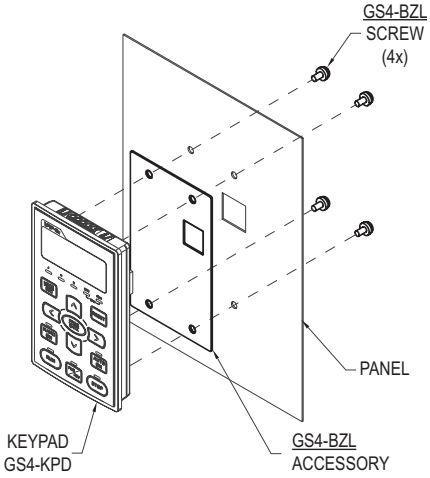
RJ45 Connector

Dimensions (mm [in])

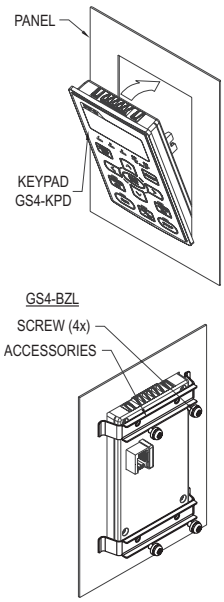


GS4-BZL

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	GS4-FAN-AM	$;10[p:		Frame A main	40mm	24	0.15	1
GS4-27P5	GS4-FAN-BM1	$;-10[j:		Frame B main	80mm	24	0.33	1
	GS4-FAN-BB	$;10[q:		Frame B board level	40mm	24	0.18	1
GS4-2010 GS4-2015	GS4-FAN-BM2	$;10[k:		Frame B main	80mm	24	0.51	1
	GS4-FAN-BB	$;10[q:		Frame B board level	40mm	24	0.18	1
GS4-2020 GS4-2025 GS4-2030	GS4-FAN-CM	$;10[s:		Frame C main	92mm	24	0.75	1
	GS4-FAN-CB1	$;-10[l:		Frame C board level	40mm	24	0.18	1
GS4-2040 GS4-2050	GS4-FAN-DM	$;010[v:		Frame D main	92mm	24	0.75	2
	GS4-FAN-DB	$;10[u:		Frame D board level	70mm	24	0.33	1
GS4-2060 GS4-2075	GS4-FAN-EM1	$;010[o:		Frame E main	120mm	24	1.08	2
	GS4-FAN-EB	$;010[x:		Frame E board level	120mm	24	0.76	1
GS4-2100	GS4-FAN-EM2	$;-010[i:		Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
	GS4-FAN-EB	$;010[x:		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	GS4-FAN-AM	$;10[p:		Frame A main	40mm	24	0.15	1
GS4-4010	GS4-FAN-BM1	$;-10[j:		Frame B main	80mm	24	0.33	1
	GS4-FAN-BB	$;10[q:		Frame B board level	40mm	24	0.18	1
GS4-4015 GS4-4020	GS4-FAN-BM2	$;10[k:		Frame B main	80mm	24	0.51	1
	GS4-FAN-BB	$;10[q:		Frame B board level	40mm	24	0.18	1
GS4-4025 GS4-4030 GS4-4040	GS4-FAN-CM	$;10[s:		Frame C main	92mm	24	0.75	1
	GS4-FAN-CB2	$;10[n:		Frame C board level	40mm	12	0.60	1
GS4-4050 GS4-4060	GS4-FAN-D0M	$;;10[t:		Frame D0 main	80mm	24	0.75	2
	GS4-FAN-DB	$;10[u:		Frame D board level	70mm	24	0.33	1
GS4-4075 GS4-4100	GS4-FAN-DM	$;010[v:		Frame D main	92mm	24	0.75	2
	GS4-FAN-DB	$;10[u:		Frame D board level	70mm	24	0.33	1
GS4-4125 GS4-4150	GS4-FAN-EM2	$;-010[i:		Frame E main	92mm 120mm 120mm	24	0.75 1.08 1.08	3
	GS4-FAN-EB	$;010[x:		Frame E board level	120mm	24	0.76	1
GS4-4175 GS4-4200	GS4-FAN-FM	$;010[z:		Frame F main	92mm	24	0.76	4
	GS4-FAN-FB	$;010[y:		Frame F board level	120mm	24	1.08	1
GS4-4250 GS4-4300	GS4-FAN-GM	$;;;0010[]:		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	GS4-CBX-D0	$;010[_:		NEMA 1 conduit box kit for use with GS4 frame size DO AC drive; mounting hardware included
GS4-2040, GS4-2050; GS4-4075, GS4-4100	D	GS4-CBX-D	$;010[#:		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	GS4-CBX-E	$;;010[!:		NEMA 1 conduit box kit for use with GS4 frame size E AC drive; mounting hardware included
GS4-4150, GS4-4200	F	GS4-CBX-F	$;010[?:		NEMA 1 conduit box kit for use with GS4 frame size F AC drive; mounting hardware included
GS4-4250, GS4-4300	G	GS4-CBX-G	$;;010[,:		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.

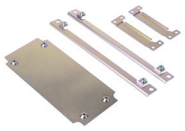
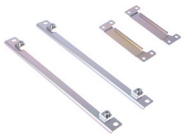
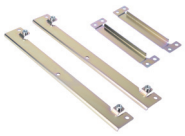
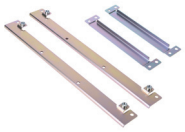
GS4-Specific Optional Accessories – Flange Mounting Kits

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	GS4-FMKIT-1	$10_0:		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	GS4-FMKIT-A	$10_1:		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	GS4-FMKIT-B	$10_2:		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	GS4-FMKIT-C	$10_3:		GS4 series Flange Mounting Kit, NEMA 1; for use with GS4 Frame C drives; mounting hardware included

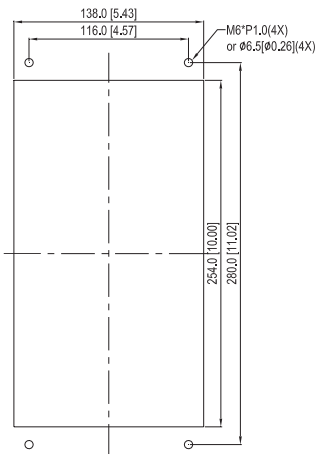
* *See panel cutout dimensions below for GS4 Frames A, B, C.*

* *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.*

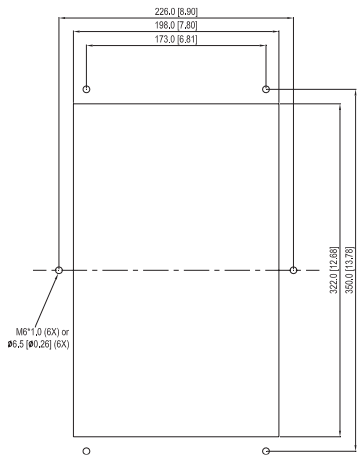
* *Frame size G cannot be flange-mounted.*

GS4 Flange Mounting Kit Cutout Dimensions (mm [in])

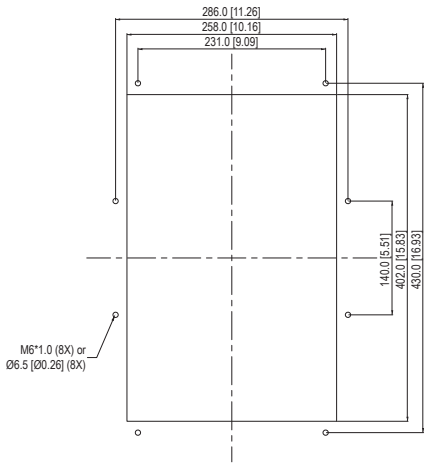
Frame A



Frame B



Frame C

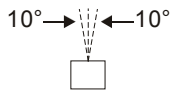


*DURA*PULSE GS4 AC Drives Specifications – Installation

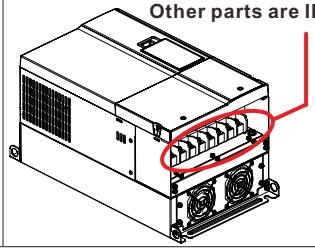
Understanding the installation requirements for your *DURA*PULSE AC drive will help to ensure that it operates within its environmental and electrical limits.

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

Condition	Operation	Storage	Transportation
Installation Location	IEC60364-1/IEC60664-1 Pollution degree 2, Indoor use only	n/a	n/a
Ambient Temperature	see separate Operating Temperature table below	-25°C to +70°C	
Relative Humidity	Max 90%, non-condensing, non-frozen	Max 95%, non-condensing, non-frozen	
Air Pressure	86 to 106 kPa		70 to 106 kPa
Pollution Level	IEC721-3-3, no concentrate		
	Class 3C2; Class 3S2	Class 2C2; Class 2S2	Class 1C2; Class 1S2
Altitude	0–1000m (see separate derating section for altitudes of 1000–3000m)	n/a	n/a
Package Drop	n/a	ISTA procedure 1A(according to weight) IEC60068-2-31	
Vibration	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		
Impact	IEC/EN 60068-2-27		
Installation Orientation	Max allowed offset angle ±10° (from vertical installation position) 		

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 * **Only the circled area is IP00. Other parts are IP20.** 	-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[1] for Cooling						Power (Heat) Dissipation[2]		
	Flow Rate[1] (cfm)			Flow Rate[1] (m^3/hr)			Power Dissipation[2] (Watt)		
	External	Internal	Total	External	Internal	Total	External (Heat sink)	Internal	Total
GS4-21P0	–	–	–	–	–	–	33	27	60
GS4-22P0	14	–	14	24	–	24	56	31	87
GS4-23P0	14	–	14	24	–	24	79	36	115
GS4-25P0	10	–	10	17	–	17	113	46	159
GS4-27P5	40	14	54	68	24	92	197	67	264
GS4-2010	66	14	80	112	24	136	249	86	335
GS4-2015	58	14	73	99	24	123	409	121	530
GS4-2020	166	12	178	282	20	302	455	161	616
GS4-2025	166	12	178	282	20	302	549	184	733
GS4-2030	166	12	178	282	20	302	649	216	865
GS4-2040	179	30	209	304	51	355	913	186	1099
GS4-2050	179	30	209	304	51	355	1091	220	1311
GS4-2060	228	73	301	387	124	511	1251	267	1518
GS4-2075	228	73	301	387	124	511	1401	308	1709
GS4-2100	246	73	319	418	124	542	1770	369	2139
GS4-41P0	–	–	–	–	–	–	33	25	58
GS4-42P0	–	–	–	–	–	–	45	29	74
GS4-43P0	14	–	14	24	–	24	71	33	104
GS4-45P0	10	–	10	17	–	17	103	38	141
GS4-47P5	10	–	10	17	–	17	134	46	180
GS4-4010	40	14	54	68	24	92	216	76	292
GS4-4015	66	14	80	112	24	136	287	93	380
GS4-4020	58	14	73	99	24	123	396	122	518
GS4-4025	99	21	120	168	36	204	369	138	507
GS4-4030	99	21	120	168	36	204	476	158	634
GS4-4040	126	21	147	214	36	250	655	211	866
GS4-4050	179	30	209	304	51	355	809	184	993
GS4-4060	179	30	209	304	51	355	929	218	1147
GS4-4075	179	30	209	304	51	355	1156	257	1413
GS4-4100	186	30	216	316	51	367	1408	334	1742
GS4-4125	257	73	330	437	124	561	1693	399	2092
GS4-4150	223	73	296	379	124	503	2107	491	2598
GS4-4175	224	112	336	381	190	571	2502	579	3081
GS4-4200	289	112	401	491	190	681	3096	687	3783
GS4-4250	–		454	–		771	–		4589
GS4-4300			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

Terminal	Description	Remarks
+10V	Potentiometer Power Supply	Analog frequency setting: +10VDC 20mA max output
-10V		Analog frequency setting: -10VDC 20mA max output
+24V	Digital Control Signal Source	+24V±5%, 200mA max output; use with DCM
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)
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);
AI3	Analog Input 3	Impedance: 20kΩ Range: -10VDC to +10 VDC = 0–Max Output Frequency *Note: For -10V to +10V operation, connect the pot to +10V and -10V. Keep the pot wiper connected to AI3.*
ACM	Analog Common	Common for analog terminals
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
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	Safe Torque Off function. Refer to Appendix E: Safe Torque Off for more details.
ECM	EStop Common	
SCM1	STO Input 1 Common	
SCM2	STO Input 2 Common	
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] x 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 Pin 4: SG- Pin 5: SG+ (RJ45-1 and RJ45-2 are connected internally to ports SG+ and SG- below)
RJ45-2	RJ45 Port 2 (RS-485)	
SG+, SG-, SGND	Modbus RS-485 (SG+ and SG- are connected internally to the two RJ45 ports above)	
⏚	Digital Control Ground	

Main Circuit Terminals

Terminal	Description
R/L1	Input Power – phase 1
S/L2	Input Power – phase 2
T/L3	Input Power – phase 3
U/T1, V/T2, W/T3	AC Drive Output
+1, +2	DC Choke Connection (frames A–C)
B1, B2	Braking Resistor Connection (frames A–C)
+1/DC+, -/DC-	External Dynamic Brake Unit (frames D–G)
⏚	Ground

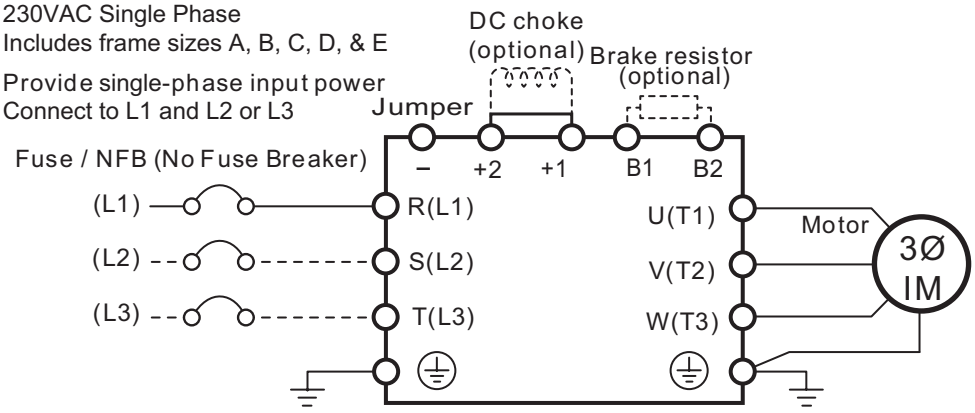
DURAPULSE GS4 AC Drives – Basic Wiring Diagram

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.

GS4-2xxx models,
230VAC Single Phase
Includes frame sizes A, B, C, D, & E

Provide single-phase input power
Connect to L1 and L2 or L3



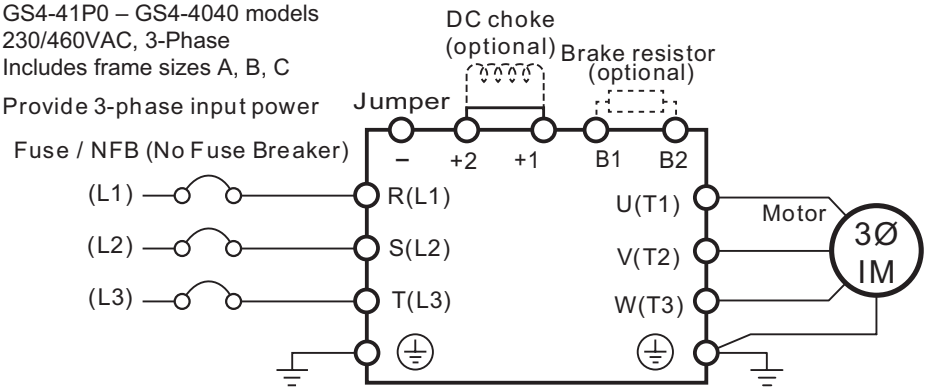
Connect 230VAC, Single-Phase power to any two of the R, S, or T terminals

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.

GS4-21P0 – GS4-2030
GS4-41P0 – GS4-4040 models
230/460VAC, 3-Phase
Includes frame sizes A, B, C

Provide 3-phase input power



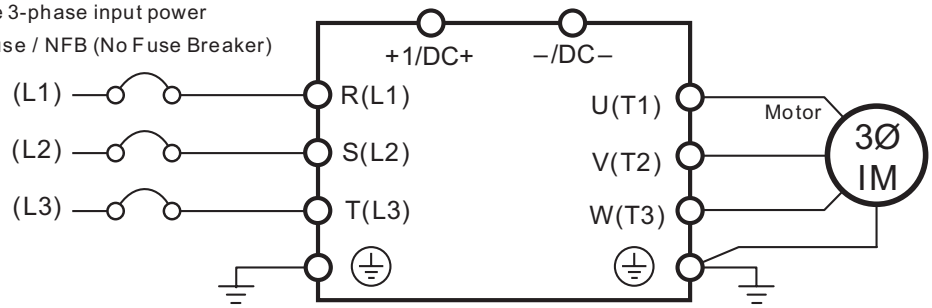
Power Wiring Diagram: GS4 Frame Size D0, D, E, F Models – Three-Phase

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

GS4-2040 – GS4-2100
GS4-4050 – GS4-200 models
230/460VAC, 3-Phase
Includes frame sizes D0, D, E, F

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

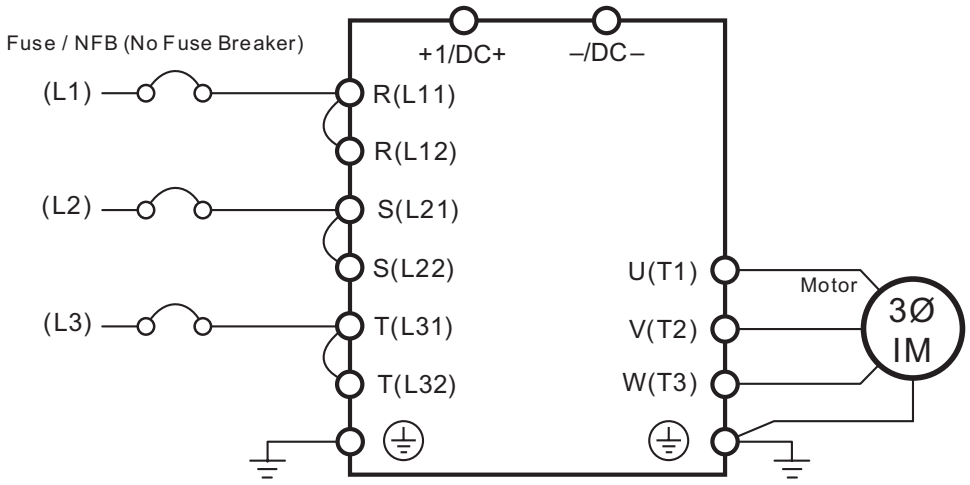
Power Wiring Diagram: GS4 Frame Size G Models – Three-Phase

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!

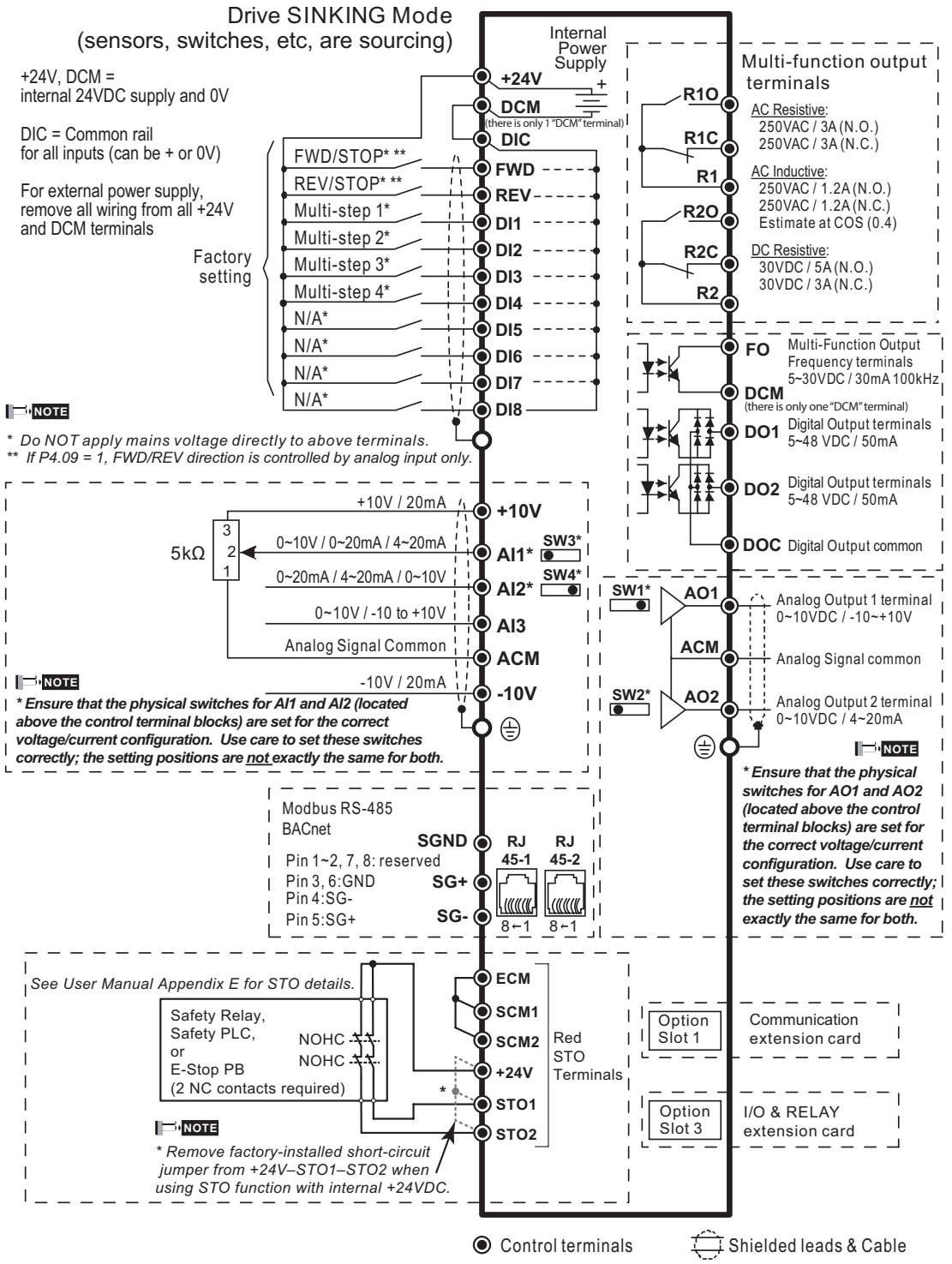


DURAPULSE GS4 AC Drives – Basic Wiring Diagram

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.

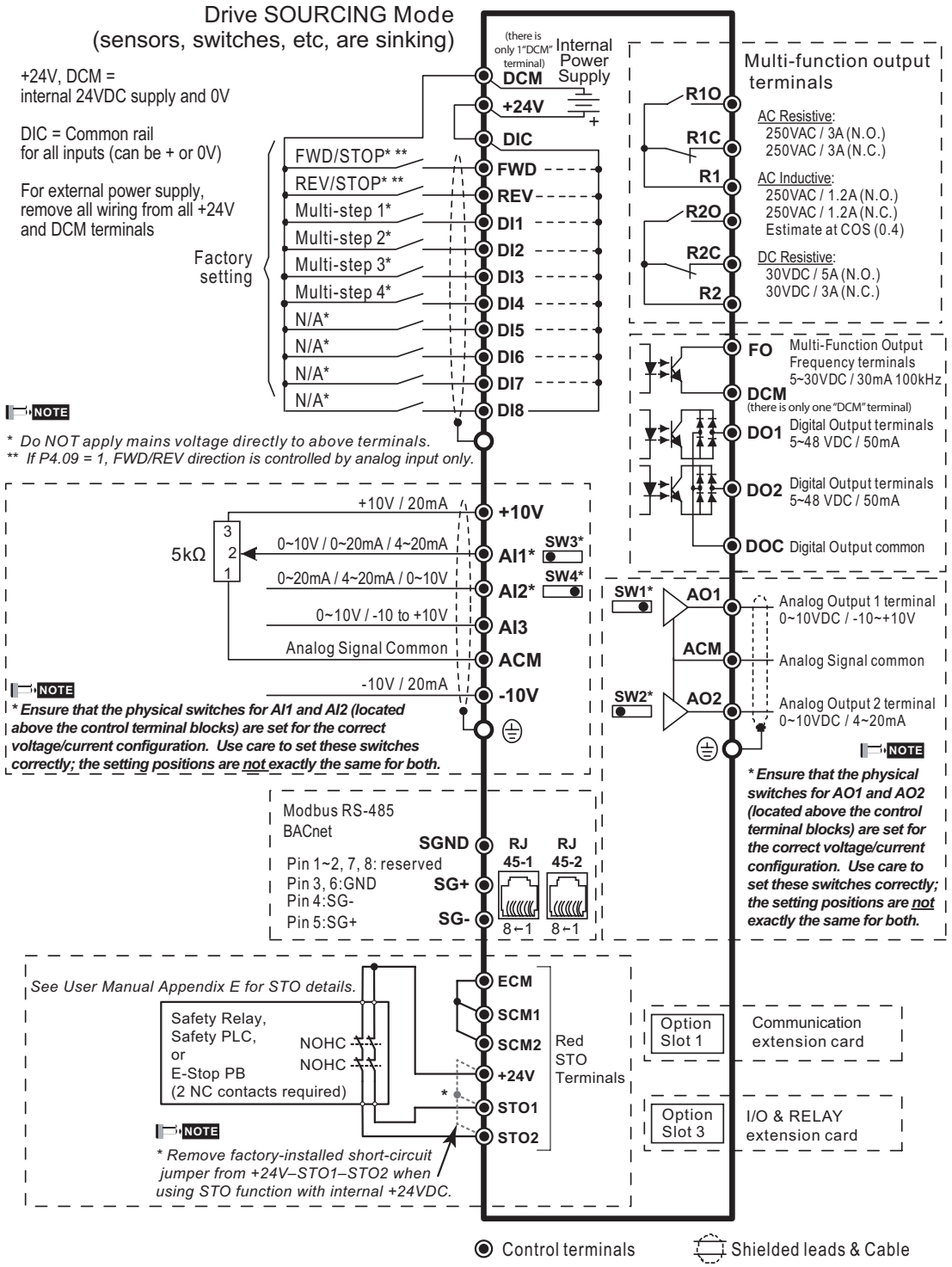


DURAPULSE GS4 AC Drives – Basic Wiring Diagram

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.



DURAPULSE GS4 AC Drives – Dimensions

GS4 DURAPULSE Frame Sizes by Drive Model

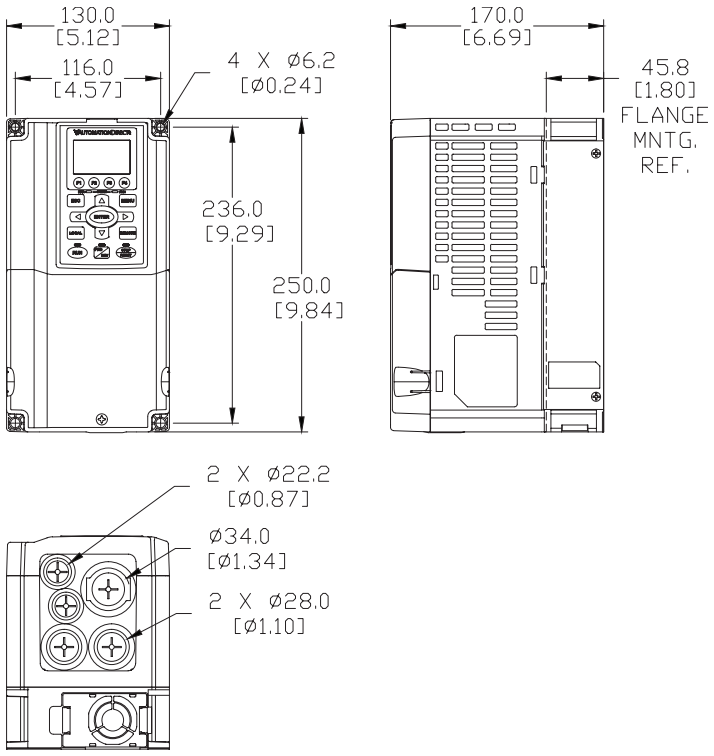
GS4 DURAPULSE Frame Sizes by Drive Model												
A		B		C		D0	D		E		F	G
230V	460V	230V	460V	230V	460V	460V	230V	460V	230V	460V	460V	460V
GS4-21P0	GS4-41P0	GS4-27P5	GS4-4010	GS4-2020	GS4-4025	GS4-4050	GS4-2040	GS4-4075	GS4-2060	GS4-4125	GS4-4175	GS4-4250
GS4-22P0	GS4-42P0	GS4-2010	GS4-4015	GS4-2025	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 for complete engineering drawings.

Dimensions – Frame Size A

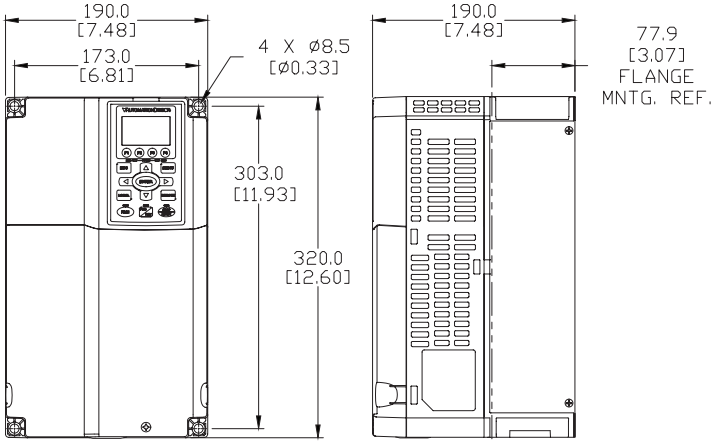


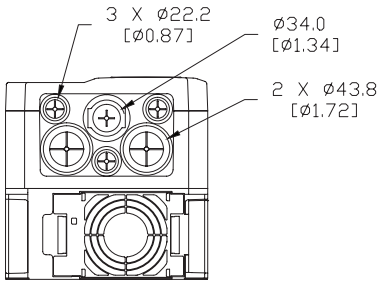
DURAPULSE GS4 AC Drives – Dimensions

Dimensions – GS4 AC Drives (Units = mm [in])

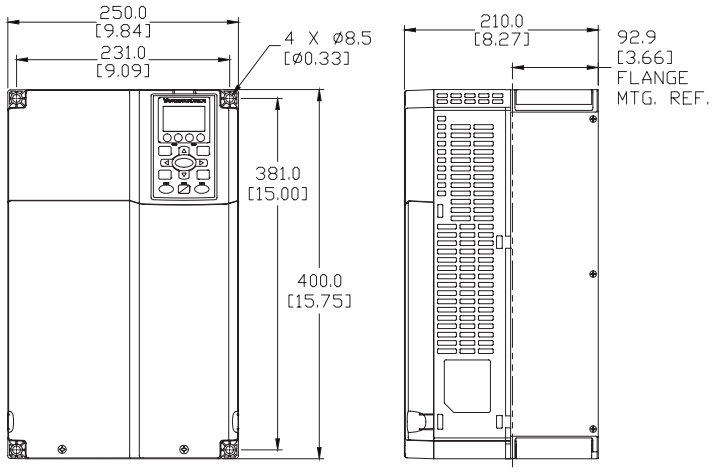
See our website: www.AutomationDirect.com for complete engineering drawings.

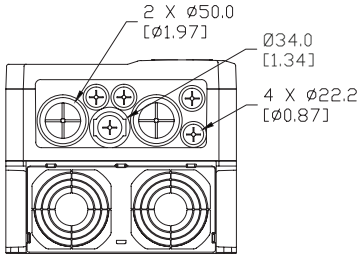
Dimensions – Frame Size B





Dimensions – Frame Size C



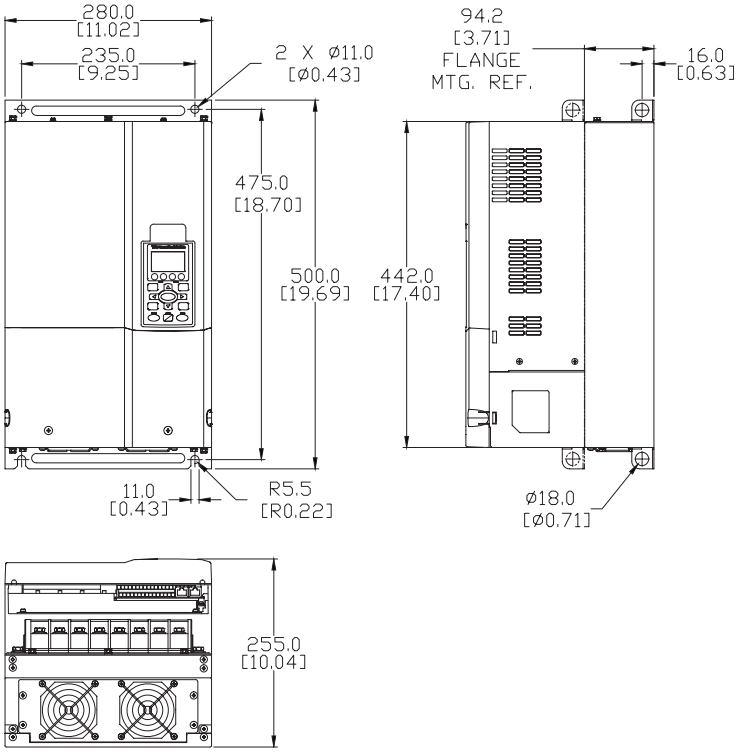


DURAPULSE GS4 AC Drives – Dimensions

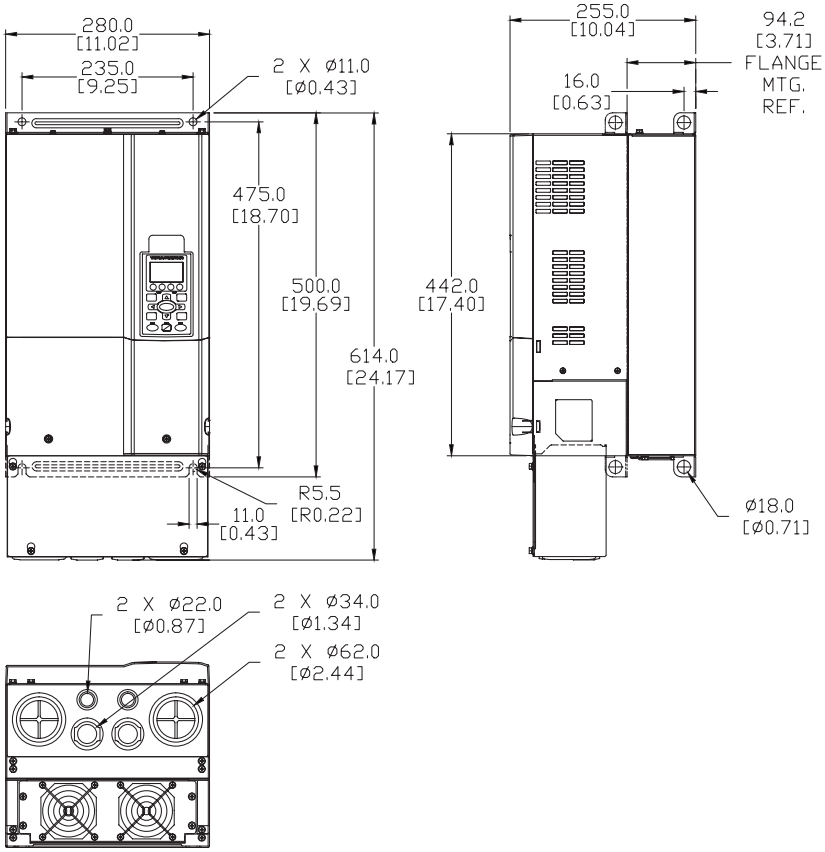
Dimensions – GS4 AC Drives (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

Dimensions – Frame Size D0



Dimensions – Frame Size D0 with Conduit Box

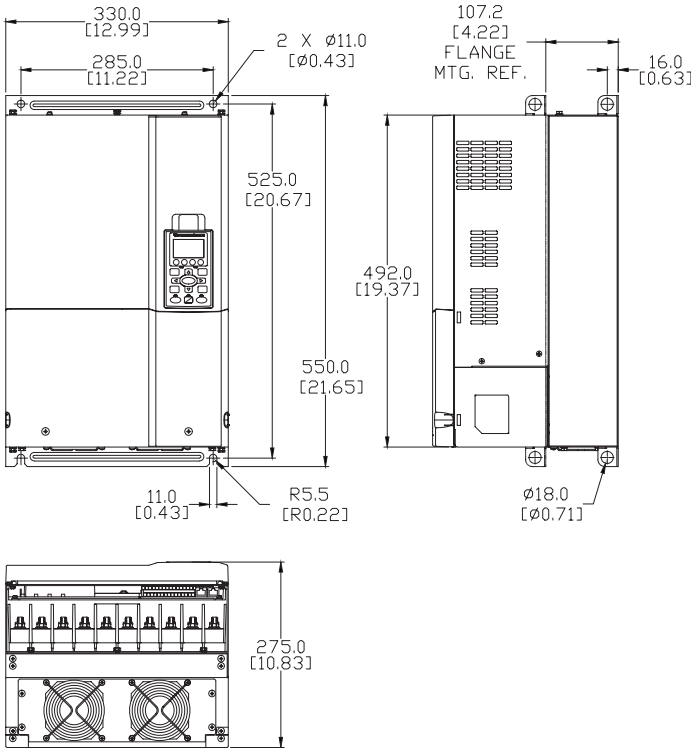


DURAPULSE GS4 AC Drives – Dimensions

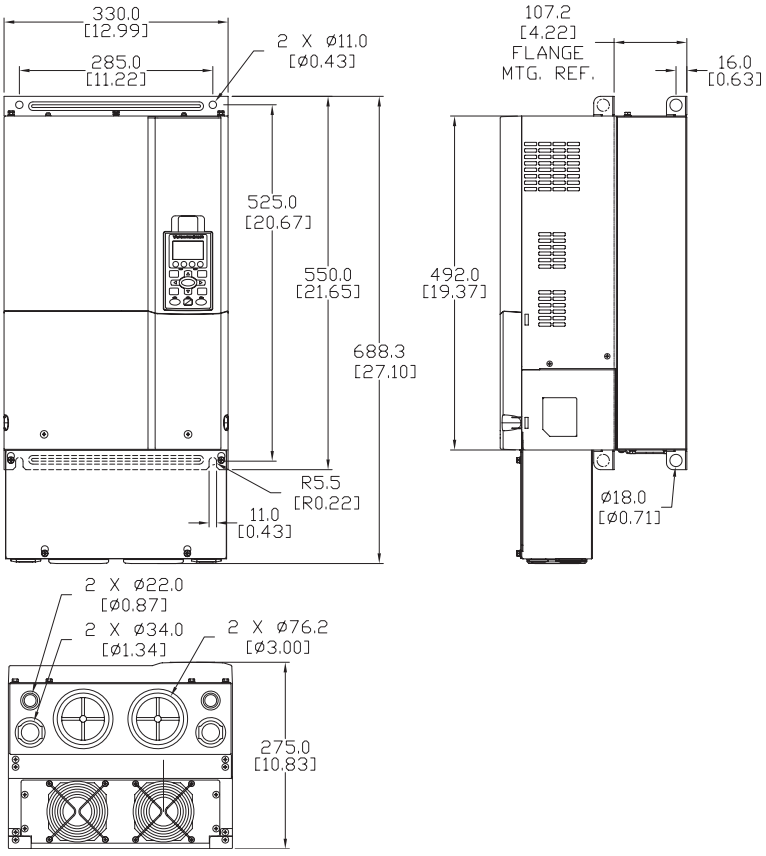
Dimensions – GS4 AC Drives (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

Dimensions – Frame Size D



Dimensions – Frame Size D with Conduit Box

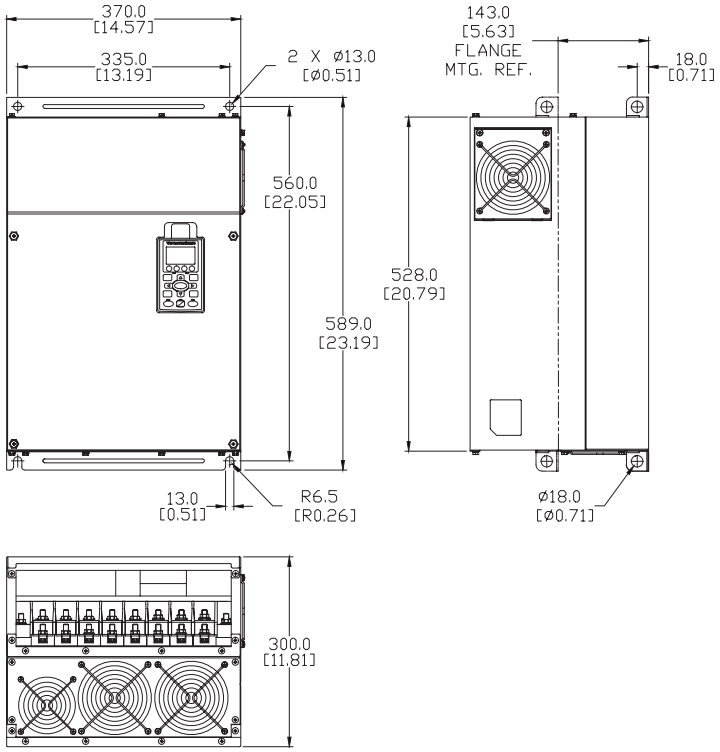


DURAPULSE GS4 AC Drives – Dimensions

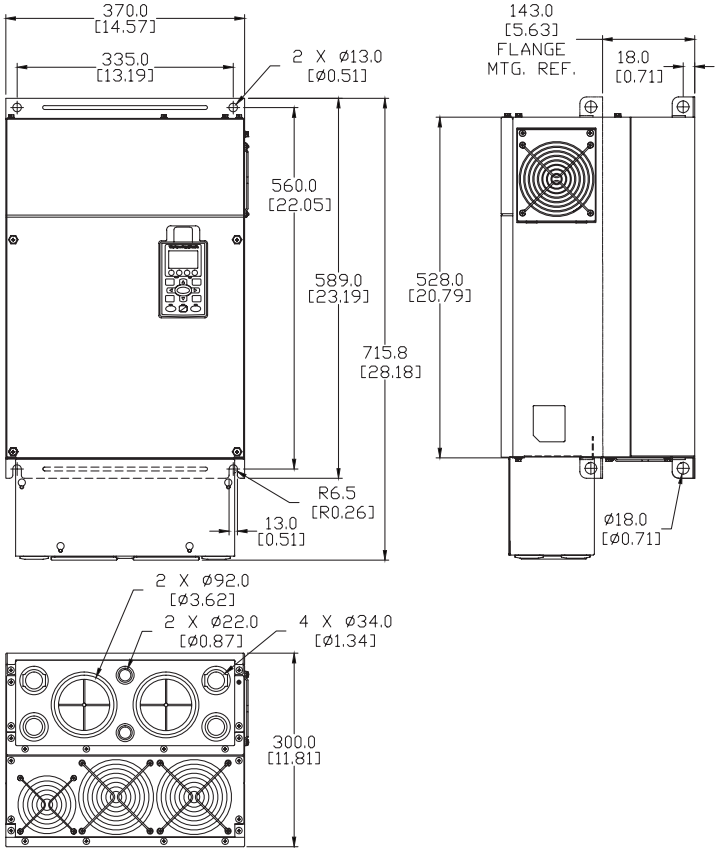
Dimensions – GS4 AC Drives (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

Dimensions – Frame Size E



Dimensions – Frame Size E with Conduit Box

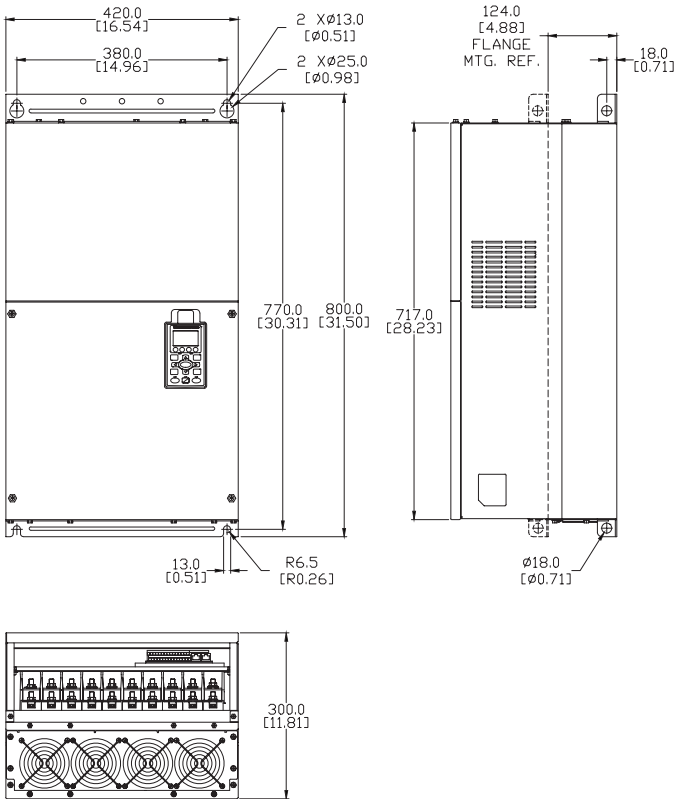


DURAPULSE GS4 AC Drives – Dimensions

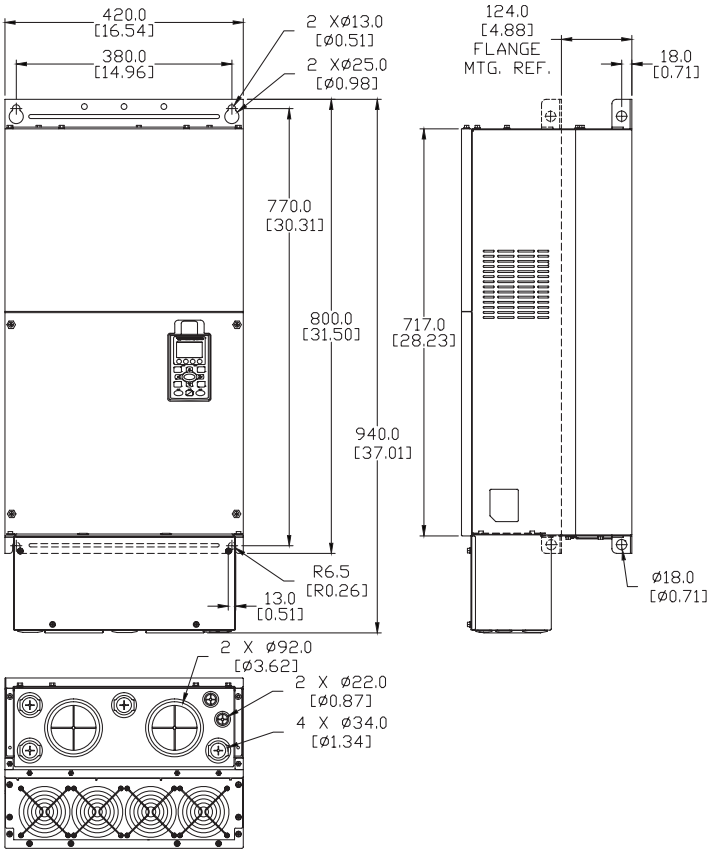
Dimensions – GS4 AC Drives (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

Dimensions – Frame Size F



Dimensions – Frame Size F with Conduit Box

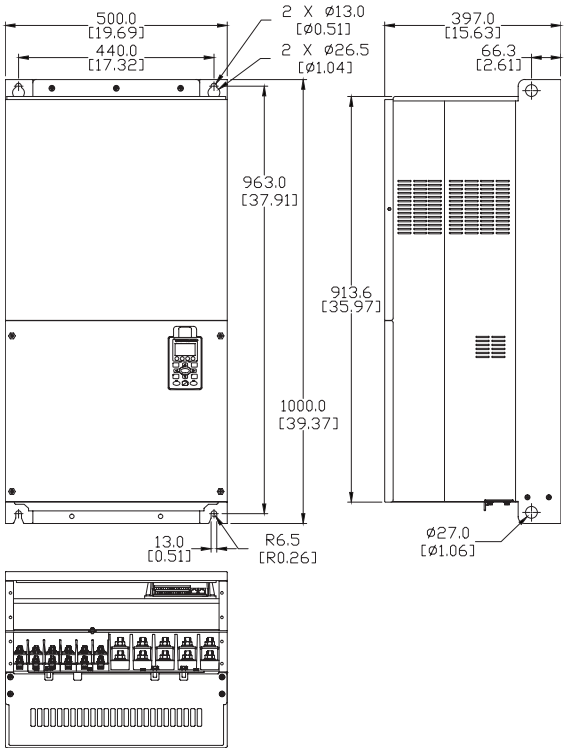


DURAPULSE GS4 AC Drives – Dimensions

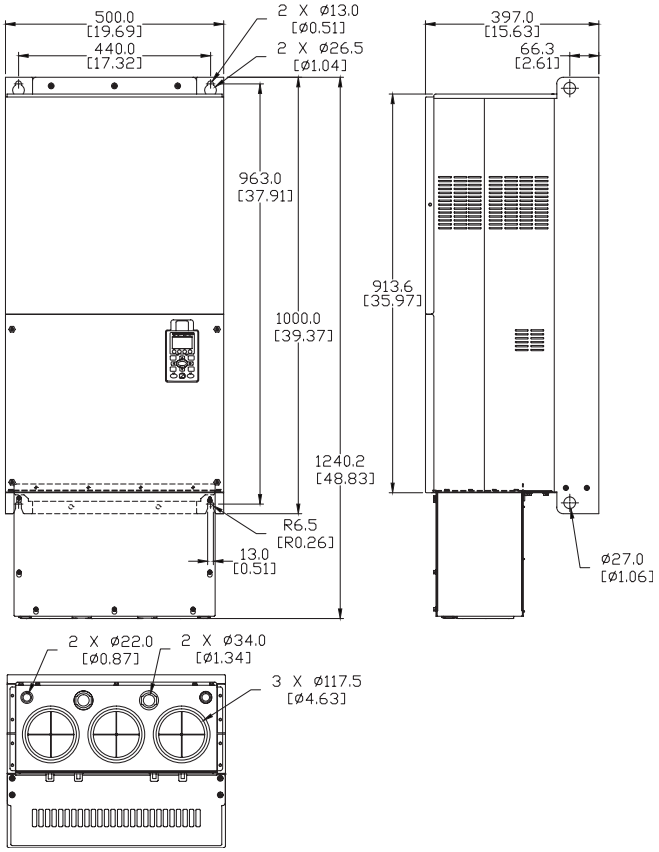
Dimensions – GS4 AC Drives (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.

Dimensions – Frame Size G

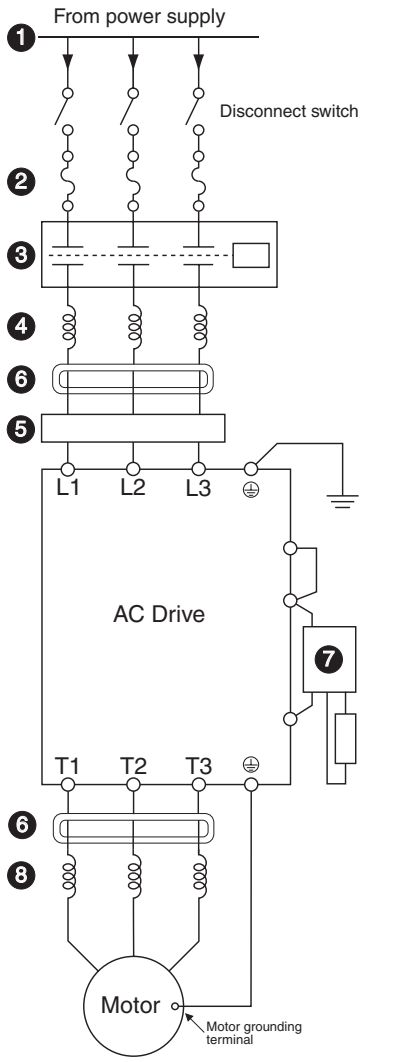


Dimensions – Frame Size G with Conduit Box



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 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 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.**

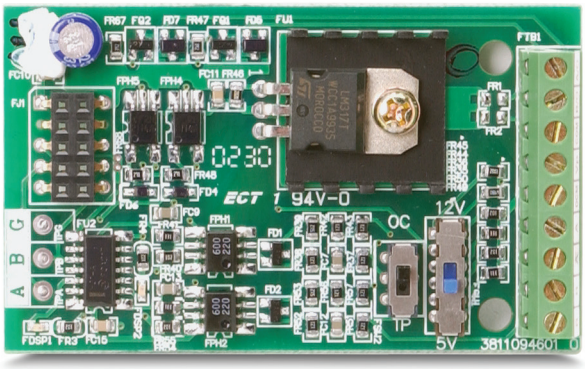
Voltage Time filters provide enhanced protection for motors with distances up to 1,000 feet.

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 for specific product offerings.

GS3 *DURA*PULSE Accessories – Feedback Card

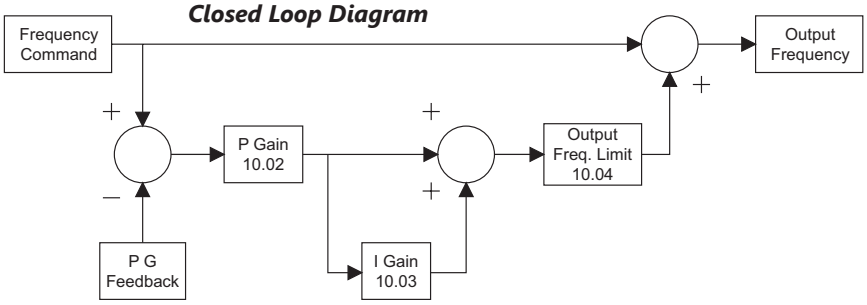
Feedback Card for *DURA*pulse AC Drives		
Part Number	***Price***	***Drive Model***
GS3-FB	$;0eo[:	GS3-xxxx
The GS3-FB feedback card is for use only with DURA*PULSE *AC drives.		

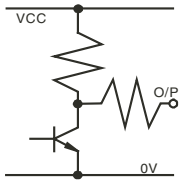
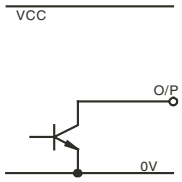
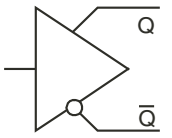
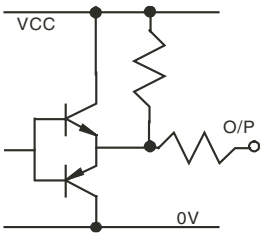


Description

The GS3-FB card is used to add another layer of precision control to the already precise control algorithm utilized in the *DURA*PULSE 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.

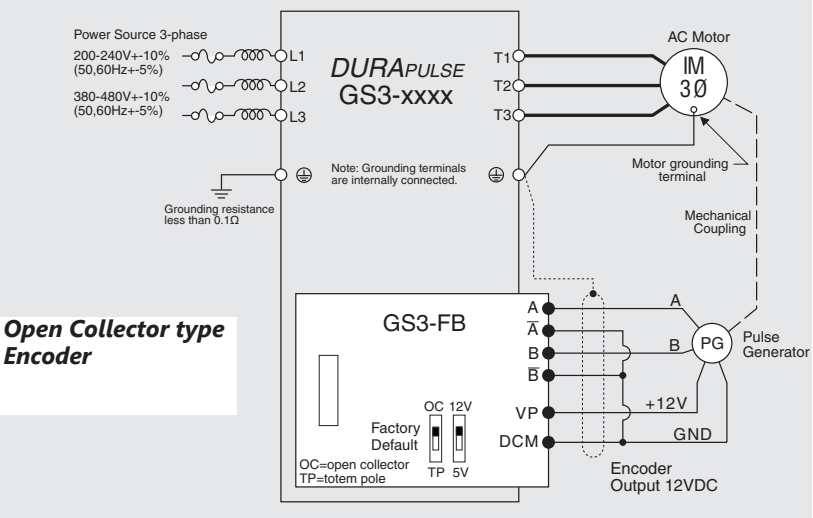
Closed Loop Diagram



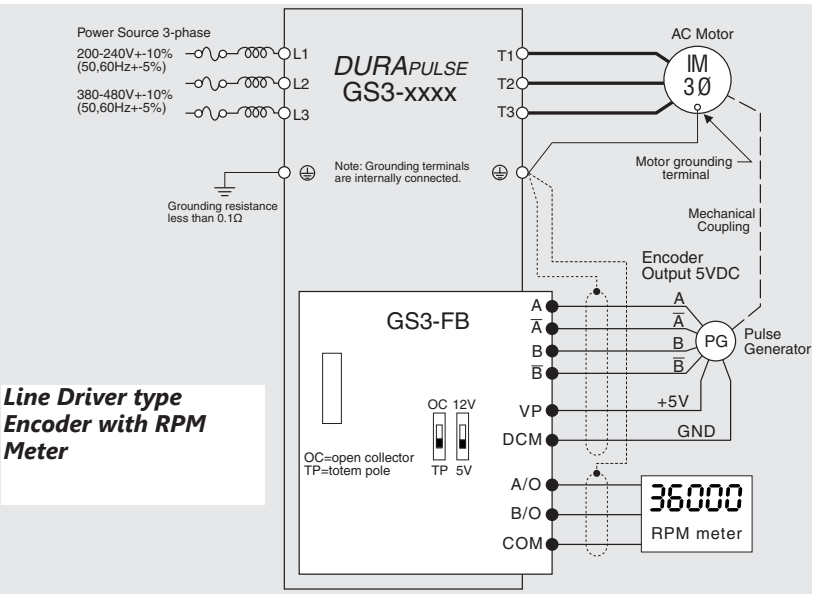
Types of Encoders		SW1 and SW2 switches	
		5V	12V
Output Voltage			
Open collector			
Line driver			
Complimentary			

GS3 *DURA*PULSE Accessories – Feedback Card

Wiring Diagrams



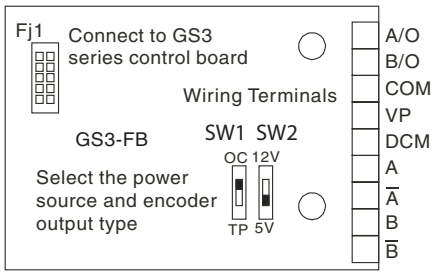
Open Collector type Encoder

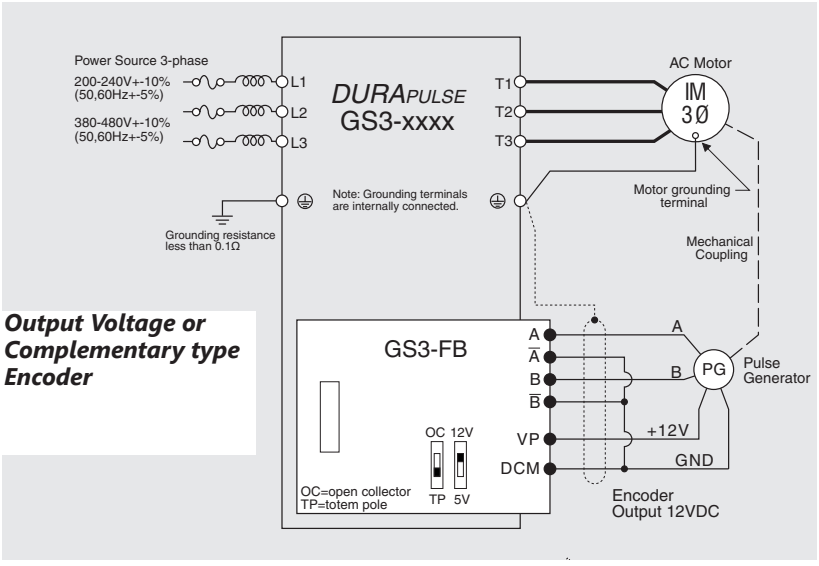


Line Driver type Encoder with RPM Meter

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

Control Terminals Block Designations





Output Voltage or Complementary type Encoder

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:

- $_{C}UL_{US}$ listed (E197592)
- CE marked
- RoHS

Line/Load Reactors for GS1, GS2, GS3/*DURA*PULSE AC Drives – Selection Specifications

Line/Load Reactors – LR Series – for GS1, GS2, GS3/*DURA*PULSE

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.*								
LR-20P5	2.4	3%	4.2 mH	7	208/240	3 – I/O	GS1-20P2	0.25
LR-21P0-1PH (2)	8		2.29 mH	15.9	115	1 – In	GS1-21P0	0.33
LR-22P0-1PH (2)	12		1.53 mH	24.3	115	1 – In 1 – In	GS2-22P0	0.5
LR-23P0-1PH (2)	17		1.08 mH	27.3	115	1 – In 1 – In	GS2-23P0 GS3-23P0	1 1
LR-23P0	10.6		0.97 mH	38	208/240	3 – I/O 3 – I/O	GS2-23P0 GS3-23P0	3 3
LR-25P0	16.7		0.626 mH	48		3 – I/O 3 – I/O	GS3-25P0 GS2-25P0	5 5
LR-27P5	24.2		0.434 mH	65		3 – I/O 3 – I/O	GS2-27P5 GS3-27P5	7.5 7.5
LR-2010	30.8		0.342 mH	96	208/240	3 – I/O	GS3-2010	10
LR-2015	46.2		0.22 mH	64			GS3-2015	15
LR-2020	59.4		0.172 mH	85			GS3-2020	20
LR-2030	88		0.116 mH	135			GS3-2030	30
LR-2040	114		0.0886 mH	149			GS3-2040	40
LR-2050	143		0.0699 mH	154			GS3-2050	50

(table continued next page)

GS/DURApulse Drives Accessories – Line/Load Reactors

Line/Load Reactors for GS1, GS2, GS3/*DURA*PULSE AC Drives – Selection Specifications

Line/Load Reactors – LR Series – for GS1, GS2, GS3/*DURA*PULSE								
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.*								
LR-20P5	2.4		4.2 mH	7	208/240	3 – I/O	***GS1-20P2***	0.25
LR-21P0-1PH *(2)*	8		2.29 mH	15.9	115	1 – In	***GS1-21P0***	0.33
LR-23P0-1PH *(2)*	17		1.08 mH	27.3	115	1 – In	***GS3-23P0***	1
LR-23P0	10.6		0.97 mH	38	208/240	3 – I/O	***GS3-23P0***	3
LR-25P0	16.7		0.626 mH	48		3 – I/O	***GS3-25P0***	5
LR-27P5	24.2		0.434 mH	65		3 – I/O	***GS3-27P5***	7.5
LR-2010	30.8		0.342 mH	96	208/240	3 – I/O	***GS3-2010***	10
LR-2015	46.2		0.22 mH	64			***GS3-2015***	15
LR-2020	59.4		0.172 mH	85			***GS3-2020***	20
LR-2030	88		0.116 mH	135			***GS3-2030***	30
LR-2040	114		0.0886 mH	149			***GS3-2040***	40
LR-2050	143		0.0699 mH	154			***GS3-2050***	50
LR-4010	14		1.29 mH	64	480		***GS3-4010***	10
LR-4020	27		0.694 mH	79			***GS3-4020***	20
LR-4040	52		0.387 mH	114			***GS3-4040***	40
LR-4060	77		0.227 mH	169			***GS3-4060***	60
LR-4100	124		0.152 mH	225			***GS3-4100***	100
LR-4125	156		0.117 mH	254			–	125
LR-4150	180		0.103 mH	299				150
LR-4200	240		0.0839 mH	280				200
LR-4250	302		0.0654 mH	337				250
LR-4300	361		0.0565 mH	381				300
LR-5010	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/*DURA*PULSE AC Drives – Selection Specifications

Supply: 230V, 1Ø, 50/60 Hz (*Constant* Torque; reactor installed *Line* 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				
GS4-21P0	0.5	4.2	7.6	2.506	4.176	0.37	LR2-20P5-1PH	4.9	3.74
GS4-22P0	0.75	5.6	10.1	1.879	3.132	0.25	LR-21P0-1PH	8	2.29
GS4-23P0	1	8.7	15.7	1.210	2.016	0.25	LR-21P0-1PH	8	2.29
GS4-25P0	2	14	25	0.752	1.253	0.37	LR-22P0-1PH	12.0	1.53
GS4-27P5	3	19	34	0.554	0.923	0.75	LR-23P0-1PH	17.0	1.08
GS4-2010	3	19	34	0.554	0.923	0.75	LR-23P0-1PH	17.0	1.08
GS4-2015	5	30	54	0.351	0.585	3.7	LR-2010	30.8	0.342
GS4-2020	7.5	43	77	0.245	0.408	5.5	LR-2015	46.2	0.220
GS4-2025	10	57	103	0.184	0.307	7.5	LR-2020	59.4	0.172
GS4-2030	10	57	103	0.184	0.307	7.5	LR-2020	59.4	0.172
GS4-2040	10	57	103	0.184	0.307	7.5	LR-2020	59.4	0.172
GS4-2050	10	57	103	0.184	0.307	7.5	LR-2020	59.4	0.172
GS4-2060	15	85	153	0.124	0.206	11	LR-2025	74.8	0.138
GS4-2075	20	113	203	0.093	0.155	15	LR-2040	114	0.0886
GS4-2100	25	130	234	0.081	0.135	18.5	LR-2050	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/*DURA*PULSE AC Drives – Selection Specifications

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

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

GS4 *DURA*PULSE Drives Accessories – Line/Load Reactors

Line/Load Reactors for GS4/*DURA*PULSE AC Drives – Selection Specifications

Supply: 230V, 3Ø, 50/60 Hz (*Variable* Torque; reactor installed *Line* or *Load* 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				
GS4-21P0	1	5	8.7	2.536	4.226	0.75	LR-21P0	4.6	2.46
GS4-22P0	2	8	12.8	1.585	2.641	1.5	LR-23P0*	10.6	0 .97
GS4-23P0	3	11	18	1.152	1.921	2.2	LR-23P0	10.6	0.97
GS4-25P0	5	17	29	0.746	1.244	3.7	LR-25P0	16.7	0.626
GS4-27P5	7.5	25	43	0.507	0.845	5.5	LR-27P5	24.2	0.434
GS4-2010	10	33	56	0.320	0.534	7.5	LR-2010	30.8	0.342
GS4-2015	15	49	85	0.216	0.359	11	LR-2015	46.2	0.22
GS4-2020	20	65	112	0.163	0.271	15	LR-2020	59.4	0.172
GS4-2025	25	75	128	0.169	0.282	18.5	LR-2025	74.8	0.138
GS4-2030	30	90	155	0.141	0.236	22	LR-2040*	114	0.0886
GS4-2040	40	120	205	0.106	0.176	30	LR-2040	114	0.0886
GS4-2050	50	146	250	0.087	0.146	37	LR-2050	143	0.0699
GS4-2060	60	180	308	0.070	0.117	45	not available*	169	0.0624
GS4-2075	75	215	367	0.059	0.098	55		211	0.0487
GS4-2100	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 *Line* or *Load* 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				
GS4-41P0	1	3	5.2	8.102	13.503	0.75	LR-41P0	2.1	8.927
GS4-42P0	2	4	6.8	6.077	10.128	1.5	LR-42P0	3.4	5.790
GS4-43P0	3	6	10.3	4.050	6.751	2.2	LR-43P0	4.8	4.270
GS4-45P0	5	9	14.6	2.700	4.500	3.7	LR-45P0	7.6	2.770
GS4-47P5	7.5	12	20	2.025	3.375	5.5	LR-47P5	11	1.680
GS4-4010	10	18	31	1.174	1.957	7.5	LR-4010	14	1.290
GS4-4015	15	24	41	0.881	1.468	11	LR-4015	21	0.912
GS4-4020	20	32	54	0.660	1.101	15	LR-4020	27	0.694
GS4-4025	25	38	65	0.639	1.066	18.5	LR-4025	34	0.569
GS4-4030	30	45	77	0.541	0.901	22	LR-4030	40	0.469
GS4-4040	40	60	103	0.405	0.675	30	LR-4040	52	0.387
GS4-4050	50	73	124	0.334	0.556	37	LR-4050	65	0.295
GS4-4060	60	91	155	0.267	0.445	45	LR-4060	77	0.227
GS4-4075	75	110	189	0.221	0.368	55	LR-4075	96	0.196
GS4-4100	100	150	257	0.162	0.270	75	LR-4100	124	0.152
GS4-4125	125	180	308	0.135	0.224	90	LR-4125	156	0.117
GS4-4150	150	220	376	0.110	0.184	110	LR-4150	180	0.103
GS4-4175	175	260	445	0.098	0.163	132	LR-4200	240	0.0839
GS4-4200	215	310	531	0.078	0.130	160	LR-4250	302	0.0654
GS4-4250	250	370	634	0.066	0.109	185	LR-4250	302	0.0654
GS4-4300	300	460	787	0.054	0.090	220	LR-4300	361	0.0565

GS/*DURA*PULSE Drives Accessories – Line/Load Reactors

Line/Load Reactors for GS/*DURA*PULSE AC Drives – Additional Specifications

Line Reactors – LR Series – Additional Specifications							
Part Number	*Price*	*Product Weight*	*Wire Range*	*Terminal Torque*	*Temperature Range*		*Environment*
					Operating	*Storage*	
LR-20P5	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
LR-21P0-1PH	$;08,q:	2.8 lb [1.3 kg]	#12–#18 AWG	10 lb·in			
LR-22P0-1PH	$;;08,t:	4.3 lb [2.0 kg]	#12–#18 AWG	20 lb·in			
LR-23P0-1PH	Retired	4.3 lb [2.0 kg]	#12–#18 AWG	20 lb·in			
LR-23P0	Retired	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in			
LR-25P0	$;008,x:	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
LR-27P5	$;008,y:	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
LR-2010	$;;008,f:	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
LR-2015	$;008,g:	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
LR-2020	$;008,h:	12 lb [5.4 kg]	#18–#4 AWG	20 lb·in			
LR-2025	$;-008,i:	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			
LR-2030	$;-008,j:	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120			
LR-2040	$;008,k:	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120			
LR-2050	$;-008,l:	36 lb [16 kg]	250kcmil – #6AWG (AL or CU)	275			
LR-4010	Retired	4.0 lb [1.8 kg]	#12–#18 AWG	10 lb·in			
LR-4015	$;;008,]:	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
LR-4020	$;;008,[:	8.0 lb [3.6 kg]	#18–#4 AWG	20 lb·in			
LR-4025	$;008,_:	10 lb [4.5 kg]	#18–#4 AWG	20 lb·in			
LR-4030	$;008,#:	10 lb [4.5 kg]	#18–#4 AWG	20 lb·in			
LR-4040	$;;008,!:	15 lb [6.8 kg]	#18–#4 AWG	20 lb·in			
LR-4050	$;008,?:	25 lb [11 kg]	#22–#4 AWG	#22–#16 AWG: 25 lb·in #14–#6 AWG: 30 lb·in #4 AWG: 35 lb·in			
LR-4060	$0091c:						
LR-4075	$0091d:	33 lb [15 kg]	2/0 – #6AWG (AL or CU)	120 lb·in			
LR-4100	$0091e:	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
LR-4125	$;0091f:	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
LR-4150	$;00091g:	46 lb [21 kg]	250kcmil – #6AWG (AL or CU)	275 lb·in			
LR-4200	$;-00091i:	74 lb [34 kg]	(1) 600kcmil – #4 AWG (2) 250kcmil – 1/0	500 lb·in			
LR-4250	$;-00091j:	74 lb [34 kg]	(2)* 350kcmil – #4 AWG (AL or CU)	275 lb·in			
LR-4300	$;-00091l:	74 lb [34 kg]	(2)* 350kcmil – #4 AWG (AL or CU)	275 lb·in			
LR-5010	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/*DURA*PULSE Drives Accessories – Line/Load Reactors

Line/Load Reactors Part Number Cross Reference for GS/*DURA*PULSE AC Drives

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

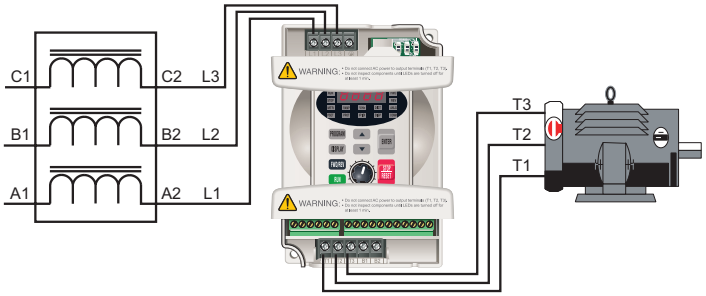
GS/*DURA*PULSE Drives Accessories – Line/Load Reactors

Line/Load Reactors for GS/*DURA*PULSE AC Drives – Generic One-Line Wiring Examples

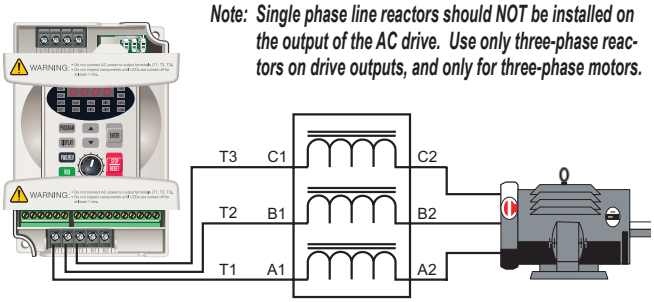
WARNING: CONSULT THE APPLICABLE GS DRIVE USER MANUAL BEFORE ACTUALLY WIRING THE DRIVE!

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.



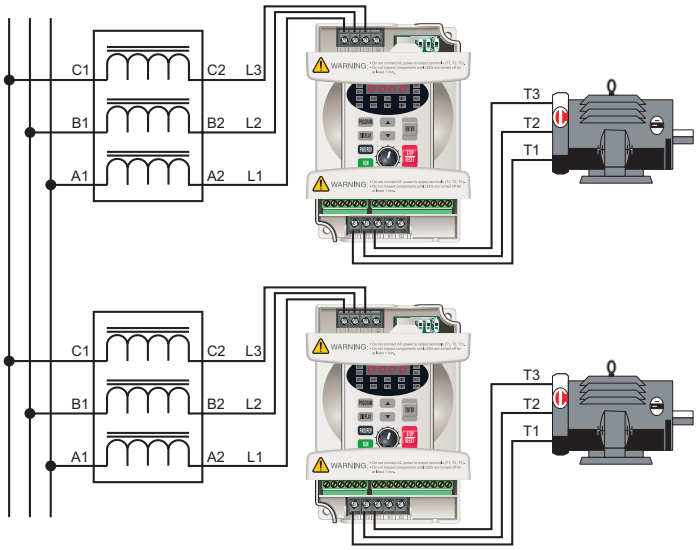
Output side of the drive

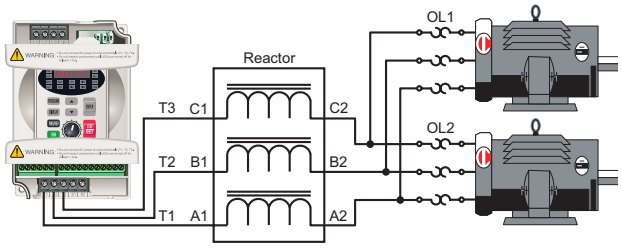
When installed on the output side of the drive, line reactors protect the drive from short circuits at the load. Voltage and current waveforms from the drive are enhanced, reducing motor overheating and noise emissions.

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

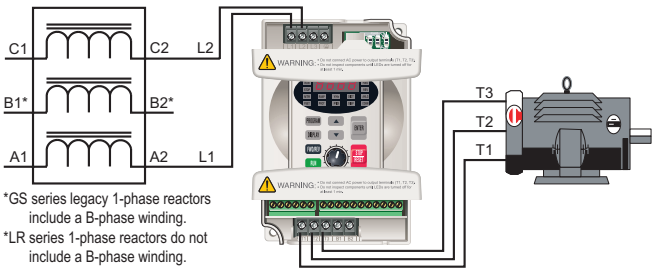
A single reactor can be used for multiple motors on the same drive, **if the motors operate simultaneously**. Size the reactor based upon the total horsepower of all the motors. Select a reactor with a current rating greater than the sum of the motor full-load currents. **Overload relays are recommended**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

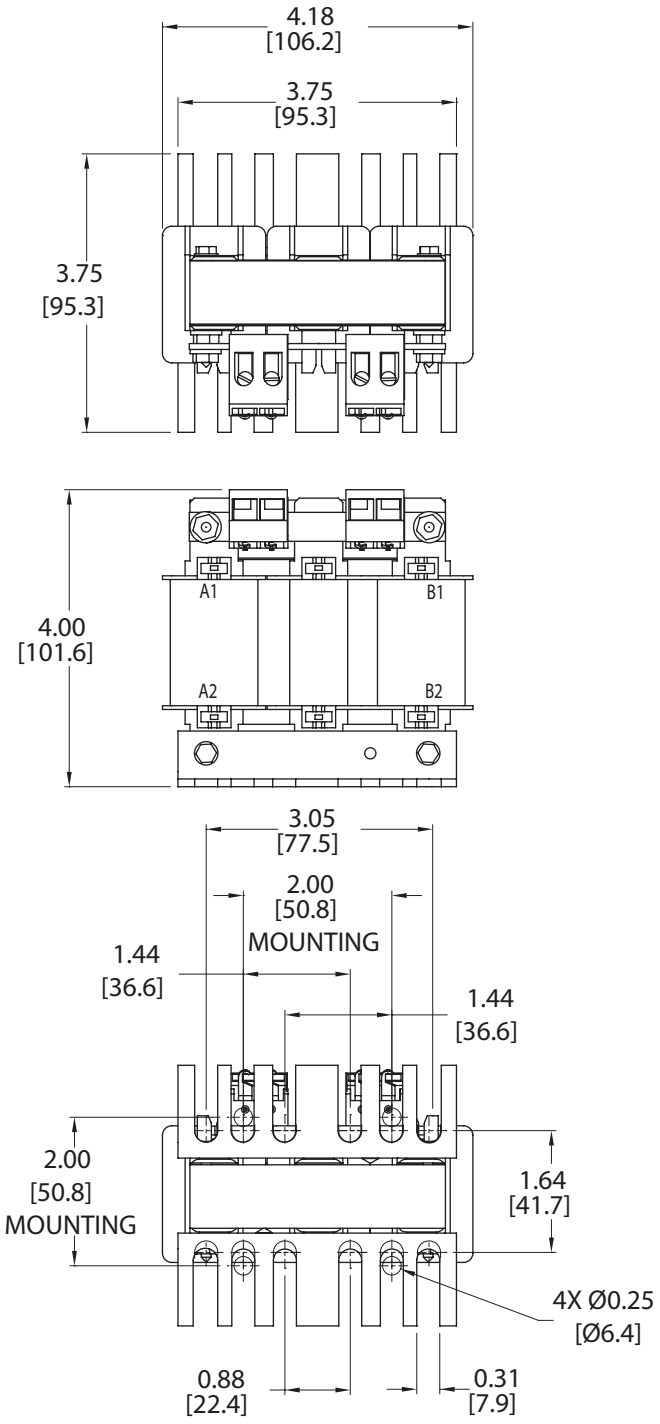


*GS series legacy 1-phase reactors include a B-phase winding.
*LR series 1-phase reactors do not include a B-phase winding.

GS/*DURA*PULSE Drives Accessories – Line/Load Reactors

Line/Load Reactor Dimensions (Units = in [mm])

LR-21P0-1PH
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.



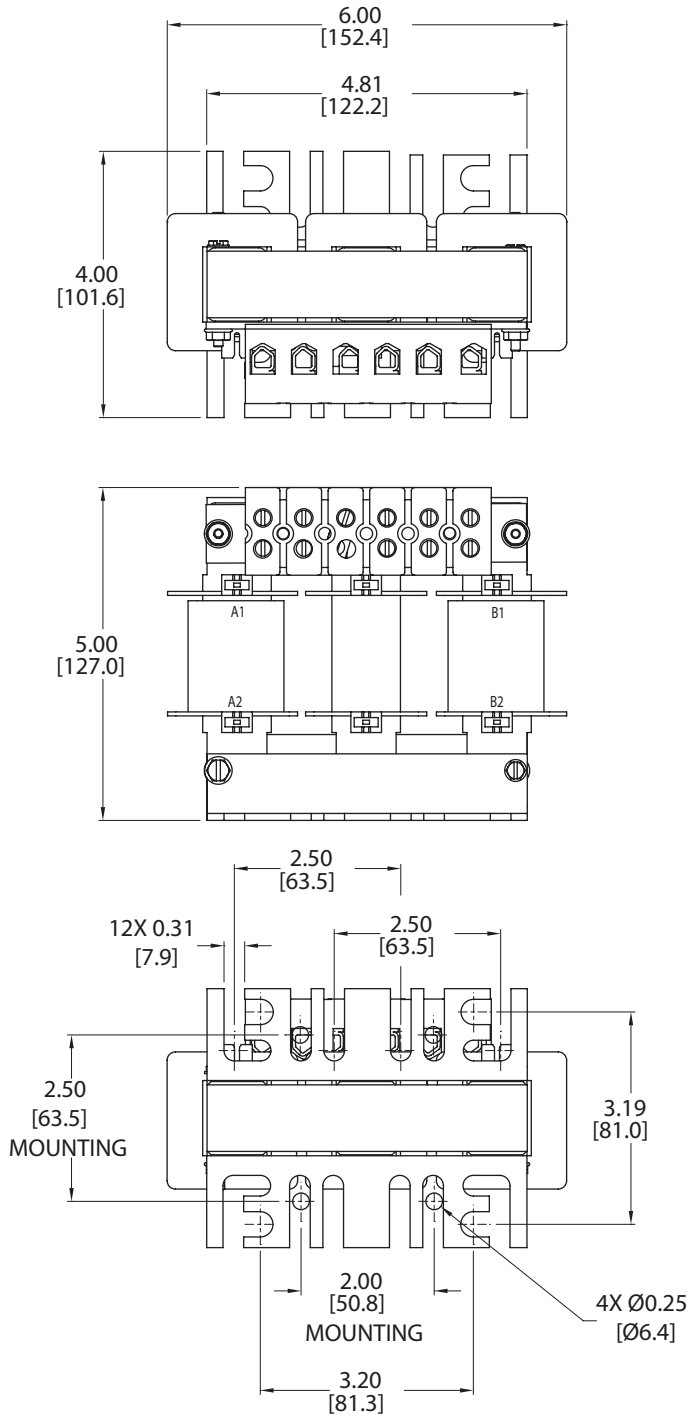
GS/*DURAPULSE* Drives Accessories – Line Reactors

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])



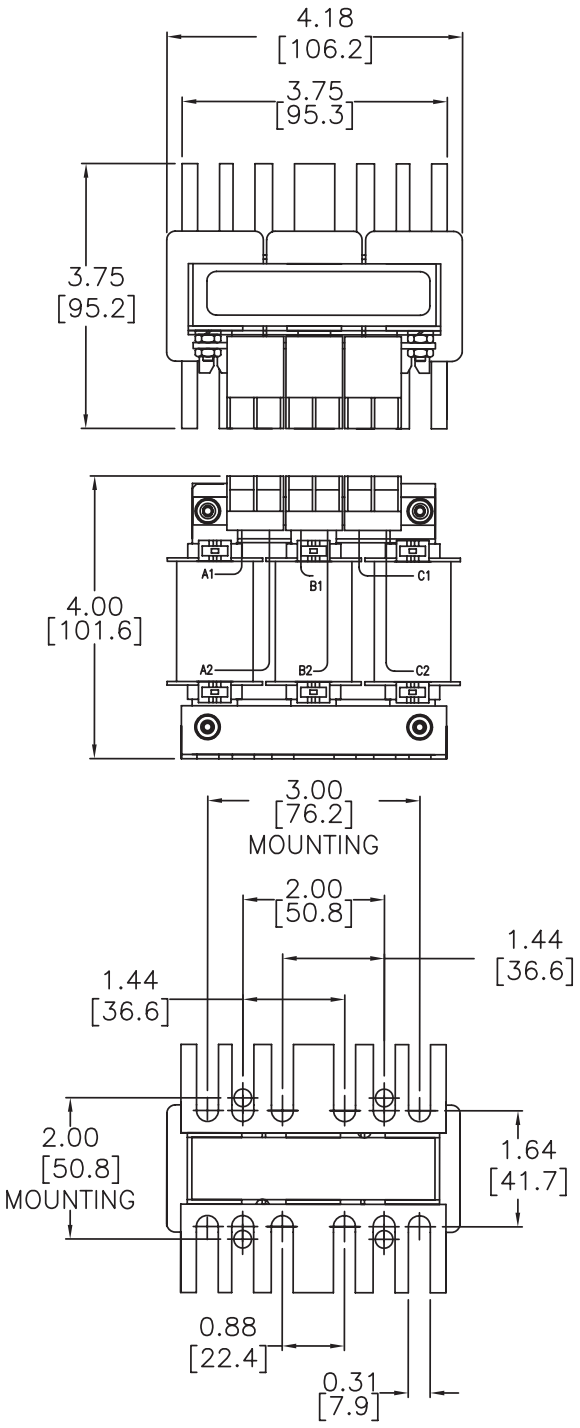
GS/DURAPULSE Drives Accessories – Line Reactors

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])



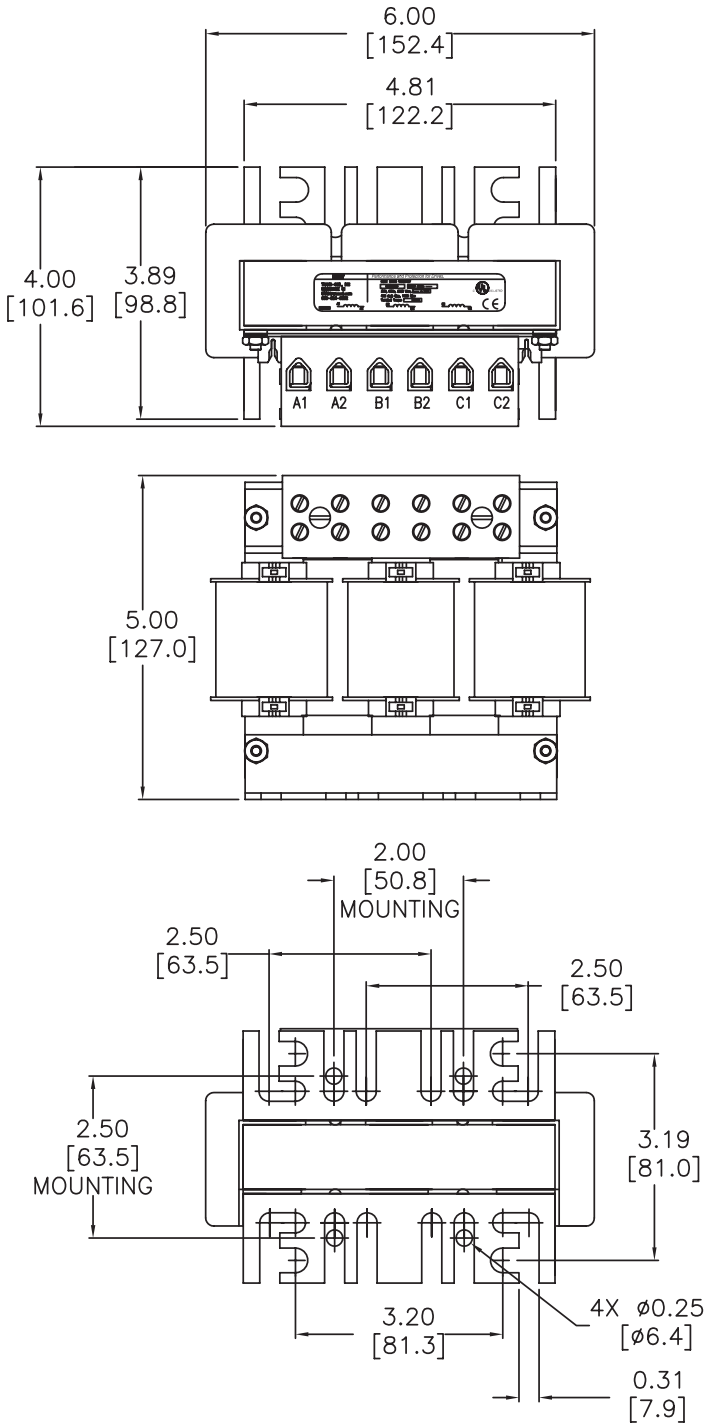
GS/DURAPULSE Drives Accessories – Line Reactors

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])



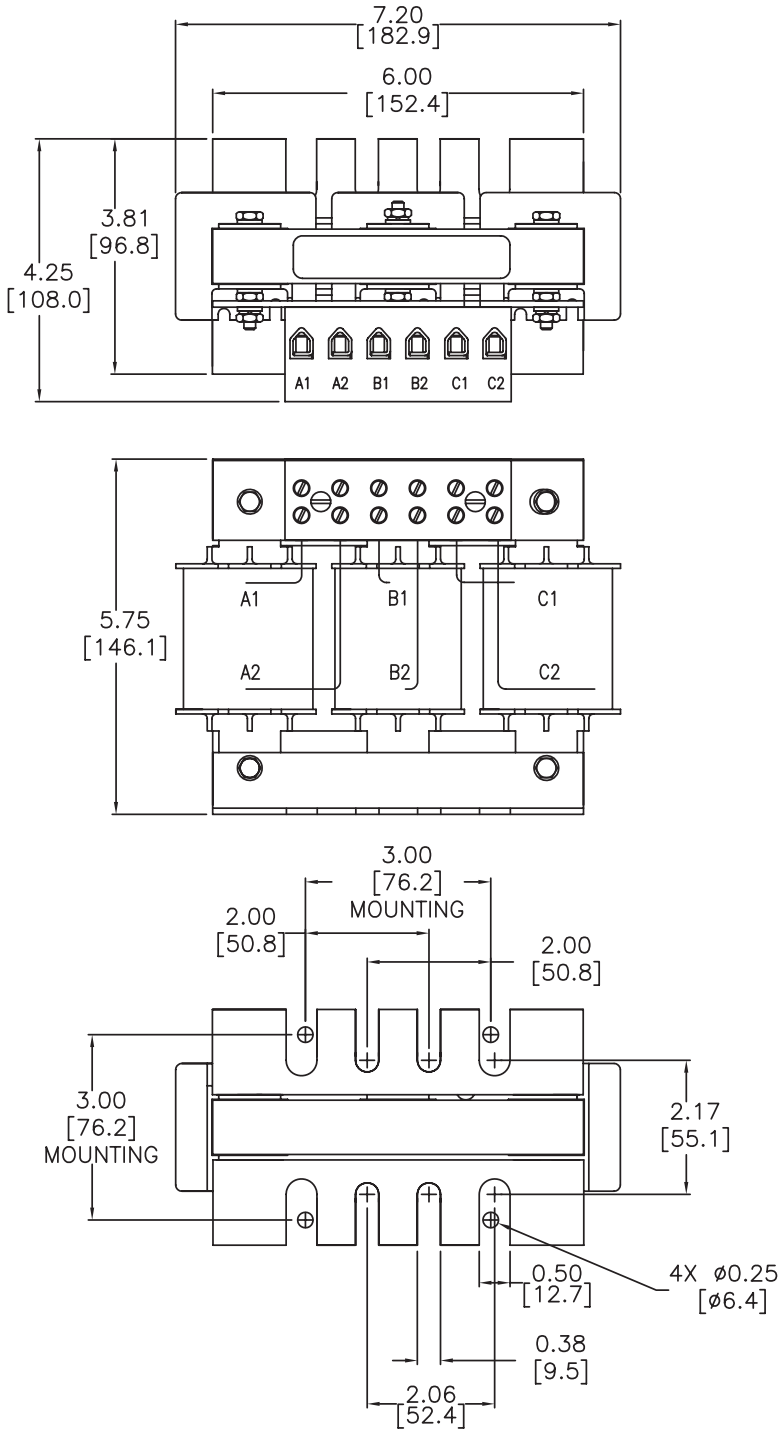
GS/DURAPULSE Drives Accessories – Line Reactors

Line Reactor Dimensions

LR-2010, LR-2015, LR-2020, LR-4025, LR-4030

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])



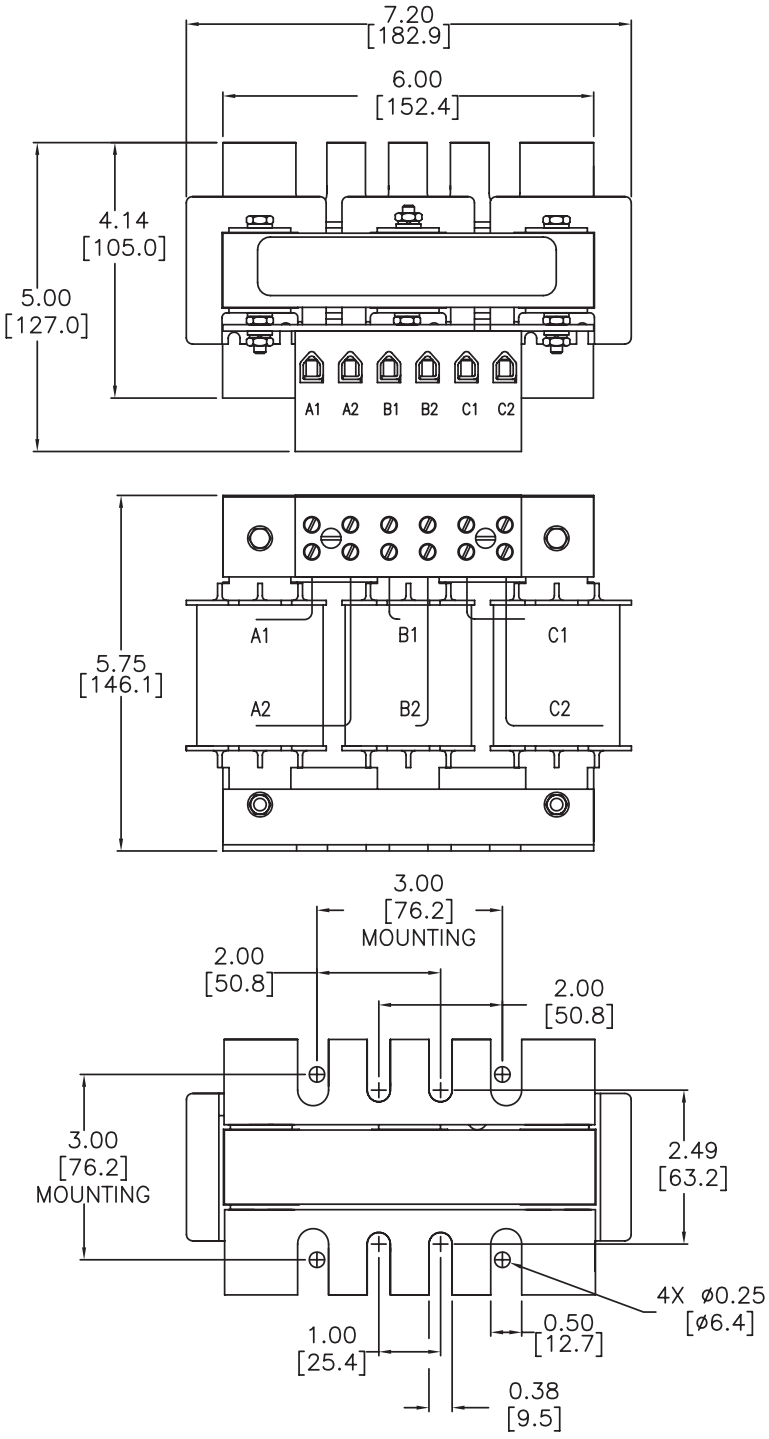
GS/DURAPULSE Drives Accessories – Line Reactors

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])



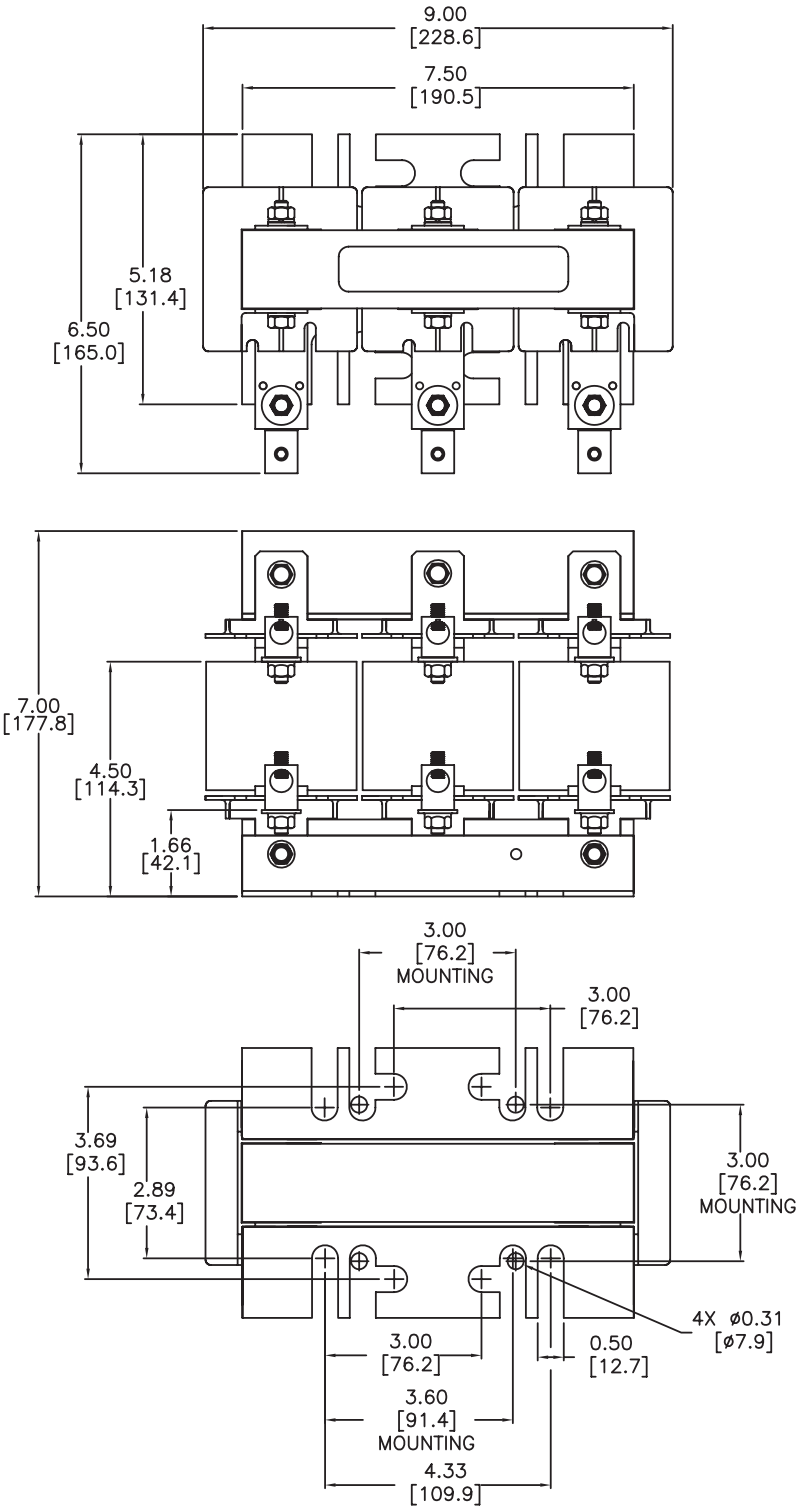
GS/DURAPULSE Drives Accessories – Line Reactors

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])



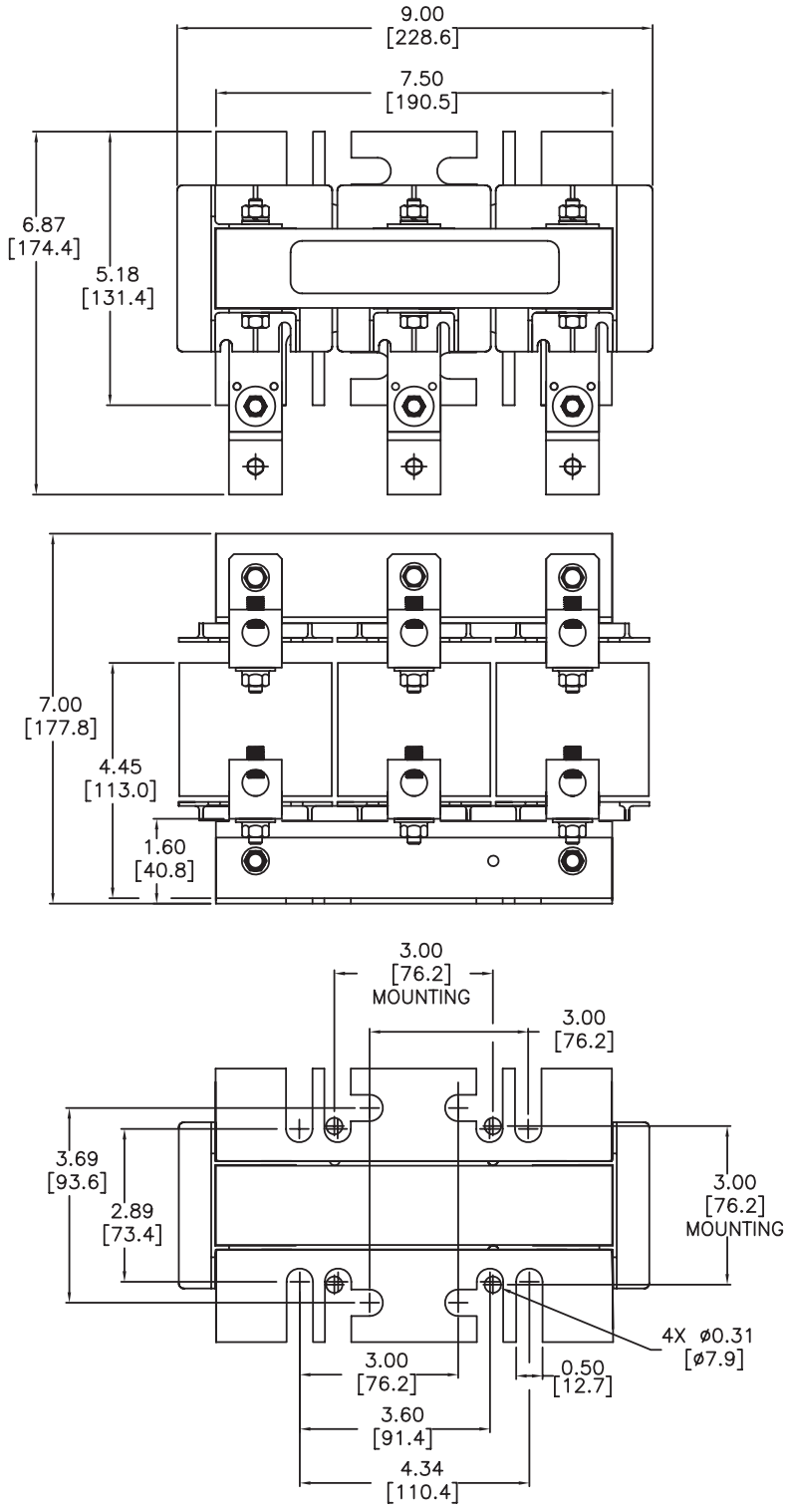
GS/DURAPULSE Drives Accessories – Line Reactors

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])



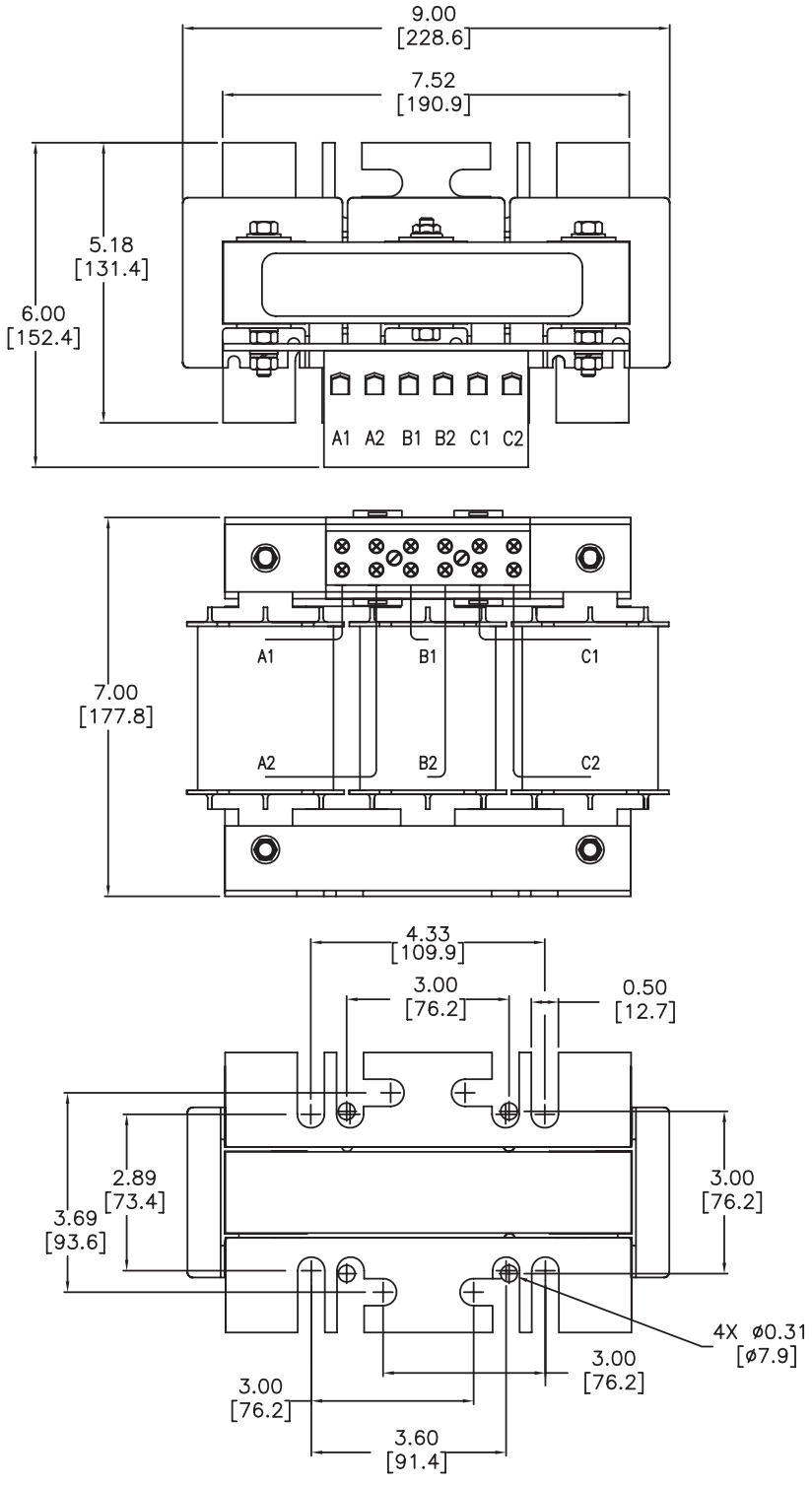
GS/DURAPULSE Drives Accessories – Line Reactors

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])



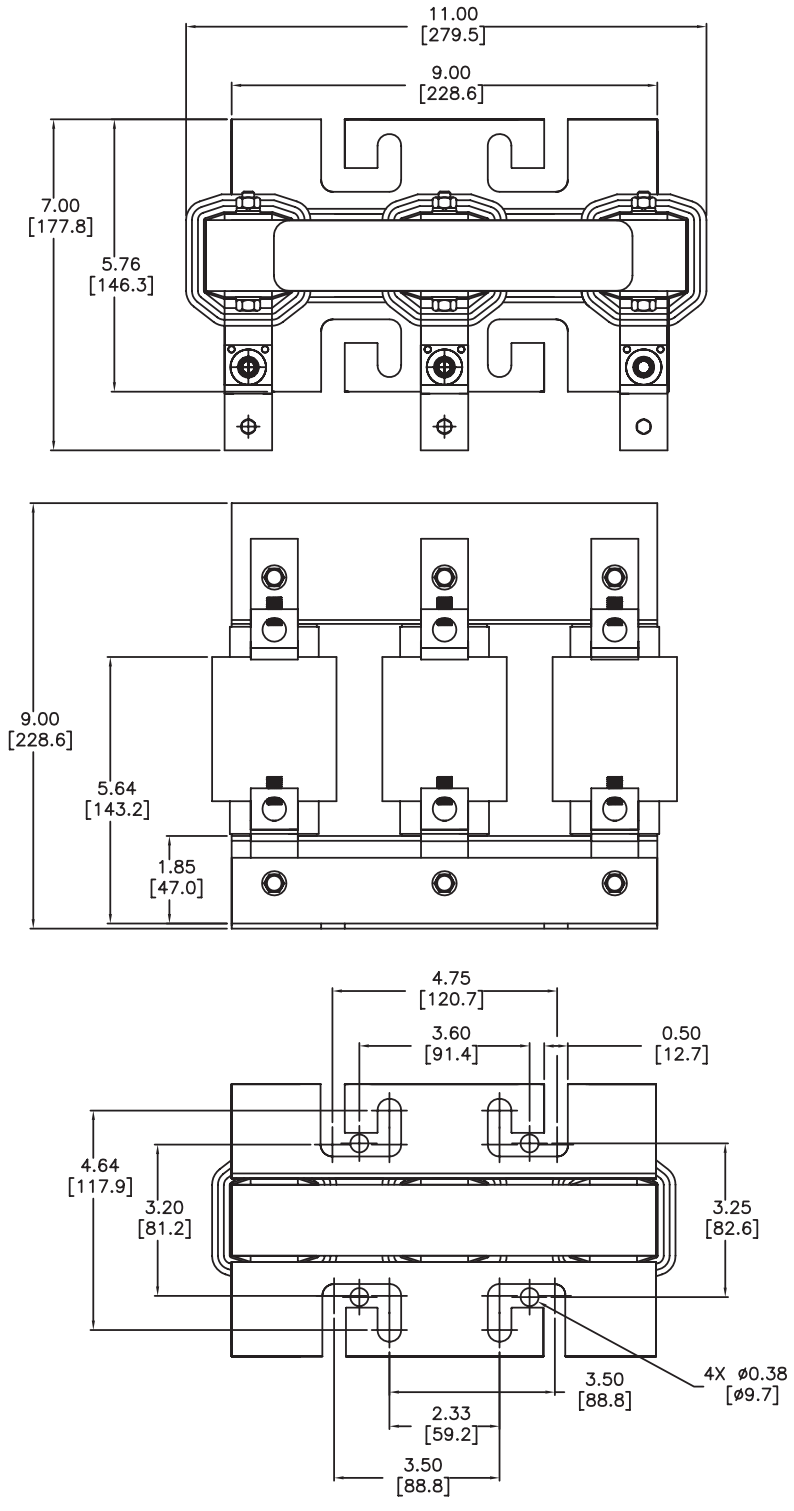
GS/DURAPULSE Drives Accessories – Line Reactors

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])



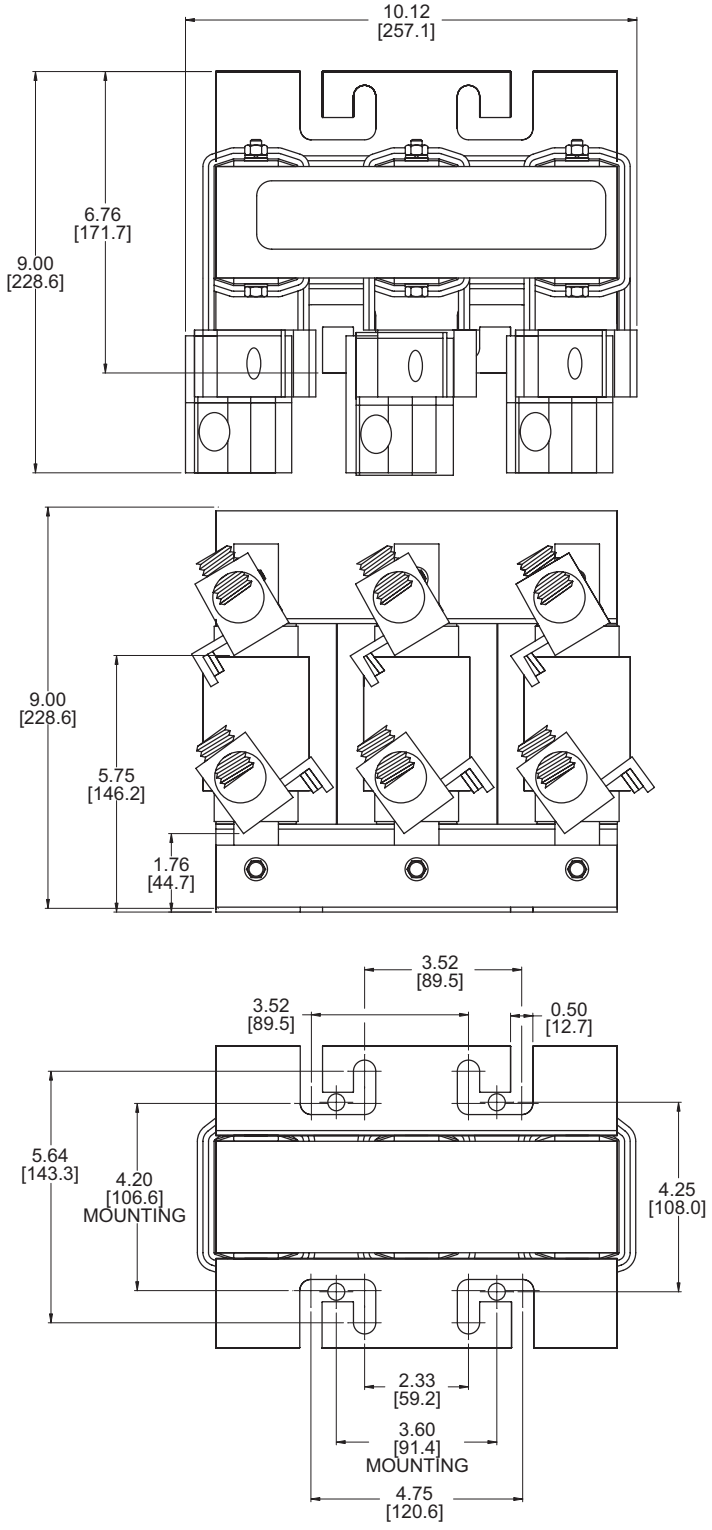
GS/*DURAPULSE* Drives Accessories – Line Reactors

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])



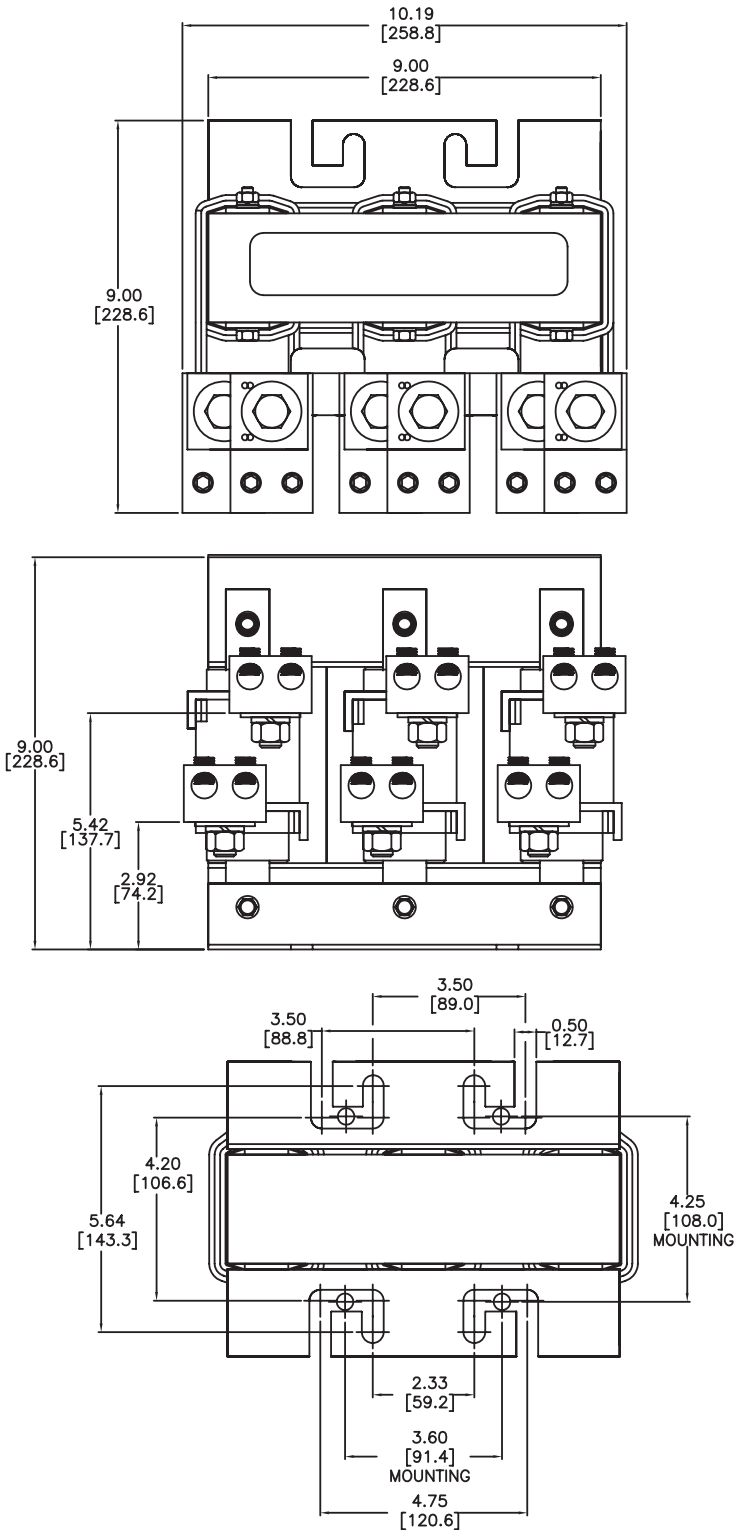
GS/DURAPULSE Drives Accessories – Line Reactors

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/*DURA*PULSE 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***
GS-22P0-BR	1	Retired	GS2-22P0	230 / 2	125%	100	300	10%
GS-23P0-BR	1	Retired	GS2-23P0	230 / 3	125%	70	300	10%
GS-25P0-BR *	1	Retired	GS2-25P0	230 / 5	125%	40	400	10%
GS-27P5-BR	1	Retired	GS2-27P5	230 / 7.5	125%	30	500	10%
GS-41P0-BR	1	Retired	GS2-41P0	460 / 1	125%	750	80	10%
GS-42P0-BR	1	$;092f:	GS2-42P0 GS2-51P0	460 / 2 575 / 1	125%	400	300	10%
	2 / parallel		GS2-53P0 GS2-57P5	575 / 3 575 / 7.5				
GS-43P0-BR	1	Retired	GS2-43P0	460 / 3	125%	250	300	10%
GS-45P0-BR	1	Retired	GS2-45P0	460 / 5	125%	150	400	10%
GS-47P5-BR	1	Retired	GS2-47P5	460 / 7.5	125%	100	500	10%
GS-4010-BR	1	Retired	GS2-4010	460 / 10	125%	75	1000	10%
	2 / series		GS2-5010	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/*DURA*PULSE 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	Total Brake Current	Min Resistor Value	Max Total Brake Current	Peak Power
	(hp)	(kW)	GS3-	Quantity	Part # GS-	Quantity	Part # GS-	(kg·m)	(A)	(Ω)	(A)	(W)
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 *DURA*PULSE Drives Accessories – Dynamic Braking Component Selection

Dynamic Braking Components

Use the table below to find the appropriate braking resistor and braking unit (if applicable) for your GS4 series AC drive. For more information and installation instructions, please see the GS4 User Manual. All listed resistors are available for purchase at www.automationdirect.com.

GS4 AC Drive Braking Component Selection

Drive Voltage	Motor Power (hp)	Drive Model	Drive Brake Capacity - Max Torque		Braking Unit		125% Braking Torque @ 10% Duty Cycle*					NEMA1 Resistors with Thermal Switch			
							Open Type Braking Resistor								
			Min Resistor Value (Ω)	Max Total Brake Current (A)	Quantity	Part # GS-	Part #	Quantity	Wiring Diagram	Brake Torque (kg·m)	Total Brake Current (A)	Part #	Qty.	Wiring Diagram	Total Brake Current (A)
230V	1	GS4-21P0	63.3	6	–	n/a	GS-BR-080W200	1	A	0.5	1.9	BR-N1-240W150	1	A	2.6
	2	GS4-22P0	47.5	8			GS-BR-200W091	1		1.0	4.2	BR-N1-280W50	1		7.8
	3	GS4-23P0	38.0	10			GS-BR-300W070	1		1.5	5.4		1		
	5	GS4-25P0	19.0	20			GS-BR-400W040	1		2.5	9.5	BR-N1-800W25	1		15.6
	7.5	GS4-27P5	14.6	26			GS-BR-1K0W020	1		3.7	19	BR-N1-800W18P0	1		21.7
	10	GS4-2010	14.6	26				1		5.1		BR-N1-1K1W15P0	1		26.0
	15	GS4-2015	12.6	28			GS-BR-1K5W013	1		7.5	29	BR-N1-1K5W14P0	1		27.9
	20	GS4-2020	8.3	46			GS-BR-1K0W4P3	2S	B	10.2	44	BR-N1-2K2W08P6	1		45.3
	25	GS4-2025	8.3	46				2S		12.2			1		
	30	GS4-2030	5.8	66			GS-BR-1K5W3P3	2S		14.9	58	BR-N1-3K0W05P8	1		67.2
	40	GS4-2040	4.8*	80*	2	1DBU	Not offered					BR-N1-1K6W10P0	2 (1/DBU)	F	79*
	50	GS4-2050	3.2*	120*	2	2DBU						BR-N1-2K2W06P8	2 (1/DBU)		116*
	60	GS4-2060	3.2*	120*	2	2DBU						BR-N1-3K6W06P8	2 (1/DBU)		
	75	GS4-2075	2.1*	180*	3	2DBU						BR-N1-2K2W06P8	3 (1/DBU)		
	100	GS4-2100	1.6*	240*	4	2DBU							4 (1/DBU)		
460V	1	GS4-41P0	190	4	–	n/a	GS-BR-080W750	1	A	0.5	1	BR-N1-240W200	1	A	4.0
	2	GS4-42P0	126.7	6			GS-BR-200W360	1		1	2.1	BR-N1-240W150	1		5.3
	3	GS4-43P0	108.6	7			GS-BR-300W250	1		1.5	3	BR-N1-500W200	1		4.0
	5	GS4-45P0	84.4	9			GS-BR-400W150	1		2.5	5.1	BR-N1-500W130	1		6.1
	7.5	GS4-47P5	54.3	14			GS-BR-1K0W075	1		3.7	10.2	BR-N1-720W85	1		9.3
	10	GS4-4010	47.5	16				1		5.1		BR-N1-1K2W50	1		15.8
	15	GS4-4015	42.2	18			GS-BR-1K5W043	1		7.5	17.6	BR-N1-1K5W40	1		19.8
	20	GS4-4020	26.2	29			GS-BR-1K0W016	2S	B	10.2	24	BR-N1-1K7W30	1		26.3
	25	GS4-4025	23.0	33				2S		12.2		BR-N1-2K3W26	1		30.4
	30	GS4-4030	23.0	33			GS-BR-1K5W013	2S		14.9	29	BR-N1-2K8W25	1		31.6
	40	GS4-4040	14.1	54			GS-BR-1K0W016	4 (2S/2P)	D	20.3	47.5	BR-N1-4K0W16P0	1		49.4
	50	GS4-4050	12.7*	60*	1	4DBU	Not offered					BR-N1-4K7W14P7	1	F	53.7
	60	GS4-4060	12.7*	60*	1	4DBU						BR-N1-6K9W13P6	1		58.1
	75	GS4-4075	9.5*	80*	2	3DBU						BR-N1-3K6W20	2 (1/DBU)		39.5*
	100	GS4-4100	6.3*	120*	2	4DBU						BR-N1-4K7W14P7	2 (1/DBU)		53.7*
	125	GS4-4125	6.3*	120*	2	4DBU						BR-N1-6K9W13P6	2 (1/DBU)		58.1*
	150	GS4-4150	6.0*	126*	1	5DBU						BR-N1-13K0W06P4	1		123.4
	175	GS4-4175	4.0*	190*	1	6DBU						BR-N1-18K0W03P7	1		213.5
	200	GS4-4200	4.0*	190*	1	6DBU							1		
	250	GS4-4250	3.4*	225*	1	7DBU							1		210.8
	300	GS4-4300	3.0*	252*	2	5DBU						BR-N1-13K0W06P4	2 (1/DBU)		123.4*

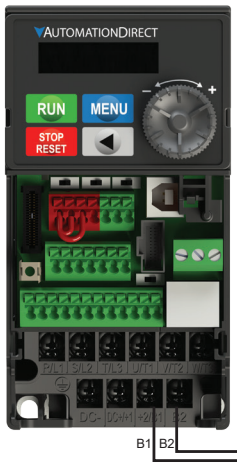
** These values are per individual DBU, as seen between DBU terminals B1 and B2.*

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

GS30 *DURA*PULSE Drives Accessories – Dynamic Braking Component Selection

Dynamic Braking Components

Use the table below to find the appropriate braking resistor and braking unit (if applicable) for your GS30 series AC drive. For more information and installation instructions, please see the GS30 User Manual. All listed resistors are available for purchase at www.automationdirect.com.



GS30 braking resistor connection; Refer to user Dynamic Braking user manual GS-DB_UMP for DURAPULSE resistor connection information.

For drive models GS33-2040, GS33-2050, GS33-4050, GS33-4060, GS33-4075, and GS33-4100, a dynamic braking unit must be used in conjunction with the braking resistor, as shown in the GS30 AC Drive Braking Component Selection table.

GS30 AC Drive Braking Component Selection

Drive Voltage	Motor Power (hp)	Drive Model	Drive Brake Capacity - Max Torque		Braking Unit		125% Braking Torque @ 10% Duty Cycle*								
							Open Type Braking Resistor					NEMA1 Resistors with Thermal Switch			
			Min Resistor Value (Ω)	Max Total Brake Current (A)	Qty.	Part #	Part #	Qty.**	Wiring Diagram	Brake Torque (kg•m)	Total Brake Current (A)	Part #	Qty.	Wiring Diagram	Total Brake Current (A)
230V	1/2	GS31-20P5	95.0	4	–	n/a	GS-BR-080W200	1	A	0.3	1.9	BR-N1-240W150	1	A	2.6
	1	GS31-21P0	63.3	6				1		0.5			1		
	2	GS31-22P0	47.5	8			GS-BR-200W091	1		1	4.2	BR-N1-280W50	1		7.8
	3	GS31-23P0	38.0	10			GS-BR-300W070	1		1.5	5.4		1		
	1/2	GS33-20P5	95.0	4			GS-BR-080W200	1		0.3	1.9	BR-N1-240W150	1		2.6
	1	GS33-21P0	63.3	6				1		0.5			1		
	2	GS33-22P0	47.5	8			GS-BR-200W091	1		1	4.2	BR-N1-280W50	1		7.8
	3	GS33-23P0	38.0	10			GS-BR-300W070	1		1.5	5.4		1		
	5	GS33-25P0	19.0	20			GS-BR-400W040	1		2.5	9.5	BR-N1-800W25	1		15.6
	7 1/2	GS33-27P5	16.5	23			GS-BR-1K0W020	1		3.7	19	BR-N1-800W18P0	1		21.7
	10	GS33-2010	14.6	26				1		5.1		BR-N1-1K1W15P0	1		26.0
	15	GS33-2015	12.6	29			GS-BR-1K5W013	1		7.4	29	BR-N1-1K5W14P0	1		27.9
	20	GS33-2020	8.3	46			GS-BR-1K0W4P3	2S	B	10.2	44	BR-N1-2K2W08P6	1		45.3
	25	GS33-2025	8.3	46			GS-BR-1K0W016	2P	C	14.6	47.5		1		
	30	GS33-2030	5.8	66			GS-BR-1K5W3P3	2S	B	17.9	57.6	BR-N1-3K0W05P8	1		67.2
	40	GS33-2040	4.8	79	2	1DBU	Not offered					BR-N1-1K6W10P0	2 (1/DBU)	E	39.0
	50	GS33-2050	3.2	119	2	2DBU						BR-N1-2K2W06P8	2 (1/DBU)		57.4
460V	1/2	GS33-40P5	380.0	2	–	n/a	GS-BR-080W750	1	A	0.3	1	BR-N1-250W400	1	A	2.0
	1	GS33-41P0	190.0	4				1		0.5		BR-N1-240W200	1		3.9
	2	GS33-42P0	126.7	6			GS-BR-200W360	1		1	2.1	BR-N1-240W150	1		5.2
	3	GS33-43P0	108.6	7			GS-BR-300W250	1		1.5	3	BR-N1-500W200	1		3.9
	5	GS33-45P0	84.4	9			GS-BR-400W150	1		2.5	5.1	BR-N1-500W130	1		6.0
	7 1/2	GS33-47P5	50.7	15			GS-BR-1K0W075	1		3.7	10.2	BR-N1-720W85	1		9.2
	10	GS33-4010	40.0	19				1		5.1		BR-N1-1K2W50	1		15.6
	15	GS33-4015	33.0	23			GS-BR-1K5W043	1		7.4	17.6	BR-N1-1K5W40	1		19.5
	20	GS33-4020	26.2	29			GS-BR-1K0W016	2S	B	10.2	24	BR-N1-1K7W30	1		26.0
	25	GS33-4025	26.2	29				2S		12.2		BR-N1-2K3W26	1		30.0
	30	GS33-4030	23.0	33			GS-BR-1K5W013	2S		14.9	29	BR-N1-2K8W25	1		31.2
	40	GS33-4040	15.2	50			GS-BR-1K5W040	2P	C	24.4	38.0	BR-N1-4K0W16P0	1		48.8
	50	GS33-4050	12.7	60	1	4DBU	Not offered					BR-N1-4K7W14P7	1	E	53.1
	60	GS33-4060	12.7	60	1	4DBU						BR-N1-6K9W13P6	1		57.4
	75	GS33-4075	9.5	80	2	3DBU						BR-N1-3K6W20	2 (1/DBU)	F	39.0
	100	GS33-4100	6.3	121	2	4DBU						BR-N1-4K7W14P7	2 (1/DBU)		53.1

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

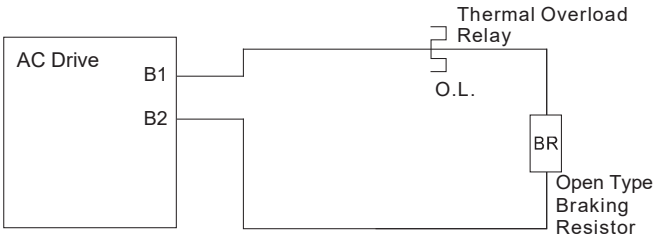
*** S= series wiring, P= parallel wiring.*

GSxx *DURA*PULSE Drives Accessories – Dynamic Braking Component Selection

Brake Wiring

Use your drive's Braking Component Selection table to determine the appropriate brake resistor model and configuration for your drive. Refer to the diagrams below for examples on how to wire each possible configuration

Diagram A (Drive + 1 Resistor or NEMA1 Resistor):



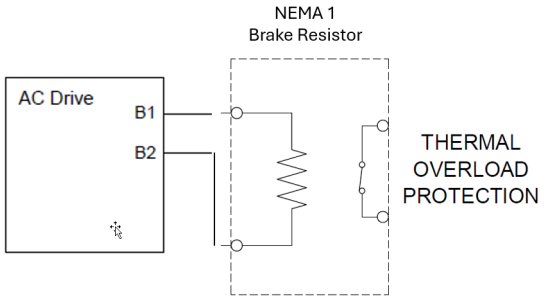


Diagram B (Drive + 2 Series Resistors):

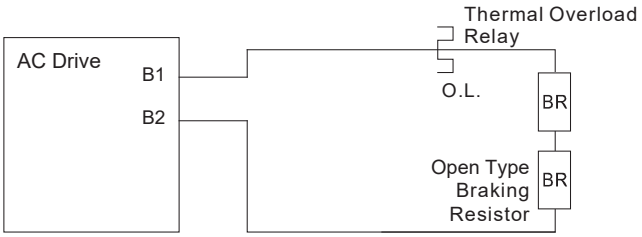


Diagram C (Drive + 2 Parallel Resistors):

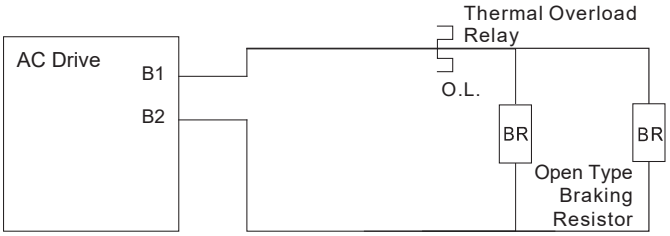
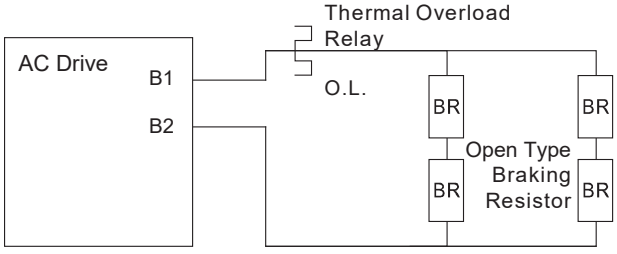


Diagram D (drive + 2 Series and 2 Parallel Resistors):



GSxx *DURA*PULSE Drives Accessories – Dynamic Braking Component Selection

Brake Wiring, *continued*

Diagram E (Drive + 1 DBU with 1 NEMA1 Resistor:

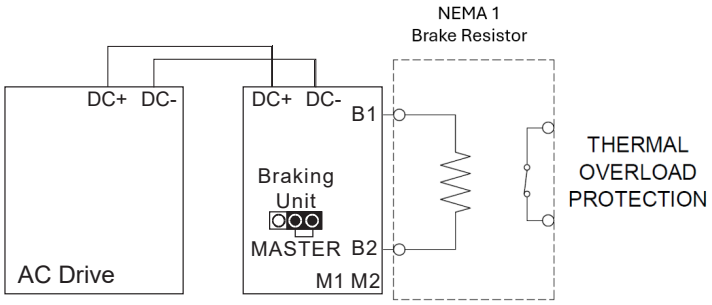
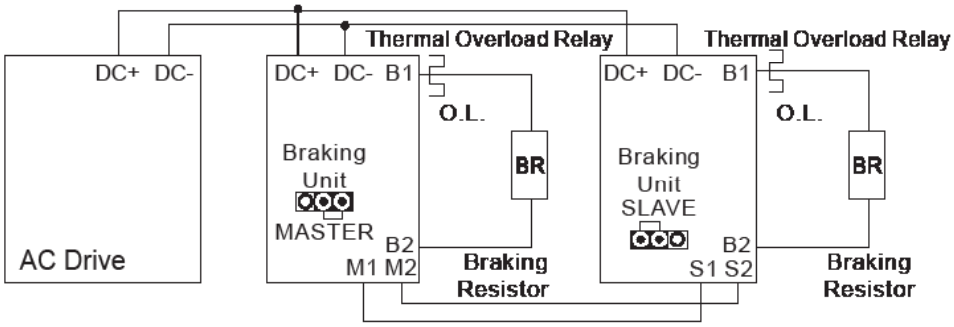
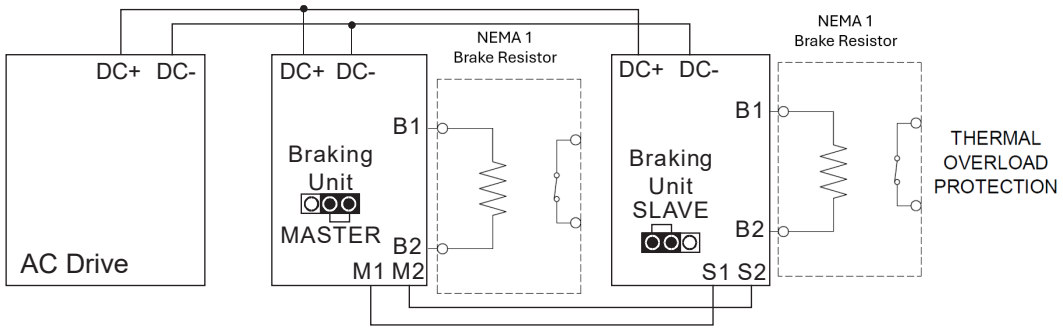


Diagram F (Drive + DBUs with 1 Resistor or NEMA1 Resistor per DBU):





GS/*DURA*PULSE Drives Accessories – Braking Unit Specifications for GS4 & GS30 *DURA*PULSE AC Drives

Braking Units for 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 GS4 & GS30 *DURA*PULSE AC Drives

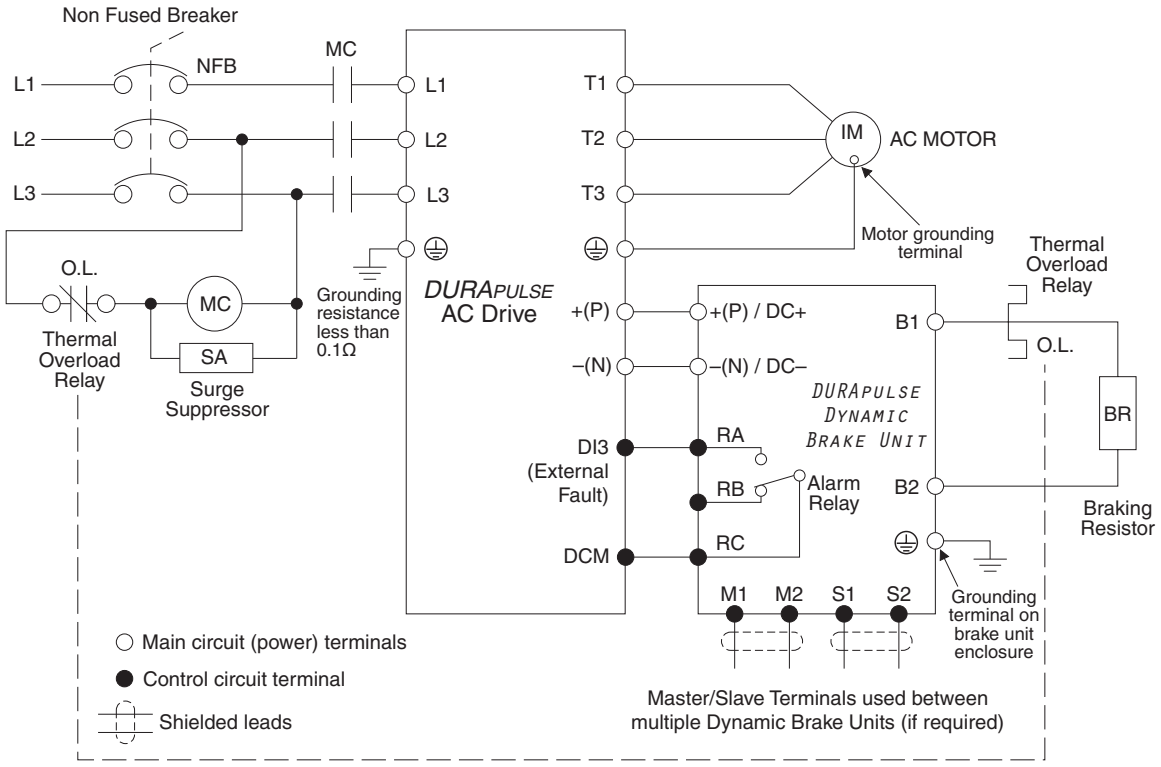
Braking Unit Part Number		***GS-1DBU***	***GS-2DBU***	***GS-3DBU***	***GS-4DBU***	***GS-5DBU***	***GS-6DBU***	***GS-7DBU***
Price		$;010e[:	$00923:	$010e_:	$-0092j:	$;0010e#:	$;;0010e!:	$;0010e?:
Nominal Voltage (VAC)		230		460				
Max Motor Capacity (hp/[kW])		20 [15]	30 [22]	40 [30]	60 [45]	150 [110]	200 [160]	250 [185]
Output Rating	***Max Discharge Current (A) @ 10% Duty Cycle****	40	60	40	60	126	190	225
	Continuous Discharge Current (A)	15	20	15	18	45	50	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 Temperture	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^2 [1G] under 20Hz ; 2m/s^2 [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/*DURA*PULSE Drives Accessories – Braking Unit Basic Wiring for GS4 & GS30 *DURA*PULSE AC Drives

Basic Dynamic Braking Wiring Diagram for GS4 & GS30 *DURA*PULSE AC Drives

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.

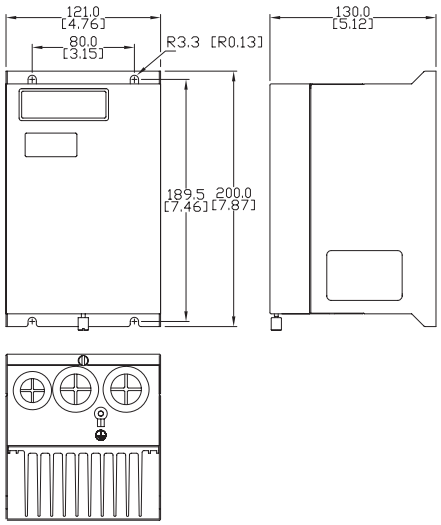


GS/*DURA*PULSE Drives Accessories – Braking Unit Dimensions for GS4 & GS30 *DURA*PULSE AC Drives

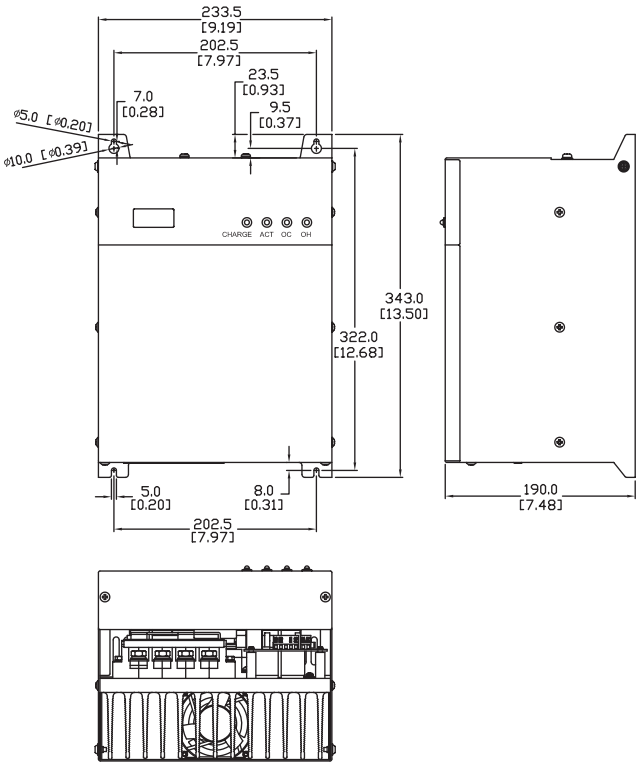
Braking Unit Dimensions (Dimensions = mm [in])

See our website: 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)

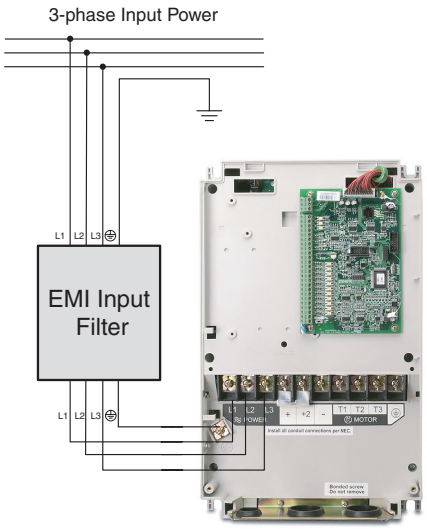


GS2 & GS3 *DURA*PULSE Accessories – EMI Filters

Overview

The CE Declaration of Conformity for the *DURA*PULSE 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 *DURA*PULSE 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	Dimen -sions
GS2-1xxx	–	SVA-2040 (1-ph) *	20DRT1W3S	Retired	1-phase, 20A	Figure 1
GS3-23P0 (1-ph)			32DRT1W3C	Retired	1-phase, 32A	Figure 2
GS3-23P0		–	26TDT1W4C	Retired	3-phase, 26A	Figure 3
–	GS3-4020	–	50TDS4W4C	Retired	3-phase, 50A	Figure 4
GS3-2020	GS3-4040	–	100TDS84C	Retired	3-phase, 100A	Figure 5
GS3-2030	GS3-4060	–	150TDS84C	Retired	3-phase, 150A	Figure 6
GS3-2040						
GS3-2050	–	–	180TDS84C	Retired	3-phase, 180A	Figure 7
–	GS3-4010	–	RF110B43CA	Retired	3-phase, 25A	Figure 8
–	GS3-4100	–	200TDDS84C	Retired	3-phase, 200A	Figure 9

** 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 *DURA*PULSE Accessories – EMI Filters

Dimensions

Figure 1 [units = mm]

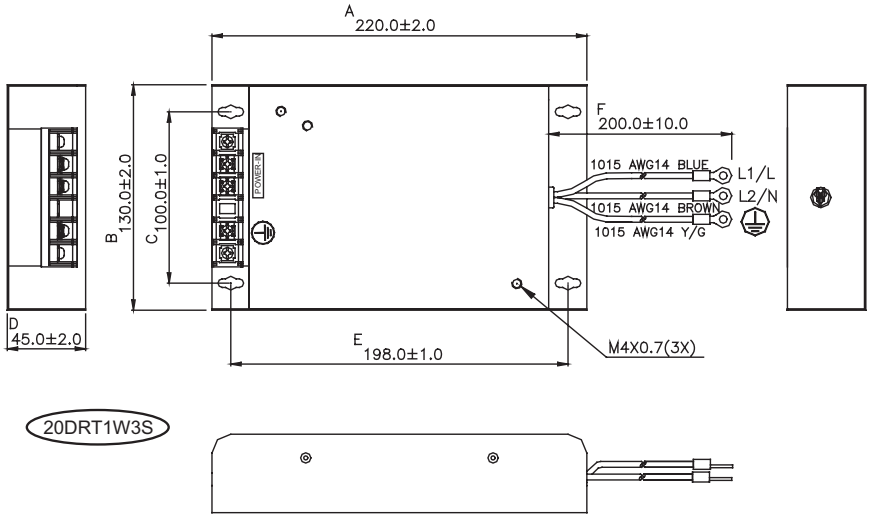
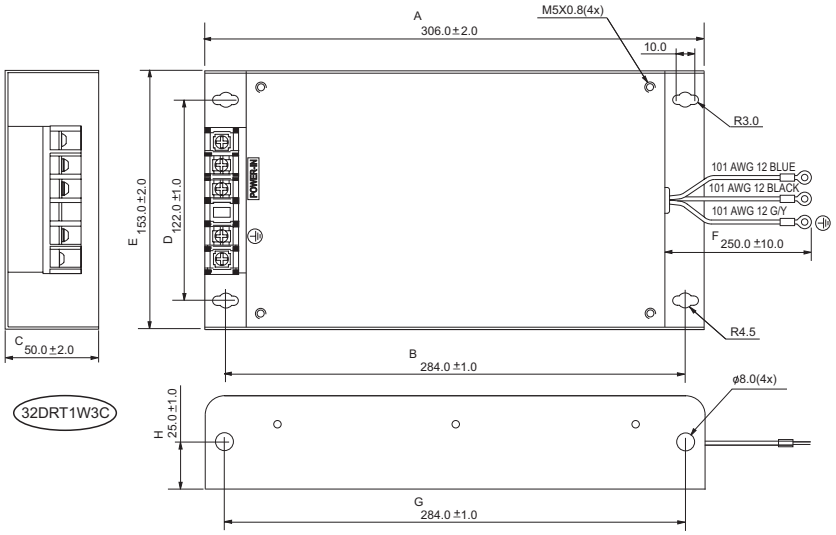


Figure 2 [units = mm]



GS2 & GS3 *DURA*PULSE Accessories – EMI Filters

Figure 3 [units = mm (in)]

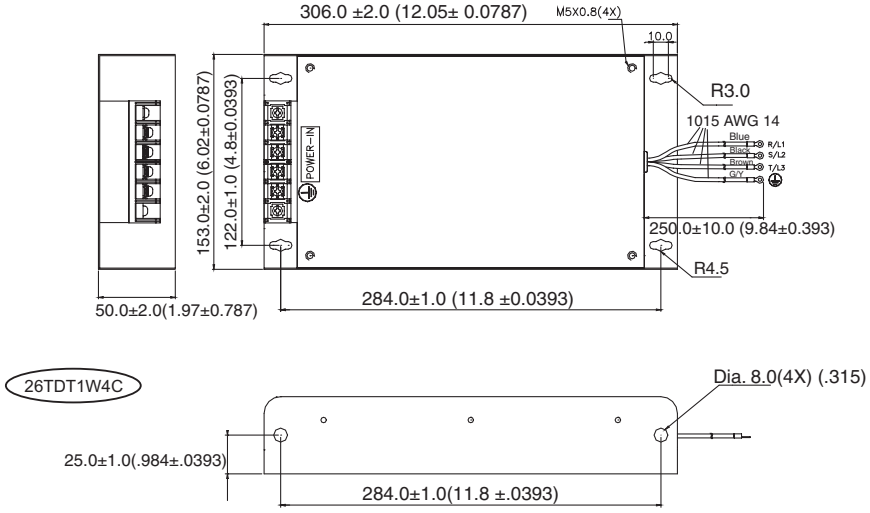


Figure 4 [units = mm (in)]

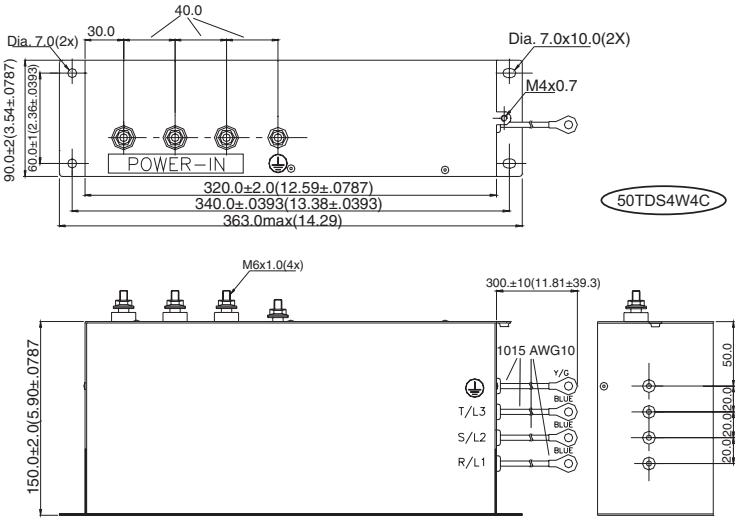
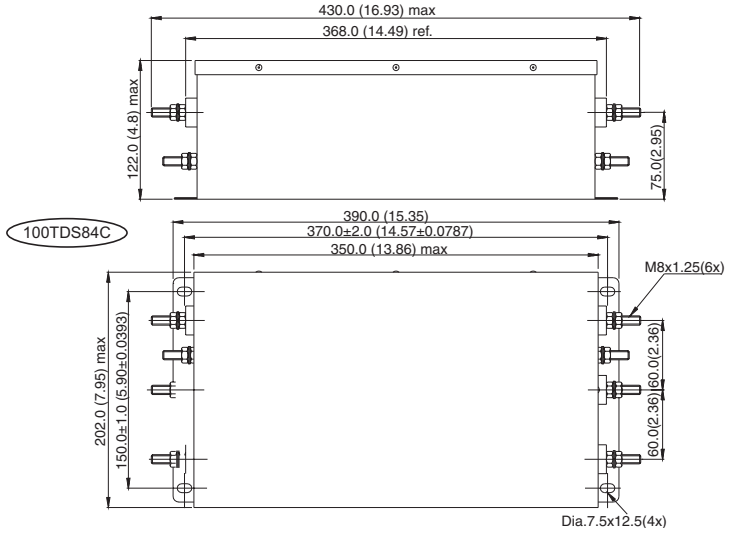


Figure 5 [units = mm (in)]



GS2 & GS3 *DURA*PULSE Accessories – EMI Filters

Figure 6 [units = mm (in)]

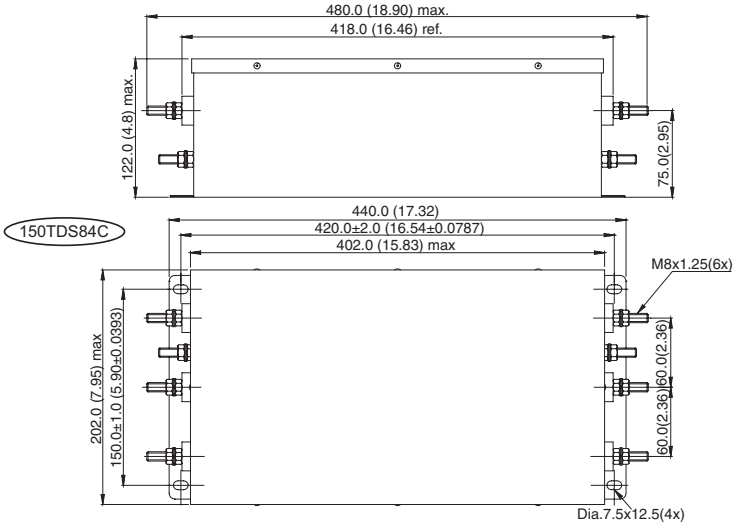
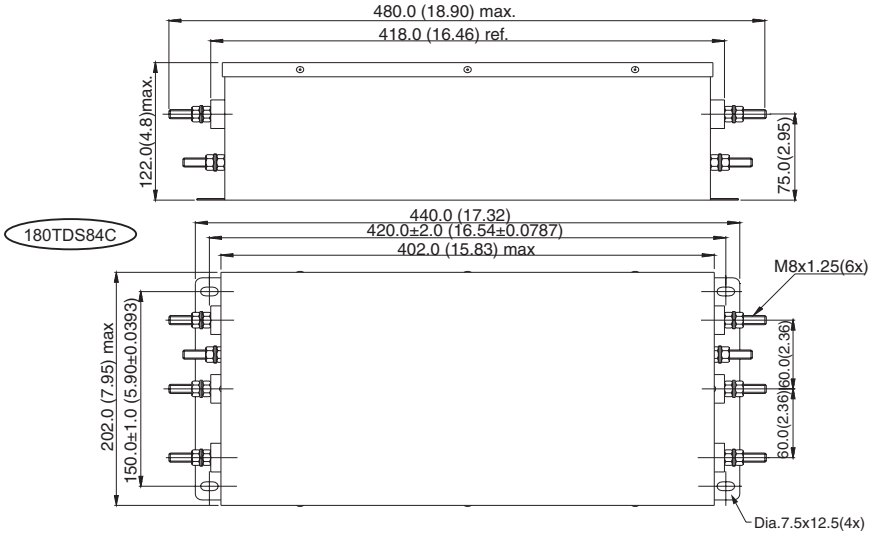


Figure 7 [units = mm (in)]



GS2 & GS3 *DURA*PULSE Accessories – EMI Filters

Figure 8 [units = mm (in)]

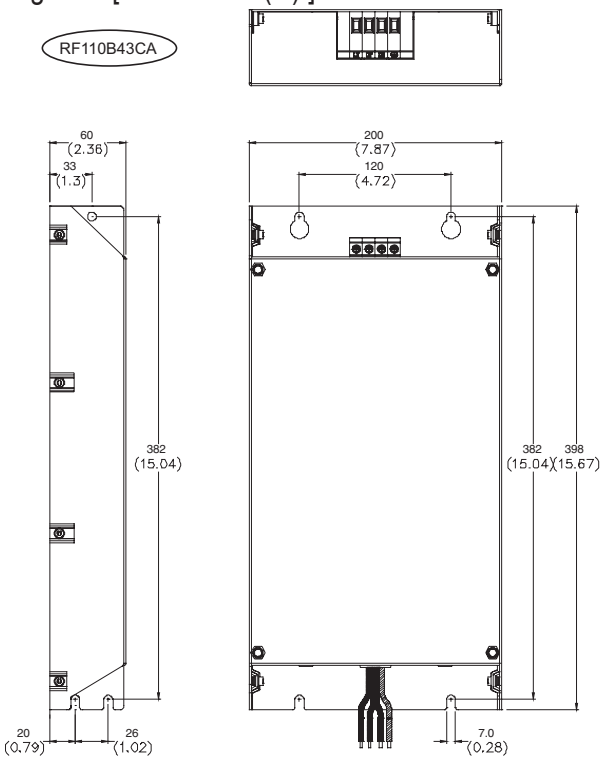
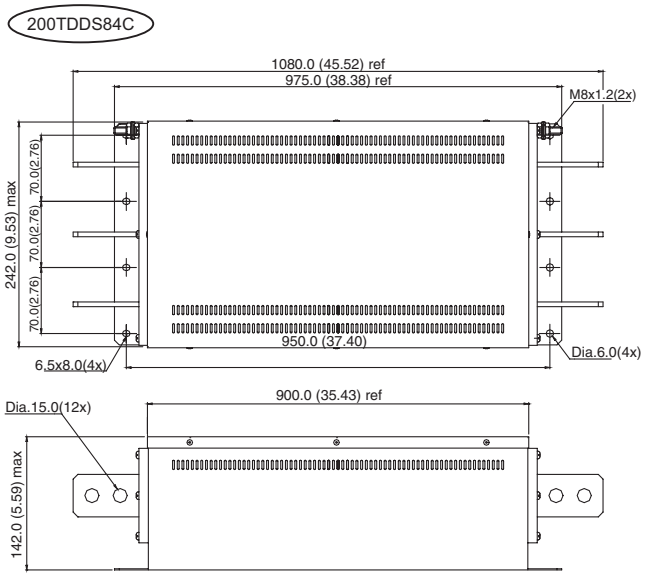


Figure 9 [units = mm (in)]



GS4 *DURA*PULSE 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.

EMI Filters Selection for GS4 AC Drives

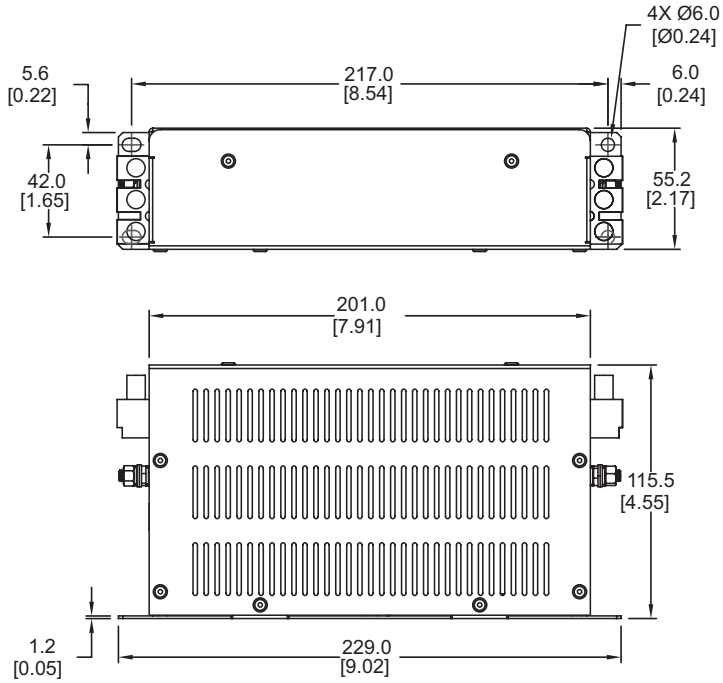
Model*	Description	EMI Filter **	Max Power kW [max/ph]	Max Torque kg·cm [lb·in]	SCCR Rating (kA)
GS4-21P0	230V 1ph/3ph 1.0 hp	KMF325A	20.8 [6]	17.7 [2]	5
GS4-22P0	230V 1ph/3ph 2.0 hp				
GS4-23P0	230V 1ph/3ph 3.0 hp				
GS4-25P0	230V 1ph/3ph 5.0 hp				
GS4-27P5	230V 1ph/3ph 7.5 hp	KMF370A	58.1 [16.8]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

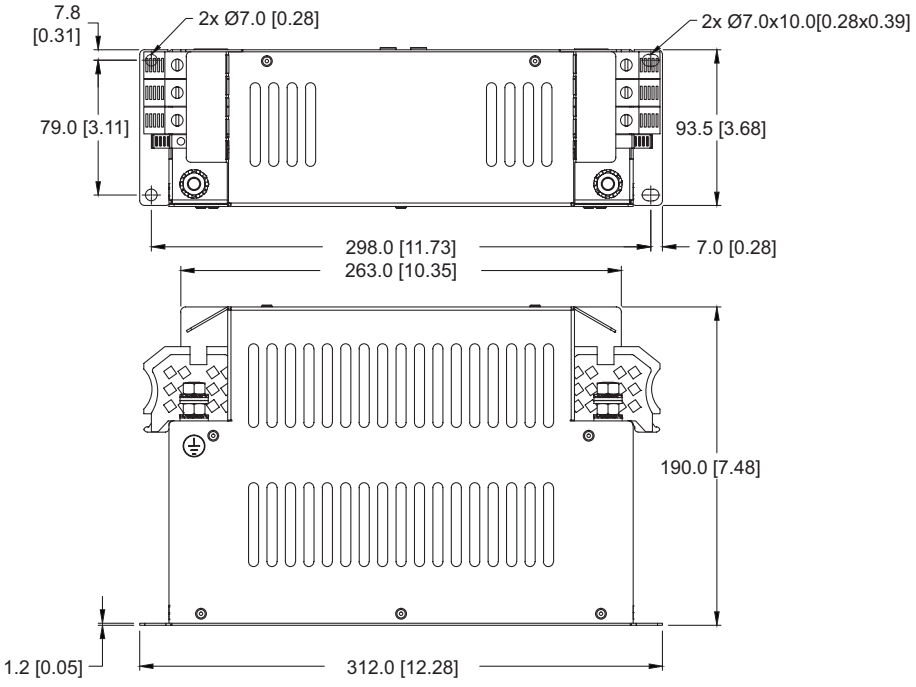
GS4 *DURA*PULSE Accessories – EMI Filters

Dimensions (Units = mm [in])

See our website: www.AutomationDirect.com for complete engineering drawings.



KMF318A KMF325A

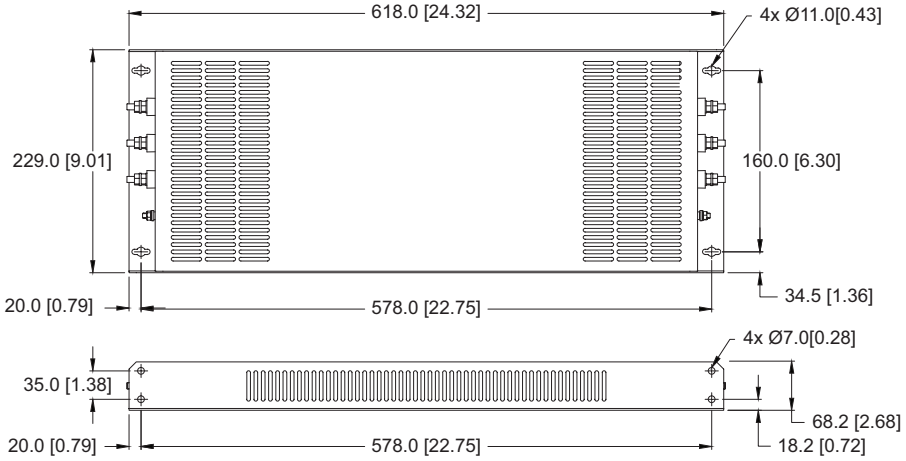


KMF350A KMF370A KMF3100A

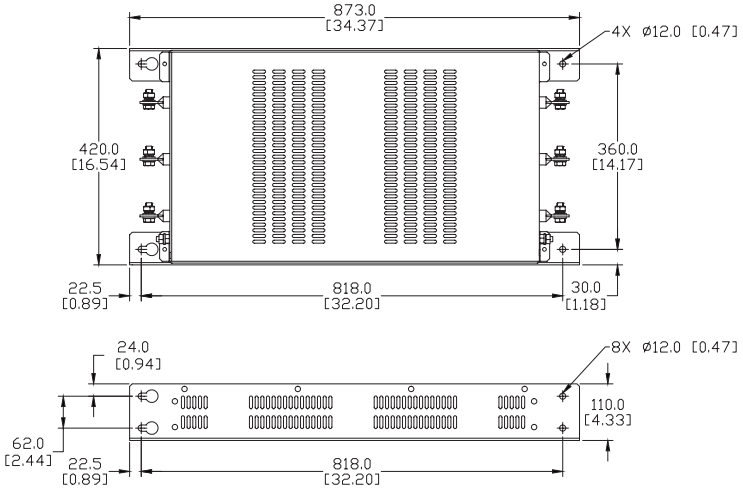
GS4 *DURA*PULSE Accessories – EMI Filters

Dimensions (Units = mm [in])

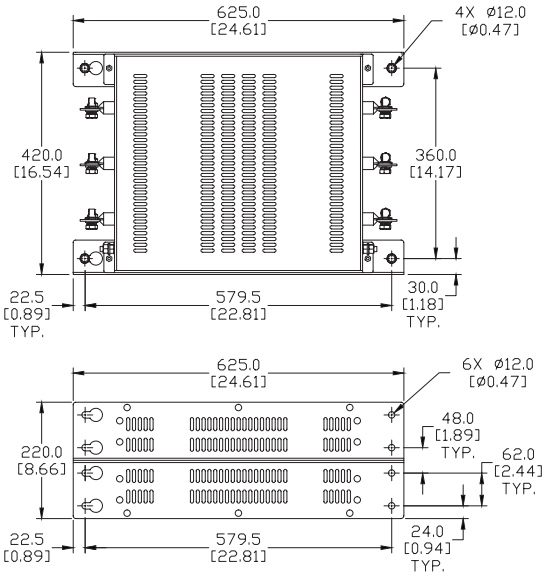
See our website: www.AutomationDirect.com for complete engineering drawings.



MIF3150



MIF3400B



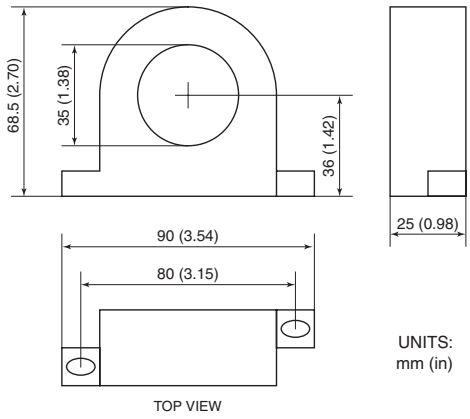
MIF3800

GS/DURAPULSE Accessories – RF Filter

RF Filter for GS1,GS2, GS3/DURAPULSE AC Drives		
Part Number	*Price*	*Drive Model*
RF220X00A	$;05!h:	GS1-xxxx GS2-xxxx GS3-xxxx

Description

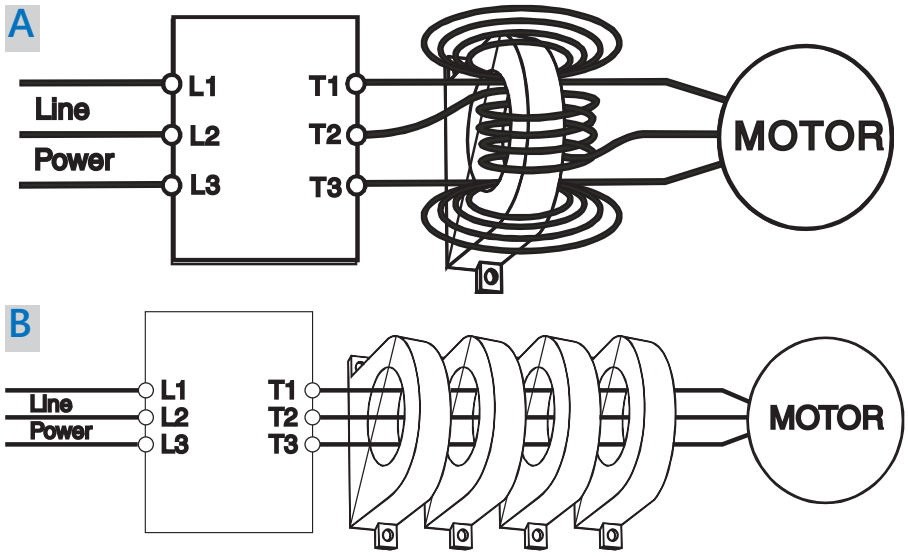
Zero phase reactors, (aka RF noise filters) help reduce radiated noise from the inverter wiring. The wiring must go through the opening to reduce the RF component of the electrical noise. Loop the wires three times (four turns) to attain the full RF filtering effect. For larger wire sizes, place multiple 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.



GS4 *DURA*PULSE 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.

Fuse Specification Chart GS4 *DURA*PULSE 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*
GS4-21P0	1	3	230	6.4	10	TJN10	JHL10	0.5	1	230	6.4	10	TJN10	JHL10
GS4-22P0	2	3	230	12	15	TJN15	JHL15	0.75	1	230	9.7	15	TJN15	JHL15
GS4-23P0	3	3	230	16	25	TJN25	JHL25	1	1	230	15	20	TJN20	JHL20
GS4-25P0	5	3	230	20	35	TJN35	JHL35	2	1	230	20	30	TJN30	JHL30
GS4-27P5	7.5	3	230	28	50	TJN50	JHL50	3	1	230	26	40	TJN40	JHL40
GS4-2010	10	3	230	36	70	TJN70	JHL70	3	1	230	26	40	TJN40	JHL40
GS4-2015	15	3	230	52	100	TJN100	JHL100	5	1	230	40	70	TJN70	JHL70
GS4-2020	20	3	230	72	125	TJN125	JHL125	7.5	1	230	58	100	TJN100	JHL100
GS4-2025	25	3	230	83	150	TJN150	JHL150	10	1	230	76	125	TJN125	JHL125
GS4-2030	30	3	230	99	175	TJN175	JHL175	10	1	230	76	125	TJN125	JHL125
GS4-2040**	40	3	230	124	175	TJN175	JHL175	10	1	230	63	90	TJN90	JHL90
GS4-2050**	50	3	230	143	200	TJN200	JHL200	10	1	230	63	90	TJN90	JHL90
GS4-2060	60	3	230	171	250	TJN250	JHL250	15	1	230	94	150	TJN150	JHL150
GS4-2075	75	3	230	206	300	TJN300	JHL300	20	1	230	124	175	TJN175	JHL175
GS4-2100	100	3	230	245	350	TJN350	JHL350	25	1	230	143	200	TJN200	JHL200
GS4-41P0	1	3	460	4.3	6	TJS6	JHL6							
GS4-42P0	2	3	460	5.9	10	TJS10	JHL10							
GS4-43P0	3	3	460	8.7	15	TJS15	JHL15							
GS4-45P0	5	3	460	14	20	TJS20	JHL20							
GS4-47P5	7.5	3	460	17	25	TJS25	JHL25							
GS4-4010	10	3	460	20	35	TJS35	JHL35							
GS4-4015	15	3	460	26	45	TJS45	JHL45							
GS4-4020	20	3	460	35	60	TJS60	JHL60							
GS4-4025	25	3	460	40	70	TJS70	JHL70							
GS4-4030	30	3	460	47	90	TJS90	JHL90							
GS4-4040**	40	3	460	63	125	TJS100	JHL100							
GS4-4050	50	3	460	74	100	TJS110	JHL110							
GS4-4060	60	3	460	101	125	TJS150	JHL150							
GS4-4075	75	3	460	114	150	TJS150	JHL150							
GS4-4100	100	3	460	157	200	TJS200	JHL200							
GS4-4125	125	3	460	167	250	TJS250	JHL250							
GS4-4150	150	3	460	207	300	TJS300	JHL300							
GS4-4175	175	3	460	240	350	TJS350	JHL350							
GS4-4200	200	3	460	300	450	TJS450	JHL450							
GS4-4250	250	3	460	380	500	TJS500	JHL500							
–	–					Fast Acting Current Limiting Class L								
GS4-4300	300	3	460	400	700	LCU700								

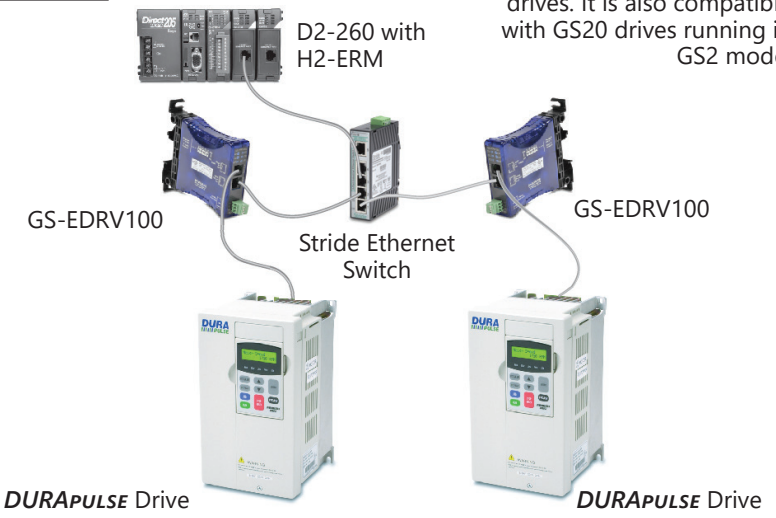
single-phase input power not applicable for 460V

** High-speed Class J*
*** Includes DC choke*
**** The fuses listed above are available from AutomationDirect.com. (Individual web links are associated with each part number listed above.)*

GS1,GS2,GS3/*DURA*PULSE Accessories – Ethernet Interface

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

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



GS-EDRV100 Overview

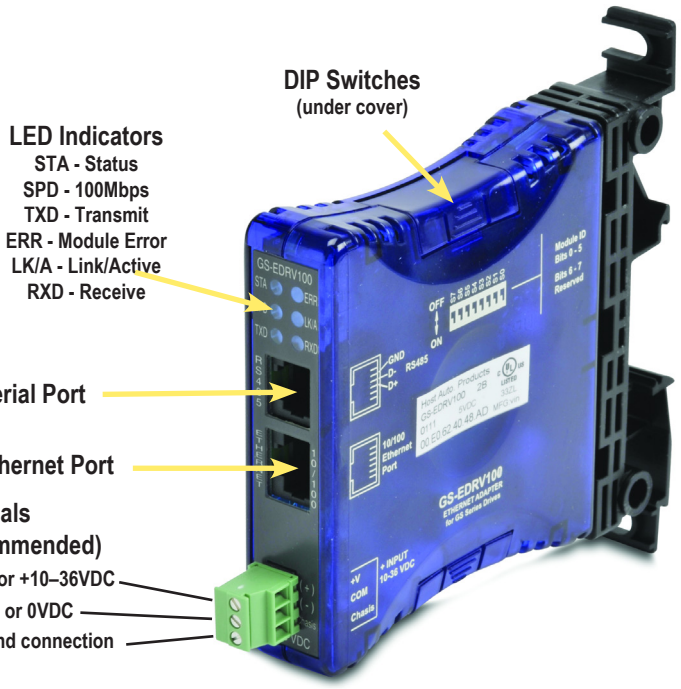
The GS-EDRV100 Ethernet interface provides a high-performance Ethernet link between a control system for legacy GS1, GS2, GS3, or GS4 drives. The module will also work with GS20 drives that are running in GS2 mode. The GS-EDRV100 processes signals to and from the drive, mounts on 35mm DIN rail, and connects 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.

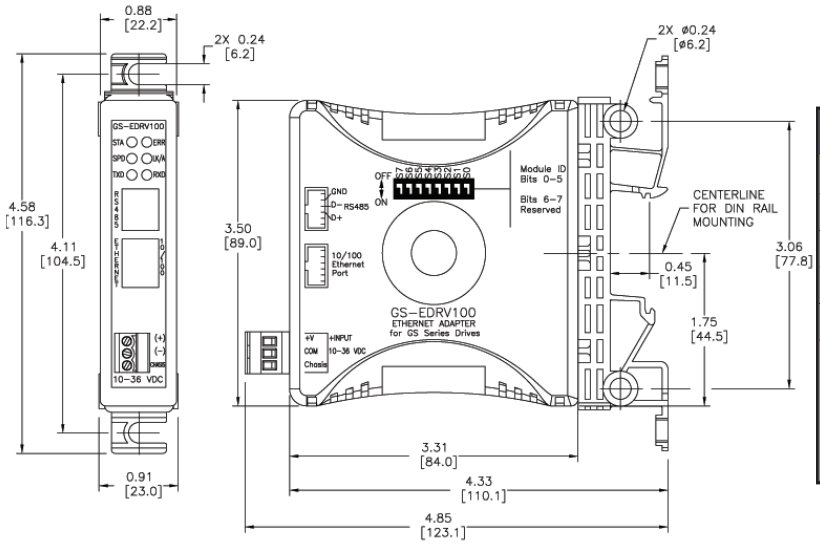
Note: The GS-EDRV100 requires an external 24 VDC power supply.

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]



GS-EDRV100 Specifications

Part Number	***GS-EDRV100***
Price	$00e8b:
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/*DURA*PULSE Accessories – Software

Overview

GSoft, the configuration software for the GS1, GS2, GS3/*DURA*PULSE drives, allows a personal computer to be directly connected to the drives via RS-232 or RS-485 (PC serial port, USB-RS232-1, 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-RS232-1, 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

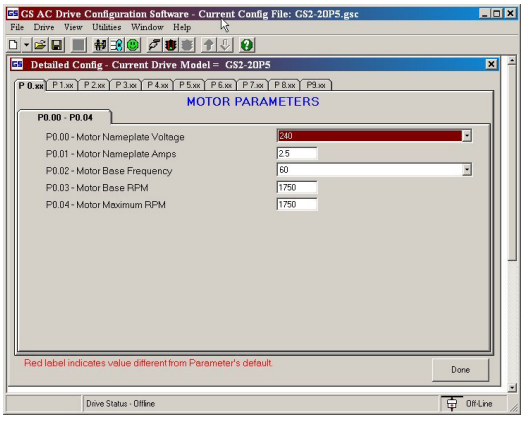
GS1, GS2, GS3/*DURA*PULSE AC Drive Software

Part Number	Price	Description
GSOFT *	Free	configuration software*
USB-485M	$02_o:	USB to RS-485 converter
USB-RS232-1	$;6fdk:	USB to RS232 converter

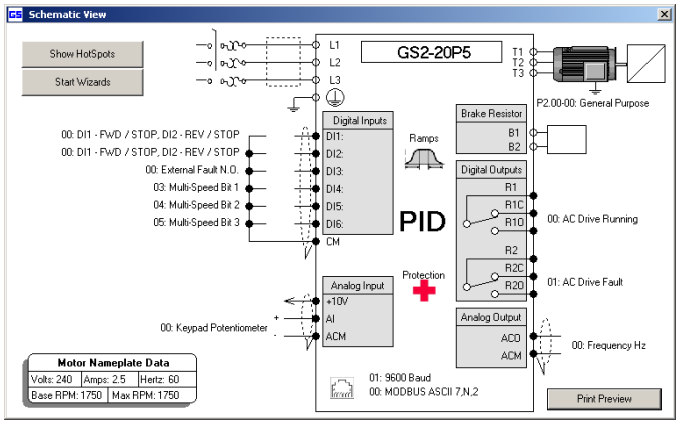
** GSOFT can be used with GS1, GS2, & GS3/DURAPULSE drives; USB-485M or FA-ISOCON required for GS1 and GS3/DURAPULSE drives.*
** GSOFT can be downloaded for free: www.automationdirect.com*

GSoft offers three software configuration methods

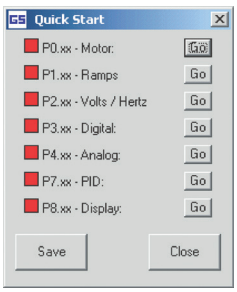
Detailed Configuration
The Detailed Configuration method provides AC drive parameter access in a tabbed dialog format. Detailed Configuration can be used for new or existing configurations.



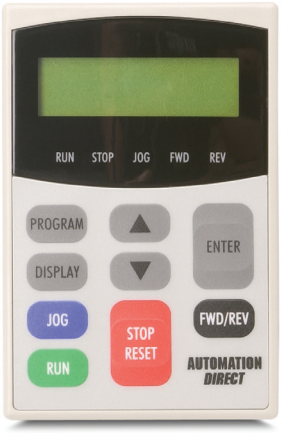
Schematic View Configuration
The Schematic View Configuration method uses a schematic picture of the AC drive and external connections to guide you through the setup of the AC drive. The Schematic View method can be used for new or existing configurations.



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/*DURA*PULSE Accessories – Miscellaneous

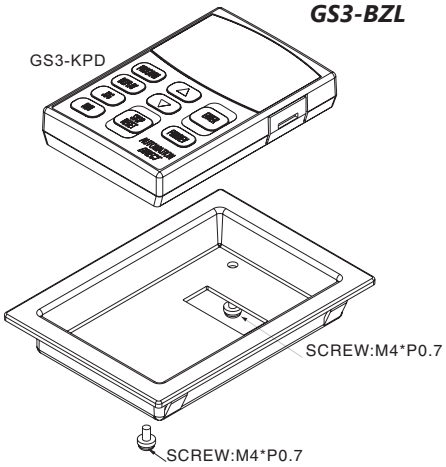


GS3-KPD

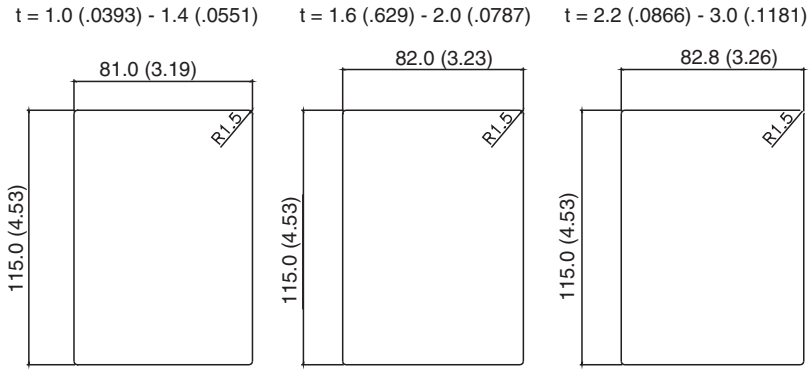
ZL-CDM-RJ12x4

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:



GS-CBL2-1L

GS-CBL2-5L

GS1, GS2, GS3/*DURA*pulse Drives Miscellaneous Accessories			
Part Number	***Drive Model***	***Description***	***Price***
GS-CBL2-1L	GS2, GS3/DURApulse	One meter keypad cable (installation screws included)	$04yo:
GS-CBL2-3L	GS2, GS3/DURApulse	Three meter keypad cable (installation screws included)	$04yp:
GS-CBL2-5L	GS2, GS3/DURApulse	Five meter keypad cable (installation screws included)	$04yq:
GS3-KPD	GS3/DURApulse	Spare or replacement keypad for DURApulse AC drives; great for maintenance or back-up programs	Retired
GS3-BZL	GS3/DURApulse	Flush Mount Bezel Kit for remote mounting of the DURApulse removable keypad	$;06fh:
ZL-CDM-RJ12X4	GS1, GS2, GS3/DURApulse	ZIPLink 4-port communication distribution module, 4 RJ12 ports, and 1 screw terminal port	$;08f8:
ZL-CDM-RJ12X10	GS1, GS2, GS3/DURApulse	ZIPLink 10-port communication distribution module, 10 RJ12 ports, and 1 screw terminal port	$;08f7:
Optional ZipLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix on page pg.tGSX-171.			

GS3/*DURA*PULSE Accessories – Replacement Parts

GS3/*DURA*PULSE 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 *DURA*pulse (GS3 Series) AC Drives

Part Number (1)	Price	Specifications (2)	Fans / Drive (3)	GS3 Drive Model (4)	Drive V / HP
GS-FAN-1	$0907:	50 mm, 12 VDC, 0.25A	1	GS3-43P0	460 / 3
GS-FAN-2	$0908:	60 mm, 12 VDC, 0.25A	1	GS3-23P0	230 / 3
GS-FAN-3	Retired	80 mm, 12 VDC, 0.42A	2	GS3-4010	460 / 10
GS-FAN-4	Retired	92 mm, 24 VDC, 0.30A	2	GS3-2020 GS3-2030 GS3-4020	230 / 20 230 / 30 460 / 20
GS-FAN-5	$0090b:	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 *ZIP*Link Wiring System

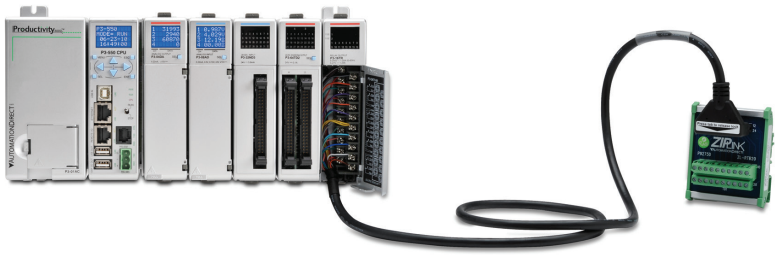
ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using half the space at a fraction of the cost of standard terminal blocks. There are several wiring solutions available when using the ***ZIP***Link System ranging from PLC I/O-to-***ZIP***Link 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 ***ZIP***Link modules are provided with ***ZIP***Link cables. See the following solutions to help determine the best ***ZIP***Link 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 ***ZIP***Link connector module used in conjunction with a prewired ***ZIP***Link 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 ***ZIP***Link Connector Modules selector tables located in this section,

- 1. Locate your I/O module/PLC.
  2. Select a ***ZIP***Link Module.
  3. Select a corresponding ***ZIP***Link 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 ***ZIP***Link Pigtail Cables. ***ZIP***Link 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 ***ZIP***Link 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 *Sure*Servo, *Sure*Step, Stellar Soft Starter and AC drives. Add a ***ZIP***Link 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 ***ZIP***Link cable and other associated hardware.

Wiring Solutions

Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with ***Direct***LOGIC, 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, ***ZIP***Link 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 ***ZIP*****Link 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 ***ZIP***Link 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 Hard-ware 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				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
			ZL-CDM-RJ12Xxx *	RJ12	GS-485RJ12-CBL-2		
			FA-ISOCON	5-pin connector	GS-ISOCON-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	Port 2 (HD15)			FA-15HD
			D2-250-1 CPU				
			D2-260, D2-262 CPU				
			D4-450, D4-454 CPU	Port 3 (25-pin)			FA-CABKIT
		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				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
			ZL-CDM-RJ12Xxx *	RJ12	GS-485RJ12-CBL-2		
			FA-ISOCON	5-pin connector	GS-ISOCON-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				
			GS-EDRV100	RJ12	GS-EDRV-CBL-2	RJ12 to RJ12	
			ZL-CDM-RJ12Xxx *	RJ12	GS-485RJ12-CBL-2		
			FA-ISOCON	5-pin Connector	GS-ISOCON-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)*