GS2 Series - Introduction

GS2 Series Drives									
Motor Rating	**Hp**	*0.25*	*0.5*	*1*	*2*	*3*	*5*	*7.5*	*10*
	kW	*0.2*	*0.4*	*0.75*	*1.5*	*2.2*	*3.7*	*5.5*	*7.5*
Single-Phase Input 115V Class		✔	✔	✔					
Single/Three-Phase Input 230V Class			✔	✔	✔	✔			
Three-Phase 230V Class							✔	✔	
Three-Phase 460V Class				✔	✔	✔	✔	✔	✔
Three-Phase 575V Class				✔	✔	✔	✔	✔	✔

Overview

The GS2 series of AC drives offers all of the features of our GS1 drive plus dynamic braking, PID and a removable keypad. The drive can be configured using the built-in digital keypad or with the standard RS-232/RS-485 serial communications port. The standard keypad allows you to configure the drive, set the speed, start and stop the drive, command forward and reverse direction of motor shaft, and monitor specific parameters during operation. Each GS2 features one analog and six programmable digital inputs, and one analog and two programmable relay outputs.

Features

- Simple Volts/Hertz control
- Sinusoidal Pulse Width Modulation (PWM)
- 1-12 kHz carrier frequency
- IGBT technology
- Starting torque: 125% at 0.5 Hz/150% at 5 Hz
- 150% rated current for one minute
- Electronic overload protection
- Stall prevention
- Adjustable accel and decel ramps
- S-curve settings for acceleration and deceleration
- Automatic torque compensation
- Automatic slip compensation
- Dynamic braking circuit
- DC braking
- Three skip frequencies
- Trip history
- Programmable jog speed
- Integral PID control
- Removable keypad with speed potentiometer
- Programmable analog input
- Programmable analog output
- Six programmable digital inputs
- Two programmable relay outputs
- RS-232/485 Modbus communications up to 38.4 Kbps.
- Optional Ethernet communications
- Two-year warranty
- UL/cUL/CE* listed
  * GS2-5xxx 575V drives NOT CE compliant

Accessories

- AC line reactors
- EMI filters
- RF filter
- Braking resistors
- Fuse kits and replacement fuses
- DIN rail mounting adapter (see "Accessories" table for applicability)
- Replacement keypads
- Keypad cables in 1, 3, and 5-meter lengths
- Ethernet interface
- Four and eight-port serial communication breakout boards
- KEP*Direct* I/O or OPC Server
- GSoft drive configuration software
- Serial communication cables available for creating plug and play RS-232/RS-485 networks with AutomationDirect PLCs. See the comm cable matrix on page DR-93
- USB-485M – USB to RS-485 PC adapter (see "Communications Products" chapter for detailed information)
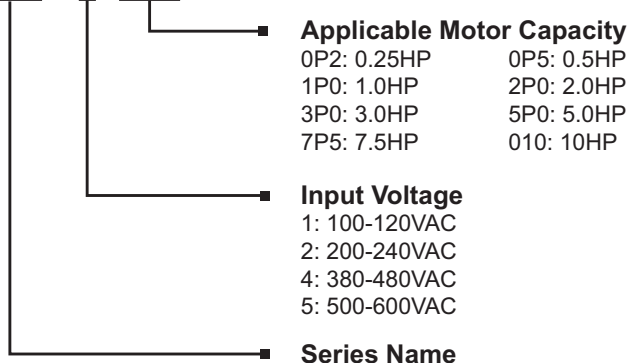
Detailed descriptions and specifications for GS accessories are available in the "GS/DURAPULSE Accessories" section.

Typical Applications

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

GS2 series part numbering system

GS2- 4 7P5

Applicable Motor Capacity
0P2: 0.25HP   0P5: 0.5HP
1P0: 1.0HP   2P0: 2.0HP
3P0: 3.0HP   5P0: 5.0HP
7P5: 7.5HP   010: 10HP

Input Voltage
1: 100-120VAC
2: 200-240VAC
4: 380-480VAC
5: 500-600VAC

Series Name

GS2 Series Specifications

115V CLASS GS2 SERIES				
Model		GS2-10P2	GS2-10P5	GS2-11P0
Price		$156.00	$166.00	$186.00
Motor Rating	*HP*	1/4hp	1/2hp	1hp
	kW	0.2kW	0.4kW	0.75kW
Rated Output Capacity (kVA)		0.6	1.0	1.6
Rated Input Voltage		Single-phase : 100 to 120 VAC ±10% 50/60 Hz ±5%		
Rated Output Voltage		Three-phase, two times proportion to input voltage		
Rated Input Current (A)		6	9	16
Rated Output Current (A)		1.6	2.5	4.2
DC Braking		Frequency 60–0 Hz, 0–100% rated current, start time 0.0–5.0 seconds, Stop Time 0.0–25.0 seconds		
Watt Loss @ 100% I (W)		24	34	46
Weight (lb)		3.5	3.6	3.7
Dimensions* (HxWxD) (mm [in])**		151.0 x 100.0 x 140.5 [5.94 x 3.94 x 5.53]		
Accessories				
Line Reactor	*Input side of drive (1 Phase)**	LR-10P2-1PH	LR-10P5-1PH	LR-11P0-1PH
	*Output side of drive (3 Phase)**	LR-20P5		LR-21P0
Braking Resistor		GS-20P5-BR	GS-20P5-BR	GS-21P0-BR
EMI Filter		20DRT1W3S		
RF Filter		RF220X00A		
Fuse Kit	*Single Phase***	GS-10P2-FKIT-1P	GS-10P5-FKIT-1P	GS-11P0-FKIT-1P
Replacement Fuses	*Single Phase***	GS-10P2-FUSE-1P	GS-10P5-FUSE-1P	GS-11P0-FUSE-1P
DIN Rail Mounting Adapter		GS2-DR02		
Spare Keypad, GS2 Series Drive		GS2-KPD		
Keypad Cable, GS2 Series, 1 meter		GS-CBL2-1L		
Keypad Cable, GS2 Series, 3 meter		GS-CBL2-3L		
Keypad Cable, GS2 Series, 5 meter		GS-CBL2-5L		
Ethernet Communications module for GS Series Drives (DIN rail mounted)		GS-EDRV100		
USB to RS232 PC Communication Adapter		USB-RS232		
RS-232 Serial Cable, GS2 Drive to DL05/06, CLICK, D2-250/260, D4-450, P3-550		GS-RJ12-CBL-2		
USB to RS-485 PC Communication Adapter		USB-485M		
RS-485 Communication Distribution Module (for creating plug and play RS-485 networks)		ZL-CDM-RJ12X4 / ZL-CDM-RJ12X10		
RS-485 Serial Cable, GS Drive to DL06/D2-260		GS-485HD15-CBL-2		
RS-485 Serial Cable, GS Drive to ZIPLink CDM Module		GS-485RJ12-CBL-2		
Software		GSoft / KEP*Direct*		
OPC Server		KEP*Direct*		

*Note: GS2-1xxx drives require 115V class input line reactors and 230V class output line reactors.

**Note: Single phase fuse kits and fuses are used only with GS2-1xxx drives.

***Note: Height dimension does not include external ground terminal, which adds 10 to 15 mm. Refer to dimensional drawings for details.

GS2 Series Specifications

230V CLASS GS2 SERIES							
Model		GS2-20P5	GS2-21P0	GS2-22P0	GS2-23P0	GS2-25P0	GS2-27P5
Price		$158.00	$177.00	$251.00	$309.00	$363.00	$465.00
Motor Rating	*HP*	1/2hp	1hp	2hp	3hp	5hp	7.5hp
	kW	0.4kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW
Rated Output Capacity (kVA)		1.0	1.9	2.7	3.8	6.5	9.5
Rated Input Voltage		Single/Three-phase : 200/208/220/230/240 VAC ±10%; 50/60Hz ±5%				Three-phase : 200/208/220/230/240 VAC ±10%; 50/60 Hz ±5%	
Rated Output Voltage		Three-phase : Corresponds to input voltage					
Rated Input Current (A)		6.3/2.9	11.5/6.3	15.7/8.8	27.0/12.5	19.6	28
Rated Output Current (A)		2.5	5.0	7.0	10	17	25
DC Braking		Frequency 60–0 Hz, 0–100% rated current, start time 0.0–5.0 seconds, Stop Time 0.0–25.0 seconds					
Watt Loss @ 100% I (W)		34	57	77	111	185	255
Weight (lb)		3.5	3.6	3.7	8.5	8.5	8.5
Dimensions* (HxWxD) (mm [in])		151.0 x 100.0 x 140.5 [5.94 x 3.94 x 5.53]			220.0 x 125.0 x 189.5 [8.66 x 4.92 x 7.46]		
Accessories							
Line Reactor	*Single-Phase*	LR-20P5-1PH	LR-21P0-1PH	LR-22P0-1PH	LR-23P0-1PH	n/a	n/a
	Three-Phase	LR-20P5	LR-21P0	LR-22P0	LR-23P0	LR-25P0	LR-27P5
Braking Resistor		GS-20P5-BR	GS-21P0-BR	GS-22P0-BR	GS-23P0-BR	GS-25P0-BR	GS-27P5-BR
EMI Filter (single phase input)		20DRT1W3S			32DRT1W3C	40TDS4W4B	
RF Filter		RF220X00A					
Fuse Kit	*Single-Phase*	GS-20P5-FKIT-1P	GS-21P0-FKIT-1P	GS-22P0-FKIT-1P	GS-23P0-FKIT-1P	N/A	N/A
	Three-Phase	GS-20P5-FKIT-3P	GS-21P0-FKIT-3P	GS-22P0-FKIT-3P	GS-23P0-FKIT-3P	GS-25P0-FKIT-3P	GS-27P5-FKIT
Replacement Fuses	*Single-Phase*	GS-20P5-FUSE-1P	GS-21P0-FUSE-1P	GS-22P0-FUSE-1P	GS-23P0-FUSE-1P	N/A	N/A
	Three-Phase	GS-20P5-FUSE-3P	GS-21P0-FUSE-3P	GS-22P0-FUSE-3P	GS-23P0-FUSE-3P	GS-25P0-FUSE	GS-27P5-FUSE
DIN Rail Mounting Adapter		GS2-DR02			n/a		
Spare Keypad, GS2 Series Drive		GS2-KPD					
Keypad Cable, GS2 Series, 1 meter		GS-CBL2-1L					
Keypad Cable, GS2 Series, 3 meter		GS-CBL2-3L					
Keypad Cable, GS2 Series, 5 meter		GS-CBL2-5L					
Ethernet Communications module for GS Series Drives (DIN rail mounted)		GS-EDRV100					
USB to RS232 PC Communication Adapter		USB-RS232					
RS-232 Serial Cable, GS2 Drive to DL05/06, CLICK, D2-250/260, D4-450, P3-550		GS-RJ12-CBL-2					
USB to RS-485 PC Communication Adapter		USB-485M					
RS-485 Communication Distribution Module (for creating plug and play RS-485 networks)		ZL-CDM-RJ12X4 / ZL-CDM-RJ12X10					
RS-485 Serial Cable, GS Drive to DL06/D2-260		GS-485HD15-CBL-2					
RS-485 Serial Cable, GS Drive to ZIPLink CDM Module		GS-485RJ12-CBL-2					
Software		GSoft / KEP*Direct*					
OPC Server		KEP*Direct*					

*Note: Height dimension does not include external ground terminal, which adds 10 to 15 mm. Refer to dimensional drawings for details.

GS2 Series Specifications

460V CLASS GS2 SERIES							
Model		GS2-41P0	GS2-42P0	GS2-43P0	GS2-45P0	GS2-47P5	GS2-4010
Price		$261.00	$303.00	$357.00	$410.00	$586.00	$725.00
Motor Rating	HP	1hp	2hp	3hp	5hp	7.5hp	10hp
	kW	0.8kW	1.5kW	2.2kW	4kW	5.5kW	7.5kW
Rated Output Capacity (kVA)		2.3	3.1	3.8	6.2	9.9	13.7
Rated Input Voltage		Three-phase: 380/400/415/440/460/480 VAC ±10%; 50/60 Hz ±5%					
Rated Output Voltage		Corresponds to input voltage					
Rated Input Current (A)		4.2	5.7	6.0	8.5	14	23
Rated Output Current (A)		3.0	4.0	5.0	8.2	13	18
DC Braking		Frequency 60–0 Hz, 0–100% rated current, Start Time 0.0–5.0 seconds, Stop Time 0.0–25.0 seconds					
Watt Loss @ 100% I (W)		73	86	102	170	240	255
Weight (lb)		3.5	3.6	3.7	8.5	8.5	8.5
Dimensions* (HxWxD) (mm [in])		151.0 x 100.0 x 140.5 [5.94 x 3.94 x 5.53]			220.0 x 125.0 x 189.5 [8.66 x 4.92 x 7.46]		
Accessories							
Line Reactor		LR-41P0	LR-42P0	LR-43P0	LR-45P0	LR-47P5	LR-4010
Braking Resistor		GS-41P0-BR	GS-42P0-BR	GS-43P0-BR	GS-45P0-BR	GS-47P5-BR	GS-4010-BR
EMI Filter		11TDT1W4S			17TDT1W44		26TDT1W4B4
RF Filter		RF220X00A					
Fuse Kit		GS-41P0-FKIT	GS-42P0-FKIT	GS-43P0-FKIT	GS-45P0-FKIT	GS-47P5-FKIT	GS-4010-FKIT
Replacement Fuses		GS-41P0-FUSE	GS-42P0-FUSE	GS-43P0-FUSE	GS-45P0-FUSE	GS-47P5-FUSE	GS-4010-FUSE
DIN Rail Mounting Adapter		GS2-DR02			n/a		
Spare Keypad, GS2 Series Microdrive		GS2-KPD					
Keypad Cable, GS2 Series, 1 meter		GS-CBL2-1L					
Keypad Cable, GS2 Series, 3 meter		GS-CBL2-3L					
Keypad Cable, GS2 Series, 5 meter		GS-CBL2-5L					
Ethernet Communications Module for GS Series Drives (DIN rail mounted)		GS-EDRV100					
USB to RS232 PC Communication Adapter		USB-RS232					
RS-232 Serial Cable, GS2 Drive to DL05/06, CLICK, D2-250/260, D4-450, P3-550		GS-RJ12-CBL-2					
USB to RS-485 PC Communication Adapter		USB-485M					
RS-485 Communication Distribution Module (for creating plug and play RS-485 networks)		ZL-CDM-RJ12X4 / ZL-CDM-RJ12X10					
RS-485 Serial Cable, GS Drive to DL06/D2-260		GS-485HD15-CBL-2					
RS-485 Serial Cable, GS Drive to ZIPLink CDM Module		GS-485RJ12-CBL-2					
Software		GSoft / KEPDirect					
OPC Server		KEPDirect					

*Note: Height dimension does not include external ground terminal, which adds 10 to 15 mm. Refer to dimensional drawings for details.

Automation Direct

Company Information

Drives

Soft Starters

Motors

Power Transmission

Motion: Servos and Steppers

Motor Controls

Sensors: Proximity

Sensors: Photoelectric

Sensors: Encoders

Sensors: Limit Switches

Sensors: Current

Sensors: Pressure

Sensors: Temperature

Sensors: Level

Sensors: Flow Switches

Pushbuttons and Lights

Stacklights

Signal Devices

Process

Relays and Timers

Pneumatics: Air Prep

Pneumatics: Directional Control Valves

Pneumatics: Cylinders

Pneumatics: Tubing

Pneumatics: Air Fittings

Appendix Book 2

Terms and Conditions

GS2 Series Specifications

575V CLASS GS2 SERIES							
Model		GS2-51P0	GS2-52P0	GS2-53P0	GS2-55P0	GS2-57P5	GS2-5010
Price		$279.00	$319.00	$378.00	$491.00	$721.00	$812.00
Motor Rating	HP	1hp	2hp	3hp	5hp	7.5hp	10hp
	kW	0.75kW	1.5kW	2.2kW	3.7kW	5.5kW	7.5kW
Rated Output Capacity (kVA)		1.7	3.0	4.2	6.6	9.9	12.2
Rated Input Voltage		Three-phase: 500 to 600 VAC -15/+10%; 50/60 Hz ±5%					
Rated Output Voltage		Corresponds to input voltage					
Rated Input Current (A)		2.4	4.2	5.9	7.0	10.5	12.9
Rated Output Current (A)		1.7	3.0	4.2	6.6	9.9	12.2
DC Braking		Frequency 60-0 Hz, 0-100% rated current, Start Time 0.0-5.0 seconds, Stop Time 0.0-25.0 seconds					
Watt Loss @ 100% I (W)		30	58	83	132	191	211
Weight (lb)		3.3	3.3	4.4	7.0	7.0	7.3
Dimensions* (HxWxD) (mm [in])		151.0 x 100.0 x 140.5 [5.94 x 3.94 x 5.53]			220.0 x 125.0 x 189.5 [8.66 x 4.92 x 7.46]		
Accessories							
Line Reactor		LR-51P0	LR-52P0	LR-53P0	LR-55P0	LR-5010	
Braking Resistor		GS-42P0-BR			GS-42P0-BR x (2) in parallel		GS-4010-BR x (2) in series
EMI Filter		not available					
RF Filter		RF220X00A					
Fuse Block (Edison 3-pole part #)		BC6033PQ or CHCC3D or CHCC3DI					
Replacement Fuses (Edison Fuse part #)		HCLR6 (10 fuses per pack)	HCLR10 (10 fuses per pack)	HCLR15 (10 fuses per pack)		HCLR20 (10 fuses per pack)	HCLR30 (10 fuses per pack)
DIN Rail Mounting Adapter		GS2-DR02			n/a		
Spare Keypad, GS2 Series Microdrive		GS2-KPD					
Keypad Cable, GS2 Series, 1 meter		GS-CBL2-1L					
Keypad Cable, GS2 Series, 3 meter		GS-CBL2-3L					
Keypad Cable, GS2 Series, 5 meter		GS-CBL2-5L					
Ethernet Communications Module for GS Series Drives (DIN rail mounted)		GS-EDRV100					
USB to RS232 PC Communication Adapter		USB-RS232					
RS-232 Serial Cable, GS2 Drive to DL05/06, CLICK, D2-250/260, D4-450, P3-550		GS-RJ12-CBL-2					
USB to RS-485 PC Communication Adapter		USB-485M					
RS-485 Communication Distribution Module (for creating plug and play RS-485 networks)		ZL-CDM-RJ12X4 / ZL-CDM-RJ12X10					
RS-485 Serial Cable, GS Drive to DL06/D2-260		GS-485HD15-CBL-2					
RS-485 Serial Cable, GS Drive to ZIPLink CDM Module		GS-485RJ12-CBL-2					
Software		GSoft / KEPDirect					
OPC Server		KEPDirect					

*Note: Height dimension does not include external ground terminal, which adds 10 to 15 mm. Refer to dimensional drawings for details.

GS2 Series — General Specifications

General Specifications				
Control Characteristics				
Control System			Sinusoidal Pulse Width Modulation, carrier frequency 1kHz–12kHz	
Output Frequency Resolution			0.1 Hz	
Overload Capacity			150% of rated current for 1 minute	
Torque Characteristics			Includes auto-torque boost, auto-slip compensation, starting torque 125% @ 0.5Hz/150% @ 5.0Hz	
Braking Torque			20% without dynamic braking resistor, 125% with optional braking resistor	
DC Braking			Operation frequency 60–0 Hz, 0–100% rated current. Start time 0.0–5.0 seconds. Stop time 0.0–0 25.0 seconds	
Acceleration/Deceleration Time			0.1 to 600 seconds (linear or non-linear acceleration/deceleration), second acceleration/deceleration available	
Voltage/Frequency Pattern			V/F pattern adjustable. Settings available for Constant Torque - low and high starting torque, Variable Torque - low and high starting torque, and user configured	
Stall Prevention Level			20 to 200% or rated current	
Operation Specifications				
Inputs	**Frequency Setting**	**Keypad**	Setting by <UP> or <DOWN> buttons or potentiometer	
		External Signal	Potentiometer - 3k to 5kΩ/2W, 0 to 10VDC (input impedance 10kΩ), 0 to 20mA / 4 to 20 mA (input impedance 250Ω), Multi-speed inputs 1 to 3, Serial Communication RS232 and RS485 (Modbus RTU)	
	Operation Setting	**Keypad**	Setting by <RUN>, <STOP> buttons	
		External Signal	Forward/Stop, Reverse/Stop (run/stop, fwd/rev), 3-wire control, Serial Communication RS232 and RS485 (Modbus RTU)	
	Input Terminals	**Digital**	6 user-programmable: FWD/STOP, REV/STOP, RUN/STOP, REV/FWD, Run momentary (N.O.), STOP momentary (N.C.), External Fault (N.O./N.C.), External Reset, Multi-Speed Bit (1-3), Jog, External Base Block (N.O./N.C.), Second Accel/Decel Time, Speed Hold, Increase Speed, Decrease Speed, Reset Speed to Zero, PID Disable (N.O.), PID Disable (N.C.), Input Disable	
		Analog	1 user-configurable, 0 to 10VDC (input impedance 10k Ω) or 0 to 20mA / 4 to 20mA (input impedance 250Ω), 10 bit resolution Frequency setpoint or PID process variable PV	
Outputs	**Output Terminals**	**Digital**	2 user-programmable; Inverter Running, Inverter Fault, At Speed, Zero Speed, Above Desired Frequency, Below Desired Frequency, At Maximum Speed, Over Torque Detected, Above Desired Current, Below Desired Current, PID Deviation Alarm	
		Analog	1 user-programmable: 0 to 10VDC (max load 2mA), 8 bit resolution frequency, current, process variable PV	
	Operating Functions		Automatic voltage regulation, voltage/frequency characteristics selection, non-linear acceleration/deceleration, upper and lower frequency limiters, 7-stage speed operation, adjustable carrier frequency (1 to 12 kHz), PID control, skip frequencies, analog gain & bias adjustment, jog, electronic thermal relay, automatic torque boost, trip history, software protection	
Protective Functions			Electronic Thermal, Overload Relay, Auto Restart after Fault, Momentary Power Loss, Reverse Operation Inhibit, Auto Voltage Regulation, Over-Voltage Trip Prevention, Auto Adjustable Accel/Decel, Over-Torque Detection Mode, Over-Torque Detection Level, Over-Torque Detection Time, Over-Current Stall Prevention during Acceleration, Over-Current Stall Prevention during Operation	
Operator Interface	**Operator Devices**		8-key, 4-digit, 7-segment LED, 14 status LEDs, potentiometer	
	Programming		Parameter values for setup and review, fault codes	
	Status Display		Actual Operating Frequency, RPM, Scaled Frequency, Amps, % Load, Output Voltage, DC Bus Voltage, Process Variable, Set-point Frequency	
	Key Functions		RUN, STOP/RESET, FWD/REV, PROGRAM, DISPLAY, <UP>, <DOWN>, ENTER	
Environment	**Enclosure Rating**		Protected chassis, IP20	
	Ambient Temperature		-10° to 50°C (14°F to 122°F) -10° to 40°C (14°F to 104°F) For models 7.5 hp (5.5 kW) and higher	
	Storage Temperature		-20° to 60 °C (-4°F to 140°F) - during short-term transportation period	
	Ambient Humidity		20 to 90% RH (non-condensing)	
	Vibration		9.8 m/s^2 (1G), less than 10Hz; 5.9 m/s^2 (0.6G) 10 to 60 Hz	
	Installation Location		Altitude 1000m or lower above sea level, keep from corrosive gas, liquid and dust	
Options			Noise filter, input AC reactor, output AC reactor, cable for remote operator, programming software (GSOFT), Dynamic braking resistor, input fuses, ethernet interface (GS-EDRV100), EMI filters	

GS2 Specifications — Installation

Understanding the installation requirements for your GS2 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, GS2-M.

Environmental Specifications	
Protective Structure [1]	IP20
Ambient Operating Temperature [2]	-10 to 50°C (14°F to 122°F) -10 to 40°C (14°F to 104°F) for models 7.5HP and higher
Storage Temperature [3]	-20 to 60°C (-4°F to 140°F)
Humidity	To 90% (no condensation)
Vibration [4]	5.9 m/s² (0.6g), 10 to 55 Hz
Location	Altitude 1,000 m or less, indoors (no corrosive gases or dust)

1: Protective structure is based upon EN60529

2: The ambient temperature must be in the range of -10° to 40° C. If the range will be up to 50° C, you will need to set the carrier frequency to 2.1 kHz or less and derate the output current to 80% or less. See our Web site for derating curves.

3: The storage temperature refers to the short-term temperature during transport.

4: Conforms to the test method specified in JIS CO911 (1984)
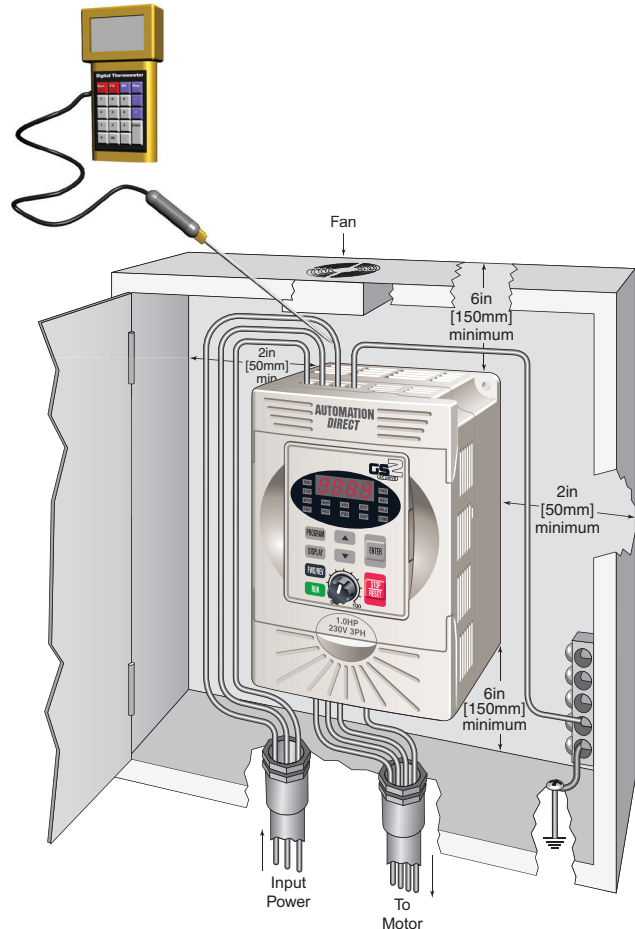
Watt-loss Chart	
GS2 Drive Model	**At full load**
GS2-10P2	24
GS2-10P5	34
GS2-11P0	46
GS2-20P5	34
GS2-21P0	57
GS2-22P0	77
GS2-23P0	111
GS2-25P0	185
GS2-27P5	255
GS2-41P0	73
GS2-42P0	86
GS2-43P0	102
GS2-45P0	170
GS2-47P5	240
GS2-4010	255
GS2-51P0	30
GS2-52P0	58
GS2-53P0	83
GS2-55P0	132
GS2-57P5	191
GS2-5010	211

Fan

2in [50mm] min

6in [150mm] minimum

2in [50mm] minimum

6in [150mm] minimum

Input Power

To Motor

Warning: Maximum ambient temperatures must not exceed 50°C (122°F), or 40°C (104°F) for models 7.5 hp (5.5 kW) and higher!
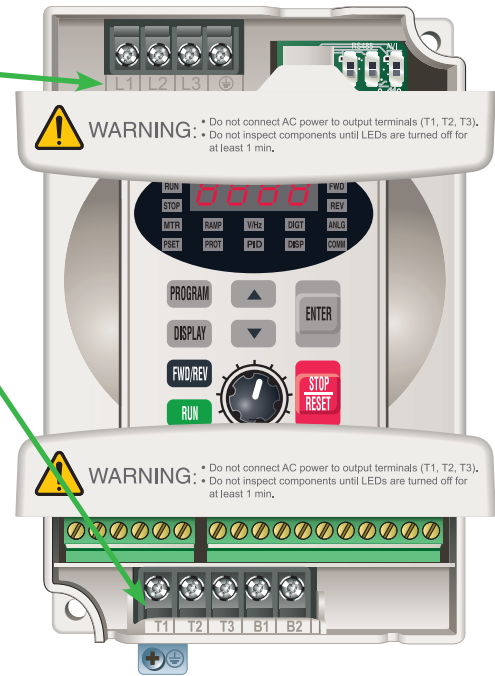

Air Flow
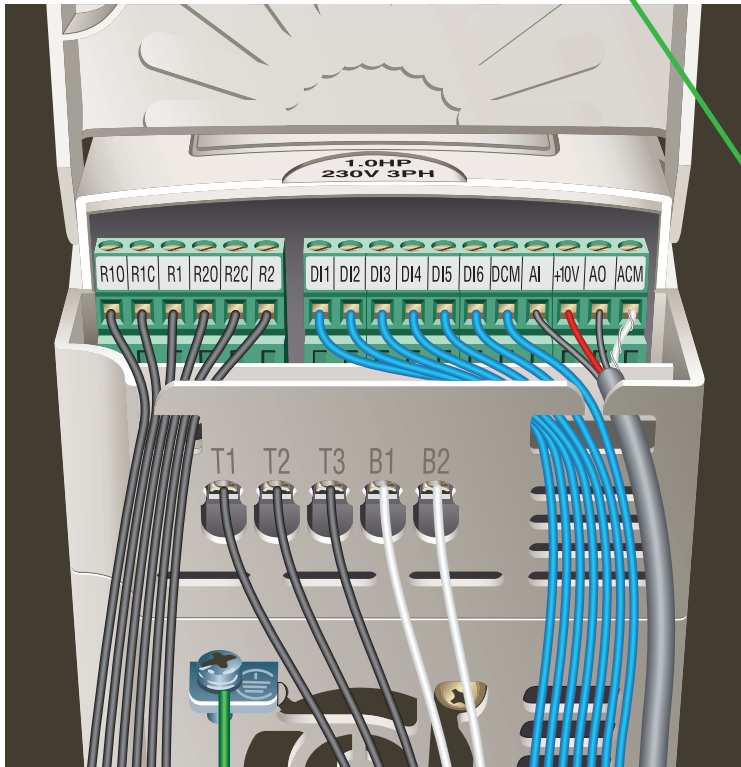
Warning: AC drives generate a large amount of heat which may damage the AC drive. Auxiliary cooling methods are typically required in order not to exceed maximum ambient temperatures.

Panel

Ground braid copper lugs

Star washers*

Panel or single point ground*
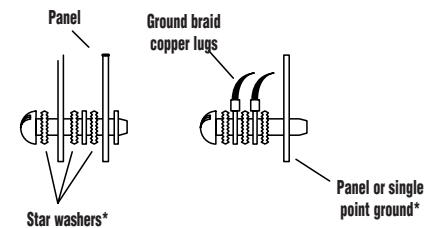
FOR PAINTED SUB-PANELS, SCRAPE THE PAINT FROM UNDERNEATH THE STAR WASHERS BEFORE TIGHTENING THEM.

GS2 Specifications — Terminals

Company Information

Drives

Soft Starters

Motors

Power Transmission

Motion: Servos and Steppers

Motor Controls

Sensors: Proximity

Sensors: Photoelectric

Sensors: Encoders

Sensors: Limit Switches

Sensors: Current

Sensors: Pressure

Sensors: Temperature

Sensors: Level

Sensors: Flow Switches

Pushbuttons and Lights

Stacklights

Signal Devices

Process

Relays and Timers

Pneumatics: Air Prep

Pneumatics: Directional Control Valves

Pneumatics: Cylinders

Pneumatics: Tubing

Pneumatics: Air Fittings

Appendix Book 2

Terms and Conditions

Main Circuit Wiring	
Terminal	*Description*
L1, L2, L3	Input power
T1, T2, T3	AC drive output
B1, B2	DB resistor input
⏚	Ground

WARNING: • Do not connect AC power to output terminals (T1, T2, T3). • Do not inspect components until LEDs are turned off for at least 1 min.

Control Circuit Terminals	
Terminal Symbol	*Description*
R1O	Relay output 1 normally open
R1C	Relay output 1 normally closed
R1	Relay output 1 common
R2O	Relay output 2 normally open
R2C	Relay output 2 normally closed
R2	Relay output 2 common
DI1	Digital input 1
DI2	Digital input 2
DI3	Digital input 3
DI4	Digital input 4
DI5	Digital input 5
DI6	Digital input 6
DCM	Digital common
AI	Analog input
+10V	Internal power supply (DC 10V) @ 10 mA
AO	Analog output
ACM	Analog common

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

GS2 Specifications — Basic Wiring Diagram

Note: Users MUST connect wiring according to the circuit diagram shown below. (Refer to user manual GS2-M for additional specific wiring information.)
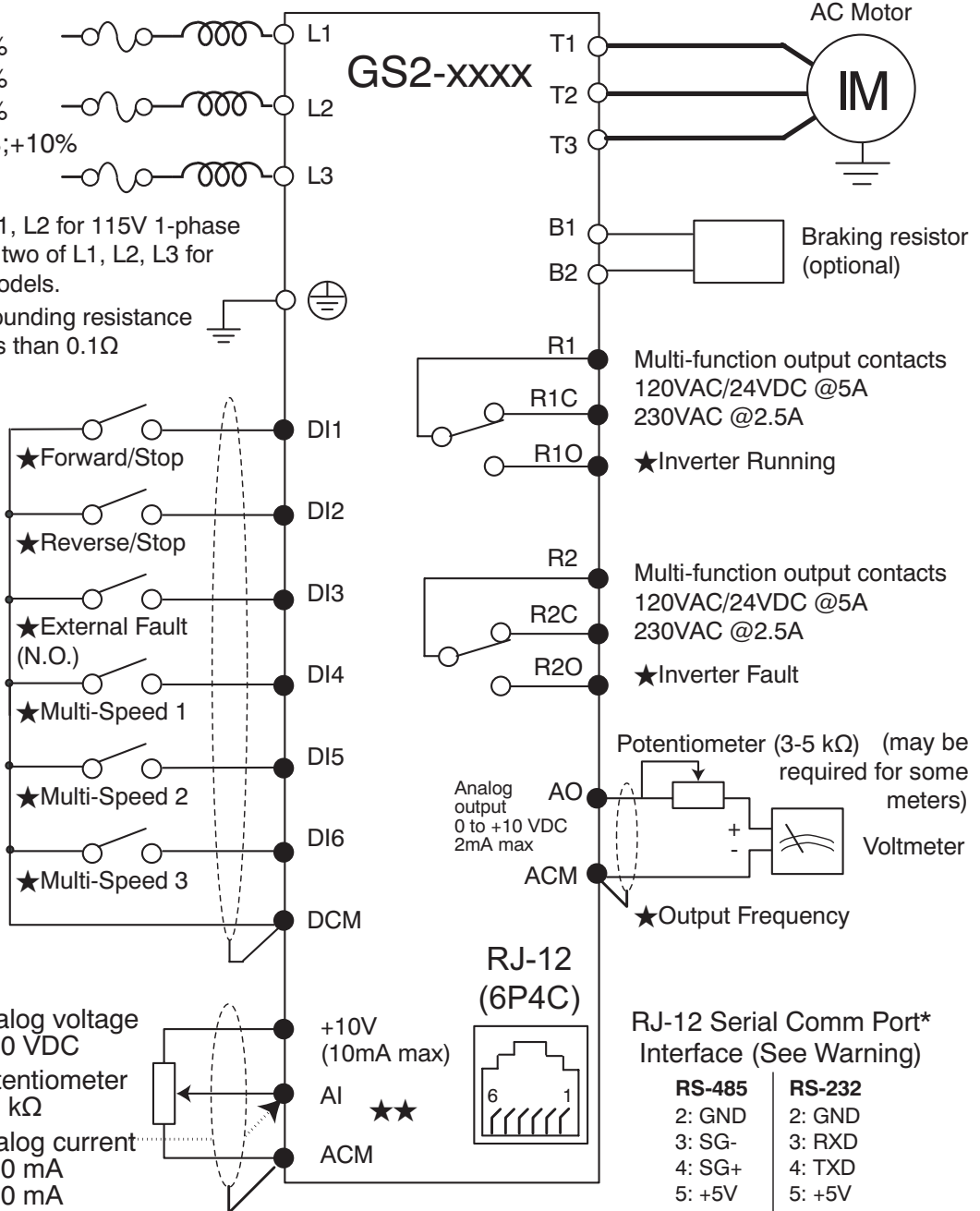
Note: Refer to the following pages for explanations and information regarding line reactors, braking resistors, EMI and RF filters, and fuses:
    DR-50, DR-69, DR-74, DR-80, DR-81.

Power Source*

100-120V ±10%
200-240V ±10%
380-480V ±10%
500-600V -15%;+10%

(50,60Hz ±5%)

* Use terminals L1, L2 for 115V 1-phase models; use any two of L1, L2, L3 for 230V 1-phase models.

Grounding resistance less than 0.1Ω

L1
L2
L3

GS2-xxxx

AC Motor

IM

T1
T2
T3

B1
B2

Braking resistor (optional)

R1
R1C
R1O

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

R2
R2C
R2O

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

DI1 ★Forward/Stop
DI2 ★Reverse/Stop
DI3 ★External Fault (N.O.)
DI4 ★Multi-Speed 1
DI5 ★Multi-Speed 2
DI6 ★Multi-Speed 3
DCM

Analog output
0 to +10 VDC
2mA max

AO

Potentiometer (3-5 kΩ) (may be required for some meters)

+
-

Voltmeter

ACM

★Output Frequency

Analog voltage
0-10 VDC

Potentiometer
3-5 kΩ

Analog current
0-20 mA
4-20 mA

+10V
(10mA max)

AI ★★

ACM

RJ-12
(6P4C)

6 1

RJ-12 Serial Comm Port*
Interface (See Warning)

RS-485	RS-232
2: GND	2: GND
3: SG-	3: RXD
4: SG+	4: TXD
5: +5V	5: +5V

★Factory default setting

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

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

Optional ZIPLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix on page DR-93.

⚠ **WARNING:** Do not plug a modem or telephone into the GS2 RJ-12 Serial Comm Port, or permanent damage may result. Terminals 2 and 5 should not be used as a power source for your communication connection.

GS2 Specifications — Dimensions

GS2-10P2, GS2-10P5, GS2-11P0; GS2-20P5, GS2-21P0, GS2-22P0;
GS2-41P0, GS2-42P0, GS2-43P0; GS2-51P0, GS2-52P0, GS2-53P0
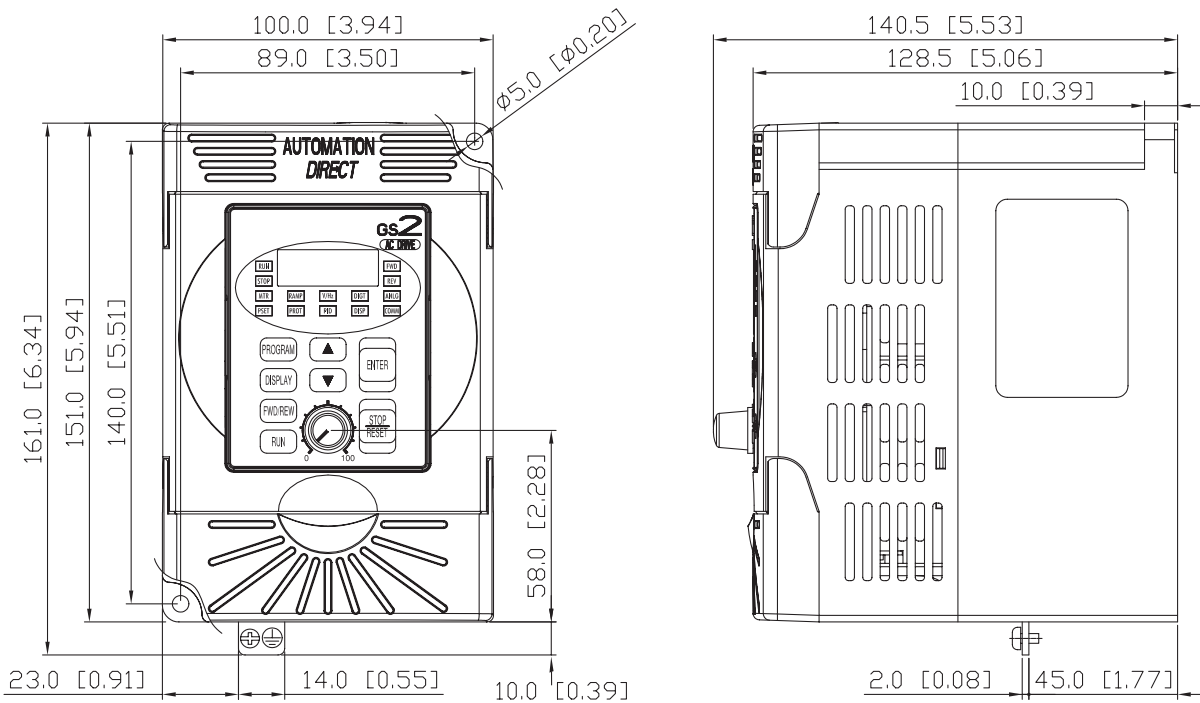
GS2-23P0, GS2-25P0, GS2-27P5;
GS2-45P0, GS2-47P5, GS2-4010; GS2-55P0, GS2-57P5, GS2-5010
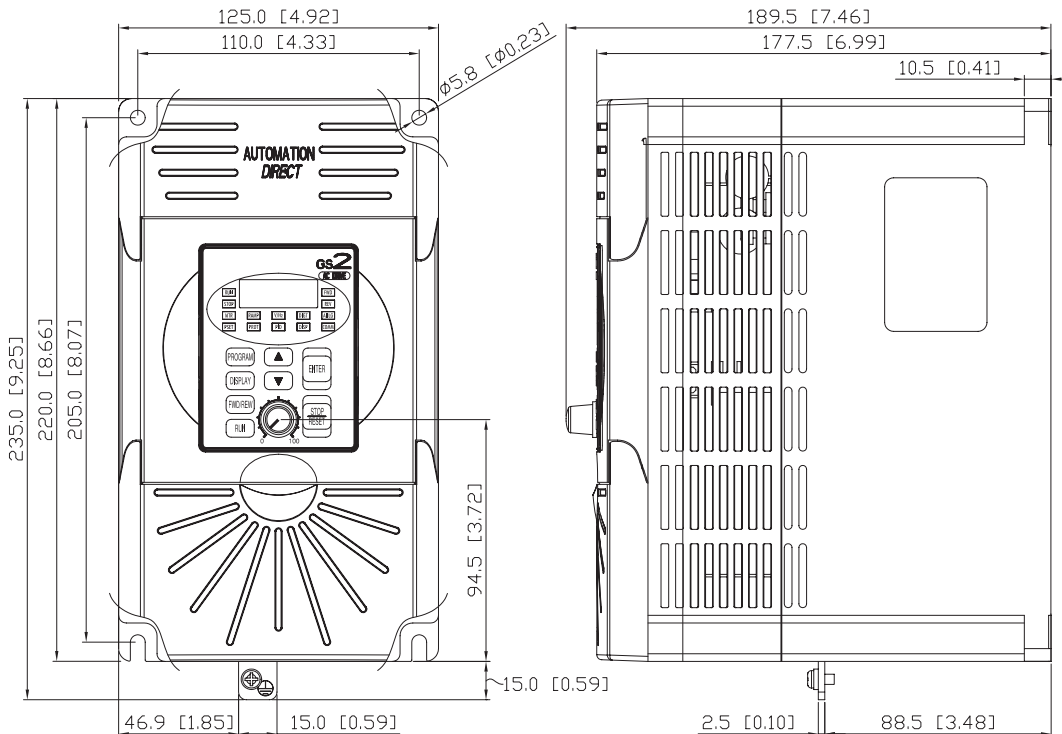
Company Information
Drives
Soft Starters
Motors
Power Transmission
Motion: Servos and Steppers
Motor Controls
Sensors: Proximity
Sensors: Photoelectric
Sensors: Encoders
Sensors: Limit Switches
Sensors: Current
Sensors: Pressure
Sensors: Temperature
Sensors: Level
Sensors: Flow Switches
Pushbuttons and Lights
Stacklights
Signal Devices
Process
Relays and Timers
Pneumatics: Air Prep
Pneumatics: Directional Control Valves
Pneumatics: Cylinders
Pneumatics: Tubing
Pneumatics: Air Fittings
Appendix Book 2
Terms and Conditions

Wiring Solutions

Wiring Solutions using the *ZIP*Link Wiring System

*ZIP*Links 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 Productivity3000 I/O Modules to *ZIP*Link 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.
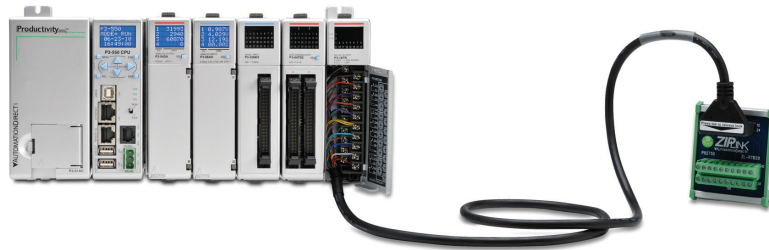
Using the PLC I/O Modules to *ZIP*Link Connector Modules selector tables located in this section,

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 Productivity3000 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?

*ZIP*Link 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.

ZIPLINK™
AUTOMATIONDIRECT.com

Wiring Solutions

Solution 4: Serial Communications Cables

*ZIP*Link offers communications cables for use with *Direct*LOGIC, CLICK, and Productivity3000 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 *ZIP*Link 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: *ZIP*Link 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

Automation Direct

Company Information

Drives

Soft Starters

Motors

Power Transmission

Motion: Servos and Steppers

Motor Controls

Sensors: Proximity

Sensors: Photoelectric

Sensors: Encoders

Sensors: Limit Switches

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Pneumatics: Directional Control Valves

Pneumatics: Cylinders

Pneumatics: Tubing

Pneumatics: Air Fittings

Appendix Book 2

Terms and Conditions

Drive / Motor Controller (GS/*DURAPULSE*/SureServo/SureStep/Stellar) *ZIP*Link Selector							
Drive / Motor Controller		**Communications**			**_ZIP_Link Cable**		
Controller	*Comm Port Type*	*Network/Protocol*	*Connects to*	*Comm Port Type*	*Cable (2 meter length)*	*Cable Connectors*	*Other Hardware Required*
GS1	RJ12	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 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	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 CPU				
			D4-450 CPU	Port 3 (25-pin)			FA-CABKIT
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 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	DL06 PLCs	Port 2 (HD15)	GS-485HD15-CBL-2	RJ12 to HD15	–
			D2-260 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	–
Stellar (Soft Starter) SR44 Series	RJ45**	RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	SR44-485HD15-CBL-2	RJ45 to HD15	SR44-RS485**
			D2-250-1 CPU				
			D2-260 CPU				
			ZL-CDM-RJ12Xxx*	RJ12	SR44-485RJ45-CBL-2	RJ45 to RJ12	
SureServo	IEEE1394 (CN3)	RS-232 Modbus RTU	CLICK PLCs	Port 2 (RJ12)	SVC-232RJ12-CBL-2	6-pin IEEE to RJ12	–
			DL05 PLCs				–
			DL06 PLCs	Port 2 (HD15)			FA-15HD
			D2-250-1 CPU				
			D2-260 CPU				
			D4-450 CPU	Port 3 (25-pin)			FA-CABKIT
			P3-550 CPU	Port 2 (RJ12)			–
		RS-485 Modbus RTU	DL06 PLCs	Port 2 (HD15)	SVC-485HD15-CBL-2	6-pin IEEE to HD15	–
			D2-260 CPU				–
			ZL-CDM-RJ12Xxx*	RJ12	SVC-485RJ12-CBL-2	6-pin IEEE to RJ12	–
			USB-485M	RJ45	SVC-485CFG-CBL-2	6-pin IEEE to RJ45	–
SureStep	RJ12	RS-232 ASCII	DL06 PLCs	Port 2 (HD15)	STP-232HD15-CBL-2	HD15-pin to RJ12	–
			D2-250-1 CPU				–
			D2-260 CPU (Port2)				–
			DL05 PLCs	RJ12	STP-232RJ12-CBL-2	RJ12 to RJ12	–
			CLICK PLCs				–

* 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)

** The SR44-RS485 Communications Adapter must be installed for RS-485 communications with the Stellar soft starters.

Hitachi Drives Cross References

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

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

Hitachi SJ300 Cross Reference

	Hitachi SJ300 AC Drives		Possible Replacements					
	Part No.	Horsepower	GS1	Price	GS2	Price	DURAPULSE (GS3)	Price
230V	SJ300-004LFU	0.5 hp	GS1-20P5	$117.00	GS2-20P5	$158.00	GS3-21P0 **	$242.00
	SJ300-007LFU	1.0 hp	GS1-21P0	$134.00	GS2-21P0	$177.00	GS3-21P0	$242.00
	SJ300-015LFU	2.0 hp	GS1-22P0 *	$164.00	GS2-22P0	$251.00	GS3-22P0	$293.00
	SJ300-022LFU	3.0 hp	–	–	GS2-23P0	$309.00	GS3-23P0	$347.00
	SJ300-037LFU	5.0 hp	–	–	GS2-25P0 *	$363.00	GS3-25P0 *	$400.00
	SJ300-055LFU	7.5 hp	–	–	GS2-27P5 *	$465.00	GS3-27P5 *	$549.00
	SJ300-075LFU	10 hp	–	–	–	–	GS3-2010 *	$698.00
	SJ300-110LFU	15 hp	–	–	–	–	GS3-2015 *	$889.00
	SJ300-150LFU	20 hp	–	–	–	–	GS3-2020 *	$1,104.00
	SJ300-185LFU	25 hp	–	–	–	–	GS3-2025 *	$1,298.00
	SJ300-220LFU	30 hp	–	–	–	–	GS3-2030 *	$1,486.00
460V	SJ300-007HFU	1.0 hp	–	–	GS2-41P0 *	$261.00	GS3-41P0 *	$323.00
	SJ300-015HFU	2.0 hp	–	–	GS2-42P0 *	$303.00	GS3-42P0 *	$360.00
	SJ300-022HFU	3.0 hp	–	–	GS2-43P0 *	$357.00	GS3-43P0 *	$385.00
	SJ300-040HFU	5.0 hp	–	–	GS2-45P0 *	$410.00	GS3-45P0 *	$427.00
	SJ300-055HFU	7.5 hp	–	–	GS2-47P5 *	$586.00	GS3-47P5 *	$613.00
	SJ300-075HFU	10 hp	–	–	GS2-4010 *	$725.00	GS3-4010 *	$734.00
	SJ300-110HFU	15 hp	–	–	–	–	GS3-4015 *	$957.00
	SJ300-150HFU	20 hp	–	–	–	–	GS3-4020 *	$1,165.00
	SJ300-185HFU	25 hp	–	–	–	–	GS3-4025 *	$1,383.00
	SJ300-220HFU	30 hp	–	–	–	–	GS3-4030 *	$1,570.00

Notes: Replacement drives do not necessarily have the same physical dimensions, mounting hole patterns or wiring terminal arrangements.

* All SJ300 drives are specified for use with 3-phase power (but can be installed in single-phase applications). Replacement drive requires 3-phase power. Ensure that the existing SJ application uses 3-phase input power, or that 3-phase power is available.

** Replacement drive is higher horsepower than existing drive. Output power of new drive can be parameter-limited to the smaller horsepower.

Hitachi Drives Cross References

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

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

Hitachi L100 Cross Reference

	Hitachi L100 AC Drives		Possible Replacements					
	Part No.	Horsepower	GS1	Price	GS2	Price	DURAPULSE	Price
230V	L100-002NFU	0.25 hp	GS1-20P2	$113.00	GS2-20P5 **	$158.00	GS3-21P0 **	$242.00
	L100-004NFU	0.5 hp	GS1-20P5	$117.00	GS2-20P5	$158.00	GS3-21P0 **	$242.00
	L100-007NFU	1.0 hp	GS1-21P0	$134.00	GS2-21P0	$177.00	GS3-21P0	$242.00
	L100-015NFU	2.0 hp	GS1-22P0 *	$164.00	GS2-22P0	$251.00	GS3-22P0	$293.00
	L100-022NFU	3.0 hp	–	–	GS2-23P0	$309.00	GS3-23P0	$347.00
	L100-037LFU	5.0 hp	–	–	GS2-25P0 *	$363.00	GS3-25P0 *	$400.00
	L100-055LFU	7.5 hp	–	–	GS2-27P5 *	$465.00	GS3-27P5 *	$549.00
	L100-075LFU	10 hp	–	–	–	–	GS3-2010 *	$698.00
460V	L100-004HFU	0.5 hp	–	–	GS2-41P0 * **	$261.00	GS3-41P0 * **	$323.00
	L100-007HFU	1.0 hp	–	–	GS2-41P0 *	$261.00	GS3-41P0 *	$323.00
	L100-015HFU	2.0 hp	–	–	GS2-42P0 *	$303.00	GS3-42P0 *	$360.00
	L100-022HFU	3.0 hp	–	–	GS2-43P0 *	$357.00	GS3-43P0 *	$385.00
	L100-040HFU	5.0 hp	–	–	GS2-45P0 *	$410.00	GS3-45P0 *	$427.00
	L100-055HFU	7.5 hp	–	–	GS2-47P5 *	$586.00	GS3-47P5 *	$613.00
	L100-075HFU	10 hp	–	–	GS2-4010 *	$725.00	GS3-4010 *	$734.00

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

Hitachi SJ100 Cross Reference

	Hitachi SJ100 AC Drives		Possible Replacements					
	Part No.	Horsepower	GS1	Price	GS2	Price	DURAPULSE	Price
230V	SJ100-002NFU	0.25 hp	GS1-20P2	$113.00	GS2-20P5 **	$158.00	GS3-21P0 **	$242.00
	SJ100-004NFU	0.5 hp	GS1-20P5	$117.00	GS2-20P5	$158.00	GS3-21P0 **	$242.00
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	SJ100-037LFU	5.0 hp	–	–	GS2-25P0 *	$363.00	GS3-25P0 *	$400.00
	SJ100-055LFU	7.5 hp	–	–	GS2-27P5 *	$465.00	GS3-27P5 *	$549.00
	SJ100-075LFU	10 hp	–	–	–	–	GS3-2010 *	$698.00
460V	SJ100-004HFU	0.5 hp	–	–	GS2-41P0 * **	$261.00	GS3-41P0 * **	$323.00
	SJ100-007HFU	1.0 hp	–	–	GS2-41P0 *	$261.00	GS3-41P0 *	$323.00
	SJ100-015HFU	2.0 hp	–	–	GS2-42P0 *	$303.00	GS3-42P0 *	$360.00
	SJ100-022HFU	3.0 hp	–	–	GS2-43P0 *	$357.00	GS3-43P0 *	$385.00
	SJ100-040HFU	5.0 hp	–	–	GS2-45P0 *	$410.00	GS3-45P0 *	$427.00
	SJ100-055HFU	7.5 hp	–	–	GS2-47P5 *	$586.00	GS3-47P5 *	$613.00
	SJ100-075HFU	10 hp	–	–	GS2-4010 *	$725.00	GS3-4010 *	$734.00

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

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Sensors: Encoders
Sensors: Limit Switches
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Appendix Book 2
Terms and Conditions