GS1 Series Introduction

GS1 Series Drives					
Motor Rating	hp	0.25	0.5	1	2
	kW	0.2	0.4	0.75	1.5
115V Single-Phase Input / 230V Three-Phase Output		✓	✓		
230V Single-Phase Input / 230V Three-Phase Output		✓	✓	✓	
230VThree-Phase Input / Output		✓	✓	✓	✓

Overview

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

Features

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

Accessories

- AC line reactors
- RF filter
- Fuse kits and replacement fuses
- Ethernet interface
- Four and eight-port RS-485 multi-drop termination board
- Serial communication cables available for creating plug and play RS-232/RS-485 networks with AutomationDirect PLCs. See the comm cable matrix (pg.tGSX-181).
- GSoft drive configuration software
- USB-485M – USB to RS-485 PC adapter (see "Communications Products" chapter for detailed information)
- Detailed descriptions and specifications for GS accessories are available in the "GS/DURApulse Accessories" section.

Typical Applications

- Conveyors
- Fans
- Pumps
- Shop tools

GS1 Series Specifications

115V/230V CLASS GS1 Series			
Model		***GS1-20P2***	***GS1-21P0***
Price		Retired	Retired
Motor Rating	***HP***	1/4 hp	1hp
	kW	0.2 kW	0.7 kW
Rated Output Capacity (200V) kVA		0.6	1.6
Rated Input Voltage		Single/three-phase: 200–240 VAC ±10%; 50/60 Hz ±5%	
Rated Output Voltage		Three-phase corresponds to the input voltage	
Rated Input Current (A)		4.9/1.9	9.7/5.1
Rated Output Current (A)		1.6	4.2
Watt Loss @ 100% I (W)		18.4	44.6
Cooling Fan		no	yes
Weight: kg (lb)		2.20	2.20
Dimensions (HxWxD) (mm [in])		132.0 x 68.0 x128.1 [5.20 x 2.68 x 5.04]	
Accessories			
Line Reactor *		LR-1xxPx-xxx (refer to "GS/DURApulse Drives Accessories – Line Reactors" section for exact part #)	
RF Filter		RF220X00A	
Fuse Kit **	***Single-Phase****	GS-20P2-FKIT-1P	n/a
	Three-Phase	GS-20P2-FKIT-3P	n/a
Replacement Fuses	***Single-Phase***	GS-20P2-FUSE-1P	GS-21P0-FUSE-1P
	Three-Phase	GS-20P2-FUSE-3P	n/a
Ethernet Communications module for GS Series Drives (DIN rail mounted)		GS-EDRV100	
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	

** GS1-1xxx drives require 115V class input line reactors and 230V class output line reactors.*
*** Single-phase fuse kits and fuses are used only with GS1-1xxx drives.*

GS1 General Specifications

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

GS1 Specifications - Installation

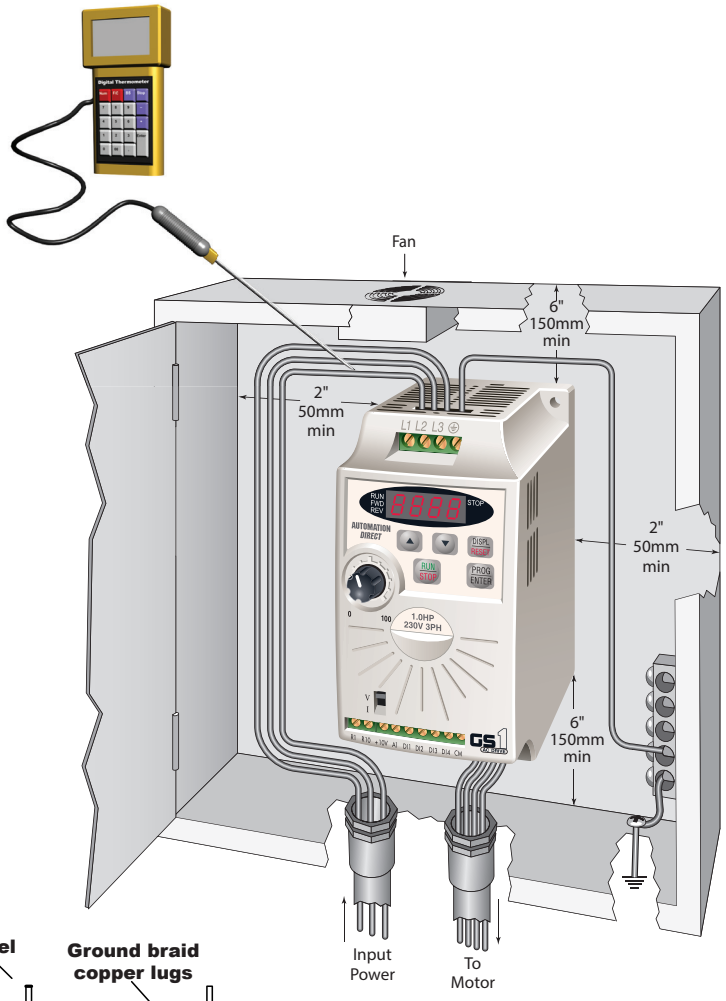
Understanding the installation requirements for your GS1 drive will help to ensure that it will operate within its environmental and electrical limits.

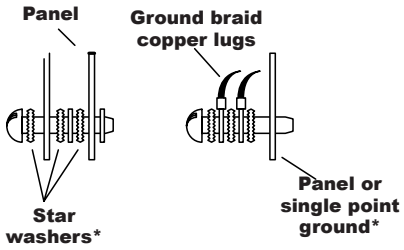
NOTE:
Never use only this catalog for installation instructions or operation of equipment; refer to the user manual, GS1-M.

Environmental Specifications	
Protective Structure [1]	IP20
Ambient Operating Temperature [2]	-10 to 40 °C (14 to 104 °F)
Storage Temperature [3]	-20 to 60°C (-4 to 140 °F)
Humidity	up to 90% (no condensation)
Vibration [4]	5.9 m/s^2 (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 (14 to 104 °F). If the range will be up to 50°C (122°F), you will need to set the carrier frequency to 3.0 kHz and derate the output current to 80% or less. See our web site for derating curves.
3: The storage temperature refers to the short-term temperature during transport.
4: Conforms to the test method specified in JIS CO911 (1984)

Watt Loss Chart	
GS1 Drive Model	***At full load***
GS1-20P2	18.4
GS1-21P0	44.6



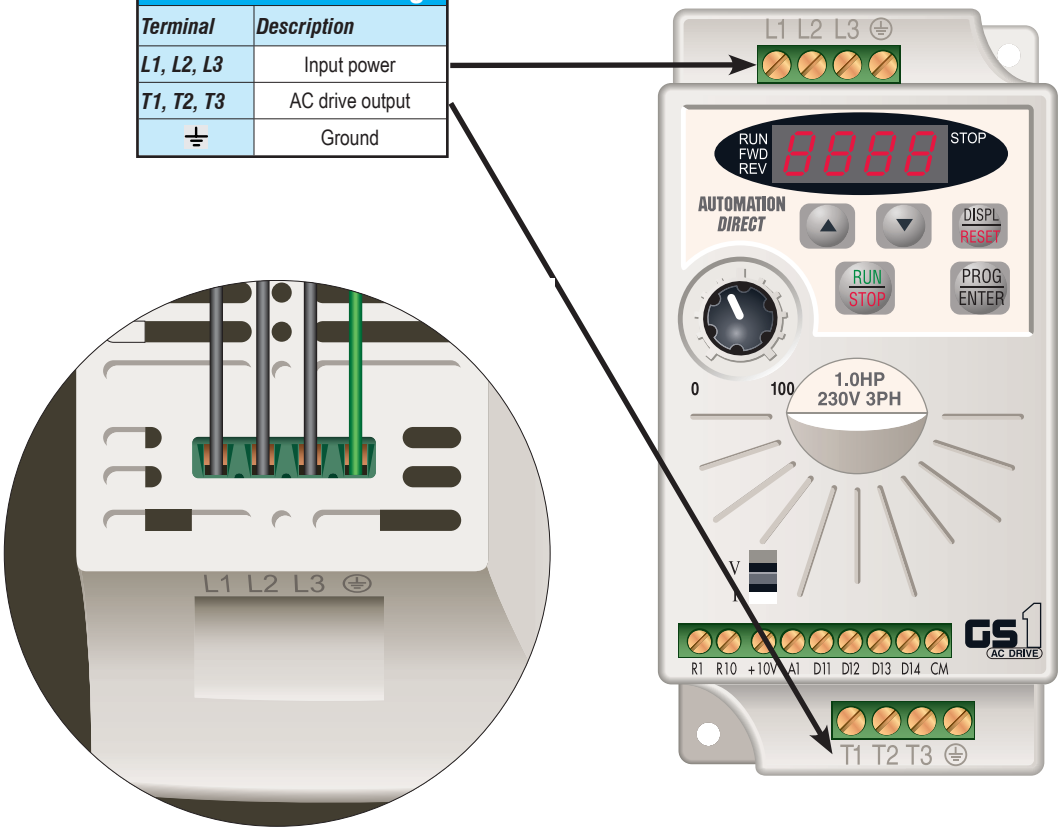


* For painted sub-panels, scrape the paint from underneath the star washers before tightening them.

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

GS1 Specifications - Terminals

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



Control Circuit Terminals	
Terminal Symbol	***Description***
R10	Relay output 1 normally open
R1	Relay output 1 common
DI1	Digital input 1
DI2	Digital input 2
DI3	Digital input 3
DI4	Digital input 4
AI [1]	Analog input
+10V	Internal power supply (10 mA @ 10 VDC)
CM	Common

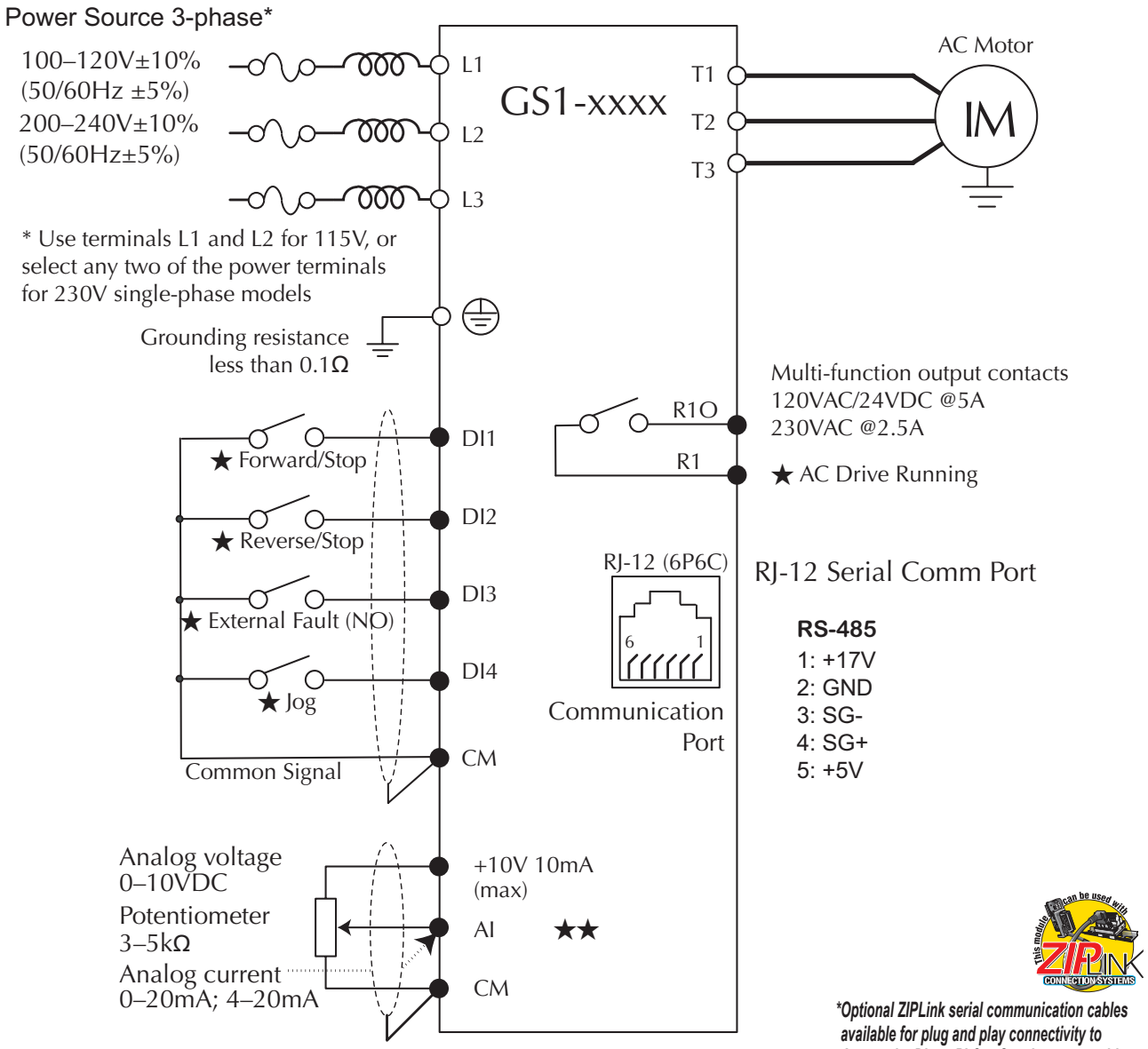
[1] 0 to +10 VDC, 0 to 20 mA, or 4 to 20 mA input represents zero to maximum output frequency.

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

GS1 Specifications - Basic Wiring Diagram

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

Note: Please refer to the following pages for explanations and information regarding line reactors (pg.tGSX-134) and RF filters (pg.tGSX-170).



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

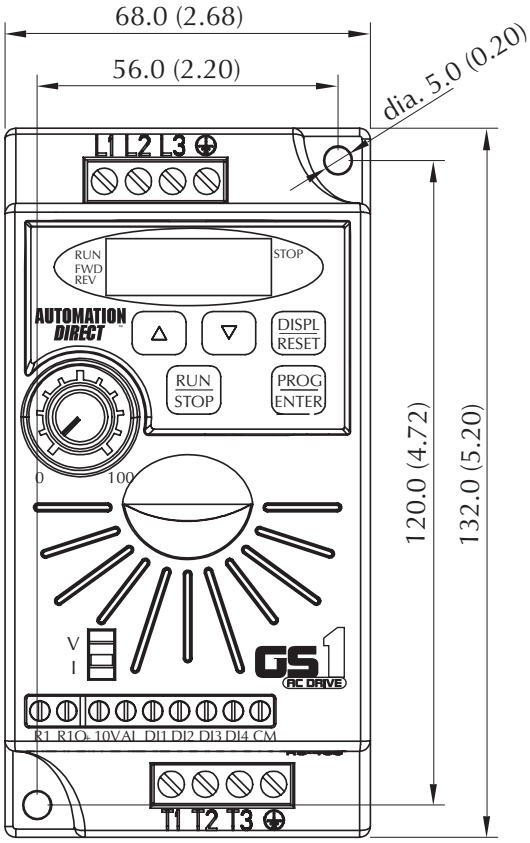
★ Factory default setting

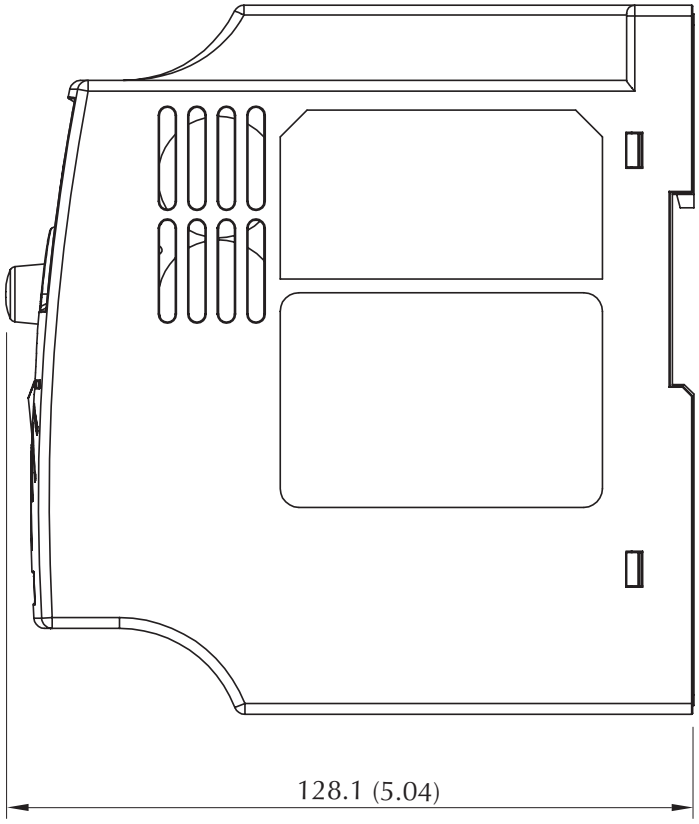
★★ Factory default source of frequency command is via the keypad potentiometer

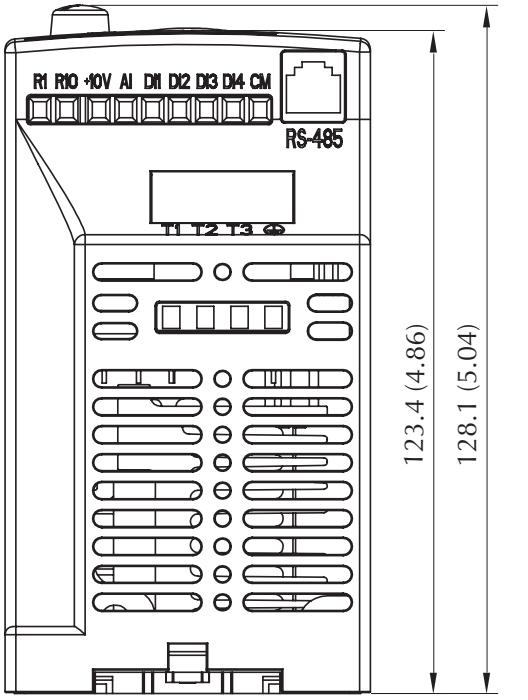
○ Main circuit (power) terminals ● Control circuit terminal ⫩ Shielded leads

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

GS1 Specifications - Dimensions







Unit: mm (in)

Wiring Solutions

Wiring Solutions using the *ZIP*Link Wiring System

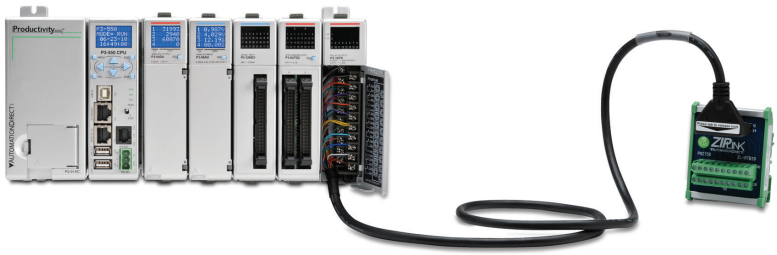
ZIPLinks eliminate the normally tedious process of wiring between devices by utilizing prewired cables and DIN rail mount connector modules. It's as simple as plugging in a cable connector at either end or terminating wires at only one end. Prewired cables keep installation clean and efficient, using 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)*