

DURAPULSE GS3 AC Drives – Introduction

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

Overview

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



Features

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

Accessories

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

Typical Applications

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

DURAPULSE GS3 AC Drives Specifications

230V Class														
Model Name			GS3-21P0	GS3-22P0	GS3-23P0	GS3-25P0	GS3-27P5	GS3-2010	GS3-2015	GS3-2020	GS3-2025	GS3-2030	GS3-2040	GS3-2050
Price			<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->
Output Rating	Max Motor Output	HP	1.0	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
		kW	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37
	Rated Output Current (A)		5	7	11	17	25	33	49	65	75	90	120	145
	Max Output Voltage		Three-phase 200 to 240V (proportional to input voltage)											
	Rated Frequency		0.1 to 400 Hz											
* Input Rating	Rated Voltage/Frequency		Single/Three-phase				Three-phase 200/208/220/230/240 VAC, 50/60Hz							
	Rated Input Current (A)		11.9 / 5.7	15.3 / 7.6	22 / 15.5	20.6	26	34	50	60	75	90	110	142
Voltage/Frequency Tolerance			Voltage: ± 10% Frequency: ± 5%											
Watt Loss @ 100% I (W)			60	82	130	194	301	380	660	750	920	1300	1340	1430
Weight (lb [kg])			4.5 [2.034]	4.5 [2.034]	9.4 [4.24]	9.4 [4.24]	13.3 [6.031]	13.3 [6.031]	14.3 [6.487]	26.5 [12]	26.5 [12]	26.5 [12]	77.2 [35]	77.2 [35]
* All 3-phase power sources must be symmetrical. Do not connect any DURAPULSE drives to grounded, center-tapped delta transformers (which are typically used for lighting circuits).														

460V Class – Three-Phase																
Model Name			<u>GS3-42P0</u>	<u>GS3-43P0</u>	<u>GS3-45P0</u>	<u>GS3-47P5</u>	<u>GS3-4010</u>	<u>GS3-4015</u>	<u>GS3-4020</u>	<u>GS3-4025</u>	<u>GS3-4030</u>	<u>GS3-4040</u>	<u>GS3-4050</u>	<u>GS3-4060</u>	<u>GS3-4075</u>	<u>GS3-4100</u>
Price			<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->
Output Rating	Maximum Motor Output	HP	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100
		kW	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
	Rated Output Current (A)		4.2	5.5	8.5	13	18	24	32	38	45	60	73	91	110	150
	Maximum Output Voltage		Three-phase 380 to 480V (proportional to input voltage)													
	Rated Frequency		0.1 to 400 Hz													
*Input Rating	Rated Voltage/ Frequency		Three-phase, 380/400/415/440/460/480VAC, 50/60Hz													
	Rated Input Current (A)		4.3	5.9	11.2	14	19	25	32	39	49	60	63	90	130	160
Voltage/Frequency Tolerance			Voltage: ± 10% Frequency: ± 5%													
Watt Loss @ 100% I (W)			102	132	176	250	345	445	620	788	1290	1420	1680	2020	2910	3840
Weight (lb [kg])			4.4 [1.994]	4.1 [1.857]	9.4 [4.24]	13.2 [6.002]	13.5 [6.106]	14.4 [6.525]	26.5 [12]	26.5 [12]	26.5 [12]	77.2 [35]	77.2 [35]	77.2 [35]	116.8 [53]	116.8 [53]
* All 3-phase power sources must be symmetrical. Do not connect any DURAPULSE drives to grounded, center-tapped delta transformers (which are typically used for lighting circuits).																

DURAPULSE GS3 AC Drives General Specifications

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

DURAPULSE GS3 AC Drives Specifications – Installation

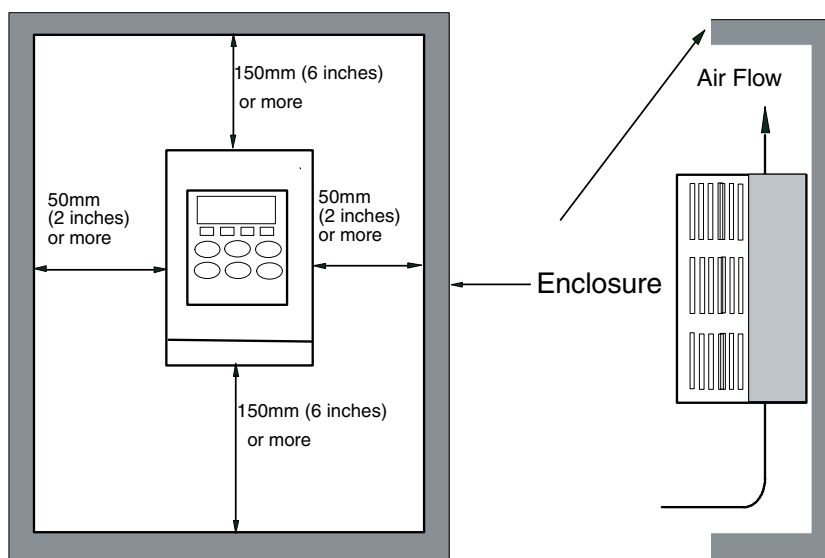
Understanding the installation requirements for your *DURAPULSE* AC drive will help to ensure that it operates within its environmental and electrical limits.

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

Watt-loss Chart	
GS3 Drive Model	At full load
<u>GS3-21P0</u>	60
<u>GS3-22P0</u>	82
<u>GS3-23P0</u>	130
<u>GS3-25P0</u>	194
<u>GS3-27P5</u>	301
<u>GS3-2010</u>	380
<u>GS3-2015</u>	660
<u>GS3-2020</u>	750
<u>GS3-2025</u>	920
<u>GS3-2030</u>	1300
<u>GS3-2040</u>	1340
<u>GS3-2050</u>	1430
<u>GS3-42P0</u>	102
<u>GS3-43P0</u>	132
<u>GS3-45P0</u>	176
<u>GS3-47P5</u>	250
<u>GS3-4010</u>	345
<u>GS3-4015</u>	445
<u>GS3-4020</u>	620
<u>GS3-4025</u>	788
<u>GS3-4030</u>	1290
<u>GS3-4040</u>	1420
<u>GS3-4050</u>	1680
<u>GS3-4060</u>	2020
<u>GS3-4075</u>	2910
<u>GS3-4100</u>	3840

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

1: Protective structure is based upon EN60529
 2: The ambient temperature must be in the range of -10° to 40°C. If the range will be up to 50°C, you will need to set the carrier frequency to 2.1 kHz or less and derate the output current to 80% or less.
 3: The storage temperature refers to the short-term temperature during transport.
 4: Conforms to the test method specified in JIS C0911 (1984)



Minimum Clearances and Air Flow




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



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

DURAPULSE GS3 AC Drives Specifications — Terminals

Main Circuit Terminals

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



GS3-4030 shown

Control Circuit Terminals

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



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



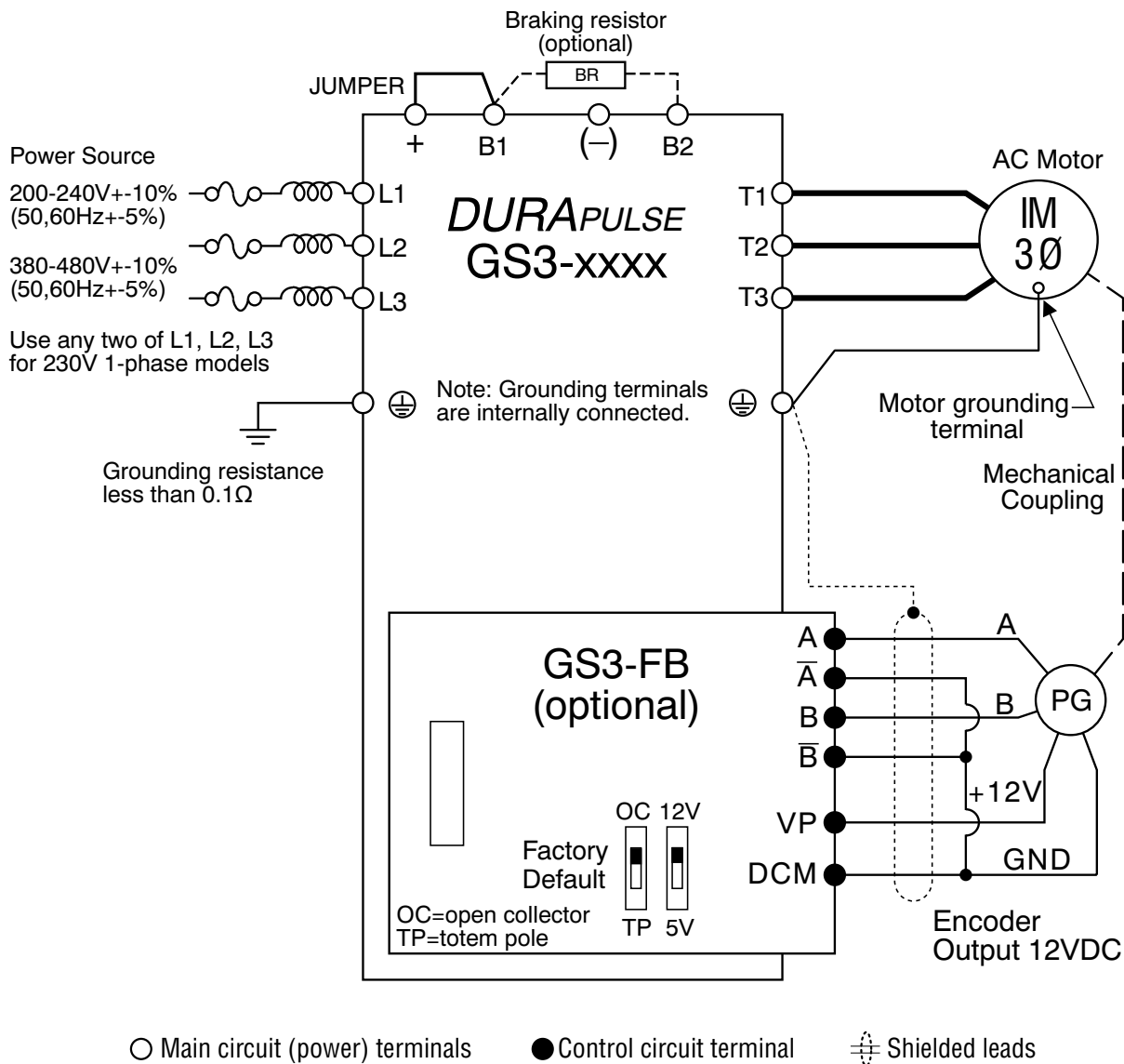
Note: Use twisted-shielded, twisted-pair or shielded-lead wires for the control signal wiring. It is recommended to run all signal wiring in a separate steel conduit. The shield wire should only be connected at the AC drive. Do not connect shield wire on both ends.

DURAPULSE GS3 AC Drives – Basic Wiring Diagram

Power Wiring Diagram – drives under 20 hp

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

Note: Please refer to the following pages for explanations and information regarding feedback cards (pg.tGSX-116), line reactors (pg.tGSX-118), braking components (pg.tGSX-17), EMI filters (pg.tGSX-150), RF filters (pg.tGSX-159), and fuses (pg.tGSX-160).



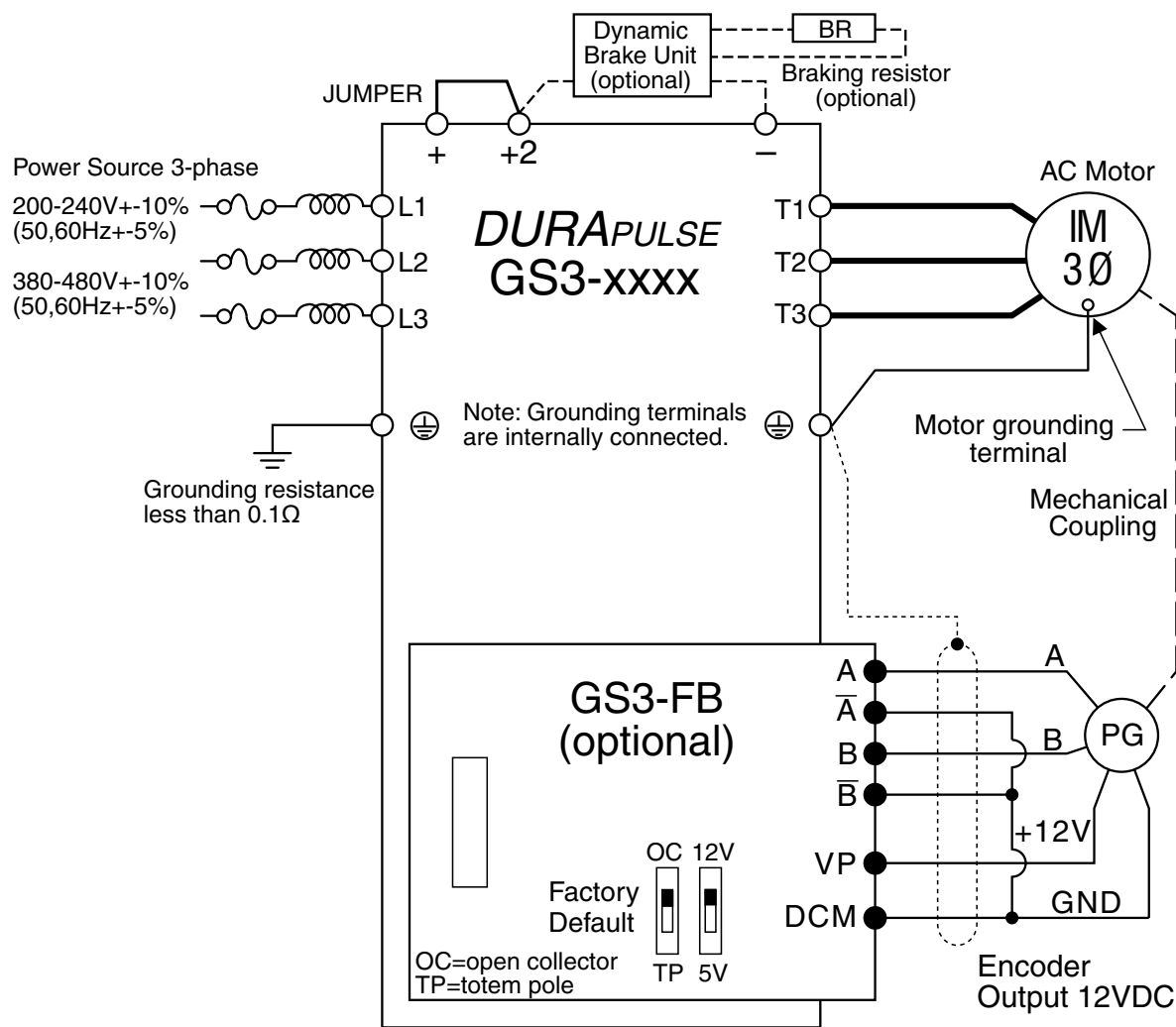
WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.
 TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.

DURAPULSE GS3 AC Drives – Basic Wiring Diagram

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

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

Note: Please refer to the following pages for explanations and information regarding feedback cards (pg.tGSX-116), line reactors (pg.tGSX-118), braking components (pg.tGSX-17), EMI filters (pg.tGSX-150), RF filters (pg.tGSX-159), and fuses (pg.tGSX-160).



○ Main circuit (power) terminals

● Control circuit terminal

⊘ Shielded leads



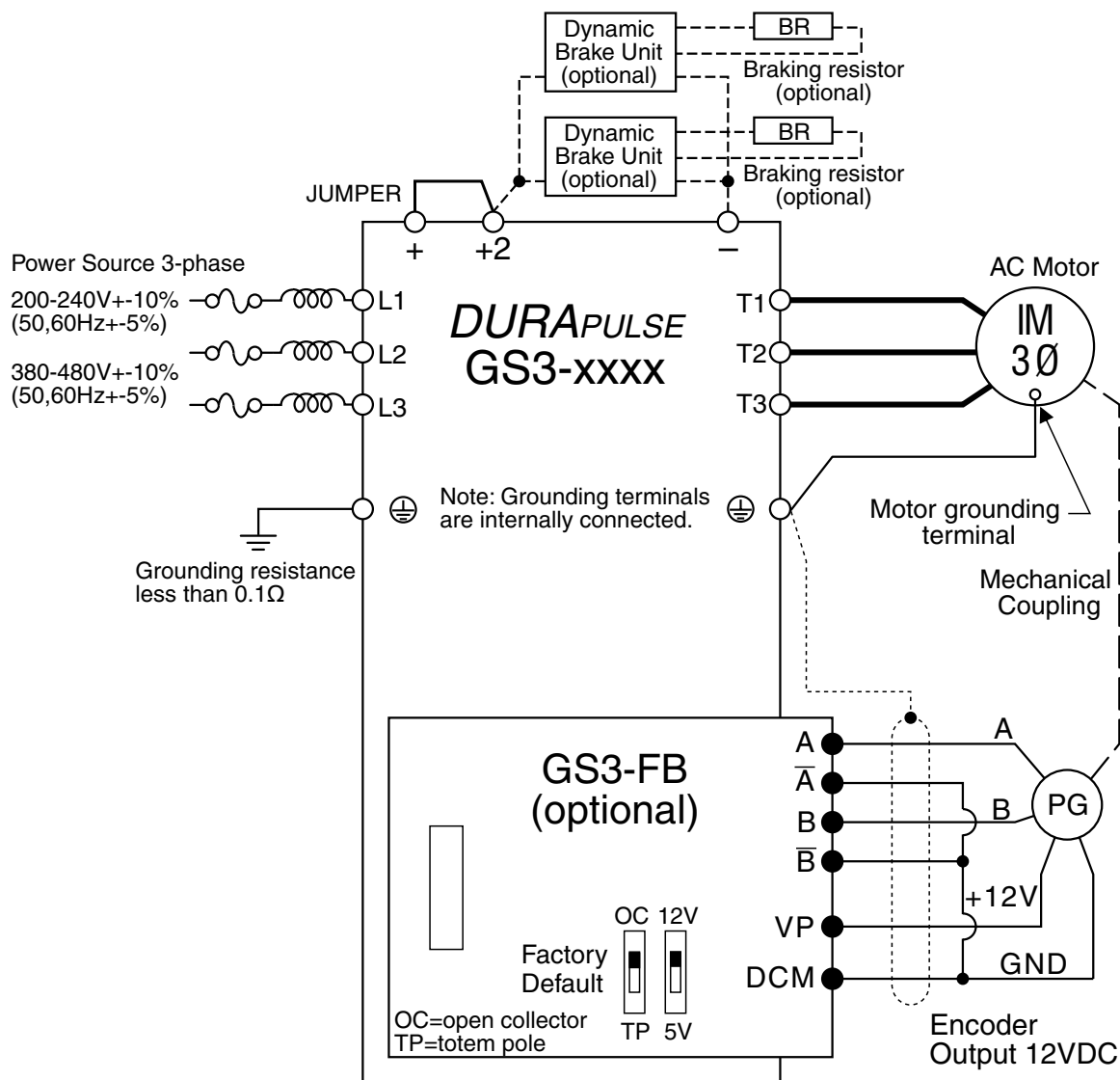
WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.
TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.

DURAPULSE GS3 AC Drives – Basic Wiring Diagram

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

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

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



○ Main circuit (power) terminals

● Control circuit terminal

⧻ Shielded leads



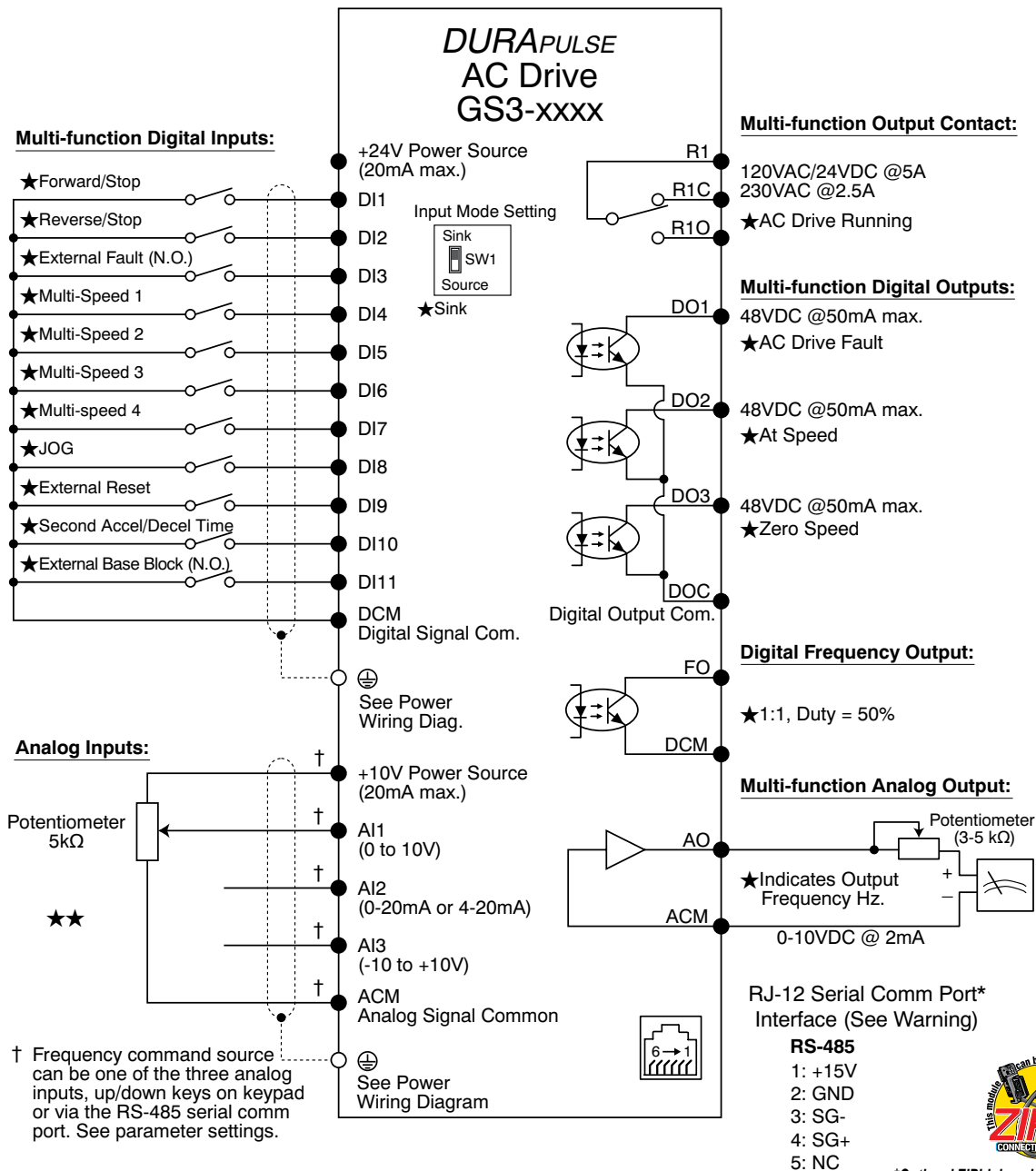
WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE GS3/DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.
TERMINALS 2 AND 5 SHOULD NOT BE USED AS A POWER SOURCE FOR YOUR COMMUNICATION CONNECTION.

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

Control Wiring Diagram - Digital Input Connections to Sinking Output Devices



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



★ Factory default setting

★★ Factory default source of frequency command is via the keypad up/down keys

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



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



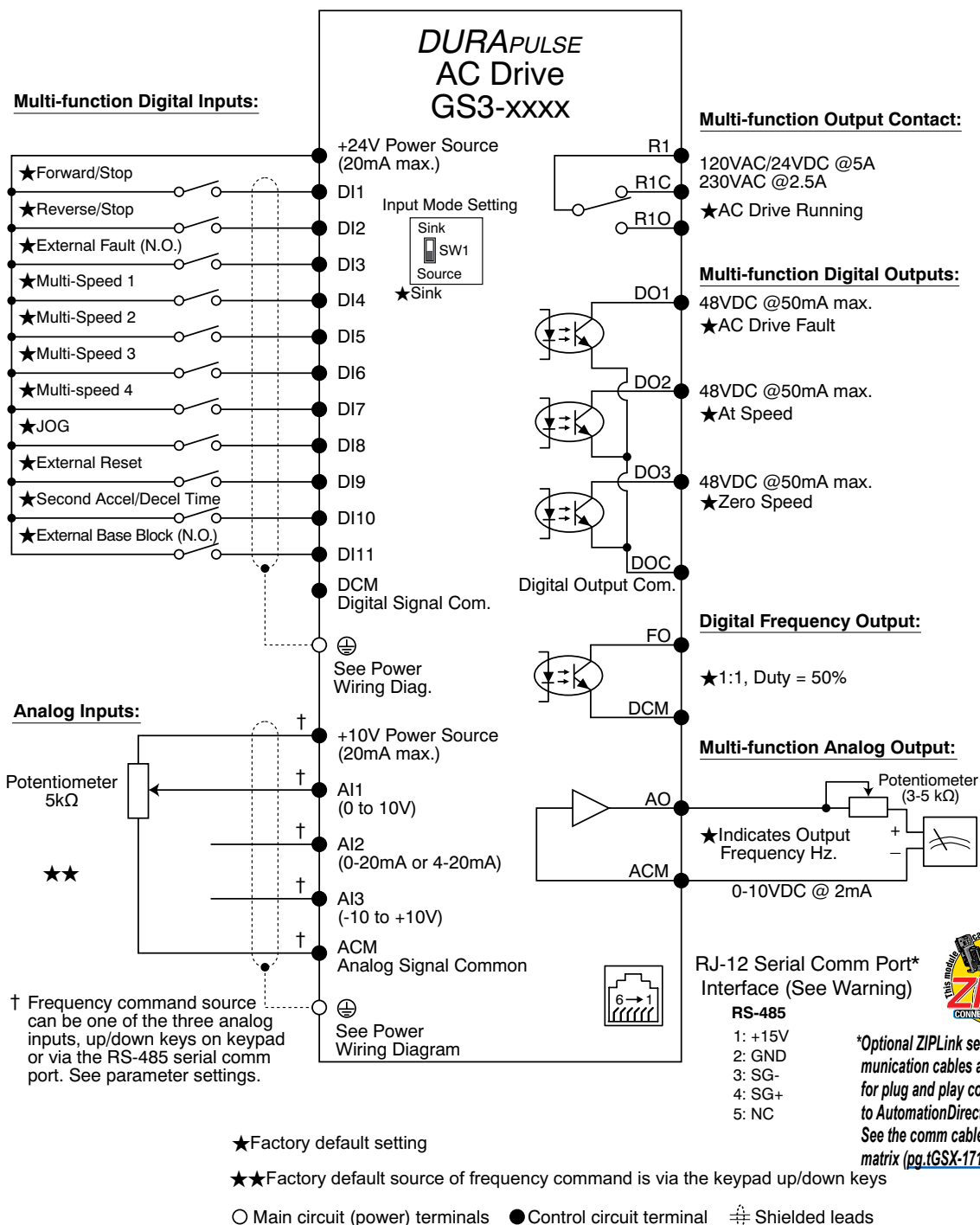
*Optional ZIPLink serial communication cables available for plug and play connectivity to AutomationDirect PLCs. See the comm cable selection matrix (pg.tGSX-171).

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

Control Wiring Diagram - Digital Input Connections to Sourcing Output Devices



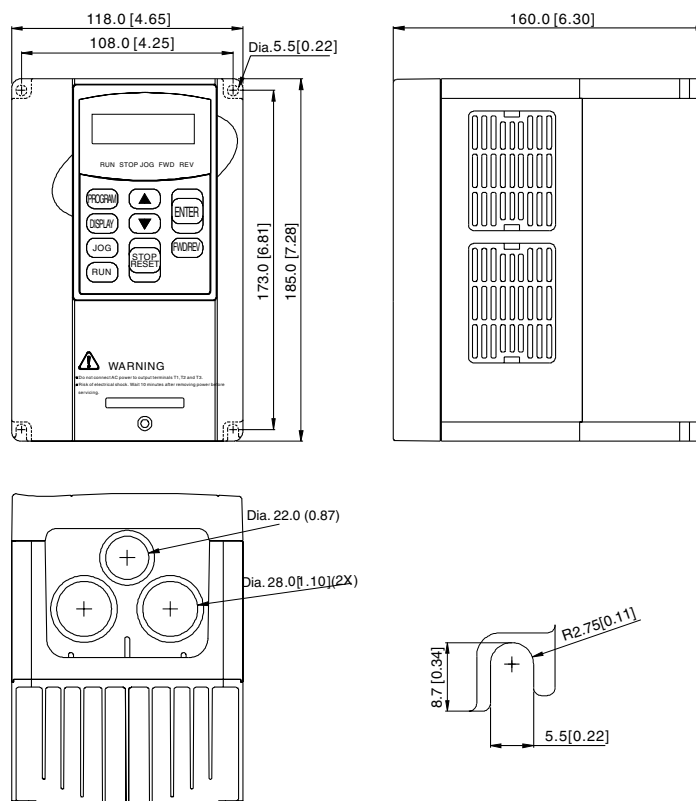
Note: Users MUST connect wiring according to the circuit diagram shown below.



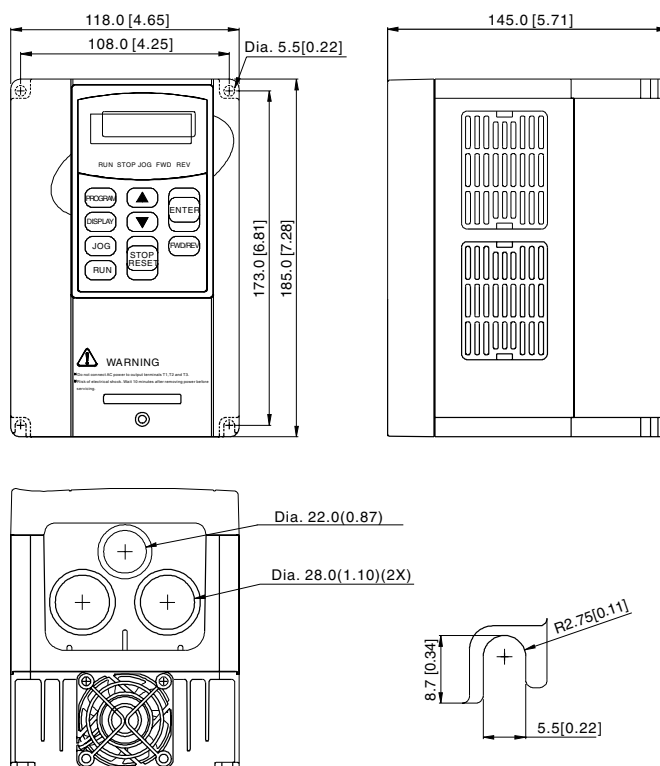
WARNING: DO NOT PLUG A MODEM OR TELEPHONE INTO THE DURAPULSE RJ-12 SERIAL COMM PORT, OR PERMANENT DAMAGE MAY RESULT.

DURAPULSE GS3 AC Drives – Dimensions

GS3-21P0, GS3-22P0, GS3-42P0



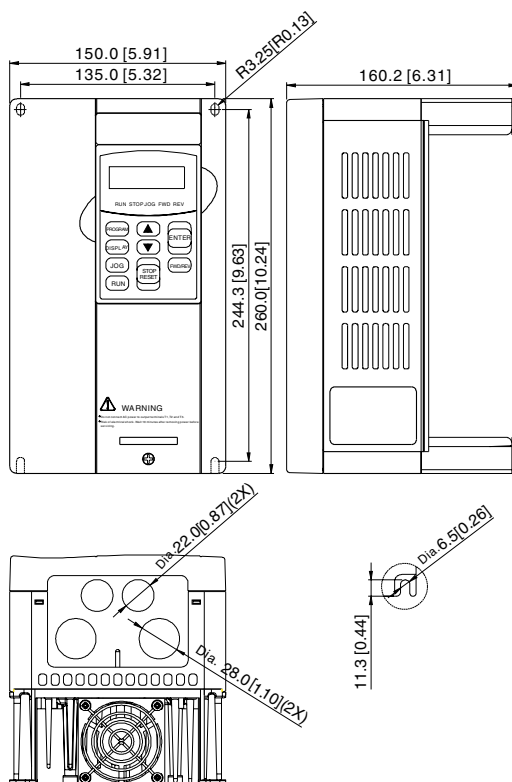
GS3-43P0



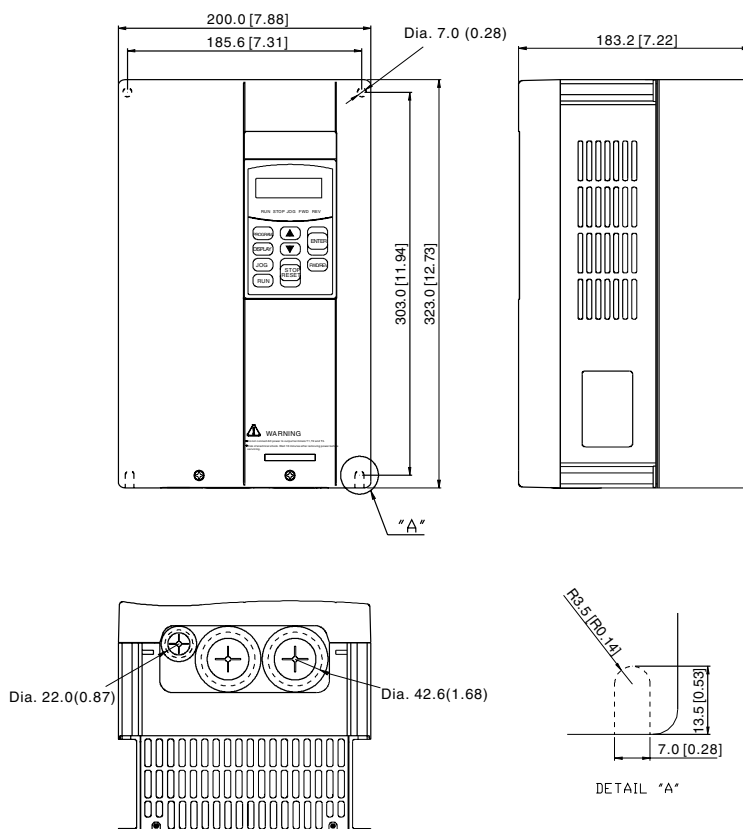
unit: mm(in)

DURAPULSE GS3 AC Drives – Dimensions

GS3-23P0, GS3-25P0, GS3-45P0



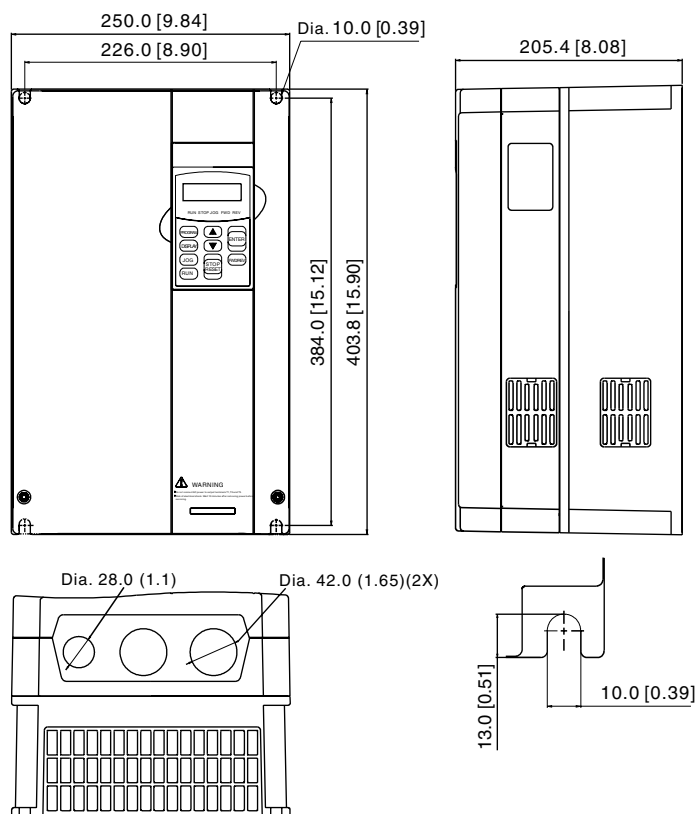
GS3-27P5, GS3-2010, GS3-2015, GS3-47P5, GS3-4010, GS3-4015



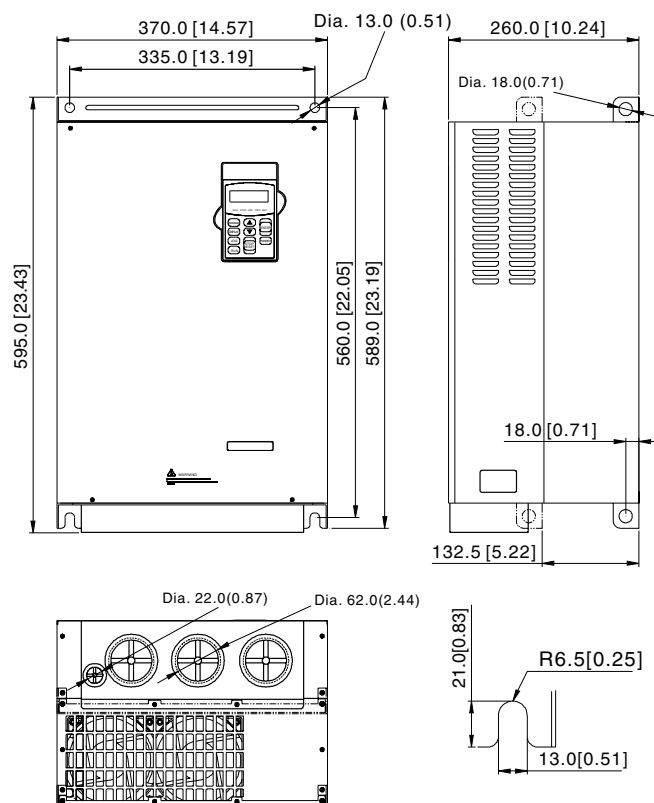
unit: mm(in)

DURAPULSE GS3 AC Drives – Dimensions

GS3-2020, GS3-2025, GS3-2030, GS3-4020, GS3-4025, GS3-4030

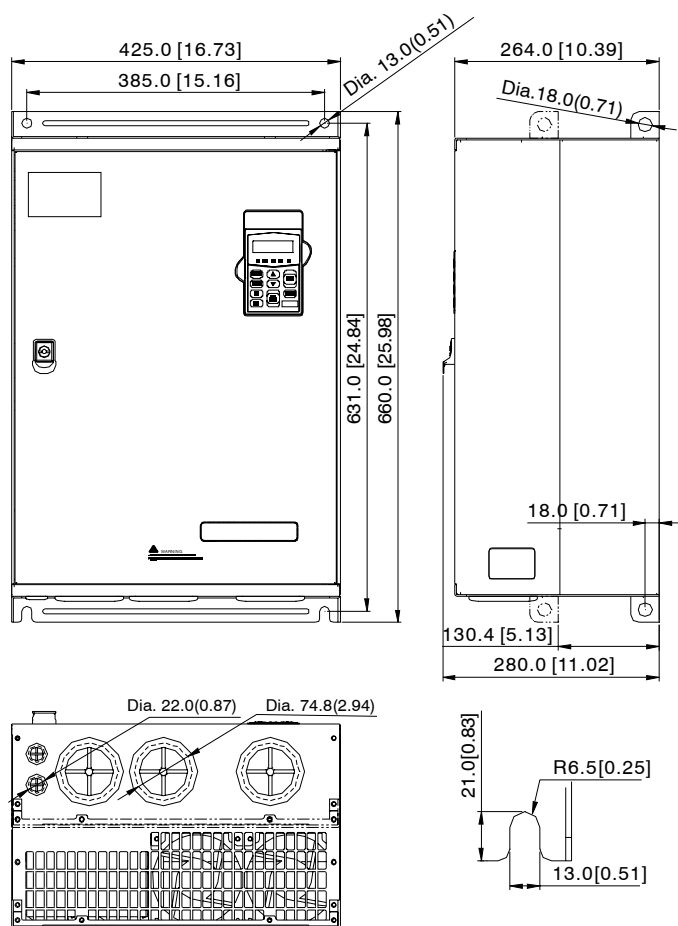


GS3-2040, GS3-2050, GS3-4040, GS3-4050, GS3-4060



unit: mm(in)

DURAPULSE GS3 AC Drives – Dimensions

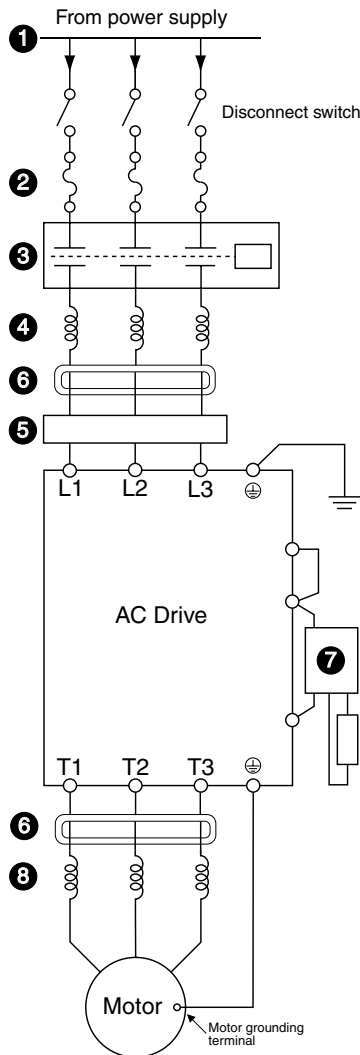
GS3-4075, GS3-4100

unit: mm(in)

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 *DURAPULSE* Accessories – Feedback Card

Feedback Card for *DURApulse* AC Drives

Part Number	Price	Drive Model
GS3-FB	<--->	GS3-xxxx

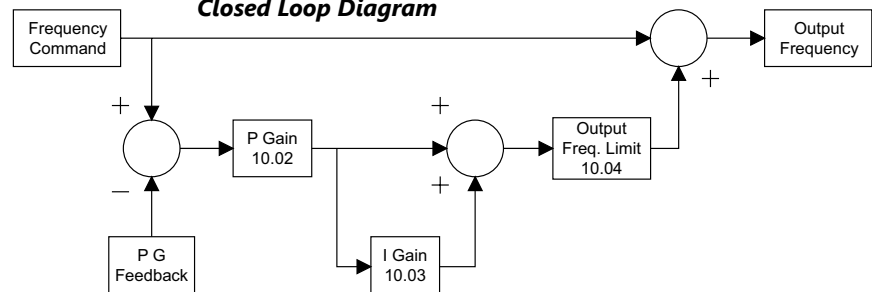
The GS3-FB feedback card is for use only with *DURAPULSE* AC drives.

Description

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



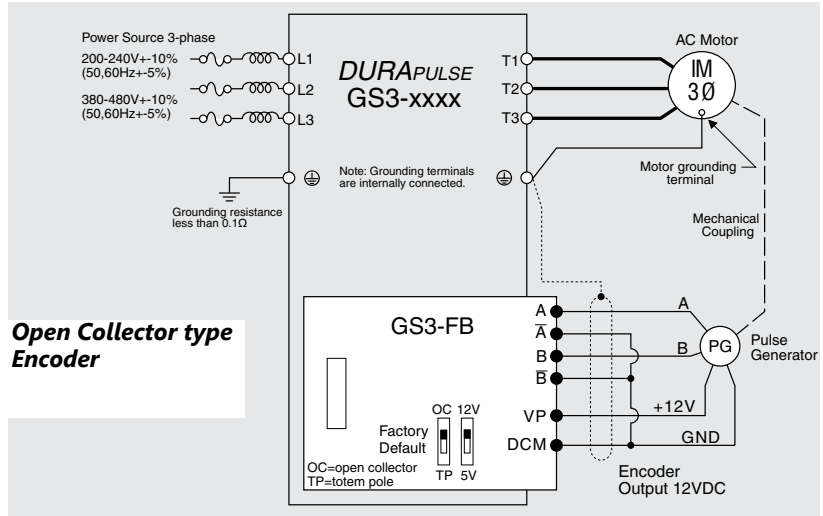
Closed Loop Diagram



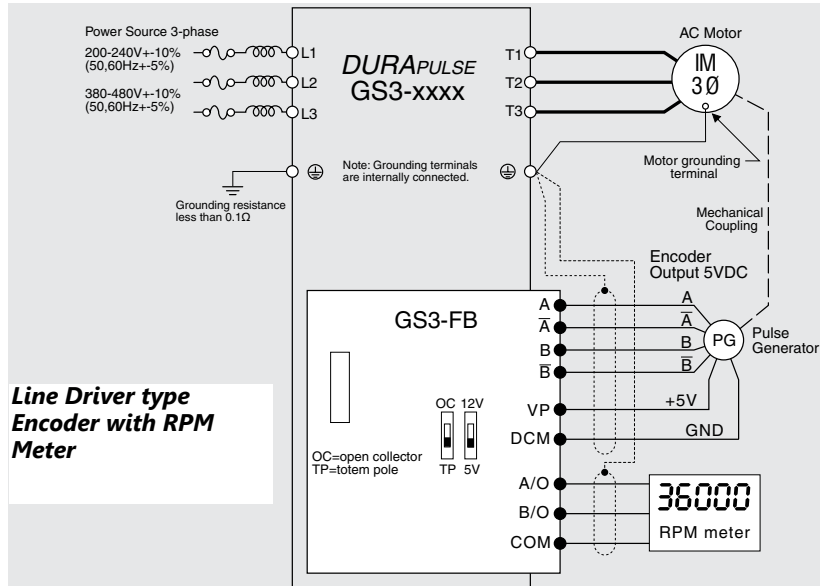
Types of Encoders		SW1 and SW2 switches	
		5V	12V
Output Voltage			
Open collector			
Line driver			
Complimentary			

GS3 *DURAPULSE* Accessories – Feedback Card

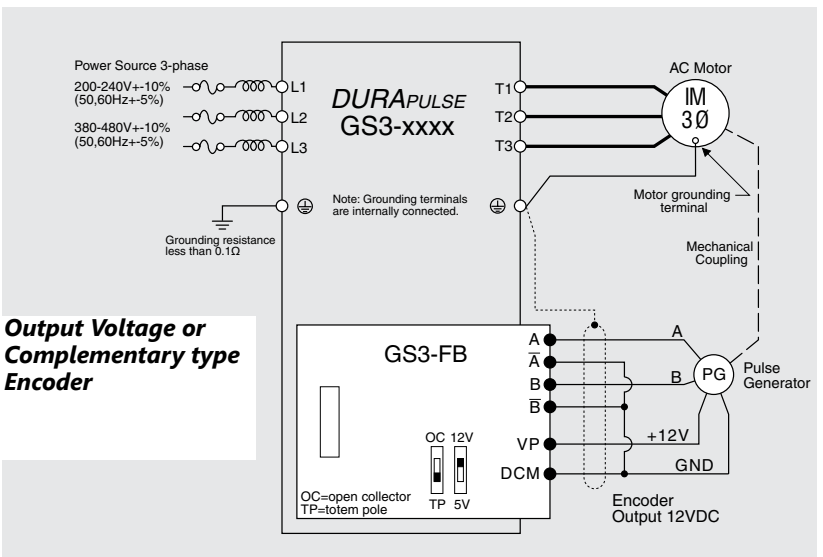
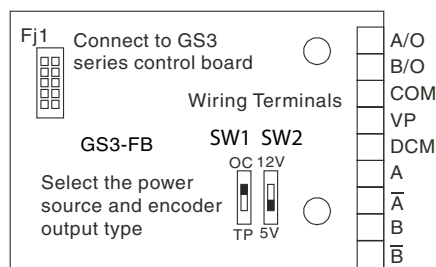
Wiring Diagrams



Terminal Symbols	Description
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





Wiring Solutions

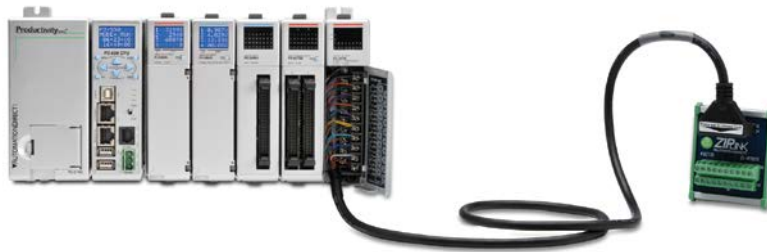
Wiring Solutions using the ZIPLink Wiring System

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

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

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

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



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

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

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

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



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

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

Solution 3: GS Series and DURAPULSE Drives Communication Cables

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

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

Using the Drives Communication selector tables located in this section,

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





Wiring Solutions

Solution 4: Serial Communications Cables

ZIPLink offers communications cables for use with *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, ZIPLink modules are available in a variety of configurations including stand-alone relays, 24VDC and 120VAC transorb modules, D-sub and RJ12 feedthrough modules, communication port adapter and distribution modules, and SureServo 50-pin I/O interface connection.

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

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



Solution 6: ZIPLink Connector Modules to 3rd Party Devices

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

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

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





Motor Controller Communication

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

* 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)

* 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)