

City of Yukon



Document Packet

Repair and Capital Improvements



Capital Repair and Improvement Items

1. Clarifier Rehab (Cost per Clarifier)

- a. Rehab 35 yr old Clarifiers, includes new mechanical components.
(see Attachment Quote from BW Services)

2. Return Activated Sludge Building Rehab

- a. Replace RAS Pumps, sludge meters, and install telemetry on old RAS building.
 1. Control Building 12X12
 2. Pumps (see quote from Bertrem)
 3. Automated Valves and Meters
 4. VFD's and Telemetry

3. Bar Screen for WWTP

- a. Install new ½ " (half-inch) automatic bar screen at Wastewater Treatment plant. Replace panels in existing screen with 1/16" plates.

4. West Screw Pump for Headworks

- a. Replace old screw pump with a double flight USFilter unit. This unit should be the same setup as the east screw pump.

Quotation



BW Services
 4140 Reilly Road
 Wichita Falls, TX 76305
 Phone: 940-855-2710
 Fax: 940-855-2833
 www.bwfabricators.com

Quote Date: **2/11/2010**
 Quote ID: **QT001992**
 Sales Rep.: **MBARFIELD**

Quote To: **VEOLIA WATER**
 YUKON, OK

Ship To:

Contact: **GARY GIDDINGS**
 Phone: **405-354-6245**
 Email:

Contact: **GARY GIDDINGS**

Customer Reference: **YUKON OK** Quote Lead Time: **Weeks ARO** Desired Ship Date: Quote Expiration Date: **3/11/2010**

Terms: **Net 30** Tax Status: FOB Point: Ship Via: **TBD** Freight:

Item	Quantity	Part Description and Specifications	UM	Unit Price	Extension
1	1.00	60' DIA LINKBELT CLARIFIER REHAB CLARIFIER REHAB- WITH FRP WEIRS AND BAFFLES >DISSASSEMBLE CLARIFIER >SAND BLAST AND PAINT >INSTALL A NEW DRIVE (OLD DRIVE IS DISCONTINUED RETROFIT WITH NEW SIEMENS UNIT) >RE-ASSEMBLE CLARIFIER	EA	134,400.00	134,400.00
2	1.00	60' DIA LINKBELT CLARIFIER REHAB CLARIFIER REHAB- WITH STAINLESS STEEL WEIRS AND BAFFLES >DISSASSEMBLE CLARIFIER >SAND BLAST AND PAINT >INSTALL A NEW DRIVE (OLD DRIVE IS DISCONTINUED RETROFIT WITH NEW SIEMENS UNIT) >RE-ASSEMBLE CLARIFIER	EA	160,800.00	160,800.00

TOTAL **\$295,200.00**

Quote Specifications

>>>SITE NOTES

- > WE WILL NEED ACCESS TO THE SITE FROM 7AM TO 7PM AND 7 DAYS A WEEK UNTIL JOB IS COMPLETED.
- > DELAYS BEYOND OUR CONTROL WILL BE BROUGHT TO THE ATTENTION OF THE OWNER AND CHARGED AT OUR STANDARD RATES.
- > ANY OBSTRUCTIONS, WHICH MAY BE IN THE WAY OF DIRECT ACCESS TO OR AROUND THE UNIT'S GRADE WILL BE REMOVED OR OTHERWISE MADE SAFE PRIOR TO OUR START OF WORK AT NO COST TO BW SERVICES.
- > WE ASSUME ALL MATERIALS AND EQUIPMENT CAN BE STORED NEAR WORK SITE

> SCOPE NOTES:

- > EQUIPMENT CLEANING BY OTHERS
- > ELECTRICAL NOT INCLUDED
- > SAFETY HOLE WATCH STANDBY AND FIRE WATCH AT ALL TIMES BY OTHERS
- > SPECIAL PERMITS NOT INCLUDED
- > BONDING AND EXTRAORDINARY INSURANCE NOT INCLUDED
- > DELAYS BEYOND OUR CONTROL ARE CONSIDERED EXTRA WORK
- > PRICES FOR EXTRA WORK SHALL BE ITEMIZED AND COVERED BY SUPPLEMENTAL AGREEMENT SUBMITTED AND APPROVED PRIOR TO THE STARTING OF SUCH WORK.

Disregard

>>>COMMERCIAL NOTES

- > LABOR, FUEL AND MATERIAL PRICES SUBJECT TO CHANGE WITH MARKET CONDITIONS.
- > IF ASKED TO PROCEED WITH CHANGE ORDER WORK PRIOR TO APPROVAL, THE PRICE IS ACCEPTED AS SUBMITTED.
- > BW RESERVES THE RIGHT TO NEGOTIATE CONTRACT TERMS AND CONDITIONS.
- > THIS PROPOSAL SHALL REMAIN VALID FOR 30 DAYS. AFTER THAT TIME BW RESERVES THE RIGHT TO REVISE PRICING AND/ OR SCHEDULE.
- > OBLIGATIONS FOR WORK OBTAINED IN THE INTERIM PRIOR TO AWARD COULD CHANGE OUR AVAILABILITY AND THUS THE TIME OF MOBILIZATION AFTER AWARD.
- > WORK IS NON-UNION AND NON-PREVAILING WAGE RATES.

THANK YOU FOR CONSIDERING OUR SERVICES!!!

H*E ENGINEERED EQUIPMENT CO.

824 W. ELGIN * BROKEN ARROW, OK 74012-2425

P.O. BOX 98 * BROKEN ARROW, OK 74013-0098

(918) 251-2121 * FAX: (918) 251-1051

Veolia Water
Yukon OK
Attn: Gary Giddings

Subject: Pratt plug valve w/EMO

Gary,

We are pleased to offer the following quote for your consideration.

2 ea. 6" 125# flanged Pratt Ballcentric plug valve with Limitorque model QX-3, WP, non-intrusive electric actuator with standard controls for open close service, local/stop/remote control station, manual override, operating time 15 to 60 seconds, mounted and cycle tested as complete assembly.

Note: you will need to confirm you available power at time of order.

Unit price: \$4,996.00 ea.

Terms: net 30 days

FOB: shipping point – full freight allowed

Shipment: 8-10 weeks

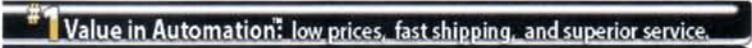
Taxes: not included

If you have any questions please don't hesitate to contact us.

Best regards,



Robert Donohew



This is the printable version of: [http://www.automationdirect.com/adc/Shopping/Catalog/Drives/DURApulse_-_GS3_\(230_-z-_460_VAC_Sensorless_Vector_Control\)/DURApulse_-_GS3_Drive_Units_\(230_-z-_460_VAC_SLV\)/GS3-4010](http://www.automationdirect.com/adc/Shopping/Catalog/Drives/DURApulse_-_GS3_(230_-z-_460_VAC_Sensorless_Vector_Control)/DURApulse_-_GS3_Drive_Units_(230_-z-_460_VAC_SLV)/GS3-4010)
 Please note: Some pages may look best printed in "Landscape" orientation. [Restore Layout](#)

You are looking at: [Drives](#) > [DURApulse - GS3 \(230...](#) > [DURApulse - GS3 Driv...](#) > **GS3-4010**

Products

Reviews

GS3-4010



DURApulse (r) AC drive, 10 hp, 460V, three-phase, sensorless vector or V/F (volts per hertz) control modes. Manual included with product.



Manual comes with each DURApulse Drive. We do not offer a hard copy of this manual for purchase, however, it can be downloaded here at no charge.

GS3-4010

Documentation Links

[Specifications](#)

[Online Manual](#)

[AutoCAD Drawings](#)

[Frequently Asked Questions](#)

[Agency Approval Checklist](#)
 (CE/UL/CUL/CSA/RoHS docs)

Item Shipping Weight: 15.64 lbs.
 MADE IN CHINA
 HS Code: 8504.40



Customer Reviews

Overall Score (4.3)
 (5 reviews)

[read reviews](#)

[write a review](#)

Item Code	Short Description	Price (US \$)	Quantity	Stock Status	Specs	Fav/BOM
GS3-4010	GS3 10HP AC DRIVE 460VAC 3 PHASE Our standard 30-day return policy IS offered on this item. Free 2-day shipping available for orders greater than \$300.	\$713.50	0			

For each item, enter the quantity you wish to order and press Update. Items can be added to your favorites list or a bill of materials by clicking on the icon in the right hand column.

[Update](#)

Recommended Items

The following items are recommended by Automationdirect for purchase with a GS3-4010

Item Code	Short Description	Price (US \$)	Quantity	Specs	Fav/BOM
USB-485M	USB TO RS-485 PC ADAPTER, INCLUDES RJ12 CABLES AND MINI-CD WITH DRIVER	\$49.00	0		

For each item, enter the quantity you wish to order and press Update. Items can be added to your favorites list or a bill of materials by clicking on the icon in the right hand column.

[Update](#)

[Drives > GS Configuration & Communications & Software](#)

Customers who bought a GS3-4010 also purchased the following items.

Item Code	Short Description	Price (US \$)	Quantity	Specs	Fav/BOM
GS-4010-LR	AC LINE REACTOR, 460V, 10HP, 3PH, FOR GS2/GS3-4010, INPUT/OUTPUT	\$168.00	0		
GS3-45P0	GS3 5HP AC DRIVE 460VAC 3 PHASE Our standard 30-day return policy IS offered on this item. Free 2-day shipping available for orders greater than \$300.	\$415.25	0		

For each item, enter the quantity you wish to order and press Update. Items can be added to your favorites list or a bill of materials by clicking on the icon in the right hand column.

[Update](#)

[Cart](#)

[Checkout](#)

DURAPULSE AC Drives – Introduction



DURApulse Drives																
Motor Rating	Hp	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100
	kW	.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
Single/Three-Phase 230 Volt	✓	✓	✓													
Three-Phase 230 Volt Class					✓	✓	✓	✓	✓	✓	✓	✓	✓			
Three-Phase 460 Volt Class	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 (aka HIM 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
- **HIM** Keypad with memory to store up to four programs of any **DURAPULSE** drive

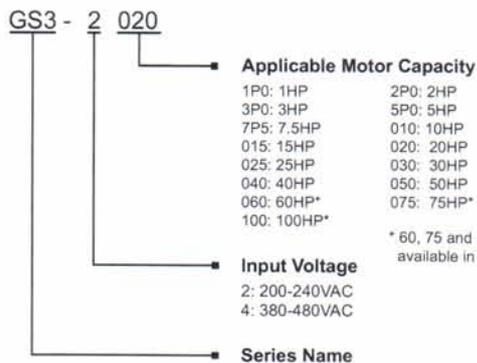
- Eleven programmable digital inputs
- Three programmable analog inputs
- Three digital and one SPDT relay programmable outputs
- One programmable analog output
- One digital frequency output
- RS-485 Modbus communications
- Ethernet communication optional
- UL/cUL/CE listed

Accessories

- AC line reactors
- EMI filters
- RF filters
- Braking resistors
- Braking units (for models 20 hp and above)
- Fuse kits and replacement fuses
- Ethernet interface
- Replacement keypad
- Remote panel adapter
- Keypad cables in 1, 3, and 5 meter lengths
- Four and eight port RS-485 multi-drop termination boards
- **KEP Direct** I/O Server
- **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

Detailed descriptions and specifications for the accessories are available in the "GS/DURAPULSE Accessories" section.

DURAPULSE part numbering system



Typical Applications

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

DURAPULSE AC Drives Specifications



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/Lights

Process

Relays/Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

Product Index

Part # Index

230V Class															
Model Name: GS3-xxx		21P0	22P0	23P0	25P0	27P5	2010	2015	2020	2025	2030	2040	2050		
Price		<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->		
Output Rating	Maximum Motor Output	HP		1.0	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
		kW		.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		
	Maximum 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 DURApulse drives require a symmetrical 3-phase power source.
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: GS3-xxx		41P0	42P0	43P0	45P0	47P5	4010	4015	4020	4025	4030	4040	4050	4060	4075	4100		
Price		<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->	<--->		
Output Rating	Maximum Motor Output	HP		1	2	3	5	7.5	10	15	20	25	30	40	50	60	75	100
		kW		.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55	75
	Rated Output Current (A)	2.7	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)	3.2	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)	70	102	132	176	250	345	445	620	788	1290	1420	1680	2020	2910	3840		
	Weight (lb [kg])	3.9 [1.759]	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 DURApulse drives require a symmetrical 3-phase power source.
Do not connect any DURApulse drives to grounded, center-tapped delta transformers (which are typically used for lighting circuits).

DURAPULSE AC Drives General Specifications

General Specifications			
Control Characteristics			
Control System		Pulse Width Modulation, Carrier frequency adjustable from 1k - 15kHz 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 Specification			
Inputs	Frequency Setting	Keypad	Setting by <UP> or <DOWN> buttons
		External Signal	Potentiometer - 3 to 5 k Ω , 0 to 10 VDC (input impedance 10 k Ω), -10 to +10 VDC, 4 to 20 mA (input impedance 250 Ω), 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 k Ω), 0 to 20 mA, 4 to 20 mA (input impedance 250 Ω), 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 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.

Environmental Specifications	
Protective Structure¹	IP20
Ambient Operating Temperature²	-10 to 40°C (14°F to 104°F) †
Storage Temperature³	-20 to 60°C (-4°F to 140°F)
Humidity	To 90% (no condensation)
Vibration⁴	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)

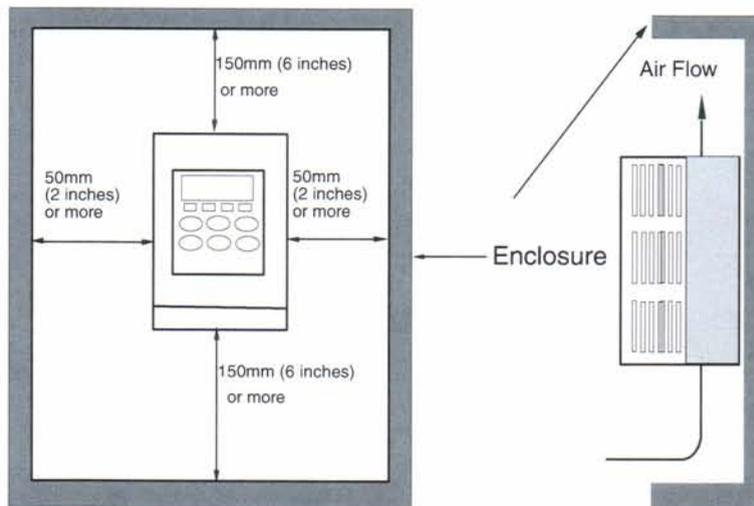
1: Protective structure is based upon EN60529

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)

Watt-loss Chart	
GS3 Drive Model	At full load
GS3-21P0	60
GS3-22P0	82
GS3-23P0	130
GS3-25P0	194
GS3-27P5	301
GS3-2010	380
GS3-2015	660
GS3-2020	750
GS3-2025	920
GS3-2030	1300
GS3-2040	1340
GS3-2050	1430
GS3-41P0	70
GS3-42P0	102
GS3-43P0	132
GS3-45P0	176
GS3-47P5	250
GS3-4010	345
GS3-4015	445
GS3-4020	620
GS3-4025	788
GS3-4030	1290
GS3-4040	1420
GS3-4050	1680
GS3-4060	2020
GS3-4075	2910
GS3-4100	3840



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 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	
DI2	Digital Input 2	
DI3	Digital Input 3	
DI4	Digital Input 4	
DI5	Digital Input 5	Input Voltage: Internally Supplied (see Warning below)
DI6	Digital Input 6	Sink Mode: Low active, VinL Min = 0V, VinL Max = 15V, Iin Min = 2.1mA, Iin Max = 7.0mA
DI7	Digital Input 7	Source Mode: High active, VinH Min = 8.5V, VinH Max = 24V, Iin Min = 2.1mA, Iin Max = 7.0mA
DI8	Digital Input 8	Input response: 12 - 15 msec
DI9	Digital Input 9	Also see "Basic Wiring Diagram" on the next pages.
DI10	Digital Input 10	
DI11	Digital Input 11	
DCM	Digital Common	
+10V	Internal Power Supply	+10VDC (10mA maximum load)
A11	Analog Input	0 to +10 V input only
A12	Analog Input	0 to 20mA / 4 to 20mA input
A13	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	
DO2	Photocoupled digital output	
DO3	Photocoupled digital output	Maximum 48VDC, 50mA
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.



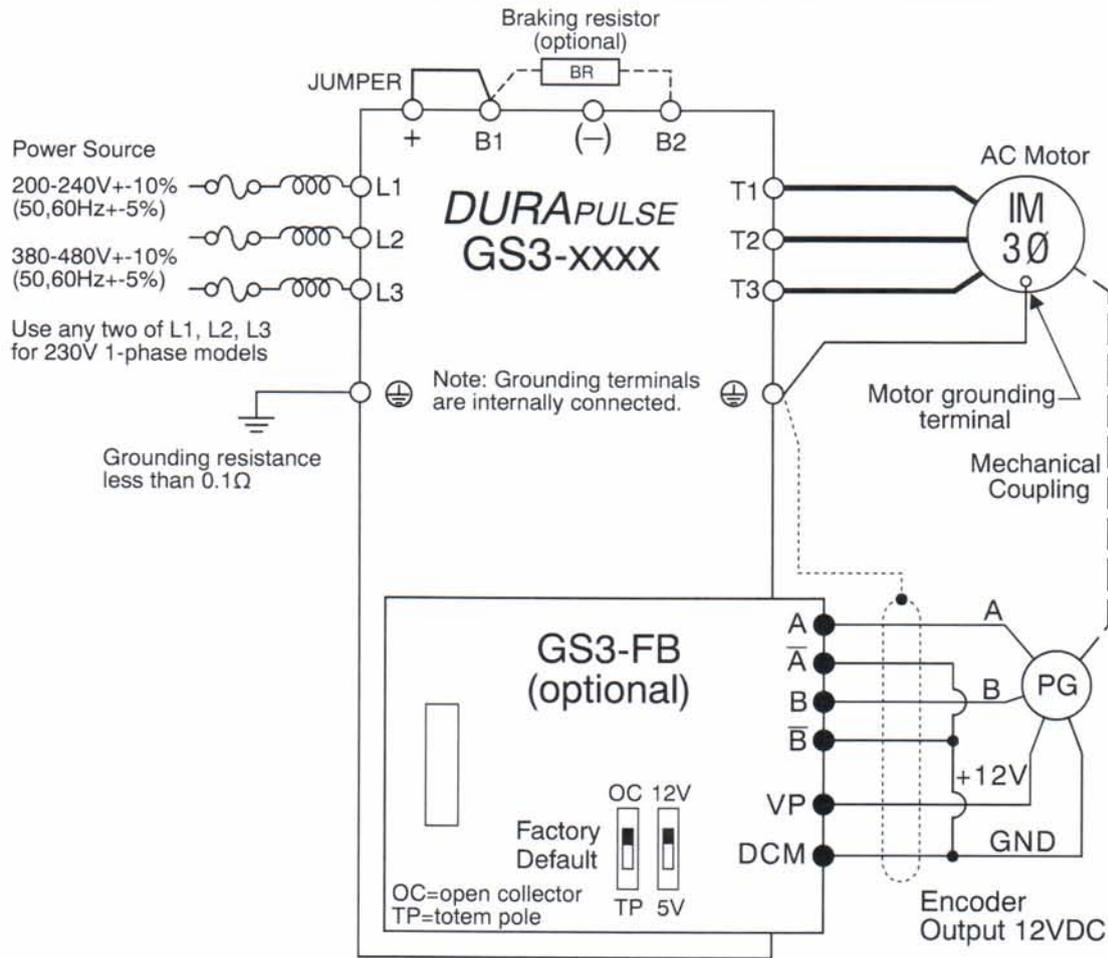
NOTE: USE TWISTED-SHIELDED, TWISTED-PAIR OR SHIELDED-LEAD WIRES FOR THE CONTROL SIGNAL WIRING. IT IS RECOMMENDED TO RUN ALL SIGNAL WIRING IN A SEPARATE STEEL CONDUIT. THE SHIELD WIRE SHOULD ONLY BE CONNECTED AT THE AC DRIVE. DO NOT CONNECT SHIELD WIRE ON BOTH ENDS.

DURAPULSE 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: Refer to the following pages for explanations and information regarding feedback cards, line reactors, braking resistors, EMI and RF filters, and fuses: 13-48, 13-50, 13-56, 13-61, 13-67, 13-68.



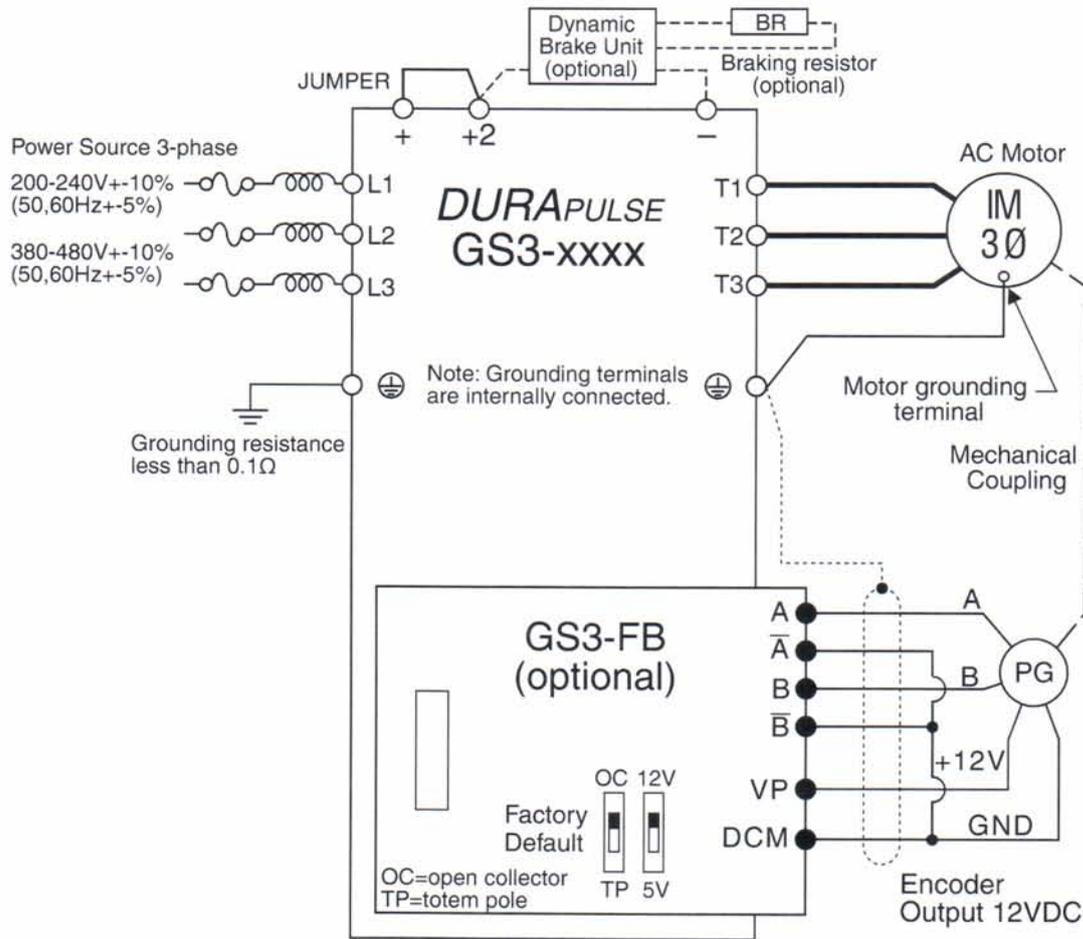
WARNING: Do not plug a modem or telephone into the GS3/DURAPULSE RJ-12 Serial Comm Port, or permanent damage may result. Terminals 2 and 5 should not be used as a power source for your communication connection.

DURAPULSE 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: Refer to the following pages for explanations and information regarding feedback cards, line reactors, braking units and resistors, EMI and RF filters, and fuses: 13-48, 13-50, 13-54, 13-56, 13-61, 13-67, 13-68.



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



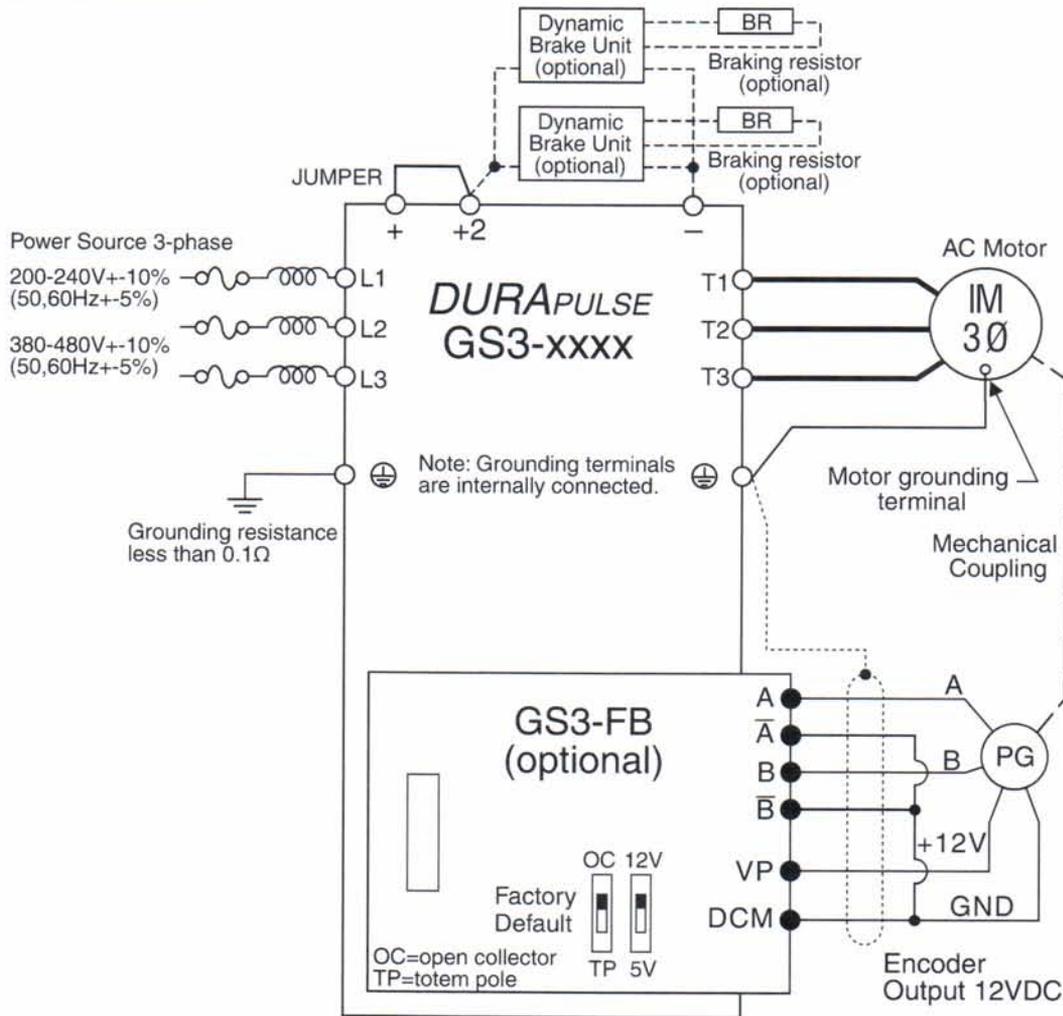
WARNING: Do not plug a modem or telephone into the GS3/DURAPULSE RJ-12 Serial Comm Port, or permanent damage may result. Terminals 2 and 5 should not be used as a power source for your communication connection.

DURAPULSE 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-M for additional specific wiring information.)

Note: Refer to the following pages for explanations and information regarding feedback cards, line reactors, braking units and resistors, EMI and RF filters, and fuses: 13-48, 13-50, 13-54, 13-56, 13-61, 13-67, 13-68.



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



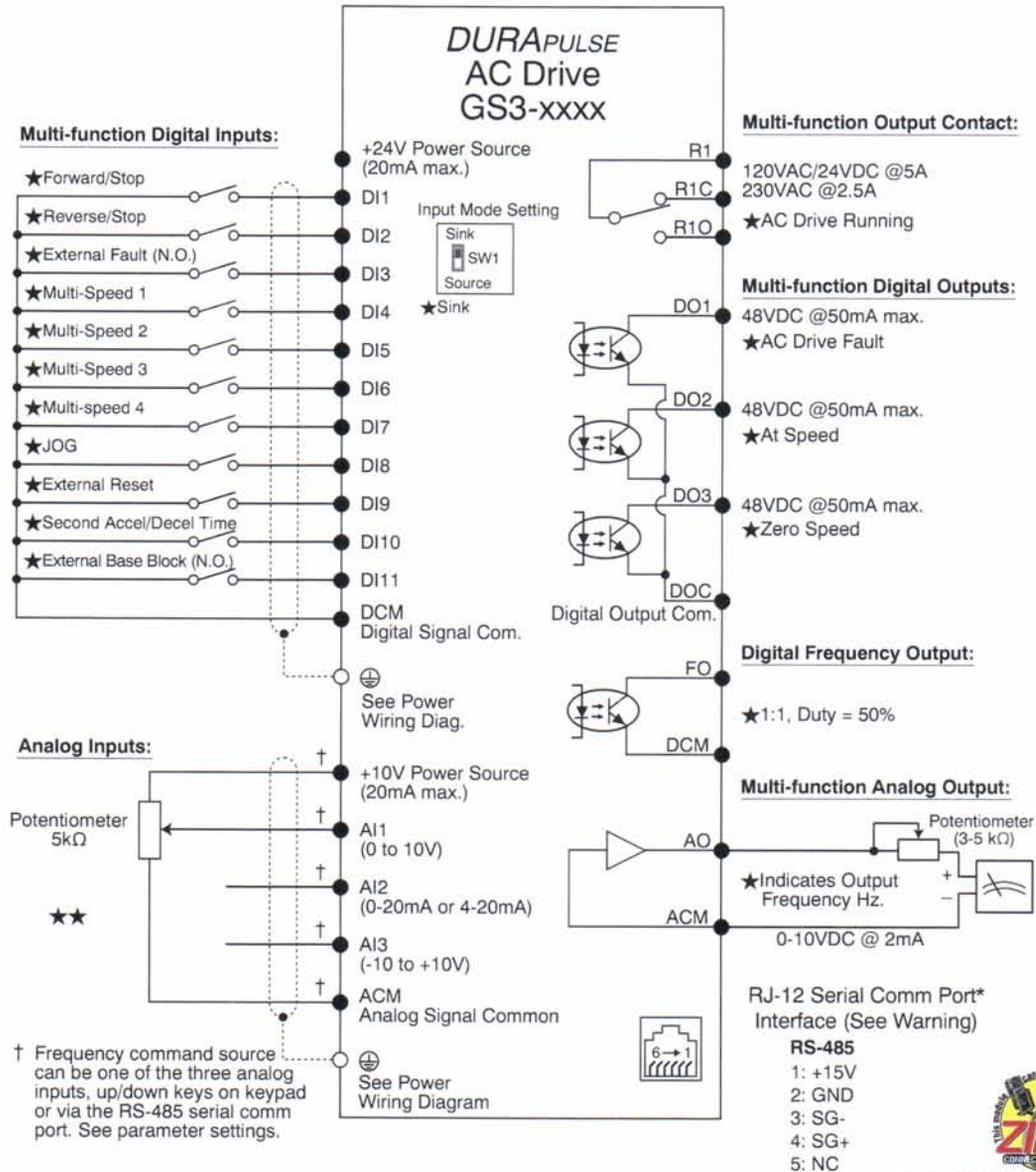
WARNING: Do not plug a modem or telephone into the GS3/DURAPULSE RJ-12 Serial Comm Port, or permanent damage may result. Terminals 2 and 5 should not be used as a power source for your communication connection.

DURAPULSE 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.



*Optional ZIPLink RS485 Communication cable GS-485HD15-CBL available for connection to the DL06 and D2-260 15-pin ports. See page 12-75.



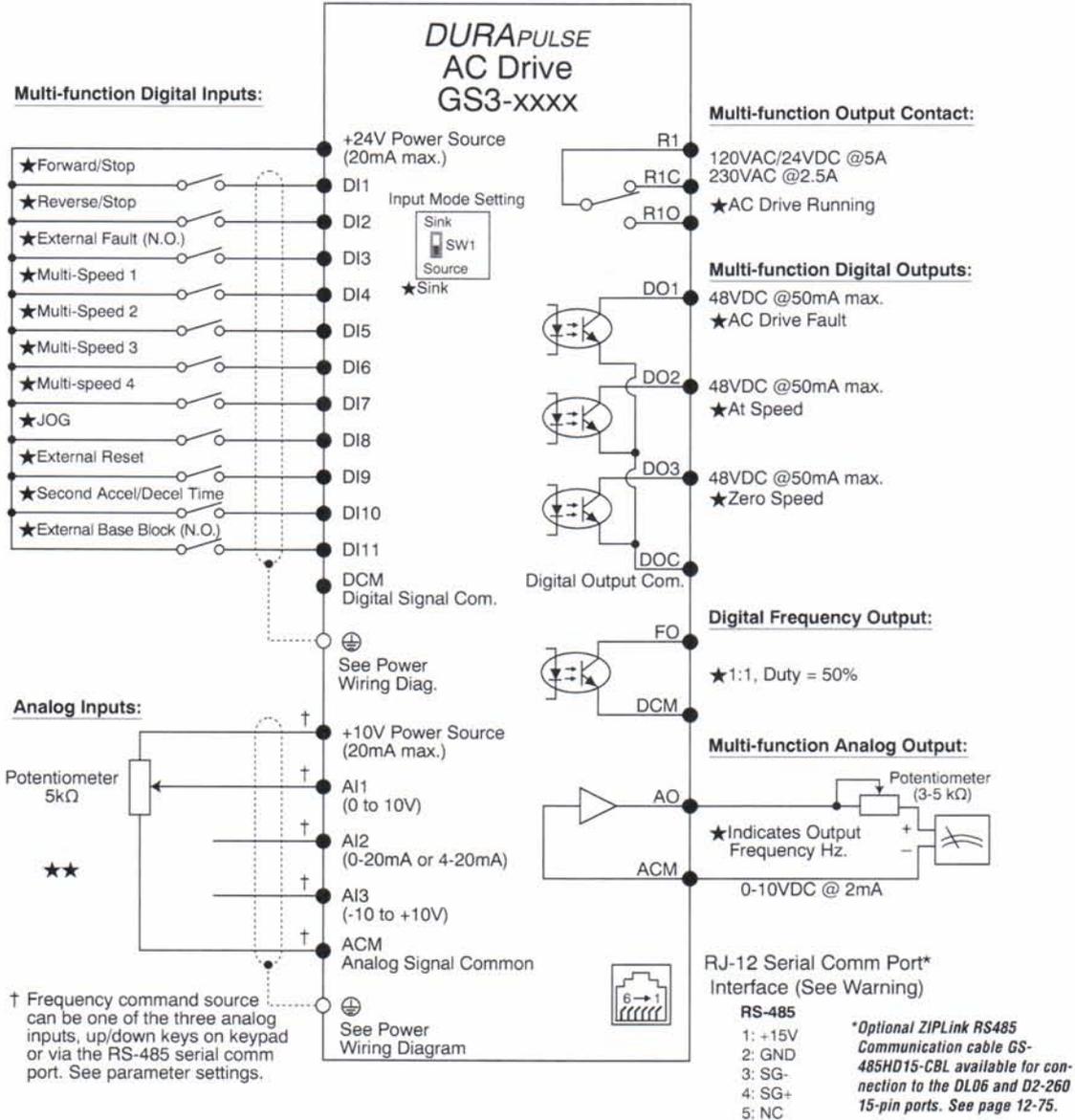
WARNING: Do not plug a modem or telephone into the DURAPULSE RJ-12 Serial Comm Port, or permanent damage may result.

DURAPULSE 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.



- ★ 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

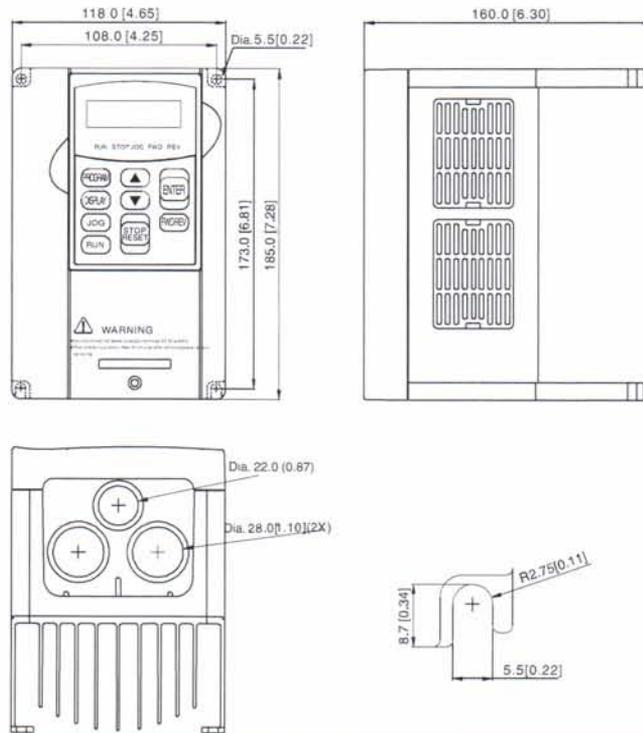


WARNING: Do not plug a modem or telephone into the DURAPULSE RJ-12 Serial Comm Port, or permanent damage may result.

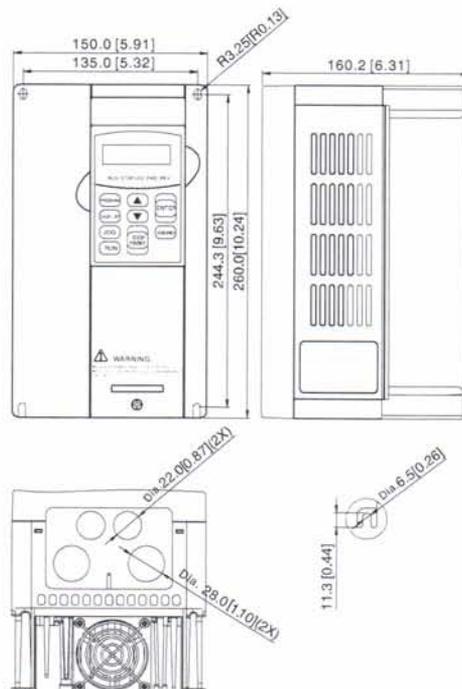


DURAPULSE AC Drives — Dimensions

GS3-21P0, GS3-22P0, GS3-41P0, GS3-42P0



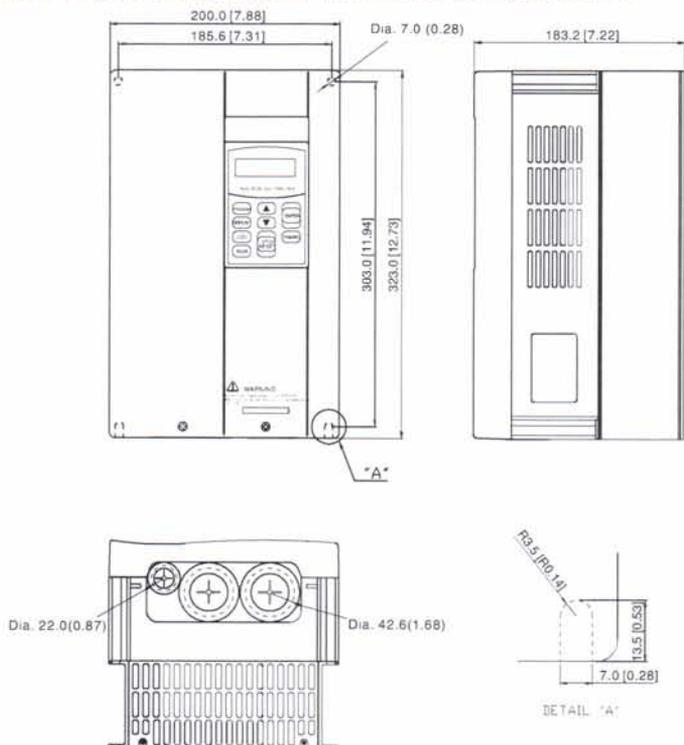
GS3-23P0, GS3-25P0, GS3-45P0



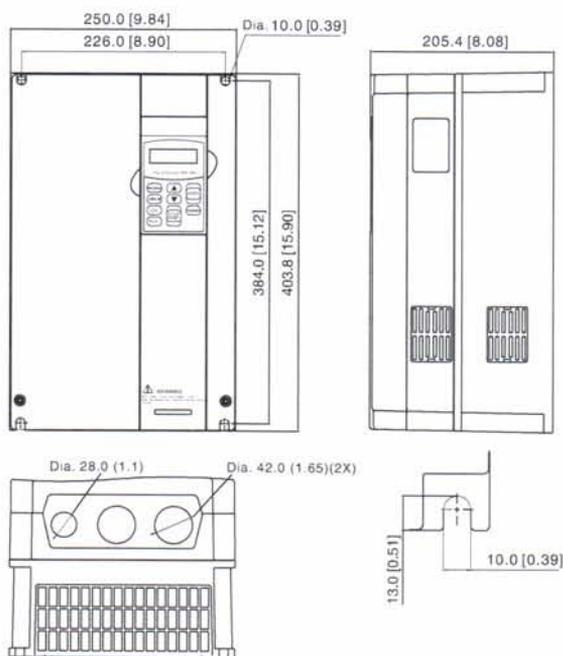
unit: mm(in)

DURAPULSE AC Drives — Dimensions

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



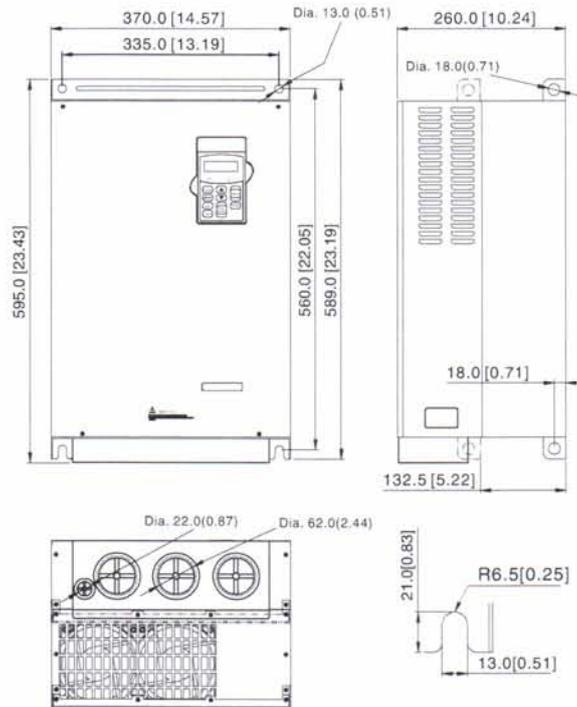
GS3-2020, GS3-2025, GS3-2030, GS3-4020, GS3-4025, GS3-4030



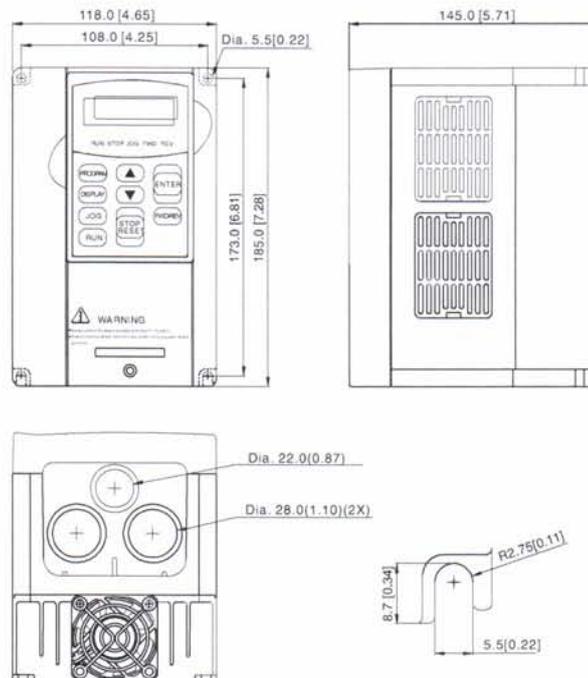
unit: mm(in)

DURAPULSE AC Drives — Dimensions

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



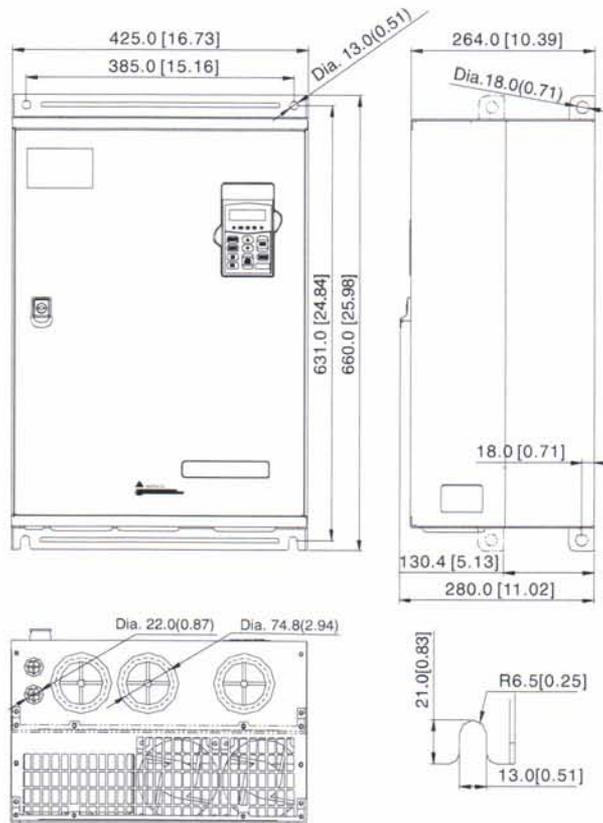
GS3-43P0



unit: mm(in)

DURAPULSE AC Drives — Dimensions

GS3-4075, GS3-4100



unit: mm(in)



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

Product Index

Part # Index

USB to RS-485 PC Adapter

USB to RS-485 PC Adapter

Convenient 2-wire USB to RS-485 serial communication adapter for universal RS-485 use (GS drives, SureServo servos, Solo temperature controllers, CLICK PLCs, etc.). Does not require an external power supply or complicated configuration process.

Features:

- Type A (plug) USB connector
- Universal female RJ45/RJ12 modular connector (accepts RJ12 & RJ45 plugs)
- Supports multiple baud rates
- USB v2.0 compliant
- RoHS compliant
- CE compliant

Components Included:

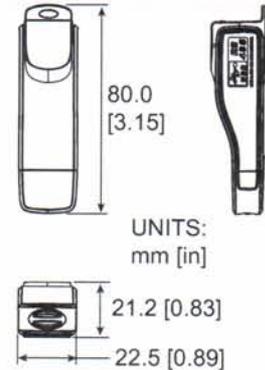
- Adapter
- Cable – 6-wire RJ12 crossover; 2m [79 in] (for plug & play connectivity to GS drives)
- Cable – 2-wire RJ12–flying leads; 2m [79 in] (for universal RS-485 connectivity to SureServo, Solo, etc.)
- Mini CD with Windows driver & installation instructions

USB to RS-485 PC Adapter			
Part Number	Price Each	Description	Component Compatibility *
USB-485M	↔	USB TO RS-485 PC Adapter; includes (2) RJ12 cables, mini-CD with driver, instructions	GS series AC drives – GSOFT configuration software GS series AC drives – Modbus polling SureServo servo drives – SV-PRO configuration software SureServo servo drives – Modbus polling SOLO process controllers – SL-SOFT configuration software SOLO process controllers – Modbus polling CLICK PLCs – Modbus polling P3-550 PLCs – Modbus polling
Specifications			
Power Supply	no external power supply needed		
Power Consumption	0.4W		
Voltage Isolation	3000 VDC		
Baud Rates Supported	75, 150, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (bps)		
Transmission Type	RS-485 half-duplex (2-wire)		
LED Display	Steady Green LED ON: power is ON. Blinking orange LED: data is transmitting.		
USB Connector	Type A (plug)		
RS-485 Connector	RJ45		
Compatibility	USB v2.0 specification		
PC Compatibility	Windows OS required for bridge & driver installation: Win 98, Win 2000, Win NT, Win XP, 32-bit Win Vista, 32-bit Win 7		
* NOT compatible with DirectSOFT PLC software. (DirectSOFT RS-485 programming requires 4-wire full-duplex data transmission.)			

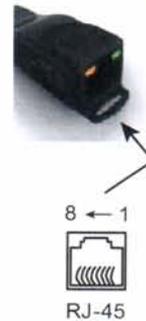
USB-485M



USB-485M Dimensions



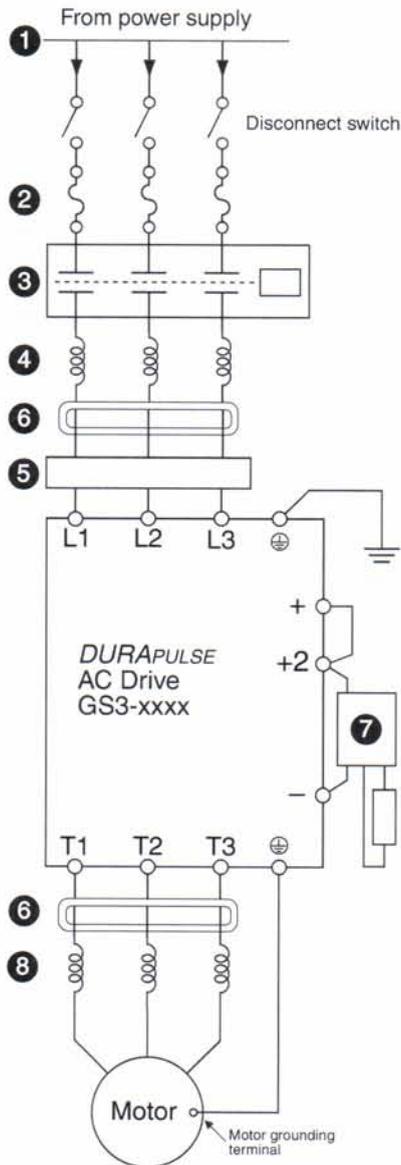
USB-485M RJ-45 Pin-out



Pin	Description
1	reserved
2	reserved
3	reserved
4	SG+
5	SG-
6	reserved
7	reserved
8	reserved

GS/DURAPULSE Accessories – Overview

20hp & Over
(DURAPULSE only)



1 Power Supply

Please follow the specific power supply requirements shown in Chapter 1 of the DURAPULSE AC Drives User Manual.

2 Fuses

 (Refer to page 13-68.)

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)

 (Refer to the Motor Controls section.)

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)

 (Refer to page 13-50.)

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)

 (Refer to page 13-61.)

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)

 (Refer to page 13-67.)

RF filters reduce the radio frequency interference or noise on the input or output side of the inverter.

7 Braking Unit & Braking Resistor (Optional)

 (pg 13-54)

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 Line Reactor (Optional)

 (Refer to page 13-50.)

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 "non-inverter-duty" motors and when the length of wiring between the AC drive and motor exceeds 75 feet.



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

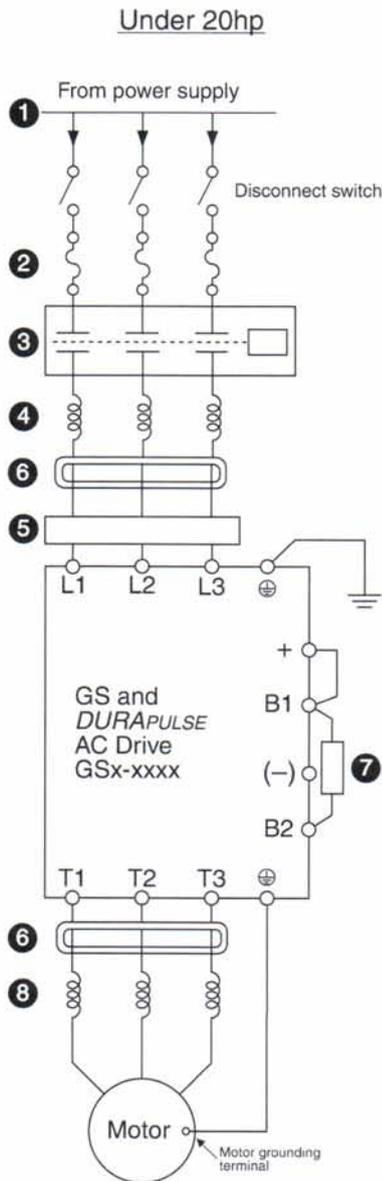
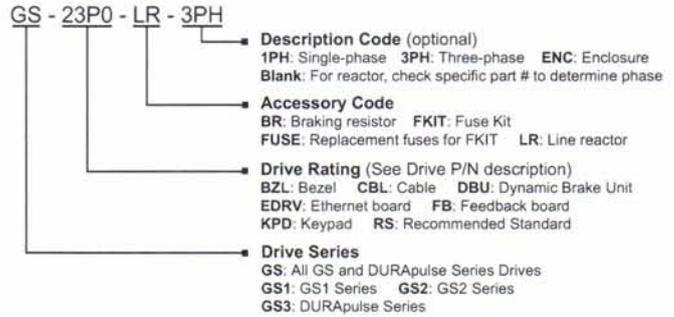
Product Index

Part # Index

GS/DURAPULSE Accessories – Overview

Accessories part numbering system

Note: With the exception of the EMI filters and RF filters, each accessory part number begins with GS, followed by the AC Drive rating, and then the relevant accessory code. Following the accessory code, you will find a description code when applicable. The diagram at right shows the accessory part numbering system.



1 Power Supply

Please follow the specific power supply requirements shown in Chapter 1 and the Warning section of the applicable GS or DURAPULSE AC Drives User Manual.

2 Fuses

(Refer to page 13-68.)

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. *(AutomationDirect fuses are not available for GS1 drives.)*

3 Contactor (Optional)

(Refer to the Motor Controls section.)

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)

(Refer to page 13-50.)

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)

(Refer to page 13-61.)

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. *(Separate EMI filters are not necessary for GS1 drives.)*

6 RF filter (Optional)

(Refer to page 13-67.)

RF filters reduce the radio frequency interference or noise on the input or output side of the inverter.

7 Braking Resistor (Optional)

(Refer to page 13-56.)

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. *(Braking resistors are not available for GS1 drives.)*

8 Output Line Reactor (Optional)

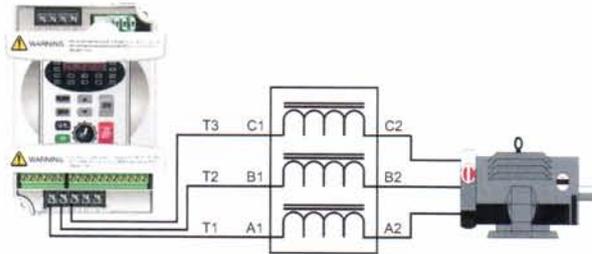
(Refer to page 13-50.)

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 “non-inverter-duty” motors and when the length of wiring between the AC drive and motor exceeds 75 feet.

GS/DURAPULSE Drives Accessories – Line Reactors

Input side of the drive

When installed on the input side of the AC drive, line reactors will reduce line notching, and limit current and voltage spikes and surges from the incoming line. The line reactor will also reduce harmonic distortion from the drive onto the line. Units are installed in front of the AC drive as shown.



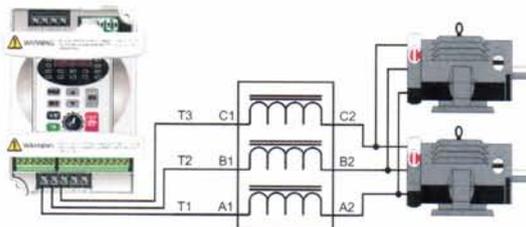
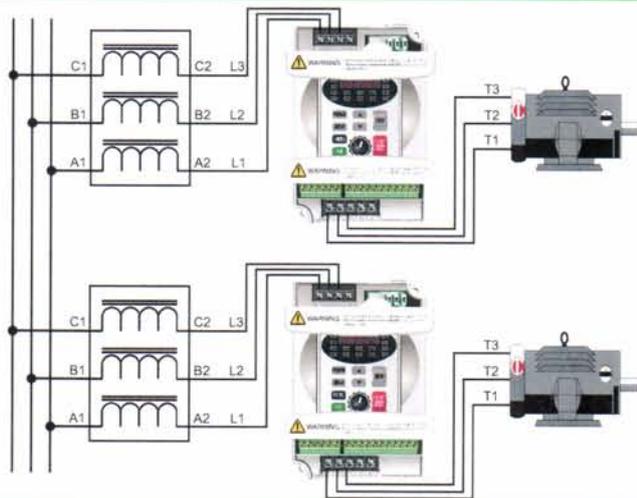
Output side of the drive

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

Note: Single phase line reactors should not be installed on the output of the AC Drive. Use three-phase only.

Multiple drives

Individual line reactors are recommended when installing multiple drives on the same power line. Individual line reactors eliminate cross talk between multiple drives and provide isolated protection for each drive for its own specific load.



Multiple motors

A single reactor can be used when the application calls for multiple motors on the same drive. The reactor is sized based upon the total horsepower of all the motors. **Overload relays** (not shown) are recommended for use in multi-motor applications.

Note: A single reactor should only be used with multiple motors when the motors will always operate simultaneously.

Single phase applications

Some of the line reactors are listed for use with single-phase input power. Follow the connection diagram to the left. Make sure that terminals B1 and B2 are properly insulated before any connections are made.



WARNING: Please ensure that terminals B1 and B2 are properly insulated before making any connections to single-phase power.



GS/DURAPULSE Drives Accessories – Line Reactors



Company Information

Systems Overview

Programmable Controllers

Field I/O

Software

C-more & other HMI

Drives

Soft Starters

Motors & Gearbox

Steppers/ Servos

Motor Controls

Proximity Sensors

Photo Sensors

Limit Switches

Encoders

Current Sensors

Pressure Sensors

Temperature Sensors

Pushbuttons/ Lights

Process

Relays/ Timers

Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

Pneumatics

Appendix

Product Index

Part # Index

115 Volt Single-Phase Input Reactors							
<i>NOTE: Single phase line reactors should not be installed on the output of the AC Drive.</i>							
Part Number	Price	Rated Amps	Impedance	Inductance	Watt Loss	Drive Model and Side / Phase / Volts	Drive hp
GS-10P2-LR	<-->	18	3%	0.80 mH	19	GS1-10P2 (input) / 1ph / 115V GS2-10P2 (input) / 1ph / 115V	0.25
GS-10P5-LR	<-->	25	3%	0.50 mH	23	GS1-10P5 (input) / 1ph / 115V GS2-10P5 (input) / 1ph / 115V	0.5
GS-11P0-LR	<-->	35	3%	0.40 mH	36	GS2-11P0 (input) / 1ph / 115V	1

230 Volt Single-Phase Input Reactors							
<i>NOTE: Single phase line reactors should not be installed on the output of the AC Drive.</i>							
Part Number	Price	Rated Amps	Impedance	Inductance	Watt Loss	Drive Model and Side / Phase / Volts	Drive hp
GS-20P5-LR-1PH	<-->	8	3%	6.50 mH	13	GS1-20P5 (input) / 1ph / 230V GS2-20P5 (input) / 1ph / 230V	0.5
GS-21P0-LR-1PH	<-->	12	3%	1.30 mH	23	GS1-21P0 (input) / 1ph / 230V GS2-21P0 (input) / 1ph / 230V GS3-21P0 (input) / 1ph / 230V	1
GS-22P0-LR-1PH	<-->	18	3%	3.00 mH	25	GS2-22P0 (input) / 1ph / 230V GS3-22P0 (input) / 1ph / 230V	2
GS-23P0-LR-1PH	<-->	35	3%	2.50 mH	26	GS2-23P0 (input) / 1ph / 230V GS3-23P0 (input) / 1ph / 230V	3

230 Volt Three-Phase Input / Output Reactors							
Part Number	Price	Rated Amps	Impedance	Inductance	Watt Loss	Drive Model and Side / Phase / Volts	Drive hp
GS-20P5-LR-3PH	<-->	4	3%	6.50 mH	13	GS1-10P5 (output) / 3ph / 230V GS1-20P5 (in/out) / 3ph / 230V GS2-20P5 (in/out) / 3ph / 230V	0.5
GS-21P0-LR-3PH	<-->	4	3%	3.00 mH	7	GS1-21P0 (in/out) / 3ph / 230V GS2-21P0 (in/out) / 3ph / 230V GS3-21P0 (in/out) / 3ph / 230V	1
GS-22P0-LR-3PH	<-->	8	3%	1.50 mH	11	GS1-22P0 (in/out) / 3ph / 230V GS2-22P0 (in/out) / 3ph / 230V GS3-22P0 (in/out) / 3ph / 230V	2
GS-23P0-LR-3PH	<-->	12	3%	1.30 mH	23	GS2-23P0 (in/out) / 3ph / 230V GS3-23P0 (in/out) / 3ph / 230V	3
GS-25P0-LR	<-->	18	3%	0.80 mH	19	GS2-25P0 (in/out) / 3ph / 230V GS3-25P0 (in/out) / 3ph / 230V	5
GS-27P5-LR	<-->	25	3%	0.50 mH	23	GS2-27P5 (in/out) / 3ph / 230V GS3-27P5 (in/out) / 3ph / 230V	7.5
GS-2010-LR	<-->	35	3%	0.40 mH	36	GS3-2010 (in/out) / 3ph / 230V	10
GS-2015-LR	<-->	45	3%	0.30 mH	33	GS3-2015 (in/out) / 3ph / 230V	15
GS-2020-LR	<-->	55	3%	0.25 mH	39	GS3-2020 (in/out) / 3ph / 230V	20
GS-2025-LR	<-->	80	3%	0.20 mH	88	GS3-2025 (in/out) / 3ph / 230V	25
GS-2030-LR	<-->	80	3%	0.20 mH	88	GS3-2030 (in/out) / 3ph / 230V	30
GS-2040-LR	<-->	130	3%	0.10 mH	95	GS3-2040 (in/out) / 3ph / 230V	40
GS-2050-LR	<-->	130	3%	0.10 mH	95	GS3-2050 (in/out) / 3ph / 230V	50

GS/DURAPULSE Drives Accessories – Line Reactors

460 & 575 Volt Three-Phase Input / Output Reactors							
Part Number	Price	Rated Amps	Impedance	Inductance	Watt Loss	Drive Model and Side / Phase / Volts	Drive hp
GS-41P0-LR	<-->	2	3%	12.0 mH	7	GS2-41P0 (in/out) / 3ph / 460V GS3-41P0 (in/out) / 3ph / 460V	1
GS-42P0-LR	<-->	4	3%	6.50 mH	13	GS2-42P0 (in/out) / 3ph / 460V GS2-53P0 (in/out) / 3ph / 575V GS3-42P0 (in/out) / 3ph / 460V	2 3 2
GS-43P0-LR	<-->	8	3%	5.00 mH	31	GS2-43P0 (in/out) / 3ph / 460V GS2-55P0 (in/out) / 3ph / 575V GS3-43P0 (in/out) / 3ph / 460V	3 5 3
GS-45P0-LR	<-->	8	3%	3.00 mH	25	GS2-45P0 (in/out) / 3ph / 460V GS3-45P0 (in/out) / 3ph / 460V	5
GS-47P5-LR	<-->	12	3%	2.50 mH	26	GS2-47P5 (in/out) / 3ph / 460V GS2-57P5 (in/out) / 3ph / 575V GS2-5010 (in/out) / 3ph / 575V GS3-47P5 (in/out) / 3ph / 460V	7.5 7.5 10 7.5
GS-4010-LR	<-->	18	3%	1.50 mH	29	GS2-4010 (in/out) / 3ph / 460V GS3-4010 (in/out) / 3ph / 460V	10
GS-4015-LR	<-->	25	3%	1.20 mH	44	GS3-4015 (in/out) / 3ph / 460V	15
GS-4020-LR	<-->	35	3%	0.80 mH	51	GS3-4020 (in/out) / 3ph / 460V	20
GS-4025-LR	<-->	35	3%	0.80 mH	51	GS3-4025 (in/out) / 3ph / 460V	25
GS-4030-LR	<-->	45	3%	0.70 mH	64	GS3-4030 (in/out) / 3ph / 460V	30
GS-4040-LR	<-->	55	3%	0.50 mH	75	GS3-4040 (in/out) / 3ph / 460V	40
GS-4050-LR	<-->	80	3%	0.40 mH	138	GS3-4050 (in/out) / 3ph / 460V	50
GS-4060-LR	<-->	80	3%	0.40 mH	138	GS3-4060 (in/out) / 3ph / 460V	60
GS-4075-LR	<-->	110	3%	0.30 mH	123	GS3-4075 (in/out) / 3ph / 460V	75
GS-4100-LR	<-->	130	3%	0.20 mH	115	GS3-4100 (in/out) / 3ph / 460V	100
GS-51P0-LR	<-->	2	3%	20.0 mH	9	GS2-51P0 (in/out) / 3ph / 575V	1
GS-52P0-LR	<-->	4	3%	9.10 mH	15	GS2-52P0 (in/out) / 3ph / 575V	2

GS/DURAPULSE Drives Accessories – Line Reactors



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C-more & other HMI

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Encoders

Current Sensors

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Temperature Sensors

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Comm.

Terminal Blocks & Wiring

Power

Circuit Protection

Enclosures

Tools

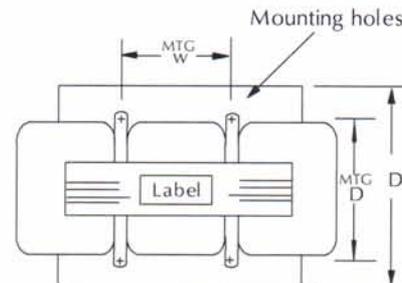
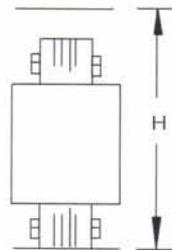
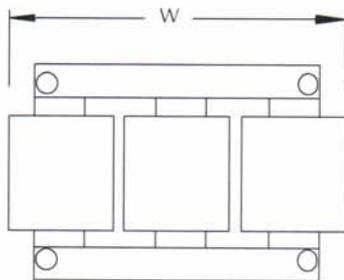
Pneumatics

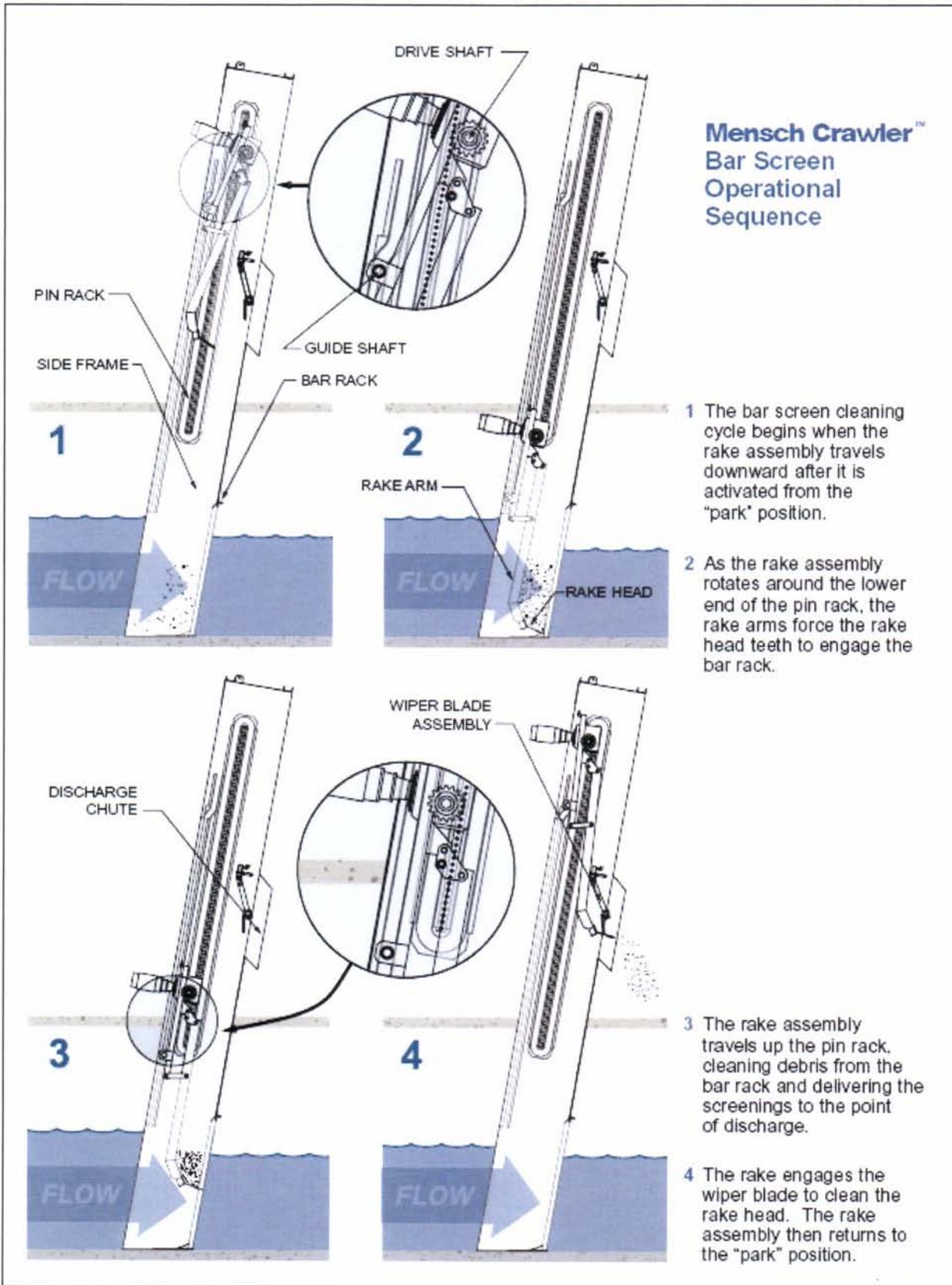
Appendix

Product Index

Part # Index

AC Line Reactor Dimensions (inches)							
Part Number	H	W	D	Mtg D	Mtg W	Mtg Slot Hole Size	Weight (lbs)
GS-10P2-LR	4.80	6.00	3.30	2.09	2.00	0.28 x 0.63	7.10
GS-10P5-LR	5.7	6.00	3.09	2.09	3.00	0.28 x 0.63	7.00
GS-11P0-LR	5.7	6.00	3.34	2.34	3.00	0.28 x 0.63	8.90
GS-20P5-LR-1PH	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.80
GS-20P5-LR-3PH	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.80
GS-21P0-LR-1PH	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.80
GS-21P0-LR-3PH	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.30
GS-22P0-LR-1PH	4.80	6.00	3.30	2.09	2.00	0.28 x 0.63	7.10
GS-22P0-LR-3PH	3.40	4.40	2.83	1.77	2.00	0.28 x 0.63	2.80
GS-23P0-LR-1PH	4.80	6.00	3.30	2.09	2.00	0.28 x 0.63	7.50
GS-23P0-LR-3PH	3.40	4.40	2.83	1.77	2.00	0.28 x 0.63	2.90
GS-25P0-LR	4.80	6.00	3.30	2.09	2.00	0.28 x 0.63	7.10
GS-27P5-LR	5.70	6.00	3.09	2.09	3.00	0.28 x 0.63	7.00
GS-2010-LR	5.70	6.00	3.34	2.34	3.00	0.28 x 0.63	9.00
GS-2015-LR	5.70	6.00	3.84	2.84	3.00	0.28 x 0.63	13.0
GS-2020-LR	5.70	6.00	3.84	2.84	3.00	0.28 x 0.63	12.0
GS-2025-LR	6.88	8.50	4.37	3.12	3.60	0.44 x 1.00	26.0
GS-2030-LR	6.88	8.50	4.37	3.12	3.60	0.44 x 1.00	26.0
GS-2040-LR	6.88	8.50	4.37	3.12	3.00	0.44 x 1.00	27.0
GS-2050-LR	6.88	8.50	4.37	3.12	3.00	0.44 x 1.00	27.0
GS-41P0-LR	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.30
GS-42P0-LR	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	2.80
GS-43P0-LR	3.40	4.40	3.39	2.39	2.00	0.28 x 0.63	4.30
GS-45P0-LR	3.40	4.40	2.83	1.77	2.00	0.28 x 0.63	3.10
GS-47P5-LR	4.80	6.00	3.30	2.09	2.00	0.28 x 0.63	7.50
GS-4010-LR	4.80	6.30	3.55	2.34	2.00	0.28 x 0.63	9.10
GS-4015-LR	5.70	6.00	3.34	2.34	3.00	0.28 x 0.63	10.0
GS-4020-LR	5.61	6.90	3.95	2.75	3.00	0.38 x 0.63	17.0
GS-4025-LR	5.61	6.90	3.95	2.75	3.00	0.38 x 0.63	17.0
GS-4030-LR	5.61	6.90	4.45	3.25	3.00	0.38 x 0.63	22.0
GS-4040-LR	6.88	8.50	4.37	3.12	3.00	0.44 x 1.00	26.0
GS-4050-LR	6.88	8.50	4.87	3.62	3.60	0.44 x 1.00	36.0
GS-4060-LR	6.88	8.50	4.87	3.62	3.60	0.44 x 1.00	36.0
GS-4075-LR	8.29	10.50	5.35	3.73	3.60	0.44 x 1.25	52.0
GS-4100-LR	8.29	10.50	5.35	3.73	3.60	0.44 x 1.25	41.0
GS-51P0-LR	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	3
GS-52P0-LR	3.40	4.40	2.83	1.77	1.44	0.28 x 0.63	3





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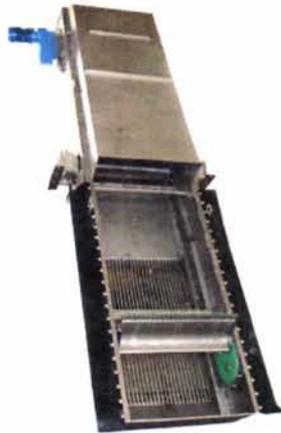
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The SCREENMASTER CS provides efficient cleaning of a bar screen rack and removal of solids from rectangular channel installations. This versatile unit employs a simple, yet effective rotary front clean/front return raking mechanism. It installs at a 75° inclination so it has a very small footprint. This streamlined unit is fully enclosed above the water line.

The SCREENMASTER CS provides smooth quiet operation and is highly reliable. It employs rake heads that penetrate the screen slots as they reach the channel bottom and lift accumulated debris up to a discharge height of up to 38 ft (11.6m) from the channel bottom. The screenings drop out the unit's discharge chute and into a SPIRALIFT SC Screenings conditioner/washer or into a bin or auxiliary conveyor.

The SCREENMASTER is fabricated in stainless steel including the unit's oversized drive chains. Unlike other screens, the SCREENMASTER's design employs no bottom bearings or sprockets thereby eliminating a major cause maintenance problems.

The SCREENMASTER CS is available with a choice of slots openings from 2 inch down to 1/4". They are available for any channel width up to 78"wide (2 m).