

M501 VFD Motor



GSD6-240-15C

GSD6 Series DC Drives

Motor Rating Range @ 115/230 VAC_{IN}

1/8 – 3 hp

Overview

The reliable, versatile, and economical GSD6 DC drive is the most fully-featured IronHorse analog DC drive.

It provides many standard features typically offered as options by other DC drives.

By combining advanced engineering design, quality component selection, and rigorous quality control, the GSD6 DC drive offers an excellent off-the-shelf SCR control device. Its dependable, time-proven circuitry offers performance characteristics previously available only in more costly drives.

Features

- Dual input voltage 115/230 VAC, 50/60 Hz via slide selector switch
- Adjustable horsepower settings
- Barrier terminal strip
- Packaged bridge supply (full wave)
- 1% speed regulation with armature voltage feedback ($\pm 1/2\%$ with tach feedback)
- Adjustable minimum speed
- Adjustable maximum speed
- Adjustable IR compensation
- Adjustable linear acceleration
- Adjustable linear deceleration
- Adjustable current limit
- Line voltage compensation
- 5k Ω speed potentiometer with leads, dial, and knob included
- 50:1 speed range
- Overload capacity: 200% for one minute
- Transient voltage protection
- Voltage following mode or DC tachometer follower by supplying ungrounded analog input signal
- DC tachometer feedback (jumper selectable)
- Inhibit circuit – permits start and stop without breaking AC lines
- Shunt field supply provided
- AC line fuses
- +12 VDC, 12mA power supply, user accessible

Accessories

- Replacement speed potentiometer kit
- Digital potentiometer
- Analog current input card

Detailed descriptions and specifications for GSD accessories are available in the "GSD Series DC Drives Accessories" section.

Typical Applications

- Auger feeders
- Automated door actuators
- Commercial cooking equipment
- Commercial lift
- Food production
- Industrial pumping systems
- Measurement instruments
- Miniature lathes and mills
- Packaging / material-handling equipment
- Printing and labeling machines
- Small shop machine tools
- Spray / print reciprocating head

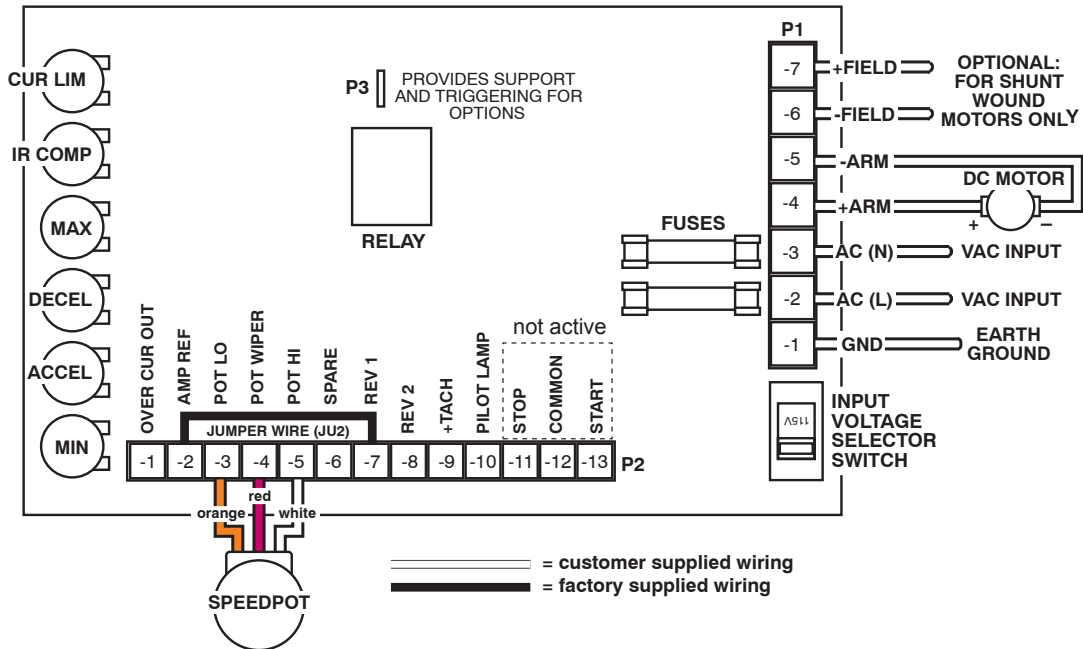
M501 VFD Motor Specifications

	\$339.00
Package Configuration	open frame
Power Quality Form Factor	1.4
Input Voltage (@50/60Hz)	115/230 VAC $\pm 10\%$
Output Voltage	0–90/180 VDC
Shunt Field Voltage	100VDC @ 115VAC input ; 200VDC @ 230VAC input ; (1.5A max)
Motor Rating (hp)	1/8 – 1.5 hp @ 90VDC ; 1/4 – 3 hp @ 180VDC
Output Current (continuous)	15A (DC)
Current Overload Capacity	200% for 60s
Current Limit (adjustable)	2–30A (DC)
Transient Protection	Metal Oxide Varistor (MOV)
I.R. Compensation	adjustable
Speed Adjustment	5k Ω 2W potentiometer
Speed Range	50:1
Speed Regulation	$\pm 1\%$ of base speed
Maximum Speed	adjustable from 60% to 120% of base speed
Minimum Speed	linear ramp 0–30% of adjustable maximum speed
Acceleration	linear ramp adjustable 0.3–12s
Deceleration	adjustable 0.6–12s
Dynamic Braking	no
Plugging Capability **	no
Electrical Connections	barrier-type terminal strip; 26–12 AWG
Fusing	(2) 20A fuses included (Bussman ABC-20 or Littelfuse 314020 ceramic fuses or equivalent)
Operating Temperature	-10 to 45 °C [14 to 113 °F]
Thermal Protection	not available
Mounting Orientation	can be mounted in any orientation
Corrosive Gases	NOT compatible with any corrosive gases
Weight	40 oz [1134g]
Agency Approvals	RoHS
Optional Accessories *	
Replacement Potentiometer	GSDA-5K
Digital Potentiometer	GSDA-DP
Analog Current Input Card	GSDA-AI-A
* For accessories details, refer to the "GSD Series DC Drives Accessories" section.	
** Plugging is a method of rapidly changing motor direction by reversing motor armature polarity, while the motor is still running.	

M501 VFD Motor Drawing

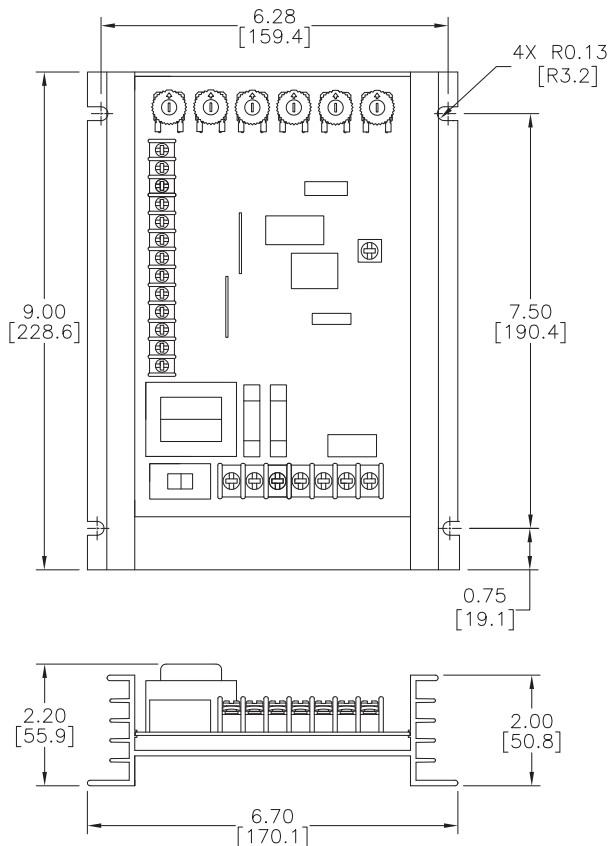
GSD6 Wiring Diagrams

GSD6-240-15C Basic Wiring Diagram – (refer to User Manual for more detailed wiring information)



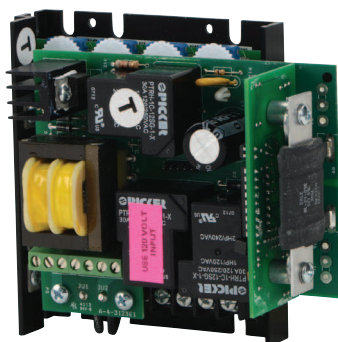
GSD6 Dimensions — dimensions = in [mm]

GSD6-240-15C Dimensions



GSD7 Series DC Drives

GSD7 Introduction



GSD7-xxx-xCR3



GSD7-xxx-xCR30

GSD7 Series DC Drives	
Motor Rating Range @ 120 VAC _{IN}	1/50 – 1 hp
Motor Rating Range @ 240 VAC _{IN}	1/25 – 2 hp

Overview

Instant reversing, quick stopping, rapid cycling... The IronHorse GSD7 series DC drives outperform other dynamic braking and reversing drives by utilizing unique zero-speed detect and dynamic braking circuits.

These circuits eliminate the contact arcing and failed braking problems associated with other reversing and dynamic braking drives. The GSD7 zero-speed detect circuit also eliminates motor plug reversing problems.

In the event of a power loss or emergency stop condition, the GSD7 Series DC drives will drop into a dynamic brake condition to safely and quickly bring the motor to a stop.

Features

- Adjustable horsepower settings
- Barrier terminal blocks
- Full-wave bridge supply
- Adjustable minimum speed
- Adjustable maximum speed
- Adjustable IR compensation
- Adjustable current limit
- Fixed acceleration (0.5 sec)
- Line voltage compensation
- 5k Ω pot with leads, dial, and knob included
- 50:1 speed range
- Overload capacity: 200% for one minute
- Transient voltage protection
- Shunt field supply provided
- Onboard dynamic brake resistor
- Automatic dynamic braking on power loss
- 1% speed regulation with armature voltage feedback

Accessories

- Replacement speed potentiometer kit
- Digital potentiometer

Detailed descriptions and specifications for GSD accessories are available in the "GSD Series DC Drives Accessories" section.

Typical Applications

- Auger feeders
- Automated door actuators
- Commercial cooking equipment
- Commercial lift
- Food production
- Industrial pumping systems
- Measurement instruments
- Miniature lathes and mills
- Packaging / material-handling equipment
- PLC-controlled reversing
- Printing and labeling machines
- Small shop machine tools
- Spray / print reciprocating head

GSD7 Series DC Drives

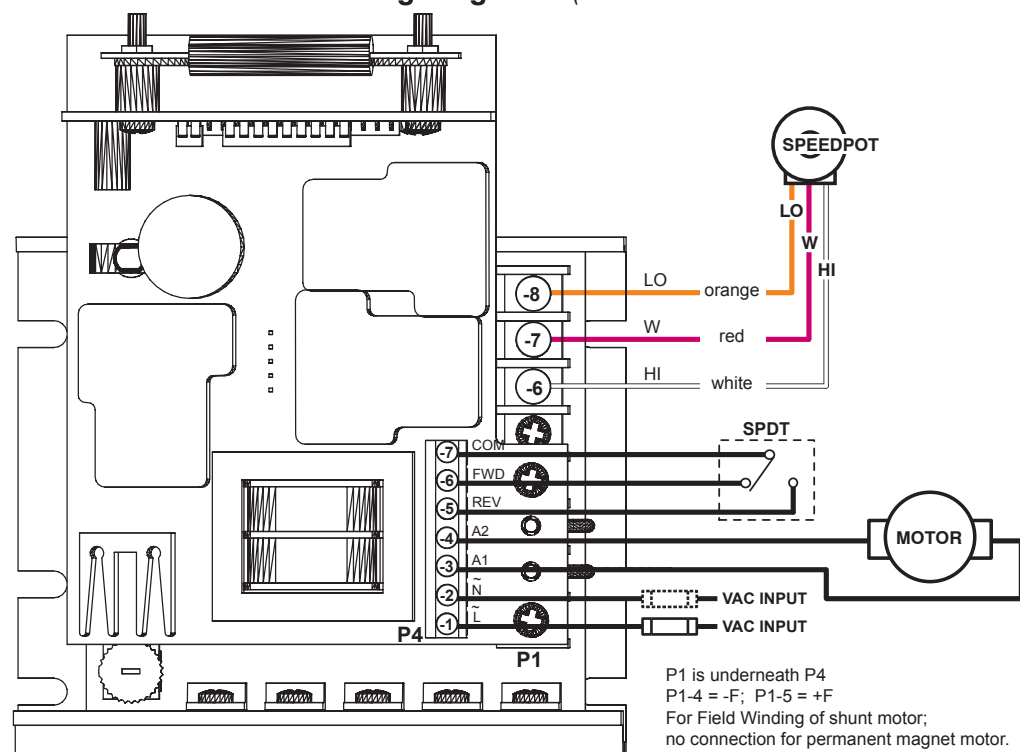
GSD7 Selection and Specifications

GSD7 Series DC Drives – Selection & Specifications							
Model	GSD7-120-1CR3	GSD7-120-1CR30	GSD7-120-5CR3	GSD7-120-10CR30	GSD7-240-1CR3	GSD7-240-5CR3	GSD7-240-10CR30
Price	\$165.00	\$197.00	\$165.00	\$197.00	\$172.00	\$172.00	\$202.00
Package Configuration	open frame						
Power Quality Form Factor	1.4						
Input Voltage (@50/60Hz)	120 VAC ±10%				240 VAC ±10%		
Output Voltage	0–90 VDC				0–180 VDC		
Shunt Field Voltage	100 VDC (1A max)				200 VDC (1A max)		
Motor Rating (hp)	1/15 – 1/8		1/8 – 1/2	1/8 – 1	1/25 – 1/4	1/4 – 1	1/4 – 2
Output Current (continuous)	500mA–1.2A (DC)		500mA–5.5A (DC)	500mA–10A (DC)	500mA–1.2A (DC)	500mA–5.5A (DC)	500mA–10A (DC)
Current Overload Capacity	200% for 60s						
Current Limit (adjustable)	0.3–3A (DC)		1–18A (DC)		0.3–3A (DC)	1–18A (DC)	
Cycling Rate (cycles/min)	3	30	3	30	3	3	30
Transient Protection	Metal Oxide Varistor (MOV)						
I.R. Compensation	adjustable						
Speed Adjustment	5kΩ 0.5W potentiometer or 0–10VDC isolated input signal						
Speed Range	50:1						
Speed Regulation	±1% of base speed						
Maximum Speed	adjustable from 60% to 110% of base speed						
Minimum Speed	linear ramp 0–30% of adjustable maximum speed						
Acceleration	0.5s fixed						
Deceleration	0.5s fixed						
Dynamic Braking	yes						
Plugging Capability **	yes						
Electrical Connections	barrier-type terminal blocks; 22–14 AWG						
External Fusing Required	Bussman ABC or Littlefuse 314 series ceramic fuses or equivalent Refer to “Installation and Wiring” section of user manual for details						
Operating Temperature	-10 to 45 °C [14 to 113 °F]						
Thermal Protection	current limiting						
Mounting Orientation	can be mounted in any orientation						
Corrosive Gases	NOT compatible with any corrosive gases						
Weight	1.1 lb [490g]	3.3 lb [1497g]	1.1 lb [490g]	3.3 lb [1497g]	1.1 lb [490g]	1.1 lb [490g]	3.3 lb [1497g]
Agency Approvals	cUL _{US} (E333109), RoHS						
Optional Accessories *							
Replacement Potentiometer	GSDA-5K						
Digital Potentiometer	GSDA-DP						
* For accessories details, refer to the “GSD Series DC Drives Accessories” section.							
** Plugging is a method of rapidly changing motor direction by reversing motor armature polarity, while the motor is still running.							

GSD7 Series DC Drives

GSD7 Wiring Diagrams

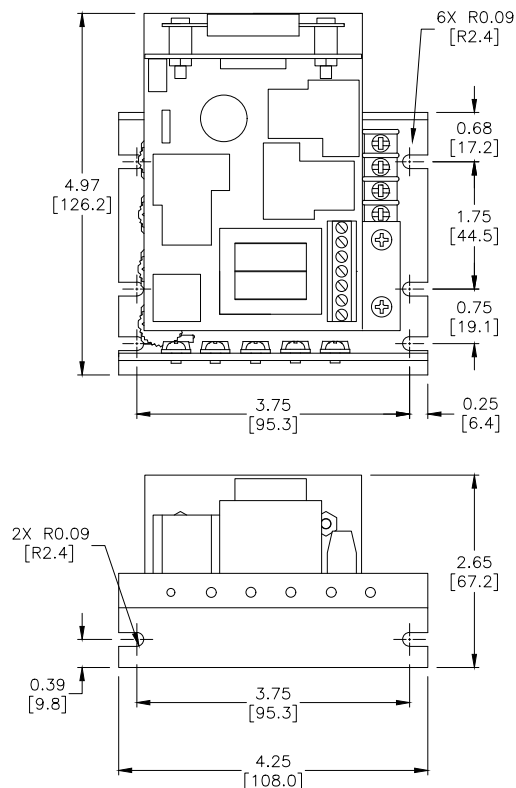
GSD7-xxx-xxxxx Basic Wiring Diagram – (refer to User Manual for more detailed wiring information)



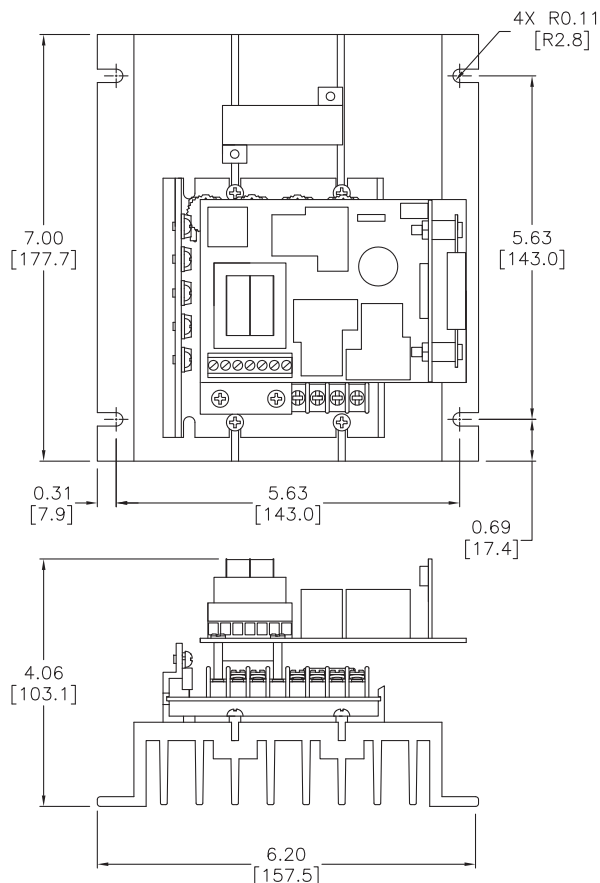
M501 Drives Dimension Drawing

GSD7 Dimensions — dimensions = in [mm]

GSD7-xxx-xCR3 Dimensions



GSD7-xxx-xCR30 Dimensions



GSD Series DC Drives Accessories

GSDA Accessories for GSD Series DC Drives – Selection & Specifications

GSDA Accessories for GSD Series DC Drives			
Model	Price	Description	For Use With
GSDA-5K	\$15.00	Speed Potentiometer Kit. 5k Ω accessory/replacement. Includes adjustment knob and 0-100% speed dial.	GSD - all
GSDA-ACCDEC-4	\$12.00	Independent Accel/Decel Adjustment Card. Field installable.	GSD4 - all
GSDA-AI-A	\$39.00	Isolated Analog Current Signal Input Card. Range: 4–20mA. Field installable for open-frame drives as shown.	GSD4-24x-xC (open-frame) GSD5-240-10C (open-frame) GSD6 (open-frame)
GSDA-AI-V4	\$81.00	Isolated Analog Voltage Signal Input Card. Range: 0–10V or 0–250V. Field installable for open-frame drives as shown.	GSD4-240-xC (240V open-frame)
GSDA-AI-V5	\$81.00	Isolated Analog Voltage Signal Input Card. Range: 0–10V or 0–250V. Field installable for open-frame drives as shown.	GSD5-240-10C (open-frame)
GSDA-DP	\$229.00	Digital Potentiometer. 120–240 VAC input. Programmable. Outputs any unipolar or bipolar voltage range (based on input voltage) up to 24VDC ($\pm 12V$, $\pm 10V$, 0–5V, 0–24V, etc.). NEMA 4X enclosure fits 1/8 DIN cutout. Replaces analog potentiometers where vibration, repeatability, or precision is a concern.	GSD1 - all GSD4 - all GSD5 - all GSD6 - all GSD7 - all
GSDA-MREV	\$80.00	Manual Reverse Switch. 4PDT rated at 10A. Allows reversing by switching DC motor armature leads. Center-blocking prevents motor leads from reversing when motor is still turning in the previous direction.	GSD4 - all GSD5-240-10C (open-frame)
GSDA-HTSNK-4	\$27.00	Heatsink. Increases the drive's output current rating.	GSD4-24x-xC (open-frame)
NOTE: All GSDA Accessories are RoHS compliant.			

GSDA-5K

For use with all GSD series DC drives

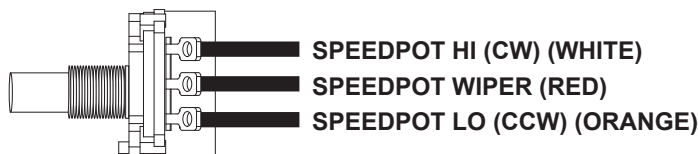
The GSDA-5K is a replacement potentiometer kit that can be used with IronHorse GSD series DC drives to control the speed of a DC motor.

(All GSD series DC drives include a speed potentiometer.)

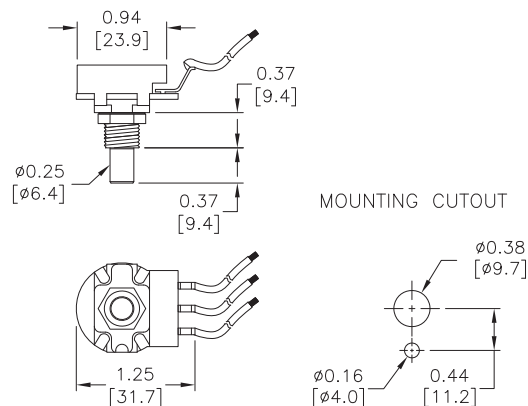
The kit includes:

- (1) 5k Ω potentiometer
- (3) pigtail wiring leads (8-1/2 in; 20 AWG)
- (1) adjustment knob
- (1) 0–100% dial
- (1) mounting nut and lock washer

Wiring Connections



Dimensions (in [mm])



GSD Series DC Drives Accessories

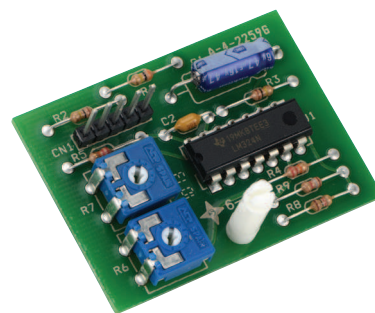
GSDA-ACCDEC-4

For use with all GSD4 DC drives

The GSDA-ACCDEC-4 option card overrides the fixed accel ramp built into the GSD4 drive, providing independently adjustable linear acceleration and deceleration from 0.5 to 8.0 seconds. Adjustments are made via two separate trim pots.

This option card plugs into the expansion connector on the GSD4 main circuit board.

GSDA-ACCDEC-4 installation and wiring information is included in the GSD4 DC Drives User Manual.

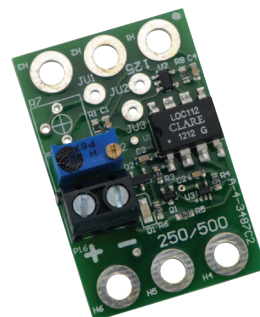


GSDA-AI-A

For use with DC drives: GSD4-24x-xC, GSD5-240-10C, GSD6-all (open-frame)

This option card is a 4–20 mA isolated analog current signal card that can replace the speed pot as a speed input signal to certain GSD series drives. The 4–20 mA signal input can be either grounded or ungrounded. The board sets on spacers screwed to the potentiometer HI, Wiper, and LO terminals on the main GSD drive board using screws (included).

GSDA-AI-A installation and wiring information is included in the GSDA-AI-A DC Drives Accessory Data Sheet.

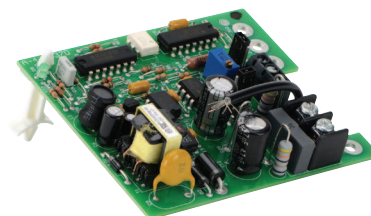


GSDA-AI-V4

For use with GSD4-240-xC (120–240V open-frame) DC drives

This option card allows for the use of either a grounded or non-grounded remote DC signal such as 0–5 VDC through 0–250 VDC, 4–20mA current, or a remote speed pot. The DC input signal type can be selected for voltage (Vin) or current (4–20mA), and there is a GAIN trim pot to set full linear output in reference to the input signal range. The output of this remote signal isolation board is a linear signal that is proportional to the remote input signal being supplied.

GSDA-AI-V4 installation and wiring information is included in the GSD4 DC Drives User Manual.



GSDA-AI-V5

For use with GSD5-240-10C (open-frame) DC drives

This option card allows for the use of either a grounded or non-grounded remote DC signal such as 0–5 VDC through 0–250 VDC, 4–20mA, or a remote speed potentiometer. The DC input signal type can be selected for voltage (Vin) or current (4–20mA), and there is a Hi/Lo range selection to select the voltage ranges. The GAIN trim pot is used to set full linear output in reference to the input signal range. The output of this remote signal isolation board is a linear signal that is proportional to the remote input signal being supplied.

GSDA-AI-V5 installation and wiring information is included in the GSD5 DC Drives User Manual.



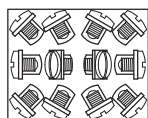
GSD Series DC Drives Accessories

GSDA-MREV

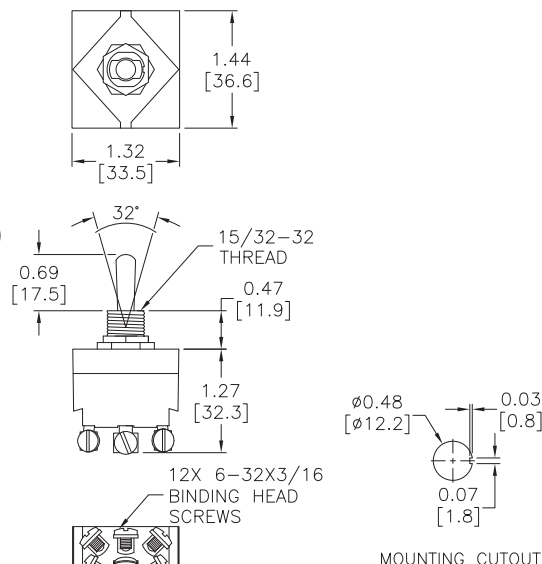
For use with DC drives: GSD3 - all, GSD4 - all, GSD5-240-10C (open-frame)

The GSDA-MREV Manual Reversing Switch is a 4PDT 10A-rated center-blocked manual switch that can be used with IronHorse GSD series DC drives to manually reverse the direction of a DC motor. When switched between the Forward and Reverse positions, the blocked center position causes a delay which protects the DC drive from any voltage that may be on the motor armature terminals. The center position is OFF/NEUTRAL, and is not connected to a wiring terminal.

Use the GSDA-MREV switch to manually reverse a DC motor without damaging the drive.



Dimensions (in [mm])



GSDA-HTSNK-4

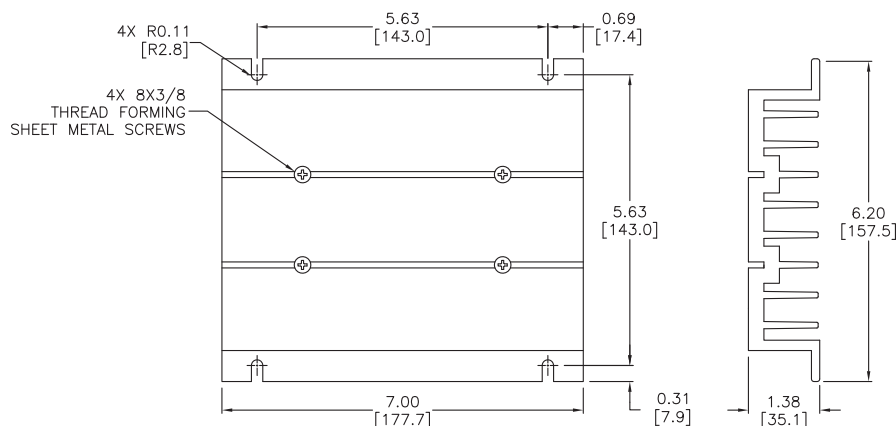
For use with GSD4-xxx-xC (open-frame) DC drives

Optional heatsink for open-frame GSD4-xxx-1C and GSD4-xxx-5C DC drives only.

Increases the output current capability of GSD4-240-5C drives to 10A (non-UL applications only).



Dimensions (in [mm])



M501 VFD Motor Specifications Drives Accessories

For use with DC drives: GSD1 - all, GSD3-24A-xxx (12–24V), GSD4 - all, GSD5 - all, GSD6 - all, GSD7 - all

The GSDA-DP digital potentiometer is a compact, microprocessor-based unit capable of being either field or factory configured for a number of industrial user interface / control signal needs. The GSDA-DP allows the user to adjust the displayed value via the front-panel push buttons. As the displayed value is raised or lowered, the output signal from the GSDA-DP follows proportionally according to the unit's configuration. These units support both unipolar and bipolar output and are capable of automatically inverting, scaling, and offsetting the output as needed. The GSDA-DP series is ideal for volume OEM applications requiring specialized inputs and outputs.

The GSDA-DP durable 1/8 DIN aluminum housings can be easily mounted in a panel or control cabinet.



Standard Features

- Microprocessor-based design combines the ultimate in responsiveness and accuracy in one package
- Non-volatile memory stores adjustable parameters even when power has been removed
- Adjustable parameters include display range, output range, output polarity, alarm options, etc.
- Internal program-enable jumper selectively prevents tampering with unit's configuration
- Optional keyswitch mode prevents unauthorized changes (purchase GCX1420, etc. separately).
- Universal power supply accepts line voltages inputs from 85–265 VAC @ 50–60Hz without switches or jumpers. The unit automatically adjusts as needed.
- Transient voltage protection prolongs unit's life in harsh industrial environments
- Self-contained power supply for external sensor, limited to 5V @ 50mA
- 1/8 DIN durable aluminum housing for panel mounting
- Large 4-digit, 1/2" LED display
- G.E. Lexan membrane and gasket (which are included) meet NEMA 4X standards when used with NEMA 4X enclosures
- Wide operating ambient temperature range of -10 °C to 45 °C (14 °F to 113 °F)
- Multiple operating modes including:
 - Rate Mode* – Displays in rate and non-rate units such as rpm, gallons per second, and percent
 - Time Mode* – Displays in time units such as HH:MM, MM:SS, SS:TT, or other units
 - Rate and Time Modes operate inversely from each other

GSDA-DP – Specifications		
Electrical	Line Input Voltage	85–265 VAC
	Line Input Frequency	48–62 Hz
	Display Range	0.001 – 9999
	Units of Operation	User Programmable, any Unit
	Onboard Power Supply (externally accessible)	5V @ 50mA
	Pot Lo/Hi Supply VDC Range (external supply)	0–2 VDC through 0–24 VDC
	Pot Wiper VDC Range	Pot Lo +50mV through Pot Hi -50mV
	Pot Circuit Current Draw	2mA @ 12V
	Pot Circuit Isolation	>500 MΩ
	Isolated Alarm Relay Output Ratings	250VAC @ 5A; Form C
	Resolution of D-A Converter	10 bits
	Analog Output	Any unipolar or bipolar voltage range (based on input voltage) up to 24VDC
Mechanical	Display Type	LED, Red, 4-Digit, 1/2 in Height
	Housing Type (with supplied gasket in NEMA 4X panel)	1/8 DIN NEMA 4X
	Connector Style	12-position 5mm European Style
	Terminal Block Torque Setting	4.4 lb-in Max [0.5 N-m]
	Faceplate Material	Polycarbonate with GE Lexan Overlay
	Housing Material	Aluminum
	Weight	14.4 oz [408.22g]
Environmental	Operating Temperature Range	-10 °C to 45 °C [14 °F to 113 °F]
	Operating Humidity Range	95% non-condensing
Regulatory	Agency Approvals	RoHS

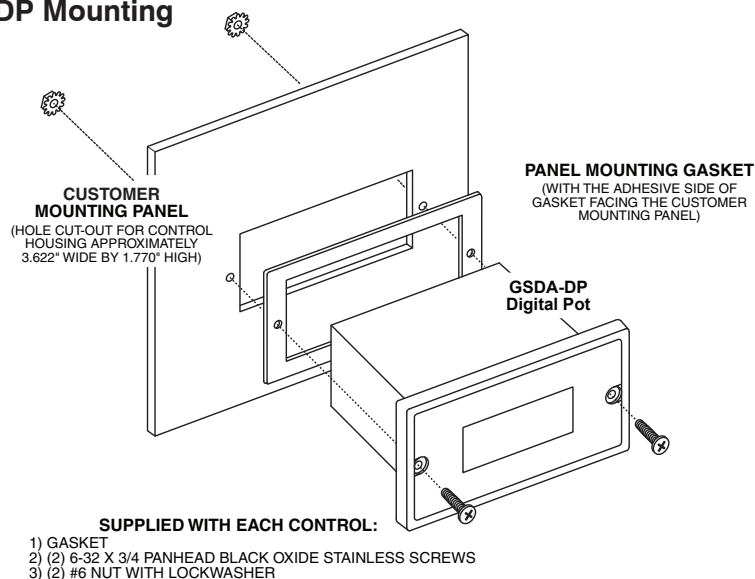
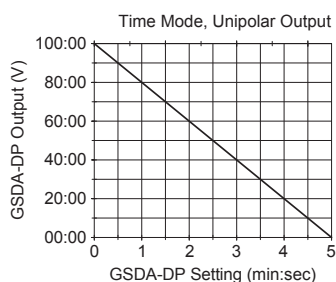
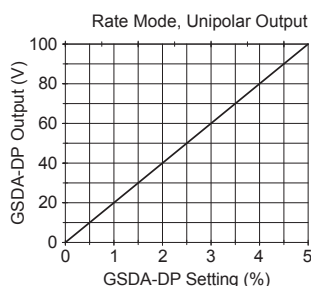
GSD Series DC Drives Accessories

GSDA-DP

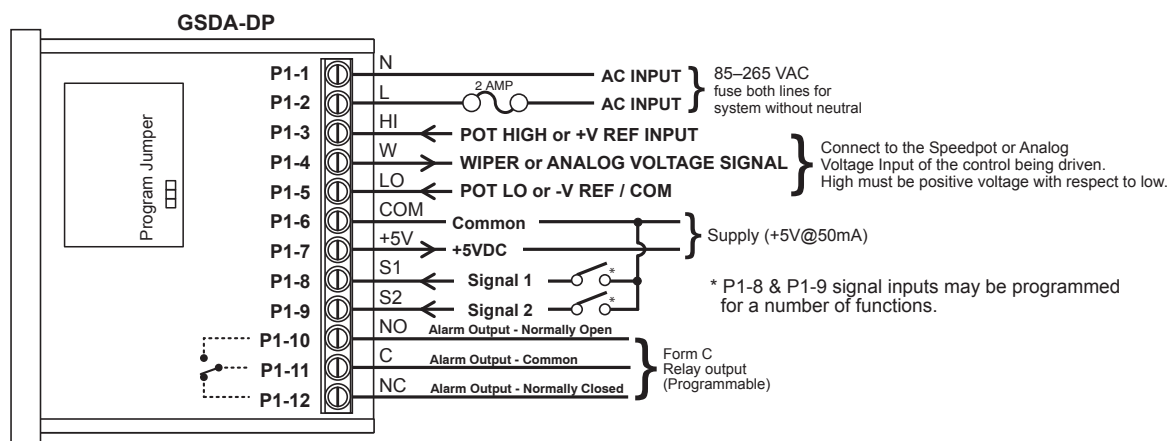
GSDA-DP Mounting

GSDA-DP Operation Modes

Rate and Time mode cycle times operate inversely from each other.



M501 GSDA-DP Wiring



M501 Motor Dimensions (in [mm])

