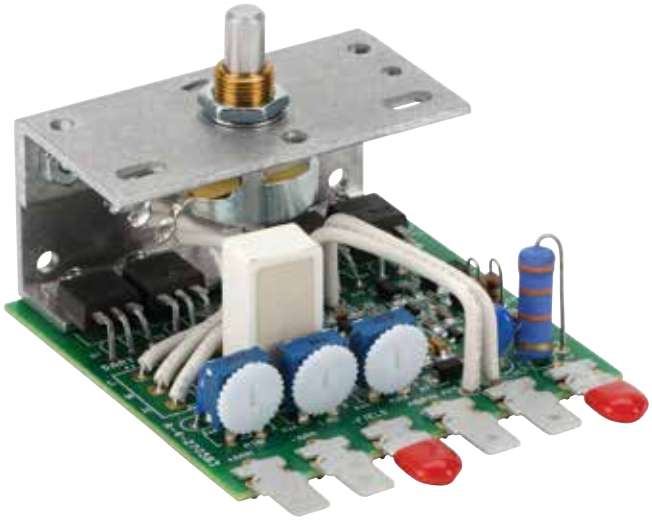
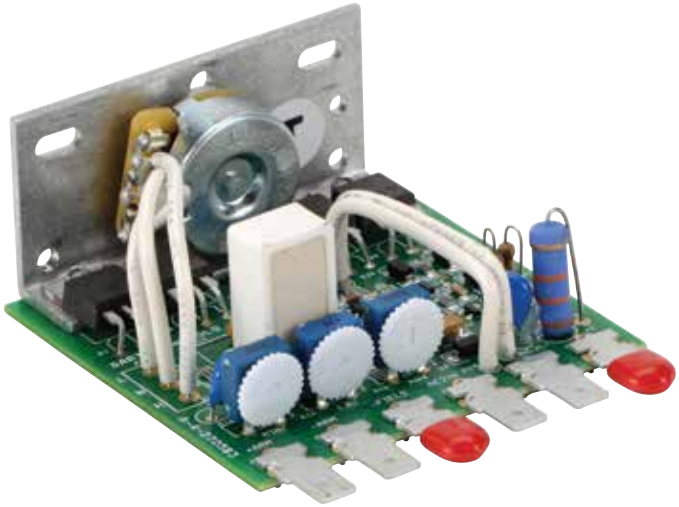
AUTOMATIONDIRECT.com

IRONHORSE™

GSD3 Series DC Drives User Manual

User Manual Number: IH-GSD3-User-M





WARNING

Thank you for purchasing automation equipment from Automationdirect.com®, doing business as Automation-Direct. We want your new automation equipment to operate safely. Anyone who installs or uses this equipment should read this publication (and any other relevant publications) before installing or operating the equipment.

To minimize the risk of potential safety problems, you should follow all applicable local and national codes that regulate the installation and operation of your equipment. These codes vary from area to area and usually change with time. It is your responsibility to determine which codes should be followed, and to verify that the equipment, installation, and operation is in compliance with the latest revision of these codes.

At a minimum, you should follow all applicable sections of the National Fire Code, National Electrical Code, and the codes of the National Electrical Manufacturer's Association (NEMA). There may be local regulatory or government offices that can also help determine which codes and standards are necessary for safe installation and operation.

Equipment damage or serious injury to personnel can result from the failure to follow all applicable codes and standards. We do not guarantee the products described in this publication are suitable for your particular application, nor do we assume any responsibility for your product design, installation, or operation.

Our products are not fault-tolerant and are not designed, manufactured or intended for use or resale as on-line control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines, or weapons systems, in which the failure of the product could lead directly to death, personal injury, or severe physical or environmental damage ("High Risk Activities"). AutomationDirect specifically disclaims any expressed or implied warranty of fitness for High Risk Activities.

For additional warranty and safety information, see the Terms and Conditions section of our catalog. If you have any questions concerning the installation or operation of this equipment, or if you need additional information, please call us at 770-844-4200.

This publication is based on information that was available at the time it was printed. At AutomationDirect we constantly strive to improve our products and services, so we reserve the right to make changes to the products and/or publications at any time without notice and without any obligation. This publication may also discuss features that may not be available in certain revisions of the product.

TRADEMARKS

This publication may contain references to products produced and/or offered by other companies. The product and company names may be trademarked and are the sole property of their respective owners. AutomationDirect disclaims any proprietary interest in the marks and names of others.

CONTENTS

GSD3 DC DRIVES USER MANUAL OVERVIEW

OVERVIEW OF THIS PUBLICATION

The IronHorse GSD3 Series DC Drives User Manual describes the installation, configuration, and methods of operation of the GSD3 Series DC Drives.

All information contained in this manual is intended to be correct. However, information and data in this manual are subject to change without notice. AutomationDirect (ADC) makes no warranty of any kind with regard to this information or data. Further, ADC is not responsible for any omissions or errors or consequential damage caused by the user of the product. ADC reserves the right to make manufacturing changes which may not be included in this manual.

WHO SHOULD READ THIS USER MANUAL

This manual contains important information for those who will install, maintain, and/or operate any of the GSD3 Series DC Drives.

TECHNICAL SUPPORT

By Telephone: 770-844-4200 (Mon.–Fri., 9:00 a.m.–6:00 p.m. ET)

On the Web: www.automationdirect.com

Our technical support group is glad to work with you in answering your questions. If you cannot find the solution to your particular application, or, if for any reason you need additional technical assistance, please call Technical Support at 770-844-4200. We are available weekdays from 9:00 a.m. to 6:00 p.m. Eastern Time.

We also encourage you to visit our web site where you can find technical and non-technical information about our products and our company. Visit us at www.automationdirect.com.

SPECIAL SYMBOLS

WHEN YOU SEE THE "NOTEPAD" ICON IN THE LEFT-HAND MARGIN, THE PARAGRAPH TO ITS IMMEDIATE RIGHT WILL BE A SPECIAL NOTE.

WHEN YOU SEE THE "EXCLAMATION MARK" ICON IN THE LEFT-HAND MARGIN, THE PARAGRAPH TO ITS IMMEDIATE RIGHT WILL BE A ***WARNING.*** *THIS INFORMATION COULD PREVENT INJURY, LOSS OF PROPERTY, OR EVEN DEATH (IN EXTREME CASES).*

IronHorse GSD3 Series DC Drives General Information

Carefully check the DC Drive for shipping damage. Report any damage to the carrier immediately. Do not attempt to operate the drive if visible damage is evident to either the circuit or to the electronic components.

Standard Features

- Dual voltage models of 12/24 VAC or 120/240 VAC input.
- Full wave bridge power supply.
- Adjustable minimum and maximum speeds.
- Adjustable IR Compensation.
- Fixed Acceleration (0.5 seconds).
- 5kΩ speed potentiometer with leads, knob & dial included.
- 25:1 speed range; 1% speed regulation.
- Shunt field supply provided.
- Overload capacity of 200% for 1 minute.
- Transient voltage protection.
- Power on/off switch (enclosed models only).
- AC line fuse (120/240 VAC enclosed model GSD3-240-3N4 only)
- Enclosed models (GSD3-xxx-3N4) are rated NEMA 4.

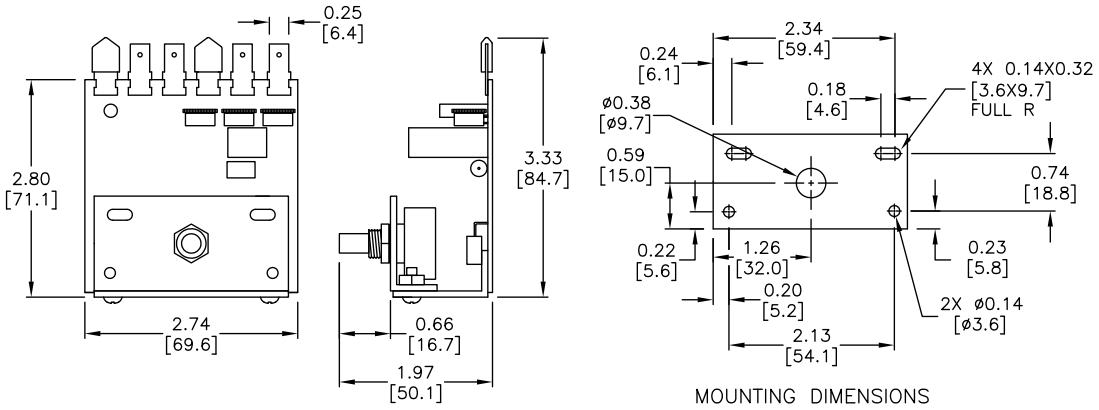
Selection and Specifications

GSD3 Series DC Drives – Selection & Specifications						
Model	***GSD3-24A-2CJ***	***GSD3-24A-2CL***	***GSD3-24A-3N4***	***GSD3-240-2CJ***	***GSD3-240-2CL***	***GSD3-240-3N4***
Package Configuration	open frame		NEMA 4	open frame		NEMA 4
Power Quality Form Factor	1.4					
Input Voltage (@ 50/60 Hz)	12 or 24 VAC ±10%			120 or 240 VAC ±10%		
Output Voltage	0–12 or 0–24 VDC			0–90 or 0–180 VDC		
Shunt Field Voltage & Current	10 VDC @ 12 VAC 20 VDC @ 24 VAC (1A max)		10 VDC @ 12 VAC 20 VDC @ 24 VAC (0.75A max)	100 VDC @ 120 VAC 200 VDC @ 240 VAC (1A max)		100 VDC @ 120 VAC 200 VDC @ 240 VAC (0.75A max)
Output Rating (hp)	1/50 – 1/40 @ 12V 1/25 – 1/20 @ 24V		1/50 – 1/25 @ 12V 1/25 – 1/12 @ 24V	1/50 – 1/6 @ 90V 1/25 – 1/3 @ 180V		1/50 – 1/3 @ 90V 1/25 – 2/3 @ 180V
Output Current (continuous)	150 mA to 2A (DC)		150 mA to 3A (DC)	150 mA to 2A (DC)		150 mA to 3A (DC)
Current Overload Capacity	200% for 60s					
Current Limit	n/a					
Transient Protection	Metal Oxide Varistor (MOV)					
I.R. Compensation	adjustable – full range					
Speed Adjustment	5kΩ potentiometer					
Speed Range	25:1					
Speed Regulation	±1% of base speed					
Maximum Speed	adjustable from 40% to 120% of base speed					
Minimum Speed	adjustable from 0% to 30% of maximum speed					
Acceleration	0.5s (fixed)					
Deceleration	0.5s (fixed)					
Dynamic Braking	no					
Plugging Capability **	no					
Electrical Connections	spade connector lugs					
External Fusing Required	Internal fusing is included which is adequate for GSD3-240-3N4 120 VAC line and neutral inputs. Refer to “Fusing” (page 7) and “Wiring Diagrams” (page 7) for external fusing requirements for other wiring configurations.					
Operating Temperature	-10 to 45 °C [14 to 113 °F]		-10 to 40 °C [14 to 104 °F]	-10 to 45 °C [14 to 113 °F]		-10 to 40 °C [14 to 104 °F]
Thermal Protection	none					
Mounting Orientation	can be mounted in any orientation					
Corrosive Gases	NOT compatible with any corrosive gases					
Weight	2.9 oz [83g]	2.6 oz [75g]	20.3 oz [575g]	2.9 oz [83g]	2.6 oz [75g]	20.3 oz [575]g
Agency Approvals	RoHS			$_{C}UL_{US}$ Listed (E333109), RoHS		
Optional Accessories *						
Replacement Potentiometer	GSDA-5K					

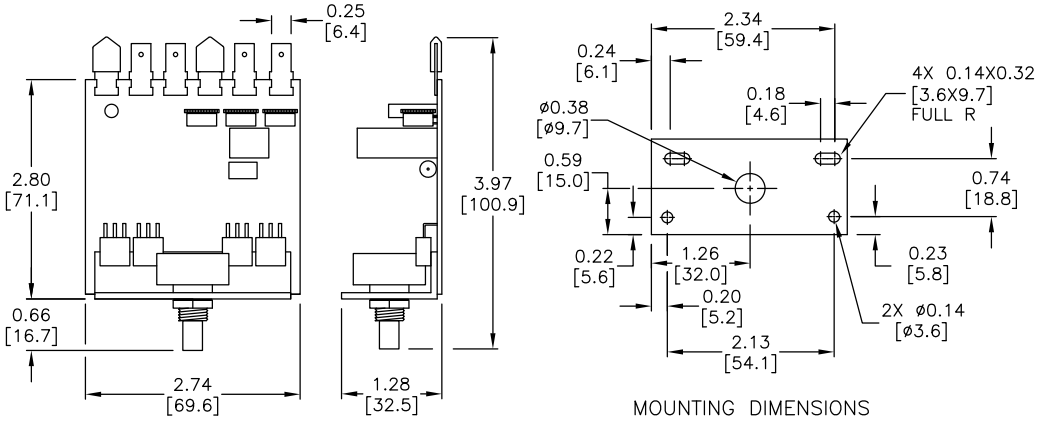
** For accessories details, please visit www.AutomationDirect.com.*
*** Plugging is a method of rapidly changing motor direction by reversing motor armature polarity, while the motor is still running.*

DIMENSIONS

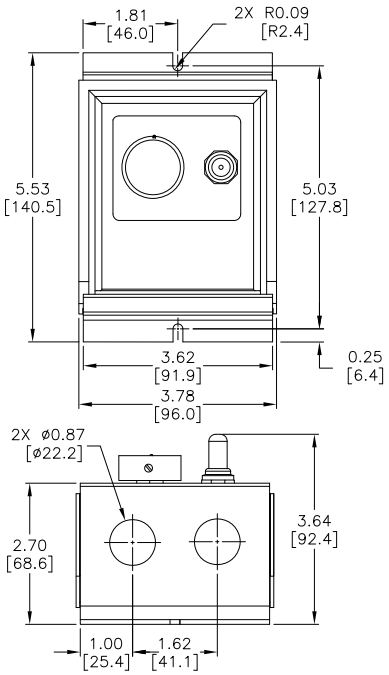
GSD3-24x-2CJ (dimensions = in [mm])



GSD3-24x-2CL (dimensions = in [mm])



GSD3-24x-3N4 (dimensions = in [mm])



Installation and Wiring

Install open-frame drives in an enclosure with a volume at least three times the volume of the open-frame drive.

Do not mount GSD3-24x-2Cx DC drive where ambient temperature is outside the range of -10 to 45 °C (14 to 113 °F).
Do not mount GSD3-24x-3N4 DC drive where ambient temperature is outside the range of -10 to 40 °C (14 to 104 °F).

Improper installation or operation of this DC Drive may cause injury to personnel or drive failure. The drive must be installed in accordance with local, state, and national safety codes. Make certain that the power supply is disconnected before attempting to service or remove any components!!! If the power disconnect point is out of sight, lock it in disconnected position and tag it to prevent unexpected application of power. Only a qualified electrician or service personnel should perform any electrical troubleshooting or maintenance. At no time should circuit continuity be checked by shorting terminals with a screwdriver or other metal device.

Before attempting to wire the DC Drive, make sure all power is disconnected.
Recheck code designation to assure proper voltage is present for the DC Drive.
Carefully select proper wire size for current and voltage drop.
Limit the voltage drop through the wiring to 5% of the line voltage at full load.

CAUTION!! Turn power OFF while making wiring connections.

CAUTION!! Do not attempt to perform a hi-pot test across the AC lines with the DC drive in the circuit. This will result in immediate or long-term damage to the drive.

Fusing

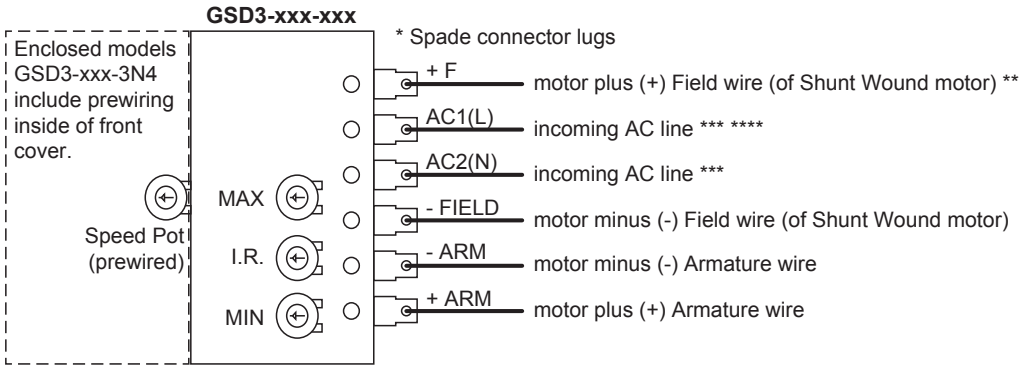
Refer to the wiring diagram for fusing information.

Terminals

GSD3 Wiring Terminals			
GSD Model	**Type**	**Wire Range**	**Tightening Torque**
GSD3-xxx-xxx	Spade connector lugs	n/a	n/a

Wiring Diagram

GSD3-xxx-xxx Wiring Diagram



* *For wiring connections, use customer-supplied Sta-Kon 0.25 in x 0.25 in spade connectors or similar.*

** *+F connection is only for Shunt Wound motor; NOT for Permanent Magnet motor. For motors with dual voltage field, i.e. 50/100V or 100/200V, connect the highest value.*

*** *Use normal-blow fuses in series with all ungrounded (hot) AC inputs, rated to 125% of motor current. NOTE: Fuse both AC input lines for 240 VAC input, where both lines are hot. For line-to-neutral circuits, fuse the hot input line and connect it to AC1.*

**** *GSD3-240-3N4 drives include a replaceable built-in fuse wired in line with AC1. (Fuse is 250VAC, 6.3A Littlefuse 21606.30 or equivalent.)*

TRIM POT ADJUSTMENTS

Before the power is applied, the speed potentiometer and trim pots should be preset as follows:

TRIM POT PRESET

1) Preset trim pots in the counter-clockwise position (CCW).
2) Apply power and set GSD3-24x-3N4 power ON/OFF switches to the ON position.
3) Turn the Speed pot fully CW.
4) Adjust the MAX trim pot in the CW direction until the maximum desired speed is obtained.
5) Turn the Speed pot fully CCW.
6) Adjust the MIN trim pot in the CW direction until deadband or the desired speed is obtained.

TRIM POT ADJUSTMENT

The IR COMP trim pot is used as a regulation adjustment. If better motor regulation is needed between minimum and maximum loads, then adjust the IR COMP trim pot as follows:

1) Turn the Speed pot CW to the 50% position.
2) Turn the IR COMP trim pot CW as needed to increase regulation.
3) Recheck and readjust the trim pots if necessary. Trim pot interaction with each other will be minimal.

BLANK
PAGE

BLANK
PAGE

BLANK
PAGE

Literature Number: LT134
Drawing Number: A-5-3901A