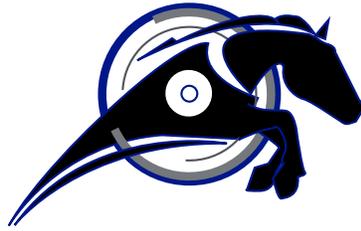


 AUTOMATIONDIRECT.com



# IRONHORSE™

**GSD6 SERIES DC DRIVES USER MANUAL**

***USER MANUAL NUMBER: GSD6\_UMP***



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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.

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**GSD6 DC DRIVES USER MANUAL OVERVIEW**

**OVERVIEW OF THIS PUBLICATION**

The IronHorse GSD6 Series DC Drives User Manual describes the installation, configuration, and methods of operation of the GSD6 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 GSD6 Series DC Drives.

**TECHNICAL SUPPORT**

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

On the Web: [www.automationdirect.com](http://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](http://www.automationdirect.com).

**SPECIAL SYMBOLS**




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*NOTE: When you see the “notepad” icon in the left-hand margin, the paragraph to its immediate right will be a special note.*

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*WARNING: 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).*

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## IRONHORSE GSD6 SERIES DC DRIVES GENERAL INFORMATION

IronHorse GSD6 DC drives are versatile, general-purpose, variable-speed, DC motor controllers that are designed to control DC Permanent Magnet, Shunt Wound, and some Universal (AC/DC) motors. Incoming AC voltage is converted to adjustable full-wave rectified DC voltage to operate the DC motor. Also, a full-wave field voltage is provided for shunt wound motors.




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*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

- Input voltages 115/230VAC @ 50/60Hz; output 0–90/180VDC.
- Barrier terminal strip for all power and control wiring.
- Full-wave packaged bridge supply.
- 1% speed regulation with armature voltage feedback;  $\pm 1/2\%$  with tachometer feedback.
- Adjustable Minimum speed, Maximum speed, IR Compensation, Current Limit, and Acceleration & Deceleration.
- Line voltage compensation.
- 5k $\Omega$  speed potentiometer with leads, dial, and knob included.
- 50:1 speed range.
- Transient voltage protection.
- Voltage following mode or DC tachometer follower by supplying ungrounded 0–12VDC analog input signal.
- DC tachometer feedback (jumper selectable 3V or 7V per 1,000 rpm).
- Inhibit circuit permits start & stop without breaking AC lines.
- Shunt field supply provided.
- Includes two AC line fuses.
- 12 VDC 12 mA user-accessible power supply
- Open-frame chassis.

### CONTROL FEATURES

**MINIMUM SPEED** – Allows adjustment of the motor speed when the speed pot is set at minimum (CCW). This permits the user to eliminate “Deadband” on the main speed control, permitting zero calibration.

**MAX SPEED** (Maximum Speed) – Allows adjustment of the motor speed when the speed pot is set at maximum (CW). This permits the user to eliminate the top end “Deadband”, which will provide full speed at maximum rotation.

**ACCEL** (Acceleration) – Allows adjustment of the motor acceleration time.

**DECEL** (Deceleration) – Allows adjustment of the motor deceleration time.

**I.R. COMP** (Speed Regulation) – Adjusts the drive output to compensate for speed changes caused by varying motor loads. As motor load is increased, IR COMP increases the voltage output of the drive.

**CUR. LIM.** (Current Limit) – Provides protection from excessive armature current by limiting the maximum armature current the drive can provide. This enables adjustment of the maximum torque the motor can deliver.

**INPUT SELECTION SWITCH** – Switch selectable between 115VAC and 230VAC input

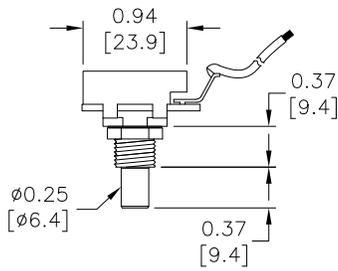
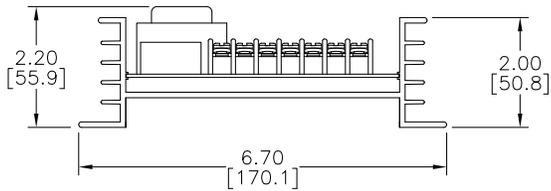
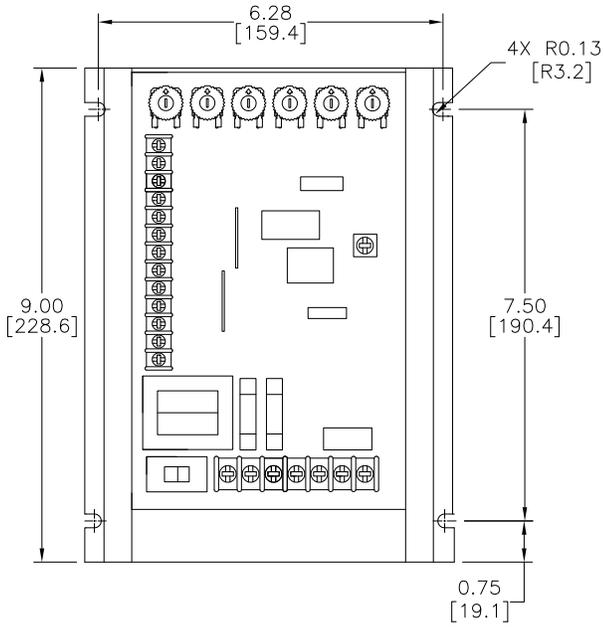
**TACH INPUT SELECTION** – Jumper selectable between 3V and 7V per 1,000 rpm (preset for 3V).

## SELECTION AND SPECIFICATIONS

<b>GSD6 Series DC Drives – Selection &amp; Specifications</b>		
<b>Model</b>	<b>GSD6-240-15C</b>	
<b>Package Configuration</b>	Open frame	
<b>Power Quality Form Factor</b>	1.4	
<b>Input Voltage (@50/60Hz)</b>	115/230 VAC ±10%	
<b>Output Voltage</b>	0–90 @ 115 VAC INPUT / 0–180 VDC @ 230 VAC input	
<b>Shunt Field Voltage</b>	100VDC @ 115VAC input ; 200VDC @ 230VAC input ; (1.5A max)	
<b>Motor Rating (hp)</b>	1/8 – 1.5 hp @ 90VDC ; 1/4 – 3 hp @ 180VDC	
<b>Output Current (continuous)</b>	15A (DC)	
<b>Current Overload Capacity</b>	200% for 60s	
<b>Current Limit (adjustable)</b>	2–30A (DC)	
<b>Transient Protection</b>	Metal Oxide Varistor (MOV)	
<b>I.R. Compensation</b>	Adjustable	
<b>Speed Adjustment</b>	<b>Potentiometer</b>	5kΩ 2W potentiometer
	<b>Current</b>	4–20mA with option GSDA-AI-A
	<b>Voltage</b>	n/a
<b>Speed Range</b>	50:1	
<b>Speed Regulation</b>	±1% of base speed	
<b>Maximum Speed</b>	Adjustable from 60% to 120% of base speed	
<b>Minimum Speed</b>	Linear ramp 0–30% of adjustable maximum speed	
<b>Acceleration</b>	Linear ramp adjustable 0.3–12s	
<b>Deceleration</b>	Adjustable 0.6–12s	
<b>Dynamic Braking</b>	No	
<b>Plugging Capability **</b>	No	
<b>Electrical Connections</b>	Barrier-type terminal strip; 26–12 AWG	
<b>Fusing</b>	(2) 20A fuses included (Bussman ABC-20 or Littlefuse 314020 ceramic fuses or equivalent)	
<b>Operating Temperature</b>	-10 to 45 °C [14 to 113 °F]	
<b>Thermal Protection</b>	Not available	
<b>Mounting Orientation</b>	Can be mounted in any orientation	
<b>Corrosive Gases</b>	NOT compatible with any corrosive gases	
<b>Weight</b>	40 oz [1134g]	
<b>Agency Approvals</b>	RoHS	
<b>Optional Accessories *</b>		
<b>Replacement Potentiometer</b>	GSDA-5K	
<b>Digital Potentiometer</b>	GSDA-DP	
<b>Analog Current Input Card</b>	GSDA-AI-A	
<p>* For accessories details, refer to the "GSD Series DC Drives Accessories" section.</p> <p>** Plugging is a method of rapidly changing motor direction by reversing motor armature polarity, while the motor is still running.</p>		

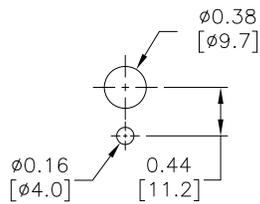
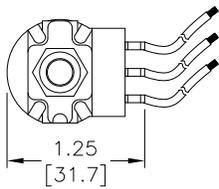
## DIMENSIONS

### GSD6-240-15C (Dimensions = in [mm])

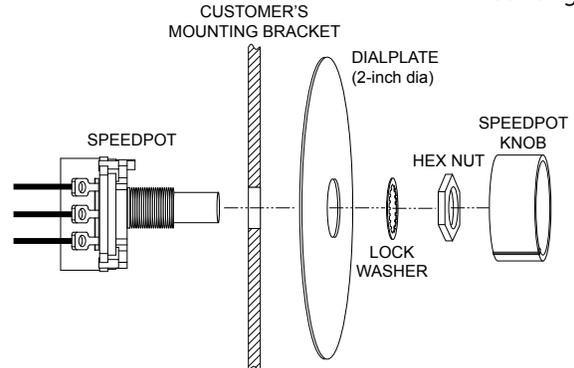


Speed Pot

MOUNTING CUTOUT



Speed Pot Mounting



## 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 GSD6-240-15C DC drive where ambient temperature is outside the range of -10 to 45 °C (14 to 113 °F).



Size all wires that carry armature or line currents as specified by applicable national, state, and/or local codes. All other wires may be 20AWG or smaller as permitted by the codes.



Separate control wires from the armature and AC lines when routed in conduit or wire trays.



**CAUTION!!** TURN POWER OFF WHILE MAKING WIRING CONNECTIONS.



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!!** 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.



- 1) ENSURE THAT THE GSD6 DRIVE CHASSIS IS PROPERLY GROUNDED.
- 2) MOTOR ARMATURE CONNECTIONS MUST NOT BE SWITCHED OR BROKEN WHILE THE GSD6 DRIVE IS ON. SERIOUS DAMAGE MAY RESULT.
- 3) THE INPUTS TO THE SPEED POT TERMINALS (P2-3, P2-4, P2-5) MUST NOT BE GROUNDED. SERIOUS DAMAGE MAY RESULT.

### FUSING

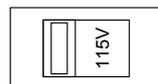
The GSD6 has a 20A internal fuse in each AC line (P1-2 & P1-3), and this fuse is sized to open in the event of a shorted armature or if an armature line is shorted to earth ground. Both AC lines are fused. For replacement, use Bussman ABC-20 or LittleFuse 314-020. (AutomationDirect sells ABC series fuses.)



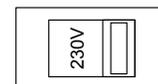
AC current is determined by motor characteristics, and it may be necessary to increase fuse value for some applications.

### INPUT VOLTAGE SWITCH SELECTION

For 110–130 VAC inputs, slide the selector switch completely to the left, as shown below:



For 208–240 VAC inputs, slide the selector switch completely to the right, as shown below:



**CAUTION!!** AN INCORRECT SETTING OF THE INPUT VAC SELECTOR SWITCH WILL RESULT IN DAMAGE TO THE DRIVE.

## WIRING TERMINALS

GSD6 Wiring Terminals		
Type	Wire Range	Tightening Torque
barrier-type terminal strip	26–12 AWG	10.0 lb-in [1.1 N·m]

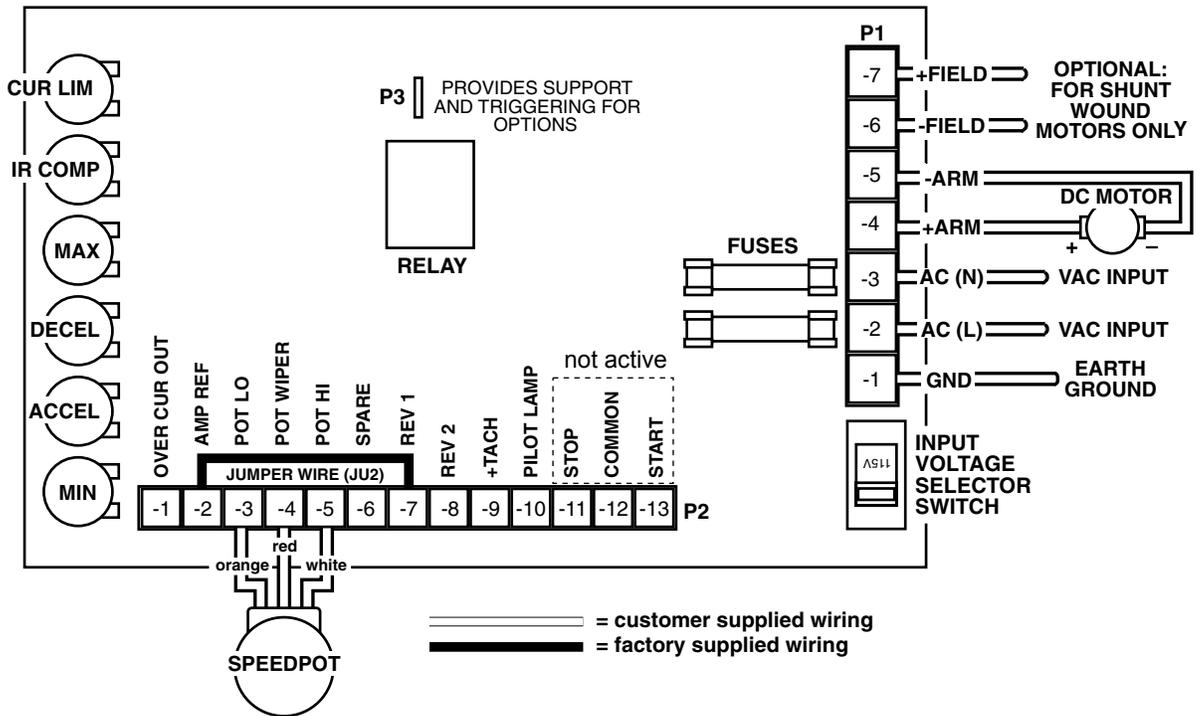
## WIRING TERMINAL FUNCTIONS

GSD6 Series DC Drives – Terminal Strip Functions	
<b>CAUTION: BE SURE DRIVE HOUSING IS PROPERLY GROUNDED.</b>	
Number	Purpose
<b>P1 – Terminal Strip for Power Wiring</b>	
<b>P1-1</b>	(EARTH GROUND) – Ground the drive by connecting the ground wire to this terminal. NOTE: Terminals P1-5 (-ARM) and P2-2 (AMP REF) are electrically the same, which is the common reference point (low voltage common) for the control logic. The EARTH GROUND terminal (P1-1) is electrically different from common. If connected together, either at the amplifier or in any other fashion, fatal or hazardous operation may occur and permanent damage to the drive WILL result!
<b>P1-2</b>	(AC1) 115VAC – Connect incoming hot AC (black wire) to this terminal. NOTE: This is fused (F1) on the drive. (AC1) 230VAC – Connect either hot side.
<b>P1-3</b>	(AC2) 115VAC – Connect the neutral AC (white wire) to this terminal. NOTE: This is fused (F2) on the drive. (AC2) 230VAC – Connect either hot side.
<b>P1-4</b>	(+ ARMATURE) – Connects to the plus (+) Armature wire on the motor. 0-90VDC for 115VAC input or 0-180VDC for 230 VAC input. See “SPECIFICATIONS” for output rating. CAUTION: ARMATURE CONNECTION MUST NOT BE SWITCHED OR BROKEN WHILE DRIVE IS ON, OR SERIOUS DAMAGE TO THE DRIVE MAY RESULT.
<b>P1-5</b>	(- ARMATURE) – Connects to minus (-) Armature wire (also considered circuit common) on the motor.
<b>P1-6</b>	(- FIELD) – Connect minus (-) Field wire of the Shunt Wound motor (not used on PM motors).
<b>P1-7</b>	(+ FIELD) – DO NOT use for Permanent Magnet motor. This supplies + Field voltage for a Shunt Wound motor. For motors with dual voltage field (ie. 50/100V or 100/200V), make sure the highest value is connected.
<b>P2 – Terminal Strip for Control Wiring</b>	
<b>CAUTION: NONE OF THE P2 TERMINALS SHOULD BE EARTH GROUNDED!</b>	
<b>P2-1</b>	(OVER CURRENT OUT) – This is a low level logic signal which goes “high” when the drive is in Current Limit. The output at this terminal is zero (0) volts under normal operation, and 1.5 volts @ 1.5mA when the drive is in Current Limit.
<b>P2-2</b>	(AMP REF) – This is the common point of the logic. It is used as common with OVER CURRENT OUT (P2-1), +TACH (P2-9), REV 1 (P2-7), REV 2 (P2-8), and WIPER (P2-4). <b>NOTE:</b> Never connect this terminal to earth ground !! Serious damage and injury may result !! This terminal is electrically the same point as -ARM (P1-5).
<b>P2-3</b>	(SPEEDPOT LO) – Connects to the low side (orange wire) of the 5kΩ Speed Pot (normally the CCW end). This input is raised and lowered by the MIN trim pot. Electronic speed input voltage (voltage follower) may be referenced to Speed Pot LO if the MIN trim pot adjustments are to be active. Otherwise, inputs may be referenced to AMP REF (P2-2), which will bypass the MIN trim pot. INPUT MUST NOT BE GROUNDED ! CAUTION FOR VOLTAGE FOLLOWER APPLICATIONS: THE INPUT CONNECTION TO THE Speed pot MUST NOT BE GROUNDED !! SERIOUS DAMAGE TO THE DRIVE MAY RESULT FROM A GROUNDED INPUT.
<b>P2-4</b>	(SPEEDPOT WIPER) – Connects to the wiper (red wire) of the Speed Pot (center lead). Use this input for the plus (+) side of voltage follower operation or tach follower. The minus (-) side connects to AMP REF (P2-2). INPUT MUST NOT BE GREATER THAN +12V MAXIMUM AND MUST NOT BE GROUNDED !
<b>P2-5</b>	(SPEEDPOT HI) – Connects to high side (white wire) of the Speed Pot (CW end). This is internal +12 volts. INPUT MUST NOT BE GROUNDED !
<b>P2-6</b>	(SPARE) – This terminal is not connected to the drive circuit. It can be used as a terminal for field modifications.
<b>P2-7</b>	(REV 1) – REV 1 and REV 2 are identical quick stop inputs. One of them must be held low (to AMP REF) before the drive will operate. The two are diode separated to form an “OR” gate. Since -ARM (P1-5) is also low in the system, these two inputs can be wired to the motor side of a reversing switch or relay. During the period of switching, neither input will be low, which will instantly return the set speed to zero and reset the acceleration ramp.
<b>P2-8</b>	(REV 2) – Identical to REV 1 (P2-7).
<b>P2-9</b>	(+TACH) – Connect +Tach from a DC tachometer for tachometer feedback. The minus (-) lead from the tachometer goes to AMP REF (P2-2). Output voltage from the tachometer at full speed can range from 6 to 12 volts. The scale is corrected using the JU3 jumper selectable setting of 3V/7V per 1000 rpm and the MAX speed trim pot. A 3-volt per 1000 rpm OR 7-volt per 1000 rpm tachometer should be used.
<b>P2-10</b>	(PILOT LIGHT) – Connecting point for Drive Power ON lamp. This output is ON if AC power is applied to the drive, 120VAC @ 100mA. Connect the neutral lead from the lamp to terminal P2-11 to complete the circuit.
<b>P2-11</b>	Reserved (Pilot Light <u>neutral</u> lead connection)
<b>P2-12</b>	Reserved
<b>P2-13</b>	Reserved

**INSTALLATION AND WIRING (CONTINUED)**

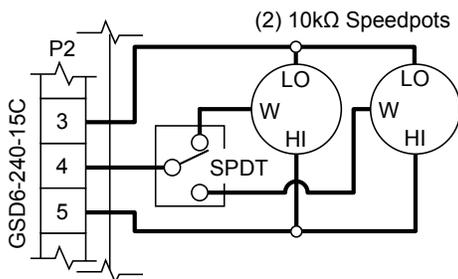
**WIRING DIAGRAMS**

**GSD6-240-15C BASIC WIRING DIAGRAM**



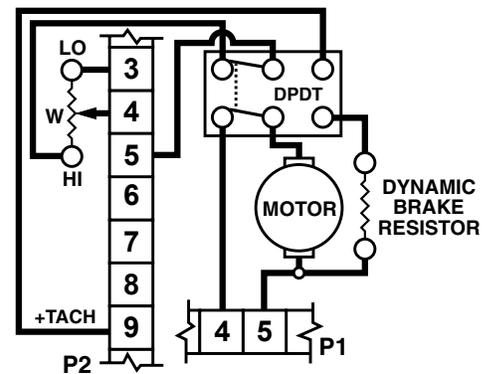
**GSD6-240-15C Two-Speed Operation**

Two-speed operation is done using two 10 kΩ speed potentiometers in parallel, with both Highs connected to terminal P2-5, and both Lows connected to P2-3. A SPDT switch selects which pot Wiper is connected to terminal P2-2.



**GSD6-240-15C Dynamic Braking**

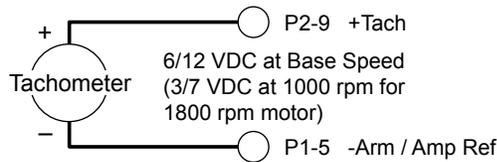
A DPDT switch is used to control and to connect a customer-supplied Dynamic Braking Resistor (DBR). Typical values for the DBR are 35–50W at 5Ω for 115V, or 10Ω for 230V. Motor horsepower, inertia, and cycle time affect the sizing of the DBR.



**INSTALLATION AND WIRING – WIRING DIAGRAMS (CONTINUED)**

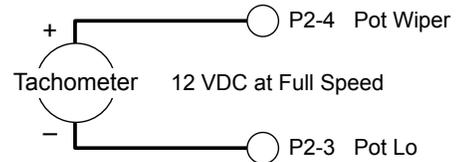
**GSD6-240-15C TACHOMETER FEEDBACK**

Improves regulation to  $\pm 1/2\%$  of base speed.



**GSD6-240-15C TACHOMETER FOLLOWER**

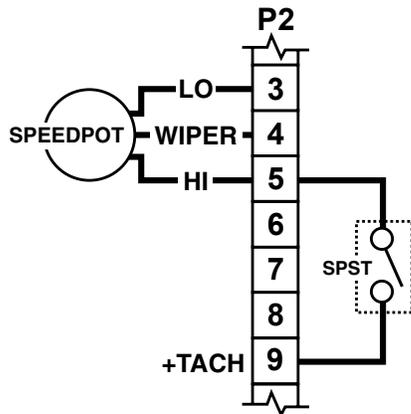
Allows drive output to follow tachometer voltage.



*Tachometer control needs tachometer output ripple limited to 1% or less.*

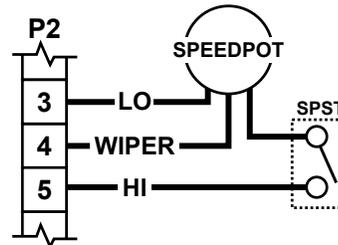
**GSD6-240-15C INHIBIT (USED INDEPENDENTLY)**

Connect the customer-supplied SPST switch in series between the Speed Pot High (P2-5) and the +Tach (P2-9) drive terminals. To inhibit (stop motor), close Speed Pot High to +Tach. To restart, return the switch to open. The drive will stop and start the motor quickly.



**GSD6-240-15C INHIBIT (USED WITH SPEED POT)**

Connect the customer-supplied SPST switch in series between Speed Pot High the drive Speed Pot High terminal (P2-5). To inhibit (stop motor), open the SPST switch. To restart, close the switch. The drive will soft stop and soft start the motor through the acceleration setting.



- 1) Inhibit control permits starting and stopping the motor without breaking the AC lines.
- 2) In the event of SCR failure or false triggering, the Inhibit circuit will not stop the motor.
- 3) Always use shielded wire when connecting to the Inhibit terminal, and connect the shield to the -Armature or Common of the drive.

## START-UP

- 1) Ensure that the 115/230 VAC is set for the proper input voltage.
- 2) Check to see that the incoming power is of the correct voltage.
- 3) Recheck all wiring. Accidental grounds, loose or pinched wires on armature or speed pot wires may damage the DC drive when power is applied.
- 4) Preset trim pots for your horsepower by using the "Trim Pot Preset Chart".
- 5) Turn the speed pot to zero (fully CCW).
- 6) Turn power on, and advance the speed pot while observing motor direction of rotation. Power must be turned off again before step 7 can be accomplished!
- 7) If the motor rotation is incorrect, turn power off at external disconnect, and reverse the +ARM and -ARM connections.
- 8) Check for satisfactory operation throughout the speed range.
- 9) If operation is satisfactory, no readjustments are needed.
- 10) If instability or surging is observed, or if maximum speed is higher than desired, refer to the "Trim Pot Adjustments" section."
- 11) For other problems, consult the "Troubleshooting" section.

### TRIM POT PRESET CHART



WHEN MAKING ADJUSTMENTS, ALWAYS USE A SCREWDRIVER WITH AN INSULATED SHAFT TO AVOID SHORT-CIRCUITING PC BOARD COMPONENTS.

MIN	ACCEL	DECEL	MAX	I.R.	CUR LIM	HP	VOLTS	MIN	ACCEL	DECEL	MAX	I.R.	CUR LIM	HP	VOLTS
						<b>1.5</b>	<b>120</b>							<b>3.0</b>	<b>240</b>

NOTES: These settings apply when using a 5kΩ speedpot.

## TRIM POT ADJUSTMENTS

Four adjustments (MIN., MAX., I.R. COMP., and CUR. LIM.) are checked at the factory using a typical motor. Use the “Trim Pot Preset Chart” to adjust the trim pots to the approximate setting for your horsepower. The other two adjustments (ACCEL and DECEL), are the Acceleration and Deceleration adjustments and should be set for your particular application requirements. The “Trim Pot Preset Chart” is approximate, and is valid when using a speed pot, a 0–12 VDC input signal, or a 0–10V isolated input signal to control the speed. Operation of the drive beyond ±10% of normal line voltage is not recommended and could result in readjustments. These settings are permanent; periodic readjustment is normally not needed.



*Use only an ungrounded voltmeter*

### FOR GSD6 DRIVES WITHOUT ANALOG CURRENT/VOLTAGE INPUT CARDS

GSD6-240-15C Trim Pot Adjustment *		
Trim Pot	Function	Adjustment
<b>Max</b>	Sets maximum motor speed when speed pot is set at maximum (fully CW rotation). CW rotation of MAX trim pot increases maximum motor speed.	<ol style="list-style-type: none"> <li>1) Connect a DC voltmeter: + to +ARM; - to -ARM.</li> <li>2) Set meter voltage range: (90VDC for 115VAC; 180VDC for 230VAC).</li> <li>3) With no load on the motor, adjust MAX trim pot to rated motor armature voltage as shown on meter.</li> </ol> <p><i>NOTE:</i> A tachometer or strobe may be used in lieu of a meter. Follow above steps, except adjust MAX trim pot to rated motor base speed indicated by tachometer or strobe.</p>
<b>Min</b>	Sets minimum motor speed when speed pot is set at zero. CW rotation will increase minimum motor speed.	<ol style="list-style-type: none"> <li>1) Set Speed Pot to zero (fully CCW).</li> <li>2) With no load on the motor, rotate MIN trim pot CW until motor starts to rotate.</li> <li>3) Slowly rotate MIN trim pot CCW until motor stops.</li> </ol> <p><i>NOTE:</i> If motor rotation is desired, rotate MIN trim pot CW until desired MIN speed is reached.</p>
<b>IR Comp</b>	Provides a means of improving motor speed regulation in the armature feedback mode. If a slowdown due to load change is of no concern, rotate this trim pot fully CCW.	<ol style="list-style-type: none"> <li>1) Set Speed Pot at 50%.</li> <li>2) Observe motor speed at no load condition.</li> <li>3) Apply full load to motor.</li> <li>4) Turn IR COMP trim pot CW (with load still applied) to obtain the same motor speed as with no load.</li> </ol>
<b>Cur Lim</b>	Limits DC motor armature current (torque) to prevent damage to the motor or drive. The current limit is set for 125% rated motor current. CW rotation of this trim pot increases the armature current (or torque produced).	<ol style="list-style-type: none"> <li>1) TURN DRIVE POWER OFF!</li> <li>2) Connect a DC Ammeter between +A on motor and +ARM on drive. Preset the Current Limit trim pot CCW.</li> <li>3) Turn power ON.</li> <li>4) Set Speed Pot at the 50% position.</li> <li>5) Apply friction braking to motor shaft until motor stalls (zero rpm).</li> <li>6) With motor stalled, set current at 125% of rated motor armature current by adjusting CUR. LIM. trim pot.</li> </ol>
<b>Accel</b>	Allows adjustment of acceleration by user.	CW rotation of the ACCEL trim pot increases acceleration time.
<b>Decel</b>	Allows adjustment of deceleration by user.	CW rotation of the DECEL trim pot increases deceleration time.

\* DO NOT USE this adjustment procedure for GSD6-240-15C DC drives with GSDA-AI-A analog current input cards.

## TROUBLESHOOTING

If a newly installed DC Drive will not operate, it is likely that a terminal connection is loose. Check the terminal connections and ensure that they are secure and correct. If the drive is still inoperative, refer to the Troubleshooting Table.

<b>Troubleshooting</b>		
<b>Problem</b>	<b>Possible Cause(s)</b>	<b>Corrective Action</b>
<b>Motor doesn't run</b>	<ol style="list-style-type: none"> <li>1) Blown fuse or circuit breaker</li> <li>2) Incorrect or no power</li> <li>3) Speed Pot set at zero</li> <li>4) Worn motor brushes</li> <li>5) Improper or missing jumper</li> </ol>	<ol style="list-style-type: none"> <li>1) Replace fuse or reset breaker</li> <li>2) Install proper power service</li> <li>3) Rotate Speed Pot CW to start</li> <li>4) Replace motor brushes</li> <li>5) Ensure that jumper JU2 is properly connected between drive terminals P2-2 and P2-7</li> </ol>
<b>Armature output voltage cannot be adjusted; output is a constant DC level</b>	<ol style="list-style-type: none"> <li>1) No motor or load connected</li> <li>2) Speed Pot low connection open</li> </ol>	<ol style="list-style-type: none"> <li>1) Ensure that motor or load is connected to armature terminals</li> <li>2) Ensure that Speed Pot Low wire is connected</li> </ol>
<b>Motor stalls, or runs very slowly with speed control set fully CW</b>	<ol style="list-style-type: none"> <li>1) Low voltage</li> <li>2) Overload condition</li> <li>3) Worn motor brushes</li> <li>4) Max speed set incorrectly</li> </ol>	<ol style="list-style-type: none"> <li>1) Ensure that VAC is above 104 or 208 VAC</li> <li>2) Reduce load or re-adjust Current Limit</li> <li>3) Replace brushes</li> <li>4) Consult "Trim Pot Adjustments" section</li> </ol>
<b>Motor "hunts"</b>	<ol style="list-style-type: none"> <li>1) Too much IR Comp</li> <li>2) Motor is in Current Limit</li> <li>3) Motor speed is above rated speed</li> </ol>	<ol style="list-style-type: none"> <li>1) Consult "Trim Pot Adjustments" section</li> <li>2) Consult "Trim Pot Adjustments" section</li> <li>3) Reduce Max trim pot setting</li> </ol>
<b>Repeated fuse blowing</b>	<ol style="list-style-type: none"> <li>1) Overload condition</li> <li>2) Worn motor brushes</li> <li>3) Defective motor</li> <li>4) Defective electrical components</li> </ol>	<ol style="list-style-type: none"> <li>1) Reduce load</li> <li>2) Replace brushes</li> <li>3) Replace motor</li> <li>4) Contact AutomationDirect "Product Returns" for replacement.</li> </ol>
<b>Motor runs, but will not stop</b>	<ol style="list-style-type: none"> <li>1) Incorrect wiring (enclosed drive)</li> <li>2) Defective wiring</li> <li>3) Defective component</li> </ol>	<ol style="list-style-type: none"> <li>1) Ensure that Terminal Strip Wiring is correct per wiring instructions/diagrams</li> <li>2) Check wiring</li> <li>3) Contact AutomationDirect "Product Returns" for replacement.</li> </ol>

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