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Publication History

User Manual Publication History		
Issue	*Date*	*Description*
First Edition	06/13/19	Initial release
1st Edition, Rev A	06/17/22	Removal of GSD8 drive slot 100 as an installation option for the GSDA-AI-A8 card.

CONTENTS

GSDA-AI-A8 User Manual Overview

Overview of this Publication

The IronHorse GSDA-AI-A8 User Manual describes the installation, configuration, and methods of operation of the GSDA-AI-A8 Analog Module.

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 the GSDA-AI-A8 Analog Module.

Technical Support

By Telephone: 800-633-0405 (Mon.–Fri., 9:00 a.m.–6:00 p.m. E.T.)

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 800-633-0405. We are available weekdays from 9:00 a.m. to 6:00 p.m. Eastern Time.

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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.

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).

IronHorse GSDA-AI-A8 General Information

Standard Features

- *Plug-in option card (Slot 200)*
- *Auto/Manual Input (Dry contact)*
- *Optically isolated 4 to 20mA input, (Target Speed Reference)*
- *Optically isolated 4 to 20mA output, (Motor Actual Speed, Tach Driven)*
- *Programmable, form C Relay output, (Alarm 2)*

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> NOTE: Carefully check the GSDA-AI-A8 for shipping damage. Report any damage to the carrier immediately. Do not attempt to install the card if visible damage is evident to either the circuit or to the electronic components.

GSDA-AI-A8 Overview

The GSDA-AI-A8 is an "option card" featuring an Optically-Isolated 4-20 mA Current Loop Input and an Optically-Isolated 4-20 mA Current Loop Output. Both the input and output are Optically-Isolated from the GSD8 Drive, circuit common, earth ground, and from each other. In addition, a non-isolated SPST switch input is provided. In the typical application with a GSD8-240 drive, that switch is used to determine where the GSD8 Drive gets its "Target Speed" setting. Additionally, the GSD8-240-5C-D, 10C-D, and 10N4X drives have an "Auto/Manual" LED indicator which displays whether the source of the Target Setting comes from the 4-20 mA input ("Auto") or from the "front panel" Target setting ("Manual"). Both the input and output 4-20 mA loops require customer supplied 9-36 VDC loop excitation power supplies.

In "Manual" mode, the GSD8 Drive uses its normal Front Panel display and Up/Down buttons to set the Target Speed (or Time). However, in "Auto" mode, the GSD8 Drive follows the GSDA-AI-A8's 4-20 mA Current Loop signal. In either mode, the GSDA-AI-A8's Current Loop Output provides a real-time updating 4-20 mA signal that represents the GSD8 Drive motor's Actual (Tach) Speed. This is primarily used by a SCADA system to provide "feedback" that the SCADA's speed setting was received and acted upon by the GSD8 Drive.

INSTALLING THE GSDA-AI-A8 IN SLOT 200 OF THE GSD8 DRIVE
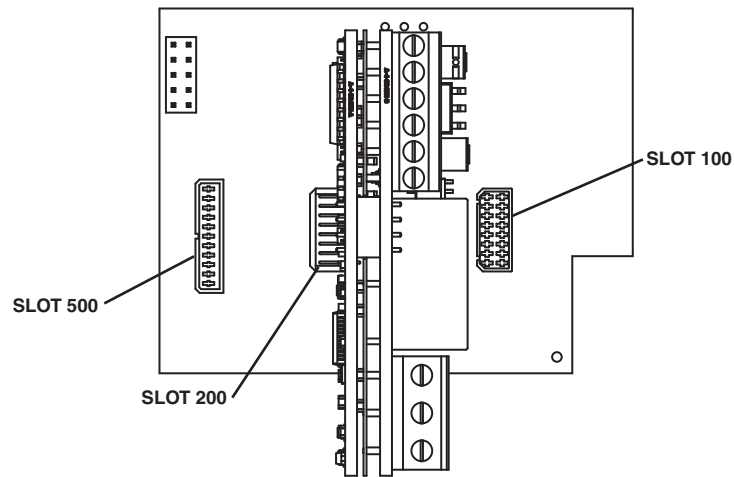
NOTE: *THE GSDA-AI-A8 MAY BE INSTALLED IN SLOT 200.*

Also, the GSDA-AI-A8 comes with Default Values that allow a simple checkout procedure to verify that everything is connected correctly and functioning. See the GSDA-AI-A8 Software Parameter Table for further details.

When the GSDA-AI-A8 is first installed and power applied, the following message will appear on the display:
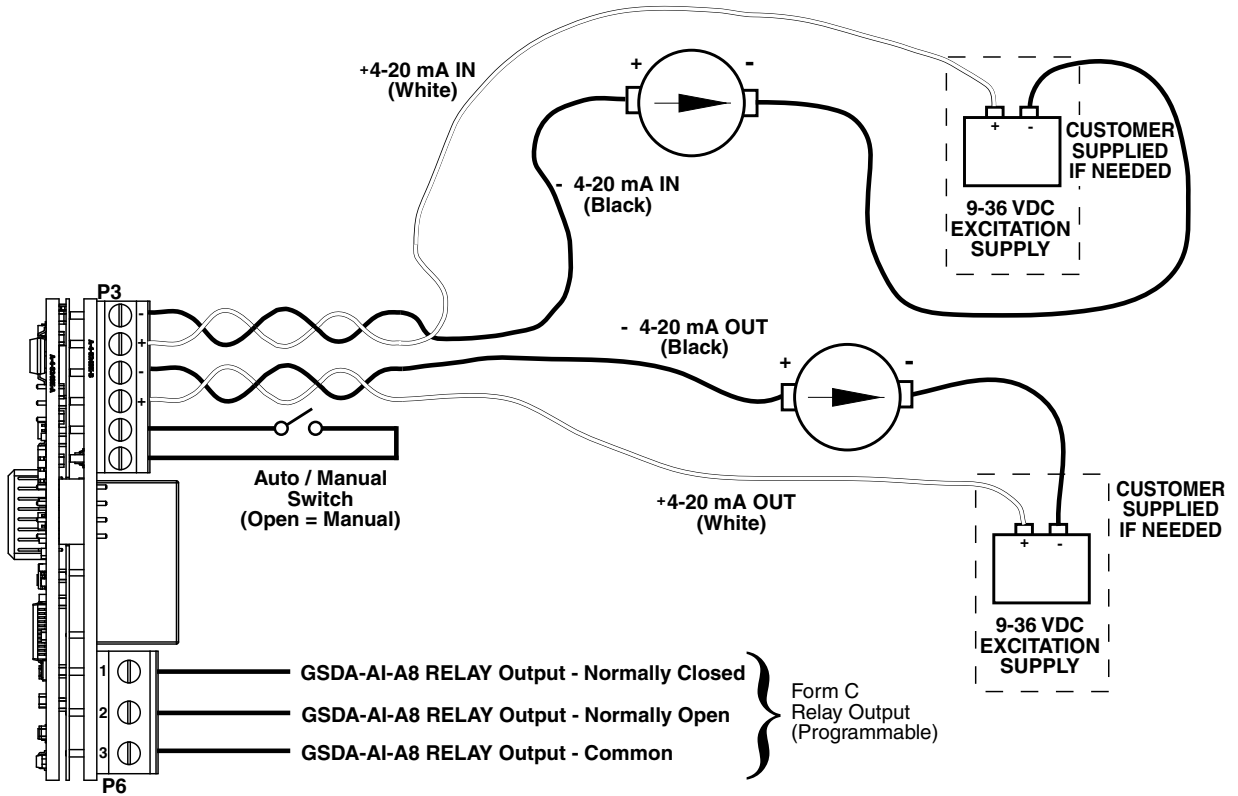
"Configuration Change--Card in slot 200 is not in stored configuration--Up button to store factory defaults...dn button to ignore card."

If the Up button is pushed, the factory settings will be installed and the card will be initialized. If the Down button is pushed, the factory settings will NOT be installed and the card will NOT be initialized. The option to install the card will appear every time power is applied to the GSD8 drive until the card is configured or removed.

NOTE: THE GSDA-AI-A8 DOES NOT SUPPLY LOOP "EXCITATION VOLTAGE". If the flowmeter, SCADA system, etc. does not have a Loop Excitation supply, an external +9 to +36 VDC power source must be provided, capable of at least 50mA for each of the two 4-20 mA Current Loops (Input and Output), as shown in the diagram below. Additionally, if the Input and Output must be isolated from each other, two excitation supplies may be needed.

Terminal Block Descriptions	
Terminal	**Description**
P3 Terminal Blocks	
P3-1	(- 4-20 mA Input) – Connect this terminal to the next 4-20 mA device in the loop, or, if the GSDA-AI-A8 is the last device in the current loop, then connect this terminal to the - (negative) side of the current loop.
P3-2	(+ 4-20 mA Input) –Connect this terminal to the previous 4-20 mA device in the loop, or, if the GSDA-AI-A8 is the first device in the current loop, then connect this terminal to the + (positive) side of the current loop.
P3-3	(- 4-20 mA Output) – Connect this terminal to the next 4-20 mA device in the loop, or, if the GSDA-AI-A8 is the last device in the current loop, then connect this terminal to the - (negative) side of the current loop.
P3-4	(+ 4-20 mA Output) –Connect this terminal to the previous 4-20 mA device in the loop, or, if the GSDA-AI-A8 is the first device in the current loop, then connect this terminal to the + (positive) side of the current loop.
P3-5	(S1 Input) – Connect this terminal to one side of a SPST switch to control Auto/Manual Operation. If switch is OPEN (or unconnected), MD40/50-420 Target Speed will come from its Target Speed setting (as usual), if the switch is CLOSED, MD40/50-420 Target Speed will follow the GSDA-AI-A8 4-20 mA Current Loop Input. This signal is internally "pulled-up" via a 15K Ohm resistor.
P3-6	(COM) – This is the common point for the control logic. Normally, the other side of the SPST Auto/Manual switch would be connected to this terminal.
P6 Terminal Blocks	
P6-1	(NC) – This is the normally-closed contact of the user-assignable GSDA-AI-A8 Alarm 2 relay.
P6-2	NO) – This is the normally-open contact of the user-assignable GSDA-AI-A8 Alarm 2 relay.
P6-3	(C) – This is the common contact of the user-assignable GSDA-AI-A8 Alarm 2 relay.

NOTE: P3-1, 2, 3, & 4 are isolated inputs.

How to Change a Parameter's Value

1) Hold down the Enter button until Parameter Mode is entered. The 'Parm' indicator will light up
2) Using the Up and Down buttons, select the desired parameter number to view or edit
3) Press the Enter button to change the value of the parameter. The 'Valu' indicator will light up
4) Using the Up and Down buttons, change the parameter's value as desired
5) Press the Enter button to save the changes (Returns to Parameter Mode)
6) Select Parameter Zero ("0") and press the Enter button to return to Running Mode

NOTE: See control manual for further explanation

GSDA-AI-A8 Software Parameters

NOTE: Add the "Slot" Number (100, 200, 500) X 10 to the Item number below to determine the actual Item Number in the GSD8 Drive's Item-Numbering scheme. For example, to set Item 41 of an GSDA-AI-A8 in Slot 200, you would select Item 2041 (200 X 10 + 41).

Parameter	Description	Value Range	Units	Default
0	Select parameter 0 to return to Run mode	n/a		n/a
Read-Only Parameters				
1	Model Number	420 = GSDA-AI-A8		420
2	Software Version	1 – 9999		
3	Hardware Version	1 – 9999		
4	Device Type	100 = Type 1 Communications Card		100
5	Minimum Supported Framework Version	1 – 9999		
6	Maximum Supported Protocol Version	1 – 9999		
7	Serial Number (Major)	0-9999		n/a
8	Serial Number (Minor)	0-9999		n/a
4-20 mA Input Scaling Parameters				
20	GSDA-AI-A8's Target Speed to Drive @ 4mA Input Current	0 – 9999 (Limited by Drive's Display Minimum Setting)	(Eng. units)	0
21	GSDA-AI-A8's Target Speed to Drive @ 20mA Input Current	0 – 9999 (Limited by Drive's Display Maximum Setting)	(Eng. units)	2400
22	4mA Input Trim	-600 – +600[1]		0
23	20mA Input Trim	-600 – +600[1]		0
4-20 mA Output Scaling Parameters				
40	Actual (S1 tach) Speed from Drive needed to Produce 4mA Output Current from GSDA-AI-A8	0 – 9999	(Eng. units)	0
41	Actual (S1 tach) Speed from Drive needed to Produce 20mA Output Current from GSDA-AI-A8	0 – 9999	(Eng. units)	2400
42	4mA Output Trim	-600 – +600[1]		0
43	20mA Output Trim	-600 – +600[1]		0
Read-Only Real-time Process Variables				
70	Input Current to GSDA-AI-A8	0 – 4095	ADC Steps	n/a
71	Target Speed to Drive from GSDA-AI-A8	0 – 9999	(Eng. units)	n/a
72	Output Current to Drive from GSDA-AI-A8	0 – 4095	(Eng. units)	n/a
73	GSDA-AI-A8 Condition Flags (not yet implemented)	0 = No Active "Flags" 1 – 9999 = Flags Activated	BCD	0
74	GSDA-AI-A8 Auto/Manual Switch State	0 = Manual Mode 1 = Auto Mode		0

GSDA-AI-A8 Software Parameter Descriptions

Parameter	Parameter Name	Description
Read-Only Identification Parameters		
1	Model Number	This number represents the base model number for the product. The model code for the GSDA-AI-A8 card is 420. In this manual, where appropriate, the "Drive" in which this GSDA-AI-A8 card is installed is called the GSD8 Drive.
2	Software Version	The software version is a code which identifies the software "build number" of the unit.
3	Hardware Version	The hardware version is a code which identifies which hardware was used to build the unit.
4	Device Type	This value is primarily used to determine whether the particular card has on-board non- volatile storage for its parameter settings. The GSDA-AI-A8 is a "Type 1" card (value = 100), which does not have its own non-volatile storage. It depends on the GSD8 Drive to store its parameter settings. This means that if a GSDA-AI-A8 must be replaced in a GSD8 Drive, the "new" GSDA-AI-A8 does not need to be configured. It will simply "inherit" the "old" GSDA-AI-A8's parameter settings, provided it is placed in the same slot.

Parameter	Parameter Name	Description
5	Minimum Supported Framework Version	The lowest software "framework" version that is compatible with this card.
6	Maximum Supported Protocol Version	The protocol version is a code which identifies the highest (most-recent) version of the protocol with which this card is compatible.
7	Serial Number (Major)	These parameters are reserved for future use as an electronic serial number and are unique to each manufactured unit.
8	Serial Number (Minor)	
	4-20 mA Input Scaling Parameters	
20	GSDA-AI-A8's Target Speed to Drive @ 4mA Input Current	This is the Target Speed setting that the GSDA-AI-A8 makes available to its GSD8 Drive when there is 4mA of current flowing through the GSDA-AI-A8's Input Loop terminals. The setting is in the GSD8 Drive's "Engineering Units", just as if the Target Speed was being entered on the GSD8 Drive itself. This setting is limited by the GSD8 Drive's Minimum Display setting.
21	GSDA-AI-A8's Target Speed to Drive @ 20mA Input Current	This is the Target Speed setting that the GSDA-AI-A8 makes available to its GSD8 Drive when there is 20mA of current flowing through the GSDA-AI-A8's Input Loop terminals. The setting is in the GSD8 Drive's "Engineering Units", just as if the Target Speed was being entered on the GSD8 Drive itself. This setting is limited by the GSD8 Drive's Maximum Display setting. This setting should also be greater than the setting for Parameter 20, above.
22	4mA Input Trim	Used to compensate for minor inaccuracies in the overall system that is connected to the GSDA-AI-A8's Input Loop terminals. This "trim", which has a range that goes both positive and negative, affects the 4mA endpoint of the GSDA-AI-A8's input range. To return to the factory-calibrated 4mA endpoint, set this parameter to a value of zero.
23	20mA Input Trim	Used to compensate for minor inaccuracies in the overall system that is connected to the GSDA-AI-A8's Input Loop terminals. This "trim", which has a range that goes both positive and negative, affects the 20mA endpoint of the GSDA-AI-A8's input range. To return to the factory-calibrated 20mA endpoint, set this parameter to a value of zero.
	4-20 mA Output Scaling Parameters	
40	Actual (S1 tach) Speed from Drive needed to Produce 4mA Output Current from GSDA-AI-A8	This is the Actual Speed (tach) value that the GSDA-AI-A8 translates into 4mA of current flow through the GSDA-AI-A8's Output Loop terminals. The setting is in the GSD8 Drive's "Engineering Units", just as if the Tach Display was being viewed on the GSD8 Drive itself.
41	Actual (S1 tach) Speed from Drive needed to Produce 20mA Output Current from GSDA-AI-A8	This is the Actual Speed (tach) value that the GSDA-AI-A8 translates into 20mA of current flow through the GSDA-AI-A8's Output Loop terminals. The setting is in the GSD8 Drive's "Engineering Units", just as if the Tach Display was being viewed on the GSD8 Drive itself.
42	4mA Output Trim	Used to compensate for minor inaccuracies in the overall system that is connected to the GSDA-AI-A8's Output Loop terminals. This "trim", which has a range that goes both positive and negative, affects the 4mA endpoint of the GSDA-AI-A8's Output range. To return to the factory-calibrated 4mA endpoint, set this parameter to a value of zero.
43	20mA Output Trim	Used to compensate for minor inaccuracies in the overall system that is connected to the GSDA-AI-A8's Output Loop terminals. This "trim", which has a range that goes both positive and negative, affects the 20mA endpoint of the GSDA-AI-A8's Output range. To return to the factory-calibrated 20mA endpoint, set this parameter to a value of zero.

REAL-TIME PROCESS VARIABLE DESCRIPTIONS

Rather than being a "setting" or a "switch" type parameter, parametres 70 through 74 on the GSDA-AI-A8 are used to view (only) certain Real-Time "Process" variables going to/from the GSDA-AI-A8. These parameters are mainly useful in troubleshooting a particular application, rather than being of general-purpose use.

Parameter	Parameter Name	Description
70	Input Current to GSDA-AI-A8	This shows the instantaneous input loop current to the GSDA-AI-A8, in raw ADC "steps". Since the GSDA-AI-A8 uses a 12-bit A/D, the range of this parameter can be from 0 to 4095, although it will not get to these extremes in the typical 4-20 mA setup. The actual number is of less interest than whether the numbers tend to "follow" a 4-20 mA input signal.
71	Target Speed to Drive from GSDA-AI-A8	This shows the instantaneous "Target Speed" that the GSDA-AI-A8 has calculated to make available to the GSD8 Drive, in the GSD8 Drive's Engineering Units, based on the Input Current flowing through P3 1 & 2 on the GSDA-AI-A8, and the setting of GSDA-AI-A8 parameters 20 through 23.
72	Output Current to Drive from GSDA-AI-A8	This shows the instantaneous output loop current from the GSDA-AI-A8, in raw DAC "steps". Since the GSDA-AI-A8 uses a 12-bit D/A, the range of this parameter can be from 0 to 4095, although it will not get to these extremes in the typical 4-20 mA setup. The actual number is of less interest than whether the numbers tend to "follow" the GSD8 Drive's Actual (S1 Pickup) "Tach" speed.
73	GSDA-AI-A8 Condition Flags (not yet implemented)	Not yet implemented.
74	GSDA-AI-A8 Auto/Manual Switch State	This shows the instantaneous state of the Auto/Manual switch input. A value of zero means that the GSDA-AI-A8 will report "Manual" mode to the GSD8 Drive. A value of 1 equals "Auto" mode.