ARD154

DIN RAIL MOUNTABLE AMPLIFIER FOR STRAIN GAGE SENSORS

User's guide

SUMMARY

Technical specifications are subject to change without further notice.

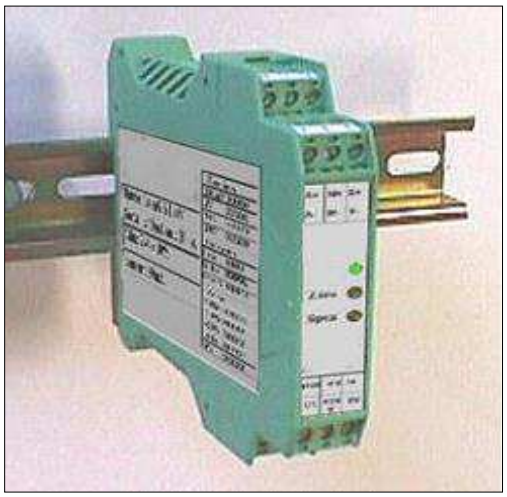
1.INTRODUCTION

Dear customer,

Thank you for choosing MEAS Strain Gage conditioning electronics ARD154. Please take a few moments to read these instructions, since warranty applies only if the devices are properly installed, used and maintained.

DESCRIPTION

The **ARD154** is a DIN rail mountable amplifier, which adapts to most strain gage-based load cells, pressure transducers and accelerometers. The bridge supply voltage can be set to 5 V or 10 V for ±10 V analogue output signals or 0/4-20 mA current outputs. The module covers a sensitivity range from 0.1 mV/V to 30 mV/V. It also allows connecting four 350 Ω sensors in line with 5V excitation.



- Suited for 1 to 4 Strain Gage Sensors
- 120 to 10000 Ω Bridge Impedance
- 10 V or 5 V Bridge Excitation – 4 or 6 wires
- Adjustable Sensitivity Range 0.1 to 30 mV/V
- Calibration Pushbutton from 0.1 to 10 mV/V
- Zero and Gain Fine Tuning by Trimmers
- ±10 V Analog or 0/4-20 mA Current Output
- 0.01% F.S. Accuracy
- 2 kHz or 20 kHz max. Bandwidth
- 24 Vdc ±10% Isolated Power Supply

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TECHNICAL SPECIFICATION

Sensor Type	Full bridge, strain gage-based, 4 or 6 wires Optional ½ and ¼ bridge 350 Ω (120 Ω on request)
Bridge Impedance	120 Ω < Z < 10000 Ω (for 120 Ω, bridge excitation 5 V max.)
Bridge Supply Voltage	5 V or 10 V (for 120 Ω select 5 V) i maxi 60 mA
Sensor Cable rejection	2.10-5 / Ω
Input Sensitivity	5 ranges from 0.1 mV/V to 30 mV/V
Fixed Zero Offset	4 ranges from ±20% to ±100% F.S.
Adjustable Zero Offset	±20 % minimum of the full scale
Calibration Levels	0.1 to 10 mV/V
Voltage Output **Output Current** **Output Impedance**	±10 V 5 mA 0.3 Ω
Current Output **Dynamic of the Current Output**	4-20 mA or 0–20 mA, ±20mA ±10 V (Load Resistance 500 Ω at 20 mA)
Linearity	0.01% F.S.
Maximum Drift at the Input	< 1 µV / °C max.
Maximum Noise at the Input	< 3 µV RMS
Common Mode Rejection	100 dB
Rejection of Power Supply Variations	120 dB
Bandwidth	2 kHz or 20 kHz at -3dB (15kHz maxi for range 0.1mV/V)
Power Supply	24 Vcc ±10% Consumption 100 mA max.
Power Supply Isolation	1000 V dc max. 1 min between 0 V and GND output 400 V peak between: 0V input/ earth or GND output/earth
Operating Temperature	-10°C to 60°C
Storage Temperature	-40°C to 70°C
DIN rail mountable module	H: 99 L: 17.5 P: 112 mm.
Screw Connector Blocs	4 x 3 screws
Weight	110 grams approx.

2.SETTINGS AND ADJUSTMENTS

Basic settings, including bridge supply voltage, bandwidth, signal output and fixed zero offset are easily performed with onboard jumpers. Zero and Gain adjusting is performed by trimmers on the front panel.

Important Advice: Disconnect all cables, before opening the module.

CONFIGURABLE PARAMETERS :

- Range of sensitivity in mV/V, jumpers of ranges « GAIN 1 to 5 »
- Offset jumpers «DZ 1 to 4 »
- Bandwidth, jumper « BP2K » (without jumper the bandwidth is 20 kHz)
- Voltage excitation, jumper « Up5V » (without jumper, excitation = 10V)
- Analog output, jumper on « U » voltage output, jumper on « I » current output

CALIBRATION POINTS

Several calibration points are possible. They depend on the range of selected sensitivity. Calibration point has always the value of the lowest sensitivity of the range. For example, for the range from 1 to 3 mV/V the calibration point is of 1mV/V.

To activate the calibration point it is necessary to maintain on the pushbutton of the front panel.

VALLUE TO ADJUST THE SYSTEM

Adjust the zero using the potentiometer of the front panel.

The value of analog output to be obtained depends on the sensitivity of the sensor. Press and hold on the pushbutton during the adjustment of the potentiometer to obtain:

Calibration voltage output Uc

Uc = (calibration point / sensor sensitivity) x 10V.

EXAMPLE OF ADJUSTMENT

Sensor sensitivity 1.26mV/V for 100 Kg (the full scale value of the sensor does not intervene in calculations)

Wished analog output: 10V for 100Kg (100kg corresponding to 1.26mV/V)

Range of sensitivity set on “1 to 3 mV/V, range n°3

With this range N°3 the calibration point is of 1mV/V.

Uc = (1 mV/V / 1.26 mV/V) x 10V = 7.936V

After having adjusted the zero, hold on the calibration pushbutton and adjust the “Gain” to obtain 7.936 volts at the analog output.

If it is not possible to reach the desired value, change the range by using the jumper inside the unit.

Caution: the calibration point changes too. Refer to the table below.

OTHER EXAMPLE:

1) ANALOG OUTPUT 10V FOR 3.26 mV/V

Sensor sensitivity 3.26mV/V for 500 Kg (the full scale value of the sensor does not intervene in calculations)

Wished analogue output: 10V for 500Kg (500kg corresponding to 1.26mV/V)

Range of sensitivity set on “3 to 10 mV/V, range n°4

With this range N°4 the calibration point is of 3mV/V.

Uc = (3mV/V / 3.26mV/V) x 10V = 9.202V .

After having adjusted the zero, hold on the calibration pushbutton and adjust the “Gain” to obtain 9.202 volts at the analogue output.

If it is not possible to reach the desired value, change the range by using the jumper inside the unit.

Caution: the calibration point changes too. Refer to the table below.

2) ANALOG OUTPUT ±20MA FOR 2 MV/V

Sensor sensitivity 2.00 mV/V for 100 Kg (the full scale value of the sensor does not intervene in calculations)

Wished analogue output: ±20mA for ±100Kg (100kg corresponds to 2.00mV/V)

Range of sensitivity set on “1 to 3 mV/V, range n°3

With this range N°3 the calibration point is of 1mV/V.

Non offset “DZ ”.

Uc = (1mV/V / 2mV/V) x 20mA = 10 mA .

After having adjusted the zero to get 0.00mA at the analogue output, hold on the calibration pushbutton and adjust the “Gain” to obtain 10mA at the analogue output.

If it is not possible to reach the desired value, change the range by using the jumper inside the unit.

Caution: the calibration point changes too. Refer to the table below.

3) ANALOG OUTPUT 4-20MA FOR 1.26 mV/V

Sensor sensitivity 1.26 mV/V for 500 Kg (the full scale value of the sensor does not intervene in calculations)

Wished analogue output: 4 - 20 mA for 0 to 500 Kg (500kg corresponding to 1.26 mV/V and 16 mA swing)

Range of sensitivity set on “1 to 3 mV/V, range n°3

With this range N°3 the calibration point is of 1mV/V.

Uc = (1mV/V / 1.26mV/V) x 16mA = 12.698mA .

After having adjusted the zero to get 0.00mA without offset “DZ” at the analogue output, hold on the calibration pushbutton and adjust the “Gain” to obtain 12.698 mA at the analog output.

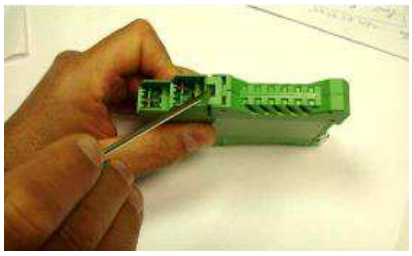
Adjust again the zero to get 4.00 mA when sensor is rest to zero or 12.698 mA + 4 mA = 16.698 mA with calibration pushbutton.

If it is not possible to reach the desired value of zero, change the offset by using jumper “DZ” inside the unit.

3. CONFIGURATION OF MODULE ARD154

Important Advice: Disconnect all cables before opening the module.

Open the case



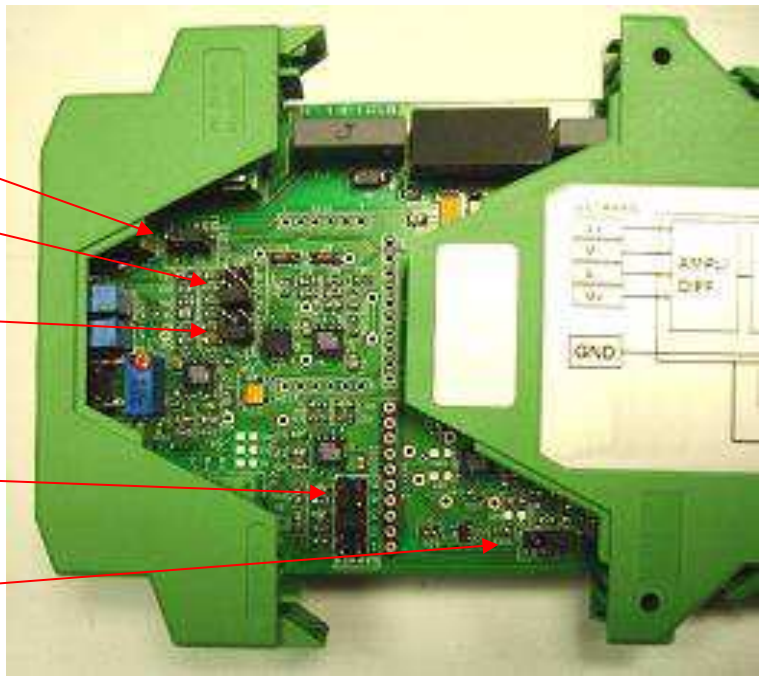
Analog output U or i

Zero offset 1 to 4

Bandwidth
2 kHz with jumper
20 kHz without jumper

Sensitivity ranges 1 to 5

Sensor excitation voltage
5V with jumper
10V without jumper



BOARD JUMPER CONFIGURATION

Sensitivity ranges	Sensibilité mV/V For Uexit = 10V Vout = 10V	Sensitivity mV/V for Uexit = 5V Vout = 10V	Calibration point mV/V
Range 1	0.1 to 0.3	0.2 to 0.6	0.1
Range 2	0.3 to 1	0.6 to 2	0.3
Range 3	1 to 3	2 to 6	1
Range 4	3 to 10	6 to 20	3
Range 5	10 to 30	20 to 60	10

Uexit = 5V	Jumper « Up5V »JP23	
Uexit = 10V	No jumper on JP23	
Bandwidth 2KHz	Jumper on « BP2K » JP24	
Bandwidth 20KHz	No jumper on JP24	
Analog output ±10V	Jumper on « SORTIE » U	
Analog output 4-20mA or 0 ±20mA	Jumper on « SORTIE » i	
Zero offset and adjustment jumper « Dz »	Potentiometer	± 50% range in mV/V
	Dz 1	+100% range in mV/V
	Dz 2	+50% range in mV/V
	Dz 3	-50% range in mV/V
	Dz 4	-100% range in mV/V

4. CONNECTION OF MODULE ARD154

Power Supply

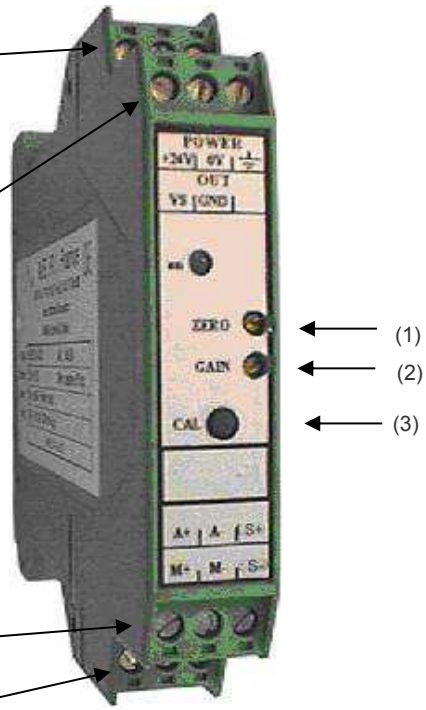
+24 V Supply	0 Volt Supply	Earth connected to DIN rail

Output

Analogue Output	GND Ground	Do not use

Inputs

A+ +Excitation	A- -Excitation	S+ +Sense
M+ +Measure	M- -Measure	S- -Sense



(1) Zero adjustment

(2) Gain adjustment

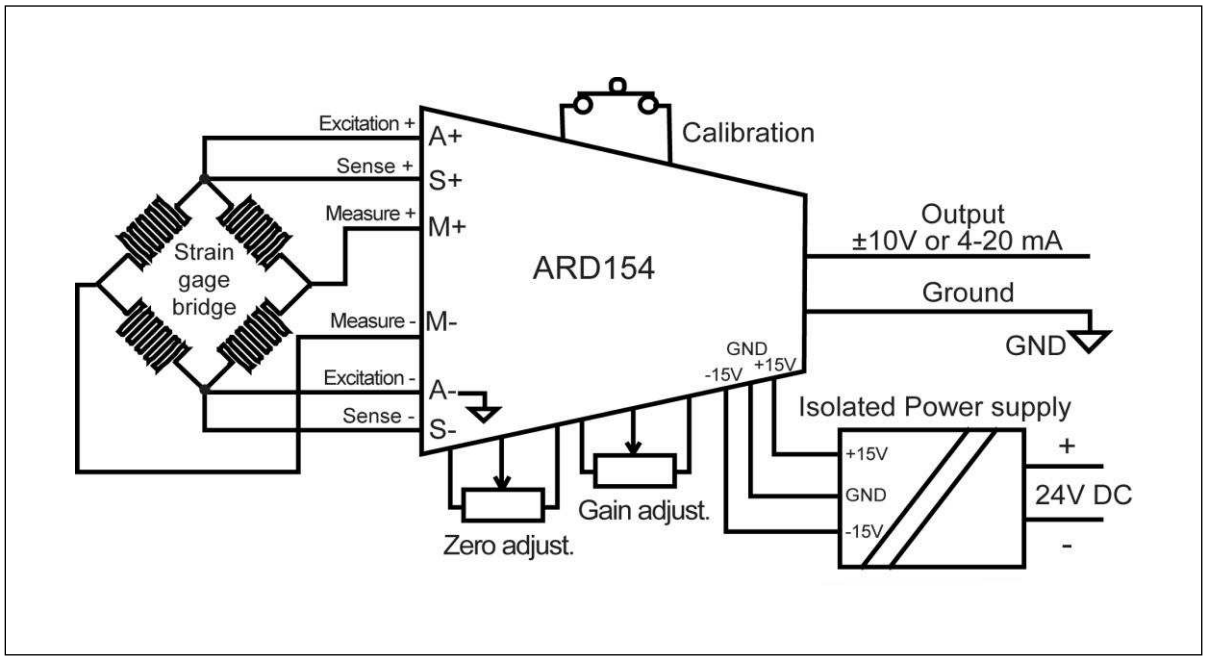
(3) Calibration point

5. CONNECTING 6-WIRE SENSORS

With compensation of sensor cable

Connections: S+ connected to sensor A+
S- connected to sensor A-
Shield connected to A- or to GND of analogue output.

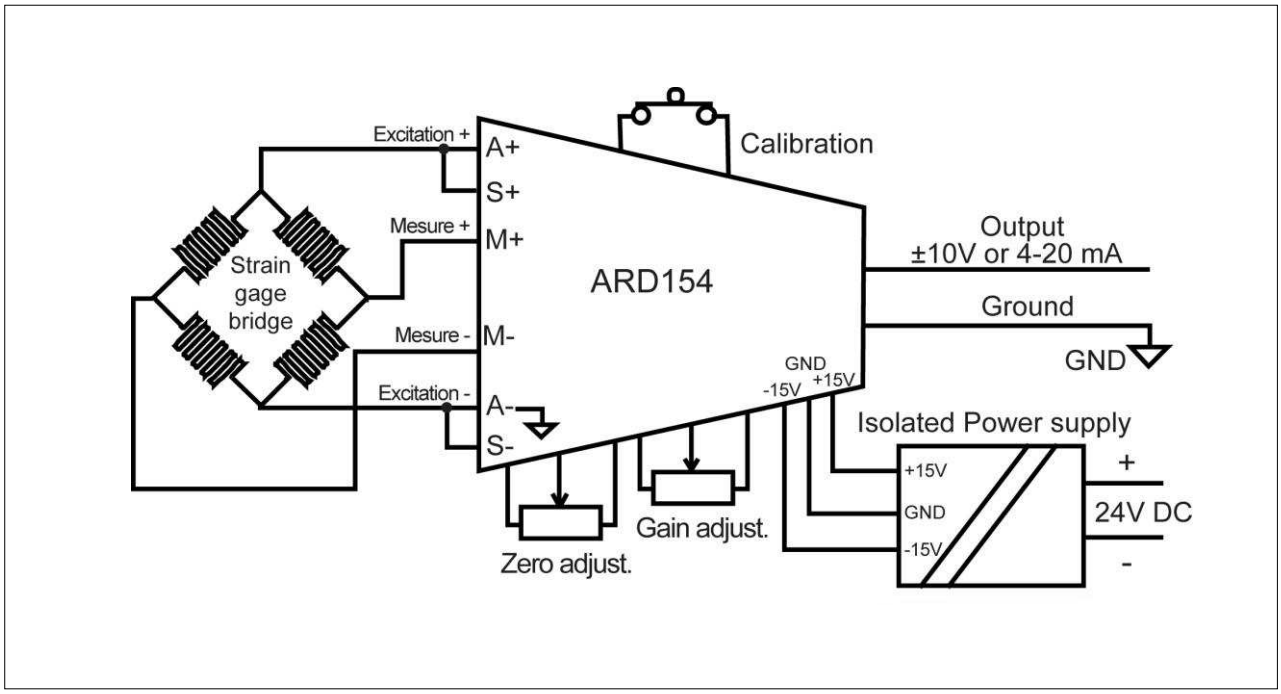
Note: A- and GND are connected together inside the module.
500 grams.



6. CONNECTING 4-WIRE SENSORS

Connections: S+ connected to module A+
S- connected to module A-
Shield connected to A- or to GND of analogue output

Note: A- and GND are connected together inside the module.



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