User's Guide

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DMD-476-DC Bridgesensor
DC Powered Signal Conditioner

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It is the policy of OMEGA to comply with all worldwide safety and EMC/EMI regulations that apply. OMEGA is constantly pursuing certification of its products to the European New Approach Directives. OMEGA will add the CE mark to every appropriate device upon certification.

WARNING: These products are not designed for use in, and should not be used for, patient-connected applications.

Features

- Complete Strain Gage Bridge Signal Conditioner
- 4-20 mA or 0-20 mA Output
- Output Capable of Driving 1000 ohm Loop
- Bridge Balance with 68% Tare Offset Capability
- High Gain Amplifier; Can Accept Live Load Signals as Low as 3 mV and Provide 16 mA Output Span
- Sufficient Excitation Current for Five Load Cells
- Powered by 10 to 36 VDC Unregulated
- Rugged Epoxy Encapsulated Design

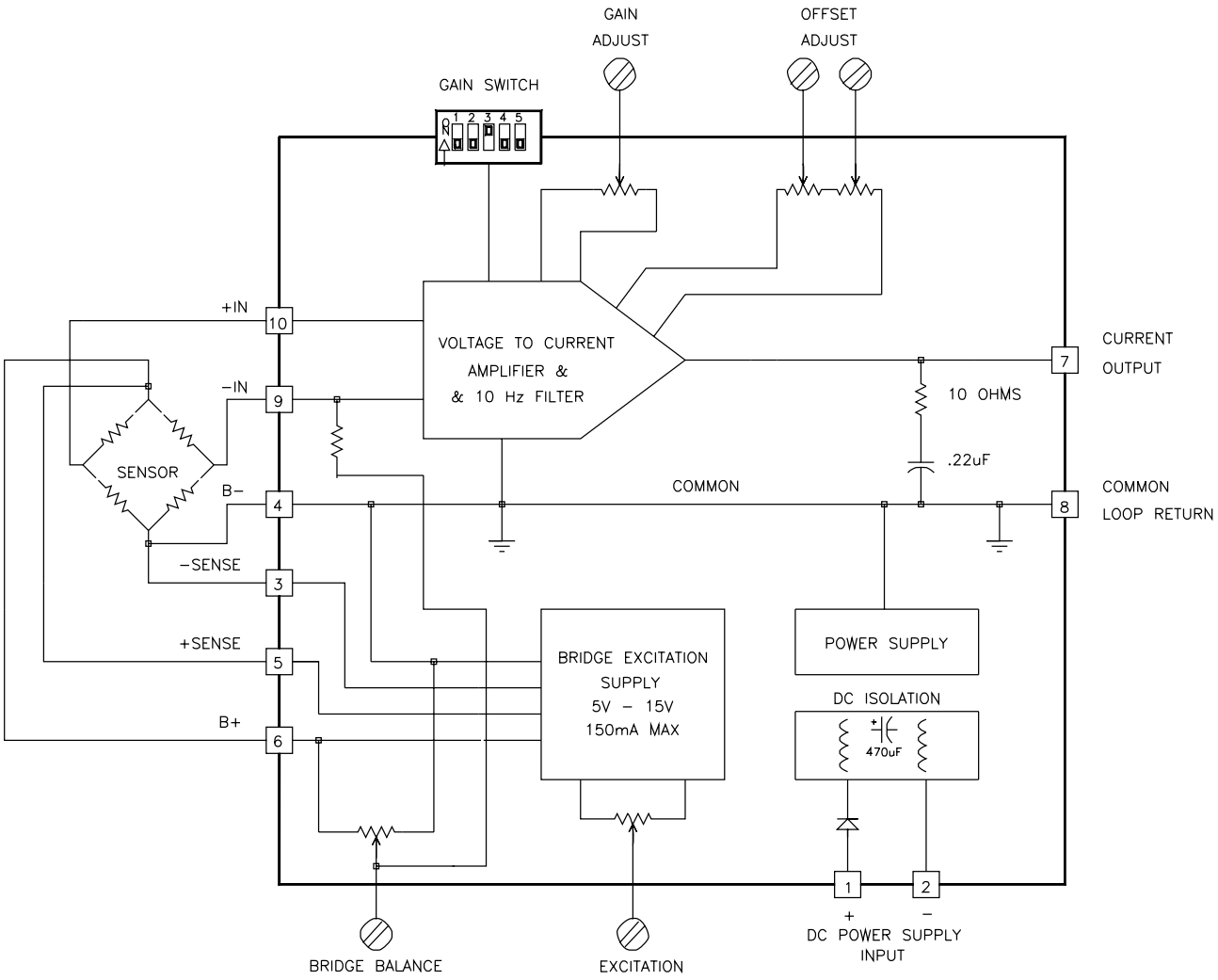
Description

The Model DMD-476-DC is a self contained, DC powered signal conditioner for bridge type instrumentation. It contains a precision differential amplifier with filtered output and a highly regulated, low noise, adjustable output bridge excitation source. What sets the DMD-476-DC apart is a Bridge Balance pot and high gain capability to accurately condition load cell weighing systems with large tare offsets and small live load signals. The unit is completely encapsulated for use in rugged environments.

Applications

- Weighing with Load Cells
- Process Control Add-on Loops

DMD-476-DC Block Diagram



Specifications

Output Current Span	4 to 20 mA; 0 to 20 mA
Input for 16 mA Span	3 mV to 62 mV
Zero Adjust	12 mA
Temperature Coefficient 0° to 55°C	1 microamp/°C typical 4 microamp/°C maximium
Hysteresis	50 microamp maximum
Amplifier	
Cell Sensitivity (10 Volts Excitation)	0.3 mV/V to 6.2 mV/V
Linearity	0.005% typical
Temperature Stability	50 ppm/°C
Hysteresis	0.1% of span maximum
Input Bias Current	150 pA maximum
Input Noise: DC to 10 Hz	4 microvolts P-P maximum
Common Mode Input	0 to +7.5 Volts
Common Mode Rejection DC to 60 Hz	90 dB minimum
Output	
Current	0 to 20 mA
Loop Resistance	0 to 1000 ohm
Compliance	20 Volts maximum
Frequency Response	10 Hertz, 2 Pole Filter
Response Time to 0.1%	90 ms typical
Bridge Excitation Supply	
Adjustment Range	5 to 15 Volts
Load Current	150 mA maximum
Stability	100 ppm/°C maximum
Hysteresis	0.1%
Bridge Balance Adjust- (Tare Weight)	
With 350 ohm Load Cell 3mV/V Sensitivity	±68% of Full Scale
Power Requirements	
Input power supply is DC isolated from the amplifier and is reverse polarity protected.	
Input Voltage	10 to 36 Volts DC
Input Current with 150mA B+ load with one 350 ohm Bridge	 0.17A @ 36V to 0.7A @ 10V 0.1A @ 36V to 0.35A @ 10V
120 Hertz Ripple allowed on input supply	1 Volt P-P at 10 Volts input 2 Volts above 12 Volts input
Isolation	700 Volts DC & .0033 mF

NOTE: Specifications apply 0°C to 55°C and 10 to 36 Volts DC input.

Getting Started with the Model DMD-476-DC

This procedure is for large tare weights, i.e. greater than about 10% of the cell's full scale rating.

I. Hook Up Procedure

A. Connect the + out of your load cell to the + INPUT, pin 10.

B. Connect the - out of your load cell to the - INPUT, pin 9.

Note: If the ±SENSE are not used in your application, the connections in step C & D need to be followed. If the ± SENSE are going to be used, do not jumper them as described in steps C & D.

C. Connect +Excitation, pin 6, to the + excitation of your load cell and jumper the + SENSE, pin 5, to +Excitation, pin 6.

D. Connect -Excitation, pin 4, to the - excitation of your load cell and jumper the - SENSE, pin 3, to -Excitation, pin 4.

E. Determine the voltage of the power supply to be used and adjust within the 10 to 36 volt range if necessary before connecting to the power pins, 1 and 2.

F. Verify that the hook up procedure is complete.

G. Turn on the power supply and check the bridge excitation supply.

II. Calibration Procedure

A. Set the GAIN SWITCH position 1 ON and all others OFF.

B. Short the signal input pins 9 and 10 together with a clip lead. Adjust the COARSE and FINE OFFSET pots, C and B, for zero or 4 mA output current.

Note: Some PLC models do not accept negative inputs. The maximum negative current is 1 mA.

C. Remove the short between the signal input pins, 9 and 10. Adjust the BRIDGE BALANCE pot for zero or 4 mA output current.

D. Set the GAIN SWITCH to the expected load cell output.

E. Adjust the BRIDGE BALANCE pot for zero or 4 mA output current.

F. Apply the live load to the cell and adjust the GAIN, pot D, for the desired output current.

G. Remove live load and use the COARSE and FINE OFFSET pots to set the zero or 4 mA output current.

H. Repeat steps E. to G. until the desired settings are obtained.

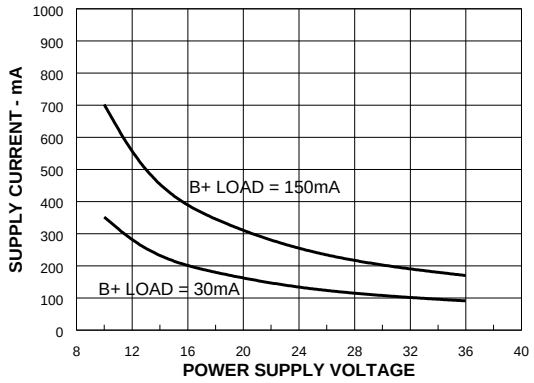
Amplifier

The built-in amplifier is a true differential input, low noise, low drift, instrumentation amplifier. It has a high common mode rejection ratio (CMRR) and is provided with an output offset that is potentiometer adjustable. The output offset pots adjust the output zero current up to 12 mA. The zero current can also be adjusted for 0 to 20 mA output. The instrumentation amplifier has a gain DIP switch which changes the gain by factors of two and a gain potentiometer for fine adjustments.

The amplifier accepts input signals of 3 mV to 62 mV. The amplifier can withstand input voltages up to 15 Volts without damage. The output of the amplifier is filtered to be 3 dB down at 10 Hz using a double pole Butterworth filter to minimize the effects of high frequency electrical and physical noise on the system.

The Model DMD-476-DC has a Bridge Balance pot which is connected internally to the amplifier - INPUT.

MODEL 437 POWER INPUT



Transducer Excitation

Transducer excitation is provided by an adjustable, well regulated, low noise power supply. The excitation voltage is adjustable by means of a molded-in potentiometer which allows the output voltage to be varied from 5 to 15 Volts. It is capable of supplying up to 150 mA to easily drive five 350 ohm load cells at 10 Volts.

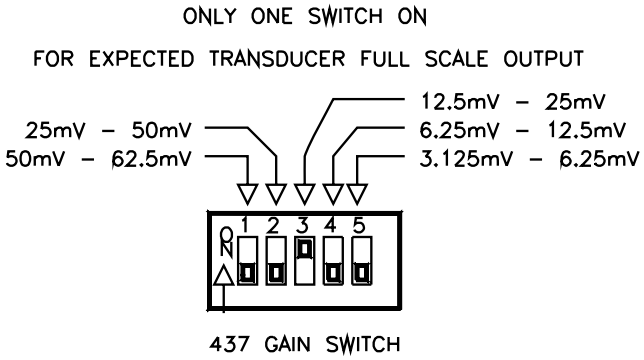
The +Excitation supply has remote sensing provisions for 6 wire configurations. The sense lines minimize variations in output voltage with changes in load current or lead resistance. The supply output, +Excitation, may be connected through a 300 ohm safety barrier and the sense lines will regulate the voltage across a 350 ohm bridge between 5 and 8 volts.

The supply has short circuit protection to protect it against short term faults. The output recovers automatically from short circuit conditions once the short is removed.

Bridge Balance

The Bridge Balance pot provides up to 68% of full scale tare weight adjustment when using a 350 ohm, 3 mV/V load cell. The DMD-476-DC can then be adjusted to provide full span output with only about 10% of the cell's range.

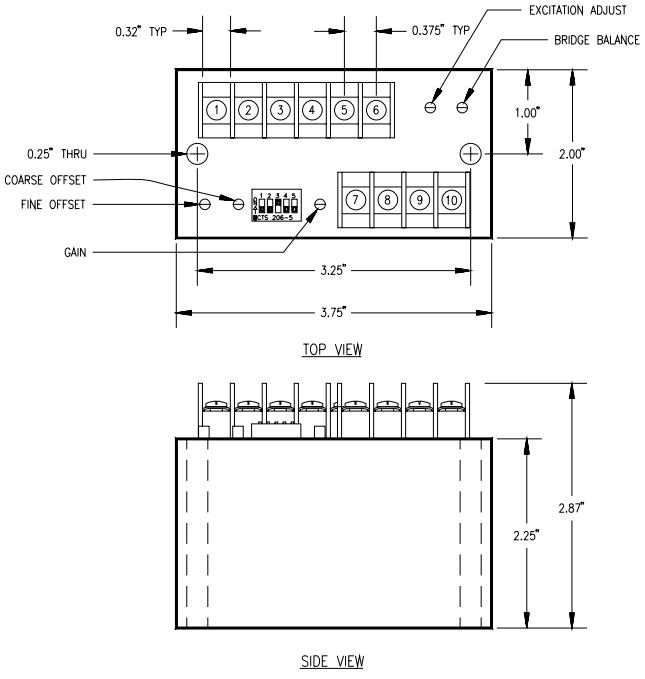
Model DMD-476-DC Gain Switch



Bridge Output Signal for:

	0 to 20 mA	**4 to 20 mA**
Gain Switch Position **"ON"**:		
1	50mV to 62.5mV	40mV to 50mV
2	25mV to 50 mV	20mV to 40mV
3	12.5mV to 25mV	10mV to 20mV
4	6.25mV to 12.5mV	5mV to 10mV
5	3.125mV to 6.25mV	2.5mV to 5mV

Mechanical Specifications



Terminal Strip Assignments			
Screw Terminal	**Function**	**Screw Terminal**	**Function**
1	+DC POWER	6	+EXCITION
2	-DC POWER	7	CURRENT OUTPUT
3	-SENSE	8	AMPLIFIER CMN
4	-EXCITATION	9	-INPUT
5	+SENSE	10	+INPUT

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WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA Warranty adds an additional one (1) month grace period to the normal one **(1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by it will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

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RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of product, and
3. Repair instructions and/or specific problems relative to the product.

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