COOPER
INSTRUMENTS & SYSTEMS

DCM 496

SIGNAL CONDITIONING MODULE

USER'S GUIDE

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1.0 INTRODUCTION

1.1 Overview

The Cooper DCM 496 Universal Inline Amplifier is housed in a small plastic package, which is connected between the transducer and a readout instrument. The DCM 496 amplifier supplies a highly regulated bridge excitation voltage for the transducer and converts the millivolt signal of the transducer to a +/- 5-volts DC. The inline features include two selectable excitation voltages, programmable gain settings, a wide adjustment range on the zero and a buffered solid state shunt cal relay for quick calibration.

1.2 Specification

Power Requirements	11-28 volts DC
Bridge Excitation	5 or 3 volts DC @ 70mA (user selectable)
Output voltage range	+/- 5 volt @ 2.5 mA
Frequency response	DC - 5000 Hz
Zero Balance range	± 50% coarse, ± 15% fine adjustment range
Gain Adjustment Range	Switch selectable (0.5 to 5 mV/V), ± 25% fine adjust
Short circuit protected	(+) Output to (-) Output
Environment Protection	IP-66 or NEMA 4
Shunt calibration	Solid State Relay
Long Term Zero Drift	.1% of Full Scale per 6 months

1.3 Layout

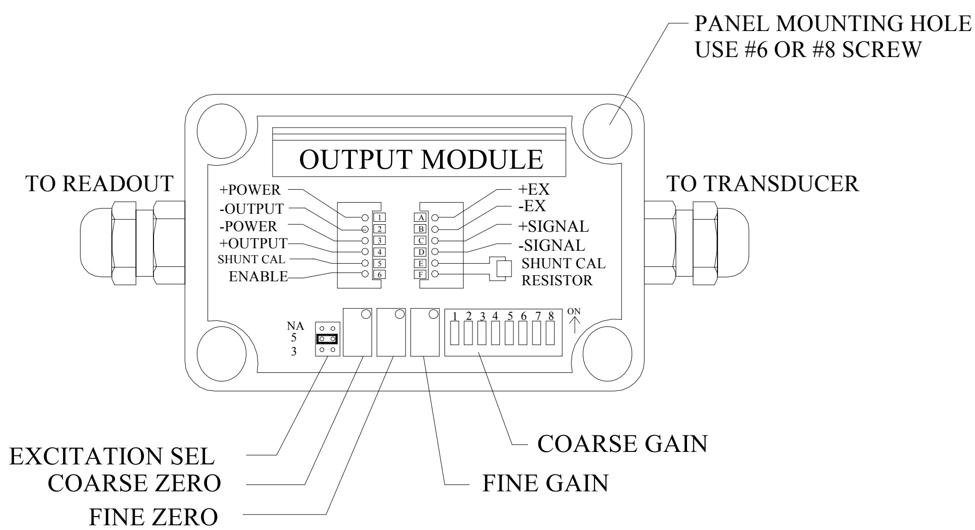


Fig. 1-1. Layout of Inline Amplifier

2.0 INSTALLATION / SET UP

2.1 Wiring

The DCM 496 INLINE amplifier can be powered from an 11 to 32 volt single voltage supply. The following diagrams show the wiring to the supply and readout.

Cables should be stripped back 3 inches with the wires stripped and tinned 1/2 inch. Connections to the terminal block are made by pressing the orange levers and inserting the wires into the hole next to the levers. The terminal block will accept wire up to AWG 20.

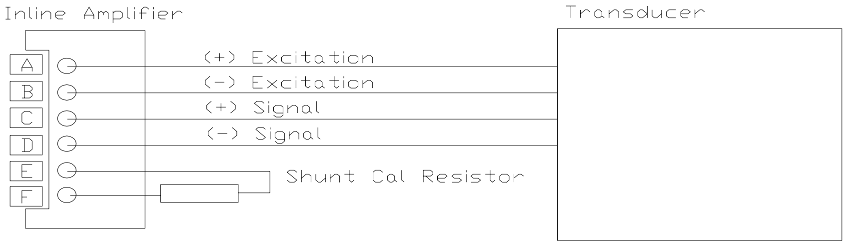
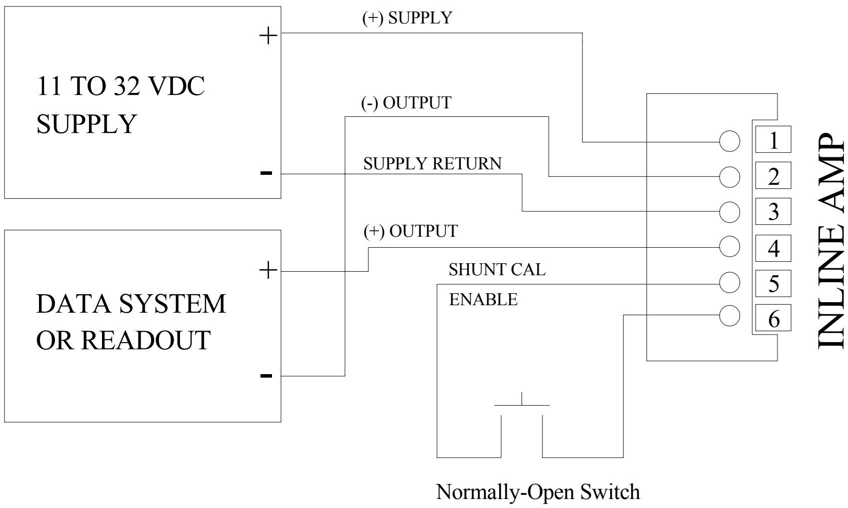


Figure 2-1. Transducer to Inline Wiring



CLOSE SWITCH TO ENERGIZE SHUNT CAL

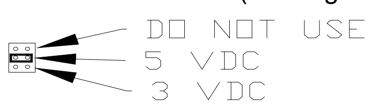
Figure 2-2. 11 to 32 Volt Power Supply to Inline Wiring

NOTE: -OUTPUT AND RETURN ARE TIED TOGETHER INTERNALLY

2.2 Excitation and Coarse Gain Switch

PROCEDURE FOR SETTING UP EXCITATION AND COARSE GAIN SWITCH:

1. Determine the EXCITATION VOLTAGE required by the transducer being used.
2. Set the EXCITATION SELECT JUMPER as shown below: (See Fig. 1-1 for location of jumper).



3. Determine the sensitivity of the transducer in mV/V from the transducer calibration sheet.
4. Set the COARSE GAIN SWITCH (See Fig. 1-1 for location of switch) to the nearest mV/V setting in the corresponding excitation column in Figure 2-3.

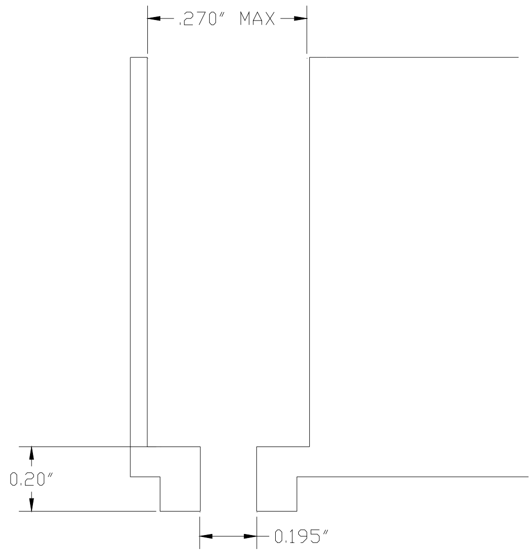
COARSE GAIN SETUP		
SWITCH POSITION on	EXCITATION	
	5	3
1 & 3	.75 MV/V	1.25MV/V
1	1 MV/V	1.6 MV/V
2 & 4	1.5 MV/V	2.5 MV/V
2	2 MV/V	3.3 MV/V
3 & 6	2.5 MV/V	4.1 MV/V
3	3 MV/V	5 MV/V
4 & 8	3.5 MV/V	5.8 MV/V
4	4 MV/V	6.6 MV/V
4 & 5	4.5 MV/V	7.5 MV/V

5	5 MV/V	8.3 MV/V
6	6 MV/V	10 MV/V
7	7 MV/V	11.6 MV/V
8	8 MV/V	13.3 MV/V

Figure 2-3. Coarse Gain Setup Table

2.3 Panel Mounting Information

The inline can be easily mounted to a panel by using the template in Appendix A for marking the holes in the panel. The cover must be removed to get access to the mounting holes. Use #6 or #8 screws for mounting box to panel.



NOTE: ACTUAL SIZE NOT SHOWN

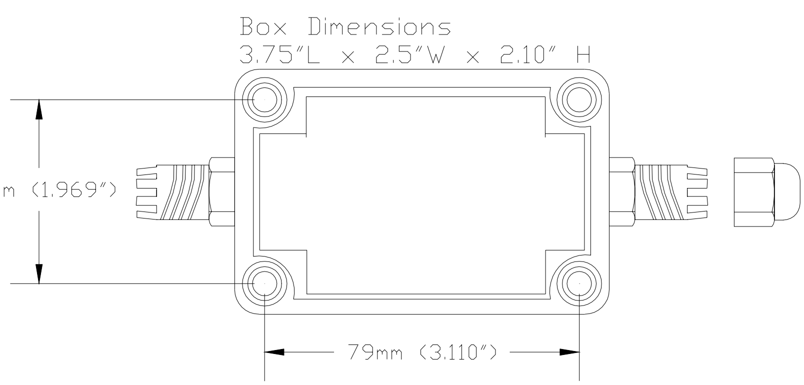


Figure 2-4. Panel Mounting Layout

3.0 CALIBRATION

3.1 Calibration

Step 1. Apply power and allow unit to stabilize for 10 minutes
Step 2. With zero load or pressure on the transducer adjust the ZERO potentiometers to indicate zero on the readout instrument.
Step 3. Apply full scale pressure or load to the transducer and adjust the SPAN potentiometer to indicate full scale on the readout instrument or voltmeter.
Step 4. Recheck zero and full scale (repeat steps 2 & 3)

3.2 Using Shunt Calibration

Cooper transducers feature a calibration technique called shunt calibration. This method applies a known resistance across one leg of the transducer, which simulates an output, as if a load or pressure was applied to the transducer. When performing shunt calibration the transducer should be at ZERO pressure or load. The full scale output and shunt cal output is found on the TRANSDUCER CALIBRATION SHEET. This information can be sued to calibrate the amplifier's output voltage and the readout's display with the following equations.

TRANSDUCER CALIBRATION DATA

Full Scale Output = ______________________ mV/V

Shunt Resistor Value of ____________________ Ohms

Shunt Cal Output = ____ ________________ mV/V

The following equations are used to calculate output current and display units:

3.3 Formula To Calculate Output Voltage

$$\frac{\text{SHUNT CAL OUTPUT}}{\text{FULL SCALE OUTPUT}} \times \text{FULL SCALE VOLTAGE} = \text{OUTPUT VOLTAGE}$$

__________________ X ____________________ = __________________

3.4 Formula To Calculate Display Units

$$\frac{\text{SHUNT CAL OUTPUT}}{\text{FULL SCALE OUTPUT}} \times \text{FULL SCALE UNITS} = \text{DISPLAY UNITS}$$

__________________ X ___________________ = ___________________

Step 1. Apply power and allow the amplifier to warm up
Step 2. With zero load or pressure on the transducer adjust the ZERO potentiometer to indicate zero on the readout instrument.
Step 3. Connect a jumper across PINS 5 & 6 of the power terminals (See Fig. 1-1) or wire in a switch as shown in wiring section. Adjust the span potentiometer to the calculated voltage or calculated units on the readout instrument.
Step 4. Disconnect the shunt cal jumper or release the shunt cal switch and repeat steps 2 & 3 if needed.

4.0 WARRANTY REPAIR POLICY

Limited Warranty on Products

Any Cooper Instruments product which, under normal operating conditions, proves defective in material or in workmanship within one year of the date of shipment by Cooper will be repaired or replaced free of charge provided that a return material authorization is obtained from Cooper and the defective product is sent, transportation charges prepaid, with notice of the defect, and it is established that the product has been properly installed, maintained, and operated within the limits of rated and normal usage. Replacement or repaired product will be shipped F.O.B. from our plant. The terms of this warranty do not extend to any product or part thereof which, under normal usage, has an inherently shorter useful life than one year. The replacement warranty detailed here is the buyer's exclusive remedy, and will satisfy all obligations of Cooper whether based on contract, negligence, or otherwise. Cooper is not responsible for any incidental or consequential loss or damage which might result from a failure of any and all other warranties, express or implied, including implied warranty of merchantability or fitness for particular purpose. Any unauthorized disassembly or attempt to repair voids this warranty.

Obtaining Service under Warranty

Advance authorization is *required* prior to the return to Cooper Instruments. Before returning the item, contact the Repair Department c/o Cooper Instruments at (540) 349-4746 for a Return Material Authorization number. Shipment to Cooper shall be at buyer's expense and repaired or replacement items will be shipped F.O.B. from our plant in Warrenton, Virginia. Non-verified problems or defects may be subject to a $100 evaluation charge. Please return the original calibration data with the unit.

Repair Warranty

All repairs of Cooper products are warranted for a period of 90 days from date of shipment. This warranty applies only to those items that were found defective and repaired; it does not apply to products in which no defect was found and returned as is or merely recalibrated. It may be possible for out-of-warranty products to be returned to the exact original specifications or dimensions.

* Technical description of the defect: In order to properly repair a product, it is *absolutely necessary* for Cooper to receive information specifying the reason the product is being returned. Specific test data, written observations on the failure and the specific corrective action you require are needed.