DM4051
STRAIN GAUGE (BRIDGE) INPUT FIELD RANGEABLE ISOLATED TRANSMITTER

The DM4051 provides an isolated output voltage or current proportional to a differential input signal from a strain gauge(bridge) input. It is useful for measuring outputs of load cells, pressure transducers, and strain gauge sensors.

A bipolar regulated voltage of ±5 volts DC with 35 mA capability is provided to excite the bridge. Input terminals are provided to connect the varying bridge element to a high quality differential preamplifier.

The output is fully isolated from input, line power, and ground. The unit is useful for eliminating ground loops and for isolating from common mode voltages. The DM4051 utilizes a feedback voltage controlled oscillator to develop a digital signal with a duty cycle proportional to the input signal amplitude. This signal is coupled through an isolating pulse transformer to the output circuitry, where the duty cycle data is converted to a proportional output signal level.

The module includes filtering and conditioning to reduce susceptibility to transients and noisy environments.

Input and output ranges are fully user-settable. With handy goldplated jumper connections, the user selects and sets - full range input span, suppressed and elevated full range input offset, response time/filtering, voltage/current output, output range, and normal/reverse acting output. Input span and zero adjustments provide full range adjustability. All adjustments, settings, and input and output connections are easily accessed from under a pull off/push on cover panel. A write-on label is supplied on the front panel for the user's convenience.

OPTIONS (User specified)

AC Power 24, 115 or 230 VAC

DC Power 12 or 24 VDC

U All circuit boards conformal coated for protection against moisture.

INSTALLATION

DM4051 mounts on standard DIN Rail. Install it by hooking the top of the module's latch onto the top of the rail, then use a downward rotating motion to snap the module onto the rail. To remove the module, insert a screwdriver into the slot on the spring loaded snapwhich is located on the lower backside of the unit. Apply a downward pressure on the release and rotate the module up and off of the rail.

1. Remove the front panel by spanning the top and bottom edges between the thumb and index finger. Use a rocking motion to pull the front panel away from the module.

2. Input, Output and Power connections are shown on the terminal block labels.

CAUTION: BEFORE PROCEEDING, REMOVE ALL POWER TO THE WIRES AND MODULE TO AVOID THE DANGER OF SHOCK AND/OR DAMAGE TO THE UNIT.

To access input and output terminals, the connecting wires are inserted into the top of the top terminal block, and into the bottom of the bottom terminal block. The terminal blocks unplug. Wiring can be completed before the product is installed. Recommended wire sizes are 22-14 AWG Cu, with a strip length of 0.25 inches.

3. Replace the front panel by inserting the pins into the slotted holes located on the bezel and pushing it into position.

4. The front panel label provides space for the user to make application notes.

CALIBRATION

The DM4051 is factory calibrated to the input and output noted on the side label.

The DM4051 allows the user to calibrate the module to operate as required for a specific application.

Field adjustments can be made by using the following recommended procedure.

CAUTION: BE SURE ALL RANGE SELECT JUMPERS ARE SET TO THEIR PROPER POSITIONS BEFORE APPLYING INPUT OR POWER.

1. Remove the front panel and disconnect the power.

2. Using the label on the side of the module (Figure 1) as a guide, position the jumper blocks for the desired operation of the following functions:

span - Choose the lowest span selection which includes the maximum of the input span. Span is the difference between the highest input and the lowest input. With the SPAN adjustment, the module's amplification can be calibrated to give the full output range for the input span.

% of offset cancel - The ZERO adjustment provides ±30% offset canceling. For larger offsets, select the % OFFSET CANCEL needed to zero the input signal. The ZERO adjustment will provide 30% variation above and below the selected offset cancel.

suppressed or elevated offset - select OFFSET CANCEL ELV if the input offset is positive and select OFFSET CANCEL SUP if the input offset is negative.

filter capacitor(use the capacitor selection chart to obtain the desired cut-off frequency and response time)

output range - Select the voltage or current range to obtain the desired output.

output mode - Select either voltage or current, this selection must be made in conjunction with the output range selection. There are two jumper positions for this selection, both must be selected.

normal or reverse acting output - Select normal for the output to increase as the input increases, select reverse for the output to decrease with increasing input.

3. Connect the mating input device or a voltage source calibrated to the excitation voltage being used to the input; and connect meters to the input and output terminals. Apply power to the module.

4. Set the input resistance/voltage to represent the zero level, the lowest value of the input span.

5. Observe the output meter. Use the ZERO adjustment to raise or lower the output to the desired zero level.

6. Set the input resistance/voltage to represent the upper limit of the SPAN, the highest value of the input span.

7. Observe the output monitor. Use the SPAN adjustment to raise or lower the output to the desired maximum level.

8. Repeat steps 4 to 7 to fine tune the output. Usually 3 repetitions will give the desired results.

9. Remove power, disconnect test equipment and install the module for operation. Replace the front panel.

Example for Span and Offset Selection

Strain Gauge
2 mV/V @ 1000με to be used over 400με to 1000με range

Fixed Excitation Voltage
10 Vdc

Actual Span
2 mV/V
Select Span Jumper for 2 mV/V

Actual Offset
(400με /1000με)x100%=40%
Select Offset Jumper for 50%
400με is elevated from zero
Select Elevated Jumper

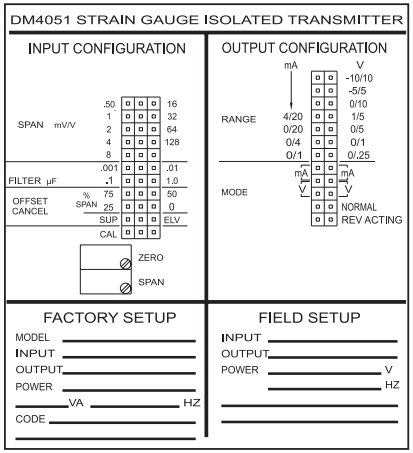
Input Voltage for Zero adjust
(2 mV/V)x(10V)x(400με\1000με)=8 mV

Maximum input for Span adjust
(2 mV/V)x(10V)x(1000με\1000με)=20mV

FILTER CAPACITOR SELECTION CHART		
CAPACITOR	**RESPONSE TIME TO 99%**	**LOW PASS CUT-OFF FREQUENCY**
µF		**Hz**
0.001*	20 msec	50
0.01	200 msec	5
0.1	2 sec.	0.5
1	20 sec.	0.05

*Ripple (p-p) ≤ 0.2%

FIGURE 1



SPECIFICATIONS

INPUT

Excitation supply
±5V(10V) @ 35mA

Input Impedance
>5 megohms

Span Select (User settable)
0.5, 1.0, 2, 4, 8,16, 32, 64, and 128 millivolts/volt

Span adjustment
+5%,-55% of selected span

Zero adjustment
±30% of selected span

Offsets (User settable)
Suppressed or elevated at 0%, 25%, 50% & 75% of selected span

OUTPUT

Modes (User settable)
Voltage/current
Normal/reverse acting

Range (User settable)
0/.25, 0/1, 0/5, 0/10, -5/5, & -10/10 VDC
0/1, 0/4, 0/20, & 4/20 mAdc

Accuracy
±0.1% of span

Step response time
see FILTER CAPACITOR SELECTION CHART

Ripple (peak-to-peak)
<0.1%

Input to Output Linearity
±0.01% of span

COMMON MODE REJECTION
120 dB DC to 60 Hz

ISOLATION, OUTPUT/INPUT
>500 megohms

BREAKDOWN, OUTPUT TO INPUT
>1000 volts RMS sinewave

BREAKDOWN, POWER CIRCUITRY
>1500 volts RMS sinewave

OPERATING TEMPERATURE 14° to 140°F (-10° to 60°C)

TEMPERATURE STABILITY
±(0.01% of span)/°C

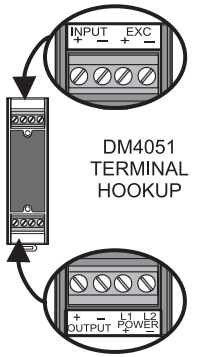
POWER (2.5 W max)
115 VAC ±10%, 50/60 Hz
230 VAC ±10%, 50/60 Hz
24 VAC ±10%, 50/60 Hz

DC(optional)
12 VDC nominal (10 to 15 VDC)
24 VDC nominal (21 to 28 VDC)

CAUTION: THE DIN/RAIL SHOULD BE EARTH GROUNDED (GREEN WIRE) TO ENSURE SAFEST OPERATION AND TO PROVIDE OPTIMUM PERFORMANCE.

MOUNTING

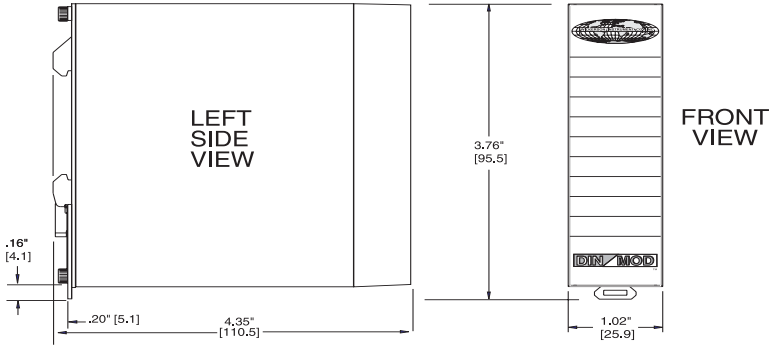
The DIN Rail package is installed by snapping it onto the rail and it is removed from the front side by using a screwdriver to release the spring loaded snap *(located on the lower backside of the unit)*.

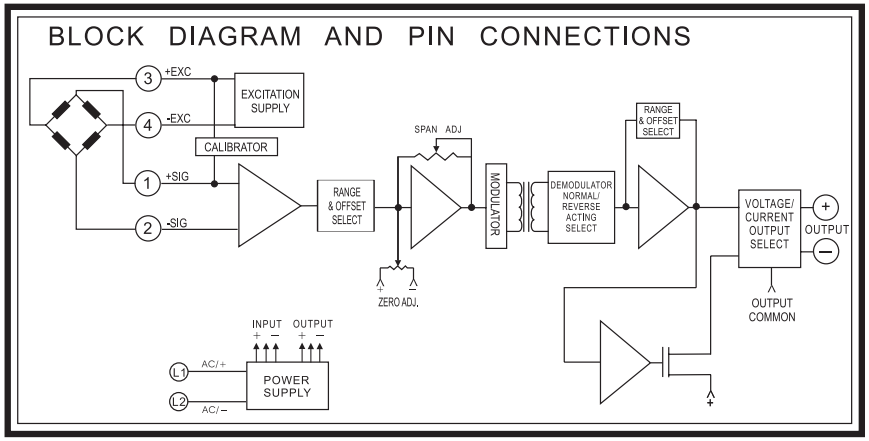


WARRANTY

The DIN/MOD Series of products carry a limited permanent warranty. In the event of a failure due to defective material or workmanship, the unit will be repaired or replaced at no charge. Relays are not covered by the warranty.

CASE DIMENSIONS INCHES [mm]





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