

# DM7010 FREQUENCY INPUT FIELD RANGEABLE ISOLATED TRANSMITTER



The DM7010 provides an isolated output voltage or current proportional to the frequency of the input AC voltage. The wide input voltage range allows the module to be used with low level magnetic pick-ups, for flow or speed applications, for digital signals, or for direct power line monitoring.

A selectable pull-up resistor allows input drive from switch closure or open collector transistor. Also, CMOS or TTL inputs are accepted.

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 DM7010 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 gold plated jumper connections, the user selects and sets - input frequency span, filter capacitor, 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.

The DIN Rail package snaps onto the rail and is easily removed from the front side by using a screwdriver to release the spring loaded snap.

## 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

DM7010 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 snap which 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 DM7010 is factory calibrated to the input and output noted on the side label.

The DM7010 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 frequency span which includes the maximum input frequency.

**pull-up/normal** - Choose pull-up to add a 4700 ohm to +5 Volts load to the input terminal.

**filter capacitor** - Use the filter capacitor selection chart to obtain the desired filter 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 calibrated frequency source to the input; and meters to the input and output terminals. Apply power to the module.
4. Set the input frequency 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 frequency 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 Frequency and Filter Selection:**

**Input Frequency:** 100 Hz to 1000 Hz

**Maximum Ripple:** .1%

**Output:** +5/-5 Volts

**Actual Span:** 900 Hz

(must include maximum input frequency)

Select Span Jumper for 1600 Hz

Select Filter Capacitor Jumper for 0.1µF (from the Chart)

Select Output Mode Jumpers for Volts (two positions)

Select Output Mode Jumper for REACTING

Select Output Range Jumper for -5/+5

Set input frequency to 100 Hz

Adjust Zero for +5 Volt output

Set Input frequency to 1000 Hz

Adjust Span for -5 Volt output

Repeat adjustments for accurate calibration

FILTER CAPACITOR SELECTION CHART				
FREQUENCY SPAN SETTING	MINIMUM CAPACITOR* SETTING FOR LESS THAN 0.1% RIPPLE PEAK-PEAK		MINIMUM CAPACITOR* SETTING FOR LESS THAN 0.5% RIPPLE PEAK-PEAK	
	HERTZ	CAPACITOR (µF)	RESPONSE TO 99% (*SEC)**	RESPONSE TO 99% (*SEC)**
12	2.2	110	1.0	50
25	2.2	110	1.0	50
50	1.0	50	0.47	24
100	1.0	50	0.47	24
200	0.47	24	0.47	24
400	0.47	24	1.0	5
800	0.47	24	0.047	2.4
1600	0.1	5	0.047	2.4
3200	0.047	2.4	0.047	2.4
6400	0.047	2.4	0.01	0.5
12500	0.01	0.5	0.0047	0.24
25000	0.01	0.5	0.0047	0.24
50000	0.0047	0.24	0.001	0.05

\* The minimum capacitor value is based on full span where the minimum frequency is 0.1% of the frequency setting. When the minimum frequency to be measured is greater than 0.1% of the frequency setting, the capacitor value may be decreased to improve the response time.

\*\* The minimum frequency which will meet the ripple specifications is 0.5 Hertz.

DM7010 FREQUENCY ISOLATED TRANSMITTER			
INPUT CONFIGURATION		OUTPUT CONFIGURATION	
PULL-UP NORMAL		mA      V -10/10 -5/5 0/10 0/5 0/1 0/1.25	
kHz    50    25    12.5    6.2    3.1    1.6    Hz SPAN		RANGE    4/20    0/20    0/4    0/1	
.001    .0047    .01    .047    .1    .47    1    2 FILTER μF		MODE    mA    mA    V    V NORMAL    REV ACTING	
ZERO SPAN			
FACTORY SETUP		FIELD SETUP	
MODEL _____		INPUT _____	
INPUT _____		OUTPUT _____	
OUTPUT _____		POWER _____ V	
POWER _____ VA      _____ HZ		_____ HZ	
CODE _____		_____	

Figure 1

## SPECIFICATIONS

<b>INPUT</b> Frequency Range 10 Hz to 50 kHz Impedance 100,000 ohms Coupling AC Voltage range 50 mV to 700 V p-p Span Select (User settable) 12, 25, 50, 100, 200, 400, 800, 1600, 3200, 6400, 12500, 25000 and 50000 Hz Span adjustment +5%, -55% of selected span Zero adjustment ±30% of selected span Offsets (User settable) None Pull-Up Resistor 4.7 kilohm (+5 VDC)	<b>OUTPUT</b> Modes Normal/ Reverse Acting Range (User settable) 0/.25, 0/1, 0/5, 0/10, -5/5, & -10/10 VDC & 4/20 mAdc Accuracy 0.1% of span Step response time see FILTER CAPACITOR SELECTION CHART Ripple (peak-to- peak) see FILTER CAPACITOR SELECTION CHART Input to Output Linearity ±0.01% of span	<b>COMMON MODE REJECTION</b> 120 dB DC to 60 Hz <b>ISOLATION, OUTPUT/INPUT</b> >500 megohms <b>BREAKDOWN, OUTPUT TO INPUT</b> >1000 volts RMS sinewave <b>BREAKDOWN, POWER CIRCUITRY</b> >1500 volts RMS sinewave <b>OPERATING TEMPERATURE</b> -13° to 140°F (-25° to 60°C)	<b>TEMPERATURE STABILITY</b> ±(0.01% of span)/°C <b>POWER</b> Wattage 2.5 W max AC Options 115 VAC ±10%, 50/60 Hz 230 VAC ±10%, 50/60 Hz 24 VAC ±10%, 50/60 Hz DC Options 12 VDC nominal (10 to 15 VDC) 24 VDC nominal (21 to 28 VDC)
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**CAUTION: THE DIN/RAIL SHOULD BE EARTH GROUNDED (GREEN WIRE) TO ENSURE SAFEST OPERATION AND TO PROVIDE OPTIMUM PERFORMANCE.**

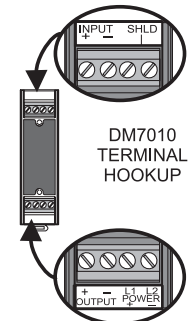
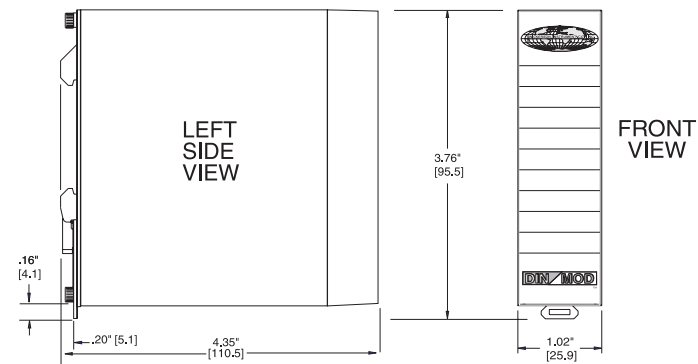
## MOUNTING

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).

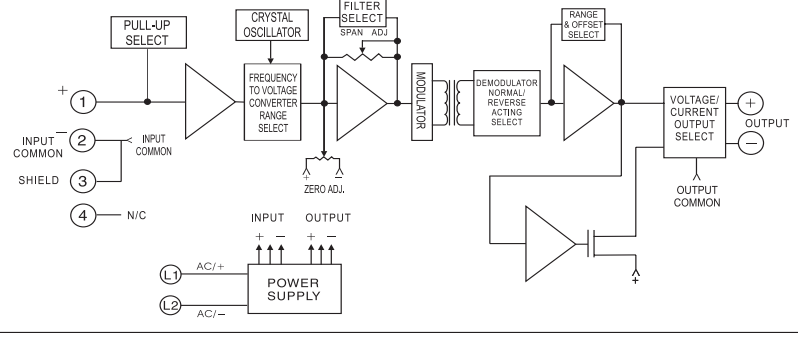
## WARRANTY

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]



## BLOCK DIAGRAM AND PIN CONNECTIONS



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