

# DM6010

## AC TRUE RMS INPUT ISOLATED FIELD RANGEABLE TRANSMITTER



### DESCRIPTION

The DM6010 provides an isolated output voltage or current proportional to the true RMS of the AC input signal allowing accurate measurement of distorted sine wave sources, as well as, complex wave shapes like a phase angle modulated SCR drive output. 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 DM6010 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 - voltage/current mode, span, 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

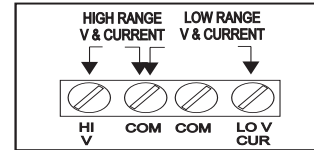
DM6010 mounts on standard DIN Rail. Install it by hooking the top of the module's latch onto the top of the rail, then use a downward rotating motion to snap the module onto the rail. To remove the module, insert a screwdriver into the slot on the spring loaded snap which is located on the lower backside 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. For input voltage spans from .031 to .250 VAC RMS and input current spans from 1.5 to 13.0 mA AC RMS use terminals labeled LO V/CUR and COM.

For input voltage spans from .251 to 256 VAC RMS and input current spans from 13.1 to 100 mA AC RMS use terminals labeled HI V and COM.

For 0/5 A AC RMS see FIGURE 2. Terminals labeled COM are common and may be used interchangeably for low lead (gnd) and shield connections.



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

See CALIBRATION, Step 2: 'INPUT: SPAN' and 'Example for Span selection and adjustments' below, to determine the voltage range to use. 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 11-14 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 DM6010 is factory calibrated to the input and output noted on the side label. The DM6010 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:

#### INPUT

**MODE VOLTS/CURRENT** - (top row of 3 pins) Jumper on left two pins selects volts, jumper on right two pins selects mA.

**RANGE HIGH/LOW** - (second row of 3 pins) Jumper on left two pins for voltage input range of 0.5 volts to 256 volts, jumper on right two pins for voltage input range of 0.031 volts to 0.25 volt and for all current inputs.

**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. Using the SPAN adjustment, the module's amplification can be calibrated to give the full output range for the input span.

#### OUTPUT

**RANGE** - Select the voltage or current range to obtain the desired 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** - Select normal for the output to increase as the input increases, select reverse for the output to decrease with increasing input.

3. Connect AC sine wave signal to the input; and meters to the input and output terminals. Use true RMS meters to obtain an accurate RMS calibration. Apply power to the module.

4. Set the input RMS signal to represent the zero level, the lowest value of the input span. NOTE: If the zero level is 0.0 V, short the input terminals together during the zero adjustment.

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

6. Set the input RMS signal 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 selection and adjustments:**

**Input Range:** 0/80 mA RMS

**Output Range:** 4/20 mAdc

**Actual Span:** (80-0) mA RMS = 80 mA RMS

Select Span Jumper for 100 mA

Select Output Jumper for 4/20 mAdc

Set input to 0 mA RMS

Adjust Zero for 4 mAdc output

Set input to 80 mA RMS

Adjust Span for 20 mAdc output

Repeat adjustments to obtain accurate calibration

## SPECIFICATIONS

### INPUT

MODES (user settable):

Voltage/current

RANGE:

0-256 VAC RMS

0-100 mA AC RMS

0-5 Amps AC RMS

with external shunt (**SEE FIGURE 2**)

ACCURACY:

±0.3% sinewave

CRESTFACTOR:

16 dB with 1% accuracy

IMPEDANCE:

1 megohm for voltage mode

20 ohms for internal current mode

FREQUENCY:

47 Hz to 1000 Hz

COUPLING

AC for RMS from 47 to 1000 Hz

SPAN SELECT (user settable) 31, 62, 130, 250, & 500 mV RMS

1, 2, 4, 8, 16, 32, 64, 128, 256, VAC RMS

1.6, 3.1, 6.2, 13, 25, 50, 100 mA AC RMS

SPAN ADJUSTMENT

+5, -55% of selected span

ZERO ADJUSTMENT

-10, +50% of selected span

OFFSETS (user settable)

none

### 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 mA DC

ACCURACY

±0.1% of span

STEP RESPONSE TIME

<1.2 seconds

RIPPLE (peak-to-peak)

<0.1%

INPUT TO OUTPUT LINEARITY ±0.01% of span

DM6010 TRUE RMS ISOLATED TRANSMITTER									
INPUT CONFIGURATION					OUTPUT CONFIGURATION				
MODE	VOLTS	□	□	□	CURRENT	mA	□	□	V
RANGE	HIGH	□	□	□	LOW	□	□	□	□
	V	256	□	□	.031	V	1.5	mA	-10/10
		128	□	□	.062	V	3.1	mA	-5/5
		64	□	□	.13	V	6.2	mA	0/10
		32	□	□	.25	V	13	mA	1/5
		16	□	□	.50	V	25	mA	0/1
		8	□	□	1	V	50	mA	0/.25
		4	□	□	2	V	100	mA	
FACTORY SETUP					FIELD SETUP				
MODEL	_____				INPUT	_____			
INPUT	_____				OUTPUT	_____			
OUTPUT	_____				POWER	_____ V			
POWER	_____					_____ HZ			
	VA	_____		HZ	_____				
CODE	_____								

FIGURE 1

### 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 (Wattage 2.5 W max)

AC (standard)

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 module mounts on a standard H-35 DIN rail. A spring latch holds it in place. The module is demounted by using a screw driver to release the latch. The latch is accessible at the bottom of the module.

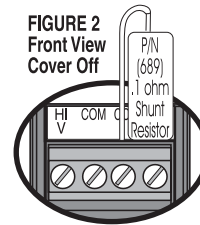
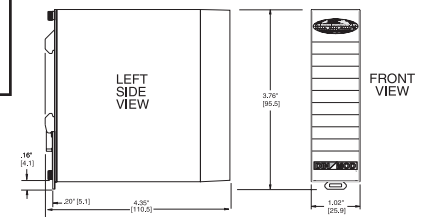


FIGURE 2  
Front View  
Cover Off

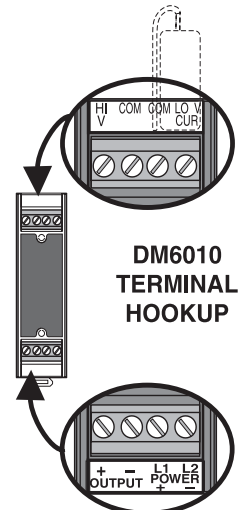
To use the external shunt, add a short jumper wire 18-20 gauge between input terminals labeled HI V and LO V/CUR. Add shunt, P/N 689, between terminals labeled COM and LO V/CUR as shown in Figure 2. Connect input wires to input terminals labeled HI V and COM.

## CASE DIMENSIONS INCHES [mm]



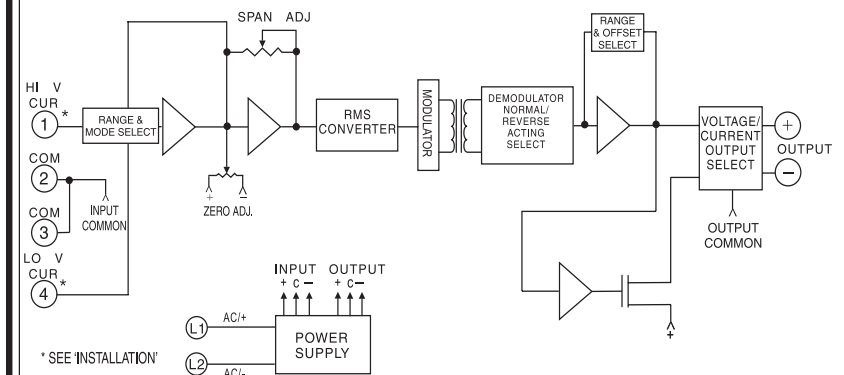
## WARRANTY

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.



DM6010  
TERMINAL  
HOOKUP

## BLOCK DIAGRAM AND PIN CONNECTIONS



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