MM4380A

DC INPUT
FIELD-RANGEABLE
ISOLATED TRANSMITTER

DESCRIPTION

The MM4380A provides a DC output proportional to a DC input. The output is fully isolated from input, line power and ground. The unit is useful in eliminating ground loops and common mode signals.

Input and output ranges are fully user-settable. Each may be voltage or current, with or without offset. The output response may be normal or reverse-acting. A fully-labeled set of jumpers selects the input and output ranges. The MM4380A is identical in size, and fully interchangeable with, fixed-range modules such as the MM4300.

The MM4380A includes filtering and conditioning to reduce susceptibility to transients and noisy operations. It utilizes a feedback VCO to develop a pulse train with a duty cycle proportional to the input signal amplitude. This pulse train is coupled through a pulse transformer to the output circuitry, where the duty cycle data is converted to a proportional DC output level.

OPTIONS

DC Power

Inverter isolated 12 or 24 VDC power

U All circuit boards conformal coated for protection against moisture.

CONTROLS

Two controls, ZERO and SPAN, are accessible through holes at the top of the MM4380A's cover. These controls allow precise calibration to any selected range.

Range select jumpers, located at the top of the module, are accessed by removing the cover. The use of these jumpers is described under the SELECTING THE RANGE SETTINGS section.

CALIBRATION

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

The MM4380A is supplied calibrated for 4/20 mA input and 4/20 mA output unless otherwise specified on your order.

Refer to the instrument's label to determine its supply voltage. Check that all range select jumpers are properly set for your input and output range. Refer to the BLOCK DIAGRAM AND PIN CONNECTIONS for connections.

Connect a precision DC voltage or current source to the input. Connect a precision DC voltage or current meter to the output. Set the input source to the low-end value and adjust the ZERO control for the proper low-end output. *(Adjust for full-scale output if the REVERSE-ACTING mode is selected.)* Increase the input to its full-scale value and adjust the SPAN control for full-scale output *(low-end output if REVERSE-ACTING)*. Repeat until both readings are correct.

SELECTING THE RANGE SETTINGS

Unplug the module and unscrew the four screws at the corner of the base to remove the cover. Tables 1 and 2 list typical input and output range settings. If your range is not listed, set the range select jumpers as follows:

CAUTION: The MM4380A's circuitry is precise, sensitive and closely spaced. Circuit board contamination can lead to errors and instability especially at high humidities. Handle all circuit boards by their edges only, or wear clean gloves, to avoid contamination.

CAUTION: For safety, do not apply power while the cover is removed.

Figure 1 illustrates the range select jumper positions.

1. Place the left-side INPUT jumper in its upper (MA) position for DC current inputs or its lower (V)position for DC voltage inputs.
2. Place the INPUT SPAN jumper at the next position higher than the desired span. The labeled valuesrepresent the **maximum** achievable span achievable span for each position. For example, the position marked 2 VOLTS/100 MA allows span to be adjusted from 1 to 2 volts and from 50 to 100 milliamperes.

Remember: SPAN is the difference between full-scale and the low end. For example, a -10/+10 V input range has a span of 20 volts, 4/20 mA has a span of 16 mA.

3. The INPUT CANCEL OFFSET % SPAN jumper positions are labeled as percent of **maximum** span. For example, for a range of +5/+10 V (span = 5 V), the 8 volt span position will be used. The 5 volt input offset is 62.5% of the 8 volt maximum span.

Place the jumper in the position nearest the desired offset. In the above example either the 50% or the 75% positions could be used.

4. Place the ELV/SUP jumper in the ELV (elevated)positions for positive input off sets, SUP (suppressed) for negative off sets. In the above example ELV would be used.
5. Place the OUTPUT NORM/REV jumper in the NORM (normal) position for standard operation,REV (reverse) for reverse-acting (output decreases as input increases).
6. Place the OUTPUT MA/V jumpers in their upper (MA) positions for DC current out puts or their lower (V) positions for DC voltage outputs. The jumpers should be positioned vertically, not horizontally.
7. The OUTPUT SPAN jumper selects certain specific ranges, not a continuous range of adjustments. Place the jumper at your desired range.
8. Replace the cover, positioned so that the holes in the top line up with the ZERO and SPAN controls.
9. Apply power and calibrate per CALIBRATION, above.

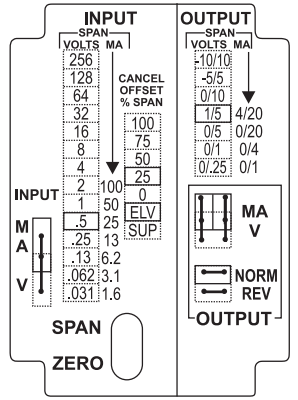


Figure 1
MA & V jumpers
Must be positioned vertically

Table 1. Typical Input Range Settings

INPUT RANGE	INPUT	SPAN VOLTS/MA	CANCEL OFFSET
0/15 mV	V	.031/1.6	0 ELV
0/100 mV	V	.13/6.2	0 ELV
0/500 mV	V	.5/25	0 ELV
0/1 V	V	1/50	0 ELV
0/5 V	V	8	0 ELV
0/10 V	V	16	0 ELV
0/20 V	V	32	0 ELV
0/50 V	V	64	0 ELV
0/100 V	V	128	0 ELV
0/200 V	V	256	0 ELV
1/5 V	V	4	25 ELV
-1/+1 V	V	2	50 SUP
-5/+5 V	V	16	50 SUP
-5/+15 V	V	32	25 SUP
-10/+10 V	V	32	50 SUP
0/1 mA	MA	.031/1.6	0 ELV
0/10 mA	MA	.25/13	0 ELV
0/20 mA	MA	.5/25	0 ELV
0/50 mA	MA	1/50	0 ELV
0/100 mA	MA	2/100	0 ELV
4/20 mA	MA	.5/25	25 ELV
10/50 mA	MA	1/50	25 ELV
-10/+10 mA	MA	.5/25	50 SUP
-50/+50 mA	MA	2/100	50 SUP

Table 2. Output Range Settings

OUTPUT RANGE	SPAN VOLTS/MA	MA/V
0/250 V	0/.25 V	V
0/1 V	0/1 V	V
0/5 V	0/5 V	V
1/5 V	1/5 V	V
0/10 V	0/10 V	V
-5/+5 V	-5/5V	V
-10/+10 V	-10/10 V	V
0/1 mA	0/1 mA	MA
0/4 mA	0/4 mA	MA
0/20 mA	0/20 mA	MA
4/20 mA	4/20 mA	MA

REVERSE-ACTING TRANSMITTER

Use the same settings as normal action, but set the NORM/REV jumper to REV.

Example:
For 4 to 20 mA output with 20 to 4 mA input, or for 20 to 4 mA output with 4 to 20 mA input, use the settings for 4/20 mA input and 4/20 mA output with the jumper set to REV.

NEGATIVE INPUTS

1. The easiest way to accommodate negative inputs is to simply reverse the connections to the (+) and (-) inputs (5 and 6). If this is not possible, use the following method.

2. LO to HI output from 0 to -V input is the sameas HI to LO output from -V to 0 input. Select the desired output range. Set up the INPUT jumpers for a range from minus full scale to zero. Select REVERSE ACTING mode.

Example:
4/20 mA output from 0/-10 V input.
(Same as 20/4 mA output from -10/0 V input.

a. Input Jumpers: Place MA/V on V (volts). Place SPAN on 16. Place CANCEL OFF SET % SPAN on 50. Place ELV/SUP on SUP (suppressed).

b. Output: Place SPAN on 4/20 mA. Place MA/V on MA (milliampere). Place NORM/REV on REV (reverse).

c. Adjust ZERO for 20 mA output at -10 V input. Adjust SPAN for 4 mA output at 0 V input. Repeat until both are correct.

NEGATIVE OUTPUTS

1. To provide negative outputs simply reverse the connections to the (+) and (-) outputs (7 and 8).

MOUNTING

The module is designed to plug into a standard 8-pin relay socket. (MP008) is a molded plastic socket suitable for mounting on a flat surface or snap into a 2 ¾ inch wide PVC track (TRK48).

A spring hold-down clip (CLP1) is available for installation where vibration may be a problem.

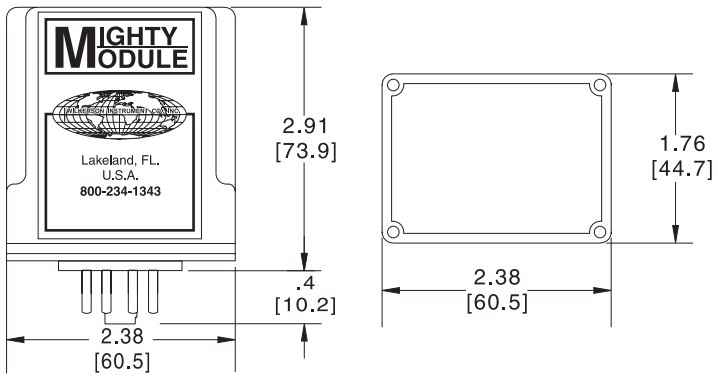
A DIN rail mounted socket (DMP008) is available for 35mm symmetrical DIN rail.

A Killark HK Series explosion-proof housing with dome and 8-pin socket is available (HKB-HK2D-8).

WARRANTY

The Field Rangeable 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.

CASE DIMENSIONS INCHES [mm]



SPECIFICATIONS

INPUT RANGE (User-Settable)
Limits
any voltage between -250 and +250 VDC
any current between -100 and +100 mAdc
Span
any voltage span from 15 mV to 250 VDC
any current span from 0.8 to 100 mAdc
Offset
can cancel any input offset between -110% and +110% of span

INPUT IMPEDANCE
Voltage
1 megohm
Current
20 ohms

OUTPUT RANGE (User-Settable)

Voltage	Current
0/.25 V	0/1 mA
0/1 V	0/4 mA
0/5 V	0/20 mA
1/5 V	4/20 mA
0/10 V	
-5/+5 V	
-10/+10 V	

OUTPUT LOAD
Voltage
10 mA max (1 kilohm at 10 V)
Current
24 V compliance
(1200 ohms max. at 20 mA)

OUTPUT RESPONSE (User-Settable)
normal or reverse-acting
(example 10 to 0 VDC)

RESPONSE TIME
<100 ms

OUTPUT RIPPLE (peak-to-peak)
<0.1% of span

ACCURACY
±0.1% of span (exclusive of user-supplied calibration instruments

LINEARITY
±0.05% of span

COMMON MODE REJECTION
120 dB, DC to 60 Hz

ISOLATION, OUTPUT/INPUT
>500 megohms

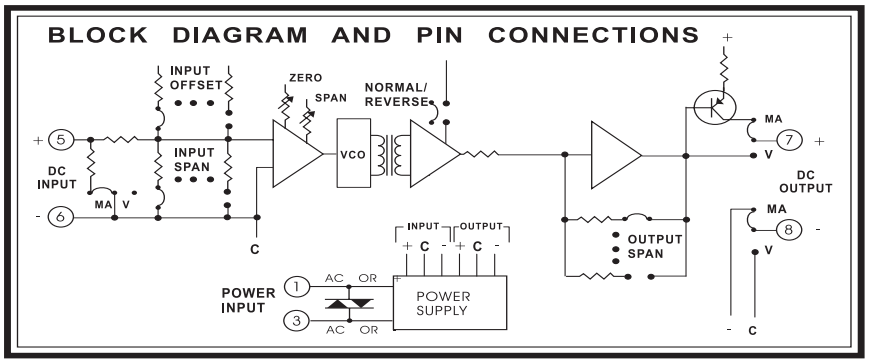
BREAKDOWN, OUTPUT/INPUT
>1000 VAC rms

BREAKDOWN, POWER/CIRCUITRY
>1500 VAC rms

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

TEMPERATURE STABILITY
±(0.02% of span + 2 µV)/°C max

POWER (2.5 W max)
115 VAC ±10%, 50 or 60 Hz
230 VAC ±10%, 50 or 60 Hz
(DC Power Option)
12 VDC (limits 10 VDC to 15 VDC)
24 VDC (limits 21 VDC to 32 VDC)



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