

Space-saving Signal Conditioners M3-UNIT Series

CURRENT LOOP SUPPLY
(linearizing; field- and PC-configurable)

MODEL **M3LDY**

MODEL & SUFFIX CODE SELECTION

M3LDY-R/□□

MODEL _____

INPUT: 0 – 20mA DC

OUTPUT SELECTION

◆DC Current: Usable range 0 – 20mA; min. span 1mA

◆DC Voltage

Narrow Spans: Usable range ±2.5V; min. span 250mV

Wide Spans: Usable range ±10V; min. span 1V

POWER INPUT _____

R : 24V DC

CONFIGURATION OPTIONS _____

A : PC and field configurable

B : Field configurable

OPTIONS _____

/UL : UL approval

ORDERING INFORMATION

Specify code number. Orders will be shipped at default factory settings (4 – 20mA input / proportional 4 – 20mA output).

Ordering example:

- Code number (e.g. M3LDY-R/A)

RELATED PRODUCTS

- PC configurator software (model: M3CON)
Downloadable at M-System's web site:
<http://www.m-system.co.jp>
- PC configurator cable (model: MCN-CON)

GENERAL SPECIFICATIONS

Connection: Removable terminal block

Housing material: Flame-resistant resin (grey)

Isolation: Input to output to power

Overrange output: Approx. -15 – +115%

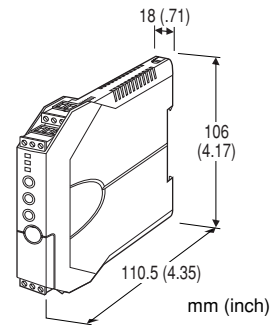
Fine zero and span adjustments: ±15% via the front control buttons

Configuration

'One-Step Cal' calibration: With output type and the full-scale range configured via the internal DIP switches, precise 0% and 100% output range is calibrated via the front control buttons with a help of LED.

PC configurator (model: M3CON): Via Windows PC connected to the front jack. Programmable features include:

- Input range
- Output type and range
- Zero and span adjustments
- Linearization
- Loop test output



Functions & Features

- Powers a 4 – 20mA DC current loop
- Shortcircuit protection
- Applicable to smart transmitters
- PC-programmable linearization data (100 points and square root extraction)
- Easy 'One-Step Cal' calibration using the front three control buttons without needing a PC
- Loop testing via the PC configuration software
- High-density mounting
- UL approval

Typical Applications

- Various 2-wire transmitters
- Linearizing weir flowmeter output to provide a linear-to-volume signal
- Isolator application (0 – 20mA input)
- Square root extraction for differential pressure transmitter

Status indicator LED: Tri-color (green/amber/red) LED; Flashing patterns indicate operation status of the transmitter.

TWO-WIRE TRANSMITTER INPUT

■SUPPLY OUTPUT (across the terminals 1 – 2)

Output voltage: 24 – 28V DC with no load
19V DC maximum at 20mA

Current rating: 22mA DC maximum

Permissible leadwire resistance:

$$LR (\Omega) \leq (19 - \text{Min. Operational Voltage})V / 0.02A$$

•Shortcircuit Protection

Current limited: 35mA maximum

Protected time duration: no limit

■INPUT: 274.9Ω resistor incorporated (0.25W)

Maximum range: 0 – 20mA DC

Minimum span: 2mA

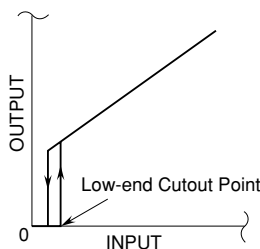
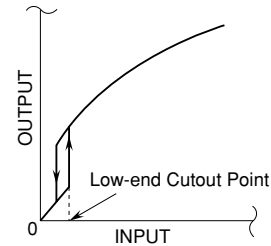
Offset: Lower range can be any specific value within the maximum range provided that the minimum span is maintained.

OUTPUT**DC CURRENT****Maximum range:** 0 – 20mA DC**Minimum span:** 1mA**Operational range:** 0 – 24mA DC**Offset:** Lower range can be any specific value within the maximum range provided that the minimum span is maintained.**Load resistance:** Output drive 12V maximum
(e.g. 4 – 20mA: 600Ω [12V/20mA])**DC VOLTAGE****Narrow Spans (mV)****Maximum range:** -2.5 – +2.5V DC**Minimum span:** 250mV**Operational range:** -3 – +3V DC**Wide Spans (V)****Maximum range:** -10 – +10V DC**Minimum span:** 1V**Operational range:** -11.5 – +11.5V DC**Offset:** Lower range can be any specific value within the maximum range provided that the minimum span is maintained.**Load resistance:** Output drive 1mA maximum
(e.g. 1 – 5V: 5000Ω [5V/1mA])**LINEARIZATION (M3LDY-R/A only)****Type selection and data programming:**

PC Configurator Software

•No Linearization:

The output is proportional to the input.

•Segment Data: 100 points max. within the range of -15.00 to +115.00% input or output represented as percentage of full-scale**Low-end cutout:** Low-end cutout point selectable within the range of 0 to 100%. For the input lower than the low-end cutout point, the output signal equals 0%.**•Square Root Extraction****Low-end cutout:** Low-end cutout point selectable within the range of 0 to 100%. For the input lower than the low-end cutout point, the output signal is linear to the input.**INSTALLATION****Power input:** Operational voltage range 24V DC ±10%; approx. 3W; ripple 10% p-p max.**Operating temperature:** -25 to +65°C (-13 to +149°F); Max. 55°C (131°F) for UL approval**Operating humidity:** 0 to 95% RH (non-condensing)**Mounting:** DIN rail**Dimensions:** W18×H106×D110.5 mm
(0.71"×4.17"×4.35")**Weight:** 100 g (0.22 lbs)**PERFORMANCE****Accuracy:** Input accuracy + output accuracy**Input accuracy*:** ≤ ±0.06% of input range**Output accuracy*:** ≤ ±0.04% of output range

*Inversely proportional to the span, except the accuracy of input resistor

[Example] Input 4 – 20mA, Output 4 – 20mA

$$\text{Input accuracy} = \frac{\text{Range } 20\text{mA}}{\text{Span } 16\text{mA}} \times 0.06\% = 0.075\%$$

$$\text{Output accuracy} = \frac{\text{Range } 20\text{mA}}{\text{Span } 16\text{mA}} \times 0.04\% = 0.05\%$$

$$\text{Overall accuracy} = 0.075 + 0.05 = 0.13\%^{**}$$

**Segment gain ≤1. Multiply the calculated result by the gain when exceeding 1.

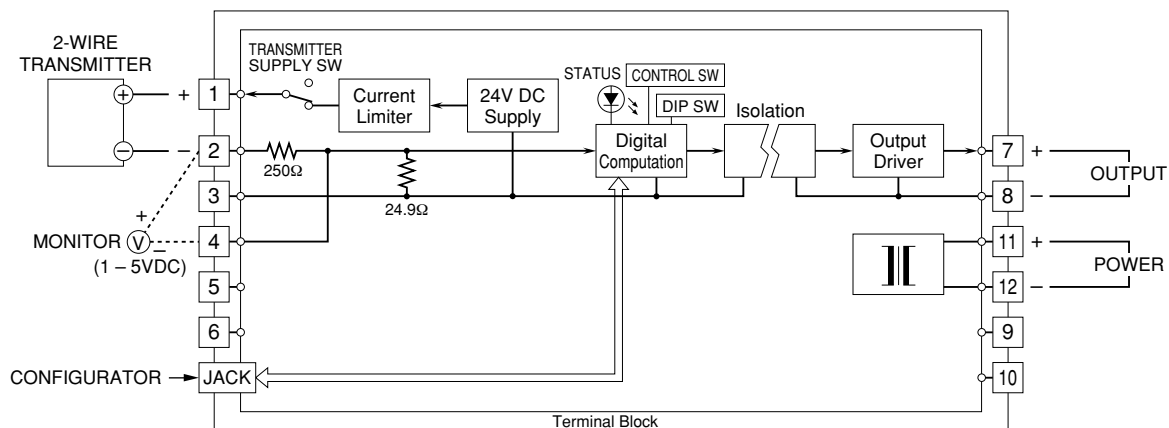
Temp. coefficient: ±0.015%/°C (±0.008%/°F) of max. range**Response time:** ≤1.0 sec. (0 – 90%)**Line voltage effect:** ±0.1% over voltage range**Insulation resistance:** ≥100MΩ with 500V DC**Dielectric strength:** 1500V AC @1 minute(input to output or power to ground)
500V @1 minute (output to power)**STANDARDS & APPROVALS****CE conformity:** EMC Directive (89/336/EEC)

EMI EN61000-6-4

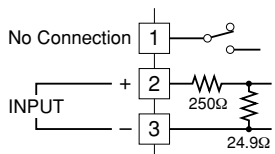
EMS EN61000-6-2

Approval: UL/C-UL general safety requirements
(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

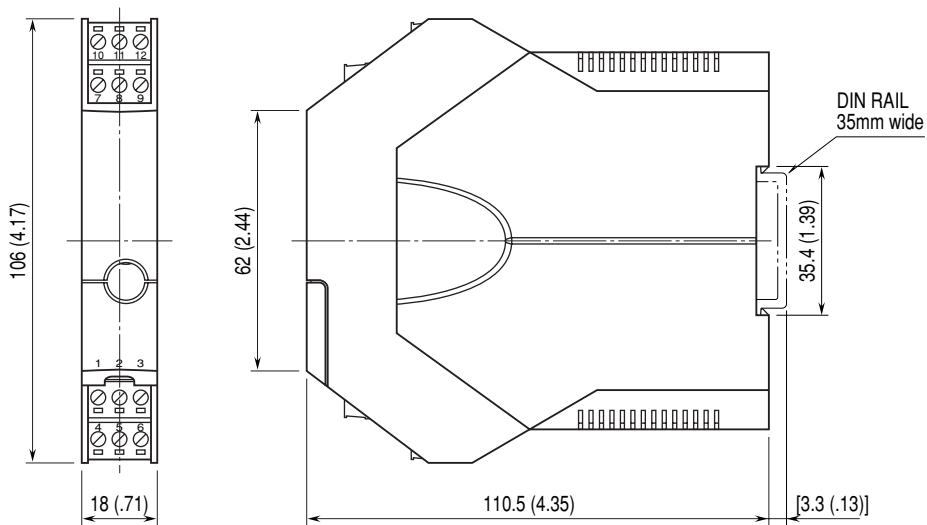
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



■ When Used as Isolator



EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS mm (inch)



⚠When mounting, no extra space is needed between units.

ONE-STEP-CAL CALIBRATION

CONFIGURATION MODES & DIP SW

When you calibrate the transmitter module, two configuration modes are available: Field Configuration using DIP SW / control buttons, and PC Software. (Option B type is for the field configuration only.)

The internal DIP switches are used to configure output type. Once the module is configured, precise ranges are set up with the front control buttons using a simulator connected to the input terminals and a multimeter connected to the output terminals as a reference.

INPUT & OUTPUT RANGING

For example, suppose that you need to calibrate the input range to 4 – 20mA. Turn the power supply to the transmitter on and press MODE button to enter to the Input Calibration Mode. Apply the desired minimum (e.g. 4mA) and maximum (e.g. 20mA) input levels and push the DOWN (zero) and UP (span) respectively to set the input range to 4 – 20mA.

Then the output range can be calibrated in a similar manner after moving to the Output Calibration Mode by pressing MODE button again. Increase or decrease the simulated input until the output meter shows the desired levels and push the DOWN (zero) and UP (span) respectively for the minimum (e.g. 4mA) and maximum (e.g. 20mA) levels.

The front LEDs' colors and flashing patterns help you to easily identify the transmitter's status and confirm the setup actions in each step of Calibration Modes. See detailed explanation in "Calibration Flow Chart."

The calibrated input and output ranges are stored in the internal memory. The module reads the DIP-switch-calibrated configuration only once after the power supply is turned on. Set the switches with the power supply removed.

FINE ZERO & SPAN ADJUSTMENTS

After the transmitter is installed and operational, fine zero and span tuning can be also performed using the front control buttons. Both zero and span are adjustable within ±15%.

PC SOFTWARE CONFIGURATION

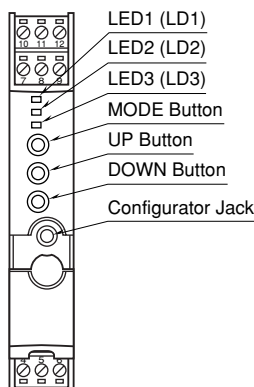
When you need to apply the same setting to multiple transmitters, downloading one setting from the PC is convenient. Furthermore, the PC configuration type must be selected to program the linearization. The PC Configurator Software (model: M3CON) is available separately.

Turn the transmitter to PC Configuration Mode (See Table 1 below) and all programmable features can be set up on a PC regardless of other DIP SW setting except for the output type must be selected with the DIP SW1-1 through SW1-4 (See Table 4).

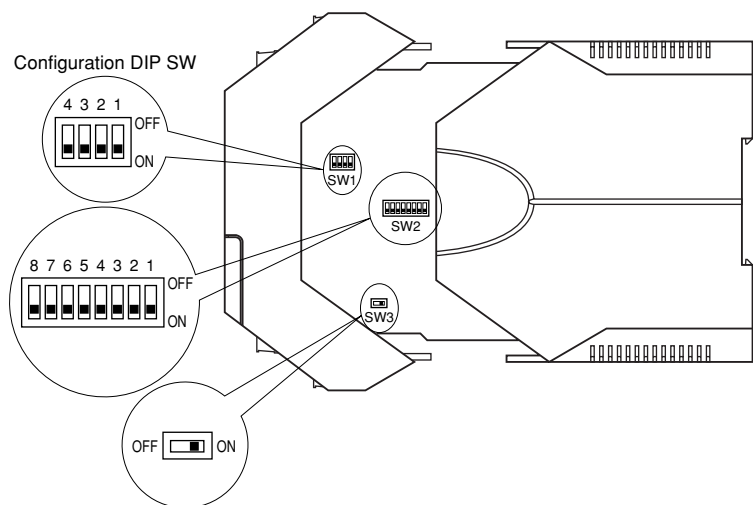
For detailed information on the PC configuration, refer to the M3CON instruction manual.

EXTERNAL & INTERNAL VIEWS

FRONT VIEW



SIDE VIEW



DIP SWITCH SETTINGS

CONFIGURATION MODE (SW2)

Table 1

MODE	SW2-8	
DIP SW	OFF	Configuration mode can be confirmed with the front LED.
PC	ON	

INPUT TYPE (SW2 & 3)

Table 2

INPUT TYPE	SW2-7	SW3
DC current (isolator use)	ON	OFF
2-wire loop (DC supply use)	OFF	ON

OUTPUT TYPE (SW2 & 1)

Table 3

OUTPUT	SW2-4	SW2-3	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	OFF	OFF	ON	OFF	OFF
-2.5 – +2.5V	OFF	ON	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF	ON	OFF

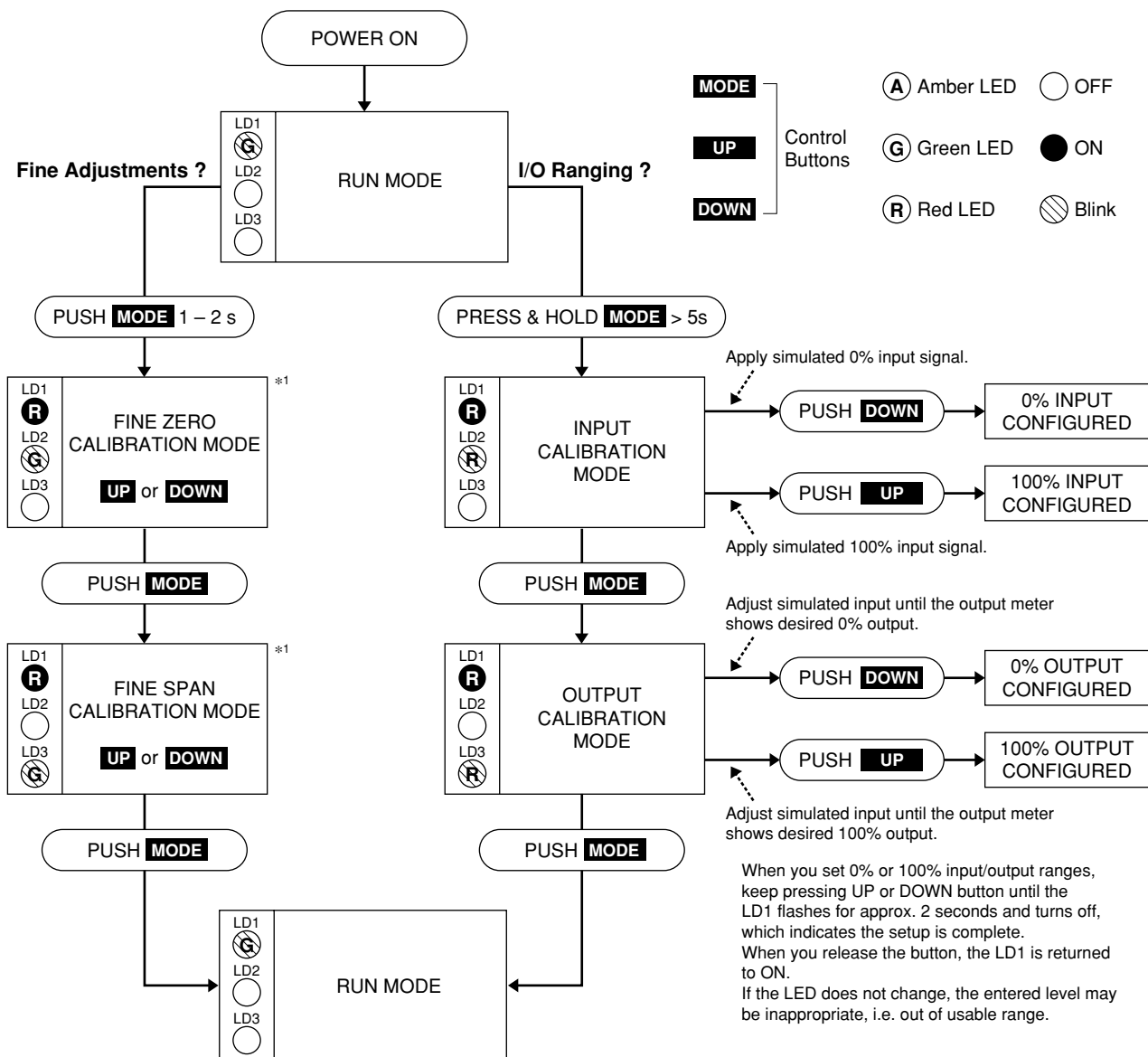
OUTPUT TYPE / PC CONFIG (SW1)

Table 4

OUTPUT	SW1-4	SW1-3	SW1-2	SW1-1
0 – 20mA	OFF	ON	OFF	OFF
-2.5 – +2.5V	ON	OFF	OFF	ON
-10 – +10V	ON	OFF	ON	OFF

Specifications subject to change without notice.

CALIBRATION FLOW CHART



*1. Fine zero and calibrations are performed for 0% and 100% output regardless of the input value.