

## Space-saving Signal Conditioners M3-UNIT Series

### CURRENT LOOP SUPPLY

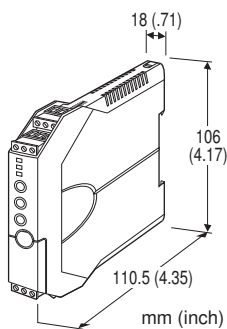
(linearizing; field- and PC-configurable)

#### Functions & Features

- Powers a 4 – 20 mA 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
- Front control button function can be locked
- Loop testing via the PC configuration software

#### Typical Applications

- Various 2-wire transmitters
- Linearizing weir flowmeter output to provide a linear-to-volume signal
- Isolator application (0 – 20 mA input)
- Square root extraction for differential pressure transmitter
- Ideal for use as a fast solution, multifunctional spare part



## MODEL: M3LDY-R/[1][2]

### ORDERING INFORMATION

- Code number: M3LDY-R/[1][2]

Specify a code from below for each of [1] and [2].

- (e.g. M3LDY-R/A/UL/Q)
- Specify the specification for option code /Q (e.g. /C01)

Orders will be shipped with default factory settings (4 – 20 mA input / 4 – 20 mA output).

### INPUT

#### Current

0 – 20mA DC (Input resistance 274.9 Ω)

### OUTPUT – Field-selectable

#### Current

0 – 20 mA DC

#### Voltage

-2.5 – +2.5 V DC

-10 – +10 V DC

### POWER INPUT

#### DC Power

R: 24 V DC

(Operational voltage range 24 V ±10 %, ripple 10 %p-p max.)

### [1] CONFIGURATION OPTIONS

A: PC and field configurable

B: Field configurable

### [2] OPTIONS (multiple selections)

#### Standards & Approvals

blank: CE marking

/UL: UL approval, CE marking

#### Other Options

blank: none

/Q: Option other than the above (specify the specification)

### SPECIFICATIONS OF OPTION: Q

#### COATING (For the detail, refer to M-System's web site.)

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating (UL not available)

### RELATED PRODUCTS

- PC configurator software (model: M3CFG)

Downloadable at M-System's web site.

A dedicated cable is required to connect the module to the PC. Please refer to the internet software download site or the users manual for the PC configurator for applicable cable types.

## GENERAL SPECIFICATIONS

**Construction:** Small-sized front terminal structure  
**Connection:** Euro type connector terminal  
 (applicable wire size: 0.2 to 2.5 mm<sup>2</sup>, stripped length 8 mm)  
**Housing material:** Flame-resistant resin (gray)  
**Isolation:** Input to output to power  
**Overrange output:** -15 to +115 %  
**Zero adjustment:** -15 to +15 % (front)  
**Span adjustment:** 85 to 115 % (front)  
**Status indicator LED:** Tri-color (green/amber/red) LED;  
 Blinking patterns indicate operation status of the transmitter.  
**Configuration**  
**PC configurator:** (Model: M3LDYCFG) 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

(Refer to the instruction manual)  
**'One-Step Cal' calibration:** With I/O type and the full-scale range configured via the internal DIP switches, precise 0 % and 100 % ranges are calibrated via the front control buttons with a help of LED. Also I/O calibration and fine adjustment are available with a PC.  
**Configurator connection:** 2.5 dia. miniature jack; RS-232-C level

## OUTPUT SPECIFICATIONS

■ **DC Current**  
**Maximum range:** 0 – 20 mA DC  
**Minimum span:** 1 mA  
**Conformance range:** 0 – 24 mA DC  
 (Negative overrange current below 0 mA is not available.)  
**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.  
**Load resistance:** Output drive 12 V maximum

■ **DC Voltage**  
**Narrow Spans**  
**Maximum range:** -2.5 – +2.5 V DC  
**Minimum span:** 250 mV  
**Conformance range:** -3 – +3 V DC

**Wide Spans**  
**Maximum range:** -10 – +10 V DC  
**Minimum span:** 1 V  
**Conformance range:** -11.5 – +11.5 V DC  
**Offset:** Lower range can be any specific value within the output range provided that the minimum span is maintained.  
**Load resistance:** Output drive 1 mA maximum

## SUPPLY OUTPUT

■ **SUPPLY OUTPUT (across the terminals 1 – 2)**  
**Output voltage:** 24 – 28 V DC with no load  
 19 V DC minimum at 20 mA  
**Current rating:** ≤ 22 mA DC  
**Permissible load resistance:**  
 $LR (\Omega) \leq (19 - \text{Min. Operational Voltage})V \div 0.02 A$   
 • **Shortcircuit Protection**  
**Current limited:** 35 mA max.  
**Protected time duration:** No limit

## INPUT SPECIFICATIONS

■ **DC Current:**  
**Input resistor:** Resistor incorporated  
 (24.9Ω for isolator use)  
**Maximum range:** 0 – 20 mA DC  
**Minimum span:** 2 mA  
**Offset:** Lower range can be any specific value within the input range provided that the minimum span is maintained.

## LINEARIZATION (/A only)

Type selection and data programming: PC Configurator Software

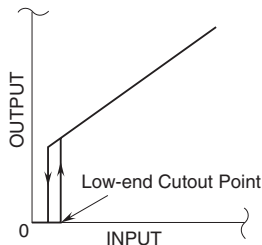
- **No Linearization:** The output is proportional to the input.
- **Segment Data:** 100 points max. within the range of -15.00 to +115.00 % input or output represented as percentage of full-scale

**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 %.

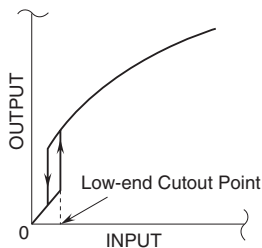
### • Square Root Extraction

**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.

### • Segment Data :



### • Square Root Extraction



**Line voltage effect:**  $\pm 0.1$  % over voltage range

**Insulation resistance:**  $\geq 100$  M $\Omega$  with 500 V DC

**Dielectric strength:** 1500 V AC @ 1 minute

(input to output or power to ground)

500 V AC @ 1 minute (output to power)

## CALCULATION EXAMPLES OF OVERALL ACCURACY

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

Input accuracy = Range 20 mA  $\div$  Span 16 mA  $\times$  0.06 % = 0.075 %

Output accuracy = Range 20 mA  $\div$  Span 16mA  $\times$  0.04 % = 0.05 %

Overall accuracy = 0.075 + 0.05 = 0.13 %

(Segment gain < 1. Multiply the calculated result by the gain when exceeding 1.

## STANDARDS & APPROVALS

**EU conformity:**

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

RoHS Directive

EN 50581

**Approval:**

UL/C-UL general safety requirements

(UL 61010-1, CAN/CSA-C22.2 No.1010-1)

## INSTALLATION

**Power consumption**

•DC: Approx. 3 W

**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

**Weight:** 100 g (3.53 oz)

## PERFORMANCE

**Accuracy:** Input Accuracy + Output Accuracy

**Input accuracy:**  $\pm 0.06$  % of input range

**Output accuracy:**  $\pm 0.04$  % of output range

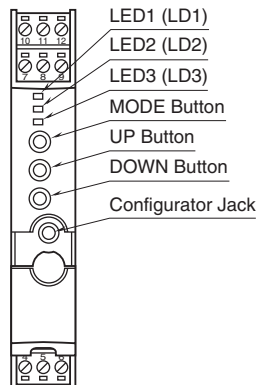
(Input and output accuracy is inversely proportional to the span)

**Temp. coefficient:**  $\pm 0.015$  %/°C ( $\pm 0.008$  %/°F) of max. span

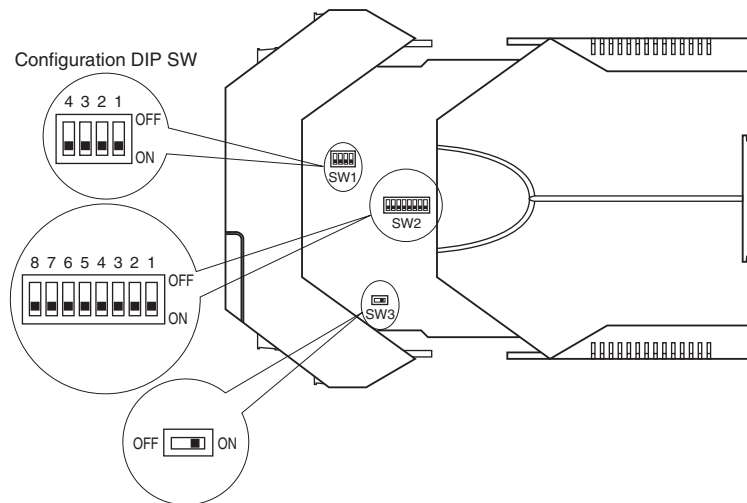
**Response time:**  $\leq 1$  sec. (0 - 90 %)

## EXTERNAL VIEW

### ■ FRONT VIEW



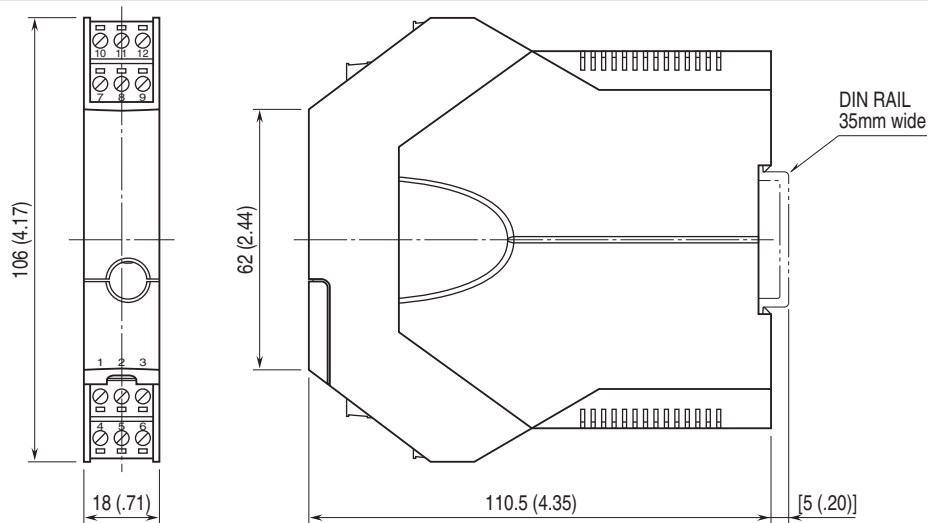
### ■ SIDE VIEW



For M3LDY-R/A, the DIP switch setting is required to select output and input types before setting a precise output range using the PC configurator software.

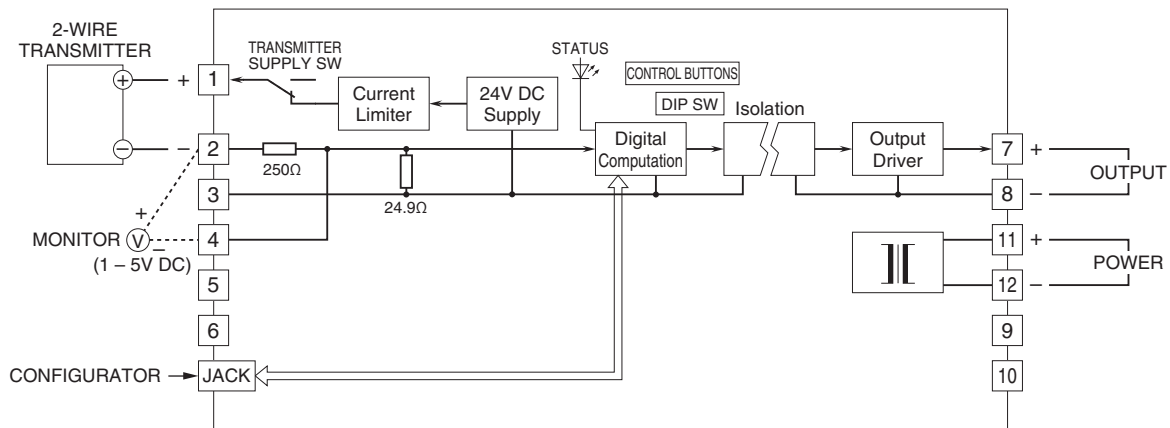
For detailed information on the configuration and calibration, refer to the instruction manual.

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

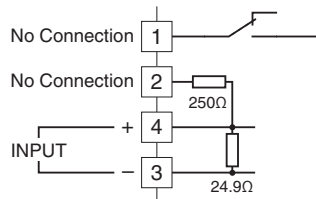


• When mounting, no extra space is needed between units.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



### ■ When Used as Isolator



Specifications are subject to change without notice.