Space-saving Signal Conditioners M3-UNIT Series

STRAIN GAUGE TRANSMITTER
(field- and PC-configurable)

Functions & Features
• Provides a DC output signal proportional to a bridge type strain gauge utilized in load cells and pressure transducers
• Compatibility with strain gauges of various bridge resistances and output ratings
• Supplies required excitation voltage; 0.1 – 10.0 V adjustable
• Response time ≤ 10 msec.
• Front control button function can be locked

Typical Applications
• Weighing system for tanks, hoppers and silos
• Weighing system using cranes
• Pressure sensor utilizing strain gauges
• Float level meter utilizing strain gauges

18 (.71)
106 (4.17)
110.5 (4.35)
mm (inch)
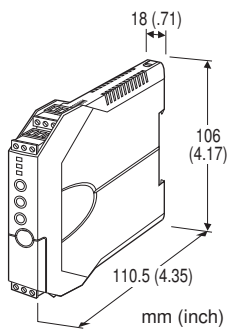
MODEL: M3LLC–[1]–R4/[2][3]

ORDERING INFORMATION
• Code number: M3LLC–[1]–R4/[2][3]
Specify a code from below for each of [1] through [3].
  (e.g. M3LLC-S1-R4/A/UL/Q)
• Specify the specification for option code /Q
  (e.g. /C01)
• Factory setting:
Input signal
  S1: 1.0 mV
  S2: 3.0 mV
  S3: 10.0 mV
  S4: 30.0 mV
Excitation voltage: 1 V
Output range: 4 – 20 mA

[1] INPUT STRAIN GAUGE
S1: 0.0 – 1.0 mV/V
S2: 0.0 – 3.0 mV/V
S3: 0.0 – 10.0 mV/V
S4: 0.0 – 30.0 mV/V

OUTPUT – Field-selectable
Current
0 – 20 mA DC
Voltage
-2.5 – +2.5 V DC
-10 – +10 V DC

POWER INPUT
DC Power
R4: 10 – 32 V DC
(Operational voltage range 9 - 36 V, ripple 10 %p-p max.)

[2] CONFIGURATION OPTIONS
A: PC and field configurable
B: Field configurable

[3] 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^2, 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:
Programmable features include:
• Input range and output type and range
• Zero and span adjustments
(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

INPUT SPECIFICATIONS

■ **Strain Gauge Input**
• **Strain Gauge**
Rated output from strain gauge:
• S1: Volt. range -10.0 – +10.0 mV, span 1.0 – 10.0 mV
• S2: Volt. range -30.0 – +30.0 mV, span 3.0 – 30.0 mV
• S3: Volt. range -99.9 – +99.9 mV, span 10.0 – 99.9 mV
• S4: Volt. range -300.0 – +300.0 mV, span 30.0 – 300.0 mV
Consult factory for use with a compression/tension load cells.
• **Excitation**: 0.1 – 10.0 V adjustable (0.1 V increments)
Maximum current: 30mA
■ **Contact Input**: TTL level (5V-CMOS level), open collector or dry contact (detecting voltage: approx. 5 V, saturation voltage: ≤ 1 V, sink current: 0.5 mA)

OUTPUT SPECIFICATIONS

■ **DC Current**
Maximum range: 0 – 20 mA DC
Minimum span: 1 mA
(Add 0.1 % to accuracy with output span 2 mA or less.)
Conformance range: 0 – 20 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 (mV)
  Maximum range: -2.5 – +2.5 V DC
  Minimum span: 500 mV
  Conformance range: -3 – +3 V DC
Wide Spans (V)
  Maximum range: -10 – +10 V DC
  Minimum span: 0.5 V
  Conformance range: -11.5 – +11.5 V DC
(Overrange voltage below -11.5 V 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 10 mA maximum; 5 mA for negative output

INSTALLATION

Power consumption
•**DC**: Approx. 5 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: 150 g (0.33 lb)

PERFORMANCE in percentage of span

Accuracy: Input + output
  Input: ±0.1 %
  Output: ±0.1 %
Temp. coefficient: ±0.015 %/°C (±0.008 %/°F) of max. range at -5 to +55°C [23 to 131°F];
±0.03 %/°C (±0.02 %/°F) at <-5°C, >+55°C
Response time: ≤10 msec. (0 – 90 %)
Excitation: Set value ±250 mV
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ 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)

STANDARDS & APPROVALS

EU conformity:
EMC Directive
  EMI EN 61000-6-4
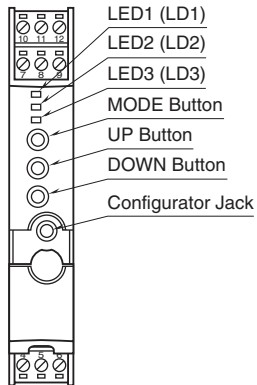 EMS EN 61000-6-2
RoHS Directive
  EN 50581
Approval:
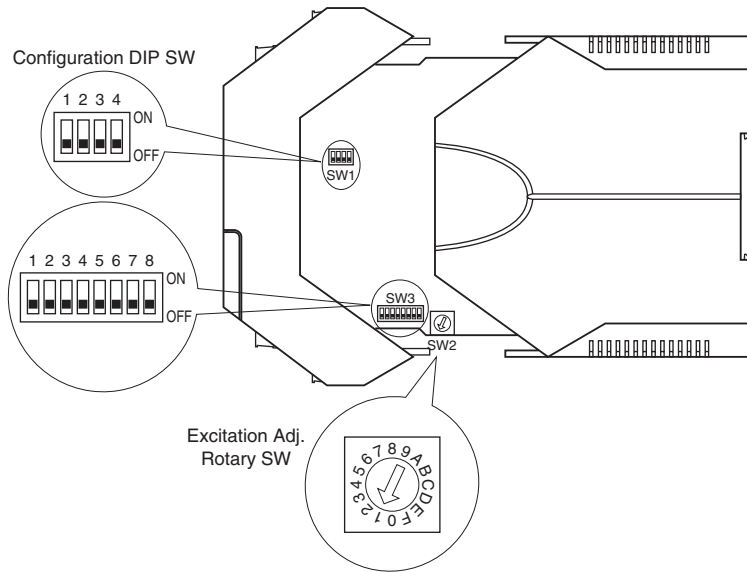UL/C-UL general safety requirements
  (UL 61010-1, CAN/CSA-C22.2 No.1010-1)

EXTERNAL VIEW

■ **FRONT VIEW**

LED1 (LD1)
LED2 (LD2)
LED3 (LD3)
MODE Button
UP Button
DOWN Button
Configurator Jack

■ **SIDE VIEW**

Configuration DIP SW

1 2 3 4
ON
OFF

SW1

1 2 3 4 5 6 7 8
ON
OFF

SW3

SW2

Excitation Adj.
Rotary SW

The DIP switch setting is required to select output types before setting a precise output range using the PC configurator software.
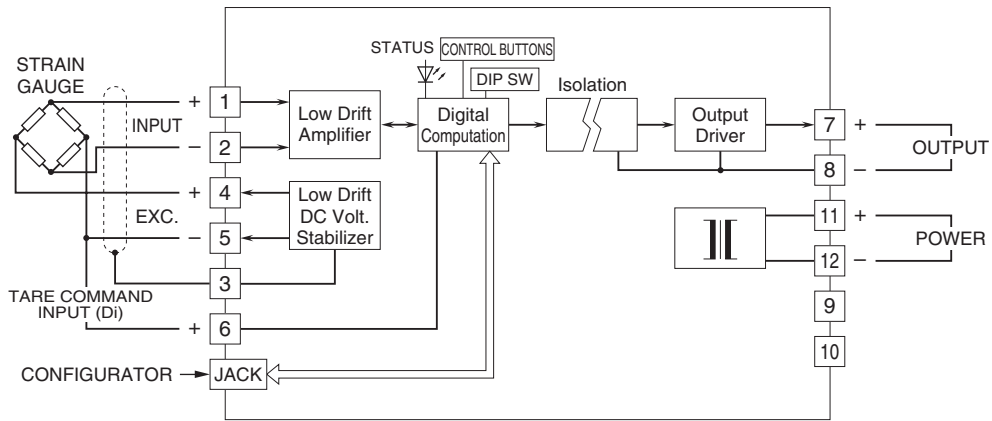For detailed information on the configuration and calibration, refer to the instruction manual.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)

106 (4.17)

18 (.71)

62 (2.44)

110.5 (4.35)

[5 (.20)]

DIN RAIL
35mm wide
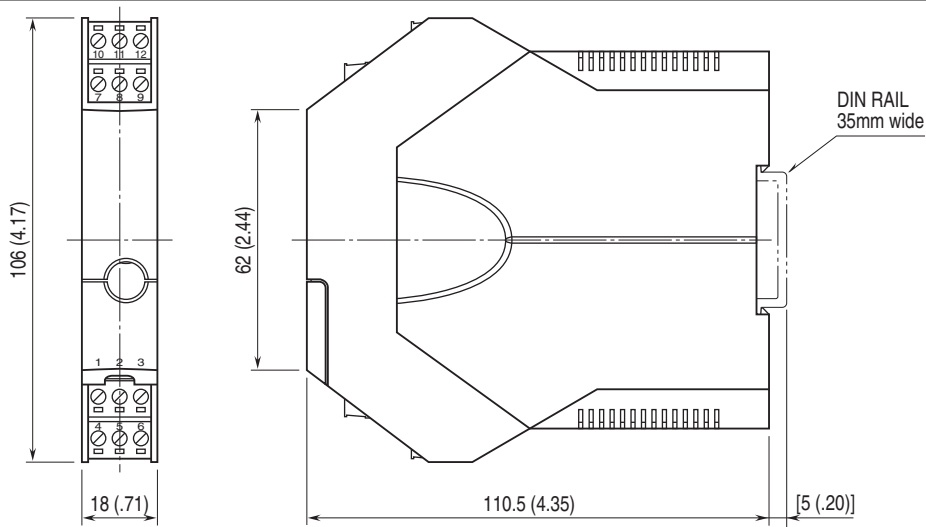
• When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

⚠ Specifications are subject to change without notice.