

Plug-in Signal Conditioners M-UNIT

STRAIN GAUGE/DIGITAL CONVERTER

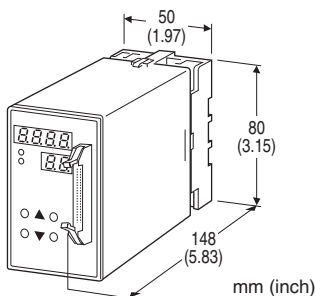
(16-bit resolution)

Functions & Features

- Accepting a bridge type strain gauge utilized in load cells, pressure transducers
- BCD, binary, reflected binary, two's complement outputs
- Open collector or CMOS for output levels
- Output and setting can be scaled in convenient engineering unit
- Output display

Typical Applications

- Interface of analog signal to computers and PLC
- Input to a digital panel meter



MODEL: AD2LC-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: AD2LC-[1][2]-[3][4]
- Specify a code from below for each of [1] through [4].
(e.g. AD2LC-S1C-M2/Q)
- Specify the specification for option code /Q
(e.g. /C01/S01)

[1] INPUT STRAIN GAUGE

- S1: 0.0 – 3.0 mV/V
- S2: 0.0 – 10.0 mV/V
- S3: 0.0 – 30.0 mV/V

[2] OUTPUT LEVEL

- A: Open collector (NPN)
- C: CMOS level

[3] POWER INPUT

AC Power

M2: 100 – 240 V AC (Operational voltage range 85 – 264 V, 47 – 66 Hz)

DC Power

R: 24 V DC

(Operational voltage range 24 V $\pm$ 10 %, ripple 10 %p-p max.)

P: 110 V DC

(Operational voltage range 85 – 150 V, ripple 10 %p-p max.)

[4] OPTIONS

blank: none

/Q: With options (specify the specification)

SPECIFICATIONS OF OPTION: Q (multiple selections)

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

/C01: Silicone coating

/C02: Polyurethane coating

/C03: Rubber coating

TERMINAL SCREW MATERIAL

/S01: Stainless steel

RELATED PRODUCTS

- Connector terminal block (model: CNT)
- Special cable (model: MCN26)

GENERAL SPECIFICATIONS

Construction: Plug-in

Connection

Input & power: M3.5 screw terminals

Output: 26-pin connector (OMRON XG4A-2634)

Paired connector: OMRON XG4M-2630-T, XG5M-263x-N

Cover: OMRON XG5S-2612

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Excitation adjustment: 0.1 – 12.0 V (front)

Zero adjustment: -99.99 – 99.99 % (front)

Gain adjustment: 0.000 – 9.999 (front)

Tare adjustment: -999.9 – 999.9 % (front or by contact input (Di))

Setting: (Front key pad)

- Scaled range
- Moving average
- Output code
- Available number of bits
- POL/OVF output logic
- Data output logic
- HOLD input logic
- DAV output logic
- DAV output time
- Zero and gain adjustment
- Tare adjustment

• etc.

For detailed information, refer to the instruction manual.

■ DISPLAY

LED: 7 mm (.28") 7 segment, red

Number of display digits: 4 digits for DATA display; 2 digits for ITEM display

PV indication: Output signal in engineering unit

Overrange indication: LEDs blinking

Power saving mode: Displays turn off if the keys are untouched for a preset time period

PL1 (POL) LED: Red LED turns on at negative polarity.

PL2 (HOLD) LED: Red LED turns on at HOLD.

INPUT SPECIFICATIONS

■ Strain Gauge Input

• Strain Gauge

Sensor sensitivity setting

S1: 0.010 - 3.000mV/V

S2: 0.010 - 9.999mV/V

S3: 0.10 - 30.00mV/V

Sensor sensitivity setting min. step:

S1: 0.001 mV/V

S2: 0.001 mV/V

S3: 0.01 mV/V

Default setting:

S1: 3.000 mV/V

S2: 9.999 mV/V

S3: 30.00 mV/V

Rated output from strain gauge:

S1: -30.00 – +30.00 mV, span 1.00 – 30.00 mV

S2: -99.99 – +99.99 mV, span 3.00 – 99.99 mV

S3: -300.0 – +300.0 mV, span 10.0 – 300.0 mV

Input voltage setting min. step:

S1: 0.01 mV

S2: 0.01 mV

S3: 0.1 mV

Note: Consult factory for use with a compression/tension load cells.

• **Excitation:** 0.1 – 12.0 V adjustable (0.1 V increments)

Maximum current: 30 mA

Default setting: 1.0 V

■ **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)

■ **Hold Input:** TTL level (5 V - CMOS level)

Commands to stop data renewal;

Choose from below:

Hold with low or short

Hold with high or open

(detecting voltage: approx. 5 V, saturation voltage: ≤ 1 V, sink current: 0.5 mA)

OUTPUT SPECIFICATIONS

■ **Output Code:** Code, logic and scaling are user-selectable.

BCD with polarity (Settable range: -9999 - 9999)

Binary with polarity (Settable range: -7FFF - 7FFF)

Offset binary (Settable range: 0000 - FFFF)

Two's complement (Settable range: 8000 - 7FFF)

Reflected binary (Settable range: 0000 - FFFF)

Output code, logic, scaling are settable.

■ **Available number of bits**

Selectable from 8, 10, 12, 14, 16 bits

■ **Output Level**

• **Open Collector**

Max. collector-emitter voltage: 30 V DC

Max. collector current: 30 mA

Saturation voltage: ≤ 1.1 V

Common: Negative

• **CMOS Level**

H output: ≥ 4.5 V DC

L output: ≤ 0.5 V DC

Common: Negative

■ **POL output (Polarity):** Same logic and level as for the output code; logic user-selectable

■ **OVF output (Overflow):** Same logic and level as for the output code; logic user-selectable

■ **DAV output (Data available):** Same level as for the output code; logic user-selectable

INSTALLATION

Power consumption

• **AC:** Approx. 10 VA

• **DC:** Approx. 7 W (300 mA at 24 V)

Operating temperature: -5 to +55°C (23 to 131°F)

Operating humidity: 30 to 90 %RH (non-condensing)

Mounting: Surface or DIN rail

Weight: 450 g (0.99 lb)

PERFORMANCE in percentage of span

Accuracy: ± 0.1 %

Temp. coefficient: ± 0.015 %/°C (± 0.008 %/°F) of max. span

Resolution: 16 bits

Response time: ≤ 1.5 sec. (0 – 90 %)

(Update period is less than or equal to 0.3 seconds. The update pauses by auto compensation for approx. 0.8 seconds at every 5 or 6 seconds. Response time should include that time.)

Excitation: Set value ± 150 mV

Line voltage effect: ± 0.1 % over voltage range

Insulation resistance: ≥ 100 M Ω with 500 V DC

Dielectric strength: 2000 V AC @ 1 minute
(input to output to power)

2000 V AC @ 1 minute

(input or output or power to ground)

STANDARDS & APPROVALS

EU conformity:

EMC Directive

EMI EN 61000-6-4

EMS EN 61000-6-2

Low Voltage Directive

EN 61010-1

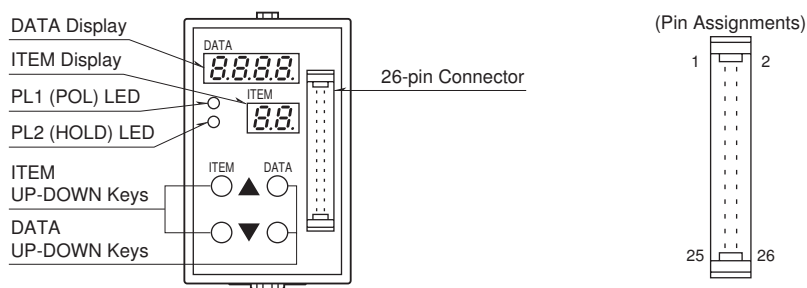
Installation Category II

Pollution Degree 2

Input to output to power: Basic insulation (300 V)

RoHS Directive

EXTERNAL VIEW



PARAMETER LIST

It is available to configure or confirm settings shown below by using front key pad.

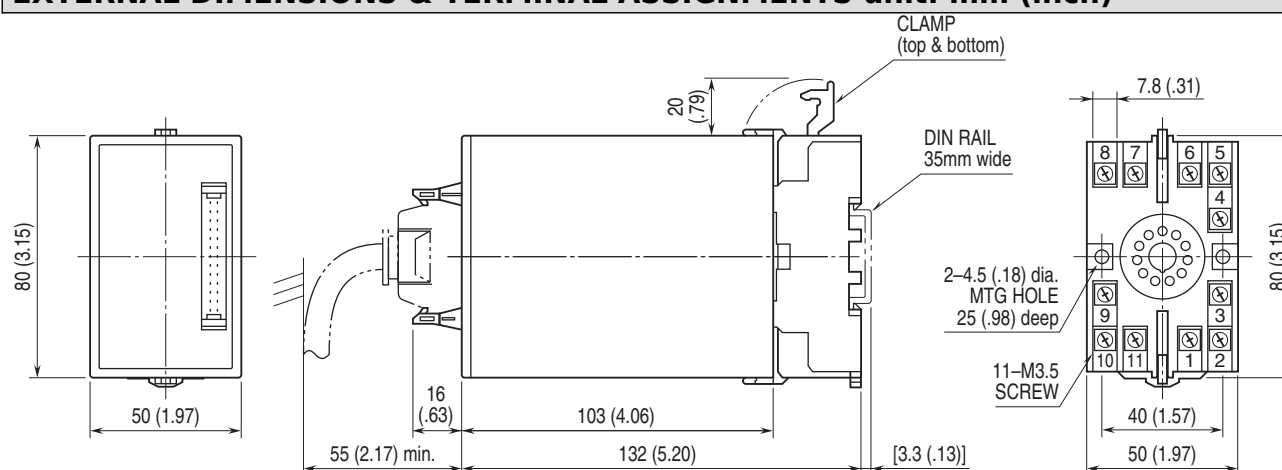
ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
P	N/A	-9999 – 9999 (-FFFF – FFFF)	Output display in engineering unit, BCD (as set in ITEM 17/18) () for binary, offset binary, two's complement, reflected binary	----
01		1, 2	Modification code 1 : Data indication only. 2 : All parameters are modifiable.	1
02	N/A	0 – 99	Status indication ("0" is normally indicated.)	----
03	N/A	0, 1, 2	Input range code 0 : S1 (0.0 – 3.0mV/V) 1 : S2 (0.0 – 10.0mV/V) 2 : S3 (0.0 – 30.0mV/V)	User specified
04	2	0.1 – 12.0	Excitation voltage (V)	1.0V
05	2	0.010 – 3.000 0.010 – 9.999 0.10 – 30.0	Sensor sensitivity S1 : 0.0 – 3.0mV/V S2 : 0.0 – 10.0mV/V S3 : 0.0 – 30.0mV/V Used when adjusting the sensor sensitivity by its rating value. Set ITEM 06 before 05.	3.000 9.999 30.00
06	2	-30.00 – 30.00 -99.99 – 99.99 -300.0 – 300.0	0% input voltage S1 : -30.00 – 30.00mV S2 : -99.99 – 99.99mV S3 : -300.0 – 300.0mV Sensor's zero adjustment. Approximate offset voltage.	
07	2	-30.00 – 30.00 -99.99 – 99.99 -300.0 – 300.0	100% input voltage S1 : -30.00 – 30.00mV S2 : -99.99 – 99.99mV S3 : -300.0 – 300.0mV Used when adjusting the sensor sensitivity with an actual load. Set ITEM 06 before 07.	
08	2	10.0 – 100.0	Load ratio (%) Used when adjusting the sensor sensitivity with an actual load.	100.0
09	2	-999.9 – 999.9	Tare adjustment (%)	0.0
10	N/A	-15.0 – 115.0	Input indicated in % (of the range set in ITEM 05/06/07)	----
11	2	-99.99 – 99.99	Zero adjustment (%) (fine adj. of the value set in ITEM 05/06/07)	0.00
12	2	0.000 – 9.999	Gain adjustment (fine adj. of the value set in ITEM 05/06/07)	1.000
13	2	0, 1, 2, 3, 4	Moving average (200 msec./sampling) 0: No 1: 4 samples 2: 8 samples 3: 16 samples 4: 32 samples	0
14	2	0, 1, 2, 3	Contact input function 0 : Tare adjustment 1 : Peak hold 2 : Valley hold 3 : Sample hold	0
15	2	10 – 99	Power ON-delay time (seconds)	10
16	2	0, 1 – 60	Power-saving mode 0 : Continuous display 1 – 60 : Time before display turned off (minutes)	10
17	2	-9999 – 9999	BCD Display range scaling 0% *1	-1000
18	2	-9999 – 9999	Display range scaling 100% *1	1000
17	2	-7FFF – 7FFF	Binary Display range scaling 0% *1	-7FFF
18	2	-7FFF – 7FFF	Display range scaling 100% *1	7FFF

ITEM	MDF. CODE	DATA	CONTENTS		DEFAULT
17	2	0000 – FFFF	Offset binary	Display range scaling 0% *1	0000
18	2	0000 – FFFF		Display range scaling 100% *1	FFFF
17	2	8000 – 7FFF	Two's complement	Display range scaling 0% *1	8000
18	2	8000 – 7FFF		Display range scaling 100% *1	7FFF
17	2	0000 – FFFF	Reflected binary	Display range scaling 0% *1	0000
18	2	0000 – FFFF		Display range scaling 100% *1	FFFF
19	2	0, 1, 2, 3, 4	Display code 1 : Binary with polarity 3 : Two's complement	0 : BCD with polarity (decimal) 2 : Offset binary 4 : Reflected binary	0
20	2	0, 1, 2, 3, 4	Available number of bits 0: 16 bits 1: 14 bits 2: 12 bits 3: 10 bits 4: 8 bits		0
21	2	0, 1	POL, OVF output logic	0 : Data available at High (CMOS level) or ON (open collector) 1 : Data available at Low (CMOS level) or OFF (open collector)	0
22	2	0, 1	Data output logic *2	0 : Positive (CMOS level, Negative (open collector) 1 : Negative (CMOS level, Positive (open collector)	0
23	2	0, 1	HOLD input logic	0 : HOLD at Low or shortcircuit 1 : HOLD at High or opencircuit	0
24	2	0, 1	DAV output logic	0 : Data available at High (CMOS level) or ON (open collector) 1 : Data available at Low (CMOS level) or OFF (open collector)	0
25	2	1 – 50	DAV output time (msec.)		1
26	N/A	----	ROM version		----

*1. Of the range set in ITEM 05/06/07. ITEM 17 < ITEM 18.

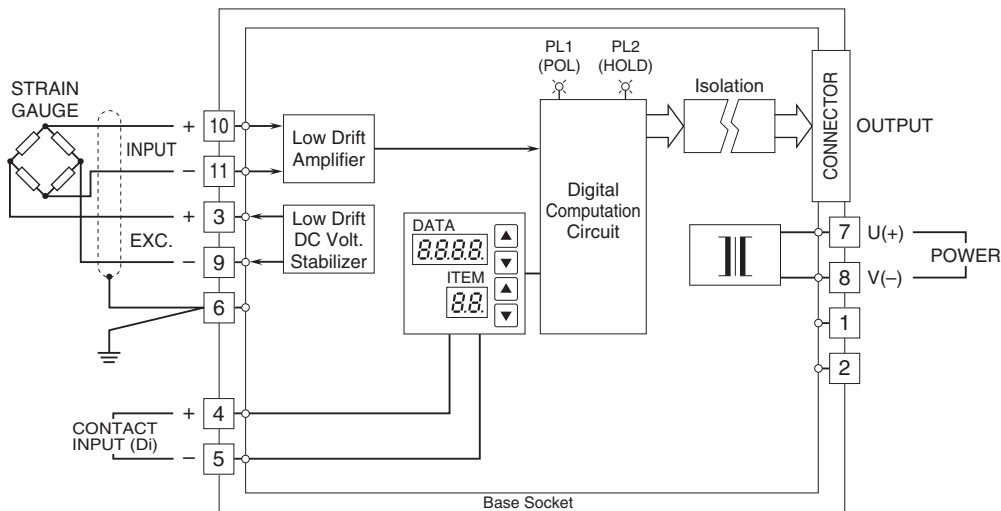
*2. ITEM 21, 23 or 24 is independent from ITEM 22.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



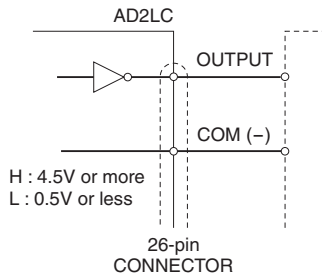
•When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

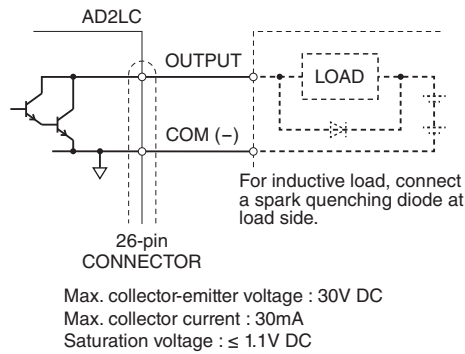


■ Connection Examples

• CMOS LEVEL (5V-CMOS)



• OPEN COLLECTOR



OUTPUT CONNECTOR (26-pin)

■ BCD OUTPUT

PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	1×10^0	17	COM
2	2×10^0	18	COM
3	4×10^0	19	OVF
4	8×10^0	20	POL
5	1×10^1	21	DAV
6	2×10^1	22	HOLD ^{*1}
7	4×10^1	23	COM
8	8×10^1	24	COM
9	1×10^2	25	No connection
10	2×10^2	26	No connection
11	4×10^2		
12	8×10^2		
13	1×10^3		
14	2×10^3		
15	4×10^3		
16	8×10^3		

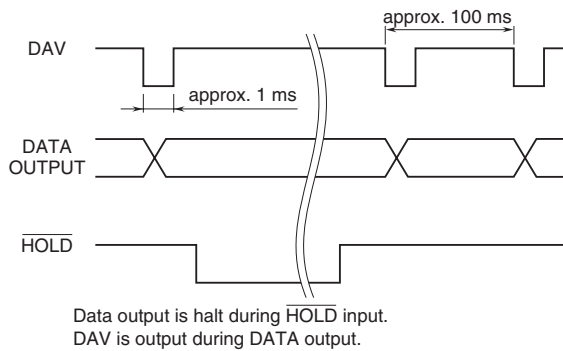
■ BINARY, TWO'S COMPLEMENT OUTPUTS

PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	B ⁰	17	COM
2	B ¹	18	COM
3	B ²	19	OVF
4	B ³	20	POL
5	B ⁴	21	DAV
6	B ⁵	22	HOLD ^{*1}
7	B ⁶	23	COM
8	B ⁷	24	COM
9	B ⁸	25	No connection
10	B ⁹	26	No connection
11	B ¹⁰		
12	B ¹¹		
13	B ¹²		
14	B ¹³		
15	B ¹⁴		
16	B ¹⁵		

*1. HOLD signal is for input, the others are for output.

Note: With the number of bits set to 14 (or 12, 10, 8) with ITEM 20, Pin No. 1 – 14 (or 1 – 12, 1 – 10, 1 – 8) are valid.

TIMING CHART



INPUT-OUTPUT RELATION EXAMPLES

- FS
-FS stands for 0 % of the input range configured by ITEM 06. +FS stands for +100 % of the input range, configured by ITEM 07.

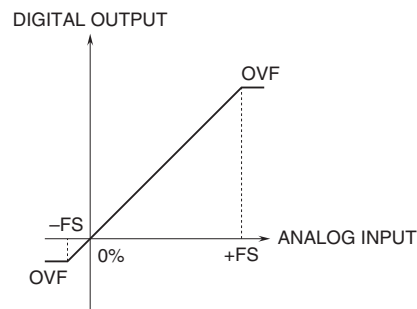
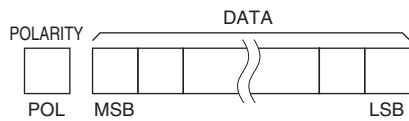
• OVF

When one of the following conditions is true, the digital output overflows (OVF).

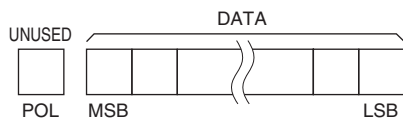
- 1) When the input signal is out of the range between -FS and +FS.
- 2) When the display value (= output signal) exceeds the display range.

The display range differs according to output code. For example, in case of BCD with polarity, it is -9999 to 9999. Please refer to the instruction manual for detail.

■ BCD, BINARY (WITH POLARITY)



■ OFFSET BINARY & TWO'S COMPLEMENT



Specifications are subject to change without notice.