

## Plug-in Signal Conditioners M-UNIT

### STRAIN GAUGE/DIGITAL CONVERTER

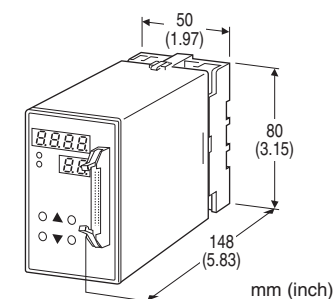
(16-bit resolution)

#### 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 our 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 MΩ 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

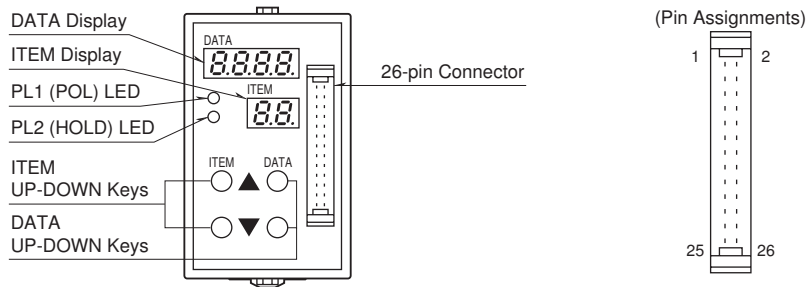
Installation Category II

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.

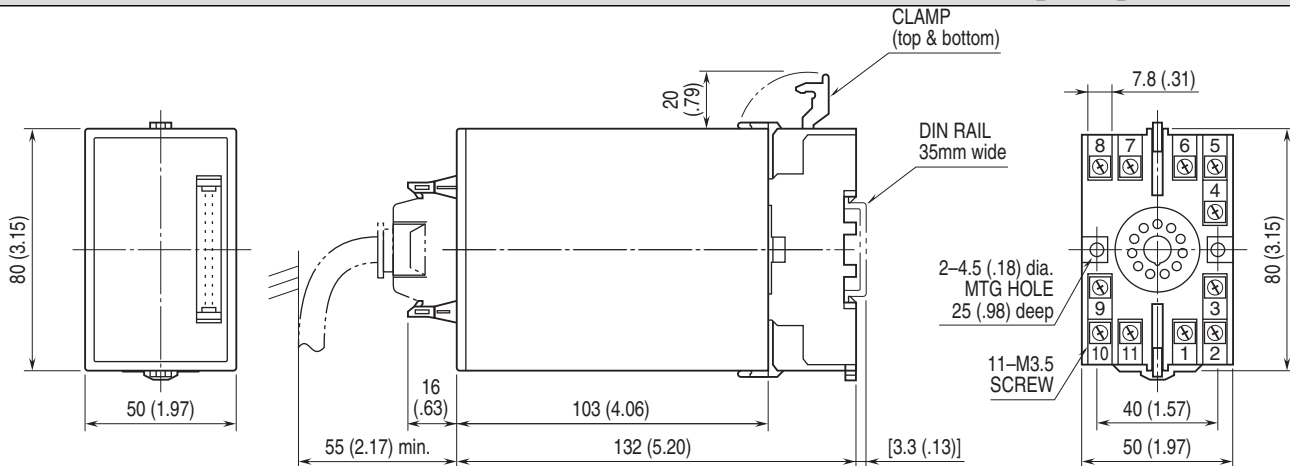
ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
P	N/A	-9999 – 9999 (-FFFF – FFFF)	Output display in engineering unit, BCD (as set in ITEM 17/18) ( ) for binary, offset binary, two's complement, reflected binary	----
01		1, 2	Modification code 1 : Data indication only. 2 : All parameters are modifiable.	1
02	N/A	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.

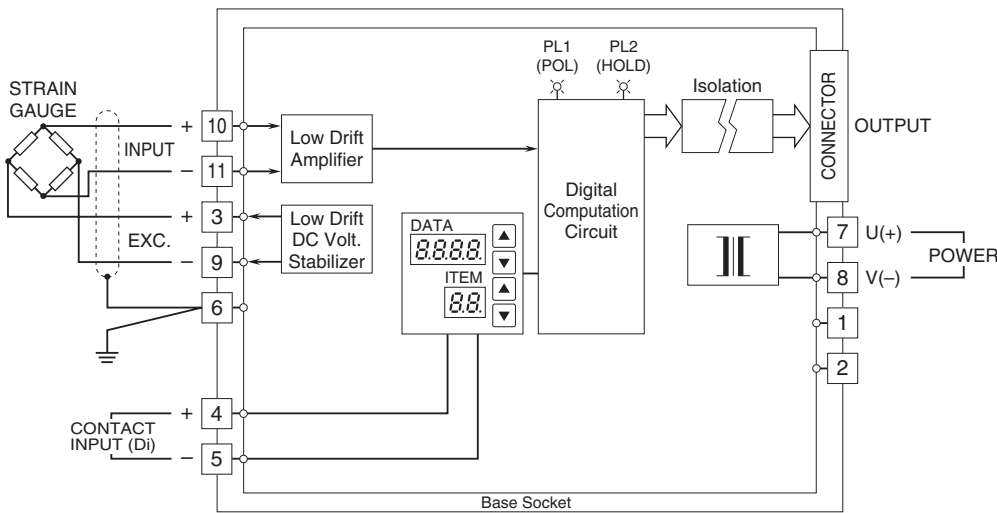
\*2. ITEM 21, 23 or 24 is independent from ITEM 22.

## EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm [inch]



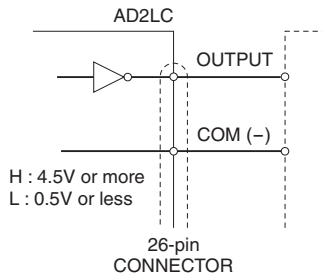
•When mounting, no extra space is needed between units.

## SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

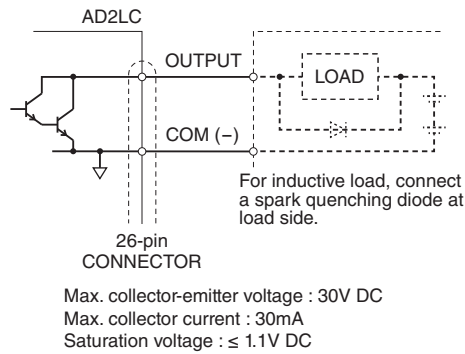


### ■ Connection Examples

#### • CMOS LEVEL (5V-CMOS)



#### • OPEN COLLECTOR



## OUTPUT CONNECTOR (26-pin)

### ■ BCD OUTPUT

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

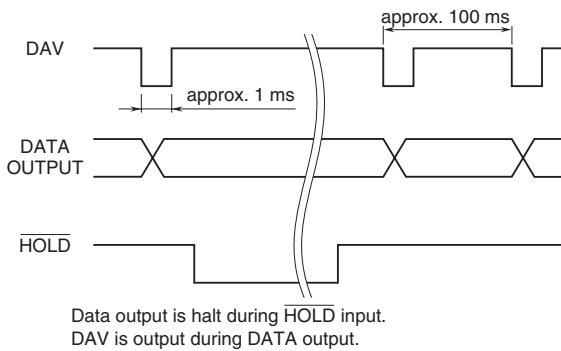
### ■ BINARY, TWO'S COMPLEMENT OUTPUTS

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**



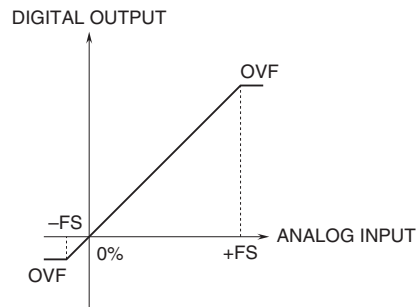
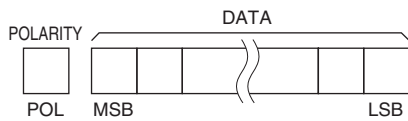
**INPUT-OUTPUT RELATION EXAMPLES**

• **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.

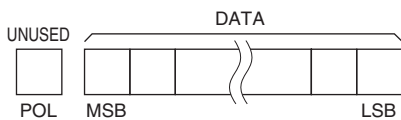
• **OVF**  
When one of the following conditions is true, the digital output overflows (OVF).  
1) When the input signal is out of the range between -FS and +FS.  
2) When the display value (= output signal) exceeds the display range.

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.