

Plug-in Signal Conditioners M-UNIT

D/A CONVERTER

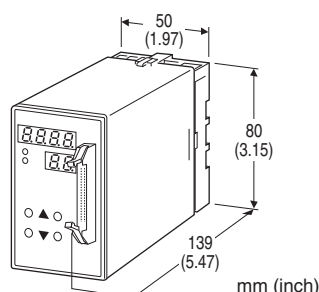
(16-bit resolution)

Functions & Features

- Converts parallel digital signal into a DC output
- BCD, binary, offset binary, two's complement, reflected binary inputs
- Positive or negative logic selectable
- Display can be scaled in convenient engineering unit
- Scalable DC output range
- Parity check

Typical Applications

- Interface of analog signal for computers and PLC



MODEL: DA3-[1][2]-[3][4]

ORDERING INFORMATION

- Code number: DA3-[1][2]-[3][4]
Specify a code from below for each of [1] through [4].
(e.g. DA3-V11-M2/A/Q)
 - Specify the specification for option code /Q
(e.g. /C01/S01)
- Use Ordering Information Sheet (No. ESU-1395) for specifying programmable variables. Default setting will be used if not specified.

[1] OUTPUT

Current

Z1: Range 0 – 20 mA DC (Load resistance 600Ω max.)

Voltage

V1: Range -1 – +1 V DC (Load resistance 1000Ω min.)

V2: Range -10 – +10 V DC (Load resistance 10kΩ min.)

[2] RESPONSE TIME

1: 400 msec.

2: 10 msec.

[3] POWER INPUT

AC Power

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

DC Power

R3: 12 – 24 V DC

(Operational voltage range 10.8 – 26.4 V, ripple 10 %p-p max.)

P: 110 V DC

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

[4] OPTIONS (multiple selections)

Input

Blank: TTL level

/A: 24 V DC

Other Options

blank: none

/Q: Option other than the above (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: 26-pin connector(OMRON XG4A-2634)

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

Cover: OMRON XG5S-2612

Output, power: M3.5 screw terminals

Screw terminal: Chromated steel (standard) or stainless steel

Housing material: Flame-resistant resin (black)

Isolation: Input to output to power

Overrange output: Approx. -15 to +115 %

■DISPLAY

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

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

PV indication: Input 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 (LOAD) LED: Red LED turns on at LOAD.

Setting: Via the front key pad

- Display range scaling
- Available number of bits
- Data input logic
- POL input
- LOAD input
- Parity check

For detailed information, refer to the instruction manual.

INPUT SPECIFICATIONS

■ **Input 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

■ **Input Specifications**

• **TTL Level:** TTL level (5 V-CMOS level) or open collector (sink type), dry contact (detecting voltage: approx. 5 V, saturation voltage: ≤ 1 V, sink current: 1 mA)

Saturation voltage: ≤ 1 V

Sink current: 1 mA

Common: Negative

• **24 V DC:** Open collector (source type)

Rated voltage: 24 V DC $\pm 10\%$, ripple 5 %p-p max.

ON voltage/current: ≥ 18 V / 2.5 mA DC

OFF voltage/current: ≤ 3 V / 0.4 mA DC

Input current: ≤ 3.5 mA @24 V DC

Input resistance: Approx. 7.5 k Ω

Common: Negative

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

■ **LOAD input:** Same logic and level as for the input code; logic user-selectable

■ **Odd or even parity:** Same logic and level as for the input code; logic user-selectable

OUTPUT SPECIFICATIONS

■ **DC Current:** 0 - 20 mA DC

Operational range: 0 - 24.0 mA DC

Minimum increment: 0.1 mA

■ **DC Voltage**

Code V1: -1.00 - +1.00 V DC

Operational range: -1.15 - +1.15 V DC

Minimum increment: 10 mV

Code V2: -10.0 - +10.0 V DC

Operational range: -11.5 - +11.5 V DC

Minimum increment: 100 mV

INSTALLATION

Power consumption

• **AC:** Approx. 10 VA

• **DC:** Approx. 4 W (160 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: 300 g (0.66 lb)

PERFORMANCE in percentage of max. span

Accuracy: ± 0.1 %

Min. span required to ensure the accuracy: 20 % of the nominal output range

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

Resolution: 16 bits

Response time: ≤ 400 msec. or ≤ 10 msec. (0 - 90 %)

as specified by model suffix code, with ITEM 16 set to 0.0.

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 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

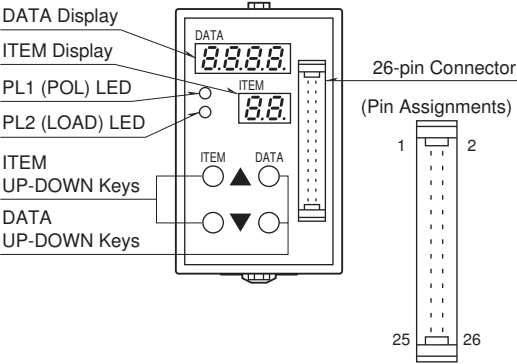
Pollution Degree 2

Input or output to power: Reinforced insulation (300 V)

Input to output: 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)	Input display in engineering unit, BCD (as set in ITEM 08/09) () for binary, offset binary, two's complement, reflected binary	–
01		1, 2, 3	Modification code 1 : Data indication only. 2 : All parameters are modifiable. 3 : ITEM 22 only.	1
02	N/A	0 – 99	Status indication ("0" is normally indicated.) 0: Normal 1: Memory error 10: Out of input range -15 – 115%	–
03/L	2	-15.0 – 115.0	Input indicated in % (of the range set in ITEM 17/18) Loop test output with ITEM 01 DATA 2 ('L' is indicated as ITEM No.)	–
04	2	-99.99 – 99.99	Zero adjustment (%) (fine adj. of the value set in ITEM 17)	0.00
05	2	-99.99 – 99.99	Span adjustment (%) (fine adj. of the value set in ITEM 18)	0.00
06	2	0, 1, 2, 3, 4	Display code 0 : BCD with polarity (decimal) 1 : Binary with polarity 2 : Offset binary 3 : Two's complement 4 : Reflected binary	0
07	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
08	2	-9999 – 9999	BCD Display range scaling 0% *1	-9999
09	2	-9999 – 9999	Display range scaling 100% *1	9999
08	2	-7FFF – 7FFF	Binary Display range scaling 0% *1	-7FFF
09	2	-7FFF – 7FFF	Display range scaling 100% *1	7FFF
08	2	0000 – FFFF	Offset binary Display range scaling 0% *1	0000
09	2	0000 – FFFF	Display range scaling 100% *1	FFFF
08	2	8000 – 7FFF	Two's complement Display range scaling 0% *1	8000
09	2	8000 – 7FFF	Display range scaling 100% *1	7FFF
08	2	0000 – FFFF	Reflected binary Display range scaling 0% *1	0000
09	2	0000 – FFFF	Display range scaling 100% *1	FFFF
10	2	0, 1	Data input logic*2 0 : Positive 1 : Negative ITEM 11 and 13 are independent from ITEM 10.	1
11	2	0, 1, 2	LOAD input 0: LOAD at Low or shortcircuit*3 1 : LOAD at High or opencircuit*4 2 : Unavailable (unused)	0
12	2	0, 1	POL input 0 : Unavailable (unused) 1 : Available (used)	1
13	2	0, 1	POL input 0: Negative at High or opencircuit*4 1 : Negative at Low or shortcircuit*3	1
14	2	0, 1, 2	Parity check 0: Disable 1: Enable Parity per each digit 2: Enable Parity for all digits	0
15	2	0, 1	Odd or even parity 0 : Odd 1 : Even	0
16	2	0.0 – 60.0	Delay buffer (seconds, 0 – 90%) When the Response Time model suffix code is specified to 1, the set value is only effective at 0.5 or higher value.	0.0
17	2	-1.00 – 1.00	Output code V1 0% output voltage (V) *5	-1.00
18	2	-1.00 – 1.00	100% output voltage (V) *5	1.00
17	2	-10.0 – 10.0	Output code V2 0% output voltage (V) *5	-10.0
18	2	-10.0 – 10.0	100% output voltage (V) *5	10.0
17	2	0.0 – 20.0	Output code Z1 0% output voltage (V) *5	4.0
18	2	0.0 – 20.0	100% output voltage (V) *5	20.0
19	2	0 – 99	Power ON-delay time (seconds)	5
20	2	0, 1 – 60	Power-saving mode 0 : Continuous display 1 – 60 : Time before display turned off (minutes)	10
21	2	0 – 9999	Parity check error count The count value is reset to 0 with double-clicking the DATA DOWN key.	–
22	3	0, 1	Reset all settings	0
23	N/A	–	ROM version	–

*1. ITEM 08 < ITEM 09.

*2. Open collector input logic

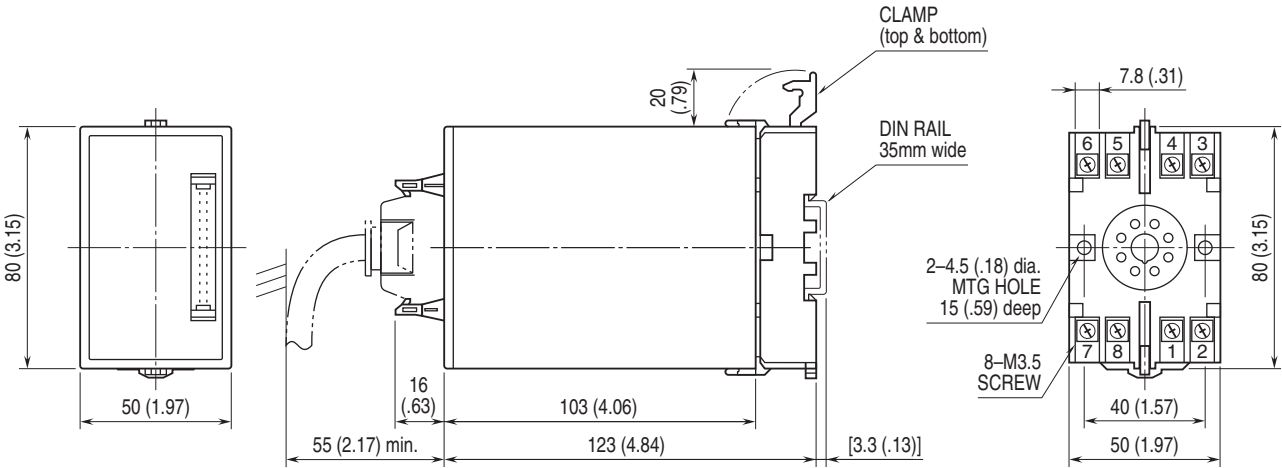
INPUT	LOGIC	ITEM 10		0 : Positive logic		1 : Negative logic	
		DATA		0	1	0	1
TTL level, open collector sink type (TTL level)		Short (LOW)		Open (HIGH)	Open (HIGH)	Open (HIGH)	Short (LOW)
24V DC, open collector source type		Open		Short	Short	Short	Open

*3. "Opencircuit" with 24V DC input

*4. "Shortcircuit" with 24V DC input

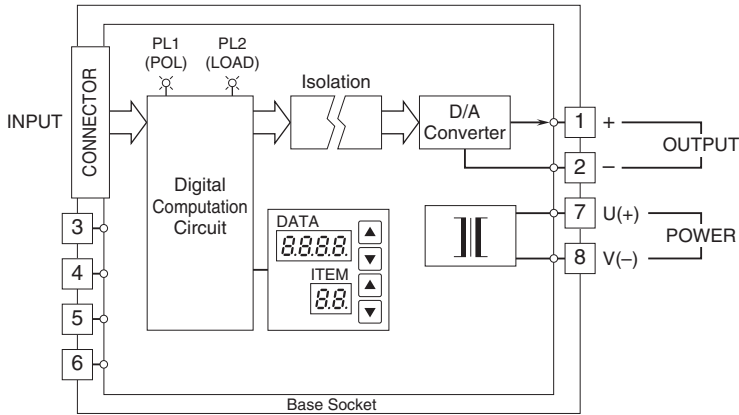
*5. Of the range set in ITEM 08/09. ITEM 17 < ITEM 18.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



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

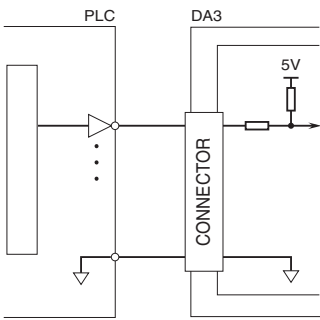
SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM



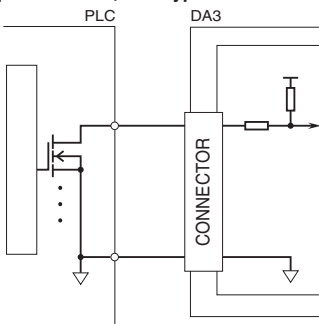
■ Input Connection Examples

- Standard type
- Option /A

TTL level

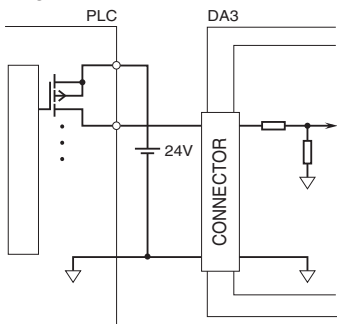


Open collector, sink type



- Option /A

24V DC



INPUT CONNECTOR (26-pin)**■ BCD INPUT**

PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	1×10^0	17	COM (-)
2	2×10^0	18	COM (-)
3	4×10^0	19	No connection
4	8×10^0	20	POL
5	1×10^1	21	LOAD ^{*1}
6	2×10^1	22	LOAD ^{*1}
7	4×10^1	23	P ⁰ ^{*2}
8	8×10^1	24	P ¹
9	1×10^2	25	P ²
10	2×10^2	26	P ³
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 INPUTS

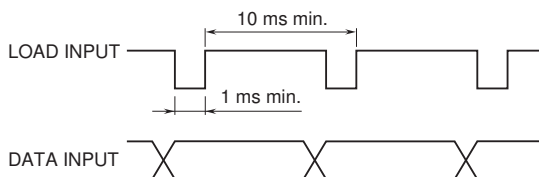
PIN NO.	ASSIGNMENT	PIN NO.	ASSIGNMENT
1	B ⁰	17	COM (-)
2	B ¹	18	COM (-)
3	B ²	19	No connection
4	B ³	20	POL
5	B ⁴	21	LOAD ^{*1}
6	B ⁵	22	LOAD ^{*1}
7	B ⁶	23	P ⁰ ^{*3}
8	B ⁷	24	P ¹
9	B ⁸	25	P ²
10	B ⁹	26	P ³
11	B ¹⁰		
12	B ¹¹		
13	B ¹²		
14	B ¹³		
15	B ¹⁴		
16	B ¹⁵		

*1. Pin No. 21 and 22 are internally connected.

*2. P⁰ corresponds to $n \times 10^0$, P¹ to $n \times 10^1$, P² to $n \times 10^2$, P³ to $n \times 10^3$. Only P⁰ corresponds when the parity for all digits are valid.

*3. P⁰ corresponds to B⁰ through B³, P¹ to B⁴ through B⁷, P² to B⁸ through B¹¹, P³ to B¹² through B¹⁵. Only P⁰ corresponds when the parity for all digits are valid.

Note: With the number of bits set to 14 (or 12, 10, 8) with ITEM 07, Pin No. 1 – 14 (or 1 – 12, 1 – 10, 1 – 8) are valid.

TIMING CHART**• Example: TTL Level Input (setting)**

The unit reads data upon detecting a change of LOAD input status.
DO NOT change LOAD input setting when the data input logic is changed.

Note: Even if LOAD signal is entered, the unit does not convert into analog and hold previous value until entering next normal data, when error is detected by parity check.

INPUT-OUTPUT RELATION EXAMPLES

• FS

-FS stands for -15 % of the input range (0 to 100 %), which is configured by ITEM 08, display range scaling 0 % and ITEM 09, display range scaling 100 %. +FS stands for +115 % of the input range.

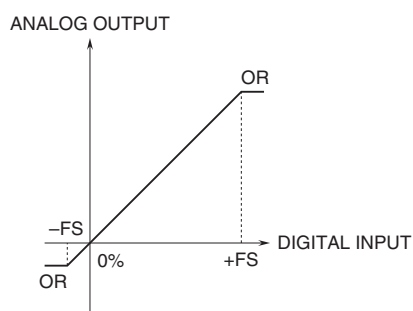
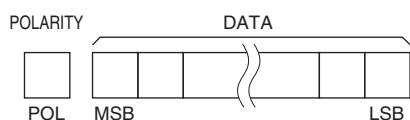
• OR

When one of the following conditions is true, the digital input overflows (OR).

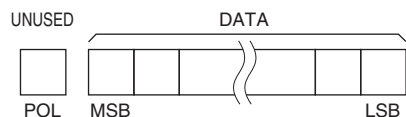
- 1) When the input signal is out of the range between -FS and +FS.
- 2) When the display value (= input signal) exceeds the display range.

The display range differs according to input 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.