D/A CONVERTER
(16-bit resolution)

MODEL **DA3**

BEFORE USE ....

Thank you for choosing us. Before use, please check contents of the package you received as outlined below.
If you have any problems or questions with the product, please contact our sales office or representatives.

■ PACKAGE INCLUDES:

Signal conditioner (body + base socket)............................(1)

■ MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■ INSTRUCTION MANUAL

This manual describes necessary points of caution when you use this product, including installation, connection and basic maintenance procedures.

POINTS OF CAUTION

■ CONFORMITY WITH EU DIRECTIVES

- This equipment is suitable for Pollution Degree 2 and Installation Category II (transient voltage 2500V). Reinforced insulation (signal input or output to power input: 300V) and basic insulation (signal input to output: 300V) are maintained. Prior to installation, check that the insulation class of this unit satisfies the system requirements.
- Altitude up to 2000 meters.
- The equipment must be mounted inside a panel.
- Insert a noise filter for the power source connected to the equipment. TDK-Lambda Noise Filter Model RSAN-2006 or equivalent is recommended.
- The equipment must be installed such that appropriate clearance and creepage distances are maintained to conform to CE requirements. Failure to observe these requirements may invalidate the CE conformance.
- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this unit when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures* to ensure the CE conformity.
  * For example, installation of noise filters and clamp filters for the power source, input and output connected to the unit, etc.
- Install lightning surge protectors for those wires connected to remote locations.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
  100 – 240V AC rating: 85 – 264V, 47 – 66 Hz, approx. 10VA
  12 – 24V DC rating: 10.8 – 26.4V, approx. 4W
  110V DC rating: 85 – 150V, approx. 4W

■ GENERAL PRECAUTIONS

- Before you remove the unit from its base socket or mount it, turn off the power supply and input signal for safety.

■ ENVIRONMENT

- Indoor use.
- When heavy dust or metal particles are present in the air, install the unit inside proper housing with sufficient ventilation.
- Do not install the unit where it is subjected to continuous vibration. Do not subject the unit to physical impact.
- Environmental temperature must be within -5 to +55°C (23 to 131°F) with relative humidity within 30 to 90% RH in order to ensure adequate life span and operation.

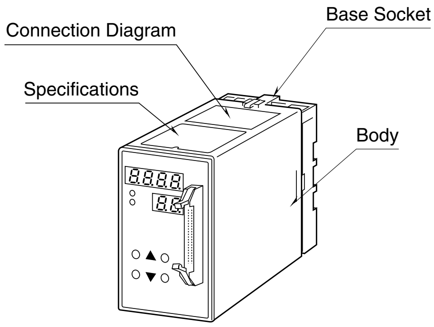
■ WIRING

- Do not install cables close to noise sources (relay drive cable, high frequency line, etc.).
- Do not bind the unit's cables together with cables where high noise levels are present. Do not install them in the same duct.

■ AND ....

- The unit is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

COMPONENT IDENTIFICATION

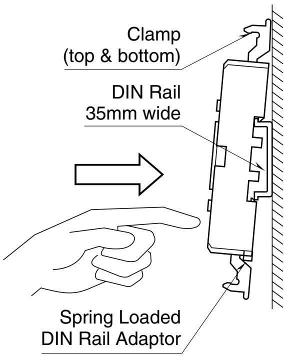


INSTALLATION

Detach the yellow clamps located at the top and bottom of the unit for separate the body from the base socket.

■ DIN RAIL MOUNTING

Set the base socket so that its DIN rail adaptor is at the bottom. Hang the upper hook at the rear side of base socket on the DIN rail and push in the lower. When removing the socket, push down the DIN rail adaptor utilizing a minus screwdriver and pull.



Shape and size of the base socket are slightly different with various socket types.

■ WALL MOUNTING

Refer to “EXTERNAL DIMENSIONS.”

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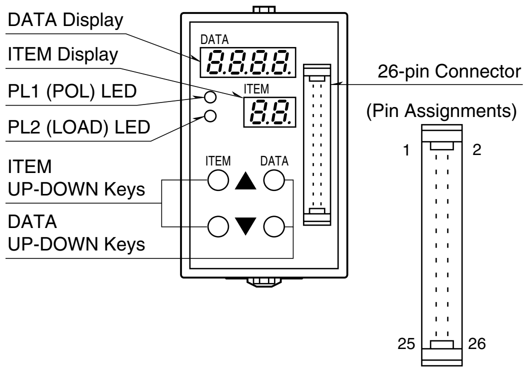
FRONT PANEL CONFIGURATION & PROGRAMMING

■ PROGRAMMING PROCEDURE



1) Press ITEM UP or DOWN key until ITEM display indicates “01”.
2) Press DATA UP or DOWN key and choose “2” on DATA display.
   1 : Data indication only.
   2 : All parameters are modifiable.
3) Press ITEM UP or DOWN key until ITEM display shows the ITEM No. you need to change.
4) Press DATA UP or DOWN key and choose a DATA No. or value you need on DATA display.
5) Repeat above 3 and 4. (Entered data is stored when you move to a new ITEM.)
6) Press ITEM UP or DOWN key until ITEM display indicates “01”.
7) Press DATA UP or DOWN key and choose “1” on the display.
8) Press ITEM UP or DOWN key until ITEM display indicates “P”.

DATA display shows process input. You can now check data setting by choosing ITEM No.
Note: DO NOT press UP and DOWN keys simultaneously.

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 05	2 2	-99.99 – 99.99 -99.99 – 99.99	Zero adjustment (%) (fine adj. of the value set in ITEM 17) Span adjustment (%) (fine adj. of the value set in ITEM 18)	0.00 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 09	2 2	-9999 – 9999 -9999 – 9999	BCD Display range scaling 0% *1 Display range scaling 100% *1	-9999 9999
08 09	2 2	-7FFF – 7FFF -7FFF – 7FFF	Binary Display range scaling 0% *1 Display range scaling 100% *1	-7FFF 7FFF
08 09	2 2	0000 – FFFF 0000 – FFFF	Offset binary Display range scaling 0% *1 Display range scaling 100% *1	0000 FFFF
08 09	2 2	8000 – 7FFF 8000 – 7FFF	Two’s complement Display range scaling 0% *1 Display range scaling 100% *1	8000 7FFF
08 09	2 2	0000 – FFFF 0000 – FFFF	Reflected binary Display range scaling 0% *1 Display range scaling 100% *1	0000 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 18	2 2	-1.00 – 1.00 -1.00 – 1.00	Output code V1 0% output voltage (V) *5 100% output voltage (V) *5	-1.00 1.00
17 18	2 2	-10.0 – 10.0 -10.0 – 10.0	Output code V2 0% output voltage (V) *5 100% output voltage (V) *5	-10.0 10.0

ITEM	MDF. CODE	DATA	CONTENTS	DEFAULT
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 *6	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)	Short (LOW)
24V DC, open collector source type		Open	Short	Short	Open

*3. "Opencircuit" with 24V DC input

*4. "Shortcircuit" with 24V DC input

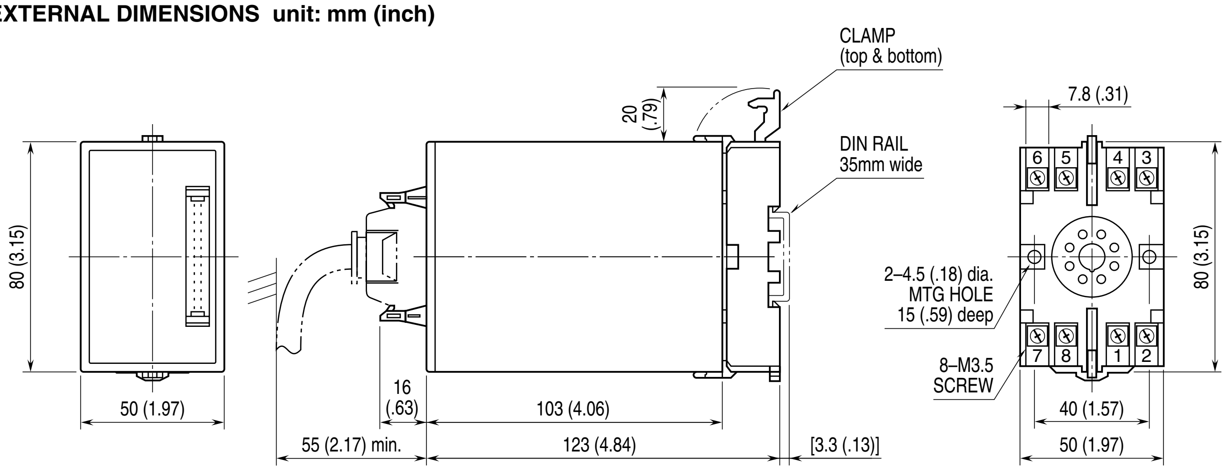
*5. Of the range set in ITEM 08/09. ITEM 17 < ITEM 18.

*6. Press DATA UP key and choose DATA 1. Double-click DATA DOWN key. The display shows DATA 0 after the initialization is complete.

TERMINAL CONNECTIONS

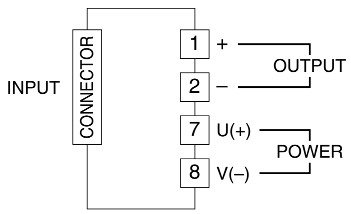
Connect the unit as in the diagram below or refer to the connection diagram on the top of the unit.

■ EXTERNAL DIMENSIONS unit: mm (inch)



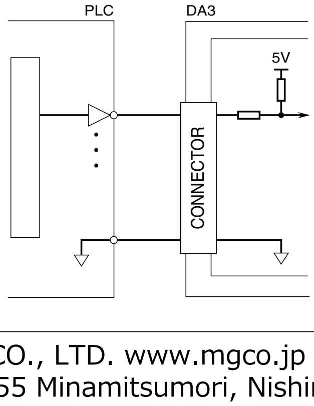
•When mounting, no extra space is needed between units.

■ CONNECTION DIAGRAM

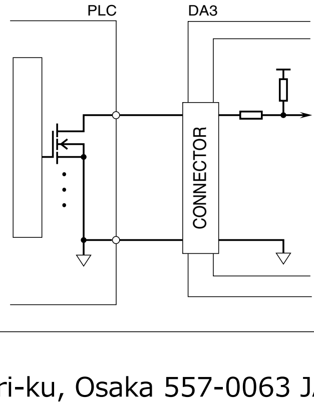


■ Input Connection Examples

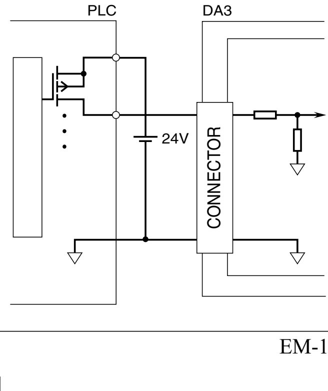
• Standard type
TTL level



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}		

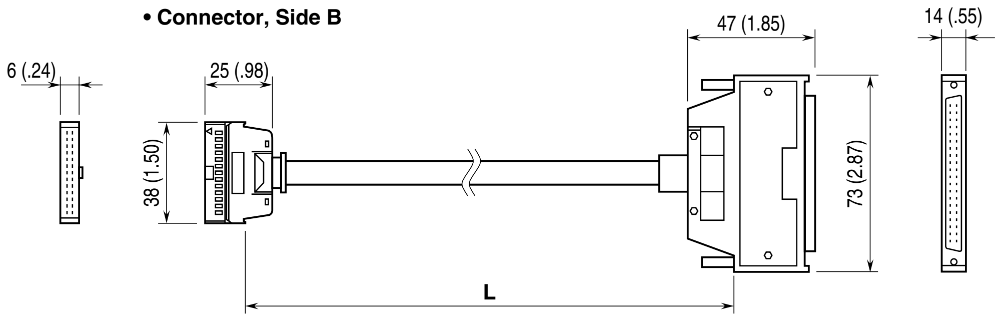
*1. Pin No. 21 and 22 are internally connected.
*2. P^{0} corresponds to $n \times 10^{0}$, P^{1} to $n \times 10^{1}$, P^{2} to $n \times 10^{2}$, P^{3} to $n \times 10^{3}$. Only P^{0} corresponds when the parity for all digits are valid.
*3. P^{0} corresponds to B^{0} through B^{3}, P^{1} to B^{4} through B^{7}, P^{2} to B^{8} through B^{11}, P^{3} to B^{12} through B^{15}. Only P^{0} 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.

CABLE (MODEL: MCN26) PIN ASSIGNMENTS

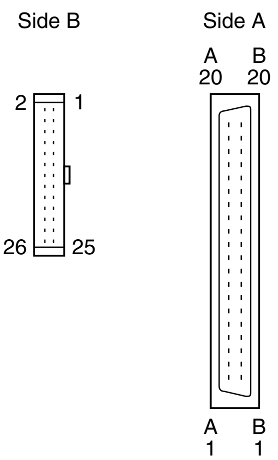
• **Connector, Side A**

• **Connector, Side B**

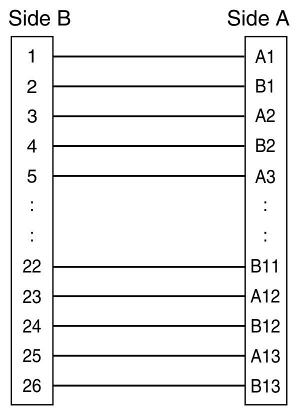


	MCN26-03	MCN26-05	MCN26-10	MCN26-30
L	30 cm (11.8 in.)	50 cm (19.7 in.)	1 m (3.3 ft.)	3 m (9.8 ft.)

■ **CONNECTOR PIN ASSIGNMENT**



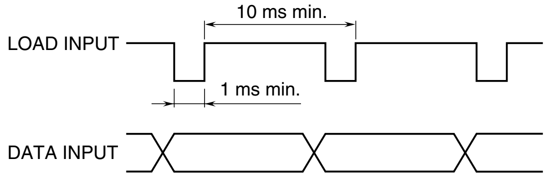
■ **WIRING DIAGRAM**



Pins No. A14 – B20 on Side A are not connected.

TIMING CHART

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

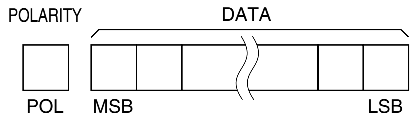


The unit reads data upon detecting a change of LOAD input status.
DO NOT change LOAD input setting when the data input logic is changed.

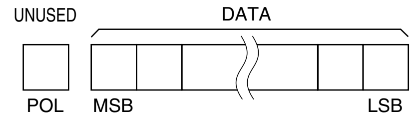
Note: Even if LOAD signal is entered, the unit does not convert into analog and hold previous value until entering next normal data, when error isdetected by parity check.

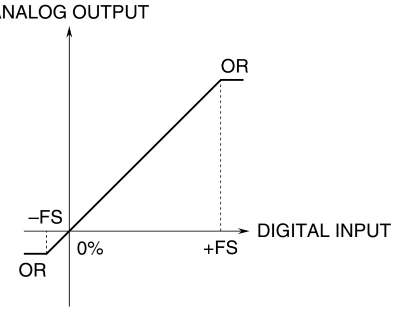
INPUT-OUTPUT RELATION EXAMPLE

■ **BCD, BINARY (WITH POLARITY)**



■ **OFFSET BINARY & TWO'S COMPLEMENT**





• 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 output 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 input range differs according to input code. For example, in case of BCD with polarity, it is -9999 to 9999. Please refer to the table in the FRONT PANEL CONFIGURATION & PROGRAMMING for detail.

CHECKING

1) Terminal wiring: Check that all cables are correctly connected according to the connection diagram.
2) Power input voltage: Check voltage across the terminal 7 – 8 with a multimeter.
3) Input: Dry contact or open collector. Check the input device meets the following requirements.

TTL level
Sensing: 5 V DC @1 mA
Threshold voltage of the input circuit: 1 V DC
24 V DC
Sensing: 24 V DC @ 3.5 mA
Threshold voltage of the input circuit: 3 V DC
LOAD signal: ON time 1 millisec. min.

4) Output: Check that the load resistance meets the described specifications.

LIGHTNING SURGE PROTECTION

We offer a series of lightning surge protector for protection against induced lightning surges. Please contact us to choose appropriate models.