INSTRUCTION MANUAL

D/A CONVERTER
(16-bit resolution; programmable with programming unit)

MODEL **KDA3**

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.
When you need to change software settings, please refer to the Operation Manual for Model PU-2x (EM-9255), Section B.

POINTS OF CAUTION

■ 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. 8VA
   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
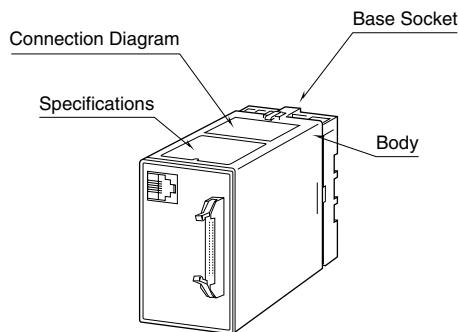
INSTALLATION

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.
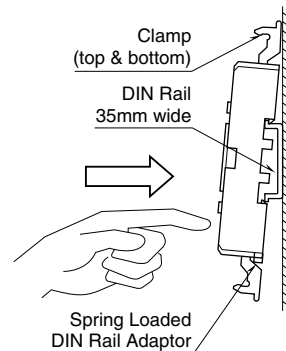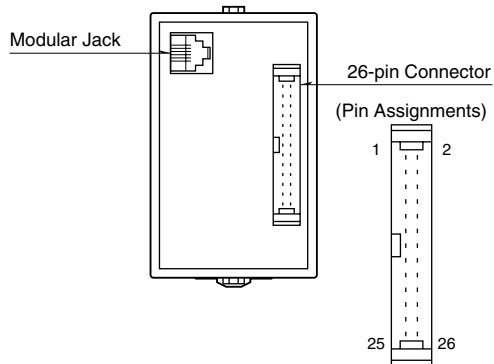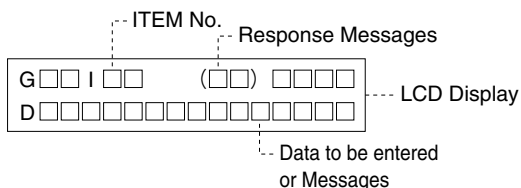

■ WALL MOUNTING

Refer to "EXTERNAL DIMENSIONS."

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

FRONT PANEL CONFIGURATION & PROGRAMMING WITH PU-2x

• **Response Messages**

OK: OK

NG: No good. Check modular jack connection.

ER: Communication error

[GROUP 00]

ITEM	MDF. CODE	INPUT DATA	EXAMPLE (DEFAULT)	CONTENTS	
01	S	0, 1	MNTSW : MON MODE	Modification code 0 : Data indication only. 1 : All parameters are modifiable.	
02	D		STATUS : 0	Status indication	
03	D		DEVICE : 0 DEVICE : 1 DEVICE : 2	Output type 0 : V1 1 : V2 2 : Z1	
04	P	0 – 99	POWONDELAY : 5	Power ON-delay time (seconds)	
10	D	-15.0 – 115.0	%PV : XXX.X	Output indicated in % (as set in ITEM 26/27)	
11	P	-99.99 – 99.99	ZERO : 0.00	Zero adjustment (%) (fine adj. of the value set in ITEM 26)	
12	P	-99.99 – 99.99	SPAN : 0.00	Span adjustment (%) (fine adj. of the value set in ITEM 27)	
13	D		PV : YYYY	Input indicated in engineering unit (as scaled in ITEM 14/15)	
14	P	-9999 – 9999	SCALE 0 : -9999	BCD	Scaled range 0%[*1]
15	P	-9999 – 9999	SCALE 100 : 9999		Scaled range 100%[*1]
14	P	-7FFF – 7FFF	SCALE 0 : -7FFF	Binary	Scaled range 0%[*1]
15	P	-7FFF – 7FFF	SCALE 100 : 7FFF		Scaled range 100%[*1]
14	P	0000 – FFFF	SCALE 0 : 0000	Offset binary	Scaled range 0%[*1]
15	P	0000 – FFFF	SCALE 100 : FFFF	Reflected binary	Scaled range 100%[*1]
14	P	8000 – 7FFF	SCALE 0 : 8000	Two's complement	Scaled range 0%[*1]
15	P	8000 – 7FFF	SCALE 100 : 7FFF		Scaled range 100%[*1]
17	P	0, 1, 2, 3, 4	CODE : 0	Input code	0 : BCD with polarity (decimal) 1 : Binary with polarity 2 : Offset binary 3 : Two's complement 4 : Reflected binary
18	P	0, 1, 2, 3, 4	AV1L_BIT : 0	Available number of bits 0: 16 bits 1: 14 bits 2: 12 bits 3: 10 bits 4: 8 bits	
19	P	0, 1	POLAR : 1	POL input	0 : Unavailable (unused) 1 : Available (used)
20	P	0, 1	DATA_LOGIC : 1	Data input logic[*2]	0 : Positive 1 : Negative
21	P	0, 1, 2	LOAD_LOGIC : 0	LOAD input	0 : LOAD at Low or shortcircuit[*3] 1 : LOAD at High or opencircuit[*4] 2 : Unavailable (unused)
22	P	0, 1	POLAR_LOGIC : 1	POL input	0 : Negative at High or opencircuit[*4] 1 : Negative at Low or shortcircuit[*3]
23	P	0, 1, 2	PARITY : 0	Parity check	0 : Disable 1 : Enable Parity per each digit 2 : Enable Parity for all digits
24	P	0, 1	PARITY_TYPE : 0	Odd or even parity	0 : Odd 1 : Even

*1. ITEM 14 < ITEM 15. Set after ITEM 17 and 18.

*2. Open collector input logic

LOGIC — ITEM 20		0 : Positive logic		1 : Negative logic	
INPUT — 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

ITEM	MDF. CODE	INPUT DATA	EXAMPLE (DEFAULT)	CONTENTS		
25	P	0.0 – 60.0	LAG_TIME : 0.0	Delay buffer (seconds, 0 – 90%) When the Response Time model suffix code is specified to 1, the set value is only effective at 5.0 or higher value.		
26	P	-1.00 – 1.00	ZERO : -1.00	Output code V1	0% output voltage (V)[5]	
27	P	-1.00 – 1.00	SPAN : 1.00		100% output voltage (V)[5]	
26	P	-10.0 – 10.0	ZERO : -10.00	Output code V2	0% output voltage (V)[5]	
27	P	-10.0 – 10.0	SPAN : 10.00		100% output voltage (V)[5]	
26	P	0.0 – 24.0	ZERO : 4.00	Output code Z1	0% output current (mA)[5]	
27	P	0.0 – 24.0	SPAN : 20.00		100% output current (mA)[5]	
28	N/A	–	KDA3_VER : *.**	ROM version		

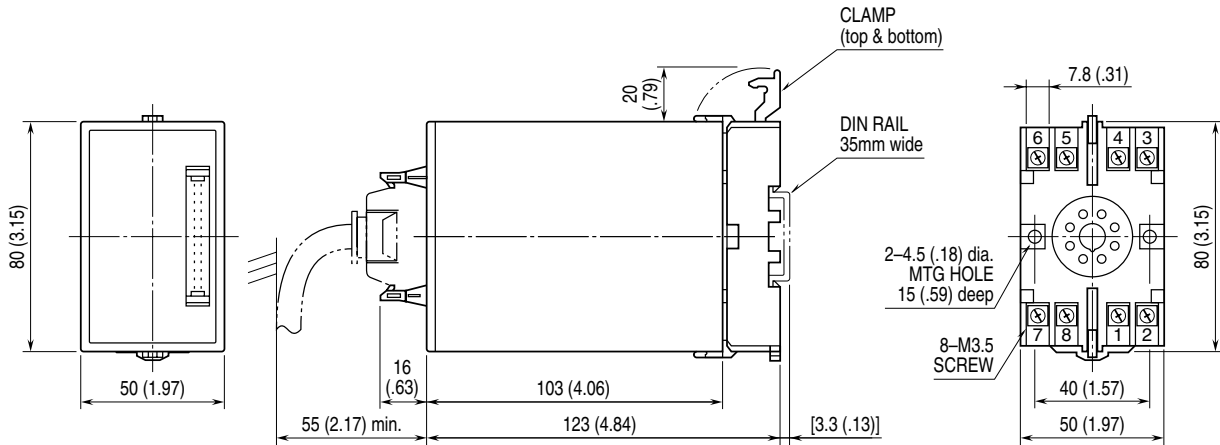*5. Of the range set in ITEM 14/15, ITEM 26 < ITEM 27.

Modification Code

D: No modification (writing) possible. Used only for monitoring (reading).
S: Modifiable at any time.
P: Modifiable only when the MAINTENANCE SWITCH is in the "PRG" mode.
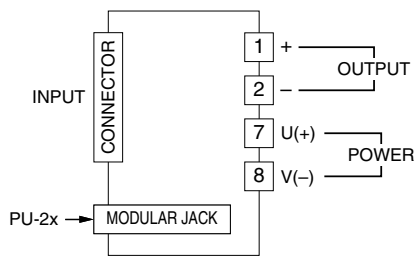
TERMINAL CONNECTIONS

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

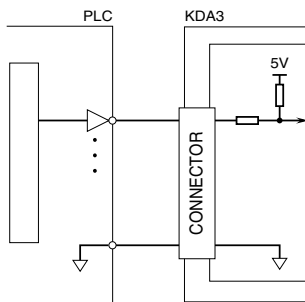## ■ EXTERNAL DIMENSIONS unit: mm (inch)

CLAMP (top & bottom)

DIN RAIL 35mm wide

20 (.79)

7.8 (.31)

80 (3.15)

50 (1.97)

55 (2.17) min.

16 (.63)

103 (4.06)

123 (4.84)

[3.3 (.13)]

2–4.5 (.18) dia. MTG HOLE 15 (.59) deep

8–M3.5 SCREW

80 (3.15)

40 (1.57)

50 (1.97)

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

■ CONNECTION DIAGRAM

INPUT

CONNECTOR

PU-2x → MODULAR JACK

1 +
2 − OUTPUT

7 U(+)
8 V(−) POWER

■ Input Connection Examples

• Standard type TTL level

PLC   KDA3

5V

CONNECTOR

Open collector, sink type

PLC   KDA3

CONNECTOR

• Option /A 24V DC

PLC   KDA3

24V

CONNECTOR

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	P0 *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.
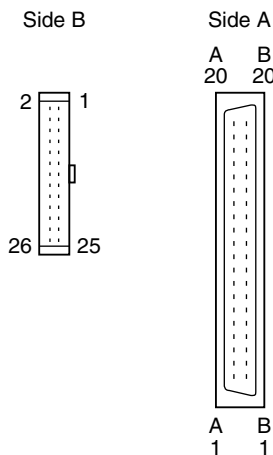
Note: With the number of bits set to 14 (or 12, 10, 8) with ITEM 18, Pin No. 1 – 14 (or 1 – 12, 1 – 10, 1 – 8) are valid.
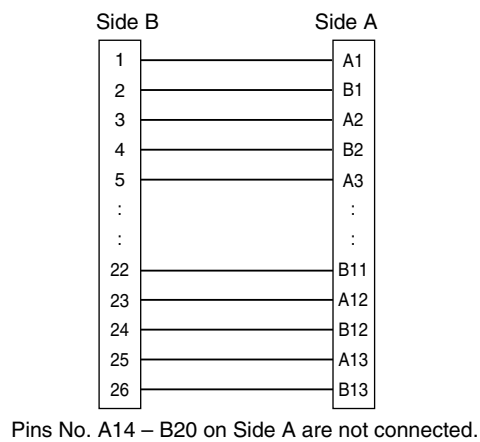
CABLE (MODEL: MCN26) PIN ASSIGNMENTS

• Connector, Side A

• Connector, Side B

6 (.24)   25 (.98)   38 (1.50)   47 (1.85)   73 (2.87)   14 (.55)

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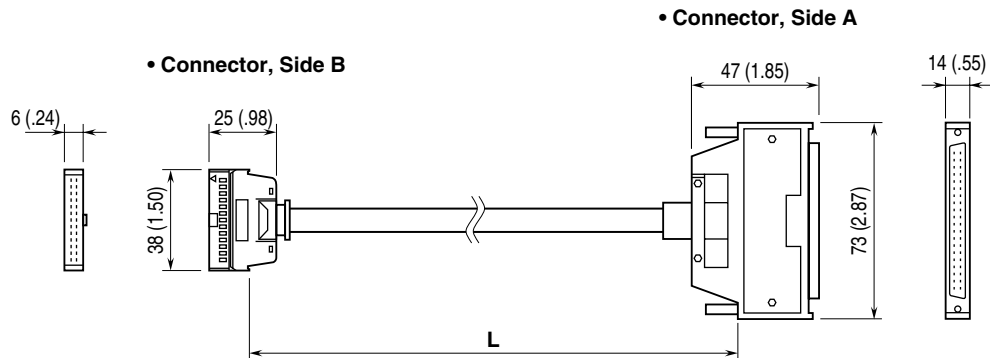
	MCN26-03	MCN26-05	MCN26-10	MCN26-30
L	30 cm (11.8 in.)	50 cm (19.7 in.)	1 m (3.3 ft.)	3 m (9.8 ft.)

■ CONNECTOR PIN ASSIGNMENT

Side B

2 1

26 25

Side A

A 20   B 20

A 1   B 1

■ WIRING DIAGRAM

Side B	Side A
1	A1
2	B1
3	A2
4	B2
5	A3
⋮	⋮
⋮	⋮
22	B11
23	A12
24	B12
25	A13
26	B13

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

TIMING CHART

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

LOAD INPUT

10 ms min.
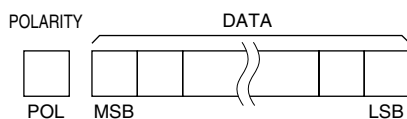
1 ms min.
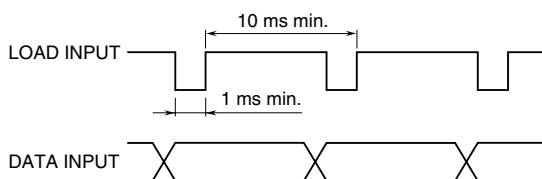
DATA INPUT

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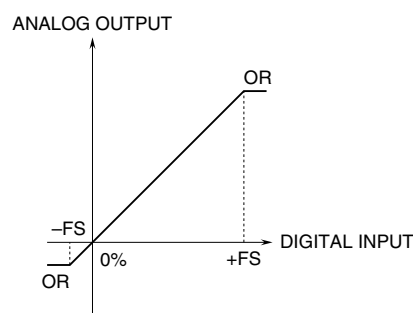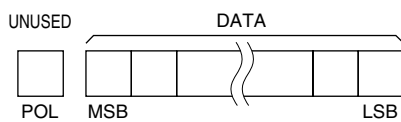DO NOT change LOAD input setting when the data input logic is changed.

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)**

POLARITY   DATA

POL   MSB   LSB

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

UNUSED   DATA

POL   MSB   LSB

ANALOG OUTPUT

OR

−FS

0%   +FS

DIGITAL INPUT

OR

• **FS**

-FS stands for -15% of the input range (0 to 100%), which is configured by ITEM 14, display range scaling 0% and ITEM 15, 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 input value exceeds the input 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 WITH PU-2x 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: 5V DC @1mA
　　　Threshold voltage of the input circuit: 1V DC
　24V DC
　　　Sensing: 24V DC @3.5mA
　　　Threshold voltage of the input circuit: 3V 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.