Plug-in Signal Conditioners K-UNIT

D/A CONVERTER

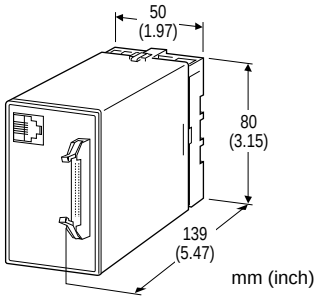
(16-bit resolution; programmable with programming unit)

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
- Scalable DC output range
- Programming Unit (PU-2x) used for setting

Typical Applications

- Interface of analog signal for computers and PLC



MODEL: KDA3–[1][2]–[3][4]

ORDERING INFORMATION

- Code number: KDA3-[1][2]-[3][4]

Specify a code from below for each of [1] through [4].
(e.g. KDA3-V11-M2/A/Q)

- Specify the specification for option code /Q
(e.g. /C01/S01)

Use Ordering Information Sheet (No. ESU-3646) 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)
- Programming Unit (model: PU-2x)

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 %

Setting: Programming Unit (model: PU-2x)

- Scaled range
- Input code
- Available number of bits
- POL input
- Data input logic
- 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 ±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 kΩ
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
Default setting: 4 – 20 mA DC

■ **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
Default setting:
Code V1: -1.00 – +1.00 V DC
Code V2: -10.00 – +10.00 V DC

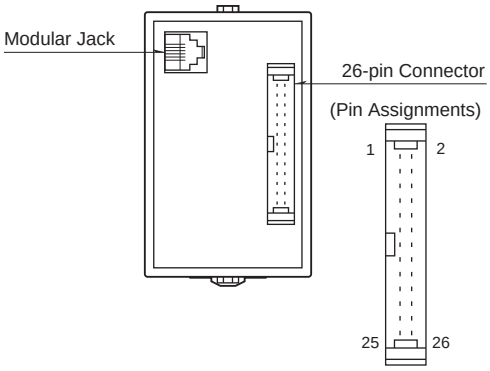
INSTALLATION

Power consumption
•**AC**: Approx. 8 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 25 set to 0.0.
Line voltage effect: ±0.1 % over voltage range
Insulation resistance: ≥ 100 MΩ with 500 V DC
Dielectric strength: 1500 V AC @1 minute
(input to output to power)
2000 V AC @1 minute
(input or output or power to ground)

EXTERNAL VIEW



PARAMETER LIST

It is available to configure or confirm settings shown below by using the Programming Unit (model: PU-2x).

[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

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

*2. Open collector input logic

LOGIC / INPUT	ITEM 20 / DATA	0 : Positive logic		1 : Negative logic	
		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

ITEM	MDF. CODE	INPUT DATA	EXAMPLE (DEFAULT)	CONTENTS	
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
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 27	P P	-1.00 – 1.00 -1.00 – 1.00	ZERO : -1.00 SPAN : 1.00	Output code V1	0% output voltage (V)*5 100% output voltage (V)*5
26 27	P P	-10.0 – 10.0 -10.0 – 10.0	ZERO : -10.00 SPAN : 10.00	Output code V2	0% output voltage (V)*5 100% output voltage (V)*5
26 27	P P	0.0 – 24.0 0.0 – 24.0	ZERO : 4.00 SPAN : 20.00	Output code Z1	0% output current (mA)*5 100% output current (mA)*5
28	N/A	–	KDA3_VER : *.**	ROM version	

*3. “Opencircuit” with 24V DC input

*4. “Shortcircuit” with 24V DC input

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

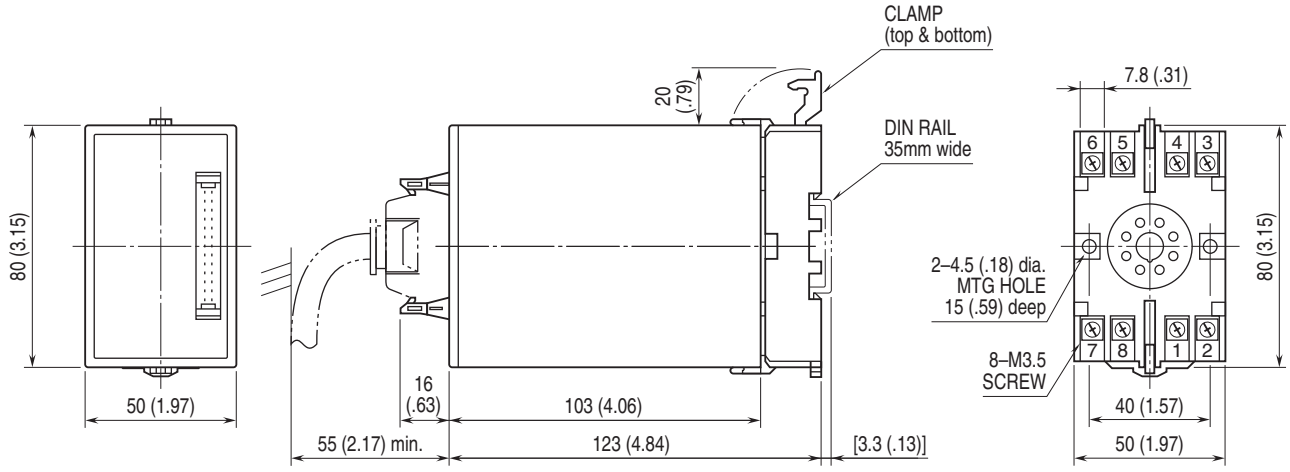
Modification Code

D: No modification (writing) possible. Used only for monitoring (reading).

S: Modifiable at any time.

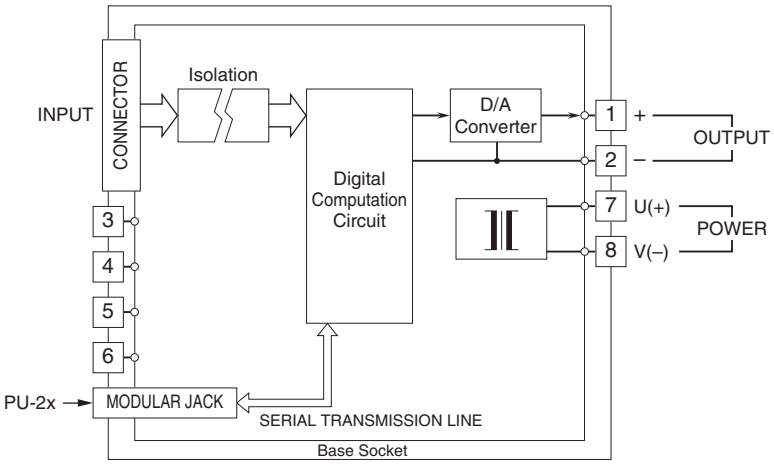
P: Modifiable only when the MAINTENANCE SWITCH is in the “PRG” mode.

EXTERNAL DIMENSIONS & TERMINAL ASSIGNMENTS unit: mm (inch)



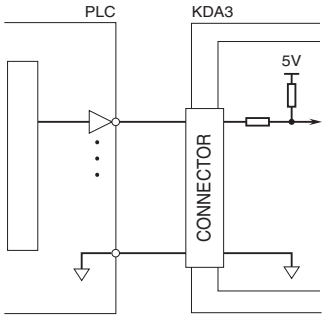
•When mounting, no extra space is needed between units.

SCHEMATIC CIRCUITRY & CONNECTION DIAGRAM

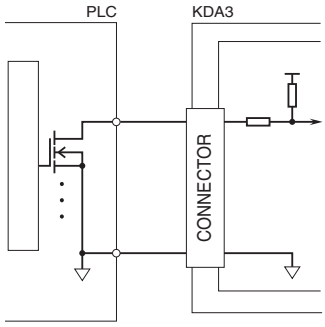


■ **Input Connection Examples**

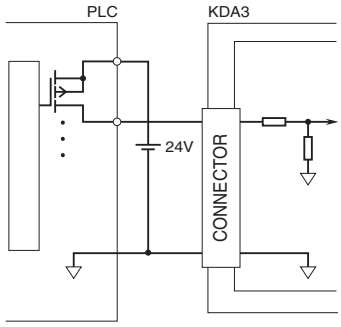
• Standard type
TTL level



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.

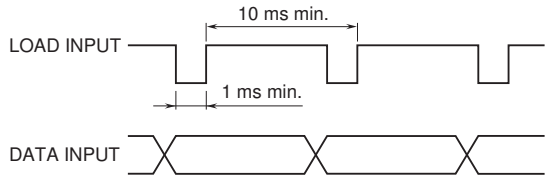
*2. P^0 corresponds to $n \times 10^0$, P^1 to $n \times 10^1$, P^2 to $n \times 10^2$, P^3 to $n \times 10^3$. Only P^0 corresponds when the parity for all digits are valid.

*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 18, 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 isdetected by parity check.

INPUT-OUTPUT RELATION EXAMPLES

• 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

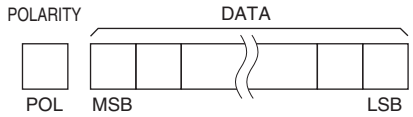
When one of the following conditions is true, the digital input overflows (OR).

1) When the input signal is out of the range between -FS and +FS.

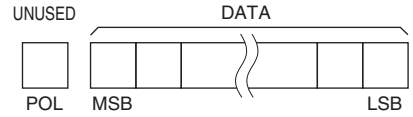
2) When the input value exceeds the input range.

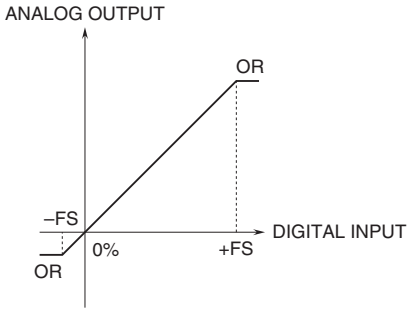
The input range differs according to input code. For example, in case of BCD with polarity, it is -9999 to 9999. Please refer to the instruction manual for detail.

■ **BCD, BINARY (WITH POLARITY)**



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





⚠ Specifications are subject to change without notice.