

Digital Panel Meters 46 Series

DC INPUT DIGITAL PANEL METER
(4-digit, alarm and various output options)

MODEL **46DV2**

MODEL & SUFFIX CODE SELECTION

46DV2-□□□□□

- MODEL _____
 DISPLAY _____
 INPUT _____
 ALARM OUTPUT (Hi/Lo alarm) _____
 OPTIONS _____
 POWER INPUT _____
- 1 : Multi display
 - 2 : Single Display
 - 1 : DC voltage
 - 2 : DC current, narrow span
 - 3 : DC current, wide span
 - 0 : None
 - 1 : Relay contact
 - 2 : Photocoupler
 - 0 : None
 - 1 : External control
 - 2 : BCD output (TTL) + external control
 - 3 : BCD output (open collector) + external control
 - 4 : Analog output + external control
 - 5 : RS-232C
 - 6 : RS-485
 - 7 : RS-232C + analog output
 - 8 : RS-485 + analog output
 - M2 : 100 – 240V AC
 - R5 : 12 – 48V DC

ORDERING INFORMATION

Specify code number and variables.

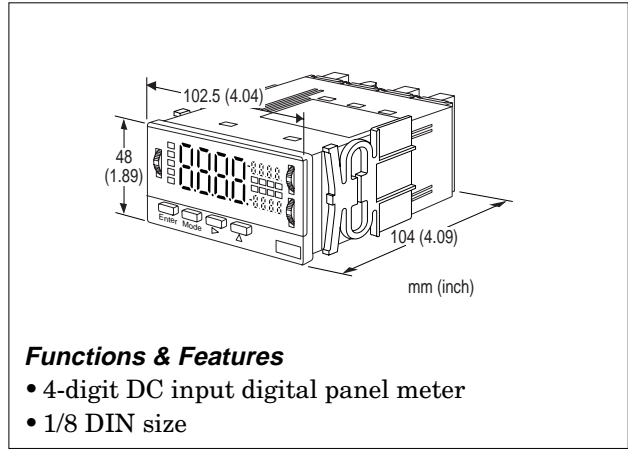
- **Code number** (e.g. 46DV2-1114-M2)
- **Input range** (e.g. ±99.99V)

Choose an input range from Tables 1, 2 and 3 depending on the input type specified by the model number.

Alternately, exactly scaled input and display ranges can be specified. The initial setting value will be used for the display range if not specified:

- **Input range and display scale**
(e.g. 4 – 20mA DC, 0.0 – 150.0)

Refer to Parameter List for the initial setting values at the factory.



Functions & Features

- 4-digit DC input digital panel meter
- 1/8 DIN size

GENERAL SPECIFICATIONS

- Construction:** Panel flush mounting
- Connection**
 - Input, alarm and power:** M3 screw terminal
 - External control:** Euro terminal block (connector for BCD output)
 - Analog output:** Euro terminal block
 - BCD output:** Connector
 - Serial output:** Modular jack and euro terminal
- Housing material:** flame-resistant resin (black)
- Input configuration:** Single-ended
- Scaling:** Programming via the front keys
- Averaging:** None, average and moving average
- Power ON delay:** 0 – 9 seconds
- Lockout protection:** Prevents from unwanted key operations.

DISPLAY

- LED**
 - Main display:** 20 mm (.79") 7-segment, 4 digits, bicolor (red/green) LED
 - Sub display:** 6 mm (.24") 7-segment, 4 digits, red LED (multi display type only)
- Scaling range:** -9999 to 9999 counts
- Decimal point position:** 10⁻¹, 10⁻², 10⁻³ or none
- Read rate:** 1 millisecond
- Display rate:** Equal to the read rate (Read rate x average sample numbers when the averaging is selected.)
- Over-range indication:** -OVER for negative; OVER for positive over-range out of the display or measured range
- Zero display:** Suppressing the higher digits
- Engineering unit indication:** Sticker label attached

INPUT**■DC VOLTAGE INPUT** **Table 1**

CODE	RANGE	IMPEDANCE	MAX. INPUT
11	±99.99mV	≥100MΩ	±50V
12	±999.9mV	≥100MΩ	±50V
13	±9.999V	≥1MΩ	±250V
14	±99.99V	≥10MΩ	±250V
15	±700.0V	≥10MΩ	±700V

■DC CURRENT INPUT, narrow span **Table 2**

CODE	RANGE	IMPEDANCE	MAX. INPUT
21	±99.99μA	1kΩ	±10mA
22	±999.9μA	100Ω	±10mA
23	±9.999mA	10Ω	±50mA
24	±99.99mA	1Ω	±500mA

■DC CURRENT INPUT, wide span **Table 3**

CODE	RANGE	IMPEDANCE	MAX. INPUT
25	±999.9mA	0.1Ω	±3A
26	±2.000A	0.01Ω	±3A

■EXTERNAL CONTROL

Internal configuration: Pulled up to approx. +5V
(resistance approx. 10kΩ)

Control signal HI level: 4.2 – 5V relative to COM

Control signal LO level: 0 – 0.4V relative to COM

S/H: Start/Hold control; Hold with shortcircuit or same potential as COM

PH: Peak Hold control; Peak Hold with shortcircuit or same potential as COM

DZ: Digital Zero control; Digital Zero with shortcircuit or same potential as COM; valid only when TERM (ext. control terminal) is selected as DZ control method.

R.RESET: Relay Reset control; Relay Reset with shortcircuit or same potential as COM; valid only with alarm output type.

P1/P2/P3: Pattern Selection control; Pattern Selection with shortcircuit or same potential as COM to switch the registered scaling and alarm data patterns; valid only when TERM (ext. control terminal) is selected as P.SEL control method. (Pattern Selection via external control is not available with the analog output option.)

COM: Common negative terminal for the external control. Common to Input LO.

•Pattern Selection via External Control

PATTERN	1	2	3	4	5	6	7	8
P1	O	C	O	C	O	C	O	C
P2	O	O	C	C	O	O	C	C
P3	O	O	O	O	C	C	C	C

O = Open, C = Close

OUTPUT**■ANALOG OUTPUT**

Conversion: PWM

Resolution: Equivalent to 14 bits

Scaling: Digital (scalable to any display value)

•Current Output

Load resistance

(Range) 4 – 20mA : 550Ω maximum

•Voltage Output

Load resistance

(Range) 0 – 1V : 10k (Ω minimum)

0 – 10V : 10k

1 – 5V : 10k

■ALARM OUTPUT: N.O. or N.C. contact for each of three zones (Hi/Go/Lo) separated by Hi/Lo setpoints.

•Relay Contact: 30V DC @2A

250V AC @2A (resistive load)

Relay life: Electrical 5 × 10⁴ cycles (N.O.)
3 × 10⁴ cycles (N.C.)

Mechanical 10⁷ cycles

•Photocoupler: 30V DC @20mA

Saturation voltage: ≤1.2V

■BCD OUTPUT**•Open Collector**

Polarity: Transistor ON with negative indication

Overrange: ON with overrange indication

Logic: Selectable (P. C. logic cannot be inverted.)

Rating: 30V DC @10mA

Saturation voltage: ≤1.2V

•TTL Compatible

Polarity: Bit '1'

Overrange: Bit '1'

Logic: Selectable (P. C. logic cannot be inverted.)

Rating: Fan-out 2

■RS-232C OUTPUT

Baud rate: 38.4, 19.2, 9.6, 4.8 or 2.4 kbps

Start bit: 1 bit

Data length: 7 or 8 bits

Parity: Even, odd or none

Stop bit: 1 or 2 bits

Character code: ASCII

Delimiter: CR or CR+LF

■RS-485 OUTPUT

Baud rate: 38.4, 19.2, 9.6, 4.8 or 2.4 kbps

Start bit: 1 bit

Data length: 7 or 8 bits

Parity: Even, odd or none

Stop bit: 1 or 2 bits

Character code: ASCII

Delimiter: CR or CR+LF

Error check: BBC sum check

Number of nodes: Max. 31

Transmission distance: Max. 500 meters

INSTALLATION

Power input

AC: Operational voltage range 85 – 264V,
50/60 Hz,
max. load approx. 8VA at 100V
max. load approx. 11VA at 200V
max. load approx. 12VA at 264V

DC: Operational voltage range 10.8 – 52.8V,
max. load approx. 6W at 12V
max. load approx. 5.5W at 24V
max. load approx. 5.5W at 48V
max. load approx. 5.5W at 52.8V

Operating temperature: 0 to 50°C (32 to 122°F)

Operating humidity: 35 to 85% RH (non-condensing)

Storage temperature: -10 to +70°C (14 to 158°F)

Storage humidity: ≤60% RH

Mounting: Panel flush mounting

Dimensions: W102.5×H48×D104 mm
(4.04"×1.89"×4.09")

Weight: 450 g (0.99 lbs)

PERFORMANCE

Accuracy (23°C ±5°C, read rate ≤ 20/sec)

Ammeter: ±(0.1% of |rdg| + 2 digits)

Voltmeter: ±(0.03% of |rdg| + 1 digit)
±(0.1% of |rdg| + 2 digit) for ±700.0V range

Analog output: ±0.5% of FS

Temp. coefficient

Ammeter: ±0.015% of FS /°C (±0.008% of FS /°F)

Voltmeter: ±0.01% of FS /°C (±0.006% of FX /°F)

Analog output: ±0.02%/°C (±0.01%/°F)

Analog output response time: Approx. 0.5 seconds
(10 – 90%)

Insulation resistance: ≥100MΩ with 500V DC (input
or output to power, input or external
control to output, between each output)

Dielectric strength: 1500V AC @1 minute (AC power)
500V DC @1 minute (DC powre)
(input or output to power)
500V DC @1 minute (input or external
control to output, bewteen each output)
1500V AC @1 minute
(input or output or power to housing)

PARAMETERS LIST

■CONDITION DATA

MENU	PARAMETER	INITIAL	P.L	SELECTIONS / RANGES	FUNCTIONS / REMARKS
AVG	Average rate	50	0	1 / 2 / 4 / 8 / 10 / 20 / 50 / 100 / 200 / 400 / 800 / 1000 / 2000 / 5000	Select the average sample numbers. (Read rate: approx. 1 msec.)
MAV	Moving average rate	1	0	1 / 2 / 4 / 8 / 16 / 32	Select the moving average sample numbers. 1 = OFF, Filter: [smaller] 2 < 4 < 8 < 16 < 32 [greater]
S.WD	Round off display	1	0	1 / 2 / 5 / 10 (digits)	Rounding off the display to the nearest digits to eliminate display jitter. (e.g. Displays only 0 or 5 when set to 5.)
CLR	Display color	RED	1	RED / GREN	Select the display color. (Not selectable for alarm output type)
CLT.T	Indicator color type	AUTO	1	AUTO / MANU	Select the zone indicator color type. Auto: Red in HI/LO zones, Green in GO zone. Manu: Manual selection
HI.CL	HI indicator color	RED	1	RED / GREN	Select the HI indicator color (Red or Green). (Valid only with CLT.T set to MANU.)
GO.CL	GO indicator color	GREN	1	RED / GREN	Select the GO indicator color (Red or Green). (Valid only with CLT.T set to MANU.)
LO.CL	LO indicator color	RED	1	RED / GREN	Select the LO indicator color (Red or Green). (Valid only with CLT.T set to MANU.)
BLNK	Display brightness cutoff	OFF	0	OFF / LV1 / LV2 / LV3 / ON	Select the display brightness cutoff level. OFF = brightest > LV1 > LV2 > LV3 > ON = completely dark
J.SW	Jog dial	ON	0	ON / OFF	Enable/disable the use of front jog dials. (Valid only with Multi Display type.)
PVH	Peak/Valley Hold	OFF	0	PH / VH / PVH	Select the peak hold type to be used when the PH mode is enabled. PH = Peak Hold, VH = Valley Hold, PVH = Peak/Valley Hold
DZ/BU	Digital Zero backup	OFF	0	OFF / ON	Select whether the Digital Zero data must be backed up or not when the power is removed.
PS	Pattern selection	1	0	1 / 2 / 4 / 8	Specify the pattern selection numbers activated for use.
LINE	Linearization	OFF	0	OFF / 2 / 4 / 8 / 16	Select the calibration point numbers for linearization. OFF = No linearization
TR.T	Tracking Zero time	000	0	000 to 999 (times)	Select the calibration time for the Tracking Zero function. 000 = Disable
TR.W	Tracking Zero range	01	0	01 to 99 (digits)	Select the calibrated digits for the Tracking Zero function. (Invalid with TR.T set to 000)
P.ON	Power ON delay time	0	0	0 to 9 (seconds)	Select the stand-by time (in seconds) after the power startup.
PRO	Lockout protection level	LV1	3	LV0 / LV1 / LV2 / LV3	Select the level of protection to prevent unwanted key operation. [lower] LV0 < LV1 < LV2 < LV3 [higher]
U.NO.	Hardware configuration	OFF	0	OFF / ON	Disable/enable the code display of built-in hardware unit types at the startup.
S/H.T	Start/Hold type	A	0	A / B	Select among Type A (typical) and Type B (special). (Valid only with External Control type)
S/H.D	Start/Hold delay time	0	0	0 to 9999 (milliseconds)	Specify the delay time in msec. to Start after Hold (Valid only with External Control type)
PVH.T	Peak Hold type	A	0	A / B	Select among Type A (typical) and Type B (special). (Valid only with External Control type)
DZ.C	Digital Zero control	SW	0	SW / TERM	Specify how Digital Zero control should be accessed. SW = Front keys, TERM = External control terminals
PS.C	Pattern selection control	SW	0	SW / TERM	Specify how Pattern Selection control should be accessed. (SW = Front keys, TERM = External control terminals)
BCD.L	BCD logic	N.LOG	0	N.LOG / P.LOG	Select the BCD output logic. (N.LOG = Negative logic, P.LOG = Positive logic)
BAUD	Baud rate	9600	1	2400 / 4800 / 9600 / 19.2k / 38.4k	Select the baud rate for serial communication.
DATA	Data length	7	1	7 / 8	Select the data length for serial communication.
P.BIT	Parity bit	E	1	E / O / N	Select the parity bit for serial communication. E = Even, O = Odd, N = None
STP.B	Stop bit	2	1	1 / 2	Select the stop bit for serial communication.
T-	Delimiter	CR.LF	1	CR.LF / CR	Select the delimiter for serial communication.
ADR	Device address	01	1	01 to 99	Select the device address for RS-485.

Specifications subject to change without notice.

PARAMETERS LIST

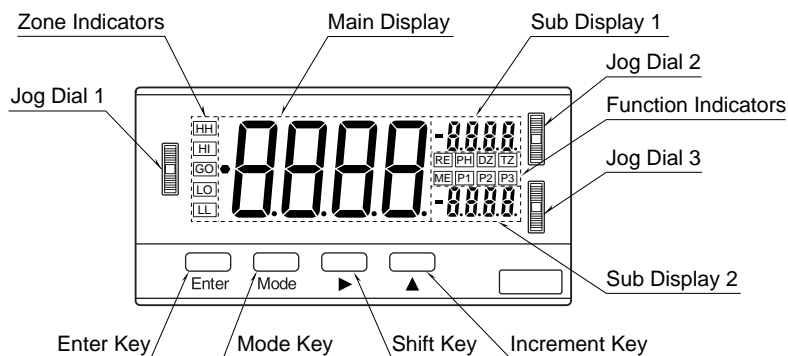
■ SCALING DATA

MENU	PARAMETER	INITIAL	P.L	SELECTIONS / RANGES	FUNCTIONS / REMARKS
RANG	Input range				
	DC voltage	*1	1	11 / 12 / 13 / 14 / 15	Select the input range code.
	DC current, narrow span	*1	1	21 / 22 / 23 / 24	(Input terminal may vary depending on the input range.)
	DC current, wide span	*1	1	25 / 26	
FSC	Full-scale display reading	9999*2	2	-9999 to +9999	Select the scaled 100% display reading.
FIN	Full-scale input	9999*2	2	-9999 to +9999	Select the reading equivalent to 100% input.
OFS	Offset display	0*2	2	-9999 to +9999	Select the scaled 0% display reading.
OIN	Offset input	0*2	2	-9999 to +9999	Select the reading equivalent to 0% input.
DLHI	Digital limiter, HI	9999	0	-9999 to +9999	Select the maximum limit of display range.
DLLO	Digital limiter, LO	-9999	0	-9999 to +9999	Select the minimum limit of display range.
A.OUT	Analog output range	0-1	1	0-1 / 0-10 / 1-5 / 4-20	Select the analog output range.
AOHI	Analog output, HI	9999	1	-9999 to +9999	Select the reading equivalent to 100% analog output.
AOLO	Analog output, LO	0	1	-9999 to +9999	Select the reading equivalent to 0% analog output.
DP	Decimal point	None*2	2	Each digit	Select the decimal point position.

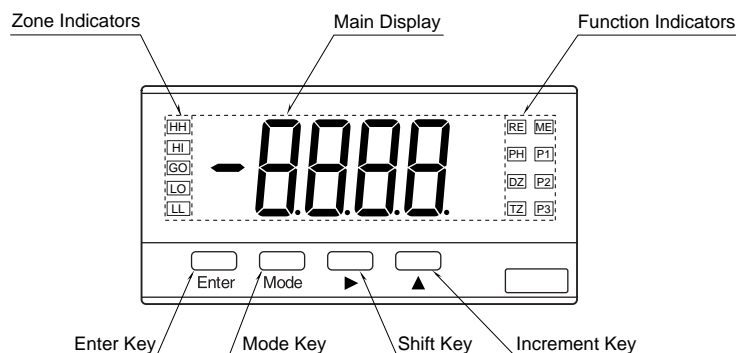
*1. Specified when ordering. *2. Specified when ordering. Initial setting if not specified.

■ ALARM DATA

MENU	PARAMETER	INITIAL	P.L	SELECTIONS / RANGES	FUNCTIONS / REMARKS
COM.T	Alarm type	O/U	1	O/U / ERR	Select either HI/LO alarm (O/U) or Deviation alarm (ERR).
HI-S	HI setpoint reading	1000	2	-9999 to +9999	Select the HI setpoint for HI/LO alarm.
LO-S	LO setpoint reading	500	2	-9999 to +9999	Select the LO setpoint for HI/LO alarm.
N.VAL	Nominal reading	5000	2	-9999 to +9999	Select the nominal reading for Deviation alarm.
ERR1	Deviation	5.00	2	0.00 to 10.00 (%)	Select the deviation (% of the nominal reading) for Deviation alarm.
HI-H	HI hysteresis (deadband)	0	1	-999 to +999	Select the hysteresis (deadband) to go below the setpoint for HI alarm.
LO-H	LO hysteresis (deadband)	0	1	-999 to +999	Select the hysteresis (deadband) to go above the setpoint for LO alarm.
ER1.H	Deviation hysteresis	0	1	-999 to +999	Select the hysteresis (deadband) to go inside the deviation reading for Deviation alarm.
HI-L	HI contact logic	N.O.	0	N.O. / N.C.	Select either Normally-Open or Normally-Close contact for HI alarm. (Open at power off.)
GO-L	GO contact logic	N.O.	0	N.O. / N.C.	Select either Normally-Open or Normally-Close contact for GO alarm. (Open at power off.)
LO-L	LO contact logic	N.O.	0	N.O. / N.C.	Select either Normally-Open or Normally-Close contact for LO alarm. (Open at power off.)

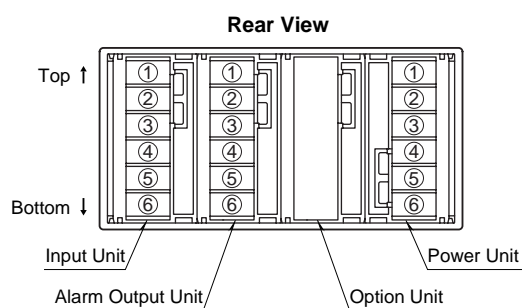
FRONT VIEW**■MULTI DISPLAY**

COMPONENT	FUNCTIONS																																				
Jog Dial 1	Selects menus and their selections during the parameter setting. Selects patterns when used with Increment key.																																				
Jog Dial 2	Selects alarm setpoints and transfers the current reading to the setpoints with the alarm output type. Switches to the maximum value with no-alarm output type.																																				
Jog Dial 3	Selects alarm setpoints and transfers the current reading to a setpoint with the alarm output type. Switches to the maximum value with no-alarm output type.																																				
Zone Indicators	Shows the zone in which the current reading is.																																				
Main Display	Shows the meter reading, menu and their selections during the parameter setting.																																				
Sub Display 1	Shows alarm setpoints with the alarm output type, the maximum value with no-alarm output type.																																				
Function Indicators	RE Light turns on when the remote control via serial communication is activated. PH Light turns on when Peak Hold, Valley Hold or Peak/Valley Hold is activated. DZ Light turns on when Digital Zero is activated. TZ Light turns on when Tracking Zero is activated. ME Light turns on when Digital Zero Backup is activated.																																				
	<table border="1"> <thead> <tr> <th></th> <th>Pattern 1</th> <th>Pattern 2</th> <th>Pattern 3</th> <th>Pattern 4</th> <th>Pattern 5</th> <th>Pattern 6</th> <th>Pattern 7</th> <th>Pattern 8</th> </tr> </thead> <tbody> <tr> <td>P1</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> <td>OFF</td> <td>ON</td> </tr> <tr> <td>P2</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> </tr> <tr> <td>P3</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>OFF</td> <td>ON</td> <td>ON</td> <td>ON</td> <td>ON</td> </tr> </tbody> </table>		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern 7	Pattern 8	P1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	P2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	P3	OFF	OFF	OFF	OFF	ON	ON	ON	ON
	Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern 7	Pattern 8																													
P1	OFF	ON	OFF	ON	OFF	ON	OFF	ON																													
P2	OFF	OFF	ON	ON	OFF	OFF	ON	ON																													
P3	OFF	OFF	OFF	OFF	ON	ON	ON	ON																													
Sub Display 2	Shows alarm setpoints with the alarm output type, the maximum value with no-alarm output type.																																				
Enter Key	Switches to the parameter setting mode.																																				
Mode Key	Select modes during the parameter setting. Switches to the memory mode during normal measuring mode. (Press and Hold)																																				
Shift Key	Shifts among the digits during the parameter setting. Digital Zero control during normal measuring mode.																																				
Increment Key	Changes items and values during the parameter setting. Selects the pattern during normal measuring mode (Press and Hold) and other special functions.																																				

■SINGLE DISPLAY

COMPONENT	FUNCTIONS								
Zone Indicators	Shows the zone in which the current reading is.								
Main Display	Shows the meter reading, menu and their selections during the parameter setting.								
Function Indicators	RE	Light turns on when the remote control via serial communication is activated.							
	PH	Light turns on when Peak Hold, Valley Hold or Peak/Valley Hold is activated.							
	DZ	Light turns on when Digital Zero is activated.							
	TZ	Light turns on when Tracking Zero is activated.							
	ME	Light turns on when Digital Zero Backup is activated.							
		Pattern 1	Pattern 2	Pattern 3	Pattern 4	Pattern 5	Pattern 6	Pattern 7	Pattern 8
P1	OFF	ON	OFF	ON	OFF	ON	OFF	ON	
P2	OFF	OFF	ON	ON	OFF	OFF	ON	ON	
P3	OFF	OFF	OFF	OFF	ON	ON	ON	ON	
Enter Key	Switches to the parameter setting mode.								
Mode Key	Select modes during the parameter setting.								
	Switches to the memory mode during normal measuring mode. (Press and Hold)								
Shift Key	Shifts among the digits during the parameter setting.								
	Digital Zero control during normal measuring mode.								
Increment Key	Changes items and values during the parameter setting.								
	Selects the pattern during normal measuring mode (Press and Hold) and other special functions.								

TERMINAL CONNECTION



■INPUT UNIT

•DC Voltage Input

①	15 Range HI
②	14 Range HI
③	13 Range HI
④	12 Range HI
⑤	11 Range HI
⑥	LO

•DC Current Input, Narrow Span

①	24 Range HI
②	23 Range HI
③	22 Range HI
④	21 Range HI
⑤	LO
⑥	LO

•DC Current Input, Wide Span

①	25 Range HI
②	25 Range LO
③	NC
④	26 Range HI
⑤	26 Range LO
⑥	NC

■ALARM OUTPUT UNIT

•Relay Output

①	HI a
②	HI c
③	GO a
④	GO c
⑤	LO a
⑥	LO c

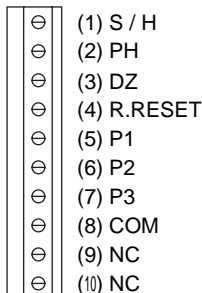
•Photocoupler Output

①	HI c
②	HI e
③	GO c
④	GO e
⑤	LO c
⑥	LO e

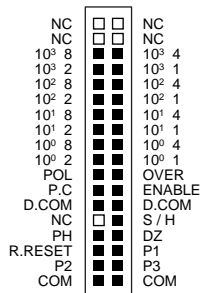
TERMINAL CONNECTION

■ **OPTION UNIT**

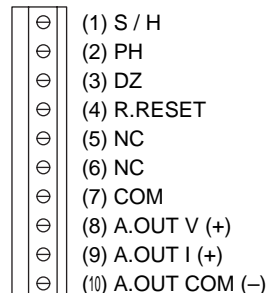
• **External Control**



• **BCD Output (TTL) + External Control**
 • **BCD Output (open collector) + External Control**



• **Analog Output + External Control**



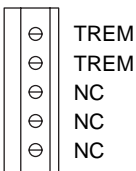
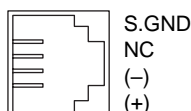
Suitable connector or receptacle:
 8822E-036-171 (KEL Corporation)
 (included in the product package)

DO NOT connect to 'NC' terminals.

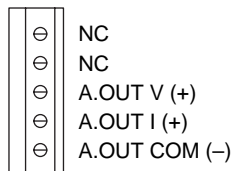
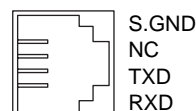
• **RS-232C**



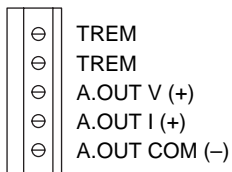
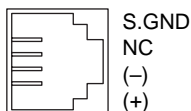
• **RS-485**



• **RS-232C + Analog Output**

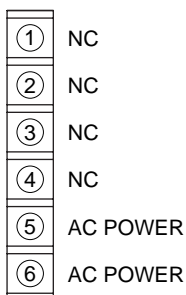


• **RS-485 + Analog Output**

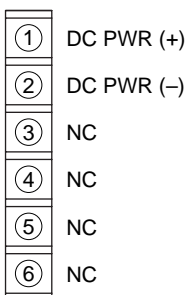


■ **POWER UNIT**

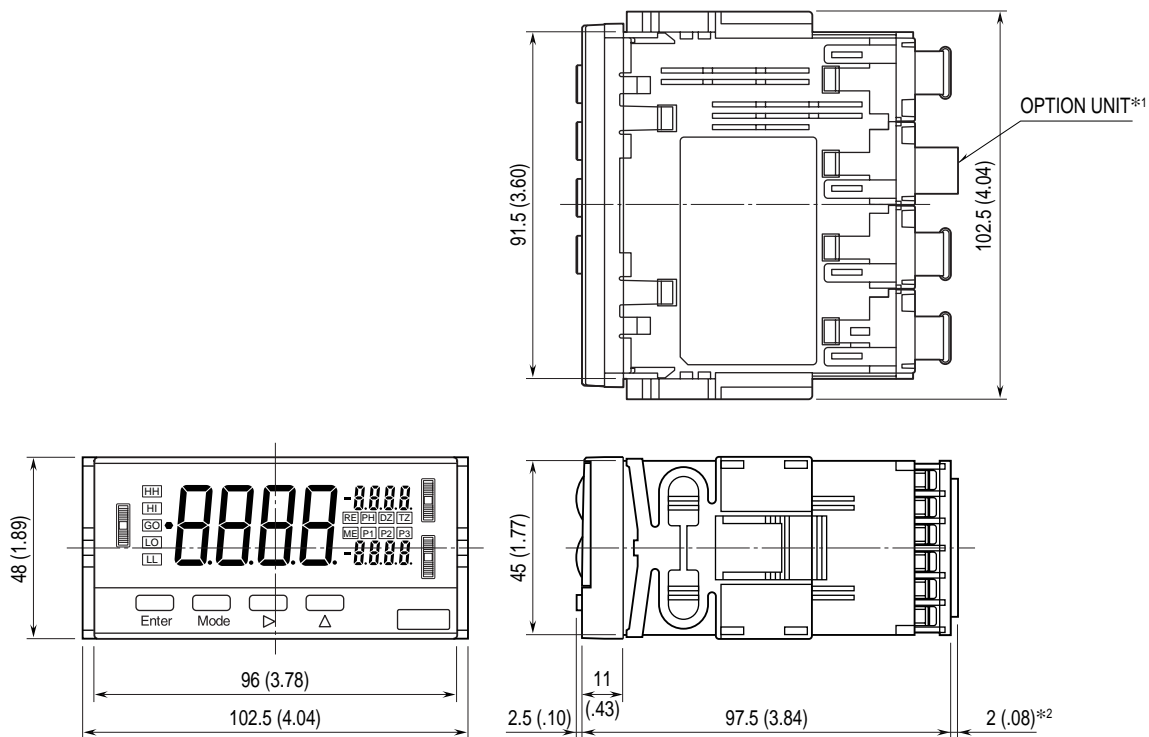
• **AC Power**



• **DC Power**



EXTERNAL DIMENSIONS mm (inch)

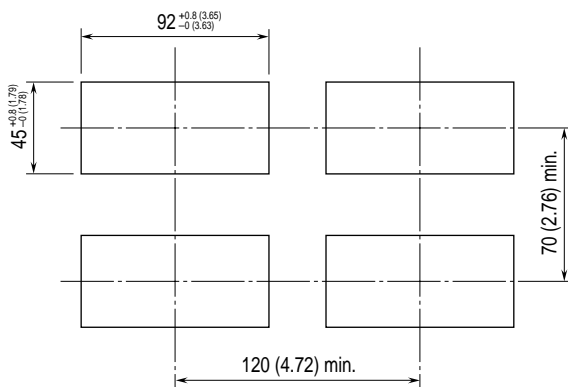


*1. Not provided when no option is specified, or only with RS-232C output.

*2. 4 mm (.16") with BCD output.

MOUNTING REQUIREMENTS mm (inch)

■ PANEL CUTOUT



Panel thickness: 0.8 – 5 mm (0.03" – 0.20")