KN-2000W series

Multi Indicator

The new KN-2000W series of multi input digital temperature indicator with alarm is designed for the most demanding applications in industrial process monitoring, environmental studies and quality control processes.

This multipurpose unit unites the latest advances in electronic circuitry and solid state construction which provides a highly reliable indicator moderately priced.

Features

- Clearer display by adopting 3-color LED
- Multi input signal (B, R, S, L, N, G, K, E, J, T, RTD, mV, V, mA)
- Internal 2 or 4 point alarm output
- Modbus RTU protocol by RS485 communication
- 4~20mA transmission output(Isolated output)
- Peak-Hold function : Memorize / indicate the highest value
- Burn-Out function & sensor compensation function
- Convenient digital input function(Alarm ON/OFF, Hold PV, Zero adjustment)
- Internal sensor power supply(24VDC)
- Full option model
 (2 or 4 point alarm+RS 485 communication output+transmission output)

Ordering codes

```
KN - 2 0 0 0 W
```

Size(mm)	W	DIN W96×H48	
Power(Voltage)	0	85-264VAC(47~63Hz)	
	1	24VDC(Option)	
Option output	0	None	
	1	Output(4~20mA)	
	4	485 Communication	
	5	Output(4~20mA)+485Communication	
Alarm output	0	None	
	2	2 Alarm	
	4	4 Alarm	
Item	KN 2	Multi indicator	

Panel Cutout

(Unit : mm)

Over 116

Over 52

$46 ^{+0.6}_{-0}$

$92 ^{+0.6}_{-0}$

Dimensions

(Unit : mm)

KN-2000

AL1 AL2 AL3 AL4

% ℃ °F

MODE ≪ ∧ ∨ ⌐D.IN⌐

96

108

48

10

90

91

44.8
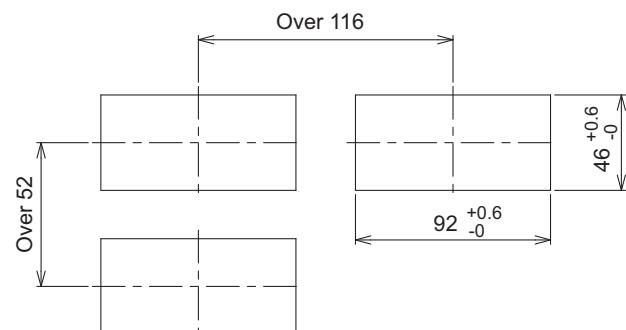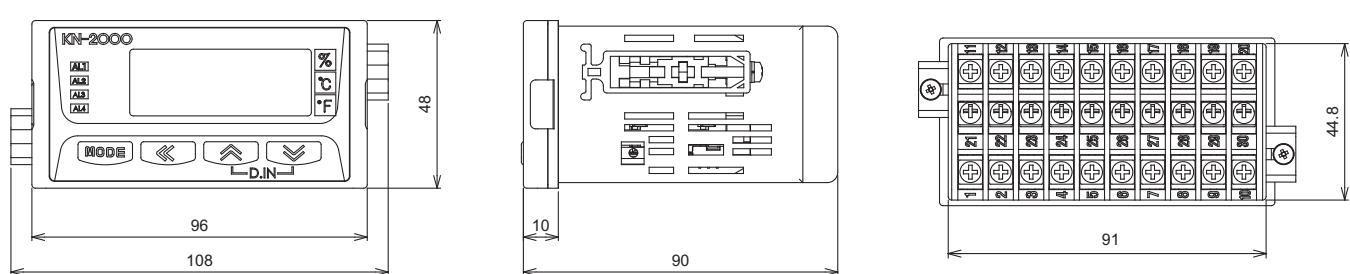
Connections

· KN-24□□-W
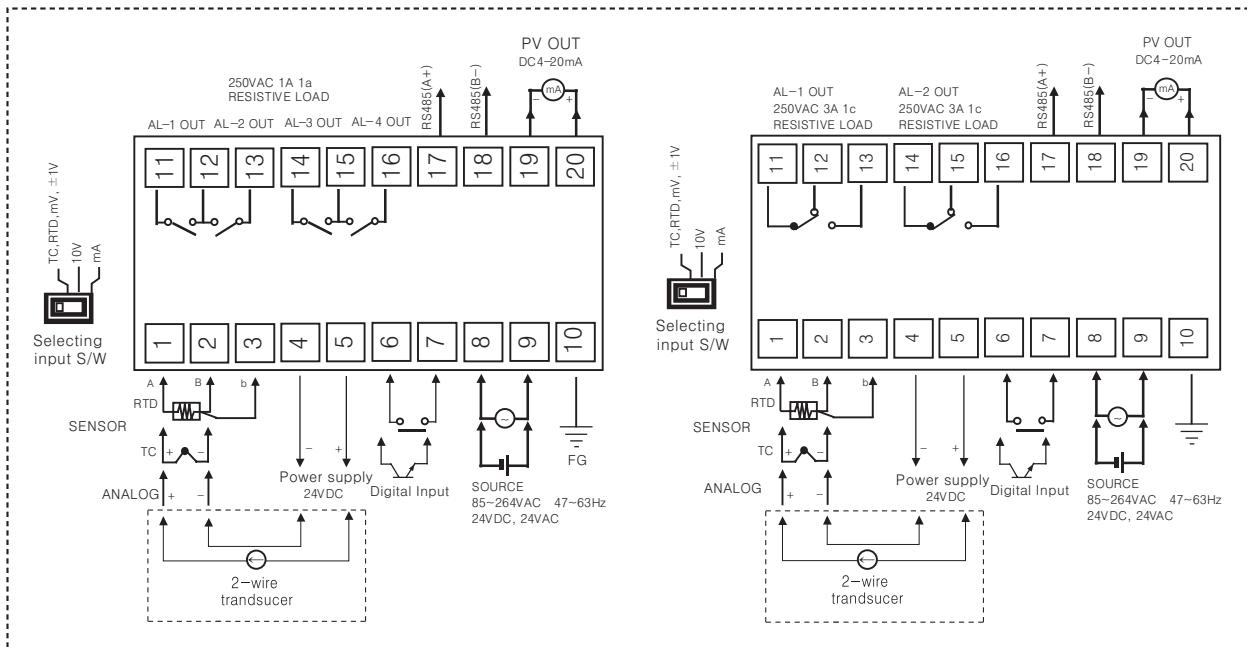
· KN-22□□-W
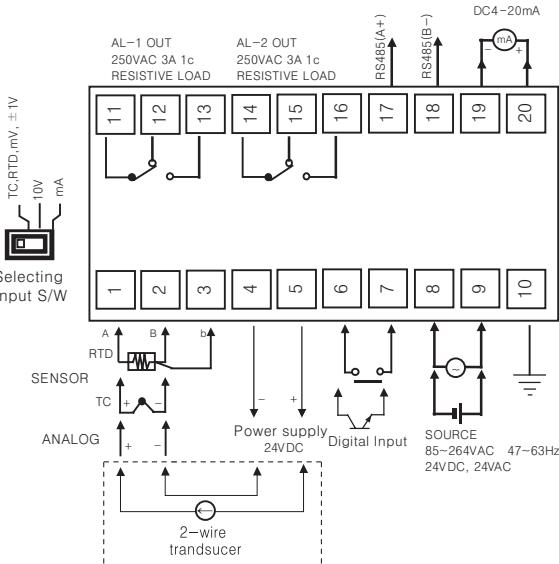
Specifications

Model		KN-2000W Series
Power supply		85~264VAC 47~63Hz / 24VDC 50/60Hz(Option)
Power consumption		Approx.8VA(264VAC 60Hz)
Digital input		Free input selection by 3 function(Alarm ON/OFF, Hold-indicated value, zero adjustment)
Auxiliary output	Alarm output	2 point : Relay contacting point capacity 250VAC 3A 1c 4 point : Relay contacting point capacity 250VAC 1A 1c
	Transmission output	Isolated 4~20mA(PV transmission), Less 600 resistance load
	Communication output	RS 485(Protocol : Modbus)
Indicating accuracy		±0.2% F.S ±1 Digit(25±5˚), ±0.3% F.S ±1Digit (-10~20˚, 30~50˚) ※But, Under - 100˚ in TC, ±0.4% F.S ±1Digit / ˚ TC-T, TC-U are at Min, ±2.0˚
Setting method		Set by Key
Alarm hysteresis		Set ON/OFF interval : within 999 digit
Input sampling cycle		100ms(Analog input), 250ms(Temperature input)
Function		Alarm, Seif-Diagnosis, Peak-Storage, Digital input, Hoid, Input special function, Input compensation, Indication scaling, Output scaling
Internal voltage		200VAC 50/60Hz during a minute(Between input terminal and power terminal)
Internal vibration		0.75mm amplitude at frequency of 5~55Hz in each of X, Y, Z directions for 2 hours
Life of relay	2 point	Mechanic-Over 10 million times, Electronics-Over 100,000 times(250VAC 3A Resistance load)
	4 point	Mechanic-Over 20 million times, Electronics-Over 500,000 times(250VAC 1A Resistance load)
Isolation Resistance		Over 100MΩ(500VDC Mega STD)
Internal noise		±2kV the square wave noise(pulse width : 1μs) by the noise simulator
Memory retention		About 10 years(when using non-volatile memory semiconductor)
Used ambient temperature		-10~50˚(at non-freezing status)
Storage temperature		-20~60˚(at non-freezing status)
Used ambient humidity		35~85%RH
Weight		Approx.200g(except for packing box)

A
Recorders

B
Data Loggers

C
Indicators

D
Converters

E
Controllers

F
Thyristor Units

G
Transmitters

H
Temp. Sensors

I
Thermo Meters

J
Pressure Gauges

K
Others

KN-1000B series

KN-2000W series

KN-2300

KN-270

SS-2400

KCR-311

Multi Range Input

Sensor type		Type	Message	Selectable temp. range ℃	Selectable temp. range ℉
TC		K(CA)	ᵗᶜ.ᵏ1	−200 ~ 1350	−392 ~ 2462
		K(CA)	ᵗᶜ.ᵏ2	−199.9 ~ 999.9	−392 ~ 1832
		J(IC)	ᵗᶜ-ᴶ	−199.9 ~ 800.0	−392 ~ 1472
		E(CC)	ᵗᶜ-ᴱ	−199.9 ~ 800.0	−392 ~ 1472
		T(CC)	ᵗᶜ-ᵗ	−199.9 ~ 400.0	−392.0 ~ 752.0
		B(PR) *	ᵗᶜ-ᵇ	0 ~ 1800	32 ~ 3272
		R(RR)	ᵗᶜ-ʳ	0 ~ 1750	32 ~ 3182
		S(PR) *	ᵗᶜ-ˢ	0 ~ 1750	32 ~ 3182
		N(NN) *	ᵗᶜ-ⁿ	−200 ~ 1300	−392 ~ 2372
		G(W) *	ᵗᶜ-ᴳ	0 ~ 2300	32 ~ 4172
		L(IC) *	ᵗᶜ-ᴸ	−199.9 ~ 900.0	−392 ~ 1652
		U(CC)*	ᵗᶜ-ᵁ	−199.9 ~ 400.0	−392.0 ~ 752.0
		Platinel II *	ᵗᶜ-ᴾ	0 ~ 1390	32 ~ 2534
RTD		CU50Ω *	ᶜᵁ.50	−199.9 ~ 200.0	−392.0 ~ 392.0
		CU100Ω *	ᶜᵁ.10	−199.9 ~ 200.0	−392.0 ~ 392.0
		JPt 100Ω	ᴶᴾᵗ.1	−199.9 ~ 600.0	−392 ~ 1112
		DPt 50Ω	ᵈᴾᵗ.5	−199.9 ~ 600.0	−392 ~ 1112
		DPt 100Ω	ᵈᴾᵗ.1	−199.9 ~ 850.0	−392 ~ 1562
Analog	Current	0.00 ~ 20.00mA	ᴬ.ᵐᴬ1	Scale display Range: −19999~19999	
		4.00 ~ 20.00mA	ᴬ.ᵐᴬ2		
	Voltage	−50.0 ~ 50.0mV	ᴬ.ᵐᵛ1		
		−199.9 ~ 200.0mV	ᴬ.ᵐᵛ2		
		−1.000 ~ 1.000V	ᴬ-ᵛ1		
		−1.00 ~10.00V	ᴬ-ᵥ2		

* If applying an electric current with pressing M key simultaneously, the type of input is able to be expanded.

* ⚠ CAUTION : Please adjust the selecting input switch according to the input specification.

Functions

• **Digital filter function(Program mode : ᵐᴬᵥ.ᶠ)**

Digital filter function can be used in order for stable indication and output by controlling noise and unstable signal coming to input line.The cycle of display is same because of applying moving average filter.

※ Setting range : 01 ~ 16 (When setting 01, digital filter function does not operate)

• **Digital input function(Program mode : ᵈ1-ᵗ, ᵈ1-ᵗ mode)**

It is able to operated through input terminal as below 3 kinds of function.

Mode	Operation
Alam ON/OFF function ᴬᴸ.ʳᴱ	Although alarm is off, when setting Alarm ON/OFF function, alarm is unable to off. Then, using funtion by compulsive alarm off.
Hold indicated value function ᴴᵒᴸᵈ	Temporarily indicated value is stopped in order to confirm indicated value, in flexible input
Zero adjustment function ᶻᴱʳᵒ	"Same as Input compensation function." When zero adjustment, compensation value is possible to confirm and change in ᴵⁿ-ᶜ

• **Input compensation function(Program mode : ᴵⁿ-ᵇ)**

It has not any errors by itself but, if temperature input, analog input etc. occur regular error, this function can add and subtract compensation value for measurement value.

• **Expansion and control the upper/lower limit deviation of input and transmission output function(Program mode : ᴱ˅.ᴸᵒ)**

This function is to adjust the range of analog input/output. Please use after setting in accord with environment, because it can be changed with input/output to the point you want, if set as below. Following a diagram is the output range of 4-20mA

Mode	Operation
ᴼᴾ	Output 4-20mA in only the output range of 4-20mA
⁵ᴾ	Output 3.2-20.8mA to the input range which is out of 5% of 4-20mA output range
¹ᴼᴾ	Output 2.4-21.6mA to the input range which is out of 10% of 4-20mA output range

• **Alarm function(ᴬᴸ-1 , ᴬᴸ-2 , ᴬᴸ-3 , ᴬᴸ-4)**

1) Alarm type

Alarm type	Explanation for alarm operation
Not use alarm output	- Eventhough it has alarm output inside and set to 'Not use alarm output', alarm output is not operated -'Not use alarm output' has not alarm option
Upper limit alarm	PV ≥ 800℃ Alarm output ON Upper limit alarm value is set on ᴬᴸ-1, ᴬᴸ-2, ᴬᴸ-3, ᴬᴸ-4 of monitoring mode.
Lower limit alarm	PV ≤ 200℃ Alarm output ON Lower limit alarm value is set on ᴬᴸ-1, ᴬᴸ-2, ᴬᴸ-3, ᴬᴸ-4 of monitoring mode.
Disconnected sensor alarm	- In case disconnecting sensor and alarm output is ON, output is stable continuously. - 'Disconnected sensor alarm' does not have alarm option. ※ Keeping alarm can be removed by using 'Digital Input function' or power off

2) Alarm option

Alarm option	Explanation for alarm option
Normal alarm	- If it reaches alarm temperature, alarm output is ON but, if it is out of range, output is OFF
keeping alarm	- If it reaches alarm temperature, alarm output is ON and condition is stable continuously. (Alarm output HOLD) ※ Keeping alarm can be removed by using 'Digital Input function' or power off.
Expectation alarm	- If it reaches alarm temperature at first time, alarm output is not ON, but, since second time, if it reaches alarm temperature, normal alarm is operating.
keeping alarm+ Expectation alarm	- keeping alarm and expectation alarm are operating at once.

KN-2000W series
Multi Indicator

A
Recorders

B
Data
Loggers

C
Indicators

D
Converters

E
Controllers

F
Thyristor
Units

G
Transmitters

H
Temp.
Sensors

I
Thermo
Meters

J
Pressure
Gauges

K
Others

• Input special function (Program mode : $In.SF$)

This function is used for when input value and PV are through calculation of Square, Root($\sqrt{\ }$) or TUF in case of voltage, current input.

mode	LIn	$root$	$SQAr$	tUF
Function	Input value without any operation	Input value with	Input value with x2	
Graph	Display Y=AX+B Input value	Display Y=A($\sqrt{X}$)+B (X≥0) Y=0 (X<0) Input value	Display Y=A(X)²+B (X>0) Input value Y=-A(X)²+B (X<0)	Two unit function relative
Appli cation	General Measurement Input requiring linearization	Measure flow with Orifice	When differential output is from flow signal	
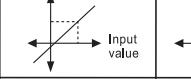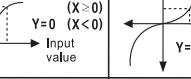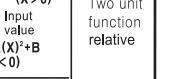
• In $SQAr$ message, PV and mA output value is :

$$PV\ (output\ value) = \{(\frac{Input\ value - L.rnG}{H.rnG - L.rnG})^2 \times (H-SC - L-SC)\} + L-SC$$

• In $root$ message, PV and mA output value is :

$$PV\ (output\ value) = \{(\sqrt{\frac{Input\ value - L.rnG}{H.rnG - L.rnG}} \times (H-SC - L-SC)\} + L-SC$$

• TUF function

- If ductile pressure is lower than air pressure(0), this is indicating the degree of vibration of mmHg, but if ductile pressure is same or higher than air pressure, this is indication the static pressure of kg/cm² unit.
- Air pressure is 0 kg/cm². If not 0kg/cm², it can be calabrated by 'Instance ZERO function' (Input compensation function is not accepted)
- In case of TWO UNIT FUNCTION, L-SC is fixed with -760 inside. Therefore, L-SC parameter is able to be indicated but, disable to set and H-SC is able to set in 0-9999.

Display
3.000kg/cm²
2.000kg/cm²
1.000kg/cm²
4mA
mmHg
Input
-760mmHg
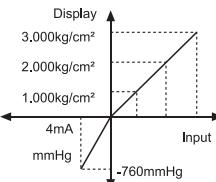
• Save peak value function

This function is saving Max. and Min. value to check the adnormal condition of system, which is invisible, for input and it is possible for checking it by entering into [Monitoring mode] from RUN mode.

• Burn Out function(Program mode : $bUrn$)

When line of sensor is disconnected, abnormal reaction will transmit to Master and fixed output 4mA or 20mA.
If set BURN = ON, PV(4-20mA DC) transmission output is 20mA.
If set BURN = OFF, PV(4-20mA DC) transmission output is 4mA.
※ When it is TC and PV(4-20mA DC) transmission output, possible to be set.

**• Current output scale function(Program mode : $L.oUt$, $H.oUt$)**

This function is to set current output against PV in 4-20mA DC current output. Set for outputting 4mA($L.oUt$) and 20mA($H.oUt$). Minimum setting interval between $L.oUt$ and $H.oUt$ is over 10% F.S, if setting interval is within 10% F.S, automatically set.

Output
20mA
4mA
Input
$L.oUt$ $H.oUt$

Output
20mA
4mA
Input
$H.oUt$ $L.oUt$
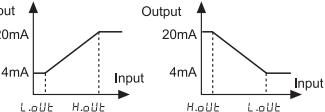
• Error indicating function

Display	Description	Action
$LLLL$	When measured sensor input is lower than indicating	Input should be within indicating range.
HHH	When measured sensor input is higher than indicating	"
$bUrn$	When temperature sensor is disconnected	Check the condition of temperature sensor.
Err	If there is error under operation.	After checking the setting condition, reset.
$Err1$	If input setting and position of switch is inconsistent(but, temperature sensor and analog input are classified.	After checking input specification, reset.

Front Panel Identifications

③ ① ②
KN-2000
AL1
AL2
AL3
AL4
%
℃
°F
MODE
D.IN
④ ⑤ ⑥ ⑦
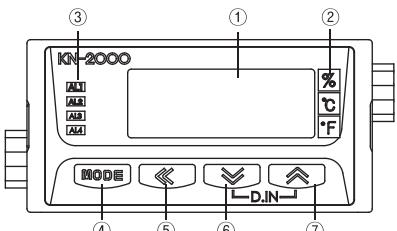
① Indicating display : Indicating measuring value and setting message
② Indicating unit
③ Alarm lamp
④ Mode key : Storing setting data and changing the menu of operation
⑤ Shift key : Decide setting position of data
⑥ Down key : Decreasing setting value of data
⑦ Up key : Increasing setting value of data

KN-1000B
series

KN-2000W
series

KN-2300

KN-270

SS-2400

KCR-311

Multi Indicator
KONICS