KONICS

KN-2000W MANUAL

Thank you for using KONICS products.
Please read "Caution for your safety" in operation manual before using.

■ Caution for your safety

※ Please keep these instructions and review them before using this unit.

※ Please observe follow for safety

⚠ **Warning** Serious injury may result if instructions are not followed.

⚠ **Caution** Product may be damaged, or injury may result if instructions are not followed.

※ The following is an explanation of the symbols used in the operation manual.
⚠ Injury or danger may occur under special conditions.

⚠ Warning

1. **In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required.**
   It may result in serious damage, fire or human injury.
2. **It must be mounted on panel.**
   It may give an electric shock.
3. **Do not repair or check up during power on.**
   It may give an electric shock.
4. **Do not disassemble and modify this unit, when it requires, please contact us.**
   It may cause a fire or give electronic shock, damage to product.
5. **Please check the number of terminal before connecting a power line or measuring input.**
   It may cause a fire.

⚠ Caution

1. **This unit shall not be used outdoors.**
   It might shorten the life cycle of the product or give an electric shock.
2. **Please observe specification rating.**
   It might shorten the life cycle of the product and cause a fire.
3. **Do not use the load beyond rated switching capacity of Relay contact.**
   It may cause insulation failure, contact melt, contact failure, relay broken etc.
4. **In cleaning the unit, do not use water or an oil-based detergent.**
   It might cause an electric shock or fire that will result in damage to this product.
5. **Do not use this unit at place where there are flammable or explosive gas,humidity, direct ray the sun, radiant heat, vibration, impact etc.**
   It may cause explosion.
6. **Do not inflow dust or wire dregs into inside of this unit.**
   It may cause a fire or mechanical trouble.
7. **Please wire properly after check polarity of power.**
   It may cause a fire or explosion and result in product damage.

■ Ordering Code

KN 2 0 0 0 W

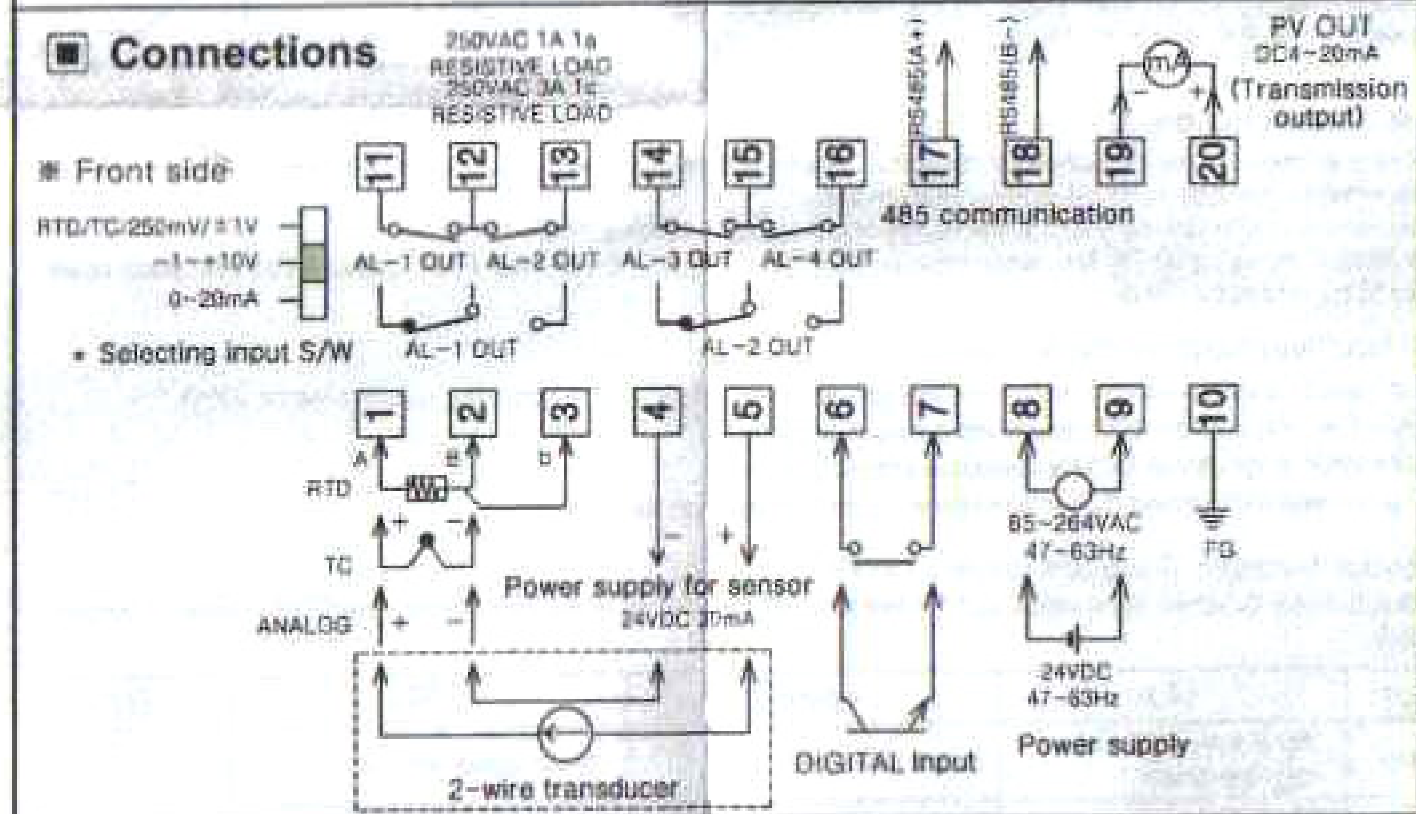
Field	Code	Description
Size (mm)	W	DIN Size W96×H48mm
Power (Voltage)	0	85~264VAC 47~63Hz
	1	24VDC(Option)
Option output	0	None
	1	Output (4~20mA)
	4	485 Communication
	5	Output(4~20mA)+485 Communication
Alarm output	0	None
	2	2 Alarm
	4	4 Alarm
Item	2	Multi indicator
Maker	KN	KONICS

■ Input range for the sensor

Sensor		Type	Display	Using(display) temp. range℃	Using(display) temp. range°F
Thermo couple		K(CA)	tCK1	-200 ~ 1350	-328 ~ 2462
		K(CA)	tCK2	-199.9 ~ 999.9	-328 ~ 1832
		J(IC)	tC-J	-199.9 ~ 800.0	-328 ~ 1472
		E(CR)	tC-E	-199.9 ~ 800.0	-328 ~ 1472
		T(CC)	tC-t	-199.9 ~ 400.0	-199.9 ~ 752.0
		B(PR) •	tC-b	100 ~ 1800	212 ~ 3272
		R(RR)	tC-r	0 ~ 1750	32 ~ 3182
		S(PR) •	tC-S	0 ~ 1750	32 ~ 3182
		N(NN) •	tC-n	-200 ~ 1300	-328 ~ 2372
		C(W5) •	tC-C	0 ~ 2300	32 ~ 4172
		L(IC) •	tC-L	-199.9 ~ 900.0	-328 ~ 1652
		U(CC) •	tC-U	-199.9 ~ 400.0	-199.9 ~ 752.0
		Platinel II •	tC-P	0 ~ 1390	32 ~ 2534
RTD		CU50Ω •	CU50	-199.9 ~ 200.0	-199.9 ~ 392.0
		CU100Ω •	CU10	-199.9 ~ 200.0	-199.9 ~ 392.0
		JPt 100Ω	JPt.1	-199.9 ~ 600.0	-328 ~ 1112
		DPt 50Ω	dPt.5	-199.9 ~ 600.0	-328 ~ 1112
		DPt 100Ω	dPt.1	-199.9 ~ 850.0	-328 ~ 1530
Analog	Current	0.00 ~ 20.00mA	AmA1	Scale display range : -1999 ~ 9999	
		4.00 ~ 20.00mA	AmA2		
	Voltage	-50.0~ 50.0mA	Amu1		
		-199.9 ~ 200.0mA	Amu2		
		-1.000 ~ 1.000V	A-u1		
		-1.00 ~ 10.00V	A-u2		

• 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.

■ Connections

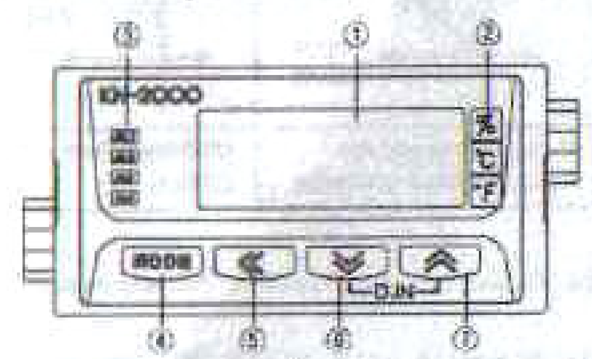


■ Factory defaults

• Program mode

Mode	Set value	Mode	Set value
In-P	AmA2	AL-2	At1A
Unit	℃	AL-3	At2A
dUnt	%o	AL-4	At2A
L-rG	0400	A-HY	001
H-rG	2000	InSF	Lin
dP	00	AAuF	04
L-SC	0000	dI-1	Hold
H-SC	1000	dI-2	Hold
In-b	0000	bUrn	oFF
L oUt	0000	Addr	01
H oUt	1000	bAUd	9600
E4 Io	SP	ConV	EnA
AL-1	At1A	LoCK	oFF

■ Front panel identification

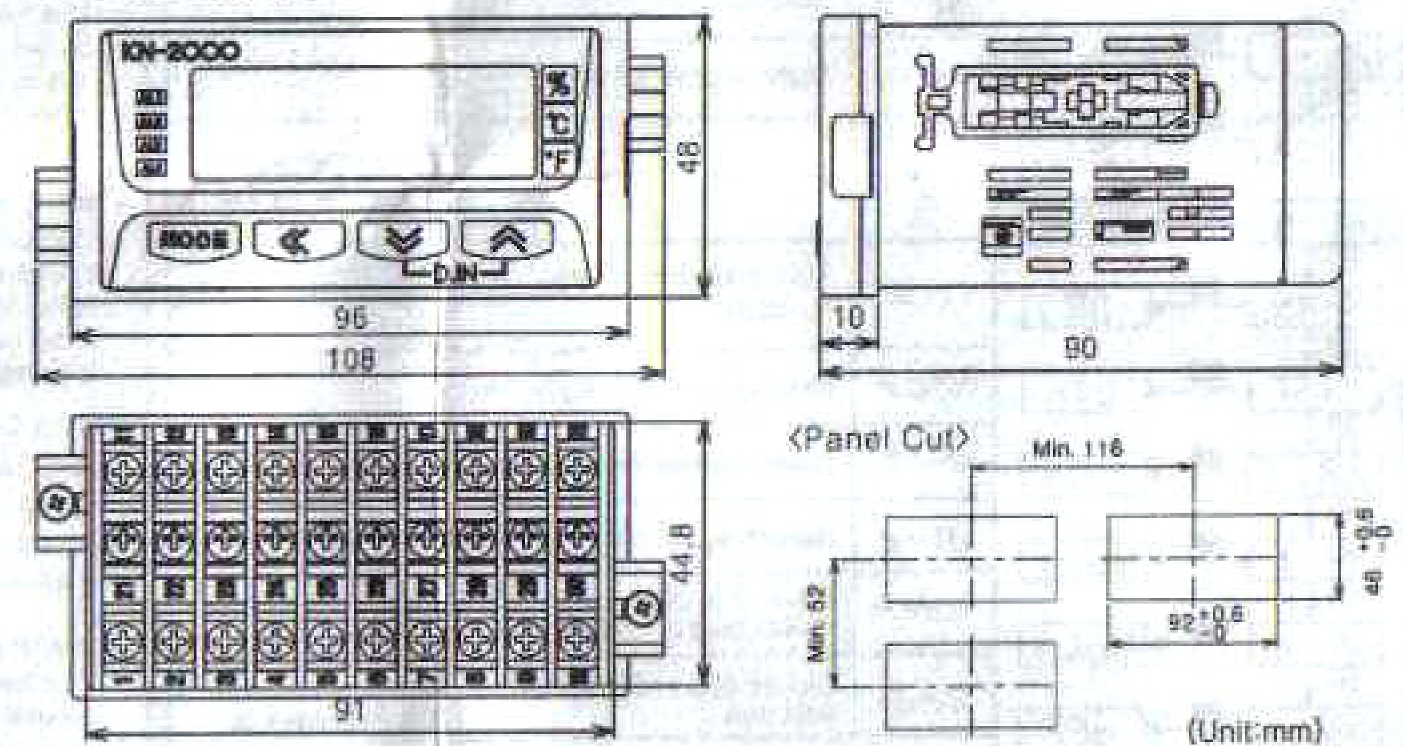


① Indicating display : Indicating measuring value and setting message
② Indicating unit
③ Alarm lamp
④ Mode key : Storing setting data and changing the menu of operation
⑤ Shift key : Decide setting position of data
⑥ Down key : Decreasing setting value of data
⑦ Up key : Increasing setting value of data

■ Specifications

Item		Specification
Model		KN-2000W Series
Power supply		85~264VAC 47~63Hz, 24VDC 50/60Hz (Option)
Power consumption		Approx. 8VA (264VAC 60Hz)
Display		Number : 7Segment LED Display(RED)
Digital input		Free input selection by 3 function (Alarm ON/OFF, hold-indicated value, zero adjustment)
Auxiliary output	Alarm output	2point : Relay Contacting point capacity 250VAC 3A 1c 4point: Relay Contacting point capacity 250VAC 1A1C
	Transmission output	Isolated 4~20mA (PV transmission), Less 600Ω resistance load
	communication output	RS485(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 or RS485 communication
Alarm Hysteresis		Set ON/OFF interval (1~999 Digit)
Input Sampling Cycle		100ms(Analog input), 250ms(Temperature Input)
Function		Alarm,Self-Diagnosis,Peak-Storage, Digital input, Lock, Input Special Function, Input compensation, Indication Scaling, Output Scaling
Internal Voltage		2000VAC 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	2point	Mechanic-Over 10 million times, Electronics-Over 100,000 times(250VAC 3A Resistance Load)
	4point	Mechanic-Over 20 million times, Electronics-Over 500,000 times(250VAC 1A Resistance Load)
Isolation Resistance		Over 100MΩ(500VDCMega STD)
Internal Noise		±2kV the square wave noise (pulse width : 1㎲)by the noise simulator
Memory retention		about 10 years (when using non-volatile memory semiconductor)
Using Ambient Temp.		-10 ~ 50℃(at non-freezing status)
Storage Temp.		-20 ~ 60℃(at non-freezing status)
Using Ambient Humidity		35~ 85%RH
Weight		Approx. 200g(except for packing box)

■ Dimensions

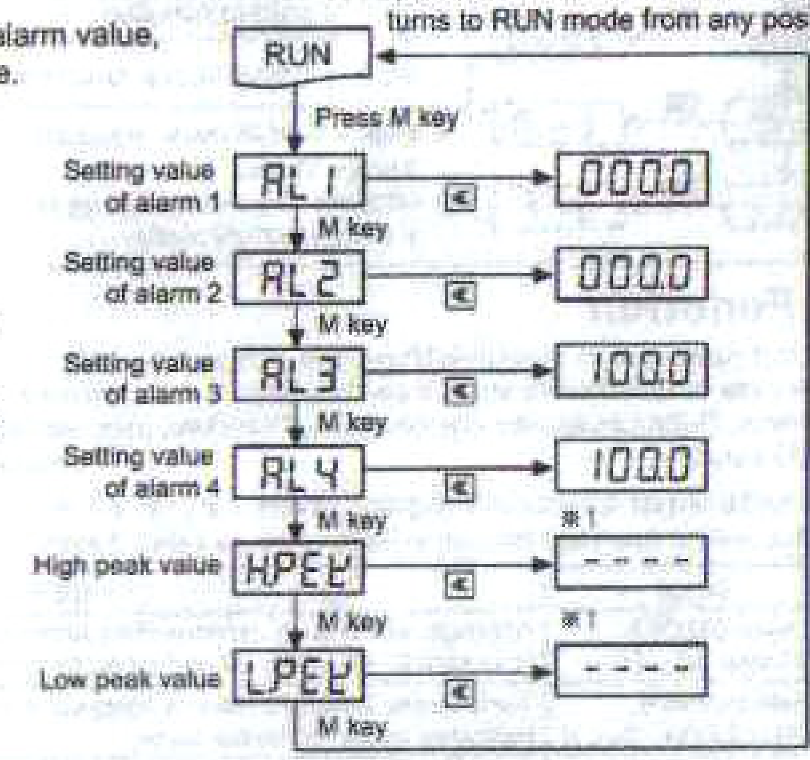


■ Explanation for monitoring mode

This mode is to use when setting alarm value, if this unit has alarm function inside.

※ It turns to RUN mode, if not operating to control key for 30 sec.
※ After entering mode, if press M key at any position for 3 sec, it moves to RUN mode.
※1. Initial HIGH/LOW peak value is storing the observing value of after power on 2 sec later.

For each parameter, if press M key for 3 sec, it turns to RUN mode from any position.



※ It is indicated in compliance with setting alarm function of "Program mode"

▣ Explanation for program mode

This group is to set in accord with the purpose of user.

RUN — For each parameter, if press [M] key for 3 sec, it returns to RUN mode from any position.

Press M key for 3 sec ■ : Press any key [◀], [▲], [▼]

In-P	Select input		
Unit	Select temperture unit		When select temp' sensor input, it is indicated
d.Unt	Select front unit lamp		When select analog input, it is indicated
L-rG	Indicate LOW range for user		
H-rG	Indicate HIGH range for user		
d.P	Set the decimal point		
L-SC	LOW indicating scale		
H-SC	HIGH indicating scale		
In-b	Input compensation value		
L.oUt	Set the position of 4mA output		It is indicated for the model having transmission output
H.oUt	Set the position of 20mA output		
EPIo	Input/Output expansion range		
AL-1	Alarm 1 and option		It is not indicated in case of no alarm
AL-2	Alarm 2 and option		
AL-3	Alarm 3 and option		It is not indicated in case of 2 alarm
AL-4	Alarm 4 and option		
A-HY	Set alarm hysteresis		It is not indicated in case of no alarm
InSF	Select special input function		It is indicated in case of only analog input
nAv.F	Moving average digital filter		
dI-t	Select digital input function(Terminal)		
dI-P	Select digital input function(Front key)		
bUrn	When it is disconnected, select output condition		Refer to"Burn out" function
Addr	Select 485 communication address		It is indicated in case of only having communication output
bAUd	Select 485 communication baud rate		
Conu	Select 485 communication setting function		
LoCP	Select "Lock function"		

※ It turns to RUN mode automatically, if not operating to control key for 30 sec.
※ After entering mode, if press M key at any position for 3 sec., it moves to RUN mode.

▣ Function

o Unit conversion function(Program mode : Unit)
In case of temperature input, it can be set to °F or °C. When it changes Unit, all Prescale, Alarm, Output scale, etc. are initialized. Therefore, user needs to reset it in accord with the purpose. * Formula : °F = 1.8°C + 32

o Digital input function(Program mode : dI-P, dI-t)
It is able to operated through input terminal as below 3 kinds of function.

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

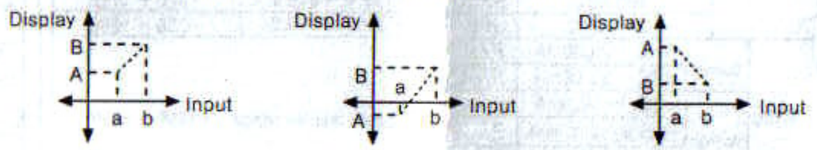
o Digital filter function(Program mode : FILt)
Digital filter function can be used in order for stable indication and output by controlling noise and unstable signal coming to input line. The cycle of display is same because of applying moving average filter.
※ Setting range : 01 ~ 16 (When setting 01, digital filter function does not operate)

o 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. Only in case of1 NSF=TUF,1 N-8 is operated with atmospheric pressure input value instead of input compensation function. (Refer to "● TUF function")
Ex) In case sensor temperature is 4℃ and actual temperature is 0℃, PV indicates 0℃ if setting In-b= - 4.

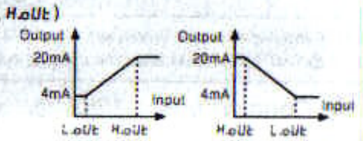
o Expansion and control the upper/lower limit deviation of input and transmission output function (Program mode : EHJo)
This function is to adjust the range of analog input/output. Please use after setting in accord with environment, because it can be changed with input/output to the point you want, if set as below. Following a diagram is the output range of 4-20mA

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

o Indicating scale function (Program mode : L-SC, H-SC)
Regarding voltage and current input, this function voluntarily sets upper / lower limit indicating scale. As below diagragm, if analog input is a,b and voluntary indicating value is A,B for a,b input, a->A, b->B are indicated.



o Transmission 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.



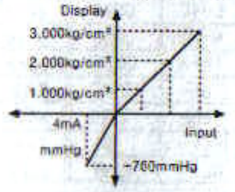
o Save peak value function
This function is to check when the abnormal condition of system for input, saving Max. value and Min.Value. It is possible to check by entering the first setting group on RUN mode.
When Max.value and Min.value are out of the range of pressure, indicating HHHH, LLLL
It can be initialized by using [▲], [▼] key, when display Max. Peak value(H.PEt)or Min. Peak value(L.PEt) then peak value is initialized to current input value.

o 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.

o Input special function (Program mode : InSF)
This function is used for when input value and PV are through calculation of Square, Root(√) or TUF in case of voltage, current input.

Message	Lin	root	SQRr	TUF
Function	Input value without any operation	Input value with	Input value with x2	Refer to Two unit function
Graph	Display Y=AX+B Input value	Display Y=A(√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)	
Appli cation	General Measurement Input requiring linearization	Measure flow with Orifice	When differential output is from flow signal	

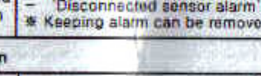
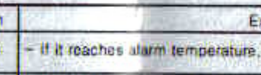
- In SQRr message, PV and mA output value is : PV (output value) = $\{(\frac{\text{Input value} - \text{L.rnG}}{\text{H.rnG} - \text{L.rnG}})^2 \times (\text{H-SC} - \text{L-SC})\} + \text{L-SC}$
- In root message, PV and mA output value is : PV (output value) = $\{(\sqrt{\frac{\text{Input value} - \text{L.rnG}}{\text{H.rnG} - \text{L.rnG}}} \times (\text{H-SC} - \text{L-SC})\} + \text{L-SC}$
- Two unit 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/㎠ unit.



o Alarm function(AL-1, AL-2, AL-3, AL-4)
- This indicator has 4 alarm(2 alarm) and can set alarm operation separately.
- If it does not have alarm output, it does not have alarm function.
- Alarm operation is operating through mixing 'alarm type' and 'alarm option'
- Alarm type and option can set on program mode and alarm value(AL-1, AL-2, AL-3, AL-4) can set on monitoring mode
- How to check parameter

AL1A
- L Alarm option
  - A:Normal alarm b:keeping alarm C:Expectation alarm d:keeping alarm + Expectation alarm
- Alarm type
  - 0:Not use alarm function 1:Upper limit alarm 2:Lower limit alarm SbA:Disconnected sensor alarm

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.

o Lock mode(Program mode : LoCP)
This function is to check setting value of parameter and to restrict changes.

	oFF	LoC 1	LoC2
First setting group	●	◐	◐
Second setting group	●	●	◐

● Check/setting possible
◐ Check possible/setting impossible
○ Check impossible

※ If lock mode is set to LoS2 and enter into program mode, it is only indicating LoS9 parameter.

o Error indicating function
This has error monitoring function inside. If it occurs error as below diagram, please check input or setting condition and should take action correctly.

Display	Description	Action
LLLL	When measured sensor input is lower than indicating	Input should be within indicatingrange.
HHHH	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.
Err 1	If input setting and position of switch isinconsistent (but, temperature sensor and analog input are classified.	After checking input specification, reset.

▣ Caution for using

1. The model is designed to use under the following environment conditions :
   ①It shall be used indoor. ②Altitude Max. 2000m ③Pollution Degree 2. ④Installation Category II
2. Please use the terminal(M3.5, Max. 7.2mm) when connect the AC power source.
3. Please use separated line from high voltage line or power line in order to avoid inductive noise.
4. Please install power switch or circuit-breaker in order to cut power supply off.
5. The switch or circuit-breaker should be installed near by users.
6. Keep away from the high frequency instruments. (High frequency welding machine & sewing machine, big capacitive SCR controller)
7. When you set input and it indicates "HHHH" or "LLLL", Please disconnect power supply and inspect the line

※ It may cause malfunction if above instructions are not followed.
※ Dimensions or specification from this manual can be changed without previous notice in order to improve the product.

Thank you for using our products. We always promise you to supply high-technology and the best product in industrial measuring field.

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