OMRON®

Temperature Meter	K3NH

High-performance Temperature Meter Accepts Temperature/Analog Inputs

- Multirange capability: a single processor connects to 14 types of sensors with varying current/voltage

- Programmable through the front panel or via RS-232C, RS-485, or RS-422

- Programming with easy setup and calibration

- Output boards include communications and linear boards

- High accuracy: 100-ms sampling for analog input

- High visibility: 14.2-mm red LED display

- °C/°F display selection

- NEMA4/IP66 front panel

- UL, CSA, and CE approved

Ordering Information

■ BASE UNIT

Model		Supply voltage	Applicable output boards	Part number
Basic model		100 to 240 VAC	K31-C1/C2/C5 K31-T1/T2 K31-B2/B4 K31-L1/L2/L3/L4/L5/L6/L7/L8/L9/L10 K31-FLK1/FLK2/FLK3/FLK4/FLK5/FLK6	K3NH-TA1A
	Present value LED and front-panel control keys. Can connect to any output board or, without an output board, can be used for display only.	12 to 24 VDC		K3NH-TA2D
Set value LED model		100 to 240 VAC	K31-C1/C2/C5 K31-T1/T2 K31-B4 K31-L4/L5/L6/L9/L10 K31-FLK4/FLK5/FLK6	K3NH-TA1C
	Present value LED, set value LED, and front-panel control keys. Can connect to relay, transistor, or combination output boards.	12 to 24 VDC		K3NH-TA2C

Note: "Set Value LED" models must be used with an output board in order for them to operate.

■ RANGES

Platinum Resistance Thermometer

Input		JPt100	Pt100
Range	°C	−199.9 to 650.0	−199.9 to 650.0
	°F	−199.9 to 999.9	−199.9 to 999.9
Parameter		JPt	Pt

Thermocouple

Input (See Note.)		K1	K2	J1	J2	T	E	L1	L2	U	N	R	S	B	W	PLII
Range	°C	−200 to 1,300	0.0 to 500.0	−100 to 850	0.0 to 400.0	−199.9 to 400.0	0 to 600	−100 to 850	0.0 to 400.0	−199.9 to 400.0	−200 to 1,300	0 to 1,700	0 to 1,700	100 to 1,800	0 to 2,300	0 to 1,300
	°F	−300 to 2,300	0.0 to 900.0	−100 to 1,500	0.0 to 750.0	−199.9 to 700.0	0 to 1,100	−100 to 1,500	0.0 to 750.0	−199.9 to 700.0	−300 to 2,300	0 to 3,000	0 to 3,000	300 to 3,200	0 to 4,100	0 to 2,300
Parameter		H1CA	H2CA	J1CC	J2CC	t CC	E Cr	L1CC	L2CC	U CC	n	r Pr	S Pr	b Pr	Y526	PL 2

Note: Thermocouple W is W/Re5-26 (Tungsten rhenium 5, tungsten rhenium 26).

Current/Voltage

Input	Current input		Voltage input		
	4 to 20 mA	0 to 20 mA	1 to 5 V	0 to 5 V	0 to 10 V
Range	One of following ranges depending on results of scaling −1999 to 9999 −199.9 to 999.9 −19.99 to 99.99 −1.999 to 9.999				
Parameter	4-20	0-20	1-5	0-5	0-10

■ AVAILABLE OUTPUT BOARD COMBINATIONS

Output type	Output configuration	Part number
Relay contact	3 outputs: H, PASS, L (SPDT)	K31-C1
	5 outputs: HH, H, L, LL (SPST-NO), and PASS (SPDT)	K31-C2
	5 outputs: HH, H, L, LL (SPST-NC), and PASS (SPDT)	K31-C5
Transistor	5 outputs (NPN open collector)	K31-T1
	5 outputs (PNP open collector)	K31-T2
BCD (See Note.)	5-digit output (NPN open collector)	K31-B2
Linear	4 to 20 mA DC	K31-L1
	1 to 5 VDC	K31-L2
	1 mV/10 digits	K31-L3
	0 to 5 VDC	K31-L7
	0 to 10 VDC	K31-L8
Communication boards (See Note.)	RS-232C	K31-FLK1
	RS-485	K31-FLK2
	RS-422	K31-FLK3
Combination output and communication boards	BCD output + 5 transistor outputs (NPN open collector)	K31-B4
	4 to 20 mA + 5 transistor outputs (NPN open collector)	K31-L4
	1 to 5 V + 5 transistor outputs (NPN open collector)	K31-L5
	1 mV/10 digits + 5 transistor outputs (NPN open collector)	K31-L6
	0 to 5 VDC + 5 transistor outputs (NPN open collector)	K31-L9
	0 to 10 VDC + 5 transistor outputs (NPN open collector)	K31-L10
	RS-232C + 5 transistor outputs (NPN open collector)	K31-FLK4
	RS-485 + 5 transistor outputs (NPN open collector)	K31-FLK5
	RS-422 + 5 transistor outputs (NPN open collector)	K31-FLK6

Note: For details, refer to the *Communication Operation Manual* (N96).

■ MODEL NUMBER LEGEND

Base units and output boards are available individually. Refer to the *Available Output Board Combinations* table provided within *Ordering Information*.

Base Units

K3NH - ☐ ☐ ☐ ☐
       1 **2** **3** **4**

1, 2. Input Sensors Codes	**3. Supply Voltage**	**4. Display**
TA: Current series	1: 100 to 240 VAC	A: Basic Model
	2: 12 to 24 VDC	C: Set Value LED Display

Specifications ━━━━━━━━━━━━━━━━━━━━━━━━━━

■ RATINGS

Supply voltage	100 to 240 VAC (50/60 Hz); 12 to 24 VDC	
Operating voltage range	85% to 110% of supply voltage	
Power consumption (See Note.)	15 VA max. (max. AC load with all indicators lit) 10 W max. (max. DC load with all indicators lit)	
Insulation resistance	20 MΩ min. (at 500 VDC) between external terminal and case. Insulation provided between inputs, outputs, and power supply.	
Dielectric withstand voltage	2,000 VAC for 1 min between external terminal and case. Insulation provided between inputs, outputs, and power supply.	
Noise immunity	±1,500 V on power supply terminals in normal or common mode ±1 μs, 100 ns for square-wave noise with 1 ns	
Vibration resistance	Malfunction: 10 to 55 Hz, 0.5-mm for 10 min each in X, Y, and Z directions Destruction: 10 to 55 Hz, 0.75-mm for 2 hrs each in X, Y, and Z directions	
Shock resistance	Malfunction: 98 m/s^2 (10G) for 3 times each in X, Y, and Z directions Destruction: 294 m/s^2 (30G) for 3 times each in X, Y, and Z directions	
Ambient temperature	Operating	−10 to 55°C (14 to 131°F) with no icing
	Storage	−20 to 65°C (−4 to 149°F) with no icing
Ambient humidity	Operating	25% to 85% (with no condensation)
Ambient atmosphere	Must be free of corrosive gas	

EMC	Emission Enclosure: EN55011 Group 1 class A
	 Emission AC Mains: EN55011 Group 1 class A
	 Immunity ESD: EN61000-4-2: 4-kV contact discharge (level 2)
	                         8-kV air discharge (level 3)
	 Immunity-RF-interference: ENV50140: 10 V/m (amplitude modulated, 80 MHz to 1 GHz) (level 3)
	                                          10 V/m (pulse modulated, 900 MHz)
	 Immunity Conducted Disturbance: ENV50141: 10 V (0.15 to 80 MHz) (level 3)
	 Immunity Burst: EN61000-4-4: 2-kV power-line (level 3)
	                                      2-kV I/O signal-line (level 4)	

Approved standards	UL508, CSA22.2, CE; conforms to EN50081-2, EN50082-2, EN61010-1 (IEC1010-1); conforms to VDE106/part 100 (Finger Protection) when the terminal cover is mounted.	
Weight	Approx. 400 g	

Note: An Intelligent Signal Processor with DC supply voltage requires approximately 1 A DC as control power supply current the moment the Intelligent Signal Processor is turned on. Do not forget to take this into consideration when using several Intelligent Signal Processors. When the Intelligent Signal Processor is not in measuring operation (e.g., the Intelligent Signal Processor has been just turned on or is operating for startup compensation time), the display will read "□□□□□" and all outputs will be OFF.

■ INPUT/OUTPUT RATINGS

Relay Contact Output (Incorporating a G6B Relay)

Item	Resistive load (cosϕ = 1)	Inductive load (cosϕ = 0.4, L/R = 7 ms)
Rated load	5 A at 250 VAC; 5 A at 30 VDC	1.5 A at 250 VAC, 1.5 A at 30 VDC
Rated carry current	5 A max. (at COM terminal)	
Max. contact voltage	380 VAC, 125 VDC	
Max. contact current	5 A max. (at COM terminal)	
Max. switching capacity	1,250 VA, 150 W	375 VA, 80 W
Min. permissible load (P level, reference value)	10 mA at 5 VDC	
Mechanical life	50,000,000 times min. (at a switching frequency of 18,000 times/hr)	
Electrical life (at an ambient temperature of 23°C)	100,000 times min. (at a rated load switching frequency of 1,800 times/hr)	

Transistor Output

Rated load voltage	12 to 24 VDC $^{+10\%}/_{-15\%}$
Max. load current	50 mA
Leakage current	100 μA max.

BCD Output

I/O signal name		Item	Rating
Inputs	REQUEST, HOLD, MAX, MIN, RESET	Input signal	No-voltage contact input
		Input current with no-voltage input	10 mA
		Signal level	ON voltage: 1.5 V max. OFF voltage: 3 V min.
Outputs	DATA, POLARITY, OVERFLOW, DATA VALID, RUN	Rated load voltage	12 to 24 VDC $^{+10\%}/_{-15\%}$
		Max. load current	10 mA
		Leakage current	100 μA max.

Note: Logic method: negative logic

Linear Output

Item	4 to 20 mA	1 to 5 V	1 mV/10 digits (See Note.)
Resolution	4,096		
Output error	±0.5% FS		±1.5% FS
Permissible load resistance	600 Ω max.	500 Ω min.	1 KΩ min.

Note: For the 1 mV/10-digit output, the output voltage changes for every 40 to 50 increment in the display value.

■ COMMUNICATIONS

Item	RS-232C, RS-422	RS-485
Transmission method	4-wire, half-duplex	2-wire, half-duplex
Synchronization method	Start-stop synchronization	
Baud rate	1200/2400/4800/9600/19200/38400 bps	
Transmission code	ASCII (7-bit)	
Communications	Write to K3NH	Comparative set value, scaling value, remote/local programming, reset control of maximum/minimum values, and other setting mode items excluding communications conditions
	Read from K3NH	Process value, comparative set value, maximum value, minimum value, model data, error code, and others

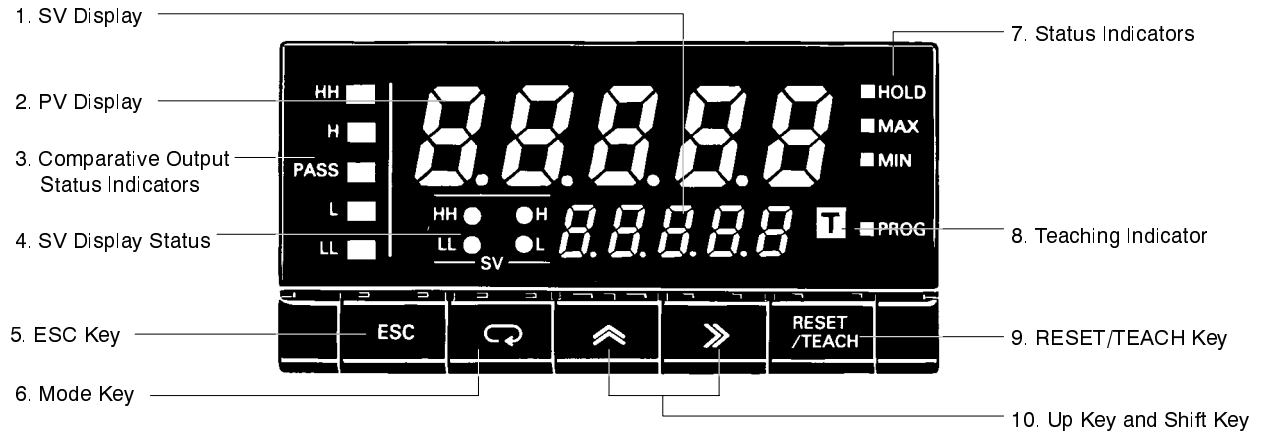For details, refer to the *Communication Operation Manual* (N96).

■ CHARACTERISTICS

Indication accuracy (at 23±5°C) (See Note.)	Thermocouple	(±0.3% of indication value or ±1°C, whichever greater) ±1 digit max.
	Platinum resistance thermometer	(±0.2% of indication value or ±0.8°C, whichever greater) ±1 digit max.
	Analog input	±0.2% FS ±1 digit max.
Input	Thermocouple	K, J, T, E, L, U, N, R, S, B, W, PLII
	Platinum resistance thermometer	JPt100, Pt100
	Current input	4 to 20 mA, 0 to 20 mA
	Voltage input	1 to 5 V, 0 to 5 V, 0 to 10 V
Sampling period	Temperature input	250 ms
	Analog input	100 ms
Input shift		Two-point settings (upper limit and lower limit)
Max. displayed digits		5 digits (−19999 to 99999)
Display		7-segment LED
Polarity display		"−" is displayed automatically with a negative input signal.
Zero display		Leading zeros are not displayed.
HOLD function		Maximum hold (maximum data) Minimum hold (minimum data)
External controls		HOLD: Process value held RESET: Maximum/Minimum data reset
Comparative output hysteresis setting		Programmable with front-panel key inputs (1 to 9999).
Other functions		Variable linear output range (for models with linear outputs only) Remote/Local processing (available for communications output models only) Maximum/Minimum value data reset with front panel keys °C/°F display selection Averaging processing function (simple or moving average) Comparative output pattern selection Standby sequence Security Field calibration
Output configuration		Relay contact output (5 outputs) Transistor output (NPN and PNP open collector), BCD (NPN open collector) Parallel BCD (NPN open collector) + transistor output (NPN open collector) Linear output (4 to 20 mA, 1 to 5 V) + transistor output (NPN open collector) Communication functions (RS-232C, RS-485, RS-422) Communication functions (RS-232C, RS-485, RS-422) + transistor output (NPN open collector)
Delay in comparative outputs (transistor output)		500 ms max.
Enclosure rating	Front panel	NEMA4 for indoor use (equivalent to IP66)
	Rear case	IEC standard IP20
	Terminals	IEC standard IP00
Memory protection		Non-volatile memory (EEPROM) (possible to rewrite 100,000 times)

Note: The indication accuracy of the K1, T, and N thermocouples at a temperature of -100°C or less is ±2°C ±1 digit maximum. The indication accuracy of the U, L1, and L2 thermocouples at any temperature is ±2°C ±1 digit maximum.
The indication accuracy of the B thermocouple at a temperature of 400°C or less is unrestricted.
The indication accuracy of the R and S thermocouples at a temperature of 200°C or less is ±3°C ±1 digit maximum.
The indication accuracy of the W thermocouple at any temperature is (±0.3% of the indicated value or ±3°C, whichever is greater) ±1 digit maximum.
The indication accuracy of the PLII thermocouple at any temperature is (±0.3% or ±2°C, whichever is greater) ±1 digit maximum.

Nomenclature

■ K3NH

1. SV Display

2. PV Display

3. Comparative Output Status Indicators

4. SV Display Status

5. ESC Key

6. Mode Key

7. Status Indicators

8. Teaching Indicator

9. RESET/TEACH Key

10. Up Key and Shift Key

Name	Functions
1. SV display	Displays the set value or parameter. Available for Set Value LED Models only.
2. PV display	Displays the process value in addition to the max/min value or parameter.
3. Comparative output status indicators	Displays the status of comparative output.
4. SV display status	Indicates which comparative set value is currently on the SV display.
5. ESC Key	Used to return to the RUN mode from the Setting, Protect, or Maintenance mode. The process value, maximum value, or minimum value to be displayed can be selected.
6. Mode Key	Used to enter the Setting mode. Used to allow the PV display to indicate set values sequentially. Available for Basic Models only. Used to indicate set values sequentially on the SV display. Available for Set Value LED Models only.
7. Status indicators	HOLD: Lit when HOLD input is ON. MAX: Lit when the maximum value is indicated on the PV display. MIN: Lit when the minimum value is indicated on the PV display. PROG: Lit or flashes while parameters are being set.
8. Teaching indicator	Lit when the teaching function is enabled and flashes when the Intelligent Signal Processor is in teaching operation.
9. RESET/TEACH Key	The maximum value and minimum value are reset by pressing this key. Teaching is available when the teaching function is enabled.
10. Up Key and Shift Key	The digit being set is scrolled by pressing the Shift Key. The set value increases by one whenever the Up Key is pressed.

Operation ————————————————————————————————————

■ SETTING PROCEDURES

The K3NH has four modes: RUN mode for normal operations, Setting mode for initial parameter input, Protect mode for lock-out configuration, and Maintenance mode for initializing set values and user calibration. The parameters that are accessible on any individual K3NH will vary depending on the output board installed. Refer to the *K3NH Operation Manual* for details.

RUN Mode: Remains in this mode under normal operation.
                 The process value or the max./min. value can be monitored.
                 Using the front panel keys, the comparative set value can be changed and max./min. values reset can be performed.

Setting Mode: Used for making initial settings.
                 Includes settings for three menus (Set value (5u5Et), setup (5EtUP), option (ōPt)) and the output test.

Protect Mode: Used for locking the front key operation or parameter changes.

Maintenance Mode: Used for initializing set values and user calibration of the inputs.
                 The user calibration is valid for selected input ranges.
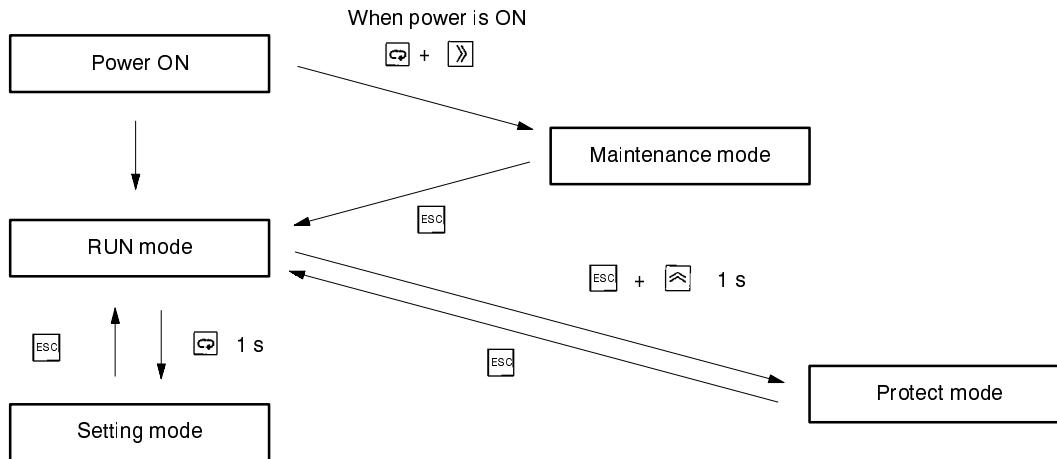
5u5Et - Program set values

     5u.HH   Enter set value HH
     5u. H   Enter set value H
     5u. L   Enter set value L
     5u.LL   Enter set value LL

5EtUP - Program input type/Serial communications

     ⌐n-t   Determine input type
     C--F   Select the °C/°F display
     ⌐n-H   Scaling upper limit
     ⌐n-L   Scaling lower limit
     dEC-P   Select decimal point
     U-nō   Enter the unit no. for the host
     bP5   Select the baud rate
     LEn   Select the word bit length
     5b⌐t   Select the stop bits
     Prty   Select the parity bits

ōPt - Supplementary settings related to display or control

     AUG   Set for averaging process value
     d⌐G⌐t   Select the number of digits to be displayed
     ⌐n5H   Select shift amounts of input shift upper limit values
     ⌐n5L   Select shift amounts of input shift lower limit values
     H95   Enter hysteresis value
     C-ōUt   Select the output pattern
     5tdb9   Enable standby sequence
     L5Et.H   Enter the upper limit (H) of linear output range
     L5Et.L   Enter the lower limit (L) of linear output range
     r-L   Select the remote/local programming

**tE5t** - Generating simulated input for testing the output function

Prōt - Program lock-out configuration

     ALL   Enable all key protection
     5u5Et   Enable set value change prohibition
     ōō.r5t   Enable prohibition of max./min. value reset using the front panel keys
   5EC r   Specify the menus to be protected against setting in the setting mode

■ PARAMETERS

Scaling Upper/Lower Limit Ln-H/Ln-L

When the input type is set to the current/voltage input, input signals can be converted and displayed in the desired display value. The setting can be made by inputting display values that correspond to the upper-limit input value and lower-limit input value for the selected input type. The decimal point can be set to any position.

Display

100

0

Input

Input range
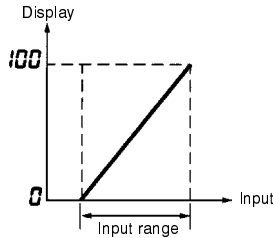
When displaying the 4- to 20-mA input as 20.0% to 95.0%.

Ln-H : **950**

dEL-P:ooo.o

Ln-L : **200**
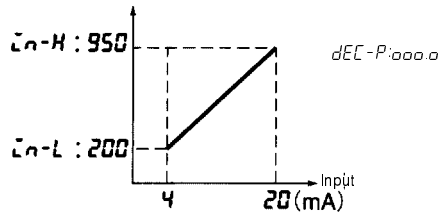
Input
4   20(mA)

Average Processing AuL

The average processing function stabilizes displayed values by averaging the corresponding analog input signals that fluctuate dynamically or reducing the noise in the input signals.

Input Shift LnSH/LnSL

When temperature input is selected, scaling is not required. This is because input is treated as the "temperature" as it is matched to the input type. However, note that the upper- and lower-limit values of the sensor can be shifted. For example, if both the upper- and lower-limit values are shifted by 1.2°C, the process value (before shift) is regarded as 201.2°C after shift when input is 200°C before shift.

Temperature

Upper-limit
compensation value

Upper-limit value

After com-
pensation

Before compensation

Lower-limit value

Lower-limit
compensation value

0   100   Input
(% FS)
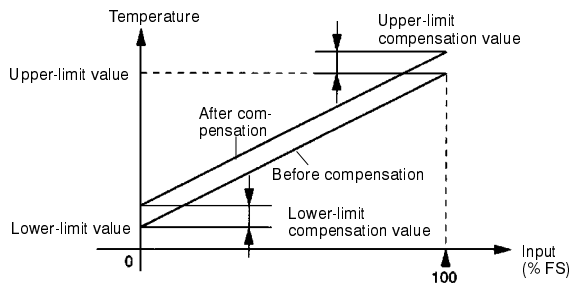
Hysteresis HYS

The hysteresis of comparative outputs can be set to prevent the chattering of comparative outputs. For more details, refer to *Output Operation Timing in Run Mode* (found later in this section).

Output Pattern Selection L-oUt

The patterns of comparative output are selectable according to the level change. Select the pattern according to the application.

Standard Output
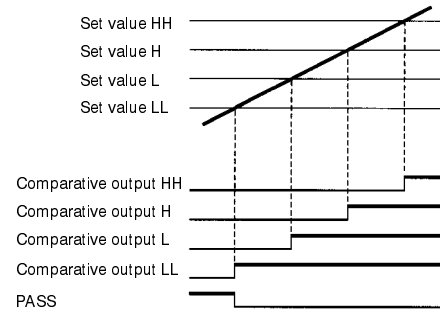
Set value HH
Set value H
Set value L
Set value LL

Comparative output HH
Comparative output H
PASS
Comparative output L
Comparative output LL

Zone Output

Set value HH
Set value H
Set value L
Set value LL

Comparative output HH
Comparative output H
PASS
Comparative output L
Comparative output LL

Level Output

Set value HH
Set value H
Set value L
Set value LL

Comparative output HH
Comparative output H
Comparative output L
Comparative output LL
PASS

Note: The following setting conditions must be satisfied, otherwise the zone output will not turn ON correctly.
LL < L < H < HH

Standby Sequence *StdbY*

The comparative output operation can be disabled from when the power supply is turned ON to when it enters the PASS range. This is effective for avoiding any unnecessary output until the output reaches the measurement range after the power is turned ON.

(Since other comparative output operations are disabled until the output falls within the PASS range, comparative output operation may not be performed if the settings are incorrect. Therefore, be careful when selecting the comparative output pattern and setting various comparative values.)

Example: When the standby sequence function is ON.
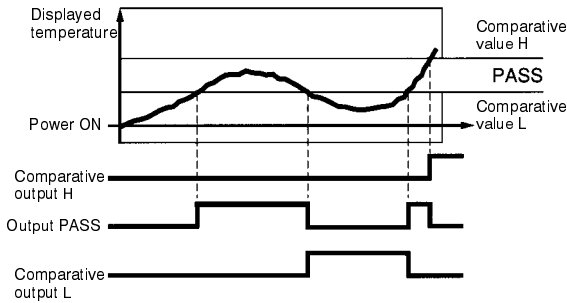
Linear Output Range *LSEt*

A linear output range can be set as required. A value corresponding to the maximum output value and that corresponding to the minimum output value can be set.
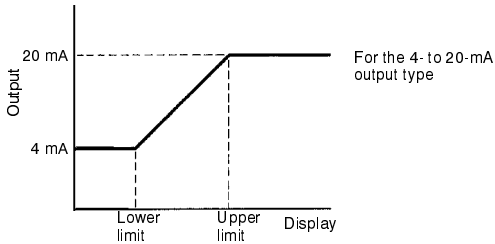
Remote/Local Selection *r-L*

Select remote programming when performing all settings through the host devices and select local programming when performing settings through key operation.

■ TERMINAL ARRANGEMENT
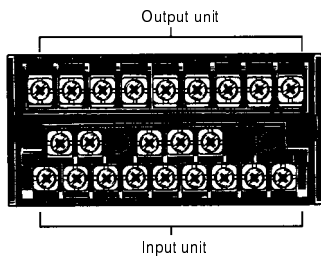
Terminal Numbers
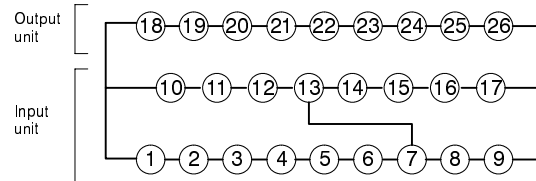
Note: Terminals 7 to 13 are connected internally.

■ INPUT UNIT
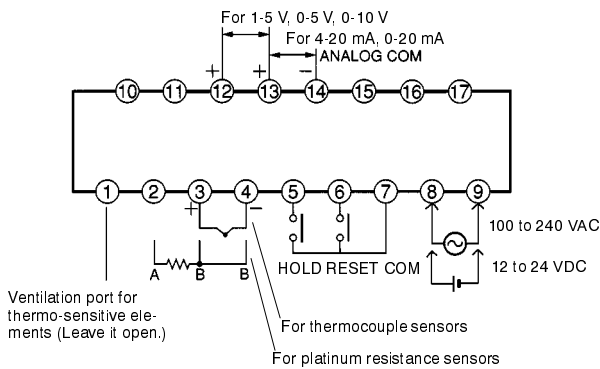
When inputting the external control signals through the open collector:

Transistor Inputs:
    ON: Residual voltage must be 3 V max.
    OFF: Leakage current must be 1.5 mA max.
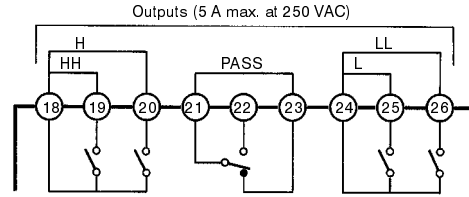   The switching capacity must be 20 mA or greater.

When the external signal input is short-circuited, a voltage of approximately 5 V will be applied between terminals 5 and 7 and the COM terminal, and a current of approximately 18 mA (nominal value) will flow.
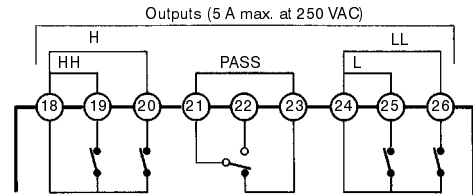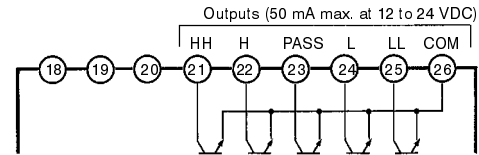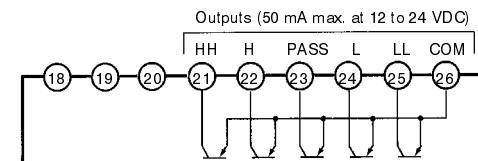
■ OUTPUT BOARDS

K31-C1: Relay (3 Outputs)

Outputs (5 A max. at 250 VAC)
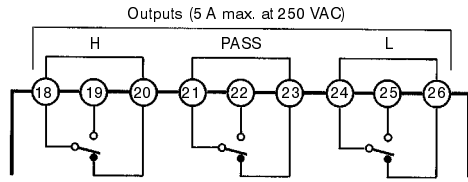
K31-C2: Relay (5 Outputs)

Outputs (5 A max. at 250 VAC)

K31-C5: Relay (5 Outputs)

Outputs (5 A max. at 250 VAC)

K31-T1: Transistor (NPN Open Collector)

Outputs (50 mA max. at 12 to 24 VDC)

K31-T2: Transistor (PNP Open Collector)

Outputs (50 mA max. at 12 to 24 VDC)

K31-B2, -B4: BCD (NPN Open Collector)
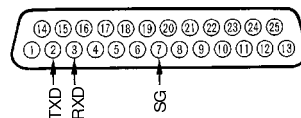
(Terminals 32 to 36 are provided only on K31-B4.)
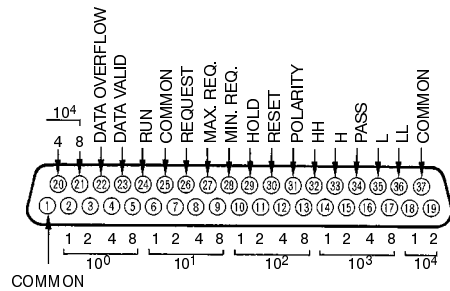
K31-L1, -L2, -L3, -L4, -L5, -L6, -L7, -L8, -L9, -L10: Linear

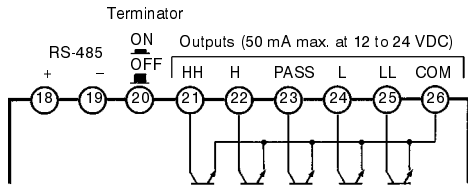(Terminals 21 to 26 are provided only on K31-L4, -L5, -L6, -L9, -L10.)
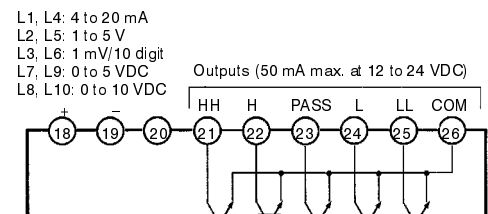
L1, L4: 4 to 20 mA
L2, L5: 1 to 5 V
L3, L6: 1 mV/10 digit
L7, L9: 0 to 5 VDC
L8, L10: 0 to 10 VDC

Outputs (50 mA max. at 12 to 24 VDC)

K31-FLK1: RS-232C

K31-FLK2, -FLK5: RS-485

(Terminals 21 to 26 are provided only on K31-FLK5.)

Terminator

RS-485
+ − ON OFF   Outputs (50 mA max. at 12 to 24 VDC)
HH H PASS L LL COM
(18) (19) (20) (21) (22) (23) (24) (25) (26)

- D-sub 37P connectors for BCD output (order separately)
  Plug: XM2A-3701
  Hood: XM2S-3711

- D-sub 25P connectors for RS-232C output (K31-FLK1)
  (order separately)
  Plug: XM2A-2501
  Hood: XM2S-2511

- D-sub 9P connectors for RS-422 output (K31-FLK3 and
  K31-FLK6) (order separately)
  Plug: XM2A-0901
  Hood: XM2S-0911

- D-sub 9P connectors for RS-232C output (K31-FLK4)
  (order separately)
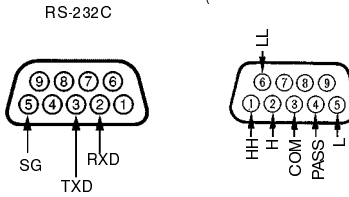 Plug: XM2D-0901
  Hood: XM2D-0911

K31-FLK3, -FLK6: RS-422

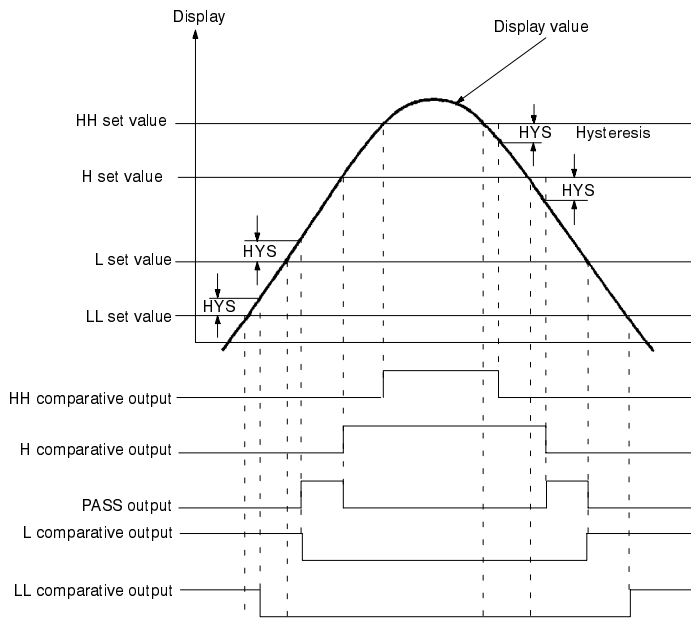(The right-hand side connector is provided only on K31-FLK6.)

RS-422   Output NPN Tr.
                         (50 mA max. at 12 to 24 VDC)

RDA SDA   LL

Terminator
■ ON
■ OFF

(6)(7)(8)(9)   (6)(7)(8)(9)
(1)(2)(3)(4)(5)   (1)(2)(3)(4)(5)

RDB SG SDB   HH H COM PASS L
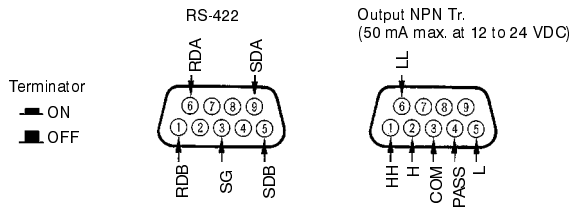
K31-FLK4: RS-232C + Transistor (NPN Open Collector)

RS-232C   Output NPN Tr.
                         (50 mA max. at 12 to 24 VDC)
                              LL

(9)(8)(7)(6)   (6)(7)(8)(9)
(5)(4)(3)(2)(1)   (1)(2)(3)(4)(5)

SG   RXD   HH H COM PASS L
   TXD

■ OUTPUT OPERATION TIMING IN RUN MODE (RELAY OR TRANSISTOR OUTPUTS)

The following timing chart is for a 5-comparative output board when the standard output pattern is selected.
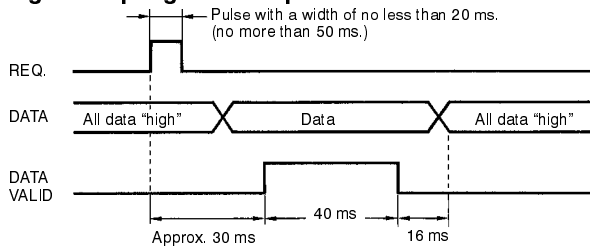
Display

Display value

HH set value   HYS   Hysteresis

H set value   HYS

L set value
   HYS

LL set value
HYS

HH comparative output

H comparative output

PASS output

L comparative output

LL comparative output

Note: The hysteresis value set in setting mode will be applied to all set values.

■ BCD OUTPUT TIMING CHART

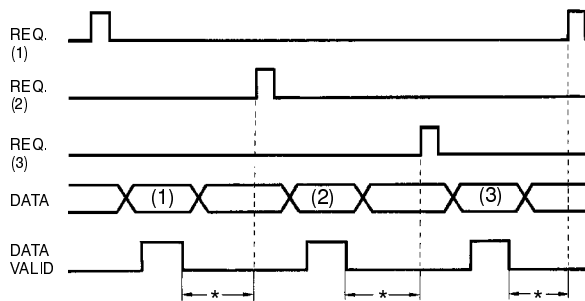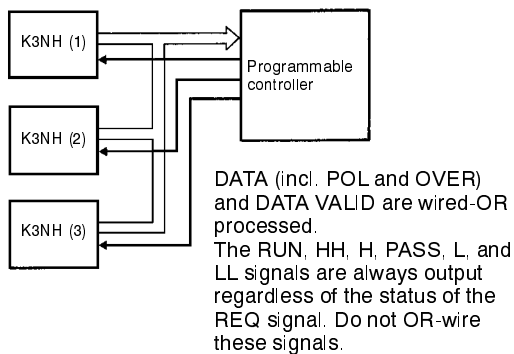A request signal from an external device (such as a Programmable Controller) is required to read BCD data.

Single Sampling Data Output

Pulse with a width of no less than 20 ms.
(no more than 50 ms.)

REQ.

DATA   All data "high"   Data   All data "high"

DATA
VALID

Approx. 30 ms   40 ms   16 ms

Approximately 30 ms after the REQ signal rises, a sample is taken and the DATA VALID signal is output. Read the data when the DATA VALID signal is ON.
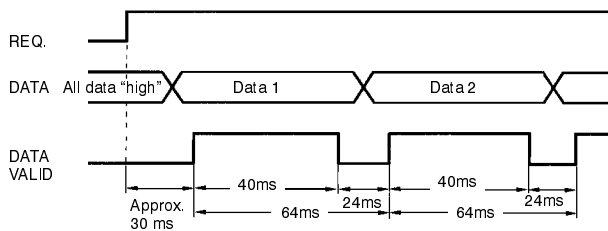
The DATA VALID signal will turn OFF in 40 ms, and then in 16 ms, the data will go OFF.

Models with a BCD output have an open collector output configuration so that wired-OR connection is possible.

K3NH (1)
K3NH (2)
K3NH (3)

Programmable
controller

DATA (incl. POL and OVER) and DATA VALID are wired-OR processed.
The RUN, HH, H, PASS, L, and LL signals are always output regardless of the status of the REQ signal. Do not OR-wire these signals.

REQ.
(1)

REQ.
(2)

REQ.
(3)

DATA   (1)   (2)   (3)

DATA
VALID

*   *   *

*The period between the DATA VALID signal and the REQ signal should be no less than 20 ms max.

Continuous Data Output

REQ.

DATA   All data "high"   Data 1   Data 2
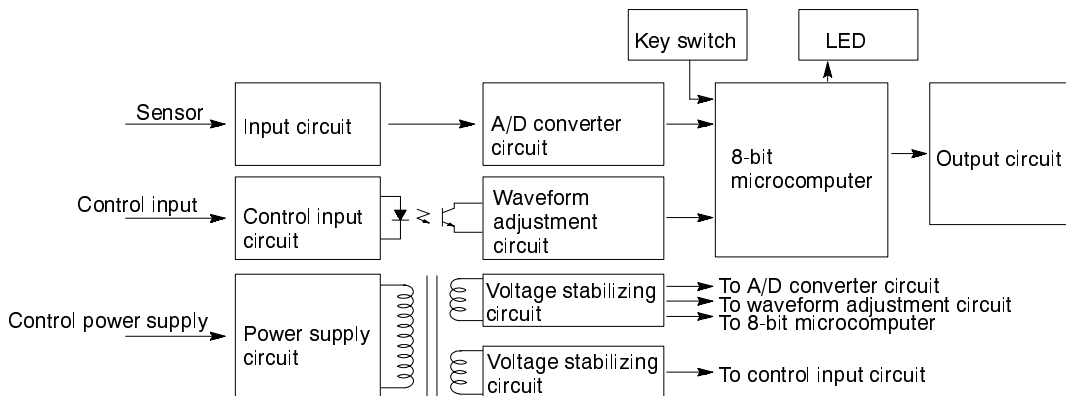
DATA
VALID

Approx. 30 ms   40ms   24ms   40ms   24ms
64ms   64ms

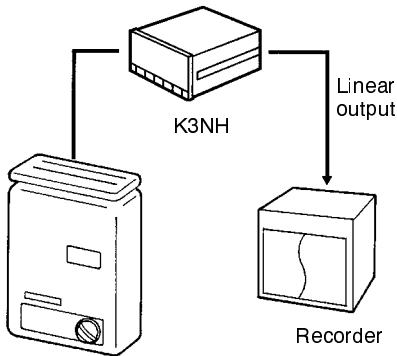The K3NH outputs each measurement at an interval of 64 ms when a REQ signal is ON continuously.

If the HOLD signal is ON at the moment the DATA output is switched from data 1 to data 2 or vice versa, the output BCD data will be either data 1 or data 2 according to the timing of the HOLD signal. However, output data will never be low.

■ BLOCK DIAGRAM

Key switch
LED
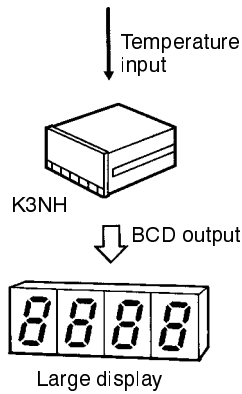
Sensor → Input circuit → A/D converter circuit

Control input → Control input circuit → Waveform adjustment circuit

8-bit microcomputer → Output circuit

Control power supply → Power supply circuit

Voltage stabilizing circuit → To A/D converter circuit
→ To waveform adjustment circuit
→ To 8-bit microcomputer

Voltage stabilizing circuit → To control input circuit

Application Examples

■ **INSPECTION LINES FOR GAS APPLIANCES**

K3NH

Linear output

Recorder

■ **TEMPERATURE MONITORING FOR PLATING AND COATING BATHS**

Rotating beacon

H
Pass
L

K3NH   Alarm output
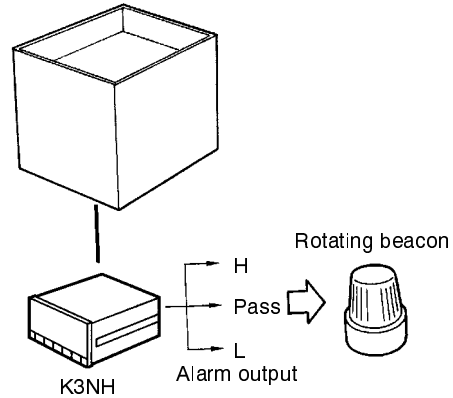
■ **INTERFACING LARGE EXTERNAL DISPLAYS**

Temperature input

K3NH

BCD output

8888

Large display

■ **CENTRALIZED TEMPERATURE MONITORING FOR INDUSTRIAL FURNACES**

Industrial furnaces

Computer

K3NH   K3NH   K3NH

Communication output
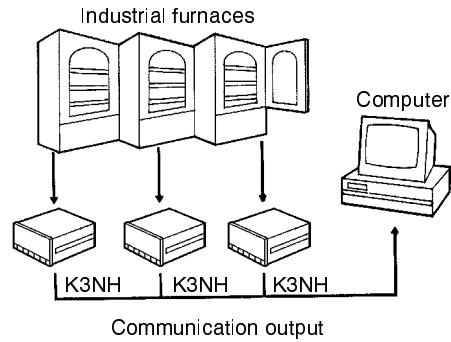
■ **MONITORING EXHAUST TEMPERATURES ON MARINE ENGINES**

K3NH

H
Pass
L

Alarm output

Marine engines
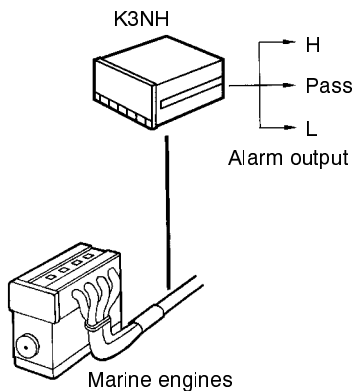
■ **TEMPERATURE DISPLAY AND ALARMS FOR FORMING EQUIPMENT**

H
Pass
L

Alarm output

PID control

E5EK   K3NH
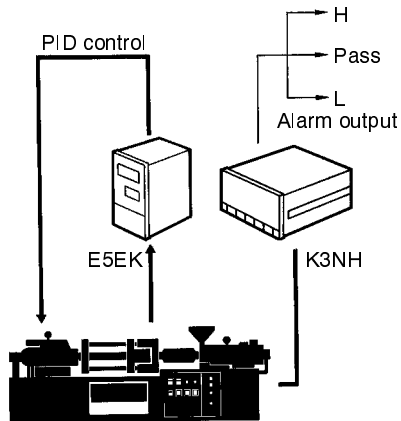
■ MONITORING BEARING TEMPERATURE ON GENERATORS AND MOTORS

Communication output

K3NH

Computer
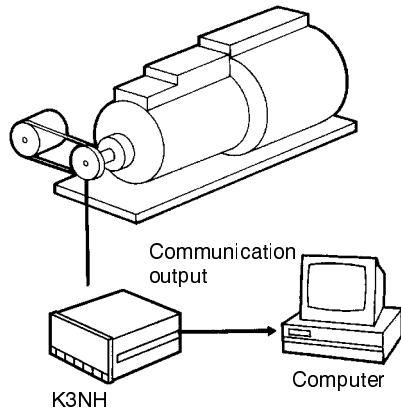
■ TEMPERATURE MONITORING AND CONTROL INTERFACES FOR MULTILEVEL ALARMS

K3NH

→ HH: Upper-limit alarm

→ H: To heating controls
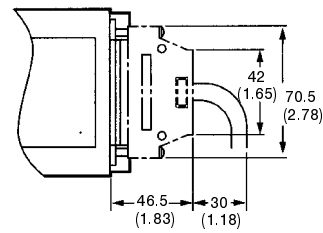
→ PASS

→ L: To cooling controls

→ LL: Lower-limit alarm

Industrial furnace
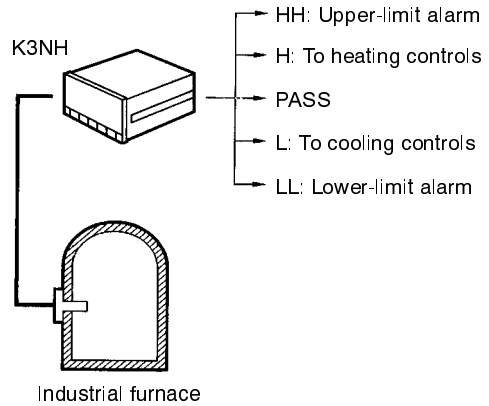
Dimensions

Unit: mm (inch)

■ K3NH

PV Display

14.2

8.2

91 (3.58)   90 (3.54)

42 (1.65)   70.5 (2.78)

46.5 (1.83)   30 (1.18)

48 (1.89)

44 (1.73)   43 (1.69)

96 (3.78)

112 (4.41)

12.4 (0.49)   130 (5.12)   2.2 (0.09)

Panel Cutouts

45 (1.77)

92

75 min (2.95)

120 min (4.72)
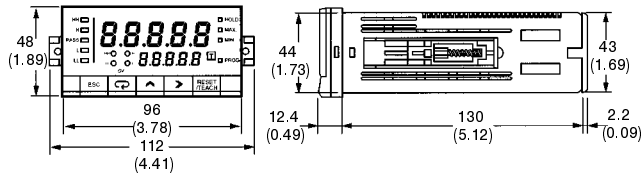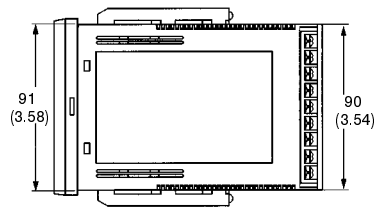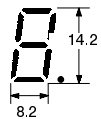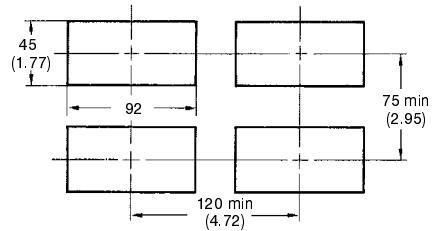
Installation ———————————————————————————

■ EXAMPLE OF CONNECTION TO PROGRAMMABLE CONTROLLER

Intelligent Signal
Processor

PLC (SYSMAC)
DC Input Unit

1. COMMON   COM

2. 1   IN

3. 2   IN

4. 4   IN 10^0

5. 8   IN

Internal circuit

23. DATA VALID

24. RUN   IN

IN

25. COMMON

Transistor Output Module

26. REQUEST   OUT

240 Ω

+5 V

240 Ω

Internal circuit

Internal circuit

30. RESET   OUT

240 Ω

31. POLARITY   COM
                   (0 V)

(Polarity: +, −)

240 Ω

24 VDC

+24 V
                   DC power
0 V   supply
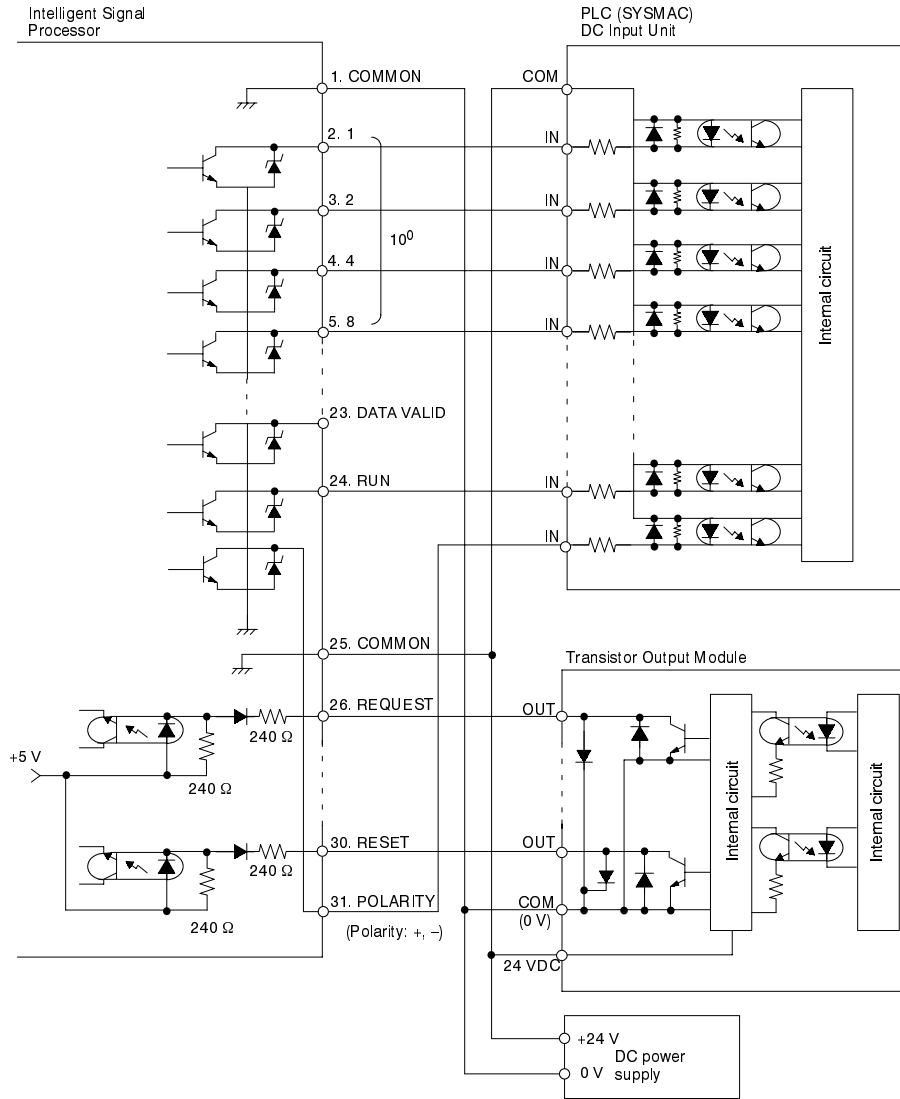
Precautions

■ AVOID ELECTRIC SHOCK

- Do not touch any terminals.

- Do not disassemble the product or touch the internal components of the product.

- Be sure that the power supply voltage is within the rated range.

- Do not use the Intelligent Signal Processor in locations with flammable gas or combustible substances.

- Be sure to wire the terminals correctly by checking the terminal names.

- Be sure that the terminal screws are tightened securely when wiring.

■ OPERATION

- A Processor model with a relay contact or transistor output board may not output any alarm signal normally if the model has an error. It is recommended that an independent alarm device be connected to the model.

- The parameters are factory-set for normal operation. The settings of the parameters may be changed according to the application.

■ MOUNTING

- Recommended panel thickness is 1 to 3.2 mm.

Panel
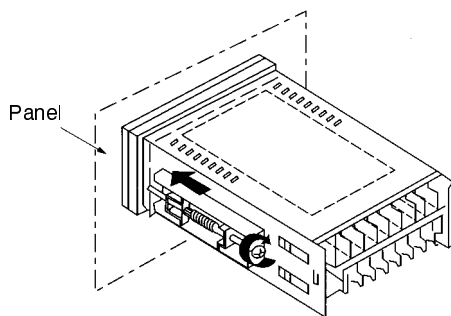
- Attach the mounting bracket on the left and right sides of the Intelligent Signal Processor (as shown in the illustration above). Gradually tighten each screw evenly, balancing the tightening force until the ratchet starts to slip.

- Mount the Processor as horizontally as possible.

- Never use the Processor in locations where corrosive gas (particularly sulfur or ammonia gas) is generated.

- Avoid use of the Processor in a location subject to severe shock or vibration, excessive dust, or excessive moisture.

- Select an indoor mounting location where the Intelligent Signal Processor is at the rated temperature and humidity and free from direct sunlight.

- Separate the Processor from machines generating high-frequency noise, such as high-frequency welding machines and high-frequency sewing machines.

■ UNIT LABEL (ATTACHED)

No product is shipped with the unit label attached. Select a unit label from the sheet provided and attach it to the Processor.

A	A	mA	mA	V
V	mV	mV	W	KW
VA	KVA	var	Kvar	Ω
℃	°F	K	Hz	rpm
m	mm	cm	μm	Km
ℓ	Kℓ	t	TON	ℓx
m³	cm³	mm³	Kg	g
mg	Kg/m³	g/cm³	m³/Kg	m/s²
G	N	mmHg	mmH2O	Kgf/cm²
Kgf/mm²	J	KJ	Kgf-cm	gf-cm
PS	hp	cal	Kcal	Kg/h
t/h	Kg/s	m³/min	m³/h	m³/s
ℓ/s	ℓ/min	ℓ/h	m/min	mm/s
m/s	%	dB	φ-mm	SCCM
sec	ms	min	counts	×10
×100	×1000	pH	ppm	pcs
deg	cP	cSt	KΩ	MΩ
KHZ	rps			
kV	s	m³	cm³	rad
S	S	L	kL	L/s
L/min	L/h	kN	mN	Pa
kPa	mPa	N·m	kN·m	mN·m
kg·m³	lx	cPs	°	rPh
r/s	r/min	r/h	min⁻¹	h⁻¹
				h.min.s
min.s.1 10s			OMRON	

OMRON®

OMRON ELECTRONICS, INC.

One East Commerce Drive

Schaumburg, IL 60173

1-800-55-OMRON

OMRON CANADA, INC.

885 Milner Avenue

Scarborough, Ontario M1B 5V8

416-286-6465