Features

• High accuracy with 16bit ADC (±0.2% F.S.)
• Max. display range: -19999 to 19999
• Multi-input
  : Thermometer 12 types, RTD 5 types, analog (mV, V, mA) 6 types
• Auto display color change function (for error or alarm)
• Various output options:
  4EA or 2EA alarm output, 4-20 mA transmission output (isolated), RS485 communication output
  ※Full output option model is available.
  (alarm output 4EA + RS485 communication output +transmission output)
• Various functions
  : High/Low peak monitoring, sensor break alarm output (burn-out), input correction, digital input (DI),
  user input range, display scale, transmission output scale, etc.
• Built-in power supply for sensor (24 VDC)

Ordering information

<table>
<thead>
<tr>
<th>Item</th>
<th>Size</th>
<th>Power supply</th>
<th>Option output</th>
<th>Alarm output</th>
</tr>
</thead>
<tbody>
<tr>
<td>KN-2 000 W</td>
<td>W DIN W96×H48 mm</td>
<td>0: 100-240 VAC 50 to 60 Hz</td>
<td>0: No option</td>
<td>0: No alarm output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1: 24 VDC</td>
<td>1: Transmission output (4-20 mA)</td>
<td>2: 2EA alarm output</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4: RS485 communication output</td>
<td>4: 4EA alarm output</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5: Transmission output (4-20 mA) + RS485 communication output</td>
<td></td>
</tr>
</tbody>
</table>

Dimensions

- Panel cut-out
  - Min. 116
  - Min. 52
  - 92 °

Please read “Caution for your safety” in operation manual before using this unit.
## Specifications

### Series

- **KN-2000W**

### Power supply

- **AC voltage**: 100-240 VAC 50 to 60 Hz
- **DC voltage**: 24 VDC

### Allowable voltage range

- 90 to 110% of rated voltage

### Power consumption

- **AC voltage**: Max. 8 VA
- **DC voltage**: Max. 3 W

### Display method

- 4 1/2 digit : 7 Segment LED Display (selectable red, green, yellow), character size : W10 mm×H17 mm

### Input type

- **RTD**: JPt100Ω, DPt100Ω, DPt50Ω, Cu50Ω, Cu100Ω (5 types)
- **Thermocouple**: K, J, E, T, R, B, S, N, C (W5), L, U, PLII (12 types)
- **Analog**: - Voltage : ±1.0000 V, ±50.0 mV, ±200.0 mV, ±1.000 V-10.000 V (4 types)
- **Current** : 4.00-20.00 mA, 0.00-20.00 mA (2 types)

### Digital input

- **Contact input**: Max. 2 kΩ in ON, Max. 90 kΩ in OFF
- **Non-contact input**: Residual voltage max. 1.0 V in ON, Leakage current max. 0.03 mA in OFF
- **Outflow current**: Approx. 0.2 mA

### Sub output

- **Alarm output**: 2-point : Relay contact capacity 250 VAC 3 A 1c , 4-point : Relay contact capacity 250 VAC 1 A 1a
- **Transmission output**: ISOLATED DC 4-20 mA (PV transmission) load resistance max. 600 Ω (accuracy: ±0.2% F.S., resolution: 8000)
- **Communication output**: RS485 (Modbus RTU)

### Display accuracy

- ±0.2% F.S. ±1digit (25±5 ℃)
- ±0.3% F.S. ±1digit (-10 to 20 ℃, 30 to 50 ℃)
- In case of thermocouple and below -100 ℃ input, [±0.4% F.S.] ±1digit
- TC-T, TC-U is min. ±2.0 ℃

### Setting method

- Set by front keys, or RS485 communication

### Alarm output hysteresis

- Set ON/OFF interval (1 to 999 digit)

### Sampling cycle

- Analog input : 100 ms, Temperature sensor input : 250 ms

### Dielectric voltage

- 2000 VAC 50/60 Hz for 1 min. (between input terminal and power terminal)

### Vibration

- 0.75 mm amplitude at frequency of 5 to 55 Hz (for 1 min.) in each of X, Y, Z directions for 2 hours

### Relay life cycle

- **2-point**: Mechanical: Min. 10,000,000, Electrical: Min. 100,000 (250 VAC 3 A resistance load)
- **4-point**: Mechanical: Min. 20,000,000, Electrical: Min. 500,000 (250 VAC 1 A resistance load)

### Insulation resistance

- Min. 100 MΩ (at 500VDC megger)

### Noise resistance

- Square shaped noise by noise simulator (pulse width 1 μs) ±2 kV

### Memory retention

- Approx. 10 years (non-volatile semiconductor memory type)

### Environment

- **Ambient temperature**: -10 to 50 ℃, storage: -20 to 60 ℃
- **Ambient humidity**: 35 to 85%RH, storage: 35 to 85%RH

### Approval

- CE

### Unit weight

- Approx. 200 g

※ Environment resistance is rated at no freezing or condensation.
Input type and range

Input type selection switch

- 0-20mA : Select it for 0(4)-20 mA input
- -1-10V : Select it for -1V-10 V input
- TD/TC/mV±1V : Select it for RTD, TC temperature sensor or ±1 V, mV input

This unit is multi input product. Select the proper input with the input type selection switch and select this input type in mode. The setting of input type selection switch and the input type parameter should be the same and it can display the proper measurement value. Factory default is 4-20mA.

<table>
<thead>
<tr>
<th>Input type</th>
<th>Parameter</th>
<th>Input range(℃)</th>
<th>Input range(℉)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K(CA)</td>
<td>℃ - ℃</td>
<td>-200.0 to 1350.0</td>
<td>-328.0 to 2462</td>
</tr>
<tr>
<td>J(IC)</td>
<td>℃ - ℃</td>
<td>-200.0 to 800.0</td>
<td>-328.0 to 1472.0</td>
</tr>
<tr>
<td>E(CR)</td>
<td>℃ - ℃</td>
<td>-200.0 to 800.0</td>
<td>-328.0 to 1472.0</td>
</tr>
<tr>
<td>T(CC)</td>
<td>℃ - ℃</td>
<td>-200.0 to 400.0</td>
<td>-328.0 to 752.0</td>
</tr>
<tr>
<td>R(PR)</td>
<td>℃ - ℃</td>
<td>0.0 to 1750.0</td>
<td>32 to 3182</td>
</tr>
<tr>
<td>B(PR)*</td>
<td>℃ - ℃</td>
<td>400.0 to 1800.0</td>
<td>752 to 3272</td>
</tr>
<tr>
<td>S(PR)*</td>
<td>℃ - ℃</td>
<td>0.0 to 1750.0</td>
<td>32 to 3182</td>
</tr>
<tr>
<td>N(NN)*</td>
<td>℃ - ℃</td>
<td>-200.0 to 1300.0</td>
<td>-328 to 2372</td>
</tr>
<tr>
<td>C(W5)*</td>
<td>℃ - ℃</td>
<td>0 to 2300</td>
<td>32 to 4172</td>
</tr>
<tr>
<td>L(IC)*</td>
<td>℃ - ℃</td>
<td>-200.0 to 900.0</td>
<td>-328.0 to 1652.0</td>
</tr>
<tr>
<td>U(CC)*</td>
<td>℃ - ℃</td>
<td>-200.0 to 400.0</td>
<td>-328.0 to 752.0</td>
</tr>
<tr>
<td>Platinel II*</td>
<td>℃ - ℃</td>
<td>0.0 to 1390.0</td>
<td>32 to 2534</td>
</tr>
<tr>
<td>Thermocouple</td>
<td>Cu50Ω*</td>
<td>℃ - ℃</td>
<td>200.0 to 200.0</td>
</tr>
<tr>
<td></td>
<td>Cu100Ω*</td>
<td>℃ - ℃</td>
<td>200.0 to 200.0</td>
</tr>
<tr>
<td></td>
<td>JPt100Ω</td>
<td>℃ - ℃</td>
<td>200.0 to 600.0</td>
</tr>
<tr>
<td></td>
<td>DPl50Ω</td>
<td>℃ - ℃</td>
<td>200.0 to 600.0</td>
</tr>
<tr>
<td>RTD</td>
<td>DPl100Ω</td>
<td>℃ - ℃</td>
<td>200.0 to 850.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current</th>
<th>Input range(0-20 mA)</th>
<th>Input range(4-20 mA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00 - 20.00 mA</td>
<td>RAR1</td>
<td>RAR2</td>
</tr>
<tr>
<td>4.00 - 20.00 mA</td>
<td>RAR1</td>
<td>RAR2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Input range(-50.00 to 50.00 mV)</th>
<th>Input range(-200.00 to 200.00 mV)</th>
<th>Input range(-1.0000 to 1.0000 V)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-50.00 - 50.00 mV</td>
<td>RAω1</td>
<td>RAω1</td>
<td></td>
</tr>
<tr>
<td>-200.00 - 200.00 mV</td>
<td>RAω2</td>
<td>RAω2</td>
<td></td>
</tr>
<tr>
<td>-1.0000 - 1.0000 V</td>
<td>RAω3</td>
<td>RAω3</td>
<td></td>
</tr>
</tbody>
</table>

※ Above input types which have the * mark are not displayed. To display the above input types, supply the power with pressing the MODE key.

Part descriptions

① Display part(red)
- Run mode : Displays current measurement value.
- Parameter set mode : Displays parameter and SV.
② Unit indicator : Displays the set unit.
③ Alarm output indicator : Turns ON when the alarm is ON.
④ MODE key: Used to enter parameter set mode, move to parameters, save SV and return to RUN mode.
⑤ , , , key: Used to change parameter SV.
⑥ D.IN3 : Press the and keys keys for 3 sec. at the same time, it operates the set function (alarm clear, display hold, zero-point adjustment) at [ ] at program mode.
Multi Indicator

**Functions**

- **Alarm [AL - 1, AL - 2, AL - 3, AL - 4]**

  This product has 2 or 4 alarms to operate individually when the value is too high or low. Alarm function is set by the combination of alarm mode and alarm option.

  To clear alarm, use digital input function (setting $d_1 - t$, $d_1 - t$ as $R - E$) or turn the power OFF and ON.

  ※ For the model (KN-20□□W) without alarm output, these parameters are not displayed.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Name</th>
<th>Alarm operation</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ab1□□</td>
<td>High limit alarm</td>
<td>ON</td>
<td>PV ≥ alarm temperature, alarm is ON</td>
</tr>
<tr>
<td>Ab2□□</td>
<td>Low limit alarm</td>
<td>OFF</td>
<td>PV ≤ alarm temperature, alarm is ON</td>
</tr>
<tr>
<td>SbR</td>
<td>Sensor break alarm</td>
<td>—</td>
<td>It will be ON when it detects sensor disconnection. Sensor break alarm does not have alarm option.</td>
</tr>
</tbody>
</table>

※ H : Alarm output hysteresis

- **Alarm option**

<table>
<thead>
<tr>
<th>Mode</th>
<th>Name</th>
<th>Descriptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ab□□□</td>
<td>Standard alarm</td>
<td>If it is an alarm condition, alarm output is ON. Unless an alarm condition, alarm output is OFF.</td>
</tr>
<tr>
<td>Ab□□□b</td>
<td>Alarm latch</td>
<td>If it is an alarm condition, alarm output is ON. Before clearing the alarm, an ON condition is latched. (Holding the alarm output)</td>
</tr>
<tr>
<td>Ab□□□c</td>
<td>Standby sequence</td>
<td>First alarm condition is ignored. From the second alarm condition, standard alarm operates. When power is ON and it is an alarm condition, it is ignored. From the second alarm condition, standard alarm operates.</td>
</tr>
<tr>
<td>Ab□□□d</td>
<td>Alarm latch and standby sequence</td>
<td>If it is an alarm condition, it operates both alarm latch and standby sequence. When power is ON and it is an alarm condition, it is ignored. From the second alarm condition, alarm latch operates.</td>
</tr>
</tbody>
</table>

- **Alarm output hysteresis [Program mode: R-HY]**

  Set the interval of ON/OFF alarm output.

  The set hysteresis is applied to AL1 to AL4 and it is as below. ※Ex) R-HY: 4, high limit alarm value: 800, low limit alarm value: 200

- **High/Low peak monitoring [Monitoring mode: HPEV, LPEV]**

  This function is to save high/low peak to check the invisible abnormal condition of system at [HPEV] or [LPEV] in monitoring mode.

  When the high/low peak is out of the temperature range, it displays HHHH or LLLL.

  To initialize high/low peak, press the $R$, $S$ keys at the same time for 3 sec. at [HPEV] or [LPEV].

  In this case, peak value is the present input value.

- **Error**

<table>
<thead>
<tr>
<th>Display</th>
<th>Descriptions</th>
<th>Troubleshooting</th>
</tr>
</thead>
<tbody>
<tr>
<td>LLLL</td>
<td>Flashes when measured sensor input is lower than the temperature range.</td>
<td>When input is moved within the temperature range, it is cleared.</td>
</tr>
<tr>
<td>HHHH</td>
<td>Flashes when measured sensor input is higher than the temperature range</td>
<td>Check temperature sensor connection.</td>
</tr>
<tr>
<td>bUrn</td>
<td>Flashes when the sensor is break or not connected.</td>
<td>Check set conditions and re-set it.</td>
</tr>
<tr>
<td>Err</td>
<td>Flashes when the input type selection switch setting and input type selection switch setting are not same.</td>
<td>Check input type.</td>
</tr>
</tbody>
</table>
Parameter initialization

To initialize all parameter as factory default, supply the power to the product with pressing the MODE and EYES keys at the same time and it enters initialization parameter.

Press the MODE + EYES keys at the same time.

Supply the power.

Completes initialization.

Temperature unit [ Program mode : UNI / ℃ ]

Temperature unit (°C/°F) is selectable. When changing temperature unit, user input range, display scale, output scale, alarm SV are initialized. You should set the parameters again for your purpose.

※ When selecting analog input, temperature unit [ UNI / ℃ ] parameter is not displayed.

Front display unit [ Program mode : dUND ]

When selecting analog input, select the unit (%,*°C,*°F, not display) of display value.

※ When not displaying unit, set OFF and it turns OFF all indicators.
※ When selecting temperature sensor input, this parameter [ dUND ] is not displayed.

User input range [ Program mode : L-RG, H-RG ]

When selecting analog input, you can set the input range for your purpose. Set low limit input value [ L-RG ] and high limit input value [ H-RG ] to limit the input range.

• Set conditions :
  Low limit input value [ L-RG ]<20%f.s. < High limit input value [ H-RG ]

Input and transmission output extension [ Program mode : EIU a ]

This function is to extend analog input and 4 to 20mA transmission output to 5% or 10% range.

<table>
<thead>
<tr>
<th>Mode</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0P</td>
<td>Outputs 4 to 20 mA within analog input range.</td>
</tr>
<tr>
<td>5P</td>
<td>Outputs 3.2 to 20.8 mA for 5% out of the analog input range.</td>
</tr>
<tr>
<td>10P</td>
<td>Outputs 2.4 to 21.6 mA for 10% out of the analog input range.</td>
</tr>
</tbody>
</table>

※ This parameter is displayed only for transmission output (4-20 mA) model. But it is not displayed when selecting temperature sensor input.

Display scale [ Program mode : L-SC, H-SC ]

For analog input, this function is to set (-19999 to 19999) for particular high/low limit value in order to display high/low limit value of measurement input. If measurement inputs are 'a' and 'b' and particular values are 'A' and 'B', it will display a=A, b=B as below graphs.

Display scale function is able to change display value for max./min. measured input by setting high limit scale [ H-SC ] and low limit scale [ L-SC ] in program mode.

※ Ex) Set high/low scale value (input range is 0 to 10V)
  • L-SC = 0.00
  • H-SC = 5.00, 10.00, 15.00, 20.00

※ When changing input type, high/low scale is changed as factory default.
**Transmision output scale**  
[Program mode: L\text{\underline{u}}B, H\text{\underline{u}}B ]

For 4-20 mA current output, this function is to set the display value for 4 mA [L\text{\underline{u}}B ] and the display value for 20 mA [ H\text{\underline{u}}B ].

The interval between L\text{\underline{u}}B and H\text{\underline{u}}B is 10% F.S. If it is below 10%, it is fixed as 10% of SV.

Relation among input range, user input range, display scale, and transmission scale

The below figure is the example for 4 to 20 mA.

\begin{align*}
\text{Input range} & : 4 \text{mA} \rightarrow 20 \text{mA} \\
\text{User input range} & : L\text{\underline{u}}B \rightarrow H\text{\underline{u}}B \\
\text{Display scale} (\text{display value}) & : L\text{\underline{u}}B \rightarrow H\text{\underline{u}}B \\
\text{Transmission output scale} & : L\text{\underline{u}}B \rightarrow H\text{\underline{u}}B 
\end{align*}

\[ \text{Display value} = \frac{\text{Input value} \times L\text{\underline{u}}B \rightarrow H\text{\underline{u}}B}{L\text{\underline{u}}B \rightarrow H\text{\underline{u}}B} \]

※ Relation among input range, user input range, display scale, and transmission scale

The below figure is the example for 4 to 20 mA.

**Input special function**  
[Program mode: \text{nS}F ]

When selecting analog input, this function is to display the calculated actual value by square, root (\sqrt{}), or two unit function (TUF) as display value.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Functions</th>
<th>Graph</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lin</td>
<td>Outputs as input value</td>
<td>Display</td>
<td>[ Y = AX + B ]</td>
</tr>
<tr>
<td>root</td>
<td>Outputs the rooted (\sqrt{}) input value</td>
<td>Display</td>
<td></td>
</tr>
<tr>
<td>S9Rr</td>
<td>Outputs the squared input value</td>
<td>Display</td>
<td></td>
</tr>
</tbody>
</table>

\[ Y = A(X)^2 + B \]

\[ Y = AX + B \]

TUF  
Refer to "Two unit function"

※ Display value and mA output value for S9Rr:

\[ \text{Display value} = \frac{\text{Input value} \times \text{L} \rightarrow \text{H}}{\text{H} \rightarrow \text{L}} \]

※ Display value and mA output value for root:

\[ \text{Display value} = \frac{\text{Input value} \times \text{L} \rightarrow \text{H}}{\text{H} \rightarrow \text{L}} \]

**Decimal point**  
[Program mode: dP ]

It is able to change decimal point position for high/low limit scale value. It changes decimal point position of display value.

**Two Unit Function**  
[Program mode: \text{TUF} ]

When connecting a pressure sensor, compound pressure which is below atmospheric pressure (0) is for vacuum as mmHg and which is atmospheric pressure or over it is for positive pressure as kg/cm².

Atmospheric pressure is 0 kg/cm². When this unit does not display 0 kg/cm², you can correct zero-point adjustment function.

When using two unit function, L-SC is fixed as -760. L-SC parameter is displayed but you cannot set this. You can set H-SC within 0 to 19999 range.

Ex) When pressure range is -760.0 mmHg to 3.000 kg/cm², and pressure transmitter outputs 4-20 mA, set the scale as H-SC: 3000, dP: 0000.

This unit displays for 4 mA input as ~1600, and for 20 mA input as 3000.

**Input correction**  
[Program mode: \text{n-b } ]

This function is to correct the error occurring from a thermocouple, a RTD or analog input out of allowable error range of this unit.

This also available to correct error when a sensor cannot contact the subject position by calculating the error temperature.

Variable temperature sensors have accuracy level. Because high accuracy type is expensive, standard thermocouples are generally used.

In this case, temperature sensor may occur error.

By executing this function, you can get more accurate temperature.

When executing input correction function, you should measure the error from a sensor accurately. If the measured error is not correct, error may be greater.

(IF \text{nSF} = \text{\underline{b}UF}, \text{n-b } as atmospheric pressure input value not as input correction function. Refer to Two unit function.)

Ex) When measured temperature is 4 ℃ and actual temperature is 0 ℃. Set \text{n-b } as -4, and displayed value is 0 ℃.

\[ \frac{\text{Input value} \times \text{L} \rightarrow \text{H}}{\text{H} \rightarrow \text{L}} \]

\[ \frac{\text{Input value} \times \text{L} \rightarrow \text{H}}{\text{H} \rightarrow \text{L}} \]
### Digital input [Program mode: DI-T, DI-K]

By digital input terminal [DI-T] (no. 6, 7 terminals) or digital input key [DI-K] (D.IN3: + for 3 sec.), one of three functions executes as the below table.

<table>
<thead>
<tr>
<th>Function</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>RLR/E</td>
<td>Alarm clear</td>
</tr>
<tr>
<td>Hold</td>
<td>Display HOLD</td>
</tr>
<tr>
<td>Error</td>
<td>Zero-point adjustment</td>
</tr>
</tbody>
</table>

#### Digital filter [Program mode: MAvF]

Moving average digital filter is able to stably display and output the noise from input line and irregular signals as software.

- Filter set range: 01 to 16
  (When setting as 01, digital filter function does not run.)

#### Display color [Program mode: CL or C-RL]

This function is to change display color for occurring error, operating alarm automatically. User can check the status of this unit directly.

*Color of monitoring mode, program mode is red.*

#### RUN mode and error display color [Program mode: CL or C-RL]

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Display color</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV</td>
<td>RUN</td>
</tr>
<tr>
<td>rEd</td>
<td>Red</td>
</tr>
<tr>
<td>Grn</td>
<td>Green</td>
</tr>
<tr>
<td>YELd</td>
<td>Yellow</td>
</tr>
<tr>
<td>r-G</td>
<td>Red</td>
</tr>
<tr>
<td>G-r</td>
<td>Green</td>
</tr>
</tbody>
</table>

#### Alarm display color [Program mode: C-RL]

This parameter is displayed only for the alarm output models (KN-22W, KN-24W).

- The number of set digit is same as the number of alarm output.

#### Alarm output for disconnecting input sensor [Program mode: bURN]

When disconnecting input sensor, you can set the status of transmission output.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>SV</th>
<th>Transmission output (4-20 mA)</th>
<th>Alarm output</th>
</tr>
</thead>
<tbody>
<tr>
<td>bURN</td>
<td>on</td>
<td>20 mA+5% output</td>
<td>High limit alarm ON</td>
</tr>
<tr>
<td></td>
<td>off</td>
<td>4 mA-5% output</td>
<td>Low limit alarm OFF</td>
</tr>
</tbody>
</table>

#### Lock [Program mode: LoC]

It limits to check parameter set value and to change it.

- : Enable to check/set
- : Enable to check, disable to set.
- : Disable to check

*In LoC2, only LoC2 parameter displays in program mode.*
Communications

- Communication set
  [ Program mode: \texttt{Addr}, \texttt{bAddr} ]
  You can set communication address [ \texttt{Addr} ] and commu-
  nication speed [ \texttt{bAddr} ] for RS485 communication.

- Communication write enable/disable
  [ Program mode: \texttt{ComW} ]
  You can set to enable [ \texttt{EnA} ] or disable [ \texttt{DisA} ] or writing
  parameter setting by RS485 communication.

- Communication specifications

<table>
<thead>
<tr>
<th>Item</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication method</td>
<td>RS485 2-wire half duplex</td>
</tr>
<tr>
<td>Communication speed(BPS)</td>
<td>9600, 4800, 2400, 1200</td>
</tr>
<tr>
<td>Converter</td>
<td>Converter built in RS232</td>
</tr>
<tr>
<td>Max. connections</td>
<td>32 units</td>
</tr>
<tr>
<td>Communication distance</td>
<td>Max. 1200m (within 700m recommended)</td>
</tr>
<tr>
<td>Protocol</td>
<td>MODBUS 1.1 RTU</td>
</tr>
<tr>
<td>Parity</td>
<td>None</td>
</tr>
<tr>
<td>Stop Bit</td>
<td>1Bit</td>
</tr>
<tr>
<td>Data length</td>
<td>8Bit</td>
</tr>
</tbody>
</table>

- Communication manual
  Refer to communication manual for RS485 communication. Visit our web site (www.autonics.com) to download communication manual and software [ Integrated device management program: DAQMaster ].

- Integrated device management program ( DAQMaster )
  DAQMaster is the integrated device management program to set parameters and manage monitoring data. Visit our website (www.autonics.com) to download user manual and integrated device management program.

< Computer specification for using software >

<table>
<thead>
<tr>
<th>Item</th>
<th>Minimum requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>System</td>
<td>IBM PC compatible computer with Intel Pentium III or above</td>
</tr>
<tr>
<td>Operating system</td>
<td>Microsoft Windows 98/NT/XP/Vista/7</td>
</tr>
<tr>
<td>Memory</td>
<td>256MB or more</td>
</tr>
<tr>
<td>Hard disk</td>
<td>More than 1GB of free hard disk space</td>
</tr>
<tr>
<td>VGA</td>
<td>1024×768 or higher resolution display</td>
</tr>
<tr>
<td>Others</td>
<td>RS-232 serial port(9-pin), USB port</td>
</tr>
</tbody>
</table>

< DAQMaster screen >
**Monitoring mode**

- **RUN mode**
  - Press the [MODE] key.

- **Alarm 1 value**
  - Press key among the 1, 3, 4.
  - After entering setting group, press the [MODE] key for 3 sec. or there is no additional key operation in 30 sec., it returns to RUN mode.

- **High peak value**
  - Displays high/low peak value.
  - Initial high/low peak is saved after 2 sec. from supplying the power.

- **Low peak value**
  - Displays only for alarm output models.

- **Set each alarm value; [RL - 1 to RL - 4] in program mode.**
  - Set range: Temperature sensor input → within temperature range
    - Analog input → L - 5°C to H - 5°C
  - When alarm mode [RL - 1 to RL - 4] in program mode is no alarm [SbRL - 1] or sensor break alarm [SbRL - 2], these parameters are not displayed.
  - For 2EA alarm output model (KN-22W), RL 3, RL 4 are not displayed.

**Program mode**

- **RUN mode**
  - Press the [MODE] key for 3 sec.

- **Input type**
  - Press any key among the 1, 3, 4.

- **Select input type.**
  - (Refer to “Input type and range”.)

- **Temperature unit**
  - Select temperature unit.

- **Front display unit**
  - Select front display unit.

- **Low limit input value**
  - Set low limit of input range.
  - Set range: within analog input type range

- **High limit input value**
  - Set high limit of input range.
  - Set range: within analog input type range
Multi Indicator

A.
Recorder
B.
Indicator
C.
Converter
D.
Controller
E.
Thyristor unit
F.
Pressure transmitter
G.
Temp. transmitter
H.
Accessories

Set output scale value for 4 mA.
• Set range: Temperature sensor input → within temperature range.
  Analog input → L - 5°C to H - 5°C

Set output scale value for 20 mA.
• Set range: Temperature sensor input → within temperature range.
  Analog input → L - 5°C to H - 5°C

Set low limit scale value.
• Set range: -19999 to 19999

Set high limit scale value.
• Set range: -19999 to 19999

Select extension range of 4-20 mA input and transmission output.

Select decimal point position of display scale value.

*Displayed only when selecting analog input type.

*Displayed only for transmission output model.

*Displayed only when selecting analog input type.

※ SV changing method of AL-2 to AL-4 is same as AL-1's.
※ For 2EA alarm output model (KN-22□□W), AL 3, AL 4 are not displayed.
※ No alarm [RtO], sensor break alarm [SbR] do not have alarm option.
※ Set alarm value [R L 1 to R L 4] in monitoring mode.

※ Displayed only for alarm output models.

※ Displayed only when selecting analog input type.

※ Displayed only when selecting analog input type.

※ Displayed only when selecting analog input type.

※ Displayed only when selecting analog input type.
KN-2000W Series

Digital filter

(mode)

Set the number of moving average digital filters.
- Set range: 01 to 16

Digital input terminal

(mode)

Select digital input function by no. 6 and 7.
※ For the model without alarm output (KN-20(W)), RL, E is not displayed.

Digital input key

(mode)

Select digital input function by front keys.
※ Press the 4, 3 keys for 3 sec. at the same time and it executes the selected function.
※ For the model without alarm output (KN-20(W)), RL, E is not displayed.

Display color

(mode)

Select display part color for RUN mode and error.
※ Refer to 「Display color」.

Alarm display color

(mode)

※ Displayed only for alarm output models.

Sensor break alarm output

(mode)

Select output status when sensor disconnection.
※ Displayed only for alarm, transmission output models.

Communication address

(mode)

Set communication address.
- Set range: 01 to 99

Communication speed

(mode)

Select communication speed (baud rate).
※ Displayed only for alarm, transmission output models.

Communication write

(mode)

Select enable/disable to communication write.
(EnA: enable to write, d/A: disable to write)

Lock

(mode)

Select lock function.

※ Displayed only for RS485 communication output model.
### Factory default

#### Monitoring mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Parameter</th>
<th>Default</th>
<th>Parameter</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>l IN-P</td>
<td>AñAR2</td>
<td>l OUT</td>
<td>0000</td>
<td>l nS</td>
<td>L n</td>
</tr>
<tr>
<td>l IN-t</td>
<td>0'C</td>
<td>l Out</td>
<td>1000</td>
<td>l n-b</td>
<td>0000</td>
</tr>
<tr>
<td>d IN-t</td>
<td>0'p</td>
<td>d OUT</td>
<td>5P</td>
<td>ARUF</td>
<td>04</td>
</tr>
<tr>
<td>L - rG</td>
<td>0'000</td>
<td>AL - 1</td>
<td>RL 1A</td>
<td>d1 - e</td>
<td>Hold</td>
</tr>
<tr>
<td>H - rG</td>
<td>2000</td>
<td>AL - 2</td>
<td>RL 1A</td>
<td>d1 - e</td>
<td>Hold</td>
</tr>
<tr>
<td>dP</td>
<td>00</td>
<td>AL - 3</td>
<td>RL 2A</td>
<td>C lor</td>
<td>red</td>
</tr>
<tr>
<td>L - SC</td>
<td>0000</td>
<td>AL - 4</td>
<td>RL 2A</td>
<td>C - RL</td>
<td>rrrr</td>
</tr>
<tr>
<td>H - SC</td>
<td>1000</td>
<td>A + HY</td>
<td>00 1</td>
<td>burn</td>
<td>on</td>
</tr>
</tbody>
</table>

#### Program mode

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Default</th>
<th>Parameter</th>
<th>Default</th>
<th>Parameter</th>
<th>Default</th>
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<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>L IN-P</td>
<td>AñAR2</td>
<td>l OUT</td>
<td>0000</td>
<td>l nS</td>
<td>L n</td>
<td></td>
<td></td>
</tr>
<tr>
<td>l IN-t</td>
<td>0'C</td>
<td>l Out</td>
<td>1000</td>
<td>l n-b</td>
<td>0000</td>
<td>Addr</td>
<td>D 1</td>
</tr>
<tr>
<td>d IN-t</td>
<td>0'p</td>
<td>d OUT</td>
<td>5P</td>
<td>ARUF</td>
<td>04</td>
<td>bAUD</td>
<td>96L</td>
</tr>
<tr>
<td>L - rG</td>
<td>0'000</td>
<td>AL - 1</td>
<td>RL 1A</td>
<td>d1 - e</td>
<td>Hold</td>
<td>L oC</td>
<td>off</td>
</tr>
<tr>
<td>H - rG</td>
<td>2000</td>
<td>AL - 2</td>
<td>RL 1A</td>
<td>d1 - e</td>
<td>Hold</td>
<td></td>
<td></td>
</tr>
<tr>
<td>dP</td>
<td>00</td>
<td>AL - 3</td>
<td>RL 2A</td>
<td>C lor</td>
<td>red</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L - SC</td>
<td>0000</td>
<td>AL - 4</td>
<td>RL 2A</td>
<td>C - RL</td>
<td>rrrr</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H - SC</td>
<td>1000</td>
<td>A + HY</td>
<td>00 1</td>
<td>burn</td>
<td>on</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Proper usage

#### Caution for using

- For connecting the power, use a crimp terminal (M3.5, min. 7.2 mm).
- The connection of this unit should be separated from the power line and high voltage line in order to prevent inductive noise.
- Install a power switch or a circuit breaker to supply or cut off the power.
- Switch or circuit breaker should be installed nearby users for convenient control.
- Do not use this unit near the high frequency instruments (high frequency welding machine & sewing machine, large capacity SCR controller).
- When supplying input, if HHHH or LLLL is displayed, measured input may have problem. Turn off the power and check the line.
- Installation environment.
  ① It shall be used indoor.
  ② Pollution Degree 2
  ③ Altitude max. 2,000 m
  ④ Installation category II
- It may cause malfunction if above instructions are not followed.