

# KRN1000 Series

## LCD Touchscreen Paperless Recorder

### ■ Features

- 5.6-inch color TFT LCD (640×480) touchscreen display with excellent readability and intuitive control interface
- Supports 27 input types (thermocouple, RTD, analog voltage and current[shunt])
- 4 / 8 / 12 / 16 input channel models available
- Various communication methods (RS422/485, Ethernet, USB) standard
- 25 to 250 ms high-speed sampling, 1 to 3600 s recording cycle
- 200 MB internal memory and external memory support (SD/USB up to 32 GB)
- Store and backup internal data to external memory (SD/USB)
- 9 different graph types available
- Various option input/output available: digital input (contact/non-contact), alarm output, transmitter power output
- Compact, space-saving design (rear length: 69.2 mm)



 Please read "Safety Considerations" in the instruction manual before using.



### ■ Manuals

- The user manual includes product specifications, functions, and operations.
- The user manual for communication includes information about Modbus RTU protocol, Modbus TCP protocol, and Modbus mapping table.

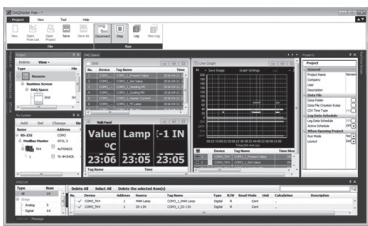
### ■ Comprehensive Device Management Program (DAQMaster)

- DAQMaster is comprehensive device management program for convenient management of parameters and multiple device data monitoring.

< Computer specification for using software >

| Item       | Minimum requirements                                       |
|------------|--|
| System     | IBM PC compatible computer with Intel Pentium III or above |
| Operations | Microsoft Windows 98/NT/XP/Vista/7/8/10                    |
| Memory     | 256MB+   |
| Hard disk  | 1GB+ of available hard disk space                          |
| VGA        | Resolution: 1024×768 or higher                             |
| Others     | RS-232 serial port (9-pin), USB port                       |

< DAQMaster screen >



# LCD Touchscreen Paperless Recorder

## ■ Ordering Information

|                |   |           |          |          |   |          |                      |   |
|----------------|---|-----------|----------|----------|---|----------|----------------------|---|
| <b>KRN1000</b> | — | <b>04</b> | <b>0</b> | <b>1</b> | — | <b>0</b> | <b>S</b>             |   |
|                |   |           |          |          |   |          | Case                 | S Standard panel installation type  |
|                |   |           |          |          |   |          | Power supply         | 0 100-240VAC 50/60Hz  |
|                |   |           |          |          |   |          | Communication output | 1 RS422/485+Ethernet+USB Device   |
|                |   |           |          |          |   |          |                      | 0 None  |
|                |   |           |          |          |   |          | Option input/output  | 1 Alarm relay output 8 channels   |
|                |   |           |          |          |   |          |                      | 2 Alarm relay output 6 channels + Digital input 2 channels                                      |
|                |   |           |          |          |   |          |                      | 3 Alarm relay output 6 channels + 24VDC power output for transmitter                            |
|                |   |           |          |          |   |          |                      | 4 Alarm relay output 4 channels + Digital input 2 channels + 24VDC power output for transmitter |
|                |   |           |          |          |   |          | Input channels       | 04 4 channels   |
|                |   |           |          |          |   |          |                      | 08 8 channels   |
|                |   |           |          |          |   |          |                      | 12 12 channels  |
|                |   |           |          |          |   |          |                      | 16 16 channels  |
|                |   |           |          |          |   |          | Item                 | KRN1000 Paperless recorder  |

## ■ Specifications

|                               |                      |  |
|-------------------------------|----------------------|--|
| Series                        |                      | <b>KRN1000</b>   |
| Power supply                  |                      | 100-240VAC~ 50/60Hz  |
| Allowable voltage range       |                      | 85 to 110% of rated voltage  |
| Power consumption             |                      | Max. 23VA  |
| Screen                        | Display method       | 5.6 inch TFT Color LCD   |
|                               | Resolution           | 640×480 pixels   |
|                               | Adjusting brightness | 3-level (Min/Standard/Max)   |
|                               | Input method         | Touch screen (pressure sensitive type)   |
| Number of input channels      |                      | 4 / 8 / 12 / 16 channels   |
| Universal input <sup>※1</sup> |                      | Temperature sensors (thermocouple, RTD), Analog (voltage, current (shunt))   |
| Sampling period               |                      | 1 to 4-CH: 25ms/125ms/250ms, 5 to 16-CH: 125ms/250ms<br>(internal sampling period is average movement filter and alarm output operation unit time) |
| Recording period              |                      | 1 to 3600 sec  |
| Internal memory               |                      | Approx. 200MB  |
| External memory <sup>※2</sup> |                      | SD / USB memory max. 32GB  |
| Dielectric strength           |                      | 2300VAC 50/60Hz for 1 min (between power terminals and case)<br>※Except Ethernet and USB device  |
| V bration                     | Mechanical           | 10 to 60Hz 4.9m/s <sup>2</sup> in each X, Y, Z direction for 1 hour  |
|                               | Malfunction          | 10 to 60Hz 1m/s <sup>2</sup> in each X, Y, Z direction for 10 min  |
| Insulation resistance         |                      | Over 20MΩ (at 500VDC megger)   |
| Noise immunity                |                      | ±2kV the square wave noise (pulse width 1μs) by the noise simulator  |
| Time accuracy                 |                      | Within ±2 min/year (available up to 2099)  |
| Protection structure          |                      | IP50 (front part)  |
| Environ-ment                  | Ambient temperature  | 0 to 50°C, storage: -20 to 60°C  |
|                               | Ambient humidity     | 35 to 85%RH, storage: 35 to 85%RH  |
| Approval                      |                      | CE   |
| Weight <sup>※3</sup>          |                      | Approx. 1290 to 1400g (approx. 590 to 700g)  |

※1. For more information of universal input, please refer to 「Input/Output」.

※2. This is included in the product. In case of using the USB flash drive that the user purchased, the device may not be supported.

※3. The weight includes packaging. The weight in parenthesis is for unit only.

※Environment resistance is rated at no freezing or condensation.

# KRN1000 Series

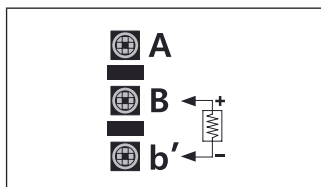
## Input/Output

| Type                               | Input/Output type                          |                  | Description  |
|------------------------------------|--|------------------|--|
| Universal input                    | Input type                                 | RTD              | JPt100Ω, DPt100Ω, DPt50Ω, Cu100Ω, Cu50Ω<br>(supplied current: approx. 190μA)   |
|                                    |  | Thermocouple     | B, C (W5), E, G, J, K, L, L (Russia), N, P, R, S, T, U   |
|                                    |  | Analog           | Voltage: ±60mV, ±200mV, ±2V, 1-5V, ±5V, -1V-10V<br>Current: 0-20mA, 4-20mA (measurable when using 250Ω shunt resistance) <sup>※1</sup> |
|                                    | Input impedance                            |                  | Voltage (V): approx. 205kΩ<br>RTD, Thermocouple, Voltage (mV): min. 200kΩ  |
|                                    | Display accuracy <sup>※2</sup>             | RTD              | Warm-up time: Max. 30 min  |
|                                    |  | Thermocouple     | At room temperature (25°C±5°C): ±0.1% F.S.±1-digit   |
|                                    |  | Analog           | Out of room temperature: ±0.2% F.S.±1-digit  |
|                                    | Resolution                                 |                  | 16-bit   |
| Option input/output <sup>※3</sup>  | Digital input                              | No-contact input | ON: residual voltage max. 1VDC, OFF: leakage current max. 0.1mA  |
|                                    |  | Contact input    | ON: max. 1kΩ, OFF: min. 100kΩ, Short-circuit: approx. 4mA  |
|                                    | Alarm relay output                         | Capacity         | 250VAC~ 3A, 30VDC= 3A, 1 Form A (resistive load)   |
|                                    |  | Life cycle       | Mechanical: min. 20,000,000 operations<br>Electrical: 100,000 operations (250VAC~ 3A, 30VDC= 3A)                                       |
|                                    | Power output for transmitter <sup>※4</sup> |                  | 24±2VDC=, max. 60mA ※Built-in over current protection circuit  |
| Communication output <sup>※5</sup> | RS422/485                                  |                  | Modbus RTU ※It is recommended to use shielded cable over AWG 24  |
|                                    | Ethernet                                   |                  | IEEE802.3 10 BASE-T / IEEE802.3U 100 BASE-TX (Modbus TCP)  |
|                                    | USB Device                                 |                  | USB V2.0 Full Speed (Modbus RTU)   |

※1. Current measurement and connection examples

Connect 250Ω shunt resistance and set analog input type 0-20mA (shunt) / 4-20mA (shunt).

It is available to measure 0-20mA / 4-20mA current.



※2. ○ At room temperature (23°C ± 5°C)

- RTD Cu50Ω (-200≤T≤200): (±0.1% F.S. or ±1.5°C, select the higher one) ±1 digit
- RTD DPt50Ω (-200≤T≤500): (±0.1% F.S. or ±1.5°C, select the higher one) ±1 digit
- Thermocouple R, S, C, G type (0≤T≤100): (±0.1% F.S. or ±4.0°C, select the higher one) ±1 digit
- Thermocouple U, T type (-100≤T≤400): (±0.1% F.S. or ±2.0°C, select the higher one) ±1 digit
- Thermocouple B type, below 400°C: there is no accuracy standards.
- All thermocouples, below -100°C: (±0.3% F.S. or ±4.0°C, select the higher one) ±1 digit

○ Out of room temperature range

- RTD Cu50Ω (-200≤T≤200): (±0.2% F.S. or ±3.0°C, select the higher one) ±1 digit
- RTD DPt50Ω (-200≤T≤500): (±0.2% F.S. or ±3.0°C, select the higher one) ±1 digit

※3. Input/Output is different by option. Please refer to 「Ordering information」.

※4. For supplying power for transmitter, it is recommended to use shield cable to reduce noise.

※5. RS422/485, Ethernet, USB device communication outputs are not used at the same time.

※If sensor input line is longer, it is recommended to use shield cable to reduce noise.

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## ■ Input Type and Range

| Input type   |                               |                    | Display           | Input range       |   |                 |
|--------------|-------------------------------|--------------------|-------------------|-------------------|---|-----------------|
|              |                               |                    |                   | °C                | °F  | K               |
| Thermocouple | K(CA)                         |                    | TC-K              | -200.0 to 1350.0  | -328.0 to 2462.0  | 73.2 to 1623.2  |
|              | J(IC)                         |                    | TC-J              | -200.0 to 800.0   | -328.0 to 1472.0  | 73.2 to 1073.2  |
|              | E(CR)                         |                    | TC-E              | -200.0 to 800.0   | -328.0 to 1472.0  | 73.2 to 1073.2  |
|              | T(CC)                         |                    | TC-T              | -200.0 to 400.0   | -328.0 to 752.0   | 73.2 to 673.2   |
|              | B(PR)                         |                    | TC-B              | 100.0 to 1800.0   | 212.0 to 3272.0   | 373.2 to 2073.2 |
|              | R(PR)                         |                    | TC-R              | 0.0 to 1750.0     | 32.0 to 3182.0  | 273.2 to 2023.2 |
|              | S(PR)                         |                    | TC-S              | 0.0 to 1750.0     | 32.0 to 3182.0  | 273.2 to 2023.2 |
|              | N(NN)                         |                    | TC-N              | -200.0 to 1300.0  | -328.0 to 2372.0  | 73.2 to 2023.2  |
|              | C(TT) <sup>※1</sup>           |                    | TC-C              | 0.0 to 2300.0     | 32.0 to 4172.0  | 273.2 to 2573.2 |
|              | G(TT) <sup>※2</sup>           |                    | TC-G              | 0.0 to 2300.0     | 32.0 to 4172.0  | 273.2 to 2573.2 |
|              | L(IC)                         |                    | TC-L              | -200.0 to 900.0   | -328.0 to 1652.0  | 73.2 to 1173.2  |
|              | L(Russian type) <sup>※3</sup> |                    | TC-L_R            | 0 to 600.0        | 32.0 to 1112.0  | 273.2 to 873.2  |
|              | U(CC)                         |                    | TC-U              | -200.0 to 400.0   | -328.0 to 752.0   | 73.2 to 673.2   |
|              | Platinel II                   |                    | TC-P              | 0.0 to 1350.0     | 32.0 to 2462.0  | 273.2 to 1623.2 |
| RTD          | Cu50Ω                         |                    | CU50              | -200.0 to 200.0   | -328.0 to 392.0   | 73.2 to 473.2   |
|              | Cu100Ω                        |                    | CU100             | -200.0 to 200.0   | -328.0 to 392.0   | 73.2 to 473.2   |
|              | JPt100Ω                       |                    | JPT100            | -200.0 to 600.0   | -328.0 to 1112.0  | 73.2 to 873.2   |
|              | DPt50Ω                        |                    | DPT50             | -200.0 to 600.0   | -328.0 to 1112.0  | 73.2 to 873.2   |
|              | DPt100Ω                       |                    | DPT100            | -200.0 to 850.0   | -328.0 to 1562.0  | 73.2 to 1123.2  |
| Analog       | Voltage                       | -60.00 - 60.00mV   | ±60mV             | Resolution : 10μV | -99999 to 99999<br>(display range depends on<br>the decimal point position) |                 |
|              |                               | -200.00 - 200.00mV | ±200mV            | Resolution : 10μV |   |                 |
|              |                               | -2.000 - 2.000V    | ±2V               | Resolution : 1mV  |   |                 |
|              |                               | 1.000 - 5.000V     | 1-5V              | Resolution : 1mV  |   |                 |
|              |                               | -5.000 - 5.000V    | ±5V               | Resolution : 1mV  |   |                 |
|              |                               | -1.00 - 10.00V     | -1V-10V           | Resolution : 10mV |   |                 |
|              | Current<br>(shunt)            | 0 - 20mA           | 0-20mA<br>(shunt) | —                 |   |                 |
|              |                               | 4 - 20mA           | 4-20mA<br>(shunt) | —                 |   |                 |

※1. C (TT): Same as existing W5 (TT) type sensor

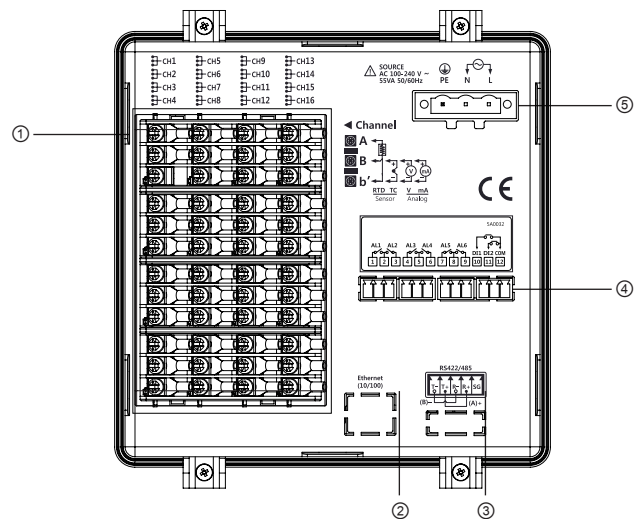
※2. G (TT): Same as existing W (TT) type sensor

※3. Russian type L type temperature sensor is divided from general purpose L type.

# KRN1000 Series

## ■ Connections

### ■ KRN1000 Rear part



- ① Sensor input terminal: Connects universal input.
- ② Ethernet port  
: Connector for Ethernet cable.  
It communicates Modbus TCP.
- ③ RS422/485 port  
: Connects RS422/485 for Modbus RTU comm.
- ④ Option input/output port  
: Connects for option input/output .
- ⑤ Power input  
: Power connection (100-240VAC 50/60Hz)

### ■ Input/Output Circuit

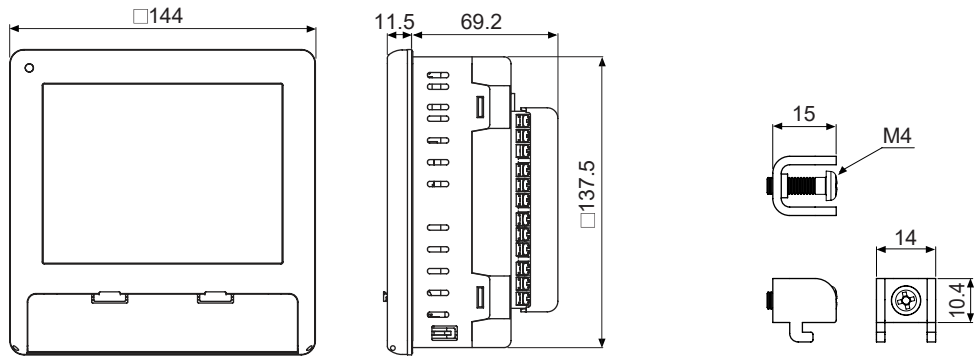
| Universal input※      | Communication output  |
|-----------------------|-----------------------|
|                       |                       |
| Option input/output 1 | Option input/output 2 |
|                       |                       |
| Option input/output 3 | Option input/output 4 |
|                       |                       |

※ In case of current input, connect 250Ω resistance at external part.

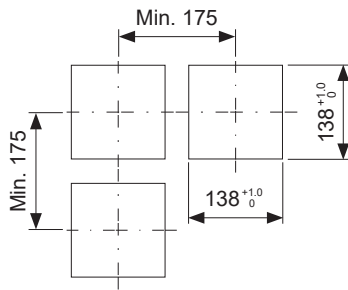
# LCD Touchscreen Paperless Recorder

## ■ Dimensions

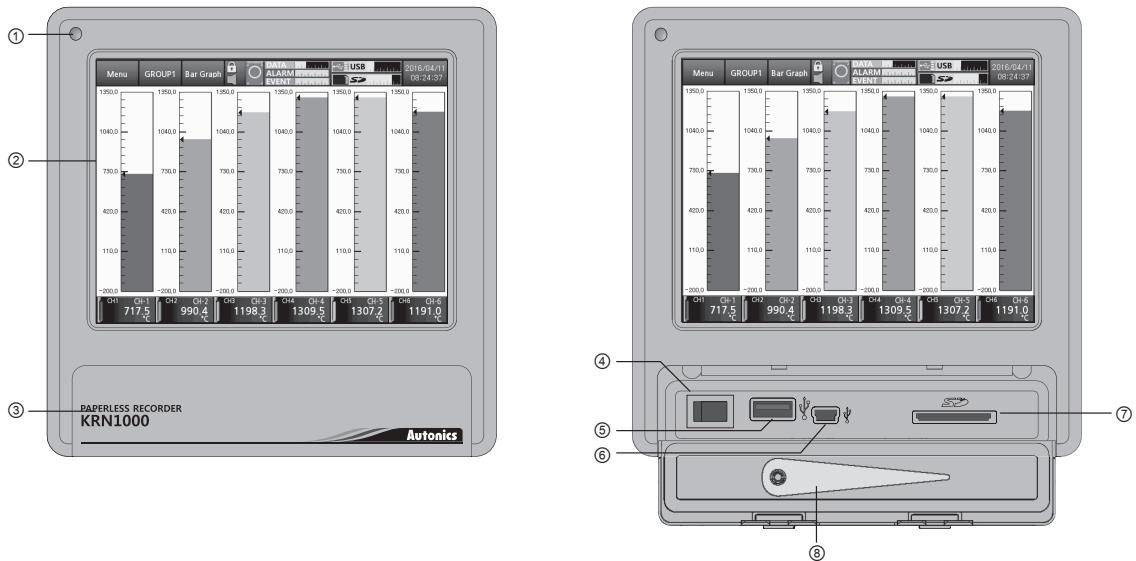
(unit: mm)



### • Panel cut-out



## ■ Unit Descriptions

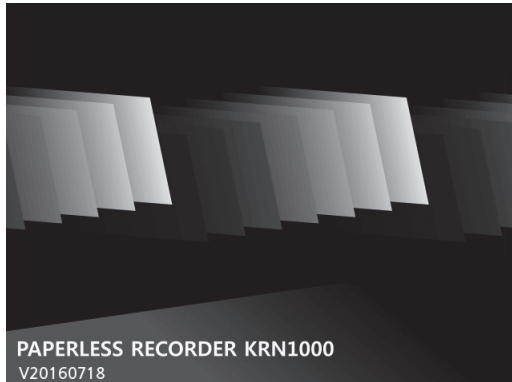


- ① Power indicator: Power turns ON and the red LED turns ON.
- ② Screen (touch panel): Measured value is displayed as trend graph, bar graph, digital figures.
- ③ Front cover: Open the front cover. There are power switch and, USB Host/Device, SD card slot.
- ④ Power switch: Turn ON/OFF the power of KR1000.
- ⑤ USB host port: Connect the USB memory.  
It recognizes up to 32GB. When using extension cable, cable length should be up to 1.5m.  
Connect only USB device.
- ⑥ USB device port: Used for connecting PC via Modbus RTU communication.
- ⑦ SD card slot: SD card memory slot. It supports up to 32GB.
- ⑧ Stylus pen: Used for touching screen.

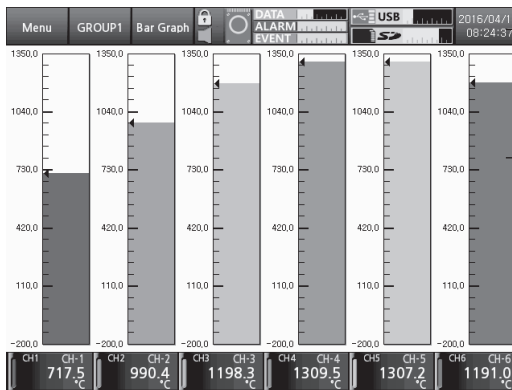
# KRN1000 Series

## Screen Description

### Booting screen



### Run screen



#### ① Status display part

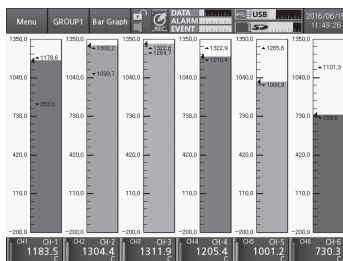
: Status display part appears at top screen.  
Touch each icon and it enters the menu.

#### ② Measurement value display part

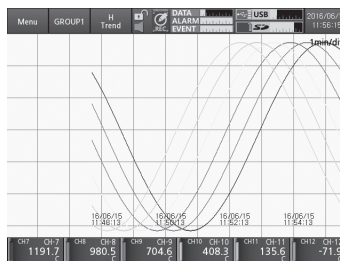
: Displays the measured value of each channel as graph.

Set one graph among 9 graphs: bar graph, (Vertical/Horizontal) Trend graph, (Vertical/Horizontal) Mixed graph, Divided (Vertical/Horizontal) Trend Graph, (Group/All) Digital.

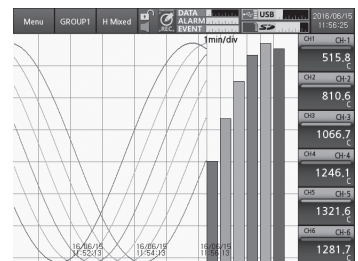
#### Bar graph



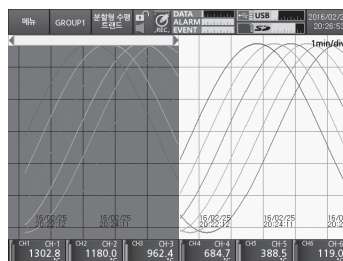
#### (Vertical/Horizontal) Trend graph



#### (Vertical/Horizontal) Mixed graph



#### Divided (Vertical/Horizontal) Trend Graph

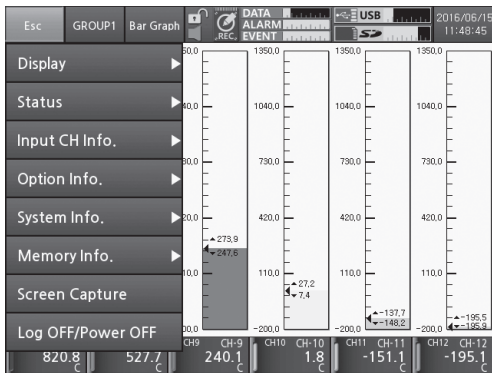


#### (Group/All) Digital



# LCD Touchscreen Paperless Recorder

## Menu



Touch the status display part at the upper screen and menu appears as right screen.

Menu is as below.

|                |                   |                   |                   |
|----------------|-------------------|-------------------|-------------------|
| Display        | History           | System Info.      | Date/Time         |
|                | File History      |                   | Reservation       |
|                | Group Setting     |                   | Device            |
|                | Touch Calibration |                   | File              |
| Status         | Alarm List        |                   | Log In            |
|                | Event List        |                   | System Info.      |
|                | AO/DI Status      | Memory Info.      | Memory Management |
| Input CH Info. | Input/Display     |                   | Internal Memory   |
|                | Input Option      | Screen Capture    |                   |
|                | Alarm             | Log OFF/Power OFF |                   |
|                | User Unit         |                   |                   |
| Option Info.   | Alarm Output      |                   |                   |
|                | Digital Input     |                   |                   |
|                | RS422/485         |                   |                   |
|                | Ethernet/USB      |                   |                   |

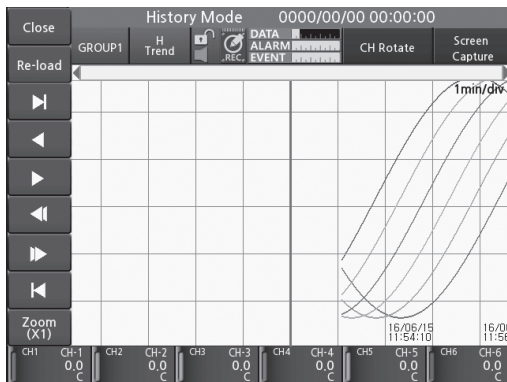


## ■ Functions

### ■ History

It checks data history which is recording at [Menu]-[Display]-[History]. When recording is stop, it displays warning message.

- Checks data history by each group, channel.
- Data history displays as horizontal/vertical trend, divided horizontal/vertical trend.
- Saves the screen as \*.bmp file.

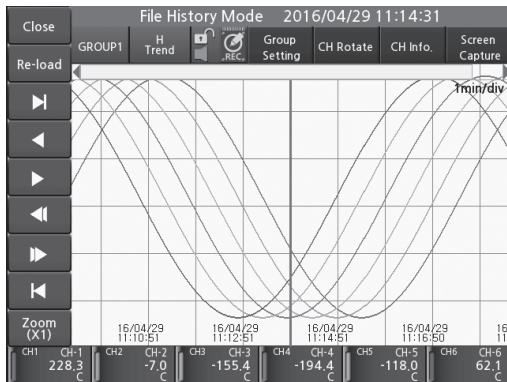


### ■ File History

It checks the saved data history at internal/external memory.

Touch [Menu]-[Display]-[File History].

- Set the information of display group or channel.
- Data history displays as horizontal/vertical trend, divided horizontal/vertical trend.



### ■ Special Function

It displays the applied measuring value of the set special function. Depending on Input type, applied special function is different.

- Setting range :
    - When input type is temperature sensor (thermocouple, RTD): None ↔ Difference
    - When input type is analog (voltage, current (shunt)): Linear ↔ Root ↔ Square ↔ Two Unit
- Two Unit is displayed when input type is set as 4-20mA (shunt).

### ○ Difference (deviation)

It is available to set when input type is temperature sensor (thermocouple, RTD). It displays the deviation of reference channel measuring value.

(Display value = standard channel measuring value - reference channel measuring value)

- The set channel as analog (voltage, current (shunt)) of Input type is not able to set as reference channel.
- If there is no set reference channel, it displays standard channel measuring value.
- If any one of reference channel, or standard channel is break (BURN), high-limit value (HHHH), low-limit value (LLLL) status, it displays as correspond value. If you select the channel which is used Difference function as reference channel, it displays the value based on calculating actual measuring value, not display value of reference channel.

### ○ Linear

It applies low-limit scale and high-limit scale to low-limit input value and high-limit input value and displays this values.

E.g.) In case low-limit input value: -5V, high-limit input value: +5V and in case low-limit scale: -1000, high-limit scale: 1000, if input value is 2V, display value is 400.

### ○ Root

In case voltage, current (shunt) input type, this mode is used when input value is calculated by Root ( $\sqrt{\quad}$ ) for the desired display value. Differential pressure signal of differential pressure flow meter is calculated Root ( $\sqrt{\quad}$ ) for the to-be measured flux. This function is used to measure flux by input value.

E.g.) In case low-limit input value: -5V, high-limit input value: +5V and in case low-limit scale: -1000, high-limit scale: 1000, if input value is 2V, display value is approx. 673.32.

### ○ Square

In case of voltage, current (shunt) input type, this mode is used when input value is calculated by square for the desired display value. Reverse of Root, flux signal is calculated by square for differential pressure signal.

E.g.) In case low-limit range: -5V, high-limit range: +5V and in case low-limit scale: -1000, high-limit scale: 1000, if input value is 2V, display value is -20.

### ○ Two Unit

For compound pressure, if input pressure is lower than atmospheric pressure (0), it displays the degree of a vacuum with mmHg unit. If input pressure is higher than or same as atmospheric pressure (0), it displays positive pressure with  $\text{kg/cm}^2$  unit.

When using Two Unit function, low-limit value is fixed as -760mmHg and  $\text{kg/cm}^2$  value is able to set within Setting range 1 to 35.

Two Unit limits scale point as  $0 \leftrightarrow 0.0 \leftrightarrow 0.00$ . When using Two Unit, display unit is automatically changed as mmHg or  $\text{kg/cm}^2$ .

This function has two different unit values and it is impossible to calculate by recording method and digital filter and ignore it.

E.g.) If pressure range is -760mmHg to  $3\text{kg/cm}^2$ , and pressure transmitter outputs 4-20mA, for 4mA input it displays -760mmHg, 8mA input is unit changing point. For 20mA input, it displays  $3\text{kg/cm}^2$ .

# LCD Touchscreen Paperless Recorder

## ■ Functions

### ■ Reservation

It sets reservation recording time to start and finish recording.  
Touch [Menu]-[System Info.]-[Reservation].  
Set reservation recording type; repeat, single.

#### ○ Repeat

Records from the start time to end time at every day during start date to end date. If start time is later of end time, it records and saves until end of next day.

#### ○ Single

Records from the start date and time to end date and time.

### ■ Digital Input

It sets digital input operation mode and status to operate for DI-1/2 input.  
Touch [Menu]-[Option Info.]-[Digital Input].  
The operation mode and status are as below.

#### ○ DI-□ Type

Set the operation type for digital input.  
(None, Rec/Stop, Alarm Reset, Alarm ON, Capture)

#### ○ DI-□ Status

Set digital input operation status.

(only when DI type is set as 'Record/Stop')

- Edge: When supplying digital input over 0.3 sec, the recording starts. When resupplying it, the recording stops.
- Level: When shorting digital input over 0.3 sec, the recording starts. When opening it, the recording stops.

#### ○ Alarm Reset/ON

- Alarm Reset  
When DI type is set as 'Alarm Reset', select the desired relay to reset the alarm.
- Alarm ON  
When DI type is set as 'Alarm ON', select the desired relay to turn ON the alarm.

### ■ Summer Time

Set the summer time duration.

Set enable to summer time and designate start date and end date of summer time at [Menu]-[System Info.]-[Date/Time].

### ■ Screen Capture

It saves current screen as \*.bmp file. Set file storage location and file name.

Storage setting range: Internal, SD/USB memory

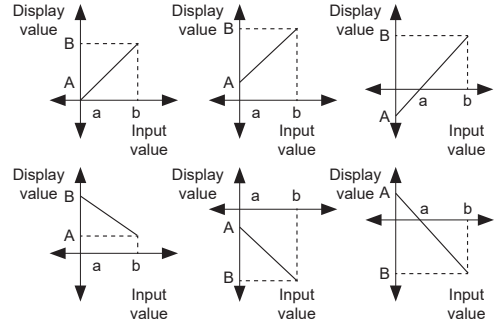
Internal memory saves the set number of screen captures at [Menu]-[Memory Info.]-[Internal Memory].

### ■ High/Low-Limit Graph Scale Value

In case of temperature sensor input (thermocouple, RTD), set the graph scale value to set the desired record range. Therefore, it helps to record as curve at the desired range.

## ■ Display Scale

For analog input, this function is to set (-9999.9 to 9999.9) 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.



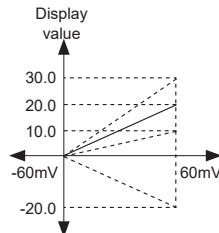
Display scale function is able to change display value for max./min. measured input by setting high-limit scale and low-limit scale.

Set high/low-limit scale at [Menu]-[Input CH Info.]-[Input/Display].

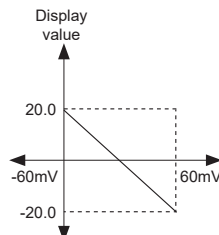
E.g.) Setting high/low-limit scale value

(In case of input type, -60 to +60mV)

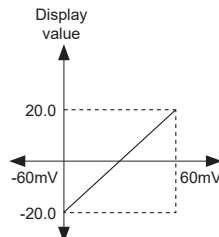
- Low Scale (low-limit scale value) = 0.0
- Hi Scale (high-limit scale value) = 10.0, 20.0, 30.0, -20.0



- Low Scale (low-limit scale value) = 20.0
- Hi Scale (high-limit scale value) = -20.0



- Low Scale (low-limit scale value) = -20.0
- Hi Scale (high-limit scale value) = 20.0



※ When changing input type, high/low-limit scale is changed as factory default display range of the set input type.

# KRN1000 Series

## ■ Functions

### ■ Internal Memory Info.

It sets number of events, alarms, screen captures, and storage options at internal memory.

It sets also internal memory storage options. When internal memory uses all, it operates overwrite (deletes oldest data) or stop (stops saving).

### ■ Firmware update

Update firmware.

Download the firmware at our web site. Save the downloaded firmware at the top-level folder on USB/SD memory and touch [Menu]-[System Info.]-[System Info.].

When completes firmware update, re-boot the unit.

Do not turn OFF the power during firmware update.

### ■ Ethernet Communication setting

It sets about Ethernet communications.

Set IP address, subnet mask, default gateway, communication write, Ethernet port, USB communication write, USB device usage.

### ■ RS422/485 Communication setting

Setting items are only available to check by communication.

RS422/485 communication makes set or monitor parameters at external upper system (PC or graphic panel, etc.) and uses transfer data. It is recommended to use our dedicated software program DAQMaster for monitoring.

If you want to develop monitoring program not using our DAQMaster program or to use the related Modbus program, please refer to user manual for communication.

## ○ Interface

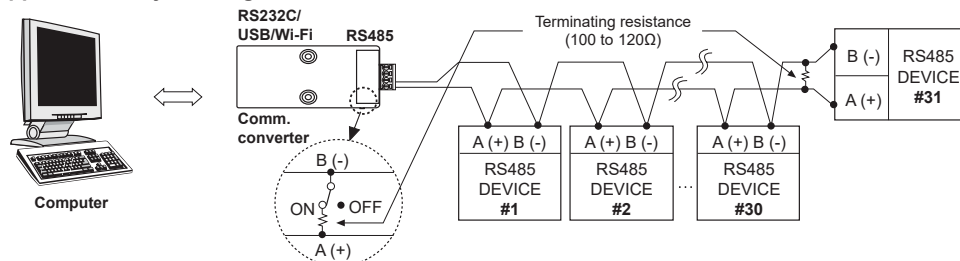
| Item                        | RS485                              | Ethernet  | USB                      |
|-----------------------------|------------------------------------|---|--------------------------|
| Application standard        | Compliance with EIA RS485          | —   | Compliance with USB V2.0 |
| Max. connections            | 31 units<br>(address: 1 to 127)    | 1 unit<br>(number of occupations per a unit)          | 1 unit                   |
| Com. distance※1             | Within max. 1km<br>(below 9600bps) | Single cable within 100m<br>(recommended over CAT5E ) | Single cable within 1.5m |
| Com. method                 | Full duplex / Half duplex          | Full duplex   | —                        |
| Com. synchronization method | Asynchronous                       | Asynchronous  | Asynchronous             |
| Com. speed                  | 2400/4800/9600/19200/38400bps      | 10/100Mbps  | 12Mbps (full Speed)      |
| Com. response wait time     | 5 to 99ms                          | —   | —                        |
| Start Bit                   | 1-bit (fixed)                      | —   | —                        |
| Data Bit                    | 8-bit (fixed)                      | —   | —                        |
| Parity Bit                  | None, Odd, Even                    | —   | —                        |
| Stop Bit                    | 1, 2-bit                           | —   | —                        |
| Protocol                    | Modbus RTU                         | Modbus TCP  | Modbus RTU               |

※1. In case of Ethernet connection, and connecting through the network such as network hub (HUB) and gateway, etc, there is no distance limit, but it is recommended to use min. network. Please use communication cables which is satisfied the below conditions.

- RS422/485 communication: Shield Twist Pair over AWG24, characteristic impedance 100Ω, capacity component 50 pF/m cable length max. 1km
- Ethernet communication: Over CAT5E, cable max. length: 100m
- USB communication: Single cable built-in ferrite core within 1.5m

※USB device is recognized as USB to Serial device and communication speed: 115200bps, start bit: 1-bit, data bit: 8-bit, parity bit: none, stop bit: 1-bit are fixed.

## ○ Application of system organization



※It is recommended to use Autonics communication converter; SCM-WF48 (Wi-Fi to RS485·USB wireless communication converter, sold separately), SCM-US481 (USB to RS485 converter, sold separately), SCM-381 (RS232C to RS485 converter, sold separately). Please use twisted pair wire, which is suitable for RS485 communication, for SCM-WF48 and SCM-US481.

# LCD Touchscreen Paperless Recorder

## ■ Functions

### ■ Error

Displays error messages on screen and print data when error occurs.

| Message | Description   |
|---------|---|
| HHHH    | When input type is temperature sensor (Thermocouple, RTD) and the measurement value is higher than high-limit value of input range, it flashes HHHH. It is cleared when the measurement value is within the high-limit range.<br>When input type is analog (voltage, current (shunt)) and the measurement value is over 10% of high-limit input range, it flashes HHHH. It is cleared when the measurement value is within 10% of high-limit input range. |
| LLLL    | When input type is temperature sensor (Thermocouple, RTD) and the measurement value is lower than low-limit value of input range, it flashes LLLL. It is cleared when the measurement value is within the low-limit range.<br>When input type is analog (voltage, current (shunt)) and the measurement value is over 10% of low-limit input range, it flashes LLLL. It is cleared when the measurement value is within 10% of low-limit input range.      |
| BURN    | When input type is temperature sensor (Thermocouple, RTD) and input is break, it flashes BURN. It is cleared when input is connected.   |
| ASKey   | When forgetting and entering invalid password 3 times, "ASKey" appears with error message. Contact our service center with ASKey.   |

## ■ Factory Default

### ■ Display

#### ◎ File History

| Menu               | Default         |
|--------------------|-----------------|
| History Mode Graph | H Trend         |
| Memory             | Internal Memory |
| File Name          | —               |

#### ◎ Group Setting

| Parameter        | Default    | Parameter        | Default  |
|------------------|------------|------------------|----------|
| CH Rotation Time | 5s         | Display CH Color | Auto set |
| Name             | GROUP1     | Line Thickness   | 2Pt      |
| No. of CHs       | Auto set   | Min. Value       | -200.0   |
| Background       | 21 (White) | Max. Value       | 1350.0   |
| Display CH       | Auto set   |                  |          |

### ■ Input CH Info.

#### ◎ Input/Display

| Parameter              | Default  | Parameter        | Default  |
|------------------------|----------|------------------|----------|
| Copy                   | None     | High-Limit Input | Auto set |
| Tag Name               | CH-1     | Point            | 0.0      |
| Input Type             | TC-K     | Low-Limit Scale  | —        |
| Low-Limit Graph Scale  | -200.0   | Low-Limit Scale  | —        |
| High-Limit Graph Scale | 1350.0   | Display Unit     | °C       |
| Low-Limit Input        | Auto set |                  |          |

#### ◎ Input Option

| Parameter     | Default | Parameter              | Default |
|---------------|---------|------------------------|---------|
| Special Func. | None    | Record Method          | Instant |
| Ref. CH       | —       | Digital Filter         | None    |
| Two Unit      | —       | No. of Digital Filters | 1       |
| Input Bias    | 0.0     | Burn-out Mark          | None    |
| Span          | 1.000   |                        |         |

#### ◎ Alarm

| Parameter     | Default | Parameter  | Default |
|---------------|---------|------------|---------|
| Type          | PV.Hi   | ON Delay   | 0s      |
| Ref. CH       | —       | OFF Delay  | 0s      |
| Option        | Normal  | Alarm No.  | None    |
| Setting Value | 1350.0  | Save Event | ON      |
| Hys           | 0.0     |            |         |

# KRN1000 Series

## ■ Factory Default

### ■ Option Info.

#### ○ Alarm Output

| Parameter       | Default | Parameter           | Default   |
|-----------------|---------|---------------------|---|
| Alarm Mark      | ON      | Alarm Color         | (Alarm 1) Red<br>(Alarm 2) Orange<br>(Alarm 3) Light green<br>(Alarm 4) Green |
| Alarm Mark Type | Flash   | Relay output method | (Relay-1 to 6) N.O.<br>(Relay-7 to 8) —                                       |

#### ○ Digital Input

| Parameter   | Default | Parameter   | Default          |
|-------------|---------|-------------|------------------|
| DI-1 Type   | None    | DI-2 Status | —                |
| DI-2 Type   | None    | Alarm Reset | (Relay-1 to 8) — |
| DI-1 Status | —       | Alarm ON    | (Relay-1 to 8) — |

#### ○ RS422/485

| Parameter     | Default | Parameter          | Default |
|---------------|---------|--------------------|---------|
| Comm. Address | 1       | Response Wait Time | 20ms    |
| Baud Rate     | 9600    | Protocol           | RTU     |
| Parity Bit    | None    | Comm. Write        | Enable  |
| Stop Bit      | 2 bit   | RS422/485 Port     | Disable |

#### ○ Ethernet/USB

| Parameter       | Default       | Parameter       | Default |
|-----------------|---------------|-----------------|---------|
| IP Address      | 10.0.2.15     | Ethernet Port   | Disable |
| Subnet Mask     | 255.255.255.0 | USB Comm. Write | Enable  |
| Default Gateway | 10.0.2.2      | USB Device      | Enable  |
| Comm. Write     | Enable        |                 |         |

### ■ System Info.

#### ○ Date/Time

| Parameter    | Default    | Parameter            | Default                    |
|--------------|------------|----------------------|----------------------------|
| Date Setting | Auto set   | Summer Time          | Disable                    |
| Time Setting |            | Summer Time Duration | 1month 1day to 1month 1day |
| Date Type    | yyyy/mm/dd | Time                 | 1 hour                     |

#### ○ Reservation

| Parameter                  | Default | Parameter        | Default |
|----------------------------|---------|------------------|---------|
| Reservation Recording Date | —       | Reservation Type | Disable |
| Reservation Recording Time |         |                  |         |

#### ○ Device

| Parameter        | Default          | Parameter   | Default  |
|------------------|------------------|-------------|----------|
| Device Name      | KRN1000 Recorder | Backlight   | Standard |
| Language         | English          | Screen Save | Disable  |
| PWR ON Record    | Hold             | Alarm Sound | OFF      |
| Sampling         | 125ms            | Touch Sound | Standard |
| Log Record Speed | 1s               | Graph Speed | 1s       |

#### ○ File

| Parameter              | Default | Parameter                | Default |
|------------------------|---------|--------------------------|---------|
| Parameter Setting File | None    | Screen Simulation (Demo) | Start   |

#### ○ Log In

| Parameter                | Default | Parameter      | Default |
|--------------------------|---------|----------------|---------|
| Log In Function          | Disable | Input CH Info. | Unlock  |
| Activate Administer Mode | 0000    | Option Info.   | Unlock  |
| Change Password          | —       | System Info.   | Unlock  |
| Display                  | Unlock  | Memory Info.   | Unlock  |
| Status                   | Unlock  |                |         |

### ■ Memory Info.

#### ○ Memory Management

| Parameter | Default | Parameter | Default  |
|-----------|---------|-----------|----------|
| Clear     | —       | Storage   | Internal |

#### ○ Internal Memory

| Parameter     | Default | Parameter                       | Default   |
|---------------|---------|---------------------------------|-----------|
| No. of Events | 100     | No. of Screen Captures          | 10        |
| No. of Alarms | 100     | Internal Memory Storage Options | Overwrite |

※Shaded parameters are depending on other parameters' SV. Refer to the more information of the parameter.

## ■ Proper Usage

- Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
- Install a surge absorber at each end of inductive load coil when controlling high-capacity power relay or inductive load (e.g. magnet).
- 24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
- Check the polarity of the terminals before wiring the temperature sensor.  
For RTD temperature sensor, wire it as 3-wire type, using cables in same thickness and length.  
For thermocouple (CT) temperature sensor, use the designated compensation wire for extending wire.
- Keep away from high voltage lines or power lines to prevent inductive noise.  
In case installing power line and input signal line closely, use line filter or varistor at power line and shielded wire at input signal line.  
Do not use near the equipment which generates strong magnetic force or high frequency noise.
- Install the unit straightly at the well-ventilated environment with 30mm of separation distance from the wall.
- This unit may be used in the following environments.  
①Indoors (in the environment condition rated in 'Specifications')    ②Altitude max. 2,000m  
③Pollution degree 2    ④Installation category II