LCD Touchscreen Paperless Recorder

KRN1000 Series

PRODUCT MANUAL

For your safety, read and follow the considerations written in the instruction manual, other manuals and Autonics website.
The specifications, dimensions, etc. are subject to change without notice for product improvement. Some models may be discontinued without notice.

Features

- 5.6-inch color TFT LCD (640 × 480) touchscreen display with excellent readability and intuitive control interface
- Supports maximum 16 input channel and 27 input types
- Various communication methods (default option: RS422 / 485, Ethernet, USB)
- 25 to 250 ms high-speed sampling, 1 to 3600 sec recording cycle
- 200 MB internal memory and external SD / USB memory (up to 32 GB) support
- Store and backup internal data to external SD / USB memory
- 9 different graph types available
- 4 types of option input / output available:
  digital input (non-contact / contact), alarm output, power output for transmitter
- Compact, space-saving design (depth: 69.2 mm)

Safety Considerations

- Observe all 'Safety Considerations' for safe and proper operation to avoid hazards.
- ⚠ symbol indicates caution due to special circumstances in which hazards may occur.

⚠ Warning Failure to follow instructions may result in serious injury or death.

01. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime / disaster prevention devices, etc.)**
    Failure to follow this instruction may result in personal injury, economic loss or fire.
02. **Do not connect, repair, or inspect the unit while connected to a power source.**
    Failure to follow this instruction may result in fire or electric shock.
03. **Check 'Connections' before wiring.**
    Failure to follow this instruction may result in fire.
04. **Do not touch the unit during or after operation for a while.**
    Failure to follow this instruction may result in burn or electric shock due to high temperature of the surface.
05. **Do not use the unit in the place where flammable / explosive / corrosive gas, high humidity, direct sunlight, radiant heat, vibration, impact or salinity may be present.**
    Failure to follow this instruction may result in explosion or fire.
06. **Install on the device panel, and ground to the F.G. terminal separately. When connecting the F.G. terminal, use AWG16 (1.25 mm²) or over.**
    Failure to follow this instruction may result in fire or electric shock.
07. **Do not disassemble or modify the unit.**
    Failure to follow this instruction may result in fire.
08. **Since Lithium battery is embedded in the product, do not disassemble or burn the unit.**
    Failure to follow this instruction may result in fire.

⚠ Caution Failure to follow instructions may result in injury or product damage.

01. **Use the unit within the rated specifications.**
    Failure to follow this instruction may result in fire or product damage.
02. **Use a dry cloth to clean the unit, and do not use water or organic solvent.**
    Failure to follow this instruction may result in fire or electric shock.
03. **Keep the product away from metal chip, dust, and wire residue which flow into the unit.**
    Failure to follow this instruction may result in fire or product damage.
04. **When connecting the power input or measurement input, use AWG20 (0.50 mm²) cable or over, and tighten the terminal screw with a tightening torque of 0.74 N·m to 0.90 N·m.**
    Failure to follow this instruction may result in fire or malfunction due to contact failure.
05. **Do not use the load beyond rated switching capacity contact.**
    Failure to follow this instruction may result in fire, relay broken, contact melt, insulation failure or contact failure.
06. **Use the transmitter output terminal only for the power for the transmitter.**
    Failure to follow this instruction may result in product damage.
07. **Do not put any heavy object on the front screen.**
    Failure to follow this instruction may result in malfunction due to deformation of LCD and touch panel.

Cautions during Use

- 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).
- 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 30 mm of separation distance from the wall.
- This unit may be used in the following environments.
  - Indoors (in the environment condition rated in 'Specifications')
  - Altitude max. 2,000 m
  - Pollution degree 2
  - Installation category II

Ordering Information

This is only for reference, the actual product does not support all combinations.
For selecting the specified model, follow the Autonics website.

KRN1000 - ❶ ❷ ❸ - ❹ ❺

❶ Number of input CH
04: 4 CH
08: 8 CH
12: 12 CH
16: 16 CH

❷ Option input / output
0: None
1: Alarm relay output 8 CH
2: Alarm relay output 6 CH + digital input 2 CH
3: Alarm relay output 6 CH + 24 VDC⎓ power for transmitter
4: Alarm relay output 4 CH + digital input 2 CH
+ 24 VDC⎓ power for transmitter

❸ Communication output
1: RS422/485 / Ethernet / USB

❹ Power supply
0: 100 - 240 VAC~

❺ Case shape
S: Standard panel installation type

Manual

For proper use of the product, refer to the manuals and be sure to follow the safety considerations in the manuals.
Download the manuals from the Autonics website.

Software

Download the installation file and the manuals from the Autonics website.

■ DAQMaster

It is the comprehensive device management program for Autonics' products, providing parameter setting, monitoring and data management.

Product Components

- Product (+terminal cover)
- USB memory
- Instruction manual
- Bracket × 4
- Resistance (250 Ω) (N = input CHs)
- Basic model connector × 2
- Option model connector × 6

Specifications

Series	KRN1000
Screen size	5.6 inch
LCD type	TFT Color LCD
Resolution	640 × 480 pixel
Brightness adjustment	3-level (Min. / Standard / Max.)
Touch	Resistive type
No of input channel	4 / 8 / 12 / 16 CH model
Universal input	Please refer to 'Input / Output' for detailed information about universal input.
Sampling cycle 01)	1 to 4 CH: 25 ms / 125 ms / 250 ms, 5 to 16 CH: 125 ms / 250 ms
Recording cycle	1 to 3,600 sec
Internal memory	≈ 200 MB
External memory 02)	SD / USB memory maximum 32 GB

01) Internal sampling cycle is average movement filter and alarm output operation unit time.
02) USB memory is included in the box. If you use USB memory you purchased separately, it could not be recognized.

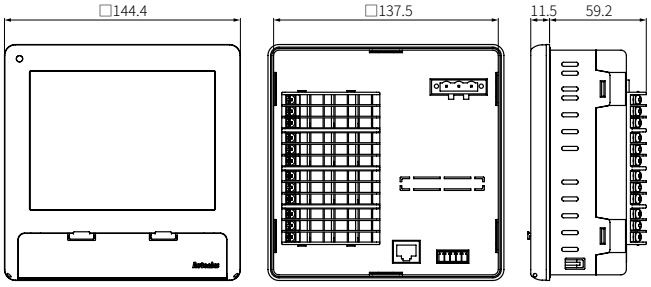
Power supply	100-240 VAC~ 50 / 60 Hz
Permissible voltage range	85 to 110 % of rated power supply
Power consumption	≤ 23 VA
Dielectric strength	Between the charging part and the case: 2,300 VAC~ 50 / 60 Hz for 1 minute (except Ethernet and USB device)
Vibration	10 to 60 Hz 4.9 m/s² X, Y, Z in each X, Y, Z direction for 1 hour
Vibration (malfunction)	10 to 60 Hz 1 m/s² X, Y, Z in each X, Y, Z direction for 10 minutes
Insulation resistance	≥ 20 MΩ (500 VDC⎓ megger)
Noise immunity	Square shaped noise by noise simulator (pulse width 1 μs) ± 2 kV
Time accuracy	Within ± 2 min / year (available up tp 2099 year)
Protection structure	IP50 (front part, IEC standard)
Ambient temperature	0 to 50 °C, storage: -20 to 60 °C (no freezing or condensation)
Ambient humidity	35 to 85 %RH, storage: 35 to 85 %RH (no freezing or condensation)
Certification	CE EAC KC EAC RCM
Unit weight (packaged)	≈ 590 to 700 g (≈ 1,290 to 1,400 g)

Error

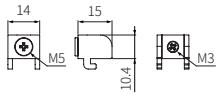
Display	Description	Troubleshooting
HHHH	In case when the input method is temperature sensor (thermocouple, RTD), flashes when the input value is exceeded the upper limit value.	Automatically cleared when the input value returns below the upper limit
	In case when the input method is analog (voltage, current(shunt)), flashes when the input value is exceeded the +10 % of upper limit value.	Automatically cleared when the input value returns below the +10 % of upper limit
LLLL	In case when the input method is temperature sensor (thermocouple, RTD), flashes when the input value is lower than the lower limit value.	Automatically cleared when the input value returns over the lower limit
	In case when the input method is analog (voltage, current(shunt)), flashes when the input value is lower than the -10 % of lower limit value.	Automatically cleared when the input value returns over the -10 % of lower limit
BURN	In case when the input method is temperature sensor (thermocouple, RTD), flashes when the input is disconnected.	Automatically cleared when input is connected
ASKey	Appears when the log-in password is invalid over 3 times.	Please contact customer service center with the "ASKey" code in the error message

Dimensions

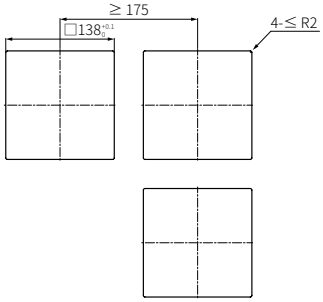
• Unit: mm, For the detailed drawings, follow the Autonics website.



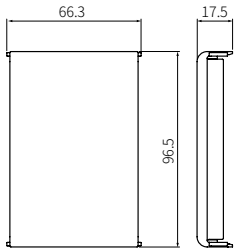
■ Bracket



■ Panel cut-out



■ Terminal cover



Input / Output

■ Universal input

• Input specifications

RTD		JPt100Ω, DPt100Ω, DPt50Ω, Cu100Ω, Cu50Ω (supplied current ≈ 190 μA)
Thermocouple		B, C (W5), E, G, J, K, L, L (Russia), N, P, R, S, T, U
Analog	Voltage	± 60 mV, ± 200 mV, ± 2 V, 1-5 V, ± 5 V, -1V-10 V
	Current	0-20 mA, 4-20 mA (measurable when using 250 Ω shunt resistance) Current measurement and connection examples) Connect 250 Ω shunt resistance, and set to analog input 0-20 mA (shunt) / 4-20 mA (shunt), to measure current of 0-20 mA / 4-20 mA.

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

• Input impedance

RTD, thermocouple, voltage (mV)	≥ 200 kΩ
Voltage (V)	≈ 205 kΩ

• Display accuracy

Input method	Temperature	Display accuracy
RTD	Room temperature range (25 °C ± 5 °C)	± 0.1 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes) • Cu50Ω, Cu100Ω, DPt50Ω (full scale) / JPt100Ω, DPt100Ω (T ≤ -100, T ≥ 400): (higher one between ± 0.1 % F.S. and ± 1.5 °C) ± 1 digit
	Out of room temperature range	± 0.2 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes) • Cu50Ω, Cu100Ω, DPt50Ω (full scale) / JPt100Ω, DPt100Ω (T ≤ -100, T ≥ 400): (higher one between ± 0.2 % F.S. and ± 3.0 °C) ± 1 digit
Thermocouple	Room temperature range (25 °C ± 5 °C)	± 0.1 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes) • R, S, C, G (T ≤ 200): (higher one between ± 0.1 % F.S. and ± 4.0 °C) ± 1 digit • U, T (-100 ≤ T ≤ 400): (higher one between ± 0.1 % F.S. and ± 2.0 °C) ± 1 digit • Below 400 °C of B: there is no accuracy standards. • Below -100 °C of all thermocouples: (higher one between ± 0.3 % F.S. and ± 4.0 °C) ± 1 digit
	Out of room temperature range	± 0.2 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes) • R, S, B, C, G (T ≤ 200): (higher one between ± 0.2 % F.S. and ± 6.0 °C) ± 1 digit • U, T (-100 ≤ T ≤ 400): (higher one between ± 0.2 % F.S. and ± 4.0 °C) ± 1 digit • Below -100 °C of all thermocouples: (higher one between ± 0.5 % F.S. and ± 6.0 °C) ± 1 digit
Analog	Room temperature range (25 °C ± 5 °C)	± 0.1 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes)
	Out of room temperature range	± 0.2 % F.S. ± 1 digit (warm-up time: ≥ 30 minutes)

• Resolution: 16 bit

■ Option input / Output

Option input / output is different by model.

• Digital input

Non-contact input	ON: residual voltage ≤ 1 VDC⎓, OFF: leakage current ≤ 0.1 mA
Contact input	ON: ≤ 1 kΩ , OFF: ≥ 100 kΩ, short-circuit: ≈ 4 mA

• Alarm relay output

Capacity	250 VAC~ 3 A, 30 VDC⎓ 3 A, 1 Form A (resistive load)
Mechanical life cycle	≥ 20,000,000 operations
Electrical life cycle	≥ 100,000 operations (250 VAC~ 3 A, 30 VDC⎓ 3 A)

• Power output for transmitter: 24± 2 VDC⎓, ≤ 60 mA (built-in over current protection circuit)
For supplying power for transmitter, it is recommended to use shield cable to reduce noise.

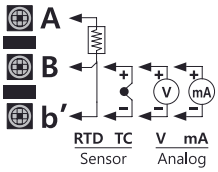
■ **Communication output**

RS422 / 485	Modbus RTU (It is recommended to use shielded cable over AWG 24.)
EEPROM life cycle	≈ 1,000,000 operations (Erase / Write)
Ethernet	IEEE802.3 10 BASE-T / IEEE802.3U 100 BASE-TX (Modbus TCP)
USB Device	USB V2.0 Full Speed (Modbus RTU)

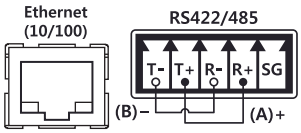
RS422 / 485, Ethernet, and USB device communication outputs cannot be used at the same time.

Input / Output Circuit

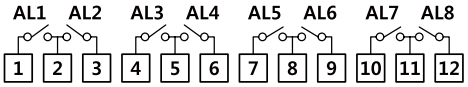
■ **Universal input**



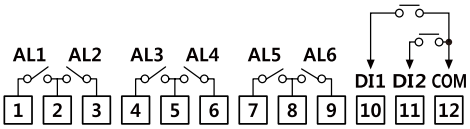
■ **Communication output**



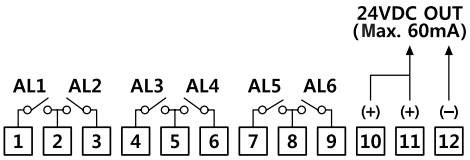
■ **Option input / output 1 (alarm output 8 CH)**



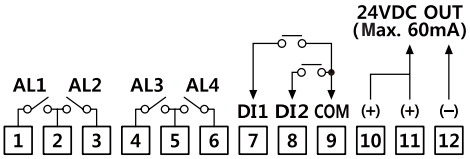
■ **Option input / output 2 (alarm output 6 CH + digital input 2 CH)**



■ **Option input / output 3**
(alarm output 6 CH + power output for transmitter)

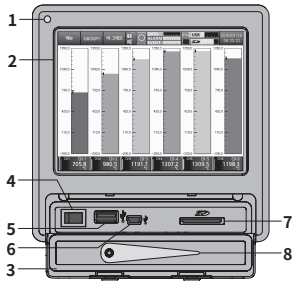


■ **Option input / output 4**
(alarm output 4 CH + digital input 2 CH + power output for transmitter)



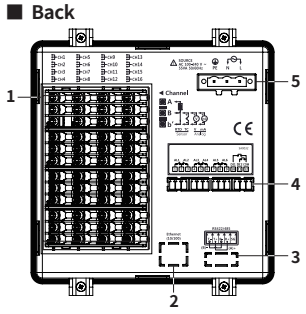
Unit Descriptions

■ **Front**



1. Power indicator
Red LED turns ON when the power is supplied.
2. Screen
Measured value is displayed as trend graph, bar graph, or digital figures.
3. Front cover
In the cover, there are power switch and, USB Host / Device, and SD card slot.
4. Power switch
It tuns on / off the power.
5. USB Host port
It is for connecting USB memory. It recognizes up to 32 GB. When using extension cable, cable length should be shorter than 1.5m. Do not connect any USB device except USB memory.
6. USB Device port
It is for setting parameter.
7. SD card slot
It is SD card memory slot. It recognizes up to 32 GB.
8. Stylus pen
It is used for touching the screen.

■ **Back**



1. Sensor input terminal
It is for connecting universal input.
2. Ethernet port
It is for connecting Ethernet cable. It communicates Modbus TCP.
3. RS422 / 485 port
It is for connecting RS422 / 485 for Modbus RTU communication.
4. Option input / output port
It is for connecting option input / output (digital input (non-contact / contact) and alarm output, power for transmitter)
5. Power input terminal
It is for connecting the power.

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