

Autonics

LCD Touchscreen Paperless Recorder

KRN1000 SERIES

INSTRUCTION MANUAL

Thank you for choosing our Autonics product.
Please read the following safety considerations before use.

- ⚠ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ Warning

⚠ Caution

1. 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.

2. 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.

3. Check 'Connections' before wiring.

Failure to follow this instruction may result in fire.

4. Do not touch the product during operation or for a certain period of time after stopping.

Failure to follow this instruction may result in burn or fire.

5. 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.

6. Install on the device panel or DIN rail, and ground to the F.G. terminal separately.

When connecting the F.G. terminal, use AWG16(1.25mm²) or over.

Failure to follow this instruction may result in fire or electric shock.

7. Do not disassemble or modify the unit.

Failure to follow this instruction may result in fire or electric shock.

8. 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

1. Use the unit within the rated specifications.

Failure to follow this instruction may result in fire or product damage.

2. 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.

3. 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.

4. When connecting the power input or measurement input, use AWG20(0.50mm²) cable or over and tighten the terminal screw with a tightening torque of 0.74 to 0.9N·m.

Failure to follow this instruction may result in fire or malfunction due to contact failure.

5. 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.

6. Use the transmitter output card only as the power for the transmitter.

Failure to follow this instruction may result in output module damage.

7. 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.
- ※Please read Safety Considerations in KRN1000 user manual before using.
- | Ordering Information | | |
|--|---------|---|
| <div><div>KRN1000</div><div>—</div><div>04</div><div>0</div><div>1</div><div>—</div><div>0</div><div>S</div></div> | | |
| Case | S | Standard panel installation type |
| | 0 | 100-240VAC 50/60Hz |
| Power supply | 0 | 100-240VAC 50/60Hz |
| | 1 | RS422/485+Ethernet+USB Device |
| Communication output | 0 | None |
| | 1 | Alarm relay output 8 channels |
| Option input/output | 2 | Alarm relay output 6 channels + Digital input 2 channels |
| | 3 | Alarm relay output 6 channels + 24VDC power output for transmitter |
| Input channels | 4 | Alarm relay output 4 channels + Digital input 2 channels + 24VDC power output for transmitter |
| | 04 | 4 channels |
| Item | 08 | 8 channels |
| | 12 | 12 channels |
| | 16 | 16 channels |
| | KRN1000 | Paperless recorder |
- User Manual
- For the detail information and instructions, please refer to user manual and user manual for communication.
- ※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, website).
- Specifications
- | | | |
|-------------------------------|--|---|
| Series | KRN1000 | |
| 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 ^{※1} | Temperature sensors (thermocouple, RTD), analog (voltage, current (shunt)) | |
| Sampling period | 1 to 4-CH: 25ms/125ms/250ms, 5 to 16-CH: 125ms/250ms
(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 ^{※2} | SD / USB memory max. 32GB | |
| Dielectric strength | 2300VAC 50/60Hz for 1 min (between power terminals and case)
※Except ethernet and USB device | |
| | 10 to 60Hz 4.9m/s ² in each X, Y, Z direction for 1 hour | |
| Vibration | Mechanical | 10 to 60Hz 1m/s ² in each X, Y, Z direction for 10 min |
| | Malfunction | |
| Insulation resistance | Over 20MΩ (at 500VDC megger) | |
| Noise immunity | Square shaped noise by noise simulator (pulse width 1μs) ±2kV | |
| Time accuracy | Within ±2 min/year (available up to 2099) | |
| Protection structure | IP50 (front part, IEC standard) | |
| 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 ^{※3} | Approx. 1290 to 1400g (approx. 590 to 700g) | |
- ※1: For more information of universal input, refer to 'Input/Output'.
※2: USB memory is included in the box. If you use USB memory you purchased separately, it could not be recognized.
※3: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.
- Unit Description
- Front part
-
1. Power indicator: Power turns ON and the red LED turns ON.

2. Screen: 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 KRN1000.

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.

6. USB device port: Used for parameter settings.

7. SD card slot: SD card memory slot. It supports up to 32GB.

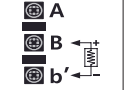
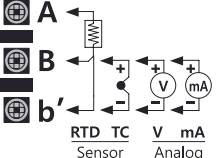
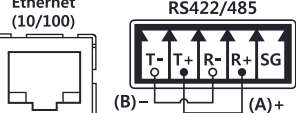
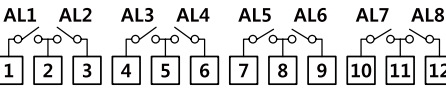
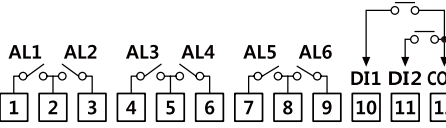
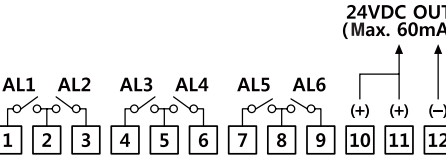
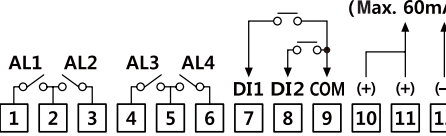
8. Stylus pen: Used for touching screen.

※Do not connect the other USB devices except USB memory at USB host port.
- 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 communication.

4. Option input/output port: Connects for option input/output (digital input (non-contact/ contact), alarm output, power for transmitter).

5. Power input: Power connection (100-240VAC 50/60Hz)
- Dimensions
-
- Input/Output
- | Type | Input/Output type | Description |
|------------------------------------|--|---|
| Universal input | Input type | RTD JPt100Ω, DPt100Ω, DPt50Ω, Cu100Ω, Cu50Ω (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
Current: 0-20mA, 4-20mA (measurable when using 250Ω shunt resistance) ^{※1} |
| | Input impedance | Voltage (V): approx. 205kΩ
RTD, Thermocouple, Voltage (mV): min. 200kΩ |
| Option input/output ^{※3} | Display accuracy ^{※2} | RTD Warm-up time: max. 30 min |
| | | Thermocouple At room temperature (25°C±5°C): ±0.1% F.S.±1-digit |
| | Alarm relay output | Analog Out of room temperature: ±0.2% F.S.±1-digit |
| | | Life cycle Mechanical: min. 20,000,000 operations
Electrical: 100,000 operations (250VAC~3A, 30VDC~3A) |
| Communication output ^{※5} | Power output for transmitter ^{※4} 24±2VDC≒, max. 60mA ※Built-in over current protection circuit | |
| | 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. 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.
- Input/Output Circuit
- | Universal input | Communication output |
|---|--|
|  |  |
| Option input/output 1
(alarm output 8 channels) | Option input/output 2
(alarm output 6 channels + digital input 2 channels) |
|  |  |
| Option input/output 3
(alarm output 6 channels + power for transmitter output) | Option input/output 4
(alarm output 4 channels + digital input 2 channels + power for transmitter output) |
|  |  |
- Comprehensive Device Management Program [DAQMaster]
- DAQMaster is the comprehensive device management software for setting parameters and monitoring processes.
- | Item | Minimum specifications | Item | Minimum specifications |
|------------|--|-----------|--------------------------------------|
| System | IBM PC compatible computer with Pentium III or above | Hard disk | 1GB+ of available hard disk space |
| Operations | Windows 98/NT/XP/Vista/7/8/10 | VGA | Resolution: 1024×768 or higher |
| Memory | 256MB+ | Others | RS232C serial port (9-pin), USB port |
- Error Message
- | Error message | Descriptions |
|---------------|---|
| 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.
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.
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. |

■ Status Display Part

Menu	GROUP1	Bar Graph			DATA ALARM EVENT	USB	2016/04/14 15:55:18
1	2	3	4	5	6	7	8
Section	Item						
1		Menu	Displays menu.				
		Esc	Moves from menu to current screen.				
		Home	Moves to main screen.				
2		Group	Displays currently displayed group name. Touch the icon and select the group. You can set the group name and the set group name is displayed.				
3		Graph	Select the displayed graph at the current screen. Select one among bar graph, vertical/horizontal trend graph, divided vertical/horizontal trend graph, vertical/horizontal mixed graph, digital group/all.				
4		Lock	Displays at standard user mode. (activated log-in function or log off status)				
		Lock Setting	Displays at administer mode. (activated log-in function and log-in as administer mode)				
		Unlock	Displays at unlock. (inactivated log-in function)				
		No Alarm	Displays at no alarm.				
		Alarm	Displays when alarm occurs.				
5		Internal Memory Record	Displays when displaying measurement value and no recording it at internal memory.				
		Internal Memory No Record	Displays usage details of data recording space.				
6		Data Record Space	Displays usage details of data recording space.				
		Alarm Record Space	Displays empty space of alarm data memory.				
		Event Record Space	Displays empty space of event data memory.				
7		USB Memory No Connection	Displays when USB memory is not connected.				
		USB Memory No Save (gray)	Displays when internal memory data does not save at USB memory.				
		USB Memory Save (yellow)	Displays when internal memory data saves at USB memory.				
		SD Card No Connection	Displays when SD card is not connected.				
		SD Card No Save (gray)	Displays when internal memory data does not save at SD card.				
8		SD Card Save (yellow)	Displays when internal memory data saves at SD card.				
		Date/Time	Displays date and time.				
			If summer time is set, "(s)" marks in front of time.				

■ Menu

Display	History	System Info.	Date/Time
	File History		Reservation
	Group Setting		Device
	Touch Calibration		File
Status	Alarm List		Log In
	Event List	Memory Info.	System Info.
	AO/DI Status		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		

※For more information about menu, refer to KRN1000 user manual.

■ Major Menu

1) Input/Display [Menu → Input CH Info. → Input/Display]

It sets input type of each channel of KRN1000.

GROUP1Bar GraphDATAALARM EVENTUSB2016/04/1811:10:09

1 CH1>>Input/DisplayInput OptionAlarmUser Unit

2 CopySelect7 Tag NameCH-1

3 Input TypeTC-K

4 Low-Limit Graph Scale-200.08 Low-Limit Scale--

5 High-Limit Graph Scale1350.09 High-Limit Scale--

6 Point0.010 Display Unit°C

SaveEsc

No	Item	Descriptions
1	Channel	Moves channel. Touch 'CH1' or to change the channel.
2	Copy	Copies the other channels parameters of the same group. Select the channel to be copy.
3	Input Type	Set the input type. Input types are total 27: thermocouple, RTD, voltage, current (shunt).
4	Low-Limit Graph Scale/ Low-Limit Input	In case of temperature sensor input, set the low-limit graph scale value within the input range. Setting range: Min. value of input range to high-limit graph scale value-F.S. 5% E.g.) In case of TC-K input, -200.0 to 1350.0°C of input range, and setting range is -200.0 to 1272.5°C. (-F.S.=77.5) In case of analog input, it displays low-limit input value.
5	High-Limit Graph Scale/ High-Limit Input	In case of temperature sensor input, set the high-limit graph scale value within the input range. Setting range: Low-limit graph scale value+F.S. 5% to Max. value of input range E.g.) In case of TC-K input, -200.0 to 1350.0°C of input range, and setting range is -122.5 to 1350°C. (+F.S.=77.5) In case of analog input, it displays high-limit input value.
6	Point	- Temperature sensor input: 0, 0.0 (set the decimal point for the measurement value) - Analog input: 0, 0.0, 0.00, 0.000, 0.0000 (set the decimal point position for the scale value)
7	Tag Name	Set the channel name.
8	Low-Limit Scale	Set the desired display value based on the measurement value.
9	High-Limit Scale	It is activated only for analog (voltage, current (shunt)) input type.
10	Display Unit	- Temperature sensor input: Temperature units, °C, °F, K are available. - Analog input: 72 display units are available. When not using unit, select blank.

2) Device [Menu → System Info. → Device]

It sets initial setting and option of KRN1000.

GROUP1V TrendDATAALARM EVENTUSB2016/06/1316:19:45

Date/TimeReservationDeviceFileLog InSystem Info.

1 Device NameKRN1000 Recorder6 Sampling125ms

2 LanguageEnglish7Log Record Speed100 s

3 PWR ON RecordHold8Graph Speed1 s

4 Touch SoundStandard9 BacklightStandard

5 Alarm SoundOFF10 Screen SaveDisable

SaveEsc

No	Item	Descriptions
1	Device Name	Set KRN1000 device name. It supports English capital/small letter, sign and number up to 16 characters.
2	Language	Set KRN1000 display language. It supports Korean, English, Chinese (Simplified/Traditional) and Russian.
3	PWR ON Record	Set record status when supplying power or re-supplying power at power failure. - Hold: It maintains record status (recording/stop) of before power OFF. - Record: It records when power is ON. - Stop: It does not record regardless when power is ON.
4	Touch Sound	Set touch sound volume when touching the menu or button of screen. Setting range: OFF, Min., Standard, Max.
5	Alarm Sound	Set alarm sound volume. Setting range: OFF, Min., Standard, Max.
6	Sampling	Set internal sampling period of measurement value. Setting range (varied by number of input channel connections) - Below 4CHs: 25, 125, 250ms - The others: 125, 250ms
7	Log Record Speed	Set log speed for recording measurement value at system memory. Setting range: 1 to 3600 sec E.g.) When setting as 3 sec, it records present value and the value after 3 sec.
8	Graph Speed	Set Graph speed for displaying data on the graph. Setting range: 1 to 3600 sec E.g.) When setting as 3 sec, new data is displayed on the graph with the interval of 3 sec.
9	Backlight	Set display backlight level. Setting range: Min., Standard, Max.
10	Screen Save	For saving LCD life cycle and power, screen can automatically turn OFF. Even though during screen save status, it maintains recording. Touch the screen and it turn ON the screen. Setting range: 0 to 360 min (0: disable screen save)

3) File [Menu → System Info. → File]

It manages parameter setting files which are saved at KRN1000 memory, resets parameters.

GROUP1Bar GraphDATAALARM EVENTUSB2016/04/1417:14:45

Date/TimeReservationDeviceFileLog InSystem Info.

1 Parameter Setting FileNone

2 Internal MemorySaveOpen

3 SD MemorySaveOpen

4 USB MemorySaveOpen

5 Reset ParametersReset Settings

6 Screen Simulation (Demo)StartStop

SaveEsc

No	Item	Descriptions
1	Parameter Setting File	Displays parameter setting file name.
2	Internal Memory	Save the set parameter information at the dedicated memory or open it.
3	SD Memory	
4	USB Memory	
5	Reset Parameters	Reset parameter settings as factory default.
6	Screen Simulation (Demo)	Execute simulation the set parameters. Touch 'Start' and re-boot the unit and simulation mode starts. Touch 'Stop' to exit simulation mode and re-boot the unit.

4) Memory Management [Menu → Memory Info. → Memory Management]

It manages internal/external memory. You can check memory usage and move and copy data files.

GROUP1Bar GraphDATAALARM EVENTUSB2016/04/1417:15:09

Memory ManagementInternal Memory

1 Internal Memory1MB / 14MB(8 %)Clear

2 SD Memory15MB / 20MB(75 %)Clear

3 USB Memory5MB / 20MB(25 %)Clear

4 Internal >>Move/Copy>> USB or SD

5 StorageInternalSDUSB

SaveEsc

No	Item	Descriptions
1	Internal Memory	Displays each memory usage. Touch 'Clear' to initial the memory.
2	SD Memory	
3	USB Memory	
4	Move/Copy	<div><div></div><div>MoveCopyDeleteSDUSB</div><div>Move AllCopy AllDelete AllClose</div></div> <p>Moves/Copies files of internal memory to SD/USB memory. - Move: Moves the file to external memory and deletes the existing file at internal memory. - Copy: Moves the file to external memory and maintains the existing file at internal memory. - Delete: Deletes the file. - Move All: Moves all files to external memory and deletes the existing all files at internal memory. - Copy All: Moves all files to external memory and maintains the existing all files at internal memory. - Delete All: Deletes all files.</p>
5	Storage	Select the memory to save the data.

■ 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).
- 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