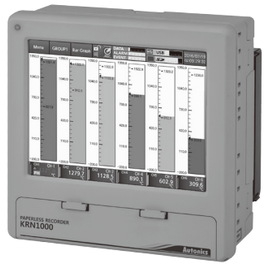
Autonics

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.

※Safety considerations are categorized as follows.

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

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

※The symbols used on the product and instruction manual represent the following.
⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠Warning

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, fire, or economic loss.
2. **The unit must be installed on a device panel before use.**
   Failure to follow this instruction may result in electric shock.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in electric shock .
4. **Do not disassemble or modify the unit. Please contact us if necessary.**
   Failure to follow this instruction may result in electric shock or fire.
5. **Check the terminal numbers before connecting the power source.**
   Failure to follow this instruction may result in fire or burning the unit.

⚠Caution

1. **Do not use the unit outdoors.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or electric shock.
2. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in shortening the life cycle of the unit, or fire.
3. **Do not use water or oil-based detergent when cleaning the unit. Use dry cloth to clean the unit.**
   Failure to follow this instruction may result in electric shock or fire.
4. **Do not use the unit where flammable or explosive gas, humidity, direct sunlight, radiant heat, vibration, or impact may be present.**
   Failure to follow this instruction may result in fire or explosion.
5. **Keep dust and wire residue from flowing into the unit.**
   Failure to follow this instruction may result in fire or product damage.
6. **Check the polarity of the power contact before wiring the unit.**
   Failure to follow this instruction may result in fire or explosion.

※**Please read "Safety Considerations" in KRN1000 user manual before using.**

▣ Ordering Information

KRN1000 – **04** **0** **1** – **0** **S**

Case	S	Standard panel installation type
Power supply	0	100-240VAC 50/60Hz
Communication output	1	RS422/485+Ethernet+USB Device
Option input/output	0	None
	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

▣ User Manual

For the detail information and instructions, please refer to user manual and user manual for communication.
Download manuals from the enclosed CD-ROM or our web site (www.autonics.com).

※**The above specifications are subject to change and some models may be discontinued without notice.**

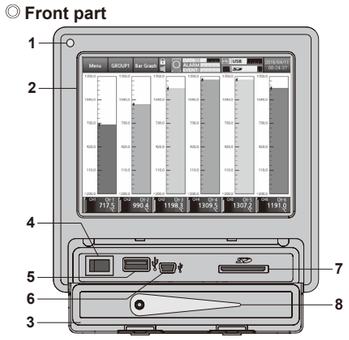
▣ Specifications

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		SD / USB memory max. 32GB
Dielectric strength		2300VAC 50/60Hz for 1 min (between power terminals and case) ※Except ethernet and USB device
Vibration	Mechanical	10 to 60Hz 4.9m/s² in each X, Y, Z direction for 1 hour
	Malfunction	10 to 60Hz 1m/s² in each X, Y, Z direction for 10 min
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)
Environment	Ambient temperature	0 to 50℃, storage: -20 to 60℃
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH
Approval		CE
Weight※2		Approx. 1290 to 1400g (approx. 590 to 700g)

※1: For more information of universal input, refer to '▣ Input/Output'.
※2: The weight includes packaging. The weight in parenthesis is for unit only.
※Environment resistance is rated at no freezing or condensation.

▣ Unit Description

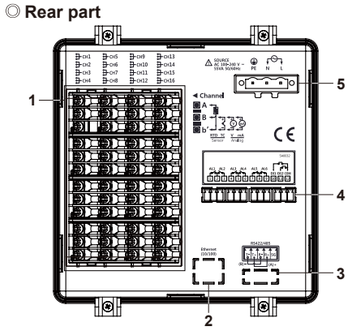
◎ **Front part**



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.

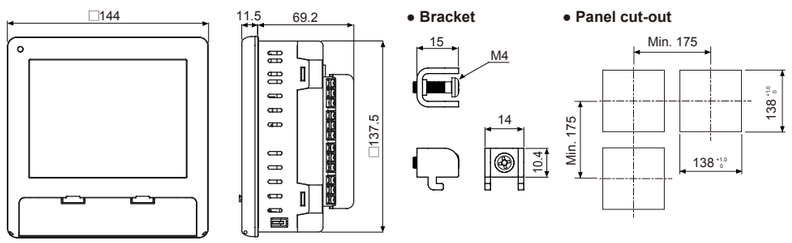
◎ **Rear part**



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

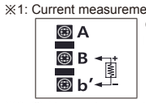
(unit: mm)



▣ 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 (measureable when using 250Ω shunt resistance)※1
	Input impedance		Voltage (V): Approx. 205kΩ RTD, Thermocouple, Voltage (mV): Min. 200kΩ
	Display accuracy※2	RTD	Warm-up time: Max. 30 min At room temperature (25℃±5℃): ±0.1% F.S.±1-digit Out of room temperature: ±0.2% F.S.±1-digit
		Thermocouple	
		Analog	
	Resolution		16-bit
Option input/output※3	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 Electrical: 100,000 operations (250VAC⎓ 3A, 30VDC⎓ 3A)
	Power output for transmitter※4		24±2VDC⎓, Max. 60mA ※Built-in over current protection circuit
Communication output※5	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.

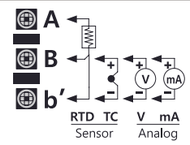
※2: ◎ At room temperature (23℃±5℃)
- RTD Cu50Ω (-200≤T≤200): (±0.1% F.S. or ±1.5℃, select the higher one) ±1-digit
- RTD DPt50Ω (-200≤T≤500): (±0.1% F.S. or ±1.5℃, select the higher one) ±1-digit
- Thermocouple R, S, C, G type (0≤T≤100): (±0.1% F.S. or ±4.0℃, select the higher one) ±1-digit
- Thermocouple U, T type (-100≤T≤400): (±0.1% F.S. or ±2.0℃, select the higher one) ±1 digit
- Thermocouple B type, below 400℃: There is no accuracy standards.
- All thermocouples, below -100℃: (±0.3% F.S. or ±4.0℃, select the higher one) ±1-digit

◎ Out of room temperature range
- RTD Cu50Ω (-200≤T≤200): (±0.2% F.S. or ±3.0℃, select the higher one) ±1-digit
- RTD DPt50Ω (-200≤T≤500): (±0.2% F.S. or ±3.0℃, select the higher one) ±1-digit

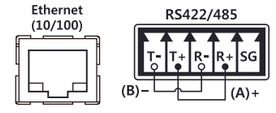
※3: Input/Output is different by option. Refer to '▣ Ordering Information'.
※4: For supplying power for transmitter, it is recommended to use shield cable to reduce noise.
※5: RS422/485, ethernet, USB device communication outputs are not used at the same time.
※If sensor input line is longer, it is recommended to use shield cable to reduce noise.

▣ Input/Output Circuit

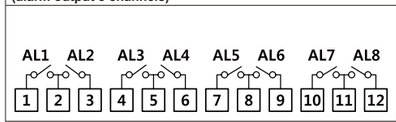
Universal input



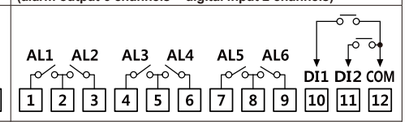
Communication output



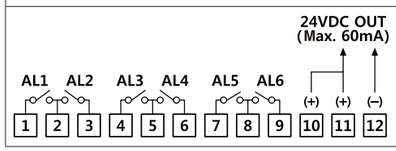
Option input/output 1 (alarm output 8 channels)



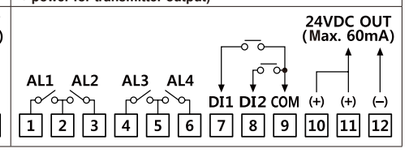
Option input/output 2 (alarm output 6 channels + digital input 2 channels)



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.
DAQMaster can be downloaded from our web site at www.autonics.com.

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

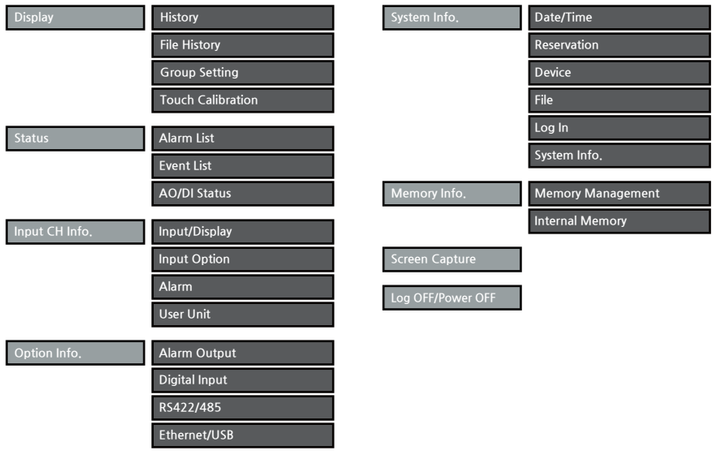
Error message	Descriptions
HHHH	When input type is temperature sensor (Thermocouple, RTD) and the measurement value is higher than high-limit value of input range, it flashes HHHH. It is cleared when the measurement value is within the high-limit range.
	When input type is analog (voltage, current (shunt)) 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

1	2	3	4	5	6	7	8

Section	Item		Description
1	Menu	Menu	Displays menu.
	Esc	Esc	Moves from menu to current screen.
		Home	Moves to main screen.
2	GROUP1	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	Bar Graph	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	REC	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	Data Record Space	Displays usage details of data recording space.
	ALARM	Alarm Record Space	Displays empty space of alarm data memory.
	EVENT	Event Record Space	Displays empty space of event data memory.
7		USB Memory No Connection	Displays when USB memory is not connected.
	USB	USB Memory No Save (gray)	Displays when internal memory data does not save at USB memory.
	USB	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	SD Card No Save (gray)	Displays when internal memory data does not save at SD card.
	SD	SD Card Save (yellow)	Displays when internal memory data saves at SD card.
8	2015/09/24 14:31:39	Date/Time	Displays date and time.
	2015/09/24 (S) 15:33:23		If summer time is set, "(s)" marks in front of time.

▣ Menu

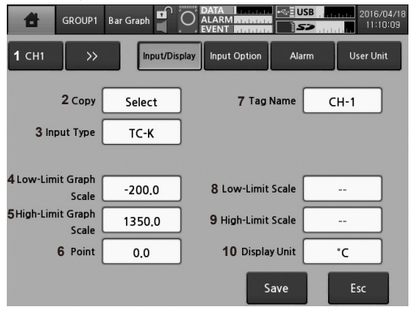


※**For more information about menu, refer to KRN1000 user manual.**

▣ Major Menu

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

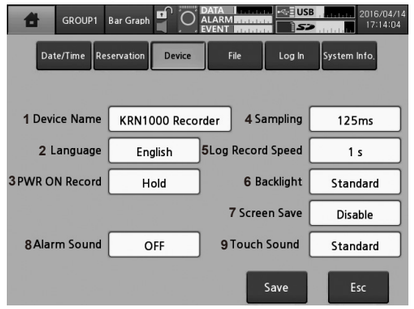
It sets input type of each channel of KRN1000.



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℃ of input range, and setting range is -200.0 to 1272.5℃. (-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℃ of input range, and setting range is -122.5 to 1350℃. (+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. It is activated only for analog (voltage, current (shunt)) input type.
9	High-Limit Scale	
10	Display Unit	- Temperature sensor input: Temperature units, ℃, ℉, K are available. - Analog input: 72 display units are available. When not using unit, select blank.

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

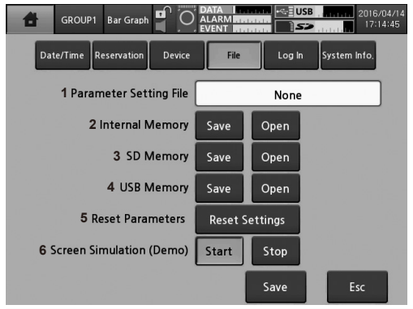
It sets initial setting and option of KRN1000.



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	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
5	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.
6	Backlight	Set display backlight level. Setting range: Min., Standard, Max.
7	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)
8	Alarm Sound	Set alarm sound volume. Setting range: OFF, Min., Standard, Max.
9	Touch Sound	Set touch sound volume when touching the menu or button of screen. Setting range: OFF, Min., Standard, Max.

3) File [Menu → System Info. → File]

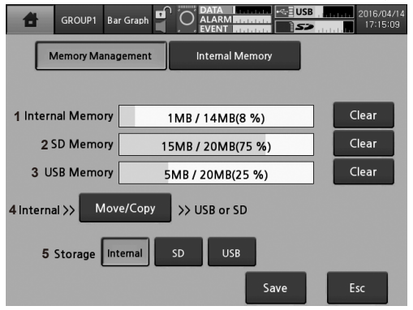
It manages parameter setting files which are saved at KRN1000 memory, resets parameters.

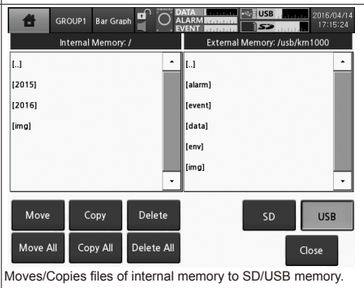


No	Item	Descriptions
1	Parameter Setting File	Displays parameter setting file name.
2	Internal Memory	Save the set parameter information at the dedicated memory or open it.
3	SD Memory	
4	USB Memory	
5	Reset Parameters	Reset parameter settings as factory default.
6	Screen Simulation (Demo)	Execute simulation 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.



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	 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.
5	Storage	Select the memory to save the data.

▣ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connectors/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System(Fiber, CO_2, Nd:YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse(Rate) Meters
- Display Units
- Sensor Controllers
- Recorders
- Indicators
- Converters
- Controllers
- Thyristor Power Controllers
- Pressure Transmitters
- Temperature Transmitters

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