KR2S SERIES

GRAPHIC RECORDER

PS PERFORMANCE SPECIFICATION **CHINO**

KR2S series are advance touch screen display (Keyless) paperless Graphic Recorder with high performance and high operating function along with high visibility 5.7" VGA TFT color LCD display.
Universal input with high speed of sampling rate 100msec and high accuracy rating of ±0.1% realized. Measured data is stored into memory and support up to 8GB through USB and CF card. As it can be monitored by a web browser display on several computers on intranet or internet, FTP transfer of data file and E-mail notification are also available.

■FEATURES

● **Employing clear 5.7"VGA TFT color LCD display.**
Large-sized high visibility display with various display functions. Real time/historical trend screen, circular trend screen, bar-graph screen, data screen are selectable for various applications.

● **Large capacity of data memory and various recording method.**
USB slot and CF card slot is equipped as standard memory and optionally expandable up to 8 GB. Various data storing methods are selectable such as schedule programming by time of day and time of date, recording start-up by external signal, and event and data logging of before and after trigger points for alarm.

● **Multi points recording with high speed/accuracy.**
High-speed recording of approximately 100msec for 4 points and 1 sec for 6/12 points and high accuracy of ±0.1% were realized. Stable measuring and recording are possible with high speed. With stand voltage between input channels is as high as 1000V AC (Excluding resistance thermometer input).

● **Direct writing on the screen.**
With attached touch pen, various comments can be written on the screen.

● **Extend inputs with CHINO controllers.** KR2S can communicate with up to 16 CHINO controllers for parameter settings and read/record of measuring values through low-order communications (Option).

● **Easy operating and programming without manual**

● **USB port provided in front.** Readout of data and files are possible by connecting through an USB memory stick for PC.

● **LAN network capability (Option).**
Various networked environment such as remote monitoring by browser, FTP, HTTP, SNTP and DHCP server and E-mail notification are applied when Ethernet communication interface is used.

● **Safety system and reliability.** No battery backup needed for recorded storage data.

● **Analyzing/data acquisition application software (Option).**
It is easy to replay and edit the recorded data file. Replay display has various mode of vertical/horizontal trend, circular trend and also has wave-analyzing and marking by using the cursor.

● **Custom graphic screen for per each applications (NEW).**
By using optional custom graphic screen function, it can display the graphic screen which the user created by PC software KR Screen Designer (option). Create letters, rectangle, oval, line, etc by drawing tool and allocate KR measuring data while making the background by JPEG or other images. By lower communication, controller SV, MV, PID can also be changed. Register up to 5 screens and its screens are switchable.

■MODELS

K R 2 S □ P S □□□ - □□□

Measurement point/sampling rate
6: 6 points/1 sec.
2: 12 points/1 sec.

Communication interface (option)
N: None
E: Ethernet
R: Low/high order communications (RS485)
G: Ethernet + low/high order communications(RS485)

Alarm output, Contact input (option)
0: None
2: Mechanical relay output (4 points 'c' contact)
7: Digital input (4 points)
8: Mechanical relay output (2 points 'c' contact) + Digital input (2 points)

Installation type
A: Device mounting (panel mounting type)
T: Portable type (Grip and rubber feet attached)

Others (option)
-NNN : None
-1NN : Custom graphic screen

* If the recording cycle is set less than 500ms (100 to 500 ms), input channel point becomes 100ms for 4 points automatically.
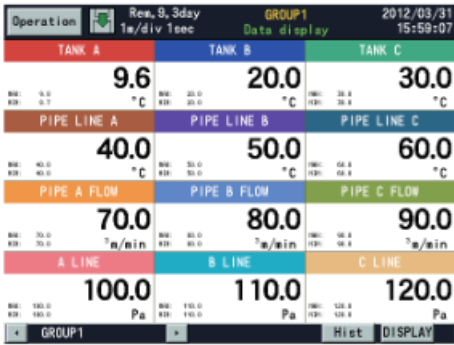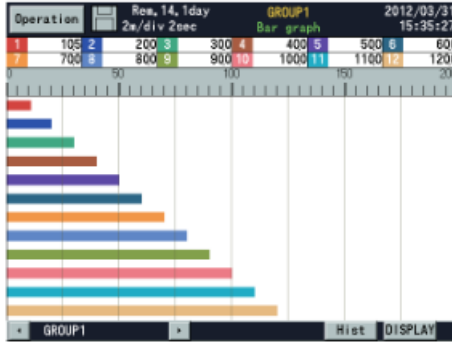
KR2S SERIES

■SCREENS

Sharp touch panel display based on Human Engineering such as color, line, thickness, key position.
Adopts VGA (640X480) which has 4 times better resolution of conventional model.
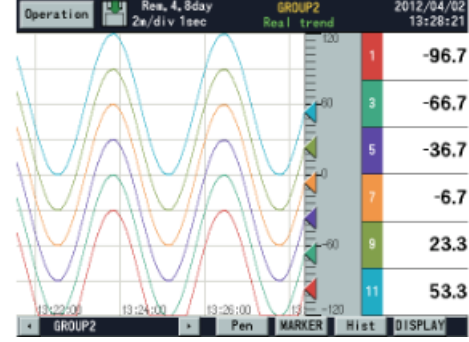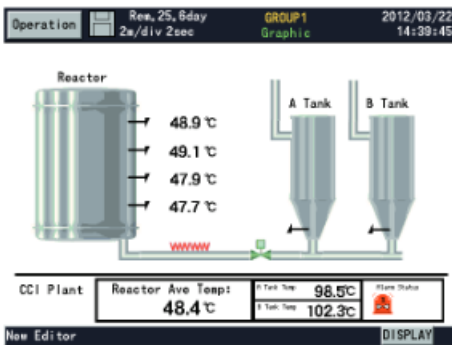
● **Data screen**

● **Bar-graph screen**

● **Real-time trend screen**

● **Graphic screen**

Enable to create custom display for each user*.
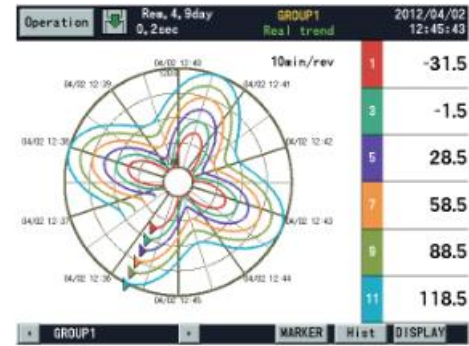

● **Pen writing**

Free writing by 16 colors.

● **Circular trend screen**

High-resolution color and easy to read curve.

● **2-Zone screen**

Split the trend in 2-zones and monitor.

● **Dual trend screen**

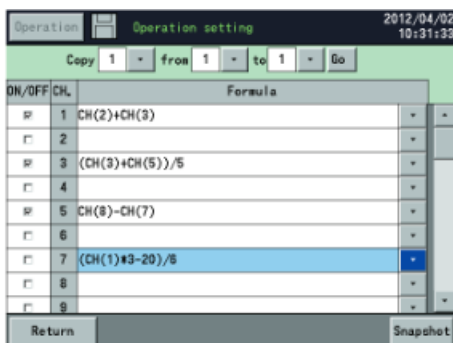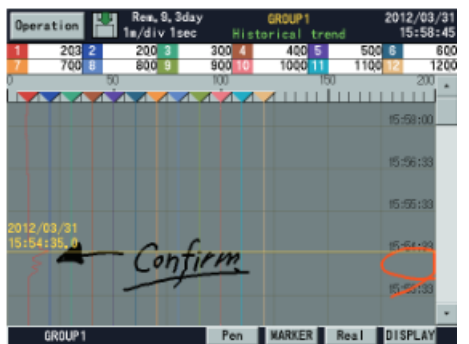2 split display for real time trend and historical trend.
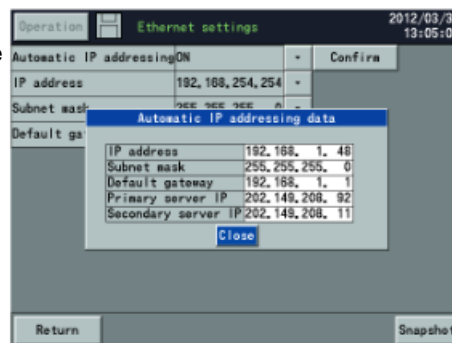Scroll available for historical trend.

● **Historical trend screen**

● **Math functions**

Easy to set and manage the formula.

● **Various communication function**

Enable to use E-mail, FTP, HTTP, SNTP, and DHCP.
(Automatic acquisition IP address)

*Graphic screen feature is provided optionally.
BMP image has to be prepared by customer.

PS PERFORMANCE SPECIFICATION

■ INPUT SPECIFICATIONS

Measuring points: 6 points, 12 points
Input types: Universal
DC voltage --- ±13.8mV, ±27.6mV, ±69.0mV
±200mV, ±500mV, ±2V
±5V*, ±10V*, ±20V*, ±50V*
(*with built-in voltage divider)
DC current --- With external shunt resistor (sold separately)
Thermocouple --- B, R, S, K, E, J, T, N, PtRh40-PtRh20,
W-WRe26, WRe5-WRe26, Platinel II, NiMo-
Ni,CR-AuFe, U, L
Resistance thermometer --- Pt100, JPt100, Pt-Co, Pt50
*Contact CHINO for Nickel-100, Pt130, Pt25, Pt46, Cu10, Cu25, Cu53

Accuracy ratings: Refer to the table of measuring range and accuracy ratings

Reference junction compensation accuracy:
K, E, J, T, N, Platinel II --- ±0.5°C or less
R, S, W-WRe26, WRe5-WRe26, NiMo-Ni,
CR-AuFe,U, L --- ±1.0°C or less

Sampling rate: Approximately 1second/12 points, 0.1 second/4 points
Burnout: Disconnection of input signal is detected on thermocouple and resistance thermometer input. UP/DOWN/DISABLE is selectable.
Scaling: Range/scale is selectable.
Digital filter: Programming FIR filter for each point (common to all points)

Allowable signal source resistance:
Thermocouple input (burnout disable)/
DC voltage input (±2V or less) ---1kΩ or less
DC voltage input (±5V or more) ---100Ω or less
Resistance thermometer --- Per wire 10Ω or less
(same resistance for 3 wires)

Input resistance: Thermocouple --- Approx. 1 MΩ
DC voltage input --- ±2V or less : Approx. 1 MΩ
±5V to ±50V : Approx. 1 MΩ

Maximum input voltage:
DC voltage input (±2V or less)/
Thermocouple input (burnout enabled) --- ±10VDC Resistance thermometer input --- ±6VDC
DC voltage input (±5V to ±50V) --- ±60VDC

Dielectric strength between channels:
1000V AC or more between each channel
(High strength semiconductor relay used)
(B terminal of resistance thermometer is shorted inside between channels)

Common mode rejection ratio:
120dB or more (50 or 60Hz)
Series mode rejection ratio:
50dB or more (50 or 60Hz)

■ RECORDING SPECIFICATIONS

Memory for history: 264MB
Additional memory: CF card (Up to 8GB)
256MB standard attached, Apacer Technology made recommended
USB memory stick (Up to 8GB)
Not all USB memory stick allowable
Recording cycle: 100, 200, 500ms
1, 2, 3, 5, 10, 15, 20, 30s
1, 2, 3, 5, 10, 15, 20, 30, 60min
Logging data: Measured data --- File name (group name), time of day, month and year of recording start, maker text, measured data, alarm status/types
Setting parameter
Operation result data
Storing types: Binary/CSV
Storing methods: Manual start/stop (dedicated touch key operation)
Schedule (designation for time of day and date)
Trigger signal (alarm event, digital input)
*Pre-trigger is selectable
Measuring numbers of pre-trigger --- Maximum 950 data
Recording group: Recording cycle 1s or slower --- up to 5 groups of 44 points/group can be programmed
(Up to total of 100 points)

When 6 channels recorded in sampling mode (real data)

Recording cycle	256MB	512MB	1GB	2GB	8GB
1sec	126 days	253 days	1.4 yrs	2.8 yrs	11.2 yrs

When 12 channels recorded in sampling mode (real data).

Recording cycle	256MB	512MB	1GB	2GB	8GB
1sec	63.2 days	126 days	253 days	1.4 yrs	5.6 yrs

■ COMPUTATION SPECIFICATIONS

Computation points: Maximum 44 points
Computation types: Arithmetic operations --- Addition, subtraction, multiplication, division, remainder, exponential
Comparison operations --- Equality, inequality, great, less, equality /great, equality / less
Logical operations --- AND, OR, XOR, NOT
General functions --- Round-up, round-down, absolute value, square root, exponent of e, natural logarithm, common logarithm
Integration operations --- Analog integration, digital integration
Channel data operations --- Measured data computation, calculated data computation
Others --- Dew point, relative humidity, F-value Remaining amount of CF card

■ALARM SPECIFICATIONS

Setups: Up to 4 alarms can be programmed per channel
Alarm types: Upper limit, lower limit, differential upper limit, differential lower limit (deadband is selectable), abnormal data
Delay function: Setup range of alarm delay --- 1 to 3600 seconds
Alarm settings: AND/OR selectable
Alarm outputs: Refer to option specification

■ DISPLAY SPECIFICATIONS

Display: 5.7"VGA TFT color LCD VGA (640x480 dots)
Display types: Measured data display (Trend screen, Data screen, Bar-graph screen)
Historical trend display (simultaneous display with Real-time trend is available)
Information display (alarm display, marker list, file list)
Setting screen (alarm, computation, memory, system, maintenance, communication, etc.)
Trend screen: 12 colors selectable
Display screen--- 5 screens (5 groups)
Display points --- Maximum 44 points/screen
Time axis direction --- Vertical or horizontal
Line width --- 5 step selection
Scale display --- 4 scales
Tag/data display --- Show/hide selectable
Marker display
Circular trend
Data screen: Display screen --- 5 screens (5 groups)
Display points --- Maximum 44 points/screen
Display contents --- Measured value, channel/tag, unit, alarm status
Bargraph screen: 12 colors selectable
Display screen --- 5 screens (5 groups)
Display points --- Maximum 44 points/screen
Display direction --- Vertical or horizontal
Scale display --- 1 scale
Information display: Alarm display (alarm activation/released history display)
Marker list
File list (group data file list display)
LCD back light: Auto/manual OFF function
Unit information (Model, serial no., option, etc.)
Brightness --- 4 levels adjustment
*The LCD display may contain some pixels that always or never illuminate, and the brightness of some areas of the display may appear uneven. There are typical LCD performance characteristics and do not constitute malfunctions.
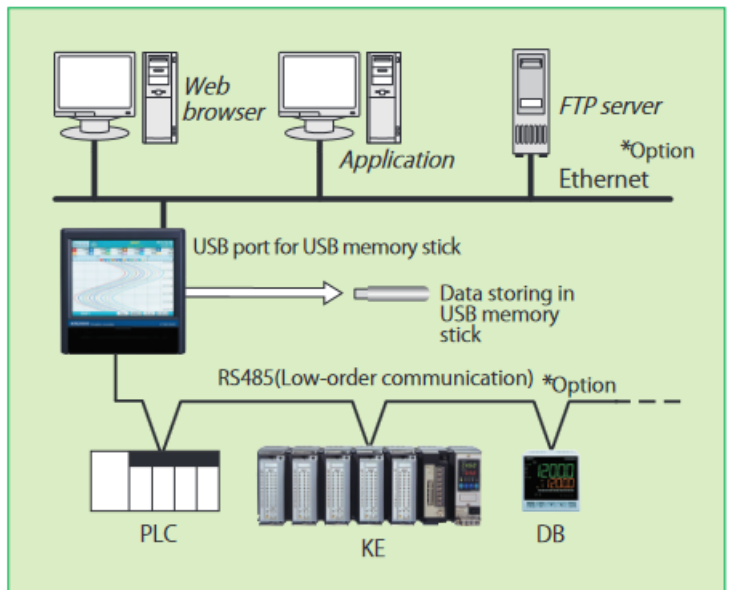
■ COMMUNICATION FUNCTIONS

● **Network**
Communication type:
Ethernet (10BASE-T/100BASE-TX)
FTP server: Data file can be read from the network computer
FTP client: Transfer a data file to a network server
SNTP client: The time can be synchronized to the time of SNTP server
Web server: Conformed to HTTP1.0 --- Displays the alarm, information of maintenance by browser software (Internet Explorer5.0 or later, Netscape6.0 or later, Opera7 or later)
* User's ID and password registration available
E-Mail: E-Mail notification at specified time for alarm activation
Report data at specified time is selectable from all registered data
Notification address --- Maximum 8 contacts
DHCP client: Automatic IP address acquisition

● **USB Communications**
USB: Communication type --- USB1.1
Transfer systems --- Bulk transfer, control transfer
File transfer by connecting as removable disk drive

■ CONNECTIVITY

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KR2S SERIES

■ PROGRAMMING/OPERATION SPECIFICATIONS

HOME settings: Simple recording settings --- Common setting to all channels
Parameter programming for all channels together, recording cycle, selection settings

MENU settings: Input/computation programming --- Input parameter, computation parameter
DISP settings --- Data channel parameter, group parameter, common parameter (combination display, trend vertical/horizontal)
Alarm settings
File settings (5 individual files) --- Storing method settings
Marker text settings
System settings --- Communication, clock, maintenance, key lock, password, screen, etc.

DISP operations: Operating screen selection --- Trend, data, bar-graph, historical trend, alarm display, maker list
Display selection on each screen --- Group 1 to 5 selectable

■ GENERAL SPECIFICATIONS

Rated power voltage: 100 to 240V AC (universal power supply) 50/60Hz
Maximum power consumption:
   35VA
Reference operating condition:
   Ambient temperature --- 21 to 25℃,
   Ambient humidity --- 45 to 65%RH
   Power voltage --- 100V AC±1.0%
   Power frequency --- 50/60Hz±0.5%
   Attitude --- Left/right 0°,forward/backward 0°
   Warm-up time --- Longer than 30 minutes
Normal operating condition:
   Ambient temperature --- 0 to 50℃
   Ambient humidity --- 20 to 80%RH
   Power voltage --- 90 to 264V AC
   Power frequency --- 50/60Hz±2%
   Attitude --- left/right 0°,forward tilting 0°,
   Backward tilting 0°to 20°
Transport condition (at the packed condition on shipment from our factory):
   Ambient temperature --- -20 to 60℃
   Ambient humidity --- 5 to 90%RH (No dew condensation)
   Vibration --- 10 to 60Hz 0.5G (4.9m/S^2) or less
   Impact --- 40G (392m/ S^2) or less
Storage condition: Ambient temperature --- -20 to 60℃
   Ambient humidity --- 5 to 90%RH (No dew condensation)
Power failure protection:
   Flash memory and SDRAM stores the setting.
   Flash memory stores the data.
   Lithium battery back up the clock and parameter
   RAM for more than 5 years (provided that the daily operating hours is longer than 8hours).
Insulation resistance: Secondary terminals and protective conductor terminals --- 20MΩ or more at 500V DC
   Primary terminals and protective conductor terminals --- 20MΩ or more at 500V DC
   Primary and secondary terminals --- 20MΩ or more at 500V DC
   Primary terminals: power terminals (L,N), alarm output terminals
   Secondary terminals: measuring input terminals, digital input terminals, communications terminals
Dielectric strength: Secondary terminals and protective conductor terminals --- 1 minute at 500V AC
   Primary terminals and protective conductor terminals --- 1 minute at 1500V AC
   Primary and secondary terminals --- 1 minute at 2300V AC
   Primary terminals: power terminals (L,N), alarm output terminals
   Secondary terminals: measuring input terminals, digital input terminals, communications terminals
Case assembly material:
   Front bezel --- ABS resin
   Case --- Steel
Color: Front bezel --- Black (equivalent to Munsell N3.0)
   Case --- Painting color, gray (equivalent to Munsell N7.0)
Weight: 2.1kg (12 points input with full options)
Mounting: Panel mounting
Terminal screws: Power terminals/protective conductor terminals/communications terminals --- M4.0
   Measuring input terminals/alarm output terminals/digital input terminals --- M3.5
   Communications terminals --- M3.0

■ STANDARDS

CE :   EMC directive ---   EN61326-1
   Class A
   Low voltage directive --- EN61010-1, EN61010-2-030
Protection: Conformed to IEC60529 IP54 (recorder front bezel)

■ OPTION SPECIFICATIONS

Options		Specifications
Alarm output		Mechanical relay (c contact) output for alarm activation and input error. Output point: 4 or 2 points Contact capacity: resistive load 3A, inductive load 1.5A
Digital input (Non-voltage contact input/ 4 or 2 points)	ON/OFF signal	ON/OFF input recording
	Pulse input	Maximum 10Hz pulse input Used for flow rate, operation time and frequency
	External drive	The following operations are available (selectable by parameter) Data memory triggering Marker display Integrated calculation reset

Communications
 	
interface
	High and
	
	low-order
	
	communication
		Communications interface for high and low-order unit
		RS485 (MODBUS)
		Choose one function from the following 3 functions.
		 Communication interface for high-order unit
		 Recording input data of CHINO products connected to a low-order unit and data in PLC register.
		 Display and record parameter setting, measured value, setting value, etc. of up to 16 CHINO controllers.
		 Recording points:
		   6-channel specification – 34 points
		   12-channel specification – 28 points
		Connectable models: KE, KR2S, KR3S,
		   KR2000, KR3000,
		   LE5000, AL3000,
		   AL4000, AH3000,
		   AH4000,
		   DB1000, 2000,
		   LT230, 830, 350, 370, 450, 470,
		   KP1000, KP2000,
		   DP-G
		   (data collection only)
		   JU, JW, SE3000
		 Transfer input data of KR2S to PLC.
		 The input data can be written on PLC only.
		 Data writing points: 44 points
		Connectable PLC: Mitsubishi Electric Corporation
		   MELSEC AnA, QnA, QnAS, FX series
		   OMRON Corporation SYSMAC series
		Note) Separate purchase of protocol converter SC8-10 (optional) is required for connection to OMRON PLC.

Custom Graphic Screen		By KR Screen Designer (optional), create graphic screen by PC and display to KR screen via CF card. KR measuring value can be located to the screen.
Others		Handle and rubber feet

■ ACCESSORIES (SOLD SEPARATELY)

Name	Description
Resistor for DC current input 100Ω	For 50mA
Resistor for DC current input 250Ω	For 20mA
CF card	128MB, 256MB, 512MB, 1GB, 2GB, 4GB, 8GB
Card adapter	For PC card

■ KR SCREEN DESIGNER (sold separately) (NEW)

Model: KS3200-000
OS: Windows Vista/7/8
Others: Your OS recommended requirements or better

PS
PERFORMANCE SPECIFICATION

■MEASURING RANGES

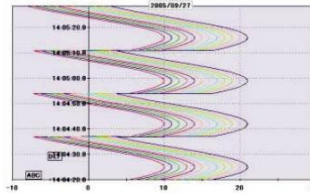| Input type		Measuring range			Accuracy ratings
DC voltage		-13.80	to	13.80mV	
		-27.60	to	27.60mV	
		-69.00	to	69.00mV	
		-200.0	to	200.0mV	
		-500.0	to	500.0mV	
		-2.000	to	2.000V	±0.1%±1digit
(with built-in voltage divider)		-5.000	to	5.000V	
		-10.00	to	10.00V	
		-20.00	to	20.00V	
		-50.00	to	50.00V	
T/C	K	-200.0	to	300.0℃	
		-200.0	to	600.0℃	
		-200	to	1370℃	
	E	-200.0	to	200.0℃	±0.1%±1digit
		-200.0	to	350.0℃	*-200 to 0℃:
		-200	to	900℃	±0.2%±1digit
	J	-200.0	to	250.0℃	
		-200.0	to	500.0℃	
		-200	to	1200℃	
	T	-200.0	to	250.0℃	
		-200.0	to	400.0℃	
	R	0	to	1200℃	±0.1%±1digit
		0	to	1760℃	*0 to 400℃:
	S	0	to	1300℃	±0.2%±1digit
		0	to	1760℃	
	B	0	to	1820℃	±0.1%±1digit *0 to 400℃:Out of accuracy ratings *400 to 800℃: 0.15%±1digit
	N	-200.0	to	400.0℃	±0.15%±1digit
		-200.0	to	750.0℃	*-200 to 0℃:
		-200	to	1300℃	±0.3%±1digit
	W-WRe26	0	to	2315℃	±0.15%±1digit *0 to 100℃: ±4%±1digit *100 to 400℃: ±0.5%±1digit
	WRe5-WRe26	0	to	2315℃	±0.2%±1digit
	PtRh40-PtRh20	0	to	1888℃	±0.2%±1digit *0 to 300℃: ±1.5%±1digit *300 to 800℃: ±0.8%±1digit
	NiMo-Ni	-50.0	to	290.0℃	±0.2%±1digit
		-50.0	to	600.0℃	
		-50	to	1310℃	
	CR-AuFe	0.0	to	280.0K	±0.2%±1digit *0 to 20K: ±0.5%±1digit *20 to 50K: ±0.3%±1digit
	Platinel II	0.0	to	350.0℃	
		0.0	to	650.0℃	±0.15%±1digit
		0	to	1395℃	
	U	-200.0	to	250.0℃	±0.15%±1digit
		-200.0	to	500.0℃	*-200 to 0℃:
		-200.0	to	600.0℃	±0.3%±1digit
	L	-200.0	to	250.0℃	±0.1%±1digit
		-200.0	to	500.0℃	*-200 to 0℃:
		-200	to	900℃	±0.2%±1digit
RTD	Pt100	-140.0	to	150.0℃	±0.1%±1digit *-140.0 to 150.0℃
		-200.0	to	300.0℃	700 to 850℃:
		-200.0	to	850.0℃	±0.15%±1digit
	JPt100	-140.0	to	150.0℃	±0.1%±1digit
		-200.0	to	300.0℃	*-140.0 to 150.0℃:
		-200.0	to	649.0℃	±0.15%±1digit
	Pt50	-200.0	to	649.0℃	±0.1%±1digit
	Pt-Co	4.0	to	374.0K	±0.15%±1digit *4 to 50K: ±0.3%±1digit

Note: The accuracy ratings are converted into the measuring range under reference operating condition.
Thermocouple input does not contain reference junction compensation accuracy.
K,E,J,T,R,S,B,N:IEC584,JIS C1602-1995
W-WRe26,WRe5-WRe26,PtRh40-PtRh20,Platinel II ,NiMo-Ni,
Cr-AuFe:ASTM Vol14.03
U(Cu-CuNi),L(Fe-CuNi):DIN43710
Pt100:IEC751(1995),JIS C1604-1997
JPt100:JIS C1606-1989

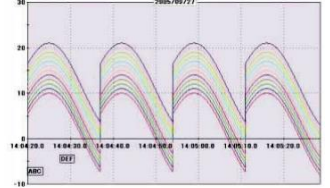## ■ APPLICATION SOFTWARE ZAILA (sold separately)

The software is applied for replay display/wave editing operation of recorded data in KR2S series. It has replay display of vertical/horizontal trend and circular trend function, and also analyzing function such as magnify/reduce/partially magnify of graphs and message insert.
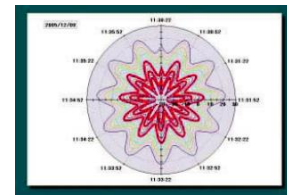
●Display examples
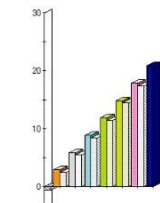
Trend display window (vertical flow)

Trend display window (horizontal flow)

Trend display window (circular trend)

Bar-graph

●Main functions

■**Trend display**
Selectable from trend display window (vertical flow, horizontal flow) and circular trend display window.

■**Continuous replay display window**
Trend is scrolled continuously (automatically).
Scroll changes by speed and renewal data no.

■**Data list display window**
Displays registered data as list display.

■**Bar-graph**
Displays by bar. Message can be inserted into bar-graph.

■**Data between markers**
Displays date/time, time difference between 2 data, data difference, maximum, minimum, average, standard deviation and median among all data.

■**Alarm display**
Points for alarm activation at each level are displayed on a trend graph.

■**Settings**
Cursor, trend line, scale axis, time axis, title input on the graph, graph assistant and magnify/reduce/rotation of graphs
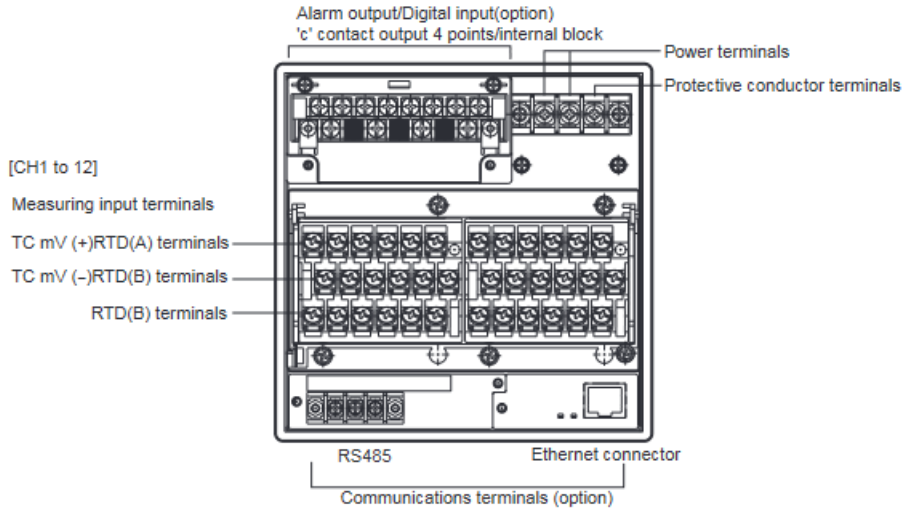
■**Data conversion**
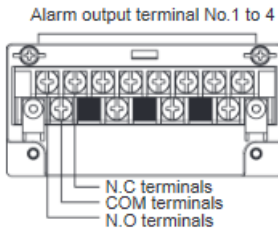Exporting to Excel, and converting to CSV file or TEXT file are available.

■ ENVIRONMENT

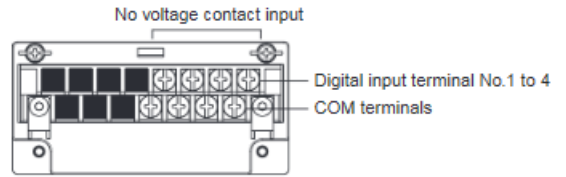| CPU	Your OS recommended CPU and/or upper grade
OS	Windows XP Home / XP Pro / VISTA / 7 *Internet Explorer 4.0 or later
Memory	Your OS recommended memory or larger
Disk drive	CD-ROM drive: 1 drive or more Hard disk drive: Disk space of 1 drive or more for 100MB or more
Language	Japanese, English, Chinese (simplified and traditional characters), Korean

PS
PERFORMANCE SPECIFICATION
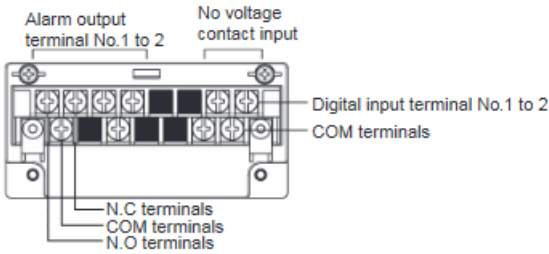
■TERMINAL ARRANGEMENT

● Alarm relay output (4 points 'c' contact)
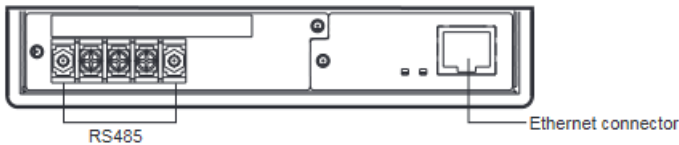

● Digital input (No voltage contact input 4 points)

●

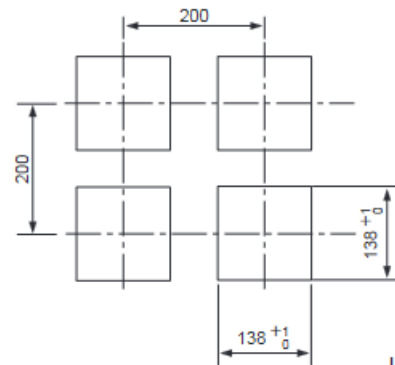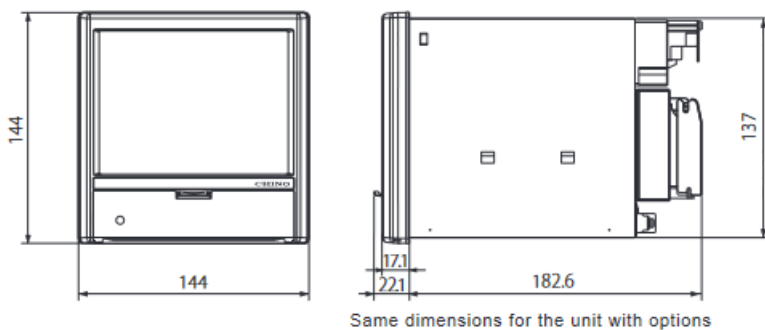Alarm relay output (2 points 'c' contact) + Digital input (No voltage contact input 2 points)

●Communication terminal

■DIMENSIONS

Same dimensions for the unit with options

● PANEL CUTOUT

Unit: mm