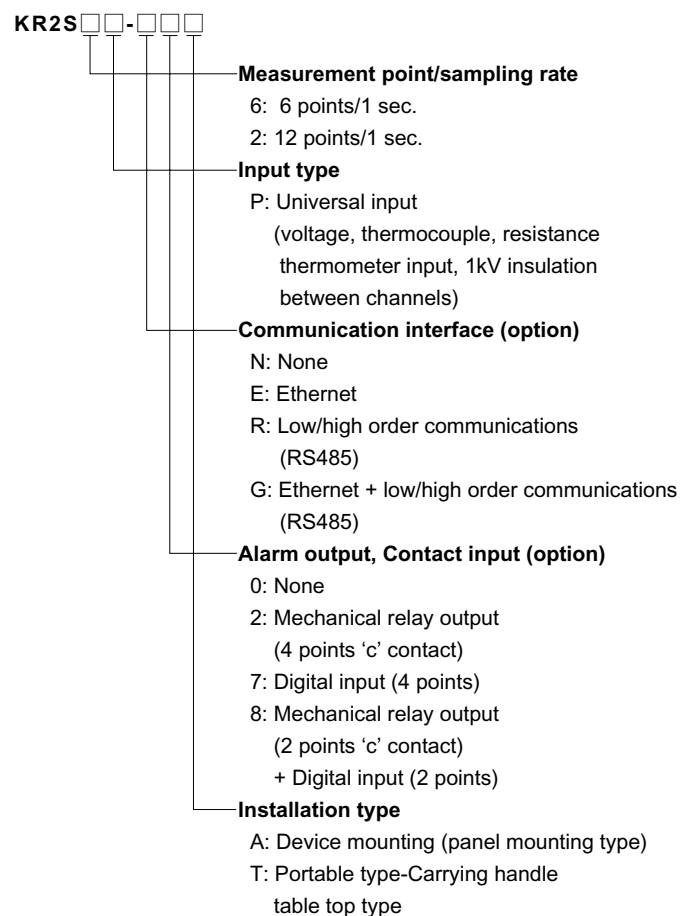# KR2S SERIES
GRAPHIC RECORDER

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 is equipped as standard memory provided 2GB 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.

● **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**
· Various networked environment such as remote monitoring by browser, FTP, HTTP, SNTP and DHCP server and E-mail notification are applied as Ethernet is equipped as standard.

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

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

● **Graphic screen**
· Custom graphic which the user can see their operation easily is available.

■ MODELS

KR2S ☐☐ - ☐☐☐

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

Input type
P: Universal input
   (voltage, thermocouple, resistance thermometer input, 1kV insulation between channels)

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-Carrying handle table top type

* If the recording cycle is set less than 500ms (100 to 500 ms), input channel point becomes 100ms for 4 points automatically.
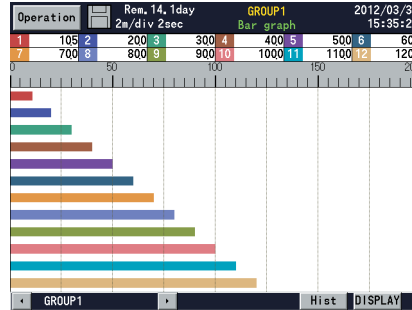
PSE-801

■ SCREENS

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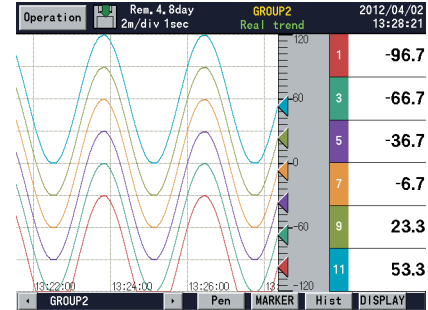Adopts VGA (640X480) which has 4 times the resolution of conventional model.
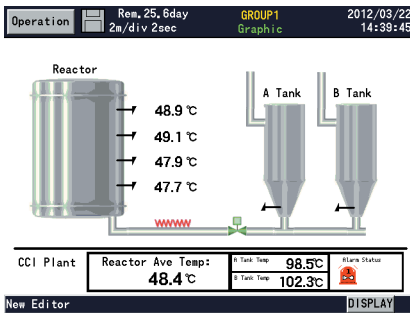
● Data screen
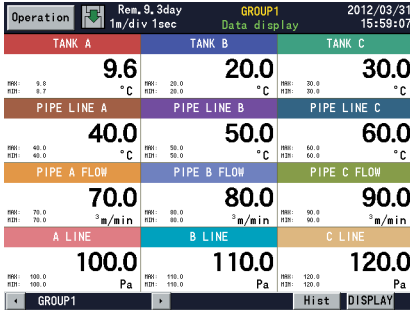
● Bar-graph screen
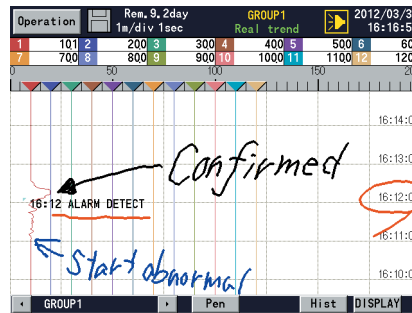

● Real-time trend screen

● Graphic screen

Enable to create custom display for each user*.
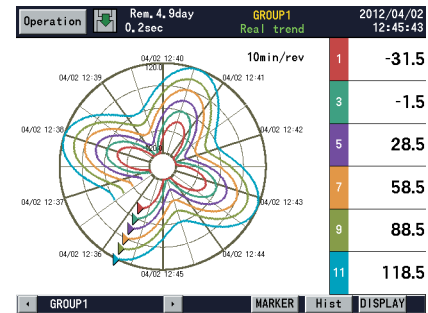

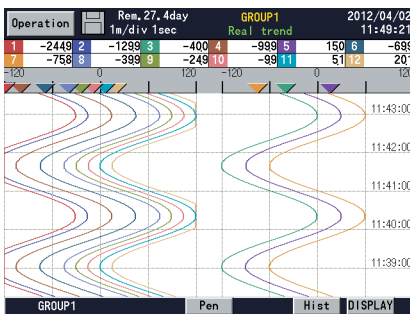
● Pen writing

Free writing by 16 colors.

● Circular trend screen
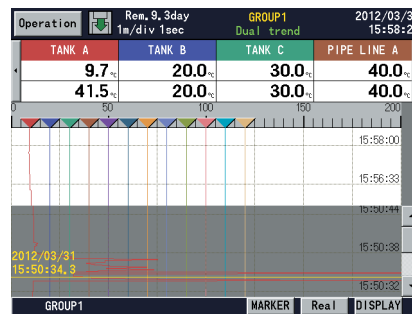
High-resolution color and easy to read curve.

● 2-Zone screen

Split the trend in 2-zones and monitor.

● Dual trend screen

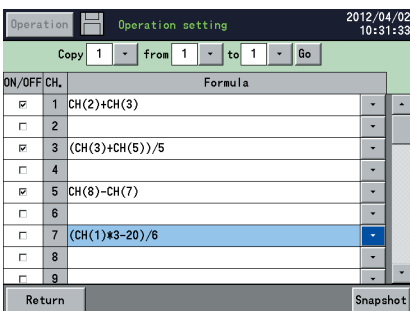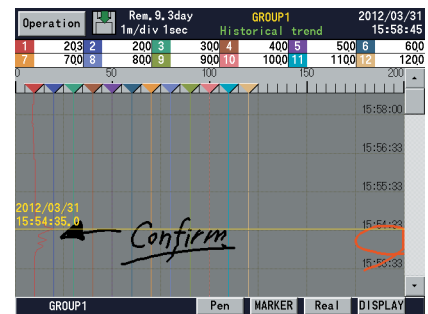2 split display for real time trend and historical trend. Scroll available for historical trend.
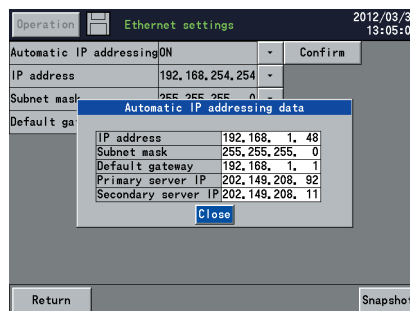

● Historical trend screen

● 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.

■ 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, PlatinelII, 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, PlatinelII--- ±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 1s / 12 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)

■ RECORDING SPECIFICATIONS

Additional memory: CF card (Up to 8GB),
USB memory stick (Up to 8GB)
Not all USB memory stick is operated
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 500ms or faster --- up to 3 groups of 12 points/group can be programmed
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 1000 seconds
Alarm settings: AND/OR selectable
Alarm outputs: Refer to option specification

■ DISPLAY SPECIFICATIONS

Display: 5.7"VGA TFT color LCD
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 --- 1/3/5 dot selectable
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 adress acquisition

● USB Communications

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

■ CONNECTIVITY

Web browser
Application
FTP server
*Option
Ethernet
USB port for USB memory stick
Data storing in USB memory stick
RS485(Low-order communication) *Option
PLC
KE
LT
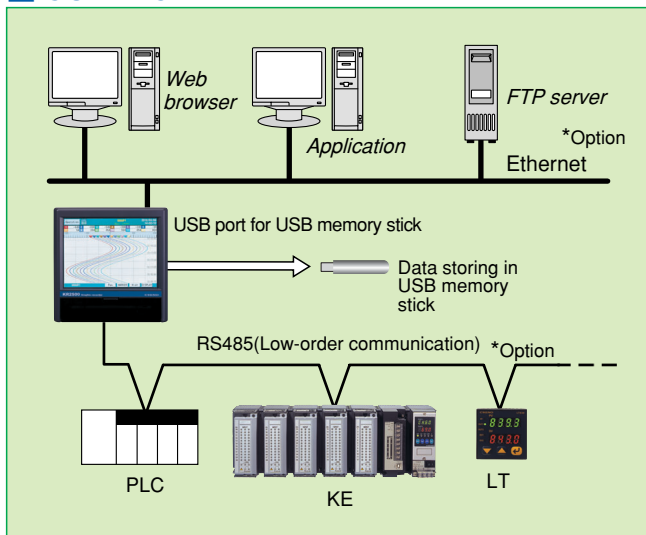
■ PROGRAMMING/OPERATION SPECIFICATIONS

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 Mussel N3.0)
                   Case --- Painting color, gray (equivalent to Mussel 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 (CONFORMITY PENDING)

CE :   EMC directive ---   EN61326
                   Class A
                   EN61000-3-2
                   EN61000-3-3
                   Low voltage directive --- EN61010-1, EN61010-2-030
Protection: Conformed to IEC529 IP54 (recorder front bezel)

■ OPTION SPECIFICATIONS

Options	Specifications		
Mechanical relay alarm output	2 or 4 points (c contact)		
Communications interface	High and low-order communications	RS485	
	Ethernet		
Digital inputs	4 points		

■ MEASURING RANGES

| Input type		Messureing 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℃	±0.1%±1digit *-200 to 0℃: ±0.2%±1digit
	E	-200.0 to 200.0℃ -200.0 to 350.0℃ -200 to 900℃	
	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 to 1760℃	±0.1%±1digit *0 to 400℃: ±0.2%±1digit
	S	0 to 1300℃ 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℃ -200.0 to 750.0℃ -200 to 1300℃	±0.15%±1digit *-200 to 0℃: ±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℃ -50.0 to 600.0℃ -50 to 1310℃	±0.2%±1digit
	CR-AuFe	0.0 to 280.0K	±0.2%±1digit *0 to 20K: ±0.5%±1digit *20 to 50K: ±0.3%±1digit
	PlatinelⅡ	0.0 to 350.0℃ 0.0 to 650.0℃ 0 to 1395℃	±0.15%±1digit
	U	-200.0 to 250.0℃ -200.0 to 500.0℃ -200.0 to 600.0℃	±0.15%±1digit *-200 to 0℃: ±0.3%±1digit
	L	-200.0 to 250.0℃ -200.0 to 500.0℃ -200 to 900℃	±0.1%±1digit *—200 to 0℃: ±0.2%±1digit
RTD	Pt100	-140.0 to 150.0℃ -200.0 to 300.0℃ -200.0 to 850.0℃	±0.1%±1digit *-140.0 to 150.0℃ 700 to 850℃: ±0.15%±1digit
	JPt100	-140.0 to 150.0℃ -200.0 to 300.0℃ -200.0 to 649.0℃	±0.1%±1digit *-140.0 to 150.0℃: ±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,PlatinelⅡ,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.
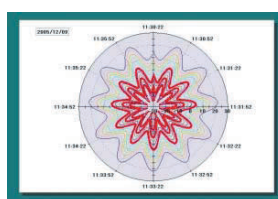
●Display examples
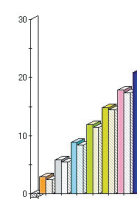
Trend display window (vertical flow)
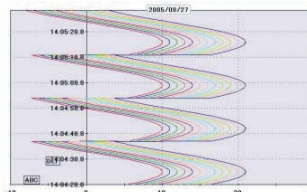
Trend display window (horizontal flow)
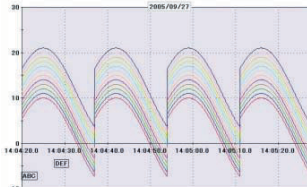
Trend display window (circular trend)

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
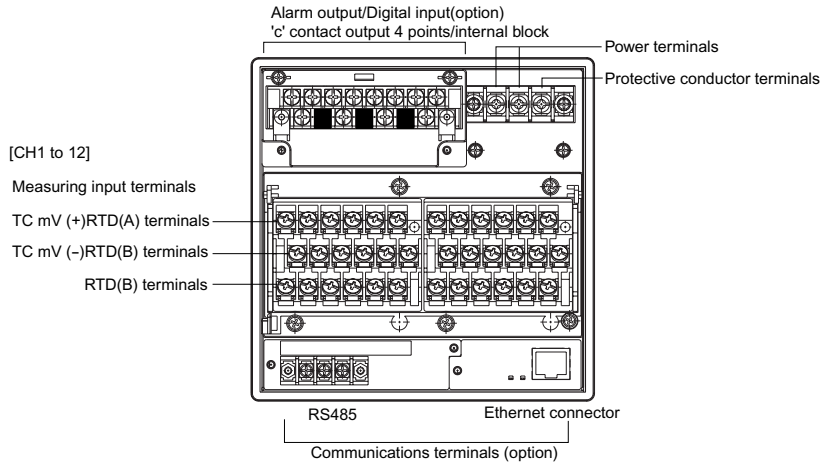
■**Data conversion**
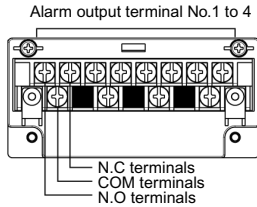Exporting to Excel, and converting to CSV file or TEXT file are available.

■ ENVIRONMENT

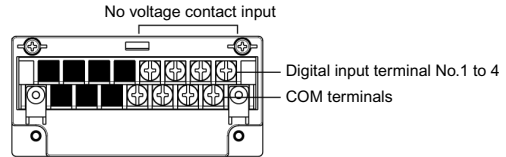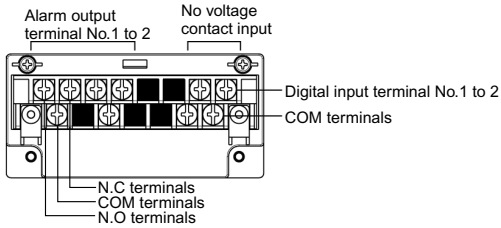| CPU	1GHz or faster
OS	Windows XP Home / XP Pro / VISTA / 7 *Internet Explorer 6.0 or later
Memory	256MB or more (512MB or more recommended)
Disk drive	CD-ROM drive: 1 drive or more Hard disk drive: Disk space of 1 drive or more for 100MB or more
Language	Japanese, English, Chinese (simplified and traditional characters), Korean

■ TERMINAL ARRANGEMENT
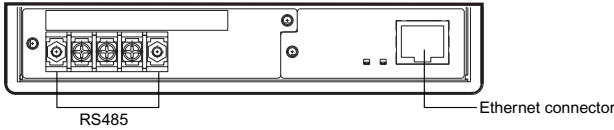
Alarm output/Digital input(option)
'c' contact output 4 points/internal block
Power terminals
Protective conductor terminals

[CH1 to 12]

Measuring input terminals

TC mV (+)RTD(A) terminals
TC mV (−)RTD(B) terminals
RTD(B) terminals

RS485
Ethernet connector
Communications terminals (option)

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

Alarm output terminal No.1 to 4

N.C terminals
COM terminals
N.O terminals

●Digital intput (No voltage contact input 4 points)

No voltage contact input

Digital input terminal No.1 to 4
COM terminals

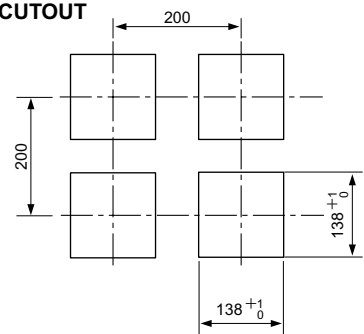●Alarm relay output (2 points 'c' contact) + Digital intput (No voltage contact input 2 points)

Alarm output terminal No.1 to 2
No voltage contact input

Digital input terminal No.1 to 2
COM terminals

N.C terminals
COM terminals
N.O terminals

●Communication terminal

RS485
Ethernet connector

■ DIMENSIONS

● PANEL CUTOUT

63 18 63
144
144
21.1 235.7
137 161

200
200
$138 ^{+1}_{0}$
$138 ^{+1}_{0}$
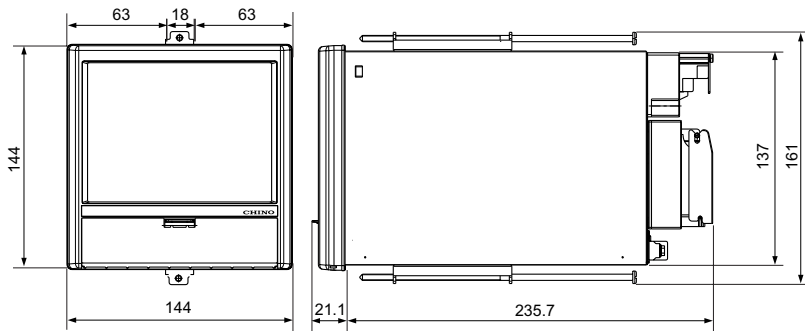
Unit: mm

Specifications subject to change without notice. Printed in Japan (I) 2012. 6