KR3S SERIES

GRAPHIC RECORDER

PERFORMANCE SPECIFICATION
CHINO

KR3S series are network compatible advanced paperless Graphic Recorder with high performance and high operating function along with high visibility 10.4" TFT color LCD touch-screen display.
Universal input with high speed of sampling rate 1sec. and high accuracy rating of ±0.1% realized. Measured data is stored into memory and supported 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.

*The image is
an embedded composite image.

FEATURES

Adopting clear 10.4" TFT color LCD display
· High visibility display with various display functions.
Real time/historical trend screen, bar-graph screen and numeric display 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 stable recording with high speed/accuracy
· High-speed recording of approximately 1sec. for every points and high accuracy of ±0.1% are realized. Stable measuring and recording are possible with high speed. Withstand voltage between input channels is as high as 1000V AC (Excluding resistance thermometer input).

Easy operating and programming without manual
· With touch screen display, operation and settings can be performed easily by touching buttons on the display.

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

Extend inputs with CHINO controllers
· KR3S can communicate with up to 16 CHINO controllers for parameter settings and read/record of measuring values through low-order communications (Option).

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

Support LAN network (Option)
· Through Ethernet communications (Option), various functions such as remote monitoring by a browser, and FTP server, and Email notification etc. are supported.

Analyzing/data acquisition application software (Option)
· It is easy to replay and edit the recorded data file with the software. 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 (optional). 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

KR3S□□-□□□-□□□

Measurement point/sampling rate
21: Input 12 points/1 sec.
41: Input 24 points/1 sec.
61: Input 36 points/1 sec.
81: Input 48 points/1 sec.

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

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

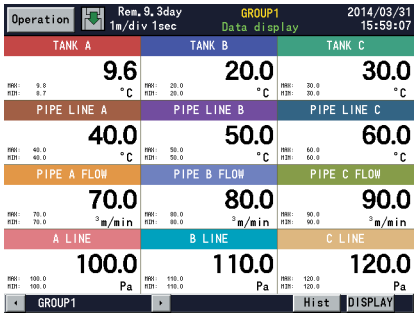
Installation type
A: Panel mounting type
T: With carrying handle and feet (option)

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

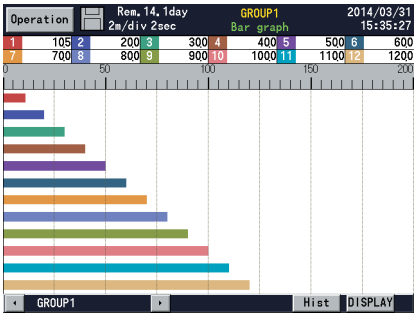
SCREENS

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.

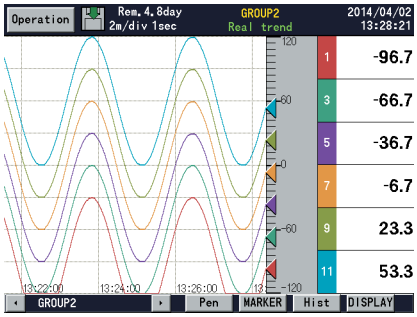
Data screen



Bar-graph screen

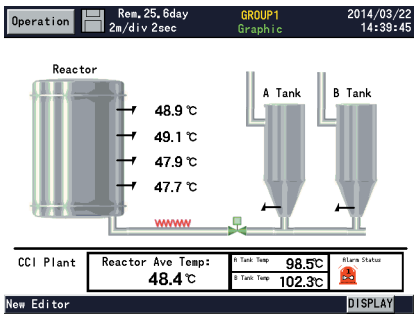


Real-time trend screen



Graphic screen

Enable to create custom display for each user*.

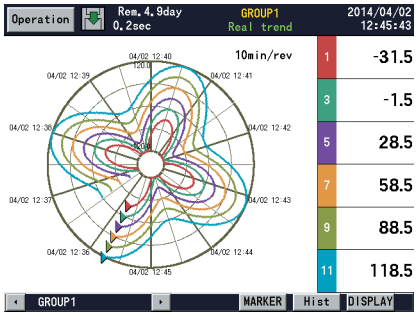


Pen writing

Free writing by 16 colors.

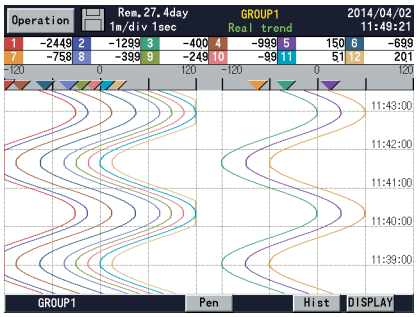
Circular trend screen

High-resolution color and easy to read curve.



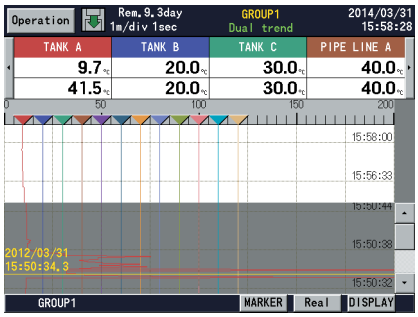
2-Zone screen

Split the trend in 2-zones and monitor.

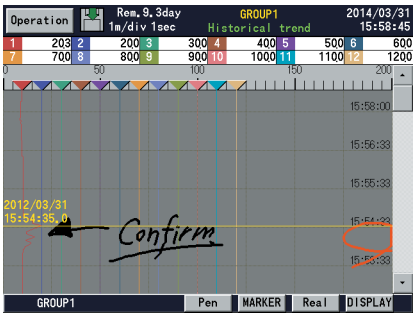


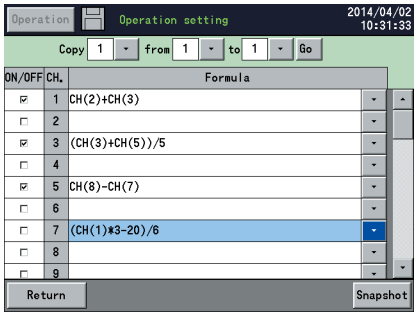
Dual trend screen

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



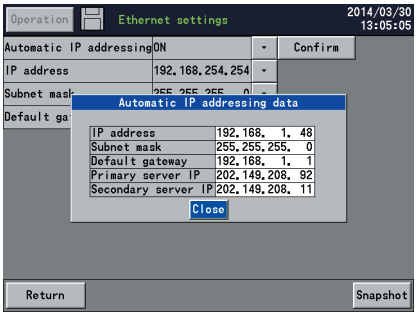
Historical trend screen





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.

INPUT SPECIFICATIONS

Measuring points: 12 points, 24 points, 36 points, 48 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, Pt50, Pt-Co
*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 1sec./ 48 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 disabled)/
DC voltage input (±2V or less) ---1kΩ or less
DC voltage input (±5V or more) ---100Ω or less
Resistance thermometer --- 10Ω or less per wire (same resistance for 3 wires should be the same)
Input resistance: Thermocouple input, DC voltage input --- Approx. 1 MΩ
Maximum input voltage:
DC voltage input (±2V or less)
Thermocouple DC voltage input (burnout disabled) --- ±10VDC
DC voltage input (±5V to ±50V) --- ±60VDC
Dielectric strength between channels:
1000V AC or more between each channels
(High strength semiconductor relay used)
(B terminal of resistance thermometer is shorted inside between channels)
Common mode rejection ratio:
120dB or more
Series mode rejection ratio:
50dB or more

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: 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, tag, measured data, alarm status/types and marker text
Setting parameter --- All parameters
Operation result data
Storing types: Binary/CSV, selectable
Storing methods: Manual start/stop (dedicated touch key operation)
Schedule (designation for time of day and date)
Trigger signal (alarm event, digital input)
Data recording of before and after trigger
*Pre-trigger is selectable.
Measuring numbers of pre-trigger --- Maximum 950 data
Recording group: Up to 6 groups of 56 points can be programmed (Up to total of 128 points)

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

When 24 channels recorded in sampling mode (real data).

Recording cycle	256MB	512MB	1GB	2GB	8GB
1sec	31.6 days	63 days	126.5 days	8.4 months	2.8 yrs

When 36 channels recorded in sampling mode (real data).

Recording cycle	256MB	512MB	1GB	2GB	8GB
1sec	21 days	42 days	84.3 days	5.6 months	1.8 yrs

When 48 channels recorded in sampling mode (real data).

Recording cycle	256MB	512MB	1GB	2GB	8GB
1sec	15.8 days	31.5 days	63 days	4.2 months	1.4 yrs

COMPUTATION SPECIFICATIONS

Computation points: Up to 128 points
Computation cycle: 100ms/ all every 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 capacity of CF card
moving average
Wind direction (displays16 directions)

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 --- 0 to 3600sec.
Alarm settings: AND/OR selectable
Alarm outputs: Refer to optional specifications

DISPLAY SPECIFICATIONS

Display: 10.4"VGA TFT color LCD (640 x480 dots)
Display types: Measured data display (Trend screen, Data screen, Bar-graph screen, Circular trend 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: 48 colors selectable
Display screen group--- Up to 6 groups
Display points --- Up to 56 points/group
Time axis direction --- Vertical, horizontal or circular
Line width --- selectable from 5 kinds
Scale display --- 4 scales
Tag/data display --- Show/hide selectable
Marker display
Numeric Data Display:
Display group--- Up to 6 groups
Display points --- Maximum 56 points/group
Display contents --- Measured value, channel/tag, unit, alarm status

Bar-graph screen: 48 colors selectable
Display screen group --- Up to 5 groups
Display points --- Maximum 56 points/group
Display direction --- Vertical or horizontal
Scale display --- 1 scale
Information display: Alarm display (alarm activation/released history display)
Marker list
File list (file list display of group data file)
Unit information (Model, serial no, option, etc.)
LCD back light: Auto/manual OFF function
Brightness --- 4 levels adjust table

*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

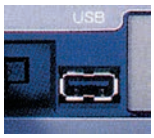
COMMUNICATION FUNCTIONS

Network (Option)

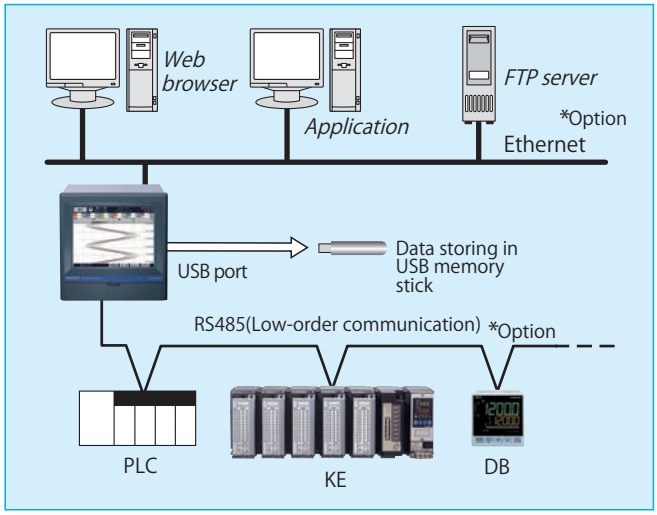
Communications type:
Ethernet (10BASE-T/100BASE-TX)
FTP server: Data file can be read from the network computer
FTP client: Transfer a data file to a network server
SNTP client: The time can be synchronized to the time of SNTP server
Web server: Conformed to HTTP1.0 --- Displays screens, the alarm and information of maintenance by browser software (Internet Explorer 5.0 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

USB Communications

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



CONNECTIVITY



GENERAL SPECIFICATIONS

Rated power voltage: 100 to 240V AC (universal power supply) 50/60Hz
Maximum power consumption:
60VA
Reference operating condition:
Ambient temperature --- 21 to 25°C
Ambient humidity --- 45 to 65%RH
Power voltage --- 100V AC±1.0%
Power frequency --- 50/60Hz±0.5%
Attitude --- Left/right, forward 0°, backward 0°
Warm-up time --- Longer than 30 minutes
Normal operating condition:
Ambient temperature --- 0 to 50°C
Ambient humidity --- 20 to 80%RH
Power voltage --- 90 to 264V AC
Power frequency --- 50/60HZ ±2%
Attitude --- Left/right, forward 0°, backward 0° to 20°
Transport condition (at the packed condition on shipment from our factory):
Ambient temperature --- -20 to 60°C
Ambient humidity --- 5 to 90%RH (No dew condensation)
Vibration --- 10 to 60Hz, 4.9m/s2 (0.5G) or less
Impact --- 392m/s2 (40G) or less
Storage condition: Ambient temperature --- -20 to 60°C
Ambient humidity --- 5 to 90%RH (No dew condensation)
Power failure protection:
Flash memory stores the settings and the data.
Lithium battery backs up the clock and parameter RAM for more than 5 years (provided that the daily operating hours is longer than 8 hours).
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, communication terminals
Case assembly material:
Front bezel --- Polycarbonate and ABS resin (frame)
Case --- Steel
Color: Front bezel --- Black (equivalent to Munsell N3.0)
Case --- Gray (equivalent to Munsell N7.0)
Weight: Approximately 5.6kg (at maximum)
Mounting: Panel mounting
Terminal screws: Power terminals/protective conductor terminals --- M4.0
Measuring input terminals/alarm output terminals/digital input terminals --- M3.5
Communications terminals --- M3.0

SAFETY STANDARDS

IP: Conformed to IEC60529 IP54 (recorder front panel)
CE marking:
EMC directive --- EN61326-1
Low voltage directive --- EN61010-1, EN61010-2-030
Overvoltage (Installation) category II, Pollution Degree 2, Measurement category II

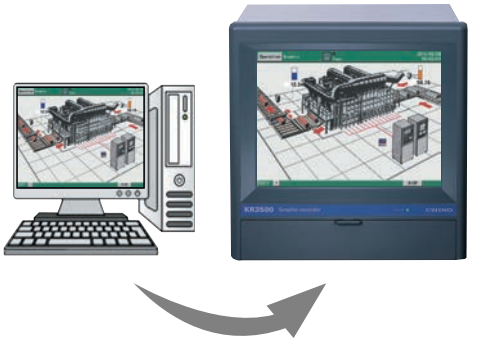
OPTION SPECIFICATIONS

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: 12-channel specification --- 108 points 24-channel specification --- 96 points 36-channel specification --- 84 points 48-channel specification --- 72 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 KR3S 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

MEASURING RANGE/ACCURACY RATINGS

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℃	±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

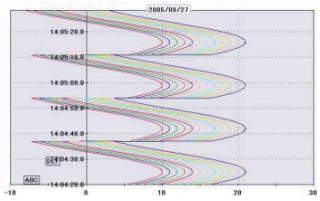
APPLICATION SOFTWARE (Sold Separately)

Data analysis software "ZAILA"

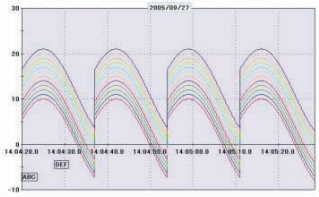
The software is applied for replay display/wave editing operation of recorded data in KR3S series. It has replay display of vertical/horizontal trend and circular trend function, and also analyzing function such as magnify/reduce/partially magnify of graphs and message insert.

Display examples

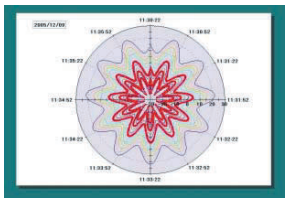
Trend display window (vertical flow)



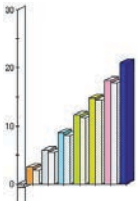
Trend display window (horizontal flow)



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 is changed by changing scroll speed and numbers of renewal data.

Data list display window
Displays registered data as a list display.

Bar-graph
Displays data using bars. Message can be inserted into the 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 feature
Exporting to Excel and converting to CSV file or TEXT file are available.

ENVIRONMENT

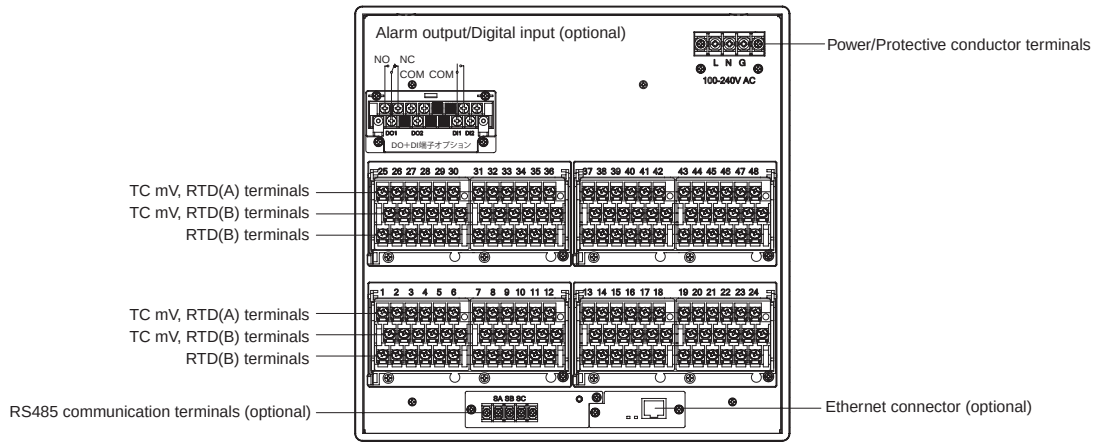
CPU	Your OS recommended CPU and/or upper grade
OS	Windows XP/Vista/7
Memory	Your OS recommended memory or larger
Disk drive	CD-ROM drive: 1 drive or more Hard disk drive: More than 1 drive with free area of at least 100MB
Language	Japanese, English, Chinese (simplified and traditional characters)& Korean

*Above languages are described for computer software only.

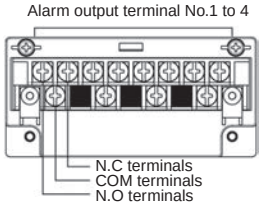
Data acquisition software "KIDS"

On-line acquisition of measured data and replay acquisition data are available.

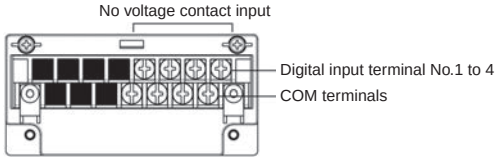
TERMINAL ARRANGEMENT



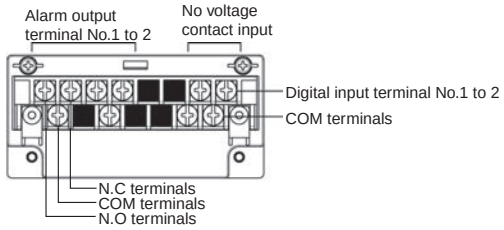
●Alarm relay output (4 points 'c' contact) (optional)



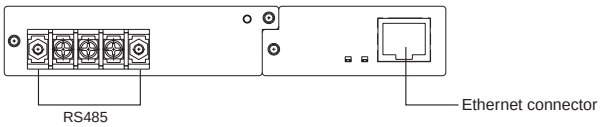
●Digital input (Non-voltage contact input 4 points)(optional)



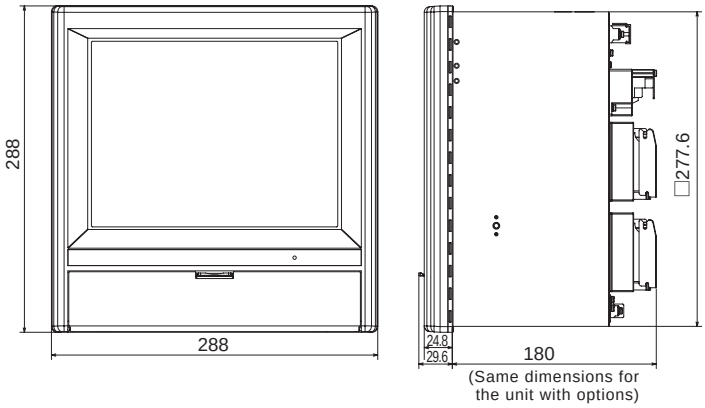
●Alarm relay output (2 points 'c' contact) + Digital input (Non-voltage contact input 4 points)(optional)



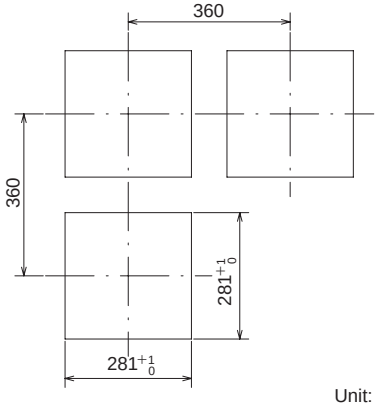
●Communications terminal (optional)



DIMENSIONS



● PANEL CUTOUT AND MINIMUM CLEARANCE



Unit: mm

Specifications subject to change without notice. Printed in Japan (I) 2017. 7

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