

CHINO

Instrumentation, Control and Systems

RECORDERS
CONTROLLERS
RADIATION THERMOMETERS
MOISTURE METERS
SENSORS
THYRISTOR REGULATORS
TRACEABILITY



CHINO CORPORATION

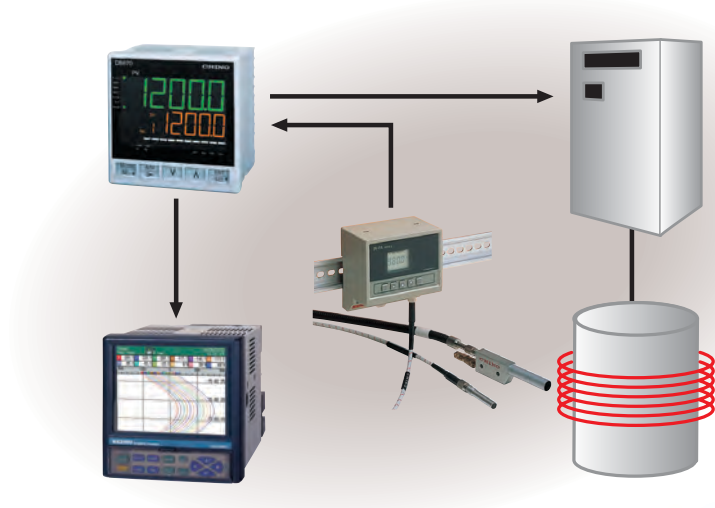
TOKYO JAPAN

<http://www.chino.co.jp>
WEBSITE



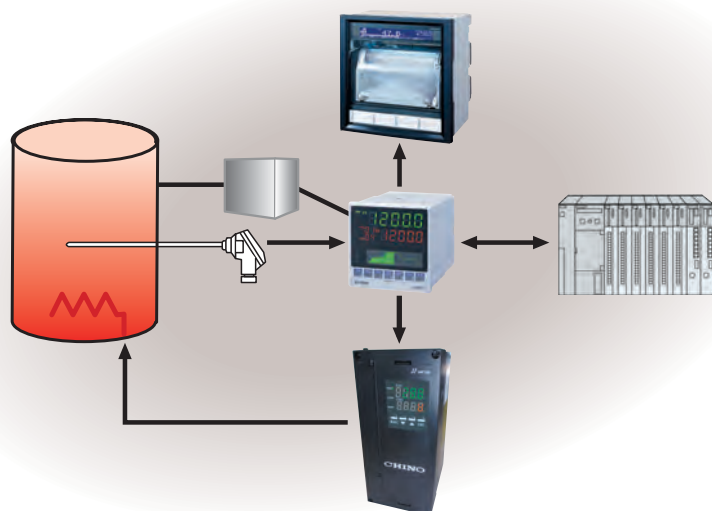
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Vacuum Furnace

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CHINO
LOOP SOLUTION

Control

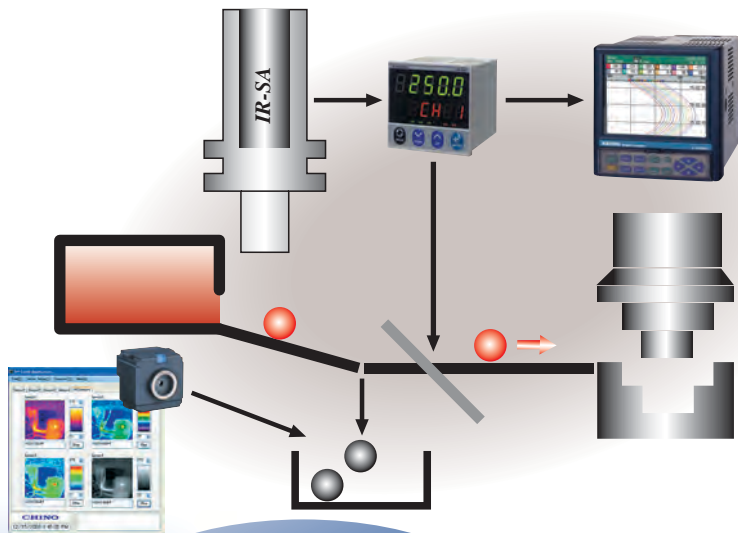
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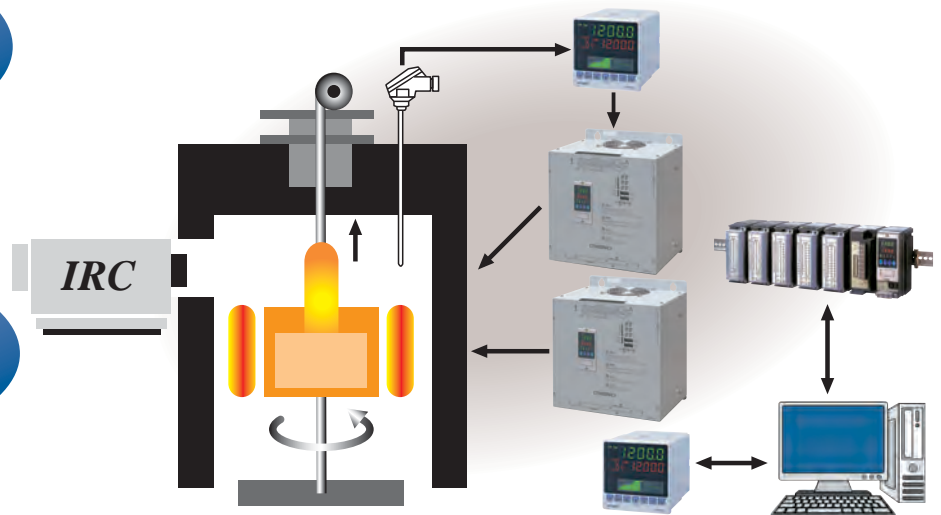
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Monitor

Measurement

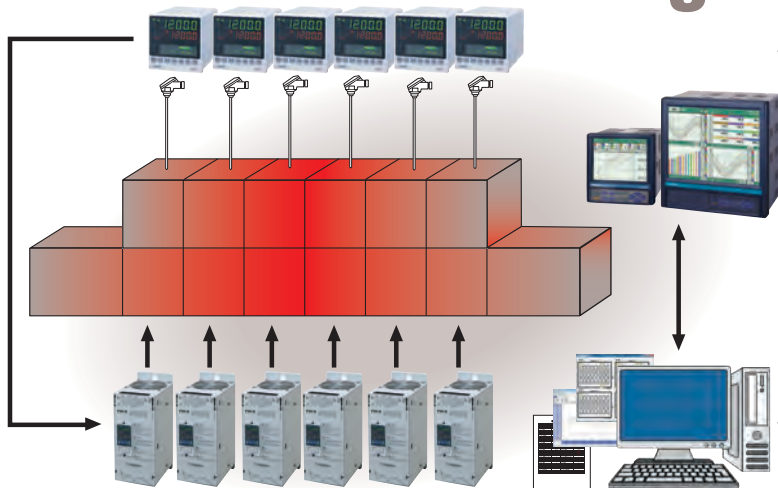
Semiconductors



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RECORDERS

HYBRID MEMORY RECORDER AH4000 AL4000 SERIES

These recorders are a hybrid recorder which employs bright and clear, easy to view LCD display. Measuring value display is prepared as 1 point display, multi-points simultaneous display and digital display + bar graph display.

Various measuring and recording setting can be easily done by front key switch and confirmed by LCD digital display.

- SD card as data storage (512MB, 1GB, 2GB)
- Setting/Recording software available (Standard attached)

Main Specifications

No. of measuring points:

(AL) 6 points (AH) 6, 12, 24 points

(AL/AH) 1 pen, 2 pens, 3 pens, 4 pens

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: $\pm 0.1\%$ ± 1 digit (DC voltage input)

Chart speed: 1 to 1500mm / h (Dotting type)
1 to 600mm / h, 1 to 200mm/min (pen type)

Power supply: 100 to 240VAC, 50/60Hz

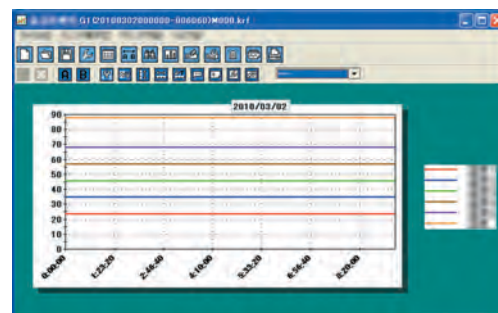
Communications: Ethernet, RS232C, RS422A, RS485 (Option)

Dimensions: (AL) 144 X 144 X 216mm
(AH) 288 X 288 X 216mm



AH4000

AL4000



Data Analysis Software

GRAPHIC RECORDER KR2000 KR2S SERIES



KR2000

KR2S

KR2000 & KR2S Series are network-compatible paperless recorders with high performance and high operating function employed high visibility 5.6" & 5.7" TFT color LCD display. Furthermore KR2S series has touch panel function.

The recorder can be used for various applications such as data management, research, development, remote and wide range monitoring by utilizing internet environment.

- 6 or 12 channels measurement at sampling rate of 1sec or 100ms
- Simple no-manual operations. Large data memory

Main Specifications

No. of measuring points:

6, 12 points

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: $\pm 0.1\%$ ± 1 digit (DC voltage input)

Power supply: 100 to 240VAC, 50 / 60Hz

Communications: Ethernet, RS232C, RS422A, RS485 (Option)

Dimensions: (KR2000) 144X144X204mm
(KR2S) 144X144X235.7mm

GRAPHIC RECORDER KR3000 KR3S SERIES



KR3000

KR3S

KR3000 & KR3S Series are network-compatible paperless recorders with high visibility max. 12.1" TFT color LCD display and touch panel operation system. High speed of fastest sampling rate 100ms for 48 points and high accuracy of $\pm 0.1\%$ were realized, and measured data is stored into internal memory and maximum 8GB compact flash card (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.

- Max large sized 12.1" TFT color LCD touch panel display
- Large capacity of data memory and various recording method
- Multi points recording with high speed/high accuracy

Main Specifications

No. of measuring points:

12, 24, 36 and 48 channels

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: $\pm 0.1\%$ ± 1 digit (DC voltage input)

Power supply: 100 to 240VAC, 50 / 60Hz

Communications: Ethernet, RS232C, RS422A, RS485 (Option)

Dimensions: (KR3000) 288X288X218mm
(KR3S) 288X288X180mm

RECORDING AND DATA LOGGING

HYBRID RECORDER KH4000 KL4000 SERIES



KH4000

KL4000

KH4000 Series hybrid recorders realize simple and easy operation as analog recorders.

Not only can each measured value be read from the custom made analog scale plate which incorporates input type and measurement value input, but a comprehensive LED display also enables precise digital measurements to be taken by the user.

■ Main Specifications

No. of measuring points:

(KL) 6 points (KH) 6, 12, 24 points

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: $\pm 0.1\% \pm 1$ digit (DC voltage input)

Power supply: 100 to 240VAC, 50 / 60Hz

Communications: Ethernet, RS232C, RS422A, RS485 (Option)

Dimensions: (KL) 144 X 144 X 216mm
(KH) 288 X 288 X 216mm

HYBRID RECORDER LE5000 SERIES



LE5000 series are 250mm hybrid recorders with multi-range input.

Innovative design high performance recorder provides high accuracy $\pm 0.05\%$; high speed sampling 0.1 second for 36 points and high speed recording, 3 seconds/line. Simple operational keys and PC setting functions drastically improved usability of recording system.

- High speed sampling at 0.1 sec for 36 points and high-speed recording
- Operation keys are functionally designed for ease of use
- High accuracy of 0.05%

■ Main Specifications

No. of measuring points:

12, 24 or 36 channels

Input signals: DC voltage 8 kinds, Thermocouple 28 kinds, Resistance thermometer 8 kinds, DC current (shunt resistors)

Accuracy ratings: $\pm 0.05\% \pm 1$ digit (DC voltage)

Power supply: 100 to 240VAC, 50/60Hz

Communications: Ethernet, RS422A, RS485 (option)

ANALOG RECORDERS EH3000 EL3000 ES600 SERIES



EH3000 DOT

EH3000 PEN



EL3000 DOT

EL3000 PEN



ES600

1 to 12-point, dotting types and 1 to 3-pen types are available.

- Various options for many applications
- High accuracy on 180mm industrial recorders
- Robust analog recorders

■ Main Specifications

No. of measuring points:

(EH3000 DOT) 1 to 12 points (EH3000/EL3000 PEN) 1 to 3 pens

(EL3000 DOT) 1 to 6 points

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: (EH) $\pm 0.25\% \pm 1$ digit (DC voltage input)

(EL) $\pm 0.5\% \pm 1$ digit (DC voltage input)

Power supply: 100 to 240VAC, 50 / 60Hz

1-point, 2-point, 3-point, 6-point dotting types and 1 to 3-pen types are available.

- Small and light-weight
- Various models and options

1-point, 2-point, 3-point, 6-point dotting type and 1-pen types are available in the recorders.

- Small and light-weight (depth-200mm)
- Reliable self-balancing type

■ Main Specifications

No. of measuring points:

1 to 6 points, 1pen

Input types: DC voltage, DC current, Thermocouple, Resistance thermometer

Accuracy rating: $\pm 1.0\% \pm 1$ digit (DC voltage input)

Power supply: 100 to 240VAC
50 / 60Hz

DIGITAL INDICATING CONTROLLERS

DIGITAL INDICATING CONTROLLERS DB600 SERIES



DB670

DB650

DB630

The DB600 series have three types of size (DB670...96 x 96mm, DB650...48 x 96mm, DB630...48 x 48mm). Various functions including universal input and multiple setting values (8 types) are provided as standard.

- Large easy-to-view 5 digit display
- Highly-functional operation screen and setting screen
- Simple program (4 patterns, 12 steps)

Main Specifications

Input type :	Thermocouple (B,R,S,K,E,J,T,N,others)
	Resistance thermometer (Pt100, JPt100, Pt50)
	DC voltage ($\pm 20\text{mV}$, $\pm 100\text{mV}$, $\pm 5\text{V}$, $\pm 10\text{V}$)
Accuracy rating :	$\pm 0.1\%$ of FS ± 1 digit of measuring range
Control system :	PID system or Z control
Output type :	ON-OFF pulse output, ON-OFF servo output (DB650 and DB670 only), Current output, SSR drive pulse output, Voltage output
Power supply :	100 to 240VAC or 24VAC/24VDC
Communication interface :	DB670 RS422A, RS485(option) DB650 RS422A, RS485(option) DB630 RS485(option)
Dimensions :	DB670 96 x 96 x 73mm DB650 48 x 96 x 73mm DB630 48 x 48 x 88mm

DIGITAL INDICATING CONTROLLERS LT/LTA SERIES



LT110

LT230

LT23A

LT35A/37A

LT45A/47A

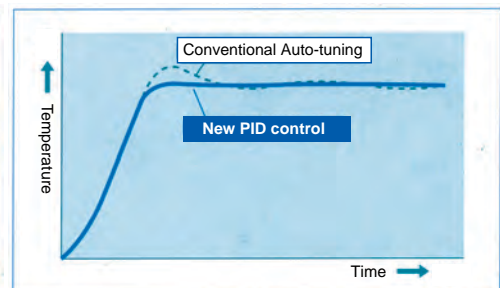
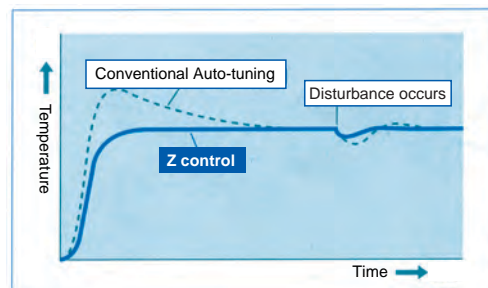
	LT110	LT230	LT23A	LT35A/37A	LT45A/47A
Input type Thermocouple	K,E,J,N	B,R,S,N,K,E,J,T,U,L			
Resistance thermometer	Pt100,JPt100				
DC voltage	—	±5V	0 to 5V		
DC current	—	4 to 20mA			
Accuracy rating Thermocouple	±0.3% of ± 1 digit or ±2°C, whichever larger	±0.25% of FS	±0.5% of FS	±0.2% of FS	±0.1% of FS
Resistance Thermometer	±0.2% of scale range ± 1 digit	± 1 digit	± 1 digit	± 1 digit	± 1 digit
Sampling	250msec	500msec	500msec	300msec	100msec
Control system	PID system (2-position is available)		PID system (2 types of algorithm)		
Output type	ON-OFF pulse, SSR drive pulse, Current output	ON-OFF pulse, SSR drive pulse, Current output, Voltage output			
Power supply	100 to 240VAC		100 to 240VAC 24 to 48 VDC		100 to 240VAC 21.6 to 26.4VDC
Dimensions (mm)	96 x 96 x 127	48 x 48 x 122	48 x 48 x 60	48 x 96 x 65 / 96 x 96 x 65	

Z Control (Economical control)

Z control is a control algorithm learned from plants. Compared to conventional control algorithm, Z control is the algorithms that keeps start-up speed and improves overshoot suppressive effect, energy saving effect, disturbance suppressive effect and shorten the settling time. Hemothermal nature of organism is robust to the environmental change and energy saving structure. Z control includes this ecological algorithm and compared to conventional control, it improves robustness of energy saving effect, parameter variation and load variation. For the compatibility with PID control, parameter is similar parameter as PID control.



Skunk cabbage (white arum)



EASY-TO-OPERATE AND ABUNDANT FUNCTIONS

DIGITAL INDICATING CONTROLLERS DB SERIES

The DB series is a 96 x 96mm digital indicating controller with the indicating accuracy of $\pm 0.1\%$ and the control cycle of approximately 0.1 seconds.



DB1000

Various function including universal input and multiple setting values (8 types) are provided as standard.

- Large easy-to-view 5 digit display
- Highly-functional operation screen and setting screen
- Outstanding controllability
- Conforming to international safety standards and CE marking and conforming to RoHS

■ Main Specifications

Input type : Thermocouple (B,R,S,K,E,J,T,N,others)
Resistance thermometer (Pt100,Pt-Co,others)
DC voltage ($\pm 10\text{mV}$, $\pm 20\text{mV}$, $\pm 50\text{mV}$, $\pm 100\text{mV}$,
 $\pm 5\text{V}$, $\pm 10\text{V}$)
Accuracy rating : $\pm 0.1\%$ of measuring range ± 1 digit
Control system : PID system or Z control
Output type : ON-OFF pulse, ON-OFF servo, Current output,
SSR drive pulse, Voltage output
Power supply : 100 to 240VAC or 24VAC/24VDC
Communication interface : RS232C, RS422A, RS485(option)
Dimensions : 96 x 96 x 127mm

PROGRAM CONTROLLERS KP SERIES

The KP1000 series is a 96 x 96mm digital program controller with the indicating accuracy of $\pm 0.1\%$ and the control cycle of approximately 0.1 seconds and maximum 19 program patterns (maximum 19 steps/pattern).



KP1000

Various function including the whole program pattern display screen and universal input are provided as standard.

- Large easy-to-view 5 digit display
- Highly-functional operation screen and setting screen
- Easily identifiable pattern progress display
- Outstanding controllability
- Conforming to international safety standards and CE marking and conforming to RoHS

■ Main Specifications

Input type : Thermocouple (B,R,S,K,E,J,T,N,others)
Resistance thermometer (Pt100,Pt-Co,others)
DC voltage ($\pm 10\text{mV}$, $\pm 20\text{mV}$, $\pm 50\text{mV}$, $\pm 100\text{mV}$,
 $\pm 5\text{V}$, $\pm 10\text{V}$)
Accuracy rating : $\pm 0.1\%$ of measuring range ± 1 digit
Control system : PID system
Output type : ON-OFF pulse, ON-OFF servo, Current output,
SSR drive pulse, Voltage output
Power supply : 100 to 240VAC or 24VAC/24VDC
Communication interface : RS232C, RS422A, RS485 (option)
Dimensions : 96 x 96 x 127mm

DIGITAL INDICATING CONTROLLERS CP SERIES

CP350/370 series is CHINO new digital indicating controller. High function and optional programmed control mode are provided.



CP350

CP370

- Adopt MODBUS communications mode, CE marking
- Universal power supply (100-240V AC)
- More programmed control mode
- Can select the PID mode from total PID type or differential type

■ Main Specifications

Input type : Thermocouple (B,R,S,K,E,J,T,N,others)
Resistance thermometer (Pt100,JPt100)
DC voltage ($\pm 5\text{V}$)
Accuracy rating : $\pm 0.25\%$ of measuring range ± 1 digit
Control system : PID system
Output type : ON-OFF pulse, Current output,
SSR drive pulse, Voltage out put
Power supply : 100 to 240VAC
Dimensions : CP350...48 x 96 x 132 mm
CP370...96 x 96 x 132 mm

PROGRAM CONTROLLERS DP-G SERIES

The DP-G series is graphic program controller employed high visibility 5.6" TFT color LCD display. Maximum 200 types of program pattern (Maximum 4000 steps) are stored and performance pattern is selectable.



DP1000G

- Easy program pattern setting on graphic screen
- High performance and universal input
- Storing settings in CF card

■ Main Specifications

Input type : Thermocouple (B,R,S,K,E,J,T,N,others)
Resistance thermometer (Pt100,JPt100,others)
DC voltage ($\pm 10\text{mV}$, $\pm 20\text{mV}$, $\pm 50\text{mV}$, $\pm 100\text{mV}$,
 $\pm 5\text{V}$, $\pm 10\text{V}$)
DC current (20mA)
Accuracy rating : $\pm 0.1\%$ of measuring range ± 1 digit
(DC voltage/current input)
Control system : PID system
Output type : ON-OFF pulse type, ON-OFF servo type ,
Current output type, SSR drive pulse type,
Voltage output type
Power supply : 100 to 240VAC ,50/60Hz
Dimensions : 144 x 144 x 252mm

INFRARED RADIATION THERMOMETERS

HIGH-SPEED INFRARED RADIATION THERMOMETER IR-CZ SERIES



- Reduced optical error measurement caused by dust and contaminants
- High response, 2 to 15ms
- Significantly effective for distinctive applications:
 - Ceramic high-temp. baking process
 - Crystal growing

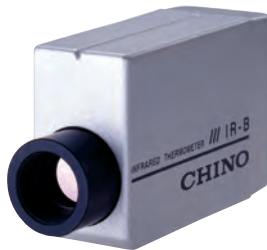
■ Main Specifications

Temperature range:
350 to 2000°C / 400 to 3100°C / 500 to 3500°C
Response time: 2 to 15ms
Analog output: 4 to 20mADC

INFRARED RADIATION THERMOMETER IR-BA SERIES

The IR-BA series is a non-contact and high-speed compact radiation thermometer. The card sized detector with built-in converting function of 4-20mA output signal can easily be installed in narrow places, production lines and small equipment.

A standard speed type and a high speed type (50ms/95%) are respectively available for these standard type and small-target/short-distance type and small-target/long-distance type, and also various applicable types like as glass, lamp-anneal, film and burning gas.

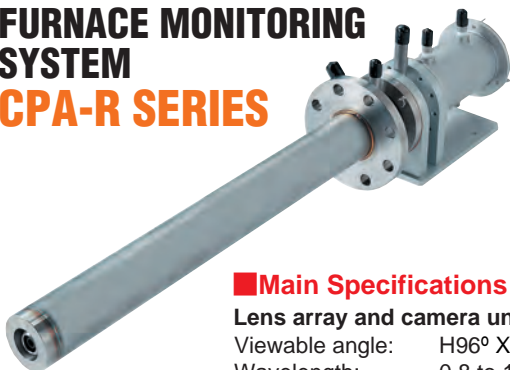


- High response: Standard: 100ms, High-speed: 50ms
- Compact & lightweight: W32XH56XD100mm, 220g

■ Main Specifications

Detecting element/measuring wavelength: Thermopile
Temperature range:
0 to 300°C, 0 to 600°C
Output: 4 to 20mADC
Power supply: 12 to 24VDC

FURNACE MONITORING SYSTEM CPA-R SERIES



■ Main Specifications

Lens array and camera unit
Viewable angle: H96° X 70° (100° Lens)
Wavelength: 0.8 to 1.0μm
Temperature range: 700°C to 2500°C
(Assignable span: 200°C to 500°C)
Accuracy: ±1% at full scale (black body)

INFRARED RADIATION THERMOMETER IR-CA SERIES

The IR-CA product line of non-contact infrared thermometers provides broad selection of units to match your applications and requirements for non-contact temperature measurement. The product line consists of 15 different series grouped into general purpose and application specific models.



- Functional digital display and parameter setup keys
- High accuracy, high-speed response, high reliability
- High distance factor in focusable model to enable ease of installation
- Optional RS485 communications
- Remote setup and monitoring by IR-GZ connectable up to 32 IR-CA
- Software package IR-VXC1E
- Variety of accessories to protect the IR-CA under harsh environment

FIBER OPTIC RADIATION THERMOMETER IR-FA SERIES

The IR-FA series is a fiber optic radiation thermometer featuring multi-function and high-speed response (10ms). Three types: single-color type for low temperature; single-color type for medium/high temperature and two-color type, are available.



- Low temperature type with high-speed response and short wavelength enables to measure objects with low emissivity like as metals.
- Medium/high temperature type with high accuracy ±0.5 to 1% for 1000 to 2000°C) and high-speed response is for various temperature measurement fields.
- Two-color type is stable with less effectiveness of smoke, vapor, dust and lack-of-view.

■ Main Specifications

Detecting element/measuring wavelength:
Single-color type: PbS / 2.0μm, InGaAs / 1.55μm, Si / 0.9μm,
Two-color type: Hybrid element 0.9 / 1.55μm,
Output: 4 to 20mADC
Power supply: 24VDC

The CPA-R series utilizes a CCD camera, which has sensitivity at 1.0μm and image processing unit that provides an image and converts video signal from the camera into temperature information.

The special high temperature optics lens array system can be inserted through a small insertion hole on many types of furnaces.

The image processing unit has an 8.3" LCD touch panel that displays wide-angle image and temperature information. It also provides the capability of up to 40 points of contact Inputs/outputs as well as 32 points of analog outputs through an external I/O unit.



Image processing unit

Camera control: Up to 3 Cameras
Display: 8.4" Color LCD (touch panel)
External input/output: Contact output max 40 points
Protective Structure: IP65 (Front Panel)

NON-CONTACT TEMPERATURE MEASUREMENT

PALM SIZED INFRARED RADIATION THERMOMETER IR-TE2

Washable!!

Non-contact temperature measurement in one second!!

Model IR-TE2 palm-sized infrared thermometer is designed to measure the surface temperature of objects without making contact with them. The built-in laser sighting pinpoints the center of the area being measured on the target.

- Conforms to IP67 (dustproof and waterproof) and washable.
- ABS resin housing with sanitary specification fits in your safety program. CE marking
- Wide temperature range of -40 to 300°C (-40 to 572°F) - °C/°F selectable



ON-LINE INFRARED RADIATION THERMOMETER IR-SA SERIES



The IR-SA series of infrared Radiation thermometer provides broad selection of small and robust units to match your on-line applications for non-contact temperature measurement from 0 to 2500°C under harsh environment. Four models are available with MODBUS connectivity for parameter setup through remote setting unit or PC.

- Withstand temperature 90°C, IP67, CE marking
- Fast response time of 0.002 seconds for IR-SAI/IR-SAS
- RS485 MODBUS connectivity
- Telescope or laser pointer for targeting

RADIATION DIGITAL THERMOMETER IR-AH SERIES



The hand-held thermometer offers a wide measuring range of 600°C to 3000°C for IR-AHS, 900°C to 3000°C for IR-AHU, and 50°C to 1000°C for IR-AHT, digital display of the measured value in view-finder and LCD display, plus storage of measured data.

- A data logging software package for easy data treatment
- CE marking

■ Main Specifications

Detecting element: Si, Thermopile
Power supply: 4AA batteries

HAND-HELD TYPE INFRARED RADIATION THERMOMETER IR-TAP

The IR-TA series hand-held type thermometer is easy to use and can be applied to a variety of applications. The built-in laser sight helps to pinpoint a measured spot accurately.

- Temperature range: -40 to 500°C
- Spot size: $\phi 30 / 1000\text{mm}$
- CE marking



RADIATION THERMOMETER IR-H SERIES



The handheld thermometer is a small and lightweight with a clear view-finder. The direct view-finder enables to measure a small object with a long distance.

- Temperature range from 400°C to 3000°C (IR-HQH)
- CE marking
- Low temperature area and emissivity are measured by connecting a K-type thermocouple separately prepared.

■ Main Specifications

Detecting element: Si (IR-HS), InGaAs (IR-HI), Si/InGaAs (IR-HQH)
Response time: 0.2 seconds
Power supply: 2AA batteries

THERMAL IMAGING SENSOR

HAND-HELD TYPE THERMAL IMAGING SENSOR TP-S

The TP-S series is a ultra small handy thermal image sensor both industrial and commercial use.

- Temp.range of -10 to 180°C
- 2000 pixel resolution
- Just one click operation and instant glance
- Temperature range: -10 to 180°C
- ABS resin(anti bacterial)
- CE marking



THERMAL IMAGING SENSOR TP SERIES

The TP series is a compact infrared thermal imaging sensor utilizing a thermopile array detector.

- Easy to use and implement
- 2000 pixel resolution
- Built-in alarms
- IP65/NEMA4, CE marking

■ Main Specifications

Temperature range: -20 to 300°C, 100 to 800°C
Resolution: 0.5°C (At black body temperature of 100°C)
Accuracy: $\pm 2\%$ of reading or $\pm 3^\circ\text{C}$ whichever larger (At ambient temp of $25^\circ\text{C} \pm 2^\circ\text{C}$)
Power supply: 12 to 24VDC



THERMAL IMAGING SYSTEM CPA-L SERIES



Fixed mount type thermal image measuring device for online monitoring, measurement, and inspection

The CPA-L series consists of a fixed mount type camera using an uncooled element and a controller.

The camera, supporting measuring wavelengths of 8 to 14 μm and a temperature detecting range of -40°C to 500°C, is compact, lightweight, and excellent in dust and drip proofing performance.

The controller has image processing functions such as binarization and particle analysis functions in addition to the temperature measurement processing function and can provide output via a LAN and as analog/digital signals.

TEMPERATURE / HUMIDITY SENSORS

HANDHELD TYPE TEMPERATURE/HUMIDITY METER HN-EH SERIES

Speedy, lightweight, high accuracy !!

Measurement in 30-seconds level !!

HN-EH series is accurate handheld type temperature/humidity meter with the measuring range of -20 to 70°C (sensor built-in type -10 to 45°C) and 5 to 95%RH. Two types of model, simple basic type (sensor built-in type only) and standard type (sensor built-in type and probe type), can be selected to meet various applications requirement.

- Overriding fast response time, measurement 30-seconds level
- Small, lightweight (sensor built-in type approx. 120g) and easy operation
- Low running cost, built-in type sensor unit is interchangeable by user

■ Main Specifications

Measuring range:	Temperature -10 to 45°C (Sensor built-in type) -20 to 70°C (Probe type) Relative humidity 5 to 95%RH (no dew condensation) Dew point temperature -35 to 55°C (standard type only)
Measuring resolution:	Temperature 0.1°C, Relative humidity 0.1%RH
Response:	Temperature 40 seconds or less (under 0.5m/s ventilation, 90% step response of approx. 50°C → 25°C) Humidity 40 seconds or less (25°C constant, under 0.1m/s ventilation, 90% step response of approx. 30%RH → 50%RH)
Standard:	CE marking

DIGITAL THERMOMETER FOR FOODS MODEL MF1000

The portable thermometer model MF1000 is combined with a needle type sensor for measurement of internal temperature of foods or liquid temperature.



- Washable and anti-bacteria surface housing

■ Main Specifications

Temperature range:	-40 to 260°C
Measuring accuracy:	±0.5°C
Response time:	2 seconds
Sensor:	K type thermocouple
Sealing:	IP67 (waterproof and dustproof)
Standard:	CE marking

ROLLER SURFACE THERMOCOUPLES C015 SERIES



The thermocouples are designed for non-contact measurement of surface temperature of moving or rolling materials such as heating rollers, moving belts and plastic sheets.

- Built-in compensating circuit for the difference between actual temperature and adjustment atmospheric temperature
- Affection-free from emissivity of surface

■ Main Specifications

Element:	K type thermocouple
Measuring accuracy:	Within ±5°C in 200°C span
Measuring distance:	1 to 2mm (fixed)
Output:	E.M.F. of K type thermocouple

PALM-SIZED TEMPERATURE/HUMIDITY METER HN-CH SERIES

The HN-CH series is reliable and accurate palm-sized temperature/humidity meter with the humidity range of 0 to 100%RH by using a newly developed capacitance type humidity sensor. The data logging function capable to store each 8000 readings of temperature and humidity into memory is built-in.



- Three types of sensors, sensor built-in type, probe type and separated type available for various applications

■ Main Specifications

Relative humidity

Sensor:	High-polymer capacitance type
Measuring range:	0 to 100% RH
Accuracy rating:	±2%RH

Temperature

Sensor:	Semiconductor type
Measuring range:	-10 to 50°C
Accuracy rating:	±0.5°C
Data logging:	Temperature and humidity -each 8000 data (16000 data in total)
Display:	Current data, replaying data, parameters
Communications interface:	RS232C or RS485
Power supply:	2AA batteries or 100-240 V AC (with AC adapter; sold separately)
Standard:	CE marking

SELECTION FROM VARIOUS SENSORS FOR EACH APPLICATION

HANDHELD DIGITAL THERMOMETER MC1000 SERIES

MC1000 is a handheld digital thermometer having an easy-to-read large LCD display and light weight. A range of temperature probes with a variety of shapes and sizes to suit the application requirements.

- Dual displays for measured data and arithmetic result
- Multi-input (thermocouple/RTD) allows various applications
- Exclusive connector prevents accidental probe disconnection

■ Main Specifications

Measuring range: Thermocouple type K -200 to 1370°C
T -200 to 400°C
-200 to 500°C

Display: 3-1/2 digital LCD with backlight

Computation: Max/min/average/relatives

Power supply: 2AA batteries

Standard: CE marking

Dimensions: 76(W) X 164(H) X 36.3(D)mm



TEMPERATURE CARD LOGGER MR SERIES

MR series is a small size and light-weight card logger. Various types of external mounting sensors including a built-in type are available.

- A traceability or inspection certificate, which can be used for HACCP or ISO9000, is available. (Separate purchase required)
- Capable to store up 6000 data per channel
- Conforms to CE marking and IP64

■ Main Specifications

Measuring range: -40 to 60°C, 0 to 100°C, 50 to 150°C

Accuracy rating: $\pm 1.0^\circ\text{C} \pm 1 \text{ digit}$
($\pm 0.5^\circ\text{C} \pm 1 \text{ digit}$ for -5 to 50°C)

Sensor: Automatic switchover of built-in/external sensor. External sensor operates when it is connected

Measuring range of the built-in sensor: -40 to 60°C

Number of storing data: 6000 data (about 8-month data storage at 60-minute measuring interval)

Storing mode: Automatic stop mode under specified conditions or endless mode by a PC

Communications: Built-in (connection to a PC through a data readout unit)

Standard: IP64, CE-marking

External dimensions: 54(W) X 110(H) X 20.5(D)mm

Weight: 95g (including batteries)

Power supply: 2AAA batteries

Battery life: Approx. 1 year (at 25°C and 10-minute interval)



THERMO HYGROMETER HN-C SERIES

HN-C series using developed humidity element features high performance and reliability 2-wire transmission type thermo-hygrometers for the wide measuring range of 0 to 100%.

Models with temperature output of 3-wire type Pt100 is available. Wall-mount type, separated type and inserting type are available for various application.

Heat-resistive and separated type, which can be used in operating temperature of -40 to 180°C is available, too.

■ Main Specifications

Humidity

Measuring range: 0 to 100% (no dew condensation)

Accuracy range: $\pm 2\% \text{RH}$ (at 0 to 90%RH and 25°C)
 $\pm 3\% \text{RH}$ (at 90 to 95%RH and 25°C)

Coefficient of relative humidity / temperature: $\pm 0.1\% \text{RH} / ^\circ\text{C}$ (at 5 to 80°C)

Temperature

Measuring range: -40 to 180°C

Accuracy range: $\pm 0.3^\circ\text{C}$ ($\pm 0.5^\circ\text{C}$ Heat-resistive separated type)



HANDY LOGGER MR2041 SERIES

Handy logger MR2041 is a palm size data logger, it is capable of storing up to 1000 temperature data per each channel. Power supply of logger is selectable from AA battery or AC adaptor, so it is usable as a portable type logger or fixing type logger. Using the exclusive software, recording/recalling of data and programming of logging parameters can be executed with logger or through a PC.

- Input signals: thermocouple, K, E, J, T, 0 to 5V, 0 to 20mA
- Simultaneous 4 channels, measurement and display
- Data processable through a PC

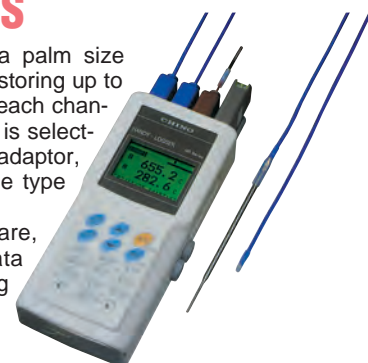
■ Main Specifications

Measuring range: Thermocouple K -200.0 to 1370.0°C
E -200.0 to 700.0°C
J -200.0 to 700.0°C
T -200.0 to 400.0°C

DC voltage 0 to 5V (scale -9999 to 9999)

DC current 0 to 20mA (scale -9999 to 9999)

Accuracy rating: Thermocouple $\pm (0.1\% \text{ of measuring value} + 0.3^\circ\text{C})$ ($> -100^\circ\text{C}$)
 $\pm (0.1\% \text{ of measuring value} + 0.6^\circ\text{C})$ ($< 100^\circ\text{C}$)
DC voltage $(0.1\% \text{ of measuring value} + 0.2\% \text{ of range})$



ON-LINE MEASUREMENT OF INFRARED MULTI ANALYZER, MOISTURE (THICKNESS) METERS

INFRARED MULTI ANALYZER IM SERIES

- Up to 10 wavelength, capable of measuring 4 constituents
- Ethernet, MODBUS communications
- High-speed & High-repeatability (28ms)
- Self-diagnostic function, easy maintenance

■ Main Specifications

Measuring system: Infrared reflection type

Measuring wavelength: Up to 10 wavelengths

Measuring scope: Up to 4 constituents

Computing function: Ratio calculation for 2-color or 3-color, and multiple regression calculation

Calibration curve: Linear, quadratic, cubic and multiple regression line

The IM series is on-line multi analyzer utilizing the infrared absorption. Converting capabilities are built into the compact designed detector unit for easy installation and operation.



THYRISTOR REGULATORS

SINGLE/THREE-PHASE THYRISTOR REGULATORS

JU/JW SERIES

The JU/JW series of thyristor regulators feature a compact size and light weight and enable high-density installation. Their methods of control include two ways, the phase-angle control and zero-cross control systems. In the phase-angle control systems, the voltage, current and power feedback control types and a type without feedback control are available for the selection of an optimum type according to the characteristics of the heater used.



- Compact, lightweight and high-density installation
- Phase-angle firing and zero-cross firing are selectable
- Setting communication unit displays voltage, current, power and heater measurement values, and enables parameter setup and operation selection
- Prepare heater disconnection alarm and current limiter

■ Main Specifications

JU

Phase: Single phase
 Rated voltage: 100, 110, 120, 200, 220, 240, 380, 400, 440V AC (to be specified)
 Rated frequency: 50/60Hz (automatic selection)
 Rated current: 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 750, 1000A (to be specified)

JW

Phase: Three phase
 Rated voltage: 200V AC (200V/220V/240V selectable)
 400V AC (380V/400V/440V selectable)
 Rated frequency: 50/60Hz (automatic selection)
 Rated current: 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 750, 1000A (to be specified)

SINGLE-PHASE THYRISTOR REGULATORS

JB SERIES

The small and lightweight thyristor regulators for single-phase loads are characterized with high panel installation density.

Two control systems, a phase-angle firing system for continuous power control and a zero-cross firing system, are built-in and selectable for various applications and power environment.

The applications include small electric furnaces, calibration bath, casting dies heating and heating units for laboratory use.



THYRISTOR REGULATORS JJ SERIES

*Built-in Setting
Communication
display unit*

Coming soon!



- Display voltage/current/power & heater resistance
- Easy setting for parameter such as elevation, soft-start and so on
- Outputs data to PLC or PC with communication function (option) and parameter can be changed from host unit
- Alarm contents are displayed when alarm is activated. Output alarm contact from AL1 and AL2 depending on the situation
- Phase-angle firing and zero-cross firing are selectable
- Switching between feedback and non-feedback of voltage, current and power in phase angle firing are possible
- Switching between fixed time base and variable time base in zero cross firing are possible
- Heater disconnection alarm and current limiter is available as option
- CE marking will be conformed.



■ Main Specifications

Phase: Single-phase
 Rated voltage: 100 to 120 VAC and 200 to 240 VAC (selection by terminals)
 Rated frequency: 50/60Hz (automatic selection)
 Rated current: 20, 30, 40, 50, 75, 100A (to be specified)
 Input signal: 4 to 20mADC, 1 to 5VDC or on-off contact
 Output range: 0 to 98% of rated voltage
 Minimum load current: 0.5A (at 98% output)
 Applicable loads: Resistive load
 Inductive load (transformer primary control and phase control system only)
 Control system: Phase-angle firing and zero-cross firing (selectable)

SHEATH THERMOCOUPLES SHEATH RESISTANCE THERMOMETERS

The temperature sensors filled with high-purity magnesium oxide in protective tube provide excellent response along with vibration resistance and corrosion resistance.

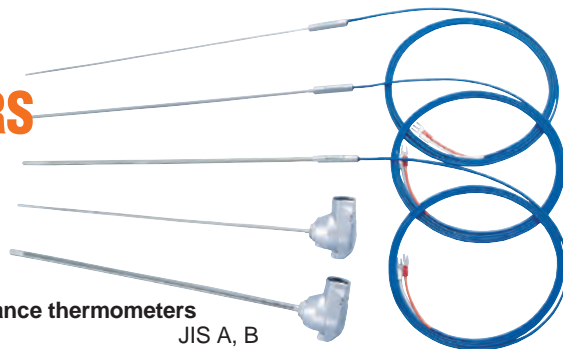
■ Main Specifications

Thermocouples

Class: JIS 1 (class 0.4), 2 (class 0.75)
 Element: K, J, E, T, N, Chino Arroy B (NB), X (XL)
 Measuring temperature: -200 to 1050°C
 Protective tube diameter: 0.15, 0.3, 0.5, 1.0, 1.6, 3.2, 4.8, 6.4, 8.0mmφ
 Protective tube length: 300, 500, 750, 1000, 1500, 2000mm~
 Protective tube material: SUS316, SUS310S, NCF600
 J, E, T...SUS316
 (Protection tube of 0.3 and 0.5mmφ : only available on K element and NCF600)

Resistance thermometers

Class: JIS A, B
 Element: Pt100, JPt100, 3-wire
 Nominal current: 2mA, 1mADC
 Measuring temperature: -200 to 500°C
 Protection tube diameter: 3.2, 4.8, 6.4, 8.0mmφ
 Protection tube length: 300, 500, 750, 1000, 1500, 2000mm
 Protection tube material: SUS316



TRACEABILITY

SMALL TYPE LOW TEMPERATURE COMPARATIVE CALIBRATION EQUIPMENT

KT-H SERIES

Realize low temperature calibration at -100°C and compact & light weight body.
For on-site calibration of resistance thermometer and thermocouple!

■Main Specifications

Calibration Temperature Range : -100 to 50°C (KT-H503)
-30 to 155°C (KT-H504)
-20 to 155°C (KT-H504S)



FIXED POINT IR-ROA SERIES BLACKBODY FURNACE

Fixed point black body furnace, model : IR-ROA is a highly precise fixed point black body furnace that can use for the temperature standard for radiation thermometer.

IR-ROA has 6 kinds of fixed point cell from In (157°C) in low temperature to Cu(1085°C) in high temperature.

- Realization of a good plateau by the improvement of the temperature distribution
- Lineup In to Cu point
- Changeable to other fixed points by cell exchange easily
- Compact size (184 X 370 X 360mm), weight (13kg)

■Main Specifications

Fixed point cell In point : 156.60°C, Sn point : 231.93°C
Zn point : 419.53°C, Al point : 660.32°C
Ag point : 961.78°C, Cu point : 1084.62°C



COMPARISON MODELS BLACKBODY IR-R24,IR-R26,IR-R27 FURNACE

The comparison type blackbody furnaces were developed jointly with National Research Laboratory of Metrology for calibration of radiation thermometers and have large aperture diameters.

■Main Specifications

Temperature range: 50 to 450°C (low temperature type)
200 to 1050°C (medium temperature type)
800°C to 1450°C (high temperature type)
Aperture diameter: ϕ 60mm (low temperature type)
 ϕ 50mm (medium temperature type)
 ϕ 30mm (high temperature type)



STANDARD RESISTANCE THERMOMETER R800 SERIES

The standard platinum resistance thermometers, which have been commercialized under the guidance of National Research Laboratory of Metrology, conform to International Temperature Scale, 1990 (ITS-90).

- From vapor point of helium to freezing point of silver

■Main Specifications

Measuring range: 13K to 30°C (R800-0), 90K to 661°C (R800-2)
0 to 962°C (R800-3, 3L), 4K to 0°C (R800-4)



STANDARD RADIATION THERMOMETER IR-RST SERIES

Standard Radiation Thermometer IR-RST series has been developed under collaborative research with the National Metrology Institute of Japan (NMIJ), which is applicable for traceability of calibrating conventional radiation thermometers.

■Main Specifications

Detecting element: Silicon Photo Diode, InGaAs Photo Diode
Measuring range: 400 to 2000°C (0.9 μ m) 3-step selection
1000 to 3000°C (0.65 μ m) 3-step selection
150 to 1100°C (1.6 μ m) 3-step selection



HEAT PIPE TYPE FIXED POINT CALIBRATION FURNACE KT-F116

KT-F116 conducts fixed point calibration of resistance thermometer and thermocouple by realizing freezing point of Al and Ag, combining with shield fixed point cell.

- Na heat pipe is used for soaking pipe and realize 0.1°C p-p/200mm.
- No need of gas exchange, adopts shield fixed point cell, which is easy to use.
- Able to maintain more than 10 hours of plateau by adjusting furnace temperature.

■Main Specifications

Furnace operating temperature range: 600 to 1000°C
Fixed point Metal: Al and Ag



STANDARD THERMOCOUPLE C800 SERIES

The standard thermocouples are for calibration of thermocouples.

Three kinds of S type, R type and B type thermocouples are available.

- Temperature-thermoelectromotive force tables are prepared on request.

■Main Specifications

Element diameter: ϕ 0.5mm
Measuring range: Maximum 1100°C(S, R)
Maximum 1554°C(B)



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LOS ANGELES



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