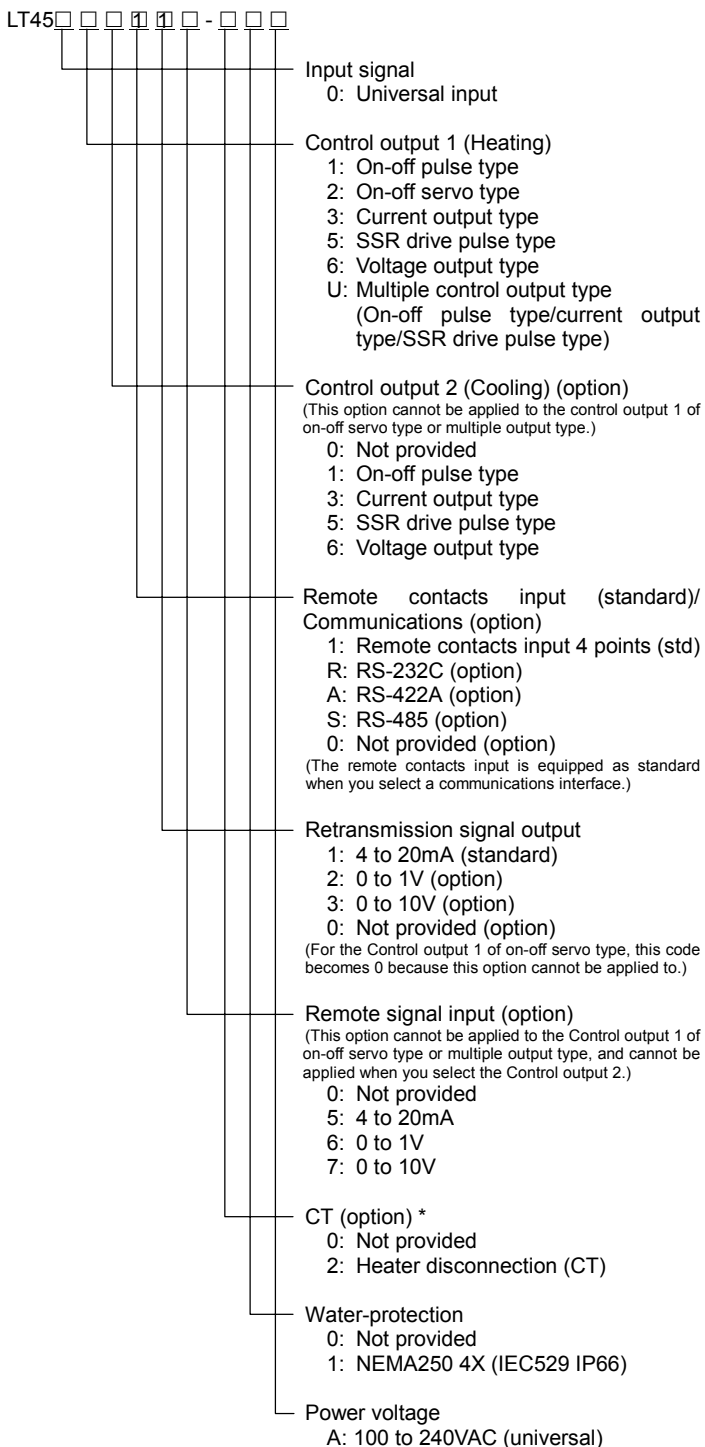


DIGITAL INDICATING CONTROLLER LT450 SERIES

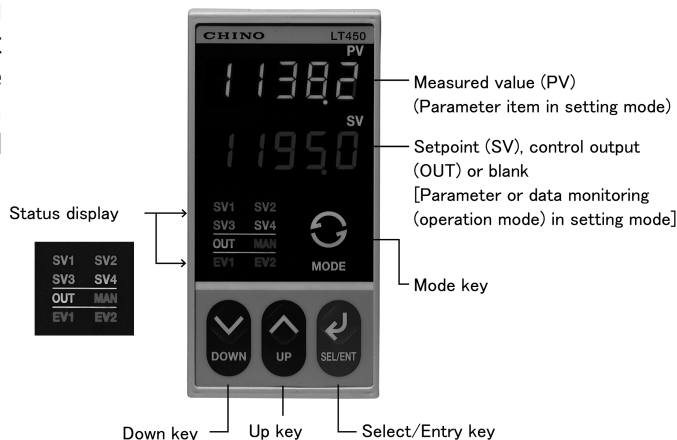


LT450 series, 1/8 DIN size, new digital indicating controllers feature all functions including 5-digit display, newly developed PID algorithms and the new learning type overshoot suppression function **JyroNavi** which are convenient in various control applications.

■ **MODEL** (The figure of 1 in □ shows a standard specification.)



* The heater disconnection (CT) is only applied to the Control output 1 of on-off pulse type or SSR drive pulse type, and cannot be applied to the remote signal input.



■ FEATURES

- High accurate setting by 5-digit display
- Universal input
- New PID algorithms built-in
- New learning type overshoot suppression function **JyroNavi** built-in
- MODBUS protocol communications for easy system configuration
- Remote contacts input and retransmission output are built-in as standard. (Retransmission output cannot be built-in for on-off servo type control output.)
- Various functions are built-in for easy control.
- Only 7mm thickness of the front panel
- Conformance to CE, UL and CSA (UL, CSA: Approval pending)
- Water-proof conforming to NEMA250 4X (equivalent to IEC529 IP66) (option)

■ MEASURING RANGES

Input type		Input range	
T/C	B	0.0 to 1820.0°C	32 to 3300 °F
	R	0.0 to 1760.0°C	32 to 3200 °F
	S	0.0 to 1760.0°C	32 to 3200 °F
	N	0.0 to 1300.0°C	32 to 2350 °F
	K	-200.0 to 1370.0°C	-300 to 2450 °F
	E	-200.0 to 700.0°C	-300.0 to 1250.0°F
	J	-200.0 to 900.0°C	-300.0 to 1650.0°F
	T	-200.0 to 400.0°C	-300.0 to 700.0°F
	U	-200.0 to 400.0°C	-300.0 to 700.0°F
	L	-200.0 to 900.0°C	-300.0 to 1650.0°F
	WRe5-WRe26	0 to 2310 °C	32 to 4190 °F
	W-WRe26	0 to 2310 °C	32 to 4190 °F
	PlRh40-PlRh20	0.0 to 1880.0°C	32 to 3400 °F
	Platinel II	0.0 to 1390.0°C	32 to 2500 °F
RTD	Pt100	-200.0 to 850.0°C	-300.0 to 1500.0°F
	JPt100	-200.0 to 649.0°C	-300.0 to 1200.0°F
DC voltage	20mV	0 to 20mV (0.00 to 20.00)	Scaling setting range: -19999 to 20000 Decimal place can be adjusted.
	5V	0 to 5V (0.000 to 5.000)	
	10V	0 to 10V (0.000 to 10.000)	
DC current	20mA *	4 to 20mA (1.000 to 5.000 - Converted into voltage value)	

Note: For the current input, a 250Ω shunt resistor (sold separately) is required.

■ SPECIFICATIONS

INPUT SPECIFICATIONS

Input signal:

Thermocouple ... B, R, S, N, K, E, J, T, U, L, WRe5-WRe26, W-WRe26, PtRh40-PtRh20, Platinel II
Resistance thermometer ... Pt100, JPt100
DC voltage ... 0 to 20mV, 0 to 5V, 0 to 10V
DC current ... 4 to 20mA [By using a 250Ω shunt resistor (sold separately) and 5V range (1 to 5V)]

Measuring range:

Refer to the list of measuring ranges.
Total of 20 kinds consisted of 14 kinds of thermocouple, 2 kinds of resistance thermometer, 3 kinds of dc voltage, and 1 kind of dc current

Accuracy ratings:

±0.1% of measuring range ± 1 digit (at reference operation conditions), exception PtRh40-PtRh20: ±0.3% ± 1 digit
Refer to the details of accuracy ratings.

Reference junction compensation accuracy:

±1.0°C (23°C ± 10°C), ±2.0°C (-10 to 50°C)

Temperature unit: °C or °F

Sampling period: Approx. 0.2 second

Burnout: Up scale/down scale (selectable)

Allowable signal source resistance:

Thermocouple/mV input ... 250Ω or less
V input ... 1kΩ or less
Resistance thermometer input ... 10Ω or less (per wire)

Input resistance: Thermocouple/DC voltage ... 1MΩ or more DC current ... Approx. 250Ω

Measuring current: Resistance thermometer ... 1mA ± 20%

Measuring input shift (sensor correction):

Can be set with the resolution of 0.1 times the setting resolution of SV (-19999 to 20000)

Digital filter: 0.0 to 99.9 seconds

Scaling: Range/scale of DC voltage/current input (-19999 to 20000), optional setting

Scale decimal point: 0 to 4

Maximum allowable input range: DC voltage ... ±10VDC RTD ... ±5VDC

Maximum common mode voltage: 30VAC

Common mode rejection ratio:

130dB or more (50/60Hz) (signal source resistance 1Ω or less)

Series mode rejection ratio:

50dB or more (50/60Hz) (signal source resistance 1Ω or less)

CONTROL SPECIFICATIONS

Control cycle time: Approx. 0.2 second

Control system:

On-off pulse type PID system
Current output type PID system
SSR drive pulse type PID system
On-off servo type PID system
Voltage output type PID system
Multiple control type (on-off pulse type/current output type/SSR drive pulse type) PID system
* 2-position control is selectable.

Control setpoint: 4 sets switching, 5-digit setting

Setpoint limiter: Within measuring range

Setpoint ramp function:

Setpoint ramp unit ... °C/second, °C/minute, °C/hour (common to rising/falling)
Setpoint rising ramp: 0 to 20000 (0 = no operation)
Setpoint falling ramp: 0 to 20000 (0 = no operation)
PV start function ... At SV change, power-on, MAN to AUTO, etc.

Control setpoint accuracy ratings:

Relative error to displayed value ... ± 1 digit

Auto-tuning: Standard (Manual setting of PID constants enabled)

PID constants:

4 sets switching (interlocking to SV)
P ... 0.1 (0.0) to 999.9% (0 = 2-position)
I ... 0 to 9999 seconds
D ... 0 to 9999 seconds

PID deadband (gap):

0.0 to 9.9% (4 sets switching, interlocking to SV)

Anti-reset windup:

High limit ... 0.0 to 100.0%, Low limit ... -100.0 to 0.0%

Overshoot suppression function:

On/off selectable (4 sets independent switching, interlocking to SV, independent keeping of learned results)

Control operation:

With direct/reverse action switching

Output specifications:

• On-off pulse type

Output signal ... On-off pulse conductive signal

Contact ratings ...

Resistive load 100VAC 5A, 240VAC 5A, 30VDC 5A
Inductive load 100VAC 2.5A, 240VAC 2.5A, 30VDC 2.5A

Electrical relay life ... More than 100,000 times

Pulse cycle ... Approx. 1 second to 180 seconds adjustable
Contact protection element ... Not built-in [If required, add a contact protection element (sold separately) externally.]

• Current output type

Output signal ... 4 to 20mADC, Load resistance ... 600Ω or less

• SSR drive pulse type

Output signal ... On-off pulse voltage signal

At ON 12VDC ± 20% (load current ... 20mA or less)
At OFF 0.8VDC or less

Pulse cycle ... Approx. 1 second to 180 seconds adjustable

• On-off servo type

Output signal ... On-off conductive signal

Feedback resistance ... 100Ω to 2.5kΩ

Contact ratings ...

Resistive load 100VAC 5A, 240VAC 5A, 30VDC 5A
Inductive load 100VAC 2.5A, 240VAC 2.5A, 30VDC 2.5A
Minimum load 5VDC or more, 10mADC or more

Electrical relay life ... More than 100,000 times

Contact protection element ... Not built-in [If required, add a contact protection element (sold separately) externally.]

Combination adjustment ... Manual or auto-tuning

• Voltage output type

Output signal ... 0 to 10VDC

Output resistance ... Approx. 10Ω

Load resistance ... 50kΩ or more

Output limiter: 4 sets switching (interlocking to SV)

High limit ... 0.0 to 105.0%, Low limit ... -5.0 to 100.0%

Output variation limiter: 4 sets switching (interlocking to SV)

Rising ... 0.1 to 100.0%, Falling ... -100.0 to -0.1%

Output preset: -100.0 to 100.0%

PV error output: -5.0 to 105.0%

Run/Ready: Run/ready (control stop, output: preset output value) selectable

Preset output: -5.0 to 105.0%

Control at power recovery: Continuous/ready selectable

Auto-output/man-output (AUTO/MANUAL): Balanceless bumpless switching

EVENT SPECIFICATIONS

Event point: 2 points

Event type:

Setting to each of Event 1/2

Absolute value alarm ... High/low, standby enabled/disabled

Deviation alarm ... High/low, standby enabled/disabled

Absolute value deviation alarm ... High/low, standby enabled/disabled

Setpoint alarm ... High/low, standby enabled/disabled

Output value alarm ... High/low, standby enabled/disabled

Abnormal control loop, fail, heater disconnection alarm, timer function

Event setpoint: Event 1/2, 4 sets individual setting

Event deadband: Can be set by the resolution of 0.1 times the setting resolution of SV, Setting to each Event 1/2

Event delay: 0 to 9999 seconds

Event output phase: Normal/reverse selectable

Event output at Ready: Off/computation selectable

Event output:

Output signal ... Form A relay output

Contact ratings ...

Resistive load 100VAC 3A, 240VAC 3A, 30VDC 3A
Inductive load 100VAC 1.5A, 240VAC 1.5A, 30VDC 1.5A

Minimum load 5VDC or more, 10mADC or more

Electrical relay life ... More than 100,000 times

Contact protection element ... Not built-in [If required, add a contact protection element (sold separately) externally.]

RETRANSMISSION OUTPUT SPECIFICATIONS

Output signal being proportioned to the setpoint, the measured value, control output value, etc.

Output signal:

1 kind to be specified from 4 to 20mADC (load resistance ... 400Ω or less), 0 to 1VDC, or 0 to 10VDC (output resistance ... approx. 10Ω, load resistance ... 50kΩ or more)

Output accuracy: ±0.2% of retransmission scale range

Output resolution: Approx. 1/30000

Retransmission scale: -19999 to 20000, optional setting

REMOTE CONTACTS INPUT SPECIFICATIONS

Following functions enabled by the remote contacts input

Input point: 4 points (No-voltage contacts or transistor open collector)
(Remote contacts rating ...5VDC or more, 2mA or more)

Function:

The following functions are allocated by parameter settings.

- (1) Setpoint external switching, (2) Auto/man external switching
- (3) Run/ready switching, (4) Timer start-up, (5) Holding of the setpoint ramp operation, (6) Resetting of the setpoint ramp operation,
- (7) Remote/local switching

DISPLAY/SETTING SPECIFICATIONS

Display type: 5-digit seven-segment LED display, two lines
Status display ... 8 independent LEDs

Display content:

First LED (green) display ...

At operation mode: Measured value (PV)

Decimal place of PV is optionally set in 0 to 4.

At setting mode: Parameter item

Second LED (red) display ...

At operation mode: Setpoint (SV) or control output value (OUT)

At setting mode: Parameter or data monitoring (operation mode)

Status (red/green) ...

EV1 (red): Lights when EV1 is activated.

EV2 (red): Lights when EV2 is activated.

MAN (red): Lights when the control output value is set manually.

SV1/2/3/4 (green): The number selected is lit.

OUT (green): Lights when the control output value is displayed in the second display.

Operation mode display:

No display function of the operation mode screen, 5 levels

Automatic return: Returns to operation mode if any key is not pressed for more than 1 minute in setting mode.

Password: No display function of the setting mode screen by a password, 3 levels

Key lock: Locking function of parameters, 5 levels

Eng. port: Communications enabled by connecting the exclusive cable (Model: RZ-EC1) to the Eng. port at the upper side of the case.

Parameter programming software package available (release shortly)

GENERAL SPECIFICATIONS

Rated power voltage: 100 to 240VAC 50/60Hz (universal)

Allowable power voltage: 90 to 264VAC

Power consumption: Approx. 16VA (max.)

Operation conditions:

Operation	Reference condition	Normal condition
Ambient temperature	23°C ± 2°C	-10 to 50°C (Max. 40°C for closed-installation)
Ambient humidity	55% ± 5%RH	20 to 90%RH
Power supply	100VAC ± 1%	90V to 264VAC
Power frequency	50Hz/60Hz ± 1%	50Hz/60Hz ± 2%
Mounting angle	Forward/backward ±3 degrees or less	Forward/backward ±10 degrees or less
Vibration/impact	0m/s ² / 0m/s ²	2m/s ² / 0m/s ²

Ambient temperature change ratio: 10°C/H or less

Warm-up time: 30 minutes or more

Power interruption: Parameters are memorized by EEPROM (Writing: Approx. 100,000 times)

Insulation resistance:

Between primary side terminals (*1) and secondary side terminals (*2) 20MΩ or more at 500VDC

Dielectric strength:

Between primary side terminals (*1) and secondary side terminals (*2) 1 minute at 1500VAC

*1 = Terminals of power supply, control output event relay output

*2 = Terminals except above

Front and case: Front ... Non-flammable ABS

Case ... Non-flammable polycarbonate resin

Color: Gray

Installation: Flush panel installation

Weight: Approx. 250 to 350g (max.)

Transportation/storage condition (with packing at shipment):

Ambient temperature ... -20 to 60°C

Ambient humidity ... 5 to 95%RH (no dew condensation)

Vibration ... 0 to 4.9m/s² (10 to 60Hz)

Impact ... 400m/s² or less

INTERNATIONAL STANDARDS

CE: EN61326+A1 *, EN61010+A2

UL: UL3121-1 (approval pending)

CSA (C-UL): C22.2, No. 1010 (approval pending)

NEMA: NEMA250 4X (front panel: option) (equivalent to IEC529 IP66)

Note: Not available in closed-installation

* The display of the measured value and output may vary up to ±10% or ±2mV under the EMC test ambient.

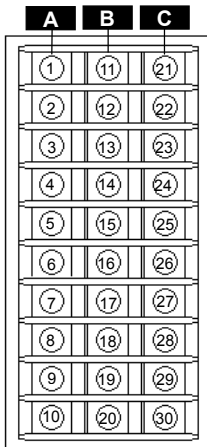
ACCURACY RATINGS

Input		Accuracy ratings	Details
T/C	B	±0.1% ± 1 digit exception: ±0.2% ± 1 digit for -200°C to 0°C	Not specified for less than 400°C
	R		400°C to 800°C: ±0.2% ± 1 digit
	S		0°C to 400°C: ±0.2% ± 1 digit
	N, K, E, J, T, U, L		0°C to 400°C: ±0.2% ± 1 digit
	WRe5-WRe26		
	W-WRe26		0°C to 400°C: ±0.4% ± 1 digit
	Platinel II		
RTD	PlRh40-PlRh20	±0.3% ± 1 digit	0°C to 400°C: ±2% ± 1 digit 400°C to 800°C: ±1% ± 1 digit
	Pt100 JPt100	±0.1% ± 1 digit	
DC voltage	mV, V	±0.1% ± 1 digit	
DC current	mA	±0.1% ± 1 digit	By using the shunt resistor specified for current input

OPTIONS

Option	Contents
Control output 2 (Heating/cooling)	Control calculation: Matching computation/cooling proportion computation switching Matching computation parameters • Split direct ... 0.0 to 60.0% • Split reverse ... 40.0 to 100.0% Cooling proportion computation parameters • Cooling proportional band coefficient ... 0.00 to 10.00 • Deadband ... -50.0 to 50.0% Pulse cycle: 1 second to 180 seconds (cooling side)
Communications interface (RS-232C, RS-422A or RS-485)	The setpoint and the measured value can be transmitted to a master CPU, and the parameters can be set by the master CPU. Protocol: MODBUS, RTU mode/Ascii mode switching, and private protocol Address: 01 to 99 Communications function: 1 kind to be specified from setpoint/data transmission, digital transmission, or digital remote
Remote signal input	Remote input function By the remote contacts, Remote or Local can be selected, and the setpoint can be set in Remote. This function can be used in a secondary controller for cascade control. Input signal: 1 kind to be specified from 4 to 20mADC (input resistance approx. 50Ω), 0 to 1VDC (input resistance approx. 500kΩ or more), or 0 to 10VDC (input resistance approx. 100kΩ or more) Input accuracy: ±0.3% of input range ± 1 digit Input resolution: Approx. 1/40000 Remote scale: Optional setting from -19999 to 20000 Remote shift: Can be set by the resolution being 0.1 times the setting resolution of SV (-19999 to 20000) Cascade primary controller function Cascade calculation: SV2 = (a + d x SV1/100) x MV1 + b + c x SV1 SV2 ... SV (%) of secondary controller SV1 ... SV (%) of primary controller MV1 ... PID constants (%) of primary controller Cascade parameters: a = primary ratio fixed parameter ... 0.01 to 1.00 b = primary bias fixed parameter ... -100.0 to 100.0% c = Primary bias variable parameter ... 0.00 to 1.00 d = Primary ratio variable parameter ... 0.00 to 1.00
Heater disconnection detection	Function to detect the heater disconnection by CT input (CT: separate purchase required) Input signal: 5.0 to 50.0AAC (50/60Hz) Input accuracy: ±5% of full scale ± 1 digit Resolution: Approx. 1/400 Recommended CT: Model CTL-6-S-H
Water-proof	For water-proofing of the front panel, a rubber packing is inserted between a controller and a panel board. NEMA250 4X (equivalent to IEC529, IP66) This option cannot be applied for closed-installation.

■ TERMINAL BOARD



Line A Measuring input/control output 1/power supply

Measuring input	No.	Voltage (current *)	Thermocouple	Resistance thermometer
	1	+	/	/
	2	/	+	A
	3	-	-	B
4	/	/	/	B

* For current input
Connect a shunt resistor (250Ω, separate purchase required) to + and - terminals.

Control output 1 (heating)	No.	On-off pulse type Multiple output 1 (On-off pulse output)	SSR drive pulse type Current output type Voltage output type	On-off servo type See Line C
	6	H (NC)	+	/
	7	C (COM)	-	/
8	L (NO)	/	/	/

Power supply	No.	
	9	L (live)
10	N (Neutral)	

- Note) 1. All terminal screws are M3.5.
2. For Y-tip or O-tip, use it with the outside dimension of 7mm or less.

Line B Communications/remote contacts input

Communications interface	No.	RS-232C	RS-422A	RS-485
	11	SD	SDA	SA
	12	/	SDB	SB
	13	RD	RDA	/
	14	/	RDB	/
15	SG	SG	SG	

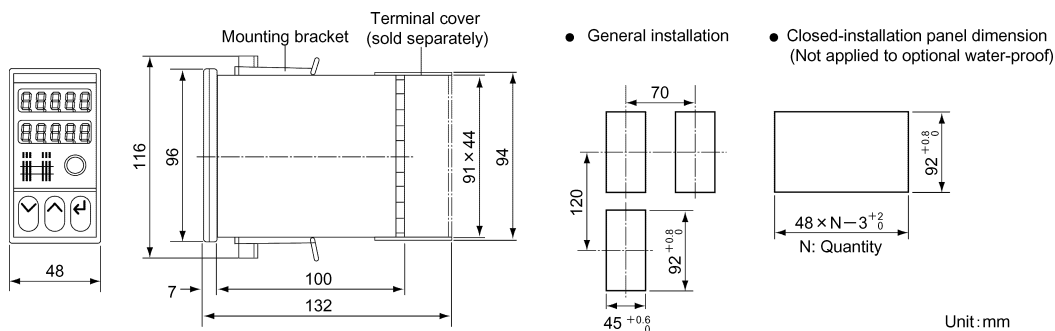
Remote contacts input	No.	DI1+	DI2+	DI3+	DI4+	DI-COM
	16	DI1+	DI2+	DI3+	DI4+	DI-COM
	17	DI2+	DI3+	DI4+	DI-COM	
	18	DI3+	DI4+	DI-COM		
	19	DI4+	DI-COM			
20	DI-COM					

Line C Retransmission output/control output 2/CT/event output ... differs on output type of heating control

No.	Standard	No.	On-off servo type	No.	Multiple type
21	+	21	/	21	+
22	-	22	R1 (open)	22	-
23	H (NC) +	23	RC (common)	23	/
24	C (COM) -	24	R2 (close)	24	+
25	L (NO) /	25	M3 (close)	25	-
26	CT	26	M2 (open)	26	+
27	CT	27	M1 (common)	27	-
28	EV1	28	EV1	28	EV1
29	EV2	29	EV2	29	EV2
30	COM12	30	COM12	30	COM12

* R/L: Remote/local switching (ON: Remote, OFF: Local)

■ DIMENSIONS AND PANEL CUTOUT (Steel plate with thickness of 1 to 10mm is recommended for installation.)



■ ACCESSORIES (Separate purchase is required.)

Accessory	Remarks
CT (current transformer)	Recommendation: Model CTL-6-S-H
Terminal cover	The depth is extended to 132mm by the terminal cover.
Shunt resistor for current input (250Ω)	For measurement by DC current of 4 to 20mA

Specifications subject to change without notice. Printed in Japan (I) 2002.1

CHINO CORPORATION

32-8, KUMANO-CHO, ITABASHI-KU, TOKYO 173-8632
 PHONE: +81-3-3956-2171
 FAX: +81-3-3956-0915
 E-mail: inter@chino.co.jp
 Website: http://www.chino.co.jp