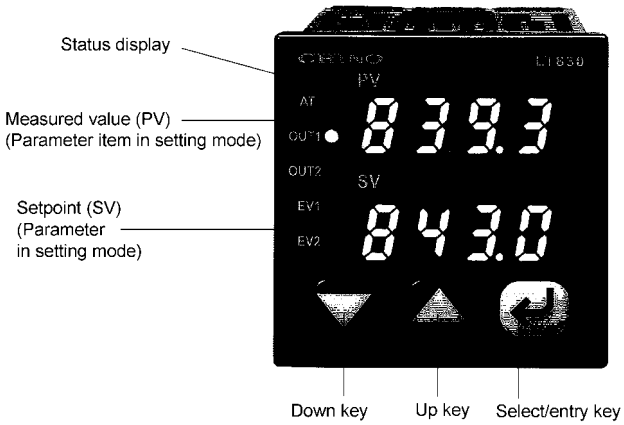
# DIGITAL INDICATING CONTROLLER
# LT830 Series

PERFORMANCE SPECIFICATION CHINO

LT830 series, new digital indicating controller, is user-friendly 1/16 DIN controllers featuring socket type terminal board, 24V AC/DC power supply, international compliance, and MODBUS protocol communication. The software package provides the ease of parameter setup and data monitoring.




## ■ MODEL

LT830□□000–□□□

- Control output 1 (Heating)
  - 1: On-off pulse type
  - 5: SSR drive pulse type
- Control output 2 (Cooling) *1(option)
  - 0: None
  - 1: On-off pulse type
- 2 points event output + Communications IF + heater disconnection (CT) (option)
  - 0: None
  - 1: 2-point of event output*2
  - 2: 2-point of event output*2 Communication IF(RS485) + Heater disconnection (CT)*3
- Terminal type and waterproof specs. (option)
  - 0: Terminal block type + Without waterproof
  - 1: Terminal block type + With waterproof (option)
  - 2: Socket type + Without waterproof
  - 3: Socket type + With waterproof (option)
- Power voltage
  - A: 100 to 240VAC (universal)
  - D: 24V AC/DC (option)

*1.This option is to be combined with the event output "1" or "2" at "event option".
*2.For combination with the Control output 2, 1-point of event output is only available.
*3.Heater disconnection is only available for Terminal Block type.

## ■ FEATURES

- Universal input
  Thermocouple, Resistance Thermometer, DC voltage
  The current input utilizes a 250Ω shunt resistor with voltage range.
- PID Algorithms for easy operation
  Suitable for any type of instrumentations, devices and process.
- User friendly LED numerical display
  Simple key functions for easy operation.
- Global standards approvals
  Conforms to CE approval and IP protection (IEC529 IP66)
  RS485 serial communications is built with MODBUS protocol.
- Various options
  Socket terminal board, 24V AC/DC power supply
- Software package
  KIDS + PASS software provides parameter setup and data monitoring.

## ■ MEASURING RANGES

| Input type | | Input range | | | |
|---|---|---|---|---|---|
| T/C | B | 0 | to | 1820°C | |
| | R | 0 | to | 1760°C | |
| | S | 0 | to | 1760°C | |
| | N | 0 | to | 1300°C | |
| | K | -200 | to | 1370°C | |
| | | -199.9 | to | 500.0°C | |
| | E | -199.9 | to | 700.0°C | |
| | J | -199.9 | to | 900.0°C | |
| | T | -199.9 | to | 400.0°C | |
| RTD | Pt100 | -199.9 | to | 850.0°C | |
| | | -199.9 | to | 200.0°C | |
| DC voltage | 5V | Scaling setting range: -1999 to 9999 Decimal place can be adjusted. | | | 0 to 5v |

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
Resistance thermometer … Pt100
DC voltage … 0 to 5V
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.

**Accuracy ratings:**
±0.3% of measuring range ± 1 digit (at reference operation conditions)
Refer to the table of accuracy ratings.
*Add the reference junction compensation accuracy to thermocouple input.

**Reference junction compensation accuracy:**
±1.0°C (23°C ± 10°C), ±2.0°C (-10 to 50°C)

**Sampling period:**
Approx. 0.5 second

**Burnout:**
Up scale (thermocouple input/resistance thermometer input)

**Allowable signal source resistance:**
Thermocouple input… 200Ω or less
Voltage input … 1kΩ or less
Resistance thermometer input … 10Ω or less (per wire)
* Resistance of 3wires needs to be equal.

**Input resistance:**
Thermocouple/DC voltage … 1MΩ or more

**Measuring current:**
Resistance thermometer … Approx. 125μA

**Measuring input shift (sensor correction):**
Can be set by the resolution being 0.1 times the setting resolution of SV (-1999 to 9999)

**Digital filter:**
0.0 to 99.9 seconds

**Scaling:**
Range/scale of DC voltage/current input (-1999 to 9999), optional setting

**Scale decimal point:**
0 to 3

**Maximum allowable input range**:
DC voltage … -5V/+8V DC
Resistance thermometer … ±5VDC

**Maximum common mode voltage:**
30VAC

**Common mode rejection ratio (thermocouple input):**
130dB or more (50/60Hz) (signal source resistance 1Ω or less)

**Series mode rejection ratio (thermocouple input):**
50dB or more (50/60Hz) (signal source resistance 1Ω or less)

### *CONTROL SPECIFICATIONS*

**Control cycle time:**
Approx. 0.5 second

**Control system:**
On-off pulse type PID system
SSR drive type PID system
* 2-position control can be selected.

**Control setpoint:**
1 setpoint. 4-digit setting

**Setpoint limiter**
Within measuring range

**Setpoint ramp function:**
Setpoint ramp unit … °C/minute (common to rising/falling)
Setpoint rising ramp … 0 to 9999 (0 = no operation)
Setpoint falling ramp … 0 to 9999 (0 = no operation)
PV start function … At SV change, power-on, changing from Ready to Run

**Control setpoint accuracy ratings:**
Relative error to displayed value … ± 1 digit

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

**PID constants:**
P … 0.1 to 999.9%
I … 0 to 9999 seconds
D … 0 to 9999 seconds

**PID deadband (gap):**
0.0 to 9.9%

**Anti-reset windup:**
High limit … 0.0 to 100.0%
Low limit … -100.0 to 0.0%

**Overshoot suppression function:**
ON/OFF selectable

**Control operation:**
With direct/reverse action switching

### *OUTPUT SPECIFICATIONS*

• On-off pulse type
Output signal … On-off pulse conductive signal (relay “a” contact output)
Contact ratings …
Resistive load 100VAC 3A, 240VAC 3A, 30VDC 3A
Inductive load 100VAC 1.5A, 240VAC 1.5A, 30VDC 1.5A
Electrical relay life … More than 100,000 times
Pulse cycle … Approx. 1 second to 180 seconds adjustable (1second increments)

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

• 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 (1second increments)

**Output limiter:**
1 set
High limit … 0.0 to 105.0%
Low limit … -5.0 to 100.0%

**Output variation limiter:**
0.1 to 100.0%

**Output preset:**
-100.0 to 100.0%

**Run/Ready:**
Run/Ready (control stop, output: control output value at Ready) switchable

**Control output at Ready:**
-5.0 to 105.0%

**Control at power recovery:**
Continuous/Ready switchable

### *EVENT SPECIFICATIONS*

**Event calculation:**
2 points

**Event output point:**
None (standard)
2-point relay output (EV1/EV2) can be added as an option.

**Event type**:
Setting to each of Event 1/2
Absolute value alarm … High/low, standby enable/disable
Deviation alarm … High/low/high &low, standby enable/disable
FAIL, heater disconnection alarm (option)

**Event setpoint:**
Event 1/2 individual setting

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

**Event output phase:**
Normal/reverse switchable

**Event output at Ready:**
Off/computation switchable

### *DISPLAY SPECIFICATIONS*

**Display type:**
4-digit seven-segment LED display, two lines
Status display … 5 independent LEDs

**Display content:**
First LED (green) display …
At operation mode: Measured value (PV)
At setting mode: Parameter item
Second LED (red) display …
At operation mode: Setpoint (SV)
At setting mode: Parameter
Status (red/green) …
AT(green):Blinks during the auto-tuning is executed.
OUT1 (green): Lights when the control output1 (heating) is output.
OUT2 (green): Lights when the control output2 (cooling) is output.
EV1 (red): Lights when event1 is active.
EV2 (red): Lights when event2 is active.

**Automatic return:**
Returns to operation mode if any key is not pressed for more than 3 minute in setting mode.

**Key lock:**
Locking function of parameters, 4 levels

***GENERAL SPECIFICATIONS***

**Rated power voltage:**
100 to 240V AC 50/60Hz (universal) or 24V AC/DC

**Allowable power voltage:**
90 to 264V AC or 24V AC/DC( ±10%)

**Power consumption:**
Maximum 6VA (100-240 VAC), Maximum 4VA (24V AC), Maximum 3W (24 V DC)

**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 (No dew condensation) | 20 to 90%RH (No dew condensation) |
| Power supply | 100VAC ± 1%, 24V AC/DC | 90V to 264VAC, 24V AC/DC ± 10% |
| Power frequency | 50Hz/60Hz ± 1% | 50Hz/60Hz ± 2% |
| Mounting angle | Upward/downward ±3° or less | Upward/downward ±10° or less |
| Mounting altituds | Lower than 2000m | Lower than 2000m |
| 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. 1,000,000 times).

**Insulation resistance:**
Between primary side terminals (*1) and secondary side terminals (*2) 500VDC, 20MΩ or more

**Dielectric strength:**
Between primary side terminals (*1) and secondary side terminals (*2)
1 minute at 1500VAC
*1 = Terminals for 100-240V AC(L,N) power supply, on-off pulse type control output & event relay output
*2 = Terminals for 24V AC/DC power supply, measurement input, communication interface, CT input &SSR drive pulse type control output

**Front and case:**
Front … Non-flammable ABS
Case … Non-flammable polycarbonate resin

**Color:**
Black

**Installation:**
Terminal type … Panel mounting
Socket type … Socket mounting
*Recommended DIN-rail mounted socket ATC180041(Matsushita Electric works)

**Weight:**
Approx. 160g

**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/s$^2$ (10 to 60Hz)
Impact … 400m/s$^2$ or less

***INTERNATIONAL STANDARDS***

**CE:**
EN61326+A1 *, EN61010+A2
Under EMC test, output & indication may change max. ±10% or ± 2mV

**IP:**
IEC529 IP66 (Front face for panel mounting, option)
Note: Not available in closed-installation

## ■ ACCURACY RATINGS

| Input | | Accuracy ratings | Details |
|---|---|---|---|
| T/C | B | ±0.3% ± 1 digit | Not specified for less than 400°C<br>400 to 800°C: ±1.0% ± 1 digit |
| | R | | -200 to 0°C ±0.5%±1 digit |
| | S | | |
| | N | | |
| | K | | |
| | E | | |
| | J | | |
| | T | | |
| RTD | Pt100 | ±0.3% ± 1 digit | |
| DC voltage | V | ±0.3% ± 1 digit | |

## ■ OPTIONS

| Option | Contents |
|---|---|
| Communications interface (RS485) | The setpoint and the measured value can be transmitted to a master CPU, and the parameters can be set by the master CPU.<br>Protocol:<br>MODBUS, RTU mode/Ascii mode selectable<br>Address:<br>01 to 99<br>Transmission speed : 9600/19200bps<br>Communications function:<br>1 kind to be specified from setting/data transmission, digital transmission, or digital remote<br>* Parameters can be re-written approx. 1 million times. |
| Control output 2 (Heating/ cooling) | Control calculation:<br>Matching computation/cooling proportion computation switching<br>Matching computation parameters<br>• Split direct … 0.0 to 60.0%<br>• Split reverse … 40.0 to 100.0%<br>Cooling proportion computation parameters<br>• Cooling proportional band coefficient … 0.00 to 10.00<br>• Deadband … -50.0 to 50.0%<br>Pulse cycle:<br>1 second to 180 seconds (cooling side) |
| Event output | Event output point:<br>Relay output 2 points (EV1/EV2)<br>Contact ratings:<br>Resistive load<br>100VAC 3A, 240VAC 3A, 30VDC 3A<br>Inductive load<br>100VAC 1.5A, 240VAC 1.5A, 30VDC 1.5A<br>Minimum load<br>5VDC or more, 10mADC or more<br>Electrical relay life …<br>More than 100,000 times<br>Contact protection element … Not built-in [If required, add a contact protection element (sold separately) externally.] |
| Heater disconnection detection | Function to detect the heater disconnection by CT input (CT: separate purchase required)<br>Input signal:<br>5.0 to 50.0AAC (50/60Hz)<br>Input accuracy:<br>±5% of full scale ± 1 digit<br>Resolution:<br>Approx. 1/100<br>CT:<br>Model CTL-6-S-H is required. |
| Water-protection | For water-protection of the front panel, a rubber gasket is inserted between a controller and a panel board.<br>IEC529, IP66<br>Note) This option cannot be applied to closed-installation. |
| 24V AC/DC | Power voltage:<br>24V AC/DC ± 10% [To be supplied from (SELV circuit)]<br>Power consumption:<br>Maximum 4VA (24V AC) Maximum 3W(24V DC) |

## ■ PARTS (Separate purchase is required.)

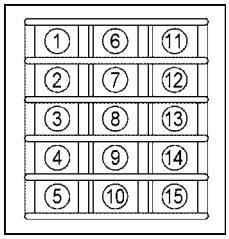
1. Contact protection element …To be mounted externally

| Type | Specification | Open/close current | Application |
|---|---|---|---|
| CX-CR1 | 0.01μF+120Ω | 0.2A or less | For light load |
| CX-CR2 | 0.5μF+47Ω | 0.2A or more | For heavy load |

2. Shunt resistor for current input …To be mounted externally
   • Resistance … 250Ω accuracy … ±0.05%
   • Maximum allowable continuos current … 25mA
3. Terminal cover … ABS resin flame proof
   The depth is extended to 15 mm by terminal cover.

## ■ TERMINAL BOARD

### ■ Terminal block type




Control output 1 (heating)

| № | On-off pulse type | SSR drive pulse type |
|---|---|---|
| ① | COM | + |
| ② | NO | − |

Communications(option)

| № | Interface | |
|---|---|---|
| ⑥ | SA | RS-485 |
| ⑦ | SB | |
| ⑧ | SG | |

Heater disconnection (option)

| № | input |
|---|---|
| ⑨ | CT |
| ⑩ | CT |

Power supply

| № | AC | DC |
|---|---|---|
| ⑭ | L (Live) | + |
| ⑮ | N (Neutral) | − |

Measuring input

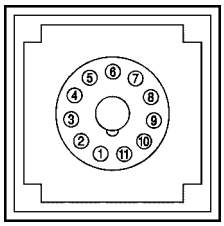
| № | Voltage (current ) | Thermocouple | Resistance thermometer |
|---|---|---|---|
| ③ | | | A |
| ④ | + | + | B |
| ⑤ | − | − | B |

Event output/Control output (option)

| № | Event output option | | Control output 2 option | |
|---|---|---|---|---|
| ⑪ | EV1 | Buffer relay | EV1 | Event1 |
| ⑫ | EV2 | Buffer relay | NO | Control Output 2 (Cooling) |
| ⑬ | COM 1,2 | Power | COM | |

### ■ Socket type

| | |
|---|---|
| ⑥ | Open terminal |




Control output 1 (heating)

| № | On-off pulse type | SSR drive pulse type |
|---|---|---|
| ⑤ | COM | + |
| ④ | NO | − |

Measuring input

| № | Voltage (current ) | Thermocouple | Resistance thermometer |
|---|---|---|---|
| ③ | | | A |
| ② | + | + | B |
| ① | − | − | B |

Event output/Control output (option)

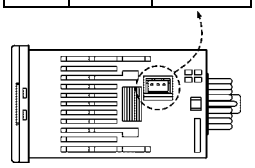
| № | Event output option | | Control output 2 option | |
|---|---|---|---|---|
| ⑦ | EV1 | Buffer relay | EV1 | Event1 |
| ⑧ | EV2 | Buffer relay | NO | Control Output 2 (Cooling) |
| ⑨ | COM 1,2 | Power | COM | |

Communications(option)

| RS-485 | | |
|---|---|---|
| SG | SB | SA |

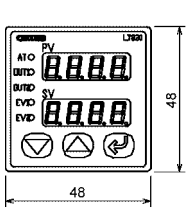
Power supply

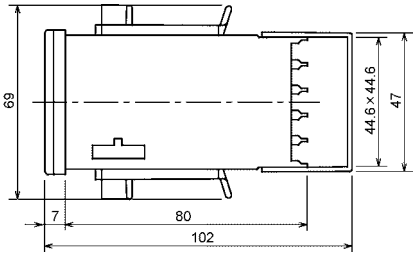
| № | AC | DC |
|---|---|---|
| ⑩ | L (Live) | + |
| ⑪ | N (Neutral) | − |



## ■ DIMENSIONS AND PANEL CUTOUT

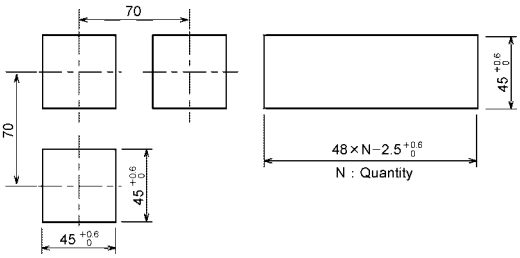
### ■ Terminal block type



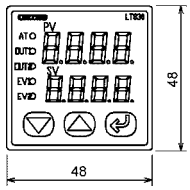



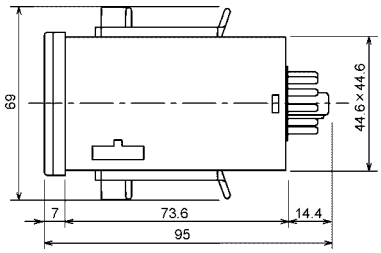

Terminal cover (sold separately) is mounted.

- General installation
- Closed-installation panel dimension (Not applied to optional water-protection)




### ■ Socket type



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