

# Single Phase Thyristor Regulator JM series



**Best for heater control**  
**All-in-one type with built in setting display provided as standard.**

JM is a single phase thyristor regulator that receives signal from controller, PLC and manual setting unit and regulates power provided to the electric furnace heater. 7 types of rated current are prepared from 10A to 500A so capacity according to the heater ratings can be selected.



## FEATURES

- **Ease of settings and checking operations**  
You can check the parameter settings and load status (voltage, current\*<sup>1</sup>, power\*<sup>1</sup> and resistance value\*<sup>1</sup>)
- **Built in setting display unit and panel mounting types are provided**  
Thyristor model that matches with place of installation can be selected
- **Improvement in safety features**
  - (1) Load current is measured\*<sup>1</sup> and gate off alarm is output in case of over current is flown.
  - (2) Built in fast-acting fuse\*<sup>2</sup> protects from over current.\*<sup>3</sup>
  - (3) The models with rated current of 200A or more monitor heat sink temperature and turns the gate off and output alarm in case of abnormal heating. Further, predicts failure by monitoring cooling fan rotations, and notifies to replace the fan before it breaks down.
- **Heater disconnection alarm**\*<sup>1</sup> \*<sup>4</sup>  
Output alarm when load resistance value goes above set disconnection rate. In case of Phase control, disconnection of 1 wire out of 7 wires, and in case of zero cross control disconnection of 1 wire out of 5 wires can be detected.\*<sup>5</sup>
- **RS485 (MODBUS) communication function provided as standard**  
Integrated management of power monitoring, parameters and alarm detection by high order devices (like PC and PLC) is possible.
- **International Standards**\*<sup>12</sup>  
Conform to CE, UKCA marking

\*1 Built in or external CT is required.  
\*2 Corresponds to the main circuit rated current 30A to 500A.  
\*3 For 10A and 20A external fuse (No Alarm) is required.  
\*4 Control input is less than 30%. In case of Silicon Carbide heater. Cannot be used in case of applicable to any of these.  
\*5 Heater should be of same material and same capacity.

## MODELS

JM □ □ □ □ □ □ □ 3NN

**Main circuit rated voltage**  
20 : 200V (200V/220V/240V)\*<sup>6</sup> \*<sup>7</sup>

10 : 100V (100V/110V/120V)\*<sup>6</sup> \*<sup>7</sup>  
40 : 400V (380V/400V/440V)\*<sup>6</sup> \*<sup>7</sup>

100V and 400V series requires additional step up / down transformer (accessories) for control power supply.

**Main circuit rated current**

010 : 10A    020 : 20A    030 : 30A  
050 : 50A    075 : 75A    100 : 100A \*<sup>12</sup>  
150 : 150A    200 : 200A    250 : 250A  
300 : 300A    400 : 400A    500 : 500A

**Feedback type**\*<sup>8</sup>

V : Voltage feedback (Phase control)  
A : Current feedback (Phase control)  
W : Power feedback (Phase control)

**Fast-acting fuse**

A : Built-in\*<sup>2</sup>  
N : None

**Setting display unit / communication**\*<sup>9</sup>

3 : Built-in with communication  
4 : Panel mounting, with communication

**CT (current transformer)**

0 : Mounted externally\*<sup>10</sup>  
1 : Built-in

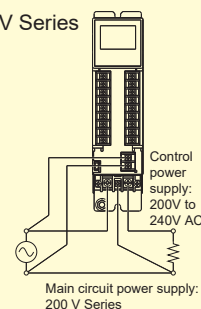
**Heater disconnection alarm / current limit**

3 : Heater disconnection alarm + current limit\*<sup>11</sup>

\*6 Set by the setting display unit on the JM unit (at the initial power on)  
\*7 Note that the control power supply voltage is 200V to 240V.  
\*8 Control system (Phase control / Zero-cross control) and feedback type (only Phase control) are switchable on setting display unit on the JM unit  
\*9 Cannot be changed after the Thyristor is delivered.  
\*10 Use the CT with rated current of 5A at secondary side, if necessary.  
\*11 CT is required for heater disconnection alarm / current limit. Functions only when using phase control.  
\*12 Items marked with   does not conform to CE, UKCA marking.

## Main circuit rated voltage and control power supply

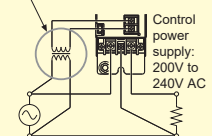
200V Series



Main circuit power supply: 200 V Series

100V Series / 400V series

Transformer for control power supply  
100V Series: CH1-4H381-014  
400V Series: CH1-4H381-013



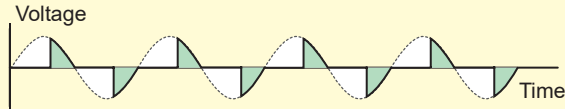
Main circuit power supply: 100 V / 400V Series

## Control system and feedback type switchable

2 kinds of control system (phase control/ zerocross control) and 3 kinds of feedback type (voltage, power, current) are selectable / switchable depending on the control target.

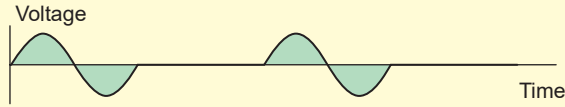
### Control system

#### ●Phase control (when output is 50 percent)



Control system in which output is done by changing control angle  $\theta$  (ON timing) depending on each half cycle of power (180 degrees).

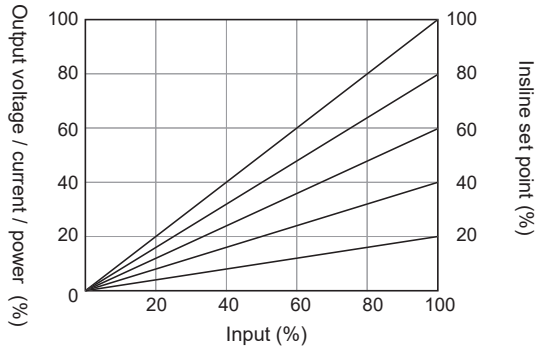
#### ●Zero-cross control (when output is 50 percent)



Control system that decides on / off for each cycle of power supply and outputs it. Corresponds to ni-chrome heater only.

### Slope setting

It changes gradient of input / output characteristics and controls maximum output in the range of 0 to 100% even if input is 100%.

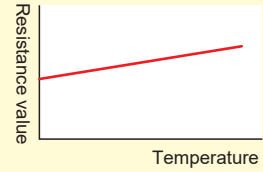


### Feedback type (phase control)

#### ●Voltage feedback

For heating element which has small resistance change.

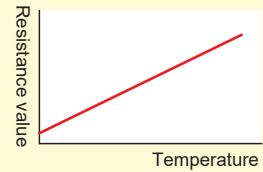
Nichrome heater



#### ●Current feedback

For heating element with small electric resistance at low temperature and which changes up to 6 to 12 times at heating.

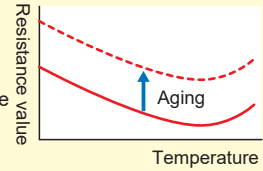
Molybdenum disilicide heater



#### ●Power feedback

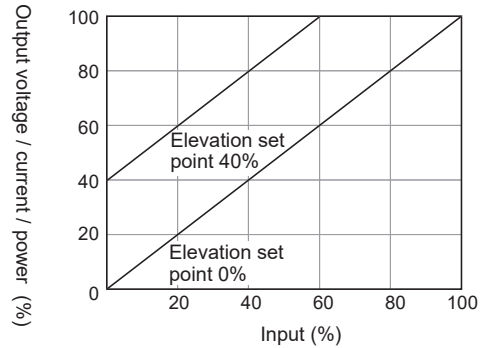
For the heating elements for which electrical resistance changes from minus to plus when temperature increases or becomes 4 times more due to aging.

Ex. SiC heater



### Elevation setting

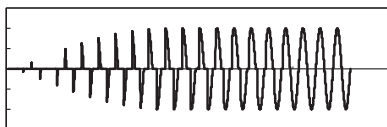
Keeps the gradient of input / output characteristics as it is and output adding value that is set to it.



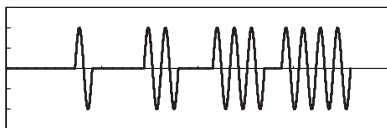
### Soft start

Increases or decreases the output gradually up to specified value when power is turned ON or when there is sudden change in the input. Time of output from 0% to 100% can be set freely from 0.1 to 20.0 sec.

#### ●Phase control

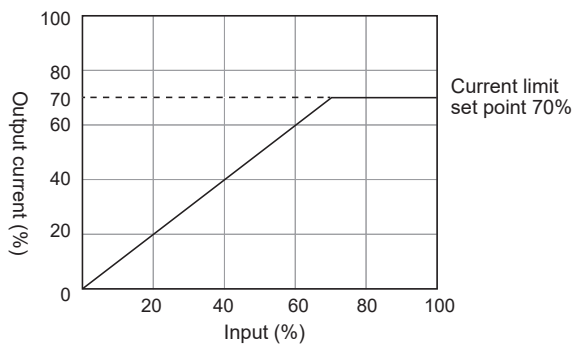


#### ●Zero-cross control



### Current limit

Controls upper limit of output current (load current) at any value.



## GENERAL SPECIFICATIONS

Phase: Single-phase  
 Control power supply  
 Rated voltage: 200 to 240V AC  
 Rated frequency: 50 / 60 Hz (±2Hz)  
 Power consumption

Rated current (A)	Power consumption (VA)	
	Setting display (Built-in)	Setting display (Panel mounting)
10 to 150	7	8
200 to 500	25	26

Main circuit power supply  
 Rated voltage: 100V (100/110/120V AC)  
 200V (200/220/240V AC)  
 400V (380/400/440V AC)  
 Rated frequency: 50 / 60 Hz (automatic change)  
 Rated current: 10,20,30,50,75,100,150,200,250,300,400,500A (to be specified)  
 Measure for power failure: Setting are stored in non-volatile memory. (Number of re-writes 1000000 times)

Insulation resistance  
 Between primary terminal and protective conductor terminals:  
 50MΩ or larger at 500VDC  
 Primary terminal: Control power terminal, V terminal, Main circuit terminal, alarm output terminal

Between secondary terminal and protective conductor terminals:  
 50MΩ or larger at 500VDC  
 Secondary terminal : Primary terminal, all terminals other than protective conductor terminal

Withstand voltage: Between primary terminal and protective conductor terminal  
 1 minute at 2000VAC (rated voltage 100 series / 200V series)  
 1 minute at 2500V AC (rated voltage 400V series)  
 Primary terminal : Control power terminal, V terminal, Main circuit terminal, alarm output terminal

Casing  
 Front: Fire resistant polycarbonate (UL94V-0)  
 Case: Steel sheet / Aluminum heat sink  
 Colour: Gray JM unit, Black (Power unit & Control unit)

Installation: Panel mount type  
 External dimensions: 10,20A 194(H)X48(W)X163(D)  
 30,50,75A 270(H)X60(W)X239(D)  
 100,150A 270(H)X120(W)X274(D)  
 200,250A 320(H)X120(W)X274(D)  
 300,400,500A 440(H)X120(W)X310(D)

Weight: 10,20A Approx 0.9Kg  
 30,50,75A Approx 2.4Kg  
 100,150A Approx 4.5Kg  
 200,250A Approx 6.0Kg  
 300,400,500A Approx 10.5Kg  
 \*Not including setting display unit (panel mounting)

Terminal screw

Rated current (A)	Main circuit terminal	protective conductor terminal	V terminal
10,20	M4	M5	M3
30,50,75	M6	M6	M4
100,150	M8	M8	M4
200,250	M10	M8	M4
300,400	M12	M8	M4
500	M16	M8	M4

Others M3

Calorific value

Rated current (A)	Calorific value(W)	Rated current (A)	Rated voltage (V)	Calorific value(W)
10	16	300	100 / 200	379
20	33		400	395
30	40	400	100 / 200	526
50	71		400	542
75	116	500	100 / 200	669
100	136		400	692
150	214			
200	310			
250	397			

## INPUT SPECIFICATIONS

Input signal: 4 to 20mA, 0 to 10V DC, 0 to 5V DC,  
 1 to 5V DC, Logic input  
 (L: 0.0V DC ≤ input ≤ 1.5V DC,  
 H: 4.0V DC ≤ input ≤ 10.0V DC)  
 Sampling rate: 10ms  
 Input resistance: Current input : 100Ω  
 Voltage input : 150kΩ  
 Allowable signal source resistance: Voltage input : 100Ω or less  
 Current input : ± 40mA  
 Allowable input: Voltage input : ± 20V AC

## OUTPUT SPECIFICATIONS

Control system: Phase control / zero-cross control  
 Feedback type: Voltage, current, power or no-feedback (switchable)  
 Output range: 0 to 98% of rated voltage  
 Output accuracy: No-feedback... within ±10% FS of rated voltage  
 Voltage feedback... within ±3% FS of rated voltage  
 (At ±10% fluctuation of rated voltage)  
 Current feedback... within ±3% FS of rated current  
 (At ±10% fluctuation of rated current and at 1 to 10 times variation of load resistance)  
 Power feedback... within ±3% FS of rated voltage  
 (At ±10% fluctuation of rated current and at 1 to 3 times variation of load resistance)  
 Accuracy to be considered under reference operation conditions, and in the 10 to 90% range of rated voltage (at the time of voltage feedback specifications) / rated current (at the time of current feedback specifications) / rated power (at the time of power feedback specifications). CT error is not included. Display value is not in the scope of accuracy guarantee.  
 Resistance load: SiC, Nichrome, Iron chrome, Molybden disilicide, Platinum, Tanguisuten, Molybden etc.  
 Inductive load: Transformer load (Applicable for phase control and primary control. Magnetic flux density below 1.2T is recommended).  
 Allowable voltage fluctuation range: ±10% of rated voltage

## ALARM FUNCTION

Alarm types

Alarm output	Alarm types	Operation
AL1	Over current Fast-acting fuse melting Frequency abnormality Operation abnormality Heat sink overheat (Above rated current 200A)	Operation Stop
AL2	Power supply abnormality Heater disconnection Loop abnormality Cooling fan abnormality	Operation continue

## ALARM OUTPUT

Output points: Mechanical relay 2 points  
 Output capacity (Mechanical relay output)  
 Contact type: 1a common  
 Contact capacity: Resistance load 240V AC 1A  
 30V DC 1A  
 Inductive load 240V AC 1A  
 30V DC 1A  
 Smallest load 5V DC 10mA  
 Contact protection element: Not included  
 Insulation: Reinforced insulation

## EXTERNAL SIGNAL INPUT (DI)

Input points: 2 points  
 Input signal: Non-voltage contact  
 External contact capacity: 5V DC 8mA  
 Function: Switching of start / stop, auto / manual, phase control / zero-cross control

# JM SERIES

## EXTERNAL SETTING INPUT (AI)

Input point: 2 points  
 External variable resistance: 10KΩ recommended (within 2 to 20 KΩ)  
 Function: Slope, current limit, elevation, manual output, soft-start

## CT

External CT: 5A output for full scale of thyristor rated current model

## SUPPORTING FUNCTION

Slope: 0 to 100% of output range  
 Elevation: 0 to 100% of output range  
 Soft-start: 0.1 to 20.0 seconds  
 Current limit: 0 to 100% of output range

## PROTECTIVE FUNCTION

Over current: Operation stops at 120% or over of rated current  
 Instantaneous power failure detection: Voltage reduction of control power supply (about 70% or lower of rated voltage)

## COMMUNICATION INTERFACE

Type: RS485  
 Protocol: MODBUS-RTU, MODBUS-ASCII  
 Function: High order communication

Communication specification

Item	RTU mode	ASCII mode
Communication method	Half-duplex start-stop synchronization method	
Communication speed	9600, 19200 bps	
Transmission code	Binary	ASCII
Error check	Vertical direction	Parity
	Horizontal direction	CRC-16 LRC
Character constitution	Start bit	1 bit
	Data length	8 bit / 7 bit / 8 bit
	Parity bit	Non / Even number / Odd Number / Non* / Even number / Odd Number
	Stop bit	1 bit / 2 bit

\* Not supported when data length is 7 bit (No parity bit)

## REFERENCE OPERATING CONDITIONS

Ambient temperature: 23°C ± 2°C  
 Ambient humidity: 55%rh ± 5% (no condensation)  
 Power voltage: 220 VAC ± 1%  
 Main circuit power supply and voltage: Rated voltage ± 1%  
 Power supply frequency: 50 / 60Hz ± 1Hz  
 Mounting angle: Forward and backward --- within ± 1°  
 Lateral --- within ± 1°  
 Altitude: 1000m or less  
 Vibration: 0m/s<sup>2</sup>  
 Shock: 0m/s<sup>2</sup>  
 Installation condition: Single panel mounting  
 Necessary space: Top and bottom more than 200mm, left and right 25mm (10 to 250A) or 33mm (300 to 500A),  
 Wind: None  
 External noise: None  
 Warm up time: At least 30 minutes

## NORMAL OPERATING CONDITIONS

Ambient temperature: -10°C to 50°C (50°C to 55°C in case rated current are 90%)  
 Ambient humidity: 20 to 90%rh (no condensation)  
 Power voltage: 200 to 240VAC  
 Main circuit power supply and voltage: Rated voltage ± 10%  
 Power supply frequency: 50 / 60Hz ± 2Hz  
 Mounting angle: With vertical direction, within ± 2° in forward and backward, within ± 2° in lateral  
 Installation height: 1000m or below  
 Vibration: 0m/s<sup>2</sup>  
 Shock: 0m/s<sup>2</sup>  
 Installation condition: Single panel mounting  
 Necessary space: Top and bottom more than 200mm, left and right 25 mm (10 to 250A) or 33mm (300 to 500A)  
 External noise: None  
 Rate of change of temperature: Less than 10°C / hour

## TRANSPORT CONDITIONS

Ambient temperature: -20 to 60°C  
 Ambient humidity: 5 to 95%rh (no condensation)  
 Vibration: 4.9m/s<sup>2</sup> or less (10 to 60Hz)  
 Shock: 392m/s<sup>2</sup> or less (under factory packing condition)

## STORAGE CONDITIONS

Ambient temperature: -20 to 60°C  
 \*10 to 30°C for long-term storage  
 Ambient humidity: 5 to 95%rh (no condensation)  
 Vibration: 0m/s<sup>2</sup>  
 Shock: 0m/s<sup>2</sup> (under factory packing condition)

## SETTING DISPLAY (Panel mount type)

Installation: Panel mount type  
 Between JM unit and setting display are exclusive cable SH-JMK3(3m), SH-JMK5(5m), SH-JMK8(8m)  
 supply from JM unit

Power supply:  
 Ambient temperature: -10 to 55°C  
 Ambient humidity: 20 to 90%rh (no condensation)  
 Weight: 50 g

## INTERNATIONAL STANDARD

CE, UKCA marking: Make sure to use specified filter to comply with low voltage directive and EMC directive.  
 Low Voltage directive: EN60947-4-3 (Form4) Pollution degree 2, only for resistance load  
 Environmental regulations: RoHS (CE/UKCA)  
 Environmental regulations standards: EN IEC63000 conformity  
 EMC directive: EN60947-4-3 (Form4)  
 EMC test standard

Emission standard: according to EN60947-4-3 below

Emission type	Test standard
Conducted interference	CISP11 Class A Groupe 2
Radiation electromagnetic field	CISP11 Class A

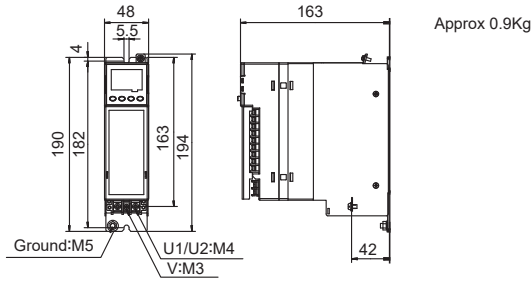
Immunity standard: according to EN60947-4-3 below

Test type	Test standard
Electrostatic discharge	EN61000-4-2
Radio frequency radiation electromagnetic field	EN61000-4-3
First transient / Burst	EN61000-4-4
Surge	EN61000-4-5
Conducted disturbances induced by radio- frequency	EN61000-4-6
Voltage dip	EN61000-4-11

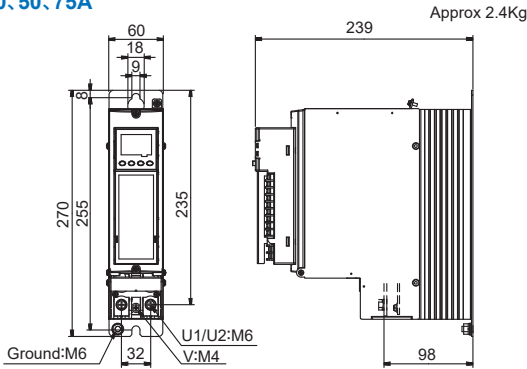
Rated voltage 200 to 500A do not comply with CE, UKCA marking.

## EXTERNAL DIMENSIONS

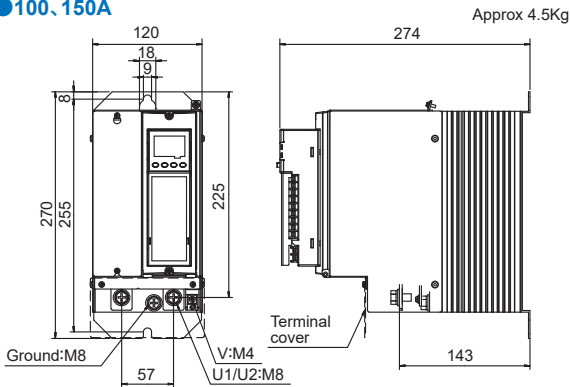
### 10, 20A



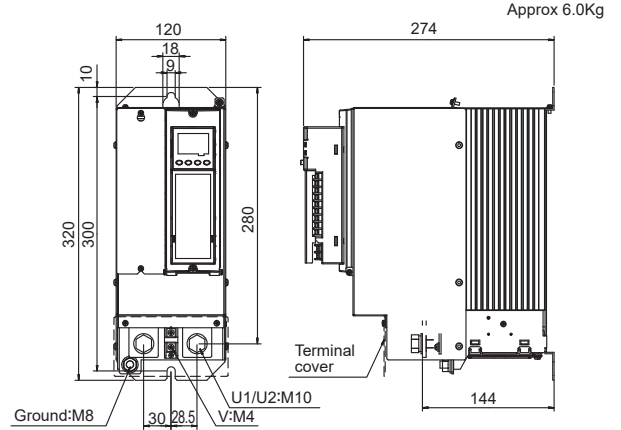
### 30, 50, 75A



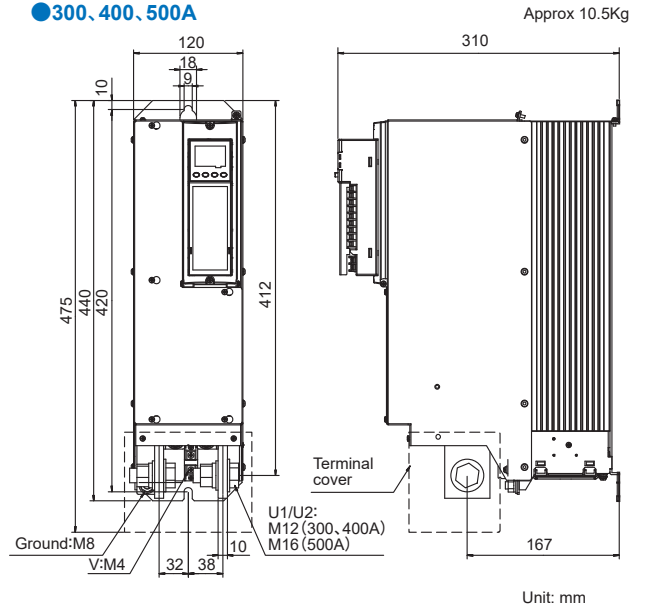
### 100, 150A



### 200, 250A

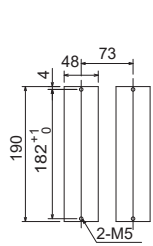


### 300, 400, 500A

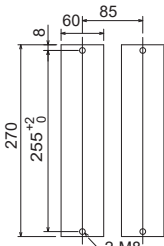


## PANEL CUT OUT

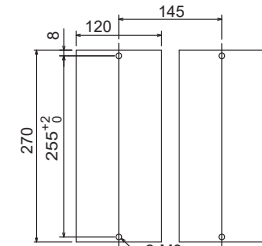
### 10, 20A



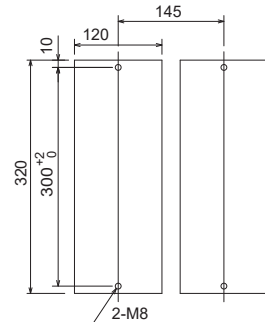
### 30, 50, 75A



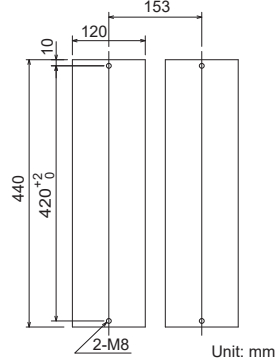
### 100, 150A



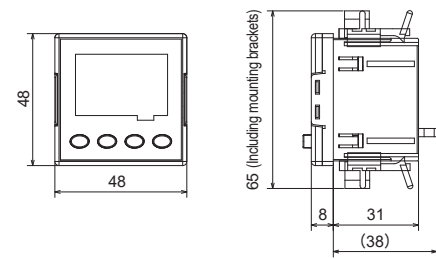
### 200, 250A



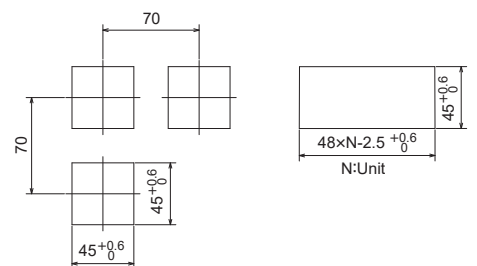
### 300, 400, 500A



## SETTING DISPLAY



## PANEL CUT OUT

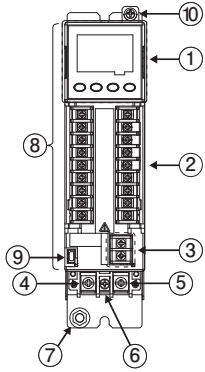


Unit: mm

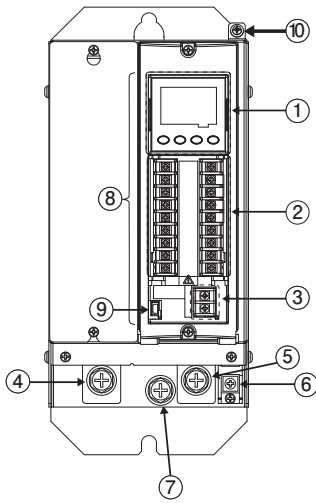
# JM SERIES

## ■ NAMES AND FUNCTIONS OF PARTS

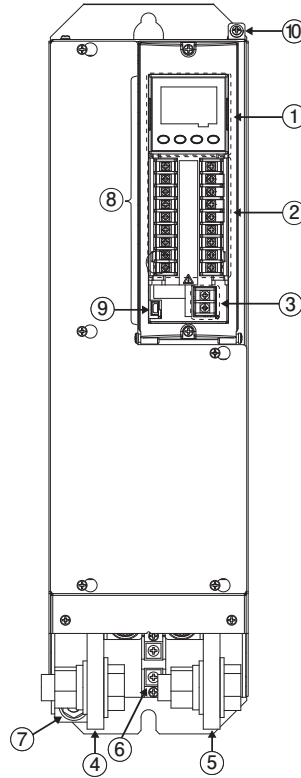
● 10, 20A



● 100, 150A

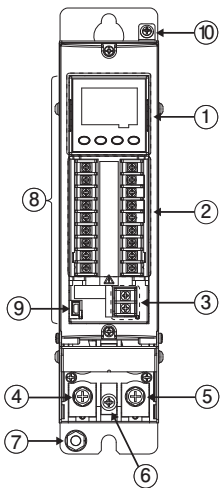


● 300, 400, 500A

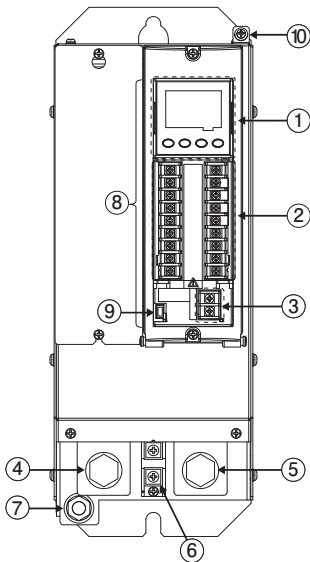


- |   |  |
|---|--|
| ① | Setting display unit                           |
| ② | Setting terminal                               |
| ③ | Control power terminal                         |
| ④ | Main circuit terminal (U1 : Power supply side) |
| ⑤ | Main circuit terminal (U2 : Load side)         |
| ⑥ | Feedback terminal (V terminal)                 |
| ⑦ | Protective conductor (ground) terminal         |
| ⑧ | Power supply / control unit                    |
| ⑨ | Engineering port                               |
|   | *Maintenance use only (Cannot be used)         |
| ⑩ | Shield connection terminal                     |
|   | *For panel mounting setting display unit       |

● 30, 50, 75A



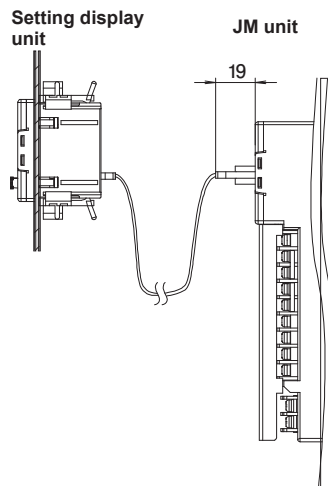
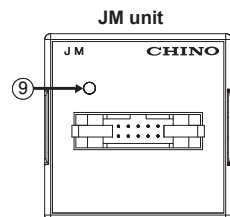
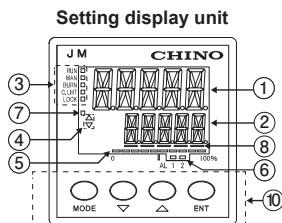
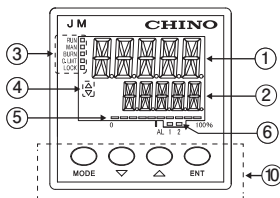
● 200, 250A



## ■ NAMES AND FUNCTIONS OF SETTING DISPLAY UNIT

● JM unit

● Panel mounting type



- |   |                                 |
|---|---------------------------------|
| ① | DISP1                           |
| ② | DISP2                           |
| ③ | Status lamp                     |
| ④ | Elevation / slope display       |
| ⑤ | Analog bar indication display   |
| ⑥ | Alarm output indication display |
| ⑦ | Busy lamp                       |
| ⑧ | Communication error lamp        |
| ⑨ | Power lamp                      |
| ⑩ | Operation keys                  |

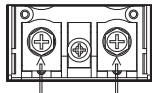
## CONNECTION OF POWER SUPPLY, SETTING INPUT AND COMMUNICATION

\*To prevent the risk of getting electric shock, make sure to turn OFF the power supply before doing wiring.

### Control power supply terminal

**L(U1)** It is necessary to match main circuit power supply and the phase. Step-up transformer is required if main circuit rated voltage is 100V line.  
**N(V1)** Step-down transformer is required if main circuit rated voltage is 400V line.

### Main circuit terminal



Position of main circuit terminals differs depending on the rated current. Refer to P6 'Names and functions of parts.'

U1 terminal power supply side  
 U2 terminal load side

### Protection conductor (grounding) terminal

Make sure to connect protective conductor (ground) terminal of the instrument to the protective conductor (ground) terminal of power supply facility. Position of protective conductor (ground) terminal differs depending on the rated current.

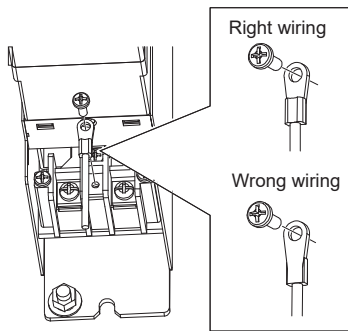
Put crimp type terminal with insulation sleeves to the ground cable first and then connect.

Refer to P6 'Names and functions of parts.'

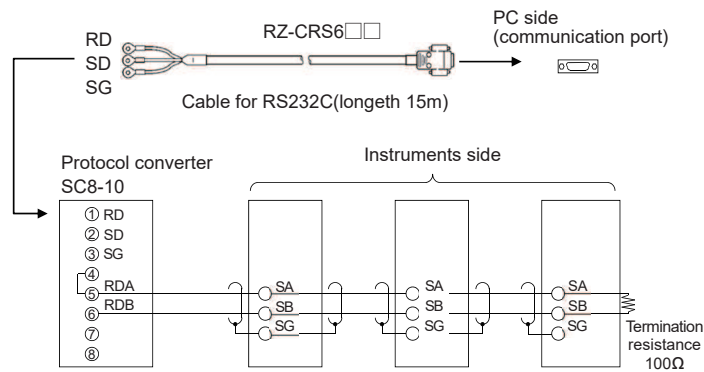
### Feedback terminal

Location of feedback terminal varies depending on rated current of the instrument. Refer to P6 'Names and Functions of Parts.'

For wiring of the feedback terminal, put crimp type terminal as shown below.



### Connection of communication interface

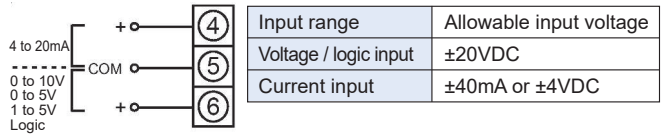


Set to RS485 using selector switch.

Please do not connect the SG line to the FG terminal of the instrument or a grounding terminal.

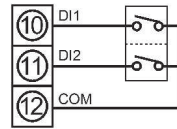
## CONNECTION OF SETTING INPUT TERMINALS

### DC voltage / DC current / Logic input terminal

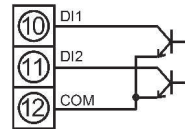


### External signal input (DI) terminal

Wiring to relay and switch



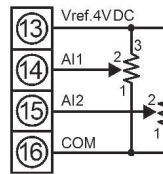
Wiring to open collector output



\*At the purchase, short-circuit bar is placed between DI2 and COM (between ⑩-⑫ terminals).

Take it out if using external signal input (DI).

### External signal input (AI) terminal

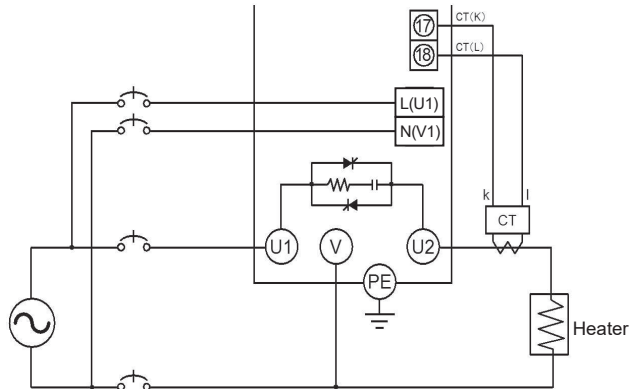


\*At the purchase, short-circuit bar is placed between Vref.4V and AI1 (between ⑬-⑭ terminals).

Take it out if using external setting input (AI).

\*Use 10kΩ for external variable resistor.

### External current transformer (CT) terminal

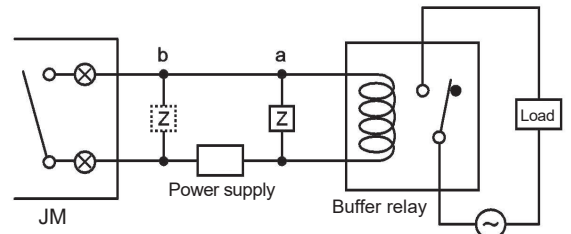


CT specification : 5A output to rated current full scale.

### Wiring of alarm output terminals

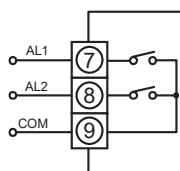
\*In order to prevent electric shocks, shut down the power supply and buffer relay before wiring.

\*Connect cables via buffer relay if the load capacity exceeds the built in relay capacity of the instrument.



Z: Contact protective element (it is recommended to mount this element on the 'a' side)

### Alarm relay output (2 points 'a' contact)



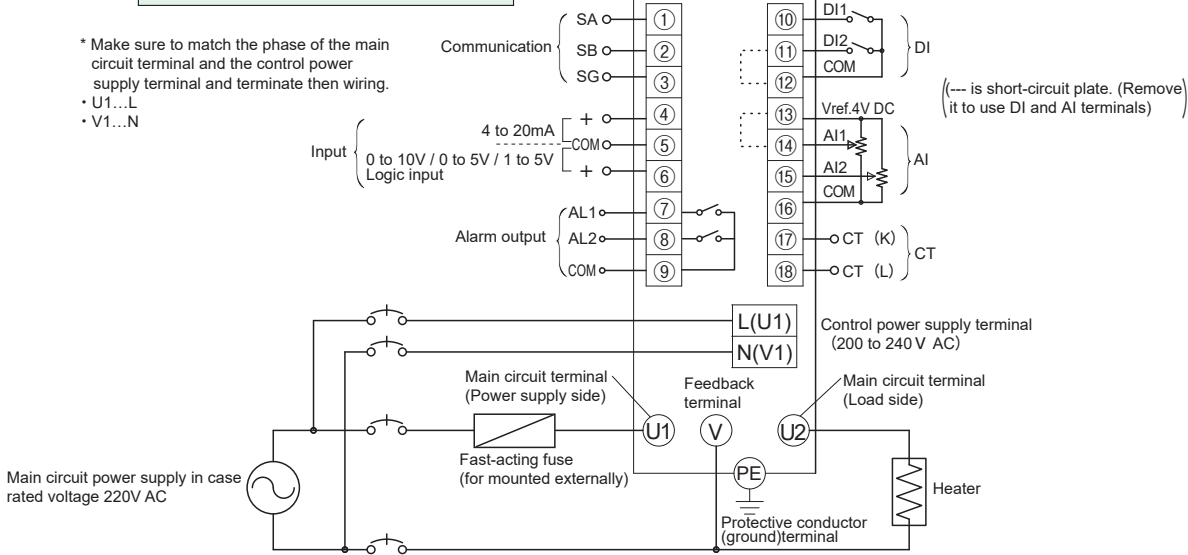
AL1	①Over current ②Fast-acting fuse melting ③Frequency abnormality ④Operation abnormality ⑤Heat sink overheat
AL2	①Power supply abnormality ②Heater disconnection ③Loop abnormality ④Cooling fan abnormality

# JM SERIES

## Basic wiring

### JM unit

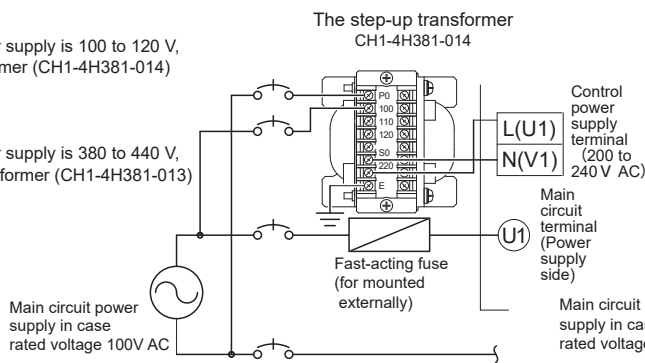
#### Main circuit rated voltage 200V series



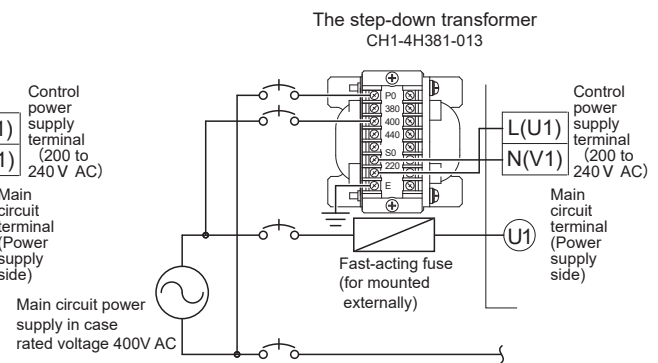
#### Main circuit rated voltage 100V series

\* If main circuit power supply is 100 to 120 V, use step-up transformer (CH1-4H381-014)

\* If main circuit power supply is 380 to 440 V, use step-down transformer (CH1-4H381-013)



#### Main circuit rated voltage 400V series



## Types of terminals and terminal process

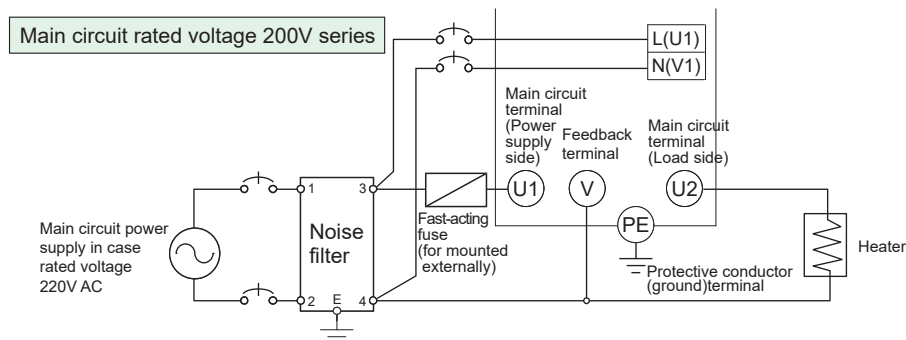
For control power terminals, use type O terminals without fail to ensure safety. It is recommended to use O type terminals for other terminals also as far as possible.

Terminal base	Screw diameter	Tightening torque (Unit : mm)	Terminal base	Screw diameter	Tightening torque (Unit : mm)
Main circuit terminal (500A)	M16	O-type 50.5 or less with insulation sleeve t:4 or more	Protective conductor terminal (10A, 20A)	M5	O-type 12 or less 5.3 or more with insulation sleeve t:1.2 or more
Main circuit terminal (300A, 400A)	M12	O-type 50.5 or less with insulation sleeve t:4 or more	Main circuit terminal (10A, 20A) Feedback terminal (30 to 500A)	M4	O-type 10 or less 4.3 or more with insulation sleeve t:0.8 or more
Main circuit terminal (200A, 250A)	M10	O-type 36 or less 10.5 or more with insulation sleeve t:3 or more	Control power supply terminal Alarm output terminal Setting input terminal Communication terminal Feedback terminal (10A, 20A)	M3	O-type 6 or less 3.2 or more 5.6 or more* t:0.8 or more with insulation sleeve
Main circuit terminal (100A, 150A) Protective conductor terminal (100A to 500A)	M8	O-type 22 or less 8.4 or more with insulation sleeve t:2 or more			Y-type 6 or less 3.2 or more with insulation sleeve
Main circuit terminal Protective conductor (ground)terminal (30A, 50A, 75A)	M6	O-type 16.5 or less 6.4 or more with insulation sleeve t:1.8 or more	*To fasten two terminal together, use type O terminal 5.6 mm or more.		



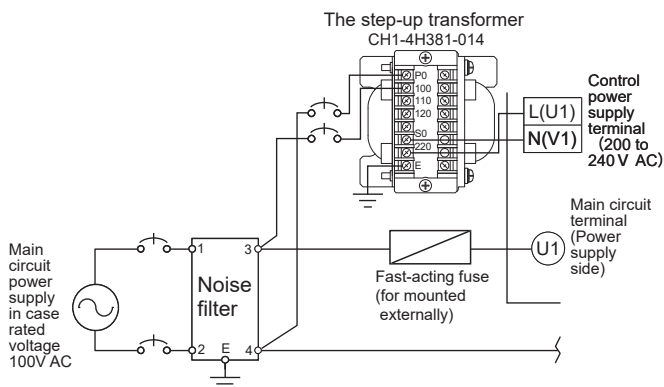
### Wiring of CE,UKCA marking conformity

It complies with CE,UKCA marking by connecting to a specific noise filter.  
This is applicable if rated current of the instrument is 10 to 150A.



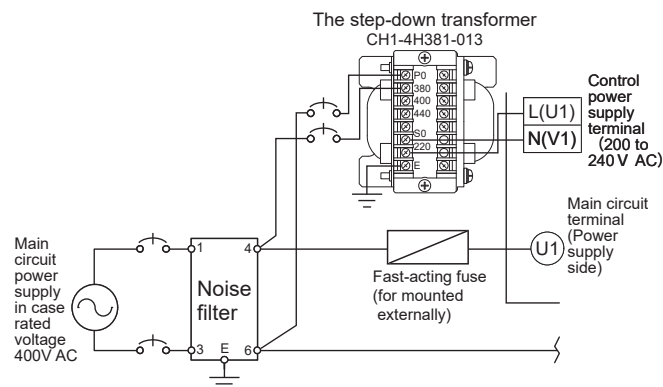
#### Main circuit rated voltage 100V series

\*If main circuit power supply is 100 to 120 V, use step-up transformer (CH1-4H381-014)



#### Main circuit rated voltage 400V series

\*If main circuit power supply is 380 to 440 V, use step-down transformer (CH1-4H381-013)



### Noise filter (Please arrange by yourself.)

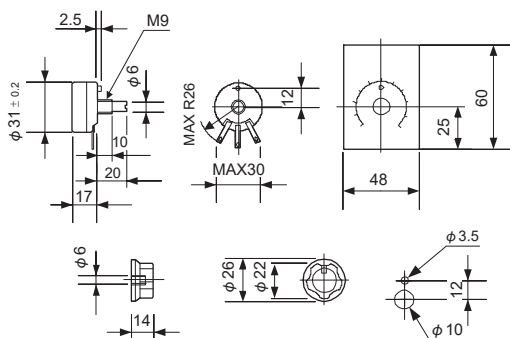
Main circuit power supply voltage (V)	Rated current (A)	Models	Main circuit power supply voltage (V)	Rated current (A)	Models
100 to 240	10	HF2010A-UP	380 to 440	10	NF3010C-SVB
	20	HF2020A-UP		20	NF3020C-SVB
	30	HF2030A-UP		30	NF3030C-SVB
	50	HF2050A-UP		50	NF3050C-SVB
	75	HF2080A-UP		75	NF3080C-SVB
	100	HF2100A-UP		100	NF3100C-SVB
	150	HF2150A-UP		150	NF3150C-SVB

Noise filters are manufactured by SOSHIN ELECTRIC CO.,LTD

## ACCESSORIES

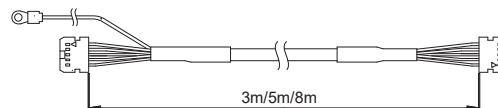
### External setting unit (VL-JAL)

Model	Purpose of use	Specifications
VL-JAL	Slope setting, current limit, elevation, manual output, soft start.	Variable resistance 10 kΩ



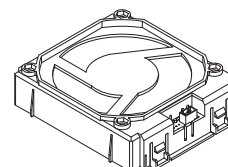
Unit : mm

### Exclusive cable for connected between JM unit and setting display (Corresponds to panel installation specs)



Length (m)	Models
3	SH-JMK3
5	SH-JMK5
8	SH-JMK8

### Cooling fan unit SH-JMFAN



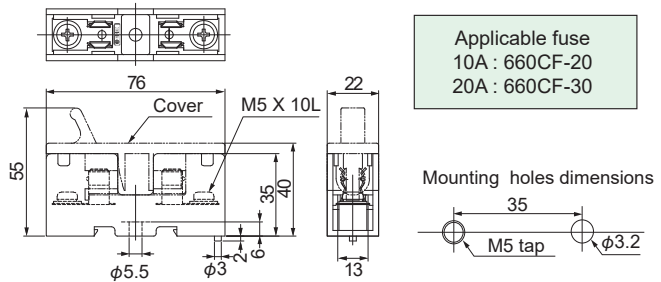
### ●Fast-acting fuse

Rated current (A)		Models
10		660CF-20*
20		660CF-30*
30		660GH-050S
50		660GH-080S
75		660GH-100S
100		660GH-160S
150		660GH-200S
200		660GH-315S
250		660GH-350S
300	100 / 200V	250GH-450S
	400V	660GH-450S
400	100 / 200V	250GHW630S
	400V	660GH-630S
500	100 / 200V	250GHW710S
	400V	660GH-710S

\*This fast-acting fuse is for external attachment. Fuse holder is required separately. Alarm is not activated for fuse melting.

### ●External fuse unit

Fuse holder (HK1038UL) / Fuse holder cover (HC-10)

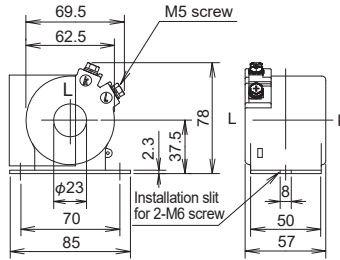


Unit : mm

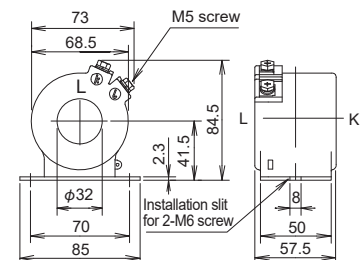
### ●CT (Current transformer)

Rated current (A)	Models	Number of turns	TYPE
10	CW-5L-100/5A	10	TYPE1
20	CW-5L-100/5A	5	
30	CW-5L-150/5A	5	
50	CW-5L-100/5A	2	
75	CW-5L-150/5A	2	
100	CW-5L-100/5A	1	
150	CW-5L-150/5A	1	TYPE2
200	CW-5L-200/5A	1	
250	CW-5L-250/5A	1	
300	CW-5L-300/5A	1	TYPE2
400	CW-5L-400/5A	1	
500	CW-5L-500/5A	1	TYPE3

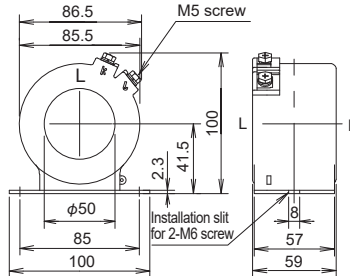
#### ●TYPE 1



#### ●TYPE 2



#### ●TYPE 3



Unit : mm

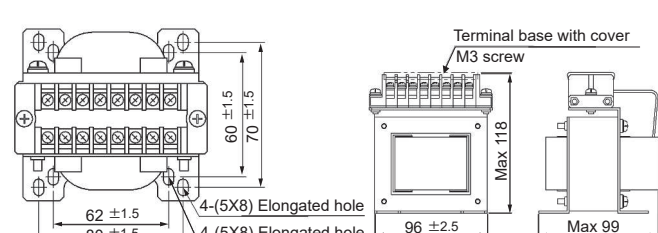
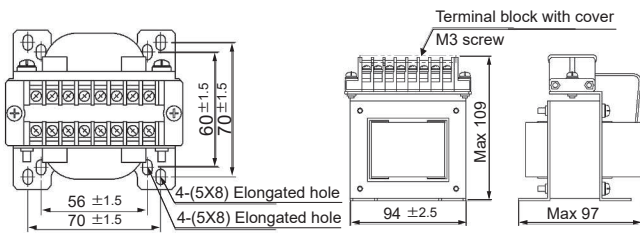
### ●Transformer for control power supply

The step-up transformer  
CH1-4H381-014  
Main circuit rated voltage 100V series

Capacity 50VA  
Weight approx 1.8kg

The step-down transformer  
CH1-4H381-013  
Main circuit rated voltage 400V series

Capacity 50VA  
Weight approx 2.2kg



Unit : mm

Specifications subject to change without notice. Printed in Japan (I) 2024. 7

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