

JW SERIES

Three Phase Thyristor Regulator



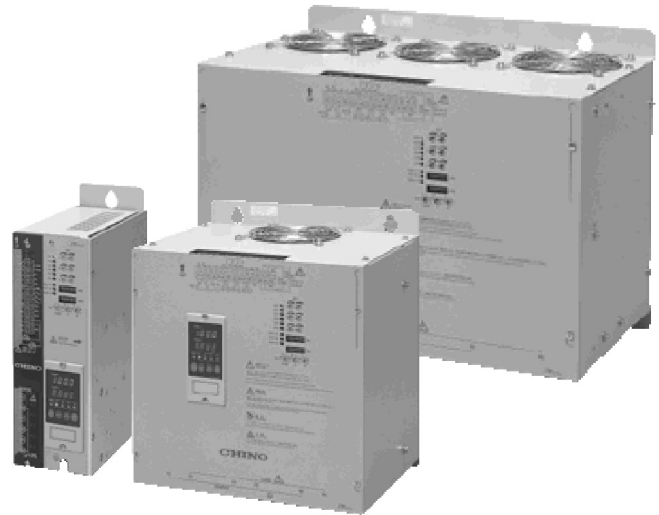
JW Series is compact lightweight three-phase control thyristor regulators enabling high-density instrumentation.

The methods of control are divided into two ways, the phase control and zero-cross control.

In the phase control systems, a type with the voltage, current and power feedback control types and a type without those feedbacks are available according to the characteristics of a heater used.

JW Series are also capable of advanced three-phase control based on 6-arm control and fine control setting from the setting communication unit.

Furthermore, remote control and data monitoring is available by connecting to a host unit.



■ FEATURES

● Compact all-in-one configuration

Flat and slim structure, high-density instrumentation is available.

As they are using the same pitch of JT Series a replacement from an old version is easy.

● Setting communication unit is included

Displaying measured values of real time power voltage, current, electric power and also settings of each parameter, switching operation are available.

Each parameter enables fine control.

Units including communication enable to set data monitor and each parameter via PC upper communication, RS-422 or RS-485.

● Disconnection alarm and current limit are included as a standard

Heater disconnection alarm function and power current control function.

● Controllability is improved with 6-arm control

6-arm control functions especially for transformer loading and the controllability was highly improved.

6-arm control is the best for improving controllability, unbalanced alarm function, reducing harmonic noise.

● Imbalanced alarm function equipped as standard

The imbalance adjustment function used to adjust the imbalanced status is included. Balance control of three phase's outputs value is also available.

Imbalance alarm judges the imbalance ratio of the current.

● Various protective functions

Thyristor elements are protected by gating off for over-current, melting of the rapid fuse for short-circuit and gating off for radiation fin over-heating.

Phase-sequence abnormalities alarm and open-phase alarm, which are suitable for three phase control are included.

■ MODELS

JW□□□□□□□□□□

Power voltage

20:200V AC (200V/220V/240V)

40:400V AC (380V/400V/440V)

99: Others

Rated Current

010: 10A 200: 200A

020: 20A 250: 250A

030: 30A 300: 300A

050: 50A 400: 400A

075: 75A 500: 500A

100: 100A 750: 750A

150: 150A X00: 1000A

Control system

V: Phase-angle firing. voltage feedback/ Zero-cross firing

A: Phase-angle firing. current feedback/ Zero-cross firing

W: Phase-angle firing. power feedback/ Zero-cross firing

N: Phase-angle firing. no feedback/ Zero-cross firing

Z: Zero-cross firing

Rapid fuse*1

N: Not provided

A: Provided

Setting communication unit *2

0: Not provided

1: Provided (Installed to unit)

2: Provided (Panel installation)

3: Provided (Installed to unit including communication)

4: Provided (Panel installation including communication)

CT(current transformer) function *3

0: Mounted externally(or none)

1: Built-in

Arms

3: 3 arms

6: 6 arms

*1 In case the rated current with rapid fuse is 010 or 020, "A" cannot be chosen

*2 For setting communication unit of panel installation, exclusive cable "SH-JUK3" of 3m or "SH-JUK5" of 5m are necessary.

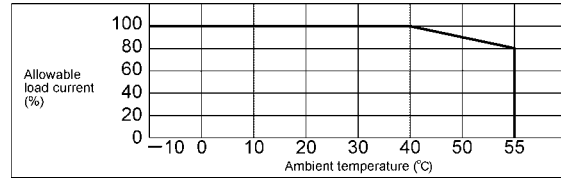
*3 In case current rate with CT function is more than 100A "1" cannot be chosen. When installing CT externally please select 0.

■ GENERAL SPECIFICATIONS

Phase:	Three-phases
Rated voltage:	200V AC(200V/ 220V/ 240V selectable by switch) 400V AC(380V/ 400V/ 440V selectable by switch) to be specified (main circuit power supply and control circuit power supply are common) * The models which have a different main circuit power supply and a control circuit power supply are manufactureable.
Rated current:	10A, 20A, 30A, 50A, 75A, 100A, 150A, 200A, 250A, 300A, 400A, 500A, 750A, 1000A to be specified
Rated frequencies:	50/60 Hz (automatic change)
Allowable voltage fluctuation:	± 10% of rated voltage
Allowable frequency fluctuation:	± 2Hz of rated frequency
Control system:	Phase angle firing system and zero-crossing firing system
Arms:	Specify 3 arms or 6 arms
Feedback types:	Voltage, current, power feedback
Control input signal:	4 to 20mA DC(input resistance is approx. 100Ω) 1 to 5V DC(input resistance is approx. 50kΩ)
External setting input:	Volume signal (10kΩ is recommended)
External contact input:	External signal no-voltage contact or open collector (external contact capacity 1mA 5V DC or more)
External CT input:	0 to 5A AC of rated current
Ramp:	0 to 100 % of output range
Elevation:	0 to 100 % of output range
Soft-start:	1 to 20 seconds
Current limit:	0 to 100 %of output range
Imbalance adjustment:	Imbalance of approx. 40 % output range can be adjusted
Output range:	0 to 98 % of supplied power voltage
Output accuracy:	No-feedback ... Within ± 10% of rated voltage Voltage feedback ... Within ± 3% of rated voltage (Rated voltage is ± 10%, at 1 to 10 times variation of load resistance) Current feedback ... Within ± 3% of rated current (Rated voltage is ± 10%, at 1 to 10 times variation of load resistance) Power feedback ... Within ± 3% of rated voltage (Rated voltage is ± 10%, at 1 to 3 times variation of load resistance) *Note: this is not including the accuracy in the rating from 10 to 90 % and CT error. (at reference operating condition)
Applicable load:	Resistive load, inductive load, (Inductive load ... phase-angle firing system, primary side control of transformer, and flux density 1.2 T or lower are recommended)
Minimum load current:	0.5 A or more(at 98% output of rated voltage)
Alarm types:	Over-current alarm (alarm output AL1) Rapid fuse meltdown alarm (alarm output AL1) Radiation fin over heating alarm (alarm output AL1) Heater disconnection alarm (alarm output AL2) Thyristor elements abnormal alarm (alarm output AL2) Abnormal operation alarm, abnormal phase sequence alarm, Open-phase alarm Imbalance alarm (alarm output AL2) Frequency abnormality alarm
Alarm contact output:	2 points,(AL1, AL2)
Alarm output:	Maximum load 240V AC 1A, 30V DC 1A Minimum load 5V DC 10mA or more Electricity life 100,000 times or more Contact protection elements not included (sold separately)
Over current protection:	Melting of the rapid fuse for short-circuit 0% output at 120% of rated current (thyristor gate-off) With current limit function high limit output value is configurable
External setting:	Ramp setting (AI1), elevation(AI2), Current limit(AI3)
External contact:	Operational status(DI1 --- run/ stop) Control system (DI2 --- phase angle firing/ zero-cross firing) Setting system (DI3 --- front display setting/ external setting)

Cooling system: Natural air cooling for 75A or less of rated current
Forced air cooling for 100A or more of rated current

Working temperature: -10 to 55 °C
In case of more than 40°C it depends on the following derating performance.



Working humidity: 30 to 90 %RH, No dew-condensation

Insulation resistance:

Between power supply terminal and protection conductor terminal 500V DC, 50MΩ or more

Dielectric strength: Between power supply terminal and protection conductor terminal

2000V AC, 1 min(200V system)
2500V AC, 1 min(400V system)

Dielectric strength of cooling fan is 2000V AC

Weight:

About 6kg for 10A and 20A

About 8kg for 30A and 50A

About 13kg for 75A and 100A

About 22kg for 150A to 250A,

About 36kg for 300 to 500A

Case :

Steel

Color:

Gray

Installation:

Installed to panel

Working condition: Reference operating condition

--- Ambient temperature 23°C ± 2°C

Ambient humidity 55% ± 5%RH

Power supply voltage rated voltage ± 1%

Power supply frequency rated supply frequency

Normal operating condition

--- Ambient temperature -10 to 55°C

Ambient humidity 30 to 90%RH

Power supply voltage rated voltage ± 10%

Power supply frequency rated supply frequency ± 2Hz

■ Setting communication unit

Main setting:

Operational status (active / stop),

Control system(Zero-cross/ Phase angle)

Output system (automatic/ manual)

Alarm output (ON/OFF)

Manual output value, Feedback control system,

Ramp setting, Elevation, Soft start

SV high/ SV low limit, Heater disconnection

alarm(ON/OFF)

Heater disconnection alarm rating,

Heater disconnection alarm detect time

Current limit(ON/OFF), Current limit value

Imbalance alarm (ON/OFF)

Imbalance Alarm imbalance rate

Communication protocol, Communication address,

Communication transmission rate

Communication character, Pulse cycle, Scaling etc

Measuring value display:

Current value, voltage value, power value, load

resistance value, etc

Error display:

Error display, alarm display, etc

Communication interface:

RS-422A, RS-485

Communication type:

Half-duplex asynchronous type

Communication protocols:

MODBUS(RTU/ASCII)

Transmission rate: 19200bps, 9600 bps

Working temperature: -10 to 55°C

Working humidity: 30 to 90%RH (non dew-condensation)

Power supply: Supplied from Thyristor unit

Weight:

About 50g

Case:

Fire retardant ABS

Color:

Gray

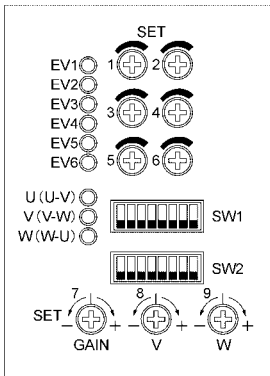
Installation:

Installed to thyristor unit or panel

(exclusive cable sold separately is necessary for panel installation)

■ Front panel

● Front panel close up



● Function of trimmers

Trimmer No.	Setting function
SET1	Ramp (0 to 100%)
SET2	Elevation (0 to 100%)
SET3	Soft start (Approx 1 to 20 sec.)
SET4	Current limit (0 to 100%)
SET5	Ratio of heater disconnection(0 to 100%)
SET6	Imbalance ratio(1 to 40%)
SET7	Output gain of imbalance adjustment (60 to 140%)
SET8	V phase output of imbalance adjustment (V phase...±40%)
SET9	W phase output of imbalance adjustment (W phase...±40%)

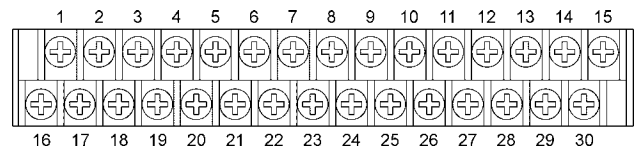
● Function of dipswitch SW1

Bit No.	Setting function
1	Current limit ON/OFF. ON to activate.
2	Heater disconnection alarm ON/OFF. ON to activate.
3	Storage of the initial resistance value for heater disconnection alarm. ON to activate.
4	Imbalance alarm ON/OFF. ON to activate.
5	Alarm output ON/OFF. ON to make the function OFF.
6	Feedback control ON/OFF. OFF to make the FB function OFF.
7	Imbalance adjustment ON/OFF. ON to activate.
8	Unused

● Function of dipswitch SW2

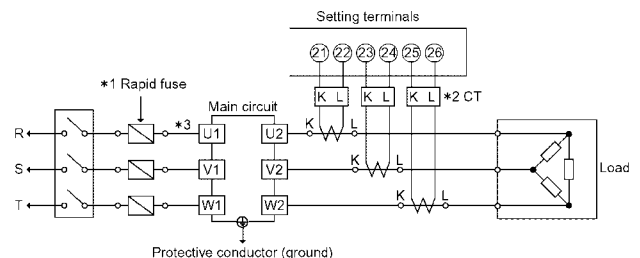
Bit No.	Setting function					
1	Logical switching of remote contact input 1 (Run/ Stop)					
2	Logical switching of remote contact input 2 (Phase/Zero-cross)					
3	Logical switching of remote contact input 3 (Front panel/ Remote setting input)					
4	Individual selection of remote setting input: Ramp					
5	Individual selection of remote setting input: Elevation					
6	Individual selection of remote setting input: Current limit					
7		ON	ON	OFF	OFF	
8		ON	OFF	ON	OFF	
	Power supply voltage	200V	240V	220V	200V	(unused)
		400V	(unused)	440V	400V	380V

■ Terminal assignment



Bit No.	Terminal function
1	Remote setting input common (AI com)
2	Remote setting input ref. voltage(AI V-ref)
3	Remote setting input1 (AI1)
4	Remote setting input1 (AI2)
5	Remote setting input1 (AI3)
6	Remote contact input common (DI com)
7	Remote contact input1 (DI1)
8	Remote contact input2 (DI2)
9	Remote contact input3 (DI3)
10	N, C (unused)
11	N, C (unused)
12	N, C (unused)
13	Alarm output1 (AL1)
14	Alarm output1 (AL2)
15	N, C (unused)
16	Control input signal (+)
17	Control input signal selection (mA/V)
18	Control input signal (-)
19	Control signal output (OUT)
20	Control signal input (IN)
21	CT, U (K)
22	CT, U (L)
23	CT, V (K)
24	CT, V (L)
25	CT, W (K)
26	CT, W (L)
27	N, C (unused)
28	Alarm output1 (AL1)
29	Alarm output2 (AL2)
30	N, C (unused)

■ Connection of main circuit terminals



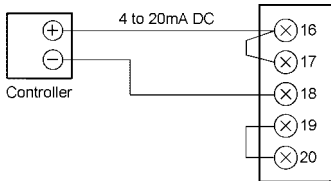
*1 For models without the rapid-break fuse, make sure to connect a rapid fuse externally to protect a system

*2 When the CT is not built in, connect a CT externally as required.

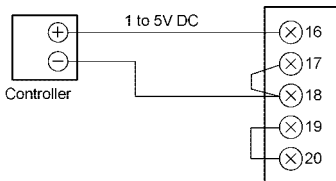
*3 Main power supply and control circuit power supply are common in standard type. Special type, whose main power and circuit power is separated is also available.

■ Connection of terminals

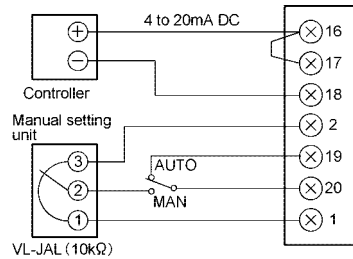
● Control input signal only Current signal (4 to 20mA DC)



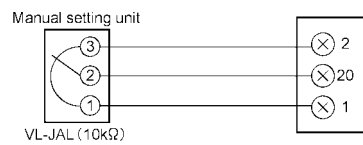
Voltage signal (1 to 5V DC)



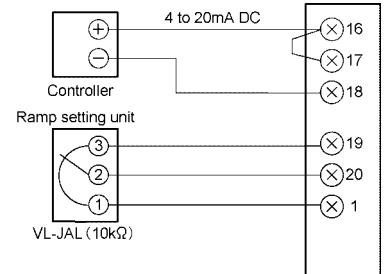
● Manual setting unit and with auto/man switching Current signal (4 to 20mA DC)



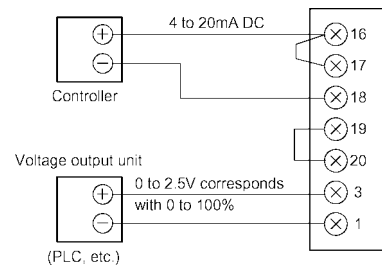
● Manual setting unit only



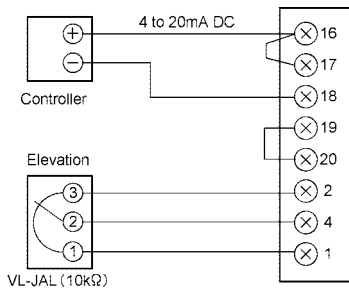
● With ramp setting unit (Ramp using control input signal) Current signal (4 to 20mA DC)



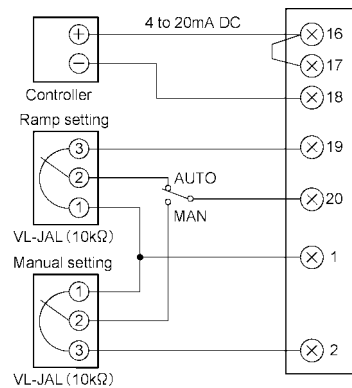
● With ramp setting unit (Ramp using remote setting input) Current signal (4 to 20mA DC)



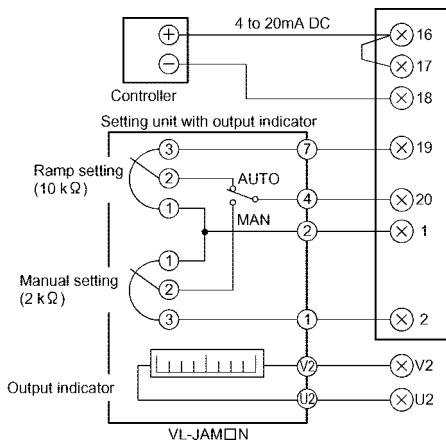
● With elevation setting unit Current signal (4 to 20mA DC)



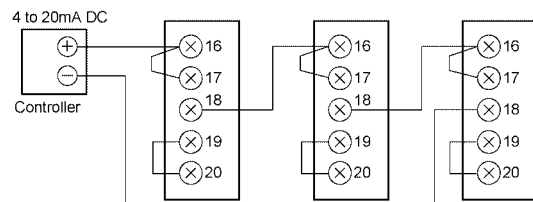
● Manual setting unit, ramp setting unit with auto/man switching Current signal (4 to 20mA DC)



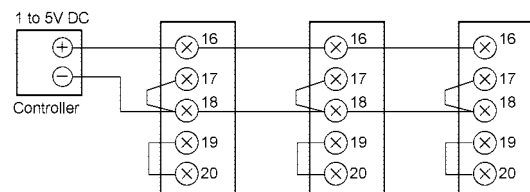
● Setting unit with output indicator (*Cannot be used in zero-cross control) Current signal (4 to 20mA DC)



● Operation of multiple instruments Current signal (4 to 20mA DC)

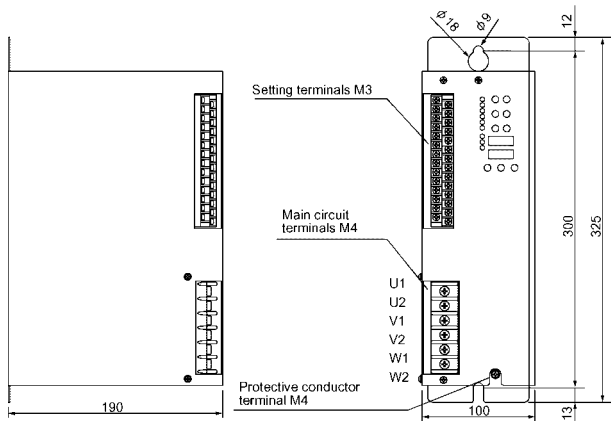


Voltage signal (1 to 5V DC)

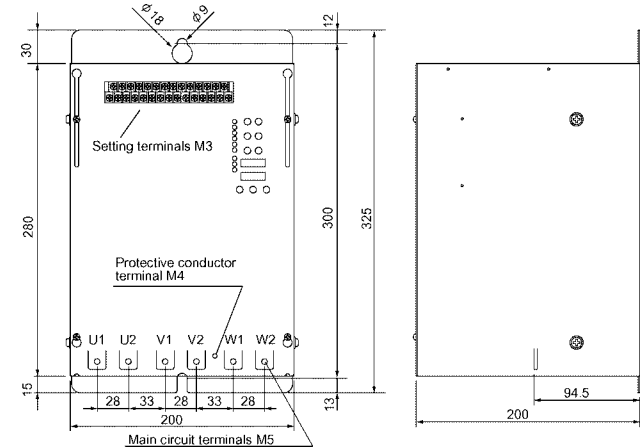


External dimensions

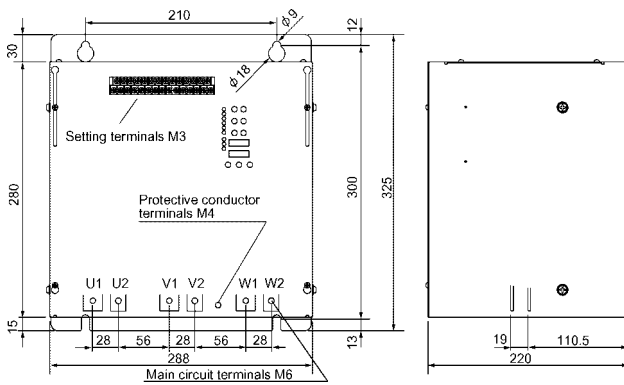
● 10A, 20A



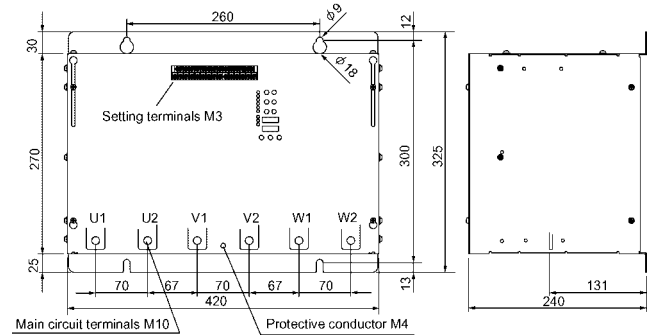
● 30A, 50A



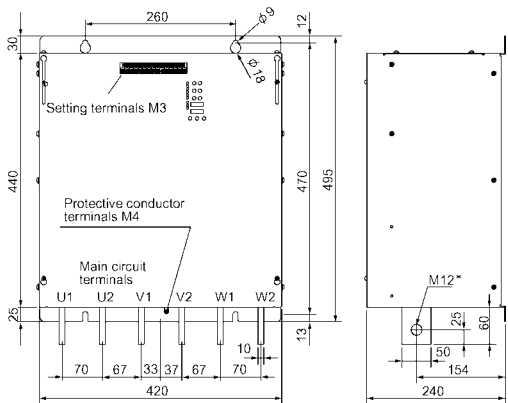
● 75A, 100A



● 150A, 200A, 250A

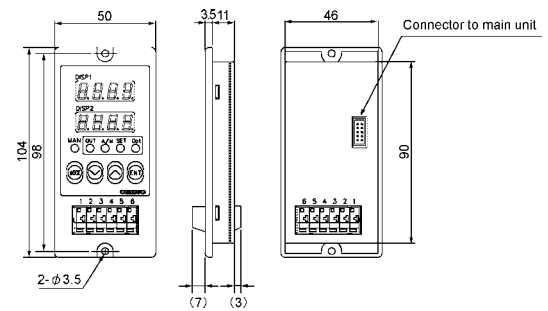


● 300A, 400A, 500A



*M16 for 500A type

● Setting Communication unit



Unit: mm

Heating value

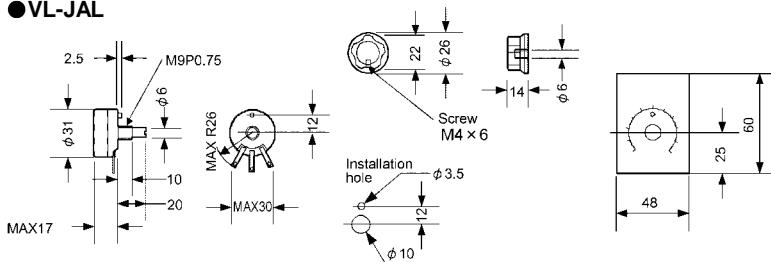
Rated current	Maximum heating value	Rated current	Maximum heating value
10A	40W	150A	500W
20A	90W	200A	790W
30A	140W	250A	920W
50A	180W	300A	1100W
75A	260W	400A	1530W
100A	380W	500A	1980W

■ ACCESSORIES

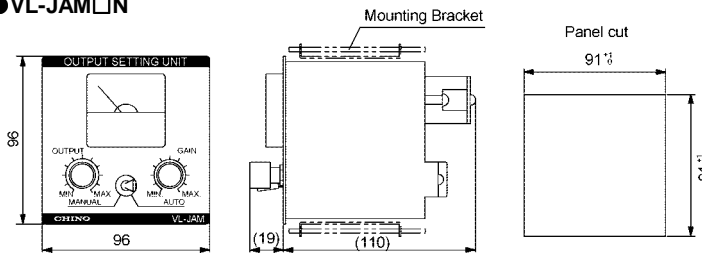
● Manual setting unit

Model	Specifications
VL-JAL	Simple function type for ramp setting Variable resistance value: 10kΩ
VL-JAM□ <div style="margin-left: 20px;"> 2: Voltage indicator (0 to 250V) 4: Voltage indicator (0 to 500V) </div>	All-in-one function combined with indicator, ramp setting, manual setting and selector switch Variable resistance value: 10kΩ (Ramp setting) 2kΩ (Manual setting)

● VL-JAL



● VL-JAM□

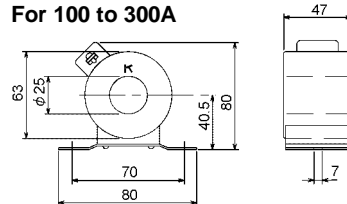


● CT (external current transformer)

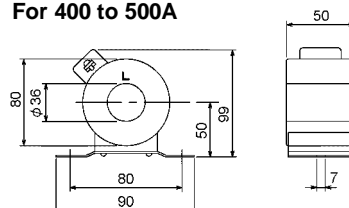
Rated current	Models	Number of through-holes
10A	CPI-1TR 100AT	10
20A	CPI-1TR 100AT	5
30A	CPI-1TR 150AT	5
50A	CPI-1TR 100AT	5
75A	CPI-1TR 150AT	2
100A	CPI-1TR 100AT	2
150A	CPI-1TR 150AT	1
200A	CPI-1TR 200AT	1
250A	CPI-1TR 250AT	1
300A	CPI-1TR 300AT	1
400A	CPI-1TR 400AT	1
500A	CPI-1TR 500AT	1
750A	CPI-3T 750AT	1
1000A	CPI-3T 1000AT	1

*secondary output current 5A

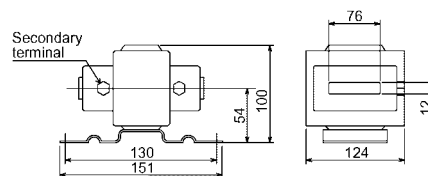
For 100 to 300A



For 400 to 500A



For 750 to 1000A



Unit: mm

● Built-in rapid fuse (for replacement)

Rated current	Models	
	200V system	400V system
30A	250GH-50S	660GH-50S
50A	250GH-75S	660GH-80S
75A	250GH-100S	660GH-100S
100A	250GH-160S	660GH-160S
150A	250GH-200S	660GH-200S
200A	250GH-315S	660GH-315S
250A	250GH-350S	660GH-350S
300A	250GH-450S	660GH-450S
400A	250GH-630S	660GH-630S
500A	250GH-710S	660GH-710S

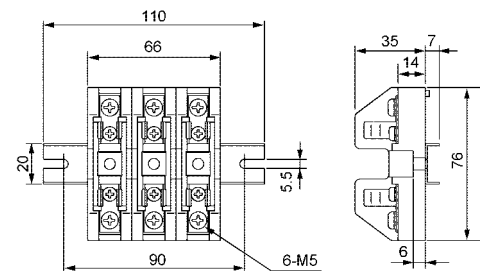
*manufactured by HINODE ELECTRIC CO., LTD

● External mounted rapid fuse unit

Rated current	Models
10A	FU-J015T
20A	FU-J030T

*Available for 200V and 400V.

● FU-J015T, FU-030T



● Contact Protection element for relay

Object	Models
For low load	CX-CR1
For high load	CX-CR2

● Exclusive cable for setting communication unit (panel mounting type)

Cable Length	Models
3m	SH-JUK3
5m	SH-JUK5

Specifications subject to change without notice. Printed in Japan (I) 2006. 4 Recycled Paper

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