

# JW SERIES

## Three Phase Thyristor Regulator



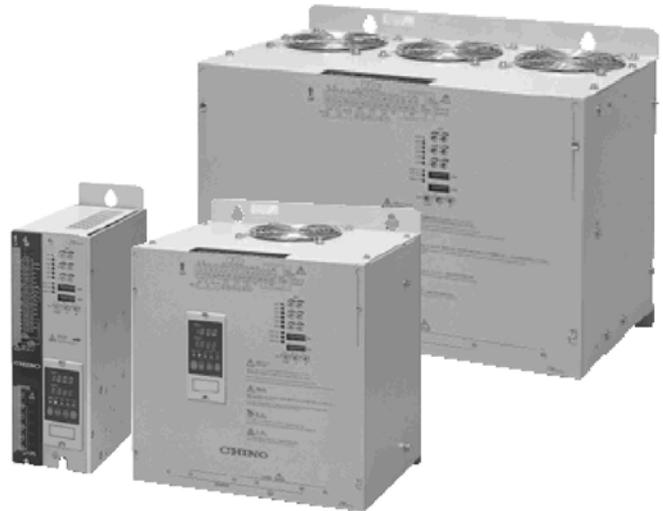
JW series is a three-phase control thyristor regulators having compact size and lighter in weight.

There are two control systems, the phase control system and the zero-cross control system.

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

JW series is also capable of advanced three-phase control based on 6-arm control and fine control setting by the setting communications unit.

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



### ■ FEATURES

#### ● Compact all-in-one configuration

Narrow width unit enables a closed mounting.

As they are using the same pitch of old JT series, a replacement by an old version is easy.

#### ● Setting communications unit is prepared

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.

A unit having communications enable to monitor a data and to set up a parameter by the PC through RS422A / RS485.

#### ● Disconnection alarm and current limit are provided as a standard

Heater disconnection alarm function and current control function.

(Heater disconnection alarm function is not applicable for SiC heater.)

#### ● 6-arm control employed as standard

6-arm control is employed to all models to improve controllability.

6-arm control particularly in the transformer loading is the best for improving controllability, handling imbalance load and reducing harmonic noise.

#### ● 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 over-heating of heat sink.

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

#### ● External transformer specification

Damage by abnormal voltage such as surge is reduced by dividing synchronized signal input (control circuit power input) from main circuit and connecting external terminals.

### ■ MODELS

JW□□□□□□□□ 6

#### Power voltage \*1

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

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

4X: 400V AC External transformer spec.

99: Others

#### Rated Current \*2

010: 10A    150: 150A

020: 20A    200: 200A

030: 30A    250: 250A

050: 50A    300: 300A

075: 75A    400: 400A

100: 100A    500: 500A

#### 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 \*3

N: None

A: Built-in

#### Setting communication unit \*4

0: None

1: Built-in setting unit

2: Panel-mount setting unit

3: Built-in setting communications unit

4: Panel-mount setting communications unit

#### CT( current transformer) \*5

0: Mounted externally( or none)

1: Built-in

\*1 In case the external transformer spec 4x is selected, an exclusive external transformer kit "SH-JWT40" is required.

Please ask for available power voltage "99" .

\*2 Less than 50A can not be selected when a power voltage is the external transformer spec.

Please ask for a rated current 750A and 1000A.

\*3 Built-in rapid fuse is not available to the rated current 10A or 20A.

\*4 For panel-mount setting unit, an exclusive cable "SH-JUK3"(3m) or "SH-JUK5"(5m) is required.

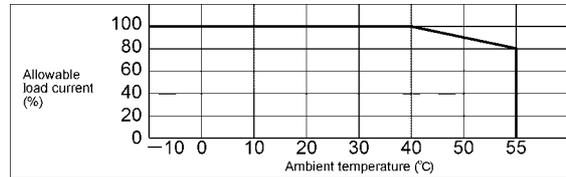
\*5 Built-in CT function is not available to the rated current 100A or more. When installing CT externally please select 0.

## ■ 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) *External transformer spec is available for 400V
Rated current:	10A, 20A, 30A, 50A, 75A, 100A, 150A, 200A, 250A, 300A, 400A, 500A to be specified *Please ask for the rated current 750 and 1000A.
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:	6 arms
Feedback types:	Voltage, current, power feedback
Control input signal:	4 to 20 mA 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 (3pcs of CT are required)
Output range:	0 to 98% of rated voltage, 0 to 100% of rated current (Depending on load resistance)
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)
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. 10% output range can be adjusted
Applicable load:	Resistive load, inductive load, (Inductive load --- phase-angle firing system, primary side control of transformer, and flux density 1.2T or lower are recommended)
Minimum load current:	0.5A or more (at 98% output of rated voltage)
Alarm types:	Over-current alarm (alarm output AL1) Rapid fuse meltdown alarm (alarm output AL1) Heat sink over heating alarm (alarm output AL1) Heater disconnection alarm (alarm output AL2) Thyristor elements abnormal alarm (alarm output AL2) Imbalance alarm (alarm output AL2) Abnormal phase sequence alarm (alarm output AL3) Open-phase alarm (alarm output AL3) Frequency abnormality alarm (alarm output AL3) Abnormal operation alarm
Alarm contact output:	3 points (AL1, AL2, AL3) Alarm output AL1, AL2 --- ON for alarm activation AL3 --- OFF for alarm activation
Alarm output:	Mechanical relay output a contact 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°C 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 terminals and protection conductor terminal 500V DC, 50MΩ or more

Dielectric weight: Between power supply terminals and protection conductor terminal  
2000V AC, 1min (200V system)  
2500V AC, 1min (400V system)  
Dielectric strength of cooling fan is 2000V AC

Weight: 10A and 20A --- Approx 5kg  
30A and 50A --- Approx 8kg  
75A and 100A --- Approx 13kg  
150A to 250A --- Approx 22kg  
300A to 500A --- Approx 36kg

Case: Steel  
Color: Gray  
Installation: Panel-mounting

Working condition: Reference operating condition  
--- Ambient temperature 23°C ±2°C  
Ambient humidity 55% ±5%RH (No dew-condensation)  
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 (No dew-condensation)  
Power supply voltage rated voltage ±10%  
Power supply frequency rated supply frequency ±2Hz  
Do not use under the environment where there are dust and extraneous material (metallic powder, facet, carbon fiber, carbon dust)  
Please prevent dust with control panel when using carbon heater.

## ■ SETTING COMMUNICATIONS 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  
Communications protocol, Communications address  
Communications transmission rate  
Communications character, Pulse cycle, Scaling

Measuring value display: Current value, voltage value, power value, load resistance value, etc

Error display: Error display, alarm display, etc

Communications interface: RS422A, RS485

Communications type: Half-duplex asynchronous type

Communications protocol: MODBUS (RTU/ASCII)

Transmission rate: 19200bps, 9600bps

Working temperature: -10 to 55°C

Working humidity: 30 to 90%RH (no dew-condensation)

Power supply: Supplied from thyristor unit

Weight: About 50g

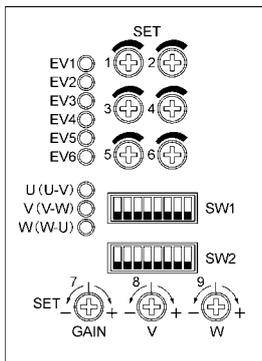
Case: Fire retardant polycarbonate

Color: Gray

Mounting: Mount to the thyristor unit or the panel (exclusive cable sold separately is required for panel mounting)

## FRONT PANEL

### Front setup part



### 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*1: Approx ±40% of firing
SET8	V phase output of imbalance adjustment*1: Approx ±40% of firing against gain
SET9	W phase output of imbalance adjustment*1: Approx ±40% of firing against gain

\*1 It is not output adjustment range. Output adjustment range is approx 10%.

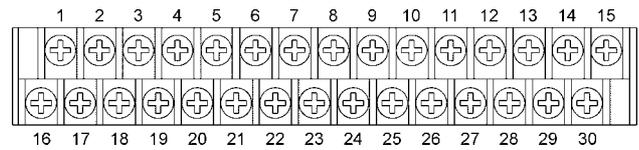
### Function of dipswitch SW1

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

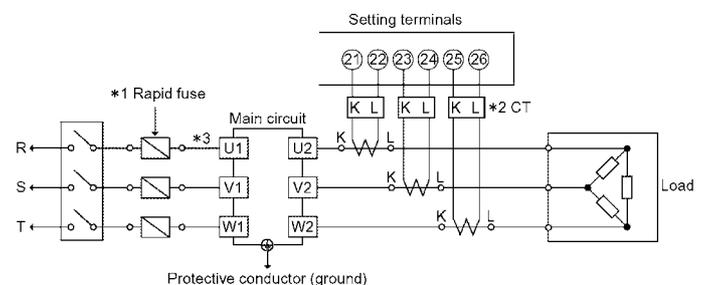
Bit No.	Setting function					
1	Logical switching of remote contact input 1 (Run/ Stop)					
2	Logical switching of remote contact input 2 (Phase/Zero-cross)					
3	Logical switching of remote contact input 3 (Front panel/ Remote setting input)					
4	Individual selection of remote setting input: Ramp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

## TERMINAL ARRANGEMENT



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 input2 (AI2)
5	Remote setting input3 (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 output2 (AL2)
15	Alarm output3 (AL3)
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	Alarm output3 (AL3)

## MAIN CIRCUIT CONNECTIONS



\*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 Connect an arrester or a spark killer to protect from abnormal voltage such as surge super-imposed on the power supply.

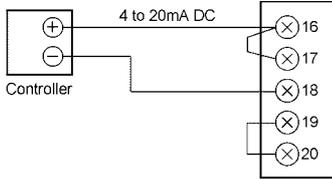
\*4 Connect a dummy resistance for transformer loading. Connect a load to have power supply of more than 0.5A for each phase.

\*5 Connect a magnet conductor and make a fail-safe design to separate power supply from the system at abnormal activation.

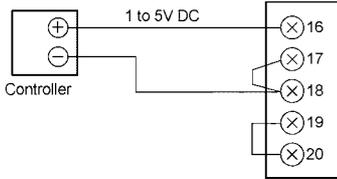
\*6 There is no power switch. Connect an over-current protection device such as rated breaker to power supply.

## CONNECTION OF SETTING TERMINALS

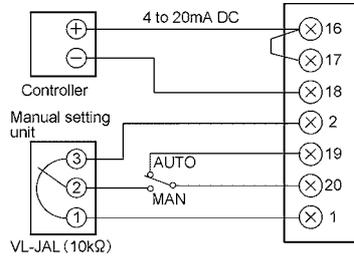
### Control input signal only Current signal (4 to 20mA DC)



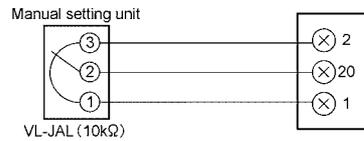
### Voltage signal (1 to 5V DC)



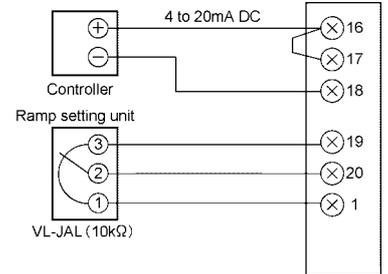
### Manual setting unit and with auto/man switching Current signal (4 to 20mA DC)



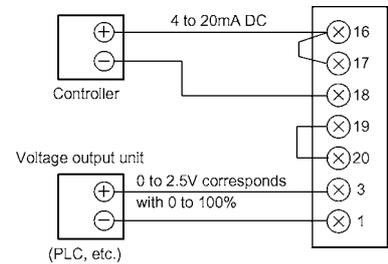
### Manual setting unit only



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

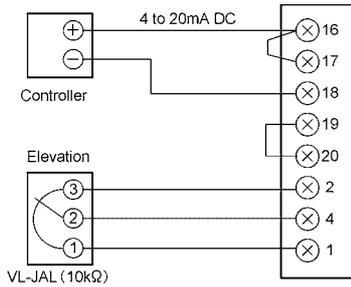


### With ramp setting unit (Ramp using remote setting input) Current signal (4 to 20mA DC)

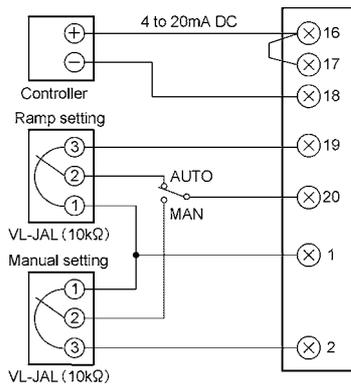


\* Output of voltage output unit needs to be insulated to connect multiple units (JW). A voltage output unit can not be connected in parallel to multiple units.

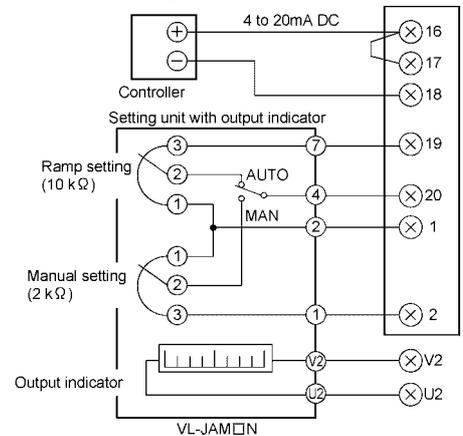
### With elevation setting unit Current signal (4 to 20mA DC)



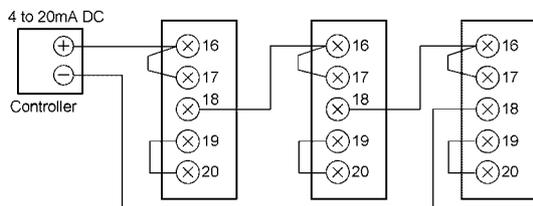
### Manual setting unit, ramp setting unit with auto/man switching Current signal (4 to 20mA DC)



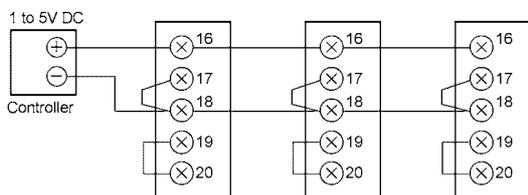
### Setting unit with output indicator (\*Cannot be used in zero-cross control) Current signal (4 to 20mA DC)



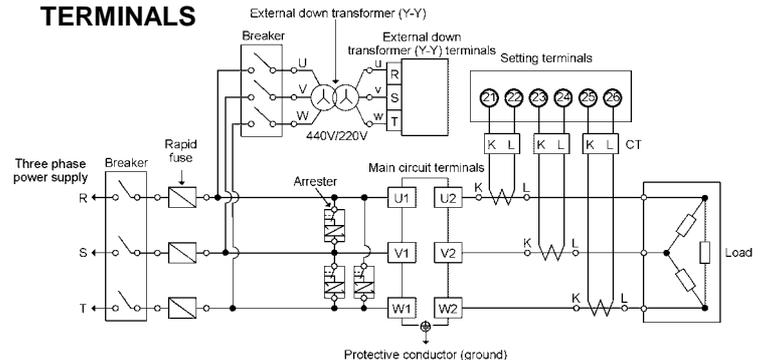
### Operation of multiple instruments Current signal (4 to 20mA DC)



### Voltage signal (1 to 5V DC)



## CONNECTION OF EXTERNAL TRANSFORMER TERMINALS



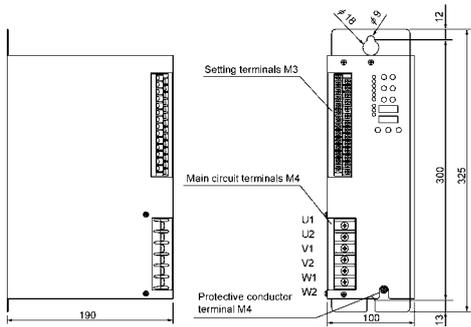
\*1 External down transformer (Y-Y) is sold separately.

\*2 Make sure to connect an arrester among power supply wires of main circuit to protect main circuit from surge. Arrester is sold separately.

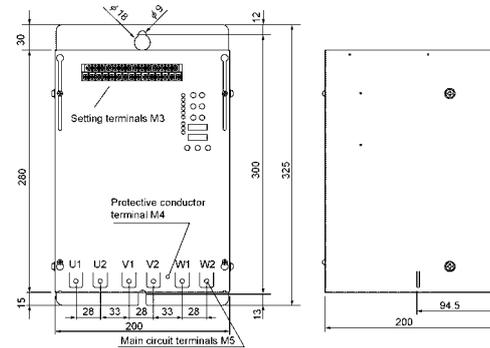
\*3 Connect an over-current protection device such as rated breaker to power supply to protect external down transformer (Y-Y).

## EXTERNAL DIMENTIONS

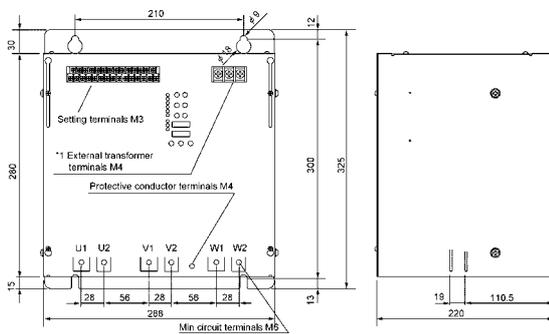
### ●10A, 20A



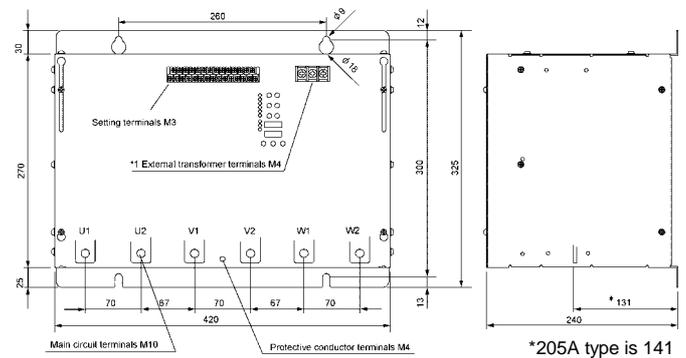
### ●30A, 50A



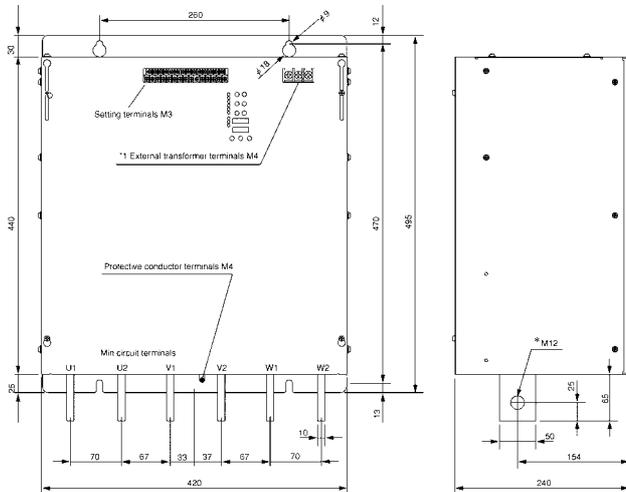
### ●75A, 100A



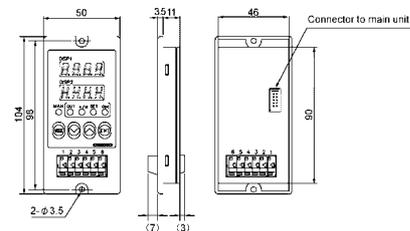
### ●150A, 200A, 250A



### ●300A, 400A, 500A



### ●Setting Communication unit



\*M16 for 500A type

Unit: mm

- \*1 External transformer terminals (synchronized signal terminals) is provided as an option for external transformer spec
- \*2 Setting terminals and external transformer terminals are installed inside cover

## HEATING VALUE

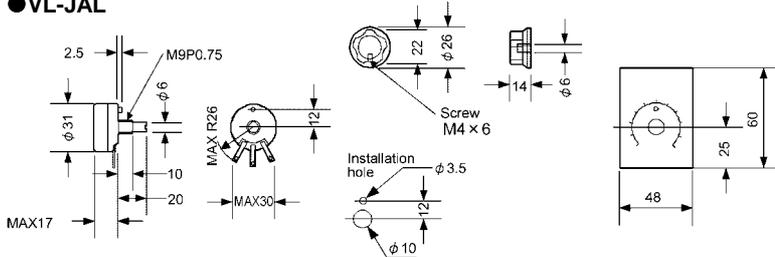
Rated current	Maximum heating value	Rated current	Maximum heating value
10A	40W	150A	500W
20A	90W	200A	790W
30A	140W	250A	920W
50A	180W	300A	1100W
75A	260W	400A	1530W
100A	380W	500A	1980W

■ ACCESSORIES

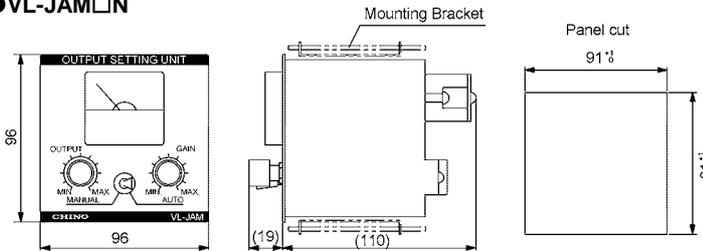
● Manual setting unit

Model	Specifications
VL-JAL	Simple function type for ramp setting Variable resistance value: 10kΩ
VL-JAM□N	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□N

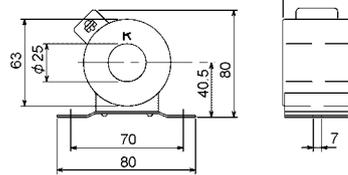


● CT (external current transformer)

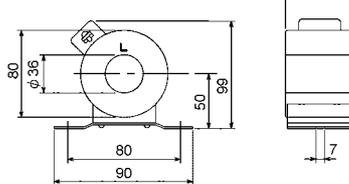
Rated current	Models	Number of through-holes
10A	CPI-1TR 100AT	10
20A	CPI-1TR 100AT	5
30A	CPI-1TR 150AT	5
50A	CPI-1TR 100AT	5
75A	CPI-1TR 150AT	2
100A	CPI-1TR 100AT	2
150A	CPI-1TR 150AT	1
200A	CPI-1TR 200AT	1
250A	CPI-1TR 250AT	1
300A	CPI-1TR 300AT	1
400A	CPI-1TR 400AT	1
500A	CPI-1TR 500AT	1

\*secondary output current 5A  
3pcs/unit is required

For 100 to 300A



For 400 to 500A



Unit: mm

● Contact Protection element for relay

Object	Models
For light load	CX-CR1
For heavy load	CX-CR2

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

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

● Fuse for power input board

Models	Specification
500SF-04	75-500A (3pcs)

\*(HINODE ELECTRIC CO., LTD)  
\* Fuse to protect PCB  
\* Not installed to 10 to 50A spec

● 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

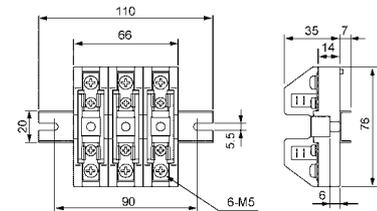
\*Manufactured by HINODE ELECTRIC CO., LTD

● External mounted rapid fuse unit

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

\*Available for 200V and 400V.

● FU-J015T, FU-030T

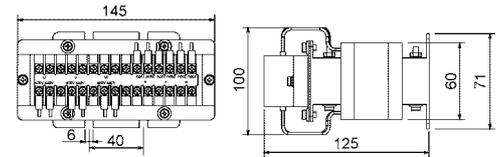


● External transformer kit for 4X

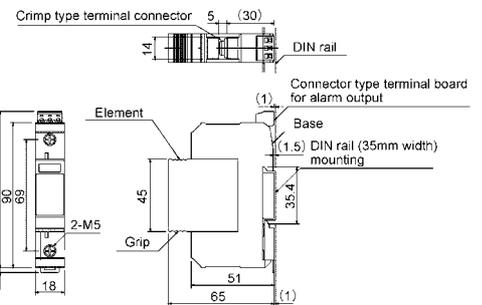
Models	Specification
SH-JWT40	· External down transformer (Y-Y) · Arrester (3pcs)

\* 1set/unit is necessary for 400VAC external transformer  
\* Transformer: Kitagawa Electric CO., LTD  
\* Arrester: M-System Co., Ltd

● External transformer



● Arrester



Unit: mm

Specifications subject to change without notice. Printed in Japan (I) 2008. 11 Recycled Paper

**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