JU series small and lightweight thyristor regulators for single-phase loads are characterized with high panel installation density.

Two control systems, a phase-angle firing system and a zero-cross firing system, are built in and can be changed by remote contacts signal.

In the phase-angle firing system, feedback types of voltage, current and power, and no-feedback type are selectable depending on heating characteristics of heaters.

Three kinds of input signals, 4 to 20mADC, 1 to 5VDC and ON-OFF contact signal, can be changed by terminal connections. Options of heater disconnection alarm function and current limit function are available.

The rapid fuse is built in all models and the current transformer built-in type is also available.

By the option setting unit (with communication function), it can be connected to the higher instruments such as PC and PLC (signal converter may be required) and centralize control the setting value and data up to 31 units.

**FEATURES**

- **Compact structure**
  Compact, lightweight and high panel installation density.

- **Options**
  The options of heater disconnection alarm function and current limit function are available.

- **Phase-angle firing/zero-cross firing**
  The phase-angle firing system and the zero-cross firing system are switchable.\(^1\) The running by the phase-angle firing system at the initial stage and by the zero-cross firing system at the normal stage is possible.

- **Zero-cross firing system**
  With the delta-sigma modulation, which controls every 1 cycle, the fine control like the phase-angle firing system is possible.

\(^1\) If the model is without setting unit and with heater disconnection alarm or the heater is SiC heater then it is not applicable.

**Setting unit (option)**
Display of various parameters, voltage/current/power and change of the feedback system are possible. By using communication function, various settings value can be changed from the higher side instruments or send various data to the higher side.

**Various protections functions built-in**
The thyristor element is protected by melting of the rapid fuse for short-circuit of load, and by gate-off for over-current. For models with a cooling fan built-in, alarm is activated and output is stopped for abnormal heat-sink temperature.

**Self-diagnosis function built-in**
The self-diagnosis function is built in for abnormal operation, abnormal thyristor element and abnormal power supply.
MODELS

JU-2-1000A-000

Power supply
40: 400V 44: 440V 99: Others

Rated current
010: 10A 020: 20A 030: 30A 050: 50A 075: 75A 100: 100A 150: 150A
200: 200A 250: 250A 300: 300A 400: 400A 500: 500A 750: 750A 1000: 1000A

Control system/feedback type
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
C: Zero-cross firing
Rapid fuse
A: Built-in N: Not provided

Setting unit (option)
0: Not provided 1: Provided (installed to unit) 2: Provided (panel installation) *2
3: Provided (with communications, installed to unit)
4: Provided (with communications, panel installation) *2
CT (current transformer) function (option)
0: Mounted externally (rated current 10 to 1000A, standard)
1: Built-in (rated current 10 to 75A only)

Other functions (option)
0: Not provided 1: Heater disconnection alarm + *3
2: Current limit + 3: Heater disconnection alarm + current limit (with setting unit only)

*1: For no-feedback types, then the heater disconnection alarm, current limit and setting unit cannot be added.
*2: For the panel installation type setting unit, the exclusive cable SH-JUK3 (3m) or SH-JUK5 (5m) is required separately.
*3: For models without setting unit and with heater disconnection alarm, or if the heater is SiC heater then the phase-angle firing system and the zero-cross firing system cannot be switched.

*4: For models with current limit, the zero-cross firing system cannot be combined.

*5: 750A and 1000A is built to order product.

SPECIFICATIONS

Phase: Single-phase
Rated voltage: 100, 110, 120, 200, 220, 240, 380, 400, 440VAC (to be specified)
Rated current: 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 750, 1000A (to be specified)
Allowable voltage fluctuation range: ±10% of rated voltage
Rated frequency: 50/60Hz (automatic change)
Allowable frequency fluctuation: ±2Hz of rated frequency (±1Hz for performance guarantee)

Working temperature range: -10 to 55°C (load current will decrease if 5°C or higher)
Working humidity range: 30 to 90%RH (no dew condensation)
Insulation resistance: 50MΩ or larger at 500VDC (between power terminals and ground terminal)

Dielectric strength:
1 minute at 2000VAC (rated voltage 100 to 240V)
1 minute at 2500VAC (rated voltage 380V or higher)

Output control system: Phase-angle firing system and zero-cross firing system (selectable on models)
Feedback type: Voltage, current, power or no-feedback
Input signal: Selectable on terminals of 4 to 20mA (DC (internal resistance 100Ω), 1 to 5VDC (internal resistance 25kΩ), ON-OFF contact signal, and Resistance signal (10kΩ, manual))
Ramp setting: By built-in variable resistor (0 to 100% of output range) or external variable resistor (10kΩ)
Elevation setting: By built-in variable resistor (0 to 100% of output range) or external variable resistor (10kΩ)
Built-in variable resistor cannot be used for models without the setting unit and with optional heater disconnection alarm.
Soft-start time setting: 1 to 20 seconds
Running/stop selection: By contact signal
Phase-angle firing system/zero-cross firing system selection: By contact signal
External CT input: 0 to 5A for full scale of rated current
Models with built-in CT are available in 75A or lower.

Output range:
No feedback...........0 to 98% of rated voltage
Voltage feedback....0 to 98% of rated voltage
Current feedback...0 to 100% of rated voltage
Power feedback....0 to 98% of rated voltage x 100% of rated voltage

Output accuracy:
No-feedback ... Within ±10% of rated voltage
Voltage feedback ... Within ±3% of rated voltage (at ±10% fluctuation of rated voltage)
Current feedback ... Within ±3% of rated current (at 1 to 10 times variation of load resistance)
Power feedback ...Within ±3% of rated voltage (at 1 to 3 times variation of load resistance, at ±10% fluctuation of rated voltage)
* Performance guarantee is 0 to 50°C

Applicable load:
Resistive load, inductive load (primary side control of transformer, flux density 1.2T or lower, phase-angle firing system only)
Minimum load current: 0.5A or more (at 98% output of rated voltage)

Alarm:
Over-current (on built-in or external CT), rapid fuse melting (30A or more),
Heat sink abnormal over-heating (200A or more) ...
LED lights and alarm contact output 1 is ON.
Abnormal thyristor element, abnormal operation, heater disconnection ...
LED blinks and alarm contact output 2 is ON.
* No-feedback types ... Only abnormal operation and abnormal power supply, no alarm contact
Alarm contact output: 2 points, maximum 250VAC, 1A
Over-current protection: Thyristor gate-off (120% or more of rated current, on built-in or external CT)
Heater disconnection is protected by melting of built-in rapid fuse (built-in type only).

Cooling system:
Natural cooling for 150A or less of rated current
Built-in cooling fan for 200A or more
Other functions: Soft-start, soft-up/down (1 to 20 seconds), soft-start at power failure recovery

Weight: About 2kg for 10A, 20A, about 3kg for 30 to 75A, about 8kg for 100 to 150A, about 7kg for 200 to 250A, about 12kg for 300 to 500A, about 35kg for 750A, about 37kg for 1000A
**DIMENSIONS**

- **10A, 20A**
  - Dimensions: 10A, 20A
  - Setting unit: M3

- **30A to 75A**
  - Dimensions: 300A to 500A
  - Setting terminal M3

- **100A to 250A**
  - Dimensions: 100A to 250A
  - Setting terminal M6
  - Main power terminal M16
  - Earth terminal M6

- **300A to 500A**
  - Dimensions: 300A to 500A
  - Setting terminal M3

- **750A**
  - Dimensions: 750A

- **1000A**
  - Dimensions: 1000A
  - Setting terminal M3

- **Setting unit**
  - Dimensions: Setting unit
  - Unit: mm
■ OPTIONS (not applicable for no feedback type)

- Setting unit
  Setting: Output (0 to 100%), high/low limits (0 to 100%), ramp setting (0 to 100%), soft-start time setting (1 to 20 seconds), heater disconnection alarm setting (load resistance 0 to 100%, available in models with heater disconnection alarm only), phase-angle firing system/zero-cross firing system selection, feedback system selection, current limit)
  Display: Output value (voltage, current, power), heater resistance value, alarm, parameters
  Communication: RS422A/RS485 MODBUS protocol (various setting, output display, alarm display, heater disconnection alarm setting is available)
  Installation: Installed to thyristor unit or panel [by exclusive cable of SH-JUK3 (3m) or SH-JUK5 (5m) between thyristor unit and setting unit]

Power supply: Supplied from thyristor unit
Working temperature: -10 to 55°C
Working humidity: 30 to 90%RH (no dew condensation)
Weight: About 50g

- Heater disconnection alarm
  Detects the heater disconnection by built-in or external CT. When disconnection is detected, LED blinks and alarm contact output becomes ON. The switching of phase-angle firing system/zero-cross firing system is not possible without setting unit. Also not applicable for SiC heater.

- Current limit
  Sets the maximum limit of the load current (detected by built-in or external CT. The combination with zero-cross firing system is not possible.

■ ACCESSORIES

- Setting unit

<table>
<thead>
<tr>
<th>Model</th>
<th>Purpose</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>VL-JAL</td>
<td>Ramp setting</td>
<td>Variable resistor 10kΩ</td>
</tr>
<tr>
<td></td>
<td>Manual setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High/low limits setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Elevation setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current limit setting</td>
<td></td>
</tr>
<tr>
<td>VL-JAM1N: 0 to 150V</td>
<td>Output indicator</td>
<td>1: Voltage indicator 0 to 150V</td>
</tr>
<tr>
<td></td>
<td>Ramp/manual setting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Combined with selector switch</td>
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</tr>
<tr>
<td>VL-JAM2N: 0 to 250V</td>
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<tr>
<td>VL-JAM4N: 0 to 500V</td>
<td></td>
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</tr>
</tbody>
</table>

VL-JAL is consisted of variable resistor, scale and knob.

VL-JAM series output indicator can be used for phase angle firing only.

- VL-JAL

![Diagram of VL-JAL](image)

- VL-JAM

![Diagram of VL-JAM](image)

- VL-JAMN

![Diagram of VL-JAMN](image)

![Diagram of TERMINAL COVER](image)

■ RAPID FUSE

<table>
<thead>
<tr>
<th>Current</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>100/200V</td>
<td>400V line</td>
</tr>
<tr>
<td>10A</td>
<td>35OKH-15</td>
</tr>
<tr>
<td>20A</td>
<td>35OKH-30</td>
</tr>
<tr>
<td>30A</td>
<td>250GH-50S</td>
</tr>
<tr>
<td>50A</td>
<td>250GH-75S</td>
</tr>
<tr>
<td>75A</td>
<td>250GH-100S</td>
</tr>
<tr>
<td>100A</td>
<td>250GH-160S</td>
</tr>
<tr>
<td>150A</td>
<td>250GH-200S</td>
</tr>
<tr>
<td>200A</td>
<td>250GH-315S</td>
</tr>
<tr>
<td>250A</td>
<td>250GH-350S</td>
</tr>
<tr>
<td>300A</td>
<td>250GH-450S</td>
</tr>
<tr>
<td>400A</td>
<td>250GH-630S</td>
</tr>
<tr>
<td>500A</td>
<td>250GH-710S</td>
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<tr>
<td>750A</td>
<td>50SRF1000S</td>
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<tr>
<td>1000A</td>
<td>50SRF1250S</td>
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</tbody>
</table>

■ EXCLUSIVE CABLE

(between thyristor unit and setting unit)

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH-JUK3</td>
<td>Length: 3m</td>
</tr>
<tr>
<td>SH-JUK5</td>
<td>Length: 5m</td>
</tr>
</tbody>
</table>

■ TERMINAL COVER

(for main circuit)

<table>
<thead>
<tr>
<th>Model</th>
<th>Specification</th>
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</thead>
<tbody>
<tr>
<td>SH-JUR500</td>
<td>For 300 to 500A</td>
</tr>
<tr>
<td>SH-JUR1000</td>
<td>For 750A, 1000A</td>
</tr>
</tbody>
</table>

Note:
The terminal cover is attached for 10 to 75A.
The thyristor unit cover serves as the terminal cover concurrently for 100 to 250A.
The thyristor unit cover serves as the setting terminal cover concurrently for 300 to 500A.
The setting terminal cover is attached for 750A and 1000A.

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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