



## Product overview

The MW30L is a three-phase SCR (thyristor) power regulator designed for precise, reliable control of electric power delivered to resistive and inductive loads in industrial heating and process applications. Built around a high-performance, low-power consumption microprocessor, the regulator combines accurate phase-angle and burst-firing power control with comprehensive protection, flexible signal interfaces, and industrial-grade Modbus-RTU communication, all in a compact, light weight enclosure enabled by a high-efficiency heat-dissipation design.

## Technical Specifications

### 1.Key Features

- Three phase power regulator, auto phase detection
- soft-start/soft-stop ramp control(0-120 seconds programmable)
- Work with resistive load and inductive load, heaters and transformers etc
- Integrated heatsink and fans with temperature detection
- Maximum and minimum output configurable
- Rated load voltage 260~440Vac 50/60HZ
- Power supply for SCR to work is 220Vac
- Input, 0-10Vdc, 0-5Vdc, 4-20mA, 0-20mA, Potentiometer(field configurable)
- Rated current from 25 amps all the way up to 350 amps
- Modbus RS-485 communication as standard feature
- Compatible with Delta, Star, Star with neutral wire, all kinds electrical circuit
- Works with digital inputs and analog inputs
- This unit featuring a compact and light weight design, SCR can handle phase current up to 90% of rating, for example, a 100 amps SCR from us can handle a load with 90 amps phase current
- Three selectable control modes, user can choose **phase-angle close-loop**, **phase-angle open loop**, or **burst-firing trigger mode**, matching the regulator to resistive heaters, infrared elements, transformer-coupled loads.
- Two digital inputs, one for externally start/stop the SCR, another one to switch between different inputs, a potentiometer can also be connected externally to manually control the output.
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- Various protection mechanism with built-in alarm, phase loss, overheating, over current, and loop open-circuit(broken load wire)
- Full three-phase measurement and display. The unit continuously measures and displays effective input/output percentage, output voltage, per-phase output currents(A/B/C) and output power in KW-giving operators complete visibility of the load without external meters
- Programmable relay output, one relay output(3A@AC 250V/3A DC 30 V) can be programmed to signal either a fault condition or running status
- Temperature control feature can be selected, if you select temperature control feature, the unit will be a 2-in-1 device works with thermocouple and controls temperature directly.
- The unit has a built-in display on the panel, you can also choose an external display to be mounted on the panel of the control cabinet.
- Available current options are: 25A, 50A, 75A, 100A, 150A, 200A, 250A 300A, 350A.

### 2.Key features at a glance

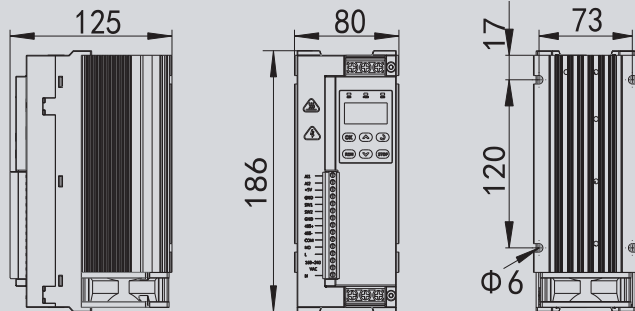
| Category             | Feature                                                                                                       |
|----------------------|---------------------------------------------------------------------------------------------------------------|
| Control core         | Built-in high-performance, low-power-consumption microprocessor                                               |
| Main circuit input   | Wide-range three-phase AC 260~440 V                                                                           |
| Control power supply | AC 160~240 V                                                                                                  |
| Setpoint inputs      | 0~20 mA / 4~20 mA (AI1) and 0~5 V / 0~10 V (AI2), dual analog channels; digital setpoint via keypad or Modbus |
| Digital inputs       | 2 programmable switch inputs (SW1: start/stop; SW2: AI1/AI2 selection)                                        |
| Control modes        | Phase-angle closed-loop / phase-angle open-loop / zero-crossing trigger                                       |
| Regulation           | Closed-loop PID with feedback selectable from voltage, current, or power                                      |
| Alarm & protection   | Phase loss, overheat, overcurrent, load open-circuit (broken wire) detection                                  |
| Relay output         | 1 channel, 3 A @ AC 250 V / 3 A @ DC 30 V, programmable (fault or run status)                                 |
| Communication        | Modbus-RTU over RS-485; function codes 03/04/06/16; 2400~38400 bps                                            |
| Soft start/stop      | Ramp-up / ramp-down time adjustable 0~120 s                                                                   |
| Output limiting      | Output upper/lower limit (0~100.0%), current or voltage limiter                                               |
| Frequency            | 50 Hz / 60 Hz / automatic tracking                                                                            |
| Cooling & build      | High-efficiency heat dissipation — compact size, light weight                                                 |
| Current ratings      | 10~350 A frame sizes                                                                                          |
| Options              | T: temperature-control function; ED: external display extension                                               |

## 3. Model Range and Mounting Dimensions

The series is available in five frame sizes. All dimensions are in millimeters (W × H × D refer to overall outline; mounting holes are 6mm or 9mm, install the unit vertically, allowing free airflow around the heatsink)

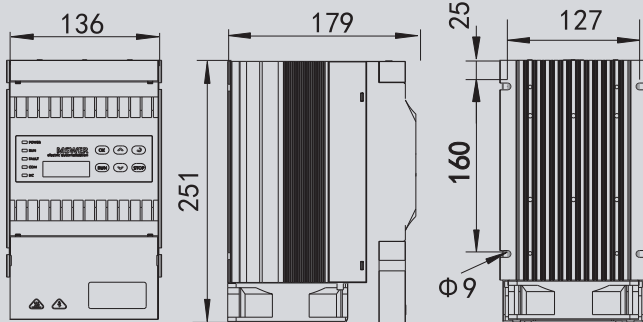
Rating : 25A, 50A

Dimension: Length\*Width\*Height(186mm\*80mm\*125mm)



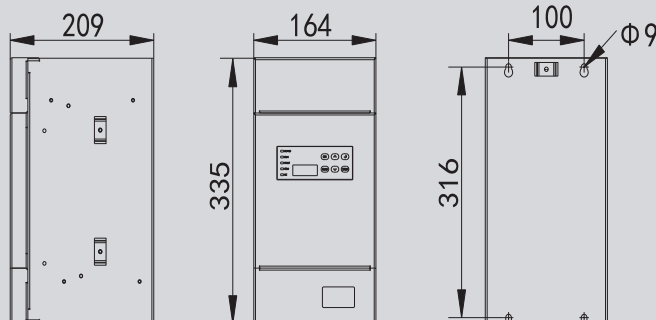
Rating : 75A, 100A

Dimension: Length\*Width\*Height(251mm\*136mm\*179mm)



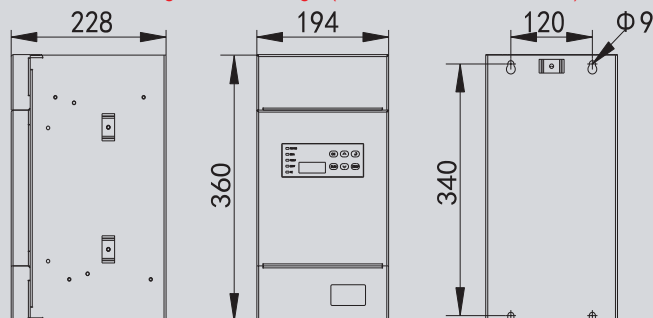
Rating : 150A

Dimension: Length\*Width\*Height(335mm\*164mm\*209mm)



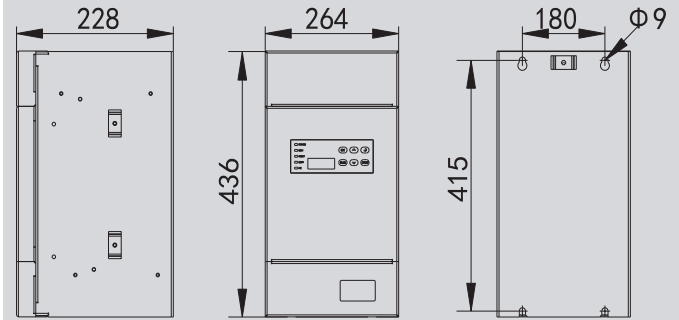
Rating : 200A, 250A, 300A

Dimension: Length\*Width\*Height(360mm\*194mm\*228mm)



Rating : 350A

Dimension: Length\*Width\*Height(436mm\*264mm\*228mm)



| Specifications                          | 25         | 50          | 75          | 100         | 150         | 200  | 250  | 300  | 350  |
|-----------------------------------------|------------|-------------|-------------|-------------|-------------|------|------|------|------|
| Rated current                           | 025A       | 050A        | 075A        | 100A        | 150A        | 200A | 250A | 300A | 350A |
| Dimensions (MM) (length, width, height) | 186*80*125 | 251*136*179 | 335*164*209 | 360*194*228 | 436*264*228 |      |      |      |      |

## 4. Ordering Information

MW30L-----[Rated Current (A)]-----[Option]

| Field                      | Meaning                                            |
|----------------------------|----------------------------------------------------|
| MW30L                      | MW30L series 3 phase power regulator               |
| Rated Current(A)           | 25A, 50A, 75A, 100A, 150A, 200A, 250A, 300A, 350A. |
| Temperature control option | "T" with temperature control function              |
| External display option    | "ED" with external display                         |

Example: MW30L-250-T-ED

MW30L series SCR power regulator

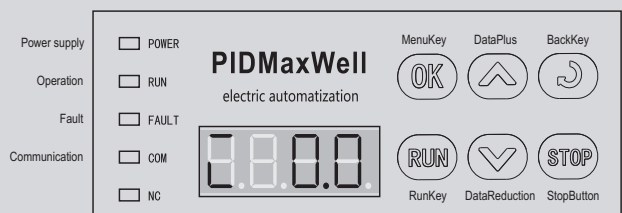
250 amps rating

With temperature control feature

With external mounted display

## 5. Front panel and key pad operation

| Key      | Function                               |
|----------|----------------------------------------|
| Menu(OK) | Enter parameter level/confirm and save |
| ▲        | Increase data/scroll parameters        |
| ▼        | Decrease data/scroll parameters        |
| Return   | Go back to the previous level          |
| RUN      | RUN the regulator                      |
| STOP     | Stop the regulator                     |

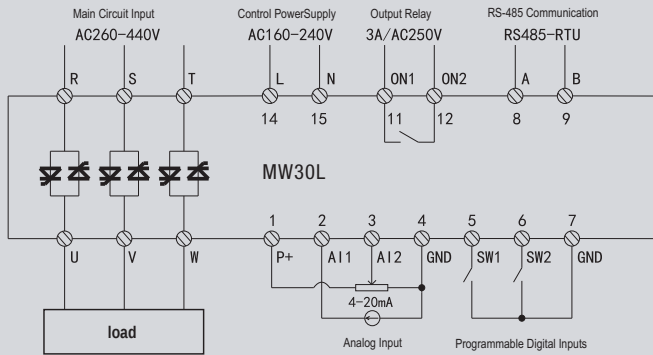


Display navigation. The interface is organized in three levels:

1. Initial(monitor) window-cycles through input percentage, output percentage, output voltage, output current, and output power.
2. Parameter level-shows parameter numbers (e.g., F000); scroll with ▲/▼ and press OK to enter
3. Date level-the parameter value is shown; a flashing display indicates edit mode. Adjust the value with up/down and press OK to save(the display stops flashing and shows the stored, constant value). press return to exit without saving.

Note: Modify parameters only while the regulator is in the STOP state

## 6. Terminal Description and Wiring



| Terminal Group       | Terminals                                                     | Specification                                     |
|----------------------|---------------------------------------------------------------|---------------------------------------------------|
| Main circuit input   | R, S, T                                                       | Three-phase AC 260~440 V                          |
| Main circuit output  | U, V, W                                                       | To load                                           |
| Control power supply | L (14), N (15)                                                | AC 160~240 V                                      |
| Relay output         | ON1 (11), ON2 (12)                                            | 3 A / AC 250 V (also 3 A / DC 30 V), programmable |
| RS-485 communication | A (8), B (9)                                                  | Modbus-RTU                                        |
| Analog/digital I/O   | P+ (2), A11 (3), A12 (4), GND (5), SW1 (6), SW2 (7), GND (7*) | See below                                         |

Signal input functions:

- A11 — analog current setpoint input: 0~20 mA, 4~20 mA, or combined-slope control (set by F-012).
- A12 — analog voltage setpoint input: 0~5 V or 0~10 V (set by F-033).
- SW1 — start/stop signal by default; connect to an external switch or push-button for remote start/stop.
- SW2 — analog channel selector: open (SW2-GND disconnected) selects A11; closed (SW2-GND connected) selects A12.
- Potentiometer use — select A12 as the active signal; wire the potentiometer wiper (center tap) to A12 and the two ends to P+ and GND.

Connect the three-phase load to U, V, W. Follow the wiring diagram in the original datasheet exactly; incorrect wiring is a common cause of the E002 main-power fault.

## 7. Communication (Modbus-RTU)

The MW30L series supports the Modbus-RTU protocol over RS-485 with four function codes: 03 (read holding registers), 04, 06 (write single register), and 16 (write multiple registers).

| Setting       | Parameter | Range / Options                    | Default |
|---------------|-----------|------------------------------------|---------|
| Slave address | F-035     | 1~247                              | 2       |
| Baud rate     | F-036     | 2400 / 4800 / 9600 / 19200 / 38400 | 9600    |
| Data format   | F-037     | 8n2, 8e1, 8o1, 8n1                 | 8e1     |

Important programming rules:

1. Parameter values are transmitted as 16-bit unsigned registers with no decimal point. To write a value such as 56.7, first convert it to the integer 567 (multiply by 10 for all parameters whose resolution is 0.1).
2. Each frame must not exceed 10 bytes, so a maximum of 5 parameters can be read per frame. (Example: when communicating with an MCGS/Kunlun touch screen, set the maximum block length of area 4 to 5 so that only 5 registers are read per frame.)
3. Host (master) register addresses start from 1, so add 1 to the parameter's register number — e.g., to read F-004, write register number 5 in the master.
4. Changes to communication parameters (F-035/F-036/F-037) take effect only after a power cycle.

### Read Holding Registers frame format (function 03H):

| Byte    | 0             | 1   | 2                | 3                | 4                | 5                | 6     | 7     |
|---------|---------------|-----|------------------|------------------|------------------|------------------|-------|-------|
| Content | Slave address | 03H | Register addr. H | Register addr. L | Register count H | Register count L | CRC L | CRC H |

### Preset Single Register frame format (function 06H):

| Byte    | 0             | 1   | 2                | 3                | 4      | 5      | 6     | 7     |
|---------|---------------|-----|------------------|------------------|--------|--------|-------|-------|
| Content | Slave address | 06H | Register addr. H | Register addr. L | Data H | Data L | CRC L | CRC H |

## 8. Parameter table

The following are the basic operating parameters. Attribute R means read-only; RW means read/write. Modify parameters only in the stopped state.

| Parameter | Description                                                                                                                   | Range /Options             | Default | Attr. | Register |
|-----------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------|-------|----------|
| F-000     | Effective output<br>This parameter shows the real time output                                                                 | 0~100.0 [%], res. 0.1%     | —       | R     | 0        |
| F-001     | Effective input<br>This parameter shows the real time input                                                                   | 0~100.0 [%], res. 0.1%     | —       | R     | 1        |
| F-002     | Output voltage                                                                                                                | 0~3000.0 [V], res. 0.1 V   | —       | R     | 2        |
| F-004     | Phase A output current                                                                                                        | 0~3000.0 [A], res. 0.1 A   | —       | R     | 4        |
| F-005     | Phase B output current                                                                                                        | 0~3000.0 [A], res. 0.1 A   | —       | R     | 5        |
| F-006     | Phase C output current                                                                                                        | 0~3000.0 [A], res. 0.1 A   | —       | R     | 6        |
| F-007     | Output power                                                                                                                  | 0~3000.0 [kW], res. 0.1 kW | —       | R     | 7        |
| F-008     | Regulator status (0: stop, 1: run, 2: fault)                                                                                  | 0~2                        | 0       | RW    | 8        |
| F-009     | Digital inputs, you can manually set the output via Modbus from master device and write desired output to this register       | 0~100.0 [%], res. 0.1%     | 0       | RW    | 9        |
| F-010     | Start/stop control mode (0: external switch, 1: panel, 2: communication)                                                      | 0~2                        | 0       | RW    | 10       |
| F-011     | Select input type (0: analog, 1: digital)<br>4~20mA 0~10Vdc is analog signal<br>Set from panel or via Modbus is digital input | 0~1                        | 0       | RW    | 11       |
| F-012     | A11 signal type (0: 0~20 mA, 1: 4~20 mA, 2: combined-slope control)                                                           | 0~2                        | 1       | RW    | 12       |
| F-013     | Ramp-up time (time for the pre-ramp signal to rise from 0.0% to the set point)                                                | 0~120 [s]                  | 2       | RW    | 13       |
| F-014     | Ramp-down time (time for the pre-ramp signal to fall from the set point to 0.0%)                                              | 0~120 [s]                  | 2       | RW    | 14       |
| F-015     | Output upper limit (maximum output setting)                                                                                   | 0~100.0 [%], res. 0.1%     | 100.0   | RW    | 15       |
| F-016     | Output lower limit (minimum output setting)                                                                                   | 0~100.0 [%], res. 0.1%     | 0       | RW    | 16       |
| F-017     | Proportional gain (PID control)                                                                                               | 0~200                      | 80      | RW    | 17       |
| F-018     | Integral time (PID control)                                                                                                   | 0~200                      | 5       | RW    | 18       |
| F-019     | Derivative time (PID control)                                                                                                 | 0~200                      | 0       | RW    | 19       |
| F-020     | Feedback signal source (0: voltage, 1: current, 2: power)                                                                     | 0~2                        | 0       | RW    | 20       |
| F-021     | Limiter signal source (0: current, 1: voltage)                                                                                | 0~1                        | 0       | RW    | 21       |
| F-022     | Limit percentage (limit-signal percentage setting)                                                                            | 0~100.0 [%], res. 0.1%     | 100     | RW    | 22       |
| F-023     | Control mode (0: phase-angle closed-loop, 1: phase-angle open-loop, 2: Burst-firing mode)                                     | 0~2                        | 0       | RW    | 23       |
| F-027     | A11 high-end calibration (set so that 20 mA corresponds to 100% input)                                                        | 50~150.0 [%], res. 0.1%    | 100.0   | RW    | 27       |
| F-029     | A12 high-end calibration (set so that 5 V / 10 V corresponds to 100% input)                                                   | 50~150.0 [%], res. 0.1%    | 100.0   | RW    | 29       |

|       |                                                                                                                                                               |                      |               |    |    |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------|----|----|
| F-033 | AI2 signal type (0: 0–5 V, 1: 0–10 V)                                                                                                                         | 0–1                  | 0             | RW | 33 |
| F-035 | Device address (Modbus slave address)                                                                                                                         | 0–247                | 2             | RW | 35 |
| F-036 | Baud rate (0: 2400, 1: 4800, 2: 9600, 3: 19200, 4: 38400)                                                                                                     | 0–4                  | 2             | RW | 36 |
| F-037 | Data format (0: 8n2 — 8 data bits, no parity, 2 stop bits; 1: 8e1 — even parity, 1 stop bit; 2: 8o1 — odd parity, 1 stop bit; 3: 8n1 — no parity, 1 stop bit) | 0–3                  | 1             | RW | 37 |
| F-040 | Programmable relay (0: fault, 1: running-status output)<br>Program the relay for different function                                                           | 0–1                  | 0             | RW | 40 |
| F-041 | Previous fault record                                                                                                                                         | 0–100                | –             | RW | 41 |
| F-042 | Overcurrent protection enable (0: disable, 1: enable)                                                                                                         | 0–1                  | 1             | RW | 42 |
| F-043 | Phase-loss protection enable (0: disable, 1: enable, 2: automatic fault recovery)                                                                             | 0–2                  | 1             | RW | 43 |
| F-044 | Load protection enable (0: disable, 1: enable)                                                                                                                | 0–1                  | 1             | RW | 44 |
| F-045 | Load imbalance threshold (see fault code E004 formula)                                                                                                        | 10–70 [%], res. 1%   | 70            | RW | 45 |
| F-046 | Thyristor overheat protection enable (0: disable, 1: enable)                                                                                                  | 0–1                  | 1             | RW | 46 |
| F-048 | Rated voltage (same as nameplate; may be reduced to match the actual load for protection purposes; must not exceed the nameplate value)                       | 0–3000 [V], res. 1 V | 380           | RW | 48 |
| F-049 | Rated current (same as nameplate; may be reduced to match the actual load for protection purposes; must not exceed the nameplate value)                       | 0–3000 [A], res. 1 A | Per nameplate | RW | 49 |
| F-050 | Rated frequency (0: 50 Hz, 1: 60 Hz, 2: automatic tracking)                                                                                                   | 0–2                  | 0             | RW | 50 |

Note: never set the rated voltage or current above the nameplate values.

5. Full, uncontrollable output immediately at power-on. Check whether the input signal to the regulator is at maximum; for analog input, check for wiring errors on the signal input; with power removed, measure the resistance between each phase's input and output — a few hundred ohms or less suggests damaged thyristor

6. Communication problems. The regulator supports Modbus function codes 03, 04, 06, and 16. Defaults: slave address 2, baud rate 9600, data format 8E1 (changeable via F-035/F-036/F-037; a power cycle is required for changes to take effect). Values are 16-bit unsigned integers without decimal points-multiply by 10 when the resolution is 0.1 (e.g., write 155 for 15.5). Master register addresses start at 1, so add 1 to the register number (F-004 register 5 in the master). Each frame is limited to 10 bytes, i.e., at most 5 parameters per read.

7. Roles of SW1/SW2 and AI1/AI2. SW1 defaults to the start/stop signal and may be wired to an external push-button. SW2 selects the active analog channel: SW2–GND open AI1 (current signal: 0–20 mA/4–20 mA/combined-slope, per F-012); SW2–GND closed AI2 (voltage signal: 0–5 V / 0–10 V, per F-033). For potentiometer control, select AI2 and wire the wiper to AI2 with the remaining two terminals to P+ and GND.

## 11. Maintenance and Care

Environmental temperature, humidity, dust, vibration, and the aging of internal components can all lead to device failure over time. Perform periodic inspection and maintenance every 3–6 months depending on site conditions:

1. Verify that the main circuit terminal connections are secure.
2. Thoroughly clean dust from the circuit boards, air ducts, and cooling fans.
3. If the regulator is out of service for an extended period, power it on at least once every 3 months.
4. Store the device away from high temperature, humidity, and metallic dust.

For repair service or spare parts, contact PIDMaxwell after sell service

## 9. Fault codes and diagnostics

| Code | Fault                           | Trigger Condition                                                                                                                                      | Checks and Remedies                                                                                                                                                                                                                                                                                                                                                                     |
|------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| E002 | Main power fault                | Main circuit input voltage abnormal; input voltage not matching the nameplate; wiring not per the wiring diagram                                       | 1. Measure the phase-to-phase AC voltage of the three-phase main circuit with a multimeter and confirm it is within the nameplate range. 2. Verify the wiring matches the wiring diagram. 3. For automatic fault recovery, set F-051 = 66 and F-043 = 2.                                                                                                                                |
| E003 | Overcurrent                     | Detected current exceeds $1.25 \times$ rated current                                                                                                   | 1. Check whether the pre-alarm maximum current exceeded $1.25 \times$ rated current. 2. Check that the phase-to-phase resistance of the load is consistent; inconsistency may indicate a shorted or damaged load. 3. Measure the resistance between each phase's input and output terminals of the regulator — a reading of a few hundred ohms or less may indicate damaged thyristors. |
| E004 | Load open-circuit (broken load) | Among the three phase currents, $I_{\max} - I_{\min} > I_{\max} \times \text{load-imbalance threshold}$ ( $I_{\max}$ must exceed 10% of rated current) | 1. Check that the load is reliably connected to the regulator. 2. If the load's rated current is far below the regulator's rated current, reduce the rated-current setting to about $1.2 \times$ the load's rated current. 3. Check whether the F-045 threshold is set too low (default 70%).                                                                                           |
| E005 | Regulator overheat              | Heatsink temperature above 85 °C                                                                                                                       | 1. Check whether the ambient temperature exceeds 45 °C. 2. Check whether the cooling fan is damaged. 3. Check whether the regulator has accumulated excessive dust. 4. If installed in a cabinet, verify the cabinet's heat-dissipation capacity is sufficient.                                                                                                                         |

## 10. Troubleshooting(FAQ)

1. Input present but no output. Check whether the regulator has an active alarm; confirm it is in the running state (front-panel indicators or parameter F-008); verify the main circuit input voltage is within the nameplate range; confirm a set point signal (analog or digital) is actually being sent to the regulator; and verify the set point signal type is configured correctly (parameter F-011).
2. Voltage present but no current, or current inconsistent with the theoretical value. Check that the load is reliably connected to the regulator, that the load is not damaged, that the load wiring method is correct, and that the rated-current setting matches the nameplate.
3. Output cannot be adjusted. Verify the set point signal type setting (F-011); verify the analog signal type selection — current vs. voltage signal (see Section 7 on SW1/SW2 and AI1/AI2); and check whether the output is being limited by a parameter (F-015 output upper limit, default 100%).
4. How to limit the output. (a) Use parameter F-015 as an overall output limit. Example: with rated voltage 380 V and F-015 = 100%, a 100% setpoint gives 380 V output; with F-015 = 50%, a 100% setpoint gives  $380 \text{ V} \times 50\% = 190 \text{ V}$  (current is limited in the same way). (b) Alternatively, reduce the rated-current (F-049) or rated-voltage (F-048) settings. Example: with rated voltage 380 V and rated current 50 A, set the rated current to 30 A to limit the current to 30 A.