ZHENMING ELECTRONICS

2-Channel Ethernet Relay Controller

ZMRN0230-Q2

User Manual and Communication Protocol

Manual version: V1.0.1

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0 Quick Start

Connect DC 12 V and Ethernet, then access the local web page.

1. After a network reset, the static IP address is 192.168.1.166, the subnet mask is 255.255.255.0, the default gateway is 192.168.1.1, and DHCP is disabled.
2. Connect the computer to the device network. When using the default static address, configure the computer on the 192.168.1.0/24 subnet with a unique address.
3. Open http://192.168.1.166/ in a browser and sign in with the default username admin and password 12345678. Change the default password after signing in.
4. If the IP address has been changed or DHCP is enabled, use the device's current IP address.

Operate channels 1 and 2 separately and verify their relay states.

1 Product Overview

The ZMRN0230-Q2 is a two-channel Ethernet relay controller. It switches two loads, monitors input states, and runs scheduled actions. Use a supported management platform or communication interface to remotely manage lighting, pumps, valves, and other equipment.

Function	Description
Two relay outputs	Control each relay contact independently and monitor its output state.
Two inputs	Monitor external input signals and trigger configured output actions.
Network management	Control and manage the device over a local network or through a supported platform.
Scheduled control	Supports 32 weekday and time schedules, plus sunrise and sunset scheduling by coordinates or a Chinese telephone area code.
Parameter configuration	Configure power-loss state retention, pulse duration, action interval, and input triggers.
System integration	TCP, UDP, Modbus TCP, MQTT, SNMP v1/v2/v3 and HTTP GET, with SNTP synchronization and DNS resolution.
RS485 expansion	Onboard on V2.3: sensor, Modbus TCP-to-RTU, MQTT forwarding, serial relay and DMX512 modes.

This manual applies to the ZMRN0230-Q2. Expansion functions require the appropriate interfaces and external devices.

2 Specifications

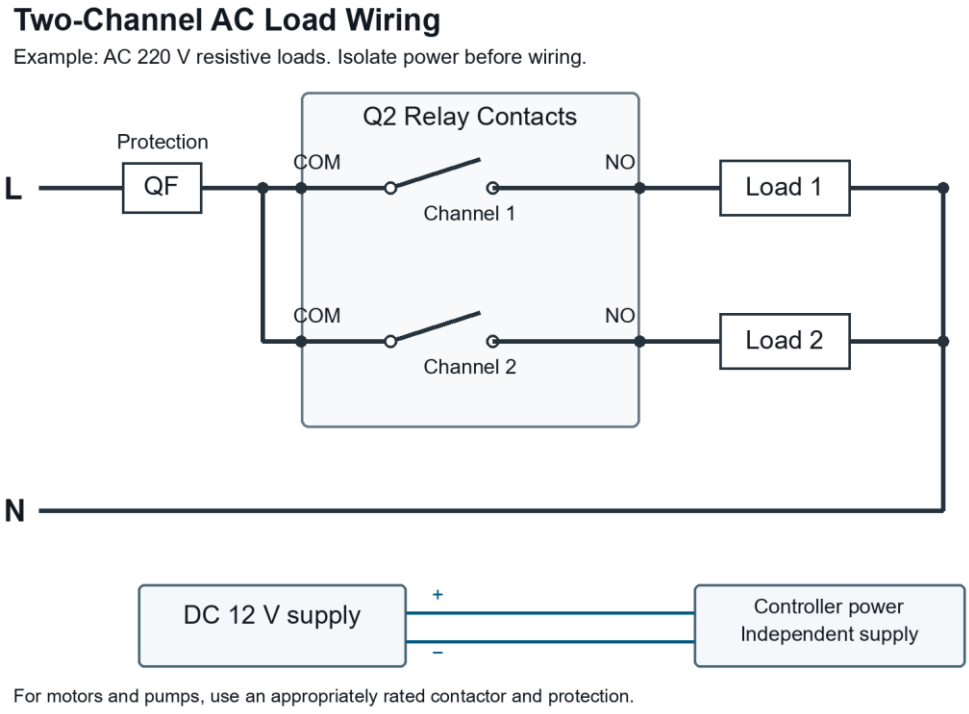
Item	Specification
Model	ZMRN0230-Q2
Electrical parameters	
Power supply	12 V DC; use a 12 V / 1 A power adapter
Power consumption	Standby approx. 0.8 W; maximum approx. 3 W
Relay outputs	2 independent relay contact outputs
Contact rating	30 A / 250 V AC
Number of inputs	2 active voltage inputs
Input signal	5–12 V DC
Mechanical and environmental parameters	
Dimensions (L × W × H)	115 × 90 × 40 mm
Mounting	35 mm standard DIN rail
Operating temperature	−40 °C to 85 °C
Storage temperature	−40 °C to 85 °C
Storage humidity	5% to 95% RH
Communication and software parameters	
Ethernet	RJ45; TCP, UDP, Modbus TCP, MQTT, SNMP v1/v2/v3, HTTP GET, SNTP and DNS
TCP / UDP ports	TCP server 1234; UDP 9128
Modbus TCP	Server port 502; local Slave ID (Unit ID) 254
MQTT protocol / port	MQTT 3.1.1; default broker port 1883, configurable
MQTT topics	Default subscription: device serial number + ctr; default publication: device serial number + state; configurable
MQTT reporting interval	Factory default 300 seconds
RS485 interface	Onboard on V2.3 hardware; operating modes listed below
RS485 factory settings	9600 bit/s, 8 data bits, no parity, 1 stop bit; address 1
RS485 baud rates	4800, 9600, 19200, 38400 and 115200 bit/s; 250000 bit/s in DMX mode
Timers	32 schedules; numbered 1–32; time, weekday and actions for both outputs
Pulse duration	0.1-second units; default 1 second, maximum 600 seconds
RS485 modes	Zhenming sensor, Modbus TCP-to-RTU, RS485-to-MQTT forwarding, serial relay and DMX512; select one mode at a time
Sunrise / sunset	Calculated from coordinates or a Chinese telephone area code; time offsets and actions for both outputs
SNMP / HTTP	SNMP v1: UDP 161; HTTP GET: TCP 80; web authentication required
Time / name services	SNTP time synchronization; DNS name resolution

The relay outputs are dry contacts. Supply load power from an external circuit. Select protection devices for the load type and rated current. Use a suitable contactor for inductive loads.

3 Interfaces and Installation



Q2 product view and basic terminals; identify V2.3 RS485 terminals on the device



Two-channel AC load wiring example

QF represents supply-side protection. Select supply and branch protection for the conductors and loads. Where the load requires protective earth, connect PE according to local wiring rules; PE is not shown.

Output channel	Terminals
Channel 1	Common · Normally closed · Normally open
Channel 2	Common · Normally closed · Normally open

Interface	Purpose
DC 12 V	Controller power supply
RJ45	Ethernet interface
IN1 / IN2	Input channels 1 / 2
COM / GND / VCC	Input common, ground and supply terminals

The two relay terminal groups are located at the top. The DC 12 V power connector, Ethernet port, reset button, and input terminals are located at the bottom.

3.1 Installation and Wiring

1. Mount the device on a suitable DIN rail or in an enclosure. Leave sufficient access and wiring space.
2. Disconnect all relevant power sources. Connect the 12 V DC supply as marked and connect the Ethernet port to a router or switch.
3. Connect each external load circuit to the appropriate relay contacts. Supply each load from a suitable external power source.
4. For input wiring, follow the terminal markings and electrical ratings. Verify the input voltage and common terminal before connection.
5. Check wiring and insulation, apply power, and test each channel separately.

Mains wiring must be performed by qualified personnel. Motors and pumps draw starting current; use a suitable contactor where required and select protection devices for the actual load.

3.2 Factory Reset

A factory reset restores the network settings, web password, relay parameters, input scenes, MQTT, RS485 and timer settings. Existing schedules are cleared. Record the required settings and place loads in a safe state before resetting.

1. Disconnect power from the device.
2. Press and hold the initialization button, then apply power while keeping the button pressed.
3. Continue to hold the button for 30 seconds after applying power, then release it.
4. Reconnect to the device using its default network address and login credentials, then configure the required settings again.

4 Network Configuration and Local Access

4.1 Dynamic Address Assignment DHCP

When DHCP is enabled, the device obtains an IP address from the network DHCP server. Find the current address using the configuration software or router client list. The address can change. The

factory network settings are static IP 192.168.1.166, subnet mask 255.255.255.0, gateway 192.168.1.1, and DHCP disabled. Existing settings and other firmware versions can differ.

4.2 Static IP Address

For a static address, enter the IP address, subnet mask, gateway, and DNS settings for the network. Use an unused address in the gateway subnet. Restart or power-cycle the device after changing network settings, then connect using the new address.

For a direct connection, assign the computer and device different addresses in the same subnet. For example, when the device is at 192.168.1.166, set the computer to 192.168.1.100 with subnet mask 255.255.255.0. Adjust the computer address if the device address has changed.



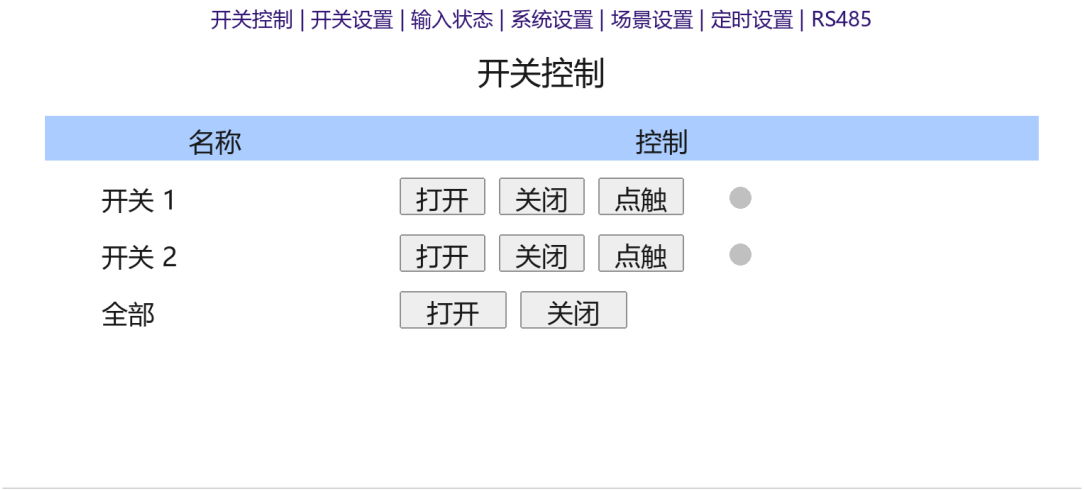
Network settings illustration

4.3 Control Outputs on the Device Web Page

Sign in to the device web page and select “开关控制” (Relay Control). The page has separate controls for switch 1, switch 2 and all outputs.

1. In the switch 1 or switch 2 row, select “打开” (On) or “关闭” (Off) to operate the corresponding relay.
2. Select “点触” (Pulse) for a channel. Its relay closes for the configured pulse duration, then opens.
3. In the all-outputs row, select On or Off to command both channels.
4. Check the channel status indicators on the page. During commissioning, verify the relay contacts and external circuits.

The page shows the controller’s recorded output state; it does not measure whether the load is operating.



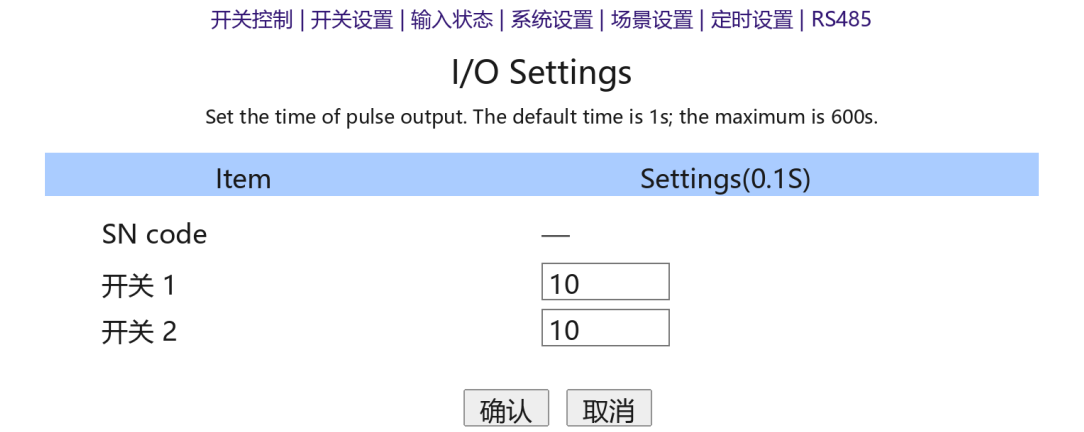
Output control illustration

4.4 Set Pulse Duration

On “开关设置” (I/O Settings), set each channel’s pulse duration in units of 0.1 seconds.

1. Select “开关设置” and locate the duration fields for switch 1 and switch 2.
2. Enter the duration value. For example, 10 represents 1 second and 100 represents 10 seconds.
3. Select “确认” (Confirm) and accept the confirmation prompt. Return to Relay Control, pulse the channel and check the duration.

The page states a default pulse duration of 1 second and a maximum of 600 seconds. Set and test the required duration.



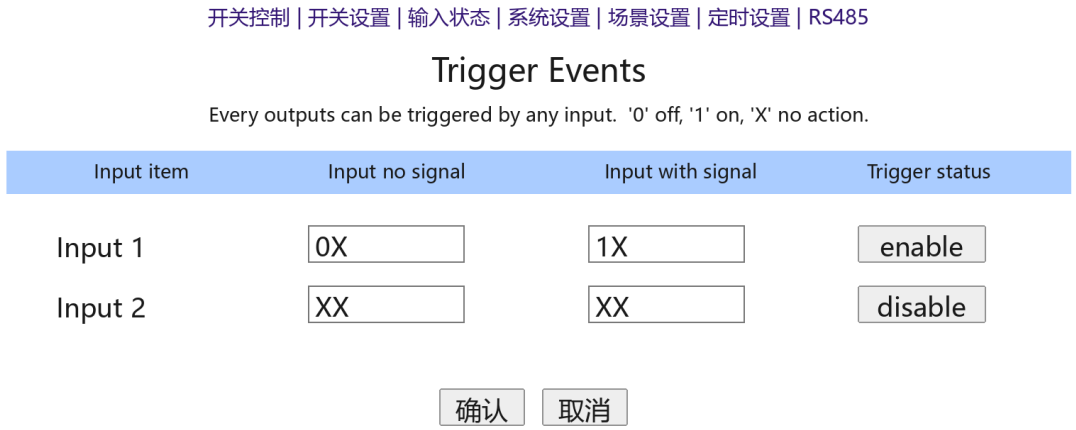
Pulse settings illustration

4.5 Configure Input Trigger Actions

On “场景设置” (Trigger Events), configure the two-channel actions for the no-signal and signal states of inputs 1 and 2. Each input also has a trigger-enable control.

1. In “系统设置” (System Settings), configure the two input modes in “输入点触使能”: 1 selects edge mode and 0 selects level mode, in input 1, input 2 order.
2. Open Trigger Events. For the selected input, enter two action characters in each no-signal and signal field, in output 1, output 2 order: 0 turns off, 1 turns on and X makes no change.
3. Example: for input 1, enter 0X for no signal and 1X for signal. In level mode, output 1 turns off or on respectively; output 2 is unchanged.
4. Select “确认” to save the actions, then enable triggering using the control in that input row. Change the input state and verify both outputs.

In level mode, the high and low levels select their respective actions. In edge mode, the rising edge switches the action set and the falling edge executes the current set again. Verify the input electrical conditions and field wiring before configuration.



Input scene settings illustration

4.6 MQTT Settings

Open http://device-IP/cloud.cgi in a browser and sign in with the device web username and password to open the device settings page.

1. Determine whether to use the ThingsBoard platform, then set Thingsboard Enable. Selecting this button immediately submits the current page values and replaces the subscription and publication topics; check the page values before switching.

2. Set the status reporting interval in seconds; the factory default is 300 seconds. Enter the server domain or IP, port, server username and password. A configured domain is resolved through DNS and updates the server IP; clear the domain when using an IP address.

3. Enter the subscription and publication topics required by the platform. In standard mode, empty topics default to the device serial number + ctr for subscription and the serial number + state for publication. Check the topics again after switching ThingsBoard mode.

4. Set MQTT 使能 (MQTT enable). The button displays enable when enabled and disable when disabled. Selecting it switches the setting and immediately submits the current page values.

5. Select 确定 (Confirm), accept the confirmation prompt and restart the device. Then check the platform connection, subscription and status reports.

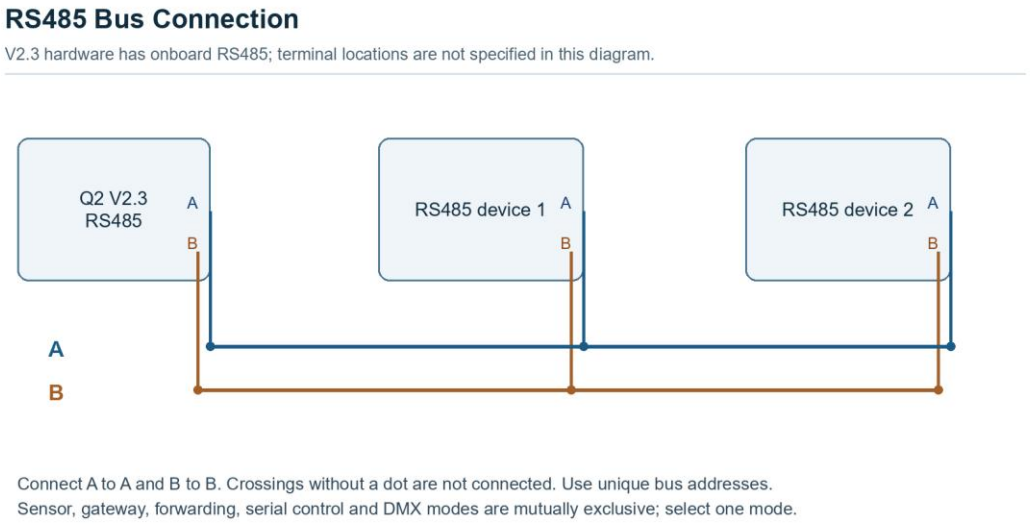


MQTT device settings page illustration

Page labels: 上报周期 = reporting interval; 服务器域名 = server domain; 服务器 IP = server IP; 服务器端口 = server port; 服务器用户名 = server username; 服务器密码 = server password; 指定订阅号 = subscription topic; 指定发布号 = publication topic.

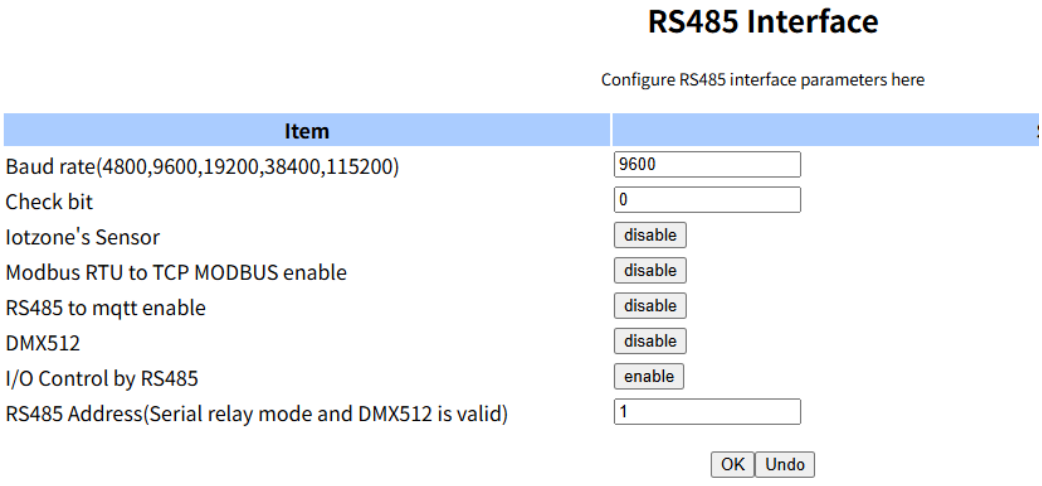
5 Expansion Functions

Hardware version V2.3 provides onboard RS485. Select the serial operating mode on the device configuration page; only one mode can use the serial interface at a time. Configure matching communication parameters and addresses before connecting external devices.



RS485 bus connection overview

Mode	Function
Zhenming sensors	Connect compatible external sensors and read their measurements.
Modbus TCP-to-RTU	Forward Modbus TCP requests from the network to Modbus RTU devices on RS485.
RS485-to-MQTT forwarding	Transfer data between a serial device and an MQTT communication channel.
Serial relay control	Control relay outputs over RS485 using Modbus RTU.
DMX512	Control the relay outputs using DMX512 input.



RS485 configuration page illustration

Factory-reset serial settings are 9600 baud, device address 1 and serial relay mode. Assign a unique address to each device on the bus.

Sensors, RS485 devices and the associated cabling must be provided separately. Verify the interface, protocol, power supply and wiring before connection.

6 Platform Operation

Platform website: https://pc.netrelay.cn/

6.1 Add the Device

1. Sign in to a supported management platform. New users should register as directed by the platform.
2. Select Add Device, then scan the device QR code or enter its serial number.
3. Select or retrieve the model as prompted, then set the device name, group, and location as needed.
4. After adding the device, check its online status. If it is offline, check power, Ethernet wiring, network settings, and platform connectivity.

6.2 Outputs and Inputs

On the device control page, monitor and control each output. Available controls include all on, all off, pulse, and toggle, as provided by the device and platform. The input page displays both input states. Configure active levels and trigger modes to match the field wiring.

Action	Operation
On / Off	Close or open the selected relay contact.
Pulse	Close the contact for the configured time, then open it.
Toggle	Reverse the current relay state.
Interlock	Turn off both channels, then turn on the selected channel after a delay.

6.3 Device Management

Rename devices and channels for identification and group multiple devices. Sharing, unbinding, and resetting timers affect access or configuration. Verify the target before proceeding. Unbinding can also remove associated alarms, scenes, or automation settings.



Platform device parameters and settings

Interface labels: 掉电保存 = power-loss state retention; 间隔时间 = action interval; 输入模式场景 = input scene; 输入触发模式 = input trigger mode; 点触时间 = pulse duration; 串口地址 = serial address; 设备名称 = device name; 设备信息 = device information.



Platform device name settings

Interface labels: 设备名称 = device name; 修改 = modify; 设置 = settings.

7 Function Settings

7.1 Timers

ZMRN0230-Q2 supports 32 schedules. The number available on a platform is determined by that platform. Synchronize the schedules when prompted after first use or configuration changes. For each schedule, set the time, weekdays and actions for both channels, and save it. Check the device time and time zone. Sunrise and sunset schedules use coordinates or a Chinese telephone area code; see Section 7.4.

Example: Set a timer for 08:30 Monday through Friday, with channel 1 on and channel 2 unchanged. Save and check the settings, then verify the action on site.

Offline scheduling depends on device time, saved timer settings, and power. Check time synchronization and device version support.

7.2 Power-Loss State Retention and Pulse

Power-loss state retention determines whether the output returns to its pre-outage state after power is restored. Verify the behavior with the connected load. When retention is disabled, other startup settings also affect the output state.

Pulse control energizes the relay for the configured duration, then de-energizes it. The device web interface and protocol use units of 0.1 s; a setting of 10 means 1 s.

7.3 Input Triggers and Action Interval

Configure inputs for edge or level triggering and associate them with output actions. Test both active and inactive input conditions after configuration.

The action interval sets the delay between relay actions in a group operation. In the protocol, jgtime=10 means 1 second. Check the unit displayed in the interface.

Each input channel has two configurable output-action sets. In level mode, the high and low levels select the respective sets. In edge mode, a rising edge switches the selected set and a falling edge executes the currently selected set again. Enable the corresponding input scene to activate these actions.

7.4 Sunrise and Sunset Scheduling

Configure sunrise and sunset schedules on the device web page using a Chinese telephone area code or coordinates, output actions and offsets. Enter latitude and longitude as integers multiplied by 100: for example, enter 11640 for 116.40 longitude and 3992 for 39.92 latitude. The device uses coordinates only when both are positive; otherwise it uses a Chinese telephone area code. Set both coordinates to zero when using an area code.

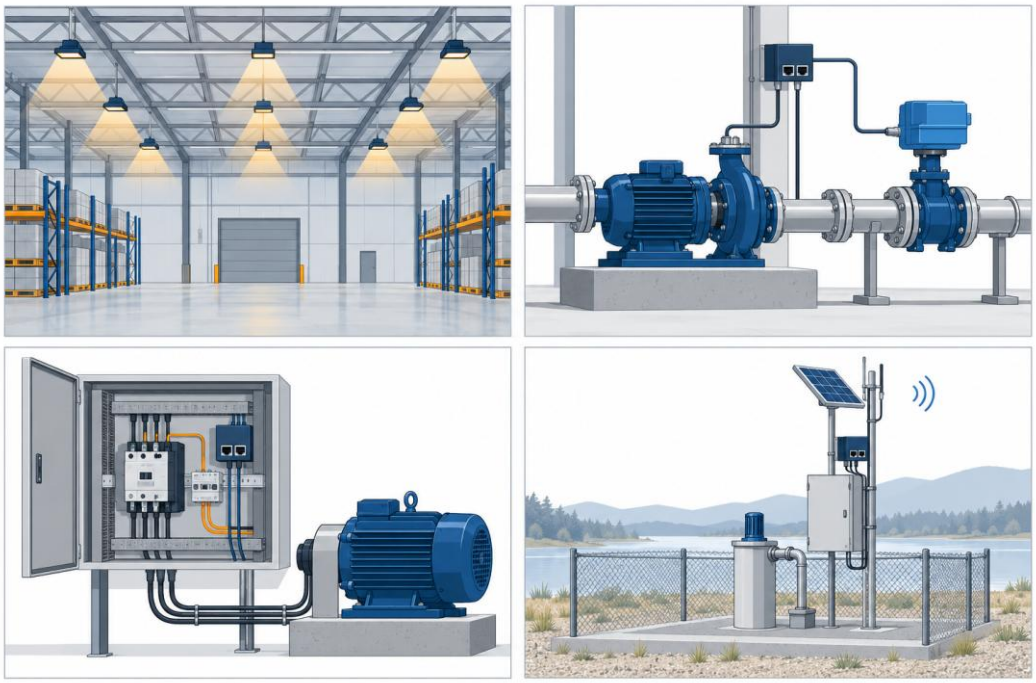
Offsets are in minutes: negative values advance the action and positive values delay it. Specify actions in channel 1, channel 2 order: 00 turns both off and 11 turns both on. Do not set an offset that moves the execution time across a date boundary or to 00:00. Check the calculated time and operation after saving.



Sunrise and sunset settings illustration

Figure labels: 年-月-日 = date; 时-分-秒 = time; 星期 = day of week; NTP 地址 = NTP address; 时区设置 = time zone; 区号 = area code; 经度 / 纬度 = longitude / latitude; 日出时间 / 日落时间 = sunrise / sunset time; 日出执行时间 / 日落执行时间 = sunrise / sunset execution time; 日出偏移时间 / 日落偏移时间 = sunrise / sunset offset in minutes; 日出输出 / 日落输出 = sunrise / sunset outputs; 经纬度定时使能 = location-based scheduling enable.

8 Typical Applications



Typical applications: lighting, pumps and valves, power equipment, and unattended sites

8.1 Lighting Circuit Management

Use the two relay channels to control separate lighting circuits. Switch the circuits over the network or run schedules for different areas. Select suitable contactors and protection devices for the luminaires' inrush current.

8.2 Pump and Valve Control

Use separate outputs for the external control circuits of a pump and a valve. Start and stop them remotely or use schedules. Use suitable contactors and protection for motor loads; implement the required safe operating sequence in the site control system.

8.3 High-Power Load Switching

Use a relay contact to control an external contactor for remote switching of high-power equipment. Select the contactor for the load type, starting current and control circuit; do not use the relay rating as the sole load-selection criterion.

8.4 Unattended Sites

Connect the controller to the site network to operate and schedule two circuits remotely. View controller output states on the platform. Output-state feedback does not establish that the connected equipment is running; use external feedback or site monitoring for that purpose.

9 Communication Protocol

Supports SNMP v1/v2/v3. BACnet/IP and EtherNet/IP are optional.

The device supports TCP, UDP, Modbus TCP, MQTT, SNMP v1/v2/v3 and HTTP GET, plus SNTP time synchronization and DNS name resolution. Restart or power-cycle the device after changing network settings. Connect the device to a trusted network, do not expose control ports directly to the public Internet, and change the web password.

9.1 Communication Interfaces

Interface	Communication parameters
TCP	Server port 1234
UDP	Server port 9128
MQTT	Device control subscription: device serial number + ctr; device status publication: device serial number + state. Topics are configurable.
Modbus TCP	Server port 502; local Slave ID 254. Forwarded RS485 devices use their own addresses.
SNMP v1	UDP 161; default community public; relay-control and input-status management objects.
HTTP GET	TCP 80; control relays using web GET parameters; web authentication required.
SNTP	Synchronize device time with a time server.
DNS	Resolve the MQTT server hostname for MQTT connections.

Substitute the device serial number into the default topics. Subscribe and publish topics can be changed; use the configured values when integrating.

HTTP GET examples

Endpoint and authentication

Send HTTP GET requests to /relay.cgi on port 80 by default. The device uses HTTP Basic authentication. The factory username is admin and the password is 12345678; use the new password after changing it.

URL format with username and password:

```
http://username:password@device-ip:port/relay.cgi?parameter
```

Port 80 may be omitted. This example uses the factory IP and credentials to turn channel 1 on:

```
http://admin:12345678@192.168.1.166/relay.cgi?relayon1=on
```

The client converts the username and password into HTTP Basic authentication. Some browsers do not accept credentials in URLs; use the curl command below or set an authentication header in your application.

Control requests

Send the following paths to the device HTTP port using the same username and password:

Action	Request path
Turn channel 1 on	`/relay.cgi?relayon1=on`
Turn channel 1 off	`/relay.cgi?relayoff1=off`
Pulse channel 1	`/relay.cgi?pulse1=pulse`
Turn channel 2 on	`/relay.cgi?relayon2=on`
Turn channel 2 off	`/relay.cgi?relayoff2=off`
Pulse channel 2	`/relay.cgi?pulse2=pulse`
Turn both on	`/relay.cgi?relayonA=on`
Turn both off	`/relay.cgi?relayoffA=off`

Pulse duration is set for each channel on the switch settings page, in 0.1-second units. On and off set the relay state; a pulse opens the relay after the configured duration.

curl example

```
curl --user admin:12345678 "http://192.168.1.166/relay.cgi?relayon1=on"
```

HTTP request header example

```
GET /relay.cgi?relayon1=on HTTP/1.1
Host: 192.168.1.166
Authorization: Basic YWRtaW46MTIzNDU2Nzg=
```

End the request line and each header line with CRLF, followed by an empty line after the headers. The Authorization value is Base64 of the username, a colon and the password; regenerate it after changing the password. The response is an HTML page, not JSON. Replace the example IP with the device address if it has changed. HTTP transmits credentials in cleartext; use a trusted local network.

SNMP v1 management objects

Relay-control OID 1.3.6.1.3.1.0 accepts an integer that sets both outputs: bit 0 is channel 1 and bit 1 is channel 2; 1 means on and 0 means off. For example, writing 1 turns channel 1 on and channel 2 off. Input-status OID 1.3.6.1.3.2.0 is read-only.

9.2 Common Fields

Field	Description
cmd	Response command name
output	Output states in channel order
input	Input states in channel order
sn	Device serial number
runtime	Device uptime
ts	Timestamp; verify device time synchronization

9.3 Query Status and Control Outputs

Send state=? to query status. The response contains cmd, output, input, runtime, ts, and sn.

```
state=?
{
  "cmd": "state",
  "output": "00",
  "input": "00",
  "online": 0,
  "runtime": 23,
  "ts": 23,
  "sn": "Q253xxxxxxxx5b63"
}
```

Send setr=11 to turn both outputs on. The two characters correspond to channels 1 and 2.

Action code	Meaning
0	Off
1	On
2	Pulse
3	Toggle
4	Interlock
x or X	No action

The response contains cmd=setr and the current output and input states. An interlock action first turns off the selected and adjacent channels, then turns on the selected channel after a delay. This is software logic; design separate safety interlocks as required by the load.

9.4 Output State Retention and Action Interval

Send relaysave=11 to enable state retention for both channels. The characters correspond to channels 1 and 2: 1 enables retention and 0 disables it. The response type is outset.

Send jgtime=10 to set a 1-second action interval. The device accepts 0–1200 in 0.1-second units. Send outset=? to query output parameters. The response includes relaystatus, relaysave, pulsetm1, pulsetm2, and jgtime.

```
{
  "cmd": "outset",
  "relaystatus": "11",
  "relaysave": "11",
  "pulsetm1": 10,
  "pulsetm2": 10,
  "jgtime": 10,
  "runtime": 59,
  "ts": 59,
  "sn": "Q253xxxxxxxx5b63"
}
```

9.5 Pulse Duration

Send pulsetm1=100 to set channel 1 pulse duration to 10 seconds; use pulsetm2=100 for channel 2. The pulsetm1 and pulsetm2 units are 0.1 seconds. The response type is outset.

9.6 Input Parameters

Send intype=11 to configure both inputs for edge triggering; 1 means edge and 0 means level. Send inset=? to query input parameters. The response type is inset.

The response fields senceon1, senceon2, senceoff1 and senceoff2 contain the two action sets for each input. The field names retain the protocol spelling. In level mode, high and low levels select the action set; in edge mode, a rising edge switches the set and a falling edge executes the current set again. Send houts1=3x or louts1=3x to configure an action set for input 1; 3x toggles channel 1 and leaves channel 2 unchanged. Use houts2 or louts2 for input 2.

9.7 Time Zone and Reporting Interval

Send timezone=8 to set the time zone; the response type is ntpts. Send interval=100 to set the reporting interval to 100 seconds; the response type is cloud. The device accepts 30–3599 seconds. Use the configured service address.

9.8 Timers

Send timer1=? to query timer 1. The device supports timer numbers 1–32. The response includes num, hour, min, sec, week, output, ts, runtime, sn, and cmd. The seven week characters correspond from left to right to Sunday through Saturday.

Send timer1=150630/0000001/11 to turn both outputs on at 15:06:30 on Saturday. Use six digits for time, seven for weekdays, and two for actions. The device parses the full command length; do not append extra characters to the command body.


```
{
  "num": 1,
  "hour": 15,
  "min": 6,
  "sec": 30,
  "week": "0000001",
  "output": "11",
  "ts": 1732937411,
  "runtime": 23209,
  "sn": "Q253xxxxxxxx5b63",
  "cmd": "timer1"
}
```


9.9 Query Sunrise and Sunset Settings

Send gpstimer=? to query settings, gpstimer=1 to enable, or gpstimer=0 to disable. The response includes gpstimer, areacode, gpslat, gpslng, riseout, setout, risetime, settime, realrise, realset, sunriseoffset, and sunsetoffset. Configure coordinates on the web page and verify the saved values. See Section 7.4.

9.10 Device Information and Restart

Send firm to query the firmware version and device=? to query device information.

Send restart to restart the device. Check the output actions and field equipment state before restarting.

9.11 Relay Action Examples

The two characters after setr correspond to channels 1 and 2; x means no separate action is commanded for that position. The following commands pulse, toggle and interlock channel 1. Interlock first turns off both channels and then turns on the target after a delay; it may turn off the other channel even if its position is x.

```
setr=2x
setr=3x
setr=4x
```

Response example:

```
{
  "cmd": "setr",
  "output": "10",
  "input": "00",
  "online": 0,
  "runtime": 120,
  "ts": 1732937411,
  "sn": "q200000000000001"
}
```

The output value illustrates the state sampled in the response; it is not guaranteed to be 10 for each command. Pulse and interlock involve timing: query state=? for subsequent status. online reflects external device status and does not confirm load operation.

9.12 Query Output Settings

Send outset=? to query relay state, power-loss state retention, pulse duration and action interval. pulsetm1, pulsetm2 and jgtime use units of 0.1 seconds.

```
outset=?
```

Response example:

```
{
  "cmd": "outset",
  "relaystatus": "10",
  "relaysave": "11",
  "pulsetm1": 10,
  "pulsetm2": 10,
  "jgtime": 10,
  "runtime": 120,
  "ts": 1732937411,
  "sn": "q200000000000001"
}
```

The settings in this example illustrate the response fields.

9.13 Query Input Settings

Send inset=? to query input modes, scene enable states and the two action sets for each input. In intype, 1 denotes edge mode and 0 denotes level mode. In en, 1 enables the corresponding input scene.

```
inset=?
```

Response example:

```
{
  "cmd": "inset",
  "intype": "10",
  "en": "11",
  "senceon1": "3x",
  "senceon2": "x3",
  "senceoff1": "3x",
  "senceoff2": "x3",
  "runtime": 120,
  "ts": 1732937411,
  "sn": "q200000000000001"
}
```

The execution of senceon and senceoff depends on input mode. In edge mode, a rising edge switches the action set and a falling edge executes the current set again. Field names retain the device protocol spelling.

9.14 Query Firmware Version

Send firm to query the firmware version identifier. fver contains the firmware internal board identifier and build date and time.

```
firm
```

Response example:

```
{
  "sn": "q200000000000001",
  "fver": "ZMRN0202-QV2-Feb 25 2026-12:00:00",
  "cmd": "firm"
}
```

The fver value illustrates the format; the build time is reported by the device. The internal board identifier does not replace the product model.

9.15 Restart the Device

Send restart to restart the device. The connection will be interrupted. Query the state after the device comes back online.

```
restart
```

Response example:

```
{
  "sn": "q200000000000001",
  "cmd": "restart"
}
```

The device constructs the response shown, but restarting can interrupt communications. Do not rely on receiving it.

Appendix A Troubleshooting

Symptom	Checks
Device not found	Check power, Ethernet wiring, and the computer network. Find the current IP address in the configuration software or router client list.
Device offline	Check network connectivity, gateway, DNS settings, and platform availability.
Relay does not operate	Check the target channel, control mode, power, wiring, load supply, and contact state.
Timer does not run	Check time, time zone, weekdays, scheduled action, power, and synchronization.
Unexpected power-on state	Check retention and startup settings, then power-cycle and test.
Unexpected input action	Check input electrical ratings, wiring, active level, and edge/level mode.

Appendix B Hardware and Firmware Compatibility

V2.3 hardware includes onboard RS485. Use V2.3-compatible firmware dated 2025-01-02 or later.

Firmware dated 2025-01-02 or later can be used on earlier hardware. Do not install firmware dated before that on V2.3 hardware: RS485 communication will not work.

Before an upgrade, check the hardware version, firmware model and upgrade file. Maintain power and communication during the upgrade.

Appendix C Load Selection

Relay contacts switch external circuits. Select components for lighting, motors and pumps according to load type, starting current and site protection requirements. Use a suitable contactor for high-power or high-inrush loads.

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