REDZ
SMART COMMUNICATION

redz-sc.com hi@redz-sc.com

HUR Series Modbus RTU Remote I/O Devices

Digital and analog I/O on the DIN rail, over one RS485 line



- Reads inputs and drives outputs of the field for a PLC, SCADA or gateway over Modbus RTU
- Keeps outputs in a defined state when the line or the master fails
- Firmware update and settings over the same RS485 line

HUR Series RTU modules add 8 digital outputs, 8 digital inputs, 8 analog inputs or 5 analog outputs to any Modbus RTU master, such as a PLC, a SCADA computer or a gateway. They are built for rugged industry and infrastructure sites, with a metal DIN rail housing, a wide operating temperature range and AC or DC power input. One RS485 line carries data, settings and firmware updates, the modules on it are told apart by their Modbus address (1 to 247), and every output module keeps its outputs in a defined state when the line or the master fails - a cost-effective way to build a remote I/O system.

Highlights

1. Modbus RTU slave with selectable speed (9600 to 230400 bit/s), parity and address 1 to 247.
2. **Communication watchdog:** outputs go to user-defined safe values when the master stops polling.
3. Firmware update over RS485 into a second memory area; the running firmware is replaced only after the new image is complete and checked.
4. Write lock for the settings and a diagnostic block with frame and error counters.
5. **Inputs are processed in the module:** counters with debounce on the digital inputs, 4 - 20 mA wire-break status and a low-pass filter on the analog inputs.
6. Output values at power up and after the automatic restart are set per output and kept in the module.

Key Figures

8
inputs or outputs per module

115200
bit/s default Modbus RTU speed, 8N1

1 - 247
Modbus addresses on one line

16 bit
analog input resolution

5 A
relay output per channel, 250 V AC / 30 V DC

-40 to 85 C
operating temperature, DC models

Main Features

Modbus RTU

- Modbus RTU over RS485, 2 wires and GND; default address 1
- Speed 9600, 19200, 57600, 115200 or 230400 bit/s; 8N1, 8E1 or 8O1; settings take effect after the next start
- Function codes 01, 02, 03, 04, 05, 06, 15 and 16; broadcast writes to address 0
- Exception responses for unknown functions, addresses and values, and for locked settings

Outputs

- Watchdog time 1 to 3600 s (0 = off); a safe value or "keep the last value" per output
- Output values at power up, set per output
- Automatic restart every 1 to 255 h (default 24 h, 0 = off); output values are kept over the restart

Inputs

- Input status by Modbus, 16-bit counter per input with reset and debounce
- Analog input, 0 - 10 V or 0 - 20 mA, switch per channel; 4 - 20 mA mode with wire-break status

Monitoring and maintenance

- Device up time, read counter, firmware date and version registers
- Diagnostic block: received frames, CRC, parity, framing and buffer errors
- Firmware update over the RS485 line, with the previous firmware kept until the new one is checked
- Write lock for all settings (address, speed, watchdog, input settings)

Power

- DC: 9 - 48 V DC, polarity-independent input
- AC: 100 - 240 V AC, 50 - 60 Hz (120 - 370 V DC)

Models

- HUR118 / HUR218: 8 optocoupler outputs, 5 - 275 V AC/DC, 100 mA
- HUR128 / HUR228: 8 relay outputs, 5 A 250 V AC / 30 V DC
- HUR318 / HUR418: 8 optocoupler inputs, 12 - 275 V AC/DC
- HUR518 / HUR618: 8 analog inputs, 0 - 10 V or 0 - 20 mA
- HUR555 / HUR655: 5 analog outputs, 4 - 20 mA

Power input

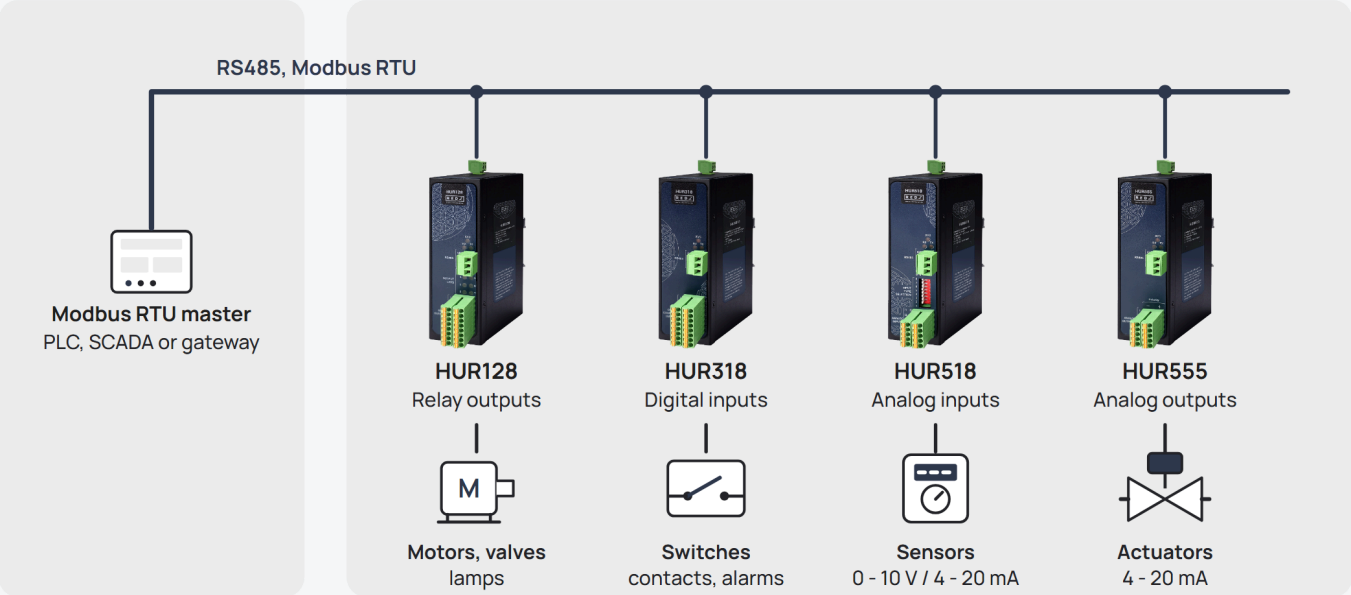
- HUR118, HUR128, HUR318, HUR518, HUR555: DC input
- HUR218, HUR228, HUR418, HUR618, HUR655: AC input
- Same housing, terminals and Modbus registers for the AC and DC versions

Technical Data

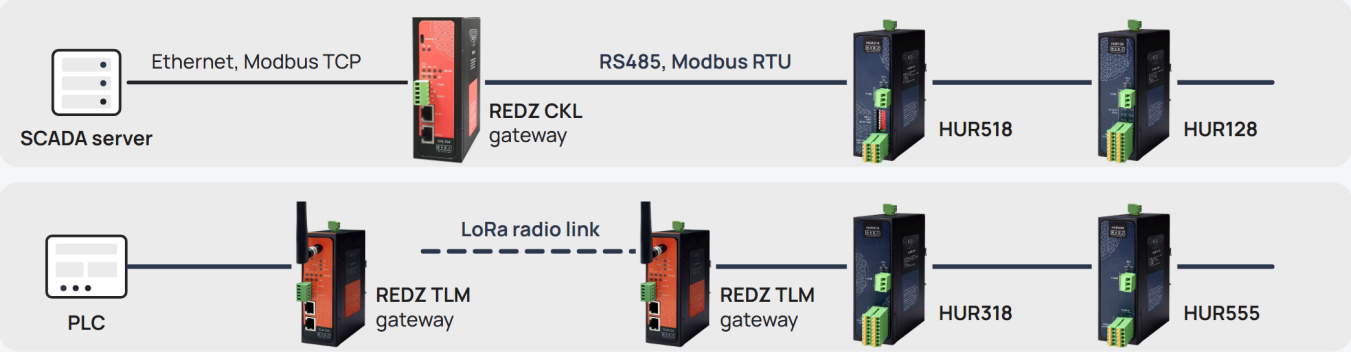
Inputs and outputs

	HUR118 / HUR218 optocoupler outputs	**HUR128 / HUR228** relay outputs	**HUR318 / HUR418** digital inputs	**HUR518 / HUR618** analog inputs	**HUR555 / HUR655** analog outputs
Channels	8	8	8	8	5
Type	Optocoupler (solid state) output, polarity-independent	Relay output (normally open), polarity-independent	Optocoupler input, AC or DC, polarity-independent	Analog input, 0 - 10 V or 0 - 20 mA, switch per channel; 4 - 20 mA mode with wire-break status	Analog output, 4 - 20 mA
Rating	5 - 275 V AC/DC, 100 mA per channel	5 A 250 V AC / 30 V DC per channel (resistive load)	12 - 275 V AC/DC	16 bit, 250 kSPS converter; optional low-pass filter, time constant about 0.16 to 5.1 s	4 - 20 mA, for a 24 V loop with 250 ohm or a 12 V loop with 125 ohm load
Isolation and protection	3750 V rms isolation for 1 min; overvoltage 275 V, peak pulse current 80 A	3 kV between coil and contacts	4470 V rms isolation for 1 min; overvoltage 275 V	Inputs isolated from the RS485 and power side as one group (1 kV DC, 1 s test); polarity-sensitive, 2 common points	Overvoltage protection up to 40 V
Connector	16 pins, 2 per channel	16 pins, 2 per channel	16 pins, 2 per channel	10 pins: 8 inputs and 2 common points	10 pins, 2 per channel

Typical Application



Typical application: a PLC, SCADA computer or gateway reads and writes several HUR RTU modules on one RS485 line.



Remote sites: a REDZ CKL Series serial to Ethernet gateway connects the RS485 line to a TCP/IP network (Modbus TCP), and REDZ TLM Series LoRa gateways carry it over a radio link.

Power and environment

	DC models HUR118 / 128 / 318 / 518 / 555	AC models HUR218 / 228 / 418 / 618 / 655
Power input	9 - 48 V DC	100 - 240 V AC, 50 - 60 Hz (120 - 370 V DC)
Protection and isolation	Reverse polarity, thermal shutdown and current limit	Class II; 3 kV AC input to output
Operating temperature	-40 to 85 C	-25 to 70 C
Storage temperature	-65 to 150 C	-40 to 105 C
Humidity	5 to 95 %, non-condensing	5 to 95 %, non-condensing
Interface	1 x RS485 (Modbus RTU)	1 x RS485 (Modbus RTU)
Indicators	Tx, Rx and System LEDs	Tx, Rx and System LEDs
Housing	Metal, IP 40	Metal, IP 40
Mounting	DIN rail	DIN rail
Dimensions (w x d x h)	43 x 95 x 124 mm	43 x 95 x 124 mm
Weight	approx. 400 g	approx. 400 g

The models come in pairs with the same I/O and the same Modbus registers: HUR118, HUR128, HUR318, HUR518 and HUR555 take DC power, HUR218, HUR228, HUR418, HUR618 and HUR655 take AC power.

Product Comparison

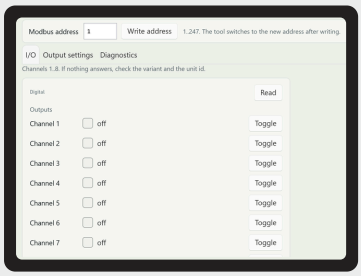
HUR RTU	118	218	128	228	318	418	518	618	555	655
Optocoupler output	●	●								
Relay output			●	●						
Digital input					●	●				
Analog input							●	●		
Analog output									●	●
DC power input	●		●		●		●		●	
AC power input		●		●		●		●		●
1 x RS485 (Modbus RTU)	●	●	●	●	●	●	●	●	●	●

Ordering Information

Model	Inputs / outputs	Power
HUR118	8 x 5 - 275 V AC/DC optocoupler outputs	DC
HUR218	8 x 5 - 275 V AC/DC optocoupler outputs	AC
HUR128	8 x 5 A relay outputs	DC
HUR228	8 x 5 A relay outputs	AC
HUR318	8 x 12 - 275 V AC/DC digital inputs	DC
HUR418	8 x 12 - 275 V AC/DC digital inputs	AC
HUR518	8 x 0 - 10 V / 0 - 20 mA analog inputs	DC
HUR618	8 x 0 - 10 V / 0 - 20 mA analog inputs	AC
HUR555	5 x 4 - 20 mA analog outputs	DC
HUR655	5 x 4 - 20 mA analog outputs	AC

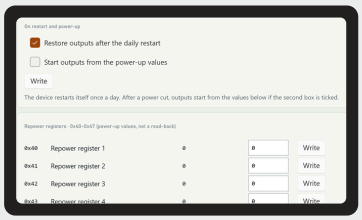
Configuration and Monitoring Software

ZTerminal for Windows is the REDZ configuration and monitoring software for the HUR RTU modules. It talks to the modules over the RS485 line through a serial port of the PC.



Inputs and outputs

Inputs, counters and analog values are read live; outputs are switched or set on the same page.



Output settings

What the outputs do after the automatic restart and at power up, with the power-up value of each output.

ZTerminal for Windows

- Finds the Modbus address of a module with one broadcast request and changes it (1 to 247).
- Shows the digital inputs with their counters, and the analog inputs as raw values and in mA or V.
- Switches the digital outputs and sets the analog outputs (0 to 1000).
- Sets the output values used at power up and after the automatic restart.
- Reads back every write and has a diagnostics page.
- User guide: redzsoftware.com/zterminal/windows-manual/