HUR Series Modbus TCP Remote I/O Devices User Manual

1. About HUR Series Modbus TCP Remote I/O Devices

HUR Series Modbus TCP Remote Input/Output (I/O) Devices are designed for facilities of rugged industry and infrastructure. HUR Series Modbus TCP Remote I/O Devices are tailored to perform various features such as wide temperature, wide range power input range... etc. HUR Series Modbus TCP Remote I/O Devices offers different I/O combinations, which provide greater flexibility and are compatible with many different applications that makes them the perfect choice for establishing a cost-effective remote I/O system.

2. Hardware Features

HUR Series Modbus TCP Remote I/O Devices has several versions with different I/O options such as:

- 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output
- 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

- 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input
- 8 Channel 0-10V and 0-20mA Selectable Analog Input
- 5 Channel 4-20mA Analog Output

All versions can be selected with 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC input or 5-48V (max. 60V) DC wide range power input. HUR Series Modbus TCP Remote I/O Devices communicate over TCP/IP connection.

HUR Multi Slot Version contains 4 of the above I/O options such as

- 4 x 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

There are several alternatives and project based application is also available.

2.1 Features

- Supports 2 x 10/100Base-T(X) ports
- Supports Full/Half-Duplex, auto MDI/MDI-X on each port
- Supports 1 x RS232 and 1 x RS485 Serial Connection up to 921600 Baud
  Modbus TCP to RTU Gateway functionality for Modbus packages with different addresses on serial line (Different than device own address)
- Embedded web interface for ease of use
- 2 different Operating Modes:
  Modbus TCP Remote I/O Device with MQTT Publisher in Server Mode
  Modbus TCP Remote I/O Device as a slave Device in Client Mode and Supports I/O Mirror for Output Devices
- MQTT Publisher with different data transfer options
  OBIS Values as Data Objects
  OBIS Values as Modbus Frame
- HUR can send Data to Server and MQTT Server can remotely control Output Versions of HUR Devices in the same time
- Up to 10 client connection in Server Mode
- DHCP Server Capability
- Easy to follow Device Status on web interface
- Device Address changeable via web interface
- Easy to follow Device Parameters such as Device Up Time, Modbus read counter etc. on web interface

- Easy to follow Serial and Ethernet data packages on web interface
- Black List and White List based IP Filter in TCP Server Mode
- Firmware Upgrade over Web
- 2 firmware storage capability on same device (1 active only)
- AC or DC wide range power options
- Wide operating temperature range from -25 to 70 °C AC and -40 to 85 °C DC power input versions
- Rugged Metal IP-40 housing design
- DIN-Rail mounting

2.2 Extra Features for Output Models

- Output configuration can be defined by user for restart
- Output values can be saved and applied during auto restart
- I/O Mirror functionality: Device can duplicate output from a Modbus input device

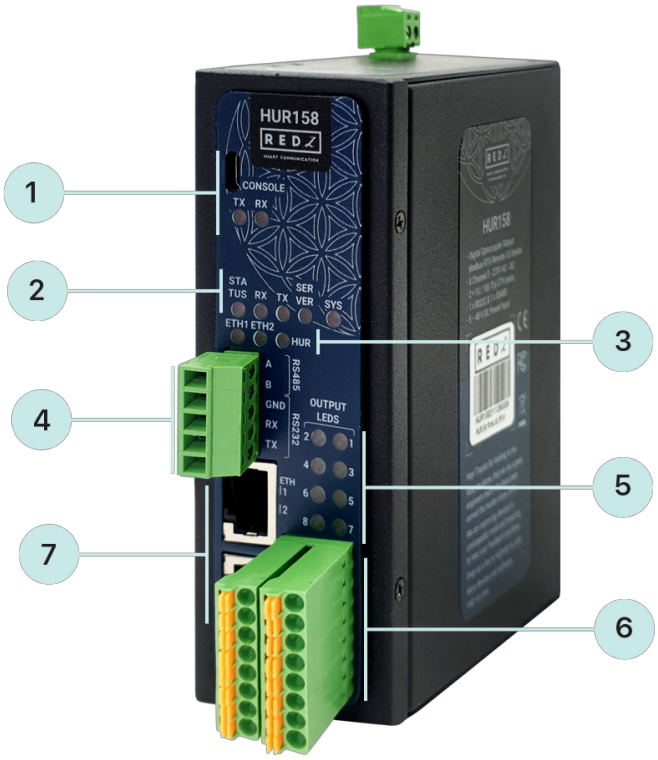
3. Installation

Each device has a Din-Rail kit on rear panel. The Din-Rail kit helps device to fix on the Din-Rail. Slant the switch and mount the metal spring to Din-Rail.

Then Push the switch toward the Din-Rail until you heard a “click” sound.

4. Front Panel Description

4.1 HUR158 & HUR258



1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   SYS: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity

4. 5 pin Terminal Block

   RS232: Tx, Rx and GND pins

   RS485: A, B and GND pins

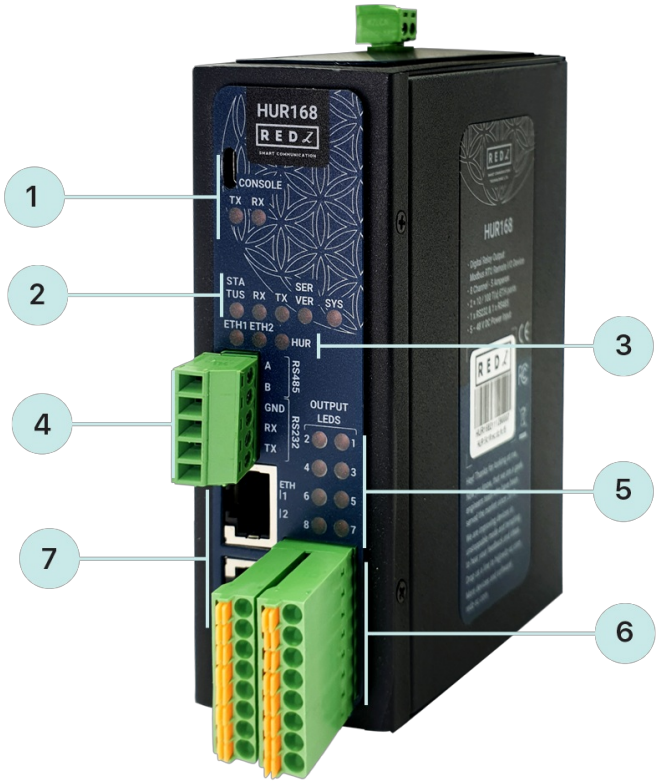
   Can be activated over web interface and baud rate/data type configurable

5. Output Status LEDs: Shows which pin is ON (conducting) and OFF (cut off) for Digital Outputs

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

6. Output Channels: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 5-275V AC-DC, 100mA Digital Optocoupler Outputs.
7. 10/100Base-T(X) Ethernet ports

4.2 HUR168 & HUR268



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   RS232: Tx, Rx and GND pins

   RS485: A, B and GND pins

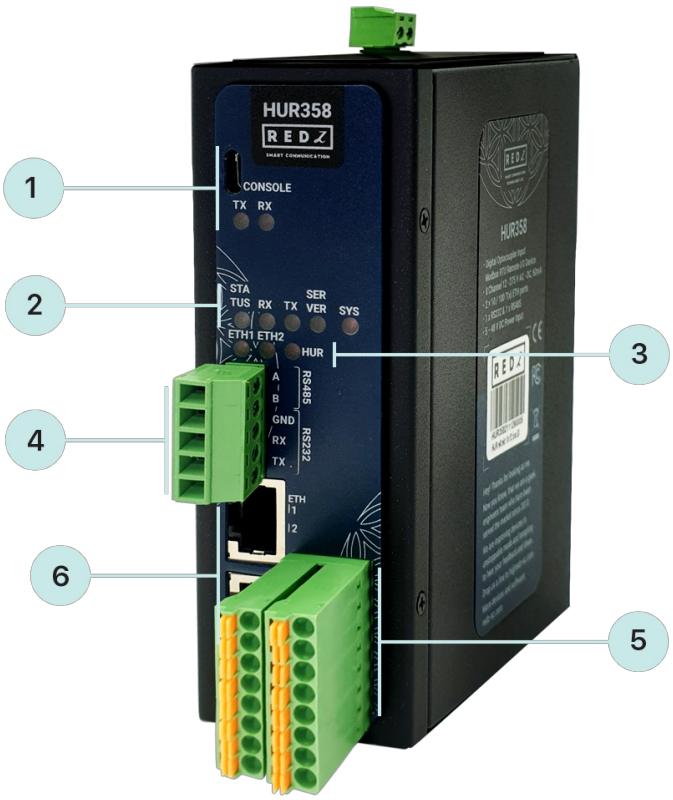
   Can be activated over web interface and baud rate/data type configurable

5. Output Status LEDs: Shows which pin is ON (conducting) and OFF (cut off) for Digital Outputs.

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

6. Output Channels: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. Maximum 5 Amperes 250VAC/30VDC for each channel.
7. 10/100Base-T(X) Ethernet ports

4.3 HUR358 & HUR458



1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs

2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   SYS: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity

4. 5 pin Terminal Block

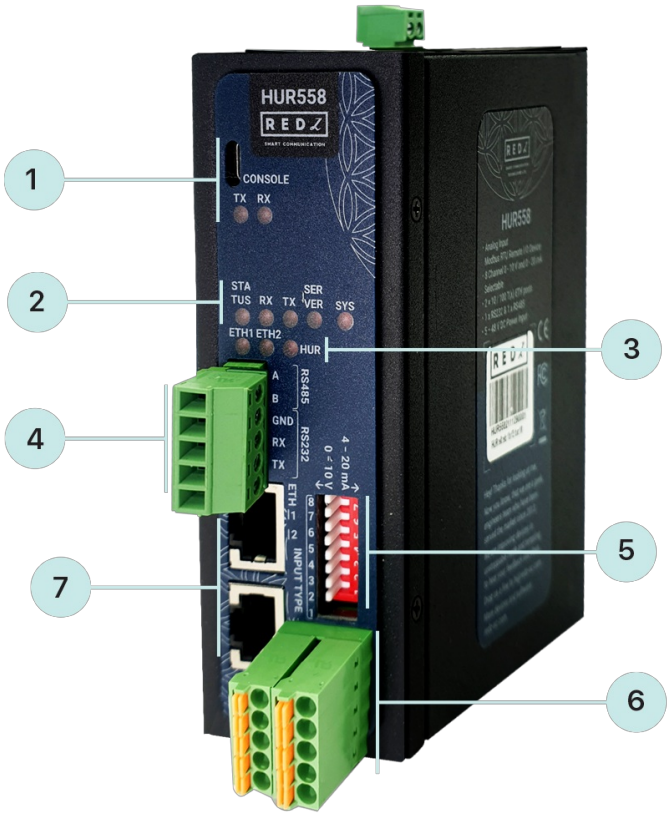
   RS232: Tx, Rx and GND pins

   RS485: A, B and GND pins

   Can be activated over web interface and baud rate/data type configurable

5. Input Channels: 8 Channel Input terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 12-275 AC-DC, 60mA Digital Optocoupler Inputs.
6. 10/100Base-T(X) Ethernet ports

4.4 HUR558 & HUR658



1. Micro USB or USB Type-C Console port for LOG in 115200 baud
   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs
   STATUS: Blinks based on device operation
   - When TCP line used blinks during no connection and keeps ON after TCP connection
   - When Serial line used keeps ON
   Device Tx and Rx Blinks when data transmission occurs
   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected
   SYS: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O

Interface

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. 5 pin Terminal Block

   RS232: Tx, Rx and GND pins

   RS485: A, B and GND pins

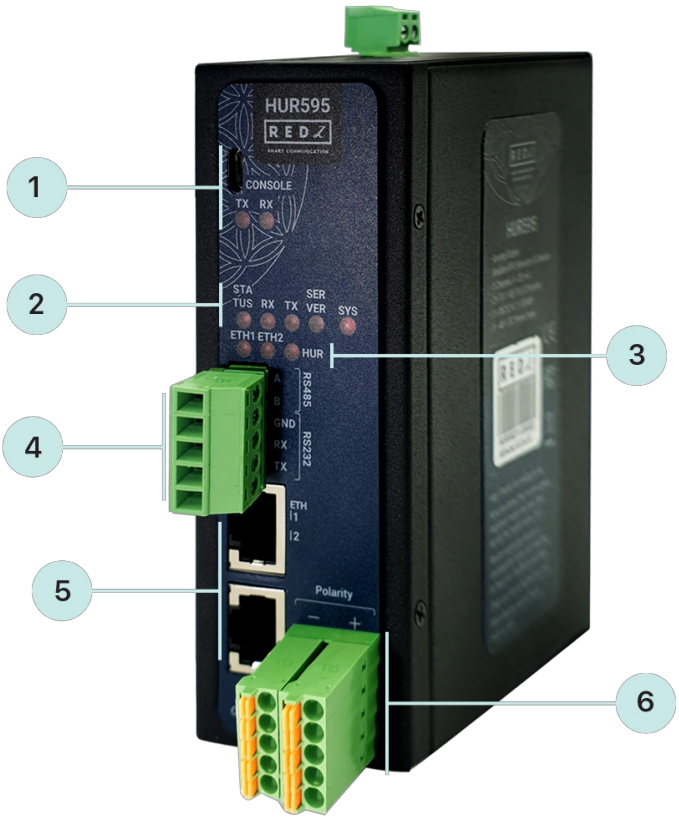
   Can be activated over web interface and baud rate/data type configurable

5. Operation Mode Selection Switches for Analog Inputs: 8 pin Switch to select operation mode of each Analog Input either 0-10V or 0-20mA.

Switch Number	Switch Status and Description
1	Switch Position ON: 4-20mA analog input expected Switch Position OFF: 0-10V analog input expected
2	
3	
4	
5	
6	
7	
8	

6. Input Channels: 8 Channel Input terminals and polarity is important. All inputs references to Common point. 2 Common points and 8 Analog Inputs total 10 connection pins. 0-10V and 0-20mA Individually Selectable Analog Inputs.
7. 10/100Base-T(X) Ethernet ports

4.5 HUR595 & HUR695



1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   SYS: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. 5 pin Terminal Block

   RS232: Tx, Rx and GND pins

   RS485: A, B and GND pins

   Can be activated over web interface and baud rate/data type configurable

5. Output Channels: 5 Channel Output terminals and polarity is important. 2 pins for each connection and total 10 connection pins. 4-20mA Analog Outputs designed for 24V 250ohm load or 12V 125ohm load.
6. 10/100Base-T(X) Ethernet ports

4.6 HUR711 & HUR811

1. Micro USB or USB Type-C Console port for LOG in 115200 baud
   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs
   STATUS: Blinks based on device operation
   - When TCP line used blinks during no connection and keeps ON after TCP connection
   - When Serial line used keeps ON
   Device Tx and Rx Blinks when data transmission occurs

SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Status LEDs: Shows which pin is ON (conducting) and OFF (cut off) for Digital Outputs for relevant Slot

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

5. Output Channels for All Slots: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 5-275V AC-DC, 100mA Digital Optocoupler Outputs.
6. 10/100Base-T(X) Ethernet ports

4.7 HUR712 & HUR812

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected
3. S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.
4. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
5. Output Status LEDs: Shows which pin is ON (conducting) and OFF (cut off) for Digital

Outputs for relevant Slot

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

6. Output Channels for All Slots: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. Maximum 5 Amperes 250VAC/30VDC for each channel.
7. 10/100Base-T(X) Ethernet ports

4.8 HUR713 & HUR813

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Input Channels for All Slots: 8 Channel Input terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 12-275 AC-DC, 60mA Digital

Optocoupler Inputs.

5. 10/100Base-T(X) Ethernet ports

4.9 HUR714 & HUR814

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs

2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Input Channels for All Slots: 8 Channel Input terminals and polarity is important. All inputs references to Common point. 2 Common points and 8 Analog Inputs total 10 connection pins. 0-10V and 0-20mA Individually Configurable during order (default is 0-20mA version) Analog Inputs.
5. 10/100Base-T(X) Ethernet ports

4.10 HUR715 & HUR815

1. Micro USB or USB Type-C Console port for LOG in 115200 baud
   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

STATUS: Blinks based on device operation

- When TCP line used blinks during no connection and keeps ON after TCP connection

- When Serial line used keeps ON

Device Tx and Rx Blinks when data transmission occurs

SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Channels for All Slots: 5 Channel Output terminals and polarity is important. 2 pins for each connection and total 10 connection pins. 4-20mA Analog Outputs designed for 24V 250ohm load or 12V 125ohm load.
5. 10/100Base-T(X) Ethernet ports

4.11 HUR721 & HUR821

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Status LEDs for Slot 1 and 2: Shows which pin is ON (conducting) and OFF (cut

off) for Digital Outputs for relevant Slot

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

5. Output Channels for Slot 1 and 2: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 5-275V AC-DC, 100mA Digital Optocoupler Outputs.
6. Input Channels for Slot 3 and 4: 8 Channel Input terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 12-275 AC-DC, 60mA Digital Optocoupler Inputs.
7. 10/100Base-T(X) Ethernet ports

4.12 HUR722 & HUR822

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Status LEDs for Slot 1 and 2: Shows which pin is ON (conducting) and OFF (cut

off) for Digital Outputs for relevant Slot

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

5. Output Channels for Slot 1 and 2: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. Maximum 5 Amperes 250VAC/30VDC for each channel.
6. Input Channels for Slot 3 and 4: 8 Channel Input terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 12-275 AC-DC, 60mA Digital Optocoupler Inputs.
7. 10/100Base-T(X) Ethernet ports

4.13 HUR725 & HUR825

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

   - When Serial line used keeps ON

   Device Tx and Rx Blinks when data transmission occurs

   SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

   S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.
3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Channels for Slot 1 and 2: 5 Channel Output terminals and polarity is important.

   2 pins for each connection and total 10 connection pins. 4-20mA Analog Outputs

designed for 24V 250ohm load or 12V 125ohm load.

5. Input Channels for Slot 3 and 4: 8 Channel Input terminals and polarity is important. All inputs references to Common point. 2 Common points and 8 Analog Inputs total 10 connection pins. 0-10V and 0-20mA Individually Configurable during order (default is 0-20mA version) Analog Inputs.
6. 10/100Base-T(X) Ethernet ports

4.14 HUR741 & HUR841

1. Micro USB or USB Type-C Console port for LOG in 115200 baud

   Console Tx and Rx Blinks when data transmission occurs
2. Device Status LEDs

   STATUS: Blinks based on device operation

   - When TCP line used blinks during no connection and keeps ON after TCP connection

- When Serial line used keeps ON

Device Tx and Rx Blinks when data transmission occurs

SERVER: Keeps ON after selecting Server from Server-Client Operating Modes. Keeps OFF if Client operating Mode selected

S-1, S-2, S-3 and S-4: Turns On for 1 second and Turns OFF for 1 second under normal operation of I/O Interface. Each LED corresponds to related I/O Slot.

3. ETHERNET Activity LEDs for port 1, 2 and HUR device itself. Blinks during ethernet activity
4. Output Status LEDs for Slot 2: Shows which pin is ON (conducting) and OFF (cut off) for Digital Outputs for relevant Slot

LED Number	LED Status and Description
1	ON: Output ON, circuit is closed and running OFF: Output is OFF, circuit is open and cut off
2	
3	
4	
5	
6	
7	
8	

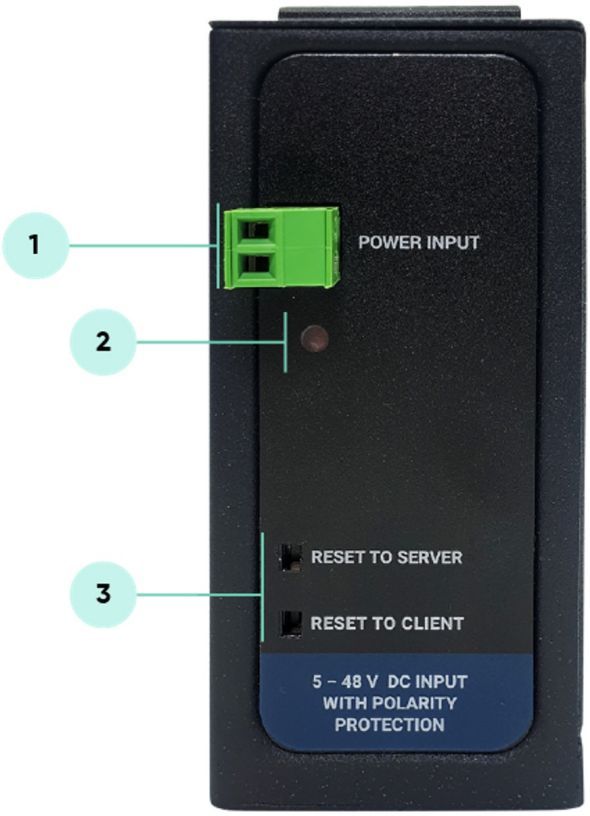
5. Output Channels for Slot 1: 5 Channel Output terminals and polarity is important. 2 pins for each connection and total 10 connection pins. 4-20mA Analog Outputs designed for 24V 250ohm load or 12V 125ohm load.
6. Output Channels for Slot 2: 8 Channel Output terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. Maximum 5 Amperes 250VAC/30VDC for each channel.
7. Input Channels for Slot 3: 8 Channel Input terminals and polarity is important. All inputs references to Common point. 2 Common points and 8 Analog Inputs total 10 connection pins. 0-10V and 0-20mA Individually Configurable during order (default is

0-20mA version) Analog Inputs.

8. Input Channels for Slot 4: 8 Channel Input terminals and polarity is not important. 2 pins for each connection and total 16 connection pins. 12-275 AC-DC, 60mA Digital Optocoupler Inputs.
9. 10/100Base-T(X) Ethernet ports

5. Top Panel Description

5.1 HUR158 & HUR168 & HUR358 & HUR558 & HUR595



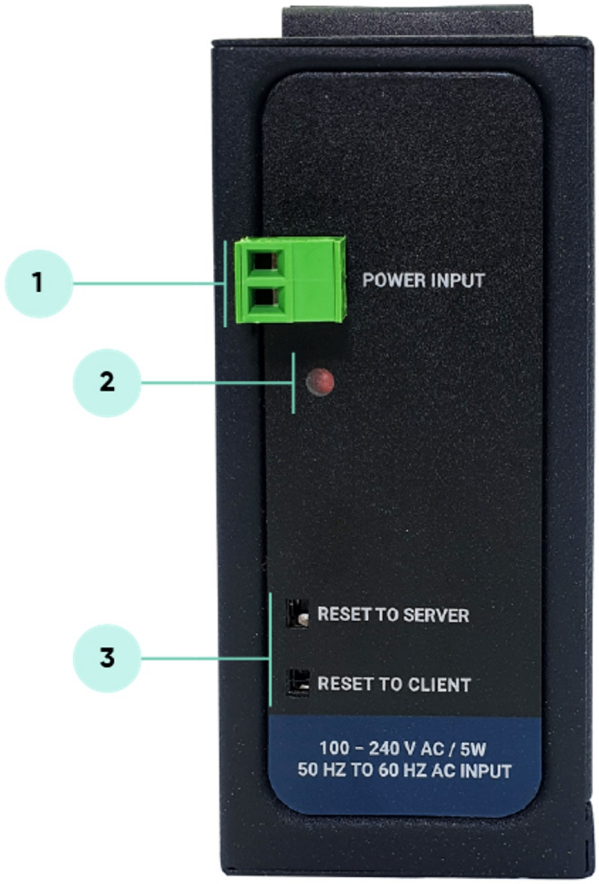
1. Power Input DC: 5-48V (allows up to 60V) DC. Polarity protected so that the power input can be connected in any direction
2. Power LED: Turns ON when there is power in device
3. Reset Buttons

   RESET TO SERVER: Resets the device to factory setting as Server from Server-Client Operating Modes

   RESET TO CLIENT: Resets the device to factory setting as Client from Server-Client Operating Modes

Reset can be done at any time by pushing any of the button for 5 seconds.

5.2 HUR258 & HUR268 & HUR458 & HUR658 & HUR695



1. Power Input AC: 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Input
2. Power LED: Turns ON when there is power in device
3. Reset Buttons

   RESET TO SERVER: Resets the device to factory setting as Server from Server-Client Operating Modes

   RESET TO CLIENT: Resets the device to factory setting as Client from Server-Client Operating Modes

   Reset can be done at any time by pushing any of the button for 5 seconds.

5.3 HUR711 & HUR712 & HUR713 & HUR714 & HUR715 & HUR721 & HUR722 & HUR725 & HUR741

1. Power Input DC: 5-48V (allows up to 60V) DC. Polarity protected so that the power input can be connected in any direction
2. Power LED: Turns ON when there is power in device
3. Reset Buttons

   RESET TO SERVER: Resets the device to factory setting as Server from Server-Client Operating Modes

   RESET TO CLIENT: Resets the device to factory setting as Client from Server-Client Operating Modes

   Reset can be done at any time by pushing any of the button for 5 seconds.

5.4 HUR811 & HUR812 & HUR813 & HUR814 & HUR815 & HUR821 & HUR822 & HUR825 & HUR841

1. Power Input AC: 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Input
2. Power LED: Turns ON when there is power in device
3. Reset Buttons

   RESET TO SERVER: Resets the device to factory setting as Server from Server-Client Operating Modes

   RESET TO CLIENT: Resets the device to factory setting as Client from Server-Client Operating Modes

   Reset can be done at any time by pushing any of the button for 5 seconds.

6. Ethernet Cables

HUR Series Modbus TCP Remote Input/Output (I/O) Deviceshave standard Ethernet ports. According to the link type, the switches use CAT 3, 4, 5, 5e UTP cables to connect to any other network device (PCs, servers, switches, routers, or hubs).

6.1 Cable Type and Specifications

Cable	Type	Max. Length	Connector
10BASE-T	Cat. 3, 4, 5 100-ohm	UTP 100 m (328 ft)	RJ-45
100BASE-TX	Cat. 5 100-ohm UTP	UTP 100 m (328 ft)	RJ-45

6.2 ETH Cable Pin Assignments

With 100BASE-TX/10BASE-T cable, pins 1 - 2 are used for transmitting data and pins 3 - 6 are used for receiving data.

Pin Number	Description
1	TD+
2	TD-
3	RD+
4	Not Used
5	Not Used
6	RD-
7	Not Used
8	Not Used

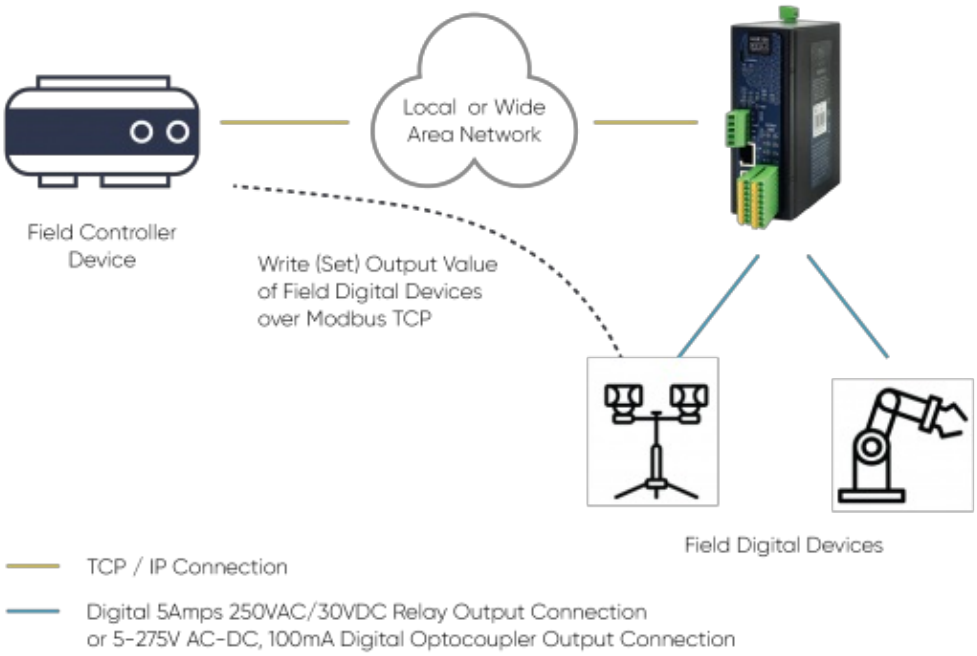
7. Usage Scenarios and Connection Diagrams

HUR Series Modbus TCP Remote I/O Devices can be used in different scenarios. Usages are not limited to that examples and user may create their own usage scenario.

6.1 Scenario 1: Write/Set Status of Digital Field Devices

HUR Series Modbus TCP Remote I/O Devices can be connected to Digital field devices and Field Control or Central Software Control System can write parameters such as Turn ON a light or Turn on a valve. Communication protocol will be Modbus TCP. Outputs will be 5-275V AC-DC, 100mA Digital Optocoupler Output or 5Amperes 250VAC/30VDC Relay Output. Following devices can be used for this application:

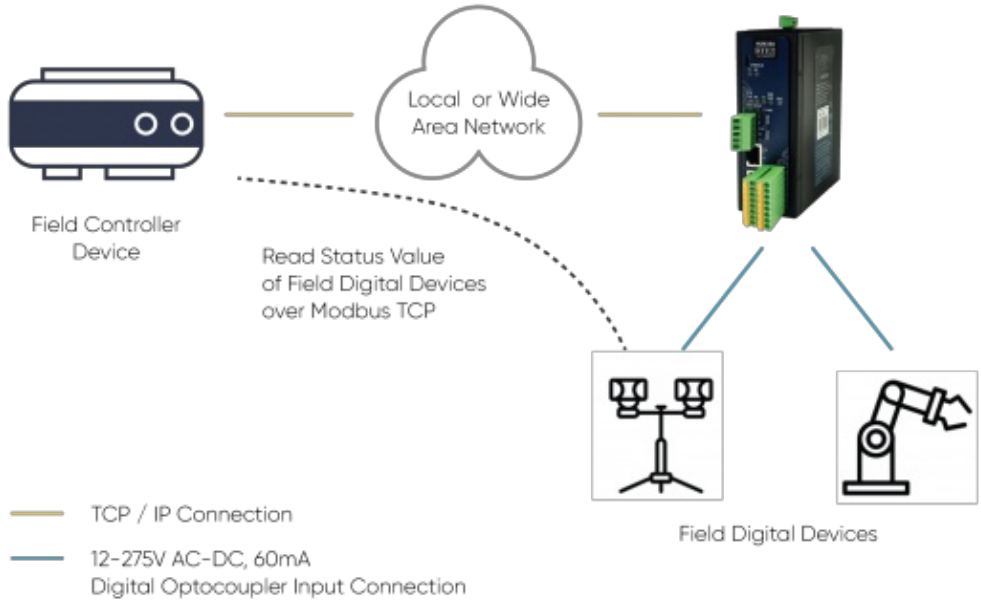
- HUR158 and HUR258 with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output
- HUR168 and HUR268 with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output



6.2 Scenario 2: Read Status of Digital Field Devices

HUR Series Modbus TCP Remote I/O Devices can be connected to Digital field devices and Field Control or Central Software Control System can read status of the field devices such as status of light or status of a circuit breaker. Communication protocol will be Modbus TCP. Inputs will be 12-275V AC-DC, 60mA Digital Optocoupler Input. Following devices can be used for this application:

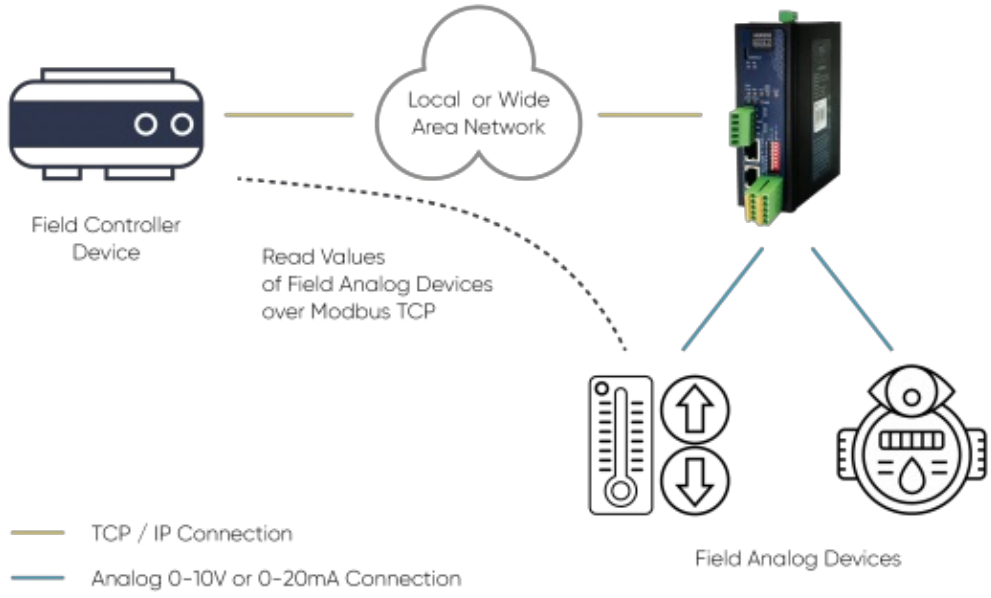
- HUR358 and HUR458 with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input



6.3 Scenario 3: Read Analog Field Devices

HUR Series Modbus TCP Remote I/O Devices can be connected to Analog field devices and Field Control or Central Software Control System can read status of the field devices such as status temperature sensors or pressure sensors. Communication protocol will be Modbus TCP. Inputs will be 0-10V and 0-20mA Selectable Analog Input. Following devices can be used for this application:

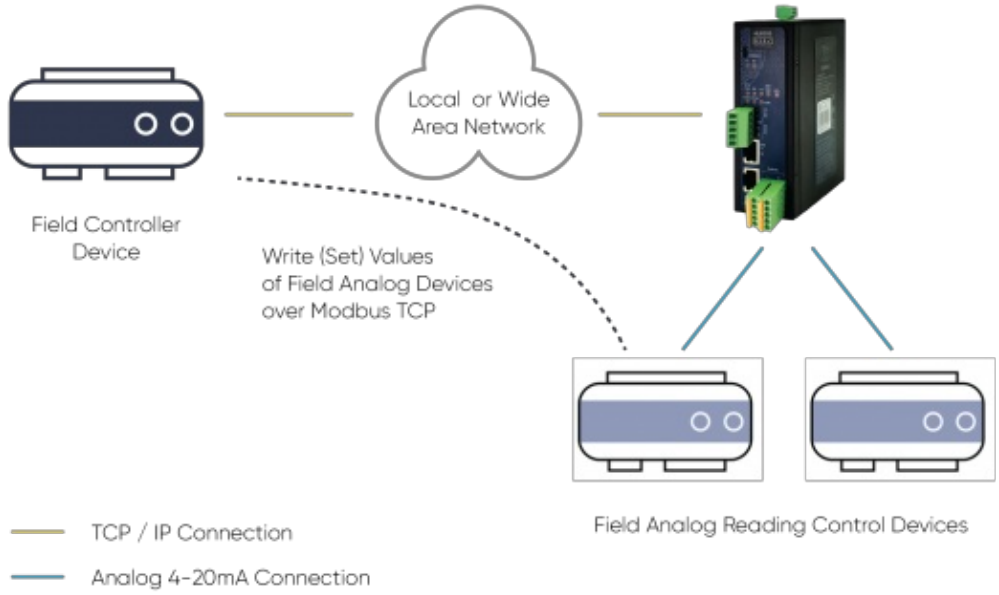
- HUR558 and HUR658 with 8 Channel 0-10V and 0-20mA Selectable Analog Input



6.4 Scenario 4: Write Analog Values for Field Control Devices

HUR Series Modbus TCP Remote I/O Devices can be connected to field control devices and Field Main Control or Central Software Control System can write Analog Values for that secondary field control devices such as duplicating or generating an analog value like flow of a fluid value for a field control device. Communication protocol will be Modbus TCP. Outputs will be 4-20mA Analog Output. Following devices can be used for this application:

- HUR595 and HUR695 with 5 Channel 4-20mA Analog Output



6.5 Scenario 5: Read Status of Digital Field Devices Over LoRa RF Wireless Network

REDZ TLM Series LoRa Based RF Gateways can link TCP/IP based devices and create a network over RF. For example, with TLM Series LoRa Based RF Gateways users can connect HUR Series Modbus TCP Remote I/O Devices with Field Control Devices over RF network and create wireless automation.

TLM act as TCP/IP to LoRa RF Gateway configured as Client Mode on HUR Series Modbus TCP Remote I/O Devices side to connect them actively and configured as Server Mode on Field Controller Device side to wait connection.

HUR Series Modbus TCP Remote I/O Devices can be connected to Digital field devices and Field Control or Central Software Control System can read status of the field devices such as status of light or status of a circuit breaker.

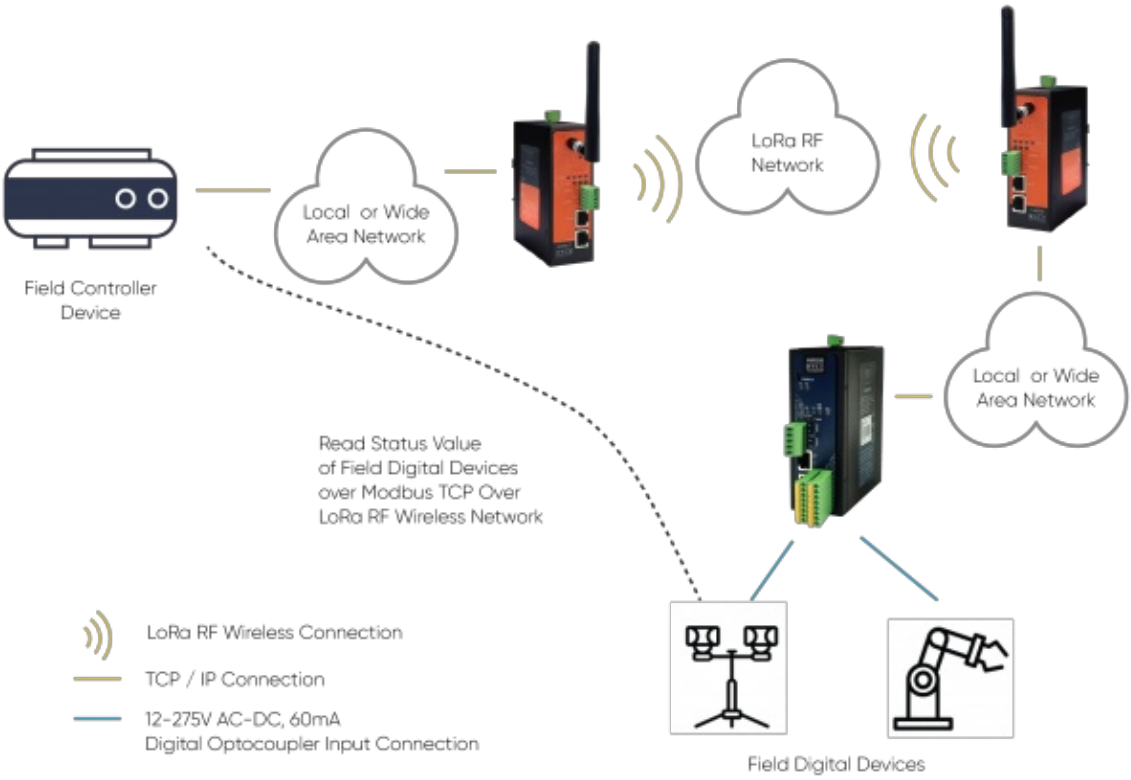
Communication protocol will be Modbus TCP over Lora RF Network thanks to TLM connection.

Inputs will be 12-275V AC-DC, 60mA Digital Optocoupler Input. Following devices can be used for this application:

- TLM154: 868MHz LoRa based gateway, 2x 10/100 T(x) ETH ports, 1 x RS232 & 1 x RS485, 5-60V DC Power Input
- TLM254: 868MHz LoRa based gateway, 2x 10/100 T(x) ETH ports, 1 x RS232 & 1 x RS485, 90 - 265V AC (100 – 370V DC), 47Hz to 63Hz AC Power Input
- TLM655: 868MHz LoRa based gateway, 2x 10/100 T(x) ETH ports + 1 x BPL (Broadband Power Line) Link, 1 x RS232 & 1 x RS485, 3 Phase AC Power Input, 110V–240V/50-60Hz

(User needs to create a Broadband Powerline Network with REDZ devices by using TLM or BSB series in order to use that model)

- HUR358 and HUR458 with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input



6.6 Scenario 6: Read/Write Field I/O Devices with Modbus TCP Protocol Over TCP/IP Network and Send Read Data to MQTT Server and Control Remote Output From MQTT Server

HUR Series Modbus TCP Remote I/O Devices can be connected to Analog field devices and Field Control or Central Software Control System can read status of the field devices such as status temperature sensors or pressure sensors.

Inputs will be 0-10V and 0-20mA Selectable Analog Input. Following devices can be used for this application:

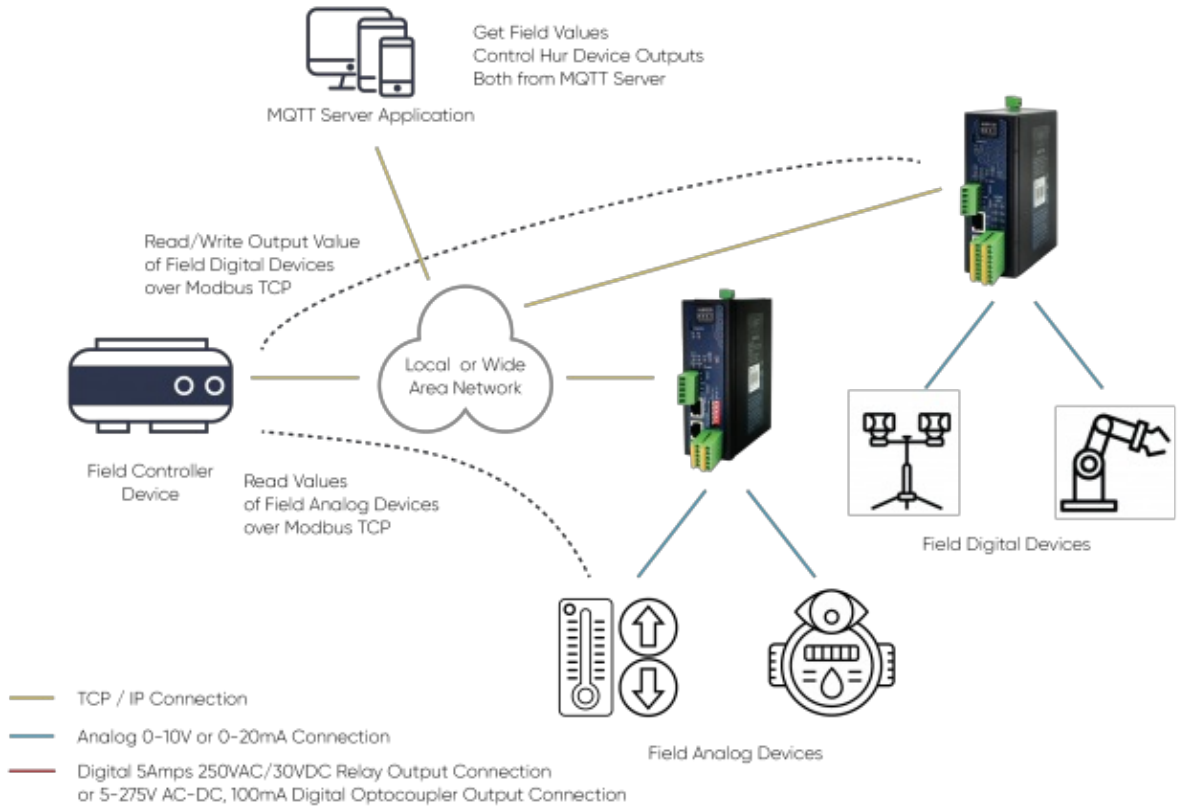
- HUR518 and HUR618 with 8 Channel 0-10V and 0-20mA Selectable Analog Input

HUR Series Modbus TCP Remote I/O Devices can be connected to Digital field devices and Field Control or Central Software Control System can write parameters such as Turn ON a light or Turn on a valve. Communication protocol will be Modbus TCP. Outputs will be 5-275V AC-DC, 100mA Digital Optocoupler Output or 5Amperes 250VAC/30VDC Relay Output. Following devices can be used for this application:

- HUR158 and HUR258 with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output

- HUR168 and HUR268 with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

All read data can be sent to MQTT server for web based applications. Also MQTT Server can control field device remotely via commands. Field device can read/write HUR Series Modbus TCP Remote I/O Devices, all can take palce in simultaneously.



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NOTE: HUR Series Modbus TCP Remote I/O Devices can be queried via Modbus TCP and send their data to MQTT Server simultaneously.

Thus, same HUR device can be used for field I/O device over Modbus TCP and getting I/O data from MQTT Server and even control output of HUR via MQTT Server.

6.7 Scenario 7: I/O Mirror Application Between 2 HUR Series Modbus TCP Remote I/O Devices

HUR Series Modbus TCP Remote I/O Devices Output versions can duplicate input value of Input versions. Outputs can be 5-275V AC-DC, 100mA Digital Optocoupler Output or 5Amperes 250VAC/30VDC Relay Output or 4-20mA Analog Output. Following devices can be used as output device for this application:

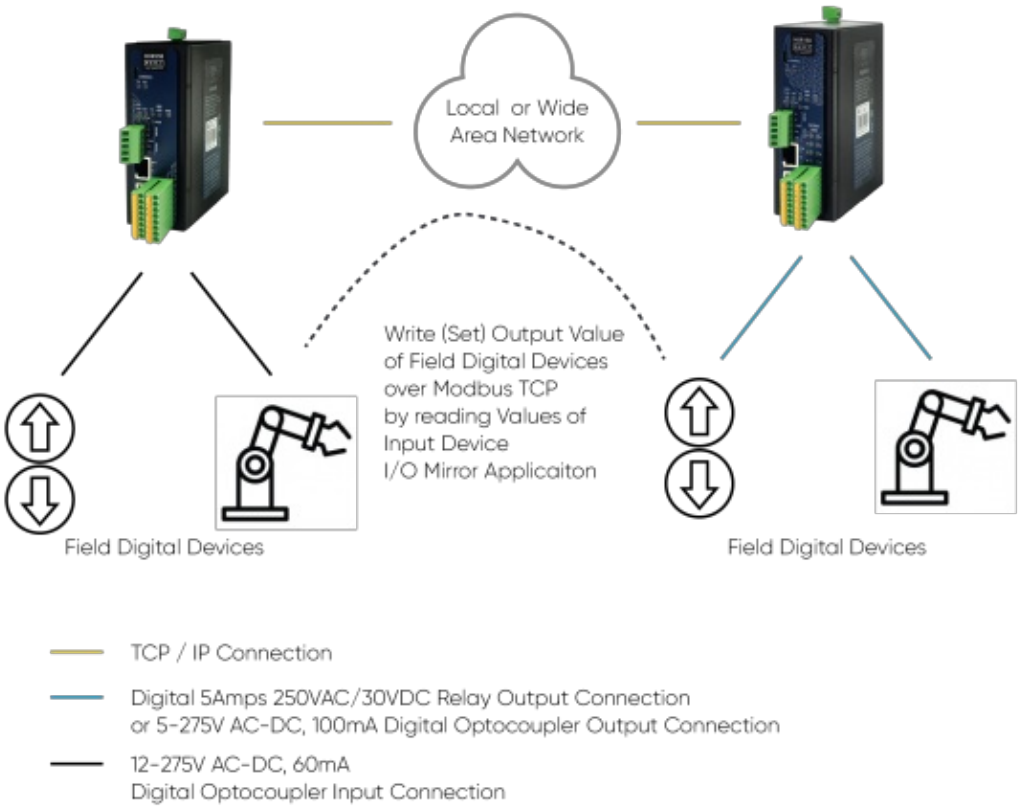
- HUR158 and HUR258 with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output
- HUR168 and HUR268 with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

- HUR595 and HUR695 with 5 Channel 4-20mA Analog Output

Inputs can be 12-275V AC-DC, 60mA Digital Optocoupler Input or 4-20mA Analog Input. Following devices can be used for this application:

- HUR358 and HUR458 with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input
- HUR558 and HUR658 with 8 Channel 0-10V and 0-20mA Selectable Analog Input

As expected, Analog devices can pair with each other and Digital devices can pair with each other.



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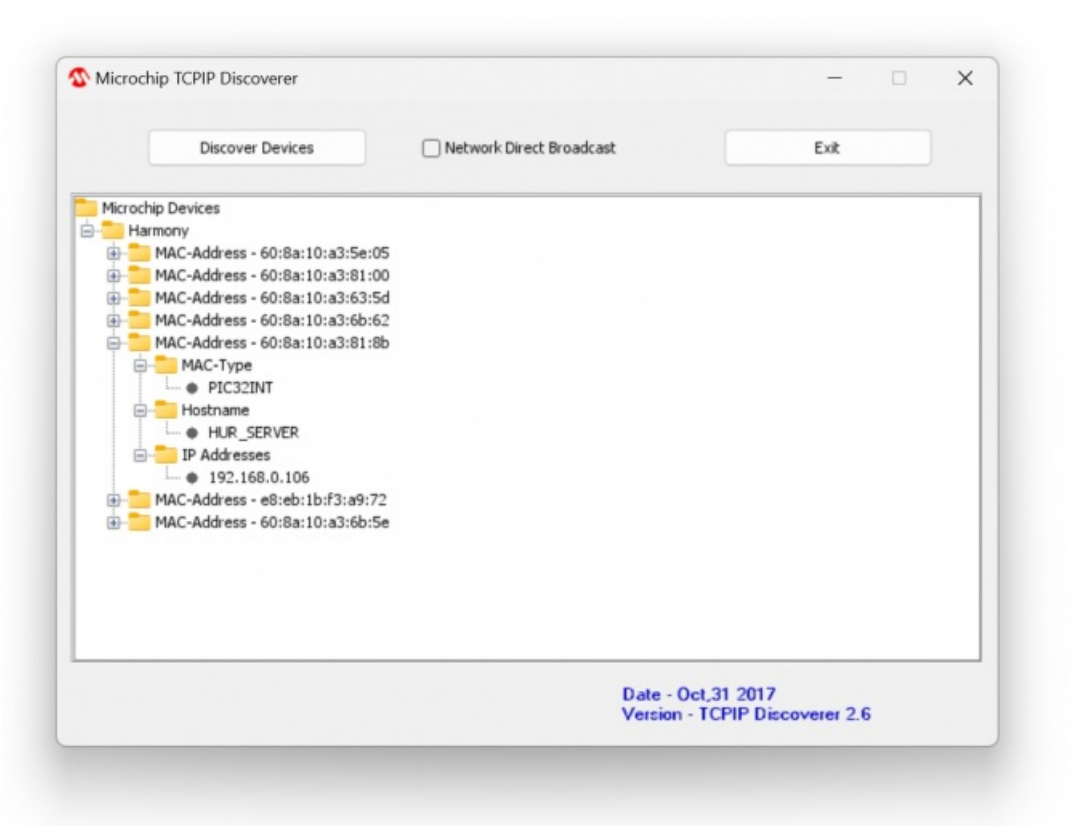
NOTE: I/O Mirror Application can be done between same I/O devices which means Analog devices can pair with each other and Digital devices can pair with each other.

8. Configuration via WEB Interface

HUR Series Modbus TCP Remote I/O Devices can be configured over web interface.

Device will get IP from DHCP client when connected to a network. User can use discovery tool to see IP of the device.

Once the IP of the device is set, user may login the device by simply typing the Ip address of device.



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NOTE 1: HUR default firmware runs with DHCP off and expects an IP lease. If user need static IP or prefers DHCP on during start up, additional firmware is available.

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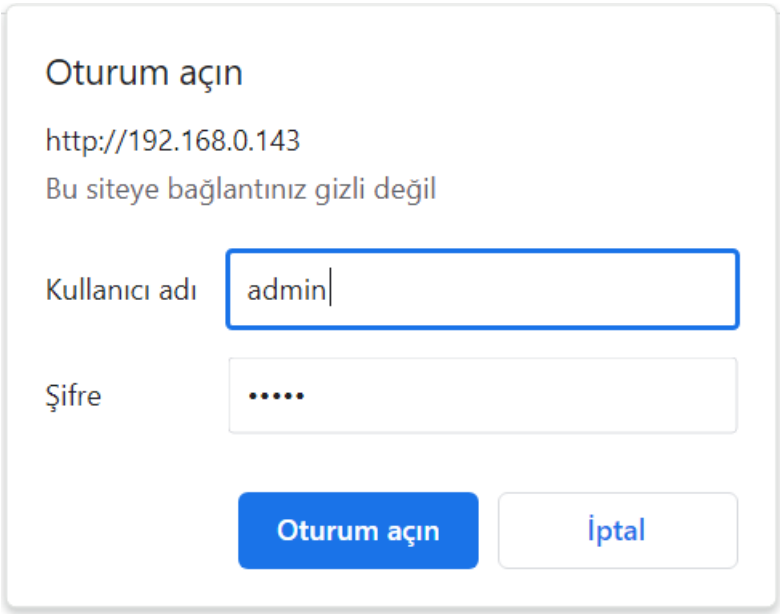
NOTE 2: If there is no DHCP server in LAN, REDZ device will get default 192.168.1.1 IP if it is set as Server Mode. It will get default 192.168.1.100 IP if it is set as Client mode.

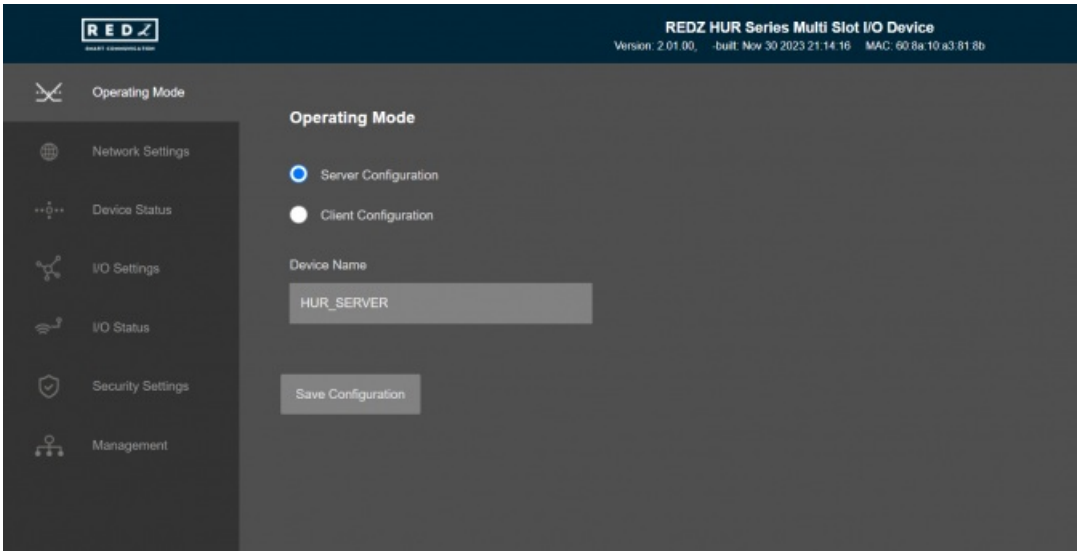
10.1 Connecting Web Interface

Simply write IP of the device to the http client. Google Chrome is suggested to use. Login screen will pop up.

Default user name: **admin**
Default password: **admin**



Main screen of device will appear with following information:



Firmware Info, MAC details and Device Name on top

Menu Items on left

Menu Item details in center

10.2 MENU: Operating Mode

From this menu user may select the operating mode of the device.

There are 2 different Operating Modes:

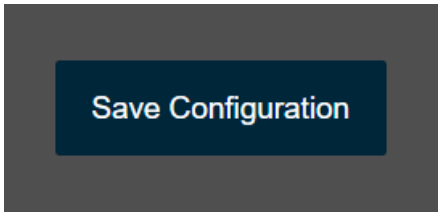
Server Configuration act as TCP Server Device with MQTT Publisher

Client Configuration act as TCP Client Device

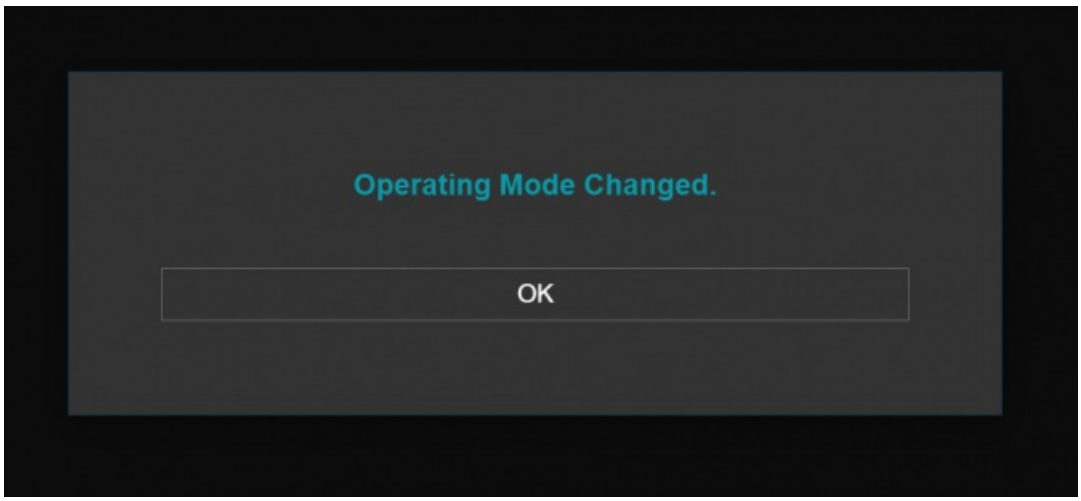
- Set "Server Configuration" to read or control Input/Output (I/O) values of device over Modbus TCP and/or send meter data to MQTT Server.
- Set "Client Configuration" to read or control Input/Output values of device over Modbus TCP but this time client will connect to remote IP by itself. This is also used in I/O Mirror applciation to connect remote I/O device.

"Device Name" field is used to identify device.

When all settings done, click "Save Configuration" to save settings.



After clicking button system will tell if the settings applied successfully or not.



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NOTE 1: HUR Series Modbus TCP Remote I/O Devices can keep configuration of 2 different modes in its memory and once the configuration enabled, its already saved settings will be applied. Device can act as Server or Client at a time.

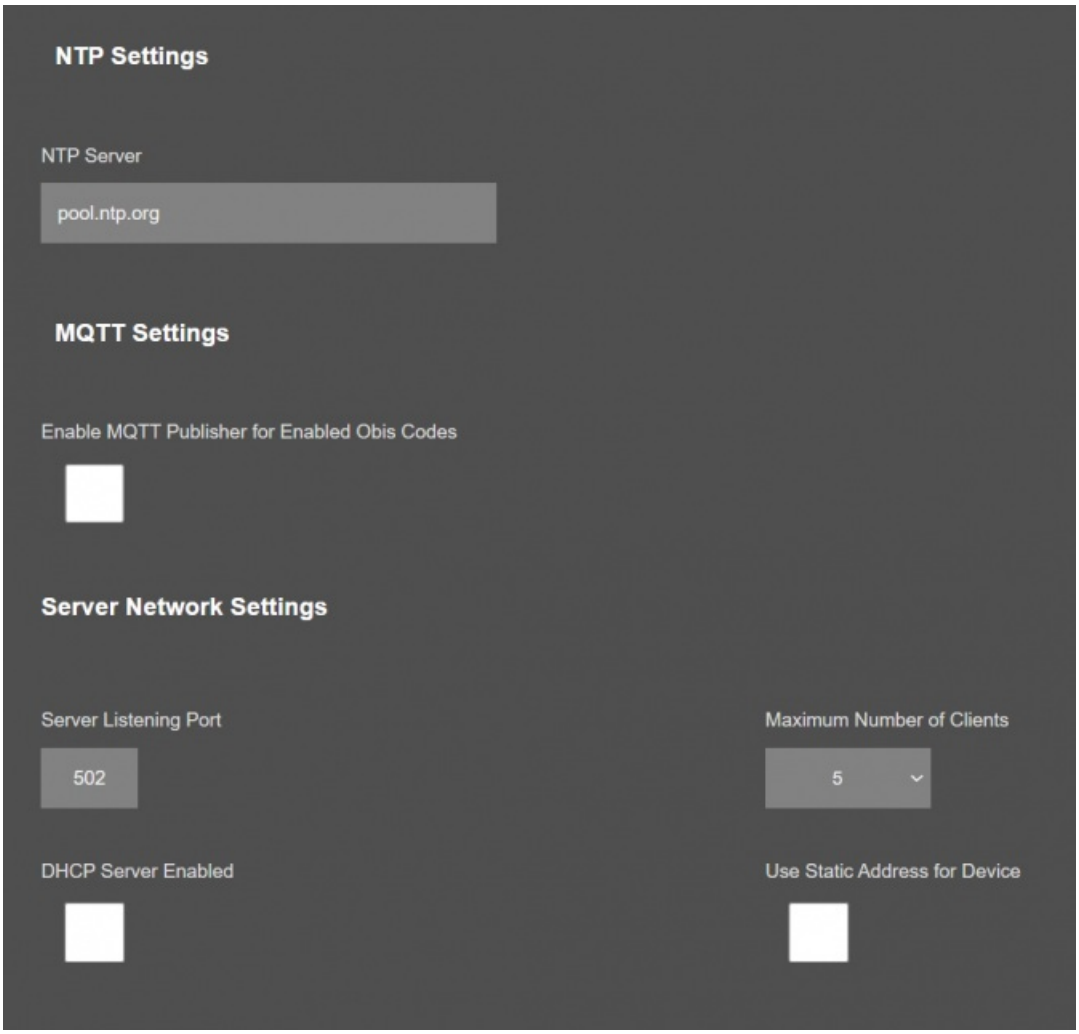
☝

NOTE 2: Settings will be applied once the device is rebooted from web interface or repowered manually.

10.3 MENU: Network Settings - Server

From this menu user may change the network settings of the device.

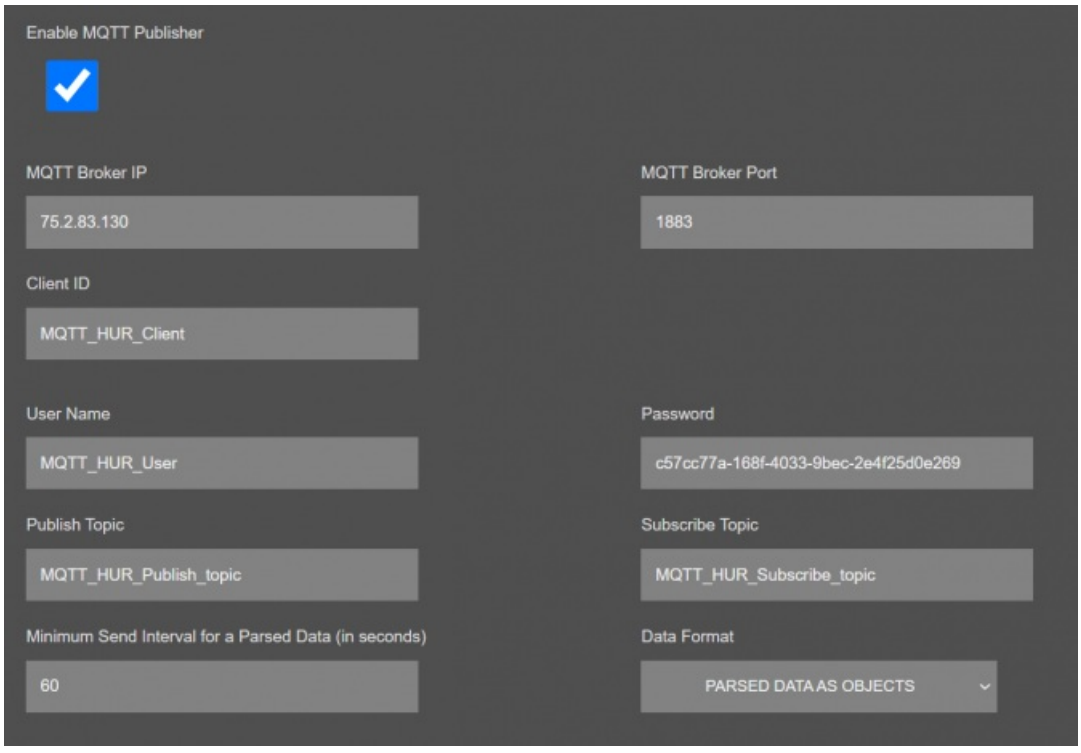
- User can change NTP Server address that used in MQTT data transmission.
- User can activate MQTT Publisher mode and change settings for MQTT data tranmission.
- User can change TCP Listening port for field devices.
- User can select maximum number of clients allowed to connect device.
- User can activate DHCP server.
- User can force device to a static IP.



"NTP Server": NTP Server address that used in MQTT data transmission.

"Enable MQTT Publisher for Enabled Obis Codes": Click to enable MQTT Publisher. HUR will send data read from meters for enabled OBIS codes (there are up to 48 available) to MQTT Server

If "Enable MQTT Publisher for Enabled Obis Codes" is checked, following settings will be shown.



"MQTT Broker IP": TCP IP of the MQTT Server. User must enter IP value
Ex: 75.2.83.130 is for "https://tago.io/" web address

"MQTT Broker Port": TCP Port of the MQTT Server.
Ex: 1883 is for "https://tago.io/" web address

"Client ID": MQTT Publisher client ID. Default is "MQTT_HUR_Client".
Maximum length for this field is 32.

"User Name": MQTT Publisher user name. This must be entered based on MQTT server settings.
Maximum length for this field is 64.

"Password": MQTT Publisher password. This must be entered based on MQTT server settings.
Maximum length for this field is 48.

"Publish Topic": MQTT Publisher topic value. Default is "MQTT_HUR_Publish_topic".
Maximum length for this field is 32.

"Subscribe Topic": MQTT Publisher subscribe topic value. Default is
"MQTT_HUR_Subscribe_topic".
Maximum length for this field is 32.

"Minimum Send Interval for a Parsed Data (in seconds)": Minimum value to send meter data to MQTT Server. This time may be longer due to meter quantity in reading queue.

"Data Format": Options for how data is shared by HUR with MQTT server. There are 2 options:

Parsed Data as Objects

Parsed Data as Modbus Frame

When selected as "Parsed Data as Objects", HUR will share data as follows

Device Name, Device Model, NTP Time and Data itself in pairs as IO number and its value.

Device Model Can be:

"Analog Out"
"Digital Out"
"Analog In"
"Digital In"

Here is an example for "Digital Out"

11:04:49:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701417889\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"1\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"1\",\"IO8\":\"1\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701417889\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"1\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"1\",\"IO8\":\"1\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

"IO1" is the first one and its value is shown as "1"
Which means digital out value for 1st port is "1" or "ON".
Next values can be seen in same manner.

Here is an example for "Digital In"

12:13:54:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701422033\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701422033\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

"IO1" is the first one and its value is shown as "1"
Which means digital out value for 1st port is "1" or "ON".
Next values can be seen in same manner.

Here is an example for "Analog Out"

12:03:13:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701421393\",\"Data\":{\"IO1\":\"1F4\",\"IO2\":\"64\",\"IO3\":\"3E8\",\"IO4\":\"64\",\"IO5\":\"32\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701421393\",\"Data\":{\"IO1\":\"1F4\",\"IO2\":\"64\",\"IO3\":\"3E8\",\"IO4\":\"64\",\"IO5\":\"32\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

"IO1" is the first one and its value is shown as "1F4"
Which means analog out value for 1st port is "500" in decimal within a range of 0-1000. Which means port 1 value is "12.0mA".
Next values can be seen in same manner.

Here is an example for "Analog In"

12:09:07:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"IO1\":\"7F3B\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"IO1\":\"7F3C\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

"IO1" is the first one and its value is shown as "7F3C"
Which means analog out value for 1st port is "32572" in decimal within a range of 0-65535.
Which means port 1 value is "10.0mA".
Next values can be seen in same manner.

When selected as "Parsed Data as Modbus Frame", HUR will share data as follows

Device Name, Device Model, NTP Time and Data itself in hexadecimal format just like a Modbus query response. First byte will show data bytes count and rest is the data itself. Data will be in similar formta with how the device responds when read via Modbus commands.

Here is an example for "Digital Out"

11:11:47:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701418305\",\"Data\":{\"ModFr\":\"01C3\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701418305\",\"Data\":{\"ModFr\":\"01C3\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

01 in beginning is hexadecimal equivalent for 1 byte data count

Next is the value of 8 ports which is "C3"
Binary equivalent of hec C3 is "11000011"

This means

Port 1 value is "1"
Port 2 value is "1"
Port 3 value is "0"
Port 4 value is "0"
Port 5 value is "0"
Port 6 value is "0"
Port 7 value is "1"
Port 8 value is "1"

The 1st bit is port 1 value and 8th bit is port 8 value.

Here is an example for "Digital In"

11:58:33:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701421113\",\"Data\":{\"ModFr\":\"0101\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701421113\",\"Data\":{\"ModFr\":\"0101\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

01 in beginning is hexadecimal equivalent for 1 byte data count
Next is the value of 8 ports which is "01"
Binary equivalent of hec C3 is "00000001"

This means

Port 1 value is "1"
Port 2 value is "0"
Port 3 value is "0"
Port 4 value is "0"
Port 5 value is "0"
Port 6 value is "0"
Port 7 value is "0"
Port 8 value is "0"

The 1st bit is port 1 value and 8th bit is port 8 value.

Here is an example for "Analog Out"

11:16:48:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701418608\",\"Data\":{\"ModFr\":\"0A01F4006403E800640032\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701418608\",\"Data\":{\"ModFr\":\"0A01F4006403E800640032\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

0A in beginning is hexadecimal equivalent for 10 bytes data count. Each value is 2 bytes, for 5 ports Analog out device, there are 10 bytes.
Next 2 bytes are the value of port 1 which is "01F4"
That means "500" in decimal and that is equal to "12.0mA" in a range of 0-1000.

Next values can be seen in same manner.

Here is an example for "Analog In"

11:46:22:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"ModFr\":\"107FBE00000000000000000000000000000\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"ModFr\":\"107FBE00000000000000000000000000000\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

10 in beginning is hexadecimal equivalent for 10 bytes data count. Each value is 2 bytes, for 8 ports Analog in device, there are 16 bytes.
Next 2 bytes are the value of port 1 which is "7FBE"
That means "32702" in decimal and that is equal to "9.98mA" in range 0-65535.

Next values can be seen in same manner.

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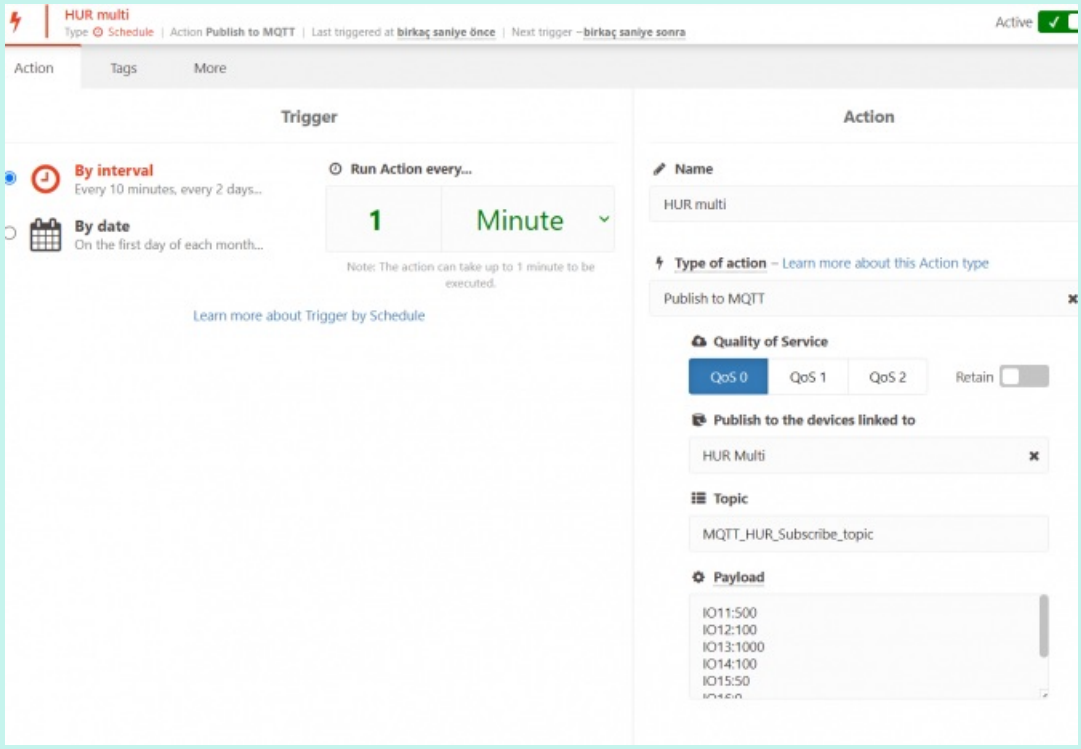
NOTE: Analog Out and Digital Out models can also be controlled via MQTT server.

Format will be as follows:

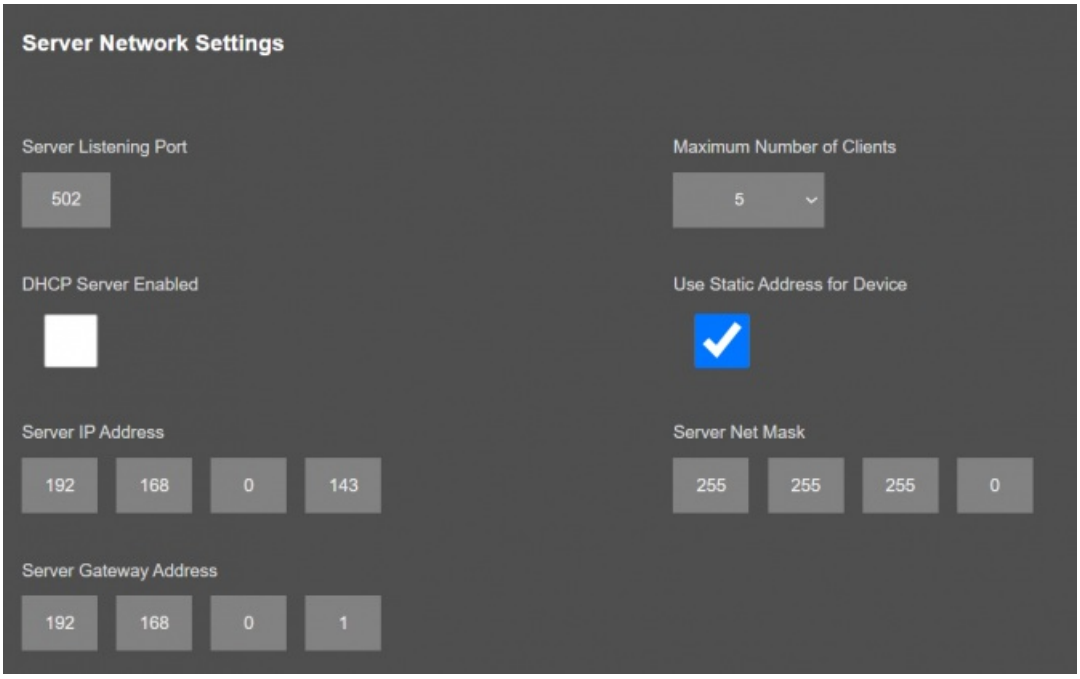
IO11:500

Letters 'I' and 'O', then Slot number '1' (always 1 for single Slot devices and can be 1-2-3-4 for multi slot device), then ':' and then the value which is a value between range 0-1000 for Analog output version and 0 or 1 for Digital out version. User can write multiple commands and those must be seperated with new line '\n' or 0x0D in hexadecimal format.

Here is screenshot for an example:



Following parameters and static IP settings available for “Server Network Settings” part.

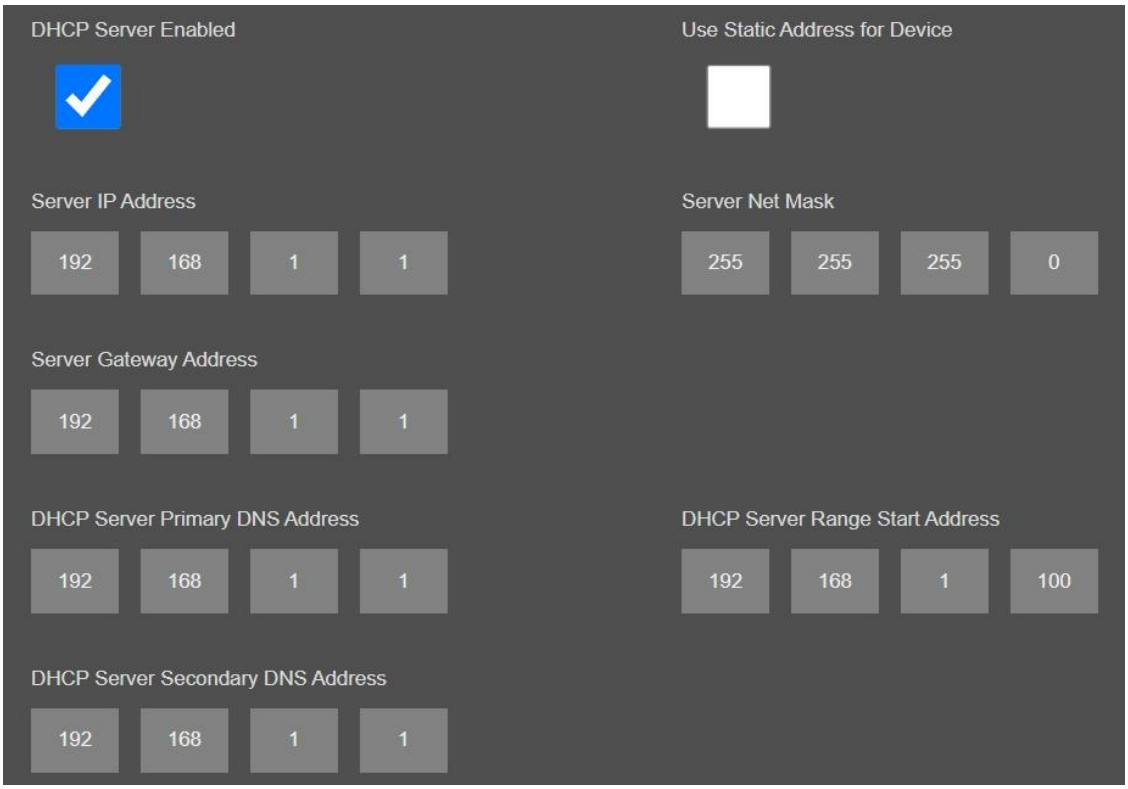


"Listening Port": TCP Port that HUR uses for incoming connections. Remote devices can use HUR IP and this port to connect to HUR for Modbus TCP query.

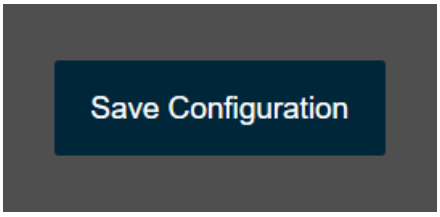
"Maximum Number of Clients": Maximum numbers of incoming connections accepted. HUR can accept up to 10 simultaneous connection and all devices can query Modbus TCP.

"Use Static Address for Device": Set a static TCP IP for HUR from this part. Enable and enter network settings and HUR will be available to connect from this static IP locally or remotely (gateway must be set properly for remote WAN connection).

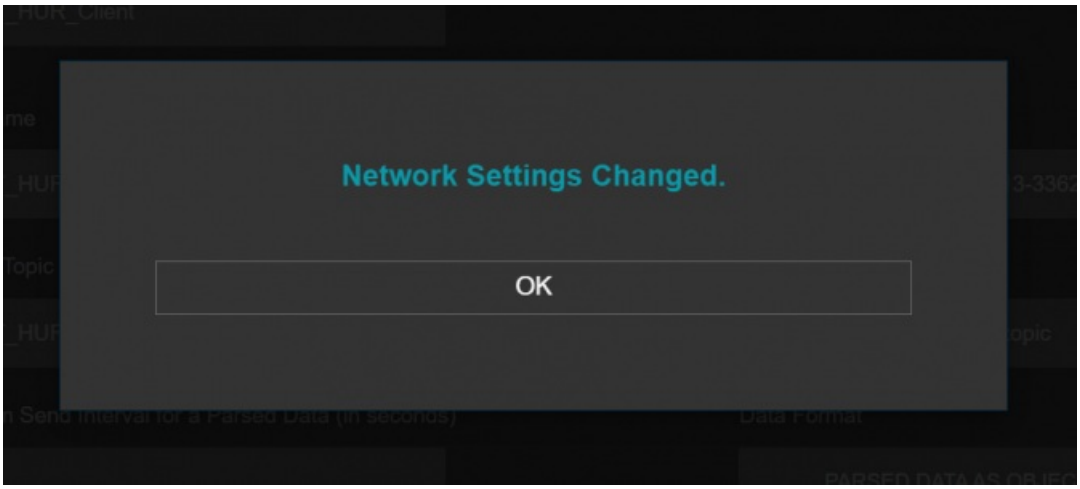
Following parameters available if “DHCP Server” setting is enabled. This is used if DHCP server is needed in network. HUR can distribute IP to field devices connected to it in this way.



Once the setting has been changed, “Save Configuration” button will be enabled.



After clicking button system will tell if the settings applied successfully or not.



☝

NOTE 1: HUR Series Modbus TCP Remote I/O Devices can keep configuration of 2 different modes in its memory and once the configuration enabled, its already saved settings will be applied. Device can act as Server or Client at

a time.

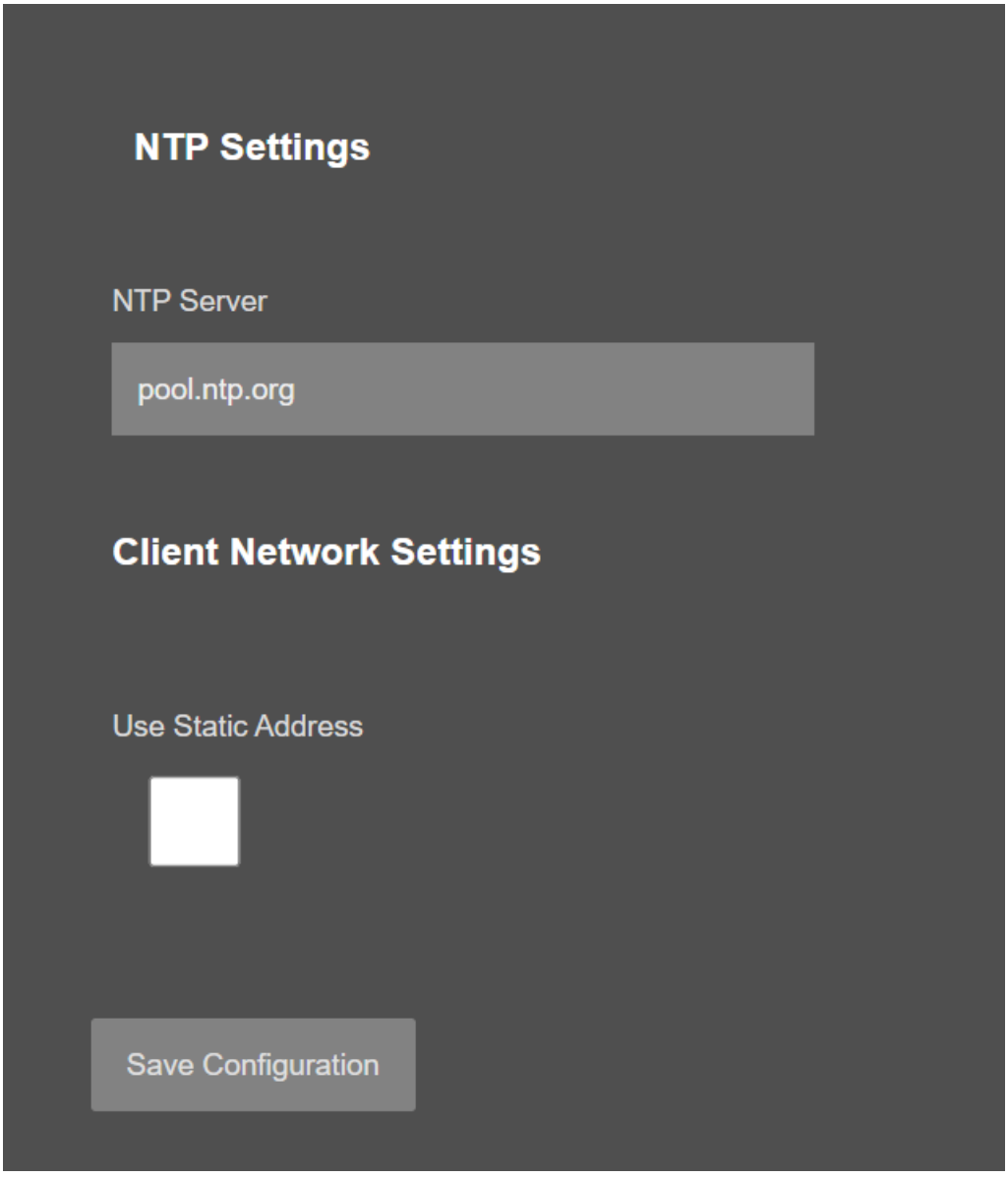
☝

NOTE 2: Settings will be applied once the device is rebooted from web interface or repowered manually.

10.4 MENU: Network Settings - Client

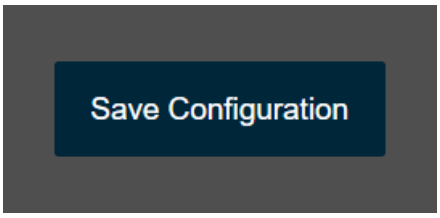
From this menu user may change the network settings of the device.

- User can change NTP Server address that used in MQTT data transmission.
- User can force device to a static IP.

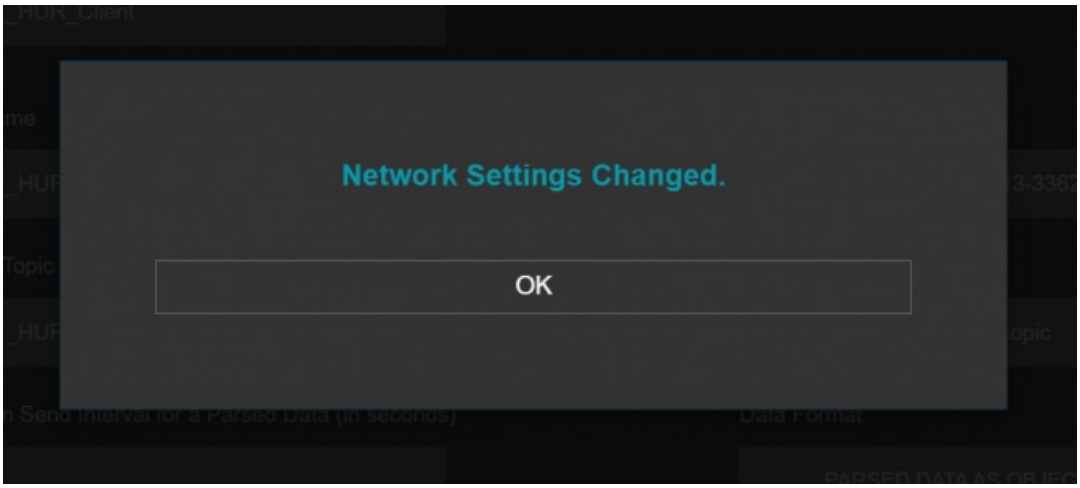


"NTP settings" and "Client Network Settings" are done in same way like in "Network Settings" for "Server Configuration" explained in item 10.3.

Once the setting has been changed, “Save Configuration” button will be enabled.



After clicking button system will tell if the settings applied successfully or not.



☝

NOTE 1: HUR Series Modbus TCP Remote I/O Devices can keep configuration of 2 different modes in its memory and once the configuration enabled, its already saved settings will be applied. Device can act as Server or Client at a time.

☝

NOTE 2: Settings will be applied once the device is rebooted from web interface or repowered manually.

10.5 MENU: Serial Settings - Single Slot Devices Only

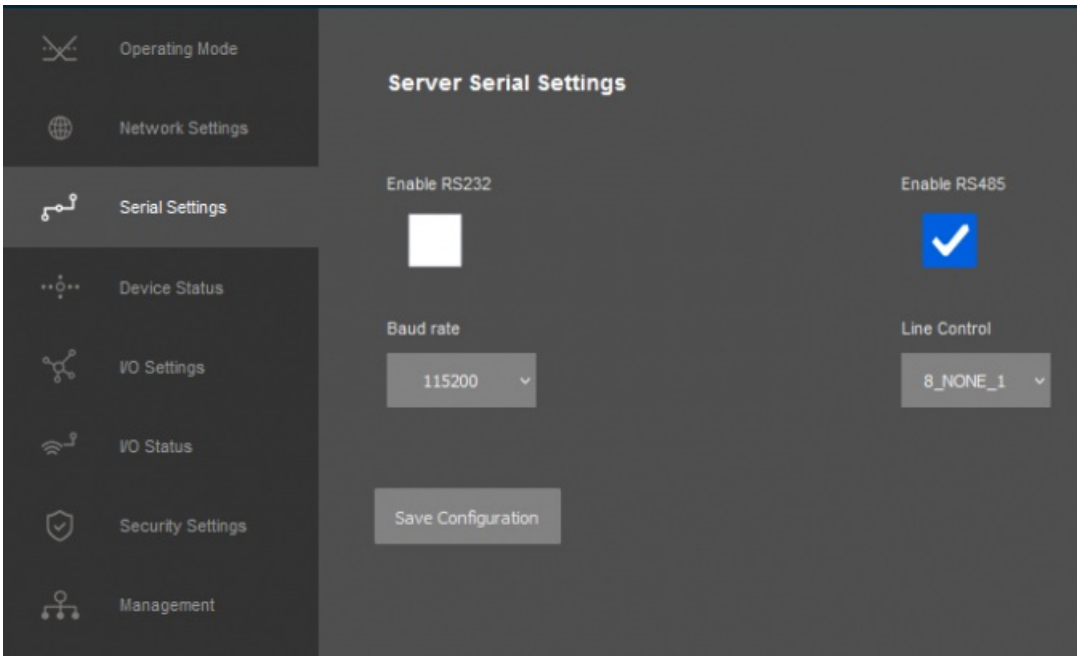
HUR Series Modbus TCP Remote I/O Devices can be single slot device or multi slot devices.

This menu is shown only if HUR is set "Client Configuration" and the device has single slot.

HUR Series Modbus TCP Remote I/O Devices can direct the Modbus TCP message to serial line if the Modbus Id of received package do not match with HUR own Modbs uld thus it can be used as Modbus TCP to Modbsu RTU gateway.

From this menu user may select RS232 or RS485 connection for Modbus RTU communication with another device in field.

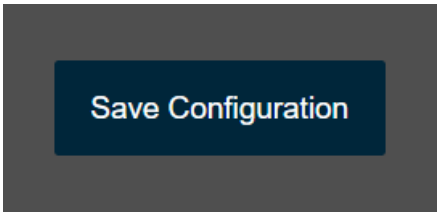
- User can select RS232 line and can set baud rate and data type for serial line.
- User can select RS485 line and can set baud rate and data type for serial line.



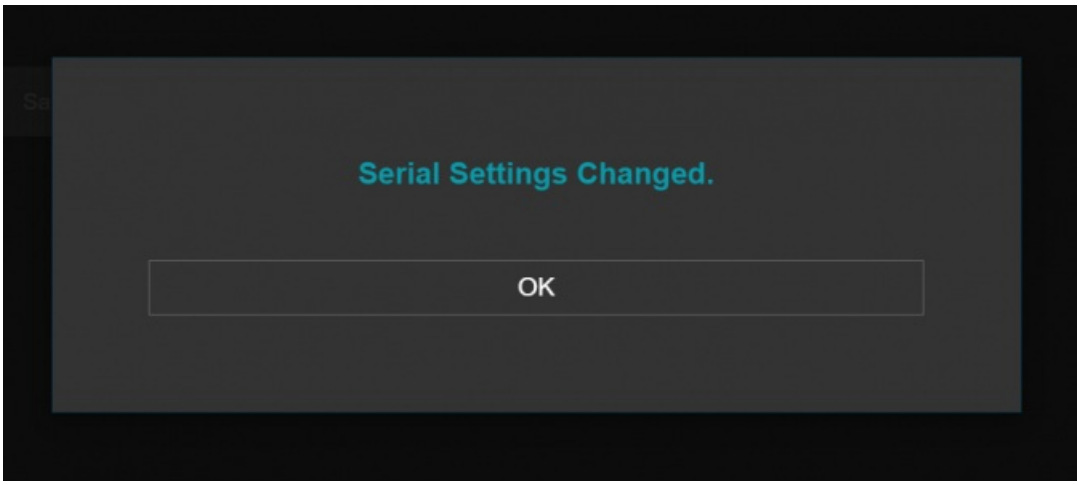
"Baud rate": Serial communication baud rate selection.

"Line Control": Serial communication data type selection in form of Data bits-Parity-Stop bits. Available options are:
8_NONE_1
9_NONE_1
8_EVEN_1
8_EVEN_2
8_ODD_1
8_ODD_2
8_NONE_2
9_NONE_2

Once the setting has been changed, "Save Configuration" button will be enabled.



After clicking button system will tell if the settings applied successfully or not.



☝

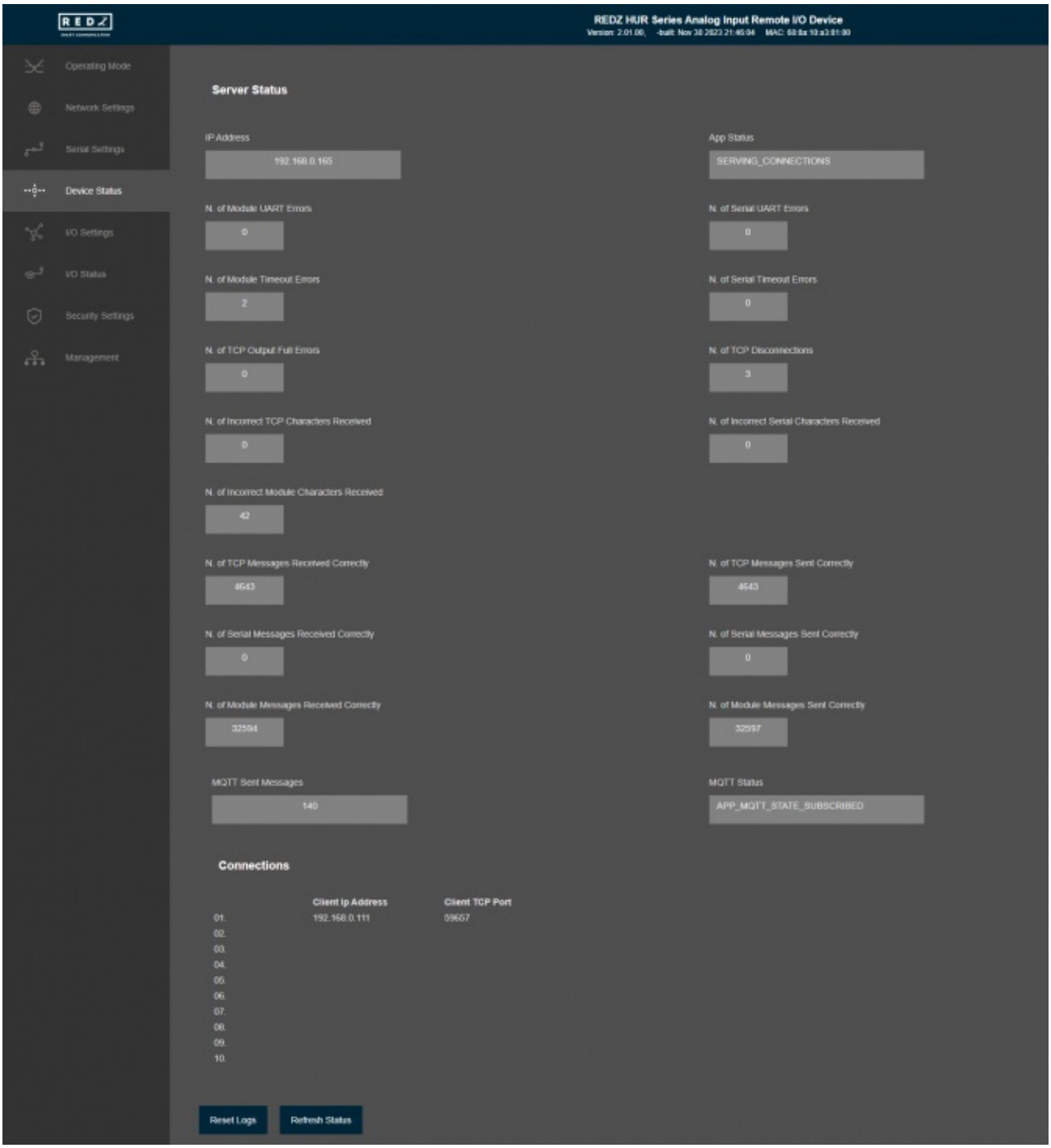
NOTE 1: Settings will be applied once the device is rebooted from web interface or repowered manually.

☝

NOTE 2: This page is only available for Single Slot HUR Devices.

10.6 MENU: Device Status

From this menu user may monitor device status and statistics based on operating mode of device. The page also helps users to check connections and modbus communication status.



In "Device Status" part:

"IP Address": TCP/IP address of HUR itself.

"App Status": It shows current status of HUR application. "SERVING CONNECTIONS" means device is ready for normal operation.

"Log Status": It is only available when "Log" is enabled from "Management" menu and shows current status of HUR logging. "LOG_STATE_TRYWRITELOG" means normal operation.

"Log Counter": It is only available when "Log" is enabled from "Management" menu and shows how many log lines has been transfered till now.

"N. of Module UART Errors": Number of Module (I/O) side uart errors. Device will enter "Reboot State" if this number is above 20.

"N. of Serial UART Errors": Number of Serial side uart errors both on RS232 and RS485. Device will enter "Reboot State" if this number is above 20.

"N. of Module Timeout Errors": Number of Module (I/O) side time out errors during waiting respond for Modbus command.

"N. of Serial Timeout Errors": Number of Serial side time out errors during waiting respond for Modbus command both on RS232 and RS485.

"N. of TCP Output Full Errors": Number of TCP output full errors during trying to send data to TCP client. Device will enter "Reboot State" if this number is above 5.

"N. of TCP Disconnections": Number of TCP disconnections from HUR.

"N. of Incorrect Module Characters Received": Number of Module (I/O) side incorrect chars received as Modbus response frame which cannot be recognized by HUR device. Device will enter "Reboot State" if this number is higher than maximum allowed incorrect chars.

"N. of TCP Messages Received Correctly": Number of Modbus TCP messages received by HUR over TCP/IP.

"N. of TCP Messages Sent Correctly": Number of Modbus TCP messages sent by HUR over TCP/IP.

"N. of Serial Messages Received Correctly": Number of Modbus RTU messages received by HUR over RS232 or RS485 Serial lines.

"N. of Serial Messages Sent Correctly": Number of Modbus RTU messages received by HUR over RS232 or RS485 Serial lines.

"N. of Module Messages Received Correctly": Number of Modbus RTU messages received by HUR from Module (I/O) side.

"N. of Module Messages Sent Correctly": Number of Modbus RTU messages sent by HUR to Module (I/O) side.

"MQTT Sent Messages": It is only available when "MQTT" is enabled from "Network Settings" menu and shows how many MQTT messages has been transfered till now.

"MQTT Status": It is only available when "MQTT" is enabled from "Network Settings" menu and shows current status of HUR MQTT Publisher. "APP_MQTT_STATE_SUBSCRIBED" means MQTT publisher is ready for normal operation.

In "Connections" part:

"Client Ip Address": Is the TCP IP address of client connected to HUR.

"Client TCP Port": Is the TCP Port number of client connected to HUR.

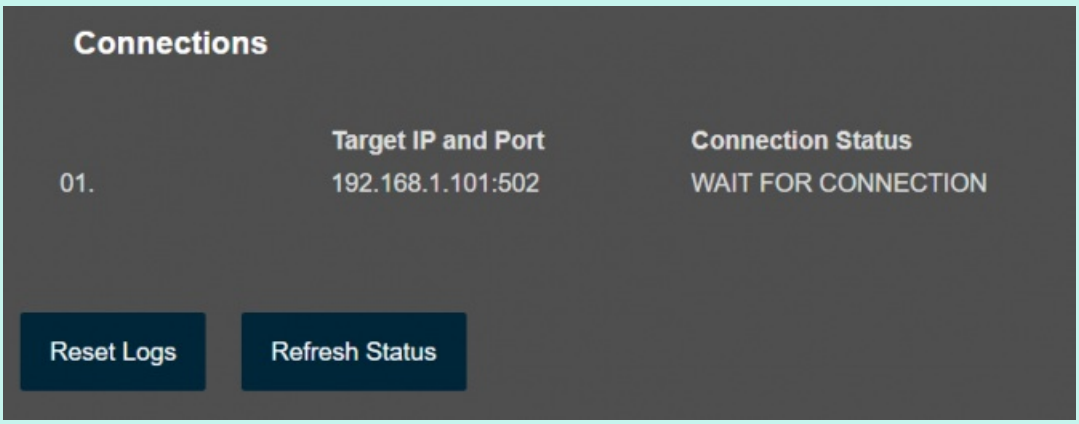
After clicking “Refresh Status” button, system will reload data only and will not reload page. Button will be disabled during reload for an instance. If timeout occurs during the reload, the button will be enabled again with warning of timeout. In normal operation reload of status data will be done immediately. "Reset Logs" button will reset device status parameres.

NOTE 1: "Modbus Communication Status" will list based on "Maximum Number of Clients" set in "Network Settings" menu.

☝

NOTE 2: "Client Operation Mode" has similar status menu. In client configuration HUR will connect remote TCP IP Modbus device.

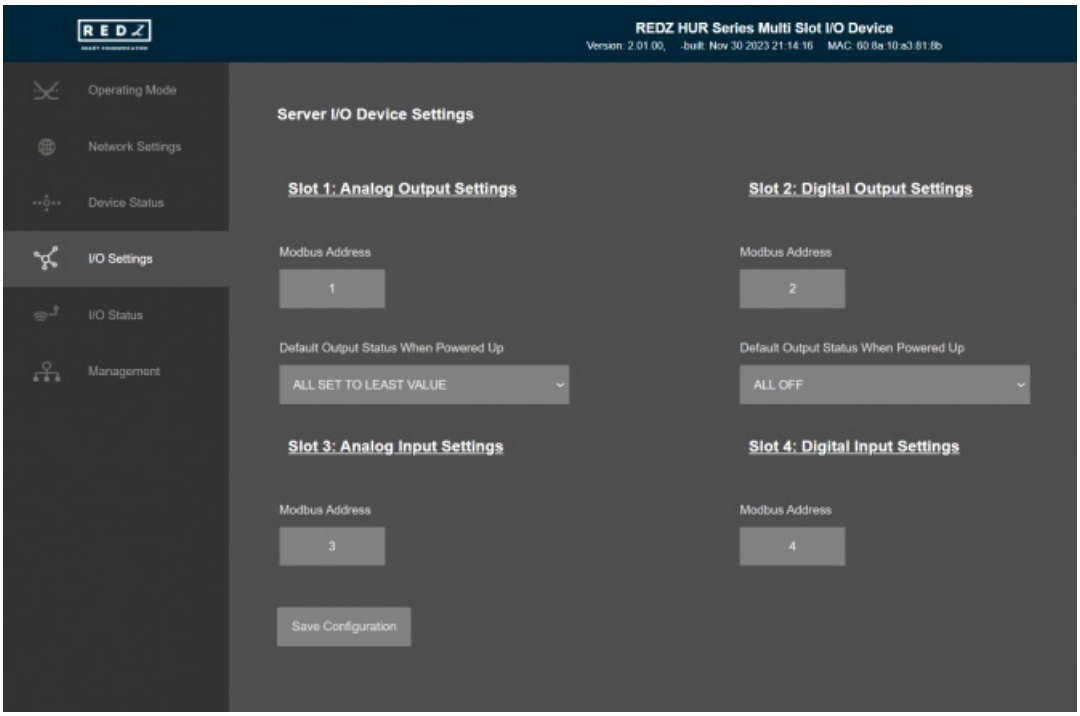
Thus in "Connections" part, HUR will show target ip and port in "Target IP and Port" part and will show connection status in "Connection Status" part.



10.7 MENU: I/O Settings

From this menu user may change Input/Output (I/O) parameters.

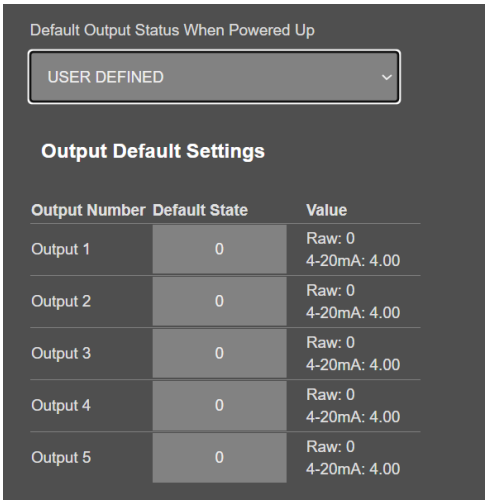
- Modbus Address of HUR I/O Slot can be changed
- For output devices "Default Output Status When Powered Up" can be changed
- Only in "Client" Operating Mode, "Remote Device IP Address" and "Remote Device TCP Port" that the device will connect be changed
- Only in "Client" Operating Mode and only for output devices, user can enable "I/O Mirror" functionality and can change "Remote Input Device Modbus Address" that the ports will be mirrored.



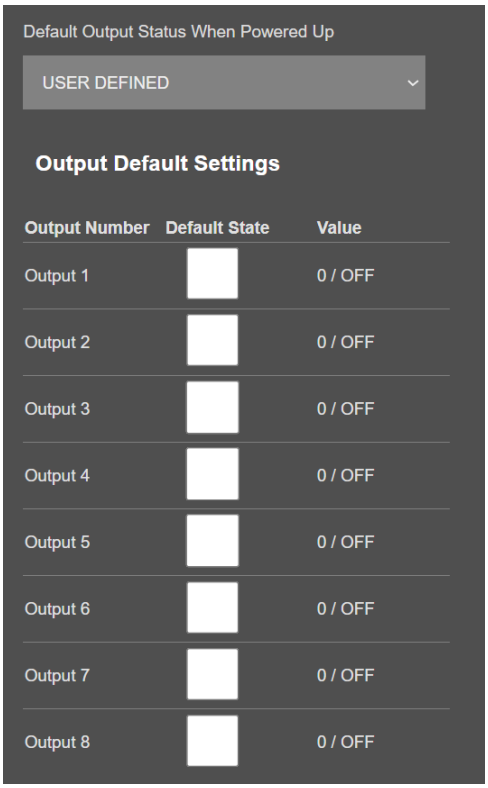
"Modbus Adress": Is the Modbus address of relevant I/O Slot of HUR.

"Default Output Status When Powered Up": Only shown for output devices. User can define initial state of output values when the device is powered up.

For Analog output modules, user can set and number within range 0-1000 for 4-20mA output.



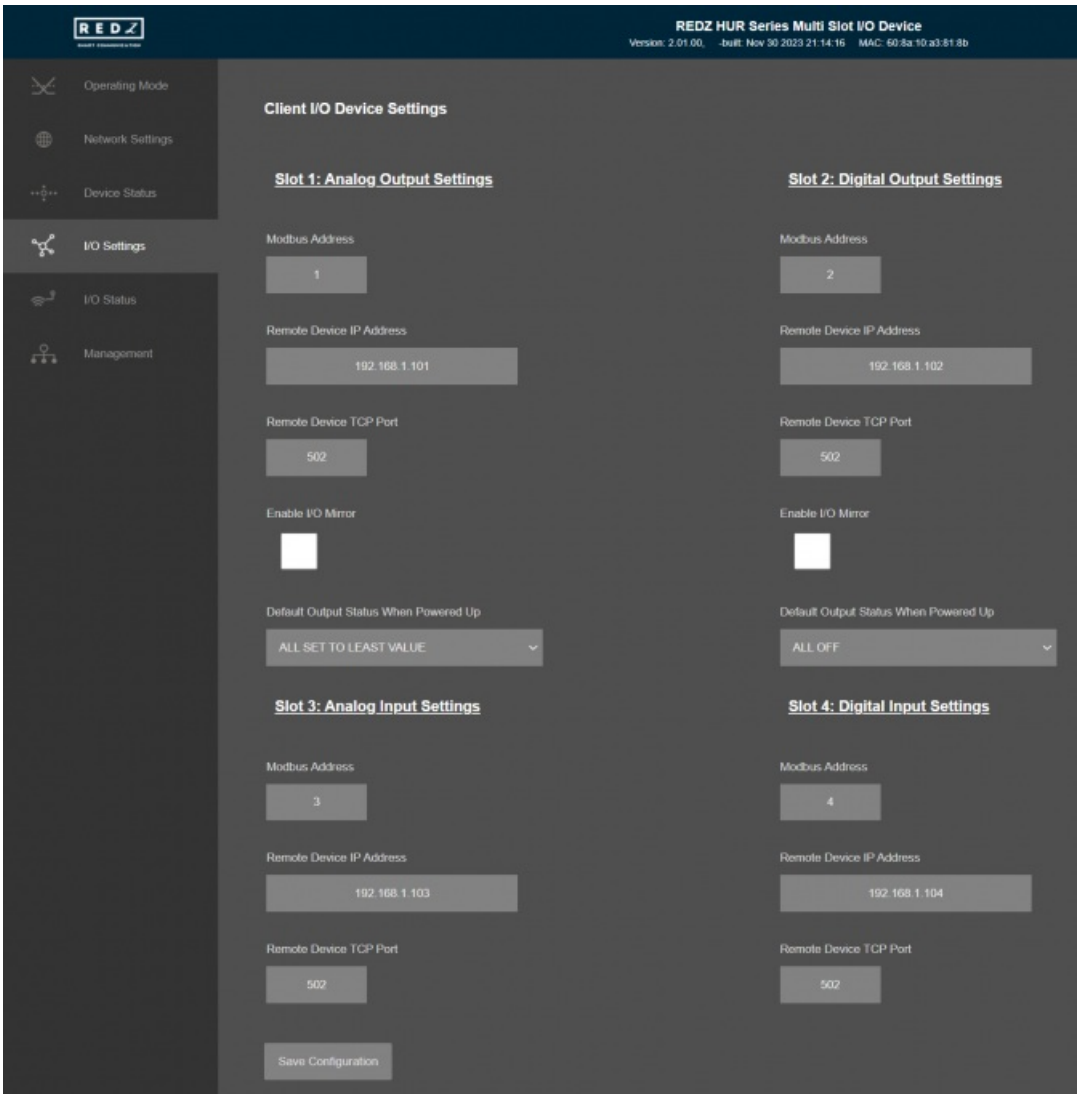
For Digital output modules, user can simply set intiial value of output as "0"-"OFF" or "1"-"ON".



☝

NOTE: This menu will change based on module used in HUR Series Modbus TCP Remote I/O Devices. Muti slot version will showw several option in same screen, single slot versions will show only 1.

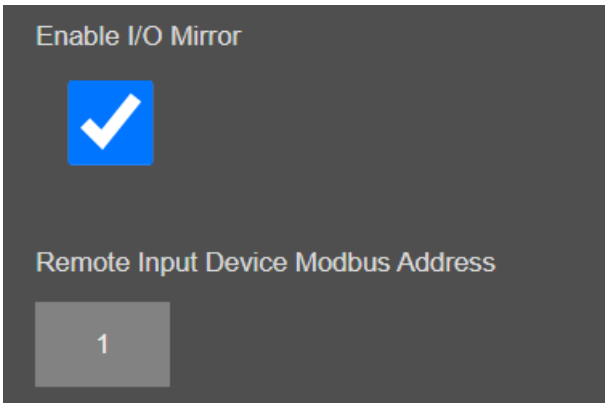
When device set to "Client" operating mode, following options will be shown.



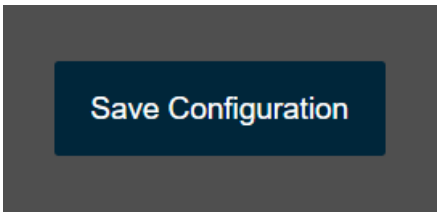
Only in "Client" Operating Mode, "Remote Device IP Address" and "Remote Device TCP Port" that the device will connect be shown. User can enter remote device Ip and Port from that options.

Only in "Client" Operating Mode and only for output devices, user can enable "I/O Mirror" functionality and can change "Remote Input Device Modbus Address" that the ports will be mirrored.

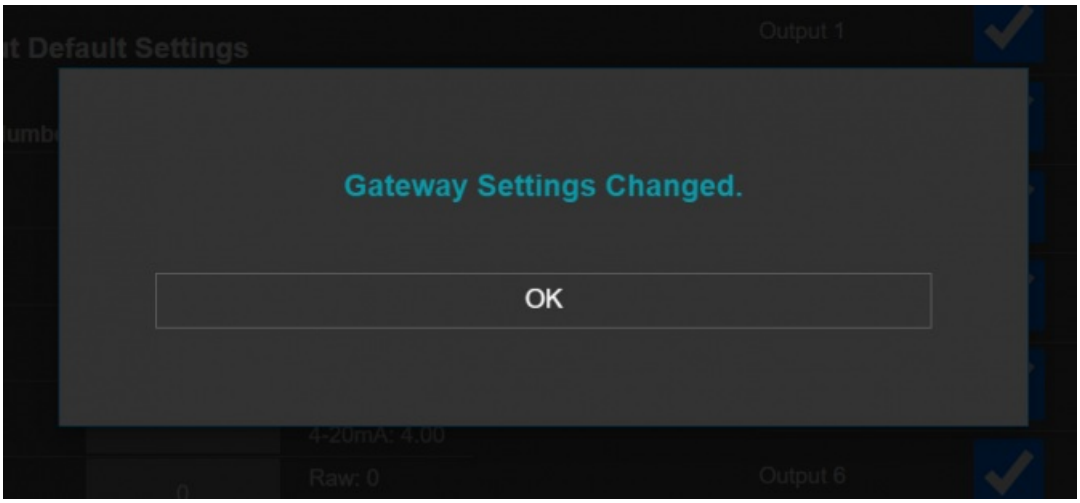
In short, user will enter remote device IP, port and Modbus Id from this options.



Once the setting has been changed, “Save Configuration” button will be enabled.

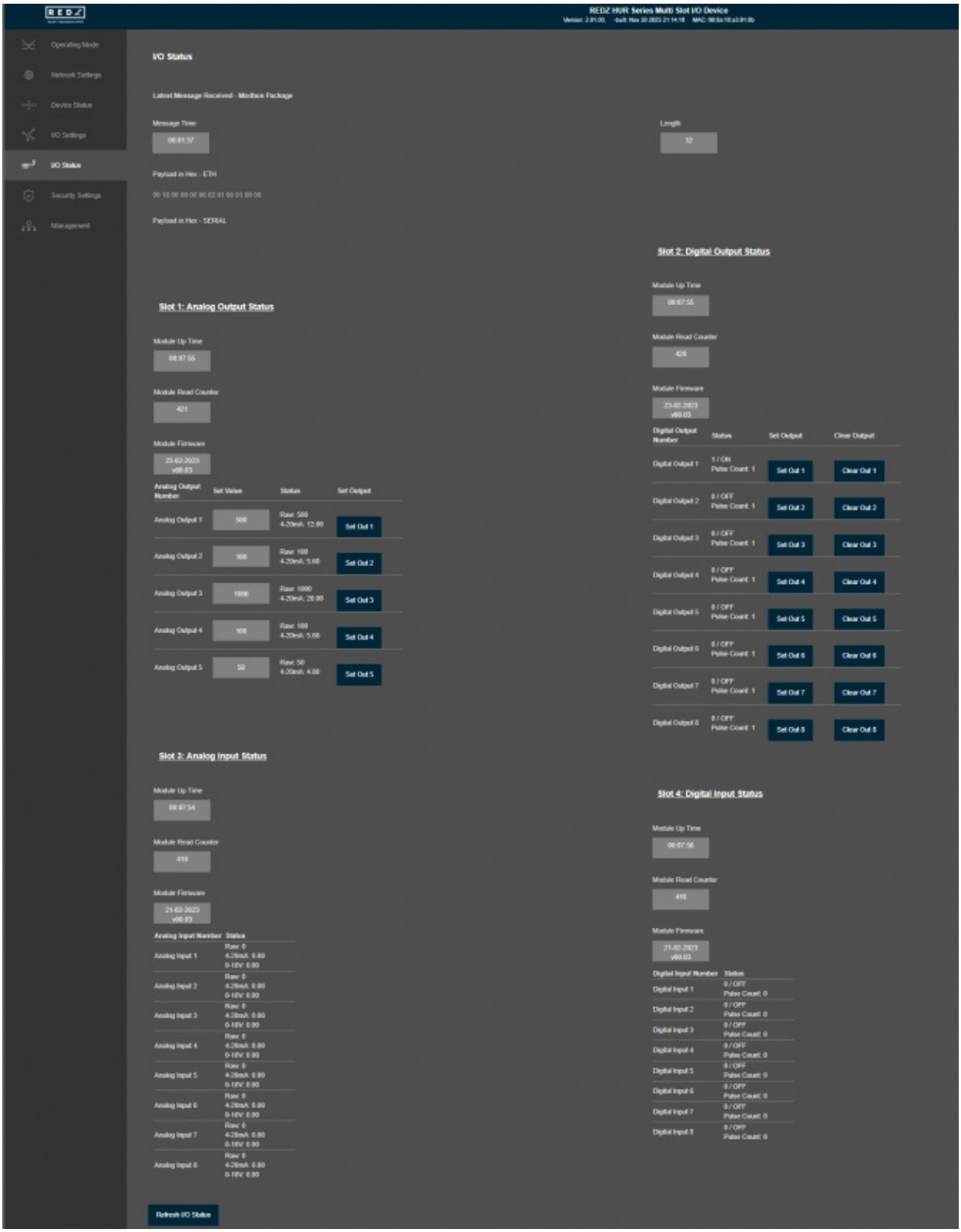


After clicking button system will tell if the settings applied successfully or not.



10.8 MENU: I/O Status

From this menu user may monitor I/O status and statistics. The page also helps users to change output values for output devices.



In "Latest Message Received - Modbus Package" part:

"Message Time": Time when Modbus message received. The device shows time as hours and minutes since it is powered up.

"Length": Time message length of Modbus message received.

"Payload in Hex - ETH": Latest Modbus TCP message received shown as hexadecimal array.

"Payload in Hex - SERIAL": Latest Modbus RTU message received shown as hexadecimal array. This is valid for single slot devices only.

☝

NOTE: The following options are available for anly slot and single slot devices only shows Slot 1 and multi slot devices shows Slot 1-2-3-4.

Analog Output

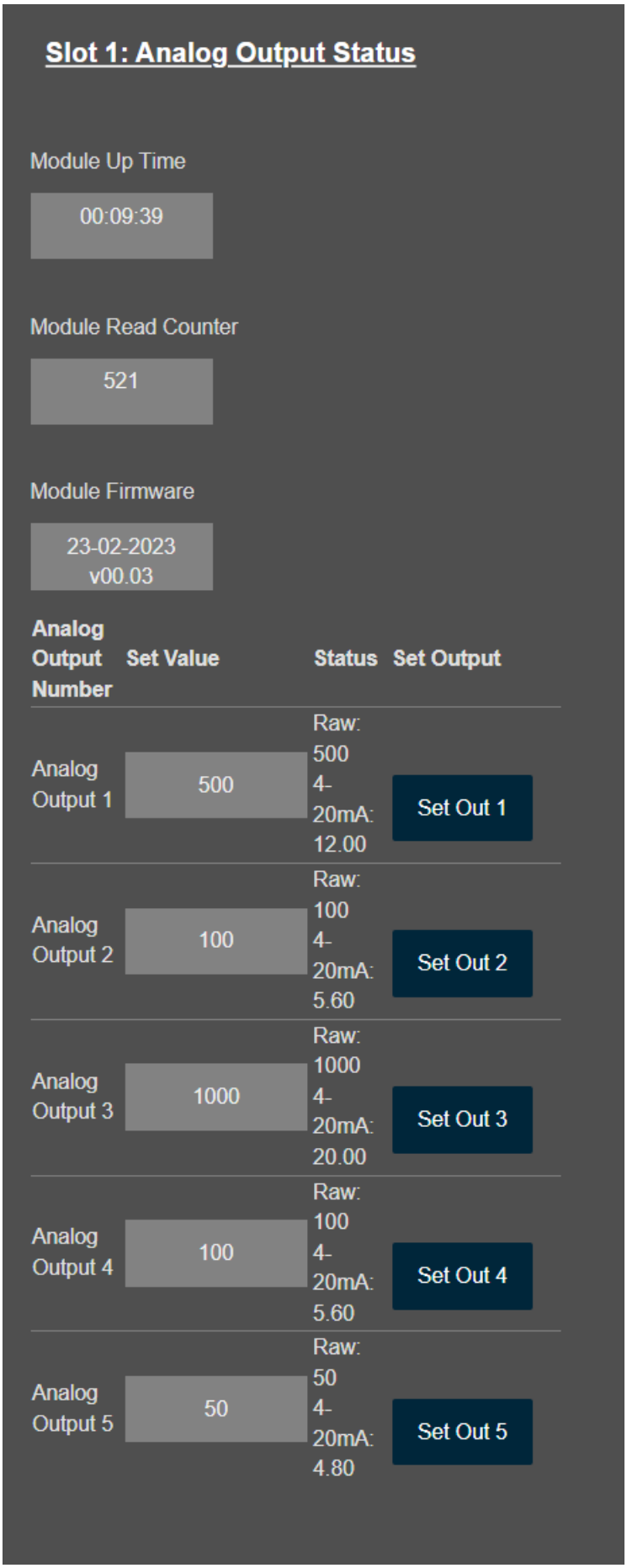
Digital Output

Analog Input

Digital Input

In "Slot 1" part:

In this example "Analog Output" is used in Slot 1



"Module Up Time": Time as hours and minutes since the I/O module is powered up.

"Module Read Counter": Shows how many times the I/O module is queried with Modbus commands since it is powered up.

"Module Firmware": The firmware version and build date of I/O module used in this slot.

"Analog Output Number": The port number of I/O module.

"Set Value": User can set output value of output versions of I/O modules. User can enter a value in range 0-1000 to set Analog Output Value and from "Status" part user can also see the Analog value to be set based on entered raw value.

"Set Output": User can set output value of output versions of I/O modules. Every output has its own button for sending command. Once the button clicked the command will sent to HUR and the command will be realized immediately. Meanwhile the value will be updated automatically on screen within 1 second.

In "Slot 2" part:

In this example "Digital Output" is used in Slot 2

Slot 2: Digital Output Status

Module Up Time

00:09:39

Module Read Counter

528

Module Firmware

23-02-2023
v00.03

Digital Output Number	Status	Set Output	Clear Output
Digital Output 1	1 / ON Pulse Count: 1	Set Out 1	Clear Out 1
Digital Output 2	0 / OFF Pulse Count: 1	Set Out 2	Clear Out 2
Digital Output 3	0 / OFF Pulse Count: 1	Set Out 3	Clear Out 3
Digital Output 4	0 / OFF Pulse Count: 1	Set Out 4	Clear Out 4
Digital Output 5	0 / OFF Pulse Count: 1	Set Out 5	Clear Out 5
Digital Output 6	0 / OFF Pulse Count: 1	Set Out 6	Clear Out 6
Digital Output 7	0 / OFF Pulse Count: 1	Set Out 7	Clear Out 7
Digital Output 8	0 / OFF Pulse Count: 1	Set Out 8	Clear Out 8

"Module Up Time": Time as hours and minutes since the I/O module is powered up.

"Module Read Counter": Shows how many times the I/O module is queried with Modbus commands since it is powered up.

"Module Firmware": The firmware version and build date of I/O module used in this slot.

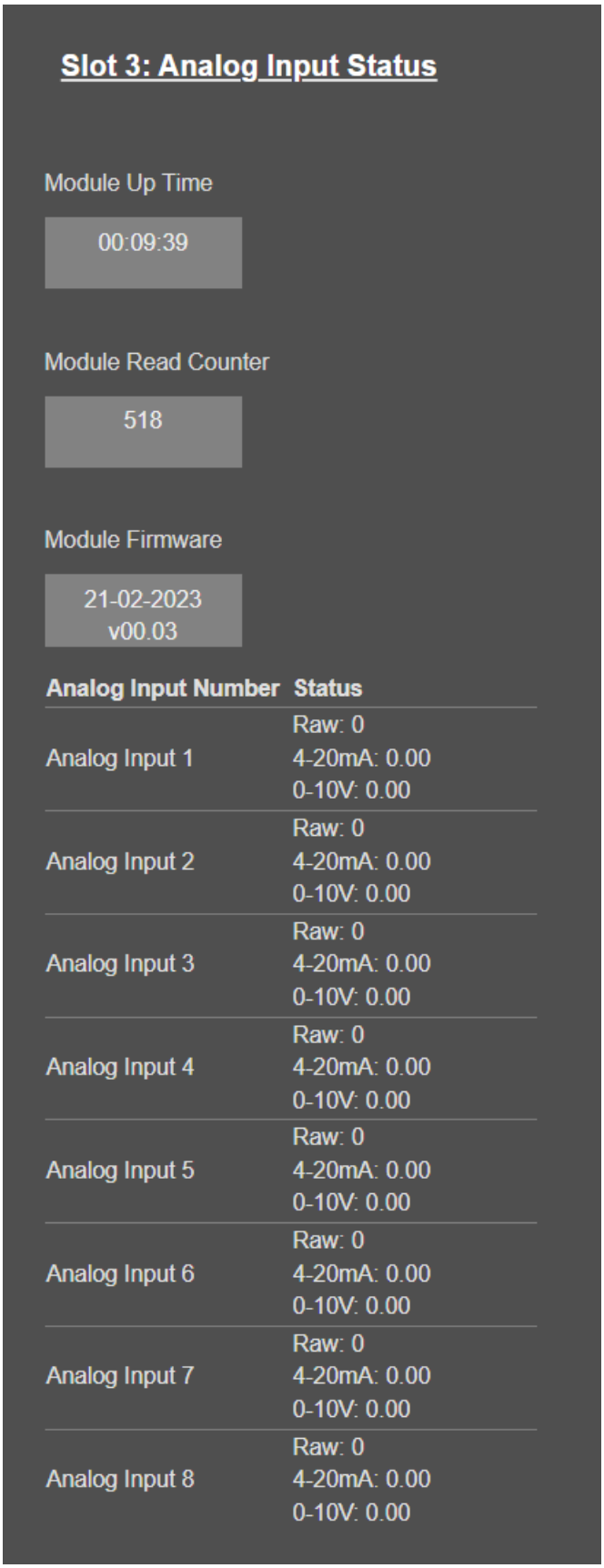
"Digital Output Number": The port number of I/O module.

"Set Output": User can set output value of output versions of I/O modules. Every output has its own button for sending command. This option is used to set Digital Output "1" or "ON".
Once the button clicked the command will sent to HUR and the command will be realized immediately. Meanwhile the value will be updated automatically on screen within 1 second.

"Clear Output": User can set output value of output versions of I/O modules. Every output has its own button for sending command. This option is used to set Digital Output "0" or "OFF".
Once the button clicked the command will sent to HUR and the command will be realized immediately. Meanwhile the value will be updated automatically on screen within 1 second.

In "Slot 3" part:

In this example "Analog Input" is used in Slot 3



"Module Up Time": Time as hours and minutes since the I/O module is powered up.

"Module Read Counter": Shows how many times the I/O module is queried with Modbus commands since it is powered up.

"Module Firmware": The firmware version and build date of I/O module used in this slot.

"Analog Input Number": The port number of I/O module.

"Status": Actual port values of Analog Input I/O module. User can see the raw value within a range 0-65535, the current value 0-20mA or voltage value 0-10V.

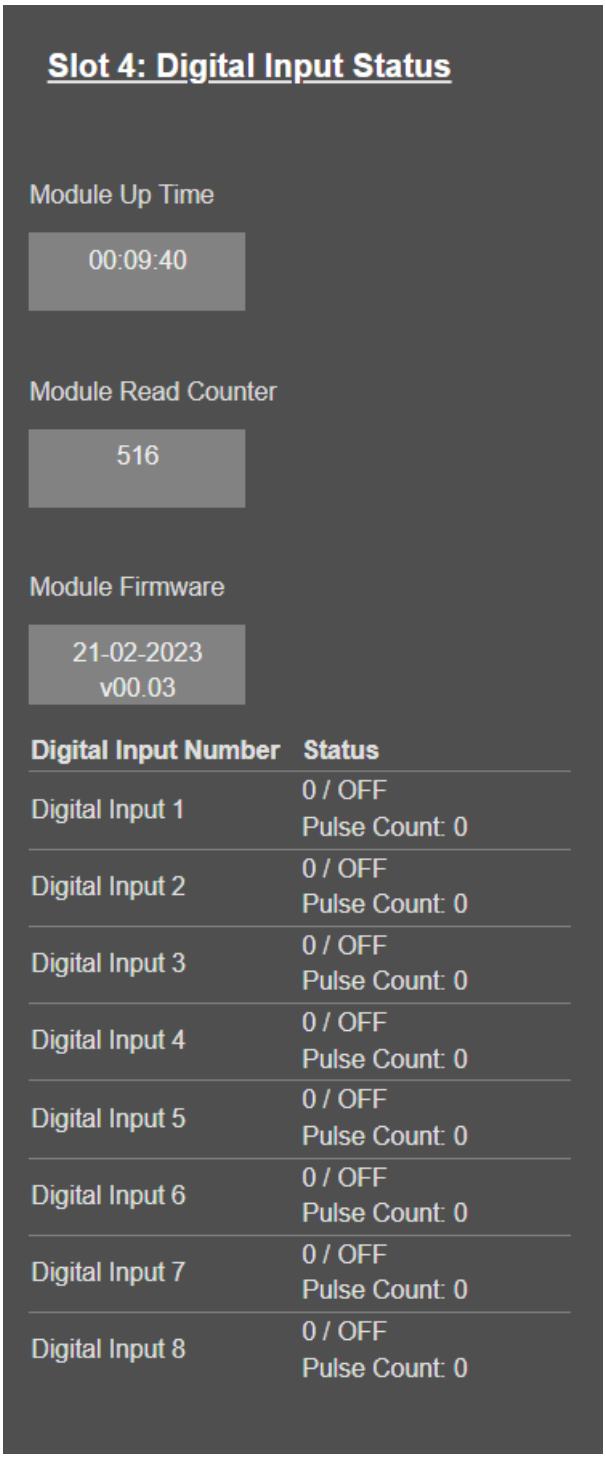
☝

NOTE: For Analog Input models, input value can be configured via switches for 0-10V or 0-20mA. This is available in single slot versions

Multi slot versions comes in 0-20mA setting as standard. If needed 0-10V version can also be ordered.

In "Slot 4" part:

In this example "Digital Output" is used in Slot 4



"Module Up Time": Time as hours and minutes since the I/O module is powered up.

"Module Read Counter": Shows how many times the I/O module is queried with Modbus commands since it is powered up.

"Module Firmware": The firmware version and build date of I/O module used in this slot.

"Digital Input Number": The port number of I/O module.

"Status": Actual port values of Digital Input I/O module. User can see the raw value as "1"-"ON" or "0"-"OFF". Webside also shows the pulse count, which menas how many times the output value changed from "0" to "1".

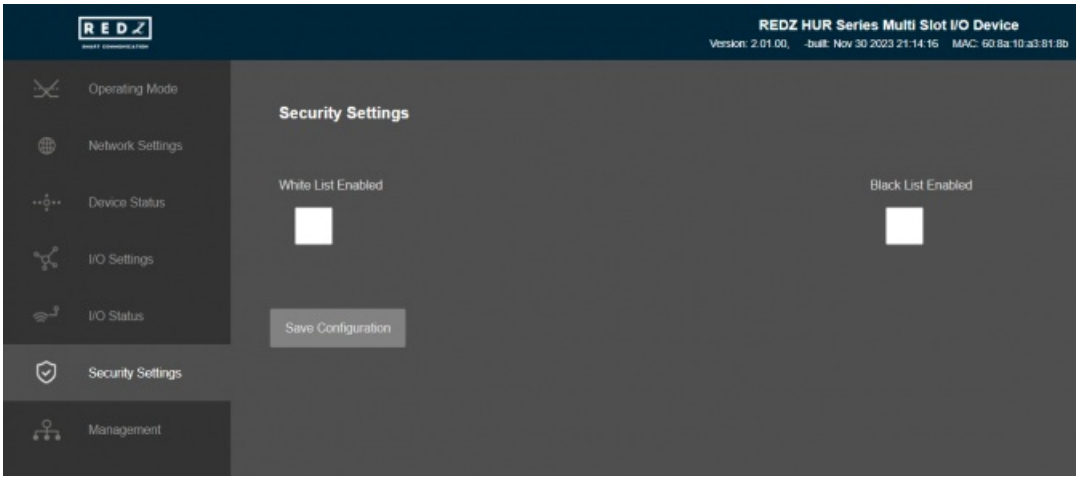
After clicking “Refresh Status” button, system will reload data only and will not reload page.

Button will be disabled during reload for an instance. If timeout occurs during the reload, the button will be enabled again with warning of timeout. In normal operation reload of status data will be done immediately.

10.9 MENU: Security Settings - Server Only

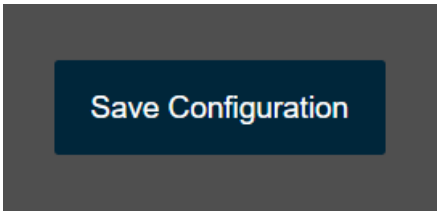
This menu is available only in Server Operating mode since it filters TCP/IP connections based on IP of the devices.
From this menu user may activate TCP IP filter based on White list (accepted packages from IP Address) or Black list (rejected packages from IP Address).

- User can select to activate White List and HUR device will accept data packages only from the devices with addresses stated in the list.
- User can select to activate Black List and HUR device will accept all data packages except from the devices with addresses stated in the list.

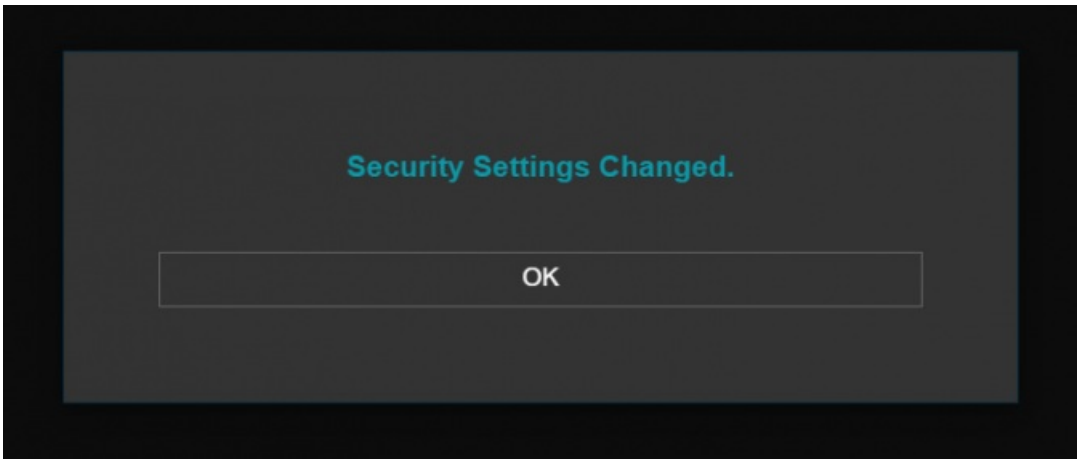


Up to 20 IPs to be filtered are available for any of the list.

Once the setting has been changed, “Save Configuration” button will be enabled.



After clicking button system will tell if the settings applied successfully or not.



☝

NOTE 1: Settings will be applied once the device is rebooted from web interface or repowered manually.

☝

NOTE 2: This page is only available for Server Operating mode.

10.11 MENU: Management

From this menu user may change parameters or send command to device

> The device restarts itself every 86400 seconds (which means every 24 hours). There are also timeout restart routines in Server mode during listening clients and in Client Mode trying to connect to the server. (both preset to 10 minutes which means device will restart system if fails to connect a server in Client mode or a client do not connect in preset time in Server mode)

- User can change firmware of device. HUR Series Modbus TCP Remote I/O Devices has easy to use firmware capability and system can store 2 firmware at memory. After a firmware change, user can restore back old firmware anytime needed.

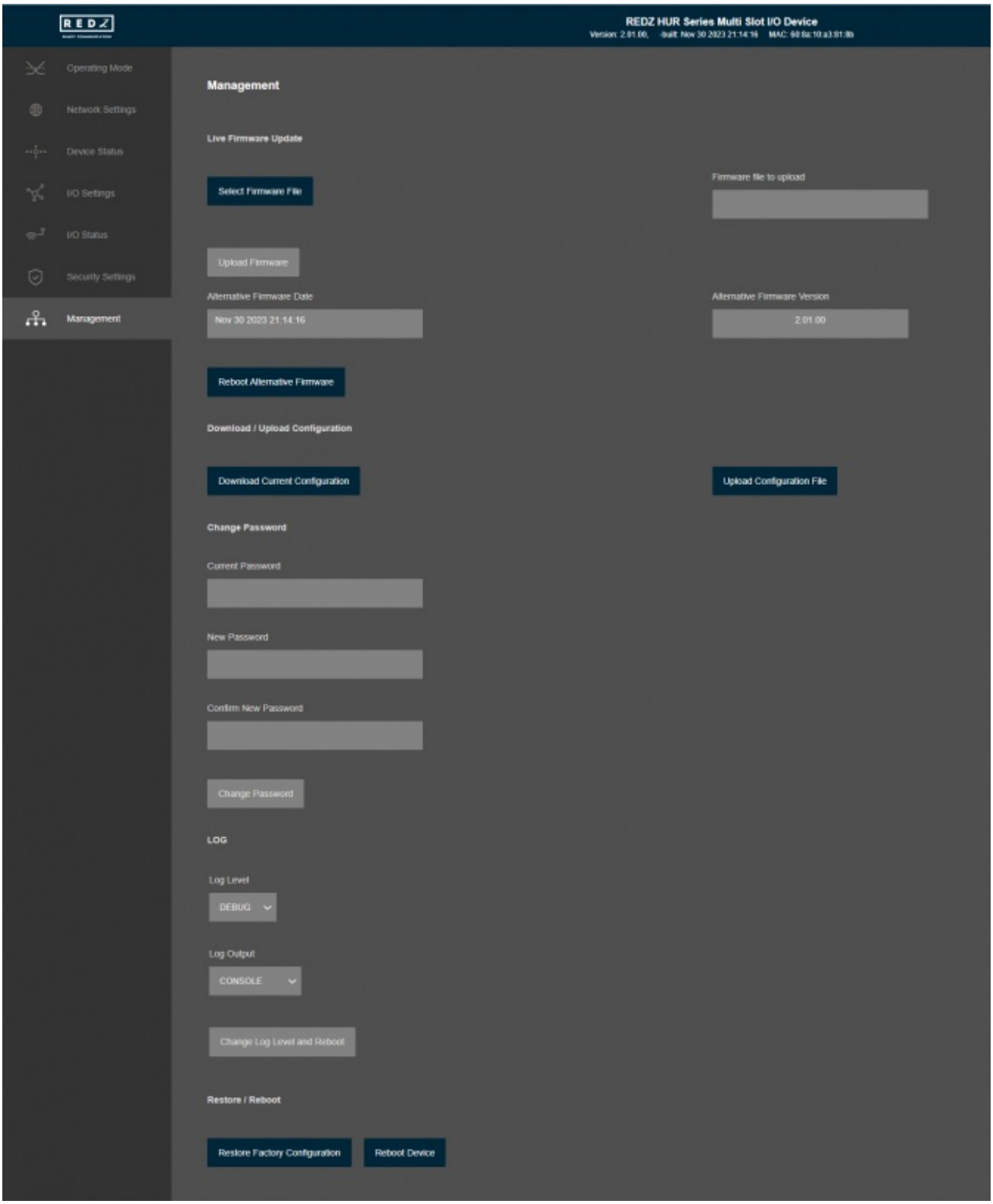
> After a firmware change old configuration will be used for minor changes. If a major change occurs system will restore to factory default configuration.

- User can backup configuration of device and restore it back.

- User can change the login information.

- User can change the debug level of the device. HUR Series Modbus TCP Remote I/O Devices has micro USB or USB Type-C and gives log in 115200 - 8N1 format.
  Any terminal program can be used to listen the LOG over USB type-C or micro USB port of the device which is recognized as Virtual COM port in PC.
  LOG to remote UDP server is also available. If set to UDP server, then HUR will send LOG data to remote UDP server device.

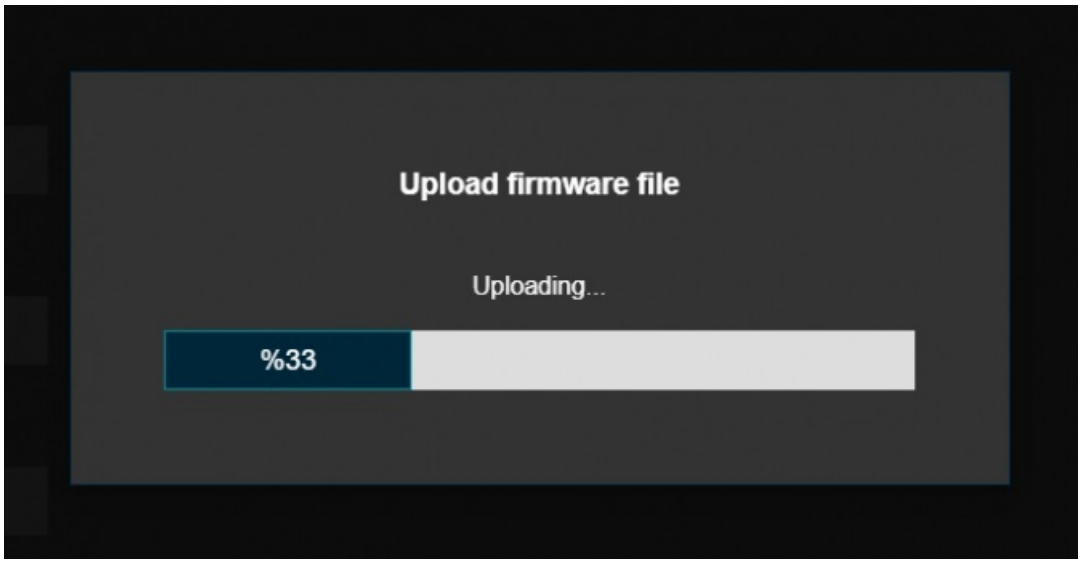
- User can restore to factory settings and force device to reboot. Factory settings restored for Client if the device in Client mode and factory settings are restored for Server if the device in Server mode.



In "Live Firmware Update" part:

Firmware upgrade is possible only with files that REDZ supplied. Once the file selected, TLM shows selected file:

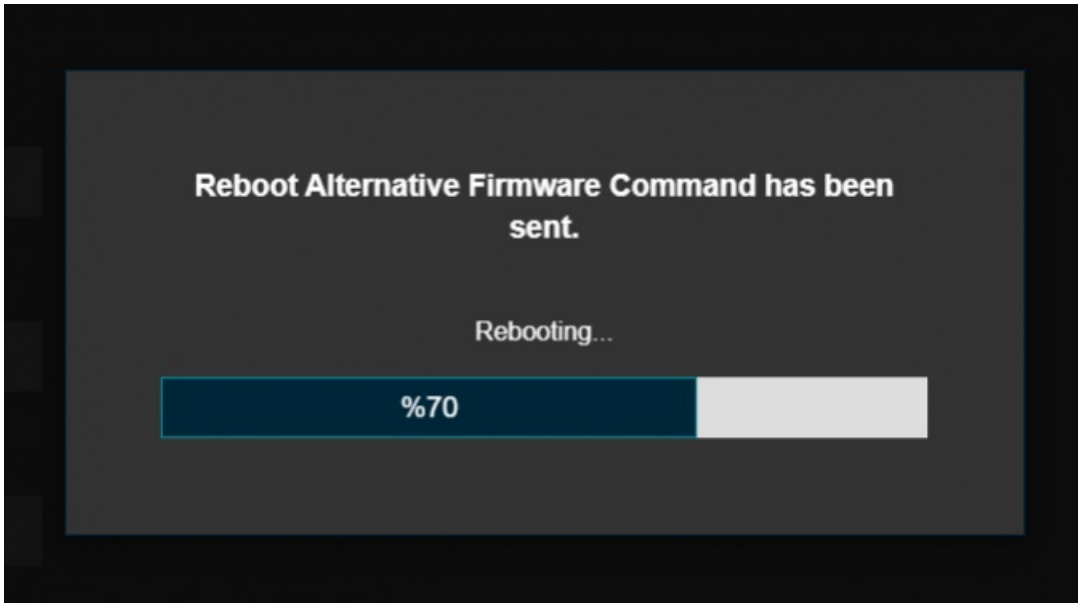
Then “Upload Firmware” button must be clicked. HUR will start to upload file and show status on pop up screen.



Click "Close" when finished. If somehow HUR fails to upload, refresh webpage and try again please.

After successful upload, HUR will show "Alternative Firmware Date" and "Alternative Firmware Version" data.

Click "Reboot Alternative Firmware" and HUR will reboot with new firmware and show status on screen.



> This will take 5 seconds only. Please wait .

Check firmware details from upper part of main screen please if the update firmware procedure finalized properly.

☝

NOTE 1: User must refresh cache of their browser by clicking CTRL+F5 after a succesfull firmware change so that it will force browser to reload web interface (with latest updates/changes).

☝

NOTE 2: In major updates user must also reset device to factory settings.

In "Download / Upload Configuration" part:

User can download current configuration of the device to a file or restore a previously defined configuration to device from file.

"Download Current Configuration": Downloads the configuration to a file. It uses "Device Name" for file name and the extensions will be "*.zcfg".
"Download Configuration File": Uploads the configuration from "*.zcfg" file.

☝

NOTE: Modbus Id configurations will not work if they are different from uploaded device. User must set those values manually.

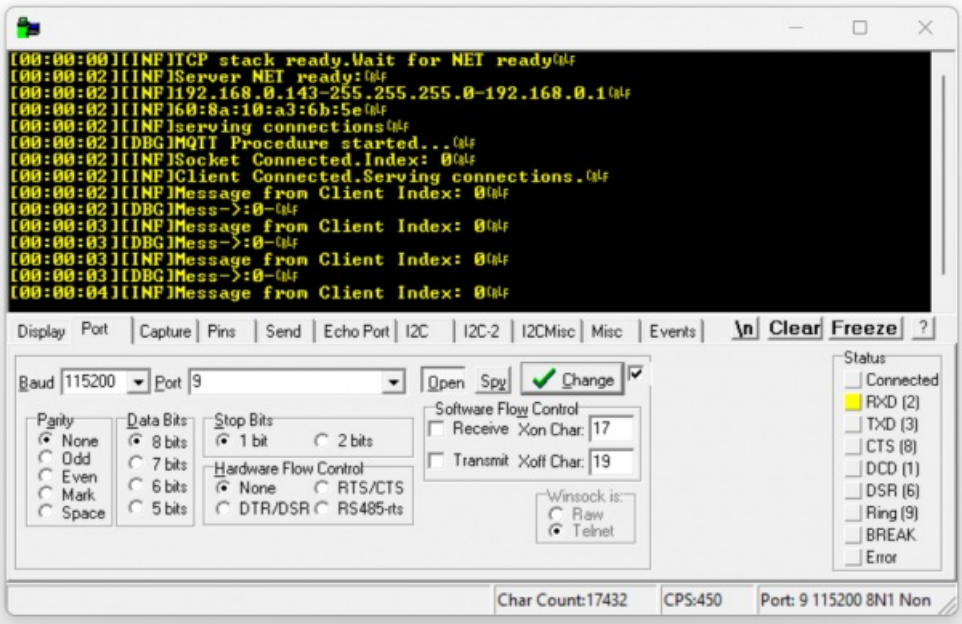
In "Log" part:

User may activate Logging and see details of operation. There are different levels of Log with different amount of data.

"None": Logging is closed
"Error": Only errors in systems will be logged
"Info": General info and errors will be logged
"Debug": All details regarding device operation will be logged

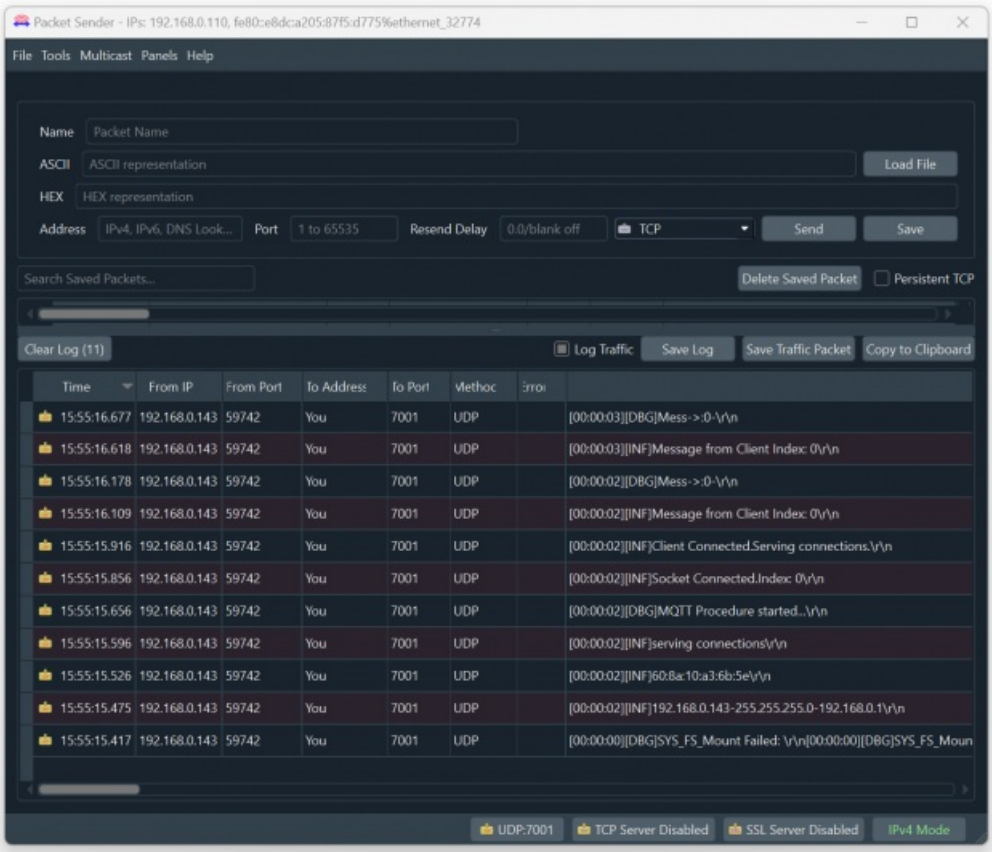
If "Console" is selected as output of Log, then micro USB or USB Type-C port of device will be used for logging. Proper cable must be connected and a teminal should be used to receive Log data. As an example "RealTerm" tool can be used.

Simply select COM port and set baud rate 115200 and data type 8N1 and then click open. Device will send log data.



If "UDP Server" is selected as output of Log, then proper tool must be used to get log data. User must set "UDP Server IP" and "UDP Server Port". Device will send Log to that address. As an example "Package Sender" tool can be used.

Click "File" and then "Settings". Enable "UDP Server" and set the port. Device will send Log data to UDP server.



Here is a video example to enable UDP log and receive data via UDP Server software. Video is created with CKL series but applies to all series.

☝

NOTE: This page has same settings both for Server and Client operating modes.

9. Modbus Communication Example

HUR Series Modbus TCP Remote I/O Devices communicate in Modbus TCP protocol over TCP/IP. HUR Series Modbus TCP Remote I/O Devices has several versions with different I/O options and different version uses different Modbus Function codes:

- HUR Devices with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output

  Uses Function Code 0x01: Read Coil Status to read status of output values

  Uses Function Code 0x03: Read Holding Registers to read device status of monitoring values

  Uses Function Code 0x05: Force Single Coil to set value of individual output values

  Uses Function Code 0x0F: Force Multiple Coils to set value of all output values at once

- HUR Devices with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

  Uses Function Code 0x01: Read Coil Status to read status of output values

  Uses Function Code 0x03: Read Holding Registers to read device status of monitoring values

  Uses Function Code 0x05: Force Single Coil to set value of individual output values

  Uses Function Code 0x0F: Force Multiple Coils to set value of all output values at once

- HUR Devices with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input

  Uses Function Code 0x02: Read Input Status to read status of input values

  Uses Function Code 0x03: Read Holding Registers to read device status of monitoring values

- HUR Devices with 8 Channel 0-10V and 0-20mA Selectable Analog Input

  Uses Function Code 0x03: Read Holding Registers to read device status of monitoring values

Uses Function Code 0x04: Read Input Registers to read input values

- HUR Devices with 5 Channel 4-20mA Analog Output

  Uses Function Code 0x03: Read Holding Registers to read device status of monitoring values

  Uses Function Code 0x04: Read Input Registers to read output values

  Uses Function Code 0x06: Preset Single Register to set value of individual device output values

9.1 Reading I/O Module Status Values: For all I/O Models

HUR Series Modbus TCP Remote I/O Devices shares module status values with Modbus Function Code 3:

Modbus Read Counter: Shows how many times this module is queried via Modbus

Device Up Time in Seconds: Shows seconds passed since the module is powered up.

Firmware Version Original: The firmware downloaded in this module during manufacturing process.

Firmware Version Upgraded: Actual firmware running in this module right now.

Register Number	Definition	Explanation	Modbus Address (Decimal)	Modbus Address (Hexadecimal)	Data Type
1	Modbus Read Counter	This value increments 1 after successful sending a Modbus Response Package from HUR device side.	160	0xA0	Unsigned Long (UInt32)
2	Second Counter	Increments 1 every second since the device is powered up. Module restarts after 24 hours (86400 seconds)	162	0xA2	Unsigned Long (UInt32)

3	FW Version Original	Gives device firmware info when the device is sold from stock. Includes version and build date 4 byte data example: **0x1A37E401:** **0x1A:** DAY = 26 **0x3:** MONTH = 3 **0x7E4:** YEAR = 2020 **0x01:** VERSION = 1	164	0xA4	Unsigned Long (UInt32)
4	FW Version Upgraded	Gives device firmware info and it differs from FW Original version if the device firmware changed in the field. Includes version and build date 4 byte data example: **0x1B37E401:** **0x1B:** DAY = 27 **0x3:** MONTH = 3 **0x7E4:** YEAR = 2020 **0x01:** VERSION = 1	166	0xA6	Unsigned Long (UInt32)

Read Holding Registers (Function Code=3)

Request

This command is requesting the content of module status holding registers from the HUR Series Modbus TCP Remote I/O Devices with address 1.

0001 0000 0006 01 03 0005 0008

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

01: The Slave Address (01 hex = address 1)

03: The Function Code 3 (read module status)

00A0: The Data Address of the first register requested.

(00A0 hex = 160 decimal)

0008: The total number of registers requested. (read 8 registers for 4 values since each value is 4byte)

Response

0001 0000 0013 01 03 10 0000 053D 0000 05BD 1B37 E401 1727 E703

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0013: Modbus TCP - Message Length (19 bytes to follow)

01: The Slave Address (01 hex = address 1)

03: The Function Code 3 (read module status)

10: The number of data bytes to follow (4 registers x 4 bytes each = 16 bytes)

0000 053D: The contents of register "Modbus Read Counter"

0000 05BD: The contents of register "Second Counter"

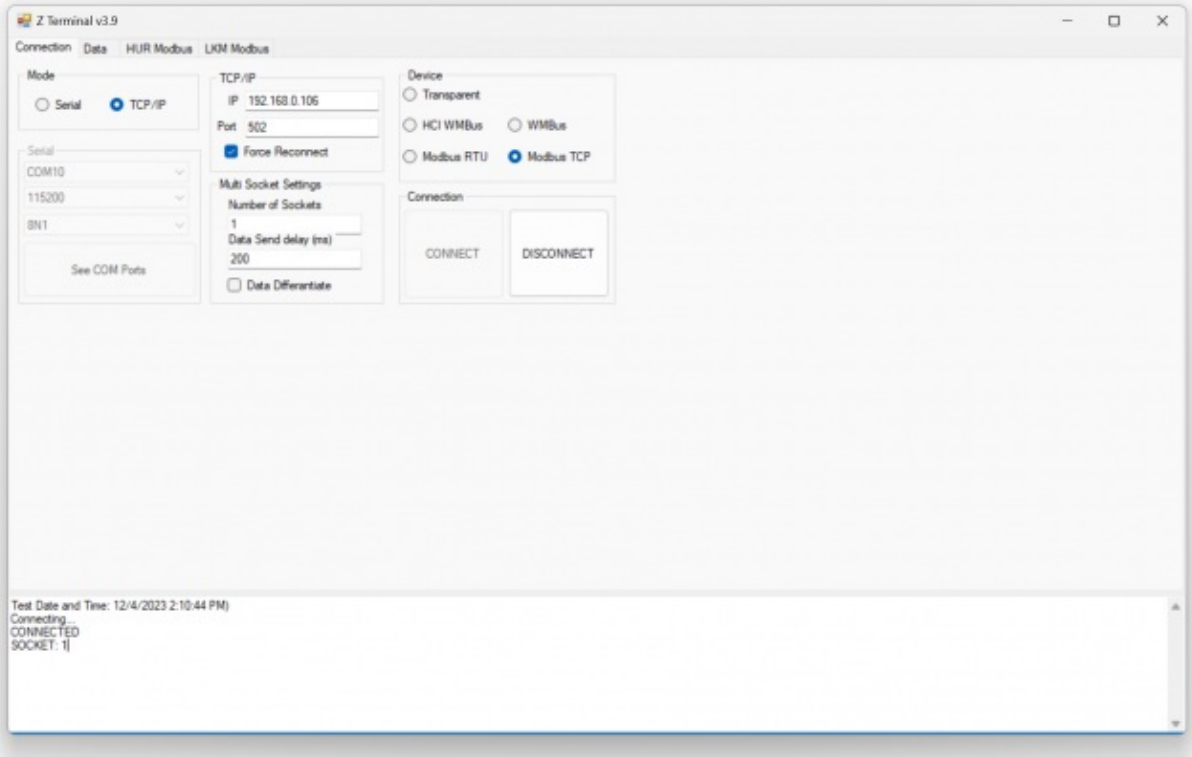
1B37 E401: The contents of register "FW Version Original"

1727 E703: The contents of register "FW Version Upgraded"

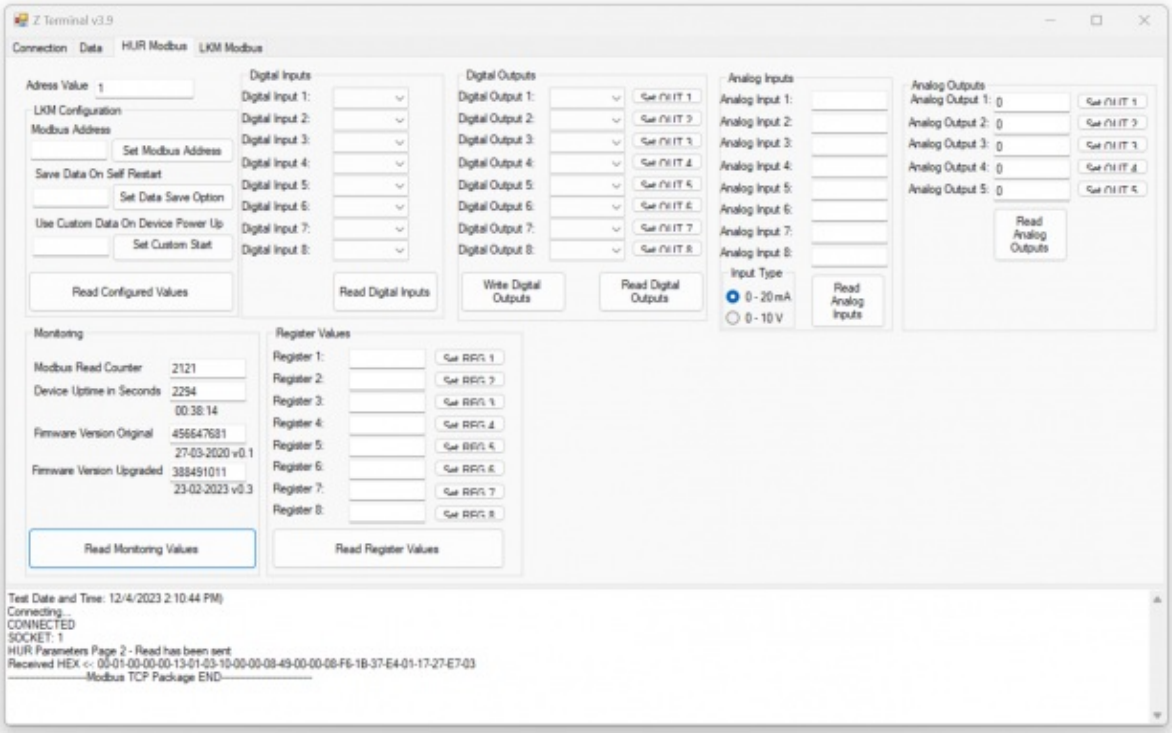
Read Holding Registers (Function Code=3): Read via ZTerminal Software Example

ZTerminal software can be used to read values of HUR Series Modbus TCP Remote I/O Devices.

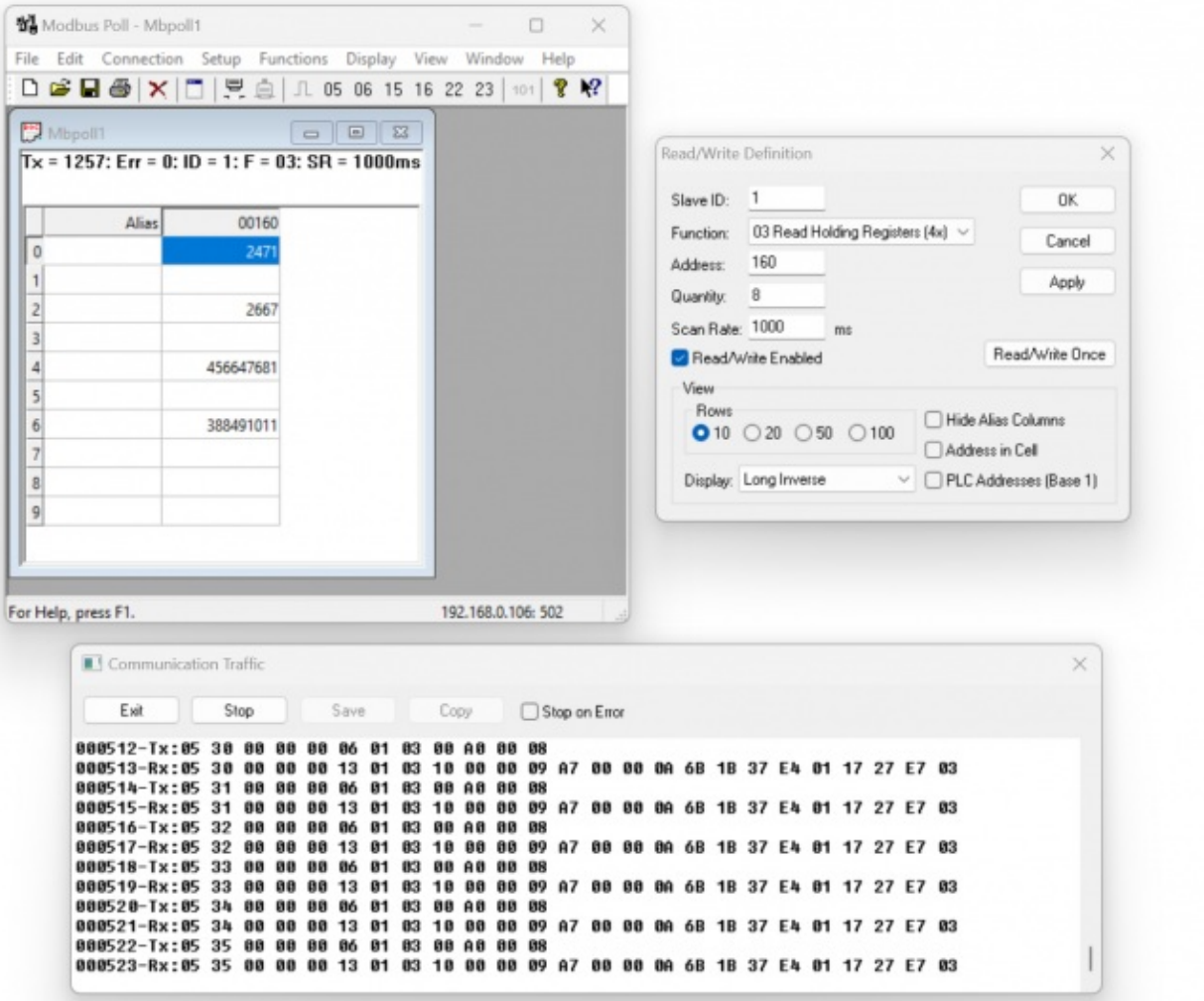
Enter "IP" and "port" value of HUR device, select "Modbus TCP" and click connect.



Then go to "HUR Modbus" page, enter module Modbus Adress Value"" and click "Read Monitoring Values". ZTerminal will show monitoring values.



Modbus Poll Software can also be used to read those values. After successfull connection to HUR device, following settings can be used to read status values.



9.2 Reading and Writing I/O Values: Digital Output Models

Following commands available to read and write output values of HUR Series Modbus TCP Remote I/O Devices.

- HUR Devices with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output and/or with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output

  Uses Function Code 0x01: Read Coil Status to read status of output values

  Uses Function Code 0x05: Force Single Coil to set value of individual output values

  Uses Function Code 0x0F: Force Multiple Coils to set value of all output values at once

Read Output Values with Read Coil Status (Function Code=1)

Request

This command is requesting the ON/OFF status of discrete outputs # 01 to 08

from the slave device with address 1.

0001 0000 0006 02 01 0001 0008

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

02: The Slave Address (02 hex = address 2)

01: The Function Code 1 (read coil status)

0001: The Data Address of the first output to read.

(0001 hex = 01)

0008: The total number of outputs requested. (08hex = 8)

Response

0001 0000 0004 02 01 01 C3

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0004: Modbus TCP - Message Length (4 bytes to follow)

02: The Slave Address (02 hex = address 2)

01: The Function Code 1 (read coil status)

01: The number of data bytes to follow (8 Outputs / 8 bits per byte = 1 byte)

C3: Outputs 1 - 8 (1100 0011)

The more significant bits contain the higher output variables.

This shows that outputs 8-7 and 1-2 are ON - 1, rest of the outputs are OFF - 0.

Write Individual Output Value with Force Single Coil (Function Code=5)

Request

This command is writing the contents of discrete output # 7 to OFF - 0 in the slave device with address 2.

0001 0000 0006 02 05 0007 0000

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

02: The Slave Address (02 hex = address 2)

05: The Function Code 5 (Force Single Coil)

0007: The Data Address of the coil. (output# 7 = 7 hex)

(0007 hex = 7 = output # 7)

0000: The value to write (FF00 = ON, 0000 = OFF)

Response

0001 0000 0006 02 05 0007 0000

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

02: The Slave Address (02 hex = address 2)

05: The Function Code 5 (Force Single Coil)

0007: The Data Address of the coil which is written

0000: The written value (FF00 = ON, 0000 = OFF)

Write Output Values at Once with Force Multiple Coils (Function Code=15)

Request

This command is writing the contents of a series of 8 discrete outputs from #1 to #8

to the slave device with address 2.

0001 0000 0008 02 0F 0007 0001 0100

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0008: Modbus TCP - Message Length (8 bytes to follow)

02: The Slave Address (02 hex = address 2)

0F: The Function Code 15 (Force Multiple Coils)

0007: The Data Address of the coil. (output# 7 = 7 hex)

(0007 hex = 7 = output # 7)

0001: The number of outputs to write (01 hex = 1)

01: The number of data bytes to follow (8 outputs / 8 bits per byte = 1 byte)

00: The value to write

Response

0001 0000 0006 0F 05 0007 0001

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0008: Modbus TCP - Message Length (8 bytes to follow)

02: The Slave Address (02 hex = address 2)

0F: The Function Code 15 (Force Multiple Coils)

0007: The Data Address of the written coil. (output# 7 = 7 hex)

(0007 hex = 7 = output # 7)

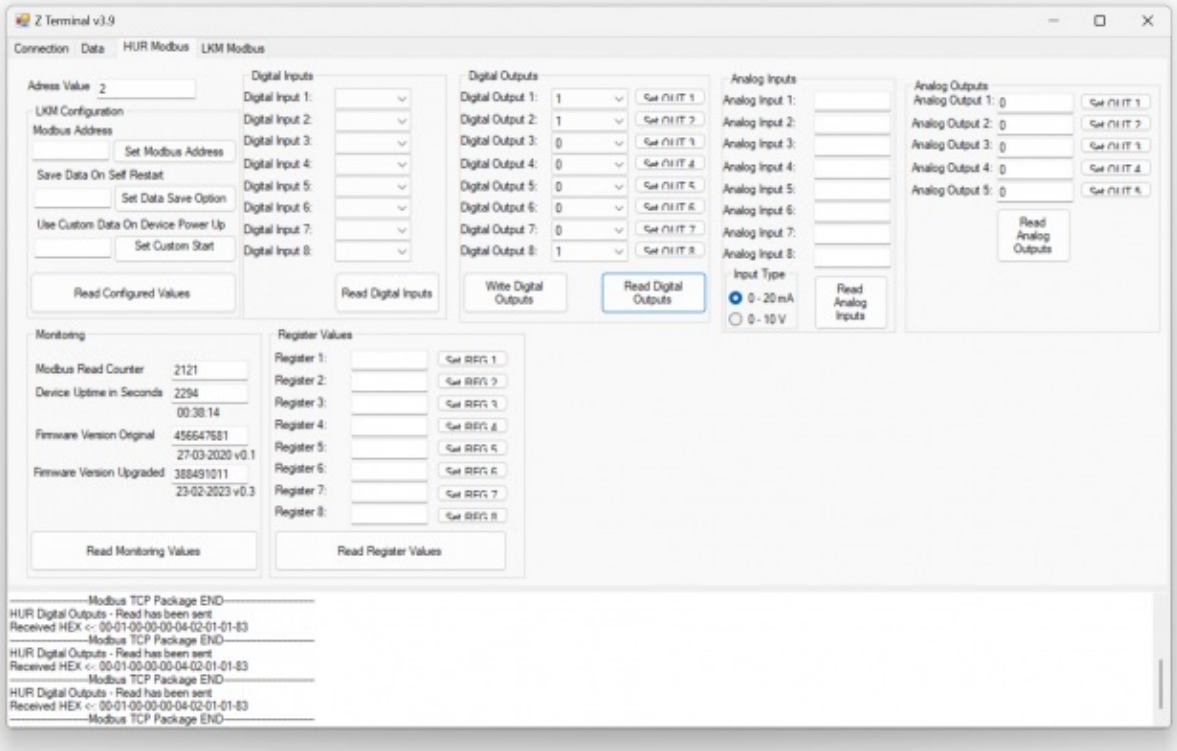
0001: The number of outputs written (01 hex = 1)

Read via ZTerminal Software Example

ZTerminal software can be used to read values of HUR Series Modbus TCP Remote I/O Devices.

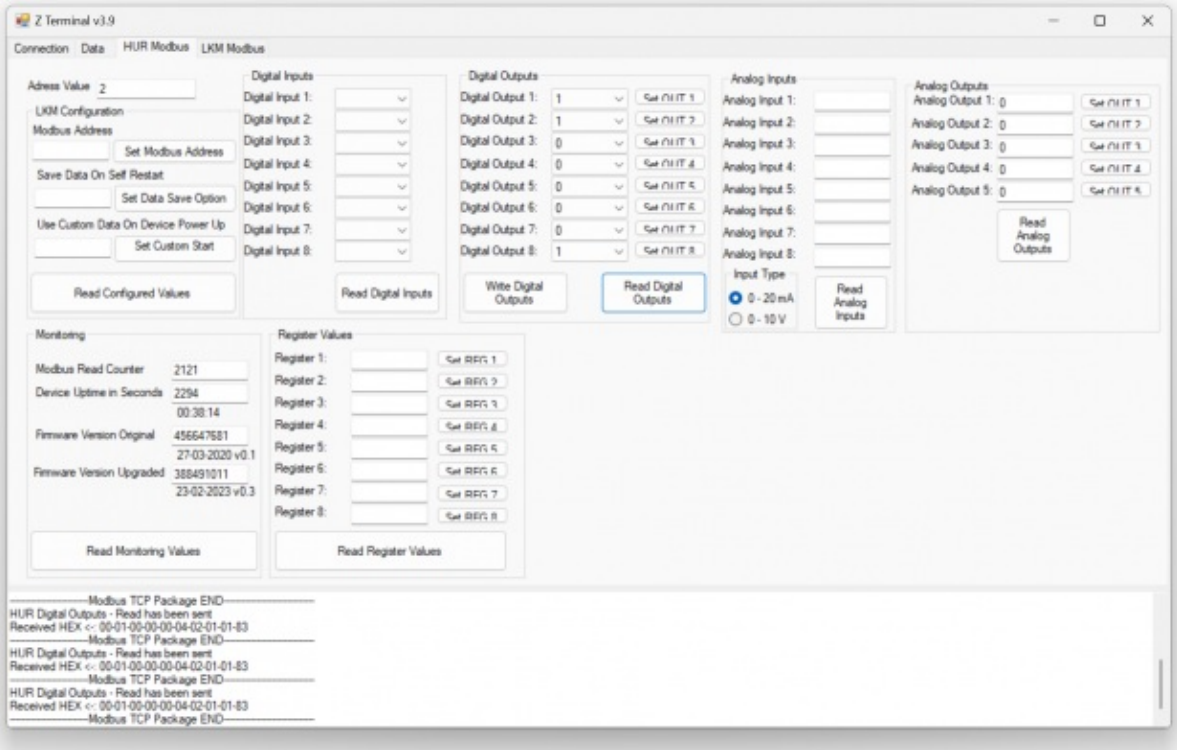
Enter "IP" and "port" value of HUR device, select "Modbus TCP" and click connect.

Then go to "HUR Modbus" page, enter module Modbus Adress Value"" and click "Read Digital Outputs". ZTerminal will show output values.

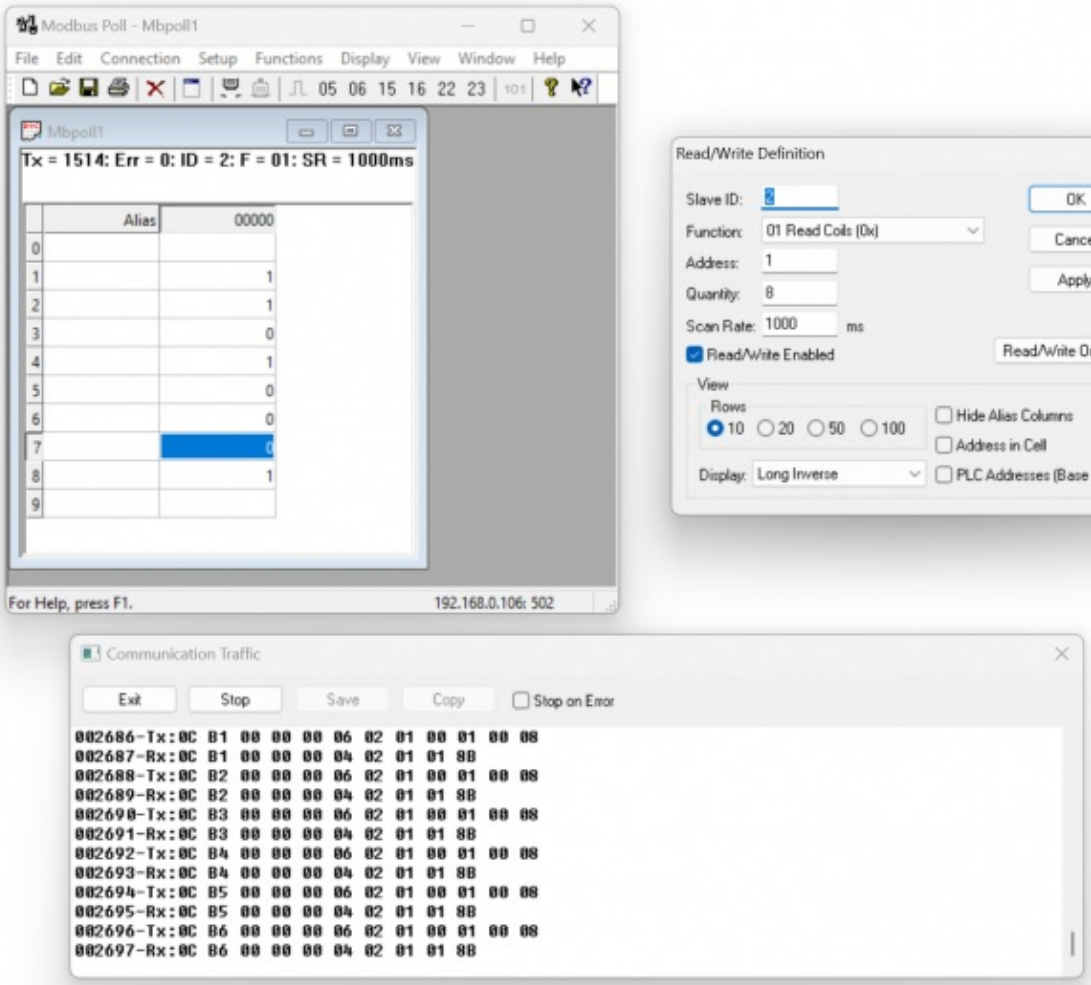


In the same way click "Set Out 4" button to set output value of port 4 after changing its value

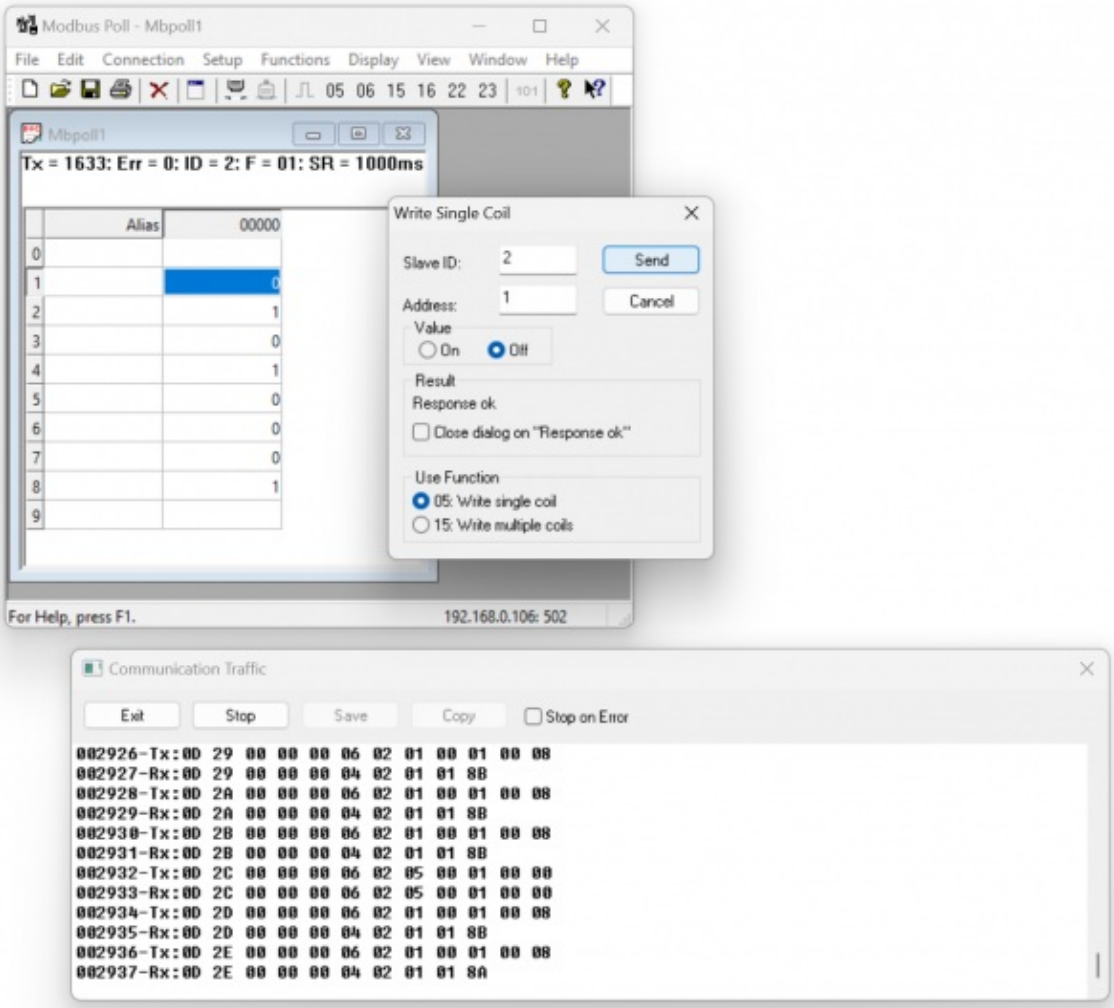
OFF - 0 or ON - 1. User may change output values and click "Write Digital Outputs" to set all values at once.



Modbus Poll Software can also be used to read and write those values. After successfull connection to HUR device, following settings can be used to read output values.



Also user can double click any of the port to open dialog for value write and select the value and write it to device. This dialog also lets user to select writing with Function code 5 or 15.



9.3 Reading I/O Values: Digital Input Models

Following commands available to read input values of HUR Series Modbus TCP Remote I/O Devices.

- HUR Devices with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input

  Uses Function Code 0x02: Read Input Status to read status of input values

Read Input Values with Read Input Status (Function Code=2)

Request

This command is requesting the ON/OFF status of discrete inputs # 01 to 08

from the slave device with address 1.

0001 0000 0006 01 02 0001 0008

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

01: The Slave Address (01 hex = address 1)

02: The Function Code 2 (read input status)

0001: The Data Address of the first output to read.

(0001 hex = 01)

0008: The total number of outputs requested. (08hex = 8)

Response

0001 0000 0004 02 01 01 C3

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0004: Modbus TCP - Message Length (4 bytes to follow)

01: The Slave Address (01 hex = address 1)

02: The Function Code 2 (read input status)

01: The number of data bytes to follow (8 Outputs / 8 bits per byte = 1 byte)

01: Outputs 1 - 8 (0000 0001)

The more significant bits contain the higher output variables.

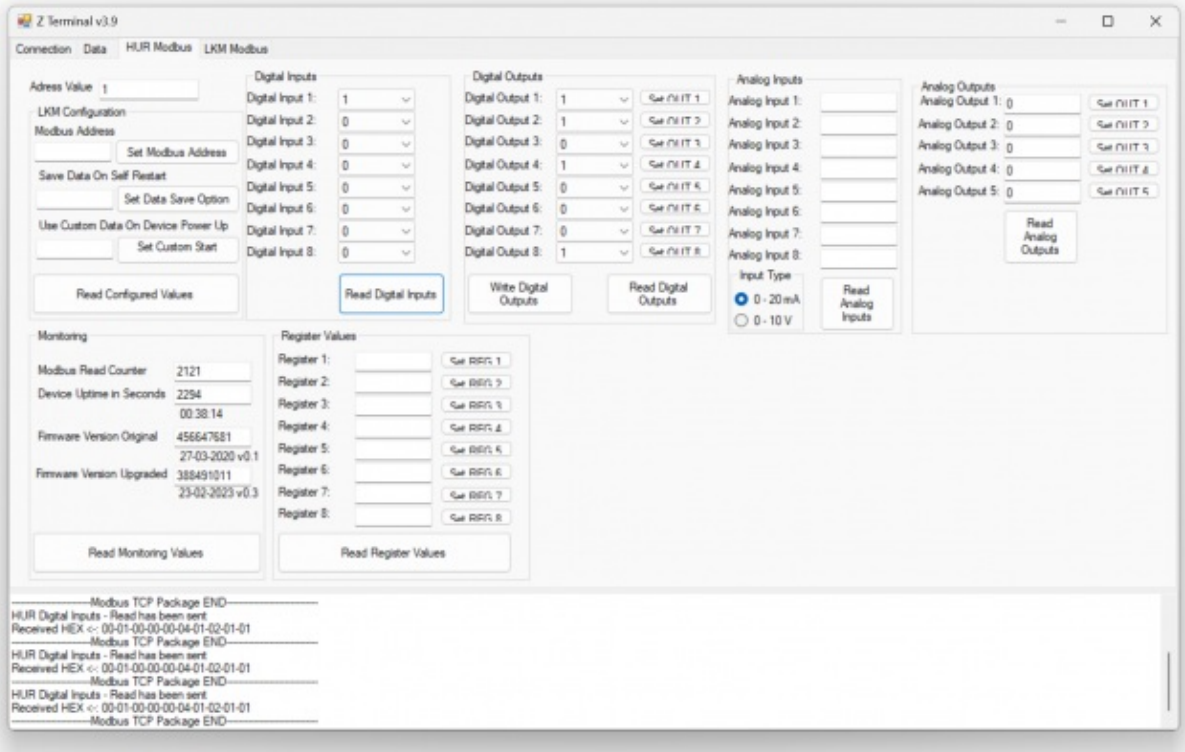
This shows that output 1 is ON - 1, rest of the outputs are OFF - 0.

Read via ZTerminal Software Example

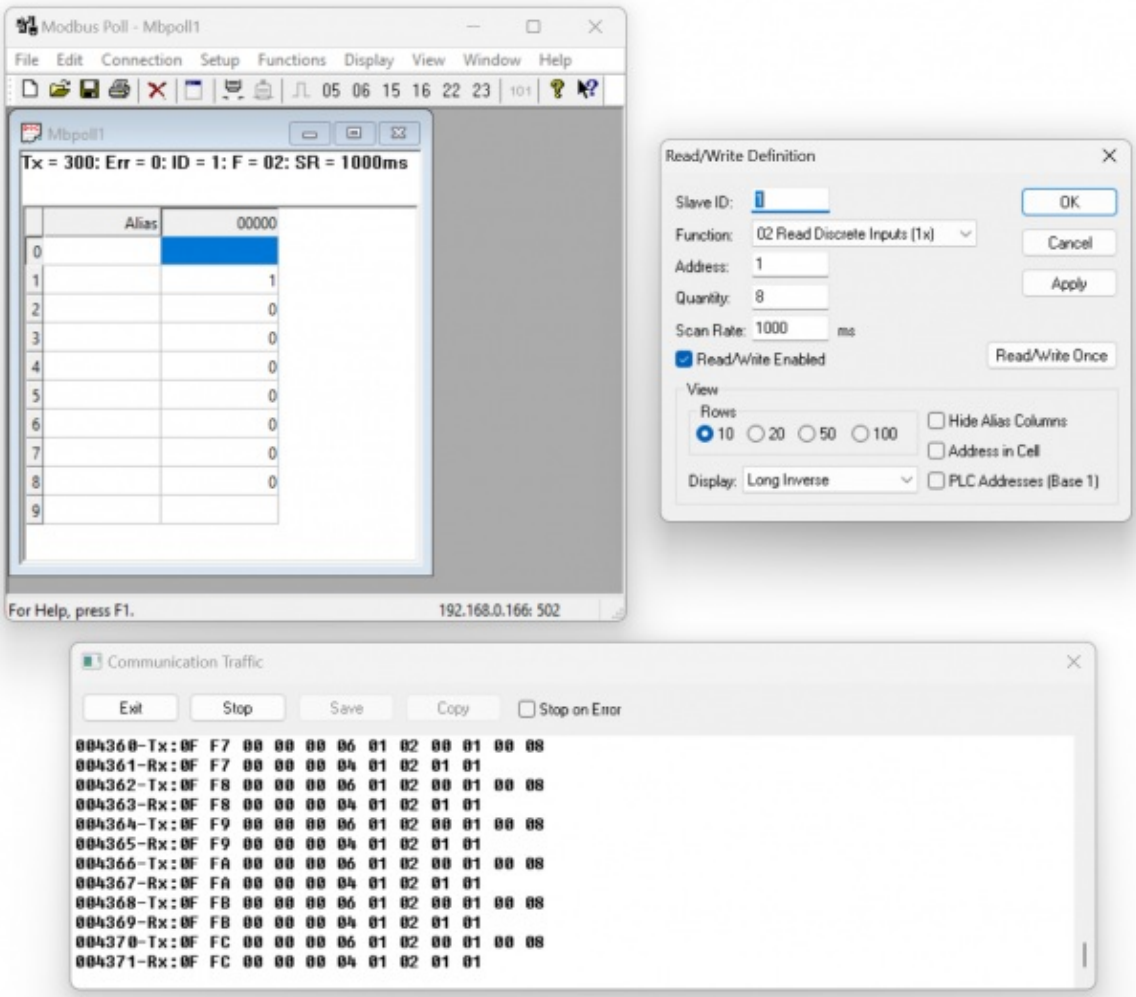
ZTerminal software can be used to read values of HUR Series Modbus TCP Remote I/O Devices.

Enter "IP" and "port" value of HUR device, select "Modbus TCP" and click connect.

Then go to "HUR Modbus" page, enter module Modbus Address Value"" and click "Read Digital Outputs". Zterminal will show input values.



Modbus Poll Software can also be used to read and write those values. After successfull connection to HUR device, following settings can be used to read input values.



9.4 Reading and Writing I/O Values: Analog Output Models

Following commands available to read and write output values of HUR Series Modbus TCP Remote I/O Devices.

- HUR Devices with 5 Channel 4-20mA Analog Output

  Uses Function Code 0x04: Read Input Registers to read output values

  Uses Function Code 0x06: Preset Single Register to set value of individual device output values

Read Output Values with Read Input Registers (Function Code=4)

Request

This command is requesting the values for analog outputs # 01 to 05

from the slave device with address 1.

0001 0000 0006 01 04 0001 0005

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

01: The Slave Address (01 hex = address 1)

04: The Function Code 4 (read input registers)

0001: The Data Address of the first output to read.

(0001 hex = 01)

0005: The total number of outputs requested. (05hex = 5)

Response

0001 0000 000D 01 04 0A 01F4 0064 03E8 0064 0032

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

000D: Modbus TCP - Message Length (13 bytes to follow)

01: The Slave Address (01 hex = address 1)

04: The Function Code 4 (read input registers)

0A: The number of data bytes to follow (5 Outputs / 2 bytes per output)

01F4: Value Output 1 in a range of 0-1000

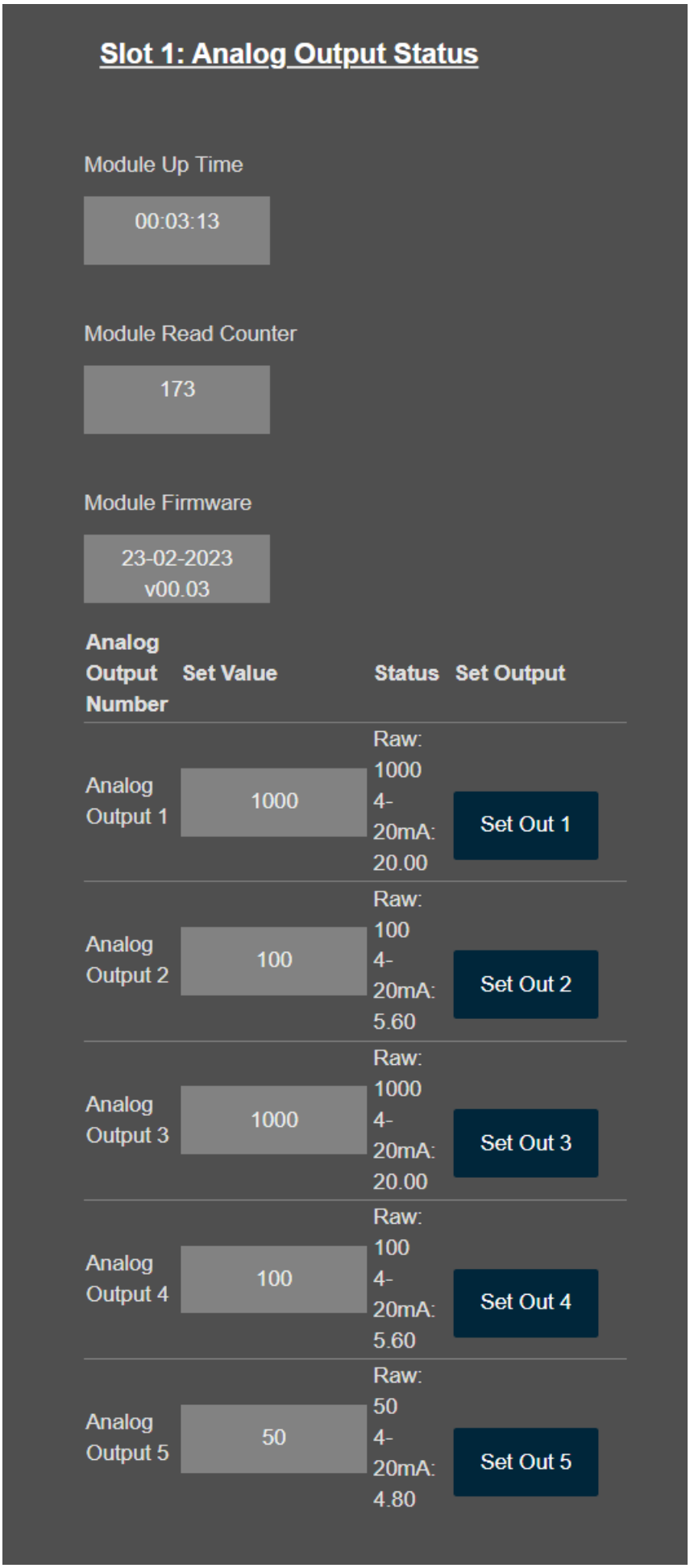
0064: Value Output 2 in a range of 0-1000

03E8: Value Output 3 in a range of 0-1000

0064: Value Output 4 in a range of 0-1000

0032: Value Output 5 in a range of 0-1000

For output 5, Hexadecimal 0x0032 is 50 in decimal. Which is 4.80mA. "I/O Status" menu also shows the value in decimal and in 4-20mA range.



Write Output Values with Preset Single Register (Function Code=6)

Request

This command is writing the value for analog outputs # 01

from the slave device with address 1.

0001 0000 0006 01 06 0001 0005

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

01: The Slave Address (01 hex = address 1)

06: The Function Code 6 (preset single register)

0001: The Data Address of the output to write.

(0001 hex = 01)

0032: The value to write. (Set output port 1 to 0x32 = 50 in decimal and which is 4.80mA)

Response

0001 0000 0006 01 06 0001 0005

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

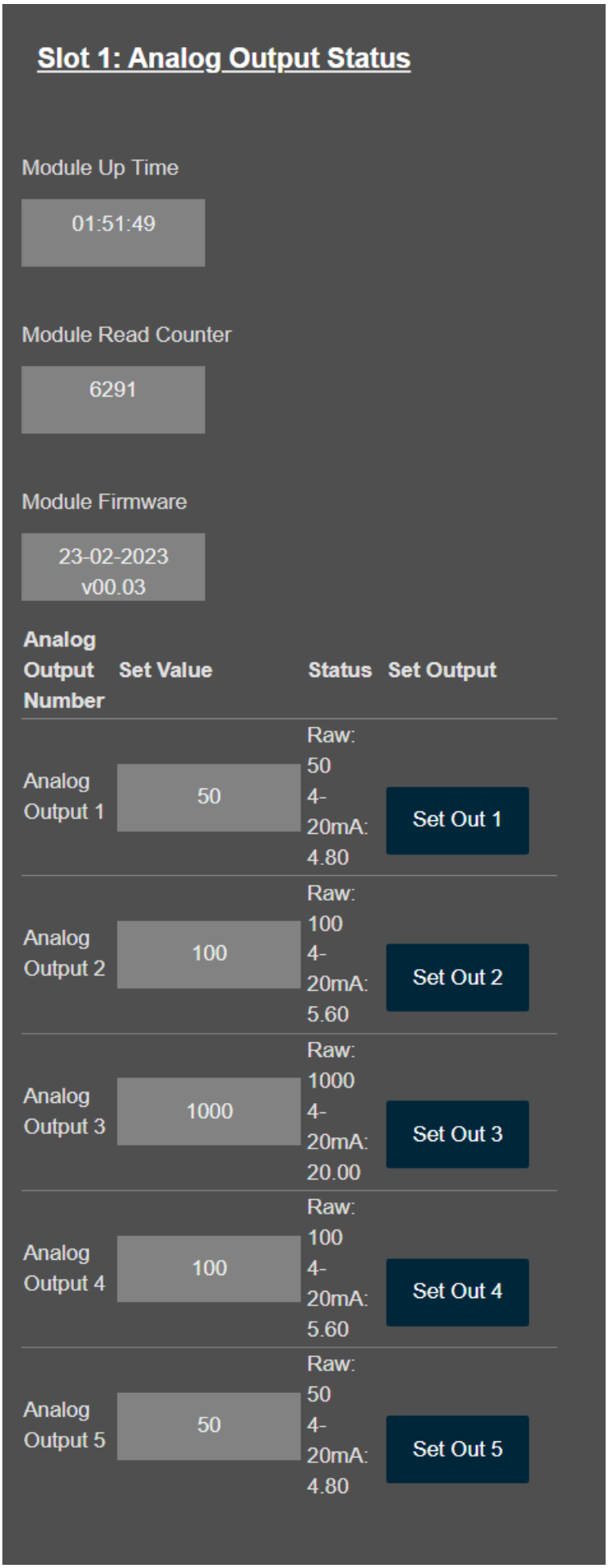
01: The Slave Address (01 hex = address 1)

06: The Function Code 6 (preset single register)

0001: The Data Address of the output written.

0032: The value written. (Output port 1 is now 0x32 = 50 in decimal and which is 4.80mA)

"I/O Status" menu also shows the value in decimal and in 4-20mA range.

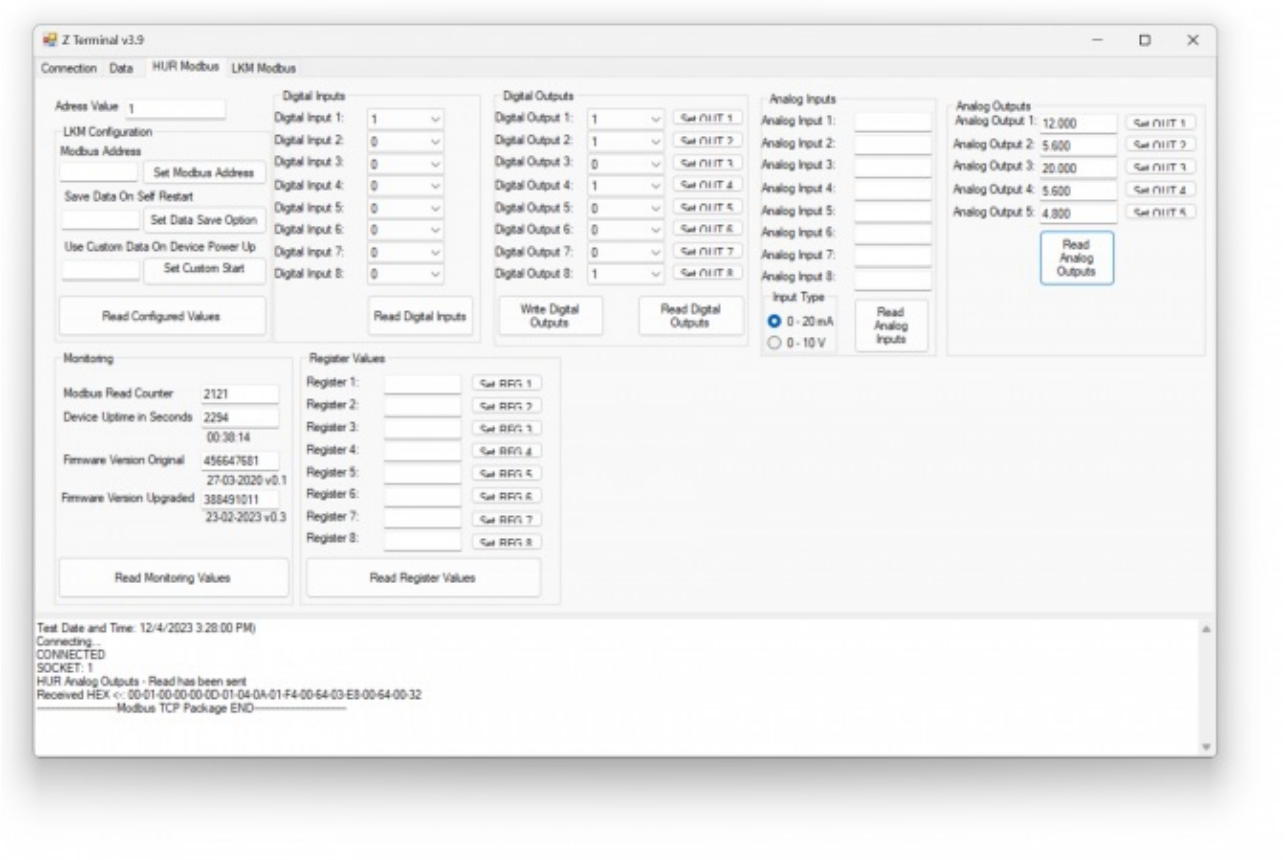


Read via ZTerminal Software Example

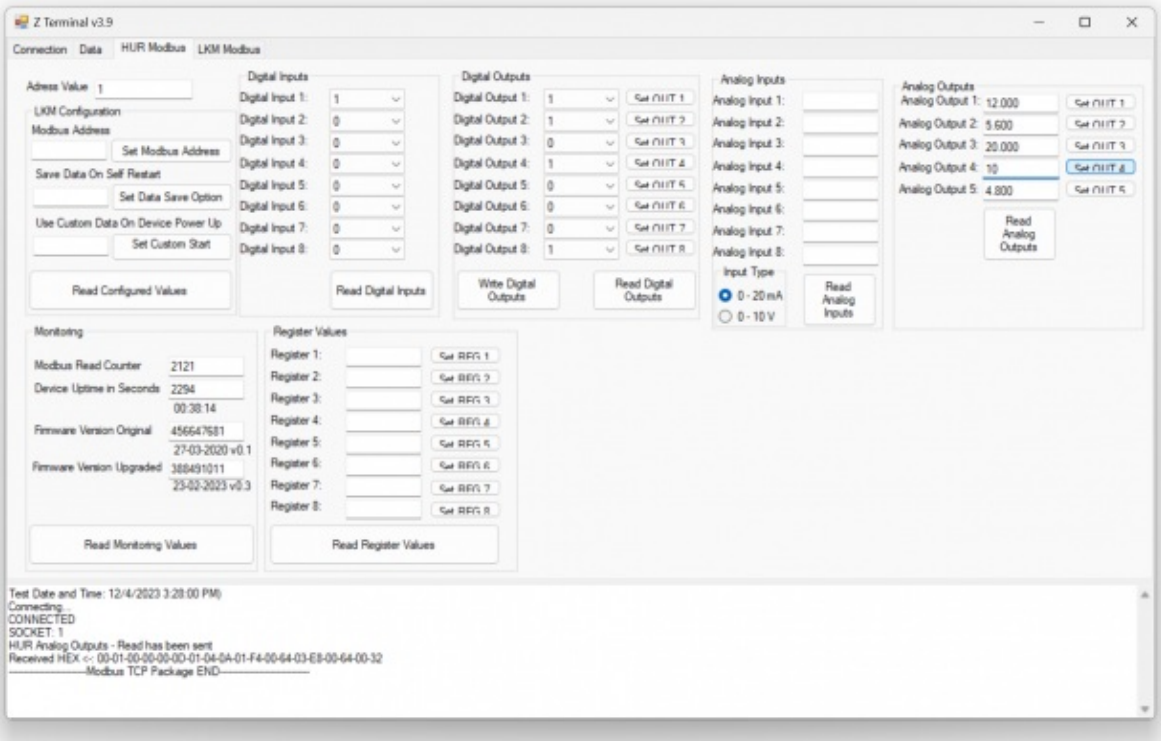
ZTerminal software can be used to read and write values of HUR Series Modbus TCP Remote I/O Devices.

Enter "IP" and "port" value of HUR device, select "Modbus TCP" and click connect.

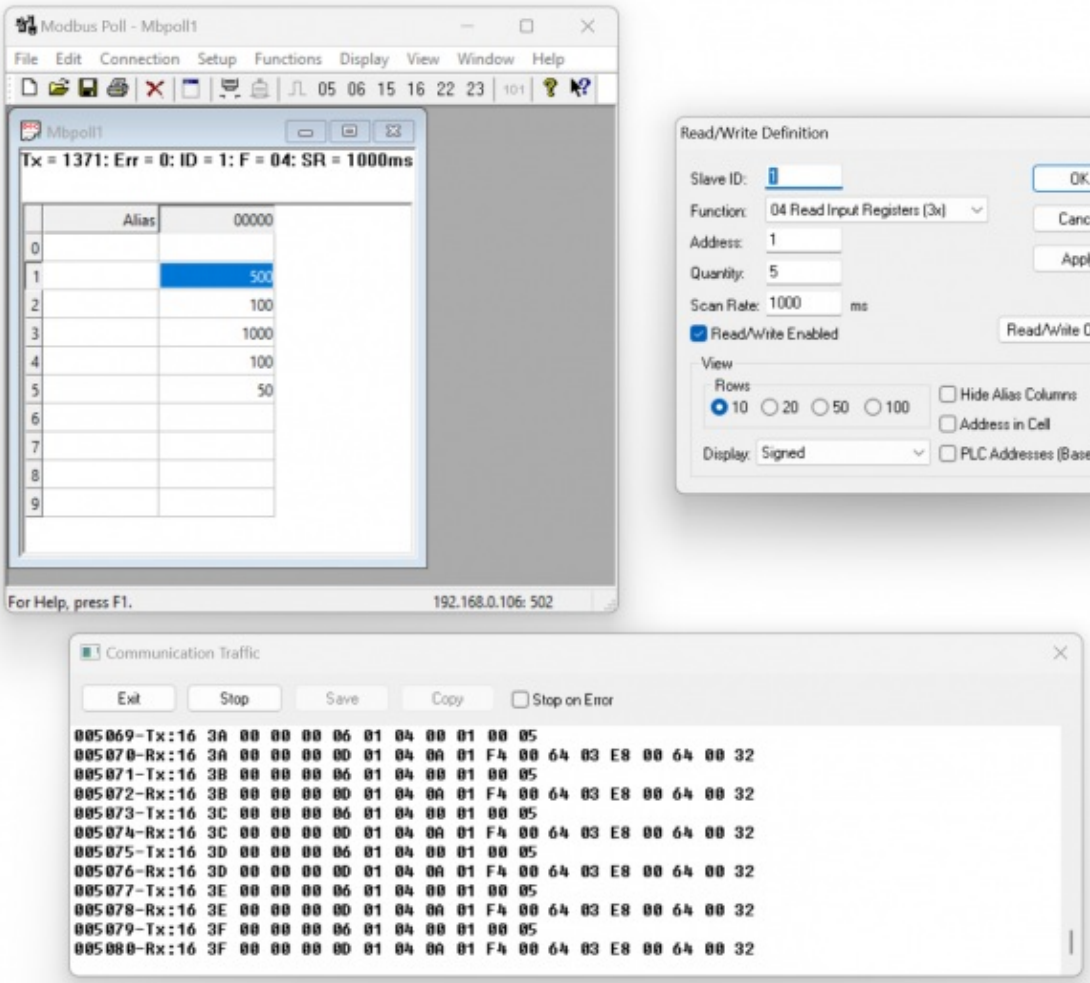
Then go to "HUR Modbus" page, enter module Modbus Address Value"" and click "Read Analog Outputs". ZTerminal will show output values.



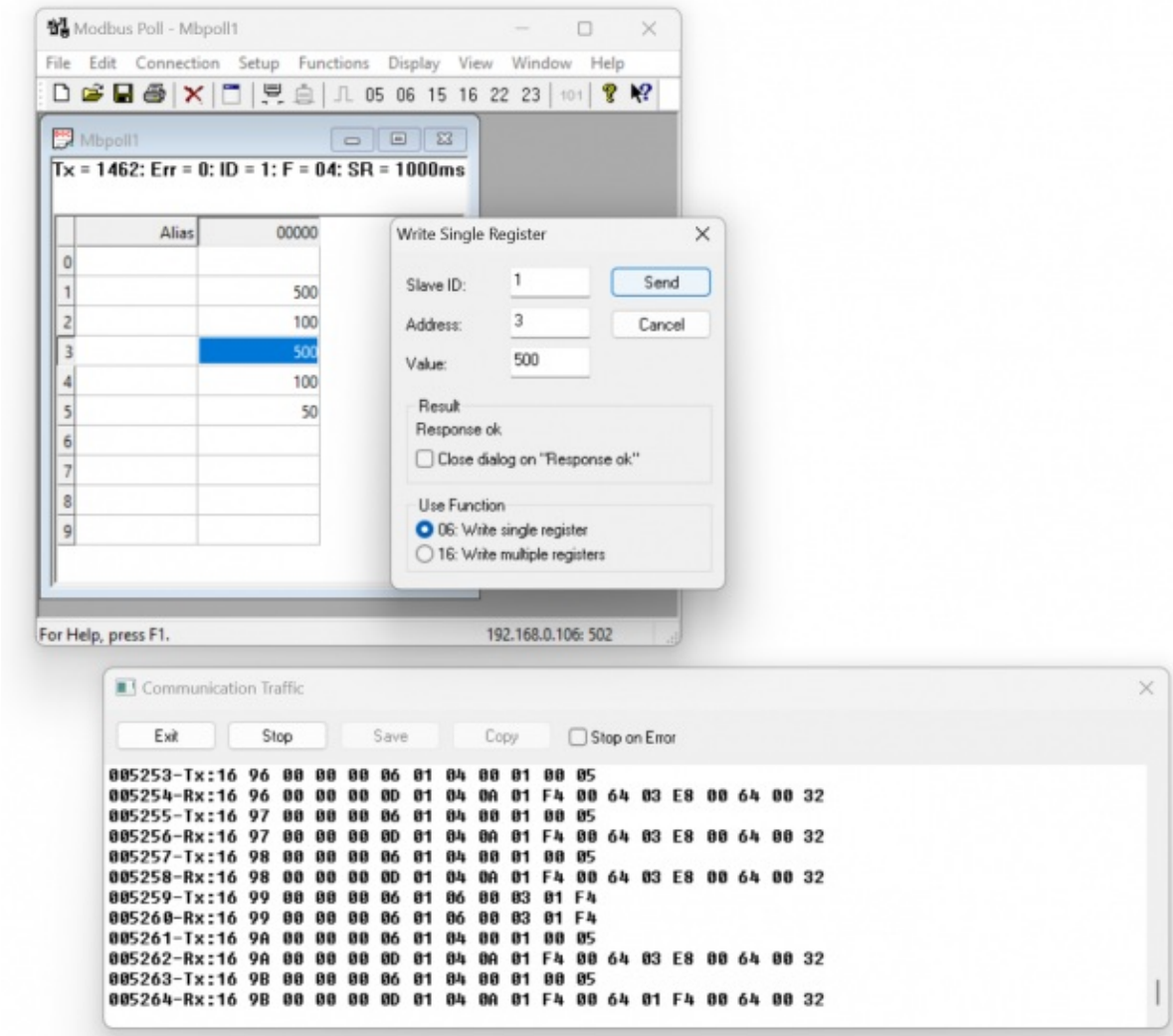
In the same way click "Set Out 4" button to set output value of port 4 after changing its value in range 4 - 20mA.



Modbus Poll Software can also be used to read and write those values. After successfull connection to HUR device, following settings can be used to read output values.



Also user can double click any of the port to open dialog for value write and select the value and write it to device within range 0-1000.



9.5 Reading I/O Values: Analog Input Models

Following commands available to read input values of HUR Series Modbus TCP Remote I/O Devices.

- HUR Devices with 8 Channel 0-10V and 0-20mA Selectable Analog Input

  Uses Function Code 0x04: Read Input Registers to read input values

Read Input Values with Read Input Registers (Function Code=4)

Request

This command is requesting the values for analog outputs # 01 to 08

from the slave device with address 1.

0001 0000 0006 01 04 0001 0008

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0006: Modbus TCP - Message Length (6 bytes to follow)

01: The Slave Address (01 hex = address 1)

04: The Function Code 4 (read input registers)

0001: The Data Address of the first output to read.

(0001 hex = 01)

0008: The total number of outputs requested. (08hex = 8)

Response

0001 0000 0013 01 04 10 7FFC 0000 0000 0000 0000 0000 0000 0000 0000

0001: Modbus TCP - Transaction Identifier

0000: Modbus TCP - Protocol Identifier

0013: Modbus TCP - Message Length (19 bytes to follow)

01: The Slave Address (01 hex = address 1)

04: The Function Code 4 (read input registers)

10: The number of data bytes to follow (8 Outputs / 2 bytes per output)

7FFC: Value Output 1 in a range of 0-65535

0000: Value Output 2 in a range of 0-65535

0000: Value Output 3 in a range of 0-65535

0000: Value Output 4 in a range of 0-65535

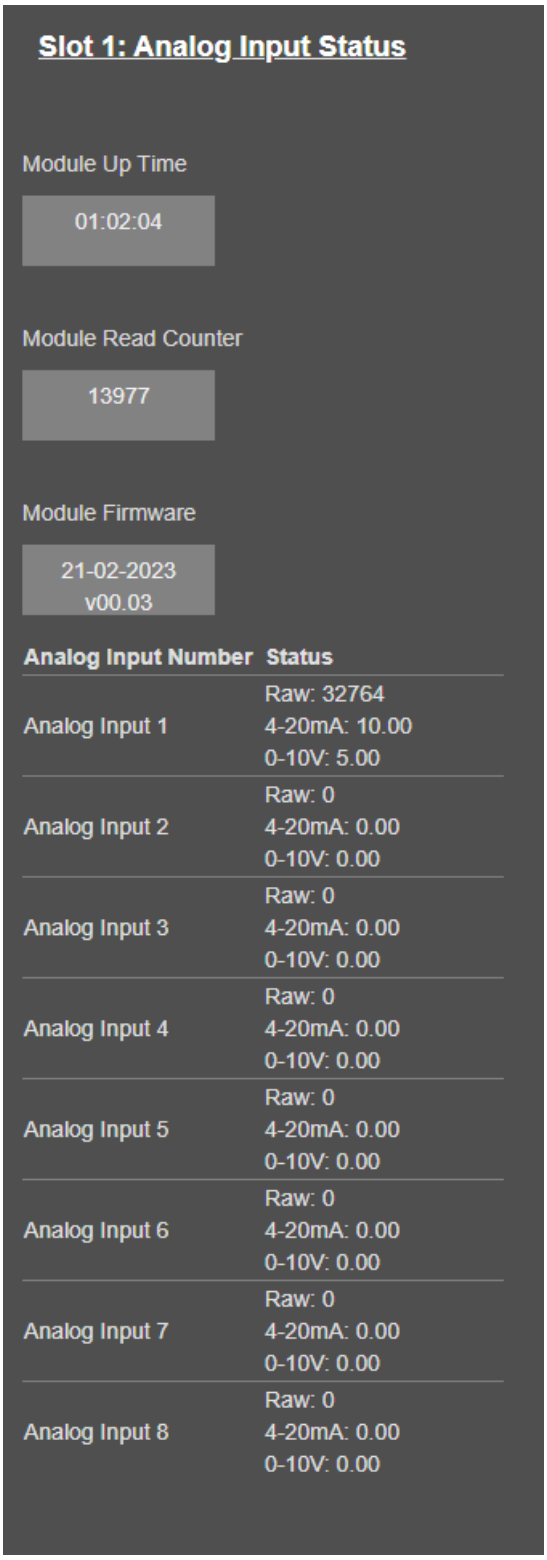
0000: Value Output 5 in a range of 0-65535

0000: Value Output 6 in a range of 0-65535

0000: Value Output 7 in a range of 0-65535

0000: Value Output 8 in a range of 0-65535

For output 1, Hexadecimal 0x7FFC is 32764 in decimal. Which is 10.0mA. "I/O Status" menu also shows the value in decimal and in 4-20mA range.

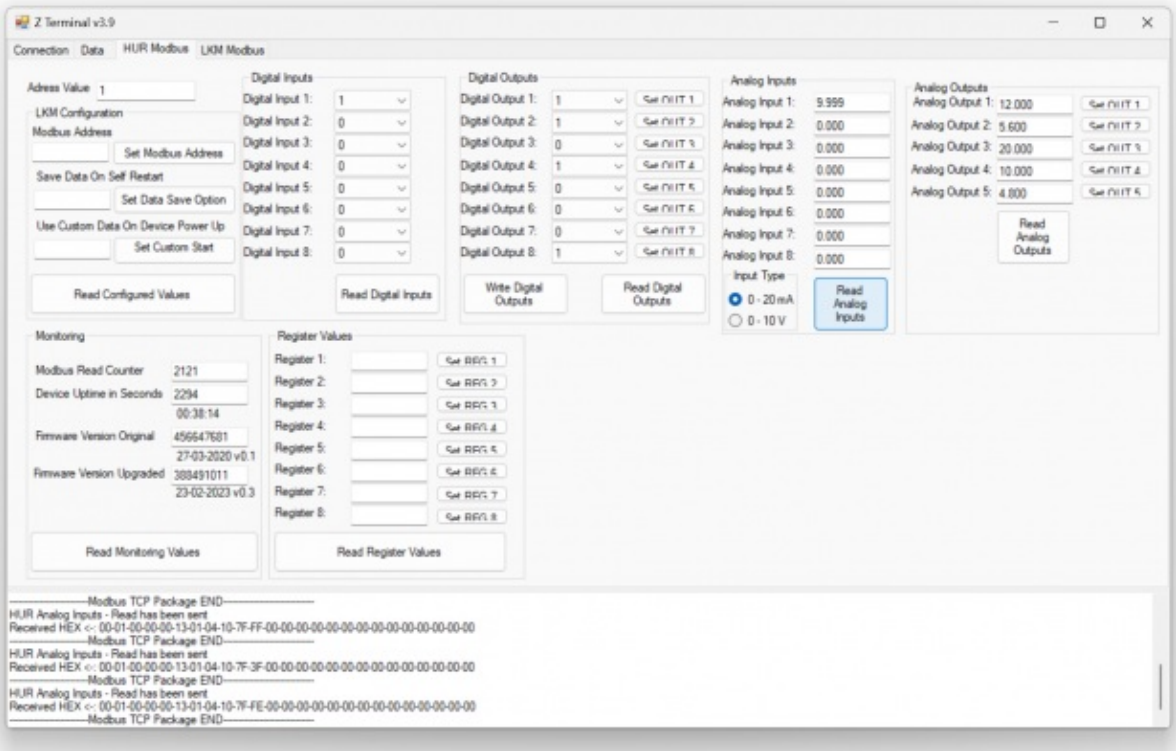


Read via ZTerminal Software Example

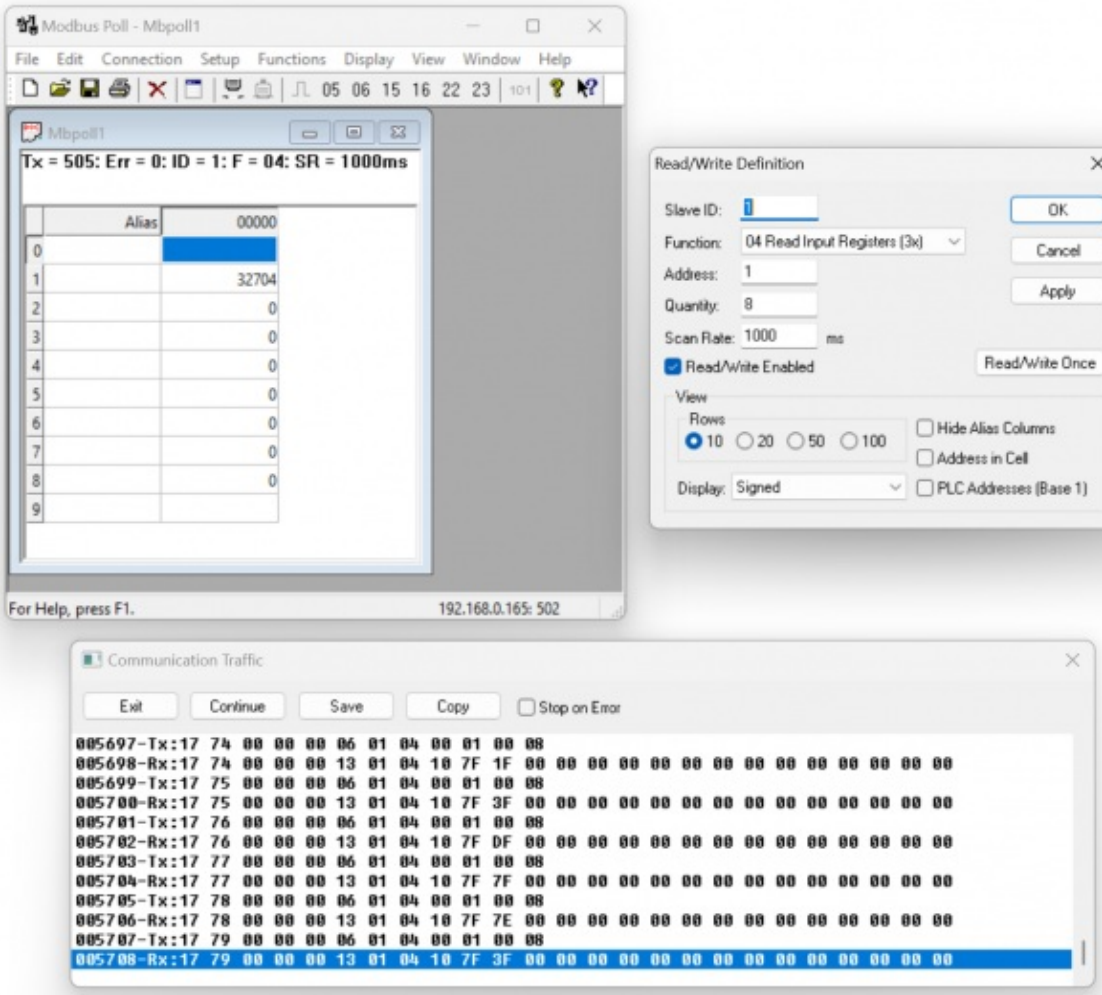
ZTerminal software can be used to read values of HUR Series Modbus TCP Remote I/O Devices.

Enter "IP" and "port" value of HUR device, select "Modbus TCP" and click connect.

Then go to "HUR Modbus" page, enter module Modbus Address Value"" and click "Read Analog Inputs". ZTerminal will show input values.



Modbus Poll Software can also be used to read those values. After successfull connection to HUR device, following settings can be used to read input values.



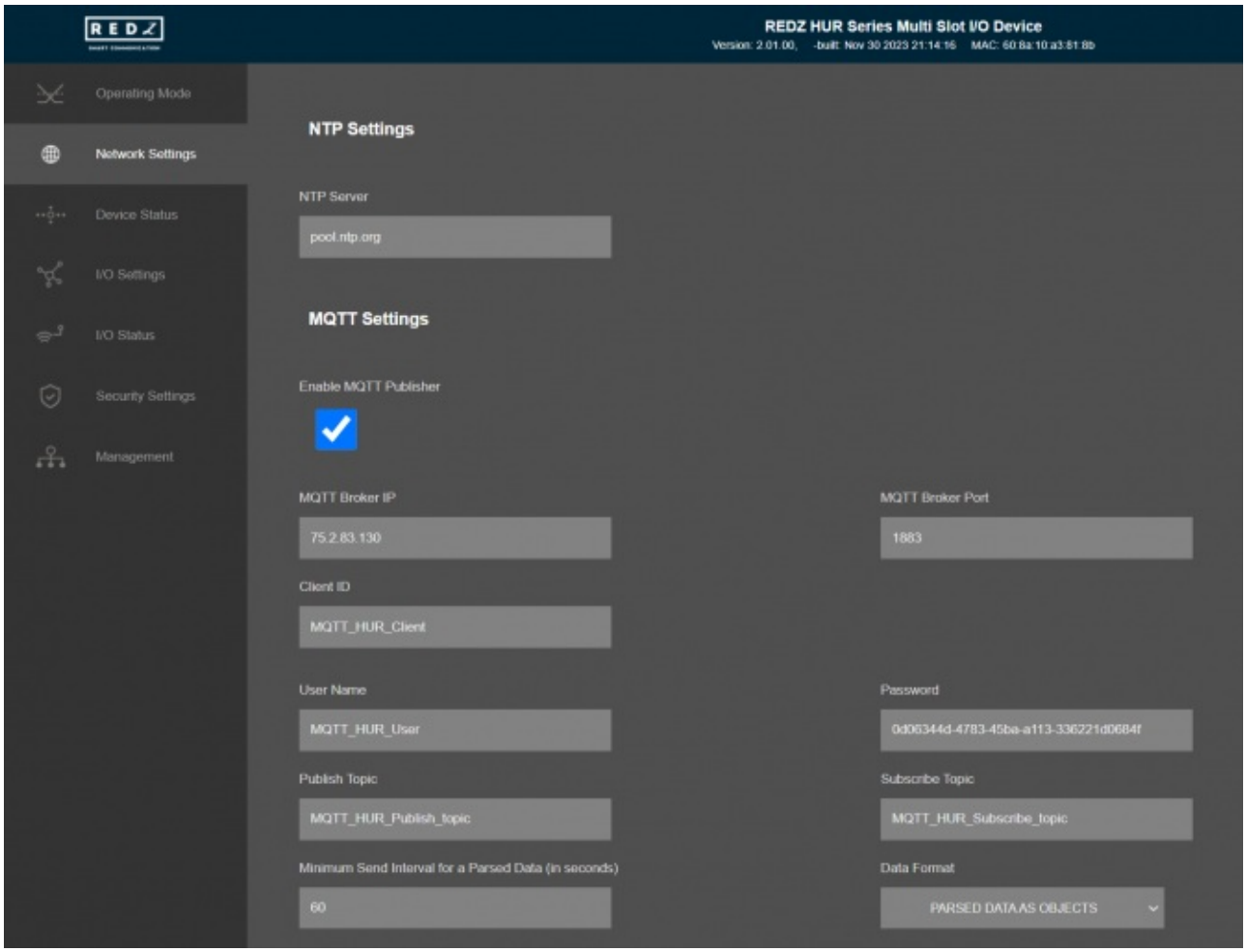
10. MQTT Communication Example

HUR Series Modbus TCP Remote I/O Devices lets user to read input values or write output values over Modbus TCP. Simultaneously all meter data can be sent to MQTT Server.

12.1 MQTT Data Transmission: Example

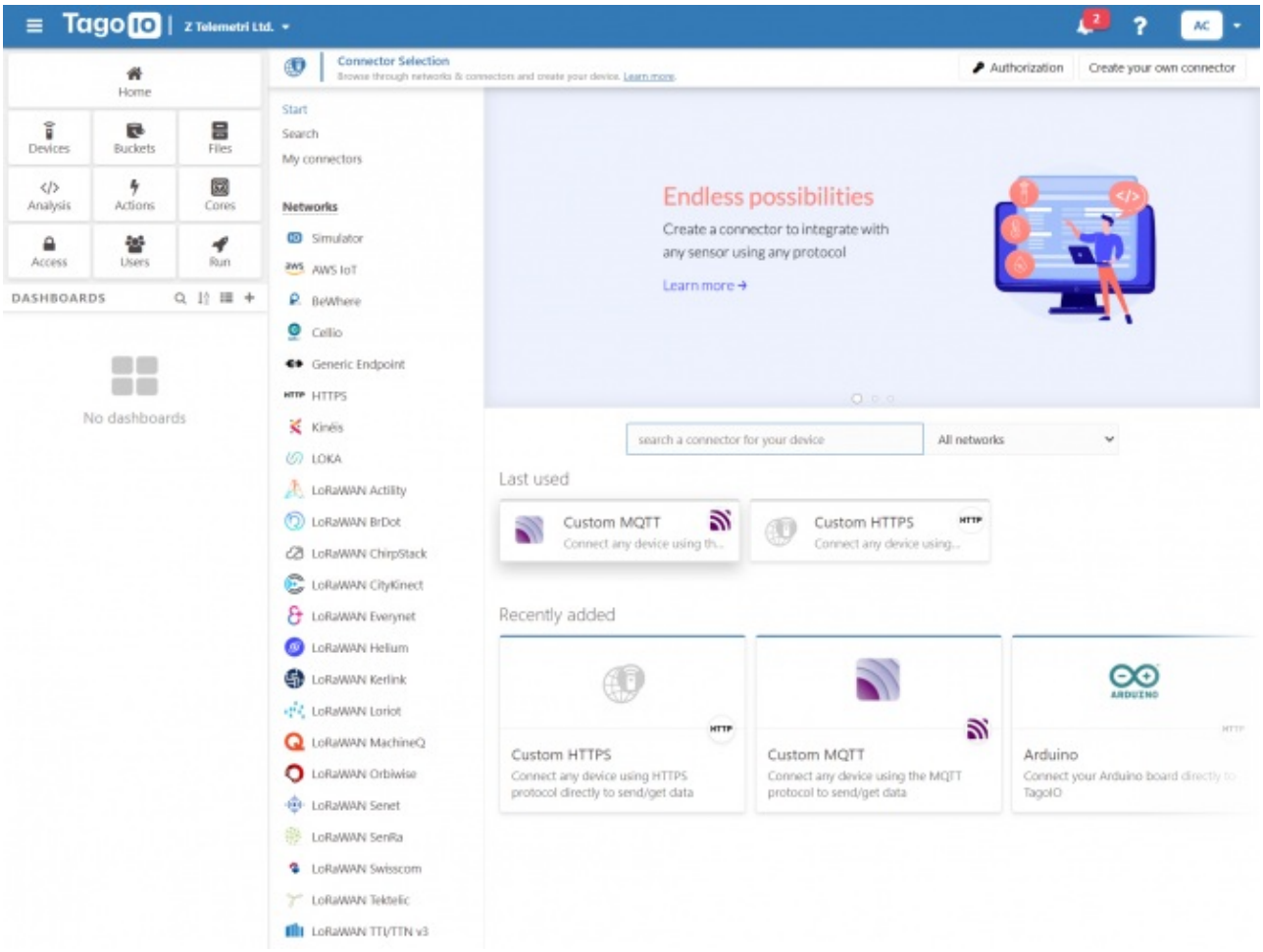
Please follow details regarding reading or writing Modbus registers of HUR which is explained in chapter "9. Modbus Communication" and make sure all readings are ok.

Then go to "Network Settings" menu and "Enable MQTT Publisher for Enabled Obis Codes" part.

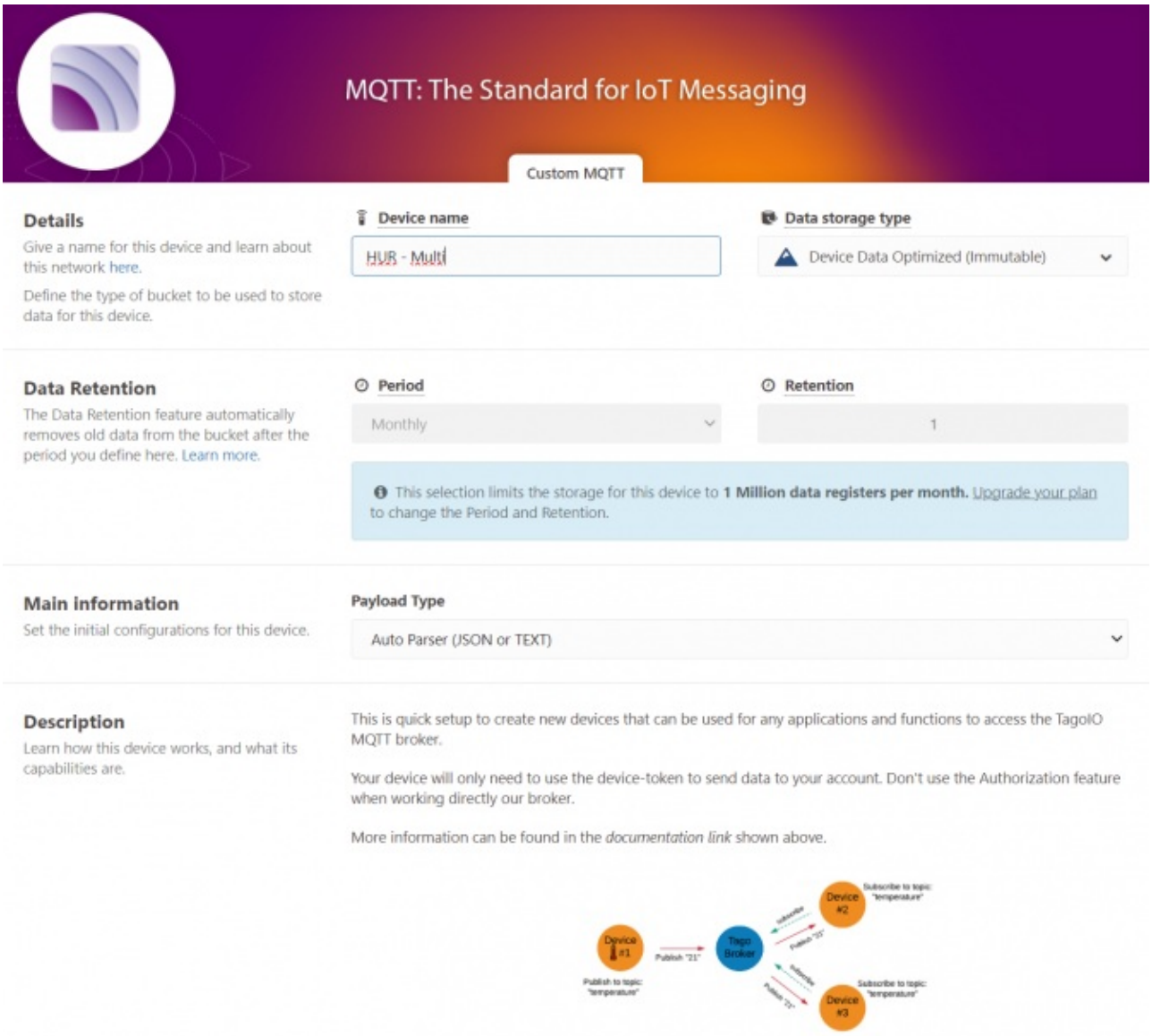


In our example we will use "https://tago.io/" as MQTT Server.

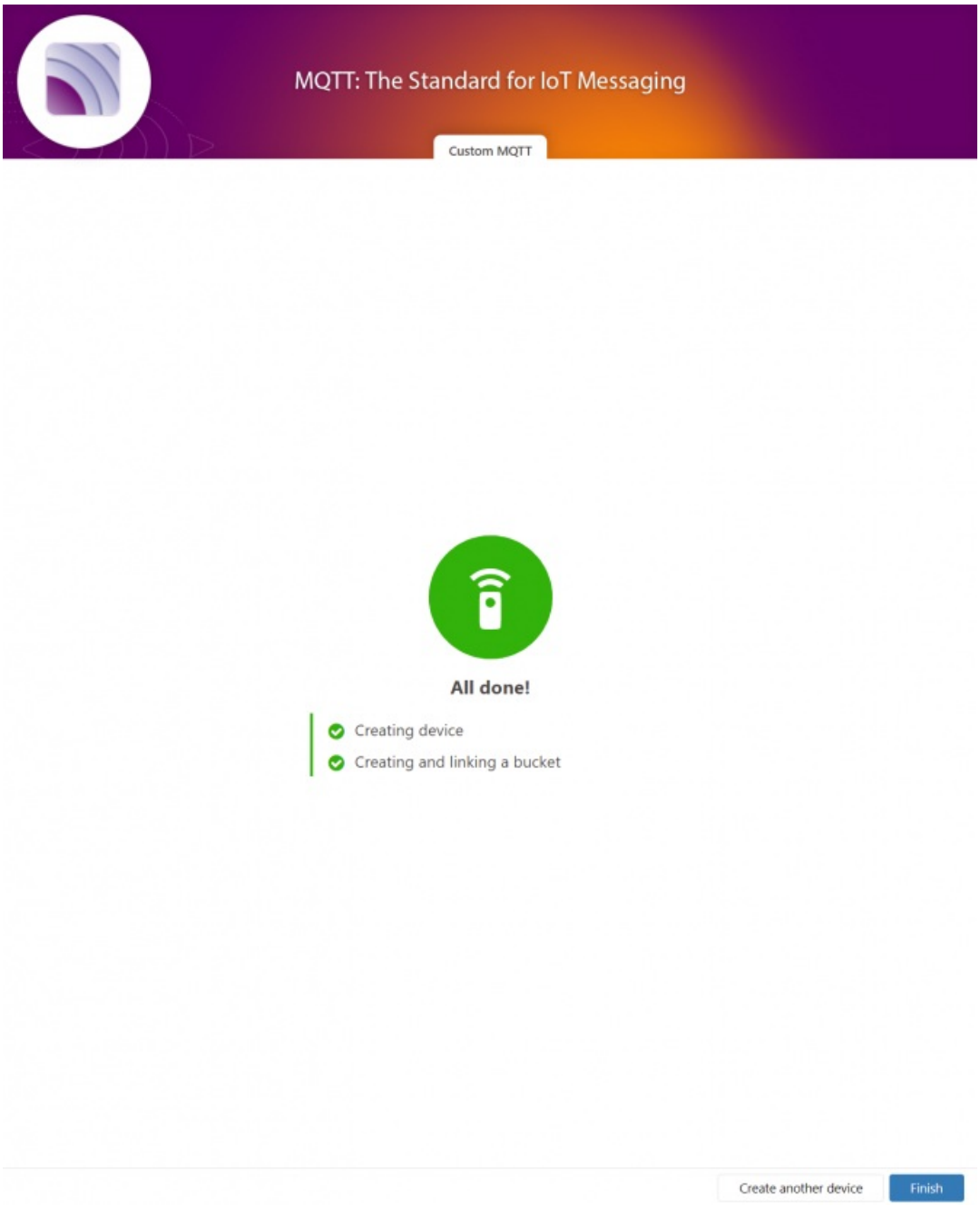
Go to MQTT server panel and click "Add Device" to add HUR to MQTT Server. We will also get password after adding device.



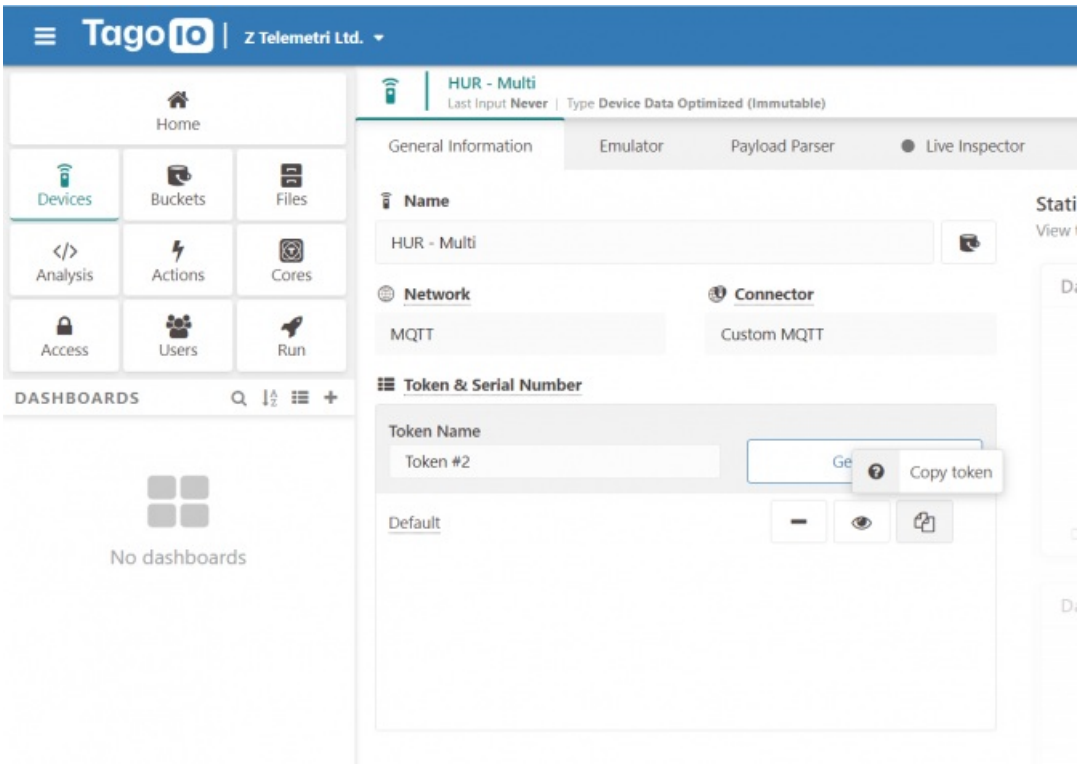
Select "Custom MQTT".



Then enter "Device name" in pop up screen and click "Create My Device".

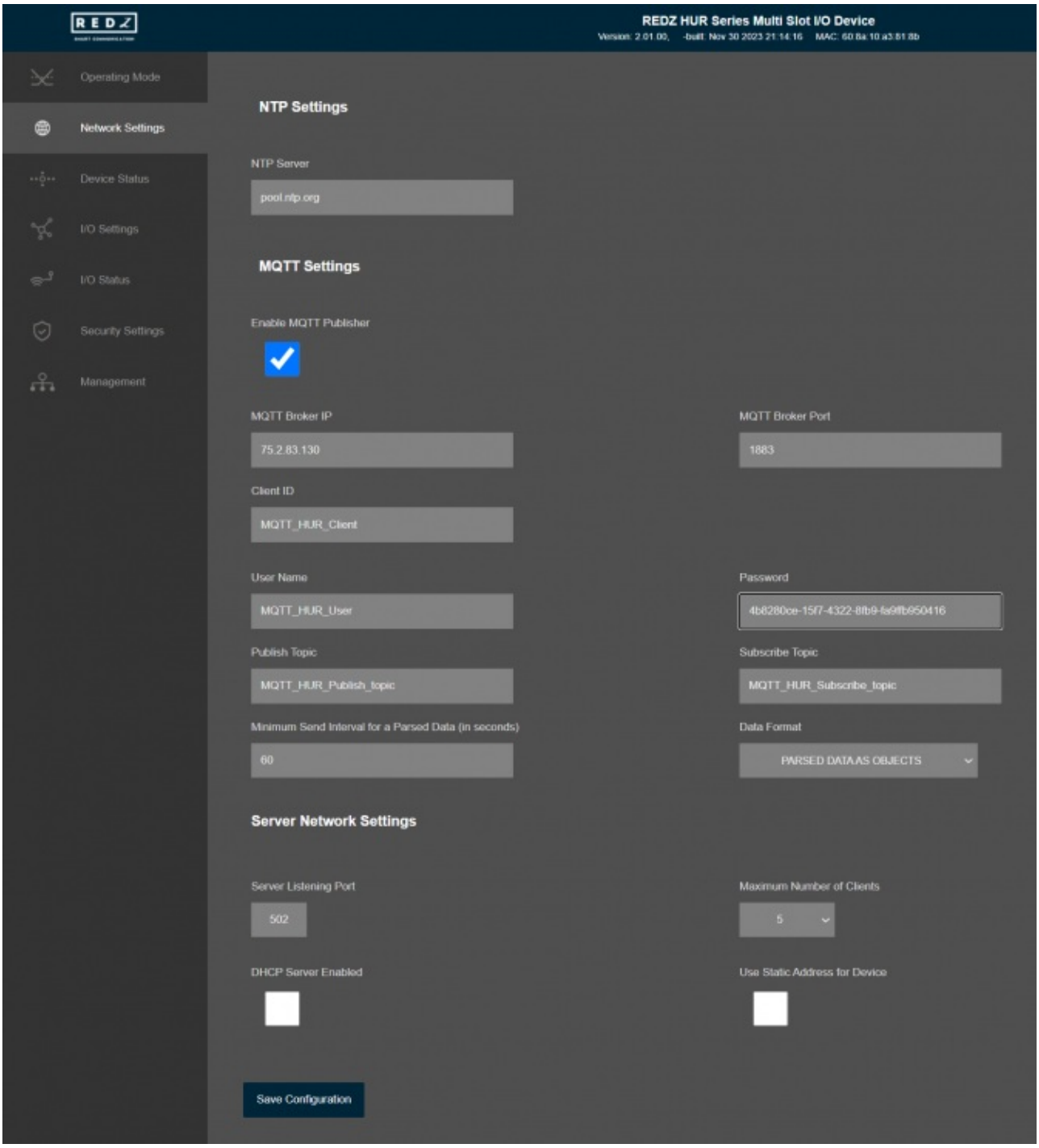


Click "Finish" when all done.



Once the device is created, click "Copy Token" button. This will copy password value.

Then go back to HUR and enter that value as password and click "Save Configuration" button.



"MQTT Broker IP": TCP IP of the MQTT Server. User must enter IP value
75.2.83.130 is IP of "https://tago.io/" web address.

"MQTT Broker Port": TCP Port of the MQTT Server.
1883 is TCP Port of "https://tago.io/" web address.

"Client ID": MQTT Publisher client id. Default is MQTT_HUR_Client.
Maximum length for this field is 32.

"User Name": MQTT Publisher user name. This must be entered based on MQTT server settings.
Maximum length for this field is 64.

"Password": MQTT Publisher password. This must be entered based on MQTT server settings.
Maximum length for this field is 48.

"Publish Topic": MQTT Publisher topic value. Default is MQTT_HUR_Publish_topic.
Maximum length for this field is 32.

"Subscribe Topic": MQTT Publisher subscribe topic value. Default is MQTT_HUR_Subscribe_topic.
Maximum length for this field is 32.

"Minimum Send Interval for a Parsed Data (in seconds)": Minimum value to send meter data to MQTT Server. This time may be longer due to meter quantity in reading queue.

"Data Format": Options for how data is shared by HUR with MQTT server. There are 2 options:

Parsed Data as Objects

Parsed Data as Modbus Frame

When selected as "Parsed Data as Objects", HUR will share data as follows

Device Name, Device Model, NTP Time and Data itself in pairs as IO number and its value.

Device Model Can be:

"Analog Out"
"Digital Out"
"Analog In"
"Digital In"

Here is an example for "Digital Out"

11:04:49:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701417889\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"1\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"1\",\"IO8\":\"1\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701417889\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"1\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"1\",\"IO8\":\"1\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

"IO1" is the first one and its value is shown as "1"
Which means digital out value for 1st port is "1" or "ON".
Next values can be seen in same manner.

Here is an example for "Digital In"

12:13:54:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701422033\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701422033\",\"Data\":{\"IO1\":\"1\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

"IO1" is the first one and its value is shown as "1"
Which means digital out value for 1st port is "1" or "ON".
Next values can be seen in same manner.

Here is an example for "Analog Out"

12:03:13:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701421393\",\"Data\":{\"IO1\":\"1F4\",\"IO2\":\"64\",\"IO3\":\"3E8\",\"IO4\":\"64\",\"IO5\":\"32\"}}", "qos": 0,

"isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701421393\",\"Data\":{\"IO1\":\"1F4\",\"IO2\":\"64\",\"IO3\":\"3E8\",\"IO4\":\"64\",\"IO5\":\"32\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

"IO1" is the first one and its value is shown as "1F4"
Which means analog out value for 1st port is "500" in decimal within a range of 0-1000. Which means port 1 value is "12.0mA".
Next values can be seen in same manner.

Here is an example for "Analog In"

12:09:07:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"IO1\":\"7F3B\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"IO1\":\"7F3C\",\"IO2\":\"0\",\"IO3\":\"0\",\"IO4\":\"0\",\"IO5\":\"0\",\"IO6\":\"0\",\"IO7\":\"0\",\"IO8\":\"0\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

"IO1" is the first one and its value is shown as "7F3C"
Which means analog out value for 1st port is "32572" in decimal within a range of 0-65535.
Which means port 1 value is "10.0mA".
Next values can be seen in same manner.

When selected as "Parsed Data as Modbus Frame", HUR will share data as follows

Device Name, Device Model, NTP Time and Data itself in hexadecimal format just like a Modbus query response. First byte will show data bytes count and rest is the data itself. Data will be in similar format with how the device responds when read via Modbus commands.

Here is an example for "Digital Out"

11:11:47:
[MQTT] Device publish
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701418305\",\"Data\":{\"ModFr\":\"01C3\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }
{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Digital Out\",\"Time\":\"1701418305\",\"Data\":{\"ModFr\":\"01C3\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

01 in beginning is hexadecimal equivalent for 1 byte data count
Next is the value of 8 ports which is "C3"
Binary equivalent of hec C3 is "11000011"

This means

Port 1 value is "1"
Port 2 value is "1"
Port 3 value is "0"
Port 4 value is "0"
Port 5 value is "0"
Port 6 value is "0"
Port 7 value is "1"
Port 8 value is "1"

The 1st bit is port 1 value and 8th bit is port 8 value.

Here is an example for "Digital In"

11:58:33:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701421113\",\"Data\":{\"ModFr\":\"0101\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER\",\"HURMdl\":\"Digital In\",\"Time\":\"1701421113\",\"Data\":{\"ModFr\":\"0101\"}}", "qos": 0, "isHex": false, "bucket": "65699f72cc7006000fd24c88", "messageId": 0 }

01 in beginning is hexadecimal equivalent for 1 byte data count
Next is the value of 8 ports which is "01"
Binary equivalent of hec C3 is "00000001"

This means

Port 1 value is "1"
Port 2 value is "0"
Port 3 value is "0"
Port 4 value is "0"
Port 5 value is "0"
Port 6 value is "0"
Port 7 value is "0"
Port 8 value is "0"

The 1st bit is port 1 value and 8th bit is port 8 value.

Here is an example for "Analog Out"

11:16:48:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701418608\",\"Data\":{\"ModFr\":\"0A01F4006403E800640032\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_SERVER1\",\"HURMdl\":\"Analog Out\",\"Time\":\"1701418608\",\"Data\":{\"ModFr\":\"0A01F4006403E800640032\"}}", "qos": 0, "isHex": false, "bucket": "65326fbe7dc2cd00092f998f", "messageId": 0 }

0A in beginning is hexadecimal equivalent for 10 bytes data count. Each value is 2 bytes, for 5 ports Analog out device, there are 10 bytes.
Next 2 bytes are the value of port 1 which is "01F4"
That means "500" in decimal and that is equal to "12.0mA" in a range of 0-1000.

Next values can be seen in same manner.

Here is an example for "Analog In"

11:46:22:
[MQTT] Device publish

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"ModFr\":\"107FBE00000000000000000000000000\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

{ "topic": "MQTT_HUR_Publish_topic", "payload": "{\"HURNme\":\"HUR_AI_8100\",\"HURMdl\":\"Analog In\",\"Data\":{\"ModFr\":\"107FBE00000000000000000000000000\"}}", "qos": 0, "isHex": false, "bucket": "65699c4040e648000925f01e", "messageId": 0 }

10 in beginning is hexadecimal equivalent for 10 bytes data count. Each value is 2 bytes, for 8 ports Analog in device, there are 16 bytes.
Next 2 bytes are the value of port 1 which is "7FBE"
That means "32702" in decimal and that is equal to "9.98mA" in range 0-65535.

Next values can be seen in same manner.

☝

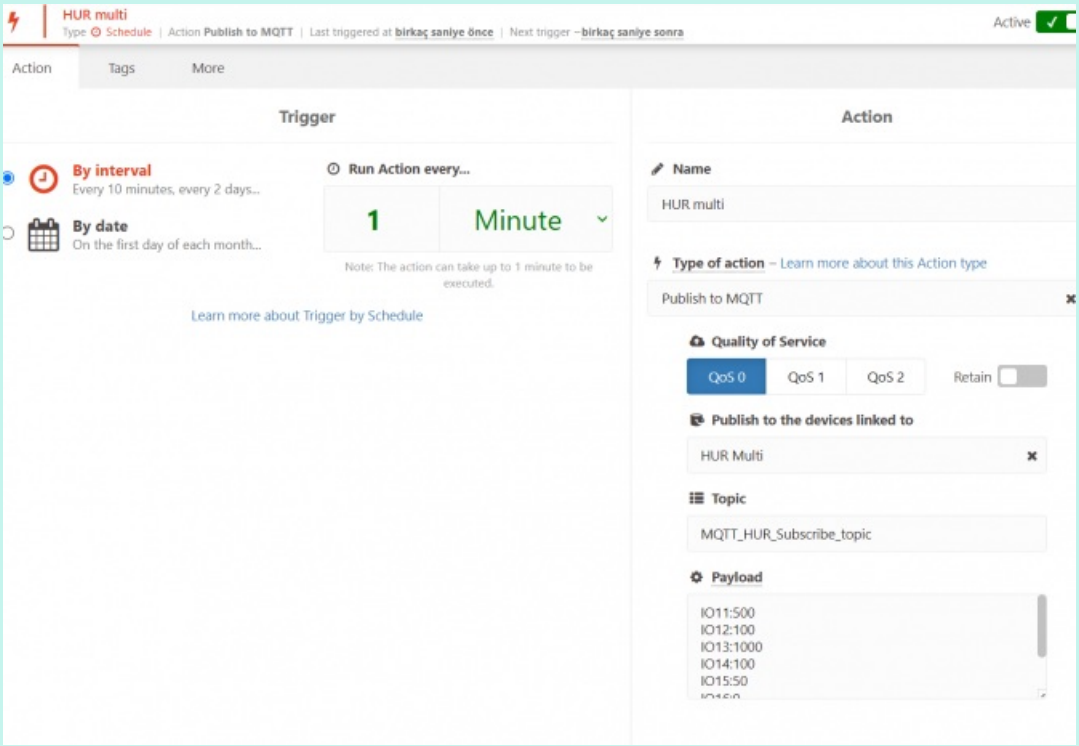
NOTE: Analog Out and Digital Out models can also be controlled via MQTT server.

Format will be as follows:

IO11:500

Letters 'I' and 'O', then Slot number '1' (always 1 for single Slot devices and can be 1-2-3-4 for multi slot device), then ':' and then the value which is a value between range 0-1000 for Analog output version and 0 or 1 for Digital out version. User can write multiple commands and those must be seperated with new line '\n' or 0x0D in hexadecimal format.

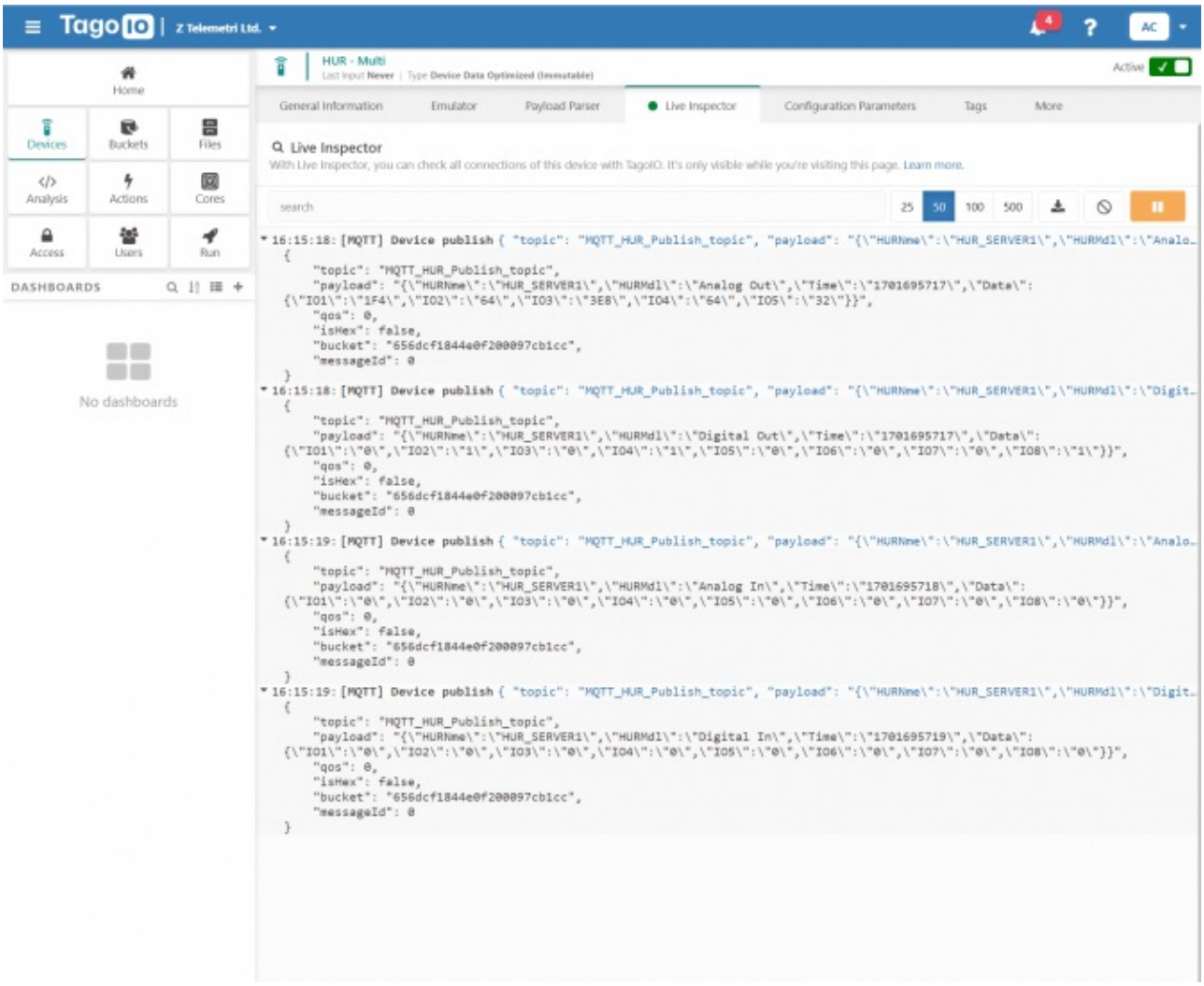
Here is screenshot for an example:



When all settings are done click "Save Configuration".

Go back to "https://tago.io/" panel and click "Live Inspector" for the HUR and click "Play button".

Data will be shown in real time.



User has to parse and use that parsed data for visualization (for graphs for example) for their application. That is beyond scope of HUR usage.

☝

NOTE: HUR Multi models send values to MQTT server for all slots. HUR single slot versions can also send values for 1 slot.

HUR single slot or multi slot Output slots can be managed from MQTT server in same manner.

11. I/O Mirror Application Example with TLM LoRa RF Modems

11.1 I/O Mirror Application Between 2 HUR Series Modbus TCP Remote I/O Devices

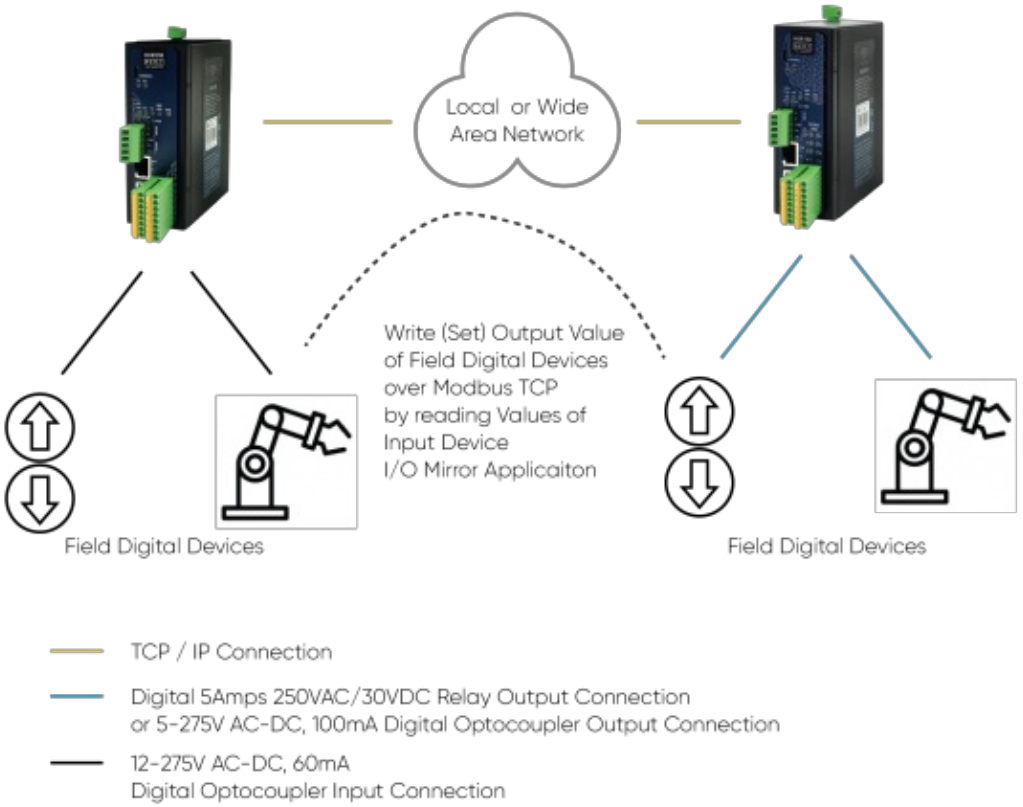
HUR Series Modbus TCP Remote I/O Devices Output versions can duplicate input value of Input versions. Outputs can be 5-275V AC-DC, 100mA Digital Optocoupler Output or 5Amperes 250VAC/30VDC Relay Output or 4-20mA Analog Output. Following devices can be used as output device for this application:

- HUR158 and HUR258 with 8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output
- HUR168 and HUR268 with 8 Channel Digital 5Amps 250VAC/30VDC Relay Output
- HUR595 and HUR695 with 5 Channel 4-20mA Analog Output

Inputs can be 12-275V AC-DC, 60mA Digital Optocoupler Input or 4-20mA Analog Input. Following devices can be used for this application:

- HUR358 and HUR458 with 8 Channel 12-275V AC-DC, 60mA Digital Optocoupler Input
- HUR558 and HUR658 with 8 Channel 0-10V and 0-20mA Selectable Analog Input

As expected, Analog devices can pair with each other and Digital devices can pair with each other.



☝

NOTE: I/O Mirror Application can be done between same I/O devices which means Analog devices can pair with each other and Digital devices can pair with each other.

11.2 I/O Mirror Application Example Between 2 HUR Series Analog Input and Analog Output Devices

Here is an example video for I/O Mirror application between

- HUR558 and HUR658 with 8 Channel 0-10V and 0-20mA Selectable Analog Input

The Analog Current value we input from Analog In HUR is set to Analog Out HUR via TLM Series LoRa RF Modems.

Here is the video for configurations:

12. Ordering Information

HUR158: 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output Modbus TCP Remote IO Device, 1 x RS485, 5-48V (max. 60V) DC Power Input

HUR168: 8 Channels Digital 5Amps 250VAC/30VDC Relay Output Modbus TCP Remote IO Device, 1 x RS485, 5-48V (max. 60V) DC Power Input

HUR258: 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output Modbus TCP Remote IO Device, 1 x RS485, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR268: 8 Channels Digital 5Amps 250VAC/30VDC Relay Output Modbus TCP Remote IO Device, 1 x RS485, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR358: 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 1 x RS485, 5-48V (max. 60V) DC Power Input

HUR458: 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 1 x RS485, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR558: 8 Channels 0-10V and 0-20mA Selectable Analog Input Modbus TCP Remote IO Device, 1 x RS485, 5-48V (max. 60V) DC Power Input

HUR595: 5 Channels 4-20mA Analog Output Modbus TCP Remote IO Device, 1 x RS485, 5-48V (max. 60V) DC Power Input

HUR658: 8 Channels 0-10V and 0-20mA Selectable Analog Input Modbus TCP Remote IO Device, 1 x RS485, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR695: 5 Channels 4-20mA Analog Output Modbus TCP Remote IO Device, 1 x RS485, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR711: Multi Slot, 4 x 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR811: Multi Slot, 4 x 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR712: Multi Slot, 4 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR812: Multi Slot, 4 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR713: Multi Slot, 4 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR813: Multi Slot, 4 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR714: Multi Slot, 4 x 8 Channels 0-20mA Analog Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR814: Multi Slot, 4 x 8 Channels 0-20mA Analog Input Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR715: Multi Slot, 4 x 5 Channels 4-20mA Analog Output Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR815: Multi Slot, 4 x 5 Channels 4-20mA Analog Output Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR721: Multi Slot, 2 x 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output, 2 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR821: Multi Slot, 2 x 8 Channels 5-275V AC-DC, 100mA Digital Optocoupler Output, 2 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR722: Multi Slot, 2 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output, 2 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR822: Multi Slot, 2 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output, 2 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR725: Multi Slot, 2 x 5 Channels 4-20mA Analog Output, 2 x 8 Channels 0-20mA Analog Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR825: Multi Slot, 2 x 5 Channels 4-20mA Analog Output, 2 x 8 Channels 0-20mA Analog Input Modbus TCP Remote IO Device, 100 - 240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input

HUR741: Multi Slot, 1 x 5 Channels 4-20mA Analog Output, 1 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output, 1 x 8 Channels 0-20mA Analog Input, 1 x 8 Channels 12-275 AC-DC, 60mA Digital Optocoupler Input Modbus TCP Remote IO Device, 5-48V (max. 60V) DC Power Input

HUR841: Multi Slot, 1 x 5 Channels 4-20mA Analog Output, 1 x 8 Channels Digital 5Amps 250VAC/30VDC Relay Output, 1 x 8 Channels 0-20mA Analog Input, 1 x 8 Channels 12-275 AC-

13. Product Selection

Model	5-48V (max. 60V) DC Power input	100-240V AC (120 – 370V DC), 50Hz to 60Hz AC Power Input	1 x RS485 port	8 Channel 5-275V AC-DC, 100mA Digital Optocoupler Output	8 Channel Digital 5Amp. Relay Output	8 Channel 12-275 AC-DC, 60mA Digital Optocoupler Input	8 Channel 0-10V and 0-20mA Selectable Analog Input	5 Channel 4-20mA Analog Output	Multi Slot
HUR158	X		X	X					
HUR168	X		X		X				
HUR258		X	X	X					
HUR268		X	X		X				
HUR358	X		X			X			
HUR458		X	X			X			
HUR558	X		X				X		
HUR595	X		X					X	
HUR658		X	X				X		
HUR695		X	X					X	
HUR711	X			X (4)					X
HUR811		X		X (4)					X
HUR712	X				X (4)				X
HUR812		X			X (4)				X
HUR713	X					X (4)			X
HUR813		X				X (4)			X
HUR714	X						X (4)		X
HUR814		X					X (4)		X
HUR715	X							X (4)	X
HUR815		X						X (4)	X
HUR721	X			X (2)		X (2)			X
HUR821		X		X (2)		X (2)			X
HUR722	X				X (2)	X (2)			X
HUR822		X			X (2)	X (2)			X
HUR725	X						X (2)	X (2)	X
HUR825		X					X (2)	X (2)	X
HUR741	X				X	X	X	X	X
HUR841		X			X	X	X	X	X