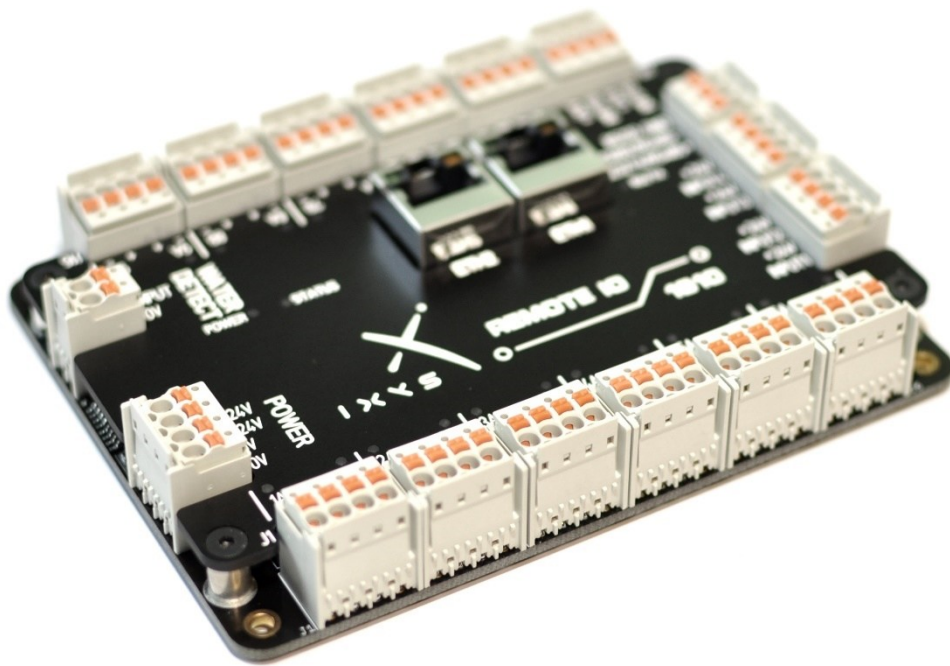


USER MANUAL



REMOTE IO 1810

REVISION C

**REVISIONS**

| PUBLISHED | REVISION | NOTES | REVISED BY |
|------------|----------|---|------------|
| 03.06.2025 | C | Updated template, reworked structure, added Functional description | OMH |
| 22.01.2024 | B | Changed product name | VHA |
| 10.03.2023 | A | Issued for release | VHA |



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1 INTRODUCTION

1.1 PURPOSE AND SCOPE

This document outlines and defines the installation, operation, and maintenance procedures for the Ixys Remote IO 1810 PCB. The manual will contain all relevant data and methods to be able to use and maintain the device for its intended purpose.

The manual includes technical specifications, installation information, description of the various switch features, as well as troubleshooting suggestions.

1.2 ABBREVIATIONS

| ABBREVIATION | DESCRIPTION |
|--------------|-------------------------------|
| ESD | Electrostatic Discharge |
| IP | Internet Protocol |
| PCB | Printed Circuit Boards |
| PWM | Pulse Width Modulation |
| TCP | Transmission Control Protocol |
| UDP | User Datagram Protocol |

1.3 SUPPLIER CONTACT INFORMATION

Ixys AS
Langmyra 11
4344 Bryne
Norway

+47 51 42 22 22
post@ixys.no
<https://ixys.no>

1.4 DOCUMENT REFERENCES

| DOCUMENT NUMBER | DESCRIPTION |
|------------------------|-------------|
| 114554-ICS-PD-DAS-0001 | Datasheet |







2 HEALTH, SAFETY AND ENVIRONMENT

2.1 GENERAL

Safety Notes and General Precautions shall be presented to all personnel concerned prior to testing, operation, maintenance, and repair. The operations shall be performed by the responsible engineer/supervisor. The personnel using this equipment must have knowledge of this type of equipment and have familiarized themselves with the applicable procedures and manuals for this product.

2.2 SAFETY MESSAGE LEVELS

| Safety message level | | Indication |
|---|---------------------------|---|
|  | DANGER: | A hazardous situation which, if not avoided, will result in death or serious injury |
|  | WARNING: | A hazardous situation which, if not avoided, could result in death or serious injury |
|  | CAUTION: | A hazardous situation which, if not avoided, could result in minor or moderate injury or damage to equipment |
|  | Electrical Hazard: | The possibility of electrical risks if instructions are not followed in a proper manner |
| Note: | | A potential situation which, if not avoided, could result in an undesirable result or state. A practice not related to personal injury |



3 TECHNICAL INFORMATION AND DATA

3.1 TECHNICAL DESCRIPTION

The Remote IO 1810 is a printed circuit board with dual Ethernet ports and a built-in switch enabling daisy-chaining multiple PCBs. The board has 18 PWM outputs and 10 analog 4-20 mA inputs. 6 inputs can be used as discrete digital inputs, or combined in pairs as 3 digital counters, to read encoders, flow meters or similar.

The PCB has a full-featured, user-friendly web-interface, which allows configuration of all features. There's also a live view of input and output values.

All inputs and outputs are available over Modbus, for usage from Ixys VJU Studio or other systems. The PCB supports Modbus over TCP and UDP over Ethernet, and Modbus RTU over RS232 or two-wire RS485.

The board has built-in monitoring of supply voltage and water detection.

3.2 TECHNICAL DATA

| | |
|----------------------|----------------------|
| Manufacturer | Ixys AS |
| Ixys part number | 114554 |
| Description | PCB Remote IO 1810 |
| Weight | ~ 150 g |
| Dimensions | 120 x 90 x 22 mm |
| Supply voltage | 24 V DC (10-30) |
| Power consumption | < 3 W* |
| Network connectivity | 10/100 Mbps |
| Serial communication | RS232/two-wire RS485 |

*Power consumption when idle, only Ethernet communication active

3.3 WARRANTY CONDITIONS AND GUARANTEE

- Improper use of equipment where use is not reflected in what it was intended to.
- Where general maintenance is not performed, leading to defective parts or other types of defects.
- Incorrect handling or use of equipment.
- Packing not carried out in an ESD protective way.

3.4 ORDERING

| Ixys Part Number | Description |
|------------------|--------------------|
| 114554 | PCB Remote IO 1810 |



3.5 ACCESSORIES

| Ixys Part Number | Description |
|------------------|--|
| 114568 | Connector – 2-way plug Wago 3.5 mm 2091-1122 |
| 114566 | Connector – 3-way plug Wago 3.5 mm 2091-1123 |
| 112073 | Connector – 4-way plug Wago 3.5 mm 2091-1124 |



4 HARDWARE DESCRIPTION

4.1 DRAWING

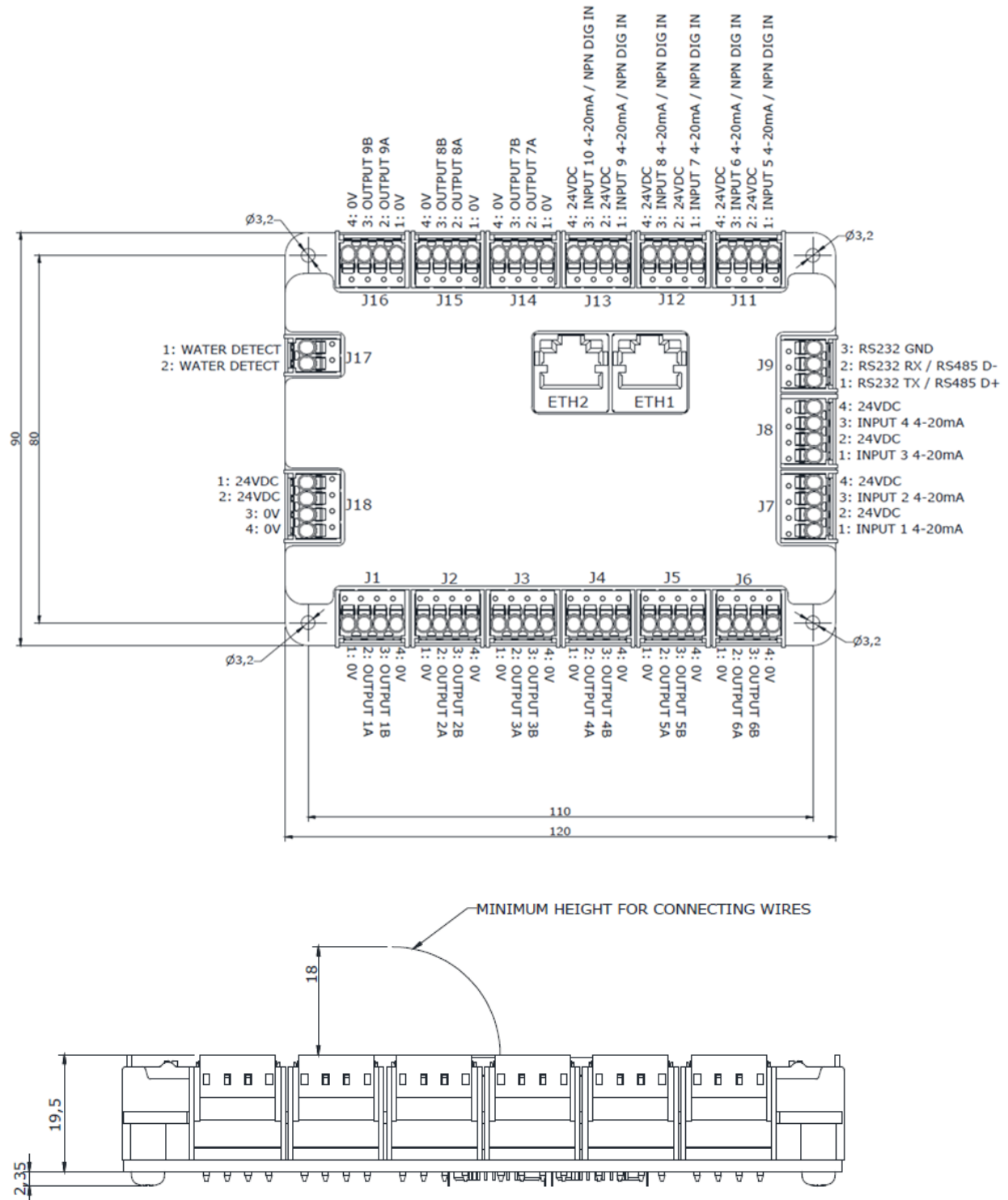


Figure 4-1 - Dimensions and pinout



4.2 LEDS

The POWER LED will light up as soon as the board is powered correctly.

Each RJ45 has two LEDs. The green LED is a combined link/activity LED. When it's lit, a link has been established on this port, and blinking indicates activity on this port. The yellow LED indicates port speed.

The serial port has a dual TX/RX LED. It's lit up green when data is transmitted out of the PCB, and red when data is received into the PCB.

For each output channel, there is an LED that shows the current output state. A outputs use a green LED and B outputs use blue LED. The brightness will be dependent on the current output value.

4.3 CONNECTIONS

The PCB should be powered by connecting supply voltage on J18.

J17 is usable for water detection. If pin 1 of J17 is shorted to pin 2, the board will detect this, and indicate it as described in section 6.2.

If it's desired to communicate with the PCB over the serial interface, RS232/RS485 devices can be connected to J9. When using RS232, the PCB expects to receive data on the RS232 RX pin, while responses will come back out of RS232 TX pin. RS232 requires a common GND, so pin 3 must be connected to the external device's GND. When using RS485, pin 3 can be left unconnected.

Each output (e.g. Output 1A, output 1B and so on) will give a 24 V PWM signal, with a variable duty cycle, and can be directly connected to a load (for instance a hydraulic valve).

4-20 mA sensors can be directly connected to each of the input channels. If the sensor needs 24 V DC supply, that can be drawn from the 24 V DC of the input connectors, if desired. The 24 V DC pins are each protected with an auto-resetting 160 mA PTC fuse.

Digital inputs can be connected to inputs 5-10. The digital inputs are NPN inputs, so they need to be pulled low externally to read an edge. The digital inputs are combined in fixed pairs (input 5 and 6, 7 and 8 and 9 and 10) for reading A/B encoders or flow meters, for a total of 3 counters.



5 FUNCTIONAL DESCRIPTION

5.1 GENERAL

All outputs are disabled when the board is powered on.

The PCB has a water detect input, which can be used to indicate water intrusion, and supply voltage measurement. See section 6.2 for details on how to read out these values.

5.1.1 WEB INTERFACE

All features of the PCB can be configured from a user-friendly web interface. The web interface is accessible by opening the device's IP address in any modern browser.

The About page shows the firmware version, serial number and hardware revision. It's also possible to perform a Factory reset to return all settings to default, and to reboot the PCB.

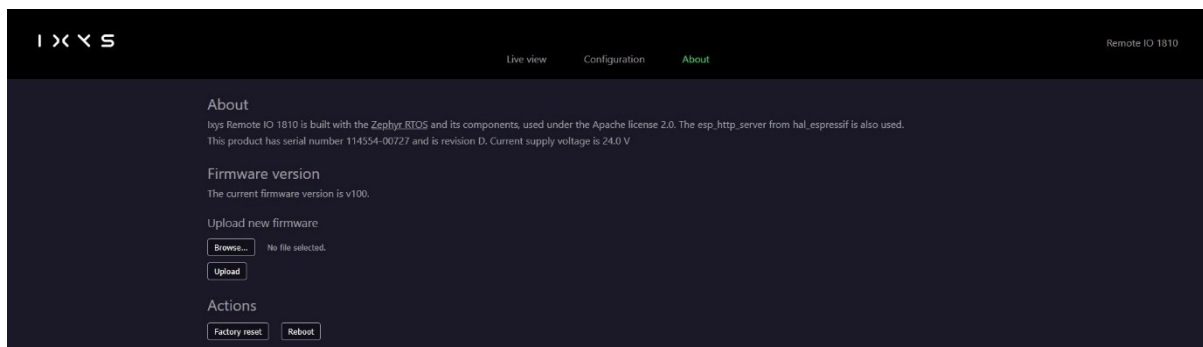


Figure 2 About page

The Live view tab allows viewing the current output and input values, and easily change the current output values.

Note: If any output is being written over Modbus while the web interface is open, Modbus writes will overwrite any change in the web interface.

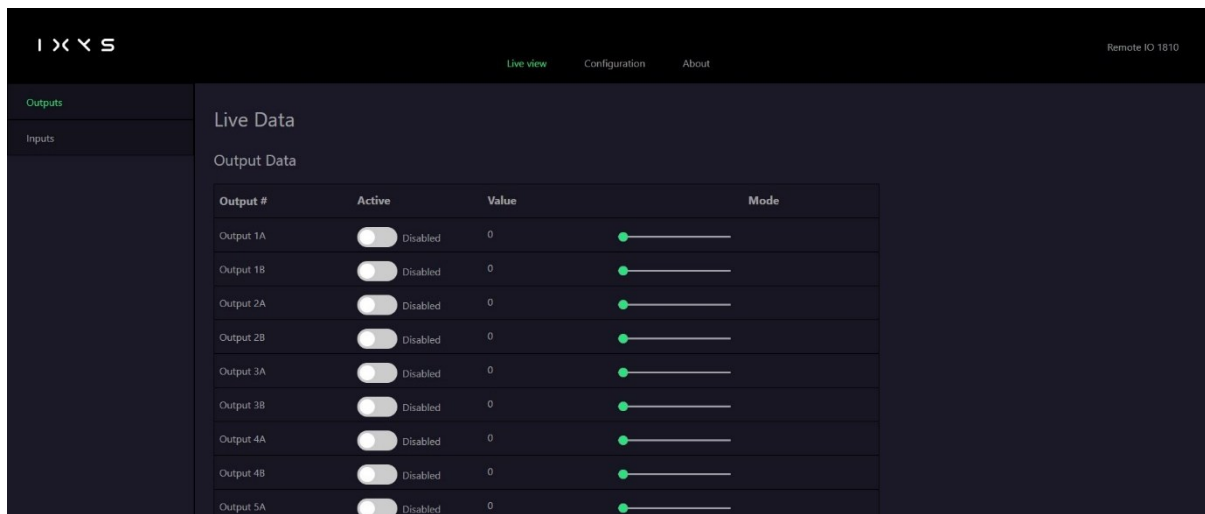


Figure 3 Live output view

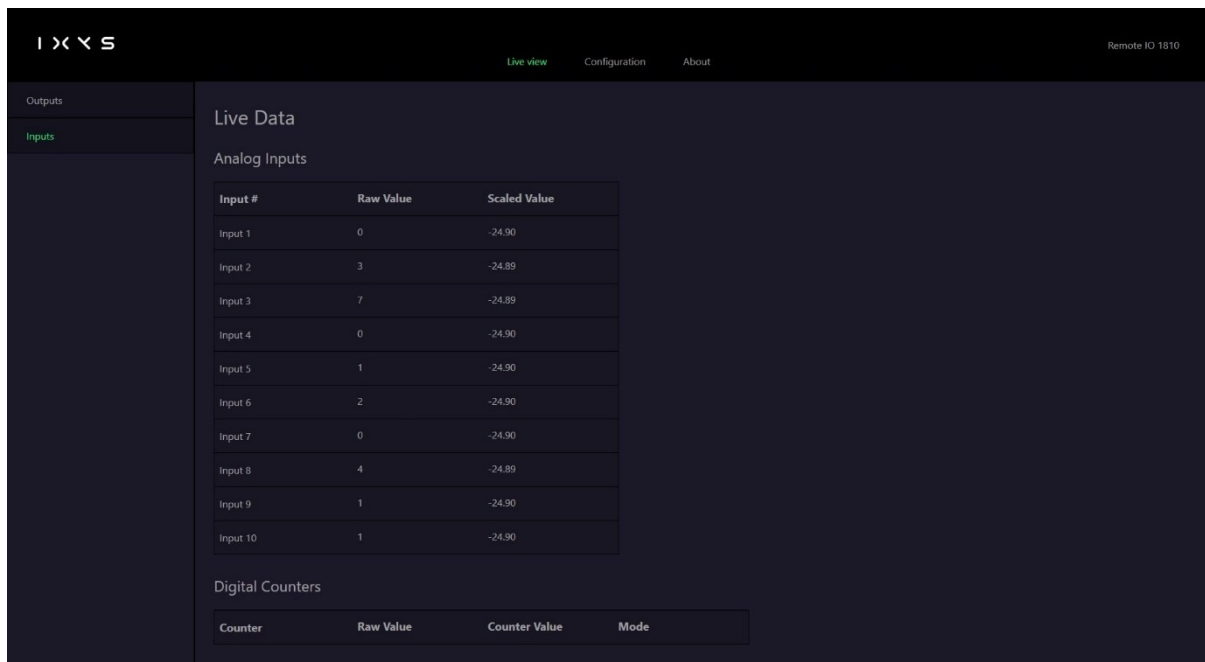


Figure 4 Live input view

All configuration is available on the Configuration tab, including the ability to change the PCB's IP address.



The screenshot shows the IXYS web interface. The top navigation bar includes 'Live view', 'Configuration', and 'About'. The left sidebar has 'General', 'Outputs', and 'Inputs'. The main content area is titled 'Configuration' and contains two sections: 'Network configuration' and 'Communication failure settings'. Under 'Network configuration', there are input fields for 'IP address' (10.0.37.248), 'Network mask' (255.255.255.0), and 'Gateway' (0.0.0.0). Below these are two dropdown menus for 'Port 1' and 'Port 2', both set to 'Auto-negotiate'. The 'Communication failure settings' section has a 'Timeout' field set to 1000 ms. At the bottom, there is a 'Serial settings' section with 'Unit ID' (1), 'Serial mode' (RS232), and 'Baud rate' (115200). A 'Save configuration' button is located at the bottom of the serial settings.

Figure 5 Basic configuration

5.1.2 NETWORK PORTS

The PCB has two Ethernet ports, which functions as an Ethernet switch. Other PCBs or network devices can therefore be daisy-chained if needed.

Each port is set up with auto-negotiation enabled by default, but port speed and duplex mode can be forced per port from the web interface.

The default IP of is 10.0.37.248/24.

5.1.3 COMMUNICATION FAILURE

When used as part of a control system, it is usually expected that another device in the system will write desired output states to the PCB periodically. Should such writes not happen for a given period, this often indicates a system problem.

The board therefore monitors writes and can be configured to zero all outputs a certain time after the last write. This time period is called the Communication Failure timeout, and can be set from the web interface, or in a Modbus register.

By default, the board has its timeout set to 0, which means that all outputs will be left as-is when the Communication Failure timeout triggers. If the timeout is set to a non-zero value, all outputs will be set to 0 once the timeout triggers.

5.1.4 HEARTBEAT BROADCAST

Every 5 seconds, the device sends a UTF-8 encoded JSON object in a UDP packet to the broadcast IP 255.255.255.255 on port 65000. This message includes the device's IP address, firmware version, serial number, and allows easy identification.



Ixys VJU Studio software will use this to automatically identify the device, but it can also be found manually for instance with Wireshark, or by other applications.

5.1.5 MODBUS TCP/UDP/RTU

The PCB supports Modbus/TCP and Modbus/UDP over Ethernet and Modbus/RTU over RS232/RS485.

When using RS485, there is a software-controlled termination on the PCB, which can be enabled or disabled as required.

The default Modbus Unit ID is 1 and the baud rate on Modbus RTU is 115200, but both can be changed through a Modbus register or from the web interface. The serial interface always uses 8 data bits, no parity and 1 stop bit.

Registers that can be read or written are described in section 6.2.

All readable registers can be read with Function Code Read Holding Registers and Read Input Registers. All registers are writable with both Write Single Register and Write Multiple Registers.

5.1.6 IXYS REMOTE IO ASYNC PROTOCOL

Remote IO 1810 supports a binary UDP-based protocol to access the most common registers. The PCB listens for output messages on UDP port 65123, and once an output message is received, input messages will be transmitted at a configurable interval. If no output message is received for 1 s, input message transmission will be stopped.

Input messages are sent back to the IP and port the output message was received from. The output and input messages are defined below.

OUTPUT MESSAGE

This message should be sent by the host device, to the Remote IO 1810 PCB's IP.

| Byte | Description | Note | Data Type |
|------|----------------------|----------------------|-----------|
| 0 | Output 1A Active MSB | Same as Register 200 | UINT16 |
| 1 | Output 1A Active LSB | | |
| 2 | Output 1A Value MSB | Same as Register 201 | UINT16 |
| 3 | Output 1A Value LSB | | |
| 4-71 | Output 1B-9B | | |



INPUT MESSAGE

This message will be sent by the Remote IO 1810 PCB to the device that it receives an output message from.

| Byte | Description | Note | Data Type |
|---------|-------------------|---------------------|----------------------------------|
| 0 | Status MSB | Same as Register 3 | UINT16 |
| 1 | Status LSB | | |
| 2 | Voltage MSB | Same as Register 5 | UINT16 |
| 3 | Voltage LSB | | |
| 4 | Input 1 Scaled b1 | Same as Register 10 | REAL32 |
| 5 | Input 1 Scaled b0 | | |
| 6 | Input 1 Scaled b3 | Same as Register 11 | |
| 7 | Input 1 Scaled b2 | | |
| 8 | Input 1 Raw MSB | Same as Register 12 | Analog: UINT16 Digital: INT16 |
| 9 | Input 1 Raw LSB | | |
| 10 – 63 | Input 2-10 | | |

5.1.7 FIRMWARE UPGRADE

Firmware upgrades will be made available on an ongoing basis on ixys.no.

Upgrades are provided as a zip archive of an updater-application. The updater application will upgrade both the actual firmware and the included web interface.

```
Remote IO 1810 updater v100
-----
Make sure you're connected to the card's ethernet interface.
Enter the card's IP address, or press enter to use default [10.0.37.248].
|
```

Figure 6 Updater application

After an upload has been completed, the PCB should be kept powered for a couple of minutes to allow the upgrade to finalize.



5.2 PWM OUTPUTS

5.2.1 GENERAL

For each output of the PCB, there is both an Enable register and a Value register. The Value register sets the duty cycle of the output PWM signal, from 0 to 100 %. A 0 % duty cycle means that the output is continuously 0 V, while a 100 % duty cycle means that the output is continuously 24 V.

There's no difference to the output between setting Enable to 0 and Value to non-zero, and Enable to 1 and Value to 0. This means it's possible both to keep the Value register constant and toggle the Enable register, and to keep the Enable register permanently on and only change the Value register.

The PWM frequency for each output can be changed individually.

The screenshot shows the IXYS Configuration interface. On the left, there are tabs for 'General', 'Outputs', and 'Inputs'. The 'Outputs' tab is selected. The main area is titled 'Configuration' and contains a sub-section 'Output Configuration' with a 'Save All' button. Below this is a table with 8 columns: 'Output #', 'Frequency [Hz]', 'Dither Frequency [Hz]', 'Dither Amplitude', 'Power Save', 'Timeout [ms]', 'Low Value', and 'High Value'. The table lists 16 outputs, from Output 1A to Output 9B. Each output row has input fields for Frequency (set to 500 Hz), Dither Frequency (set to 100 Hz), and Dither Amplitude (set to 0). The 'Power Save' column contains toggle switches, all of which are currently disabled. The 'Timeout [ms]', 'Low Value', and 'High Value' columns are empty.

| Output # | Frequency [Hz] | Dither Frequency [Hz] | Dither Amplitude | Power Save | Timeout [ms] | Low Value | High Value |
|-----------|----------------|-----------------------|------------------|------------|--------------|-----------|------------|
| Output 1A | 500 | 100 | 0 | Disabled | | | |
| Output 1B | 500 | 100 | 0 | Disabled | | | |
| Output 2A | 500 | 100 | 0 | Disabled | | | |
| Output 2B | 500 | 100 | 0 | Disabled | | | |
| Output 3A | 500 | 100 | 0 | Disabled | | | |
| Output 3B | 500 | 100 | 0 | Disabled | | | |
| Output 4A | 500 | 100 | 0 | Disabled | | | |
| Output 4B | 500 | 100 | 0 | Disabled | | | |
| Output 5A | 500 | 100 | 0 | Disabled | | | |
| Output 5B | 500 | 100 | 0 | Disabled | | | |
| Output 6A | 500 | 100 | 0 | Disabled | | | |
| Output 6B | 500 | 100 | 0 | Disabled | | | |
| Output 7A | 500 | 100 | 0 | Disabled | | | |
| Output 7B | 500 | 100 | 0 | Disabled | | | |
| Output 8A | 500 | 100 | 0 | Disabled | | | |
| Output 8B | 500 | 100 | 0 | Disabled | | | |
| Output 9A | 500 | 100 | 0 | Disabled | | | |
| Output 9B | 500 | 100 | 0 | Disabled | | | |

Figure 7 Output configuration

5.2.2 DITHER

It's possible to apply a dither effect to the PWM outputs. Both the dither frequency and the dither amplitude can be adjusted. Applying a dither means that the duty cycle will change slightly, even when the set PWM output value stays constant. The feature can be useful for instance to avoid sticky valves in hydraulic systems.



5.2.3 POWER-SAVE

There is a power-save feature available for each output. When this feature is enabled for an output, the Enable value is the only way to control the output, and any writes to the Value register are ignored. When Enable goes from 0 to 1, the output will go to a predefined Power Save High value for the Power Save Timeout period, and then go to the Power Save Low value until enable is set back to 0, at which point the output will be turned off.

It's always possible to read the Value register to know the current duty cycle applied on the output.

This feature is useful to reduce the power consumption in systems where the outputs need less power to maintain a state than to switch states, for instance with solenoid outputs.

Both the Power Save High, Power Save Low and the Power Save Timeout values can be set individually per output.

5.3 ANALOG INPUTS

5.3.1 GENERAL

Each input channel can be used to read a 4-20 mA sensor. The sensor signal is terminated in a 120 ohm resistor, and measured using a 16-bit ADC with a 2.5 V reference. A 20 mA signal will therefore give a reading of about 62900, while a 4 mA signal will give a reading of about 12600.

For each channel, there is both a Raw value read from the ADC and a floating-point Scaled value available. The scaling values used to go from raw value to scaled value can be configured independently for each input.



The screenshot shows the IXS Configuration interface. The top navigation bar includes 'Live view', 'Configuration' (active), and 'About'. The left sidebar has 'General', 'Outputs', and 'Inputs' (active). The main content area is titled 'Configuration' and contains two sections: 'Analog Inputs' and 'Digital Counters'.

Analog Inputs (Save All)

| Input # | Raw Min | Raw Max | Scaled Min | Scaled Max | Sampling Mode | Interval [ms] | On Period [ms] | Output |
|----------|---------|---------|------------|------------|---------------|---------------|----------------|--------|
| Input 1 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 2 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 3 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 4 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 5 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 6 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 7 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 8 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 9 | 12500 | 62700 | 0 | 100 | Disabled | | | |
| Input 10 | 12500 | 62700 | 0 | 100 | Disabled | | | |

Digital Counters (Save All)

| Counter | Mode |
|-----------|----------|
| Counter 1 | Disabled |
| Counter 2 | Disabled |
| Counter 3 | Disabled |

Figure 8 Input configuration

5.3.2 SAMPLING MODE

It's possible to enable a sampling mode for each input. This enables tying an output to an input, so that the output is turned on, the sensor input is sampled, and the output turned off again. This can be useful to save power in systems where having all sensors enabled at all times consumes significant power in itself.

To use this function, the output that controls a given input must be chosen, and a sampling Interval and an On Period needs to be set. The Sampling Interval decides the time between each sampling of the sensor, while the On Period sets how long the sensor is kept powered before it's measured.

5.4 DIGITAL INPUTS

5.4.1 GENERAL

It's possible to use each input as a digital input instead of an analog one. To do so, the input needs to be set to digital mode. For inputs in digital mode, the Raw value will be 0 when the input is low, and 1 when the input is high. The Scaled value is unused for digital inputs when counter mode is Digital Mode.

Note: Inputs 1-4 can not be used as digital inputs.



5.4.2 COUNTERS

It's possible to enable different counter modes. These modes affect pairs of digital inputs, and there are a total of 3 counters available. Counter 1 uses Input 5 and Input 6, counter 2 uses Input 7 and 8 and counter 3 uses Input 9 and Input 10.

Note: The analog function for an input is unavailable when its counter is enabled.

When a counter mode is enabled, the board will count edges on the digital inputs, both calculating a count per minute and an accumulated count. The Scaled value is the accumulated count, while the Raw value is the count of edges seen per minute.

Note: If a single output encoder is used, the corresponding counter will count only upwards if it is connected to Input 5, 7 or 9. If a single output encoder is connected to Input 6, 8 or 10, the counter will not count.

For each input used by a counter, the same value will be presented as each input's Raw and Scaled values, e.g. as long as Counter 1 is enabled, Input 5's Raw value will be equal to Input 6's Raw value, and Input 5's Scaled value will be equal to Input 6's Scaled value.

There are 5 different counter modes available, as indicated in the table below.

| Name | Scaled | Raw | Description |
|----------------------------------|---------------------|------------------------|---|
| Digital Mode (0) | Unused | Electrical input level | |
| Frequency (1) | Accumulated counter | Edge frequency | Accumulated is signed, frequency only positive. Scaling values are unused. |
| Directional Frequency (2) | Accumulated counter | Edge frequency | Accumulated and frequency are signed. Scaling values are unused. |
| Scaled Frequency (3) | Accumulated counter | Edge frequency | Accumulated is signed, frequency only positive. Values are scaled with the Input's scaling setting. |
| Scaled Directional Frequency (4) | Accumulated counter | Edge frequency | Accumulated and frequency are signed. Values are scaled with the Input's scaling setting. |



6 REGISTERS

6.1 DATA TYPES

The following table describes the data types used. For 32-bit values two Modbus registers are used, where the first is the most significant.

| Name | Size | Value Range |
|--------|---------|---------------------------------|
| INT16 | 2 bytes | -32,768 to 32,767 |
| UINT16 | 2 bytes | 0 to 65,535 |
| INT32 | 4 bytes | -2,147,483,648 to 2,147,483,647 |
| UINT32 | 4 bytes | 0 to 4,294,967,295 |
| REAL32 | 4 bytes | 1.2E-38 to 3.4E+38 |

6.2 HEADER REGISTERS

Register 4 and 6 are stored in non-volatile memory when changed.

| Address | Description | Default | Note | Data Type |
|---------|------------------------|---------|---|-----------|
| 0 | PCB Type | N/A | 37 | UINT16 |
| 1 | Serial Number | N/A | | UINT16 |
| 2 | Firmware Version | N/A | | UINT16 |
| 3 | Status | N/A | Bit0 = Reserved Bit1 = Water Alarm | UINT16 |
| 4 | Serial baud rate (RTU) | 5 | The baud rate is indicated by a single digit: 0 = 9600 1 = 19200 2 = 28800 3 = 38400 4 = 57600 5 = 115200 | UINT16 |
| 5 | Supply voltage | N/A | Unit = 0.1 V | UINT16 |
| 6 | Timeout | 1000 | Milliseconds without writes before Communication Failure is triggered. See section 5.1.2. | UINT16 |
| 7 | Unit identifier | 1 | Modbus unit identifier (1-247) | UINT16 |
| 8 | Heartbeat | N/A | Increments by one each second and rollover at 65535 | UINT16 |
| 9 | Reserved | N/A | | UINT16 |



6.3 INPUT REGISTERS

| Address | Description | Note | Data Type |
|---------|--------------------|--|-----------|
| 10 | Input 1 Scaled MSB | <i>Analog input:</i> Input raw value scaled according to input settings and presented as floating-point number. <i>Digital input:</i> Accumulated edge counter, dependent on input's counter mode. See section 5.4 for details. | REAL32 |
| 11 | Input 1 Scaled LSB | | |
| 12 | Input 1 Raw | <i>Analog input:</i> Raw ADC value where 4 mA = 12600, 20 mA = 62900 <i>Digital input:</i> Digital input level or edge count per minute, dependent on input's counter mode. See section 5.4 for details. | UINT16 |
| 13 - 39 | Input 2 - 10 | Same as registers 10 to 12 repeated for inputs 2 to 10. | |

6.4 OUTPUT REGISTERS

| Address | Description | Note | Data Type |
|-----------|------------------|--|-----------|
| 200 | Output 1A Active | Set to 1 for output to become active | UINT16 |
| 201 | Output 1A Value | 16-bit value (0-65535) representing the PWM duty cycle from 0 to 100 % | UINT16 |
| 202 - 235 | Output 1B - 9B | Same as registers 200 to 201 repeated for outputs 1B to 9B. | |



6.5 SETTING REGISTERS

All setting registers are saved when written.

6.5.1 INPUT SETTINGS

| Address | Description | Default | Note | Data Type |
|---------|------------------------------------|---|--|-----------|
| 300 | Input 1 Type | 0 | 0 = Analog Input 1 = Digital Input Only input 5 to 10 can be used as digital inputs. | UINT16 |
| 301 | Input 1 Raw Max | 62700 | Raw value corresponding to Scaled Max value | UINT16 |
| 302 | Input 1 Raw Min | 0 | Raw value corresponding to Scaled Min value | UINT16 |
| 303 | Input 1 Scaled Max | 100 | A high reference for calibration of input scaling (typically sensor maximum) | INT16 |
| 304 | Input 1 Scaled Min | 0 | A low reference for calibration of input scaling (typically zero) | INT16 |
| 305 | Input 1 Sampling Mode Output Index | -1 | Output index controlling input, or -1 to disable Sampling Mode. See section 5.3.2 for details. | INT16 |
| 306 | Input 1 Sampling Mode Interval | 1000 | Time between sampling. See section 5.3.2 for details. | UINT16 |
| 307 | Input 1 Sampling Mode On Period | 50 | Time to keep output on. See section 5.3.2 for details. | UINT16 |
| 308 | Input 1 Reserved | N/A | | UINT16 |
| 309 | Input 1 Counter Mode | 0 | 0 = Digital Mode 1 = Frequency 2 = Directional Frequency 3 = Scaled Frequency 4 = Scaled Directional Frequency See section 5.4.2 for details. | UINT16 |
| 310-399 | Input 2-10 | Same as registers 300 to 309 repeated for inputs 2 to 10. | | |

6.5.2 OUTPUT SETTINGS

| Address | Description | Default | Note | Data Type |
|---------|-------------------------|---------|----------------------|-----------|
| 500 | Output 1A Reserved | N/A | | UINT16 |
| 501 | Output 1A PWM Frequency | 500 | 40-2000 = 40-2000 Hz | UINT16 |



| | | | | |
|---------|------------------------------|---|--|--------|
| 502 | Output 1A Dither Amplitude | 0 | 0-65535 = 0-100 % | UINT16 |
| 503 | Output 1A Dither Frequency | 100 | 1-200 = 1-200 Hz | UINT16 |
| 504 | Output 1A Power Save Timeout | 0 | Power Save timeout in milliseconds. See section 5.2.3 for details. | UINT16 |
| 505 | Output 1A Power Save Low | 0 | Duty cycle in Power Save low state. 0-65535 = 0-100 %. See section 5.2.3 for details. | UINT16 |
| 506 | Output 1A Power Save High | 0 | Duty cycle in Power Save high state. 0-65535 = 0-100 % See section 5.2.3 for details. | UINT16 |
| 507 | Output 1A Reserved | N/A | | UINT16 |
| 508 | Output 1A Reserved | N/A | | UINT16 |
| 509 | Output 1A Reserved | N/A | | UINT16 |
| 510-679 | Output 1B – 9B | Same as registers 500 to 509 repeated for outputs 1B to 9B. | | |



7 TROUBLESHOOTING / FAULTFINDING

| Symptom | Possible cause | Remedy |
|--|-------------------------------|---|
| Power LED not lit | Not powered | <ul style="list-style-type: none">• Verify power connections are according to specifications in section 3.2 and connected as in section 4.3 |
| | Faulty PCB | <ul style="list-style-type: none">• Contact Ixys support |
| No link LED | Linked device not powered | <ul style="list-style-type: none">• Verify linked device is powered |
| | Faulty cabling | <ul style="list-style-type: none">• Try different network cable• Verify cable used with other equipment |
| Intermittent link LED | Poor cabling | <ul style="list-style-type: none">• Try different network cable• Verify cable used with other equipment |
| | Wrong configuration | <ul style="list-style-type: none">• Verify that linked device is correctly powered• Try using fixed speed and duplex on both devices |
| Not able to access web interface | Wrong IP address being used | <ul style="list-style-type: none">• Use VJU Device Discovery or read broadcast messages to identify IP. See section 0 for details. |
| | Client device in wrong subnet | <ul style="list-style-type: none">• Verify the client is in the same subnet as the PCB |
| Not able to communicate with PCB over the serial interface | Wrong connection | <ul style="list-style-type: none">• Verify TX/RX/GND for RS232, or D+/D- for RS485 are connected as per section 4.3• For RS485, try enabling/disabling termination |
| | Wrong settings | <ul style="list-style-type: none">• Verify configured baud rate• Verify configured Modbus Unit ID• Verify other settings are according to section 5.1.5 |