USER MANUAL

SERIES R I/O
WITH MODBUS TCP-IP
and MODBUS RTU PROTOCOL

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ORIGINAL INSTRUCTIONS

Introduction

The content of this documentation refers to products and technologies described in it.
All technical data contained in the document may be changed without notice.
The content of this documentation is subject to periodic review.
To use the product safely and effectively, read the following instructions carefully before use.
The product must be used only for the use for which it was designed and manufactured: any other use is under the full responsibility of the user.
Installation, programming and set-up are allowed only to authorized, physically and intellectually suitable operators.
Set-up must be performed only after correct installation and the user must follow all the operations described in the installation manual carefully.
Seneca is not responsible for failures, breakages and accidents caused by ignorance or failure to apply the stated requirements.
Seneca is not responsible for any unauthorized modifications.
Seneca reserves the right to modify the device, for any commercial or construction requirement, without the obligation to promptly update the reference manuals.
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There may be errors and inaccuracies in this document that could damage your system, so proceed with caution, the author(s) will not take responsibility for it.
Technical specifications are subject to change without notice.

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Document revisions

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1. INTRODUCTION

ATTENTION!

This user manual extends the information from the installation manual to the configuration of the device. Use the installation manual for more information.

ATTENTION!

In any case, SENECA s.r.l. or its suppliers will not be responsible for the loss of data/revenue or consequential or incidental damages due to negligence or bad/improper management of the device, even if SENECA is well aware of these possible damages.
SENECA, its subsidiaries, affiliates, group companies, suppliers and distributors do not guarantee that the functions fully meet the customer's expectations or that the device, firmware and software should have no errors or operate continuously.

1. R SERIES DEVICES

The R-series I/O devices support both the RTU protocol (via the serial port) and the Modbus TCP-IP protocol (via the ethernet ports).

For more information on these protocols, see the website:
http://www.modbus.org/specs.php.

1.1. R-32DIDO-1 AND R-32DIDO-2

The devices allow the use of 32 digital channels that can be individually configured for input or output. When a digital channel is configured as an input, a 32-bit counter is also associated with a value saved in non-volatile memory.

CODE	*ETHERNET PORT*
R-32DIDO-1	1 PORT 10/100 Mbit
R-32DIDO-2	2 PORTS 10/100 Mbit (Switch mode)

1.1.1. PROTECTION OF DIGITAL OUTPUTS

The outputs are protected against overload and against overtemperature, they open cyclically until the fault is repaired or the output opens.
The limit current is between 0.6 and 1.2 A.

1.2. R-16DI-8DO

The devices allow the use of 16 digital input channels and 8 digital relay output channels.

CODE	***ETHERNET PORT***
R-16DI8DO	2 PORTS 10/100 Mbit (Switch mode)

1.3. R-8AI-8DIDO

The devices allow the use of 8 analogue input channels and 8 digital channels that can be individually configured for input or output.

CODE	***ETHERNET PORT***
R-8AI-8DIDO	2 PORTS 10/100 Mbit (Switch mode)

1.3.1. ANALOGUE INPUT UPDATE TIME

The sampling time of the analogue inputs depends on the ADC sampling time.
If an analogue input is disabled, its acquisition time must not be counted.

The refresh time of an analogue channel is:

$$T_{refresh}[ms] = (N_{act} + 1) * (2 * T_{ADC}[ms] + 10ms)$$

Where:
N_{act} $rappresenta\ il\ numero\ di\ canali\ analogici\ attivi$

$T_{ADC}[ms]$ $rappresenta\ il\ tempo\ di\ campionamento\ dell'ADC\ in\ ms$

If, for example, the sampling time of the ADC is set at 50ms and all 8 input analogue channels are active, we have:

T refresh = 9 * (2*50 +10ms) = 9*110ms = 990 ms

1.3.2. DIGITAL INPUT UPDATE TIME

The sampling time of the digital inputs takes place between the sampling of one channel and the other so the I/O update takes place every:

$$T_{refresh\ digital}[ms] = (2 * T_{ADC}[ms] + 10ms)$$

If, for example, the sampling time of the ADC is set to 50ms, the refresh of the digital I/Os is:

T refresh = (2*50 +10ms) = 110ms

1.4. R-SG3

R- SG3 is a load cell converter (strain gauge). The measurement, carried out with the 4 or 6-wire technique, is available via the server TCP-IP Modbus or via RTU slave Modbus protocols
The device is equipped with a new noise filter specifically developed to obtain a rapid response time. The device is also fully configurable via the webserver.

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CODE	***ETHERNET PORT***
R-SG3	1 PORT 10/100 Mbit

1.4.1. LOAD CELL CONNECTION

It is possible to connect the converter to the load cell in 4- or 6-wire mode. 6-wire measurement is preferable for measurement accuracy.
The load cell power supply is provided directly by the device.

1.4.2. 4- OR 6-WIRE LOAD CELL CONNECTION

A load cell can have a four-wire or six-wire cable. In addition to having the +/- excitation and +/- signal lines a six-wire cable also has the +/- sense lines. It is a common misconception to think that the only difference between 4- or 6-wire load cells is the possibility of the latter to measure the actual voltage at the load cell. A load cell is compensated to work within specifications in a certain temperature range (usually -10 - +40°C). Since the cable resistance depends on the temperature, the response of the cable to temperature changes must be eliminated. The 4-wire cable is part of the load cell temperature compensation system. The 4-wire load cell is calibrated and compensated with a certain amount of cable connected. For this reason, never cut the cable of a 4-wire load cell. The cable of a 6-wire cell, on the other hand, is not part of the load cell temperature compensation system. The sense lines are connected to the R-SG3 sense terminals, to measure and adjust the actual voltage of the load cell. The advantage of using this "active" system is the possibility of cutting (or extending) the 6-wire load cell cable to any length. It must be considered that a 6-wire load cell will not reach the performance declared in the specifications if the sense lines are not used.

1.4.3. CHECKING THE LOAD CELL OPERATION

Before starting the configuration of the device it is necessary to verify the correctness of the wiring and the integrity of the load cell.

1.4.3.1. CHECKING CABLES WITH A DIGITAL MULTIMETER

First you need to check with the load cell manual that there are about 5V DC between the +Excitation and –Excitation cables. If the cell has 6 wires check that the same voltage is also measured between +Sense and –Sense.
Now leave the cell at rest (without the tare) and check that the voltage between the +Signal and –Signal cables is around 0 V.
Now unbalance the cell by applying a compression force, checking that the voltage between the +Signal and –Signal cables increases until it reaches the full scale (if possible) where the measurement will be approximately:

5* (cell sensitivity) mV.

For example, if the declared cell sensitivity is 2 mV/V, 5 * 2 = 10 mV must be obtained.

In the case of bipolar measurement only (compression/traction) it is necessary to completely unbalance the cell even in traction, in this case the same value must be measured between the +Signal and –Signal cables but with the negative sign:

-5* (cell sensitivity) mV.

1.4.4. CONNECTION OF MORE LOAD CELLS IN PARALLEL

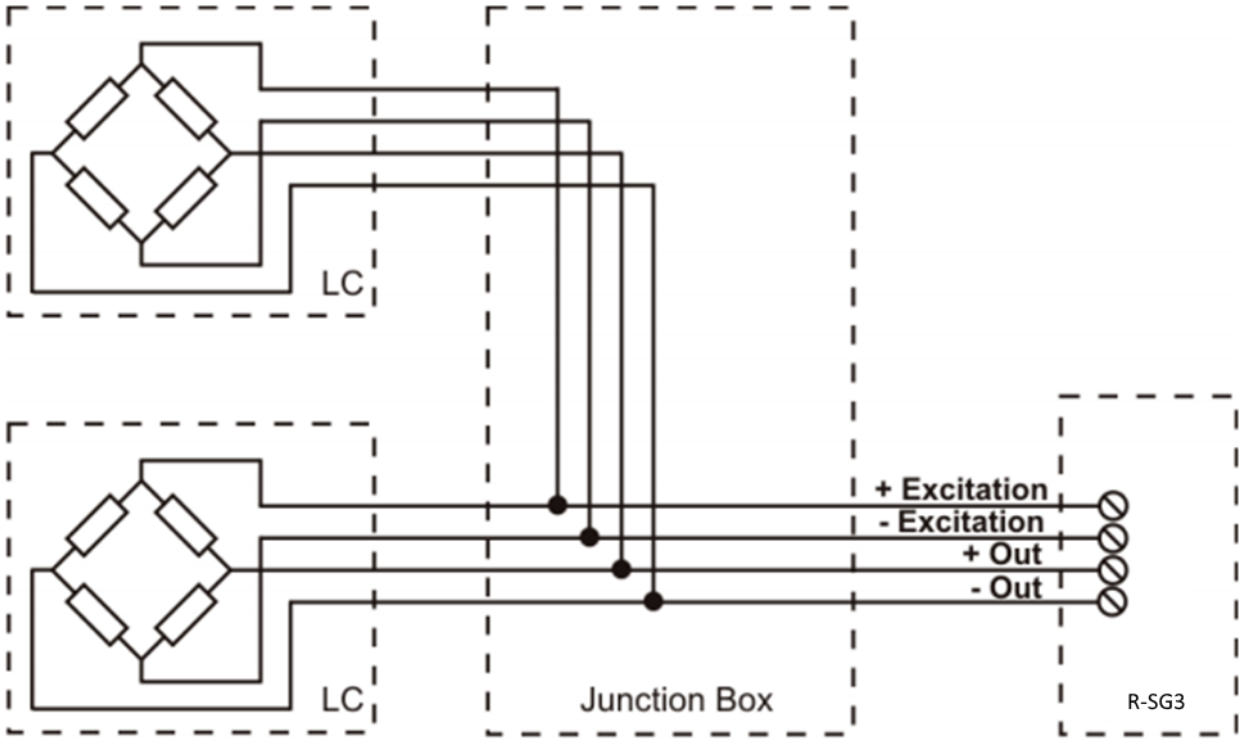
It is possible to connect up to a maximum of 8 load cells (and in any case without ever falling below the minimum 87 Ohms).

It is therefore possible to connect:

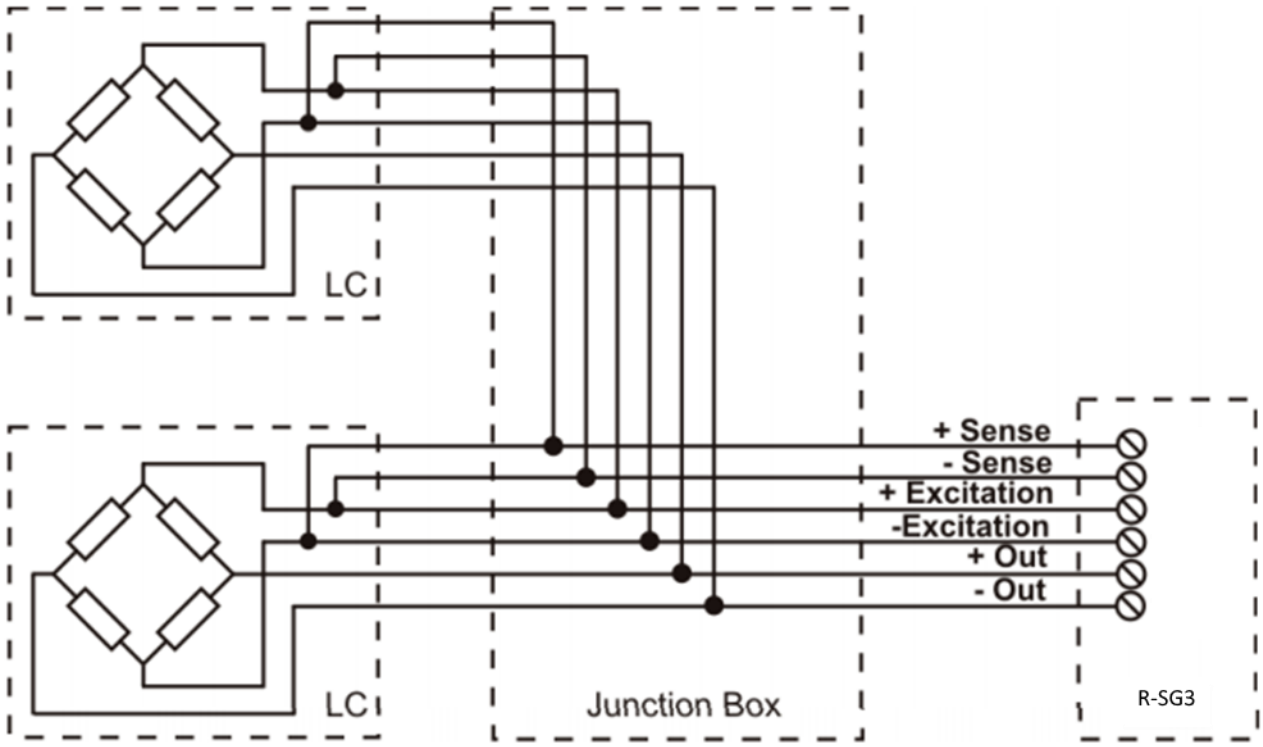
NUMBER OF LOAD CELLS IN PARALLEL	
IMPEDANCE OF THE STATED LOAD CELL [Ohm]	*MAXIMUM NUMBER OF CONNECTABLE CELLS IN PARALLEL*
350	4
1000	8

For the connection of 4 load cells Seneca recommends using the SG-EQ4 product.

To connect 2 or more 4-wire cells in parallel with the SG-EQ4 junction box, use the following diagram:



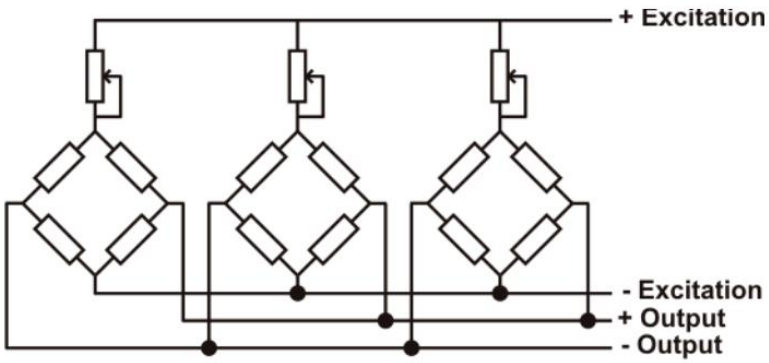
To connect 2 or more 6-wire cells in parallel with the SG-EQ4 junction box use the following diagram:



For more details, refer to the SG-EQ4 Junction Box accessory manual.

1.4.5. TRIMMING 4-WIRE LOAD CELLS

The figure below shows a diagram of three trimmed load cells.



A variable resistor, independent of the temperature, or a typically 20 Ω potentiometer is inserted in the +Excitation cable of each load cell. There are two ways to trim the load cells. The first method is to adjust the potentiometers by trial, shifting the calibration weights from one corner to another. All the potentiometers must be adjusted so as to set the maximum sensitivity for each cell, turning them all completely clockwise. Then, once

the angle with the lowest output is located, act on the trimmers of the other cells until obtaining the same minimum output value. This method can be very long, especially for large scales where the use of test weights on the corners is not very practical. In these cases the second, more suitable method is to "pre-trim" the potentiometers using a precision voltmeter (at least 4 1/2 digits). You can use the following procedure:
1) Determine the exact mV/V ratio of each load cell, shown in the calibration certificate of the cell itself.
2) Determine the exact excitation voltage provided by the indicator/meter (for example Z-SG), measuring this voltage with the voltmeter (for example 10.05 V).
3) Multiply the lowest mV/V value found (point 1) by the excitation voltage (point 2).
4) Divide the trimming factor calculated in point 3 by the mV/V value of the other load cells.
5) Measure and adjust the excitation voltage of the other three load cells using the respective potentiometer. Check the results and make a final adjustment by moving a test load from corner to corner.

2. DIP SWITCH

ATTENTION!

THE DIP SWITCH SETTINGS ARE READ ONLY AT THE START. AT EACH CHANGE, IT IS NECESSARY TO RESTART.

ATTENTION!

DEPENDING ON THE MODEL IT MAY BE NECESSARY TO REMOVE THE REAR COVER OF THE DEVICE TO ACCESS THE DIP SWITCHES

2.1. MEANING OF THE DIP SWITCHES FOR THE R-8AI-8DIDO MODEL

Below is the meaning of SW3 dip switches:

DIP1	*DIP2*	*MEANING*
OFF	OFF	Normal operation: The device loads the configuration from the flash.
ON	ON	Resets the device to its factory configuration
OFF	ON	Not used
ON	OFF	Reserved

2.2. MEANING OF THE DIP SWITCHES FOR THE R- 32DIDO-1 AND R- 32DIDO-2 MODELS

Below is the meaning of the SW1 dip switches for the various firmware revisions:

2.2.1. DIP SWITCH FOR FIRMWARE REVISION <= 1014

DIP1	*DIP2*	*MEANING*
OFF	OFF	Normal operation: The device loads the configuration from the flash.
ON	ON	Resets the device to its factory configuration
OFF	ON	Only forces the device IP address to the standard value of SENECA Ethernet products: 192.168.90.101
ON	OFF	Reserved

2.2.2. DIP SWITCH FOR FIRMWARE REVISION>= 1015

DIP1	*DIP2*	*MEANING*
OFF	OFF	Normal operation: The device loads the configuration from the flash.
ON	ON	Resets the device to its factory configuration
OFF	ON	Disables access to the Web server
ON	OFF	Reserved

ATTENTION!

ONCE THE COMMISSIONING HAS BEEN COMPLETED, IN ORDER TO INCREASE THE SECURITY OF THE DEVICE, DISABLE THE WEBSERVER THROUGH THE DIP SWITCHES

2.3. MEANING OF THE DIP SWITCHES FOR THE R-SG3 MODEL

Below is the meaning of the SW1 dip switches:

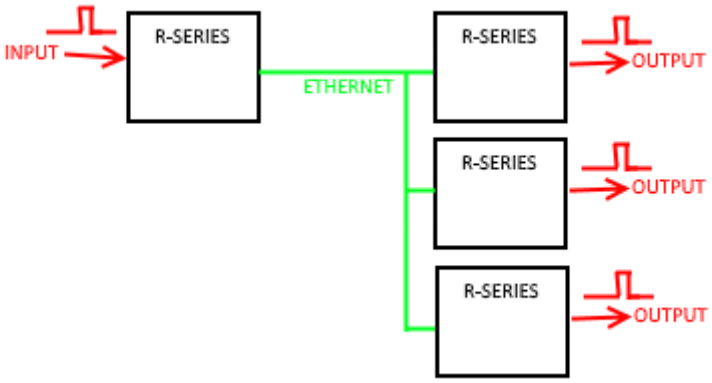
DIP1	*DIP2*	*MEANING*
OFF	OFF	Normal operation: The device loads the configuration from the flash.
ON	ON	Resets the device to its factory configuration
OFF	ON	Disables access to the Web server
ON	OFF	Reserved

3. I/O COPY USING THE PEER TO PEER FUNCTION WITHOUT WIRING

The "R" series devices can be used to copy and update in real time an input channel on a remote output channel without the aid of a master controller.

For example, a digital input can be copied to a remote digital output device:

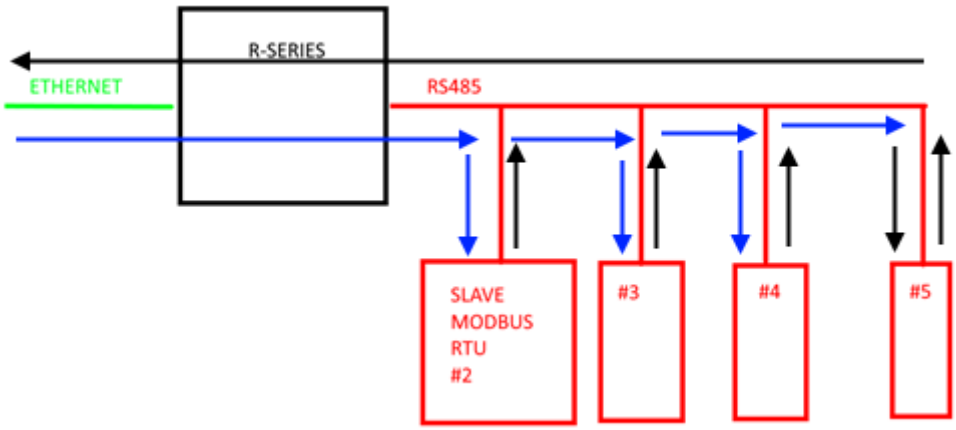
Note that no controller is required because the communication is managed directly by the R series devices.
It is possible to make a more sophisticated connection, for example it is possible to copy the inputs to different R-series remote devices (from Device 1 Input 1 to Device 2 Output1, Device 1 Input 2 to Device 3 Output 1 etc ...)
It is also possible to copy an input to an output of multiple remote devices:



Each R-series device can send and receive a maximum of 32 inputs.

4. MODBUS PASSTHROUGH

Thanks to the Modbus Passthrough function it is possible to extend the amount of I/O available in the device via the RS485 port and the Modbus RTU slave protocol, for example by using the Seneca Z-PC series products.
In this mode the RS485 port stops working as Modbus RTU slave and the device becomes a gateway from Modbus TCP-IP (ethernet) to Modbus RTU (serial):



Each Modbus TCP-IP request with station address other than that of the R series device is converted into a serial packet on the RS485 and, in the case of a reply, it is turned over to TCP-IP.
Therefore, it is no longer necessary to purchase gateways to extend the I/O number or to connect already available Modbus RTU I/O.

5. RESETTING THE DEVICE TO FACTORY CONFIGURATION

5.1. ACCESS TO DIP SWITCHES

Depending on the model, to access the dip switches, it may be necessary to remove the bottom cover of the device.

⚠ ATTENTION!

BEFORE REMOVING THE COVER, TURN OFF THE POWER SUPPLY TO THE DEVICE

5.2. PROCEDURE FOR RESTORING DEVICES TO THE FACTORY CONFIGURATION

It is possible to reset the device to the factory configuration using the following procedure:

1) With the device off, set dip switch 1 and 2 to ON
2) Power up the device
3) The device has now been reset to the factory configuration
4) Turn dip switch 1 and 2 back to OFF.

6. CONNECTION OF THE DEVICE TO A NETWORK

The factory configuration of the IP address is:

Static address: 192.168.90.101

Therefore, multiple devices must not be inserted on the same network with the same static IP.
If you want to connect multiple devices on the same network, you need to change the IP address configuration using Seneca Discovery Device software.

⚠ ATTENTION!

DO NOT CONNECT 2 OR MORE FACTORY-CONFIGURED DEVICES ON THE SAME NETWORK, OR THE ETHERNET INTERFACE WILL NOT WORK
(CONFLICT OF IP ADDRESSES 192.168.90.101)

If the addressing mode with DHCP is activated and an IP address is not received within 1 minute, the device will set an IP address with a fixed error:

169.254.x.y

Where x.y are the last two values of the MAC ADDRESS.
This way it is possible to install more I/O of the R series and then configure the IP with the Seneca Discovery Device software even on networks without a DHCP server.

7. WEB SERVER

7.1. ACCESS TO THE WEB SERVER

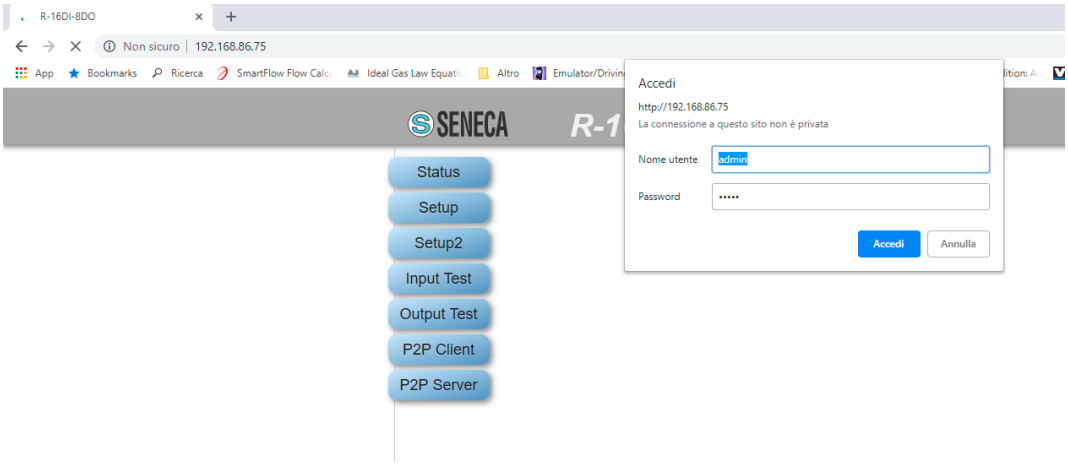
Access to the web server takes place using a web browser and entering the IP address of the device.
To know the IP address of the device you can use the Seneca Discovery Device software.

On first access the user name and password will be requested.
The default values are:

User Name: admin
Password: admin

ATTENTION!

AFTER THE FIRST ACCESS CHANGE USER NAME AND PASSWORD IN ORDER TO PREVENT ACCESS TO THE DEVICE TO UNAUTHORIZED PEOPLE.



ATTENTION!

IF THE PARAMETERS TO ACCESS THE WEB SERVER HAVE BEEN LOST, IT IS NECESSARY TO RESET THE FACTORY-SET CONFIGURATION

8. CONFIGURATION OF THE R-32DIDO DEVICE VIA WEB SERVER

8.1. SETUP SECTION

DHCP (ETH) (default: Disabled)
Sets the DHCP client to get an IP address automatically.

IP ADDRESS STATIC (ETH) (default: 192.168.90.101)
Sets the device static address. Careful not to enter devices with the same IP address into the same network.

IP MASK STATIC (ETH) (default: 255.255.255.0)
Sets the mask for the IP network.

GATEWAY ADDRESS STATIC (ETH) (default: 192.168.90.1)
Sets the gateway address.

PROTECT CONFIGURATION (default: Disabled)
Allows you to enable or disable password protection for reading and writing the configuration (including the IP address) using the Seneca Discovery Device software. The password is the same one that allows accessing the web server.

ATTENTION!

IF THE CONFIGURATION PROTECTION IS ENABLED IT WILL BE IMPOSSIBLE TO READ/WRITE THE CONFIGURATION OF THE DEVICE WITHOUT KNOWING THE PASSWORD.
IF THE PASSWORD IS LOST, IT WILL BE POSSIBLE TO RETURN THE DEVICE TO THE FACTORY-SET CONFIGURATION USING THE DIP SWITCHES

MODBUS SERVER PORT (ETH) (default: 502)
Sets the communication port for the Modbus TCP-IP server.

MODBUS SERVER STATION ADDRESS (ETH) (default: 1)
Active only if Modbus Passthrough is also active, it sets the station address of the modbus TCP-IP server.

ATTENTION!

THE MODBUS SERVER WILL ANSWER ANY STATION ADDRESS ONLY IF THE MODBUS PASSTHROUGH MODE IS DISABLED.

MODBUS PASSTHROUGH (ETH) (default: disabled)
Sets the conversion mode from Modbus TCP-IP to Modbus RTU serial (see chapter 4).

MODBUS TCP-IP CONNECTION TIMEOUT [sec] (ETH) (default: 60)
Sets the TCP-IP connection timeout for the Modbus TCP-IP server and Passthrough modes.

P2P SERVER PORT (default: 50026)
Sets the communication port for the P2P server.

WEB SERVER USERNAME (default: admin)
Sets the username to access the webserver.

CONFIGURATION/WEB SERVER PASSWORD (default: admin)
Sets the password to access the webserver and to read/write the configuration (if enabled).

WEB SERVER PORT (default: 80)
Sets the communication port for the web server.

BAUDRATE MODBUS RTU (SER) (default: 38400 baud)
Sets the baud rate for the RS485 communication port.

DATA MODBUS RTU (SER) (default: 8 bit)
Sets the number of bits for the RS485 communication port.

PARITY MODBUS RTU (SER) (default: None)
Sets the parity for the RS485 communication port.

STOP BIT MODBUS RTU (SER) (default: 1 bit)
Sets the number of stop bits for the RS485 communication port.

MODBUS PASSTHROUGH SERIAL TIMEOUT (default: 100ms)
Active only if passthrough mode is activated, sets the maximum waiting time before sending a new packet from TCP-IP to the serial port. It must be set according to the longest response time of all the devices present on the RS485 serial port.

8.2. DIGITAL I/O SETUP SECTION

This section allows the configuration of the digital I/Os present in the device.

DIGITAL I/O MODE (default Input)

Selects whether the selected input will work as an input or output.

DIGITAL INPUT NORMALLY HIGH/LOW (default Normally Low)

If selected as digital input, it configures whether the input is normally high or low.

DIGITAL OUTPUT NORMALLY STATE (default Normally Open)

If selected as digital output, it configures whether the output is normally open or closed.

DIGITAL OUTPUT WATCHDOG (default Disabled)

If selected as digital output, it sets the output watchdog mode.
If “Disabled”, it disables the watchdog function for the selected output.
If "Enabled on Modbus Communication" the output goes into "Watchdog state" if there has been no generic Modbus communication within the set time.
If "Enabled on Modbus Digital Output Writing" the output goes into "Watchdog state" if there has been no writing of the output within the set time.

DIGITAL OUTPUT WATCHDOG STATE (default Open)

Sets the value that the digital output must adopt if the watchdog has been triggered.

DIGITAL OUTPUT WATCHDOG TIMEOUT [s] (default 100s)

Represents the watchdog time of the digital output in seconds.

8.3. SETUP COUNTERS SECTION

COUNTERS FILTER [ms] (default 0)
Sets the value in [ms] for filtering all the counters connected to the inputs.

8.4. P2P CONFIGURATION

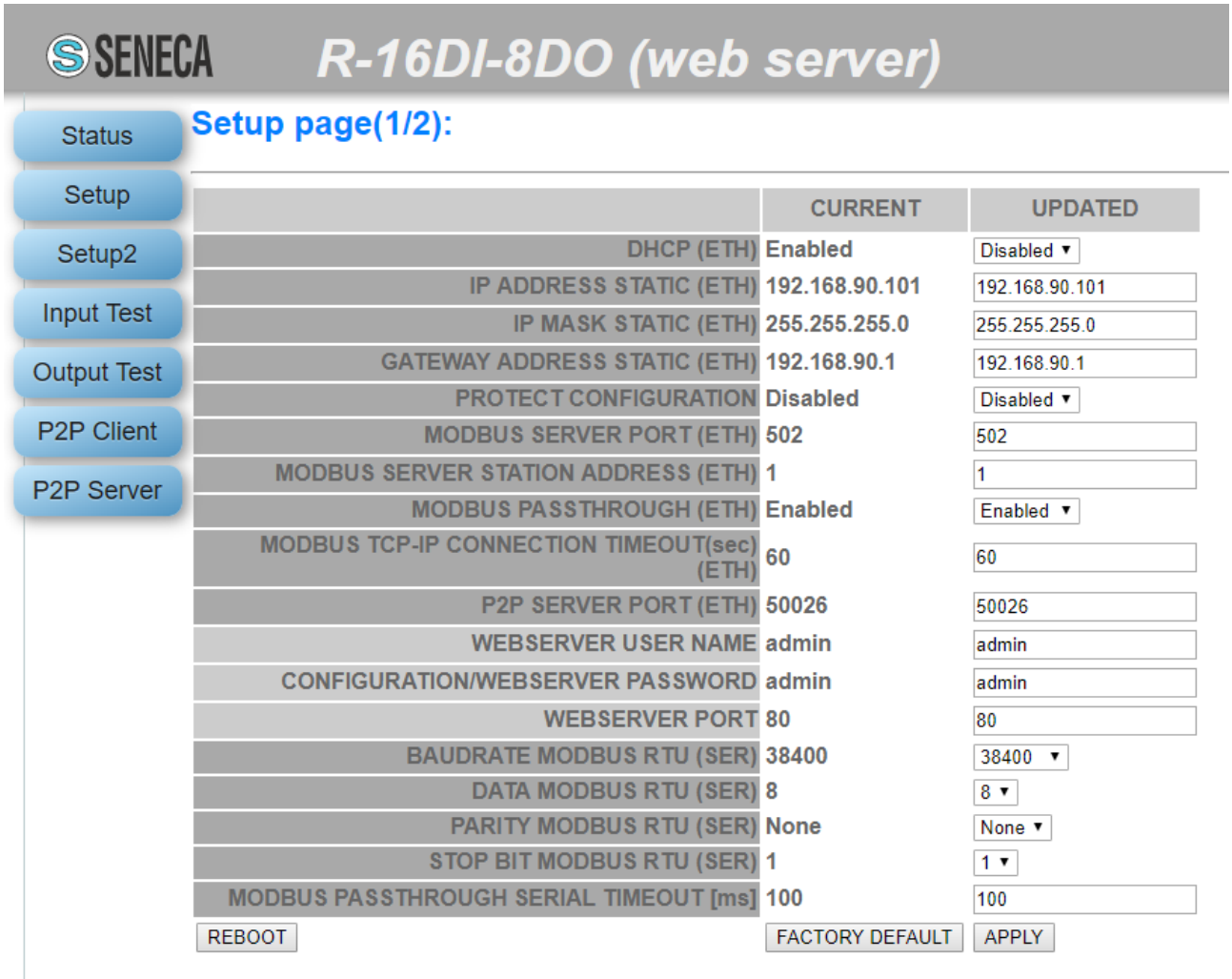
In the P2P Client section it is possible to define which local events to send to one or more remote devices. This way it is possible to send the status of the inputs to the remote outputs and obtain the input-output replication without wiring. It is also possible to send the same input to several outputs simultaneously.

In the P2P Server section it is instead possible to define which inputs must be copied to the outputs.

The "***Disable all rules***" button places all the rules in a disabled status (default).
The "***APPLY***" button allows you to confirm and then save the set rules in the non-volatile memory.

9. CONFIGURATION OF THE R-16DI-8DO DEVICE VIA WEB SERVER

9.1. SETUP SECTION



DHCP (ETH) (default: Disabled)

Sets the DHCP client to get an IP address automatically.

***IP ADDRESS STATIC (ETH)* (default: 192.168.90.101*)**

Sets the device static address. Careful not to enter devices with the same IP address into the same network.

IP MASK STATIC (ETH) (default: 255.255.255.0)

Sets the mask for the IP network.

GATEWAY ADDRESS STATIC (ETH) (default: 192.168.90.1)

Sets the gateway address.

PROTECT CONFIGURATION (default: Disabled)

Allows you to enable or disable password protection for reading and writing the configuration (including the IP address) using the Seneca Discovery Device software.

ATTENTION!

IF THE CONFIGURATION PROTECTION IS ENABLED IT WILL BE IMPOSSIBLE TO READ/WRITE THE CONFIGURATION OF THE DEVICE WITHOUT KNOWING THE PASSWORD.
IF THE PASSWORD HAS BEEN LOST, THE DEVICE CAN BE RETURNED TO ITS DEFAULT SETTINGS BY CONNECTING IT VIA USB TO THE EASY SETUP 2 SOFTWARE

MODBUS SERVER PORT (ETH) (default: 502)
Sets the communication port for the Modbus TCP-IP server.

MODBUS SERVER STATION ADDRESS (ETH) (default: 1)
Active only if Modbus Passthrough is also active, it sets the station address of the modbus TCP-IP server.

ATTENTION!

THE MODBUS SERVER WILL ANSWER ANY STATION ADDRESS ONLY IF THE MODBUS PASSTHROUGH MODE IS DISABLED.

MODBUS PASSTHROUGH (ETH) (default: disabled)
Sets the conversion mode from Modbus TCP-IP to Modbus RTU serial (see chapter 4).

MODBUS TCP-IP CONNECTION TIMEOUT [sec] (ETH) (default: 60)
Sets the TCP-IP connection timeout for the Modbus TCP-IP server and Passthrough modes.

P2P SERVER PORT (default: 50026)
Sets the communication port for the P2P server.

WEB SERVER USER NAME (default: admin)
Sets the user name to access the web server.

CONFIGURATION/WEB SERVER PASSWORD (default: admin)
Sets the password to access the webserver and to read/write the configuration (if enabled).

WEB SERVER PORT (default: 80)
Sets the communication port for the web server.

BAUDRATE MODBUS RTU (SER) (default: 38400 baud)
Sets the baud rate for the RS485 communication port.

DATA MODBUS RTU (SER) (default: 8 bit)
Sets the number of bits for the RS485 communication port.

PARITY MODBUS RTU (SER) (default: None)
Sets the parity for the RS485 communication port.

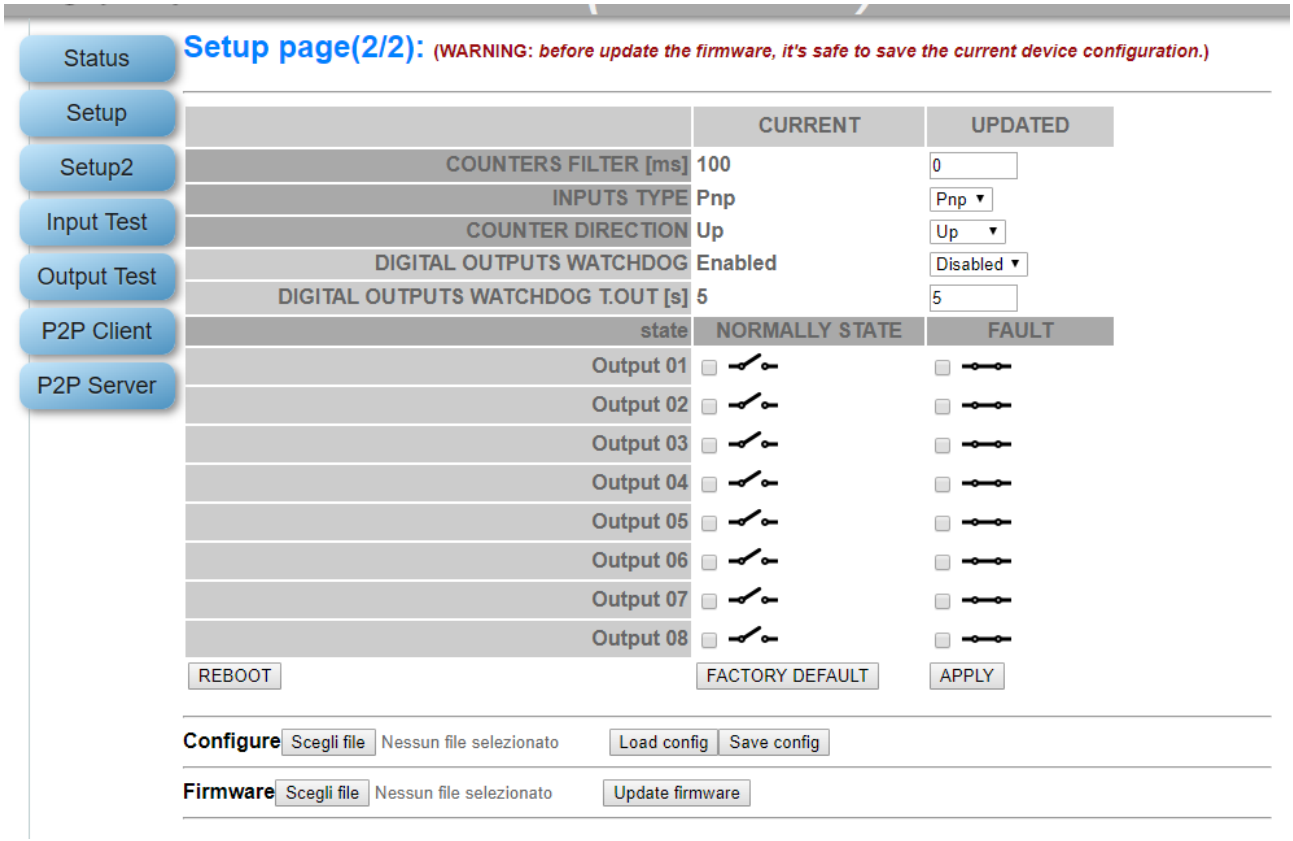
STOP BIT MODBUS RTU (SER) (default: 1 bit)
Sets the number of stop bits for the RS485 communication port.

MODBUS PASSTHROUGH SERIAL TIMEOUT (default: 100 ms)
Active only if passthrough mode is activated, sets the maximum waiting time before sending a new packet from TCP-IP to the serial port. It must be set according to the longest response time of all the devices present on the RS485 serial port.

ATTENTION!

THE USB PORT CONFIGURATION PARAMETERS CANNOT BE MODIFIED AND ARE BAUDRATE: 115200
DATA: 8 BIT
PARITY: NONE
STOP BIT: 1
MODBUS RTU PROTOCOL

9.2. SETUP 2 SECTION



COUNTERS FILTER (default: 100 ms)

Sets the filtering of the counters, the value is expressed in [ms].

The filter cut-off frequency corresponds to:

$$f_{cut}[Hz] = \frac{1000}{2 * Counters\ Filter\ [ms]}$$

For example, if the filter counter is 100ms the cutting frequency will be:

$$f_{cut}[Hz] = \frac{1000}{2 * Counters\ Filter\ [ms]} = 5\ Hz$$

So all input frequencies greater than 5 Hz will be cut.

ATTENTION!

WHEN COUNTER FILTERING IS ACTIVE, THE SAME FILTER IS ALSO OBTAINED ON THE SINGLE DIGITAL INPUTS!

INPUTS TYPE (default: Pnp "Source")
Sets the input/counter operating mode to between npn "Sink" and pnp "Source".

COUNTER DIRECTION (default: Up)
Sets the counting mode of the counters "forward", up or back "down".
In the "Up" mode when the counter reaches the value:

$$Max\ Value = 2^{32} - 1 = 4294967295$$

A subsequent increase will return the value to 0.
In the "Down" mode, if the counter value is 0, a subsequent input pulse will return the value to 4294967295.

DIGITAL OUTPUT WATCHDOG (default: Disabled)
Set whether the digital output watchdog is to activated. When enabled, if within the timeout time there has been no communication from the master to the device (Modbus serial communication, TCP-IP or USB or P2P communication) the outputs go into a Fail state. This mode makes it possible to obtain a secure system in the event of a master malfunction and its use is recommended in the case of radio type connections.

DIGITAL OUTPUTS WATCHDOG T.OUT [s] (default: 5 s)
Sets the watchdog time of the digital outputs (valid only if the DIGITAL OUTPUT WATCHDOG parameter is enabled)

NORMALLY STATE/FAULT (default: normally Normally open (N.O.) and Normally closed (N.C.) state in case of fail
They set the states of each of the outputs in normal conditions and in the event of a failure.
In the case of normally open (not energized) writing in the Modbus "Outputs" register with 0 will cause the relay not to energize, otherwise, in the case of normally closed (energized) writing in the Modbus "Outputs" register with 1 will determine the relay not to be energized.
In the case of "fail" the output will go into the selected configuration between not energized or energized .

The "***Configure***" section allows you to save or open a complete configuration of the device.

The "***Firmware***" section allows you to update the device firmware in order to obtain new functions.

10. CONFIGURATION OF THE R-8AI-8DIDO DEVICE VIA WEB SERVER

10.1. SETUP SECTION

DHCP (ETH) (default: Disabled)
Sets the DHCP client to get an IP address automatically.

IP ADDRESS STATIC (ETH)* (default: 192.168.90.101*)
Sets the device static address. Careful not to enter devices with the same IP address into the same network.

IP MASK STATIC (ETH) (default: 255.255.255.0)
Sets the mask for the IP network.

GATEWAY ADDRESS STATIC (ETH) (default: 192.168.90.1)
Sets the gateway address.

PROTECT CONFIGURATION (default: Disabled)
Allows you to enable or disable password protection for reading and writing the configuration (including the IP address) using the Seneca Discovery Device software. The password is the same one that allows accessing the web server.

ATTENTION!

IF THE CONFIGURATION PROTECTION IS ENABLED IT WILL BE IMPOSSIBLE TO READ/WRITE THE CONFIGURATION OF THE DEVICE WITHOUT KNOWING THE PASSWORD.
IN THE EVENT OF LOSING THE PASSWORD IT WILL BE POSSIBLE TO RETURN THE DEVICE TO THE FACTORY CONFIGURATION (SEE CHAPTER 5)

MODBUS SERVER PORT (ETH) (default: 502)
Sets the communication port for the Modbus TCP-IP server.

MODBUS SERVER STATION ADDRESS (ETH) (default: 1)
Active only if Modbus Passthrough is also active, it sets the station address of the modbus TCP-IP server.

ATTENTION!

THE MODBUS SERVER WILL ANSWER ANY STATION ADDRESS ONLY IF THE MODBUS PASSTHROUGH MODE IS DISABLED.

MODBUS PASSTHROUGH (ETH) (default: disabled)
Sets the conversion mode from Modbus TCP-IP to Modbus RTU serial (see chapter 4).

MODBUS TCP-IP CONNECTION TIMEOUT [sec] (ETH) (default: 60)
Sets the TCP-IP connection timeout for the Modbus TCP-IP server and Passthrough modes.

P2P SERVER PORT (default: 50026)
Sets the communication port for the P2P server.

WEB SERVER USERNAME (default: admin)
Sets the username to access the webserver.

CONFIGURATION/WEB SERVER PASSWORD (default: admin)
Sets the password to access the webserver and to read/write the configuration (if enabled).

WEB SERVER PORT (default: 80)
Sets the communication port for the web server.

BAUDRATE MODBUS RTU (SER) (default: 38400 baud)
Sets the baud rate for the RS485 communication port.

DATA MODBUS RTU (SER) (default: 8 bit)
Sets the number of bits for the RS485 communication port.

PARITY MODBUS RTU (SER) (default: None)
Sets the parity for the RS485 communication port.

STOP BIT MODBUS RTU (SER) (default: 1 bit)
Sets the number of stop bits for the RS485 communication port.

MODBUS PASSTHROUGH SERIAL TIMEOUT (default: 100ms)
Active only if Passthrough mode is activated, sets the maximum waiting time before sending a new packet from TCP-IP to the serial port. It must be set according to the longest response time of all the devices present on the RS485 serial port.

CHANNEL SAMPLE TIME [ms] (default: 100ms)
Sets the sampling time of each analogue input.

⚠ ATTENTION!

THE USB PORT CONFIGURATION PARAMETERS CANNOT BE MODIFIED AND ARE BAUDRATE: 115200
DATA: 8 BIT
PARITY: NONE
STOP BIT: 1
MODBUS RTU PROTOCOL

10.2. SETUP AIN 1. 8 SECTION

This section allows the configuration of the analogue inputs present in the device.

ATTENTION!

THE DEVICE CAN DETECT THE COLD JOINT TEMPERATURE FROM THE INTERNAL SENSORS OR FROM ANALOGUE INPUT 1 (THROUGH EXTERNAL PT100-TYPE SENSOR).
IN THIS CASE ALL THE DETECTIONS OF THE INTERNAL SENSORS WILL BE REPLACED BY THE READING OF ANALOGUE INPUT 1.

ANALOGUE INPUT MODE (default +-30V)
Set the type of measurement for the selected input.

It is possible to choose between the following types of input:

+-30V
+-100mV
+-20 mA
Thermocouple
PT100 2 wires (for use as a cold junction and only for input 1)
PT100 3 wires (for use as a cold junction and only for input 1)

If the"IN2..8 CJ PT100" type of measurement is selected for input 1, this will automatically be used as a measurement of the cold junction for all inputs configured by thermocouple between IN2 and IN8 included.

ANALOGUE INPUT 1 PT100 WIRE RESISTANCE [Ohm] (default 0 Ohm)
(Only for analogue input 1) allows to compensate the cable resistance in case of 2-wire connection to the PT100.

ANALOGUE INPUT TC TYPE (default J)
In the case of thermocouple measurement, it allows to select the type of thermocouple between:
J, K, R, S, T, B, E, N, L

ANALOGUE INPUT TEMPERATURE OFFSET (default 0°C)
Sets a temperature offset in °C for thermocouple measurements

ANALOGUE INPUT ONBOARD COLD JUNCTION (default ENABLED)
In the case of thermocouple measurement, it enables or disables the automatic cold junction offset of the device. If channel 1 has been configured as PT100 cold junction measurement, this sensor will be used for the offset and not the one inside the instrument.

ANALOGUE INPUT COLD JUCTION VALUE [°C] (default 0°C)

In the case of thermocouple measurement, if the automatic measurement of the cold junction has been deactivated, it is possible to manually enter the cold junction temperature.

ANALOGUE INPUT BURNOUT MODE (default FAIL VALUE)

In the case of thermocouple measurement, it selects the behaviour in case of sensor failure:
In the case of "Last Value" the value is stopped at the last valid value, in the case of "Fail Value" the "Burnout" value is loaded in the registers.

ANALOGUE INPUT BURNOUT VALUE (default 10000°C)

In the case of thermocouple measurement, if the ANALOGUE INPUT BURNOUT MODE = "FAIL VALUE" mode is activated and the sensor is in the "burn" state, it allows you to set a value in °C to be taken by the measurement register.

ANALOGUE INPUT UNIT MEASURE (default °C)

In the case of thermocouple measurement, it allows you to set the measurement unit of the measurement register between °C, K, °F and mV.

ANALOGUE INPUT FILTER [samples] (default 0)

Allows you to set the moving average filter with the selected number of samples. If the value is "0" the filter is disabled.

ANALOGUE INPUT START SCALE

Represents the start of the electrical scale of the analogue measurement used for the register of the engineering measurement.

ANALOGUE INPUT STOP SCALE

Represents the electrical full scale of the analogue measurement used for the engineering measurement register.

ANALOGUE INPUT ENG START SCALE

Represents the value of the engineering measurement register when the input reaches the value shown in the ANALOGUE INPUT START SCALE parameter.
For example if:
ANALOGUE INPUT START SCALE = 4mA
ANALOGUE INPUT STOP SCALE = 20mA
ANALOGUE INPUT ENG STOP SCALE = -200 metres
ANALOGUE INPUT ENG START SCALE = 200 metres

With a 12 mA input the engineering value will be 0 metres.

ANALOGUE INPUT ENG STOP SCALE
Represents the value of the engineering measurement register when the input reaches the value shown in the ANALOGUE INPUT STOP SCALE parameter.

For example if:
ANALOGUE INPUT START SCALE = 4mA
ANALOGUE INPUT STOP SCALE = 20mA
ANALOGUE INPUT ENG STOP SCALE = -200 metres
ANALOGUE INPUT ENG START SCALE = 200 metres

With a 12 mA input the engineering value will be 0 metres.

10.3. DIGITAL I/O SETUP SECTION

This section allows the configuration of the digital I/Os present in the device.

DIGITAL I/O MODE (default Input)
Selects whether the chosen terminal will work as an input or output.

DIGITAL INPUT NORMALLY HIGH/LOW (default Normally Low)
If selected as digital input, it configures whether the input is normally high or low.

DIGITAL OUTPUT NORMALLY STATE (default Normally Open)
If selected as digital output, it configures whether the output is normally open or closed.

DIGITAL OUTPUT WATCHDOG (default Disabled)
If selected as digital output, it sets the output watchdog mode.
If “Disabled”, it disables the watchdog function for the selected output.
If "Enabled on Modbus Communication" the output goes into "Watchdog state" if there has been no generic Modbus communication within the set time.
If "Enabled on Modbus Digital Output Writing" the output goes into "Watchdog state" if there has been no writing of the output within the set time.

DIGITAL OUTPUT WATCHDOG STATE (default Open)
Sets the value that the digital output must adopt if the watchdog has been triggered.

DIGITAL OUTPUT WATCHDOG TIMEOUT [s] (default 100s)
Represents the watchdog time of the digital output in seconds.

10.4. EVENT SETUP SECTION

This section allows the configuration of events to send analogue values with the P2P protocol.

EVENT AIN MODE (Default: DISABLED)

Represents the event condition for sending packets linked to the analogue inputs in the P2P protocol.
It may be:
"Disabled" the sending event of the analogue packet is disabled
"Event when AIN > HIGH THRESHOLD" the packet sending event occurs when the analogue input exceeds the "High" threshold set.

"Event when AIN < LOW THRESHOLD" the packet sending event occurs when the analogue input is lower than the "Low" threshold set.

EVENT AIN HIGH THRESHOLD (Default: 0)

Threshold value linked to the “High” event.

EVENT AIN LOW THRESHOLD (Default: 0)

Threshold value linked to the “Low” event.

EVENT AIN HISTERESYS

Hysteresis value for the reset of the "event" condition.
For example, if the event is configured in "Event when AIN > HIGH THRESHOLD" mode, when the analogue input exceeds the threshold value, the packet will be sent, to send the next packet it will be necessary for the analogue value to fall below the value (EVENT AIN HIGH THRESHOLD + EVENT AIN HYSTERESIS) and then to rise above the HIGH value again.

11. CONFIGURATION OF THE R- SG3 DEVICE VIA WEB SERVER

11.1. SETUP SECTION

DHCP (ETH) (default: Disabled)
Sets the DHCP client to get an IP address automatically.

IP ADDRESS STATIC (ETH) (default: 192.168.90.101)
Sets the device static address. Careful not to enter devices with the same IP address into the same network.

IP MASK STATIC (ETH) (default: 255.255.255.0)
Sets the mask for the IP network.

GATEWAY ADDRESS STATIC (ETH) (default: 192.168.90.1)
Sets the gateway address.

MODBUS SERVER PORT (ETH) (default: 502)
Sets the communication port for the Modbus TCP-IP server.

MODBUS SERVER STATION ADDRESS (ETH) (default: 1)
Active only if Modbus Passthrough is also active, it sets the station address of the modbus TCP-IP server.

ATTENTION!

THE MODBUS SERVER WILL ANSWER ANY STATION ADDRESS ONLY IF THE MODBUS PASSTHROUGH MODE IS DISABLED.

MODBUS PASSTHROUGH (ETH) (default: disabled)
Sets the conversion mode from Modbus TCP-IP to Modbus RTU serial (see chapter 4).

MODBUS TCP-IP CONNECTION TIMEOUT [sec] (ETH) (default: 60)
Sets the TCP-IP connection timeout for the Modbus TCP-IP server and Passthrough modes.

P2P SERVER PORT (default: 50026)
Sets the communication port for the P2P server.

WEB SERVER USERNAME (default: admin)
Sets the username to access the webserver.

CONFIGURATION/WEB SERVER PASSWORD (default: admin)
Sets the password to access the webserver and to read/write the configuration (if enabled).

WEB SERVER PORT (default: 80)
Sets the communication port for the web server.

BAUDRATE MODBUS RTU (SER) (default: 38400 baud)
Sets the baud rate for the RS485 communication port.

DATA MODBUS RTU (SER) (default: 8 bit)
Sets the number of bits for the RS485 communication port.

PARITY MODBUS RTU (SER) (default: None)
Sets the parity for the RS485 communication port.

STOP BIT MODBUS RTU (SER) (default: 1 bit)
Sets the number of stop bits for the RS485 communication port.

MODBUS PASSTHROUGH SERIAL TIMEOUT (default: 100ms)
Active only if Passthrough mode is activated, sets the maximum waiting time before sending a new packet from TCP-IP to the serial port. It must be set according to the longest response time of all the devices present on the RS485 serial port.

11.2. LOAD CELL SETUP SECTION

FUNCTION MODE
It allows to configure the basic operation of the device, can be set to factory calibration or to Calibration with standard weight.

FACTORY CALIBRATION
It is used when a load cell with declared sensitivity is available.
In this mode, calibration only consists in acquiring the tare directly in the field with a direct measurement. If it is not possible to acquire the tare with a direct measurement (for example in the case of an already filled silo) it is possible to manually enter the tare value in the desired unit of measurement (kg, t, etc.).

CALIBRATION WITH STANDARD WEIGHT
It is used when a sample weight is available (as far as possible towards the load cell full scale).
In this mode the calibration consists in acquiring both the tare and the sample weight directly on the field.

MEASURE TYPE
It allows to configure the operation of the device between:

BALANCE (UNIPOLAR)

It is used when a scale is being created in which the load cell is only compressed, in this case the maximum resolution of the compression measurement is obtained.

COMPRESSION AND TRACTION (BIPOLAR)

It is used when a measurement system (typically of force) is being created that can both compress and extend the load cell. In this case the direction of the force can also be decided, if compression the measurement will have the + sign, if traction it will have the - sign. A typical case of use is to link the direction of the force to the analogue output so that, for example, 4mA correspond to the maximum traction force and 20mA correspond to the maximum compression force (in this case the cell at rest will provide 12Ma).

MEASURE UNIT

Sets the unit of measurement for the weighing in g, Kg, t etc.

CELL SENSITIVITY

It is the declared cell value sensitivity expressed in mV/V (in most cells it is 2mV/V).

CELL FULL SCALE

It is the full scale value of the cell expressed in the selected unit of measurement.

STANDARD WEIGHT VALUE

It represents the value of the sample weight that will be used in the calibration if the operating mode with standard weight has been chosen.

NOISE FILTER

Enables or disables measurement filtering.

FILTER LEVEL

Allows you to set the measurement filter level according to the following table:

FILTER LEVEL	RESPONSE TIME [ms]
0	2
1	6.7
2	13
3	30
4	50
5	250
6	850
ADVANCED	Configurable

The higher the filter level the more stable (but slow) the weight measurement will be.

If you select the advanced filtering level (Advanced), the configuration will allow you to select the following parameters:

ADC SPEED Selects the ADC acquisition speed from 4.7 Hz to 960 Hz

NOISE VARIATION It is the variation in ADC points due to noise alone (represents the measurement uncertainty due to noise) or how much we expect the measurement to vary (the unit of measurement is in raw ADC points).

FILTER RESPONSE SPEED
Represents a parameter related to the filter response speed, it can vary from 0.001 (slowest response) to 1 (fastest response). Represents the variance of the process.

NET WEIGHT RESOLUTION
It is the resolution with which the value of the net weighing is represented, it can be worth:

MAXIMUM RESOLUTION
It will represent the net weight with the highest possible resolution

MANUAL
It will represent the net weight with the manual resolution set (in engineering units).
For example, by setting 0.1 Kg you will get that the net weight can only vary by multiples of 100g.

AUTOMATIC RESOLUTION
It will represent the net weight with a calculated resolution of about 20000 points. Unlike Maximum or Manual resolution, this setting limits also the ADC value and therefore affects all measurements.

⚠ CAUTION

Keep in mind that in the "Calibration with sample weight" mode, using the "Manual Resolution", the correct sample weight value may not be perfectly represented:

For example, you have:

Cell full scale 15000 g
Sample weight 14000 g
Manual Resolution 1.5 g

The value of the sample weight (14000 g) cannot be represented with the resolution in 1.5g steps (14000/1.5g = 9333.333 is not an integer value) so it will be represented as: 9333*1.5g = 13999.5g

To avoid this effect, use a resolution that allows the value to be represented (for example 1g or 2g).

SAMPLE PIECE WEIGHT

Sets the weight of a single piece in technical units for the mode. By setting the net weight of a single element in this register, the converter will be able to indicate the number of pieces present in the scales special register according to the relation:

$$Nr\ Pezzi = \frac{Peso\ Netto}{Peso\ Pezzo\ Campione}$$

AUTOMATIC TARE TRACKER

It allows you to enable or disable the automatic tare reset.

ADC VALUE

It allows to set the number of ADC points within which to reset the tare automatically.
If after 5 seconds of stable weighing condition the ADC value of the net weight deviates by less than this value then a new tare is acquired.

11.3. I/O SETUP SECTION

DIGITAL I/O MODE

Configures the digital I/O of the device

DIGITAL INPUT

If the nth IO is configured as an input, it is possible to choose its function from:

FUNCTION DIGITAL INPUT

The input is configured as a digital input whose value can be read from the appropriate register.

FUNCTION ACQUIRE TARE

In this mode, if the digital input is activated for a time longer than 3 seconds, a new tare value is acquired (in RAM, then it is lost upon restart). It is equivalent to sending the command 49594 (decimal) in the command register.

DIGITAL OUTPUT

If the nth IO is configured as an output, it is possible to choose its function from:

DIGITAL OUTPUT MODE

The output can be configured as normally open (***Normally Open***) or as normally closed (***Normally Close***).

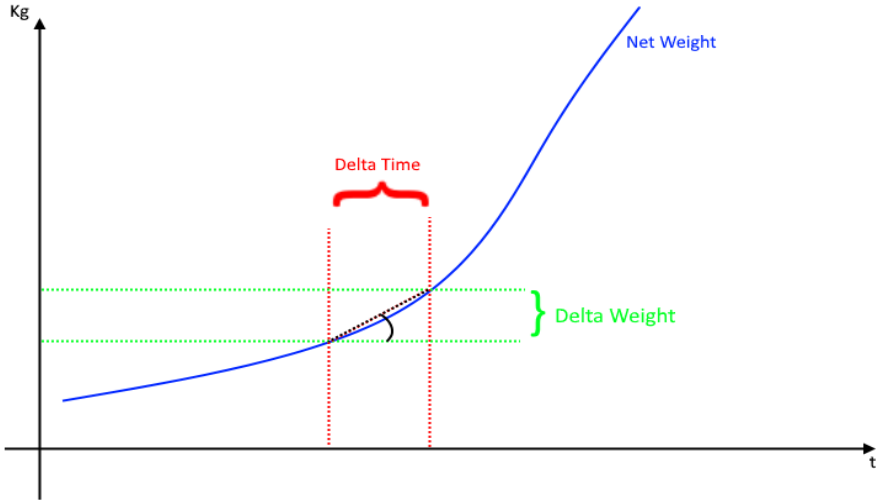
DIGITAL OUTPUT CONFIGURATION

Here you can choose the behaviour of the digital output:

STABLE WEIGHT

The stable weighing condition is used to indicate that the net weight measurement is stable if:

The net weight remains within the weight $\Delta peso\_netto$ over time $\Delta tempo$ or if the slope of the curve drawn by the net weight is less than $\frac{\Delta peso\_netto}{\Delta tempo}$:



You will be prompted to enter Delta Net Weight (***Delta Weight***) (in engineering units) and Delta Time (***Delta Time***) (in 0.1 seconds).

THRESHOLD AND STABLE WEIGHT

In this mode, the output activates when the net weight reaches the threshold and the weigh is in a stable weighing condition.

STABLE WEIGHT

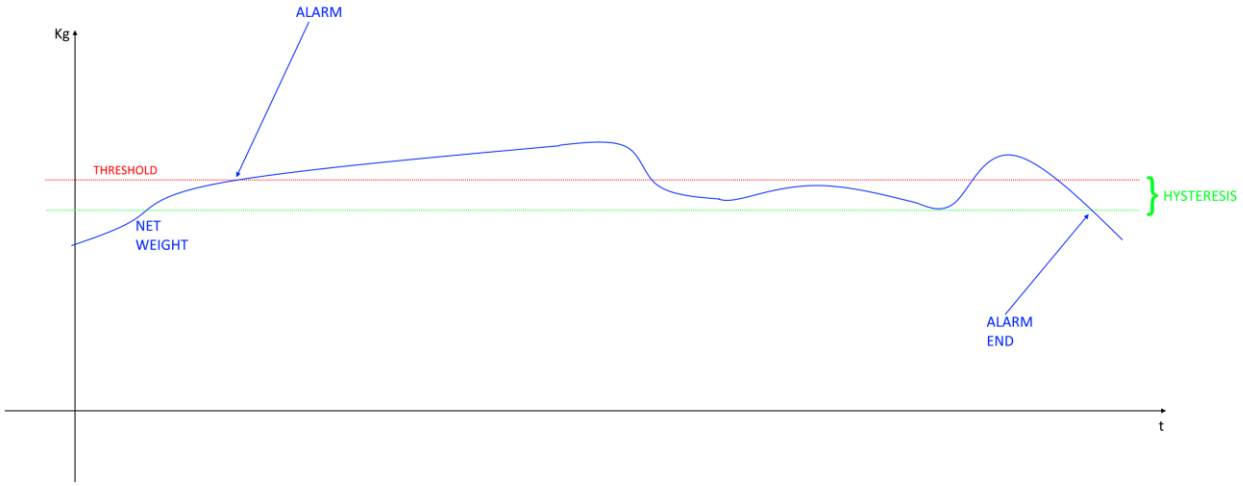
In this mode the output is activated if the weighing is in the stable weighing condition.

COMMANDABLE FROM MODBUS

In this mode the output can be controlled by the modbus register.

THRESHOLD WITH HYSTERESIS

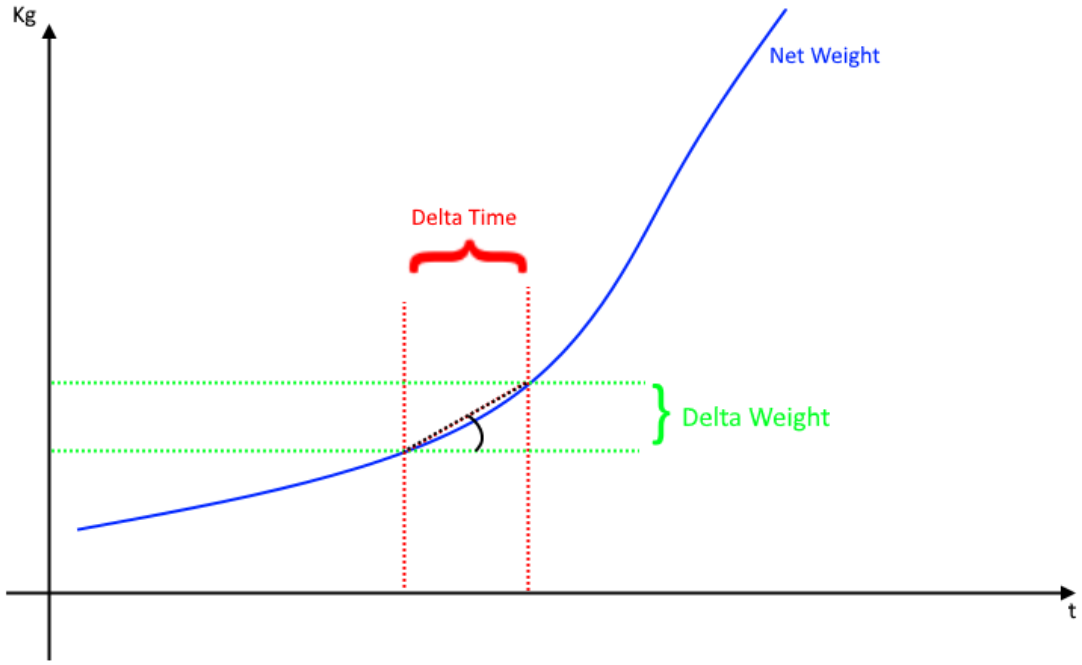
In this mode the output is activated when the net weight reaches the threshold, the alarm is cancelled when the net weight falls below the Threshold-Hysteresis value:



STABLE WEIGHT CONDITION

The stable weighing condition is used to indicate that the net weight measurement is stable if:

The net weight remains within the weight $\Delta peso\_netto$ (DELAT WEIGHT) over time $\Delta tempo$ (DELTA TIME) or if the slope of the curve drawn by the net weight is less than $\frac{\Delta peso\_netto}{\Delta tempo}$:



11.4. TEST AND LOAD CELL CALIBRATION SECTION

In this section it is possible to calibrate the cell and carry out the tests. For more information on cell calibration refer to the Cell Calibration chapter of this manual.

11.5. P2P CONFIGURATION

In the P2P Client section it is possible to define which local events to send to one or more remote devices. This way it is possible to send the status of the inputs to the remote outputs and obtain the input-output replication without wiring. It is also possible to send the same input to several outputs simultaneously.

In the P2P Server section it is instead possible to define which inputs must be copied to the outputs.

The "***Disable all rules***" button places all the rules in a disabled status (default).
The "***APPLY***" button allows you to confirm and then save the set rules in the non-volatile memory.

11.6. LOAD CELL CALIBRATION THROUGH THE WEB SERVER

To calibrate the load cell, access the "TEST AND LOAD CELL CALIBRATION" section of the web server. Depending on the two modes chosen between factory calibration or with standard weight, it will be possible to proceed with the calibration.

11.6.1. CELL CALIBRATION WITH FACTORY PARAMETERS

In cell calibration with factory parameters it is not necessary to use a standard weight as reference is made to the parameters acquired in the factory.
The necessary data are:

-The cell sensitivity
-The cell full scale

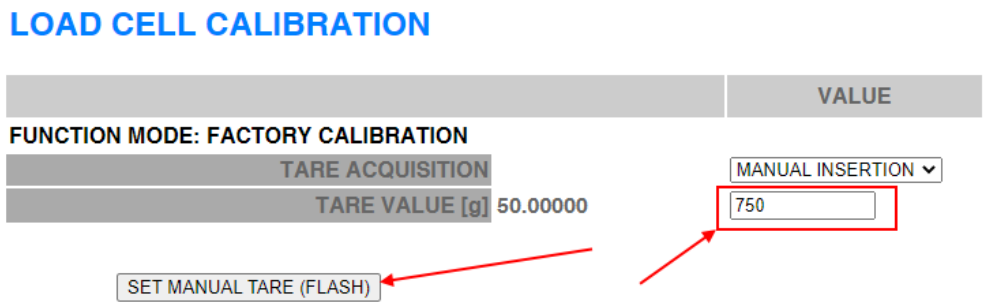
For the cell calibration procedure it is necessary to acquire the tare.
The tare can be entered manually in technical units (if known) or it can be acquired from the field.

⚠ ATTENTION!

TO OBTAIN A BETTER MEASUREMENT ACCURACY ACQUIRE THE TARE FROM THE FIELD

11.6.1.1. MANUAL ENTRY OF THE TARE VIA WEB SERVER

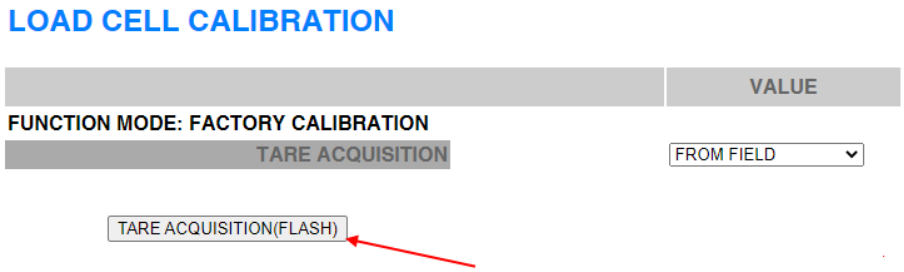
It is not always possible to acquire the tare value from the field (for example in the case of already filled silos), in these cases it is possible to introduce the tare weight in technical units.



To acquire the tare value, press the "SET MANUAL TARE (FLASH)" button

11.6.1.2. ACQUISITION OF THE TARE FROM THE FIELD VIA WEB SERVER

1) Enter the "Test and load cell calibration" web server page
2) Replace the tare on the cell
3) Wait for the measurement to stabilize
4) Press the "TARE ACQUISITION (FLASH)" button

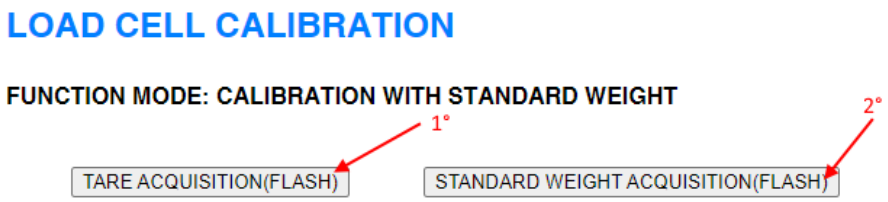


11.6.2. CELL CALIBRATION WITH A SAMPLE WEIGHT

In cell calibration with a standard weight it is necessary to know:

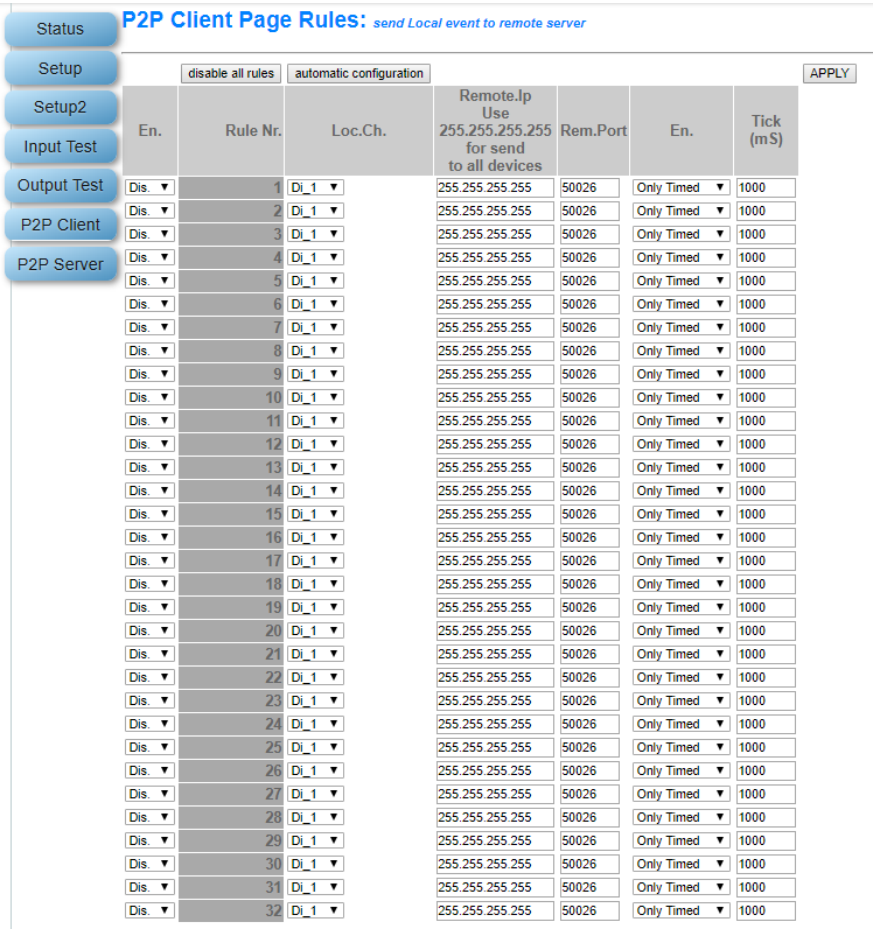
-The cell sensitivity
-The cell full scale
-A standard weight (so that Standard weight + Tare are as close as possible to the cell full scale)

1) Enter the "Test and load cell calibration" web server page
2) Replace the tare on the cell
3) Wait for the measurement to stabilize
4) Press the "TARE ACQUISITION (FLASH)" button
5)



6) Replace the Tare + Standard Weight
7) Wait for the measurement to stabilize
8) Press the "STANDARD WEIGHT ACQUISITION (FLASH)" button

12. P2P CLIENT



The "***Automatic configuration***" button allows you to prepare the rules for sending all the inputs available in the device in use.

En.

Selects whether the copy rule is active or not.

Loc. Ch.

Selects the status of which channel should be sent to the remote device(s).

Remote IP

Selects the IP address of the remote device to which the status of that input channel is to be sent.

If the channel has to be sent simultaneously to all the devices (broadcast), enter the broadcast address (255.255.255.255) as the IP address.

Remote Port

Selects the communication port for sending the status of the inputs. It must coincide with the ***P2P SERVER PORT*** parameter of the remote device.

En

Selects operation in "Only Timed" or "Timed+Event" mode.
In "Only Timed" mode, the status of the inputs is sent on each "tick [ms]" and then refreshed continuously (cyclic sending).
In the “Timed+Event” mode, the status of the inputs is sent to a digital event (change of status).

Tick [ms]

Sets the cyclical sending time of the input status.

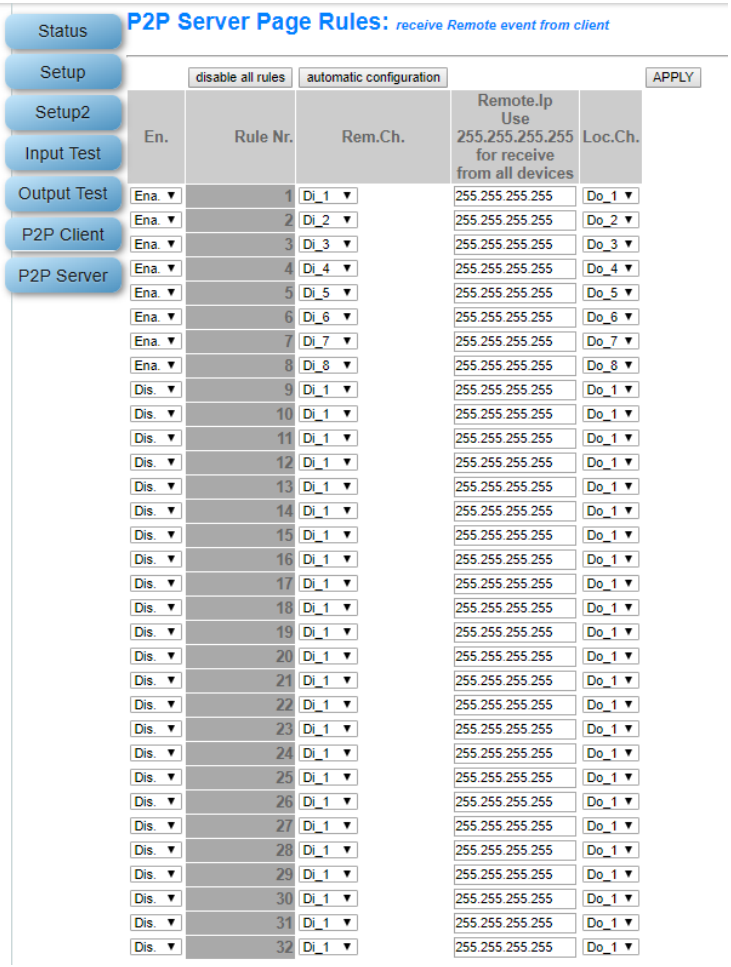
ATTENTION!

IN CASE OF ENABLED WATCHDOG OF DIGITAL OUTPUTS THE RULE'S TICK TIME MUST BE LOWER THAN THE WATCHDOG TIMEOUT SET

ATTENTION!

IT IS ALSO POSSIBLE TO COPY SOME I/O OF THE SAME DEVICE (FOR EXAMPLE, COPY THE I01 INPUT TO D01) BY ENTERING THE IP OF THE DEVICE AS REMOTE IP

13. P2P SERVER



En.	Rule Nr.	Rem.Ch.	Remote.Ip Use 255.255.255.255 for receive from all devices	Loc.Ch.
Ena.	1	Di_1	255.255.255.255	Do_1
Ena.	2	Di_2	255.255.255.255	Do_2
Ena.	3	Di_3	255.255.255.255	Do_3
Ena.	4	Di_4	255.255.255.255	Do_4
Ena.	5	Di_5	255.255.255.255	Do_5
Ena.	6	Di_6	255.255.255.255	Do_6
Ena.	7	Di_7	255.255.255.255	Do_7
Ena.	8	Di_8	255.255.255.255	Do_8
Dis.	9	Di_1	255.255.255.255	Do_1
Dis.	10	Di_1	255.255.255.255	Do_1
Dis.	11	Di_1	255.255.255.255	Do_1
Dis.	12	Di_1	255.255.255.255	Do_1
Dis.	13	Di_1	255.255.255.255	Do_1
Dis.	14	Di_1	255.255.255.255	Do_1
Dis.	15	Di_1	255.255.255.255	Do_1
Dis.	16	Di_1	255.255.255.255	Do_1
Dis.	17	Di_1	255.255.255.255	Do_1
Dis.	18	Di_1	255.255.255.255	Do_1
Dis.	19	Di_1	255.255.255.255	Do_1
Dis.	20	Di_1	255.255.255.255	Do_1
Dis.	21	Di_1	255.255.255.255	Do_1
Dis.	22	Di_1	255.255.255.255	Do_1
Dis.	23	Di_1	255.255.255.255	Do_1
Dis.	24	Di_1	255.255.255.255	Do_1
Dis.	25	Di_1	255.255.255.255	Do_1
Dis.	26	Di_1	255.255.255.255	Do_1
Dis.	27	Di_1	255.255.255.255	Do_1
Dis.	28	Di_1	255.255.255.255	Do_1
Dis.	29	Di_1	255.255.255.255	Do_1
Dis.	30	Di_1	255.255.255.255	Do_1
Dis.	31	Di_1	255.255.255.255	Do_1
Dis.	32	Di_1	255.255.255.255	Do_1

The "***Automatic configuration***" button allows you to prepare the rules to receive all the inputs on the outputs of the device in use.

En.

Selects whether the copy rule is active or not.

Rem. Ch.

Selects the status of which remote channel should be received by the local device.

Remote IP

Selects the IP address of the remote device from which to receive the input status.

If the channel must be received simultaneously by all the devices (broadcast), enter the broadcast address (255.255.255.255) as the IP address.

Loc. Ch.

Selects the copy destination of the remote input value.

⚠ ATTENTION!

IT IS ALSO POSSIBLE TO COPY SOME I/O OF THE SAME DEVICE (FOR EXAMPLE, COPY THE I01 INPUT TO D01) BY ENTERING THE IP OF THE DEVICE AS REMOTE IP. HOWEVER, THE ETHERNET PORT MUST BE CORRECTLY CONNECTED.

13.1. P2P CONFIGURATION EXAMPLE

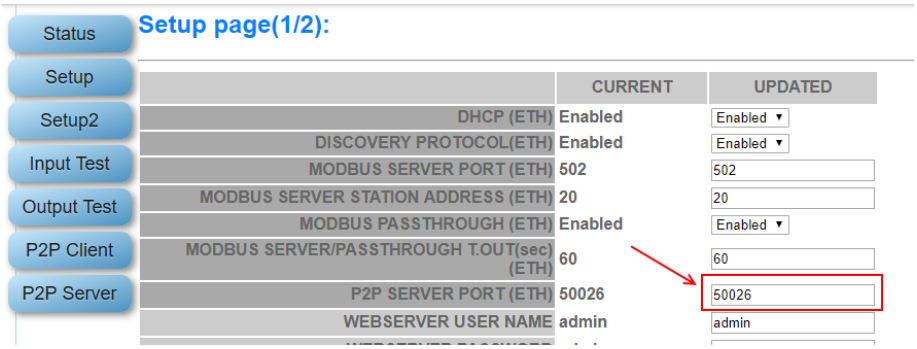
In the following example we have No.2 devices and we want to copy the status of digital input 1 of the first to the digital output of the second.
The IP address of Device 1 is 192.168.1.10
The IP address of Device 2 is 192.168.1.11

Let's move to device 1 with IP address 192.168.1.10 and select the sending of digital input 1 to the remote address 192.168.1.11 of device 2 this way:

DEVICE 1

En.	Rule Nr.	Loc.Ch.	Remote.Ip Use 255.255.255.255 for send to all devices	Rem.Port	En.	Tick (mS)
Ena.	1	Di_1	192.168.1.11	50026	Timed+Event	1000

Now let's move on to device 2 and first configure the P2P server communication port on 50026:



And we now configure the P2P server, the channel to be received from 192.168.1.10 is Di_1 and must be copied to Do_1:

DEVICE 2

En.	Rule Nr.	Rem.Ch.	Remote.Ip Use 255.255.255.255 for receive from all devices	Loc.Ch.
Ena.	1	Di_1	192.168.1.10	Do_1

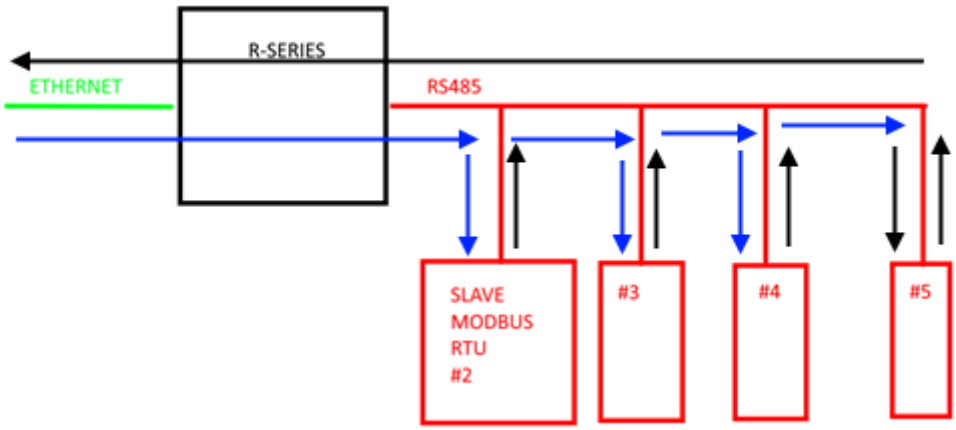
With this configuration, each time digital input 1 of device 1 (192.168.1.10) changes status, a packet will be sent to device 2 (192.168.1.11) which will copy it to digital output 1.
After 1 second, the same packet will be sent cyclically.

13.2. P2P EXECUTION TIME

The switching time depends on the client device model and the server device model in addition to the congestion of the ethernet network.
For example, for the R-16DI8DO model, the switching time of the remote digital output as a response to an incoming event into another R-16DI8DO is about 20 ms (daisy chain connection of 2 devices, 1 set rule).
As regards the analogue models, the refresh time of the digital inputs/outputs and analogue inputs typical of the device must also be considered.

14. MODBUS PASSTHROUGH

Thanks to the Modbus Passthrough function it is possible to extend the amount of I/O available in the device via the RS485 port and the Modbus RTU slave protocol, for example by using the Seneca Z-PC series products.
In this mode the RS485 port stops working as Modbus RTU slave and the device becomes a Modbus TCP-IP gateway to Modbus RTU serial:



Each Modbus TCP-IP request with station address other than that of the R series device is converted into a serial packet on the RS485 and, in the case of a reply, it is turned over to TCP-IP.
Therefore, it is no longer necessary to purchase gateways to extend the I/O number or to connect already available Modbus RTU I/O.

15. UPDATING THE FIRMWARE AND SAVING/OPENING A CONFIGURATION

The firmware update can be performed via the web server in the appropriate section.
Via the web server it is possible to save or open a saved configuration.

ATTENTION!

NOT TO DAMAGE THE DEVICE DO NOT REMOVE THE POWER SUPPLY DURING THE FIRMWARE UPDATE OPERATION.

16. MODBUS RTU/ MODBUS TCP-IP REGISTERS

The following abbreviations are used in the register tables:

MS	Most Significant
LS	Least Significant
MSBIT	Most Significant Bit
LSBIT	Least Significant Bit
MMSW	“Most” Most Significant Word (16bit)
MSW	Most Significant Word (16bit)
LSW	Least Significant Word (16bit)
LLSW	“Least” Least Significant Word (16bit)
RO	Read Only
RW	Register in RAM or Fe-RAM Writable infinite times.
RW*	Flash Read-Write: REGISTERS CONTAINED IN THE FLASH MEMORY: WRITABLE AT THE MAXIMUM ABOUT 10000 TIMES.
UNSIGNED 16 BIT	Unsigned integer register that can take values from 0 to 65535
SIGNED 16 BIT	Signed integer register that can take values from -32768 to +32767
UNSIGNED 32 BIT	Unsigned integer register that can take values from 0 to +4294967296
SIGNED 32 BIT	Signed integer register that can take values from -2147483648 to 2147483647
UNSIGNED 64 BIT	Unsigned integer register that can take values from 0 to 18446744073709551615
SIGNED 64 BIT	Signed integer register that can take values from -2^63 to 2^63-1
FLOAT 32 BIT	Single-precision, 32-bit floating point register (IEEE 754) https://en.wikipedia.org/wiki/IEEE_754
BIT	Boolean register, which can take values 0 (false) or 1 (true)

16.1. NUMBERING OF "0-BASED" OR "1-BASED" MODBUS ADDRESSES

According to the Modbus standard the Holding Registers are addressable from 0 to 65535, there are 2 different conventions for numbering the addresses: "0-BASED" and "1-BASED".
For greater clarity, Seneca shows its register tables in both conventions.

ATTENTION!

CAREFULLY READ THE DOCUMENTATION OF THE MODBUS MASTER DEVICE IN ORDER TO UNDERSTAND WHICH OF THE TWO CONVENTIONS THE MANUFACTURER HAS DECIDED TO USE

16.2. NUMBERING OF MODBUS ADDRESSES WITH "0-BASED" CONVENTION

The numbering is:

HOLDING REGISTER MODBUS ADDRESS (OFFSET)	***MEANING***
0	FIRST REGISTER
1	SECOND REGISTER
2	THIRD REGISTER
3	FOURTH REGISTER
4	FIFTH REGISTER

Therefore, the first register is at address 0.
In the following tables, this convention is indicated with ***"ADDRESS OFFSET".***

16.3. NUMBERING OF MODBUS ADDRESSES WITH "1 BASED" CONVENTION (STANDARD)

The numbering is that established by the Modbus consortium and is of the type:

HOLDING REGISTER MODBUS ADDRESS 4x	***MEANING***
40001	FIRST REGISTER
40002	SECOND REGISTER
40003	THIRD REGISTER
40004	FOURTH REGISTER
40005	FIFTH REGISTER

In the following tables this convention is indicated with ***"ADDRESS 4x"*** since a 4 is added to the address so that the first Modbus register is 40001.

A further convention is also possible where the number 4 is omitted in front of the register address:

HOLDING MODBUS ADDRESS WITHOUT 4x	*MEANING*
1	FIRST REGISTER
2	SECOND REGISTER
3	THIRD REGISTER
4	FOURTH REGISTER
5	FIFTH REGISTER

16.4. BIT CONVENTION WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

For instance, if the value of the register in decimal is
12300
the value 12300 in hexadecimal is:
0x300C

the hexadecimal 0x300C in binary value is:
11 0000 0000 1100

So, using the above convention, we get:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0

16.5. MSB and LSB BYTE CONVENTION WITHIN A MODBUS HOLDING REGISTER

A Modbus Holding Register consists of 16 bits with the following convention:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0

LSB Byte (Least Significant Byte) defines the 8 bits ranging from Bit 0 to Bit 7 included, we define MSB Byte (Most Significant Byte) the 8 bits ranging from Bit 8 to Bit 15 inclusive:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
BYTE MSB								BYTE LSB							

16.6. REPRESENTATION OF A 32-BIT VALUE IN TWO CONSECUTIVE MODBUS HOLDING REGISTERS

The representation of a 32-bit value in the Modbus Holding Registers is made using 2 consecutive Holding Registers (a Holding Register is a 16-bit register). To obtain the 32-bit value it is therefore necessary to read two consecutive registers:
For example, if register 40064 contains the 16 most significant bits (MSW) while register 40065 contains the least significant 16 bits (LSW), the 32-bit value is obtained by composing the 2 registers:

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40064 MOST SIGNIFICANT WORD															

BIT 15	BIT 14	BIT 13	BIT 12	BIT 11	BIT 10	BIT 9	BIT 8	BIT 7	BIT 6	BIT 5	BIT 4	BIT 3	BIT 2	BIT 1	BIT 0
40065 LEAST SIGNIFICANT WORD															

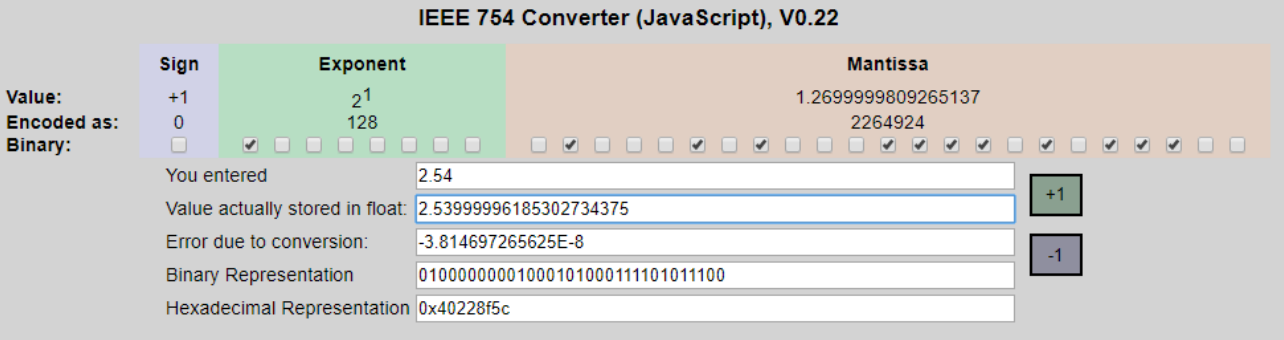
$$Value_{32bit} = Register_{LSW} + (Register_{MSW} * 65536)$$

In the reading registers it is possible to swap the most significant word with the least significant word, therefore it is possible to obtain 40064 as LSW and 40065 as MSW.

16.7. TYPE OF 32-BIT FLOATING POINT DATA (IEEE 754)

The IEEE 754 standard (https://en.wikipedia.org/wiki/IEEE_754) defines the format for representing floating point numbers.
As already mentioned, since it is a 32-bit data type, its representation occupies two 16-bit holding registers.
To obtain a binary/hexadecimal conversion of a floating point value it is possible to refer to an online converter at this address:

http://www.h-schmidt.net/FloatConverter/IEEE754.html



Using the last representation the value 2.54 is represented at 32 bits as:

0x40228F5C

Since we have 16-bit registers available, the value must be divided into MSW and LSW:

0x4022 (16418 decimal) are the 16 most significant bits (MSW) while 0x8F5C (36700 decimal) are the 16 least significant bits (LSW).

16.8. SUPPORTED MODBUS COMMUNICATION PROTOCOLS

The Modbus communication protocols supported are:

- Modbus RTU Slave (from the RS485 port)
- Modbus TCP-IP Server (from Ethernet ports) 8 clients max

16.9. SUPPORTED MODBUS FUNCTION CODES

The following Modbus functions are supported:

- Read Holding Register (function 3)
- Read Coil Status (function 1)
- Write Coil (function 5)
- Write Multiple Coil (function 15)
- Write Single Register (function 6)
- Write Multiple Registers (function 16)

ATTENTION!

All 32-bit values are contained in 2 consecutive registers

ATTENTION!

Any registers with RW* (in flash memory) can be written up to 10000 times
The PLC/Master Modbus programmer must not exceed this limit

17. MODBUS REGISTER TABLE FOR THE R-32DIDO PRODUCT

17.1. R-32DIDO: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

ADDRESS (4x)	OFFSET (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40001	0	MACHINE-ID	-	Device identification	RO	UNSIGNED 16 BIT
40002	1	FW REVISION (Maior/Minor)	-	Fw Revision	RO	UNSIGNED 16 BIT
40003	2	FW REVISION (Fix/Build)	-	Fw Revision	RO	UNSIGNED 16 BIT
40004	3	FW CODE	-	Fw Code	RO	UNSIGNED 16 BIT
40005	4	RESERVED	-	-	RO	UNSIGNED 16 BIT
40006	5	RESERVED	-	-	RO	UNSIGNED 16 BIT
40007	6	BOARD-ID	-	Hw Revision	RO	UNSIGNED 16 BIT
40008	7	BOOT REVISION (Maior/Minor)	-	Bootloader Revision	RO	UNSIGNED 16 BIT
40009	8	BOOT REVISION (Fix/Build)	-	Bootloader Revision	RO	UNSIGNED 16 BIT
40010	9	RESERVED	-	-	RO	UNSIGNED 16 BIT
40011	10	RESERVED	-	-	RO	UNSIGNED 16 BIT
40012	11	RESERVED	-	-	RO	UNSIGNED 16 BIT
40013	12	COMMAND_AUX _3H	-	Aux Command Register	RW	UNSIGNED 16 BIT
40014	13	COMMAND_AUX _3L	-	Aux Command Register	RW	UNSIGNED 16 BIT
40015	14	COMMAND_AUX 2	-	Aux Command Register	RW	UNSIGNED 16 BIT
40016	15	COMMAND_AUX 1	-	Aux Command Register	RW	UNSIGNED 16 BIT
40017	16	COMMAND	-	Aux Command Register	RW	UNSIGNED 16 BIT
40018	17	STATUS	-	Device Status	RW	UNSIGNED 16 BIT
40019	18	RESERVED	-	-	RW	UNSIGNED 16 BIT
40020	19	RESERVED	-	-	RW	UNSIGNED 16 BIT
40021	20	DIGITAL I/O	16..1	Digital IO Value [Channel 16...1]	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40022	21	DIGITAL I/O	32..17	Digital IO Value [Channel 32…17]	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40101	100	COUNTER MSW DIN	1	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40102	101	COUNTER LSW DIN			RW	
40103	102	COUNTER MSW DIN	2	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40104	103	COUNTER LSW DIN			RW	
40105	104	COUNTER MSW DIN	3	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40106	105	COUNTER LSW DIN			RW	
40107	106	COUNTER MSW DIN	4	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40108	107	COUNTER LSW DIN			RW	
40109	108	COUNTER MSW DIN	5	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40110	109	COUNTER LSW DIN			RW	
40111	110	COUNTER MSW DIN	6	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40112	111	COUNTER LSW DIN			RW	
40113	112	COUNTER MSW DIN	7	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40114	113	COUNTER LSW DIN			RW	
40115	114	COUNTER MSW DIN	8	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40116	115	COUNTER LSW DIN			RW	
40117	116	COUNTER MSW DIN	9	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40118	117	COUNTER LSW DIN			RW	
40119	118	COUNTER MSW DIN	10	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40120	119	COUNTER LSW DIN			RW	

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40121	120	COUNTER MSW DIN	11	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40122	121	COUNTER LSW DIN			RW	
40123	122	COUNTER MSW DIN	12	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40124	123	COUNTER LSW DIN			RW	
40125	124	COUNTER MSW DIN	13	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40126	125	COUNTER LSW DIN			RW	
40127	126	COUNTER MSW DIN	14	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40128	127	COUNTER LSW DIN			RW	
40129	128	COUNTER MSW DIN	15	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40130	129	COUNTER LSW DIN			RW	
40131	130	COUNTER MSW DIN	16	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40132	131	COUNTER LSW DIN			RW	
40133	132	COUNTER MSW DIN	17	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40134	133	COUNTER LSW DIN			RW	
40135	134	COUNTER MSW DIN	18	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40136	135	COUNTER LSW DIN			RW	
40137	136	COUNTER MSW DIN	19	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40138	137	COUNTER LSW DIN			RW	
40139	138	COUNTER MSW DIN	20	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40140	139	COUNTER LSW DIN			RW	
40141	140	COUNTER MSW DIN	21	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40142	141	COUNTER LSW DIN			RW	
40143	142	COUNTER MSW DIN	22	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40144	143	COUNTER LSW DIN			RW	
40145	144	COUNTER MSW DIN	23	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40146	145	COUNTER LSW DIN			RW	
40147	146	COUNTER MSW DIN	24	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40148	147	COUNTER LSW DIN			RW	
40149	148	COUNTER MSW DIN	25	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40150	149	COUNTER LSW DIN			RW	
40151	150	COUNTER MSW DIN	26	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40152	151	COUNTER LSW DIN			RW	
40153	152	COUNTER MSW DIN	27	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40154	153	COUNTER LSW DIN			RW	
40155	154	COUNTER MSW DIN	28	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40156	155	COUNTER LSW DIN			RW	
40157	156	COUNTER MSW DIN	29	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40158	157	COUNTER LSW DIN			RW	
40159	158	COUNTER MSW DIN	30	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40160	159	COUNTER LSW DIN			RW	
40161	160	COUNTER MSW DIN	31	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40162	161	COUNTER LSW DIN			RW	
40163	162	COUNTER MSW DIN	32	CHANNEL COUNTER VALUE	RW	UNSIGNED 32 BIT
40164	163	COUNTER LSW DIN			RW	
40165	164	PERIOD	1	PERIOD [ms]	RW	FLOAT 32 BIT
40166	165				RW	
40167	166	PERIOD	2	PERIOD [ms]	RW	FLOAT 32 BIT
40168	167				RW	

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40169	168	PERIOD	3	PERIOD [ms]	RW	FLOAT 32 BIT
40170	169				RW	
40171	170	PERIOD	4	PERIOD [ms]	RW	FLOAT 32 BIT
40172	171				RW	
40173	172	PERIOD	5	PERIOD [ms]	RW	FLOAT 32 BIT
40174	173				RW	
40175	174	PERIOD	6	PERIOD [ms]	RW	FLOAT 32 BIT
40176	175				RW	
40177	176	PERIOD	7	PERIOD [ms]	RW	FLOAT 32 BIT
40178	177				RW	
40179	178	PERIOD	8	PERIOD [ms]	RW	FLOAT 32 BIT
40180	179				RW	
40181	180	PERIOD	9	PERIOD [ms]	RW	FLOAT 32 BIT
40182	181				RW	
40183	182	PERIOD	10	PERIOD [ms]	RW	FLOAT 32 BIT
40184	183				RW	
40185	184	PERIOD	11	PERIOD [ms]	RW	FLOAT 32 BIT
40186	185				RW	
40187	186	PERIOD	12	PERIOD [ms]	RW	FLOAT 32 BIT
40188	187				RW	
40189	188	PERIOD	13	PERIOD [ms]	RW	FLOAT 32 BIT
40190	189				RW	
40191	190	PERIOD	14	PERIOD [ms]	RW	FLOAT 32 BIT
40192	191				RW	
40193	192	PERIOD	15	PERIOD [ms]	RW	FLOAT 32 BIT
40194	193				RW	
40195	194	PERIOD	16	PERIOD [ms]	RW	FLOAT 32 BIT
40196	195				RW	
40197	196	PERIOD	17	PERIOD [ms]	RW	FLOAT 32 BIT
40198	197				RW	
40199	198	PERIOD	18	PERIOD [ms]	RW	FLOAT 32 BIT
40200	199				RW	
40201	200	PERIOD	19	PERIOD [ms]	RW	FLOAT 32 BIT
40202	201				RW	
40203	202	PERIOD	20	PERIOD [ms]	RW	FLOAT 32 BIT
40204	203				RW	
40205	204	PERIOD	21	PERIOD [ms]	RW	FLOAT 32 BIT
40206	205				RW	
40207	206	PERIOD	22	PERIOD [ms]	RW	FLOAT 32 BIT
40208	207				RW	
40209	208	PERIOD	23	PERIOD [ms]	RW	FLOAT 32 BIT

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40210	209				RW	
40211	210	PERIOD	24	PERIOD [ms]	RW	FLOAT 32 BIT
40212	211				RW	
40213	212	PERIOD	25	PERIOD [ms]	RW	FLOAT 32 BIT
40214	213				RW	
40215	214	PERIOD	26	PERIOD [ms]	RW	FLOAT 32 BIT
40216	215				RW	
40217	216	PERIOD	27	PERIOD [ms]	RW	FLOAT 32 BIT
40218	217				RW	
40219	218	PERIOD	28	PERIOD [ms]	RW	FLOAT 32 BIT
40220	219				RW	
40221	220	PERIOD	29	PERIOD [ms]	RW	FLOAT 32 BIT
40222	221				RW	
40223	222	PERIOD	30	PERIOD [ms]	RW	FLOAT 32 BIT
40224	223				RW	
40225	224	PERIOD	31	PERIOD [ms]	RW	FLOAT 32 BIT
40226	225				RW	
40227	226	PERIOD	32	PERIOD [ms]	RW	FLOAT 32 BIT
40228	227				RW	
40229	228	FREQUENCY	1	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40230	229				RW	
40231	230	FREQUENCY	2	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40232	231				RW	
40233	232	FREQUENCY	3	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40234	233				RW	
40235	234	FREQUENCY	4	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40236	235				RW	
40237	236	FREQUENCY	5	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40238	237				RW	
40239	238	FREQUENCY	6	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40240	239				RW	
40241	240	FREQUENCY	7	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40242	241				RW	
40243	242	FREQUENCY	8	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40244	243				RW	
40245	244	FREQUENCY	9	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40246	245				RW	
40247	246	FREQUENCY	10	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40248	247				RW	
40249	248	FREQUENCY	11	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40250	249				RW	

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40251	250	FREQUENCY	12	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40252	251				RW	
40253	252	FREQUENCY	13	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40254	253				RW	
40255	254	FREQUENCY	14	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40256	255				RW	
40257	256	FREQUENCY	15	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40258	257				RW	
40259	258	FREQUENCY	16	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40260	259				RW	
40261	260	FREQUENCY	17	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40262	261				RW	
40263	262	FREQUENCY	18	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40264	263				RW	
40265	264	FREQUENCY	19	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40266	265				RW	
40267	266	FREQUENCY	20	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40268	267				RW	
40269	268	FREQUENCY	21	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40270	269				RW	
40271	270	FREQUENCY	22	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40272	271				RW	
40273	272	FREQUENCY	23	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40274	273				RW	
40275	274	FREQUENCY	24	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40276	275				RW	
40277	276	FREQUENCY	25	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40278	277				RW	
40279	278	FREQUENCY	26	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40280	279				RW	
40281	280	FREQUENCY	27	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40282	281				RW	
40283	282	FREQUENCY	28	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40284	283				RW	
40285	284	FREQUENCY	29	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40286	285				RW	
40287	286	FREQUENCY	30	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40288	287				RW	
40289	288	FREQUENCY	31	FREQUENCY [Hz]	RW	FLOAT 32 BIT
40290	289				RW	
40291	290	FREQUENCY	32	FREQUENCY [Hz]	RW	FLOAT 32 BIT

ADDRESS (4x)	OFFEST (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40292	291				RW	

17.2. R-32DIDO: TABLE OF MODBUS REGISTERS 0x COIL STATUS (FUNCTION CODE 1)

ADDRESS (0x)	ADDRESS (0x) OFFSET	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
1	0	DIGITAL I/O	1	DIGITAL I/O	RW	BIT
2	1	DIGITAL I/O	2	DIGITAL I/O	RW	BIT
3	2	DIGITAL I/O	3	DIGITAL I/O	RW	BIT
4	3	DIGITAL I/O	4	DIGITAL I/O	RW	BIT
5	4	DIGITAL I/O	5	DIGITAL I/O	RW	BIT
6	5	DIGITAL I/O	6	DIGITAL I/O	RW	BIT
7	6	DIGITAL I/O	7	DIGITAL I/O	RW	BIT
8	7	DIGITAL I/O	8	DIGITAL I/O	RW	BIT
9	8	DIGITAL I/O	9	DIGITAL I/O	RW	BIT
10	9	DIGITAL I/O	10	DIGITAL I/O	RW	BIT
11	10	DIGITAL I/O	11	DIGITAL I/O	RW	BIT
12	11	DIGITAL I/O	12	DIGITAL I/O	RW	BIT
13	12	DIGITAL I/O	13	DIGITAL I/O	RW	BIT
14	13	DIGITAL I/O	14	DIGITAL I/O	RW	BIT
15	14	DIGITAL I/O	15	DIGITAL I/O	RW	BIT
16	15	DIGITAL I/O	16	DIGITAL I/O	RW	BIT
17	16	DIGITAL I/O	17	DIGITAL I/O	RW	BIT
18	17	DIGITAL I/O	18	DIGITAL I/O	RW	BIT
19	18	DIGITAL I/O	19	DIGITAL I/O	RW	BIT
20	19	DIGITAL I/O	20	DIGITAL I/O	RW	BIT
21	20	DIGITAL I/O	21	DIGITAL I/O	RW	BIT
22	21	DIGITAL I/O	22	DIGITAL I/O	RW	BIT
23	22	DIGITAL I/O	23	DIGITAL I/O	RW	BIT
24	23	DIGITAL I/O	24	DIGITAL I/O	RW	BIT
25	24	DIGITAL I/O	25	DIGITAL I/O	RW	BIT
26	25	DIGITAL I/O	26	DIGITAL I/O	RW	BIT
27	26	DIGITAL I/O	27	DIGITAL I/O	RW	BIT
28	27	DIGITAL I/O	28	DIGITAL I/O	RW	BIT
29	28	DIGITAL I/O	29	DIGITAL I/O	RW	BIT
30	29	DIGITAL I/O	30	DIGITAL I/O	RW	BIT
31	30	DIGITAL I/O	31	DIGITAL I/O	RW	BIT
32	31	DIGITAL I/O	32	DIGITAL I/O	RW	BIT

17.3. R-32DIDO: TABLE OF MODBUS REGISTERS 1x INPUT STATUS (FUNCTION CODE 2)

ADDRESS (1x)	ADDRESS (0x) OFFSET	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
10001	0	DIGITAL I/O	1	DIGITAL I/O	RW	BIT
10002	1	DIGITAL I/O	2	DIGITAL I/O	RW	BIT
10003	2	DIGITAL I/O	3	DIGITAL I/O	RW	BIT
10004	3	DIGITAL I/O	4	DIGITAL I/O	RW	BIT
10005	4	DIGITAL I/O	5	DIGITAL I/O	RW	BIT
10006	5	DIGITAL I/O	6	DIGITAL I/O	RW	BIT
10007	6	DIGITAL I/O	7	DIGITAL I/O	RW	BIT
10008	7	DIGITAL I/O	8	DIGITAL I/O	RW	BIT
10009	8	DIGITAL I/O	9	DIGITAL I/O	RW	BIT
10010	9	DIGITAL I/O	10	DIGITAL I/O	RW	BIT
10011	10	DIGITAL I/O	11	DIGITAL I/O	RW	BIT
10012	11	DIGITAL I/O	12	DIGITAL I/O	RW	BIT
10013	12	DIGITAL I/O	13	DIGITAL I/O	RW	BIT
10014	13	DIGITAL I/O	14	DIGITAL I/O	RW	BIT
10015	14	DIGITAL I/O	15	DIGITAL I/O	RW	BIT
10016	15	DIGITAL I/O	16	DIGITAL I/O	RW	BIT
10017	16	DIGITAL I/O	17	DIGITAL I/O	RW	BIT
10018	17	DIGITAL I/O	18	DIGITAL I/O	RW	BIT
10019	18	DIGITAL I/O	19	DIGITAL I/O	RW	BIT
10020	19	DIGITAL I/O	20	DIGITAL I/O	RW	BIT
10021	20	DIGITAL I/O	21	DIGITAL I/O	RW	BIT
10022	21	DIGITAL I/O	22	DIGITAL I/O	RW	BIT
10023	22	DIGITAL I/O	23	DIGITAL I/O	RW	BIT
10024	23	DIGITAL I/O	24	DIGITAL I/O	RW	BIT
10025	24	DIGITAL I/O	25	DIGITAL I/O	RW	BIT
10026	25	DIGITAL I/O	26	DIGITAL I/O	RW	BIT
10027	26	DIGITAL I/O	27	DIGITAL I/O	RW	BIT
10028	27	DIGITAL I/O	28	DIGITAL I/O	RW	BIT
10029	28	DIGITAL I/O	29	DIGITAL I/O	RW	BIT
10030	29	DIGITAL I/O	30	DIGITAL I/O	RW	BIT
10031	30	DIGITAL I/O	31	DIGITAL I/O	RW	BIT
10032	31	DIGITAL I/O	32	DIGITAL I/O	RW	BIT

18. MODBUS REGISTER TABLE FOR THE R-16DI-8DO PRODUCT

18.1. R-16DI-8DO: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40001	0	MACHINE-ID	-	DEVICE IDENTIFICATION	RO	UNSIGNED 16
40002	1	FIRMWARE REVISION	-	FIRMWARE REVISION	RO	UNSIGNED 16

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40017	16	COMMAND	-	COMMAND REGISTER	RW	UNSIGNED 16
40018	17	RESERVED	-	RESERVED	RO	UNSIGNED 16
40019	18	RESERVED	-	RESERVED	RO	UNSIGNED 16
40020	19	RESERVED	-	RESERVED	RO	UNSIGNED 16
40021	20	DIGITAL INPUT [16…1]	[1…16]	DIGITAL INPUTS [16… 1] THE LEAST SIGNIFICANT BIT IS RELATIVE TO I01 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => I01 = High, I02 = LOW, I03 = HIGH, I04… I16 = LOW	RO	UNSIGNED 16
40022	21	RESERVED	-	RESERVED	RO	UNSIGNED 16
40023	22	DIGITAL OUT [8…1]	[8…1]	DIGITAL OUTPUTS [8… 1] THE LEAST SIGNIFICANT BIT IS RELATIVE TO D01 EXAMPLE: 5 decimal =	RW	UNSIGNED 16

				0000 0000 0000 0101 binary => D01=High, D02=LOW, D03=HIGH, D04…D08=LOW		

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40101	100	RESET_COUNTER [1..16]	16..1	RESET A BIT OF THE i-TH COUNTER THE LEAST SIGNIFICANT BIT RELATES TO COUNTER 1 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => Resets the value of counters 1 and 3	RW	UNSIGNED 16
40102	101	RESERVED	-		RW	UNSIGNED 16
40103	102	COUNTER	1	LSW	RW	UNSIGNED 32
40104	103			MSW	RW	
40105	104	COUNTER	2	LSW	RW	UNSIGNED 32
40106	105			MSW	RW	
40107	106	COUNTER	3	LSW	RW	UNSIGNED 32
40108	107			MSW	RW	
40109	108	COUNTER	4	LSW	RW	UNSIGNED 32
40110	109			MSW	RW	
40111	110	COUNTER	5	LSW	RW	UNSIGNED 32
40112	111			MSW	RW	
40113	112	COUNTER	6	LSW	RW	UNSIGNED 32
40114	113			MSW	RW	
40115	114	COUNTER	7	LSW	RW	UNSIGNED 32
40116	115			MSW	RW	
40117	116	COUNTER	8	LSW	RW	UNSIGNED 32
40118	117			MSW	RW	
40119	118	COUNTER	9	LSW	RW	UNSIGNED 32
40120	119			MSW	RW	
40121	120	COUNTER	10	LSW	RW	UNSIGNED 32
40122	121			MSW	RW	
40123	122	COUNTER	11	LSW	RW	UNSIGNED 32
40124	123			MSW	RW	
40125	124	COUNTER	12	LSW	RW	

40126	125			MSW	RW	UNSIGNED 32
40127	126	COUNTER	13	LSW	RW	UNSIGNED 32
40128	127			MSW	RW	
40129	128	COUNTER	14	LSW	RW	UNSIGNED 32
40130	129			MSW	RW	
40131	130	COUNTER	15	LSW	RW	UNSIGNED 32
40132	131			MSW	RW	
40133	132	COUNTER	16	LSW	RW	UNSIGNED 32
40134	133			MSW	RW	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/ R*	*TYPE*
40201	200	INT MEASURE TLOW	1	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40202	201			Integer measure of Tlow in [ms] MSW	RO	
40203	202	INT MEASURE TLOW	2	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40204	203			Integer measure of Tlow in [ms] MSW	RO	
40205	204	INT MEASURE TLOW	3	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40206	205			Integer measure of Tlow in [ms] MSW	RO	
40207	206	INT MEASURE TLOW	4	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40208	207			Integer measure of Tlow in [ms] MSW	RO	
40209	208	INT MEASURE TLOW	5	Integer measure of	RO	UNSIGNED 32

				Tlow in [ms] LSW		
40210	209			Integer measure of Tlow in [ms] MSW	RO	
40211	210	INT MEASURE TLOW	6	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40212	211			Integer measure of Tlow in [ms] MSW	RO	
40213	212	INT MEASURE TLOW	7	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40214	213			Integer measure of Tlow in [ms] MSW	RO	
40215	214	INT MEASURE TLOW	8	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40216	215			Integer measure of Tlow in [ms] MSW	RO	
40217	216	INT MEASURE TLOW	9	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40218	217			Integer measure of Tlow in [ms] MSW	RO	
40219	218	INT MEASURE TLOW	10	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40220	219			Integer measure of Tlow in [ms] MSW	RO	
40221	220	INT MEASURE TLOW	11	Integer measure of	RO	UNSIGNED 32

				Tlow in [ms] LSW		
40222	221			Integer measure of Tlow in [ms] MSW	RO	
40223	222	INT MEASURE TLOW	12	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40224	223			Integer measure of Tlow in [ms] MSW	RO	
40225	224	INT MEASURE TLOW	13	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40226	225			Integer measure of Tlow in [ms] MSW	RO	
40227	226	INT MEASURE TLOW	14	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40228	227			Integer measure of Tlow in [ms] MSW	RO	
40229	228	INT MEASURE TLOW	15	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40230	229			Integer measure of Tlow in [ms] MSW	RO	
40231	230	INT MEASURE TLOW	16	Integer measure of Tlow in [ms] LSW	RO	UNSIGNED 32
40232	231			Integer measure of Tlow in [ms] MSW	RO	

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40233	232	INT MEASURE THIGH	1	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40234	233			Integer measure of Thigh in [ms] MSW	RO	
40235	234	INT MEASURE THIGH	2	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40236	235			Integer measure of Thigh in [ms] MSW	RO	
40237	236	INT MEASURE THIGH	3	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40238	237			Integer measure of Thigh in [ms] MSW	RO	
40239	238	INT MEASURE THIGH	4	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40240	239			Integer measure of Thigh in [ms] MSW	RO	
40241	240	INT MEASURE THIGH	5	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40242	241			Integer measure of Thigh in [ms] MSW	RO	
40243	242	INT MEASURE THIGH	6	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40244	243			Integer measure of Thigh in [ms] MSW	RO	

40245	244	INT MEASURE THIGH	7	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40246	245			Integer measure of Thigh in [ms] MSW	RO	
40247	246	INT MEASURE THIGH	8	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40248	247			Integer measure of Thigh in [ms] MSW	RO	
40249	248	INT MEASURE THIGH	9	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40250	249			Integer measure of Thigh in [ms] MSW	RO	
40251	250	INT MEASURE THIGH	10	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40252	251			Integer measure of Thigh in [ms] MSW	RO	
40253	252	INT MEASURE THIGH	11	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40254	253			Integer measure of Thigh in [ms] MSW	RO	
40255	254	INT MEASURE THIGH	12	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40256	255			Integer measure of Thigh in [ms] MSW	RO	

40257	256	INT MEASURE THIGH	13	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40258	257			Integer measure of Thigh in [ms] MSW	RO	
40259	258	INT MEASURE THIGH	14	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40260	259			Integer measure of Thigh in [ms] MSW	RO	
40261	260	INT MEASURE THIGH	15	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40262	261			Integer measure of Thigh in [ms] MSW	RO	
40263	262	INT MEASURE THIGH	16	Integer measure of Thigh in [ms] LSW	RO	UNSIGNED 32
40264	263			Integer measure of Thigh in [ms] MSW	RO	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40265	264	INT MEASURE PERIOD	1	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40266	265			Integer Period Measure [ms] MSW	RO	
40267	266	INT MEASURE PERIOD	2	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40268	267			Integer Period Measure [ms] MSW	RO	

40269	268	INT MEASURE PERIOD	3	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40270	269			Integer Period Measure [ms] MSW	RO	
40271	270	INT MEASURE PERIOD	4	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40272	271			Integer Period Measure [ms] MSW	RO	
40273	272	INT MEASURE PERIOD	5	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40274	273			Integer Period Measure [ms] MSW	RO	
40275	274	INT MEASURE PERIOD	6	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40276	275			Integer Period Measure [ms] MSW	RO	
40277	276	INT MEASURE PERIOD	7	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40278	277			Integer Period Measure [ms] MSW	RO	
40279	278	INT MEASURE PERIOD	8	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40280	279			Integer Period Measure [ms] MSW	RO	
40281	280	INT MEASURE PERIOD	9	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40282	281			Integer Period Measure [ms] MSW	RO	
40283	282	INT MEASURE PERIOD	10	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40284	283			Integer Period Measure [ms] MSW	RO	

40285	284	INT MEASURE PERIOD	11	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40286	285			Integer Period Measure [ms] MSW	RO	
40287	286	INT MEASURE PERIOD	12	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40288	287			Integer Period Measure [ms] MSW	RO	
40289	288	INT MEASURE PERIOD	13	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40290	289			Integer Period Measure [ms] MSW	RO	
40291	290	INT MEASURE PERIOD	14	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40292	291			Integer Period Measure [ms] MSW	RO	
40293	292	INT MEASURE PERIOD	15	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40294	293			Integer Period Measure [ms] MSW	RO	
40295	294	INT MEASURE PERIOD	16	Integer Period Measure [ms] LSW	RO	UNSIGNED 32
40296	295			Integer Period Measure [ms] MSW	RO	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40297	296	INT MEASURE FREQ	1	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40298	297	INT MEASURE FREQ	2	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40299	298	INT MEASURE FREQ	3	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16

40300	299	INT MEASURE FREQ	4	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40301	300	INT MEASURE FREQ	5	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40302	301	INT MEASURE FREQ	6	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40303	302	INT MEASURE FREQ	7	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40304	303	INT MEASURE FREQ	8	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40305	304	INT MEASURE FREQ	9	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40306	305	INT MEASURE FREQ	10	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40307	306	INT MEASURE FREQ	11	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40308	307	INT MEASURE FREQ	12	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40309	308	INT MEASURE FREQ	13	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40310	309	INT MEASURE FREQ	14	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40311	310	INT MEASURE FREQ	15	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16
40312	311	INT MEASURE FREQ	16	Integer measure of the frequency in [Hz]	RO	UNSIGNED 16

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40401	400	FLOAT TLOW	1	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40402	401			Floating point measure of Tlow in [ms] (MSW)	RO	
40403	402	FLOAT TLOW	2	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32

40404	403			Floating point measure of Tlow in [ms] (MSW)	RO	
40405	404	FLOAT TLOW	3	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40406	405			Floating point measure of Tlow in [ms] (MSW)	RO	
40407	406	FLOAT TLOW	4	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40408	407			Floating point measure of Tlow in [ms] (MSW)	RO	
40409	408	FLOAT TLOW	5	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40410	409			Floating point measure of Tlow in [ms] (MSW)	RO	
40411	410	FLOAT TLOW	6	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40412	411			Floating point measure of Tlow in [ms] (MSW)	RO	
40413	412	FLOAT TLOW	7	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40414	413			Floating point measure of Tlow in [ms] (MSW)	RO	
40415	414	FLOAT TLOW	8	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40416	415			Floating point measure of Tlow in [ms] (MSW)	RO	
40417	416	FLOAT TLOW	9	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40418	417			Floating point measure of Tlow in [ms] (MSW)	RO	
40419	418	FLOAT TLOW	10	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40420	419			Floating point measure of Tlow in [ms] (MSW)	RO	
40421	420	FLOAT TLOW	11	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40422	421			Floating point measure of Tlow in [ms] (MSW)	RO	
40423	422	FLOAT TLOW	12	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40424	423			Floating point measure of Tlow in [ms] (MSW)	RO	
40425	424	FLOAT TLOW	13	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32

40426	425			Floating point measure of Tlow in [ms] (MSW)	RO	
40427	426	FLOAT TLOW	14	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40428	427			Floating point measure of Tlow in [ms] (MSW)	RO	
40429	428	FLOAT TLOW	15	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40430	429			Floating point measure of Tlow in [ms] (MSW)	RO	
40431	430	FLOAT TLOW	16	Floating point measure of Tlow in [ms] (LSW)	RO	FLOAT 32
40432	431			Floating point measure of Tlow in [ms] (MSW)	RO	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40465	464	FLOAT THIGH	1	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40466	465			Floating point measure of Thigh in [ms] (MSW)	RO	
40467	466	FLOAT THIGH	2	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40468	467			Floating point measure of Thigh in [ms] (MSW)	RO	
40469	468	FLOAT THIGH	3	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40470	469			Floating point measure of Thigh in [ms] (MSW)	RO	
40471	470	FLOAT THIGH	4	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40472	471			Floating point measure of Thigh in [ms] (MSW)	RO	
40473	472	FLOAT THIGH	5	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40474	473			Floating point measure of Thigh in [ms] (MSW)	RO	

40475	474	FLOAT THIGH	6	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40476	475			Floating point measure of Thigh in [ms] (MSW)	RO	
40477	476	FLOAT THIGH	7	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40478	477			Floating point measure of Thigh in [ms] (MSW)	RO	
40479	478	FLOAT THIGH	8	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40480	479			Floating point measure of Thigh in [ms] (MSW)	RO	
40481	480	FLOAT THIGH	9	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40482	481			Floating point measure of Thigh in [ms] (MSW)	RO	
40483	482	FLOAT THIGH	10	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40484	483			Floating point measure of Thigh in [ms] (MSW)	RO	
40485	484	FLOAT THIGH	11	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40486	485			Floating point measure of Thigh in [ms] (MSW)	RO	
40487	486	FLOAT THIGH	12	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40488	487			Floating point measure of Thigh in [ms] (MSW)	RO	
40489	488	FLOAT THIGH	13	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40490	489			Floating point measure of Thigh in [ms] (MSW)	RO	

40491	490	FLOAT THIGH	14	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40492	491			Floating point measure of Thigh in [ms] (MSW)	RO	
40493	492	FLOAT THIGH	15	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40494	493			Floating point measure of Thigh in [ms] (MSW)	RO	
40495	494	FLOAT THIGH	16	Floating point measure of Thigh in [ms] (LSW)	RO	FLOAT 32
40496	495			Floating point measure of Thigh in [ms] (MSW)	RO	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40529	528	FLOAT PERIOD	1	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40530	529			Floating point measure of the Period in [ms] (MSW)	RO	
40531	530	FLOAT PERIOD	2	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40532	531			Floating point measure of the Period in [ms] (MSW)	RO	
40533	532	FLOAT PERIOD	3	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40534	533			Floating point measure of the Period in [ms] (MSW)	RO	
40535	534	FLOAT PERIOD	4	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40536	535			Floating point measure of the Period in [ms] (MSW)	RO	

40537	536	FLOAT PERIOD	5	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40538	537			Floating point measure of the Period in [ms] (MSW)	RO	
40539	538	FLOAT PERIOD	6	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40540	539			Floating point measure of the Period in [ms] (MSW)	RO	
40541	540	FLOAT PERIOD	7	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40542	541			Floating point measure of the Period in [ms] (MSW)	RO	
40543	542	FLOAT PERIOD	8	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40544	543			Floating point measure of the Period in [ms] (MSW)	RO	
40545	544	FLOAT PERIOD	9	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40546	545			Floating point measure of the Period in [ms] (MSW)	RO	
40547	546	FLOAT PERIOD	10	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40548	547			Floating point measure of the Period in [ms] (MSW)	RO	
40549	548	FLOAT PERIOD	11	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40550	549			Floating point measure of the Period in [ms] (MSW)	RO	
40551	550	FLOAT PERIOD	12	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40552	551			Floating point measure of the Period in [ms] (MSW)	RO	

40553	552	FLOAT PERIOD	13	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40554	553			Floating point measure of the Period in [ms] (MSW)	RO	
40555	554	FLOAT PERIOD	14	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40556	555			Floating point measure of the Period in [ms] (MSW)	RO	
40557	556	FLOAT PERIOD	15	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40558	557			Floating point measure of the Period in [ms] (MSW)	RO	
40559	558	FLOAT PERIOD	16	Floating point measure of the Period in [ms] (LSW)	RO	FLOAT 32
40560	559			Floating point measure of the Period in [ms] (MSW)	RO	

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
40593	592	FLOAT FREQUENCY	1	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40594	593			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40595	594	FLOAT FREQUENCY	2	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40596	595			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40597	596	FLOAT FREQUENCY	3	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32

40598	597			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40599	598	FLOAT FREQUENCY	4	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40600	599			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40601	600	FLOAT FREQUENCY	5	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40602	601			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40603	602	FLOAT FREQUENCY	6	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40604	603			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40605	604	FLOAT FREQUENCY	7	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40606	605			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40607	606	FLOAT FREQUENCY	8	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40608	607			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40609	608	FLOAT FREQUENCY	9	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32

40610	609			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40611	610	FLOAT FREQUENCY	10	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40612	611			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40613	612	FLOAT FREQUENCY	11	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40614	613			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40615	614	FLOAT FREQUENCY	12	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40616	615			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40617	616	FLOAT FREQUENCY	13	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40618	617			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40619	618	FLOAT FREQUENCY	14	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40620	619			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40621	620	FLOAT FREQUENCY	15	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32

40622	621			Floating point measure of the Frequency in [Hz] (MSW)	RO	
40623	622	FLOAT FREQUENCY	16	Floating point measure of the Frequency in [Hz] (LSW)	RO	FLOAT 32
40624	623			Floating point measure of the Frequency in [Hz] (MSW)	RO	

18.2. R-16DI-8DO: CONSECUTIVE REGISTERS MODBUS 4x COPY (WITH INTEGER MEASURE REGISTERS)

ADDRESS (4x)	*OFFSET ADDRESS (4x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/ R*	*TYPE*
48001	8000	DIGITAL INPUT [16…1]	[1…16]	DIGITAL INPUTS [16…1] THE LEAST SIGNIFICANT BIT IS RELATIVE TO I01 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => I01 = High, I02 = LOW, I03 = HIGH, I04… I16 = LOW	RO	UNSIGNED 16
48002	8001	DIGITAL OUT [8…1]	[8…1]	DIGITAL OUTPUTS [8…1] THE LEAST SIGNIFICANT BIT IS RELATIVE TO D01 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => D01=High, D02=LOW, D03=HIGH, D04…D08=LOW	RW	UNSIGNED 16
48003	8002	COUNTER	1	LSW	RW	UNSIGNED 32
48004	8003			MSW	RW	
48005	8004	COUNTER	2	LSW	RW	UNSIGNED 32
48006	8005			MSW	RW	
48007	8006	COUNTER	3	LSW	RW	UNSIGNED 32
48008	8007			MSW	RW	
48009	8008	COUNTER	4	LSW	RW	UNSIGNED 32
48010	8009			MSW	RW	
48011	8010	COUNTER	5	LSW	RW	

48012	8011			MSW	RW	UNSIGNED 32
48013	8012	COUNTER	6	LSW	RW	UNSIGNED 32
48014	8013			MSW	RW	
48015	8014	COUNTER	7	LSW	RW	UNSIGNED 32
48016	8015			MSW	RW	
48017	8016	COUNTER	8	LSW	RW	UNSIGNED 32
48018	8017			MSW	RW	
48019	8018	COUNTER	9	LSW	RW	UNSIGNED 32
48020	8019			MSW	RW	
48021	8020	COUNTER	10	LSW	RW	UNSIGNED 32
48022	8021			MSW	RW	
48023	8022	COUNTER	11	LSW	RW	UNSIGNED 32
48024	8023			MSW	RW	
48025	8024	COUNTER	12	LSW	RW	UNSIGNED 32
48026	8025			MSW	RW	
48027	8026	COUNTER	13	LSW	RW	UNSIGNED 32
48028	8027			MSW	RW	
48029	8028	COUNTER	14	LSW	RW	UNSIGNED 32
48030	8029			MSW	RW	
48031	8030	COUNTER	15	LSW	RW	UNSIGNED 32
48032	8031			MSW	RW	
48033	8032	COUNTER	16	LSW	RW	UNSIGNED 32
48034	8033			MSW	RW	
48035	8034	INT MEASURE TLOW	1	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48036	8035			Tlow Integer measure [x 50us] MSW	RO	
48037	8036	INT MEASURE TLOW	2	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48038	8037			Tlow Integer measure [ms] MSW	RO	
48039	8038	INT MEASURE TLOW	3	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48040	8039			Tlow Integer measure [x 50us] MSW	RO	
48041	8040	INT MEASURE TLOW	4	Tlow Integer measure [ms] LSW	RO	UNSIGNED 32

48042	8041			Tlow Integer measure [x 50us] MSW	RO	
48043	8042	INT MEASURE TLOW	5	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48044	8043			Tlow Integer measure [x 50us] MSW	RO	
48045	8044	INT MEASURE TLOW	6	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48046	8045			Tlow Integer measure [ms] MSW	RO	
48047	8046	INT MEASURE TLOW	7	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48048	8047			Tlow Integer measure [x 50us] MSW	RO	
48049	8048	INT MEASURE TLOW	8	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48050	8049			Tlow Integer measure [x 50us] MSW	RO	
48051	8050	INT MEASURE TLOW	9	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48052	8051			Tlow Integer measure [x 50us] MSW	RO	
48053	8052	INT MEASURE TLOW	10	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48054	8053			Tlow Integer measure [x 50us] MSW	RO	
48055	8054	INT MEASURE TLOW	11	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48056	8055			Tlow Integer measure [x 50us] MSW	RO	
48057	8056	INT MEASURE TLOW	12	Tlow Integer measure [ms] LSW	RO	UNSIGNED 32

48058	8057			Tlow Integer measure [x 50us] MSW	RO	
48059	8058	INT MEASURE TLOW	13	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48060	8059			Tlow Integer measure [x 50us] MSW	RO	
48061	8060	INT MEASURE TLOW	14	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48062	8061			Tlow Integer measure [ms] MSW	RO	
48063	8062	INT MEASURE TLOW	15	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48064	8063			Tlow Integer measure [x 50us] MSW	RO	
48065	8064	INT MEASURE TLOW	16	Tlow Integer measure [x 50us] LSW	RO	UNSIGNED 32
48066	8065			Tlow Integer measure [x 50us] MSW	RO	
48067	8066	INT MEASURE THIGH	1	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48068	8067			Thigh Integer measure [ms] MSW	RO	
48069	8068	INT MEASURE THIGH	2	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48070	8069			Thigh Integer measure [x 50us] MSW	RO	
48071	8070	INT MEASURE THIGH	3	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48072	8071			Thigh Integer measure [x 50us] MSW	RO	
48073	8072	INT MEASURE THIGH	4	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32

48074	8073			Thigh Integer measure [x 50us] MSW	RO	
48075	8074	INT MEASURE THIGH	5	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48076	8075			Thigh Integer measure [x 50us] MSW	RO	
48077	8076	INT MEASURE THIGH	6	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48078	8077			Thigh Integer measure [ms] MSW	RO	
48079	8078	INT MEASURE THIGH	7	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48080	8079			Thigh Integer measure [x 50us] MSW	RO	
48081	8080	INT MEASURE THIGH	8	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48082	8081			Thigh Integer measure [x 50us] MSW	RO	
48083	8082	INT MEASURE THIGH	9	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48084	8083			Thigh Integer measure [x 50us] MSW	RO	
48085	8084	INT MEASURE THIGH	10	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48086	8085			Thigh Integer measure [x 50us] MSW	RO	
48087	8086	INT MEASURE THIGH	11	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48088	8087			Thigh Integer measure [x 50us] MSW	RO	
48089	8088	INT MEASURE THIGH	12	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32

48090	8089			Thigh Integer measure [x 50us] MSW	RO	
48091	8090	INT MEASURE THIGH	13	Thigh Integer measure [ms] LSW	RO	UNSIGNED 32
48092	8091			Thigh Integer measure [x 50us] MSW	RO	
48093	8092	INT MEASURE THIGH	14	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48094	8093			Thigh Integer measure [ms] MSW	RO	
48095	8094	INT MEASURE THIGH	15	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48096	8095			Thigh Integer measure [x 50us] MSW	RO	
48097	8096	INT MEASURE THIGH	16	Thigh Integer measure [x 50us] LSW	RO	UNSIGNED 32
48098	8097			Thigh Integer measure [x 50us] MSW	RO	
48099	8098	INT MEASURE PERIOD	1	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48100	8099			Period Integer measure [x 50us] MSW	RO	
48101	8100	INT MEASURE PERIOD	2	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48102	8101			Period Integer measure [x 50us] MSW	RO	
48103	8102	INT MEASURE PERIOD	3	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48104	8103			Period Integer measure [x 50us] MSW	RO	
48105	8104	INT MEASURE PERIOD	4	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32

48106	8105			Period Integer measure [x 50us] MSW	RO	
48107	8106	INT MEASURE PERIOD	5	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48108	8107			Period Integer measure [x 50us] MSW	RO	
48109	8108	INT MEASURE PERIOD	6	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48110	8109			Period Integer measure [x 50us] MSW	RO	
48111	8110	INT MEASURE PERIOD	7	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48112	8111			Period Integer measure [x 50us] MSW	RO	
48113	8112	INT MEASURE PERIOD	8	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48114	8113			Period Integer measure [x 50us] MSW	RO	
48115	8114	INT MEASURE PERIOD	9	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48116	8115			Period Integer measure [x 50us] MSW	RO	
48117	8116	INT MEASURE PERIOD	10	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48118	8117			Period Integer measure [x 50us] MSW	RO	
48119	8118	INT MEASURE PERIOD	11	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48120	8119			Period Integer measure [x 50us] MSW	RO	
48121	8120	INT MEASURE PERIOD	12	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32

48122	8121			Period Integer measure [x 50us] MSW	RO	
48123	8122	INT MEASURE PERIOD	13	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48124	8123			Period Integer measure [x 50us] MSW	RO	
48125	8124	INT MEASURE PERIOD	14	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48126	8125			Period Integer measure [x 50us] MSW	RO	
48127	8126	INT MEASURE PERIOD	15	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48128	8127			Period Integer measure [x 50us] MSW	RO	
48129	8128	INT MEASURE PERIOD	16	Period Integer measure [x 50us] LSW	RO	UNSIGNED 32
48130	8129			Period Integer measure [x 50us] MSW	RO	
48131	8130	INT MEASURE FREQ	1	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48132	8131	INT MEASURE FREQ	2	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48133	8132	INT MEASURE FREQ	3	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48134	8133	INT MEASURE FREQ	4	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48135	8134	INT MEASURE FREQ	5	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48136	8135	INT MEASURE FREQ	6	Frequency Integer Measure [Hz]	RO	UNSIGNED 16

48137	8136	INT MEASURE FREQ	7	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48138	8137	INT MEASURE FREQ	8	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48139	8138	INT MEASURE FREQ	9	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48140	8139	INT MEASURE FREQ	10	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48141	8140	INT MEASURE FREQ	11	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48142	8141	INT MEASURE FREQ	12	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48143	8142	INT MEASURE FREQ	13	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48144	8143	INT MEASURE FREQ	14	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48145	8144	INT MEASURE FREQ	15	Frequency Integer Measure [Hz]	RO	UNSIGNED 16
48146	8145	INT MEASURE FREQ	16	Frequency Integer Measure [Hz]	RO	UNSIGNED 16

18.3. R-16DI-8DO: TABLE OF MODBUS REGISTERS 0x COIL STATUS (FUNCTION CODE 1)

ADDRESS (0x)	OFFSET ADDRESS (0x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
1	0	DIGITAL INPUT	1	DIGITAL INPUT	RO	BIT
2	1	DIGITAL INPUT	2	DIGITAL INPUT	RO	BIT
3	2	DIGITAL INPUT	3	DIGITAL INPUT	RO	BIT
4	3	DIGITAL INPUT	4	DIGITAL INPUT	RO	BIT
5	4	DIGITAL INPUT	5	DIGITAL INPUT	RO	BIT
6	5	DIGITAL INPUT	6	DIGITAL INPUT	RO	BIT
7	6	DIGITAL INPUT	7	DIGITAL INPUT	RO	BIT
8	7	DIGITAL INPUT	8	DIGITAL INPUT	RO	BIT
9	8	DIGITAL INPUT	9	DIGITAL INPUT	RO	BIT
10	9	DIGITAL INPUT	10	DIGITAL INPUT	RO	BIT
11	10	DIGITAL INPUT	11	DIGITAL INPUT	RO	BIT
12	11	DIGITAL INPUT	12	DIGITAL INPUT	RO	BIT
13	12	DIGITAL INPUT	13	DIGITAL INPUT	RO	BIT
14	13	DIGITAL INPUT	14	DIGITAL INPUT	RO	BIT
15	14	DIGITAL INPUT	15	DIGITAL INPUT	RO	BIT
16	15	DIGITAL INPUT	16	DIGITAL INPUT	RO	BIT

ADDRESS (0x)	OFFSET ADDRESS (0x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
33	32	DIGITAL OUT	1	DIGITAL OUTPUT	RW	BIT
34	33	DIGITAL OUT	2	DIGITAL OUTPUT	RW	BIT
35	34	DIGITAL OUT	3	DIGITAL OUTPUT	RW	BIT
36	35	DIGITAL OUT	4	DIGITAL OUTPUT	RW	BIT
37	36	DIGITAL OUT	5	DIGITAL OUTPUT	RW	BIT
38	37	DIGITAL OUT	6	DIGITAL OUTPUT	RW	BIT
39	38	DIGITAL OUT	7	DIGITAL OUTPUT	RW	BIT
40	39	DIGITAL OUT	8	DIGITAL OUTPUT	RW	BIT

ADDRESS (0x)	OFFSET ADDRESS (0x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
101	100	COUNTER RESET	1	COUNTER RESET	RW	BIT
102	101	COUNTER RESET	2	COUNTER RESET	RW	BIT
103	102	COUNTER RESET	3	COUNTER RESET	RW	BIT
104	103	COUNTER RESET	4	COUNTER RESET	RW	BIT
105	104	COUNTER RESET	5	COUNTER RESET	RW	BIT
106	105	COUNTER RESET	6	COUNTER RESET	RW	BIT
107	106	COUNTER RESET	7	COUNTER RESET	RW	BIT
108	107	COUNTER RESET	8	COUNTER RESET	RW	BIT
109	108	COUNTER RESET	9	COUNTER RESET	RW	BIT
110	109	COUNTER RESET	10	COUNTER RESET	RW	BIT
111	110	COUNTER RESET	11	COUNTER RESET	RW	BIT
112	111	COUNTER RESET	12	COUNTER RESET	RW	BIT
113	112	COUNTER RESET	13	COUNTER RESET	RW	BIT
114	113	COUNTER RESET	14	COUNTER RESET	RW	BIT
115	114	COUNTER RESET	15	COUNTER RESET	RW	BIT
116	115	COUNTER RESET	16	COUNTER RESET	RW	BIT

18.4. R-16DI-8DO: TABLE OF REGISTERS 1x INPUT STATUS (FUNCTION CODE 2)

ADDRESS (1x)	OFFSET ADDRESS (1x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
10001	0	DIGITAL INPUT	1	DIGITAL INPUT	RO	BIT
10002	1	DIGITAL INPUT	2	DIGITAL INPUT	RO	BIT
10003	2	DIGITAL INPUT	3	DIGITAL INPUT	RO	BIT
10004	3	DIGITAL INPUT	4	DIGITAL INPUT	RO	BIT
10005	4	DIGITAL INPUT	5	DIGITAL INPUT	RO	BIT
10006	5	DIGITAL INPUT	6	DIGITAL INPUT	RO	BIT
10007	6	DIGITAL INPUT	7	DIGITAL INPUT	RO	BIT
10008	7	DIGITAL INPUT	8	DIGITAL INPUT	RO	BIT
10009	8	DIGITAL INPUT	9	DIGITAL INPUT	RO	BIT
10010	9	DIGITAL INPUT	10	DIGITAL INPUT	RO	BIT
10011	10	DIGITAL INPUT	11	DIGITAL INPUT	RO	BIT
10012	11	DIGITAL INPUT	12	DIGITAL INPUT	RO	BIT
10013	12	DIGITAL INPUT	13	DIGITAL INPUT	RO	BIT
10014	13	DIGITAL INPUT	14	DIGITAL INPUT	RO	BIT
10015	14	DIGITAL INPUT	15	DIGITAL INPUT	RO	BIT
10016	15	DIGITAL INPUT	16	DIGITAL INPUT	RO	BIT

19. MODBUS REGISTER TABLE FOR THE R-8AI-8DIDO DEVICE

19.1. R-8AI-8DIDO: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40001	0	MACHINE-ID	-	Device ID	RO	UNSIGNED 16 BIT
40002	1	FIRMWARE REVISION (Maior/Minor)	-	FW revision	RO	UNSIGNED 16 BIT
40003	2	FIRMWARE REVISION (Fix/Build)	-	FW revision	RO	UNSIGNED 16 BIT
40004	3	FW CODE	-	FW code	RO	UNSIGNED 16 BIT
40005	4	RESERVED	-	-	RO	UNSIGNED 16 BIT
40006	5	RESERVED	-	-	RO	UNSIGNED 16 BIT
40007	6	BOARD-ID	-	HW revision	RO	UNSIGNED 16 BIT
40008	7	BOOT REVISION (Maior/Minor)	-	FW Bootloader revision	RO	UNSIGNED 16 BIT
40009	8	BOOT REVISION (Fix/Build)	-	FW Bootloader revision	RO	UNSIGNED 16 BIT
40010	9	RESERVED	-	-	RO	UNSIGNED 16 BIT
40011	10	RESERVED	-	-	RO	UNSIGNED 16 BIT
40012	11	RESERVED	-	-	RO	UNSIGNED 16 BIT
40013	12	RESERVED	-	-	RW	UNSIGNED 16 BIT
40014	13	RESERVED	-	-	RW	UNSIGNED 16 BIT
40015	14	RESERVED	-	-	RW	UNSIGNED 16 BIT
40016	15	RESERVED	-	-	RW	UNSIGNED 16 BIT
40017	16	COMMAND	-	Supported command list: 49568 decimal to perform a Reboot	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40018	17	STATUS	-	Bit 0: Thermocouple AIN1 Burnout status (0 = OK, 1 = BURN) Bit 1: TC AIN2 Burnout status (0 = OK, 1 = BURN) Bit 2: TC AIN3 Burnout status (0 = OK, 1 = BURN) Bit 3: TC AIN4 Burnout status (0 = OK, 1 = BURN) Bit 4: TC AIN5 Burnout status (0 = OK, 1 = BURN) Bit 5: TC AIN6 Burnout status (0 = OK, 1 = BURN) Bit 6: TC AIN7 Burnout status (0 = OK, 1 = BURN) Bit 7: TC AIN8 Burnout status (0 = OK, 1 = BURN) Bit 8-15: AIN[8..1] current measurement dipswitch status	RW	UNSIGNED 16 BIT
40019	18	RESERVED	-	-	RW	UNSIGNED 16 BIT
40020	19	RESERVED	-	-	RW	UNSIGNED 16 BIT
40021	20	DIGITAL I/O	[8…1]	Digital input/output status For inputs: 0 = Low input 1 = High input For outputs: 0 = Inactive output 1 = Active output THE LEAST SIGNIFICANT BIT RELATES TO IO1 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => IO1=High/Active IO2=Low/Not Active IO3=High/Active IO4..IO8=Low/Not Active	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40022	21	STATUS 2		Bit 0: Outputs in watchdog timeout (0 = OK, 1 = Timeout) Bit 7: No power for digital outputs (0 = OK, 1 = No power) Bit 8: At least one TC sensor in burnout status (0 = OK, 1 = Burnout sensor) Bit 9: Voltage/current switch set wrongly with regard to the configured measurement (0 = OK, 1 = FAIL)	RW	UNSIGNED 16 BIT
40023	22	DIGITAL I/O (READ)		Digital input/output status For inputs: 0 = Low input 1 = High input For outputs: 0 = Inactive output 1 = Active output THE LEAST SIGNIFICANT BIT RELATES TO IO1 EXAMPLE: 5 decimal = 0000 0000 0000 0101 binary => IO1=High/Active IO2=Low/Not Active IO3=High/Active IO4..IO8=Low/Not Active Unlike the I/O STATUS register, it is read-only and shows the real status of the outputs	RO	UNSIGNED 16 BIT
40101	100	CHANNEL VALUE	1	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV]	RO	FLOAT 32
40102	101				RO	FLOAT 32

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
				or [mA] or [°C] o [K] or [°F])		
40103	102	CHANNEL VALUE	2	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40104	103				RO	FLOAT 32
40105	104	CHANNEL VALUE	3	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40106	105				RO	FLOAT 32
40107	106	CHANNEL VALUE	4	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40108	107				RO	FLOAT 32
40109	108	CHANNEL VALUE	5	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40110	109				RO	FLOAT 32
40111	110	CHANNEL VALUE	6	Channel measurement (unit of	RO	FLOAT 32

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40112	111			measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40113	112	CHANNEL VALUE	7	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40114	113				RO	FLOAT 32
40115	114	CHANNEL VALUE	8	Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] o [K] or [°F])	RO	FLOAT 32
40116	115				RO	FLOAT 32
40117	116	ENG. VALUE	1	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40118	117	ENG. VALUE	2	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40119	118	ENG. VALUE	3	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40120	119	ENG. VALUE	4	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40121	120	ENG. VALUE	5	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40122	121	ENG. VALUE	6	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40123	122	ENG. VALUE	7	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40124	123	ENG. VALUE	8	Channel measurement scaled in engineering units	RO	SIGNED 16 BIT
40125	124	NTC TEMP	1	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40126	125					
40127	126	NTC TEMP	2	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40128	127					
40129	128	NTC TEMP	3	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40130	129					
40131	130	NTC TEMP	4	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40132	131					
40133	132	NTC TEMP	5	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40134	133					
40135	134	NTC TEMP	6	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40136	135					
40137	136	NTC TEMP	7	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40138	137					
40139	138	NTC TEMP	8	Measurement of the cold junction internal sensor temperature in [°C]	RO	FLOAT 32
40140	139					

19.2. R-8AI-8DIDO: TABLE OF MODBUS REGISTERS 0x COIL STATUS (FUNCTION CODE 1)

ADDRESS (0x)	*OFFSET ADDRESS (0x)*	*REGISTER*	*CHANNEL*	*DESCRIPTION*	*W/R*	*TYPE*
1	0	DIGITAL INPUT/OUTPUT	1	DIGITAL INPUT/OUTPUT	RW	BIT
2	1	DIGITAL INPUT/OUTPUT	2	DIGITAL INPUT/OUTPUT	RW	BIT
3	2	DIGITAL INPUT/OUTPUT	3	DIGITAL INPUT/OUTPUT	RW	BIT
4	3	DIGITAL INPUT/OUTPUT	4	DIGITAL INPUT/OUTPUT	RW	BIT
5	4	DIGITAL INPUT/OUTPUT	5	DIGITAL INPUT/OUTPUT	RW	BIT
6	5	DIGITAL INPUT/OUTPUT	6	DIGITAL INPUT/OUTPUT	RW	BIT
7	6	DIGITAL INPUT/OUTPUT	7	DIGITAL INPUT/OUTPUT	RW	BIT
8	7	DIGITAL INPUT/OUTPUT	8	DIGITAL INPUT/OUTPUT	RW	BIT

19.3. R-8AI-8DIDO: TABLE OF MODBUS REGISTERS 1x INPUT STATUS (FUNCTION CODE 2)

ADDRESS (1x)	OFFSET ADDRESS (1x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
10001	0	DIGITAL INPUT	1	DIGITAL INPUT/OUTPUT	RO	BIT
10002	1	DIGITAL INPUT	2	DIGITAL INPUT/OUTPUT	RO	BIT
10003	2	DIGITAL INPUT	3	DIGITAL INPUT/OUTPUT	RO	BIT
10004	3	DIGITAL INPUT	4	DIGITAL INPUT/OUTPUT	RO	BIT
10005	4	DIGITAL INPUT	5	DIGITAL INPUT/OUTPUT	RO	BIT
10006	5	DIGITAL INPUT	6	DIGITAL INPUT/OUTPUT	RO	BIT
10007	6	DIGITAL INPUT	7	DIGITAL INPUT/OUTPUT	RO	BIT
10008	7	DIGITAL INPUT	8	DIGITAL INPUT/OUTPUT	RO	BIT

20. MODBUS REGISTER TABLE FOR THE R-SG3 DEVICE

20.1. R-SG3: MODBUS 4X HOLDING REGISTERS TABLE (FUNCTION CODE 3)

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/R	TYPE
40001	0	MACHINE-ID	-	DEVICE IDENTIFICATION	RO	UNSIGNED 16
40002	1	FIRMWARE REVISION	-	FIRMWARE REVISION	RO	UNSIGNED 16

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40003	2	MEASURE UNIT	-	Select the unit of measurement between: 0 = Kg 1=g 2=t 3=lb 4=l 5=N 6=bar 7=atm 8=other	RW	UNSIGNED 16
40004	3	UNIPOLAR	-	0 = compression and traction (Bipolar) 1 = Balance (Unipolar)	RW	UNSIGNED 16
40005	4	ANALOGUE OUTPUT TYPE (Only Model ZE-SG3, Z-SG3)	-	0 = Voltage, 1 = Current	RW	UNSIGNED 16
40006	5	DIGITAL IN TYPE/ DIGITAL IN-OUT	-	(MSB) DIGITAL IN TYPE: Select the input digital 1/2 type BIT[8] 0 = digital input 1 acquires the tare 1 = Status of the digital input 1 is shown on Modbus BIT[9] 0 = digital input 2 acquires the tare 1 = Status of the digital input 2 is	RW	UNSIGNED 16

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				shown on Modbus BIT[15..10] NOT USED (LSB) DIGITAL IN-OUT BIT[0] 0 = DIDO1 configured as Input 1 = DIDO1 configured as output BIT[1] 0 = DIDO2 configured as Input 1 = DIDO2 configured as output		
40007	6	CALIBRATION MODE	-	Set the calibration type mode: 0 = Factory calibration 1 = Calibration with standard weight	RW	UNSIGNED 16
40008	7	RESERVED	-	RESERVED MSW	RW	UNSIGNED 32
40009	8			RESERVER LSW	RW	
40010	9	RESERVED	-	RESERVED MSW	RW	UNSIGNED 32
40011	10			RESERVER LSW	RW	

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40012	11	RESERVED	-	RESERVED MSW	RW	UNSIGNED 32
40013	12			RESERVER LSW	RW	
40014	13	CELL SENSE RATIO [mV/V]	-	Load cell sensitivity value in [mV/V] MSW	RW	FLOATING POINT 32 BIT
40015	14			Load cell sensitivity value in [mV/V] LSW	RW	
40016	15	CELL FULL SCALE [kg/g/t...]	-	Full scale value of the load cell in technical units [kg/g/t...] MSW	RW	FLOATING POINT 32 BIT
40017	16			Full scale value of the load cell in technical units [kg/g/t...] LSW	RW	
40018	17	STANDARD WEIGHT CELL FLOAT [kg/g/t...]	-	Standard weight value in technical units to use in calibration mode with sample weight [kg/g/t...] MSW	RW	FLOATING POINT 32 BIT
40019	18			Standard weight value in technical units to use in calibration mode with sample weight [kg/g/t...] LSW	RW	
40020	19	THRESHOLD DO1 [kg/g/t...]	-	Alarm threshold value in technical units for digital	RW	FLOATING POINT 32 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				output 1 [kg/g/t...] MSW		
40021	20			Alarm threshold value in technical units for digital output 1 [kg/g/t...] LSW	RW	
40022	21	OUTPUT WEIGHT START SCALE [kg/g/t...] (Only for model ZE-SG3, Z-SG3)	-	Initial scale value of the net weight for the analogue output [kg/g/t...] MSW	RW	FLOATING POINT 32 BIT
40023	22			Initial scale value of the net weight for the analogue output [kg/g/t...] LSW	RW	
40024	23	OUTPUT WEIGHT STOP SCALE [kg/g/t...] (Only for model ZE-SG3, Z-SG3)	-	Full scale value of the net weight for the analogue output [kg/g/t...] MSW	RW	FLOATING POINT 32 BIT
40025	24			Full scale value of the net weight for the analogue output [kg/g/t...] LSW	RW	
40026	25	OUTPUT STOP SCALE [V/mA] (Only for model ZE-SG3, Z-SG3)	-	Full scale value of the analogue output in [V/mA] MSW	RW	FLOATING POINT 32 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40027	26			Full scale value of the analogue output in [V/mA] LSW	RW	
40028	27	OUTPUT START SCALE [V/mA] (Only for model ZE-SG3, Z-SG3)	-	Initial scale value of the analogue output in [V/mA] MSW	RW	FLOATING POINT 32 BIT
40029	28			Initial scale value of the analogue output in [V/mA] LSW	RW	
40030	29	DELTA WEIGHT [kg/g/t…]	-	Delta weight value in technical units for stable weighing condition [kg/g/t…] MSW	RW	FLOATING POINT 32 BIT
40031	30			Delta weight value in technical units for stable weighing condition [kg/g/t…] LSW	RW	
40032	31	DELTA TIME [*100 ms]	-	Value of the delta time in 100ms quantities for the stable weighing condition	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40033	32	DOUT MODE	1-2	BIT[0] 0 = DOUT1 NORMALLY OPEN 1 = DOUT1 NORMALLY CLOSE BIT[1] 0 = DOUT2 NORMALLY OPEN 1 = DOUT2 NORMALLY CLOSE BIT[2..7] NOT USED BIT[8..11] 0 = DOUT1 MODE FULL SCALE 1 = DOUT1 MODE OVERTHRESHOLD 2 = DOUT1 STABLE WEIGHT 3 = DOUT1 FROM MODBUS 4 = DOUT1 OVERTHRESHOLD WITH HYSTERESIS BIT[12..15] 0 = DOUT2 MODE FULL SCALE 1 = DOUT2 MODE OVERTHRESHOLD 2 = DOUT2	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				STABLE WEIGHT 3 = DOUT2 FROM MODBUS 4 = DOUT2 OVERTHRESHOLD WITH HYSTERESIS		
40034	33	ADVANCED ADC SPEED	-	Configure the sampling rate of the ADC. It is active only if you set the filtering at level 7 (advanced). 0 = 960 Hz 1 = 300 Hz 2 = 150 Hz 3 = 100 Hz 4 = 60 Hz 5 = 12 Hz 6 = 4.7 Hz	RW	UNSIGNED 16 BIT
40035	34	AUTOMATIC TARE RESET	-	0 = Disable the tare tracker If >= 1 it is the value of ADC points within which the tare automatically will be reset . If after 5 seconds of stable weighing condition the ADC value of the net weight deviates by	RW	UNSIGNED 32

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				less than this value then a new tare is acquired ADC POINTS MSW		
40036	35		-	ADC POINTS LSW	RW	
40037	36	THRESHOLD HYSTERESIS DO 1 [kg/g/t…]	-	Hysteresis value for digital output 1 threshold MSW	RW	FLOATING POINT 32 BIT
40038	37		-	Hysteresis value for digital output 1 threshold LSW	RW	
40039	38	ADVANCED DENOISE FILTER VARIATION	-	It represents the change in ADC points due to noise alone. It is active only if you set the filtering at level 7 (advanced). ADC VALUE MSW	RW	FLOATING POINT 32 BIT
40040	39		-	ADC VALUE LSW	RW	
40041	40	ADVANCED DENOISE FILTER RESPONSE	-	Represents a parameter related to the response speed of the filter, it can vary from 0.001 (Slowest Response) to 1 (Fast Response). It is	RW	FLOATING POINT 32 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				active only if you set the filtering at level 7 (advanced). RESPONSE SPEED MSW		
40042	41		-	RESPONSE SPEED LSW	RW	
40043	42	DENOISE FILTER VALUE	-	It is possible to configure a pre-established filter level The higher the filter level is, plus the weight measurement will be stable but slow. A value other than 7 will override the advanced parameters. In the "Advanced" mode it will be possible to act on the individual parameters of the ADVANCED NOISE FILTER VARIATION, ADVANCED NOISE FILTER RESPONSE, ADVANCED ADC SPEED 0 = FILTER	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				RESPONSE TIME 2 ms 1 = FILTER RESPONSE TIME 6,7 ms 2 = FILTER RESPONSE TIME 13 ms 3 = FILTER RESPONSE TIME 30 ms 4 = FILTER RESPONSE TIME 50 ms 5 = FILTER RESPONSE TIME 250 ms 6 = FILTER RESPONSE TIME 850 ms 7 = ADVANCED		
40044	43	RESOLUTION MODE	-	Select the type of resolution to be used in the Weight measurement: 0 = Automatic Resolution (calculated on the basis of the full scale to obtain about 20000 points) 1 = Manual resolution (Taken from MANUAL RESOLUTION register) 2 = Max resolution (Full 24 bits resolution)	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40045	44	DENOISE FILTER ENABLE	-	0 = Noise filter disabled (advanced mode enabled) 1 = Noise filter enabled	RW	UNSIGNED 16 BIT
40046	45	MANUAL RESOLUTION [kg/g/t…]	-	Sets the manual resolution with which the weight measure is displayed in technical units [kg/g/t…] MSW	RW	FLOATING POINT 32 BIT
40047	46		-	Sets the manual resolution with which the weight measure is displayed in technical units [kg/g/t…] LSW	RW	
40048	47	ONE PIECE WEIGHT [kg/g/t…]	-	Sets the weight of a single piece (used for pieces counter) MSW	RW	FLOATING POINT 32 BIT
40049	48		-	Sets the weight of a single piece (used for pieces counter) LSW	RW	
40050	49	THRESHOLD DO2 [kg/g/t…]	-	Alarm threshold value in technical units for digital output 2 [kg/g/t…] MSW	RW	FLOATING POINT 32 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40051	50		-	Alarm threshold value in technical units for digital output 2 [kg/g/t…] LSW	RW	
40052	51	THRESHOLD HYSTERESIS DO 2 [kg/g/t…]	-	Hysteresis value for digital output 1 threshold MSW	RW	FLOATING POINT 32 BIT
40053	52		-	Hysteresis value for digital output 1 threshold LSW	RW	
40061	60	RESERVED	-	Reserved	RO	FLOATING POINT 32 BIT
40062	61			Reserved	RO	
40063	62	16 BIT ADC FILTERED	-	ADC Converted in 16 Bit filtered value	RO	UNSIGNED 16 BIT
40064	63	NET WEIGHT VALUE [Kg/g/t..]	-	Net weight in technical units MSW	RO	FLOATING POINT 32 BIT
40065	64			Net weight in technical units LSW	RO	
40066	65	GROSS WEIGHT VALUE [Kg/g/t..]	-	Gross weight in technical units MSW	RO	FLOATING POINT 32 BIT
40067	66			Gross weight in technical units LSW	RO	
40068	67	TARE WEIGHT VALUE [kg/g/t…]	-	Tare weight in technical units MSW	RO	FLOATING POINT 32 BIT
40069	68		-	Tare weight in technical units LSW	RO	

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40070	69	INTEGER NET WEIGHT VALUE [kg/g/t…]	-	Net weight in technical units MSW	RO	SIGNED 32 BIT
40071	70		-	Net weight in technical units LSW	RO	
40072	71	INTEGER GROSS WEIGHT VALUE [kg/g/t…]	-	Gross weight in technical units MSW	RO	SIGNED 32 BIT
40073	72		-	Gross weight in technical units LSW	RO	
40074	73	INTEGER TARE WEIGHT VALUE [kg/g/t…]	-	Tare weight in technical units MSW	RO	SIGNED 32 BIT
40075	74		-	Tare weight in technical units LSW	RO	
40076	75	FACTORY MANUAL TARE [kg/g/t…]	-	Value to use for the manual tare in the factory mode calibration (MSW)	RW	FLOATING POINT 32 BIT
40077	76		-	Value to use for the manual tare in the factory mode calibration (LSW)	RW	

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40078	77	STATUS	-	Status register: BIT 0 LSBIT (RO) Bit 0 = 1 THRESHOLD AND STABLE WEIGHT for DIDO 1 BIT 1 (RO) Bit 1 = 1 FULL SCALE CELL BIT 2 (RO) Bit 2 = 1 NET WEIGHT < 0 BIT 3 (RO) Bit 3 =1 THRESHOLD AND STABLE WEIGHT for DIDO 2 BIT 4 (RO) Bit 4 = 1 Stable weight BIT 5-6 (R/W) Only if the output mode commandable from modbus has been chosen: Bit 5 = 1 digital output 2 on Bit 5 = 0 digital output 2 off Bit 6= 1 digital output 1 on Bit 6 = 0 digital output 1 off BIT 7 (RO) Bit 7 = 1 Threshold with hysteresis for DIDO 1 BIT 8 (RO) Bit 8 = 1 tare	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				tracker (if enabled) BIT 9 (RO) Bit 9 = 1 Threshold with hysteresis for DIDO 2 BIT 10..15 Not used		
40079	78	PASSWORD	-	Reserved	RW	UNSIGNED 16 BIT
40080	79	COMMAND REGISTER	-	Command register once the command has been executed, the register returns to the value 0 43948 (decimal) Reboot the device 49594 (decimal) Acquires the	RW	UNSIGNED 16 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				tare in RAM (at reboot is lost) 49914 (decimal) Acquires the tare in Flash for the calibration procedure in both operating modes (factory calibration and with sample weight) 50700 (decimal) Acquires the sample weight value in Flash for calibration with standard weight 50773 (decimal) Acquires the tare value from the register MANUAL TARE (only for the factory calibration mode) 49151 (decimal) Reset the maximum net weight		

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
				45056 (decimal) Reset the register with the minimum net weight		
40081	80	PIECES NR	-	PIECES COUNTER VALUE	RO	UNSIGNED 16 BIT
40082	81	MAX NET WEIGHT [Kg/g/t…]	-	Maximum weight value net in technical units from last reboot [MSW]	RO	FLOATING POINT 32 BIT
40083	82		-	Maximum weight value net in technical units from last reboot [LSW]	RO	
40084	83	MIN NET WEIGHT [Kg/g/t…]	-	weight value net in technical units from last reboot [MSW]	RO	FLOATING POINT 32 BIT
40085	84		-	weight value net in technical units from last reboot [LSW]	RO	
40086	85	RESERVED	-	Reserved	RO	UNSIGNED 32 BIT
40087	86		-	Reserved	RO	
40088	87	RESERVED	-	Reserved	RO	UNSIGNED 32 BIT

ADDRESS (4x)	OFFSET ADDRESS (4x)	REGISTER	CHANNEL	DESCRIPTION	W/ R	TYPE
40089	88		-	Reserved	RO	
40090	89	RESERVED	-	Reserved	RO	UNSIGNED 32 BIT
40091	90		-	Reserved	RO	
40092	91	ADC RAW 24 BIT	-	ADC 24 bit value not filtered	RO	UNSIGNED 32 BIT
40093	92		-	ADC 24 bit value not filtered	RO	
40094	93	ADC RAW 24 BIT FILTERED	-	ADC 24 bit value filtered	RO	UNSIGNED 32 BIT
40095	94		-	ADC 24 bit value filtered	RO	

21. R-SG3: LOAD CELL CALIBRATION THROUGH MODBUS REGISTERS

It is not always possible to use the Web server to calibrate the load cell, for example if a PLC or an HMI is to be used.
It is also possible to implement the calibration of a load cell in a simple way by sending Modbus RTU / TCP-IP commands according to the type of operation chosen.

21.1. CELL CALIBRATION PROCEDURE WITH FACTORY PARAMETERS AND WITH TARE ACQUIRED FROM THE FIELD

1) Place the tare on the load cell
2) Wait for the measurement to stabilize
3) Write the decimal value 49914 in the COMMAND REGISTER
4) The device saves the new tare value in flash and resets the COMMAND REGISTER value
5) The load cell is calibrated

21.2. CELL CALIBRATION PROCEDURE WITH FACTORY PARAMETERS AND MANUALLY ENTERED TARE

1) Write the tare value in technical units in the FACTORY MANUAL TARE registers
2) Write the decimal value 50773 in the COMMAND REGISTER

3) The device acquires the new flash tare value and resets the COMMAND REGISTER value
4) The load cell is calibrated

21.3. PROCEDURE FOR CALIBRATION OF THE CELL WITH A STANDARD WEIGHT

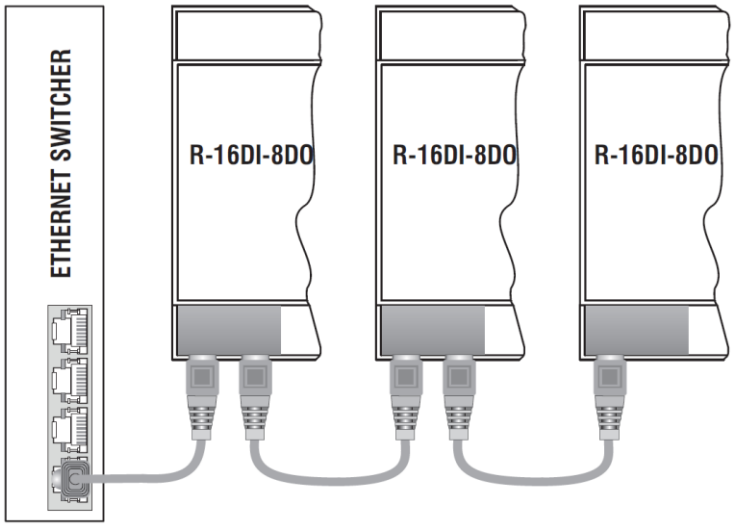
1) Place the tare on the load cell
2) Wait for the measurement to stabilize
3) Write the decimal value 49914 in the COMMAND REGISTER
4) The device saves the new tare value in flash and resets the COMMAND REGISTER value
5) Enter the weight value of the sample weight in technical units in the STANDARD WEIGHT VALUE registers
6) Place the sample weight on the load cell
7) Wait for the measurement to stabilize
8) Write the decimal value 50700 in the COMMAND REGISTER
9) The device saves the new sample weight value in flash and resets the COMMAND REGISTER value
10) The load cell is calibrated

22. CABLE HARNESS FOR MODELS WITH DOUBLE ETHERNET PORT

Models with double Ethernet port can be connected in daisy chain and take advantage of the Lan Fault Bypass.

22.1. CHAIN ETHERNET CONNECTION (DAISY CHAIN)

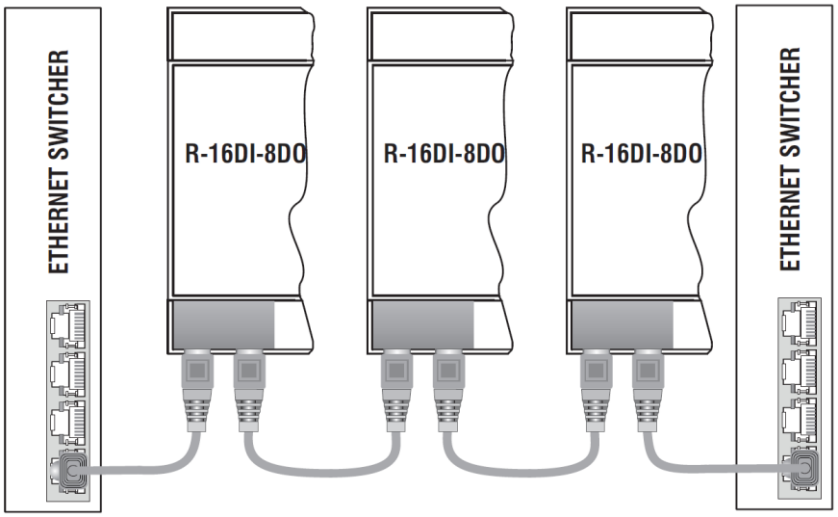
Using the daisy chain connection it is not necessary to use switches to connect the devices.
An example (in this case on R-16DI-8DO) of connection of 3 devices is as follows:



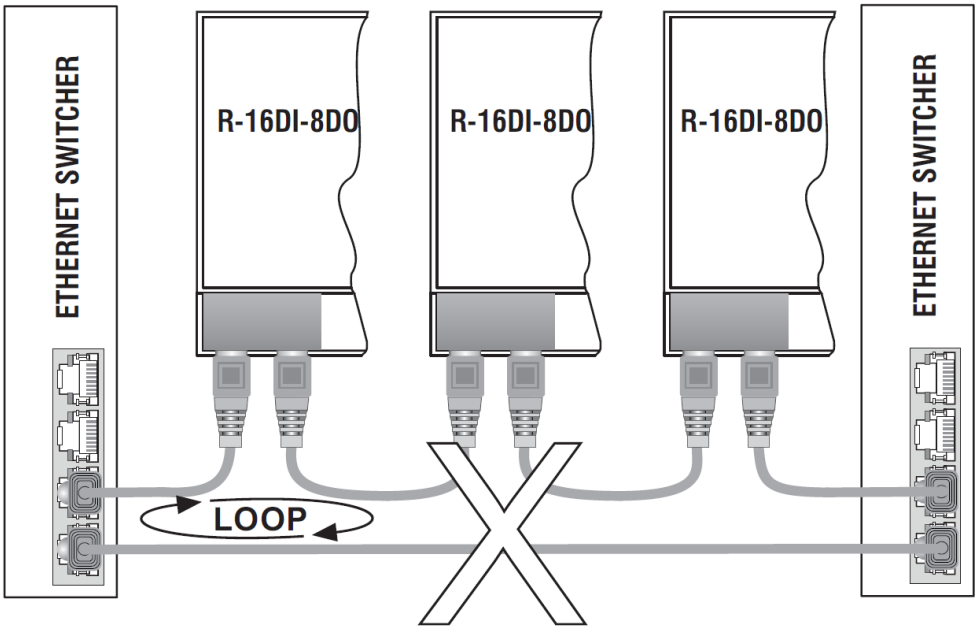
ATTENTION!

IT IS NOT POSSIBLE TO CREATE LOOPS WITH ETHERNET CABLES

If it is necessary to connect the devices to the switches, correct wiring is as follows:

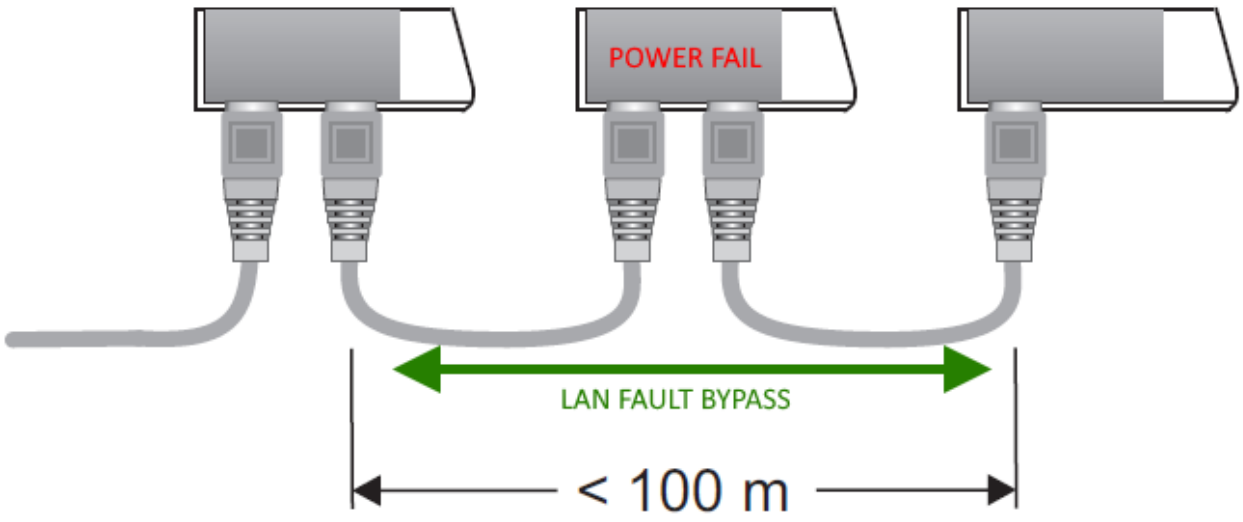


In the Ethernet wiring there must be no loop, otherwise the communication will not work, some examples of incorrect wiring are the following:



22.2. LAN FAULT-BYPASS FUNCTION

The LAN fault-bypass function allows you to keep the connection between the two Ethernet ports of the device ON, in the event of power failure problems.
If a device turns off, the chain is not interrupted and the devices downstream of the switched-off one will still be accessible.
This function has a limited duration: the connection remains active for a few days, typically 4.
The Lan fault-bypass function requires that the sum of the lengths of the two cables connected to the switched off module is less than 100m.



23. SEARCH AND MODIFICATION OF THE DEVICE IP WITH THE SENECA DISCOVERY DEVICE TOOL

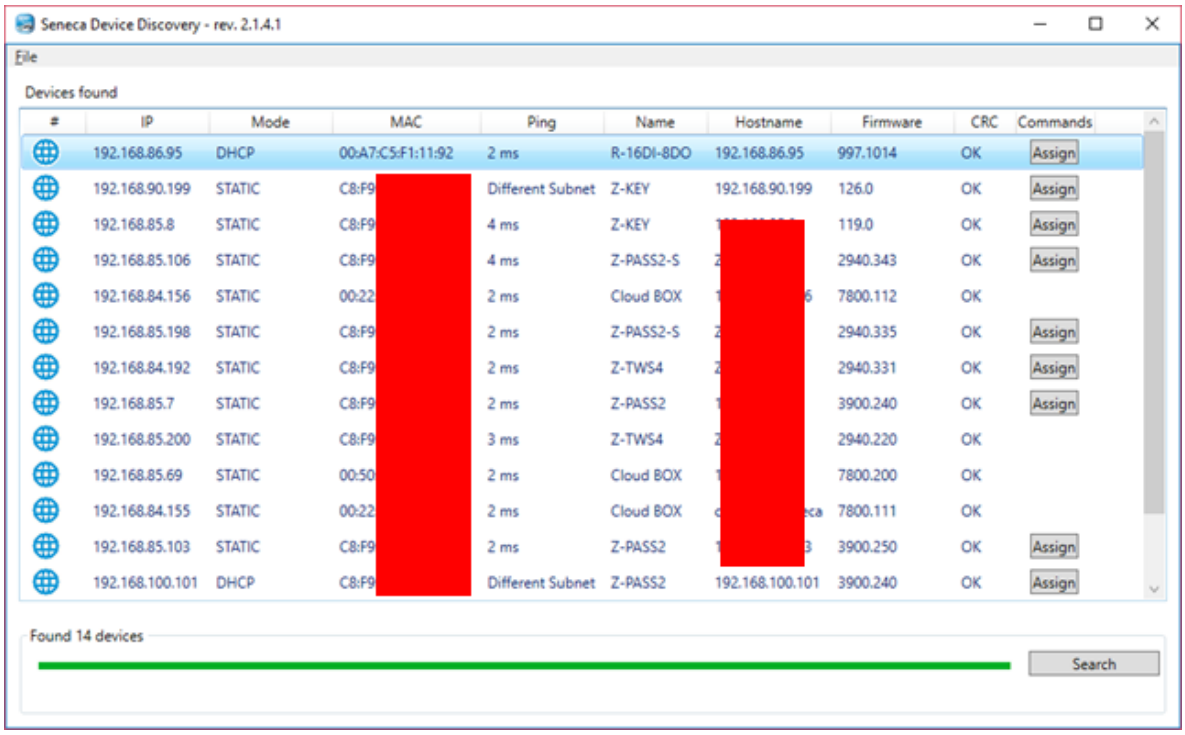
The search and modification of an IP of the device can be performed via the Seneca Discovery Device software.
If Seneca devices that are not part of the R series are also used, it is more convenient to set the addresses with a single software.

When in the R series device the STS LED is on steady, it is possible to obtain the IP address which has been set using the "Seneca Discovery Device" tool too.

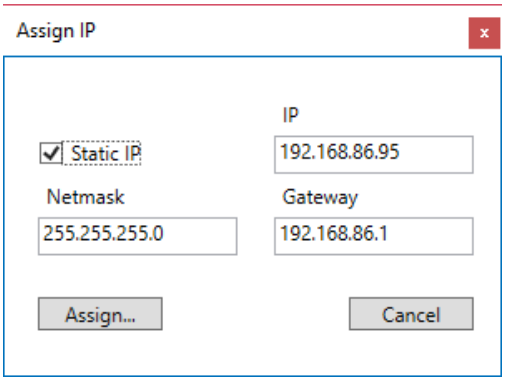
The software can be downloaded from:

https://www.seneca.it/en/linee-di-prodotto/software/easy/sdd

Pressing the "search" button starts the search for all Seneca devices present in the network even if with IP addresses not compatible with the current PC configuration:



It is now possible to change the address by pressing the "Assign" button:



The software works on layer 2 level and it is therefore not necessary to have an Ethernet configuration compatible with the device you are looking for.