# USER MANUAL

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

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**ORIGINAL INSTRUCTIONS**

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# 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.
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## Document revisions

| DATE | REVISION | NOTES | AUTHOR |
|---|---|---|---|
| 10/02/2023 | 0 | First revision<br>R-32DIDO-1, R-32DIDO-2, R-16DI-8DO, R-8AI-8DIDO | MM |
| 02/03/2023 | 1 | Added Chapter “Protection of digital outputs” | MM |
| 15/03/2023 | 2 | Fix Seneca Discovery Device, Easy Setup 2, Seneca Studio Seneca Studio<br>Fix cross references | MM |
| 15/03/2023 | 3 | Tables translated in English language | MM |
| 08/05/2023 | 5 | Added info about RW register<br>Fix registers info in English language | MM |
| 29/05/2023 | 6 | Added R-SG3 device, modified chapter “Factory configuration reset” | MM |
| 31/05/2023 | 7 | Added DIP SWITCH chapter | MM |
| 19/07/2023 | 8 | Fixed ModBUS registers 40044, 40079 and 40080 of R-SG3 | AZ |
| 13/11/2023 | 9 | Changed old R-8AI-8DIDO with new R-8AI-8DIDO version<br>Deleted -1 R-series HW code<br>Minor fix | MM |
| 27/11/2023 | 10 | Fix R-8AI-8DIDO Modbus table | MM |

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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.**

# 2. R SERIES DEVICES

The R Series I/O modules are devices designed for flexible cabling needs, reduced installation spaces, high I/O density applications with ModBUS communication (serial and Ethernet). Configuration can be done via dedicated software and/or DIP switches.
The devices can be connected in daisy chain mode (without the use of an external switch) and support fault-bypass mode to ensure the Ethernet connection even in the event of failure of a module in the chain.

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

## 2.1. R-32DIDO

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-2 | 2 PORTS 10/100 Mbit (Switch mode) |

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### 2.1.1. 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.

## 2.2. 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) |

## 2.3. R-8AI-8DIDO

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

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

### 2.3.1. ANALOG INPUT UPDATE TIME

Sampling time can be configured from 25ms to 400ms per each channel, in particular:

| *CHANNEL SAMPLING TIME* |
|---|
| 25ms |
| 50ms |
| 100ms |
| 200ms |
| 400ms |

To calculate the update time of a channel, consider the following example:

By activating 8 channels and setting a sampling time of 25 ms, you get an input update every: 25*8 = 200 ms.

***Note (only if thermocouple channels are enabled):***
In the case of a thermocouple input, the Burnout check is carried out every 10 seconds.
The duration of this check takes 25ms on each enabled thermocouple channel.

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For example, with 3 active thermocouples, every 10 seconds the following are used:
25ms x 3 channels = 75 ms for Burnout evaluation.

### 2.3.2. UPDATE TIME OF DIGITAL INPUTS/OUTPUTS

The update time of the 8 digital inputs/outputs is 25ms.

## 2.4. 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.

.

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

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### 2.4.1. 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.

### 2.4.2. 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.

### 2.4.3. 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.

#### 2.4.3.1. 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.

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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.

### 2.4.4. CONNECTION OF MORE LOAD CELLS IN PARALLEL

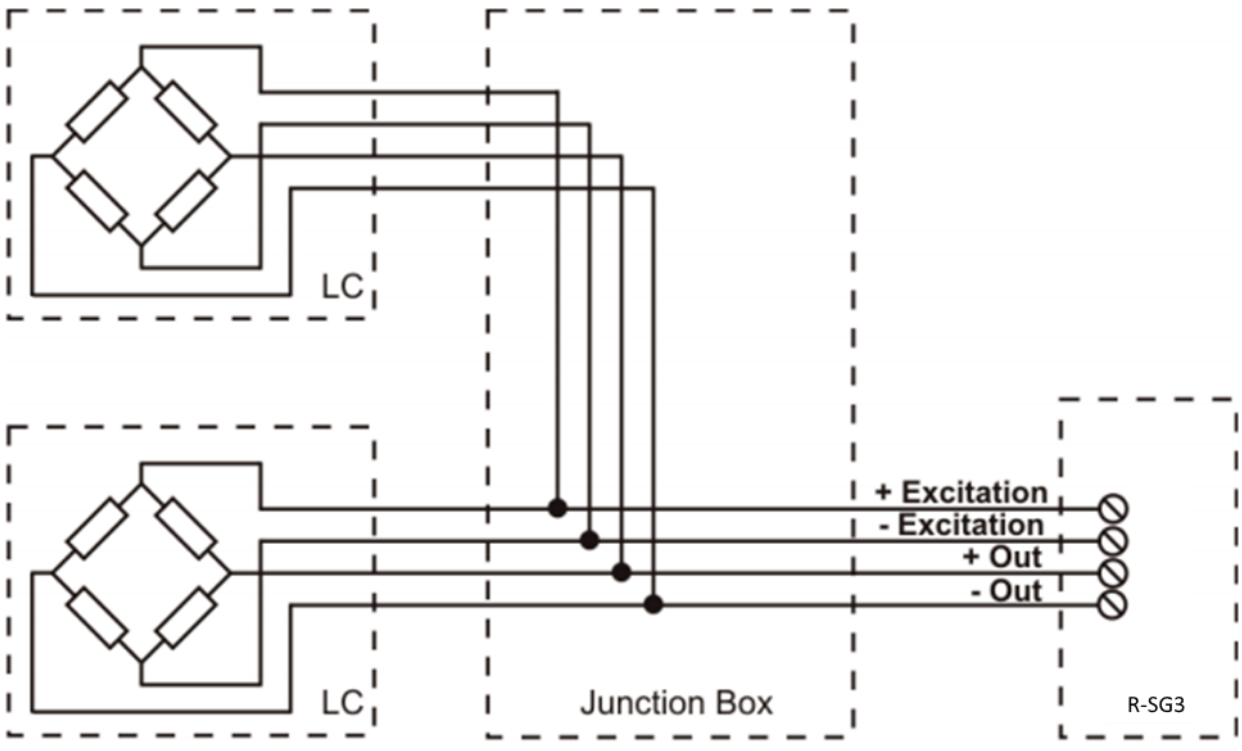
It is possible to connect up to a maximum of 8 load cells (and in any case without ever falling below the minimum 87 Ohms).

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.

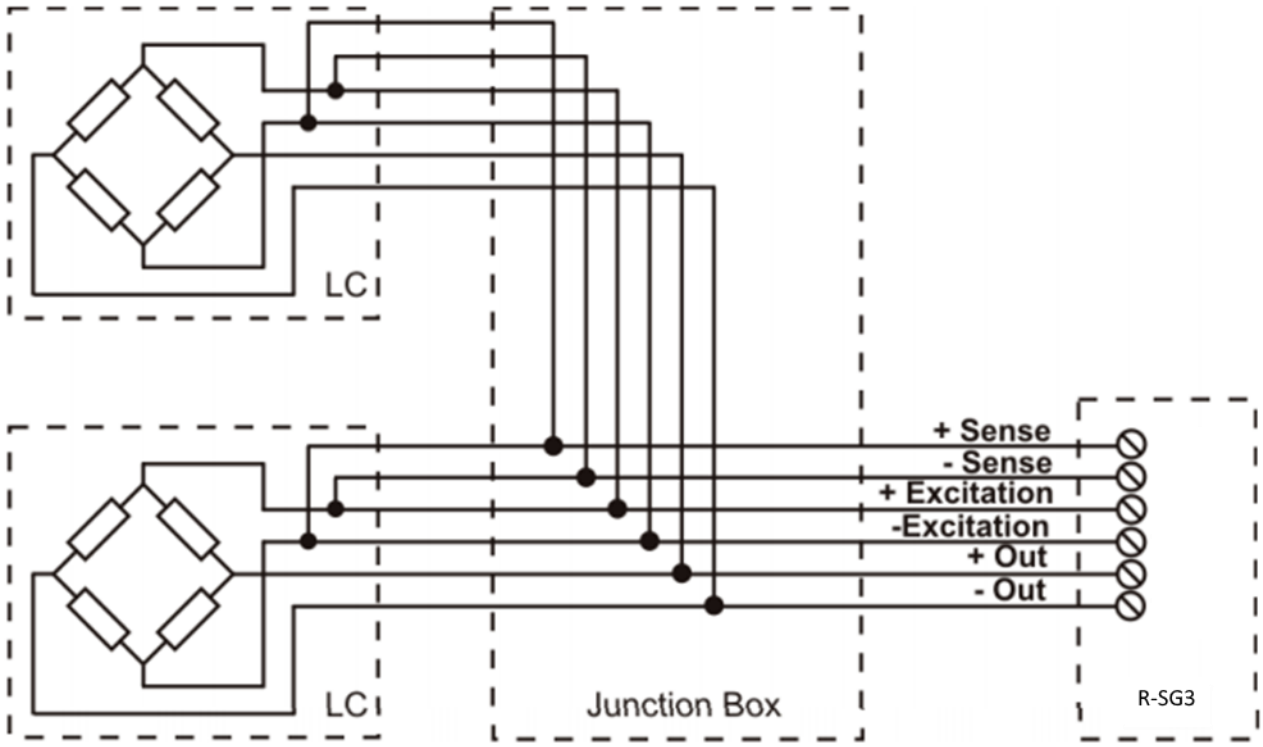
To connect 2 or more 4-wire cells in parallel with the SG-EQ4 junction box, use the following diagram:




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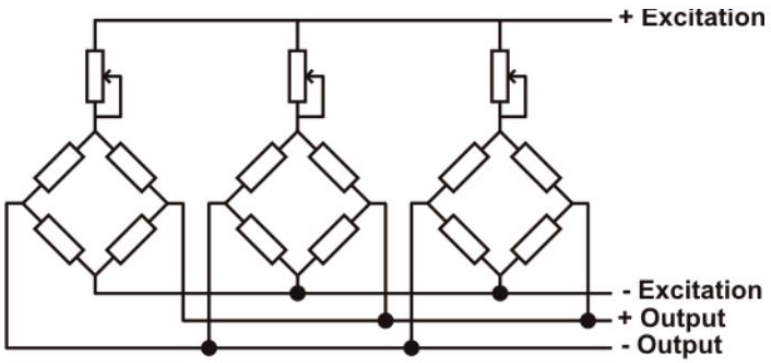
To connect 2 or more 6-wire cells in parallel with the SG-EQ4 junction box use the following diagram:




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

### 2.4.5. 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

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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.

## 3. 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**

### 3.1. MEANING OF THE DIP SWITCHES SW1 FOR THE R-8AI-8DIDO 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 |

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**ATTENTION!**

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

## 3.2. MEANING OF SW1 DIP-SWITCHES FOR THE R-32DIDO MODEL

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

### 3.2.1. DIP SWITCH SW1 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:<br>192.168.90.101 |
| ON | OFF | Reserved |

### 3.2.2. DIP SWITCH SW1 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 COMMISSIONING HAS BEEN COMPLETED, IN ORDER TO INCREASE THE SECURITY OF THE DEVICE, DISABLE THE WEBSERVER THROUGH THE DIP SWITCHES**

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## 3.3. MEANING OF THE SW1 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 |

**ATTENTION!**

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

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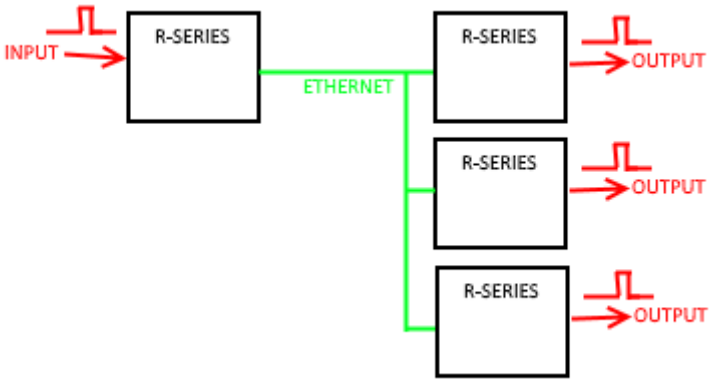
## 4. I/O COPY USING THE PEER TO PEER FUNCTION WITHOUT WIRING

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:



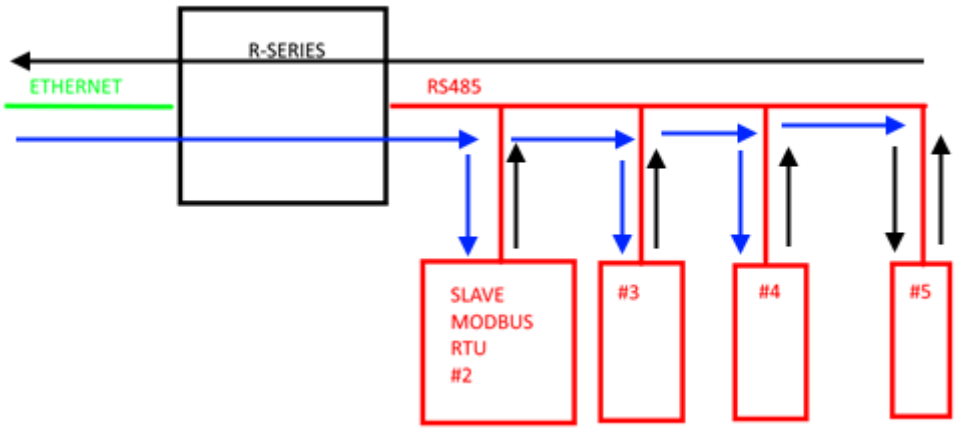

Each R-series device can send and receive a maximum of 32 inputs.

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# 5. 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.

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# 6. RESETTING THE DEVICE TO FACTORY CONFIGURATION

## 6.1. PROCEDURE FOR RESTORING DEVICES TO THE FACTORY CONFIGURATION

It is possible to reset the device to the factory configuration using the dip-switches (see chapter 3).

# 7. 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.

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# 8. WEB SERVER

## 8.1. ACCESS TO THE WEB SERVER

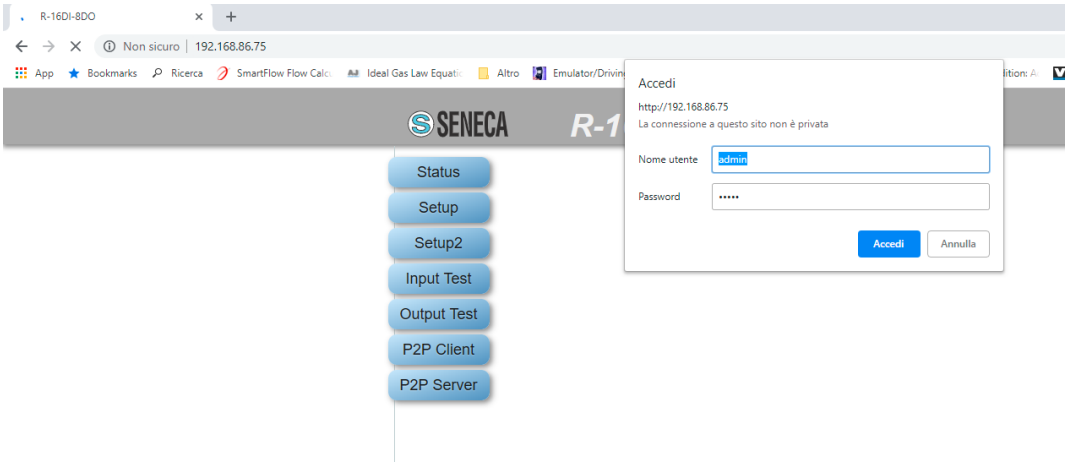
Access to the web server takes place using a web browser and entering the IP address of the device.
To know the IP address of the device you can use the Seneca Discovery Device software.

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**

**ATTENTION!**

**BEFORE ACCESSING THE WEBSERVER, CHECK THE STATE OF THE DIP-SWITCHES (SEE CHAPTER 3)**

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# 9. CONFIGURATION OF THE R-32DIDO 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. 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 5).

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***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.

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## 9.2. 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.

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## 9.3. SETUP COUNTERS SECTION

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

## 9.4. 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.

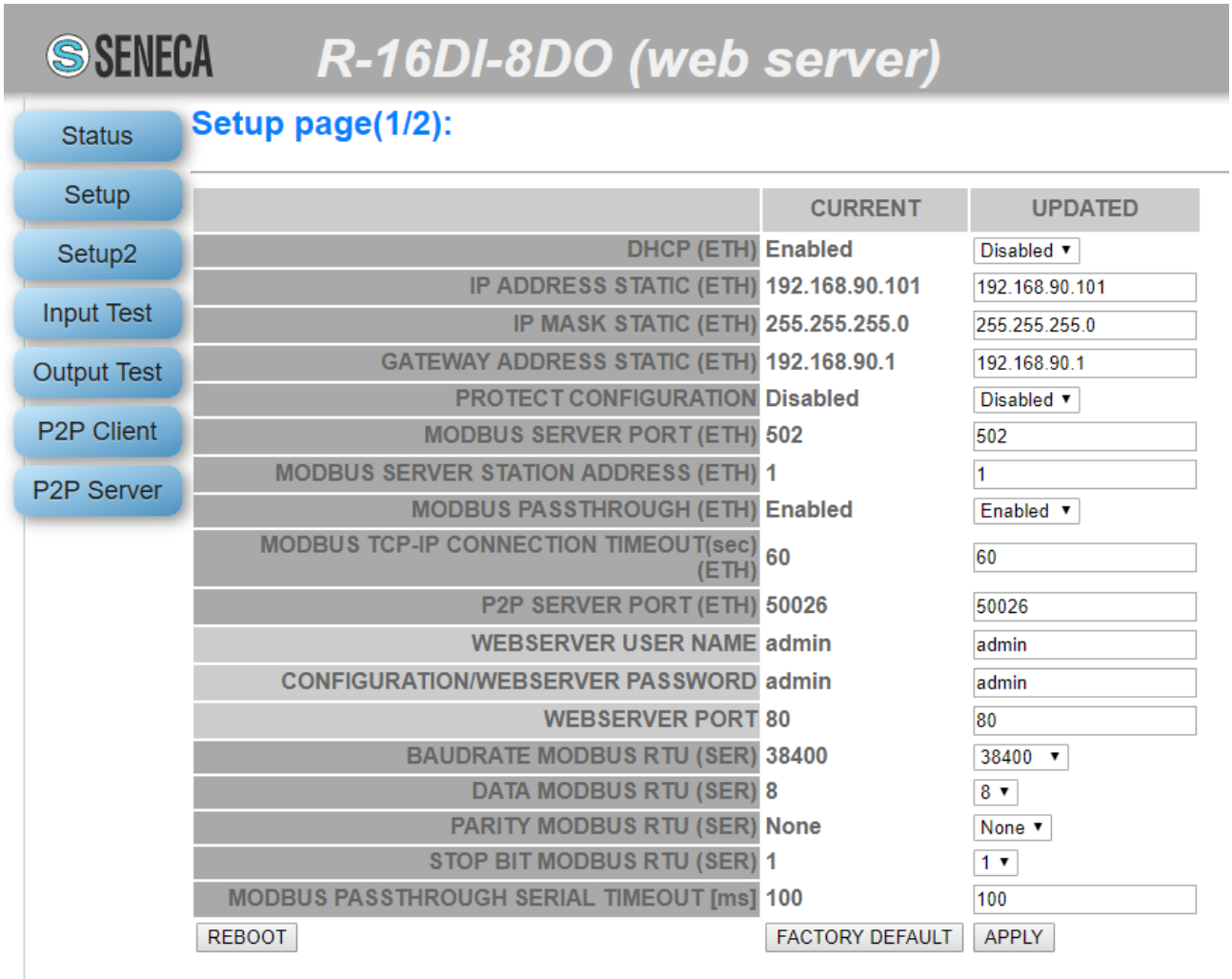
The "***Disable all rules***" button places all the rules in a disabled status (default).
The "***APPLY***" button allows you to confirm and then save the set rules in the non-volatile memory.

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# 10. CONFIGURATION OF THE R-16DI-8DO 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.

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**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 5).

***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.

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***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.

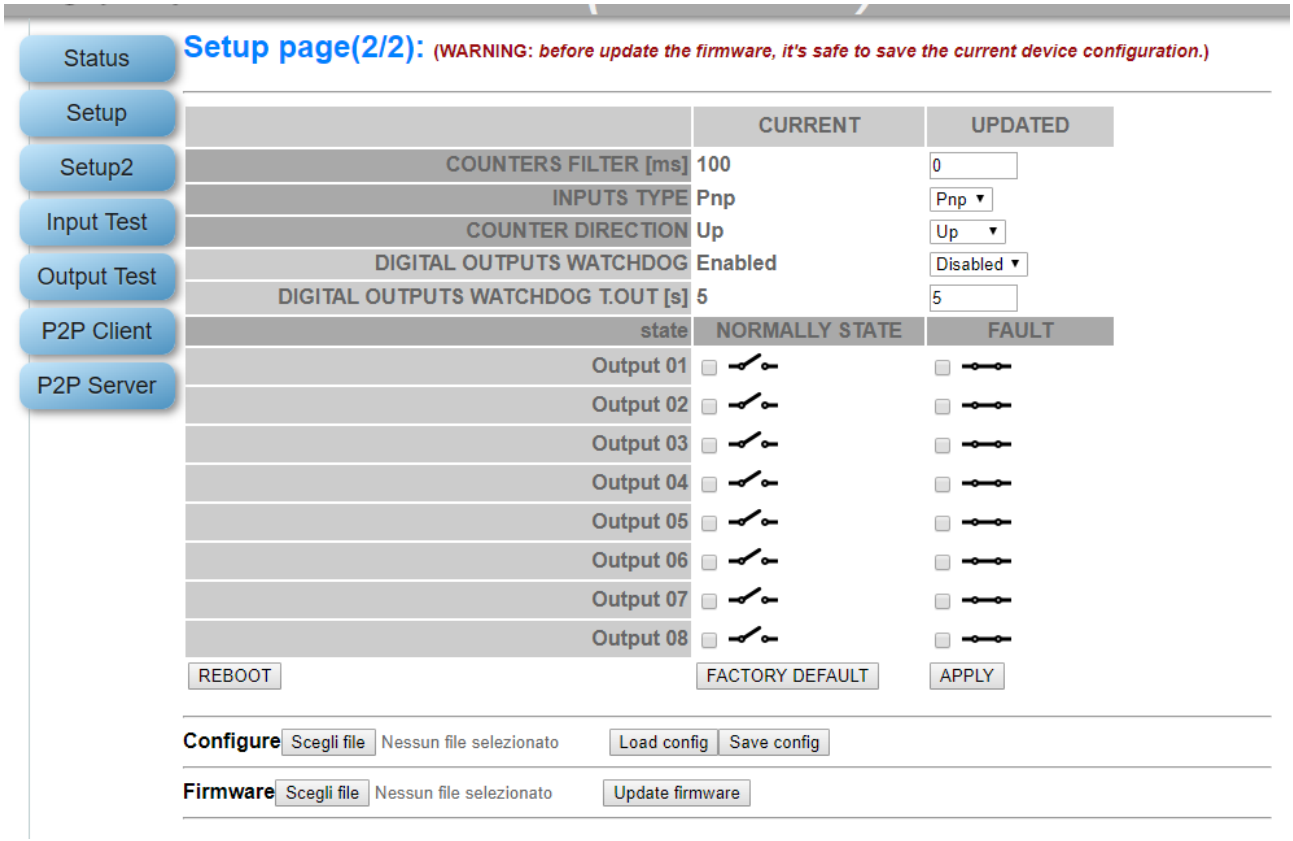
**ATTENTION!**

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

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## 10.2. SETUP 2 SECTION




***COUNTERS FILTER (default: 100ms)***

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!**

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***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.

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# 11. CONFIGURATION OF THE R-8AI-8DIDO 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.

***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 6)**

***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 5).

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***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 analog input.

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# ⚠ ATTENTION!

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

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## 11.2. SETUP AIN 1. 8 SECTION

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

**ATTENTION!**

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

***ANALOG 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
+-24 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.

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

***ANALOG 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

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

***ANALOG 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.

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***ANALOG 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.

***ANALOG 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.

***ANALOG INPUT BURNOUT VALUE (default 10000°C)***

In the case of thermocouple measurement, if the ANALOG 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.

***ANALOG 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.

***ANALOG 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.

***ANALOG INPUT START SCALE***

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

***ANALOG INPUT STOP SCALE***

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

***ANALOG INPUT ENG START SCALE***

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

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

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***ANALOG INPUT ENG STOP SCALE***
It represents the value of the engineering measurement register when the input reaches the value shown in the ANALOG INPUT STOP SCALE parameter.

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

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

## 11.3. 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.

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## 11.4. EVENT SETUP SECTION

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

***EVENT AIN MODE (Default: DISABLED)***

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

"Event when AIN < LOW THRESHOLD" the packet sending event occurs when the analog 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 analog input exceeds the threshold value, the packet will be sent, to send the next packet it will be necessary for the analog value to fall below the value (EVENT AIN HIGH THRESHOLD + EVENT AIN HYSTERESIS) and then to rise above the HIGH value again.

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# 12. CONFIGURATION OF THE R- SG3 DEVICE VIA WEB SERVER

## 12.1. 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 5).

***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).

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***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.

## 12.2. 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:

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***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 analog 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 |

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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).**

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***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.

## 12.3. 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***).

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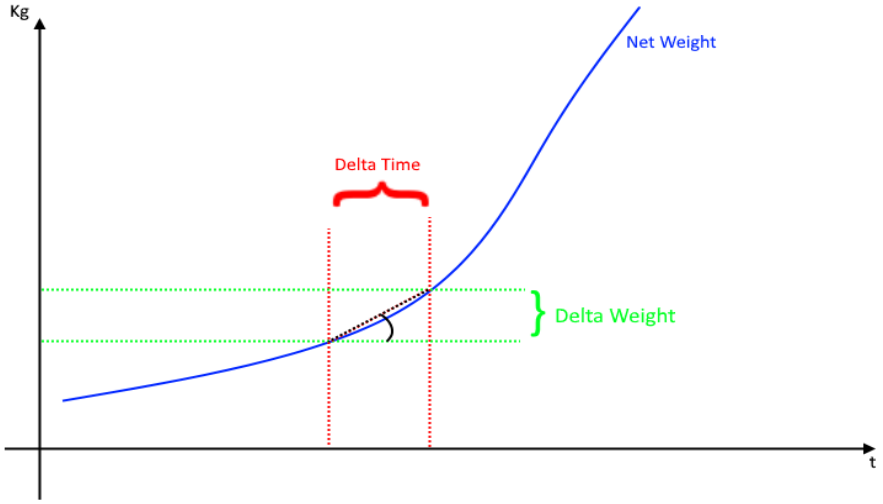
### *DIGITAL OUTPUT CONFIGURATION*

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.

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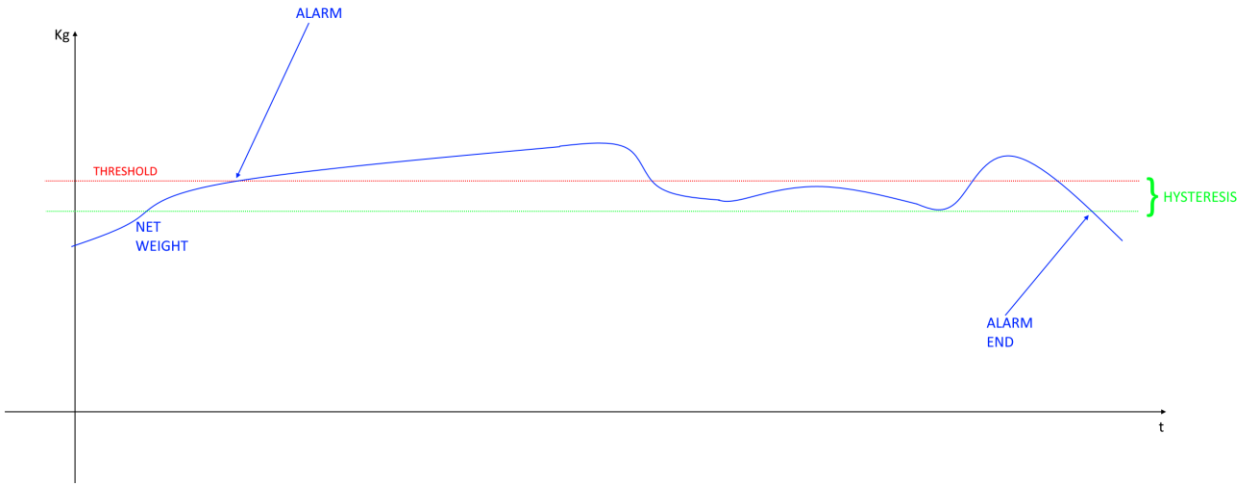

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### *COMMANDABLE FROM MODBUS*

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:



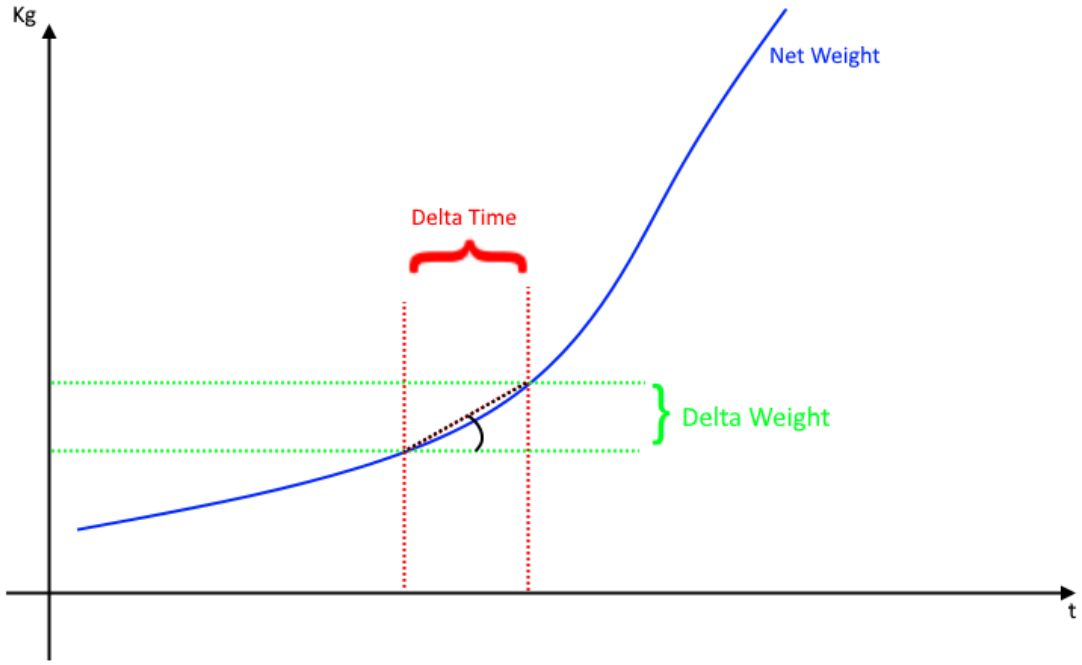

## *STABLE WEIGHT CONDITION*

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 $\frac{\Delta peso_netto}{\Delta tempo}$ :

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## 12.4. 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.

## 12.5. 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.

## 12.6. 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.

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### 12.6.1. 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

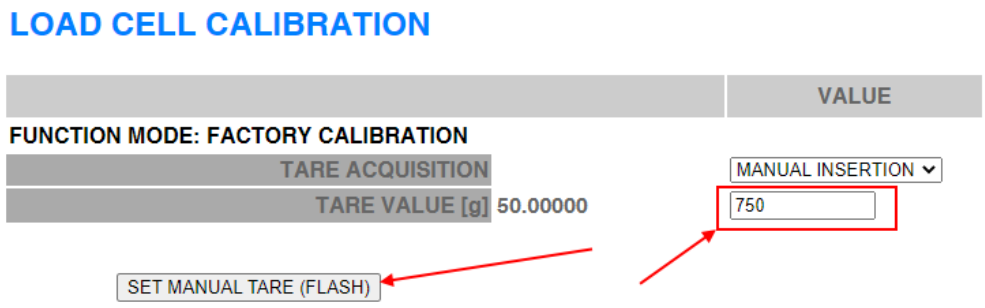
For the cell calibration procedure it is necessary to acquire the tare.
The tare can be entered manually in technical units (if known) or it can be acquired from the field.

**ATTENTION!**

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

#### 12.6.1.1. 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.



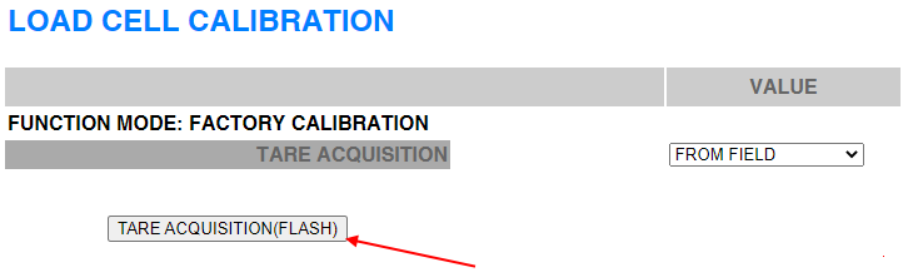

To acquire the tare value, press the "SET MANUAL TARE (FLASH)" button

#### 12.6.1.2. 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

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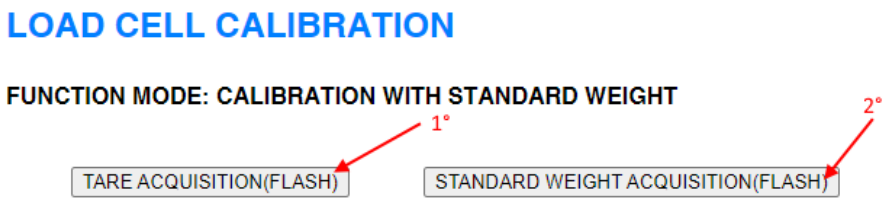



### 12.6.2. CELL CALIBRATION WITH A SAMPLE WEIGHT

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)

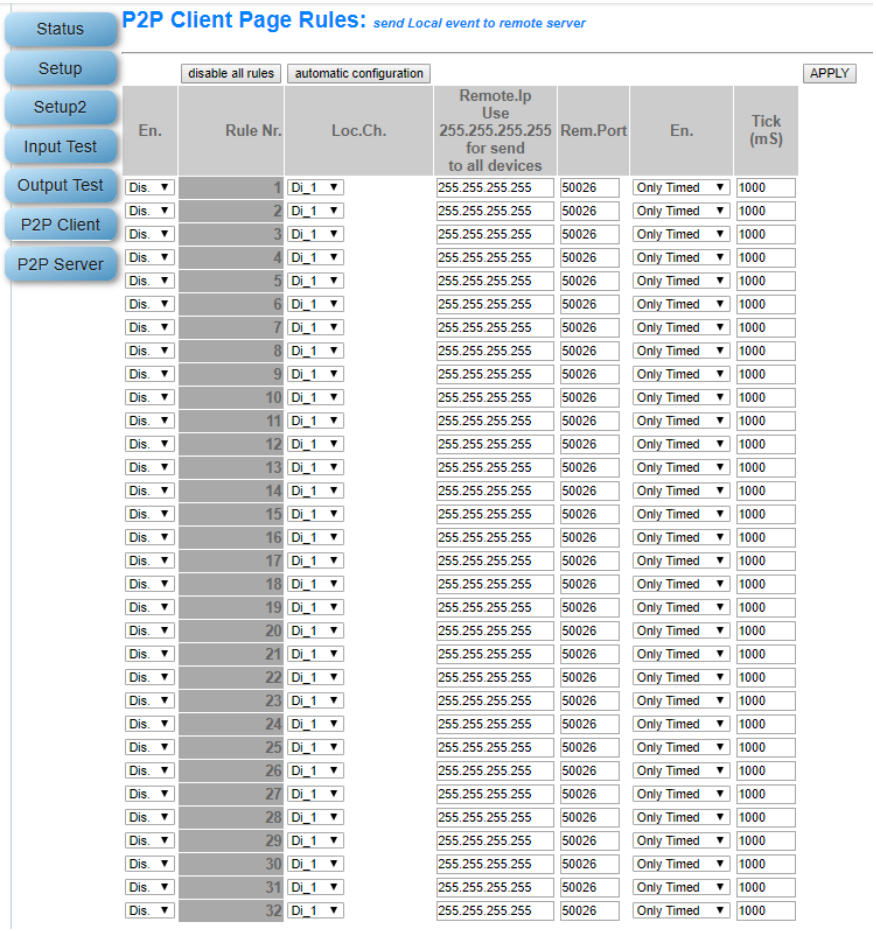



6) Replace the Tare + Standard Weight
7) Wait for the measurement to stabilize
8) Press the "STANDARD WEIGHT ACQUISITION (FLASH)" button

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# 13. 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.

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***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**

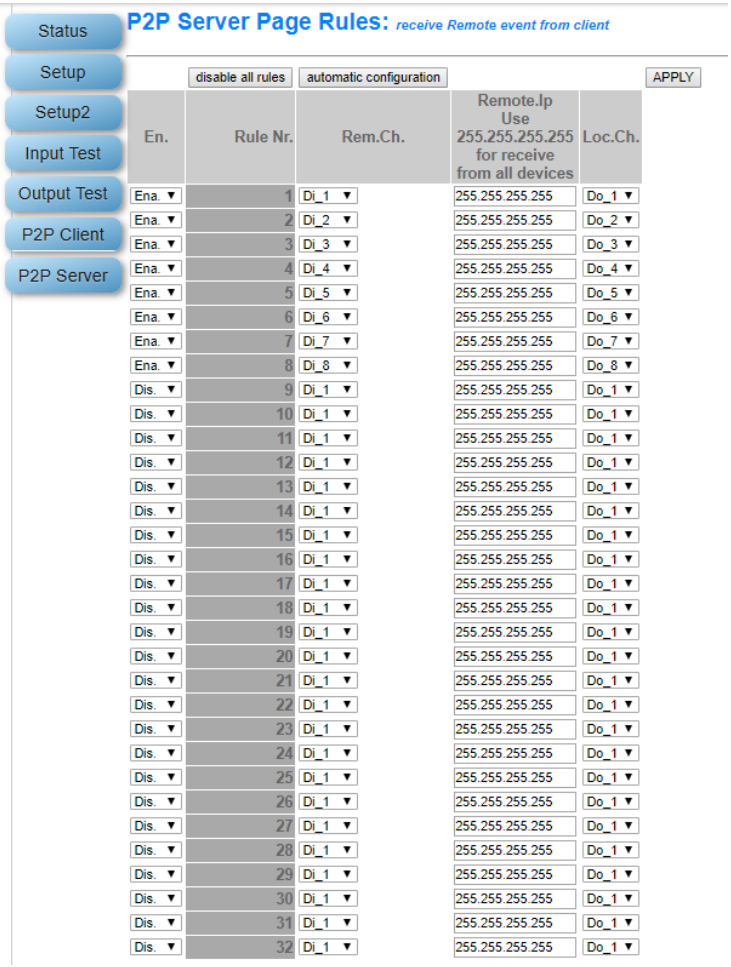
**ATTENTION!**

***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***

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## 14. 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.

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**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.***

## 14.1. P2P CONFIGURATION EXAMPLE

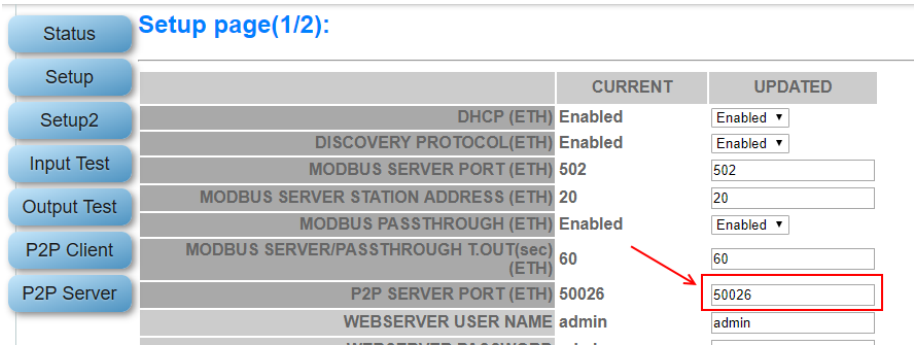
In the following example we have No.2 devices and we want to copy the status of digital input 1 of the first to the digital output of the second.
The IP address of Device 1 is 192.168.1.10
The IP address of Device 2 is 192.168.1.11

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 |

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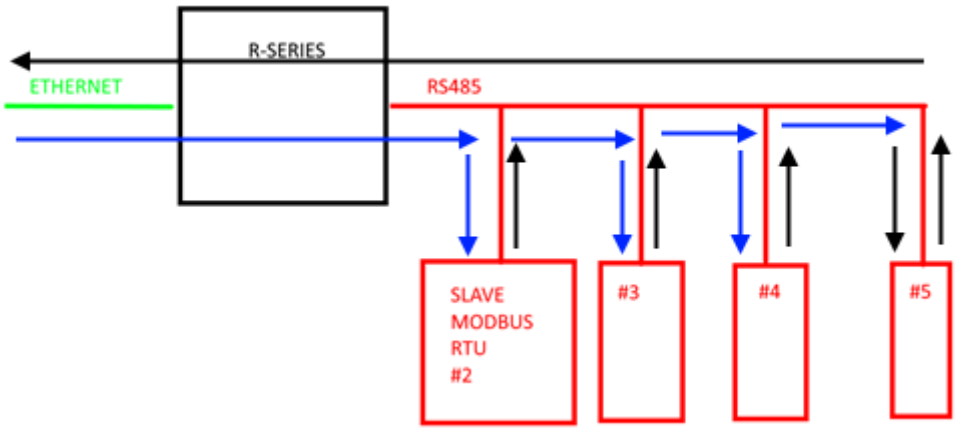
With this configuration, each time digital input 1 of device 1 (192.168.1.10) changes status, a packet will be sent to device 2 (192.168.1.11) which will copy it to digital output 1.
After 1 second, the same packet will be sent cyclically.

### 14.2. 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 analog models, the refresh time of the digital inputs/outputs and analog inputs typical of the device must also be considered.

## 15. 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.

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## 16. 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.**

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# 17. 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 18.446.744.073.709.551.615 |
| 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) |

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## 17.1. 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***

## 17.2. 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".***

## 17.3. 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.

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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 |

## 17.4. 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 |

## 17.5. 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 | | | | | | | |

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## 17.6. 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.

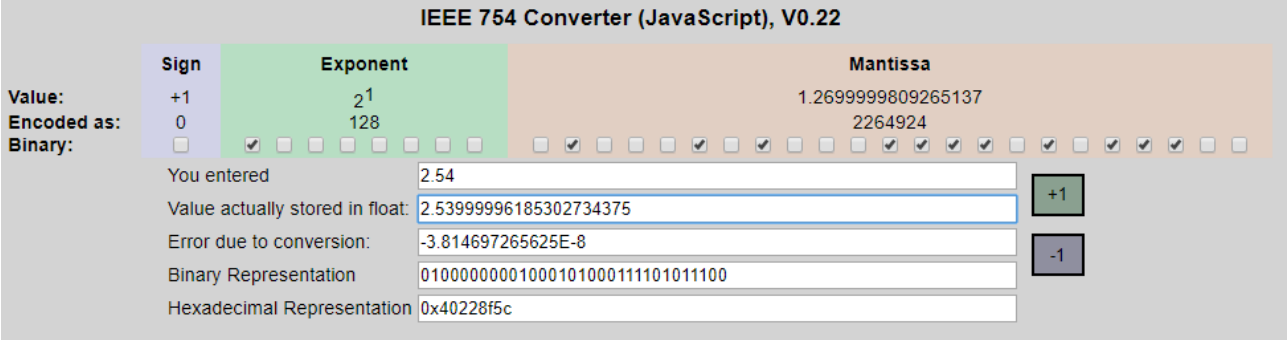
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## 17.7. TYPE OF 32-BIT FLOATING POINT DATA (IEEE 754)

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).

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## 17.8. 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

## 17.9. 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**

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# 18. MODBUS REGISTER TABLE FOR THE R-32DIDO PRODUCT

## 18.1. 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 |

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| 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 | |

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| 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 |

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| 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 | |

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| 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 |

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| 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 | |

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| 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 |

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

## 18.2. 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 |

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## 18.3. 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 |

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

## 19.1. 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 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 | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | 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 | |

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| 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 | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | |

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|---|---|---|---|---|---|---|
| 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 | |

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|---|---|---|---|---|---|---|
| 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 | |

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|---|---|---|---|---|---|---|
| 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 | |

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|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 | |

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## 19.2. 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 | |

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|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 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 |

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## 19.3. 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 |

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| 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 |

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## 19.4. 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 |

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

## 20.1. 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 | COMMAND | - | Supported command list: 49568 decimal to perform a Reboot | RW | UNSIGNED 16 BIT |
| **40014 … 40058** | 13…57 | RESERVED | - | - | RW | UNSIGNED 16 BIT |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40059** | 58 | DIGITAL OUT | [8…1] | Digital output values<br>0 = Not active output<br>1 = Active output<br>THE LEAST SIGNIFICANT BIT RELATES TO IO1<br>EXAMPLE:<br>5 decimal = 0000 0000 0000 0101 binary =><br>OUT1= Active<br>OUT2= Not Active<br>OUT3= Active<br>OUT4..OUT8=Not Active | RW | UNSIGNED 16 BIT |
| **40060** | 59 | DIGITAL IN | [8…1] | Digital input values<br>0 = Low<br>1 = High<br>THE LEAST SIGNIFICANT BIT RELATES TO IO1<br>EXAMPLE:<br>5 decimal = 0000 0000 0000 0101 binary =><br>IN1 = High<br>IN2 = Low<br>IN3 = High<br>OUT4..OUT8 = Low | RO | UNSIGNED 16 BIT |
| **40317** | 316 | CHANNEL VALUE | 1 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40318** | 317 | | | | RO | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40319** | 318 | CHANNEL VALUE | 2 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40320** | 319 | | | | RO | |
| **40321** | 320 | CHANNEL VALUE | 3 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40322** | 321 | | | | RO | |
| **40323** | 322 | CHANNEL VALUE | 4 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40324** | 323 | | | | RO | |
| **40325** | 324 | CHANNEL VALUE | 5 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40326** | 325 | | | | RO | |
| **40327** | 326 | CHANNEL VALUE | 6 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40328** | 327 | | | | RO | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40329** | 328 | CHANNEL VALUE | 7 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40330** | 329 | | | | RO | |
| **40331** | 330 | CHANNEL VALUE | 8 | Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [°C] or [Ohm] or Scaled | RO | FLOAT 32 |
| **40332** | 331 | | | | RO | |
| **40381** | 380 | ERRORS | - | Measurement errors<br>Bit = 0 OK<br>Bit = 1 FAIL<br>Bit[15] CJ Err IN7&IN8<br>Bit[14]=CJ Err IN5&IN6<br>Bit[13]=CJ Err IN3&IN4<br>Bit[12]=CJ Err IN2&IN1<br>Bit[0]=GENERIC FAULT | RO | UNSIGNED 16 |
| **40382** | 381 | ERRORS2 | - | Measurement errors 2<br><br>Bit = 0 OK<br>Bit = 1 FAIL<br><br>Bit[15]=OVERFLOW IN8<br>Bit[14]=OVERFLOW IN7<br>Bit[13]=OVERFLOW IN6<br>Bit[12]=OVERFLOW IN5<br>Bit[11]=OVERFLOW IN4<br>Bit[10]=OVERFLOW IN3<br>Bit[9]=OVERFLOW IN2<br>Bit[8]=OVERFLOW IN1<br>Bit[7]=BURNOUT IN8<br>Bit[6]=BURNOUT IN7<br>Bit[5]=BURNOUT IN6<br>Bit[4]=BURNOUT IN5<br>Bit[3]=BURNOUT IN4 | RO | UNSIGNED 16 BIT |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| | | | | Bit[2]=BURNOUT IN3<br>Bit[1]=BURNOUT IN2<br>Bit[0]=BURNOUT IN1 | | |
| **40383** | 382 | DIP SWITCH ERRORS | - | Configuration Dip switch Errors<br><br>Bit = 0 OK<br>Bit = 1 FAIL<br><br>Bit[7]=DIP SWITCH ERR IN8<br>Bit[6]= DIP SWITCH ERR IN7<br>Bit[5]= DIP SWITCH ERR IN6<br>Bit[4]= DIP SWITCH ERR IN5<br>Bit[3]= DIP SWITCH ERR IN4<br>Bit[2]= DIP SWITCH ERR IN3<br>Bit[1]= DIP SWITCH ERR IN2<br>Bit[0]= DIP SWITCH ERR IN1 | RO | UNSIGNED 16 BIT |
| **40416** | 415 | SECONDARY CHANNEL VALUE | 1 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40417** | 416 | | | | RO | |
| **40418** | 417 | SECONDARY CHANNEL VALUE | 2 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40419** | 418 | | | | RO | |
| **40420** | 419 | SECONDARY CHANNEL VALUE | 3 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40421** | 420 | | | | RO | |
| **40422** | 421 | SECONDARY CHANNEL VALUE | 4 | Secondary Channel measurement (unit of | RO | FLOAT 32 |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/R | TYPE |
|---|---|---|---|---|---|---|
| **40423** | 422 | | | measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | |
| **40424** | 423 | SECONDARY CHANNEL VALUE | 5 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40425** | 424 | | | | RO | |
| **40426** | 425 | SECONDARY CHANNEL VALUE | 6 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40427** | 426 | | | | RO | |
| **40428** | 427 | SECONDARY CHANNEL VALUE | 7 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40429** | 428 | | | | RO | |
| **40430** | 429 | SECONDARY CHANNEL VALUE | 8 | Secondary Channel measurement (unit of measurement depending on the type of measurement or configuration) [V] or [mV] or [mA] or [Ohm] | RO | FLOAT 32 |
| **40431** | 430 | | | | RO | |

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## 20.2. 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 |

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## 20.3. 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 |

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# 21. MODBUS REGISTER TABLE FOR THE R-SG3 DEVICE

## 21.1. 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 IDENTIFICATIO N | RO | UNSIGNED 16 |
| **40002** | 1 | FIRMWARE REVISION | - | FIRMWARE REVISION | RO | UNSIGNED 16 |
| **40003** | 2 | MEASURE UNIT | - | Select the unit of measurement between:<br>0 = Kg<br>1=g<br>2=t<br>3=lb<br>4=l<br>5=N<br>6=bar<br>7=atm<br>8=other | RW | UNSIGNED 16 |
| **40004** | 3 | UNIPOLAR | - | 0 = compression and traction (Bipolar)<br>1 = Balance (Unipolar) | RW | UNSIGNED 16 |
| **40005** | 4 | ANALOG OUTPUT TYPE (Only Model ZE-SG3, Z-SG3) | - | 0 = Voltage, 1 = Current | RW | UNSIGNED 16 |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40006** | 5 | DIGITAL IN TYPE/ DIGITAL IN-OUT | - | (MSB) DIGITAL IN TYPE: Select the input digital 1/2 type<br>BIT[8]<br>0 = digital input 1 acquires the tare<br>1 = Status of the digital input 1 is shown on Modbus<br>BIT[9]<br>0 = digital input 2 acquires the tare<br>1 = Status of the digital input 2 is shown on Modbus<br>BIT[15..10] NOT USED<br><br>(LSB) DIGITAL IN-OUT<br>BIT[0]<br>0 = DIDO1 configured as Input<br>1 = DIDO1 configured as output<br>BIT[1]<br>0 = DIDO2 configured as Input<br>1 = DIDO2 configured as output | RW | UNSIGNED 16 |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **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 | |
| **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 | RW | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | in technical units [kg/g/t…] LSW | | |
| **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 output 1 [kg/g/t…] MSW | RW | FLOATING POINT 32 BIT |
| **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 analog output [kg/g/t…] MSW | RW | FLOATING POINT 32 BIT |
| **40023** | 22 | | | Initial scale value of the net weight for the analog | RW | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | output [kg/g/t...] LSW | | |
| **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 analog output [kg/g/t...] MSW | RW | FLOATING POINT 32 BIT |
| **40025** | 24 | | | Full scale value of the net weight for the analog 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 analog output in [V/mA] MSW | RW | FLOATING POINT 32 BIT |
| **40027** | 26 | | | Full scale value of the analog 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 analog output in [V/mA] MSW | RW | FLOATING POINT 32 BIT |
| **40029** | 28 | | | Initial scale value of the analog 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 | RW | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | condition [kg/g/t…] LSW | | |
| **40032** | 31 | DELTA TIME [*100 ms] | - | Value of the delta time in 100ms quantities for the stable weighing condition | RW | UNSIGNED 16 BIT |
| **40033** | 32 | DOUT MODE | 1-2 | BIT[0]<br>0 = DOUT1 NORMALLY OPEN<br>1 = DOUT1 NORMALLY CLOSE<br><br>BIT[1]<br>0 = DOUT2 NORMALLY OPEN<br>1 = DOUT2 NORMALLY CLOSE<br>BIT[2..7] NOT USED<br><br>BIT[8..11]<br>0 = DOUT1 MODE FULL SCALE<br>1 = DOUT1 MODE OVERTHRESHOLD<br>2 = DOUT1 STABLE WEIGHT<br>3 = DOUT1 FROM MODBUS<br>4 = DOUT1 OVERTHRESHOLD WITH HYSTERESIS | RW | UNSIGNED 16 BIT |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | BIT[12..15]<br>0 = DOUT2 MODE FULL SCALE<br>1 = DOUT2 MODE OVERTHRESHOLD<br>2 = DOUT2 STABLE WEIGHT<br>3 = DOUT2 FROM MODBUS<br>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).<br>0 = 960 Hz<br>1 = 300 Hz<br>2 = 150 Hz<br>3 = 100 Hz<br>4 = 60 Hz<br>5 = 12 Hz<br>6 = 4.7 Hz | RW | UNSIGNED 16 BIT |
| **40035** | 34 | AUTOMATIC TARE RESET | - | 0 = Disable the tare tracker<br>If >= 1 it is the value of ADC points within which the tare automatically will be reset . If after 5 seconds of stable weighing | RW | UNSIGNED 32 |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | condition the ADC value of the net weight deviates by 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 | RW | FLOATING POINT 32 BIT |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | (Slowest Response) to 1 (Fast Response). It is 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, | RW | UNSIGNED 16 BIT |

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

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | 2 = Max resolution (Full 24 bits resolution) | | |
| **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 | RW | FLOATING POINT 32 BIT |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | technical units for digital output 2 [kg/g/t...] MSW | | |
| **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 |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40069** | 68 | | - | Tare weight in technical units LSW | RO | |
| **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 | |

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

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| | | | | tracker (if enabled)<br>BIT 9 (RO)<br>Bit 9 = 1<br>Threshold with hysteresis for DIDO 2<br>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<br><br>43948 (decimal) Reboot the device<br><br>49594 (decimal) Acquires the | RW | UNSIGNED 16 BIT |

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

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| 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…] | - | Minimum weight value net in technical units from last reboot [MSW] | RO | FLOATING POINT 32 BIT |
| **40085** | 84 | | - | Minimum weight value net in technical units from last reboot [LSW] | RO | |
| **40086** | 85 | RESERVED | - | Reserved | RO | UNSIGNED 32 BIT |
| **40087** | 86 | | - | Reserved | RO | |

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| ADDRESS (4x) | OFFSET ADDRESS (4x) | REGISTER | CHANNEL | DESCRIPTION | W/ R | TYPE |
|---|---|---|---|---|---|---|
| **40088** | 87 | RESERVED | - | Reserved | RO | UNSIGNED 32 BIT |
| **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 | |

# 22. 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.

## 22.1. 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

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### 22.2. 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

### 22.3. 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

## 23. CABLE HARNESS FOR MODELS WITH DOUBLE ETHERNET PORT

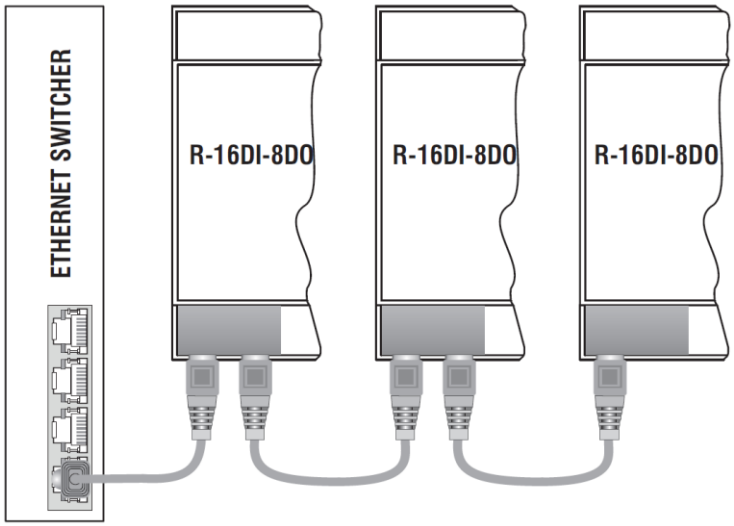
Models with double Ethernet port can be connected in daisy chain and take advantage of the Lan Fault Bypass.

### 23.1. 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:

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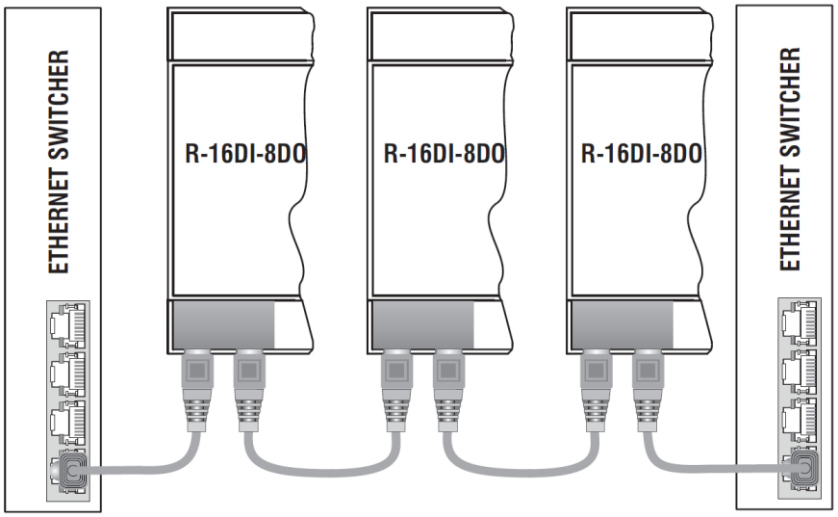

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**ATTENTION!**

**IT IS NOT POSSIBLE TO CREATE LOOPS WITH ETHERNET CABLES**

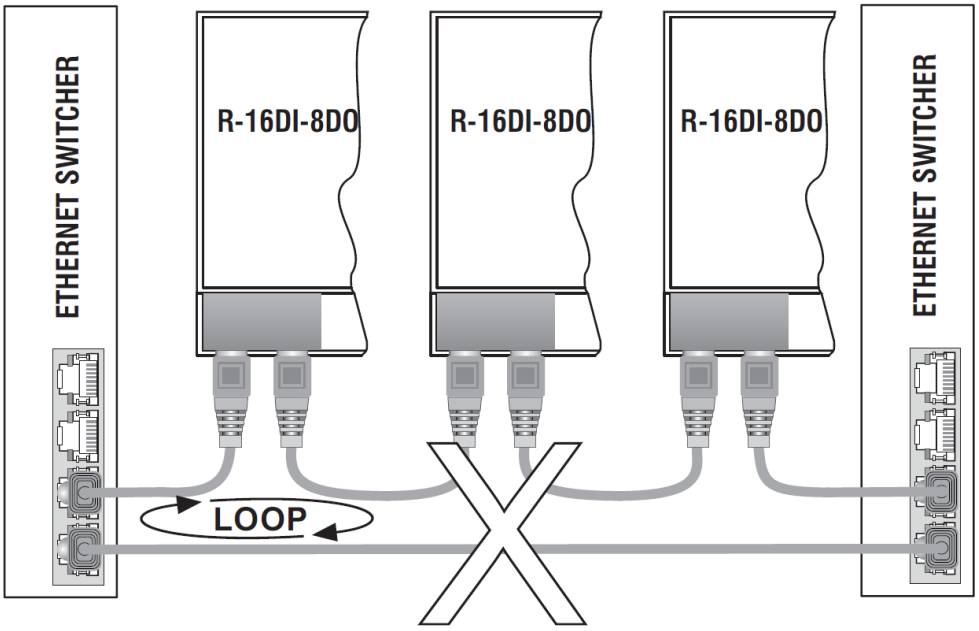
If it is necessary to connect the devices to the switches, correct wiring is as follows:




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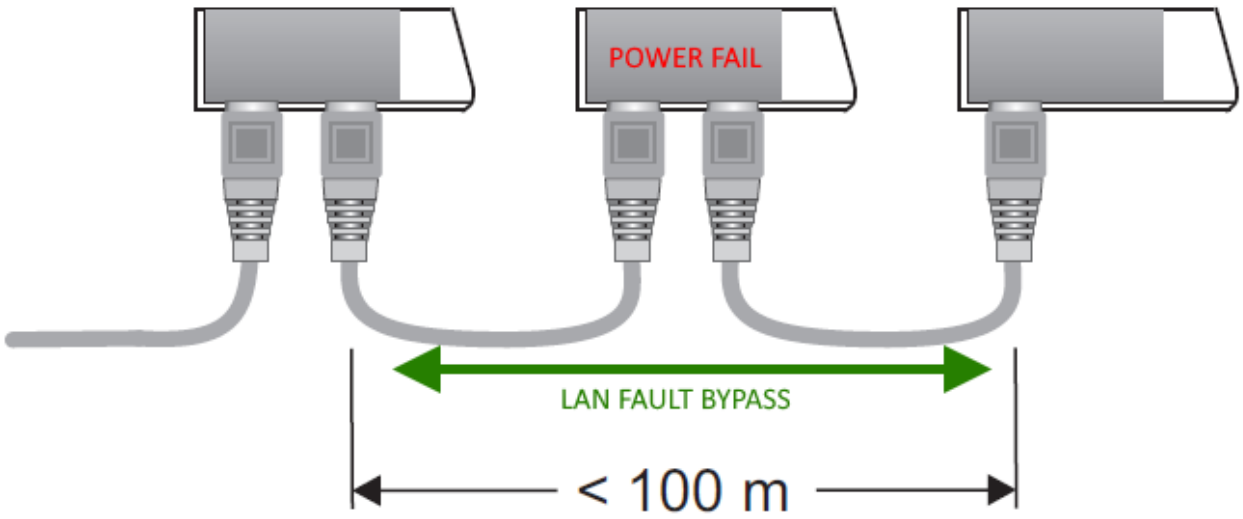

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In the Ethernet wiring there must be no loop, otherwise the communication will not work, some examples of incorrect wiring are the following:




## 23.2. 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.




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

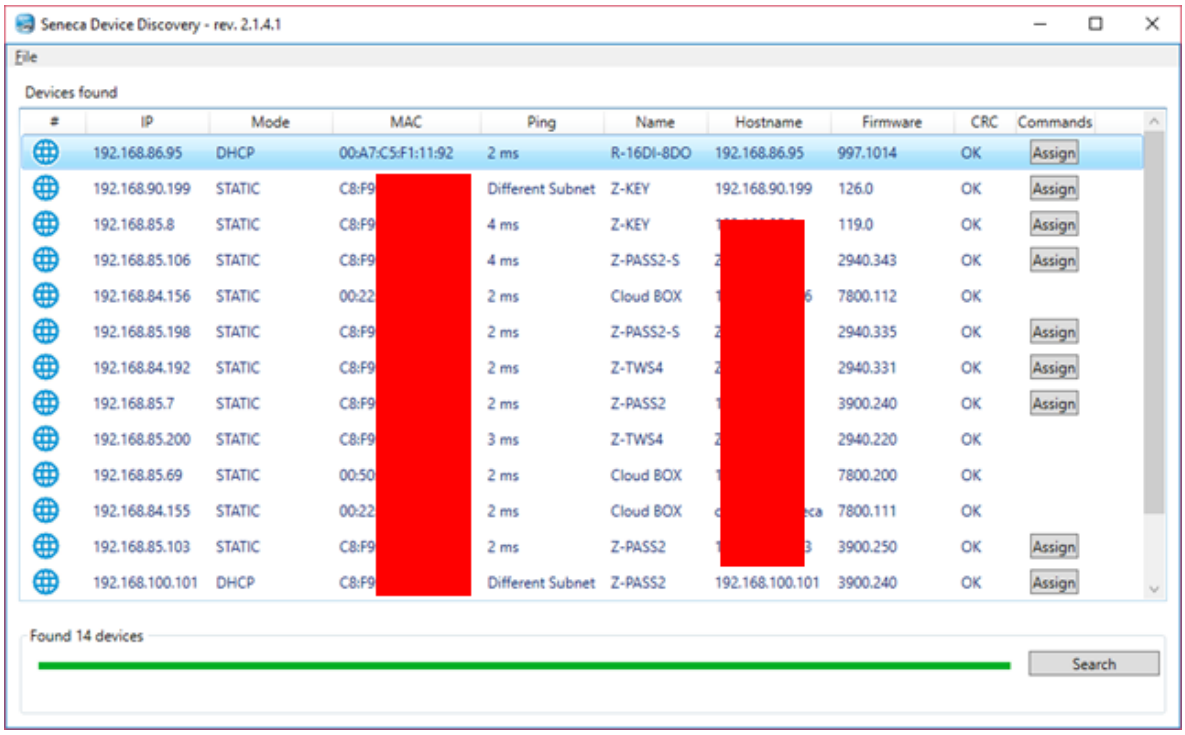
The search and modification of an IP of the device can be performed via the Seneca Discovery Device software.
If Seneca devices that are not part of the R series are also used, it is more convenient to set the addresses with a single software.

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

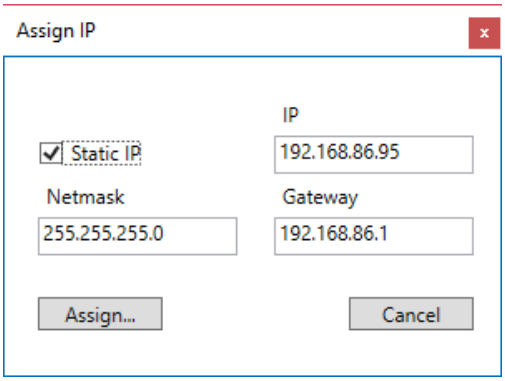
Pressing the "search" button starts the search for all Seneca devices present in the network even if with IP addresses not compatible with the current PC configuration:




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

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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.

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