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INSTRUCTIONS FOR INSTALLATION AND MAINTENANCE (GB)
INSTRUCTIONS POUR L´INSTALLATION ET LA MAINTENANCE (FR)
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ΟΔΗΓΙΕΣ ΓΙΑ ΤΗΝ ΕΓΚΑΤΑΣΤΑΣΗ ΚΑΙ ΤΗ ΣΥΝΤΗΡΗΣΗ (GR)
KURMA VE BAKIM BİLGİLERİ (TR)
INSTALLÁCIÓS ÉS KARBANTARTÁSI KÉZIKÖNYV (HU)
ИНСТРУКЦИЯ ЗА МОНТИРАНЕ И ПОДДРЪЖКАТА (BG)
تعليمات التركيب والصيانة (اللغة العَرَبِيّة)

ESY I/O

$C\,\epsilon$

DAB®
W A T E R • T E C H N O L O G Y

Manuale valido per le versioni firmware 1.x.x **(IT)**

Manual valid for firmware versions 1.x.x **(GB)**

Manuel applicable aux versions de firmware 1.xx **(FR)**

Für Firmware 1.x.x gültiges Handbuch **(DE)**

Manual válido para las versiones de firmware 1.x.x **(ES)**

Handleiding geldig voor firmwareversies 1.x.x **(NL)**

Руководство действительно для версий программы 1.x.x **(RU)**

Návod platí pro verze mající firmware 1.x.x **(CZ)**

Instrukcja ważna dla wersji firmware 1.x.x **(PL)**

Manual válido para as versões firmware 1.x.x **(PT)**

Käyttöopas laiteohjelmaversioille 1.x.x **(FI)**

Bruksanvisning för programvaruversioner 1.x.x **(SE)**

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Το εγχειρίδιο αυτό ισχύει για τις εκδόσεις firmware 1.x.x **(GR)**

1.x.x donanım yazılımı (firmware) sürümleri için geçerli kılavuz **(TR)**

1.x.x Firmware verziókra érvényes kézikönyv **(HU)**

Ръководство, валидно за версии на фърмуера 1.x.x **(BG)**

(AR) دليل صالح لإصدارات البرامج الثابتة 1.x.x

CONTENTS

KEY

The following symbols have been used in the discussion

SITUATION OF GENERAL DANGER.
Failure to respect the instructions that follow may cause harm to persons and property.

SITUATION OF ELECTRIC SHOCK HAZARD.
Failure to respect the instructions that follow may cause a situation of grave risck for personal safety.

Notes and general information.

WARNINGS

The products dealt with in this discussion fall within the category of professional equipment and belong to insulation class 1.

Read this documentation carefully before installation. Installation and operation must comply with the local safety regulations in force in the country in which the product is installed. Everything must be done in a workmanlike manner
Failure to respect the safety regulations not only causes risk to personal safety and damage to the equipment, but invalidates every right to assistance under guarantee.

Skilled personnel
Installation must be carried out by competent, skilled personnel in possession of the technical qualifications required by the specific legislation in force. The term skilled personnel means persons whose training, experience and instruction, as well as their knowledge of the respective standards and requirements for accident prevention and working conditions, have been approved by the person in charge of plant safety, authorizing them to perform all the necessary activities, during which they are able to recognize and avoid all dangers. (Definition for technical personnel IEC 364)

This appliance can be used by children aged from 8 years and above and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning use of the appliance in a safe way and understand the hazards involved.

Safety
Use is allowed only if the electric system is in possession of safety precautions in accordance with the regulations in force in the country where the product is installed (for Italy CEI 64/2).

The power supply cable must never be used to carry or shift the device.

Never pull on the cable to detach the plug from the socket.

Failure to observe the warnings may create situations of risk for persons or property and will void the product guarantee.

Particular warnings

Always switch off the mains power supply before working on the electrical or mechanical part of the system. Before opening the equipment, wait at least five minutes after disconnecting it from the power supply. Only firmly cabled mains connections are admissible.

1. GENERAL

ESY I/O is designed to provide the Esyline range of products with optoisolated inputs and outputs, access via BMS systems via MODBUS RTU Rs485, remote pressure sensor.

ESY I/O is configured and updated via the DConnect APP.

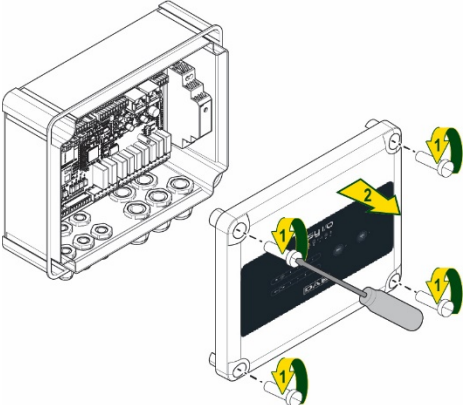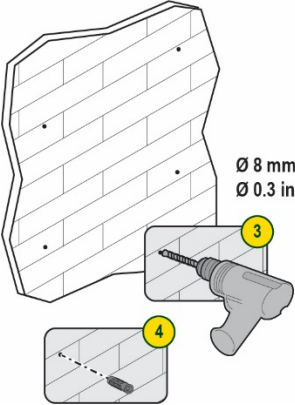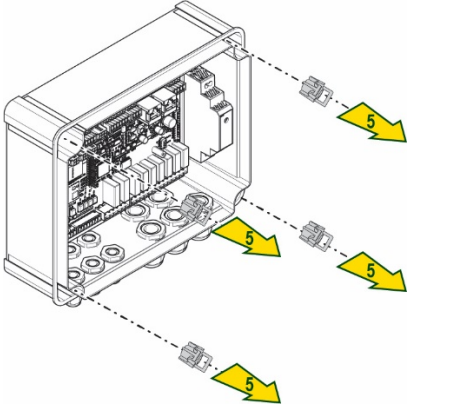**1.1 Content of the pack**
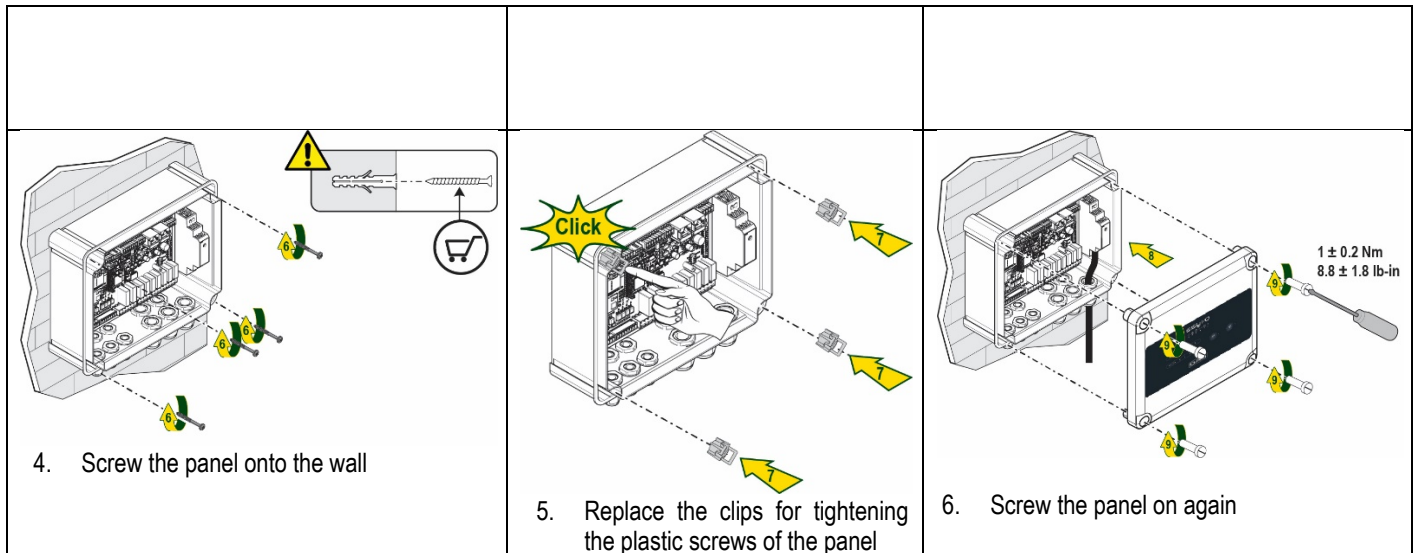
- ESY I/O
- Quick Guide.

1.2 Applications

Esy I/O allows the following applications:
- connection to BMS (Build Management Systems) equipped withRS485 MODBUS RTU interface
- Connection with clean contact inputs (e.g. floats)
- Output connection, (e.g. sirens)
- Connection of remote pressure sensor, to compensate for pressure losses

2. INSTALLATION

For the first installation, if wall mounting is necessary, proceed as described below:

1. Remove the front panel by unscrewing the 4 retaining screws with a straight tip screwdriver.

2. Drill holes in the wall and insert fixtures aligned with the panel columns

3. Remove the clips for tightening the plastic screws of the panel

 4. Screw the panel onto the wall	 5. Replace the clips for tightening the plastic screws of the panel	 6. Screw the panel on again

⚠️ Before screwing the panel back on, make sure that the cable between the two boards is correctly connected!

2.1 Electrical connections

ESY I/O requires the connection of an L-N single-phase power supply cable, the characteristics of which must be as follows:

- Single cable copper section minimum 0.8mm^2 (AWG 18)
- Maximum sheath diameter 10mm
- Minimum sheath diameter 5mm

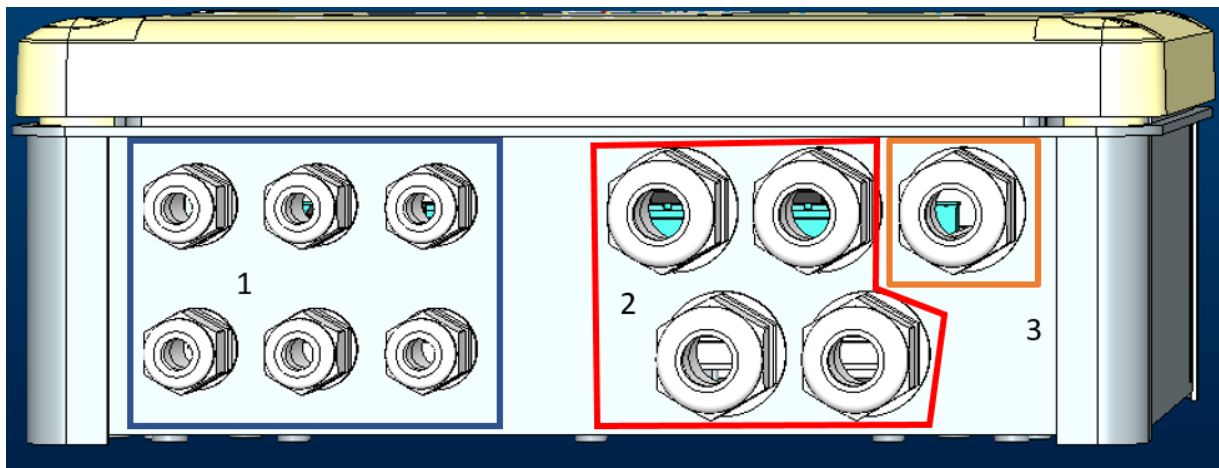1. Insert the cable in the cable gland shown in Figure 1, circled in orange (Cable gland 3)

Figure 1: Front view of cable glands

2. Connect the power cable before closing the front panel as shown below:
3. Tighten the cable gland to maintain the IP rating of the panel

Depending on the application, the user can make other electrical connections, see Figure 1.
The cable glands in section 1 are used to wire Inputs (see Paragraph 2.7), pressure sensor (see Paragraph 2.9) and Rs485 Modbus (see Paragraph 2.10).
The cable glands in section 2 are used to wire Outputs (see Paragraph 2.8).

2.2 Product characteristics

The product characteristics are listed below:

- Supply voltage: 100-240 VAC
- Frequency: 50-60Hz
- Rated current (rms) @ 230 VAC: 125 mA
- Optoisolated digital inputs: 4
- Output: 4 NO (Normally open) , max 5A @230VAC
- 1 RS485 (Modbus RTU)
- Working temperature: 0 -50 °C
- Protection rating: IP55
- Radio Modules:
    - DAB Proprietary Wireless (IEEE 802.15.4), FFC ID: OA3MRF24J40MA
    - Wifi (802.11 b/g/n 2.4 GHz)
    - Bluetooth V4.2 BR/EDR, Bluetooth LE

2.3 User interface

Figure 2: Esy I/O label

On the Esy I/O there are LEDs indicating the system operating status.

Characteristics of the LEDs		
Led	**Colour**	**Description**
⏻ Power	White	On: Esy I/O powered Off: Esy I/O not powered
⚠ Fault	Red	Lit blinking: Error present (see paragraph 2.10) Off: No error
Pressure	Green	On: Pressure sensor connected Off: Pressure sensor not connected
Modbus	Green/Red	Steady green: Gateway modbus active Regular blinking green: Modbus gateway in alignment Green with temporary blinking: message transmission in progress Steady red if error (error message, timeout error) Blinking red: Modbus Gateway alignment error Off: Gateway modbus not active
Internet	Blue	RFU
Bluetooth	Blue	On: Bluetooth connection active Off: Bluetooth connection not active
IN Input (4 leds)	Green	On: Corresponding input energised (e.g. contact closed) Off: Corresponding input not energised (e.g. contact open)
OUT Output (4 leds)	Yellow	On: Corresponding relay closed Off: Corresponding relay open
Dab Proprietary Wireless	Blue	On with a fixed light: wireless communication present On blinking: Network configuration present, but connection not active or not complete

		Off: Wireless network configuration not present
Wifi	Blue	On: Wifi connection present Blinking: AP mode Off: Wifi connection not present

Table 1: Led Description

Esy I/O has two touch buttons in the interface (Wireless and wifi). When the touch button is pressed, the corresponding LED blinks rapidly. The implementation of the commands, described below, is confirmed by a beep.

2.4 Local connection via APP

The "Smart Solution" DConnect APP is the interface for local control of the Esy I/O device. Via the DConnect APP you can update the product and configure the main parameters of the device with the convenience of an easy-to-use and always handy APP. Via the APP it is possible to interact locally with the product through the "Direct Connection" menu accessible directly from the main page of the APP.
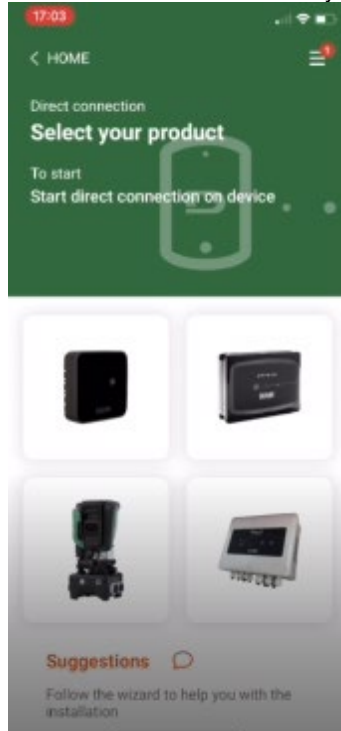

Figure 3: Dconnect APP main screen

Select the image related to the Esy I/O product, and follow the instructions during the process.

2.5 Updating the software

Updates ensure a better use of the services offered by the product. Before starting to use the product, make sure that it is updated to the latest software version available. During the software update the products involved cannot carry out their functions. For this reason a manned update is recommended.

NOTE 1: The update can take up to 5 minutes per product and when it ends the device will restart.

2.6 Dab Proprietary Wireless connection

The basic function of the Esy I/O is that it can be connected by means of a wireless interface 802.15.4, equipped with a DAB proprietary protocol, to one or more supported e.syline products.
The proprietary wireless connection is also necessary for the alignment to use Esy I/O as Modbus gateway (see Paragraph 2.10)

Proprietary wireless connection procedure
It is possible to connect the Esy I/O to a device or to several devices using the following procedure:
• Put the device to be connected into association status (see the manual of the product to be associated)

• Press the **key** on Esy I/O for a least **5 seconds**, then wait for the blue led (seeTable 1) to light up with a fixed light.

To **interrupt** the procedure it is possible to press the **left key** on the Esy I/O.

In the event of a momentary disconnection of the associated device, the blue LED will flash to indicate that the device is not connected, but is trying to restore the connection.
The wireless network configuration is maintained even in the case of a temporary power cut or if the device is switched off.

Disconnection procedure and resetting of the wireless configuration.

Hold down **the** ![key icon] **key for 5 seconds**. If the operation has been successful the blue LED will be off.

2.7 Optoisolated digital inputs

ESY I/O has the possibility to connect up to 4 optoisolated inputs.
The 4 digital inputs are optoisolated, they can be energised either with continuous negative and positive voltages or with alternating current at 50-60 Hz. Table 2 describes the characteristics and the limits of the digital inputs:

Characteristics of the inputs		
	DC inputs [V]	AC inputs 50-60 Hz [Vrms]
Minimum switch-on voltage [V]	6.2	4.5
Maximum switch-off voltage [V]	2	1.5
Maximum admissible voltage [V]	40	40
Current absorbed at 12V [mA]	1.4	1.4
Max. accepted cable section [mm²]	1.5	

Table 2: input characteristics

The optoisolated terminals are connected by applying a voltage to the terminals or by connecting the common signal to GND as a jumper and connecting the I_n signal to a contact (e.g. float, pressure switch, etc.)

Input wiring			
	Input connected to clean contact		Voltage input
Input	Clean contact between pins	Jumper	Connection
I1	I1-V+	C1/2 - CM	I1 – C1/2
I2	I2-V+	C1/2 - CM	I2 - C1/2
I3	I3-V+	C3/4 - CM	I3 – C3/4
I4	I4-V+	C3/4 - CM	I4 – C3/4

Table 3: Input wiring

Below, Figure 4: Example of clean contact connectionFigure 4, an example of clean contact wiring on I1.
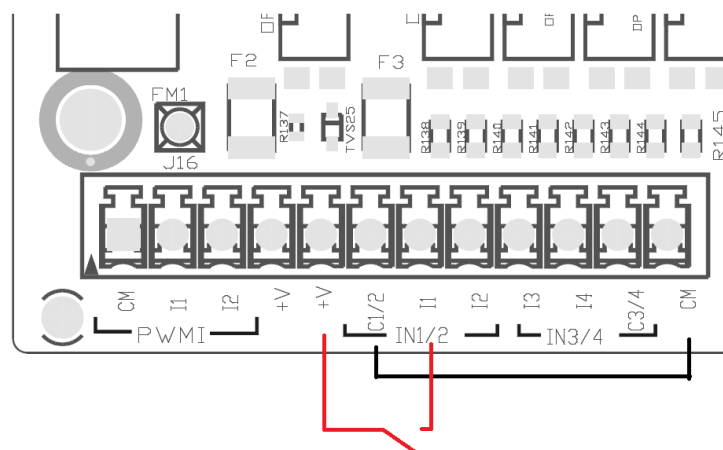

Figure 4: Example of clean contact connection

For the configuration of the inputs (e.g. Float Pressure Switch, Disable, etc.), refer to the manual of the device connected to ESY I/O.
The input status is displayed both by the Input LEDs (see Table 1), and on the APP Status page (see Figure 5).
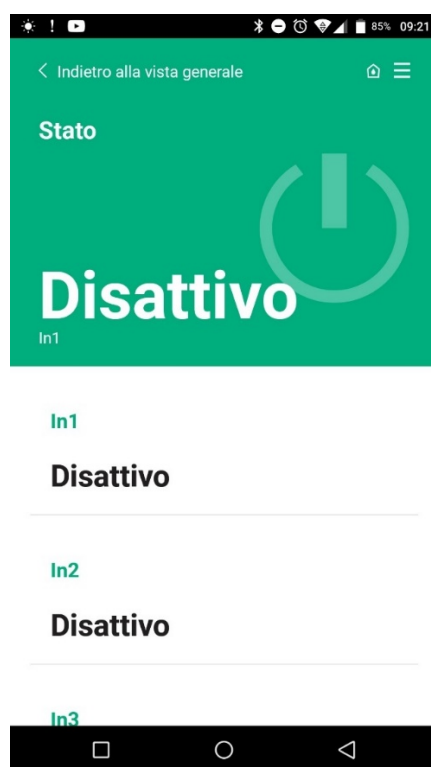
Figure 5: Input Status Page

2.8 Output contacts

The connections of the outputs listed below refer to the terminal board indicated with screen printing O1, O2 and CA.
Table 3 describes the characteristics and limits of the output contacts.

Characteristics of the output contacts	
Type of contact	NO (Normally open)
Max. bearable voltage [V]	230 VAC
Max. bearable current [A]	5 -> resistive load 2.5 -> inductive load
Max. accepted cable section [mm²]	2.5

Table 4: Characteristics of the output contacts

The correspondences between relays and outputs are described below:

Label	Corresponding Output
RL6	O1
RL7	O2
RL8	O3
RL9	O4

Table 5: Relay Output correspondence

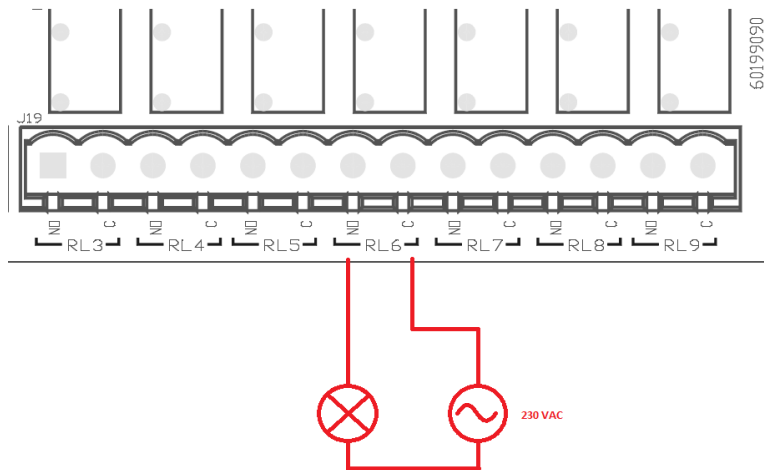An example of a connection is shown below, on output O1 with a 230V load.

Figure 6: Example of O1 connection with 230V load

Switching on and off will depend on the settings made on the device/group of devices (see associated product manual). The output status is displayed both by the Output LEDs (see Table 1), and on the APP Status page (see Figure 7).
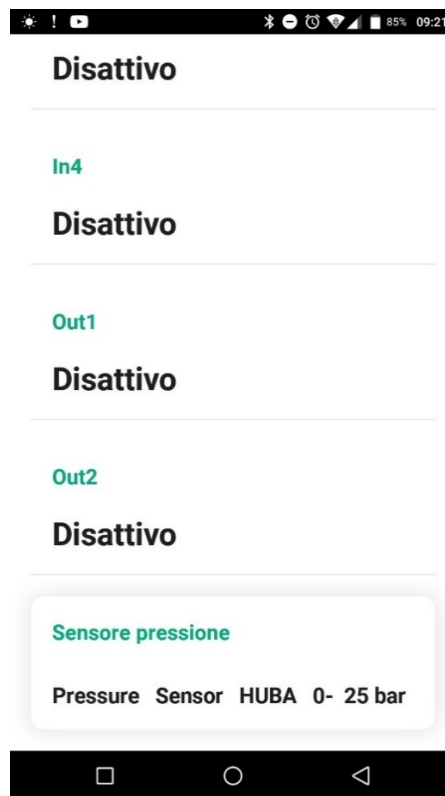

Figure 7: Output Status Display

2.9 Remote pressure sensor

The Esy I/O allows the use of 1 remote pressure sensor, directly on the 4-pole connector PR1 (see Figure 8).
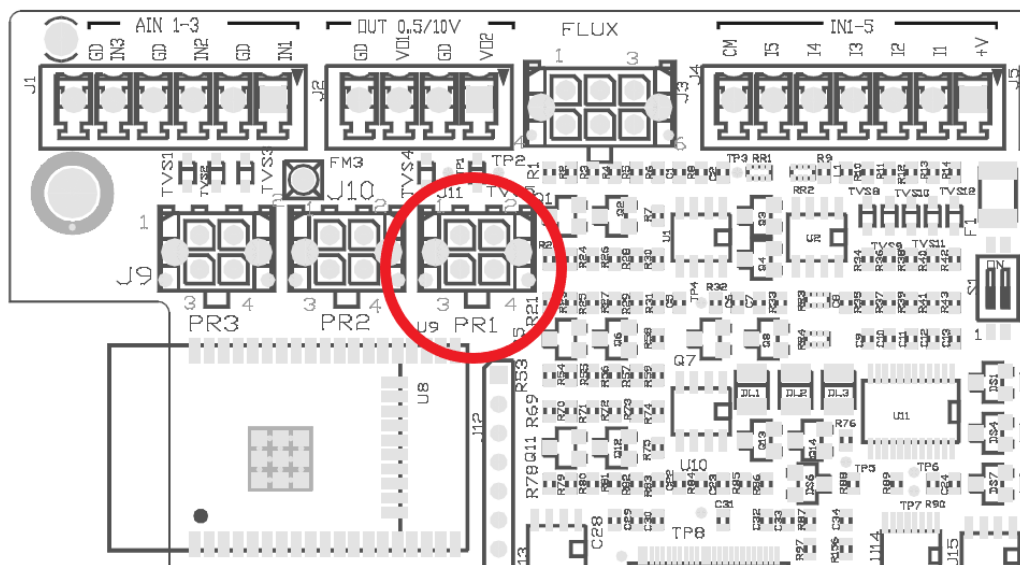
Figure 8: Connection of the pressure sensor

The mode of use will depend on the settings made on the device/group of devices (see associated product manual).
Via the Dconnect APP, it is possible to select the sensor used.

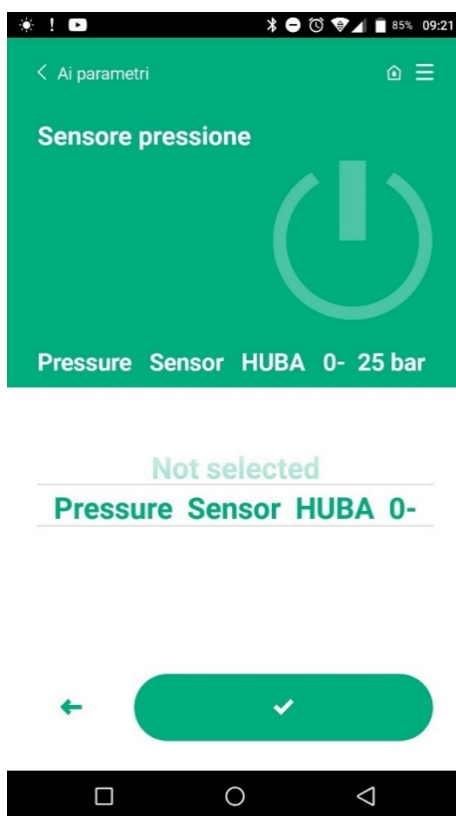*Figure 9: Pressure Sensor Setting Page*

The following sensors are currently supported:
1) HUBA pressure sensor 0-25 bar

2.10 RS485 Modbus RTU connection

Esy I/O can be used as an RS485 gateway, with MODBUS RTU protocol, in order to perform data monitoring and control on devices supported by Esy I/O.

Wiring

Modbus communication with 2-wire RS485 contemplates the use of 3 cables (A, B and GND). Connect the 3 cables correctly.

It is recommended to use a screened 2-pole cable, with a twisted pair, adapted to 120 ohm if termination resistors are to be used.
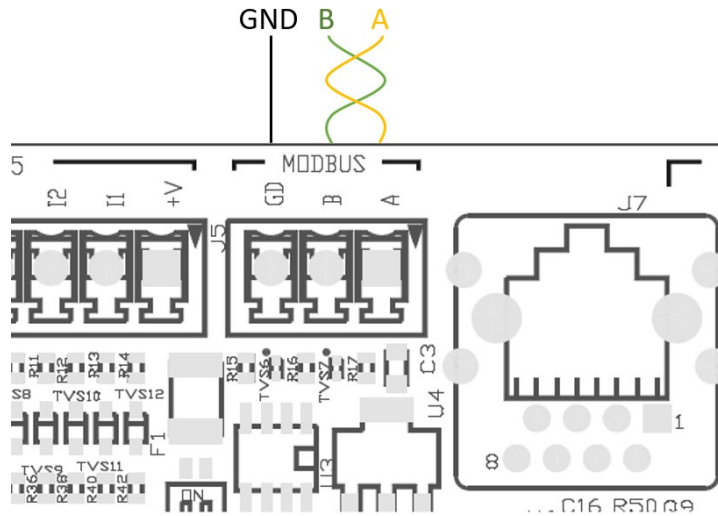

Figure 10: Rs485 Modbus Wiring

MODBUS Terminals	Description
A	Terminal -
B	Terminal +
GND	Reference

Table 6: Description of Rs485 Terminals

The typical connection with an RS485 BUS is shown below.

The recommended connection is always of the Daisy chain type (option 1). Do not use star (option 2) or ring connections. The termination resistors, if necessary, must be inserted in the first and last device on the bus (e.g. Figure 11: The termination resistors must be inserted in *Master BMS* and *Device n*) Figure 11: Examples of bus *wiring*.

The maximum recommended number of connected devices is 32, consistent with other devices in the network. The length of the cables depends on the baud rate chosen, i.e. the higher the baud rate, the shorter the cable length.
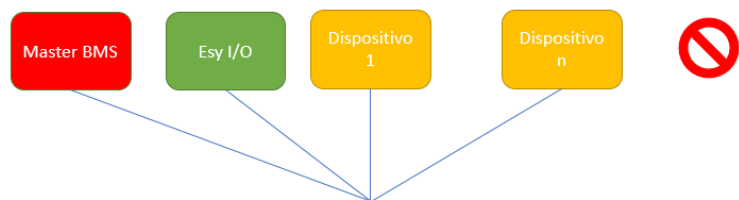

Figure 11: Examples of bus wiring

Parameter configuration

Esy I/O parameters are configured via Dconnect APP, connecting point-to-point via smartphone.
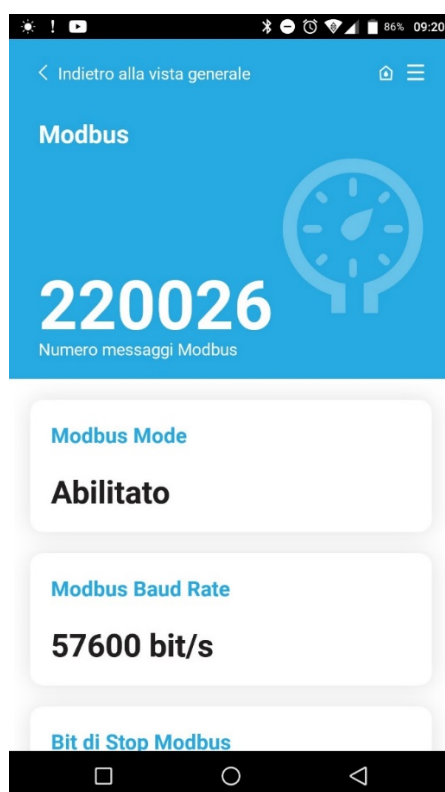
Figure 12: APP page for setting Modbus parameters

The characteristics of the Modbus connection are as follows (the options at the first start-up are shown in bold):

Parameter	Description	Settable values
Baud rate (bps)	Transmission speed	2400, 4800, 9600, **19200**, 38400, 57600, 115200
Parity	Parity check	**No**, Even, Odd
Stop bit	Number of stop bits	**1**.2
Minimum response delay (ms)	Minimum response time (e.g., if 100, Esy I/O will respond to the message after at least 100ms)	**0** – 1000
Id	Slave identification (each slave device on the Modbus network must have a different Id)	**1**-247

Table 7: Modbus characteristics

For information on Modbus registers that can be consulted and/or modified, refer to the manual of the device connected to Esy I/O.

IMPORTANT! In order to use the Modbus peripheral, enable it via APP by configuring the Modbus Mode parameter.

2.11 Fault management

 Table 8 Describes possible faults that may be encountered by Esy I/O.

Fault	FAULT LED
General	On with fixed light
Insufficient supply voltage	1 blink
Pressure sensor error (if sensor use is set)	2 blinks
Internal error	3… 7 blinks
Wireless	8 blinks
Wifi	9 blinks

Table 8: List of faults

3. PROBLEM SOLVING

⚠️ Before starting to look for faults **due to the wiring** it is necessary to disconnect the power supply to the pump (take the plug out of the socket).

Below is a list of possible problems:

Problem	Problem description	Possible solution
Power led off	No power supply	Check power supply wiring
		Check for short circuits due to incorrect wiring
Error Insufficient supply voltage	Board power supply voltage not sufficient	Check for overloads due to incorrect wiring of sensors, inputs and outputs
Pressure sensor error	Pressure sensor out of range	Check that the pressure sensor connection is correct (PR1 connector)
Green pressure sensor led not active	Although the pressure sensor is connected, the led does not work	Make sure the pressure sensor is enabled (proceed via APP)
Modbus communication not working	Modbus communication not working	**If Modbus LED is GREEN:** 1) Check that Modbus is enabled, via APP (Modbus Mode parameter = enabled) 2) Check that Modbus parameters are correct (Baud rate, parity, stop bits, ID), via APP 3) Check RS485 wiring **If Modbus LED is RED:** 1) Make sure that wireless communication between pump/group and ESY I/O is active.

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