VLW90M

Tank Inventory, Differential Level, Open Channel Flow, Pumps Control

865B131A

Technical Data

Housing material:	**ABS**
Mechanical installation:	**Wall, pipe or DIN rail mountin**
Protection degree:	**IP66**
Keyboard:	**5 push buttons**
Display:	**320x240 matrix color LCD with backlight**
Electrical connection:	**Internal connectors**
Working temperature:	**-20 ÷ +60°C**
Power supply:	**85÷230Vac; 24Vdc**
Power consumption:	**Max. 10W**
Analog output:	**n.2 configurable isolated 4÷20mA**
Relays output:	**n.5 fully configurable relay (5A 250Vac)**
Digital output:	**n.2 open collector (max. 24Vdc 50mA)**
Analog input:	**n.2 4÷20mA**
Digital input:	**n.2 (max. 24Vdc 10mA)**
Digital communication:	**MODBUS RTU**
Datalogger:	**on Pen Drive USB; max.32GB (FAT32)**
Power supply for analog transmitters:	**24Vdc; 200mA max**

Warranty

Products supplied by SGM LEKTRA are guaranteed for a period of 12 (twelve) months from delivery date according to the conditions specified in our sale conditions document.
SGM LEKTRA can choose to repair or replace the Product.
If the Product is repaired it will mantein the original term of guarantee, whereas if the Product is replaced it will have 12 (twelve) months of guarantee.
The warranty will be null if the Client modifies, repair or uses the Products for other purposes than the normal conditions
foreseen by instructions or Contract.
In no circumstances shall SGM LEKTRA be liable for direct, indirect or consequiential or other loss or damage whether caused by negligence on the part of the company or its employees or otherwise howsoever arising out of defective goods

Factory Test Certificate

In conformity to the company and check procedures I certify that the equipment:

VLW90M..... Production and check date: .....

Serial n. .....

is conform to the technical requirements on Technical Data and it is made in conformity to the SGM-LEKTRA procedure

Quality Control Manager .....

VLW90M is a multifunctional unit, suitable for via **MODBUS RTU** connection with **PTU51**, **PTU56**, **METER** and **KTU5** ultrasonic level sensors by **SGM LEKTRA**. **VLW90M** integrates the data acquisition and display management of: levels, flow rates, pumps. Integrated data logger with data storage on memory pen (USB)

- ***Open channels flow measurements***
- ***Level and differential level measurements***
- ***Volume, inventory measurements***
- ***Up to 5 pumps control in a well water rise***
- ***Up to 8 MODBUS ultrasonic sensors + 2 4-20mA analog transmitters***
- ***Large colours display***
- ***Datalogger on USB pendrive***
- ***Entering data via 5 push buttons***
- ***IP66 housing for wall, pipe or DIN rail mountin***
- ***MODBUS RTU port (RS485)***
- ***Ultrasonic sensors cable lengh up to 1km***

1. SAFETY

1.1 Installation precaution

a) Installation shall only be performed by qualified personnel and in accordance with local governing regulations.

b) Make sure that the working temperature is between -20 and +60°C

c) Install the transmitter in a its physical characteristics and housing/sensor construction materials compatible environment; for external installation, protect the unit from rain and sun with a protection cover

d) Improper transmitter use would cause serious damage to people, to the product and connected equipment.

2. INSTALLATION

2.1 Mechanical dimensions

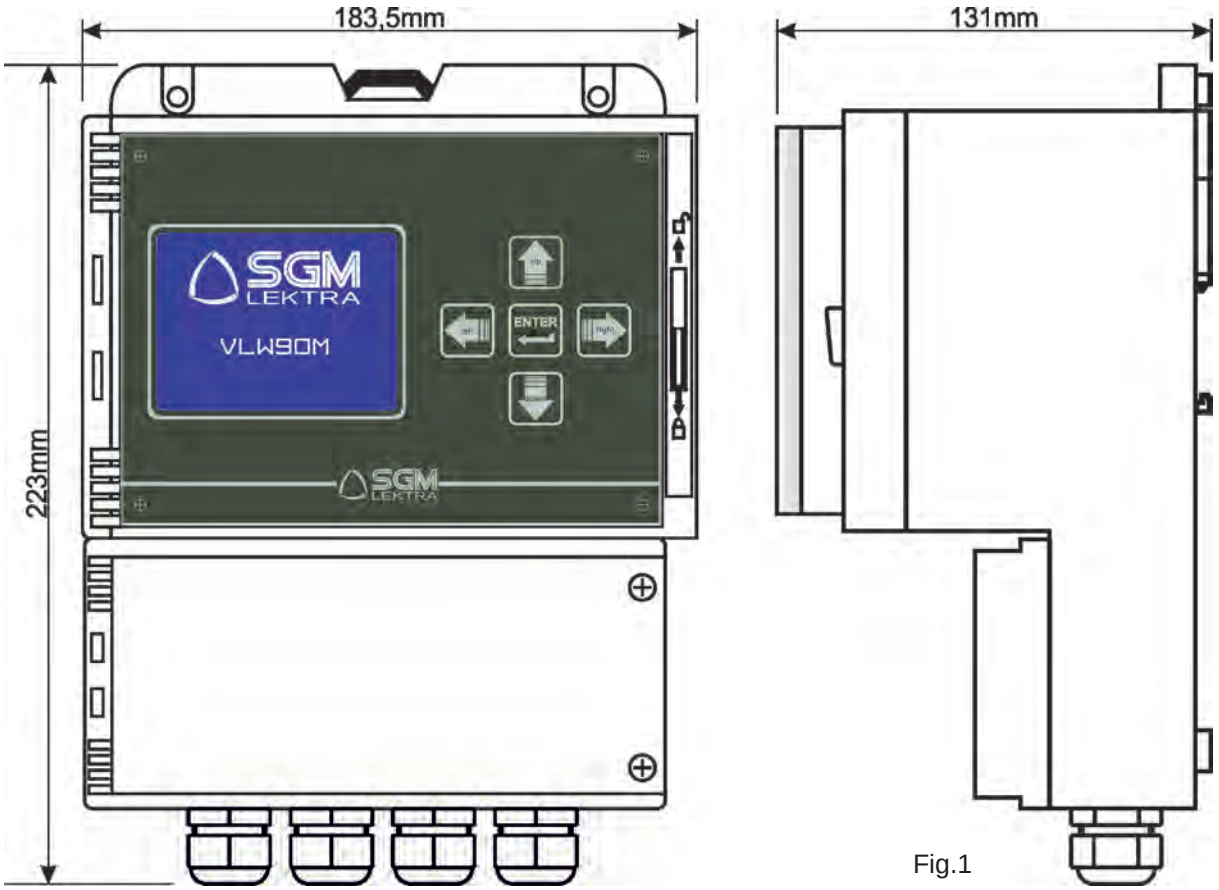


Fig.1

2.2 Drilling template for wall mounting

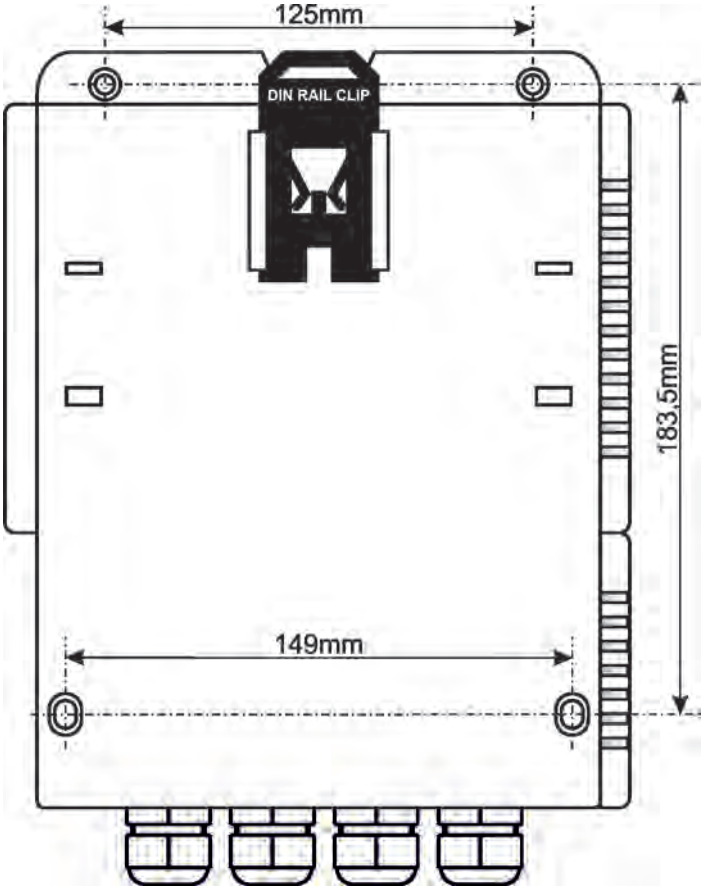


Fig.2

2.3 DIN rail mounting

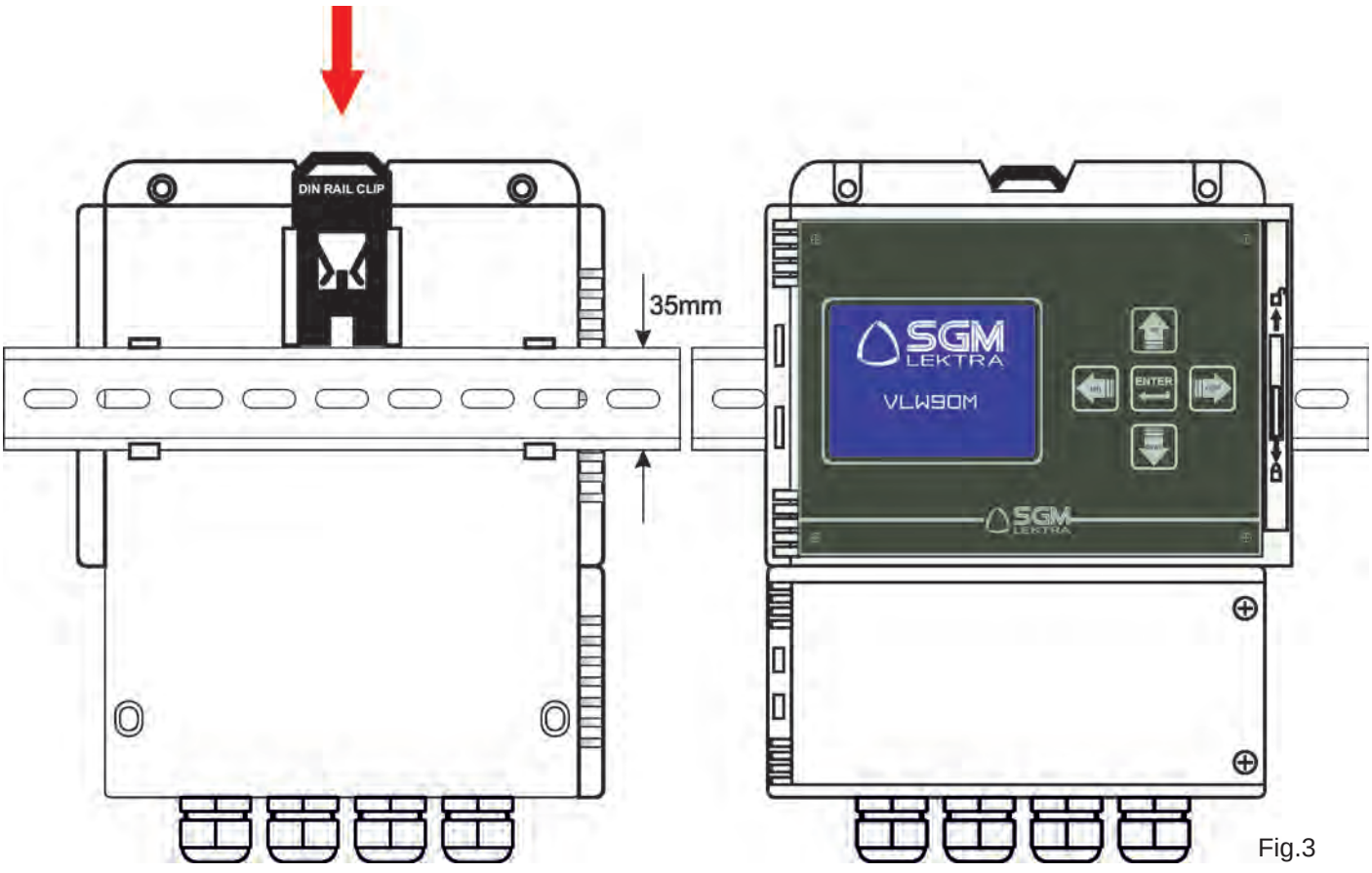


Fig.3

2.4 Mechanical installation accessories

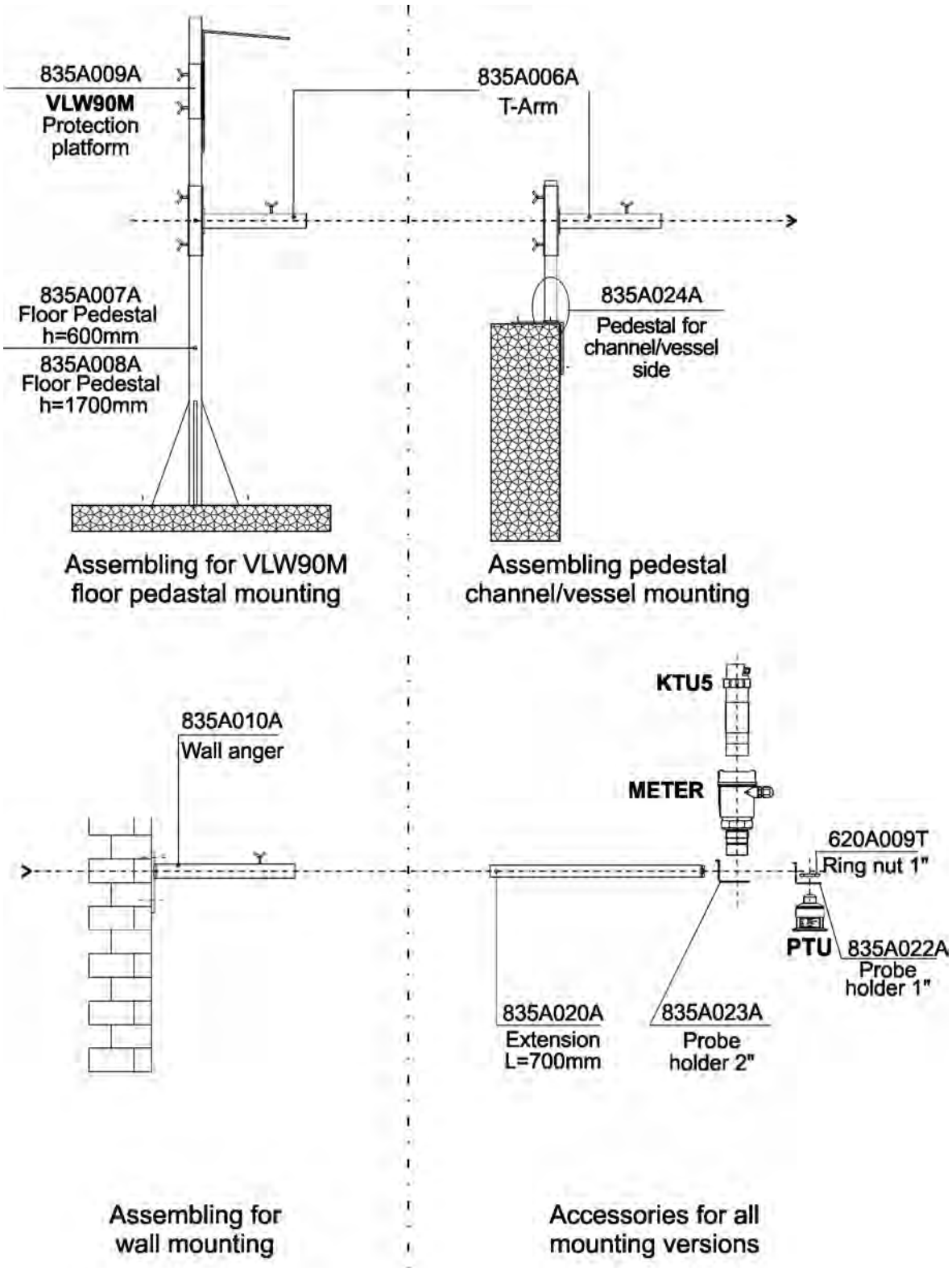


Fig.4

3. CONNECTIONS

3.1 Wiring

1) Separate the engine control cables or power cables from the **VLW90M** connection cables.
2) Remove the caps from the cable glands and open the cover by unscrewing the screws.
3) Lead the cables into the transmitter through the cable glands
4) Close the cap and tighten the cable glands

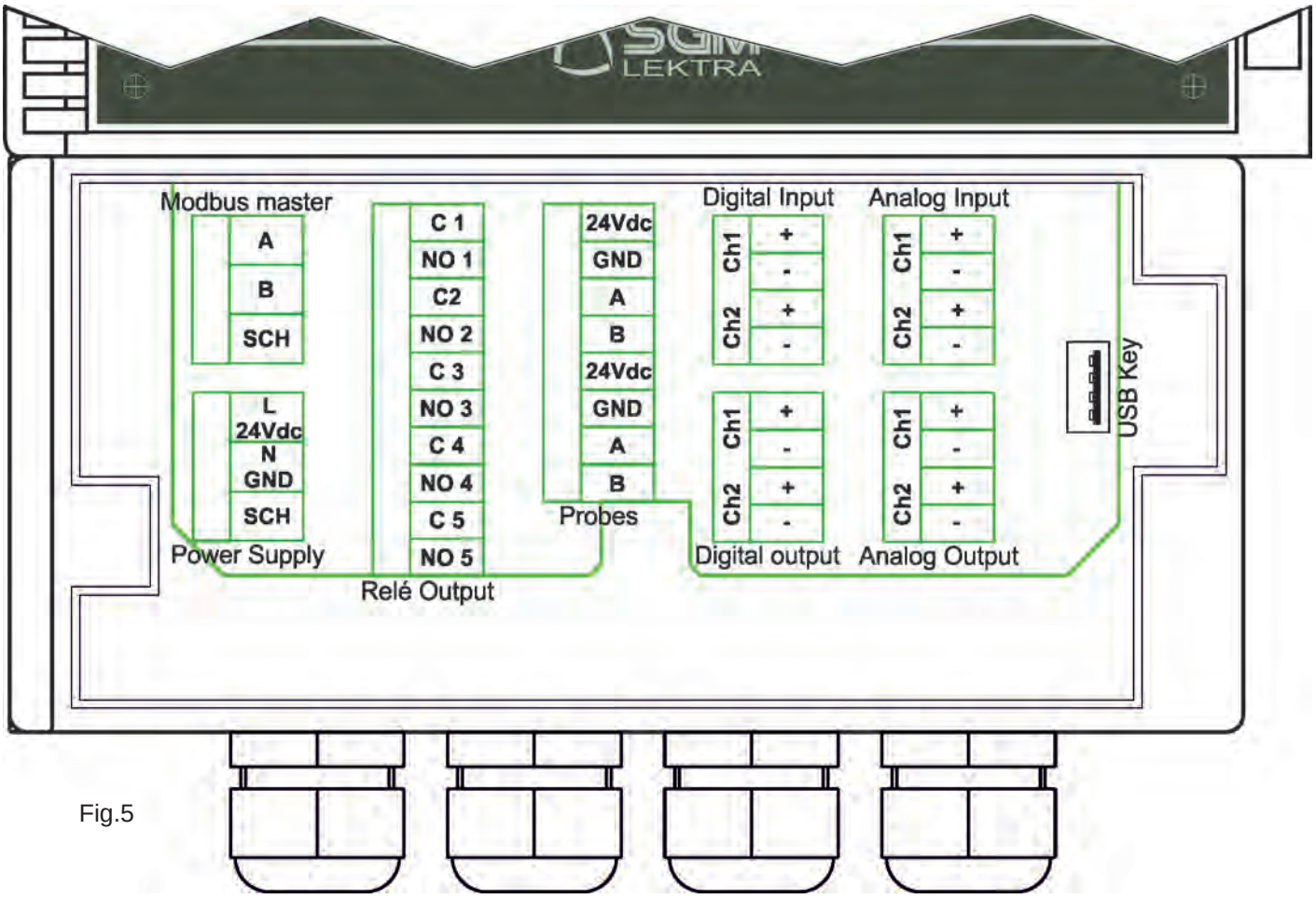


Fig.5

The immunity to electromagnetic interference is in accordance with CE directives

3.2 Recommendations for external mounting

- for electrical connections, use a cable with a 6÷12mm outer diameter and fully tighten the M20 cable gland
- fully tighten the cap
- position the cable so that it forms a downward curve at the M20 output (Fig.6); in this way the condensation and/or rain water will tend to drop from the curve bottom

Fig.6

3.3 SGM Lektra Ultrasonic MODBUS level transmitters connection

Up to 2 **SGM LEKTRA** ultrasonic level transmitters can be directly powered by the **VLW90M** (see Figure 7).
With more than two ultrasonic sensors **SGM LEKTRA**, 24Vdc additional power supply is needed (see fig.8)

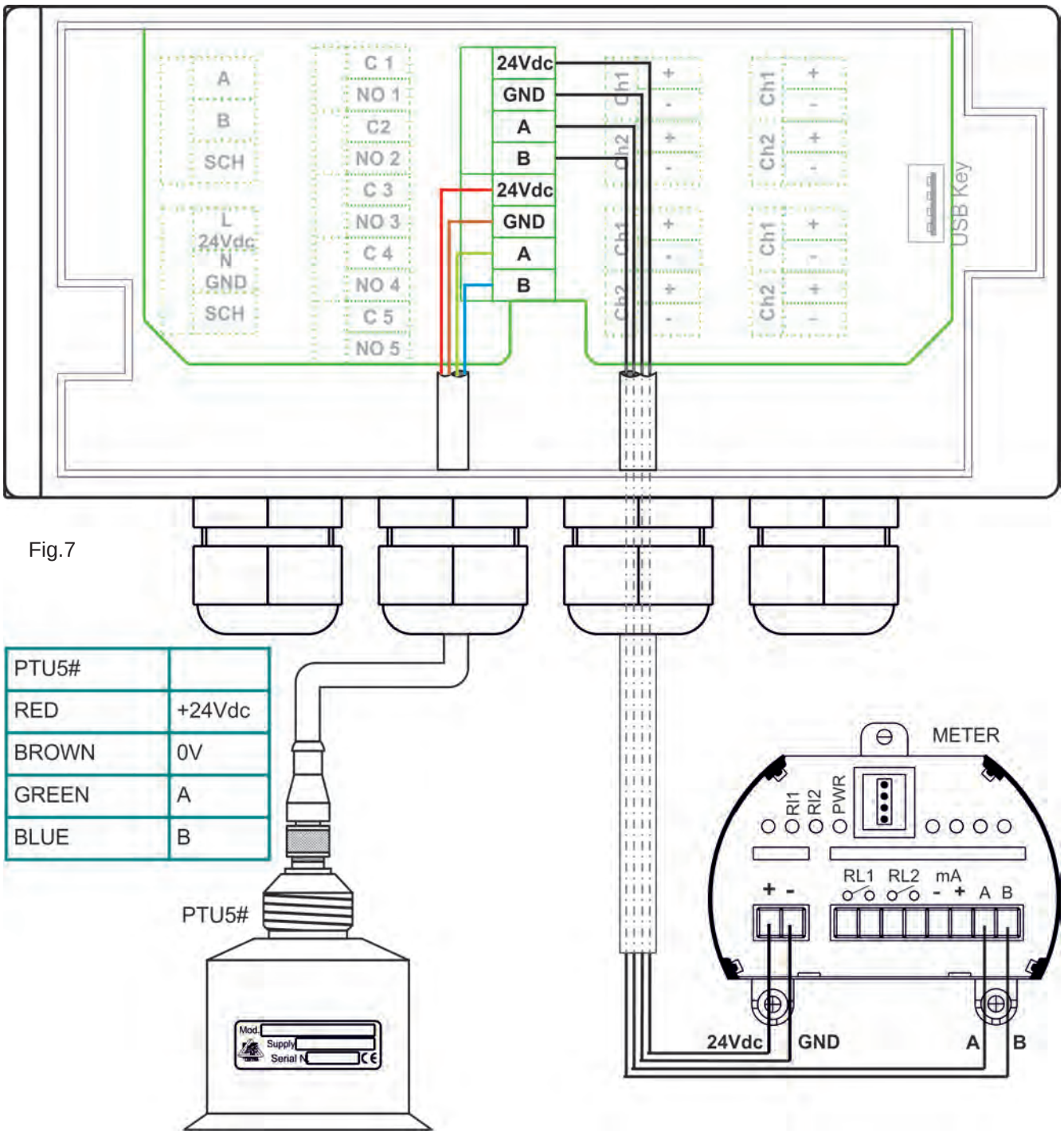


Fig.7

PTU5#	
RED	+24Vdc
BROWN	0V
GREEN	A
BLUE	B

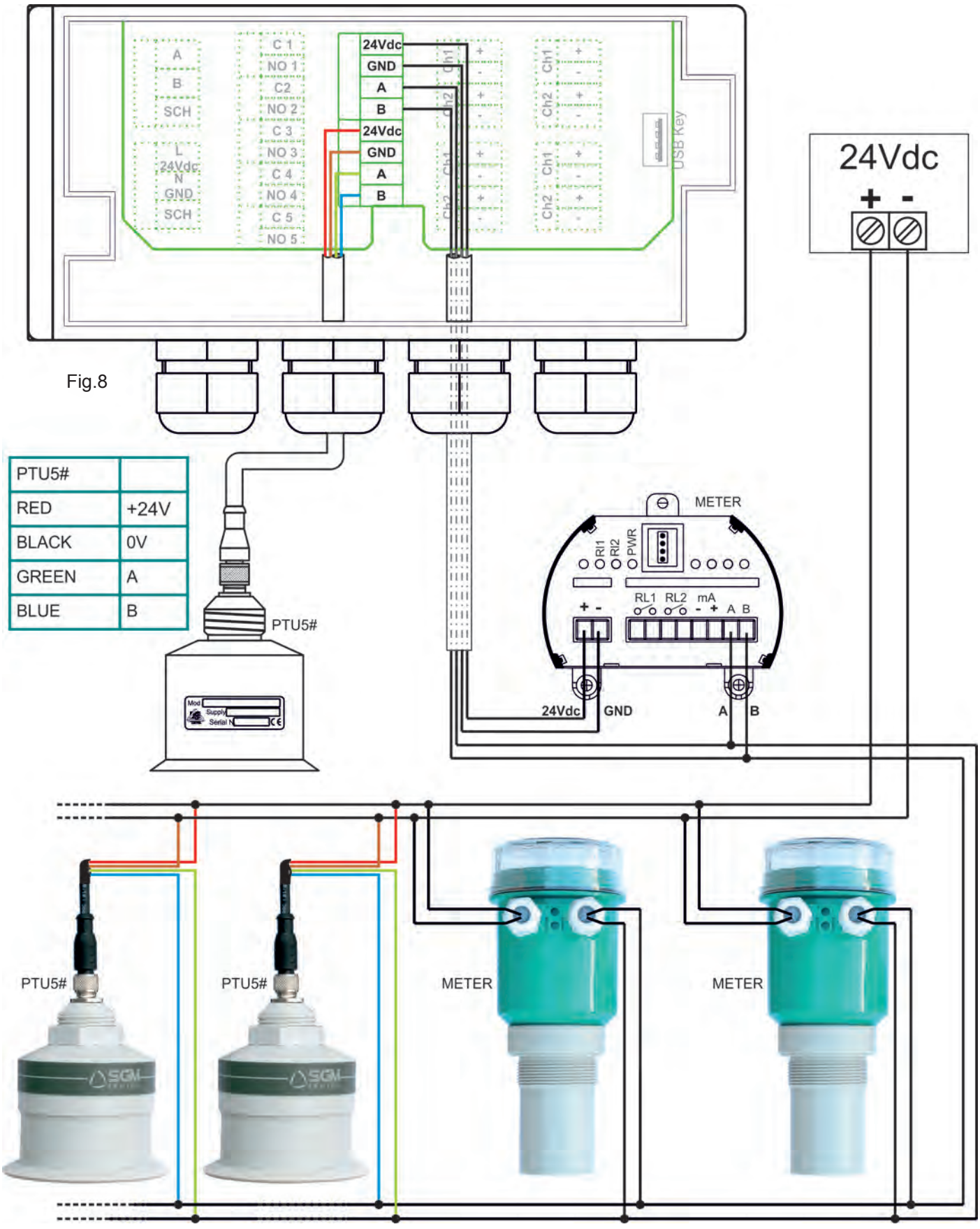

A
B
SCH
L
24Vdc
N
GND
SCH
C 1
NO 1
C2
NO 2
C 3
NO 3
C 4
NO 4
C 5
NO 5
24Vdc
GND
A
B
24Vdc
GND
A
B
Ch1
Ch2
USB Key
24Vdc
+ -
PTU5#
RED +24V
BLACK 0V
GREEN A
BLUE B
METER
RI1
RI2
PWR
RL1 RL2 mA
+ - - + A B
24Vdc
GND
A
B
PTU5#
PTU5#
METER
METER

Fig.8

3.4 **ATEX certified METER or radar RPL / RWL level transmitters connection**

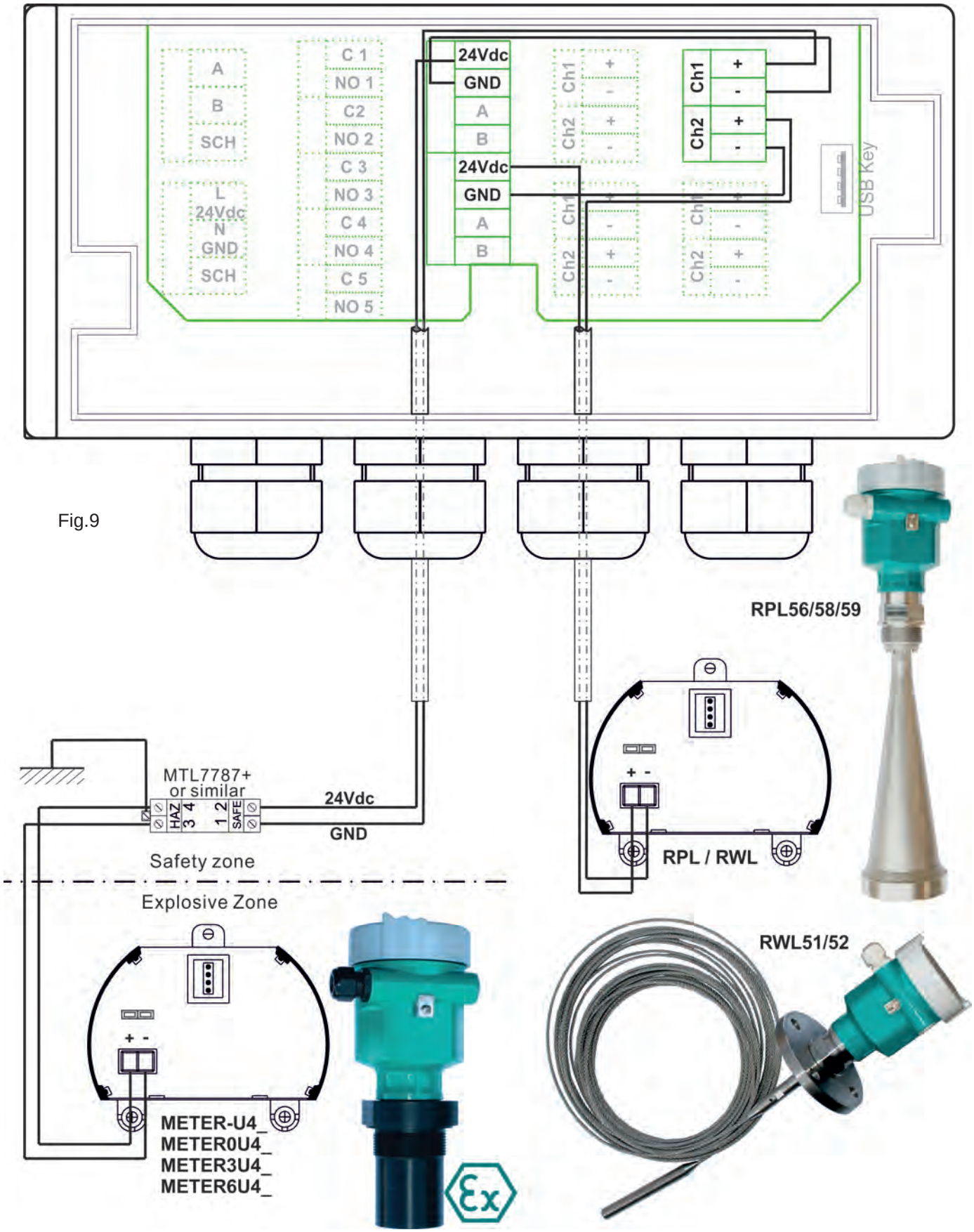


Fig.9

3.5 SGM LEKTRA hydrostatic head level transmitters connection

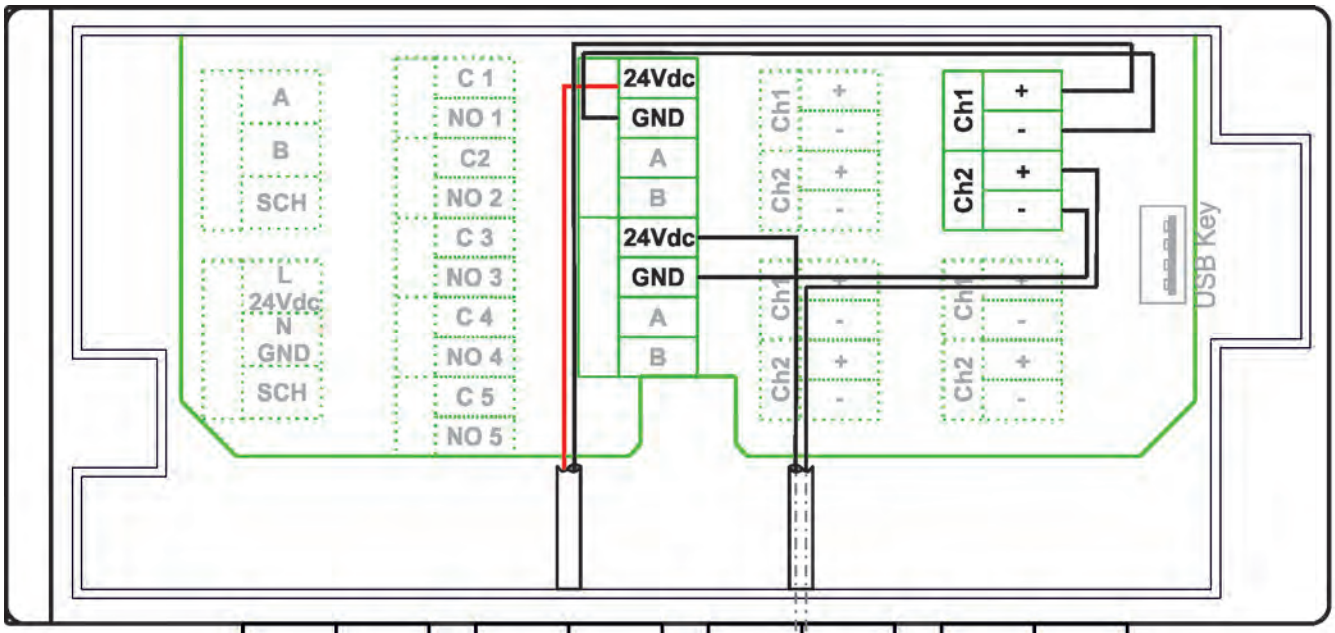
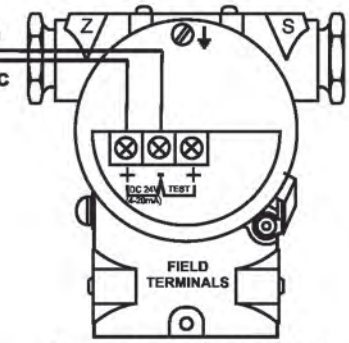


Fig.10

P-LC1__	
RED	+24Vdc
BLACK	0V



P-BADP / P-BADR / P-AK

PAK

P-BADP / P-BADR

3.5 Analog and digital outputs connection

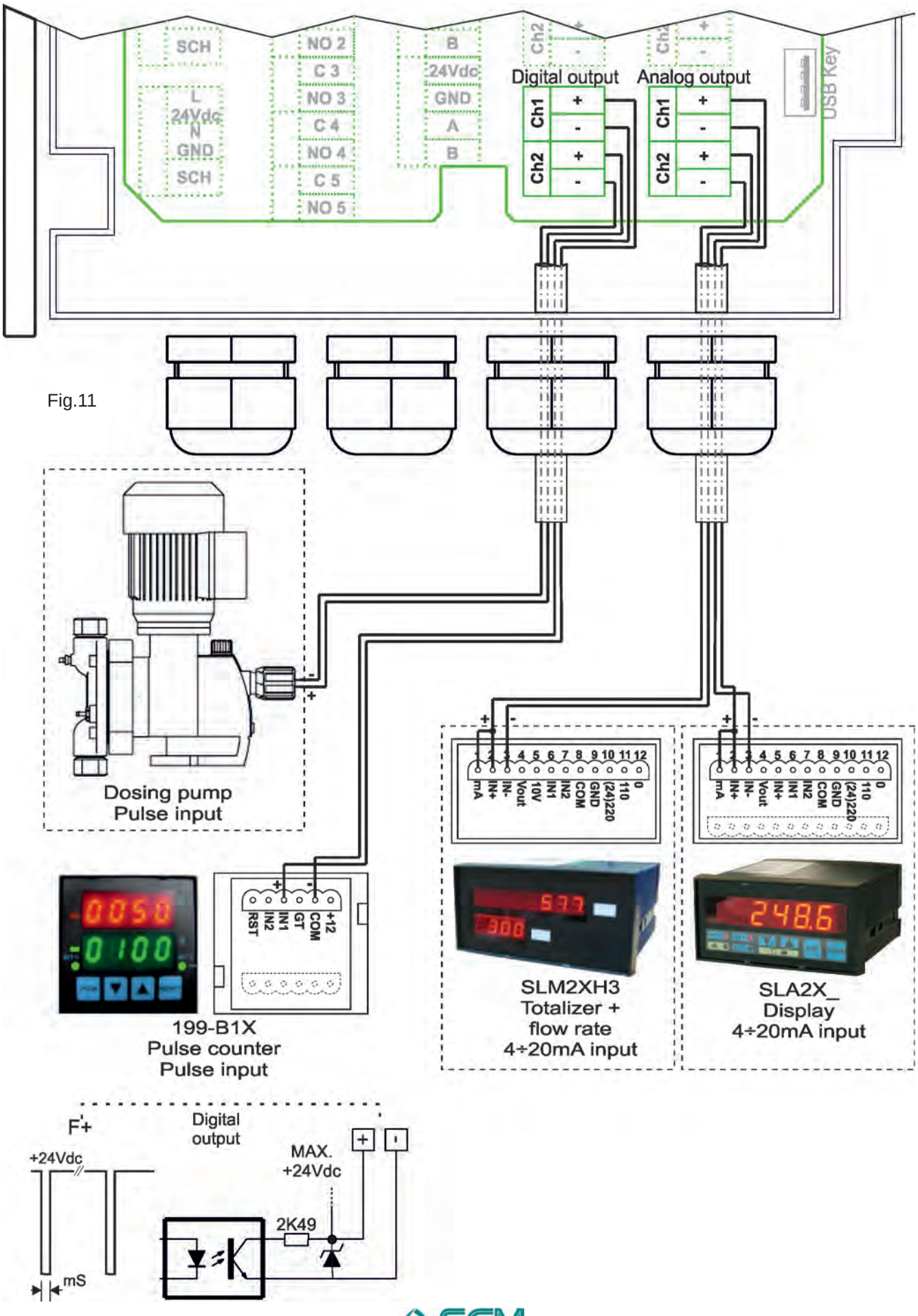


Fig.11

3.6 **USB Pen Drive connection (Data Logger)**

VLW90M, thanks to its internal data logger (see Chapter 12), can be stored on USB pen drive the flow, level, differential level, volume measurements data reading and pumps control or water lifting pumps operating states.
The pen drive requires FAT32 formatting and can be 1GB, 4GB, 8GB or 32GB size.

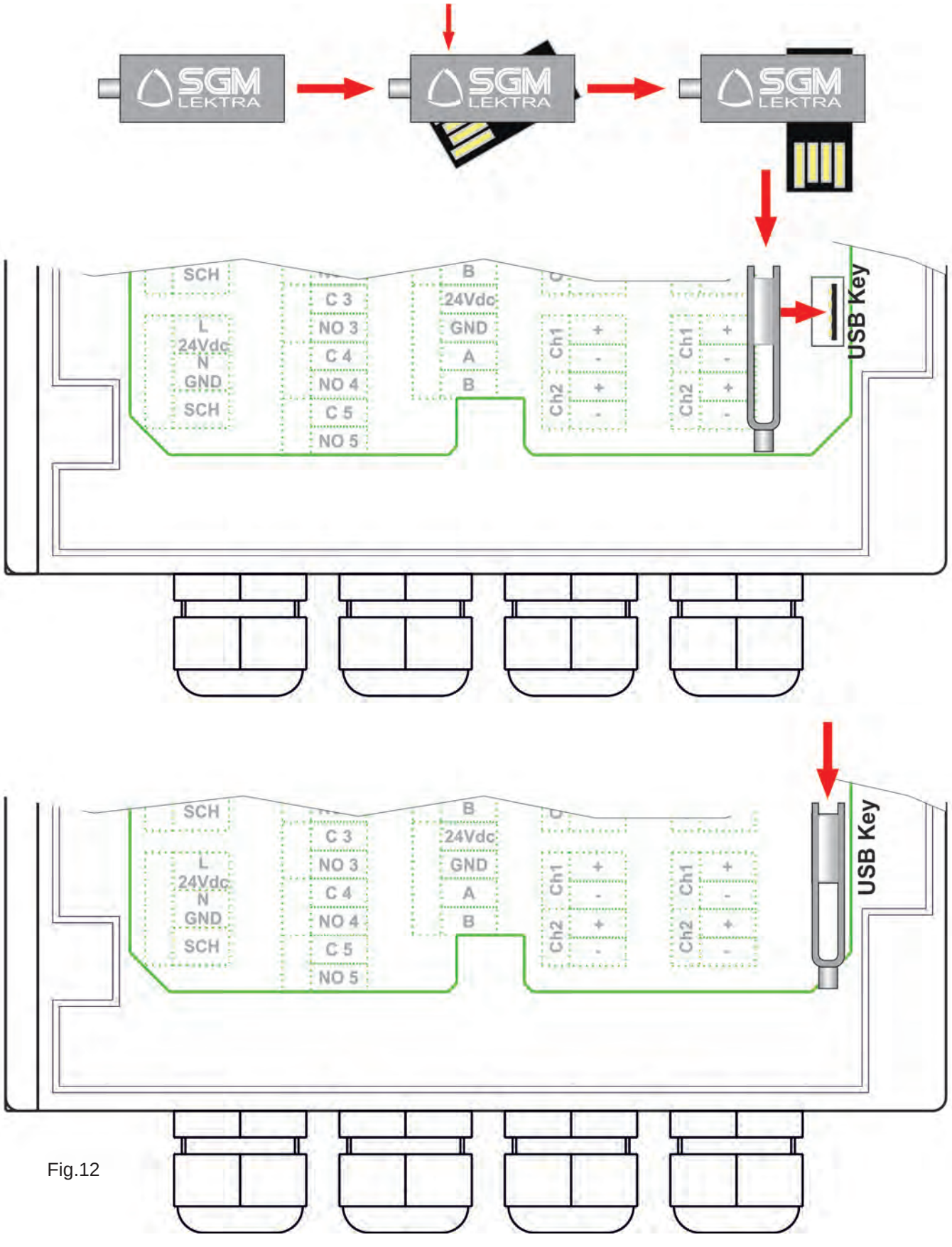


Fig.12

4. PROGRAMMING

VLW90M is a programmable unit suitable for different functions::

- open channels flow measurement (max. 2)

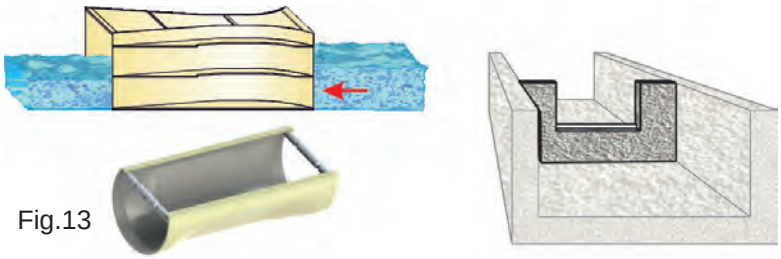


Fig.13

- level measurement (max.6)

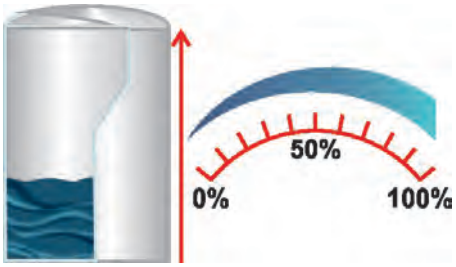


Fig.14

- differential level (max.1)

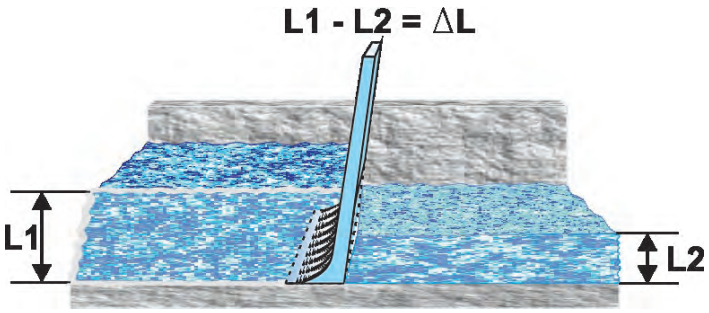


Fig.15

- volume measurement (max.2)

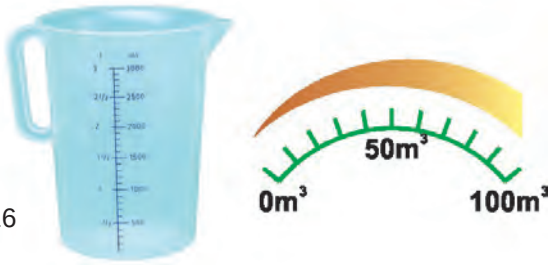


Fig.16

- Pump control (max.5)

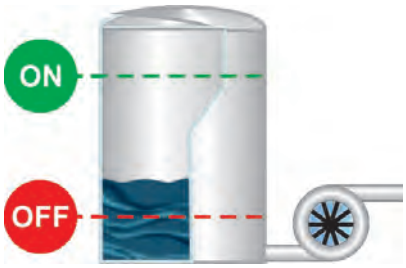


Fig.17

- Well water rise

Fig.18

4.1 **Unit**/user Interface

Opening the display cover the 5 buttons for programming are accessible.
The key functions are always described when every single menu and program parameters page are displayed
The **VLW90M** menu structure is simple and easy to intuition.
Quick start guides are available to facilitate startup, the quick start guides summary is in section 4.4.

Fig.19

4.2 VLW90M turning on and system initialization

At power on, **VLW90M** start automatically the following system procedures:

1) Firmware loading for the **VLW90M** unit operating (fig. 19.a).
   A green bar is displayed to indicate the initialization procedure progress.

Fig.19.a

2) Searching for **SGM LEKTRA** ultrasonic sensors connected via **MODBUS RTU** communication port (RS485) (fig. 19.b).
   The following information is displayed:
   a) ✱ **Probes Found: 4** ; shows the ultrasonic sensors number connected, with the properly configured **UID** address (see chapter 11,)
   b) **UID1.....UID4** ; showing the measuring sensor model with its **UID** address.

   In the example shown in fig.19.b, 4 sensors are identified with their model and UID address.

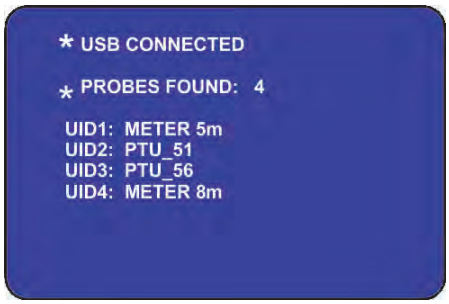


Fig.19.b

3) Searching for data logger Pen Drive connected to the **USB** port.
   The following information is displayed:

   a) ✱ **USB CONNECTED**; shows that a **FAT32** formatted Pen Drive is connected to the **USB** port (Fig. 19.c) and the datalogger function is automatically enabled (see chapter 12)

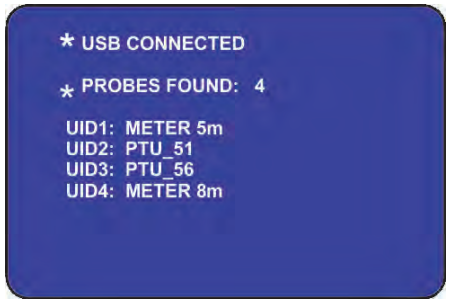


Fig.19.c

   b) ✘ **USB NOT CONNECTED**; shows that no Pen Drive is connected to the **USB** port (Fig. 19.d), or that the pen drive connected to the **USB** port is not **FAT32** formatted; In this case, connect the Pen Drive to a PC or notebook, and format it by selecting the "**FAT32**" option in "**File System**". After is possible to connect the Pen Drive following the procedure described in Chapter 12.

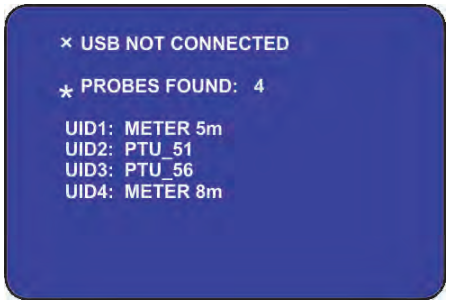


Fig.19.d

4.3 Access to the programming menus

- From "**RUN**" mode: Press  to access the main menu
- To select a programming menu use the  /  /  /  arrow keys and confirm with  .
- To return to the run mode, in the main menu select the  icon (**DISPLAY MEASURE**) with arrow keys, and confirm with  .

Fig.20

Icons:

MAIN SETUP 

SENSOR SETUP 

TASK 

OUTPUT 

TOTALIZER 

INFO 

DISPLAY MEASURE 

From the main menu you can access all the VLW90M configuration menu:

 **MAIN SETUP** - Menu for the **VLW90M** general configuration.

 **SENSOR SETUP** - Menu for **SGM LEKTRA** ultrasonic sensors via **MODBUS** configuration.

 TASK - Menu to configure the **VLW90M** measurement functions (flow, level, etc.) .

 **OUTPUT** - Menu to configure the analog/digital outputs and the 5 threshold relay.

 TOTALIZER - Menu for the flow totalizers management

 INFO - **VLW90M** info menu.

WARNING! - The documentation provided with the **VLW90M** contain the most frequently used indications. If it's necessary refer to the full manual, it can be downloaded from our website www.sgm-lektra.com , in the products section.

4.4 Set Up guides

In the following chapters there are the set up guides for frequently used measurement functions:

5. OPEN CHANNELS FLOW MEASUREMENT SET UP GUIDES

The procedures for open channels flow measurement quick start are available in this section:

- **SGM VENTURI STD prefabricated channels configuration**; paragraph **5.1** (pag.17)

Fig.21

- **Constriction rectangular weir (Francis) configuration**; paragraph **5.2** (pag.18)

Fig.22

- **SGM LEKTRA "PALMER BOWLUS" prefabricated channels configuration**; paragraph **5.3** (pag.20)

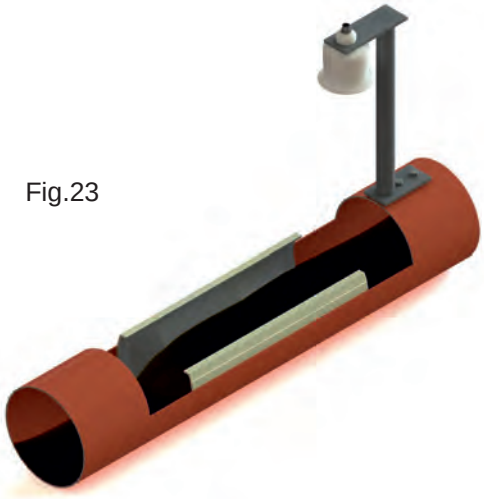
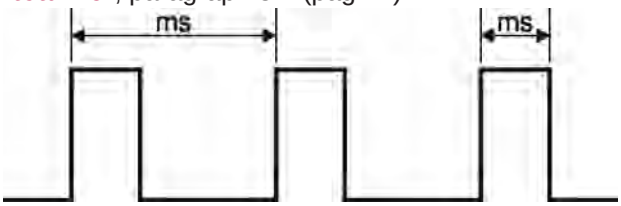
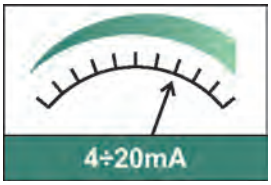


Fig.23

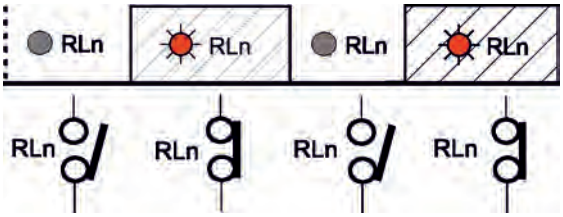
- **Volume pulse repetition configuration for remote totalizer**; paragraph **5.4** (pag.22)



- **4÷20mA output configuration for flow rate transmission**; paragraph **5.5** (pag.23)



- **Flow rate threshold relays configuration**; paragraph **5.6** (pag.24)



- **Measures display configuration**; paragraph **5.7** (pag.25)

From **RUN** mode press to access the main menu

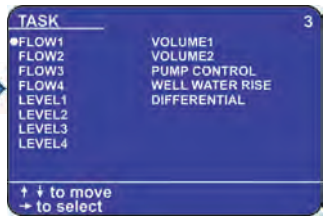
Fig.24

5.1 SGM VENTURI STD prefabricated channels configuration

The **SGM-LEKTRA** developed in collaboration with the Pavia University Hydraulics Institute a "**SGM VENTURI STD**" called venturi channels family. These primary device are Venturi channels with a flat bottom and they are suitable to be installed in pre-existing rectangular channels. The **SGM VENTURI STD** are suitable for use in irrigation systems, water treatment, industrial wastewater, for sewage sludge and for any murky waters; the flat bottom without protrusions has a self-cleaning effect that makes it difficult to debris deposit. **SGM VENTURI STD** can be easily incorporated into existing rectangular channels. The fundamental importance parameters, to obtain the correct flow measurement, are highlighted with the symbol.

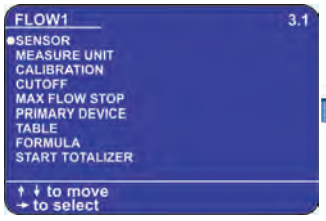
To configure the flow measurement with **SGM VENTURI STD** channels follow the procedure below:

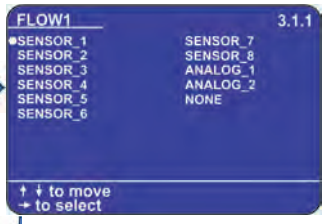
With the arrow keys select the "**TASK**" menu icon.
Confirm the selection by pressing ENTER



Press to access the submenu "**FLOW1**" or "**FLOW2**", is possible to configure up to 2 flow measurements

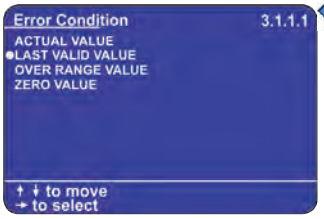
5.1.1 Press to select "**SENSOR**".



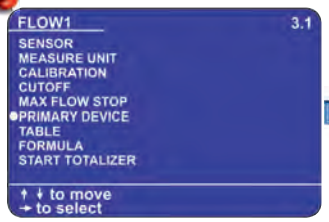


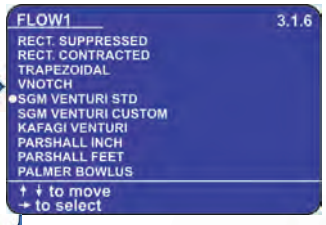
Select the **SENSOR_x** installed on channel with or .
The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press to confirm.

Press to select the measure condition in error state .
Press to confirm.



5.1.2 Press to select "**PRIMARY DEVICE**" and press to confirm.



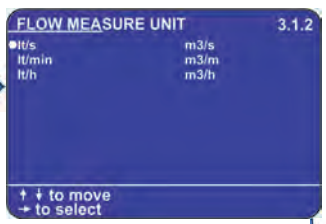


Press to select "**SGM VENTURI STD**" and press to confirm.

Use the or to select the model.
Confirm selection with .

Fig.25

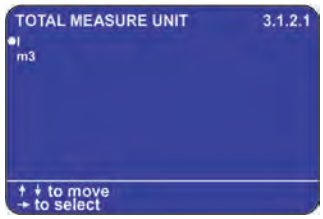
5.1.3 Press to select "**MEASURE UNIT**" and press to confirm.



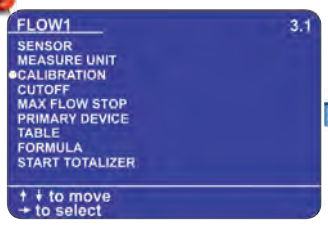
Press or to select the flow rate measure unit and press to confirm.

Continued to next page

Press ↓ or ↓ to select the totalizer measure unit and press → to confirm.



5.1.4 Press ↓ to select "**CALIBRATION**" and press → to confirm.



"**MAX Q**" is the threshold for Max flow beyond which the tot. does not increase. Set the value and confirm with ENTER. Disabled function with "**0**" threshold value

Enter the actual head or the "**Q=0**"distance in mm . Press ↓ to select the measure to be set, Move the cursor with → and press ↑ to change the digit. Confirm with ENTER.

Manually measure in mm the "**ACTUAL HEAD**" and insert the data, the unit will automatically calculate the fluid distance to the "**Q=0**" point (zero flow distance). Alternatively, can directly be entered the "**Q=0**" empty distance. In fig.26 the example to correctly detect the "**ACTUAL HEAD**" measure. It is recommended to use the "**ACTUAL HEAD**" system with the zero flow condition (no flow: see fig.27), because in doing so the "**ACTUAL HEAD**" or "**Q=0**" manually measurement distance errors are avoided. "**ACTUAL HEAD**" set to "**0**" is enough to ensure the correct calibration.

Fig.26

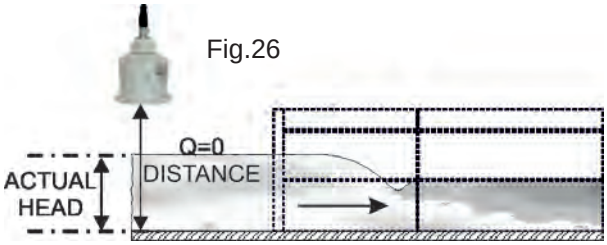
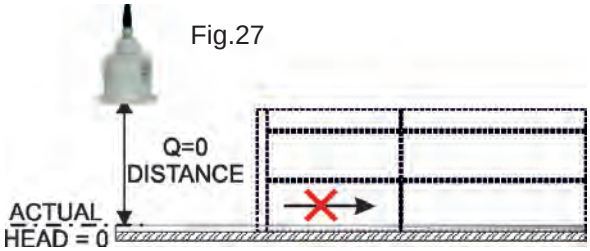
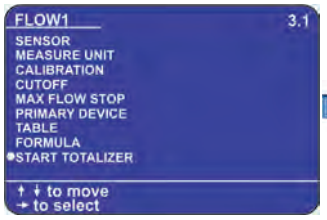
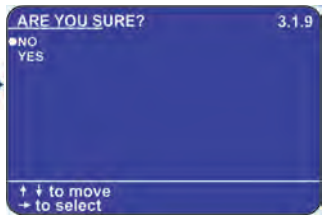


Fig.27



5.1.5 Press ↓ to select "**START TOTAL**" and confirm with →. Takes to start the totalizer volume flow.





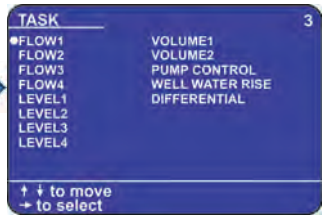
Start the flow totalizer only after have completed the flow measurement configuration, including head calibration, select "**YES**" and press → to start the flow totalizer.

Press 2 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

5.2 Constriction rectangular weir (Francis) configuration

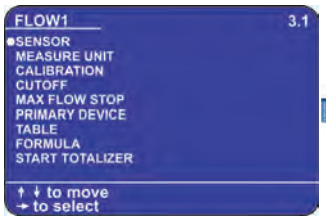
The fundamental importance parameters, to obtain the correct flow measurement, are highlighted with the symbol. To configure the flow measurement with rectangular weir (Francis) follow the procedure below:

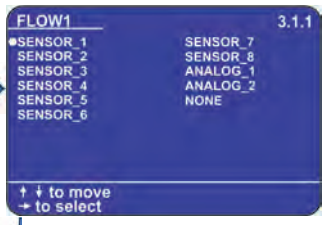
With the arrow keys select the "**TASK**" menu icon.
Confirm the selection by pressing ENTER



Press to access the submenu "**FLOW1**" or "**FLOW2**", is possible to configure up to 2 flow measurements

5.2.1 Press to select "**SENSOR**".

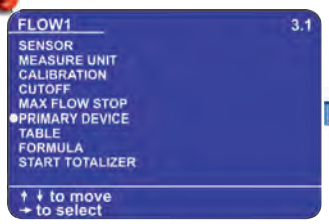


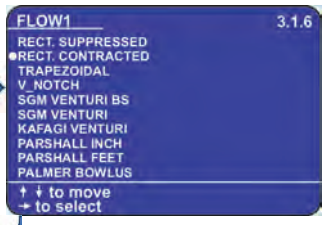


Select the **SENSOR_x** installed on channel with or .
The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press to confirm.

Press to select the measure condition in error state .
Press to confirm.

5.2.2 Press to select "**PRIMARY DEVICE**" and press to confirm.





Press to select "**RECT. CONTRACTED**" and press to confirm.

Enter the "L" dimension in mm. Move the cursor with , and press to change the digit.
Press to confirm.

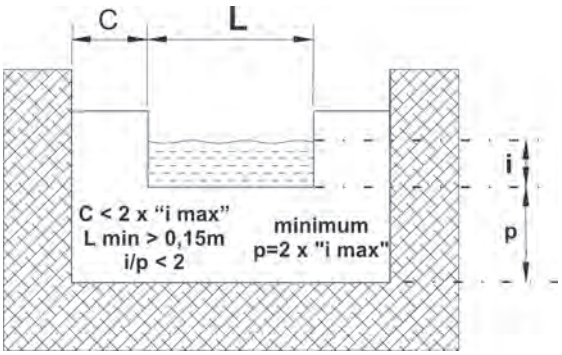
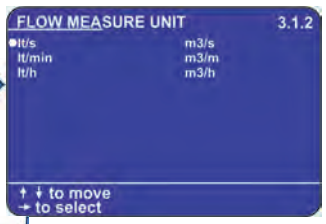


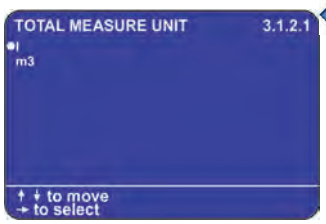
Fig.28

5.2.3 Press to select "**MEASURE UNIT**" and press to confirm.

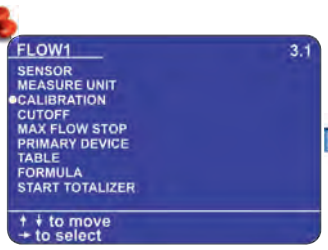


Press or to select the flow rate measure unit and press to confirm.

Press or to select the totalizer measure unit and press to confirm.



5.2.4 Press to select "**CALIBRATION**" and press to confirm.



"**MAX Q**" is the threshold for Max flow beyond which the tot. does not increase. Set the value and confirm with . Disabled function with "**0**" threshold value

Enter the actual head or the "**Q=0**"distance in mm . Press to select the measure to be set, Move the cursor with and press to change the digit. Confirm with .

Manually measure in mm the "**ACTUAL HEAD**" and insert the data, the unit will automatically calculate the fluid distance to the "**Q=0**" point (zero flow distance). Alternatively, can directly be entered the "**Q=0**" empty distance. In fig.29 the example to correctly detect the "**ACTUAL HEAD**" measure. It is recommended to use the "**ACTUAL HEAD**" system with the zero flow condition (no flow: see fig.30), because in doing so the "**ACTUAL HEAD**" or "**Q=0**" manually measurement distance errors are avoided. "**ACTUAL HEAD**" set to "**0**" is enough to ensure the correct calibration.

Fig.29

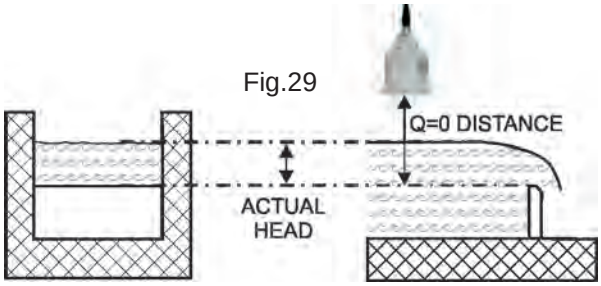
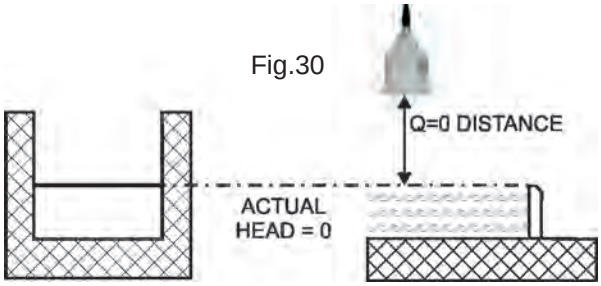
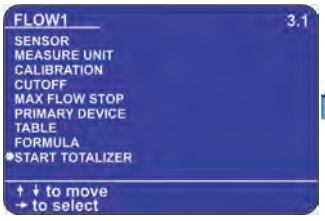
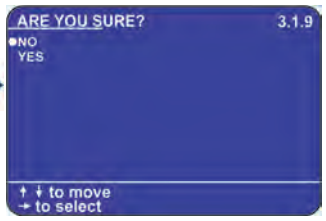


Fig.30



5.2.5 Press to select "**START TOTAL**" and confirm with . Takes to start the totalizer volume flow.





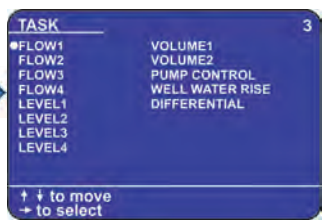
Start the flow totalizer only after have completed the flow measurement configuration, including head calibration, select "**YES**" and press to start the flow totalizer.

Press 2 times to return to the main menu. Select and press to return to "**RUN**" mode

5.3 SGM LEKTRA "PALMER BOWLUS" prefabricated channels configuration

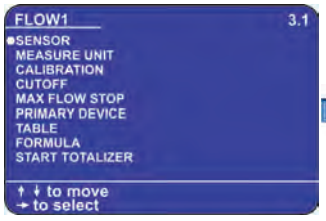
The **Palmer Bowlus** flume is usually used in underground pipes with manholes for inspection, even if its size made it interesting for flow monitoring in many kinds of channels. The fundamental importance parameters, to obtain the correct flow measurement, are highlighted with the symbol. To configure the flow measurement with **SGM LEKTRA "PALMER BOWLUS"** prefabricated channels channels follow the procedure below:

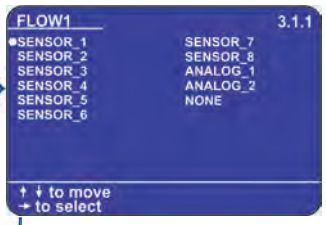
With the arrow keys select the "**TASK**" menu icon. Confirm the selection by pressing



Press to access the submenu "**FLOW1**" or "**FLOW2**", is possible to configure up to 2 flow measurements

5.3.1 Press to select "**SENSOR**".



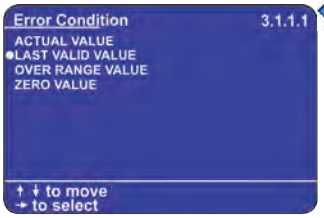


Select the **SENSOR_x** installed on channel with or .

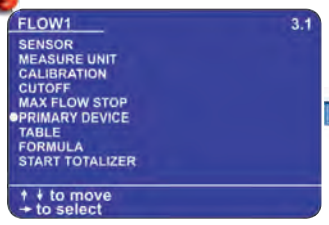
The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press to confirm.

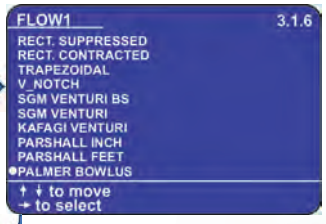
Press to select the measure condition in error state .

Press to confirm.



5.3.2 Press to select "**PRIMARY DEVICE**" and press to confirm.





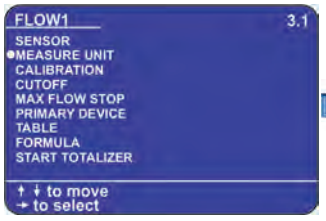
Press to select "**PALMER BOWLUS**" and press to confirm.

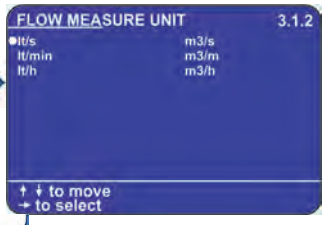
Use the or to select the model.

Confirm selection with .

Fig.31

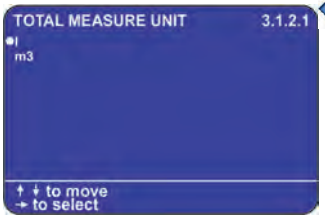
5.3.3 Press to select "**MEASURE UNIT**" and press to confirm.



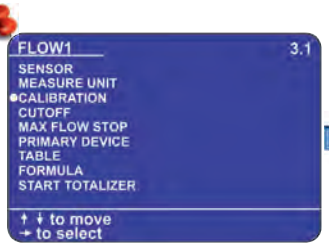


Press or to select the flow rate measure unit and press to confirm.

Press or to select the totalizer measure unit and press to confirm.



5.3.4 Press to select "**CALIBRATION**" and press to confirm.



"**MAX Q**" is the threshold for Max flow beyond which the tot. does not increase. Set the value and confirm with . Disabled function with "**0**" threshold value

Continued to next page

Enter the actual head or the "**Q=0**"distance in mm . Press to select the measure to be set, Move the cursor with and press to change the digit. Confirm with .

Manually measure in mm the "**ACTUAL HEAD**" and insert the data, the unit will automatically calculate the fluid distance to the "**Q=0**" point (zero flow distance). Alternatively, can directly be entered the "**Q=0**" empty distance. In fig.32 the example to correctly detect the "**ACTUAL HEAD**" measure. It is recommended to use the "**ACTUAL HEAD**" system with the zero flow condition (no flow: see fig.33), because in doing so the "**ACTUAL HEAD**" or "**Q=0**" manually measurement distance errors are avoided. "**ACTUAL HEAD**" set to "**0**" is enough to ensure the correct calibration.

Fig.32

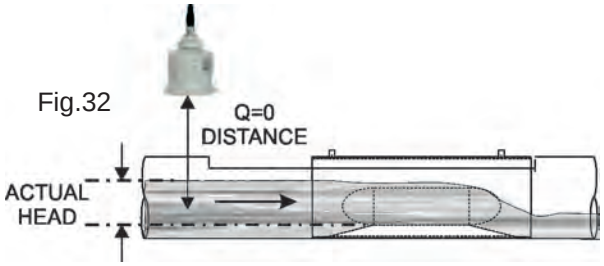
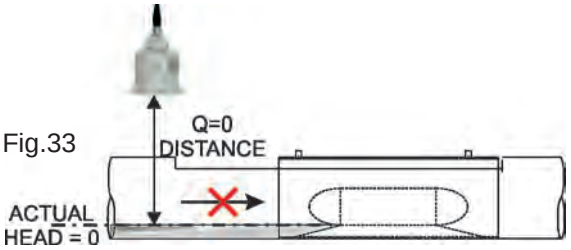
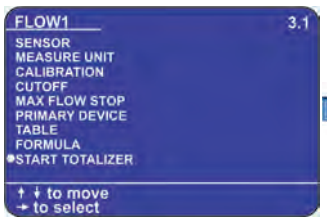
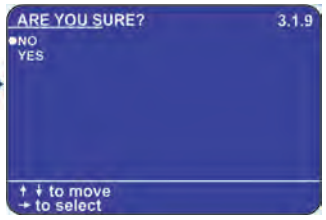


Fig.33



5.3.5 Press to select "**START TOTAL**" and confirm with . Takes to start the totalizer volume flow.





Start the flow totalizer only after have completed the flow measurement configuration, including head calibration, select "**YES**" and press to start the flow totalizer.

Press 2 times to return to the main menu. Select and press to return to "**RUN**" mode

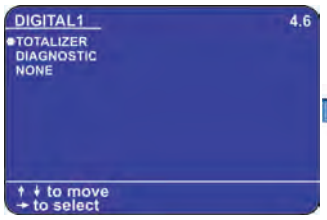
5.4 Volume pulse repetition configuration for remote totalizer

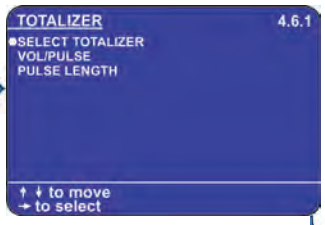
The **VLW90M** has 2 configurable digital open collector outputs for flow totalizer pulse repetition.

With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing

Press o to select "**DIGITAL1**" or "**DIGITAL1**". Press to confirm.

5.4.1 Press to select "**TOTALIZER**"

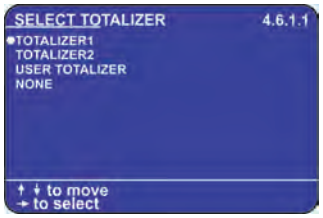




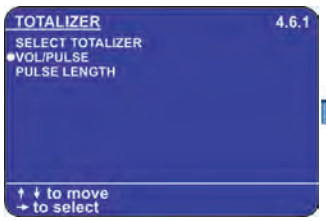
Press to select "**SELECT TOTALIZER**"

Continued to next page

Select the totalizer to be associated with the digital output and confirm the selection with  .

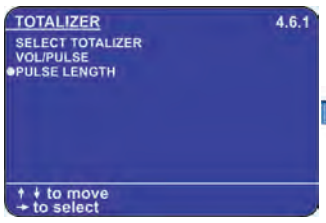


5.4.2 Select with  "**VOLUME/PULSE**" . Press  to confirm.



Set the single pulse value in liters. Move the cursor with  and  to change the digit.
Confirm with  .

5.4.3 Select with  "**PULSE LENGTH**" . Press  to confirm.



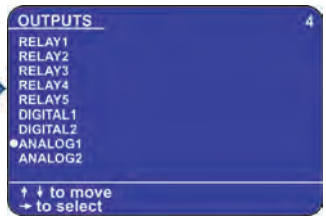
Set the pulse length value in ms. Move the cursor with  and  to change the digit.
Confirm with  .

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

5.5 4÷20mA output configuration for flow rate transmission

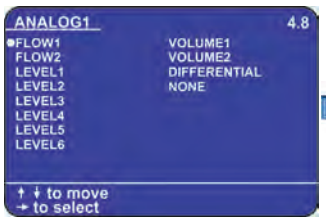
The **VLW90M** has 2 configurable analog outputs 20mA for the flow measurement remote transmission.

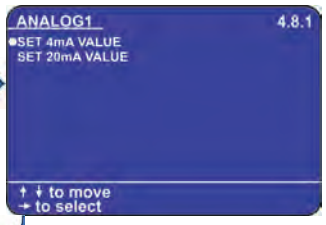
With the arrow keys select the "**OUTPUT**"  menu icon. Confirm the selection by pressing 



Press  o  to select "**ANALOG1**" or "**ANALOG2**". Press  to confirm.

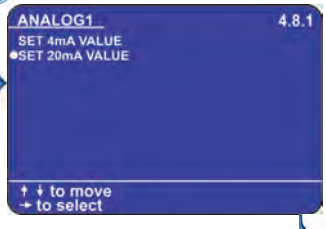
5.5.1 Press  or  to select "**FLOW1**" or "**FLOW2**". Confirm with  .





To set begining of scale, press  to select "**SET 4mA VALUE**".

Set the flow rate value corresponding to the 4mA output. Confirm with  .
Measure unit is displayed according to the setting in par. **5.1.3**, **5.2.3** or **5.3.3**



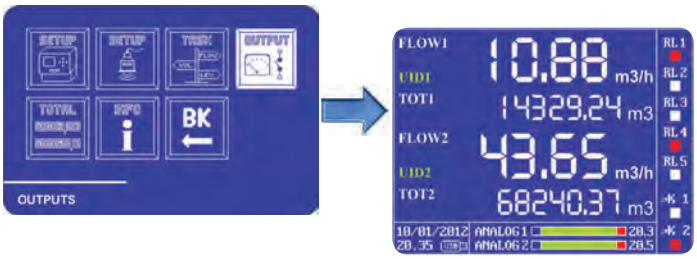
To set end ofscale, press  to select "**SET 20mA VALUE**".
Confirm with 

Continued to next page

Set the flow rate value corresponding to the 20mA output. Confirm with ENTER.

Measure unit is displayed according to the setting in par. **5.1.3**, **5.2.3** or **5.3.3**

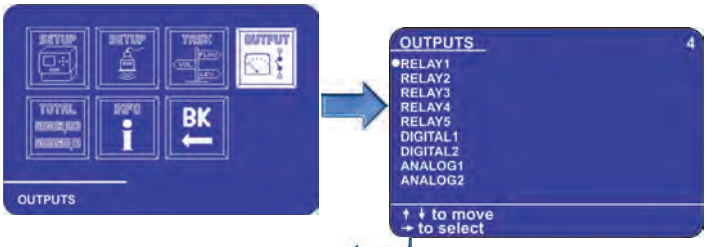
Press 2 times ESC to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode



5.6 Flow rate threshold relays configuration

The **VLW90M** has 5 configurable relays for flow rate alarm thresholds.

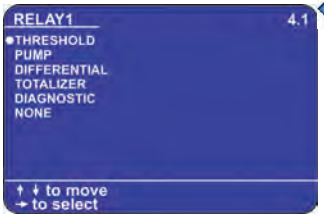
With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing ENTER



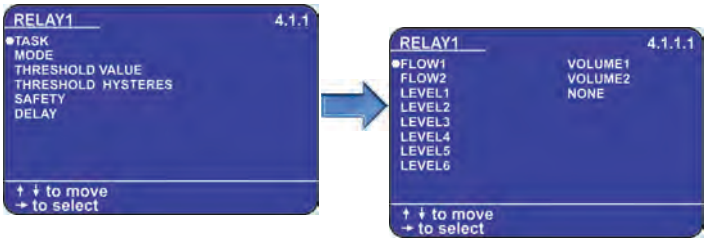
Press ↑ o ↓ to select "**RELAY1**", or "**RELAY2**", or "**RELAY3**", or "**RELAY4**" or "**RELAY5"**.

Press → to confirm.

Press → to select "**THRESHOLD**".

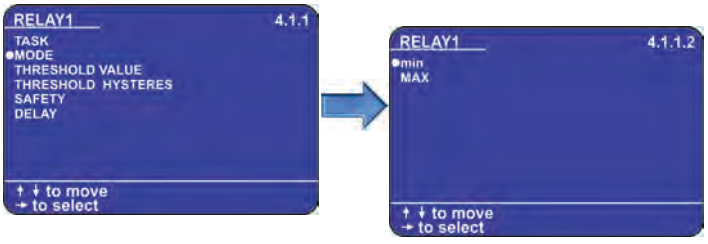


5.6.1 Press → to select "**TASK**".



Select "**FLOW1**" or "**FLOW2**". Press → to confirm.

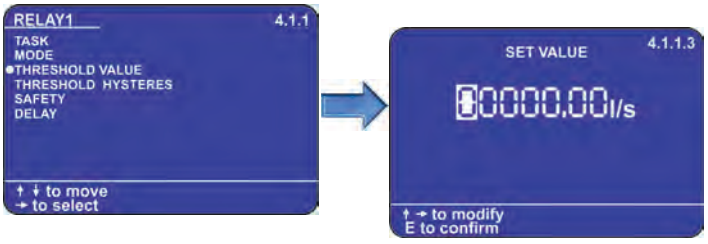
5.6.2 Press → to select "**MODE**".



Select "**min**" for minimum flow alarm or "**MAX**" for maximum flow alarm.

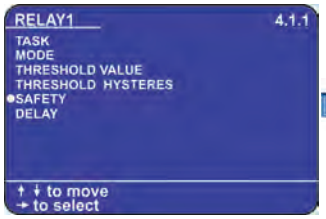
Press → to confirm.

5.6.3 Select "**THRESHOLD VALUE**" to set the relay switching point and press → to confirm.



Set the flow threshold value. Move the cursor with → and ↑ to change the digit. Confirm with ENTER.

5.6.4 To set the relay alarm condition status select "**SAFETY**" and confirm with  .



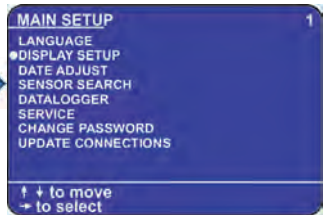
Select:
"**YES**" relay de-energized in alarm condition;
"**NO**" relay energized in alarm condition.
Press  to confirm.

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

5.7 Configuration of displaied measures

The **VLW90M** can display the flow rate measurement and the relative volume totalizer.

With the arrow keys select the "**MAIN SETUP**"  menu icon. Confirm the selection by pressing 



Press  or  to select "**DISPLAY SETUP**".
Confirm with  .

5.7.1 Press  to select "**DISPLAY MEASURES**" and confirm with  .

With the ● pointer to "**FLOW1**", press  , the ✱ symbol will highlight the selection. Press  to save and exit. "**FLOW2**" is available only when active

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

6. LEVEL MEASUREMENT SET UP GUIDES

The procedures for level measurement quick start are available in this section:

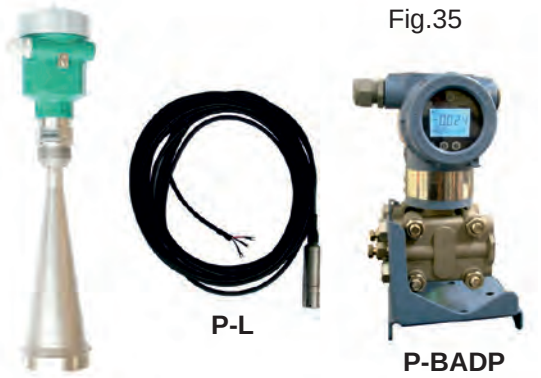
- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **6.1** (pag.26)

Fig.34

PTU51 PTU56 METER KTU5

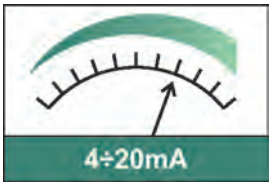
- **4÷20mA analog transmitter configuration**; paragraph **6.2** (pag.27)

Fig.35

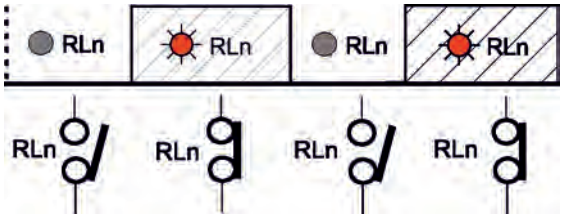


RPL/RWL P-L P-BADP

- **4÷20mA output configuration for measurement level transmission to remote displays**; paragraph **6.3** (pag.28)



- **Level threshold relays configuration**; paragraph **6.4** (pag.29)



- **Measures display configuration**; paragraph **6.5** (pag.30)

From **RUN** mode press  to access the main menu

Fig.36

6.1 via MODBUS SGM LEKTRA ultrasonic transmitters configuration

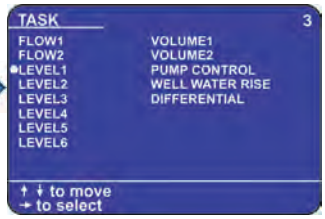
The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the level measurement total control with the **VLW90M** unit.

The fundamental importance parameters, to obtain the correct level measurement, are highlighted with the  symbol.

To configure the level measurement with **SGM LEKTRA** ultrasonic transmitters follow the procedure below:

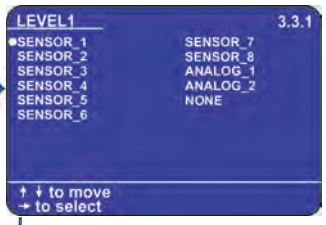
With the arrow keys select the "**TASK**"  menu icon.

Confirm the selection by pressing 



Press  to access the submenu "**LEVEL1**", or "**LEVEL2**", or "**LEVEL3**", or "**LEVEL4**", or "**LEVEL5**" or "**LEVEL6**", is possible to configure up to 6 level measurements

6.1.1 Press to select “**SENSOR**”.

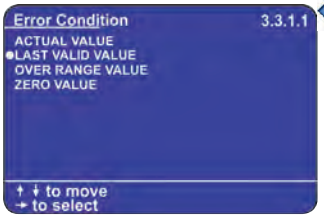


Select the **SENSOR_x** with or .

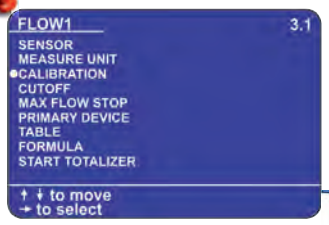
The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press to confirm.

Press to select the measure condition in error state .

Press to confirm.



6.1.2 Press to select “**CALIBRATION**” and press to confirm.



Enter the empty and full distance in mm (see fig.37).

Press to select the distance to be set, Move the cursor with and press to change the digit.

Confirm with .

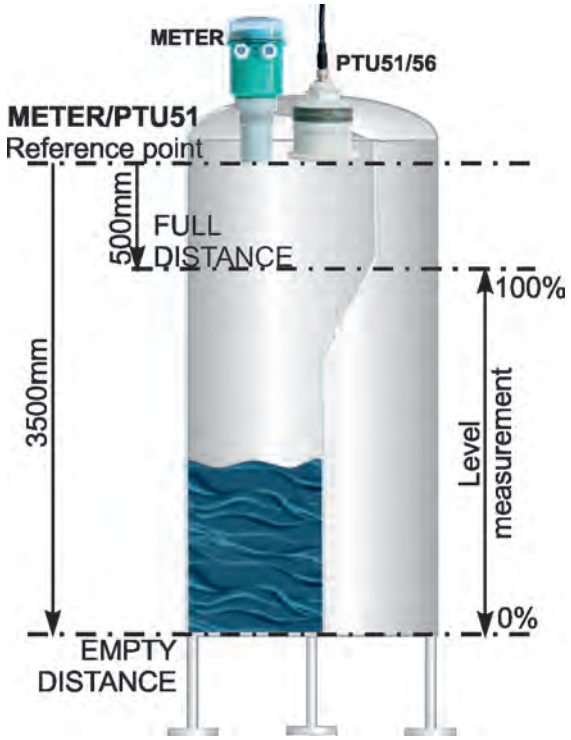


Fig.37

Press 2 times to return to the main menu. Select BK and press to return to “**RUN**” mode

6.2 4÷20mA analog transmitter configuration

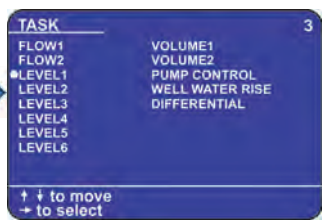
With the 2 **VLW90M** analog inputs is possible to control the measurement with any level sensor that transmits an **4÷20mA** analog signal.

The fundamental importance parameters, to obtain the correct level measurement, are highlighted with the symbol.

To configure the level measurement with **4÷20mA** analog level transmitters follow the procedure below:

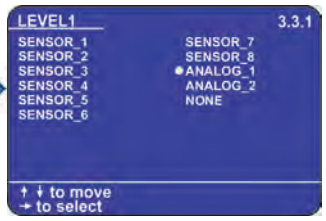
With the arrow keys select the “**TASK**” menu icon.

Confirm the selection by pressing



Press to access the submenu “**LEVEL1**”, or “**LEVEL2**”, or “**LEVEL3**”, or “**LEVEL4**”, or “**LEVEL5**” or “**LEVEL6**”, is possible to configure up to 6 level measurements

6.1.1 Press to select "**SENSOR**".



Select the **ANALOG_x** input with or .

ANALOG_1 is associated with the sensor connection to **Analog Input Ch1** terminals; **ANALOG_2** is associated with the sensor connection to **Analog Input Ch2** terminals (see par.3.4/3.5 at pages 8/9).

Press to confirm.

6.1.2 Press to select "**CALIBRATION**" and press to confirm.

Enter the level value at **4mA** and **20mA** (fig.38; **RPL56** radar level sensor application).

Press to select the distance to be set, Move the cursor with and press to change the digit.

Confirm with .

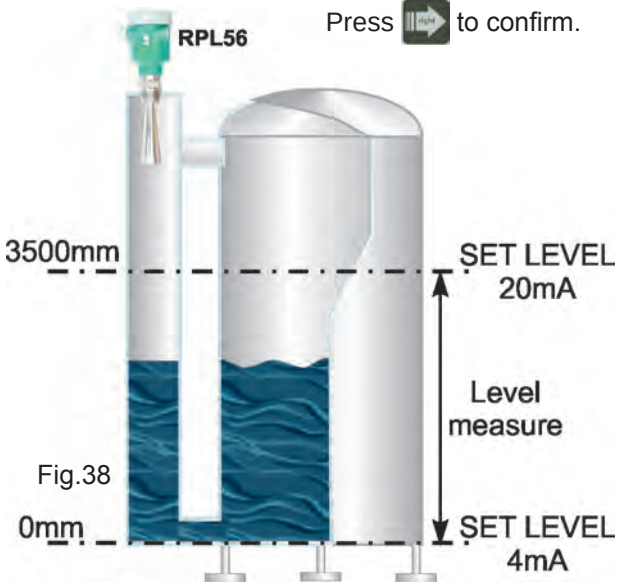


Fig.38

Press 2 times to return to the main menu. Select and press to return to "**RUN**" mode

6.3 4÷20mA output config. for level measurement transmission to remote displays

The **VLW90M** has 2 configurable analog outputs 20mA for the level measurement remote transmission.

With the arrow keys select the "**OUTPUT**" menu icon.

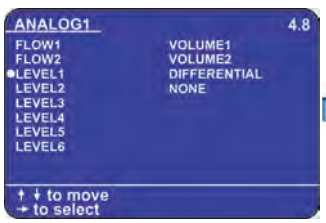
Confirm the selection by pressing

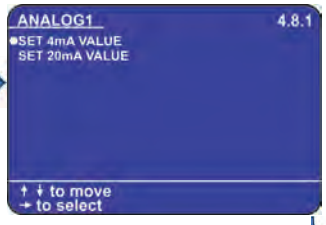
Press o to select "**ANALOG1**" or "**ANALOG2**".

Press to confirm.

6.3.1 Press or to select "**LEVEL1**", or "**LEVEL2**", or "**LEVEL3**", or "**LEVEL4**", or "**LEVEL5**" or "**LEVEL6**".

Confirm with .

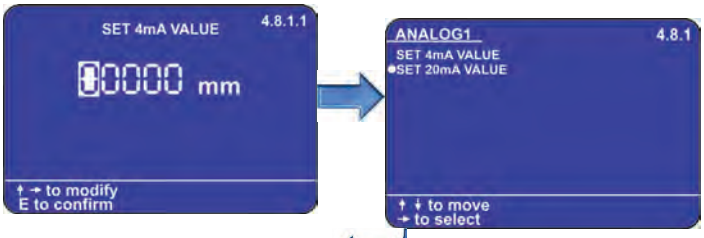




To set begining of scale, press to select "**SET 4mA VALUE**".

Continued to next page

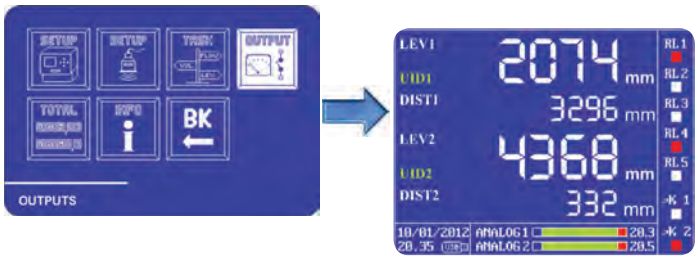
Set in mm the level value corresponding to the 4mA output. Confirm with ENTER.



To set end of scale, press ↓ to select "**SET 20mA VALUE**". Confirm with →.

Set in mm the level value corresponding to the 20mA output. Confirm with ENTER.

Press 2 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode



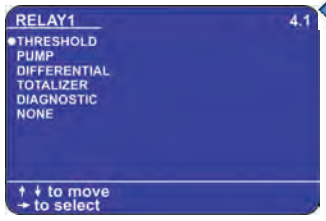
6.4 Level threshold relays configuration

The **VLW90M** has 5 configurable relays for level alarm thresholds.

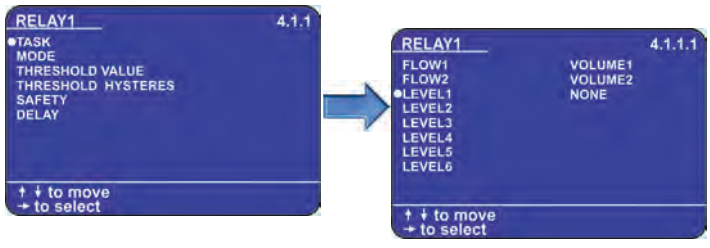
With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing ENTER

Press ↑ o ↓ to select "**RELAY1**", or "**RELAY2**", or "**RELAY3**", or "**RELAY4**" or "**RELAY5"**. Press → to confirm.

Press → to select "**THRESHOLD**".

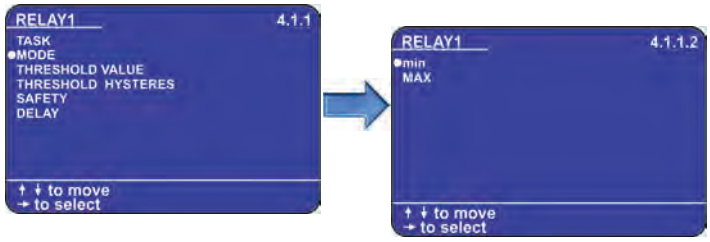


6.4.1 Press → to select "**TASK**".



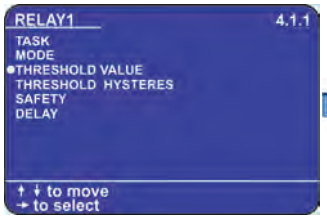
Select "**LEVEL1**", or "**LEVEL2**", or "**LEVEL3**", or "**LEVEL4**", or "**LEVEL5**" or "**LEVEL6**". Press → to confirm.

6.4.2 Press → to select "**MODE**".



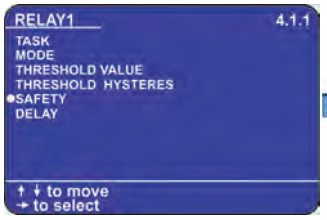
Select "**min**" for minimum level alarm or "**MAX**" for maximum level alarm. Press → to confirm.

6.4.3 Select "**THRESHOLD VALUE**" to set the relay switching point and press  to confirm.



Set in mm the level threshold value. Move the cursor with  and  to change the digit.
Confirm with  .

6.4.4 To set the relay alarm condition status select "**SAFETY**" and confirm with  .



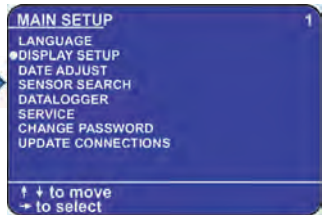
Select:
"**YES**" relay de-energized in alarm condition;
"**NO**" relay energized in alarm condition.
Press  to confirm.

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

6.5 Configuration of displaied measures

The **VLW90M** can display the level measurement.

With the arrow keys select the "**MAIN SETUP**"  menu icon. Confirm the selection by pressing 



Press  or  to select "**DISPLAY SETUP**".
Confirm with  .

6.5.1 Press  to select "**DISPLAY MEASURES**" and confirm with  .

With the ● pointer to "**LEVEL1**", press  , the ✱ symbol will highlight the selection. Press  to save and exit.
"**LEVEL2/3/4/5/6**" are available only when active

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

7. DIFFERENTIAL LEVEL MEASUREMENT SET UP GUIDES

The procedures for differential level measurement quick start are available in this section:

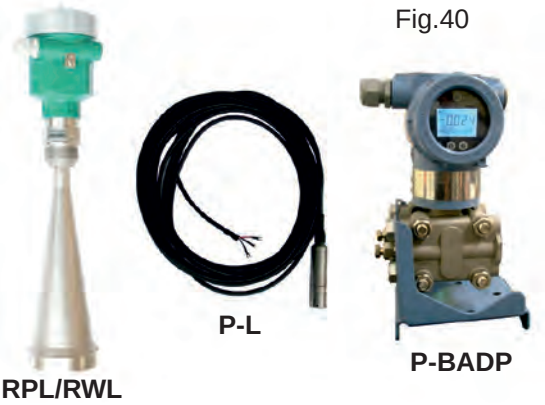
- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **7.1** (pag.31)

Fig.39

PTU51 PTU56 METER KTU5

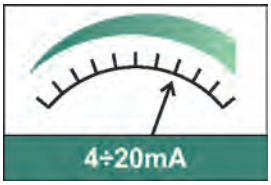
- **4÷20mA analog transmitter configuration**; paragraph **7.2** (pag.33)

Fig.40

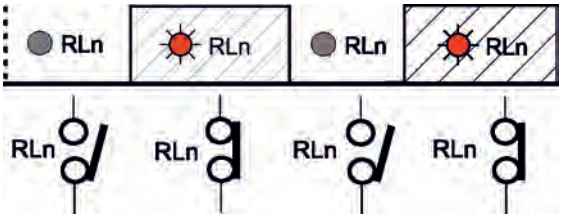


RPL/RWL P-L P-BADP

- **4÷20mA output configuration for differential level transmission to remote displays**; paragraph **7.3** (pag.34)



- **Differential level threshold relays configuration**; paragraph **7.4** (pag.35)



- **Measures display configuration**; paragraph **7.5** (pag.36)

From **RUN** mode press to access the main menu

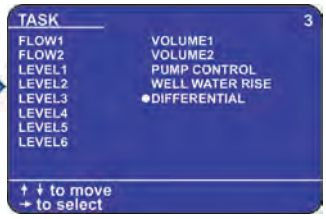
Fig.41

7.1 via MODBUS SGM LEKTRA ultrasonic transmitters configuration

The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the differential level measurement total control with the **VLW90M** unit. The fundamental importance parameters, to obtain the correct level measurement, are highlighted with the symbol. To configure the level measurement with **SGM LEKTRA** ultrasonic transmitters follow the procedure below:

With the arrow keys select the "**TASK**" menu icon.

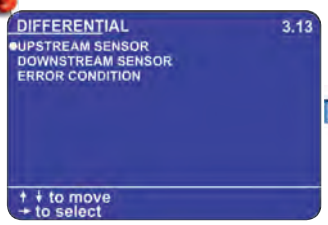
Confirm the selection by pressing ENTER

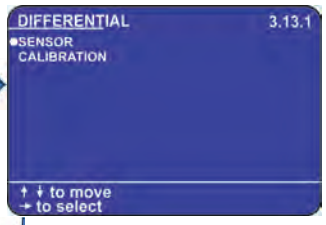


Press to access the submenu "**DIFFERENTIAL**".

NB - Perform the steps described in **7.1.1.2** and **7.1.2.2** sections (**CALIBRATION**) during the "**Level difference = 0**" real condition, because this condition allows to enter the same "**ACTUAL LEVEL**" value, automatically obtain the correct **0** setting (**UPSTREAM LEVEL - DOWNSTREAM LEVEL = 0**)

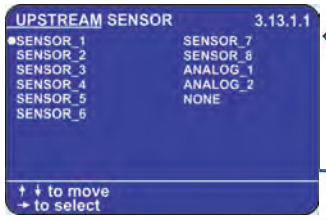
7.1.1 Press to select "**UPSTREAM SENSOR**"



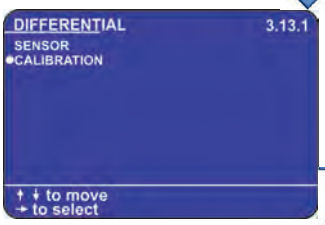


Press to select "**SENSOR**"

Select the **UPSTREAM SENSOR_x** with . The sensor **UID** address identifies the sensor n.: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Confirm with

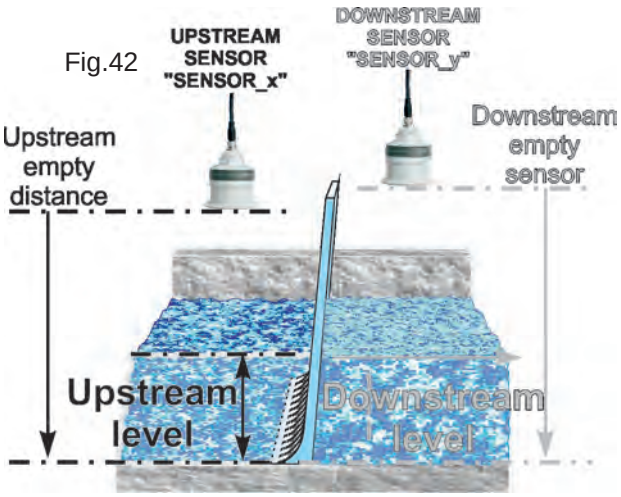


Select "**CALIBRATION**" with and press .

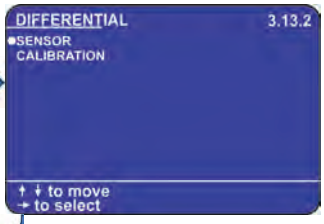


Enter in mm the **ACTUAL LEVEL** or **EMPTY DISTANCE** value (fig.42).Press to select the measure to be set. Move the cursor with . Press to change the digit. Confirm with and then press .

Fig.42

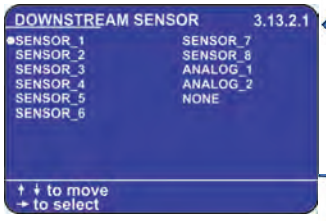


7.1.2 Press to select "**DOWNSTREAM SENSOR**"

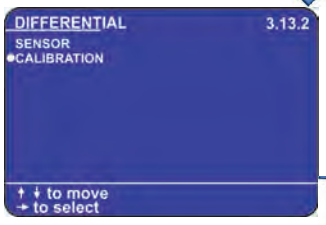


Press to select "**SENSOR**"

Select the **DOWNSTREAM SENSOR_x** with . The sensor **UID** address identifies the sensor n.: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Confirm with

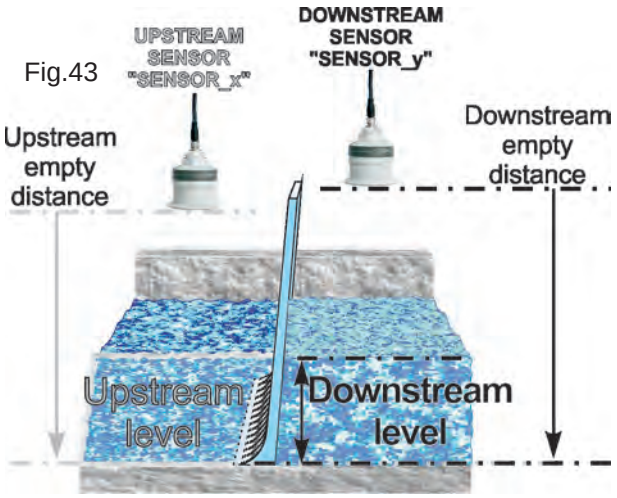


Select "**CALIBRATION**" with and press .



Enter in mm the **ACTUAL LEVEL** or **EMPTY DISTANCE** value (fig.43).Press to select the measure to be set. Move the cursor with . Press to change the digit. Confirm with and then press .

Fig.43



Press 3 times to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

7.2 4÷20mA analog transmitter configuration

With the 2 **VLW90M** analog inputs is possible to control the measurement with any level sensor that transmits an **4÷20mA** analog signal.

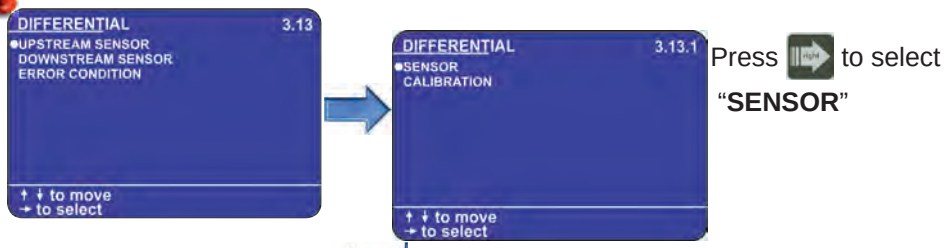
The fundamental importance parameters, to obtain the correct level measurement, are highlighted with the symbol.

To configure the differential level measurement with **4÷20mA** analog level transmitters follow the procedure below:

With the arrow keys select the "**TASK**" menu icon. Confirm the selection by pressing ENTER

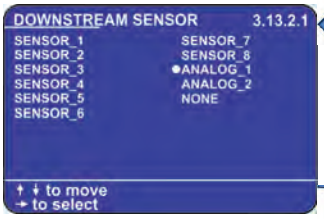
Press to access the submenu "**DIFFERENTIAL**".

7.2.1 Press to select "**UPSTREAM SENSOR**"

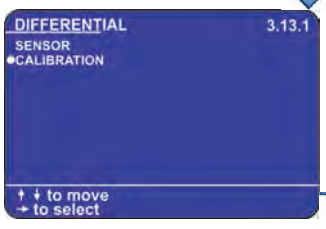


Press to select "**SENSOR**"

Select the **ANALOG_x** input with or . **ANALOG_1** is associated with the sensor connection to **Analog Input Ch1** terminals (see par.3.4/3.5 at pag. 8/9). Press to confirm.



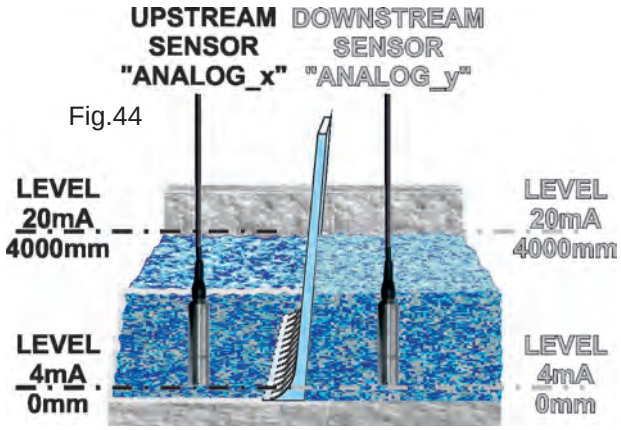
Select "**CALIBRATION**" with and press .



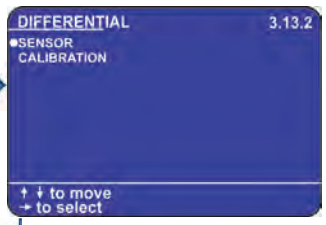
Enter the upstream sensor level value at 4mA and 20mA (see fig.44). Press to select the measure to be set, Move the cursor with and press to change the digit.
Confirm with ENTER.

Figure 44 shows an differential measurement application with 2 hydrostatic level transmitters (cod. P-LC1S1 with range 0÷4000mmH^{2}O)

Fig.44

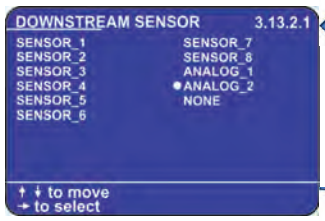


7.2.2 Press ▲ or ▼ to select "**DOWNSTREAM SENSOR**". Confirm with →.

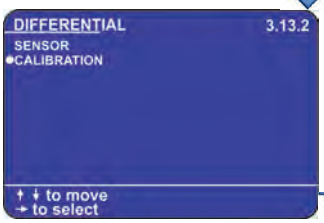


Press → to select "**SENSOR**"

Select the **ANALOG_y** input with ▲ or ▼. **ANALOG_2** is associated with the sensor connection to **Analog Input Ch2** terminals (see par.3.4/3.5 at pag. 8/9). Press → to confirm.



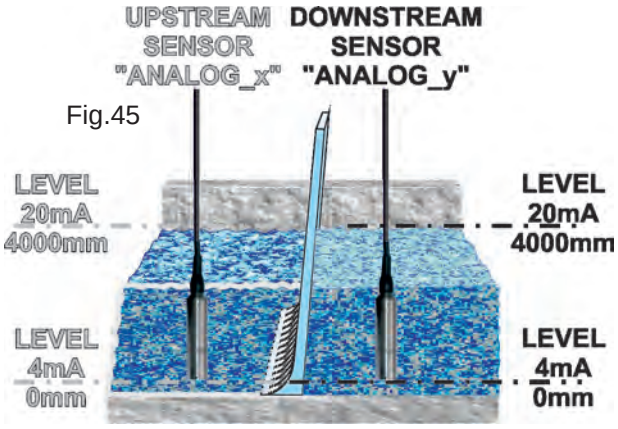
Select "**CALIBRATION**" with ▼ and press →.



Enter the stream sensor level value at 4mA and 20mA (see fig.45). Press ▼ to select the measure to be set, Move the cursor with → and press ▲ to change the digit. Confirm with ENTER.

Figure 45 shows an differential measurement application with 2 hydrostatic level transmitters (cod. P-LC1S1 with range 0÷4000mmH²O)

Fig.45

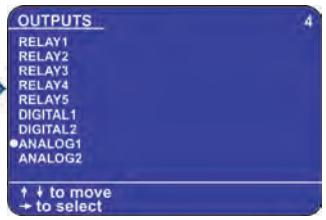


Press 3 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

7.3 4÷20mA output config. for differential level transmission to remote displays

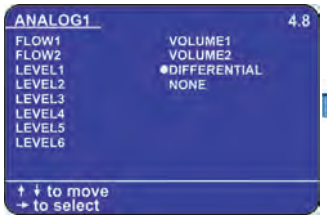
The **VLW90M** has 2 configurable analog outputs 20mA for the differential level remote transmission.

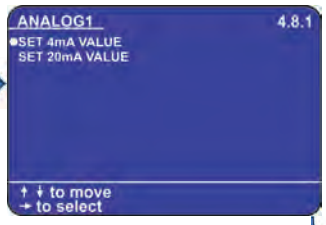
With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing ENTER



Press ▲ o ▼ to select "**ANALOG1**" or "**ANALOG2**". Press → to confirm.

7.3.1 Press ▲ or ▼ to select "**DIFFERENTIAL**". Confirm with →.

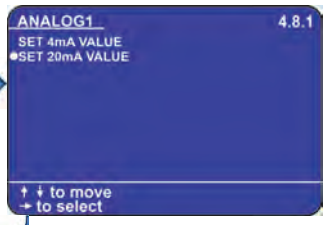




To set begining of scale, press → to select "**SET 4mA VALUE**".

Continued to next page

Set in mm the differential level value corresponding to the 4mA output. Confirm with ENTER.



To set end of scale, press ↓ to select "**SET 20mA VALUE**". Confirm with →.

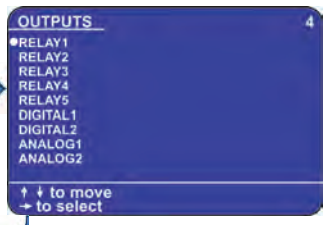
Set in mm the differential level value corresponding to the 20mA output. Confirm with ENTER.

Press 2 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

7.4 Differential level threshold relays configuration

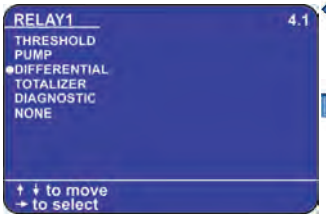
The **VLW90M** has 5 configurable relays for differential level alarm thresholds.

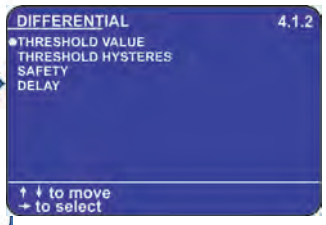
With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing ENTER



Press ↑ o ↓ to select "**RELAY1**", or "**RELAY2**", or "**RELAY3**", or "**RELAY4**" or "**RELAY5"**. Press → to confirm.

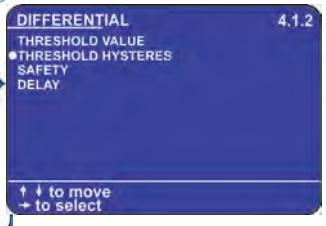
Press ↓ to select "**DIFFERENTIAL**" and confirm with →.





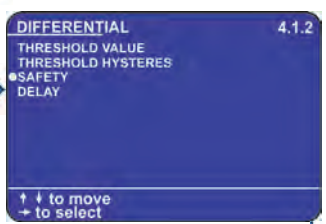
Press → to select "**THRESHOLD VALUE**" to set the relay switching point

Set in mm the differential level threshold value. Move the cursor with → and ↑ to change the digit. Confirm with ENTER



Press ↓ to select "**THRESHOLD HYSTERES**" to set the relay hysteresis and press → to confirm.

Set in mm the threshold hysteresis value. Move the cursor with → and ↑ to change the digit. Confirm with ENTER.



Press ↓ to select "**SAFETY**" to set the relay alarm condition status and press → to confirm.

Continued to next page

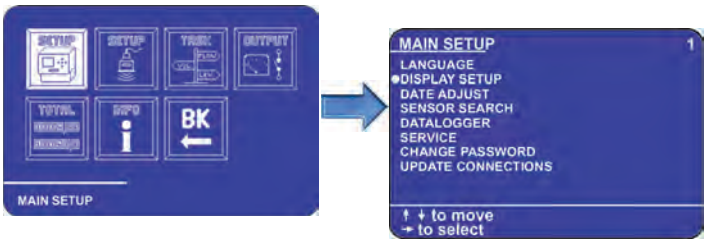
Select:
"**YES**" relay de-energized in alarm condition;
"**NO**" relay energized in alarm condition.
Press → to confirm.

Press 2 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

7.5 Configuration of displaied measures

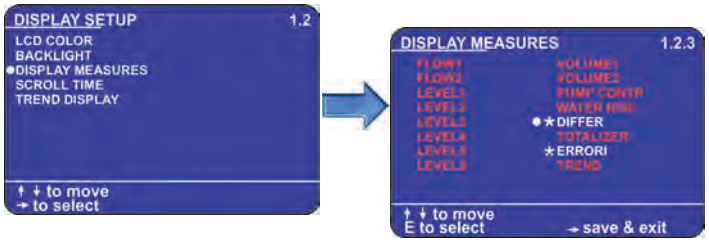
The **VLW90M** can display the differential level measurement.

With the arrow keys select the "**MAIN SETUP**" menu icon. Confirm the selection by pressing ENTER



Press ↑ or ↓ to select "**DISPLAY SETUP**". Confirm with →.

7.5.1 Press ↓ to select "**DISPLAY MEASURES**" and confirm with →.



With the ● pointer to "**DIFFER**", press ENTER, the * symbol will highlight the selection. Press → to save and exit.

Press 2 times ← to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

8. VOLUME MEASUREMENT SET UP GUIDES

The procedures for volume measurement quick start are available in this section:

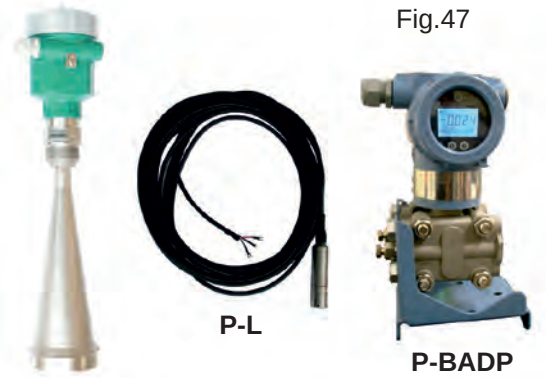
- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **8.1** (pag.37)

Fig.46

PTU51 PTU56 METER KTU5

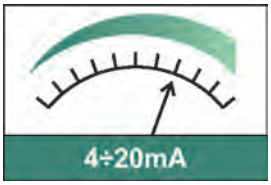
- **4÷20mA analog transmitter configuration**; paragraph **8.2** (pag.40)

Fig.47

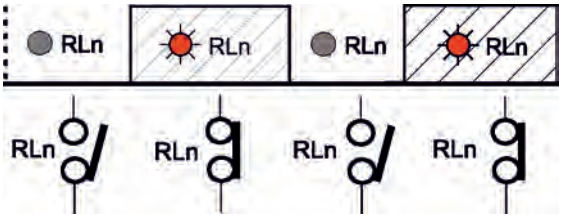


RPL/RWL P-L P-BADP

- **4÷20mA output configuration for volume measurement transmission to remote displays**; paragraph **8.3** (pag.41)



- **Volume threshold relays configuration**; paragraph **8.4** (pag.42)



- **Measures display configuration**; paragraph **8.5** (pag.43)

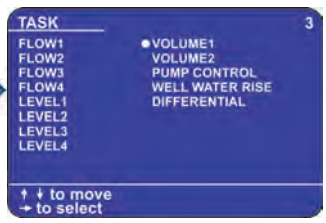
From **RUN** mode press to access the main menu

Fig.48

8.1 via MODBUS SGM LEKTRA ultrasonic transmitters configuration

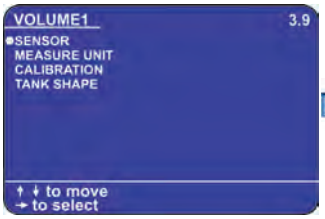
The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the level measurement total control with the **VLW90M** unit.
The fundamental importance parameters, to obtain the correct volume measurement, are highlighted with the symbol.
To configure the volume measurement with **SGM LEKTRA** ultrasonic transmitters follow the procedure below:

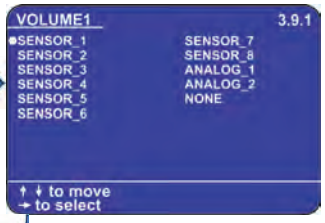
With the arrow keys select the "**TASK**" menu icon.
Confirm the selection by pressing ENTER



Press to access the submenu "**VOLUME1**" or "**VOLUME2**", is possible to configure up to 2 volume measurements

8.1.1 Press to select "**SENSOR**"



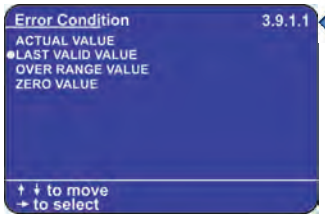


Select the **SENSOR_x** with or .

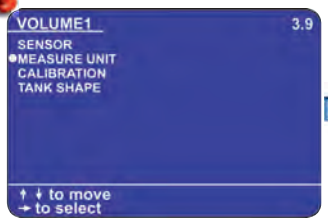
The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press to confirm.

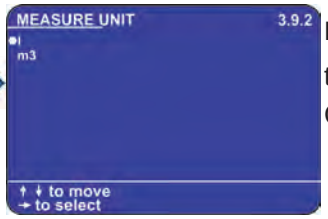
Press to select the measure condition in error state.

Press to confirm.



8.1.2 Press to select "**MEASURE UNIT**" and press .

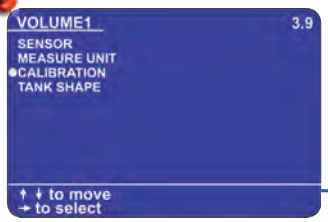




Press or to select the measure unti.

Confirm with .

8.1.3 Press to select "**CALIBRATION**" and press .



Enter the empty and full distance in mm (see fig.49).

Press to select the measure to be set. Move the cursor with and press to change the digit.

Confirm with .

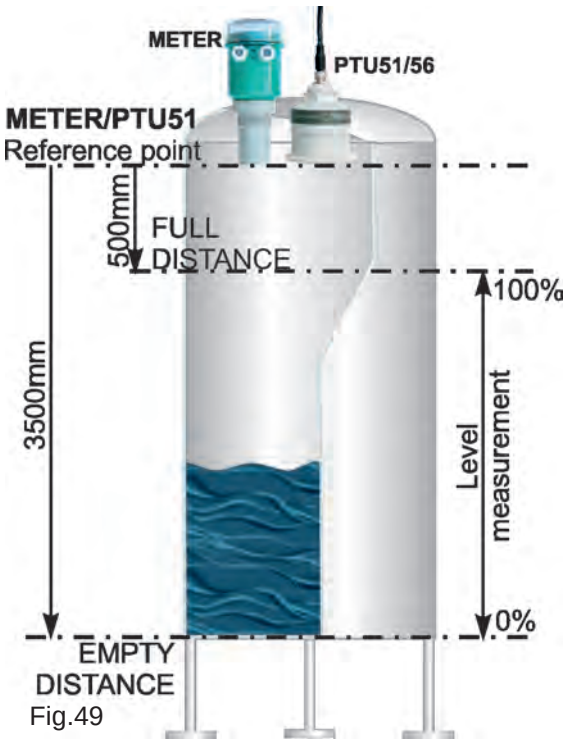
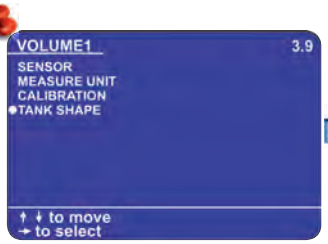
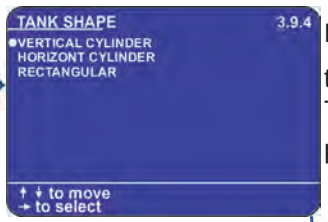


Fig.49

8.1.4 Press to select "**TANK SHAPE**" and confirm with .





Press or to select the geometric shape.

To confirm the selection press .

Continued to next page

8.1.4.1 For tank or silo with vertical cylindrical section, select "**VERTICAL CYLINDER**" and press .

Enter the diameter in mm and, if necessary, the tank/silo conical part volume (**OFFSET VOL**), according to parameter **3.9.2**, paragraph 8.1.2. 50: ex. silo with 2000mm diameter and 50lt **OFFSET VOL**.

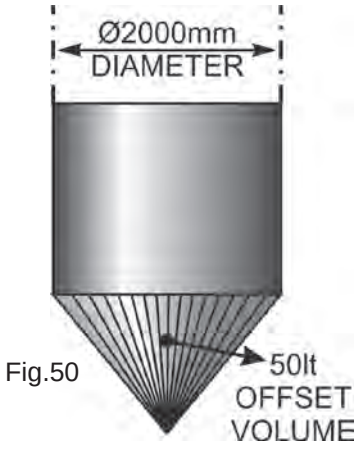
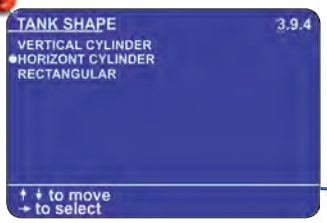


Fig.50

8.1.4.2 For tank with horizontal cylindrical section, select "**HORIZONT CYLINDER**" and press .



Enter the diameter and the length in mm. Fig.51: ex. tank with 1500mm diameter and length 3000mm

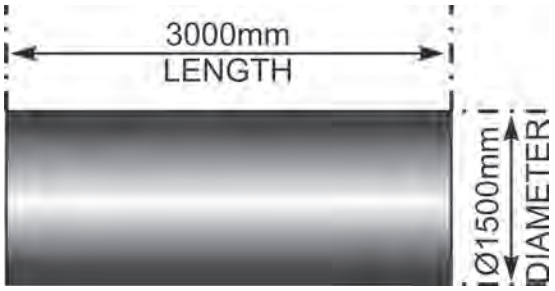
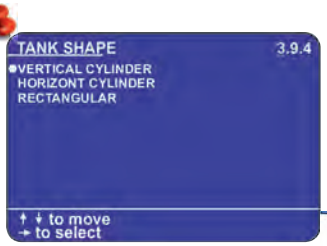


Fig.51

8.1.4.3 For tank or silo with vertical rectangularl section, select "**RECTANGULAR**" and press . Fig.52: ex. silo with a 2000mm width and 1500mm length



Enter the width and the length in mm and, if necessary, the tank/silo conical part volume (**OFFSET VOL**), according to parameter **3.9.2**, paragraph 8.1.2. Fig.52: ex. silo with a 2000mm width, 1500mm length and 50lt **OFFSET VOL**.

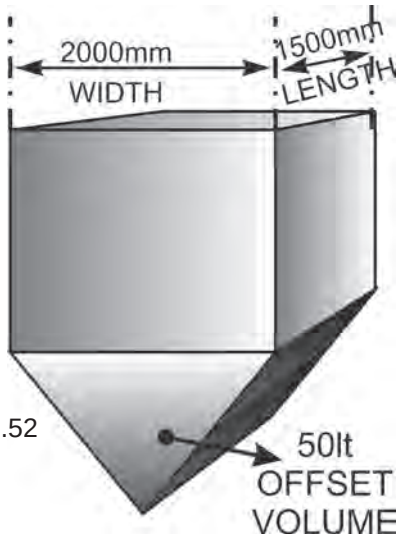


Fig.52

Press 2 times to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

8.2 4÷20mA analog transmitter configuration

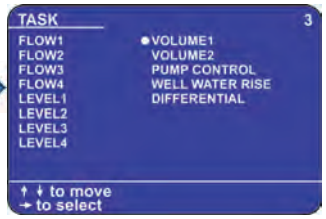
With the 2 **VLW90M** analog inputs is possible to control the measurement with any level sensor that transmits an **4÷20mA** analog signal.

The fundamental importance parameters, to obtain the correct volume measurement, are highlighted with the symbol.

To configure the volume measurement with **4÷20mA** analog level transmitters follow the procedure below:

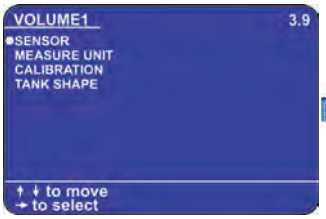
With the arrow keys select the "**TASK**" menu icon.

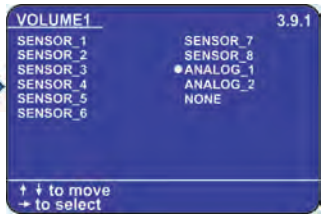
Confirm the selection by pressing ENTER



Press to access the submenu "**VOLUME1**" or "**VOLUME2**", is possible to configure up to 2 volume measurements

8.2.1 Press to select "**SENSOR**"

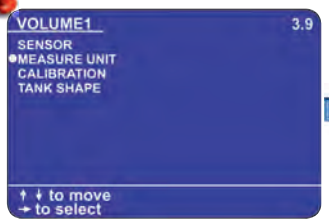


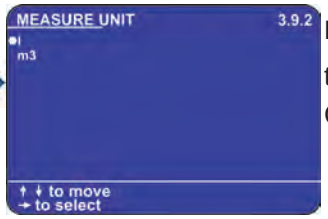


Select the **ANALOG_x** input with or .

ANALOG_1 is associated with the sensor connection to **Analog Input Ch1** terminals; **ANALOG_2** is associated with the sensor connection to **Analog Input Ch2** terminals (see par.3.4/3.5 at pages 8/9). Press to confirm.

8.2.2 Press to select "**MEASURE UNIT**" and press .

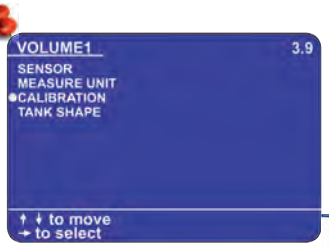




Press or to select the measure unti.

Confirm with .

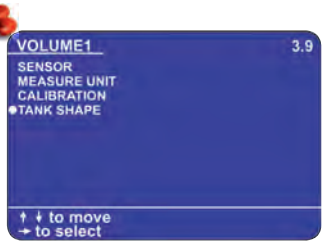
8.2.3 Press to select "**CALIBRATION**" and press .



Enter the level value at 4mA and 20mA (fig.53; RPL56 radar level sensor application).

Press to select the measure to be set. Move the cursor with and press to change the digit. Confirm with ENTER.

8.2.4 Press to select "**TANK SHAPE**" and confirm with . Follow the procedure described in paragraphs: **8.1.4.1**, or **8.1.4.2** or **8.1.4.3**.



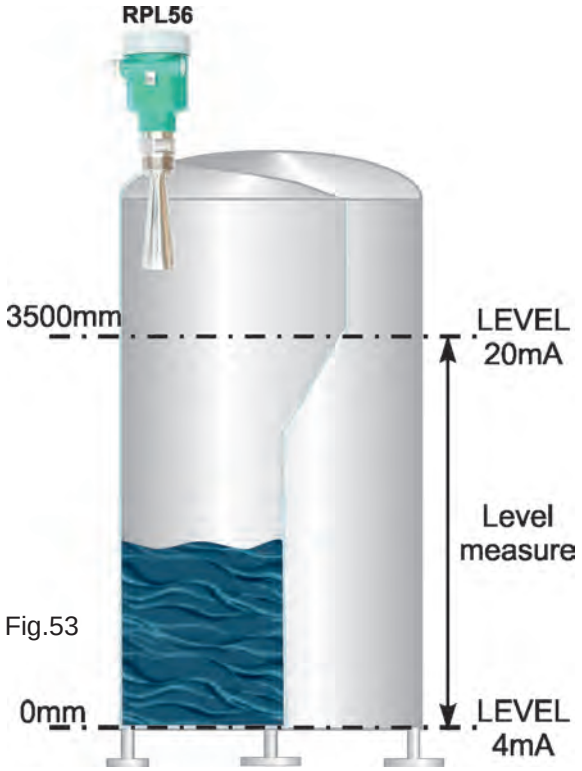


Fig.53

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

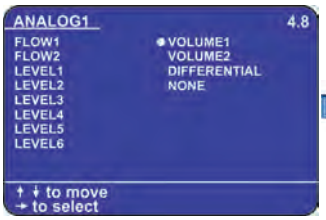
8.3 4÷20mA output configuration for volume measurement transmission to remote displays

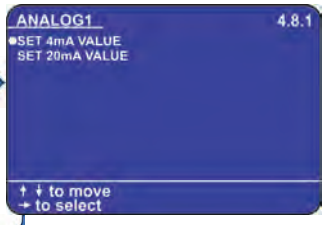
The **VLW90M** has 2 configurable analog outputs 20mA for the level measurement remote transmission.

With the arrow keys select the "**OUTPUT**"  menu icon. Confirm the selection by pressing 

Press  o  to select "**ANALOG1**" or "**ANALOG2**". Press  to confirm.

8.3.1 Press  or  to select "**VOLUME1**" or "**VOLUME2**". Confirm with  .

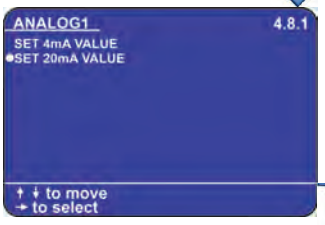




To set begining of scale, press  to select "**SET 4mA VALUE**".

Set in mm the volume value corresponding to the 4mA output. Confirm with  .

To set end of scale, press  to select "**SET 20mA VALUE**". Confirm with 



Set in mm the volume value corresponding to the 20mA output. Confirm with  .

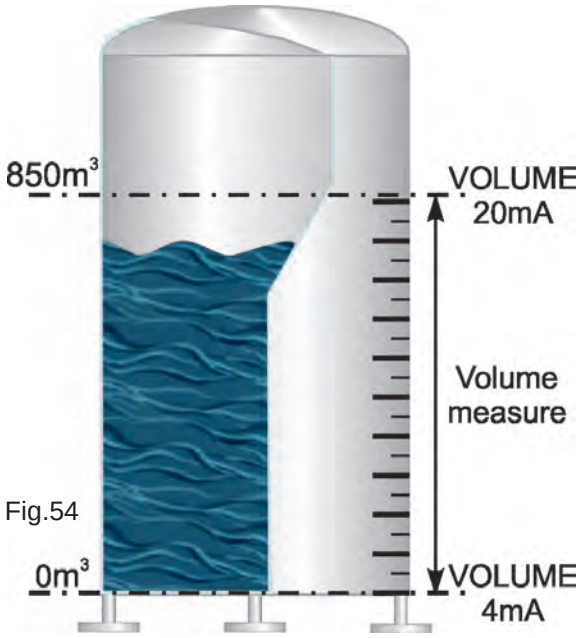


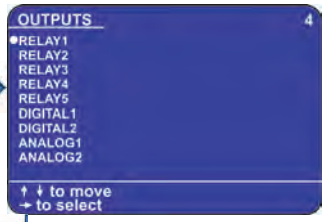
Fig.54

Press 2 times  to return to the main menu. Select  and press  to return to "**RUN**" mode

8.4 Volume threshold relays configuration

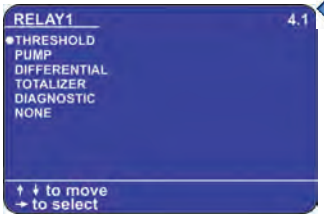
The **VLW90M** has 5 configurable relays for volume alarm thresholds.

With the arrow keys select the "**OUTPUT**" menu icon. Confirm the selection by pressing ENTER

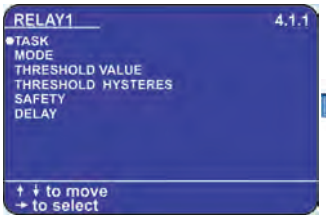


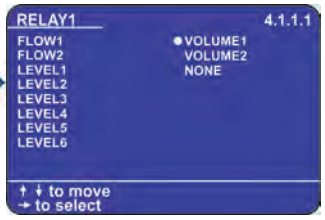
Press UP o DOWN to select "**RELAY1**", or "**RELAY2**", or "**RELAY3**", or "**RELAY4**" or "**RELAY5"**.
Press RIGHT to confirm.

Press RIGHT to select "**THRESHOLD**".



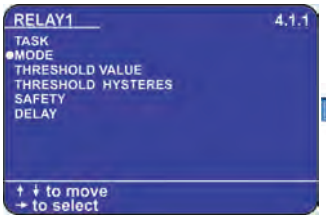
8.4.1 Press RIGHT to select "**TASK**".





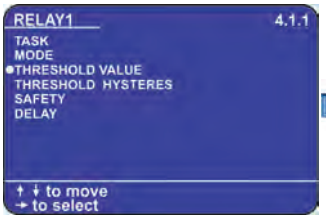
Select "**VOLUME1**", or "**VOLUME2**".
Press RIGHT to confirm.

8.4.2 Press RIGHT to select "**MODE**".



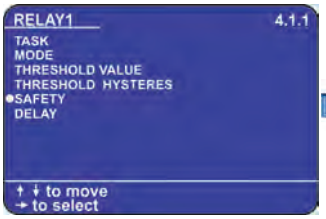
Select "**min**" for minimum level alarm or "**MAX**" for maximum level alarm.
Press RIGHT to confirm.

8.4.3 Select "**THRESHOLD VALUE**" to set the relay switching point and press RIGHT to confirm.



Set m^3 or in l the volume threshold value(depending on the parameter **3.9.2** in paragraph 8.1.2/8.2.2). Set m^3 or in l the volume threshold value.
Move the cursor with RIGHT and UP to change the digit.
Confirm with ENTER.

8.4.4 To set the relay alarm condition status select "**SAFETY**" and confirm with RIGHT .



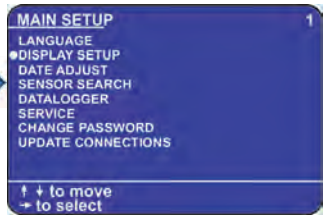
Select:
"**YES**" relay de-energized in alarm condition;
"**NO**" relay energized in alarm condition.
Press RIGHT to confirm.

Press 2 times LEFT to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

8.5 Configuration of displaied measures

The **VLW90M** can display the level measurement.

With the arrow keys select the "**MAIN SETUP**" menu icon. Confirm the selection by pressing ENTER



Press UP or DOWN to select "**DISPLAY SETUP**". Confirm with RIGHT.

8.5.1 Press DOWN to select "**DISPLAY MEASURES**" and confirm with RIGHT.

With the ● pointer to "**VOLUME1**", press ENTER, the ✱ symbol will highlight the selection. Press RIGHT to save and exit.
"**VOLUME2**" are available only when active

Press 2 times ESC to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

9. PUMP CONTROL SET UP GUIDES

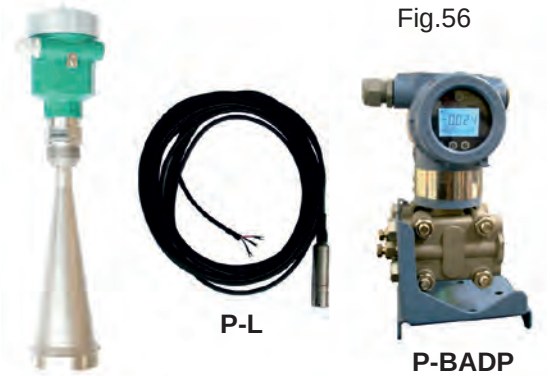
The procedures for pump control quick start are available in this section:

- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **9.1** (pag.44)
- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **9.2** (pag.46)

Fig.55

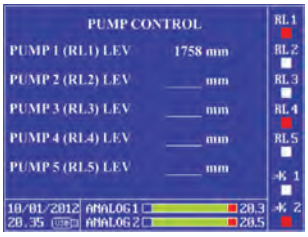
PTU51 **PTU56** **METER** **KTU5**

Fig.56



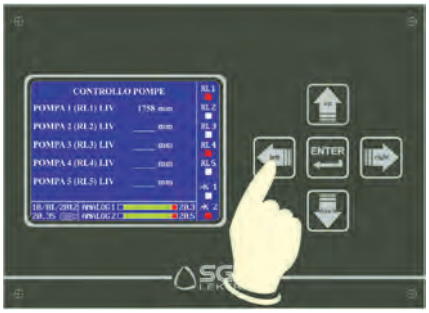
RPL/RWL **P-L** **P-BADP**

- **Measures display configuration**; paragraph **9.3** (pag.48)



From **RUN** mode press  to access the main menu

Fig.57

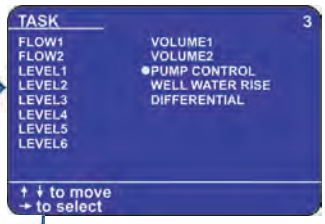


9.1 via MODBUS SGM LEKTRA ultrasonic transmitters configuration

The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the level measurement total control with the **VLW90M** unit. The fundamental importance parameters, to obtain the correct pump control, are highlighted with the symbol. To configure the volume measurement with **SGM LEKTRA** ultrasonic transmitters follow the procedure below:

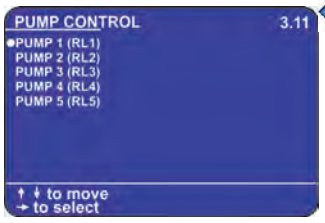
With the arrow keys select the "**TASK**" menu icon.

Confirm the selection by pressing ENTER

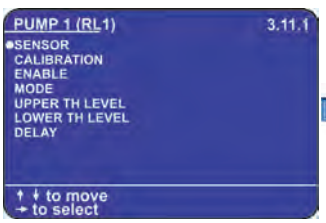


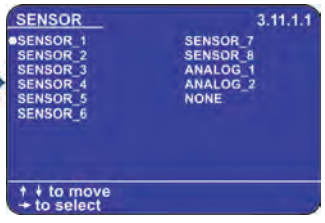
Select submenu "**PUMP CONTROL**" and Press 

Select "**PUMP 1**", or "**PUMP 2**", or "**PUMP 3**" or "**PUMP 4**" or "**PUMP 5**" with 



9.1.1 Press  to select "**SENSOR**"





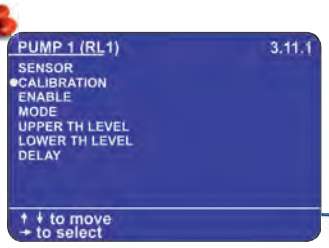
Select the **SENSOR_x** with  or  .

The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press  to confirm.

Continued to next page

Press to select the measure condition in error state.
Press to confirm.

9.1.2 Press to select "**CALIBRATION**" and press .



Enter the empty and full distance in mm (see fig.58).
Press to select the measure to be set. Move the cursor with and press to change the digit.
Confirm with .

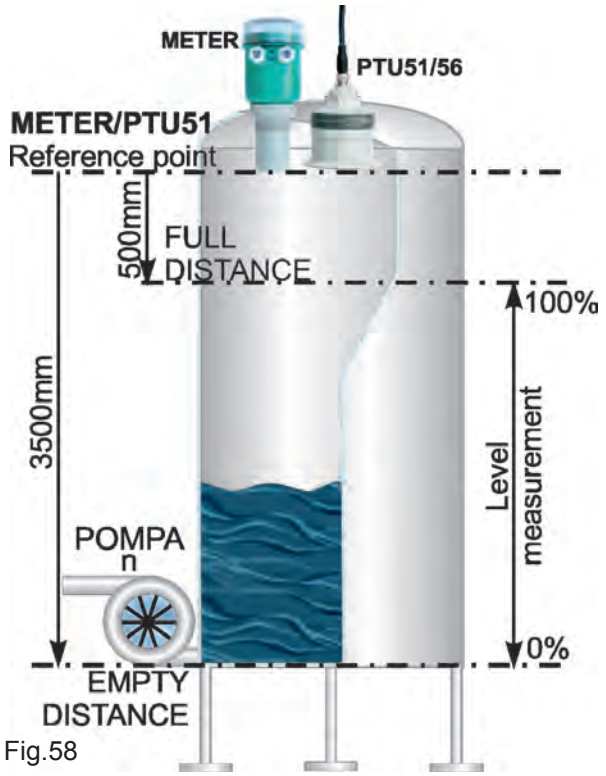
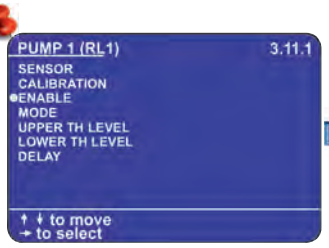
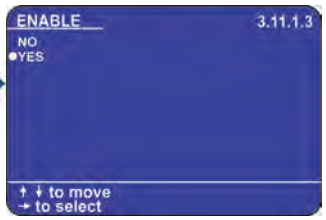


Fig.58

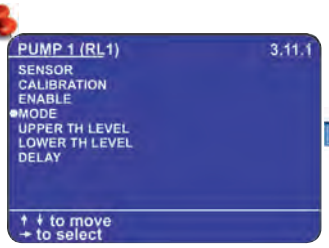
9.1.3 Press to select "**ENABLE**" and press .

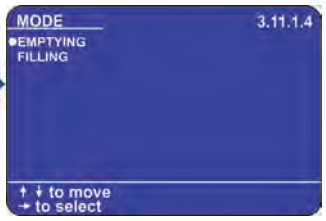




Press or to select "**YES**".
Confirm with .

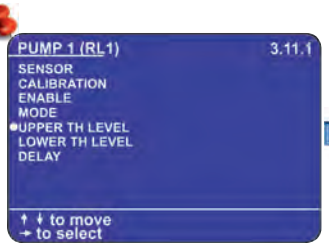
9.1.4 Press to select "**MODE**".
Confirm with .





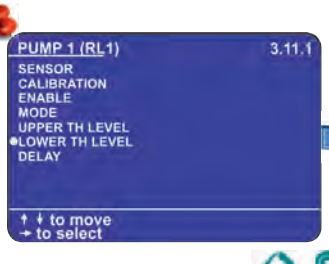
Press or to select "**EMPTYNG**" or "**FILLING**".
Confirm with .

9.1.5 Press to select "**UPPER TH LEVEL**".
Confirm with .



Set in mm the upper threshold level value (see fig.59). Move the cursor with and to change the digit·
Confirm with .

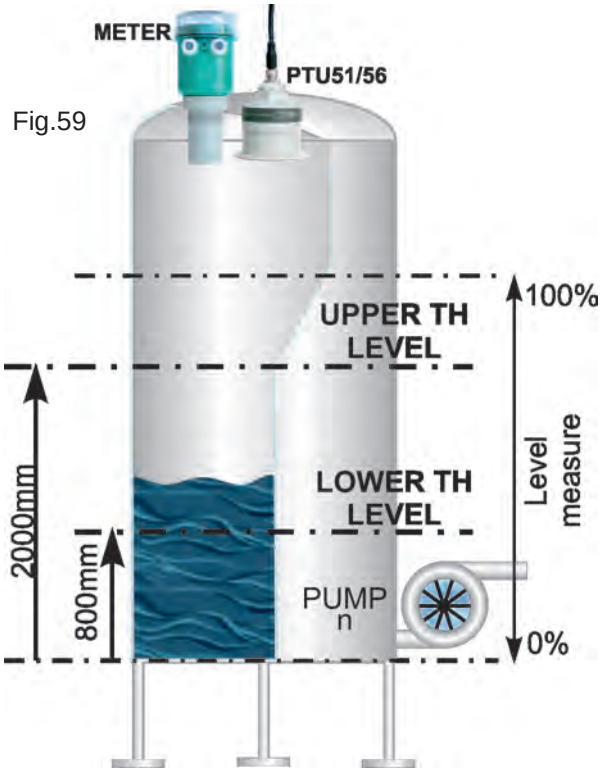
9.1.6 Press to select "**LOWER TH LEVEL**".
Confirm with .



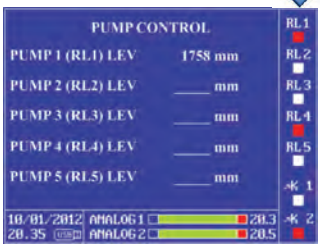
Continued to next page

Set in mm the lower threshold level value (see fig.59). Move the cursor with [right] and [up] to change the digit.
Confirm with [ENTER].

Fig.59



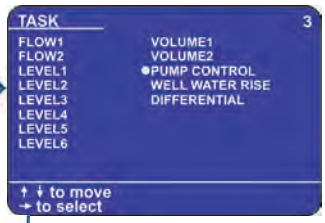
Press 2 times [left] to return to the main menu. Select [BK] and press [ENTER] to return to "**RUN**" mode



9.2 4÷20mA analog transmitter configuration

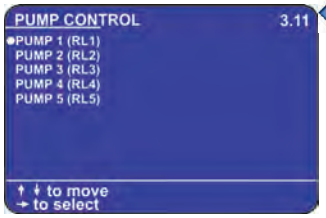
With the 2 **VLW90M** analog inputs is possible to control the measurement with any level sensor that transmits an **4÷20mA** analog signal. The fundamental importance parameters, to obtain the correct pump control, are highlighted with the [pin] symbol. To configure the pump control with **4÷20mA** analog level transmitters follow the procedure below:

With the arrow keys select the "**TASK**" [TASK] menu icon.
Confirm the selection by pressing [ENTER]

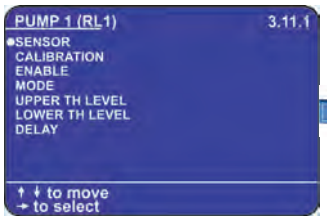


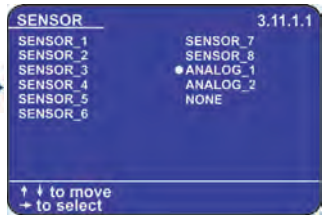
Select submenu "**PUMP CONTROL**" and Press [right]

Select "**PUMP 1**", or "**PUMP 2**", or "**PUMP 3**" or "**PUMP 4**" or "**PUMP 5**" with [right]



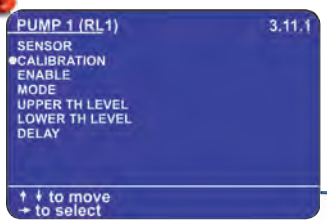
9.2.1 Press [right] to select "**SENSOR**"





Select the **ANALOG_x** input with [up] or [down].
ANALOG_1 is associated with the sensor connection to **Analog Input Ch1** terminals; **ANALOG_2** is associated with the sensor connection to **Analog Input Ch2** terminals (see par.3.4/3.5 at pages 8/9). Press [right] to confirm.

9.2.2 Press to select "**CALIBRATION**" and press .



Enter the level value at 4mA and 20mA (fig.60; RPL56 radar level sensor application).
Press to select the measure to be set, Move the cursor with and press to change the digit.
Confirm with .

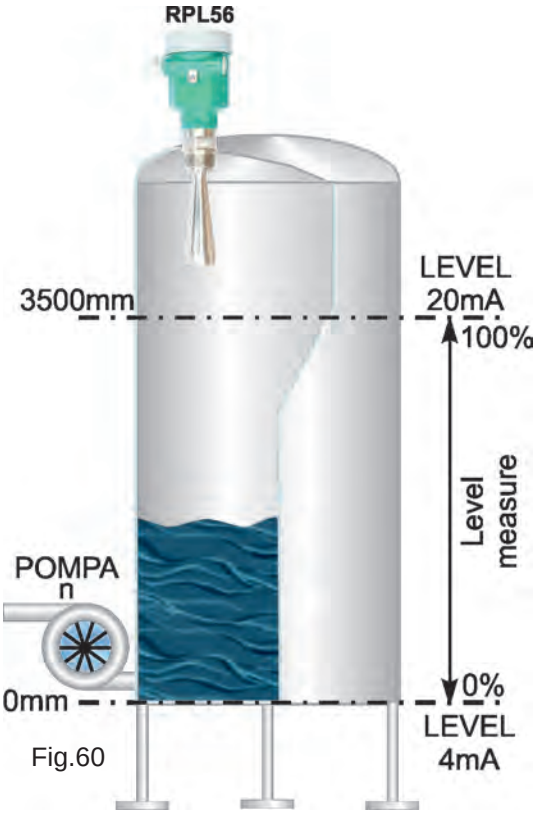
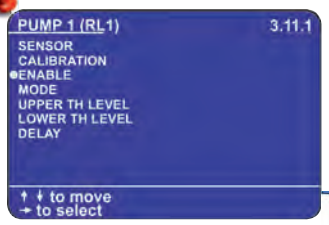
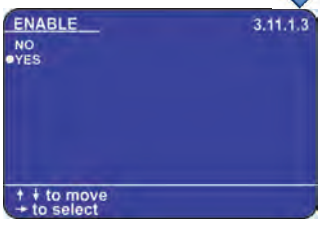


Fig.60

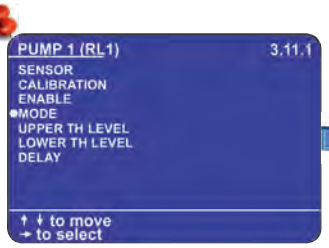
9.2.3 Press to select "**ENABLE**" and press .

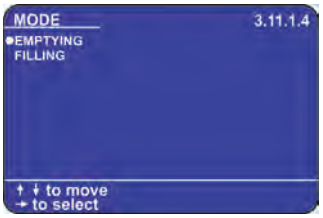


Press or to select "**YES**".
Confirm with .



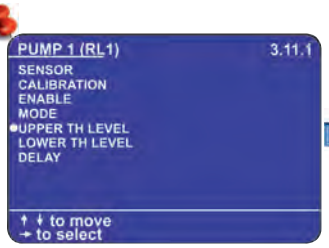
9.2.4 Press to select "**MODE**".
Confirm with .





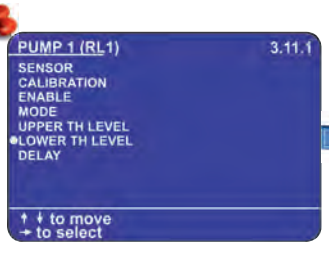
Press or to select "**EMPTYNG**" or "**FILLING**".
Confirm with .

9.2.5 Press to select "**UPPER TH LEVEL**".
Confirm with .



Set in mm the upper threshold level value (see fig.61). Move the cursor with and to change the digit·
Confirm with .

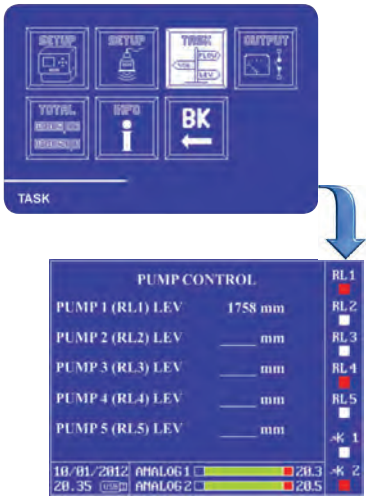
9.2.6 Press to select "**LOWER TH LEVEL**".
Confirm with .



Continued to next page

Set in mm the lower threshold level value (see fig.61). Move the cursor with [→] and [↑] to change the digit.
Confirm with [ENTER].

Press 2 times [←] to return to the main menu. Select [BK] and press [ENTER] to return to "**RUN**" mode



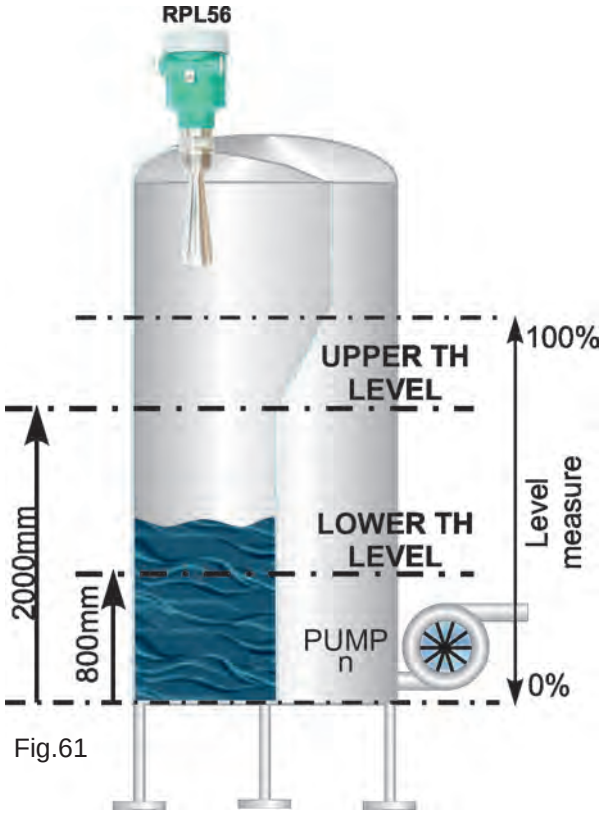
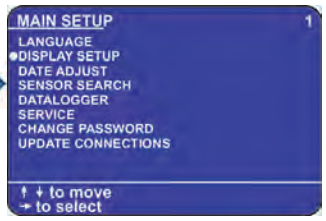


Fig.61

9.3 Configuration of displaied measures

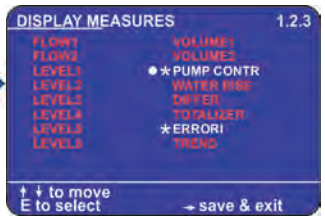
The **VLW90M** can display the level measurement.

With the arrow keys select the "**MAIN SETUP**" [SETUP] menu icon. Confirm the selection by pressing [ENTER]



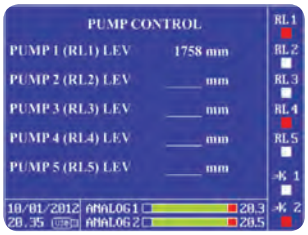
Press [↑] or [↓] to select "**DISPLAY SETUP**".
Confirm with [→].

9.3.1 Press [↓] to select "**DISPLAY MEASURES**" and confirm with [→].



With the ● pointer to "**PUMP CONTR**", press [ENTER] the ✱ symbol will highlight the selection. Press [→] to save and exit.

Press 2 times [←] to return to the main menu. Select [BK] and press [ENTER] to return to "**RUN**" mode



10. WELL WATER RISE SET UP GUIDES

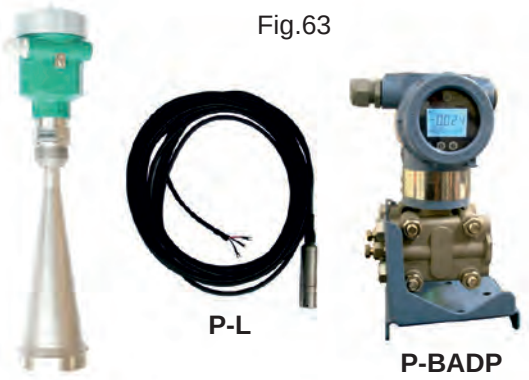
The procedures for pump control quick start are available in this section:

- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **10.1** (pag.49)
- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **10.2** (pag.51)

Fig.62

PTU51 **PTU56** **METER** **KTU5**

Fig.63



RPL/RWL **P-L** **P-BADP**

- **Measures display configuration**; paragraph **10.5** (pag.53)

From **RUN** mode press  to access the main menu

Fig.64

10.1 via MODBUS SGM LEKTRA ultrasonic transmitters configuration

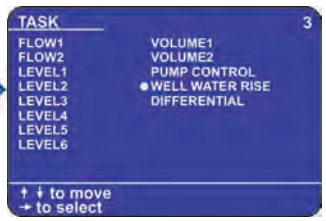
The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the level measurement total control with the **VLW90M** unit.

The fundamental importance parameters, to obtain the correct pump control, are highlighted with the  symbol.

To configure the well water rise with **SGM LEKTRA** ultrasonic transmitters follow the procedure below:

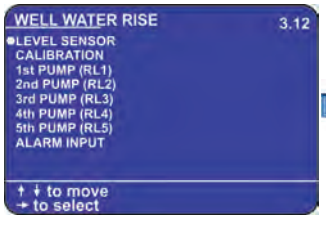
With the arrow keys select the "**TASK**"  menu icon.

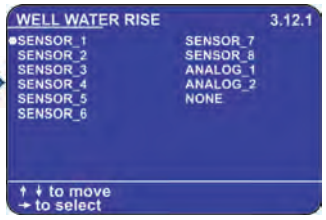
Confirm the selection by pressing 



Select submenu "**WELL WATER RISE**" and Press 

10.1.1 Press  to select "**SENSOR**"



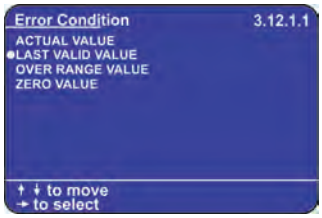


Select the **SENSOR_x** with  or  .

The sensor **UID** address identifies the sensor number: ex. sensor with **UID 1** address = **SENSOR_1**, etc.. Press  to confirm.

Continued to next page

Press to select the measure condition in error state.
Press to confirm.



10.1.2 Press to select "**CALIBRATION**" and press .

Enter the empty and full distance in mm (see fig.65).
Press to select the measure to be set, Move the cursor with and press to change the digit. Confirm with .

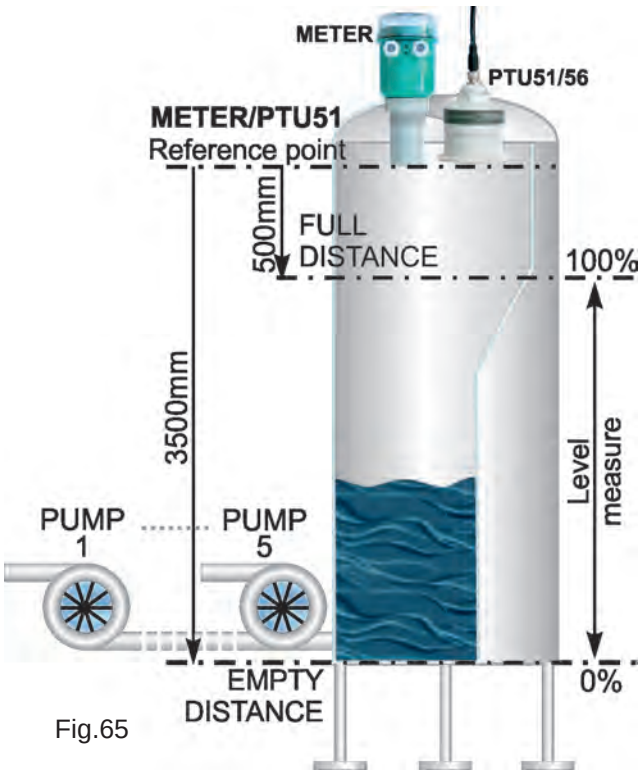
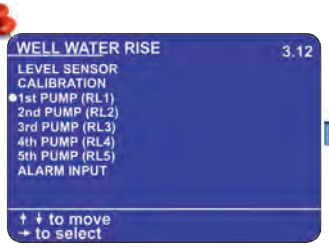
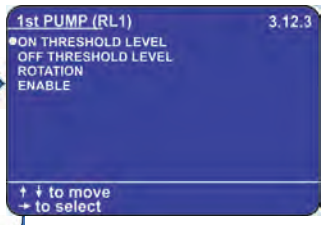


Fig.65

10.1.3 Press to select "**1st PUMP**", or "**2st PUMP**", or "**3st PUMP**", or "**4st PUMP**" or "**5st PUMP**".
Confirm with .

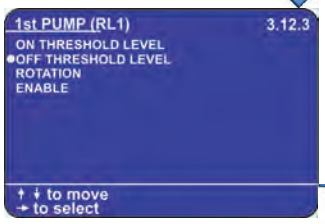




Press to select "**ON THRESHOLD LEVEL**" and press .

Set in mm the on threshold level value (see fig.66).
Move the cursor with and to change the digit.
Confirm with .

Press to select "**OFF THRESHOLD LEVEL**" and press .



Set in mm the off threshold level value (see fig.66).
Move the cursor with and to change the digit.
Confirm with .

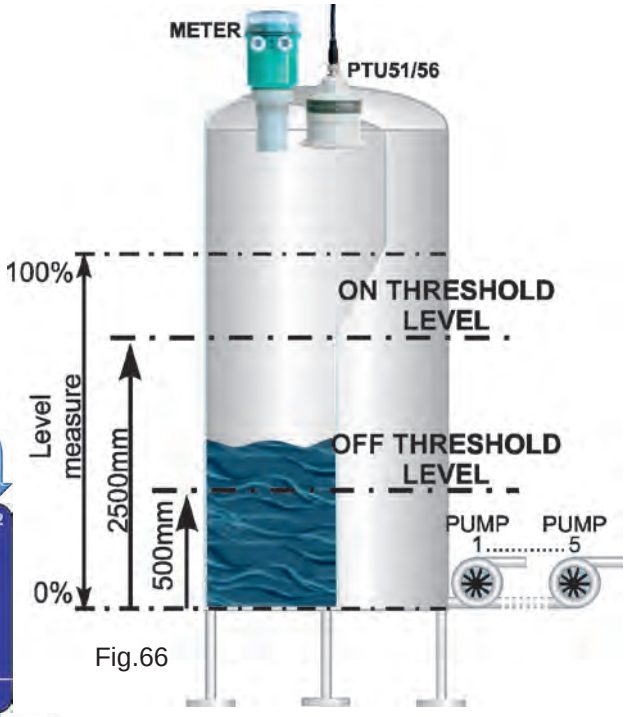
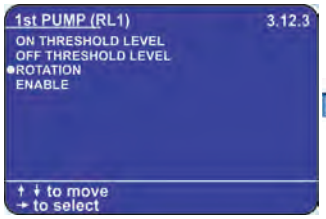
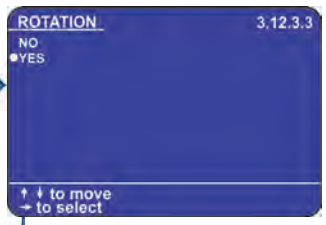


Fig.66

Continued to next page

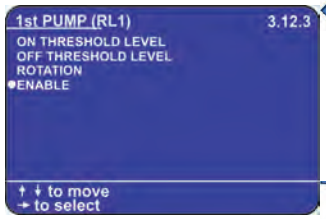
Press to select "**ROTATION**" and press .





Select "**YES**" to enter the pump operating cycle in the working times table. The pump that has accumulated the lowest operation time will be turned on for the first.
Press to confirm.

Press to select "**ENABLE**" and press .



Press or to select "**YES**".
Confirm with .

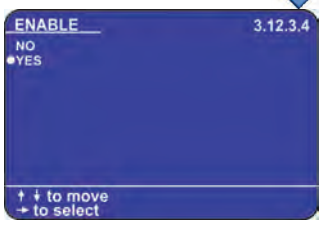


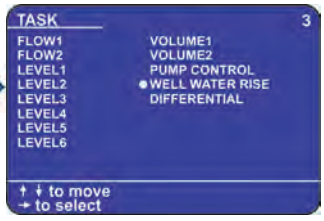
Fig.67

Press 3 times to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode

10.2 4÷20mA analog transmitter configuration

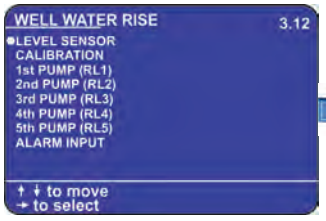
With the 2 **VLW90M** analog inputs is possible to control the measurement with any level sensor that transmits an **4÷20mA** analog signal. The fundamental importance parameters, to obtain the correct pump control, are highlighted with the symbol. To configure the well water rise with **4÷20mA** analog level transmitters follow the procedure below:

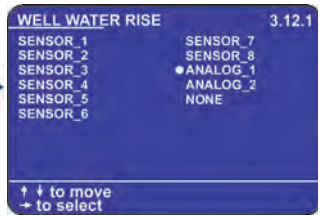
With the arrow keys select the "**TASK**" menu icon.
Confirm the selection by pressing ENTER



Select submenu "**WELL WATER RISE**" and Press

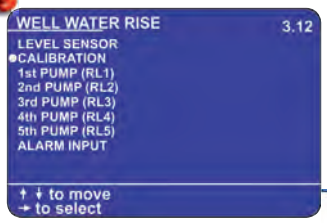
10.2.1 Press to select "**SENSOR**"





Select the **ANALOG_x** input with or .
ANALOG_1 is associated with the sensor connection to **Analog Input Ch1** terminals; **ANALOG_2** is associated with the sensor connection to **Analog Input Ch2** terminals (see par.3.4/3.5 at pages 8/9). Press to confirm.

10.2.2 Press to select "**CALIBRATION**" and press .



Enter the level value at 4mA and 20mA (fig.68; RPL56 radar level sensor application).
Press to select the measure to be set, Move the cursor with and press to change the digit.
Confirm with .

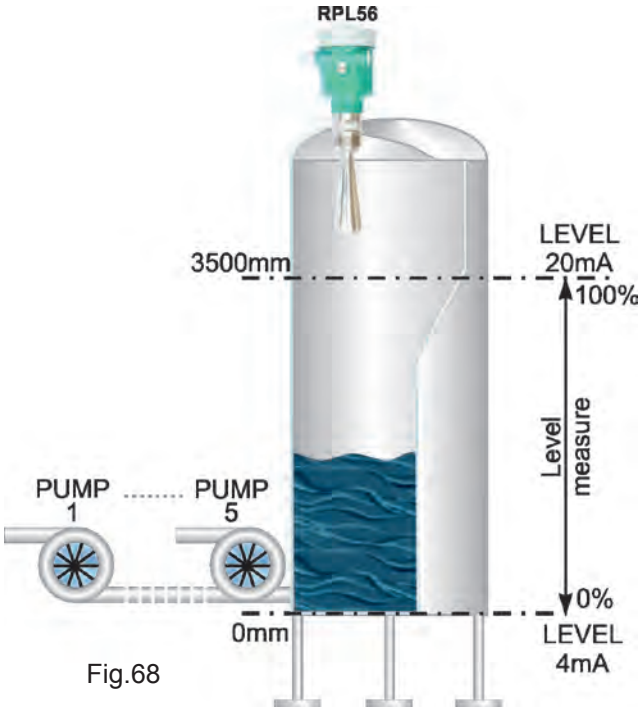
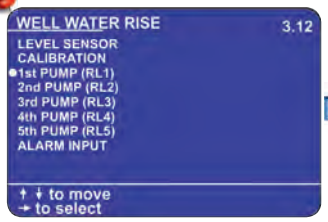
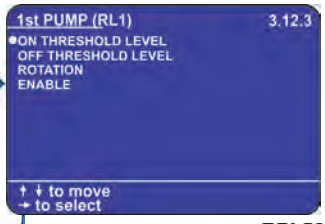


Fig.68

10.2.3 Press to select "**1st PUMP**", or "**2st PUMP**", or "**3st PUMP**", or "**4st PUMP**" or "**5st PUMP**".
Confirm with .

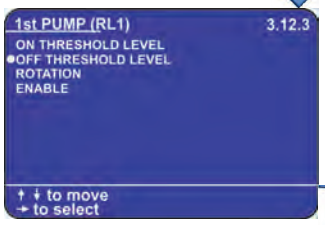




Press to select "**ON THRESHOLD LEVEL**" and press .

Set in mm the on threshold level value (see fig.69).
Move the cursor with and to change the digit.
Confirm with .

Press to select "**OFF THRESHOLD LEVEL**" and press .



Set in mm the off threshold level value (see fig.69).
Move the cursor with and to change the digit.
Confirm with .

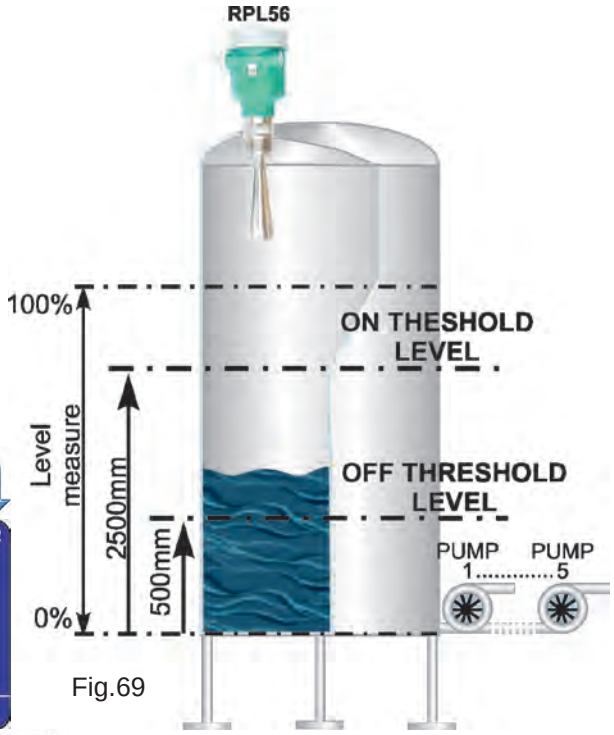
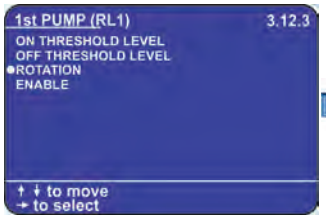
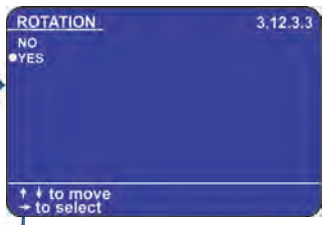


Fig.69

Continued to next page

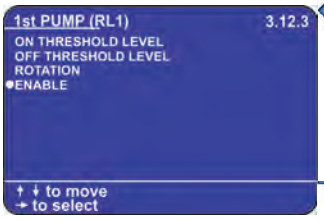
Press to select "**ROTATION**" and press .





Select "**YES**" to enter the pump operating cycle in the working times table. The pump that has accumulated the lowest operation time will be turned on for the first.
Press to confirm.

Press to select "**ENABLE**" and press .



Press or to select "**YES**".
Confirm with .

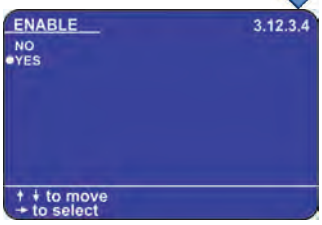


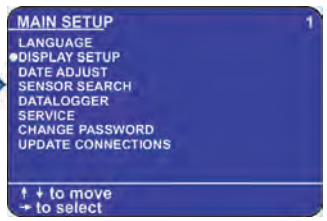
Fig.70

Press 3 times to return to the main menu. Select and press to return to "**RUN**" mode

10.3 Configuration of displaied measures

The **VLW90M** can display the well water rise level and working time table.

With the arrow keys select the "**MAIN SETUP**" menu icon. Confirm the selection by pressing



Press or to select "**DISPLAY SETUP**".
Confirm with .

10.3.1 Press to select "**DISPLAY MEASURES**" and confirm with .

With the ● pointer to "**WATER RISE**", press the ✱ symbol will highlight the selection. Press to save and exit.

Press 2 times to return to the main menu. Select and press to return to "**RUN**" mode

11. METER OR PTU51/56 SENSOR Via MODBUS NEW CONNECTION

The procedures for **METER** or **PTU51/56** sensor Via **MODBUS** new connection quick start are available in this section:

- **via MODBUS SGM LEKTRA ultrasonic transmitters configuration**; paragraph **11.1** (pag.54)

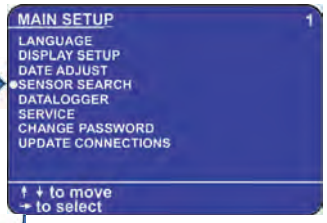
Fig.71

11.1via MODBUS SGM LEKTRA ultrasonic transmitters configuration

The use of **SGM LEKTRA** ultrasonic level transmitters, with **MODBUS RTU** communication protocol, allows the total sensor control with the **VLW90M** unit.

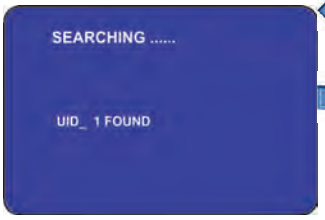
WARNING - Disconnect all PTU51/56 or METER transmitters and only connect the new PTU51/56 or METER transmitter to configure

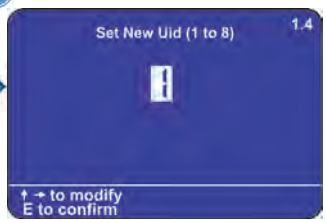
11.1.1 With the arrow keys, select the "**MAIN SETUP**" menu icon. Press ENTER to confirm.



Press UID or to select "**SENSOR SEARCH**". Confirm with RIGHT.

The display will show the **UID** address of the new connected transmitter. Normally the new transmitters have the **UID 1** address

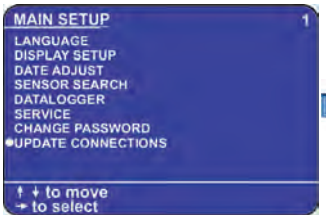




Set the **UID** address of the new connected transmitter.
NB - The transmitters connected to the same **VLW90M** must have different **UID** addresses from each other.
Press ENTER to confirm.

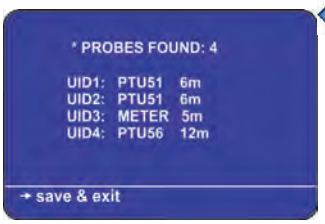
WARNING - Reconnect all PTU51/56 or METER transmitter

11.1.2 Press DOWN to select "**UPDATE CONNECTIONS**" and press RIGHT.



The display will show the search bar graph progress of the connected transmitters.

The display shows the connected sensors number, the model and the maximum measurement distance.
Press RIGHT to save and exit.



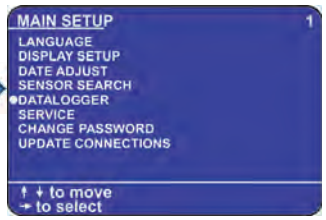
12. DATALOGGER

The guides for integrated **DATALOGGER** are available in this section:

12.1 DATALOGGER on USB Pen Drive activation

The fundamental importance parameters are highlighted with the symbol.

With the arrow keys, select the "**MAIN SETUP**" menu icon. Press ENTER to confirm.

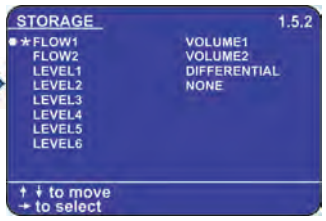


Press or to select "**DATALOGGER**". Confirm with .

12.1.1 Press to select "**WRITE RATE**" and press .

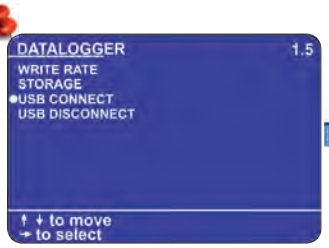
Enter the interval time, in sec., for data storage. Move the cursor with and to change the digit. Confirm with ENTER.

12.1.2 Press to select "**STORAGE**" and press .



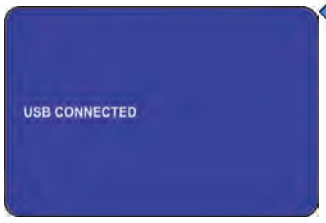
Position the pointer on the task to be stored. Pressing ENTER, the ✱ symbol will highlight the selection. Press to save and exit. Only the activated functions are selectable.

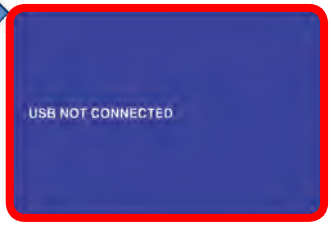
12.1.3 Only if the Pen Drive is inserted into the **USB** port after turning on the **VLW90M**, select "**USB CONNECT**" and confirm with .



Wait until the system finds the connected pen drive to the **VLW90M USB** port.

The Pen Drive is connected to the system. The "**USB CONNECTED**" message is displayed and the data logger is enabled to write data to the "**LOG_FILE.TXT**" file.



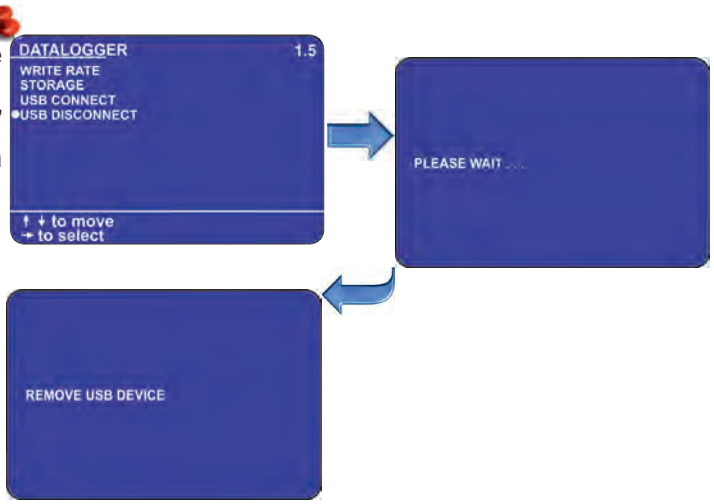


Connection failed. The message "**USB NOT CONNECTED**" is displayed. Check:
a) connection to the **USB** port
b) that the Pen Drive formatting mode (File System) is "**FAT32**"

12.2DATALOGGER on USB Pen Drive file reading

The fundamental importance parameters are highlighted with the symbol.

12.2.1 Before removing the Pen Drive to read the file, select "**USB DISCONNECT**" with the and confirm with .



Wait until the system disconnects the Pen Drive from the **VLW90M USB** port.

The message "**REMOVE USB DEVICE**" is displayed. Is now possible to remove the pen drive.

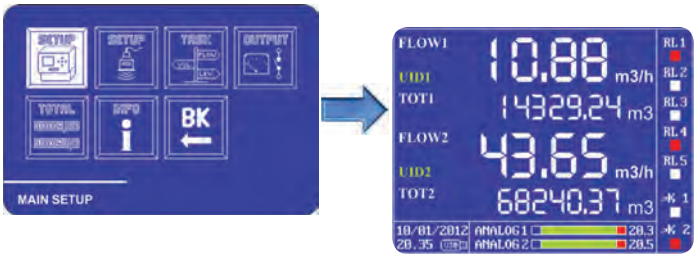
12.2.2 To read the stored data, simply insert the pen drive into a PC or a notebook **USB** port and open the "**LOG_FILE.TXT**" datalogger file directly with **EXCEL**® or **CALC** by OpenOffice.org™.
The following data are available in the table DATA LOGGER (columns):

DATE
TIME
TASK
UID (ultrasonic sensor UID address)
FLOW (flow rate measure)
unit (flow rate measure unit)
TOT (flow totalizer volume)
unit (flow totalizer measure unit)
LEV [mm] (level measure)
VOL (volume mesure)
unit (volume measure unit)
DIFF[mm] (differential level measure)
PUMP_LEV[mm] (pump level measure)
RL1/2/3/4/5 (relay status; 0 = relay de-energized 1 = relay energized)
DIST_ERR (ultrasonic sensor distance measurement error; 0 = normal condition, 1 = error condition)
MAXGAIN_ERR (ultrasonic sensor max gain alarm; 0 = normal condition, 1 = alarm condition)
NOECHO_ERR (ultrasonic sensor echo signal reception absence; 0 = normal condition, 1 = alarm condition)
TEMP_ERR (ultrasonic sensor temperature measurement error; 0 = normal condition, 1 = alarm condition)

DATE	TIME	TASK	UID	FLOW	unit	TOT	unit	LEV[mm]	VOL	unit	DIFF[mm]	PUMP_LEV[mm]
22/05/2013	18:26:16	FLOW1	1	28513,68	l/m	2529,30	m3	0	0,00	--	0	0
22/05/2013	18:26:36	FLOW1	1	23816,33	l/m	2538,02	m3	0	0,00	--	0	0
22/05/2013	18:26:56	FLOW1	1	6636,55	l/m	2542,76	m3	0	0,00	--	0	0
22/05/2013	18:27:16	FLOW1	1	11376,47	l/m	2545,24	m3	0	0,00	--	0	0

Fig.72

Press 2 times to return to the main menu. Select BK and press ENTER to return to "**RUN**" mode



SGM-LEKTRA S.r.l. Via Papa Giovanni XXIII, 49 - 20090 Rodano (MI) - ITALY-
tel: ++39 0295328257 **fax:** ++39 0295328321
web: www.sgm-lektra.com **e-mail:** info@sgm-lektra.com