PTU50-51-56

Ultrasonic level transmitter

825B124C

Technical Data

Housing material:	**PP**
Mechanical installation:	**1"GAS M; (PP flange DN100 opt.)**
Protection degree:	**IP68**
Electrical connection:	**IP68 male connector with 5/10/15/20m linking cable**
Working temperature:	**-25° ÷ +75°C**
Pressure:	**da 0,5 a 1,5 bar (absolute)**
Power supply:	**24Vdc**
Power consumption:	**1,5W**
Analog output:	**4÷20mA max 750ohm**
Digital communication:	**MODBUS RTU**
Max measure range:	**PTU50 0.05÷1.5m; PTU51 0.3÷6m; PTU56 0,5÷12m**
[In case of non perfectly reflecting surfaces, the maximu distance value will be reduced]	
Temperature compensation:	**digital in the working temperature**
Accuracy:	**±0,2% (of the measured distance) not better than ±3mm (PTU50 ±1mm)**
Resolution:	**1mm**
Calibration:	**VLW601 prog. module with 4 buttons or by MODBUS RTU**
Warm-up:	**30 minutes typical**
LCD Display:	**matrix LCD display on VLW601 module (opt.)**

CE

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:

PTU..... 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 .....

The non intrusive system application is now preferred in the level measurements field. For this reason the **SGM-LEKTRA** developed the **PTU50**, **PTU51** and **PTU56** unity to best meet the "**GENERAL-PURPOSE**" application requests. The **PTU50**, **PTU51** and **PTU56** units are compact sensors and have a via connector quick connection. The **IP68** protection makes them suitable for external applications with direct exposure to the weather, including areas with diving hazard (up to 1m). **PTU50**, **PTU51** and **PTU56** are ultrasonic level transmitter, temperature-compensated and suitable for connection with **MODBUS RTU**.

- ***Non-contact level measurements***
- ***Suitable for liquids and granulates level measurement***
- ***Integrated digital temperature sensor to compensate the measure***
- ***MODBUS RTU communication protocol***
- ***24Vdc power supply***
- ***Mechanical protection: IP68***
- ***1 4÷20mA analog output***

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 -35° and +75°C

c) Install the transmitter in a its physical characteristics and housing/sensor construction materials compatible environment.

d) The transmitter must be used safety warnings observance.

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

2. INSTALLATION

2.1 Mechanical dimensions

The **PTU50**, **PTU51** and **PTU56** transmitter have the 1" GAS M threaded, equipped with 1" PP fixing bolt.
Also available with:

PTU50-51 - DN100 PN6 UNI 1092-1/PP flange (optional accessory)
PTU56 - DN120 PN6 UNI 1092-1/PP flange (optional accessory)

PTU50

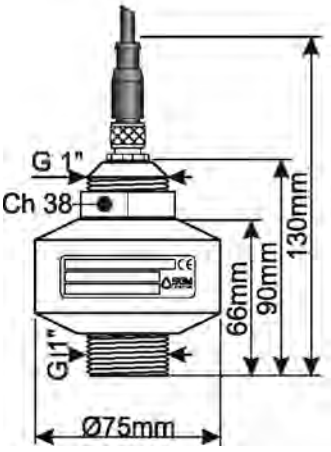


Fig.1

PTU51

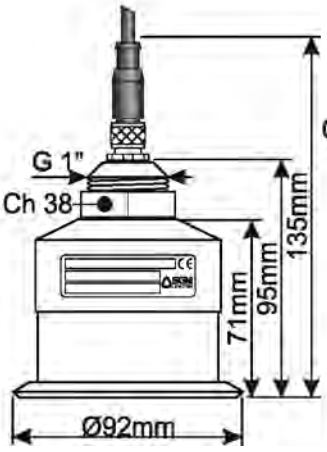


Fig.2

PTU56

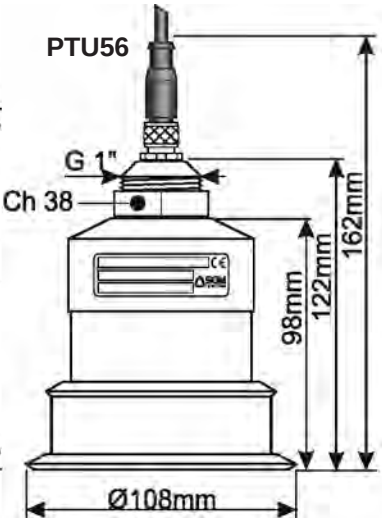


Fig.3

DN100/125 PN6 Flange
UNI 1092-1/PP
(optional accessory)

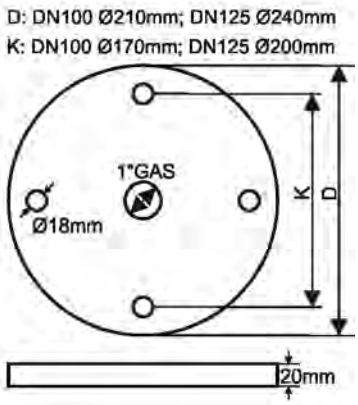


Fig.4

2.2 Mounting examples

Fig.5

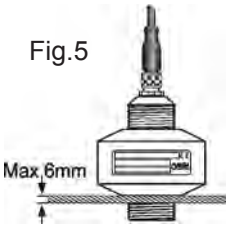


Fig.5.b

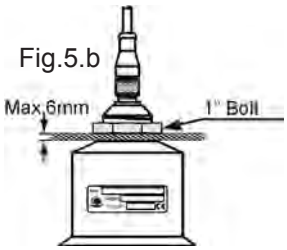


Fig.6

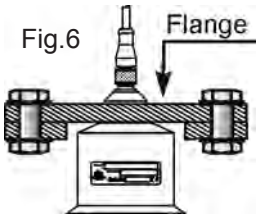
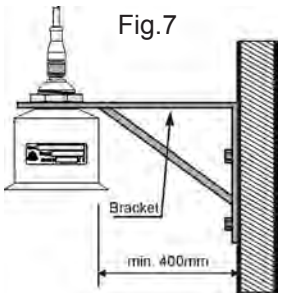


Fig.7

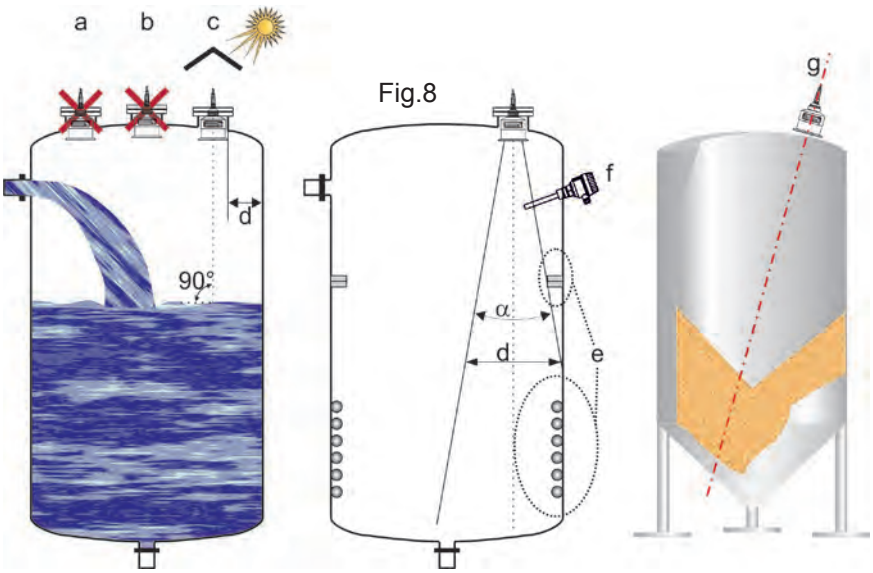


2.3 Mounting precautions

2.3.1 Mounting position (Fig.8)

- With cambered roof, Do not install the sensor in the tank center (b). Leave a 300mm minimum distance between the sensor and the tank smooth wall (d).
- Use a protective cover to protect the sensor from weather and direct sunlight (c).
- Do not install the sensor near the load zone (a).
- Make sure that in the sensor emission beam (lobe "α") there are no obstacles (f,s) that can be intercepted as level.
- Make sure that there is not foam presence on the product surface to be measured

Fig.8



Liquids

Bulk solids

	Lobe α	L	d
PTU50 6m	10°	1.5m	0.2m (1.5m)
PTU51 6m	10°	6m	0.6m (6m)
PTU56 12m	10°	12m	1m (12m)

Tab.1

2.3.1 Blind distance

During installation is important to remember that in the sensor vicinity there is a blind zone (or **BLIND DISTANCE**) of **0.05m** (for 1.5m max **PTU50** range), **0.3m** (for 6m max **PTU51** range) or **0.5m** (for 12m max **PTU56** range) where the sensor can not measure.

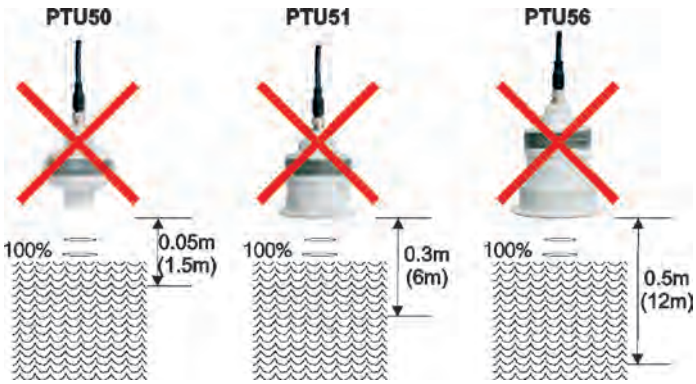


Fig.9

2.3.2 IInstallation in nozzle

Installing the **PTU50-51-56** sensor in a nozzle (see fig.10), make sure the sensor bottom protrudes at least 10 mm from the bottom nozzle

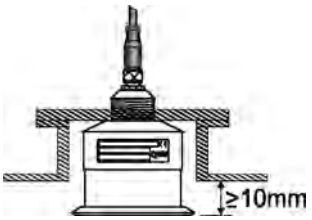


Fig.10

PTU50-51-56 can be installed in an extension pipe (see Figure 11) to turn away the sensor from the maximum level point. The extension pipe must be flat and without joints (welds, etc..), also, the pipe terminal part must be cut at 45° and with the borders without burr.

PTU50 1.5m - PTU51 6m		PTU56 12m	
D (mm)	Lmax.(mm)	D (mm)	Lmax.(mm)
100	80m	125	240
125	240	150	300
150	300		

Tab.2

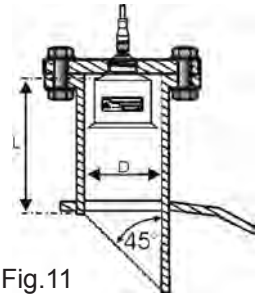


Fig.11

2.3.4 Reference pipe installation

Disturbing factors that may influence the level measurement in liquids, as for example:

- foam presence on the product surface (Fig.12)
- internal structures presence in the tank (Fig.13)
- presence on the liquid surface of floating bodies (Fig.14)

can be avoided with the use of level measurement inside of pipes (by-pass pipe or calm pipe with 100mm min. diameter for PTU50-51, or 125mm min. diameter for PTU56)

The pipe must have a length greater or equal than the empty distance, also, must have some of vent holes (Fig. 14-A) to allow the pipe regular filling and emptying.

In the programming menu, to the "**PRODUCT**" parameter, must select the "***LIQUID PIPE***" option (see page 7 or 11)

Fig.12

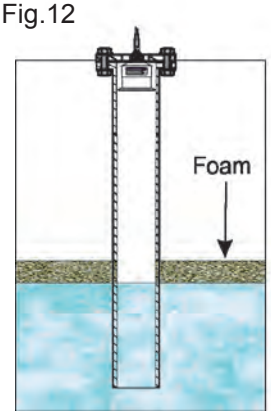


Fig.13

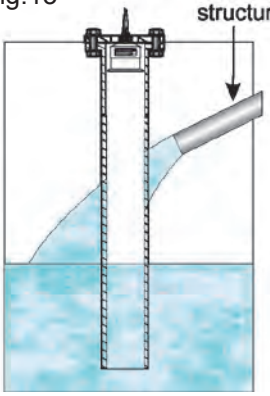


Fig.14

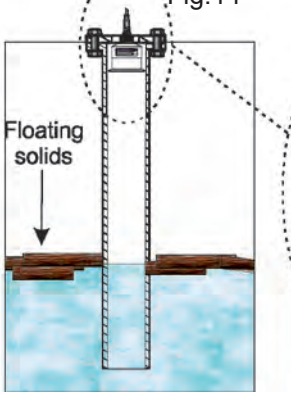
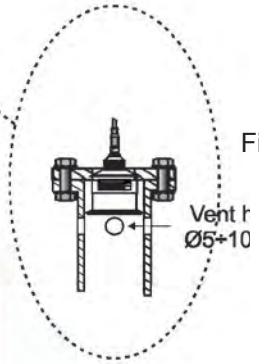


Fig.14-A



2.3.5 Agitators presence

The level measurement is possible thanks to the **Auto-Tuned** statistical filter. Should rarely need to adjust the filter setting by editing 2 **PTU50-51-56** sensor programming parameters:

- **FILTER**; this parameter is present in the **Quick Setup** menu (page 8) and in the Advanced Configuration "**SETUP**" menu (page 11); increasing the parameter value, decreases the sensor sensitivity to the level measurement sudden variations.

- **F-WINDOW**; this parameter is present in the Advanced Configuration "**SERVICE**" menu (page 18); decreasing the parameter programmed value, increases the sensor immunity to false echoes.

Fig.15

2.3.6 Mechanical installation accessories

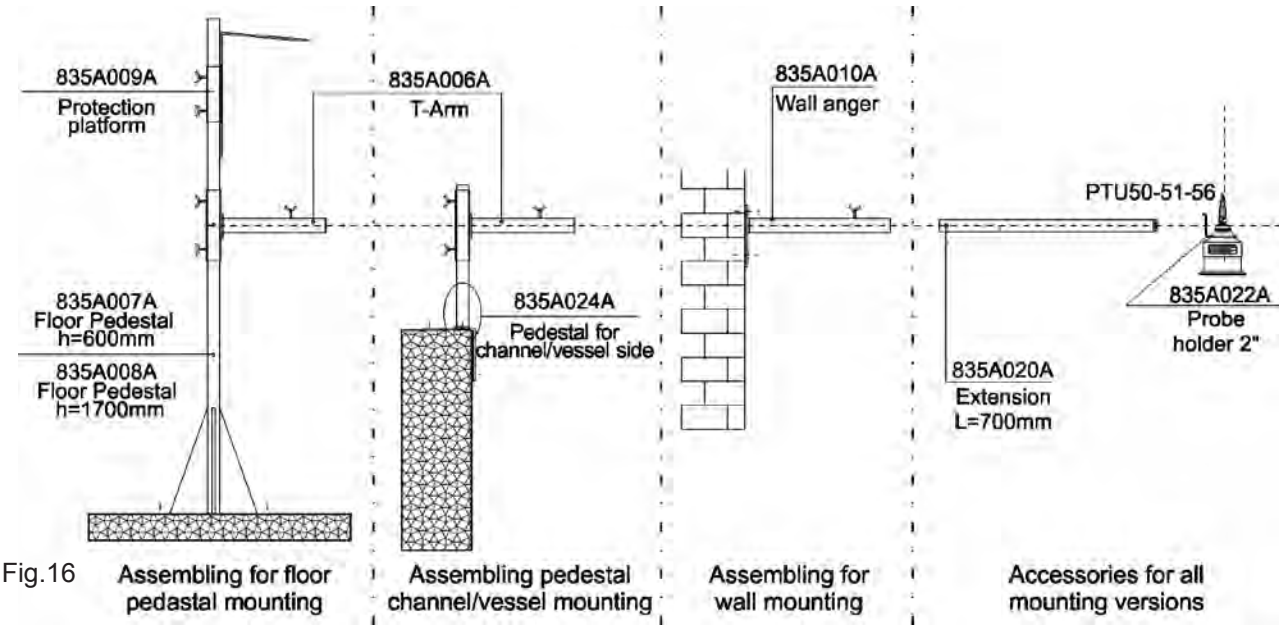


Fig.16

3. CONNECTIONS

3.1 Wiring

1) Separate the engine control cables or power cables from the **PTU5x** connection cables.
2) Isolate unused wires of the cable.
3) Fully tighten the connector ring nut

Brown	GND (0V)	**Green**	A (RS485)
Red	+24Vdc	**Blue**	B (RS485)
White	SDA Display	**Pink**	+3.3V Display
Yellow	+ 4÷20mA	**Grey**	SCL Display

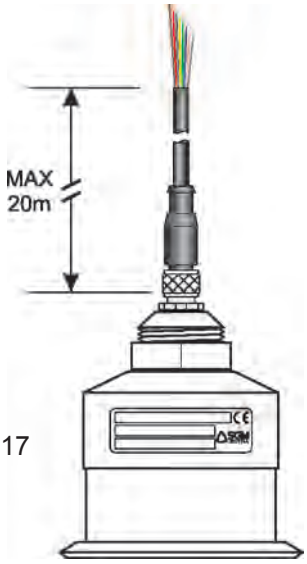


Fig.17

The immunity to electromagnetic interference complies with CE Directives

3.2 **Humidity infiltrations**

To avoid the humidity infiltration inside the connector is recommended:

- Fully tighten the connector ring nut
- position the cable so that it forms a downward curve at the M20 output (Fig. 18); in this way the condensation and/or rain water will tend to drip from the curve bottom

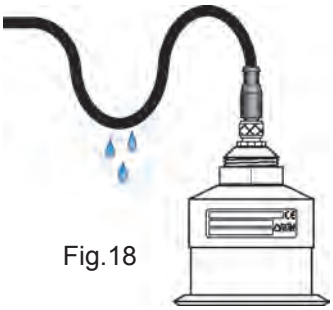


Fig.18

4. CONFIGURATION MODES

The **PTU50**, **PTU51** and **PTU56** have 2 configuration/calibration modes:
- via **MODBUS RTU**, by PC
- via **VLW601** programming module

4.1 Via MODBUS RTU

4.1.1 MODBUS RTU PC connection (fig.19)

1) **PTU50**, **PTU51** or **PTU56** with **MODBUS RTU** communication protocol
2) USB/RS485 interface module, cod.694A004A
3) **MODBUS RTU** communication S/W, cod.010F105A (3)
With this software is possible:
- connect, by selecting the **UID** address, the **PTU50**, **PTU51** or **PTU56** transmitters in **MODBUS RTU** network
- read on your PC monitor all measures in reading and **PTU50**, **PTU51** or **PTU56** operation data
- programming all **PTU50**, **PTU51** or **PTU56** configuration parameters
- storing on files, data logger function; **PTU50**, **PTU51** or **PTU56** measures in reading and operating states

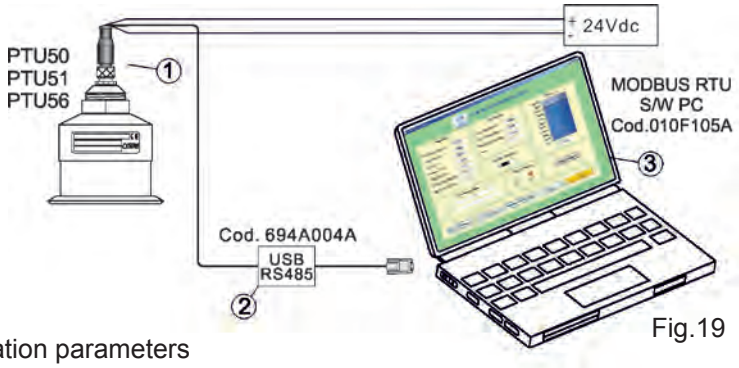


Fig.19

4.3 **via VLW601 configuration**

With the **VWL601** display module (Fig. 20) is possible to display the measured values and configure the **PTU50**, **PTU51** and **PTU56** sensors operating parameters. The **VWL601** module is equipped with matrix LCD.

displayed at the bottom indicates the correct echo signal reception

! displayed at the top alerts that there is a generic error; press to show the message that indicates the present error type.
The **PTU50**, **PTU51-56** returns automatically to RUN mode.

Fig.20

The **VLW601** program module has 4 buttons (fig. 21) which allow to perform all operational, control and programming instrument functions.

In the configuration menus, is possible:

a) Submenus and parameters access; press ⇄ to select and press OK to access.

b) Parameter options choice: Press ⇄ to select the option and press OK to store the option.
Press BK to exit without storing

c) Configure the parameter values; in some parameters the configuration is done by setting a value (eg., in the **SET DISTANCE 4mA** parameter is possible to change the the corresponding distance value, in mm): press ⇄ to select the digit to be modified (the digit is highlighted in **inverse**), press ↑ to change the highlighted digits number, press OK to save the set value and exit automatically. Press BK to exit without storing.

In the display top right, during the settings, there is always a number, eg. “1.2”. This number is the menu or parameter index that’s displayed. The menu structure is represented on page 7 and on pages 9÷10.

Fig.21

OK - Configuration access
- Options confirmation
- Parameters values confirmation

⇄ - Parameters values selection
- Parameters scroll

↑ - Parameters values modification

BK - Exit configuration
- Back to previous menu

With the VLW601 module is possible to access two configuration modes for the PTU50-51-56 setting:

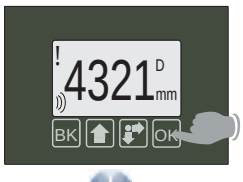
❑ QUICK START - Menu with easy access for quick basic parameters configuration.
To access: from “RUN” mode press OK to the quick setup menu mode access, BK to exit

❑ ADVANCED CONFIGURATION - Full menu with access to all parameters, including functional parameters.
It is recommended to carefully read the complete documentation before accessing.
To access: from “RUN” mode, holding down ↑ , press OK to the advanced configuration mode access, BK to exit

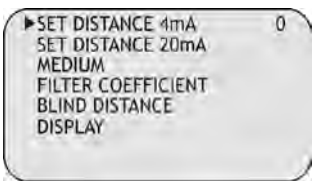
WARNING! - The documentation provided with the **PTU50-51-56** contain the most frequently used indications. If it’s necessary refer to the full manual, it can be downloaded from our website www.sgm-lektra.com , in the products section.

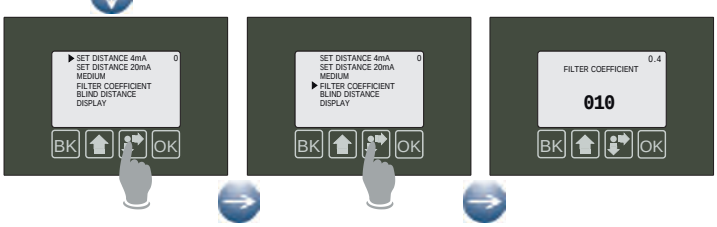
5. QUICK START MODE

From “RUN” mode press OK to access the Quick Setup menu

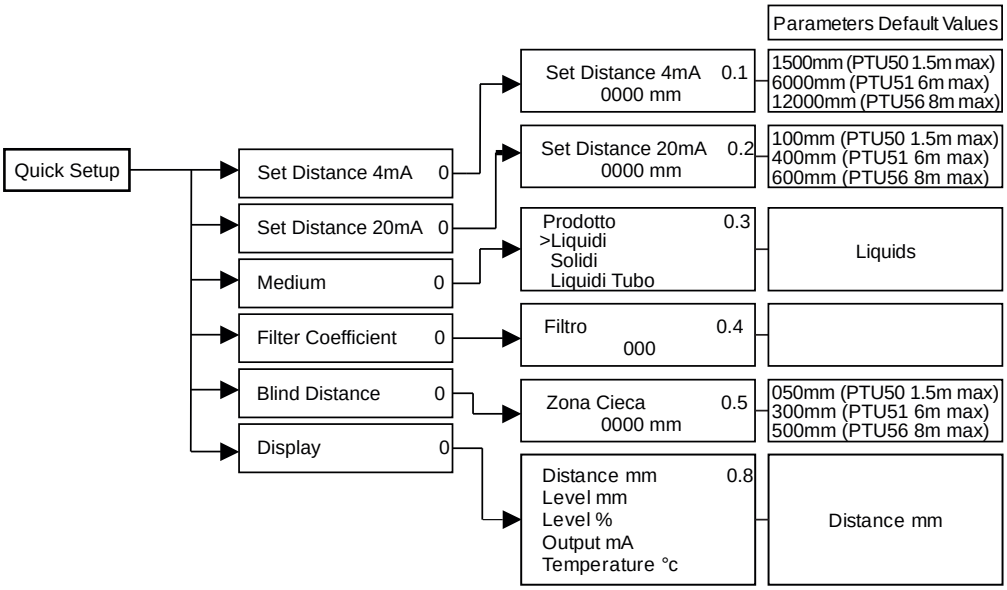


Select the parameters by moving the cursor with ⇄, and confirm with OK; press BK to exit



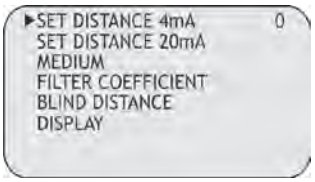


5.1 **Struttura menù di configurazione rapida**



5.1.1 SET DISTANCE 4mA

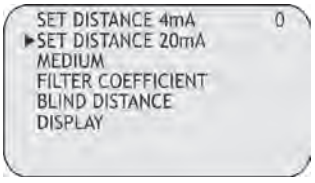
Press OK to display the distance value associated with 4mA output.



Use and to modify that value; in the Fig.22 example, the 4mA distance is 3500mm. Press OK to confirm.

5.1.2 SET DISTANCE 20mA

Press OK to display the distance value associated with 20mA output.



Use and to modify that value; in the Fig.22 example, the 20mA distance is 500mm. Press OK to confirm.

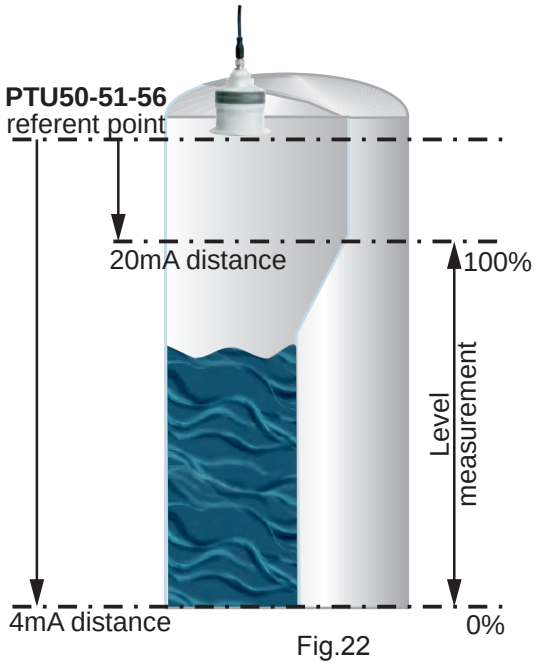
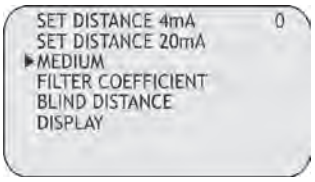


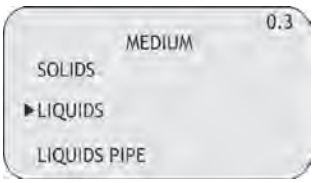
Fig.22

5.1.3 MEDIUM

Press OK to display the previous setting



Press to select the medium type.
Press OK to confirm.
In fig.23 product selection example.



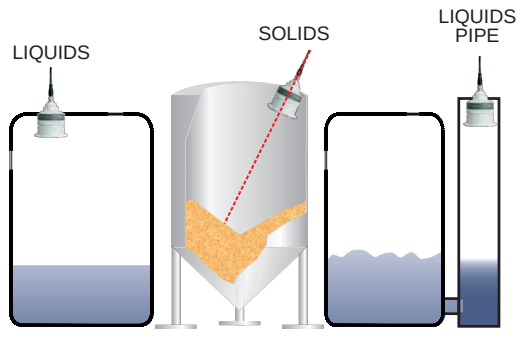
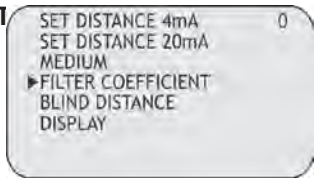


Fig.23

5.1.4 FILTER COEFFICIENT

Press OK. Increasing the value slows down the sensor response speed.



Use and to modify the value. Input a value from 1 to 99. Press OK to confirm.
In fig.24 value choice example.

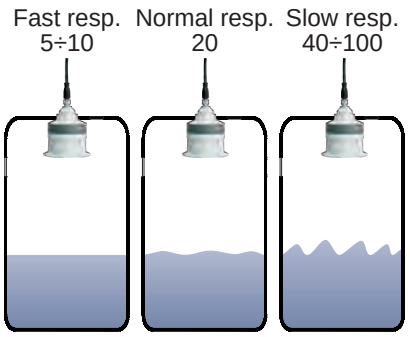
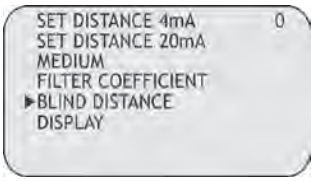


Fig.24

5.1.5 BLIND DISTANCE

Press OK. The **BLIND ZONE** is used to avoid undesired measures near to the transmitter
Use and to modify the value. Press OK to confirm. The minimum value is 50mm (PTU50), or 300mm (PTU51) or 500mm (PTU56).



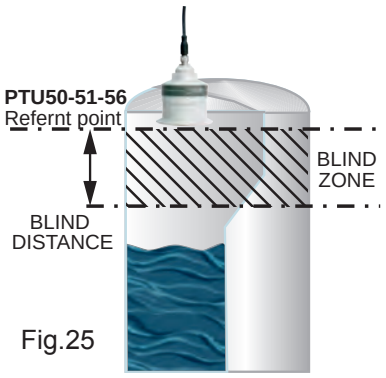
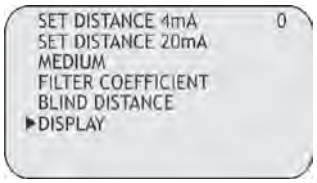
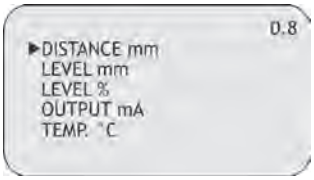


Fig.25

5.1.8 DISPLAY

Press OK to access the settings change.





With the button is possible to select the data to display
Press OK to confirm.

5.2 ECHO MAP

Pressing the **BK**, from RUN mode, to access directly to the echoes digital map display, which are in **PTU50-51-56** receiving (Fig.26).
This function is useful for:
- properly orient the transducer pointing.
- verify the echoes in acquisition correctness.
- identify any false echo signals that may cause measurement errors.

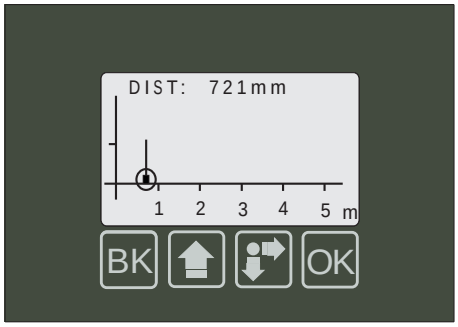


Fig.26

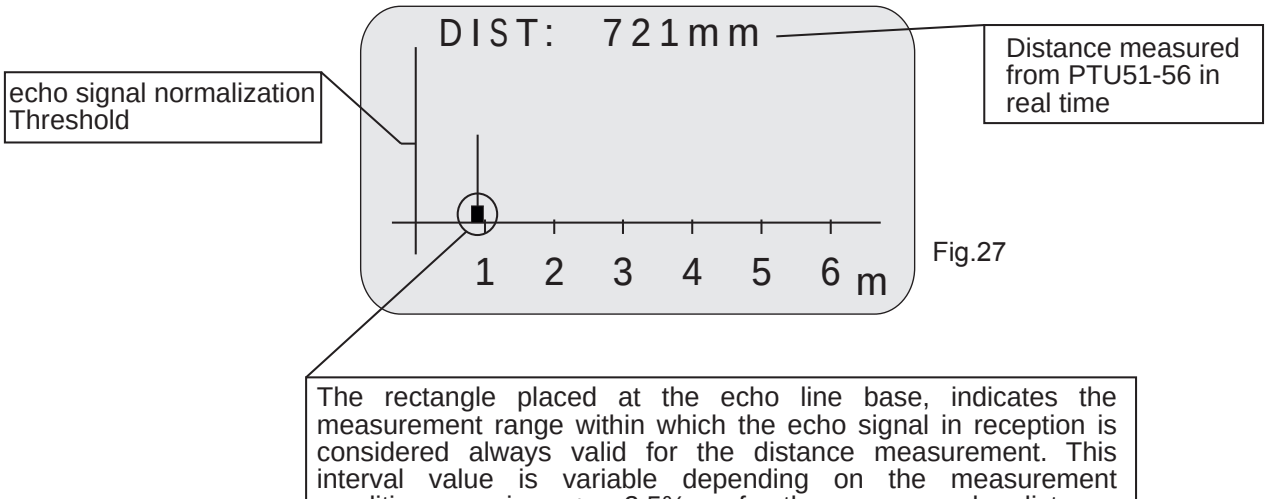


Fig.27

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 Pages from 9 to 20 (full manual) can be downloaded from our website www.sgm-lektra.com in the products section