RIL390-91-96
Ultrasonic level transmitter

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: **RIL390 0.05÷1.5m; RIL391 0.3÷6m;**

RIL396 0,5÷12m
 [In case of non perfectly reflecting surfaces, the maximu
Accuracy: **digital in the working temperature not better than ±3mm (RIL390 ±1mm**
Resolution: **)1mm**
Calibration: **VLW601 prog. module with 4 buttons or by MODBUS RTU30 minutes**
Warm-up: **typical**
LCD Display: **matrix LCD display on VLW601 module (opt.)**

PTU50

PTU51

PTU56

CE

The non intrusive system application is now preferred in the level measurements field. For this reason the **RIELS** developed the **RIL390**, **RIL391** and **RIL396** unity to best meet the " **GENERAL-PURPOSE**" application requests. The **RIL390**, **RIL391** and **RIL396** 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). **RIL390**, **RIL391** and **RIL396** 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 **RIL390**, **RIL391** and **RIL396** transmitter have the 1" GAS M threaded, equipped with 1" PP fixingbolt.
Also available with:

    RIL390-51 - DN100 PN6 UNI 1092-1/PP flange (optional accessory)
   **RIL396**   - DN120 PN6 UNI 1092-1/PP flange (optional accessory)

RIL390 — Fig.1

RIL391 — Fig.2

RIL396 — Fig.3

DN100/125 PN6 Flange UNI 1092-1/PP (optional accessory)
D: DN100 Ø210mm; DN125 Ø240mm
K: DN100 Ø170mm; DN125 Ø200mm
Fig.4

2.2 Mounting examples

Fig.5
Max,6mm

Fig.5.b
Max,6mm   1" Bolt

Fig.6
Flange

Fig.7
Bracket
min. 400mm
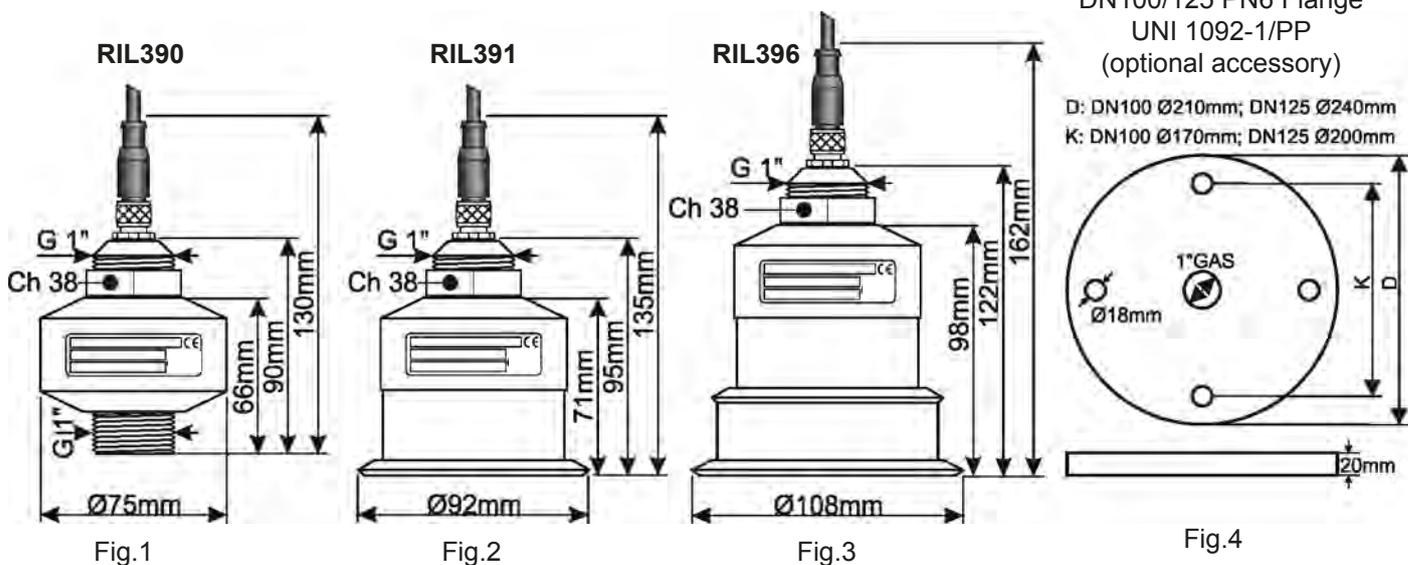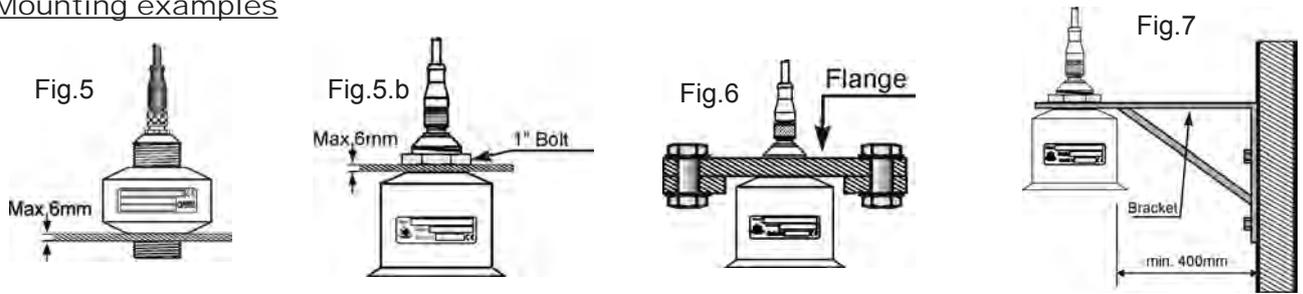
2.3 Mounting precautions

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
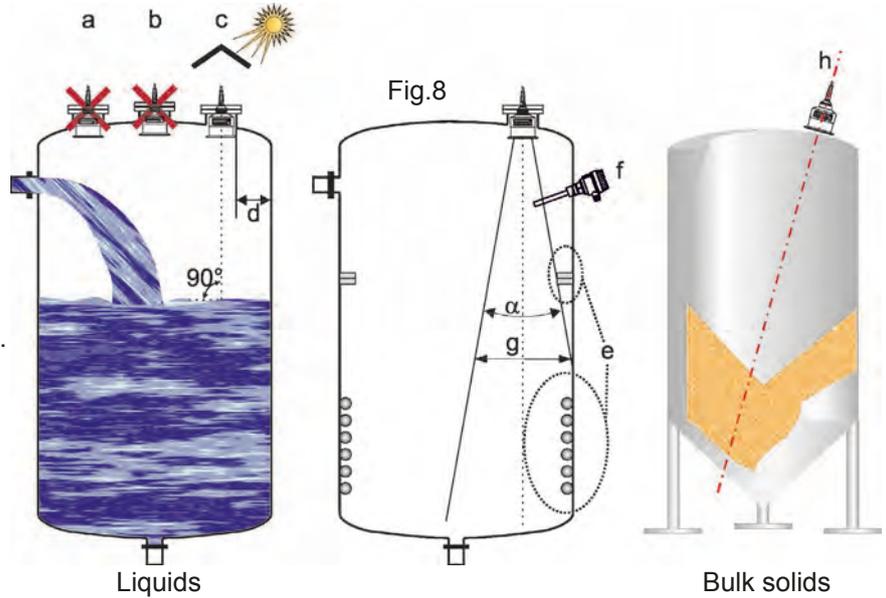
	Lobo α	L	g
RIL390 1.5m	10°	1.5m	0.3m (1.5m)
RIL391 6m	10°	6m	1.1m (6m)
RIL396 12m	10°	12m	2m (12m)

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 **RIL390** range), **0.3m** (for 6m max **RIL391** range) or **0.5m** (for 12m max **RIL396** range) where the sensor can not measure.

PTU50   PTU51   PTU56
100% 0.05m (1.5m)   100% 0.3m (6m)   100% 0.5m (12m)
Fig.9
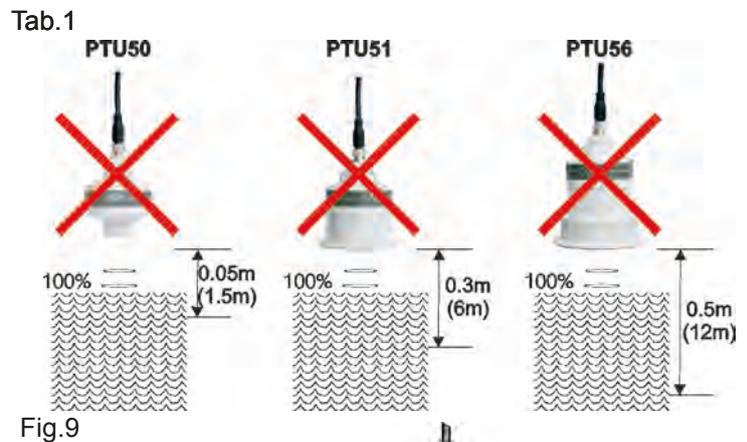
2.3.2 IInstallation in nozzle

Installing the **RIL390-91-96** sensor in a nozzle (see fig.10), make sure the sensor bottom protrudes at least 10 mm from the bottom nozzle

≥10mm
Fig.10
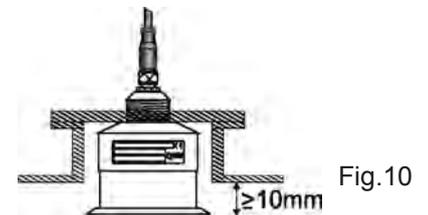
RIL390-91-96 can be installed in an extension pipe (see Figure 11) to turn away the sensor
from the maximum level point. The extension pipe must be flat and without joints (welds, etc..), also, the pipe terminal part must be cut at 45° and with the borders without burr.

RIL390 1.5m - RIL391 6m		RIL396 12m	
D (mm)	Lmax(mm)	D (mm)	Lmax(mm)
100	180	125	240
125	240	150	300
150	300		

Tab.2
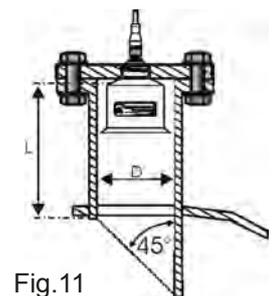
Fig.11
45°

### 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 <u>100mm min. diameter for RIL390-51, or 125mm min. diameter for RIL396</u>)

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.

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

Fig.12 Fig.13 Internal structure Fig.14 Fig.14-A

Foam Floating solids Vent h Ø5÷10
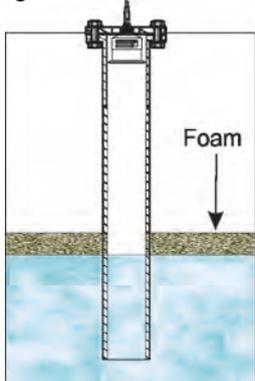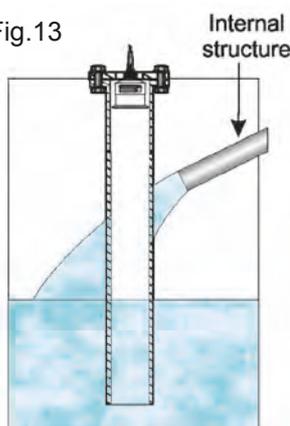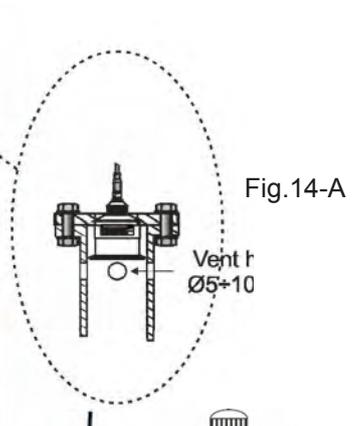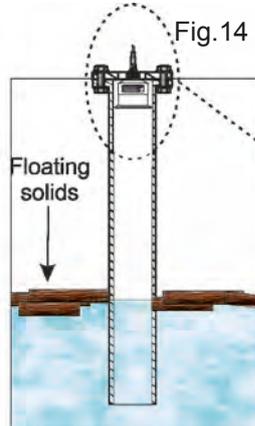
2.3.5 Agitators presence

The level measurement is possible thanks to the **Auto-Tuned** statistical filter. Should rarely need to adjust the filter setting by editing 2 **RIL390-91-96** sensorprogramming 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

835A009A Protection platform

835A006A T-Arm

835A010A Wall anger

PTU50-51-56

835A007A Floor Pedestal h=600mm

835A008A Floor Pedestal h=1700mm

835A024A Pedestal for channel/vessel side

835A022A Probe holder 2"

835A020A Extension L=700mm
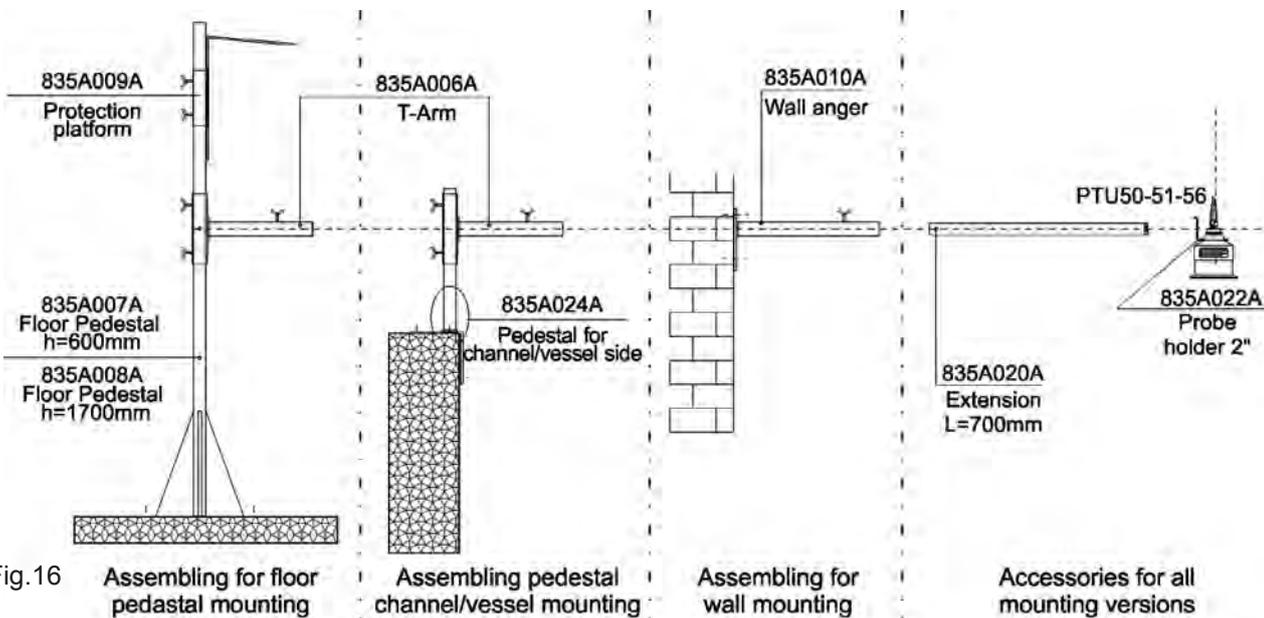
Fig.16 Assembling for floor pedastal mounting | Assembling pedestal channel/vessel mounting | Assembling for wall mounting | Accessories for all mounting versions

3. CONNECTIONS

3.1 Wiring

1) Separate the engine control cables or power cables from the **RIL39x** 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
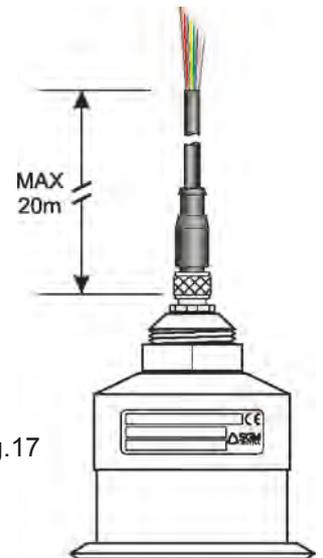
The immunity to electromagnetic interference complies with CE Directives

Fig.17

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
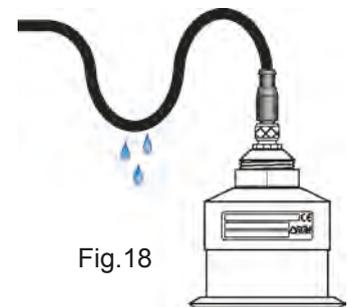
Fig.18

4. CONFIGURATION MODES

The **RIL390**, **RIL391** and **RIL396** have 2 configuration/calibrationmodes:
- via **MODBUS RTU**, by PC
- via **VLW601** programming module

4.1 Via MODBUS RTU

4.1.1 MODBUS RTU PC connection (fig.19)

1) **RIL390**, **RIL391** or **RIL396** 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 slave address, the **RIL390**, **RIL391** or **RIL396** transmitters in **MODBUS RTU** network
- read on your PC monitor all measures in reading and **RIL390**, **RIL391** or **RIL396** operation data
- programming all **RIL390**, **RIL391** or **RIL396** configuration parameters
- storing on files, data logger function; **RIL390**, **RIL391** or **RIL396** measures in reading andoperatingstates
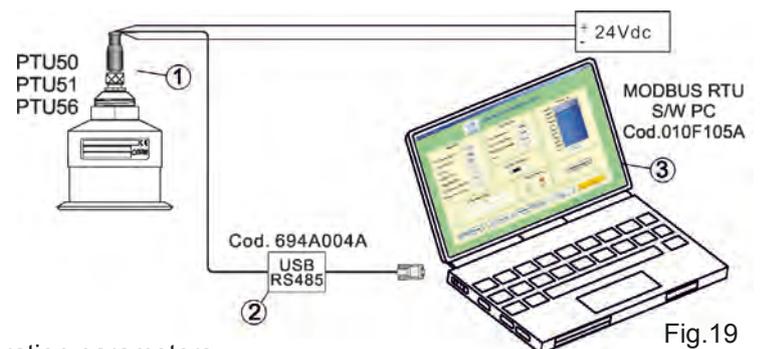
Fig.19

4.3 via VLW601 configuration

With the **VWL601** display module (Fig. 20) is possible to display the measured values and configure the **RIL390**, **RIL391** and **RIL396** 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 **RIL390**, **RIL391-56** 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 [icon] to select and press [icon] to access.

b) Parameter options choice: Press [icon] to select the option and press [icon] to store the option. Press [icon] 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 [icon] to select the digit to be modified (the digit is highlighted in **inverse**), press [icon] to change the highlighted digits number, press [icon] to save the set value and exit automatically. Press [icon] 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.
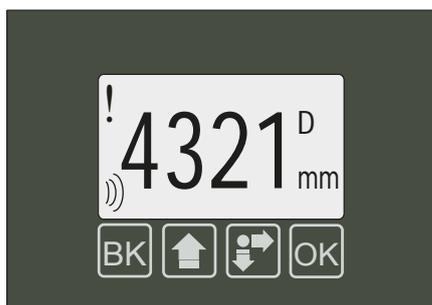
Fig.21

|OK| - Configuration access
- Options confirmation
- Parameters values confirmation

[icon] - Parameters values selection
- Parameters scroll

[icon] - Parameters values modification

|BK| - Exit configuration
- Back to previous menu

With the VLW601 module is possible to access two configuration modes for the RIL390-51-

☐

QUICK START - Menu with easy access for quick basic parameters configuration.
☐ To access: from "RUN" mode press   to the quick setup menu mode access,   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   to the advanced configuration mode access,   to exit

---

5. QUICK START MODE

From "RUN" mode press [icon] to access the Quick Setup menu
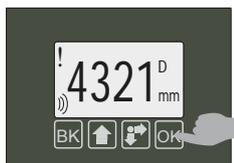
Select the parameters by moving the cursor with [icon], and confirm with [icon]; press [icon] to exit

```
▶ SET DISTANCE 4mA      0
  SET DISTANCE 20mA
  MEDIUM
  FILTER COEFFICIENT
  BLIND DISTANCE
  DISPLAY
```
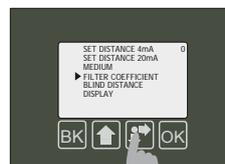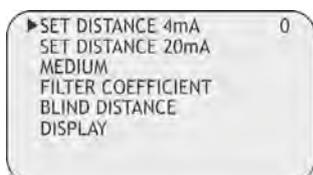
5.1 Struttura menù di configurazione rapida

|	Parameters Default Values
Set Distance 4mA 0.1 0000 mm	1500mm (RIL390 1.5m max) 6000mm (RIL391 6m max) 12000mm (RIL396 8m max)
Set Distance 20mA 0.2 0000 mm	100mm (RIL390 1.5m max) 400mm (RIL391 6m max) 600mm (RIL396 8m max)
Prodotto 0.3 >Liquidi Solidi Liquidi Tubo	Liquids
Filtro 0.4 000	20
Zona Cieca 0.5 0000 mm	050mm (RIL390 1.5m max) 300mm (RIL391 6m max) 500mm (RIL396 8m max)
Distance mm 0.8 Level mm Level % Output mA Temperature °c	Distance mm

Quick Setup →
- Set Distance 4mA   0
- Set Distance 20mA   0
- Medium   0
- Filter Coefficient   0
- Blind Distance   0
- Display   0

5.1.1 SET DISTANCE 4mA

Press [ENTER] to display the distance value associated with 4mA output.
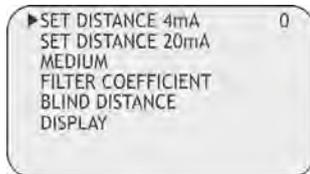
Use [↓] and [↑] to modify that value; in the Fig.22 example, the 4mA distance is 3500mm. Press [ENTER] to confirm.

```
▶SET DISTANCE 4mA        0
 SET DISTANCE 20mA
 MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 DISPLAY
```

```
SET DISTANCE 4mA     0.1

   3500 mm
```

5.1.2 SET DISTANCE 20mA

Press [ENTER] to display the distance value associated with 20mA output.
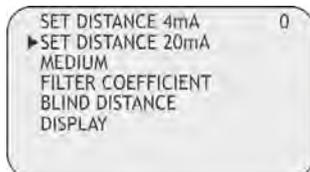
Use [↓] and [↑] to modify that value; in the Fig.22 example, the 20mA distance is 500mm. Press [ENTER] to confirm.

```
 SET DISTANCE 4mA        0
▶SET DISTANCE 20mA
 MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 DISPLAY
```

```
SET DISTANCE 20mA     0.2

   0500 mm
```

RIL390-91-96 referent point

20mA distance   100%

Level measurement

4mA distance   0%

Fig.22

5.1.3 MEDIUM

Press [ENTER] to display the previous setting
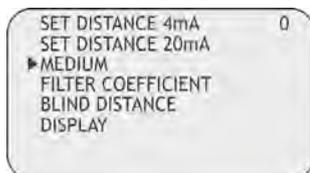
Press [↓] to select the medium type.
Press [ENTER] to confirm.
In fig.23 product selection example.

```
 SET DISTANCE 4mA        0
 SET DISTANCE 20mA
▶MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 DISPLAY
```

```
        MEDIUM        0.3

 SOLIDS

▶LIQUIDS

 LIQUIDS PIPE
```

LIQUIDS   SOLIDS   LIQUIDS PIPE

Fig.23
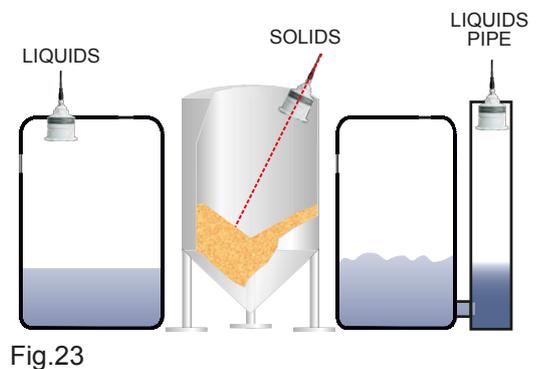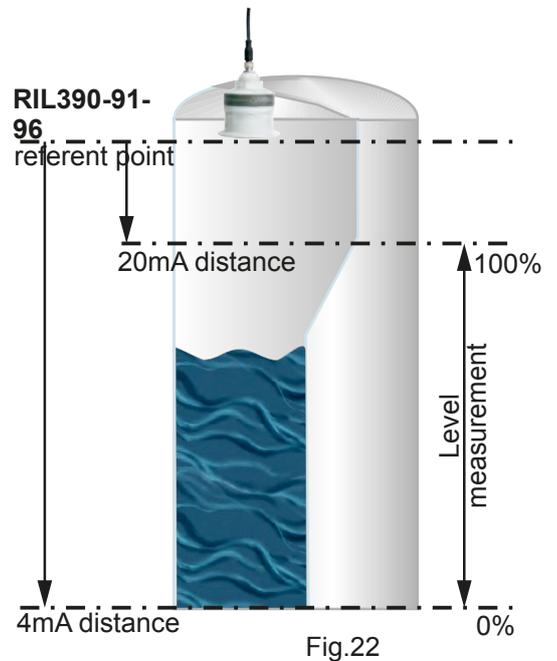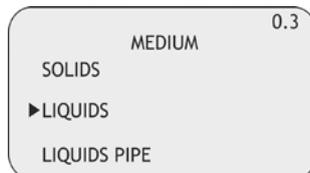
5.1.4 FILTER COEFFICIENT

Press [ENTER]. Increasing the value slows down the sensor response speed.

Use [→] and [↑] to modify the value. Input a value from 1 to 99. Press [ENTER] to confirm. In fig.24 value choice example.

```
SET DISTANCE 4mA        0
SET DISTANCE 20mA
MEDIUM
►FILTER COEFFICIENT
BLIND DISTANCE
DISPLAY
```

```
                        0.4
FILTER COEFFICENT

    20
```

Fast resp.   Normal resp.   Slow resp.
 5÷10   20   40÷100
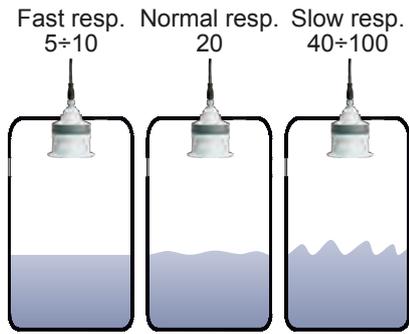
Fig.24

5.1.5 BLIND DISTANCE

Press [ENTER]. The **BLIND ZONE** is used to avoid undesired measures near to the transmitter
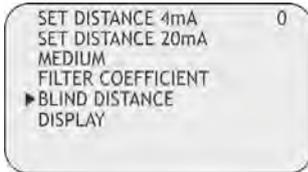
Use [→] and [↑] to modify the value. Press [ENTER] to confirm. The minimum value is 50mm (RIL390), or 300mm (RIL391) or 500mm (RIL396).

```
SET DISTANCE 4mA        0
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
►BLIND DISTANCE
DISPLAY
```

```
                        0.5
BLIND DISTANCE

0300 mm
```

RIL390-91-96
Refernt point

BLIND ZONE

BLIND DISTANCE

Fig.25

5.1.8 DISPLAY
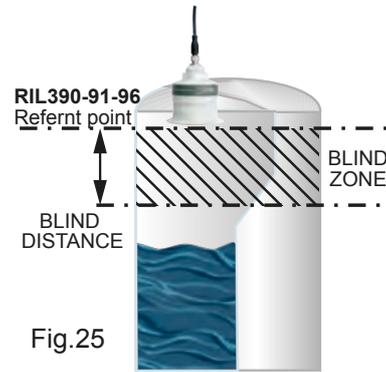
Press [ENTER] to access the settings change.

```
SET DISTANCE 4mA        0
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
BLIND DISTANCE
►DISPLAY
```

```
                        0.8
►DISTANCE mm
 LEVEL mm
 LEVEL %
 OUTPUT mA
 TEMP. °C
```
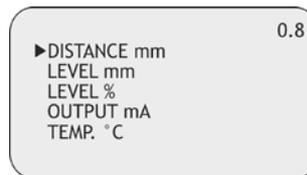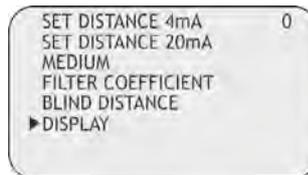
With the [→] button is possible to select the data to display

Press [ENTER] to confirm.

5.2 ECHO MAP

Pressing the **BK**, from RUN mode, to access directly to the echoes digital map display, which are in **RIL390-91-96** 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.

```
DIST:  721mm



    1   2   3   4   5 m

[BK] [↑] [→] [OK]
```

Fig.26

```
DIST:  721mm




    1   2   3   4   5   6 m
```

echo signal normalization Threshold

Distance measured from RIL391-56 in real time
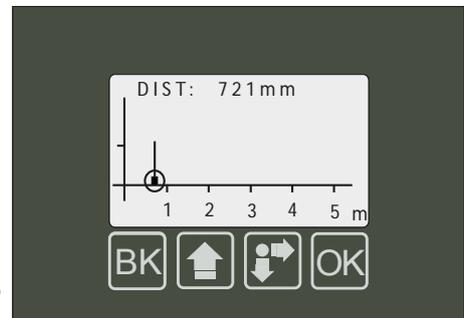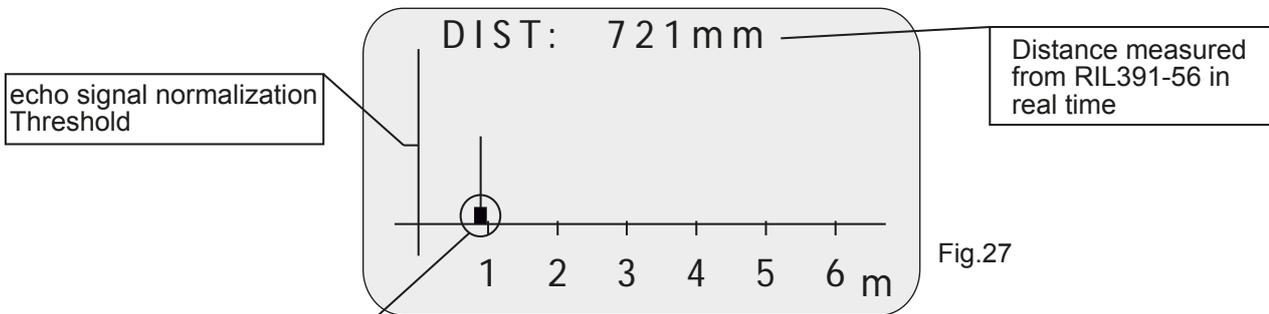
Fig.27

The rectangle placed at the echo line base, indicates the measurement range within which the echo signal in reception is considered always valid for the distance measurement. This interval value is variable depending on the measurement conditions: min. ± 2.5% of the measured distance

6. ADVANCED CONFIGURATION MODE

From "RUN" mode, holding down ⬆, press ↵ to the advanced configuration mode access

DISTANCE
3321 mm

LEVEL
1679 mm

DISTANCE
3321 mm
LEVEL
1679 mm
BK ⬆ ➡ OK

press ➡ to select the menu and press ↵ to access. Press ⬅ to exit

▶SETUP
DISPLAY
DIAGNOSTIC
SERVICE
INFO

▶SETUP
DISPLAY
DIAGNOSTIC
SERVICE
INFO
BK ⬆ ➡ OK

▶ SET DISTANCE 4mA   1
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
BLIND DISTANCE
ACTUAL LEV. 4mA
ACTUAL LEV. 20mA
BK ⬆ ➡ OK

DISTANCE 4mA   1.1
5000 mm
BK ⬆ ➡ OK
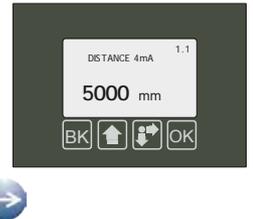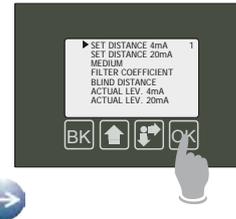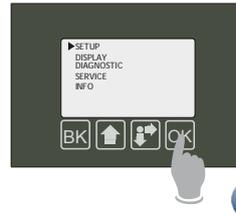
6.1 Advanced setup menu structure

6.1.1 "SETUP" menu

SETUP

SET DISTANCE 4mA [1] → SET DISTANCE 4mA 1.1
0000 mm

SET DISTANCE 20mA [1] → SET DISTANCE 20mA 1.2
0000mm

MEDIUM [1] → LIQUIDS   1.3
SOLIDS
LIQUIDS PIPE

FILTER COEFFICIENT [1] → FILTER COEFFICIENT 1.4
000

BLIND DISTANCE [1] → BLIND DISTANCE 1.5
0000mm

ACTUAL LEV 4mA [1]

ACTUAL LEV 20mA [1] → OK TO confirm

6.1.2 "DISPLAY" menu

DISPLAY

DISPLAY VALUES [2] → DISPLAY VALUES   2.1
>1 VALUE
2 VALUES
→ DISTANCE mm   2.1.1
LEVEL mm
LEVEL %
OUTPUT mA
TEMPERATURE °C

ECHO MAP [2] → DISPLAY VALUES   2.1
1 VALUE
>2 VALUES
→ 2 VALUES   2.1.2
>PRIMARY VALUE
SECONDARY VALUE
→ DISTANCE mm   2.1.3
LEVEL mm
LEVEL %
OUTPUT mA
TEMPERATURE °C

LCD CONTRAST [2] → LCD CONTRAST   2.2
00

2 VALUES   2.1.2
PRIMARY VALUE
>SECONDARY VALUE

WELCOME TEXT [2] → WELCOME TEXT   2.3
SGM-LEKTRA PTU5x

6.1.3 "DIAGNOSTIC" menu

6.1.4 "SERVICE" menu
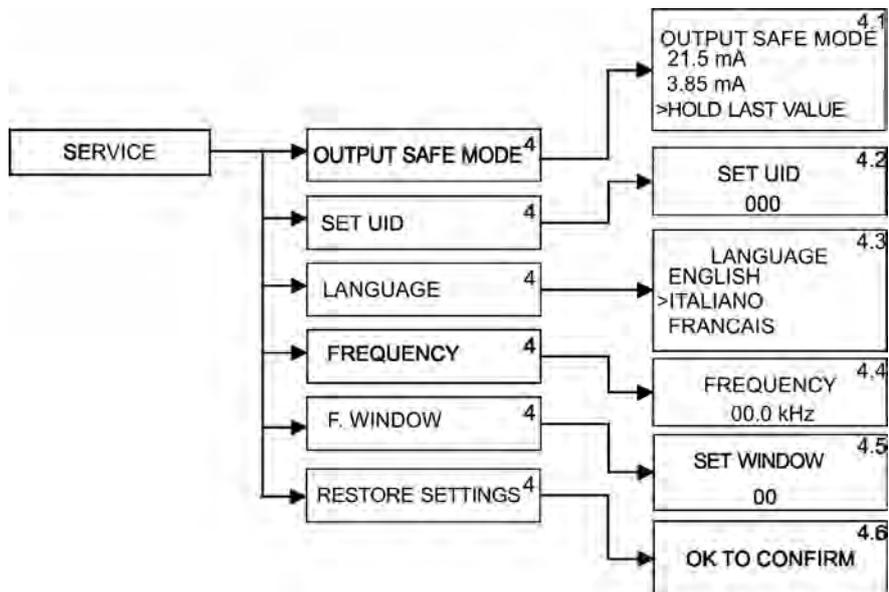
6.1.4 "INFO" menu
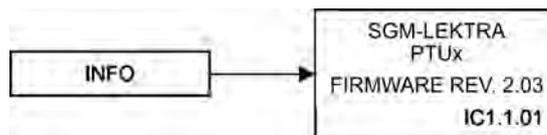
(∗)**This function is only active for RIL391 and RIL396**

7. ADVANCED CONFIGURATION DETAIL

7.1 <u>SETUP</u>

From "RUN" mode, <u>holding down</u> 🔼 , press ⏎ to access

▶SETUP
DISPLAY
DIAGNOSTIC
SERVICE
INFO

Select the parameters by moving the cursor with 🔀 and confirm with ⏎

▶SET DISTANCE 4mA   1
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
BLIND DISTANCE
ACTUAL LEV. 4mA
ACTUAL LEV. 20mA

7.1.1 SET DISTANCE 4mA

Position the ▶ cursor on DISTANCE 4mA, press ⏎ to enter

```
▶SET DISTANCE 4mA        1
 SET DISTANCE 20mA
 MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 ACTUAL LEV. 4mA
 ACTUAL LEV. 20mA
```

Use 🔼 and 🔁 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

Default value: 1500mm (**RIL390** range 1.5m), or 6000mm (**RIL391** range 6m)or 12000mm (**RIL396** range 12m)

```
                    1.1
   SET DISTANCE 4mA

   5000 mm
```
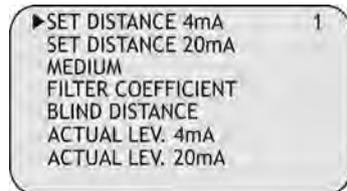
7.1.2 SET DISTANCE 20mA

Position the ▶ cursor on SET DISTANCE 20mA, press ⏎ to enter

```
 SET DISTANCE 4mA        1
▶SET DISTANCE 20mA
 MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 ACTUAL LEV. 4mA
 ACTUAL LEV. 20mA
```

Use 🔼 and 🔁 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

Default value: 100mm (**RIL390** range 1.5m), or 400mm (**RIL391** range 6m)or 600mm (**RIL396** range 12m)

```
                    1.2
   SET DISTANCE 20mA

   0300 mm
```
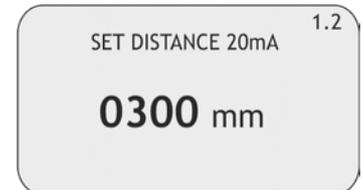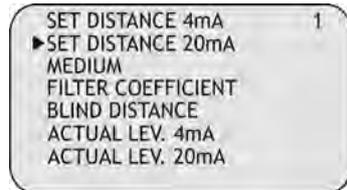
7.1.3 MEDIUM

Position the ▶ cursor on MEDIUM, press ⏎ to enter

Sono possibili 3 configurazioni:
SOLIDS - granular solids measurement
LIQUIDS - liquids measurement
LIQUIDS PIPE - liquids measurement in pipe reference
Press 🔁 to select the product type.
Press ⏎ to confirm. ◀ to exit without changes
Default value: LIQUIDS

```
 SET DISTANCE 4mA        1
 SET DISTANCE 20mA
▶MEDIUM
 FILTER COEFFICIENT
 BLIND DISTANCE
 ACTUAL LEV. 4mA
 ACTUAL LEV. 20mA
```

```
                    1.3
        MEDIUM
   SOLIDS

 ▶LIQUIDS

   LIQUIDS PIPE
```
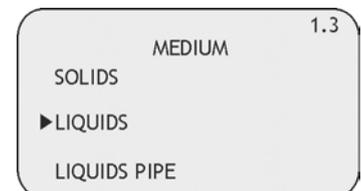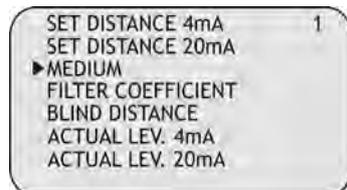
7.1.4 FILTER COEFFICIENT

Position the ▶ cursor on FILTER COEFFICIENT, press ⏎ to enter

```
 SET DISTANCE 4mA        1
 SET DISTANCE 20mA
 MEDIUM
▶FILTER COEFFICIENT
 BLIND DISTANCE
 ACTUAL LEV. 4mA
 ACTUAL LEV. 20mA
```

Immettere un valore da 1 a 99. 1 massima velocità, 99 massima lentezza. 0 esclude il filtro rendendo immmediata la risposta
Use 🔼 and 🔁 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

Default value: 20

```
                    1.4
   FILTER COEFF.

   20
```
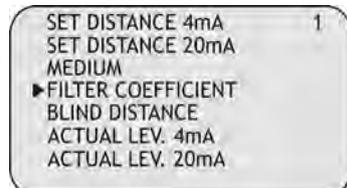
7.1.5 BLIND DISTANCE

Position the ▶ cursor on BLIND DISTANCE, press [ENTER] to enter

```
SET DISTANCE 4mA        1
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
▶ BLIND DISTANCE
ACTUAL LEV. 4mA
ACTUAL LEV. 20mA
```
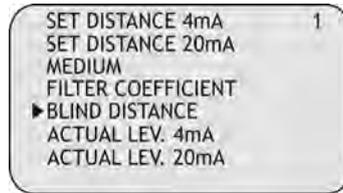
Represent the "BLIND ZONE" of the sensor. Input the desired value in order to avoid measures near the surface of the sensor (if necessary).
The minimum value is 50mm (RIL390), or 300mm (RIL391) or 500mm (RIL396)Use [ ] and [ ] to modify the value.
Press [ENTER] to confirm.
Default values: 50mm (RIL390), or 300mm (range 5m) or 500mm (RIL396)

```
                        1.4
BLIND DISTANCE

0600 mm
```

7.1.6 ACTUAL LEV. 4mA

Position the ▶ cursor on ACTUAL LEV. 4mA, press [ENTER] to enter
Self distance learning function that is associated with the 4mA (lower value). Make sure that the level corresponds to 0%, [ENTER] to associate the actual measure with 4mA output value;
OK TO CONFIRM . [ ] to exit without change

```
SET DISTANCE 4mA        1
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
BLIND DISTANCE
▶ ACTUAL LEV. 4mA
ACTUAL LEV. 20mA
```
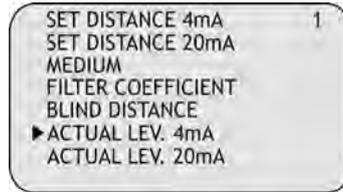
7.1.7 ACTUAL LEV. 20mA

Place the ▶ cursor on ACTUAL LEV. 20mA, press [ENTER] to enter
Self distance learning function that is associated with the 20mA (lower value). Make sure that the level corresponds to 100%, [ENTER] to associate the actual measure with 20mA output value;
OK TO CONFIRM . [ ] to exit without change

```
SET DISTANCE 4mA        1
SET DISTANCE 20mA
MEDIUM
FILTER COEFFICIENT
BLIND DISTANCE
ACTUAL LEV. 4mA
▶ ACTUAL LEV. 20mA
```
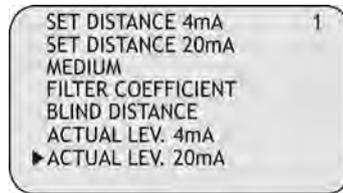
7.2 DISPLAY

From "RUN" mode, holding down [ ] , press [ENTER] to access
Position the ▶ cursor on DISPLAY, press [ENTER] to enter

```
SETUP
▶ DISPLAY
DIAGNOSTIC
SERVICE
INFO
```

Select the parameters by moving the cursor with [ ]
and confirm with [ENTER]

```
                        2
▶ DISPLAY VALUES
ECHO MAP
LCD CONTRAST
WELCOME TEXT
```

7.2.1 DISPLAY VALUES

Position the ▶ cursor on DISPLAY VALUES, press [ENTER] to enter

```
                        2
▶ DISPLAY VALUES
ECHO MAP
LCD CONTRAST
WELCOME TEXT
```
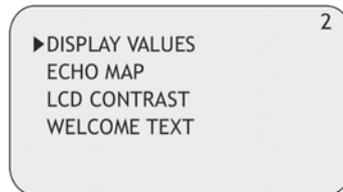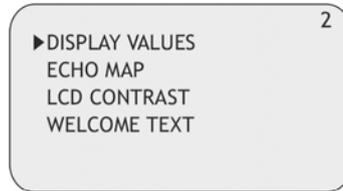
It's possible to select if one value with big digits or two values are shown on the display in "RUN" mode
With the [ ] button you can select the parameter to be programmed.
Press [ENTER] to confirm. [ ] to exit without changes

```
                        2.1
DISPLAY VALUES
▶ 1 VALUE
  2 VALUES
```

7.2.1.1 1 VALUE

Position the ▶ cursor on 1 VALUE, press ⏎ to enter

```
                                              2.1
DISPLAY VALUES
▶1 VALUE
 2 VALUES
```

Only one value is displayed; it's possible to choose from 5 parameters.
With the 🔁 button you can select data to display.
Press ⏎ to confirm. ◀ to exit without changes

```
                                              2.1.1
▶DISTANCE mm
 LEVEL mm
 LEVEL %
 OUTPUT mA
 TEMP. °C
```

$$2013^{D}_{mm}$$
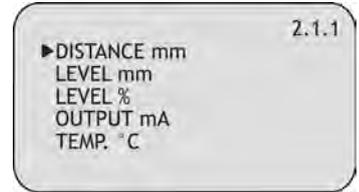
7.2.1.2 2 VALUES

Position the ▶ cursor on 2 VALUES, press ⏎ to enter

```
                                              2.1
DISPLAY VALUES
 1 VALUE
▶2 VALUES
```

Two values are displayed; it's possible to choose which one is the primary
and which is the secondary, each with a choice of 5 parameters
With the 🔁 button you can select data to display
Press ⏎ to confirm. ◀ to exit without changes

```
                                              2.1.2
         2 VALUES

▶PRIMARY VALUE
 SECONDARY VALUE
```

```
                                              2.1.3
▶DISTANCE mm
 LEVEL mm
 LEVEL %
 OUTPUT mA
 TEMP. °C
```

```
                                              2.1.2
         2 VALUES

 PRIMARY VALUE
▶SECONDARY VALUE
```

```
DISTANCE
3321 mm
LEVEL
1679 mm
BK ⬆ 🔁 OK
```

```
                                              2.1.3
 DISTANCE mm
▶LEVEL mm
 LEVEL %
 OUTPUT mA
 TEMP. °C
```
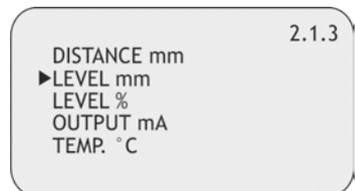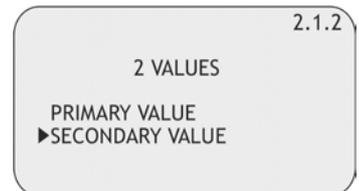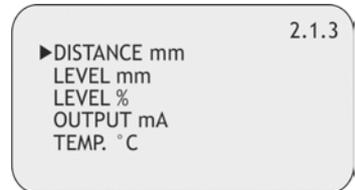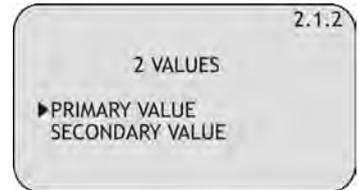
7.2.2 ECHO MAP

Position the ▶ cursor on ECHO MAP, press [ENTER] to enter

```
                                      2
DISPLAY VALUES
▶ECHO MAP
LCD CONTRAST
WELCOME TEXT
```

Detailed function description on page 13, figure 34
[◀] to exit and return to the menu 2

```
       DIST: 3005mm       2.2



  1  2  3  4  5  6  7  8  m
```
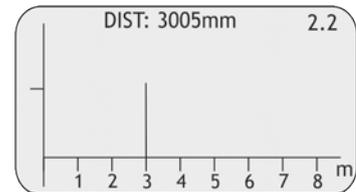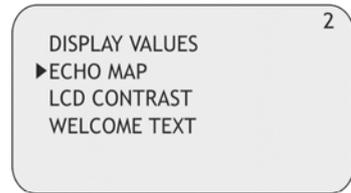
7.2.3 LCD CONTRAST

Position the ▶ cursor on LCD CONTRAST, press [ENTER] to enter

```
                                      2
DISPLAY VALUES
ECHO MAP
▶LCD CONTRAST
WELCOME TEXT
```

it's possible to adjust the contrast of LCD, simply increasing or decreasing the value of a parameter from 0 to 63.
Use [↑] and [↓] to modify the value.
Press [ENTER] to confirm. [◀] to exit without changes
Default value: 32

```
                                    2.3
        LCD CONTRAST

            32
```
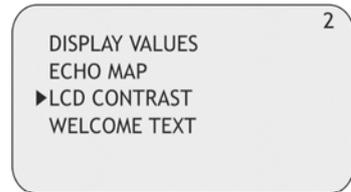
7.2.4 WELCOME TEXT

Position the ▶ cursor on WELCOME TEXT, press [ENTER] to enter

```
                                      2
DISPLAY VALUES
ECHO MAP
LCD CONTRAST
▶WELCOME TEXT
```

It's possible to edit or delete the message that is displayed by the RIL391-56during the ignition phase.
Use [↑] (up scroll) and [↓] (down scroll) to change the digit; [ENTER] to move the digit to the right. To confirm press [ENTER] repeatedly until leave the parameter. [◀] to exit without changes
Default value: RIL39x

```
     WELCOME TEXT      2.4
    SGM-LEKTRA
       PTU5x
```
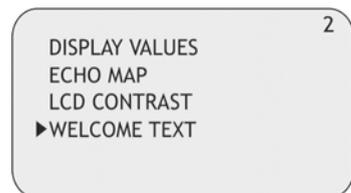
7.3 DIAGNOSTIC

From "RUN" mode, holding down [↑] , press [ENTER] to access
Position the ▶ cursor on DIAGNOSTIC, press [ENTER] to enter

```
SETUP
DISPLAY
▶DIAGNOSTIC
SERVICE
INFO
```

Select the parameters by moving the cursor with [↓]
and confirm with [ENTER]

```
▶FALSE ECHO DETECT    3
 MEASURE STATUS
 FROZEN GAIN
 MAX GAIN TH.
 PEAK VALUES
 OUTPUT SIMUL.
```
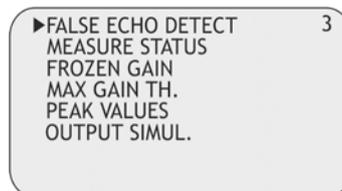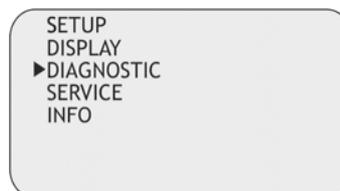
7.3.1 FALSE ECHO DETECT

Position the ▶ cursor on FALSE ECHO DETECT, press [ENTER] to enter

NB - To use this parameter the tank *must strictly be empty*
     This function is only active for RIL391 and RIL396

```
▶FALSE ECHO DETECT    3
 MEASURE STATUS
 FROZEN GAIN
 MAX GAIN TH.
 PEAK VALUES
 OUTPUT SIMUL.
```
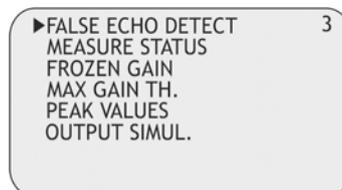
It's necessary to imput the empty distance (distance from the tank bottom)
Use ⬆ and 🔄 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

"RIL391-56" automatically stores all echoes detected and implemented an
echo true and any eventual spurious echoes automatic selection. After this,
the following message is displayed: **FALSE ECHO DETECT PROGRESS**
After procedure completion, the detected false echoes distances are displayed
and automatically stored (up to 3 false echoes). Press ⏎ to return to the
"DIAGNOSTIC" menu If something's not corretct

(e.g wrong empty distance value, obstacles that hides the bottom) the following message is displayed:
FALSE ECHO DETECT ERROR

Note: False echo detect procedure is not recommended for pipe and stand-pipe applications
*To delete this function, need to restore the default parameters (see par. 7.4.5)*

```
                                  3.1
        SET EMPTY DISTANCE

        0000 mm
```

7.3.3   MEASURE STATUS

Position the ▶ cursor on MEASURE STATUS, press ⏎ to enter

```
FALSE ECHO DETECT        3
▶MEASURE STATUS
 FROZEN GAIN
 MAX GAIN TH.
 PEAK VALUES
 OUTPUT SIMUL.
```
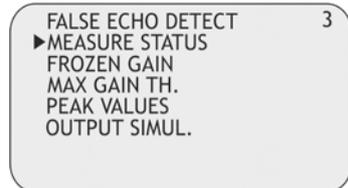
It's possible to display the gain of the system, with values from 0 to 255.
While displayed, the automatic gain control is not active
◀ to exit

```
                                  3.2
          MEASURE STATUS

            G : 00000
```
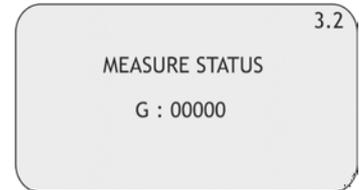
7.3.4   FROZEN GAIN

Position the ▶ cursor on FROZEN GAIN, press ⏎ to enter

```
FALSE ECHO DETECT        3
 MEASURE STATUS
▶FROZEN GAIN
 MAX GAIN TH.
 PEAK VALUES
 OUTPUT SIMUL.
```
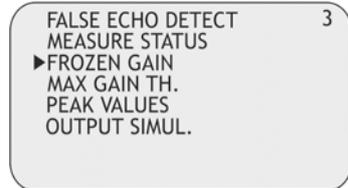
It's possible to fix a value of gain (from 1 to 255) and consequently
disable the automatic gain control. Once the value is 000 the automatic
gain control restarts
Use ⬆ and 🔄 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

Default value: 000

```
                                  3.3
          FROZEN GAIN

            000
```

7.3.5   MAX GAIN TH

Position the ▶ cursor on **MAX GAIN TH**, press ⏎ to enter

```
FALSE ECHO DETECT        3
 MEASURE STATUS
 FROZEN GAIN
▶MAX GAIN TH.
 PEAK VALUES
 OUTPUT SIMUL.
```
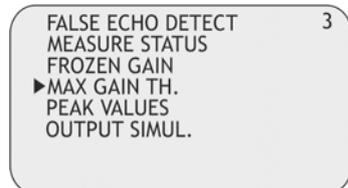
It's possible to input a value of gain that it should be not reached
in normal operation. If the gain exceeds this value, the "GAIN"
error code is activated.
Use ⬆ and 🔄 to modify the value.

Press ⏎ to confirm. ◀ to exit without changes

Default value: 255 (Max gain)

```
                                  3.4
          MAX GAIN TH

            255
```

7.3.6 PEAK VALUES

Position the ▶ cursor on PEAK VALUES, press [ENTER] to enter

```
FALSE ECHO DETECT        3
MEASURE STATUS
FROZEN GAIN
MAX GAIN TH.
▶PEAK VALUES
OUTPUT SIMUL.
```

The system store the maximum distance and the minimum distance measured since the power is turned ON.
It's possible to see those values or reset the values
With the [ ] button you can select the function.
Press [ENTER] to confirm.

```
                         3.5
▶DISPLAY VALUES

 RESET VALUES
```

7.3.6.1 DISPLAY VALUES

Position the ▶ cursor on DISPLAY VALUES, press [ENTER] to enter

```
                         3.5
▶DISPLAY VALUES

 RESET VALUES
```

Displays the max. and min. distance measured from power on.
[ ] to exit.
NB - The peak values stored are erased every time the RIL391-56 turns-off

```
                         3.5.1
      PEAK VALUES

 MAX    0000mm

 MIN    0000mm
```
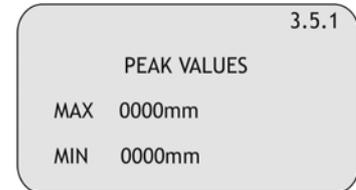
7.3.6.2 RESET VALUES

Position the ▶ cursor on RESET VALUES, press [ENTER] to reset
[ ] to return to the previous menu.

```
                         3.5
 DISPLAY VALUES

▶RESET VALUES
```

7.3.7 OUTPUT SIMULATION

WARNING - *entering in the SIMULATION function, the current output is not in function of the level measurement. To restore the current as a measured level function, press the [ENTER] button 3 times (RUN mode)*

Position the ▶ cursor on OUTPUT SIMULATION, press [ENTER] to enter .

It'possible to force the analog output to a desired value.

Use [ ] and [ ] to modify the value.

Press [ ] to return to the previous menu.

```
FALSE ECHO DETECT        3
MEASURE STATUS
FROZEN GAIN
MAX GAIN TH.
PEAK VALUES
▶OUTPUT SIMUL.
```

```
                         3.6
    OUTPUT SIMUL.

    00.0 mA
```
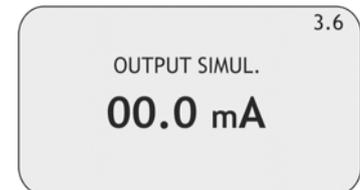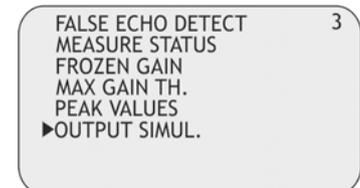
7.4 SERVICE

From "RUN" mode, holding down 🔼 , press [ENTER] to access

Position the ▶ cursor on SERVICE, press [ENTER] to enter

```
SETUP
DISPLAY
DIAGNOSTIC
▶SERVICE
INFO
```

Select the parameters by moving the cursor with [button] and confirm with [ENTER]

```
                                    4
▶OUTPUT SAFE MODE
 SET UID
 LANGUAGE
 FREQUENCY
 F. WINDOW
 RESTORE SETTINGS
```
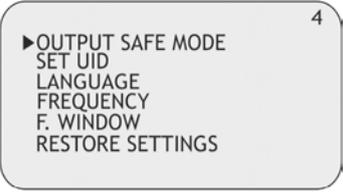
7.4.1 OUTPUT SAFE MODE

Position the ▶ cursor on OUTPUT SAFE MODE, press [ENTER] to enter

```
                                    4
▶OUTPUT SAFE MODE
 SET UID
 LANGUAGE
 FREQUENCY
 F. WINDOW
 RESTORE SETTINGS
```

It's possible to choose a analog output value durin diagnostic errors.
"*21.5 mA*" forces the current output to 21,5mA
"*3.85 mA*" forces the current output to 3,85mA
"*HOLD LAST VALUE*" maintains the output at the last valid value.
With the [button] button you can select the operation mode.
Press [ENTER] to confirm. [◀] to exit without changes
Default value: HOLD LAST VALUE

```
                                  4.1
    OUTPUT SAFE MODE

 ▶21.5 mA
  3.85 mA
  HOLD LAST VALUE
```
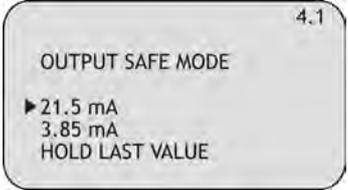
7.4.2 SET UID

Position the ▶ cursor on SET UID, press [ENTER] to enter

Can assign the address UID in this parameter, for a MUDBUS RTU network

Use 🔼 and [button] to modify the value.
Press [ENTER] to confirm. [◀] to exit without changes
Default value: 001

```
                                    4
 OUTPUT SAFE MODE
▶SET UID
 LANGUAGE
 FREQUENCY
 F. WINDOW
 RESTORE SETTINGS
```

```
                                  4.2
        SET UID

        001
```

7.4.3 LANGUAGE

Position the ▶ cursor on LANGUAGE, press [ENTER] to enter

Sets the menu language: English, Italian, French

Press [button] to select the menu language.
Press [ENTER] to confirm. [◀] to exit without changes

```
                                    4
 OUTPUT SAFE MODE
 SET UID
▶LANGUAGE
 FREQUENCY
 F. WINDOW
 RESTORE SETTINGS
```

```
              LANGUAGE          4.3

   ENGLISH
 ▶ITALIANO
  FRANCAIS
```

7.4.5 CHECK FREQUENCY

Position the ▶ cursor on CHECK FREQUENCY, press 🔘 to enter

```
                                    4
OUTPUT SAFE MODE
SET UID
LANGUAGE
▶FREQUENCY
F. WINDOW
RESTORE SETTINGS
```
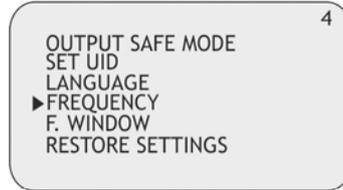
It's possible to check the computed sensor emission frequency
◀ to exit

```
                                    4.5

        FREQUENCY

        00.0 kHz
```

7.4.6 F. WINDOWS

Position the ▶ cursor on F. WINDOWS, press 🔘 to enter

Refer to figure 34 on page 13 .The F.WINDOW is the sensitive
area width around the true echo. All echoes detected inside the
F.WINDOW are valid. F.WINDOW automatically centers itself
in the most probable echo neighborhood and automatically adjusts
its width (step). The step value of the window, expressed in cm,
is represented by SET WIDTH; for example: parameter set to 5; the
sensor is hooked to a 4m distant signal echo; suddenly the echo signal
disappears and a echo signal is detected to 1m; RIL391-56 will start to
openthe search range with steps of 5cm at each echo signal emission, so
tocover the 3 meters that separate the 4m distant signal echo by the new
1m distant echo, RIL391-56 will take 60 emissions to reach the new 1m
distance eco. This parameter serves to filter false echo signals products,
for example, by the agitator blades. Range: 00÷20
Press 🔘 to confirm. ◀ to exit without changes

Default value: 05

```
                                    4
OUTPUT SAFE MODE
SET UID
LANGUAGE
FREQUENCY
▶F. WINDOW
RESTORE SETTINGS
```

```
                                    4.6
        SET WIDTH

        00
```
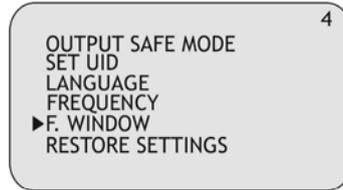
7.4.5 RESTORE SETTING

Position the ▶ cursor on RESTORE SETTING, press 🔘 to enter

```
                                    4
OUTPUT SAFE MODE
SET UID
LANGUAGE
FREQUENCY
F. WINDOW
▶RESTORE SETTINGS
```

Press 🔘 to restore the RIL391-56 default settings
◀ to exit whitout restored the RIL391-56 default settings.

```
                                    4

        OK TO CONFIRM
```
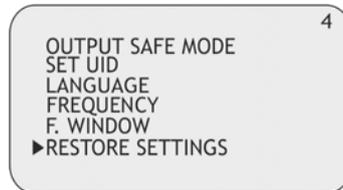
7.5 INFO

Position the ▶ cursor on INFO, press 🔘 to enter

```
SETUP
DISPLAY
DIAGNOSTIC
SERVICE
▶INFO
```
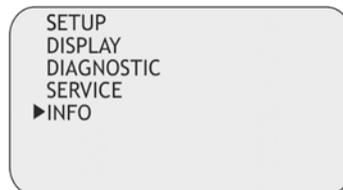
In addition to information about the manufacturer, are displayed the
firmware revision and the configuration index.
◀ to exit.

```
        SGM-LEKTRA        5
            PTU5x
    FIRMWARE  REV. 2.03

        I.C  1.1.01
```