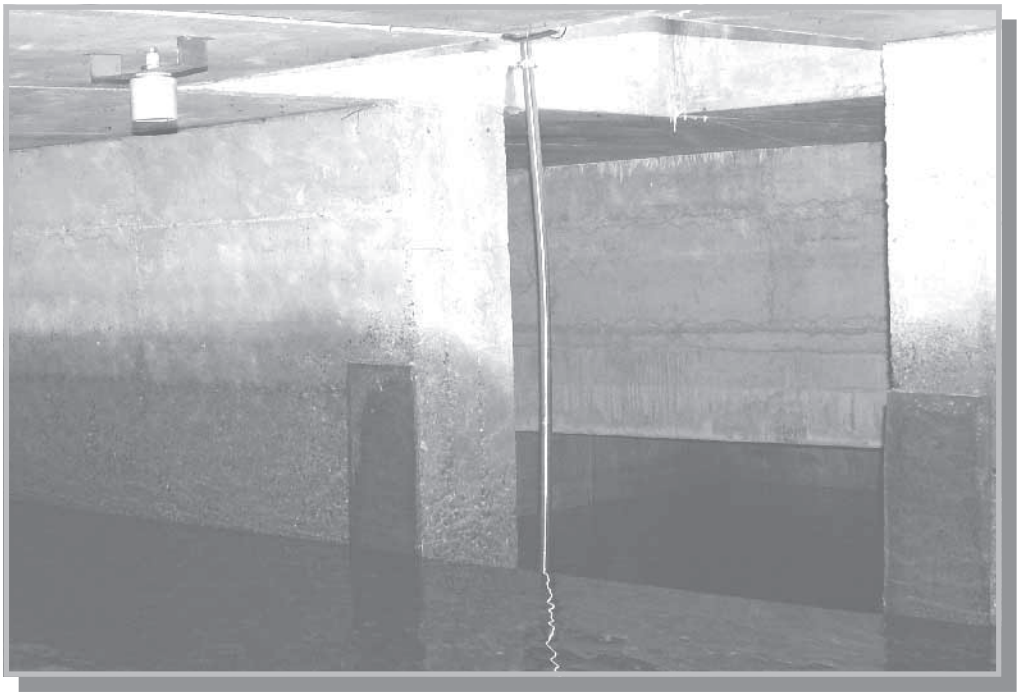
SWING

INSTRUCTION MANUAL

825B038N



LEKTRA

applied solutions for the applications

Health and Safety

To ensure that our products are safe and without risk to health,the following points must be noted:
1.The relevant sections of these instructions must be read carefully before proceeding.
2.Warning labels on containers and packages must be observed.
3.Installation,operation,maintenance and servicing must only be carried out by suitably trained personnel and in accordance with the information given.
4.Normal safety precautions must be taken to avoid the possibility of an accident occurring when operating in conditions of high pressure and/or temperature.
5.It must be understood that operation of damaged equipment could,under certain operational conditions,result in degraded process system performance leading to personal injury or death.

Information in this manual is intended only to assist our customers in the efficient operation of our equipment.
Use of this manual for any other purpose is specifically prohibited and its contents are not to be reproduced in full or part without prior approval.

Because of the technical evolution of the products, the SGM Lektra reserves the possibility of modify the present technical manual without warning.

- **Unit designed to be connected to one or two ultrasonic level sensors (PTU family) & transmitters (Smart family)**
- **Display and control programmable unit. Suited to single or double measurement**
- **Applications: level measurements, Open channel flow measurements, Up to 5 pumps controller**
- **Input:**
  - **n.2 RS485 ports for PTU and Smart ultrasonic level sensors**
  - **n.1 analog input for 4÷20mA or 0÷10V transmitters**

  Output:
  - **n.2 4÷20mA analog outputs**
  - **n.5 relays**
  - **n.1 RS485 port**

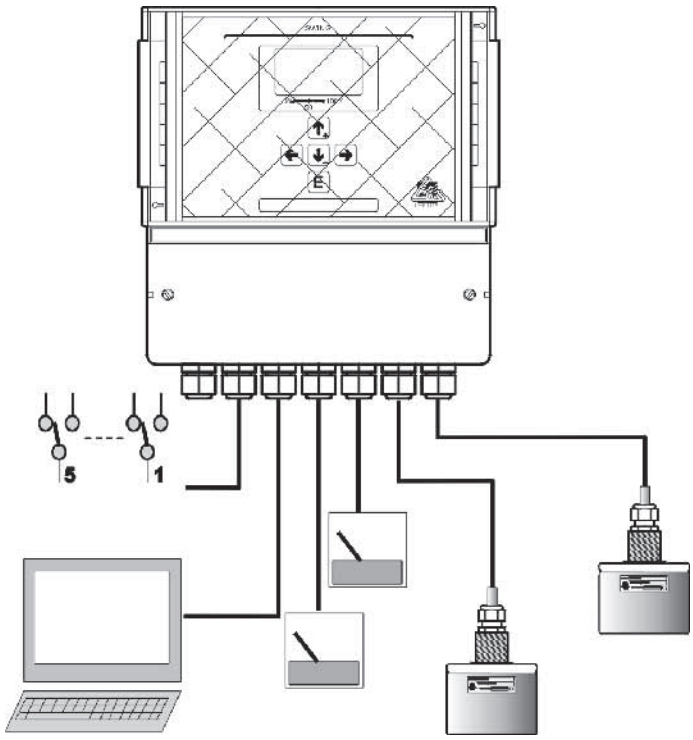


Fig. 1

TECHNICAL DATA

Enclosure:	**IP66, for external installation, wall mounted**
Enclosure material:	**ABS color RAL7035**
Keyboard:	**5 keys**
Display:	**back lighted graphic LCD 128x64**
Electrical connections:	**screw-connectors, separate access**
Power supply:	**24 115 230Vca; 24Vdc ±10% based on ordered supply**
Power consumption:	**max 15W**
Inputs:	**n.2 RS485 serial port for PTU/Smart family n.1 4÷20mA or 0÷10V analog input**
Outputs:	**n.5 SPDT relays; 5A 250V (resistive); n.2 4÷20mA analog outputs with galvanic separation n.1 RS485 serial port**
Tecnology:	**digital, using Flash microprocessor**
Custom parameters memory:	**EEPROM**
Working temperature:	**-20°C ÷ +60°C**
CE conformity:	**93/68 CEE**
Analog transmitter power supply:	**24Vdc; 200mA max**

CODE

SWING □□□□□

	Version
2	Smart/PTU sensors
3	For very low-power consumption self-switch-off 1 sensor connectable
9	Special
	Output relays
A	None
C	5 Relays SPDT
	Power supply
0	115Vac
1	230Vac
2	24Vac
4	24Vdc
	Analog current Output
A	None
B	n.1 4÷20mA
C	n.2 4÷20mA
	Serial interface
0	None
1	RS485 std.
9	Special

LEKTRA

The Swing unit is a general purpose controller for ultrasonic sensors . Swing is a very versatile unit ables to perform four different functions:
LEVEL measurement
OPEN CHANNEL FLOW measurement
PUMPS CONTROLLER
DIFFERENTIAL LEVEL measurement

The selection of the function and the calibration of the inherent parameters are made directly on the frontal keys.

Swing unit must be considered a single or a double channel unit. Consequently one or two sensors can be connected.

In the double channel configuration the following function can be performed:

CH1 = LEVEL	CH2 = LEVEL
CH1 = LEVEL	CH2 = FLOW
CH1 = FLOW	CH2 = FLOW
CH1 = FLOW	CH2 = LEVEL
CH1 = PUMPS	CH2 = LEVEL
CH1 = PUMPS	CH2 = FLOW
CH1 = DIFF.LEVEL	CH2 = LEVEL

The relays output can be addressed to the relevant functions and can be 3 or 5 depending from the version.

1 or 2 galvanically isolated analog output are available.

SWING Sensors
The Swing unit can be connected to the Smart family or PTU family sensors and Swing comunicates with a RS485 ports.
An extra analog input allows the connection with a 4-20mA level transmitter .

PTU sensor family, is a compact IP68 sensors with RS485 communication port only .The electrical connection between PTU and Swing unit is possible up to 1km and no coax cables are requested:

PTU05: liquids up to 5m (IP68)

PTU10: liquids up to 10m (IP68)

PTU15: liquids up to 10m (IP68)

Smart sensors family, are complete units because a 4-20mA current output and two programmable relays are available for local indication and alarms.

SWING SENSORS

❑ **PTU05/10/15**: or liquids up to 5m/8m/12m IP68

Fig. 2

❑ **SmartCost**: for liquids up to 5m IP65, IP68

Fig. 3

❑ **521/522Smart**: for liquids 10m/15m & granulates 5m/8m (IP65)

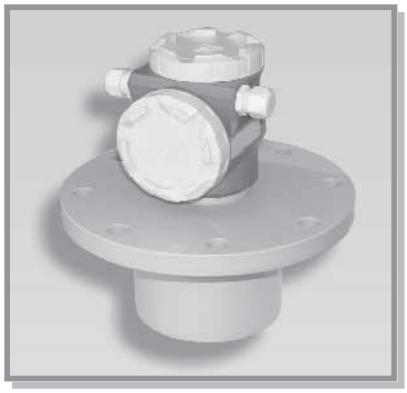


Fig. 4

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LEVEL

Swing unit can be connected to a ultrasonic sensor for liquid application or for application in granulates and powders. The range is from 5m to 25m. The Swing unit can works with 2 different sensors connected. The differential level function allows to drive automatically grill-cleaner .

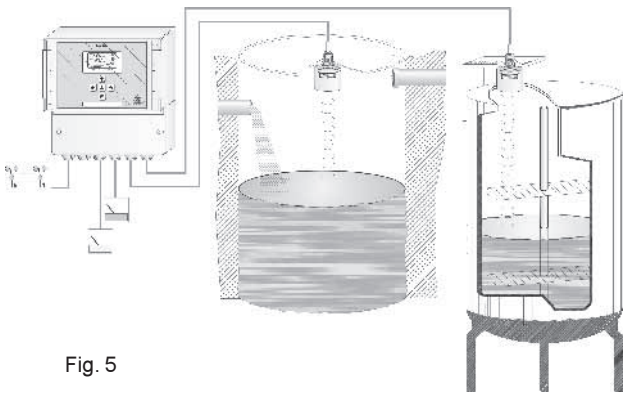


Fig. 5

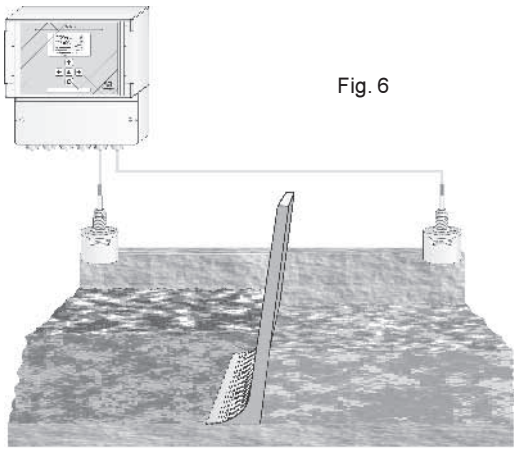


Fig. 6

Open Channel FLOW

The most diffuse standard weirs and flumes are just in a scroll selection of the Swing unit. A special customer situation ca be solved with the calibration of a general discharge formula.

Up to 32 level/flow points can be memorized for a special customer table.

Internal volume-totalizer and two counters are available for batch control, addittivation, sampler drive.

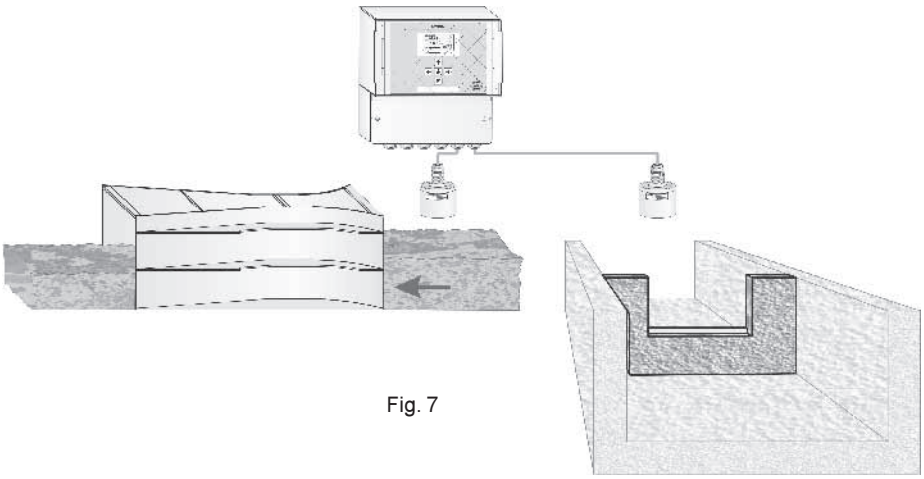


Fig. 7

PUMPS Controller

The Swing unit can drive through relays output up to 5 pumps.

The pumps can be setted on-off individually and can be configured for the pumps rotation in order to reach the same average working

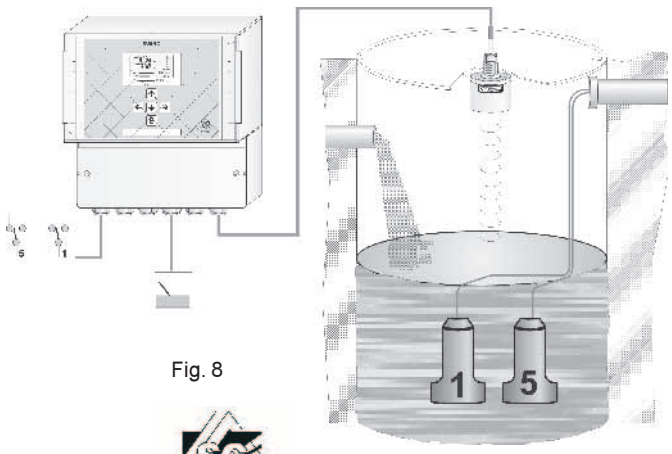
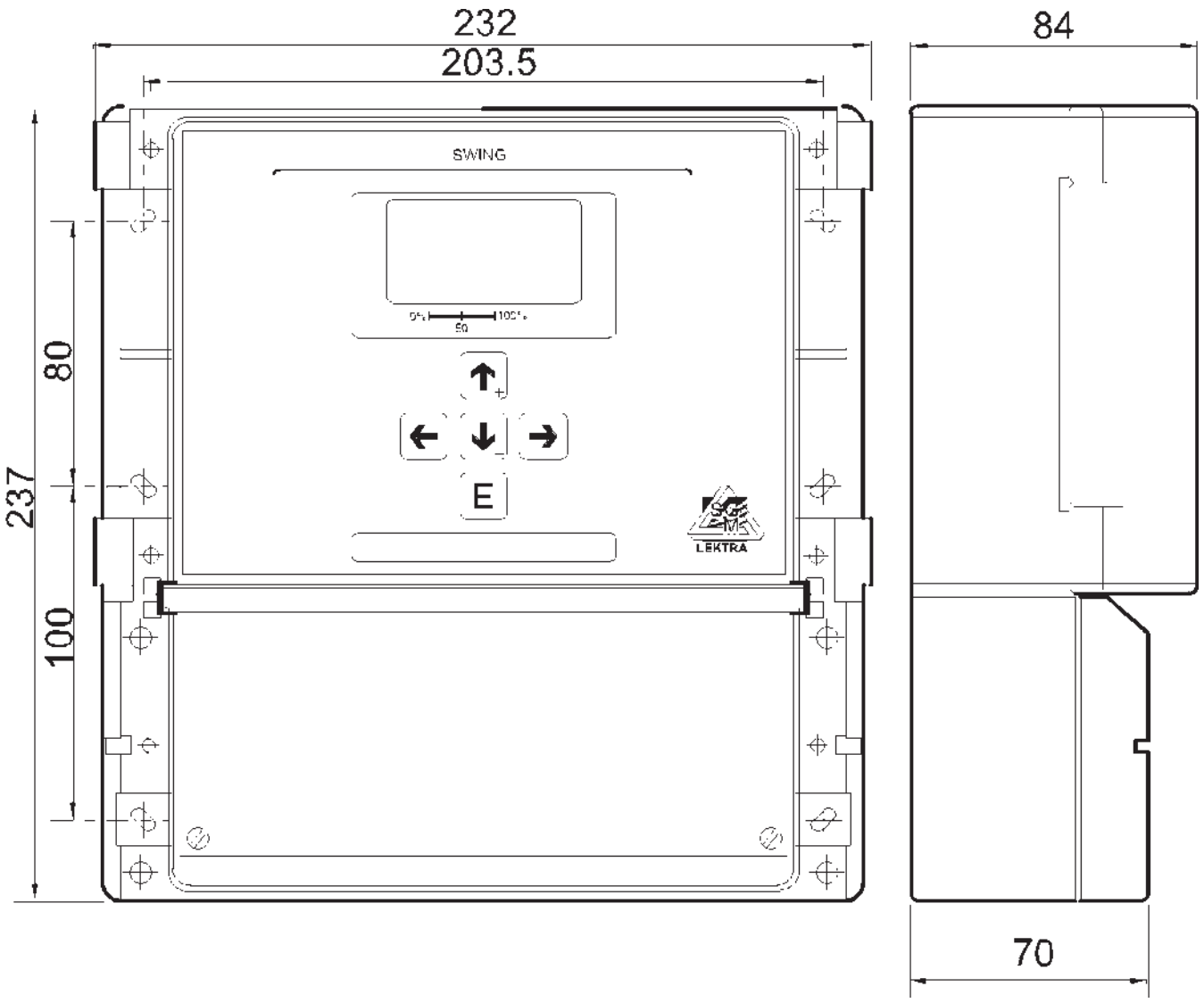


Fig. 8



SWING - Overall dimensions(in mm.)

Fig. 9

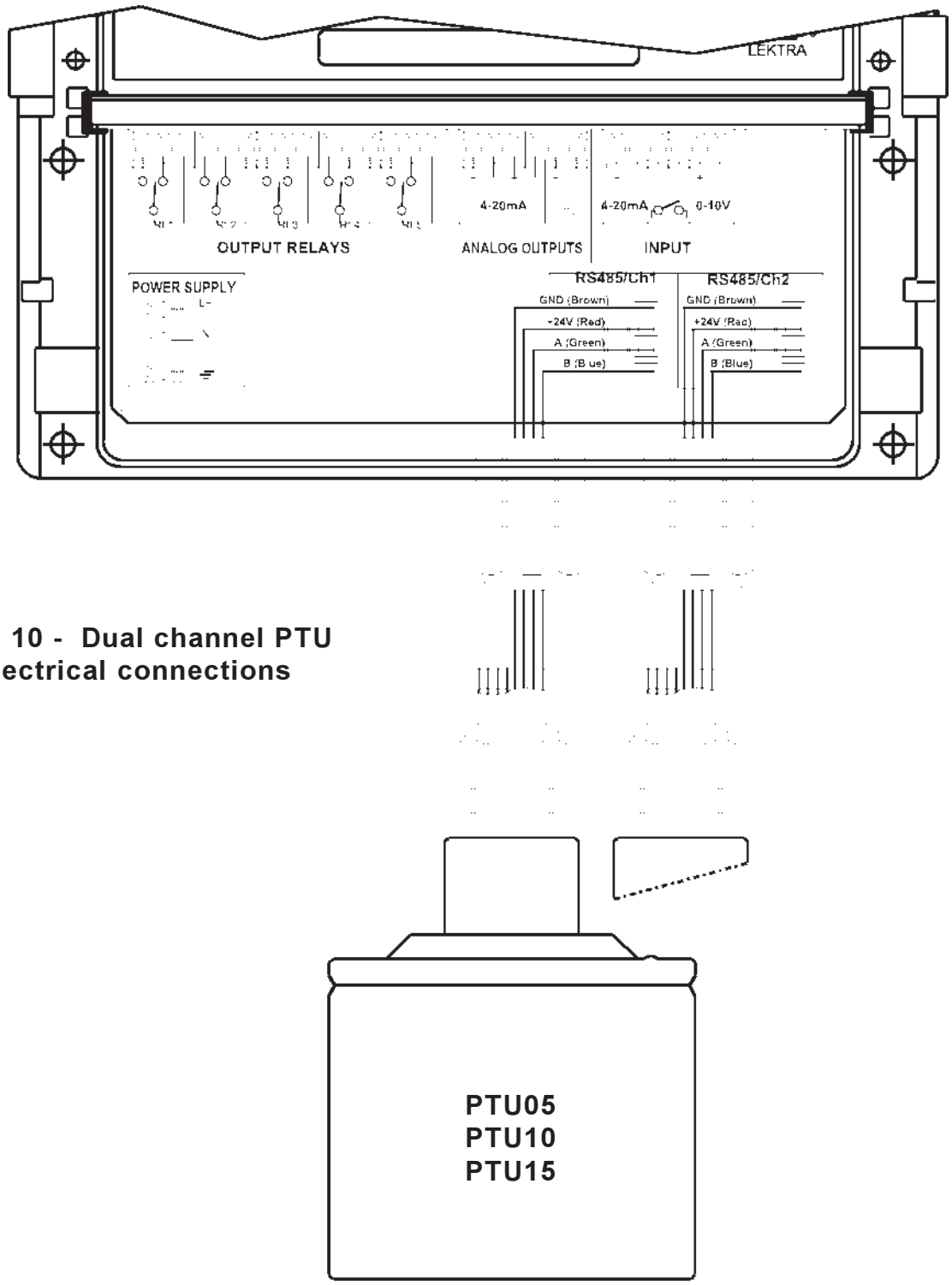


FIG. 10 - Dual channel PTU electrical connections

Warning. For dual channel configuration, it is necessary set the internal Unit Identification Device (UID) by the RS485 ports. To program different UID codes for each PTU sensor needs to connect the CH1 PTU sensor disconnecting the CH2 PTU sensor extracting connector then refer to the procedure in “Configuration/ProbeCH1-Selection”. Successively connect CH2 PTU sensor, disconnecting the CH1 PTU sensor and refer to “Configuration/ ProbeCH2-Selection”, then connect both PTU sensors. (see 1.3.1 and 1.4.1).

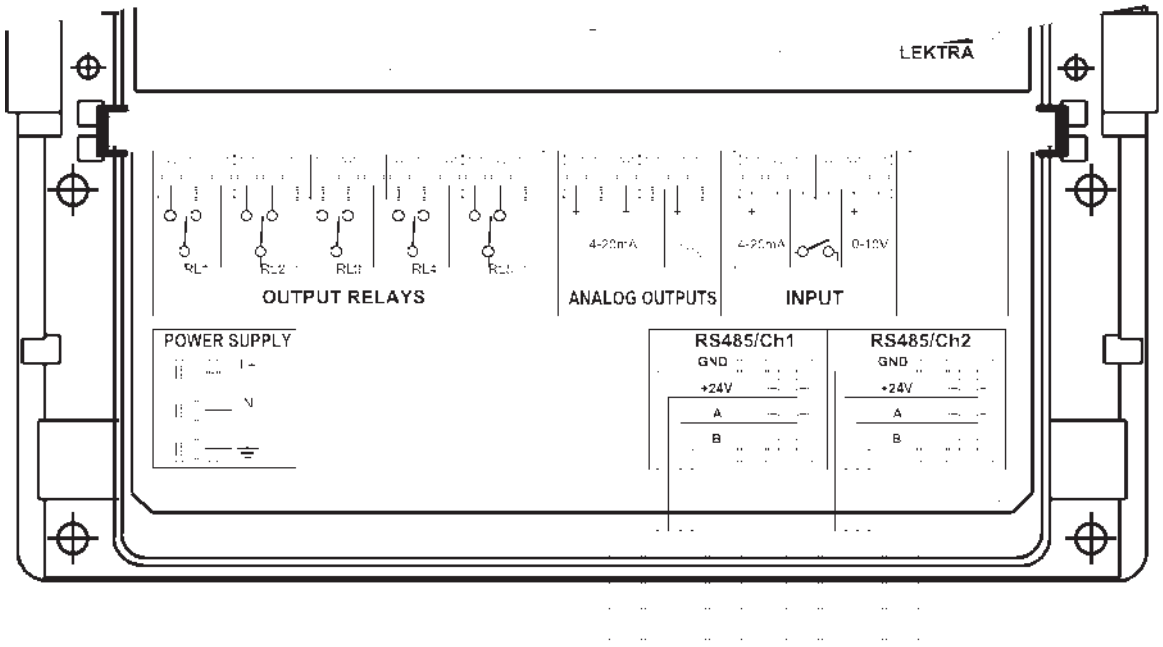
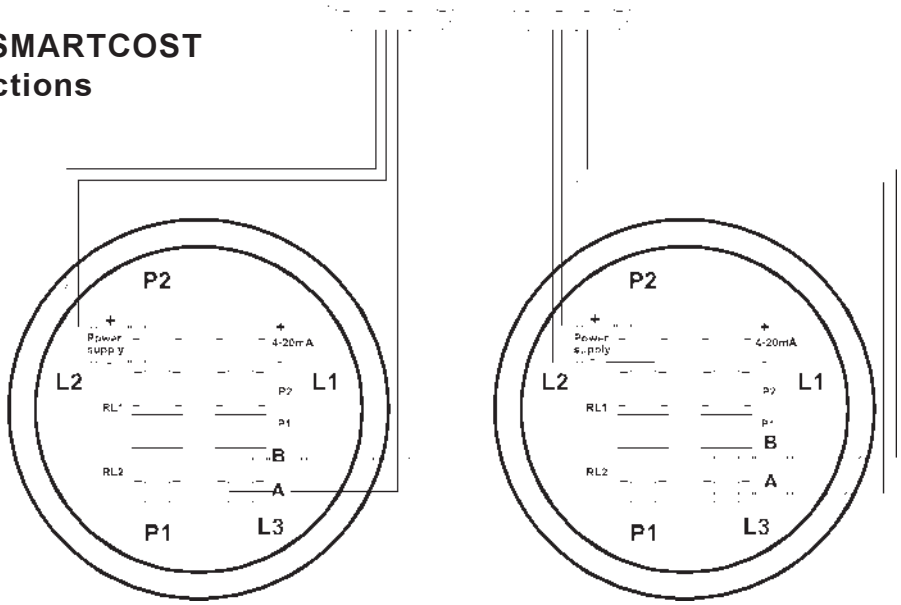


Fig.11 - Dual channel SMARTCOST electrical connections



Warning. For dual channel configuration, it is necessary set the internal Unit Identification Device (UID) by the RS485 ports. To program different UID codes for each SmartCost transmitter needs to connect the CH1 SmartCost disconnecting the CH2 SmartCost extracting connector then refer to the procedure in “Configuration/ProbeCH1-Selection”. Successively connect CH2 SmartCost, disconnecting the CH1 SmartCost and refer to “Configuration/ ProbeCH2-Selection” (see 1.3.1 and 1.4.1).

1. Programming structure:

Swing has three different access levels:

- ***MENU***
- ***GROUPS***
- ***PARAMETERS***

Each ***MENU*** include different ***GROUPS***, each ***GROUP*** has a few ***PARAMETERS.***

Each ***PARAMETER*** can be of three different types:

FLOAT

Are numeric(integer positive and negative) values that can be setted digit per digit using (**+**) and (**-**) keys.

STRING

Are selection messages scrolling by (**+**) and (**-**) keys.

STRUCT

Are selection mixed with STRING and FLOAT values. Normally must be selected the message by scrolling then the numeric value pressing i
(**+**), (**-**) and (**E**) keys.

2. MENUs & *GROUPs*:

CONFIGURATION

- *SINGLE/DOUBLE*
- *INSTALLED RELAYS* @
- *PROBE CH1*
- *PROBE CH2*
- *ANALOG INPUT* @
- *DIGITAL INPUT* @
- *TASK*
- *EMERGENCY STATUS (EX ALARM CONDITION)* @
- *ALARM OUTS STATUS (EX ALARM CONDITION)* @
- *PROGRAM LEVEL*
- *TAG NAME* @
- *BACK LIGHT* @
- *CLOCK* @
- *SERVICE* @

LEVEL

- *DISPLAY*
- *LEVEL ADJ*
- *ANALOG INPUT ADJ* @
- *APPLICATION* @
- *SET-POINT*

FLOW

- *DISPLAY*
- *FLOW ADJ*
- *ANALOG INPUT ADJ* @
- *APPLICATION*
- *SET-POINT*

PUMPS

- *DISPLAY*
- *LEVEL ADJ*
- *APPLICATION*
- *PUMPS ADJ*
- *SET-POINT*

DIFFERENTIAL

- *DIFFERENCE LEVEL*
- *DIFFERENCE OFFSET*

3. Keyboard (fig.12)

5 keys allow the control and the configuration/ programmation of all the SWING operative functions.

4 keys can move the cursor into the parameters map. Jump from one to another **MENU**, or nestled from **MENU** to *GROUP* and to the relevant parameters. [**E**] key, is used for data confirmation. For instance starting from **EDIT** page display it is possible move the cursor from **CONFIGURATION** to **LEVEL** to **FLOW** using the arrow DOWN key, while, reversely pushing arrow UP key.

To move from menu **LEVEL** to its *GROUPS* push RIGHT key, to jump back from *GROUP* to the relevant **MENU** push LEFT key. In this situation, [**E**] key, will stop the configuring/ programming (**EDIT**) operation jumping to the (**RUN**) **DISPLAY** mode.

UP and DOWN function keys change when a parameter to be modify is selected; in this situation, UP and DOWN keys are used to set value or to choosed the message.

The number and message are always displayed normally when they are equal to the memorized one ; if some changing are made in the value or in the selection message, the new value/selection, will be displayed in **"reverse"**. Pushing [**E]** key, the "reverse" displayed value/selection will be memorized into the EEPROM memory and the acknowledge change from "reverse" to normal display.

The RIGHT key is used to move the cursor, while the LEFT key, has the escape function, leaving the same value and returning from parameters to GROUPS or to **MENU** as applicable.

Press at the same time UP and RIGHT to change the dot position

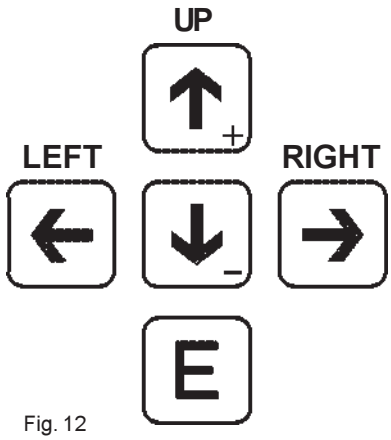


Fig. 12

4. DISPLAY

SWING unit has two different operating and display mode:**RUN** (fig.13) and **EDIT (fig.14)**.

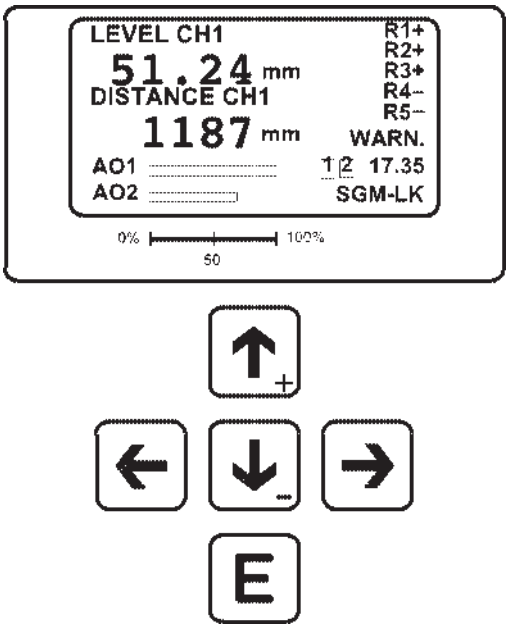


Figure 13 - RUN mode display

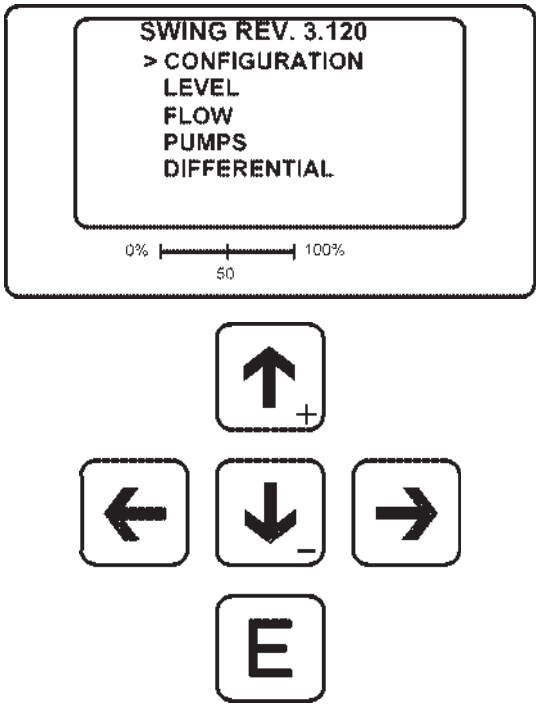


Figure 14 - EDIT mode display

SWING unit after turn on power supply if already configured (made in factory), it will go automatically on the run mode display.
The moving from "**RUN**" (fig.13) mode to "**EDIT**" (fig.14) mode, to configure and program the relevant parameters, is made by press the **LEFT** key (fig.15).

Fig. 15 

To jump back to the measuring **RUN** mode press enter

Fig. 16 

Once push LEFT key, is showed the **MENU** list.
With UP e DOWN keys the cursor > is moving up and down in the list then, referring to the selected **MENU** , press RIGHT key to enter in the desired menu. The GROUPS list will be displayed.

If depends to the configuration, some **MENU** are not available, the **MENU** name will be in "reverse" and the cursor will displayed in the opposite direction.

< **FLOW**

SWING enable **MENU** are selected into **CONFIGURATION** TASK parameters.

5. Contrast

In **RUN** mode the contrast can be modify pressing **UP** (clears up) and **DOWN** (grows dark) function keys.
In **EDIT** mode the contrast can be modify pressing simultaneously **LEFT** and **UP** (clears up) or pressing simultaneously **LEFT** and **DOWN** (grows dark)

Warning: In the next paragraphs, dedicates to the configuration and programmation of the SWING unit, the factory setted default parameters value, are underlined

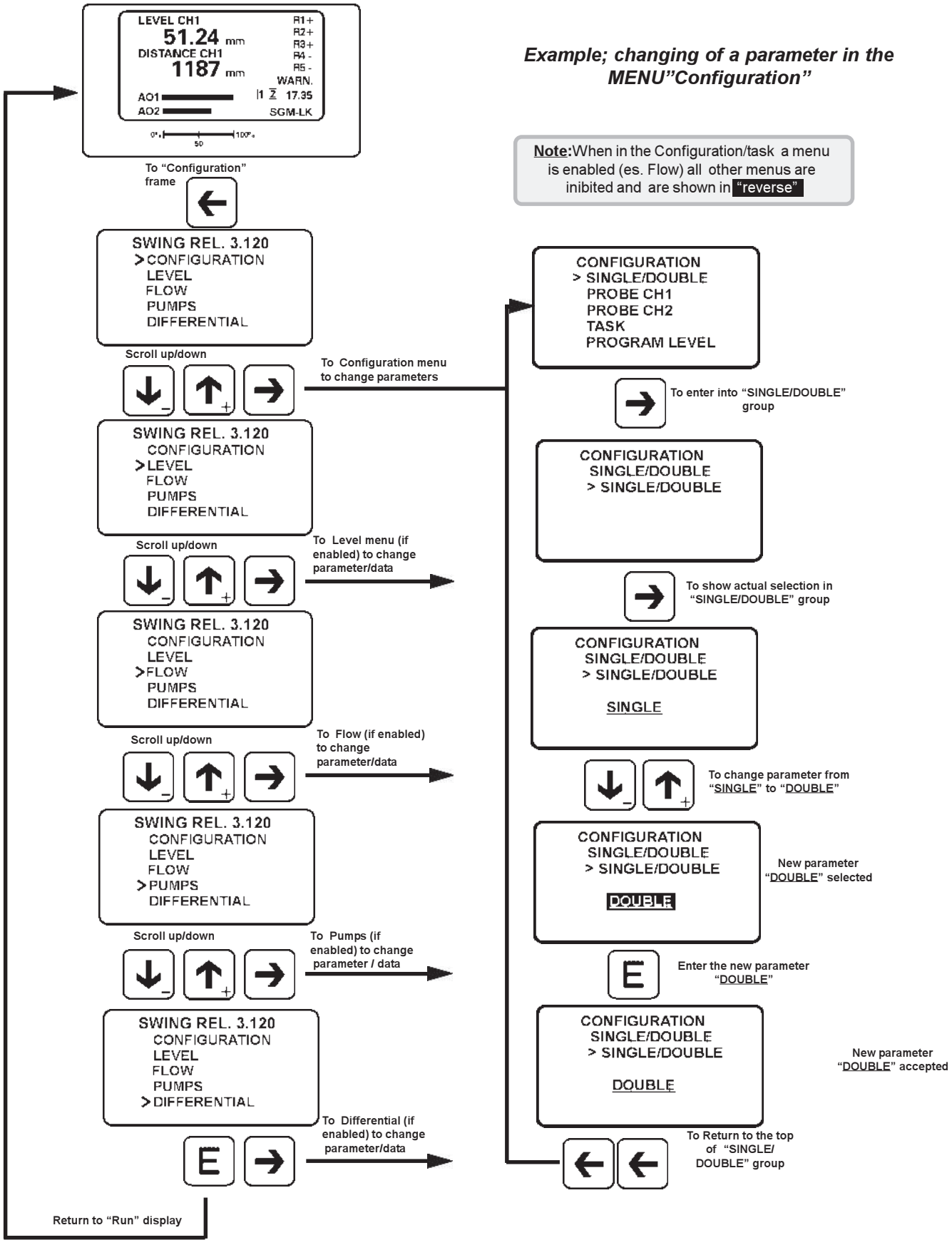

LEVEL CH1
51.24 mm
DISTANCE CH1
1187 mm
AO1
AO2
R1+
R2+
R3+
R4 -
R5 -
WARN.
17.35
SGM-LK
To "Configuration" frame
SWING REL. 3.120
>CONFIGURATION
LEVEL
FLOW
PUMPS
DIFFERENTIAL
Scroll up/down
To Configuration menu to change parameters
SWING REL. 3.120
CONFIGURATION
>LEVEL
FLOW
PUMPS
DIFFERENTIAL
Scroll up/down
To Level menu (if enabled) to change parameter/data
SWING REL. 3.120
CONFIGURATION
LEVEL
>FLOW
PUMPS
DIFFERENTIAL
Scroll up/down
To Flow (if enabled) to change parameter/data
SWING REL. 3.120
CONFIGURATION
LEVEL
FLOW
>PUMPS
DIFFERENTIAL
Scroll up/down
To Pumps (if enabled) to change parameter / data
SWING REL. 3.120
CONFIGURATION
LEVEL
FLOW
PUMPS
>DIFFERENTIAL
To Differential (if enabled) to change parameter/data
Return to "Run" display
Example; changing of a parameter in the MENU"Configuration"
Note:When in the Configuration/task a menu is enabled (es. Flow) all other menus are inibited and are shown in "reverse"
CONFIGURATION
> SINGLE/DOUBLE
PROBE CH1
PROBE CH2
TASK
PROGRAM LEVEL
To enter into "SINGLE/DOUBLE" group
CONFIGURATION
SINGLE/DOUBLE
> SINGLE/DOUBLE
To show actual selection in "SINGLE/DOUBLE" group
CONFIGURATION
SINGLE/DOUBLE
> SINGLE/DOUBLE
SINGLE
To change parameter from "SINGLE" to "DOUBLE"
CONFIGURATION
SINGLE/DOUBLE
> SINGLE/DOUBLE
DOUBLE
New parameter "DOUBLE" selected
Enter the new parameter "DOUBLE"
CONFIGURATION
SINGLE/DOUBLE
> SINGLE/DOUBLE
DOUBLE
New parameter "DOUBLE" accepted
To Return to the top of "SINGLE/ DOUBLE" group

Fig. 17

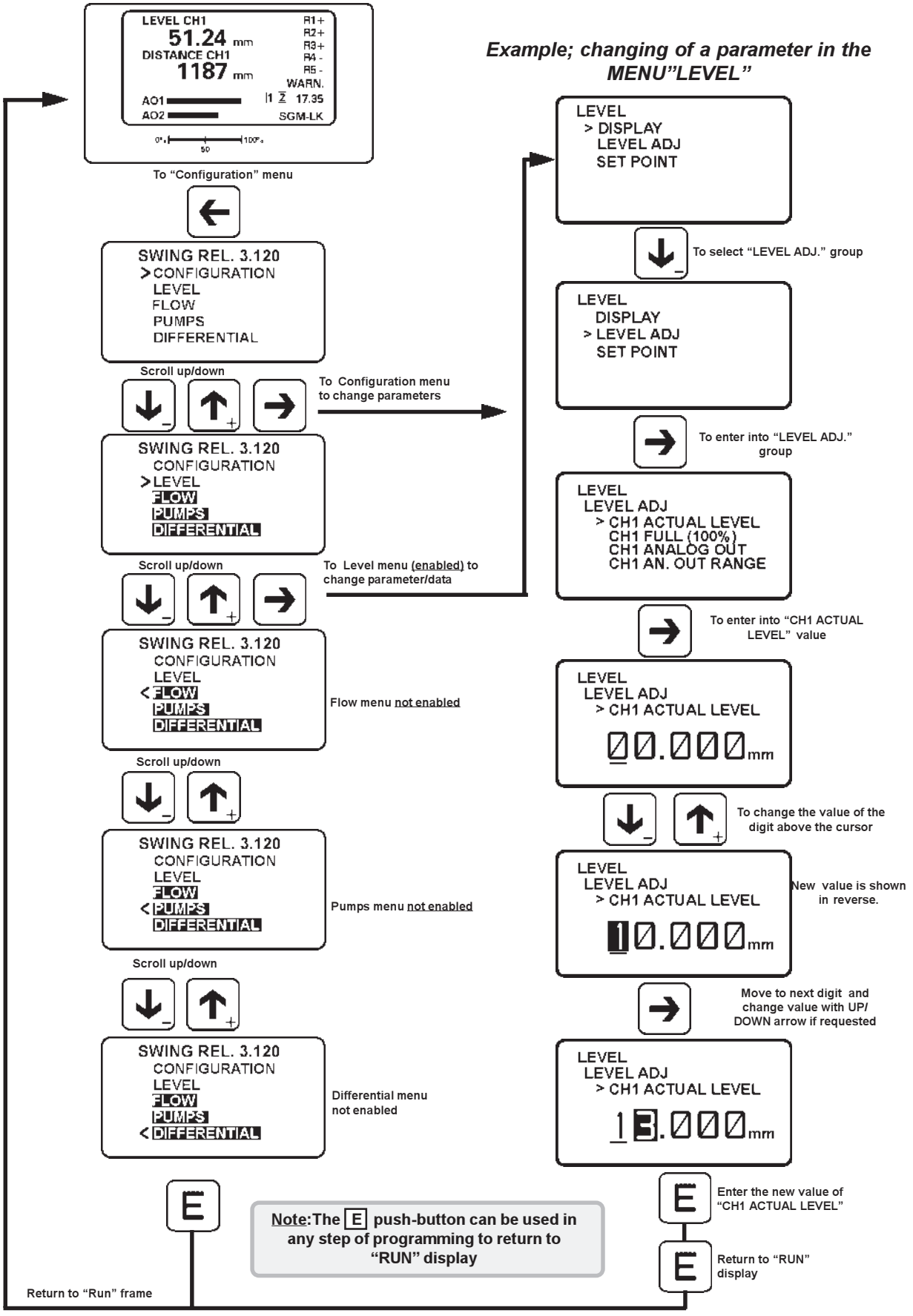

LEVEL CH1
51.24 mm
DISTANCE CH1
1187 mm
R1+
R2+
R3+
R4 -
R5 -
WARN.
AO1
AO2
I1 Σ 17.35
SGM-LK
To "Configuration" menu
SWING REL. 3.120
>CONFIGURATION
LEVEL
FLOW
PUMPS
DIFFERENTIAL
Scroll up/down
To Configuration menu to change parameters
SWING REL. 3.120
CONFIGURATION
>LEVEL
FLOW
PUMPS
DIFFERENTIAL
Scroll up/down
To Level menu (enabled) to change parameter/data
SWING REL. 3.120
CONFIGURATION
LEVEL
<FLOW
PUMPS
DIFFERENTIAL
Flow menu not enabled
Scroll up/down
SWING REL. 3.120
CONFIGURATION
LEVEL
FLOW
<PUMPS
DIFFERENTIAL
Pumps menu not enabled
Scroll up/down
SWING REL. 3.120
CONFIGURATION
LEVEL
FLOW
PUMPS
<DIFFERENTIAL
Differential menu not enabled
E
Return to "Run" frame
Note:The E push-button can be used in any step of programming to return to "RUN" display
Example; changing of a parameter in the MENU"LEVEL"
LEVEL
> DISPLAY
LEVEL ADJ
SET POINT
To select "LEVEL ADJ." group
LEVEL
DISPLAY
> LEVEL ADJ
SET POINT
To enter into "LEVEL ADJ." group
LEVEL
LEVEL ADJ
> CH1 ACTUAL LEVEL
CH1 FULL (100%)
CH1 ANALOG OUT
CH1 AN. OUT RANGE
To enter into "CH1 ACTUAL LEVEL" value
LEVEL
LEVEL ADJ
> CH1 ACTUAL LEVEL
00.000mm
To change the value of the digit above the cursor
LEVEL
LEVEL ADJ
> CH1 ACTUAL LEVEL
10.000mm
New value is shown in reverse.
Move to next digit and change value with UP/ DOWN arrow if requested
LEVEL
LEVEL ADJ
> CH1 ACTUAL LEVEL
13.000mm
Enter the new value of "CH1 ACTUAL LEVEL"
Return to "RUN" display

Fig. 18

SWING - Program "NORMAL" - layout

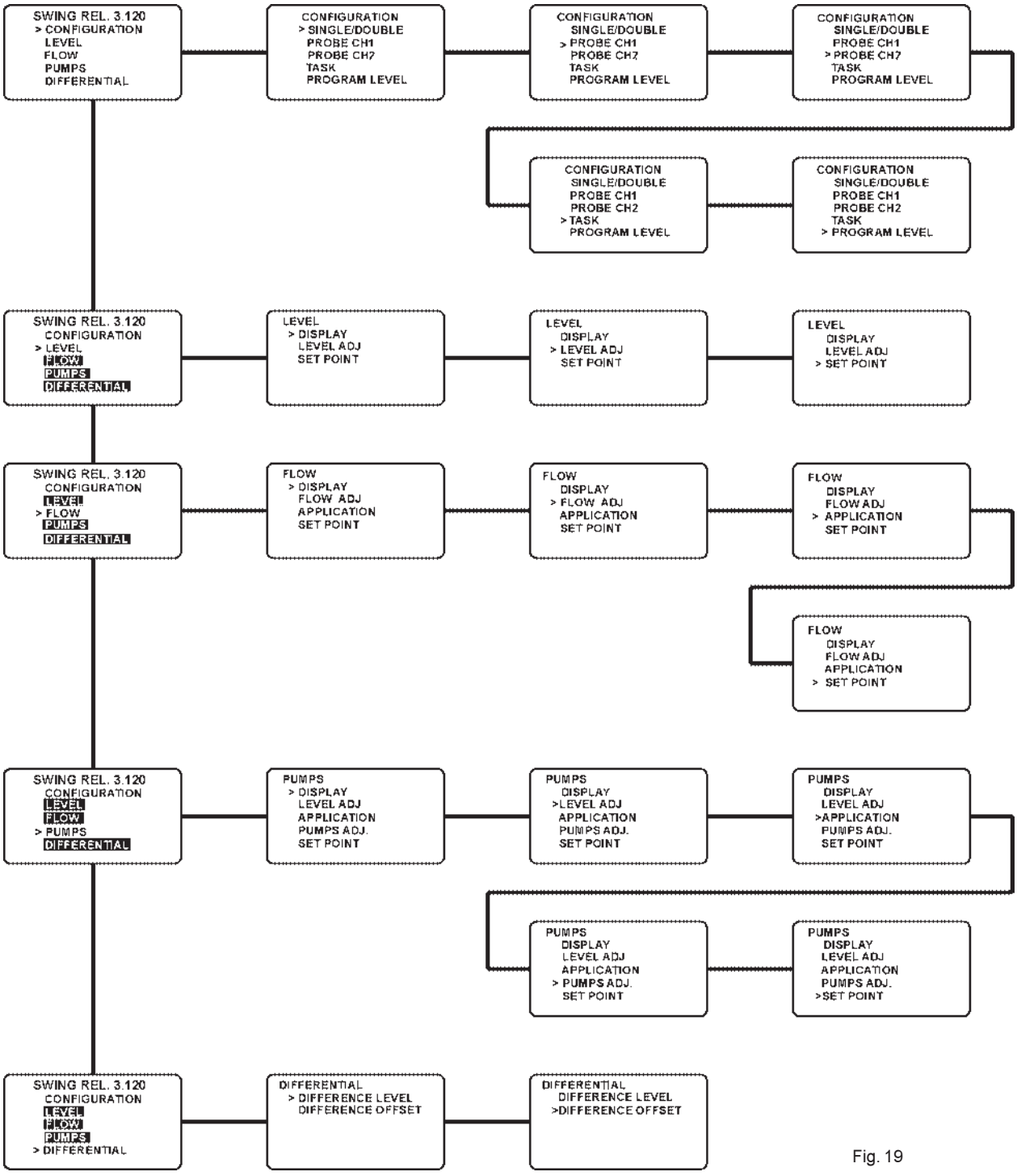


Fig. 19

1.CONFIGURATION

1.1 - SINGLE/DOUBLE

1.1.1 SINGLE/DOUBLE

The unit can operate as single measurement (only one sensor) or double measurement channels. If SINGLE , parameters referred to the CH2 will not be displayed.

Attention! Selecting "DOUBLE" mode in a programmed unit already in "SINGLE" mode all the system parameters memorize previously they for CH1 will have annulled, will be therefore necessary program the unit again. Identical situation in the inverse case, that is spending from "DOUBLE" mode to "SINGLE" mode.

Selection messages
SINGLE
DOUBLE

1.3 - PROBE CH1

1.3.1 PROBE TYPE

This parameter select the ultrasonic sensor type to be connected to the SWING at the CH1 measurement channel. The selection will be made scrolling the ultrasonic sensor type, pressing "E" key to confirm selection. During the ultrasonic sensor selection will be checked the electrical connection and the corrispondence to the wiring sensor .

Setting the parameter means that the SWING unit accept the sensor connected and, write into the ultrasonic sensor the relevant UID code name.

Warning ! ! if two ultrasonic sensor are connected , during this setup, only the CH1 ultrasonic sensor must be connected (consequently disconnect please, CH2 sensor taking out the CH2 extractable connector).

Selection messages	*Description*
NONE	No connected ultrasonic transmitter
SGM PROBE	Connection to a SGM LEKTRA ultrasonic transmitter
SPECIAL	

1.4 - PROBE CH2

1.4.1 PROBE TYPE

Showed if DOUBLE was selected in 1.1.1 parameter

This parameter select the ultrasonic sensor type to be connected to the SWING at the CH2 measurement channel. The selection will be made scrolling the ultrasonic sensor type, pressing "E" key to confirm selection. During the ultrasonic sensor selection will be checked the electrical connection and the corrispondence to the wiring sensor .

Setting the parameter means that the SWING unit accept the sensor connected and, write into the ultrasonic sensor the relevant UID code name.

Warning ! ! if two ultrasonic sensor connected , during this setup, only the CH2 ultrasonic sensor must be connected (consequently disconnect please, CH1 sensor taking out the CH1 extractable connector)..

Selection messages	*Description*
NONE	No connected ultrasonic transmitter
SGM PROBE	Connection to a SGM LEKTRA ultrasonic transmitter
SPECIAL	

1.7 - TASK

1.7.1 CH1 TASK

Measurement channel CH1, selection of the relevant function

Selection messages	*Description*
LEVEL	CH1 makes LEVEL measurement
FLOW	CH1 makes Open Channel Flow measurement
PUMPS	CH1 makes the pumps controller
NONE	None function at CH1

1.7.2 CH2 TASK

Measurement channel CH2, selection of the relevant function **Showed if DOUBLE was selected in 1.1.1 parameter**

Selection messages	*Description*
LEVEL	CH2 makes LEVEL measurement
FLOW	CH2 makes Open Channel Flow measurement
NONE	None function at CH2

1.10 - PROGRAM LEVEL

Parameter Program selection.

Selection messages	*Description*
normal	Agreed to the system configuration parameters
@	Agreed to the service configuration parameters

2.LEVEL

N.B. - It's possible enter if "**CH1 TASK**" and/or "**CH2 TASK**" have been previously seted in "**LEVEL**" mode(see **1.7**)

2.1. DISPLAY

The SWING's display, can shows up to two variables. This parameter selects the variables to be displayed. The first variable setted will be positioned in the upper part, then if another variable will be selected the last will be positioned in the upper part and the previous variable will be shifted below (see fig. 20 and 21). If a third variable is setted the first one will be lost.
The measure variable is selected in the following way:

- Select the variable with the "**UP**" or "**DOWN**" keys
- Agree to the variable with the "**RIGHT**" key, on the display will come visualized the selected variable instant value
- Press the "**LEFT**" key for go out without modify the display in "**RUN**" mode or press the "**E**" key " for display in "RUN" mode the variable as soon as selected

Variables	*Description*
DISTANCE CH1	CH1 instant distance
LEVEL CH1	CH1 instant level
LEVEL % CH1	CH1 instant % level
TEMPERATURE CH1	CH1 instant temperature (only for SGM ultrasonic sensor)

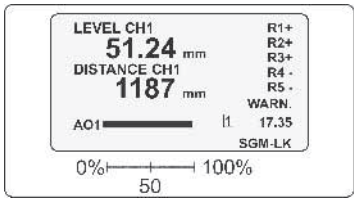


Fig. 20 - Display example: has stayed selected first "DISTANCE CH1," then "LEVEL CH1"

CH2 parameters are showed if DOUBLE was selected in 1.1.1 parameter

Variables	*Description*
DISTANCE CH2	CH2 instant distance
LEVEL CH1	CH2 instant level
LEVEL % CH1	CH2 instant % level
TEMPERATURE CH1	CH2 instant temperature (only for SGM ultrasonic sensor)

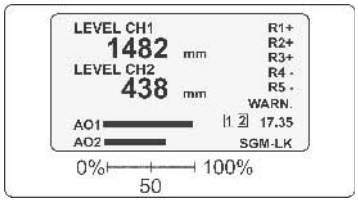


Fig. 21 - Display example: has stayed selected first "LEVEL CH2," then "LEVEL CH1"

2.2. LEVEL ADJ

2.2.3.CH1 ACTUAL LEVEL

Parameter to calibrate the level measure. Must be setted the present level measured (**ACTUAL LEVEL**) from the ultrasonic level sensor in mm. Swing unit compute automatically the distance at which set the "**ZERO**" level, see fig.22. Set the present instantaneous level in mm (**ACTUAL LEVEL**) and then push "**E**" key to confirm.

Parameter	*Description*
CH1 ACTUAL LEVEL = 0	Measured level during the calibration

2.2.5.CH1 FULL (100%)

N.B. - *Maids sole when is necessary dispaly the % level measure*
The parameter set the level value , in mm, referred to 100%, see fig.22. Set the value and push "**E**" key to confirm.

Parameter	*Description*
CH1 FULL (100%) = 1000	Level value in mm referred to level=100%

2.2.8. CH1 ANALOG OUT

Selection of the CH1 output variables to be addressed to CH1 4-20mA

Parameter	*Description*
CH1 ANALOG OUT	NONE
	DISTANCE
	LEVEL
	LEVEL %
	TEMPERATURE

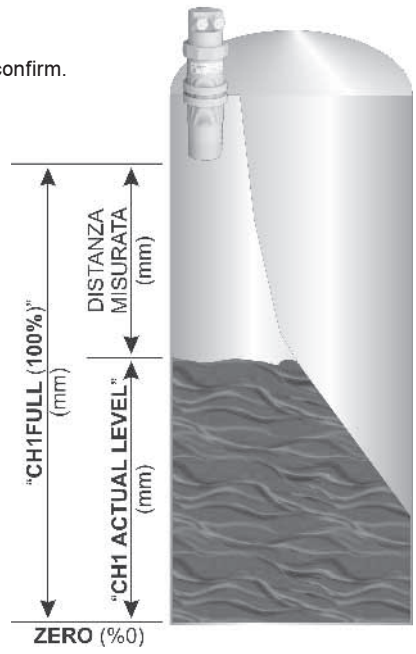


Fig. 22

2.2.9.CH1 ANALOG OUT RANGE

Selection of the CH1 output range of 4-20mA.

Parameter	*Messages*	*Description*
CH1 AN.OUT RANGE	Begin scale	"CH1 Analog Out " begin scale. Set the value, and press E
	End scale	"CH1 Analog Out " end scale. Set the value, and press E

If DOUBLE was selected in 1.1.1 ; the following CH2 parameters will be displayed, please refer to the CH1 corrispondence

2.2.12. CH2 ACTUAL LEVEL

2.2.15. CH2 FULL (100%)

2.2.17. CH2 ANALOG OUT

2.2.18. CH2 ANALOG OUT RANGE

2.5. - SET-POINT

2.5.1. CH1 SETPOINT1

Setpoint associated to REL1, variable and value selection

Parameter	*Messages*		*Description*
CH1 SETPOINT1	DISTANCE,	=9999	Limit point, referred to the CH1 distance variable
	LEVEL,	=9999	Limit point, referred to the CH1 level variable
	LEVEL PERC.	=9999	Limit point, referred to the CH1 % level variable
	TEMPERATURE,	=9999	Limit point, referred to the CH1 temperature variable

2.5.2. CH1 SETPOINT2

Setpoint associated to REL2, variable and value selection

Parameter	*Messages*		*Description*
CH1 SETPOINT2	DISTANCE,	=9999	Limit point, referred to the CH1 distance variable
	LEVEL,	=9999	Limit point, referred to the CH1 level variable
	LEVEL PERC.	=9999	Limit point, referred to the CH1 % level variable
	TEMPERATURE,	=9999	Limit point, referred to the CH1 temperature variable

2.5.3. CH1 SETPOINT3

Setpoint associated to REL3, variable and value selection

Parameter	*Messages*		*Description*
CH1 SETPOINT3	DISTANCE,	=9999	Limit point, referred to the CH1 distance variable
	LEVEL,	=9999	Limit point, referred to the CH1 level variable
	LEVEL PERC.	=9999	Limit point, referred to the CH1 % level variable
	TEMPERATURE,	=9999	Limit point, referred to the CH1 temperature variable

2.5.4. CH1 SETPOINT4

Setpoint associated to REL4, variable and value selection

Parameter	*Messages*		*Description*
CH1 SETPOINT4	DISTANCE,	=9999	Limit point, referred to the CH1 distance variable
	LEVEL,	=9999	Limit point, referred to the CH1 level variable
	LEVEL PERC.	=9999	Limit point, referred to the CH1 % level variable
	TEMPERATURE,	=9999	Limit point, referred to the CH1 temperature variable

2.5.5. CH1 SETPOINT5

Setpoint associated to REL5, variable and value selection

Parameter	*Messages*		*Description*
CH1 SETPOINT5	DISTANCE,	=9999	Limit point, referred to the CH1distance variable
	LEVEL,	=9999	Limit point, referred to the CH1level variable
	LEVEL PERC.	=9999	Limit point, referred to the CH1 % level variable
	TEMPERATURE,	=9999	Limit point, referred to the CH1 temperature variable

The following five parameters select the action type referring the relevant previous setpoint variable. The parameter can be setted as a Minimum, Maximum, Window, and Differential threshold action

2.5.6. CH1 SETP.1 MODE

Parameter	*Messages*		*Description*
CH1 SETP.1 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

2.5.7. CH1 SETP.2 MODE

Parameter	*Messages*		*Description*
CH1 SETP.2 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

2.5.8. CH1 SETP.3 MODE

Parameter	*Messages*		*Description*
CH1 SETP.3 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

2.5.9. CH1 SETP.4 MODE

Parameter	*Messages*		*Description*
CH1 SETP.4 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

2.5.10. CH1 SETP.5 MODE

Parameter	*Messages*		*Description*
CH1 SETP.5 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

if DOUBLE was selected in 1.1.1 ; the following CH2 parameters will be displayed please, refer to the CH1 corrispondence

2.5.11. CH2 SETPOINT1

2.5.12. CH2 SETPOINT2

2.5.13. CH2 SETPOINT3

2.5.14. CH2 SETPOINT4

2.5.15. CH2 SETPOINT5

2.5.16. CH2 SETP.1 MODE

2.5.16. CH2 SETP.1 MODE

2.5.18. CH2 SETP.3 MODE

2.5.19. CH2 SETP.4 MODE

2.5.20. CH2 SETP.5 MODE

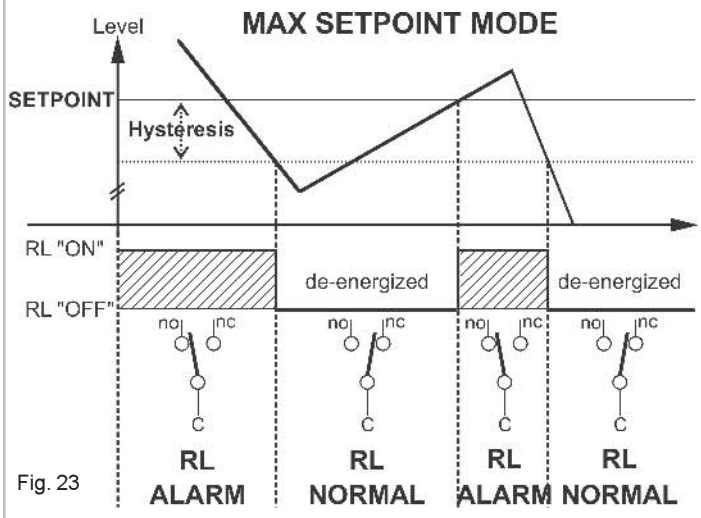


Fig. 23

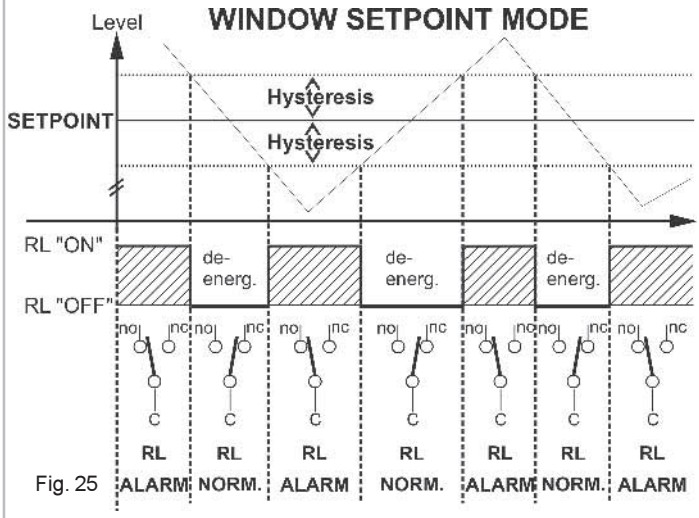


Fig. 25

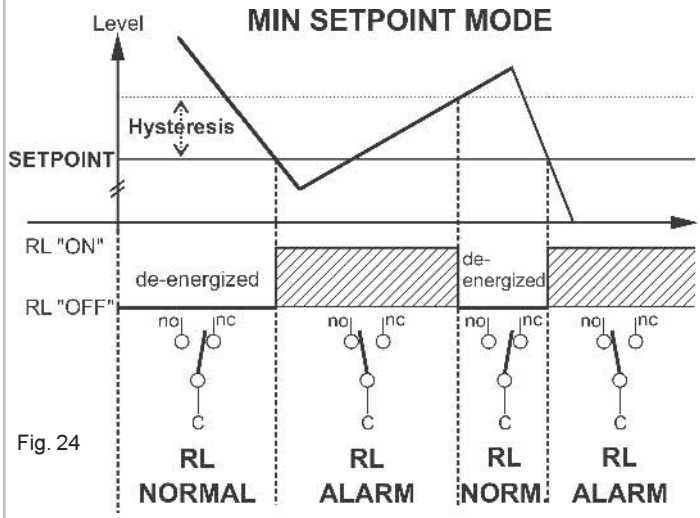


Fig. 24

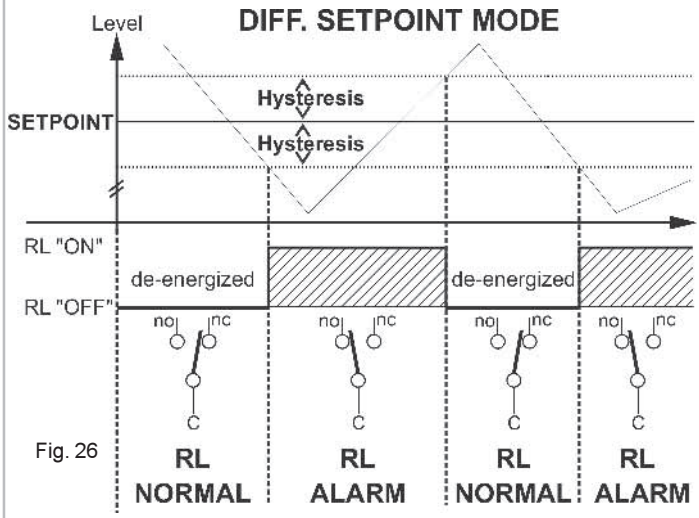


Fig. 26

3. FLOW

N.B. - It's possible enter if "**CH1 TASK**" and/or "**CH2 TASK**" have been previously seted in "**FLOW**" mode(see **1.7**)

3.1. DISPLAY

The SWING's display, can shows up to two variables. This parameter selects the variables to be displayed. The first variable setted will be positioned in the upper part, then if another variable will be selected the last will be positioned in the upper part and the previous variable will be shifted below (see fig. 27 and 28). If a third variable is setted the first one will be lost.
The measure variable is selected in the following way:

- Select the variable with the "**UP**" or "**DOWN**" keys
- Agree to the variable with the "**RIGHT**" key, on the display will come visualized the selected variable instant value
- Press the "**LEFT**" key for go out without modify the display in "**RUN**" mode or press the "**E**" key " for display in "RUN" mode the variable as soon as selected

Messages	*Description*
CH1 FLOW	Instantaneus CH1flow
CH1 LEVEL	Instantaneus CH1 level (head)
CH1 TOTALIZER	CH1 Totalizer, max 9999999
CH1 COUNTER	CH1 Counter, max 9999999
CH1 COUNTER DOWN	CH1 Presettable decrement counter

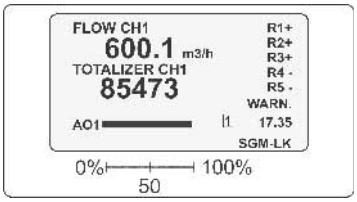


Fig. 27 - Display example: has stayed selected first "TOTALIZER CH1," then "FLOW CH1"

CH2 parameters showed if DOUBLE was selected in 1.1.1 parameter

Messages	*Description*
CH2 FLOW	Instantaneus CH2 flow
CH2 LEVEL	Instantaneus CH2 level (head)
CH2 TOTALIZER	CH2 Totalizer, max 9999999
CH2 COUNTER	CH2 Counter, max 9999999
CH2 COUNTER DOWN	CH2 Presettable decrement counter

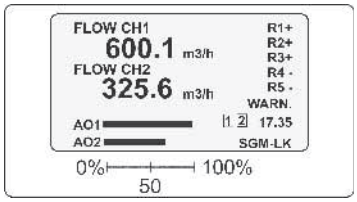


Fig. 28 - Display example: has stayed selected first "FLOW CH2," then "FLOW CH1"

3.2. FLOW ADJ

3.2.2.CH1 FLOW UNIT

Select the flow measure unit then press "E" to confirm.

Parameter	*Messages*	*Description*
CH1 FLOW UNIT	L/Sec	flow measure in l/ s
	L/min	flow measure in l/min
	L/hour	flow measure in l/h
	-m3/Sec	flow measure in m^3/s
	-m3/min	flow measure in m^3/min
	-m3/hour	flow measure in m^3/h

3.2.4.CH1 ACTUAL LEVEL

Parameter to calibrate the level measure. Must be setted the present level measured (**ACTUAL LEVEL**) from the ultrasonic level sensor in mm. Swing unit compute automatically the distance at which set the "**ZERO**" level, see fig.29 and 30. Set the present instantaneous level in mm (**ACTUAL LEVEL**) and then push "**E**" key to confirm.

Parameter		*Description*
CH1 ACTUAL LEVEL	=0	Measured level during the calibration

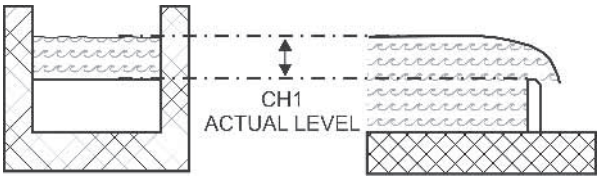


Fig. 29

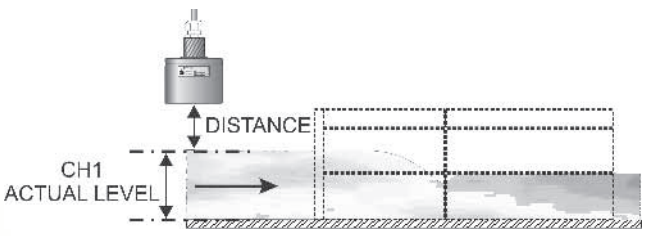


Fig. 30

3.2.6.CH1 FULL (100%)

The parameter set the level value, in mm, referred to 100% . Set the value and press "E" key to confirm

Parameter		*Description*
CH1 FULL (100%)	=1000	Level value in mm referred to level=100%

3.2.10. CH1 ANALOG OUT

Selection of the CH1 output variables to be addressed to CH1 4÷20mA

Parameter	*Messages*	*Description*
CH1 ANALOG OUT	NONE	None
	HEAD	Instantaneus CH1head
	FLOW	Instantaneus CH1flow

3.2.11. CH1 ANALOG OUT RANGE

Selection of the CH1 output range of 4-20mA

Parameter	*Messages*	*Description*
CH1 AN. OUT RANGE	Begin scale	"CH1 Analog Out " begin scale. Set the value, press E
	End scale	"CH1 Analog Out " end scale. Set the value, press E

If DOUBLE was selected in 1.1.1 ; the following CH2 parameters will be displayed please, refer to the CH1 corrispondence

3.2.13. CH2 FLOW UNIT

3.2.15. CH2 ACTUAL LEVEL

3.2.17. CH2 FULL (100%)

3.2.21. CH2 ANALOG OUT

3.2.22. CH2 ANALOG OUT RANGE

3.3. APPLICATION

3.3.1.CH1 PRIMARY DEVICE

The flow measurement in open channel needs hydraulic restriction and must be measured the level (HEAD) of the liquids before the restriction. Mathematical equations , already implemented into the SWING unit, will convert the Head into the relevant Flow. WEIRS, must be used for clean water, FLUMES are better for water with sedimentation. If not standard restrictions are used and the Head-Flow relation are known (like discharge table), TABLE can be used to fit the relevant corrispondece (up to 32 couple of head-flow values). Select and press "E" key to confirm.

Parameter	*Messages*	*Description*
CH1 PRIMARY DEVICE	WEIRS	Weirs
	FLUMES	Pre-fabricated SGM-LEKTRA Venturi flumes
	TABLE	Level/Flow table

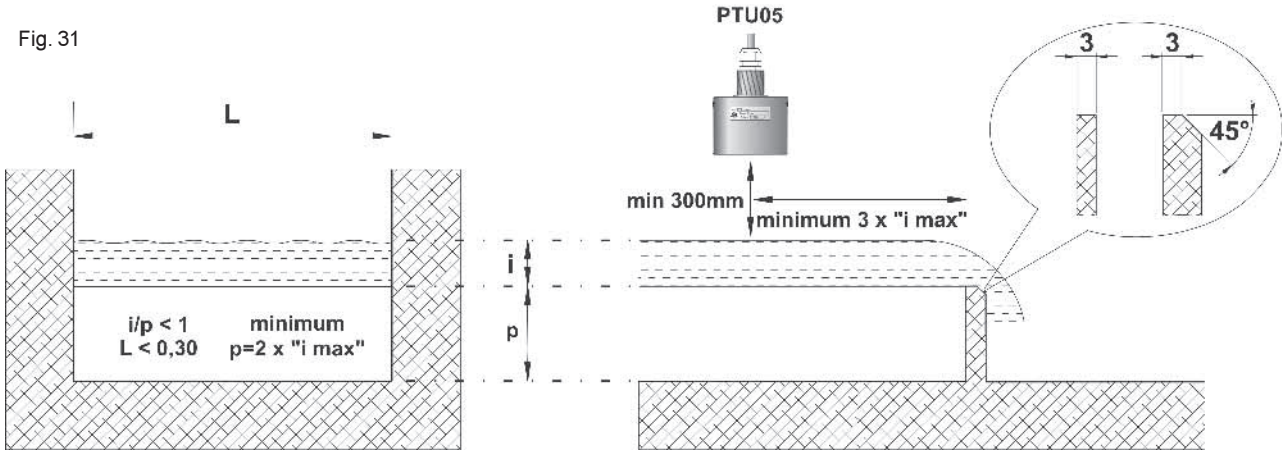
3.3.2.CH1 WEIRS

Displayed only if : Primary Device = Weirs

Parameter	*Messages*	*Description*
CH1 WEIRS	NOT COSTR.RECT.	No constriction rectangular weir (see fig.31)
	COSTR. RECT.	Constriction rectangular weir (see fig.32)
	V-NOTCH	V-notched weir (triangular weir) (see fig.33)
	TRAPEZIOIDAL	Trapezoidal weir (see fig.34)

NO CONSTRICTION RECTANGULAR WEIR "Bazin"

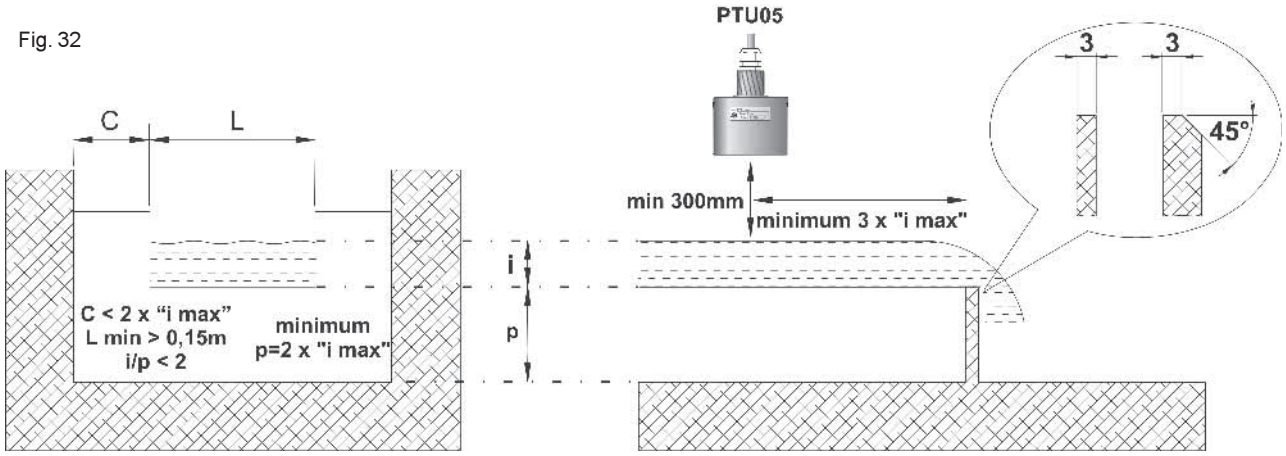
Fig. 31



To parity of flow, the "Bazin" weir is what has a smallest loss of load, it that is requires a smallest level height "i"

CONSTRICTION RECTANGULAR WEIR "Francis"

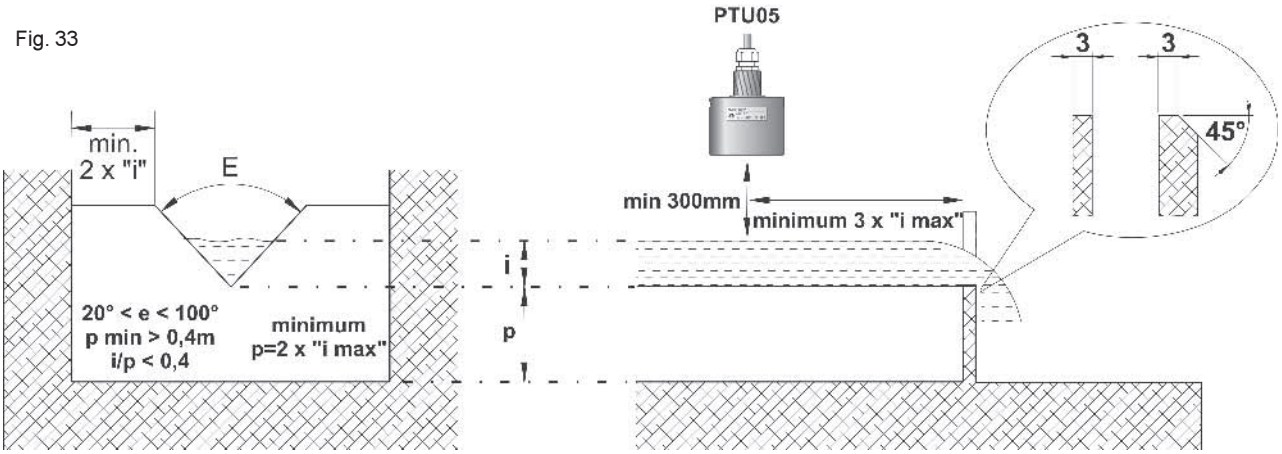
Fig. 32



The "Francis" weir comes generally used when is required a better accuracy than the "Bazin" weir, but it present a biger loss of load.

TRIANGULAR WEIR

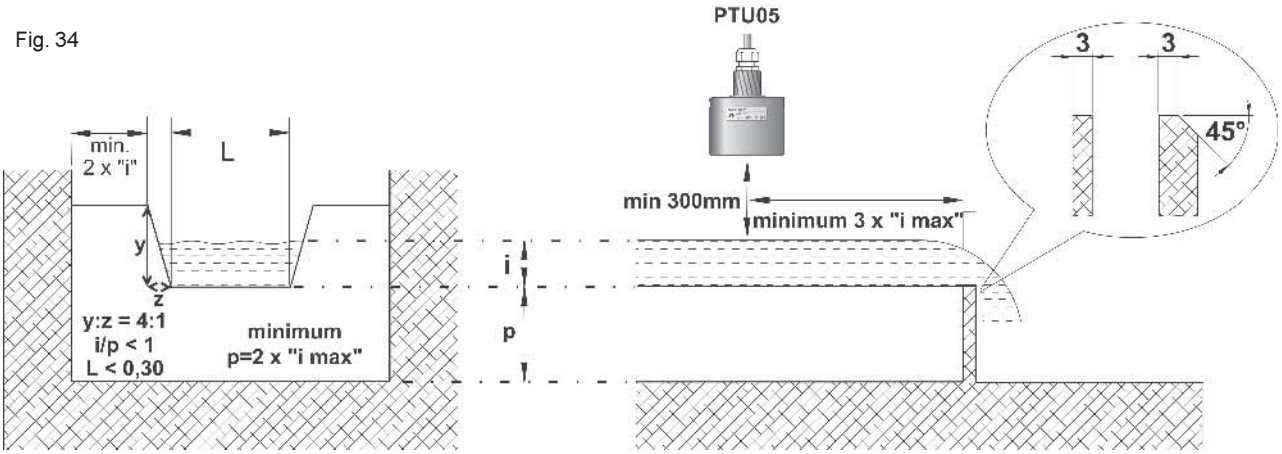
Fig. 33



To parity of flow, the triangular weir has a loss of load inversely proportional to the opening angle “E”
The considerable loss of load has compensated from a better accuracy, especially in the low flow.

TRAPEZOIDAL OR CIPOLETTI WEIR

Fig. 34



WEIRS APPLICATIVE CHARACTERISTICS

ADVANTAGES

- All flows suitable
- Good accuracy, better than the Venturi channels
- Low cost construction (self-made)

DISADVANTAGES

- Don't adapt for dirty liquids and/or with solid in suspension
- Elevated loss of load

3.3.3.CH1 FLUMES

Displayed only if : Primary Device = Flumes (fig.35)

Parameter	*Messages*
CH1 FLUMES	VENTURI

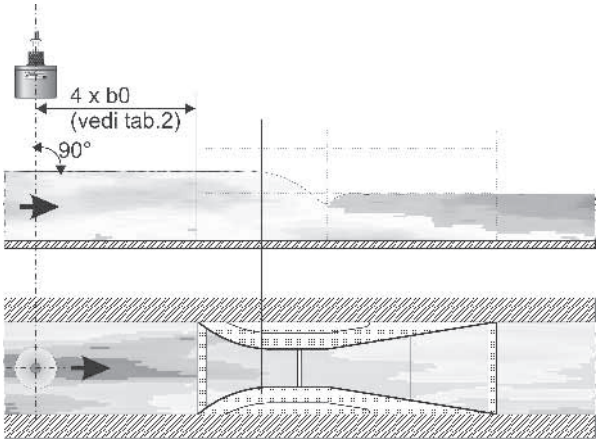


Fig. 35

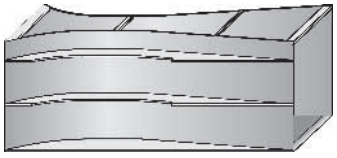
3.3.4.CH1 DIMENSION

The following parameters value meaning (see fig.36) are in relation to the preceding parameters setting (**3.3.1** and **3.3.2**): Weirs kind or Flumes channel..
N.B. - The **A**, **B**, **C**, **D** and **E** parameters, if not used, must be setted with the default values, here under suitable, besides in the case of the Venturi channels (FLUMES) the **A** parameter has sense exclusively with the SGM LEKTRA pre-fabricated Venturi flumes models

Parameter	*Messages*	
CH1 DIMENSION	A = 0000,	=1000
	B = 0000,	=100
	C = 0000,	=0
	D = 0000,	=0
	E = 0000,	=90

SGM LEKTRA FLUMES

MODEL	A
BS150	150
BS200	200
BS300	300
BS400	400
BS500	500
BS600	600
BS800	800
BS1000	1000



WEIRS

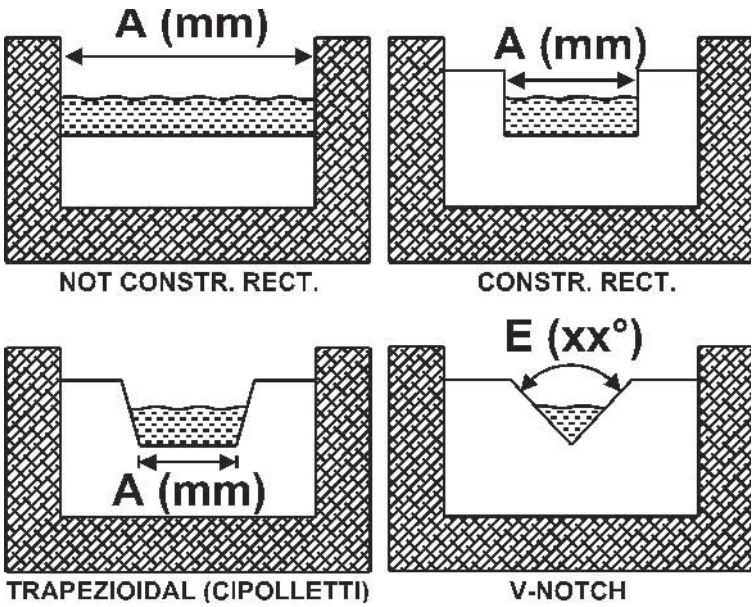


Fig. 36

3.3.7.CH1 LEV / FLOW TAB

Displayed only if : Primary Device = TABLE

Note:The values couples must be entered in ascending mode

Parameter	*Messages*	
CH1 LEV/FLOW TAB	LEVEL 01	=0
	FLOW 01	=0
	....	
	....	
	LEVEL 32	=0
	FLOW 32	=0

3.3.9.CH1 C.DOWN PRESET

In the case require activate sampling or the additives proportion, it's possible set a departure value (PRESET) for the counter to decrement "**C.DOWN**" and joining a relay "**SETPOINT**", programmed to the function "C.DOWN" with "0" value (see par. 3.4). Each whenever the counter to decrement will reach the "0" value the relay impulsive output will be activated and the counter to decrement will leave again from the departure value (PRESET) programmed.

Parameter		*Description*
CH1 C.DOWN PRESET	=1000	Set the count- down counter start value

3.3.10. CH1 VOLUME PULSE

Based on the flow measure unit selected, (eg.:l/s), set the value of this parameter that multiply the volume unit (l). This variable reppresent the counting unit for all the totalizer, and counters. For instance flow measure unit l/s; set the parameter volume pulse=1000; one count each 1 m^3 (1000 liters)

Parameter		*Description*
CH1 VOLUME PULSE	=1	Set the desired value and press “E” key

If DOUBLE was selected in 1.1.1; the following CH2 parameters will be displayed please, refers to the CH1 corrispondence

3.3.11. CH2 PRIMARY DEVICE

3.3.12. CH2 WEIRS

3.3.13. CH2 FLUMES

3.3.14. CH2 DIMENSIONS

3.3.17. CH2 LEV / FLOW TAB

3.3.19. CH2 C.DOWN PRESET

3.3.20. CH2 VOLUME PULSE

3.4. - SET-POINT

3.4.1.CH1 SETPOINT1

Parameter	*Messages*		*Description*
CH1 SETPOINT1	FLOW	=9999.0	Limit point referred to CH1 instantaneus flow variable
	LEVEL	=9999.0	Limit point referred to CH1 level variable
	TOTALIZER	=9999.0	Repetition of totalizer pulse (Must be set =1)
	COUNTER	=9999.0	Limit point referred to the counter value
	C.DOWN	=0000.0	Limit point referred to cont.down counter value

3.4.2.CH1 SETPOINT2

Parameter	*Messages*		*Description*
CH1 SETPOINT2	FLOW	=9999.0	Limit point referred to CH1 instantaneus flow variable
	LEVEL	=9999.0	Limit point referred to CH1 level variable
	TOTALIZER	=9999.0	Repetition of totalizer pulse (Must be set =1)
	COUNTER	=9999.0	Limit point referred to the counter value
	C.DOWN	=0000.0	Limit point referred to cont.down counter value

3.4.3.CH1 SETPOINT3

Parameter	*Messages*		*Description*
CH1 SETPOINT3	FLOW	=9999.0	Limit point referred to CH1 instantaneus flow variable
	LEVEL	=9999.0	Limit point referred to CH1 level variable
	TOTALIZER	=9999.0	Repetition of totalizer pulse (Must be set =1)
	COUNTER	=9999.0	Limit point referred to the counter value
	C.DOWN	=0000.0	Limit point referred to cont.down counter value

3.4.4.CH1 SETPOINT4

Parameter	*Messages*		*Description*
CH1 SETPOINT4	FLOW	=9999.0	Limit point referred to CH1 instantaneus flow variable
	LEVEL	=9999.0	Limit point referred to CH1 level variable
	TOTALIZER	=9999.0	Repetition of totalizer pulse (Must be set =1)
	COUNTER	=9999.0	Limit point referred to the counter value
	C.DOWN	=0000.0	Limit point referred to cont.down counter value

3.4.5.CH1 SETPOINT5

Parameter	*Messages*		*Description*
CH1 SETPOINT5	FLOW	=9999.0	Limit point referred to CH1 instantaneus flow variable
	LEVEL	=9999.0	Limit point referred to CH1 level variable
	TOTALIZER	=9999.0	Repetition of totalizer pulse (Must be set =1)
	COUNTER	=9999.0	Limit point referred to the counter value
	C.DOWN	=0000.0	Limit point referred to cont.down counter value

The following five parameters select the action type referring the relevant previous setpoint variable. The parameter can be setted as a Minimum, Maximum, Window, and Differential threshold action

3.4.6. CH1 SETP.1 MODE

Parameter	*Messages*		*Description*
CH1 SETP.1 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

3.4.7. CH1 SETP.2 MODE

Parameter	*Messages*		*Description*
CH1 SETP.2 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

3.4.8. CH1 SETP.3 MODE

Parameter	*Messages*		*Description*
CH1 SETP.3 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

3.4.9. CH1 SETP.4 MODE

Parameter	*Messages*		*Description*
CH1 SETP.4 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

3.4.10. CH1 SETP.5 MODE

Parameter	*Messages*		*Description*
CH1 SETP.5 MODE	MAX	=0000.0	Max threshold and hysteresis value under the threshold, set the value (fig.23)
	MIN	=0000.0	Max threshold and hysteresis value above the threshold, set the value (fig.24)
	WINDOW	=0000.0	Hysteresis above and under the **SETPOINT** value, set value (fig.25)
	DIFF.	=0000.0	The hysteresis will be setted automatically above or below the setpoint depending if the across of the set point is made during increase or decrease of the value (fig.26)

If DOUBLE was selected in 1.1.1 ; the following CH2 parameters will be displayed please refer to the CH1 corrispondence

3.4.11. CH2 SETPOINT1

3.4.12. CH2 SETPOINT2

3.4.13. CH2 SETPOINT3

3.4.14. CH2 SETPOINT4

3.4.15. CH2 SETPOINT5

3.4.16. CH2 SETP.1 MODE

3.4.17. CH2 SETP.2 MODE

3.4.18. CH2 SETP.3 MODE

3.4.19. CH2 SETP.4 MODE

3.4.20. CH2 SETP.5 MODE

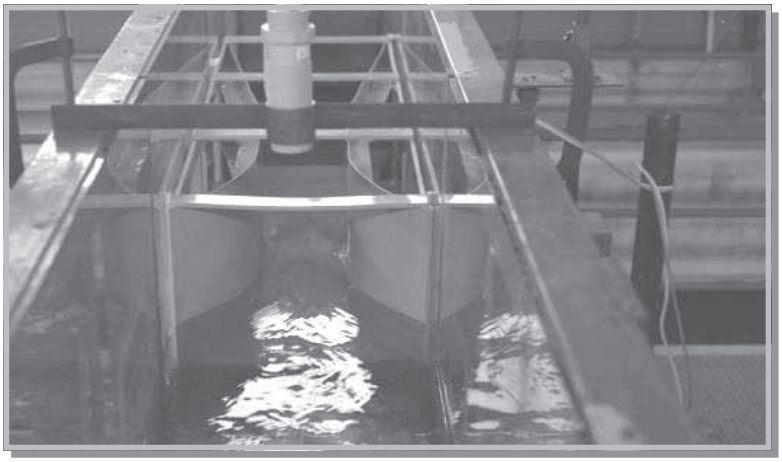


Fig. 37

The SGM-LEKTRA wants to improve his presence into the branch of open channel flow measurement. SGM-LEKTRA has developed its own flumes family called BS... in co-operation with the Division of Hydraulic of University of Pavia.

The BS... flume is a special Venturi with flat bottom and ready to be lodged in a pre-existing rectangoular channel. BS... flume family are designed for irrigation, sewage, and industrial waste measurement.

The submerged flow (ratio from downstream head and upperstream head) can be well tollerated. The practical limit of submergence for all sizes is about 90%.

A copy of the technical documentation from University is at your disposal on request.

The complete open channel measurement system are composed from: Weir or Flumes like BS... , ultrasonic head measurement (Smartcost), associated display and volume-totalizer unit like Swing.

4.PUMPS

N.B. - It's possible enter if "**CH1 TASK**" and/or "**CH2 TASK**" have been previously seted in "**PUMPS**" mode(see **1.7**)
The Pumps control is active in the CH1 only. Consequently for double channel measurement, will be possible to add to Pumps-control, Level or Open Channel Flow measurement function.

4.1. DISPLAY

The SWING's display, can shows up to two variables. This parameter selects the variables to be displayed. The first variable setted will be positioned in the upper part, then if another variable will be selected the last will be positioned in the upper part and the previous variable will be shifted below . If a third variable is setted the first one will be lost (for greater details consult the "**LEVEL**" chapter).
The measure variable is selected in the following way:
- Select the variable with the "**UP**" or "**DOWN**" keys
- Agree to the variable with the "**RIGHT**" key, on the display will come visualized the selected variable instant value
- Press the "**LEFT**" key for go out without modify the display in "**RUN**" mode or press the "**E**" key " for display in "RUN" mode the variable as soon as selected

Variables	*Description*
DISTANCE CH1	CH1 instant distance
LEVEL CH1	CH1 instant level
LEVEL % CH1	CH1 instant % level
TEMPERATURE CH1	CH1 instant temperature (only for SGM ultrasonic sensor)

4.2. LEVEL ADJ

4.2.3.CH1 ACTUAL LEVEL

Parameter to calibrate the level measure. Must be setted the present level measured (**ACTUAL LEVEL**) from the ultrasonic level sensor in mm. Swing unit compute automatically the distance at which set the "**ZERO**" level. Set the present instantaneous level in mm (**ACTUAL LEVEL**) and then push "**E**" key to confirm (for greater details consult the "**LEVEL**" chapter).

Parameter		*Description*
CH1 ACTUAL LEVEL	=0	Measured level during the calibration

4.2.5.CH1 FULL (100%)

N.B. - *Maids sole when is necessary dispaly the % level measure*
The parameter set the level value , in mm, referred to 100%. Set the value and push "**E**" key to confirm (for greater details consult the "**LEVEL**" chapter).

Parametro		*Descrizione*
CH1 FULL (100%)	=1000	Level value in mm referred to level=100%

4.2.8.CH1 ANALOG OUT

Selection of the CH1 output variables to be addressed to CH1 4-20mA

Parameter	*Description*
CH1 ANALOG OUT	NONE
	DISTANCE
	LEVEL
	LEVEL %
	TEMPERATURE

4.2.9.CH1 ANALOG OUT RANGE

Selection of the CH1 output range of 4-20mA.

Parameter	*Messages*	*Description*
CH1 AN.OUT RANGE	Begin scale	"CH1 Analog Out " begin scale. Set the value, and press E
	End scale	"CH1 Analog Out " end scale. Set the value, and press E

4.3. APPLICATION

4.3.1.CH1 FILLING TIME m/h

It represent the measure answer time (integration) on the dislpay and on the analog output. The measured value could not increase with superior speed to that setted

Parameter	*Description*
CH1 FILLING TIME m/h =9999.9	Filling middle time in m/ h

4.3.2.CH1 EMPTING TIME m/h

It represent the measure answer time (integration) on the dislpay and on the analog output. The measured value could not decrease with superior speed to that setted

Parameter		*Description*
CH1 EMPTYING TIME m/h	=9999.9	Emptying middle time in m/ h

4.5. PUMPS ADJ

4.5.1. PUMPS MODE

In the same well, specify the Pumps operating mode: Emptying or Filling

Parameter	*Messages*
PUMPS MODE	EMPTYING
	FILLING

4.5.2. PUMP1

Pump1 parameter is referred to the REL1, if chosed “none”, REL1 can be used for alarm or other functions. ROTATION enables a special feature to exchange the function from all the pumps (ROTATION) in order to have the average working time. FIXED means normal fix connection of the setpoint to the same pump (no pumps rotation).

Parameter	*Messages*	*Description*
PUMP1	NONE	Disabled pump
	ROTATION	Pumps rotation (only between the pumps in ROTATION)
	FIXED	Pump with fixed setpoint

4.5.3. PUMP2

Pump2 parameter is referred to the REL2, if chosed “none”, REL2 can be used for alarm or other functions. ROTATION enables a special feature to exchange the function from all the pumps (ROTATION) in order to have the average working time. FIXED means normal fix connection of the setpoint to the same pump (no pumps rotation).

Parameter	*Messages*	*Description*
PUMP2	NONE	Disabled pump
	ROTATION	Pumps rotation (only between the pumps in ROTATION)
	FIXED	Pump with fixed setpoint

4.5.4. PUMP3

Pump3 parameter is referred to the REL3, if chosed “none”, REL3 can be used for alarm or other functions. ROTATION enables a special feature to exchange the function from all the pumps (ROTATION) in order to have the average working time. FIXED means normal fix connection of the setpoint to the same pump (no pumps rotation).

Parameter	*Messages*	*Description*
PUMP3	NONE	Disabled pump
	ROTATION	Pumps rotation (only between the pumps in ROTATION)
	FIXED	Pump with fixed setpoint

4.5.5. PUMP 4

Pump4 parameter is referred to the REL4, if chosed "none", REL4 can be used for alarm or other functions. ROTATION enables a special feature to exchange the function from all the pumps (ROTATION) in order to have the average working time. FIXED means normal fix connection of the setpoint to the same pump (no pumps rotation).

Parameter	*Messages*	*Description*
PUMP4	NONE	Disabled pump
	ROTATION	Pumps rotation (only between the pumps in ROTATION)
	FIXED	Pump with fixed setpoint

4.5.6. PUMP 5

Pump5 parameter is referred to the REL5, if chosed "none", REL5 can be used for alarm or other functions. ROTATION enables a special feature to exchange the function from all the pumps (ROTATION) in order to have the average working time. FIXED means normal fix connection of the setpoint to the same pump (no pumps rotation).

Parameter	*Messages*	*Description*
PUMP5	NONE	Disabled pump
	ROTATION	Pumps rotation (only between the pumps in ROTATION)
	FIXED	Pump with fixed setpoint

4.6. SET_POINT

4.6.2.PUMP1 SET

Parameter	*Messages*	*Description*
PUMP1 SET	ON =9999	Over the set value, the pump becomes active
	OFF =9999	Below the set value, the pump becomes non active
	DELAY =0	Delay time of the start of the pump, in seconds.

4.6.4.PUMP2 SET

Parameter	*Messages*	*Description*
PUMP2 SET	ON =9999	Over the set value, the pump becomes active
	OFF =9999	Below the set value, the pump becomes non active
	DELAY =0	Delay time of the start of the pump, in seconds.

4.6.6.PUMP3 SET

Parameter	*Messages*	*Description*
PUMP3 SET	ON =9999	Over the set value, the pump becomes active
	OFF =9999	Below the set value, the pump becomes non active
	DELAY =0	Delay time of the start of the pump, in seconds.

4.6.8.PUMP4 SET

Parameter	*Messages*	*Description*
PUMP4 SET	ON =9999	Over the set value, the pump becomes active
	OFF =9999	Below the set value, the pump becomes non active
	DELAY =0	Delay time of the start of the pump, in seconds.

4.6.10.PUMP5 SET

Parameter	*Messages*	*Description*
PUMP5 SET	ON =9999	Over the set value, the pump becomes active
	OFF =9999	Below the set value, the pump becomes non active
	DELAY =0	Delay time of the start of the pump, in seconds.

5.DIFFERENTIAL

N.B. - It's possible enter if "**CH1 TASK**" and "**CH2 TASK**" have been previously seted in "**LEVEL**" mode(see **1.7**)

5.1. DIFFERENCE LEVEL

Difference CH1-CH2, operates with all the parameters and analog output of the CH1, (updating the values)-The priority (Master) channel is CH1.
Difference CH2-CH1, operates with all the parameters and analog output of the CH2, (updating the values)-The priority (Master) channel is CH2.

Parameter	*Messages*	*Description*
DIFFERENCE LEVEL	NONE	Differential function disabled
	CH1-CH2	Difference between CH1 and CH2
	CH2-CH1	Difference between CH2 and CH1

5.2. DIFFERENCE OFFSET

Compensation of any offset of the difference due to misalignement in the installation or other reasons .The offset can have positive or negative value but same unit and limits set for both channels.

Parameter	*Messages*	*Description*
DIFFERENCE OFFSET	Diff. Offset level	Set the required difference offset value

Example

CH1	CH2	DIFF. OFFSET	DIFFERENCE L.
200	0	0	200
200	0	100	300
200	0	-100	100

6 SWING RS485 OUT

N.B. - In the SWING with the RS485 auxiliary transmission is not available the pomps control function "PUMPS"

1. Hardware installation
Connect the RS485/RS232 interface to the SWING RS485 port

2. Software installation
The installation is very simple, needs to copy only 2 files, but it's different to second that the O.S. is Windows 2000 or Windows XP

2.1 Windows 2000
1. Copy the MSCOMM32.OCX file in the c:\winNT\System32 directory
2. Copy the swing.exe file where are desired.
3. To run the program start the swing.exe file.

2.2 Windows XP
1. Copy the MSCOMM32.OCX file in the c:\windows\System32
2. Copy the swing.exe file where are desired.
3. To run the program start the swing.exe file.

3. User interface
To the first starting the software job window will appear. The parameters display are in first plane and RS232 port selection is in low it to the right, to which is connected the SWING (through the RS232/485 converter).

3.1 COM selection
COM1 port is the dafaul connection but if the SWING is connected to the COM2 port, can select her with the mouse.

3.2 Parameters to display
Each of the 16 parameters could be visualized. Select only the necessary parameters.

3.3 Stato dei relè
Under the parameters list has visualized the relays state: "-" = de-energized relay; "+" = energized relay.

3.4 Alarm e Warning
In case of absent communication between SWING and PTU the ALARM writing will appear.
In case of relay alarm the WARNING writing will appear.
To the cessation of the alarm state the OK writing will be returned.

3.5 Adjournment frequency
The data doesn't come adjourned in real time, but around each 2 minutes.

4. Electric connections
See fig.38

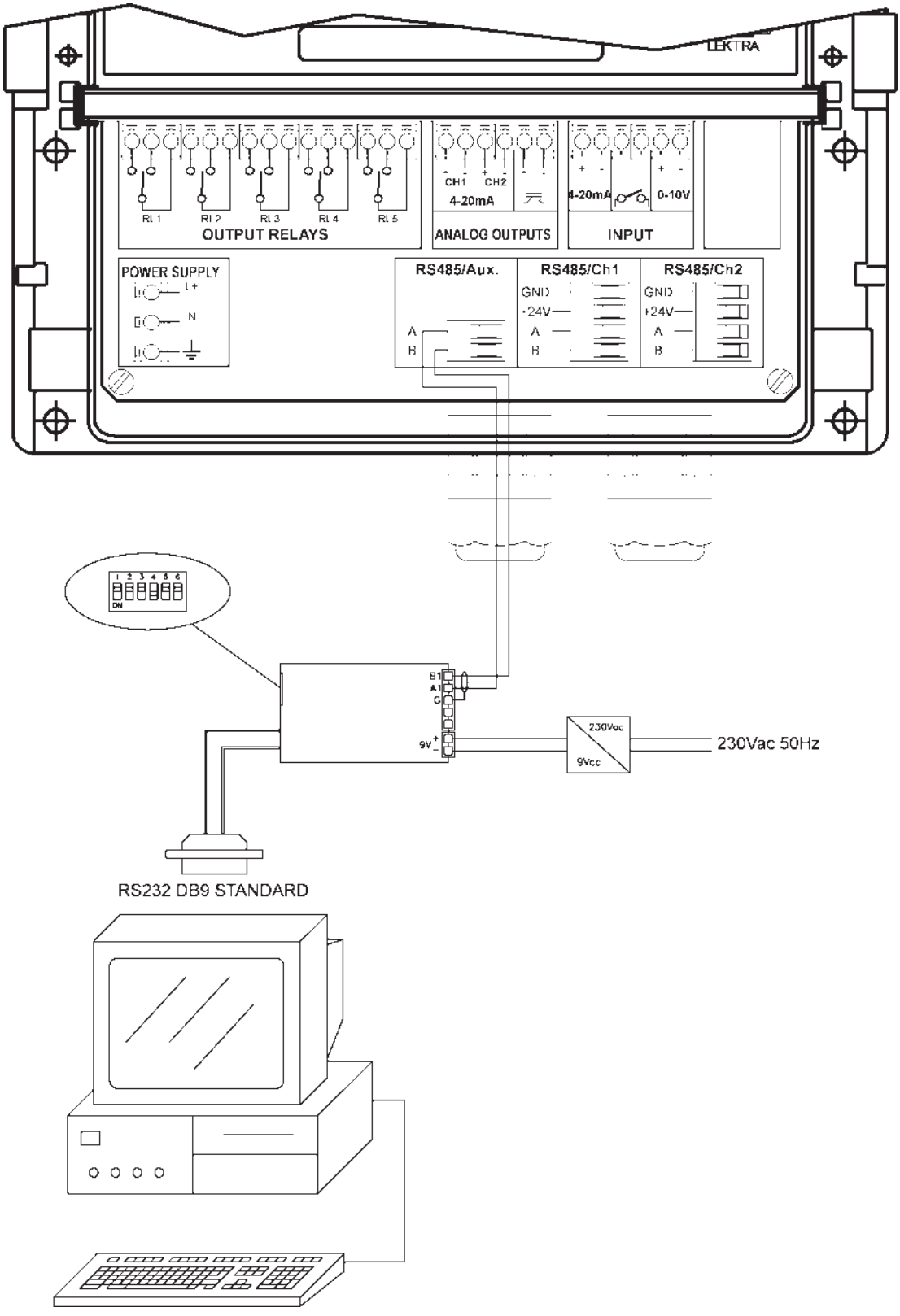

LEKTRA
RL 1
RL 2
RL 3
RL 4
RL 5
OUTPUT RELAYS
CH1
CH2
4-20mA
ANALOG OUTPUTS
4-20mA
0-10V
INPUT
POWER SUPPLY
L+
N
RS485/Aux.
RS485/Ch1
RS485/Ch2
GND
+24V
A
B
1 2 3 4 5 6
ON
B1
A1
C
9V
230Vac
9Vcc
230Vac 50Hz
RS232 DB9 STANDARD

Fig. 38

- **PTU05 (fig.40) up to 5m, PTU10 (fig.40) up to 8m, PTU15 (fig.39) up to 12m**
- **Sensors designed to be connected to Swing unit**
- **1" threaded mechanical fitting, IP68 proof, 3m lenght electrical connection cable or IP68 connector (fig.41)**
- **Sensors designed for level measurement in liquids/water applications, waste water plant applications, enviroment protection applications**

Fig. 39

The PTU's sensors are designed for application in tanks, vessels and channels. The sensors communicates to the controller unit (Swing), with RS485 field communication (up to 1km distance from the PTU to Swing unit), to perform four different applications:

LEVEL and **DIFFERENTIAL LEVEL** measurement
OPEN CHANNEL FLOW measurement
PUMPS CONTROLLER

The PTU's calibration are made directly from the associated unit consequently no calibration push buttons are available on the sensor.

Fig. 40

Fig. 41

Technical Data PTU05/10/15

Enclosure material:	**PP**
Mechanical installation:	**1" BSP**
	on request with PP DN100 PN6 flange screwed (PTU05/10)
	or PP DN150 PN6 (PTU15)
Mechanical protection:	**IP68**
Electrical connection:	**n.1 output cables (L=3m) or**
	IP68 male connector with linking cable
Working temperature:	**-25 ÷ +75°C**
Pressure:	**from 0,5 to 1,5bar (absolute)**
Power supply:	**24Vdc**
Power consumption:	**1W**
Serial port:	**RS485**
Max measure range:	**PTU05 0,3÷5m**
	PTU10 0,4÷8m
	PTU15 0,7÷12m

[The above distance must be intended from perfect reflecting surfaces]

Temperature compensation:		**PT100 from -30 to +80°C**
Accuracy:	**+/- 0,5%**	**not better than +/-2mm**
Resolution:		**1mm**
Calibration:		**by SWING unit**
Warm-up:		**30 minutes normally**
LEDs display:		**red LED for supply**
		yellow LED flashing for echo receiving

Fig. 42

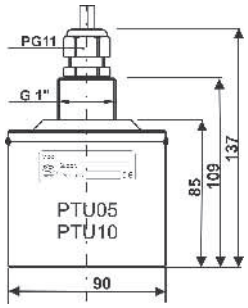


Fig. 43

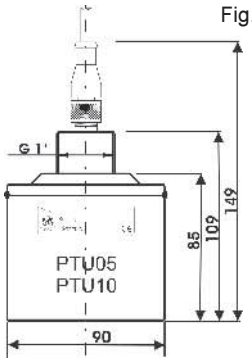


Fig. 44

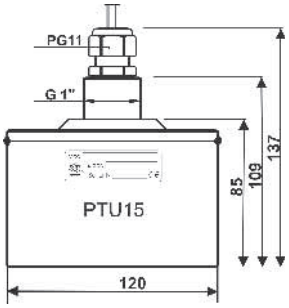
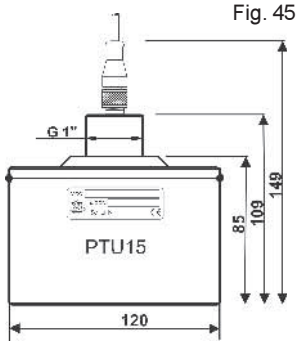


Fig. 45



PTU05/10/15 mechanical installation

Important close to the sensor there is a "blind zone" of 0,3m where the equipment can't measure.

To reach a good and safe measurement, avoiding spurious echo (not reflected from the surface to measure) need to take care about the sensor sensibility volume in the sound path, no obstacles or objects must be present into the sensibility volume (lobe), see fig.46/D/E.

On fig.46 some suggestion:

1) Install perpendiculary at the surface, see fig.46/A
2) Don't use with foaming products, see fig.46/B
3) Avoid installation where the product distance could be less than 0.3m for PTU05, 0.4m for PTU10 and 0.7 for PTU15, see fig.46/C
4) No obstacles or objects must be present into the sensibility volume, see fig.46/D/E

PTU05/10/15 calibration

The PTU05 calibration parameters was runed directly by the SWING unit. For a better calibration accuracy is better to wait 30 minutes, for the termic stabilization, before of the calibration by SWING unit

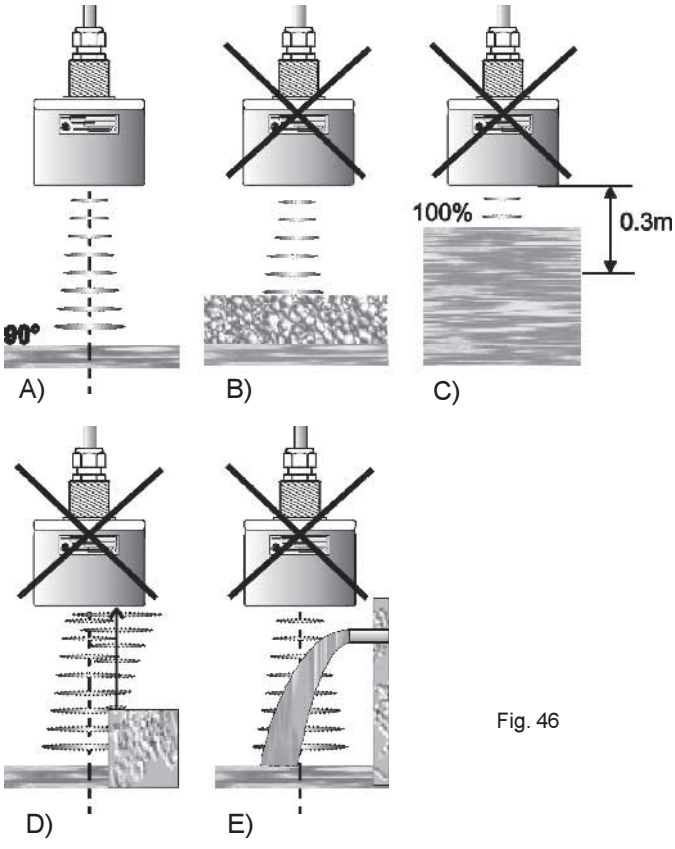


Fig. 46

SMART family Transmitter Calibration

The SMART family units (SmartCost, 521Smart, 522Smart,524Smart), connected to the SWING unit, can be locally programmed by means of their P1 and P2 pushbuttons. In this way it is possible calibrate the SMART family units 4-20mA output range and the RL1 , RL2 relays actions. Indipendent to the SWING function the SMART family transmitter output 4-20mA can be used to drive local indicator, recorder, etc. The 4-20mA SMART family output can also connected to the SWING unit associated (for instance when long distance, over 1km, there are from SWING to SMART family unit).The normal electrical-connection from SWING to SMART family units is made using the serial digital RS485 port. The SmartCost units can be delivered in the IP68 version. In the above version no access to the internal P1, P2 keys is possible (totally welded unit with output cables). It is in any case possible the programmation of the IP68 unit by means a special "Junction - box" where are lodged in a printed board the relevant P1 and P2 keys, see fig.49

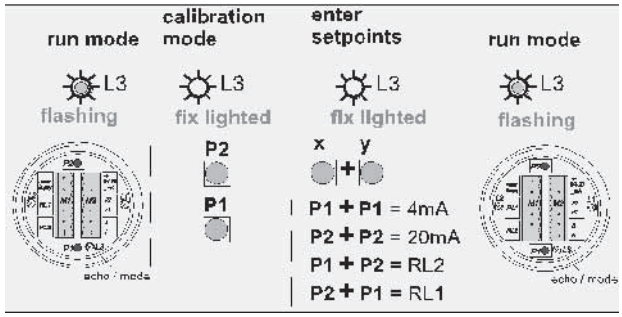


fig.47

fig.48

The SmartCost calibration can be done in two different ways:
a) **By means the P1 and P2 push-buttons.**
b) **With PC LC software communication with RS485 port.**
To calibrate by-means 2 push-buttons P1 and P2 (see figure), needs to put the "SmartCost" respectively at the distance refers to 0% and 100% level, in order to store the relevant distance electronically.
In the condition of normal working the SMARTCOST shows green L3 (echo led) flashing (when echo is received).

To calibrate 4mA needs to put the SmartCost at the distance requested for 4mA output current. Wait till the L3 is flashing than push simultaneously P1 and P2, release them and verify that L3 will stay fix lightened.
Push twice P1, release it and wait until L3 is flashing again before to move the sensor. The distance has been stored and associated to 4mA output.

To calibrate 20mA needs to put the SmartCost at the distance requested for 20mA output. Wait till the L3 is flashing than push simultaneously P1 and P2, release them and verify that L3 will be fix lightened.
Press twice P2, release it and wait until L3 is flashing again before to move the sensor. The distance has been stored and associated to 20mA output.

The SmartCost relays configuration;
RL1, min distance alarm (max level alarm)
RL2, max distance alarm (min level alarm)

To calibrate the threshold of minimum distance (maximum level) needs to put the SmartCost at the distance at which you want minimum distance set-point, waiting till the L3 is flashing then: push simultaneously P1 and P2, release them and verify that L3 will stay fix on. Push P2 and release it, push P1 and release it. Wait until L3 is flashing again 10s before to change the distance. The threshold of RL1 has been stored.

To calibrate the set point (threshold) of max distance (minimum level) needs to put the SmartCost at the distance at which you want max distance set-point, waiting till the L3 is flashing then push simultaneously P1 and P2, release them and verify that L3 will stay fix on. Push P1 and release it, push P2 and release it. Wait until L3 is flashing again for 10s before to change the distance. Threshold of RL2 has been stored

J-box

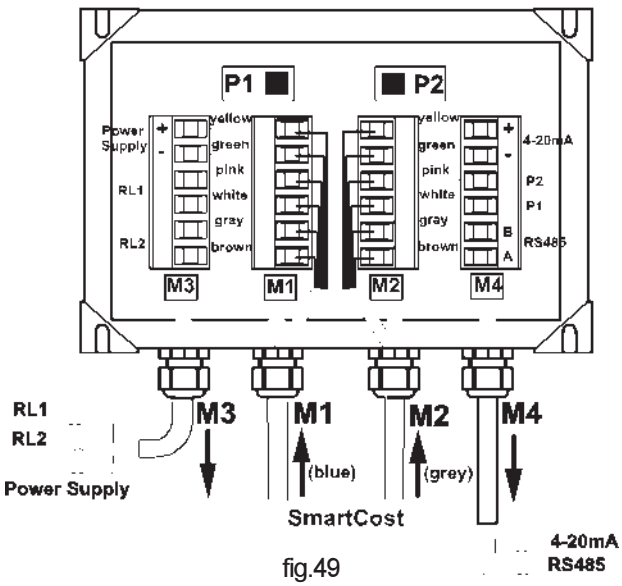


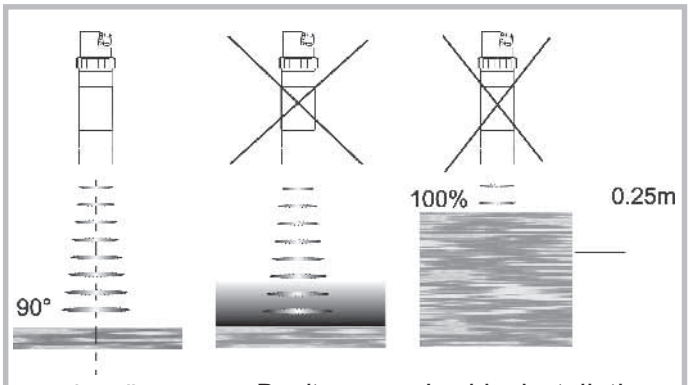
fig.49

Probe model	Range measure	Blocking distance
Smartcost (extended range)	0.25÷5 m. 0.4÷7 m.	0.25 m. 0.4 m.
521SMART	0,6÷10 m.	0.6 m.
522SMART	0.7÷15 m.	0.7 m.

Table 1

During the installation it is important to leave a "blind zone" in proximity of the sensor where no measurament is possible (see tab.1,)

Important close to the sensor there is a “blind zone” (see tab.1) where the equipment can’t measure.
To reach a good and safe measurement, avoiding spurious echo (not reflected from the surface to measure) need to take care about the sensor sensibility volume in the sound path, no obstacles or objects must be present into the sensibility volume (lobe).



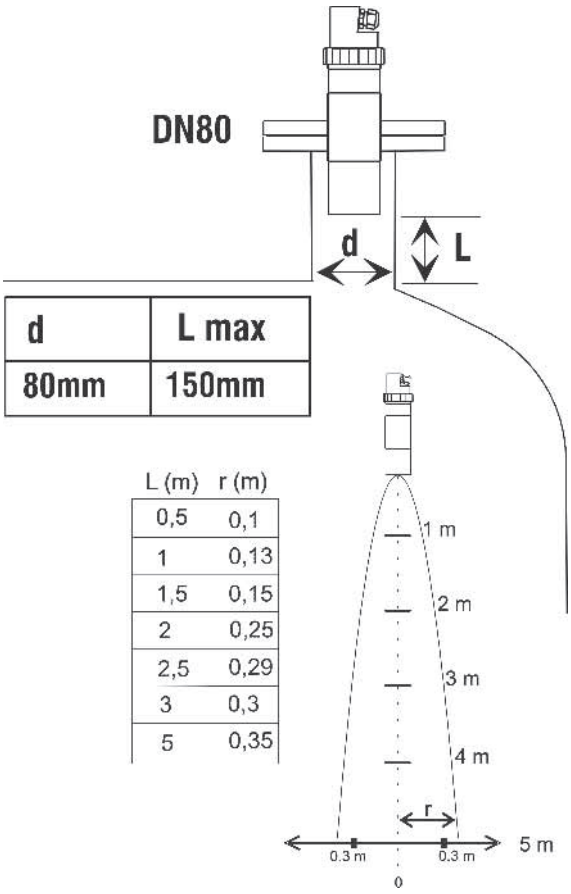
Install perpendiculary at the surface

Don’t use with foaming

Avoid installation where the product distance could be less than blokiing distance

Fig.50

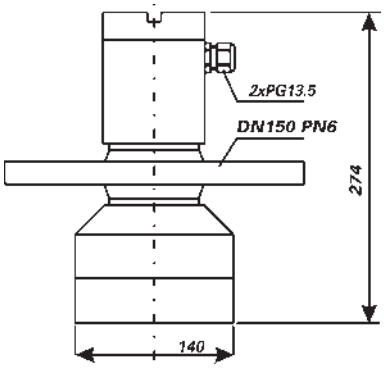
Mechanical sensor mounting



Emission lobe example, indicative only

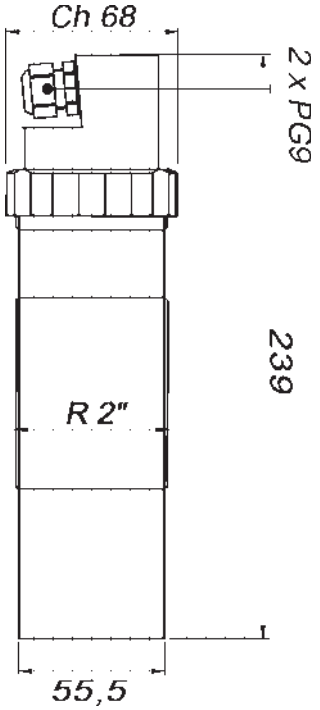
Fig.51

Sensors - Overall dimensions(in mm.)



521/522 Smart

Fig. 52



SMARTCOST

Fig. 53

SWING - Smart ultrasonic transmitter

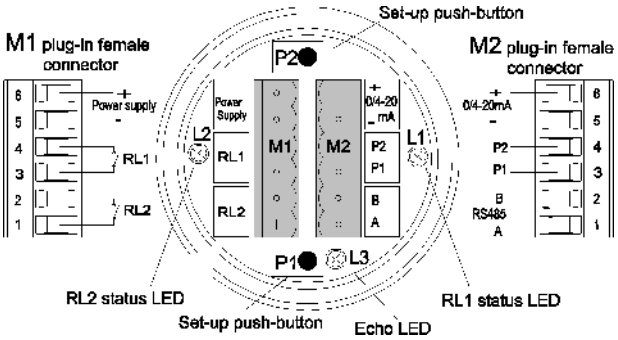


Fig. 54

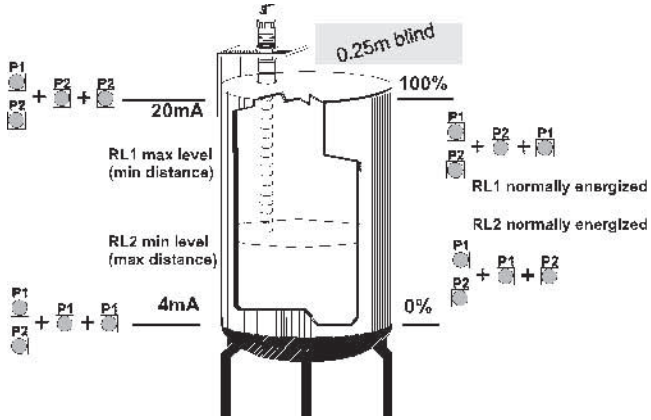


Fig. 55

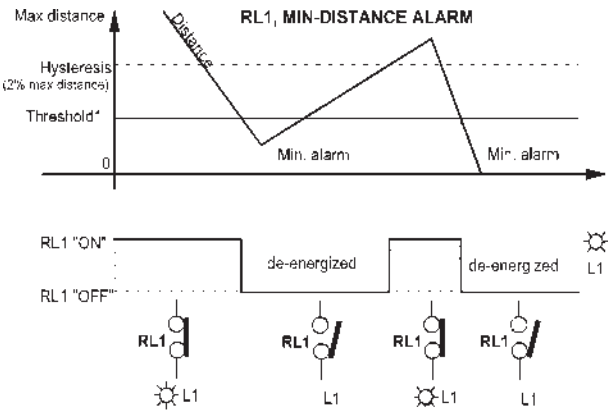


Fig. 56

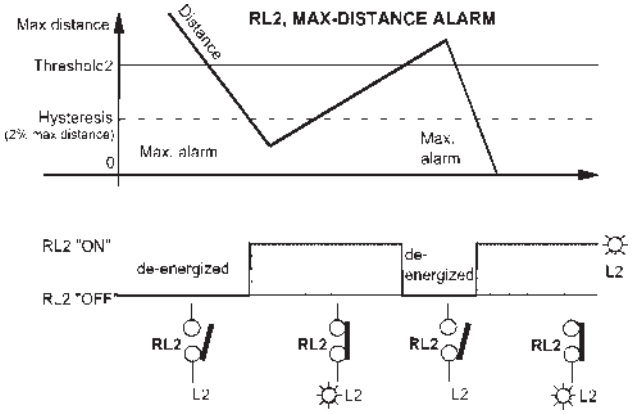


Fig. 57

SWING - Application examples

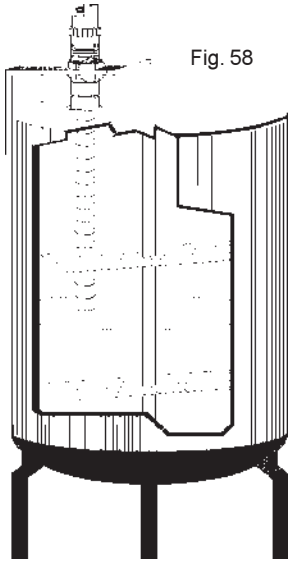


Fig. 58

Non contact continuous level measurement into tanks with agitator

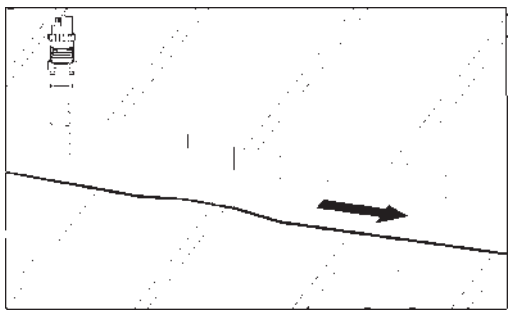


Fig. 59

Measurement in vessels and flow in open channels

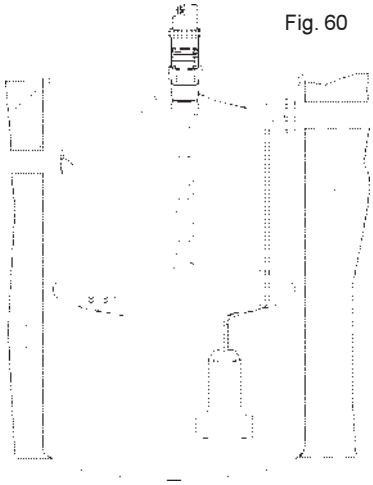


Fig. 60

Pump control, compact stand alone unit. The Pump control configuration can be made from PC using the communication “LC” S/W.

SWING 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.

SWING Factory test certificate

In conformity to the company and ceck procedure I certify that the equipment:

SWING ..... 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

.....

Production and ceck date

.....

SGM LEKTRA s.r.l.

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