

ELECTROMAGNETIC FLOWMETER

orion[®]X **orion[®]X**
VISUALFLOW

4629XXXX

CE

INSTALLATION, USE AND MAINTENANCE

LEGEND OF SYMBOLS

 = Generic danger

 = Warning

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This manual is an integral part of the equipment to which it refers and must accompany the equipment in case of sale or change of ownership. Keep it for any future reference; ARAG reserves the right to modify product specifications and instructions at any moment and without notice.

1 PRODUCT DESCRIPTION

ORION X is a flowmeter, namely a device allowing to measure the quantity of liquid flowing through it. ORION X is an electromagnetic device, hence there are no moving parts. The VISUALFLOW version, in addition, allows displaying the flowrate and dispensed volume as well as managing the filling of a tank

1.1 Intended use

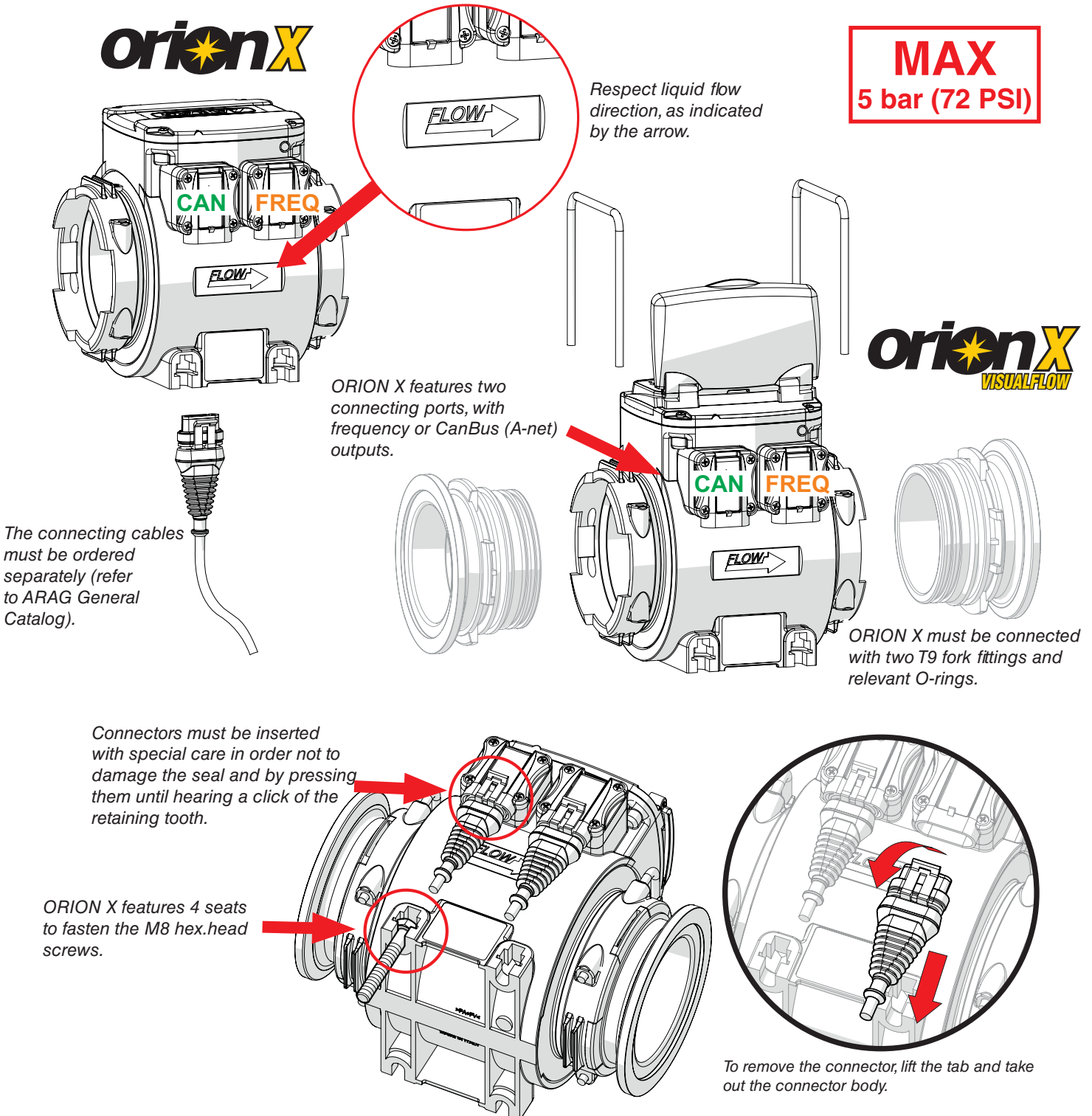
This device is designed to work on agricultural machinery for spraying and crop spraying applications.

CE The equipment is designed and built in compliance with EN ISO 14982 standard (Electromagnetic compatibility - Forestry and farming machines), harmonized with 2014/30/EU Directive.

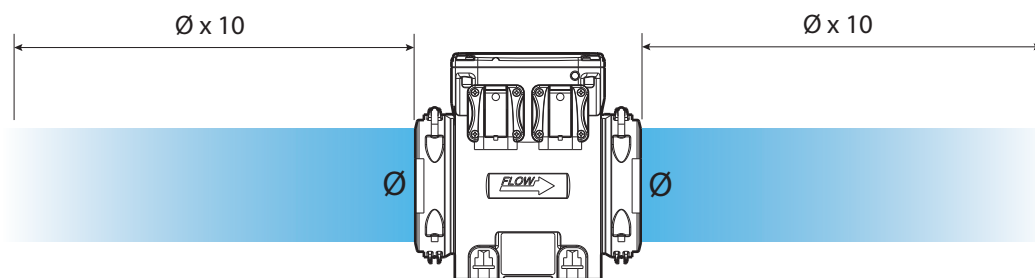
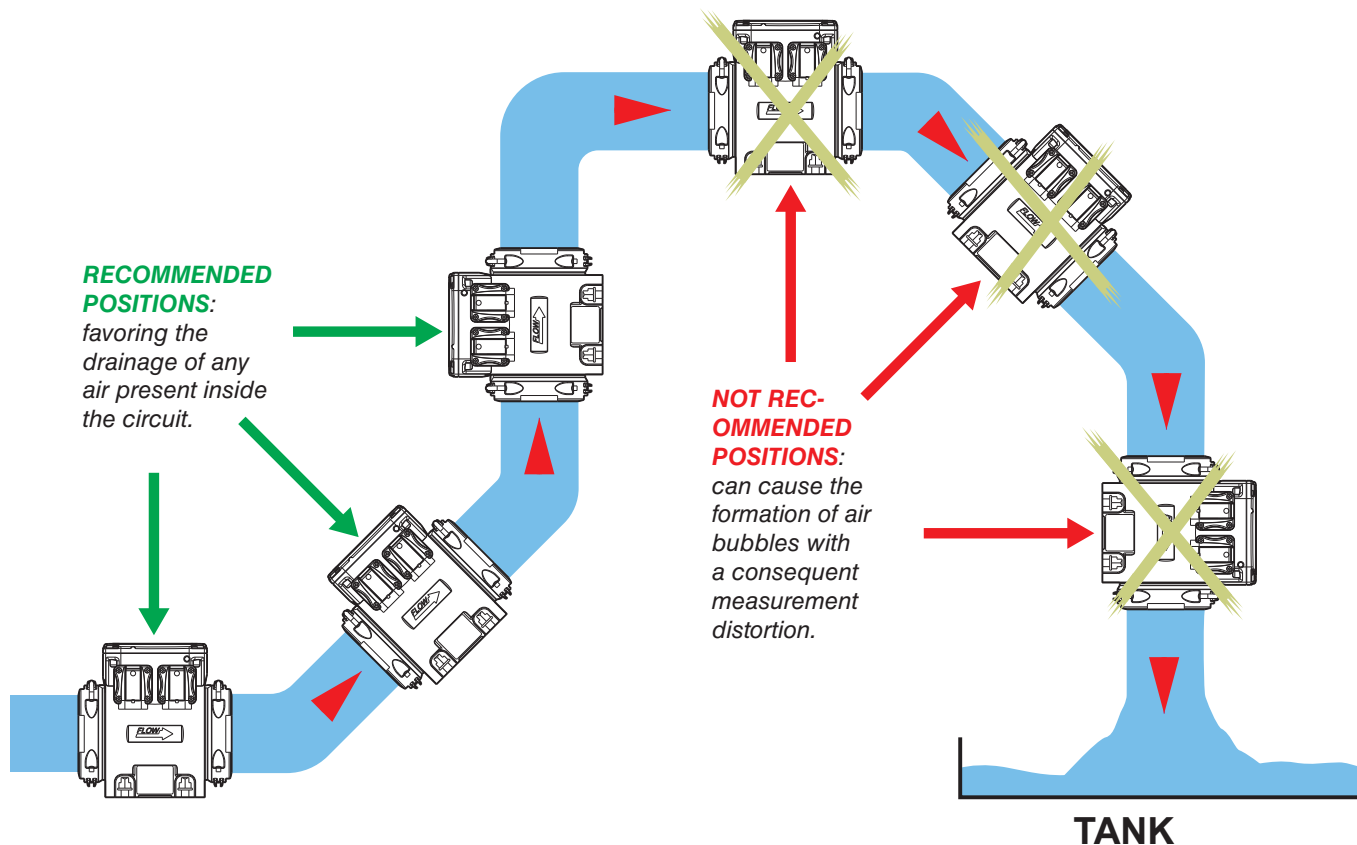


THE FLOWMETER MUST NOT BE USED TO MEASURE THE PASSAGE OF HYDROCARBONS, FLAMMABLE, EXPLOSIVE OR TOXIC LIQUIDS. THE FLOWMETER IS NOT SUITABLE FOR CONTACT WITH LIQUIDS FOR HUMAN CONSUMPTION. USE FOR SALES TRANSACTIONS IS NOT ALLOWED.

2 INSTALLATION

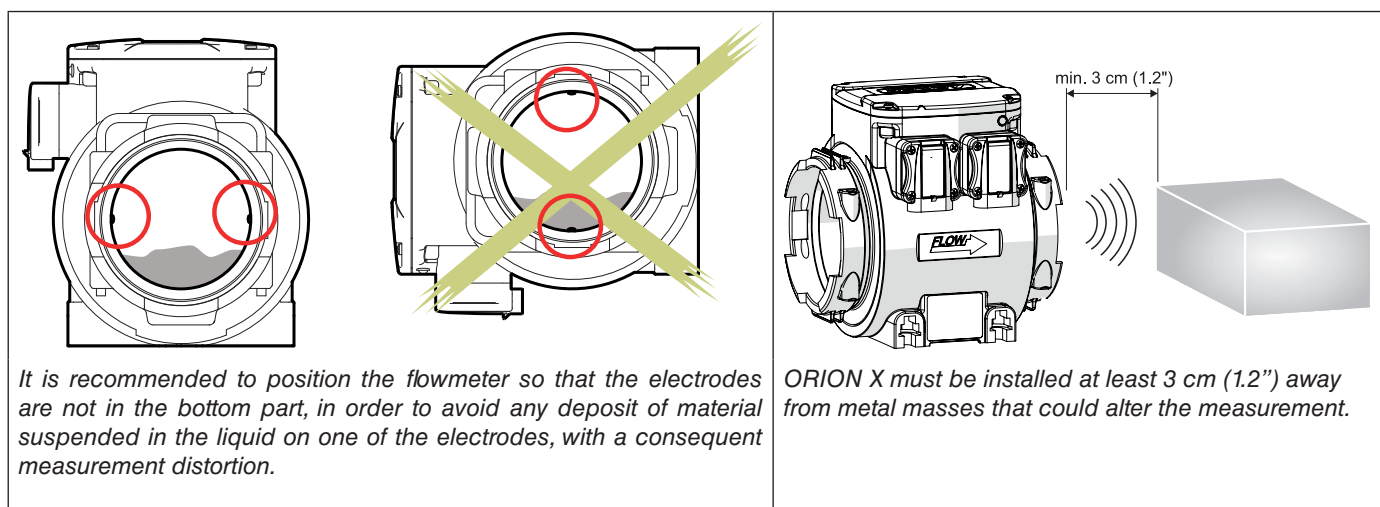


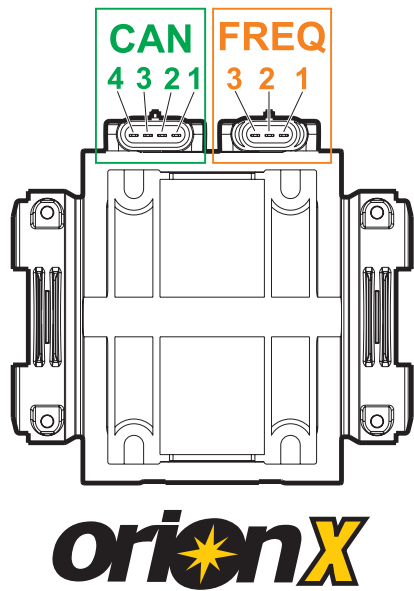
CONTINUES



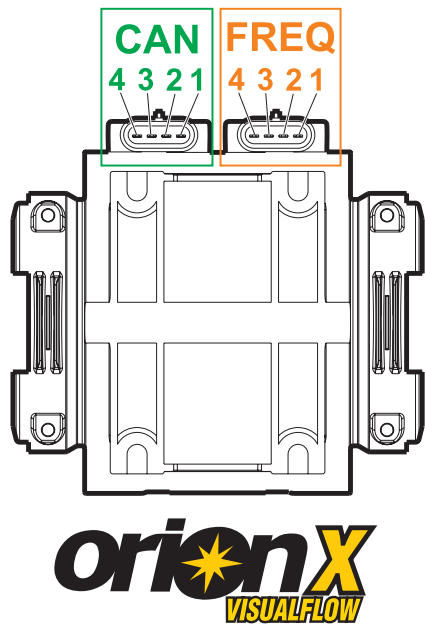
Upstream and downstream the flowmeter it is recommended to install two pipe straight lines whose length is at least 10 times the inner diameter of OrionX ($75\text{mm} \times 10 = 750\text{ mm}$).

Install the flowmeter far from the elements that could cause turbulence inside the pipe (valves, bends, bottlenecks, etc.).





PORT	PIN	OUT
FREQ	1	GND
	2	+12 Vdc
	3	OUT (Square wave signal)
CAN	1	GND
	2	+12 Vdc
	3	CAN L
	4	CAN H



PORT	PIN	OUT
FREQ	1	GND
	2	+12 Vdc
	3	OUT (Square wave signal)
	4	Pump check
CAN	1	GND
	2	+12 Vdc
	3	CAN L
	4	CAN H

THE CONNECTING CABLES MUST BE ORDERED SEPARATELY.

4 HYDRAULIC CONNECTIONS

For the connection to the system, use T9 fittings with fork coupling (Ref. ARAG General catalog).

Avoid bottlenecks or twists before the fittings and on pipes.

- 

For the connections, use pipes and fittings duly dimensioned for system operating pressure (MAX 5 bar).
- Hose tails must be tightened with special metal clips ensuring a perfect sealing even at high pressure values.

The connection with threaded fittings must be carried out by taking into account the operating pressure.



WARNING: For the implementation on already operating systems, it is necessary to follow all safety rules described herein.

System assembly and start-up must be carried out by expert personnel according to the safety rules so as to ensure the same safety level of the system where the flowmeter is installed.

5 PRELIMINARY SETUP FOR USE

Set the value of the flowmeter constant on the device connected to the ORION X flowmeter:

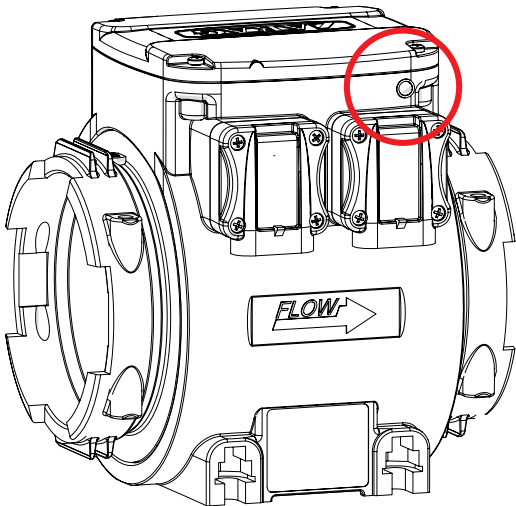
24 pulses/liter
91 pulses/gallon

For any reference on constant setting modes, refer to the use and maintenance manual provided with the device used.

6 USE

6.1 LED on the ORION X flowmeter

A multi-color LED positioned at the back of the flowmeter indicates the device status:



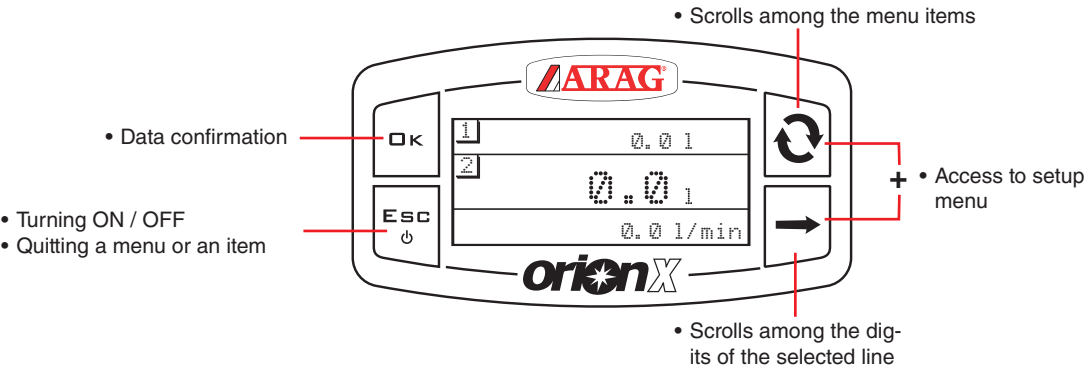
	OFF	The flowmeter is not powered.
	GREEN BLINKING	The flowmeter is waiting to acquire an address on the CAN line to which it is connected.
	GREEN STEADY ON	Presence of STILL liquid inside the flowmeter.
	BLUE STEADY ON	The flowmeter is reading the passage of the liquid inside.
	VIOLET STEADY ON	No liquid has been detected inside the flowmeter.
	WHITE STEADY ON	Cleaning of the reading electrodes in progress.
	RED BLINKING	RED: Error. The error codes are indicated through blinks, which are described in the table below.
	RED STEADY ON	SEVERE ERROR: contact a service center.

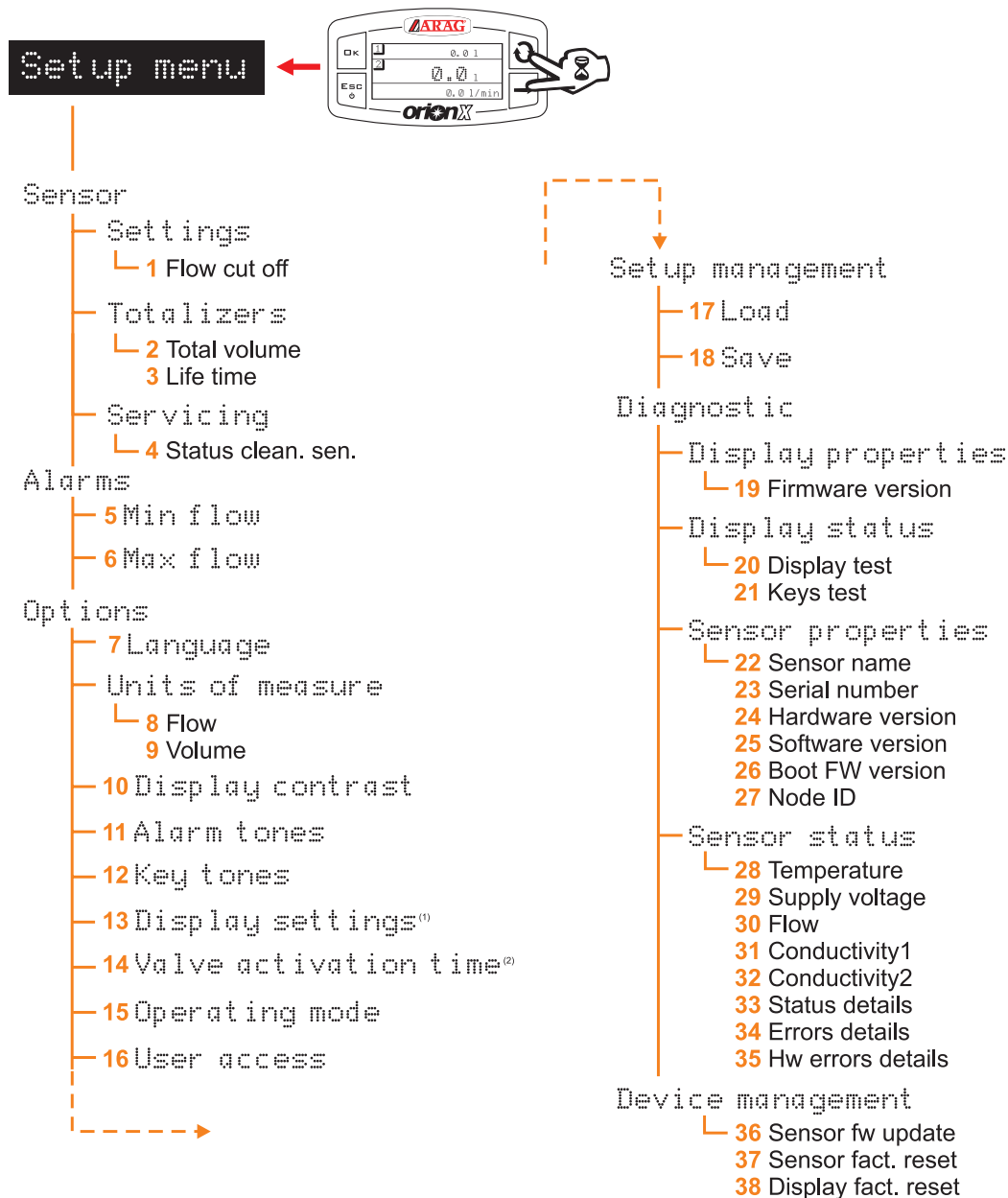
Signals that can be managed are described in Chap.8, page 11.

The ORION X flowmeter is able to detect only the passage of conductive liquids with a conductivity equal to or greater than 300 µS/cm - Use the flowmeter only within the flowrate limits set forth in the “Technical Specifications” table. Outside this range, the flowmeter may provide incorrect data, thus misleading the operator or the automatic system.

ARAG can not be held responsible for any damage caused to persons, animals or things from the incorrect or unintended use of the flowmeter or its parts.

6.2 Use of the keys (ORION X VISUALFLOW)





(1): Item available only if the "Volume Counter" operating mode has been selected.

(2): Item available only if the "Filling Check" operating mode has been selected.

KEY

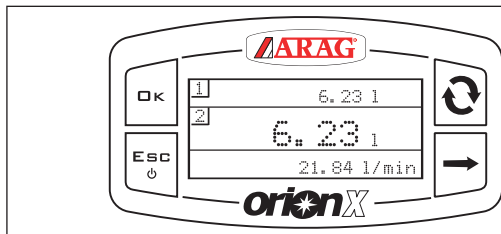
- *sensor*: the part of the flowmeter carrying out the liquid reading and generating the output in frequency and CANBUS (it is present both in ORION X and ORION X VISUALFLOW versions)

- *display*: available only in the ORION X VISUALFLOW version, it communicates with sensor electronics and allows displaying / editing the flowmeter parameters. The display also generates the pump stop signal.

#	Menu	Description	Operator	Manager	Technician
1	Sensor > Settings > Min. flowrate Threshold	Minimum flowrate under which the output signal will no longer be generated. The value is expressed in % of the full scale (Example: full scale 2500 l/min, min. flowrate threshold 2.5% = 62.5). This parameter proves useful to avoid false readings with still liquid and thus the generation of a wrong output signal. If the flowrate falls below the set value: - the frequency output is set to 0 - the CAN data indicate a flowrate equal to 0 - the Display shows a flowrate equal to 0			•
2	Sensor > Totalizers > Total volume	It displays the liquid total volume measured by the sensor	•	•	•
3	Sensor > Totalizers > Lifetime	It displays sensor total operating time	•	•	•

#	Menu	Description	Operator	Manager	Technician
4	Sensor > Maintenance > Cleaning status Sens	Function Enabling/Disabling the cleaning of sensor reading heads.	●	●	●
5	Alarms > Min. flowrate	Minimum flowrate value under which the relevant alarm is activated		●	●
6	Alarms > Max. flowrate	Maximum flowrate value above which the relevant alarm is activated		●	●
7	Options > Language	Language of the display.		●	●
8	Options > Units of measurement > Flowrate	Flowrate units of measurement.		●	●
9	Options > Units of measurement > Volume	Volume units of measurement.		●	●
10	Options > Display contrast	Display contrast.	●	●	●
11	Options > Alarm tones	Enabling/disabling of alarm tones.		●	●
12	Options > Keytones	Enabling/disabling of keytones.	●	●	●
13	Options > Screen Settings (visible only if "Volume Counter" operating mode is selected)	Setting of the position used to display the data in the current screen: "Flowrate" – "Tot 1 volume" – "Tot 2 volume"		●	●
14	Options > Valve inter. time (visible only in Operating mode "Filling check [F]")	Time between valve closing signal and valve actual closing.			●
15	Options > Operating mode	Set operating mode			●
16	Options > User access	Selected access level	●	●	●
17	Setup management > Load	Loads the settings from a USB pendrive (requires the intervention of a skilled technician)			●
18	Setup management > Save	Saves the settings from a USB pendrive (requires the intervention of a skilled technician)			●
19	Diagnostics > Display properties > Firmware version	Display firmware version (display-only)	●	●	●
20	Diagnostics > Display status > Display test	Display operation test	●	●	●
21	Diagnostics > Display status > Key test	Key operation test	●	●	●
22	Diagnostics > Sensor properties > Sensor name	Name of the sensor (display-only)	●	●	●
23	Diagnostics > Sensor properties > Serial number	Sensor serial number (display-only)	●	●	●
24	Diagnostics > Sensor properties > Hardware version	Sensor Hardware version (display-only)	●	●	●
25	Diagnostics > Sensor properties > Software version	Sensor Software version (display-only)	●	●	●
26	Diagnostics > Sensor properties > Fw. version Boot.	Sensor Bootloader Firmware version (display-only)	●	●	●
27	Diagnostics > Sensor properties > Node ID	Flowmeter identification number (ID) when connected to a CanBus network			●
28	Diagnostics > Sensor status > Temperature	Sensor internal temperature	●	●	●
29	Diagnostics > Sensor status > Batt. Power supply	Power supply voltage detected by the sensor	●	●	●
30	Diagnostics > Sensor status > Flowrate	Detected instant flowrate	●	●	●
31	Diagnostics > Sensor status > Conductivity 1	Liquid conductivity detected by electrode no.1	●	●	●
32	Diagnostics > Sensor status > Conductivity 2	Liquid conductivity detected by electrode no.2	●	●	●
33	Diagnostics > Sensor status > Status details	Sensor status details displaying: - No Err. Detec. / Error detected - Measurement active / Measurement In stand-by - No flowrate / Flowrate detected - No liquid / Liquid present - Filling disabled / Filling Enabled	●	●	●
34	Diagnostics > Sensor status > Error list	Displaying of detected errors: - None - Wrong calibration - Voltage out of limit! - High temperature! - Unstable reading - Hw errors detected"	●	●	●
35	Diagnostics > Sensor status > Hw error list	Displaying of detected hardware errors: - None - Current error - VBoost error - VMag error - 5V error - 3.3V error - System start error	●	●	●
36	Device Management > Sensor Fw update	Sensor firmware update through USB pendrive (requires the intervention of a skilled technician)			●
37	Device Management > Sensor setting Reset	Sensor default data reset			●
38	Device Management > Display setting Reset	Display default data reset.			●

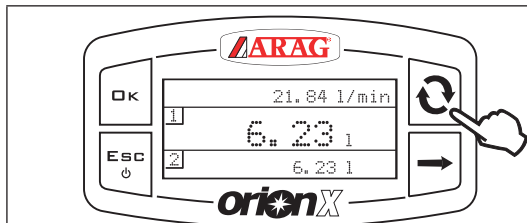
6.4 Use for flowrate measurement



Start liquid flow in the system. The display will start showing the increasing value of the measured fluid quantity and instant flowrate.

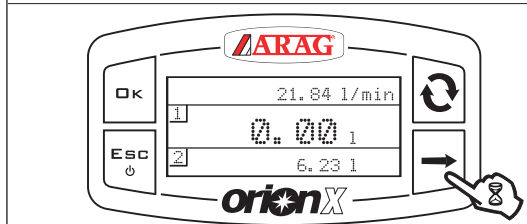
Press the key  several times to view a value in extended mode until it is displayed on the central part.

6.5 Partial totalizer reset



To reset a totalizer you must view it in extended mode.

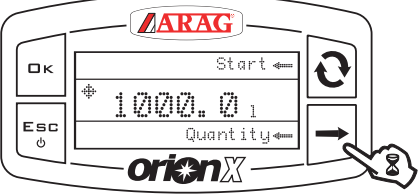
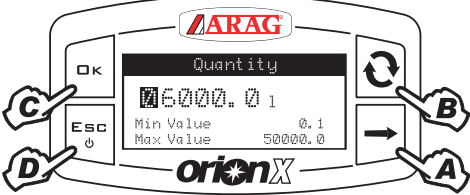
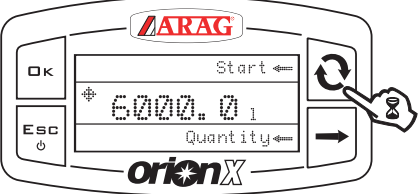
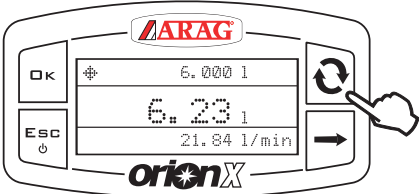
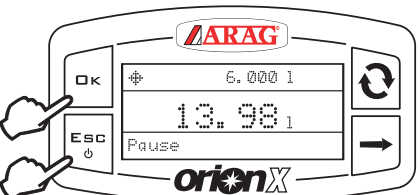
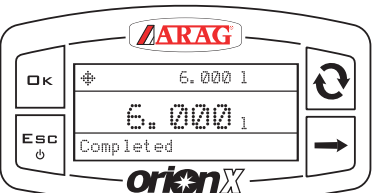
Press key several times until value to be reset is at the central area of the display.



Press the key  for two seconds. Totalizer resets.

Symbol ----- indicates that flowrate or totalizer exceed the maximum value that can be displayed.

Totalizers have a floating point and show a maximum of 5 digits. Two decimal places are shown up to 999.99, then one decimal place is shown after 1,000 and no decimals are shown when value reaches 10,000.

	- top part: item <i>Start</i> refers to the key on the side allowing user to start the procedure (key ); - central part: the value is the set filling quantity (in liters). On the side, the symbol  is displayed; - bottom part: item <i>Quantity</i> refers to the key on the side which allows user to set tank filling value (key ).
	1) Press the key  for two seconds to open the menu for setting the filling quantity.
	2) Set filling quantity: A) Press to move through digits B) Press a few times to edit the highlighted digit C) Press to save changes, or D) Press to quit the page without confirming changes.
	3) Keep key  pressed for two seconds. Filling starts.
	The display shows the following data: - top part: set filling quantity; - central part: partial totalizer; - bottom part: instant flowrate. Press key  several times to view a value in extended mode until the required value is displayed in the central part.  Displayed values cannot be edited.
	Tank filling can be interrupted at any time by pressing ESC. Pause message will be shown at the bottom of the display. Press OK to resume filling; Press ESC to finally stop filling and display will go back to initial page.
	When set quantity is reached, filling stops automatically. Completed message will be shown at the bottom of the display.

7 MAINTENANCE

- At the end of each treatment, let clean water flow inside the pipe.
- In case of malfunction, and at any rate at the end of every season, clean the flowmeter pipe with a special detergent.



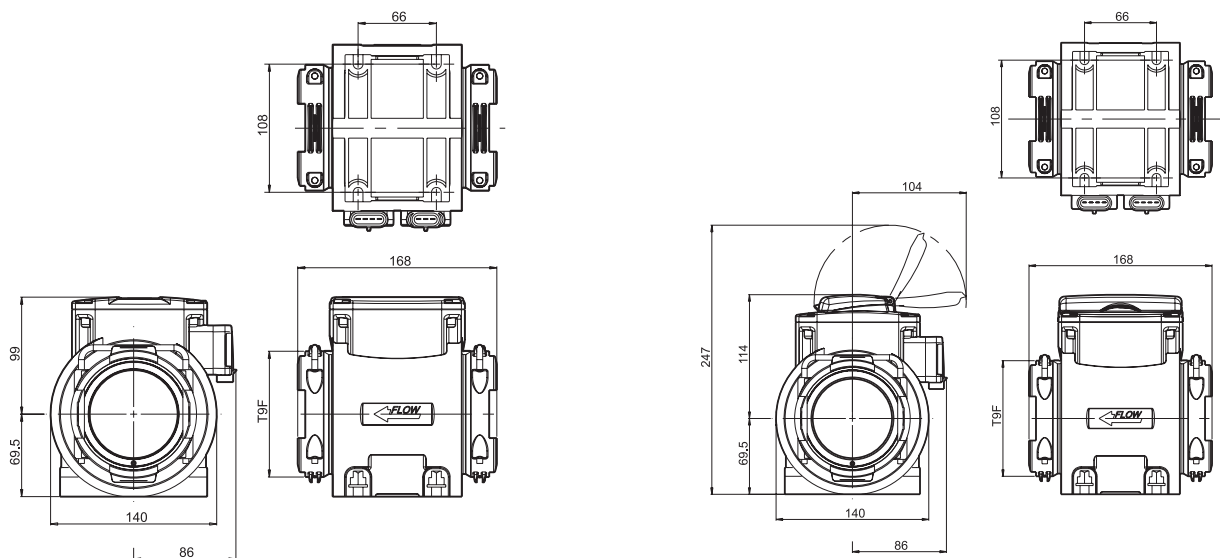
- Do not use metal or abrasive objects to clean the pipe.
- Do not use solvents or fuel to clean the case outer surface.

8 ERRORS, TROUBLESHOOTING

Trouble	"Displayed error (for version with Display, only)"	LED status	Number of blinks	Cause	Remedy
No flowrate measurement	---	Off	---	No power supply.	Check the connections and the harnesses.
	---		---		Replace the cable. If the problem persists, contact your nearest Service Center.
	---		---	Voltage is below the minimum permitted value.	Check the power supply voltage and restore the correct value.
	---	Green steady on	---	Flowrate is below the minimum measurable value	Check that the liquid passes through the flowmeter and that the flowrate is above the minimum measurable value.
	---	Blue steady on	---	CanBus The canbus address assigned to the sensor is wrong.	Repeat the address assignment procedure.
	---		---		Make sure that the harness structure complies with the CanBus 2.0 specifications.
	---		---	Frequency The CanBus network harness is not suitable.	Check for the presence and conditions of terminating resistors.
	---		---		Check connections.
	---	Violet steady on	---	The connection is wrong.	Make sure that the technical specifications of the two devices are compatible.
	---		---		
	---	White steady on	---	The type of input of the connected reading device is not compatible with the Orion X output stage	Make sure that there is liquid inside the flowmeter.
	---		---		
	---	Red blinking	---	Orion X does not detect the presence of liquid inside pipe.	Make sure that liquid conductivity is higher than the one stated in the technical specifications.
	---		---	Orion X is cleaning the heads and cannot measure the flowrate.	Turn the flowmeter off and on again to restart the measurement.
	Hw errors detected		2	Hardware error.	Contact an ARAG authorized Service Center.
	Wrong calibration		3	Corrupted calibration data.	Contact an ARAG authorized Service Center.
	Voltage out of limit		4	Power supply voltage too high or too low.	Check the power supply voltage and restore the correct value.
	Unstable reading		5	Unstable reading.	Check that the flow is normal and make sure to have complied with the hydraulic connection instructions (position, pipe dimensions, straight sections before and after the flowmeter, etc.).
	High temperature!		6	Too high temperature has been detected.	Check ambient temperature and, if outside the specified limits, turn off the device and, before turning it on again, wait for the temperature conditions to fall within the specified ones.
	Check parameters		7	Setting data are corrupted and the default ones have been restored.	Contact an ARAG authorized Service Center to check data integrity and to restore correct operation. Check that all settings are as required, validate data by accessing the "New notifications" menu and press OK (the operation can be performed only by skilled technical staff).
Unstable measurement	---	Blue steady on	---	Wrong installation.	Check that the flow is normal and make sure to have complied with the hydraulic connection instructions (position, pipe dimensions, straight sections before and after the flowmeter, etc.).
The measured flowrate does not correspond to the actual one	---		---	The measuring pipe shows chemical deposits.	Fill the pipe with clean water and activate the electrode cleaning procedure for at least 8 hours.
	---		---		Clean with a soft cloth and denatured ethyl alcohol.
The display shows an error	Stop flow!	Blue steady on	---	In filling mode, the device sent the pump stop command, but the sensor continues measuring a flowrate.	Make sure that the flow is interrupted by the pump of by the connected valve.
	Low flowrate!		---	Flowrate below the minimum set threshold.	Check that the actual flowrate is within the set range.
	High flowrate!		---	Flowrate above the maximum set threshold.	Check the set values.
	"WARNING! WRONG V.x.x.x! Upgrade OrionX to the V x.x.x Firmware Version"	LED ON <i>regardless of the color</i>	---	Obsolete firmware version.	Contact an ARAG authorized Service Center to check whether the firmware has to be updated.
	Check sensor communic.!		---	The display does not detect the sensor.	Restart the flowmeter, if the problem persists, contact an ARAG authorized Service Center.

9 TECHNICAL DATA

9.1 DIMENSIONS



9.2 PERFORMANCE

Measuring range	50÷2500 l/min - 13÷660 GPM
Accuracy.....	+/- 1% of the measured value, 250 to 2500 l/min
Maximum pressure.....	5 bar - 72 PSI
Liquid minimum conductivity	300 uS/cm
Pressure drop at maximum flowrate	0.3 bar - 44 psi
No liquid detection.....	Yes
Electrode electronics cleaning.....	Yes
Status LEDs	Yes (RGB)

9.3 DISPLAY

Graphic.....	128*64 pixel
Units of measurement	Liters/min, GPM , m³/h
Filling mode	Yes
Volume counter mode	Yes
Partial totalizers.....	2

9.4 ELECTRICAL FEATURES

Power supply voltage	9÷16 Vdc
Maximum absorption.....	300 mA
Protection against polarity inversion	Yes
Protection against short-circuit on outputs	Yes

9.4.1 Digital output:

Type.....	NPN
Wave shape:.....	Square (duty cycle 50%)
Maximum current:.....	100 mA
Frequency at the maximum flowrate.....	1Khz

9.4.2 Pump check output:

Type.....	PNP
Maximum current.....	200 mA

9.4.3 CANBUS port:

Protocol:.....	A-net
Speed.....	250 Kbit/sec
Internal ending	Not present

9.5 ENVIRONMENTAL FEATURES

Operating temperature	0°C ÷ +60°C 32°F ÷ +140°F
Storage temperature.....	-40°C ÷ +140°C -4°F ÷ +185°F

9.6 PHYSICAL FEATURES

Nominal passage	DN75
Weight	906 ÷ 1670 g (according to the type)
Flange	T9 Coupling / Clamp Coupling 3" Full Port

9.7 MATERIALS

Electrodes	Stainless steel Aisi 316
Rings	Stainless steel Aisi 316
Body	fiber glass reinforced PA 6
Pipe	fiber glass reinforced PA 6
Keyboard	Polycarbonate

10 GUARANTEE TERMS

1. ARAG s.r.l. guarantees this apparatus for a period of 360 days (1 year) from the date of sale to the client user (date of the goods delivery note). The components of the apparatus, that in the unappealable opinion of ARAG are faulty due to an original defect in the material or production process, will be repaired or replaced free of charge at the nearest Assistance Center operating at the moment the request for intervention is made. The following costs are excluded:
 - disassembly and reassembly of the apparatus from the original system;
 - transport of the apparatus to the Assistance Center.
2. The following are not covered by the guarantee:
 - damage caused by transport (scratches, dents and similar);
 - damage due to incorrect installation or to faults originating from insufficient or inadequate characteristics of the electrical system, or to alterations resulting from environmental, climatic or other conditions;
 - damage due to the use of unsuitable chemical products, for spraying, watering, weedkilling or any other crop treatment, that may damage the apparatus;
 - malfunctioning caused by negligence, mishandling, lack of know how, repairs or modifications carried out by unauthorized personnel;
 - incorrect installation and regulation;
 - damage or malfunction caused by the lack of ordinary maintenance, such as cleaning of filters, nozzles, etc.;
 - anything that can be considered to be normal wear and tear.
3. Repairing the apparatus will be carried out within time limits compatible with the organizational needs of the Assistance Center. No guarantee conditions will be recognized for those units or components that have not been previously washed and cleaned to remove residue of the products used;
4. Repairs carried out under guarantee are guaranteed for one year (360 days) from the replacement or repair date.
5. ARAG will not recognize any further expressed or intended guarantees, apart from those listed here. No representative or retailer is authorized to take on any other responsibility relative to ARAG products. The period of the guarantees recognized by law, including the commercial guarantees and allowances for special purposes are limited, in length of time, to the validities given here. In no case will ARAG recognize loss of profits, either direct, indirect, special or subsequent to any damage.
6. The parts replaced under guarantee remain the property of ARAG.
7. All safety information present in the sales documents regarding limits in use, performance and product characteristics must be transferred to the end user as a responsibility of the purchaser.
8. Any controversy must be presented to the Reggio Emilia Law Court.

11 END-OF-LIFE DISPOSAL

Dispose of the system in compliance with the established legislation in the country of use.

12 CONFORMITY DECLARATION

The declaration of conformity is available at www.aragnet.com, in the relevant section.

Only use genuine ARAG accessories or spare parts to make sure manufacturer guaranteed safety conditions are maintained in time. Always refer to the internet address www.aragnet.com

01/2019

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