



ELECTROMAGNETIC FLOWMETER

orion2


**46211AXXXX
46221AXXXX**

CE

INSTALLATION, USE AND MAINTENANCE

LEGEND SYMBOLS

 = Generic danger

 = Warning

CONTENTS

Legend symbols.....	2
1 Product description	3
1.1 Intended use	3
2 Installation	3
2.1 Dimensions (mm).....	4-6
2.2 Assembly	7
2.3 Electric connections.....	8
2.4 Hydraulic connections.....	8
2.5 Hydraulic connections for control units	9
3 Preliminary setup for use	10
4 Use	10
5 Maintenance	11
5.1 Troubleshooting	11
5.2 Technical data.....	11-12
6 Guarantee terms.....	13
7 Disposal at the end of service	13
8 Conformity Declaration	13

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 future reference; ARAG reserves the right to modify the specifications and instructions regarding the product at any time and without prior notice.


1 PRODUCT DESCRIPTION

The Orion 2 electromagnetic flowmeter is a device that enables measurement of the quantity of liquid passing through it. Using a principle of electromagnetic measurement (there are no moving mechanical parts inside it), the flowmeter outputs a signal to the computer proportional to the liquid flow that goes through it; Orion 2 displays the flowrate calculated according to the data received from the flowmeter and the value of the flowmeter constant previously set.

1.1 Intended use

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

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

Install the flowmeter **at least 20 cm** from the elements that could cause turbulence inside the tubes (valves, bends, constrictions, etc.). The flowmeter can be installed in a horizontal or vertical position.

 **CAUTION:**
For proper sealing of the flowmeter, use ARAG assembly kit **ONLY** (Ref. ARAG General catalogue - Accessories for series 463/473 modular valves).

ARAG is not liable for damage to the system, persons, animals or things caused by the use of material other than specified.

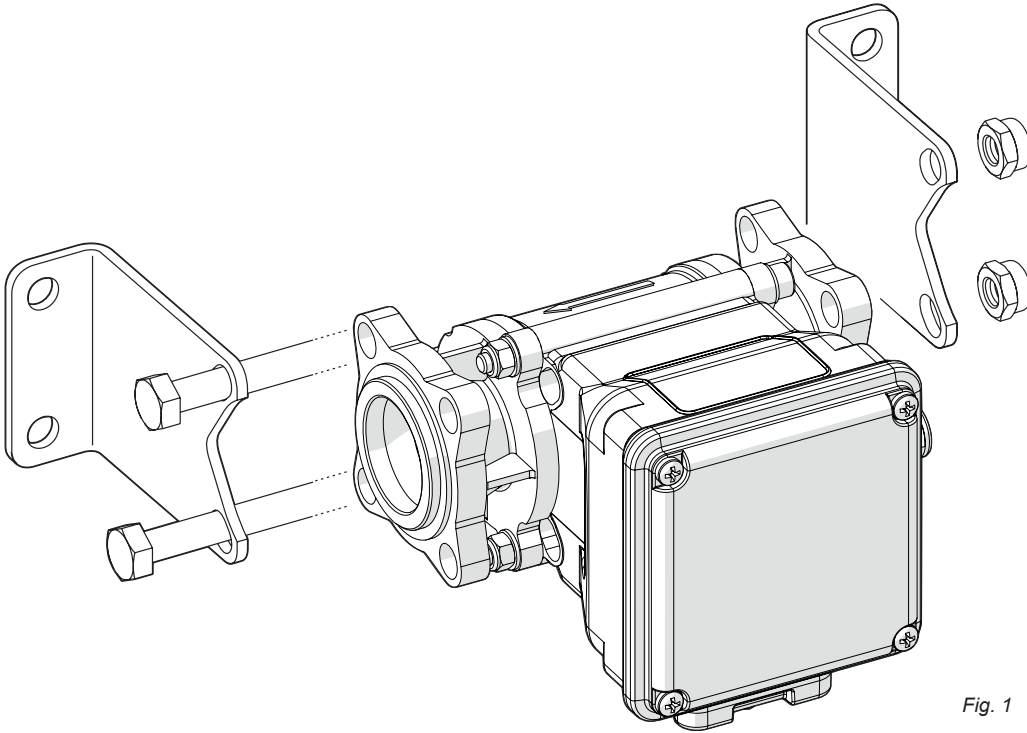


Fig. 1

CONTINUES

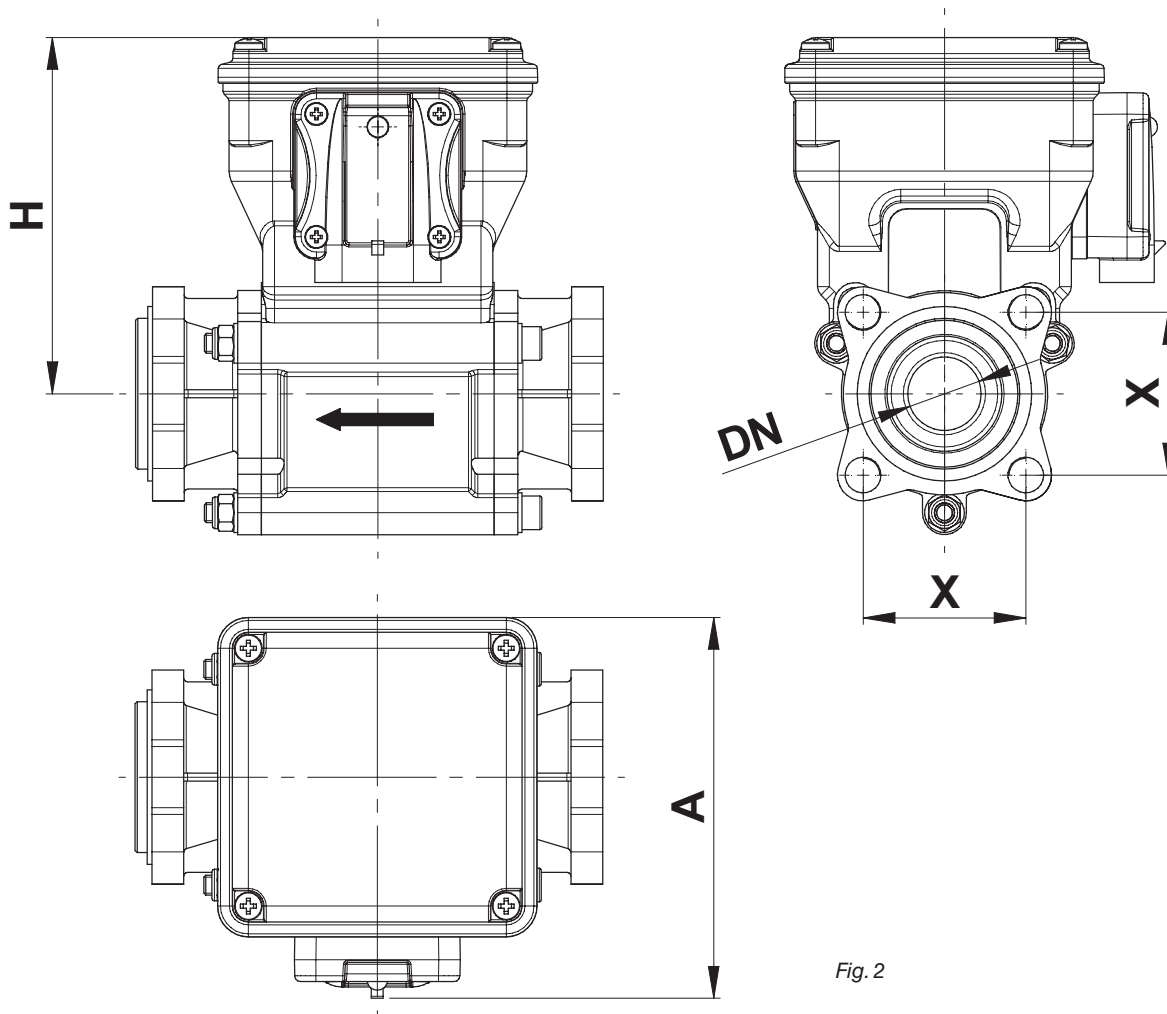


Fig. 2

CODE	DN	A	H	L	X	flange
46211AG0000	4	96	90	114	41	463 863
46211A00000	5	96	90	114	41	
46211A10000	7	96	90	114	41	
46211A20000	10	96	90	114	41	
46211A30000	14	96	90	114	41	
46211A40000	18,5	96	90	114	41	473 873
46221A40000	18,5	96	90	114	45	
46221A50000	28	96	90	114	45	
46221A60000	28	96	90	114	45	
46221A70000	28	96	90	114	45	

Tab. 1

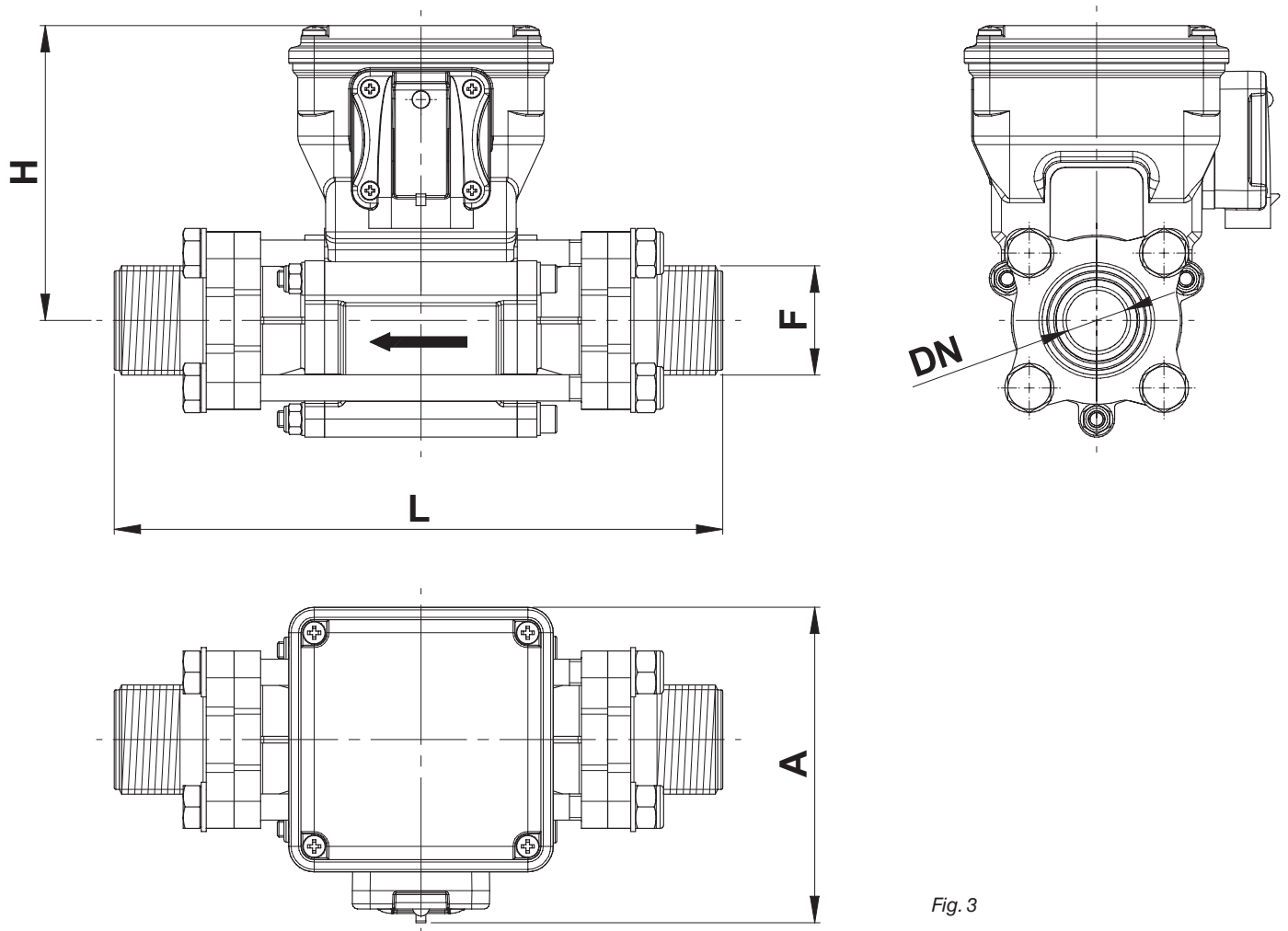


Fig. 3

CODE	DN	F	A	H	L
46211AG1313	4	G 3/4	96	90	185
46211AG3333	4	G 3/4	96	90	184
46211A01313	5	G 3/4	96	90	185
46211A03333	5	G 3/4	96	90	184
46211A11313	7	G 3/4	96	90	185
46211A13333	7	G 3/4	96	90	184
46211A21313	10	G 3/4	96	90	185
46211A23333	10	G 3/4	96	90	184
46211A31414	14	G 1	96	90	185
46211A33434	14	G 1	96	90	184
46211A41414	18,5	G 1	96	90	185
46211A43434	18,5	G 1	96	90	184
46211A41515	18,5	G 1 1/4	96	90	189
46221A51515	28	G 1 1/4	96	90	191
46221A51616	28	G 1 1/2	96	90	199
46221A61616	28	G 1 1/2	96	90	199
46221A61717	28	G 2	96	90	234
46221A71717	28	G 2	96	90	234

Tab. 2

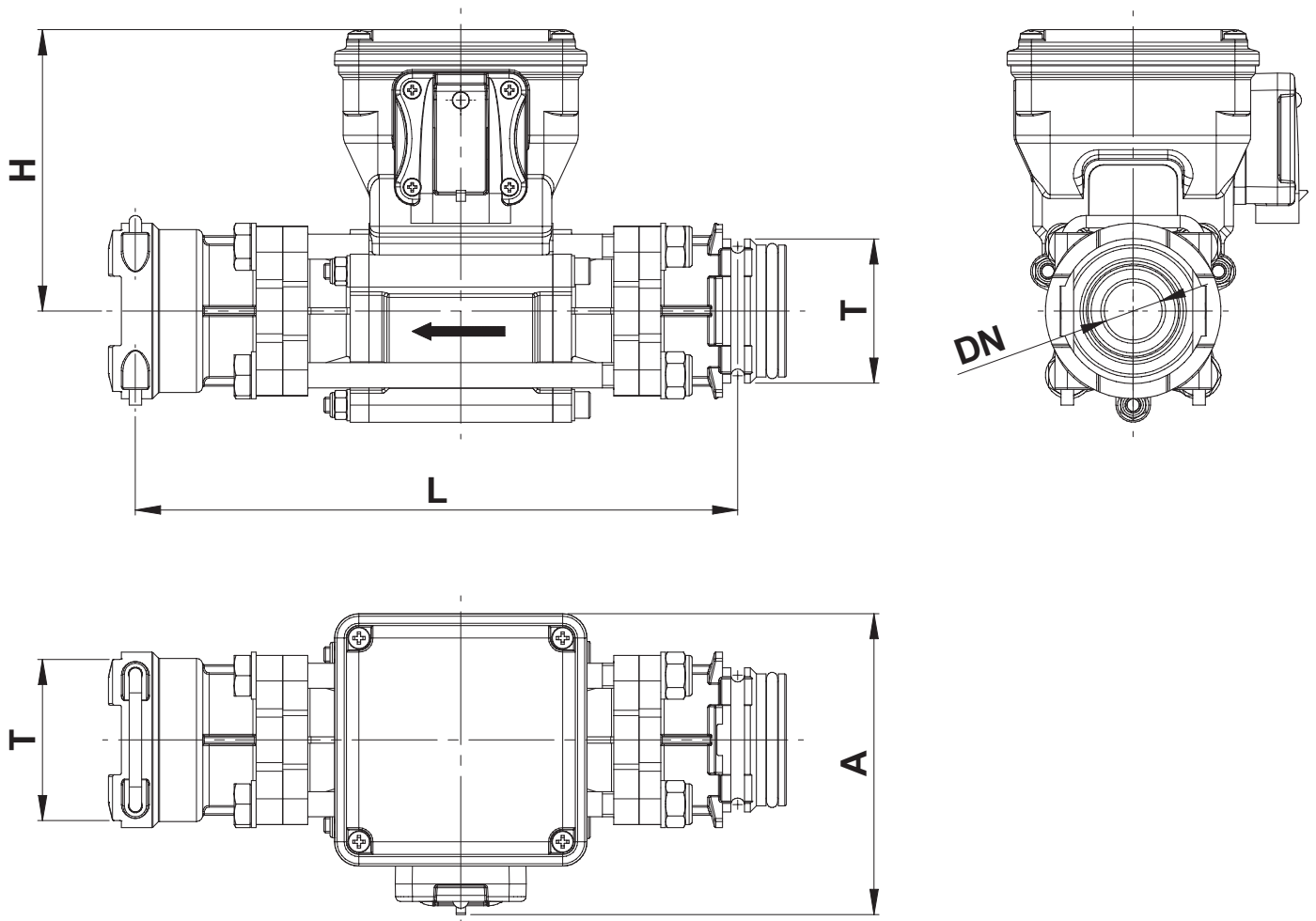


Fig. 4

CODE	DN	T	A	H	L
46211A3A5B5	14	T5	96	90	192
46211A4A5B5	18,5	T5	96	90	192

Tab. 3

To ensure trouble-free operation, comply with the indicated installation layout (Fig. 5a and Fig. 5b).



The connector must NEVER be positioned upwards.

HORIZONTAL ASSEMBLY

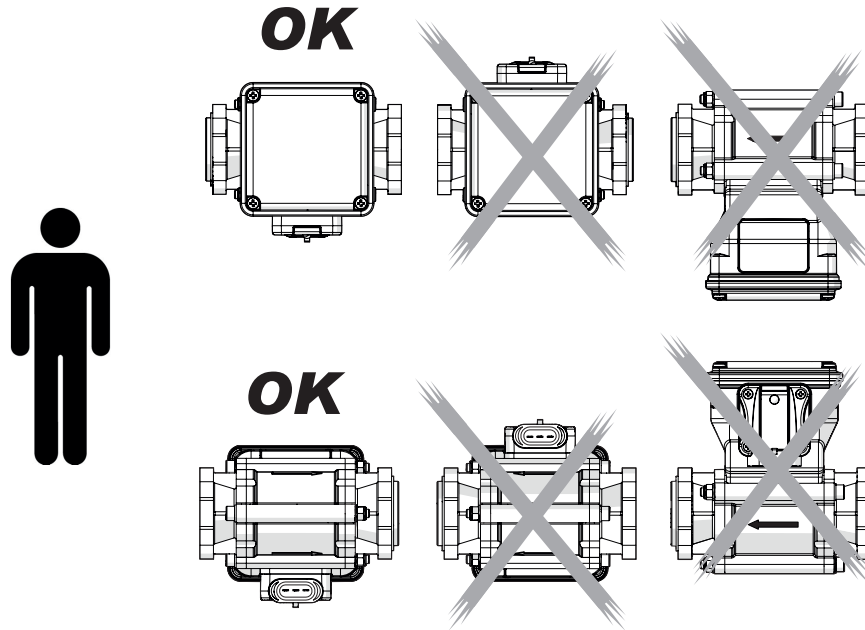


Fig. 5a

VERTICAL ASSEMBLY

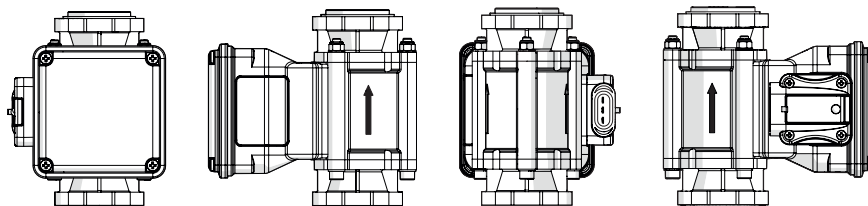


Fig. 5b

- Comply with the correct fluid inlet-outlet direction, as indicated by the arrow printed on the flowmeter body (Fig. 6).

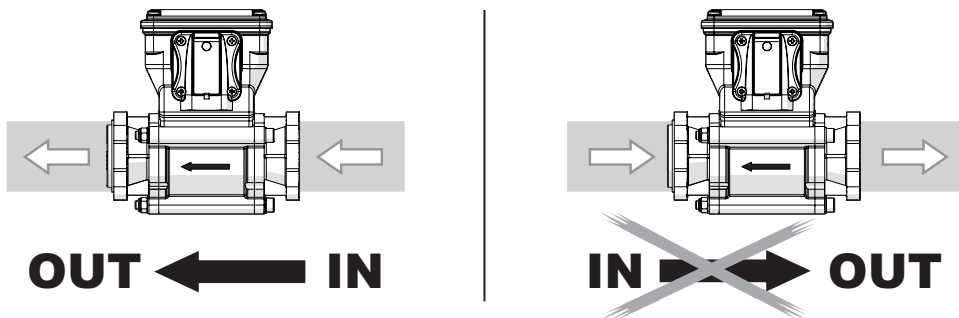


Fig. 6

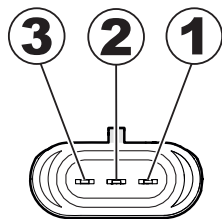
Use inlet and outlet pipes of the same diameter as the internal passages of the flowmeter; for any reference, see tables 7a-7b-7c (Chap. 5 - Technical data).


2.3 Electric connections

The Orion 2 flowmeter has been designed to be connected to ARAG devices (computers, screens, displays) but can also be connected to equipment made by other manufacturers as long as they are designed for flowmeters of this typology.



ARAG is not liable for damage to the system, persons, animals or things caused by incorrect or inadequate installation of the flowmeter. In the event of damage to the flowmeter, caused by incorrect or unsuitable assembly, any form of guarantee is automatically rendered null and void.



Color	Position	Connection	
Black	1	GND	
Red	2	+12 VDC	
Green	3	Signal (square wave)	

Tab. 4

2.4 Hydraulic connections

For connection to the system, use appropriate fittings (Ref. ARAG General catalogue).

Avoid bends and constrictions before connections and on tubes.



Regarding connections, use tubes and fittings properly sized for the operating pressure of the system.

The tightening of hose tails should be made with special metal clamps ensuring perfect sealing even at high pressures.

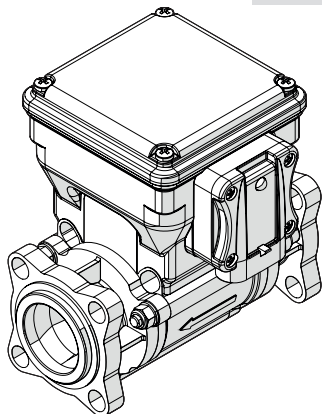
The connection by means of threaded fittings should be done taking operating pressure into account.



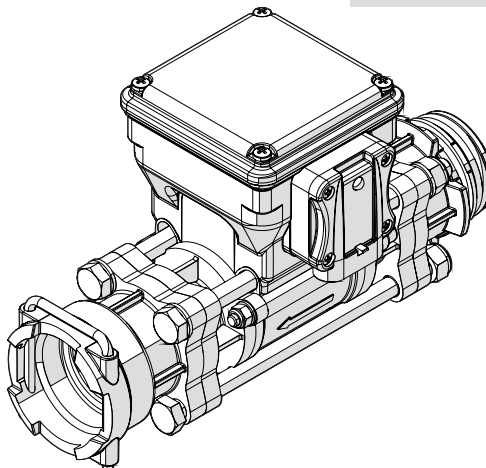
CAUTION: For the implementation on already operating systems it is necessary to follow all safety rules described herein. System assembly and start-up must be carried out by expert personnel according to the safety rules so as to ensure the same safety level of the system the flowmeter is going to be installed in.

The Orion 2 flowmeters to be integrated in the control units are available with both flanged 863/873 (in previous 463/473 series) and T5 fork coupling connectors.

FLANGED CONNECTOR



FORK COUPLING



If you need to integrate the flowmeter in an existing tie rod control unit previously configured without a flowmeter, remember to order new tie-rods in order to reconstruct the unit correctly after the flowmeter has been incorporated (Ref. ARAG general catalog, control unit section, assembly kit). **ONLY use ARAG tie-rods. If other tie-rods are used, the warranty is automatically void.**

Flowmeters with fork coupling do not need other accessories and can be directly inserted in the existing control unit provided it already comes with T5 fork coupling.



CAUTION: BEFORE INCORPORATING THE FLOWMETER TO AN EXISTING CONTROL UNIT, MAKE SURE THAT THE OPERATING PRESSURE IS SUITED FOR THAT SPECIFIC CONTROL UNIT. FLOWMETERS WITH T5 FORK COUPLING CAN WITHSTAND A MAXIMUM PRESSURE OF 20 BAR.

ARAG is not liable for damages to the equipment, persons, animals or objects caused by failure to observe the above instructions. Remember to correctly position seals and O-Rings in the coupling seats.



Note: usually, in standard control units, the flowmeter is inserted between the control valve and the section valves unit (Fig. 8a-8b).

Incorporating flanged connector

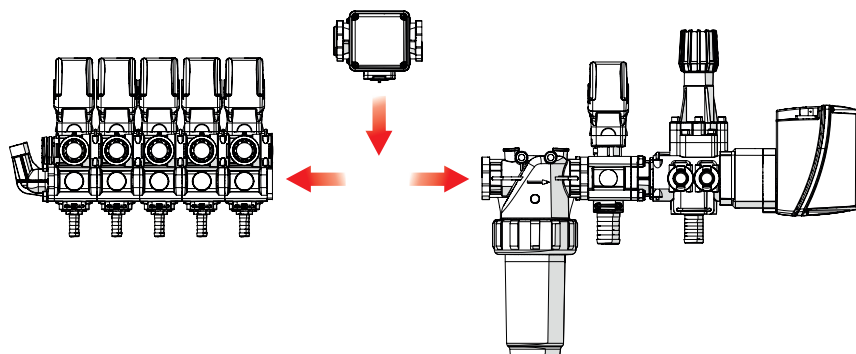


Fig. 8a

Incorporating fork coupling

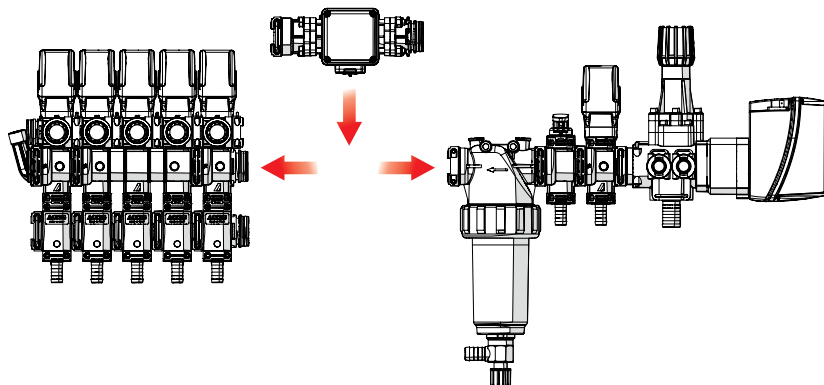


Fig. 8b

This does not prevent the assembly of the flowmeter in any other part of the control unit, however, keep in mind that if the flowmeter is positioned in different points the values may differ depending on the connected components. Filtering the liquid is recommended.



In order to obtain a correct reading, contact a dealer or installer that can give you advice on how to correctly position the flowmeter inside the control unit.

3 PRELIMINARY SETUP FOR USE

Set flowmeter constant (B, Fig. 9): on the computer connected to Orion 2 flowmeter: refer to the label on the body (A, Fig. 9) and tables 7a-7b-7c - Chap. 5 "Technical data".

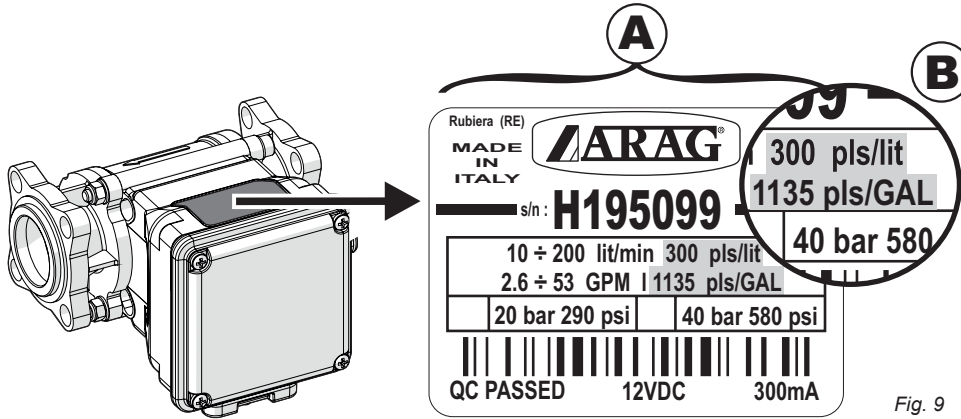


Fig. 9

For further information regarding how to set the constant, consult the use and maintenance manual of the computer being used.

4 USE

When using the system, the flowmeter sends impulses to the computer, which, according to the constant value previously set, indicates the instant flow. A LED in the connector slot indicates the status of the device (Fig. 10):

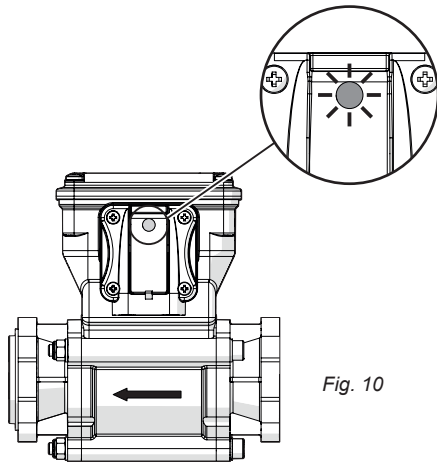


Fig. 10

○	LED OFF: the device is not powered.
●	LED ON NOT FLASHING with low light intensity: the device is powered but it does not detect liquid passage.
☀	LED ON FLASHING with high light intensity: the device is powered and it detects liquid passage. La frequenza dell'intermittenza è proporzionale alla portata.



Orion 2 flowmeter can only detect conductive fluids with a conductivity equal to 50 $\mu\text{S}/\text{cm}$ (Rif. Tab. 5.2 - Chap. 5).

- Do not aim pressurised water onto the equipment.
- Respect the device's rated power requirement (12 Vdc).
- If arc welding is required, ensure that flowmeter power is off and disconnect the power cables, if necessary.
- Use the flowmeter only within the flow limits given in the "Technical data" table. Outside these limits, the flowmeter could give incorrect data and therefore lead the operator or the automatic system to make errors.

ARAG cannot be held responsible for damage caused to persons, animals or things by incorrect or unsuitable use of the flowmeter or its parts.

5 MAINTENANCE

- After every spraying operation, flush the pipe with clean water.
- 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 for cleaning the duct.**
- **Do not use solvents or petrol for cleaning the external parts of the device.**

5.1 Troubleshooting

FAULT	CAUSE	REMEDY
The flowmeter does not read any value	No power supply	• Check the flowmeter wiring.
The value read by the flowmeter is not linear or stable	Presence of turbulence or air in the circuit	• Check the circuit.

Tab. 5

5.2 Technical data

Description	Orion 2
Power supply	10 ÷ 16 Vdc
Max. absorption	300 mA
Min. liquid conductivity	50 µS/cm
Working temperature	0 °C ÷ 60 °C 32 °F ÷ 140 °F
Storage temperature	-30 °C ÷ 80 °C -22 °F ÷ 176 °F
Material	Nylon / Brass / Polypropylene / Stainless Steel Inox
Dimensions (mm)	184 ÷ 234 (depending on the model) x 103 x 132
Weight	906 ÷ 1670 g (depending on the model)

Tab. 6

CONTINUES

CODE	Flowrate		Operating pressure		Pressure drop at maximum flowrate		Internal passages (Ø mm)	Pulses		For valves
	l/min.	US GPM	P max (BAR)	P max (PSI)	P max (BAR)	P max (PSI)		pls/l	pls/US GAL	
46211AG0000	0,3 ÷ 6	0,08 ÷ 1,6	40	580	0,3	4	4	6000	22710	863 463 series
46211A00000	0,5 ÷ 10	0,13 ÷ 2,6	40	580	0,3	4	5	6000	22710	
46211A10000	1 ÷ 20	0,3 ÷ 5	40	580	0,3	4	7	3000	11355	
46211A20000	2,5 ÷ 50	0,6 ÷ 13	40	580	0,5	7	10	1200	4542	
46211A30000	5 ÷ 100	1,3 ÷ 26	40	580	0,5	7	14	600	2271	
46211A40000	10 ÷ 200	2,6 ÷ 53	40	580	0,5	7	18,5	300	1135	873 473 series
46221A40000	10 ÷ 200	2,6 ÷ 53	20	290	0,5	7	18,5	300	1135	
46221A50000	20 ÷ 400	5 ÷ 106	20	290	0,2	3	28	150	568	
46221A60000	30 ÷ 600	8 ÷ 158	20	290	0,5	7	28	100	378	
46221A70000	40 ÷ 800	11 ÷ 211	20	290	0,5	7	28	75	284	

Tab. 7a

CODE	Flowrate		Operating pressure		Pressure drop at maximum flowrate		Thread (BSP)	Internal passages (Ø mm)	Pulses	
	l/min.	US GPM	P max (BAR)	P max (PSI)	P max (BAR)	P max (PSI)			pls/l	pls/US GAL
46211AG1313	0,3 ÷ 6	0,08 ÷ 1,6	20	290	0,3	4	G 3/4	4	6000	22710
46211AG3333	0,3 ÷ 6	0,08 ÷ 1,6	40	580	0,3	4	G 3/4	4	6000	22710
46211A01313	0,5 ÷ 10	0,13 ÷ 2,6	20	290	0,3	4	G 3/4	5	6000	22710
46211A03333	0,5 ÷ 10	0,13 ÷ 2,6	40	580	0,3	4	G 3/4	5	6000	22710
46211A11313	1 ÷ 20	0,3 ÷ 5	20	290	0,3	4	G 3/4	7	3000	11355
46211A13333	1 ÷ 20	0,3 ÷ 5	40	580	0,3	4	G 3/4	7	3000	11355
46211A21313	2,5 ÷ 50	0,6 ÷ 13	20	290	0,5	7	G 3/4	10	1200	4542
46211A23333	2,5 ÷ 50	0,6 ÷ 13	40	580	0,5	7	G 3/4	10	1200	4542
46211A31414	5 ÷ 100	1,3 ÷ 26	20	290	0,5	7	G 1	14	600	2271
46211A33434	5 ÷ 100	1,3 ÷ 26	40	580	0,5	7	G 1	14	600	2271
46211A41414	10 ÷ 200	2,6 ÷ 53	20	290	0,5	7	G 1	18,5	300	1135
46211A43434	10 ÷ 200	2,6 ÷ 53	40	580	0,5	7	G 1	18,5	300	1135
46211A41515	10 ÷ 200	2,6 ÷ 53	20	290	0,5	7	G 1 1/4	18,5	300	1135
46221A51616	20 ÷ 400	5 ÷ 106	20	290	0,2	3	G 1 1/2	28	150	568
46221A61616	30 ÷ 600	8 ÷ 158	20	290	0,5	7	G 1 1/2	28	100	378
46221A61717	30 ÷ 600	8 ÷ 158	20	290	0,5	7	G 2	28	100	378
46221A71717	40 ÷ 800	11 ÷ 211	20	290	0,5	7	G 2	28	75	284

Tab. 7b

CODE	Flowrate		Operating pressure		Connector	Internal passages (Ø mm)	Pulses	
	l/min.	US GPM	P max (BAR)	P max (PSI)			pls/l	pls/US GAL
46211A3A5B5	5 ÷ 100	1,3 ÷ 26	20	290	T5 F/M	14	600	2271
46211A4A5B5	100 ÷ 200	2,6 ÷ 53	40	290	T5 F/M	18,5	300	1135

Tab. 7c

6 GUARANTEE TERMS

1. ARAG s.r.l. guarantees this apparatus for a period of 360 day (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 Centre 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 Centre.
2. The following are not covered by the guarantee:
 - damage caused by transport (scratches, dints 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 unauthorised 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 organisational needs of the Assistance Centre.
No guarantee conditions will be recognised 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 recognise any further expressed or intended guarantees, apart from those listed here.
No representative or retailer is authorised to take on any other responsibility relative to ARAG products.
The period of the guarantees recognised 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 recognise 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.

7 DISPOSAL AT THE END OF SERVICE

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

8 CONFORMITY DECLARATION

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

*Only use original ARAG accessories and spare parts, to maintain safety conditions foreseen by the constructor.
Always refer to the ARAG spare parts catalogue.*

11/2017

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