IMMERSION PROBE

USER MANUAL Nr. 135

EDITION 05/99 rev. 0

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As the first thing, thank you for your choice. Our products are manufactured according to ISO 9001 procedures to assure maximum reliablity in any application, even in worst conditions.

WARRANTY CONDITIONS

All our products, after manufacturing process, are subject to restrictive tests and are warranted for 12 months from purchase date. Should any component fail during warranty period, our Company will repair or replace at no charge, after having verified cause of failure.
Warranty doe not include complete instrument replacement and our Company will reject any request of indemnity for damages.
Repair on warranty is intended at our Service Department (ex-works): transport expenses are on customer charge.
The customer is kindly requested to send the REPAIR – REVISION – CALIBRATION SHEET fully filled in together with the instrument and to retain the original invoice or packing list as a purchase evidence.
Warranty does not include: accidental ruptures during transport, failures due to uncorrect use, to negligence, to wrong power supply connection, all the consumable and weary parts and all accessories.
Warranty does not cover products that have been tampered with or repaired by non authorized personne. Warranty does not cover requests for service.
Any disputes arising shall be settled in the Court of Milan under Italian law and commercial customs.

1.0 AN OUTLINE OF THE APPARATUS

1.1 Applications

The SI/32 immersion electrodes holder probe, is built to house one of the following measurement electrodes: pH, redox, ISE, conductivity, dissolved oxygen and temperature and to allow direct insertion in basin, tanks or canals.
The extremely strong and compact built guarantees electrodes protection even in serious applications.
The probe has a sliding flange that simplifies mounting on wall, or on tub rim. The 300 mm version of the SI/32 can be set up on a floating.

1.2 Measurement types

The SI/32 probe can host one electrode for pH, redox, ISE, conductivity, dissolved oxygen and temperature measurements.
Electrodes that can be installed are:

MEASURE	DESCRIPTION	Mod.
pH	Combined electrode	101/V o 101/GEL
Redox	Combined electrode	201/V (Pt o Au) o 201/GEL (Pt o Au)
Conductivity	Conductivity sensor	401/L –K1
D.O.	Dissolved oxygen sensor	332/P
Temp.	Temperature sensor Pt100	PtL

On demand we can install, beyond pH, DO or conductivity electrode, a temperature sensor, fixed in the ring nut electrodes holder.

2.0 DESCRIPTION

2.1 Full measurement system

The full measurement system is composed by the measurement electrode inserted in the sensor holder probe, by the temperature sensor if required (inserted in the electrode holder ring nut), by the possible branch box and by the electronic unit related to the parameter to measure.

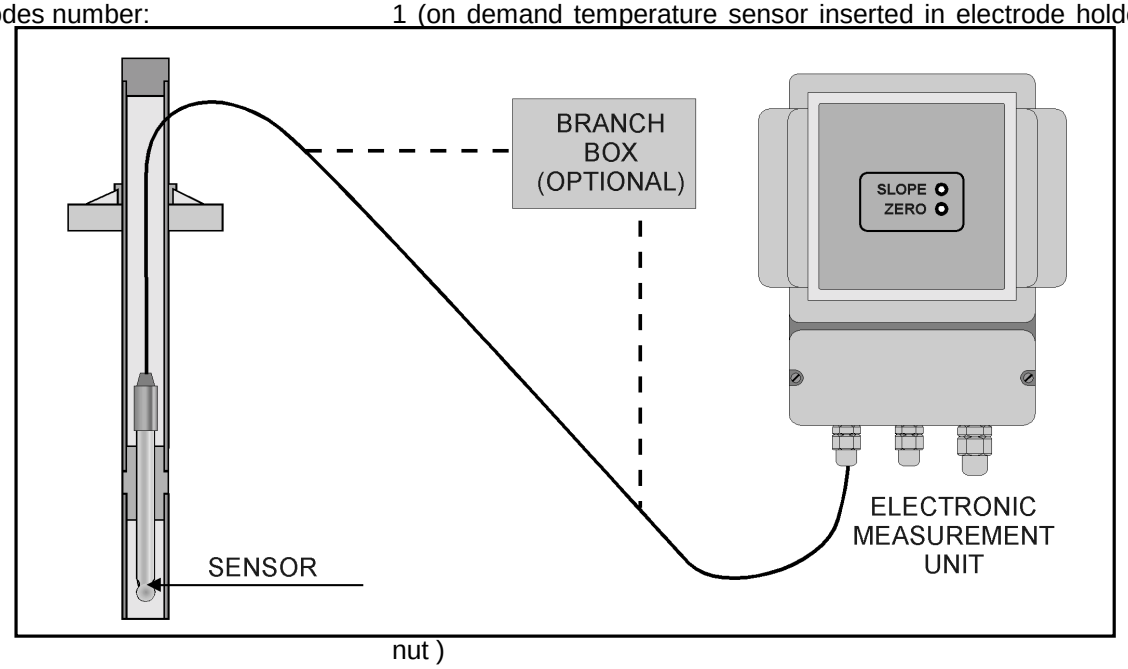
Fig.1 FULL MEASUREMENT SYSTEM

2.2 Realization

The SI/32 probe is made of a PVC cylindrical body (PP, PVDF or INOX on demand), ∅ 32 mm and a standard length of 600 mm (800 mm, 1000 mm, 1500 mm on demand); the 300 mm version for set up on a floating is available on demand.
In the lower part of the body is screwed a waterproof sensor holder rest, in which can be inserted one of the electrodes described in 1.2. O-rings guarantee the electrode seal.
The electrodes holder rest is threaded in the lower part and here the electrodes protection ring nut is screwed.
The DN25 sliding flange can be positioned along all the probe body. To stop tighten the two socket head screws.
On the superior part of the probe is mounted a closure cap, while the connection wire to the transmitter exit by means of a waterproof fairlead on the superior part of the probe body.

3.0 TECHNICAL CHARACTERISTICS

Electrodes number: 1 (on demand temperature sensor inserted in electrode holder ring nut)



Body material:	PVC, (PP, PVDF or INOX on demand)
Dimensions:	∅ 32, under flange standard length standard 600 mm (800mm, 1000 mm, 1500 mm, o demand); also available the 300 mm version for floating set up
Wires outlet	fairlead on probe's superior side
Max working temperature: (considering the electrodes max temperature)	PVC 60 °C PP 70 °C PVDF 90 °C INOX 120 °C
Max stocking temperature:	0÷60 °C
Max pressure:	depending on the electrode type inserted
Dip depth:	depending on probe length; min immersion depth 100 mm
Fixing sliding flange:	DN25
Weight:	about 0,4 kg for the 600 mm version
Max distance from the electronic unit:	50 m (stopped wires)

4.0 DIMENSIONS

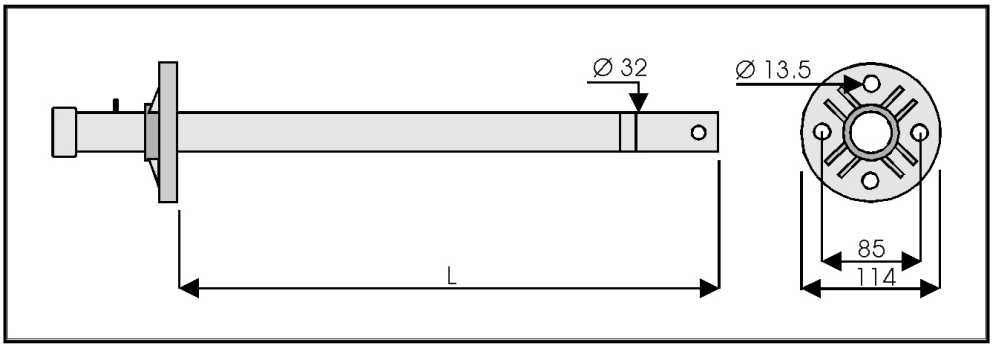


Fig.2 SI/32 IMMERSION PROBE OVERALL DIMENSIONS

5.0 SET UP

CAUTION:

The measurement and reference electrodes mounted in the probe are provided with protection cap. Remember to remove before use.

Fig.3 shows an example of typical set up of the SI/32 immersion probe and an example of floating probe set up.

Place the probe in the process vertically by means of the rest flange DN"% (see fig.3) and properly ad just immersion depth using the two inox screws sideways to the flange (min immersion depth 100 mm); make always sure that process liquid is moved and stirred and that the probe is set up in a representative position.
It is now necessary to realize electrical connections.

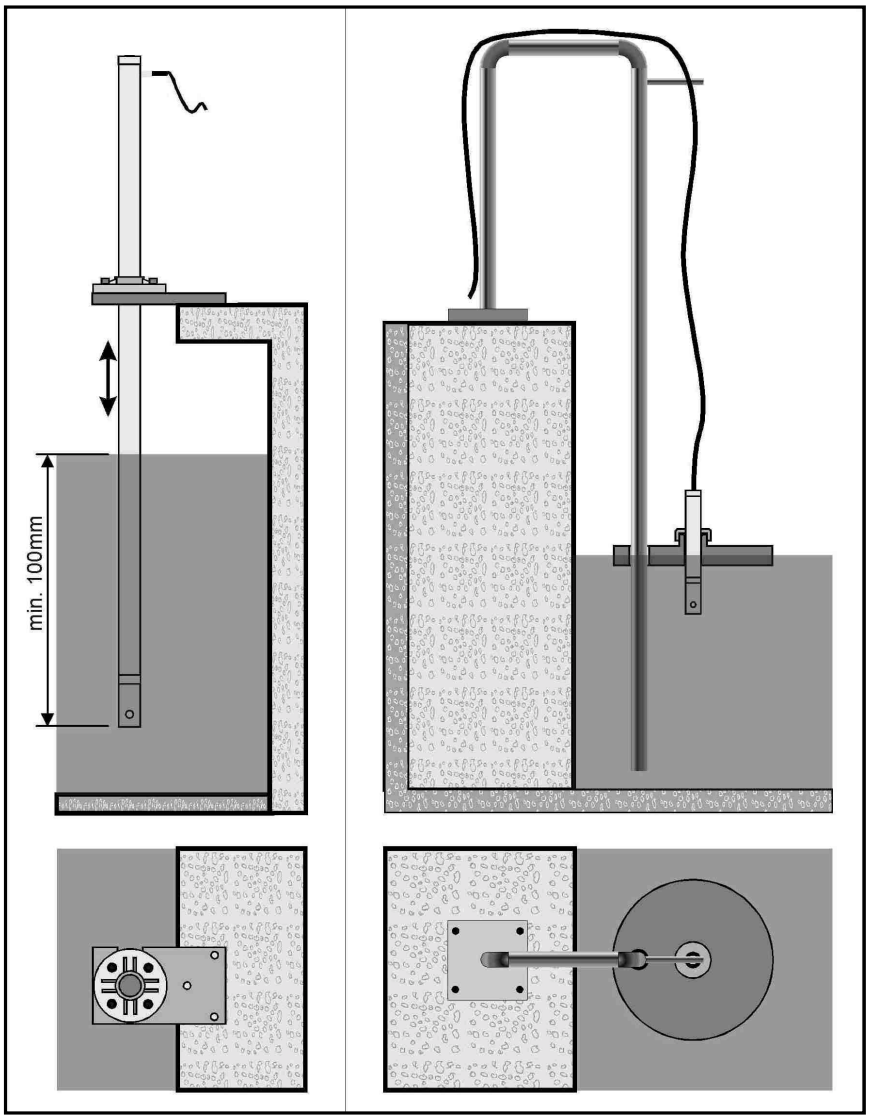


Fig.3 SI/32 PROBE TYPICAL SET UP

6.0 ELECTRICAL CONNECTIONS

Sensor is supplied complete with its wire.
Realize connection in the electronic unit following instructions in the specific user manual.

CAUTION! Connection wires to the electronic unit must be steady set up and don't have to pass together with other cables. This eliminates troubles and interferences and allows to set up the probe to a distance up to 50 m from the electronic unit.

7.0 STARTING

Once the probe is set up and connections to the electronic unit are realized, let operate the measurement chain for half on hour to let the reading stabilize, then proceed with calibration.

8.0 CALIBRATION

After conditioning period (1/2 hour) calibration can start.
Following procedure mainly refer to sensors, the correct procedure to follow in calibrating electronics depends on the electronic unit type used and can be found in the specific user manual.

8.1 pH measurement system calibration

pH measurement chain, is composed by a measurement electrode and by a reference electrode; voltage produced by such a chain depends on different factors: the measurement electrode potential, the reference electrode potential, the glass membrane potential, the potential due to the solution pH value.
So, even if the pH equality in the sample solution, potential produced will be slightly different for each measurement chain; calibration realize the standardization of those little differences.

The pH chain calibration is made by means of buffered solutions.
Procedure to apply depends on the type of electronic unit connected (calibration with potentiometer or with keyboard and display).
For further details refer to user manuals of different electronic unit.
We suggest to use the specific calibration glass (request to your provider, Mod.32-TAR).

CAUTION Never dry the electrode rubbing it with rags, paper or other materials: electrodes have an high ohmic resistance and rubbing the glass membrane produces a strong polarization of the electrode reducing in this way up to 90% its answering speed to pH variations.
If so, before any calibration wait for 10-15 min by leaving electrode plunged in water or in the buffered solution.

Unscrew and remove the electrodes protection. Clean electrodes before proceeding.
In the clean beaker, pour a quantity of a pH 7.0 buffered solution enough to wet the electrodes; hold the probe vertically and tighten the beaker. Allow that reading stabilizes, then do zero calibration in the electronic.
Then remove the beaker, throw the pH 7.0 buffered solution and rinse; pour the pH 4.0 buffered solution (or other solutions) till the right level, rinse the electrode and screw the beaker. Allow the reading stabilizes then calibrate slope on the electronic (according to the pH of the buffered solution used).

Remove the beaker , restore electrodes protection, then reinstall the probe in the process.

Now the analyzer can be set at work.

8.2 ORP measurement system calibration

The redox potential measurement chain is composed by a metallic (usually Gold and Platinum) measurement electrode and by a reference electrode.

Redox potential measurement doesn't require any calibration for operating.

Potential provided by the electrodes chain is the addition of the constant reference electrode potential and by the sample liquid redox potential.
The resultant of those potentials could not be in the measurement range of the instrument.
For this reason ORP measurement electronics are equipped with an asymmetry command that allows to algebraically add, to the potential provided by the electrodes chain, a potential that brings back the measurement in the transmitter scale.
To realize this it is necessary to follow those steps :
Wash the probe's edge with water and plunge it into the sample fluid. This must already have a pH value suitable to the reaction we want to realize).
Wait for some minutes until measurement stabilizes.
(If transmitter's indicator moves beyond full scale verify if connections are correct).
Operate on the potentiometer or on the zero calibration point until the zero value is showed on the electronic.
Now the analyzer can be set at work.

From this moment readings will indicate redox potential variations in the sample liquid compared to the zero point preset.

Consider that redox potential measurement depends on all oxidants and reducents in the solution, and not only to a specific ion. Therefore it is necessary to repeat calibration when and if the composition of the sample solution changes in time.
On the contrary, if solution keep constant its characteristics, calibration is not necessary.

8.3 Dissolved oxygen measurement system calibration

Zero point in dissolved oxygen analyzer is usually factory set and so doesn't require further calibrations.

The recommended calibration procedure for this analyzers is the following:
-expose oxygen sensor to air, keeping possibly in the shade.
-wait until sensor's signal stabilizes
-measure the room temperature of the position where the probe is located and get from the following chart the ppm oxygen value to calibrate
-correct slope on the electronics on the basis of the value read on the chart.

CHART 1 OXYGEN PPM VALUES TO USE FOR AIR CALIBRATION, DEPENDING ON ALTITUDE AND TEMPERATURE

°C	775 mmHg	760 mmHg	750 mmHg	725 mmHg	700 mmHg	675 mmHg
		L.M.	120 m	365 m	610 m	850 m
0	14.9	14.6	14.4	13.9	13.5	12.9
2	14.1	13.9	13.7	13.2	12.9	12.3
4	13.4	13.2	13.0	12.5	12.1	11.7
6	12.7	12.5	12.3	11.9	11.5	11.1
8	12.1	11.9	11.7	11.3	10.9	10.5
10	11.6	11.3	11.2	10.8	10.4	10.1
12	11.1	10.8	10.7	10.3	10.0	9.6
14	10.6	10.4	10.2	9.9	9.5	9.2
16	10.1	9.9	9.8	9.5	9.1	8.8
18	9.7	9.5	9.4	9.1	8.8	8.4
20	9.3	9.2	9.1	8.7	8.4	8.1
22	9.0	8.8	8.7	8.4	8.1	7.8
24	8.7	8.5	8.4	8.1	7.8	7.5
26	8.4	8.2	8.1	7.8	7.6	7.3
28	8.1	7.9	7.8	7.6	7.3	7.0
30	7.8	7.7	7.6	7.3	7.0	6.8
32	7.6	7.4	7.3	7.0	6.8	6.6
34	7.3	7.2	7.1	6.8	6.6	6.3
36	7.1	7.0	6.9	6.6	6.4	6.1
38	6.9	6.7	6.6	6.4	6.2	5.9
40	6.7	6.5	6.4	6.2	6.0	5.7
42	6.5	6.3	6.2	6.0	5.8	5.6
44	6.3	6.1	6.0	5.8	5.6	5.4
46	6.1	5.9	5.9	5.6	5.4	5.2
48	5.9	5.8	5.7	5.5	5.3	5.0
50	5.7	5.6	5.5	5.3	5.1	4.9

As a rule, zero point doesn't require calibration.
It is however possible to verify calibration as follows: fill a container big enough to contain the probe's trailing, with distilled or light water, melt in approx 1g/l of sodium sulfite (a reducent that eliminates all oxygen from the solution)
Allow the sensor stabilization and zero calibrate, if necessary.

Now the analyzer can be set at work.

8.4 ISE measurement system calibration

In calibrating selective ions analyzers, we recommend to carefully follow instructions supplied with each ISE sensor. This because they are so different each other in shape, slope and in use.

8.5 Conductivity measurement system calibration

For conductivity measurement system calibration, it is necessary to acquire at least one standard solution with known conductivity value (the solution type is related to the full scale of the analyzer).
Then proceed as follows:
- Unscrew the electrodes protection from the probe, rinse and drip the electrode, fill to the correct level calibration beaker and insert the electrode
- Wait for some minutes until reading stabilizes and verify if reading of the electronic matches with standard solution value. If necessary correct slope working on electronic unit.

Restore electrodes protection, then reinstall the probe.

Now the analyzer can be set at work.

9.0 USE AND MAINTENANCE

We recommend to regularly clean sensor: Frequency depends on the process type and will be established on a direct experience basis.

We also recommend, after cleaning the sensor, to regularly – depending on direct experience - verify the measurement and if necessary recalibrate it (to verify the measurement proceed either with a portable measurer opportunely calibrated, or plunging the probe into a solution with a known concentration of the measurement parameter and verifying that reading matches with such value).

To diminish cleaning operation frequency, it is possible to acquire by your provider, the chemical cleaning kit, Mod.SI/CH-AP and the board to control cleaning sequence (Mod.QAPCH).

10.0 ELECTRODES REPLACEMENT

Refer to fig. 4 “SI/32 Assembling scheme” for a better comprehension of the following description.

1. Unscrew the electrode holder (7) from the probe’s body (9) making sure not to twist cables.
2. Take out the electrode holder joint sliding cable through probe’s body.
3. Extract the electrode to substitute from electrodes holder joint pulling up.
4. We recommend to substitute the specific O-Ring (6), when the electrode is replaced
5. Replace the broken electrode and position it to obtain the correct projection
6. Reassemble the probe and close it again executing the above instructions in opposite direction

Note: If the shielded cable of the measurement electrode has to be restored (for pH, redox and ISE), ensure that the black semi conductive sheath located between the shielding and the internal wire polyethylene protection is removed for at least 20 mm.

11.0 SPARE PARTS

Refer to Fig.4 “SI/32 assembling scheme” and to the following chart. Remember to mention, in the possible order, model and serial number of your product, as well as the spare part code of the required component.

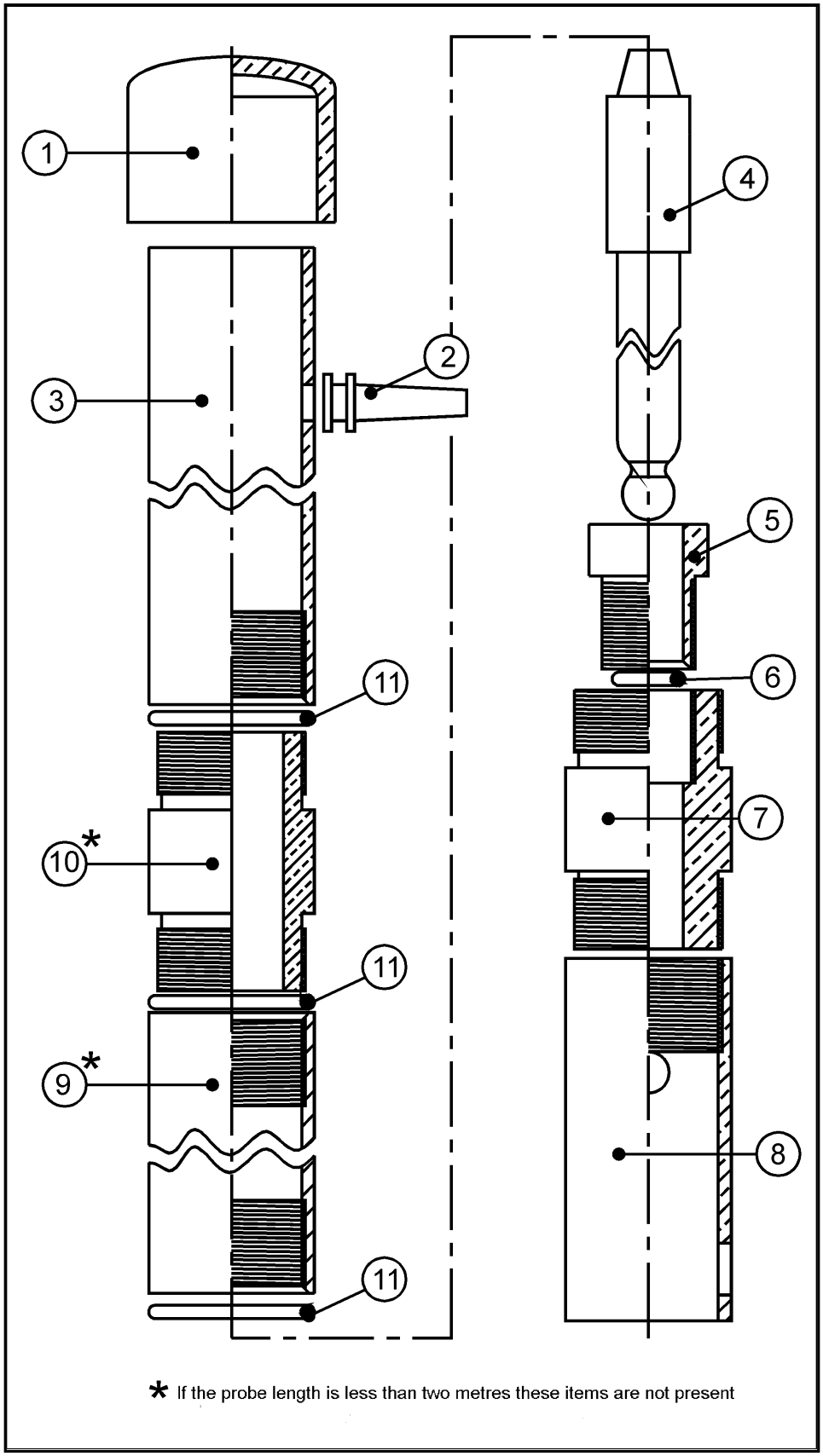


Fig.4 SI/32 ASSEMBLING SCHEME

SI/32 SPARE PARTS

Pos.in Fig.4	Spare code	Description	Material	Q.ty
1	S32-001	CAP	PVC	1
1	S32-002	CAP	PP	1
1	S32-003	CAP	PVDF	1
1	S32-004	CAP	INOX	1
2	S32-005	RUBBER FAIRLEAD 34.21.230		1
3	S32-006	BODY	PVC	1
3	S32-007	BODY	PP	1
3	S32-008	BODY	PVDF	1
3	S32-009	BODY	INOX	1
4	101/N	pH ELECTRODE		1
4	101/N-DG-SM	pH ELECTRODE		1
4	201/N (Pt O Au)	REDOX ELECTRODE		1
4	201/N (Pt O Au)	REDOX ELECTRODE		1
4	401/L-K1	CONDUCTIVITY ELECTRODE		1
4	332/P	DISSOLVED OXYGEN ELECTRODE		1
4	Pt/L	TEMPERATURE SENSOR		1
5	S32-010	O-R PUSHER	PVC	1
5	S32-011	O-R PUSHER	PP	1
5	S32-012	O-R PUSHER	PVDF	1
5	S32-013	O-R PUSHER	INOX	1
6 + 11	S32-014	OR SPARE KIT It contains: n°1OR 115 11.91x2.62x17.15 (Pos.6) n°3 OR2100 25.12x1.78x28.68 (Pos.11)		1 + 3
7	S32-015	NIPPLE WITH THERMORESISTANCE for SI/32…C	PVC	1
7	S32-016	NIPPLE WITH THERMORESISTANCE for SI/32…C	PP	1
7	S32-017	NIPPLE WITH THERMORESISTANCE for SI/32…C	PVDF	1
7	S32-018	NIPPLE WITH THERMORESISTANCE for SI/32…C	INOX	1
7	S32-019	NIPPLE WITHOUT THERMORESISTANCE for SI/32	PVC	1
7	S32-020	NIPPLE WITHOUT THERMORESISTANCE for SI/32	PP	1
7	S32-021	NIPPLE WITHOUT THERMORESISTANCE for SI/32	PVDF	1
7	S32-022	NIPPLE WITHOUT THERMORESISTANCE for SI/32	INOX	1
8	S32-023	PROTECTION	PVC	1
8	S32-024	PROTECTION	PP	1
8	S32-025	PROTECTION	PVDF	1
8	S32-026	PROTECTION	INOX	1
9	S32-027	PROBE EXTENSION	PVC	1
9	S32-028	PROBE EXTENSION	PP	1
9	S32-029	PROBE EXTENSION	PVDF	1
9	S32-030	PROBE EXTENSION	INOX	1
10	S32-031	NIPPLE FOR PROBE EXTENSION	PVC	1
10	S32-032	NIPPLE FOR PROBE EXTENSION	PP	1
10	S32-033	NIPPLE FOR PROBE EXTENSION	PVDF	1
10	S32-034	NIPPLE FOR PROBE EXTENSION	INOX	1
	S32-035	DN25 PROBE SUPPORT FLANGE		1

With your supplier you can find solutions with fixed value for pH, redox, conductivity calibration.

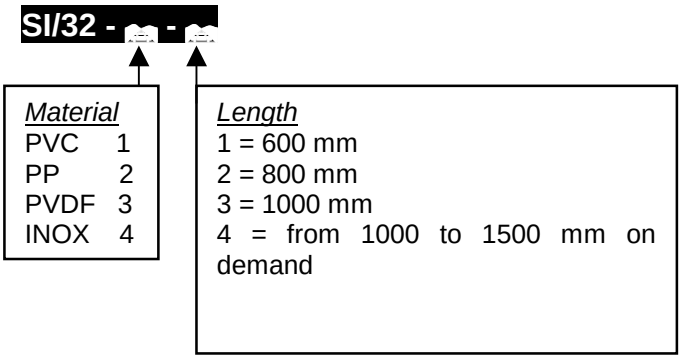
Mod. **T/101–** ☐ - ☐

Buffered solution value
1
4
7

Bottles
A 250 cc
B 500 cc
C 1000 cc

Mod. **T/401–** ☐ Specify desired conductivity value: 1 mS, 12 mS, 100 mS.

11.1 Information for full SI/32 probe order



12.0 RETURN FOR REPAIR

Should any equipment misfunctioning appear, pls contact our Technical Department.
Should the equipment be broken or faulty pls proceed to return for rapair as described hereafter.

12.1 Procedures under the care of customer

Fill in each part the enclosed REPAIR – REVISION – CALIBRATION sheet

Attach the form to the equipment and ship them to:

The material will be sent ex warehouse. To avoid unpleasant trouble, we inform the Customers that carriage forward shipping will not be accepted.

12.2 Repair procedure

When the material with the form REPAIR – REVISION – CALIBRATION will be received, we will send, as soon as possible, an estimated cost, before proceeding to any intervention on the equipment.
To each equipment received for repair or revision we assign a number that will be used as the reference for all the techniacl and commercial information.

No intervention will be carried out on the equipment without previous customer written approval.

Should the the repair cost estimate require some work, a minimum of 150.000 Itl. will be invoiced, even if the customer does not confirm the approval to repair.

Repairs under warranty won't be invoiced, except for freight cost, that will always be charged to customer.

Should any information be required, pls, contact our technical and commercial department.

REPAIR – REVISION - CALIBRATION

Company_____ **Address**_____ **Town**_____**Nation**_____ **Tel.**_____**Fax**_____	**Mod.N.**_____ **Serial N.**_____ **Purchase date**_____

Type of operation

	Repair		Revision		Calibration

Detected fault

	As the good has been received		At start up		After apprx._____-
	During calibration procedure		Intermittent		Steady

Detected fault:_____

_____

_____

_____

_____

_____

Riservato al costruttore

Date_____ **Rip. n°**_____ **Invoice n°**_____ **dated**_____

Cost estimate n°_____ **of**_____ _____ **Lit.**_____

Remarks:_____

_____

_____

_____

Equipment return

- Customer carrier Name_____ Tel._____

Address_____

- Our carrier with 25.000 Itl charge on invoice (up to 0.3 kg) and 30.000 Itl. charge (up to 20 kg) + VAT

NOTE: if written approval for reapair is not received within 40 days, the goods will be returned with our carrier with a charge of 200.000 Itl on invoice.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