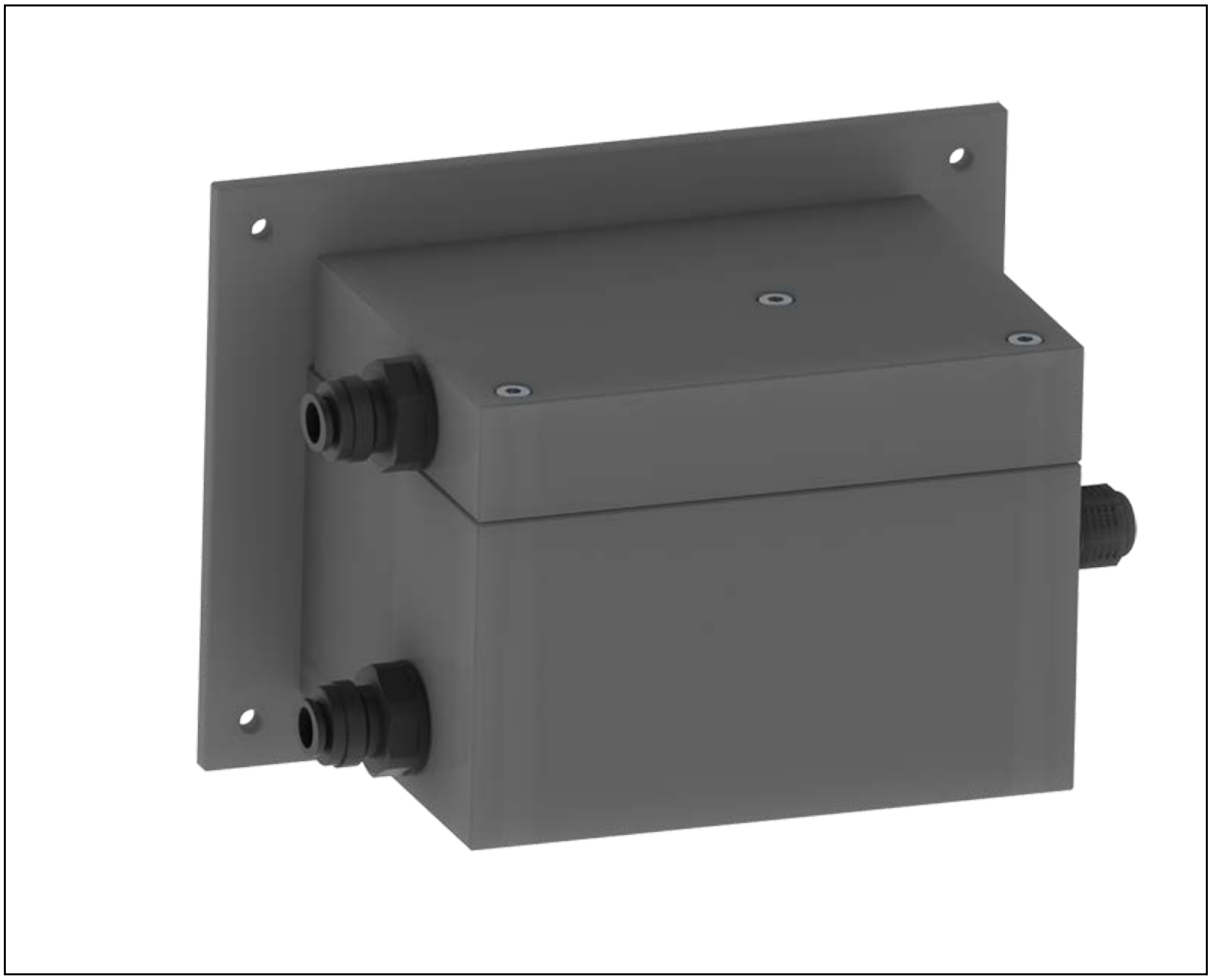
On line Turbidity probe for swimming-pools "*TURBIPOOL Primary ®*"



Installation, commissioning and maintenance instructions

SYCLOPE Electronique

Reference : TUR 20x0

Rev :1.01

General informations :

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On line turbidity probe.
TURBIPOOL *Primary*® range

Installation, commissioning and maintenance manual (Ref. DOCxxxx)

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Summary

I. Generalities

1) Application areas

The turbidity measuring probe of the SYCLOPE TURBIPOOL Primary® range that you have just acquired is a high precision electronic and optical sensor for the measurement and treatment of swimming pool water. It has been studied and built with care for your greatest satisfaction and your peace of action.

Its remarkable adaptability to the different situations of the swimming pool applications allows it to adapt to all difficult environments where the measurement processes for the water treatment are most important.

Designed according to the needs of the final user, the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe has a hydraulic inlet and outlet for sampling the water to be measured and a compatible connection cable with the "SYCLOPE" controller's brand.

Compliant with the European standard EN27027 (ISO7027), the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe operates on the principle of an infrared beam at 860 nm and a measurement of turbidity achieved with an optical sensor positioned at a 90 ° angle compared to the emitting beam.

The simplicity of operation of the turbidity sensor **SYCLOPE TURBIPOOL *Primary*®** and the remarkable technicality of these components, will make you fully enjoy a perfect control and a perfect monitoring of the water quality of your swimming-pool.

In the following instructions, you will find all informations you need for installing, commissioning and maintaining this new turbidity probe.

- Installation
- Technical specifications
- Commissioning
- Safety

If you wish to receive further information or if you encounter any difficulties that are not specified in this manual, contact your usual reseller or contact the after-sales-service department of SYCLOPE Electronic S.A.S., either at the agency or office in your region, or the technical / quality services of our institutions. We will do everything necessary to help you and make you benefit from our advice and our know-how in the field of measurement and treatment of swimming pool water.

Contact : service-technique@syclope.fr

2) Use of this document

Please read this entire document before installing, handling, or commissioning your turbidity probe to maintain the safety of the swimmers, the technical users or all equipments of the technical room.

Informations given in this document should be scrupulously followed. SYCLOPE Electronique S.A.S cannot be held responsible for any failure to follow the instructions in this document.

To facilitate reading and understanding of this manual, the following symbols and pictograms will be used.

- Information
- ► Action to be done
- ➢ Element of a list or an enumeration

3) Signs and symbols

Identification of a direct voltage or a direct current

Identification of an alternating voltage or alternating current

Protective electrical grounded

Functional grounding

Risk of injury or accident. Identifies a warning about a potentially dangerous hazard. The documentation must be consulted by the user each time the symbol is notified. Failure to follow instructions may result in death, personal injury or property damage.

Risk of electric shock. Identify a warning about a deadly electrical hazard. If the instructions are not strictly followed, this implies an inevitable risk of personal injury or death.

Risk of malfunction or damage to the device

Note or special information

Recyclable element

4) Storage and transport

Storage and transportation of the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe must be carried out in its original packaging to prevent potential damage.
The set should be stored in protected environment from moisture and protected from sun and chemical exposures.
Beware of possible transporting shocks!! The turbidity probe is an optical probe comprising fragile glass elements.

Ambient conditions for transport and storage :

Temperature : -10 °C to 60 °C
Humidity : Maximum 90% without condensation

5) Packaging

The turbidity probe is delivered with a power and signal cable at very low voltage.

Included into the packaging :

- ✓ Turbidity measurement probe **SYCLOPE TURBIPOOL *Primary*®**
- ✓ This operating instruction manual
- ✓ 5m of PE hydraulic tubing corresponding to the used diameter

6) Warranty

The guarantee is insured according to the terms of our general sales conditions and delivery insofar as the following conditions are met:

- ➢ Use of the probe according to the instructions in this manual
- ➢ No modification of the probe likely to modify its behavior or improper handling
- ➢ Respect for electrical safety conditions

Consumable material is no longer guaranteed as soon as used.

II. Safety and environmental instructions

Please :

- Read this manual carefully before unpacking, installing, or commissioning this equipment
- Consider all the dangers and recommended precautionary measures

Failure to follow these procedures could result in serious injury or damage to the device.

1) Use of the probe

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe has been designed to measure the turbidity of the swimming pool water within the scope of use described in this manual.

Any other use is considered as not-compliant and must be prohibited. SYCLOPE Electronique S.A.S. will not assume any liability and resulting damage.

Any use of sensors or interfaces that do not comply with the technical specifications defined in this manual must also be prohibited.

2) Obligations of the user

The user agrees to let working with the **SYCLOPE TURBIPOOL** ***Primary®*** turbidity Probe described in this manual, only the personnel who:

- is aware of the basic instructions on safety at work and accident prevention,
- is trained in the use of the device and its environment,
- has read and understood this manual, warnings and handling rules.

3) Risks prevention

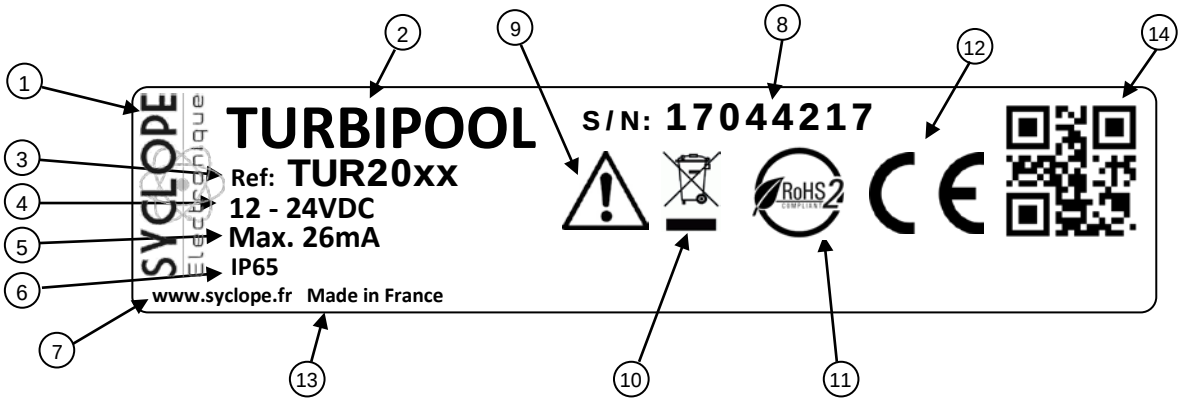
Installation and connection of the **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe must only be performed by qualified personnel for this task.
The installation must comply with the standards and safety regulations in force!

Before connecting the probe to the “SYCLOPE Electronique” controller, always switch off the primary power supply!
Never open the turbidity probe under power supplied!
Maintenance and repairs must only be carried out by authorized and specialized personnel!

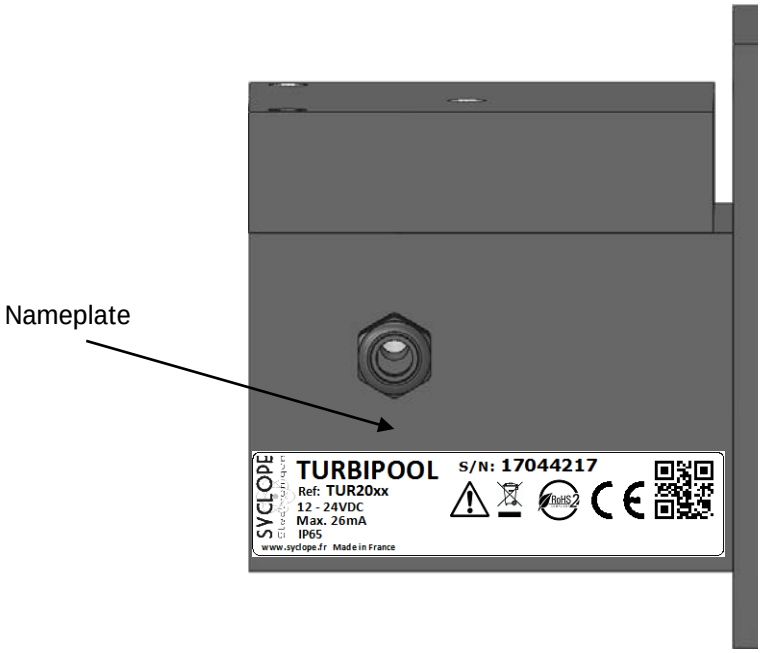
Be sure to choose the installing area of the turbidity probe according to the environment!
The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe should not be installed in a hazardous environment. It should be protected from direct sunlight, splashing water or chemicals in a dry and ventilated area isolated from corrosive fumes.

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe is composed of sensitive elements and has consumable parts. It must be monitored, maintained and checked regularly (see maintenance procedure). In case of doubt, a maintenance contract must be established with your authorized installer or, failing this, with our commercial or technical services. Contact your installer or our sales department for more information.

4) Identification and location of the nameplate



(1) Manufacturer's label	(8) Serial number
(2) Product model	(9) Warning! Read the instructions
(3) Product reference	(10) Specific recyclable product
(4) Power supply range	(11) Limitation of dangerous substances
(5) Maximum current value	(12) CE compliant
(6) Protection class of the case	(13) Native country
(7) Manufacturer identification	(14) Manufacturer's square code



5) Elimination and compliance

Recyclable packaging of **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe must be disposed of according to the rules in force.

Items such as paper, cardboard, plastics or any other recyclable element must be brought to a suitable sorting center

In accordance with the European Directive 2012/19/EU, this symbol indicates that from July 4th, 2012, electrical appliances can no longer be disposed of in household or industrial waste. In accordance with the regulations in force, consumers in the European Union are required, from this date, to return their old equipment to the manufacturer who will take care of their disposal without any charge.

According to the European Directive 2011/65/EU, this symbol indicates that the **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe has been designed respecting the limitation of hazardous substances

In accordance with the Low Voltage Directive (2014/35/EU), the Electromagnetic Compatibility Directive (2014/30/EU) and the RoHs2 Directive (2011/65/EU), this symbol indicates that the **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe has been designed in accordance with the guidelines mentioned above.

III. Technical features

1) Measurements

Turbidity measurement probes are available with standard measurement scales. They respond to all possible situations of the swimming pool applications.

Reference	Designation
TUR2010	Turbidity probe TURBIPOOL *Primary* Range 0 – 10NTU
TUR2020	Turbidity probe TURBIPOOL *Primary* Range 0 – 20NTU

2) Technical features

General characteristics		
Type	Specification(s)	Location(s)
Case dimensions	Death : 105 mm (4,13 inches) Height : 125 mm (4,92 inches) Width : 170 mm (6,69 inches)	-
Case materials	POM or black PVC	-
Measuring tank	Borosilicate glass	
Hydraulic connections	Quick connector for PE or PTFE tubing (8x5mm)	
Max. pressure	2 bars	
Max. temp. of water	0 to 50°C (32°F to 122°F)	
Primary power supply	Between 12 ~ 35VDC isolated	0V – V+
Consummation	0,26 mA Maxi.	-
Signal output	0/4 ... 20mA (Passive output : need to be supplied)	
Loop power supply	Mini : 7,5VDC + (R(Charge) x 0,02A)	
In/Out isolation	$10^9\Omega$ minimum	
Working temperature	-5 °C to 45 °C (23°F to 113°F)	-
Storage temperature	-10 °C à 60 °C (14°F to 140°F)	-
Humidity	Max. 90% without condensation	-
Measured value	Turbidity in NTU	
IR wave length	Infrared at 860 nm	
Type of measurement	Diffused at 90° according EN27027 (ISO7027)	
Response time	< 60 seconds	
Maxi. Altitude	< 2000m	
Case weight	1,6 kg (without liquid)	-
Protection rating	IP 65	-

Output(s)		
Analogical output	1 Analogical output 0/4...20 mA Max 500 Ω passive	IA-IB

Currents error values		
2,4 mA	Internal measurement system fault (Factory return)	
3,8 mA	Low offset measurement out of limits	
22,5 mA	High value measurement out of range of probe	

IV. Installation and wiring

1) Installation conditions

To ensure the safety of the users and to ensure the correct operation of the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe, please observe the following installation instructions:

- Install the turbidity probe in a dry and ventilated area,
- The turbidity probe must be protected from rain, frost and direct sunlight,
- The ambient temperature must be between 0 and 50 °C without condensation,
- Choose a place of installation without vibration, on a clean and undistorted support.

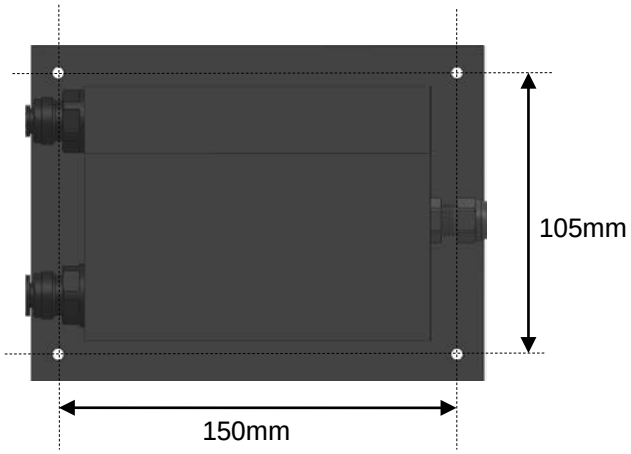
In case of no-compliance with these instructions:

- The turbidity probe and its fragile elements may be damaged
- Measurements can be disturbed
- The guarantee will not be accepted!

2) Installation mural de la sonde de turbidité

Before processing to wire electrical connections, switch off power of the controller!
The IP65 rating is only guaranteed if the top closure cover is tightened and correctly positioned. Under no circumstances should this cover be opened during normal operation.

► Draw the holes to be drilled according to the plan below, checking horizontality with a level tool,
► Drill the 4 holes ∅ 6 mm and insert the dowels using a hammer,



► Attach the 4.5mm top screw (top left screw) first and tighten partially,
► Position the other 4.5mm lower screws and tighten them,
► Tighten the upper screw,
► Ensure the stability of the probe and its horizontality.

3) Electrical connections of the turbidity probe

The **SYCLOPE TURBIPOOL *Primary*®** turbidity probe is supplied with a 4-wire cable of 5m as standard. This cable can be extended with an identical or compatible cable.

Electrical installations must be carried out according to the standards in force and by authorized personnel!
However, the electrical connections are at low voltage (below 35VDC).
Before connecting the turbidity probe, switch off the power supply of the controller!

On the controller side, preferably use crimped cable ends to ensure that no wire can come into contact with neighbouring cables!
Secure the wire connections to the terminal blocks using clamps.

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe does not have internal fuse. Do not open when powered!

4) Identification and connections of the turbidity probe wires

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe must be powered by an external voltage power supply (between 12V to 35V DC). In general, this primary power supply is provided by the SYCLOPE or compatible measuring device.

Red : Positive voltage (12~35VDC)
Brown : Ground voltage (0V)
Blue : Unpolarised 4…20mA loop
Green : Unpolarised 4…20mA loop

The 4...20mA output current loop is passive signal. It is therefore necessary to provide an additional power supply to ensure the operation of the loop. In general, this power supply is provided by the SYCLOPE controller.

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe does not have a power supply switch. It is immediately powered when connected to the device.

5) Connection conditions of hydraulic tubing

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe must be supplied with swimming pool water and with the supplied tubing.

In all cases, the 8x5mm tubing diameter must not be changed!

The sampling flow-rate must be constant and can be set by one of the SYCLOPE series housing chamber containing a micrometric adjustment device.

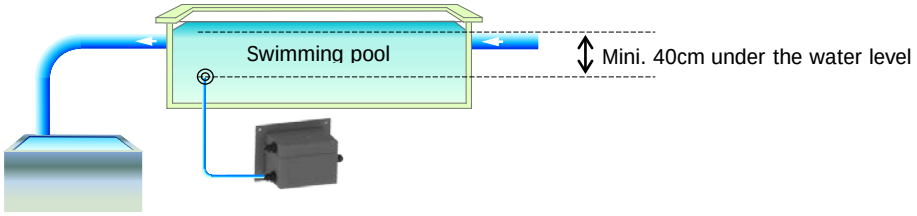
No filter system or sampling flow-rate adjustment should be installed BEFORE the turbidity measuring probe!

V. Standard uses of the turbidity probe

1) Control of swimming pool's water turbidity

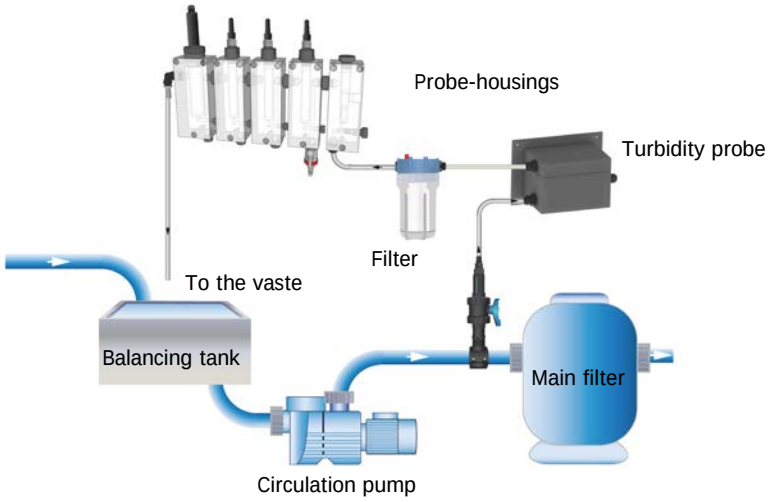
The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe is used to measure the transparency of pool water to prevent a potential hazard to swimmer monitoring.

a) General principle of installation by coring basin:



This is the closest method to the reality. The sampling must be made at least 40cm below the top level water of the basin in order to reflect the true turbidity value. No presence of air bubbles or emulsions should be noted. Do not take the sample under overflow or increase the sampling depth if this is the case. The proximity of bathers can cause a disturbance of the sample. Installation near a discharge outlet or water moved by aquatic-plays must be prohibited.

b) Alternative "on-line solution" with measuring probe housings:



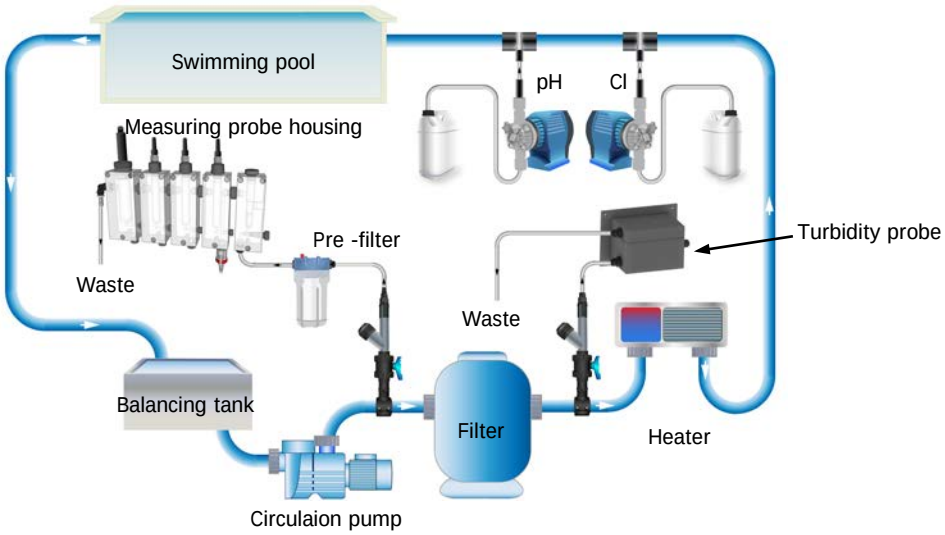
More easily, the sampling can be done in line before the measuring probe-housings with sensors for water analysing. However, the risk of measuring water disturbance can be accentuated by:

- The water supply in the balancing tank (emulsion),
- The significant return of polluted surface waters,
- An air intake in the filtration pump(s) circuit.

The turbidity probe must be installed before the measuring probe-housing and before a pre-filter if it is present.

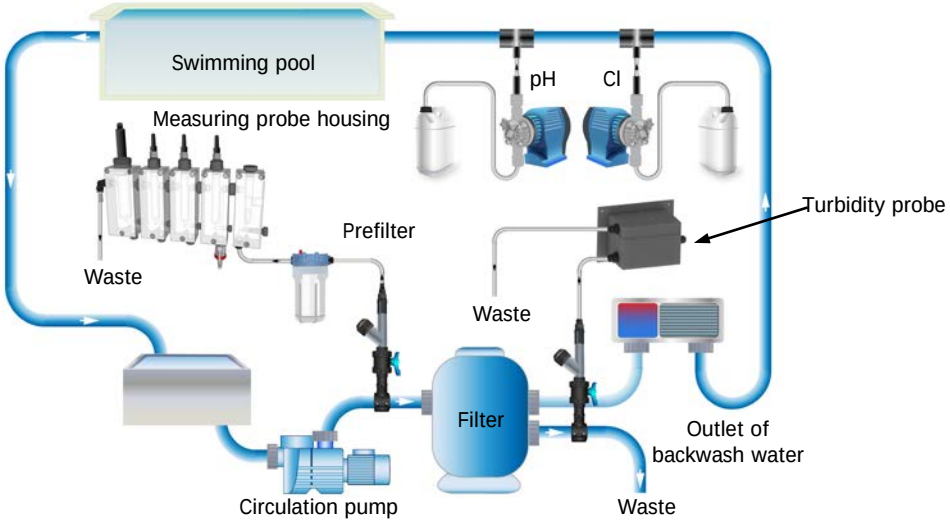
2) Control of the water quality after filtration

the **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe is used to measure the water quality at the outlet of the filter unit and thus control the overload of the filter(s). As soon as the turbidity reaches a user-defined threshold, the filter backwashing process is initiated (manually or automatically). Once this process is complete, the turbidity measurement goes down and the filtration cycle resumes until the next backwash cycle.



3) Control of the end of the filter backwash cycle

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe is used to measure the quality of the filter's outlet backwash water. When the turbidity measurement of the backwash water returns within a user-defined threshold, the process is reversed and the filter is again switched to the washing position.



WARNING: For this last application, the probe maintenance must be rigorously followed and carried out more frequently. Indeed, the outlet water of the filter is very charged with flocculant and other impurities and can cause significant deposits on the internal glass of the probe and could cause measurement errors. A solenoid valve solution can be implemented so that the control condition is made after a user-defined time to control the end of the backwash cycle.

VI. Calibration procedure

Normally, the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe has factory internal calibration and is **without local calibration.**

If necessary, the offset and the slope of the probe must be externally adjusted using the associated SYCLOPE device. If it is impossible to use the calibration procedures, refer to the maintenance section of this manual.

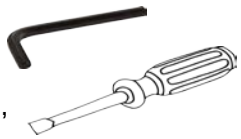
VII. Maintenance procedure

Maintenance of the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe consists only to clean the internal circulation circuits of the water to be analysed, cleaning or replacing the borosilicate glass tub and changing his seals.

1) Procedure for opening and closing the probe for maintenance operations

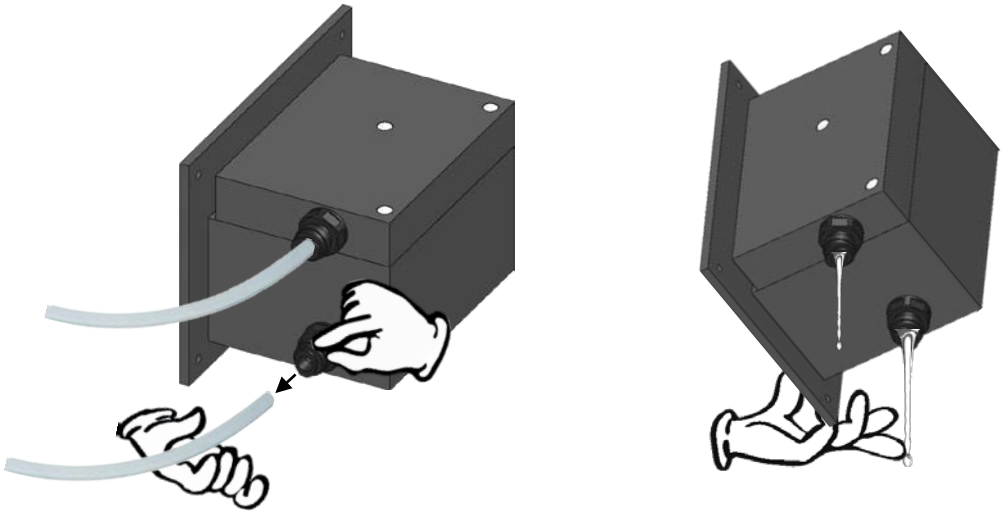
WARNING : Before opening the turbidity probe block, make sure that the water supply circuit is well insulated and without pressure. Any water splashing inside the probe can destroy the optical measuring system!

To make the maintenance of the **SYCLOPE TURBIPOOL *Primary*®** turbidity probe, you need the following tools and products :



- A Allen wrench (hexagonal) of 4mm,
- A flat screwdriver with a width size of 3mm,
- A cleaning paper kit for lenses or mirror,
- A maintenance kit comprising a borosilicate glass tub and two O-ring seals.
- A soft absorbent cloth,
- A small bottle of demineralized water.

a) Cut the water circuit by disconnecting the two 8/5 quick coupling and empty the probe,

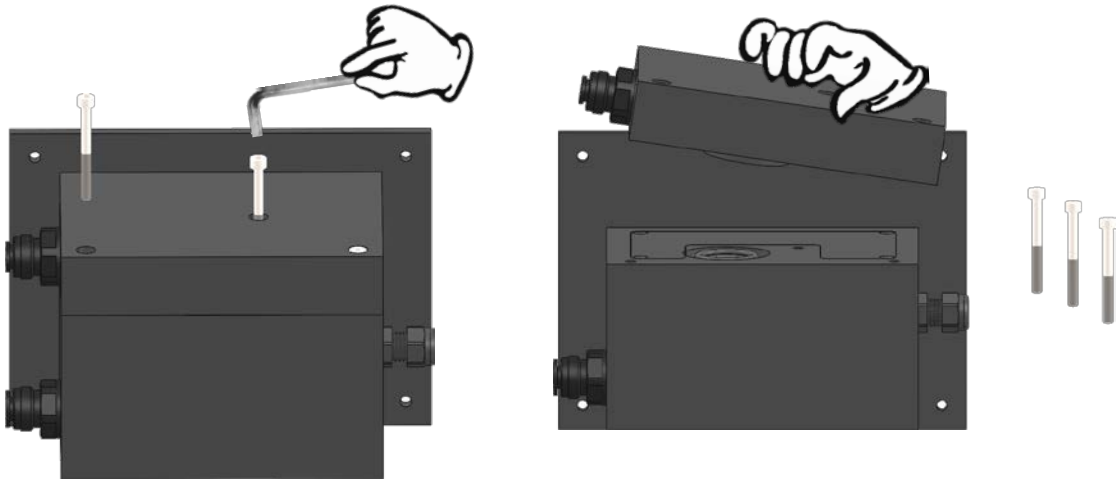


ATTENTION : Do not shock the turbidity probe during the operation!

b) Using the Allen wrench to open the top of the turbidity probe

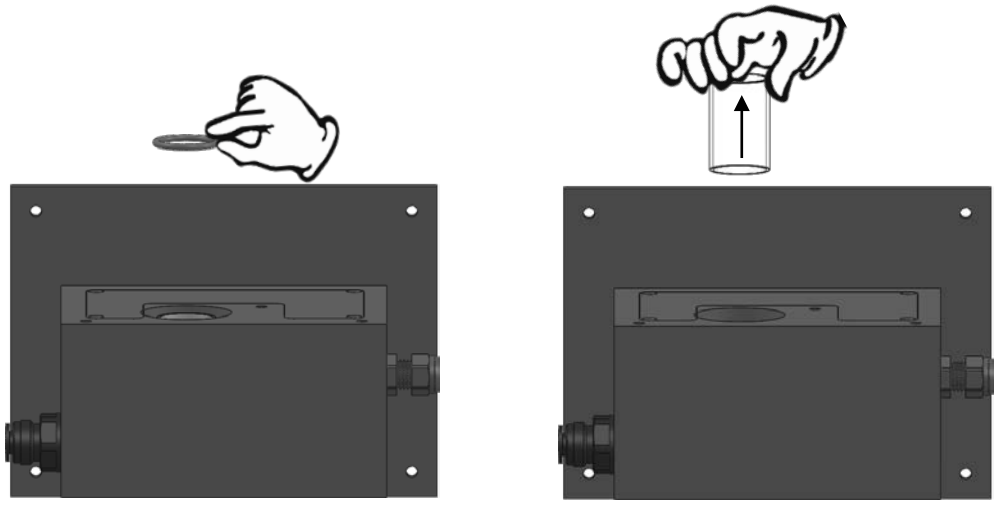
During this operation, take care to maintain the probe vertically so that the internal borosilicate glass tub and O-ring seals are not ejected or lost!

WARNING : Destruction risk of the borosilicate glass tub !!



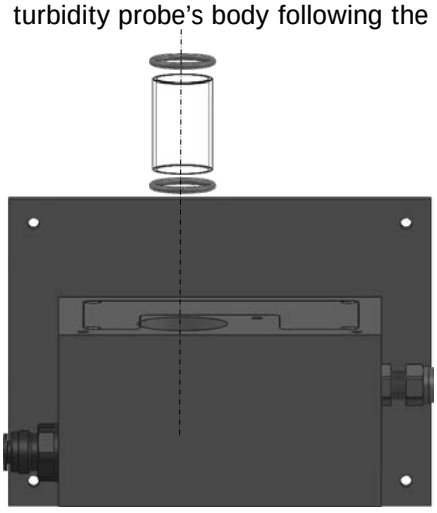
c) Remove the 3 hexagonal screws M4x40 using the Allen wrench, put the set of screws aside and lift the top cover of the probe taking care not to drag the borosilicate glass tub out of its housing.
Check that the O-ring seal is not stuck to the top cover seat and if so, take it off carefully and replace it when reassembling.

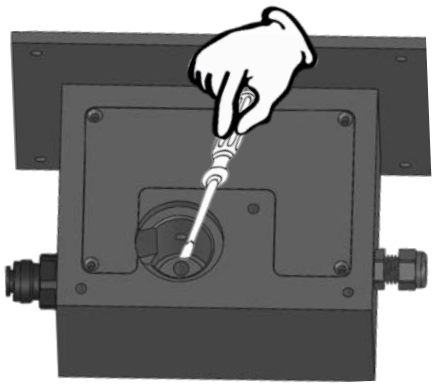
d) Remove the upper O-ring seal and gently remove the borosilicate glass tub vertically ...



WARNING : Do not touch the circular surface of the borosilicate glass tub!
Risks to deposit greasy particles from your fingers on the walls of the glass causing a drift of the probe's zero point!

e) Using the 3mm screwdriver, remove the lower O-ring seal located at the bottom of the turbidity probe's body following the assembly shown below...





WARNING : Do not mark the inner of the probe's body with the screwdriver!

f) Clean inside of the probe's body with a silky white paper or a piece of clean cloth without forcing and without additional liquid product!

WARNING : Do not use liquid products for internal cleaning! Risk of introducing liquid into both optical conduits! In this case, take care to eliminate all traces of moisture before reassembly.

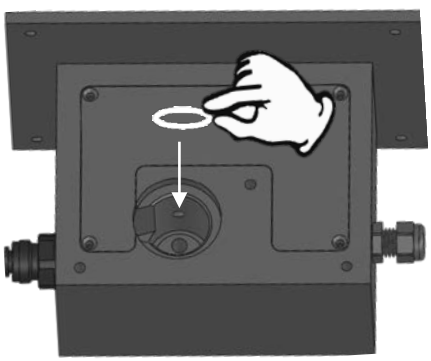
g) Preparing the reassembly of the O-ring seals and the borosilicate glass tub

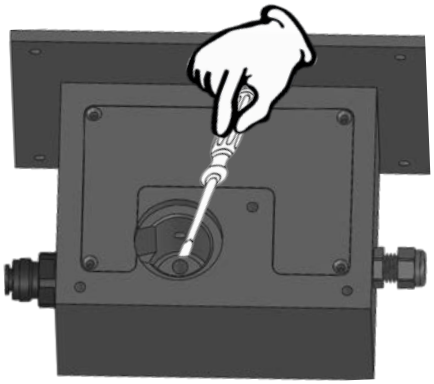
Perform coarse cleaning of the borosilicate glass tub underwater and without detergent and dry it without putting his fingers on the inner and outer surfaces of the glass tub. Do not dry with abrasive material! Preferably use a soft cloth.
Using the cleaning's paper kit for optic lens, finish cleaning the borosilicate glass tub, taking care not to touch the inner and outer surfaces with your fingers.

Do not reuse the O-ring seals and change them IMPERATIVELY by a new kit !

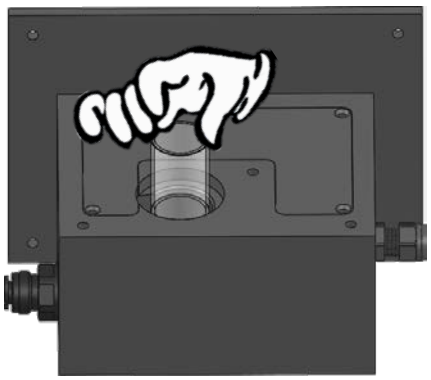
h) Reassembling the bottom O-ring seal and the borosilicate glass tub

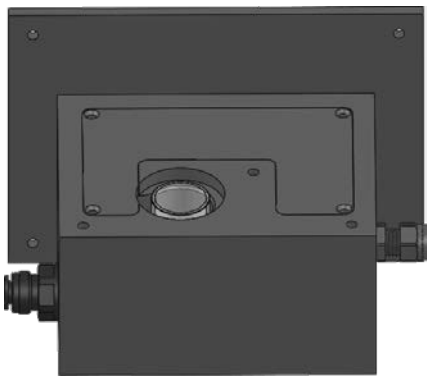
Proceed reassembling the bottom O-ring seal and place it in its inner imprint using the 3mm screwdriver...



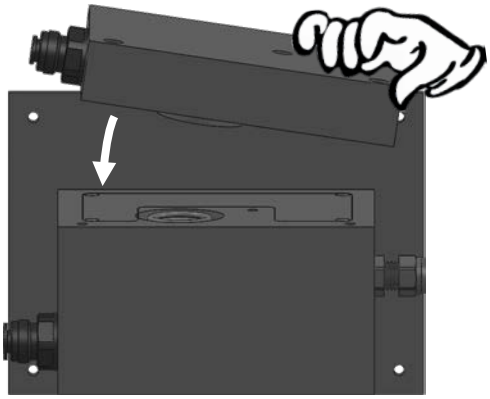


i) Reassembling the borosilicate glass tub without touching his surfaces in the opposite way to dismantling ...

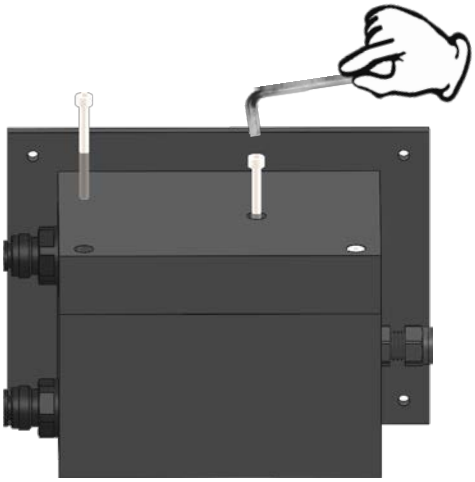


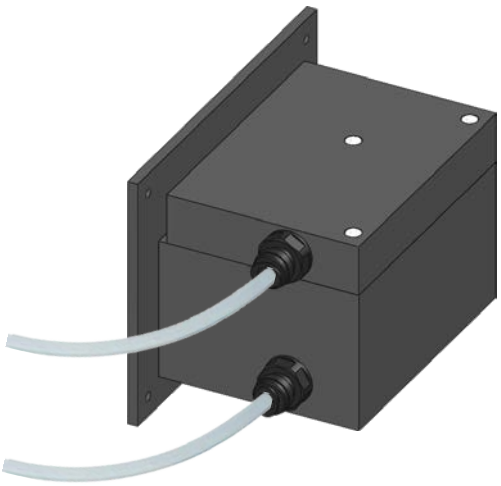


j) Position the upper O-ring seal on the turbidity probe's cover and position it on top of the lower block ...



k) Tighten the M4x40 fixing screws by "crossing mode operation" in order to balance the clamping force and to prevent breaking the borosilicate glass tub ..., then reconnect the tubings, fill the circuit with water and check the sealing.





If the zero value (small offset) is not automatically achieved, resume the maintenance procedure and try to understand the reasons of the malfunction! (Check the current error value to identify the origin of the fault ...)

2) Identification of error currents

The **SYCLOPE TURBIPOOL** ***Primary®*** turbidity probe is equipped with an automatic error detection system. In case of malfunction, an output current is automatically generated depending on the type of error encountered.
Of course, an interpretation of the result must be performed by the user in order to diagnose the possible reasons of the malfunction.
To perform this test, the probe must normally be connected to the SYCLOPE device and connected to the sampling circuit.
In normal operation, the turbidity probe generates a proportional current output according to the chosen range.

Generated current (mA)	Probable reason(s) of the malfunction
4...20mA	Normal working. The generated current (Igen) is proportional to the turbidity measured according to the range of the probe: For a turbidity probe with a range of 0...10NTU (EM), If the turbidity measurement (Meas.) is 5,00 NTU, the theoric generated current will be: I(gen) = [(Meas./EM) * (20 – 4)] + 4 means 12mA In fact, a small offset is automatically generated by the probe for balancing the mechanical errors and to be sure the signal will be over 4mA minimum. A zero calibration must be performed with distilled water (see calibration procedure)
2,4mA fixed	Significant anomaly detected by the integrated processor. Check the following points: • Internal sealing of the turbidity probe (Linkage around the borosilicate glass tub) (Borosilicate glass tub broken) • Borosilicate glass tub obstructed, striped or very dirty • Electronic circuit destroyed or water inside If the turbidity probe cannot be repaired, please send it back to your reseller or by fault, to the manufacturer address.
3,8mA fixed	Malfunction of the optical measuring system. Check the following points: • Cleanliness of the borosilicate glass tub (Proceed to internal cleaning according maintenance procedure)
22,5mA fixed	Excess of measurement or exceeding the scale of measurement Check the following points: • Cleanliness of the borosilicate glass tub (Proceed to internal cleaning according maintenance procedure) • Moisture deposit on the measuring glass tub or on the internal optics (Proceed to internal cleaning according maintenance procedure) (Check the presence of moisture on the glass tub and clean it, look for the origin of the phenomenon, check the ambient temperature and the fluid temperature ... • Operating error of a sensor or IR transmitter After checking, if the fault persists, please send back the probe to your reseller or by fault, to the manufacturer address.

CE Compliance declaration

Designation of the products : SYCLOPE TURBIPOOL *Primary*®

Declaration :

SYCLOPE Electronique SAS, Z.I. Aéropole Pyrénées in SAUVAGNON - France -, hereby certifies by the present that the following types of turbidity probes for swimming pools applications are in conformity with the standards and safety as defined by the European directives 2014/35/UE (Low voltage directive), 2014/30/UE (Electromagnetic compatibility) and 2011/65/UE (RoHS2 directive).

The present declaration is valid for all of the specimens manufactured after the date of this certificate and according to the original documents of manufacture.

The following harmonized standards were used for the examination:

2014/35/UE : **EN61010-1 : 2010**
Safety requirements for electrical equipment for measurement, control, and laboratory use
Including following derivatives : IL, RU, US and CA.

2014/30/UE : **EN61326-1 : 2013**
Electromagnetic compatibility (EMC Directive).

2011/65/UE : **EN 50581 : 2013**
RoHS2 Directive (Limitation of dangerous substances).

Date of the first sale : 2017, February

The present declaration engages the responsibility of :

SYCLOPE Electronique

SYCLOPE Electronique S.A.S.
Z.I. Aéropole Pyrénées
64 230 SAUVAGNON

Represented by :

Georges BRETON
President

Sauvagnon : 18/03/2017

CE

NOTES

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