

1. General

In modern swimming pools and water treatment plants, the water quality is guaranteed by automatically operating measuring and control devices. Since the quality of registering data is a decisive base for an accurate control of water quality, it is important that the conditions of measuring remain constant. Sampling station PM 01 has been developed to record and register data of free chlorine, pH value, and ORP (REDOX). On the basis of this data the quality of water is maintained by an electronic controller TOPAX.

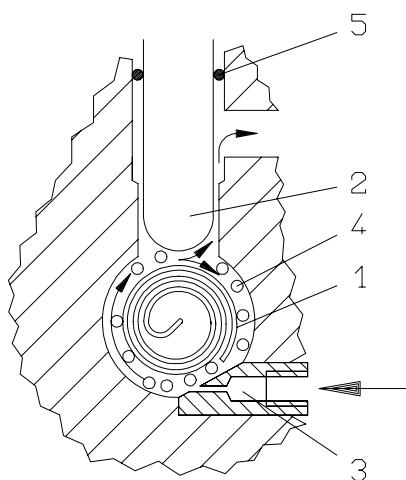
2. Functions

The sensors are set in a translucent (acrylic) multi-function instrument block (see drawing on page 2). The following functions can be performed in detail.

2.1 Measuring of Free Chlorine

For measuring free chlorine at sampling station PM 01 the potentiostatic method is applied, using a 3-electrode-system (Gold-KCl-Stainless Steel). This measuring principle is registering only free chlorine, due to a special evaluation-electronic in the amplifier. Other ions, that generate a zero current when applying an amperometric sensor, will be ignored. Therefore potentiostatic operating sensors do not require a zero-point calibration.

The free chlorine sensor at the sampling station PM 01 contains glass balls that move and rotate in the stream of sample water (see below sketch). Through hitting the electrodes any residuals are removed continuously. Thus manual cleaning of the electrodes in certain intervals is not necessary. After an initial phase of a few hours the electrodes ensure a long term, stable measurement of free chlorine.



Legend:

1. Gold electrode
2. Reference electrode
3. Nozzle for tangential water supply
4. in water rotating glass balls
5. O-ring for centering of reference electrode

2.2 Measuring of pH value, ORP, and Temperature

The acrylic instrument block houses hole locations to accommodate combination electrodes for pH and ORP measurement and a Pt-100 temperature sensor. The sensors are installed in the block by means of the supplied plug connectors.

During calibration, those sensors are removed and placed outside the instrument block into the pipe holders.

2.3 Hydrostatic Flow Control

The flow of sample water will be adjusted at the DN2-5 needle valve. An overflow at the acrylic instrument block ensures a steady flow of sample water and allows entrained air or gas bubbles to escape. This guarantees a steady cleaning of the electrodes and consistent measuring of data. The sensor requires a sample water flow of about 45 l/h, the needle valve is normally set to approx. 50 l/h.

2.4 Sample Water Filter

Integrated in the acrylic instrument block is a filter (mesh 0.5 mm) for cleaning the sample water from

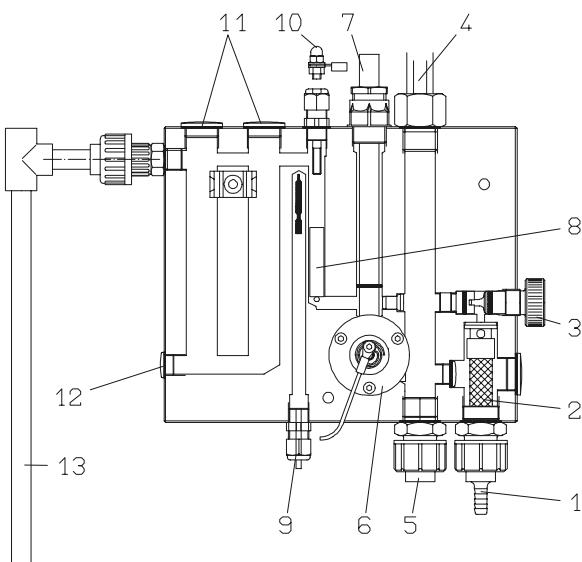
minor impurities. If the sample water carries a high amount of residues, an additional filter (mesh e.g. 80µm) should be applied.

2.5 Flow Control

A float switch in the acrylic instrument block indicates a sufficient amount of sample water for a reliable measurement of free chlorine. At sufficient flow the magnet in the float body closes a reed contact. If, for any reason, a shortage of sample water occurs, the reed contact opens. This allows the controller to shutdown valves and metering pumps that are part of the control circuit. Thus dangerous overdosage will be prevented.

2.6 Grounding

Quite often the measuring of free chlorine and of pH value is affected by static electricity and other outside current sources. To prevent measuring incorrect data the grounding pin at the instrument block should always be connected to known ground.



Legend:

1. Sample water input
2. Filter
3. Needle valve DN2.5
4. Overflow discharge/drainage assembly
5. Connection of overflow
6. Free chlorine sensor
7. Reference electrode for free chlorine
8. Flow indicator/switch with magnet
9. Reed contact
10. Grounding pin
11. Hole locations for pH combination electrode and ORP combination electrode
12. Hole location for temperature sensor Pt-100
13. Water outlet from sensor equipped with translucent PVC pipe for taking a sample

3. Routing of Sample Water

3.1 Water Inlet

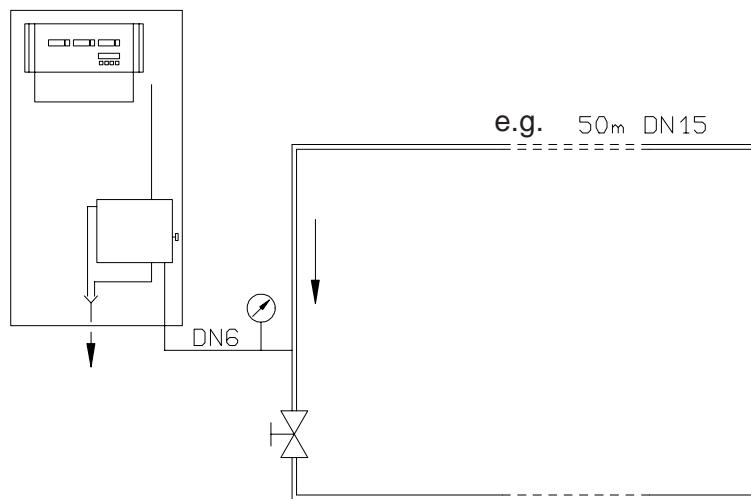
The sample water is delivered through plastic pipes or hoses, respectively, made from PVC or PE. Metal pipes must be avoided, since those will consume the free chlorine of the sample water. The measuring result would be incorrect.

The sample water is to be routed without delay from the sampling point to the sensor. Short dead times are achieved by using shortest possible hose lines with smallest possible diameter. A 50m DN6 line causes a dead time of about 2 minutes. If the hose diameter has to be widened to DN15 to avoid undesired pressure losses, the dead time will increase up to 10 minutes.

Therefore the installation shown below is recommended, when the distance between sampling

point and sensor is too far. The back pressure valve builds up the pressure, that is necessary at the needle valve of the instrument block for flow adjustment.

If the sample water can be expected to have a high amount of residuals, a separate filter (mesh e.g. 80µm) for the sample water should be applied (see installation examples). This occurs especially at outdoor pools with the sample water taken directly out of the pool. Blossoms and leafs from the pool water might block the small filter of the acrylic instrument block. The filter inset should be cleaned or exchanged, on a regular basis, to avoid incorrect measuring due to chlorine consumption in the 80µm filter.



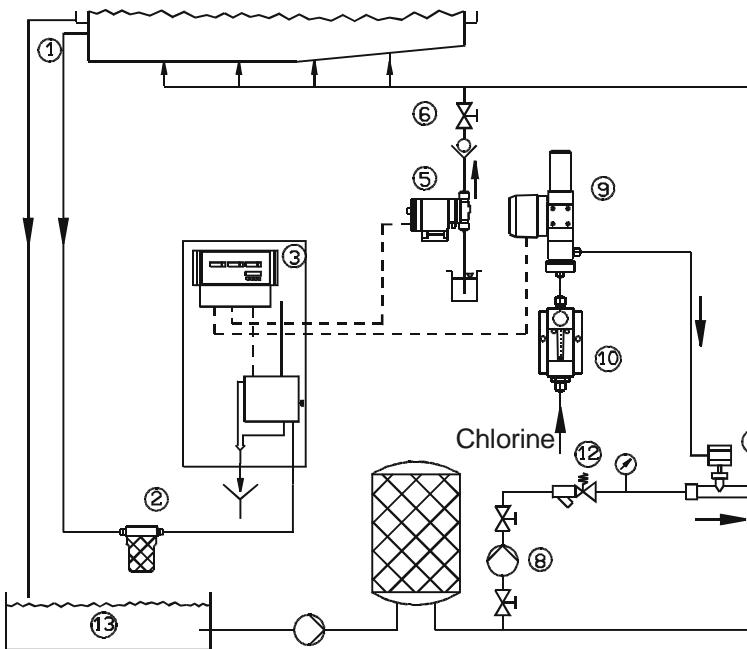
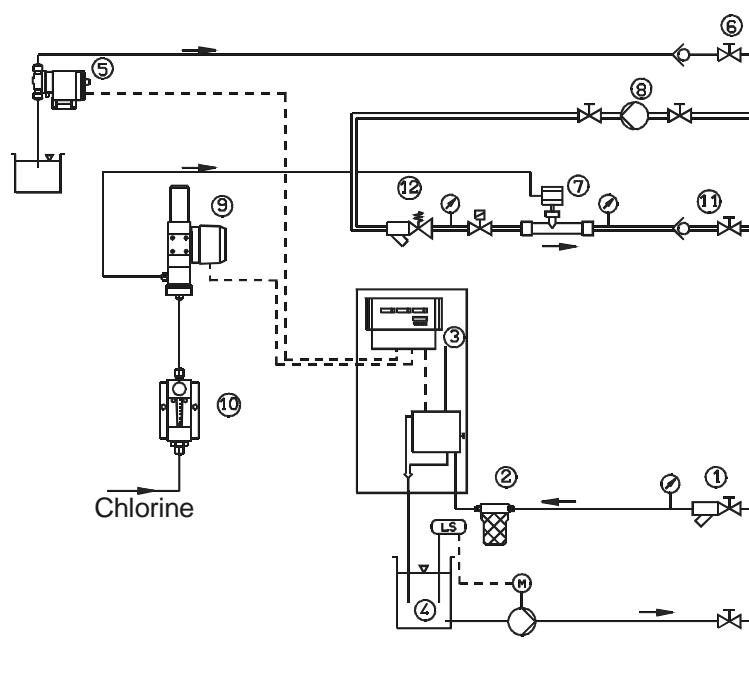
3.2 Water Outlet

The acrylic instrument block has outlets for two different water flows. One originates from the overflow, the other originates from the sensor. Both water flows are gathered at the sampling station with a collector hopper in the left lower corner. The water for the manual samples are taken from the translucent piece of PVC pipe at the sensor outlet. The water from the hopper must be released to the atmosphere. If the water shall be brought back into the system, a submersible pump must be installed in a reservoir (see installation examples).

4. Technical Data

Measuring Range (dependent on amplifier)	: 0 ... 1 mg/l 0 ... 2 mg/l 0 ... 5 mg/l 0 ... 10 mg/l
Electrode Materials	
Working Electrode	: Gold
Counter Electrode	: 316 Stainless Steel
Reference Electrode	: KCl-gelfilling
Waterflow, required	: approx. 50 l/h
Water pressure	
inlet	: 0.2...6 bar
outlet	: open reservoir
Filter mesh	: 0.5 mm

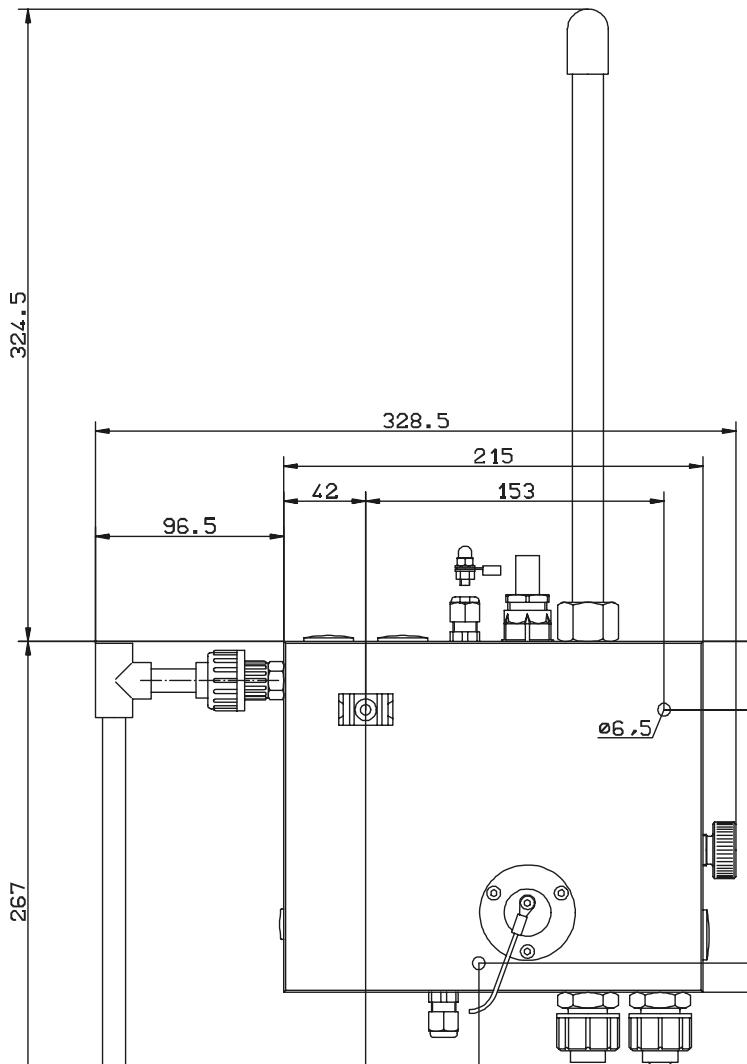
5. Installation example



Legend:

- | | |
|--|---|
| 1. Sampling point of water | 7. Ejector with non-return valve |
| 2. Filter (mesh 80µm) | 8. Booster pump |
| 3. Sampling Station PM01 | 9. Control valve for chlorine gas |
| 4. Pump for recirculating sample water | 10. Flow meter for chlorine gas |
| 5. Metering pump pH correction | 11. Injection point for chlorine solution |
| 6. Injection point pH correction | 12. Flow regulator assembly |
| | 13. Pool overflow reservoir |

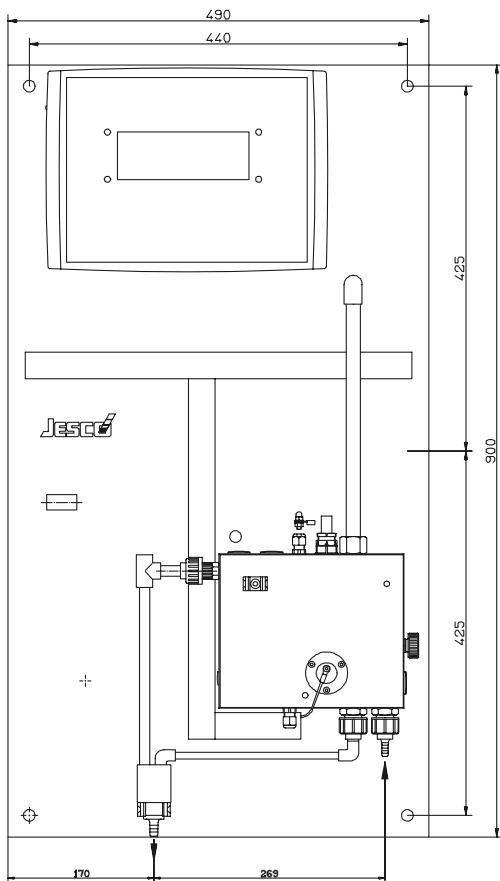
6. Dimensions



Instrument block with all components
except for reference electrode, pH and ORP combination electrode and temperature sensor
Sampling water inlet:
hose socket for tubing Ø 6mm
Sampling water outlet 1:
PVC cemented connection Ø 12mm
Sampling water outlet 2:
Piece of tubing Ø 12mm
Part Number 34186

Appropriate sensors:
Reference electrode with 1.5m fixed cable and o-ring for centering in acrylic block
Part Number 41100060
pH combination electrode with 1.5m fixed cable and BNC plug
Part Number 41100007
ORP combination electrode with 1.5m fixed cable and BNC plug
Part Number 41100015
Temperature sensor pT100 with 2.5m fixed cable
Part Number 41100022

Potentiostat



Sampling Station PM01

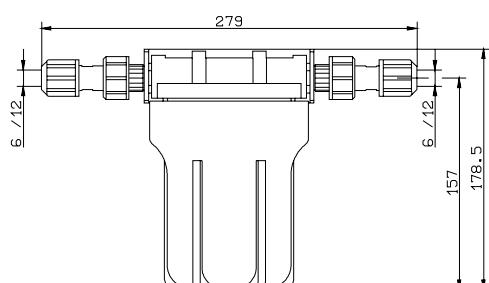
Instrument block mounted on wall plate prepared for installation of TOPAX controller.
without reference electrode, pH and ORP combination electrode, temperature sensor.
Sampling water inlet:
hose socket for tubing ø 6mm
Sampling water outlet:
hose socket for tubing ø 9mm
Part Number: 34194

Sampling Station PM01 plus TOPAX 6

equipped with input amplifiers and sensors for measuring
* free chlorine
* pH value
* ORP
Part Number: 23700400

Sampling Station PM01 plus TOPAX 6

equipped with input amplifiers and sensors for measuring
* free chlorine
* pH value
* ORP
* temperature
Part Number: 23700404



Separate Sample Water Filter (mesh 80µm)

with connections for tubing d 6/12 incl. wall bracket
Part Number: 23733816

80µm Spare Cartridge

Part Number: 33817

