

During installation and operation the valid national regulations of the corresponding country have to be observed as well as the specified maintenance, service and calibration intervals. When working with chlorinated liquids and solutions safety glasses and protective clothing must be worn. Make sure that the measuring equipment and its periphery are only operated by qualified and authorized personnel. The sensor may only be operated within the given measuring range. An electrolyte is used with the sensor. Skin contact and intake of the electrolyte has to be avoided as it is noxious and might cause damage to your health.

General

The total chlorine sensor GCM serves to determine the total chlorine concentration of potable water, pool water or water of comparable quality. The sensor is mounted to the sampling station DCM 01. The TOPAX NT serves as measuring and control unit.

Only by using the sampling station DCM 01 the desired inflow parameters are achieved which are necessary for a safe operation of the sensor. Air bubbles in the sample water may cause false measuring results and have to be avoided. The sampling station DCM 01 must be operated in a pressureless condition. For monitoring the flow a flowmeter is provided which opens a contact when no flow is present. This contact sets the control of the connected TOPAX NT to 0 % thus avoiding undefined metering. The total chlorine sensor has to be serviced and checked for impurities, plant contamination and air bubbles regularly. Impurities can be removed by means of a water jet.

Design and function

The chlorine measuring cell consists of two main parts: electrode shaft and diaphragm cap. The diaphragm cap is filled with an electrolyte and serves as a measuring chamber into which the measuring electrodes are submerged.

The measuring chamber is isolated from the sample medium by means of a microporous diaphragm. The chlorine sensor is a diaphragm-covered amperometric two-electrode probe. The working electrode is a platinum cathode and the counter electrode is a silver anode. The sensor signal is almost independent of the pH-value in the operational range of the sensor.

The amplifier electronic unit is located in the upper part of the shaft. It converts the primary sensor current into a constant current of 4...20 mA. The connection to the subsequent measuring device is



accomplished by means of a two-core cable, which means that the voltage supply of the amplifier electronic unit is achieved by means of the connected measuring and control device TOPAX NT. The measuring value is temperature compensated by means of the amplifier electronic unit.

The values for total and combined chlorine are displayed on the TOPAX NT.

Mounting

When working with chlorinated liquids and solutions always wear safety glasses and protective clothing. During mounting the following instructions have to be observed:

- Diaphragm and electrodes must not be touched or damaged.
- The electrolyte is light-sensitive which means that the electrolyte bottle must be kept closed after use.
- The electrolyte must not be poured into a light-permeable container.
- When filling in the electrolyte, bubbles must be avoided.
- The electrolyte should not be stored for more than one year (refer to label for manufacture date).
- The diaphragm cap is to be used only once.

Start-up

First the diaphragm cap of the sensor is filled with electrolyte. Make sure that no bubbles are formed during filling. Open the electrolyte bottle for this purpose and screw on the spout. Tear off the flap valve and blow out the excess air. Then attach the complete electrolyte bottle to the diaphragm cap and slowly squeeze the electrolyte out of the storage bottle. At the same time pull back the storage bottle steadily. The diaphragm cap is completely filled up if the electrolyte reaches the lower turn of thread. Now attach the electrode shaft vertically to the diaphragm cap and screw it on as far as it will go. Do not touch the tubeseal with your fingers. The excess electrolyte escapes through a drill-hole in the groove of the diaphragm cap below the tubeseal. Remove the escaped electrolyte using a smooth cloth after screwing together.

Mount the sensor now filled with electrolyte to the sampling station.

Electric connection

The chlorine sensor is connected to the TOPAX NT using a two-core cable. For the correct polarity, see wiring diagram.

This two-core connection cable provides for the voltage supply of the amplifier electronic unit of the sensor and at the same time transmits the output signal of the sensor to the TOPAX NT.

CAUTION!!

The output signal is not electrically isolated.

For connecting the cable to the sensor turn the upper part of the measuring cell counterclockwise by 90° and pull it off. Then unscrew the PG 7 screw fitting, insert and connect the cable.

Please observe the correct polarity:

1 = positive (+)

2 = negative (-)

Tighten the PG 7 screw fitting, press the upper part completely into the housing and turn it clockwise as far as it will go.

The sensor needs a certain run-in time in order to achieve a stable measuring value. It is therefore recommended to completely install the sensor, to switch it on and to operate it with sample water 24 hours before startup.

Calibration

When using the total chlorine sensor for measuring total chlorine a one-point calibration of the TOPAX NT is required. The total chlorine content has to be determined using a suitable chlorine calibration instrument according to DPD method 4 and has to be set in the corresponding menu. Calibration has to be repeated regularly if necessary.

Shut-down

If measurement is not necessary for a longer period (e.g. during winter time in outdoor pools) the sensor has to be taken out of operation. For this purpose the sensor is taken from the power supply and removed from the fitting. Unscrew the diaphragm cap and empty the electrolyte into drain. Rinse the electrodes and the diaphragm with clean water and let them both dry in dust-free environment. Screw the diaphragm cap back onto the sensor to protect the electrodes during storage.

Technical data

Measured variable	total chlorine (free and combined chlorine)
Measuring range	0.02 to 2.00 mg/l
Resolution	0.02 mg/l
pH range	5.5 to 9.5
Temperature range	5 to 45 °C (temperature compensated)
Storage temperature	frostfree between 5 and 50°C
Inflow	
min.	20 l/h
max.	100 l/h
recommended	30 l/h (sampling station DCM01)
Cross sensitivity	bromine, iodine, ClO ₂ lead to measuring errors typically 1 year depending on water quality
Operation life	typically 1 year depending on water quality
Supply voltage	16 to 24 VDC; min 35 mA at 16 VDC
Output signal	4 to 20 mA
Protection class	IP 65

Maintenance

In order to ensure a trouble-free operation the sensors have to be tested regularly. The indicated value of the sensor has to be checked by means of an appropriate chlorine calibration instrument (DPD 4) and should be reset on the TOPAX NT if necessary.

Regulations and standards

The total chlorine sensor is tested according to EG-EMV RL 89/336/EWG, 91/263/EWG, version 92/31/EWG regulations and according to the basic standards EN 50081-1 and 50082-2.

Measuring and control unit TOPAX NT

The total chlorine sensor GCM is mounted to the sampling station. The measured value is displayed on and processed by the TOPAX NT. For adjusting the TOPAX NT, see the operating and maintenance instructions BW 46110 (TOPAX NT). The total chlorine measurement is a TOPAX NT special function and is carried out in relation with the pH-value measurement, the free chlorine measurement and the temperature measurement. For activating the total chlorine measurement you have to set point "3" in the menu item "Special functions compensation". By means of this menu item all other setting functions of the TOPAX NT are enabled which are necessary for the measurement and control tasks.

Connect the total chlorine sensor to the TOPAX NT according to the wiring diagram. Input E7 is used as measuring input. This input is implemented as control function in the TOPAX NT and can be set according to BW 46110 .

Output Y22 is provided as output relay for setting "Pulse frequency", "Pulse length" or "ON/OFF".

Order data

Order number	
Sampling station type DCM 01	23700701
Total chlorine sensor type GCM	23700751
Electrolyte for total chlorine sensor	35341
TOPAX NT-Standard	46102001

Connection diagram TOPAX NT and sensors

