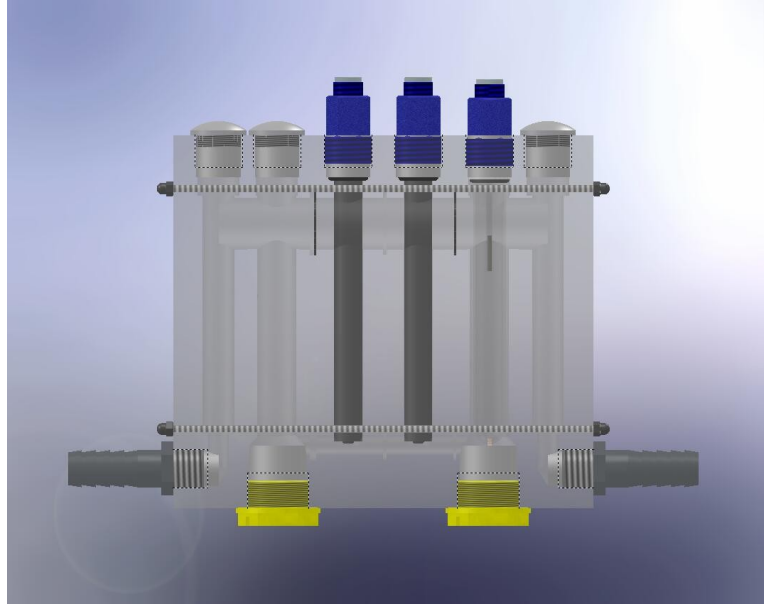


Cell for selective measurements of sulphur dioxide, metabisulphites, sulphites and other reducing substances, high and low concentrations

Sensors for reducing substances in aqueous solutions including special electrodes and peculiar operating features; their selectivity, sensitivity, accuracy and reliability cannot be easily found in other analysers presently available in the market. Mod.604-R0 cells are designed for applications where selective and accurate measure of reducing substances is a basic issue because the concentration to be detected is very low, or very high, or because high reliability for long operating periods with no maintenance needs is required. These cells are also suitable for measurements in sea water. These sensors are made of a polycarbonate chamber that houses the measuring electrode, the counter electrode, the reference electrode, the optional temperature sensor for measurement



thermo compensation and the system for automatic sample flow rate adjustment. The electrodes are directly immersed into the sample that flows in the chamber with a constant flow rate, controlled by the cell itself; the electrodes are kept clean and active by the movement of the sample itself.

Typical applications of these cells are in food and beverage industry (i.e. for the measure of metabisulphites, sulphur anhydride and sulphites), drinking water plants (i.e. when removing chlorine with a reducing substance) in oenology, in textile industry, in tanneries wastewater treatment plants, in chromium plating wastewater treatment plants.

Advantages

- **Small dimensions, sturdy execution**
- **Three electrodes polarographic cell**
- **High selectivity to different oxidising substances**
- **Remarkable linearity and repeatability**
- **High immunity to interferences**
- **No drift**
- **Self-adjusted sample flow rate**
- **Detector for the absence of sample flow into the cell**
- **Very little maintenance requirements**
- **Measuring range: 0-2000 ppb, 0-10 ppm, 0-2000 ppm**

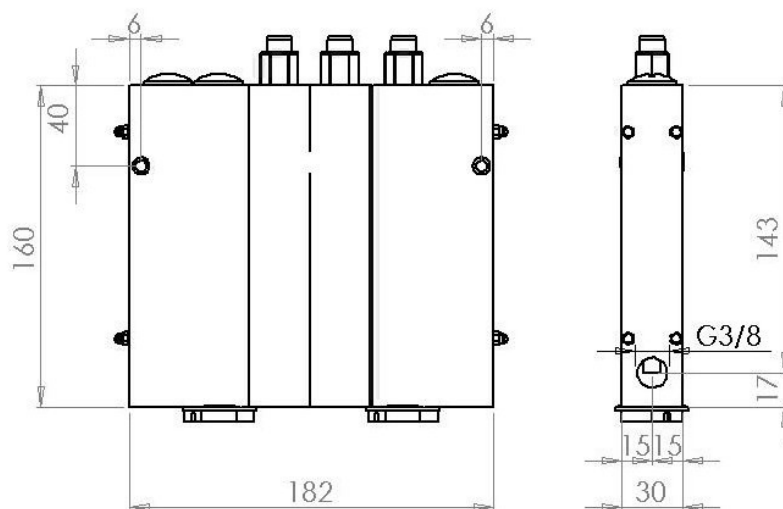
604-R0

Operating principle and realization

Mod.604-R0 measuring cells include three electrodes: measuring electrode, counter electrode and reference electrode. The counter electrode imposes a fixed potential to the measuring electrode where the reducing substance is oxidised. The oxidation of the measured substance at the measuring electrode causes a current flow that is proportional to the concentration of this substance in the sample. The polarization voltage impressed across measuring electrode and counter electrode and the proper amplification factor makes the cell selective to different reducing substances. The cell is absolutely free of unwanted effects like corrosion of the electrodes: noises due to these phenomena are so forth completely avoided even in critical applications like sea water measurements, wastewater applications and measures at high concentrations. Mod.604-R0 cells are made of a polycarbonate chamber that houses the counter electrode (C), the reference electrode (R) and the working electrode (W), the optional temperature sensor, the optional flowswitch and the system for the automatic adjustment of the sample flow rate. The special hydraulic design inside the cell assures high precision of the measure by keeping constant the flow rate of the sample inside the cell with no regard to the process sample flow rate. The electrodes are kept active and clean by the action of the sample flow itself, thank to the measuring chamber design.

Technical Specifications

Body material:..... PC
Electrodes, C and W:..... inert material
Reference electrode R:..... calomel (for very difficult applications)
Operating temperature limits: 5 to 60 °C
Storage temperature limits: -10 to +60 °C
Measuring ranges:..... 0.00÷2000 ppb, 0.00÷10 ppm, 0.00÷2000 ppm
Accuracy :..... ±2% f.s.
Max distance cell/transmitter: 5 m
Connection cable:..... coaxial cables, 5 m, included in the supply
Process connections: 3/8" F
Sample flow rate:when the sample flowrate is higher of 280 l/h sample flowrate variations
..... have no influence on the measure;
.....if the sample flowrate is lower than 280 l/h either enable the flowrate adjusting system of the cell
.....or keep the sample flowrate to the cell constant. Minimum sample flowrate is in any case 60 l/h
Operating pressure: max 2 bar
Max. salt concentration :..... 100 g/l of chlorides for 0÷2000 ppb and 0÷10 ppm, no limit for 0÷2000 ppm
Max.concentration for iron salts Fe(II) and Fe(III):..... 1 ppm as Fe
Max.allowed sample hardness:..... 10°f; above this value a frequent electrodes cleaning may be required
Response time:..... 60" for increasing measures (to reach 90%of final value)
..... 90" for decreasing measures (to reach 90% of final value)
Dimensions:..... w.182 x h.160 x d.30 mm
Fixing holes:..... ∅ 5 mm, 170 mm distance between centres



604-R0

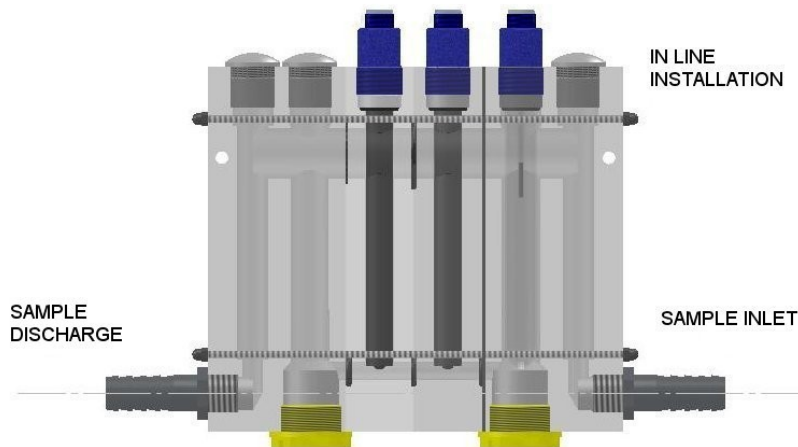
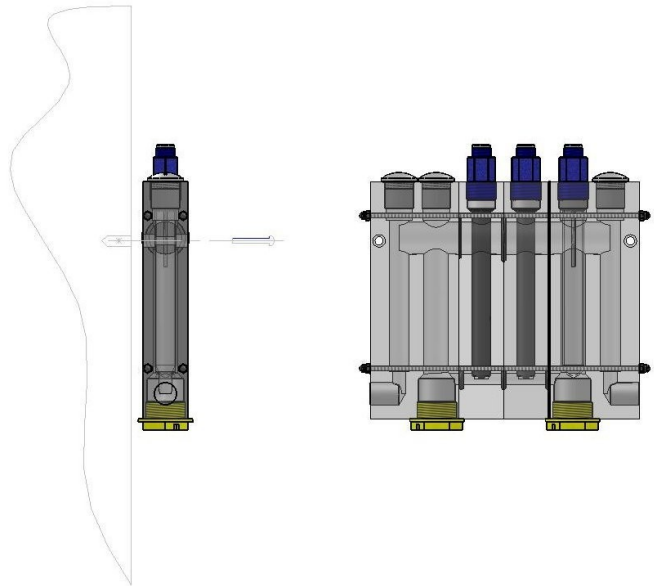
Installation, Maintenance and Calibration

The cell must be installed within 2-3 m from sample withdrawal point.

The cell is designed to be wall mounted through two screws $\varnothing 5 \times 50\text{mm}$; process connections are 3/8". Mod.604-R0 cells are suitable to be installed either in through flow arrangement, with automatic sample flowrate adjustment system or directly in line (max. allowed pressure 2 bar).

The special hydraulic design inside the cell allows to assure measure accuracy keeping the flowrate inside the chamber of the electrodes constant with no regard to sample flowrate variations at the inlet of the cell (sample flowrate adjustment system): if this system is enabled there is no need for adjusting the flowrate that enters the cell (that must however be higher than 60 l/h).

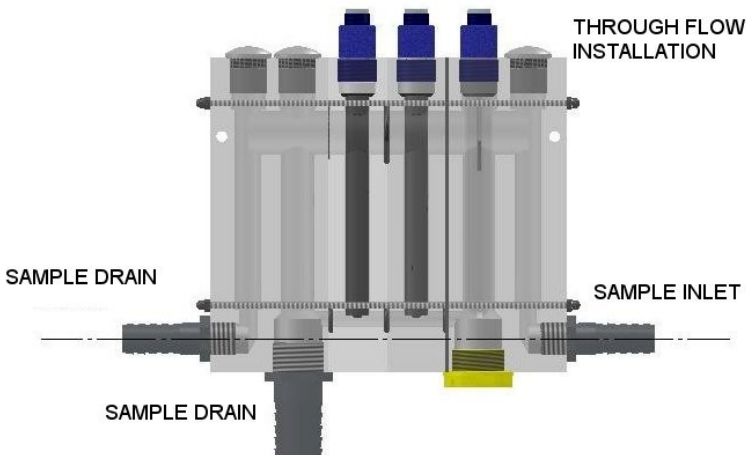
On the other hand if the sample flowrate adjusting system is disabled the sample flowrate to the cell must either be higher than 280 l/h or must be fixed to a very constant value (inside the limits 60 to 280 l/h).



The presence of iron - Fe(II) and Fe(III) – in the sample at a concentration higher than 1 ppm may cause malfunctioning of the cell because iron may react with the electrodes. Mod.603 cells only require a periodic check of calibration and the cleaning of the electrodes. To clean the electrodes only stop the sample flow rate, unscrew the electrodes from their housings, clean the sensitive end of each electrode by immersing it in a diluted HCl solution. Rinse with tap water.

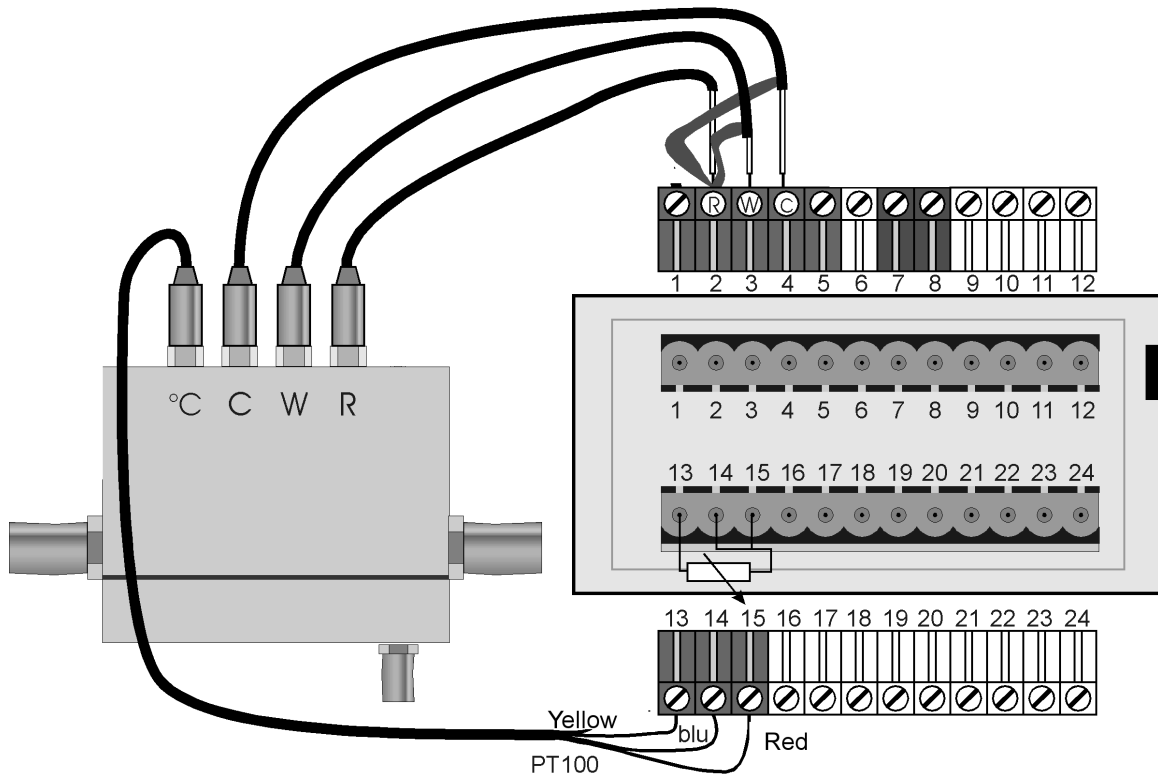
For cell conditioning and the following calibration it is enough to allow the process fluid flow through the cell for at least 30 minutes. "Zero" calibration is operated allowing a sample free of the substance in measure to flow into the cell. For the calibration of sensitivity introduce the substance to be measured. After the stabilization of the measure, compare the obtained value with that of a colorimeter or another proper analytical method with precision and repeatability in accordance with process requirements, and always better than 2%.

For high concentration measures calibrate P1 at a concentration that is approx. 50% of the process standard value, and calibrate P2 at a concentration that is approx. 50% more than the process standard value.



604-R0

Electrical connections for Mod.604-R0 cell



Spare parts for Mod.604-R0 cell

Reference electrode for very difficult applications (calomel).....	Mod.301GEL0B1A0M0
Measure electrode, W	Mod.201/GV-PG
Counterelectrode, C	Mod.201/GV-PG
Cable for the connection of the electrodes to the instrument, 5 m (for R, W and C).....	Mod.CV/S7-5
Temperature sensor (for 603CxxA).....	Mod.T0A2B0F0
Cable for the connection of the temperature sensor to the instrument, 5 m.....	Mod.CV/6009-S7-5
Flowswitch.....	Z08
Cable for flowswitch.....	CV-S7-5
Set of 2 O-ring (sealing of the cell modules).....	OR-3106+OR109
Disc, flowrate control exclusion.....	PMV/P71