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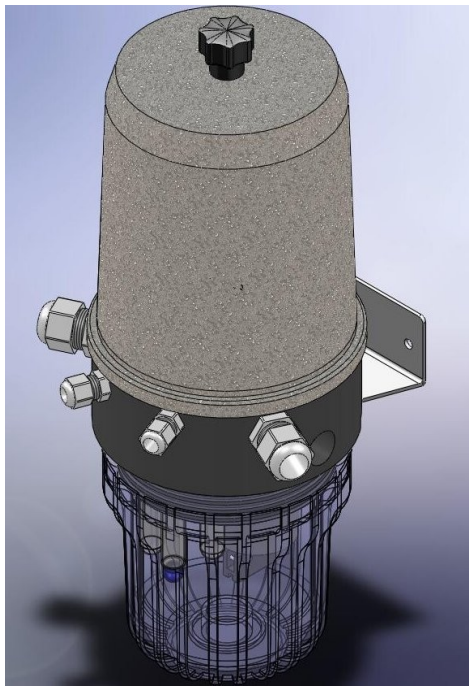
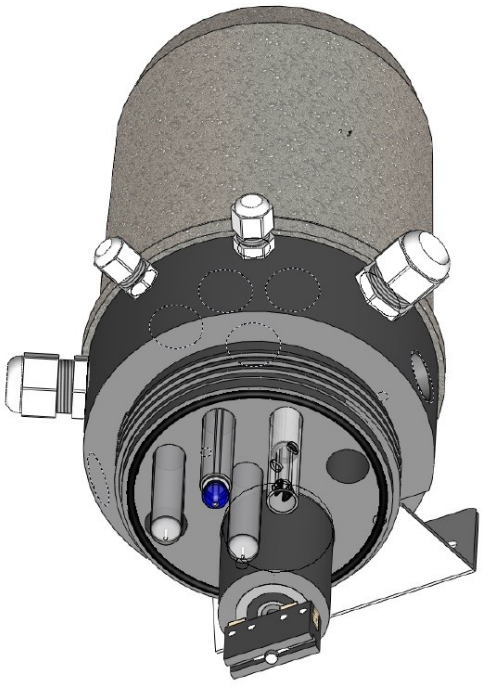
Self cleaning cell for selective measurements of chlorine, chlorine dioxide, chlorite, ozone, peracetic acid, bromine, hydrogen peroxide, permanganate and other oxidising substances at high and low concentrations



Sensors for oxidising 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.
The mechanical electrodes de-passivation system allows the use of these cells in all those applications where traditional cells could not work because of the presence of fouling substances that would deposit on the electrodes rapidly making the measure unreliable.
Mod.606 cells have been designed for applications where selective and accurate oxidant analysis 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. Another typical application of this cell is for oxidising substances measurements in sea water.
These sensors are made of a polycarbonate through flow chamber that houses the measuring electrode, the counter electrode, the reference electrode, the optional temperature sensor for measurement thermo compensation and the brush for mechanical electrodes depassivation. 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 action of the brush.
Typical applications of these cells are in drinking water plants, food and beverage industry, bottled waters industry, sea water swimming pools, thermal springs swimming pools, once through cooling systems, recirculating cooling systems, fish breeding and seafood breeding, wastewater treatment plants, paper mills and hospitals.

Advantages

- **Sturdy execution**
- **Three electrodes polarographic cell**
- **High selectivity to different oxidising substances**
- **Remarkable linearity and repeatability**
- **High immunity to interferences**
- **No drift**
- **High measure stability along the time**
- **Electrodes depassivation through the action of a brush**
- **Good reliability even in presence of fouling and scaling substances**
- **No maintenance required**
- **Measuring range: 0-2000 ppb, 0-10 ppm, 0-2000 ppm**



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Operating principle and realization

Mod.606 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 oxidizing substance is reduced. The reduction 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 make the cell selective to different oxidising 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.
The reference electrode can be selected among two versions so that the cell can be used in very harsh applications.
Mod.606 cells are made of a polycarbonate through flow chamber that houses the counter electrode (C), the reference electrode (R) and the working electrode (W), the optional temperature sensor and the brush. Optionally the cell can house other 2 electrodes, e.g. pH, ORP electrode or a conductivity cell with 12 mm diameter or solution ground contact.
The electrodes are kept active and clean by the action of the brush, moved by an electrically actuated ratiomotor, installed in the cell head (24 Vac, 110 Vac, 220 Vac or 24 Vdc) actuation.
Shaft and brush support are normally made od Stainless Steel, AISI 316; they are howevere availble also in Hastelloy, suitable to withstand harsh applications.

Technical Specifications

Body material:.....PC
Materials at contact:.....PC, PTFE, PVC, Stainless Steel (optionally Hastelloy instead of SS)
Counterelectrode and Working electrode, C and W:.....inert material
Reference Electrode, R (with salt bridge):.....calomel (for the use in specific and harsh conditions) or
.....silver/silver chloride, according to selected order code
Brush material:.....PTFE/glass
Operating temperature Limits: ..... 5 to 50°C
Storage temperature limits: ..... –10 to +50 °C
Measuring ranges: .....0.0÷2000 ppb, 0.00÷10 ppm, 0.0÷2000 ppm
Accuracy :.....±2% f.s.
Max distance cell/transmitter: .....5 mt
Cables for the connection to the measuring instrument:.....shielded, 5m
Cable for ratio motor power supply: .....to be supplied by the user
Brush speed rate:.....1 RPM for 606Axxx(1,2 or 3)xx; 12 RPM for 606Axxx5xx
Power supply:.....606Axxx1xx: 24 Vac; 606Axxx2xx: 110 Vac; 606Axxx3xx: 220 Vac; 606Axxx5xx: 24 Vdc
Consumption:.....3 W
Process conncetions: .....1/2" F
Sample flowrate:.….sample flowrate does not affect the measure. It has to be adjusted so to obtain a correct
. response time and properly representative measure (number of sample renewals per hour) (e.g.20÷800 L/h)
Operating presure: .....max 2 bar
Max. salt concentration: .....no limitation for Cl^- concentration
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
Operating pH limits (only for measures of hypochlorites and chlorites):.....6.0 to 7.7 pH
Response time:..... 30” for increasing measures (to reach 90%of final value)
.....60” for decreasing measures (to reach 90% of final value) (Note 1)
Outline dimensions:.....132 mm diameter, 368 mm height
Fixing holes:.....5.50 mm diameter, distance between centres 85 mm

Note 1: these are the cell's response times. The transmitter has a smoothing function (it computes an average of measures during a sampling time) in order to avoid any reading fluctuation due to the action of the brush on the electrodes.

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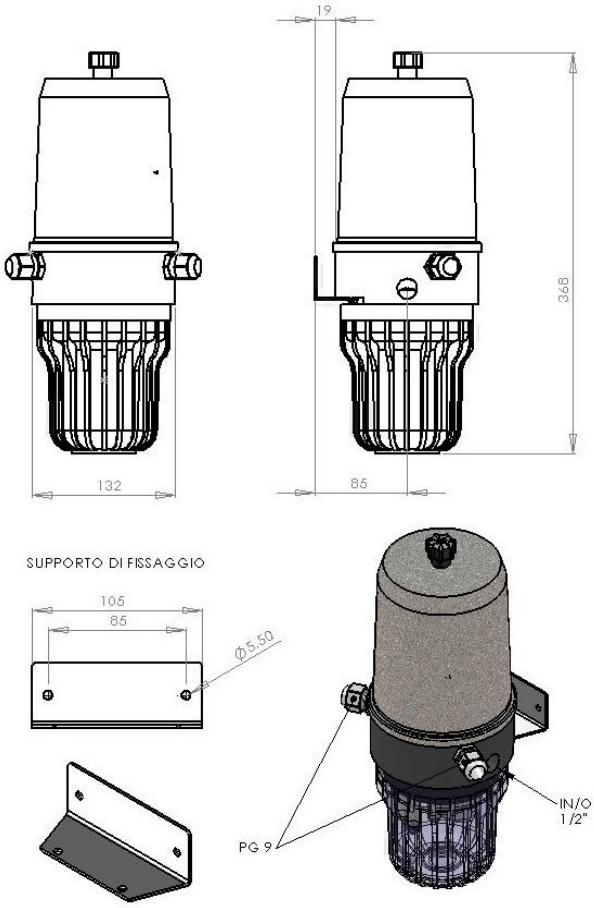
Installation, Maintenance and Calibration

The cell must be installed within 2-3 m from sample withdrawal point. The cell is supplied with bracket for wall mounting, through two screws ∅5 mm; process connections are ½" F.

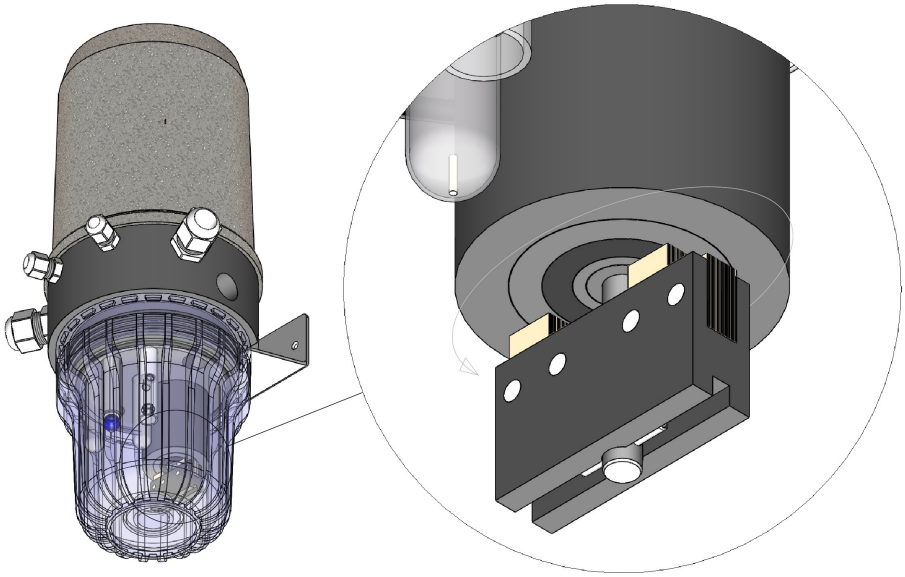
Mod.606 cells are suitable to be installed either in through flow arrangement or directly in line (max.allowed pressure 2 bar).

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.606 cells only require a periodic check of calibration and the cleaning of the electrodes (those not subject to the action of the brush) and measuring cell, that can be easily operated by flushing a proper solution (e.g. diluted acid, or other, depending on the measured solution) inside the through flow cell. On request the cleaning sequence may be directly managed by the electronic unit,Mod.µP, connected to the cell.



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 chlorine or other oxidant to be measured, to flow into the cell. For the calibration of sensitivity introduce chlorine (or other oxidizing substance that has to be measured) . After the stabilization of the measure, compare the obtained value with that of a colorimeter 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 around the process standard value.



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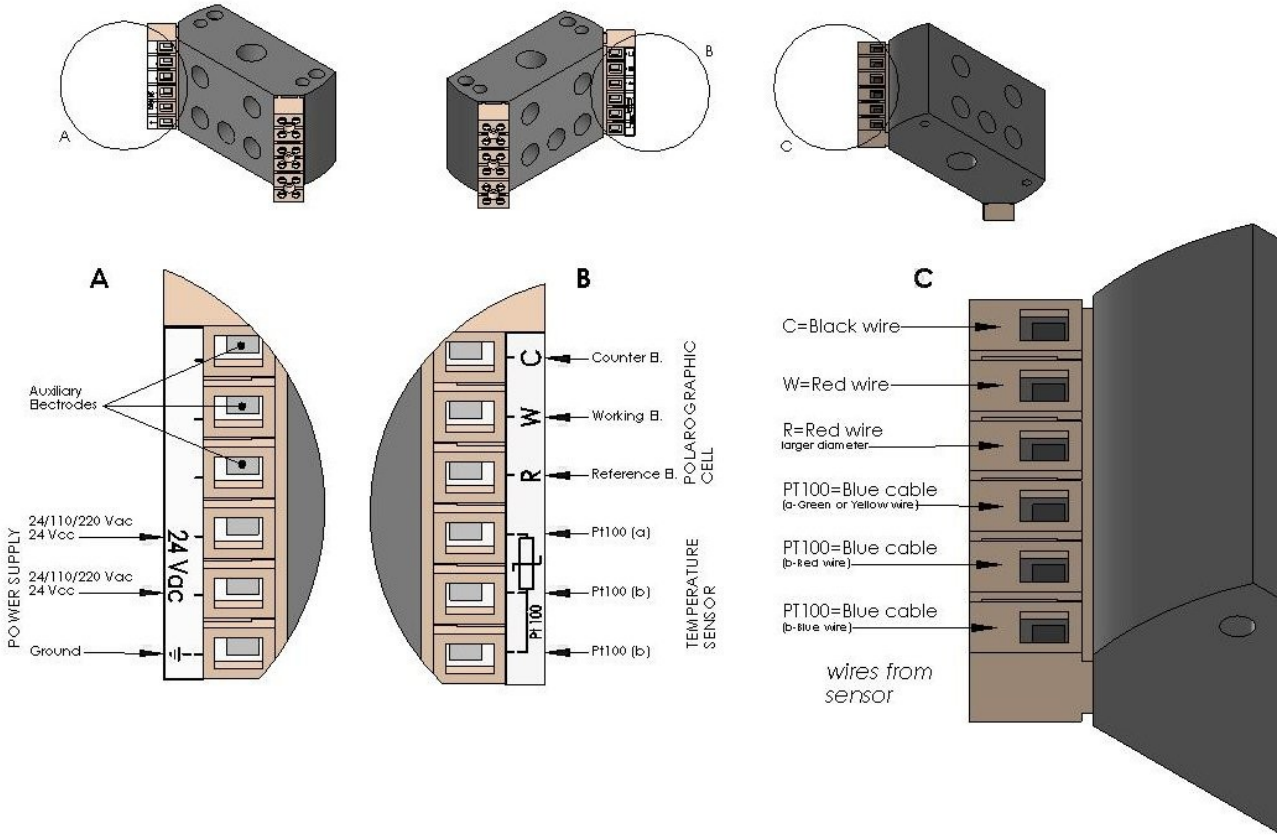
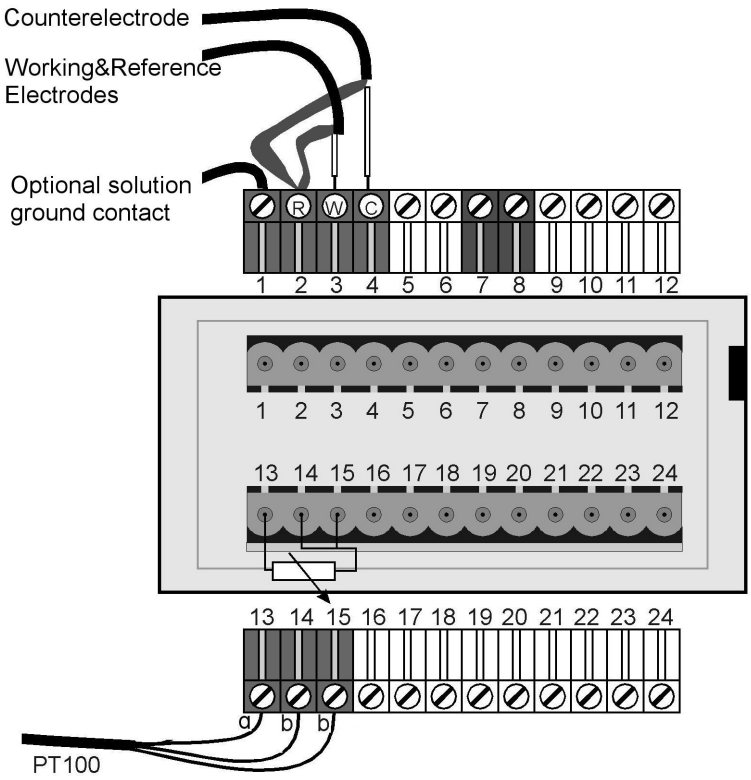
Electrical connections for Mod.606

Terminal board on 606 cell



Connections inside transmitter



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Order code Breakdown

	606	A	xx	x	x	x	x	x
Self-cleaning cell for select.meas. of oxidising subst.	606							
Fixed Code		A						
Measured Parameter								
Reserved			00					
Chlorine (Cl_2)			01					
Chlorine Dioxide (ClO_2)			02					
Chlorites (ClO_2^-)			03					
Ozone (O_3)			04					
Peracetic Acid (PAA)			05					
Bromine (Br_2)			06					
Hydrogen Peroxide (H_2O_2)			07					
Permanganate ($KMnO_4$)			08					
Oxidizing Power (Ox)			09					
Other			99					
Type of reference electrode (with salt bidge)								
Reserved				A				
Silver/Silver Chloride (Ag/AgCl)				B				
Calomel (Hg/Hg_2Cl_2)				C				
Special Execution				Z				
Mechanical cleaning actuator								
Reserved					0			
Electric, 24 Vac					1			
Electric, 110 Vac					2			
Electric, 220 Vac					3			
Electric, 24 Vdc					5			
Special Execution					9			
Temperature sensor								
Not included						A		
Included (also supplied a piece of CV/7025-SCH cable, 5 m length)						B		
Cable length for the connection to the transmitter								
Reserved							0	
q.ty 2 pieces, cable for electrodes, CV/5, ready for use, length 5 m							1	
Special execution							9	
Shaft and brush blocking pin material								
Reserved								A
Stainless Steel, AISI 316								B
No more available (Titanium)								C
Hastelloy								D
Special execution								Z

Spare parts for Mod.606

Reference electrode for very difficult applications (calomel).....Mod.301GEL0B1A0A0A
Reference electrode Ag/AgCl.....Mod.301GEL0A1A0A0A
Measuring Electrode, W and counterelectrode, C.....Mod.606-a31-3
Cable for the connection to the instrument, 5 m (for R and W).....Mod.CV/5
Cable for the connection to the instrument, 5 m (for C).....Mod.CV/5
Temperature sensor.....Mod.T0A2B0A0
Ratiomotor assembly, 24 Vac.....MK3A
Ratiomotor assembly, 110 Vac.....MK3B
Ratiomotor assembly, 220 Vac.....MK3C
Ratiomotor assembly, 24 Vdc.....MK3D