



SUBSEA CATHODIC PROTECTION SURVEYS

Ensuring the structural integrity of submerged metallic structures requires regular evaluation of the asset and any associated Cathodic Protection system. CP Surveys allow a system's ability to resist/avoid corrosion to be monitored, and any corrosion issues to be remedied before the onset of major failure. This is an area where PMAC have invested heavily in specialist proprietary monitoring equipment with sophisticated enhanced data acquisition hardware and management software.

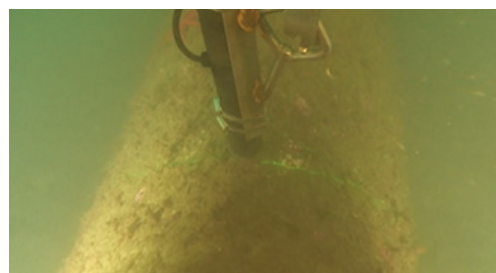
PMAC offer a complete subsea offshore Cathodic Protection Survey and Monitoring service to ensure the integrity of pipelines and other submerged metallic structures. This service is based on proven technology with highly developed hardware, software and supported by experienced technicians who hold recognised external certification to meet industry and legislative requirements.

The PMAC CPROS acquisition, processing and reporting software, used in conjunction with PMAC's experience, offers a choice of data reporting and interpretation methods, to meet the specific requirements of clients. Then reporting package uses innovative methods to reduce processing times and hence reduce reporting delivery times, making onboard data processing a real alternative to onshore reporting. PMAC also retain an extensive database of historical data which can be used to monitor CP trends to identify areas of interest throughout the design life of CP systems.

The system is controlled by a proprietary Software system allowing the user to measure, store and report in an integrated package. Advanced connectivity options allow configurable real-time gathered data to be freely passed from the PMAC CPROS PC to any other onboard system, such as the survey package or video overlay. Based on the use of the Twin Cells (TC) probe technique, the system gives real time data measurement for both subsea pipelines and structures.

Continuous Cathodic Potential (CP), Electrical Field Gradient (FG) readings and contact spot CP readings are all measured and logged simultaneously. Anode current outputs, estimated remaining life of installed anodes as well as pipeline current density profiles can all be calculated.

In addition to the 'Cell to Cell' methodology, the PMAC system can be used to perform Trailing Wire Surveys for instances of buried pipelines or assets lacking contact points. For pipeline land falls PMAC also offer CIPS/DCVG onshore surveys to complete surveys across beach areas upto test posts or where the pipeline connects to an onshore based protection system.



Our CP technicians hold specialist CSWIP Cathodic Protection and/or NACE certification at levels 2 or 3, as well as being Radiation Protection Supervisors enabling them to fulfil multiple roles on a vessel saving cost and bed space.

With Offices in Aberdeen and Singapore, PMAC operate globally and are licensed to operate radioactive Sources for FMD in various territories. PMAC are certified to ISO 14001:2015 / ISO 9001:2015 / ISO 45001:2018 as well as being Corporate Members of NACE and the Institute of Corrosion.



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SUBSEA DIGITIZER

The PMAC Subsea Digitiser utilises the latest technology adding increased reliability. With selectable outputs of RS232 and RS485, the bottle allows multiple configurations for various operational requirements. The electronic housing mounting allows the electronics package to be mounted on almost all ROVs from Observation to full Work Class, or even on deck (topside) if necessary for use with Micro/Mini vehicles. Data is measured by the subsea digitiser at a rate of 3 Hz allowing for 'fast' surveys up to a theoretical survey speed of 5.8 kn.

Calibrations on the electronics have an uncertainties confidence level of 95% and are all traceable to UKAS ISO/IEC 17025 certified testing and calibration laboratories. Power and comms are through a single connector at one end with the probe and a remote cell connection at the other end. The remote may be connected via its dedicated connection or via a pin in the power/comms connector depending on terminations of conductors in ROV umbilical for 'over the side' positioning or mounting on TMS/ROV.

TWIN-CELL PROBES

Compact and robust design mounting two changeable Ag/AgCl half-cells with a replaceable inconel tip for contact readings. Allows simultaneous measurement of Contact and Proximity Cathodic Potential (CP) and Electrical Field

Gradient (EFG or FG in $\mu\text{V}/\text{cm}$).
Material: Polyacetal
Weight: 1.8 kg approx



ACQUISITION /PROCESSING SOFTWARE

Windows based with extensive Graphic User Interface. Innovative processing package reduces processing and report delivery times. Advanced connectivity options to other onboard systems such as the survey package or video overlay. The system is controlled by a proprietary software package that allows the engineer to collect, store, process and report the data in one package. Reports can be tailored to many formats both as text documents and chart profiles.

Models for calculating Anode Current Output or pipeline Current Density are built in as well as the ability to adjust variables such as conductivity, resistivity and other design factors from CP systems to provide accurate results. PMAC are also able to Provide Seawater Conductivity and Temperature probes with continuous logging if this data is not available from other sources.

SYSTEM ELECTRONICS ARE CALIBRATED TO RECORD AT A RESOLUTION OF;

- Contact and Proximity CP to 0.1 mV,
- Contact and Proximity FG to 0.1 $\mu\text{V}/\text{cm}$



Dimensions: 78mm diameter by 318 mm length
Material: Titanium
Weight in Air: 2.6 kg
Weight in water: approx. 1.3 kg
Depth Rating: 3000 msw
Power Requirements: 24 V dc 200 mA

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