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Combined UPRS and UFM Data Sheet

This instrumentation package is designed to enhance the integrity of sub-sea MPI by enabling measurement of magnetic field strength, ambient visible light, and ultra-violet irradiance with a single sub-sea module. It has been proven over several years service in the North Sea and elsewhere.

In practice, it allows the user to replicate previous work-face MPI conditions on subsequent inspections, thus reducing the probability of spurious or missed indications. Initial inspections benefit from using a known and measured set-up.

An improvement on earlier versions, the HCL unit has a single flying lead to a combined probe head - this contains the U.V. and visible sensors, together with the magnetometer probe. This reduces the number of both penetrators and trailing cables.

Power is from internal Nickel Cadmium cells, which will give in excess of 20 hours continuous use, recharging taking about 12 hours from 'Battery Low' indication. The charging circuitry has been enhanced to give effectively penetratorless charging, the stainless steel switch knob being used as one contact and the grab-ring the other. Internal electronics double-isolate these contacts to ensure that no current can flow OUT of them, thus preventing both external discharging via the contacts and damage from charger misconnection. Additionally, a fuse has been incorporated within the battery pack that provides protection against both short circuits and excessive charging currents. Total safety is therefore ensured, and the elimination of a waterproof connector for charging provides cost and reliability advantages to the user.

The display is a 12.5mm back-lit Liquid Crystal, and ranges are selected by a rotary switch. This switch has no detents, and no end-stops, thus minimising the potential of damage by abuse. The selected range is clearly shown by indicators on the unit, as is the 'Low Battery' condition.

The magnetometer is a surface magnetometer, working on AC fields and is generally thought to be the only type of device that will measure the field below the surface of the parent metal. Other devices, such as Burmah-Castrol strips and Hall-Effect magnetometers can only detect the field above the surface of the metal, and this will vary significantly with proximity. By requiring a physical contact with the work-face, and only measuring the field within the parent metal, the HCL magnetometer reduces the potential for inadvertent operator adjustment of the readings by manipulating the device in place of adjusting the field current. Calibration is traceable via NAMAS certified test pieces.

The photometer/radiometer is a custom marinisation of the well-known instrument from Applied Scintilation Technologies. Applied Scintilation Technologies calibrate each unit to standards traceable to the United Kingdom's National Physical Laboratory.

The housing is machined from solid aluminium alloy, hard anodised to Defence Standard 03-26/2. It is fitted with a stainless steel 'grab-ring' that serves to protect the port, penetrator and switch knob, and provides a handle, a tie-off point and the negative charging electrode. The grab-ring is sacrificial, and in cases of severe impact is designed to deform and absorb the shock, thus protecting the pressure hull.

Use of this instrumentation will allow diving contractors to ensure consistent standards of MPI, and its specification by structure operators will provide them with additional confidence in MPI results.

System Components:

- **Pressure Hull & Electronics**
- **Complete Sensor/Probe Assembly**
- **120/240V AC Input**
- **140mA Constant Current output Battery Charger complete with charging lead**

- **Calibration Certificates**
- **Transit Case**

Specifications

Ranges (Opt.)	Photometer	0-199.9 Lux or 0-1999 Lux
	Radiometer	0-19.99 mW/sq cm
	Magnetometer	0-19.99T
Calibration Sources	Visible Spectrum	Tungsten
	U.V. Wavelength	366nm
	Magnetometer	BS4360-50D Steel
Accuracy	Visible Light	15%
	U.V. Light	10%
	Magnetometer	15%
Calibration Span		1 Year General
		Aerospace Applications 6 months
Battery Life		20 hours continuous us in (with new, fully charged battery pack)
Charging Time		12 hours from 'Low Battery'
Charger Type		140mA Constant Current
Display Type		12.5mm Back-Lit LCD
Sub-Sea Module approx Weights	In Air	2.5kg
	In Water	1.0kg
Overall worst-case dimensions		200mm diameter, 120mm high