MSL Subsea Logger

- Integral sensors for x,y,z acceleration and temperature
- 10 analogue 0-5v, 1 thermocouple and 1 serial input.
- Up to 7 analogue inputs can be configured for frequency inputs from flow meters
- User programmable
- Supports voltage (0-5v) and sine wave frequency inputs
- 1 serial channel for RS485 MODBUS data or other protocols as required
- Serial channel can read up to 8 Keller subsea pressure sensors.
- Optional high contrast single or dual LCD display with backlight
- Internal memory 1.5 M readings
- Micro SD memory card slot
- Depth rated to 4000 metres
- External power supply11-30vDC or internal battery.
- Internal battery option provides up to 1 month operation without external power
- Power consumption 15mA with display backlight on , 5mA with display off

Specification - Merlin Data Logger

Analogue Inputs	10 x 0-5v DC resolution 12 bit (1.2 mV,) up to 7 channels can be configured for AC frequency input suitable for turbine flow meters
Input Channels	10 analogue, 1 thermocouple, 1 serial RS485 MODBUS/Keller protocol,
Memory Capacity	1,500,000 readings internal + micro SD card 40 million readings
Logging Modes	Single point, average, min, and max
Logging Rate	Programmable - 1 Hz up to 12 hours
Data Retention	Over 200 years with no power
Operating Range	-20 to +60 degrees C (battery charging 0 to 45 degrees C)
Power Supply	Small housing: Internal re-chargeable Lithium Polymer battery 12.2v 8AH Large housing: Internal re-chargeable NiMH battery 14.4v 26AH
Data Format	Graphic and CSV, suitable for export to Excel
Display	Optional high contrast backlit LCD 1 or 2 x 72 x 45 mm showing up to 5 channels of measurements simultaneously.
Communications	RS232 and/or USB direct connection for data download (flash memory)and logger control and programming. Optional optical modem for wireless data transfer subsea
Software	Windows software included for logger control and programming. Logger control application is a simple user interface to launch logger project and download data. Programming interface provides a menu driven graphical interface for setting up the logger program, down-

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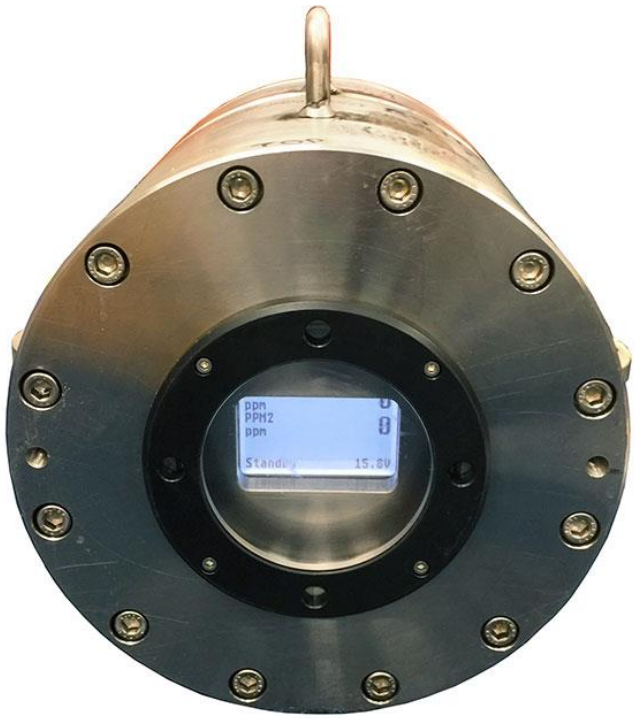
MSL Subsea Logger

General Description
The logging system comprises of multi channel data logger with high contrast backlit LCD display fitted in a stainless steel housing suitable for immersion to 4000 metres.

The data logger unit, and battery power supply are fitted inside the st.st. housing. The data logger is connected to the sensor inputs via subcon or CRE bulkhead connectors. Two housing sizes are available: small - for one external sensor, or large for up to 12 external sensors.

The data logger can log up to 10 analogue inputs from sensors with voltage or 4-20mA or frequency outputs. Up to 7 of the analogue inputs can be configured for frequency signals generated by subsea turbine flow meters. It also has an RS485 serial channel capable of logging up to 8 Keller subsea pressure sensors with 0.05% or optional 0.01% accuracy.



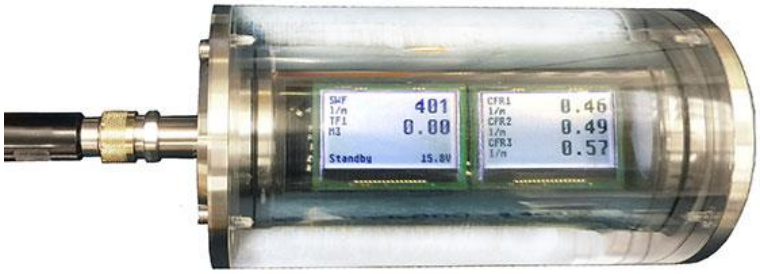
Merlin Logger fitted in a large housing suitable for up to 12 external sensors

The logger also has an integral x,y,z accelerometer which can be used for the measurement of orientation or motion. The high contrast LCD backlit display is programmable and can display to 10 channels simultaneously. The backlight intensity is adjustable, and the backlight can be light activated. The logger has an internal flash memory capacity of 1.5 million readings which overwrites the last reading when the memory is full. There is also a micro SD card which holds 40 million readings, which does not overwrite to provide full data protection.

Data can be downloaded direct from the unit via the external RS232 port to a PC, or remotely using the optional subsea optical modem connected via the RS232 port. Data from the micro SD card can only be downloaded by direct USB connection to the logger or by removing the card from the logger and using a PC micro SD card reader.

Small Instrument Housing	316 st. st. suitable for depths to 4000 metres. Optional display window. Suitable for up to 3 external sensors Dimensions 280mm x 166mm diameter (388 x 285 x 308 in mounting frame with lifting handle) Weight 25KG
Large Instrument Housing	316 st. st. suitable for depths to 4000 metres. Optional display window. Suitable for up to 12 external sensors Dimensions 320mm x 273mm diameter Weight 70KG

Optional External Dual Subsea Display Unit



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MSL Subsea Logger

Specification - Subsea Pressure Sensors

Characteristics	PA33X-Subsea	Units
Pressure Ranges:	1, 3, 10, 30, 100, 300, 700, 1000, 1360	Bar gauge Bar differential
Analogue Output	0-5v or 4-20mA	
Serial Output	RS485	
Temperature Output	RS485 only acc +/- 1 deg C	
Excitation Voltage	10-30	VDC
Input Current	<3	mA
Output Config	3 wire (0-5v) 2 wire (4-20mA) or 4 wire (RS485)	No. of wires
Accuracy	Analogue O/P 0.1	+/- % of rated O/P
Standard Unit	Serial O/P 0.05	+/- % of rated O/P
High Precision Unit	Serial O/P 0.01	+/- % of rated O/P
Temperature range	Compensated 10 to +40, -10 to +80 or ï 5 to +35	°C
Stability	<0.05% over 12 months	+/- of Rated Output
Media Compatibility	Any media Compatible with 316 L St St	
Protection	I.P. 68 to 4000 metres seawater	
Electrical Connector	5 pole subcon male connector MCBH5M-SS or BH5M-SS	
Process Connection	1/4òBSP male, or 1/2òNPT male, other on request	

Keller PA33X High Precision Transducers

	PT Range		Accuracy +/- 0.1 bar			Sensi□vity 0.05 bar		
TP*	Min	Typical	% of TP*	% of FSDMin	% of FSDTyp	% of TP*	% of FSDMin	% of FSDTyp
200	250	300	0.015	0.012	0.01	0.003	0.0024	0.002
250	312.5	500	0.02	0.016	0.01	0.004	0.003	0.002
300	375	500	0.017	0.013	0.01	0.003	0.0027	0.002
350	437.5	500	0.014	0.011	0.01	0.0029	0.0023	0.002
400	500	700	0.018	0.014	0.01	0.0035	0.0028	0.002
450	562.5	700	0.016	0.013	0.01	0.003	0.0025	0.002
500	625	1000	0.02	0.016	0.01	0.004	0.0032	0.002
550	687.5	1000	0.018	0.015	0.01	0.0036	0.003	0.002
600	750	1000	0.017	0.013	0.01	0.0033	0.0027	0.002
650	812.5	1000	0.015	0.012	0.01	0.003	0.0025	0.002
700	875	1000	0.014	0.011	0.01	0.029	0.0023	0.002
750	937.5	1000	0.013	0.011	0.01	0.0027	0.0021	0.002
800	1000	1000	0.013	0.01	0.01	0.0025	0.002	0.002

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MSL Subsea Logger

Specification - Subsea Temperature Sensors

Measurement Range	0-50, -20 to +80, 0-200 deg C
Output	4-20mA or 1-5 v DC
Sensor Type	3 wire PT100
Accuracy	0.2%
Operating Temperature	-30 to +140
Power Supply	8-32v DC
Media Compatibility	Any liquid compatible with 316 L St St
Protection	I.P. 68 to 4000 metres seawater
Electrical Connector	5 pole subcon male connector MCBH5M-SS

Specification - Subsea Flow Meters

Characteristics	**NT3-NT150-Subsea**
Output Config	2 wire AC frequency signal 50mV-800mV
Accuracy	0.5% (0.3% for NT100 & NT150)
Temperature range	-30 to +140
Pressure drop	0.2 - 0.5 bar depending on meter size
Media Compatibility	Any clean liquid compatible with 316 L St St
Protection	I.P. 68 to 4000 metres seawater
Electrical Connector	3 pole subcon male connector MCBH3M-SS or BH3M-SS or CRE 3 pin.

Type	Flow Range Ltrs/Min	K factor Ltr	BSP Threads	ANSI Flanges
NT3	0.5-5	17000.0	3/8ñ	1/2ò
NT5	1.2-10	5900.0	1/2ò	1/2ò
NT7	2-20	3000.0	1/2ò	1/2ò
NT11	5-50	2600.0	1/2ò	1/2ò
NT13	8-80	1950.0	3/4ñ	1/2ò
NT19	15-150	630.0	1ñ	1ñ
NT24	25-250	350.0	1ñ	1ñ
NT32	45-450	135.0	1 1/4ñ	1 1/2ò
NT38	65-650	117.0	1 1/2ñ	1 1/2ñ
NT48	110-1100	67.0	2ò	2ò
NT65	200-2000	18.0	3ñ	2 1/2ò
NT80	300-3000	14.0	-	3ò
NT100	500-5000	7.5	-	4ò
NT150	1000-10000	3.4	-	6ò

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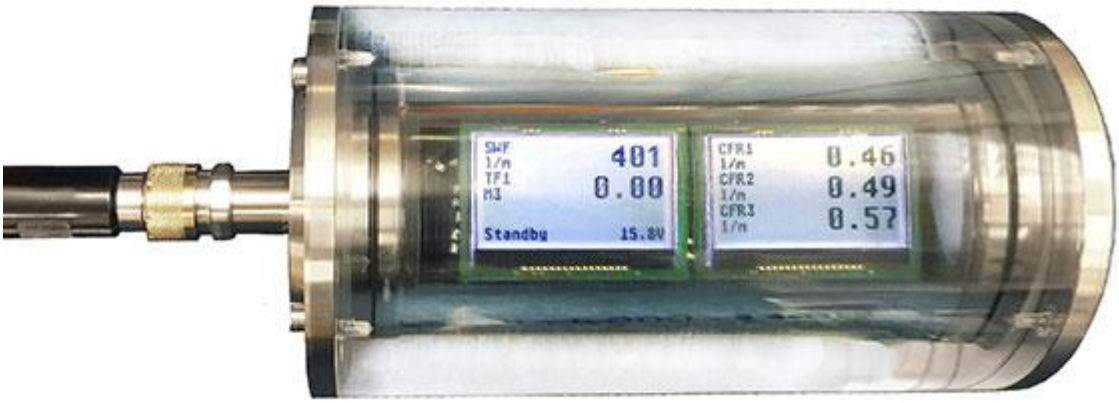
MSL Subsea Logger

Subsea External Dual Display Unit



The Subsea External Dual Display Unit is capable of displaying up to 5 measurement channels simultaneously and a total of 20 channels (4 pages x 5 channels). The page scrolling rate is user programmable via the windows setup software.

The display also shows the status of the logger i.e **Standby** or **Logging** and the **battery voltage**

Specification

Display Type	High contrast LCD display, with adjustable back light
Character Size	Channel labels 5 mm, channel values 12mm
Display Capacity	5 channels simultaneously, 20 channels in total with pagination
Depth Rating	4000 metres
Operating Temperature	-10 to + 70 deg C
Power Consumption at 12v DC	2 mA without backlight, 10 mA with backlight
Materials	Acrylic tube with stainless steel end caps
Physical	Dimensions 285mm x 160mm diameter, weight 10.8 Kg

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MSL Subsea Logger

OM-1000 Subsea Optical Modem

- Transfer real time and logged data from subsea logger to an ROV
- Optical non contact RS232 data transfer
- Half duplex transparent data link
- Data transfer rate 9600 to 57600 baud
- Suitable for depths to 4000 metres
- Power consumption 8.5mA @ 12v DC
- Compatible with MSL 1200D series loggers and all Omni Instruments subsea logging systems

The OM-1000 is a subsea optical modem suitable for use to depths of 4000 metres. It can be used to transfer data between any two serial devices with RS232 communications. The communication is half duplex transparent RS232 and is compatible with MSL1200D data logger and many other data loggers and serial devices.

The unit consists of a base modem, usually connected to the data logger and a remote unit which is connected to an ROV. To effect data transfer the ROV, using a manipulator drops the remote unit into the docking port. As the modems are transparent data transfer is controlled by the host PC on the surface via the ROV serial link.

Data communications are unaffected by electrical noise or suspended solid particles in the seawater.

Specification

Baud Rate	Programmable 9600, 19200, 38400, 57600 baud
Serial Port	RS232
Power Supply	9-28v DC
Power Consumption	8.5mA at 12vDC
Operating Temperature	0 to 50 deg C
Data Protocol	Transparent RS232, half duplex
Protection	I.P. 68 to 4000 metres seawater
Housing Material	316 stainless steel or aluminium
Electrical Connector	8 pole subcon male connector MCBH8M-SS

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