

# INTEGRIPod™ SM+

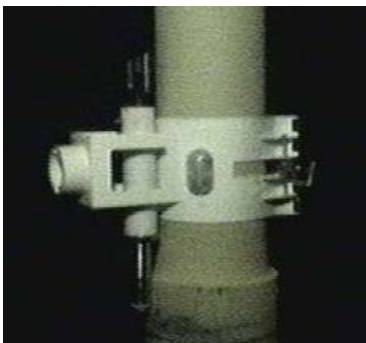
## Precision Stand-alone Motion Logger



INTEGRIPod™ SM+ precision logger



Permanently installed pod holders allow pods to be installed by ROV or divers



ROV deployable logger holder

The Pulse **INTEGRIPod™ SM+** is a standalone motion monitoring system similar to the **INTEGRIPod™ SM**, but with higher precision sensors to capture much smaller structural movements. For example, it records taper joint motions on top tensioned risers allowing accurate stresses and fatigue to be determined. Data is stored in its on-board memory and downloaded into a computer for subsequent post data processing. The basic measurement includes:

- Tri axial acceleration
- Tri plane angular rate
- Bi-plane inclination

From the measurements, various other parameters can be derived:

- Linear displacement
- Rotation
- Average inclination
- Harmonics

### DEPLOYMENT OF LOGGERS

The data logger contains all electronics, batteries and sensors enclosed in a cylindrical casing. After initialization using a computer, loggers can be deployed to the designated locations. This may simply involve strapping directly to the structure using bands or place the logger into tailor-made holders (available for diver or ROV operation).

### MOUNTING METHOD

Strapped the logger directly to a riser using bands made from titanium and plastic  
Place the logger into a holder which is pre-installed on the riser  
Place the logger into a holder which is retrofit by ROVs

### MAXIMUM LOGGING PERIODS (EXAMPLES)

Continuous logging @ 10Hz	12 days (limited by memory)
20 minute logging every 2 hours @10Hz	76 days (limited by memory)

### LOGGER SPECIFICATIONS

#### Data logger analogue inputs

Number of inputs	8 Maximum
Input range [V]	0 – 2.5
Accuracy / resolution [V]	0.0012 / 0.0006

#### G Sensors

Sensor direction	X, Y and Z
Range [g]	± 0.5 for X and Y direction, +/- 1.2 for Z direction
Cut-off response [Hz]	4.1 default or configurable
Resolution [g]	±0.0002 rms @ 0.5 g range
Accuracy [g]	1% of full range (after calibration)
DC temp drift	Can be filtered out
Alignment error [deg]	0.3 between axis
Sensor-X direction	Indicated on the logger body

#### Angular rate sensors

Sensing direction	X-Z, Y-Z planes
Range [deg/s]	+/- 4 (nominal)
Cut-off response [Hz]	4.1
Resolution [deg/s]	±0.005 rms
Accuracy [deg/s]	1% of full range (after calibration)
Alignment error [deg]	0.3

#### Inclinometers

Sensing direction	X-Z, Y-Z planes
Range [deg]	+/- 5 (nominal)
Cut-off response [Hz]	0.5 (dumped output)
Resolution [deg]	±0.03
Accuracy [deg]	1% of full range (after in-situ calibration)
Alignment error [deg]	0.3

**Data recording frequency**

Record frequency (Hz) 30, 20, 15, 10, 5,  
Frequency error <+/- 0.5% of above

**Logging Programme**

Logging mode Continuous and intermittent

**Intermittent mode**

Log on period (min) 1, 10, 15, 20, 30  
Cycle period (hour) 0.5, 1, 1.5, 2, 2.5, 3, 4, 5, 6

**Logger communication ports**

Port RS232 port  
Connection method RS232 (serial)  
On-board memory 128 Mb memory card  
Memory media 512 Mb memory on request

**Software**

Operating system Win95, 98, 2000, NT, XP,  
Functions -Diagnostic check of loggers  
-Initialise loggers  
-Download data from loggers  
-On-line logging  
-Battery/memory life

**Power**

Batteries 40 D-size 3.6V lithium  
Battery capacity (mA-hour) 120,000 nominal  
Current during logging (mA) 200 (all sensors)  
Standby (mA) 3

**Casing**

Material Superduplex SS  
Size (mm) 114 diameter x 850 length  
Weight in air (kg) 20 (with batteries)  
Weight in water (kg) 15 (with batteries)  
Direction of sensor-X Polarisation slot on base

**Environmental**

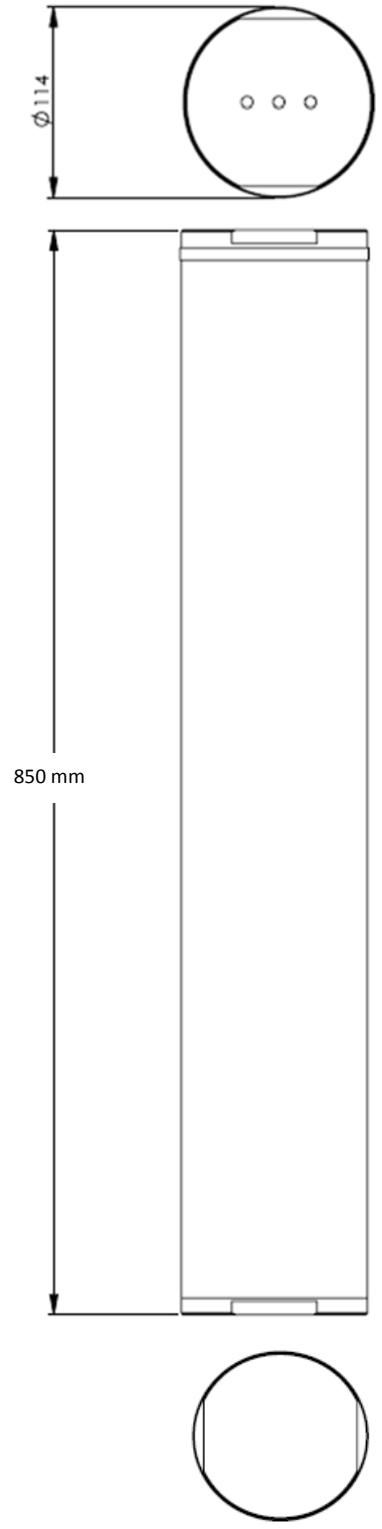
Operating (° C) 2 to 30  
Storage (° C) -5 to 50  
Pressure rating 3000 m water depth  
Seals 3 'O-rings' on caps

**Memory disk reader**

Communication USB optional  
Case 80 mm x 140 mm x 40 mm  
IP rating No IP rating

**Format of downloaded data files**

Downloaded files Time stamp files  
Voltage (mV) records  
File format ASCII format



**London**  
1-7 Cherry Street  
Surrey, GU21 6EE, UK  
Tel: +44 1483 774910

**Aberdeen**  
Tern Place House, Tern Place,  
Bridge of Don  
Aberdeen, AB23 8JX, UK  
Tel: +44 1224 452285

**Houston**  
16000 Barkers Point Lane, Suite 120,  
Houston, TX 77079, USA  
Tel: +1 713 422 2663

**Kuala Lumpur**  
Suite 16-3, 16th Floor, Wisma UOA II  
21 Jalan Panang 50450  
Kuala Lumpur, Malaysia  
Tel: +60 1 2328 312

**Rio de Janeiro**  
Praça Floriano, 19-22º andar,  
Centro, RJ, 20031-924, Brazil  
Tel: +55 21 2510 7323