



# **ISOTROPIC TRIAxIAL ROBUST FORCE-BALANCED SEISMOMETERS**

## **SP400U3, SP400cU3**



This unique seismometer is indeed a *true isotropic* instrument: it operates normally in any random orientation. It is a member of the **MP-400** Series family of instruments designed as versatile, very rugged seismic sensors. Along with all other PMD seismometers, these sensors are based on proprietary electrochemical transducer technology that offers many advantages over conventional electromechanical sensors.

**SP400U3** is designed to work within a very wide range of supply voltages, starting from 3Vdc. It is placed in a light high-pressure housing made of a special aluminum alloy, submersible to 4000m.

The force-balancing feedback provides for excellent response stability and linearity.

The latest **SP400U3** seismometer contains an optional microcontroller which maintains exceptionally accurate parameter stability over the full operating temperature range and over the life of the instrument. Optionally, the microcontroller can generate internally calibrating sine or other waveform signals. The calibration can be initiated by applying a logic level to the Calibration Enable input or via an optional serial port. If the latter is provided, the user can also select and set the Generator Constant value in the 350-20,000 V/m/s range.

Similarly to other **MP400** seismometers models these sensors are also offered in two application-dependent versions: a higher clip level **SP400U3SM**, and the standard reduced noise **SP400U3(RN)**. Both versions have the same dynamic range, which is shifted up by approximately 10dB toward stronger ground motions in the SM version.

The **SP400U3** has an exceptionally rugged design and does not require mass lock or special installation equipment or procedures. These seismometers provide a low cost of ownership, *requiring no maintenance* over the life of the instrument. Three and five-year extended warranties are available.

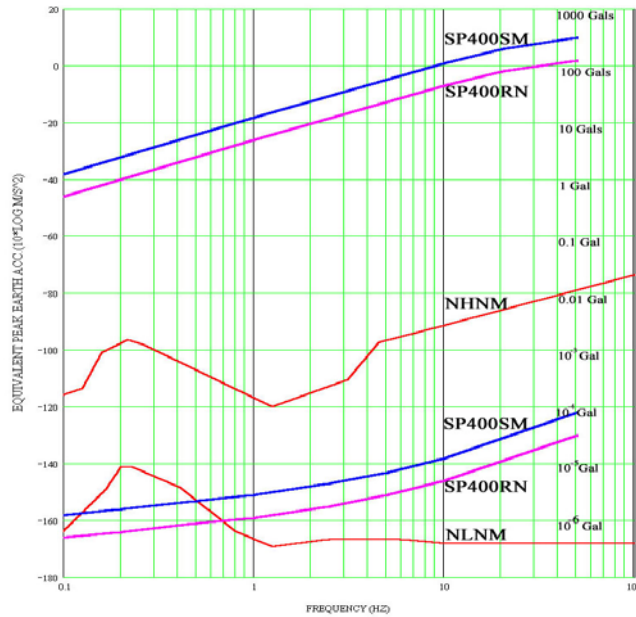
Recently a new, much more compact and lighter weight **SP400cU3** model had been introduced, which shares all major characteristics with **SP400U3**. The instrument shown on the photo above mounts in an underwater special aluminum housing submersible to operating depth of 4000m.

**SP400cU3D** model represents the digital output version of this seismometer. It contains a very low power 24-bit data digitizer **SD6503**.

## SP400U3 Specifications

PARAMETER	SP400U3
Operating principle	Proprietary Electrochemical Sensors; force-balanced
Output signals	3 channels with identical velocity flat responses
Output swing:	$\pm(V_{cc}-1)$ single-ended; $\pm 2(V_{cc} - 1)$ p-p <sup>1</sup>
Dynamic Range	142 dB (@ min 10 Vdc supply)
Passband	0.1 – 50 Hz;
Generator constant	Standard: 2000 V/m/s; Optional: 350 – 20,000 V/m/s
Mass Lock	NONE REQUIRED
Mass centering	NONE REQUIRED
Maximum installation tilt	Fully operational in any random orientation
Mechanical resonances	>150Hz
Environmental	Waterproof, submersible to 4000m <sup>2</sup>
Temperature range	-12 to + 55 °C
Housing material	Special Aluminum Alloy or custom
Case diameter <sup>2</sup>	SP400-U3 212mm SP400c-U3 200mm
Case height	SP400-U3 470mm SP400c-U3 225mm
Weight	SP400-U3 ~22kg SP400c-U3 ~12kg
Power	3 – 15 Vdc; 12mA
Connectors	Underwater circular or custom

### SP400U3 NOISE FLOORS AND CLIP LEVELS



<sup>1</sup> Vcc is the external regulated power supply voltage.

<sup>2</sup> Various housing designs and materials are available on request

*Specifications subject to change without notice*

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