

## S400

### Short Period Ultra Sensitive Seismic Sensor

- 3 axis velocity sensor
- Low power consumption
- Borehole/surface type
- Only 50 or 60mm diameter
- More than 1km depth
- Smart elastic clamping
- Guiding wheels driver
- Wide input voltage range
- Build-in test line
- Wide response 1sec-240Hz
- High sensitivity 3000V/m/s
- Velocity feedback design
- Operation Range: -20 +70°C
- Micro-seismicity monitoring



## FEATURES

The S-400 is a three-component velocity output seismic sensor. The unit is recommended for local micro-seismicity and fracturing seismicity monitoring. Three versions of this sensor type are available. One without electronics (S400A), one with preamplifier (S400B) and a third one with signal conditioner (S400C) based on the force-balance principle. This third version provides wider sensor response 1sec to 130Hz. The main characteristic of this sensor type is the high sensitivity combined with very low noise level. It is ideal for very low seismic events or fracturing events recording. The sensor must be combined with a very low noise/high dynamic range digitizer like the GEOthree/GEOsix.

The default cable length of the sensor is approximately 20 meters. Selecting special cable, the length can be extended to more than one kilometer. The sensor electronics are housed inside the back box

having the sensor body free of electronics. Thus any damage risk is dramatically minimized. The borehole type unit is housed into an 60/80mm diameter casing. The sensor body is filled with special electro-insulated resin with excellent hydrolytic stability and therefore the sensor can be installed in deep boreholes. Corrosion environment is not a problem for this sensor. No mass-lock or centering is required that makes an easy connection with the digitizer. Sensitivity is 1500V/m/sec (differentially) if electronics are used, providing a very sensitive seismic sensor. Recording fracturing events from the surface is not an easy experiment, almost impossible using ordinary equipment. Efforts were concentrated on minimizing the noise floor, increasing the downhole gain and the sensor sensitivity. This sensor uses quad geophones per axis so it meets all the requirements of gain and noise levels while sensitivity becomes quadruple of using a typical single sensing element per axis.



## INSTRUMENT SPECIFICATIONS

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### MODEL S400A (without electronics)

<b>Number of channels</b>	3channels, Vertical, North-South, East-West
<b>Channel Resistance</b>	13600 OHms
<b>Sensitivity</b>	368 V/m/s
<b>Natural Frequency</b>	4.5Hz (10Hz, 14Hz, 28Hz, 35Hz under request)
<b>Open circuit damping</b>	0.76
<b>Cable length</b>	More than 1km
<b>Size</b>	460mm length, 60mm diameter
<b>Weigh (geophone enclosure)</b>	6300g

### MODEL S400B (with preamplifier)

<b>Number of channels</b>	3channels, Vertical, North-South, East-West
<b>Channel Resistance</b>	500 OHms
<b>Sensitivity</b>	3000 V/m/s
<b>Natural Frequency</b>	4.5Hz (10Hz, 14Hz, 28Hz, 35Hz under request)
<b>Power</b>	2Vdc, 41mA (0.49W )
<b>Cable length</b>	More than 1km
<b>Size</b>	460mm length, 60mm diameter
<b>Weigh (geophone enclosure)</b>	6300g

### MODEL S200C (with signal conditioning electronics - bandwidth extended)

<b>Number of channels</b>	3channels, Vertical, North-South, East-West
<b>Channel Resistance</b>	500 OHms
<b>Sensitivity</b>	3000 V/m/s
<b>Natural Frequency</b>	1Hz (0.5Hz z, 0.2Hz under request)
<b>Power</b>	12Vdc, 43mA (0.49W )
<b>Cable length</b>	More than 1km
<b>Size</b>	460mm length, 50mm diameter
<b>Weigh (geophone enclosure)</b>	6300g

### ALL MODELS GENERAL CHARACTERISTICS

<b>Mass lock, centering</b>	Not required
<b>Temperature range</b>	-20 to +70°C
<b>Humidity</b>	100%, IP68 enclosure, resin filled
<b>Submersible</b>	>1000 meters



## RESINE SPECIFICATIONS (+stable, -unstable)

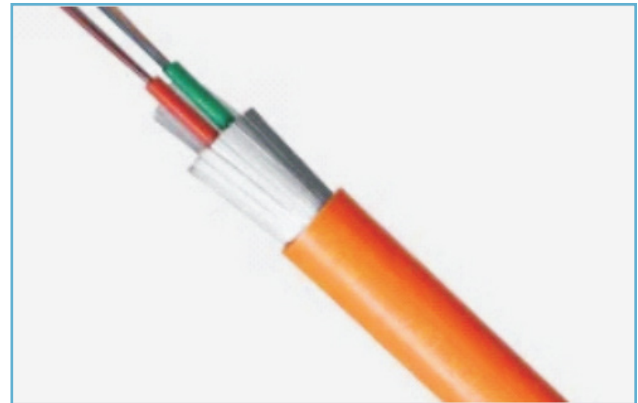
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Water +  
 Potassium hydroxide 5% +  
 Sodium Hydroxide 5% +  
 Salt water 20% +  
 Domestic Detergents +  
 Sulfuric acid 5% +  
 Temperature -40 to +100

Hydrocholic acid 5% +  
 Unleaded fuel +  
 Diesel Fuel +  
 Xylene +  
 DMSO -  
 N-Methyl pyrrolidone -  
 Solid 100%

### KEVLAR SEISMIC CABLE

<b>Conductor</b>	6*0.32 tinned cooper DCR<36Ohms
<b>Insulation</b>	HDPE O.D 1.5mm
<b>Twisted</b>	Red/Black, Blue/White, Red/blue
<b>Shield</b>	Tinned Copper Braided 16x8x0.1
<b>Strength</b>	Kevlar, >350kg
<b>Jacket</b>	TPU85A, OD 10mm
<b>Color</b>	Orange, Yellow
<b>Weight/km</b>	160kg



### STEEL ARMoured SEISMIC CABLE

<b>Conductor</b>	2x5, 0.5mm <sup>2</sup>
<b>Insulation</b>	Individually screened conductors
<b>Twisted</b>	2x5 conductors
<b>Shield</b>	PVC bedding, galvanized steel wire armour
<b>Strength</b>	Steel, >350kg
<b>Jacket</b>	PVC 20mm
<b>Color</b>	Black
<b>Weight/km</b>	730kg

