

S200 High Sensitivity Seismometer



Our S-200 and S-400 seismic sensors design is based on our favorite S-100 three-axis seismic sensor, mainly used in Passive Seismic Tomography. The NEW S-200 & S-400 seismic sensors have specially designed for surface installation in oil & gas fields, into small diameter boreholes in order to keep the installation cost low.

Installation depth can be up to 200m, but usually the suggested installation depth is 50-150m depending the surface land conditions. Recording hydraulic fracturing events at the surface, is not an easy experiment, and seems to be impossible using ordinary equipment. The instrument performance has to be improved. Efforts were concentrated on minimizing the electronic noise floor, increasing the downhole gain, and increasing the sensor sensitivity. This target has been achieved adding more geophones to the downhole sensor connected in series. The sensor uses double or quad very high gain geophone elements per axis in order to increase signal gain and minimizing the signal noise, giving the ability to record even smaller events. The electrical characteristics of the new sensors are shown on the table 1 & 2. Four different model types of sensor have been

manufactured.

	Sensor Model C100	Sensor Model C200	Sensor Model C400
Geophones per axis (OMNI- 2400 15 Hz)	1	2	4
Sensitivity	52 V/m/sec	104 V/m/sec	208 V/m/sec
Coil resistance	2400 Ω	2400 Ω	2400 Ω
Total Resistance	2400 Ω	4800 Ω	9600 Ω
Damping	0.57	0.57	0.57

Table 1 - Sensor Specifications using OMNI-2400 geophone elements

	Sensor Model C100	Sensor Model C200	Sensor Model C400
Geophones per axis (ION SM6- UA10Hz)	1	2	4
Sensitivity	78.9 V/m/sec	157.8 V/m/sec	315.6 V/m/sec
Coil resistance	3500 Ω	3500 Ω	3500 Ω
Total Resistance	3500 Ω	7000 Ω	10500 Ω
Damping	0.284	0.284	0.284

Table 2 - Sensor Specifications using ION SM6 UA10 geophone elements



INSTRUMENT CHARACTERISTICS

Number of channels Orientation Vertical, North-South, East-West Output resistance Geophone case cable length Connection cable length Power					
channels Orientation Vertical, North-South, East- West Output resistance Geophone case cable length Connection cable length Power P	GENERAL				
Orientation Vertical, North-South, East-West Output resistance Geophone case cable length Connection cable length Power Max output voltage FEATURES Sensitivity Electronic output noise Bandwidth PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range Vertical, North-South, East- West 500 Ohms 20 meters (up to 100 meters cup to 100 meters 20 meters (up to 100 meters cup to 100 meters 20 meters (up to 100 meters cup to 100 meters 21 meters 180p-p 180p-p 180mm length, 50mm diameter enclosure) Weight (geophone case) PROTECTION Overvoltage protected, all input signals are protected ENVIRONMENT Temperature range -20 to +700C	Number of	3			
Output resistance Geophone case cable length Connection cable length Power Max output voltage FEATURES Sensitivity Electronic output noise Bandwidth Description Size (electronic box) Size (geophone enclosure) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range 20 meters (up to 100 meters optional) 1000 meters 1000 m	channels				
Output resistance Geophone case cable length Connection cable length Power H/-11 to +/-36Vdc, 75mW Max output voltage FEATURES Sensitivity 1000V/m/sec Electronic output noise Bandwidth O.2 - 100Hz PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range 20 meters (up to 100 meters optional) 1 - 10 meters lup to +/-36Vdc, 75mW H11 to +/-36Vdc, 75mW H10000, 75mW H10000, 75mW H11 to +/-36Vdc, 75mW H10000, 75mW H11 to +/-36Vdc, 75mW H10000, 7	Orientation	Vertical, North-South, East-			
Geophone case cable length Connection cable length Power +/-11 to +/-36Vdc, 75mW Max output voltage +/-9Vdc bipolar, 18Vp-p FEATURES Sensitivity 1000V/m/sec Electronic output noise Bandwidth 0.2 - 100Hz PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC		West			
cable length Connection cable length Power Power H/-11 to +/-36Vdc, 75mW Max output voltage FEATURES Sensitivity 1000V/m/sec Electronic output noise Bandwidth 0.2 - 100Hz PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	Output resistance				
cable length Connection cable length Power Power H/-11 to +/-36Vdc, 75mW Max output voltage FEATURES Sensitivity 1000V/m/sec Electronic output noise Bandwidth 0.2 - 100Hz PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	Geophone case	20 meters (up to 100 meters			
length Power +/-11 to +/-36Vdc, 75mW Max output voltage +/-9Vdc bipolar, 18Vp-p FEATURES Sensitivity 1000V/m/sec Electronic output 160nV/Sqrt(Hz) noise Bandwidth 0.2 - 100Hz PHYSICAL Size (electronic 160 X 100 mm 180mm length, 50mm diameter enclosure) Weight (electronic 50x) Weight (geophone 180mm length, 50mm diameter enclosure) Weight (geophone 600g Weight (geophone case) PROTECTION Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	cable length				
Power +/-11 to +/-36Vdc, 75mW Max output voltage +/-9Vdc bipolar, 18Vp-p FEATURES Sensitivity 1000V/m/sec Electronic output 160nV/Sqrt(Hz) noise Bandwidth 0.2 - 100Hz PHYSICAL Size (electronic 160 X 100 mm 100x) Size (geophone enclosure) Weight (electronic 50x) Weight (geophone case) PROTECTION Overvoltage protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	Connection cable	1 - 10 meters			
Max output voltage	length				
Max output voltage	Power	+/-11 to +/-36Vdc, 75mW			
Sensitivity Electronic output noise Bandwidth PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range 160 X 100 mm 160 X 100 mm 180mm length, 50mm diameter 180mg 180m	Max output voltage	+/-9Vdc bipolar, 18Vp-p			
Electronic output noise Bandwidth PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range 160nV/Sqrt(Hz) 160nV/Sqr					
noise Bandwidth PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	Sensitivity	1000V/m/sec			
noise Bandwidth PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	Electronic output	160nV/Sqrt(Hz)			
PHYSICAL Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	noise				
Size (electronic box) Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	Bandwidth	0.2 - 100Hz			
Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	PHYSICAL				
Size (geophone enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage protection ENVIRONMENT Temperature range -20 to +70oC	Size (electronic	160 X 100 mm			
enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	box)				
enclosure) Weight (electronic box) Weight (geophone case) PROTECTION Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	Size (geophone	180mm length, 50mm diameter			
box) Weight (geophone case) PROTECTION Overvoltage protection signals are protected ENVIRONMENT Temperature range -20 to +70oC	enclosure)				
box) Weight (geophone case) PROTECTION Overvoltage protection signals are protected ENVIRONMENT Temperature range -20 to +70oC	Weight (electronic	900g			
PROTECTION Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	• •				
PROTECTION Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC	Weight (geophone	600g			
Overvoltage All pins are protected, all input signals are protected ENVIRONMENT Temperature range -20 to +70oC					
protection signals are protected ENVIRONMENT Temperature range -20 to +70oC	PROTECTION				
protection signals are protected ENVIRONMENT Temperature range -20 to +70oC	Overvoltage	All pins are protected, all input			
Temperature range -20 to +70oC					
Temperature range -20 to +70oC					
		-20 to +70oC			
	Humidity	100%, IP67 enclosure			

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