Hydrophone TC4014

Broad Band Spherical Hydrophone

TC4014-5

- **Wide usable frequency range**
- **Omnidirectional in all planes**
- **Built-in low noise preamplifier**
- **Long term stability**
- **Individually calibrated**
- **Available with differential output**

The TC4014-5 broad band spherical hydrophone offers a very wide usable frequency range with excellent omnidirectional characteristics in all planes. The overall receiving characteristics makes the TC4014-5 an ideal transducer for making absolute underwater sound measurements up to 480kHz. The wide frequency range also makes the TC4014-5 perfect for calibration purposes, particularly in higher frequencies.
The TC4014-5 incorporates a low-noise 26dB preamplifier providing signal conditioning for transmission through long underwater cables.

The TC4014-5 features an insert calibration facility, which allows for a reliable test of the hydrophone.
The sensor element is permanently encapsulated in Special formulated NBR to ensure long term reliability. The rubber has been specially compounded to ensure acoustic impedance close to that of water. The hydrophone and connector housing are made of corrosion resistant aluminum-bronze.
TC4014-5 has differential output. The differential output is an advantage where long cables are used in an electrically noisy environment.

TECHNICAL SPECIFICATIONS	
Usable Frequency range:	15Hz to 480kHz
Linear Frequency range:	30Hz to 100kHz ±2dB 25Hz to 250kHz ±3dB
Receiving Sensitivity:	Single ended: -186dB ±3dB re 1V/µPa
	Diff. out: -180dB ±3dB re 1V/µPa)
Horizontal directivity:	Omnidirectional ±2dB at 100kHz
Vertical directivity:	270° ±2dB at 100kHz
Operating depth:	900m
Survival depth:	1200m
Operating temperature range:	-2°C to +55°C
Storage temperature range:	-40°C to +80°C
Weight in (air):	650g without cable
Max. output voltage:	≥2.8Vrms (at 12VDC)
Preamplifier gain:	26dB
Supply voltage:	12 to 24VDC
High pass filter:	15Hz -3dB
Calibration path attenuation:	at 10kHz 14dB
Current consumption:	<28mA at 12VDC <34 mA at 24VDC
Max. output effect:	50mW

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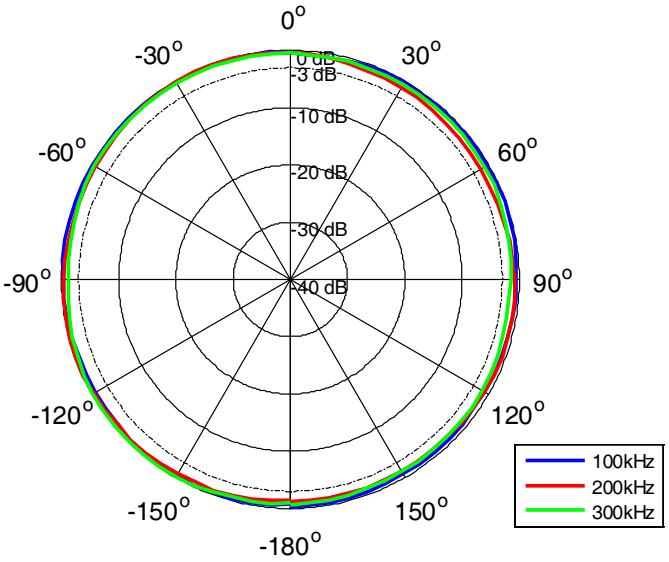
NBR means Nitrile Rubber

The NBR rubber is first of all resistant to sea and fresh water but also resistant to oil. It is limited resistant to petrol, limited resistant to most acids and will be destroyed by base, strong acids, halogenated hydrocarbons (carbon tetrachloride, trichloroethylene), nitro hydrocarbons (nitrobenzene, aniline), phosphate ester hydraulic fluids, Ketones (MEK, acetone), Ozone and automotive brake fluid.

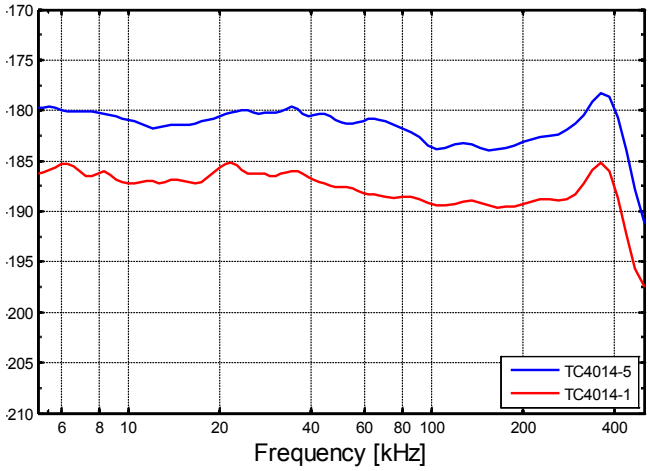
Documentation:

Horizontal directivity: At 100, 200, 300 kHz
Receiving sensitivity: At 5 kHz to 500 kHz
Vertical directivity: At 100, 200, 300 kHz
Sensitivity at ref.: frequencies: 250 Hz

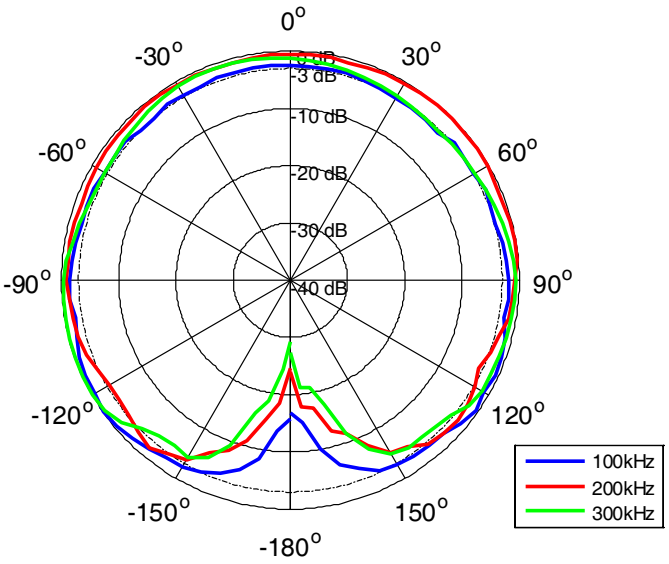
Horizontal directivity pattern



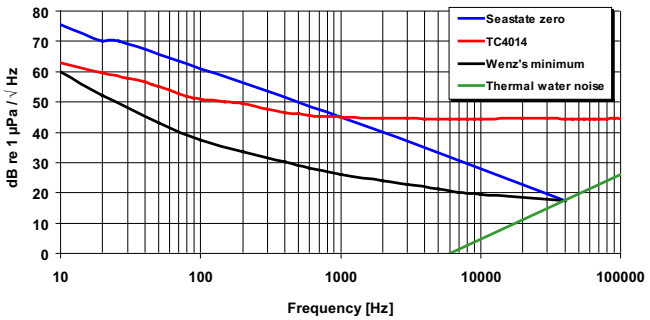
Receiving Sensitivity [dB re 1V/µPa @ 1m]



Vertical directivity pattern



Typical equivalent noise pressure curve



Valid for all versions of TC4014

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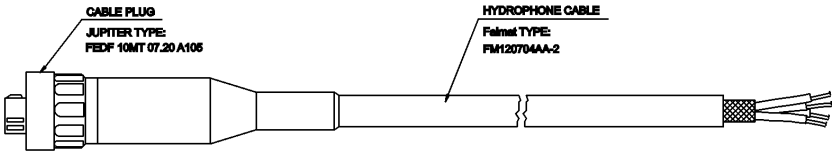
Accessories for TC4014-5



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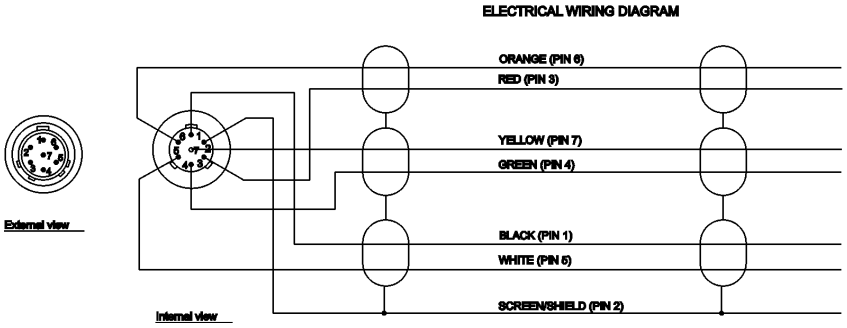

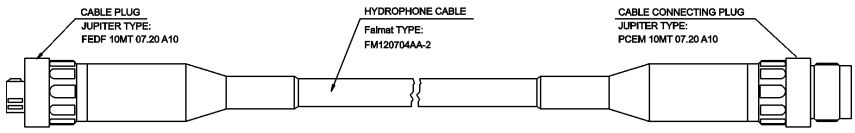

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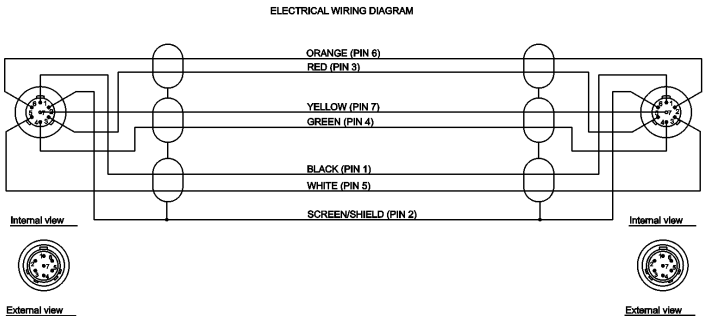
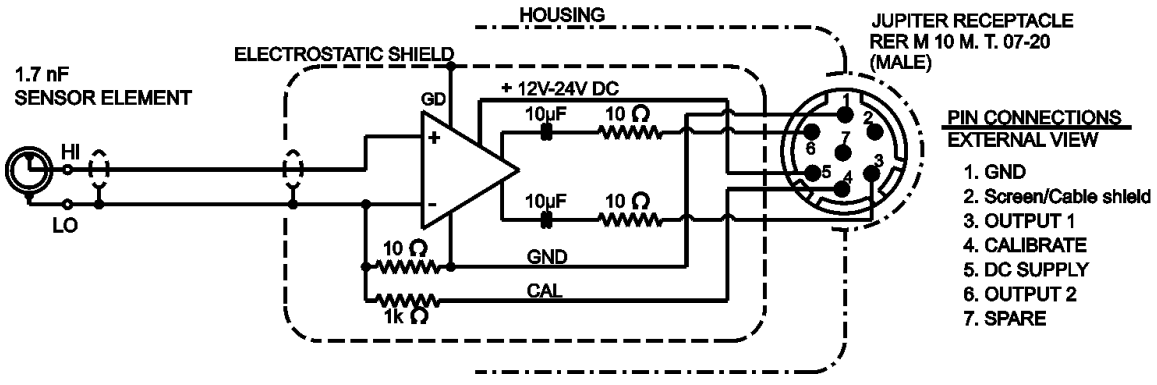


Electrical Diagram for TC4014-5



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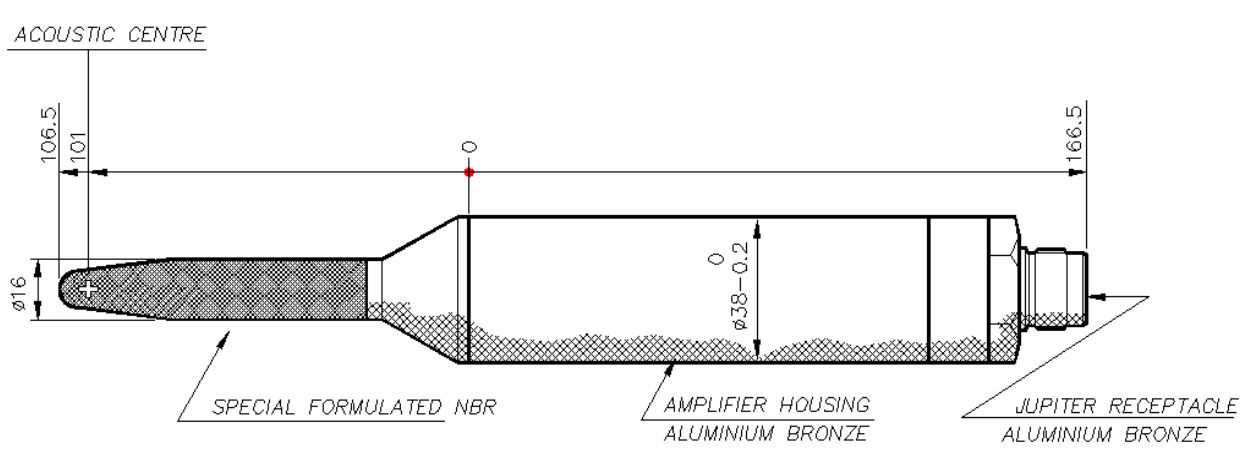
Insert voltage calibration

The TC4014 preamplifier contains an insert calibration circuit. This allows for electrical calibration of the hydrophone. The calibration method is not an absolute calibration but, it provides a reliable method for testing of the hydrophone, especially for hydrophones in fixed remote installations. The insert sine signal simulates the output signal from the sensor element.

To perform an insert calibration, use an appropriate function generator. The applied calibration signal must not exceed 10 Vrms. A higher voltage may damage the calibration resistor. 2 Vrms will be appropriate for insert calibration. The attenuation of the calibration signal is 14dB@10kHz for short cables.

Apply the signal to the calibrate input, connector contact 4. = green wire of cable. Connect generator ground to sine generator ground, and measure the signal on hydrophone output.

Outline Dimensions



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