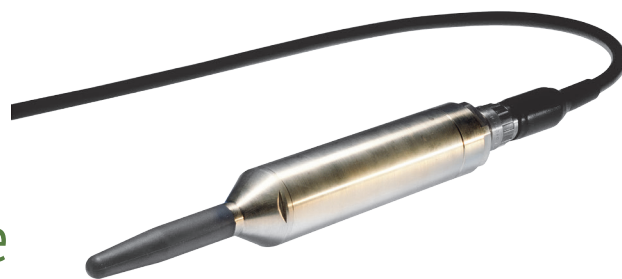


Teledyne RESON

# Hydrophone TC4014

## Broad Band Spherical Hydrophone



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

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

### PRODUCT BENEFITS

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

Please note that this product requires a minimum quantity per order



# Hydrophone TC4014

## Broad Band Spherical Hydrophone

### NBR means Nitrile Rubber

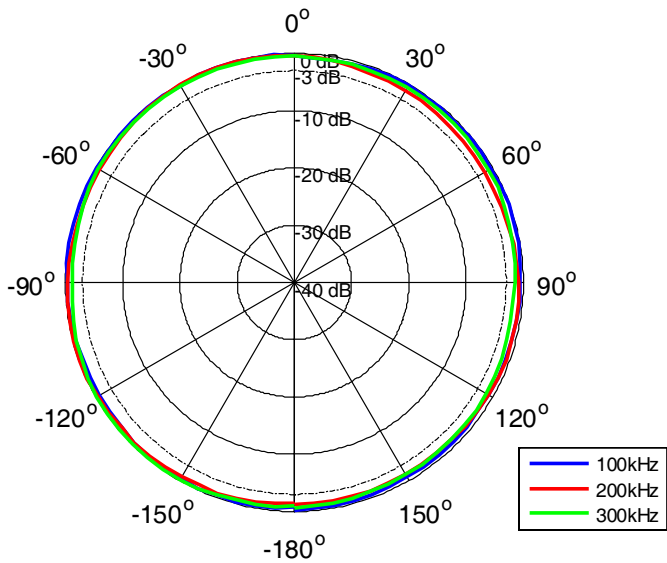
The NBR rubber is first of all resistant to sea and fresh water but also resistant to oil. It is limited resistant to petrol, limited resistant to most acids and will be destroyed by base, strong acids, halogenated hydrocarbons (carbon tetrachloride, trichloroethylene), nitro hydrocarbons (nitrobenzene,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

### Documentation:

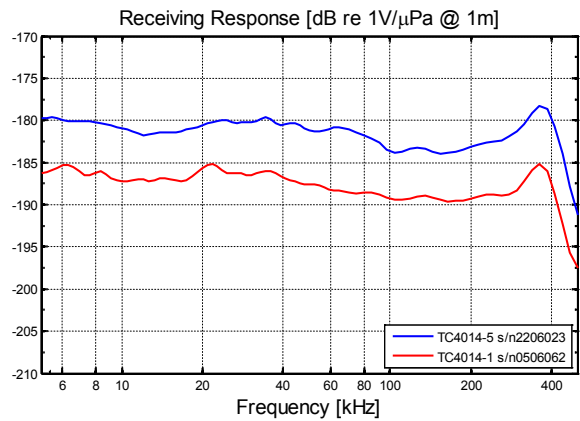
Horizontal directivity: At 100, 200, 300 kHz  
Receiving sensitivity: At 5 kHz to 500 kHz

Vertical directivity: At 100, 200, 300 kHz  
Sensitivity at ref.: frequencies: 250 Hz

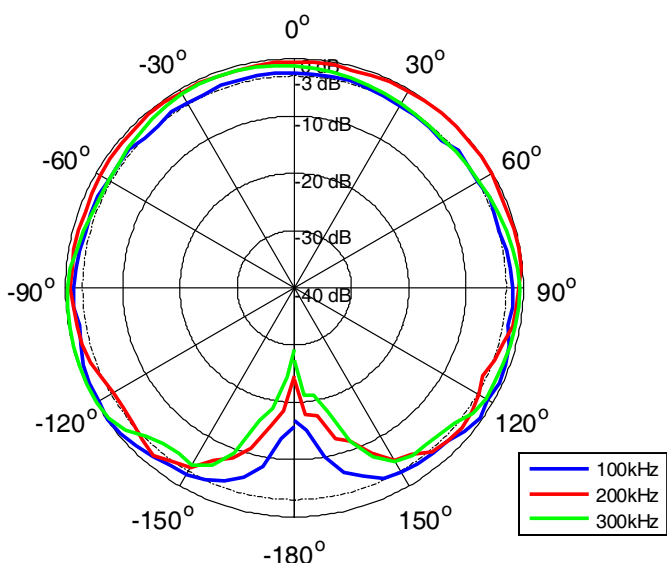
Horizontal directivity pattern



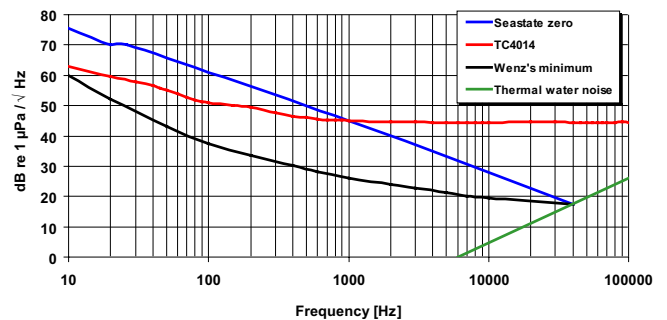
Receiving Sensitivity [dB re 1V/μPa @ 1m]



Vertical directivity pattern



Typical equivalent noise pressure curve



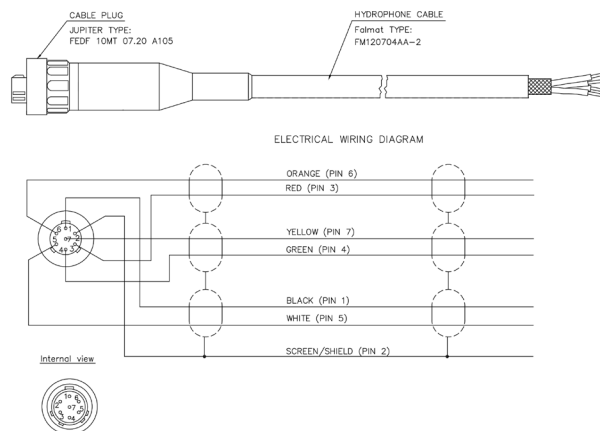
Valid for all versions of TC4014

# Hydrophone TC4014

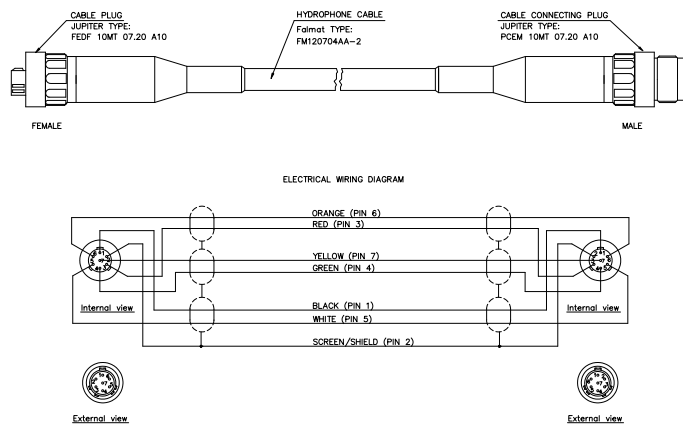
## Broad Band Spherical Hydrophone

### Accessories

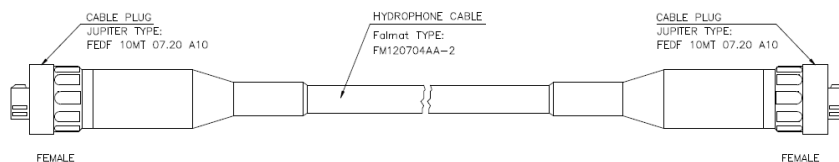
#### TL8140



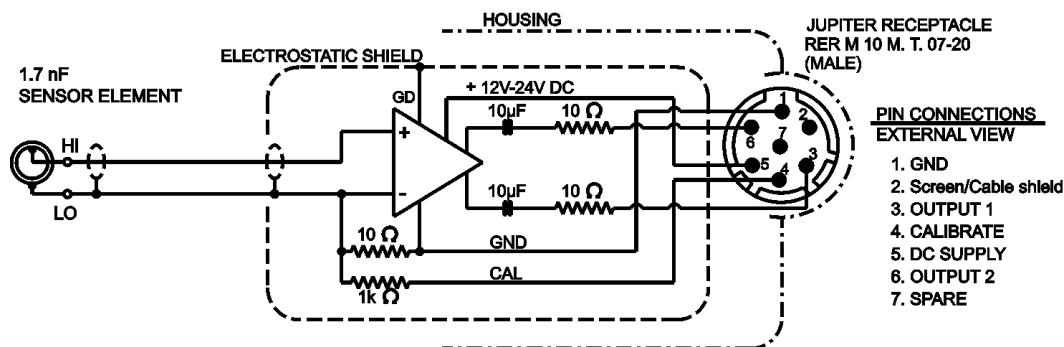
#### TL8142



#### TL8144



### Electrical Diagram for TC4014-5



# Hydrophone TC4014

## Broad Band Spherical Hydrophone

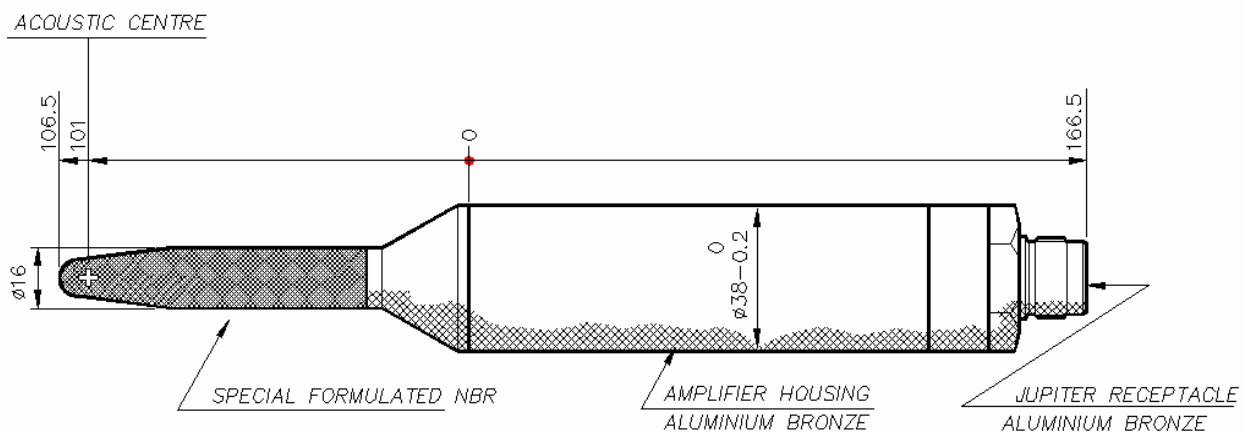
### Insert voltage calibration

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



For information on export control regulations on this product, please refer to [www.teledyne-reson.com](http://www.teledyne-reson.com)



For more details visit [www.teledyne-reson.com](http://www.teledyne-reson.com) or contact your local Teledyne RESON Office. Teledyne RESON reserves the right to change specifications without notice. 2016©Teledyne RESON

Teledyne RESON A/S  
Denmark  
Tel: +45 4738 0022  
[info@teledyne-reson.com](mailto:info@teledyne-reson.com)

Teledyne RESON Inc.  
U.S.A.  
Tel: +1 805 964-6260  
[sales@teledyne-reson.com](mailto:sales@teledyne-reson.com)

Teledyne RESON U.K. Ltd.  
Scotland U.K.  
Tel: +44 1224 709 900  
[sales@reson.co.uk](mailto:sales@reson.co.uk)

Teledyne RESON B.V.  
The Netherlands  
Tel: +31 (0) 10 245 1500  
[rbv-info@teledyne-reson.nl](mailto:rbv-info@teledyne-reson.nl)

Teledyne RESON GmbH  
Germany  
Tel: 49 421 3770 9600  
[hydro-sales@teledyne-reson.com](mailto:hydro-sales@teledyne-reson.com)

Teledyne RESON Shanghai Office  
Shanghai  
Tel: +86 21 6876 8038  
[shanghai@teledyne-reson.com](mailto:shanghai@teledyne-reson.com)