

# Hydrophone TC4032

## Low Noise Sea-State Zero Hydrophone



The TC4032 general purpose hydrophone offers a high sensitivity, low noise and a flat frequency response over a wide frequency range.

The high sensitivity and acoustic characteristics makes TC4032 capable of producing absolute sound measurements and detecting even very weak signals at levels below "Sea State 0".

The TC4032 incorporates an electrostatically shielded highly sensitive piezoelectric element connected to an integral low-noise 10dB preamplifier. The TC4032 preamplifier is capable of

driving long cables of more than 1,000 meters, and the preamplifier features an insert calibration facility.

Per default the amplifier is provided with differential output. The differential output is an advantage where long cables are used in an electrically noisy environment. For use in single ended mode: Use positive output pin together with GND.

Versions with different filter characteristics are available: 4032-1: 5Hz to 120kHz, 4032-2: 1Hz to 120kHz, and 4032-5: 100Hz to 120kHz

### TECHNICAL SPECIFICATIONS

Usable frequency range:	5Hz to 120kHz
Linear frequency range:	15Hz to 40kHz $\pm 2$ dB 10Hz to 80kHz $\pm 2.5$ dB
Receiving sensitivity:	-170dB re 1V/ $\mu$ Pa (-164dB with differential output)
Horizontal directivity:	Omnidirectional $\pm 2$ dB at 100kHz
Vertical directivity:	270° $\pm 2$ dB at 15kHz
Operating depth:	600m
Survival depth:	700m
Operating temperature range:	-2°C to +55°C
Storage temperature range:	-30°C to +70°C
Weight (in air):	720g without cable
Max. output voltage:	$\geq 3.5$ Vrms (at 12VDC)
Preamplifier gain:	10dB
Supply voltage:	12 to 24VDC
High pass filter:	7Hz -3dB
Quiescent supply current:	$\leq 19$ mA at 12VDC $\leq 22$ mA at 24VDC
Encapsulating material:	Special formulated NBR
Housing material:	Alu Bronze AlCu10Ni5Fe4



### PRODUCT BENEFITS

- Low noise performance
- High sensitivity
- Wide frequency range
- Flat frequency response
- Long term stability
- Individually calibrated



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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:

Individual calibration curves: 250kHz

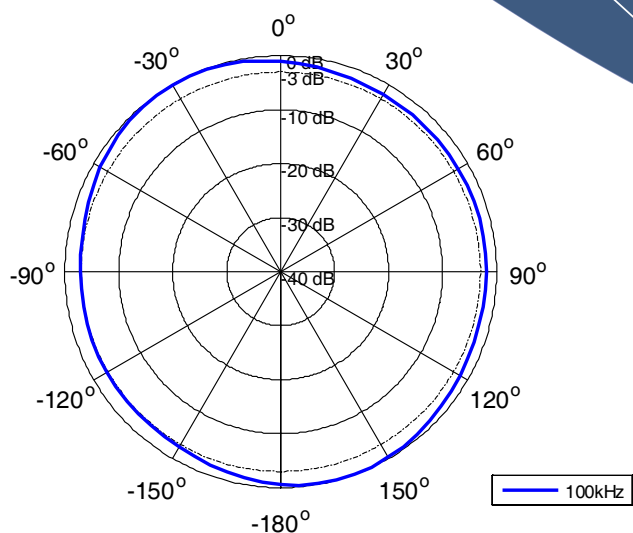
Sensitivity at reference frequencies: 250kHz

Receiving sensitivity: 5kHz to 100kHz

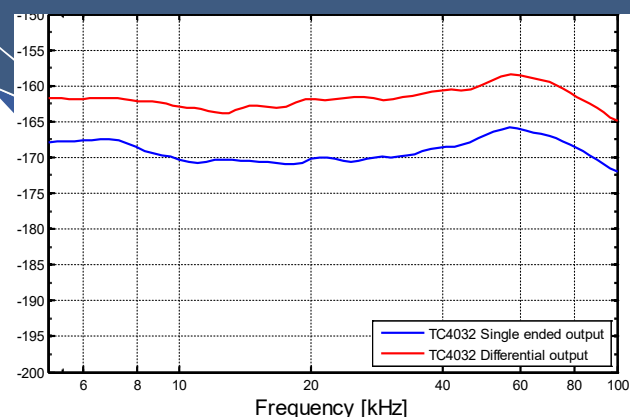
Vertical directivity: At 15kHz

Horizontal directivity: At 100kHz

Horizontal directivity pattern

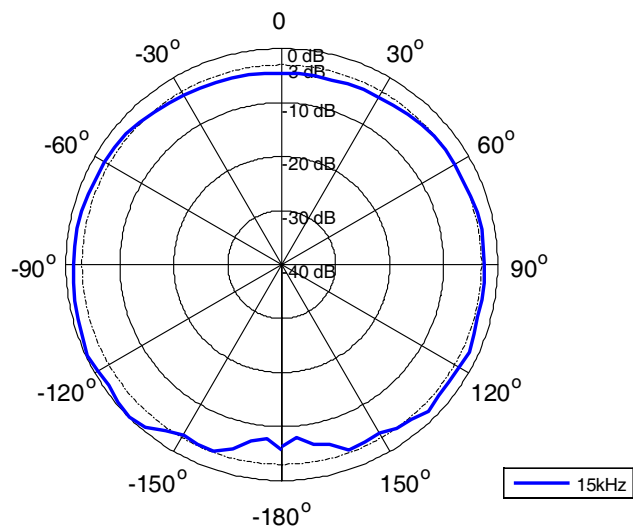


Receiving Sensitivity [dB re 1V/ $\mu$ Pa @ 1m]

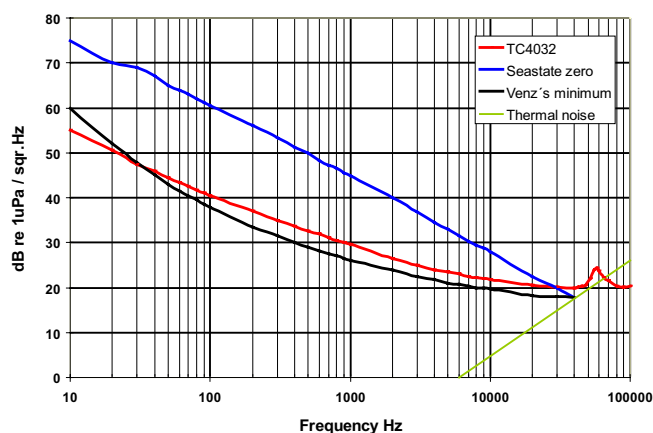


The OCR curve shown above is for single output

Vertical directivity pattern



Typical equivalent noise pressure curve



Valid for all versions of TC4032

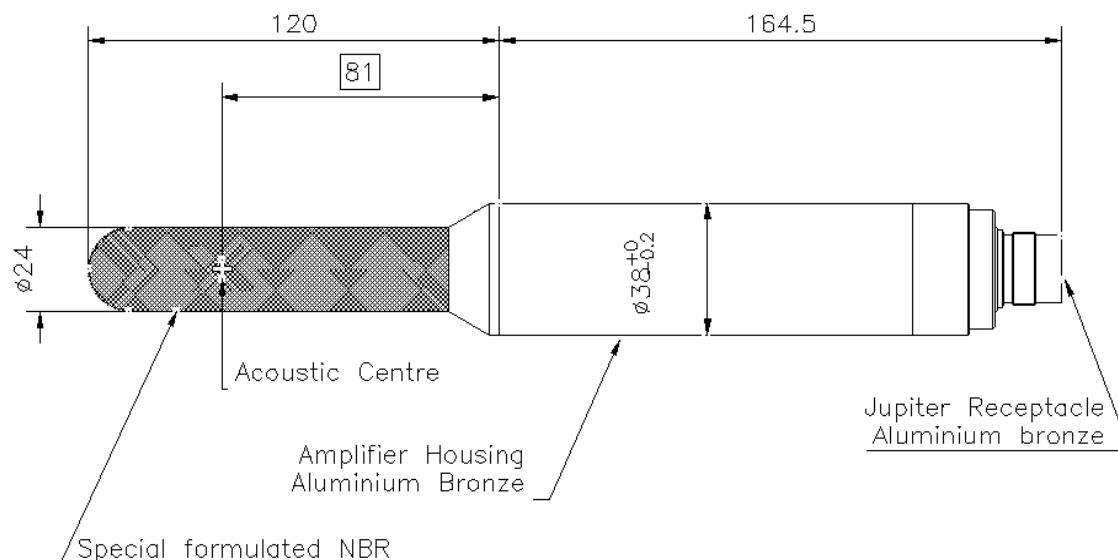


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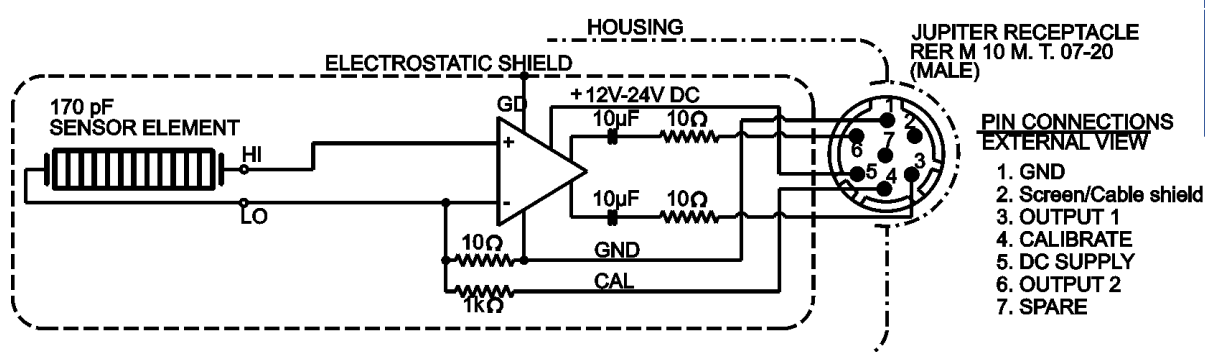
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### Outline Dimensions



### Electrical Diagram



Per default the amplifier is provided with differential output. The differential output is an advantage where long cables are used in an electrically noisy environment. For use in single ended mode: Use positive output pin (3) together with GND.

### Insert voltage calibration

The TC4032 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 10Vrms. A higher voltage may damage the calibration resistor. 2Vrms will be appropriate for insert calibration. The attenuation of the calibration signal is 30dB 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.

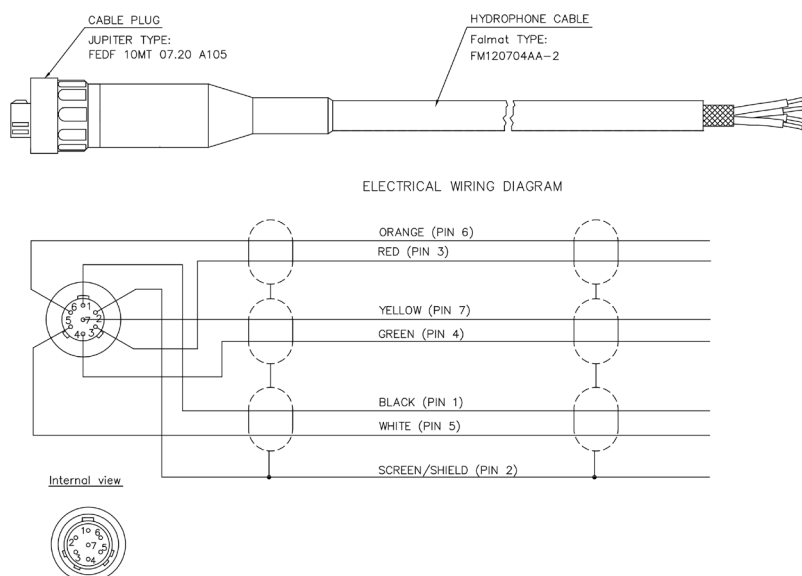
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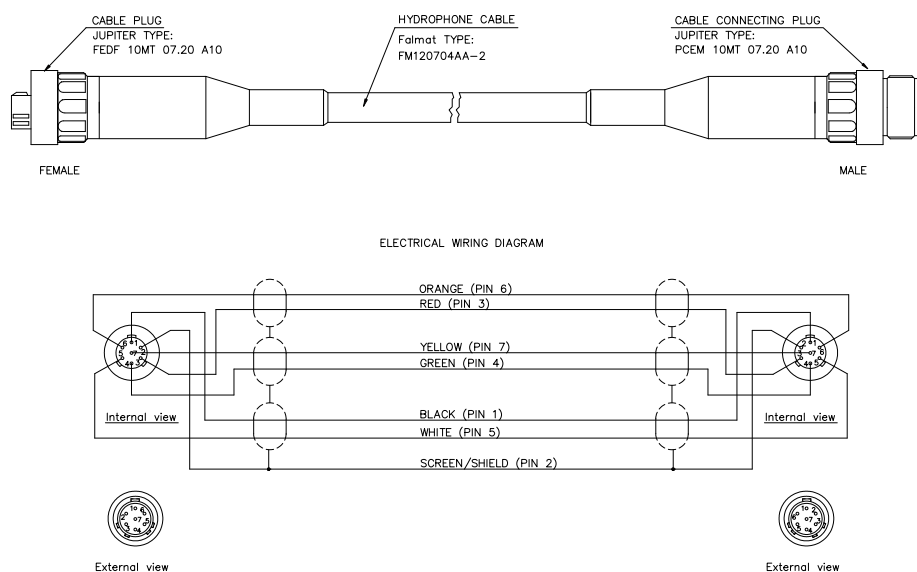


### Accessories

#### TL8140



#### TL8142



#### TL8144

