



KONGSBERG

# ***cNODE Explorer*** ***Instruction Manual***

461378/A

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## Document information

- **Product:** Kongsberg cNODE Explorer
- **Document:** Instruction Manual
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*The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.*

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## Support information

If you require maintenance or repair, contact Kongsberg Maritime's support organisation. You can also contact us using the following address: [km.support.hpr@kongsberg.com](mailto:km.support.hpr@kongsberg.com). If you need information about our other products, visit <https://www.kongsberg.com/maritime>.

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# About this manual

The purpose of this manual is to provide the descriptions, procedures and detailed parameter explanations required to allow for safe and efficient use of the cNODE Explorer.

## **Target audience**

This manual is intended for all users of the cNODE Explorer.

## **Online information**

All end-user manuals provided for operation and installation of your cNODE Explorer can be downloaded from our website.

<https://www.kongsberg.com/maritime>

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# Kongsberg cNODE Explorer

## **Topics**

[System description, page 7](#)

[System units, page 7](#)

[General supply conditions, page 8](#)

[Support information, page 9](#)

## System description

cNODE Explorer is designed for integration onto AUVs, ROVs or other vehicles where space and weight are restricted.

The cNODE electronics can be supplied in a pressure rated underwater housing or in compact lightweight non pressure rated housing for full third party integration.

cNODE Explorer is a compact transponder that is fully compatible with HiPAP, cPAP and  $\mu$ PAP underwater positioning systems.

cNODE Explorer may be connected with up to three remote transducers. The transducers may be selected and switched electronically by the subsea vehicle control system or acoustically, to optimise for example vertical or horizontal positioning performance.

The transducers may be selected and switched electronically by the subsea vehicle control system or acoustically, to optimise for example vertical or horizontal positioning performance.

## System units

### Transponders

The transponders are available in a pressure rated housing or in an open model for integration.



The titanium models have a depth rating of 7000 metres. The aluminium models are open for integration into other systems.

## Remote transducers

There are different remote transducers available for many uses.

The cable connects the remote transducer to the transponder.



## General supply conditions

General supply conditions apply to this cNODE Explorer delivery.

### Receipt, unpacking and storage

Upon accepting shipment of the equipment, the shipyard and/or the dealer must ensure that the delivery is complete and inspect each shipping container for evidence of physical damage.

If the inspection reveals any indication of crushing, dropping, immersion in water or any other form of damage, the recipient should request that a representative from the company used to transport the equipment be present during unpacking.

All equipment must be inspected for physical damage, i.e. broken controls and indicators, dents, scratches etc. during unpacking. If any damage to the equipment is discovered, the recipient must notify both the transportation company and Kongsberg Maritime so that Kongsberg Maritime can arrange for replacement or repair of the damaged equipment.

Once unpacked, the equipment must be stored in a controlled environment with an atmosphere free of corrosive agents, excessive humidity or temperature extremes.

The equipment must be covered to protect it from dust and other forms of contamination when stored.

### Equipment responsibility

Unless otherwise stated in the contract, the shipyard doing the installation and/or equipment dealer becomes fully responsible for the equipment upon receipt.

The duration of responsibility cover:



- The period of time the equipment is stored locally before installation
- The entire installation process
- Commissioning
- The period of time between commissioning and the final acceptance of the equipment by the end user or owner

Unless other arrangements have been made in the contract, the Kongsberg cNODE Explorer warranty period (as specified in the contract) begins when the acceptance documents have been signed.

## Support information

Should you need technical support for your cNODE Explorer you must contact a Kongsberg Maritime office. A list of all our offices is provided on our website. You can also contact our main support office in Norway.

Manuals and technical information can be downloaded from our support website.

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<b>Website</b>	<a href="https://www.kongsberg.com/maritime/">https://www.kongsberg.com/maritime/</a>
<b>Support website</b>	<a href="#">Product support A to Z</a>
<b>E-mail address</b>	<a href="mailto:km.support.hpr@kongsberg.com">km.support.hpr@kongsberg.com</a>

# Cable layout and interconnections

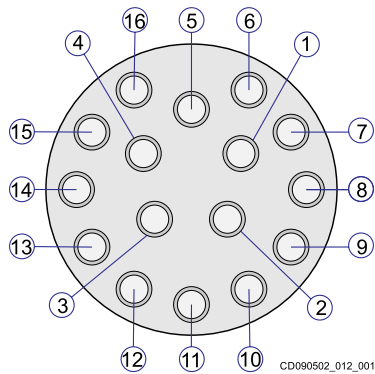
## Topics

[Transponder interface connector pinout, P1, page 11](#)

[Transducer connector pinout, TD1, page 12](#)

## Transponder interface connector pinout, P1

This is the pin configuration for a male plug, as seen towards the plug (face view).

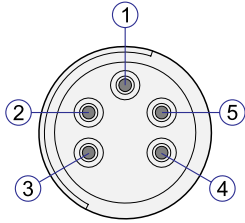


Pin number	Signal
1	RS-232 Tx 1
2	RS-232 Rx 1
3	Ground
4	
5	
6	
7	VDC In
8	Ground
9	
10	
11	
12	
13	Responder trigger +
14	Responder trigger -
15	
16	Ground

## Transducer connector pinout, TD1

This is the pin configuration for a female connector, as seen towards the connector (face view).

The other transducer connectors, TD2 and TD3, are not used for this product.



Pin number	Signal
1	TD +
2	ID data
3	
4	TD –
5	Ground

# General acoustic considerations

Take this information into consideration when deploying the transponders.

## **Acoustic range**

The depth rating should not be confused with acoustic range. The acoustic range is dependent on many factors, and some of the factors are outside control of the user.

## **Vessel system**

The directivity and coverage area for the vessel system is different, depending on which system you are using. Some systems have high directivity and omnidirectional coverage, while other systems has reduced coverage and less directivity. The transponder should always be within the coverage cone of the vessel system.

## **Transducer type**

There are different types of transducers used on the transponders. An omnidirectional transducer, such as a TD180, covers a large area, but has less acoustic power compared to a focused transducer, such as TD50V. A focused signal gives less footprint/coverage. The vessel should always be within the signal footprint of the transponder.

## **Tx Power**

The ability to detect signals depends on the signal strength. The transmission power can be adjusted, both for the vessel system and for the transponder.

## **Acoustic noise**

Acoustic noise is present at all vessels. At given conditions, the noise level can be excessive. Acoustic noise is caused by main propellers and thrusters, and in some instances also from machinery/pumps on board. Heavy propeller/thruster use or also waves can also generate air bubbles, which can get in front of the vessel transducer and block the acoustic signal.

### **Sound velocity and ray bending**

Changes in sound velocity through the water column caused by changes in the water temperature and/or salinity can bend the acoustic signal and make it impossible to reach the vessel.

# Operating procedures

The transponder is operated from the HiPAP operator station APOS.

- Refer to APOS online help for descriptions.

# Maintenance

## Lubricating SubConn® connectors

Underwater connectors must be kept clean and lubricated and should be inspected regularly for damages and corrosion.

### Context

SubConn® connectors should not be exposed to extended periods of heat or direct sunlight. If a connector becomes very dry, it should be soaked in fresh water before use.

See also information from the manufacturer <https://www.macartney.com/what-we-offer/support/subconn-handling-instructions/>

### Procedure

- 1 Grease the connector with Molykote 44 Medium or equivalent grease.  
A layer of grease corresponding to minimum 1/10 of the socket depth should be applied to the female connector.
- 2 Check that the inner edge of all sockets is completely covered, and a thin transparent layer of grease is visible on the face of the connector.
- 3 Fully mate the male and female connector in order to secure optimal distribution of grease on pins and in sockets.
- 4 Open and check for grease on every male pin, to confirm that enough grease is applied.  
Add more if necessary.
- 5 Connect and tighten the locking sleeve.



# Spare parts

## Topics

[cNODE Explorer 17 spare part, page 18](#)

[cNODE Explorer 10 spare part, page 18](#)

[TDR50V spare part, page 18](#)

[TDR180 LF spare part, page 18](#)

[Transducer cable spare part, page 18](#)

[Interface cable spare part, page 19](#)

## cNODE Explorer 17 spare part

- **Part name:** cNODE Explorer 17
- **Part number:** 461377



## cNODE Explorer 10 spare part

- **Part name:** cNODE Explorer 10
- **Part number:** TBD



## TDR50V spare part

- **Part name:** TDR50V Steel
- **Part number:** 330015



## TDR180 LF spare part

- **Part name:** TDR180 LF
- **Part number:** 394674



## Transducer cable spare part

- **Part name:** Transducer cable
- **Part number:** 454835



## Interface cable spare part

This cable has a female 16-pin SubConn connector (MCIL16F) in one end and a pigtail in the other. It is the cable between the cNODE Explorer 17 and the customer's system.

- **Part name:** Interface cable
- **Part number:** 345771

# Technical specifications

## Topics

[Performance specifications, page 21](#)

[Weight and outline dimensions, page 22](#)

[Power requirements, page 22](#)

[Environmental requirements, page 23](#)

## Performance specifications

These performance specifications summarize the main functional and operational characteristics of the cNODE Explorer transponder.

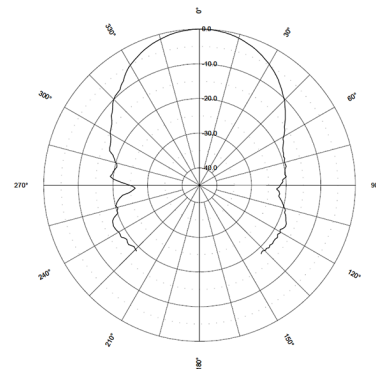
- **Operational frequency:** 12 kHz
- **Responder trigger signal:** 5 - 25 V positive logic pulse (2 - 6 ms)
- **Pigtail cable:** SubConn MCIL16F, 0.60 m
- **Operating range:** 10,000 – 13,000 m (depending on the transducer)

### cNODE Explorer 17

- **Interface connector:** SubConn MCBH16MTI
- **Transducer connector:** SubConn MCBH5FTI
- **Depth rating:** 7000 m

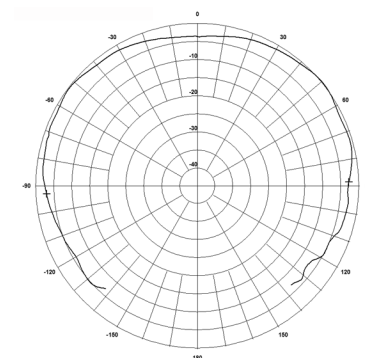
### TDR50V

- **Transducer beam:** 50° Vertical
- **Trigger level:** 85 dB
- **Source level:** 195 dB



### TDR180

- **Transducer beam:** 180°
- **Trigger level:** 100 dB
- **Source level:** 188 dB



## Weight and outline dimensions

These weights and outline dimension characteristics summarize the physical properties of the cNODE Explorer system.

### **cNODE Explorer 17**

- **Outline dimensions:**
  - **Height:** 323 mm
  - **Diameter:** 79 mm
- **Weight (In air):** 2.3 kg
- **Weight(In water):** 1.8 kg

### **TDR50V Steel**

- **Outline dimensions:**
  - **Height:** 380 mm
  - **Diameter:** 206 mm
- **Weight (In air):** 23.5 kg
- **Weight(In water):** 18.5 kg

### **TDR180 LF**

- **Outline dimensions:**
  - **Height:** 158 mm
  - **Diameter:** 94 mm
- **Weight (In air):** 4.0 kg
- **Weight(In water):** 3.5 kg

## Power requirements

These power characteristics summarize the supply power requirements for the cNODE Explorer transponder.

- **Voltage requirement:** 34-75 VDC
- **Nominal voltage:** 48 VDC
- **Transmit power:** 100 W
- **Standby power:** 12 W
- **Maximum inrush:** 6 A

## Environmental requirements

These specifications summarize the temperature requirements and other environmental standards for the cNODE Explorer system.

- **Operating temperature:** -5 to 55 °C
- **Storage temperature:** -30 to 70 °C

# Drawing file

## Topics

[cNODE Explorer 10, page 25](#)

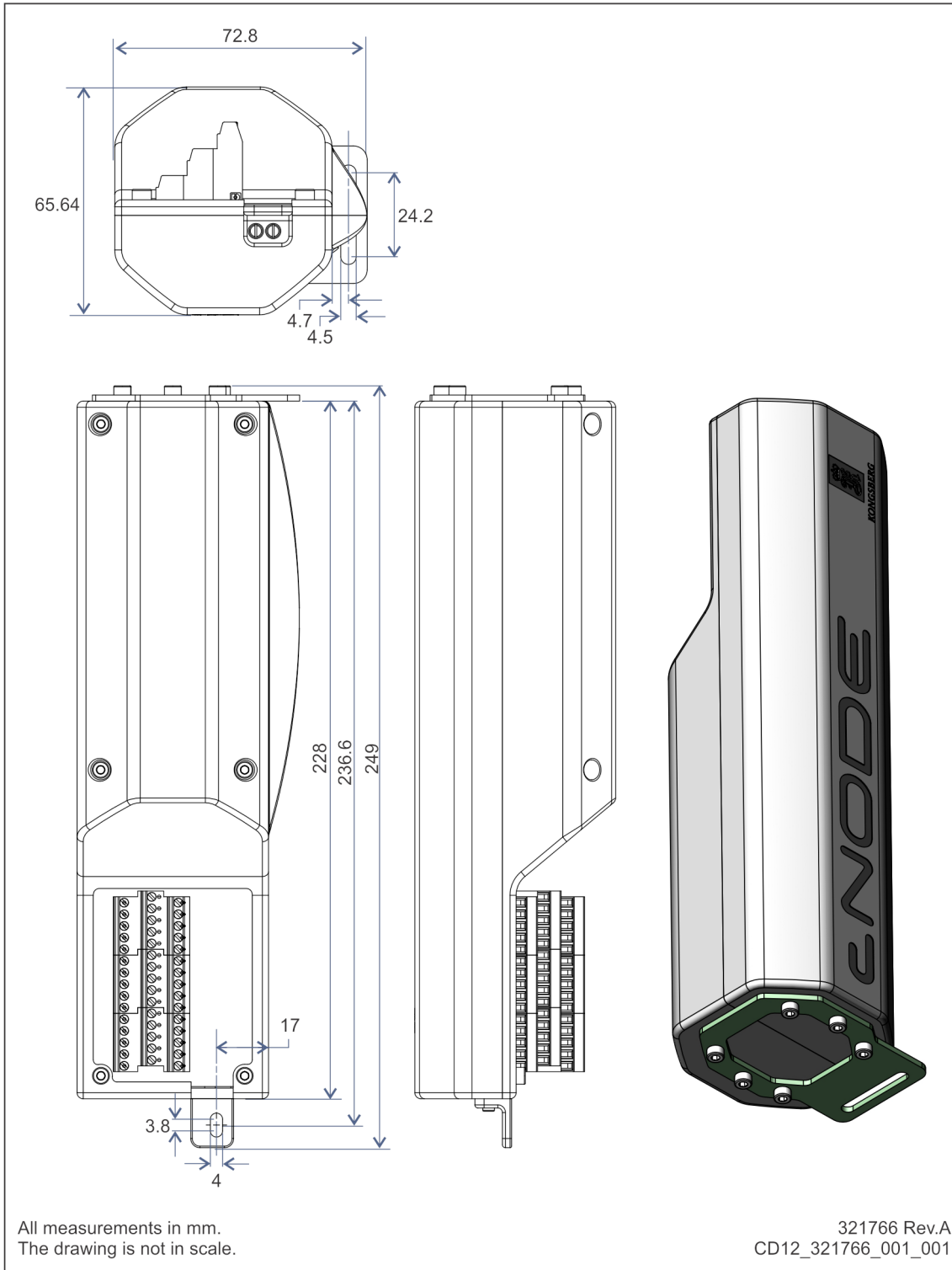
[cNODE Explorer 17, page 26](#)

[TDR50V Steel Outline dimensions, page 27](#)

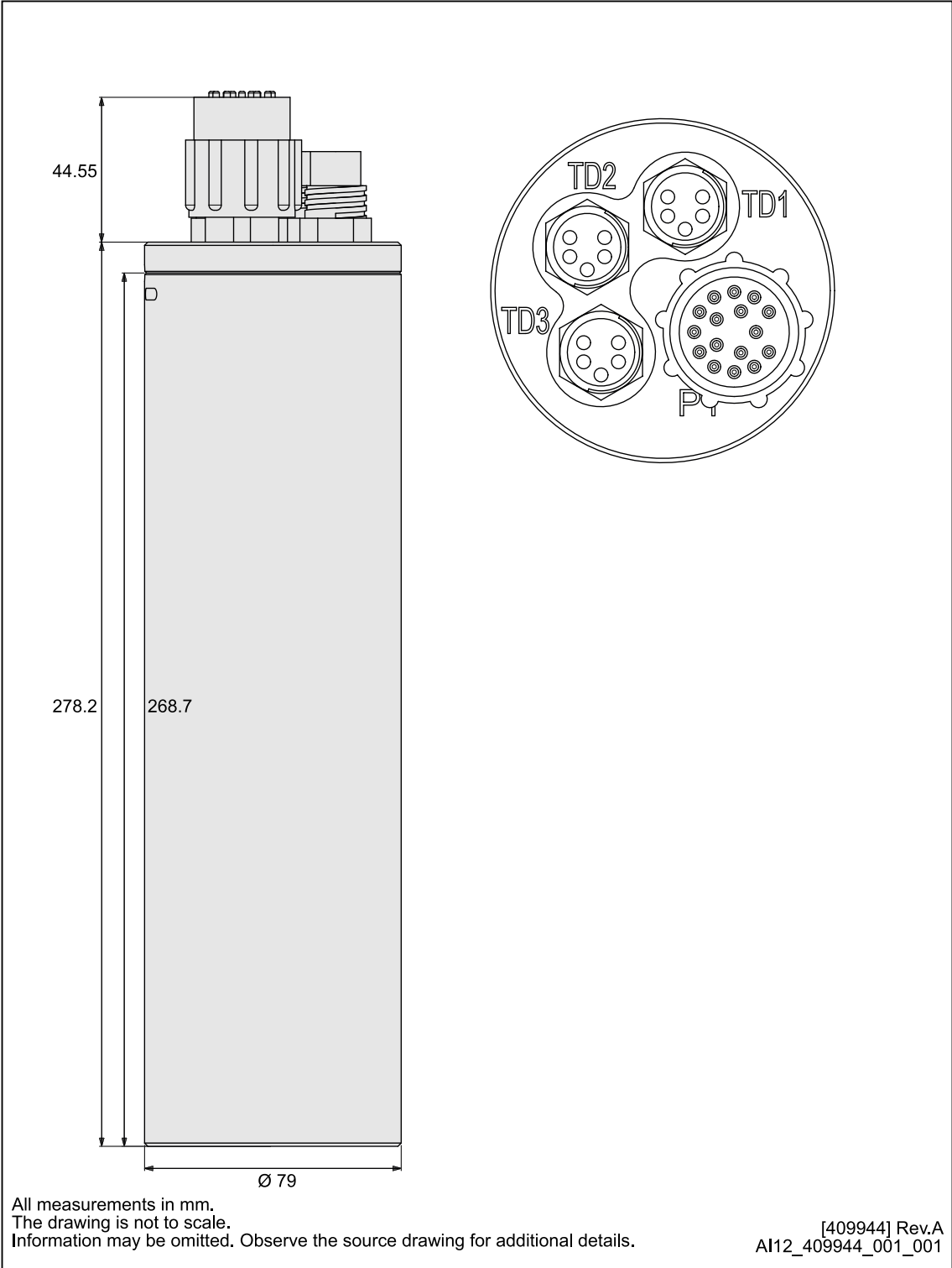
[TDR180 Outline dimensions, page 28](#)



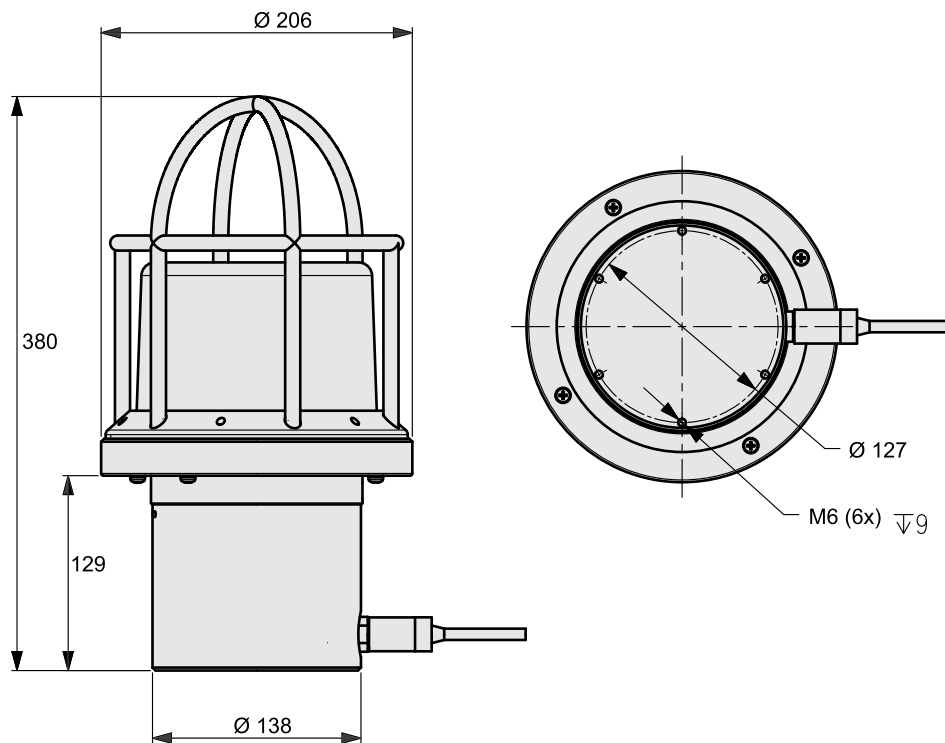
# cNODE Explorer 10



# cNODE Explorer 17



## TDR50V Steel Outline dimensions

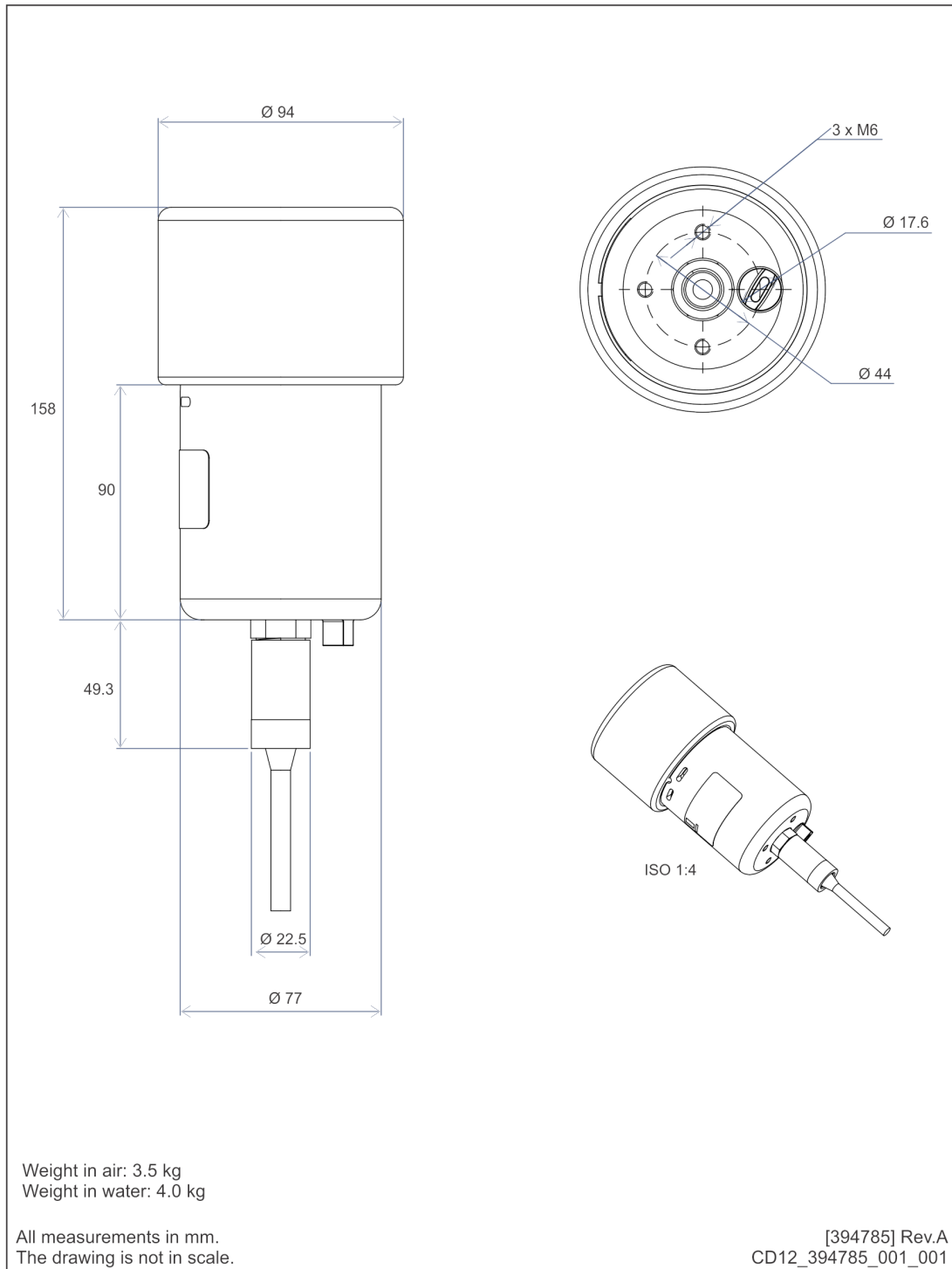


Steel:  
Weight in air 23.5 kg  
Weight in water 18.5 kg

All measurements in mm.  
The drawing is not to scale.  
Information may be omitted. Observe the source drawing for additional details.

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## TDR180 Outline dimensions



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