Instruction Manual

KONGSBERG

cNODE® Modem Explorer

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cNODE Modem Explorer

Instruction Manual

419105/A

Document information

- **Product**: Kongsberg cNODE Modem Explorer
- **Document**: Instruction Manual
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Copyright

Warning

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.

Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Disclaimer

Kongsberg Maritime AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us using the following address: km.support.hpr@kongsberg.com. If you need information about our other products, visit http://www.kongsberg.com. On this website you will also find a list of our dealers and distributors.

Table of contents

Important

cNODE Modem Explorer 10 and cNODE Modem Explorer 30 must be installed in a dry area.

The modems have different power supply requirements, so please read the power specifications section before installation.

About this manual

Observe this general information about the cNODE Modem Explorer Instruction Manual; its purpose and target audience.

Purpose of manual

The purpose of this instruction manual is to provide the descriptions and procedures required to install, operate and maintain the cNODE Modem Explorer.

Target audience

The manual is intended for all users of cNODE Modem Explorer.

Registered trademarks

Observe the registered trademarks that apply.

Windows® is a registered trademark of Microsoft Corporation in the United States and other countries.

Kongsberg cNODE Modem Explorer

Topics

System description

cNODE Modem 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 Modem Explorer is a compact transponder and modem that is fully compatible with HiPAP, cPAP and µPAP underwater positioning systems.

cNODE Modem 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 optimize for example vertical or horizontal telemetry and positioning performance.

The unit will operate as any standard cNODE offering telemetry, SSBL and long baseline positioning modes. The cNODE Modem Explorer interfaces with a subsea vehicle via a serial interface to transfer modem data. The transparent modem capability allows commands and data to be transmitted to and from the subsea vehicle from the customers topside control system via the vessels HiPAP system.

The modem utilizes Cymbal acoustic protocol.

System units

cNODE Modem Explorer 34

The modem is an aluminium model rated for 4500 m. It is a medium frequency model and it has four external connectors.

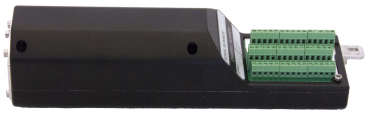
cNODE Modem Explorer 37

The modem is a titanium model rated for 7000 m. It is a medium frequency model and it has four external connectors.

cNODE Modem Explorer 17

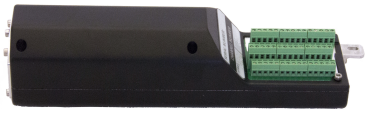
The modem is a titanium model rated for 7000 m. It is a low frequency model and it has four external connectors.

cNODE Modem Explorer 30



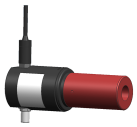
The modem is made from aluminium and it is a medium frequency model.

cNODE Modem Explorer 10



The modem is made from aluminium and it is a low frequency model.

Remote transducer TDR30H



The medium frequency transducer has a 30° horizontal beam width. Available in Super Duplex stainless steel and aluminium.

Remote transducer TDR30V

The medium frequency transducer has a 30° vertical beam width. Available in Super Duplex stainless steel and aluminium.

Remote transducer TDR180

The medium frequency transducer has a 180° omnidirectional beam width. Available in Super Duplex stainless steel and aluminium.

Remote transducer TDR40V

The medium frequency transducer has a 40° vertical beam width. Available in Super Duplex stainless steel and aluminium.

Remote transducer TDR50V LF

This is a low frequency transducer with a 50° vertical beam width and it is available in Super Duplex stainless steel.

Remote transducer TDR180 LF

This is a low frequency transducer with a 180° omnidirectional beam width and it is available in Super Duplex stainless steel.

Transducer cable 6 m

The transducer cable has two Subconn connectors; MCIL5F and MCIL5M. The cable connects all the remote transducers to the transponder.

Scope of supply

The following items are provided when you order a cNODE Modem Explorer.

- cNODE Modem Explorer
- Transducer
- Instruction manual

General supply conditions

The following general supply conditions apply to this Kongsberg cNODE Modem 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 Modem Explorer warranty period (as specified in the contract) begins when the acceptance documents have been signed.

Support information

If you need support for your Kongsberg cNODE Modem Explorer you must contact Kongsberg Maritime AS.

- **Company name**: Kongsberg Maritime AS
- **Address**: Strandpromenaden 50, 3190 Horten, Norway
- **Telephone, 24h support**: +47 33 03 24 07
- **Telefax**: +47 33 04 76 19
- **Website**: http://www.km.kongsberg.com
- **Support website**: http://www.km.kongsberg.com/support_hpr
- **E-mail address**: km.support.hpr@kongsberg.com

Technical specifications

The technical specifications summarize the main functional and operational characteristics of the cNODE Modem Explorer system, as well as information related to power requirements, physical properties and environmental conditions.

Note

We are continuously working to improve the quality and performance of our products. Technical specifications may therefore be changed without prior notice.

Topics

Performance specification

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

cNODE Modem Explorer 34

- **Depth rating**: 4500 m

cNODE Modem Explorer 37

- **Depth rating**: 7000 m

cNODE Modem Explorer 17

- **Depth rating**: 7000 m

Weight and outline dimensions

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

cNODE Modem Explorer 34

- **Physical dimensions**:
  - **Length**: 279 mm (plus 45 mm for connectors)
  - **Diameter**: 89 mm
- **Weight in air**: 3.4 kg
- **Weight in water**: 1.65 kg

cNODE Modem Explorer 37

- **Physical dimensions**:
  - **Length**: 279 mm (plus 45 mm for connectors)
  - **Diameter**: 79 mm
- **Weight in air**: 2.3 kg
- **Weight in water**: 1.8 kg

cNODE Modem Explorer 17

- **Physical dimensions**:
  - **Length**: 279 mm (plus 45 mm for connectors)
  - **Diameter**: 79 mm
- **Weight in air**: 2.3 kg

- **Weight in water**: 1.8 kg

cNODE Modem Explorer 10 and 30

- **Physical dimensions**:
  - **Length**: 238 mm
  - **Diameter**: 68 mm (plus 11 mm for attachment lug)
- **Weight in air**: 0.7 kg

Remote transducer TDR30H

- **Physical dimensions**:
  - **Height**: 225 mm
  - **Diameter**: Ø 80 mm
- **Weight in air**: 1.9 kg
- **Weight in water**: 1.0 kg

Remote transducer TDR180

- **Physical dimensions**:
  - **Height**: 172 mm
  - **Diameter**: Ø 88 mm
- **Weight in air**: 2.1 kg
- **Weight in water**: 1.1 kg

Remote transducer TDR30V

- **Physical dimensions**:
  - **Height**: 197.5 mm
  - **Diameter**: Ø 138 mm
- **Weight in air**: 8.0 kg
- **Weight in water**: 5.0 kg

Remote transducer TDR40V

- **Physical dimensions**:
  - **Height**: 173 mm
  - **Diameter**: Ø 100 mm
- **Weight in air**: 2.7 kg
- **Weight in water**: 1.6 kg

Remote transducer TDR180 LF

- **Height**: 207.3 mm
- **Diameter**: Ø 94 mm
- **Weight in air**: 4 kg
- **Weight in water**: 3.5 kg

Remote transducer TDR50V LF

- **Physical dimensions**:
  - **Height**: 380 mm
  - **Diameter**: Ø 206 mm
- **Weight in air**: 23.5 kg
- **Weight in water**: 18.5 kg

Power specifications

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

cNODE Modem Explorer 17, 34 and 37

- **Power supply**: 48 VDC (34–75 VDC)
- **Transmitting power (max)**: 100 W
- **Standby power**: 12 W
- **Optional power supply**: 24 VDC (18–36 VDC)
- **Data interface**: RS-232

cNODE Modem Explorer 10 and 30

- **Power supply**: 15 VDC (11–17 VDC)
- **Transmitting power (max)**: 100 W
- **Standby power**: < 100 mW
- **Data interface**: RS-232
- **Inrush power**: 300 W

Environmental specifications

These environmental specifications summarize the temperature and humidity requirements for the cNODE Modem Explorer.

All cNODE Modem Explorer units

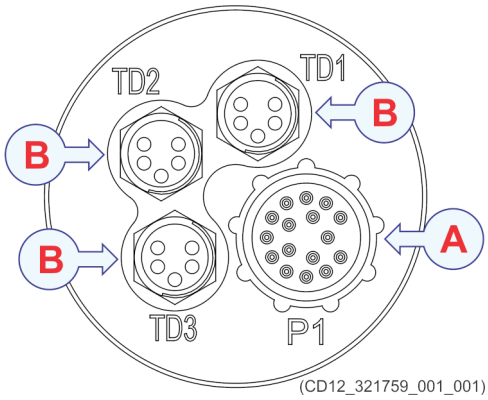
- **Operational temperature**: -5 to +50 °C
- **Storage temperature**: -30 to +70 °C

Cable layout and interconnections

Topics

cNODE Modem Explorer 17, 34 and 37 connector specifications

The cNODE Modem Explorer 17, 34 and 37 has three connectors for remote transducers and one interface connector.



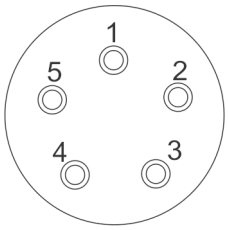
A Modem interface connector

B Transducer interface connector

Note

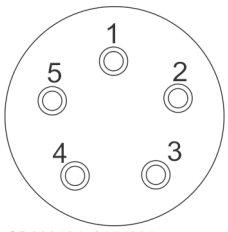
Do not connect anything to unnamed terminals.

Transducer interface connector (TD1)



Pin number	Signal
1	TD1+
2	1–WR1
3	
4	TD1–
5	GND

Transducer interface connector (TD2)



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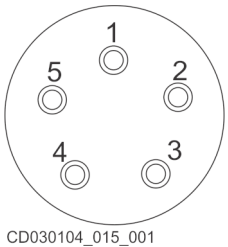
Pin number	Signal
1	TD2+
2	1–WR2
3	
4	TD2–
5	GND

Transducer interface connector (TD3)



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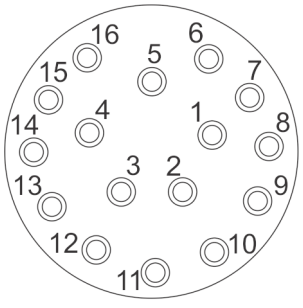
Pin number	Signal
1	TD3+
2	1–WR3
3	
4	TD3–
5	GND

Modem interface connector (P1)



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Pin number	Signal
1	Tx1 RS-232
2	Rx1 RS-232
3	GND RS-232
4	
5	
6	
7	+48 V DC IN
8	0 V DC IN
9	
10	
11	
12	
13	RESPONDER TRIG+
14	RESPONDER TRIG-
15	
16	GND

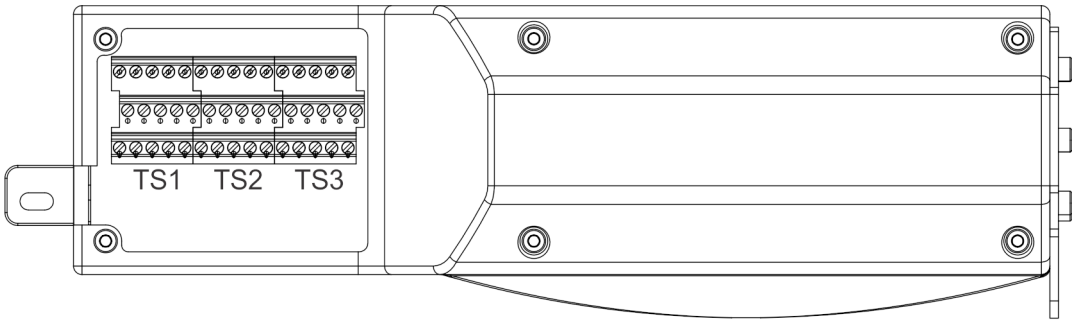
cNODE Modem Explorer 10 and 30 connector specifications

The cNODE Modem Explorer 10 and 30 has three interface connectors.

Terminal block cable requirements

- **Maximum AWG**: 16 (1.3 mm²)
- **Minimum AWG**: 30 (0.5 mm²)

Connector layout



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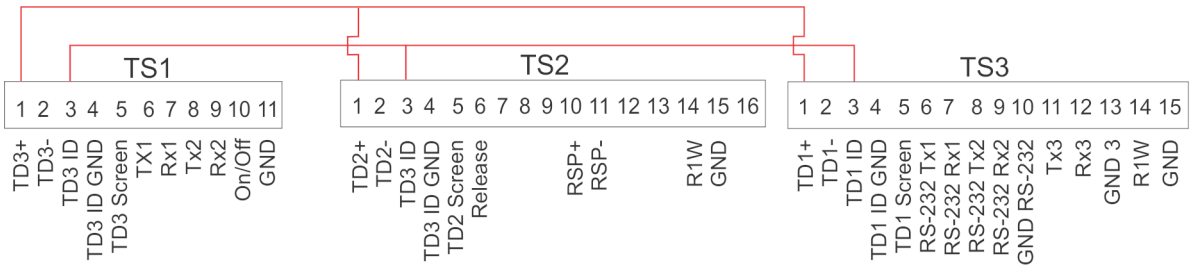
Note

Do not connect anything to unnamed terminals.

Wiring specification



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The transducer signal between TD1, TD2 and TD3 is linked on the terminal blocks. Connect the transducer wire to any of the TD+ terminals and the corresponding TD-. Then do the same for the ID signal.

Connector (TS1)

Pin number	Signal
1	TD3+
2	TD3–
3	ID3
4	ID3 GND
5	TD SCREEN
6	
7	
8	
9	
10	ON/OFF
11	GND
12	0 VDC IN
13	0 VDC IN
14	+15 VDC IN
15	+15 VDC IN

Connector (TS2)

Pin number	Signal
1	TD2+
2	TD2–
3	ID2
4	ID2 GND
5	TD SCREEN
6	
7	
8	
9	
10	RESPONDER TRIG IN+
11	RESPONDER TRIG IN-
12	
13	
14	
15	

Connector (TS3)

Pin number	Signal
1	TD1+
2	TD1–
3	ID1
4	ID1 GND
5	TD SCREEN
6	Tx1 RS-232
7	Rx1 RS-232
8	
9	
10	GND RS-232
11	
12	
13	
14	
15	

General acoustic considerations

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 (e.g. TD50V). However, 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.

Operational procedures

Once deployed the transponder is ready for operation.

The transponder is operated from the HiPAP operator station APOS.

- Refer to APOS online help for descriptions.

Maintenance

Topics

Cleaning the cNODE Modem Explorer 17, 34 and 37

The modem must be cleaned after use.

Procedure

1 Remove any growth and dirt with a stiff brush or a wooden or plastic scraper.

2 Clean the unit thoroughly with lots of fresh water.

3 Dry the unit off and it is ready for storage or next operation.

Greasing of Subconn connectors

These recommendations apply to all Subconn connectors.

Recommendations

- Connectors must be greased with Molykote 44 Medium or equivalent grease.
- A layer of grease corresponding to minimum 1/10 of socket depth should be applied to the female connector.
- The inner edge of all sockets should be completely covered, and a thin transparent layer of grease left visible on the face of the connector.

Illustrated spare parts catalogue

Topics

cNODE Modem Explorer 34 spare part

Aluminium

- **Part name**: cNODE Modem Explorer 34, MF Aluminium
- **Part number**: 390582

cNODE Modem Explorer 37 spare part

Aluminium

- **Part name**: cNODE Modem Explorer 37, MF Titanium
- **Part number**: 409159

cNODE Modem Explorer 17 spare part

Titanium

- **Part name**: cNODE Modem Explorer 17, LF Titanium
- **Part number**: 418540

cNODE Modem Explorer 30 spare part

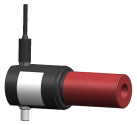
- **Part name**: cNODE Modem Explorer 30, MF Aluminium
- **Part number**: 388775

cNODE Modem Explorer 10 spare part

- **Part name**: cNODE Modem Explorer 10, LF Aluminium
- **Part number**: 418545

Remote transducer TDR30H spare part

- **Part name**: Remote transducer TDR30H
- **Part number**: 395569

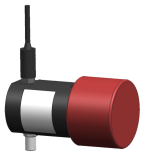


Remote transducer TDR30V spare part

- **Part name**: Remote transducer TDR30V
- **Part number**: 398291

Remote transducer TDR40V spare part

- **Part name**: Remote transducer TDR40V
- **Part number**: 321528



Remote transducer TDR180 spare part

- **Part name**: Remote transducer TDR180
- **Part number**: 395088

Remote transducer TDR50V LF spare part

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

Remote transducer TDR180 LF spare part

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

Transducer cable 6 m spare part

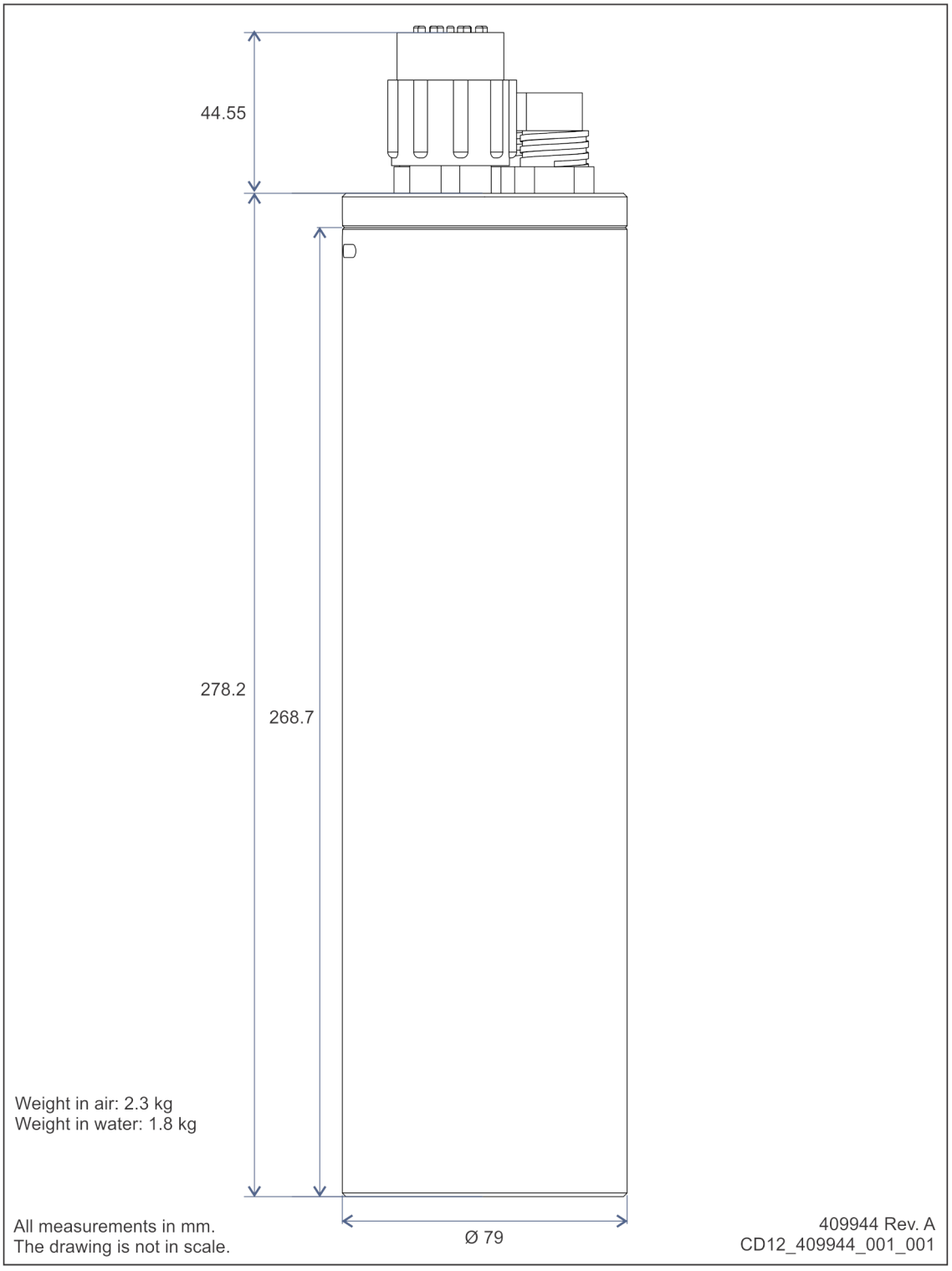
- **Part name**: Transducer cable, 6 m
- **Part number**: 345772

Drawing file

Topics

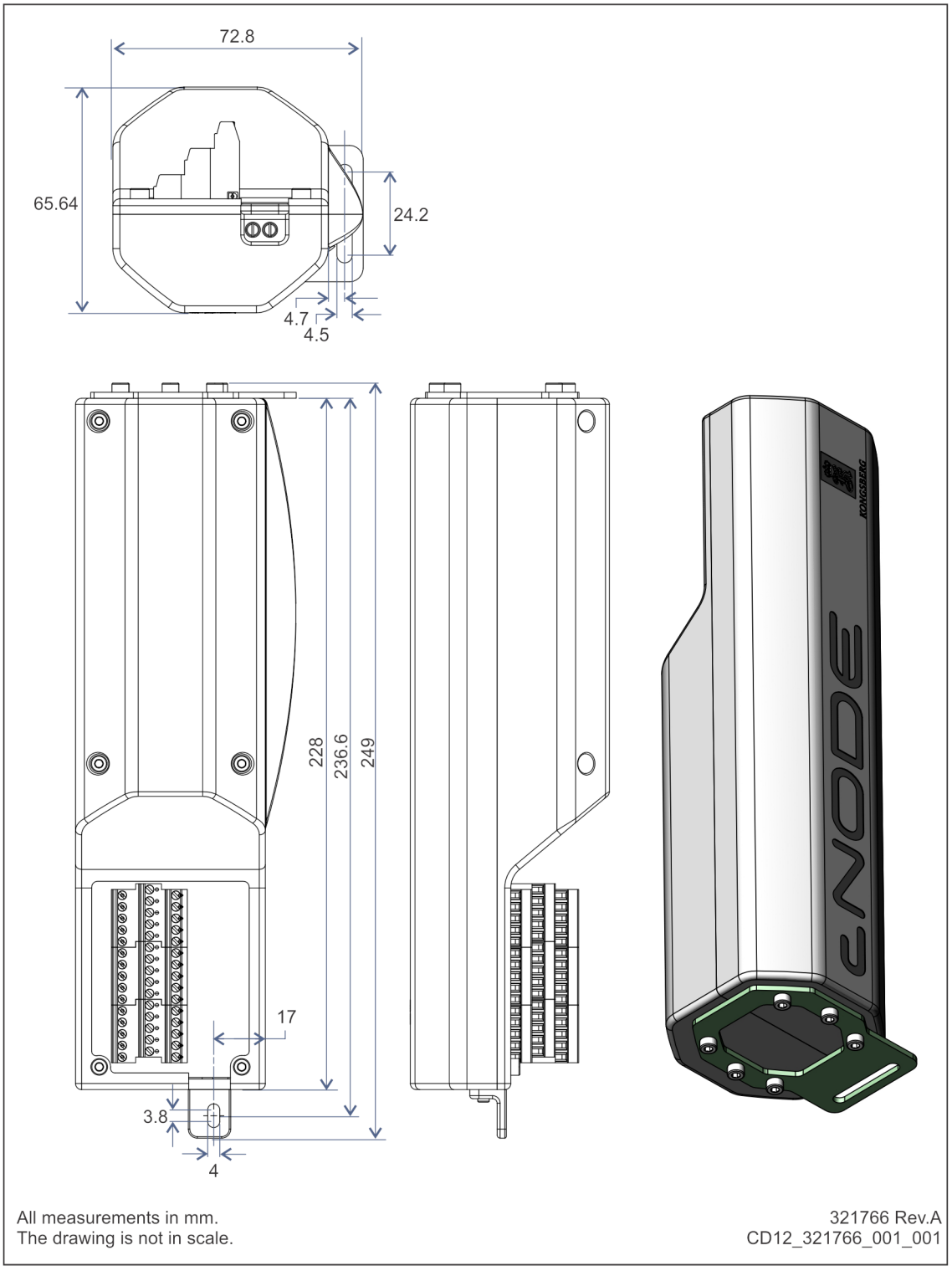
cNODE Modem Explorer 17, 34 and 37

Drawing 409944



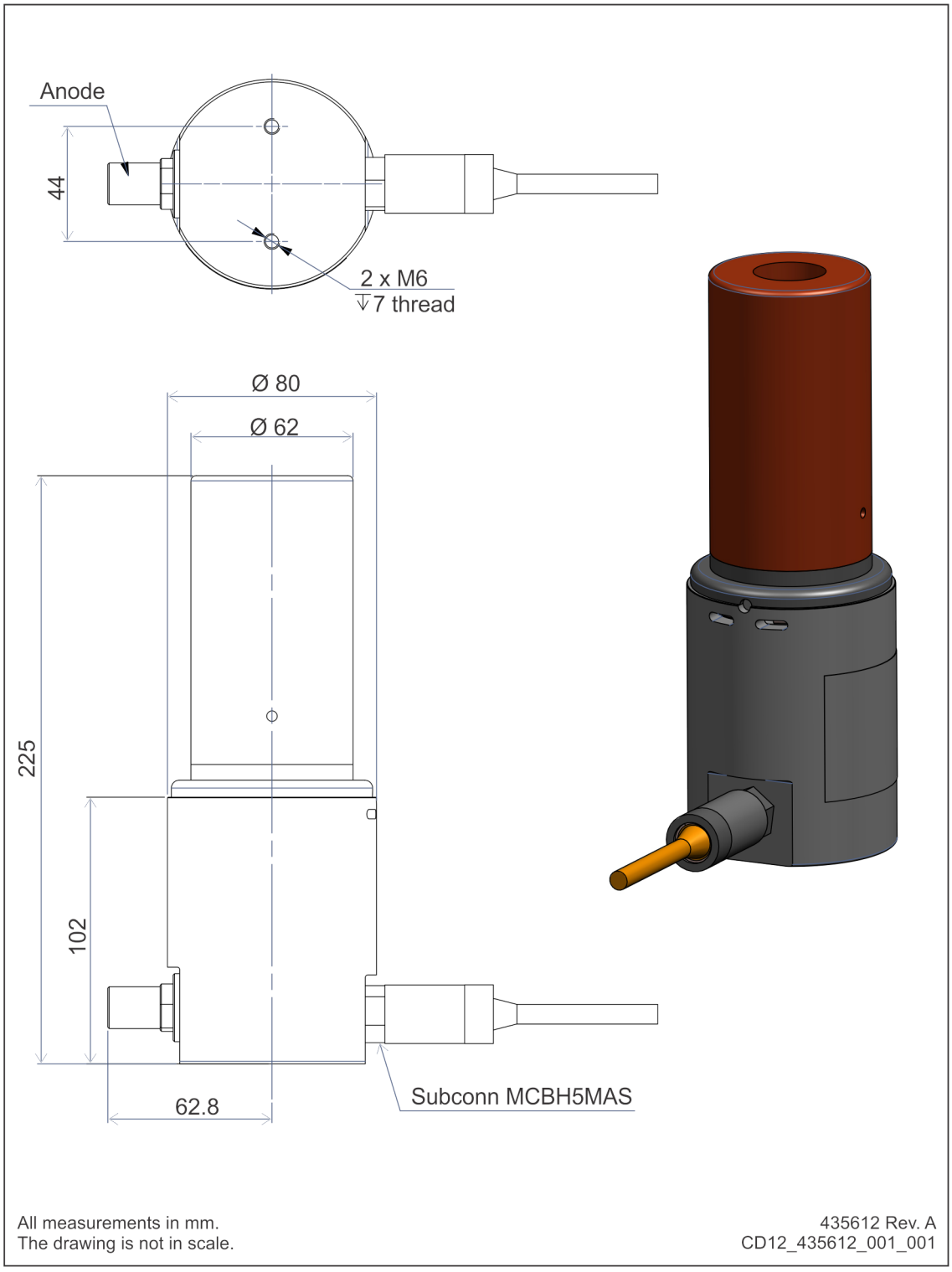
cNODE Modem Explorer 30 and 10

Drawing 321766



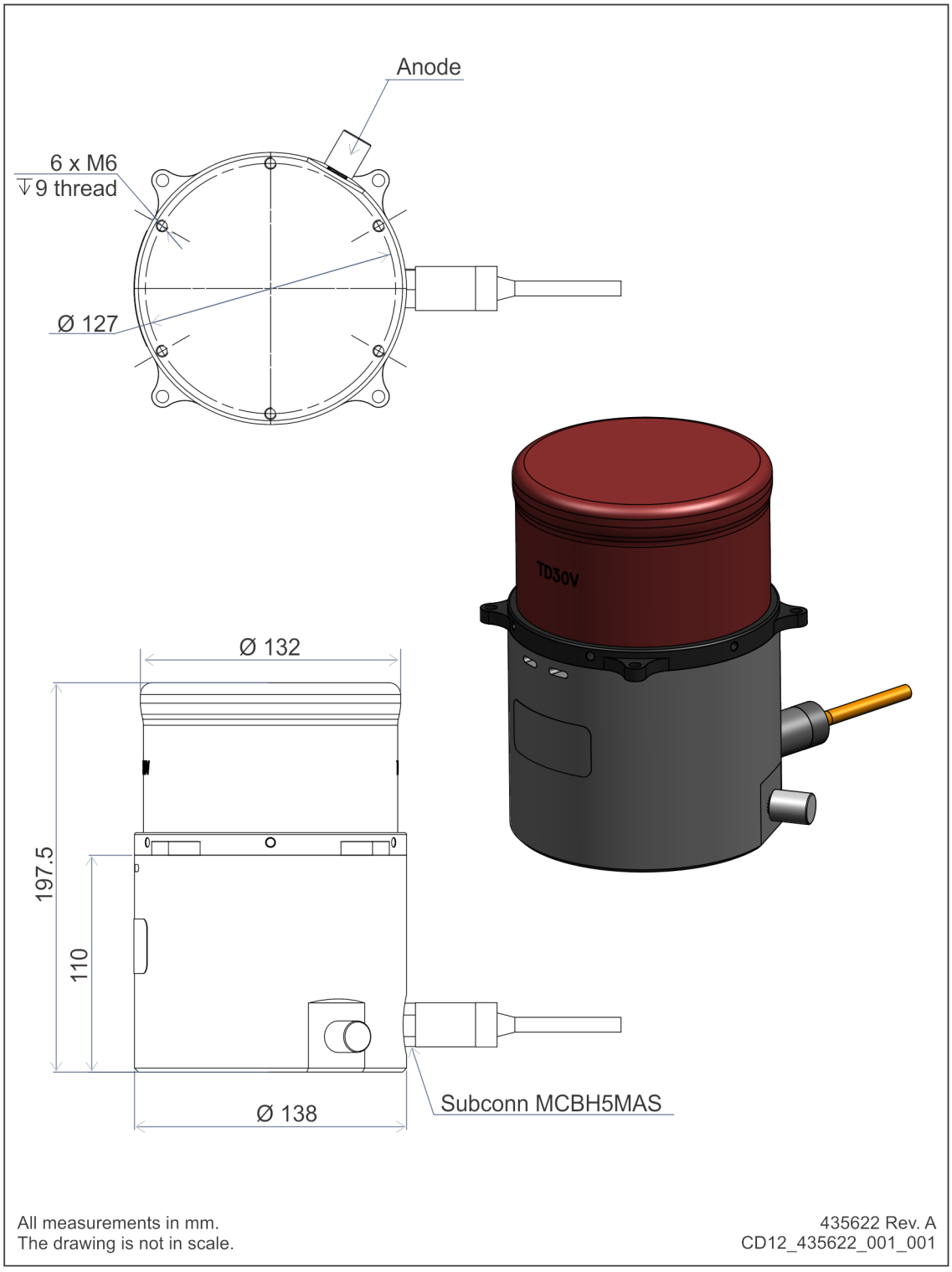
Remote transducer TDR30H

Drawing 435612



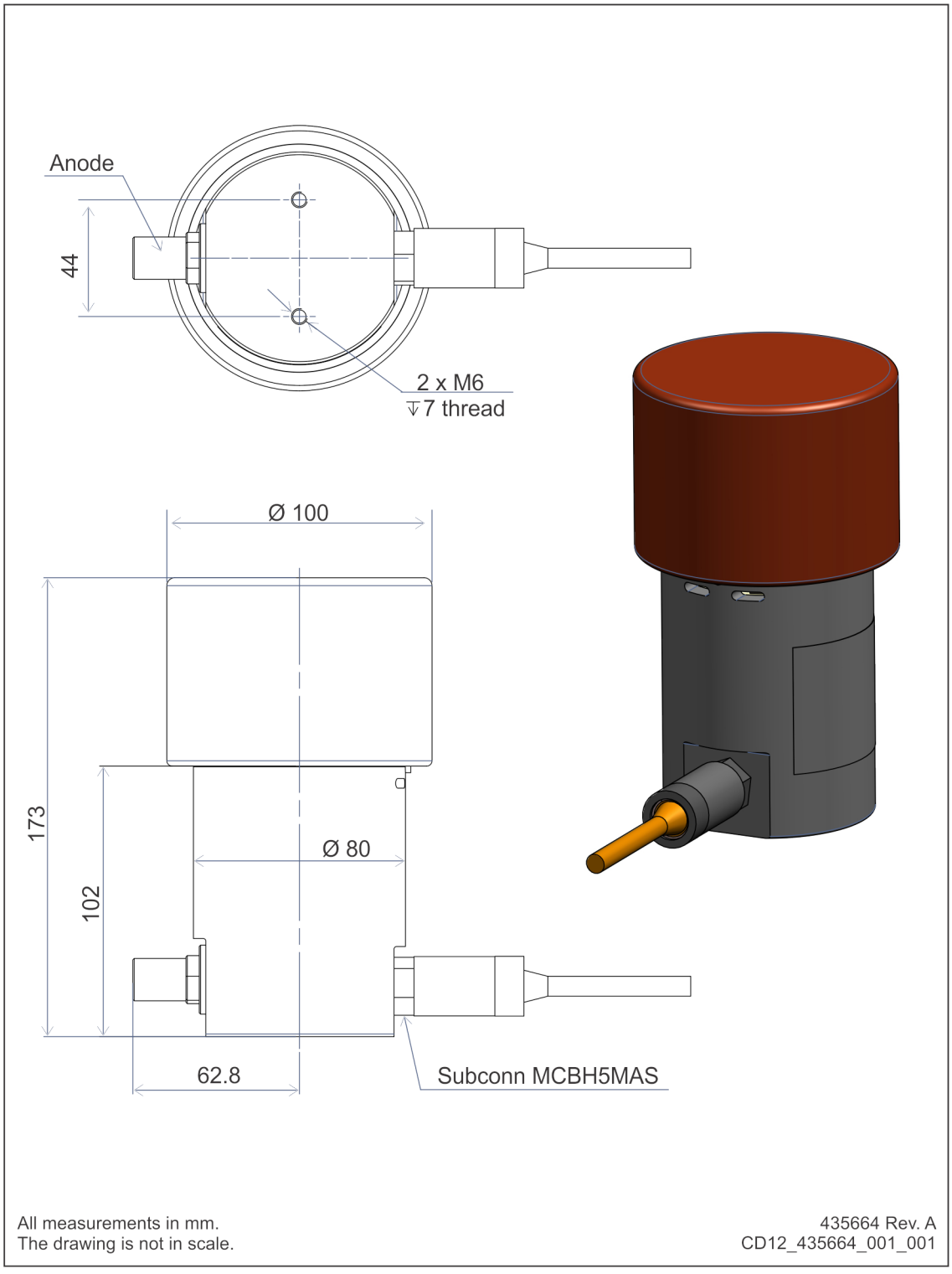
Remote transducer TDR30V

Drawing 435622



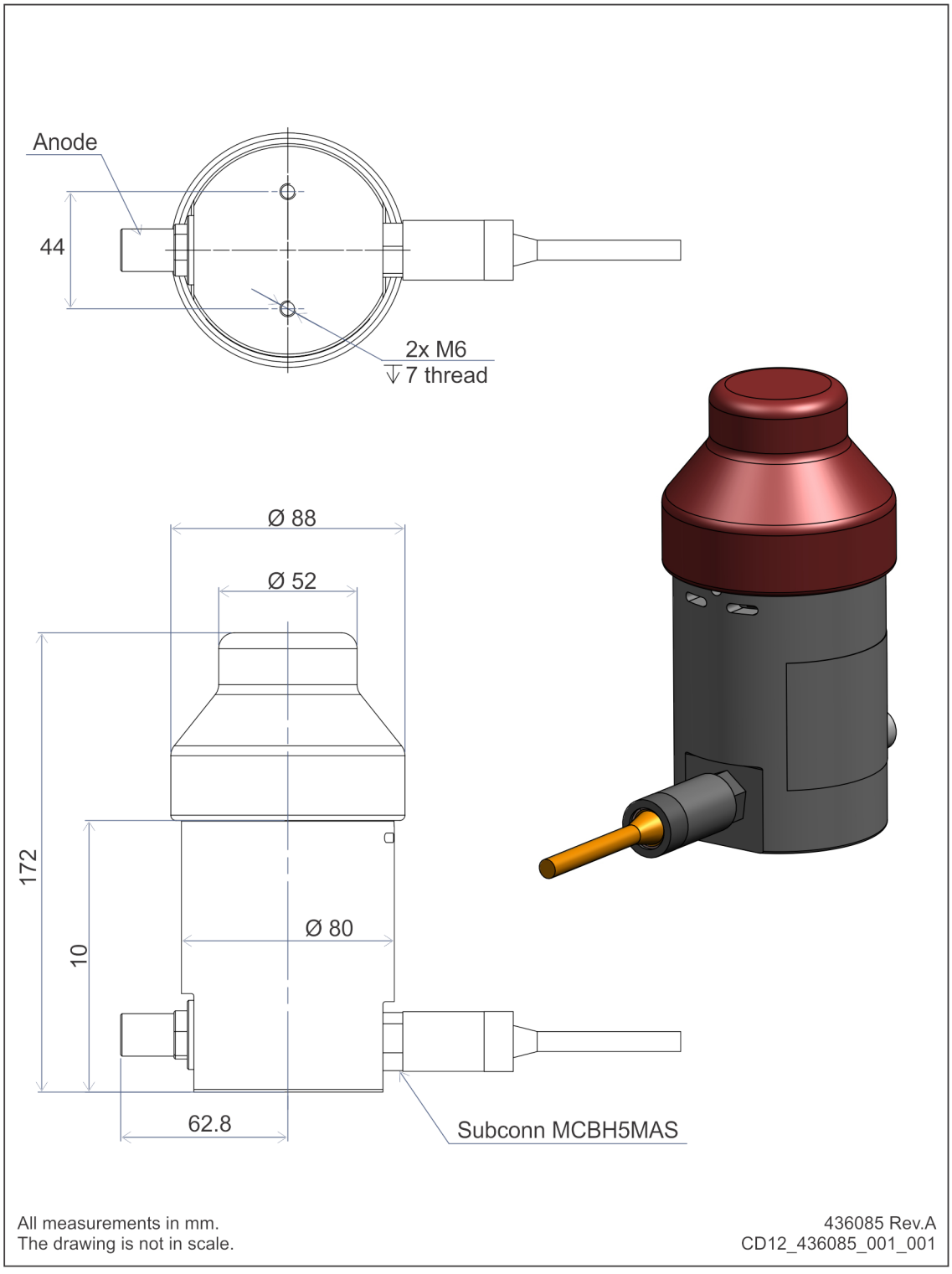
Remote transducer TDR40V

Drawing 435664



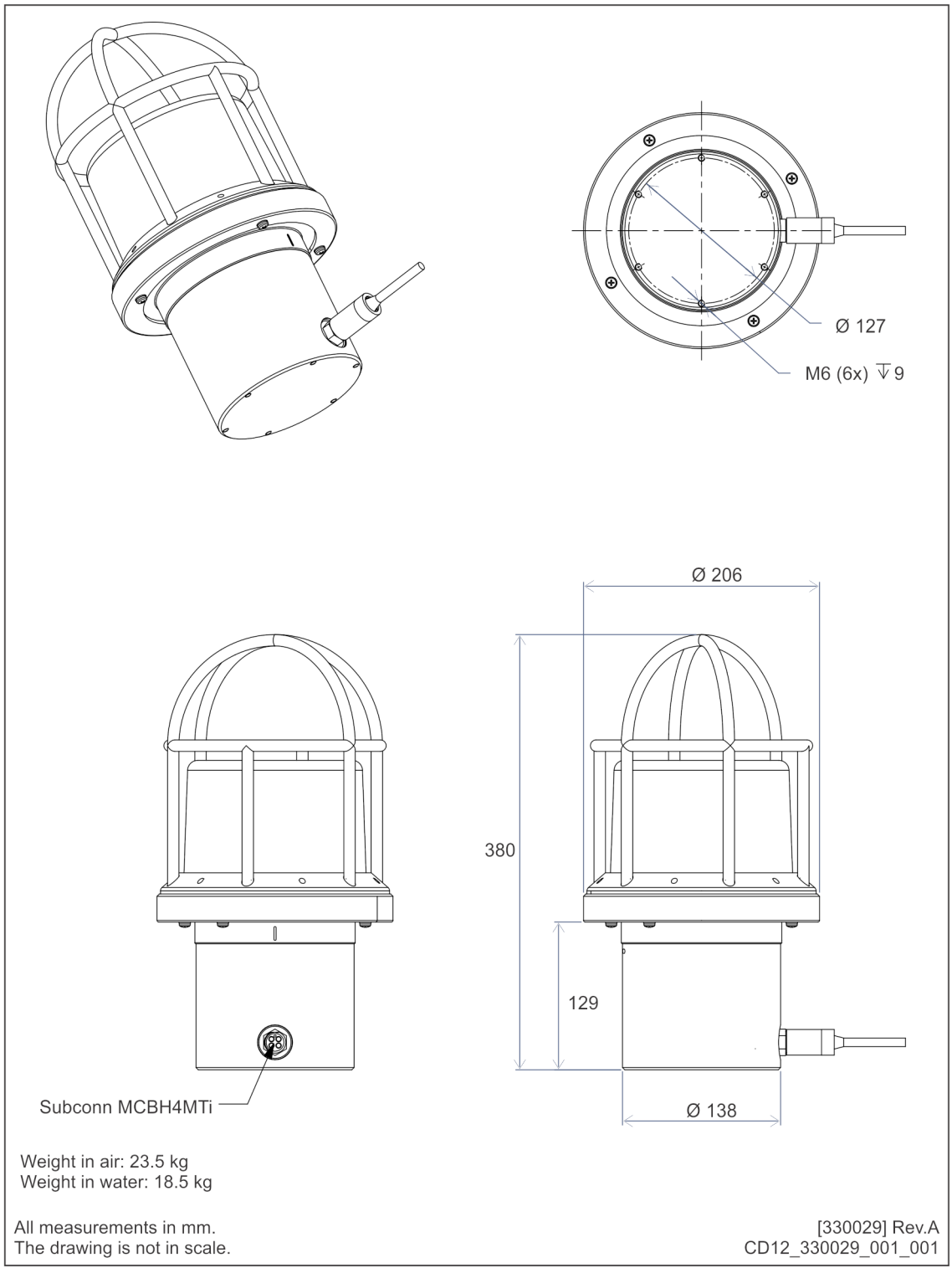
Remote transducer TDR180

Drawing 436085



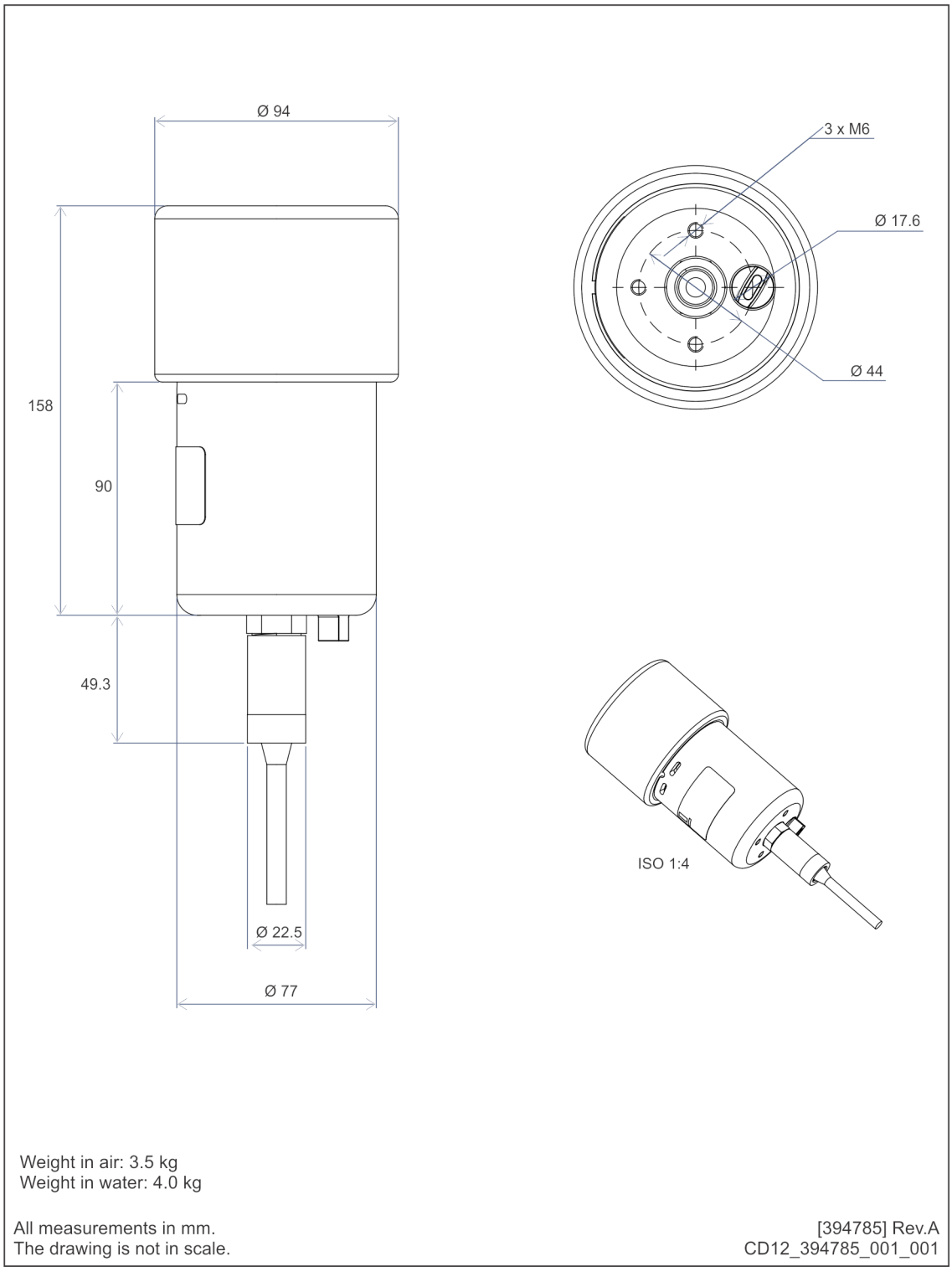
Remote transducer TDR50V LF

Drawing 330029



Remote transducer TDR180 LF

Drawing 394785



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