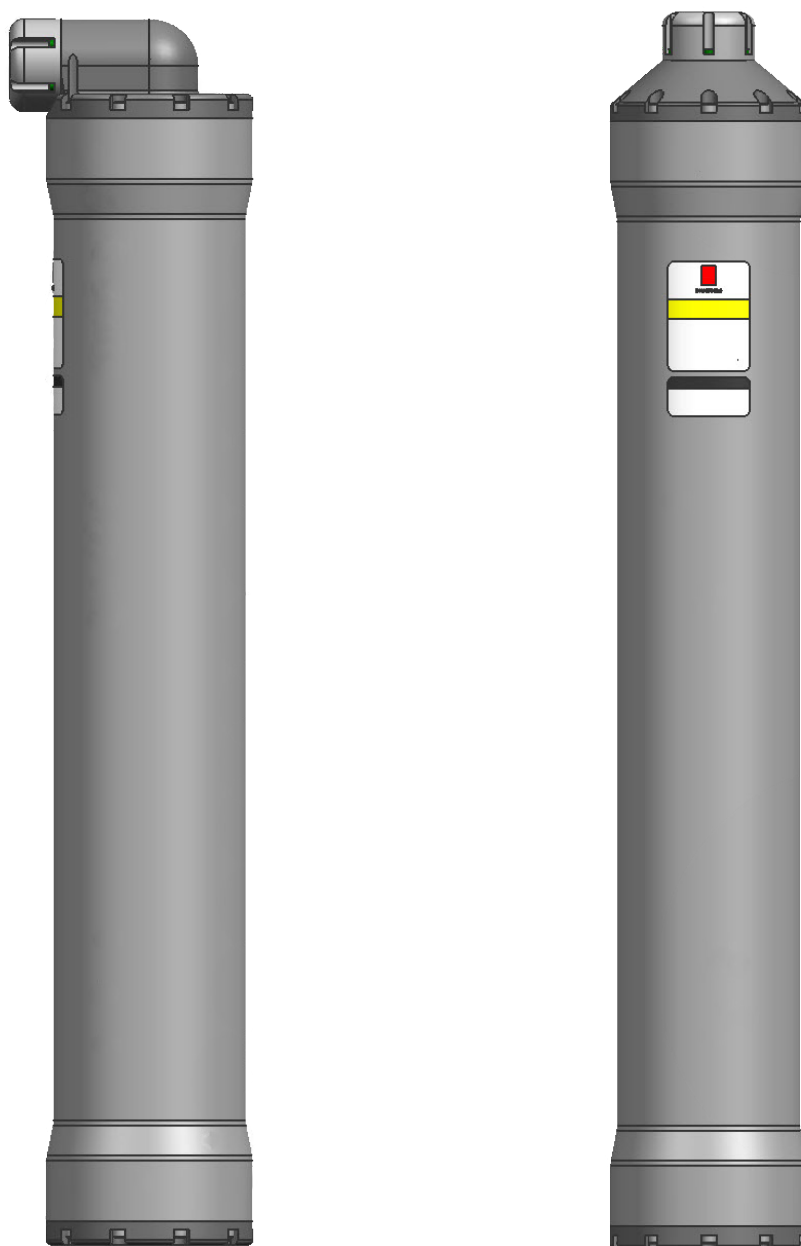


cNODE® Maxi 31 Exd Transponders





KONGSBERG

cNODE Maxi 31 Ex d
Transponder
Instruction Manual

390755/F

August 2018 © Kongsberg Maritime AS

Document information

- **Product:** Kongsberg cNODE Maxi 31 Ex d
- **Document:** Instruction Manual
- **Document part number:** 390755
- **Revision:** F
- **Date of issue:** 15 August 2018

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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 Kongsberg Maritime's support organisation. You can also contact us using the following address: km.support.hpr@kongsberg.com. If you need information about our other products, visit <https://www.km.kongsberg.com>.

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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 Maxi 31 Ex d.

Target audience

This manual is intended for all users of the cNODE Maxi 31 Ex d.

Online information

All end-user manuals provided for operation and installation of your cNODE Maxi 31 Ex d can be downloaded from our website.

- <https://www.km.kongsberg.com>

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EX related document

No modification permitted without reference to the KM EX responsible.

cNODE Maxi 31 Ex d

Topics

[Important, page 7](#)

[System description, page 7](#)

[Special conditions of use, page 8](#)

[General supply conditions, page 9](#)

[Support information, page 10](#)

Important

Working in an explosive atmosphere, there are some things you must be aware of.

WARNING

Explosion proof cNODE transponders do not have the same batteries as other cNODE Maxi transponders and can not be interchanged.

The batteries must never be changed in an explosive environment.

Read the Lithium batteries safety procedure before handling batteries.

System description

The cNODE Maxi 31 Ex d Transponders operates in an explosive atmosphere.

The transponders complies with the following directive:

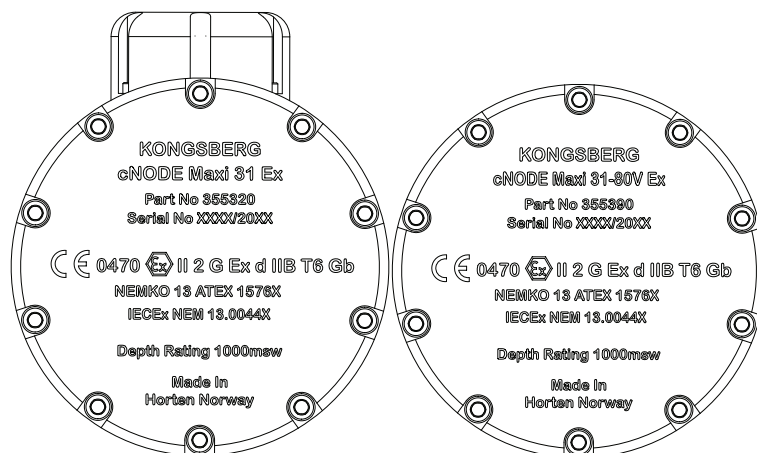
- ATEX Directive – 2014/34/EU

The transponders complies with the following standards:

- IEC 60079-0:2011, Explosive atmospheres - Part 0: Equipment - General requirements
- IEC 60079-1:2014, Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"
- IEC 60086-1:2015, Primary batteries - Part 1: General

The transducer and end cap are made of titanium. The tube and all fasteners are made of Super Duplex stainless steel.

The bottom end cap is engraved with information about the safety standards.

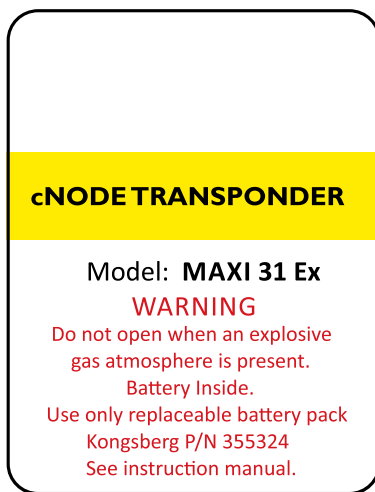


Special conditions of use

The transponder will be installed in an explosive atmosphere. It is very important to read and understand the instructions for the use of this transponder and its atmosphere.

Important conditions in explosive atmospheres

- Fit the transponder properly before operation as this will avoid the ignition hazard due to impact or friction.
- Earth the transponder according to local regulations for such conditions.
- Never open a transponder in an explosive atmosphere.



Note _____

Operational temperature is -5 to $+55^{\circ}\text{C}$.

Storage temperature is -30 to $+70^{\circ}\text{C}$.

Maximum operational depth is 1000 m.

General supply conditions

The following general supply conditions apply to this Kongsberg cNODE Maxi 31 Ex d 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 Maxi 31 Ex d 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 Maxi 31 Ex d 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.

- **Company name:** Kongsberg Maritime AS
- **Address:** Strandpromenaden 50, 3190 Horten, Norway
- **Telephone:** +47 33 03 41 00
- **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

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 TD180, covers a large area, but has less acoustic power compared to a focused transducer, such as TD30V. 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.

Getting started

Topics

[Turning on the cNODE Maxi 31 Ex d, page 14](#)

[Closing the transponder, page 15](#)

[Turning off the cNODE Maxi 31 Ex d, page 16](#)

[Pre-deployment checks, page 16](#)

Turning on the cNODE Maxi 31 Ex d

The transponder is designed for operation in water only. The transponder may be operated in air for test purposes over a short period of time.

Prerequisites

For safety reasons, the transponder is delivered with the battery outside. The battery must be inserted and connected before the transponder is deployed.

The following specific tool is required for this task:

- 5 mm Hex key

Procedure

- 1 Remove all the bolts on the top.
- 2 Remove the transducer by using the extractor holes.
- 3 Remove the transport plug.
- 4 Insert the new battery.

Note

Make sure you insert a battery labelled cNODE Ex battery.

Inserting the battery at an angle makes this easier. Press firmly to make sure the battery is properly inserted.



- 5 Switch the on/off switch inside the top to on.



Further requirements

Closing the transponder is the next step.

Related topics

[Closing the transponder, page 15](#)

Closing the transponder

Closing the transponder requires special attention. It is very important that the transponder is properly closed and watertight before it is submerged.

Prerequisites

WARNING

Do not open when an explosive atmosphere is present.

Make sure the battery is labelled cNODE Ex battery. Make sure the on/off switch is switched on.

The following specific tool is required for this task:

- 5 mm Hex key

Procedure

- 1 Replace the transducer.
- 2 Inspect the bolts.
If they have no damage they can be used again. New bolts must be of the same grade.
- 3 Clean the bolts and the hole threads.
- 4 Spray Loctite activator 7649 on the bolt's threads.
- 5 Add a drop of Loctite 243, threadlock to the lower part of the threads in the tube.
- 6 Fasten the bolts with a torque of 9.4 Nm.

Turning off the cNODE Maxi 31 Ex d

This will leave you with the transponder turned off and not using up the battery.

Prerequisites

WARNING

Remove the battery when storing the transponder for a longer period (months).

The following specific tool is required for this task:

- 5 mm Hex key

Procedure

- 1 Remove all the bolts on the top.
- 2 Remove the transducer by using the extractor holes.
- 3 Switch the on/off switch inside the top to off.
- 4 Remove the battery.

Related topics

[Opening the transponder, page 21](#)

Pre-deployment checks

Before deploying the transponder, it is important to do the following checks to make sure the operation goes smoothly.

Prerequisites

Note

Do not open when an explosive atmosphere is present.

Procedure

- 1 Record the transponder serial number and channels.
- 2 Perform an acoustic test using a Transponder Test and Configuration (TTC) unit:
 - a Interrogate the transponder.
 - b Read battery status and confirm that it will last for the upcoming operation.
 - c Read the power setting and confirm it is correct for the upcoming operation.

Installing the cNODE Maxi 31 Ex d

Correct installation is essential for keeping the transponder safe in an explosive atmosphere.

Prerequisites

The pre-deployment checks must be completed before installation can begin.

Procedure

- 1 Mount the transponder with the transducer having a free line of sight.

2

Important _____

The transponder must be earthed.

Fit the transponder to the brackets.

At least one part of the bracket must be metal in direct contact with the transponder tube.

- 3 Fit the transponder in such a way that the transducer does not move.

The transducer must be at least 0.2 mm from any metal surface to avoid the ignition hazard due to impact or friction.

Related topics

[Drawing file, page 31](#)

Operating procedures

The transponder is operated from the HiPAP operator station APOS.

- Refer to APOS online help for descriptions.

Maintenance

Topics

[Recovering the transponder, page 20](#)

[Cleaning the transponder, page 20](#)

[Opening the transponder, page 21](#)

[Changing the battery, page 21](#)

[Closing the transponder, page 15](#)

Recovering the transponder

Always read the emergency procedures before handling lithium batteries.

Context

Avoid slamming the transponder against solid objects as it is lifted out of the water.

Procedure

- 1 Check the transponder's temperature
If the transducer is overheated go directly to the emergency procedures.
- 2 Place the transponder in a safe place out on deck, shielded from people and vital equipment.
- 3 Control the transponder for minimum two hours.
Check for damages that could involve a water leakage and check the housing temperature for a possible temperature increase in the lithium battery.
For batteries with possible damages, go to the emergency procedures chapter.
- 4 Wash the unit thoroughly in warm fresh water to dissolve any salt deposits and clean off any sand or silt.
- 5 As an extra precaution, it is recommended that the unit is left to soak in fresh water to allow salt to dissolve and diffuse from hard-to-reach areas, such as crevices between mating parts.
- 6 Dry off, so no water can come inside when opening.
- 7 Turn the transponder off and store the batteries outside the housing if the transponder is not used for some time.

Cleaning the transponder

The transponder must be cleaned after use.

Procedure

- 1 Remove any growth and dirt with a stiff brush or a wooden or plastic scraper.
Be careful not to damage the unit.
- 2 Clean the unit thoroughly with lots of fresh water.
- 3 Dry off, so no water can come inside when opening.

Opening the transponder

Always read the emergency procedures before handling lithium batteries.

Prerequisites

WARNING

Do not open when an explosive atmosphere is present.

A battery malfunction may have caused high pressure to build up inside the transponder.

You must never stand in front of, or at the back of the unit, when you open it. Open the transponder in a safe place out on the deck, shielded from people and vital equipment.

Use a full face mask with minimum BE-filter, and protective equipment made of rubber or plastic.

The transponder must be cleaned and dried before opening, so that no dirt or water seeps into the unit when it is opened.

The following specific tool is required for this task:

- 5 mm Hex key

Procedure

- 1 Remove all the bolts on the top.
- 2 Remove the transducer by using the extractor holes.
- 3 Inspect all O-rings for damage.
- 4 Replace the O-rings that are damaged or used for more than a year.
There are 2 O-rings 107.32 x 5.33 (part 317051) under the transducer.
There is 1 O-ring 112.00 x 4.00 (part 317052) over the chassis.
- 5 Make sure the mating surfaces and the O-rings are completely clean and wipe a thin film of silicone grease over the rings and mating surfaces.
Use Parker Super O-lube or similar grade grease.

Changing the battery

The battery is not rechargeable and needs to be replaced when empty.

Prerequisites

The transponder must be opened to change the battery.

Caution

Read the Lithium batteries safety procedure before handling batteries.

Do not connect the + and – electrodes on the batteries with metal or wire.

Procedure

- 1 Remove the spent battery.
- 2 Insert the new battery.

Caution

Make sure you insert a battery labelled cNODE Ex battery.

Inserting the battery at an angle makes this easier. Press firmly to make sure the battery is properly inserted.



Result

Closing the transponder is the next step.

Closing the transponder

Closing the transponder requires special attention. It is very important that the transponder is properly closed and watertight before it is submerged.

Prerequisites

WARNING

Do not open when an explosive atmosphere is present.

Make sure the battery is labelled cNODE Ex battery. Make sure the on/off switch is switched on.

The following specific tool is required for this task:

- 5 mm Hex key

Procedure

- 1 Replace the transducer.
- 2 Inspect the bolts.
If they have no damage they can be used again. New bolts must be of the same grade.
- 3 Clean the bolts and the hole threads.
- 4 Spray Loctite activator 7649 on the bolt's threads.
- 5 Add a drop of Loctite 243, threadlock to the lower part of the threads in the tube.
- 6 Fasten the bolts with a torque of 9.4 Nm.

Spare parts

Topics

[Battery Spare part, page 25](#)

[O-ring 107.32 x 5.33 mm Spare part, page 25](#)

[O-ring 112.00 x 4.00 mm Spare part, page 25](#)

[Bolts Spare part, page 25](#)

[Transponder transport plug spare part, page 25](#)

[TTC 30 \(Transponder Test and Configuration unit\) Spare part, page 26](#)

[Maxi 31-80V-Exd Spare part, page 26](#)

[Maxi 31-80V-90-Exd Spare part, page 26](#)

Battery Spare part

- **Part name:** Battery cNODE Maxi Ex
- **Part number:** 355324



O-ring 107.32 x 5.33 mm Spare part

There are 2 O-rings 107.32 x 5.33 (part 317051) under the transducer.

- **Part name:** O-ring cNODE Maxi
- **Part number:** 317051

O-ring 112.00 x 4.00 mm Spare part

There is 1 O-ring 112.00 x 4.00 (part 317052) over the chassis.

- **Part name:** O-ring cNODE Maxi
- **Part number:** 317052

Bolts Spare part

There are 10 M6x16 DIN912 Super Duplex stainless steel bolts (part 560–078853) fastening the transducer.

- **Part name:** M6x16 DIN912 Super Duplex
- **Part number:** 560–078853

Transponder transport plug spare part

- **Part name:** Transport plug
- **Part number:** 346211



TTC 30 (Transponder Test and Configuration unit) Spare part

- **Part name:** TTC 30 (Transponder Test and Configuration unit)
- **Part number:** 345775



Maxi 31–80V-Exd Spare part

- **Part name:** Maxi 31–80V-Exd
- **Part number:** 355390



Maxi 31–80V-90–Exd Spare part

- **Part name:** Maxi 31–80V-90–Exd
- **Part number:** 355320



Technical specifications

Topics

[Materials, page 28](#)

[Performance specifications, page 28](#)

[Weight and outline dimensions, page 28](#)

[Power requirements, page 29](#)

[Environmental requirements, page 30](#)

Materials

This transponder is designed for use in an explosive atmosphere and the following materials are used:

Bolts and tube

Super Duplex stainless steel

Transducer, top end cap and bottom end cap

Titanium grade 5

Performance specifications

These performance specifications summarize the main functional and operational characteristics of the cNODE Maxi 31 Ex d Transponder.

Maxi 31 Exd

- **Depth range:** 1000 m
- **Operational frequency:** MF 21 – 31 kHz
- **Transducer beam:** 80° at -3dB
- **Source level:** 198 dB
- **Receiver sensitivity:** 85 dB

Weight and outline dimensions

These weights and outline dimension characteristics summarize the physical properties of the cNODE Maxi 31 Ex d system.

Maxi 31–80V-90–Exd

- **Outline dimensions:**
 - **Height:** 874 mm
 - **Diameter:** 164 mm
- **Weight (in air):** 35.5 kg
- **Weight (in water):** 25 kg

Maxi 31–80V-Exd

- **Outline dimensions:**
 - **Height:** 880 mm
 - **Diameter:** 139 mm
- **Weight (in air):** 35.5 kg
- **Weight (in water):** 25 kg

Power requirements

These power characteristics summarize the supply power requirements for the cNODE Maxi 31 Ex d Transponder.

Battery

- **Battery type:** Non-rechargeable Lithium, (Li/SOCl₂)
- **Output voltage:** 14.4VDC
- **Nominal capacity:** 128 Ah
- **Cells per battery:** 48

Transponder

- **Input voltage:** 10–14.4 VDC
- **Power consumption:** 250 W

Maxi 31 Exd Operating battery lifetime

Note

The lifetime ranges should be treated as approximations only. Calculations made should allow for standard deviation in battery manufacture.

- Quiescent battery lifetime: 913 days

Cymbal

Update rate	1 Sec- onds[Day]	2 Sec- onds[Day]	3 Sec- onds[Day]	4 Sec- onds[Day]	5 Sec- onds[Day]	10 Sec- onds[Day]
TX power level						
Minimum	95	101	102	103	104	105
Low	59	76	84	89	92	99
High	23	38	48	56	62	78
Maximum	6	11	16	21	25	40

FSK

Update rate	1 Sec- onds[Day]	2 Sec- onds[Day]	3 Sec- onds[Day]	4 Sec- onds[Day]	5 Sec- onds[Day]	10 Sec- onds[Day]
TX power level						
Minimum	167	172	174	175	175	176
Low	125	147	156	161	164	170
High	61	91	109	121	129	149
Maximum	18	34	46	57	66	96

Environmental requirements

These specifications summarize the temperature requirements and other environmental standards for the cNODE Maxi 31 Ex d system.

Transponder

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

Drawing file

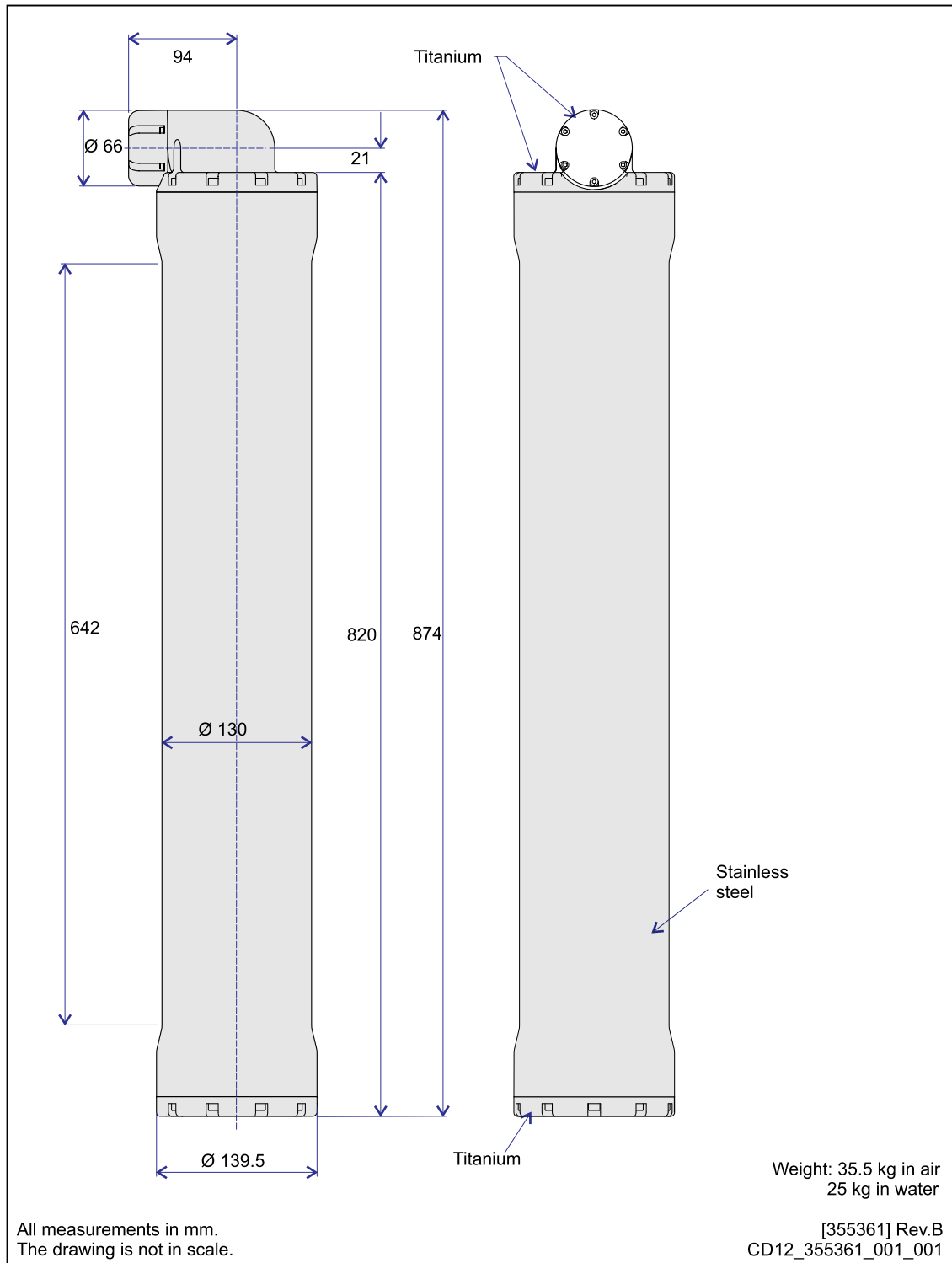
Topics

[cNODE Maxi 31-80V-90-Exd Outline dimensions, page 32](#)

[cNODE Maxi 31-80V-Exd Outline dimensions, page 33](#)

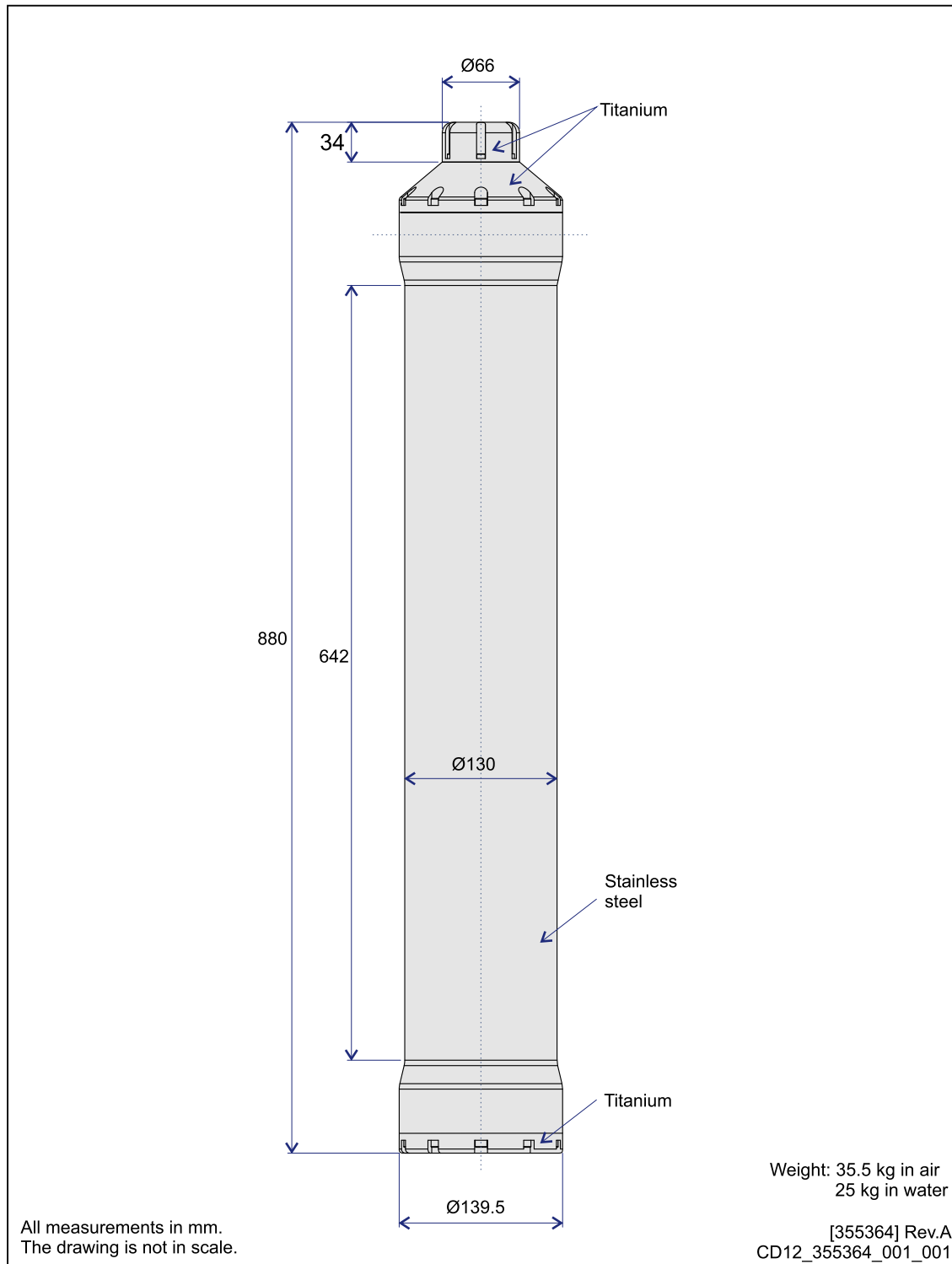
cNODE Maxi 31-80V-90-Exd Outline dimensions

Drawing 355361



cNODE Maxi 31-80V-Exd Outline dimensions

Drawing 355364



Battery safety data

This document includes transponder safety information for all the Kongsberg Maritime transponders with lithium batteries and separate lithium batteries.

Topics

- SECTION 1: Identification, page 35
- SECTION 2: Hazards identification, page 35
- SECTION 3: Composition, page 36
- SECTION 4: First aid measures, page 37
- SECTION 5: Firefighting measures, page 37
- SECTION 6: Accidental release measures, page 38
- SECTION 7: Handling and storage, page 38
- SECTION 8: Exposure control and personal protection, page 39
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- SECTION 13: Disposal considerations, page 40
- SECTION 14: Transport information, page 41
- SECTION 15: Regulatory information, page 41
- SECTION 16: Other information, page 41

SECTION 1: Identification

The specification describes the technical parameters for the battery.

The battery is used in the following products:

- cNODE Maxi 31–80V-90–Exd
- cNODE Maxi 31–80V–Exd
- **Battery name:** L14.4 (48) Maxi Exd
- **Part number:** 355324
- **Battery weight:** 5.9 kg
- **Lithium weight:** 183 g
- **Manufacturer:** Kongsberg Maritime AS
- **Address:** Strandpromenaden 50, 3190 Horten, Norway
- **Telephone:** +47 33 03 24 07 (24 h)
- **Telefax:** +47 33 04 29 87
- **E-mail address:** km.support.hpr@kongsberg.com
- **Website:** <http://www.km.kongsberg.com>

Note

The battery is provided as a solid and sealed unit. The battery cannot be opened to reveal individual cells.

For additional information about the cells inside the sealed battery pack, see the safety data sheet provided by the cell manufacturer. <http://www.al23systems.com>

SECTION 2: Hazards identification

The battery is not provided with any hazards identification. It is not classified as dangerous or hazardous with normal use.

The battery should not be opened or burned. The battery contains dangerous ingredients. Exposure to the ingredients contained within the battery cells could be harmful. The battery cells include a barrier preventing exposure to the user and environment. The battery cells are not classified as hazardous according to Regulation (EC) No. 1272/2008.

The chemicals in the battery cells are contained in a sealed enclosure. Risk of exposure occurs only if the cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, exposure to the electrolyte solution contained within can occur by inhalation, ingestion, eye contact and skin contact. The electrolyte solution would be corrosive and can cause irritation and burns.

Other hazards

- Over charge — If the cells that form the battery block are overcharged, the results may be a thermal runaway.
- External fire — Internal pressure and thermal runaway may be the consequences if the cells inside the battery are exposed to temperatures above 85 °C.
- Internal short circuit — Internal short circuit in a cell. Destruction of the separator can cause a short circuit between the anode and cathode. Thermal runaway and fire is possible.
- Water ingress — Internal pressure, thermal runaway and chemical reactions may be the consequence.

SECTION 3: Composition

The battery is a solid, manufactured article.

A lithium battery pack consists of several individual cells that are electrical connected, both in series and parallel.

The battery packs have different number of cells, output voltages and power capacity. All transponder batteries include protection against short circuits (circuit breakers) and reverse current (diodes).

The cells used within the battery pack are manufactured by one of the following companies:

- Tadiran TL-2300
- Sonnenschein SL-780
- Saft LS 33600
- Saft LSH 20
- Sonnenschein SL-760

The lithium metal cells have the following chemical formula:

Lithium thionyl chloride — Li/SOCl_2

- **Negative electrode:** Lithium
- **Positive electrode:** Carbon
- **Electrolyte:** A solution of lithium tetrachloroaluminate (LiAlCl_4) in thionyl chloride
- **Battery name:** L14.4 (48) Maxi Exd
- **Part number:** 355324
- **Battery weight:** 5.9 kg
- **Lithium weight:** 183 g

In case of hazardous events, the noxious gases are:

- Thionyl chloride (SOCl_2)

- Sulphur dioxide (SO₂)
- Hydrogen sulphide (H₂S)
- Hydrogen chloride (HCl)
- Chlorine (Cl₂)

SECTION 4: First aid measures

The battery will release toxic fumes if burned or exposed to fire.

The battery will release toxic fumes if burned or exposed to fire. If subjected to gas from a burning battery, remove the source of contamination or move the victim to fresh air. Seek medical advice.

- **Inhalation:** The chemicals are lung irritant. Remove yourself from exposure, rest, and keep warm.
- **Skin contact:** The chemicals are skin irritant. Wash off skin thoroughly with water. Remove contaminated clothing and wash it before reuse.
- **Eye contact:** The chemicals are eye irritant. Irrigate thoroughly with water for at least 15 minutes.
- **Ingestion:** Exposure to the chemicals may cause tissue damage to throat and gastro/respiratory tract if swallowed. Wash out mouth thoroughly with water and give plenty of water to drink. Seek medical advice.

SECTION 5: Firefighting measures

The battery in which the battery pack is used is designed to withstand damage to the internal battery pack. Nonflammable material is used. In case of fire, move battery from fire area if you can do it without risk. Extreme mechanical abuse to the battery may result in ruptured seal, and exposure.

- 1 If possible, move the battery and/or the transponder away from the fire.
- 2 Cool it down using lots of cold water.
 - a Immerse the battery and/or the transponder in the sea for minimum 24 hours.
 - b If this method is impossible, it can be cooled down with a fire hose.

Cooling down the battery with a large amount of cold water is the only way to reduce or stop the internal chemical reactions, or to limit the fire/explosions to as few battery cells as possible. The chemical reactions/fire will continue without additional supply of oxygen, so extinguisher like Lith-X will not work properly.

Applying water directly onto a battery may develop hydrogen gas, due to the possible electrolysis if the battery terminals are exposed to water. Mixed with air, this gas is very inflammable/explosive. However, if the water cooling takes place out on deck or in a

storeroom with good ventilation, there will never be enough hydrogen gas to exceed the lower explosive limit of hydrogen in air (about 4%).

Note

In case of an external fire, always remove transponder units and lithium batteries.

SECTION 6: Accidental release measures

During normal operation, accidental release measures are not applicable. Extreme mechanical abuse to the battery may result in ruptured seal, and exposure.

As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Keep unauthorized personnel away. Stay upwind, and keep out of low areas. Ventilate closed areas before entering. Wear adequate personal protective equipment.

Prevent material from contaminating soil and from entering sewers or waterways. Stop the leak if safe to do so. Contain the spilled liquid with dry sand or earth. Clean up spills immediately.

Absorb spilled material with an inert absorbent (dry sand or earth). Scoop contaminated absorbent into an acceptable waste container. Collect all contaminated absorbent and dispose of according to relevant regulations. Scrub the area with detergent and water; collect all contaminated wash water for proper disposal.

SECTION 7: Handling and storage

Do not open, disassemble, crush or burn the battery.

- 1 Do not open, disassemble, crush or burn the battery.
- 2 Do not expose the battery to water, sea water or other high conductivity liquids.
- 3 Avoid mechanical or electrical abuse.
- 4 Do not expose the battery to temperatures outside the range of -40 °C to 80 °C.
- 5 Store in a dry location.

Recommended relative air humidity is 40 to 70%. To minimize any adverse effects on the battery performance it is recommended that it is kept at room temperature (25 °C +/- 5 °C). Elevated temperatures can result in shortened life.

- 6 Do not store the battery in direct sunlight.
- 7 Keep the battery out of reach of children.

A suitable storage room is properly ventilated, it has sturdy racks with dedicated cradles for the batteries, and it must allow for easy removal of batteries in case of fire. The

room must be designated and clearly identified as a storage area, and entrance should be restricted. The room must not be used as a general rest or work area.

Note

The storage room must have a sprinkler system or a fire station. A suitable fire hose (with water) must be placed outside or in the proximity of the room.

SECTION 8: Exposure control and personal protection

Airborne exposures to hazardous substances are not expected when the battery is used for its intended purpose. No protection (respirator, skin and/or eye) is then required. If the battery is damaged, and you are exposed to the chemicals inside it, proper personal protection is required.

In the event of fire or physical damage to the battery, follow the mandatory rules for personal protection.

- **Fire or explosion:** Use self-contained breathing apparatus.
- **Exposure to noxious gas:** Use a full face mask with minimum BE-filter, and protective equipment of rubber or plastic.

SECTION 9: Physical and chemical properties

The battery is solid with a firm and hard appearance. No chemicals are exposed during normal use and transportation.

The battery pack is provided as a solid and sealed unit. The battery pack can not be opened to reveal the individual cells.

For additional information about the cells inside the sealed battery pack, see the safety data sheet provided by the cell manufacturer.

SECTION 10: Stability and reactivity

The battery is stable. No specific handling requirements apply.

In normal use, the battery pack is placed inside the sealed transponder.

Water ingress into the transponder can cause dangerous situations.

Short-circuiting, overheating, mechanical damage and exposure to water can start chemical reactions and high currents inside the lithium battery. This can generate noxious gases and/or cause danger of explosion. The chemical reactions will continue without additional supply of oxygen, as the battery cells contain the necessary ingredients for maintaining the chemical reactions.

- 1 Do not open, disassemble, crush or burn the battery.
- 2 Do not expose the battery to water, sea water or other high conductivity liquids.
- 3 Avoid mechanical or electrical abuse.
- 4 Do not expose the battery to temperatures outside the range of -40 °C to 80 °C.
- 5 Store in a dry location.

Recommended relative air humidity is 40 to 70%. To minimize any adverse affects on the battery performance it is recommended that it is kept at room temperature (25 °C +/- 5 °C). Elevated temperatures can result in shortened life.

- 6 Do not store the battery in direct sunlight.
- 7 Keep the battery out of reach of children.

SECTION 11: Toxicological information

Acute oral, dermal and inhalation toxicity data are not available for this battery.

Risk of irritation occurs only if the battery is abused to the point of breaking the container and opening it to reveal the individual cells. If this occurs, irritation to the skin, eyes and respiratory tract may occur.

SECTION 12: Ecological information

The battery is not biodegradable.

Provided that the battery pack is disposed of according to local regulations and/or law, it will not have any environmental impact.

SECTION 13: Disposal considerations

Dispose of in accordance with local, state and federal laws and regulations for batteries.

A lithium thionyl chloride battery does not contain any heavy metals, and is therefore not regarded as special waste (contains only biodegradable parts).

A used transponder lithium battery often contains a significant amount of residual energy. It is the danger of explosion that presents a problem when disposing a battery. Used batteries must therefore be handled with the same care as new ones.

Note _____

For safe disposal, contact the nearest local company that has been approved to collect and dispose of lithium batteries.

SECTION 14: Transport information

Transportation of the cNODE Maxi 31 Ex d must be performed in accordance to rules and regulations stated for transportation of dangerous goods in the applicable countries.

Transport identification codes:

- **Aircraft:** IATA DGR
- **Sea transport:** IMDG
- **Railway:** RID
- **Road transport:** ADR

Original shipping boxes must be used for all transport.

Only new separate transponder lithium batteries can be transported by air.

Air transport of all transponders with new lithium battery, and new separate transponder lithium batteries, is only permitted on board cargo aircraft. The goods must be clearly labelled: CARGO AIRCRAFT ONLY.

Note _____

During transport a lithium battery must always be disconnected from the electronics.

SECTION 15: Regulatory information

Not applicable.

SECTION 16: Other information

The battery manufacturers' safety data sheets are available on their websites.

- Saft: <http://www.saftbatteries.com/>
- Tadiran/Sonnenschein: <http://www.tadiranbatteries.de/>

Emergency procedures

Follow these procedures for transponders with lithium batteries with unknown or failing status. Always read these procedures before handling any lithium batteries.

Topics

[Recovering a failing transponder, page 43](#)

[Handling a heated or self-heated transponder, page 43](#)

[Handling a transponder with an open relief valve, page 44](#)

[Opening a transponder with defect/possibly defect battery, page 44](#)

[Handling heated or warm batteries, page 45](#)

[Handling transponder and separate transponder batteries in case of an external fire, page 45](#)

Recovering a failing transponder

Always read the emergency procedures before handling lithium batteries.

Prerequisites

Handle a failing transponder as a possible water ingress.

Procedure

- 1 Evacuate all unnecessary people.
- 2 Recover the transponder with great caution using a crane.
No people should be near the transponder when it is lifted up on deck.
- 3 Place the transponder in a safe place out on deck, shielded from people and vital equipment.
- 4 Fasten the transponder in a crane, ready to lower it into the sea again.
- 5 Control the transponder for minimum two hours.
- 6 Check for damages that could involve a water leakage and check the housing temperature for a possible temperature increase in the lithium battery.
- 7 For batteries with normal temperature: Take out the battery, see the emergency procedure for opening a transponder with a possible defect battery.
- 8 For batteries with increasing temperature: See the emergency procedure for handling a heated or self-heated transponder.

Handling a heated or self-heated transponder

Always read the emergency procedures before handling lithium batteries.

Procedure

- 1 Evacuate all unnecessary people.
- 2 Fasten the transponder to a rope or a crane and immerse in the sea for 24 hours or permanent. If this method is impossible, the unit can be cooled with copious amounts of cold water using a fire hose.
- 3 Recover the transponder and control the temperature.
- 4 Repeat this until the temperature is low and stable.
- 5 Take out the battery, see the emergency procedure for opening a transponder with a possible defect battery.

Handling a transponder with an open relief valve

Always read the emergency procedures before handling lithium batteries.

Procedure

- 1 Evacuate all unnecessary people.
- 2 Use a full face mask with minimum BE-filter, and protective equipment made of rubber or plastic.
- 3 Fasten the transponder to a rope or a crane and immerse in the sea for 24 hours or permanent. If this method is impossible, the unit can be cooled with copious amounts of cold water using a fire hose.
- 4 Repeat this until no gases come out the relief valve and the temperature is low and stable.
- 5 Take out the battery, see the emergency procedure for opening a transponder with a possible defect battery.
- 6 Wash out the residues from the chemical reaction with water.

Opening a transponder with defect/possibly defect battery

Always read the emergency procedures before handling lithium batteries.

Procedure

- 1 Evacuate all unnecessary people.
- 2 Use a full face mask with minimum BE-filter, and protective equipment made of rubber or plastic.

WARNING

You must never stand in front of, or at the back of the unit, when you open it.

- 3 Open the transponder in a safe place out on the deck, shielded from people and vital equipment.
- 4 If there has been water ingress and the battery is still warm, disconnect the battery from the transponder electronics and study the procedure for handling a heated or warm separate battery.
- 5 Wash out the residues from the chemical reaction with water.

Handling heated or warm batteries

Always read the emergency procedures before handling lithium batteries.

Procedure

- 1 Evacuate all unnecessary people.
- 2 Fasten the battery to a rope or a crane and immerse in the sea for 24 hours or permanent. If this method is impossible, the unit can be cooled with copious amounts of cold water using a fire hose.
- 3 Wash out the residues from the chemical reaction with water.

Handling transponder and separate transponder batteries in case of an external fire

Always read the emergency procedures before handling lithium batteries.

Procedure

- 1 If possible, move the battery and/or the transponder away from the fire.
- 2 Cool it down using lots of cold water.

Cooling down the battery with a large amount of cold water is the only way to reduce or stop the internal chemical reactions, or to limit the fire/explosions to as few battery cells as possible. The chemical reactions/fire will continue without additional supply of oxygen, so extinguisher like Lith-X will not work properly.

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