

# Instruction Manual



KONGSBERG

## cNODE® Micro







KONGSBERG

***cNODE Micro  
Transponder  
Instruction Manual***

426351/B

February 2018 © Kongsberg Maritime AS

## Document information

- **Product:** Kongsberg cNODE Micro
- **Document:** Instruction Manual
- **Document number:** 426351
- **Revision:** B
- **Date of issue:** February 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 your local dealer. 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 <http://www.kongsberg.com>. On this website you will also find a list of our dealers and distributors.

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# About this manual

Observe this general information about the cNODE Micro 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 Micro.

## **Target audience**

The manual is intended for all users of cNODE Micro.

## **Registered trademarks**

Observe the registered trademarks that apply.

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

HiPAP® is a registered trademark of Kongsberg Maritime AS in Norway and other countries.

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# Kongsberg cNODE Micro

## Topics

[Introduction, page 7](#)

[Model definition, page 7](#)

[General supply conditions, page 8](#)

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## Introduction

The cNODE® Micro transponder is a light and compact unit designed for use by divers and shallow water ROV's. Operating on Kongsberg Cymbal digital acoustic protocols, the cNODE® Micro provides the optimal positioning performance with the Kongsberg range of SSBL systems, from  $\mu$ PAP® through to HiPAP®.

The cNODE® Micro is extremely flexible featuring Cymbal digital telemetry and both SSBL & Long Baseline positioning capabilities. By high range accuracies it can measure baselines between transponders on the seabed provide capabilities for simple diver metrology or archeology.

The telemetry capability allows the battery status to be read during operation and the integrated tilt sensor can be turned on and off with positioning updates. Multiple cNODE® Micro transponders can be interrogated simultaneously in SSBL positioning mode using the  $\mu$ PAP® and HiPAP® Fast track feature to ensure the fastest possible updates during operation.

The unit has a built in Li-Ion battery pack offering long time operation.

## Model definition

The transponder name consists of the model name, the model number, the transducer beam width and any options included.

### Model name

Micro 31–180, part number 424770

### Model number

#### First number

First digit = Frequency band	Second digit = Depth rating
3 = 30 kHz	1 = 600 metres

#### Second number

Transducer beam
180 = 180 degrees

### Transponder identification

The transponders have labels that identifies:

- the transponder name
- serial number
- default channels

## General supply conditions

The following general supply conditions apply to this Kongsberg cNODE Micro 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 Micro 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 Micro 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](http://www.km.kongsberg.com/support_hpr)
- **E-mail address:** [km.support.hpr@kongsberg.com](mailto:km.support.hpr@kongsberg.com)

# Main system units

## Topics

[cNODE Micro 31-180, page 11](#)

[Battery charger, page 11](#)

[TTC 30 \(Transponder Test and Configuration unit\), page 11](#)

[Test and configuration cable \(TTC to Micro\), page 11](#)

[Test and configuration cable \(PC to Micro\), page 12](#)

## cNODE Micro 31-180



The transponder unit consist of housing, transducer, internal battery and electronics. The unit is equipped with an external connector for charging and configuration.

## Battery charger



It charges the internal Transponder battery in approximately 1 hour. The LED charge status indicator shows when charging is complete.

## TTC 30 (Transponder Test and Configuration unit)



The TTC 30 unit is for on deck testing and configuration of the medium frequency Transponders. The TTC 30 can test all KONGSBERG Transponder channels, Cymbal and HPR 400. It can also test telemetry Transponders with internal and external sensors.

## Test and configuration cable (TTC to Micro)

This cable connects the Micro to the TTC (Transponder test and configuration) unit.

## Test and configuration cable (PC to Micro)

This cable connects the Micro to the PC.

# 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.



# Getting started

## Topics

[Charging the battery \(on-deck\), page 16](#)

[Disconnecting the cNODE battery charger, page 17](#)

[LED indicator status and troubleshooting, page 18](#)

[Powering up the transponder, page 19](#)

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[Using existing versions of APOS, page 23](#)

[Pre-deployment checks, page 25](#)

[Deployment, page 25](#)

[Recovery checks, page 25](#)

## Charging the battery (on-deck)

The battery is charged through the external connector. This is connected with some risk, please read the information below and follow the charge procedure carefully.

### Prerequisites

#### Caution

---

*The cNODE Micro with battery must be climatised to a temperature between 10°C and 40°C before charging.*

*For on-deck charging use the cNODE battery charger only.*

*Never charge the battery unattended.*

---

Make sure the transponder is switched off before charging the battery and that the battery is climatised to a temperature between 10°C and 40°C before charging it.

### Context

#### Note

---

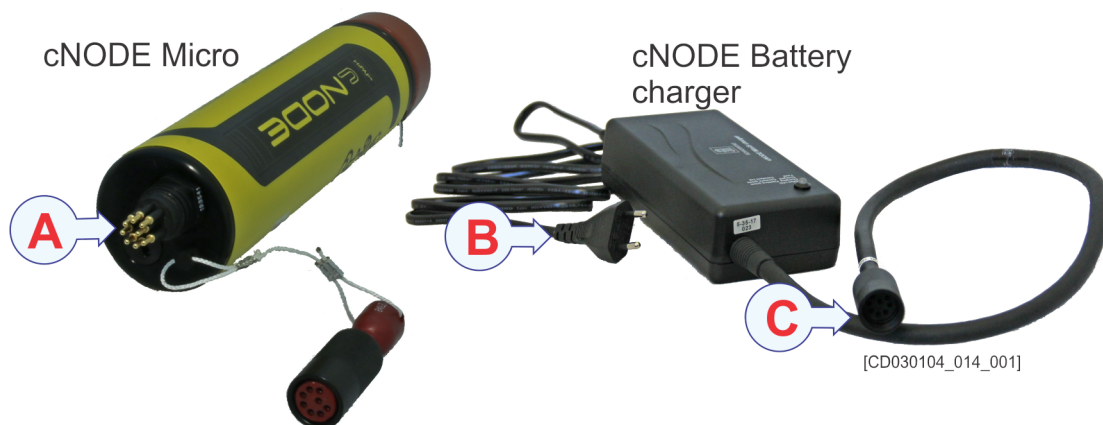
*Always connect the cNODE battery charger to the cNODE Micro before connecting the cNODE battery charger to the mains (110 or 220 Vac).*

*The battery must be fully charged before long term storage and it is recommended to recharge the battery every 6 months to make sure the battery does not discharge over time.*

*Required battery state for transportation, when the battery and the transponder are shipped separately, is 30% or less remaining capacity to comply with regulations.*

---

### Procedure



- 1 Switch off the transponder.

- 2 Let the battery climatise to an ambient temperature before charging (10°C to 40°C).
- 3 Connect the cNODE battery charger cable (C) to the connector (A).
- 4 Connect the cNODE battery charger to mains (110 or 220 Vac).
  - See label **B** in the illustration.
- 5 The LED indicator on the charger will flash green when charging.  
.It normally takes about 30 seconds before the charging starts and the LED indicator starts flashing green after connecting the cNODE battery charger to the cNODE Micro.  
The LED indicator will stay green when fully charged.  
The battery will be charged within 1 hour.

## Disconnecting the cNODE battery charger

It is very important to read the procedures before disconnecting the cNODE battery charger from the cNODE Micro.

### Prerequisites

#### Note

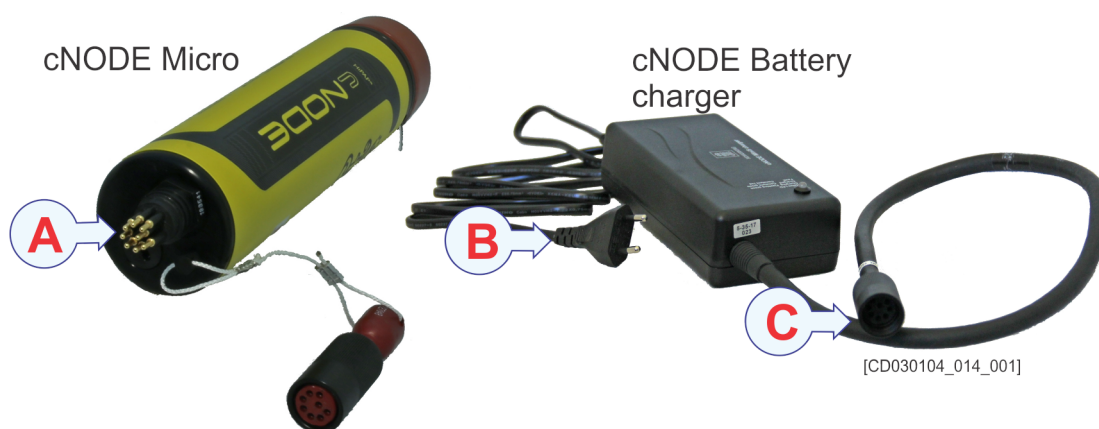
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*Always disconnect the cNODE battery charger from the mains (110 or 220 VAC) before disconnecting the cNODE battery charger from the cNODE Micro.*

---

### Procedure

- 1 Disconnect the cNODE battery charger cable (B) from mains (110 or 220 VAC).



- 2 Disconnect the cNODE battery charger cable (C) from the cNODE Micro connector (A).

## Result

The transponder is now ready for use.

## LED indicator status and troubleshooting

LED indicator	What it means	How to fix this
Flashing green	The battery is charging	
Constant green	The battery is fully charged	
Flashing red	The following might have occurred: <ul style="list-style-type: none"><li>the charger is not connected to the transponder</li><li>failure in charger/transponder connection</li><li>charger might be faulty</li></ul>	Do the following: <ul style="list-style-type: none"><li>disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li></ul> If the LED indicator is still flashing red then the following might have occurred: <ul style="list-style-type: none"><li>the charger might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li></ul>
Constant red	The following might have occurred: <ul style="list-style-type: none"><li>the battery temperature might be outside the charging specification</li><li>possible battery failure</li></ul>	Do the following: <ul style="list-style-type: none"><li>the battery temperature is outside the specification and needs to climatise before charging. (10 to 40°C)</li><li>disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li></ul> If the LED indicator is still red then the following might have occurred: <ul style="list-style-type: none"><li>the battery might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li></ul>
No light	It normally takes about 30 seconds before the battery starts charging and the LED indicator starts flashing green after connecting the cNODE battery charger to the cNODE Micro and then to the mains (110 or 220 Vac).	If there is still no change to the LED indicator after 1 minute then do the following: <ul style="list-style-type: none"><li>disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li></ul> If the LED indicator is still no light then the following might have occurred: <ul style="list-style-type: none"><li>the charger or cNODE Micro might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li></ul>

## Powering up the transponder

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

### Procedure



- 1 Connect the on/off plug to the end cap connector.
- 2 Tighten the locking sleeve to the end cap connector.

### Result

A buzz can be heard within 25 seconds as a confirmation that the transponder is activated.

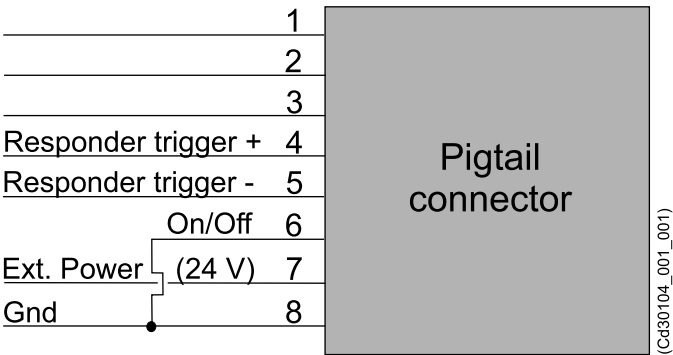
### Further requirements

It is recommended to test the transponder with the Test and Configuration Test (TTC) unit to make sure the transponder is working properly before operation.

# Connecting the transponder to external power and responder signals

The following information will help with connecting the external power to the transponder.

**Procedure**



- 1 Use the specified pigtail.
  - 2 Connect wire 6 and 8 in the pigtail (the ON/OFF function).
  - 3 Ensure that the external power supply 24 Vdc is between 18 and 36 Vdc.
  - 4 Check the responder trigger signal.
  - 5 Switch ON the unit by inserting the external power/responder cable.
- If the responder function is to be used, the unit can be checked in air on deck, using a TTC30 (Transponder Test and Configuration) unit.

**Further requirements**

Pre deployment checks must be performed before the unit is installed/used.

# Connecting the cNODE Micro to the ROV

It is very important to read the procedures before connecting the cNODE Micro to the ROV.

**Prerequisites**

Note \_\_\_\_\_

*Always connect the cNODE Micro to the ROV before turning on the power supply (24 VDC).*

---

### Procedure

- 1 Connect the cable between the cNODE Micro and the ROV.
- 2 Turn on the power supply (24 VDC) to the cNODE Micro.

## Disconnecting cNODE Micro from the ROV

It is very important to read the procedures before disconnecting the cNODE Micro from the ROV.

### Prerequisites

#### Note

---

*Always turn off the power supply (24 VDC) before disconnecting the cNODE Micro from the ROV.*

---

### Procedure

- 1 Turn off the power supply (24 VDC) to the cNODE Micro.
- 2 Disconnect the cable between cNODE Micro and the ROV.

## Powering up the TTC

### Procedure

- 1 Place the TTC in a suitable location.
- 2 Open the case by pressing the handle knobs and pulling the handles up.
- 3 Turn on the main power switch to load the software (this takes approximately 1.5 minutes).

### Result

The system is now ready for operation.

## Acoustic test

Perform the acoustic test to make sure the transponder is functioning.

### Prerequisites

Pre-deployment checks have been done.

### Context

To set **TTC POWER** use left/right arrows to choose power level and tap **SET** to confirm your selection.

### Procedure

- 1 Connect the test transducer cable to the upper right connector.
- 2 Place the Test transducer face to face with the transponder.
- 3 Communication between the TTC and the transponder may easily be tested by selecting the **ACOUSTIC TEST** tab.
- 4 Enter serial number.
- 5 Enter the transponder channel number.
- 6 Tap **INTERROGATE**.
- 7 A green indicator will blink on the display if there is acoustic contact with the transponder.
- 8 Tap **INTERROGATE** again to stop the **ACOUSTIC TEST**.

## Configuring the transponder

This will leave your transponder with a new configuration.

### Prerequisites

The transponder must be connected to the Transponder Test and Configuration unit via a TTC Test and configuration cable.

### Procedure

- 1 Tap **Transponder Configuration**.
- 2 Make changes to the configuration in the relevant fields.
- 3 Tap **DOWNLOAD A NEW CONFIGURATION** to update the transponder.

### Result

If the configuration is successful you will receive a message; Downloaded new configuration succeeded and reset performed successfully.

If the configuration is not successful you will receive a warning message; Download config failed. Check all cables and try again.

### Further requirements

See the Instruction manual for the Transducer Test and Configuration unit, document number 350839, for more information.



## cNODE Micro operation in APOS

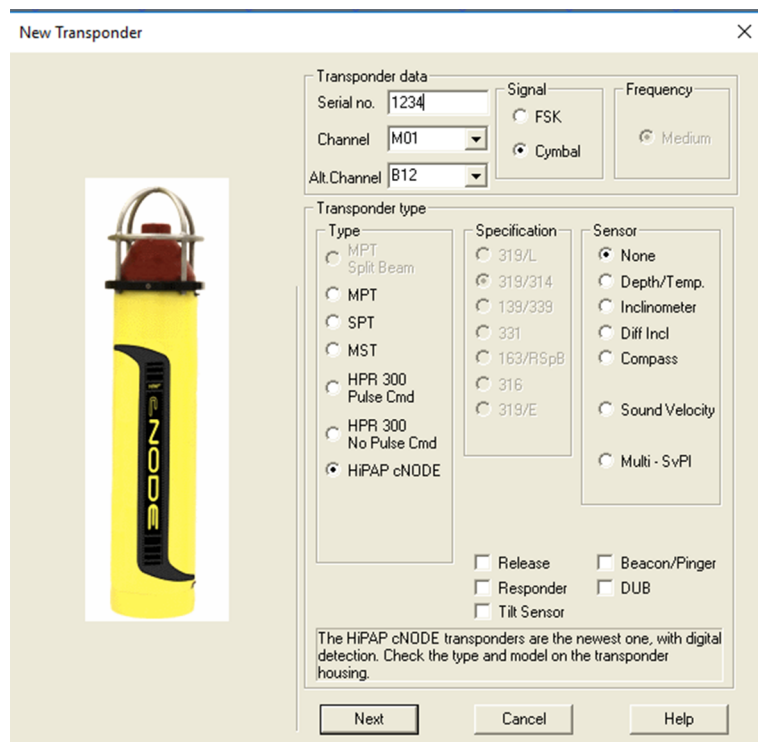
cNODE Micro only operates in Cymbal mode and uses the channels M01 - M56 for SSBL and M57 - M62 for LBL LIC. Channels such as B12 etc are not supported.

## Using existing versions of APOS

Existing versions of APOS may not support the cNODE Micro fully. When opening the **New Transponder** menu in APOS you can see that there is no information given regarding the cNODE Micro transponder using Cymbal only.

Installing a new cNODE Micro transponder in the **New Transponder** menu in APOS:

- 1 Select HiPAP cNODE.
- 2 Enter serial number and channel number.
- 3 Ignore the Alt. Channel (this is for FSK).



## Changing transponder channel

### Note

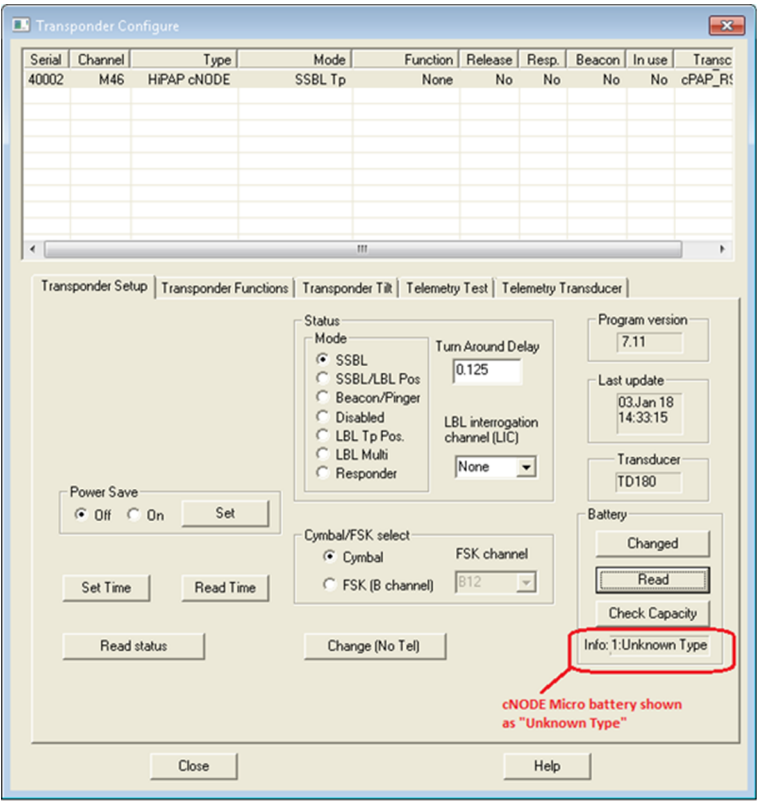
*The cNODE Micro transponder uses M-channels only. See the transponder label for channel information.*

If you by mistake change the transponder channel from Mxx channel to Bxx channel in APOS, it will result in that the transponder will not respond to this command and the transponder keeps its original channel.

APOS will however change the transponder channel for this transponder in the system and will use the wrong channel. This means that the transponder will not reply to the interrogation.

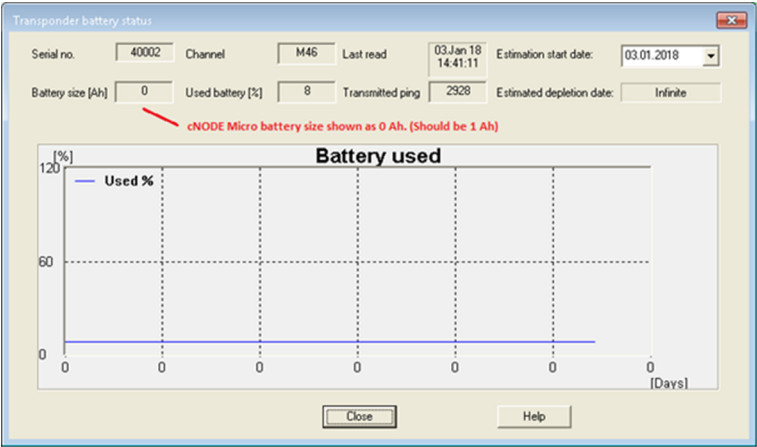
To correct this, you need to delete the installed transponder and re-install it again with the original channel number.

Battery status



When reading battery status; “Unknown type” will be displayed and Battery size will show 0.

The displayed “Used Battery [%]” and “Transmitted ping” is correct.



## Pre-deployment checks

Prior to deployment of the Transponder, it is important that the following checks are made to ensure correct operation.

### Procedure

- 1 Make sure the retaining cord is in place.
- 2 If the unit has been altered from the factory pre-sets, check that the unit is configured according to your requirements.
- 3 Make sure the battery is fully charged.
- 4 Push the pressure relief valve in to confirm that it is flush with the end cap.
- 5 Switch the Transponder ON by inserting the On/off plug.
- 6 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.

## Deployment

When you fit the Transponder onto a vehicle/structure, the unit must be positioned with the transducer upright and there must be a clear line of sight between the transducer on the Transponder and the vessel's transducer. Use a hose clamp with rubber protection to secure the Transponder.

The Transponder should be fully charged before deployment.

## Recovery checks

It is important to perform these recovery checks after every operation.

### Procedure

- 1 Wash the unit thoroughly in warm fresh water to dissolve any salt deposits and clean off any sand or silt.
- 2 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.

Leave the unit to soak for 24 hours, or as long as practical conditions allow.

- 3 Dry off the Transponder and make sure that there is no water around the On/off plug or the external connector.
- 4 Turn the unit OFF by removing the On/off plug or disconnecting the external cable.
- 5 Recharge the unit if it is deployed again and not stored.

**Result**

The Transponder is ready for operation or for storage.

# Cable layout and interconnections

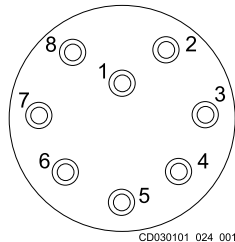
## Topics

[External connector, page 28](#)

## External connector

The external connector is for configuration, responder, on/off function and charging.

Face view (male):



Pin 1, 2 and 3 is for configuration.

Pin 4 and 5 is for responder function.

Pin 6 is for on/off function.

Pin 7 and 8 is for external power.

Pin number	Signal
1	TX RS-232
2	GND
3	RX RS-232
4	RESPONDER TRIGGER+
5	RESPONDER TRIGGER-
6	ON/OFF
7	EXTERNAL POWER (24V)
8	GND

# 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

All maintenance procedures you can do on the cNODE Micro are listed here.

## **Topics**

[Safety features, page 31](#)

[Charging the battery \(on-deck\), page 31](#)

[Disconnecting the cNODE battery charger, page 33](#)

[Greasing of Subconn connectors, page 33](#)

[LED indicator status and troubleshooting, page 34](#)



## Safety features

### Pressure relief valve

The pressure relief valve prevents internal pressure to build up. This valve will release the pressure if it exceeds approximately 1.0 bar.

The relief valve will normally pop out gently releasing the pressure. The valve is reset by firmly pushing the valve back in and is levelled with the surrounding surface.

Resetting the valve can in certain cases be obstructed due to production of acids and salts leaking from a damaged battery. In such cases the battery and circuits may have been damaged. Please contact Kongsberg Maritime for assistance.

### Handling procedures for a transponder with an open relief valve or heated body

If the transponder body is hot when recovered, place the transponder fully submerged in a bucket of water for 24 hours or deploy into the sea permanently. If this method is impossible, the transponder can be cooled with copious amounts of cold water using a fire hose.

If the transponder pressure relief valve emits gas or liquids when recovered, place the transponder fully submerged in a bucket of water for 24 hours or deploy into the sea permanently. If this method is impossible, the transponder can be cooled with copious amounts of cold water using a fire hose.

## Charging the battery (on-deck)

The battery is charged through the external connector. This is connected with some risk, please read the information below and follow the charge procedure carefully.

### Prerequisites

#### Caution

---

*The cNODE Micro with battery must be climatized to a temperature between 10°C and 40°C before charging.*

*For on-deck charging use the cNODE battery charger only.*

*Never charge the battery unattended.*

---

Make sure the transponder is switched off before charging the battery and that the battery is climatized to a temperature between 10°C and 40°C before charging it.

## Context

### Note

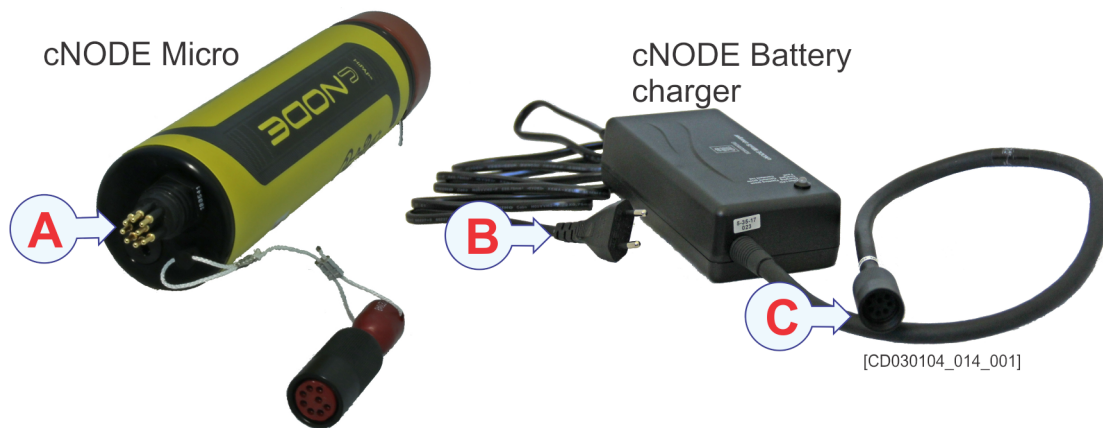
*Always connect the cNODE battery charger to the cNODE Micro before connecting the cNODE battery charger to the mains (110 or 220 Vac).*

*The battery must be fully charged before long term storage and it is recommended to recharge the battery every 6 months to make sure the battery does not discharge over time.*

*Required battery state for transportation, when the battery and the transponder are shipped separately, is 30% or less remaining capacity to comply with regulations.*

---

## Procedure



- 1 Switch off the transponder.
- 2 Let the battery climatise to an ambient temperature before charging (10°C to 40°C).
- 3 Connect the cNODE battery charger cable (C) to the connector (A).
- 4 Connect the cNODE battery charger to mains (110 or 220 Vac).
  - See label **B** in the illustration.
- 5 The LED indicator on the charger will flash green when charging.

.It normally takes about 30 seconds before the charging starts and the LED indicator starts flashing green after connecting the cNODE battery charger to the cNODE Micro.

The LED indicator will stay green when fully charged.

The battery will be charged within 1 hour.

## Disconnecting the cNODE battery charger

It is very important to read the procedures before disconnecting the cNODE battery charger from the cNODE Micro.

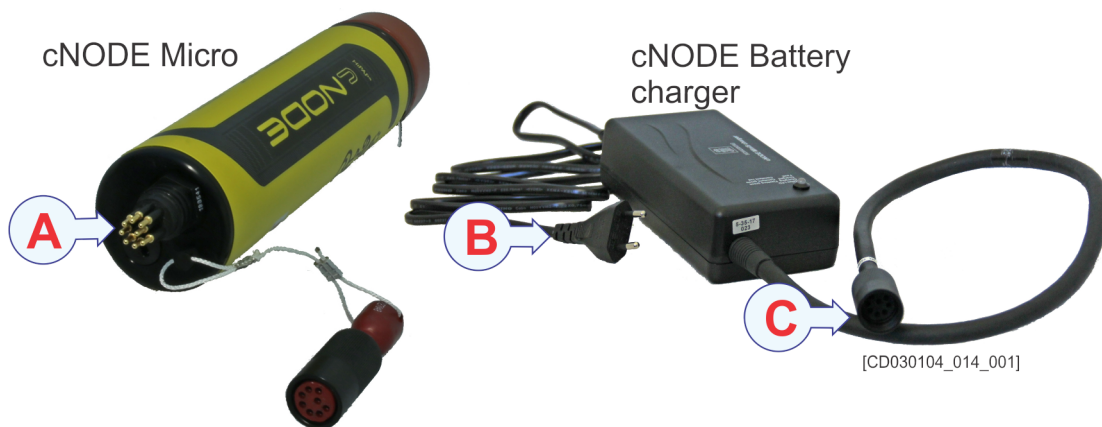
### Prerequisites

#### Note

*Always disconnect the cNODE battery charger from the mains (110 or 220 VAC) before disconnecting the cNODE battery charger from the cNODE Micro.*

### Procedure

- 1 Disconnect the cNODE battery charger cable (B) from mains (110 or 220 VAC).



- 2 Disconnect the cNODE battery charger cable (C) from the cNODE Micro connector (A).

### Result

The transponder is now ready for use.

## 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.

## LED indicator status and troubleshooting

LED indicator	What it means	How to fix this
Flashing green	The battery is charging	
Constant green	The battery is fully charged	
Flashing red	<p>The following might have occurred:</p> <ul style="list-style-type: none"> <li>• the charger is not connected to the transponder</li> <li>• failure in charger/transponder connection</li> <li>• charger might be faulty</li> </ul>	<p>Do the following:</p> <ul style="list-style-type: none"> <li>• disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li> </ul> <p>If the LED indicator is still flashing red then the following might have occurred:</p> <ul style="list-style-type: none"> <li>• the charger might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li> </ul>
Constant red	<p>The following might have occurred:</p> <ul style="list-style-type: none"> <li>• the battery temperature might be outside the charging specification</li> <li>• possible battery failure</li> </ul>	<p>Do the following:</p> <ul style="list-style-type: none"> <li>• the battery temperature is outside the specification and needs to climatise before charging. (10 to 40°C)</li> <li>• disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li> </ul> <p>If the LED indicator is still red then the following might have occurred:</p> <ul style="list-style-type: none"> <li>• the battery might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li> </ul>
No light	It normally takes about 30 seconds before the battery starts charging and the LED indicator starts flashing green after connecting the cNODE battery charger to the cNODE Micro and then to the mains (110 or 220 Vac).	<p>If there is still no change to the LED indicator after 1 minute then do the following:</p> <ul style="list-style-type: none"> <li>• disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac).</li> </ul> <p>If the LED indicator is still no light then the following might have occurred:</p> <ul style="list-style-type: none"> <li>• the charger or cNODE Micro might be faulty. Contact your local Kongsberg Maritime office if this is the case.</li> </ul>

# Illustrated spare parts catalogue

## Topics

[Micro 31-180 spare part, page 36](#)

[cNODE Micro battery charger spare part, page 36](#)

[On/off plug spare part, page 36](#)

[Pigtail cable spare part — Seacon 8F, page 36](#)

[Transponder Test and Configuration unit \(TTC30\) spare part, page 37](#)

[Test and configuration cable \(TTC to Micro\) spare part, page 37](#)

[Test and configuration cable \(PC to Micro\) spare part, page 37](#)

## Micro 31-180 spare part



- **Part name:** cNODE Micro 31–180
- **Part number:** 424770

## cNODE Micro battery charger spare part



- **Part name:** cNODE Micro battery charger
- **Part number:** 404199

## On/off plug spare part



- **Part name:** On/off plug with Locking sleeve
- **Part number:** 401633

## Pigtail cable spare part — Seacon 8F



- **Part name:** Pigtail cable with Locking sleeve — Seacon 8F
- **Part number:** 408094

## Transponder Test and Configuration unit (TTC30) spare part

- **Part name:** TTC 30
- **Part number:** 345775



## Test and configuration cable (TTC to Micro) spare part

- **Part name:** Test and configuration cable, TTC to Micro
- **Part number:** 407647

## Test and configuration cable (PC to Micro) spare part

- **Part name:** Test and configuration cable, PC to Micro
- **Part number:** 407648

# Drawing file

This chapter lists all the drawings needed for installation and maintenance.

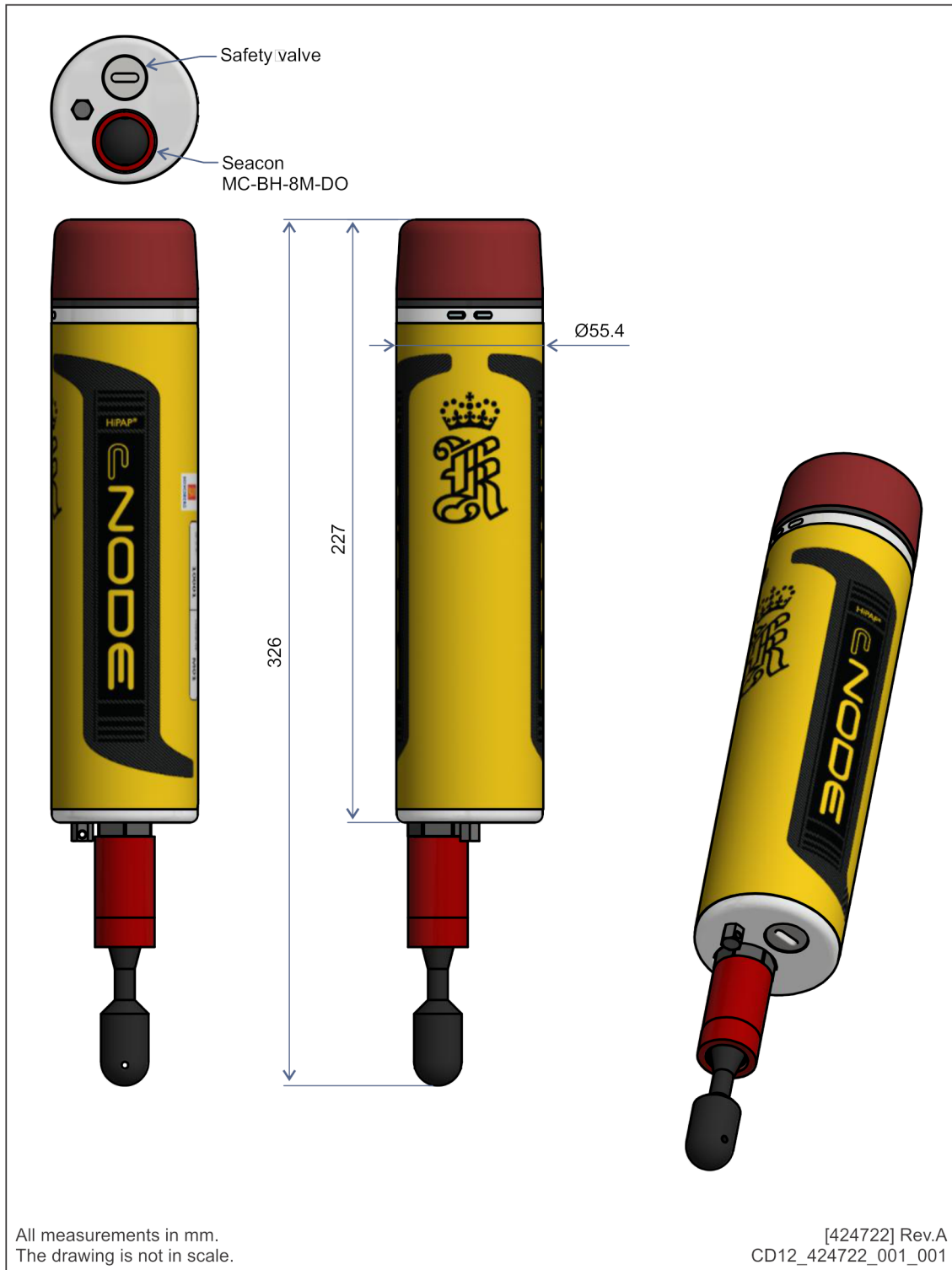
## **Topics**

[Micro 31-180 outline drawing, page 39](#)



# Micro 31-180 outline drawing

Drawing 424722



# Technical specifications

## Topics

[Environmental requirements, page 41](#)

[Performance specification, page 41](#)

[Power requirements, page 42](#)

[Weight and outline dimensions, page 42](#)

## Environmental requirements

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

### Micro 31–180

Operational temperature	-5 to +55°C
Storage temperature	-30 to +70°C

### Aluminium transponders

Housing material	Anodised aluminium
Housing coating	Polyurethane

## Performance specification

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

### Micro 31-180

Depth rating	600 m
Operational frequency	MF 21–31 kHz
Responder trigger signal	5 V to 25 V positive logic pulse (2 ms - 6 ms)
External connector	Seacon MCBH8MDO (cNODE MiniS compatible)
Pigtail cable	Seacon MC-IL-8-F (length 60 cm)
Quiescent battery lifetime	10 days
Cymbal (Low power, 1 second update rate)	< 48 hours
Battery capacity with external power	90 to 95%

## Power requirements

These power characteristics summarize the supply power requirements for the cNODE Micro.

### Micro battery

Battery type	Li-Ion (LiFePO <sub>4</sub> )
Nominal voltage	13.2 Vdc
Nominal capacity	1100 mAh/14.52 Wh

### Battery charger

Input voltage	110/230 Vac
---------------	-------------

### Micro external power

Input	24 Vdc (20-28 V), 1 A, 24 W
-------	-----------------------------

## Weight and outline dimensions

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

### Micro 31–180

Height	245 mm
Diameter	Ø 55 mm
Weight in air	1 kg
Weight in water	0.4 kg

### Battery charger

Height	47.3 mm
Length	159.7 mm
Width	80.7 mm
Weight	0.6 kg

# Battery safety

## Topics

- Section 1: Identification, page 43
- Section 2: Hazards identification, page 44
- Section 3: Composition, page 44
- Section 4: First aid measures, page 45
- Section 5: Firefighting measures, page 45
- Section 6: Accidental release measures, page 46
- Section 7: Handling and storage, page 46
- Section 8: Exposure control and personal protection, page 46
- Section 9: Physical and chemical properties, page 47
- Section 10: Stability and reactivity, page 47
- Section 11: Toxicological information, page 47
- Section 12: Ecological information, page 47
- Section 13: Disposal considerations, page 47
- Section 14: Transport information, page 48
- Section 15: Regulatory information, page 48
- Section 16: Other information, page 49

## Section 1: Identification

**Product name:** Battery pack (Li-ion) for cNODE Micro, part number 426688

The battery is included in the following model:

- cNODE Micro 31–180, part number 424770

**Manufacturer:** Kongsberg Maritime AS

**Address:** Strandpromenaden 50, 3190 Horten, Norway

**Telephone, 24 h support:** +47 33 03 24 07

**Website:** <http://www.km.kongsberg.com>

**Support website:** [http://www.km.kongsberg.com/support\\_hpr](http://www.km.kongsberg.com/support_hpr)

**E-mail:** [km.support.hpr@kongsberg.com](mailto:km.support.hpr@kongsberg.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. There is no expected release during use of the battery pack. The battery cells includes a barrier preventing exposure to the user and the 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 are overcharged, the results may be thermal runaway.
- **External fire** – Internal pressure and thermal runaway may be the consequence 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 node and cathode. Thermal runaway and fire is possible.
- **Water ingress** – Internal pressure, thermal runaway and chemical reactions may be the consequence.

The transponder has a pressure relief valve at the bottom of the unit. The relief valve prevents overpressure. Noxious gases and ingredients will then leak out of the transponder until the chemical reactions have stopped.

## Section 3: Composition

- **Battery chemistry:** The battery consist of Li-Ion cells with chemistry Lithium iron phosphate – LiFePO<sub>4</sub>

- **Cell manufacturer:** A123 Systems
- **Cell size:** 18650
- **Battery configuration:** 4S1P
- **Nominal capacity:** 1100 mAh/14.52 Wh
- **Equivalent Lithium content:** 1.33 g
- **Certification:** UN 38.3

**Note**

*For additional information about these cells, see the safety data sheet provided by the cell manufacturer.*

## Section 4: First aid measures

The battery will release toxic fumes if burned or exposed to fire. If subjected to gas from a burning transponder or battery, remove source of contamination or move victim to fresh air. In all cases, seek immediate medical attention.

Inhalation:	Remove from exposure, rest and keep warm.
Skin contact:	Wash off skin thoroughly with water and soap for at least 15 minutes. Remove contaminated clothing and wash it before reuse.
Eye contact:	Irrigate thoroughly with water for at least 15 minutes.
Ingestion:	Wash out mouth thoroughly with water and give plenty of water to drink.

## Section 5: Firefighting measures

The transponder in which the battery pack is used is designed with an overpressure vent to the internal battery pack. Nonflammable material are used. In case of fire, move transponder from fire area if you can do it without risk. Extreme mechanical, thermal or electrical abuse to the transponder may result in ruptured seal, and expose the battery. The individual cells in the battery pack contain flammable liquid electrolyte that may vent, ignite and produce sparks when subjected to high temperatures ( $> 150\text{ }^{\circ}\text{C}$  ( $302\text{ }^{\circ}\text{F}$ )), when damaged or abused. A burning battery can ignite other batteries in close proximity. Suitable extinguishing media are dry chemical,  $\text{CO}_2$ , water spray or regular foam. Cool down the battery/transponder with copious amounts of cold water.

The interaction with water or water vapor and exposed lithium hexafluorophosphate (Li PF<sub>6</sub>) may result in the generation of hydrogen and hydrogen fluoride (HF) gas. Contact with battery electrolyte may be irritating to skin, eyes and mucous membranes. Fire will produce irritating, corrosive and/or toxic gases. Fumes may cause dizziness or suffocation. Wear positive pressure self-contained breathing apparatus (SCBA).

## Section 6: Accidental release measures

During normal operation, accidental release measures are not applicable. Extreme mechanical, thermal or electrical abuse to the transponder in which the battery is used 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. 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. Do not expose the battery to temperatures outside the range of -30°C to 70°C. Store the battery in a dry location. To minimize any adverse affects on battery performance it is recommended that it is kept at room temperature (25°C +/- 5°C). Elevated temperatures can result in shortened life.

For long term storage the transponders should be fully charged and recharged every 6 months. If transponders are left to deplete completely, it might be impossible to charge them again.

## 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) are then required. If the battery is damaged, and you are exposed to the chemicals inside it, proper personal protection is required.



Personal protective equipment for damaged battery should include chemical resistant gloves and safety glasses. Use positive pressure self-contained breathing apparatus (SCBA) if batteries or transponders are involved in a fire.

## 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. For more information about the individual battery cells, observe the manufacturer's safety data sheet.

## Section 10: Stability and reactivity

The battery is stable. No specific handling requirements apply. Avoid exposing the battery to fire or temperatures above 80°C. Do not disassemble, crush, short or install the battery with incorrect polarity. Avoid mechanical or electrical abuse. Do not immerse in seawater or other high conductivity liquids. The battery may release toxic fumes if burned or exposed to fire. Breaching of the individual cell enclosure may lead to generation of hazardous fumes which may include extremely hazardous HF (hydrofluoric acid).

## 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. Risk of irritation occurs only if an individual cell is mechanically, thermally or electrically abused to the point of compromising the enclosure. If this occurs, irritation to the skin, eyes and respiratory tract may occur.

## Section 12: Ecological information

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.

## Section 14: Transport information

Required battery state for transportation is 30% or less remaining capacity to comply with regulations.

- Shipment of transponder

Each transponder unit is transported as a closed and sealed unit, and shall not be opened by unauthorized personnel. As a single unit containing a battery with less than 100 Wh capacity, the transportation is made according to **ICAO/IATA packing instructions 967 Section II**; *Cells or batteries installed in equipment*.

The cNODE Micro transponder unit must be shipped in accordance with the prevailing national regulations; **UN No. 3481**, Miscellaneous (*Lithium Ion batteries included in equipment*).

- Shipment of separate battery

Separate transponder batteries conform to **ICAO/IATA packing instructions 965 Section II**; *Cells or battery in a package, without electronic equipment*. If the battery is shipped separately, the following prevailing national regulations apply: **UN No. 3480**, Miscellaneous (*Lithium Ion battery*).

For all shipments – transponder and separate batteries – use lithium battery handling label as specified in the additional requirements of Section II of packing instructions 965, 966 and 967.

Transport identification codes:

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

Note

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*Damaged transponders returned to the manufacturer for repair shall be transported without batteries. Damages or spent batteries that have been recalled by the manufacturer for safety reasons shall not be transported by air.*

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## Section 15: Regulatory information

Not applicable.

## Section 16: Other information

The battery cell manufacturer's safety data sheet is available on the following internet address:

- **A123 Systems:** [www.a123systems.com](http://www.a123systems.com)

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