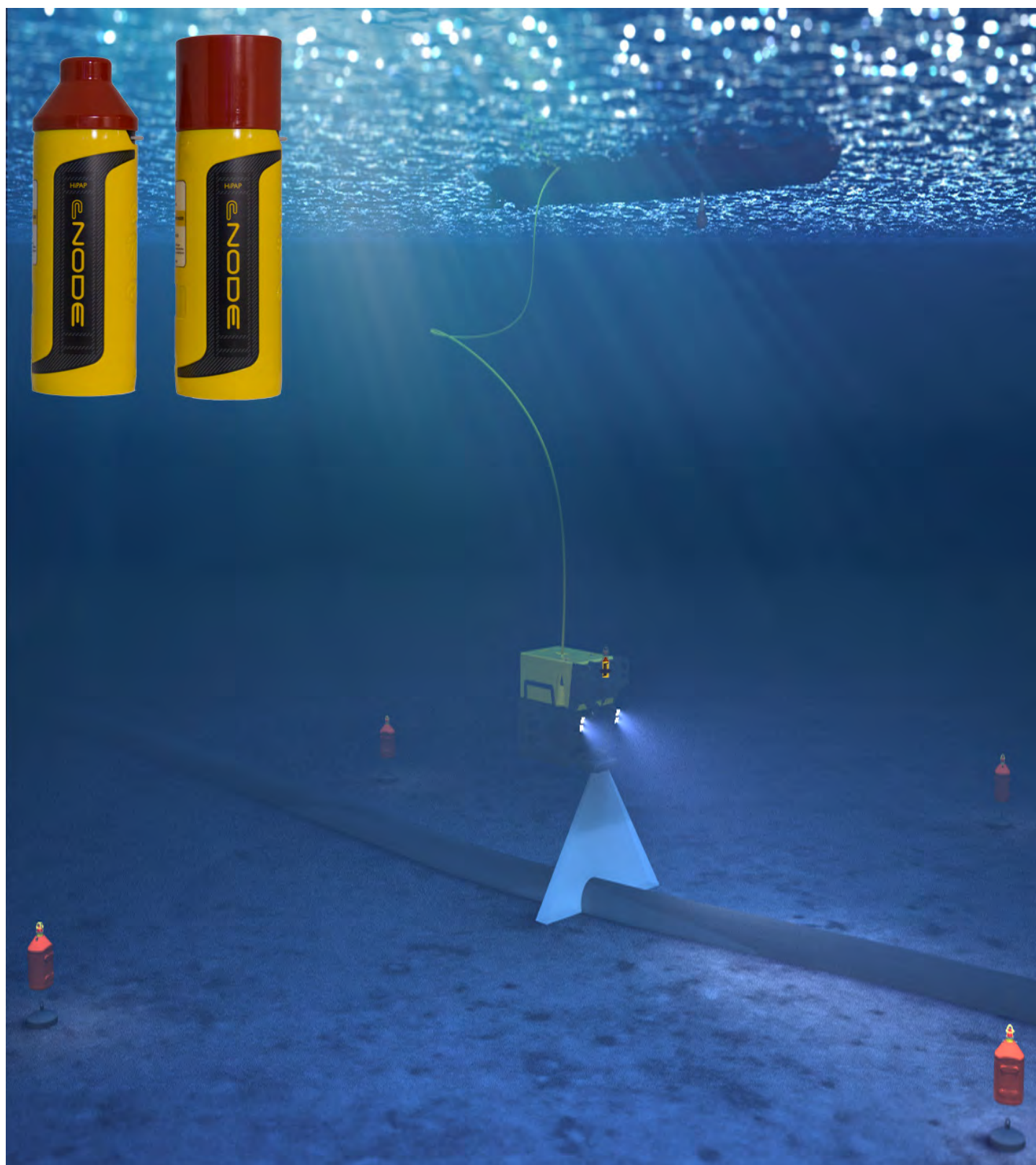


Instruction manual



KONGSBERG

cNODE MiniS transponder





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cNODE MiniS
Transponder
Instruction Manual

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About this manual

Observe this general information about the cNODE MiniS 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 MiniS.

Target audience

The manual is intended for all users of cNODE MiniS.

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Kongsberg cNODE MiniS

Topics

[System description, page 7](#)

[Naming description, page 7](#)

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System description

cNODE is a family of transponders for underwater acoustic positioning and data link and operates with both HiPAP, HPR and cPAP transceivers.

The cNODE MiniS is the smallest member of the cNODE family. These transponders are used with HiPAP, cPAP and μ PAP systems in underwater positioning and are ideal for positioning ROVs. It has responder and transponder functionality, SSBL and LBL positioning, and telemetry capabilities.

cNODE MiniS is compatible with both Cymbal protocol for positioning and data link and HiPAP/HPR 400 channels and telemetry.

The transponders are rated to 4000 m with a housing made of coated anodised aluminium. It has an internal tilt sensor $\pm 90^\circ$, an external on/off function and a pressure relief valve for safety purposes.

It receives power from an internal rechargeable Li-Ion battery pack. The transponder takes charge from ROVs 24 V during operation. An on-deck MiniS battery charger is available.

Configuration and software update via external connector. TTC30 can be used for test and configuration.

Naming description

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

Model name

MiniS

Model number

First number =Frequency band	Second number = Depth rating
3 = 30 kHz	4 = 4000 meters

Transducer beam width

- 180 = 180° beam width
- 40V = 40° vertical beam width

Example of transponder name

The transponder name MiniS 34-40V indicates that this transponder unit is operating in the 30 kHz, rated to 4000 metres depth, with a 40° vertical beam width. The standard transponder tube material is aluminium.

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 MiniS delivery.

Receipt, unpacking and storage

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

The shipyard performing the installation and/or equipment dealer becomes fully responsible for the equipment upon receipt unless otherwise stated in the contract.

The duration of responsibility includes:

- The period of time the equipment is stored locally before installation
- During the entire installation process
- While commissioning the equipment
- The period of time between commissioning and the final acceptance of the equipment by the end user (normally the owner of the vessel which the equipment has been installed to)

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

Support information

If you need support for your Kongsberg cNODE MiniS 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

Main system units

The cNODE MiniS transponder is the smallest of the cNODE transponder family.

Topics

[cNODE MiniS 34-180, page 11](#)

[cNODE MiniS 34-40V, page 11](#)

[Battery charger, page 11](#)

[TTC 30 \(Transponder Test and Configuration unit\), page 12](#)

[Test and configuration cable \(TTC to MiniS\), page 12](#)

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

cNODE MiniS 34-180



The transponder is rated to 4000 m and the transponder housing is an aluminium tube which is anodised and polyurethane coated to protect against corrosion and abrasion. The transducer has a 180° omni directional beam. The transponder has an internal tilt sensor $\pm 90^\circ$ and a rechargeable Li-Ion battery. The transponder can be charged from an on deck battery charger or from a ROV's 24 V during operation.

cNODE MiniS 34-40V



The transponder is rated to 4000 m and the transponder housing is an aluminium tube which is anodised and polyurethane coated to protect against corrosion and abrasion. The transducer has a 40° vertical beam. The transponder has an internal tilt sensor $\pm 90^\circ$ and a rechargeable Li-Ion battery. The transponder can be charged from an on deck battery charger or from a ROV's 24 V during operation.

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 MiniS)

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

Test and configuration cable (PC to MiniS)

This cable connects the cNODE MiniS 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. TD30V). 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](#)

[Connecting the transponder to external power and responder signals, page 20](#)

[Connecting cNODE MiniS to the ROV, page 21](#)

[Disconnecting cNODE MiniS from the ROV, page 21](#)

[Changing between responder and transponder mode, page 21](#)

[Powering up the TTC , page 22](#)

[Acoustic test, page 22](#)

[Configuring the transponder, page 23](#)

[Pre-deployment checks, page 23](#)

[Deployment, page 24](#)

[Recovery checks, page 24](#)

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 transponder with battery must be climatised to a temperature between 10 and 40°C before charging.

For on-deck charging use the cNODE MiniS 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 MiniS before connecting the cNODE battery charger to the mains (110 or 220 Vac).

Preferred charge state for long time storage and transportation of the transponder is 30 to 50%.

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 plug to the connector on the cNODE MiniS marked CHARGE.

– See label 1 in the illustration.

- 4 Connect the cNODE battery charger to mains (110 or 220 Vac).

– See label 2 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 MiniS.



The LED indicator will stay green when fully charged.

The battery will be charged within 1 hour.

Result

The transponder is now ready for use.

Disconnecting the cNODE battery charger

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

Prerequisites

Note

Always disconnect the cNODE battery charger from the mains (110 or 220 Vac) before disconnecting the cNODE battery charger from the cNODE MiniS.

Context



Procedure

- 1 Disconnect the cNODE battery charger from mains (110 or 220 Vac).
- 2 Disconnect the cNODE MiniS from the cNODE battery charger.

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"> the charger is not connected to the transponder failure in charger/transponder connection charger might be faulty 	<p>Do the following:</p> <ul style="list-style-type: none"> disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still flashing red then the following might have occurred:</p> <ul style="list-style-type: none"> the charger might be faulty. Contact your local Kongsberg Maritime office if this is the case.
Constant red	<p>The following might have occurred:</p> <ul style="list-style-type: none"> the battery temperature might be outside the charging specification possible battery failure 	<p>Do the following:</p> <ul style="list-style-type: none"> the battery temperature is outside the specification and needs to climatise before charging. (10 to 40°C) disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still red then the following might have occurred:</p> <ul style="list-style-type: none"> the battery might be faulty. Contact your local Kongsberg Maritime office if this is the case.

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 MiniS 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"> • disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still no light then the following might have occurred:</p> <ul style="list-style-type: none"> • the charger or cNODE miniS might be faulty. Contact your local Kongsberg Maritime office if this is the case.
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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 labeled ON/OFF.
- 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.

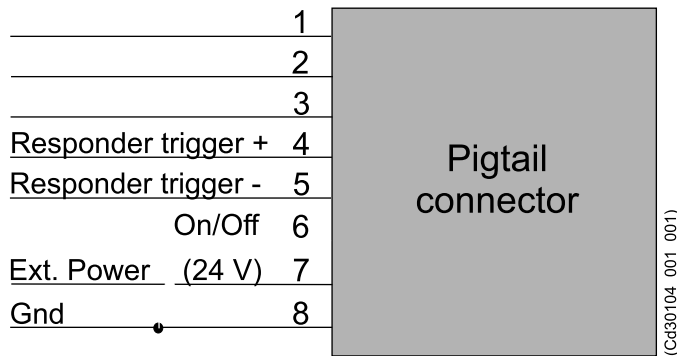
Further requirements

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 cNODE MiniS to the ROV

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

Prerequisites

Note

Always connect the cNODE MiniS to the ROV before turning on the power supply (24 Vdc).

Procedure

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

Disconnecting cNODE MiniS from the ROV

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

Prerequisites

Note

Always turn off the power supply (24 Vdc) before disconnecting the cNODE MiniS from the ROV.

Procedure

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

Changing between responder and transponder mode

The cNODE MiniS can be used in responder mode. By default when the cNODE MiniS is turned on it is in transponder mode. When responder trigger signals are received, the mode is automatically changed to responder. Once the responder trigger signals

stop, it will take 1 minute before the cNODE MiniS changes automatically back to transponder mode.

Powering up the TTC

Procedure

- 1 Place the unit 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 transponder tester 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.

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

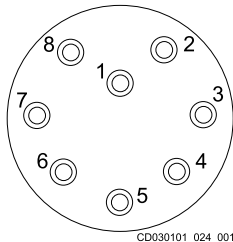
Topics

[External connector, page 26](#)

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 MiniS are listed here.

Topics

[Safety features, page 29](#)

[Charging the battery \(on-deck\), page 29](#)

[Disconnecting the cNODE battery charger, page 30](#)

[LED indicator status and troubleshooting, page 31](#)

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.

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 transponder with battery must be climatized to a temperature between 10 and 40°C before charging.

For on-deck charging use the cNODE MiniS 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 MiniS before connecting the cNODE battery charger to the mains (110 or 220 Vac).

Preferred charge state for long time storage and transportation of the transponder is 30 to 50%.

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 plug to the connector on the cNODE MiniS marked CHARGE.

– See label 1 in the illustration.

- 4 Connect the cNODE battery charger to mains (110 or 220 Vac).

– See label 2 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 MiniS.

The LED indicator will stay green when fully charged.

The battery will be charged within 1 hour.



Result

The transponder is now ready for use.

Disconnecting the cNODE battery charger

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

Prerequisites

Note

Always disconnect the cNODE battery charger from the mains (110 or 220 Vac) before disconnecting the cNODE battery charger from the cNODE MiniS.

Context



Procedure

- 1 Disconnect the cNODE battery charger from mains (110 or 220 Vac).
- 2 Disconnect the cNODE MiniS from the cNODE battery charger.

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"> • the charger is not connected to the transponder • failure in charger/transponder connection • charger might be faulty 	<p>Do the following:</p> <ul style="list-style-type: none"> • disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still flashing red then the following might have occurred:</p> <ul style="list-style-type: none"> • the charger might be faulty. Contact your local Kongsberg Maritime office if this is the case.

<p>Constant red</p>	<p>The following might have occurred:</p> <ul style="list-style-type: none"> • the battery temperature might be outside the charging specification • possible battery failure 	<p>Do the following:</p> <ul style="list-style-type: none"> • the battery temperature is outside the specification and needs to climatise before charging. (10 to 40°C) • disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still red then the following might have occurred:</p> <ul style="list-style-type: none"> • the battery might be faulty. Contact your local Kongsberg Maritime office if this is the case.
<p>No light</p>	<p>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 MiniS and then to the mains (110 or 220 Vac).</p>	<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"> • disconnect all cables and wait 1 minute before reconnecting the cables and connect power supply to mains (110 or 220 Vac). <p>If the LED indicator is still no light then the following might have occurred:</p> <ul style="list-style-type: none"> • the charger or cNODE miniS might be faulty. Contact your local Kongsberg Maritime office if this is the case.

Illustrated spare parts catalogue

Topics

[MiniS 34-180 spare part, page 34](#)

[MiniS 34-40V spare part, page 34](#)

[MiniS battery charger spare part, page 34](#)

[On/off plug spare part, page 34](#)

[Pigtail cable spare part, page 35](#)

[Transponder Test and Configuration unit \(TTC30\) spare part, page 35](#)

[Test and configuration cable \(TTC to MiniS\) spare part, page 35](#)

[Test and configuration cable \(PC to MiniS\) spare part, page 35](#)

MiniS 34-180 spare part



- **Part name:** cNODE MiniS 34-180
- **Part number:** 396588

MiniS 34-40V spare part



- **Part name:** cNODE MiniS 34-40V
- **Part number:** 396590

MiniS battery charger spare part



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

On/off plug spare part



- **Part name:** On/off plug
- **Part number:** 401633

Pigtail cable spare part



- **Part name:** Pigtail cable
- **Part number:** 402462

Transponder Test and Configuration unit (TTC30) spare part

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



Test and configuration cable (TTC to MiniS) spare part

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

Test and configuration cable (PC to MiniS) spare part

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

Drawing file

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

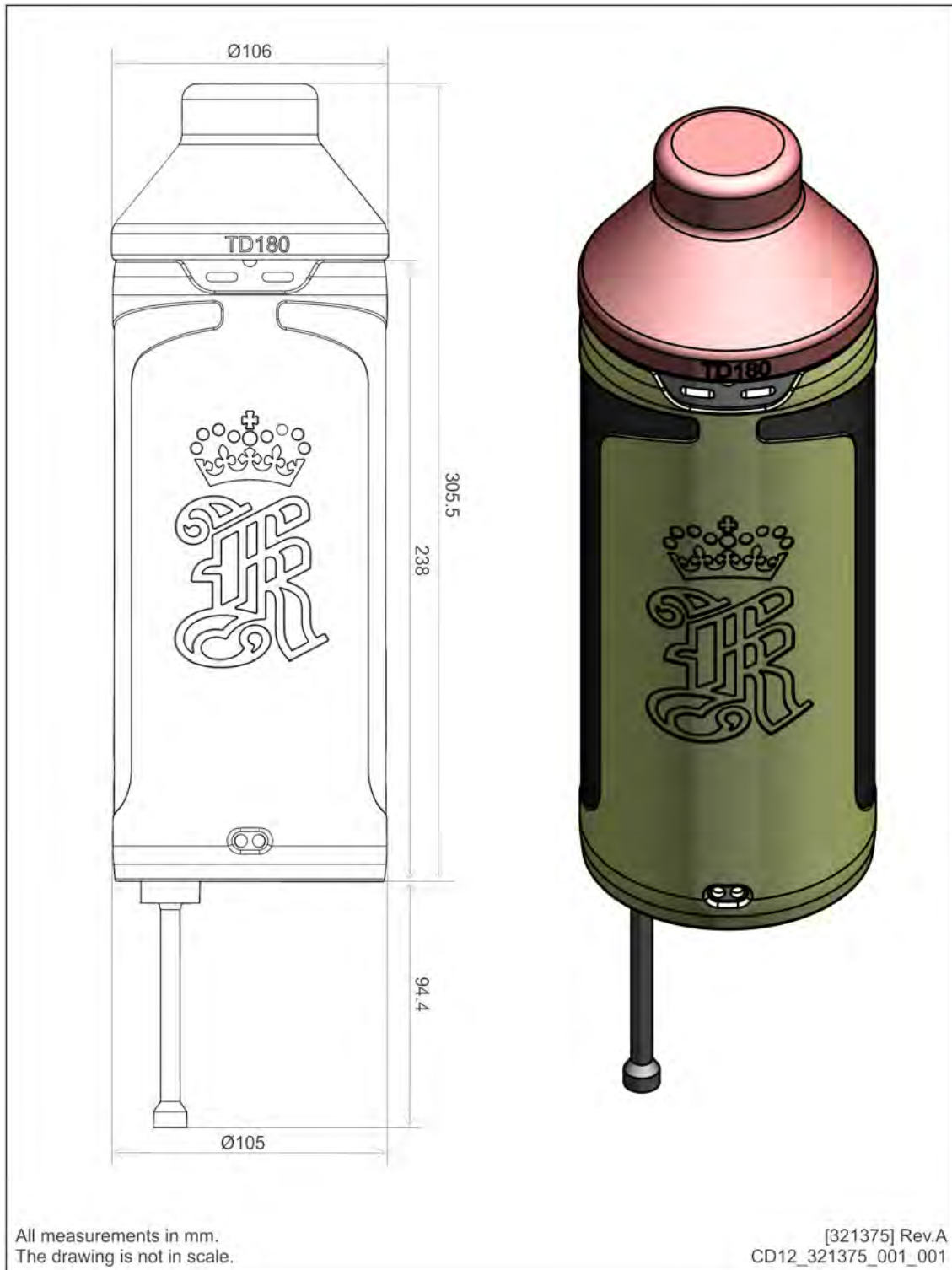
Topics

[MiniS 34-180 outline drawing, page 37](#)

[MiniS 34-40V outline drawing, page 38](#)

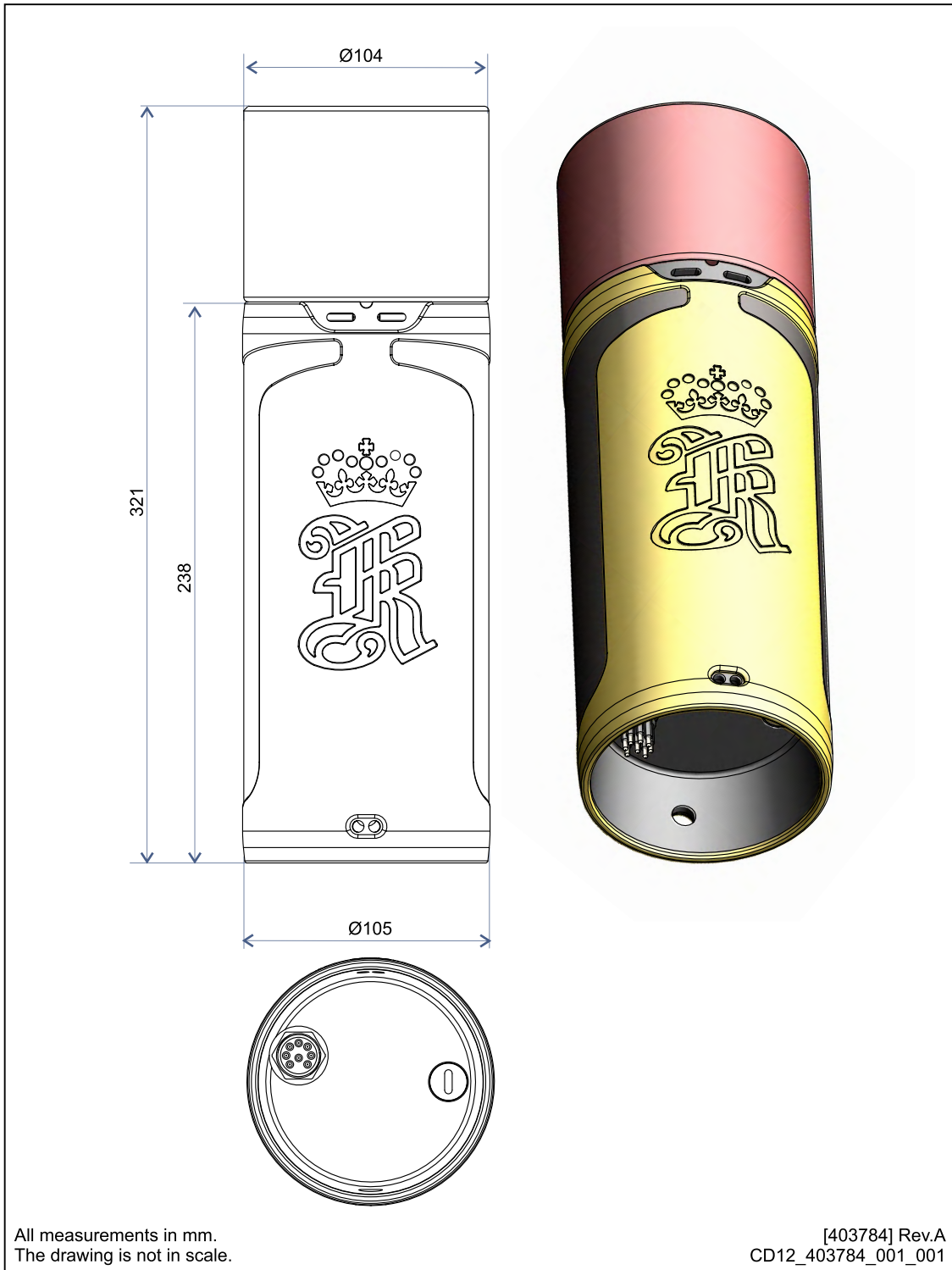
MiniS 34-180 outline drawing

Drawing 321375



MiniS 34-40V outline drawing

Drawing 403784



Technical specifications

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Environmental requirements

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

MiniS 34–180

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

MiniS 34–40V

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

Performance specification

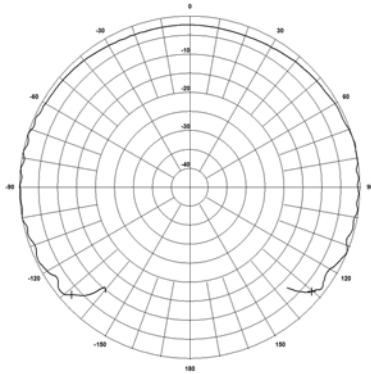
These performance specifications summarize the main functional and operational characteristics of the cNODE MiniS.

MiniS 34-180

- **Depth range:** 4000 m
- **Operating range:** Typically 1000 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
- **Pigtail cable:** Seacon MC-IL-8-F (length 60 cm)

Operating battery lifetime:

- **Quiescent battery lifetime:** 30 days
- **Cymbal (Low power, 1 second update rate):** > 2.5 days
- **Cymbal (Low power, 3 second update rate - power save mode):** > 7 days
- **FSK (High power, 3 second update rate):** > 4.5 days
- **Battery capacity with external power:** 75 to 80%



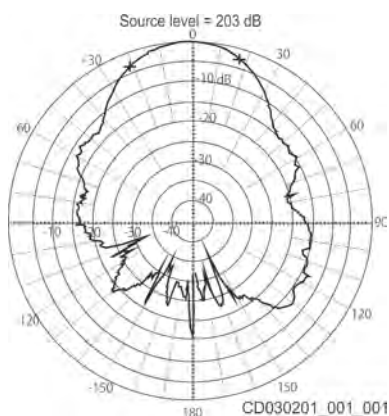
- **Transducer beam:** 180°
- **Source level:** 188 dB
- **Trigger level:** < 85 dB
- **Internal tilt sensor:** ±90°

MiniS 34-40V

- **Depth rating:** 4000 m
- **Operating range:** Typically 5000 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
- **Pigtail cable:** Seacon MC-IL-8-F (length 60 cm)

Operating battery lifetime:

- **Quiescent battery lifetime:** 30 days
- **Cymbal (Low power, 1 second update rate):** > 2.5 days
- **Cymbal (Low power, 3 second update rate - power save mode):** > 7 days
- **FSK (High power, 3 second update rate):** > 4.5 days
- **Battery capacity with external power:** 75 to 80%



- **Transducer beam:** 40° vertical
- **Source level:** 203 dB
- **Trigger level:** < 80 dB
- **Internal tilt sensor:** ±90°

Power requirements

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

MiniS battery

- **Battery type:** Li-Ion (LiFePO₄)
- **Nominal voltage:** 26.4 Vdc
- **Nominal capacity:** 2200 mAh/58 Wh

MiniS battery charger

- **Input:** 115/230 Vac 50–60 Hz max. 1.4 A
- **Output:** 24Vdc 4 A

MiniS 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 MiniS.

MiniS 34-180

- **Physical dimensions:**
 - **Height:** 305.5 mm
 - **Diameter:** Ø 106 mm
- **Weight in air:** 4 kg
- **Weight in water:** 2.1 kg

MiniS 34–40V

- **Physical dimensions:**
 - **Height:** 321 mm
 - **Diameter:** Ø 104 mm
- **Weight in air:** 4.6 kg
- **Weight in water:** 2.1 kg

MiniS battery charger

- **Physical dimensions:**
 - **Height:** 47.3 mm
 - **Length:** 159.7 mm
 - **Width:** 80.7 mm
 - **Weight:** 0.6 kg

Battery safety

Any unit powered by lithium batteries require special attention and dedicated safety procedures.

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Section 1: Identification

Product name: Battery pack for (Li-Ion) cNODE MiniS, part number 396782

The battery is included in the following transponder models:

- cNODE MiniS 34–180, part number 396588
- cNODE MiniS 34–40V, part number 396590

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

E-mail: 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 – LiFePO₄
- **Cell manufacturer:** A123 Systems
- **Cell size:** 18650
- **Battery configuration:** 8S2P
- **Nominal capacity:** 58 Wh
- **Equivalent Lithuim content:** 5.3 g
- **Certification:** UN 38.3
- **Class 9 exception:** The battery is exempted from Class 9

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, 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_6) 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 $-30\text{ }^{\circ}\text{C}$ to $70\text{ }^{\circ}\text{C}$. 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 ($25\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$). Elevated temperatures can result in shortened life.

Preferred charge state for long time storage is 30 to 50%.

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

Battery charge state is 30 to 50% for transportation.

- 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 MiniS 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

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.

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

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