



KONGSBERG

Instruction manual

BCN 1036

Battery charger

Transponder battery, Nickel Cadmium 10/36



Note

Kongsberg Simrad AS makes every effort to ensure that the information contained within this document is correct. However, our equipment is continuously being improved and updated, so we cannot assume liability for any errors which may occur.

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 or injury to personnel. The user must be familiar with the contents of the appropriate manuals before attempting to install, operate or maintain the equipment.

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BNC 1036

Battery Charger

This is the Instruction manual for the Kongsberg Simrad Battery Charger BNC 1036.

Document revisions

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Contents

1	INTRODUCTION	1
1.1	Manual contents	1
1.2	List of abbreviations	1
1.3	Overview	1
	Battery Charger BNC 1036	1
	Battery Pack N10/36	2
2	TECHNICAL SPECIFICATION	3
2.1	Battery Charger BCN 1036	3
	General	3
	Performance	3
	Electrical characteristics	3
	Fuses	4
2.2	Battery Pack N10/36	4
	General	4
	Battery lifetime	5
2.3	Cable and plugs	5
	Cable	5
	Plugs on the charger cable	5
	Operation plug on the battery	7
3	OPERATION	8
3.1	Front panel description	8
3.2	Charge methods	9
3.3	To charge a battery	9
	General	9
	Before you start charging	9
	Charging	10
	Charge status	11
	The Battery Charger is not working correctly	12
	Battery storage	12

Document history

(The information on this page is for internal use)

Rev. A Original issue.

1 INTRODUCTION

1.1 Manual contents

This manual describes the Kongsberg Simrad Battery Charger BNC 1036. It provides a general introduction, technical specifications, operating instructions and operator fault finding. It also includes a short description of the rechargeable transponder battery, Battery Pack N10/36.

1.2 List of abbreviations

TP	TransPonder
BCN 1036	Battery Charger,TP-battery Nickel Cadmium 10/36
N10/36	Nickel Cadmium 10/36
NTC	Negative Temperature Coefficient
PTC	Positive Temperature Coefficient

1.3 Overview

WARNING ! **The BCN 1036 can only be used to charge the Battery Pack N10/36. The Battery Pack N10/36 can only be charged by the BCN 1036.**

Battery Charger BNC 1036

The Kongsberg Simrad Battery Charger BNC 1036 is specially designed for charging the Battery Pack N10/36. The Battery Charger BNC 1036 is shown in the figure on the front page.

As indicated in the figure, the cable for battery connection is included.

Battery Pack N10/36

The Battery Pack N10/36 is a rechargeable battery. It contains 48 Nickel Cadmium battery cells, and may be used as a replacement for the standard transponder battery, L10/36.

Note !

Batteries delivered by Kongsberg Simrad must be charged before use (fast charge).

The Battery Pack N10/36 is to be used in the following types of Kongsberg Simrad transponders:

- The SPT 331 Series
- The SPT 314 Series
- The MPT 319 and SPT 319 Series

WARNING !

Due to safety precautions, do not open the Battery Charger. For maintenance apart from the actions described in the table on page 12, contact Kongsberg Simrad.

WARNING !

Do not short circuit the battery. This will generate heat which may cause damage and burns. In worst case, the battery may rupture.

2 TECHNICAL SPECIFICATION

2.1 Battery Charger BCN 1036

General

Battery Charger BCN 1036: Part no 211888

The battery charger contains two fully programmable current sources (one for each battery section 10/36), the PCB Battery Charger BCN 1036 (monitor and control charging, AC/DC) and a 5V-supply voltage module.

Weight 3.5 kg

Outline dimension 172 x 120 x 231 mm

Performance

Fast charge: $t_{fast} = \max 4 \text{ h}$

Slow charge: $t_{slow} = t_{discharge} + 16 \text{ h}$

(t_{fast} and $t_{discharge}$ depend on the two battery sections state of charge).

Electrical characteristics

Input voltage:

Power (AC): 115/230 VAC

Output voltage:

Battery 36 V: 0 – 47 (30 cells x 1.55 V/cell)

Battery 20 V: 0 – 28.5 (18 cells x 1.55 V/cell)

Charge current:

Fast charge: $C/3 = 1.7 \text{ A}$

Slow charge: $C/10 = 0.5 \text{ A}$

Trickle charge: $C/25 = 0.20 \text{ A}$

Max power consumption:

Fast charge: 165 W

Slow charge: 50 W

Trickle charge: 22 W

Temperature:

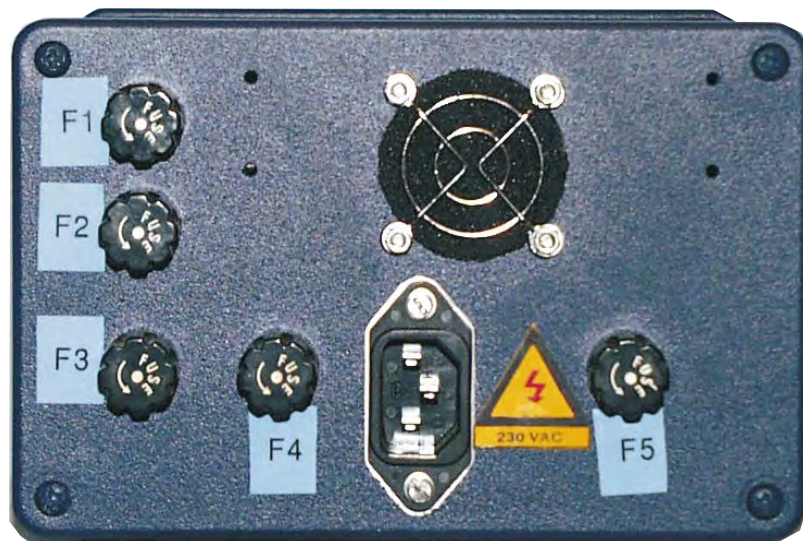
Charging 0° C to +40° C

Fuses

The table below gives an overview of the fuses. The fuses are placed at the back panel of the charger. There is no need to open the Battery Charger to change the fuses (see figure 1).

Fuse	Module	Value (V/A)
Fuse 1	BatMod 48 V	250 V/1 A
Fuse 2	BatMod 24 V	250 V/1 A
Fuse 3	MiniMod 5 V	250 V/0.2 A
Fuse 4	Net, 115/230 VAC	250 V/3.15 A
Fuse 5	Net, 115/230 VAC	250 V/3.15 A

Table 1 Fuses used with the BCN 1036



(Cd4773)

Figure 1 Fuses placement

2.2 Battery Pack N10/36

General

Battery Pack N10/36, rechargeable:

Part no 212364

The battery contains 48 nickel cadmium batteries and some NTC temperature sensors and PTC-Multifuse temperature fuses which are activated at approximately 75° C. (This means that the charging current will stop at 75° C.)

The connector for charging and the operation plug are placed in the base of the battery. The operation plug is fastened with a string.

Weight 8.5 kg

Outline dimension:

Length 525 mm

Diameter 107 mm

Temperature:

Discharging -10°C to +50°C
(TP operation)

Storage -20°C to +35°C

Battery lifetime

Quiescent lifetime: 90 days

Max continuous on time: 16 days

TX-battery (1ping/sec):

Max SL: 4 days, 0.36 millions of replies

Min SL: 12 days, 1.1 millions of replies

Number of charge/ discharge cycles: 250

2.3 Cable and plugs

Cable

The Battery Charger BNC 1036 is equipped with a cable with connectors in both ends. The plugs are described below.

Plugs on the charger cable

Table 2 presents information about the plug for charger connection.

Pin no	Signal	Description
A	NTC_36	Temperature, Battery 36V
B	BATTERY_36	Battery 36V
C	BATTERY_20	Battery 20V
D	NTC_20	Temperature, Battery 30V
E	GND	Ground

Table 2 Plug for charger connector, P1

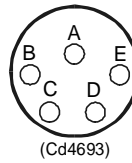


Figure 2 Plug for charger connection – layout

Table 2 presents information about the plug for the battery connection.

Pin no	Signal	Description
1	NTC_36	Temperature Battery 36 V
2	BATTERY_36	Battery 36 V
3	BATTERY_20	Battery 20 V
4	NTC_20	Temperature Battery 20 V
5 *	SERIAL_20A	Serial connection 20 V
6 *	SERIAL_20B	Serial connection 20 V
7 **	GND2	Ground
8	Not used	
9 **	GND1	Ground
10	Not used	
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	Not used	
16	Not used	

*) Pin 5 and 6 are linked in P2

**) Cable from pin 7 and 9 are linked in P1_E

Table 3 Plug for battery connection, P2

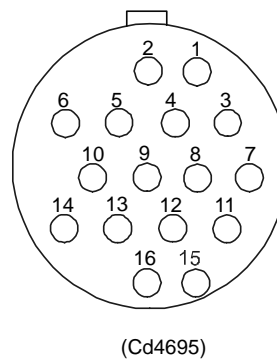


Figure 3 Plug for battery connection – layout

Operation plug on the battery

The operation plug is placed on the base of the battery and it is fasten with a string. It has to be connected when the transponder is active, and it must be disconnected before charging.

The operation plug has the same pin layout as the plug on the charger cable (see figure 3).

Pin no	Signal	Description
1	Not used	
2	Not used	
3	Not used	
4	Not used	
5	Not used	
6	Not used	
7 *	GND2	
8 *	GND_10	Ground Battery 10 V
9 **	GND1	
10 **	GND_36	Ground Battery 36 V
11	Not used	
12	Not used	
13	Not used	
14	Not used	
15	Not used	
16	Not used	

*) Pin 7 and 8 are linked

***) Pin 9 and 10 are linked

Table 4 Operation plug

3 OPERATION

3.1 Front panel description

The battery charger front panel is shown in the figure below.

The front panel includes the following:

- Pushbuttons:
 - **Options**
Activates the charge options.
 - ✓ **Fast** (yellow light when activated).
 - ✓ **Slow** (yellow light when activated).
 - ✓ **Discharge**
Lit during discharge time (Slow charge - Discharge before charging).
 - **Start/stop**
Starts or stop the charging.
- Three Error LEDs.
 - **LED Error T** (red when lit), indicating temperature faults.
 - **LED Error V** (red when lit), indicating voltage faults.
 - **LED Error I** (red when lit), indicating current faults.
- **Power** Main power switch (yellow light when ON).
- Connector for charging.



Figure 4 Front panel

3.2 Charge methods

The following charge methods are available:

- **Fast charge**
This is the main charging method.
Charge the battery from the state of charge.
Full charging is detected by one of the following methods:
 - dT/dt, Temperature slope
 - Max Temperature
 - Max Time
- **Slow charge**
Use this approximately twentieth charging for trimming the battery. The battery is slowly discharged and then recharged.
Full charging is detected by one of the following methods:
 - Max Time
 - Max Temperature

Note ! *It is not recommended to discharge a full charged battery.*

3.3 To charge a battery

General

The recommended ambient temperature range for charging the Battery Pack N10/36 is + 15°C to + 30°C.
Within this temperature range, the maximum capacity available is achieved.

The temperature ranges for charging are:

- Fast charging 10°C to 40°C.
The capacity is reduced at 10 to 15 °C and at 30 to 40 °C.
- Slow charging 0°C to 40°C
The capacity is reduced at 0 to 15 °C and at 30 to 40 °C.

Note ! *Outside these ranges, the charger will give a temperature error.*

When you are charging a battery, it is important to ensure good ventilation, stable temperature and good space.

WARNING ! Do not cover the battery or the battery charger. Ensure that there are no open fire, sparks or smoking in the area. (Hydrogen gas can be produced during charging.)

The battery must be climatized before charging. Place the battery in the charging environment 2 hours before you start charging the battery.

Before you start charging

Refer to the transponder Instruction manual for transponder dismantling.

Note ! *After removing the housing, wait 10 seconds before you start unplugging the battery.*

- 1 Unplug the connector from the battery.
- 2 Remove the four nuts and locking washer holding the battery to the chassis.
- 3 The battery can now be removed from the chassis.
- 4 Climatize the battery (environment temperature):
 - Fast charge: +10°C to +40°C
 - Slow charge: 0°C to +40°C
- 5 Disconnect the operation plug at the base of the battery.

Charging

- 1 Before connecting the charger to the mains, check that the mains voltage is correct.
- 2 Plug the charger into the mains.
- 3 Connect the battery to the charger.
- 4 Turn the **Power** switch ON. The LED will light.
- 5 Choose charge method:
 - Fast or Slow. You do this by using the **Options** pushbutton (default: Fast). The corresponding LED will lit.
- 6 Start the charging by pressing the **Start/Stop** pushbutton. The following LEDs will turn on:
Error T, Error V and Error I.
The charger will control the charge condition and the charger electronics for 30 seconds. If everything is ok the LEDs Error T, Error V and Error I will turn off, and the LED Running turns on.
The estimated charge time is:
 - Fast charging: max 4 hours
 - Slow charging: 16 hours
+ discharge time (LED Discharge on).
- 7 When the charging is completed, the LED Running is turned of, and the LED Complete will turn on.
- 8 Trickle charging - the charge will start trickle charging automatically.
- 9 Stop charging by pressing the **Start/Stop** pushbutton again. LEDs default (only Fast).
- 10 Turn the **Power** switch off.
- 11 Disconnect the battery from the charger.
- 12 Connect the operation plug.
- 13 The battery is now ready for use with the transponder.
- 14 Replace the battery into the transponder.
- 15 Refer to the transponder Instruction manual for transponder assembly.

Charge status

The table below gives a summary of which LED(s) is on/off during charging. When the power is off, no LEDs are lit.

Charge Status	LED Power	LED Complete	LED Running	LED Fast	LED Slow	LED Discharge	LED Error T	LED Error V	LED Error I
Power on, Default (Fast)	X			X					
Option Slow	X				X				
Control charge condition (30s), Fast	X			X			C	C	C
Control charge condition (30s), Slow	X				X		C	C	C
Charging, Fast	X		X	X					
Charging, Slow (discharge)	X		X		X	X			
Charging Slow (charge)	X		X		X				
Complete, Trickle charge	X	X							
Error	X	#	#	#	#	#	0/C/F	0/C	0/C

- "Blank" or 0: off
- X: on
- C: continuous
- F: flashing (1Hz)
- #: decided by previous charge status.

The Battery Charger is not working correctly

If any problems occur using the battery charger, the following table gives an overview of possible faults.

WARNING !

Any maintenance apart from the actions described in the table below, must be performed by a Kongsberg Simrad service engineer.

LED Error T	LED Error V	LED Error I	Diagnoses	Actions
Flashing			Low temperature in the battery	Climatize the battery
Continuous			High temperature in the battery	Climatize the battery
	Continuous		The battery is worn out	Change the battery
		Continuous	No charge current	Check the battery charger cable Check fuses 1 or 2
Flashing	Continuous	Continuous	The battery is disconnected	Connect the battery to the battery charger
Flashing	Flashing	Flashing	High temperature in the Battery Charger	Check the fan
Other errors that may occur:				
No light in Power switch				Check fuses 4 or 5
No light for default LED (fast)				Check fuse 3

Table 5 Possible faults

Battery storage

If the battery is not to be used in the near future, store it in a suitable environment. The recommended temperature range for long-term storage of the rechargeable battery is as cold as possible. Recommended storage temperature (-20°C to $+35^{\circ}\text{C}$).

Stored capacity decreases over time due to the self-discharge of the rechargeable battery cells. At storage more than three month, the battery will be discharged and must be recharged before use.

For long-term storage, charge the battery.

Self-discharge is dependent on temperature. The higher the temperature the greater the self-discharge over time.

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