

ENGINEERING
TOMORROW



User Manual

Remote Controls

IK2 Transmitters



Revision history*Table of revisions*

Date	Changed	Rev
January 2026	Update safety information	0401
February 2025	Updated battery information	0301
May 2021	Added trouble shooting and start-up information for TR2400	0201
December 2018	Rebranded to Danfoss	0101

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Safety instructions

FCC rules

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules.

Changes or modifications not expressly approved by the manufacturer can void the user's authority to operate the equipment.

To comply with FCC RF exposure compliance requirements, this device and its antenna must not be collocated with, or operating in conjunction with, any other antenna or transmitter, may not cause harmful interference, and must accept any interference received, including interference that may cause undesired operation.

The limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Warning

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IK2 General Safety

The following safety instructions must be read carefully to install and use the product properly, and to keep it in perfect working condition, and to reduce the risk of miss use.

- **Danfoss recommends the use of ESD PPEs (electrostatic discharge personal protection equipment).**
- Strictly adhere to the installation instructions contained in this document.
- Make sure that professional and competent personnel carry out the installation.
- Ensure that all on site and prevailing safety regulations are fully respected.
- The Electrical Installation where it may be connected, The receiver may be connected through an automatic magneto thermic switch (with omnipolar cut capacitance: F+N) and differential with characteristics according to the Low Voltage Recommendations.
- Make sure that this document is permanently available to the operator and maintenance personnel.
- Keep the transmitter out of reach of non-authorized personnel.
- Remove the transmitter key when the set is not in use.
- Check each working day the STOP button and other safety features. When in doubt, press the STOP button.
- Whenever several sets have been installed, make sure the transmitter is the right one. Identify the machine controlled on the label for this purpose on the transmitter or by using the display (in case it does have one).
- Service the equipment periodically.
- Avoid High Pressure water Spraying to Receivers while cleaning the machine
- When carrying out repairs, use spare parts supplied by Danfoss only.

Safety instructions

Warning

Potential damage to the operator or the product. Do not use this product on machines in potentially explosive atmospheres unless the model is ATEX/RATEX certified to work in such conditions.

IK2 Safety Warnings

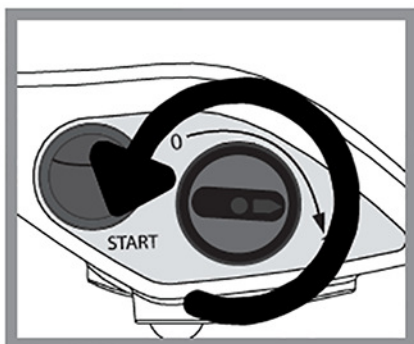
Potential damage to operator and product.

Follow the guidelines below to reduce risk of injury to the operator and the product.

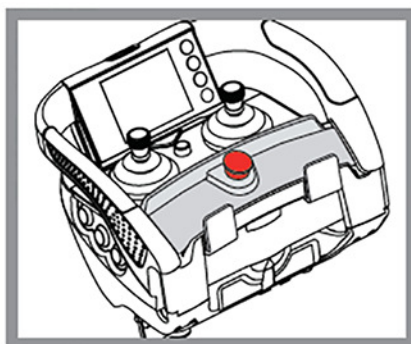
- Use the device with the manufacturer's battery and battery charger (if applicable).
- Only allow qualified personnel to operate the equipment.
- Always set the STOP button in the off position when not in use.
- Always press STOP before plugging in tether cable (if applicable).
- Remove the Tether connection on the transmitter First (if applicable).
- Do not operate product when visibility is limited.
- Make sure product is compatible with the machine.
- Avoid knocking or dropping the product.
- Do not use the product if a failure is detected.

Changes or modifications not approved by Danfoss can void the user's authority to operate this product.

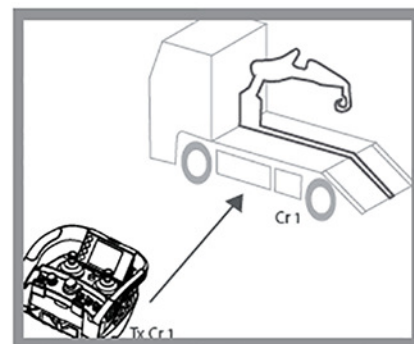
Quick reference precautions



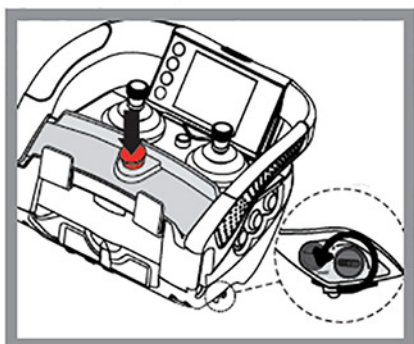
Remove the transmission key only when the set is not in use or to deny the access



When in doubt, press the STOP button



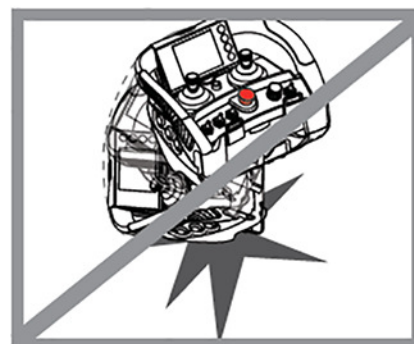
Make sure the transmitter works with the machine to be handled



After use set the contact key and the STOP button



Do not use the set when visibility is limited



Avoid knocking or dropping the set

Safety instructions

Data Encryption

In alignment with **Commission Delegated Regulation (EU) 2022/30**, supplementing the **Radio Equipment Directive (RED) 2014/53/EU**, we are introducing **encryption for radio communication** in TM80 2.4 GHz platform. This measure is designed to:

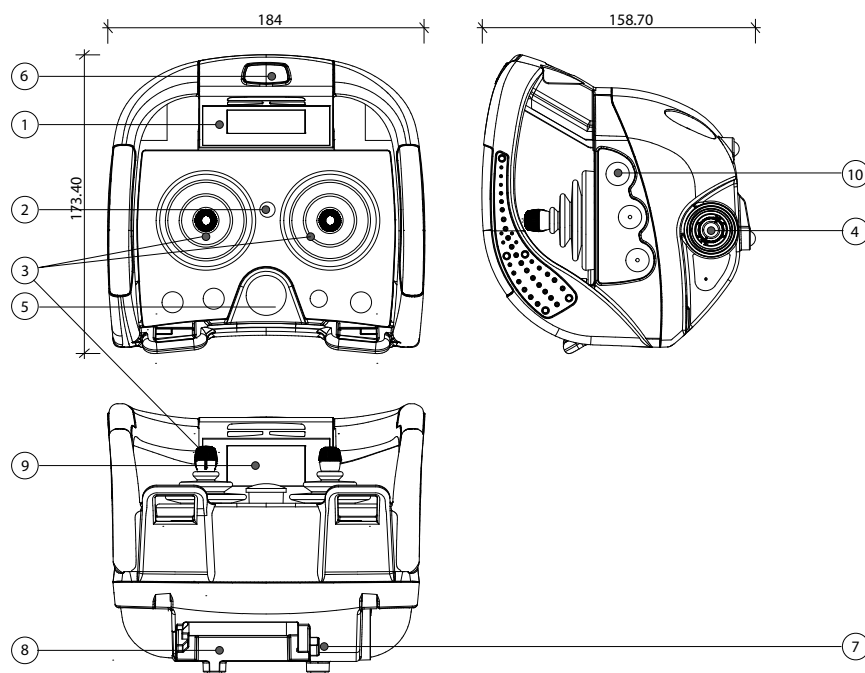
- Protect the integrity and confidentiality of transmitted data
- Prevent unauthorized access and misuse of network resources

Technical description

IKx dimensions and identification

The illustration below details dimensions and highlights product components.

Dimensions in mm



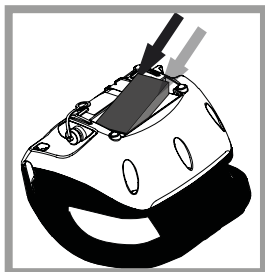
1. Label for crane identification
2. Status LED
3. Maneuver elements
4. Multi-key or Key + START Button
5. STOP button
6. Optional: range limiter
7. External and extractable EEPROM module
8. Battery
9. Monochrome Display
10. Lateral push buttons

Technical description

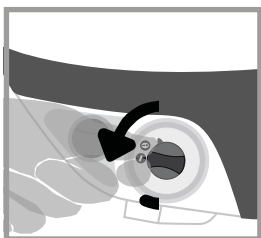
IK Transmitters Start up (400-900Mhz)

Use the information below to properly turn the transmitter ON (OPERATION mode).

1. Place a charged battery in the transmitter. The charge must be done following the instructions of the Battery Chargers' Manual.

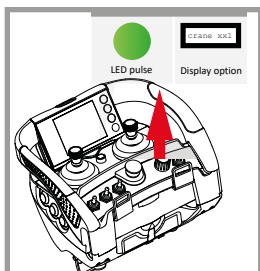


2. Turn the contact key.

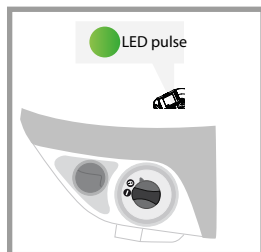


3. Push and pull out the STOP button.

LED will flash green pulse. If the transmitter has LCD, it displays the identification of the machine and battery level (only if it has been pre-programmed).



4. Press the start button. The green LED will now light to indicate the transmitter is transmitting. Once the Tx is connected, press any maneuver button and its corresponding relay will be activated. Check to make sure all other maneuvers work in a coherent way with the expected movements.

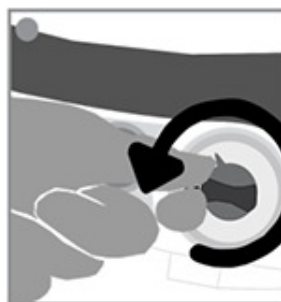


Technical description

IK Transmitters Start up (2.4 GHz)

In order to turn the transmitter ON (OPERATION mode), please follow these steps:

Start up the device



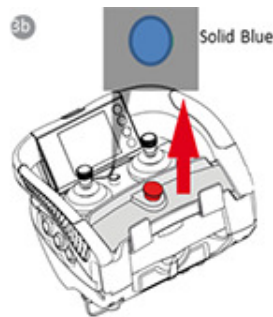
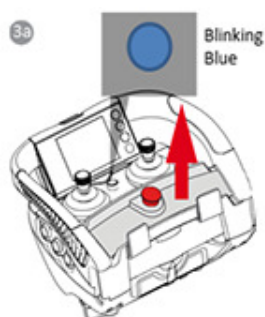
1. Place a charged battery in the transmitter.

The battery must be charged following the instructions of the Battery Charger Manual.

2. Turn the contact key or Multikey to the position "I."

3. Push and pull out the **STOP** button.

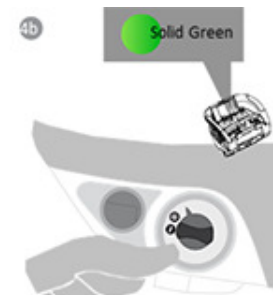
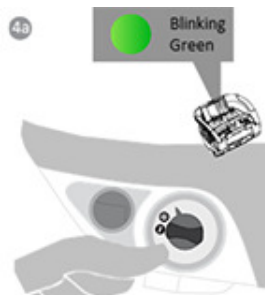
LED status (blue)



LED will flash, blinking blue until it reaches the Stand-by mode (fixed blue). If the transmitter includes a Display, it will display the identification of the machine, as well as the battery level, if it has been pre-programmed.

4. Press the **START** button, and wait for the status LED to turn to fixed green.

LED status (green)



The status LED will start blinking green, meaning the transmitter is trying to connect with the receiver. Once the Tx is linked, LED will turn to fixed green.

5. Press any of the transmitter's maneuver buttons and its corresponding relay will be activated.

6. Check to make sure all the maneuvers work in a coherent way with the expected movements by checking the supplied production sheet, included with the system.

Technical description

IK2 Detailed description

Description	Value
Stop Function (400 - 900 MHz)	Cat. 3-PLd
Stop Function (2.4 GHz)	Cat3 - PLe
Ingress Protection rating	IP65/NEMA4
Anti-condensation system	Goretex Film
Frequency band - ERP	433.050 to 434.040 MHz; ERP<1 mW
	434.040 to 434.790 MHz; ERP<10mW
	869.700 to 870.000 MHz; ERP<5 mW
	902.000 to 928.000 MHz; ERP<1mW
	2405MHz to 2475MHz ; ERP 20dBm/100mW
Range Line of sight (guaranteed)	100m
Main mechanisms (maximum number)	Joystick (2) or Paddle (4)
Auxiliary mechanisms	Pushbutton, toggle and rotary switches
Removable EEPROM	External
Battery model	BT11K
Battery life	8 hours
Response Time	100ms
Operating temperature range	-20 °C to 70 °C (-4 °F to 158 °F)
Storage Temperature Range (24h)	-25°C to 75°C (-13°F to 167°F)
Storage Temperature Range (long periods)	-25°C to 55°C (-13°F to 131°F)
Relative Humidity	max. 95% without condensation
Weight (with battery)	950 grams
Dimensions LxWxH mm	184 x 173.4 x 158.7
Harness	Belt/shoulder strap
Fast Teleteaching	Yes
Buzzer	Yes
Vibration	N/A
Free Fall Detection (2.4 GHz)	Yes
Tilt Switch	Yes
Available Options	
Display	128x64 Graphic LCD
LED Panel	Yes (up to 8 LEDs)
Tether connector	Yes (M12 Connector)
Range limiter	Yes
Link Quality Indication (2.4GHz + Display)	Yes
RFID User Validation (2.4GHz)	N/A
Associated receivers (400-900MHz)	R06, R13, R70, MPCAN, MP08, MP20
Associated receivers (2.4GHz)	R11, R13F, MP08, MPCAN, MP20

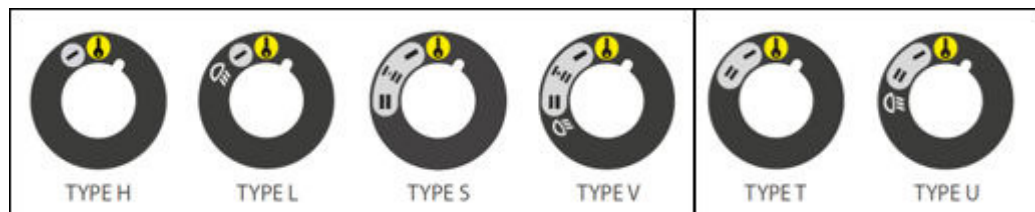
Multikey

The Multikey is a device connected to the Transmitter via RFID. It does engulf the following features:

Extractable Key (RFID) + START Pushbutton + Up to 5 position Selector switch.

There are different options for the Multikey, being the most common:

Technical description



Type H multikey is the Basic Key, having the single position and START pushbutton.

Type T multikey is the key with 2 position selector that could as an example duplicate functions (shift key) depending on the position of the multikey and the button being pressed.

Type S or V multikeys are thought for single and dual operation either on the same receiver or when using 2 Receivers to work on a "tandem" operation.

The Multikey gives a wide variety of options regarding configuration and system behavior depending on the multikey being used on the same Transmitter.

New Multikey configurations may be released upon demand.

Additional Transmitter Features

Handheld and Console Box Transmitters do have the following Features and Options:

Frequency management (400-900 MHz)

Display and Feedback information

Range Limiter

Multi System Configuration

To get further information please do follow the Link to obtain the related manuals:

[PLUS+1® remote controls | Danfoss](#)

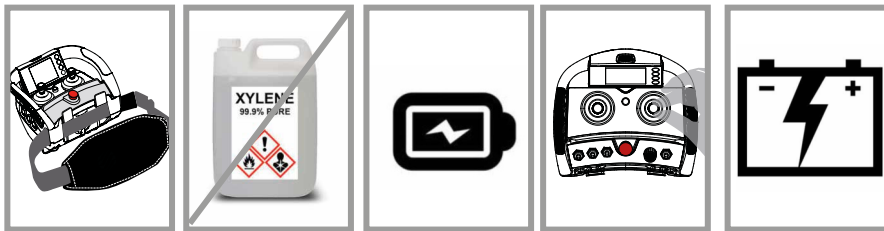
Maintenance

IK2 maintenance tips

This product is designed for use in an industrial environment that may shorten the product's lifespan. Use these tips to maximize the lifespan of the product.

- Use the hook/Shoulder strap/Belt provided with the transmitter to prevent the transmitter from falling
- Do not clean the transmitter with solvents or pressurized water; use a damp cloth or soft brush for cleaning it.
- If the Mechanisms show signs of deterioration, contact the Authorized Technical Service for repair.
- Check the battery contacts are clean and battery is inserted correctly.
- Ensure that the product is supplied with Rechargeable batteries.
- Be sure to recharge or replace battery regularly.

Maintenance tips quick reference

























Troubleshooting (400-900 MHz)

The transmitter has status monitoring LED's which help identify irregularities. The most common signals are contained in the table below:









Color and frequency	Pulse frequency	Description	Action
Green continuous		Working	Operate
Green slow pulses		Standby; no action has been taken for some time	Press START to return to operation mode
		Status Rx on Tx Function: Receiver No Link	The Receiver has lost connection with Transmitter. Press START to link again
Green fast pulses		Transmitter Reading New EEPROM	Wait until finished
		Status Rx on Tx and Autoconnect Functions: Transmitter trying to link with Rx (START being Transmitted)	Once Receiver connected will turn into solid Green.
Red slow pulses		Battery Low signal	Replace or recharge battery
Red fast pulses		EEPROM module missing or corrupt	Check EEPROM and reprogram if necessary
Red double pulses		An order is active at transmitter start up process; may indicate hardware damage if no order is active	Release the order or replace transmitter if necessary
Red continuous		General hardware failure	Replace transmitter

Maintenance

Troubleshooting 2.4GHz

Status LED (on all Transmitters)		Display Message	Description	Action
Color and frequency	Pulse frequency			
Blue fast pulses		Danfoss Logo	Starting the system; establishing communications with radio and EEPROM	Wait
Blue continuous		Label - Press start to link	Standby mode. Set up system, waiting user's action	Press START to enter operation mode
Green fast pulses		Connecting..	Attempting to link with the receiver and waiting its answer	Wait
Green continuous		Label or Feedback information	Working	Operate
Green slow pulses		Blank Display	Standby; no action has been taken for some time	Press START to return to operation mode
Green very fast pulses			Near Link Lost. The link may drop	Check Distance or RF interference
Red slow pulses		ERROR EEPROM	EEPROM module missing or corrupt	Check EEPROM and reprogram if necessary
Red double pulses		ERROR RADIO	Radio error; radio communications error	Replace transmitter
Red 3 pulses		ERROR DISPLAY	Display Error. Display communication Error	Replace Display or Transmitter
Red 4 pulses		ERROR MULTIKEY	Multikey Error. Multikey not in ON position or Broken.	Check Multikey or Replace it.
Red 5 pulses		ERROR CAN	CAN Error	
Red 6 pulses		FREE FALL	FREE FALL has been detected.	Reset the transmitter
Red 7 pulses			Display and EEPROM settings do not Match	Check files and reprogram EEPROM and/or Display
Red Long + Short pulse		ERROR RFID	RFID Signature Check Error	Use a correct RFID card and/or configuration
Red 1 Long + 2 short pulses		ERROR PAIRING	Pairing Error	Check the Tether connection and Receiver is ON.
Red 1 Long + 3 short pulses			User validation process aborted. More than one card or card removed before the validation process is completed.	Start the process again
Red 1 Long + 4 short pulses			User validation invalid UID. The PLC does not accept this UID	Start the process again, with another UID card
Red continuous		ERROR	General hardware failure	Replace transmitter
Orange slow pulses			Critical battery signal	Replace batteries with charged ones
Orange double pulses		LABEL	Activated Order	Release Order
Orange 3 pulses			Hall effect interference. Some mechanisms are disabled	Wait until interference disappears
Orange 4 pulses			Range Limiter warning. Out of Range	Check Range Limier is ON with the correct ID.
Orange 5 pulses			Wrong Selector Position	Press Start to link in this position, or return to the original position.

Maintenance

Status LED (on all Transmitters)		Display Message	Description	Action
Color and frequency	Pulse frequency			
Orange 6 pulses			Release Function: Release Button + START Pressed	The transmitter will switch off after release is done.
Orange 7 pulses			Tilt Warning. Transmitter is tilted more than the number of degrees set up in the EEPROM configuration for Pitch and Roll axis	Bring the transmitter to normal position
Pink 1 pulse			Display Value Settings Menu	Perform the Display settings
Pink Continuous		EEPROM copy - Replace EEPROM	EEPROM copy mode	Press related button to perform the copy
Pink Fast pulses		EEPROM copy - Writing EEPROM	EEPROM being copied	Wait until solid pink
Pink 3 pulses			Saving in Pairing Mode	Wait until saved
Blue + Pink 3 pulses			RFID User Validation Waiting UID Validation	Wait until UID approved or denied
Blue + Pink 1 pulse			RFID User Validation waiting User	Please place UID close to RFID reader

Charger and battery

Charger and battery



Disposal note:

This symbol on the product indicates that it may not be disposed of as household waste. It must be handed over to the applicable take-back scheme for the recycling of electrical equipment.

- Dispose of the product through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

BC70K Battery Charger and BT11K specifications

BC70K battery charger

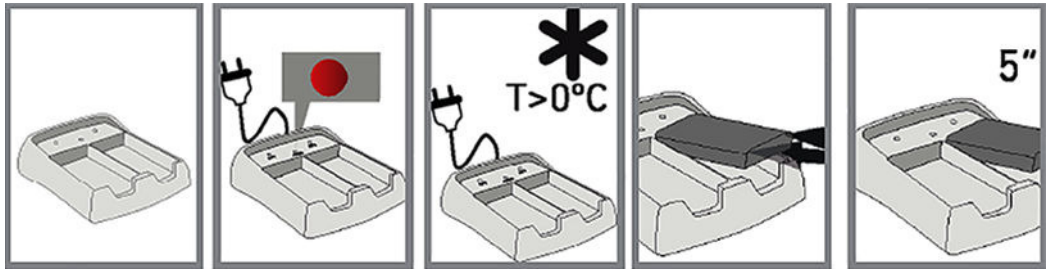
Specification	Value
AC power supply	110-230V, 50/60Hz, $\pm 10\%$, automatic switching
DC power supply, nominal	12-24V

BT11K battery

Specification	Value
Voltage	3.7V
Capacity	1130 mAh Li-ion
Charging temperature	0°C to 45°C
Discharge temperature	-20°C to 60°C
Full Charge	4h \pm 30 min
Weight	23g

BC70K Battery Charger Set-up

The battery charger has two charging compartments that can simultaneously charge two BT11K batteries. Use the information below to set up the BC70K battery charger.



Charger and battery

1. Connect the charger to a power source using the provided power supply.
The red LED will switch on if the charger is properly connected.
2. Place the batteries on the charger.
3. Optional: When charging two batteries, wait at least five seconds before inserting the second battery into the compartment.

Warning

Possible damage to battery.

The Battery Charger must be installed in a dry/interior environment. Make sure to charge batteries in environments with temperatures over 0°C.

BC70K Charger LEDs Status

The BC70K charger has a LED for each compartment (**BAT 1** and **BAT 2**) and a common indicator (**POWER**).

LED color / frequency	Description
Green LED / pulsing (BAT 1, BAT 2)	The battery is being charged
Green LED / continuous (BAT 1, BAT 2)	The battery is completely charged
Red LED / pulsing or continuous (BAT 1, BAT 2)	The battery charger fault
Red LED / continuous (POWER)	The charger is properly connected to power source

Battery Charging Recommendations

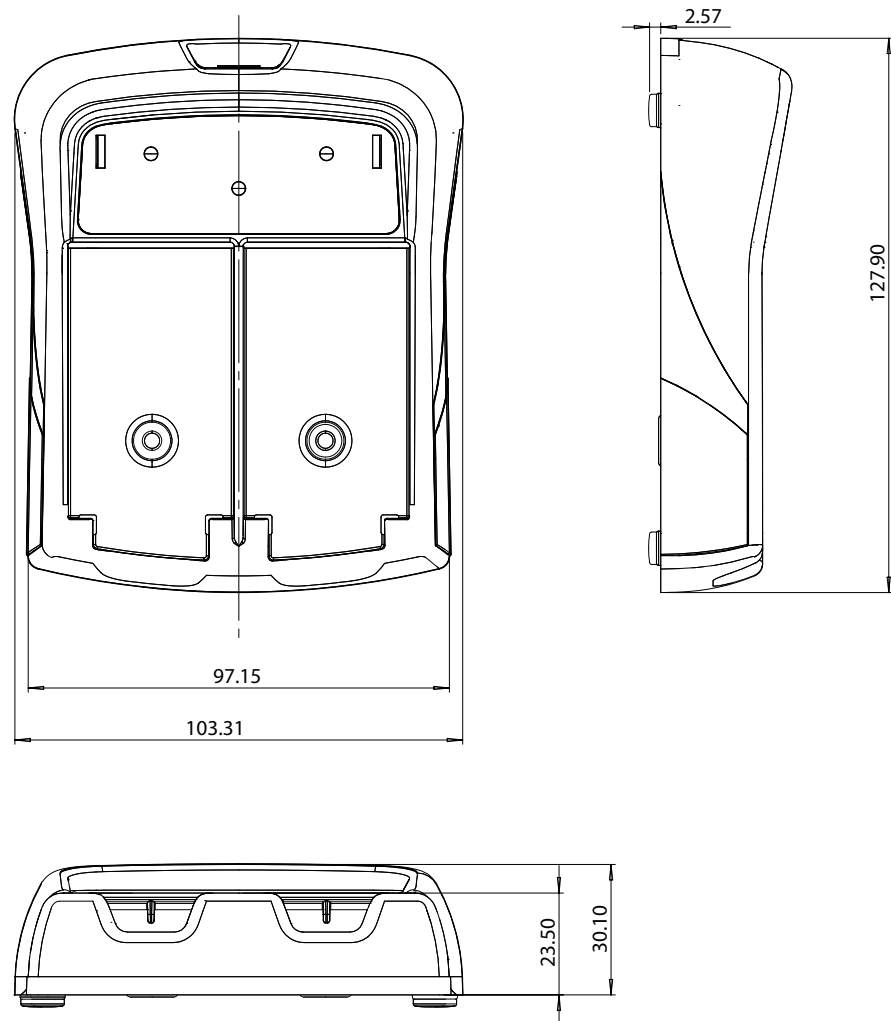
Charge the battery fully before use. This ensures that the battery's full capacity will be available. The battery lifespan is estimated to 500 recharging cycles and is largely dependent on the conditions of use. To maximize the lifespan of the batteries and battery charger, follow these recommendations:

- Do not recharge the battery until it is completely flat, as shown with red LED slow pulse on the transmitter
- Always charge the batteries at temperatures between 0° and 45°C (the batteries will not become fully charged at temperatures exceeding 45°C)
- Do not leave the battery charger or batteries in a direct sunlight
- Charge batteries at least once every three months
- Make the charge of at least 40% of the full charge.
- Ideal Battery storage temperature should be between 15°C and 25°C.
- Avoid short circuits between the battery contacts; do not carry charged batteries in toolboxes or next to other metal objects (keys, coins, etc.)
- Always keep contacts clean
- Caution! Risk of Explosion if Battery is Replaced by an incorrect type. Non Danfoss Battery use may void warranty

Charger and battery

BC70K Battery Charger Dimensions

Dimensions (mm)



Products we offer:

- Cylinders
- Electric converters, machines, and systems
- Electronic controls, HMI, and IoT
- Hoses and fittings
- Hydraulic power units and packaged systems
- Hydraulic valves
- Industrial clutches and brakes
- Motors
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Go to www.danfoss.com or scan the QR code for further product information.

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