SEACRAFT

MADE TO EXPLORE

ORIGINAL SCOOTER (DPV) USER MANUAL

MODELS:

- FUTURE BX750
- FUTURE BX1000
- FUTURE AIR-TRAVEL 600
- FUTURE AIR-TRAVEL 800
- GHOST BX1500
- GHOST BX2000

The manufacturer reserves the right to change the technical specifications of the devices described here. The current version of the manual is available for download at www.seacraft.eu

The manufacturer is not responsible for accidents and damage caused by improper use of the product, as well as by its use in a manner contrary to or deviating from the rules set forth in this manual.

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INTRODUCTION

Before operation, read the user manual and the other instructions listed below:

An integral part of the documentation equipment of the underwater scooter, are:
1. Scooter (DPV) user manual
2. Control panel manual
3. Charger manual
4. Battery manual
5. EC Declaration of Conformity

First read the safety rules, then read the information on how to operate the scooter. Read the control panel manual next to the DPV scooter for better understanding of the screen content.

Three types of designations are used in this manual, the meaning of which is as follows:

WARNING
It indicates a procedure or situation that, if disregarded, can lead to equipment damage or a serious accident. It can also indicate improper and unsafe practices.

DANGER
It indicates a dangerous situation that, if not controlled, inevitably leads to a serious accident, also with the possible result of death or disability.

CAUTION
Indicates a procedure or information that is important to the user

- **Before operating, read the instructions for the scooter, control panel, charger and battery.**
- **Follow all safety guidelines.**
- **In case any doubts about the product or the information provided with it, contact the manufacturer for additional answers.**
- **All contact details available on the front page.**
- **Updated user manual available to download from the manufacturer's website.**
- **Operation of the battery must be in accordance with the information provided in the instructions supplied with the battery.**
- **Keep the proof of purchase of the device.**
- **Keep the device's instruction manual with all additional documents.**

COMPLIANCE WITH LEGAL REQUIREMENTS

The manufacturer declares that the product meets the safety requirements, in terms of European Union directives:

- **MD Directive 2006/42/EC on machinery.**
- **EMC Directive 2014/30/EU on electromagnetic compatibility.**
- **RoHS Directive 2011/65/EU on restrictions on the use of hazardous substances in electrical and electronic equipment.**
- **regulations arising from harmonized standards and other technical standards. The signed and dated declaration of conformity is a separate appendix, attached to each unit of the SEACRAFT series. The declaration includes a list of the**

01 SAFETY

The information contained in this section is relevant to the process of safe operation of the device.

The manufacturer of the Seacraft underwater scooter shall not be liable for any damage caused by improper use of the Seacraft underwater scooter as well as by its use in a manner contrary to or deviating from the rules set forth in this manual.

The manufacturer is not responsible for damages resulting from exceeding the service life of batteries.

1.1 GENERAL SAFETY INFORMATION

1. The safety guidelines described in the manual apply to all SEACRAFT underwater scooter models.
2. Follow the safety guidelines described in the manual.
3. Follow the safety guidelines that apply to divers.
4. Make sure you are qualified, as evidenced by a certificate issued by a registered diving organization.
5. Remember the meaning of warning marks.
6. If the device malfunctions, stop further operation until the defect is corrected.
7. Replacement parts must meet the manufacturer's technical requirements.
8. Follow the rules and schedule for inspection and maintenance.

1.2 MARKINGS

Migns and pictograms are placed on SEACRAFT to remind you of potential hazards. Care should be taken to ensure the legibility of the markings. In case of loss of markings or deterioration of their legibility, such markings should be replaced with new ones. For this purpose, contact the manufacturer.

CE	The CE marking – Conformité Européenne – signifies the manufacturer's declaration that the product is compliant with the essential requirements of the applicable directives and regulations.	Identification plate
	This symbol indicates that the product is subject to the WEEE 2012/19/EU regulations. t the end of its service life, the product must not be disposed of together with other household waste. When disposing of waste from the device, it must be handled in a manner that complies with the regulations, in order to avoid negative effects on the environment and human health that could occur due to improper handling of this waste. For more information on recycling waste from this product, contact the municipal authorities in your area, the appropriate waste disposal service, or the supplier of the product.	Identification plate
	Li-ion batteries must be disposed of taking into account all regulations (nationwide and local) that apply in your country. If batteries are not disposed of properly, they may cause danger to human health or the environment	Battery housing
	Use by children and teenagers under 18 years of age is prohibited! Keep and use the device out of the reach of children!	Sticker on the pipe of the scooter
	The sign informs about the danger if it is placed on the product. The sign also indicates an important piece of information in the instruction manual..	Important parts of the manual
	Warning sign related to air transportation. The device is subject to restrictions on this type of transportation. The user is obliged to familiarize himself with the current regulations of the carrier.	Sticker on the pipe of the scooter
	A sign warning of the possibility of overheating the device. Overheating may cause fire or serious damage to the device.	Sticker on the pipe of the scooter
	A sign warning of a fast-spinning element. Risk of injury in the water: The rotating element threatens to injure the hand. It is forbidden to bring your hands close to the working area of the marine propeller. Always use protective gloves! Risk of injury on land: It is forbidden to start the scooter drive out of the water if there is a risk that bystanders are within the operating range of the marine propeller. In particular, it is forbidden to start the drive in the presence of minors.	In the area of the propeller (scooter nozzle)

The identification plate is located on the inside of the scooter: on the lid of the scooter body (fig. 3.pt.5)

2.3 POTENTIAL HAZARDS WHEN USING A COMPLIANT

Hazard during normal use	Possible cause	Prevention
Damage during the transport	Fall, hit	The device must be secured against the possibility of shifting. Care must be taken to prevent other objects from falling on the scooter.
Damage during storage	Fall from a height	Shelves must have adequate load-bearing capacity and have an adequate, flat and undamaged surface. Be careful when removing other items stored next to it to avoid dropping the unit. When storing the scooter, it should be properly protected from the possibility of falling from a height. It is recommended to use the manufacturer's dedicated scooter stand and store in a horizontal position.
	Rollover	The scooter can be positioned vertically, but its deviation from the vertical must be less than 30 degrees.
Usage errors	Failure to read the instruction manual	Avoid routine. Reading the instructions is mandatory, regardless of your experience.
Loss device underwater	Incorrect trimming, lack of use of harness or excessive wear of the harness	Allocate an appropriate amount of time for preparatory activities before diving.
Battery runout during operation	Incorrect charge	Check the battery charge level before use.
	Battery life exceeded	Do not exceed the designated battery life.
Loss of structural integrity of the scooter	Maintenance inspection	The prerequisite for maintaining the safety of the scooter, its technical performance and the guarantee of reliability, is to take care of regular maintenance, in accordance with the guidelines of the manual, and to comply with the operating conditions.
Fast wear and tear of the scooter's mechanisms	Interaction of sand grains and crystallized salt from seawater	Maintaining cleanliness affects the mechanics of the controls. Before each use of the scooter, it is recommended to check the correct operation of the control elements. Regularly, after each dive, clean the machine components from sand and crystallized salt.
	Neglecting to properly lubricate the drive train	Be aware to regularly and properly lubricate the scooter's drivetrain with dedicated grease.
Palpable vibrations	Marine propeller wear	Replacing the propeller with a new one.
	Foreign objects entangle the propeller	Turn off the scooter and clean the drive system.
	Wear and tear of drive train plain bearings	Replacement of plain bearings. Proper lubrication of the drive train.

Locking the controls in the handle	Impact of pollution, excessive wear and tear	Pre-use inspection. Preferred use of two hand control.
Difficulty reading the screen display	Diver's vision defect	Use special masks with built-in vision correction.
	A momentary glare	It is necessary to change the position of the scooter.
	Display failure	Taking care of regular annual maintenance inspection.
Pulling the diver down	Negative buoyancy	Ensure precise trimming of the scooter.
Entanglement of foreign elements in the propeller mechanism	Limited visibility. Rich vegetation. Obstacles: nets, ropes, lines.	Recommended to turn off the scooter and leave such an area, and then clean the drive system.

Exceeding the permissible rate of immersion and ascent
When using a scooter during a dive, always keep in mind that changes in depth can occur very rapidly, with the risk of exceeding the allowable rate of descent and ascent and serious injury to the diver's body.

2.4 POTENTIAL HAZARDS RESULTING FROM INCORRECT USE

Risks associated with improper use	Possible cause	Prevention
Use by unauthorized persons	Lack of supervision by scooter owner	Exercise direct supervision over the device with the battery installed
Failure to comply with maintenance rules	Disregarding instructional guidelines	Periodically check the requirements of the scooter's operating instructions and comply with them
Exceeding the diving depth	No indication control.	Knowledge of the maximum operating depth of the scooter and its observance
Exceeding the distance to return	No control of the scooter's operating time	Supervising scooter time and distance. Estimating the possibility of return with reserve left.
Appearance of vibrations	Using a scooter with a worn marine propeller, damaged drive train, or lack of lubrication.	Comply to the guidelines of the manual

Flooding of the scooter	Using equipment with damaged o-rings	Checking the condition of the seals. All O-rings must be in impeccable condition. If there is any doubt, replace them with new ones.
	Dirty o-rings	Keep the seals perfectly clean and lubricated
	Mechanical damage to the display glass or other component of the scooter	Checking the condition of the scooter before diving.
Mechanical damage to the scooter during the dive	Going underwater with a scooter damaged during transport (bending, cracking)	Visual inspection of the condition of the housing before each use.
Damage to the housing or structural components of the scooter due to thermal shock	Overheating the housing before using the scooter in water	The scooter should not be exposed to direct sunlight and other sources of heat emission, in particular, it is forbidden to allow a sudden change in temperature, for example, by throwing a heated scooter into the water. If the increased temperature of the scooter housing has occurred, it must be reduced to ambient temperature, for example, by placing it in a cooler room or covering it with a protective film , reflecting sunlight.
Electrocution	Outdoor charging	The charger is designed for indoor use only. It is prohibited to use it outdoors.
Shock during lightning discharges	Using a scooter during a storm	Do not use the scooter during thunderstorms and lightning, as there is a risk of electrocution and damage to the scooter's electrical circuits.
Fire during storage	Excessively worn battery	Pilnuj czasookresów wymiany akumulatora
	Using, charging and storing the scooter that got flooded with water	Do not use a scooter that has been flooded. Read and follow the information on handling a flooded scooter
Fire during transport or operation	Overheating due to prolonged exposure to sunlight	Take care that the scooter is not exposed to sunlight in a way that causes it to heat up excessively

2.5 RESIDUAL RISKS

Despite the application of the best possible solutions, some risks remain as so-called residual risks, i.e. risks that still remain after the application of safety measures. In order to minimize the possibility of their occurrence and, if they do occur, to minimize the negative effects of such events, it is necessary for the user to take special care in the points described in the table below.

Type of residual risk	Cause	Ways to minimize risks
Injury to the fingers of the hand caused by rotating propeller	No cover for the moving working part	Always wear protective gloves when diving and keep your hands away from the working marine propeller. If the drive will be started on land, make sure that no unauthorized person comes near the rotor in operation. No minors are allowed in the vicinity.
Implosion	Mechanical damage to the housing. Exceeding the depth of acceptable descent.	Do not operate the scooter with a damaged housing. In any doubtful case, consult an authorized service of the manufacturer. Follow the rules of inspection and maintenance and the permissible parameters of the machine.
Inability to return safely due to loss of device	Damage or depletion of the battery	Do not exceed the life of the battery or the number of charge cycles allowed. Always check that the battery is fully charged before diving. Conduct a dive risk analysis.
	Excessive departure distance	Use a spare backup scooter. Control running time and distance. Secure another option to return, such as a boat. Provide a spare scooter. Control running time and distance. Secure another option to return, such as a boat.
	Damage to or loss of the scooter	Take care of good technical condition and regular maintenance. Take care of equipment maintenance.
Uncontrolled submergence or ascent	Incorrect trimming, neglecting buoyancy control, or using the thrust of the scooter to dip or surface.	When using the scooter while diving, always remember that the use of this device can greatly offset errors in establishing the correct buoyancy, which, if the scooter is stopped, risks a rapid, uncontrolled ascent or submergence of the diver. Therefore, each time, before using the scooter, check the neutral buoyancy of the scooter and use the scooter to move underwater only in a horizontal plane at a constant depth.

Use of the scooter for purposes other than those specified in this manual or not in accordance with the rules specified in this manual may result in serious injury or even death.

2.6 PERSONS AT POTENTIAL RISK

- The user during the use, transport and storage of the scooter
- Those responsible for the inspection of the scooter and also when performing other maintenance activities.
- Bystanders if the device is left unattended, especially children

2.7 SUBSTANCES AND EMISSIONS THAT MAY PRESENT A HAZARD

Leakage from a leaking battery poses a serious threat to the environment. Place the leaking battery in a container capable of holding its contents. If this situation occurs, contact the nearest battery disposal service.

2.8 PERSONAL PROTECTIVE EQUIPMENT

Always wear protective gloves when diving. They provide protection if your hand comes into contact with the working propeller. Use gloves designed for divers.

2.9 RESPONDING TO EMERGENCY SITUATIONS

Situation	How to respond
Battery fire	Extinguish the fire with a powder extinguisher, according to the extinguisher's instructions.
Battery leakage	Follow section 2.7 of this manual.
Burns during a fire	Pour cool, fresh water over the burn site for at least 15-20 minutes. After this time, protect the burn site with a sterile dressing. Do not apply ointments or medications without consulting your doctor. Do not tear off pieces of clothing that have stuck to the skin. In this situation, contact your doctor as soon as possible.
Inhalation of exhaust gases from a fire	Get out into the fresh air as soon as possible. Contact your doctor.
Self-shutdown of the scooter during diving and inability to restart it	Immediately abort the dive and, following the proper procedures, ascend to the surface of the water.
Inability to turn off the scooter with the main switch - locking the scooter with the propeller running	In this situation, depending on the dive in question, you can: ■ Perform the necessary decompression stops while swimming with the scooter, or ■ Unhook/decouple from the harness and abandon the scooter, taking special care to ensure that the free-floating scooter does not cause any damage ■ As long as the diver has a sufficient supply of air, rest the front of the scooter in a controlled manner against the bottom, wall of the body of water, or other permanent feature, and wait for the device's battery to discharge, or ■ Abandon the scooter underwater if towing it becomes impossible or too cumbersome.

If an unforeseen situation arises, posing a threat to the diver's health and life, do not attempt to save the scooter at any cost. Be prepared to abandon it if saving your own life or the lives of others is at stake.

02
THE CONSTRUCTION AND PURPOSE OF THE MACHINE

3.1 DESCRIPTION OF THE MACHINE

SEACRAFT underwater scooter is a series of three models: FUTURE, GHOST, and FUTURE AIR-TRAVEL. The scooter is an electric device designed to assist diving in both fresh and salt water bodies. These scooters are intended for professional diving as well as recreational diving for adults. The devices are not toys. They enable fast movement over long distances and at high speed. The device is powered by an electric motor, driven by a built-in battery. It is controlled by control handles, and the operating parameters are displayed on the built-in screen panel. The different models of the equipment are presented in Figures 1 and 2.

Fig. 1 Model Future

Fig. 2 Model Ghost

The mechanical design of the different scooter models is virtually identical. The differences between the models are due to their varying technical parameters, which are described in paragraph 2.3.

STANDARD EQUIPMENT

- Li-ion rechargeable battery
- Charger
- Transport bracket
- Universal mount base
- DPV tow cord 1,8 m with boltsnap and two tensioners
- A set of spare and consumable parts
- Cardboard box package
- Documents listed on page 2 of this manual, electronically on a USB flash drive

OPTIONAL EQUIPMENT

- Stand
- Light system
- Power converter
- ENC navigation console
- USB charger
- Coupling platform
- Aluminium transport box
- Tow bar
- Harness with a carabiner for the DPV nose
- External ballast belt
- DPV trigger's lock

2.2 PURPOSE

Underwater scooters are designed for users with specialized diving qualifications. The devices are intended for individuals who are at least 18 years old.

The machine is not designed to accelerate immersion or ascent.
The machine is not designed for towing surface vessels, such as scooters, pontoons, boats, etc.

2.3 TECHNICAL PARAMETERS

Parameter	Model					
	FUTURE				GHOST	
	BX750	BX1000	Air-Travel 600	Air-Travel 800	BX1500	BX2000
Li-ion battery capacity	750 Wh	1000 Wh	572 Wh	780 Wh	1500 Wh	2000 Wh
Alow transport on passenger aircraft	no		yes		no	
Charger power	240W				400W	
Charger power supply	Complies with the marking on the charger.					
Average charging time 90%	3 hrs	5 hrs	3 hrs	3 hrs	4 hrs	6 hrs
Average charging time 100%	4 hrs	6 hrs	4 hrs	4 hrs	5 hrs	7 hrs
Maximum battery voltage:	37,8 V					
Minimum battery voltage:	26 V					
Transport bracket	fi 160				fi 208	
Width	360 mm					
Height	410 mm					
Length	845 mm				800 mm	
Body diameter	160 mm				208 mm	
Weight without battery and ballast	10 kg				12 kg	
Weight (with battery and ballast - trimmed to freshwater),	15,9 kg				22,9 kg	
Operating time at optimum speed (45 m/min)*	>260 min	>350 min	>200 min	>270 min	>525 min	>700 min
Operating time at maximum speed (gear 9)*.	>70 min	>95 min	>60 min	>80 min	>140 min	>220 min
Range	>11,7km	>15,7km	>9km	>12,1km	23,6km	31,5 km
Maximum static thrust	340 N		330 N	340 N		
Maximum speed	1,6 m/s		1,5 m/s	1,6 m/s		
Maksymalna głębokość operacyjna:	150 m				220 m	
Buoyancy (adjusted with ballast)	neutral					
Trim (with adjusted ballast)	neutral					
Operating temperature**:	-5/+45□C					
Storage temperature:	-25/+50□C					
Temperature during charging:	+10/+40□C					
Noise intensity	does not exceed 70 dB (A)					
Vibrations	imperceptible to the operator					
Electromagnetic radiation and magnetic fields	No adverse effects on inactive and active medical implants, including pacemakers.					

* Applies to a diver in a 2x12l twinset configuration, in a dry suit, in fresh water. Range tested for optimum speed.
** At temperatures below 0□C, due to the properties of lithium cells, the battery capacity and associated performance of the scooter may be significantly reduced. This is a reversible process – once the battery temperature rises above 0□C, the battery capacity returns to its nominal level. The manufacturer stipulates that laboratory data relating to the technical specifications of the Seacraft underwater scooter may differ from those obtained under actual field operating conditions.

Potential discrepancies in selected performance parameters of the scooter may result from differences in the equipment and training level of the underwater scooter user, the state of charge and wear of the scooter's batteries, the speed profile of the swim, local conditions (e.g., water temperature and speed of ocean currents), charging temperature, type of charger, technical condition of the device, regularity of servicing, degree of wear of the scooter, and many other factors.

2.4 PROHIBITED USES

- It is forbidden to use scooters by persons who do not have diving qualifications.
- It is forbidden to use scooters by children and teenagers under the age of 18.
- It is forbidden to use the scooter by persons who are under the influence of alcohol, drugs, or other intoxicating or psychotropic substances.
- It is forbidden to use the scooter by people with health conditions.
- It is forbidden to use the device when there are no suitable conditions for diving.
- It is forbidden to use the Seacraft underwater scooter for the purpose of rapid ascent to the surface and rapid submersion underwater.
- It is forbidden to approach or put hands in the area of the Marine propeller of the device.
- It is forbidden to dive with an underwater scooter without protective gloves on.
- It is forbidden to use the device during thunderstorms and lightning.
- It is forbidden to insert any object into the scooter nozzle and into the rotating blades of the marine propeller.
- It is forbidden to exceed the maximum operating depth specified in the technical parameters of the model.
- It is forbidden to start a dive until it is ensured that the scooter has zero buoyancy.
- It is forbidden to lift the underwater by the nozzle (propeller cover) or the control handle on the nozzle.
- It is forbidden to touch the charger with wet hands.
- It is forbidden to use the charger with a damaged power cord.
- It is forbidden to use other types of chargers than those approved by the scooter manufacturer.
- It is forbidden to start a dive without properly planning the maximum return point, taking into account the current state of charge of the battery.
- It is forbidden to repair the scooter yourself.
- It is forbidden for unauthorized persons to repair the scooter.
- It is forbidden to modify the scooter.
- It is forbidden to use additional equipment attached to the scooter that is not intended for the scooter model.
- It is forbidden to use accessory equipment that has not been properly attached.
- It is forbidden to remove markings, signs, pictorials.
- It is forbidden to throw the scooter.
- It is prohibited to hit the scooter.
- It is forbidden to use non-original spare parts.
- It is forbidden to leave a scooter that is ready for underwater operation unattended.
- It is forbidden to leave the scooter unattended within the reach of children or persons not authorized to operate it.

2.5 PRINCIPLES OF SAFE USE

Each time before using the scooter, check the battery charge level. Each time before using the scooter, remove from the area of the nozzle and propeller all items that could be drawn into the scooter drive unit.

Before using the scooter, it is necessary to:

- Remember to organize and secure all accessories and equipment, especially any straps, instruments, hoses, lines, etc, attached to the diver's jacket, harness, or other piece of equipment.;
- Ensure that none of the aforementioned components have the potential to become entangled with the scooter's propeller.

When using the scooter, it is necessary to:

- Regularly check that loose pieces of equipment are at a safe distance from the scooter's propeller and that there is no danger of these items becoming entangled in the scooter's propeller mechanism;
- Exercise extreme caution when maneuvering the scooter in areas with limited visibility, dense vegetation, or in bodies of water with obstacles such as nets, ropes, or wrecks. It is recommended to turn off the scooter until you have left the area with these characteristics to avoid the possibility of entanglement with the propeller mechanism of the underwater scooter.

If a rope or other unwanted elements become entangled in the propeller mechanism of the scooter, the user should first attempt to resolve the problem underwater by taking the following actions:

- Turn off the scooter;
- Untangle or, if feasible, cut off unwanted items entangled in the scooter's marine propeller;
- The underwater propeller removal system greatly assists in removing unwanted items, but note that cutting tools must not be used if the marine propeller is removed, as this risks damaging the motor
- Start the scooter again and, choosing the shortest way back, take the return course.

If the removal of unwanted elements in the mechanism of the marine propeller is not possible, the following measures should be taken:

- Turn off the scooter;
- Tow the blocked scooter independently, choosing the shortest way back;
- Surface with safety precautions.

When using a scooter during a dive, you should always:

- Be careful in caring for the natural underwater environment;
- Pay attention to the proper position of the scooter and fins when swimming past delicate underwater formations, ensuring that the device and diving equipment do not damage elements of aquatic flora or fauna;
- Avoid direct contact of the device with the bottom of the water body. Contact of the scooter with the bottom may result in impaired underwater visibility, damage to aquatic flora or fauna, as well as blocking of the scooter's propeller (e.g., due to silt or sand stirred up by the underwater scooter entering the mechanism)

2.6 CONSTRUCTION OF THE SCOOTER AND DESCRIPTION OF THE CONTROLS

The scooter consists of two main parts (Figures 3 and 4): a tubular section that houses the battery and ballast, and a propulsion unit consisting of a body with a motor and rotor, along with a nozzle featuring a control handle. The rotor in the outlet is protected by a water post swirl stator, which also provides protection for the propeller during operation. While it is possible to remove the steering wheel and dive without this element, it is not recommended for safety reasons.

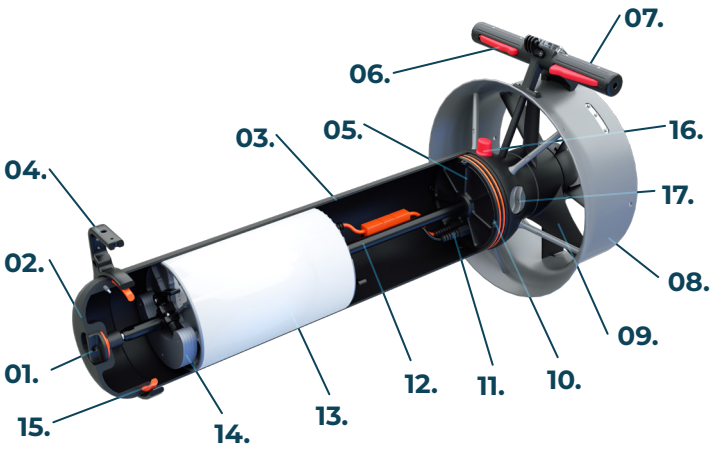

Figure 3: Overview of the basic components of the scooter

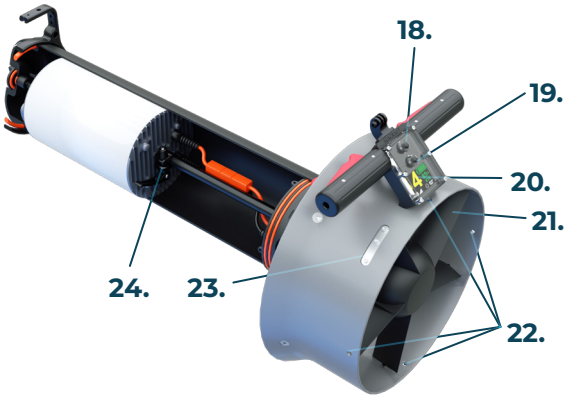

Figure 4 Overview of the basic components of the scooter

01. Cap nut
02. Cap
03. Housing cover
04. Transport bracket
05. Housing lid
06. ON/OFF button (left and right)
07. Steering handle
08. Nozzle
09. Marine propeller
10. Housing seal
11. Power cables
12. Guideway shaft
13. Battery
14. Ballast
15. Cap seal
16. Main switch
17. Charger socket cap
18. Gear up button
19. Gear down button
20. Graphic display TFT
21. Post swirl stator
22. Harness fastening hole
23. Stator lock button
24. Clamp fixing the battery position

Elements of the Seacraft underwater scooter electronics assembly (Figure 5):

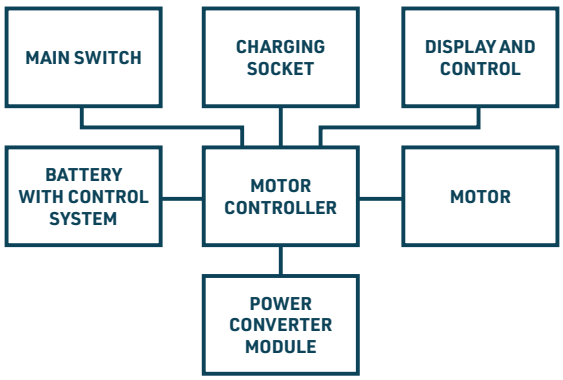

Figure 5: Block diagram of the scooter

MOTOR CONTROLLER

Responsible for the proper operation of the motor, the speed of the marine propeller, and monitoring the state of the battery, battery voltage, and current consumption. It provides communication with the power

converter module and display, and sends information about the scooter's operating parameters.

POWER CONVERTER MODULE
Optional scooter equipment that allows the scooter's battery to power external devices that use 12V, such as SLS2 lights orpersonal heating.

DISPLAY AND CONTROL
The TFT display module contains buttons that control the operation of the scooter. All controls are non-contact.

MAIN SWITCH
A non-contact sensor responsible for turning the device on and off. In the „ON" state, it is possible to operate all functions of the scooter. In the „OFF" state, the motor is immobilized, and the display does not work

BATTERY WITH CONTROL SYSTEM
The scooter is powered by a battery composed of lithium-ion cells. The voltage of the scooter's battery is always within a safe range for the user. The battery is equipped with a Battery Management System (BMS) that equalizes the voltage on all cells and a Protection Circuit Module (PCM) that protects the battery from short-circuiting, overloading, overcharging, and over-discharge.

CHARGING SOCKET
The scooter has an external battery charging socket.

MOTOR
A three-phase BLAC motor, made with patented technology. The motor operates in full immersion, completely eliminating leaks through the drive shaft. This solution rules out the need for expensive and unreliable sealants and eliminates internal heating. The motor can operate at great depths and with high power, exceeding the capabilities of scooters currently available on the market.

2.7 OPERATOR POSITION DESCRIPTION

Figure 6: Diver's position

The position shown in Figure 6 is optimal. It ensures maximum use of the driving force, with slightly bent arms allowing easy maneuvering of the scooter and a clear view of the control panel, which is angled optimally for this position (Figure 7). It is recommended to use ambidextrous control.

When diving with an underwater scooter, it is crucial to ensure that the entire thrust of the scooter is transmitted via the scooter's harness.
If force must be used to maintain the direction of the swim, or hand fatigue is felt, this indicates a poor fit of the scooter harness or the point where the scooter is clipped into the diver's body.

The performance of the scooter, such as range and speed, depends tremendously on the degree of streamlining of the towed diver and his position underwater. The more streamlined the position and the better configured the equipment, the better the performance with the scooter.

The technique of scooter diving is the subject of specialized diving courses and can only be practiced in appropriate practical classes.

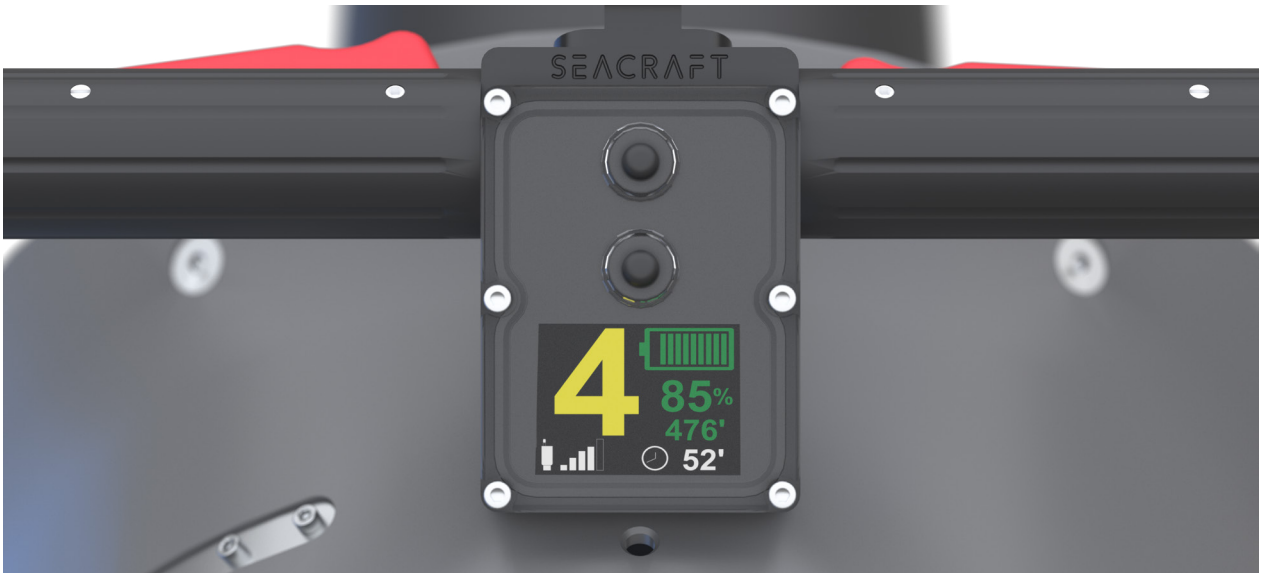

Figure 7: Position of screens and controls

03
TRANSPORTATION, HANDLING AND STORAGE

3.1 TRANSPORT

When planning to ship a underwater scooter, it is necessary to protect the device in such a way that it cannot be damaged during transportation. The battery should be charged to 30%, and in the case of air transport, below 20%. Ship only in the original packaging.

Shipping rules:

1. Use the transport stands, cases, bags and/or crates offered by the manufacturer.
2. Secure the scooter to prevent any free movement.
3. Ensure that the nozzle or other components are not deformed, such as by crushing.
4. Attach a „Fragile" sign to the package being sent by courier as example below:

5. The temperature during transportation must comply with Section 3.3.
6. Familiarize yourself with the carrier's restrictions on lithium-ion batteries. Follow the regulations of your

The battery should be protected against mechanical damage during transport, especially crushing. This type of damage may cause a fire.

Never use or transport a battery that shows signs of mechanical damage.

Dispose of packaging materials according to waste segregation rules.

3.2 HANDLING

When handling the scooter, consider the permissible lifting weights for men and women.
The weight of each model is as shown in the table:

Models	Weight without battery and ballast	Weight with battery and ballast	Masa w opakowaniu transportowym
Future	10 kg	15,9 kg	22 kg
Ghost	12 kg	22,9 kg	30 kg

Heavier models are recommended to be carried by two people.

3.3 STORAGE

1. Ensure storage conditions in accordance with Section 3.3.
2. Ensure that the storage area is dry and shaded.
3. Secure the scooter against the possibility of falling or tipping over.
4. Secure the room from access by children.
5. Before storing for a long time, perform maintenance work.

The recommended storage position as shown on Figure 8. Attaching the straps to the stand provides a high degree of stability for the scooter.

Figure 8: Storage on transport stand

04 OPERATING

4.1 PROCEDURE TO FOLLOW BEFORE DIVING WITH AN UNDERWATER SCOOTER

DEFINITION

Trimming - setting the underwater scooter neutral buoyancy and balance. It means that left in the water, it does not tend to sink or surface, and maintains a balanced position - the axis of the scooter is parallel to the water surface.

BALANCING AND TRIMMING THE SUBMARINE SCOOTER

The selection of ballast and trim of the scooter is an individual matter, depending on the preferences and needs of the individual user. It should be remembered that the buoyancy of the scooter and the associated weight of the ballast is dependent on the chemical composition (salinity) and temperature of the water in which the dive will take place. In order to properly balance and trim the scooter, the weight and distribution of additional ballast elements in the form of internal or external ballast of the scooter should be properly selected (see the section „Accessories").
The manufacturer supplies the scooter with internal ballast, prebalanced and trimmed for fresh water. Standard equipment of the scooter includes additional ballast so that the scooter can be balanced and trimmed in any water.
When using internal ballast, balancing and trimming must be done by properly moving the accumulator and installing the internal ballast. To do this, it is necessary to:

- Place the scooter vertically on the nozzle;
- Unscrew the cap nut located on the cap, then remove the housing tube;
- Loosen the battery mounting clamp and the battery positioning clamp; Move it to the desired position. The arrow marked „UP" should point towards the control handle (top of the scooter), and the battery marked „Bottom battery" should be positioned with the arrow pointing towards the bottom of the scooter;
- Ballast plates are mounted on the accumulator and moved front and back with the entire accumulator; for balancing, adjust the number of ballast plates. The internal ballast must be fixed and/or moved to the desired side and the accumulator base clamp tightened;
- Check the condition of all o-rings and lubricate them with the lubricant recommended by the manufacturer;
- Apply the housing tube;
- Check the o-rings sealing the cap nutand the cap; if there is none, place it there and then lubricate it with grease
- Tighten the cap nut by hand to a perceptible resistance; make sure there is no gap between the edge of

Keep in mind that balancing with internal ballast may require several attempts to select the weight and position of the ballast.

MOUNTING OF THE HARNESS

The harness, in the form of a rope with a piston carabiner , should be threaded through two holes located on the edges of the nozzle. The harness should be adjusted according to personal preference before diving, using the harness tensioners provided by the manufacturer. The manufacturer's proprietary shape of the tensioners allows easy adjustment of the harness length even by a diver using thick gloves.

4.2 BATTERY REPLACEMENT

Proper battery setup is one of the key elements of properly trimming a scooter. Seacraft Future and Ghost series scooters can work with several types of dedicated Seacraft brand batteries. Replacing the battery requires a change in the scooter's settings menu.

WARNING

Using a battery other than the dedicated one risks damaging the battery, the scooter and even a fire.

FUTURE scooters:

- Battery 750 Wh
- Battery 1000 Wh
- Modular Air Travel Battery with capcity 600 or 800 Wh

GHOST scooters:

- Battery 1500 Wh
- Battery 2000 Wh

WARNING

Before installing the battery, read the battery operating instructions.

Battery 1000 Wh ready for disassembly

Removing the battery
To remove the battery, follow these steps:

1. Ensure that the scooter is turned off with the main switch and the scooter charger is disconnected.
2. Place the scooter vertically on the nozzle, and then open the scooter.
3. Unfasten the battery's electrical connector (red/black end), and undo the Velcro ties securing the wires to the axle tube.
4. Ensure that the battery positioning clamp is secured (when loosening the battery mounting clamp, the battery may slide down the axial tube, potentially causing damage to the battery wires).
5. Open (release) the clamp securing the battery. By default, it is located on top of the battery, the exception is the Air-travel battery (clamp at the bottom)
6. Safely holding the battery, slide it upward from the axle tube of the scooter.
7. Do not change the position of the battery positioning clamp, for disassembly enable reassembly in the same position.

WARNING

Removal of the battery does not require force. If the battery does not slide out smoothly, make sure all cables and ties are undone.

Skuter przygotowany do montażu akumulatora

Battery assembly
In order to install a battery in a Seacraft scooter, you need to:

1. Make sure that the battery is properly prepared (see the battery manual) and compatible with your scooter model.
2. Ensure that the scooter is turned off with the main switch and the scooter charger is disconnected.
3. Place the scooter vertically on the nozzle, and then open it. Make sure that the battery positioning clamp on which the battery rests is well secured (does not move).
4. Open the battery mounting clamp and slide on the axle tube until it rests on the battery positioning clamp; pay attention to the correct positioning of the battery, the marking in the form of an arrow with the word UP, should be pointing with the arrow towards the control handle (top of the scooter), the battery with the arrow marked Bottom battery should be positioned with the arrow towards the bottom of the scooter.
5. Once the battery is properly oriented, clamp the battery mounting clamp.
6. Connect the electrical connector of the battery. Slide it upwards out of the scooter's axial tube.
7. Close the scooter.

Correct orientation of the battery.

Changing the settings of the installed battery
After installing the battery, make sure that the correct type of battery is selected in the scooter's settings. Otherwise, the display of the % charged battery and the remaining operating time may be incorrect.
See > Control panel user manual.

05
INSPECTIONS AND MAINTENANCE

If you notice any defects or problems with the operation of your Seacraft underwater scooter, you should immediately consult the problem with the brand's authorized service center. The manufacturer warns that even minor damage and neglect, such as those caused by impact during transport, storage or use of the scooter, as well as blockage of the control caused by mud, sand or careless washing after diving can cause serious malfunctions or be the cause of failure when using the device in a body of water

5.1 EXPECTED LIFE OF THE SCOOTER AND ITS COMPONENTS

The declared life of an underwater scooter is the period of its safe operation. After this time, there may be factors that weaken the structure and the effectiveness of the components, due to their degradation. At the end of its life, the scooter may be subject to a general overhaul by the manufacturer. Components should be replaced, even if their visual assessment does not show excessive wear. The periods and treatment from the table below should be followed.

Component	Lifetime	How to proceed
Underwater scooter (DPV)	10 years	General renovation at the manufacturer
Battery	max. 300 full charge cycles	Replacement with a new one
O-ringi korka dekla, gniazda ładowania oraz korpusu	12 months	Replacement with a new one
Scooter thrust bearing	To exceed consumption limits/approximately 120 hours of operation at full power	Replacement with a new one
Scooter sliding sleeves	until signs of wear and tear appear	Replacement with a new one

5.2 TYPES AND TIMING OF INSPECTIONS AND MAINTENANCE

The durability and reliability of the scooter is determined not only by skillful operation, but also by proper, regular maintenance of the device in accordance with the rules described in this manual.

Definitions:
User - the person using the underwater scooter

Individual - scooter owner

Professional - scooter owner: rentals, clubs, diving bases, group use, underwater work

Special - scooter owner: rescue, special applications such as military

Recommendations for inspections:

	Inspection and maintenance		
	Ongoing	Periodic	Annual
User	before and after the use of the scooter	**Normal conditions (fresh water, no major contaminants or stresses): every 40 dives and at least 1x every 3 months;** **Average conditions (salty, polluted waters, heavy loads): every 20 dives and at least 1x every 2 months;** **Difficult conditions (extreme temperatures, highly saline or polluted waters, b. heavy loads): every 20 dives and at least 1x per month.**	Once per12 months, from the date of first use of the scooter
Individual	User	User	Authorized service center to conduct inspections and repairs of scooters Seacraft
Professional	User	Staff trained in periodic technical inspection	
Special	User	Staff trained in periodic technical inspection	

Information and tips on the activities that can be performed by the user, and instructional videos can be found on the support portal- https://support.seacraft.eu/

5.2.1 INSPECTION AND ONGOING MAINTENANCE

Cleanliness of the scooter	Check the outside of the scooter for dirt, especially mud and sand, vegetation residue, salt. If necessary, carry out the cleaning procedure of the scooter to the extent of its dirt. Do not use detergents or solvents to wash the scooter.
General condition of the scooter	Check the condition of the protective tube, polycarbonate screen and other scooter components and check for deformation or damage. If any part of the scooter is dented or damaged, contact the nearest authorized service center or manufacturer.
Condition of the o-rings	Each time after charging the battery, check the condition of the charging socket o-rings. If it is necessary to dismantle the scooter, inspect the condition of the o-rings sealing the cap nut and the body o-rings. If necessary, carry out the procedure for cleaning and lubricating the o-rings or replacing them.
Battery status	Check that the battery charge is sufficient for the planned dive. When no use is planned, charge to approx.50% which guarantees its longest life.
Motor and controls condition	According to the rules described in the instruction manual, carry out a test of proper operation of the scooter out of the water. If you notice uneven operation of the motor, the device makes loud sounds such as screeching, rasping, carry out the procedure for cleaning the scooter and lubricating the motor. Test the control handles, gear shift buttons, main switch and correct operation of the scooter display. Ensure that the unit's settings are correct and in accordance with the user's preferences.
Equipment condition	Check the condition of the scooter's harness and the attachment and condition of other equipment mounted on the scooter (lights, navigation console).
Final inspection	Check that the lid knob and charging socket cap are tightened and the scooter is turned off.

5.2.2 INSPECTION AND PERIODIC MAINTENANCE

During the periodic inspection and maintenance, carry out all the activities contained in the current inspection table and the following:

Cleanliness of the scooter	Regardless of the state of cleanliness of the device, it is recommended to carry out the procedure of flushing the scooter.
General condition of the scooter	Check that the propeller does not rub against the scooter nozzle and the gap between the propeller and the nozzle is similar at each propeller blade. Check the blades of the propeller and post swirl stator for dings and defects. If necessary, replace the components.
Condition of the o-rings	Perform the procedure for cleaning and lubricating the o-rings.
Condition of the o-rings	Check the charger connector as well as the charging socket of the scooter for signs of corrosion, burning or other damage. Plug the scooter into the charger and charge the battery by observing the information on the display. Check that the charging is correct and that it is charged to at least 95%. If you notice abnormalities in the form of too long or short charging time, not charging the battery to min. 95%, contact the nearest authorized service center or the manufacturer.
Motor and controls condition	Remove the cover pipe of the scooter and inspect the interior of the scooter. If there is any damage to the insulation of the wires or the plug-socket connector connecting the battery to the scooter's electronics, disconnect the connector, carefully protect the damage with insulating tape, and return the scooter to an authorized service center or manufacturer. If moisture, traces of corrosion and water are found, it should be verified whether, for example, they are from careless trimming of the scooter and dampness of its interior, or whether a leak is suspected.
Equipment condition	Perform a full lubrication procedure on the Motor - remove the old grease and apply new grease.

5.2.3 DESCRIPTION OF STANDARD MAINTENANCE OR REPAIR PROCEDURES

Activity name	**Description**
Cleaning the scooter	Rinse the scooter with a stream of clean fresh water. Dismantle the post swirl stator and marine propeller with rotor and rinse them as well. If it is heavily soiled or used in salt water, it is recommended to soak the whole thing for about 6-12 hours in clean fresh water and then rinse it again with a jet of clean fresh water. If the screens on the rotor are significantly contaminated, they should be washed with a jet of water. Check the presence and amount of grease on the rotor axle and carry out lubrication of the motor if necessary. Rinse the handle buttons with a jet of water through the holes in the handles (from the outside). Check the interior of the scooter for dirt, especially mud and sand. If the elements of the internal structure of the scooter contain traces of dirt, such as salt, wipe them with a damp, soft cloth, and then wipe them dry. If the surface of the scooter is discolored, a small amount of liquid silicone grease can be rubbed into the surface, using a soft cotton cloth. This protects and preserves the surface of the anode.
Motor lubrication	Motor lubrication is an important activity necessary for the proper operation of the scooter. If you notice that the tip of the scooter axle begins to be dry - the grease is missing, apply a small amount of grease (3 match heads) to the tip of the axle, and a similar amount into the sliding bushings. Then slide the rotor axle into the bushings and, turning the propeller, distribute the grease. It is forbidden to apply an excess amount of lubricant - it should not spontaneously flow out of the motor and remain on the surface of the rotor. This risks sticking sand and dirt and damaging the drive train. If the observed grease residue is dirty - black, brown, or at the periodic inspection, the old grease should be completely removed and then the drivetrain should be lubricated from scratch. Removal of old grease is best done with a dust-free paper towel moistened with isopropyl alcohol.

Cleaning and lubricating o-rings	Remove the o-rings, without using metal tools. The fields of the o-rings are made of aluminum, so be careful not to scratch them. Clean the o-rings, their sockets and the fields of the component with which the o-ring contacts. After checking the condition of the o-rings, lubricate them and put them on. Lubricate the fields of the elements with which the oring contacts. Use a soft damp cloth for cleaning. Do not stretch the o-rings while cleaning them. Use the manufacturer's recommended grease and, in case of emergency, if there is no grease, use clean, additive-free silicone grease. If any damage is noticed, the o-ring should be replaced without fail.
O-ring replacement	If you find a damaged o-ring, locate an identical one in the service kit provided with the scooter, lubricate it and replace it. Make a note of the replacement, order a new suitable spare o-ring. Use only seals approved by the manufacturer.
Post swirl stator replacement	Cut the security cable of the post swirl stator, remove the damaged component. Check the fit of the replacement, install it and tie it with the cable analogously to the original component.
Marine propeller replacement	Seacraft propellers are individually balanced with the scooter's rotor to ensure the quietest operation possible. It is recommended to replace only with a bolt that matches the scooter's serial number. Emergency, it is possible to replace it with a standard bolt, but it should be balanced during the next annual service. Marine propeller is attached to the rotor with a 2.5mm Allen bolt. To replace it, unscrew the allen bolt and slide it off the rotor. This may require the use of force. After sliding the new bolt so that the hole for the locking bolt matches the hole in the rotor, complete the thread with a little motor grease (prevents galvanic corrosion) and tighten the locking bolt.
Replacement of the thrust bearing	Operation performed only when necessary by Seacraft specialized service during annual inspection.
Replacement of sliding sleeves	Operation performed only when necessary by Seacraft specialized service during annual inspection.

If you detect any of the defects mentioned in this manual or other problems, you should correct them using the recommendations in this manual or consult the problem with the service center.

5.3 ASSEMBLY AND DISASSEMBLY OF DRIVE UNIT COMPONENTS

The drive unit of the Seacraft underwater scooter can be easily disassembled. The disassembly should be carried out in case of:

- Marine propeller replacement is necessary;
- Maintenance of the underwater scooter is performed;
- In case of entanglement of unwanted elements in parts of the drive unit, such as fishing lines, cables or algaes.

In order to disassemble the scooter, it is necessary:

1. Press the lock button, located on the inner perimeter of the nozzle, then turn the post swirl stator in a clockwise direction and slide it backwards.
2. Remove the rotor with the screw by sliding it backwards.
3. Clean all parts of the drive unit from unwanted elements or contaminants with a jet of clean, fresh water then dry.

In order to reassemble the drive unit, it is necessary:

1. Lubricate the cleaned rotor axis and stator seat with plain bearings with the manufacturer's recommended grease.
2. Slide the rotor into the body with a rotating motion;
3. Manually rotate the rotor several times to remove air from the part where the plain bearings are located;
4. Insert the post swirl stator into the picks located on the inner perimeter of the nozzle, press the lock button and then turn counterclockwise to the stop.

Installation and removal of the propeller requires no tools.

5.4 SPECIFICATION OF SPARE PARTS AND AUXILIARY SUBSTANCES

F1062 Set of o-rings dedicated to scooter fi 160:
- O-ring NBR 35x3 70 ShA (charging port o-ring)
- O-ring NBR 23,52x1,78 70 ShA ShA
- O-ring NBR 138x4,5 70 ShA – 2 pcs
- O-ring NBR 30x5 70 ShA
- O-ring NBR 16x3 70 ShA
- O-ring NBR 25x2 70 ShA

G1063 Set of o-rings dedicated to scooter fi 208:
- O-ring NBR 35x3 70 ShA
- O-ring NBR 23,52x1,78 70 ShA
- O-ring NBR 138x4,5 70 ShA– 2 pcs
- O-ring NBR 30x5 70 ShA
- O-ring NBR 16x3 70 ShA
- O-ring NBR 185x4,5 70 ShA– 2 pcs
- O-ring NBR 25x2 70 ShA

U1065 Grease for seals 14 ml
U1068 Drive system grease 5ml
U1069 Spare rubber buttons for steering module
U1075 Trimming weight 65g - 3 pcs
U1076 Trimming weight 200g - 3 pcs
U1064 Service key
U1082 Marine propeller

Batteries:

Type	Model
Single segment	97
Modular battery	600
	800
Battery	750
	1000
	1500
	2000

5.5 RISKS WHEN PERFORMING MAINTENANCE WORK

Threat	How to minimize risk
Battery short circuit, fire.	Exercise caution when using tools.
Omission of o-ring inspection or lubrication.	Perform the steps according to the sequence described in the instructions.
Cutting the O-ring.	Avoiding the use of sharp objects and tools during maintenance work.

6.6 DECOMMISSIONING

Dispose of the product in accordance with the current regulations in the area of the country.

06. ADDITIONAL INFORMATION

6.1 INDEPENDENT PROBLEM SOLVING

IT.	Symptoms	Causes of the problem	Repair method
1.	Scooter won't start	1.1 Discharged battery.	Charge the battery.
		1.2 The unravelled connector between the battery and the drive unit.	Check the connection of the battery to the drive unit.
2.	The battery is not charging	2.1 No connection.	Check the wires, cleanliness of the plug and socket contacts and the charger.
		2.2 Battery voltage too low.	Measure the voltage at the battery terminals. If it is lower than the minimum specified for the battery type, contact the service center.
		2.3 Defective battery. 2.4 Defective charger.	Replace the battery. Replace the charger.
3.	Motor does not run or runs unevenly	3.1 Motor is dirty or blocked.	Turn off the scooter, remove the post swirl stator, remove the rotor, complete the debris or cause of blockage according to the instructions contained herein.
4.	In the hull of the scooter is water	If the user is unable to diagnose the cause of this phenomenon on his own.	Pour out the water and dry the interior of the scooter. Return the scooter to the service center with a note that there was water inside and the cause of this fault should be checked and corrected.
		4.1 Damaged o-rings.	If you suspect flooding of electronics or batteries, contact the service center
		4.2 Deformation of the housing element.	Contact the service center to replace the defective component and perform a pressure test.
		4.3 Condensation due to temperature and humidity differences.	Move the scooter to a dry room. Take the scooter apart and dry the individual components. Do not use the scooter at low temperatures if it was previously assembled in warm and humid conditions. If this is not possible, disassemble the scooter beforehand so that the moisture can evaporate.
5.	Problems with the control triggers	5.1 Dirty or blocked controls.	Thoroughly rinse, wash and wipe the controls (buttons on the control handles) with a dry cloth.
6.	The scooter sinks or swims toward the water surface	6.1 Incorrect weight and/or poor ballast placement.	Correct the weight selection and ballast weight. In case of balance and trim problems, it is recommended to use external ballast.

6.2 WARRANTY AND POST-WARRANTY SERVICE

WARRANTY
Each scooter is covered by the manufacturer's warranty. Detailed provisions are contained in the Warranty Terms and Conditions attached to this manual. They specify the obligations of the manufacturer of the Seacraft underwater scooter under the quality warranty, the temporal and territorial scope of the warranty, and the owner's rights under the warranty.

The manufacturer assumes no responsibility for damage caused by use not in accordance with the intended use and these instructions, and the resulting damage cannot be the basis for warranty claims or repairs.

POST-WARRANTY SERVICE
Any repairs to the scooter during the post-warranty period are carried out for a fee. In case of problems that users are able to fix on their own, the manufacturer provides additional information. Users can use the services of authorized service centers or service carried out directly at the scooter manufacturer - contact: service@seacraft.eu.

07.
APPENDICES

- Appendix 1 - Safety Data Sheet

SAFETY DATA SHEET

[In accordance with the criteria of Regulation No 1907/2006 (REACH) as amended]

Section 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name: **FUTURE BX 750, FUTURE BX 1000, FUTURE AIR-TRAVEL 600, FUTURE AIR-TRAVEL 800, GHOST BX 1500, GHOST BX 2000, TAC1000, TAC2000, TAC800 (MODULAR BATTERY), SCOOTER GO!, ONE 97WH SEGMENT OF MODULAR AIR-TRAVEL FRIENDLY BATTERY, MODULAR AIR-TRAVEL FRIENDLY BATTERY - 780 WH (8 MODULES), MODULAR AIR-TRAVEL FRIENDLY BATTERY - 582 WH (6 MODULES), BATTERY 750 WH DEDICATED TO SCOOTER FUTURE 750, BATTERY 1000 WH DEDICATED TO SCOOTER FUTURE 1000, BATTERY 1500 WH DEDICATED TO SCOOTER GHOST 1500, BATTERY 2000 WH DEDICATED TO SCOOTER GHOST 2000, BATTERY 1000 WH DEDICATED TO SCOOTER TAC1000, BATTERY 2000 WH DEDICATED TO SCOOTER TAC2000**

1.2. Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Lithium-Ion Battery Pack— Rechargeable.

Uses advised against: not determined.

1.3. Details of the supplier of the safety data sheet

Producer: **Marine Tech Spółka Akcyjna**

Address: ul. Franciszka Żwirki i Stanisława Wigury 17
38-400 Krosno

Telephone/Fax number: +48 502 741 715

E-mail address for a competent person responsible for sds: iga.piatek@seacraft.eu

1.4. Emergency telephone number

112 (Europe's emergency telephone number). Emergency Action: In the event of a medical enquiry involving this product, please contact your doctor or local hospital accident and emergency department. Please check any national emergency information services in your country.

Section 2: Hazards identification

2.1. Classification of the substance or mixture

In accordance with the REACH regulation, a product is considered as an article, therefore it is not subject to the classification and labelling requirements.

2.2. Label elements*

Hazard pictograms and signal words

None.

The names of substances on the label

None.

Hazard statements

None

Precautionary statements

None.

2.3. Other hazards

The product does not contain ingredients which meet criteria for PBT or vPvB in accordance with Annex XIII of REACH Regulation. The product does not contain substances included in the list established in accordance with Article 59(1) for having endocrine disrupting properties, or substances identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation 2017/2100/EU or Commission Regulation 2018/605/EU at a concentration equal to or greater than 0.1 % by weight.

For the battery cell, chemical materials are stored in a hermetically sealed metal or metal laminated plastic case, designed to withstand temperatures and pressures encountered during normal use. As a result, during normal use, there are no physical hazards such as ignition, explosion and chemical hazards due to leakage of battery contents. However, if exposed to a fire, added mechanical shocks, decomposed, added electric stress by miss-use, the gas release vent will be operated. The battery cell case will be breached at the extreme, hazardous materials may be released. Also, if it is heated strongly by surrounding fires or the like, there is a possibility that irritating or harmful gasmay be generated.

Section 3: Composition/information on ingredients

3.1 Substance

Not applicable.

3.2. Mixtures

The product is a lithium ion rechargeable battery cell. See the table below for information about the chemical nature of product. Not every product includes all of these materials.

Portion	Material name	CAS No.	Concentration range (wt. %)
positive electrode	lithium transition metal oxidate	12190-79-3 12031-65-1 12057-17-9 182442-95-1 207803-51-8	20~60
positive electrode's base	aluminium	7429-90-5	1~10
negative electrode	carbon	7782-42-5 7440-44-0	10~30
negative electrode's base	cooper	7440-50-8	1~15
outer case	aluminium, iron, aluminium laminated plastic	7429-90-5 7439-89-6	1~30
electrolyte	ethyl methyl carbonate diethyl carbonate ethylene carbonate lithium hexafluorophosphate	623-53-0 105-58-8 96-49-1 21324-40-3	5~25

Section 4: First aid measures

4.1. Description of first aid measures

The undamaged product does not pose a hazard to human health. The information on first aid described below applies to a situation in which the exposure occurred as a result of damage to the product or improper handling.

Skin contact: remove contaminated clothes and shoes immediately. Apply a sterile dressing. Immediately call a doctor. If the skin is contaminated with metallic lithium, do not rinse the skin with water before removing it.

Eye contact: do not rub one's eyes. Protect non-irritated eye, remove contact lenses. Wash out with plenty of water with the eyelid hold wide open for at least 15 min. Avoid powerful water stream – risk of cornea damage. Put on sterile dressing. Consult ophthalmologist.

Ingestion: exposure by this route does not usually occur. However, if swallowed rinse mouth with water. Never give anything to drink to an unconscious person, unless instructed by medical personnel. Do not induce vomiting. Consult a doctor, if disturbing symptoms appear, show the container or label.

Inhalation of vapours: make the victim blow his nose, gargle. Consult a doctor, if disturbing symptoms appear. Remove the victim to fresh air, keep warm and calm.

4.2. Most important symptoms and effects, both acute and delayed

There is no report data on adverse exposure health effects or risks in case of correct use of the product. In case of battery damage and leakage of content:

Skin contact: the product may cause redness, burning sensation, irritation, burns.

Eye contact: the product may cause burning sensation, irritation, tearing, pain, risk of serious damage to eyes.

Ingestion: exposure by this route does not occur.

Inhalation: high concentration of vapours and mists may cause respiratory irritation.

4.3. Indication of any immediate medical attention and special treatment needed

Physician makes a decision regarding further medical treatment after thoroughly examination of the injured. Symptomatic treatment.

Section 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media: plenty of water, carbon dioxide gas, nitrogen gas, chemical powder fire extinguishing medium and fire foam. Adapt the extinguishing media to surrounding materials.

Unsuitable extinguishing media: water jet – risk of the propagation of the flame.

5.2. Special hazards arising from the substance or mixture

During the fire may produce harmful gases containing eg. carbon oxides, other hazardous unidentified products of thermal decomposition, corrosive gases. Do not inhale combustion products, they can be dangerous for human health.

5.3. Advice for firefighters

When extinguishing a lithium battery fire with water, special care should be taken due to the possibility of metallic lithium splashes and the fact that contact of hot lithium with water can lead to hydrogen release. If the batteries are connected to a power source - turn off the power. When the battery burns with other combustibles simultaneously, take fire- extinguishing method which correspond to the combustibles. Extinguish a fire from the windward as much as possible. Personal protection typical in case of fire. Do not stay in the fire zone without self-contained breathing apparatus and protective clothing resistant to chemicals. Cool down the containers that are endangered by fire with a water spray from a safe distance. Collect used extinguishing media.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Limit the access for the outsiders into the breakdown area, until the suitable cleaning operations are completed. Ensure that only the trained personnel removes the effects of the accident. In case of large spills, isolate the exposed area. Eliminate all sources of ignition - do not use an open flame, do not smoke, do not use sparking tools, etc. Use personal protective equipment.

6.2. Environmental precautions

Do not allow the product to get into the sewage system, surface waters and soil. In case of release of large amounts of the product, it is necessary to take appropriate steps to prevent it from spreading into the environment. Notify relevant emergency services.

6.3. Methods and material for containment and cleaning up

In the event of an electrolyte leak: if possible, eliminate or limit the leak. Absorb with non-flammable liquid absorbing materials (e.g. earth, sand). The leaked place is wiped off with dry cloth. The collected material should be treated as waste and placed in an appropriately labelled container. Do not inhale the gas as much as possible. Remaining elements of the product: collect mechanically, place them in a properly labelled container and transfer to utilization. Prevention of secondary hazards: Avoid re-scattering. Do not bring the collected materials close to fire. Do not use water to clean surfaces contaminated with the electrolyte released from the product - risk of liberating flammable gases that may ignite spontaneously.

6.4. Reference to other sections

Appropriate conduct with waste product – section 13. Appropriate personal protective equipment – section 8.

Section 7: Handling and storage

7.1. Precautions for safe handling

Provide general and / or local ventilation in the workplace. Prevent the casing from unsealing. Handle in accordance with good occupational hygiene and safety practices. Use personal protective equipment. Before break and after work wash hands carefully. Keep the unused containers tightly closed. Do not eat, drink and smoke during the work. Avoid eyes and skin contamination. Do not connect the positive terminal to the negative terminal with electrical wire or chain. Avoid polarity reverse connection when installing the battery to an instrument. Do not wet the battery with water, seawater, drink or acid; or expose to strong oxidizer. Do not damage or remove the external tube. Keep the battery away from heat and fire. Do not disassemble or reconstruct the battery; or solder the battery directly. Do not give a mechanical shock or deform. Do not use unauthorized charger or other charging method. Terminate charging when the charging process doesn't end within specified time.

7.2. Conditions for safe storage, including any incompatibilities

Store in properly labelled, sealed packages in a dry, cool and well-ventilated place. Keep away from incompatible materials (see subsection 10.5). Keep away from foodstuffs and animal feed. Protect against excessive heating, high temperatures, may cause tearing of the casing or and the electrolyte leakage. Do not store the battery with metalware, water, seawater, strong acid or strong oxidizer. Make the charge amount less than or equal to 50% then store at -20~40 °C in a dry (humidity: 45~85 %) place. Since deterioration will be faster in the high temperature range than in the low temperature range, so do not keep it in the high temperature range beyond the period that is specified by the seller or owner. Excessive heating can shorten the battery life. Use insulative and adequately strong packaging material to prevent short circuit between positive and negative terminal when the packaging breaks during normal handling. Do not use conductive or easy to break packaging material.

7.3. Specific end use(s)

No information about applications other than those specified in section 1.2.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Due to the form of the product, monitoring of the permissible concentration of substances in the workplace is not required.

8.2. Exposure controls

Industrial hygiene

Use the product in accordance with good occupational hygiene and safety practices. Do not eat, drink and smoke during the work. Before break and after work wash hands carefully. Ensure adequate general and/or local ventilation at the workplace.

Individual protection measures, such as personal protective equipment

The necessity to use and the selection of appropriate personal protective equipment should take into account the type of risk posed by the product, working conditions and the way of handling the product. The personal protective equipment used must meet the requirements of Regulation (EU) 2016/425 and the relevant standards. The employer is obliged to provide protection measures appropriate to the activities performed and meeting all quality requirements, including their maintenance and cleaning. Any contaminated or damaged PPE must be replaced immediately.

Hand protection

Use protective gloves resistant to chemicals according to EN 374. Select the material for the gloves individually at the workplace.

The material that the gloves are made of must be impenetrable and resistant to the product's effects. The selection of material must be performed with consideration of breakthrough time, penetration speed and degradation. Moreover, the selection of proper gloves depends not only on the material, but also on other quality features and changes depending on the manufacturer. The producer should provide detailed information regarding the exact breakthrough time. This information should be followed. It is recommended to change protective gloves regulary and replace them immidiately if any signs of their wear, damage or changes in appearance (colour, flexibility, shape) occur.

Body protection

Use skin protection measures adequate to the existing thermal, chemical or mechanical hazards. Working clothes with long sleeve and long trousers.

Eye protection

If there is a risk of eye contamination, use safety glasses in accordance with the EN 166 standard.

Respiratory protection

Not required with adequate ventilation.

Thermal hazards

Not applicable.

Environmental exposure controls

Prevent direct release to drains/ surface waters. Do not contaminate surface waters and drainage ditches with chemicals or used containers. Released product or uncontrolled spills to surface waters should be reported to appropriate authorities in accordance with local and national legislations. Dispose as chemical waste, in accordance with local and national legislation.

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	solid
Colour	metallic colour or black
Odour	characteristic
Melting point/freezing point	not applicable
Boiling point or initial boiling point and boiling range	not applicable
Flammability	not applicable
Lower and upper explosion limit	not applicable
Flash point	not applicable
Auto-ignition temperature	not applicable
Decomposition temperature	not applicable
pH	not applicable
Kinematic viscosity	not applicable
Solubility	not applicable
Partition coefficient n-octanol/water (log value)	not applicable
Vapour pressure	not applicable
Density and/or relative density	not applicable
Relative vapour density	not applicable
Particle characteristics	not applicable

9.2. Other information

No additional tests.

Section 10: Stability and reactivity

10.1. Reactivity

Efficient and sealed battery is not reactive. Battery content is reactive. See also subsection 10.3-10.5.

10.2. Chemical stability

Normally stable unless a strong shock is applied or heated strongly.

10.3. Possibility of hazardous reactions

In normal conditions of use, they do not occur. Contact of the damaged product with water may lead to exothermic reactions and the release of flammable gas. Damage to the container may cause leakage of contents. Contents may leak or ignite due to temperature rise.

10.4. Conditions to avoid

Crushing or deformation, use and storage at 80 °C or higher or at high humidity. Usage at a voltage or a current outside the rating and external short circuit. Avoid direct exposure to sunlight.

10.5. Incompatible materials

Strong oxidizing agents. Conductive material such as water or metal pieces.

10.6. Hazardous decomposition products

Irritating or harmful gases are released if a leakage or fire occurs.

Section 11: Toxicological information

11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

Under normal conditions of use product is not dangerous for life and health.

Acute toxicity

Based on available data, the classification criteria are not met.

Skin corrosion/irritation

Based on available data, the classification criteria are not met.

Serious eye damage/irritation

Based on available data, the classification criteria are not met.

Respiratory or skin sensitisation

Based on available data, the classification criteria are not met.

Germ cell mutagenicity

Based on available data, the classification criteria are not met.

Carcinogenicity

Based on available data, the classification criteria are not met.

Reproductive toxicity

Based on available data, the classification criteria are not met.

STOT-single exposure

Based on available data, the classification criteria are not met.

STOT-repeated exposure

Based on available data, the classification criteria are not met.

Aspiration hazard

Based on available data, the classification criteria are not met.

Information on likely routes of exposure

Routes of exposure: eye contact, skin contact, inhalation. See subsection 4.2 for more information on the effects from each possible route of exposure.

Symptoms related to the physical, chemical and toxicological characteristics

Undamaged battery poses no hazard to human health.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Undamaged battery poses no hazard to human health.

11.2. Information on other hazards

Endocrine disrupting properties

The product does not contain substances included in the list established in accordance with Article 59(1) for having endocrine disrupting properties, or substances identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0.1 % by weight.

Other information

No data.

Section 12: Ecological information

12.1. Toxicity

Undamaged battery poses no hazard for the environment.

12.2. Persistence and degradability

Product is not biodegradable.

12.3. Bioaccumulative potential

Bioaccumulation is not expected.

12.4. Mobility in soil

Mobility of components of the mixture in soil depends on the hydrophilic and hydrophobic properties and biotic and abiotic conditions of soil, including its structure, climatic conditions, seasons and soil organisms.

12.5. Results of PBT and vPvB assessment

Product does not contain ingredients which meet criteria for PBT or vPvB in accordance with Annex XIII of REACH Regulation.

12.6. Other adverse effects

The product does not contain substances included in the list established in accordance with Article 59(1) for having endocrine disrupting properties, or substances identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at a concentration equal to or greater than 0.1 % by weight.

12.7. Other adverse effects

Product has no influence on global warming and destruction of the ozone layer. Consider other harmful effects of individual components of the mixture on the environment (eg. global warming potential).

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal methods for the product:

The waste product should be recovered or disposed of in authorized incineration plants or waste disposal / neutralization plants, in accordance with applicable regulations. Do not empty into drains. The waste code should be given in the place of its formation. Specified collection or disposal of lithium ion battery is required by the law like as "battery control law" in several nations. Collection or recycle of the battery is mainly imposed on battery's manufacturer or importer in the nations recycle is required.

Disposal methods for used packing: neither a container nor packing is contaminated during normal use. When internal materials leaked from a battery cell contaminates, dispose as industrial wastes subject to special control.

Legal basis: Directive 2008/98/EC as amended, 94/62/EC as amended.

Section 14: Transport information

14.1. UN number or ID number

UN 3171

14.2. UN proper shipping name

BATTERY POWERED VEHICLE

14.3. Transport hazard class(es)

9

14.4. Packing group

Not applicable.

14.5. Environmental hazards

Not applicable.

14.6. Special precautions for user

Not applicable.

14.7. Maritime transport in bulk according to IMO instruments

Not applicable.

Other information

ADR	limited quantities	Not applicable
	classification code	M11
	special provisions	388, 666, 667, 669
	transport category	-
	tunnel restriction code	(-)
IMDG	limited quantities	Not applicable
	EmS code	F-A, S-I
	marine pollutant	no
	special provisions	388, 961, 962, 971
ICAO/IATA	special provisions	A67, A87, A94, A154, A164, A214
	Ltd Qty Packing Instruction	Forbidden
	Ltd Qty Passenger and Cargo Aircraft max net	Forbidden
	Passenger and Cargo Aircraft Pkg Inst	952
	Passenger and Cargo Aircraft max net qty	No limit
	Cargo Aircraft Only Pkg Inst	952
	Cargo Aircraft Only max net qty	No limit

Section 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Regulation No 1907/2006/EC of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC as amended.

Regulation No 1272/2008/EC of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 as amended.

Commission Regulation No 2020/878/EU of 18 June 2020 amending Annex II to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives as amended.

European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste as amended.

Regulation 2016/425/EU of the European Parliament and of the Council of 9 March 2016 on personal protective equipment and repealing Council Directive 89/686/EEC.

Commission Directive 2000/39/EC of 8 June 2000 establishing a first list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work.

Commission Directive 2006/15/EC of 7 February 2006 establishing a second list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Directives 91/322/EEC and 2000/39/EC.

Commission Directive 2009/161/EU of 17 December 2009 establishing a third list of indicative occupational exposure limit values in implementation of Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.

Commission Directive 2017/164/EU of 31 January 2017 establishing a fourth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC, and amending Commission Directives 91/322/EEC, 2000/39/EC and 2009/161/EU.
Commission Directive 2019/1831/EU of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC.
European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).
IMDG Code International Maritime Dangerous Goods Code.
IATA Dangerous Goods Regulations.

15.2. Chemical safety assessment

A Chemical Safety Assessment is not required for mixtures in accordance with REACH Regulation.

Section 16: Other information

Full text of indicated H phrases mentioned in section 3

Not applicable.

Clarification of aberrations and acronyms

PBT	Persistent, Bioaccumulative and Toxic substance
vPvB	very Persistent, very Bioaccumulative substance
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods Code
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road

Trainings

Before commencing working with the product, the user should learn the Health & Safety regulations, regarding handling chemicals, and in particular, undergo a proper workplace training. Personnel related with the transport of hazardous substances in accordance with the ADR agreement should be trained and should obtain proper certification in a range of their obligations (general training, workplace training, safety training).

Key literature references and data sources

This SDS was prepared on the basis of the safety data sheet provided by the manufacturer, literature data, online databases (e.g. ECHA, TOXNET, COSING), our knowledge and experience, taking into account the current legislation.

Classification and procedure used to classify the mixture in accordance with Regulation (EC) 1272/2008 (as amended)

In accordance with the REACH regulation, a product is considered as an article, therefore it is not subject to the classification and labelling requirements.

Other data

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Safety Data Sheet made by:	**THETA Consulting Sp. z o.o.** (on the basis of producer's data).

The information above is based on a current available data concerning the product, but also on the experience and knowledge in this field of the producer. They are neither a quality description of the product nor a guarantee of particular features. They are to be treated as aid to safety in transport, storage and usage of the product. That does not free the user from the responsibility of improper usage of the information above and also of improper compliance with the law norms in the field.

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