

Technical Data Sheet & Fable Specification Documents

Product Description:

Fable is a modular construction system. Students can create their own robot in minutes. Students can assemble modules together in many different configurations. Build custom robot bodies, use the inbuilt sensors and program the robot's movement.

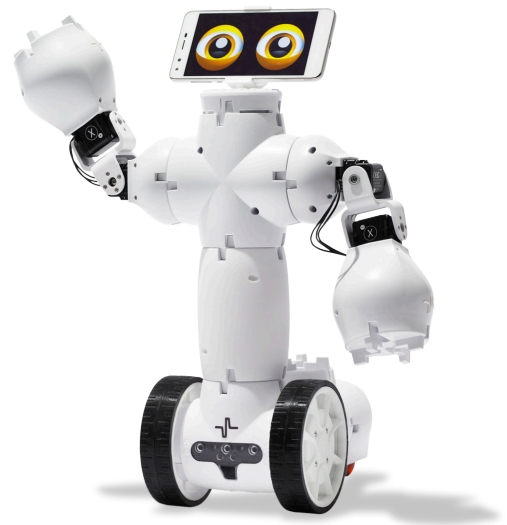
Depending on experience level, students can program using visual blocks (Blockly) or a programming language (Python). After one lesson with Fable students can work toward solving real-world problems. Fable is appropriate for primary school (8+), secondary and higher education.

Fable consists of programmable modules. These have motors, sensors, batteries and are controlled wirelessly. Additionally, the system includes passive parts and accessories enabling many different robot configurations.

Students combine modules freely, exploring untold possibilities and creating different types of robots. Some robots are pure imagination and built mostly for fun. Other robots are carefully designed and ready to solve real-life problems.

Flexible programming tools enable you to differentiate teaching styles. This helps students gradually progress from the simple, visual, drag-and-drop programming using Blockly to more elaborate forms of programming with Python.



The Fable application is divided into different levels depending on the students' level of competence. A very simple visual programming using Blockly, more advanced visual also with Blockly programming, and finally text-based programming in Python.



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Appendix 1: Technical Data Sheet - Fable Connect

Spin Module Specifications

Weight without wheels	378 grams	
Weight with wheels	631 grams	
Rotation	360 degree, infinite	
Speed	60 RpM	
Flash lights	High intensity LED	
Infrared communications	Up to 1 meter	
Distance sensors	Up to 15 cm	
RGB color sensors	Detects 8 colors	
Battery product name	Lithium ion rechargeable battery cell	
UN regulation	UN number 3481	
Proper shipping name	Lithium ion batteries contained in equipment	
Company name	Sanyo Electric Co., Ltd., Panasonic group	
Nominal voltage	3.6V	
Rated capacity	3500mAh, 12.6Wh	
Size (DxH)	18.3 x 66.4 mm	
Charging time	3 hours	
Discharge time	Average use, around 8 hours	
Charging cable	Micro USB cable	

Dongle HUB Specifications

Weight	63 grams
Size (DxH)	82 x 26 mm
Wireless communication with Join / Spin Module	2405 - 2479 MHz
Wireless communication with table / phone	Bluetooth low energy
PC connection cable	USB to Micro USB cable

4XY Module specifications

Shell material	Abs / PC plastic
Connector components	Neodymium-iron-boron magnets



Transport Information

UN regulation	UN number 3481
Proper shipping name	Lithium ion batteries contained in equipment
Class	9



Shape
Robotics

Contact Us

Shape Robotics ApS

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✉ hello@shaperobotics.com

☎ +45 2635 2569

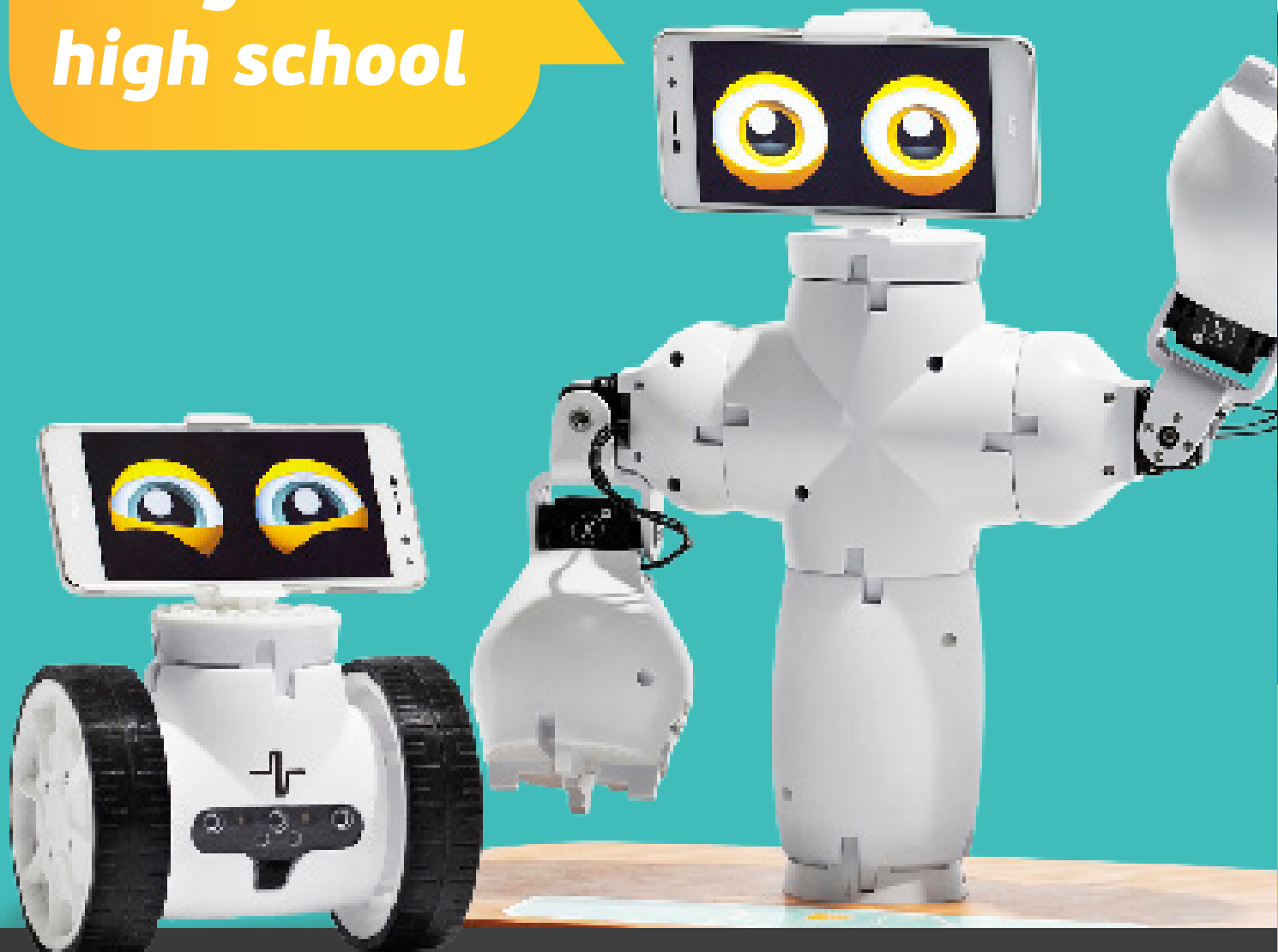
🌐 www.shaperobotics.com

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Appendix 2: Fable Brochure



*Use us from
3rd grade to
high school*



Technology and Computational Thinking
Teaching in the 21st century

Ready for the future

Artificial intelligence, nanotechnology, self-driving cars, 3D printing, quantum computers, biotechnology... **and robots.**

Scientists call it the **fourth industrial revolution.**

At Shape Robotics, we believe that **technical flair and ingenuity** will be in high demand. That is why we want to help the future workforce to **master technology and become creators** of the solutions the world needs.



Fable is...

- ✓ **Robust** – designed to withstand everyday life in schools
- ✓ **Powerful** – build from components with powerful motors and precise sensors.
- ✓ **Wireless** – communication via hub connected to your computer's USB.
- ✓ **Magnetic** – modules are connected by one click
- ✓ **Simple setup** – quick setup makes teaching proceed immediately
- ✓ **Compatible** – can be joined with LEGO®, a smartphone, or a 3D-print, later processing ind e.g. MS Excel.

LEGO® is a trademark of the LEGO Group of companies which does not sponsor, authorise or endorse this product

Program Fable

Using the **USB Hub**, the students **wirelessly program their Fable robots in our interface, Fable Blockly.**

Blockly is divided into different levels, that can be adapted to different students' levels of competence. From basic visual programming using Blockly, over more advanced Blockly programming and further to powerful text-based programming with Python or JavaScript.

The program also allows for simple data processing with graphs or data logging to files for later processing e.g. in MS Excel.

Fable Blockly supports PC, Mac, Ipad and Chromebook.



Fable - a robot designed for education

Fable helps to motivate students to embrace new technologies and build self-confidence in the skills of tomorrow.



Release the potential

Teaching robots bridge the gap between technology, science and free imagination. Learning becomes play... and play becomes learning.



Build your robots in seconds

With Fable, everybody can join. The modules are magnetic and click together in seconds. A wide range of accessories can be attached quick and easy.



Danish robot with success

The robot is suitable for students from 8 years and upwards. Primary schools, middle schools, high schools and vocational schools around the world use Fable.



Put a face on Fable

With an app on their smartphone, students can give Fable a face! They have control of eye expressions, sounds and can use the phone's sensors to control the robot.



Increasing difficulty

Fable supports Blockly and Python!

Blockly - is a simple visual programming language that gradually becomes more challenging.

Python - is a powerful programming language for the more experienced student.



Solve real problems

High-quality modules with strong actuators and sensors make Fable an ideal choice for hands-on problem solving. Students build robots, test their solutions and learn from their mistakes.



Ready to use

We provide a great variety of educational materials, including STEAM lessons ready-for-teaching.

Our content is made by experienced educators!



Breaking boundaries

Fable encourages project work across traditional subject boundaries and grade levels. The robot motivates students to dare to fail ... and try again and again.



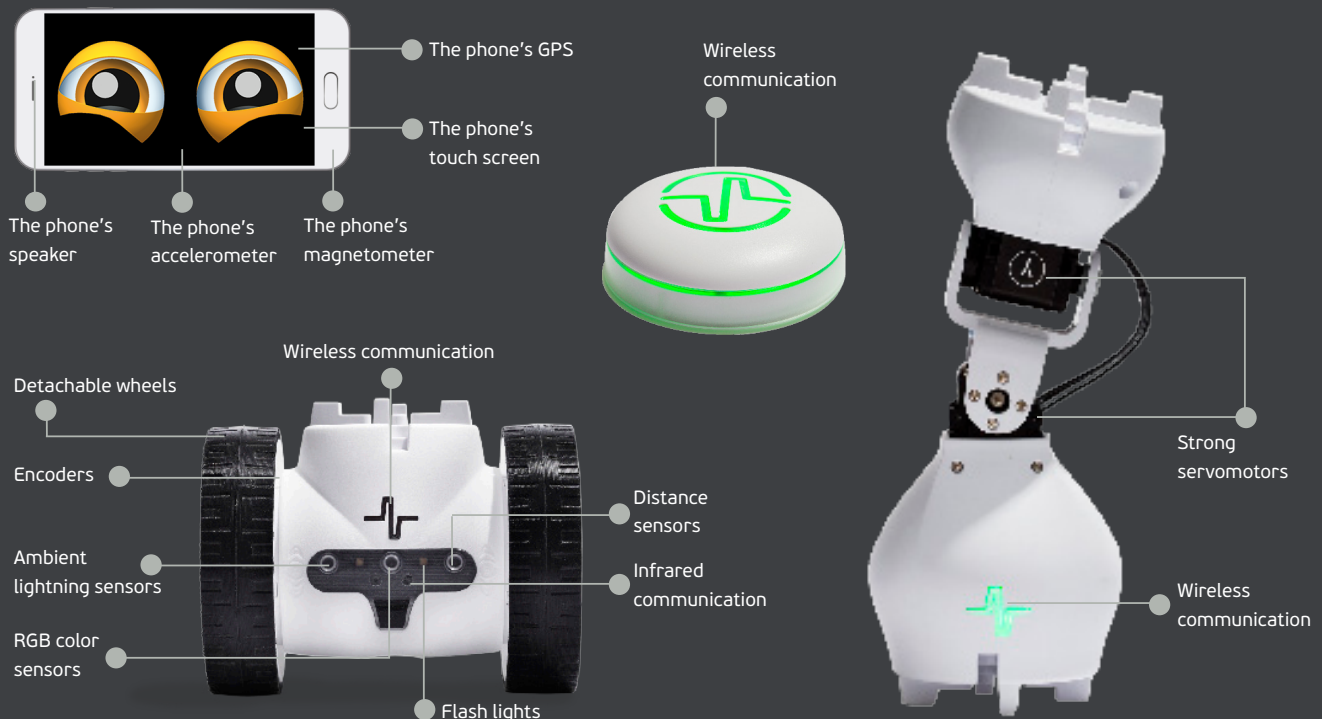
Three in one

✓ Robotic modules - contains rechargeable battery, onboard computer and much more to make the robot move and sense.

✓ Construction modules - are vital, yet passive, modules used to build both simple and more complex robots..

Accessories - expands the possibilities and complete the design of a robot.

Many cool sensors



Fable kits to match all needs

Shape Robotics aims to offer solutions that are both timesaving for the teacher, easy to learn yet difficult to master, and provide excellent educational content and support.

The Fable solution prepares students for their future life and work by exposing them to playful, problem-based, hands-on learning.

Our current product portfolio consists of around 10 different sets of the Fable educational robotics system.

Below are examples of Fable sets.

Find all available Fable sets and prices at www.shaperobotics.com

Fable Start!

€ 985 / \$ 1,150



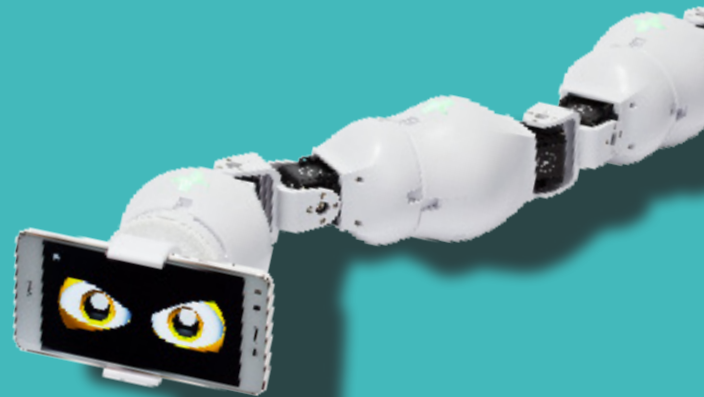
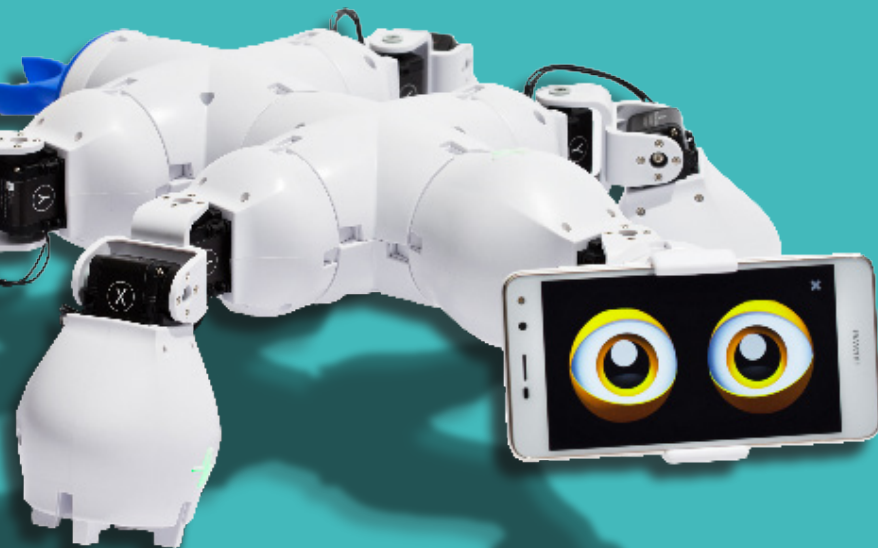
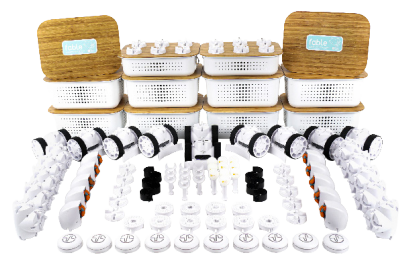
Fable Makerspace!

€ 2,699 / \$ 3,070



Fable Play! Class

€ 4,700 / \$ 5,499



**Shape
Robotics**

Contact

Shape Robotics
Rugmarken 18
3520 Farum, Denmark
Phone: +45 2635 2569

There is much more
at our website:

www.shaperobotics.com

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Appendix 3:

Battery Pack Safety Data Sheet CMEC
battery single-cell system NCR18650B

CMEC battery single-cell system.

(Material) Safety Data Sheet (SDS / MSDS)

The information contained within is provided as a service to our customers and for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate as of the date of preparation or revision. CMIUTA Electric Company makes no warranty expressed or implied, and disclaims all liabilities from reliance on it.

Section 1 – Identification

1.1 Product Name and Description: Single-cell battery system for robotic assembled with Panasonic NCR18650B Lithium-ion rechargeable battery cell.

Electro-chemistry: Lithium-ion LiNiCoAlO₂ (Lithium Nickel Cobalt Aluminum Oxide)

This Safety Data Sheet covers all lithium ion rechargeable battery packs supplied by CMIUTA Electric Company.

1.2 Supplier

Office / Address / Telephone Numbers For Information

Telephone: +31 684531172

E-mail: cmiuta@uavfpvbattery.com

Emergency Telephone: +31 684531172

CMIUTA Electric Company (CMEC), Kollumerland street no 31, 4051GX Ochten, The Netherlands.

Section 2 – Hazard(s) Identification

Warning: the battery packs should not be short circuited, punctured, incinerated, crushed, immersed in water, over-charged, over-discharged, or exposed to a temperatures above the declared operation temperature range of the cell or battery. Risk of fire or explosion may occur in the above condition of abuse.

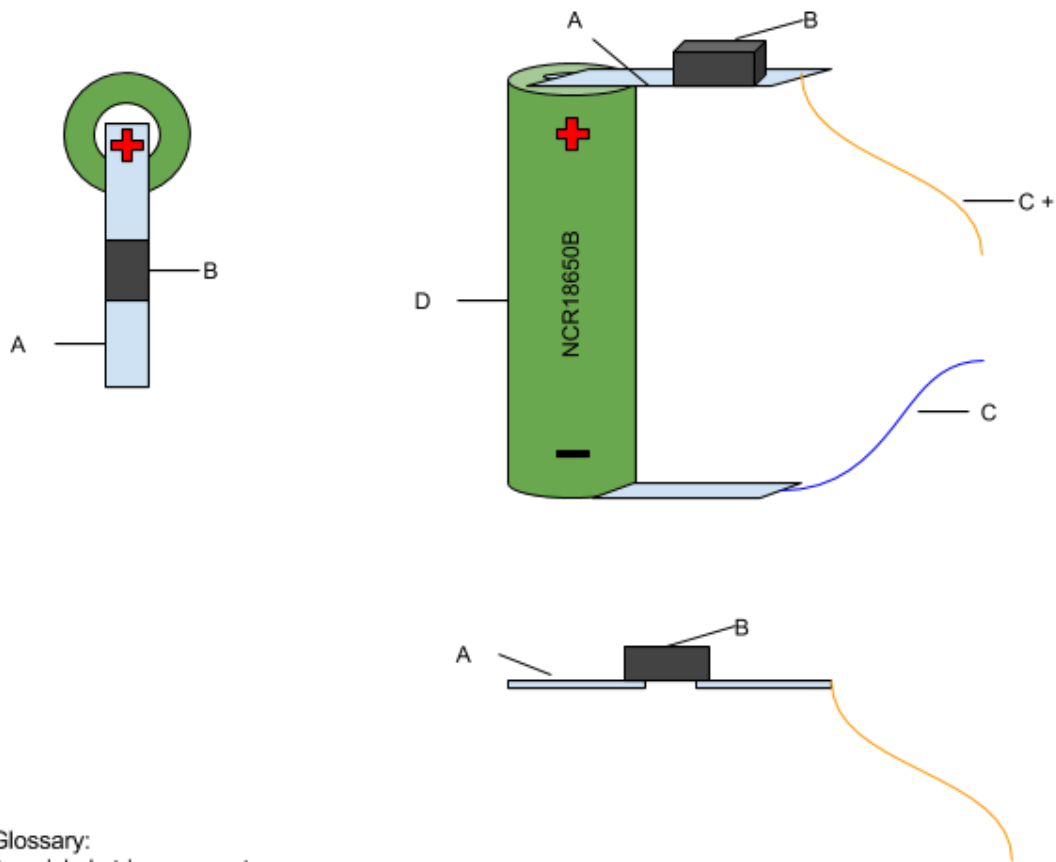
The battery cell's terminals are over insulated with electrical grade vulcanized fibre gasket, and joined by (99.97%) pure nickel-strips layers through pulse-welding (ERW). Then wiring-harnesses for PCB/BMS, insulated discharge cables are applied, spending more attention to detail and safety elements.

At the positive terminal of battery cell it is mounted an extra safety element, a PTC resettable fuse (Littelfuse 2920L700/12MR) that in a catastrophic short circuit scenario will interrupt the supply of power to the device.

Discharging/Charge wire gauge: 18AWG (300V/17A rated)

Wire colour: blue(-) and orange(+)

Nickel stripe (pole) connector: 7 x 0.15 mm



Glossary:
A = nickel stripe connector
B = PTC Resettable Fuse
C = charging/discharging cables
D = battery cell

Section 3: Design Safety Features: Cell Level

Panasonic NCR18650B battery cell incorporate numerous mechanical, thermal, and chemical factors that contribute to their safety in the CMEC battery packs. This have an internal positive temperature coefficient (PTC) current limiting device. The primary role of this PTC is to limit short circuit current on an individual cell level. It is important to note that this device is completely passive and functions without any inputs from the rest of the battery pack systems.

A second level of protection is provided by the Current Interrupt Device (CID). Each battery cell used in the CMEC battery packs has an internal CID. These devices serve to protect the cell from excessive internal pressure..

Section 4: Instructions, cautions and warnings

CMEC battery single-cell system have no any electronic circuitry – PCB/BMS, requires an additional smart charger with proper protection and balancing functions for lithium-ion cells.

The cells should be kept away from heat generating electronic parts in order to avoid deterioration of battery performance.

For safety reason and in order not to shorten the cycle life, max charging voltage should be under 4.20V/cell including tolerance.

The standard charge condition is a constant current – constant voltage method with a current 1625mA/cell.

The charging process should be automatic halted by charging device when either time, battery voltage, or current reach certain values.

The discharge end voltage should be more than 3.3V/cell including tolerance.

The charging temperature should be confined to the range 5°C to +45°C.

The discharge temperature should be between -20°C to +60°C.

Section 5: Storage temperature and humidity.

When long duration storage the battery packs should be stored in a stable environment characterized by low-humidity (less than 70%RH), free of corrosive gasses, and an ambient temperature between -20°C and +20°C.

Avoid conditions that can create condensation such as rapid fluctuations in the ambient.

Section 6: Prohibited actions.

DO NOT short circuit

DO NOT force a reverse-charge or a reverse-connection

DO NOT overcharge

DO NOT modify, disassemble, puncture, cut, crush, or incinerate

DO NOT expose to liquids

DO NOT use or place the battery a high temperatures

DO NOT connect the battery directly with AC plug (outlet) or electric car plugs.

Section 7: Recycling.

When disposing of the battery, recycle it according to local rules and regulations.

Section 8: Other battery safety requirements.

In order to ensure the safety of the battery pack, please contact CMEC to discuss design of the application from a mechanical and electrical perspective. Also, if there are special usage conditions (for example: a large (DC) current load, a quick charge method, or a special usage pattern), please consult CMEC before finalizing the product specification.

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Appendix 4: Dongle_DNG002- FCC Grant

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

ACB, Inc.
6731 Whittier Avenue Suite C110
McLean, VA 22101

Date of Grant: 03/20/2018

Application Dated: 03/19/2018

Shape Robotics ApS
Linde Alle 29A
P.O. Box 2850,
Naerum, 2850
Denmark

Attention: Moises Pacheco , CTO

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is
VALID ONLY for the equipment identified hereon for use under the Commission's
Rules and Regulations listed below.

FCC IDENTIFIER: 2A0UEDNG002
Name of Grantee: Shape Robotics ApS
Equipment Class: Part 15 Low Power Communication Device
Transmitter
Notes: Dongle

Grant Notes

FCC Rule Parts
15C

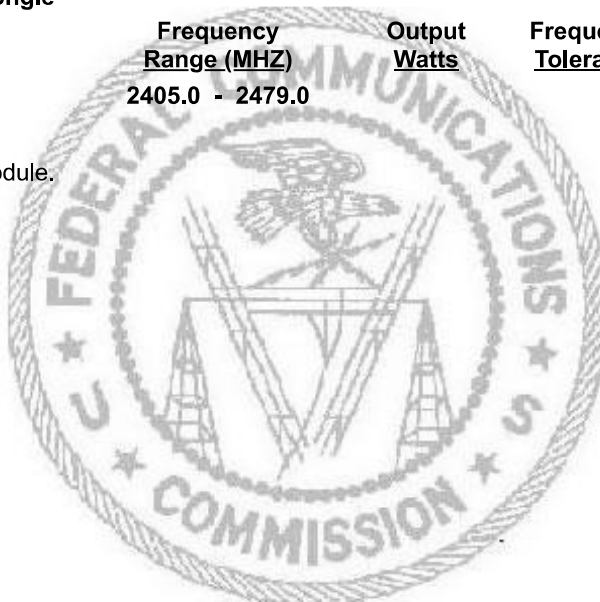
Frequency
Range (MHZ)
2405.0 - 2479.0

Output
Watts

Frequency
Tolerance

Emission
Designator

This device also contains a certified Bluetooth module.

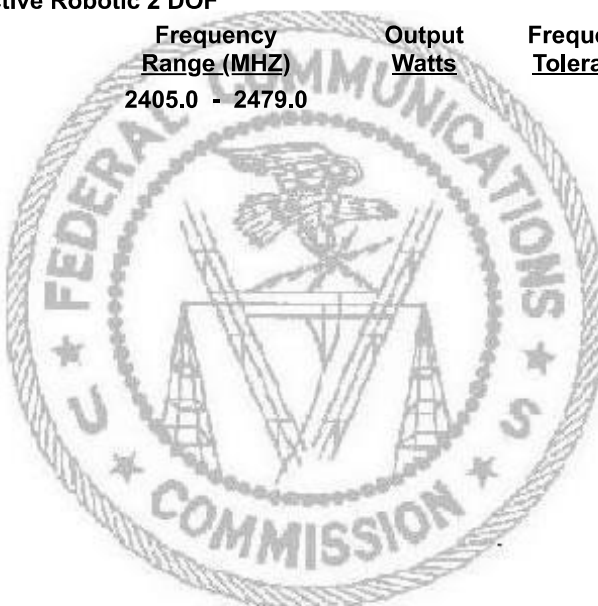


Technical Data Sheet & Fable Specification Documents

Appendix 5: Joint_JNT002 - FCC Grant

TCB**GRANT OF EQUIPMENT
AUTHORIZATION****TCB****Certification****Issued Under the Authority of the
Federal Communications Commission****By:****ACB, Inc.
6731 Whittier Avenue Suite C110
McLean, VA 22101****Date of Grant: 03/20/2018****Application Dated: 03/19/2018****Shape Robotics ApS
Linde Alle 29A
P.O. Box 2850,
Naerum, 2850
Denmark****Attention: Moises Pacheco , CTO****NOT TRANSFERABLE**

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is
VALID ONLY for the equipment identified hereon for use under the Commission's
Rules and Regulations listed below.

FCC IDENTIFIER: 2AOUEJNT002**Name of Grantee:** Shape Robotics ApS**Equipment Class:** Part 15 Low Power Communication Device
Transmitter**Notes:** Active Robotic 2 DOF**Grant Notes****FCC Rule Parts****15C****Frequency
Range (MHZ)
2405.0 - 2479.0****Output
Watts****Frequency
Tolerance****Emission
Designator**

Technical Data Sheet & Fable Specification Documents

Appendix 6: RoHS2 REACH letter_v2-JKK



RoHS2 and REACH compliance letter

Dear Valued Customers

Restriction of Hazardous Substances Directive (RoHS2)

The Restriction of Hazardous Substances Legislation (RoHS 2), European Directive 2011/65/EU, restricts the use of certain hazardous substances in electrical and electronic equipment (EEE).

The products supplied by ETK are components not defined as EEE and are therefore out of the scope of the regulations. However, it is recognized that knowledge of component parts is relevant and important to many of our customers and we can confirm that our product material formulations do not contain any of the restricted substances in concentrations and applications banned by the Directive.

Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)

ETK has reviewed its obligations under the Registration, Evaluation, Authorization and Restriction of Chemicals Legislation, European Directive 1907/2006, (REACH) legislation and considers that the following is a correct understanding of the company position.

ETK is not an importer or manufacturer of substances as defined in the regulations and therefore is not required to register any chemicals.

We are users of preparations, a preparation being a composition of two or more substances, and have made a list of the preparations that we use in the parts we supply to our customers.

We have contacted the suppliers of these preparations and requested that they inform us of their position with the REACH regulations.

The responses from our suppliers all show that they are aware of the REACH regulations and none of the substances listed on the Substances of Very High Concern (SVHC) list are present.

After consultation and investigations with our suppliers we have also been assured that all our future material supply chain will not be compromised in any way.

Please do not hesitate to contact me if there should be any further questions.

Best Regards

Jesper Krogh Knudsen.

Global Factory Manager

Technical Data Sheet & Fable Specification Documents

Appendix 7: Conflict Minerals letter_v2-JKK



Certificate of Non-use of Conflict Minerals

Dear Valued Customers

As required by the Conflict Minerals provisions under the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010, ETK continues to work proactively with all of our qualified suppliers to ensure that our products do not contain any Conflict Minerals that directly or indirectly finance or benefit armed groups in the Democratic Republic of the Congo (DRC) or an adjoining country.

Based on a Guarantee of Non-use of Conflict Minerals, and EICC Conflict Minerals Report Templates obtained from our material suppliers, ETK hereby declares that, to the best of our knowledge, our products do not contain any of the following Conflict Minerals or their derivatives: Gold (Au), Tantalum (Ta), Tungsten (W) and Tin (Sn). All products supplied have been designed and manufactured in compliance with the Electronic Industry Code of Conduct and ETK is committed to only source material from environmentally and socially responsible suppliers.

1. Guarantee of Non-Use of Conflict Minerals.
2. Requesting that our Suppliers report immediately if there are any Conflict Minerals or derivatives thereof used in supplied material.
3. Requesting that our Suppliers undertake commercially reasonable due diligence with their supply chain to assure that minerals used in supplied materials are not sourced from mines in conflict areas

Furthermore, we expect our Suppliers to conduct their worldwide operations in a manner that does not result in labor or human rights violations such as the direct financing of armed conflict in their roles as responsible corporate citizens.

Please do not hesitate to contact me if there should be any further questions.

Best Regards

Jesper Krogh Knudsen.
Global Factory Manager