



# *cPRO motor* User Guide

v1.1 | November, 2018

Software Release Package v1.1

# Imprint

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This USER GUIDE applies to the following product:

**K2.0015874 cPRO motor with Software Release Package v1.1**

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# Disclaimer

Before using the products described in this manual, be sure to read and understand all the respective instructions.

The cmotion Software Release Package v1.1 cPRO motor is only available to commercial customers. By utilization, the customer agrees that the cPRO motor or other components of the system are deployed for commercial use only. Otherwise the customer must contact cmotion before utilization.

While cmotion endeavors to enhance the quality, reliability and safety of their products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely.

To minimize the risk of damage to property or injury (including death) to persons arising from defects in the products, customers must incorporate sufficient safety measures in their work with the system and heed the stated canonic use.

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For product specification changes after this manual was published, refer to the latest published cmotion data sheets or release notes, etc., for the most up-to-date specifications. Not all products and/or types are available in every country. Please check with a cmotion sales representative for availability and additional information.

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# 1. For your safety

Before use, please ensure that all users comprehensively read, understand, and follow the instructions in this document.

## Risk levels and alert symbols

Safety warnings, safety alert symbols, and signal words in these instructions indicate different risk levels:

### **Danger!**

DANGER indicates an imminent hazardous situation which, if not avoided, will result in death or serious injury.

### **Warning!**

WARNING indicates a potentially hazardous situation which, if not avoided, may result in death or serious injury.

### **CAUTION!**

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### **NOTICE**

NOTICE explains practices not related to physical injury. No safety alert symbol appears with this signal word.

**Note:** Provides additional information to clarify or simplify a procedure.

## Vital precautions

### **Danger!**

#### **Risk of electric shock and fire!**

Short-circuits may entail lethal damage!

Before use, read and follow all valid instructions.

Use solely and exclusively as described in the instructions.

Never open. Never insert objects.

For operation, always use a power source as indicated in the instructions.

Always unplug the cable by gripping the plug, not the cable.

Never try to repair. All repair work should be done by a qualified cmotion Service Center.

Never remove or deactivate any safety equipment (incl. warning stickers or paintmarked screws).

Always protect from moisture, cold, heat, dirt, vibration, shock, or aggressive substances.

### **Danger!**

#### **Risk of fire!**

Short-circuits and back currents to power supplies/batteries may entail lethal damage!

Always use original ARRI/cmotion LBUS cables to external power sources (D-Tap, XLR)!

ARRI/cmotion LBUS cables to external power sources provide a protection circuit to prevent back currents to power supplies/batteries.

## 2. Audience and intended use

### NOTICE

The product is solely and exclusively available for commercial costumers and shall be used by skilled personnel only. Every user should be trained according to cmotion guidelines. Use the product only for the purpose described in this document. Always follow the valid instructions and system requirements for all equipment involved.

**Note:** The cPRO motor is solely and exclusively for use on professional camera setups.

## 3. Scope of delivery and warranty

### NOTICE

Product and packaging contain recyclable materials. Always store, ship, and dispose of according to local regulations.

cmotion is not liable for consequences from inadequate storage, shipment or disposal.

### Delivery

On delivery, please check that the package and content are intact. Never accept a damaged or incomplete delivery. A complete delivery includes:

- cPRO motor unit with antenna
- cforce mini clamp console 19/15mm
- cforce mini gear 0.8/40t
- User manual download card
- Original packaging

### Warranty

For scope of warranty, please ask your local cmotion Service Partner. cmotion is not liable for consequences from inadequate shipment, improper use, or third-party products.

# 4. Introduction



The cPRO motor is an intelligent lens motor with integrated red-coded cmotion radio module, eliminating the need for an additional receiver unit mounted on the camera.

The cPRO motor can pair with up to three cPRO hand units for split focus, iris and zoom operation (available with Software Release Package v2.0. / licence required for each hand unit) and provides full lens data when used with the cPRO hand unit.

The simple user interface includes two soft buttons and a display for setting the motor axis, triggering motor calibration and selecting one of the 14 radio channels.

Using the LBUS interface, the system can be expanded with up to two additional cforce motors while the new CAM connector provides a versatile interface for power supply and run/stop control for cameras, including ARRI, Red, Sony, Canon, Blackmagic and Panavision.

## Main features:

- Integrated cmotion red radio module

- Supports lens data with cPRO hand unit

- Daisy-chainable via LBUS

- Small and lightweight (~211g / <7 1/2 oz incl. gear, antenna and motor clamp)



## 4.1. LBUS connector

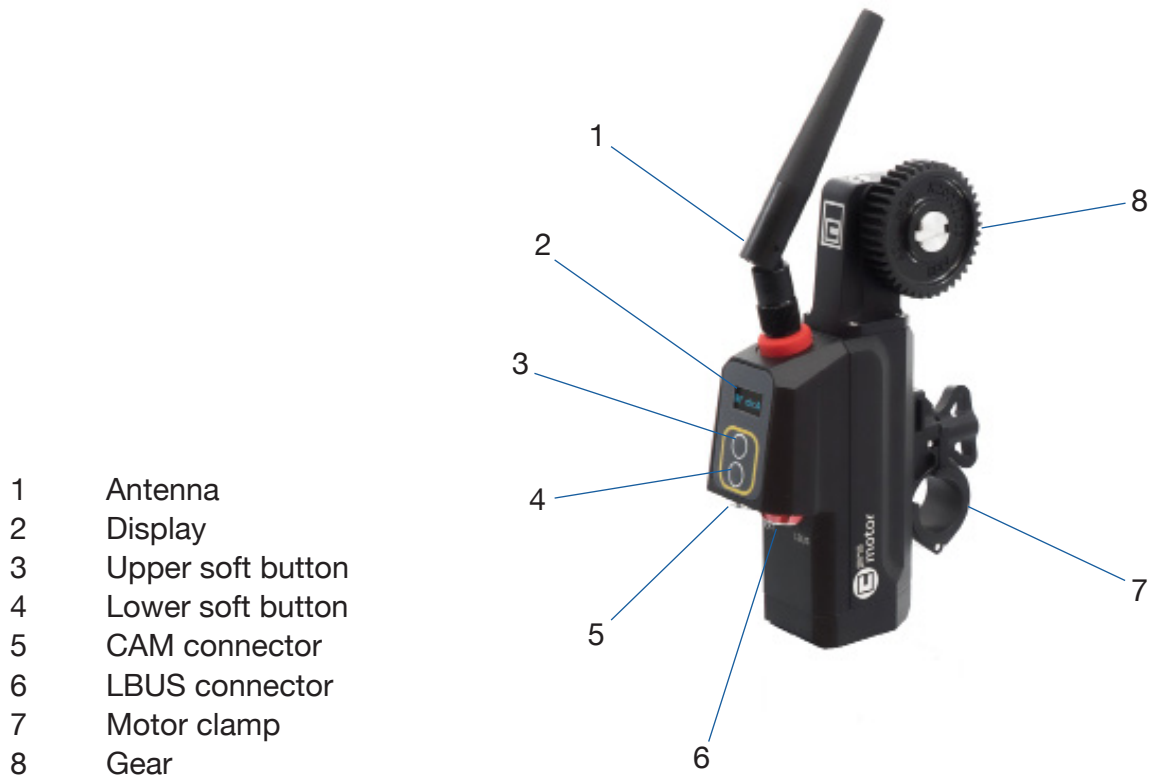
LBUS is a bus standard designed to allow multiple lens motors and control devices to communicate with each other. Up to three cforce-type motors can be chain-linked in a row. Each cforce motor has two identical, bi-directional LBUS interfaces providing power and control signals to the motor.

## 4.2. CAM interface

The CAM interface is a fully functional LBUS connector. As such it allows multiple lens motors and control devices to communicate with each other through K2.0015760 Cable CAM (7p) - LBUS.

In addition the CAM interface offers a versatile interface for camera control. There are camera interface cables, which depending on the camera offer start-stop control and record feedback, camera status, tally and control of camera settings (control of camera settings available with Software Release Package v2.0. / licence required).

## 5. Motor layout



## 5.1. Control panel

The cPRO motor features a user interface to configure the system. The display shows menu and status information.



### Soft buttons

Two soft buttons are located below the display. They change their function depending on the screen content.

### Menu navigation

Use the soft buttons to enter the setup menus as follows:

Buttons	Press button...	Menu
Upper button	Short	Motor axis (FIZ)
Upper button	Long (3 sec)	Calibration
Lower button	Short	RF channel
Lower button	Long (3 sec)	System info
Lower button	Long (6 sec)	Region settings

Note: The main screen turns off after 3 seconds.

## 5.2. Setup

### Motor assignment

Press the upper button “short” to assign the cPRO motor to focus, iris or zoom control. Make sure that the assignment matches the lens axis the motor is attached to.

### Motor calibration

Hold the upper button for three seconds to start the automatic calibration of the motor.

Press the upper button momentarily to interrupt the calibration process.

## Radio channels

The RF menu lets you switch the radio on and off and select the radio channel.

Press the lower button momentarily to enter the radio menu.

Toggle through the channels 0 - 13 until you reach the desired radio channel. The channel will be automatically set after three seconds.

Select radio channel OFF to use the cPRO motor as a regular, non-RF cforce motor.

## System info

Hold the lower button for three seconds to view the system info.

The system info shows the current firmware version.

## Region settings

The cPRO motor offers radio settings for different areas (with red-radio module EMIP400). Make sure that you select the proper area you are operating the device in.

All available region settings comply with Part 15 of the FCC rules.

Push the lower button for 6 seconds to enter the region settings menu. Push momentarily to toggle through the regions. Select World if your specific region is not listed.

Region Setting	Country code
Australia	AU
Canada	CA
China	CN
Egypt	EG
Europe	EU
Hong Kong	HK
India	IN
Japan	JP
New Zealand	NZ
Philippines	PH
Singapore	SG
South Africa	ZA
South Korea	SG
Taiwan	TW
Thailand	TH
UAE (United Arab Emirates)	AE
USA	US
World	WORLD

## Status LEDs

The status LED of the upper button indicates the current motor status, while the status LED of the lower button indicates the current radio status.

<b>LED (Upper button)</b>	<b>Status</b>
Solid green	Motor is ready and calibrated, no warnings
Green flashing	Motor is in passive mode
Green/red flashing	No motor master available (idle)
Yellow flashing	Motor is currently calibrating
Green/yellow flashing	Motor needs to be calibrated (calibration request)
Solid yellow	Motor is in calibration timeout state
Solid red	Motor power supply is below 10V
<b>LED (Lower button)</b>	<b>Status</b>
Solid green	Ready, client logged on
Yellow/red flashing	Selected channel used by another device
Green/red flashing	No device connected, wireless or hardwired
Solid red	Motor initializing / hardware fault
Red flashing	Update

# 6. cPRO motor preparation

## 6.1. Mounting the cPRO motor

### Mounting to 19 mm rods

1. Open the clamp console by turning the thumbscrew counter-clockwise.
2. Remove the 19/15mm clamp insert.
3. Attach the clamp console on the rod, with the motor gear engaged to the lens barrel.
4. Close the clamp console by turning the thumbscrew clockwise.

### Mounting to 15 mm rods

1. Open the clamp console by turning the thumbscrew counter-clockwise.
2. Attach the 19/15mm clamp insert (K2.0006175) on the 15 mm rod.
3. Attach the clamp console around the clamp insert on the rod, with the motor gear at the respective lens barrel.
4. Close the clamp console by turning the thumbscrew clockwise.

Note: For high torque applications use CLM-4 Clamp insert (K2.0002080, not included)

### Mounting to Panavision rods

1. Open the clamp console by turning the thumbscrew counter-clockwise.
2. Remove the 19/15mm clamp insert.
3. Attach the CLM-4 Clamp Insert 5/8" (K2.72115.0, not included) to the 5/8" rod.
4. Attach the clamp console around the clamp insert on the rod, with the motor gear at the respective lens barrel.
5. Close the clamp console by turning the thumbscrew clockwise.

## 6.2. Setting up the cPRO motor

1. Press the lower button for six seconds to select the region you are in. Repeat this step each time you change a region.
2. Use the upper button to assign the cPRO motor to focus, iris or zoom control of the control device. Make sure that the assignment matches the lens axis the motor is attached to.
3. Press the lower button short to select the radio channel.
4. Press the upper button for three seconds to start the automatic calibration of the respective motor. Alternatively, activate the calibration process through the cPRO hand unit (please refer to the user manual of the cPRO hand unit).

## 6.3. Connecting to the cPRO hand unit

1. Set the cPRO hand unit to the same radio channel as the cPRO motor (please refer to the user manual of the cPRO hand unit). Once both units are set to the same radio channel, the two devices will connect automatically.

2. If multiple hand units are used, please set all cPRO hand units you want to connect to the network to the same radio channel as the cPRO motor (please refer to the user manual of the cPRO hand unit). Once a hand unit is set to the same radio channel like the cPRO motor, the device will connect automatically. Upto 3 cPRO hand units can be connected to the cPRO motor at a time (available with Software Release Package v2.0. / licence required for each hand unit).

You are now ready to shoot.

### CAUTION!



Risk of injury! Do not touch the motor gear while motor is powered up!

This device is not intended for use by children. Keep body parts out of the motion path.

Disconnect the plug if the device is not used for a long period of time.

IEC 60417-6056 (2011-05) for other moving parts

### NOTICE

To prevent the cPRO motor from falling down when detaching the motor from the lens, hold the cPRO motor unit with one hand while opening the clamp console.

# 7. Compatibility

The cPRO motor is directly compatible with the following cmotion / ARRI products:

- cPRO hand unit
- cforce mini lens motor
- cforce plus lens motor
- cdistance
- cfinder III
- steady zoom / pan-bar zoom
- UDM-1 (Ultrasonic Distance Measure) via LCUBE CUB-1
- Master Grips

Note: Run/Stop control is supported for all standard digital cameras (ARRI, BLACKMAGIC, CANON, RED, SONY, PANAVISION) using additional CAM interface cables.

# 8. Software update

The cPRO motor can be updated from the cPRO hand unit via USB through its LBUS interface.

To keep your cPRO motor up-to-date, you may need to update its firmware. Please check cmotion's website for the latest firmware packages.

Please refer to the user manual of the cPRO hand unit for further information.

## **Warning!**

Do not switch power off during the update as this may damage the cPRO motor!

# 9. Power disconnection

## **CAUTION!**

To disconnect the device safely from the power source, remove both cable connectors from the cPRO motor's LBUS and CAM ports.

Mount and operate the device in an orientation to ensure easy access to the connectors.

# 10. Appendix

## 10.1. Antenna connector

The radio connection is established via the antenna, connected to the antenna connector. We recommend using the originally supplied antenna only.

### Warning!

Please ensure the antenna connector is covered by the antenna or the safety cap at any time. The radio module inside the cPRO motor could be damaged by electrostatic discharge, if the connector is left open.

## 10.2. Specifications

### Electrical data

Temperature range:	-20 to +50° C (-4 to +122° F)
Torque:	0.25 Nm (0.3 Nm peak)
Speed:	240 teeth/s (6 R/s) (all with gear m0.8, 40t)
Supply voltage:	10.5 - 34 V
Power consumption:	max. 2 - 6 A

### Radio system

The cPRO motor contains a radio unit that enables wireless lens control with a red coded radio module. A red ring at the base of the antenna mount identifies it. It offers 14 channels to choose from:

Channel	Frequency
0	2.410 GHz
1	2.415 GHz
2	2.430 GHz
3	2.435 GHz
4	2.450 GHz
5	2.455 GHz
6	2.470 GHz
7	2.475 GHz
8	2.420 GHz
9	2.425 GHz
10	2.440 GHz

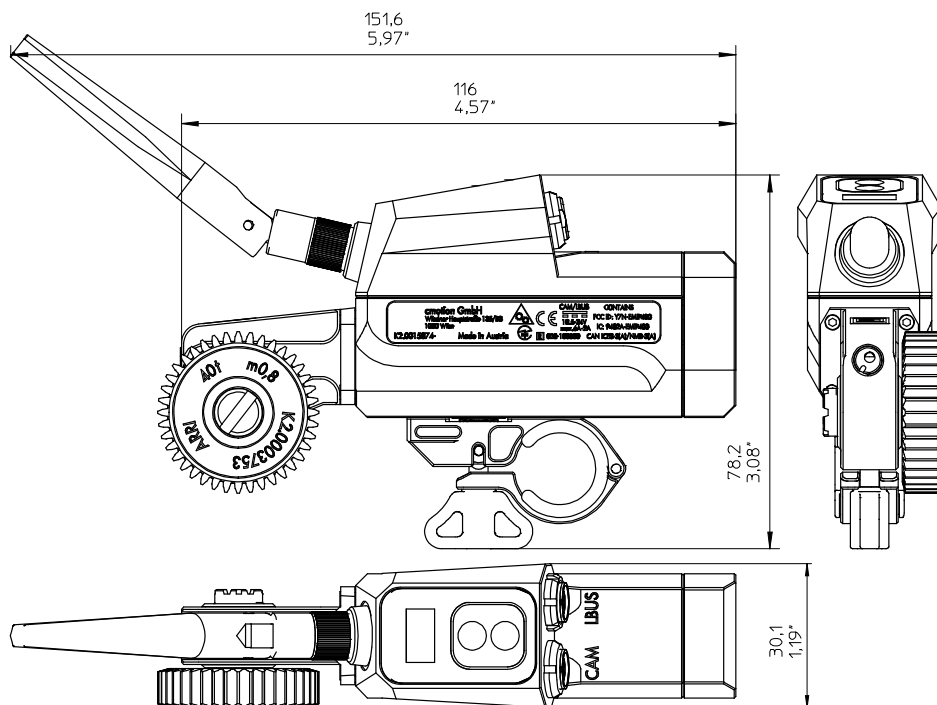


Channel	Frequency
11	2.445 GHz
12	2.460 GHz
13	2.465 GHz

NOTE: cmotion red radio and ARRI white radio cannot be mixed in the same radio network of camera and hand units. It is possible to use both systems in parallel within different radio networks.

## 10.3. Dimensions and weight

### Dimensions



### Weight

Weight of cPRO motor: 211g/<7 1/2 oz

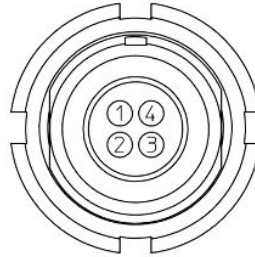
(including cPRO motor unit, cforce mini gear m0.8, 40t and cforce mini clamp console 19/15mm)

## 10.4. Pinouts

The cPRO motor contains one LBUS connector (Lemo 4 pin) and one CAM connector (Lemo 7 pin).

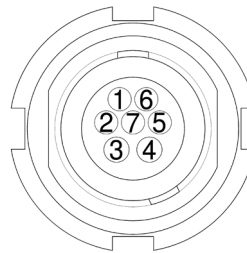
### LBUS connector

- 1 GND
- 2 CAN-L
- 3 V-BAT
- 4 CAN-H



### CAM connector

- 1 CAM If1 (CAN RS232 RX)
- 2 CAM If2 (CAN1-L)
- 3 GND
- 4 +V-Bat
- 5 CAM If3 (CAN RS232 TX)
- 6 CAM If4 (CAN1-H)
- 7 Cable ID



# 10.5. Part numbers

## K2.0015874 cPRO motor basic set

The cPRO motor basic set includes:

cPRO motor unit

K2.0001996 swivel antenna for SMC-1, EMC-1, AMC-1, cPRO hand unit / motor / camin

K2.0006176 cforce mini clamp console 19/15mm (including: K2.0006175 cforce mini clamp insert 19/15mm)

K2.0003753 cforce mini gear m0.8, 40t

### NOTICE

The cPRO motor basic set does not include an LBUS or CAM cable. LBUS cables are available in various lengths and need to be ordered separately.

## Gears for cforce mini / cPRO motor

K2.0006363 cforce mini gear m0.6, 56t (Fujinon ENG focus/ zoom)

K2.0006365 cforce mini gear m0.5, 64t (Canon ENG focus/ zoom)

K2.0006367 cforce mini gear m0.4/64p, 80t (Pan. iris, Fujinon ENG iris, Canon ENG iris)

K2.0006370 cforce mini gear 48p, 60t (Panavision zoom)

K2.0006372 cforce mini gear m0.8, 40t, 25mm

## Part numbers - antennas

Radiall/Larsen K2.0002007 Dipole / Reverse SMA

Wanshih 50.0013627 Dipole / Reverse SMA

Proant K2.0001996 Dipole / Reverse SMA

Nearson O5.20112.0 Dipole / Reverse SMA

The following accessories are compatible with the cPRO motor:

K2.0001996 swivel antenna for SMC-1, EMC-1, AMC-1, cPRO hand unit / motor / camin

K2.0002007 Outdoor Antenna (straight) for UMC-4 Motor Controller

## Camera interface cables:

K2.0015754 Cable CAM (7p) - RS

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to RS connector.

Provides power, camera RUN/STOP and tally function on ARRI WCU-4 / cmotion cPRO hand unit. Works with ALEXA and AMIRA cameras.

K2.0015755 Cable CAM (7p) - EXT (16p)

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to the EXT connector of an ALEXA EV camera.

Provides camera RUN/STOP function, tally and camera status information on ARRI WCU-4 / cmotion cPRO hand unit.

K2.0015756 Cable CAM (7p) - EXT (6p)

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to AMIRA EXT connector.

Provides camera RUN/STOP function, tally, camera status information and remote camera set up with ALEXA Remote Licence on ARRI WCU-4 / cmotion cPRO hand unit.

K2.0015757 Cable CAM (7p) - LANC/D-Tap

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to LANC connectors (e.g. Canon C300 / C500) and D-Tap power source.

Provides camera RUN/STOP function and tally on ARRI WCU-4 / cmotion cPRO hand unit.

K2.0015758 Cable CAM (7p) - RED CTRL/D-Tap

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to RED CTRL connector on RED Epic DSMC-2 and RED Weapon cameras and D-Tap power source.

Provides camera RUN/STOP function, tally, camera status information and control of EF lenses on ARRI WCU-4 / cmotion cPRO hand unit.

K2.0015759 Cable CAM (7p) - ENG (12p)

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to the AMIRA/ALEXA Mini or 3rd-party cameras Lens connector.

Provides camera RUN/STOP function, tally and camera status information on ARRI WCU-4 / cmotion cPRO hand unit.

K2.0018814 Cable CAM (7p) - Sony F5/55 CTRL/D-Tap

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to Sony F5/F55/Venice cameras and D-Tap power source.

Provides camera RUN/STOP function and tally.

K2.0015760 Cable CAM (7p) - LBUS

Connects ARRI cforce RF motor / cmotion cPRO motor and camin to LBUS devices or LBUS power source.

Provides power to LBUS daisy chain or LBUS device features on ARRI WCU-4 / cmotion cPRO hand unit.

**Note:** REQUIRED for cPRO motor / camin firmware update.

**Power cables:**

K2.0018813 Cable CAM (7p) - D-Tap

Connects ARRI cforce RF motor / cmotion cPRO motor and camin CAM connector to D-Tap power source.

K2.0006758 Cable LPS-7

Connects ARRI cforce RF motor / cmotion cPRO motor and camin LBUS connector to D-Tap power source.

## 10.6. Service contacts

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# 10.7. International declarations

## EU-Declaration of Conformity

The designated product conforms with the specifications of the following European directives:

Directive 2014/53/EU of the European Parliament and the Council of 16 April 2014 on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment and repealing Directive - OJ L 153, 22.5.2014, S. 62–106.

Directive 2011/65/EU of the European Parliament and the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment - OJ L 174, 1.7.2011, S. 88–110.

The compliance with the requirements of the European Directives was proved by the application of the following standards:

EN 62368-1:2014 + AC:2015-05 + AC:2015-11

EN 301 489-1 V2.1.1; EN 301 489-17 V3.1.1

EN 300 328 V2.1.1

EN 50581:2012

To evaluate the respective information we used:

[http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/index\\_en.htm](http://ec.europa.eu/growth/single-market/european-standards/harmonised-standards/index_en.htm)



## FCC Class A Statement

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

## Industry Canada Compliance Statement

Complies with the Canadian ICES-003 Class A specifications.

Cet appareil numérique de la Classe A est conforme à la norme NMB-003 du Canada. This device complies with RSS 210 of Industry Canada. Cet appareil est conforme à CNR-210 d'Industrie Canada. This Class A device meets all the requirements of the Canadian interference-causing equipment regulations. Cet appareil numérique de la Classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

## Japan MIC Statement

Complies with Ministry of Internal Affairs and Communications notification Article 88, Annex 43.



### Radio Module

The cPRO motor contains the following radio module:

FCC ID: Y7N-EMIP400

IC ID: 9482A-EMIP400

CMIT ID: 2017DJ7863C(M)

MIC ID: 020-180030

NCC: CCAH18LP0660T0

KC: R-CRM-ARg-EMIP400

EMIP400s: ETA:1385/2018/ERLO