cforce mini RF
Software Update Package 1.2

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Imprint

Copyright

For further assistance

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Scope

This USER MANUAL applies to the following product:

K2.0016802 cforce mini RF with Software Update Package 1.2

Document revision history

Version	ID	Order #	Release	Date
1.0	10002881	K5.0016851	F06617	03.05.2018
1.1	10002881	K5.0016851	W01412	25.09.2018
2.0	10002881	K5.0016851	W01453	14.12.2018

Disclaimer

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

The ARRI Software Update Package 1.2 cforce mini RF is/are only available to commercial customers. By utilization, the customer agrees that the cforce mini RF or other components of the system are deployed for commercial use only. Otherwise the customer must contact ARRI before utilization.

While ARRI 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.

ARRI or its subsidiaries do not assume any responsibility for losses incurred due to improper handling or configuration of the cforce mini RF or other system components.

ARRI assumes no responsibility for any errors that may appear in this document. The information is subject to change without notice.

For product specification changes after this manual was published, refer to the latest published ARRI 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 an ARRI sales representative for availability and additional information.

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In the event that one or all of the foregoing clauses are not allowed by applicable law, the fullest extent permissible clauses by applicable law are validated.

Contents

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 ARRI 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 ARRI guidelines. Use the product only for the purpose described in this document. Always follow the valid instructions and system requirements for all equipment involved.

The cforce mini RF 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. ARRI 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:

- cforce mini RF motor unit with antenna

- cforce mini clamp console 19/15mm

- cforce mini gear 0.8/40t

- User manual

- Original packaging

Warranty

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

4 Introduction

ARRI and cmotion have partnered up to develop the new intelligent cforce mini RF motor.

The ARRI cforce mini RF is an intelligent lens motor with integrated white-coded ARRI radio module, eliminating the need for an additional receiver unit mounted on the camera.

The cforce mini RF can pair with up to three hand units for split focus, iris and zoom operation and provides full lens data when used with the WCU-4 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 and Blackmagic.

Main features

- Integrated white radio module

- Supports lens data with WCU-4 hand unit

- Daisy-chainable via LBUS

- Small and lightweight (~186g/6.56oz incl. gear and antenna)

- Compatible with all hand units containing ARRI's white-coded radio module

4.1   LBUS

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.

5   Motor layout

1	Antenna
2	Gear
3	Display
4	Upper soft button
5	Lower soft button
6	CAM connector
7	LBUS connector

5.1   Control panel

The cforce mini RF 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 behavior depending on the screen content.

Menu navigation

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

Menu	Buttons	Press button...
Motor axis (FIZ)	Upper button	short
Motor calibration	Upper button	long (3 sec)
Flip screen	Upper button	short (in menu "System info")
Region settings	Lower button	6 sec
RF channel	Lower button	short
System info	Lower button	long (3 sec)

Note: Main screen turns off after 3 seconds.

5.2   Setup

Motor assignment

Push the upper button short to assign 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.

System info

Hold the lower button for three seconds to view the system info. The *System info* shows the current firmware version.

Region settings

RF offers radio settings for different areas (with white-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* your specific region is not listed.

NOTICE

If the master device (camera) is also equipped with a radio module which is able to set regions, turn off the radio module from the cforce mini RF motor.

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	KR
Taiwan	TW
Thailand	TH
UAE (United Arab Emirates)	AE
USA	US
World	WORLD

Radio channel

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 until you reach the desired Radio channel.

The channel will be automatically set after three seconds.

RF (Radio)	Note
OFF	Radio=OFF / Motor controller = ON
0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Client	Radio = OFF / Motor Controller = OFF Motor behaves like a normal cforce motor without a radio module.

5.3   Status LEDs

The status LED of the upper button indicates the current motor status:

LED (Upper button)	Status
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

The status LED of the lower button indicates the current radio status:

LED (Lower button)	Status
Solid green	Radio ready, client logged on
Yellow/red flashing	Selected channel used by another master device
Solid red	Motor initializing / hardware fault
Red flashing	Update

6 Motor preparation

Mounting to 19 mm rods

1. Open the clamp console by turning the thumbscrew counterclockwise.

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 counterclockwise.

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 counterclockwise.

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.

Setting up 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 cforce motor to the 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 control device.

Connecting to hand unit

1. Set the hand unit to the same radio channel as the cforce mini RF (refer
    to user manual of the hand unit).

2. Set the motor side, torque and direction (refer to user manual of the
    hand unit).

You are now ready to shoot.

⚠ **CAUTION!**

Risk of injury! Do not touch 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 longer period of time.

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

NOTICE

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

7   Compatibility

The cforce mini RF is directly compatible with the following ARRI products:

- cforce mini lens motor

- cforce plus lens motor

- UDM-1 (Ultrasonic Distance Measure) via LCUBE CUB-1

- Master Grips

- Operator Control Unit OCU-1

- Wireless Compact Unit WCU-4

- Single Axis Unit SXU-1

For compatibility with cmotion products please contact cmotion directly.

7.1   Sample configurations

cforce mini RF lens motors can be used in different applications, within ARRI systems. The following configurations are samples, making no claim to be exhaustive:

- cforce mini RF with WCU-4 and up to two additional cforce motors

- cforce mini RF with WCU-4 and up to two additional cforce motors and OCU-1 (Note: cforce mini RF supports OCU-1 override function with SUP 2.0)

- cforce mini RF with SXU-1

- cforce mini RF with WCU-4 and up to two additional cforce motors and LCUBE CUB-1 for UDM-1

- cforce mini RF with SXU-1 and LCUBE CUB-1 for UDM-1

- cforce mini RF with WCU-4 and up to two additional cforce motors and cmotion cfinder III

- cforce mini RF with SXU-1 and cmotion cfinder III

- cforce mini RF with WCU-4 and up to two additional cforce motors and Master Grips

- cforce mini RF with WCU-4 and up to two additional cforce motors and Master Grips (Note: cforce mini RF supports Master Grips override function with SUP 2.0)

ARRI ALEXA Mini

ARRI AMIRA

ARRI ALEXA EV

3rd Party Camera

WCU-4

SXU-1

OCU-1

cforce mini RF

2x cforce mini/plus

Master Grips

NOTICE

When using the cforce mini RF with ALEXA Mini, switch the motor to client mode in its Radio menu.

8 Software update

The cforce mini RF motor can be updated from external devices through its LBUS interface.

To keep your cforce mini RF up-to-date, you may need to update its firmware. Please check ARRI's website for the latest firmware packages.

The following device provide update functionalities for cforce mini RF:

● Wireless Compact Unit WCU-4

Please refer to the respective user manuals for further information.

⚠ WARNING!
Do not switch off power during the update as this may damage the cforce mini RF!

9   Power disconnection

> ⚠ **CAUTION!**
>
> To disconnect the device safely from the power source, pull the plugs.
>
> Mount and operate the device in an orientation that guarantees easy accessible plugs.

10 Appendix

10.1   Antenna connector

The radio connection is established via the antenna mounted to the antenna connector. The radio module inside could be damaged by electrostatic discharge via the open connector. We recommend using the originally supplied antenna only.

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 cforce mini RF motor contains a radio unit that enables wireless lens control with a white coded radio module. A white 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
11	2.445 GHz
12	2.460 GHz
13	2.465 GHz

White radio and legacy yellow 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.

N O T I C E

ARRIs white radio and cmotions red radio are not compatible.

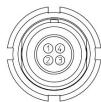# 10.3 Dimensions and weight

Dimensions
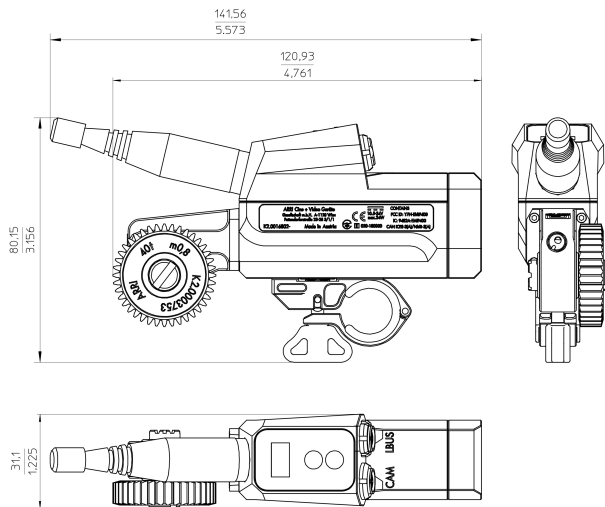
Weight

Weight of cforce mini RF: 153g/5,4oz

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

10.4   Pinouts
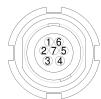
The cforce mini motor contains one LBUS connector (Lemo 4 pin) and one
CAM connector (Lemo 7 pin).

LBUS connector

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

CAM connector

1	CAM lf1 (CAN RS232 RX)
2	CAM lf2 (CAN1-L)
3	GND
4	+V-Bat
5	CAM lf3 (CAN RS232 TX)
6	CAM lf4 (CAN1-H)
7	Cable ID

10.5   Part numbers

cforce mini RF Basic Set

KK.0016804   cforce mini RF (Basic Set)

The cforce mini RF Basic Set includes:

K2.0016802   cforce mini RF motor unit

K2.0006176   cforce mini clamp console 19/15mm

K2.0006175   cforce mini clamp insert 19/15mm

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

 K2.0002007 Outdoor Antenna (straight)

NOTICE

The cforce mini RF Basic Set does not include any LBUS or CAM cables.
LBUS cables are available in various lengths and need to be ordered
separately.

Gears for cforce mini and cforce mini RF

 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 of compatible 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

Cables and Accessories

The following accessories are compatible with the cforce mini RF:

K2.0015754	Cable CAM (7p) - RS
K2.0015755	Cable CAM (7p) - EXT (16p)
K2.0015756	Cable CAM (7p) - EXT (6p)
K2.0015757	Cable CAM (7p) - LANC/D-Tap
K2.0015758	Cable CAM (7p) - RED CTRL/D-Tap
K2.0015759	Cable CAM (7p) - ENG (12p)
K2.0015760	Cable CAM (7p) - LBUS
K2.0018814	Cable CAM (7p) - Sony F5/55 CTRL/D-Tap
K2.0018813	Cable CAM (7p) - D-Tap
K2.0001996	Swivel antenna for SMC-1 and EMC-1 Motor Controllers

10.6 Service contacts

Munich, Germany
Arnold & Richter Cine Technik
+49 89 3809 2121
service@arri.de
Business hours:
Mo. - Fr. 9:00 - 17:00 (CET)

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Mo. - Fr. 8:00 - 18:00 (AEST)

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

CE

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 Réglement 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 cforce mini RF 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

10.7.1   Certifications

ARNOLD & RICHTER CINE TECHNIK GMBH & CO.
BETRIEBS KG,TUERKENSTRASSE 89
D-80799 MUENCHEN

cforce mini RF

K2.0016802

CAN ICES-3(A)/NMB-3(A)

CONTAINS FCC ID: Y7N-EMIP400
CONTAINS IC: 9482A-EMIP400

R-CRM-ARg-EMIP400
R-REM-ARg-cforce-mini-RF

Complies with
IMDA Standards
DA103787

CE

CAM/LBUS
10.5-34V
max.6A-2A

R 020-180030

TRA
REGISTERED No:
ER65094/18

DEALER No:
DA68290/17

TA-2018/1489
APPROVED

CONTAINS
CCAH18LP0660T0

R-NZ

CMIIT ID: 2018DJ4788

Manufacturer: ARRI Cine & Video Geräte Ges.m.b.H
POTTENDORFERSTRASSE 23-25 3/1/1
A-1120 WIEN
Country of Origin: Austria

Made in Austria