

cforce mini Lens Motor

Software Update Package 2.0

USER MANUAL

August 2023



Imprint

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Scope

This USER MANUAL applies to the following product:

K2.0006355 cforce mini Lens Motor with Software Update Packet SUP 1.3.4

Revision history

Version	ID	Order #	Release	Date
1.0	10001106	K5.0007312	F05851	29.05.2015
2.0	10001106	K5.0007312	W01106	22.03.2016
3.0	10001106	K5.0007312	W01463	14.04.2021
4.0	10001106	K5.0007312	W01921	01.08.2023

Disclaimer

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

The ARRI cforce mini Manual 2.7.2 is/are only available to commercial customers. By utilization, the customer agrees that the cforce mini Manual 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 Manual 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.

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1 For Your Safety

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

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 paint marked 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

ADVICE

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 Lens Motor is solely and exclusively for use on professional camera setups.

3 Scope of Delivery and Warranty

ADVICE

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 Motor Unit
- cforce mini Clamp Console 2 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 motor.

The small and lightweight lens motor moves lenses on weight-optimized camera setups with remarkable speed and torque. Equipped with twin LBUS connectors and using daisy chain technology, up to three cforce mini motors can be linked up in a row.

The cforce mini connects directly to the new ALEXA Mini LF camera and ALEXA Mini camera, providing a super lightweight, integrated solution, as well as to ARRI's new AMC-1 and UMC-4 motor controllers for camera-independent setups.

The cforce mini is fully compatible with all cmotion LBUS compatible devices such as the compact LCS and the cvolution system, the new pan-bar zoom, the knob solo and ENG adapters.

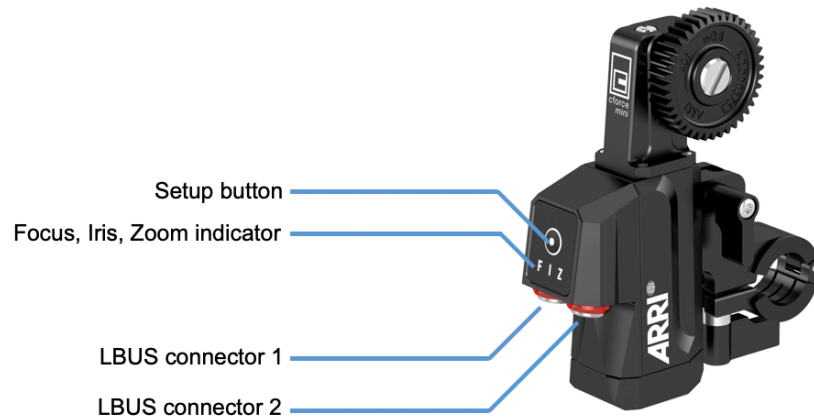
Main features

- Super small and lightweight
- Daisy-chainable via LBUS
- Directly compatible with ARRI's ALEXA Mini camera, ALEXA Mini LF camera, AMC-1 and UMC-4 motor controllers, cmotion's compact LCS, cvolution and broadcast solutions

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



5.1 Setup button

Motor assignment

Use the SETUP button to assign the cforce mini motor to the focus, iris or zoom control of the respective control device. Make sure that the assignment matches the lens scale the motor is attached to.

Press the SETUP button momentarily to indicate the current motor assignment. The F (Focus), I (Iris) or Z (Zoom) indicator underneath the SETUP button will light up for three seconds.

Press the SETUP button momentarily again to change the current motor assignment. Toggle through until you reach the desired setting.

Motor calibration

Press the SETUP button for three seconds to start the automatic calibration of the respective motor.

Press the SETUP button momentarily during calibration to interrupt the calibration process.

5.2 Status LED

The status LED of the SETUP button indicates the current motor status.

LED	Status
Solid green	Motor is ready and calibrated, no warnings
Green/red flashing	Motor is calibrated, but 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
Red flashing	No LBUS data is available
Green flashing	Motor is in passive mode

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 (K2.0038503).
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 (K2.0038503) 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.

Mounting to Panavision rods

1. Open the clamp console by turning the thumbscrew counterclockwise.
2. Remove the 19/15mm clamp insert.
3. Attach the cforce mini clamp insert 5/8" (K2.0038504, 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. Connect the motor to its control device.
2. Use the SETUP 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 scale the motor is attached to.
3. Set the motor side/direction on the control device.
4. Set the motor torque on the control device.
5. Press the SETUP button for three seconds to start the automatic calibration of the respective motor. Alternatively, activate the calibration process through the control device.

⚠ 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

ATTENTION

The motor shall only be used for smooth-runing lenses, otherwise the gear-box could get damaged.

ADVICE

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 Encoder Mode

The cforce mini motor now features an encoder mode. This mode allows the lens axis held by a lens motor to be rotated manually, by hand, while still allowing lens data from custom lens files to be recorded and displayed.

Setup:

1. Attach the motor as usual and connect it to the LBUS daisy chain
2. Load a Lens File
3. Calibrate Motor
 - Calibrate > all via Hi-5¹
 - Calibrate > all via ARRI ALEXA cameras
 - Calibrate > all via RIA-1
 - Calibrate on motor directly by pressing & holding the motor button until the motor starts calibrating
4. Make sure the motor is not controlled by any control device. e.g. deactivate the corresponding axis in the Hi-5

The motor LED will flash red / green if everything is set up properly, indicating that the motor is calibrated, but not assigned to a control axis on a hand unit.

The motor LED will turn solid blue as soon as the lens axis is rotated manually – indicating an active encoder mode.

¹ Calibrate > all via the Hi-5 will only calibrate motors which are currently controlled by a hand unit on ALEXA Mini LF and older cameras. To calibrate a lens motor in Encoder Mode, use one of the other methods to calibrate the motor or activate the corresponding axis in the Hi-5 for calibrating.

8 Compatibility

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

- ALEXA Mini LF (with LPL lens mount with LBUS connector)
- ALEXA Mini camera (with Titanium PL LDS mount with LBUS connector)
- Active Motor Controller AMC-1
- Universal Motor Controller UMC-4 in hard-wired mode
- Wireless Compact Unit WCU-4 in hard-wired mode (from WCU-4 SUP 2.2) in combination with a motor controller, an ALEXA Mini LF or an ALEXA Mini camera

The cforce mini Lens Motor is directly compatible with the following cmotion products:

- cPRO, cPRO One, cPRO Plus hand unit
- cPRO camin
- cvolution camin 3M
- broadcast camin
- compact camin
- pan-bar zoom
- knob solo
- ENG adapter
- cworld

8.1 Sample configurations

cforce mini Lens Motors can be used in different applications, within ARRI or cmotion systems. The following configurations are samples, making no claim to be exhaustive.



ADVICE

- If UMC-4 is used for controlling motors, an additional power cable is required ([See "LBUS cables", Page 18](#)).
- If motor is used with ALEXA Mini or ALEXA Mini LF an additional power cable is required.
- For hard-wired motor control with WCU-4, use an additional motor controller connected in the LBUS chain.





Operator Control Unit
OCU-1



Master Grips

LBUS cable
for hardwired operation



LBUS cable

LBUS cable

CBUS to
LBUS cable
for hardwired operation



LBUS power cable
to external power source

cmotion pan-bar zoom



cmotion compact LCS
hand unit



cmotion ENG-adapter



cmotion knob solo



LBUS cable
for hardwired operation



LBUS cable

LBUS cable

CBUS to
LBUS cable
for hardwired operation



LBUS power cable
to external power source

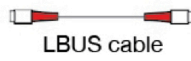
cmotion evolution camin 3M



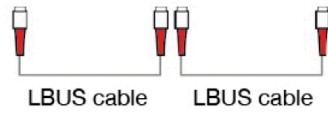
cmotion broadcast camin



cmotion compact LCS camin



LBUS cable



LBUS cable

LBUS cable

9 Software update

The cforce mini Lens Motor can be updated from external devices through its LBUS interface.

The following devices provide update functionalities for cforce mini Lens Motor:

- ARRI Wireless Compact Unit WCU-4
- ARRI Active Motor Controller AMC-1
- ARRI Universal Motor Controller UMC-4
- cmotion cPRO hand unit
- cmotion cPRO One hand unit
- cmotion cPRO Plus hand unit
- cmotion compact hand unit
- cmotion cworld

Please refer to the respective user manuals for further information.

WARNING

Do not switch off power and do not remove the SD/Micro SD card during the update as this may damage the cforce mini Lens Motor!

10 Appendix

10.1 Part Numbers

cforce mini Basic Set 2

KK.0040344 cforce mini Basic Set 2

The cforce mini Basic Set 2 includes:

K2.0006354 cforce mini Motor Unit

K2.0036610 cforce mini Clamp Console 2 19/15mm

K2.0038503 cforce mini Clamp Insert 2 15mm (included in K2.0036610)

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

ADVICE

The cforce mini Basic Set 2 does not include an LBUS cable. LBUS cables are available in various lengths and need to be ordered separately.

LBUS cables

K2.0006749	Cable LBUS 0,2 m/8" LCB-3
K2.0006750	Cable LBUS 0,3 m/1 ft LCB-4
K2.0006751	Cable LBUS 0,5 m/1.6 ft LCB-A
K2.0006752	Cable LBUS 0,8 m/2.6 ft LCB-1
K2.0006753	Cable LBUS 1,5 m/5 ft LCB-5
K2.0006754	Cable LBUS 3 m/10 ft LCB-1-01
K2.0006755	Cable LBUS 6 m/20 ft LCB-2
K2.0006756	Cable LBUS 15 m/49 ft LCB-1-15
K2.0007318	Cable LBUS to LCS 0,8 m/2.6 ft
K2.0006757	Cable LBUS to D-Tap 1,2 m/4 ft LPS-7-01
K2.0006758	Cable LBUS to D-Tap 0,8 m/2.6 ft LPS-7
K2.0006759	Cable LBUS to RS 0,8 m/2.6 ft LPS-1
K2.0006760	Cable LBUS to XLR-4 0,8 m/2.6 ft LPS-6
K2.0012630	Cable LBUS (2x angled), 0,8 m/2.6 ft
K2.0013042	Cable LBUS (angled, straight), 0,35 m/1.15 ft
K2.0013041	Cable LBUS (angled, straight), 1 m/3.3 ft
K2.0013040	Cable LBUS (2x angled), 0,6 m/2 ft
K2.0013043	Cable LBUS (angled, straight), 0,8 m/2.6 ft

K2.0013044	Cable LBUS (angled) to LCS 0,8 m/2.6 ft
K2.0012785	Cable LBUS (2x angled), 0,2 m/8"
K2.0009643	Cable AMIRA/ALEXA MINI EXT to LBUS (straight) 0,8 m/2.6 ft
K2.0012628	Cable AMIRA/ALEXA MINI EXT to LBUS (angled) 0,8 m/2.6 ft

⚠ 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.

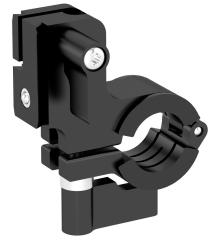
Gears for cforce mini

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 (25mm wide)

Accessories for cforce mini

K2.0036610

cforce mini Clamp Console 2 19/15mm



K2.0038503

cforce mini Clamp Insert 2 19/15mm



K2.0038504

cforce mini Clamp Insert 2 5/8in

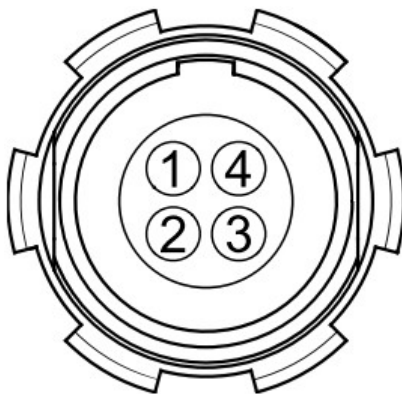


10.2 Specifications

Temperature range:	-20 to +50° C (-4 to +122° F)
Torque:	0,3 Nm const., 0.5 Nm peak at motor axis
Speed:	170 teeth per second with gear 40t (4,25 R/s)
Supply voltage:	12 - 34 V
Power consumption:	max. 20 W peak

10.3 Pinouts

LBUS connector

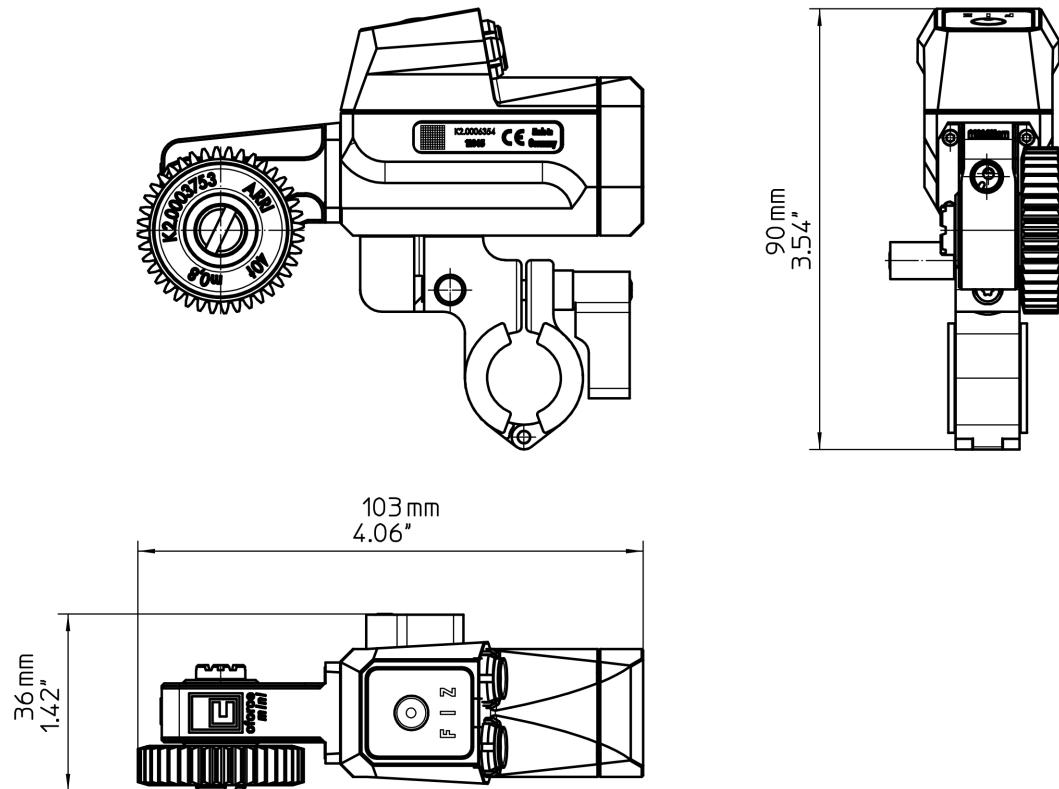


1	GND	Ground
2	CAN-L	CAN bus
3	V-BAT	Power supply in-/output
4	CAN-H	CAN bus

10.4 Dimensions and weight

Dimensions

The following dimensions are for the cforce mini including the cforce mini gear m0.8/32p, 40t.



Weight

Weight of cforce mini Basic Set 2: 192g/6,8oz

10.5 Service Contacts

Munich, Germany

Arnold & Richter Cine Technik
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service@arri.de
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Mo. - Fr. 8:00 - 18:00 (AEST)

10.6 International declarations

EC Declaration of Conformity

The product cforce mini Lens Motor conforms with the specifications of the following European directives:

- Directive 2014/30/EU of the European Parliament and the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility
- 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

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

- EN 55103-1:2009; EN 55103-2:2009; EN 50581:2012

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.