cPRO hand unit
User Guide

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Software Release Package v1.1

Imprint

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For further assistance

cmotion GmbH
Wiedner Hauptstraße 135/B3
1050 Wien
Fbnr.: FN220240H – HG Wien
UID-Nr.: ATU 54026806
http://www.cmotion.eu
sales@cmotion.eu
+43 1 7891096

This USER GUIDE applies to the following product:
K2.0016602 cPRO hand unit 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 hand unit is only available to commercial customers. By utilization, the customer agrees that the cPRO hand unit 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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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 result in serious damage to equipment, injury or death.
Before use, read and follow all valid instructions.
Use solely and exclusively as described in the instructions.
Never open. Never insert objects unless instructed to do so. E.g. battery, USB.
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 result in serious damage to equipment, injury or death.
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 customers 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 hand unit 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 hand unit unit with antenna
- Plain white focus ring for cPRO hand unit
- Plain white iris strip for cPRO hand unit
- ctruss - connection point for cstrap
- 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 damage through third-party products.

4. Introduction

The cPRO hand unit is the wireless hand-held control unit of the cPRO lens control system with an integrated red-coded cmotion radio module. With its user friendly and intuitive interface the cPRO hand unit is lightweight and sets new standards in both design and ergonomics.

The focus knob offers an ergonomic grip with a fingertip concave mold and mechanical hard stops.

6 user buttons provide quick access to cPRO's extensive features. Iluminated key elements (focus marker ring, iris slider strip and buttons) offer ideal operation even in dark environments.

The capacative touch display shows live lens and camera information.

The asymmetrical design and comfort grip keeps the hand unit balanced in your hand. Several well positioned mounting points provide options for third party accessories including quick release mounts, monitors, etc.

With optional network licensing, up to three cPRO hand units can connect to a cPRO motor / cPRO camin for split focus, iris and zoom operation (available with Software Release Package v2.0 / license required for each hand unit). Real-time lens data is available when used with the cPRO motor / cPRO camin.

Using the LBUS interface, the cPRO hand unit can be hard-wired with up to three additional cforce motors and other ARRI / cmotion control units including the pan-bar / steady zoom, ARRI LCUBE-1, LCUBE-2, ARRI Master Grips or cfinder III.

Main features:

- ☒ Ergonomic and balanced design
- ☒ Extensive software features for creative FIZ control
- ☒ Supports lens data with cPRO motor / cPRO camin
- ☒ Touch display for menu navigation and settings
- ☒ Intuitive thumb wheel for menu navigation, settings and 4th axis control (available with Software Release Package v2.0.)
- ☒ Illuminated pre-marked focus rings and iris strips with LED status feedback
- ☒ Illuminated, user assignable buttons
- ☒ Vibrating function
- ☒ USB for external power source, updates and transfer of lens files and user settings
- ☒ Mounting options for accessories like cstrap, monitor bracket or v-lock plate
- ☒ Adjustable mechanical hard stops
- ☒ Panic button for mechanical hard stop override
- ☒ Integrated cmotion red radio module
- ☒ Daisy-chain compatible via LBUS for hard-wired operation
- ☒ Lightweight (less than 900g (approx 31 oz) incl. battery and antenna)

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. For hard-wired operation the cPRO hand unit can be connected to the daisy-chain through its LBUS interface using any LBUS to LBUS cable.

4.2. CAM interface

The cPRO hand unit does not have a CAM interface itself. But, the CAM interface on the cPRO motor / cPRO camin is also 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. Using this cable the cPRO hand unit can also be connected to the daisy-chain through its LBUS interface for hard-wired operation.

In addition, the CAM interface on the cPRO motor / cPRO camin offers a versitile interface for camera control. There are several camera interface cables available which, depending on the camera, offer start-stop control with feedback, camera status, tally and even camera control. (License required to control camera settings / available with Software Release Package v2.0).

If a camera is detected in the LBUS daisy-chain, camera data and camera feedback will be displayed on the cPRO hand unit.

5. cPRO hand unit hardware layout

5.1. Hardware layout overview
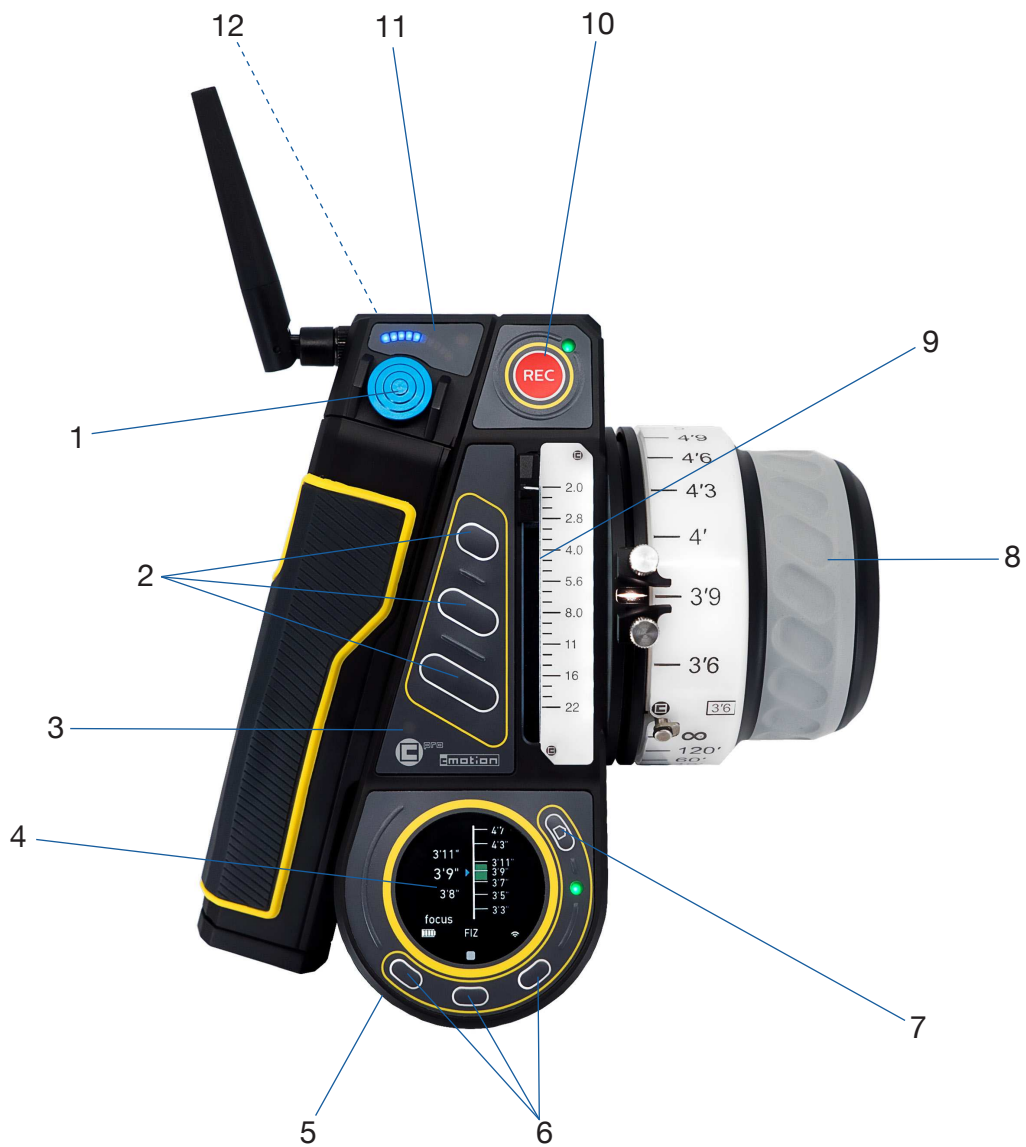
1	Joystick
2	User buttons
3	Light sensor
4	Touch display
5	Thumb wheel
6	Menu buttons
7	HOME button
8	Knob
9	Slider
10	REC button
11	Joystick indicator display
12	Back button

5.2. Control interface

5.2.1. Knob

1	Mechanical hard stops
2	Panic button
3	Pre-marked focus ring
4	Fingertip concave mold
5	Anti-slip grip
6	Datum line
7	Knob illumination / status LEDs
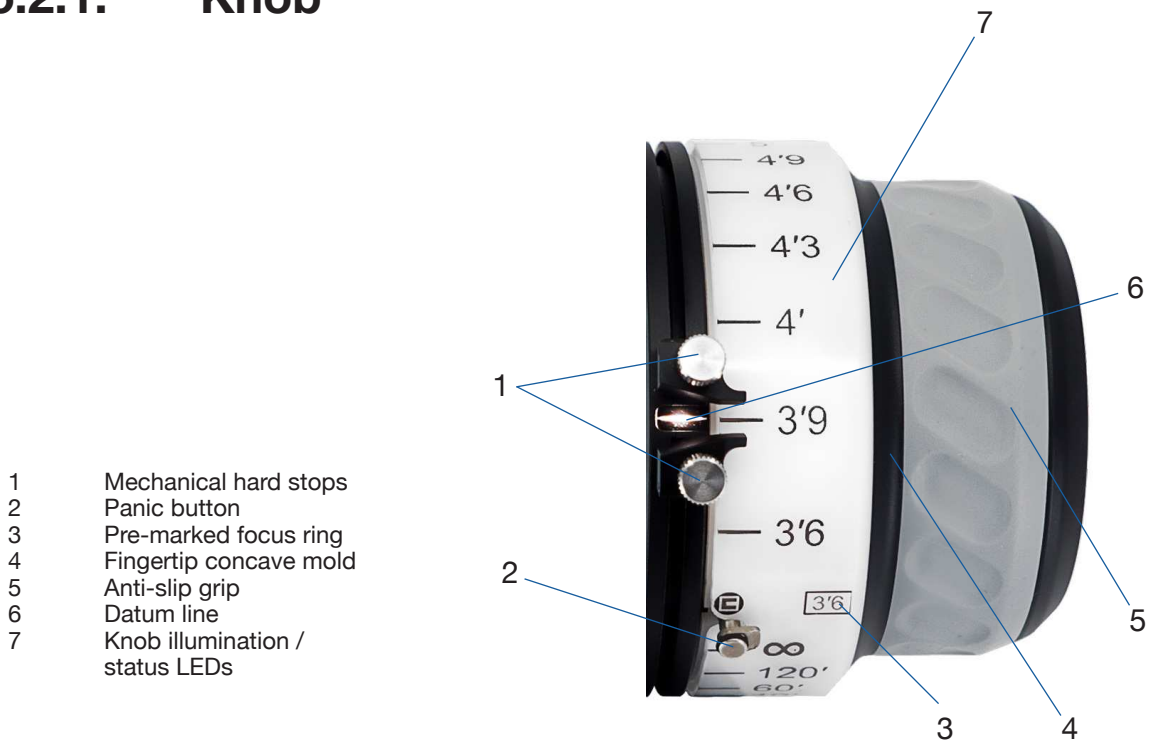
The knob is a control interface with an absolute position encoder. Turn the knob clockwise or counter-clockwise to control the assigend axis. As default the knob is assigned to focus.

5.2.1.1. Mechanical hard stops

The cPRO knob has two mechanical hard stops, which can be adjusted freely around the knob barrel. The hard stops allow you to move the knob between two focus positions precisely.

In oder to adjust your long focus distance

- match the desired long focus distance position to the datum line of the knob

- open the thumbscrew on the upper hard stop and slide the hard stop around the knob barrel until it hits the panic button.

- lock the hard stop position by turning the thumbscrew clockwise

In oder to adjust your close focus distance

- match the desired close focus distance position to the datum line of the knob

- open the thumbscrew on the lower hard stop and slide the hard stop around the knob barrel until it hits the panic button.

- lock the hard stop position by turning the thumbscrew clockwise

5.2.1.2.   Panic button

The cPRO panic button is a unique feature of the cPRO hand unit. It allows you to overwrite the mechnical hard stops without adjusting the predefined focus range. E.g. when shooting the slate outside of the predefined focus range, or the actor misses their mark.

In order to override the mechanical hard stops temporarily, simply press the panic button and dive underneath the desired hard stop.

In order to disable the mechanical hard stops, press and turn the panic button clockwise or counter-clockwise. To re-enable the mechanical hard stops, press and turn the panic button back to its 90° home position.

5.2.1.3.   Pre-marked focus rings
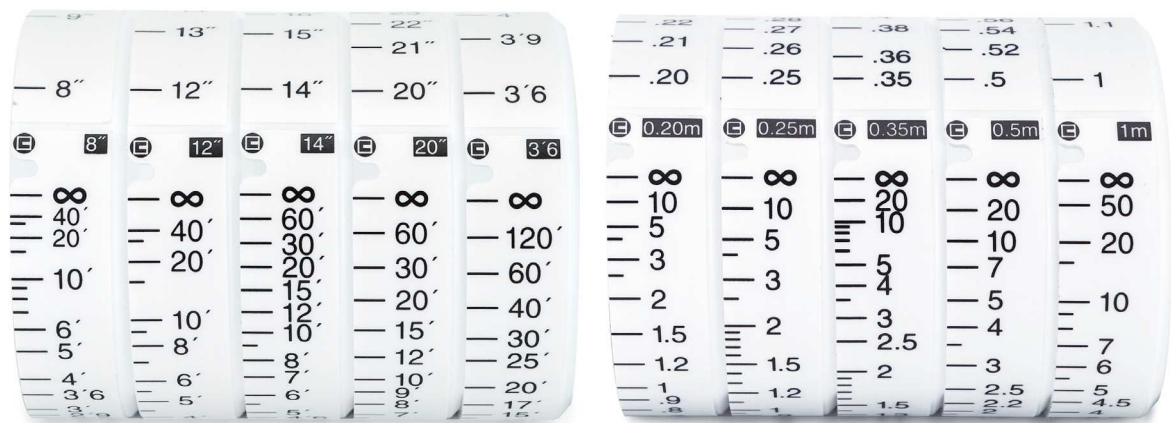
K2.0019834 cPRO pre-marked focus ring imperial set

K2.0019835 cPRO pre-marked focus ring metric set

In order to save time marking your focus rings for each lens, the cPRO hand unit offers five imperial and five metric pre-marked rings. Each ring is engraved with a scale from infinity to one of five close focus values and can be used with a wide range of lenses from wide angle to telelphoto. For more information please refer to section "6.2.3.2.1.3. Pre-marked rings" on page 39 in this manual.

5.2.1.4.   Datum line

The datum line is the reference mark on the knob. It illuminates with the knob scale illumination. Its brightness can be controlled in the "Knob brightness" menu.

5.2.1.5.   Knob illumination and status LEDs

The knob scale can be illuminated individually through the "Knob brightness" menu. The status LEDs for the knob are built into the scale illumination, which gives you direct feedback of the status for the knob axis.

LED status	Meaning
off	no axis assigned to knob / knob illumination off
solid white	motor ready, no warnings /knob illumination on
solid green	motor ready, no warnings, limits set
green/yellow flashing	calibration request
yellow flashing	motor calibration
solid yellow	calibration time out
solid red	no motor connected
red flashing	knob locked / no motor control

5.2.2.   Slider

1   Slider
2   Pre-marked iris strip
3   Slider illumination / status LEDs
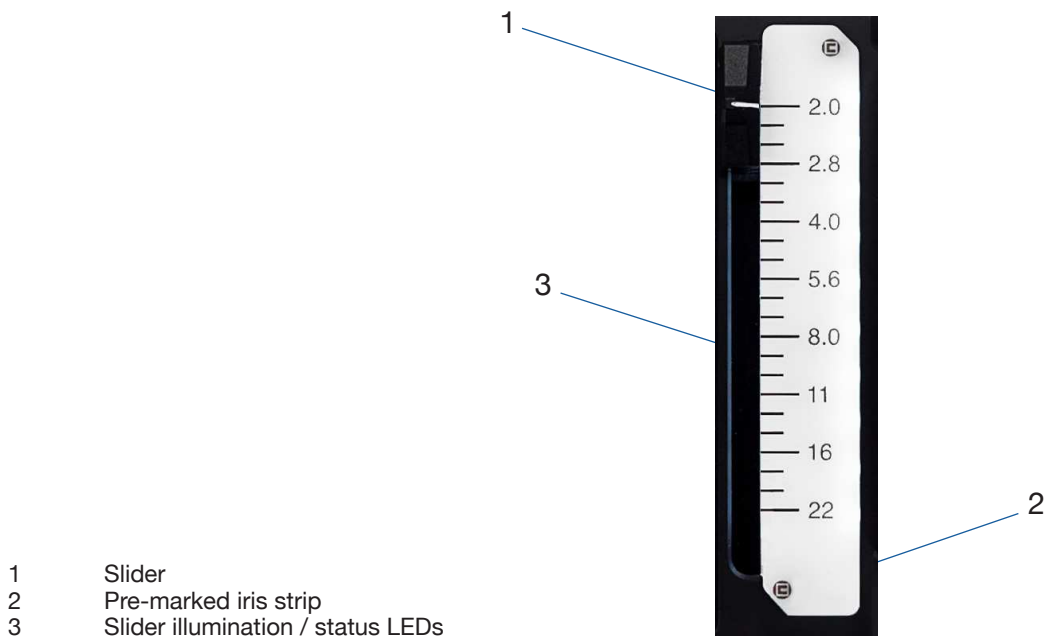
The slider is a control interface with an absolute position encoder. Move the slider up or down to control the assigned axis. As default, the slider is assigned to iris.

5.2.2.1.   Pre-marked iris strips

In order to save time marking your iris strips for each lens, the cPRO hand unit offers three pre-marked strips. Each strip is engraved with a scale from close or 22 to one of three wide open iris values. For more information refer to section "6.2.3.2.2.2. Pre-marked strips" on page 40 in this manual.

5.2.2.2.   Slider illumination and status LEDs

The slider scale can be illuminated individually through the "Slider brightness" menu. The status LEDs for the slider are built into the scale illumination, which gives you direct feedback of the status for slider axis.

LED status	Meaning
off	no axis assigned to slider / slider illumination off
solid white	motor ready, no warnings /slider illumination on
solid green	motor ready, no warnings, limits set
green/yellow flashing	calibration request
yellow flashing	motor calibration
solid yellow	calibration time out
solid red	no motor connected
red flashing	slider locked / no motor control

5.2.3. Joystick

1	Joystick
2	Position indicator display
3	Joystick status LED

The joystick is a control interface with a relative position encoder. Press the joystick up or down to control the assigned axis. The joystick´s touch sensitivity and the axis speed can be adjusted individually in the "Joystick menu" (please refer to section "6.2.3.2.3. Joystick" on page 41 in this manual). As default, the joystick is assigned to zoom.

5.2.3.1. Position indicator display

The position indicator display consits of 10 blue single LEDs. It indicates the relative position of the assigned axis in %. If the display is off, the motor is at one end stop of the lens (= < 10%). If the display is fully illuminated the motor is at the other end stop of the lens 100%. The joystick position indicator display can be illuminated individually through the "Joystick brightness" menu. As default, the joystick is assigned to zoom.

5.2.3.2. Joystick status LED

The status LED for the joystick is a seperate LED above the position indicator display. This gives you direct feedback of the status of the joystick axis.

LED status	Meaning
off	no axis assigned to joystick / joystick illumination off
solid green	motor ready, no warnings, limits set
green/yellow flashing	calibration request
yellow flashing	motor calibration
solid yellow	calibration time out
solid red	no motor connected
red flashing	joystick locked / no motor control

5.2.4. Thumb wheel

1   Thumb wheel

The thumb wheel is a unique control interface of the cPRO hand unit with a relative position encoder. It allows you to navigate through all the menu pages comfortably even when wearing gloves. It is even possible to assign the thumb wheel as a 4th axis controller (available with Software Release Package v2.0).

NAVIGATION	Thumb wheel gesture	Function
in main screens	scroll clockwise / scroll counter-clockwise	scroll through horizontal menu and display screens
in adjustment menu	scroll clockwise	navigate up
	scroll counter-clockwise	navigate down

5.2.5. Buttons / camera status LED

With the exception of the REC button, the HOME button and menu button 2 (MB2), all buttons on the cPRO hand unit can be assigned individually. And, all buttons except the back button (BB1) illuminate once assigned to a user function.

User button functions*:

Off / Focus limits set / Iris limits set / Zoom limits set / Focus calibration / Iris calibration / Zoom calibration / Calibration all / ZAP / Joystick speed up / Joystick speed down / Autofocus press / Autofocus toggle / Autofocus pinpoint / System unit / Steath mode / Laser pointer / Camera rec / Lock knob / Lock slider / Lock joystick / Lock thumb wheel

*(more user button functions available with Software Release Package v2.0)

5.2.5.1. REC button and camera status LED

1   REC button
2   Camera status LED

The REC button is assigend to "Camera rec" only and cannot be changed. Anyways the "Camera rec" function can be assigned to any other user button.

The camera status LED is next to the REC button and gives direct feedback of the camera status.

LED status	Meaning
off	no camera interface is available
solid green	camera interface is available / camera ready
solid red	camera is recording
red / green flashing	camera is in idle mode (camera not ready)
red flashing slow	remaining record time is less than five minutes
red flashing fast	remaining record time is less than one minute

5.2.5.2. User buttons
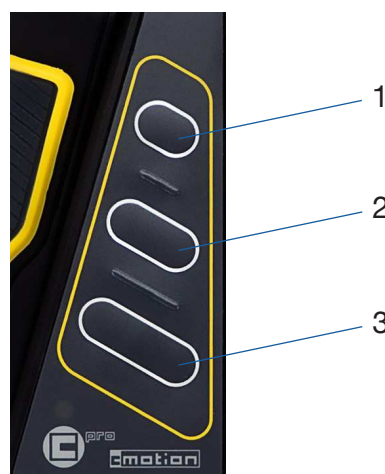
1   User button 1 (UB1)
2   User button 2 (UB2)
3   User button 3 (UB3)

All user buttons (UB1/UB2/UB3) in the center of the cPRO hand unit can be assigned individually. Once assigned to a user function, each assigned button will illuminate individually unless keypad brightness is set at 0.

5.2.5.3. Back button
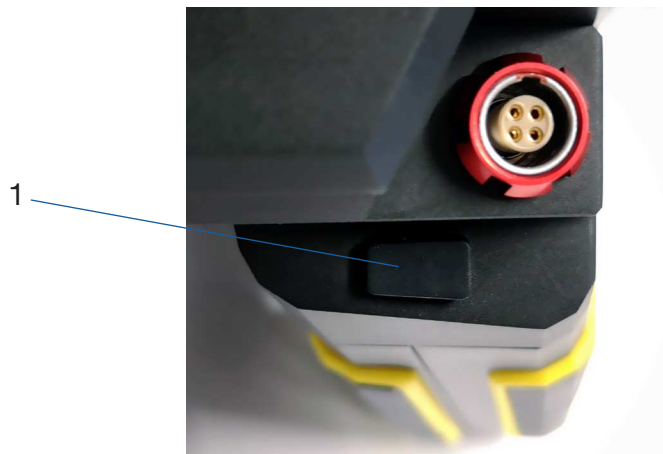
1   Back button (BB1)

The back button is located on the hand grip of the cPRO hand unit, underneath the LBUS connector. It is not illuminated but can be assigned individually to any user function.

5.2.5.4. Menu buttons
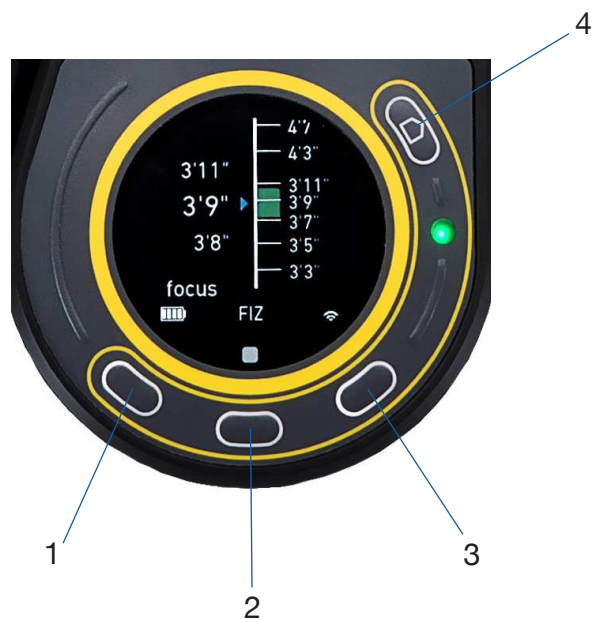
1   Menu button 1 (MB1)
2   Menu button 2 (MB2)
3   Menu button 3 (MB3)
4   HOME Button

3 menu buttons are located around the touch screen. And, with the exception of MB2, can be assigned to any user function while displaying one of the main screens. When entering the adjustment menu the menu buttons will change their behaviour and show their function on the touch display.

5.2.5.4.1. MB2 (QUICK NAV)

Menu button 2 (MB2) is permanently assigned to allow quick navigation between main screens with multiple pages, and from specific main screens directly into the related adjustment menu. MB2 is illuminated permanently if the keypad brightness is not set at 0.

5.2.5.4.2. Quick navigation between main screens

Some of the main screens consist of multiple pages. In order to navigate vertically within a main screen or menu, press menu button 2 (MB2) repeatedly. As an alternative, you can also swipe the touch screen up or down.

For an overview of which main screens consist of multiple pages, please refer to section "6.1. GUI main screen overview" on page 23 in this manual.

5.2.5.4.3. Quick navigation main screens to adjustment menu

In order to use the quick navigation to enter related adjustment menus from the main screens, press and hold menu button 2 (MB2). As an alternative, you can also tap and hold the touch display.

5.2.5.5. HOME button

The HOME button has various functions and is illuminated permanently if the keypad brightness is not set at 0.

NAVIGATION	HOME button	Function
cPRO hand unit is off	press short	turn on the cPRO hand unit
cPRO hand unit is on	press long (3 seconds)	turn off the cPRO hand unit
from main screens	press short twice	enter the adjustment menu
from adjustment menu	press short	return to the main screen

5.2.5.6. System status LED

1   System status LED

The sytem status LED indicates the status of the cPRO hand unit.

LED status	Meaning
solid green	radio turned on and device connected wireless / radio off and device connected through the LBUS port (hard-wired)
solid red	initialising state / hardware error
red / green flashing	radio turned on and device not connected wireless / radio turned off and device not connected through the LBUS port (hard-wired)
red flashing	battery low / no free RF channel available

5.2.6. Touch screen

1   Capacitive touch display

The cPRO hand unit features a multicolor 1.22" QVGA capacitive TFT touch display.

NAVIGATION	Touch screen gesture	Function
in main screens	swipe left / swipe right	switch between the main screens horizontally
	swipe up / swipe down	switch between the main screens vertically
	tap short twice	enter the adjustment menu
	tap and hold	enter related adjustment menu
in adjustment menu	swipe up	navigate down
	swipe down	navigate up
	swipe left / tap short	enter sub menu (select)
	swipe right	leave sub menu (back)

6. cPRO hand unit software layout

6.1. GUI main screen overview

The cPRO hand unit features a user interface to configure the system. The touch sensitive display shows menu and status information and can be used to navigate through the main screens and the adjustment menu. As an alternative, the thumb wheel and the menu buttons can be used to navigate and to change settings as well e.g. if wearing gloves.

If a new LBUS device is connected to the daisy-chain, the corresponding device main screen will show up automatically. Device specific capabilities will be enabled within the adjustment menu.
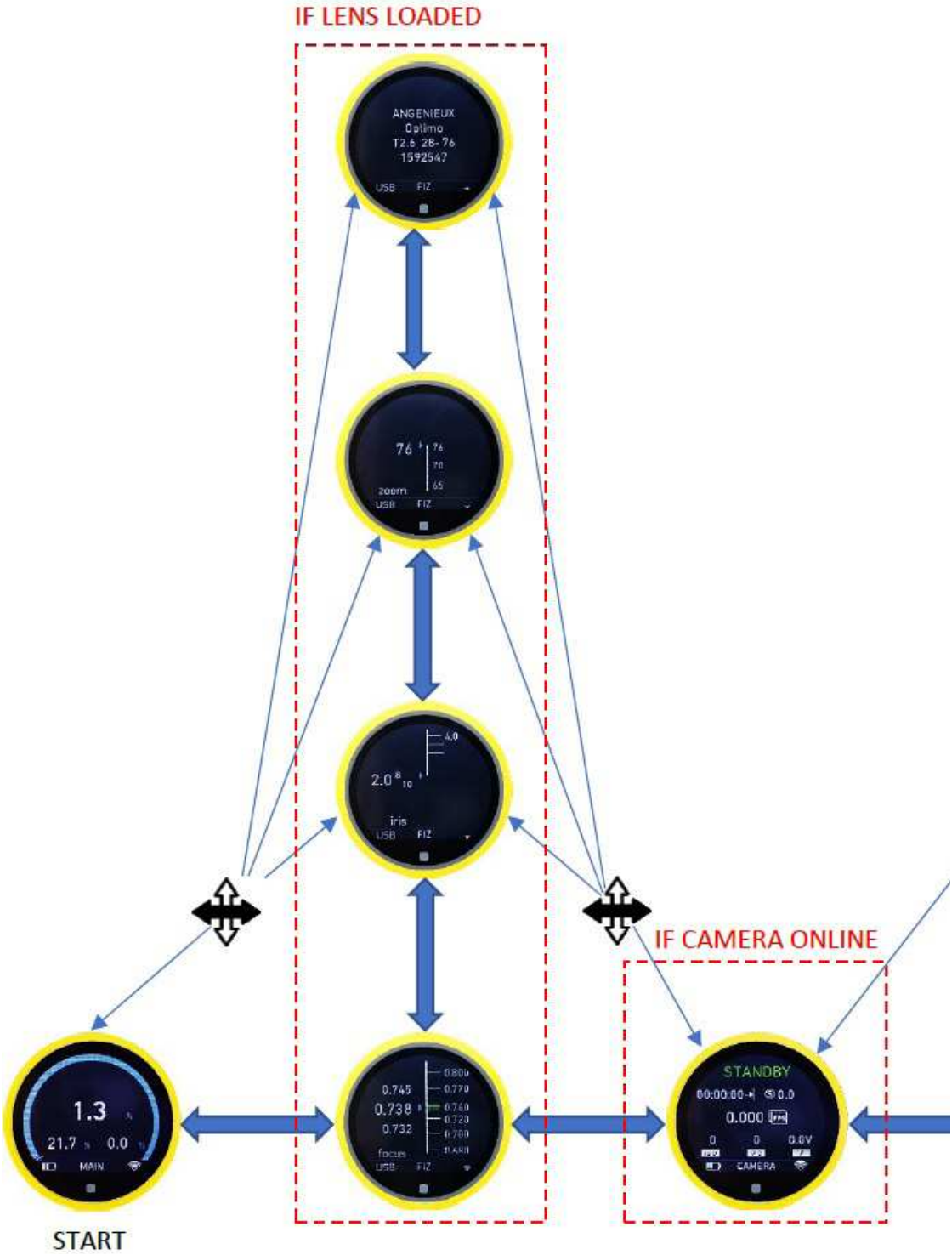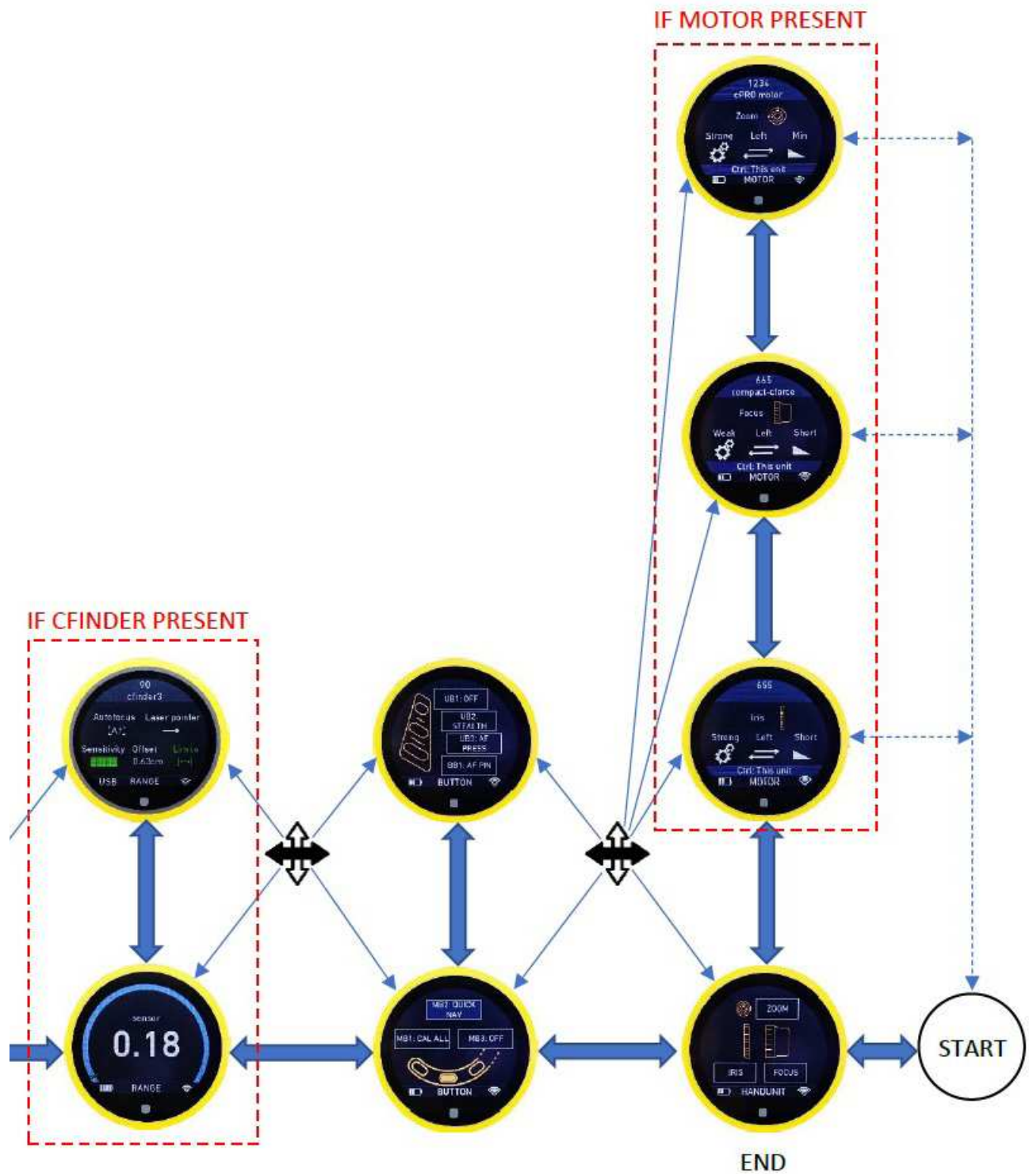
6.1.1. MAIN screen

MAIN screen if lens file loaded

MAIN screen if no lens file loaded

1	Focus information (value/percentage)
2	Iris information (value/percentage)
3	Zoom information (value/percentage)
4	Depth of field range
5	Actual focus position
6	Status bar (with battery status and RF signal strength)

The MAIN screen shows compact focus, iris and zoom information on a simple GUI. If a lens file is loaded, it shows the actual focus, iris, zoom values and the depth of field range. If no lens file is loaded, it shows the motor position as a percentage of the calibration range.

The status bar on all main screens shows information about the main screen page, battery status, wireless signal strength or, if one of the control interfaces is locked.

Note: If a rangefinder is attached to the LBUS daisy-chain, and the measured rangefinder distance is within depth of field (DOF), the focus value will turn green. Otherwise it illuminates white.

1	Measured rangefinder distance
2	Actual focus position
3	Depth of field range

6.1.2. FIZ main screen

The FIZ screen is only enabled if a lens file is loaded. It displays detailed focus information including a focus scale with depth of field (DOF), a full iris and zoom scale and information about the loaded lens file.

Note: The lens adjustment menu can be reached from all FIZ main screens quickly by tapping and holding the touch display or by pressing and holding menu button 2 (MB2).

6.1.2.1. Focus main screen

1	Actual focus position (value)
2	Focus scale
3	DOF far limit (value)
4	DOF close limit (value)
5	DOF range

The focus main screen displays a full focus scale, as well as depth of field (DOF) information grafically and numerically.

1	Actual focus position (value)
2	Measured rangefinder distance
2	Focus scale
3	DOF range
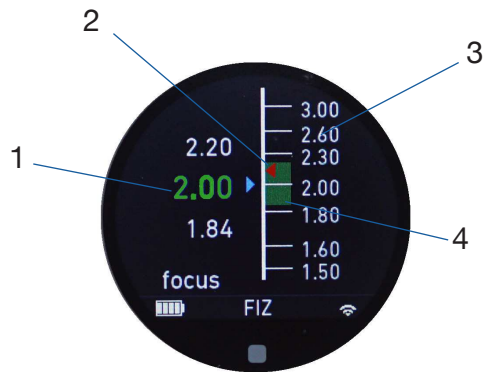
Note: If a rangefinder is attached to the LBUS daisy-chain, and the measured rangefinder distance is within depth of field (DOF), the focus value will turn green. Otherwise it illuminates white.

6.1.2.2. Iris main screen

1	Actual iris position (value)
2	Iris scale
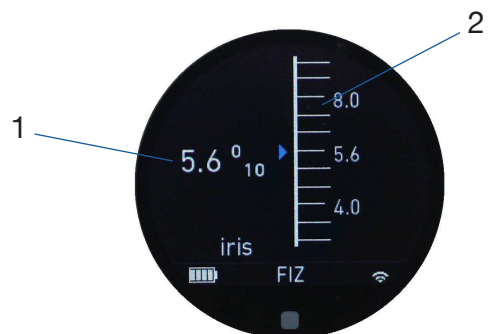
The iris main screen displays a full iris scale grafically and numerically. T-stops are displayed in 1/10 increments.

6.1.2.3. Zoom main screen

1	Actual zoom position (value)
2	Zoom scale
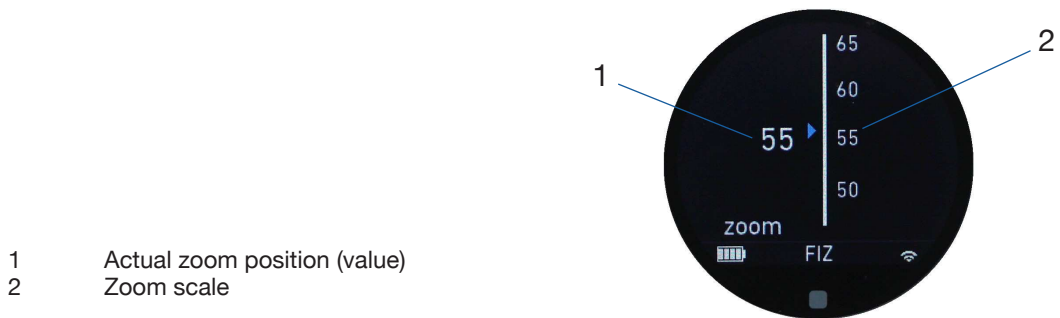
The zoom main screen displays a full zoom scale grafically and numerically.

6.1.2.4. Lens information main screen

1	Brand
2	Lens name
3	T-stop / zoom range
4	Serial number
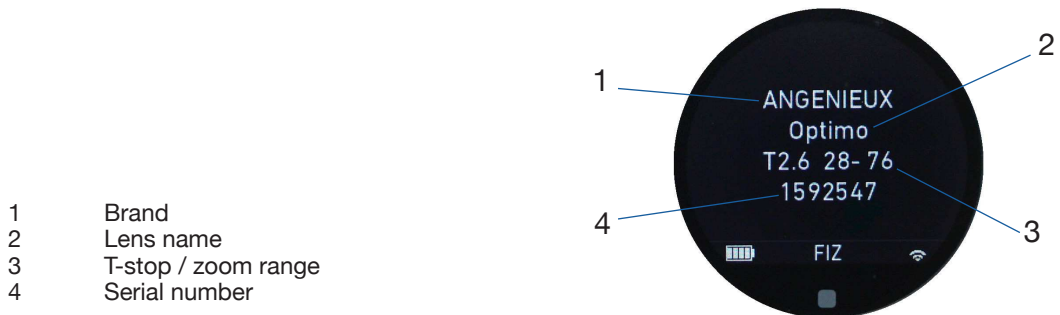
The lens information main screen displays all the relevant information about the loaded lens file, including brand, model, T-stop, zoom range and serial number.

6.1.3. Camera main screen
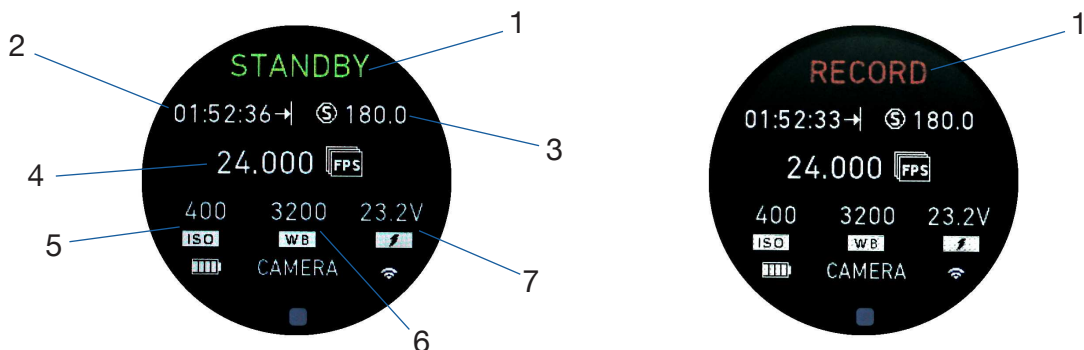
1	Camera record information
2	Remaining record time
3	Shutter speed
4	Frames per second (FPS)
5	ISO
6	White balance
7	Camera battery status

The camera information main screen is enabled automatically, as soon as a camera is detected in the daisy-chain. The camera needs to be connected to the CAM interface of the cPRO motor or the cPRO camin. Camera status information can be displayed for the most popolar cameras such as ARRI, RED, SONY, BLACKMAGIC or CANON. Depending on the camera brand and model, different functions including start-stop control and record feedback, camera status, tally and control of camera settings are available. (License required to control camera settings / available with Software Release Package v2.0)

6.1.4. Rangefinder main screens

The rangefinder main screens are enabled automatically when a rangefinder is detected in the LBUS daisy-chain and a lens file is loaded. The rangefinder main screens consits of a rangefinder overview and a rangefinder settings screen.

Note: The rangefinder adjustment menu can be accessed from both rangefinder main screens quickly by tapping and holding the touch display or by pressing and holding the menu button 2 (MB2).

6.1.4.1. Rangefinder overview screen
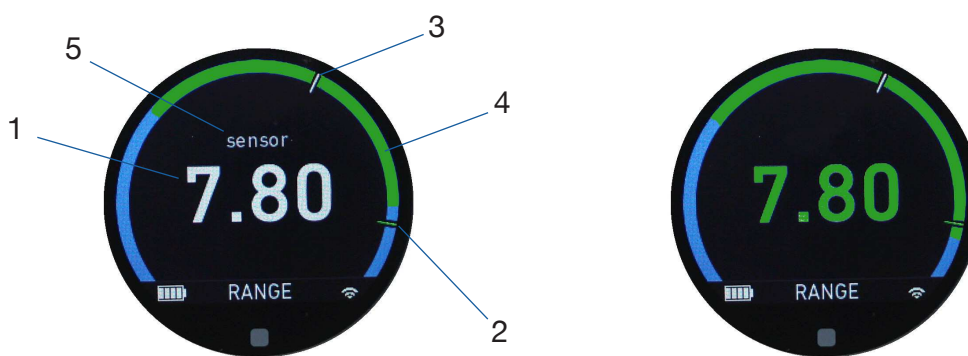
1	Measured rangefinder distance (value)
2	Measured rangefinder distance (position)
3	Actual focus position
4	DOF range
5	Rangefinder sensor warning

The rangefinder overview screen displays the rangefinder information grafically and numerically.

Note: The numeric rangefinder distance value will turn green if the measured rangefinder distance is within the depth of field.

Note: When using cmotion's cfinder III, the rangefinders sensor warning will show up if no vaild measuring is possible. (Please refer to the cfinder III user guide)

6.1.4.2. Rangefinder settings screen

1   Autofocus (on/off)
2   Laser pointer (on/off)
3   Sensitivity settings
4   Offset (value)
5   Rangefinder limits (on/off)
6   LBUS device ID (serial number/name)

Autofocus: The autofocus icon will turn green if autofocus is on. If autofocus is off, it illuminates white.

Laser pointer: The laser pointer icon will turn green if the laser pointer is on. If the laser pointer is off, it illuminates white.

Sensitivity: Shows the sensitivity settings grafically.

Offset: The offset icon will turn green if an offset is set to a value other than 0, and will display the offset value numerically.

Limits: The limits icon will turn green if a rangefinder limit other than "limit max" = infinity or "limit min" = 0 is set. Otherwise, the icon will illuminate white.

6.1.5. Buttons main screens
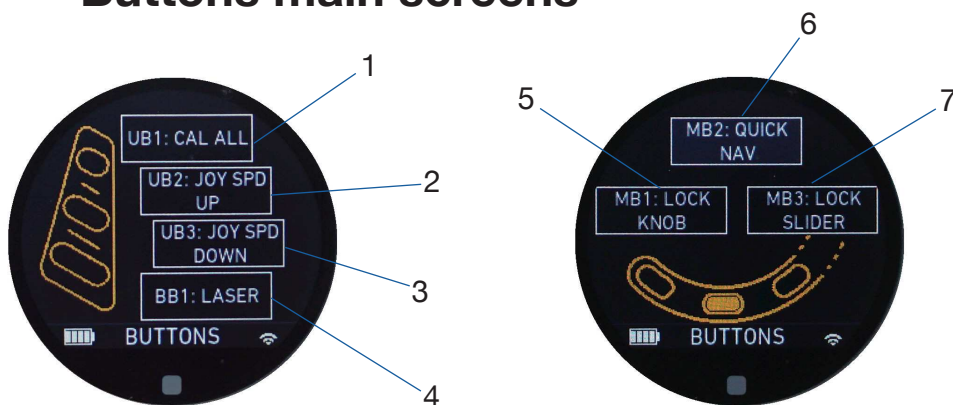
1   User button 1 / UB1 (function)
2   User button 2 / UB2 (function)
3   User button 3 / UB3 (function)
4   Back button 1 / BB1 (function)
5   Menu button 1 / MB1 (function)
6   Menu button 2 / MB2 (QUICK NAV))
7   Menu button 3 / MB3 (function)

The buttons main screens display the functions assigned to each user button.

Note: The buttons adjustment menu can be accessed from both buttons main screens quickly by tapping and holding the touch display or by pressing and holding the menu button 2 (MB2).

6.1.6. Controls main screen
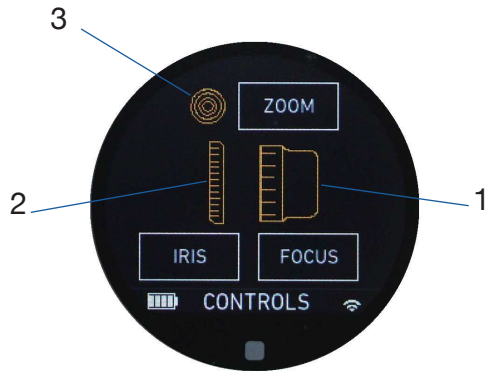
Controls main screen

Controls main screen with loaded
pre-marked focus ring / iris strip

1	Knob (assigned axis)
2	Slider (assigned axis)
3	Joystick (assigned axis)
4	Pre-marked focus ring loaded (type)
5	Pre-marked iris strip loaded (type)

The controls main screen displays information about the control interfaces knob, slider and joystick and their assigned axis, focus, iris and zoom. It also shows information about loaded pre-marked focus rings and / or pre-marked iris strips.

Note: The controls adjustment menu can be accessed from the controls main screen quickly by tapping and holding the touch display or by pressing and holding menu button 2 (MB2).

6.1.7. Motors main screens

1	Axis (Focus/Iris/Zoom)
2	Torque (Min/Weak/Strong/Max)
3	Direction (Left/Right)
4	Ramp (Min/Short/Long/Max)
5	Device in control (this unit / name, serial number)
6	LBUS device ID (serial number/name)

The motors main screens displays information for up to 3 daisy-chained cforce / cPRO motors.

Axis: Displays information about the motor assigment to focus, iris or zoom.

Note: The axis menu only changes the assignment of the motor, not the assignemnt of the control interface.

Torque: Displays information about the motor strength (Min/Weak/Strong/Max).

Direction: Displays information about the motor being mounted on the left or on the right side of the camera.

Note: The direction is defined from the operators point of view, from behind the camera.

Ramp: Displays information about the start and stop acceleration of the motor (Min/ Short/Long/Max) which allows smooth speed-up and slow-down curves.

Ctrl: Displays information about the controlling device. If multiple hand units are used and the highlighted motor is being controlled by a controller other than the one you are viewing the menu on "this hand unit" Ctrl will display the name and serial number of the hand unit which is controlling that motor.

NOTICE
The motor settings menu can be accessed from all motors main screens quickly by tapping and holding the touch display or by pressing and holding menu button 2 (MB2).

6.2. Adjustment menu

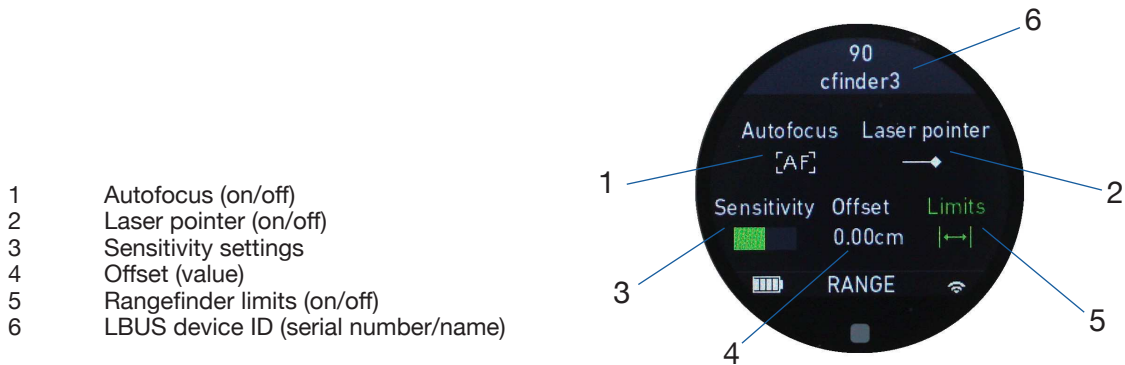## 6.2.1. Adjustment menu overview

REGION
JAPAN
EUROPE
USA
SOUTH KOREA
ROW
AUSTRALIA
CANADA
CHINA
EGYPT
HONG KONG
INDIA
NEW ZEALAND
PHILIPPINES
SINGAPORE
SOUTH AFRICA
TAIWAN
THAILAND
UAE

RADIO
RF: On/Off
RF Channel: 0-13
Region: Country

SYSTEM UNIT
Imperial
Metric

BRIGHTNESS
Auto activate: On/Off
Auto brightness: On/Off
Display: control bar
Keypad brightness: control bar
Knob brightness: control bar
Slider brightness: control bar
Joystick brightness: control bar

VIBRATION
Keypad: On/Off
Touch: On/Off
Wheel: On/Off

KNOB
Control:
Focus/Iris/Zoom/Off
Knob direction:
Left/Right
Premarked rings:
Blank/8"/12"/14"/2
0"/3'6"/0,20m/0,25
m/0,35m/0,5m/1m
Lock (On/Off)

SLIDER
Control:
Focus/Iris/Zoom/Off
Premarked stripes:
Blank/22-2,8/22-
2,0/Close-1,0
Lock (On/Off)

JOYSTICK
Control:
Focus/Iris/Zoom/Off
Sensitivity:
Min/Mid/Max
Speed: control bar
Lock (On/Off)

CONTROLS
Knob
Slider
Joystick

MAIN
Radio
Unit (status)
Brightness
Vibration
Touch (On/Off)
Thumbwheel (On/Off)
Stealth mode all
Load settings (not FCS)
Save settings (not FCS)

HOME BUTTON
Home Button HB:
list menu functions

MENU
MAIN
CONTROLS
LENS
MOTORS
RANGE FINDER
CAMERA (not FCS)
MARKER (not FCS)
BUTTONS
ABOUT

ABOUT
cPRO hand unit: info screen
LBUS DEVICES: List LBUS DEVICES
Firmware update
Factory reset

RESET
All
cPRO hand unit
LBUS devices

Info on Display
Press RESET for
factory settings

FIRMWARE UPDATE
cPRO hand unit
LBUS devices: list LBUS devices

RECORD BUTTON
Record Button-REC,
recording function: On/Off,
*REC-Note: not implemented
in Software menu options*

MOTORS
Calibration all
Motor Settings
Stealth mode: On/Off

LENS
Load: list lens files
Unload: list lens files
Send to LBUS (not FCS)
Create: lens wizard
Edit: list lens files
Delete: list lens files
Import from USB (not FCS)
Export to USB (not FCS)
Lens view (Small, Medium,
Large)
Set focus
Set iris
Set zoom
Circle of Confusion

MOTOR SET
List LBUS devices
Axis: Focus/Iris/Zoom
Direction: Left/Right
Ramp: Min/Short/Long/Max
Torque: Min/Weak/Strong/Max
Calibrate

RANGE FINDER
Offset: bar/settings offset value
Limits: Limitmax/Limit min
Sensitivity: control bar
Autofocus: On/Off
Laser pointer: On/Off
Stealth mode: On/Off

BUTTONS
User Button UB1
User Button UB2
User Button UB3
Back Button BB1
Menü Button MB1
Menü Button MB3
Menü Button MB2

MB2*
Permanently assigned:
access to each submenu
functions

MB2-Note: Button MB2 is
not implemented in the
Button menu structure
„BUTTON"*

LIST FUNCTIONS

Off	Calibration all	System unit	Lock display*: On/Off
Focus Limits set	ZAP	Stealth mode all	Thumb wheel: On/Off
Iris limits set	Joystick speed up	Laser pointer	
Zoom limits set	Joystick speed down	Camera rec	
Focus calibration	Autofocus press	Lock knob	
Iris calibration	Autofocus toggle	Lock slider	
Zoom calibration	Autofocus pinpoint	Lock joystick	

Lock Display: this function is only available for the menu-buttons MB1 and MB3*

6.2.2.   Adjustment menu navigation

There are multiple ways to enter and navigate through the adjustment menu depending on your preferences. If the touch screen is disabled or you are wearing gloves, all menu pages can be accessed and settings changed using the thumb wheel and menu buttons.

NAVIGATION	HOME button	Touch screen	Thumb wheel	Buttons
enter the adjustment menu	press short twice	tap short twice		
enter related adjustment menu		tap and hold		press and hold MB2 (QUICK NAV)
leave the adjustment menu	press short	swipe right (until leave)		back (until leave)
navigate down		swipe up	turn counter-clockwise	
navigate up		swipe down	turn clockwise	
enter sub menu (select)		swipe left		select
leave sub menu (back)		swipe right		back
increase values		swipe up	turn counter-clockwise	
decrease values		swipe down	turn clockwise	

In the following text, every single sub menu will be explained with its corresponding function. Some of the sub menus show the set status in their text, others do not.

6.2.3.   Menu

The menu consists of the following sub menus:

MAIN
CONTROLS
LENS
MOTORS
RANGEFINDER
CAMERA*
MARKER**
BUTTONS
ABOUT

* License required for control of camera settings / available with Software Release Package v2.0

** available with Software Release Package v2.0

6.2.3.1. MAIN

The main menu includes all hand unit related settings which can be adjusted in the corresponding sub menus. These include:

Radio
Unit (status)
Brightness
Vibration
Touch screen (status)
Thumb wheel (status)
Stealth mode all
Load settings*
Save settings*

* available with Software Release Package v2.0

6.2.3.1.1. Radio

The radio menu consits of the following RF related settings:

RF (status)
Channel (status)
Region (status)

6.2.3.1.1.1. RF

The RF menu allows you to turn the wireless radio on or off.

Note: If the cPRO hand unit is connected hard-wired to the cPRO motor or cPRO camin via the daisy-chain, the system will detect an LBUS loop and will turn the radio off automatically (LBUS loop detection). As soon as the cPRO hand unit is disconnected from the LBUS daisy-chain, the radio will be turned on and return to it's previous settings automatically.

6.2.3.1.1.2. Channel

The channel menu allows you to select one of the 14 radio channels from 0-13.

Note: In order to establish a wireless connection between the cPRO hand unit and the cPRO motor / cPRO camin, both devices need to be set to the same RF channel. (How to select the RF channel on the cPRO motor / cPRO camin, please refer to corresponding user guide)

6.2.3.1.1.3. Region

The region menu allows you to change the RF settings according to legal regulations of the country / region, you are operating in. Changing the region settings on the cPRO hand unit will automatically change the region settings on the connected cPRO motor / cPRO camin if a wireless connection is established. The corresponding country code will illuminate on the cPRO motor´s / cPRO camin´s display.

Note: 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.

NOTICE
It may not be legal to operate the cPRO hand unit in a country/region other than the country/region selected in the region menu. Select ROW (Rest of world) or use the device in hard-wired mode if you are unsure of the correct region setting.

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
ROW (Rest of world)	WORLD

6.2.3.1.2.   Unit

The unit menu allows you to change the system unit to imperial or metric.

Note: Changing the system unit from the cPRO hand unit will change the unit settings on all connected LBUS devices exept cameras connected through the CAM connector.

### 6.2.3.1.3.	Brightness

The brightness menu allows you to individually adjust the brightness level on several main components of the cPRO hand unit. It also includes functions like auto brightness and auto activate.

The brightness menu consits of the following functions:

<div align="center">

Auto activate (status)
Auto brightness (status)
Display
Keypad brightness
Knob brightness
Slider brightness
Joystick brightness

</div>

#### 6.2.3.1.3.1.	Auto activate

The auto activate function can be turned on or off. If turned on, the cPRO hand unit´s illumination will turn off if the light sensor is exposed to a light source. If it gets darker, the illumination will switch on to the pre-defined brightness settings again (e.g if you are shooting outside and you have to enter a dark building). If turned off, the previous brightness settings will be activated.

#### 6.2.3.1.3.2.	Auto brightness

The auto brightness function can be turned on or off. If turned on, the cPRO hand unit´s illumination will adjust dynamically to produce the best contrast for the environmental lighting. If turned off, the previous brightness settings will be activated.

#### 6.2.3.1.3.3.	Display

The display menu allows you to adjust the brightness of the touch display individually. Use the thumb wheel to turn the brightness up or down. Press select to confirm your brightness settings.

#### 6.2.3.1.3.4.	Keypad brightness

The keypad brightness menu allows you to adjust the brightness of the all illuminated buttons individually. Use the thumb wheel to turn the brightness up or down. Press select to confirm your brightness settings.

#### 6.2.3.1.3.5.	Knob brightness

The knob brightness menu allows you to adjust the brightness of the focus ring illumination individually. Use the thumb wheel to turn the brightness up or down. Press select to confirm your brightness settings

6.2.3.1.3.6.   Slider brightness

The slider brightness menu allows you to adjust the brightness of the slider strip illumination individually. Use the thumb wheel to turn the brightness up or down. Press select to confirm your brightness settings

6.2.3.1.3.7.   Joystick brightness

The joystick brightness menu allows you to adjust the brightness of the position indicator display illumination individually. Use the thumb wheel to turn the brightness up or down. Press select to confirm your brightness settings

6.2.3.1.4.   Vibration

The vibration menu consits of the following functions:

Keypad (status)
Touch screen (status)
Thumb wheel (status)

6.2.3.1.4.1.   Keypad

The keypad menu allows you to turn the tactile vibration feedback for all buttons on or off.

6.2.3.1.4.2.   Touch screen

The touch screen menu allows you to turn the tactile vibration feedback for the touch display on or off.

6.2.3.1.4.3.   Thumb wheel

The thumb wheel menu allows you to turn the tactile vibration feedback for the thumb wheel on or off.

6.2.3.1.5.   Touch screen

The touch screen menu allows you to turn the touch screen on (unlock) or off (lock). A small red lock will be displayed in the status bar on all main screens. The letter "D" for Display will illuminate each time you press the locked touch screen.

Note: The touch screen will be locked for all main screen navigation only. Within the adjustement menu, the touch screen will be unlocked automatically to allow smooth navigation. In order to enter the adjustment menu, if the touch screen is locked, press the home button twice.

6.2.3.1.6. Thumb wheel

The thumb wheel menu allows you to turn the thumb wheel on (unlock) or off (lock). A small red lock will be displayed in the status bar on all main screens. The letter "T" for thumb wheel will illuminate each time you turn the thumb wheel.

Note: The thumb wheel will be locked for main screen navigation only. Within the adjustment menu, the thumb wheel will be unlocked automatically to allow smooth navigation. In order to enter the adjustment menu, if the touch screen is locked, press the home button twice.

NOTICE
If the thumb wheel and the touch screen is off (locked) at the same time, a navigation through the main screens is not possible anymore. In order to enter the adjustment menu, press the home button twice and unlock the control interfaces if needed.

6.2.3.1.7. Stealth mode all

The stealth mode all menu allows to turn the stealth mode on or off for all LBUS devices in the daisy-chain. If stealth mode is on, all LBUS devices on the camera side´s daisy-chain will turn their illumination off (e.g. if the camera angle is critical because of camera reflection in the picture).

6.2.3.2. CONTROLS

The controls menu contains all settings related to the main controls: knob, slider and joystick.

<div align="center">

Knob
Slider
Joystick

</div>

6.2.3.2.1.   Knob

The knob menu contains all settings related to the knob control interface and consists of:

Control (status)
Knob direction (status)
Pre-marked rings
Lock (status)

6.2.3.2.1.1.   Control

The control menu allows you to assign the axis you want to control (Focus / Iris / Zoom) to the knob. If you select Off, the knob will have no control over any axis and will turn its marker ring illumination and status LEDs off.

6.2.3.2.1.2.   Knob direction

The knob direction menu allows you to change the knob direction from left to right. Left means that infinity is on the end stop turning the knob clockwise. Right means that infinity is on the end stop turning the knob counter-clockwise.

Note: Knob direction can be adjusted with individually marked focus rings only. With pre-marked focus rings the knob direction is always right / counter-clockwise.

6.2.3.2.1.3.   Pre-marked rings

The pre-marked rings menu allows you to select one of five imperial and five metric pre-marked focus rings. Each ring is engraved with a scale from infinity to one of five close focus values. Pre-marked focus rings can be used with a wide range of lenses from wide angle to telelphoto and save time marking a focus marker ring for each lens.

Pre-marked focus rings are available in imperial or metric scales:

8”	0,20m
12”	0,25m
14”	0,35m
20”	0,5m
3´6”	1m

Note: Before pre-marked focus rings can be used, a lens file needs to be created using the cPRO hand unit´s internal 'create lens' feature or a cworld.

In order to use a pre-marked focus rings please proceed as follows:

☒   Calibrate the lens

☒   Load the corresponding lens file from the cPRO hand unit or cworld

☒   Choose the right pre-marked focus ring to match the close focus value of your lens.

☒   Enter the pre-marked rings menu and select the appropriate marker ring from the list

6.2.3.2.1.4.   Lock

The lock menu allows you to lock the knob (e.g. if shooting with a locked off camera).

A small red lock will be displayed in the status bar on all main screens. The letter "K" for knob will illuminate each time you turn the knob. The knob illumination will start flashing red, indicating that the knob is locked and no motor control is possible.

6.2.3.2.2.   Slider

The slider menu contains all settings related to the slider control interface and consists of:

Control (status)
Pre-marked strips
Lock (status)

6.2.3.2.2.1.   Control

The control menu allows you to assign the axis you want to control (Focus / Iris / Zoom) to the slider. If you select Off, the slider will have no control over any axis and will turn its marker strip illumination and status LEDs off.

6.2.3.2.2.2.   Pre-marked strips

The pre-marked strips menu allows you to select one of three pre-marked iris strips. Each strip is engraved with a scale from close or 22 to one of 3 open iris values. Pre-marked iris strips can be used with a wide range of lenses and save time marking an iris strip for each lens.

Pre-marked iris strips are available with the following T-stop scales:

close - 1.0
22 - 2.0
22 - 2.8

Note: Before pre-marked iris strips can be used, a lens file needs to be created using the cPRO hand unit´s internal 'create lens' feature or a cworld.

In order to use a pre-marked iris strips please proceed as follows:

- ☒ Calibrate the lens motors
- ☒ Load the corresponding lens file from the cPRO hand unit or cworld
- ☒ Choose the right pre-marked iris strip to match the open iris value of your lens.
- ☒ Enter the pre-marked strips menu and select the appropriate marker strip from the list

6.2.3.2.2.3. Lock

The lock menu allows you to lock the slider (e.g. if shooting with a locked off camera).

A small red lock will be displayed in the status bar on all main screens. The letter "S" for slider will illuminate each time you turn the knob. The slider illumination will start flashing red, indicating that the slider is locked and no motor control is possible.

6.2.3.2.3. Joystick

The joystick menu contains all settings related to the joystick control interface and consists of:

Control (status)
Sensitivity
Speed
Lock (status)

6.2.3.2.3.1. Control

The control menu allows you to assign the axis you want to control (Focus / Iris / Zoom) to the joystick. If you select Off, the joystick will have no control over any axis and will turn the illuminated position inticator off.

6.2.3.2.3.2. Sensitivity

The sensitivity menu allows you to adjust the touch sensitivity of the micro-force joystick to Min, Mid or Max. At Min, the joystick needs more preasure to react. At Max, the joystick will respond to a lighter touch.

6.2.3.2.3.3.   Speed

The speed menu allows you to adjust the motor speed of the joystick´s assigned axis. Use the thumb wheel to increase or decrease the motor speed. Press select to confirm your speed settings.

6.2.3.2.3.4.   Lock

The lock menu allows you to lock the joystick (e.g. if shooting with a locked off camera).

A small red lock will be displayed in the status bar on all main screens. The letter "J" for joystick will illuminate each time you touch the joystick. The status LED of the joystick will start flashing red, indicating that the joystick is locked and no motor control is possible.

6.2.3.3.   LENS

The lens menu contains all settings related to lens files and lens file handling and consists of:

Load
Unload
Create
Edit
Delete
Lens View
Set iris
Set zoom
Circle of confusion

Note: A lens file must be loaded on the hand unit to view and use cPRO's advanced features. These include, lens data, pre-marked rings and sliders, and autofocus. Lens data can be created on the cPRO hand hand unit using the internal create lens wizard or cworld. It is also possible to upload archive lens files via the USB port (available with Software Release Package v2.0).

6.2.3.3.1.   Load

The load menu allows you to load a lens file from the list of lens files stored in the cPRO hand unit's internal memory. Up to 30 lens files can be stored internally.
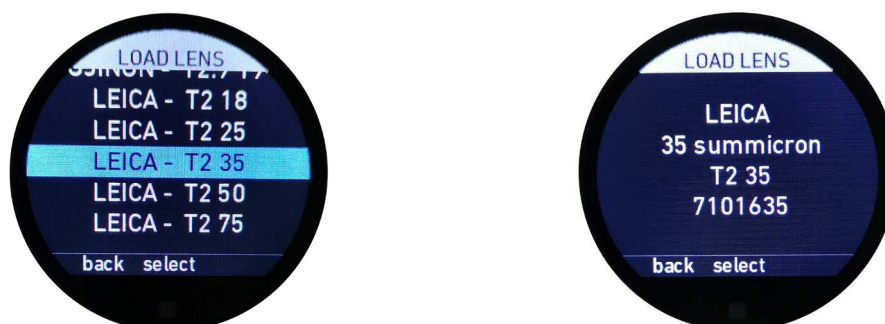
If you select a lens file form the list by pressing select, detailed lens file information will show up on the following screen. If you press select again or make a short tap on the touch screen, the lens file will be loaded without further confirmation required. If you want to choose a different lens file than the one shown in the details screen, simply press back or swipe right to return to the lens file list.

6.2.3.3.2.   Unload

The unload menu allows you to unload an already loaded lens file. Selecting unload will unload the lens file without further confirmation required.

Note: If there is no lens loaded on the hand unit, advanced cPRO features will be disabled and the main screen will only display a percentage of th motors calibrated range.

6.2.3.3.3. Create

The Create menu allows you to create a lens file using the cPRO hand unit's internal lens wizard. To create a new lens file, follow the procedure below.

Note: While creating a new lens file, it is possible to exit the lens wizard using the back function (MB1) or the HOME button at any stage without loosing recently entered data.

NOTICE
Please make sure the motor is correctly assigned to the right or left side of the camera. Please refer to section "6.2.3.4.2.3. Direction" on page 56 in this manual.

Once you re-enter the lens wizard, you can select whether you want to create a new lens or continue with the lens from the previous session. Press "clear" (MB3) if you want to delete all data from the previous session and start creating a new lens. Press "next" (MB2) if you want to keep the data from the previous session and continue creating data for that lens. Press "back" (MB1) to return to the previous menu page.

6.2.3.3.3.1. Motor calibration

Please ensure ALL motors are fully calibrated. If they are already, you can press "skip" (MB2).

If you are not sure press "cal" (MB3) to start motor calibration. Once the motors have been calibrated properly press "next" (MB2.)

<table>
<tr><td colspan="2">⚠ CAUTION!</td></tr>
<tr><td>⚠</td><td>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 longer period of time.
IEC 60417-6056 (2011-05) for other moving parts</td></tr>
</table>

6.2.3.3.3.2.   Select manufacturer

Select the name of the lens manufacturer from the list of brands. Scroll through the list using the thumb wheel or swipe up or down using the touch screen.

Confirm your selection by pressing "next" (MB3) or swipe left on the touch screen.

6.2.3.3.3.3.   Set lens name

To create the lens name, scroll through the alphabetic characters using the thumb wheel or swipe up or down on the touch screen. A minimum of two characters are required to create and save a lens name.

Once the desired letter is highlighted in blue, press "select" (MB2) to set the character. As an alternative, you can also tap the touch screen to confirm your selection.

UB1 allows you to change between UPER CASE, lower case and numbers.

UB2 allows you to delete the last set character.

UB3 allows you to select a previous set character. Once it is highlighted in blue, you can change it using the thumb wheel or touch screen or delete it by pressing UB2.

Note: You can use a maximum of 18 characters to create a lens name.

Once you have completed the lens name, press "next" (MB3) to continue or swipe left on the touch screen.

6.2.3.3.3.4. Set serial number

To help identify individual lens files, please enter the unique lens serial number. A minimum of two characters are required to set and save a serial number.

Note: You are allowed to enter a maximum of 16 characters.

Confirm your selection by pressing "next" (MB3) or swipe left on the touch screen.

6.2.3.3.3.5. Focus imperial / metric selection

Lenses are usually engraved with either a metric or imperial focus scale. Please select here if you want to create a metric scale, an imperial scale, or a scale for both imperial and metric.

Note: In the following example, a metric scale is being created. However, please follow the same procedure for creating an imperial scale or both scales.

Confirm your selection by pressing "next" (MB3) or swipe left on the touch screen.

6.2.3.3.3.6. Scale calibration

The scale calibration menu allows you to select which scale you want to create. I.e. Focus, Iris or Zoom. Initially, all scales will be illuminated in red and the "save" function (MB2) will be grayed out. The scales will only illuminate green after assigning at least one value for each scale. It is only possible to save the lens file when each axis (with an assigned motor) is green.

Note: If you do not have a motor connected and assigned to iris and zoom, you must enter at least one value for each corresponding scale. Please enter the open iris value for the iris scale and the focal length of your prime lens in the zoom scale.

6.2.3.3.3.7. Focus scale

In general, you can start creating the focus scale from either direction. In this example however, the lens is being created from infinity to close focus.

Move the control interface assigned to focus (knob as default) until the datum line on your lens matches infinity.

Use the thumb wheel to scroll clockwise or counter-clockwise until you see "inf" in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once "inf" is highlighted in the blue input box, press "set" (MB2) and the infinity mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Move the control interface assigned to focus (knob as default) to the next line and value on your lens.

If you move the lens from the last set value in one direction (in this case down, towards close focus), the lens wizard will predict the next value.

If the predicted value is not a value marked on your lens, use the thumb wheel to scroll clockwise or counter-clockwise until you see the desired value in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once the desired value is highlighted in the blue input box, press "set" (MB2) and the value mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Continue this procedure until you have set all important values on your lens.

Note: It is not necessary to assign every single lens value because the cPRO system will predict missing values automatically. However, to achieve the best matching lens data, it is recommended to input and assign as many values as possible using this procedure.

If a lens value is not displayed in the predicted list, press UB3 to change the resolution of the input box. This allows you to enter any value. The text "UB3:resolution" will illuminate green while the high resolution remains active. Press UB3 again to return to the original resolution.

As long as a value is highlighted in yellow, you can delete it by pressing UB2. You can also reposition the mark by moving lens to the new position and pressing "set" (MB2), tapping the touch screen or pressing the back button (BB1).

UB1 allows you to set lines (without a value) in order to create a perfect animated depiction of your lens. Lines can either be added between values or added separately after all the values have been created.

6.2.3.3.3.8. Iris scale

In general, you can start creating the iris scale from either open or closed.

Note: If you are not using an iris motor, please enter the wide open iris value of your lens.

Move the control interface assigned to iris (slider as default) until the datum line on your lens matches the desired T-stop value.

Use the thumb wheel to scroll clockwise or counter-clockwise until you see the corresponding numeric value in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once the desired value is highlighted in the blue input box, press "set" (MB2) and the value mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Move the control interface to the next line and value on your lens.

If you move the lens from the last set value in one direction, the lens wizard will predict the next value.

If the predicted value is not a value marked on your lens, use the thumb wheel to scroll clockwise or counter-clockwise until you see the desired value in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once the desired value is highlighted in the blue input box, press "set" (MB2) and the value mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Continue this procedure until you have set all important values on your lens.

Note: It is not necessary to assign every single lens value because the cPRO system will predict missing values automatically. However, to achieve the best matching lens data, it is recommended to input and assign as many values as possible using this procedure.

If a lens value is not displayed in the predicted list, press UB3 to change the resolution of the input box. This allows you to enter any value. The text "UB3:resolution" will illuminate green while the high resolution remains active. Press UB3 again to return to the original resolution.

As long as a value is highlighted in yellow, you can delete it by pressing UB2. You can also reposition the mark by moving lens to the new position and pressing "set" (MB2), tapping the touch screen or pressing the back button (BB1).

UB1 allows you to set lines (without a value) in order to create a perfect animated depiction of your lens. Lines can either be added between values or added separately after all the values have been created.

6.2.3.3.3.9. Zoom scale

In general, you can start creating the zoom scale from either the long end or wide end of the lens.

Note: If you are using a prime lens, please enter the focal length.

Move the control interface assigned to zoom (joystick as default) until the datum line on your lens matches the desired focal length.

Use the thumb wheel to scroll clockwise or counter-clockwise until you see the corresponding numeric value in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once the desired value is highlighted in the blue input box, press "set" (MB2) and the value mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Move the control interface to the next value on your lens.

If you move the lens from the last set value in one direction, the lens wizard will predict the next value.

If the predicted value is not a value marked on your lens, use the thumb wheel to scroll clockwise or counter-clockwise until you see the desired value in the blue input box. As an alternative, you can also swipe the touch screen up or down.

Once the desired value is highlighted in the blue input box, press "set" (MB2) and the value mark will be set on the grafical scale bar. As an alternative, you can also tap the touch screen to confirm your selection or press the back button (BB1).

Continue this procedure until you have set all important values on your lens.

Note: It is not necessary to assign every single lens value because the cPRO system will predict missing values automatically. However, to achieve the best matching lens data, it is recommended to input and assign as many values as possible using this procedure.

If a lens value is not displayed in the predicted list, press UB3 to change the resolution of the input box. This allows you to enter any value. The text "UB3:resolution" will illuminate green while the high resolution remains active. Press UB3 again to return to the original resolution.

As long as a value is highlighted in yellow, you can delete it by pressing UB2. But you can also reposition the mark by moving the lens to the new position and pressing "set" (MB2), tapping the touch screen or pressing the back button (BB1).

UB1 allows you to set lines (without a value) in order to create a perfect animated depiction of your lens. Lines can either be added between values or added separately after all the values have been created.

6.2.3.3.3.10. Save

As soon as at least one value is set per scale, the "save" icon will illuminate white. Press MB2 to save the lens file to the internal memory of the cPRO hand unit. With the present firmware release, up to 30 lens files can be saved.

Please close the lens wizard by pressing "next" (MB3) and return to the main menu.

6.2.3.3.4.   Edit

The edit menu allows you to edit existing lens files on the cPRO hand unit using the lens wizard.

Note: If you are editing a lens file and you leave the lens wizard by pressing the back function (MB1) or the HOME button, changes will not be saved. The following warning message will be displayed.

You can then confirm whether you do want to leave the lens wizard by pressing "abort" (MB3), or return to the lens wizard by pressing "back" (MB1).

The "edit lens" feature follows the exact same procedure as the "create lens" function with the exeption, that you have to select the lens file you want to edit from the dynamic list.

Press "next" (MB3) to select the lens file you want to edit. Press "back" (MB1) if you want to select a different lens file.

If the lens file you have selected does not match the motor calibration range, or e.g. you select a prime lens and 3 motors connected, or a zoom lens with only one motor connected, a warning message will appear. Press "next" (MB3) to continue, or press "back" (MB1) to select a different lens file.

For additional information on the "edit lens" procedure, please refer to section "6.2.3.3.4. Edit" on page 53 in this manual.

6.2.3.3.5. Delete

The delete menu allows you to delete an individual lens file from the cPRO hand unit's internal memory.

Once selected from the dynamic list, detailed lens information about the lens will be displayed on the following page. To delete this lens, simply press "delete" (MB3). The lens file will be deleted without further confirmation required and cannot be recovered. If you want to choose a different lens file to delete, simply press "back" (MB1) or swipe right to return to the lens file list.

6.2.3.3.6. Lens view

The lens view menu allows you to change the size of the FIZ scales for the GUI in the main screens to small medium or large.

small   medium   large

6.2.3.3.7. Set iris

The set iris menu allows you to enter a fixed iris value if no iris motor is connected, in order to allow valid lens data calculation.

Note: A lens file needs to be loaded. Set iris uses a fixed iris value when the axis is not motorized. This value needs to be changed each time the iris is changed on the lens.

6.2.3.3.8. Set zoom

The set zoom menu allows you to enter a fixed zoom value if no zoom motor is connected, in order to allow valid lens data calculation.

Note: A lens file needs to be loaded. Set zoom uses a fixed zoom value when the axis is not motorized. This value needs to be changed each time the zoom is changed on the lens.

6.2.3.3.9. Circle of confusion

The circle of confusion menu allows you to enter a value depending on your cameras sensor size and image format, in order to allow valid lens data calculation. The circle of confusion (CoC) is used to determine depth of field.

Note: A lens file needs to be loaded. This value needs to be set before shooting with a new camera. For the correct circle of confusion value for your camera, please refer to the camera manual or contact the camera manufacturer.

6.2.3.4. MOTORS

The motors menu contains all settings related to motor functions. These consist of:

Calibration all
Motor settings
Stealth mode

6.2.3.4.1. Calibration all

The calibration all menu allows you to calibrate all motors at once. Selecting calibration all will calibrate all connected motors without further confirmation required.

NOTICE
The lens motors must be recalibrated under the following conditions: - When a motor is detached from the lens - After changing motors - After changing lenses - After a change in a motor position while powered down

NOTICE
Omitting motor calibration might lead to damage of the lens due to the high level of motor torque!

⚠️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 longer period of time. IEC 60417-6056 (2011-05) for other moving parts

6.2.3.4.2. Motor settings

The motor settings menu contains all settings related to motor behaviour. Once you have entered the motor settings menu, please select the motor you want to adjust from the dynamic motor list.

Each motor menu consists of:

Axis (status)
Direction (status)
Ramp (status)
Torque (status)
Calibrate

6.2.3.4.2.1. Axis

The axis menu allows you to change the motor assigment to focus, iris or zoom.

Note: The axis menu changes the motor assignment not the assignemnt of the control interface. With cforce motors you can change the motor assignment on the motor itself by pressing the FIZ button. In order to change the motor assignement for a cPRO motor, please refer to the cPRO motor user guide.

6.2.3.4.2.2. Torque

The torque menu allows you to adjust the strength of the motor to min, weak, strong and max.

Note: Increasing the motor torque drains more power of the system and can place stress on the lens. Only increase the torque as much is necessary, in order to achieve reactive and fluent lens control.

6.2.3.4.2.3. Direction

The direction menu allows you to set the side of the camera which the lens motor is mounted on to either left or right.

Note: The direction is defined from the operators point of view, from behind the camera.

6.2.3.4.2.4.   Ramp

The ramp menu allows you to adjust the start and stop acceleration of the motor to min, short, long and max. This allows for both smooth speed-up and slow-down curves.

NOTICE
The motor settings menu can be reached from all motors main screens quickly by tapping and holding the touch display or by pressing and holding menu button 2 (MB2).

6.2.3.4.2.5.   Calibrate

The calibrate menu allows you to calibrate each motor axis individually. Selecting calibrate will calibrate the corresponding lens motor without confirmation required.

NOTICE
The lens motors must be recalibrated under the following conditions: - When a motor is detached from the lens - After changing motors - After changing lenses - After a change in a motor position while powered down

NOTICE
Omitting motor calibration might lead to damage of the lens due to the high level of motor torque!

⚠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 longer period of time. IEC 60417-6056 (2011-05) for other moving parts

6.2.3.4.3.   Stealth mode

The stealth mode menu can activate and deactivate the cPRO's stealth mode. When stealth mode is on, the illumination of all LBUS connected cforce motors will be turned off (e.g. if the camera angle is critical because of camera reflection in the picture).

6.2.3.5.   RANGEFINDER

The rangefinder menu contains all settings related to the use of rangefinders. This consists of:

<div align="center">

Offset
Limits
Sensitivity
Autofocus (status)
Laser pointer
Stealth mode

</div>

6.2.3.5.1.   Offset

The offset menu allows you to input an offset measurement between the rangefinder's sensor and the camera's sensor.

How to preceed:

Measure the distance from the datum line of the rangefinder to the sensor plane of your camera and enter the measured distance into the offset menu usning the thumb wheel. Confirm your settings by pressing select.

Note: If the rangefinder is mounted in front of the camera´s sensor plane, enter a positive value. If the rangefinder is mounted behind the camera´s sensor plane enter a negative value.

6.2.3.5.2.   Limits

The limit menu allows you to define your range of interest. If in AF mode, autofocus will be active in this range only.

How to preceed:

limit max: - use the thumb wheel to enter a far distance limit

- press next in order to switch to the next digits or to limit min

- press select in order to confirm your settings

Note: If in AF mode, focus will not be adjusted for measurements beyond limit max.

limit min: - use the thumb wheel to enter a close distance limit

- press next in order to switch to the next digits or to limit max

- press select in order to confirm your settings

Note: If in AF mode, focus will not be adjusted for measurements below limit min.

Note: The limits icon in the rangefinder main screen will turn green if a rangefinder limit other than limit max = inf and limit min = 0 is set, otherwise the icon illuminates white.

6.2.3.5.3. Sensitivity

The invisible laser used in cfinder III makes 300 measurements every second. To make this rapid distance information more suitable for both viewing and motorised lens control, cfinder III calculates an average distance that is then displayed on the screen and used to control the focus motor when autofocus is active.

Sensitivity allows you to increase or decrease the rate at which the 'average' value is calculated. By increasing sensitivity, cfinder III will display an increased number of distance values per second and adjust the motor position accordingly (= faster / snap reaction).

By decreasing sensitivity, cfinder III will display fewer distance values per second and adjust the motor position accordingly (= slower / smoother reaction).

Note: To track a fast moving target, increase sensitivity for a faster motor response. To track a slow moving or fixed target, reduce sensitivity for a smoother motor response.

Note: Sensitivity is available with cmotion cfinder III or with other rangefinders via ARRI LCUB-1 only.

6.2.3.5.4. Autofocus

Autofocus will seamlessly match distance measurement data from the rangefinder with lens data from the cPRO hand unit to control the focus scale of the lens automatically.

If autofocus "on" is selected within the autofocus menu, focus will be adjusted permanently until turned off again.

Autofocus can be activated through a cPRO hand unit user function as well. This supports various autofocus trigger options including autofocus press, autofocus toggle, and autofocus pinpoint. (For further information, please refer to section "6.2.3.6. BUTTONS" on page 61 in this manual)

Note: In order to use autofocus with a cPRO hand unit, a lens file needs to be loaded, a lens motor needs to be connected, engaged with the lens and assigned to focus. (For further information on how to create lens data, please refer to section "6.2.3.3. LENS" on page 42 in this manual or to the cworld user guide.)

6.2.3.5.5. Laser pointer

The laser pointer menu allows you to turn the rangefinder's laser pointer on or off. When the laser pointer is turned on, it will remain active for one minute before turning off automatically. During this time, you can turn it off manually by selecting "off"

Note: The laser pointer icon in the rangefinder main screen turns green if the laser pointer is on. If the laser pointer is off it illuminates white.

Note: The laser pointer can be activated through a cPRO hand unit user function as well. This allows the laser to remain active as long as the user button is being pressed. (For further information, please refer to section "6.2.3.6. BUTTONS" on page 61 in this manual.)

Note: All laser pointer functions are available with cmotion cfinder III only.

6.2.3.6. BUTTONS

The buttons menu allows you to assign user functions to any assignable user button on the cPRO hand unit. Once a user function is assigned to a button, the button will illuminate and the buttons assignment will be displayed in the buttons main screens. If the button is assigned to no function (off) the corresponding user button will not be illuminated.

Note: With the exception of of the REC button, the HOME button and the menu button 2 (MB2) all other buttons can be assigned individually. All buttons, with the exception of the back button, illuminate once assigned to a user function.

6.2.3.6.1. Assignable user buttons

Assignable user buttons	User button functions
UB1	Off
UB2	Focus limits set
UB3	Iris limits set
BB1	Zoom limits set
MB1	Focus calibration
MB3	Iris calibration
	Zoom calibration
	Calibration all
	ZAP
	Joystick speed up
	Joystick speed down
	Autofocus press
	Autofocus toggle
	Autofocus pinpoint
	System unit
	Steath mode
	Laser pointer
	Camera rec
	Lock knob
	Lock slider
	Lock joystick
	Lock thumb wheel

6.2.3.6.2. User button functions

User button function	Description
Off	turns the user button off / no function / the user button illumination will turn off
Focus limits set	please refer to the detailed explenation below
Iris limits set	please refer to the detailed explenation below
Zoom limits set	please refer to the detailed explenation below
Focus calibration	calibrates the focus motor only
Iris calibration	calibrates the iris motor only
Zoom calibration	calibrates the zoom motor only
Calibration all	calibrates all connected motors at once
ZAP	sets the joystick speed to maximum as long as the button is being pressed
Joystick speed up	turns the joystick speed up (press and hold to speed the adjustment up)
Joystick speed down	turns the joystick speed down (press and hold to speed the adjustment up)
Autofocus press	activates autofocus as long as the user button is being pressed / after releasing the user button, the focus will move to the preset knob position.
Autofocus toggle	activates autofocus by a single press of the user button / press again to deactivate / after deactivating the autofocus, the focus will move to the preset knob position
Autofocus pinpoint	please refer to the detailed explenation below
System unit	changes the scale units between imperial or metric
Steath mode all	turns the illumination of all LBUS devices on the camera side off or on
Laser pointer	turns the laser pointer on as long as the button is being pressed
Camera rec	starts and stops the camera
Lock knob	digitally locks and unlocks the knob
Lock slider	digitally locks and unlocks the slider
Lock joystick	digitally locks and unlocks the joystick
Lock thumb wheel	digitally locks and unlocks the thumb wheel

Focus limits set: This user button function allows you to limit the focus scale to a certain range. If you move the controller beyond this range, its position will not be forwarded to the lens motor. The lens motor will move within the set range only. The focus limit function works like a digital end stop.

Iris limits set: This user button function allows you to limit the iris scale to a certain range. If you move the controller beyond this range, its position will not be forwarded to the lens motor. The lens motor will move within the set range only. The iris limit function works like a digital end stop.

Zoom limits set: This user button function allows you to limit the zoom scale to a certain range. If you move the controller beyond this range, its position will not be forwarded to the lens motor. The lens motor will move within the set range only. The zoom limit function works like a digital end stop.
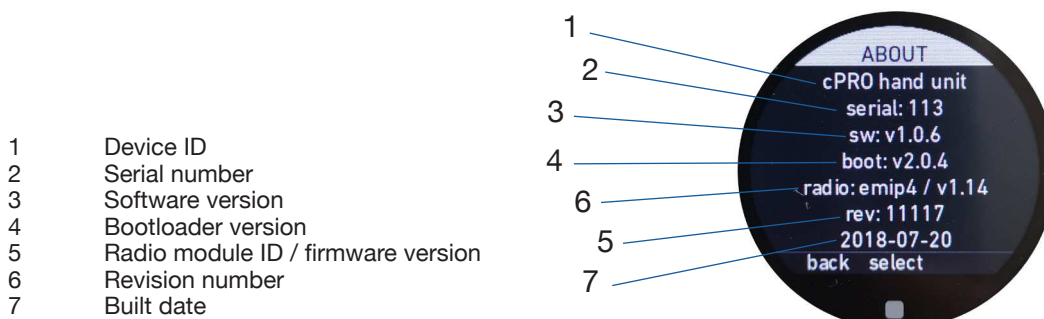
Autofocus pinpoint: This user button function takes continuous readings from the rangefinder and focuses automatically. If the user button is pressed and held, autofocus will remain active until the button is relased. After releasing the user button, the focus will stay at the last measured distance. Turning the knob over the fixed focus position, assigns the control back to the knob automatically.

6.2.3.7. ABOUT

The about menu displays information about the current firmware installed on the cPRO hand unit and each connected component. It also allows you to update firmware and perform a factory reset. The menu consists of:

cPRO hand unit
LBUS DEVICES
Firmware update
Factory reset

6.2.3.7.1. cPRO hand unit

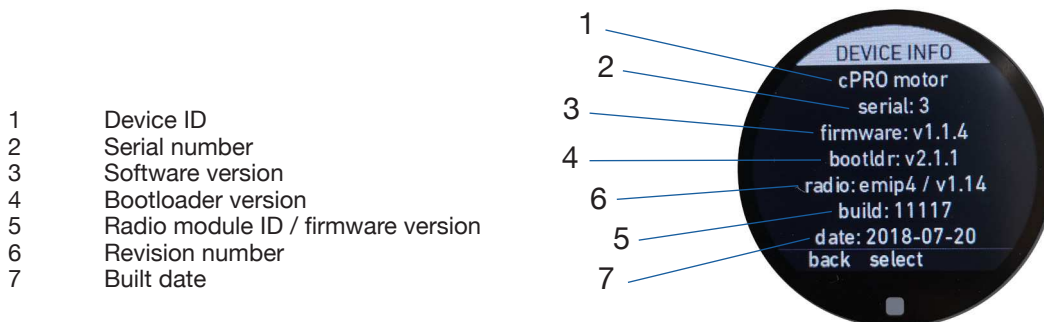|	
1	Device ID
2	Serial number
3	Software version
4	Bootloader version
5	Radio module ID / firmware version
6	Revision number
7	Built date

The cPRO hand unit ABOUT menu shows you all relevant data about your cPRO hand unit.

Note: Please have this data available, if contacting the cmotion support team with any technical enquiries.

6.2.3.7.2. LBUS devices

1	Device ID
2	Serial number
3	Software version
4	Bootloader version
5	Radio module ID / firmware version
6	Revision number
7	Built date

The LBUS device ABOUT menu shows you all relevant data about the connected LBUS devices. Please select the LBUS device form the dynamic list of devices you want more information on.

Note: Please have this data available, if contacting the cmotion support team with any technical enquiries.

6.2.3.7.3. Firmware update

The firmware update menu allows you to update your cPRO hand unit as well as other connected LBUS devices.

Note: In order to perform an update, a USB stick formated in ExFAT or FAT32 loaded with the appropriate update file for the cPRO hand unit or an other LBUS device needs to be inserted in the USB slot on the back side of the cPRO hand unit. The USB drive will be recognized and mounted automatically.

Please select cPRO hand unit if you want to update your hand unit or LBUS devices and the corresponding LBUS device form the dynamic list if you want to update another LBUS product. The update procedure is the same for any device as follows.

NOTICE
In order to update LBUS devices, the cPRO hand unit needs to be hard-wired to the corresponding LBUS device using any LCB cable. The cPRO motor and cPRO camin can also be updated through their CAM interface using the cable CAM (7p) - LBUS [K2.0015760].

Please select the update file form the USB drive which you want to up- or down-grade to.

Please check the current firmware status and the new firmware upgrade option. Press select if you want to procceed, press back if you want to select another update file.

Please confirm the update by pressing update. Press back to return to the previous page.

The update will procceed in various steps if required updating your main software, your radio module and your bootloader software. Once finished the cPRO hand unit or the connected LBUS device will restart automatically.

| NOTICE |
| --- |
| Please ensure the battery of the cPRO hand unit is completely charged before starting any update! Do not remove the battery or the USB drive from the cPRO hand unit while the update is in progress! |

NOTICE
Do not power off the cPRO hand unit or the connected LBUS devices while the update is in progress as this may damage the device!

Note: Please check cmotion`s website for the latest firmware packages.

6.2.3.7.4. Factory reset

The factory reset menu allows you to reset the cPRO hand unit and all connected LBUS devices to manufacturer settings.
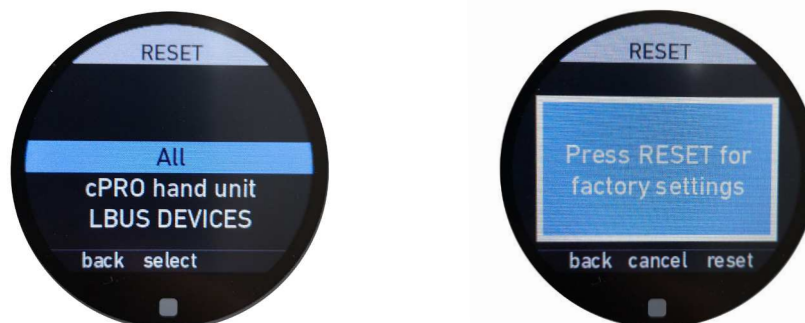
Please select all if you want to reset all connected LBUS devices and the cPRO hand unit. Select cPRO hand unit if you want to reset the cPRO hand unit only. Select LBUS devices and then one device from the dynamic LBUS device list if you want to reset a specific LBUS device only.

Please confirm your selection by pressing reset in order to reset the selected device or back / cancel in order to cancel the procedure.

When performing a factory reset on the cPRO hand unit, you will be asked to confirm whether you also want to reset the internal lens database. If you do want to delete ALL lens files saved on the cPRO hand unit, press "yes". Press "no" to perform a factory reset without deleting the entire lens database.

NOTICE
Do not power off the cPRO hand unit or the connected LBUS devices while the factory reset is in progress as this may damage the device!

7. Setting up the cPRO system

7.1. using the cPRO motor

camera   12V battery

cPRO hand unit

wireless RF connection

LPS-7 cable
(Lemo 4p to Anton Bauer Dtap)
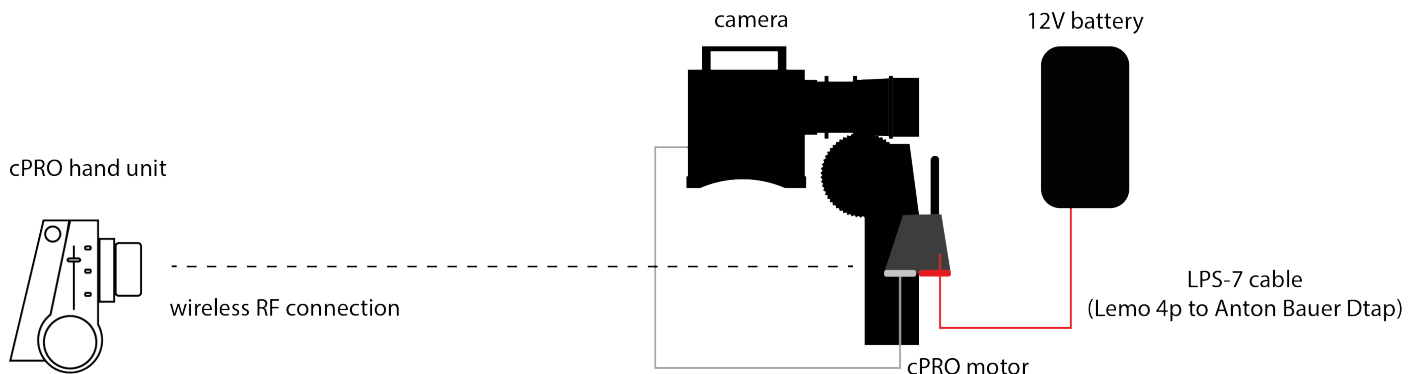
cPRO motor

7.1.1. Mounting and connecting cables:

- mount the cPRO motor on a 15mm / 19mm support rod and engage it with the lens (please refer to the cPRO motor manual)
- mount the cforce motors on the 15mm /19mm support rod and engage with the lens (please refer to the cforce motor manual)

Note: Up to 2 additional cforce motors can be daisy-chained using any LCB cable from one motor to the other.

- connect the cPRO motor to the power supply e.g. D-Tap battery using cable LPS-7.
- depending on your camera, connect the corresponding camera interface cable between the CAM port on the cPRO motor and the camera.

7.1.2. Setting up cPRO hand unit and cPRO motor

7.1.2.1. Establishing a wireless RF connection

- turn on the cPRO hand unit by pressing the HOME button
- select the same RF channel on the cPRO hand unit and the cPRO motor
  - **cPRO hand unit:** double press the HOME button to enter the adjustment menu; go to MAIN / RADIO / Channel to change the RF channel (0-13)
  - **cPRO motor:** press the lower button to change the RF channel (0-13)

Note: The RF connection will be established automatically

Note: please double check if the region settings are set to the region you are located in.

- cPRO hand unit: double press the HOME button to enter menu; go to MAIN / RADIO / Region to change the region settings. The region will be set on the cPRO motor automatically.

<table>
<tr><td>NOTICE</td></tr>
<tr><td>It may not be legal to operate the cPRO hand unit in a country/region other than the country/region selected in the region menu. Select ROW (Rest of world) or use the device in hard-wired mode if you are unsure of the correct region setting.</td></tr>
</table>

Note: 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. Once a cPRO hand unit is set to the same radio channel like the cPRO motor, the device will connect automatically. Up to 3 cPRO hand units can be connected to a cPRO motor at a time (available with Software Release Package v2.0 / license required for each hand unit).

7.1.2.2. Assigning the cPRO and other motor's control axis

- To assign the cPRO motor to the corresponding lens axis, press the upper button repeatedly until the correct axis name is displayed.
- To assign a cforce mini or cforce plus motor to the corresponding lens axis, press the FIZ button repeatedly until the correct axis character is illuminated.
  (F=Focus / I=Iris / Z=Zoom)
- alternatively assign the cPRO / cforce motors control axis using the cPRO hand unit; double press the HOME button to enter the adjustment menu; go to MOTORS / Motor Settings /select the right motor / Axis

7.1.2.3. Calibrating the cPRO / cforce motors

- calibrate the cPRO motor by pressing and holding the upper button for 3 seconds
- calibrate the cforce motors by pressing and holding the FIZ button on each cforce motor for 3 seconds
- alternatively calibrate the cPRO / cforce motors using one of the cPRO hand unit functions „calibrate" e.g. double press the HOME button to enter the adjustment menu; go to MOTORS / Calibrate all)

<table>
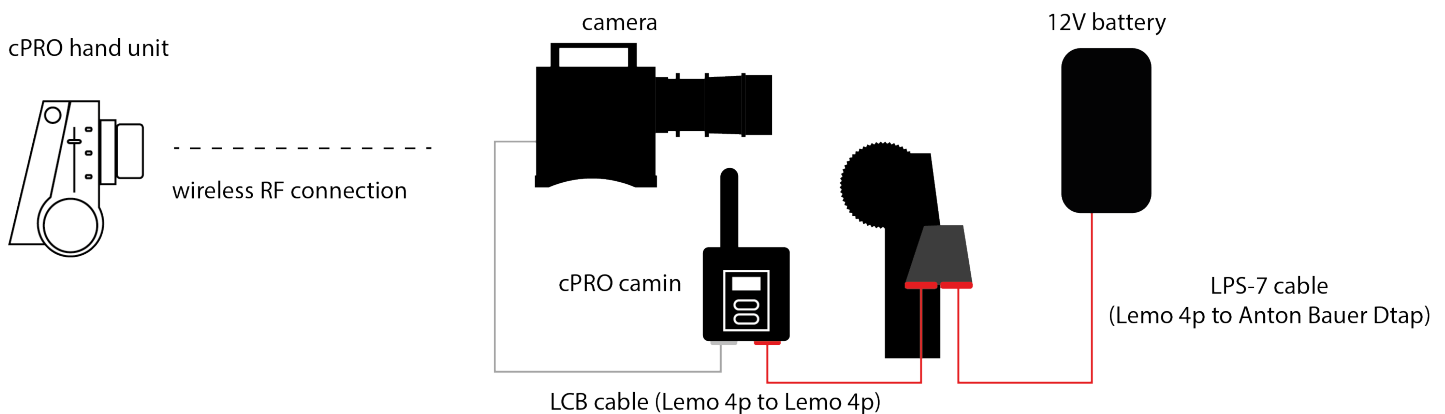<tr><td>⚠ CAUTION!</td></tr>
<tr><td>

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 longer period of time.

IEC 60417-6056 (2011-05) for other moving parts</td></tr>
</table>

7.2. using the cPRO camin with cforce motors

cPRO hand unit

camera

12V battery

wireless RF connection

cPRO camin

LPS-7 cable
(Lemo 4p to Anton Bauer Dtap)

LCB cable (Lemo 4p to Lemo 4p)

7.2.1. Mounting and connecting cables:

- mount the cPRO camin on the camera using e.g the cPRO camin bracket (please refer to the cPRO camin manual)
- mount the cforce motors on the 15mm / 19mm support rods and engage them with the lens (please refer to the cforce motor manual)

Note: Up to 3 cforce motors can be daisy-chained using LCB cables from one motor to the other.

- connect the cPRO camin with the first cforce motor using a LCB cable (e.g. cable LCB-A)
- connect the last cforce motor in the daisy-chain to the D-Tap power source using cable LPS-7.
- for camera data and run/stop control, connect the corresponding camera interface cable to the camera and the CAM connector to the cPRO camin

7.2.2. Setting up cPRO hand unit and cPRO camin

7.2.2.1. Establishing a wireless RF connection

- turn on the cPRO hand unit by pressing the HOME button
- select the same RF channel on the cPRO hand unit and the cPRO camin
  - **cPRO hand unit:** double press the HOME button to enter the adjustment menu; go to MAIN / RADIO / Channel to change the RF channel (0-13)
  - **cPRO camin:** press the lower or upper button to change the RF channel (0-13) up or down

Note: The RF connection will be established automatically

Note: please double check if the region settings are set to the region you are located in.

- cPRO hand unit: double press the HOME button to enter menu; go to MAIN / RADIO / Region to change the region settings. The region will be set on the cPRO camin automatically.

NOTICE
It may not be legal to operate the cPRO hand unit in a country/region other than the country/region selected in the region menu. Select ROW (Rest of world) or use the device in hardwired mode if you are unsure of the correct region setting.

Note: 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 camin. Once a cPRO hand unit is set to the same radio channel like the cPRO camin, the device will connect automatically. Up to 3 cPRO hand units can be connected to a cPRO camin at a time (available with Software Release Package v2.0 / license required for each hand unit).

7.2.2.2. Assigning the motor's control axis

- To assign a cforce mini or cforce plus motor to the corresponding lens axis, press the FIZ button repeatedly until the correct axis character is illuminated. (F=Focus / I=Iris / Z=Zoom)
- alternatively, assign the cforce motors control axis using the cPRO hand unit; double press the HOME button to enter the adjustment menu; go to MOTORS / Motor Settings /select the corresponding motor / Axis

7.2.2.3. Calibrating the cforce motors

- calibrate the cforce motors by pressing and holding the FIZ button on each cforce motor for 3 seconds
- alternatively calibrate the cforce motors using one of the cPRO hand unit functions „calibrate" e.g. double press the HOME button to enter the adjustment menu; go to MOTORS / Calibrate all

⚠ 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 longer period of time. IEC 60417-6056 (2011-05) for other moving parts

8. Compatibility

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

- ☒ cPRO motor / cPRO camin
- ☒ 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 optional CAM interface cables.

9. Power connection and disconnection

9.1. Power connection

⚠Warning!
Requirement for the external power supply: Limited power source according to IEC60950-1 or PS2 classified IEC62368-1 and short-circuit current < 8A.

9.2. Power disconnection

⚠CAUTION!
To disconnect the device safely from the power source, remove the cable connector from the cPRO hand unit´s LBUS port.   Mount and operate the device in an orientation to ensure easy access to the connectors.

10.   Appendix

10.1. Antenna connector

Radio connection can be established between the cPRO hand unit and cPRO motor / cPRO camin when an antenna is mounted on each device. It is recommended to only use certified antennas supplied by cmotion.

⚠️Warning!
Please ensure the antenna connector is covered by the antenna or the safety cap at any time. The radio module can suffer damage from electrostatic discharge if the antenna connector is left exposed.

10.2. Specifications

Electrical data

Temperature range: -20 to +50° C (-4 to +122° F)

Battery type: NP-FM500H, 7,2V, 2040mAh

⚠️Warning!
To reduce risk of fire or burns using the NP-FM500H battery, do not disassamble, crush, puncture short external contacts or dispose off fire and water.

⚠️CAUTION!
Only the originally supplied battery should be used with the cPRO hand unit.

Radio system

The cPRO hand unit 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 on both the cPRO motor and cPRO camin identifies this. There are 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

Channel	Frequency
8	2.420 GHz
9	2.425 GHz
10	2.440 GHz
11	2.445 GHz
12	2.460 GHz
13	2.465 GHz

Note: cmotion red radio and ARRI white radio are not compatible. This means the cPRO hand unit will not communicate with an ARRI white enabled camera or UMC. However, because both modules use the same radio frequency, it is important to have each system set to a different radio channel when being used in parallel.

10.3. Dimensions and weight

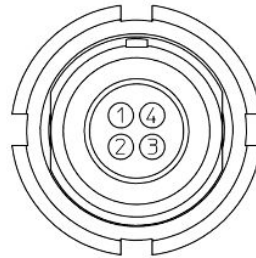**Dimensions:**
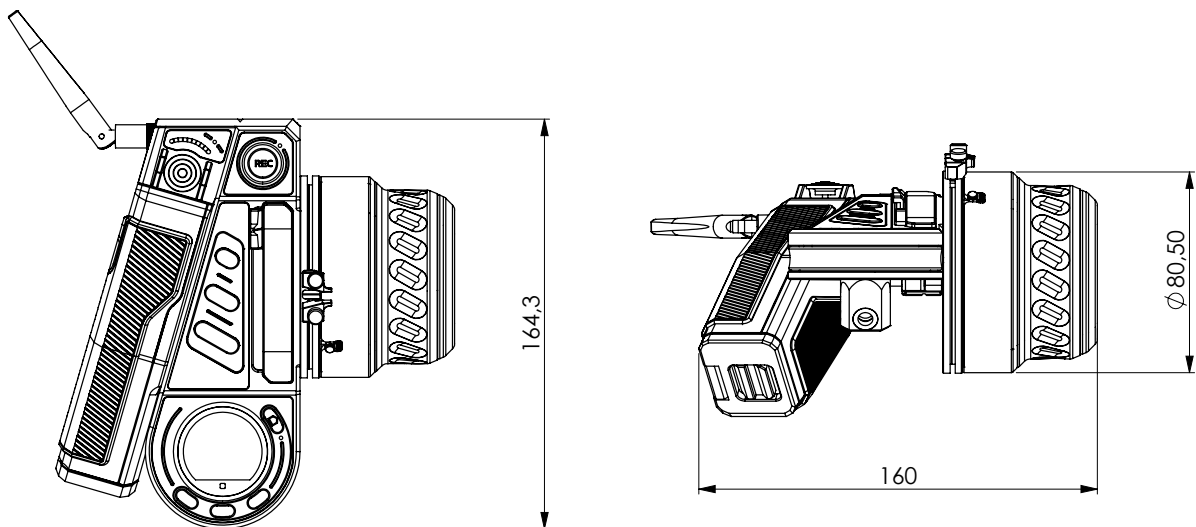
Weight:

cPRO hand unit: appx. 0,89 kg (< 32 oz) (incl. battery and antenna)

10.4. Pinouts

The cPRO hand unit is equipped with one LBUS connector (Lemo 4 pin).

LBUS connector

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

10.5. Part numbers

K2.0016602   cPRO hand unit basic set

The cPRO hand unit basic set includes:

- ☒   cPRO hand unit unit
- ☒   K2.0001996   swivel antenna for SMC-1, EMC-1, AMC-1, cPRO hand unit / motor / camin
- ☒   K2.0019833   cPRO plain white iris strip
- ☒   K2.0020890   plain white focus ring for cPRO hand unitK2.0019832 cPRO truss

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

Antenna part numbers

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

Accessories: The following accessories are compatible with the cPRO hand unit:

K2.0019832   cPRO truss

K2.0019827   cPRO monitor bracket

K2.0019830   cPRO v-lock plate

K2.0019824   cmotion battery

K2.0019822   cmotion battery charger

Focus rings / Iris strips:

K2.0020890   plain white focus ring for cPRO hand unit

K2.0019833   plain white iris strip for cPRO hand unit

Pre-marked focus ring sets:

K2.0019834   pre-marked focus ring imperial set

K2.0019835   pre-marked focus ring metric set

Pre-marked focus rings:

K2.0020897   pre-marked focus ring 3 feet 6 inch for cPRO hand unit

K2.0020904   pre-marked focus ring 20 inch for cPRO hand unit

K2.0020903   pre-marked focus ring 14 inch for cPRO hand unit

K2.0020902   pre-marked focus ring 12 inch for cPRO hand unit

K2.0020901   pre-marked focus ring 8 inch for cPRO hand unit

K2.0020896   pre-marked focus ring 1.0m for cPRO hand unit

K2.0020891   pre-marked focus ring 0.5m for cPRO hand unit

K2.0020894   pre-marked focus ring 0.35m for cPRO hand unit

K2.0020893   pre-marked focus ring 0.25m for cPRO hand unit

K2.0020892   pre-marked focus ring 0.20m for cPRO hand unit

Pre-marked iris strips:

K2.0019836   pre-marked iris strip T 22-2.8 for cPRO hand unit

K2.0019838   pre-marked iris strip T 22-2.0 for cPRO hand unit

K2.0019837   pre-marked iris strip close- T 1.0 for cPRO hand unit

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

1. **cmotion GmbH**
   Wiedner Hauptstraße 135/B3
   1050 Wien
   http://www.cmotion.eu
   sales@cmotion.eu
   +43 1 7891096

2. **camadeus Film Technologies, Inc.**
   314 N. Victory Blvd.
   Burbank, CA 91502
   http://www.camadeus.com
   contact@camadeus.com
   Service Hotline +1 (321) 345-6765

3. **ARRI China (Beijing) Co. Ltd**
   China, Chaowai SOHO Suite C0656
   Chaowai Dajie Yi 6, Chaoyang Qu,
   100020, Beijing
   store@arri.cn
   +86 10 5900 9680

10.7. International declarations

EU-Declaration of Conformity

This 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 cPRO hand unit 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

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