**Introduction: Using The User’s Manual**

**Note:** Notes are used to indicate important information for the user that pertains to the respective section of this user’s guide.

**Warning:** Warnings are used to indicate important information for the user that pertains to the respective section of this user’s guide and where something could go wrong in the process or damage to units could be caused.

**camin, coperate, czoom:** All cmotion components are written in cursive throughout this user’s manual. These words can all also be found at the back of this user’s manual.

**Cables**

When a cable is referred to in this user’s manual it will be referred to as follows (e.g. FI 12p, LE 7p). Cables are referred to in reference to their connectors. Cmotion cables are manufactured by W. W. Fisher, Lemo or Hirose which will be referred to as FI, LE and HI respectively. The cable identification begins with the connector that is connected to the cmotion unit, a comma follows, followed by the connector which is connected to non-cmotion units; each connector takes reference to the number of pins it has e.g. the cable (FI 12p, LE 7p) cable is the cmotion Scorpio motor cable. The FI 7p connector is connected to the camin and the LE 12p connector is connected to the Scorpio motor. Cables may also be referred to by their commonly used names e.g. CBUS (FI 7p, FI 7p) and RS (FI 3p, FI 3p) cables, the cable for the CBUS interface and the cable for the RS interface, respectively.

**Necessary Tools**

The following tools may be required to complete steps laid out in this user’s manual:

4mm Allen key
Table of contents

1 SAFETY WARNINGS .................................................................................................................. 4
2 COMPONENT DESCRIPTIONS .................................................................................................. 5
  2.1 Component Overview ........................................................................................................... 5
  2.2 Cmotion Software ............................................................................................................... 8
  2.3 Cmotion Accessories ......................................................................................................... 11
  2.4 Spare Parts .......................................................................................................................... 15
  2.5 Detailed Component Description .......................................................................................16
  2.5.1 camin ............................................................................................................................16
  2.5.2 coperate ........................................................................................................................18
  2.5.3 czoom ............................................................................................................................23
  2.5.4 chandle ..........................................................................................................................25
  2.5.5 cdisplay .........................................................................................................................26

3 SYSTEM SET UP ...................................................................................................................... 29
  3.1 camin ..................................................................................................................................29
  3.2 coperate ................................................................................................................................33
  3.3 czoom ..................................................................................................................................36
  3.3.1 czoom and coperate ....................................................................................................... 36
  3.3.2 czoom and chandle ......................................................................................................... 36
  3.3.3 Attaching the czoom/ chandle to the pan-bar ....................................................................36
  3.3.3.1 Various connections of czoom/chandle .........................................................................37
  3.3.3.2 czoom directly to the camin ..........................................................................................37
  3.3.3.3 czoom to the coperate ..................................................................................................38
  3.3.4 czoom Stand Alone ....................................................................................................... 38
  3.3.5 Powering up the czoom ..................................................................................................38
  3.4 cdisplay ................................................................................................................................40
  3.4.1 cdisplay in Hard-wired Mode .........................................................................................40
  3.4.2 cdisplay in Wireless Mode on the coperate .....................................................................40
  3.4.2.1 Releasing the cdisplay from the clamp .........................................................................41
  3.4.3 cdisplay in Wireless-Mode in Stand Alone ................................................................. 41

Battery .......................................................................................................................................... 42

4 SYSTEM OPERATION ............................................................................................................... 43
  4.1 camin ..................................................................................................................................43
  4.1.1 Turning the camin “ON” ............................................................................................... 43
  4.1.2 Channel Selection .......................................................................................................... 43
  4.1.3 Changing Motor Direction ............................................................................................ 44
  4.2 coperate ................................................................................................................................45
  4.2.1 Channel Selection ..........................................................................................................45
  4.2.2 Turning the coperate “ON” ...........................................................................................45
  4.2.3 Motor Calibration ...........................................................................................................46
  4.2.4 Focus Pulling ...................................................................................................................47
  4.2.5 Limit Setting ....................................................................................................................47
  4.2.6 Locking the Knob ............................................................................................................51
  4.2.7 The Marker Ring ............................................................................................................51
  4.2.8 Iris Control .....................................................................................................................52
  4.2.9 Setting Motor Limits for the Slider ...............................................................................52
  4.2.10 Locking the Slider .......................................................................................................53
  4.2.11 Marker Strips ...............................................................................................................53
  4.2.12 Camera Run ..................................................................................................................53
  4.2.13 Marker Button .............................................................................................................54
  4.2.14 Battery Control ...........................................................................................................54
  4.2.15 Battery Charging ..........................................................................................................54
  4.3 czoom ..................................................................................................................................55
  4.3.1 Zooming ........................................................................................................................55
  4.3.2 Zoom Speed ....................................................................................................................55
  4.3.3 Setting Zoom Limits .......................................................................................................55
  4.3.4 ZAP – Zoom as Fast as Possible ....................................................................................56
  4.3.5 Camera Run ....................................................................................................................56
  4.4 chandle ................................................................................................................................57
  4.4.1 Motor Calibration ..........................................................................................................57
  4.4.2 Camera Run ....................................................................................................................58
1 SAFETY WARNINGS

Warnings

Notice:
Danger of operational error!
Danger of injury!
Damage to equipment possible!

General Safety Specifications

• Do not put your fingers near the motors while motors are moving!

• In order to ensure optimal performance, read this Users’ Guide!

• Assembly and initial operation should be carried out only by persons who are familiar with the equipment!

• Make sure all components (camin, Lens Motors, etc.) are securely mounted!

• Remove batteries from components before transporting or putting in storage!

• Repairs should be made only by authorized service centers!

• Use only original cmotion replacement parts!

• In the case of wet weather, routine safety precautions for handling electrical equipment in wet weather should be taken!

• Do not remove any screws that are secured with paint!

• Do not remove warranty seal!

Important

If you have questions, or you need to order parts, please note the component’s model and serial number.
2 COMPONENT DESCRIPTIONS

2.1 Component Overview

This section will give you a brief description of all cmotion components.

**camin** (Fig. 2. 1)

The *camin* is the "brain" of the system. It communicates with the camera and the lens motors. It can be connected to the other components of the *cmotion* Lens Control System wireless or via cable. Up to 3 lens motors can be plugged into the *camin*. Commonly used digital servo motors from different manufacturers (Arri, Preston, Scorpio, Hedén) can be connected to the *camin*. It comes equipped with a radio/wireless module.

**coperate** (Fig. 2. 2)

The *coperate* is the hand-held unit of the *cmotion* Lens Control System. It controls focus and iris. The *coperate* is equipped with a control wheel and a control slider. The *coperate* is the main *cmotion* hand unit. The system can be expanded in several ways to a multi-functional 3 motor and camera control system. The *coperate* user’s structure is clearly and comprehensively laid out, with a user friendly design. The *coperate* is light-weight and its design is based on stringent ergonomic principles.

**czoom** (Fig. 2. 3)

The *czoom* is an extension module of the *cmotion* Lens Control System. It controls the zoom-motor. There are several ways to integrate the *czoom* in the *cmotion* Lens Control System. It can be attached directly to the *coperate*. It can be used in stand-alone mode, when used in combination with the *chandle*. The *czoom* + *chandle* configuration can be hard-wired to either the *camin* or the *coperate*. 
chandle (Fig. 2. 4)

The chandle is the handle unit for the czoom. It includes a [CAL] and a [RUN] button. It enables the user to use the czoom in stand-alone mode. The chandle is available in different wood types, colors and styles.

Fig. 2. 4: chandle

cdisplay (Fig. 2. 5)

The cdisplay is a multi-functional display and control unit with a 3,8” TFT-screen. The display has an integrated touch-screen. It acts as a control unit for both lenses and cameras. The cdisplay can be used stand-alone (in both wired and wireless configurations), or can be connected directly to the camin. By means of the cmotion fastening tool, the clamp, it can also be connected directly to the coperate. Lens data can be stored in the cdisplay.

Fig. 2. 5: cdisplay

cdisplay.ext (Fig. 2. 6)

The cdisplay-ext is an add-on module for the cdisplay. It allows for wireless use of the cdisplay. Its package consists of: a reader module for reading and writing the ctag (C017-K01) and a radio module for independent communication with the camin.

Fig. 2. 6: cdisplay.ext
**ctag** (Fig. 2. 7)

The ctag is the cmotion lens memory chip. All lens data is “read” onto the ctag which then accompanies its respective lens. Anytime the user may then need to upload lens information he/she can “read” the data onto the cdisplay and within seconds the lens data is available on the cdisplay.

**Note:** Includes credit for lens calibration.
2.2 Cmotion Software

**clensinfo** (Fig. 2. 8)

*clensinfo* is the software module for the *cdisplay* that allows for lens and camera information to be displayed on the *cdisplay* screen. The software reads out an animated depiction of the actual lens barrel and its movements. On the focus scale the hyperfocal distance is indicated with an “H” as well as focus near and focus far of the depth of field. The user can also make focus marker points on the focus scale using the *coperate*. The system is compatible with all lenses and all camera systems which means that all lenses can be depicted.

![clensinfo](image)

**cfocas** (Fig. 2. 9)

*cfocas* depicts a large scale image of the focus scale and all depth of field information. The large fonts of the information make the *cfocas* software practical and easy to use and practical. Information that is read out onto the *cfocas* screen include: focus near, focus far and distance measurement tools information. The focus value fields indicate whether the current focus value is within the depth of field according to color. Focus markers can also be made on the focus scale. The software is compatible with distance measurement tools e.g. the cinetape or *cfocas* will calculate the focus measurements using the distance information provided by the cinetape or cfinder. The software is compatible with all lenses and all camera systems.

![cfocas](image)
**camcon** (Fig. 2. 10)

The camera control software allows the user to set camera parameters such as fps and shutter.

**Note:** Currently, Arri 435, Arri 535, Arri 16SR3, Arri 35 III, Aaton 35 III, Aaton XTR Prod and the Panavision Millennium can be controlled. Implementation of other cameras is in development.

**Note:** Please contact cmotion for the most recent camera control information.

---

**cramp** (Fig. 2. 11)

The cmotion ramp software allows the user to program and execute ramps. Speed and depth of field ramps can be programmed. Speed ramps can be compensated by the iris or shutter or a mixture of both. The ramp time can be given in either screen-time or ramp-time.

**Note:** Currently, Arri 435, Arri 535, Arri 16SR3, Arri 35 III, Aaton 35 III, Aaton XTR Prod and the Panavision Millennium can be controlled. Implementation of other cameras is in development.

**Note:** Please contact cmotion for the most recent camera control information.
cmotion offers its users two calibration software interfaces; one which is administered from a PC, and another which is administered directly from the cdisplay. cdiscal is the cmotion cdisplay lens calibration software. The software allows the user to:

- calibrate new lenses into the system,
- edit existing lenses
- delete existing lenses
- register lenses to the system and
- write lenses to ctags

Lens calibration memorizes motor positions in relation to the user entered lens scales and the end-stops. This must be completed once for each lens and can be done using the cdiscal interface.

Fig. 2. 12: cdiscal- Welcome Screen

Fig. 2. 13: cdiscal - Iris Calibration Screen
2.3 Cmotion Accessories

clamp (Fig. 2. 14)

The clamp allows the user a very comfortable use of the coperate and the cdisplay together. The clamp provides mechanical and internal electronic connection between coperate and cdisplay.

Battery (Fig. 2. 15)

Battery, 2.400mAh, 7.2V for all cmotion hand-units

Battery Charger (Fig. 2. 16)

Battery charger for cmotion batteries, includes 3 batteries

Socket Adapter (Fig. 2. 17)

Worldwide socket adapter
**ctruss** (Fig. 2. 18)

The *ctruss* is a *coperate* fastening tool. It is attached to the back of the *coperate* giving the user access to a multi-functional 1/4 inch screw hole. The *ctruss* allows the *cstrap* can be screwed to the back of the *coperate*.

---

**cstrap** (Fig. 2. 19)

Universal carry-strap accompanied with a 1/4 inch screw. It includes an innovative locking mechanism to prevent it from coming loose.

---

**cboost** (Fig. 2. 20)

Adapter for power supply cables that keeps the voltage at a steady 28 V. The entry voltage can be anywhere between 10V and 35V. The *cboost* is used with 10V camera systems to boost the voltage available to lens motors.

---

**cfastener** (Fig. 2. 21)

The *cfastener* is a universal clamp to be secured to rods 15-28mm (e.g. a support rod or the pan-bar). The clamp comes with two 1/4 inch screws to allow attachment of various fixtures.
**cfast-czoom** (Fig. 2. 23)

Attachment set that attaches the *czoom* to the pan-bar or directly to the camera. The rosette is the same size as an Arri rosette, and is two-sided allowing for attachment to both sides.

**cfast-camin** (Fig. 2. 23)

Attachment set which secures the *camin* to the camera or any 1/4” or 3/8” screw hole. A 6 sided piece is attached to the *camin* which slips into the *cfast-camin* receiver. An integrated quick lock allows for quick and easy mounting and dismounting of the *camin*.

**cfast-cdisplay** (Fig. 2. 24)

Attachment set that connects the *cdisplay* to the camera. The multifunctional arm allows for optimal positioning of the *cdisplay*.

**cfast-artemis** (Fig. 2. 25)

Attachment tool that secures the *camin* to the Sachtler-Artemis Steadycam system.
Calibration Package (Fig. 2. 26)

The calibrating package includes all necessary tools for lens calibration with a PC. The set includes: software, webcam, fastening tool for the webcam, 2 rods, power supply, lens mount.

Note: DOES NOT INCLUDE: Laptop, lens, camin or lens-motor

Calibration Software

The cmotion calibration software is a PC program that allows the user to implement new lenses into the system. Cmotion also offers a calibration software which is administered directly through the cdisplay called cdiscal.
2.4 Spare Parts

**Antenna** (Fig. 2. 27)
Flexible swivel antenna, straight or right angle, length 10cm, +1dBi, 2.4Ghz, for all units

**Marker Ring** (Fig. 2. 28)
Marker ring for rotary knob, for coperate and Arri WFU.

**Marker Strip** (Fig. 2. 29)
Marker strip for slider, for coperate
2.5 Detailed Component Description

2.5.1 camin

Connectors and LEDs on the camin CHANNEL side

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 Channel Selector</td>
<td>Selector knob for radio transmission. Depending where the device is used, select the channel accordingly. Set ( l_0 ) in Europe, USA and Canada. Set ( l_8 ) – ( l_9 ) in Europe, USA, Canada and Japan and Australia. Set ( l_0 ) to switch off the transceiver, or to use in hand wired mode.</td>
</tr>
<tr>
<td>C2 Antenna Connector</td>
<td>Flexible swivel antenna, straight or right angle, attached here.</td>
</tr>
<tr>
<td>C3/ C5 RF LED/ ON LED (Operation Status)</td>
<td>- <strong>RF ON</strong>&lt;br&gt;Off: Off&lt;br&gt;Red/ Green/ Blinking: <strong>camin</strong> ready, (hardwired mode – channel selector set at 0), no client logged on.&lt;br&gt;Red Blinking: <strong>camin</strong> ready (wireless mode), no client logged on.&lt;br&gt;Green: <strong>camin</strong> ready, client logged on in wireless mode.&lt;br&gt;Red: <strong>During Start-Up</strong>: camin is booting up.&lt;br&gt;Selected channel already in use by another camin.&lt;br&gt;Channel selector dial was turned during operation.&lt;br&gt;Green Blinking: Software incompatible between camin and clients.&lt;br&gt;Red Blinking: Battery low, camin will not work.</td>
</tr>
<tr>
<td>C4 camin ON/OFF Switch</td>
<td>camin power switch.</td>
</tr>
<tr>
<td>C6 16 Pin EXT Connector</td>
<td>Connector for camera communication, synchronizations and power supply.</td>
</tr>
<tr>
<td>C7 M4 Screw Hole</td>
<td>For attachment of various accessories.</td>
</tr>
<tr>
<td>C8 CBUS Connector</td>
<td>Cmotion intra-system 7 pin connector.</td>
</tr>
<tr>
<td>C9 RS Connector</td>
<td>Camera power supply connector.</td>
</tr>
<tr>
<td>Connector</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
<tr>
<td>M1</td>
<td>Focus LED</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M2</td>
<td>Focus Motor Connector</td>
</tr>
<tr>
<td>M3</td>
<td>Focus Motor Direction Switch</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M4</td>
<td>Iris LED</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M5</td>
<td>Iris Motor Connector</td>
</tr>
<tr>
<td>M6</td>
<td>Iris Motor Direction Switch</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M7</td>
<td>Zoom LED</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>M8</td>
<td>Zoom Motor Connector</td>
</tr>
<tr>
<td>M9</td>
<td>Zoom Motor Direction Switch</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.5.2 coporate

![coporate top view and right side](image)

**Fig. 2.32: The coporate top view and right side**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
</table>
| **O1** | **RUN LED**  
Off: No RUN signal received from camera or Camera in standby mode  
Green: Camera running  
Red: Camera error or camera is running up/down |
| **O2** | **RUN Button**  
Starts/stops camera |
| **O3** | **CAL Button**  
• Button to start motor calibration (Push for at least one second) or  
• Can be used together with a LENS Button for single motor calibration |
| **O4** | **CAL LED**  
Off: Lens has been calibrated  
Yellow: Motors are calibrating  
Yellow Blinking: Motor(s) need to be calibrated |
| **O5** | **RDY LED/RF LED**  
RDY: System on  
RF: Off  
Off: System off  
Green: System ready, client logged on in hard-wired mode |
<table>
<thead>
<tr>
<th>Component</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Green Green</strong></td>
<td>System ready, client logged on in wireless mode</td>
<td></td>
</tr>
<tr>
<td><strong>Green Red</strong></td>
<td>Radio transmission has minor errors</td>
<td></td>
</tr>
<tr>
<td><strong>Red Blinking</strong></td>
<td>Battery is going to be empty</td>
<td></td>
</tr>
<tr>
<td><strong>Red Red</strong></td>
<td>- cooper error, system will only work in hard-wired mode&lt;br&gt;- No radio transmission to cam, system will only work in hard-wired mode&lt;br&gt;- Battery empty</td>
<td></td>
</tr>
</tbody>
</table>

<p>| <strong>O6</strong> Mechanical End-Stop Lock | Enables you to set mechanical limits on the wheel rotation                                      |
| <strong>O7</strong> Exchangeable Markable Ring | Can be used to write (e.g. focus marks) on the ring                                               |
| <strong>O8</strong> Knob | Depending on the position of the Iris/ Focus Selector the hand wheel knob will control either the Focus or the Iris motor |
| <strong>O9</strong> Slider Lock | Locks the slider as well and adjusts slider resistance                                             |
| <strong>O10</strong> Exchangeable Marker Strip | Can be used to write (e.g. a Iris scale) on the pad                                                |
| <strong>O11</strong> Knob Lock | Locks the knob rotation                                                                           |
| <strong>O12</strong> Index Marker | Enables a precise reading of the inscriptions written on the ring                                |
| <strong>O13</strong> Slider | Depending on the position of the Iris/ Focus Selector the slider will control either the Iris or the Focus motor |
| <strong>O14</strong> LENS Button (Slider) | • Assigns a segment of the lens scale to the entire length of the slider or&lt;br&gt;• can be used together with the [CAL] button for single motor calibration |
| <strong>O15</strong> LENS LED (Slider) | Off Motor ready for control&lt;br&gt;Green Limits have been set by the LENS button&lt;br&gt;Red • No motor available or&lt;br&gt;• another unit is in control of the motor&lt;br&gt;Green Blinking Limits are currently being set, LENS button is currently being pushed |
| <strong>O16</strong> Iris / Focus Selector | Pos. 1 (Up) Slider will control the Iris&lt;br&gt;Knob will control the Focus&lt;br&gt;Pos. 2 (Down) Slider will control the Focus&lt;br&gt;Knob will control the Iris |
| <strong>O17</strong> BAT LED | Off coperate battery is OK&lt;br&gt;Red Slowly Blinking coperate battery is running low&lt;br&gt;Red Fast Blinking coperate battery is almost empty, CHANGE BATTERY&lt;br&gt;Red Blinking coperate battery is empty, CHANGE BATTERY |
| <strong>O18</strong> OPEN IRIS | Opens the aperture completely                                                                   |</p>
<table>
<thead>
<tr>
<th></th>
<th>button</th>
<th>Note: If aperture closes, change the motor direction of the IRIS motor with the DIR switch on the camin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>O19</strong></td>
<td>KNOB LED</td>
<td>Off</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Blinking</td>
</tr>
<tr>
<td><strong>O20</strong></td>
<td>KNOB button</td>
<td>Assigns a rotation of the lens scale, e.g. from close focus to infinity, to just one segment of the wheel rotation</td>
</tr>
</tbody>
</table>
| **O21** | LENS Button (Knob) | • Assigns a segment of the lens scale to the entire rotation of the slider or  
• can be used together with the [CAL] button for single motor calibration |
| **O22** | LENS LED (Knob) | Off | Motor is ready for control |
| | | Green | Limits have been set by the LENS button (Knob) |
| | | Red | • No motor available or  
• another unit is in control of the motor |
| | | Green Blinking | Limits are currently being set, LENS button (Knob) is currently being pushed |
| **O23** | Battery Release Button | While holding the coprate vertically, press the release button to enable the battery to glide out of its receptacle. |
### Chapter 2 Component Descriptions

**Fig. 2.33: The coperate**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>O24</strong> Antenna Connector</td>
<td>Flexible swivel antenna, straight or right angle, attached here. <strong>Note:</strong> Only necessary for those coperates not equipped with an internal antenna. If your coperate has an antenna attachment it <strong>IS NOT</strong> equipped with an internal antenna.</td>
</tr>
<tr>
<td><strong>O25</strong> RF LED</td>
<td>Shows if there is radio contact (see [05]).</td>
</tr>
<tr>
<td><strong>O26</strong> CBUS Connector</td>
<td>cmotion intra-system interface.</td>
</tr>
<tr>
<td><strong>O27</strong> ¼” Screw Hole</td>
<td>For attachment of various accessories.</td>
</tr>
<tr>
<td><strong>O28</strong> ¼” Screw Hole</td>
<td>For attachment of various accessories.</td>
</tr>
<tr>
<td><strong>O29</strong> MARKER button</td>
<td>When the coperate is configured to work with the cdisplay, a push on the MARKER button will place a numbered mark on the Focus scale.</td>
</tr>
<tr>
<td><strong>O30</strong> Battery receptacle</td>
<td></td>
</tr>
<tr>
<td><strong>O31</strong> ctruss</td>
<td>An accessory to be attached to the coperate, allows for the attachment of cstrap.</td>
</tr>
</tbody>
</table>
Flexible swivel antenna, straight or right angle, attached here

**Note:** Only necessary for those coprates not equipped with an internal antenna. If your coprate has an antenna attachment it **IS NOT** equipped with an internal antenna

**CBUS Connector**

**cmotion** intra-system interface

**BATTERY receptacle**

**ON Button**

coprate power button

**Note:** Must be pushed for at least ½ second

**Note:** If the camin is turned off the coprate will turn off automatically

**Note:** If communication can not be formed the coprate will turn off automatically

**CHANNEL selector**

Selector knob for radio transmission

**Note:** Select the same radio channel as set on the camin
### 2.5.3 \(czoom\)

**Z1** SPEED Dial
Sets/presets the speed of the zoom motor, 1-9, 1=slow 9=zoom as fast as possible

**Z2** LENS Button
- Assigns a segment of the zoom lens scale to the force sensitive joystick or
- can be used together with the [CAL] button for single zoom motor calibration

**Z3** LENS LED
- Green
  - Slowly Blinking: Motor is at end-stop
  - Fast Blinking: Limits are currently being set
  - LENS button is currently being pushed
- Red
  - \(czoom\) is not in control of the motor

**Z4** Zoom Control
- Force sensitive joystick to control the zoom motor

**Z5** CAL Button
- Button to start motor calibration (Push for at least one second) or
- can be used together with a LENS Button for single motor calibration

**Z6** RDY LED
- Red
  - Blinking: Error has occurred (e.g. another unit is in control of the motor. System is not ready)
- Green
  - Blinking: Searching for camin
- System is ready
- \(czoom\) has no power
<table>
<thead>
<tr>
<th>Z5/ Z6</th>
<th>LENS LED/ RDY LED</th>
<th>LENS</th>
<th>RDY</th>
<th>Software incompatible with camin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green Blinking</td>
<td>Red Blinking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z7</td>
<td>czoom Connector</td>
<td>Used to connect the czoom to the coperate or the chandle. (CBUS female connector)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z8</td>
<td>ZAP Button</td>
<td>While performing zoom control, moves motor as fast as possible (Zoom As Fast as Possible)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z9</td>
<td>Mounting Screw</td>
<td>By means of an M4 Allen key, tighten the screw to fix the czoom either on the coperate or on the chandle</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z10</td>
<td>CBUS Connector</td>
<td>Cmotion intra-system interface</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 2.5.4 chandle

| H1  | RUN LED | Off  | • No RUN signal received from camera or  
|     |         |      | • Camera in standby mode  
|     |         | Green| Camera running  
|     |         | Red  | Camera error or camera is running up/down  
| H2  | RUN Button | Starts/ stops camera  
| H3  | CAL LED  | Off  | Lens has been calibrated  
|     |         | Yellow| Motors are calibrating  
|     |         | Yellow Blinking | Motor(s) need to be calibrated  
| H4  | CAL Button | • Button to start motor calibration (Push for at least one second) or  
|     |         | • can be used together with a LENS Button for single motor calibration  
| H5  | 3/8” Screw Hole | For attachment of cfast-display  
| H6  | CBUS Connector (front) | cmotion intra-system interface  

Fig. 2. 36: The chandle
2.5.5 cdisplay

- **Antenna Connector**
  - Flexible swivel antenna, straight or right angle, attached here

- **STANDBY Button**
  - cdisplay power button

- **ON LED/RF LED**
  - **Off**
    - During Start-Up: System is not yet ready or cdisplay cannot find communication with other unit or battery empty
  - **Red Blinking**
    - System is searching for connection
  - **Green Blinking**
    - cdisplay is reading transponder
  - **--**
    - Off: Unit is in hard-wired mode
  - **Red**
    - Channel is currently being changed or no RF connection
  - **Red Blinking**
    - Battery critically low

- **cdisplay.ext**
  - cmotion wireless extension module

- **Display With**
  - cdisplay screen

---

**Fig. 2.37: The cdisplay**
<table>
<thead>
<tr>
<th>Touch Screen</th>
<th>Used for operation of <em>cdisplay</em> programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D7</strong> Battery Receptacle</td>
<td></td>
</tr>
<tr>
<td><strong>D8</strong> Menu Arrow Buttons</td>
<td>Used to navigate through the <em>cdisplay</em> menu</td>
</tr>
<tr>
<td><strong>D9</strong> Menu ENTER Button</td>
<td>Used to make selections in the <em>cdisplay</em> menu</td>
</tr>
<tr>
<td><strong>D10</strong> MENU Button</td>
<td>Uploads <em>cdisplay</em> main menu</td>
</tr>
<tr>
<td><strong>D11</strong> READ Button</td>
<td>Used to transfer data to and from the <em>ctag</em></td>
</tr>
<tr>
<td><strong>D12</strong> Battery Release Button</td>
<td>While holding the <em>cdisplay</em> vertically, press the release button to enable the battery to glide out of its receptacle</td>
</tr>
<tr>
<td><strong>D13</strong> CBUS Connector</td>
<td><em>cmotion</em> intra-system 7 pin connector</td>
</tr>
</tbody>
</table>
Fig. 2. 38: The cdisplay-side view

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>D1</strong></td>
<td>Antenna Connector</td>
<td>Flexible swivel antenna, straight or right angle, attached here</td>
</tr>
<tr>
<td><strong>D5</strong></td>
<td>cdisplay_ext</td>
<td>cmotion wireless extension module</td>
</tr>
<tr>
<td><strong>D12</strong></td>
<td>Battery Release Button</td>
<td>While holding the cdisplay vertically, press the release button to enable the battery to glide out of its receptacle</td>
</tr>
<tr>
<td><strong>D13</strong></td>
<td>CBUS Connector</td>
<td>cmotion intra-system 7 pin connector</td>
</tr>
<tr>
<td><strong>D11</strong></td>
<td>READ Button</td>
<td>Used to transfer data to and from the ctag</td>
</tr>
<tr>
<td><strong>D14</strong></td>
<td>3/8” Screw Hole</td>
<td>For attachment of various accessories or cfast-cdisplay</td>
</tr>
<tr>
<td><strong>D15</strong></td>
<td>Channel Selector</td>
<td>Selector knob for radio transmission <strong>Note:</strong> Select the same radio channel as set on the camin</td>
</tr>
<tr>
<td><strong>D16</strong></td>
<td>3/8” Screw Hole</td>
<td>For attachment of various accessories</td>
</tr>
</tbody>
</table>
3 SYSTEM SET UP

This section will tell you how to set the cmotion system up. The section will start with camin set up, and then it will move on to coperate, czoom and cdisplay set up.

3.1 camin

The camin is the “brain” of the cmotion Lens Control System. It allows for communication between the lens motors and all cmotion control units. You will have to secure the camin somewhere near the camera (see Fig. 3. 1), attach motor cables and facilitate communication between units.

1. Mount Lens Motors and camin securely to camera, the camin can be attached to the camera using the attachment tool, cfast-camin (see Fig. 3. 2) or the cfast-camin & cfastener (see Fig. 3. 4).

Note: The cfastener can be attached to rods 15-28mm in diameter e.g. camera carrying handles. The cfast-camin consists of a six-sided insert piece (located on the camin) and an interlocking mechanism with a steel release clip (located on the camera or the cfastener, see Fig. 3. 2).

To attach the cfast-camin:

i. Using a 4mm Allan key attach the six-sided insert piece to the camin

ii. Using a 4mm Allan key attach the cfast-camin to any 3/8” or 1/4” screw hole (e.g. the camera carrying handle) or to the cfastener

iii. Attach the cfastener to any rod 15-28 mm (see Fig. 3. 4). Fasten securely!

iv. Place the insert piece into the interlocking mechanism at an angle (see Fig. 3. 3)

v. Gently move the insert piece into the interlocking mechanism until you hear an audible click

To release the cfast-camin:

i. Pull the steel release clip towards the camin

ii. Tilt the insert piece out of the interlocking mechanism while still pulling the release clip
2. Use the cable RRS-x (FI 3p, FI 3p) to connect the camin to the camera (see Fig. 3.6).

**Note:** RRS-x is for various Arri cameras. See attachment for more cameras

3. Screw on the antenna

4. Connect Lens Motors to the camin

- **ARRI CLM-1:** with RLM-1 (FI 7 p, FI 5p) cable to CBUS Connector (blue). The original cable can be used as a connection to the Arri CLM-1 motor.

- **ARRI CLM-2:** directly with the integrations cable (FI 12p) to the Focus, Iris and Zoom connectors (green)

- **Denz:** directly with the integrations cable (FI 12p) to the Focus, Iris and Zoom connectors (green)

- **Hedén M26VE:** with RHM-x (FI 12p, LE 7p) cable to the Focus, Iris and Zoom connectors (green)

**Note:** When using the Hedén motors (see Fig. 3.7) included in cmotion sets), the gear rings can be easily exchanged (see Fig. 3.8) according to teeth size. They can also be placed on either side of the motor. The following moduls are available:

i. Push on the small rod exiting the opposite side of the gear ring mount.

ii. Choose the gear ring with your desired teeth size

iii. Choose the side on which you would like to gear ring to be placed

iv. Place gear ring rod into hole located on the gear ring mount

v. Gently push gear ring while slowly turning it until rod pops into hole

vi. Push rod completely into hole until it clicks

The rod attachment ring’s height can also be adjusted to assure that the motor can reach the lens gear ring.
• **Preston**: with RPM -1 (FI 12p, LE 7p) cable to the Focus, Iris and Zoom connectors (green)

• **Scorpio**: with RSM-1 (FI 12p, LE 7p) cable to the Focus, Iris and Zoom connectors (green)

**Warning:** Make sure that the cables will not get in the way of equipment, during operation, or during camera handling (movement).

5. Select a radio channel

<table>
<thead>
<tr>
<th>CHANNEL</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>2</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>3</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>4</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>5</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>6</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>7</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>8</td>
<td>Europe/USA/Canada/Japan/Australia</td>
</tr>
<tr>
<td>9</td>
<td>Europe/USA/Canada/Japan/Australia</td>
</tr>
</tbody>
</table>

6. Switch *camin* ON.

7. Check LEDs

<table>
<thead>
<tr>
<th>RF LED/ON LED (Operation Status)</th>
<th>RF</th>
<th>ON</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>&quot;camin&quot; off</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td>Red/Green/Blinking</td>
<td>&quot;camin ready, (hardwired mode – channel selector set at 0), no client logged on&quot;</td>
<td></td>
</tr>
<tr>
<td>Red/Blinking</td>
<td>Red/Green/Blinking</td>
<td>&quot;camin ready (wireless mode), no client logged on&quot;</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td>Green</td>
<td>&quot;camin ready, client logged on in hard-wired mode&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>During Start-Up:</strong> motor is moving to position that hand units are currently set at</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Green</td>
<td>&quot;camin ready, client logged on in wireless mode&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RF LED/ON LED (Warnings)</th>
<th>RF</th>
<th>ON</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Red</td>
<td>&quot;During Start-Up: <em>camin</em> is booting up&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Selected channel already in use by another <em>camin</em>&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Channel selector dial was turned during operation&quot;</td>
<td></td>
</tr>
</tbody>
</table>
Warning: Important information for using the LCS system with the Titan Transvideo(TM)

Cmotion channels 8 and 9 should be used while operating wireless video link. Channel A should be used on the Transvideo.

The camin and the Transvideo transmitter Tx should be placed as far away as possible from each other.

The antennas should be aligned parallel to each other (they should not cross)
3.2 coperate

The coperate is the hand control unit of the cmotion system (see Fig. 3. 9). Please follow the following steps to get it ready for operation.

**Note:** coperate set-up is to be done after camin set-up.

**Note:** If the slider and/ or knob do not move; loosen their respective locks

1. Screw on the antenna (If external antenna is necessary).

**Note:** If you have a coperate with an antenna connector then an external antenna is necessary. If no antenna connector is available, your system is accompanied with an internal antenna.

**Note:** You can also use the coperate in hard-wired mode. You can connect the coperate and the camin using the CBUS cable (FI 7p, FI 7p). As soon as the CBUS cable (FI 7p, FI 7p) is connected the system’s wireless mode will turn off automatically.

2. Insert a battery. Press until it snaps in with an audible click.

**Note:** If you use the coperate hardwired no battery is necessary.

**Removing an Empty Battery:**

i. Hold the coperate wheel with your right hand, so that the opening of the battery receptacle looks downwards.

ii. Press the release button (see Fig. 3. 10) with your left index finger. The battery will slide out into your hand. (see Fig. 3. 11)
3. Preset the same radio channel as selected on the **camin**.

4. Push the [ON] button (see Fig. 3.12), for at least half a second, to turn the **coperate** “ON”.

**Warning:** If the **coperate** turns off automatically after 6 seconds it cannot establish communication with the **camin**. Is the **camin** turned on? Are all units preset to the same channel?

**Note:** The **coperate** offers a **Camera Run Toggle Function** for video cameras. Because the **cmotion** system usually only reads out the Camera Run LED if the camera delivers a status feedback and video cameras do not deliver status information; the Camera Run Toggle function allows you to have a camera run LED read-out once the Camera Run Button has been activated without a status feedback. The video camera must be connected with the Video Camera Interface cable (FI 16p, HI 12p). To activate the Camera Run Toggle function:

i. When turning the **coperate** on, hold down the Camera Run Button

**Note:** Make sure that the knob mechanical locks on the knob are located at their end-stops

**Accessory: The cstrap**
The cstrap is a universal carry-strap; when the **coperate** is attached to the cstrap, the **coperate** can twist freely. Screw the cstrap into the ¼ inch screw hole located at the bottom of the Coperate as tight as you can.

**To Secure the Screw:**
Push and turn the screw head to the right to fix the cstrap (see Fig. 3.13)

**Note:** The key ring is meant to act as a lever to help you turn and secure the screw

**Note:** The screw will not seem to move much while securing

5. Check LEDs

<table>
<thead>
<tr>
<th>RUN LED</th>
<th>Description</th>
</tr>
</thead>
</table>
| Off     | • No RUN signal received from camera **or**
<p>|         | • Camera in standby mode |
| Green   | Camera running |
| Red     | Camera error <strong>or</strong> camera is running up/down (this warning signal depend on the function of the camera) |</p>
<table>
<thead>
<tr>
<th>CAL LED</th>
<th>Off</th>
<th>Lens has been calibrated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yellow</td>
<td>Motors are calibrating</td>
</tr>
<tr>
<td></td>
<td>Yellow Blinking</td>
<td>Motor(s) need to be calibrated</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RDY RF</th>
<th>Off Off</th>
<th>System off</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green Off</td>
<td>System ready, client logged on in hard-wired mode</td>
</tr>
<tr>
<td></td>
<td>Green Green</td>
<td>System ready, client logged on in wireless mode</td>
</tr>
<tr>
<td></td>
<td>Green Red</td>
<td>Radio transmission has minor errors, system will continue operation</td>
</tr>
<tr>
<td></td>
<td>Green Blinking Off</td>
<td>During Start-Up: motor is moving to position that hand units are currently set at</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RDY LED/ RF LED</th>
<th>Red Blinking --</th>
<th>Battery empty</th>
</tr>
</thead>
</table>
|                 | Red Red |  • *operate* error, system will only work in hard-wired mode  
|                 |       |  • No radio transmission to *camin*, system will only work in hard-wired mode  
|                 |       |  • Battery empty |

<table>
<thead>
<tr>
<th>LENS LED (Slider)</th>
<th>Off</th>
<th>Motor ready for control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Limits have been set by the LENS button</td>
</tr>
</tbody>
</table>
|                   | Red |  • No motor available or  
|                   |   |  • another unit is in control of the motor |
|                   | Green Blinking | Limits are currently being set, LENS button is currently being pushed |

<table>
<thead>
<tr>
<th>KNOB LED</th>
<th>Off</th>
<th>No limits have been assigned to the wheel</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Limits have been set by the KNOB button</td>
</tr>
<tr>
<td></td>
<td>Green Blinking</td>
<td>Limits are currently being set, KNOB button is currently being pushed</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BAT LED</th>
<th>Off</th>
<th><em>operate</em> battery is OK</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Red Slowly Blinking</td>
<td><em>operate</em> battery is running low</td>
</tr>
<tr>
<td></td>
<td>Red Fast Blinking</td>
<td><em>operate</em> battery is almost empty, CHANGE BATTERY</td>
</tr>
<tr>
<td></td>
<td>Red</td>
<td><em>operate</em> battery is empty, CHANGE BATTERY</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENS LED (Knob)</th>
<th>Off</th>
<th>Motor is ready for control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green</td>
<td>Limits have been set by the LENS button (Knob)</td>
</tr>
</tbody>
</table>
|                 | Red |  • No motor available or  
|                 |   |  • another unit is in control of the motor |
|                 | Green Blinking | Limits are currently being set, LENS button (Knob) is currently being pushed |
3.3 czoom

The czoom (Fig. 3. 14) is the zoom control unit of the cmotion Lens Control System. There are three ways to implement the czoom into the cmotion Lens Control System.

- On the copeate
- On the chandle
- Stand alone

Please complete the following steps:

3.3.1 czoom and copeate

Note: With the czoom attached to the copeate you can control three motors wireless

You will find a CBUS connecter and a screw hole on the left top of the copeate over the green RUN button.

1. Attach the czoom to the CBUS connector on the copeate as seen in Fig. 3. 15

2. Using a 4mm Allan key, securely fasten the screw located at the bottom of the czoom

3.3.2 czoom and chandle

Note: The chandle is the czoom hand grip. It has a [RUN] and a [CAL] button. It can be attached via CBUS (FI 7p, FI 7p) to the copeate or directly to the camin

1. Plug the czoom to the CBUS connector on the chandle (see Fig. 3. 16)
2. Using a 4mm Allan key, securely fasten the screw located at the bottom of the czoom

3. Using the CBUS cable (FI 7 p, FI 7p), connect the czoom- chandle to the camin (see Fig. 3. 17). It can also be connected directly to the copeate (see Fig. 3. 17)

3.3.2.1 Attaching the czoom/ chandle to the pan-bar
Using the *cfastener-czoom* (see Fig. 3. 18) the *czoom* can be attached to the pan – bar allowing for practical zoom control. The *cfast-czoom* is composed of an arm, two rosettes and a *cfastener*. It can be attached to any rod 15-28 mm e.g. the pan bar. The angle of the *czoom* to the pan-bar can also be adjusted with the *cfast-czoom* providing optimal comfort for the user.

**Note:** The arm of the *cfast-czoom* has two rosettes. One rosette is attached to the *cfastener* and the other is attached to the *czoom*. The rosette that attaches to the *cfastener* can be switched from side to side of the arm. This means that the *cfastener* can be attached to the inside or the outside of the *czoom* (see Fig. 3. 18).

1. Attach the *czoom* to the *cfast-czoom* using the rosettes. Secure tightly with the tightening lever.

2. Attach the *cfastener* to the pan-bar (or any other rod 15-28 mm). Secure tightly with the tightening lever. (see Fig. 3. 19)

**Note:** Adjusting the angle of the *czoom* to the pan-bar

Now you can adjust the angle of the *czoom* to the pan-bar to ensure maximum comfort.

1. Loosen the tightening lever slightly
2. Rotate the *czoom* along the rosettes to your desired angle.
3. Once you have established your desired position, tighten the tightening lever again.

**Note:** The *czoom* can also be attached to the pan-bar with the Oppenheimer adapter (See Fig. 3. 20).

### 3.3.3 Various connections of *czoom/chandle*

When the *czoom* is connected to the *chandle* it can be operated in various configurations using the CBUS cable (FI 7p, FI 7p)

#### 3.3.3.1 *czoom* directly to the *camin*
Using the CBUS cable (FI 7p, FI 7p) you can connect the czoom directly to the camin e.g. the czoom is on the pan-bar and **hardwired** directly to the camin. The czoom/ chandle can be attached to either side of the pan-bar.

### 3.3.3.2 czoom to the cope rate

Using the CBUS cable (FI 7p, FI 7p) you can connect the czoom to the cope rate (see Fig. 3. 21) e.g. The czoom is attached to the cope rate using the CBUS (FI 7p, FI 7p) and the second assistant is holding the czoom/ chandle in his or her hand.

### 3.3.4 czoom Stand Alone

The czoom also functions without the chandle. The czoom can be connected to the camin or the cope rate using the CBUS (FI 7p, FI 7p) cable e.g. steadicam operators.

### 3.3.5 Powering up the czoom

**Note:** The czoom does not have a power button!

The czoom will turn on automatically as soon as it has been attached to the cope rate or to a CBUS (FI 7p, FI 7p) cable, as long as the camin and/or the cope rate are turned on.
1. Check LEDs

<table>
<thead>
<tr>
<th>RDY LED</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>czoom has no power</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>System is ready</td>
<td></td>
</tr>
<tr>
<td>Red/Green Blinking</td>
<td>Searching for camin</td>
<td></td>
</tr>
<tr>
<td>Red</td>
<td>Error has occurred (e.g. another unit is in control of the motor. System is not ready)</td>
<td></td>
</tr>
<tr>
<td>Off</td>
<td>No limits have been set</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>Limit has been set</td>
<td></td>
</tr>
<tr>
<td>Green Slowly Blinking</td>
<td>Motor is at end-stop</td>
<td></td>
</tr>
<tr>
<td>Green Fast Blinking</td>
<td>• Limits are currently being set</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• LENS button is currently being pushed</td>
</tr>
<tr>
<td>Red</td>
<td>Czoom is not in control of the motor</td>
<td></td>
</tr>
<tr>
<td>Red Blinking</td>
<td>Motor error</td>
<td></td>
</tr>
<tr>
<td>Red/Green Blinking</td>
<td>Motor is currently being calibrated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LENS LED</th>
<th>Status</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Blinking</td>
<td>Red Blinking</td>
<td>Software incompatible</td>
</tr>
</tbody>
</table>

Chapter 3 System Set Up
3.4 cdisplay

The cdisplay is a multi-functional monitor and control unit with a 3,8” TFT-screen (Fig. 3. 22). The cdisplay can be used in wireless and hard – wired modes. There are three ways to implement the cdisplay into the emotion Lens Control System.

- In **hard-wired mode** via the CBUS cable (FI 7p, FI 7p) to the coperate or to the camin
- In **wireless mode** on the coperate
- Stand alone in **wireless mode**.

Please follow the following steps:

3.4.1 cdisplay in Hard–wired Mode

Attaching the cfast-cdisplay (see Fig. 3. 23) to the cdisplay and to any 15-28mm rods e.g. lens motor rods

1. Screw the UNC 3/8” screw from the cfast-cdisplay into the hole located at the bottom (or on the right-hand side) of the cdisplay.

2. Attach the cfastener to any rod 15-28mm e.g. the lens motor rods.

3. Adjust the angle of the cfast-cdisplay arm to your desired position.

4. Tighten the lock knob to secure arm angle

**Connecting the cdisplay to the camin**

1. Connect the cdisplay to the camin using the CBUS cable (FI 7p, FI 7p)

3.4.2 cdisplay in Wireless Mode on the coperate

If the cdisplay is attached to the coperate the user can take advantage of all cdisplay programs as well as control the lens motors all in one multi-functional unit (see Fig. 3. 24).

**Note:** In this configuration, there is no antenna necessary for the cdisplay

Attaching the cdisplay to the coperate using the clamp
Note: Attaching the clamp
You will find a CBUS connector and a screw hole on the left hand side of the coporate under the green RUN button.

1. Attach the clamp as seen in Fig. 3.25

2. Stick your 4mm Allen Key in the screw hole and tighten clamp as seen in Fig. 3.26.

3. Slide cdisplay screen onto the silver mounting found on the clamp (as seen in Fig. 3.27) until you hear an audible click.

3.4.2.1 Releasing the cdisplay from the clamp
i. Push the Battery Release Button located at the bottom right hand side of display screen and

ii. Slide cdisplay off the quick clamp

3.4.3 cdisplay in Wireless-Mode in Stand Alone

The cdisplay can be used in wireless stand alone mode (see Fig. 3.28).

Note: In order for the cdisplay to be used in stand alone wireless mode it must be equipped with the cdisplay.ext (the cdisplay wireless extension module)

1. Screw on the antenna

2. The cdisplay can be used with the cfast-cdisplay or can simply be held in the user’s hand.

3. Slide the battery on at the back of the cdisplay until you hear an audible click
Battery
If you are using the cdisplay in wireless stand alone mode you will have attach a battery. The cdisplay necessitates standard Canon batteries.

Removing an Empty Battery:

Note: The cdisplay battery release button is located on the right hand side of the cdisplay.

iii. Hold the cdisplay so that the battery release button is facing you

iv. Hold the battery in your hand

v. Press the release button and the battery will fall into your hand.

Note: As soon as the cdisplay has a power source it will turn on automatically

Note: The blue button located at the top right-hand side of the cdisplay is only a stand-by button. To turn the cdisplay off you must remove the battery, disconnect the CBUS (FI 7p, FI 7p) cable or turn the camin or the coperate off.

Note: In order to turn the cdisplay off you must either remove the battery, disconnect the CBUS cable or disconnect the cdisplay from the clamp.

Check LEDs

1. Check LEDs

<table>
<thead>
<tr>
<th>D3/ D4</th>
<th>ON LED</th>
<th>RF LED</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off</td>
<td></td>
<td>cdisplay off or in standby mode</td>
</tr>
<tr>
<td>Red</td>
<td>--</td>
<td></td>
<td>During Start-Up: System is not yet ready or cdisplay cannot find communication with other unit or battery empty</td>
</tr>
<tr>
<td>Red Blinking</td>
<td>Red Blinking</td>
<td></td>
<td>System is searching for connection</td>
</tr>
<tr>
<td>Green Blinking</td>
<td>Green</td>
<td></td>
<td>Normal wireless operation</td>
</tr>
<tr>
<td>Green Blinking</td>
<td>--</td>
<td></td>
<td>cdisplay is reading transponder</td>
</tr>
<tr>
<td>--</td>
<td>Off</td>
<td></td>
<td>Unit is in hard-wired mode</td>
</tr>
<tr>
<td>Red</td>
<td>Red</td>
<td></td>
<td>Channel is currently being changed or no RF connection</td>
</tr>
<tr>
<td>Red Blinking</td>
<td>Off</td>
<td></td>
<td>Battery critically low</td>
</tr>
</tbody>
</table>
4 SYSTEM OPERATION

In order to operate the cmotion Lens Control System you must first complete the “Set-Up” steps (Please see section 3). Section 4 will describe the system operation steps. It will start with the camin, cooprate and czoom and will then describe the cdisplay and its software.

4.1 camin

Once the camin (see Fig. 4. 1) has been set up you must turn it on. You will also be able to change channels and change motor direction on the camin.

4.1.1 Turning the camin “ON”

Note: The ON switch is located on the CHANNEL side of the camin

1. Slide on/ off switch to the right

4.1.2 Channel Selection

Note: The channel selector (rotary switch) is located on the CHANNEL side (see Fig. 4. 2) of the camin

1. Using your finger nail, or a coin, rotate the channel selector to your desired channel

Note:

<table>
<thead>
<tr>
<th>CHANNEL</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OFF</td>
</tr>
<tr>
<td>1</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>2</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>3</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>4</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>5</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>6</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>7</td>
<td>Europe/USA/Canada</td>
</tr>
<tr>
<td>8</td>
<td>Europe/USA/Canada/Japan/Australia</td>
</tr>
<tr>
<td>9</td>
<td>Europe/USA/Canada/Japan/Australia</td>
</tr>
</tbody>
</table>
Note: Make sure that all cmotion units that you wish to operate are set to the same channel

4.1.3 Changing Motor Direction

Note: On the MOTOR side (see Fig. 4.3) of the camin you will see a DIR switch for each motor.

To change the direction of the motor during operation:

1. Slide the DIR switch, and the motor will change direction. You can change the motor direction again by simply sliding the switch back again.

Note: By changing the direction of the motor you are also changing the direction of the knob, respectively of the slider or the zoom joystick as well as the depiction of the lens on the cdisplay.
4.2 coperate

The coperate can carry out motor calibration, motor control of the focus and iris including limit setting and camera run.

4.2.1 Channel Selection

**Note:** The channel selector is located at the bottom underside of the coperate (see Fig. 4. 4).

1. Using your finger nail, or a coin, rotate the channel selector to your desired channel

**Note:** Make sure the coperate is set to the same channel as the camin.

**Note:** The coperate can also be used in hard-wired mode. It can be connected to the camin by means of the CBUS cable (FI 7p, FI 7p). Once you have powered the coperate through the camin the wireless function will turn off automatically.

4.2.2 Turning the coperate "ON"

**Note:** The coperate "ON" button is a blue button, set in a dip, located at the bottom of the coperate (see Fig. 4. 5).

1. Hold down the "ON" button for half a second

Before turning the coperate on please look over the following:

**Warning!** Make sure all motors are securely fastened to their support e.g. rods.

**Warning!** Make sure that the rods are securely fastened.

**Warning!** Make sure motor gear rings are secured to the lens barrel as tightly as possible.
4.2.3 Motor Calibration

Note: Motors must be calibrated each time a lens is attached, each time a motor is attached and if the lens motor has been moved/adjusted manually.

You can either calibrate all attached motors simultaneously or calibrate them singularly.

Note: The CAL button is located above the Slider on the coprate (see Fig. 4. 6)

Note: If the CAL LED is blinking, its respective motor needs to be calibrated.

Note: If the CAL LED is illuminated, its respective motor is currently being calibrated.

Note: You cannot calibrate lens motors while camera is running.

Simultaneous Calibration of all Connected Motors

1. Push the yellow CAL button located at the top of the coprate for a second

Single Motor Calibration

1. Push and hold the CAL button (see Fig. 4. 7)

2. While holding the CAL button, push the respective LENS Button of the motor you wish to calibrate
4.2.4  **Focus Pulling**

**Knob/ Slider Selection**

**Note:** The Knob/ Slider switch is located below the Slider, above the RF LED. (see Fig. 4. 9)

1. Slide the Knob/ Slider Switch up or down to change control of Focus and Iris between the knob and the slider.

**Knob**

Depending on the Iris/ Slider selector (see Fig. 4. 9) the Focus can be controlled by either the Slider or the Knob. Knob control of the focus is most common.

To move the focus (or iris) motor: rotate the knob in the direction you wish to move the motor. The faster you rotate the knob the faster the motor will move.

**Note:** The speed of the motors depends on the motor itself and the power supply.

**Note:** If you are having trouble with your motor speed and require a voltage boost please see the `cboost`, a cmotion accessory, in chapter 2 of this user’s manual.

**Note:** Motor direction can be changed by using the DIR switch on the `camin`.

4.2.5  **Limit Setting**

Limits can be set to allow for more focus pulling accuracy. **Motor limits** can be set to allow you to use the entire rotation of the knob to control only a portion of the engraved lens scale. **Knob limits** allow you to use a portion of the knob rotation to control the entire engraved scale. **Motor limits** and **Knob limits** can be used in combination with each other to maximize accuracy.

**Note:** All limits will remain programmed until they have been erased intentionally by user.

**Note:** If the mechanical end-stop locks are not located at their end – stops i.e. the knob does not turn its entire rotation:
i. Unscrew both of the mechanical locks found on the Knob’s outside ring.

ii. Rotate the Knob to one of its end – stops

iii. Move screws so that they are next to each other and one is touching the Knob index.

iv. Tighten screws

**Note:** The limit rotation circumference must be 5° of the knob rotation circumference.

### 4.2.5.1 Setting Knob Limits

Motor limits allow you to use the entire rotation of the knob to control only a portion of the engraved scale.

1. Using the Knob, move motor to one of the two desired limit – stops

2. Push **AND** hold the Knob LENS Button (see Fig. 4. 10)

**Note:** The LENS LED will blink green while limits are being set.

### Fig. 4. 10

3. While still holding the LENS Button, move the motor to the other desired limit – stop

4. Release the LENS Button and the limits are programmed
Note: As long as there is a limit currently set the LENS LED will illuminate green.

To Erase Limits:

1. Push the Knob LENS Button

4.2.5.2 Setting Motor Limits

Knob Limits allow you to use a portion of the knob rotation to control the entire engraved scale

1. Unscrew the mechanical lock that is not touching the Knob index and fasten it at your desired position (see Fig. 3. 29).

2. Move and fasten the other Knob lock so that the space which the index moves within the two locks represents the portion of the Knob rotation that you wish to define (see Fig. 3. 30).

3. Move the Knob to one of your mechanical stops (see Fig. 3. 31).

4. Push AND hold the KNOB Button

Note: The KNOB LED will blink green while setting the limits

5. While still holding the KNOB Button, move the knob to the other mechanical lock

   Note: As long as a limit is set the KNOB LED will be illuminated green

6. Release the KNOB Button and the limits are programmed

To Erase Limits:

1. Push the KNOB Button

4.2.5.3 Setting Motor Limits in Combination with Knob Limits

Knob limits can be used in combination with motor limits. This allows you to control a portion of the engraved scale with a portion of the knob rotation. This can make things a lot easier for you because you don't have to always go from one end of the knob rotation to the other for a portion of the lens barrel.
Note: Limits will remain programmed until they have been erased intentionally by user, or the camin has been turned off.

1. Set a motor limit as described in 4.2.5.1

2. Set a knob limit as described in 4.2.5.2

Note: As long as a limit is set both the KNOB and LENS LEDs will be illuminated green

To Erase Limits:

Push both the LENS Button and the KNOB Button
4.2.6  Locking the Knob

You can use the Knob Lock (Fig. 4. 11) to lock a position for both the knob and its respective motor.

1. Using the knob, move the focus motor to the desired position.

2. Lock the Knob Lock tightly

4.2.7  The Marker Ring

The marker ring (Fig. 4. 12) for the knob can be used to mark focus (and iris) values. It can also be easily exchanged.


**Slider**

### 4.2.8  Iris Control

#### Knob/ Slider Selection

**Note:** The Knob/ Slider switch is located below the Slider, above the RF LED. (see Fig. 4. 17)

1. Slide the Knob/ Slider Switch up or down to change control of Focus and Iris between the knob and the slider.

Depending on the Iris/ Slider selector Iris can be controlled by either the slider of the knob. Slider control of the iris is more common.

To move the iris (or focus) motor: slide the slider in the direction you wish to move the motor. The faster you slide the slider the faster the motor will move.

**Note:** The speed of the motors depends on the motor itself and the power supply.

**Note:** If you are having trouble with your motor speed and require a voltage boost please see the cboost, a cmotion accessory, in chapter 2 of this user’s manual.

**Note:** Motor direction can be changed by using the DIR switch on the camin.

### 4.2.9  Setting Motor Limits for the Slider

Motor limits allow you to use the entire length of the Slider to control only a portion of the engraved scale

**Note:** Limits will remain programmed until they have been erased intentionally by user.

1. Using the Slider, move motor to one of the two desired limit – stops

2. Push **AND** hold the Slider LENS Button

**Note:** The Slider LENS LED on the coperate will blink green

3. While still holding the LENS Button, move the motor to the other desired limit – stop
4. Release the LENS Button

**Note:** As long as there is a limit currently set the LENS LED will illuminate green.

**To Erase Limits:**

Push the Slider LENS Button

**4.2.10 Locking the Slider**

You can use the Slider Lock to lock a position for both the Slider and its respective motor (see Fig. 4. 14).

1. Using the Slider, move the motor to the desired position.

2. Lock the Slider Lock tightly

**4.2.11 Marker Strips**

By unscrewing the respective screws the marker strip (see Fig. 4. 15) for the knob can be used to mark focus and iris values. It can also be easily exchanged.

**4.2.12 Camera Run**

The Camera Run Button is located to the left of the CAL button on the `coperate` (see Fig. 4. 16).

1. To start/stop the camera, push the green RUN Button

<table>
<thead>
<tr>
<th>RUN LED</th>
<th>Off</th>
<th>Green</th>
<th>Red</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><em>No RUN signal received from camera or</em></td>
<td>Camera running</td>
<td><em>Camera error or camera is running up/ down</em></td>
</tr>
</tbody>
</table>

**Note:** You cannot start the camera when motors are calibrating.
4.2.12.1 Camera Run Toggle Function

The RUN LED will read out the real camera information, once the button has been pushed the camera will receive a message back from camera regarding its actual RUN status. Some cameras do not relay this information e.g. Aaton and video cameras. In this case, you can use the Camera Run Toggle Function.

1. Push and hold the camera [RUN] button
2. While holding the [RUN] button, push and hold the [ON] button.

4.2.13 Marker Button

The Marker Button is located at the underside of the camera and can be reached by your pointer finger. It can be used together with the display to make focus marks on the display focus scale (see Fig. 4. 18).

4.2.14 Battery Control

The BAT LED on the camera indicates the status of the camera battery. Please note the following:

<table>
<thead>
<tr>
<th>BAT LED</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>camera battery is OK</td>
</tr>
<tr>
<td>Red Slowly Blinking</td>
<td>camera battery is running low</td>
</tr>
<tr>
<td>Red Fast Blinking</td>
<td>camera battery is almost empty, CHANGE BATTERY</td>
</tr>
<tr>
<td>Red</td>
<td>camera battery is empty, CHANGE BATTERY</td>
</tr>
</tbody>
</table>

4.2.15 Battery Charging

The cmotion components use standard Canon batteries and standard Canon battery chargers (see Fig. 4. 18).

Note: The batteries can be charged approximately 300 times

Note: Batteries are full in 180 minutes (assuming they were completely empty)

Note: Batteries will work with the camera for more than 10 hours
4.3 *czoom*

**Note:** The zoom control button is sensitive to pressure. The speed of the motor depends on the amount of pressure you are putting on the joystick. The button does not physically move.

**Note:** The CAL Button and the Camera RUN Button are located on the *chande not* on the *zoom*.

### 4.3.1 Zooming

To move the zoom motor: put pressure on the zoom control button in the direction you wish to move the motor. The more pressure you put on the button the faster the motor will move.

### 4.3.2 Zoom Speed

The speed of the zoom motor can also be adjusted with the speed dial located on the *zoom*. The dial gives you the option of speeds 1-9. The speed dial presets the maximum speed of the zoom motor if maximum pressure is put on the zoom control button. If the dial is set at 1 maximum pressure on the zoom control button will yield a slower motor speed then if the dial were set to 9 and maximum pressure is put on the zoom control button.

### 4.3.3 Setting Zoom Limits

Motor limits allow you to use the entire range of the joystick to control only a portion of the engraved scale.

**Note:** Limits will remain programmed until they have been erased intentionally by user

1. Using the joystick, move motor to one of the two desired limit – stops

2. Push **AND** hold down the zoom LENS Button

   **Note:** The LENS LED on the *zoom* will blink green

3. While still holding down the LENS Button, move the motor to the other desired limit – stop
4. Release the LENS Button

Note: As long as there is a limit currently set the LENS LED will illuminate green.

To Erase Limits:

Hold down the Zoom LENS Button

4.3.4 ZAP – Zoom as Fast as Possible

Regardless of what speed your speed dial is set at you can move the zoom lens scale as fast as possible by pressing the zoom control button while holding down the ZAP (Zoom as Fast as Possible) Button. The ZAP button is located at the underside of the czoom.

1. With your pointer finger, hold down the ZAP button located at the back of the czoom unit
2. Using your thumb, put maximum pressure on the joystick in the direction you wish the motor to move
3. While still holding the ZAP button, move to desired zoom position

Note: The speed of the motors depends on the motor itself and the power supply.

Note: If you are having trouble with your motor speed and require a voltage boost please see the cboost, a cmotion accessory, in chapter 2 of this user’s manual.

4.3.5 Camera Run

The czoom does not contain a Camera RUN button. The Camera RUN button can be found on the chandle.
4.4 *chandle*

Motor calibration is necessary each time a lens or a lens motor has been changed. You can either calibrate all attached motors simultaneously or calibrate them singularly.

**Note:** Motors must be calibrated each time a new lens or new motor is attached.

**Note:** The CAL button is located above the *chandle* not on the *czoom* (see Fig. 4. 21)

**Note:** If the CAL LED is blinking, its respective motor needs to be calibrated.

**Note:** If the CAL LED in illuminated, its respective motor is currently being calibrated.

**Warning!** Do not calibrate lens motors while camera is running!

4.4.1 *Motor Calibration*

**Note:** Motors must be calibrated each time a lens is attached, each time motor is attached and if the lens motor has been moved/adjusted manually.

You can either calibrate all attached motors simultaneously or calibrate them singularly.

**Note:** If the CAL LED is blinking, its respective motor needs to be calibrated.

**Note:** If the CAL LED in illuminated, its respective motor is currently being calibrated.

**Note:** You cannot calibrate lens motors while camera is running.

**Simultaneous Calibration of all Connected Motors**

1. Push the yellow CAL button located at the top of the *cope rate* for a second.

**Single Motor Calibration**

1. Push and hold the CAL button

2. While holding the CAL button, push the respective LENS Button of the motor you wish to calibrate
4.4.2 Camera Run

The Camera Run Button is located above the CAL button on the chandle.

1. To start/stop the camera, push the green RUN Button.

**Note:**

<table>
<thead>
<tr>
<th>RUN LED</th>
<th>Description</th>
</tr>
</thead>
</table>
| Off     | - No RUN signal received from camera **or**
         | - Camera in standby mode |
| Green   | Camera running |
| Red     | Camera error **or** camera is running up/down |

**Note:** You cannot start the camera when motors are calibrating.
## Cameras (in alphabetic order)

*u.c.: under construction (our systems are upgraded regularly, please ask for current features)*

<table>
<thead>
<tr>
<th>camera</th>
<th>Start/Stop</th>
<th>Speed Ramp</th>
<th>depth of field ramp</th>
<th>necessary cables camera run</th>
<th>necessary cables camera control/ramping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aaton 35 III</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RAR1 (C019-KE1) or RAI-1</td>
<td>RAI-1 (C019-KF1)</td>
</tr>
<tr>
<td>Aaton minima</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RAR5 (C019-KE5)</td>
<td></td>
</tr>
<tr>
<td>Aaton XTR</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RAR1 (C019-KE1) or RAI-1</td>
<td>RAI-1 (C019-KF1)</td>
</tr>
<tr>
<td>Arri 16SR3</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 16SR3HS</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 235</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Arri 35 III</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RCI-1 (C019-K21)</td>
<td>RCI-1 (C019-K21)</td>
</tr>
<tr>
<td>Arri 435</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 435 ADV</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Arri 435 ES</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 535</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 535 B</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td>RCC-1 (C019-K91)</td>
</tr>
<tr>
<td>Arri 765</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Arri BL 4</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RCI-1 (C019-K21)</td>
<td></td>
</tr>
<tr>
<td>Arri BL II</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>RCI-1 (C019-K21)</td>
<td></td>
</tr>
<tr>
<td>Arricam Lite</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Arricam</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Cameras prov. with a</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-7 (C019-K37) and RVI-1 (C019-KC1)</td>
<td></td>
</tr>
<tr>
<td>Dalsa Origin</td>
<td>✓</td>
<td>u.c.*</td>
<td>u.c.*</td>
<td>RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Moviecam Compact</td>
<td>✓</td>
<td>u.c.*</td>
<td></td>
<td>RMR-1 (C019-KK3) and RMP-1 (C019-KK5) OR only RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Moviecam SL</td>
<td>✓</td>
<td>u.c.*</td>
<td></td>
<td>RMR-1 (C019-KK3) and RMP-1 (C019-KK5) OR only RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Moviecam Superamerik a</td>
<td>✓</td>
<td>u.c.*</td>
<td></td>
<td>RMR-1 (C019-KK3) and RMP-1 (C019-KK5) OR only RRS-8 (C019-38)</td>
<td></td>
</tr>
<tr>
<td>Panavision Millenium XL</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>RPI-1 (C019-KH1)</td>
<td>RPP-1 (C019-KH2) and RPR-1 (C019-KH3)</td>
</tr>
</tbody>
</table>
Motors:

<table>
<thead>
<tr>
<th>Motor</th>
<th>Necessary Cable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedén M26VE</td>
<td>Hedén Motor Cable, we deliver the motor with the cable, as spare part is available: C019-K81 straight plug, C019-K82: with right – angle plug</td>
</tr>
<tr>
<td>Preston DM1</td>
<td>Preston Motor Cable RPM-1 (C019-K51)</td>
</tr>
<tr>
<td>Preston DM2</td>
<td>Preston Motor Cable RPM-1 (C019-K51)</td>
</tr>
<tr>
<td>Scorpio digital motor 42V</td>
<td>Scorpio Motor Cable RSM-1 (C019-K61)</td>
</tr>
<tr>
<td>Denz DU-02</td>
<td>Cable attached to the motor. No extra cable necessary</td>
</tr>
<tr>
<td>Arri CLM-1</td>
<td>Arri CLM-1 motor cable RLM-1 (C019-K71)</td>
</tr>
<tr>
<td>Arri CLM-2</td>
<td>Cable attached to the motor. No extra cable necessary</td>
</tr>
<tr>
<td>Panavision RDM</td>
<td>Panavision Motor Cable RDM-1</td>
</tr>
<tr>
<td>Canon ENG-Lens</td>
<td>Canon Video Lens (20p) Cable - Adapter C023-K61 necessary</td>
</tr>
<tr>
<td>Angenieux ENG-Lens</td>
<td>Angenieux Video Lens (12p) Cable - Adapter C023-K61 necessary</td>
</tr>
<tr>
<td>Fujinon ENG-Lens</td>
<td>Fujinon Video Lens (xxp) Cable - Adapter C023-K61 necessary</td>
</tr>
</tbody>
</table>
Notes: