Operating Manual

Servo Drive for CANON Flex Series

Product number: CDM-FLEX-FIZ

Version 1

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Dear Customer,

Thank you for purchasing a quality product from Chrosziel. We appreciate the trust you placed in us.

This manual provides valuable information and instructions to ensure that you will get the most out of your Chrosziel Servo Drive. Before using the device for the first time please read this manual carefully. We kindly ask you to keep the manual handy for quick reference, and keep all documents supplied with the device in a safe place.

We hope you will enjoy your new CANON Flex Servo Drive!

Sincerely yours,
Chrosziel GmbH

1. Content

2. Key to symbols

Important!

This symbol highlights important instructions that must be followed for smooth, trouble-free operation of the device. Please observe these instructions to avoid malfunctions.

Notice!

This Symbol highlights information which should be noted for perfect usage.

3. Product Description

3.1 General

The Chrosziel CDM-FLEX-FIZ Servo Drive Unit was developed exclusively for all the lens derivates of the CANON Flex (CNE-xx-xxx) Series and is field installable. This compact and ergonomic design allows you to integrate the all-manual "cine-style" CANON Flex Zoom lens into your broadcast, multi-camera, or remote head workflows in a straightforward way. As on typical TV style broadcast lenses, all motors and connectors are brought together in one housing with common interface connections like demand sockets, a lens port interface, and a remote-control socket.
Three perfectly positioned drive gears engage the CANON Flex Lens with a high degree of precision employing three powerful digital motors. The Chrosziel CDM-FLEX-FIZ is particularly useful for cinematic Multi Camera, ENG and OB work where zoom, and focus can be controlled from standard TV style tripod demands or the onboard zoom rocker. It supports remote head and robotics applications via the Hirose 20pin remote interface including encoder outputs for focus and zoom motor. It allows to directly control the drive's focus, zoom and iris by the Chrosziel Magnum wireless FIZ hand unit via radio and all other compatible FIZ- systems via a wired connection.

Key- features:

- User installable drive unit
- Compatible with CN-E 20-50mm & CN-E 45-135mm T2.4 L F / FP and similar
- /i-data processing
- Encoder pulse output of Focus and Zoom motor for VR applications.
- Direct support of CANON tripod demands ZSD-300 & FSD-400
- Digital Lensport protocol (on 12-Socket)
- Digital CANON Demand protocol (on 20-pin Remote socket)
- USB Port for software updates (USB 2.0 compatible)
- Wide range of power input (10V-30V DC)
- Built-in zoom rocker with adjustable speed

3.2 Nameplate

The nameplate located on the inner side of the CANON Flex Servo Drive includes all compliance relevant details as well as the serial number.

3.3 Applications / Intended Use

The CANON Flex Servo Drive is designed to reflect the state of the art and comply with recognized technical safety rules. However, improper use of the device or use of the device for other than the intended purpose may cause damage to the device itself and/or other objects or persons.
The CANON Flex Servo Drive can be used with currently available lenses CANON CN-E 20-50mm & CN-E 45-135mm T2.4 in PL and EF-mount version. Other use, or use beyond this scope, is deemed to be used for other than the intended purpose and is entirely at the user's risk. Intended use also comprises observation of the instructions for use and installation and compliance with maintenance conditions.

3.4 Product Safety, Operating voltage and temperature

Short circuit protection is performed by a protective fuse which insulates the device from power supply in case of over-current events caused by unexpected internal failures. In addition, power input is polarity protected. The nominal input voltage of the CANON Flex Servo Drives is 10–30V. At temperatures below -10° Celsius or above 50° Celsius, optimum functioning of the product can no longer be guaranteed. A constant operating temperature of approx. 20° Celsius is recommended. The device can be used in moderate outdoor conditions.

Improper use of the Servo Drive may result in serious and extensive damage to health or can cause enormous damage to property. Please ensure you read the following instructions carefully and familiarize yourself with the device before operating it. By doing so, you will ensure safe and smooth operation of your Servo Drive.

NEVER use the mounted Servo Drive to **wear or support** the lens and/or camera.

Avoid sun exposure to the Servo Drive.

Avoid driving the motors forward/backward continuously for a longer time. This may result in damage to lens and/or the drives motors.

Observe general safety and accident prevention regulations. In addition to the instructions given in this operating manual, ensure that general safety and accident prevention regulations are observed.

Provide this operating manual to third parties. Please ensure that any third parties using the CANON Flex Servo Drive only do so after reading and understanding the instructions.

Keep away from children and protect against unauthorized use. Keep away from children. Children must not be permitted to operate the Servo Drive. Protect it from unauthorized access or use. The Servo Drive is not intended for use by persons (including children) with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless a person supervises them responsible for their safety or have received instruction concerning use of the Servo Drive from that person.

Never leave in operation unattended. Never leave the Servo Drive unattended in operational condition or in operation.

Take care and always concentrate when using the device. Do not work with the CANON Flex Servo Drive while having difficulties in concentrating or under the influence of drugs, alcohol, or medication. A single moment of inattention while using the CANON Flex Servo Drive may result in accident and injury.

Ensure the unit is firmly affixed to the lens. When affixing the CANON Flex Servo Drive to your lens, ensure the unit is mounted securely and properly.

Watch out for damage. Check your CANON Flex Servo Drive for damage before operating, and do not use the unit if there are any signs of damage.

Use for the intended purpose. Ensure you use the CANON Flex Servo Drive for the intended purpose described in this operating manual, only.

Inspect regularly. Use of the CANON Flex Servo Drive may result in wear and tear to parts of the housing or gears. Inspect the device regularly for damage or faults.

Only use original parts. For your own safety, only use accessories and add-ons that are specified in this operating manual or recommended by the manufacturer.

3.4.1 Specific Safety Instructions

Make sure you comply with the following installation and operation instructions:

- Install the CANON Flex Servo Drive in accordance with the applicable regulations.
- Observe the regulations that apply in your country.
- Observe the specified minimum safety distances from flammable materials (e.g., fabrics, paper).

4. Set-Up The CANON Flex Servo Drive

4.1 In the Box

After opening the package, immediately check if all accessories and parts listed in section 5.3 "Included accessories" below are complete and in a good condition. If anything is missing, faulty, or damaged, contact your retailer.
Do not operate the device if it is or appears to be faulty.

4.2 Preparation

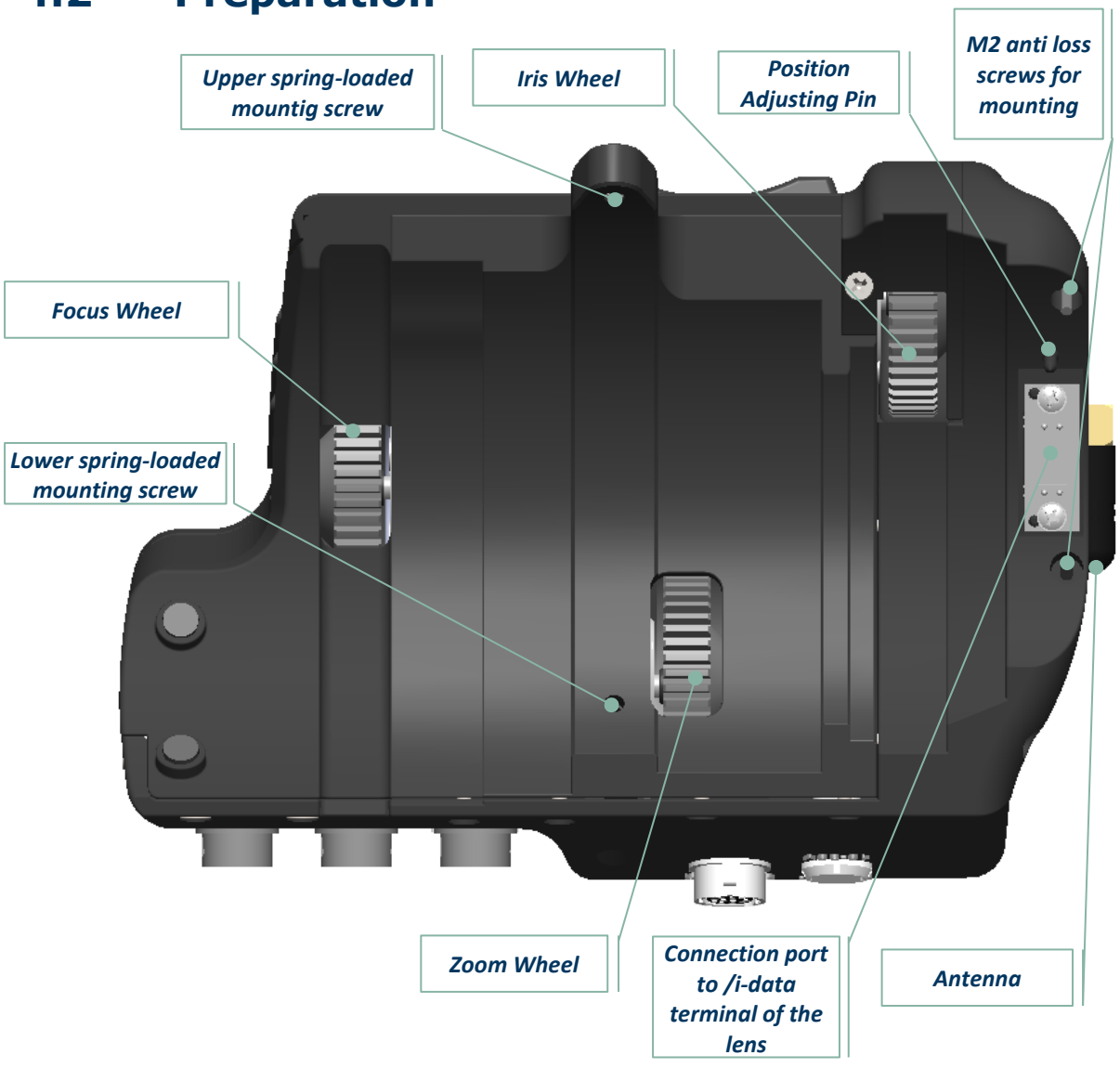


Figure 1

4.2.1 Mounting the drive to the lens

Follow these steps to mount the CANON Flex Servo Drive to the CANON Flex lens:

1. Make sure, that no cable is connected to the CANON Flex Servo Drive

2. Remove /i-data port holder (4 pin 00 size LEMO) from lens, take care not to drop/lose the screws.
3. Make sure the threads are clean and free from damage.
4. Mount the CANON Flex Servo Drive onto the lens. Take care, that the Position Adjusting Pin (see Figure 1) will move smoothly into the whole above the I-Data contacts on the lens. The three gears from the CANON Flex Servo Drive must interlock with the respective gears of the lens. The bar of the /i-data port must fit perfectly to the corresponding notch of the lens.
5. With the additional included 2,5 mm Allen Key, screw the lower spring-loaded mounting screw (see Figure 1) in the lower thread of the lens. Do the same with the upper spring-loaded mounting screw. Do not fully tighten the lower screw until the upper one is screwed in. Finally fix both screws carefully not overturning the threads. Ensure that all gears are attached to the standard 0.8mm pitch gears of the lens.
6. Fix both M2 anti loss screws (see Figure 1) carefully.
7. Rotate the lenses gears (F/I/Z rings) by hand. The gears should move freely without blocking from one to the other hard end stop.
8. Mount the antenna to the CANON Flex Servo drive (see Figure 3) if the Magnum hand unit shall be used for wireless operation and select a radio channel from "5" to F, otherwise set the code wheel to "4" or less.
9. The drive is now installed, and the lens can be used as an ENG style broadcast lens.

4.2.2 Installing and using the CANON Flex Zoom Lens as a broadcast lens

Once the drive is installed the lens can be mounted to any PL/EF- mount camera. As the drive features all the typical connectors of a broadcast lens, it will integrate flawlessly to broadcast workflow.
After installing the lens to the camera, connect the Zoom and Focus demands as well as the Lensport cable to the cameras body. Power the drive via the power cable (MN-AB-A) from a stronger 12-15V power source (i.e., from D-tap outlet of a battery). Alternatively power the drive from the RS 3pin Fischer socket on the camera if available. The needed cable for this is RS-A2-P/CAM. Right after the drive is powered it will calibrate the lenses end stops for every axis at same time as there are Focus, Iris and Zoom.

Note: lens is calibrated after each power cycle.

4.2.3 Auto calibration in detail

The calibration of the CANON Flex Servo Drive is an essential part of the setup to guarantee precise, reliable operation of the device. Calibration is a procedure where the precise torque resistance and the mechanical hard end stops of the lens is recorded for every axis. The procedure ensures optimal reliability in use. Please ensure there are no obstructions between the gears of the lenses and the CANON Flex Servo Drive. Do not touch the ring of the lenses during calibration as this will cause false torque resistance readings.
As soon as the CANON Flex Servo Drive is connected to the power source the auto calibration starts. While the yellow status LED´s near the Zoom/Focus/Iris buttons blinking, auto calibration is in progress and the device identifies end stops of the lenses. Do not touch any moving parts during auto calibration. Calibration is complete when both end stops on every axis have been identified and the LED´s are either OFF or static ON. The CANON Flex Servo Drive is now ready to shoot.

5. Operation

5.1 Controls and signaling LEDs

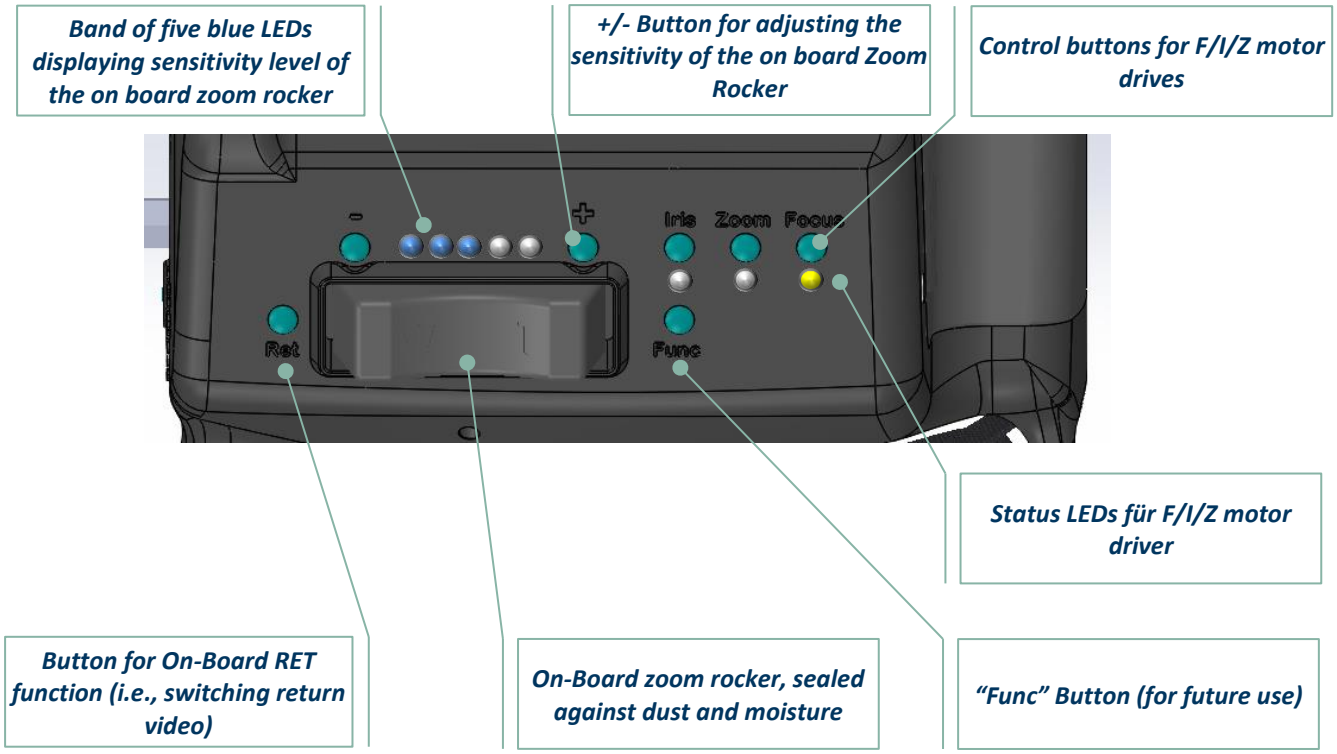


Figure 2

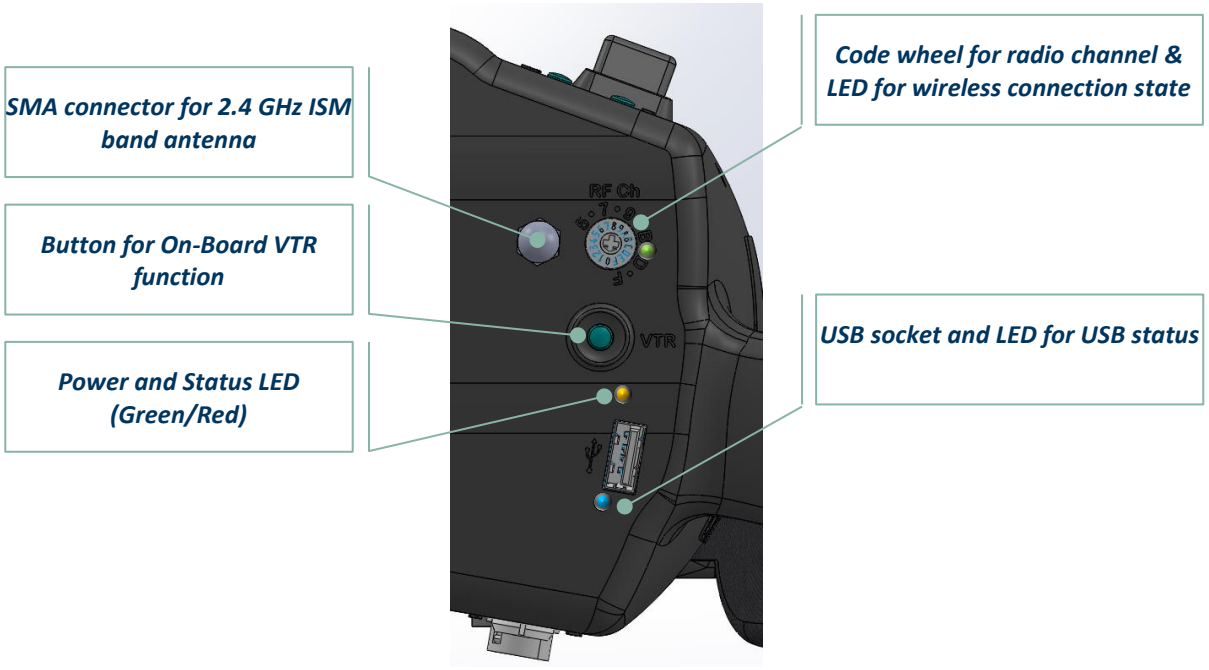


Figure 3

Band of five blue LEDs:
displays sensitivity level 1-5 of the on board zoom rocker. If no LED is lit (sensitivity = 0), the On-Board Zoom Rocker is disabled. The selected setting is stored in nonvolatile memory and restores after the next power cycle.

Control buttons for F/I/Z motor drives:
Functions are:
- Single operation toggles between motor activated ←→ deactivated (freely to move by hand or external motor)
- Continuous operation for more than 3 seconds starts the automatic lens calibration for the related axis

Status LEDs for F/I/Z motor driver:

LED State	***Meaning***
Constantly Off	The related motor is controlled by the Servo Drive or no power
Constantly On	The related motor is released from the Servo Drive and can be moved freely
Blinking	The related motor is calibrating the lens end stops
Flashing (short on / long Off)	The related motor is in fault condition

RET Button/VTR-Button:
implement the related functionality for external RETURN & VTR video switching as on typical broadcast lenses in multi-Camera set-ups.

Code wheel for radio channel:
Select the radio channel for communicating with an external Magnum hand unit. Only the channels "5"-F can be used. Channel numbers lower than "5" will switch off the radio module. When the green **Channel LED** is on, the connection between the Hand unit and the CANON Flex Servo Drive is established.

Power and Status LED (Green/Red/Orange):

LED State	***Meaning***
green	power on, status OK
Constantly Off	No Power
Orange blinking	Internal fault detected or no communication to /i-data port of the lens

USB socket and LED for USB status:
Available in software update mode only (refer to topic 6.2 "Software update via USB" below).

On-Board Zoom Rocker:
For changing the direction of the Zoomer Rocker:

1. Turn off the power.
2. press and hold the "+ Sensibility" button.
3. turn on the power and wait a second.
4. release the "+ Sensibility" button.
5. The On-Board Zoom Rocker changes operational direction. All external Zoom demands are not affected!

5.2 Connectors

For pin-outs refer to section 11.1 "Connector pin assignment" below.

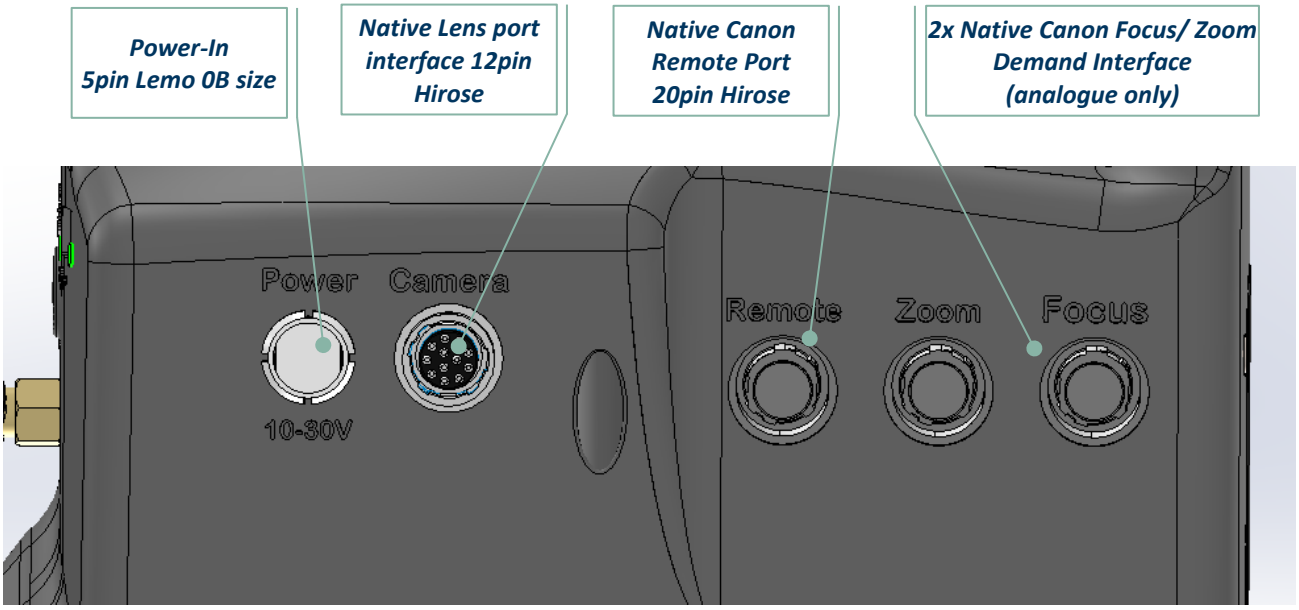


Figure 4

Power-In 5pin Lemo 0B size:
Due to the stiffness off gears on a CANON Flex Cine Zoom the needed power is higher than on other typical TV- Lens Servo drives. Make sure to use a strong power supply like 13.5V / 4A (~50 Watts).

Native Lens port interface 12pin Hirose

TV- Lensport compatible interface (analogue & digital) for applications with i.e., Sony Venice or ARRI LCUBE

Native CANON Focus/ Zoom Demand Interface (analogue):

Both sockets implement the original CANON Demand Socket base functionality. Take care to connect the demands (Focus Wheel and Zoom Rocker) to the corresponding 20-pin demand socket.

Native CANON Remote Port 20pin Hirose:

In addition to one digital interface (CANON digital demand protocol) the remote socket features encoder pulses of the Focus and Zoom motor for i.e., VR applications.

5.3 Included accessories

Item	*Chrosziel Part Number*
Power Cable D-Tap with angled Lemo plug 5pin	MN-AB-A
Lensport Interface Cable 12pin Hirose	AL2-INTF-LP
Angled Allen Key 2.5 mm	E2794009
Phillips Screwdriver PH0	E3683190

5.4 Optional accessories

Item	*Chrosziel Part Number*
Magnum Wireless Hand Unit 3 Axis (Focus/Iris/Zoom) Zoom Rocker Battery Charger	MN-200T MN-ZR MN-BAT MN-CH
Magnum Wireless Hand Unit 2 Axis (Focus/Iris) Battery Charger	MN-200T MN-BAT MN-CH
Magnum Wireless Hand Unit 1 Axis (Focus) Battery Charger	MN-150T or MN-100T MN-BAT MN-CH
3pin Fischer RS Port cable (Power/Start-Stop)	RS-A2-P/CAM

6. Maintenance

The CANON Flex Servo Drive is usually maintenance-free. In the case of wear and tear to specific parts, please send the device to an authorized service department. There are no special maintenance tasks to be done by the user/owner with one exception regarding the cleaning of the housing if needed.

- Only, clean the device when it is disconnected from power.
- Use a soft, dry cloth or compressed air to clean the CANON Flex servo motor.
- Never use harsh or abrasive cleaning agents.
- Be careful at the sockets not to blow or wipe in dust and detergents into the electric contacts.

Only, Chrosziel Customer Service operatives may perform any further maintenance or repair tasks. All warranty claims are voided if maintenance tasks are performed during the warranty period by persons or companies without Chrosziel Customer Service authorization. Wear parts are not included in the warranty.

6.1 Checking for current software version

On start-up after powering, the software version is displayed for about 3 seconds by a combination of the two top-side LED bars (5x blue ones from zoom speed indicator and three yellow ones of the servo switch states of F/I/Z motor). Both bars form a binary encoded value where the blue LEDs stand for the most significant and the three yellow ones for the least significant part of the number separated by an imaginary dot.

Examples:

Led pattern	Binary Expression	Version Number
	00001.001	1.1
	00001.110	1.6
	00001.111	1.7

6.2 Software update via USB

Chrosziel is continuously improving the software of the system based on the demands of the industry including customer-requested improvements. The user can easily install an update to the latest software. The only requested items are the software files supplied by Chrosziel and a standard USB- Stick. Contact your dealer or Chrosziel directly to obtain new files or get registered for the respective newsletter. To register for update notifications, please draft an e-mail to sales@chrosziel.com . Include product serial number, name, company, and email address. We comply with all statutory data protection laws.

Copy the two provided software files into the root of an USB stick (FAT/FAT32 formatted). Make sure to copy both files *("pmimg_m.hex" and "pmimg_s.hex")*!

Update procedure:

- Power drive down
- Remove dust cover from USB socket and plug USB stick with software files into it.
- Press and hold down button "Iris Servo" and "Focus Servo" on top side of the drive and repower it. Unit will perform the update indicating the progress by different LED flashing patterns. After update, the unit restarts automatically displaying the current software version with the top-side LED stripes for 3 seconds and performs the automated lens calibration.

7. Warranty

7.1 Scope

Chrosziel GmbH grants the owner of the product a standard warranty of **12 months** from the date of invoice. During this period, material or production defects identified on the CANON Flex Servo Drive will be remedied free of charge by the Chrosziel customer service.

The terms of the warranty exclude faults or defects from causes other than material or production defects, like

- Transport damage of any kind
- Faults caused by improper installation
- Faults caused by use for other than the intended purpose
- Faults caused by improper treatment
- Faults caused by unprofessionally performed repairs or attempts at repair by persons or companies without authorization from Chrosziel GmbH
- Normal wear and tear
- Cleaning of components
- Alignment to nationally diverging technical or safety-relevant requirements if the device is not used in the country for which it was designed and manufactured.

We do not accept liability for devices with serial numbers that are falsified, changed, or removed. All warranty claims are voided if the device is opened.

Warranty claims beyond free repair of faults, e.g., compensation claims, do not fall within the scope of the warranty.

7.2 Customer Service

In case there are operating issues with the CANON Flex Servo Drive occurring, proceed as follows:

a) Contact Customer Service

Mail: info@chrosziel.com / phone: +49 (0) 89 / 901 091 0 (Mon. – Fri.: 9 am – 5 pm CET)

Please give a detailed description of the issue, include a picture or video, and the invoice.

b) Pack the device carefully!

Pack up your device, making sure the packaging is well padded and protected from impact. N.B.: Warranty does not cover transport damage!

c) Ship the device.

After response from the Chrosziel Customer Service Center, proceed as instructed.

8. Troubleshooting

One of the Iris/Zoom/Focus LED´s is flashing

Probable reason	Suggested solution
Electronic motor fuse has fired	Press the corresponding button a couple of seconds to re-calibrate the affected axis, check for mechanical issues between the gears of lens and the drive
internal trouble	Restart the CANON Flex Servo Drive

Power LED is blinking orange

Probable reason	Suggested solution
internal trouble	Restart the CANON Flex Servo Drive
No /i-data communication to lens	Restart the CANON Flex Servo Drive, remount the drive to lens, check contact pins to lens, swap out lens

The CANON Flex Servo Drive does not power up

Probable reason	Suggested solution
No or incorrect power voltage	Replace discharged batteries with fully charged batteries, the CANON Flex Servo Drive operates from 10 to 30 V
Incorrect polarity	Check the polarity and correct if necessary
No power	Check for cable faults, damage, or short circuits
Camera is not powered (if powered from RS- port)	Power camera Check cables and connectors
CANON Flex Servo Drive receives no power	Check status LED and power cables

The CANON Flex Servo Drive does not calibrate

Probable reason	Suggested solution
Stiff lens	Check the lens
Obstruction between the lens gearing and the CANON Flex servo motor gear	Check the gearing and the CANON Flex Servo Drive gear and remove any obstructions
No or incorrect power voltage and /or wattage	Ensure the power supply is 10 to 30 V (min 50 Watt)

The firmware update does not install

Probable reason	Suggested solution
Incorrectly formatted USB flash drive	format USB flash drive to FAT16 or FAT32
Hex-file is not saved in the root of the USB flash drive	Ensure the file is saved in the root of USB flash drive, not in a sub-folder
USB flash drive is not supported	Try a different USB flash drive
Too many files in the root	Use a clean USB stick without any additional files & folders

9. Disposal

The packaging and all packaging materials used are from environmentally friendly recyclable materials. At the end of its useful life, the CANON Flex Servo Drive must be taken to a recycling center for appropriate environmentally friendly disposal. Do not discard the CANON Flex Servo Drive with household waste. Find your nearest recycling center by searching the Internet or contacting your city hall.

10. Additional Information

CANON Flex product landing page:
https://www.chrosziel.com

Subscribe to the newsletter:
https://go.chrosziel.com/newsletter-registration

Enjoy the Chrosziel blog with user stories:
https://www.chrosziel.com/userstores

Chrosziel in the social web:

Instagram: https://www.instagram.com/chrosziel

LinkedIn: https://www.linkedin.com/company/chrosziel-gmbh

Facebook: https://www.facebook.com/chrosziel

Twitter: https://twitter.com/Chrosziel

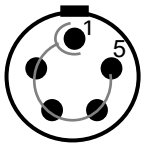
Share your excitement:

@chrosziel | #chrosziel | #hackthelens

11. Technical Data

11.1 Connector pin assignment

11.1.1 Power In

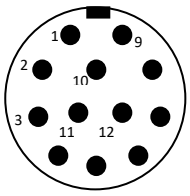


Type: Lemo compatible 0B 305 (female on Servo Drive)

Pin 1: + Power in
Pin 2 & 3: Relay closure contacts 100mA max.
Pin 4: - Power /GND

Figure 5

11.1.2 Camera

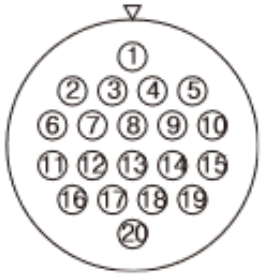


Type: Hirose HR10A-10R-12P (male on Servo Drive)

Pin 1 RET
Pin 2 VTR
Pin 3 GND
Pin 4 IRIS A/M (A: 5v, M: 0V)
Pin 5 IRIS CONT (F16: 3.4V, F2.8: 6.2V)
Pin 6 Power (10 – 30V)
Pin 7 IRIS FOLLOW (F16: 3.4V, F2.8: 6.2V)
Pin 8 IRIS A/R (A: 0V, R: 5V)
Pin 9 n.c.
Pin 10 ZOOM FOLLOW (T: 7V, W: 2V)
Pin 11 Serial Data Lens → Camera
Pin 12 Serial Data Camera → Lens

Figure 6

11.1.3 Zoom

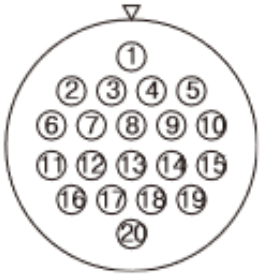


Type: Hirose HR25A-9R-20-S

Pin 1 +Ub (12V regulated)
Pin 2 Uzoom
Pin 3 n.c.
Pin 4 RET (SW_SEL1)
Pin 5 VTR (SW_SEL2)
Pin 6 SW_SEL3
Pin 7 RET
Pin 8 VTR
Pin 10 U follow Z
Pin 11 UrefH (7,5V)
Pin 12 UrefL (2,5V)
Pin 14 UrefM (5V)
Pin 20 GND

Figure 7

11.1.4 Focus

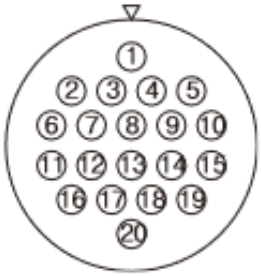


Type: Hirose HR25A-9R-20-S

Pin 1 +Ub (12V)
Pin 3 Ufoc
Pin 4 UrefM (5V)
Pin 8 Near/Far switch
Pin 11 UrefH (7,5V)
Pin 12 UrefL (2,5V)
Pin 20 GND

Figure 8

11.1.5 Remote



Type: Hirose HR25A-9R-20-S

Pin 1 +Ub (12V)
Pin 15 RS422 RX+
Pin 16 RS422 RX-
Pin 17 RS422 TX+
Pin 18 RS422 TX-
Pin 19 PC/DEMAND detect
Pin 20 GND

Figure 9

11.2 Specifications

Specification	Value
Chrosziel Part Number	CDM-FLEX-FIZ
Weight (CANON Flex Servo Drive)	approx. 1,0 kg (2.2 lbs.)
Max Zoom Speed (min to max or max to min)	1,5 Sec
Size (see Figure 10&11)	l 163 w 140mm h 124mm
Operating Temperature	-10 °C to 40 °C (20 °C is recommended)
Gear Module	0.8
Power supply	10-30V (Lemo compatible 0B 5-pin)
Power consumption max. approx.	300mAh @ 12V, no motor moving Up to 4A @ 12V, all motors moving @ full speed and torque
Demand Input Focus	analog
Demand Input Zoom	analog
Encoder Resolution (F/I/Z Motor)	16 bit (512 x 2 x 2 x 19)/gear rotation

11.3 Mounted CANON Flex Servo Drive sizes

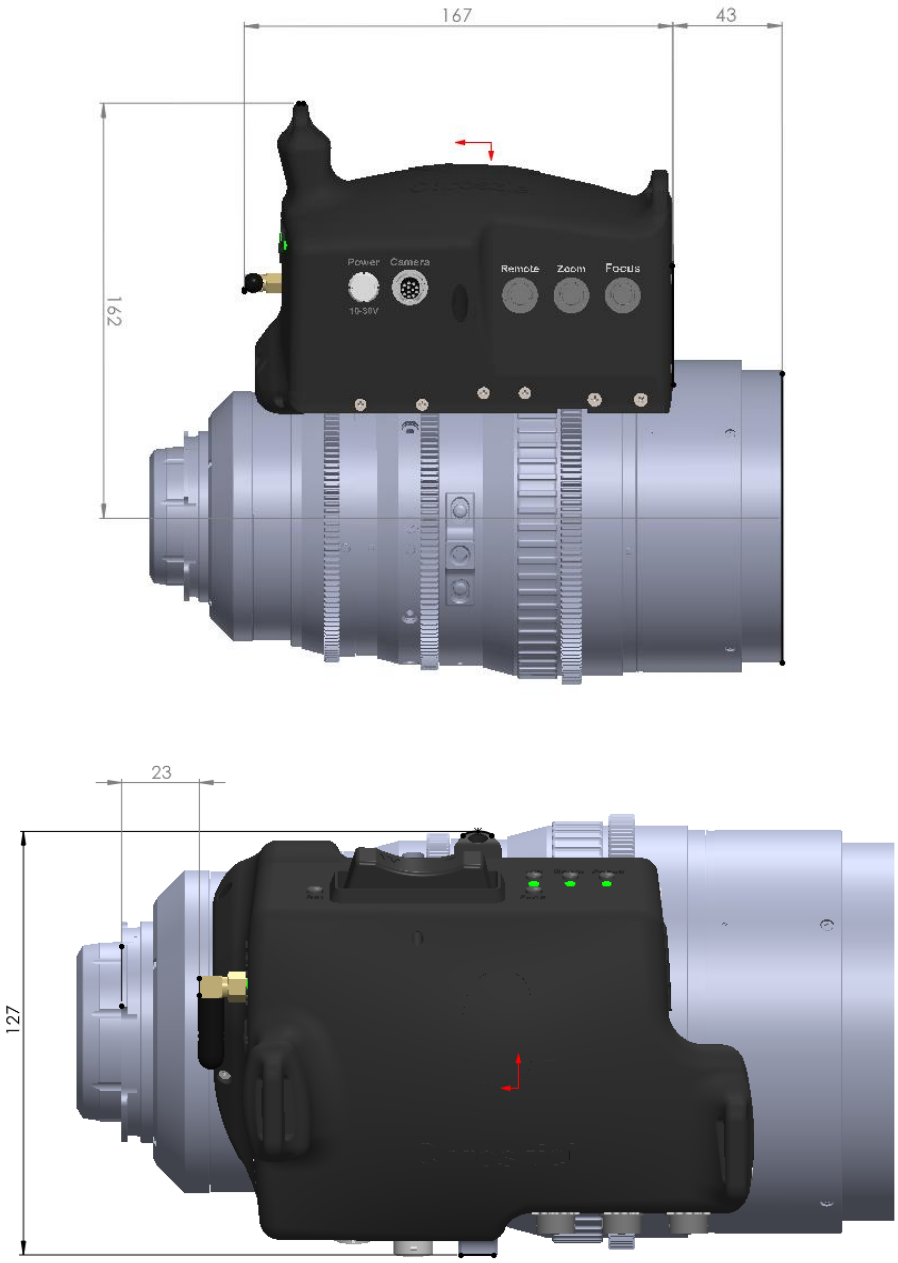


Figure 10&11

(N.B.: Pictures show CANON Flex Servo Drive mounted on an example CANON Flex CN-E 20-50 lens.)

Declaration of Conformity

CE

Manufacturer:
Chrosziel GmbH
Klausnerring 6
85551 Kirchheim
Germany

Product:
Servo drive for CANON Flex Lens series CDM-FLEX-FIZ operating in frequency band:
GHz: 2400,75 - 2481,75
Standard Frequencies: RADIO LICENCE FOR EUROPE CE Radio modules

Herewith we certify that our product mentioned above comply with CE conformity regulations. And is in conformity with the essential requirements and other relevant provisions of the following EC directive including all applicable amendments:

99/5/EC of 9 March 1999
2011/65/EU of 1 July 2011
EN 300 220-2 V2.4.1 (2012-05)
EN 300 328 V1.7.1 (2006-10)
EN 300 440-2 V1.4.1 (2010-08)
EN 301 489-1 V1.9.2 (2011-09)
EN 301 489-3 V1.4.1 (2002-08)
EN 60950 (2006)
EN 62368-1 (2016)
IEC/UL 62368

CDM-FLEX-FIZ has been assessed to the RoHS2 & RoHS3 Directive using the following harmonized standard:
RoHS 2 – (2011/65/EU) + Extension RoHS 3 (EN 50581).

Ottobrunn, July 2023

Chrosziel GmbH
Timm Stemann
CEO Chrosziel GmbH
85521 Ottobrunn

Notes