Operating Manual

Zoomer the Universal Zoom Servo Drive

Version 1.3

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Dear Customer,

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

This manual provides important information and instructions to ensure that you'll get the most out of your Chrosziel Universal zoom 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'll enjoy your new Zoomer!

Sincerely yours,
Chrosziel GmbH

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.

Although this operating manual was compiled with all possible care, we reserve the right to optimize it at any time and update it to reflect the state of the art. Images may differ from the original.

Table of Contents

1. Product Description

1.1 General

The Zoomer is a compact and universal zoom motor that can be pivoted to almost any lens by simply mounting it on a 15mm rod. The universal motor unit CDM-UNI-Z2 fits seamlessly into the operating functions of the Sony cameras of the FX9 / FX6 / FS7 / FS5 series. The servo drive can be controlled by the original zoom grip of those cameras or any other third party LANC based zoom rocker. The motor control can be addressed via Sony's camera-specific protocol taking the advantage of the higher resolution in speed steps and works independently of the camera signals when a LANC zoom rocker is plugged directly into the servo.
The multi-function handgrip, which in addition to the recording function and a zoom rocker also provide control over the camera menu and other freely selectable functions, are extremely popular on current video cameras with large sensors and are indispensable for effective operation.
The Chrosziel Universal Zoom Servo Drive now allows optimal use of all manual zoom lenses together with the multi-function handgrip. For this purpose, the Zoomer is slid onto a 15mm rod and swiveled onto the zoom lens. Two plug-in cables establish the connection with the camera. One cable is used for the power supply from the camera battery, the second for the connection to the control commands between the handle and the camera.

When using a standard LANC zoom rocker or handle with the Sony PXW-FS5, PXW-FS7 and PXW-FS7II, the servo is connected between the handle and the camera via an input and an output jack to receive all zoom control signals.

For setup with the Sony PXW-FX9 camera, a Y-cable is used that accepts the Sony multi-connector and connects to both the input jack of the Zoomer and the input multi socket of the camera.
For the Sony ILME-FX6 camera, a Y-cable is used and connects the 3.5mm connector of the Sony handgrip, input jack of the Universal Zoom Servo Drive, and the Sony camera.

1.2 Nameplate

The nameplate located on the back cover of the Chrosziel zoom servo drive housing includes all CE relevant details.

1.3 Applications / Intended Use

The Chrosziel Universal zoom 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.

The universal motor unit CDM-UNI-Z2 fits seamlessly into the operating functions of the Sony cameras of the FX9 / FX6 / FS7 / FS5 series.

Due to the included Chrosziel Flexi toothed ring (#206-30), the Zoomer can be used with almost any zoom lens even without toothing.

On any other camera, the Zoomer can be used with a standard zoom rocker based on LANC protocols.

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.

1.4 Product Safety

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 and the LANC sockets are optically de-coupled. A rubber seal protects the housing from light splash water. The device can thus be used in moderate outdoor conditions.

1.5 Technical Details

Technical data

- Power supply 10-30V (Lemo compatible 0B 5-pin)
- 2.5mm socket (control command in)
- 3.5mm socket (control command In&Out)
- USB Type mini A-B (firmware updates)
- Torque 0.5Nm
- Power consumption max. approx. 350mAh @ 12V

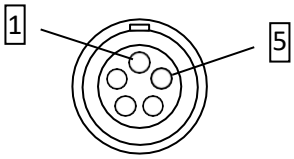
In the box

- 1x CDM-UNI-Z2 Digital motor unit
- 1x LANC cable
- 1x LANC extension cable
- 1x MN-AB-A90 (power supply cable 12 Volt A/B D-Tap – angled 90° rotated 0B 5pin)
- 1x 206-30 Flexi Gear Ring (Ø 60-120mm)
- 1x Gear Drive, mod. 0.8 (Ø 40mm)
- 1x CAB-FX9 for Sony PXW-FX9 compatibility
- 1x CAB-FX6 for Sony PXW-FX6 compatibility
- USB Mini Adapter

1.6 Connector pin assignment

Connector for: Power & camera "Start/ Stop "

Type: Lemo comp. 0B 305



Pin 1: + Power in
Pin 2: CAM Relay 1
Pin 3: CAM Relay 2
Pin 4: - Power /GND

Connector for: LANC

Type: 3,5 / 2,5 mm stereo jack cable

Pin 1 = Signal
Pin 2 = Signal
Pin 3 = GND

1.7 Operating voltage and temperature

The nominal input voltage of the Chrosziel Universal zoom servo drives is 10–30V.
At temperatures below -10° Celsius or above 40° Celsius, optimum functioning of the product can no longer be guaranteed. A constant operating temperature of approx. 20° Celsius is recommended.

1.8 Safety Information

Improper use of the Chrosziel Universal zoom 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 zoom servo drive.

1.8.1 General Safety Information

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 Chrosziel Universal zoom servo drive only do so after reading and understanding the instructions.

Keep away from children and protect against unauthorized use. Never leave your Chrosziel Universal zoom servo drive unattended in operational condition or during operation. Keep away from children. Children must not be permitted to operate the zoom servo drive. Protect it from unauthorized access or use. The Universal zoom servo drive is not intended for use by persons (including children) This appliance is not intended for use by persons (including children) with reduced physical, sensory, or mentalcapabilities, or lack of experience and knowledge, unless they are supervised by a person responsible for their safety or have received instruction concerning use of the zoom servo drive from that person.

Never leave in operation unattended. Never leave the Chrosziel Universal zoom servo drive unattended in operational condition or in operation.

Take care and concentrate at all times when using the device. Do not work with the Chrosziel Universal zoom servo drive while experiencing difficulty in concentrating or under the influence of drugs, alcohol or medication. A single moment of inattention while using the Universal zoom servo drive may result in accident and injury.

Ensure the unit is firmly affixed to the lens. When affixing the Chrosziel Universal zoom servo drive to your zoom lens, ensure the unit is mounted securely and properly.

Watch out for damage. Check your Chrosziel Universal zoom 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 Chrosziel Universal zoom servo drive for the intended purpose described in this operating manual, only.

Inspect regularly. Use of the Chrosziel Universal zoom servo drive may result in wear and tear to some parts. 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.

1.8.2 Specific Safety Instructions

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

- Install the Chrosziel zoom 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 etc.).

2. Set-Up Chrosziel Universal Zoom Servo Drive

2.1 In the Box

After opening the package, immediately check if all accessories and parts 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.

2.2 Preparation

2.2.1 Assembly

The Zoomer servo drive can be operated by simply mounting it on a 15mm rod and tightening the clamp to the rod. Ensure that the Universal zoom servo drive is securely fixed to the rod, that the gear is attached to the standard 0.8mm pitch gear of the lens. If the lens is not a cinestyle-lens and does not have any toothed ring, please attach the included Chrosziel Flexi toothed ring (#206-30) to the lens and make sure the Zoomer is properly attached to the ring. Make sure the locking end of the ring does not touch the motor and that the remaining part of the rubber ring is cut or removed. If the lens used is too short, rotate the device and mount it with the new orientation: if required, the device can be even attached to the other side of the camera or to a top plate through rods. Make sure the threads are free from damage, and that the gear of the servo motor interlocks with the gear of the zoom lens.

2.2.2 Operation

For setup with the Sony PXW-FX9 camera, a Y-cable that accepts the Sony multi-connector is available and connects to both the input jack of the Zoomer and the input jack of the camera.
For the Sony ILME-FX6 camera, a Y-cable is available and connects the 3.5mm connector of the Sony handgrip, input jack of the Universal Zoom Servo Drive, and the Sony camera.

For use with Sony FS5 or FS7, the Zoomer can be used and controlled through the Zoom rocker on the smart grip.
On any other camera, the Zoomer can be used with a standard zoom rocker based on LANC protocols: plug in the LANC cable directly to the Zoomer to gain control of the universal motor.
Connect the power cable to the zoom servo drive and connect it to the D-tap power source.
The Zoomer will start immediately and auto calibrate
Start now the camera. The Zoomer is now ready for use.

2.2.3 Auto Calibration

The calibration of the Universal zoom servo drive is an essential part of the setup to guarantee precise, reliable operation of the device. Calibration is a complex procedure where the precise torque resistance of the lens is recorded for each position. The procedure ensures optimum reliability in use. Please ensure there are no obstructions between the gears of the zoom lens and the zoom servo drive. Do not touch the zoom ring of the lens during calibration as this will cause in false torque resistance readings.

As soon as the Zoomer is connected to the power source the auto calibration starts within two seconds. While the status LED flashes green, auto calibration is in progress and the device identifies end stops of the zoom lens. Do not touch any moving parts during auto calibration. Calibration is complete when both end stops have been identified and the LED shows steady green. The Universal zoom servo drive is now ready to be controlled via the zoom rocker. Five zoom modes are available (to change mode, keep the zoom rocker fully pressed on tele end for more than 10 seconds). If you want to change the direction of the motor, keep pressed the zoom rocker on wide end for more than 10 seconds.

2.2.4 Registration for Firmware Updates

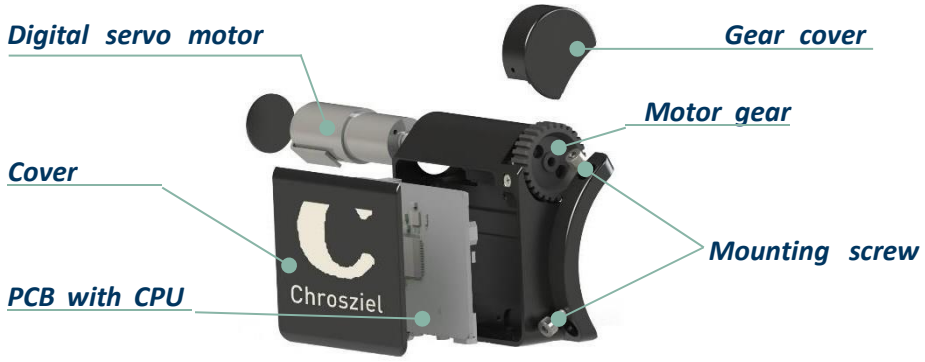
Chrosziel continuously updates and advances its firmware and incorporates user feedback. Please ensure you always run the latest firmware for optimum smooth and fault-free operation. To make sure to receive firmware updates, please register the zoom servo drive via mail (info@chrosziel.com). Include product serial number, name, company, and email address. We comply with all statutory data protection laws.

2.2.5 Implementation of Firmware Updates

For latest firmware versions check the Chrosziel website www.chrosziel.com or get in contact via e-mail info@chrosziel.com.
Download and unzip the zip file, then copy the hex files into the root folder (not a sub-folder!) of a FAT16 or FAT32 formatted USB drive. ExFAT or any other formats are NOT supported. Power off the zoom servo drive by unplugging the power cable. Insert the USB drive into the USB Mini port by using the mini-USB adapter supplied (see Fig. 2). Reconnect the power plug. The status LED flashes green until installation of the firmware update is complete (approx. 10 seconds). When the update is complete the zoom servo drive automatically restarts and the updated functions are available immediately.

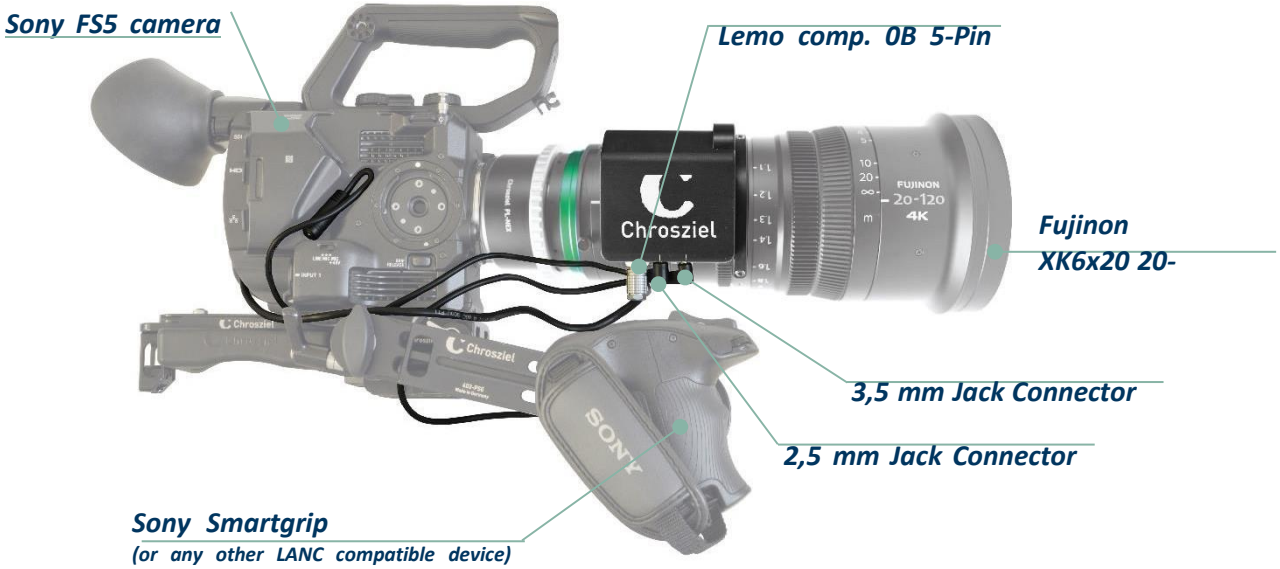
3. Diagrams

N.B.: Pictures show CDM-MK-Z2 and CDM-XK-Z2 as examples! Hardware specifications of other zoom servo drives may differ.



(Fig. 1)

(Fig. 2)



(Fig. 3)

3.1 Auto Start

As soon as the Universal zoom servo drive is powered on, auto calibration of the zoom end stops begins. The device is controlled by the zoom rocker of the control unit. Five zoom modes are available (EB/Documentary mode, Live / Hard cut mode, Silent, Direct/Raw Mode and Photo Lens mode). To change mode, keep the zoom rocker fully pressed on tele end for more than 10 seconds. If you want to change the direction of the motor, keep the zoom rocker pressed on wide end for more than 10 seconds. During the mode change, the LED on the rear of the housing flashes one to five times indicating the choice of zoom mode.

3.2 Zooming

Any LANC-compatible zoom device operates smoothly with the Universal zoom servo drives. The standard LANC protocol offers up to 8 different zoom speeds in one direction. The operator thus has a choice of 16 zoom speeds in total.

Zoom IN: Gently press down the zoom rocker of your LANC device in one direction. Themore pressure you exert on the zoom rocker, the faster or slower the zoom speed (light pressure → slow zoom speed; heavy pressure → fast zoom speed). The speed is set depending on the amount of change within the zoom rocker.

Zoom OUT: Press down the zoom rocker of your LANC device in the opposite direction.

The relation of zoom speed to zoom rocker pressure is the same in both directions. To optimize this relation, the zoom servo drive offers a range of preset zoom modes.

Note: If both LANC cables are connected, the Universal zoom servo drive will only work if the camera is turned on.

Note: Change the zoom direction by pressing the zoom rocker on wide end for more than 10 seconds

3.3 Tuning Zoom Modes

Make sure the Zoomer is ready for operation, is calibrated and the green status LED is not flashing.

To switch between zoom modes, keep the zoom rocker fully pressed on tele end for more than 10 seconds. If you want to change the direction of the motor, keep the zoom rocker pressed on wide end for more than 10 seconds.

Note: If the Zoom Rocker is equipped with a speed control wheel, make sure to adjust this to maximum speed setting.

The green status LED now flashes once or more to indicate the zoom mode selected, keep the max. Zoom-Tele position pressed until the required flashing pattern is displayed:

Zoom Mode 1	LED flashes 1x:	Super Slow for TV-Live- Productions, Interviews
Zoom Mode 2	LED flashes 2x:	EB/Documentary
Zoom Mode 3	LED flashes 3x:	Silent
Zoom Mode 4	LED flashes 4x:	Live/Hard cut
Zoom Mode 5	LED flashes 5x:	Direct/Raw
Zoom Mode 6	LED flashes 6x:	Photo Mode for sticky lenses

Note: zoom mode can be changed continuously, e.g. from Mode 1 to Mode 2, Mode 3, Mode 4, Mode 6 then back to Mode 1. Please ensure to always run the latest firmware to access zoom mode updates.

Note: The Universal zoom servo drive stores the last selected zoom mode in memory. As soon as the camera set-up is powered up, the previously selected zoom mode is instantaneously available for the operator.

3.4 Controlling Camera

The zoom servo drive instantaneously loops through all functions of the LANC device to the camera, allowing the operator to control functions supported by the LANC device with the camera, such as menus, user keys, and camera start/stop.

3.4.1 Camera Start / Stop

To ensure the external camera start / stop control is activated; consult the camera operating manual if necessary.

Connect the camera to the zoom servo drive using the connection cable. To connect a LANC camera, use the LANC connection cable supplied. For cameras without LANC input, connect the combined power / camera start/stop cable to the connectors on the camera and the zoom servo drive. This allows start/stop control to be used with cameras including ARRI Alexa (Mini) / Amira, Panasonic Varicam / EVA, Sony F5/F55, and more.

Camera Start / Stop: Press down the Run/Record switch on your LANC device. The camera starts recording. Press again to stop recording.

3.4.2 Camera Functions

All functions of the LANC device are instantaneously looped through to the camera. For information and instructions about your LANC device and camera, consult the relevant operating manuals.

3.5 Optional Accessories

Handgrip Extension (403-FX65)

- with bayonet lock for Sony Smartgrip
- with Hirth rosette for Sony PWX-FX6 & Chrosziel 401-FX6
- incl. LANC extension cable (3,5 mm Jack plug & socket)

LightWeight Support (401-FX9)

- for Sony PXW-FX9
- integrated shoulder pad, V-lock & tripod plates

LightWeight Support (401-FS6)

- for Sony PXW-FS6
- integrated shoulder pad, V-lock & tripod plates

LightWeight Support (403-FX6-COMPACT)

- for Sony PXW-Fx6
- integrated shoulder pad, V-lock & tripod plates

Leather Handles (403-30)

- for standard cameras & supports with Hirth rosette
- retractable, swiveling, rotatable

3.6 Cable Options

Model	Order No.
Angled Power Cable for Sony FS5 / FS7 / XDCA / BP-U60T, Panasonic Varicam Hirose 4-Pin / Lemo comp. 0B 5-Pin	CDM-XDCA-A
Angled Combined Power Cable with camera start / stop for ARRI Alexa / Amira, Sony F35 Fischer RS 3-Pin / Lemo comp. 0B 5-Pin	RS-A2-P-CAM-A
Angled Combined Power Cable with camera start / stop for ARRI Alexa Mini Lemo comp. 1B 7-Pin / Lemo comp. 0B 5-Pin	RS-A2M-P-CAM-A
Angled Power Cable 12 Volt Lemo comp. 0B 2-Pin / Lemo comp. 0B 5-Pin	MN-STM-A
Power Cable 12 Volt A/B D-Tap Lemo comp. 0B 5-Pin	MN-AB
Combined Power Cable with camera start / stop for ARRI Alexa / Amira / Movicam SL, Sony Fischer RS 3-Pin / Lemo comp. 0B 5-Pin	RS-A2-P-CAM
Combined Power Cable with camera start / stop for ARRI Alexa Mini Lemo comp. 1B 7-Pin / Lemo comp. 0B 5-Pin*	RS-A2M-P-CAM
Combined Power Cable with camera start / stop for Panasonic Varicam, Sony FS5 / F55 Hirose 4-Pin / Lemo comp. 0B 5-Pin	F55-A2-P-CAM
Power Cable 12 Volt Lemo comp. 0B 2-Pin / Lemo comp. 0B 5-Pin	MN-STM

4. Cleaning and Maintenance Instructions

4.1 Safety Warning

- Always disconnect the Universal zoom servo drive from power before undertaking cleaning andmaintenance tasks.

4.2 Cleaning

- Only clean the device when it is disconnected from power.
- Use only a soft, dry cloth or compressed air to clean the universal zoom servo motor.
- Never use harsh or abrasive cleaning agents.

5. Professional Cleaning and Maintenance

Maintenance tasks not listed in Section 5.2 may only be performed by Chrosziel Customer Service operatives see Section 6. All warranty claims are voided if maintenance tasks are performed during the warranty period by persons or companies without Chrosziel Customer Service authorization.

5.1 Safety

- Always disconnect the plugs and connection cables or USB connectors before performing maintenance tasks.
- Disconnect the device from power before performing cleaning or maintenance tasks.
- Be careful of sharp edges.

5.2 Maintenance

The universal zoom 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. Wear parts are not included in the Warranty.

6. Warranty

6.1 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 universal zoom 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 above and beyond free repair of faults, e.g. compensation claims, do not fall within the scope of the Warranty.

6.2 Customer Service

In case there are operating issues with the universal zoom 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.

7. Troubleshooting

The Universal zoom servo drive does not power up

Possible reason	Suggested solution
No or incorrect power voltage	Replace spent batteries with fully charged batteries, the Zoomer 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

The Universal zoom servo drive is not running at full speed

Possible reason	Suggested solution
Silent zoom mode is activated	Check the zoom mode selected and switch to a different mode (press zoom rocker more than 10 seconds)
Stiff lens	Check the lens
The LANC device is not transmitting the maximum speed	Some LANC devices limit the maximum zoom speed.

The Universal zoom servo drive is running differently than previously

Possible reason	Suggested solution
Different Zoom Modes loaded	Check the zoom mode settings and change to your preferred mode by pressing and holding the zoom rocker for more than 10 seconds
Stiff lens	Check the lens

The Universal zoom servo drive does not calibrate

Possible reason	Suggested solution
Stiff lens	Check the lens
Obstruction between the zoom gearing and the Universal zoom servo motor gear	Check the zoom gearing and the Universal zoom servo drive gear and remove any obstructions
No or incorrect power voltage	Ensure the power supply is 10 to 30 V

The firmware update does not install

Possible reason	Suggested solution
Incorrectly formatted USB flash drive	format USB flash drive to 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 a sub-folder
USB flash drive is not supported	Try a different USB flash drive

The Universal zoom servo drive does not zoom

Possible reason	Suggested solution
LANC cables not plugged in correctly	Plug-in the LANC cables correctly
Camera is not powered	Power camera Check cables and connectors
Zoom servo drive is not powered	Check status LED, LANC and D-Tap power cables

8. Disposal

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

9. Additional Information / Useful Downloads

To receive the up-to-date operating manual visit:

https://www.chrosziel.com/support-cdm-mk-z

For firmware downloads go to:

https://www.chrosziel.com/firmware

Product overviews zoom servo drives:

https://www.chrosziel.com/zoom-servo-drives-cdm

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Twitter: https://twitter.com/Chrosziel

Share your excitement:

@chrosziel | #chrosziel | #hackthelens

Notes

EU Declaration of Conformity

1. *Apparatus model/Product* — *Zoomer the universal z*oom servo drive

2. *Name and address of the manufacturer* — Chrosziel GmbH
Klausnerring 6
85551 Kirchheim b. München

3. This declaration of conformity is issued under the sole responsibility of the manufacturer.

4. *Object of declaration* — *Zoomer the universal z*oom servo drive

5. The object of the declaration described above is in conformity with the relevant Union harmonization legislation.

DIRECTIVE 2014/30/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility

6. References to the relevant harmonized standards used, including the date of the standard, or references to the other technical specifications, including the date of the specification, in relation to which conformity is declared:

Electromagnetic compatibility (EMC)- Part 4-3: Testing and measurement techniques- Radiated, radiofrequency, electromagnetic field immunity test (IEC 61000-4-3)

Electromagnetic compatibility (EMC)- Part 4-6: Testing and measurement techniques- Immunity to conducted disturbances, induced by radio-frequency fields (IEC 61000-4-6)

Electromagnetic compatibility (EMC)- Part4-4: Testing and measurement techniques- Electrical fast transient/burst immunity test (IEC 61000-4-4)

Electromagnetic compatibility (EMC)- Part 4-2: Testing and measurement techniques- Electrostatic discharge immunity test (IEC 61000-4-2)

Electromagnetic compatibility (EMC)- Part 3-2: Limits- Limits for harmonic current emissions (equipment input current <=16 A per phase) (IEC 61000-3-2)

Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current <=16 A per phase and not subject to conditional connection

Electromagnetic compatibility (EMC)- Part 4-11: Testing and measurement techniques- Voltage dips, short interruptions and voltage variations immunity tests (IEC 61000-4-11)

Electromagnetic compatibility (EMC)- Part 4-8: Testing and measurement techniques- Power frequency magnetic field immunity test (IEC61000-4-8)

Electromagnetic Compatibility (EMC)- Part 4-5: Testing and measurement techniques - Surge immunity test (IEC 61000-4-5)

7. Not applicable.

8. *Additional information* — --

Signed for and on behalf of:

Chrosziel GmbH
Klausnerring 6
85551 Kirchheim b. München

Timm Stemann, CEO

Kirchheim, 28.02.2020