HEDÉN®

CARAT

Hedén Remote Control Unit

Hand Unit (Tx) and Reciever unit (Rx)

Operation Manual
Version 0.9 Beta

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Introduction

Congratulationsy you are now a proud owner of a high quality product from Hedén Engineering Co.

The Hedén Carat CT-100 FF-system is delivered with following parts:

1 x Hand Unit (Tx)
1 x Receiver (Rx)
1 x Digital motor (M21VE,M21VE-L or M26VE) with gear module 0.8
1 x 9V (8.4V) Li-On battery for hand unit
1 x Power cable DTap 0,5m
1 x Motor cable for Digital Motor, 0,5m
2 x Quick change marking disc
1 x Hedén carrying case

With this system you can wirelessly and precisely control focus or iris on most professional camera lenses. We hope you will enjoy using this system.

Please feel free to contact us if you have any questions or comments regarding our product.

A Hedén Lens Control system consists of a hand unit / transmitter(Tx), a receiver / amplifier (Rx), a Hedén motor M26VE, M21VE or M21VE-L and appropiate cables, forming a high precision null-seeking closed loop servo system.

Important! If another lens motor model will be used this has to bet set correctly in the Hedén PC GUI before starting up the system. If this is not done the system will not work properly and damage to the lens may occur.

The Bluetooth wireless protocol enables you to wirelessly control the motor via the receiver / amplfier unit.
The Rx unit is normally powered from an external battery or from the camera power output connector

The binding of the transmitter and receiver is quick and easy procedure, ensuring interference free operating. The outdoor range in free sight is up to 1000 meters. Indoor range is approx 30 – 60 meters.

For easy and quick setup the system is delivered factory Bluetooth paired.

The system can also control Fujinon Cabrio internal FIZ motors via the Aux port (marked AM on Rx unit). Serial cable #CT-500 or #CT-501 is needed for this.

Please read this manual carefully before starting using the system. There is a quick guide printed on the backside of the hand unit.

Hand unit (Tx)

1. Battery

Type 9V block battery. We strongly recommend rechargeable Li-Ion of at least 600mah

Battery change:

Battery is removed by pulling the bottom gable cover straight out, All personilized settings will be stored during a battery change

LED (B) (Fig1) shows battery charge status as follows:

Solid green: battery status more than 20 %
Solid Red: battery status less than 20 %
Flashing red: battery status less than 10 %. Replace battery immediately

Intelligent power sleep modes:

The hand unit goes into sleep mode after 180 seconds of inactivity. LED B will flash green (0,5 Hz). Hand unit will start up instanly when activity is determined as for example when control knob is turned or a button is pressed.
After 10 minutes of inactivity the Hand Unit is powered off. To start it up press power button (A)
When battery voltage drops below 7.0 Volt the hand unit will go into battery safe mode. In safe mode the power button is not operative.

2. USB

The hand unit has a mini-usb connector that is used for the Heden PC GUI.

3. Neckstrap.

The neckstrap can be safely attached to the 1/4" SS thread at the bottom of the hand unit.

4. Control knob

The knob is extremely smooth and gives the operator superior precise control of the lens motor. Total travel of the knob is 270 degrees.

Setting the drag of the knob:

The drag of the knob can be adjusted. This done by connecting the HLC via the mini-USB port to a PC that runs the Heden GUI. Instructions how to adjust the drag is found in the Heden PC GUI under potentiometer calibration.
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5. Quick change Focus / Iris marking disc

The marking disc could be marked with a pen so it matches up with the lens you are using.

The marking disc can easily be removed by pulling it straight out of the knob. To insert a new marking disc just rotate the disc until it locks into place and push it in.
You will here a click sound when it is in place.
Spare marking discs are sold separately

6. Power / Reset button (A)

Quick press power button (A) to turn on/off the Hand Unit. LED (B) is solid green showing that unit is turned on.To maximize battery and to protect deep discharge of the battery the system has several power saving modes.

Using the Heden PC GUI you can change the standard values of the sleep delay timer and the shutdown delay timer.

After 180 seconds of inactivity the Hand unit goes into power save mode. The Power LED (B) will flash green slowly. To wake it up turn the knob or press a button.

After 10 minutes of inactivity the Hand unit will turn off. Start it up by quick press the power button (A)

The Hand Unit goes automaticly into battery safe mode when battery voltage is drops under 7.0 V. LED (B) will flash red indicating that you need to replace the battery

Battery status LED (B): Solid green: battery level more than 20 %.
Solid red: battery level less than 20 %. Flashing red: battery level less than 10 %.

8. The auto lens calibration button and manual calibration button. (F & J)

Auto calibration of lens; depress button **F** and release after approx 2 sec LED (G) & (I) starts to flash (4Hz) orange. The motor, if attached to the lens, will now start an automatic lens calibration procedure by detecting the mechanical end stops of the lens.

The auto calibration feature has automatic lens torque detection. This means that an advanced algorithm is calculating optimal motor torque that is needed to calibrate the lens in the best possible way, saving both lens and lens motor from excsessive wear

When the calibration procedure is finished LED (G) will turn solid green.

If calibration fails because of super stiff lens you can use manual setup. Manual setup is always done with 100 % motor Torque and the auto torque detection function is disabled

Manual setup: Press button (J) for approx 2 secs until LED (I) turns orange. Carefully turn the knob to its halfway position LED (I) will start flashing amber 4Hz. Here you will find a small bit of deadband (motor is not moving in any direction when knob is turned)
Now you can speed control the motor in desired direction to find the mechanical ends stops of the lens barrel. Please be carefull when you do this, it will take some practice to be good at it. When an end stop is reached press the (J) button Turn knob opposite to move motor into second position and then press knob (**J**) again. Now LED (G) will be solid green If the setup is made correcty. This manual calibration procedure can also be used on infinate rotating lenses where there is no physical end.

9. Lens limits button (J) (lens mapping)

This function allows the operator to mapp out a part of the total lens travel to correspond to the full travel of the knob.

Quick press button (J) to set the first lens limit, LED (I) flashes at 4Hz turn the knob and go to the second desired lens limit and quick press button (J) again, now LED (I) now flashes at 2Hz indicating that a lens limit now is set and ready to use. Now the full travel of the knob will correspond to the digital limits just set. To release the limits press (J) button again. LED (I) goes dark.

10. Knob limit button (F) (knob mapping)

This function allows the operator to map out a part of the total travel of the knob
Quick press button (H) to set the first knob limit LED (G) flashes at 4Hz then go to you next desired knob limit and press button (H) again. LED (G) flashes at 2Hz indicating that a knob limit has been set Now your motor movement will correspond to the limits of the knob just set. If you override the limits the motor will not move. To release limits press button (H) again.

11. Motor direction button (H)

The motor direction button (H) can change the direction of the motor travel. Depress for 2 seconds and release to change the direction.

10. Camera Run/Stop button / Bluetooth pairing button (E)

Quick press camera Run button (E) to activate camera Run function. LED (D) flashes at 1Hz red. Press again to stop camera Run. LED (D) goes dark.

Bluetooth pairing: power up hand unit and Receiver unit . Depress pairing button on both hand unit and receiver unit for 2 seconds or more and release When the pairing process is successfully done the blue LEDs stops flashing and turn solid blue.

11. Power LED (B)

Solid green: battery status more than 20 %
Solid Red: batterystatus less than 20 %
Flashing red: battery status less than 10 %. Exchange battery.

The hand unit goes into automatic into sleep mode after 30 seconds of inactivity. LED (B) will flash green (0,5 Hz). Hand unit willstart up instanly when activity is determined as for example when control knob is moved or a button is pressed

12. Camera run LED (D)

This LED (D) has two functions:
1.Flashing 1HZ red when camera run is activated.
2.Indicating if motor is running. LED is flashing green when motor is running giving you feedback that the motor works ok

13. Bluetooth LED

When LED (C) is flashing it indicates no Bluetooth connection to receiver. Receiver is out of range or units are not paired
When LED (C) lights solid blue it is Bluetooth connected / Paired to receiver unit

14. Auto setup LED & Manual setup LED (G & J)

LED (G and J) flashes amber (0,5Hz) indicating that an autosetup could be performed.
When auto setup is initiated LED (G) flashes with 4Hz. When autosetup is finsihed LED (G) turns solid green. If setup is not completed correctly LED (G & J) flashes red.

LED (J) turns solid orange indicating that a manual setup has been initiated. Flashing (4Hz) motor is moving.
LED (G) turns solid green, manual calibration is finis

Hand unit Fig 1

A. Power on/off button / Reset button
B. Power on LED and battery status LED
C. Bluetooth LED
D. Camera run LED and motor feedback LED
E. Camera Run button and Bluetooth Pairing button
F. Auto lens calibration button & serial FIZ button
G. Auto lens calibration LED
H. Motor direction button and knob limits button
I. Manual lens calibration LED
J. Manual lens calibration and lens limits button
K. Quick change marking ring

Receiver (Rx)

Receiver can be mounted using Dual-Lock, velcro or by using the ¼" thread and the backside.
You can also use the optional V-lock mounting plate.

Don´t drill holes in the receiver box as it easily could damage the electronics inside.

Bluetooth Pairing Button (6)

Press button (6) for at least 2 seconds to start up the Bluetooth pairing process. LED (5) will start fast
Flashing looking for the hand unit. If paring is succesfull the LED (5) will turn solid blue.
When pairing process is ongoing the handunit and transmitter unit should be at least 1 meter from each other.
If they are to close pairing process may fail.

Power LED (4)

LED (4) Indicates receiver unit power status
Solid green = power ok

Bluetooth LED (5)

LED (5) Solid blue: connected to hand unit
Flashing blue: not connected to hand unit, out of range or not Bluetooth paired

1. Digital motor, Hedén M21VE or M26VE, Lemo 7- pin, EGG.1B.307.CYM

2. Aux motor/ serial , Fujinon Cabrio servo motors Lemo 5-pin, EGG.1B.305.CYM

3. Power in. Lemo 2-pin, EGG.0B.302.CYM (10 – 30 VDC)

4. Power LED (not available on Carat Rx)

5. Bluetooth LED

6. Bluetooth pairing button

7. Camera Run Lemo 4-pin ERA.0S.304.CLL
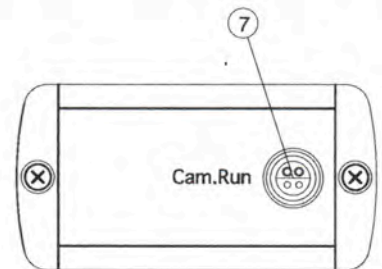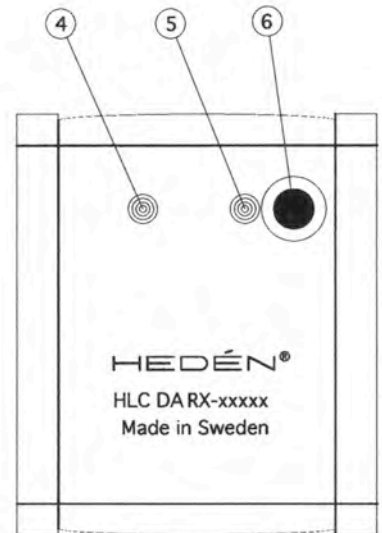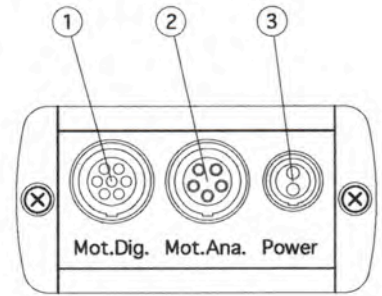
<u>Installation</u>

1. **Hand unit with receiver (Rx) , Bluetooth connection mode.**
   Hand unit (Tx) and receiver (Rx) connected in wireless mode

Engage motor to lens using appropiate gear module. Make sure that the gears are not to tight.

Connect the Dtap power cable to the receiver unit . Connect camera run cable to receiver unit if neccessary
Switch on hand unit. Be sure that the Li-Ion battery is fully charged.
When Bluetooth LEDs on hand unit and on receiver turns solid blue they are connected.
Now connect motor cable between receiver unit and motor.
The LEDs (G and I) for calibration will start to flash oange (0,5Hz) r indicating that the unit wants to have a command before
starting to operate. Depress button F or J on hand unit for at least 2 seconds to activate auto or manual calibration

All settings are memorized as long as the motorcable is connected. If motor cable is removed from receiver unit when power is
on, a new lens calibration is needed.

<u>**CAUTION**</u>!: When engaging the motor to the lens beware your fingers as the motor can be very powerful.

Troubleshooting

1. The hand unit will not turn on. Check your battery if the voltage is below 5V it will not start up the hand unit.

2. Motor is not running smooth. Check that the motor the system was delivered with is used. If not please contact us.

3. LED (G & I) flashed red. Motor, Encoder or lens calibration failure. Recycle power on receiver unit.

4. How can I activate the FIZ button (F)? The button can be used when a Fujinon Cabrio lens is connected to the Rx. You can smart jump between the FIZ axis. LED (G) will shift color depending of which axis you are operating. The control knob will memorize its last position and lens motor will not move until you come back to the exact position you left it in.

My notes:

Specifications

<u>Hand Unit</u>

Dimensions: 128mm x 78mm x 27mm
Weight: 450 grams
Battery 9V style (6.5V-30V)
Power consumption: approx 70mA
Wireless system: Bluetooth Long Range Adaptive Radio, 2.4 GHz
Radio type approved in US/Canada, Europe & Japan
CE & FCC
Antenna: External robust, unbreakable
Mini-USB interface for Heden PC GUI
¼" thread with neckstrap hole

<u>Receiver unit:</u>

Dimensions: 70mm x 60mm x 30mm
Weight: 135g
Power input 10 – 30V
Wireless system: Bluetooth Long Range Adaptive Radio, 2.4 GHz
Antenna: External robust, unbreakable
Mini-USB interface for Heden PC GUI
¼" thread on backside

Connectors:

Lemo 7-pin 1B for digital motor
Lemo 5-pin 1B for Aux motor
Lemo 4-pin ERA.0S.304.CLL for camera run

The Hedén Carat system is RoHS compliant.