

Zenmuse Z15

User Manual

V1.9

2012.11.19 Revision

ZENMUSE™

www.dji-innovations.com

Warning & Disclaimer

No adjusting or amending is allowed to Z15.

Z15 is specialized for Camera and Lens before it leaves the factory. Please mount your camera to Z15 when get it. No adjusting or amending is allowed to Z15. Do not modify or add any other component/device (such as filter, lens hood, etc.) to the camera; make sure to use the original battery; otherwise it may ends up with worse performance or even internal malfunction.

Z15 can only work with Autopilot system specified by DJI Innovations (Ace One/ Ace WayPoint/ WooKong M), so as to ensure the highest stability and precision.Please download the corresponding assistant software and upgrade the autopilot system MC firmware, otherwise may lead the Z15 work abnormally.

Make sure the Autopilot system operates in the safest manner when the main power battery is connected. We strongly recommend customers to remove all propellers, use power supply from R/C system or flight pack battery, and keep children away during gimbal calibration and parameter setup. Please strictly follow these steps to mount and connect gimbal on your aircraft, as well as to install the assistant software on your computer. Please respect the AMA's National Model Aircraft Safety Code.

As DJI Innovations has no control over use, setup, final assembly, modification (including use of non-specified DJI parts i.e. motors, ESCs, propellers, etc.) or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability. DJI assumes no liability for damage(s) or injuries incurred directly or indirectly from the use of this product.

DJI and Zenmuse is registered trademark of DJI Innovations Names of product, brand, etc., appearing in this manual are trademarks or registered trademarks of their respective owner companies. This product and manual are copyrighted by DJI Innovations with all rights reserved. No part of this product or manual shall be reproduced in any form without the prior written consent or authorization of DJI Innovations. No patent liability is assumed with respect to the use of the product or information contained herein.

Note1: Upgrade WooKong M firmware to V5.08 or above, ACE ONE firmware to V4.02 or above, or ACE WayPoint firmware to V4.02 or above.

Note2: Specified Camera and Lens Type list for Z15-N and Z15-G.

(Items in *gray italics* font are not yet supported at present.)

Z15 Type Camera Type Lens Type	Z15-N		Z15-G
	SONY		Panasonic
	NEX-5N	NEX-7	GH2
Supported	E 16mm f/2.8(SEL16F28)		Lumix G14 mm/F2.5 Lumix G20 mm/F1.7
Not yet supported	<i>Sonnar T*E 24mm F1.8 ZA</i>		<i>Lumix G 1:2.5 / 14 ASPH</i>

Note3: All diagrams in the manual are for SONY NEX-5N with SEL16F28 unless stated, since different camera or lens should use special component.

Product Profile

Z15 is an excellent gimbal designed for AP. The gimbal has built-in slip ring in the mechanical structure, preventing wire rod from winding up. It also has built-in independent IMU module, special servos drive module, HDMI- AV module, etc. Excellent job can be done by Z15 in any working mode, including Orientation-locked control, Non orientation-locked control and FPV Mode (Reset).

Z15 Working Mode			
	Orientation-locked Mode	Non orientation-locked Mode	FPV Mode (Reset)
Gimbal Pointing	Gimbal pointing moves with aircraft nose direction	Gimbal pointing stays unchanged when aircraft nose moves.	Gimbal pointing stays the same as aircraft nose direction when power up
Gimbal and Aircraft Nose Relative Angle	Gimbal pointing keeps the same relative angle with aircraft nose direction	Relative angle between gimbal pointing and aircraft nose direction may change	Zero relative angle between gimbal pointing and aircraft nose
TX Control	Controlled	Controlled	Not controlled
Attitude stability	YES	YES	YES
Vibration Reduction	YES	YES	YES
Stick Meaning	ROLL is locked level in 0~2/3 command stick and rotate in 2/3 ~endpoint; command stick stands for rotation angle limited to $\pm 45^\circ$ in PAN; command stick stands for gimbal rotation velocity in TILT.	Command stick stands for gimbal rotation velocity ,Stick center position is for 0 , its endpoint is maximum velocity.	——
Command Linearity	YES	YES	——

Note1: Gimbal pointing means gimbal PAN rotation direction.

Note2: Attitude stability means that gimbal's ROLL/TILT will not follows the aircraft's ROLL/PITCH.

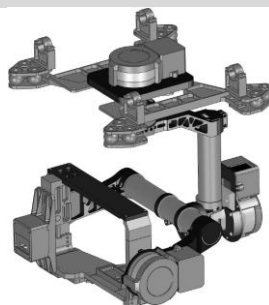
Note3: Gimbal rotating maximum velocity is corresponding to TX 100%end-point.

In Box

Gimbal ×1

In the mechanical structure, the gimbal has built-in slip rings, preventing wire rod from winding up, which also enables free rotations for the 3 axes rotating rods.

The gimbal has built-in Z15 gimbal special servos drive module, independent IMU module and HDMI - AV module.



Gimbal Controller Unit (GCU)×1

Connect the gimbal controller to the autopilot system by CAN bus.

The GCU will control the gimbal's pan, roll and tilt axes rotation.



Lens Retaining Ring×1, L-Connector ×1(Z15-N)

For fixing the camera lens.

(With jackscrew ×2)



Lens Retaining Ring Shim×1(Z15-N)

For fastening the camera lens.



Mounting Bracket ×4

For gimbal and bi-pod connection.



Camera Mount Screw×1

For camera mount.



Lens Retaining Ring Screw×1(Z15-N)

For fixing the lens retaining ring to the gimbal.



Hot Shoe ×1(Z15-G)

For fastening the camera to gimbal.



Quick Twist Screw for Hot Shoe ×1(Z15-G)

For fixing the hot shoe to camera.



Quick Twist Screw for Camera ×1(Z15-G)

For fixing the camera to gimbal.



Screw×10(Z15-N) or Screw×8(Z15-G)

For mounting gimbal to aircraft (2.5*8 Head-cup screw×8).

(Only Z15-N needs) For fixing the lens retaining ring (M2.5*5 Screw×2).



Gimbal Video Power Cable×1

For gimbal controller and Wireless Video Transmission Unit connecting, transmitting AV signal.



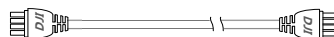
Micro-USB Cable×1

For adjusting parameter and upgrading firmware via PC.



CAN-Bus Cable×1

Use CAN-Bus to power and communicate with the autopilot system.



Spare Package×1

Damping units, Spare Screw, and Mounting Bracket.

Note: there are different between Z15-N and Z15-G.

Contents

- WARNING & DISCLAIMER2
- PRODUCT PROFILE.....3
- IN BOX.....4
- CONTENTS6
- MATTERS NEED ATTENTION.....7
- GIMBAL DESCRIPTION8
- CAMERA SETUP10
- MOUNT12
- CAMERA WIRING/SHUTTER CONTROL15
- VIDEO SIGNAL TRANSMISSION17
- GIMBAL CONTROLLER WIRING18
- WORKING MODES/HDMI/AUX2/AUX3 SWITCH SETUP20
- ASSISTANT22
- TEST25
- APPENDIX.....27
 - 1-PILOT SOLUTION27
 - 2-PILOT SOLUTION28
 - PORT DESCRIPTION29
 - GIMBAL LED INDICATOR30
 - GIMBAL LABEL DESCRIPTION30
 - TROUBLE SHOOTING31
 - SPECIFICATIONS.....32

Matters Need Attention

For safety reasons, please pay serious attention to all following items:

- Ensure nothing blocks the servo driver module rotation, to avoid motor damage.
- Camera's HDMI resolution should be set to 1080i.
- Ensure to mount the side of servo driver module1 without ports to the aircraft nose direction.
- The gimbal center of gravity has been set, whose position directly determine gimbal performance. Please do not adjust the gimbal center of gravity by yourself.
- The gimbal is a high-precision control device. Do not remove any other screws in the gimbal, which may result in bad performance or even damage.
- Do not unplug any cable attaching to the gimbal ports, or even change the mechanical structure.
- Make sure all wiring is correct, otherwise may lead to gimbal abnormal work or even out of control.
- Make sure to connect Video Transmission Unit to gimbal controller before power on the system.
- The standard gimbal video power cable is recommended.
- Make sure you solder the gimbal video power cable to the wireless video transmission unit correctly, to avoid the 12V power burn the gimbal or your own device. And ensure the cables are insulated, to prevent from short circuit.
- Ensure the 12V power is safe for you own device when other power cable is used.
- Make sure the wireless video transmission module current consumption does not exceed 1A, to prevent GCU from damage.
- Pay attention to that S800 power supply voltage is within the defined limits (6S), when using one battery for both S800 and Gimbal power supply.
- Different camera or lens should use special component.
- Prevent the Gimbal from the power cable; otherwise it may lead to the short circuit of the Gimbal.

Gimbal Description

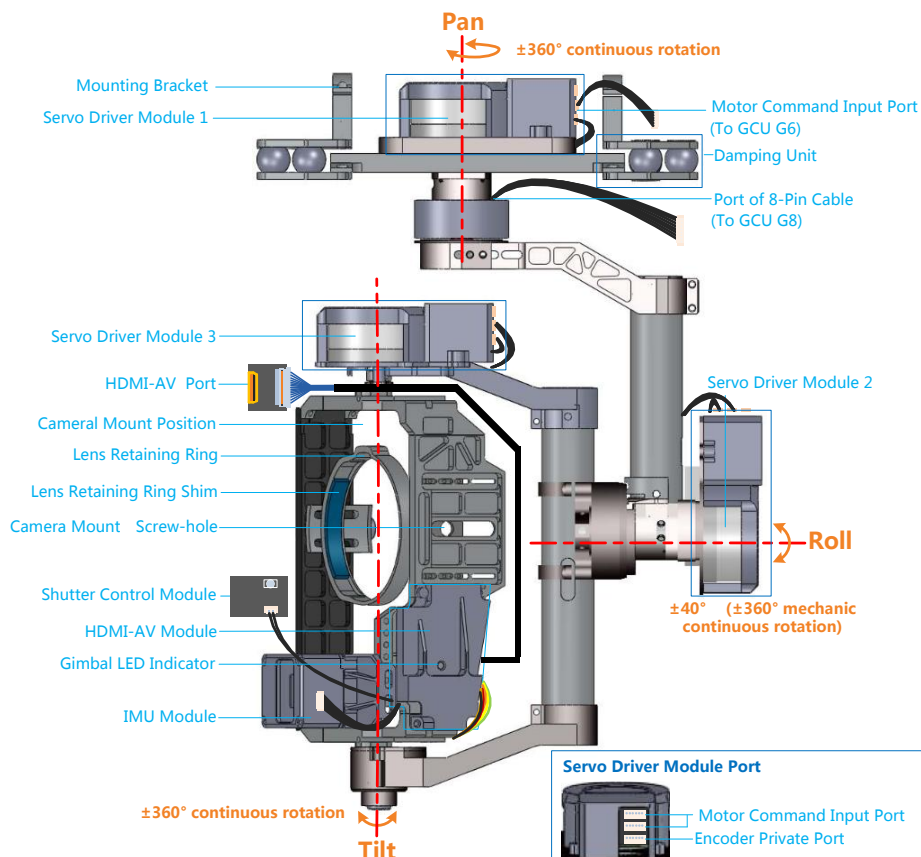
Notices:

- Ensure nothing blocks the servo driver module rotation, to avoid motor damage.
- Clear obstacle at once if the rotating gimbal is blocked.

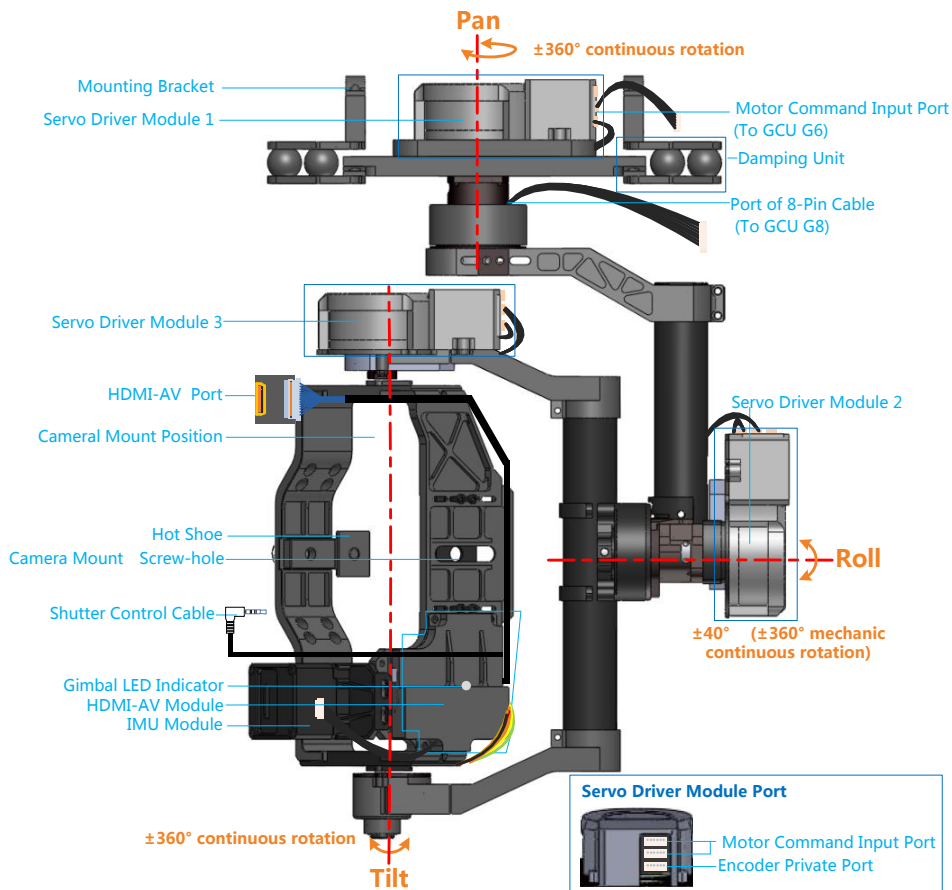
Tips:

- Servo driver module is with two motor command input ports and one encoder private port.
- HDMI-AV module converts HDMI video signal to AV video signal with a cable connecting to camera HDMI port; also transforms TX signal into shutter control signal with a shutter control module.
- (Z15-N)Shutter control module is for camera shutter control using an infrared signal emission head.
- Please read the related content according to your product (Z15-N or Z15-G).

Z15-N



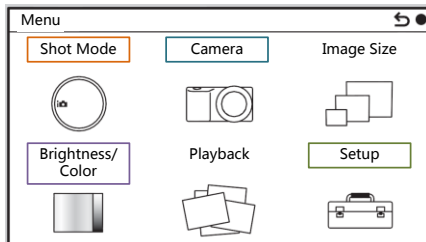
Z15-G



Camera Setup

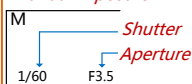
Configure your camera by following the settings, meeting the requirements of Z15. Please read the related content according to your product (Z15-N or Z15-G).

Sony NEX-5N /7



Shot Mode

Manual Exposure



Camera

Drive Mode Remote Cdr.
AF/MF Select MF

Brightness/Color

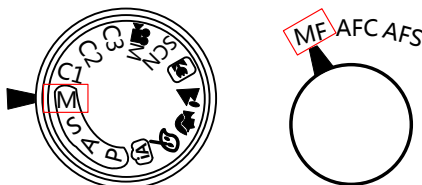
ISO Not use Auto
White Balance Not use Auto

Setup

Lens Comp: Shading Off
Lens Comp: Chro.Aber Off
Lens Comp: Distortion Off
HDMI Resolution 1080i

- Please set Shot Mode as Manual Exposure **M**.
- **Shutter**: Value 1/15~1/80 is recommended, do not set it below 1/80 (like 1/120).
- **Aperture**: According to exposure degree.
- **Drive Mode**: Set as **Remote Cdr.**, so that camera shutter can be controlled by TX.
- **AF/MF Select**: Select MF, otherwise output image would be flashing.
- **ISO**: Please fix a certain value instead of automatically.
- **White Balance**: Please do not set it to auto white balance mode.
- **Lens Comp**: Set Shading/Chro.Aber/Distortion Off.
- **HDMI Resolution**: Should be set to **1080i**.

Panasonic GH2



- Please set Shot Mode as Manual Exposure **M**.
- MF/AFC/AFS Select: Select **MF**.
- Using the MOTION PICTURE Mode Menu, set the REC MODE as **AVCHD(1080i)**.

Tips:

In the Menu settings, the mandatory values are in red italic font while recommended values in blue.

Notices :

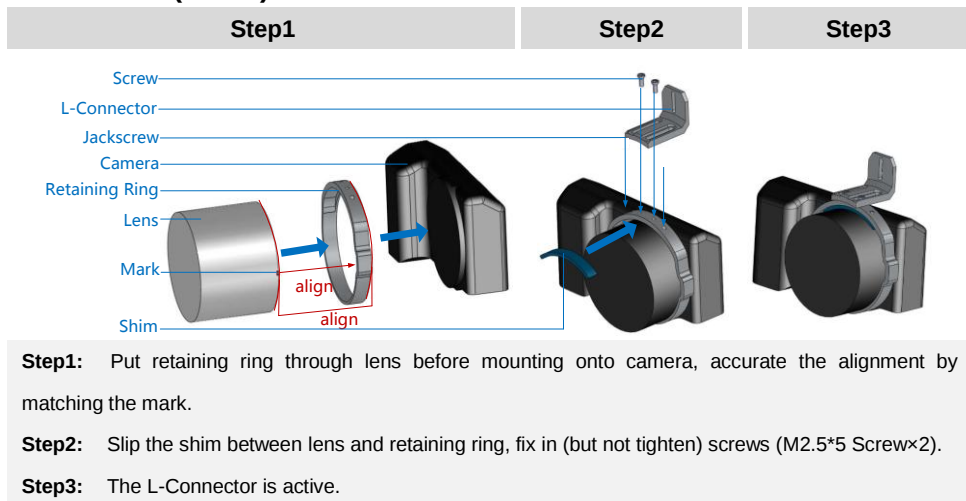
Flashing image output may occur if not follow the recommended settings.

Mount

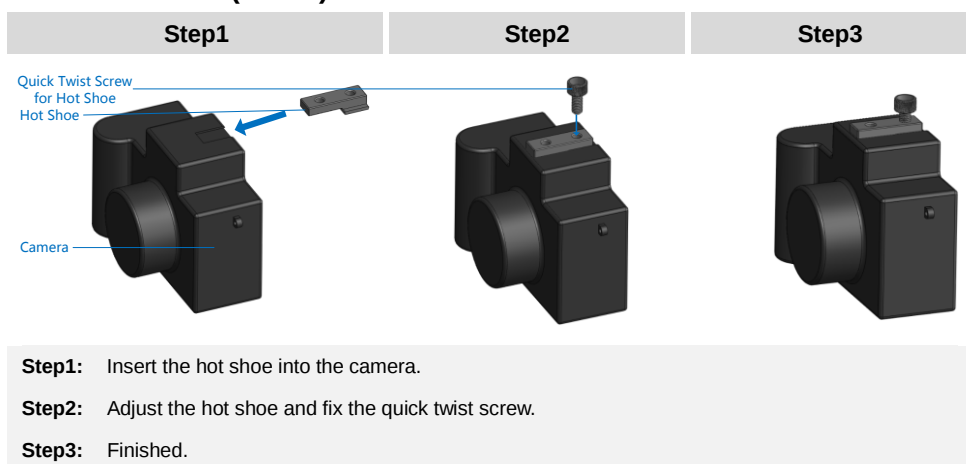
Mount Lens(Z15-N)/ Mount Hot Shoe(Z15-G)

Please read the related content according to your product (Z15-N or Z15-G). For Z15-N, please read Mount Lens, otherwise read Mount Hot Shoe for Z15-G.

Mount Lens (Z15-N)



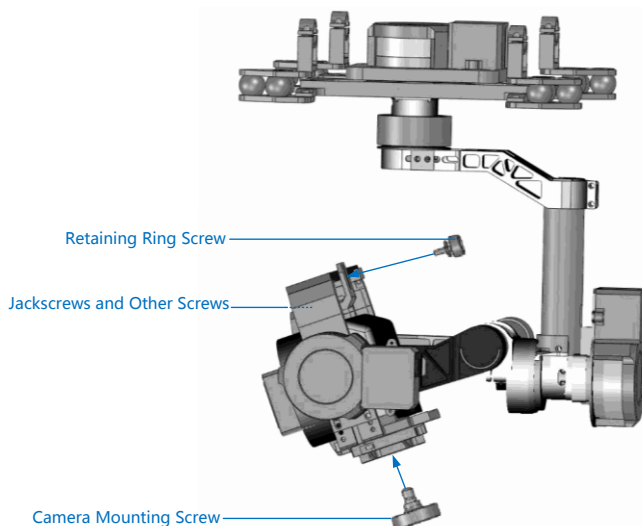
Mount Hot Shoe (Z15-G)



Mount Camera into Gimbal

Please read the related content according to your product (Z15-N or Z15-G).

Z15-N

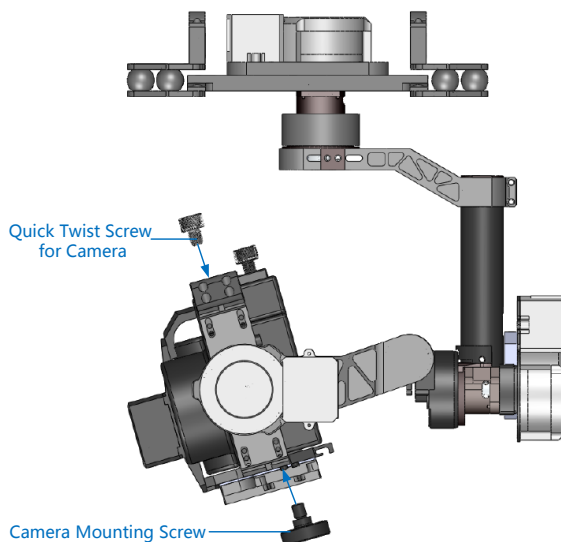


Step4: Mount the camera into the gimbal and tighten the camera mounting screw.

Step5: Adjust the L-Connector, and fix the retaining ring screw.

Step6: Tighten the jackscrews and other screws.

Z15-G :



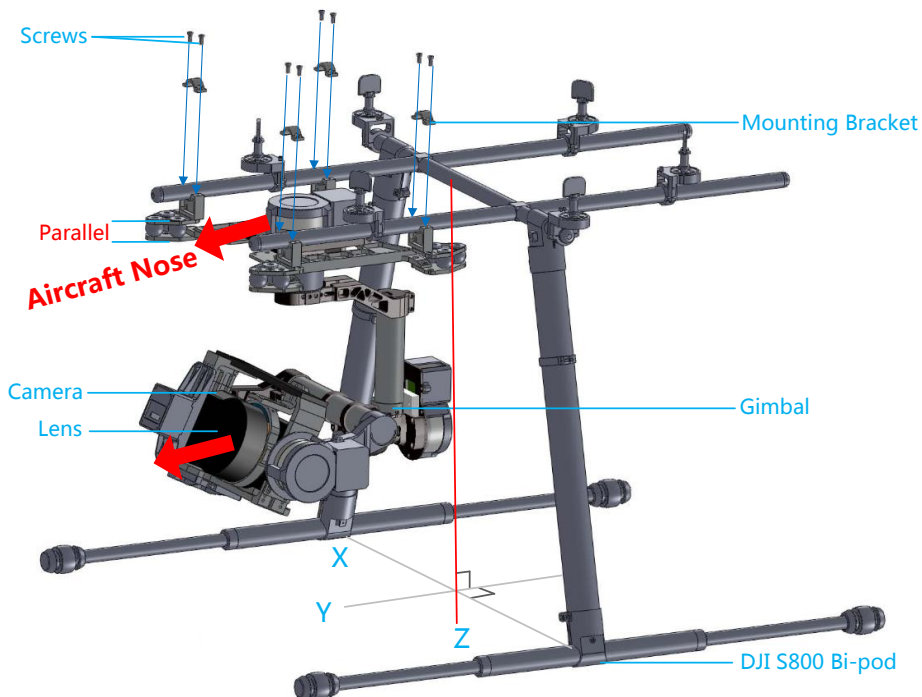
Step4: Mount the camera into the gimbal.

Step5: Adjust the camera and tighten the camera mounting screw.

Step6: Tighten the quick twist screw for camera.

Mount Gimbal to Bi-pod

Following diagram shows mounting gimbal to DJI Innovations S800 bi-pod. You may mount the gimbal to a bi-pod prepared by you referring to the following diagram.



Step7: Install gimbal to a bi-pod with mounting bracket; tighten up screws (2.5*8 Head-cup screw×8) with appropriate screw glue.

Notices:

- Ensure to mount the side of servo driver module1 without ports to the aircraft nose direction.
- Make sure the top and bottom plates of damping unit stay parallel when mounting, preventing the damping units from stretched and distorted.
- Keep overall balance when mounting, in order to make the center of gravity on the red line (Z axis).
- The gimbal center of gravity has been set, whose position directly determine gimbal performance. Please do not adjust the gimbal center of gravity by yourself.
- The gimbal is high-precision controlled. Do not remove any other screws in the gimbal, which may result in bad performance or even damage.
- Do not unplug any cable attaching to the gimbal ports, or even change the mechanical structure.
- Make sure the wiring is correct, otherwise may lead to gimbal abnormal work or even out of control.

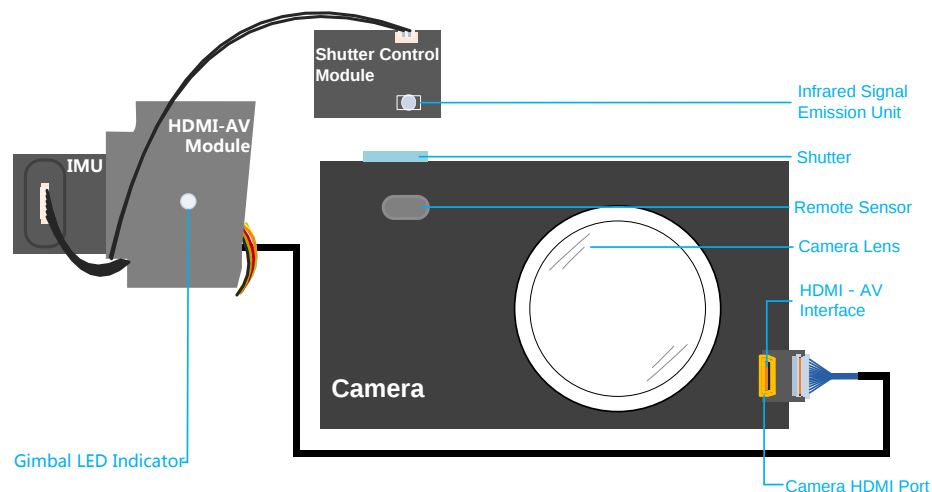
Camera Wiring/Shutter Control

Camera Wiring

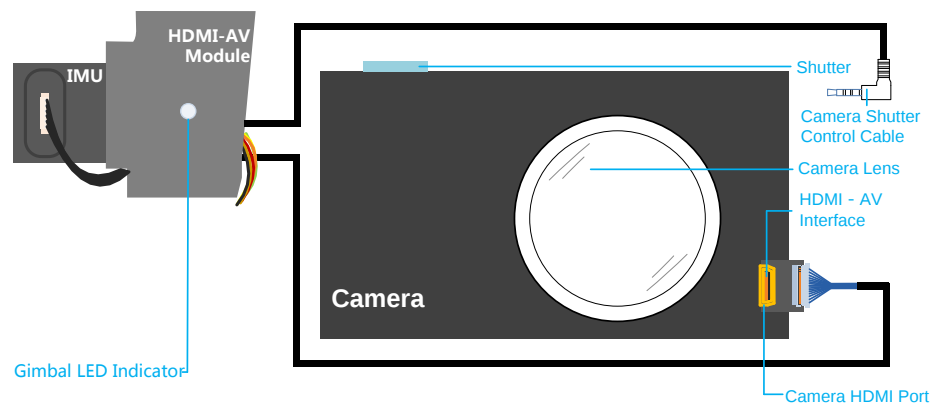
Connect the camera correctly, since the gimbal works with a HDMI-AV module for converting video signal format and transforming TX signal into shutter control signal. Please read the related content according to your product (Z15-N or Z15-G).

Ensure camera is setup first, and then follow the procedures to connect camera and gimbal.

Z15-N



Z15-G



Step1: Connect the gimbal HDMI-AV module to camera HDMI port with a HDMI-AV connection cable.

Step2: For Z15-N, make sure the infrared signal emission unit is aligned to the remote sensor.

For Z15-G, connect the camera shutter control cable to the camera.

Notices:

- When disconnect the cable between HDMI-AV module and camera, dismount the camera, and unplug the HDMI-AV interface.
- (Z15-N) Make sure the infrared signal emission unit is aligned to the remote sensor.

Shutter Control

Z15 enables transforming TX command into shutter control signal, please set one 2-position switch/channel for remote shutter control.

For Z15-N, set the **Drive Mode** as **Remote Cdr.** in **Camera** Menu, and make sure the shutter control module is correctly mounted and wired.

For Z15-G, make sure camera shutter control cable is correctly wired.

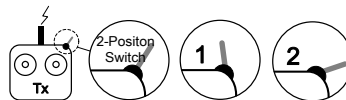
Whichever 2-position switch on your transmitter selected, wire the right channel of receiver to **SHUT** port.

One switch toggle is for one shooting.

For example, toggle twice will achieve two shootings.

Position-1→ Position -2 : First shooting

Position -2→Position -1 : Second shooting

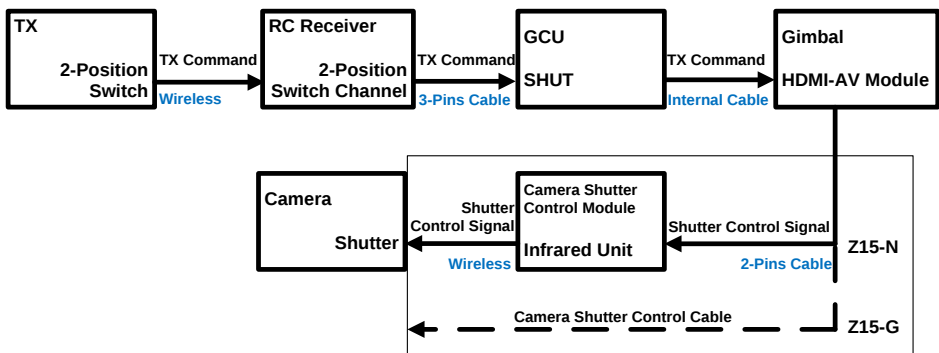


Notices:

- Set the camera of Z15-G to "Manual Video", the shutter can be used to record video. One toggle is for start/stop recording.
- The video recording of Z15-N is available by setting the AUX3 channel of the GCU. Please refer to the AUX3 Switch Setup for details.

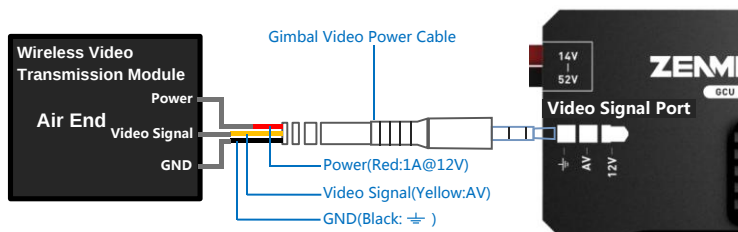
Tips:

- Following diagram shows how the shutter control works.
- If the shutter control works abnormally, please check each step.



Video Signal Transmission

A wireless video transmission module is necessary for video signal accessing remotely.



Step1: Respectively solder the Power/Video Signal/GND cables to wireless video transmission module (Air End).

Step2: Plug the gimbal video power cable head into the GCU Video Signal Port.

Notices:

- Make sure to connect Wireless Video Transmission Unit to GCU first, then power on.
- Set HDMI Resolution as 1080i for Z15-N; set the REC MODE as AVCHD (1080i) using Z15-G; otherwise the wireless video transmission module will work abnormally.
- The standard gimbal video power cable is recommended.
- Make sure you solder the gimbal video power cable to the wireless video transmission unit correctly, to avoid the 12V power burn the gimbal or your own device. And ensure the cables are insulated, to prevent from short circuit.

— Power Cable(1A @12V)

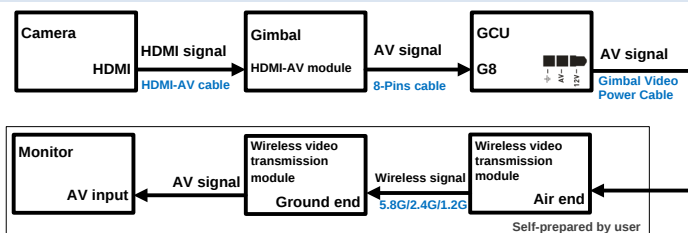
— Video Signal Cable(AV)

— GND Cable

- Ensure the 12V power is safe for you own device when using other power cable.
- Make sure the wireless video transmission module current consumption does not exceed 1A, to prevent GCU from damage.

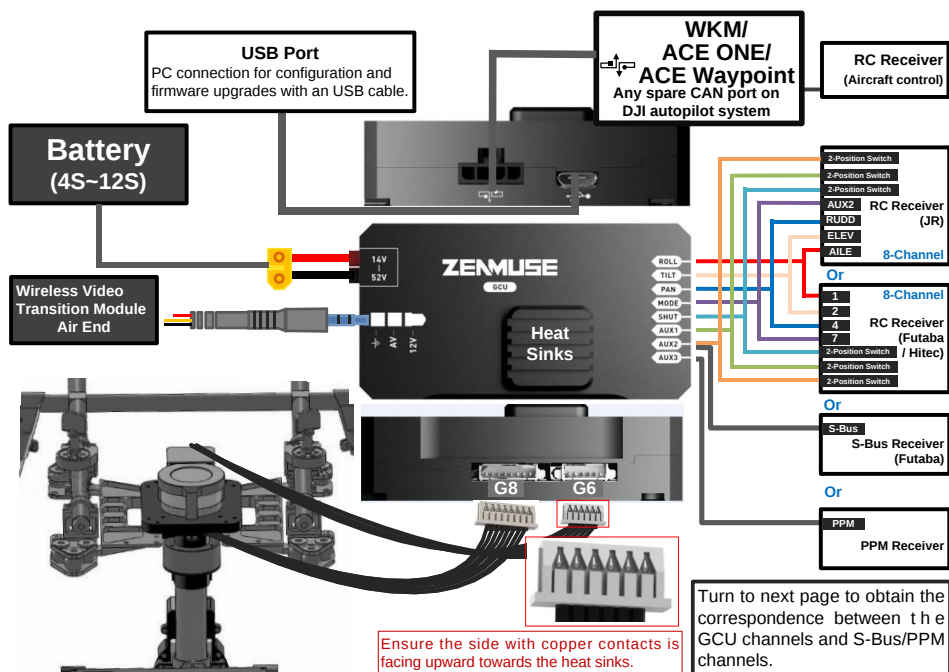
Tips:

- Following diagram shows how video signal transit when gimbal working.
- If video signal access fails, please check each step.



Gimbal Controller Wiring

GCU Wiring



Battery

- Connect the XT60 to the GIMBAL on the center frame if DJI S800 used.
- Attention that S800 power supply voltage should be within the defined limits (6S), when using one battery for both S800 and Gimbal power supply.
- Please refer to *S800 User Manual* for details.

WKM/ACE ONE/ACE Waypoint

Please refer to WKM/ACE ONE/ACE Waypoint User Manual for all connection and configuration details.

Gimbal Controller (GCU)

- Make sure ports are accessible when installing MC so as to facilitate wiring and software configuration.
- In 3-pin ports, pins near the nicks are signal pins.
- 6-pin cable for G6, 8-pin cable for G8.
- DO NOT cover the heat sinks, keep them unobstructed.
- The IMU module is NOT water-proof or oil-proof.



RC Receiver

- These are example connections. Prepare 2 TXs, one is for gimbal control, the other one for aircraft control, refer to **2-Pilots Solution** for more detail in **Appendix**.
- If one receiver is used for aircraft and gimbal control at the same time, refer to **1-Pilot Solution** for detail in **Appendix**.
- Setup Aileron, Elevator, Rudder channels on gimbal control TX. Command stick stands for gimbal rotation velocity, center position is for 0, endpoint for maximum velocity(both clockwise and counter clockwise directions). (End Point is 100%)
- Choose one 3-position switch/channel as Z15 working modes switch.(MODE)
- Choose one 2-position switch/channel As camera shutter control switch(SHUT), one for HDMI switch(AUX1), one for camera lens orientation switch in Reset Mode (AUX2), and also one for Z15-N video control switch(AUX3).
- Please refer to WKM/ACE ONE/ACE Waypoint User Manual for aircraft control setting.
- Connect the receiver to GCU correctly.

GCU Ports Indication

Following table shows the GCU channels and TX channels connection.

TX Channels		GCU	Indications
JR	Futaba/Hitec	Channels	
AILE	1	ROLL	For roll axis control (left/right). Velocity is zero if disconnection.
ELEV	2	TILT	For tilt axis control. Velocity is zero if disconnection.
RUDD	4	PAN	For pan axis control. Velocity is zero if disconnection.
AUX2	7	MODE	For Working Mode switch.
2-position switch channel		SHUT	For camera shutter control. Off when non-connection and disconnection.
2-position switch channel		AUX1	For HDMI-AV conversion switch. Conversion function is on while non-connection or disconnection.
2-position switch channel Or Futaba S-Bus channel		AUX2	When AUX2 is connected to a 2-position switch channel, it is used as camera orientation (down or forward) switch in FPV Mode (Reset). The camera orientation is forward while non-connection or disconnection. If S-Bus receiver is used, it should be connected to AUX2 port.
2-position switch channel Or PPM channel		AUX3	When AUX3 is connected to a 2-position switch channel, it is used for Z15-N video recording control. If PPM receiver is used, it should be connected to AUX3 port.

Following table shows the corresponding relationship between the GCU and the S-Bus/PPM channels.

S-Bus/PPM Channels	GCU Channel
1	ROLL
2	TILT
4	PAN
7	MODE
5	SHUT
8	AUX1
9	AUX2
6	AUX3

Working Modes/HDMI/AUX2/AUX3 Switch Setup

Gimbal Working Mode Switch Set

Whichever 3-position switch selected as working mode switch, wire the right channel of receiver to **MODE** port. At each switch position, use end-point fine tuning, set the channel AUX2(JR) /7(Futaba/Hitec) for the three Working modes.

Orientation-locked Mode **MODE** channel end-point 60%~90%

FPV Mode (Reset) back to center

Non orientation-locked Mode **MODE** channel end-point 60%~90%

Notices:

- The gimbal will work in **Orientation-locked Mode**, if not connect to **MODE**.
- Gimbal default works in **FPV Mode** after power on.
- The gimbal will maintain the Working Mode from last moment, if the cable between **MODE** and RC receiver is disconnecting while working.

Tips:

- For 3-position switch, you may assign:

Position-1 to **Non orientation-locked**

Position-2 to **FPV Mode (Reset)**

Position-3 to **Orientation-locked**

Position-1 and Position-3 can be reverse assigned.

- One 2-position switch can be assigned for any two of the working modes as you like.

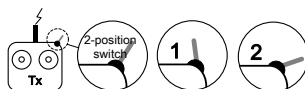


HDMI Switch Set

HDMI-AV module can be set on/off by TX. Please ensure camera HDMI port is connected to gimbal correctly.

Whichever 2-position switch selected as HDMI switch, wire the right channel of receiver to **AUX1** port.

You may assign: Position-1 to **ON**; Position-2 to **OFF**; or reverse the assignment.

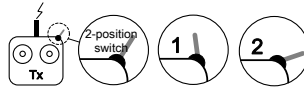


Notices:

The camera HDIM will be on if **AUX1** and RC receiver is disconnected.

AUX2 Switch Set

Z15 supports to control the camera lens down or forward in Reset Mode. Please wire the right channel of receiver to **AUX2** port. You may assign: Position-1 to **DOWN**; Position-2 to **FORWARD**; or reverse the assignment.



Notices:

- This function can only work in FPV Mode (Reset).
- When this function is on, if the working mode switch from other modes to FPV Mode (Reset), the gimbal will force the camera lens to face forward or down depending on AUX2 Switch.
- The camera orientation is forward while non-connection or disconnection.

Tips:

When AUX2 is connected to **Futaba** S-Bus channel it is used as the S-Bus channel input.

AUX3 Switch Set

Z15-N supports camera video recording. Please wire the right channel of receiver to **AUX3** port. Every toggle is for start/stop recording.

Notices:

- Only Z15-N gimbal needs to set the AUX3 channel when using the camera for video recording.
- Z15-G gimbal controls the camera to record video by setting the camera to "Manual Video".

Assistant

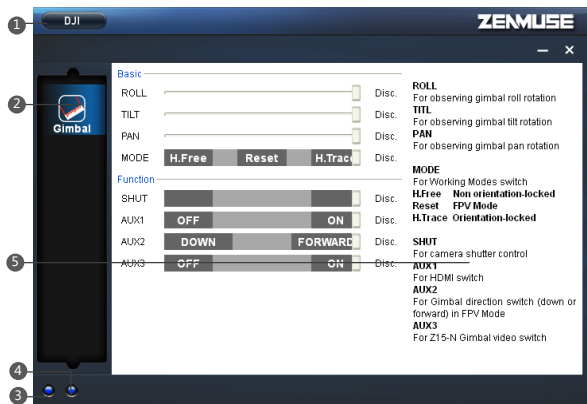
Install Driver and Software

- STEP1:** Make sure driver is installed correctly, which has been installed before you use WKM , ACE ONE or ACE WAYPOINT.
- STEP2:** Please download assistant software `ZenmuseInstaller.exe` from DJI Innovations website.
- STEP3:** Double click `ZenmuseInstaller.exe` file and follow the steps to finish installation.
- STEP4:** Run `DJI Zenmuse Assistant`.



GUI

Connect GCU and PC via USB cable, power on GCU.



- DJI**
 - **Tools:** Upgrade. For upgrading the gimbal firmware
 - **Language:** 中文 or English
 - **Help:** About. For version and SN access
- Gimbal**
 - **Basic:** For Roll/Tilt/Pan/Mode observation
 - **Function:** For Shutter/HDMI/AUX2 observation
- Connection indicator**
 - Blue LED On: Disconnected with PC
 - Green LED On: Connected with PC
- Communication indicator**
 - Blue LED On: Without communication
 - Green LED Blink: Communicating with PC
- Text Description**
 - Mouse over each item will display the corresponding content

Firmware Upgrade

Please strictly follow the operation procedures for firmware upgrade, otherwise Z15 might not work properly:

Step1: Make sure your computer is connected to the Internet.

Step2: Please close all the other applications during firmware upgrade, including anti-virus software and firewall.

Step3: Make sure the power supply is securely connected. DO NOT un-plug the power supply until firmware upgrade has finished.

Step4: Connect GCU to PC with a Micro-USB cable, DO NOT break connection until firmware upgrade has finished.

Step5: Run Software and wait for connection.

Step6: Select **DJI** → **Tools** → **Upgrade**.

Step7: DJI Innovations server will check current firmware version, and get the latest firmware prepared for the unit.

Step8: If there is a firmware version more up-to-date than your current version, you will be able to click the **Upgrade** button.

Step9: Wait until Assistant software finishes reading gimbal and GCU.

Step10: Click **OK** and power cycle the unit after at least 5 seconds.

Notices:

- After firmware upgrade, please re-recognize setup using Assistant software.
- If abnormally read or write, close software and power off, and then restart software and power up.
- If it is notified that the network or DJI Innovations server is busy, please try again later with above procedures.
- If firmware upgrade failed, please try again with the above procedures.

Product Information

You can check the product version via **Help** → **About**. This includes **Hardware ID** , **IMU** , **GCU** , **Software**.

SN is a 32 digits authorization code for unit function activations. We had already filled in the authorization code for your unit after manufacture. You might be asking to fill in the new SN in the future if you brought new function upgrades. Fill in the SN and then click **Write** button. If you filled in an invalid SN over 30 times, your product will be locked and you have to contact our customer support.

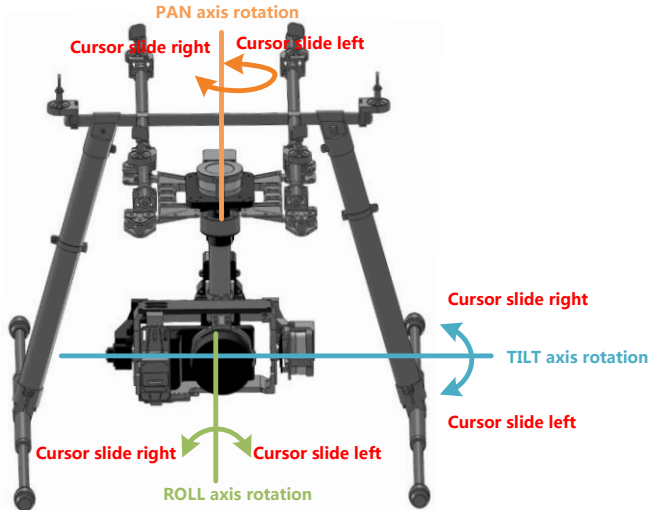
Basic

Make sure your setups according to **Basic**.

ROLL/PAN/TILT: Push the joystick on TX to obtain the stick direction and the gimbal rotation direction.

If you use the DJI iOSD, you may obtain the gimbal attitude information (PAN/ TILT/ ROLL) on the bottom right corner of the display screen.

The following diagram shows the gimbal rotation direction and the cursor slide direction on assistant.



MODE: Toggle the 3-position switch, the corresponding slider of cursor will turn red .

Function

SHUT/AUX1/AUX2/AUX3: Toggle the 2-position switch, the corresponding slider of cursor will turn red .

Test

Check Before Flight

Notices:

- Gimbal is installed firmly to bi-pod, and camera mounted correctly and stably.
- All cables are in correct connection, without anyone in backwards.
- Gimbal video power cable is in good soldered condition if wireless video transmission module used.
- Correct TX settings.
- Camera shutter control module is correctly mounted.
- Correct camera setups.
- Correct connection between GCU and RC receiver.
- Normal connection between GCU and autopilot system.
- Upgrade Autopilot System MC Firmware.

Tips:

- Gimbal LED flashing red quickly when camera and gimbal connection fails.
- Gimbal LED stays solid green when camera and gimbal is successful connection.
- Please turn to ***Trouble Shooting*** in ***Appendix*** if abnormal situation occurs.

Test

- Step1:** Ensure batteries are fully charged for transmitter, GCU and all the other devices on your aircraft.
- Step2:** Make sure all connections and wirings are in good condition.
- Step3:** Switch on the TX.
- Step4:** Power on gimbal and wait for self-testing, whose three axes will rotate quickly at the same time.
- Step5:** After self-testing, camera lens will point to aircraft nose direction, that is, the three axes of gimbal should be in the condition as the following diagram shows.
- Step6:** Gimbal goes into initialization, at this time the three axes will rotate very slowly.
- Step7:** Gimbal is at a standstill after initialization, and ready for usage.
- Step8:** Toggle the Working Modes switch on your transmitter, and make sure it is working properly.
- Step9:** Switch the Working Modes to **Non orientation-locked**, **FPV Mode (Reset)**, **Orientation-locked** respectively, and then try to push your sticks lightly in Roll, Tilt and Pan to feel if your gimbal moves to the corresponding direction. If not, go back to ***Gimbal Working mode Switch Set*** to correct your settings.

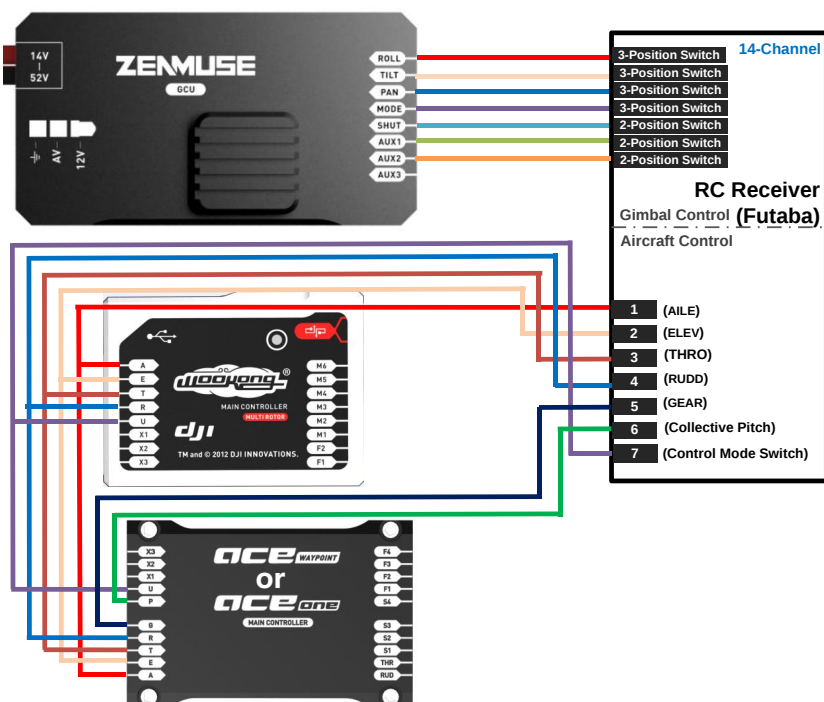


Notices:

If the gimbal is abnormal (unlike the diagram shows) after initializing, please turn to ***Trouble Shooting*** in ***Appendix***.

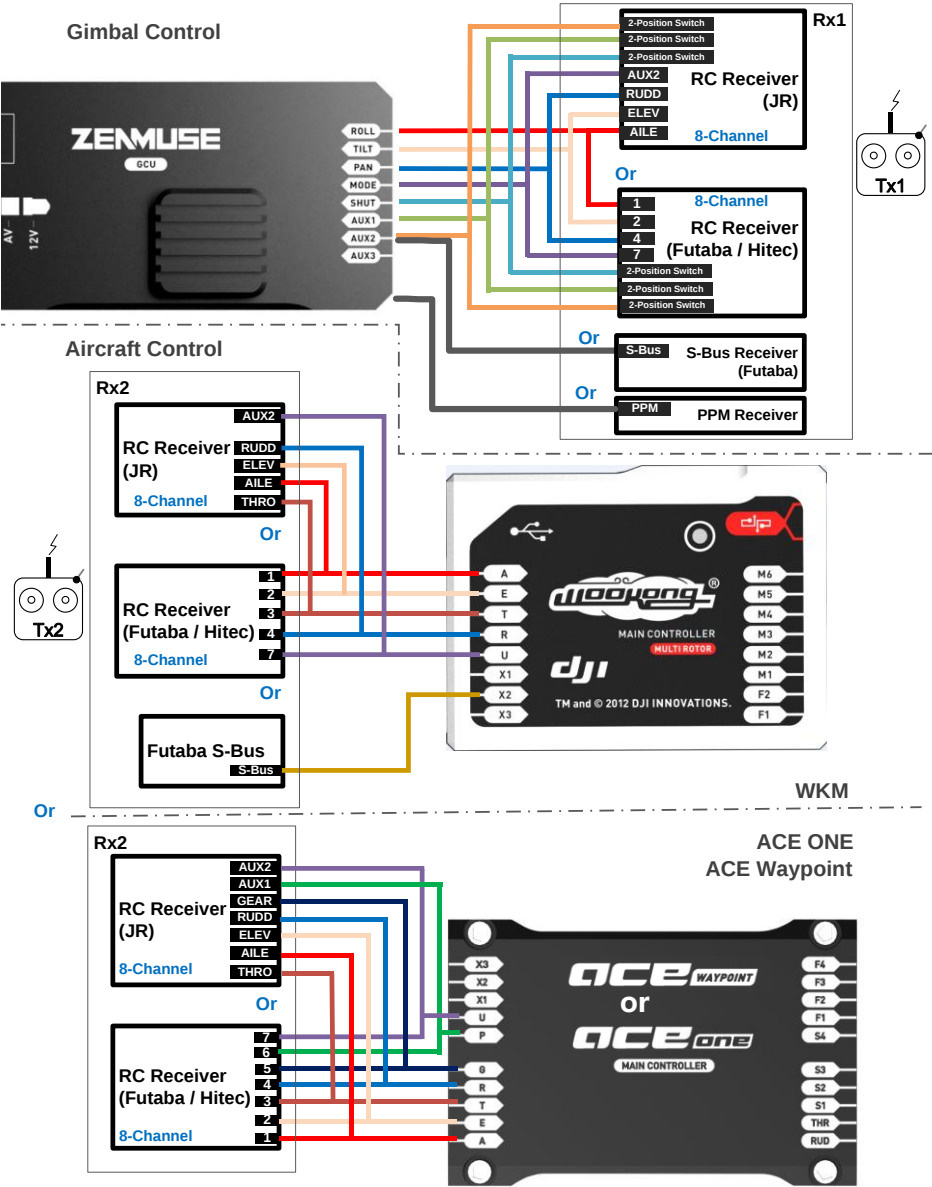
Appendix

1-Pilot Solution



- This is example connection. Prepare one 14-channel TX/RC receiver for aircraft and gimbal control.
- Setup Aileron, Elevator, Throttle, Rudder channels on TX for aircraft roll, elevator, throttle, rudder control, and TX AUX2 for aircraft control modes (Please refer to *Autopilot System User Manual*).
- Choose three 3-position switches for ROLL, TILT, and PAN rotation control. Switch center position is 0 velocity and end positions are maximum velocity.
- Choose one 3-position switch/channel as Z15 Working Modes switch (MODE).
- Choose one 2-position switch/channel as camera shutter control switch (SHUT), and one as HDMI switch (AUX1).
- Connect the receiver to GCU and Autopilot System MC correctly.

2-Pilot Solution



Prepare 2 TXs and 2 RXs.

TX1 and RX1 are for gimbal control.

TX2 and RX2 are for aircraft control.

Please refer to *Gimbal Controller Wiring* for more details.

Port Description

Gimbal Controller		
ROLL	For roll axis control	
TITL	For tilt axis control	
PAN	For pan axis control	
MODE	For Working Mode switch	
SHUT	For camera shutter control	
AUX1	For HDMI switch	
AUX2	For Gimbal orientation (down or forward) switch in FPV Mode	S-Bus Receiver
AUX3	For Z15-N video recording control	PPM Receiver
	To wireless video transmission unit, transmitting AV signal	
XT60	To battery (To GIMBAL if DJI Innovations S800 used)	
G6	To Gimbal, transmitting motor command	
G8	To Gimbal, transmitting video signal	
	Micro-B USB port: PC connection for configuration and firmware upgrades	
	CAN-Bus port: Use CAN-Bus to connect GCU to the autopilot system	
Gimbal		
HDMI-AV Port	To Camera HDMI port	
Motor Command Input Port	To GCU G6	
8-Pin Cable Port	To GCU G8	

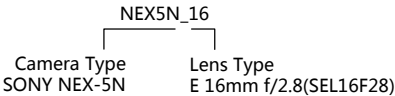
Gimbal LED Indicator

Description	LED Indicator
Camera and gimbal connected	
Camera and gimbal disconnected	

Gimbal Label Description

Camera Type _ Lens Type

For example



Trouble Shooting

NO.	What	Why	How to
1	Gimbal keeps drifting after initialization	(1) TX trims are too much (2)GCU and autopilot system is disconnected (3)Z15 mounting direction is disaccording to aircraft nose	(1) Adjust the TX trims (2)Connect GCU and autopilot system (3)Ensure Z15 mounting direction is the same with aircraft nose
2	The gimbal is abnormal after initializing	Abnormal calibration after manufacture	Please contact local dealer or DJI Innovations customer service
3	Can't distinguish gimbal pointing when using	BVR flight	Switch to FPV Mode first, then to another Working Mode needed
4	Gimbal LED flashing red	(1) The gimbal and camera disconnected (2)Camera is off (3) Camera setup failure	(1)Make sure cable connected (2)Please power on camera (3)Set HDMI resolution as 1080i
5	Gimbal green LED is on but without video display	(1) Wireless video transmission unit disconnected (2)Wrong power supply for wireless video transmission unit	(1) Check the wireless video transmission unit connection (2) Ensure the power supply for wireless video transmission unit is 12V

Specifications

General	
Built-In Functions	● Three Working Modes ✧ Orientation-locked control ✧ Non orientation-locked control ✧ FPV mode (Reset) ● Built-in independent IMU module ● DJI gimbal special servos drive module ● HDMI- AV module ● Wireless video transmission support ● Camera shutter control support ● Z15-N video recording control support ● Wide range voltage input support ● S-Bus/PPM Receiver support
Peripheral	
Supported Camera	● SONY NEX-5N ● SONY NEX-7 ● Panasonic GH2
Supported Lens Currently	● SONY: E 16mm f/2.8(SEL16F28) ● Panasonic: Lumix G14 mm/F2.5 Lumix G20 mm/F1.7
GCU Input Power	4S~12S LiPo (Recommend 6S if with S800)
Control Requirement	Four spare receiver channels at least
Assistant Software System Requirement	Windows XP SP3; Windows 7
Mechanical& Electrical Characteristics	
Working Current	● Static current: 200mA (@25V) ● Dynamic current: 400mA (@25V) ● Locked-rotor current: 4A (@25V)
Operating Temperature	-10°C ~ 50°C
Weight	● Z15-N: 1.25Kg ● Z15-G: 1.3Kg
Dimensions	200mm ×200mm ×230mm
Frame Dimensions For Camera (Inside)	● Z15-N: 115mm ×75mm ● Z15-G: 142mm ×76mm

GCU BEC Output	10A@12V
GCU Wireless Video Transmission Power	1A @12V
GCU Weight	300g
GCU Dimensions	64.2 mm ×34.1mm ×19.5mm
Working Performance	
Load Weight (Reference Value)	336g(@Sony NEX-5N with Lens and Battery) 489g(@Panasonic GH2 with Lumix G14 mm/F2.5 and Battery) 534g(@Panasonic GH2 with Lumix G20 mm/F1.7 and Battery)
Controlled Angle Accuracy	±0.05°
Maximum Controlled Rotation Speed	Pan axis: ±130°/s Tilt axis: ±130°/s Roll axis: ±30°/s
Controlled Rotation Range	Pan axis control: ±360° continuous rotation Tilt axis control: ±360° continuous rotation Roll axis control: ±40° (±360° mechanic continuous rotation)
Regulatory Approvals	
FCC (USA)	Yes
IC (Canada)	Yes
ROHS(EU)	Yes