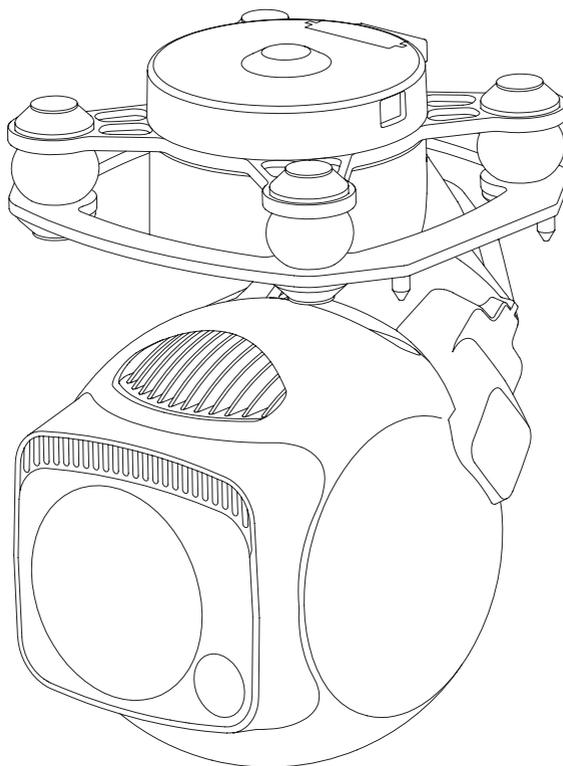


V1.4

2025.02

D-80Pro

User Manual



Using this Manual – Legend



Important



Tips



Explanation

Revision History

Date	Document Version
2023.06.19	V1.0
Date	Document Version
2023.10.16	V1.1

1. Installation: Add requirement of pod cooling.[P3]
2. Configuring & Upgrading Firmware:
 - 2.1 Modify default IP address of GCU (192.168.1.121 → 192.168.144.121) and default IP address of camera (192.168.1.108 → 192.168.144.108).[P4]
3. Configuring & Upgrading Firmware - Camera Configuring :
 - 3.1 Modify address of camera configuring webpage (http://192.168.1.108 → http://192.168.144.108).[P4]
4. Add explanation of real-time video playing.[P9]
5. Appendix 1 Specifications:
 - 5.1 Add parameters of laser lighting module (Laser power and Beam Diameter).[P10]
 - 5.2 Modify supported stream network protocol (Delete HTTP, TCP, UDP, RTP).[P11]
 - 5.3 Modify supported maximum SD card capacity (128GB → 256GB).[P11]

Date	Document Version
2024.03.12	V1.2

1. Appendix 1 Specifications: Modify parameters of object detection/ identification/ verification distance of zoom camera.[P10]

Date	Document Version
2024.10.16	V1.3

Date	Document Version
2025.02.08	V1.4

Caution

1. The D-80_{Pro} equipped with a laser lighting module, which is a Class 3B invisible laser. DO NOT exposure eyes to the beam within 12 meters or observe the beam by any optical instrument. DO NOT place any inflammable within 20 centimeters in front of the lighting module.
2. When not in use, store the D-80 in the package box. The recommended storage environment is a relative humidity less than 40% at a temperature of $20 \pm 5^\circ \text{C}$. If the lenses fog up. The water vapor will usually dissipate after turning on the device for a while.
3. Do not place the product under direct sunlight, in areas with poor ventilation, or near a heat source such as a heater.
4. Do not frequently power on/off the product. After it is turned off, wait at least 30 seconds before turning back on, otherwise the product life will be affected.
5. Make sure the pod port and pod surface are free from any liquid before installation.
6. Make sure the pod is securely installed onto the aircraft, the microSD card slot cover is clean and firmly in place.
7. Make sure the pod surface is dry before opening the microSD card slot cover.
8. Do not plug or unplug the microSD card during use.
9. Do not touch the surface of the camera lenses and keep it away from hard objects. As doing so may lead to blurred images and affect the imaging quality.
10. Clean the surface of the camera lenses with a soft, dry, clean cloth. Do not use alkaline detergents.
11. When not receiving valid carrier INS data, the yaw shaft of the pod will drift about 15 degrees per hour because of the earth rotation. To make sure the pod attitude corrects, it is necessary to transmit valid carrier INS data, usually the GNSS should be positioning.
12. When its damping platform tilted over 45° , the pod will trigger protection mode and return to its neutral position. (except in FPV mode)

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Introduction

Synopsis

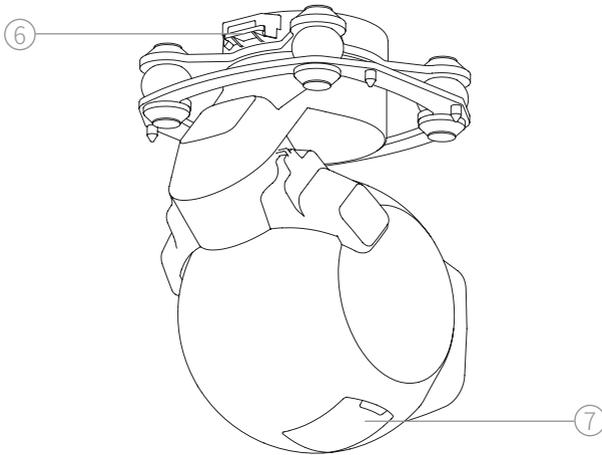
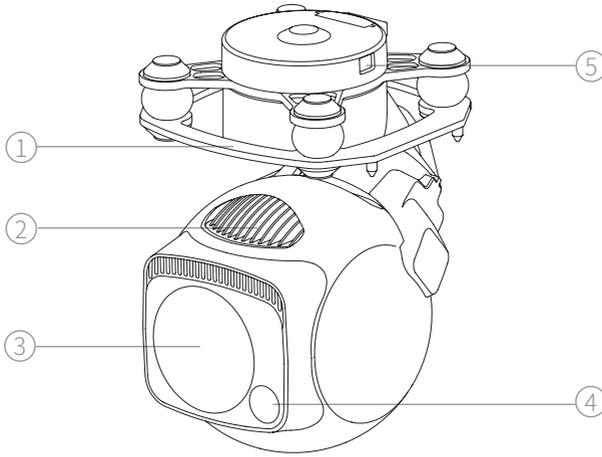
The D-80_{Pro} equips with a high-accuracy 3-axis nonorthogonal gimbal and an 8.29M pixels 40x zoom camera. User can quickly switch to a highly magnified zoom camera view after recognizing a target in a wide camera view. Thanks to the laser lighting module, the D-80_{Pro} can provide a clear image even in complete dark environments. The D-80_{Pro} have target tracking functions. The pod can constantly track the target selected on screen.

The D-80_{Pro} can be mounted tool-lessly onto multiple carriers, whether downward or upward. With the GCU and the Dragonfly software, user can watch the image from the camera and control the pod real-timely on a computer.

Characteristics

- Carries an 8.29M pixels 40x zoom camera, which provides a video resolution of 4K@30fps and an image resolution of 3840x2160.
- Laser lighting module ensures the cameras getting a clear image even in complete darkness.
- Features auto target tracking, which can constantly track the target selected on screen.
- Low-profile spherical shape and 3-axis nonorthogonal mechanical stabilized structure, minimize the gyration radius and the wind resistance of the pod. The D-80_{Pro} is able to spin continually around its yaw axis.
- With the GCU, the D-80_{Pro} supports network, UART and S.BUS control. The GCU supports both private protocol and MAVlink protocol.
- Thanks to the Dual-IMU complementary algorithms with IMU temperature control and carrier AHRS fusion, the D-80_{Pro} provides a stabilization accuracy at $\pm 0.01^\circ$.
- Can be mounted onto multiple carriers, whether downward or upward.
- With the GCU and the Dragonfly software, user can watch the image and control the pod without protocol ducking.
- Screen supports overlaying OSD information such as latitude, longitude and altitude. Image supports shooting point coordinate EXIF save.
- Supports ONVIF protocol.
- 14~53 VDC wide voltage input.

Overview

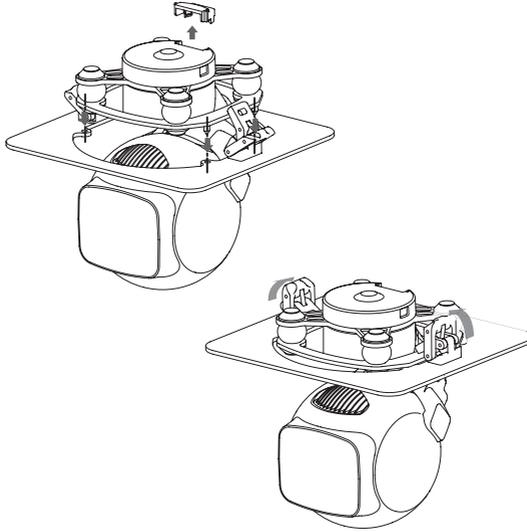


- 1. Damping Platform
- 3. Zoom Camera
- 5. Upgrade Port
- 7. MicroSD Card Slot

- 2. Heatsinkz
- 4. Laser Lighting Module
- 6. Control Port

Installation

1. Remove the control port protector.
2. Align and insert the 4 pins into the locating holes of the mount platform. Press down the lock catch to fix the pod. The pod can be also fixed with screws through the holes on the damping platform.
3. Plug the pod control cable into the control port and install the port protector back.



- ⚠ While upward mounted or mounted at carriers with large vibration or impact, the pod should be fixed with screws nor the quick-release locks.
- ⚠ Gently plug or unplug the cable. Avoid hardly pull the cable.
- ⚠ Avoid squash the cable while installing the port protector.
- ⚠ Ensure the microSD card slot cover is firmly in place to prevent dust or moisture entering during usage or storage.
- ⚠ The pod heats while operating. Please ensure the device good cooling.
- ⚠ Do not hard-connect the pod to the carrier, and make sure that the pod does not come into contact with the carrier during use.

Configuring & Upgrading Firmware

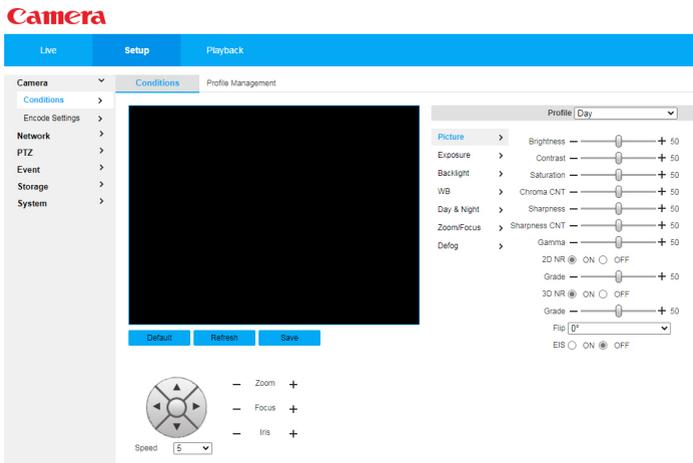
-  Ensure the gimbal and the GCU have both been upgraded to the latest firmware before use. Otherwise, usage may be affected.
-  Ensure the driver of the config module is installed on the computer before configuring or upgrading the firmware.
-  Before configuring, the computer should be set to a static IP address, which is in the same network segment with the GCU and the camera (without IP address conflicts). The default IP address of the GCU and the camera are 192.168.144.121 and 192.168.144.108.
-  Do not power off the device while upgrading the firmware. Restart the device once firmware upgrade is complete.

1. Connect the computer and ETH port with the Network Conversion Module. Power on the devices.
2. Run the Dragonfly display and control software to confirm that it is connected to the pod. Open the settings page.
3. When the settings are complete, click "Save".
4. Restart the pod to enable the configurations to take effect.

 For instructions on Net Settings, S.BUS Setting, Calibration, Carrier, and Advance, please refer to the 《Dragonfly Quick Start Guide》 - Ribbon - Settings, or visit the www.allxianfei.com to get information in the Video Center.

Configuring the Camera

1. Connect the pod and the GCU with the pod control cable. Connect the computer and ETH port of the GCU with the network conversion module. Power on the devices.
2. Visit "http://192.168.144.108" on the computer (if the IP address of the camera has been changed, the IP address in the URL should be replaced with the current camera IP address).
3. Input username and password (default as "user" / "0000").
4. Download and install plugin as prompt after login. After installation, the web page will refresh and display live view of the camera. Click Setup to set the camera. The interface is as follow.



1. Camera-Conditions

- **Picture**

Brightness / Contrast / Saturation / Chroma CNT / Sharpness / Sharpness CNT / Gamma

User can adjust the image parameters according to requirement.

2D NR / 3D NR

Used to suppress noise. The higher the noise reduction grade, the fewer the noises, yet the worse the image.

- **Exposure**

Mode

Auto: The camera automatically adjusts exposure parameters according to environment to make sure the overall brightness of the image in normal range.

Aperture priority: The aperture is fixed. The camera adjusts shutter speed and gain according to environment to make sure the optimal overall brightness of the image.

Shutter priority: The shutter speed is fixed. The camera adjusts aperture and gain according to environment to make sure the optimal overall brightness of the image.

Gain priority: The gain is fixed. The camera adjusts aperture and shutter speed according to environment to make sure the optimal overall brightness of the image.

Manual: Adjust aperture, shutter and gain of the camera manually.

Exposure Comp

Set the compensation of the exposure.

AE recovery

Auto exposure will be recovered after the recovery time while the camera is set as non-automatic exposure mode.

- **Backlight**

Set backlight to improve the adaptability of the camera in complex illuminant, which supports BLC (Backlight Compensation), HLC (Highlight Compensation) and WDR (Wide Dynamic Range).

- **WB (White Balance)**

The D-80Pro provides multiple WB modes to adapt different applications.

- **Zoom / Focus**

Digital Zoom

Enable / disable digital zoom

Zoom Speed

The larger the zoom speed is, the faster the zoom is.

Mode

Manual: The camera does not focus unless it is triggered manually.

Auto: The camera automatically focuses while zooming, switching ICR or detecting scene variation.

Semi Auto: The camera automatically focuses while zooming or switching ICR.

Fast Semi Auto / Fast Auto: Similar to Semi Auto / Auto but faster.

Far Limit

The camera only focuses on objects farther than the limit. The camera chooses optimal limit while the far limit is set as auto.

Sensitivity

Configure sensitivity to adjust the smoothness and anti-jamming of the focus. The lower sensitivity, the smoother. The higher sensitivity, the stronger anti-jamming.

AF Tracking

Enable AF tracking to get a better image while zooming. Disable AF tracking to improve focus speed.

Lens Init

Click to initialize the lens of the camera, which calibrates the zooming and focusing.

- **Defog**

Enable defog to get a clearer image blurred by smog, vapor or dust. The intensity of defog can be set manually or automatically.

2. Camera - Encode Setting

- **Video**

Set main / sub stream parameters or enable / disable sub stream in this page.

Video Codec: Set the encode mode of the video, which supports H.264, H.264H, H.264B, H.265 and MJPEG.

Resolution: 3840x2160, 1920x1080, 1280x1024, 1280x960 or 1280x720

Frame Rate (FPS): 1~30 fps

Bit Rate Type: CBR (Constant Bit Rate) or VBR (Variable Bit Rate).

 The image quality can only be set in VBR mode.

 The bit rate type can only be set as CBR in MJPEG encode mode.

Bit Rate / Max Bit Rate: Bit rate in CBR mode. Max bit rate in VBR mode.
I Frame Interval: Quantity of P frame between adjacent two I Frames, which varies with frame rate. It is recommended as two times of frame rate.

Watermark Settings: Check to enable watermark. The watermark, which is 128 characters at maximum, can only be made up of numbers, letters, underscores and hyphens.

- **Overlay**

- Channel Title**

- Set channel title displayed on live view. User can adjust the position of the title by dragging it on preview.

- Time Title.**

- Set time title displayed on live view. User can enable / disable week display and adjust the position of the title by dragging it on preview.

- OSD Info**

- Set preset point, pod coordinates and zoom rate displayed on live view. User can adjust the positions of the information by dragging them on preview.

- Text Overlay**

- Set text and its alignment displayed on live view. User can adjust the positions of the information by dragging them on preview.

- Font Size**

- Set the font size of the overlay information.

- Picture**

- Set the uploaded picture displayed on live view. User can adjust the positions of the picture by dragging it on preview.



The text overlay and picture overlay cannot be enabled at the same time.

- OSD Warning**

- Set if the warning is displayed on live view. User can adjust the positions of the warning by dragging it on preview.

- GPS Position**

- Set if the GNSS coordinates are displayed on live view. User can adjust the positions of the coordinates by dragging it on preview.

3. Network - General

- **TCP/IP**

- Host Name:** Set the name of current camera, no longer than 15 characters.

Mode: Set the IP address acquisition methods of the camera. The IP address, subnet mask and default gateway should be set manually in Static mode, which do not need to be set up in DHCP mode.

4. Network - Platform

Configure the parameters of the platform as required.

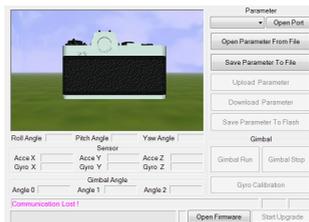
 Except settings mentioned above, please keep other settings as default, otherwise may cause the pod not working properly.

 Click "Save" to enable the settings after setup. Restart the pod to enable the configurations to take effect.

Gimbal Upgrading

1. Connect the pod and the GCU with the pod control cable. Connect the computer and the gimbal upgrade port with the config module. Power on the devices.
2. Run GimbalConfig software. Choose the COM port corresponding to the config module. Click "Open Firmware", choose the firmware file, click "Start Upgrade" and wait for the upgrading complete.

 For some brands of dual Type-C cables, there may be cases where the computer cannot recognize the Config Module. Please try replacing it with a Type-A to Type-C cable.



 Visit the www.allxianfei.com for more information in the Video Center.

Real-time Video Playing

Example as camera IP address 192.168.144.108:

Main Stream (default as 3840x2160 @30fps, corresponding to Stream 4 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=0`

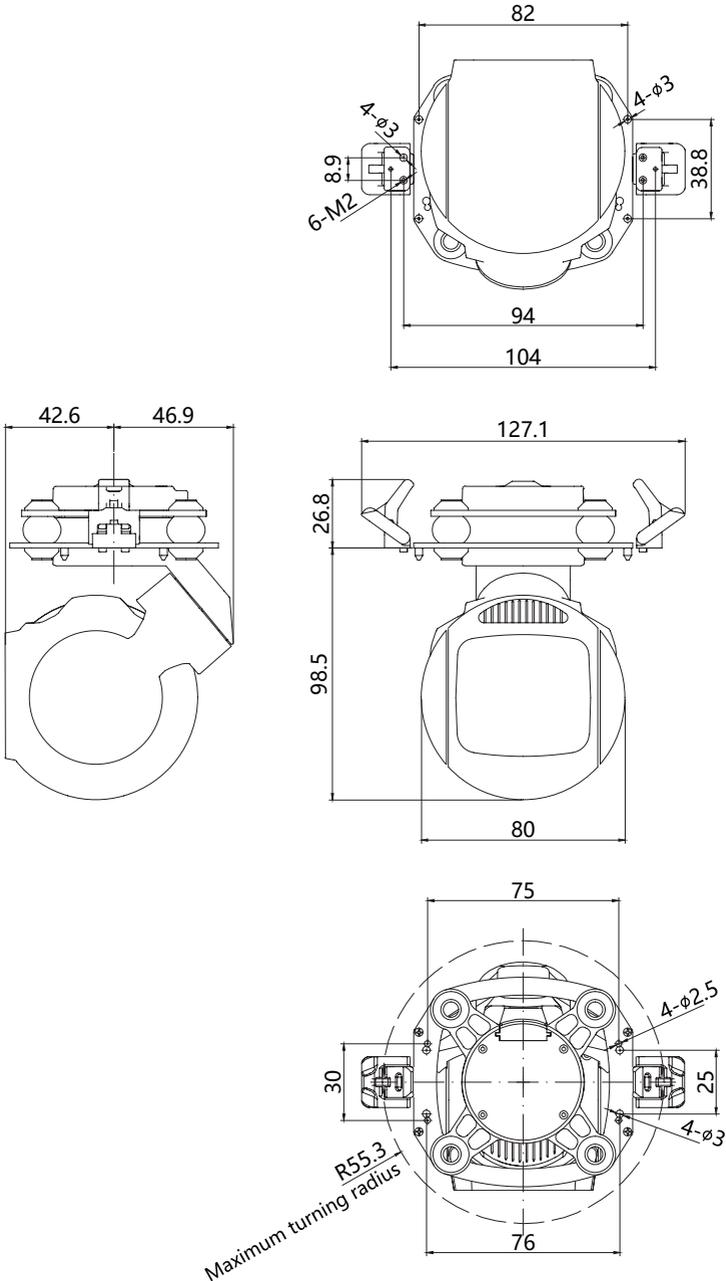
Sub Stream 1 (default as 352x240 @20fps, corresponding to Stream 2 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=1`

Sub Stream 1 (default as 1920x1080 @30fps, corresponding to Stream 1 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=2`

Appendix 1 Dimensions



Unit: mm

Appendix 2 MAVLink Configuration

ArduPilot

SERIAL1	
SERIAL1_BAUD	115
SERIAL1_OPTIONS	1024
SERIAL1_PROTOCOL	2
SR1	
SR1_ADSB	0 Hz
SR1_EXIT_STAT	0 Hz
SR1_EXTRA1	0 Hz
SR1_EXTRA2	0 Hz
SR1_EXTRA3	0 Hz
SR1_PARAMS	0 Hz
SR1_POSITION	0 Hz
SR1_RAW_CTRL	0 Hz
SR1_RAW_SENS	0 Hz
SR1_RC_CHAN	0 Hz
MNT1	
MNT1_TYPE	4 (Gremsy) / 6 (SToRM32 Mavlink)
RC1	
RC1_OPTOPN	213 (MOUNT1_PITCH)
RC2	
RC2_OPTOPN	214 (MOUNT1_YAW)
RC3	
RC3_OPTOPN	163 (MOUNT1_LOCK)
CAM	
CAM_TRIGG_TYPE	3 (Mount)

-  The MNT1_TYPE is recommended as 6. The MNT1_ROLL_MAX, MNT1_ROLL_MIN, MNT1_PITCH_MAX, MNT1_PITCH_MIN, MNT1_YAW_MAX and MNT1_YAW_MIN will be configured automatically depend on data from the GCU. The angle limit should be set manual while the MNT1_TYPE is 4.
-  The RC1~RC3 are just examples, which can be defined according to actual situation.

PX4

MAVLink	
MAV_1_CONFIG	TELEM2
MAV_1_MODE	Custom / Gimbal
MAV_1_RATE	115200 B/s
Serial	
SER_TEL2_BAUD	115200 8N1
Mount	
MNT_MAIN_PITCH	AUX1
MNT_MAIN_YAW	AUX2
MNT_MODE_IN	Auto (RC and Mavlink Gimbal)
MNT_MODE_OUT	MAVLink gimbal protocol v2
Camera Setup	
Trigger mode	Distance based, on command (Survey mode)
Trigger interface	MAVLink (forward via MAV_CMD_IMAGE_START_CAPTURE)

-  The MAV_1_MODE is recommended as Custom.
-  The AUX1 and AUX2 are just examples, which can be defined according to actual situation. It should be configured in RC Map for further application.
-  The trigger mode is just an example, which can be modified according to actual situation.

Appendix 3 MAVlink Communication Process

After receiving HeartBeat from the flight controller, and identifying SYSID and COMPID of the flight controller, GCU will operate as below:

1. GCU actively sends package *MAVLINK_MSG_ID_HEARTBEAT 0* at a frequency of 2Hz.
2. GCU requests following packages in turn at a frequency of 1Hz. The flight controller fills these parameters into package *MAVLINK_MSG_ID_COMMAND_LONG 76* until the request completing. :
MAVLINK_MSG_ID_EKF_STATUS_REPORT 193 (No this package for PX4);
MAVLINK_MSG_ID_GLOBAL_POSITION_INT 33;
MAVLINK_MSG_ID_SCALED_IMU 26;
MAVLINK_MSG_ID_SYSTEM_TIME 2;
MAVLINK_MSG_ID_RC_CHANNELS 65;
MAVLINK_MSG_ID_CAMERA_TRIGGER 112 (No this package for APM);
MAVLINK_MSG_ID_AUTOPILOT_STATE_FOR_GIMBAL_DEVICE 286;
MAVLINK_MSG_ID_GIMBAL_DEVICE_SET_ATTITUDE 284 (No this package for APM);
3. GCU actively sends package *MAVLINK_MSG_ID_GIMBAL_DEVICE_ATTITUDE_STATUS 285* at a frequency of 100 Hz while the packages above being received and the pod being operational.
4. Generally, the flight controller will request package *MAVLINK_MSG_ID_GIMBAL_DEVICE_INFORMATION 283*, which GCU does not send actively.