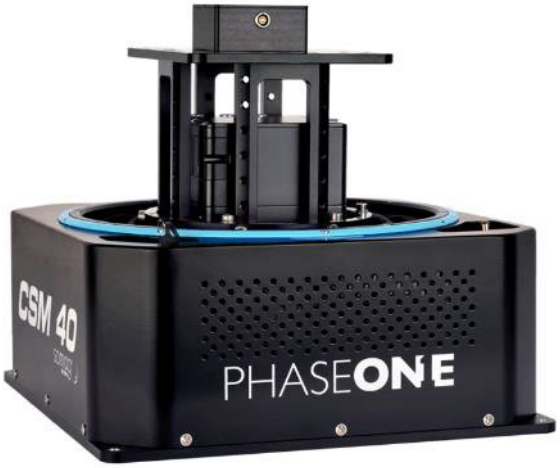
PAS 150MP MK3

Operation Guide



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1.1 Scope

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- Section 5 - Installing the PAS 150MP MK3 in the Aircraft
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- Section 8 – Shutting Down and Disassembling the PAS 150MP MK3
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- Appendix E - Declarations of Conformity

1.2 Applicable Documents

Item	Manual
Applanix GNSS/IMU	GNSS Configuration Guide for PAS Systems
Phase One iX Process	iX Process Operation Guide
Phase One iX Flight Pro	iX Flight Pro Operation Guide
Somag CSM 40 Mount	SOMAG CSM 40 Manual
Somag DSM 400 Mount	SOMAG DSM 400 Manual
Trimble AV39 Antenna	Trimble AV39 Antenna Datasheet

2 PAS 150MP MK3 Overview

> **Note**
>
> - There are no user serviceable parts inside the PAS 150MP MK3 or iX Controller. All warranties are void if access panels are opened or cables not supplied by Phase One are connected, unless specifically instructed by Phase One personnel.
> - Installation of the PAS 150MP MK3 in an aircraft must be performed by certified personnel while following the relevant Civil Aviation Authority regulations in the country of aircraft registration and operation. A Supplemental Type Certificate or Minor Change may be required.

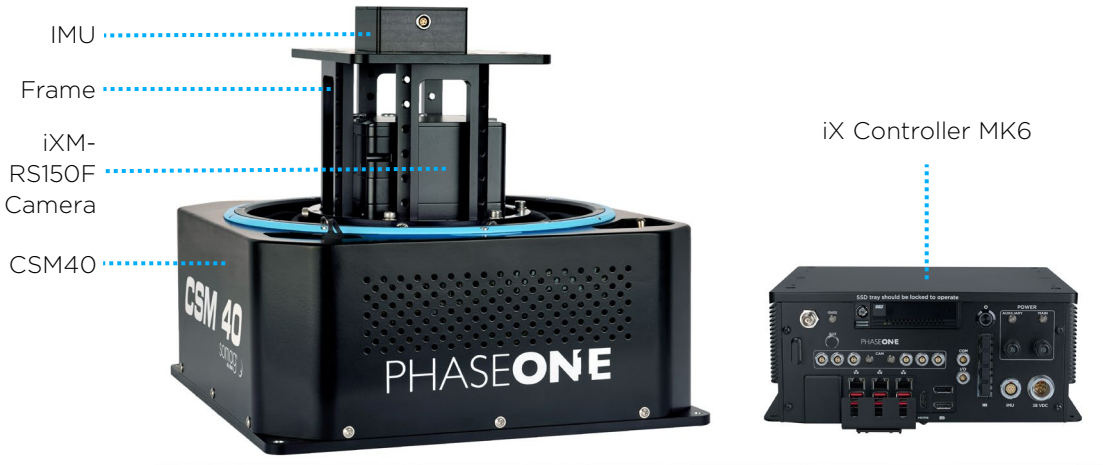
The PAS 150MP MK3 is a fully integrated solution based on the iXM-RS150F camera. The aerial system comprises the camera(s), iX Controller with an integrated Applanix GNSS, IMU and SOMAG mount.

Two configurations are available:

- Single-Band system
- 4-Band system

2.1 Hardware for Single Band System

The following figure shows the main components of the single-band system.



2.1.1 iX Controller (MK6)

The iX Controller is the communication center and data storage for the PAS. Based on Microsoft Windows 10, it is responsible for controlling power and communication for all ancillary systems. The storage solution consists of 2 x 2 TB or 4 TB SSDs. For more information on storage, see Appendix C - Data Storage Management.

The iX Controller includes an integrated Applanix AP+ GNSS.

> **Note**
>
> The SFP+ ports are currently not supported in PAS 150MP MK3.

2.1.2 iXM-RS150F Camera Head and Lenses

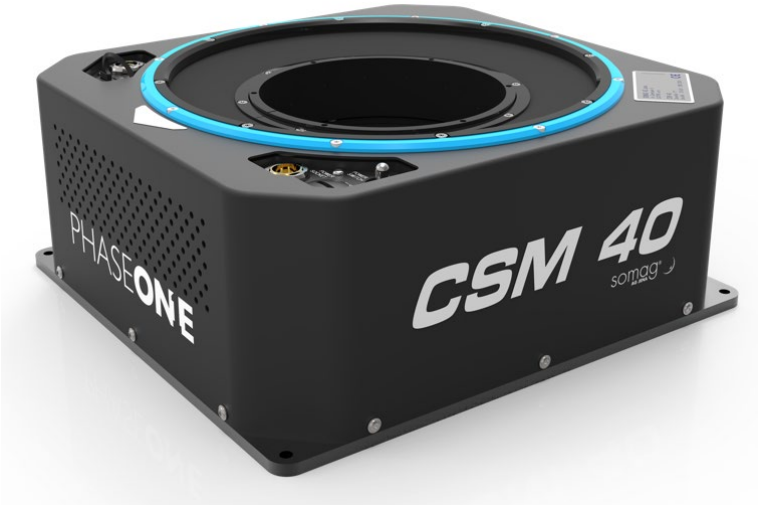
The iXM-RS150F camera is equipped with a full-frame sensor (14,204 x 10,652 pixels), and a 3.76 micrometer pixel that enables high ground resolution from high flight altitudes. It provides large aerial coverage resulting in higher aerial survey productivity.

The camera comes with one of eight RS lenses ranging from 32mm to 180mm focal length, and the 300mm RSM lens, all equipped with a central leaf shutter to ensure geometrically correct aerial images.

Designed and built for aerial photography by Rodenstock and Schneider-Kreuznach, the lenses are factory calibrated for infinity focus and equipped with a central leaf shutter with a speed of up to 1/2500 sec. The 150MP camera offers high capture speed of 2fps for an array of flight conditions. The RS lenses' opening angle is specially fitted for oblique and lidar systems.

2.1.3 SOMAG CSM 40 Mount

The SOMAG CSM 40 is a compact modular mount specially fitted for Phase One aerial systems. With a low weight of 5.2kg, the mount is particularly suitable for use on light aircraft.



2.1.4 Single-Band Frame

The single-band frame enables mounting the camera and the IMU.

2.1.5 Applanix GNSS/IMU

The Applanix GNSS/IMU contains a precision GNSS receiver and inertial sensor components, logging capability, and interfaces for mapping sensors and flight management systems.

Data such as geographic position (latitude, longitude and altitude), velocity, acceleration, angular rate, orientation (roll and pitch), ground track and performance metrics are available in real-time and through post-processing.

The Applanix GNSS/IMU is comprised of the Applanix AP+ card located in the iX Controller and one of the following IMU models:

- AP+ 180 with IMU-69 or with internal IMU-79.
- AP+ 310 with IMU-82
- AP+ 510 with IMU-91
- AP+ 610 with IMU-57

> **Note**
>
> For detailed information on the differences between the above Applanix GNSS/IMUs, refer to www.applanix.com

The Applanix GNSS is configured and managed via a browser-based application supported by the Applanix AP+ card. You can access the application through the shortcut on the iX Controller software taskbar.

2.1.6 Trimble AV39 Antenna

The Trimble AV39 antenna is a lightweight, TSO certified antenna that provides centimeter precision with superior phase center repeatability. The antenna is powered by the Applanix AP+ card in the iX Controller via a coaxial cable supplied with the antenna.

2.1.7 Monitor Kit

The monitor kit allows full control and flight feedback of the PAS 150MP MK3 and includes the following:

- pilot monitor
- operator monitor

2.1.7.1 Pilot Monitor

The 7" pilot monitor provides all flight information from iX Flight Pro, ensuring that the pilot has all required information to conduct a successful survey mission. The touch screen allows the pilot to perform several quick-access operations in iX Flight Pro (map display, zoom, line selection).

The pilot display is installed with the cables leading to the lower part of the monitor. The monitor orientation is then set in Microsoft Windows to flipped portrait.

2.1.7.2 Operator Monitor

The 15.6” operator monitor provides all required information from iX Flight Pro, ensuring the operator can control all aspects of the flight, including run selection, camera control, and data management using the touch screen.

The operator is installed with the cables leading to the lower part of the monitor. The monitor orientation is then set in Microsoft Windows to flipped landscape.

> **Note**
>
> You can install a 21” screen for the operator instead of the 15.6” screen. For details, contact Phase One.

2.2 Hardware for 4-Band System

The following figure shows the main components of the 4-band system.

The following 4-Band system components are preassembled in and form part of the 4-band frame:

- IMU
- iX Controller MK6
- 2 cameras (RGB and achromatic)

This section describes the components that are unique to the 4-band system.

2.2.1 iXM-RS150F Achromatic Camera

In addition to the iXM-RS150F camera, the 4-band system contains the iXM-RS150F achromatic camera to provide NIR data in the spectral range of 720-1000nm (4-Band system).

Post processing this data in combination with the iXM-RS150F RGB data allows output imagery as IRG/RGBi CIR products or NDVI.

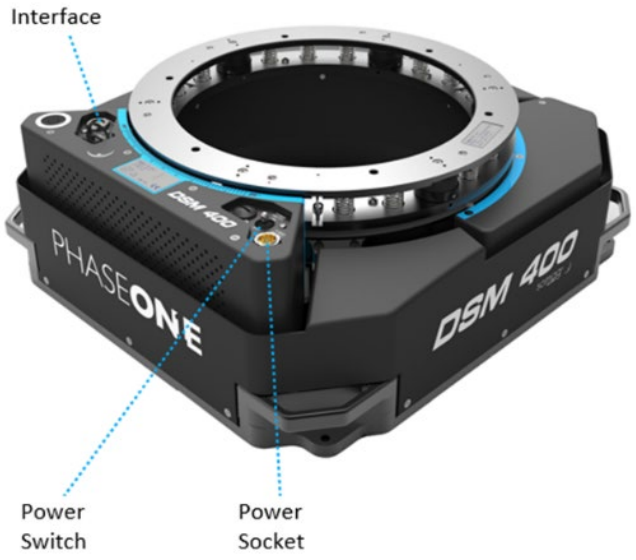
> **Note**
>
> For the iXM-RS150F Achromatic Camera, Phase One recommends using a lens with the same focal length as the RGB camera to obtain the same footprint for both RGB and NIR.

2.2.2 SOMAG DSM 400 Mount

If you are using the 4-Band system, you must install the 4-Band PAS 150MP MK3 into a DSM 400 mount.

The SOMAG DSM 400 is a high-performance gyro-stabilized platform that compensates for roll, pitch and yaw movements in real-time. The dynamic reaction times and the compensation ability of this platform ensures your imagery remains fully vertical even in challenging conditions, while maintaining high levels of accuracy and efficiency.

SOMAG DSM 400 Mount is an electromechanical gimbal system.



Note

- If you already have a GSM 4000 mount, you can install the 4-Band PAS 150MP MK3 in it with the following conditions:
  - PAS 150MP MK3 can only operate with SOMAG GSM 4000 mounts with serial numbers 090236 and higher, or with earlier mounts that were refurbished by SOMAG to the dual communication port configuration.
  - The SOMAG GSM 4000 mount requires installation of an adaptor plate. If you are providing the SOMAG GSM 4000, you also need to provide Vibration Damping Ring (111721-060-03/01).

2.3 Software

2.3.1 iX Flight Pro

iX Flight Pro uses iX Plan data to manage and guide the precise execution of aero-photography flight. Using the pilot and operator monitors, the pilot can easily maintain a precise trajectory by following altitude and localizer instructions, while the operator manages the flight, controls the order of passes, tags images and start/stops image collection. iX Flight Pro is pre-installed in the iX Controller.

For detailed information on using iX Flight Pro, see the iX Flight Pro Operation Guide provided with your PAS 150MP MK3.

Note

To process captured images, use iX Process available from Phase One.

2.3.2 Licensing

The iX Flight Pro software license is preinstalled in the iX Controller.

2.4 PAS 150MP MK3 Dataflow

The following table details the dataflow for PAS 150MP MK3 single and 4-band systems.

Dataflow for the PAS 150MP MK3 (Single and 4-Band)

Cable	Signal/Data	From	To	Protocol	Description
PAS 150MP MK3Camera I/O Cable	Camera trigger	iX Controller	Camera	Analog I/O discrete	iX Flight Pro (in iX Controller) calculates when to capture an image (based on NMEA/GSOF data received from Applanix AP+) and issues a trigger.
	MEP (Mid Exposure Pulse)	Camera	iX Controller	Discrete	Camera sends an event input to the iX Controller when the image is captured.
	Event data	iX Controller	Camera	RS-232	Applanix AP+ (in iX Controller) sends event metadata to camera for image metadata.
PAS 150MP MK3 – Mount COM cable	Start/Stop pass	iX Controller	SOMAG CSM 40/ DSM 400 mount	RS-232	• iX Flight Pro (in iX Controller) sends angle data to SOMAG mount for stabilization. • iX Flight Pro (in iX Controller) calculates Start of Line and before reached, sends "Stab" command to SOMAG mount. • iX Flight Pro (in iX Controller) calculates End of Line and after reached, sends "Manual" command to SOMAG mount.
	GIM01	SOMAG CSM 40/ DSM 400 mount	iX Controller	RS-232	SOMAG mount platform sends GIM01 message with platform angles to the Applanix AP+ (in iX Controller) for registration in T04 files.
USB cable (for each camera)	Images	Camera	iX Controller	USB	Images taken by camera transferred to iX Controller SSD.

3 Unboxing the PAS 150MP MK3

Verify that all parts were supplied according to the specific packing list for your PAS 150MP MK3.

3.1 Product Identification

To enable support for your PAS 150MP MK3, you must identify and record the model and serial numbers for each of the following components:

- Cameras: you can view camera serial numbers in iX Flight Pro. See the iX Flight Pro Operation Guide.
- Mount: model number and serial number are located on a label on the mount.
- IMU: model number and serial number is located on a label on the unit.

4 Assembling and Testing the PAS 150MP MK3 in the Office

This section describes how to assemble the PAS 150MP MK3 for testing in the office.

Phase One recommends assembling and testing the PAS 150MP MK3 in the office prior to transporting it and installing it in the aircraft. This allows for quick installation in the aircraft with little risk of missing cables or incorrect configuration.

> **Note**
>
> - Before placing the PAS 150MP MK3 on a work bench, make sure that the area is clear of debris to avoid damaging the lens. In the case of a 4-band system, the 4-band frame legs provide ample clearance between the lenses and the surface, but any objects underneath the PAS 150MP MK3, including loose cables, could impact the lenses.
> - Make sure you place the PAS 150MP MK3 on a work bench capable of withstanding the PAS 150MP MK3 weight.
> - The PAS 150MP MK3 does not have to be assembled in the mount for testing. You can place the PAS 150MP MK3 next to the mount.

The following tools are required to assemble the system in the office:

- Allen key set.
- Torx key set.
- Standard tools.

> **Note**
>
> - For a Single-Band system assembly, see section 4.1 - Assembling a Single-Band System.
> - For a 4-Band system assembly, see section 4.2 - Assembling a 4-Band System.

4.1 Assembling a Single-Band System

> **Note**
>
> If you are assembling a 4-Band system, proceed to section 4.2 - Assembling a 4-Band System.

4.1.1 Securing the iXM-RS150F Camera to the Single-Band Frame

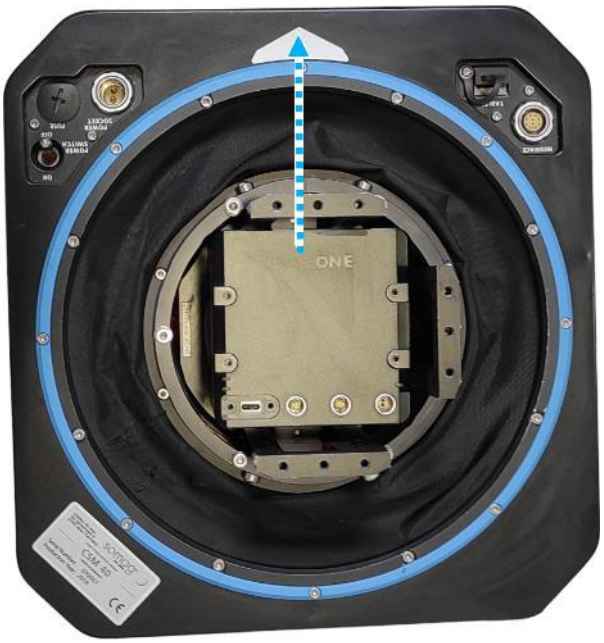
1. Insert the camera into the single-band frame in the direction shown (image at right shows top view).

1. Secure the camera to the single-band frame using four M4x16 conic head screws (image at right shows bottom). Tighten the screws to torque 2Nm.

4.1.2 Securing the Single-Band Frame to the CSM 40 Mount (Optional)

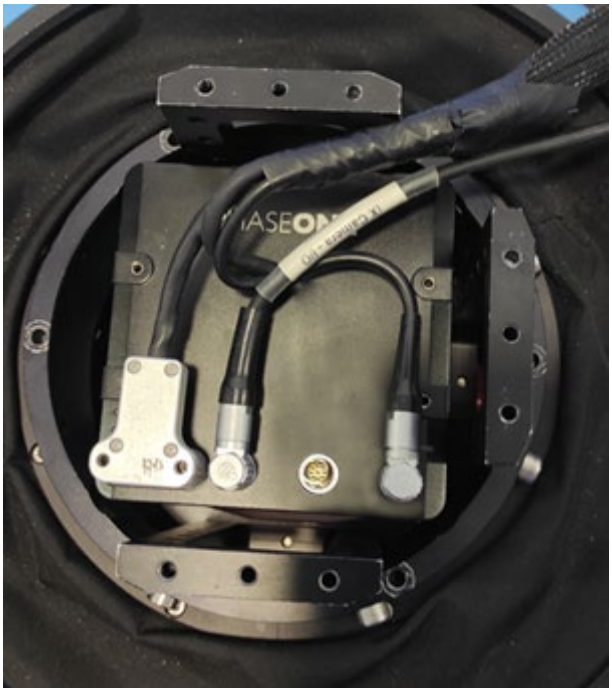
> **Note**
>
> The single-band frame with the camera and IMU does not have to be assembled in the mount for testing. You can place the single-band frame next to the mount.

1. Insert the single-band frame into the mount. The direction of the PHASEONE logo on the camera should be aligned with the white arrow on the mount that shows flight direction.
2. If necessary, adjust the height of the single-band frame in the mount using the 6 screws on the single-band frame. The height should be such that the camera will not protrude beyond the aircraft skin.
3. Secure the single-band frame to the mount using 6 M4x16 screws, spring washers and washers. Tighten the screws to torque 2Nm.



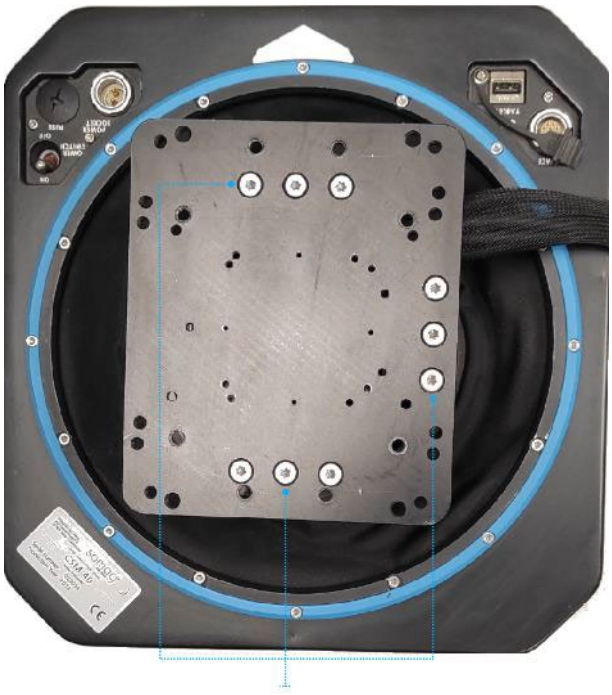
4.1.3 Connecting Cables to the Camera

1. Connect the iX Controller / Camera USB Cable (73234000) angled USB connector to the camera USB port. Tighten the screws to torque 0.25Nm.
2. Connect the Camera Control Cable (70378000) to the left LEMO port.
3. Connect the Camera Power Cable (70364000) to the right LEMO port.



4.1.4 Securing the Lid on the Single-Band Frame

1. Secure the lid to the top of the single-band frame using 9 M4x10 screws. Tighten the screws to torque 2Nm.



4.1.5 Securing the IMU to the Lid

1. Secure the IMU to the lid using 4 M6x16 screws, spring washers and washers. Tighten the screws to torque 3Nm.

2. Phase One recommends installing the IMU so that its X axis is towards the flight direction. If the IMU's X axis is not the same as the flight direction, configure the setting in the AP+ application on the **External IMU** tab.

4.1.6 Connecting a Single-Band System in the Office

Note

- Do not excessively bend cables. Allow a bending radius of at least 40mm for all cables.
- Insert connectors into ports with care to prevent damage to pins. All LEMO connectors have a red dot to indicate correct alignment.

- Use cable ties to secure cables to the cable tie mounts on the iX Controller upper plate to ensure that the connectors are secured. Do not overtighten the cable ties.

- Make sure that the port connectors for both monitors are properly secured in their sockets.
- Use cable ties to secure the cables to the appropriate points on the monitors to ensure that the connectors are secured. Do not overtighten the cable ties.

Warning

Do not connect any components while the PAS 150MP MK3 is connected to a power source. Connecting monitor cables while the power cable is attached to the system will damage the iX Controller motherboard.

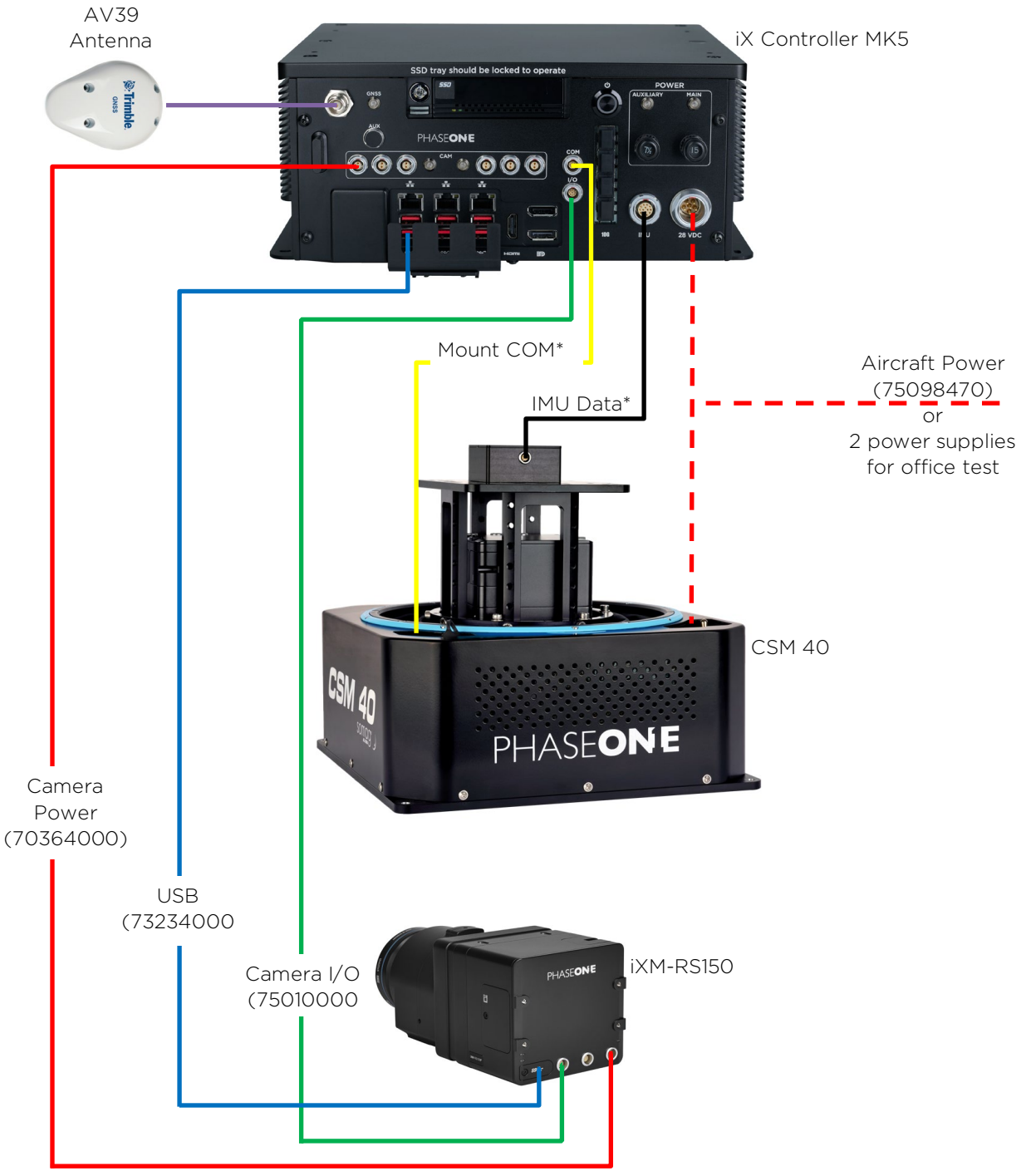
To connect the PAS 150MP MK3:

1. Connect all PAS 150MP MK3 components as described in the following table and figures.

PAS 150MP MK3 Single-Band System Connection Details

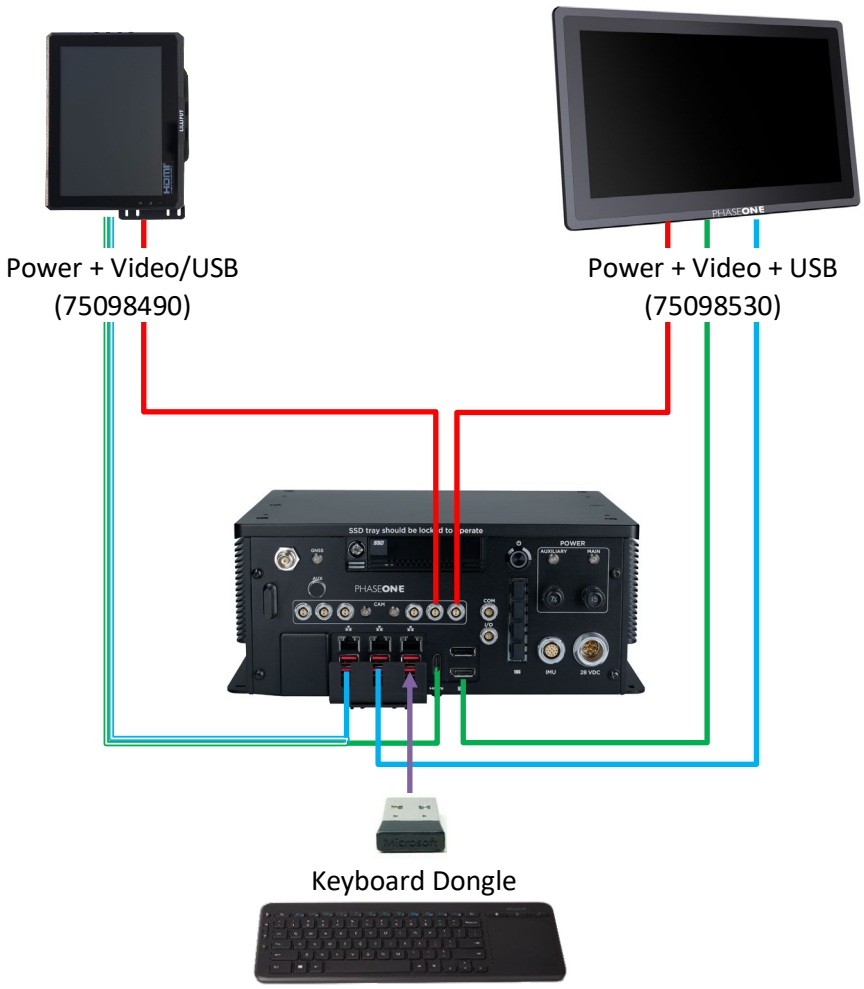
Order	P/N	Description	Connects to
1	70364000	iX Controller - Camera Power Cable	• iX Controller, power ports • iXM-150, right-LEMO port
2	73234000	USB cable	• iX Controller, USB port • iXM-150, USB port*
3	75010000	iX Controller - Camera I/O Cable	• iX Controller, I/O port • iXM-RS150 left LEMO port
4	73260000, 3 m 73285000, 0.5m 73293000, 1.6 m	iX Controller – Mount COM cable	• iX Controller, COM port • CSM 40 Mount, INTERFACE port
5	-	If using external IMU: iX Controller – External IMU Cable (supplied with external IMU)	• iX Controller, IMU port • IMU
6	75098530	iX Controller – Operator Monitor Cable	2. Operator monitor (pre-connected to operator monitor). **Note** If the operator monitor cable is not connected to the operator monitor, see Appendix D - Connecting the PAS 150MP MK3 – Operator Monitor Cable to the Monitor. • iX Controller power port (power), DP port (video); USB port (USB)
7	75098490	iX Controller - Pilot Monitor Cable	• Pilot monitor (power, video - includes USB signal) • iX Controller power port (power); HDMI port (video); USB port (USB)
8	-	Keyboard Bluetooth dongle (supplied with keyboard)	• iX Controller, USB port
9	-	Antenna cable (supplied with antenna)	• iX Controller antenna port **Note** Place the antenna outside an open window in full view of the sky.

Single-Band System and Power Connections



*See table: "PAS 150MP MK3 Single-Band System Connection Details"

Monitor and Keyboard Connections (Single and 4-Band Systems)



> **Caution**
>
> Verify that no cables are entangled with other cables or equipment.

> **Note**
>
> Proceed to section 4.3 - Powering the PAS 150MP MK3 and Mount in the Office.

4.2 Assembling a 4-Band System

The 4-Band system is preassembled in a 4-band frame.

Note

The 4-band frame with the camera and IMU does not have to be assembled in the mount for testing. You can place the 4-band frame next to the mount.

4.2.1 Connecting a 4-Band System in the Office

Note

- Do not excessively bend cables. Allow a bending radius of at least 40mm for all cables.
- Insert connectors into ports with care to prevent damage to pins. All LEMO connectors have a red dot to indicate correct alignment.

- Use cable ties to secure cables to the cable tie mounts on the iX Controller upper plate to ensure that the connectors are secured. Do not overtighten the cable ties.

- Make sure that the port connectors for both monitors are properly secured in their sockets.
- Use cable ties to secure the cables to the appropriate points on the monitors to ensure that the connectors are secured. Do not overtighten the cable ties.

Warning

Do not connect any components while the PAS 150MP MK3: is connected to a power source. Connecting monitor cables while the power cable is attached to the system will damage the iX Controller motherboard.

To connect the PAS 150MP MK3 4-Band system:

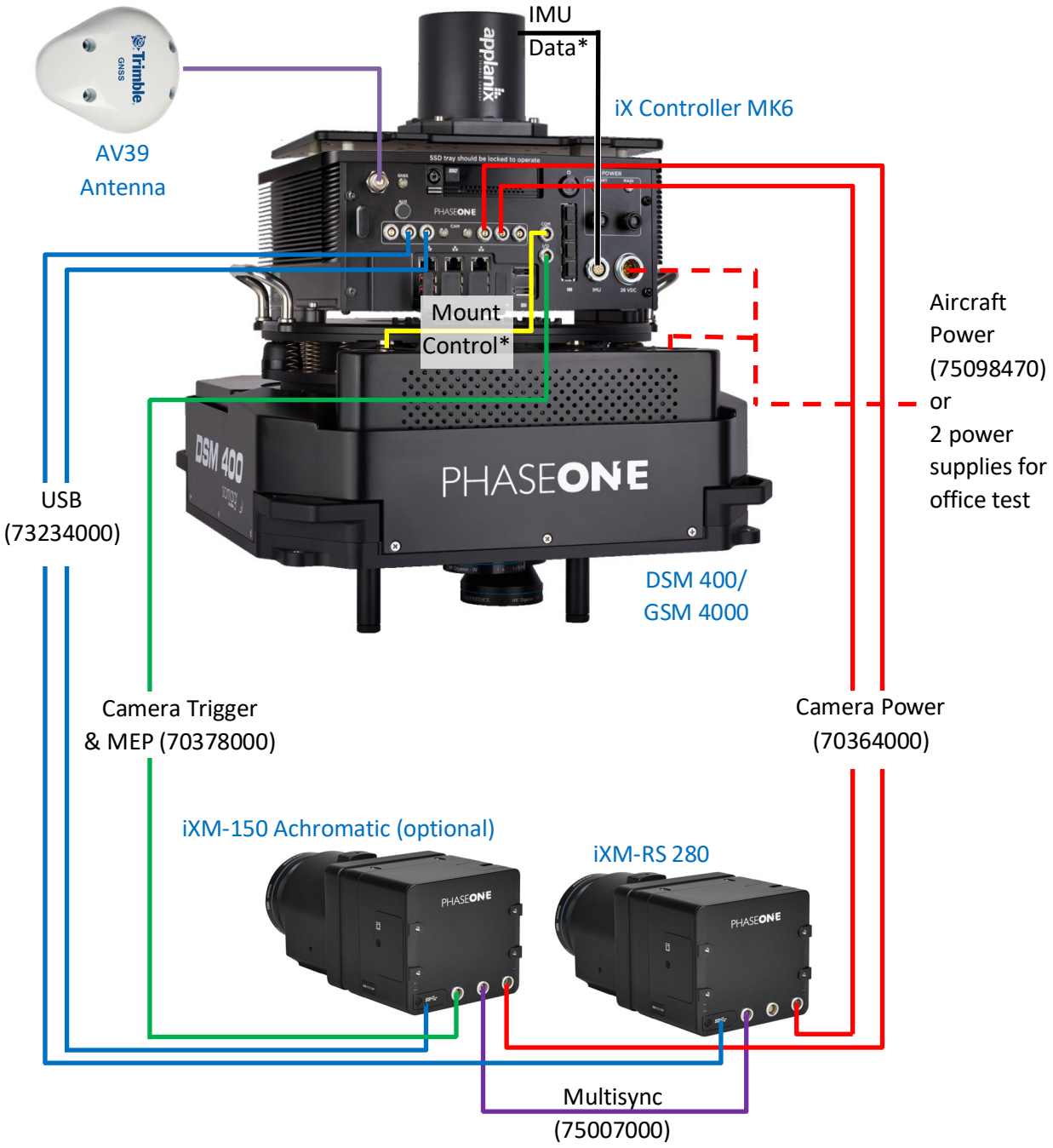
1. Connect all PAS 150MP MK3 4-Band system components as described in the following table and figure.

PAS 150MP MK3 4-Band System Connection Details

Order	P/N	Description	Connects to
1	70364000	Power cable, iX Controller/Camera (one for each camera)	Note This cable is pre-connected in the 4-band frame. 1. iX Controller, power ports 2. iXM-150, right-LEMO port
2	73234000	USB cable (one for each camera)	Note This cable is pre-connected in the 4-band frame. 1. iX Controller, USB port 2. iXM-150, USB port
3	70378000	Camera trigger & MEP	Note This cable is pre-connected in the 4-band frame. 1. iX Controller, I/O port 2. iXM-RS150, left LEMO port (on one of the cameras)
4	75007000	Multisync cable	Note This cable is pre-connected in the 4-band frame. 1. iXM-RS150, middle LEMO port (on the same camera to which the Camera trigger & MEP cable is connected) 2. iXM-RS150, left LEMO port (on the other camera)
5	73260000, 3 m 73285000, 0.5m 73293000, 1.6 m	Mount control	1. iX Controller, COM port 2. DSM 400 Mount, INTERFACE port
6	73267000 for IMU69, 3 m 73273000 for IMU82/IMU91/IMU57, 0.5 m 73278000 for IMU82/IMU91/IMU57, 3 m 75098270 for IMU82/IMU91/IMU57, 0.81 m	IMU data	1. iX Controller, IMU port 2. IMU

Order	P/N	Description	Connects to
7	75098530	Power, Video DP, USB cable	1. Operator monitor (pre-connected to operator monitor). **Note** If the operator monitor cable is not connected to the operator monitor, see Appendix D - Connecting the PAS 150MP MK3 – Operator Monitor Cable to the Monitor. 2. iX Controller power ports (power); DP (video); USB ports (USB)
8	75098490	Power, Video HDMI, USB cable	1. Pilot monitor (power, video - includes USB signal) 2. iX Controller power ports (power); HDMI (video); USB ports (USB)
9	-	Keyboard dongle (supplied with keyboard)	• iX Controller, USB port
10	-	Antenna cable (supplied with antenna)	• iX Controller (rear panel) **Note** Place the antenna outside an open window in full view of the sky.

4-Band System and Power Connections



*See table: "PAS 150MP MK3 4-Band System Connection Details"

Note

For keyboard, pilot and operator monitor connections, see Monitor and Keyboard Connections .

Caution

Verify that no cables are entangled with other cables or equipment.

4.3 Powering the PAS 150MP MK3 and Mount in the Office

> **Note**
>
> For testing in the office, you will need two power supplies as follows:
>
> - PAS 150MP MK3 power supply provided with the system for supplying power to the PAS 150MP MK3.
> - Power supply suitable for supplying power to the mount (refer to your SOMAG Manual for details).

To connect the PAS 150MP MK3 power supply to the PAS 150MP MK3:

3. Connect the PAS 150MP MK3 power supply to a mains power outlet in the office.
4. Connect the PAS 150MP MK3 power supply cable LEMO connector to the PAS 150MP MK3 28 VDC port.

To connect the mount to a power supply:

1. Connect the PAS 150MP MK3 power supply to a mains power outlet in the office.
2. Connect the PAS 150MP MK3 power supply cable LEMO connector to the mount POWER SOCKET port.

To power up the PAS 150MP MK3:

1. On the iX Controller, push in the **MAIN** circuit breaker and confirm that the green LED turns on.
2. Wait 10 seconds.
3. On the iX Controller, push in the **AUXILIARY** circuit breaker and confirm that the green LED turns on.

> **Note**
>
> - The **MAIN** circuit breaker provides power to the iX Controller motherboard.
> - The **AUXILIARY** circuit breaker provides power to the Applanix AP+ card and to the six LEMO power ports for distributing power to system components. The **AUXILIARY** circuit breaker is dependent on the **MAIN** circuit breaker.

4. Set the mount POWER SWITCH to ON.

Once the iX Controller has booted, you will see the Windows 10 Desktop on both the operator and pilot monitors.

> **Note**
>
> The pilot monitor is an extended desktop as defined under **Multiple displays** in Windows Display Settings.

4.4 Configuring the System

> **Note**
>
> All display settings (monitor orientation and touch) are relevant to the specific set of monitors attached to the system. These settings are Windows properties not controlled by Phase One software.
> If you replace monitors (even with monitors of the same type), you will need to reconfigure orientation.
> If the location of the USB connectors is changed, you may need to recalibrate the touch monitors.

4.4.1 Changing Monitor Orientation

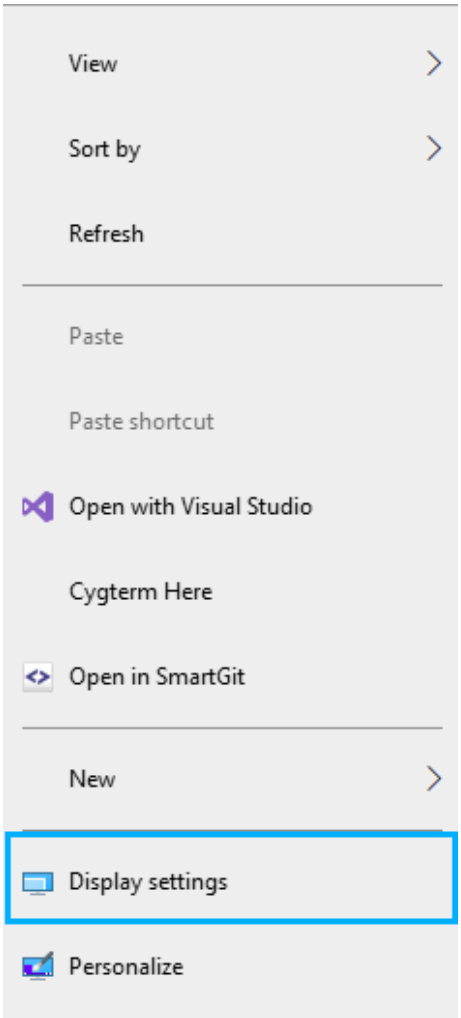
Both monitors are installed in the aircraft with their cables leading downward from the lower part of the monitor. This requires a change in display orientation.

In Windows Display Settings, the displays are identified as follows:

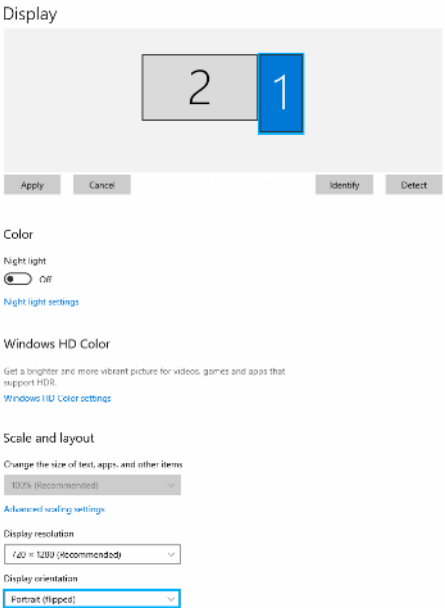
- 1 - pilot monitor connected to the iX Controller HDMI port.
- 2 - operator monitor connected to an iX Controller DP port.

To change the orientation of the monitors in Windows:

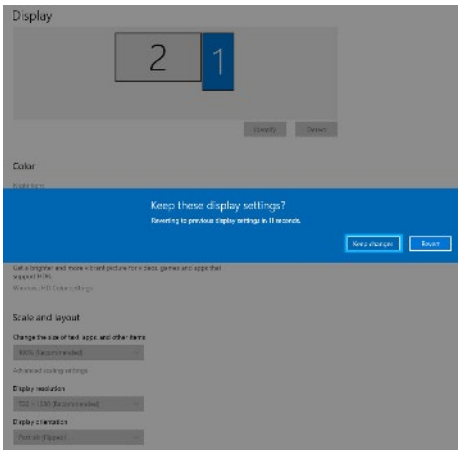
1. On the desktop, tap and hold for 1 second.
2. Tap **Display settings**.



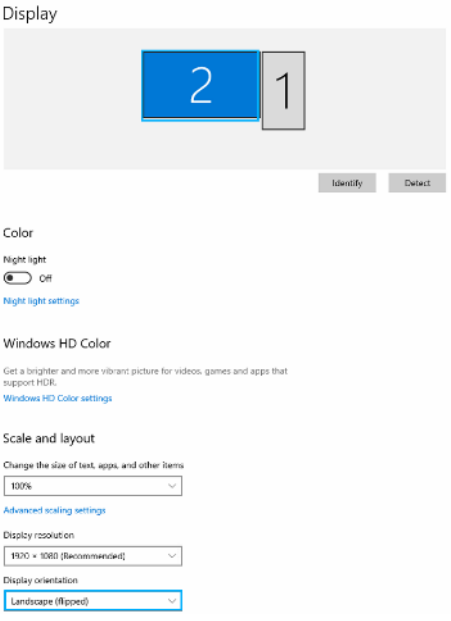
3. Tap display 1 (pilot monitor), then in **Display orientation**, select **Portrait (flipped)**.



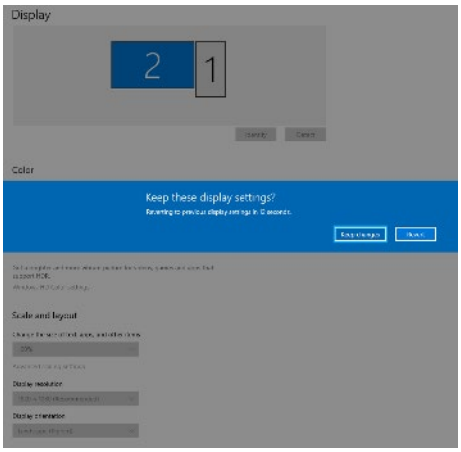
4. Tap **Keep changes**.



5. Tap display 2 (operator monitor), then in **Display orientation**, select **Landscape (flipped)**.



6. Tap **Keep changes**.

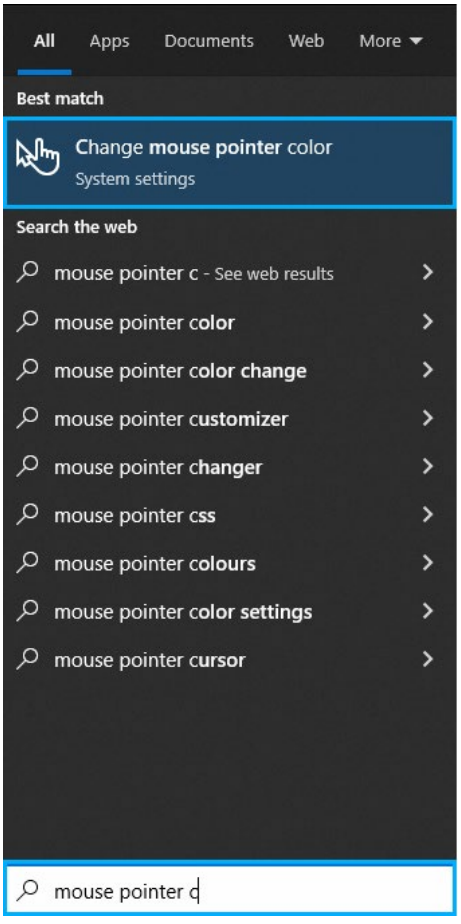


4.4.2 Changing the Mouse Pointer Color

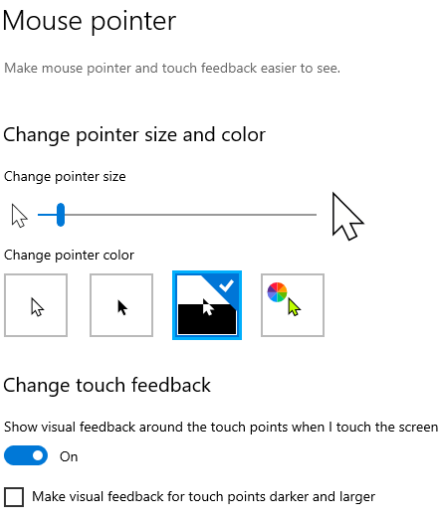
Usually, the operator controls the mouse. In order for the operator to see the pointer on the pilot display, it needs to be enlarged.

To increase the mouse pointer visibility:

1. In the Windows search box, type **mouse pointer c** and tap **Change mouse pointer color**.

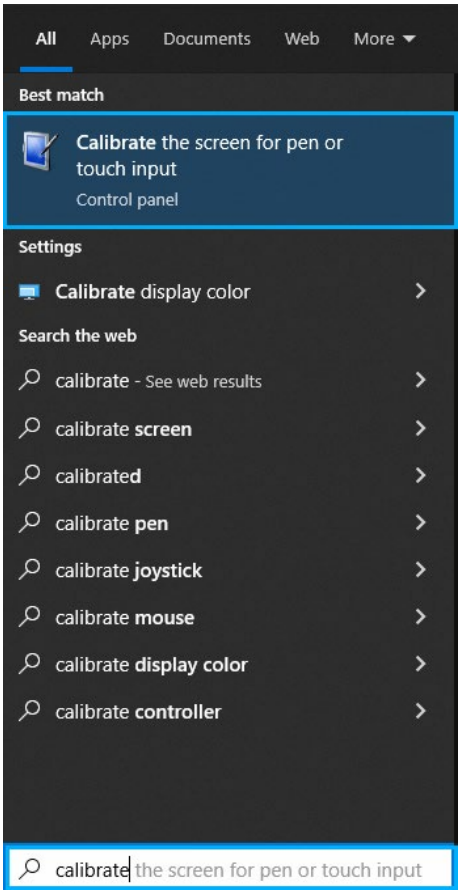


2. Tap the inverted pointer color.

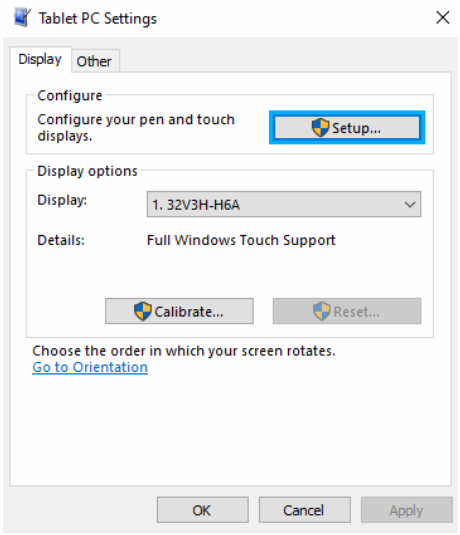


4.4.3 Configuring Touch Monitors

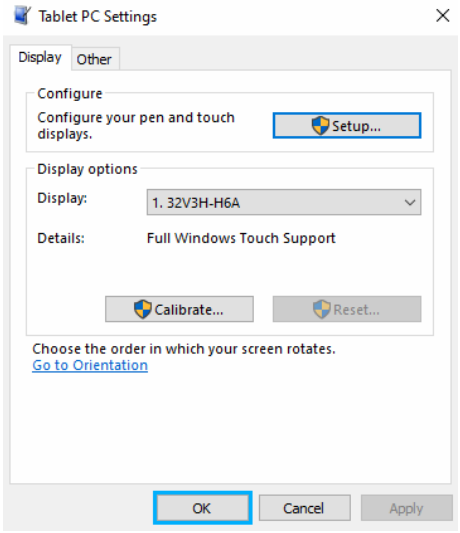
1. In the Windows search box, type **calibrate** and tap **Calibrate the screen for pen or touch input**.



2. On the **Display** tab, tap **Setup**.



3. Follow the instructions that appear on the monitors.
4. Tap **OK**.



5. Test the configuration on each monitor by tapping and dragging. The blue frame created by your finger should appear only on the monitor you are touching.

4.4.4 Check Camera Firmware for Updates

The latest firmware and instructions on how to upgrade firmware is available at: https://www.phaseone.com/download-categories/ixm-firmware/.

> **Warning**
>
> Update each camera individually.

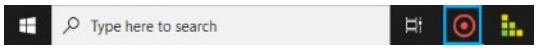
4.4.5 Configuring GNSS/IMU Parameters

Configure GNSS/IMU Parameters as described in the GNSS Configuration Guide for PAS Systems.

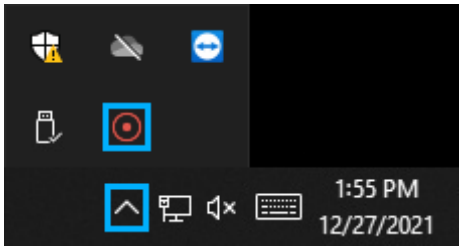
4.4.6 Configuring Screen Recorder Pro

> **Note**
>
> The procedure in this section is required only if screen recording is necessary.

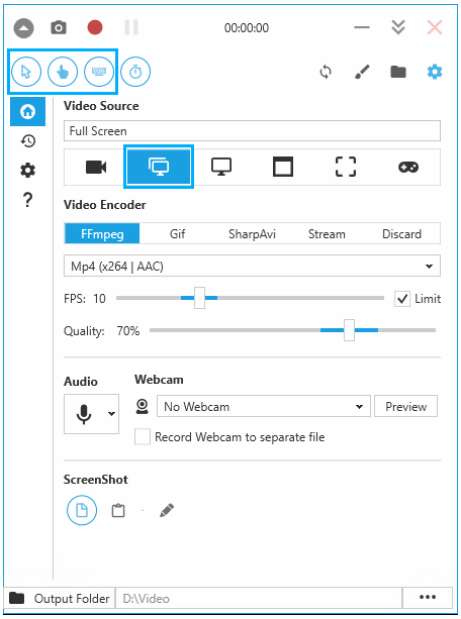
1. On the taskbar, tap the Screen Recorder Pro icon.



> **Note**
>
> If Screen Recorder Pro is already running, tap its icon in the taskbar corner ((if it is not shown, first tap the overflow window arrow).



2. Verify that the following icons are active (each icon has a blue circle around it):
   - Include Cursor
   - Include Mouse Clicks
   - Include Key Strokes
3. Under **Video Source**, verify that **All Screens** is selected.

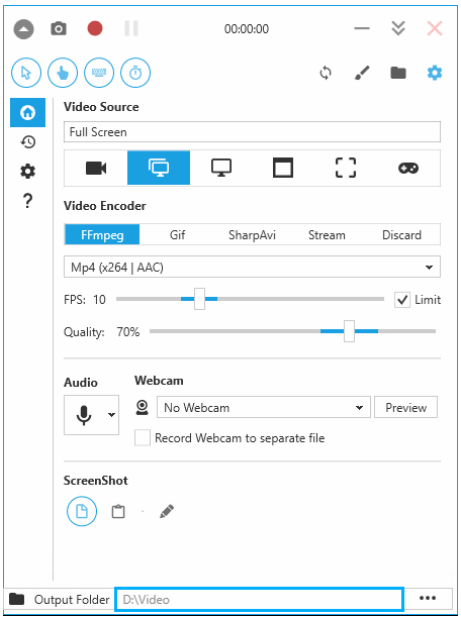


4. Verify that the **Output Folder** is set to the **D:\Videos** folder. To change:

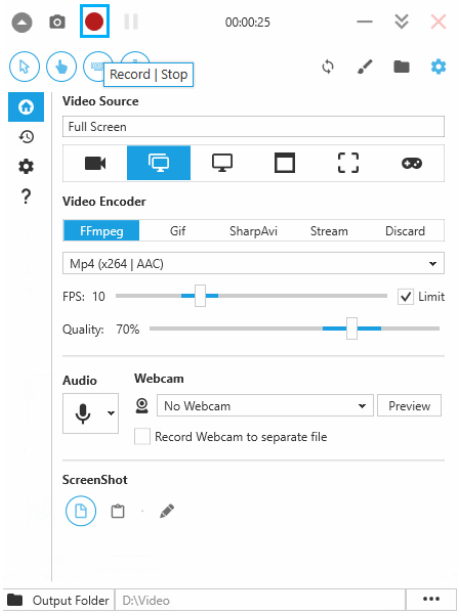
   a. Tap •••.

   b. Navigate to **D:\Videos**.

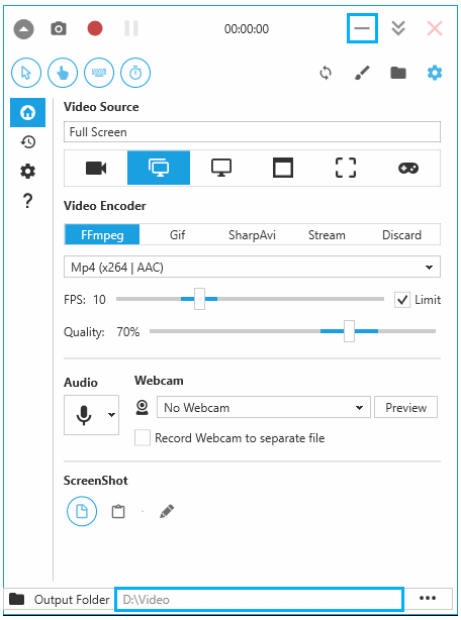
   c. Tap **Select Folder**.



5. Tap **Record | Stop**.



6. Tap minimize.



4.4.7 Configuring iX Flight Pro

1. In iX Flight Pro, configure **System Settings** and **Camera Settings** as described in the iX Flight Pro Operation Guide.

4.4.8 Checking the PAS 150MP MK3

1. In iX Flight Pro, perform a **Preflight Check** as described in the iX Flight Pro Operation Guide.

4.4.9 Configuring Lever Arms

4.4.9.1 Introduction

Photogrammetric solutions require accurate camera 6DOF data when the image is captured. Position 3D is measured by the GNSS at the antenna location. The 3 angular DOF are measured by the IMU at the IMU measurement center.

Transferring these position and angular measurements to the camera entrance pupil (nodal point) location requires accurate determination of the lever arms between the antenna and the camera entrance pupil and between the IMU measurement center and the Mount Rotation Center (MRC). This determination is performed by Applanix POSPac MMS® software.

The MRC is the origin of the reference coordinate system used by PosPac MMS.

In order to obtain the 6DOF data for each image, PosPac MMS needs the following lever arms:

- Lever arm from the MRC to the IMU measurement center.
- Lever arm from the MRC to the entrance pupil of each camera.
- Lever arm from the MRC to the antenna.

POSPac MMS performs the following calculations:

Calculation	Lever Arm Inputs	Other Inputs
North-East-Down (NED) coordinates for each image	• Lever arm from the MRC to the antenna. • Lever arm from the MRC to the entrance pupil of each camera.	• Mount angles at time of image capture. • IMU angles at time of image capture.
Omega, phi, kappa angles	• Lever arm from the MRC to the IMU measurement center.	• Mount angles at time of image capture. • IMU angles at time of image capture. • Camera boresight angles to the IMU.

4.4.9.2 Calculating and Entering Lever Arm Values

For an explanation on how to calculate the lever arms, see Appendix B - Calculating Lever Arms.

> **Note**
>
> You must enter the lever arm values in the Applanix GNSS browser UI as described in the GNSS Configuration Guide for PAS Systems.

4.5 Disconnecting the PAS 150MP MK3 in the Office

When you have completed testing the PAS 150MP MK3 in the office:

1. On the operator monitor, shut down Windows.
2. After the power LEDs have turned off, set the mount POWER SWITCH to OFF.
3. On the iX Controller, pull the MAIN circuit breaker out.
4. Power supplies - disconnect from the mains power outlet.
5. If using the GSM 4000 mount: open the main oil valve, wait until the mount returns to the lowest position then close the main oil valve.
6. Power cables - disconnect from the iX Controller and mount.
7. Mount control cable – disconnect from the iX Controller and mount.
8. Pilot and operator monitors - disconnect cables from the monitors and from iX Controller.
9. GPS antenna connection – disconnect.
10. If the single-band or 4-band frame is in the mount, remove it.

5 Installing the PAS 150MP MK3 in the Aircraft

This section describes how to perform a typical system installation in an aircraft.

> **Note**
>
> - The following aircraft installation procedure assumes the system was previously assembled and tested in the office as described in Section 4 - Assembling and Testing the PAS 150MP MK3 in the Office.
> - There are no user serviceable parts inside the PAS 150MP MK3 or iX Controller. All warranties are void if access panels are opened or cables not supplied by Phase One are connected, unless specifically instructed by Phase One personnel.
> - Installation of the PAS 150MP MK3 in an aircraft must be performed by certified personnel while following the relevant Civil Aviation Authority regulations in the country of aircraft registration and operation. A Supplemental Type Certificate or Minor Change may be required.

5.1 Required Tools

The following tools are required to install the system in the aircraft:

- Allen key set.
- Torx key set.
- Screwdriver, Hexagon 2 mm.
- Screwdriver, Hexagon 1.3 mm.
- Standard tools.
- Lens Cleaning Kit.
- Microfiber Cloth, Grey.

5.2 Installing the Trimble AV39 Antenna

> **Note**
>
> - For antenna installation instructions, refer to the Trimble AV39 Antenna Datasheet.
> - Antenna installation and wire routing in the aircraft should be made by an approved aircraft maintenance facility.

1. Install the Trimble AV39 Antenna on the aircraft roof.
2. Lead the antenna cable to the antenna connector in the aircraft cabin.

5.3 Securing the Interface Plate to the Aircraft

> **Note**
>
> Phase One recommends assembling the entire system on an approved interface plate to properly secure the system to the aircraft and isolate the system from aircraft floor sheet metal vibrations.

5.4 Securing the Mount to the Interface Plate

Note

- For complete installation instructions and user care for the CSM 40 or DSM 400, refer to the respective SOMAG manual.
- Make sure that the installation area is free from obstruction by objects.
- It is recommended that at least two people perform the installation procedures.
- Make sure you have allowed sufficient height clearance around the mount location, as described in the relevant SOMAG Manuals.

To secure the mount to the interface plate:

1. Place the mount on the interface plate and with the white arrow at the top of the mount pointing in the direction of the flight.

Note

You may install the SOMAG mount facing the rear of the aircraft, but it requires additional settings and licensing. For more information, contact Phase One Technical Support.

2. Secure the mount to the interface plate using 4 screws and torque as described in the respective SOMAG manual.

Note

- Make sure that the camera(s) does not protrude more than 2 cm cm beyond the aircraft skin.
- For a single band system, you can adjust the camera height by adjusting the single-band frame-mount interface ring position.

5.5 Installing the PAS 150MP MK3 on the Mount

Note

- Make sure that the installation area is free from obstruction by objects.
- The lenses protrude from the bottom of the PAS 150MP MK3. When placing the PAS 150MP MK3 on the ground/into the mount, take extra care that the lenses do not make contact with any objects. Where possible, the lens covers should remain attached to the cameras until it is necessary to remove them. This avoids any damage to the optics, or contamination from dust.
- Although the PAS 150MP MK3 is light enough for installation by a single person, always install with two people to enhance safety.
- Before installing the PAS 150MP MK3 into the mount, make sure that the vibration damping ring is clear of all cables before lowering the PAS 150MP MK3 onto the mount.

Note

If you are installing the PAS 150MP MK3 into a SOMAG GSM 4000 mount, you must install the adapter plate and secure it with 3 x M8-20 screws, as shown in the following figure:

To install the PAS 150MP MK3 on the mount:

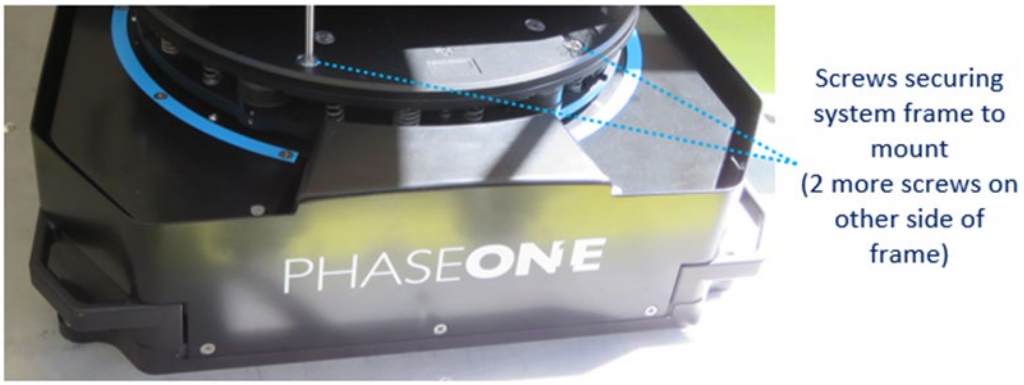
1. Carefully lower the PAS 150MP MK3 into the center cavity while making sure that there is enough vertical space between the camera lenses and the aircraft optical glass hatch.

Warning

For open air camera hatches, make sure the pod does not protrude beyond the aircraft skin.

To secure the PAS 150MP MK3 to the mount:

1. Fasten the PAS 150MP MK3 to the mount using the four M6*16 screws provided.



2. Secure the screws using a maximum torque of 6 Nm.

5.6 Installing the Pilot Monitor

1. Mount the pilot monitor. A suggested method is using a proper mount with a suction cup.

5.7 Installing the Operator Monitor

1. The operator monitor is provided with a device for attaching the monitor to the head rest base. You can use this device or mount it with your own mounting device.

5.8 Connecting a PAS 150MP MK3 and Mount in the Aircraft

5.8.1 Connecting PAS 150MP MK3 Components

1. Verify that all components are connected as follows:
   - For a single-band system, see section 4.1.6 – Connecting a Single-Band System.
   - For a 4-band system, see section 4.2.1 - Connecting a 4-Band System.

5.8.2 Powering the PAS 150MP MK3 and Mount in the Aircraft

Warning

- The iX Controller has been tested and certified for connection to a 28 VDC power supply. Installation on aircraft with other power supplies is not recommended unless special measures are taken to provide the PAS 150MP MK3 with a 28 VDC supply.
- On the aircraft side, a 10 A circuit breaker must be installed on the 28 VDC power supply.
- It is highly recommended to connect the PAS Power cable to the aircraft power supply using a proper connector in accordance with aviation standards.

To connect the PAS 150MP MK3 power supply to the PAS 150MP MK3 and to the mount:

1. Connect the open end of the PAS Power cable to the aircraft power supply as follows:

Caution

Before connecting the power cable to the aircraft power supply, verify voltage polarity.

PAS Power Cable Polarity

Wire	Polarity
Red	+
Black	GND

2. Connect the PAS power cable iX Controller LEMO straight connector to the iX Controller 28 VDC port.
3. Connect the PAS power cable mount LEMO right-angle connector to the mount POWER SOCKET port.

Caution

Verify that no cables are entangled with other cables or equipment.

To power up the PAS 150MP MK3:

1. Once aircraft power is available, set the mount **POWER SWITCH** to **ON**.
2. On the iX Controller, push in the **MAIN** circuit breaker and confirm that the green LED turns on.
3. Wait 10 seconds.
4. On the iX Controller, push in the **AUXILIARY** circuit breaker and confirm that the green LED turns on.

6 Recommended Flight Operation Procedure

1. Follow the recommended flight operation procedure as described in the iX Flight Pro Operation Guide.

7 Post Flight Operations

1. Follow the recommended post flight operations as described in the iX Flight Pro Operation Guide.

8 Shutting Down and Disassembling the PAS 150MP MK3

8.1 Shutting Down the PAS 150MP MK3

> **Warning**
>
> To avoid any damage to the PAS 150MP MK3 when shutting it down, make sure you follow the following procedure.

1. On the operator monitor, shut down Windows.
2. After the power LEDs have turned off, set the mount POWER SWITCH to OFF.
3. On the iX Controller, pull the MAIN circuit breaker out.

8.2 Disassembling the PAS 150MP MK3

1. Power switch on aircraft switches panel - verify off.
2. If using the GSM 4000 mount: open the main oil valve, wait until the mount returns to the lowest position then close the main oil valve.
3. PAS Power cable - disconnect from aircraft power outlet, iX Controller and mount.
4. Mount control cable – disconnect from the iX Controller and mount.
5. Pilot and operator monitors - disconnect cables from monitors and from iX Controller.
6. Remove monitors from aircraft.
7. GPS antenna connection – disconnect from iX Controller.
8. Single or 4-band frame - remove screws securing frame to mount and remove frame from aircraft.
9. Mount – remove screws securing mount to interface plate and remove mount from aircraft.
10. Interface plate - remove screws securing interface plate to aircraft floor and remove interface plate from aircraft.
11. Perform any other changes required to return aircraft to regular approved configuration.

> **Note**
>
> For information on transferring SSDs from the iX Controller to the processing computer, see Appendix C - Data Storage Management.

9 Troubleshooting

9.1 General Faults

The following table details how to troubleshoot general PAS 150MP MK3 faults.

Fault	Probable Cause	Solutions
Camera not ready.	No space on SSD storage.	• Change SSD storage. • Change save location.
Image too dark or too bright.	Incorrect camera settings.	Change camera settings.
All images are black.	Lens cap is still on lens.	Remove lens cap.
iX Flight Pro pilot display “frozen” and GPS icon is red.	iX Flight Pro is not receiving GPS data.	• In iX Flight Pro, check GPS status. **Note** You may need to reset the GPS or remove and reconnect the GPS antenna.
In iX Flight Pro > Preflight Check, the following error appears: Missing GPS in USB: MRXXXXXX – capture number XXXXXX?	1. GNSS antenna disconnected. 2. GNSS configuration incorrect. 3. Camera configuration incorrect.	1. Connect antenna. 2. Refer to GNSS Configuration Guide for PAS Systems for COM2 configuration. 3. In iX Flight Pro > Settings > Camera Settings > Left Terminal, set: ▪ Terminal - GPS ▪ Baud Rate - 115200 ▪ GPS Receiver - Applanix GPS
In iX Flight Pro > Preflight Check, the following error appears: Missing Mount Data in T04	• Configuration error • iX Controller backplane hardware issue.	1. Connect a USB cable between the mount and the iX Controller. 2. Power up the PAS 150MP MK3 and the mount. 3. Open the SOMAG mount management application and verify that it is connected to the mount (mount type and S/N is displayed). 4. In the mount application, go to Setting 2 page and verify that the Aux Port is enabled and that AVX210 is selected. 5. In the mount application, go to the home page, change to **MAN**, move angle sliders to 2 degrees in roll pitch and yaw. 6. Make sure nothing is blocking the system and nobody is close to it and click **Apply**. The mount moves. 7. Open the Applanix GNSS browser UI. 8. Click I/O Configuration > Port Configuration and verify that for **Serial/COM1** port, **GIMBAL** is set to **GIM01**. 9. Click **Receiver Status** > **INS Status** and verify that the gimbal angles are the same as those displayed in the mount application. If the angles displayed are “0”, there is a hardware issue. Contact Phase One Technical Support.

9.2 iX Controller (MK6) Beep POST Codes

The following table lists the iX Controller (MK6) POST (Power On Self-Test) beep codes issued by the motherboard.

POST Beep Code	Description
1	Normal POST, PAS 150MP MK3 is OK.
3	Memory not installed
5	No console output devices found

Appendix A Technical Data

A.1 PAS 150MP MK3 Weight

A.1.1 Single-Band System

Description	Weight
iXM-RS150F camera (excluding lens)	1 kg / 2.2 lb
Single-band frame	0.67 kg/1.5 lb
iX Controller	6.3 kg / 13.9 lb
SOMAG CSM 40 Mount	5.2 kg / 11.5 lb
IMUs: • IMU-69 • IMU-82 with mounting base • IMU-91 with mounting base • IMU-57	 • 0.2 kg / 0.44 lb • 1.02 / 2.25 lb • 1.02 / 2.25 lb • 2.6 kg / 5.73 lb

A.1.2 4-Band System

Description	Weight
iXM-RS150F camera (excluding lens)	1 kg / 2.2 lb
iXM-RS150F achromatic camera (excluding lens)	1 kg / 2.2 lb
4-band frame	5.4 kg/11.9 lb
iX Controller	6.3 kg / 13.9 lb
SOMAG DSM 400 Mount	14 kg / 30.9 lb
IMUs: • IMU-69 • IMU-82 with mounting base • IMU-91 with mounting base • IMU-57	 • 0.2 kg / 0.44 lb • 1.02 / 2.25 lb • 1.02 / 2.25 lb • 2.6 kg / 5.73 lb

A.2 Power Input Specifications

A.2.1 Power Requirements

Parameter	Requirement
Voltage	24 - 32 VDC
Maximum current	10 A

A.2.2 Power Consumption

Power consumption for single and 4-band systems are listed in the following table:

Parameter	Single-Band System	4-Band System
Average power consumption	95 W	106 W
Peak power consumption	150 W	155 W

Appendix B Calculating Lever Arms

B.1 Single-Band System

B.1.1 General

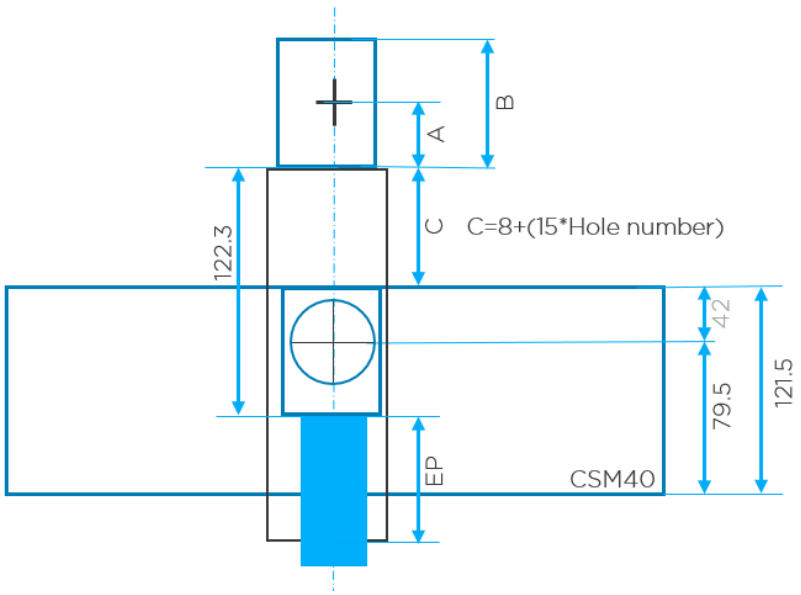
Use the following figure to calculate all three the lever arms for a PAS 150MP MK3 single-band system inserted in a SOMAG CSM 40 mount as follows:

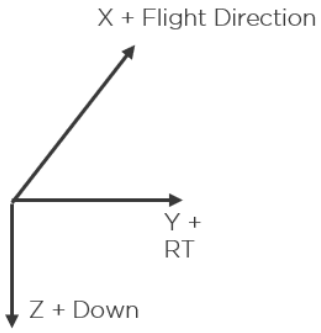
- MRC to IMU measurement center:
  Z [m] =-(42 + C + A) / 1000
- MRC to camera Entrance Pupil:
  Z [m] = (EP + 122.3 – C - 42) / 1000
- MRC to antenna:
  Z [m] = -(IMU hat mark to antenna [mm] + B + C + 42) / 1000

> **Note**
>
> - For IMU 69/91/82: EP and IMU are aligned at X=Y=0
> - For IMU 57: check X and Y offsets on the unit, as shown in the following figure.

Arms Lever Calculation

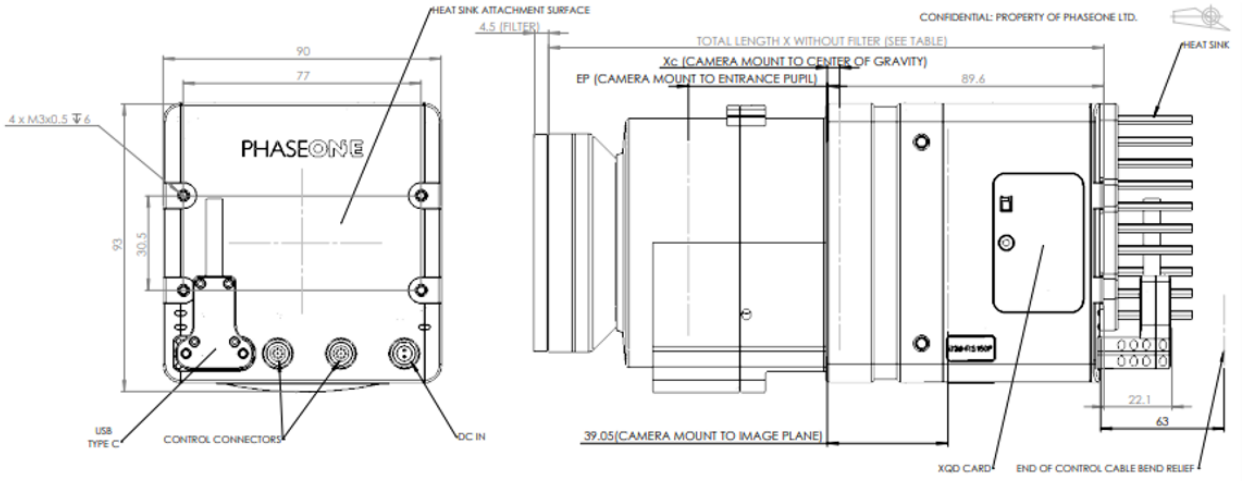
IMU Type	A (mm)	B (mm)
69	11.5	28
57	64	127
82	50.7	108
91	50.7	108

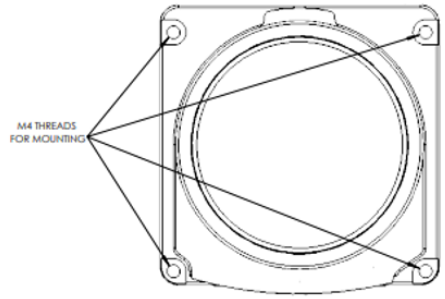




AEe!

B.1.2 EP Values for Different Lenses





LENS	TOTAL LENGTH X	Xc (CAMERA MOUNT TO CENTER OF GRAVITY)	EP (CAMERA MOUNT TO ENTRANCE PUPIL)	FILTER THREAD
28mm	173	3mm	54.35mm	M72x0.75
32mm	186	-3mm	66.65mm	M86x1
40mm	174.5	8mm	55.05mm	M67x0.75
50mm	181	3mm	60.25mm	M67x0.75
70mm	179	8mm	51.35mm	M58x0.75
90mm	224	-24mm	91.75mm	M72x1
110mm	184	1mm	37.1mm	M58x0.75
150mm	196	-1mm	29.4mm	M58x0.75
150mm MK II	257	-33mm	26.3mm	M86x1
180mm	283		134.65mm	M67x0.75

PHASEONE

Date: 03/06/2019 Product change

Signature: Zach Nahum MILLIMETERS UNLESS SPECIFIED

iXM-RS150F/100F CAMERA

SCALE 1:1

B.2 4-Band System

B.2.1 SOMAG DSM 400 Mount

B.2.1.1 General

Use the following table and the figures in this section to calculate all three the lever arms for a PAS 150MP MK3 4-band system inserted in a SOMAG DSM 400 mount.

> **Note**
>
> For the MRC to camera EP values, the following tables provide values for all three possible camera positions.

IMU-91/IMU-82

Lever Arm	X (meters)	Y (meters)	Z (meters)
MRC to IMU Navigation Center	-0.014	0.0935	-0.2681 (as calculated by Equation 1)
MRC to IMU hat mark	0	0.0935	-0.3254
MRC to antenna	X [m] = X[hat mark to antenna] + X[MRC to IMU hat mark]	Y [m] = Y[hat mark to antenna] + Y[MRC to IMU hat mark]	Use Equation 2
MRC to Left Camera EP	-0.026	-0.0517	Use Equation 3
MRC to Right Camera EP	-0.026	+0.0517	Use Equation 3
MRC to Forward Camera EP	+0.7925	0	Use Equation 4

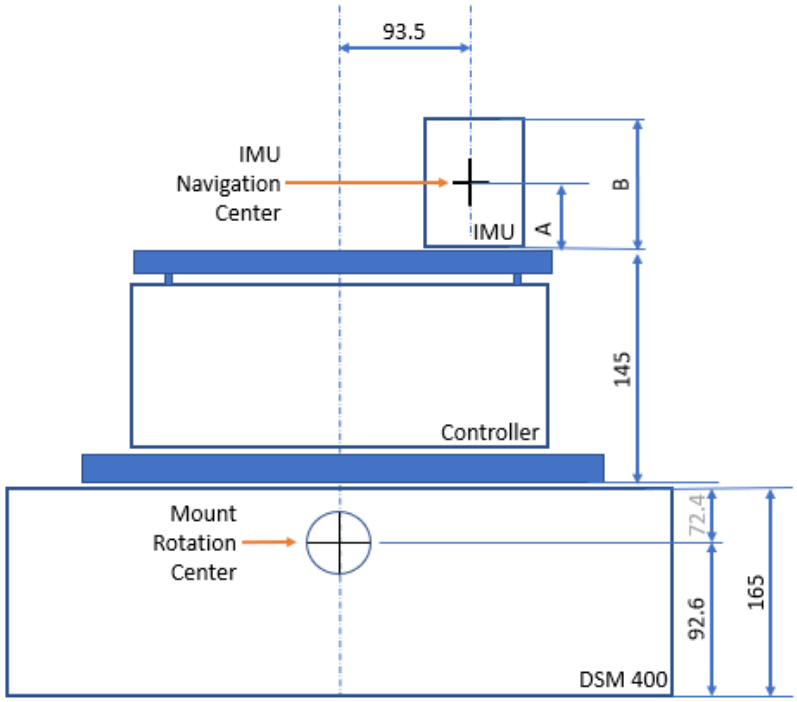
IMU-57

Lever Arm	X (meters)	Y (meters)	Z (meters)
MRC to IMU Navigation Center	-0.014	0.835	0.2814 (as calculated by Equation 1)
MRC to IMU Hat Mark	0	0.935	0.3444
MRC to antenna	X [m] = X[hat mark to antenna] + X[MRC to IMU Hat Mark]	Y [m] = Y[hat mark to antenna] + Y[MRC to IMU Hat Mark]	Use Equation 2
MRC to Left Camera EP	-0.026	-0.0517	Use Equation 3
MRC to Right Camera EP	-0.026	+0.0517	Use Equation 3
MRC to Forward Camera EP	+0.7925	0	Use Equation 4

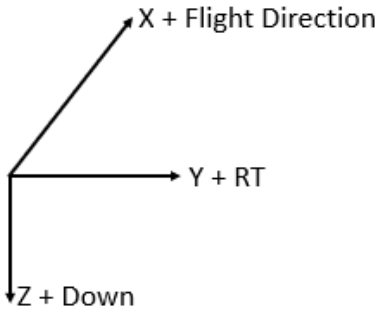
B.2.1.2 MRC Values (Z) to IMU and Antenna

Equation 1 - MRC Values to IMU Measurement Center:
Z [m] = -(72.4 + 145 + A) / 1000

Equation 2 - MRC Values to antenna:
Z [m] = -(IMU hat mark to antenna (mm) + B + 145 + 72.4) / 1000



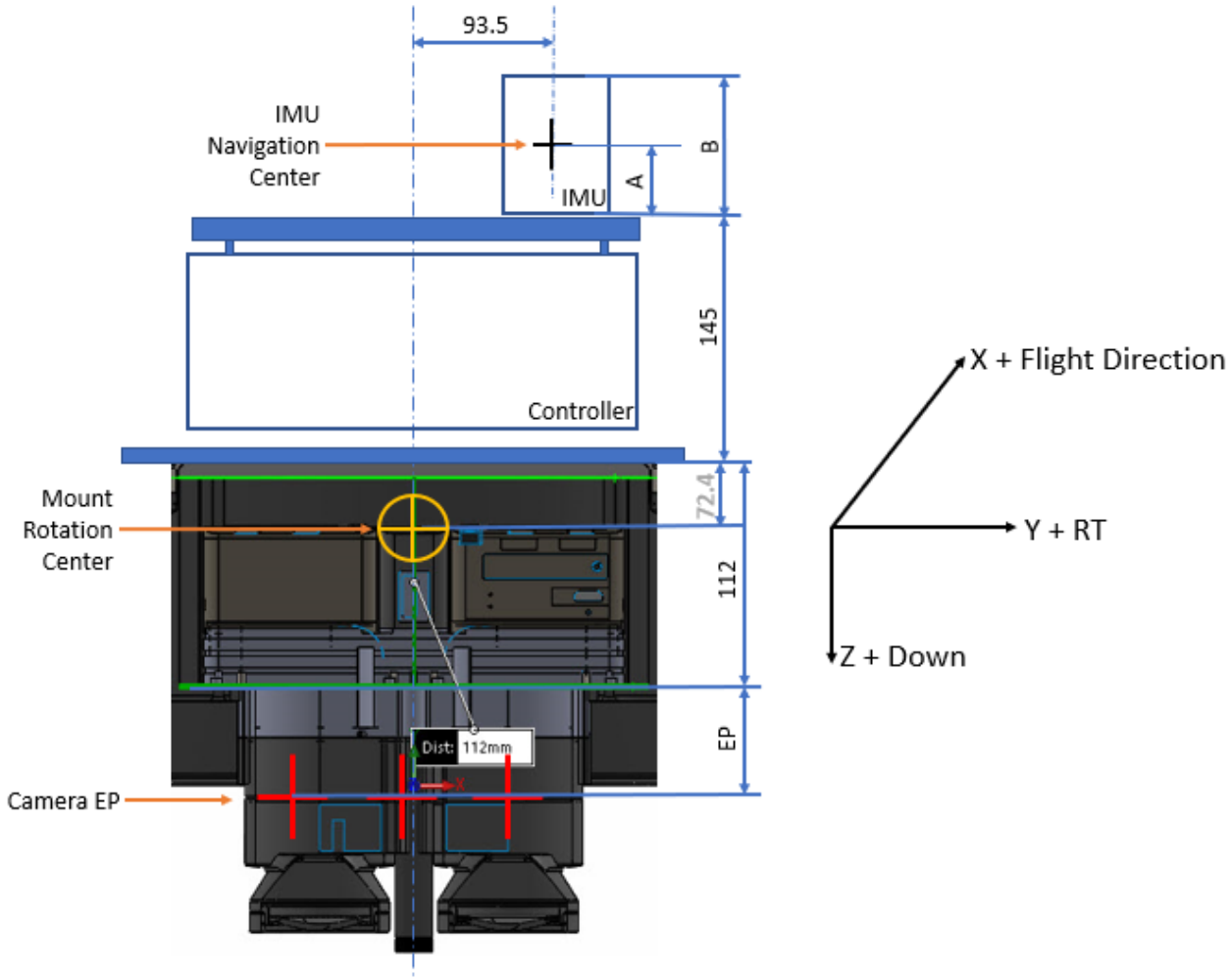
IMU Type	A (mm)	B (mm)
57	64	127
82	50.7	108
91	50.7	108



B.2.1.3 MRC Values (Z) to Cameras

Equation 3 - MRC Values to RGB EP:
Z [m] = -(72.4 + 145 + A) / 1000

Equation 4 - MRC Values to NIR EP:
Z [m] = -(IMU hat mark to antenna (mm) + B + 145 + 72.4) / 1000



B.2.2 SOMAG GSM 4000 Mount

B.2.2.1 General

Use the following table and the figures in this section to calculate all three the lever arms for a PAS 150MP MK3 4-band system inserted in a SOMAG GSM 4000 mount.

> **Note**
>
> For the MRC to camera EP values, the following tables provide values for all three possible camera positions.

IMU-91/IMU-82

Lever Arm	X (meters)	Y (meters)	Z (meters)
MRC to IMU navigation center	0	0.0935	-0.2368 as calculated by Equation 5)
MRC to IMU hat mark	0	0.0935	0.2941
MRC to antenna	X [m] = X[hat mark to antenna] + X[MRC to IMU hat mark]	Y [m] = Y[hat mark to antenna] + Y[MRC to IMU hat mark]	Equation 6
MRC to Left Camera EP	-0.026	-0.0517	Use Equation 7
MRC to Right Camera EP	-0.026	+0.0517	Use Equation 7
MRC to Forward Camera EP	+0.7925	0	Use Equation 8

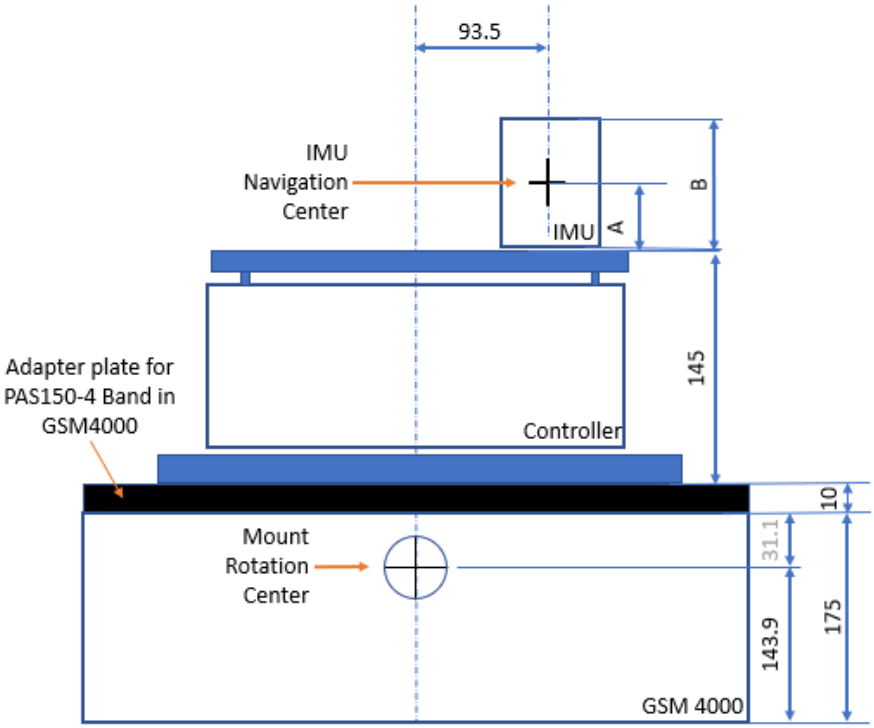
IMU-57

Lever Arm	X (meters)	Y (meters)	Z (meters)
MRC to IMU navigation center	-0.014	0.835	0.2501 as calculated by Equation 5
MRC to IMU hat mark	0	0.935	0.3131
MRC to antenna	X [m] = X[hat mark to antenna] + X[MRC to IMU hat mark]	Y [m] = Y[hat mark to antenna] + Y[MRC to IMU hat mark]	Equation 6
MRC to Left Camera EP	-0.026	-0.0517	Use Equation 7
MRC to Right Camera EP	-0.026	+0.0517	Use Equation 7
MRC to Forward Camera EP	+0.7925	0	Use Equation 8

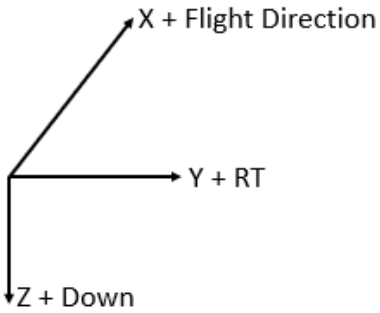
B.2.2.2 MRC Values (Z) to IMU and Antenna

Equation 5 - MRC Values to IMU Measurement Center:
Z [m] = -(31.1 + 10 + 145 + A) / 1000

Equation 6 - MRC Values to Antenna:
Z [m] = -(IMU hat mark to antenna [mm] + B + 145 + 10 + 31.1) / 1000



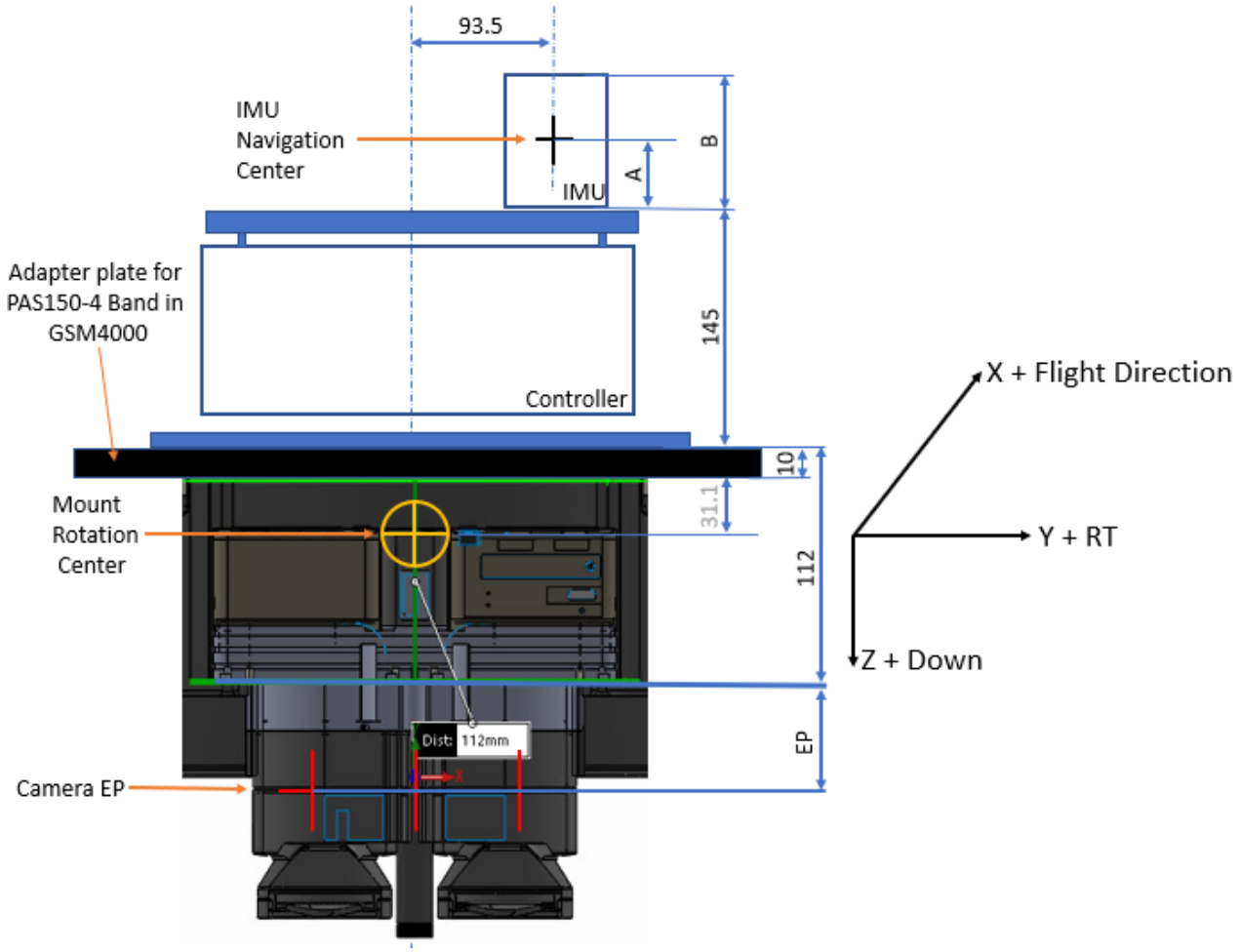
IMU Type	A (mm)	B (mm)
57	64	127
82	50.7	108
91	50.7	108



B.2.2.3 MRC Values (Z) to Cameras

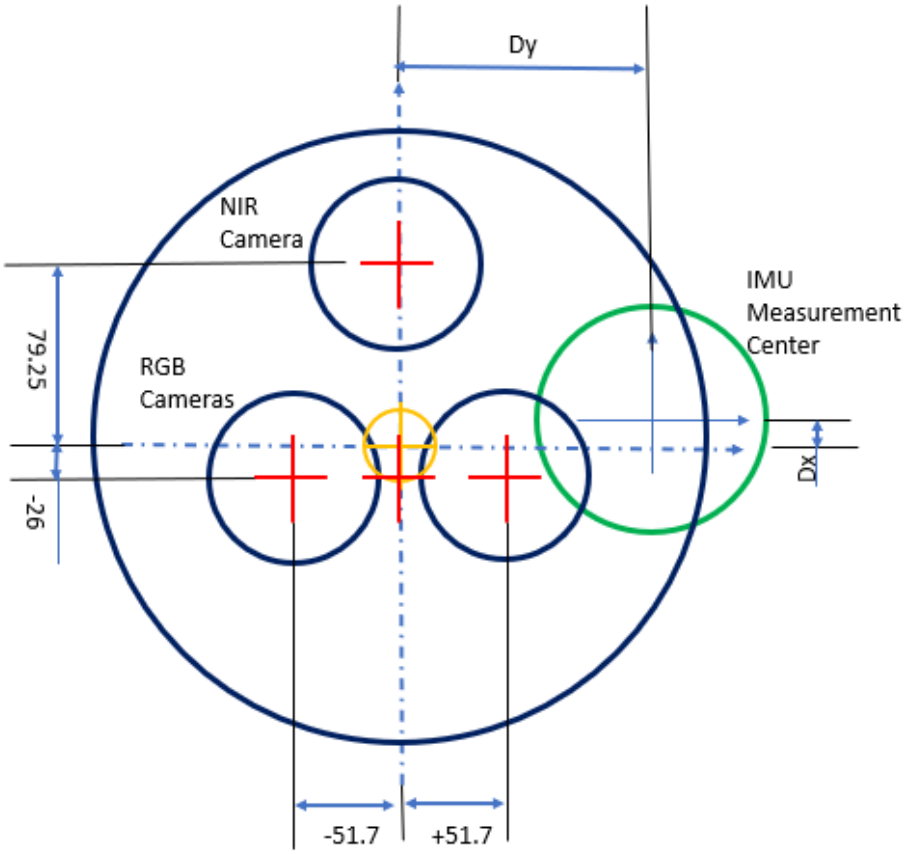
Equation 7 - MRC Values to RGB EP:
Z [m] = (EP{RGB} + 112 – 10 - 31.1) / 1000

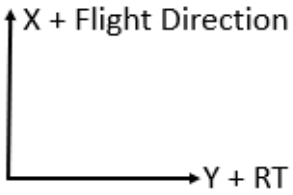
Equation 8 - MRC Values to NIR EP:
Z [m] = (EP{NIR} + 112 – 10 - 31.1) / 1000



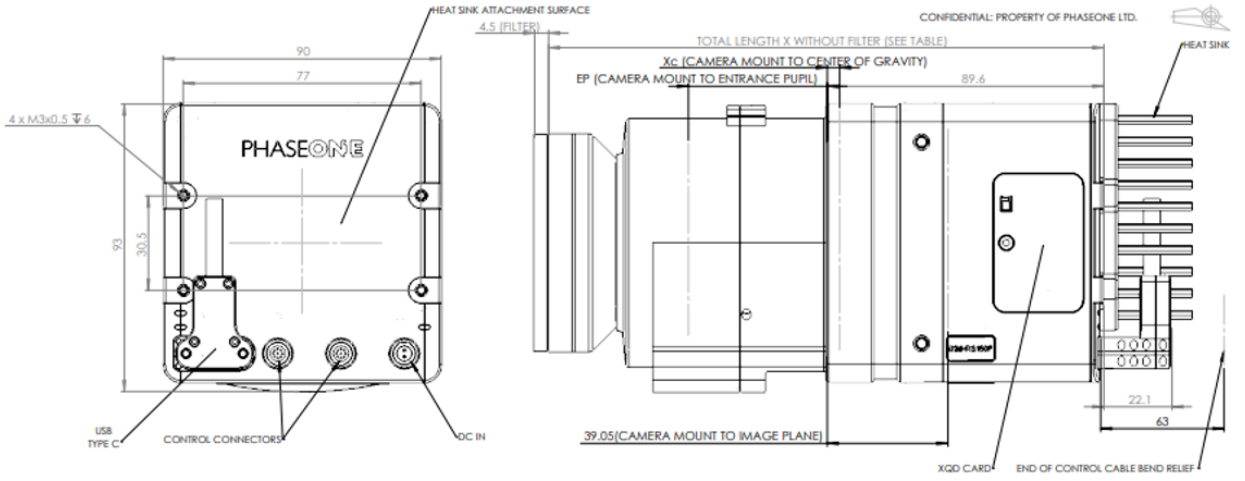
B.2.3 GSM 4000/DSM 400 MRC X and Y Values

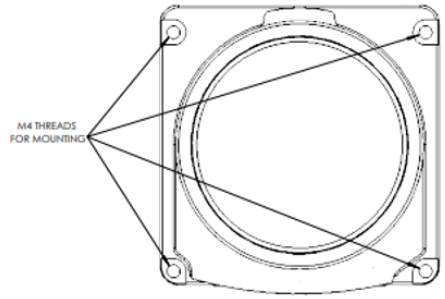
IMU Type	Dy (mm)	Dx (mm)
57	83.5	-14
82	93.5	0
91	93.5	0





B.2.4 EP Values for Different Lenses





LENS	TOTAL LENGTH X	Xc (CAMERA MOUNT TO CENTER OF GRAVITY)	EP (CAMERA MOUNT TO ENTRANCE PUPIL)	FILTER THREAD
28mm	173	3mm	54.35mm	M72x0.75
32mm	186	-3mm	66.65mm	M86x1
40mm	174.5	8mm	55.05mm	M67x0.75
50mm	181	3mm	60.25mm	M67x0.75
70mm	179	8mm	51.35mm	M58x0.75
90mm	224	-24mm	91.75mm	M72x1
110mm	184	1mm	37.1mm	M58x0.75
150mm	196	-1mm	29.4mm	M58x0.75
150mm MK II	257	-33mm	26.3mm	M86x1
180mm	283		134.65mm	M67x0.75

PHASEONE

Date: 03/06/2019 Product change

Signature: Zach Nahum MILLIMETERS UNLESS SPECIFIED

iXM-RS150F/100F CAMERA

SCALE 1:1

Appendix C Data Storage Management

C.1 Disk Management

The PAS 150MP MK3 storage consists of a built-in frame with a removable carrier containing two SSD drives. The drives store the images captured by cameras connected to the PAS 150MP MK3.

The carrier front panel contains the following LEDs:

LED	Color	State	Description
Drive power	Green	Solid	The drive is powered on.
Drive activity	Amber	Blinking	The drive is being accessed by the PAS 150MP MK3.

The drives are assigned the following drive letters:

- D - top drive
- E - bottom drive

> **Note**
>
> For information on transferring data from the SSDs to the processing computer, see the iX Process Operations Guide.

C.2 Locking the Carrier

> **Note**
>
> The carrier must be locked with the SSD carrier key for the PAS 150MP MK3 to recognize the drives.

To lock the carrier in the SSD drive bay frame:

> **Note**
>
> The SSD carrier key is stored on the left side of the PAS 150MP MK3 front panel.

1. Insert the SSD carrier key into the SSD carrier keylock and turn it 90° clockwise. The yellow and green SSD drive LEDs turn on momentarily and the green LED remains on.

An additional frame is provided with the PAS 150MP MK3. This frame should be installed in the computer used for post-flight processing. You can then transfer the carrier with its SSD drives between the PAS 150MP MK3 and the processing computer.

> **Note**
>
> Additional carriers (with or without SSD drives) with SATA or USB 3 based frames can be ordered through your Phase One sales representative.

C.3 Removing the SSD Drive Carrier

To remove the SSD drive carrier from the iX Controller:

1. On the operator monitor, shut down Windows.
2. On the iX Controller, pull the **MAIN** circuit breaker out.
3. Insert the SSD carrier key into the SSD carrier keylock and turn it 90° counterclockwise.
4. Push in the SSD carrier eject button once to release the button, and again to eject the carrier from the frame.
5. Gently remove the SSD carrier from the iX Controller.

C.4 Inserting the SSD Drive Carrier

To insert the SSD drive carrier into the iX Controller:

1. On the operator monitor, shut down Windows.
2. On the iX Controller, pull the **MAIN** circuit breaker out.
3. If the SSD carrier eject button is protruding, push it all the way in.
4. Gently insert the SSD carrier into the iX Controller.
5. Insert the SSD carrier key into the SSD carrier keylock and turn it 90° clockwise.
6. Power up the iX Controller by pushing in the **MAIN** circuit breaker.
7. Verify that the green SSD drive LED turns on.

C.5 Replacing SSD Drives

The iX Controller is factory provided with 2 x 2TB or 2 x 4TB SSD drives installed in a removable carrier.

You can replace the SSDs as required. To achieve optimal performance, both SSDs should have a high writing speed (>500 MB/S). Drive capacities can be different.

To replace the SSD drives:

1. On the operator monitor, shut down Windows.
2. On the iX Controller, pull the MAIN circuit breaker out.
3. Remove the carrier from the iX Controller (see Appendix C.3 - Removing the SSD Drive Carrier).
4. Remove both cover screws at the rear of the carrier.

5. Slide the carrier out from the carrier cover.

6. Remove all screws securing the SSD drives to the carrier.

7. Replace the SSD(s) in the carrier.
8. Secure the SSD(s) to the carrier.
9. Slide the cover back on to the carrier and secure it with the cover screws.
10. Insert the carrier into the iX Controller.

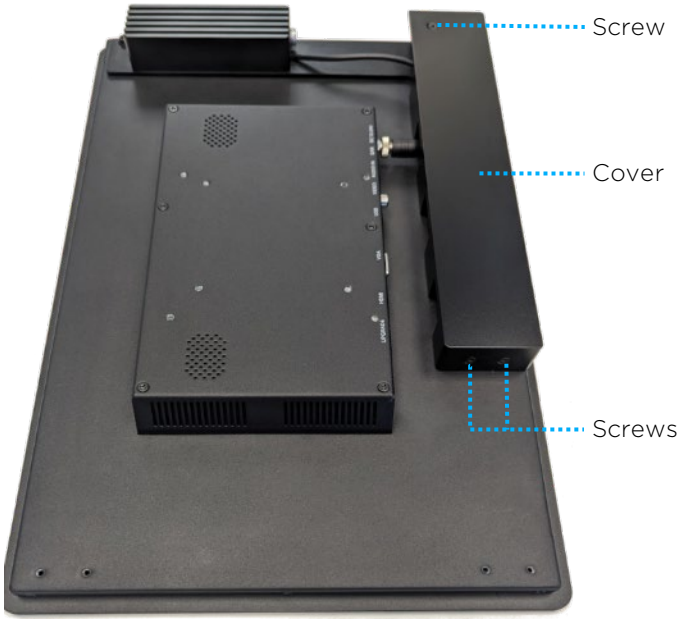
Appendix D Connecting the PAS 150MP MK3 – Operator Monitor Cable to the Monitor

> **Note**
>
> If the operator monitor cable is not connected to the operator monitor, perform the procedure in this appendix.

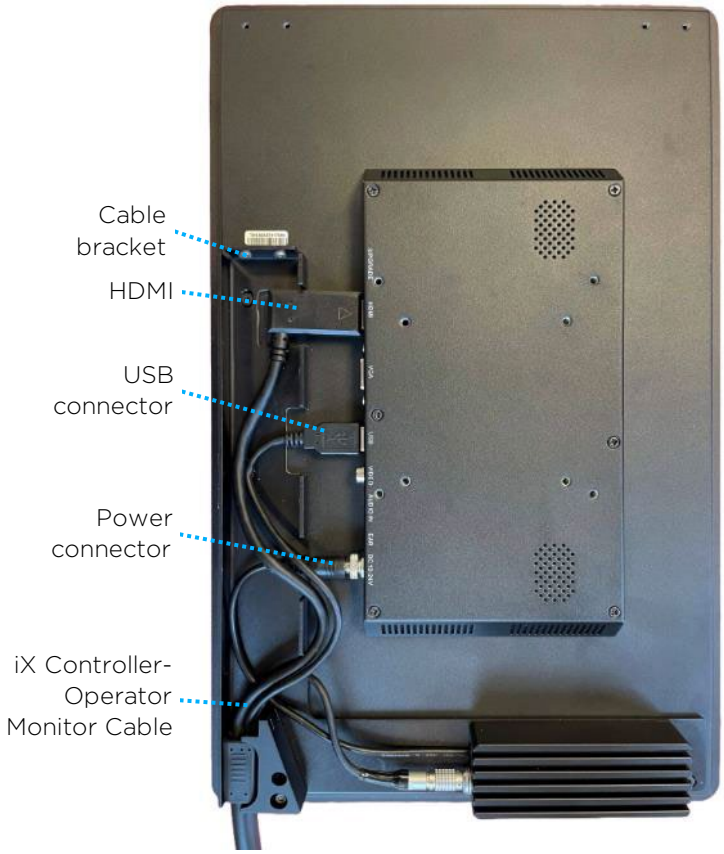
The PAS 150MP MK3 – Operator Monitor Cable is connected to the operator monitor through the cable bracket on the rear of the monitor.

To connect the PAS 150MP MK3 – Operator Monitor Cable to the operator monitor:

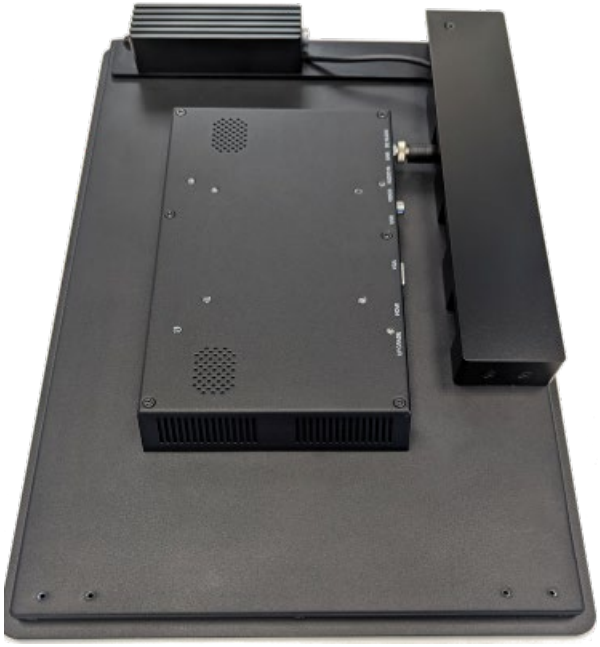
1. Locate the cable bracket on the rear panel of the operator monitor.
2. Using a 2 mm Allen key, remove all three screws securing the cover to the cable bracket.
3. Remove the cover.



4. Insert the iX Controller - Operator Monitor cable into the cable bracket and connect the following connectors:
   - HDMI
   - USB
   - Power



5. Place the cover on the housing.
6. Replace the three screws securing the cover to the cable bracket as follows:
   a. Place a drop of Loctite 222 on the screw thread and insert the screw in position.
   b. Tighten the screw with a torque of 60 cNm.



Appendix E Declarations of Conformity

E.1 iX Controller MK 6

PHASEONE

EU Declaration of Conformity

Phase One A/S issues this Declaration of Conformity under our sole responsibility, covering the following product(s):

Product: Phase One iX Controller
Manufacturer: Phase One A/S
Models: Phase One iX Controller mk 6
Phase One iX Controller mk 6 OEM

The product is in conformity with the following standards and/or other normative documents:

EMC: EN 61000-6-3:2020, EN 61000-6-1:2019
EN 55035:2017 + A1:2015, EN 55032:2015

FCC CFR 47 Part 15:2017 subpart B, class A
ANSI C63.4:2014
ICES-003:2020 issue 7
CISPR 32, AS/NZS CISPR 32:2012
VCCI Technical Requirements, V-3/2016.11

Environmental:
RTCA/DO-160G Environmental Conditions and Test Procedures for Airborne Equipment

RoHS: Article 4 (1)

Technical Documentation relevant to the product is available from:

Phase One, Roskildevej 39, DK-2000 Frederiksberg, Denmark

Frederiksberg, Denmark, March 14, 2024

Morten Bruun-Larsen

VP R&D and Quality

Phase One A/S ♦ Roskildevej 39, DK-2000 Frederiksberg, Denmark
Tel: (45) 36 46 0111 ♦ Website: geospatial.phaseone.com ♦ E-mail: geospatial@phaseone.com

E.2 iXM-RS150F Camera

PHASEONE

EU Declaration of Conformity

This declaration of conformity is issued under our sole responsibility and belongs to the following product(s):

Product: Phase One iXM-RS camera
Trade Name: Phase One A/S
Model: Phase One iXM-RS150F

The product is in conformity with the following standards and/or other normative documents:

EMC: EN 61000-6-3:2007 + EN 61000-6-1:2007,
EN 55024:2010 + A1:2015, EN 55032:2012/AC:2013

Other (voluntary specs):
EMC: FCC CFR 47 Part 15 Subpart B
ANSI C63.4:2014
Industry Canada ICES-003:06
VCCI Technical Requirements, V-3/2016

RoHS: Article 4(1)

DO160G RTCA/DO-160G: sections 4.5.1-4.5.4
Operating range: -10C to 40C
Ground survival: -55C to 85C,
4.6.1 (B4)
5.3.1
6 (B)
7.2.1 (B),
8.2.1.1, 8.5.2 – Category S, Curve M

MTBF: 20,000 Hours

Technical Documentation relevant to the product described above is held by:
Phase One, Roskildevej 39, DK-2000 Frederiksberg, Denmark

Frederiksberg, Denmark, 7-2022

d. meler

Dedi Meler / Compliance Specialist

Phase One A/S ♦ Roskildevej 39, DK-2000 Frederiksberg, Denmark
Tel: (45) 36 46 0111 ♦ Website: industrial.phaseone.com ♦ E-mail: industrial@phaseone.com

E.3 iXM-RS150F Achromatic Camera

PHASEONE

EU Declaration of Conformity

This declaration of conformity is issued under our sole responsibility and belongs to the following product(s):

Product: Phase One iXM-RS camera
Trade Name: Phase One A/S
Model: Phase One iXM-RS150F Achromatic

The product is in conformity with the following standards and/or other normative documents:

EMC: EN 61000-6-3:2007 + EN 61000-6-1:2007,
EN 55024:2010 + A1:2015, EN 55032:2012/AC:2013

Other (voluntary specs):
EMC: FCC CFR 47 Part 15 Subpart B
ANSI C63.4:2014
Industry Canada ICES-003:06
VCCI Technical Requirements, V-3/2016

RoHS: Article 4(1)

DO160G RTCA/DO-160G: sections 4.5.1-4.5.4
Operating range: -10C to 40C
Ground survival: -55C to 85C,
4.6.1 (B4)
5.3.1
6 (B)
7.2.1 (B),
8.2.1.1, 8.5.2 – Category S, Curve M

MTBF: 20,000 Hours

Technical Documentation relevant to the product described above is held by:
Phase One, Roskildevej 39, DK-2000 Frederiksberg, Denmark

Frederiksberg, Denmark, 7-2022

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