MRMC

MARK ROBERTS MOTION CONTROL

SFH-50 HEAD

QUICK START GUIDE

QSG Product Code: MRMC-1166-02
Products Covered: MRMC-1483-00, MRMC-1132-01

CRANES AND RIGS | BROADCAST | HEADS & DSLR | PRODUCT PHOTOGRAPHY | RENTALS

SFH-50 Quick Start Guide

Contents

Chapter 1 **Quick Start**

Safety

- Do not use around flammable gas. All electrical equipment can generate sparks that can ignite flammable gas.

- The head has powerful motors that can pinch, so take care not to get your hands trapped in the head or cabling.

- Keep the equipment dry. The system has **not** been made weatherproof. Do not use with wet hands.

- Keep cables tidy. Use cable ties to keep them out of harm's way. If you have a head with slip rings then make use of them; avoid running any cables between the base and the rotating head or camera.

Overview

Thank you for using the SFH-50 robotic camera head from Mark Roberts Motion Control (MRMC). The SFH-50 head is designed for reliable day-in, day-out use in professional studio environments. The versatility of the SFH-50 makes it suitable for live action, stills, and time-lapse applications.

You can connect your SFH-50 to any MRMC controller, such as a PC running Flair Motion Control Software or one of the MSA-based controllers such the Large Flat Panel (LFP), MSA-20 Handwheels, Joystick Controller, or Mini MSA.

Setting up the hardware

1. Mount the SFH-50 head onto your choice of support, such as a heavy-duty tripod or metal plate. The head can be over-slung (sitting on a tripod or platform) or under-slung (hanging from its mount).

   Further details about mounting specifications are described in Appendix 3 *Specifications*.

   SFH-50 with Support Arm:

   Over-slung   Under-slung

SFH-50 with Roll Ring:

Over-slung on a tripod

Under-slung from a scaffolding plate. For details see page 45.

Roll
180°

Cable
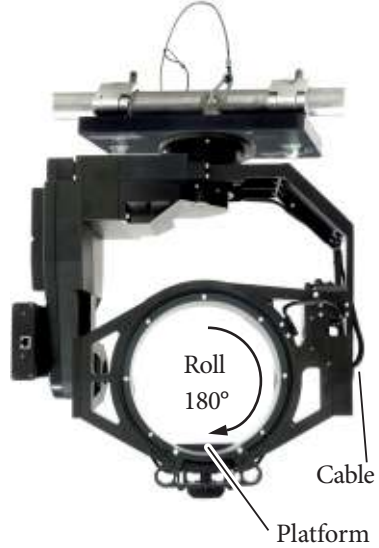
Platform

Hint

If your SFH-50 has a Roll Ring and you use under-slung mounting, move the camera platform to the bottom (lowermost) position by manually rotating the Roll Ring 180°. Do not move the camera platform to the bottom by inverting the Tilt, as doing this will twist the Roll motor cable that goes through the Tilt axle.

2. Adjust the height of the camera platform relative to the head, so that the camera lens will be at the same height as the Tilt axis (and centred in the optional Roll Ring) when the camera is mounted later. **Do not adjust the platform height when a camera is mounted.**

To adjust the height on an SFH-50 with a Support Arm, loosen the five retaining bolts that hold the camera platform in place (one on the Support Arm, then four on the main platform arm), turn the two height adjustment bolts to achieve the platform height you want, then re-tighten the five retaining bolts.
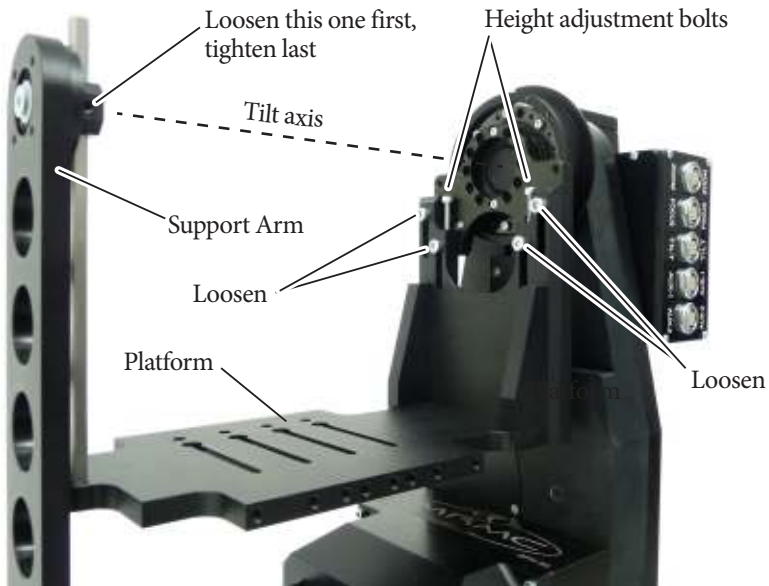
To adjust the height on an SFH-50 with a Roll Ring, loosen the six retaining bolts that hold the camera platform in place (four in the rear, two in the front), turn the height adjustment bolt to achieve the platform height you want, then re-tighten the six retaining bolts.

Rear view:

Loosen

Loosen

Platform

Front view:

Loosen

Loosen

Height adjustment bolt
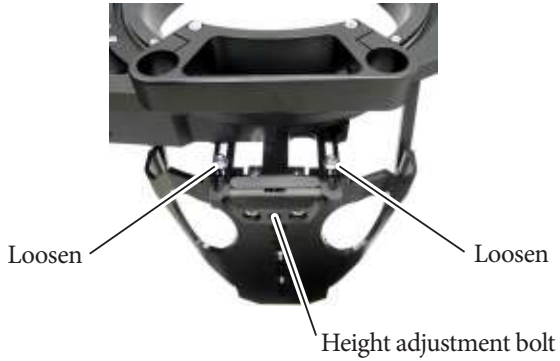
3.   If you are using external Lens Control Motors (LCMs) mounted on the head, bolt the mounting rods onto the head, then mount the LCMs onto the rods in approximately the correct position. You can fine-tune the position later.

SFH-50 with Support Arm:

Mounting rods

LCM: Focus

LCM: Zoom

SFH-50 with Roll Ring:

LCM: Focus

Mounting
rods

LCM: Zoom
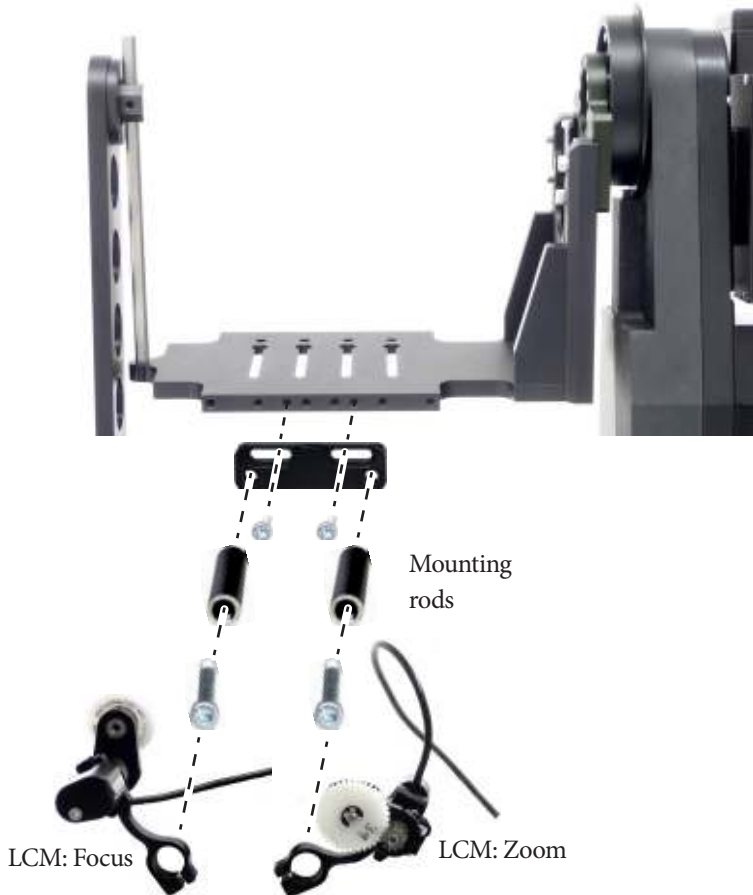
4. Place the camera on the platform, move the camera forward or backward to balance the platform in Tilt, then insert the camera mounting bolts under the platform and into the bottom of the camera housing and tighten firmly.

    SFH-50 with Support Arm:

    SFH-50 with Roll Ring:

You normally mount the camera with the lens pointing through the Roll Ring, but you can mount it backwards (pointing away from the ring) if you want.

5.   If you are using head-mounted Lens Control Motors (LCMs), adjust their position on the rods so that the LCM gears mesh firmly with the lens gears.

Connecting the cables

Quad-box example, for an SFH-50 head with stepper motors

Attach the power cables last.

Quad-box
Front

Quad-box
Rear

**POWER
18-36V**

#3 ROLL

#2 TILT

#1 PAN

ETHERNET

Example controller:
MSA-20 Handwheels

24V 5A

The head and
controller both use
the same type of
power supply brick.
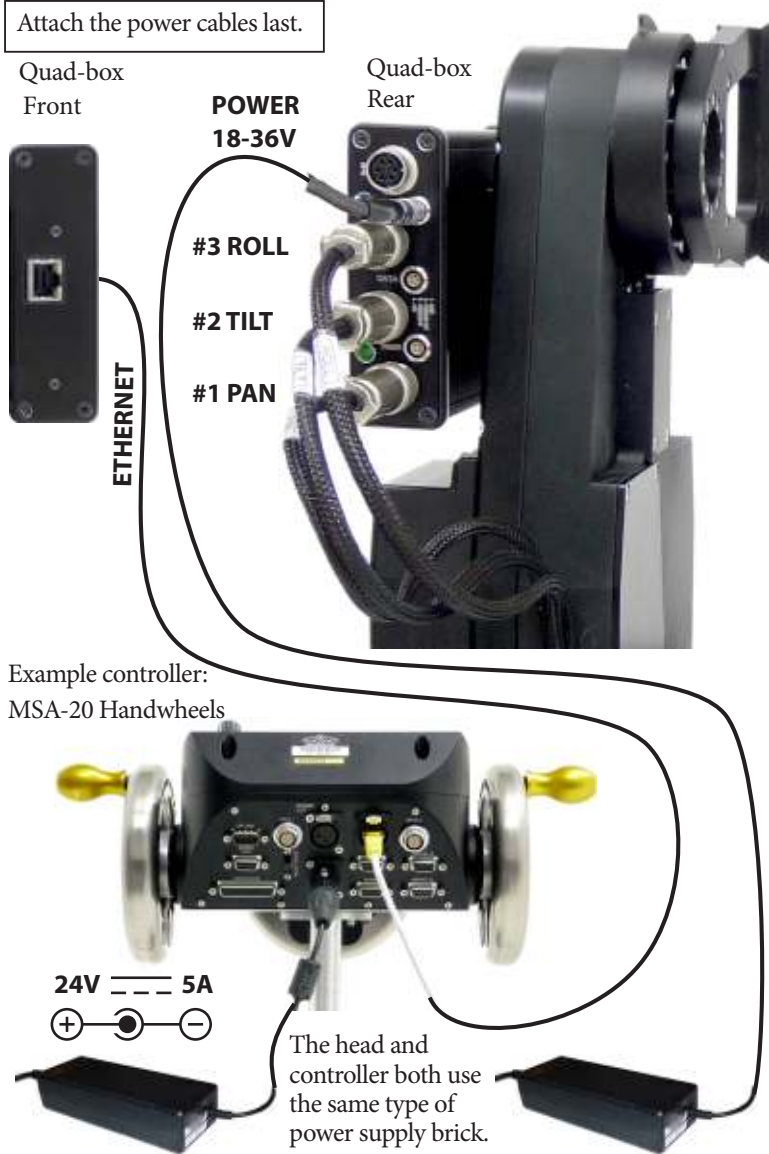
Connectors **#1**-**#4** on the Quad-box are identical and can be used for any stepper motors. The diagram shows a typical application. Attach the power cables last.

The controller can be any MRMC controller such as a PC running Flair Motion Control Software or one of the MSA-based controllers such the Large Flat Panel (LFP), MSA-20 Handwheels, Joystick Controller, or Mini MSA.

Hint

If you use a dedicated controller that has a **POWER OUT** socket, you should **not** use this socket to power the head if you are using Ethernet to connect the head to the controller. If you do so then powering up the controller will simultaneously power up the head, and in this case powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

Ulti-box example, for an SFH-50 head with servo motors

Attach the power cables last.

Ulti-box
Front

Ulti-box
Rear

ETHERNET

TILT

POWER

PAN

PAN

TILT
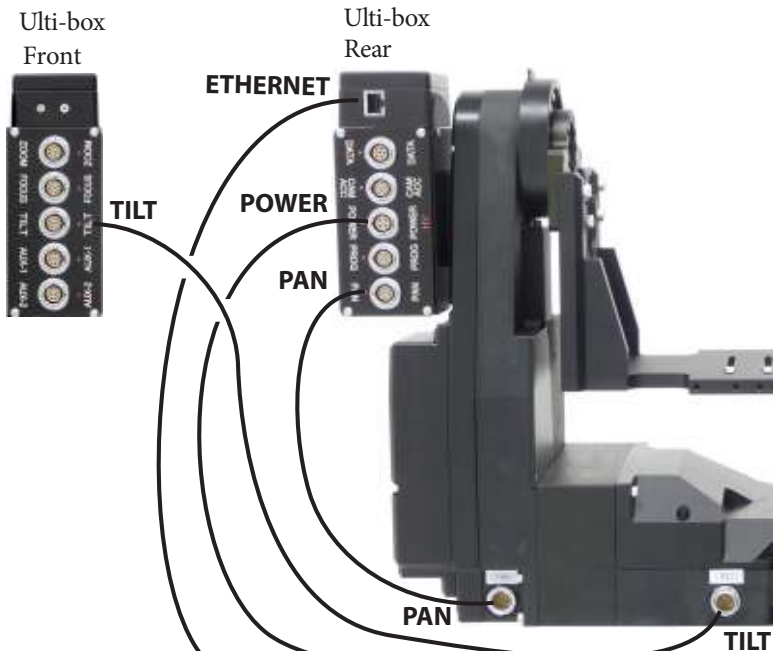
Example:
MSA-20 Handwheels
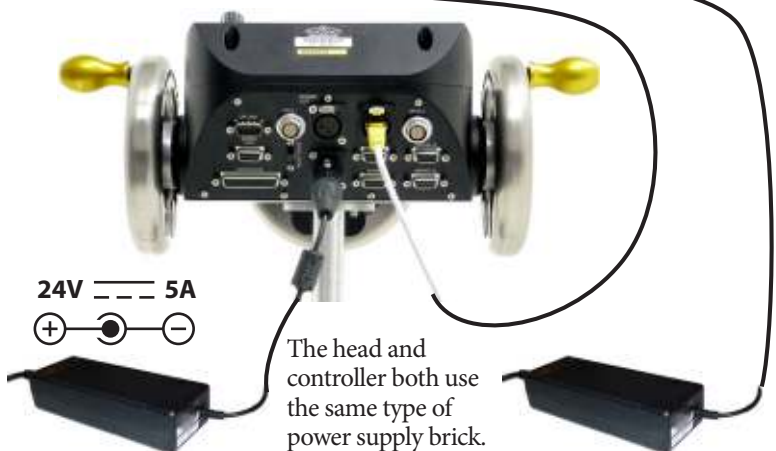
24V 5A

The head and
controller both use
the same type of
power supply brick.

The controller can be any MRMC controller such as a PC running Flair Motion Control Software or one of the MSA-based controllers such the Large Flat Panel (LFP), MSA-20 Handwheels, Joystick Controller, or Mini MSA.

Hint

If you use a dedicated controller that has a **POWER OUT** socket, you should **not** use this socket to power the head if you are using Ethernet to connect the head to the controller. If you do so then powering up the controller will simultaneously power up the head, and in this case powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

# Your first session

Instructions for using the SFH-50 head with a specific controller, or with Flair Motion Control Software running on a PC, are beyond the scope of this manual. The first time you use the head you typically need to perform the steps given below. Refer to the manual that came with your controller or software for details.

1. Attach the power cables to the head and controller.

    There is no power switch on the SFH-50 head; the power is on whenever the 24-volt power supply is attached and live. After you have attached the power cable, make sure the power indicator LED on the head lights up.

    Power LED

    > **Hint**
    >
    > It is a good idea to attach the power cables last, after all the other cables are in place.
    >
    > It is also recommended that you power up the controller last, after powering up the head if you are using Ethernet to connect the head to the controller, as powering up two devices simultaneously on the same Ethernet network can cause communication problems.

    Similarly, to turn off the head you simply remove the power cable. All MRMC controllers and heads have robust electronics that are designed to withstand the rigours of connection and disconnection to live power cables.

2. Load the head.

    The head does not retain any operating system when it is switched off, so when you turn on the head you must load the head operating system from the attached controller or PC.

    For example to load the head from an MSA-based controller from MRMC (such as the LFP, MSA-20 Handwheels, Joystick Controller, or Mini MSA) you press the **SELECT** knob on the controller when prompted to do so. Different head models and controller-head connection methods use different operating systems, so be sure that the operating system that you load from your controller is the

correct one for your particular SFH-50 head model and connection method.

3.   Set the control directions.

In your controller or software you need to specify the directions of the focus, zoom and joystick/handwheel controls for your particular head, lens gearing attachments, and preference. For example, some people prefer the camera to point upward when the joystick is pulled back, while others prefer the opposite logic whereby pushing forward ("up") on the joystick targets the camera upward in the scene.

For example to set the control directions on an LFP controller you use the menu option `SET DIRECTION`. On the MSA-20 Handwheels, Joystick Controller, or Mini MSA you can use the same menu option or use the **FWD** and **REV** hardware switches.

4.   Zero the axes.

At the beginning of each session, after loading the head, you need to **zero the axes**. This defines a base position at which all head positions and lens settings are set to zero (0) in the controller or software. All limits, lens controls, preset positions, and moves that are stored in the controller or software are measured relative to this base position. The zero points themselves are not stored in the head or lens when the power is off, so you need to define them at the start of each session, by zeroing the axes. Controllers usually offer two different ways to zero the axes: an **automatic** method and a **manual** method:

- In the **automatic** method (sometimes called **homing**), the controller physically moves the axes to the home positions that are built into the hardware (if your head has the optional homing facility) and then assigns these positions as the zero points for the axes. For example to automatically zero the axes with an MSA-based controller (such as the LFP, MSA-20 Handwheels, Joystick Controller, or Mini MSA) you can go into film mode and use the menu option `HOME AXES` > `ALL AXES`.

- In the **manual** method (sometimes called **direct zeroing**) you use the controls to point the camera head in the direction that you want to use as the zero position for the head axes and then manually set the current axes positions as the zero points. For

example to directly set the current axes positions as the zero points on an MSA-based controller you use the menu option `DIRECT ZERO ALL`.

Hints

If you plan on having several manually zeroed sessions at the same site then you should pick an object in the camera's field of view that you can use as the zero position for the head for every session. The object should be easily identifiable, stationary, and repeatable, such as the corner of a ceiling.

To zero the axes with external Lens Control Motors you first set the **focus to infinity** (∞), **zoom to wide-angle** (zoomed out all the way), **iris/aperture to wide open**. You then use the controller to zero all the axes — either automatically or manually.

If you are using the head in an **underslung** configuration it is recommended that you use the **manual** method for zeroing the axes. Depending on the controller or software settings, the automatic method might pan or tilt the camera into a home orientation that is 180° from your working target orientation, which can be potentially awkward or risky for the attached equipment.

Hint

The homing facility on the SFH-50 head uses optical sensors (with homing fins) on the Pan and Tilt axes. The optional Roll facility uses a magnetic sensor. There are two magnets on the Roll ring, so the Roll homing facility will work for both over-slung and under-slung mount configurations. For either configuration, note that the camera platform is not horizontal in the Roll home position. This is intentional, as it makes the homing procedure quick and directionally reliable when you invoke the homing facility from a typical horizontal (or near-horizontal) platform starting position, whether the camera is over-slung or under-slung.

5.   Set the limits.

In order to prevent damage to cables and other equipment, you can set limits to the range of physical travel of the head movement and lens controls.

For example to set the limits on an MSA-based controller (such as the LFP, MSA-20 Handwheels, Joystick Controller, or Mini MSA) you use the menu option SET SOFT LIMITS.

Hint

If your SFH-50 has a Roll Ring, set a Tilt limit within ±90° of a horizontal platform in order to avoid damaging the Roll motor cable which goes through the hole in the centre of the Tilt axle.

+90° Tilt axle

−90°

Roll motor cable

Roll motor
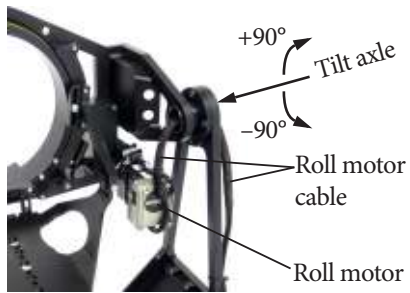
Subsequent sessions

After you have initially set up the system for your particular camera lens and preferences, subsequent sessions take less time to set up, especially if you have not disconnected control cables or moved sites. For subsequent sessions at the same site you typically need to do the following at the start of every session.

1.   Attach the power cables to the head and controller.

2.   Load the head.

3.   Zero the axes.

If you have moved sites you will need to connect the control cables before the power cables, and then set new limits after you have zeroed the axes.

Appendix 1 **Troubleshooting**

Typical symptoms, causes, and actions

Symptoms or message on the controller	Cause and/or action
HEAD DID NOT LOAD HEAD NOT LOADED LOAD FAIL FAILED TO LOAD HEAD FAILED TO INITIALIZE ETHERNET	The controller failed to load the operating system into the head. Check that all cables are connected, and all devices have power. If you have connected more than one head, connected the MRMC system to another local network, or moved the controller and head between networks, check that correct LAN addresses have been entered in the controller. See *Working with Local Area Networks* on page 19. Check the order in which the devices are powering up. If you are using an Ethernet connection to the head, avoid powering the head from the power output socket on the controller in order to avoid powering up the two devices simultaneously (which can cause problems on small isolated Ethernet networks). Use an independent power source for each, and power up the head first. If you are using a Serial connection to the head, power up the controller first.
Controls move in the wrong direction	Change the working direction of the controls to your preference (page 15).
Limits are being ignored or causing the head to oscillate when reached.	The axes have not been zeroed. You must do this at the beginning of each session just after you load the head (page 15).

Working with Local Area Networks

If you are using an Ethernet connection between the controller and the head, they communicate with each other through an Ethernet Local Area Network (LAN). The controller and head are **devices** on the network. Under certain circumstances you might need to change the LAN settings of the devices so that the devices not only work together, but do so when connected to another network. For example:

- If you install the controller as part of a multi-component system.

- If you connect your MRMC equipment to a local network.

- If you move the equipment between networks.

- If you have customised the LAN settings in a head for one of the above reasons and then sent the head back to MRMC for servicing. The service might change the LAN settings back to the factory defaults, and you will need to customise them again when you get the head back.

Introduction to LAN addresses

Each device on an Ethernet network has a suite of three addresses:

- Internet Protocol (IP) address

- Subnet (SN) address

- Gateway (GW) address

Together, these addresses indicate the device's identity and location on the network. Each address is usually written as a group of four numbers separated by periods. The factory default values used in MRMC equipment are shown in the next table:

	MRMC Controller	**Head**
IP address	192.168.1.235	192.168.1.236
SN address	255.255.255.0	255.255.255.0
GW address	192.168.1.1	192.168.1.1

On a given local network, the last group of numbers in the IP address must be unique for each device. All other numbers and addresses must be identical.

The LAN addresses of the controller and head are **static**. That is, they will stay the same unless you explicitly change them.

> Hint
>
> Most local networks use the SN and GW addresses shown in the above table, so under ordinary circumstances you will only need to be concerned with **IP addresses**. The rest of this section therefore concentrates on **IP addresses**, but you might also need to inspect or change the SN and GW addresses, depending on the structure of the network that you are using to access the head.

Although a simple controller setup has only **two** devices on the network (the controller and the head) there are potentially **three** IP addresses involved:

1. **The IP address of the controller itself.** You don't ordinarily need to change this unless you are connecting it to a local network that requires different settings.

2. **The IP address that the controller looks for** when it tries to find and load the head on the network. This must match the next IP address...

3. **The actual IP address of the head.** This is usually the IP address shown in the above table unless it has been changed, or unless you specified a different address when you ordered the head. In any case, the factory-set IP address of a head is ordinarily printed on a sticker on the head.

You can usually inspect and change the first two IP address settings directly on the controller, by accessing the LAN settings on the controller. Once you have established a connection between the controller and the head, you might be able to change the actual IP address of the head from the controller. For details see the documentation that came with your controller.

To find out the IP address of a head with an unknown history you must connect it to a PC that has Flair Motion Control Software installed. Details are in *Managing LAN addresses with Flair* on page 21.

Managing LAN addresses with Flair

The factory-set IP address of a head is printed on a sticker on the head.

If the IP address of a head has been changed to an unknown value so you can't load the head from the controller, you can find out the head's IP address by connecting the head to a Windows PC that has Flair Motion Control Software installed on it, and use Flair to interrogate the head on the network. You can also use Flair to change the IP, SN, and GW addresses of the head if necessary.

1. Find a PC that has Flair Motion Control Software installed on it, or install Flair on your own PC.

2. Attach the head to the PC with an Ethernet cable. You can use the same Ethernet cable that was connecting the head to the controller.

3. Make sure the head has power, by checking that the power indicator LED on the head lights up.

Power LED

4. Start Flair on the PC.

5. If you get any error messages, click on **OK** to close them.

6. When you get a message about network failure, click on the **Network Setup** button in the message:

or...

If the Flair installation already has a valid head connection on a network then you might not get the network failure message. In this case, start the Network Setup facility manually by choosing the **Setups** > **Network Setup** menu option in Flair.


The Network Setup window, Connection tab, lists the Nodes (head connections) that Flair is looking for, as defined in the NetworkDirect.ini file. Any changes that you make and **Save** in the Network Setup window are saved in the NetworkDirect.ini file. You can also edit this file by using the menu option **Help** > **View Network .ini File**. If Flair cannot find the head on the network at the IP address shown then the node's status is **Not connected**.

7.   In the Network Setup window click on **Find**, then on **OK** in the pop-up to confirm:
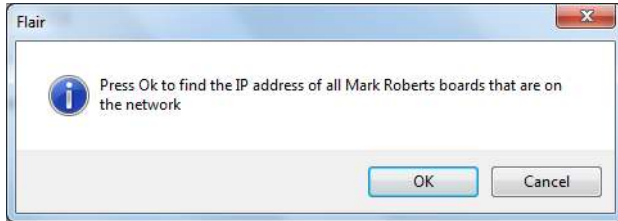
8. An Information pop-up displays information about the heads that Flair has found on the network:
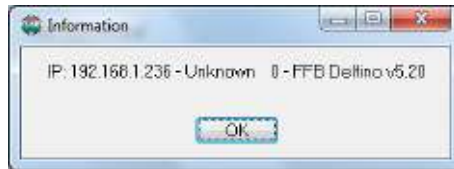
Make a note of the head's IP address that is displayed in the pop-up; for example 192.168.1.236.

9. If you want to use the head with Flair or change any of the head's LAN addresses, follow the substeps below:

9.1 Enter the head's existing IP address (as shown in the Information pop-up) into the Network Setup window and click on **Save**.

9.2 Click on **Load** to reset and load the head.

Once Flair is connected to the head, any LAN address changes that you make and **Save** in the Network Setup window will also affect the LAN addresses stored in the head.

9.3 To change the IP address of the head, enter the new IP address into the Network Setup window now and click on **Save**.

The Status temporarily changes to **Not connected** as Flair changes the IP address in the head, then to **Connected** as Flair reconnects with the head at its new IP address.

9.4 To inspect or change the SN or GW address of the head, click on **Find** again. A pop-up shows the head's three current LAN addresses, and the **Subnet Mask** (SN) and **Default Gateway** (GW) fields in the Network Setup window become editable.

Enter the new SN and GW addresses that you want to use and click on **Save**.

10. Close the Network Setup window by clicking on **Exit**.

11. If you want to use a controller other than a Flair PC then you are now done with the PC:

11.1 Close Flair by choosing the **File > Quit** menu option.

11.2 Disconnect the Ethernet cable from the PC, and re-attach it to the controller, so the head and controller are now connected.

11.3 Tell the controller which IP address to look for by following the procedures in the documentation that came with your controller.

Appendix 2 **SFH-50 Panel**

Introduction to SFH-50 connections

Interface boxes

The SFH-50 uses a modular, replaceable interface box to manage the connections between the camera, head, and controller. Your SFH-50 is supplied with one of the following interface boxes:

- **Quad-box**, for SFH-50 heads with **stepper** motors. See *Quad-box and Octo-box connector summary* on page 26.

- **Octo-box**, for SFH-50 heads with **stepper** motors. This box has all the connectors of the Quad-box, plus four additional stepper motor connectors and DataLink In/Out connectors. See *Quad-box and Octo-box connector summary* on page 26.

- **Ulti-box**, for SFH-50 heads with **servo** motors. See *Ulti-box connector summary* on page 32.

Notes on head-controller communication methods

Three types of connections between the head and controller are in common use in MRMC equipment:

- Ethernet - This is the most modern preferred method, and uses standard Ethernet plugs, cables, hubs, and protocols.

- DataLink - This is an MRMC proprietary connection type based on a modified form of Serial RS232. You can connect several DataLink devices together in a daisy-chain. DataLink is robust and dependable and is still the preferred connection method in environments with high electrical interference that can cause problems on Ethernet networks.

- Serial RS232 - This is based on standard computer serial RS232 hardware and protocols.
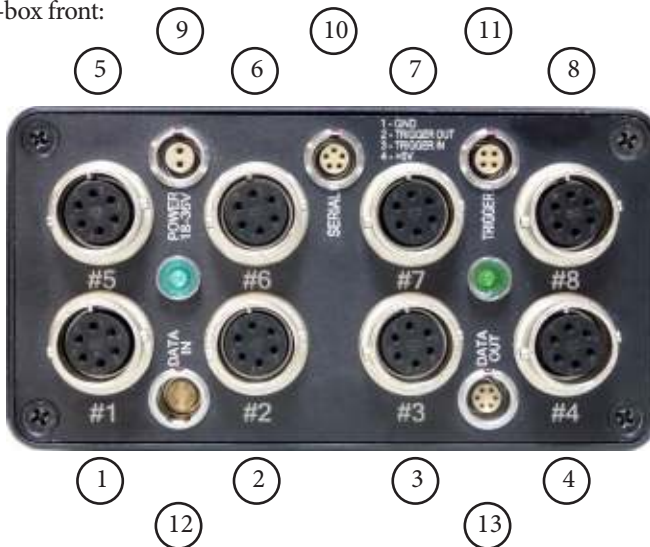
Although many MRMC devices have built-in hardware for two or three of the above connection methods, any controller that you use (such as the MSA-20 Handwheels, LFP, Joystick Controller, or Mini MSA) must be programmed at the factory for the connection method that you want to use.
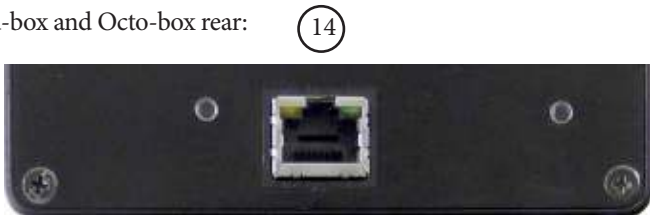
Quad-box and Octo-box connector summary

Quad-box front
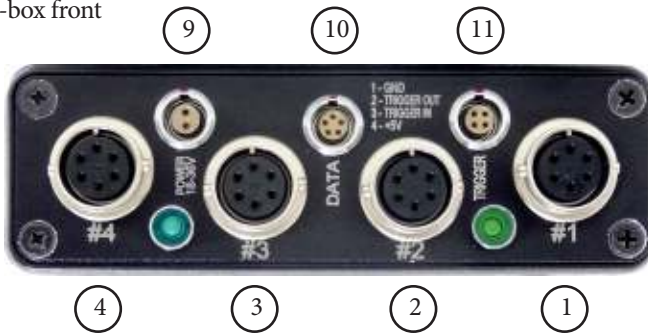
Octo-box front:

Quad-box and Octo-box rear:

1-8. **#1 - #8** identical connectors for any stepper motors, such as **PAN**, **TILT**, and **ROLL** in the head, track motors, and external Lens Control Motors. For pin-out information see *Stepper motor connector* on page 29.

9. **POWER 18-36V** connector, for power input for the head. When the power is on, the LED next to the **POWER** connector lights up. For pin-out information see *Power 18-36 Volts connector* on page 29.

    Power LED

10. **DATA** (on a Quad-box) or **SERIAL** (on an Octo-box) connector. This is a Serial RS232 connector, for connection to a controller using a Serial RS232 connection (as an alternative to an Ethernet or DataLink connection), and for updating the firmware in the Quad-box or Octo-box. For pin-out information see *Serial RS232 connector* on page 30.

11. **TRIGGER** connector, for a bi-directional trigger signal between the head and camera. When the trigger is activated the LED next to the **TRIGGER** connector lights up. For pin-out information see *Trigger connector (trigger out and in)* on page 30.

    Trigger LED

12. **DATA IN** DataLink In (Up Link) connector for controlling the head using a DataLink connection, as an alternative to an Ethernet connection. You connect this to a device that is further up the DataLink daisy-chain, such as one of the following:

    • The **DATA OUT** (or **DOWN LINK**) connector on a controller such as the MSA-20 Handwheels or Large Format Panel (LFP).

    • The **RIG/HEAD** connector on an RT-12 or RT-14 interface box which is in turn connected to a PC running Flair Motion Control Software.

    For pin-out information see *Data In connector* on page 31.

13. **DATA OUT** DataLink Out (Down Link) connector for connecting additional devices on the DataLink network. This is not normally used, as the Octo-box on the head is usually at the end of the DataLink daisy-chain. For pin-out information see *Data Out connector* on page 31.

14. **ETHERNET** RJ45 connector for controlling the head using an Ethernet network connection, as an alternative to a DataLink

connection. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

Quad-box and Octo-box connector pin-out information

Stepper motor connector

This connector is used on the SFH-50 head with the stepper motor option. The Quad-box version has four connectors for stepper motors, typically used for Pan and Tilt plus two for auxiliary devices. The Octo-box version has eight connectors for stepper motors, typically Pan, Tilt, and Roll plus five for auxiliary devices. The auxiliary devices are typically a track motor and/or Lens Control Motors (LCMs).
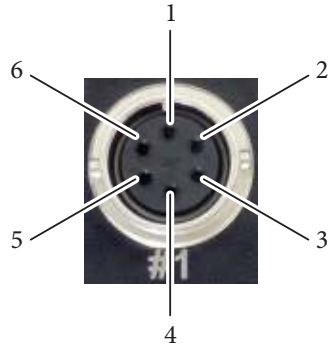
1. GND
2. 24V
3. 5V
4. Homing Datum
5. Step
6. Direction

Power 18-36 Volts connector

Two-pin DC input for powering the head. The head runs best on a 34-Volt power supply.

1. GND
2. +24V
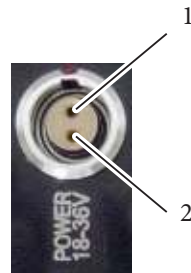
Serial RS232 connector

This is a 5-pin Serial RS232 connector.
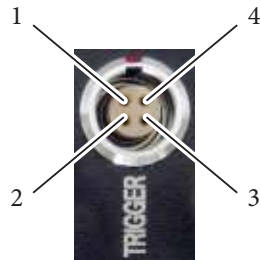For usage see page 27.

1. Boot select
2. Tx (out)
3. Rx (in)
4. 5V
5. GND
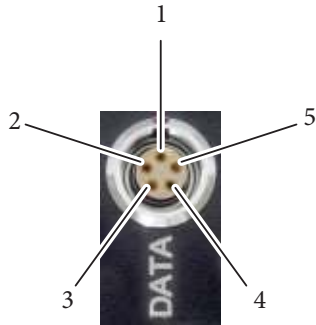
Trigger connector (trigger out and in)

Trigger connection with Trigger Out
and Trigger In connections.

1. GND
2. Trigger Out
3. Trigger In/Out
4. +5V

Pin 3 can be trigger input or output
depending on a jumper setting in the
box which is set during manufacture. DSLR applications typically use two
trigger outputs, on pins 2 and 3; one for shutter and one for auto-focus.
Video applications typically use pin 2 for trigger output and pin 3 for
trigger input.

Data In connector

This is a 6-pin male DataLink In (Up Link) connector for connection to a DataLink device higher up in the DataLink daisy-chain. For usage see page 27.
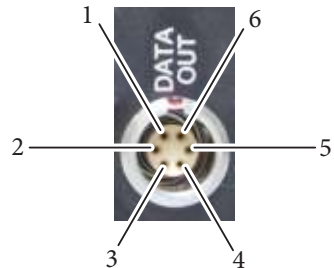
1. Watchdog–
2. Link1Out–
3. Link1Out+
4. Link1In–
5. Link1In+
6. Watchdog+
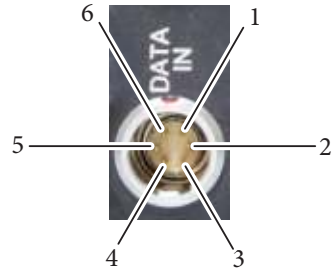
Data Out connector

This is a six-pin female DataLink Out (Down Link) connector for connection to a head. For usage see page 27.

1. Watchdog–
2. Link1Out–
3. Link1Out+
4. Link1In–
5. Link1In+
6. Watchdog+

Ulti-box connector summary

1. **PAN** connector for the Pan servo motor on the head. For pin-out information see *Servo motor connector* on page 34.

2. **PROG** serial connector for connection to a controller using a Serial RS232 connection (as an alternative to an Ethernet or DataLink connection), and for updating the firmware in the Ulti-box. For pin-out information see *Program serial connector* on page 34.

3. **POWER** DC input for the head. The standard unit uses a power input of 24-36 Volts. The high-power variant (marked **HV**, for **H**igh **V**oltage) uses 24-48 Volts. For pin-out information see *Power connector* on page 35.

4. **CAM ACC** Camera Accessory input/output connector. It has pins for three stepper motors, two serial lens controls, two trigger in controls, and two trigger out controls. For pin-out information see *Camera Accessory connector* on page 35.

5. **DATA** DataLink In (Up Link) connector for controlling the head using a DataLink connection, as an alternative to an Ethernet or Serial RS232 connection. You connect this to a device that is further up the DataLink daisy-chain, such as one of the following:

    *   The **DATA OUT** (or **DOWN LINK**) connector on a controller such as the MSA-20 Handwheels or Large Format Panel (LFP).

    *   The **RIG/HEAD** connector on an RT-12 or RT-14 interface box which is in turn connected to a PC running Flair Motion Control Software.

    Note that because there is no DataLink Out connector on the Ulti-box, the Ulti-box must be connected at the end of the DataLink daisy-chain rather than the middle. For pin-out information see *Data In connector* on page 36.

6. **ETHERNET** RJ45 connector for controlling the head using an Ethernet network connection, as an alternative to a DataLink or Serial RS232 connection. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

7, 8. **ZOOM**, **FOCUS** connectors for external servo Lens Control Motors (LCMs). For pin-out information see *Servo motor connector* on page 34.

9. **TILT** connector for the Tilt servo motor on the head. For pin-out information see *Servo motor connector* on page 34.

10, 11. **AUX-1**, **AUX-2** connectors for control of auxiliary servo motors. For pin-out information see *Servo motor connector* on page 34.

Ulti-box connector pin-out information

Servo motor connector

This type of connector is used for six
servo motor connectors on the Ulti-box:
Pan, Zoom, Focus, Tilt, Aux-1, Aux-2.

1. DATUM
2. A+
3. B+
4. Z+
5. N/C
6. MOTOR_B
7. MOTOR_A
8. LIMIT
9. +5V
10. GND
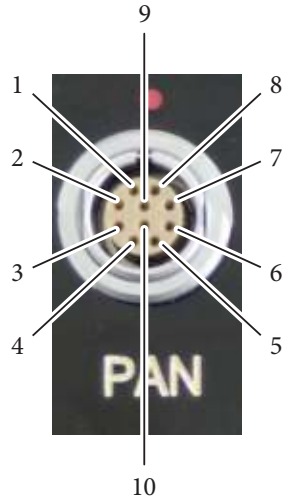
Program serial connector

Serial connector for connection to a controller using a **Serial RS232**
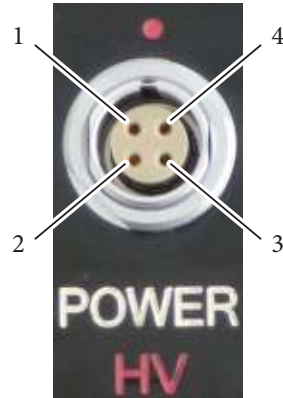connection, and for updating the firmware in the Ulti-box.

1. SerialTxA
2. SerialRxA
3. +5V
4. FGPIO
5. DSP_TRSTN
6. TCK
7. TMS
8. DSP_TDI
9. DSP_TDO
10. DSP_EMU0
11. DSP_EMU1
12. FPGA_TDI
13. FPGA_TDO
14. BOOT_SEL
15. +3.3V
16. GND
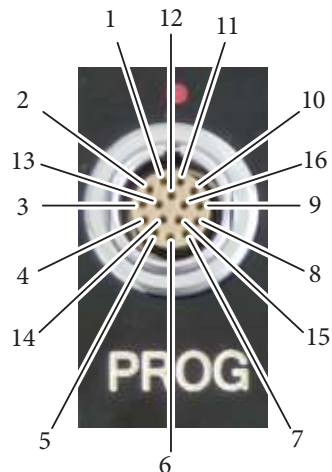
Power connector

The power input connector for the Ulti-box. For usage see page 32.

1. GND
2. GND
3. +24V
4. +48V

Camera Accessory connector

This is a multi-purpose camera accessory connector with connections for three stepper motors, two serial lens controls, two trigger in controls, and two trigger out controls.

1. Step1
2. Gp2In (Trigger In 2)
3. Step2
4. SerialTxB serial lens control
5. Step3
6. SerialRxB serial lens control
7. Dir3
8. GND
9. +5V
10. Gp1In (Trigger In 1)
11. Dir1
12. Dir2
13. Gp2Out (Trigger Out 2)
14. Gp1Out (Trigger Out 1)
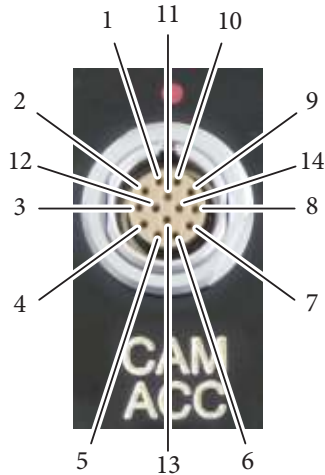
Data In connector

This is a DataLink In connector for connection to a controller using a DataLink connection. DataLink In (Up Link) connector for connection to a DataLink device higher up in the DataLink daisy-chain. For usage see. page 33.

1. Watchdog–
2. Link1Out–
3. Link1Out+
4. Link1In–
5. Link1In+
6. Watchdog+
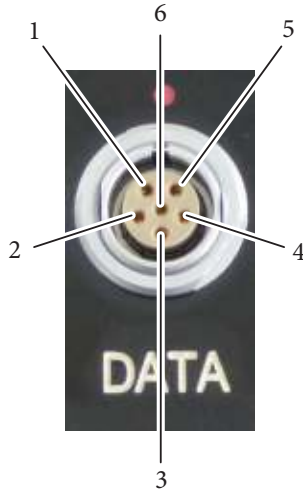
Notes

Notes

Appendix 3 **Specifications**

Weight: 6.5 Kg to 11 Kg, depending on options

Power requirements: 18-36 Volts DC

Temperature range: 0-45 °C (32-113 °F)

Humidity tolerance: 0% to 85% relative humidity, non-condensing

Camera payload: 13 Kg

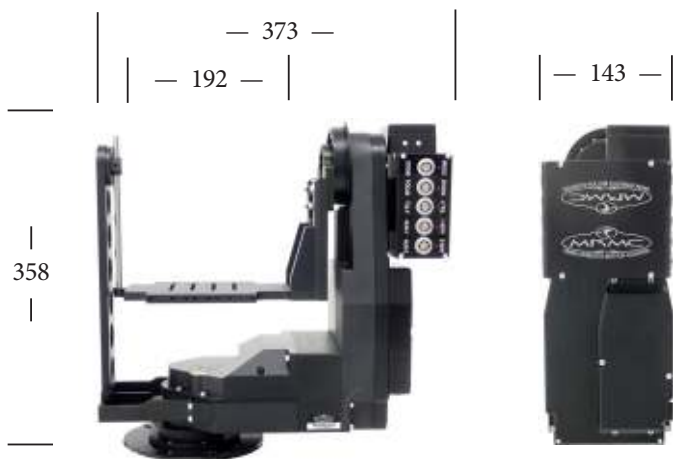Maximum speed: 30°/sec to 100°/sec, depending on options

Maximum acceleration: $200°/sec^2$
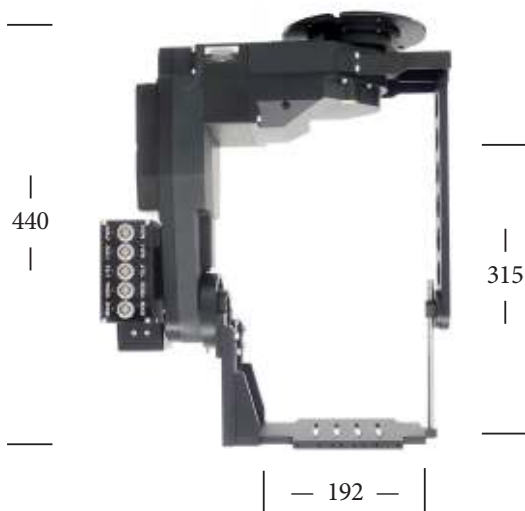
Angular resolution: Better than 0.001°

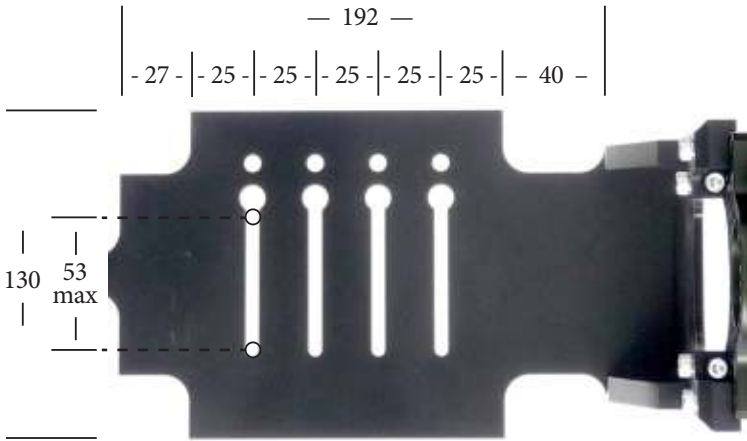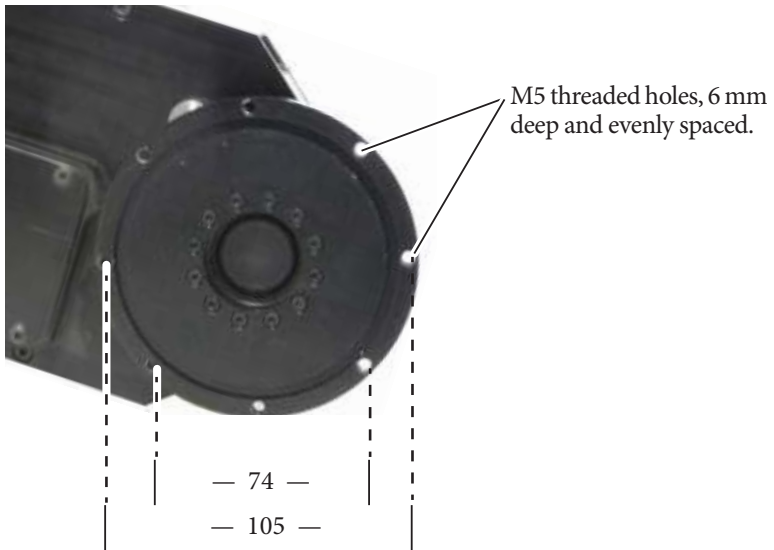Dimensions are shown below. All measurements are in mm.

SFH-50 with Support Arm:

Overslung:

— 373 —

— 192 —

— 143 —

358

Underslung:

440

315

— 192 —

Camera platform:

Mounting holes in the SFH-50 base:

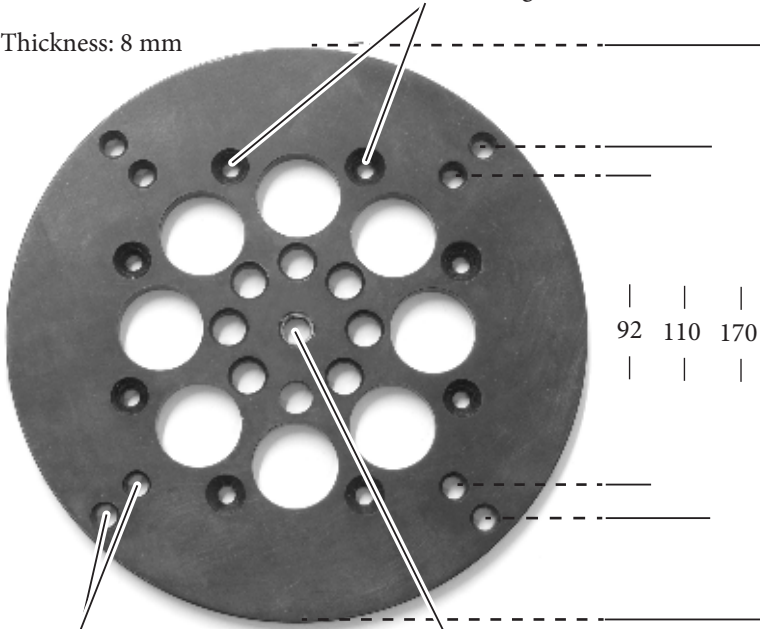M5 threaded holes, 6 mm deep and evenly spaced.

— 74 —

— 105 —

Optional mounting plate (large):

M5 unthreaded countersunk holes for attachment to the bottom of the head, using M5 CSK (countersunk) bolts 16 mm long.
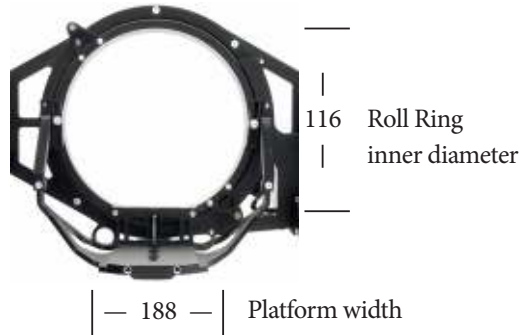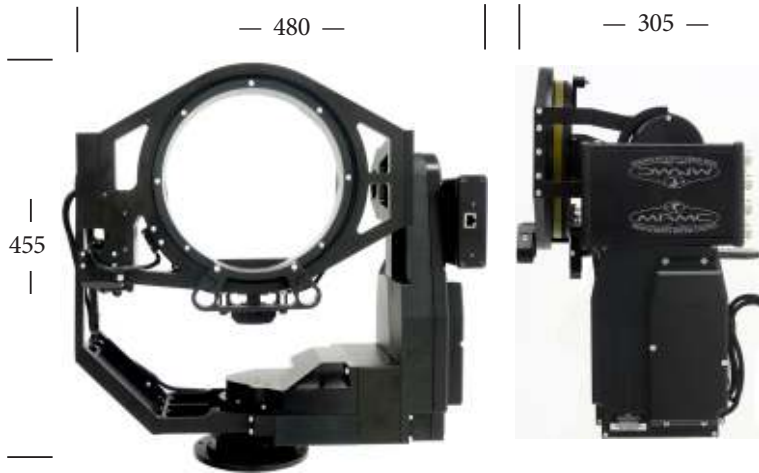
Thickness: 8 mm

92   110   170

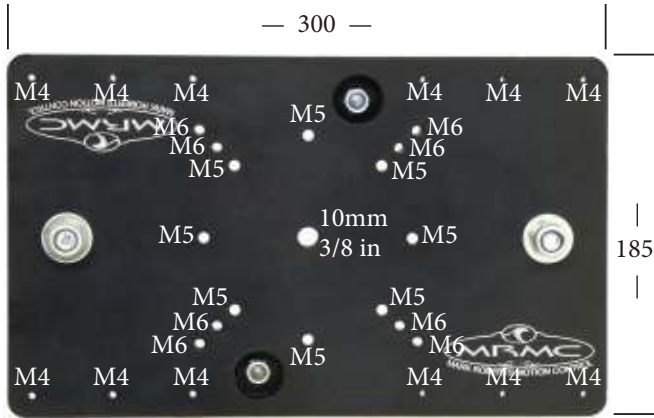M6 unthreaded holes around the edge for mounting the plate onto any solid surface.

3/8-16 centre hole threaded for a standard heavy-duty tripod mounting bolt.
All other holes in the plate are unthreaded.

Mark Roberts Motion Control can also make custom mounting plates to your specifications. Use the details given at the front of this manual to contact customer support.
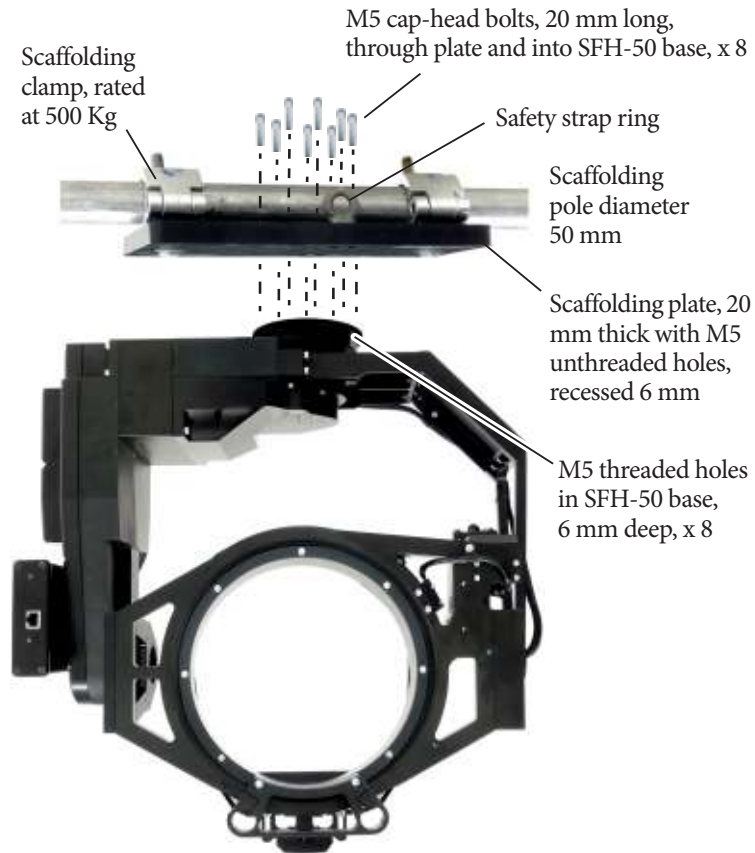
SFH-50 with Roll Ring:

— 480 —   — 305 —

455

116 Roll Ring
     inner diameter

— 188 — Platform width

215 Roll Ring
     platform length

Optional scaffolding plate:

— 300 —

185

M4   M4   M4
M5
M6
M6
M5

M4   M4   M4

M5   M5

10mm
3/8 in   M5

M4   M4   M4

M5   M5
M6   M6
M6   M6   M5

M4   M4   M4

Centre hole and M5 holes are unthreaded.
All M4 and M6 holes are threaded.

SFH-50 underslung from optional scaffolding plate:

M5 cap-head bolts, 20 mm long,
through plate and into SFH-50 base, x 8

Scaffolding
clamp, rated
at 500 Kg

Safety strap ring

Scaffolding
pole diameter
50 mm

Scaffolding plate, 20
mm thick with M5
unthreaded holes,
recessed 6 mm

M5 threaded holes
in SFH-50 base,
6 mm deep, x 8

Bolt the scaffolding plate onto the head first, then clamp the plate onto the scaffolding pole and attach the safety strap to the rings.

For a view of the completed scaffolding plate and head see page 3.

Notes

Notes