MARK ROBERTS MOTION CONTROL

AFC HEAD (MHC)

QUICK START GUIDE

QSG Product Code: MRMC-1488-00

Products Covered: MRMC-3000-217-00, MRMC-3000-219-00,
MRMC-1014-02-026-02-08-01

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

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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 AFC robotic camera head from Mark Roberts Motion Control (MRMC). The AFC head is an **A**ccurate, **F**ast, and **C**ompact head designed for reliable day-in, day-out use in professional studio and Outside Broadcast environments. The versatility of the AFC head makes it suitable for live action, stills, and time-lapse applications.

The AFC Head and lens motors are controlled from devices running Multi-Head Controller (MHC) software, Flair motion control software or API over Ethernet. This manual describes using AFC with MHC only. You can use the Ethernet connection on the AFC head to connect directly or remotely to a PC running MHC by MRMC.

Setting up the hardware

1. Mount the AFC head onto your choice of support, such as a heavy-duty tripod or metal plate.

    More information on mounting sockets and dimensions can be found in Appendix 3 *Specifications*.

    Example: AFC head mounted directly onto tripod with single 3/8-16 tripod mounting bolt:

    Example: AFC head mounted on an optional riser mounted on a table, to give the head more height and Tilt clearance. Further details are on page 43.

Example: AFC head
underslung and
directly mounted onto
scaffolding plate.
Further details are on
page 45.

For notes on zeroing
the axes when using an
underslung
configuration, see page
16.

Example: AFC head
underslung and
mounted onto riser
which is, in turn,
mounted onto a
scaffolding plate.
Further details are on
page 46.

2. If you are using serial (digital) lens then skip this step and go on to step 3 on page 7.

   If you are using external Lens Control Motors (LCMs) for focus and zoom and possibly iris, then these are ordinarily configured in MHC to suit your lens specifications. Set these up now as follows:

   2.1 Install the large gears onto the focus, zoom, and iris rings of your lens, as applicable.

Lens gear (Zoom)

Lens gear (Focus)

   The relative position of the rings depends on the make and model of the lens.

2.2   For **head-mounted LCMs**, 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:

Matte bars

2.3   For **lens-mounted LCMs**, attach the mounting ring onto the lens so it does not interfere with the focus, zoom, or iris rings, then mount the LCMs onto the rod, making sure that the LCM gears mesh firmly with the lens gears:

Lens gear (Zoom)

Mounting rod

Mounting ring

Lens gear (Focus)

LCM gear

Lens gears

LCM gear

3. 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.

Video camera,
Overslung

Video camera,
Underslung

The camera and the lens MUST be carefully balanced on the platform. One way to check this is: with the head powered off and the camera and lens attached and screwed to the platform, the camera should be able to balance without further assistance. If you find the lens drops down, then the lens is too heavy. To mount heavier cameras and lenses, see balanced offset platform on page 40.

DSLR camera

4. If you are using head-mounted LCMs, adjust their position on the rods so that the LCM gears mesh firmly with the lens gears.

Notes

Connecting the cables

Video camera example

AFC head with BCST 043 panel, BCST 036 base, GV LDX Compact video camera, Fujinon Digipower A22x7.8BERD-S28B Serial (digital) Lens Control Motors, and Windows PC running MHC.

Rear view

ETHERNET

HD SDI (A)

REF

Power DC in

12V OUT

VIDEO

Serial Lens
Control Motors

SYNC

LENS

ETHERNET

BCST MDL 013 panel

SERIAL

Front view

Attach the power cables last.

SYNC

POWER 24V

VIDEO OUT

ETHERNET

PC running MHC
Motion Control Software

24V —— **5A**
(+) —●— (−)
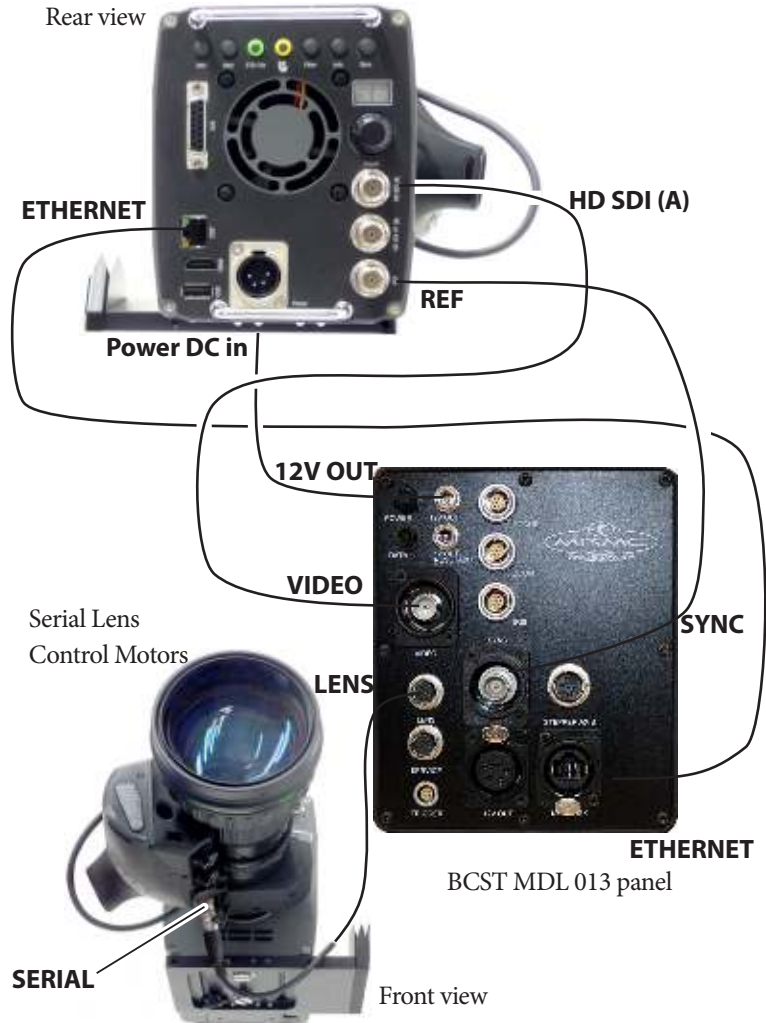
The controller can be any MRMC joystick such as the Broadcast Panel, Mini USB Joystick, USB LFP Controller, or Xbox Joystick connected to PC with MHC Motion Control Software.

DSLR camera example

AFC head with BCST 060 panel, BCST 062 base, Nikon D4s camera, external Lens Control Motors, and LFP controller.

Rear view

TRIGGER

HDMI

12V IN

HDMI

SDI

5V~12V

Optional HDMI/SDI converter

12V OUT

12V OUT

RESETABLE

VIDEO

FOCUS

ZOOM

TRIGGER

AFC 100S (with slip ring) panel

Front view

External Lens Control Motors

Attach the power cables last.

POWER 24V

VIDEO OUT

ETHERNET

USB

Broadcast Panel

24V 5A
$(+)$ — ● — $(-)$
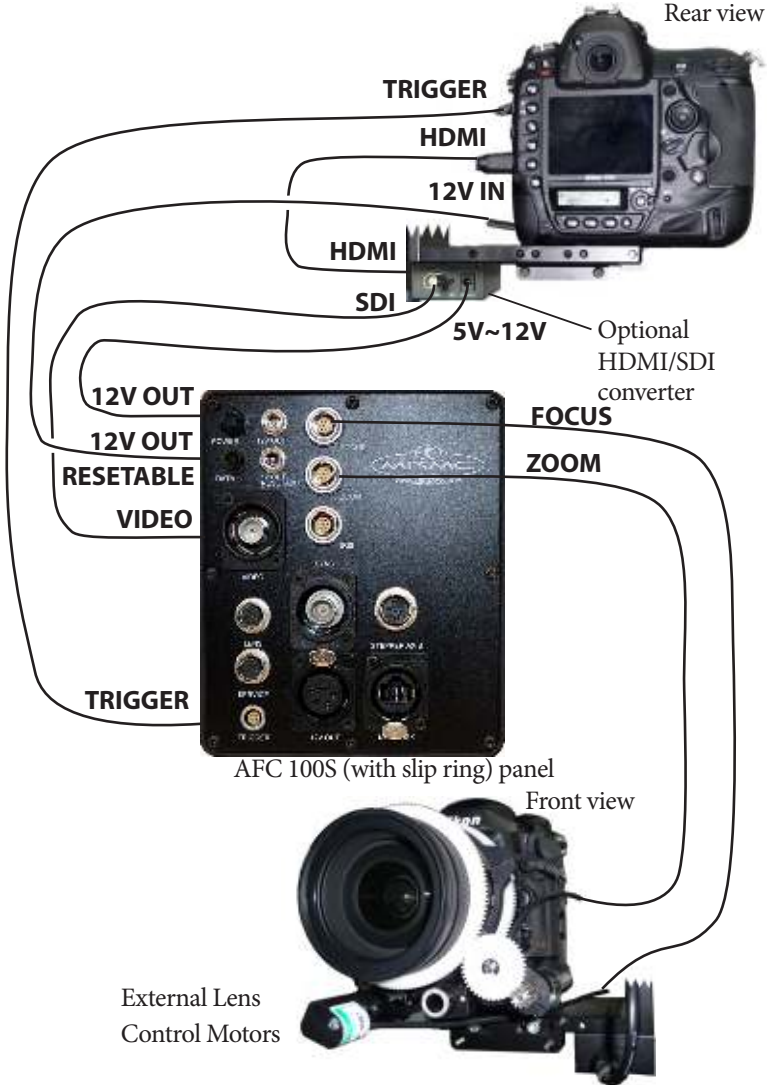The head and controller both use the same type of power supply brick.

The controller can be any MRMC USB joystick such as the Broadcast Panel, Mini USB Joystick, USB LFP Controller, or Xbox Joystick connected to PC with MHC Motion Control Software.

> 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 do so then powering up the controller will simultaneously power up the head, and in this instance powering up two Ethernet devices at the same time on the same network can cause communication problems between them.

Your first session

When you want to 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 cables to the PC, head and controller, as described in the previous section.

   > 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, as powering up two devices simultaneously on the same Ethernet network can cause communication problems.

   There is no power switch on the AFC 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.

   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.   Power up the head and start MHC on the PC.

3.   Set the control directions.

> In the MHC Client, you need to specify the directions of the focus, zoom and joystick or wheel 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.

> To invert the control directions in MHC, use **Invert** in the Preferences page. Refer to the MHC Quick Start Guide for details. Use the switches on the joystick controller to invert the axes direction on the controller.

4.   Home Zero the axes.

> After powering up, you need to Home the head and any lens axes, also called **Home Zeroing** the axes. The process of Home Zeroing involves moving each axis to a known position and referencing the software to this position. This position is usually set to zero and can include an offset adjustable by the User.

> 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 Home Zeroing the axes. The MHC software physically moves the axes to the home positions that are built into the hardware and then assigns these positions as the zero points for the axes.

> The method of Home Zeroing depends on the hardware setup and is pre-configured by MRMC. It will usually be the automatic method. It is not necessary for you change these settings.

> Each axis must be homed individually.

> 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.

> **Homing when changing lenses**

The values for the **Minimum** and **Maximum Position** must be entered for the lens fitted to the head. It is a good idea to label each lens with the Minimum and Maximum Position for Focus axis.

Important

During homing of the Focus axis, the lens ring is driven to each end of the travel. Ensure that the lens motors are sufficiently tight on their matte bars and remain in mesh with the lens gear.

Hint

If you are using the AFC 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.

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. This is especially important if you have a head without slip rings, where cabling can get wrapped around the head, or if you have a lens with external control motors.

Reasonable values for soft limits are factory-set for all the axes. However, if you do need to set new limits, use the Robot Setting page in MHC Client. For instructions, refer to the MHC Quick Start Guide.

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 PC, head and controller.

2. Power up the head and start MHC on the PC.

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	Cause and/or action
The head does not move The head does not appear connected in MHC	The head is not been able to load in MHC. 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 MHC. Check the order in which the devices are powering up. If two devices on the network try to power up and initialise their Ethernet connection at the same time, the devices can conflict with each other on the network. Avoid powering the head from the power output socket on the joystick, in order to avoid powering them up simultaneously. Use an independent power source for each, and connect the joystick to the PC after powering up the head.
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

The MHC on the PC and the head communicate with each other through an Ethernet Local Area Network (LAN). The PC 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 head 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.
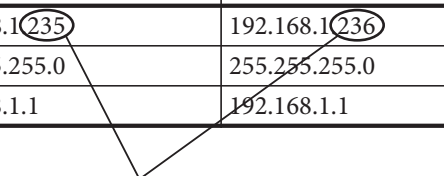
Introduction to LAN addresses

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:

		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 PC and head(s) 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.

In a basic setup using MHC, there are two devices, the PC (connected with a USB joystick) and a head. Therefore, there are two IP addresses involved:

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

2. **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.

    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 MHC Client using Admin login, you will need to contact MRMC.

Notes

Notes

Appendix 2 **AFC Back Panel**

Connector summary

MRMC offers bespoke manufacturing of AFC heads to satisfy customer requirements and preferences. Because of this, various connector panels are used on the AFC to cater for differences in head features, such as:

- Slip rings versus no slip rings. Heads with internal slip rings have an additional base unit that provides a **POWER 24V** socket, along with **VIDEO**, **NETWORK**, and optional **SYNC** sockets that connect internally to their corresponding sockets on the panel via the slip rings. Heads without slip rings have a power input socket on the main panel.

- Connectors for powering lenses with servo motors versus connectors for driving lenses with stepper motors.

Some heads also have a homing facility that allows semi-automatic zeroing of the head axes at the start of each session, although this facility has no impact on the AFC panel design. The AFC's homing mechanism is implemented by external fins on the axes, which rotate through a slot containing an optical light sensor.

The remainder of this section describes five of the most common AFC head panel configurations.

Panel AFC 100S with Slip Ring (MRMC-3000-219-xx)

1. **12V OUT** DC outlet for powering a camera or HDMI/SDI converter. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small DC jack)* on page 33.

2. **12 V OUT RESETABLE** additional 12V DC outlet which can be turned on and off from MHC Server. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small resetable DC jack)* on page 33.

3. **VIDEO** input connector for video signal from the camera. This circuit is rated at 3 GHz and internally connects with the **VIDEO** out connector in the base through the internal slip rings. For pin-out information see *Video connector* on page 34.

4. **LENS** connector for a serial (digital) lens that has internal servo motors for focus, zoom, and iris. For pin-out information see *Serial (digital) lens connector for internal servo LCMs* on page 35.

5. **SERVICE** connector, used by MRMC for testing and diagnosis.

6. **TRIGGER** connector, for triggering the camera from the head. For pin-out information see *Trigger connector (standard trigger out)* on page 35.

7, 8, 9. **FOCUS**, **ZOOM**, **IRIS** connectors for external servo Lens Control Motors (LCMs). For pin-out information see *Focus, Zoom, Iris lens connectors for external servo LCMs* on page 35.

10. **SYNC** connector. This is a multi-purpose connector which internally connects with the **SYNC** connector in the base of the AFC, through the internal slip rings. This can be used for synchronization signals between the camera and controller in either direction. There is no further connection to the circuitry inside the head. Note that although the **SYNC** and **VIDEO** connectors are similar they are **not** interchangeable. The circuitry for the **VIDEO** connector has a higher speed rating (3 GHz) than that of the **SYNC** connector which only needs to handle the synchronisation signal, so you should only put the video signal through the **VIDEO** connectors and not the **SYNC** connectors. For pin-out information see *Video Sync connector* on page 34.

11. **POWER 12V** DC outlet for powering a camera or HDMI/SDI converter. The maximum allowable sum total load for all three 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (large 4-way XLR)* on page 33.

12. **NETWORK** Ethernet RJ45 connector for network connection to a camera. This circuit internally connects with the Ethernet hub in the head, which in turn connects with the **NETWORK** connector in the base of the AFC through the internal slip rings. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

13. **STEPPER AXIS** connector for external stepper lens motors For pin-out information see *Stepper Axis connectors for external stepper LCMs* on page 36.

14. **POWER 24V** input power connector, 3-pin, 24 Volt DC power supply. For pin-out information see *Power 24V connector* on page 36.

15. **VIDEO** output connector for video signal from the camera. This circuit is rated at 3 GHz and internally connects with the **VIDEO** in connector in the head of the AFC, through the internal slip rings. For pin-out information see *Video connector* on page 34.

16. **NETWORK** Ethernet RJ45 connector for network connection to a PC running MHC. This circuit internally connects with the Ethernet hub in the head via the internal slip rings, which in turn connects with the **NETWORK** connector on the head panel. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

17. **SYNC** multi-purpose connector which internally connects with the **SYNC** connector in the head through the internal slip rings. This can be used for synchronization signals between the camera and controller in either direction. There is no further connection to the circuitry inside the head. Note that although the **SYNC** and **VIDEO** connectors are similar they are **not** interchangeable. The circuitry for the **VIDEO** connector has a higher speed rating (3 GHz) than that of the **SYNC** connector which only needs to handle the synchronisation signal, so you should only put the video signal through the **VIDEO** connectors and not the **SYNC** connectors. For pin-out information see *Video Sync connector* on page 34.
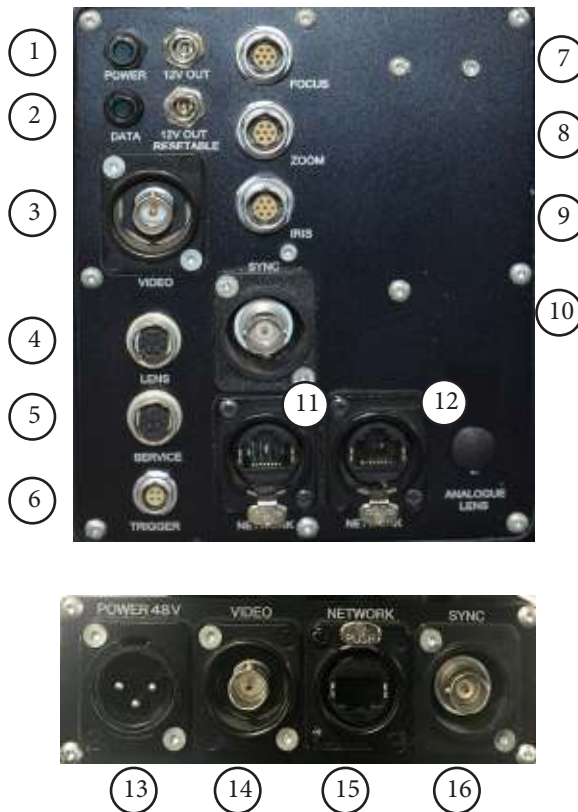
Notes

Panel AFC 100 without slip rings (MRMC-3000-217-xx)

1. **12V OUT** DC jack outlets for powering a camera or HDMI/SDI converter. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small DC jack)* on page 33.

2. **12V OUT RESETABLE** additional 12V DC outlet which can be turned on and off from MHC Server. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small resetable DC jack)* on page 33.

3. **12V OUT** DC 4-way XLR outlet. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (large 4-way XLR)* on page 33.

4. **LENS** connector for a serial (digital) lens that has internal servo motors for focus, zoom, and iris. For pin-out information see *Serial (digital) lens connector for internal servo LCMs* on page 35.

5. **SERVICE** connector, used by MRMC for testing and diagnosis.

6. **TRIGGER** connector, for triggering the camera from the head. For pin-out information see *Trigger connector (standard trigger out)* on page 35.

7, 8, 9. **FOCUS**, **ZOOM, IRIS** connectors for external servo Lens Control Motors (LCMs). For pin-out information see *Focus, Zoom, Iris lens connectors for external servo LCMs* on page 35.

10, 13. **NETWORK** Ethernet RJ45 connector for network connection to a PC running MHC. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

11. **24V IN** power connector, 3-pin, 24 Volt DC power supply. For pin-out information see *Power 24V connector* on page 36.

12. **STEPPER AXIS** connector for external stepper lens motors For pin-out information see *Stepper Axis connectors for external stepper LCMs* on page 36.

Panel AFC 180S with Slip Ring (MRMC-1014-211-xx)

1. **12V OUT** DC outlet for powering a camera or HDMI/SDI converter. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small DC jack)* on page 33.

2. **12 V OUT RESETABLE** additional 12V DC outlet which can be turned on and off from MHC Server. The maximum allowable sum total load for both 12V DC outlets is 3 Amps. For pin-out information see *12V Out connector (small resetable DC jack)* on page 33.

3. **VIDEO** input connector for video signal from the camera. This circuit is rated at 3 GHz and internally connects with the **VIDEO** out connector in the base through the internal slip rings. For pin-out information see *Video connector* on page 34.

4. **LENS** connector for a serial (digital) lens that has internal servo motors for focus, zoom, and iris. For pin-out information see *Serial (digital) lens connector for internal servo LCMs* on page 35.

5. **SERVICE** connector, used by MRMC for testing and diagnosis.

6. **TRIGGER** connector, for triggering the camera from the head. For pin-out information see *Trigger connector (standard trigger out)* on page 35.

7, 8, 9. **FOCUS**, **ZOOM**, **IRIS** connectors for external servo Lens Control Motors (LCMs). For pin-out information see *Focus, Zoom, Iris lens connectors for external servo LCMs* on page 35.

10. **SYNC** connector. This is a multi-purpose connector which internally connects with the **SYNC** connector in the base of the AFC, through the internal slip rings. This can be used for synchronization signals between the camera and controller in either direction. There is no further connection to the circuitry inside the head. Note that although the **SYNC** and **VIDEO** connectors are similar they are **not** interchangeable. The circuitry for the **VIDEO** connector has a higher speed rating (3 GHz) than that of the **SYNC** connector which only needs to handle the synchronisation signal, so you should only put the video signal through the **VIDEO** connectors and not the **SYNC** connectors. For pin-out information see *Video Sync connector* on page 34.

11, 12. **NETWORK** Ethernet RJ45 connector for network connection to a camera. This circuit internally connects with the Ethernet hub in the head, which in turn connects with the **NETWORK** connector in the base of the AFC through the internal slip rings. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

13. **POWER 48V** input power connector, 3-pin, 48 Volt DC power supply. For pin-out information see *Power 48V connector* on page 37.

14. **VIDEO** output connector for video signal from the camera. This circuit is rated at 3 GHz and internally connects with the **VIDEO** in

connector in the head of the AFC, through the internal slip rings. For pin-out information see *Video connector* on page 34.

15. **NETWORK** Ethernet RJ45 connector for network connection to a PC running MHC. This circuit internally connects with the Ethernet hub in the head via the internal slip rings, which in turn connects with the **NETWORK** connector on the head panel. This Ethernet port is rated at 100 Mbits/sec but can operate at lower speeds of 10 Mbits/sec or less.

16. **SYNC** multi-purpose connector which internally connects with the **SYNC** connector in the head through the internal slip rings. This can be used for synchronization signals between the camera and controller in either direction. There is no further connection to the circuitry inside the head. Note that although the **SYNC** and **VIDEO** connectors are similar they are **not** interchangeable. The circuitry for the **VIDEO** connector has a higher speed rating (3 GHz) than that of the **SYNC** connector which only needs to handle the synchronisation signal, so you should only put the video signal through the **VIDEO** connectors and not the **SYNC** connectors. For pin-out information see *Video Sync connector* on page 34.

Connector pin-out information

12V Out connector (small DC jack)

12V DC outlet for powering a
camera or HDMI/SDI signal
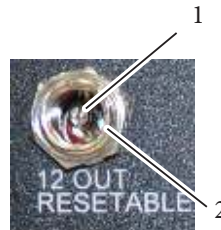converter. Centre positive.

1.   +12V
2.   GND
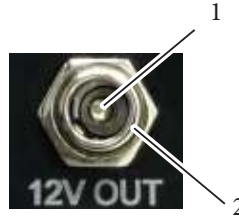
12V Out connector (small resetable DC jack)

An additional 12V DC outlet
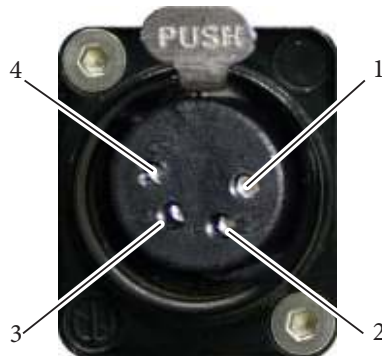which can be turned on and off
from the software. Centre
positive.

1.   +12V
2.   GND

12V Out connector (large 4-way XLR)

General purpose 12V DC outlet.

1.   GND
2.   N/C
3.   N/C
4.   +12VOUT

Video connector

The **VIDEO** connectors on the head and base are rated at 3 GHz and connected to each other through the internal slip rings, allowing the video signal from the camera to go into the head, through the slip rings, and out through the base. There is no further connection to the circuitry inside the head.


1. VIDEO (inner)
2. GND (outer)
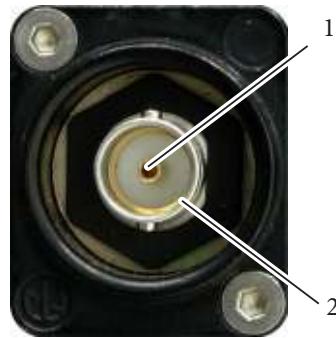
Video Sync connector

This is a multi-purpose **SYNC** connector in both the head and the base on AFC units that have the BCST 043 panel option. The two **SYNC** connectors are connected to each other via the internal slip rings. They can be used for synchronization signals between the camera and controller in either direction. There is no further connection to the circuitry inside the head. Note that although the **SYNC** and **VIDEO** connectors are similar they are **not** interchangeable. The circuitry for the **VIDEO** connector has a higher speed rating (3 GHz) than that of the **SYNC** connector which only needs to handle the synchronisation signal, so you should only put the video signal through the **VIDEO** connectors and not the **SYNC** connectors.
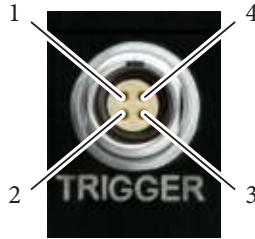

1. VIDEO (inner)
2. GND (outer)
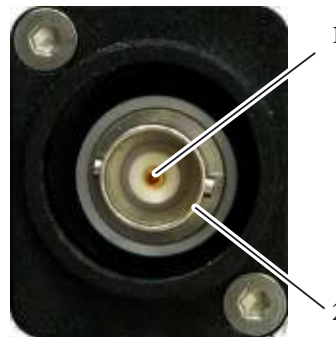
Trigger connector (standard trigger out)

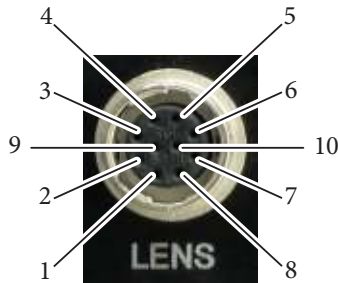Trigger out connection for the camera.

1. GND
2. Trigger 1
3. Trigger 2
4. 5V

Serial (digital) lens connector for internal servo LCMs

Connector for a serial (digital) lens that has internal Lens Control Motors (LCMs) for focus, zoom, and iris.
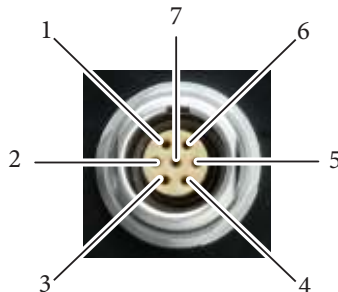
1. Boot Select
2. RS232 Out
3. RS232 In
4. VCC
5. GND
6. RS232 Select
7. RS422 Out –
8. RS422 Out +
9. RS422 In +
10. 1RS422 In –

Focus, Zoom, Iris lens connectors for external servo LCMs

The **FOCUS**, **ZOOM**, and **IRIS** connectors are for external servo Lens Control Motors (LCMs).

1. Motor +
2. Motor –
3. Encoder A
4. +5V
5. GND
6. Encoder B
7. Motor ID

Stepper Axis connectors for external stepper LCMs

These connectors are for large external stepper Lens Control Motors (LCMs).

1. GND
2. 24V
3. 5V
4. Limit
5. Step
6. Direction
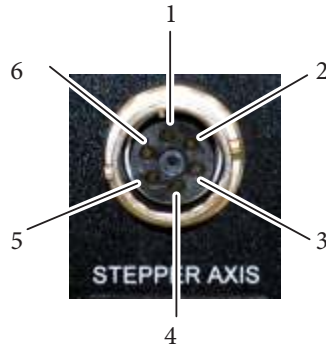
Power 24V connector

Power input for the head. The head can run on 12-35 Volts DC.

1. GND
2. 24VIN
3. N/C
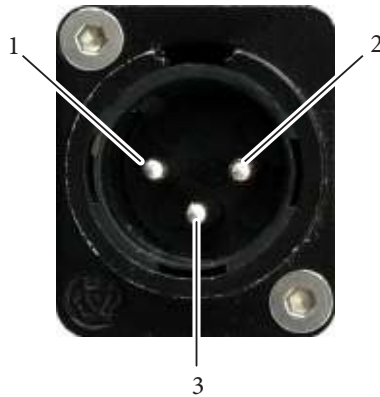
Power 48V connector

Power input for the head (AFC 180S). The head can run on 12-35 Volts DC.

1. GND
2. 48VIN
3. N/C
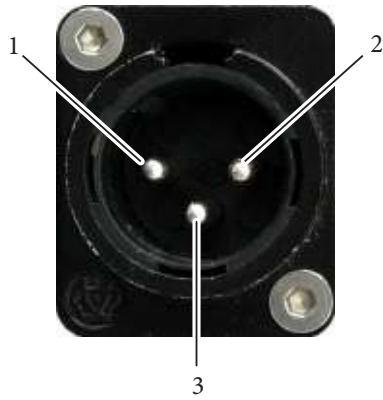
Notes

Appendix 3 **Specifications**

Weight: 6.1 Kg

Power requirements: AFC 100and AFC 100S: 24 Volts DC
AFC 180S: 48 Volts DC

Temperature range: 0-45 °C (32-113 °F)
Humidity tolerance: 0% to 85% relative humidity, non-condensing

Camera payload: 14 Kg

Maximum speed: AFC100:   100°/sec
                       AFC180:   180°/sec

Maximum acceleration: AFC100:   100°/sec^2
                       AFC 180: 300°/sec^2

Accuracy of playback (angular resolution): Better than 0.0001°.

Dimensions are shown in the following pages. All measurements are in mm.

Overslung: — 157 — — 310 —

— 100 — — 140 —

|
262*
|

*236 without
slip rings

Underslung: — 157 — — 310 —

|
350'
|

*324 without
slip rings

— 100 — — 140 —

— 218 —
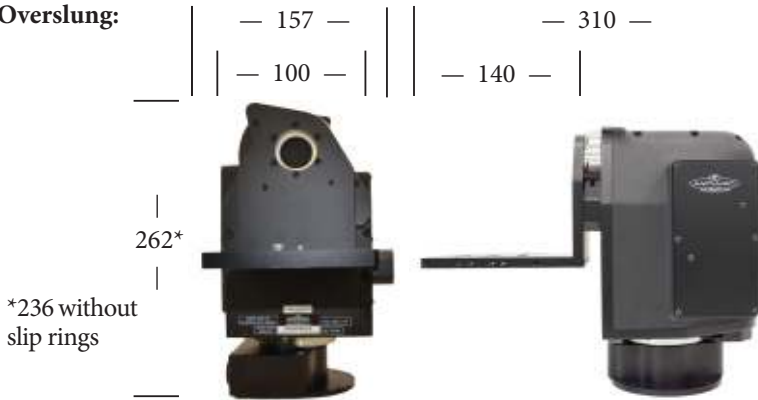
AFC with balanced offset
platform for front-heavy video
camera with a long lens. This
is an optional/additional
mount by MRMC.

— 140 —

– 25 – | – 30 – | – 30 – | — 55 —

100 53 max
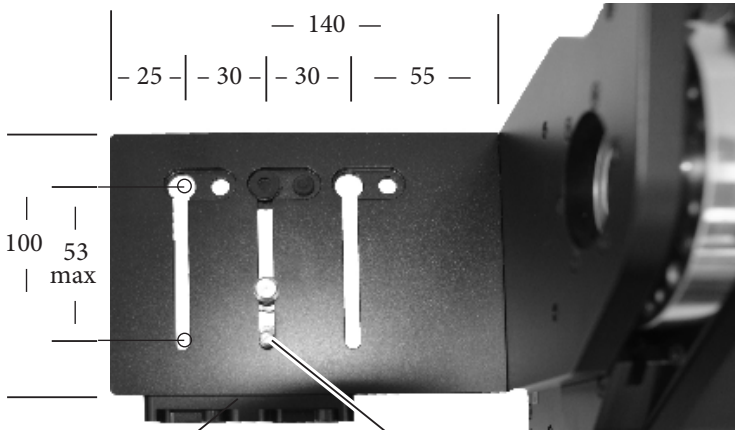
M5 matte bar holes on the front and rear edges of the platform.

Standard 1/4-20 or 3/8-16 camera mounting bolts

AFC mounting holes

M5 threaded holes, 6 mm deep and evenly spaced. The AFC with slip rings has seven of these. The AFC without slip rings has eight.

These can be attached to a Vinten, Bowl, or Mitchell mount by MRMC.
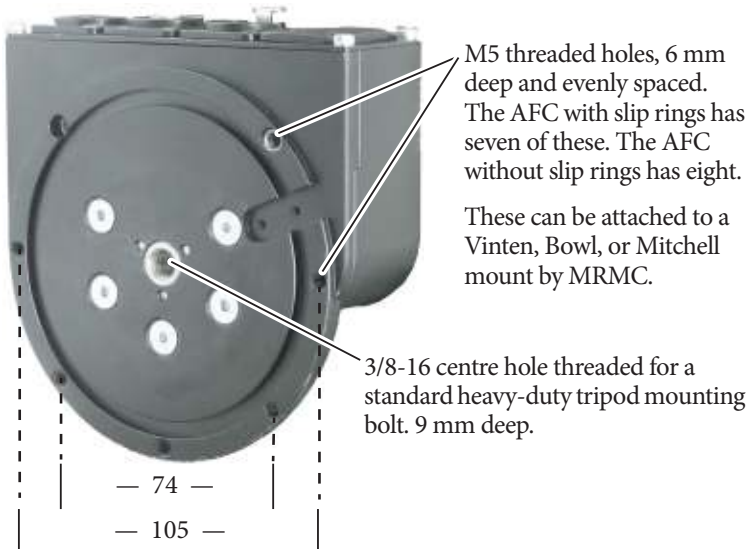
3/8-16 centre hole threaded for a standard heavy-duty tripod mounting bolt. 9 mm deep.

— 74 —

— 105 —

Optional large mounting plate

M5 unthreaded countersunk holes for attachment to the bottom of the head, using M5 CSK (countersunk) bolts 12 mm long.

Thickness: 8 mm

92 110 170
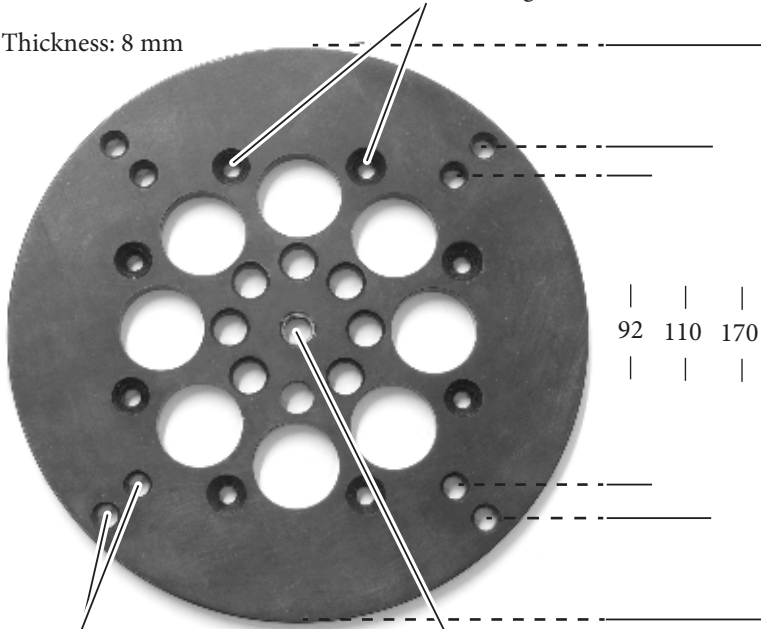
M6 unthreaded holes around the edge for mounting the plate onto any solid surface.

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.

Optional riser

For a view of the completed riser and head see page 2.

M5 CSK (countersunk) bolts 12 mm long.

Plate thickness: 8 mm

Small riser plate. Top and bottom plates are identical, but the bottom one is inverted to cater for the countersunk bolts that go into the columns

M5 cap-head bolts for attaching the riser to the base of the head, 12 mm long.

110 mm final height

Riser columns

M6 bolts or screws suitable for the surface on which you are mounting the riser.

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

M5 CSK (countersunk) bolts 12 mm long.

Small riser plate

M5 unthreaded countersunk
holes for attachment to the
bottom of the head, using M5
CSK (countersunk) bolts 12
mm long.

Thickness: 8 mm

92   145

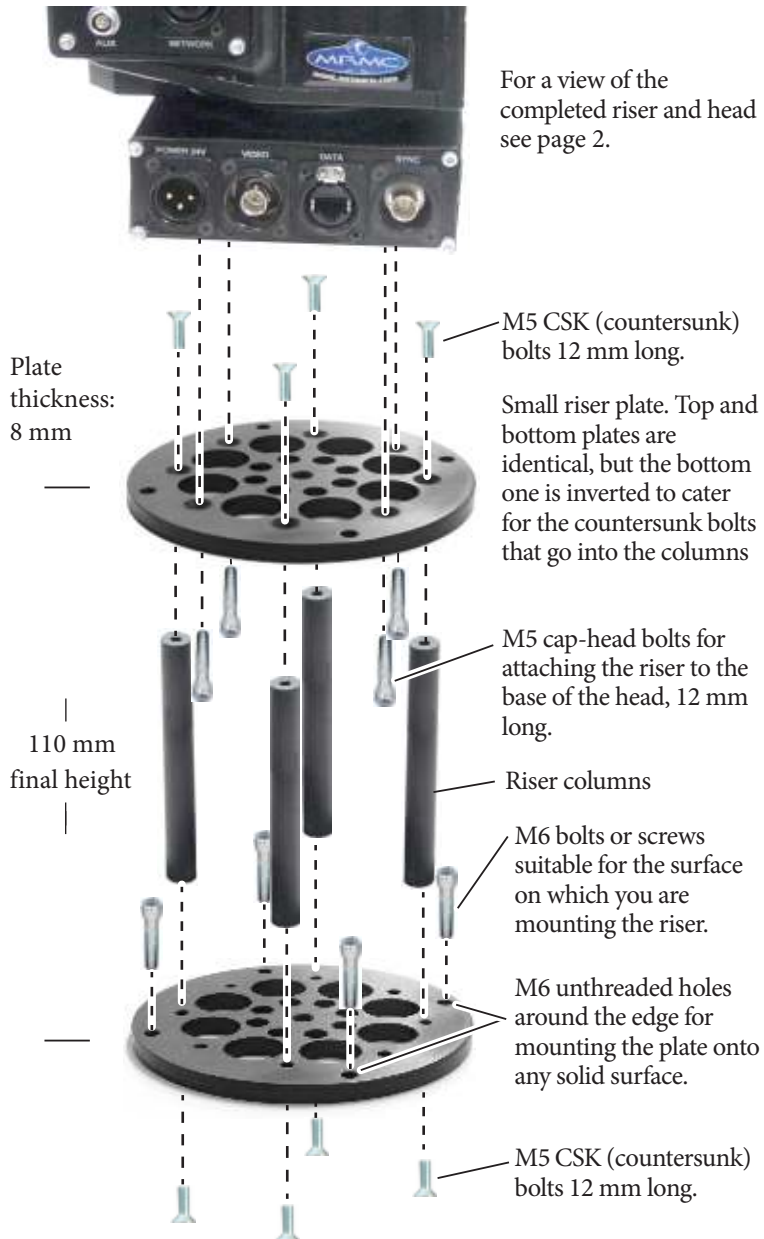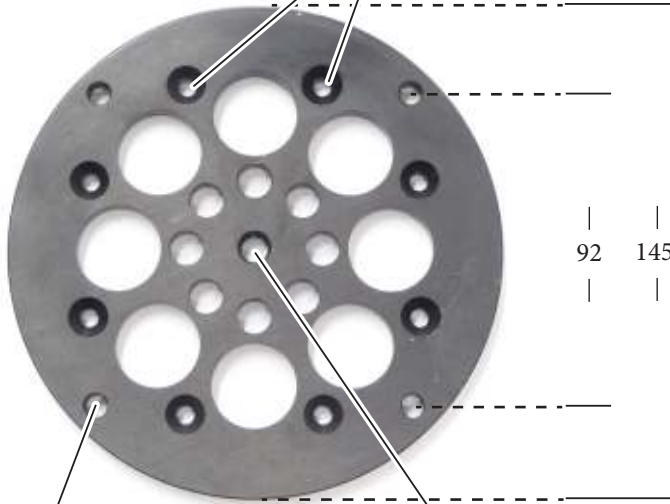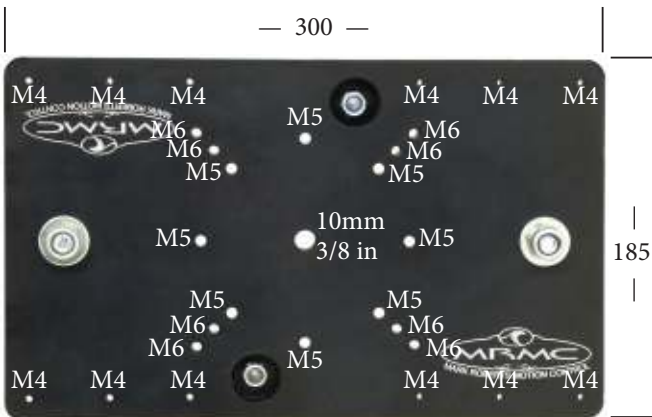M6 unthreaded holes
around the edge for
mounting the plate onto
any solid surface.

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

Optional scaffolding plate

— 300 —

M4　M4　M4　　　　　M4　M4　M4

M5

M6
M6
M5

M6
M6
M5

185

M5　　　10mm　M5
　　　　3/8 in

M5　　　　　M5
M6　　　　　M6
M6　　　M5　M6

M4　M4　M4　　　　　M4　M4　M4

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

M5 cap-head bolts, 20 mm long, through plate and into AFC base.

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

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

M5 threaded holes in AFC base, 6 mm deep
x 7 for AFC with slip rings
x 8 for AFC without slip rings

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

Optional scaffolding plate and riser

M5 30 mm cap-head bolts through scaffolding plate and riser plates x4

Scaffolding pole diameter 50m mm

M5 CSK 12 mm bolts into riser columns x 4

Plate thickness: 8 mm

Small riser plate

M5 nuts x 4

Riser columns

M5 12 mm bolts into head x 4

Small riser plate

M5 CSK 12 mm bolts into riser columns x 4

Bolt the scaffolding plate, riser, and head together 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, riser and head see page 3.

Notes