Proteân XMi

Instructions

Ver 7.2 – 02/07/2019

Contents

* Not installed at the time of writing.

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Introduction

The **Proteân XMi** has significant advances over previous designs and is available with a variety of options. When referring to this manual check the options fitted to your remote head and be sure to refer to the appropriate section.

The most usual options are;

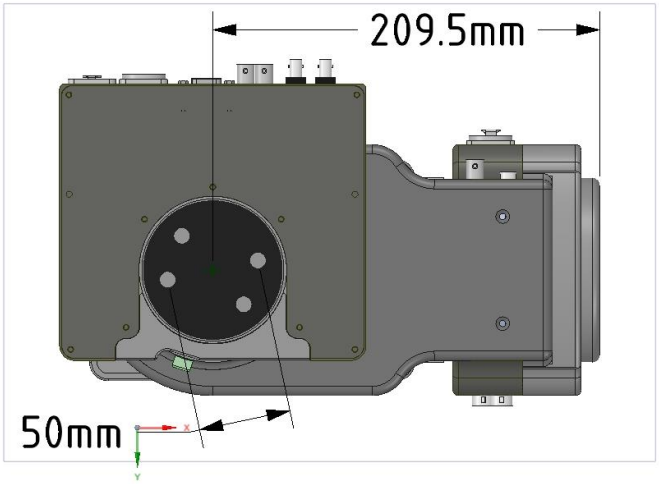
- Camplate Extension
- Width extenders - 50mm increments
- Height Extenders – 100mm increments
- 2nd Side support – for heavy cameras
- Slip Rings – for continuous panning
- IP Control Interface
- Fibre Output Interface
- Fibre Control Interface
- External Lens Servo Interface
- Front Tally Light

Mounting the Proteân XMi

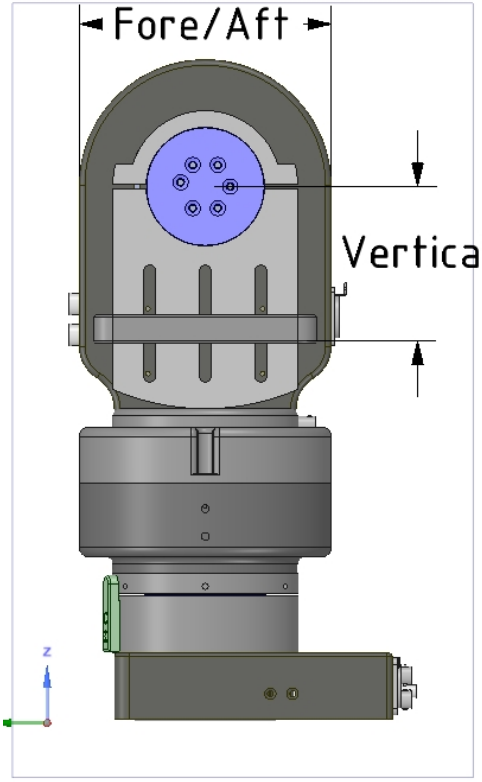
The **Proteân XMi** can be mounted either, upright, as shown in the cover picture, or inverted. Use ***at least*** 2 mounting bolts when rigging the head inverted. **Always use the safety bond attachment on the base of the unit.** This is fitted with an M6 bolt for attaching to a safety bond or chain. This bolt passes through the base clamp and into the main pan shaft.

There are 4 mounting threads on the base of the unit. These are standard 3/8" UNC camera mounting threads. They are arranged in pairs, diametrically on a 50mm pitch circle diameter.

The **Proteân XMi** **must** be mounted to a **rigid support**. Any movement in the support will result in unwanted oscillations.



Balancing the Camera



The **Protean XMi** can cope with slightly out of balance loads, but when power is removed the camera will tend to rotate about the TILT axis to settle at the balance position.

With power removed adjust the balance of the camera so that it doesn't move or ***just*** moves to a settling position that you have set by balancing.

One suggestion is to balance the camera Fore and Aft perfectly but allow it to be ***slightly*** lower than neutral so that it tends to settle horizontally when the power is removed.

There are 3 bolts securing the camera plate to the drop arm. These are used to adjust the camera plate up and down for perfect balance.

Check out the video at:
https://www.youtube.com/watch?v=GJy1MJTVMRU

PID Adjustment

For certain camera loads with a higher *moment of inertia* it may be necessary to adjust the **PID** (Proportional, Integral, Differential) values of the motors.

These will need adjusting if the camera oscillates, overshoots a position or under shoots a position.

For details of how to adjust the PID values contact BR Remote for advice and guidance.

Pan & Tilt Home Position

When the unit powers up it needs to find its absolute HOME position. Both the Pan and Tilt HOME positions are indicated with arrows on the pan and tilt axes.

It is **very important** that when the unit is rigged with a camera that these positions are **both within the working arcs** of pan and tilt. Make sure that when the camera pans and tilts it can pass both these positions.

Failure to ensure this will render the pre-set positions and profile moves unusable.

A 'User Home' position can be set if required. The absolute HOME position cannot be changed.

If the unit fails to HOME correctly it can be driven to a position close to HOME and use the ***'Re-Home'*** command.

Inverted Rigging

To satisfy the HOME condition above, when rigging the unit inverted the Drop Arm needs to be rotated through 180degrees.

Using a suitable allen key, loosen the clamp bolts as shown.

The Drop Arm can now be rotated on the Boss through 180degrees to allow for mounting the unit inverted.

When inverted the camera needs to be mounted 'back-to-front' to orient the lens and camera connectors correctly.

Make sure that the arrow indicating the absolute HOME position is located as shown. This enables correct homing when powered up.

Check out the instruction video at; www.youtube.com/watch?v=e0FpOJ8BTqA&t=36s

Extending the Head

The **Proteân** can be extended in both width and height.

Warning: DO NOT ATTEMPT TO EXTEND THE HEAD UNLESS YOU HAVE EXPERIENCE IN ELECTRONIC AND MECHANICAL ASSEMBLY!

A **Wide Extension** adds 50mm to the width. **Risers** add height in 100mm increments.

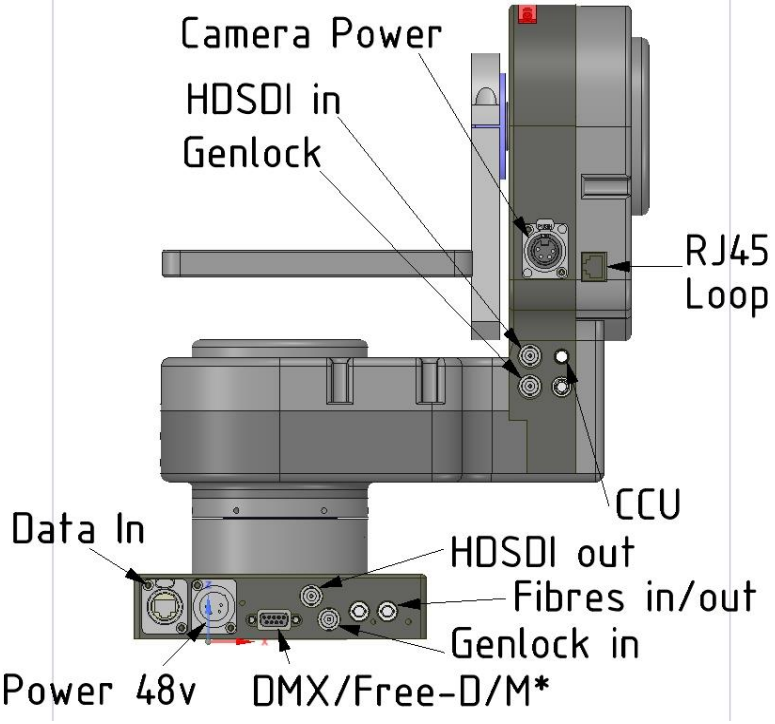
You may need a **Long Drop Arm** for taller cameras.

Check out the instruction video at; https://www.youtube.com/watch?v=__b_TRSu97A

Connections – Back

Some of the connectors on the base can be changed or configured to customer specifications.

For example; The ***Data In*** connector can be either a **3 pin XLR** for RS485 data input or an **RJ45** for IP connection. The **RJ45** can be configured as a loop-thru, via the slip rings, to the **RJ45** at the top.



Data In As standard this is an XLR3 connector for D* Protocol over RS485. It can be replaced with an RJ45 connector and an **IP interface** fitted inside. This can receive either D* or M* Protocols over IP. Alternatively, this can be connected through the slip rings (if fitted) directly to the RJ45 Loop connector at the top.

Power 48v A 48v PSU is supplied with the unit which connects here. D* data can also be injected into this socket if required. See Pinout details below.

Dsub9 This connector is designated for motion control inputs and outputs. **DMX**, **Free-D** or **Mstar** protocols can be used for positional control. Metadata, in Free-D or Mstar format is continuously output on this connector.
The Free-D format can be either original angular format or RAW as a numerical format which allows for 360 degree positioning data. The data format for this connector is configured from our **Multi Function Controller** or supplied with the customer requirement pre-set.

HDSDI out This is a 3Gb link via the slip rings from the **HDSDI in** connector at the top of the unit.

Genlock in Connects directly to the **Genlock out** connector at the top of the unit.

HDSDI Fibre If fitted this is an ST connector and carries the HDSDI picture output from the camera. The camera is connected to the **HDSDI in** connector at the top of the unit.

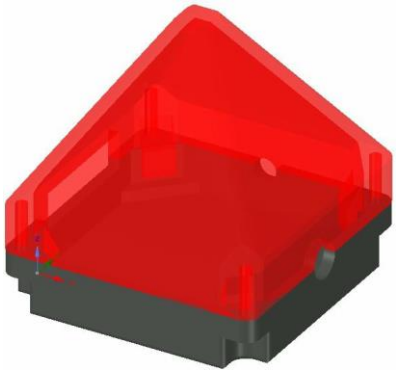
Data Fibre If fitted this is an ST connector and carries the same bi-directional data as the **Dsub9** and also Dstar Protocol. To use the data on this fibre a '**Base Station**' is required to decode the fibre signals. This presents the signals on the same electrical connectors as above.

Camera Power 4pin XLR supplies 12v @3A for powering cameras.

RJ45 Loop If an IP adaptor is not fitted this is a direct loop from the RJ45 socket on the base.

CCU This is a 7pin Lemo socket which can handle bi-directional RS422 camera CCU data and other formats. Various camera protocols are built-in. This means that many makes of camera can be controlled via data embedded within the movement control data (**Ikegami, Sony, Hitachi, Panasonic, JVC** and others on request).

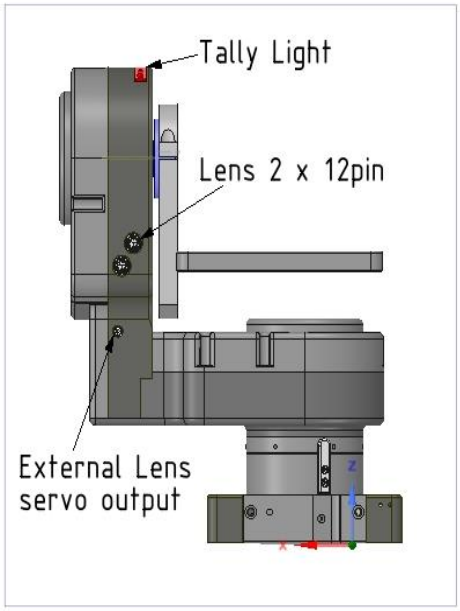
Spare A spare connector position is provided on the back. This can be fitted with a connector and used for external functions; an external Tally Light, for example.



Connectors – Front

Lens

On the front of the unit are 2 x 12pin Hirose connectors. The female connector duplicates the connector found on many cameras. Using this connector rather than the camera connector gives the head the ability to control the iris directly and the **zoom position** for the pre-set positioning functions. This connector also provides power for the lens.



The male 12pin connector is a standard remote lens connector and outputs zoom, focus & iris control for 'remote-type' lenses. If the lens is not a 'remote-type' and has only one cable, you will need an adapter cable for the particular lens.

Note: Canon & Fujinon broadcast lenses sometimes use similar connectors but control the zoom on different pins.

Zoom Position Control

To use the positioning features of the **Proteân**, both 12pin connectors may be required. This depends on the lens.

Iris Control

To control the iris from a non **BR Remote RCP** *and* have zoom positioning control the **iris input** connector needs fitting. This is a 4 pin Hirose connector. A 12pin to 4pin cable connects the camera lens connector to the iris input. The head reads the iris commands from the camera and passes them on to the lens. It also returns the iris position to the camera. To prevent accidental iris movement a significant move is required to swap control from the Multi Function Controller to the RCP and vice versa.

Lens Servo

If using external lens servos, this socket can be fitted and configured to supply data and power for lens servos. An optional tally light can also be fitted into this position.

Pinouts

Data in – XLR3

Pin 1 – GND
Pin 2 - RS485 A
Pin 3 – RS485 B

Power In – XLR5

Pin 1 – GND
Pin 2 - RS485 A
Pin 3 – RS485 B
Pin 4 – n/c
Pin 5 - +48v

Motion Control – Dsub9

Pin 1 – GND
Pin 2 - Metadata Out A
Pin 3 – DMX / Free-D / M* In B
Pin 4 – n/c
Pin 5 - n/c
Pin 6 – n/c
Pin 7 - Metadata Out B
Pin 8 – DMX / Free-D / M* In B
Pin 9 – n/c

CCU – Lemo 7pin

Pin 1 - GND
Pin 2 - RS 422/485 out A, (TTL out)
Pin 3 - RS 422/485 out B
Pin 4 - 12v In/Out
Pin 5 - RS 422/485) in A
Pin 6 - RS 422/485) in B
Pin 7 – n/c

Iris Input – Hirose 4 pin

Pin 1 - GND
Pin 2 – Iris command FROM camera
Pin 3 – Iris position TO camera
Pin 4 – n/c

Connection to a Controller

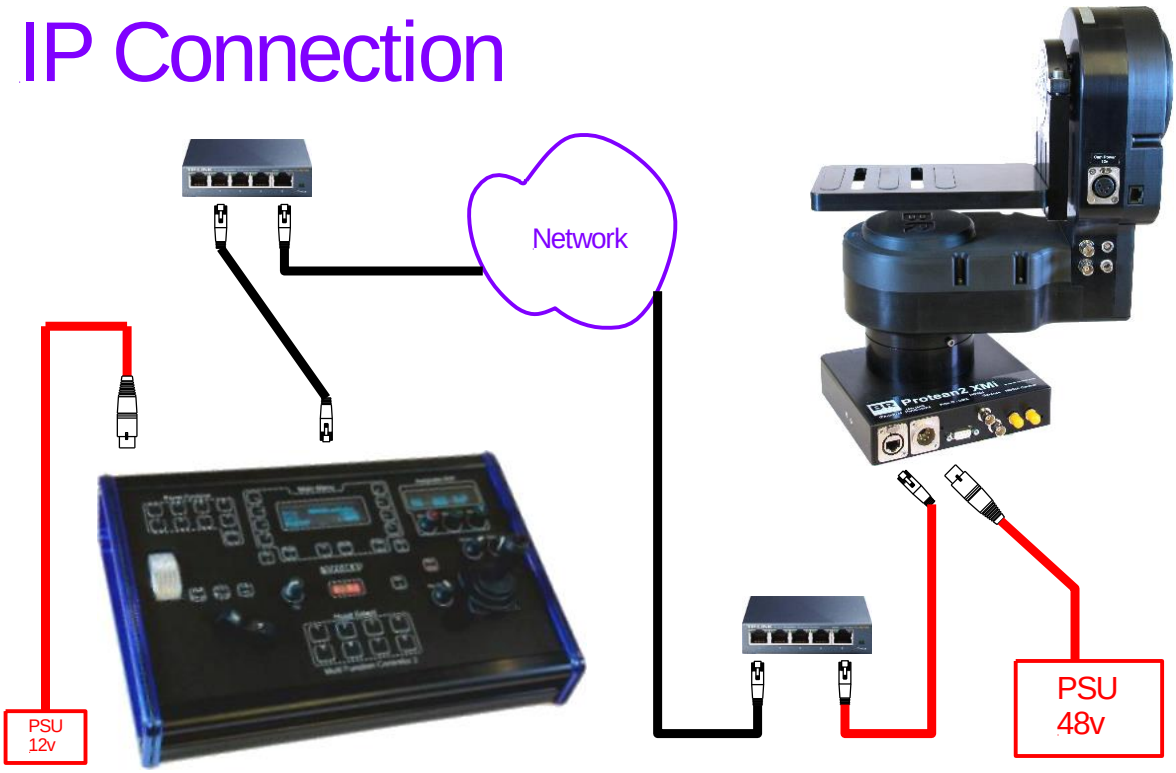
There are several methods of connecting the **Protean XMi** to a control system;

1. RS485 - illustrated below
2. IP - illustrated below
3. Fibre - see additional information with fibre interface

To test the unit, use one of the methods below.

RS485 Connection

IP Connection



IP addresses are pre-configured and use UDP multicasting as the default setting. This gives the lowest latency and control response. The system is plug-and-play if used on the same network. To use it over the internet it is best to set up a VPN. (Virtual Private Network). No re-configuration is required if this is done.

To re-configure the IP settings contact BR Remote for a link to the web tools.

Joystick Control

Manual joystick control is generally the most common method of controlling the **Proteân XMi**. Many parameters can be adjusted including joystick direction, speeds etc.

Even when being controlled manually with a joystick controller, the unit continuously outputs positional metadata which can be used to pin graphics and other AR and VR visuals.

As supplied, the unit is set to HEAD Ident #01. To change the Head ID see the instructions for the controller you are using.

Here are some of the commands the **Protean XMi** can receive and process;

Head

FUNC No.	Command Parameter
0	Pan, Tilt & Zoom
0	Focus
1 & 2	Iris
3 & 4	Power On/Off
5 & 6	Pan & Tilt Gear
7	Reverse P&T directions
8 & 9	Zoom Drift adjust
10	Restore Factory settings
11 - 14	Set Head ID
23 & 24	Remote Relay
45 & 46	Tally
47	Pan & Tilt Limits
48	Store Pre-set
49	Go To Pre-Set
50	Turbo Speed
51 & 52	Cam Display
81 & 82	PTZF Absolute positions
84	Profile Move Adjust
85	**Config & Setup**
85	Set Home
85	Go To Home
85	Acceleration
85	Velocity
85	Deceleration
85	Set Limits
86	Velocity Demand
87	Record Move Trace
88	Perform Move Trace
89	Set Protocol
94	PTZ Position Limits
95	Reverse Focus
96	Reverse Zoom
105	Information Request
108	Picture flip & mirror
111	Set DMX Base Address
112	Register & PID values
116	ND Filter Drive
150-189	Motion Control Commands
199	Head Settings Request

CCU

FUNC No.	Command Parameter
1 & 2	Iris
15 & 16	Picture Enhance
17 & 18	Master Gain
19 & 20	Auto Iris
25	White Push
26	Auto Tracing White
27 & 28	Auto Focus
31	Pre-set white 3200k
32	Pre-set white 5600k
35 & 36	Camera Format
37 & 38	Shutter
45 & 46	Tally
51 & 52	Cam Display
53	Manual White
54 & 55	Red Gain
56 & 57	Blue Gain
60	Bright
61	Saturation
62	Knee
64 & 64	Master Pedestal
66	Bars
67 & 68	Red Pedestal
69 & 70	Blue Pedestal
71	Gamma
72	Black Gamma
73	Extened Functions (ECS)
74	Dynamic Noise Reduction
75	Genlock & Sync
79	Auto Black
80	Filter Wheel
92	Colour Matrix

Most of these parameters can be adjusted with the **Multi Function Controller** and our **Remote Camera Panel**. Virtually any setting value can be requested from the unit.

In addition to the parameters above, there are numerous 'engineering' commands. Setting the PID values for Pan & Tilt, for example.

LCD Display

The LCD display on the side of the unit shows both operational and diagnostic information on several pages. The pages are scrolled using the ***Echo Head Display*** function in the MFC main menu.

For diagnostic purposes the cover over the display can be removed and there are **Page up** and **Page down** buttons on the PCB. The display also shows many of the internal registers and settings. These values may assist in diagnosing any issues that may arise. **BR Remote** technicians will guide you through this process if needed.

A useful page is the Data Input page. This shows the data sent form the controller in Dstar format.

Pre-Set Positions & Profile Moves

Up to 64 pre-set positions can be stored and recalled in the head. (dependent on controller) Each position includes, Pan, Tilt, Zoom and Focus positions. Once stored, the positions are saved during power loss. Simply drive the head to the required position and ***Store*** this position as a Pre-Set.

A major feature of the **Proteân XMi** is that it always does a ***Smooth Profile Move*** **to** each pre-set position. The profile of this move can be specified by the operator using the **Multi Function Controller**. All axes, Pan, Tilt, Zoom & Focus, default to move in the same amount of ***time*** to the pre-set position. The Zoom can be adjusted to start and stop before or after the main pan/tilt move.

Default Total Time = 4.5sec.
Default Ramp Up = 1.5sec.
Default Ramp Down = 1.5sec.

These settings are automatically stored but can be adjusted at any time from the **Multi Function Controller** Total Time, Ramp Up time, and Ramp Down time, Zoom Start and Zoom Stop can be adjusted by the operator for each pre-set position independently.

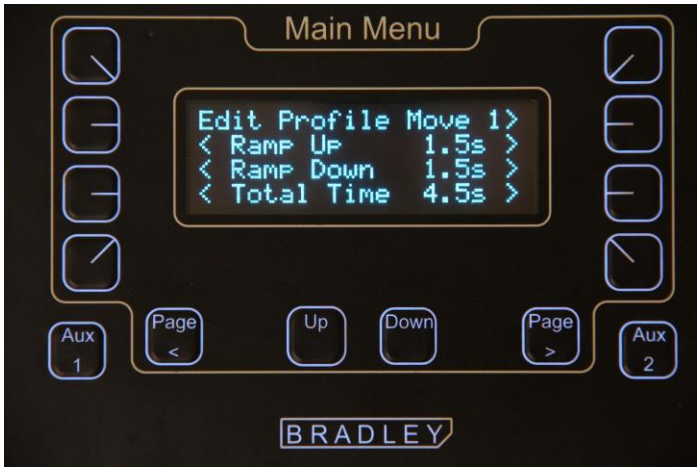


Fig.1 shows a profile move for Pan, Tilt., Zoom and Focus. In the move illustrated, pan has further to move than tilt, therefore pan moves at a faster speed than tilt so that it stops at position 2 at the same instant as tilt.

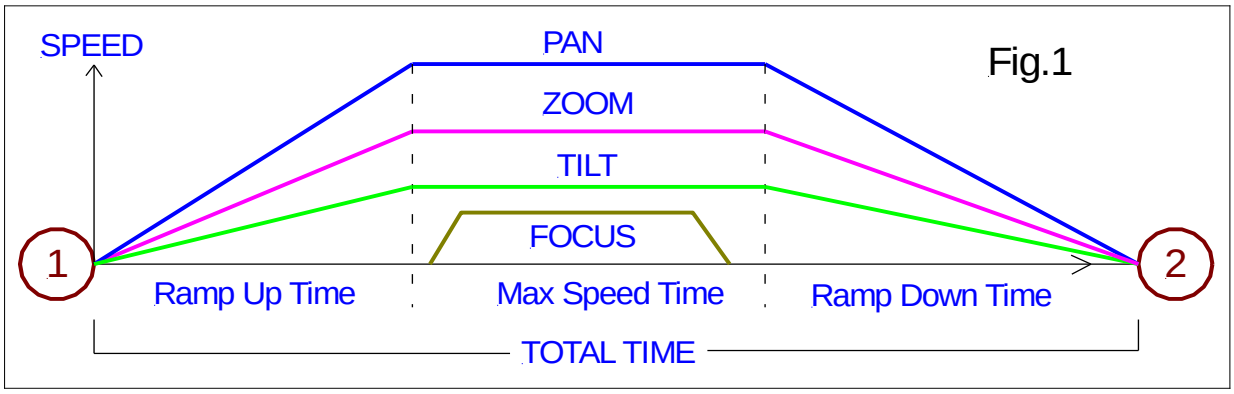


Fig.1

The default setting is that zoom also moves in the same time but the zoom start and stop times can be adjusted. The Zoom Start can be adjusted to be before or after the main move. The Zoom End can also be adjusted to be before or after the main move. Focus moves during the centre portion of the move so that objects of interest are not de-focused during the start or end of the move.

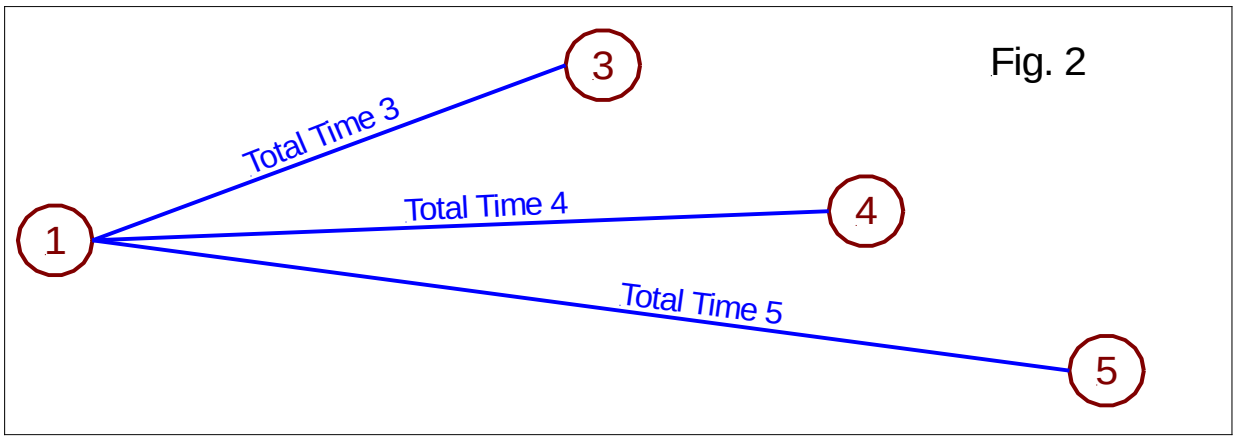


Fig. 2

The Profile of each move is stored with each position. **Fig.2** illustrates that each move **TO** a pre-set position will take the time associated with that end position. Understanding this enables efficient use of the same start position.

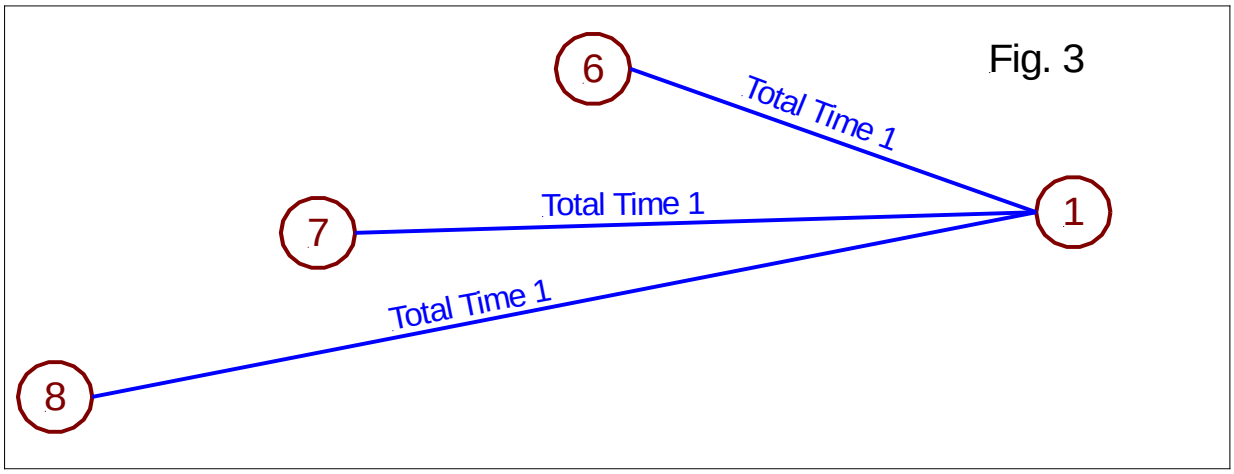


Fig. 3

Fig.3 illustrates the opposite situation to Fig.2. Because each of these moves ends with position 1, each move will take the same amount of **time** – as defined by the profile associated with position 1. Therefore, the speed from position 8 will be the fastest.

If the move is taking too long the operator simply needs to push the pre-set position button again and the camera will reposition as fast as possible.

The camera will make the profile move from **wherever it is** to the pre-set position selected, always in the same amount of **Time**. Therefore, the camera will move faster if the move is further.

To perform the same move repeatedly use 2 pre-set positions. 1 for the start position and 1 for the end position.

Should you just want to move to a pre-set position as quickly as possible, just push the button again or send the GoTo command again. The head will interpret this as a command to get there as quickly as possible.

Move Tracing – To Be Confirmed

Move Tracing is the ability to record a move made manually with the joystick. Multiple positions are recorded and the time taken to perform the move. This move can be re-played and the move time can be adjusted up or down. It can even play the move in reverse which is useful for performing an accurate zoom in. Record it as a zoom out and replay it in reverse. (Further details when complete)

These built-in features enable operators to set up simple motion control moves without needing a controlling computer. It brings the ability to intersperse motion control moves into live action applications quickly and easily.

DMX Control

The **Protean XMi** can be controlled by any DMX lighting control system with 16bit precision for pan, tilt and zoom. Also, if the correct lens is used this can be controlled also. The unit uses 8 DMX channels for full control. Selecting DMX protocol and setting the '***Base Address'*** is done using the **Multi Function Controller.**

Ch Base Address	- Pan coarse
Ch Base + 1	- Pan fine
Ch Base + 2	- Tilt coarse
Ch Base + 3	- Tilt fine
Ch Base + 4	- Zoom coarse
Ch Base + 5	- Zoom fine
Ch-Base + 6	- Focus
Ch Base + 7	- Iris

Not all channels need to be used. At any time the operator can take manual control using the **Multi Function Controller**. The unit automatically reverts to DMX control when it detects no operator input ***and*** the DMX value changes significantly.

The **Proteân XMi** ensures that movement is not jerky yet remains accurate. Loss of data is tolerated because the firmware predicts future positions based on the previous move profile and fills in any gaps. This also enables operation with very low data rates and data drop-outs, with just the minimum of variance from the desired move profile.

To inhibit DMX control of any channel, ensure the DMX value does not change.

Motion Control

Full positional motion control can be achieved by using any number of motion control software applications. The unit continuously outputs **Free-D** or **Mstar** metadata in either standard angular format or RAW numerical format. The RAW format enables metadata and control over the full 360degrees of movement.

The unit can be controlled with commands in **Dstar, Mstar, DMX** or **Free-D** protocols. Using **Mstar** protocols enables simultaneous motion control along with all other commands (eg. CCU commands) to be sent on the same data stream, either via RS422 or via an IP network.

Dstar protocol
RS485, 9600 baud, 8 data bits, no parity, 1 stop bit.

Mstar protocol
RS422, 38400 baud, 8 data bits, no parity, 1 stop bit.

DMX protocol
RS422, 250,000 baud, 8 data bits, no parity, 2 stop bits.
RS422 line is not terminated to 120 ohm.

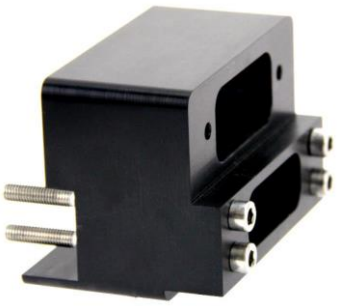
FreeD Protocol
RS422, 38400 baud, 8 data bits, odd parity, 1 stop bit

Full details of both **Dstar** and **Mstar** protocols are available on request.

Support and Optional Equipment

100m Riser – extends the height of the **Proteân** in 100mm increments.

Long Drop Arm – For taller cameras or over-slinging when used with Risers.



50mm Width Extension – widens the head for wide cameras

Wide Camera Plate – to match Width Extension

Camplate Extension – moves the camera mount rearwards for balancing. Used for standard 'Box' cameras with B4 lenses.

Multi Function Controller

This controller has all the functionality to achieve the best from the **Proteân**. It has access to all the set-ups and enables configuration of protocols, limits, PID settings etc. etc.

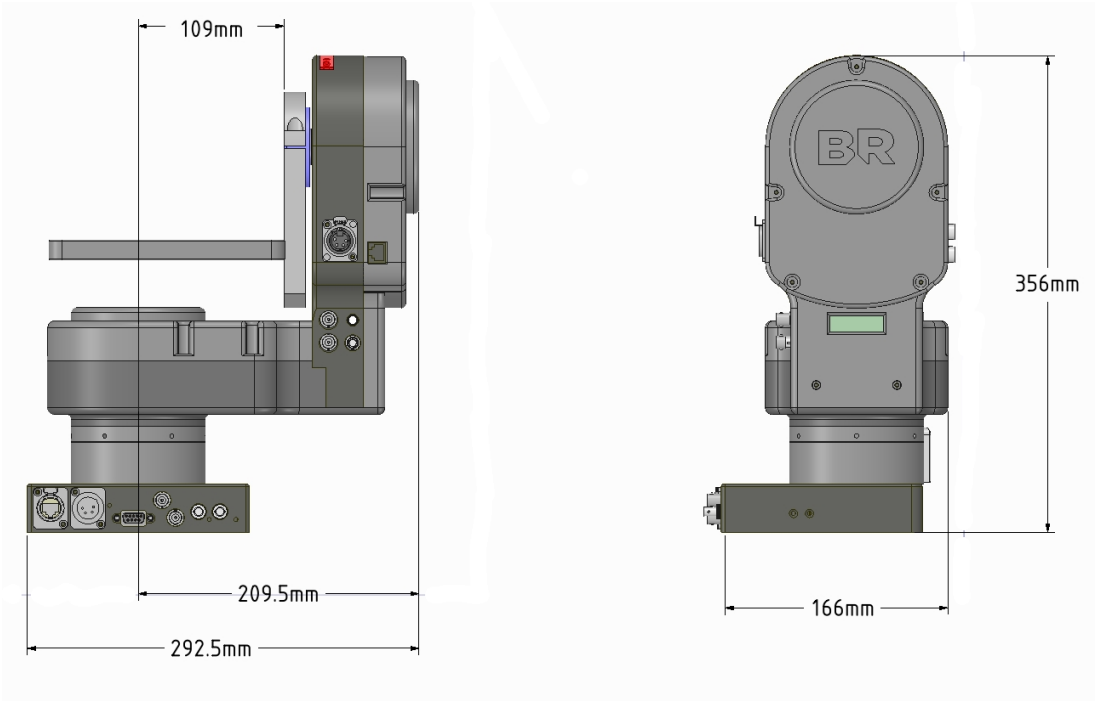
Integrated Options

Fibre converters – HDSDI over fibre and/or bi-directional control over 2nd fibre. ST connectors

IP Interfaces - Control over IP.

Specifications (TBC)

Weight:	7kg (Compact)
Capacity:	10kg standard (15kg with 2nd side support)
Dimensions:	Compact: W. 293mm, H. 356mm, D. 166mm Extended: W. 343mm, H. 656mm, D. 166mm (3 x height extensions) Max. width clearance to camera centre. 160mm Max. Tilt clearance from axis centre. 429mm
Movement:	Pan. +/- 170deg. Continuous 360deg with slip rings. Tilt. +/- 120deg. (with mechanical limits) Software limits can be set on both axes.
Speed:	From <0.05deg/sec to 180deg/sec. 10 electronic gears Fully proportional control.
Position Resolution:	0.005 deg.
Power:	48v 0.1A(idle), 2.3A max. + Camera requirement Camera PSU option – 12v 3A nominal.
RS485 Data:	9,600 baud – semi duplex



Proteân with 2nd Side Support, Wide Block and 2 x Risers.