GS200

Operation Manual

Ver. 2021.3

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The **GS200** is a fully integrated, gyro stabilised camera for a variety of broadcast applications. It is compatible with **Virtual Reality** (VR) and **Augmented Reality** (AR) applications because it outputs **Free-D** metadata as standard. This metadata is derived from the 16bit shaft encoders together with the gyroscopic and inertial sensors.

It has been designed to be as 'plug-and-play' as possible. The stabilisation gimbal does not require any line-up or calibration during rigging. This makes it extremely quick and easy to rig and be operational within just a few minutes. Should it require any adjustments of the movement or stabilisation, refer to the separate **GS200 Technical Manual**.

The **GS200** requires just power and control data. The control data can be routed via the RS485 serial input or over an IP network. The IP settings are pre-configured at the factory but can be re-configured at any time to suit the particular network. The default IP settings are listed later in this manual.

The **Free-D** metadata is also available as serial RS422/485 and on the network. This is configured at the factory and the settings are listed later in this document.

The unit is rugged and weatherproof and can be used externally without further protection provided socket shields are fitted on unused connections.

The **GS200** offers full broadcast CCU control of the camera with a dedicated **Remote Camera Panel.** This includes full matrix adjustments to enable picture matching with other cameras. Separate instructions are included for the **Remote Camera Panel**.

The camera operator panel is the BR Remote standard **Multi Function Controller** which has a dedicated control section for the **GS200**. Generic instructions are included in the included **Multi Function Controller** instruction manual.

System Components

GS200 camera unit

Lens Hood

55mm ND Filter set

Multi Function Controller

Remote Camera Panel

XLR4 – XLR4 cable

XLR3 – XLR3 cable

There are enough cables and power supplies to connect the system on the bench for testing and familiarisation of the controls and functions.

Mechanical Rigging

The **GS200** can be mounted to a variety of platforms;

Vehicles, Boats, Aircraft, Dirigables, Drones, Cable Camera Systems, etc.

On some platforms an isolation mount may be required to remove high frequency vibrations. **BR Remote** can supply various isolation mounts depending on the actual requirement.

The **GS200** can be mounted either way up, standing or hanging. If the unit is to be mounted above the heads of people then use at least 2 mounting bolts, perhaps with a 3rd for additional safety.   Mounting bolts are supplied with the unit and there is a video here: https://youtu.be/VVDzYAGpxD8 showing the ideal method of using the supplied bolts.

The mounting threads on the unit are standard 3/8" camera mounting threads.

It is recommended that *at least* 2 bolts should be used.

It is important to fit the Lens Hood.
This is part of the balance of the camera.

PCD 50mm
@ 90deg.

PCD 180mm
@ 60deg.
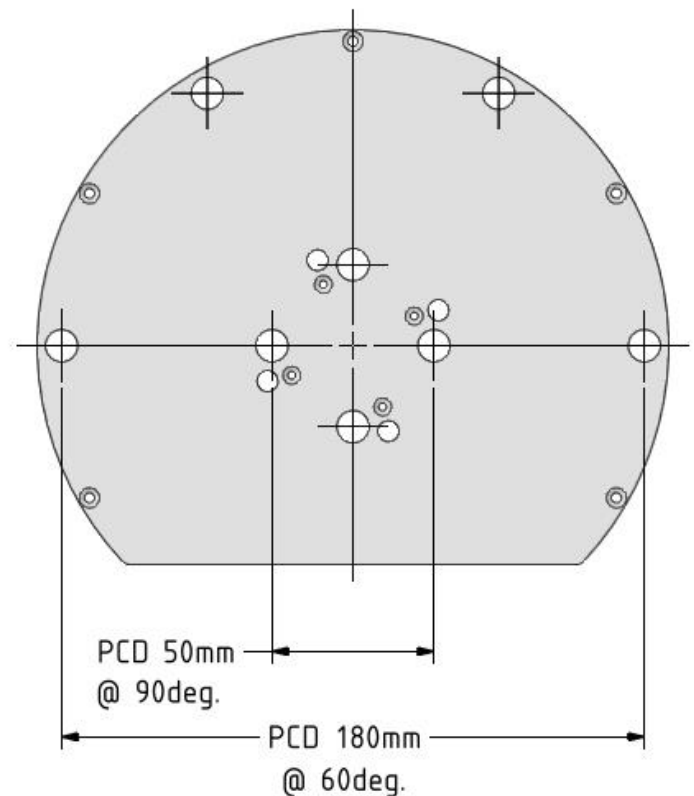
NB: Once the **GS200** is mounted, ensure the '**BR**' letters on the back of the ball are upright before powering up. This ensures the electronics and sensors have the best starting point for the auto calibration that occurs each time it is powered.

ND Filter

If the lighting conditions are bright sunshine it is better to fit one of the supplied ND Filters to allow the iris to operate below the extreme of F28. Aim to operate the lens between F5.6 – F8. Also set the **Dynamic Range** to LOW.

The ND filter is threaded on to the lens inside the ball.

Step 1:   Remove the front glass. This is sometimes tight as it is O-ring sealed. It simply pushes off using the small lip around the edge for purchase.

Step 2:   Screw the ND filter onto the front of the lens. The camera and lens will rotate on the roll axis but there is an end stop which will allow you to tighten of the ND Filter.

Step 3:   Using a **3mm AF** allen key, loosen the camera slide lock bolt as shown and slide the camera back by the thickness of the ND filter - 5mm. Then lock the slide into place with the lock bolt. The ND filter should be very close, but not touch, the front glass when it is replaced.

Step 4:   Replace the front glass and fit the lens hood.

NB: The **Lens Hood** is fitted with the clamping bolt located away from the frame to allow the maximum tilt angle. If the camera is mounted upright the clamp bolt should be at the top. If the camera is mounted inverted the clamp bolt should be underneath.

Wide Angle Lens Removal

The **GS200** can be supplied with a wide angle lens option. This can be removed if desired.

With the kit is an alternative Front Port fitted with a bearing specifically for use when the Wide Angle Lens is not required.

Step 1:   Remove the front glass. This is sometimes tight as it is O-ring sealed. It simply pushes off using the small lip around the edge for purchase.

Step 2:   Using a **3mm AF** allen key, loosen the camera slide lock bolt as shown and slide the camera forwards until the lens bearing is clear of the front.

Step 3:   Unscrew the Wide Angle Lens with the bearing.

Step 4:   Slide the camera forwards until it would sit about 1-2mm from the front glass and lock it into position.

Step 5:   Fit the Standard Lens Front Port supplied.

A Set of 55mmm ND filters is supplied for use when the Wide Angle Lens is not fitted.

Power & Control

There are 2 methods of connecting and controlling the **GS200**:

1. Power + RS485 control data.   This is via the XLR4 connector.

2. Power only via the XLR4 connector + Network data via the RJ45 network connector.

Caution: When supplying Power Only via the XLR4, **ONLY** use pins 1 & 4. Applying power to pins 2 or 3 will damage the data input.

Other connectors are detailed as shown.
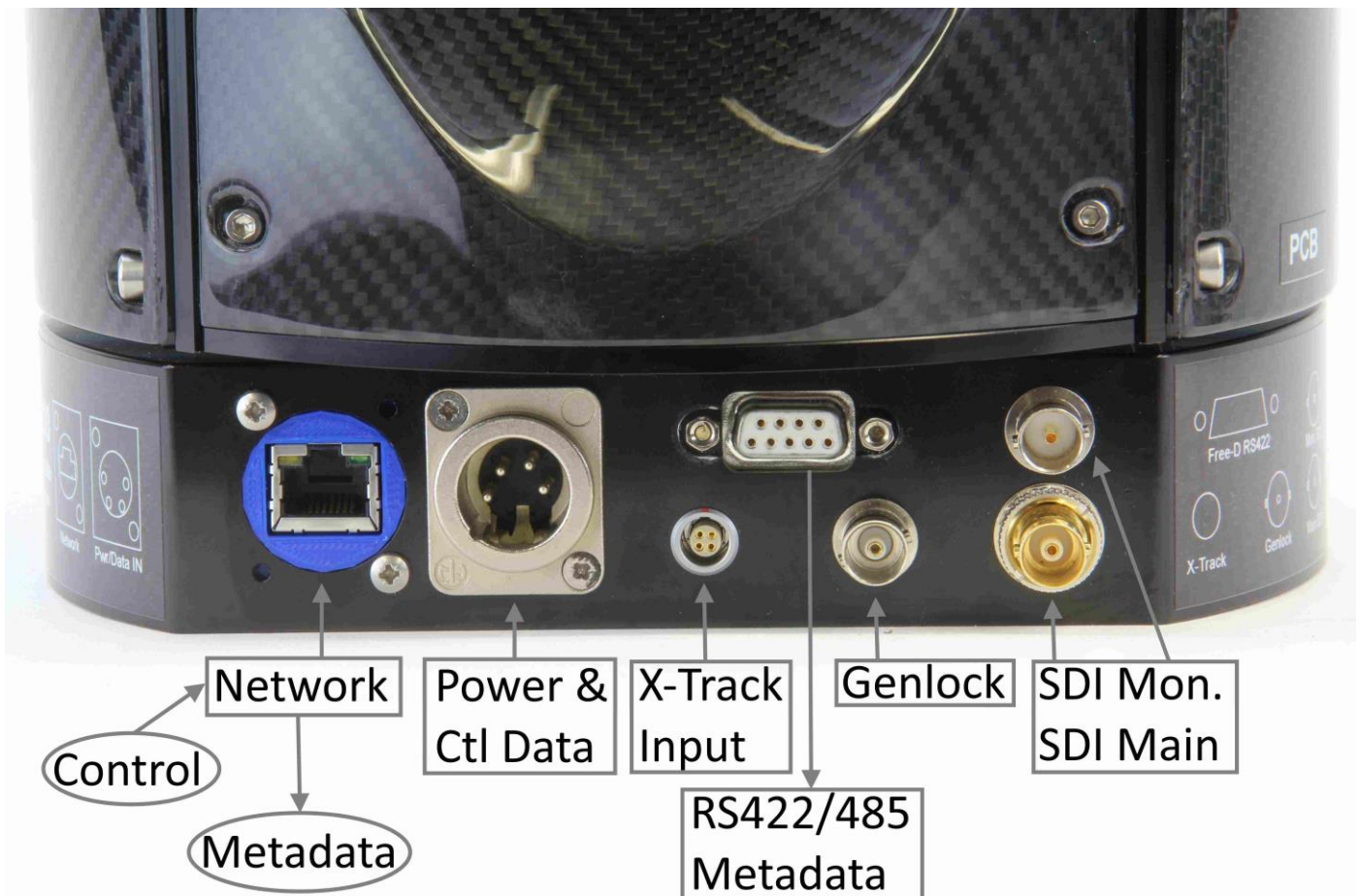
Metadata is always streamed onto the network or via the RS4322/485 output, whichever method is being used for control.

The optional X-Track input is specifically for the X-Track module. This can be re-configured for other data input purposes by request.

Connection Details

The **GS200** control data can be at either of 2 data formats;

1. 9,600baud, 8, n, 1   this is our standard Dstar setting.
2. 38,400baud, 8, o, 1   this matches Free-D and is used for the network input.

The **GS200** automatically switches to the incoming standard.

XLR4:   Pin 1 = GND
(& wire colours)   Pin 2 = RS485 A
                                                  Pin 3 = RS485B
                                                Pin 4 = 12 – 24v input

XLR3: (if fitted)   Pin 1 = GND
(& wire colours)   Pin 2 = RS485 A
                                                  Pin 3 = RS485B

X-Track Input (if fitted)   Pin 1 = GND
(& wire colours)   Pin 2 = RS485 A
                                                  Pin 3 = RS485B
                                                Pin 4 = 12v output

D-Sub (RS422/485 metadata: Pin 1 = GND
                                                  Pin 2 = RS422/485 A
                                                  Pin 7 = RS422/485 B

Genlock BNC: Black & Burst or Tri Level

SDI BNCs: 1.5Gb/s or 3Gb/s SDI – re-clocked
                                                  12Gb/s for UHD formats

Network Configuration: Mac Address: **See label on Base**
                                              IP Address: 192.168.0.240
                                              RX Port: 2101
                                              Destination IP: 192.168.0.255 (201 – 254)
                                              TX Port: 2101
                                              Data Baud Rate: 38,400 8,o,1

Any of the network settings can be changed by using the network configuration tool here:

https://www.wiznet.io/product-item/wiz108sr/

And following the specific instructions for the **IP Interfaces.**

Joystick Control

When using the joystick to control the camera there are several settings that can be used.

Pan & Tilt Directions – These can be changed using the PT Reverse command in the **Setup** menu. This command will cycle between the 4 combinations of Pan/Tilt directions.

Pan & Tilt Speeds – When adjusting the Speed knobs the display will show the speed settings.

Speed 1 – In speed 1 the pan & tilt speeds are proportional to the zoom angle. ie. If the zoom is wide the speed is higher. When you zoom in the pan & tilt speeds reduce to help with smooth camera control.

Speeds 2 – 10 – These are fixed 'gears' and do not change with the zoom angle.

Roll Levelling – The horizon can be levelled from the **Setup** menu by selecting **<Product>, <GS200>.** The roll control is via the **UP** and **Down** buttons below the menu. The horizon stability is very good and should require only occasional adjustment.

Zoom & Focus – The controls are arranged in the traditional positions. Focus is positional and Zoom is move based.

Zoom & Focus Reverse – Can be changed via the Setup menu. Select <**Lens**> for options.

Consult the dedicated **Multi Function Controller** manual for more detail on the adjustable parameters.

Re-setting & Power Saving

After a while, from a cold start, the camera may drift in pan, tilt or roll. This can be corrected with a re-boot from the Multi Function Controller. Go to the **Setup** menu and select <**Head**> then <**Power**>. This will bring you to the **Power Control** page.

Move the tilt to a roughly horizontal angle and select the <**Reboot**> option. This will reboot only the stabilisation electronics and will take a few seconds until you re-gain control.

To conserve battery power you can also put the **GS200** into *Standby Mode* which turns off the camera and the stabilisation. To switch them back on and return to normal operation select the <**Normal**> option.
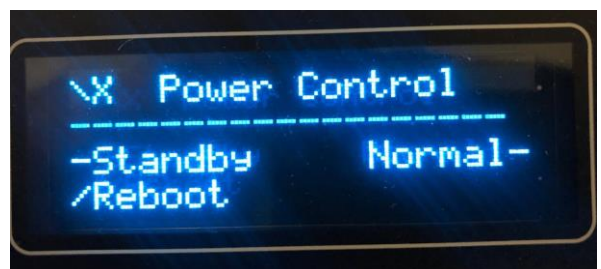
Remote Camera Panel

The **Remote Camera Panel** is connected to the **Multi Function Controller** using an XLR3 cable. A short XLR3 cable is supplied to bench test the system.

Any XLR3 audio cable or audio tie-line can be used for this connection up to about 1km.

Refer to the specific instruction manual for the **RCP**.

CCU Commands

The camera is supplied set to factory default settings. Some commands are set to AUTO but can be changed to manual if required. The camera will always power up with all the settings set as it was powered down. The settings can be restored to factory settings if needed.

To adjust the White and Black balance manually you need to be in 'Manual' which is automatically set when you select a 'Scene File'. There are 4 **Manual Scene Files**; A, B, C or D. which are accessible from the Remote Camera Panel. When working in a Scene File all changes are automatically saved in that Scene File.

White Balance:	Auto Tracing, 5600K (outdoor), 3400K (indoor), Manual, Push.
Red Gain: (Manual white)	Adjusts the RED balance in the light areas of the picture.
Blue Gain: (Manual white)	Adjusts the BLUE balance in the light areas of the picture.
Gain:	Adjusts the total GAIN in the whole picture.
Red Ped: (Manual white)	Adjusts the RED balance in the dark areas of the picture.
Blue Ped: (Manual white)	Adjusts the BLUE balance in the dark areas of the picture.
Green Ped: (Manual white)	Adjusts the GREEN balance in the dark areas of the picture.
Master Pedestal:	Adjusts the overall level of the dark areas of the picture.
Detail:	Adjusts the amount of high frequency detail in the picture.
Knee:	Sets the knee point at which the highlights are compressed. Range: OFF, 100%, 95%, 90%, 85%, 80%, 75% Knee is disabled when set to HDR mode.
Gamma:	Adjusts the Gamma curve to match human eye perception. Range: BT709 +/- 1 or 2 and HLG75
Chroma:	Adds or subtracts the amount of colour in the picture.
Shading:	Increases the brightness outside the centre area of the picture to compensate for lens shading.

Noise Reduction:	Dynamically reduces noise when adding gain.
Colour Matrix:	18 parameters can be adjusted. 3 for each of the 6 colours; Magenta, Red, Yellow, Green, Cyan, Blue.
D-Range:	Dynamic Range has 3 settings. Low, Normal and High. Low is better for outdoor bright scenes. High sets the camera to HLG HDR mode. Only use this if you are shooting in HDR or in low light situations. The Knee is disabled in HDR mode.
Colour Space:	BT.709 or BT.2020
Iris Reaction:	This sets the speed at which the iris reacts to control changes. To slow and it may appear sluggish. Too fast and it may be too 'steppy'.
IR Mode:	Switches the camera to 'Near InfraRed' and monochrome.
Output Standard:	Sets the output standard of the camera. Make sure your monitor can display the standard you are setting or no picture will appear. All **HD** standards are available.
<u>Note:</u>	Ensure you have control of the camera by operating the zoom before attempting an output standard change.

Movement

Pan:
Pan Movement: 360 deg. continuous

Tilt:
Tilt Movement: +/- 120 deg. From vertical

Zoom 18x:
Zoom Wide HFOV: Wide approx. 62 deg. Tight approx 5 deg.

Focus:
Focus Range: 10 mm. (at wide) - Infinity

Iris:
Iris Range: F1.6 – F28
Iris Resolution: 255 steps

Technical details, procedures for fault tracking and software updates etc. are available in the **GS200 Technical Manual** – available on request.