

# Tender Request and Specification for the Supply, Manufacture, Finishing and Assembly of Mechanical Hardware for the Bespoke Optical Mount Bundle

## 1 Introduction

This document presents the mechanical hardware to be supplied, manufactured, finished and assembled. An assembly drawing list is provided to express the quantity of hardware required. A parts drawing list of manufacturing drawings is also supplied for information on issued versions. The primary specification for the assemblies and components shall be the issued detail design drawings in conjunction with this specification. Some assemblies require supplier expertise to identify and supply suitable additional components to meet the function of the assembly. The components are all designed to hold and adjust optical components (such as mirrors or lenses) in a laser system. Optical components will not be supplied, but drawings for optical components can be provided to allow the supplier to manufacture testing components where appropriate.

## 2 Scope of Contract & Timescale

The contract covers the supply and delivery of all components necessary, including:

- Manufacture of components as per the drawings and specification
- Design and supply of springs, kinematic mounting and adjustment screws for optimum support and adjustment of optical components
- Supply of any off the shelf components required to complete assemblies (excluding optics)
- Finishing of components as per the drawings and specification
- Assembly of finished/purchased components with off the shelf items as per the drawings or equal and approved
- Cleaning of components and assemblies
- Functional testing of assemblies including provision of equipment and optic blanks as necessary
- Packaging and transportation to STFC RAL
- Making good any deviations from expected quality prior to delivery

The delivery of completed product is required a maximum of 20 weeks from receipt of order (FROO), where earlier delivery is preferred. It is acceptable to deliver components in stages provided the quality assurance requirements have been met. Items have been labelled for priority (1 to 5 with 1 as high) to allow the supplier to schedule manufacturing accordingly. A logically linked delivery plan considering the priority of items and their expected delivery (where staged) shall be included in the tender response.

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The price shall be broken down to assembly level in the tender response.

### 3 Drawing Lists

The table below shows the assemblies and components included in this bundle of work:

Drawing Number	Drawing Name	Issue	Quantity	Remarks	Delivery Priority
<b>10J Mirror Mounts</b>					
SL-1037380	SINGLE MIRROR (50x35x10) ASSY – 155mm BH	A	1		1
SL-1037409	SINGLE MIRROR (35x50x10) ASSY – 195mm BH	A	1		1
<b>10J Lens Mounts</b>					
SL-1037699	10J HORIZONTALLY ANGLED LENS ASSY – LA1	A	1		1
SL-1037700	VERTICALLY ANGLED LENS ASSY – LA2	A	1		1
SL-1037710	10J HORIZONTALLY ANGLED LENS ASSY – LA4	A	1		1
SL-1037711	VERTICALLY ANGLED LENS ASSY – LA3	A	1		1
<b>10J Waveplate Mounts</b>					
SL-1036867	WAVEPLATE-GONIOMETER ASSY (115)	A	1		1
SL-1036934	WAVEPLATE-GONIOMETER ASSY (195)	A	1		1
<b>100J Mirror Mounts (38 without spares, 20 with Picos)</b>					
SL-1036264	100J MIRROR MOUNT LH FW H157.5	A	2		2
SL-1036216	100J MIRROR MOUNT RH FW 42.5 DEG H240 (PERISCOPE)	A	1		2

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Drawing Number	Drawing Name	Issue	Quantity	Remarks	Delivery Priority
SL-1036214	100J MIRROR MOUNT LH FW H150	A	3		2
SL-1022774	100J MIRROR MOUNT RH FW H150	C	3		2
SL-1036230	100J MIRROR MOUNT RH FW H150	A	2		2
SL-1036218	100J MIRROR MOUNT RH FW H111.5	A	4		2
SL-1036265	100J MIRROR MOUNT LH FW H202.5	A	1		2
SL-1036266	100J MIRROR MOUNT LH FW H137.5	A	1		2
SL-1036215	100J MIRROR MOUNT RH FW 45 DEG H261	A	1		2
SL-1036219	100J MIRROR MOUNT RH SPECIAL 110	A	1		2
SL-1036232	100J MIRROR MOUNT RH FW H111.5	A	4		2
SL-1036220	100J MIRROR MOUNT RH FW 45 DEG	A	1		2
SL-1036221	100J MIRROR MOUNT LH SPECIAL	A	1		2
SL-1036217	100J MIRROR MOUNT RH FW H 152.5	A	1		2
SL-1036222	100J MIRROR MOUNT RH FW 45 DEG	A	1		2
SL-1025121	100J MIRROR MOUNT RH FW 45 DEG	B	1		2
SL-1036231	100J MIRROR MOUNT LH FW H150	A	6		2
SL-1036267	100J MIRROR MOUNT LH FW H152.5	A	1		2
SL-1036663	100J MIRROR MOUNT RH FW H116	A	1		2
SL-1025453	100J MIRROR MOUNT LH FW DF SPECIAL	A	1		2
SL-1022774	100J MIRROR MOUNT RH FW H150	C	1	EXCL. ITEMS 1, 2, 6-14, 16, 17	2

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Drawing Number	Drawing Name	Issue	Quantity	Remarks	Delivery Priority
<b>100J Lens Mounts (14 without spares)</b>					
SL-1024296	HILASE 100J LENS MOUNT H TILT 150	B	1		2
SL-1036601	100J LENS MOUNT H TILT 156	A	1		2
SL-1036224	100J LENS MOUNT H156 TILT 3 DEG	A	1		2
SL-1036225	100J LENS MOUNT ASSEMBLY H 150 3 DEG	A	1		2
SL-1036226	100J LENS MOUNT ASSEMBLY H150	A	3		2
SL-1036227	100J LENS MOUNT ASSEMBLY H150	A	4		2
SL-1036274	100J LENS MOUNT ASSEMBLY H119.5	A	1		2
SL-1036764	100J LENS MOUNT ASSEMBLY H116.5	A	1		2
SL-1037538	100J LENS MOUNT ASSEMBLY H111.5	A	1		2
SL-1024296	HILASE 100J LENS MOUNT H TILT 150	B	1	EXCL. ITEMS 2 TO 13 (spare for HILASE)	2
SL-1036225	100J LENS MOUNT ASSEMBLY H 150 3 DEG	A	1	EXCL. ITEMS 1, 2, 4, 5, 6, 9, 10, 11, (spare for HILASE)	2
<b>100J Quartz Rotator</b>					
SL-1036766	100J QUARTZ ROTATOR MOUNT ASSEMBLY	A	2		3

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The table below shows the part drawings required for this bundle of work:

Drawing Number	Drawing Name	Issue	Remarks
<b>10J MIRROR MOUNTS</b>			
<b>SL-1037380/A</b>	<b>SINGLE MIRROR (50X35X10) ASSY – 155mm BH</b>	<b>A</b>	
SL-1023277/A	MOUNTING BRACKET	A	
SL-1023320/A	MIRROR MOUNT SPIGOT	A	
SL-1037363/A	MIRROR UNIT SIDE ASSEMBLY 40x40	A	
SL-1026054/A	CLAMP SPINDLE - MIRROR ARRAY	A	
SL-1032907/A	10J HR RECTANGULAR MIRROR	A	
SL-1037369/A	SIDE MIRROR FRAME 35x50 (10 THK.)	A	
SL-1037377/A	DRAW CATCH ASSEMBLY	A	
SL-1019234/C	PLUNGER DRAW CATCH ARM	C	
SL-1020630/B	SHORT PULL BAR LINK	B	
SL-1037376/A	PLUNGER DRAW CATCH	A	
<b>SL-1037409/A</b>	<b>SINGLE MIRROR (35x50x10) ASSY – 195mm BH</b>	<b>A</b>	
SL-1023320/A	MIRROR MOUNT SPIGOT	A	
SL-1023833/A	OPTICS MOUNTING BRACKET	A	
SL-1037402/A	SHORT MIRROR UNIT ASSEMBLY 40x40	A	
SL-1026013/A	CLAMP SPINDLE - MIRROR ARRAY	A	
SL-1032907/A	10J HR RECTANGULAR MIRROR	A	
SL-1037403/A	SHORT MIRROR FRAME 35x50	A	
SL-1037406/A	DRAW CATCH ASSEMBLY	A	
SL-1019976/B	LONG PLUNGER DRAW HANDLE	B	
SL-1020631/A	LONG PULL BAR LINK	A	
SL-1037407/A	LONG PLUNGER DRAW CATCH	A	
<b>10J LENS MOUNTS</b>			
<b>SL-1037699/A</b>	<b>10J HORIZONTALLY ANGLED LENS ASSY - LA1</b>	<b>A</b>	
SL-1019496/A	LENS ARRAY - FRAME TOP PLATE MK4	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1019498/A	LENS ARRAY - FRAME GUSSET MK3	A	
SL-1020616/A	MIRROR FRAME BASE LOCKING DISC	A	
SL-1020812/B	LENS ARRAY - FRAME SIDE PLATE	B	
SL-1021218/B	LENS ARRAY - PEDESTAL	B	
SL-1021613/B	HORIZONTAL ANGLE MOUNT - TOP LEFT	B	
SL-1021621/B	HORIZONTAL ANGLE MOUNT - MIDDLE LEFT	B	
SL-1021624/B	HORIZONTAL ANGLE MOUNT - MIDDLE RIGHT	B	
SL-1021626/B	HORIZONTAL ANGLE MOUNT - BOTTOM RIGHT	B	
SL-1021627/B	HORIZONTAL ANGLE MOUNT - BOTTOM LEFT	B	
SL-1021634/B	HORIZONTAL ANGLE MOUNT - TOP	B	
SL-1021637/B	HORIZONTAL ANGLE MOUNT - BOTTOM	B	
SL-1024466/B	LENS ARRAY - FRAME BOTTOM PACKER MK4	B	
SL-1024468/A	LENS ARRAY - FRAME BOTTOM PLATE MK4	A	
SL-1020787/B	LENS UNIT ASSEMBLY	B	
SL-1018682/A	CATCH INSERT	A	
SL-1018882/A	6.0 MIRROR CATCH - NYLON	A	
SL-1020786/B	CENTRE SQUARE LENS FRAME	B	
SL-1020846/A	SQUARE LENS CATCH PIN	A	
<b>SL-1037700/A</b>	<b>VERTICALLY ANGLED LENS ASSY - LA2</b>	<b>A</b>	
SL-1019483/C	LENS ARRAY - FRAME BOTTOM PLATE MK4	C	
SL-1019496/A	LENS ARRAY - FRAME TOP PLATE MK4	A	
SL-1019498/A	LENS ARRAY - FRAME GUSSET MK3	A	
SL-1020812/B	LENS ARRAY - FRAME SIDE PLATE	B	
SL-1021454/B	VERTICAL ANGLE MOUNT - TOP RIGHT	B	
SL-1021462/B	VERTICAL ANGLE MOUNT - MIDDLE RIGHT	B	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1021463/B	VERTICAL ANGLE MOUNT - BOTTOM RIGHT	B	
SL-1021503/B	VERTICAL ANGLE MOUNT - MIDDLE LEFT	B	
SL-1021507/B	VERTICAL ANGLE MOUNT - BOTTOM LEFT	B	
SL-1021540/B	VERTICAL ANGLE MOUNT - TOP	B	
SL-1021556/B	VERTICAL ANGLE MOUNT - BOTTOM	B	
SL-1023837/A	FIDUCIAL FRAME BASE LOCKING DISC	A	
SL-1024135/B	HILASE LENS ARRAY BASE PLATE	B	
SL-1020787/B	LENS UNIT ASSEMBLY	B	
SL-1018682/A	CATCH INSERT	A	
SL-1018882/A	6.0 MIRROR CATCH - NYLON	A	
SL-1020786/B	CENTRE SQUARE LENS FRAME	B	
SL-1020846/A	SQUARE LENS CATCH PIN	A	
<b>SL-1037710/A</b>	<b>10J HORIZONTALLY ANGLED LENS ASSY - LA4</b>	<b>A</b>	
SL-1019496/A	LENS ARRAY - FRAME TOP PLATE MK4	A	
SL-1019498/A	LENS ARRAY - FRAME GUSSET MK3	A	
SL-1020616/A	MIRROR FRAME BASE LOCKING DISC	A	
SL-1020812/B	LENS ARRAY - FRAME SIDE PLATE	B	
SL-1021218/B	LENS ARRAY - PEDESTAL	B	
SL-1021612/B	HORIZONTAL ANGLE MOUNT - TOP RIGHT	B	
SL-1021613/B	HORIZONTAL ANGLE MOUNT - TOP LEFT	B	
SL-1021621/B	HORIZONTAL ANGLE MOUNT - MIDDLE LEFT	B	
SL-1021624/B	HORIZONTAL ANGLE MOUNT - MIDDLE RIGHT	B	
SL-1021627/B	HORIZONTAL ANGLE MOUNT - BOTTOM LEFT	B	
SL-1021634/B	HORIZONTAL ANGLE MOUNT - TOP	B	
SL-1021637/B	HORIZONTAL ANGLE MOUNT - BOTTOM	B	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1024466/B	LENS ARRAY - FRAME BOTTOM PACKER MK4	B	
SL-1024468/A	LENS ARRAY - FRAME BOTTOM PLATE MK4	A	
SL-1020787/B	LENS UNIT ASSEMBLY	B	
SL-1018682/A	CATCH INSERT	A	
SL-1018882/A	6.0 MIRROR CATCH - NYLON	A	
SL-1020786/B	CENTRE SQUARE LENS FRAME	B	
SL-1020846/A	SQUARE LENS CATCH PIN	A	
<b>SL-1037711/A</b>	<b>VERTICALLY ANGLED LENS ASSY – LA3</b>	<b>A</b>	
SL-1019483/C	LENS ARRAY - FRAME BOTTOM PLATE MK4	C	
SL-1019496/A	LENS ARRAY - FRAME TOP PLATE MK4	A	
SL-1019498/A	LENS ARRAY - FRAME GUSSET MK3	A	
SL-1020812/B	LENS ARRAY - FRAME SIDE PLATE	B	
SL-1021454/B	VERTICAL ANGLE MOUNT - TOP RIGHT	B	
SL-1021462/B	VERTICAL ANGLE MOUNT - MIDDLE RIGHT	B	
SL-1021463/B	VERTICAL ANGLE MOUNT - BOTTOM RIGHT	B	
SL-1021476/B	VERTICAL ANGLE MOUNT - TOP LEFT	B	
SL-1021503/B	VERTICAL ANGLE MOUNT - MIDDLE LEFT	B	
SL-1021540/B	VERTICAL ANGLE MOUNT - TOP	B	
SL-1021556/B	VERTICAL ANGLE MOUNT - BOTTOM	B	
SL-1023837/A	FIDUCIAL FRAME BASE LOCKING DISC	A	
SL-1024135/B	HILASE LENS ARRAY BASE PLATE	B	
SL-1020787/B	LENS UNIT ASSEMBLY	B	
SL-1018682/A	CATCH INSERT	A	
SL-1018882/A	6.0 MIRROR CATCH - NYLON	A	
SL-1020786/B	CENTRE SQUARE LENS FRAME	B	
SL-1020846/A	SQUARE LENS CATCH PIN	A	

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Drawing Number	Drawing Name	Issue	Remarks
<b>10J WAVEPLATE MOUNTS</b>			
<b>SL-1036867/A</b>	<b>WAVEPLATE - GONIOMETER ASSY (115)</b>	<b>A</b>	
SL-1023106/A	WAVEPLATE - POST	A	
SL-1023307/B	WAVEPLATE - SURFACE MOUNT	B	
SL-1023643/B	BEZEL - WAVEPLATE	B	
SL-1023644/A	SPACER TUBE - WAVEPLATE	A	
SL-1023646/A	WAVEPLATE INDICATOR	A	
SL-1025701/A	STOP PIN	A	
SL-1036866/A	WAVEPLATE BODY	A	
SL-1025682/B	BEZEL - WAVEPLATE	B	
<b>SL-1036934/A</b>	<b>WAVEPLATE - GONIOMETER ASSY (195)</b>	<b>A</b>	
SL-1023106/A	WAVEPLATE - POST	A	
SL-1023307/B	WAVEPLATE - SURFACE MOUNT	B	
SL-1023643/B	BEZEL - WAVEPLATE	B	
SL-1023644/A	SPACER TUBE - WAVEPLATE	A	
SL-1023646/A	WAVEPLATE INDICATOR	A	
SL-1025701/A	STOP PIN	A	
SL-1036933/A	WAVEPLATE BODY	A	
SL-1025682/B	BEZEL - WAVEPLATE	B	
<b>100J MIRROR MOUNTS (38 WITHOUT SPARES, 20 WITH PICOS)</b>			
<b>SL-1036264/A</b>	<b>100J MIRROR MOUNT LH FW H157.5</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036216/A</b>	<b>100J MIRROR MOUNT RH FW 42.5 DEG H 240 (Periscope)</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1025250/B	MIRROR MOUNT SIDE SUPPORT	B	
SL-1036487/A	MIRROR MOUNT BLOCK 47.5 DEG.	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036214/A</b>	<b>100J MIRROR MOUNT LH FW H150</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1022774/C</b>	<b>100J MIRROR MOUNT RH FW H 150</b>	<b>C</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036230/A</b>	<b>100J MIRROR MOUNT RH FW H 150</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036218/A</b>	<b>100J MIRROR MOUNT RH FW H 111.5</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036265/A</b>	<b>100J MIRROR MOUNT LH FW H202.5</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036266/A</b>	<b>100J MIRROR MOUNT LH FW H137.5</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036215/A</b>	<b>100J MIRROR MOUNT RH FW 45 DEG H261 (Periscope)</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1025117/A	MIRROR MOUNT BLOCK 45 DEG	A	
SL-1025250/B	MIRROR MOUNT SIDE SUPPORT	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036219/A</b>	<b>100J MIRROR MOUNT RH SPECIAL 110</b>	<b>A</b>	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022814/B	MIRROR HOLDER - CUTAWAY	B	
SL-1022815/B	RECT. MIRROR RETAINER - CUTAWAY	B	
SL-1022856/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023937/A	HILASE 100J REGISTER PLATE SPECIAL	A	
SL-1023938/A	HILASE 100J SETTING BASE SPECIAL	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	

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Drawing Number	Drawing Name	Issue	Remarks
<b>SL-1036232/A</b>	<b>100J MIRROR MOUNT RH FW H111.5</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036220/A</b>	<b>100J MIRROR MOUNT RH FW 45 DEG</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1036509/A	MIRROR MOUNT SIDE SUPPORT	A	
SL-1037463/A	MIRROR MOUNT BLOCK	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036221/A</b>	<b>100J MIRROR MOUNT LH SPECIAL</b>	<b>A</b>	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1036285/A	REGISTER PLATE - SPECIAL	A	
SL-1036297/A	SUPPORT PLATE 1	A	
SL-1036298/A	SUPPORT PLATE 2	A	
SL-1036299/A	SUPPORT PLATE 3	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036217/A</b>	<b>100J MIRROR MOUNT RH FW H 152.5</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036222/A</b>	<b>100J MIRROR MOUNT RH FW 45 DEG.</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1025117/A	MIRROR MOUNT BLOCK 45 DEG	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1025250/B	MIRROR MOUNT SIDE SUPPORT	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1025121/B</b>	<b>100J MIRROR MOUNT RH FW 45 DEG</b>	<b>B</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1025117/A	MIRROR MOUNT BLOCK 45 DEG	A	
SL-1025250/B	MIRROR MOUNT SIDE SUPPORT	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036231/A</b>	<b>100J MIRROR MOUNT LH FW H150</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036267/A</b>	<b>100J MIRROR MOUNT LH FW H 152.5</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1036663/A</b>	<b>100J MIRROR MOUNT RH FW H 116</b>	<b>A</b>	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	

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Drawing Number	Drawing Name	Issue	Remarks
<b>SL-1025453/A</b>	<b>100J MIRROR MOUNT LH FW DF SPECIAL</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1023716/A	POSITIONER - RECT. MIRROR HOLDER	A	
SL-1022845/B	POSITIONER - RECT. MIRROR HOLDER	B	
SL-1023732/A	RECTANGULAR MIRROR HOLDER	A	
SL-1022764/B	RECTANGULAR MIRROR HOLDER RH	B	
SL-1023733/A	RECTANGULAR MIRROR RETAINER	A	
SL-1022793/A	RECTANGULAR MIRROR RETAINER	A	
SL-1023757/B	PLUNGER ASSY	B	
SL-1023753/A	BODY - PLUNGER	A	
SL-1023754/A	PLUNGER	A	
SL-1023789/A	END CAP - PLUNGER	A	
<b>SL-1022774/C</b>	<b>100J MIRROR MOUNT RH FW H 150 EXCLUDING ITEMS 1,2,6-14,16,17</b>	<b>C</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
<b>100J LENS MOUNTS (14 WITHOUT SPARES)</b>			
<b>SL-1024296/B</b>	<b>HILASE 100J LENS MOUNT H TILT 150</b>	<b>B</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1024235/A	ADJUSTMENT PLATE - LINEAR MOUNT	A	
SL-1024309/A	BASE PLATE - LENS MOUNT A	A	
SL-1024312/A	SLIDING BLOCK - LENS MOUNT A	A	
SL-1024343/A	CORNER REGISTER	A	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036601/A</b>	<b>100J LENS MOUNT H TILT 156</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1023499/A	BASE PLATE - LENS MOUNT B	A	
SL-1023634/A	SLIDING BLOCK - LENS MOUNT B	A	
SL-1024235/A	ADJUSTMENT PLATE - LINEAR MOUNT	A	
SL-1024343/A	CORNER REGISTER	A	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036224/A</b>	<b>100J LENS MOUNT H156 TILT 3 DEG</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1023499/A	BASE PLATE - LENS MOUNT B	A	
SL-1023634/A	SLIDING BLOCK - LENS MOUNT B	A	
SL-1024235/A	ADJUSTMENT PLATE - LINEAR MOUNT	A	
SL-1024343/A	CORNER REGISTER	A	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036225/A</b>	<b>100J LENS MOUNT ASSEMBLY H150 3 DEG.</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	

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Drawing Number	Drawing Name	Issue	Remarks
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1024270/A	SPACER - ANGLED	A	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036226/A</b>	<b>100J LENS MOUNT ASSEMBLY H150</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036227/A</b>	<b>100J LENS MOUNT ASSEMBLY H150</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	

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Drawing Number	Drawing Name	Issue	Remarks
<b>SL-1036274/A</b>	<b>100J LENS MOUNT ASSEMBLY H119.5</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036764/A</b>	<b>100J LENS MOUNT ASSEMBLY H116.5</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1037538/A</b>	<b>100J LENS MOUNT ASSEMBLY H111.5</b>	<b>A</b>	
SL-1019737/B	100J AR COATED CIRCULAR LENS	B	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	

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Drawing Number	Drawing Name	Issue	Remarks
<b>SL-1024296/B</b>	<b>HILASE 100J LENS MOUNT H TILT 150 WITH EXCLUSIONS</b>	<b>B</b>	<b>EXCLUDING ITEMS 2 TO 13</b>
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>SL-1036225/A</b>	<b>100J LENS MOUNT ASSEMBLY H150 3 DEG WITH EXCLUSIONS</b>	<b>A</b>	<b>EXCLUDING ITEMS 1, 2, 4, 5, 6, 9, 10 &amp; 11</b>
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036615/A	100J LENS MOUNT MK II	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	
<b>100J Quartz Rotator</b>			
<b>SL-1036766/A</b>	<b>100J QUARTZ ROTATOR MOUNT ASSEMBLY</b>	<b>A</b>	
SL-1022796/C	HILASE 100J REGISTER PLATE	C	
SL-1022801/C	HILASE 100J SETTING BASE	C	
SL-1022805/D	LENS MOUNT DISC POSITIONER	D	
SL-1036607/A	LENS RETAINER NUT	A	
SL-1036767/A	QUARTZ ROTATOR HOLDER	A	
SL-1037570/A	LENS RETAINER ASSEMBLY	A	
SL-1036613/A	LENS RETAINER	A	
SL-1036616/A	SOFT RETAINER PAD	A	

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## 4 Technical Specification

### 4.1 Optical Mount Parameters

Where specified on the drawings, the supplier is requested to identify the necessary springs, kinematic mountings and adjusters to meet the optical mount parameters identified in this section.

#### 4.1.1 10J Mirror Mounts

Item	Nominal	Notes
Nominal Mirror Dimensions	50 x 35 x 10mm	See drawing for tolerances SL-1032907-A
Mirror Mass	53g	This mass can be simulated by using Aluminium blank of the same mirror dimensions
Tolerance on front surface location of mirror reflective face	50µm	
Kinematic Adjustment ( $\theta_x$ , $\theta_y$ & Z) – Angular Range	$\pm 4^\circ$	
Sensitivity of Adjustment	8.8 arc sec/80 TPI	
Other details	It should be noted that mirrors contain a wedge profile so the nominal thickness and tolerance is not constant across the mirror area.	

#### 4.1.2 10J Lens Mounts

Item	Nominal	Notes
Nominal Lens Dimensions	35 x 35 x 6mm	See drawing for tolerances SL-1033618-A
Lens Mass	22g	This mass can be simulated by using Aluminium blank of the same mirror dimensions
Manual Adjustment (X) range	14mm	X as specified by supplier of specified stage (Z with regard to laser beam nomenclature)
Sensitivity of Adjustment	1µm	
Other details	It should be noted that lenses are plano-convex so the nominal thickness and tolerance is not constant across the lens area.	

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#### 4.1.3 10J Waveplate Mounts

Item	Nominal	Notes
Nominal Waveplate Dimensions	Φ43.5 x 3mm	See drawing for detail and tolerances, SL-1034352-A
Range of Rotation	180°	

#### 4.1.4 100J Mirror Mounts

Item	Nominal	Notes
Actuated Travel Range Angle (X & Y)	±2°	
TPI of adjustment thread on kinematic actuator	100 TPI	
Tolerance on front surface location of mirror reflective face	50µm	
Tolerance on repeat positioning of mount to setting base	50µm	
Minimum clearance between edge of mount and transmitted beam ((beam size 75x75mm)	5mm	
Nominal Mirror Dimensions	125 x 175 x 25mm	See drawing for tolerances SL-1033099-A
Mirror Mass	1.2kg	This mass can be simulated by using Aluminium blank of the same mirror dimensions
Other details	It should be noted that mirrors contain a wedge profile so the nominal thickness and tolerance is not constant across the mirror area.	

#### 4.1.5 100J Lens Mounts

Item	Nominal	Notes
Tolerance on vertical tilt mounts	3° ±0.5°	
Tolerance on front surface location of lens flat face	100µm	
Tolerance on repeat positioning of mount to setting base	50µm	
Minimum clear aperture for transmitted beam (beam size 75x75mm)	150mm	
Nominal Lens Dimensions	Φ160 x 20mm – Plano-convex	See drawing for tolerances SL-1033101-B

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Lens Mass	0.9kg	This mass can be simulated by using Aluminium blank of the same mirror dimensions
Other details	It should be noted that lenses are plano-convex so the nominal thickness and tolerance is not constant across the lens area.	

#### 4.1.6 100J Quartz Rotator Mounts

Item	Nominal	Notes
Nominal Quartz Rotator Dimensions	100 x 100 x 14mm	dwg
Tolerance on front surface location of optic face	100µm	
Tolerance on repeat positioning of mount to setting base	50µm	
Minimum clearance between edge of mount and transmitted beam ((beam size 75x75mm)	5mm	

## 4.2 Materials

### 4.2.1 Aluminium

- A 6000 series grade is selected for the majority of machined Aluminium components for its good machining and formability properties, medium to high strength and the suitability of the grade for hard anodising.
- Where no Aluminium grade has been specified, 6061-T6 or Tooling Plate has been specified, it is acceptable to exchange this for 6082-T6. However, where Aluminium grade 6082-T6 has been specified on the drawing it is not acceptable to exchange this for any other material grade.
- It is essential that any assemblies containing multiple aluminium parts are manufactured from the same grade of Aluminium to avoid any difference in appearance. The grade used should be stated in writing to ensure any future order or spares or replacement parts are made from the same material grades

### 4.2.2 Stainless Steel

- Stainless Steel grades 304 and 316 are selected for their good machinability, weldability, clean finish, corrosion resistance and vacuum compatibility.
- It is acceptable to use 304 or 316 for any components where the stainless steel grade is not specified. It is acceptable to exchange 304 for 316 if deemed beneficial.

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However, where Stainless Steel grade 316 has been specified on the drawing, it is not acceptable to exchange this for any other material grade.

- 304L or 316L should be used where welding is part of the manufacturing process, where 304L or 316L is specified then no alternatives will be accepted
- It is desirable that any assemblies containing multiple Stainless Steel parts are manufactured from the same grade of Stainless Steel to avoid any difference in appearance. The grade used should be stated in writing to ensure any future order or spares or replacement parts are made from the same material grades

**4.2.3 Polymers**

- The ends of any retainers that come into contact with an optic must be of soft polymeric material.
- The following materials are specified on relevant drawings:
  - Acetal (also known as Delrin)
  - Nylon
  - Nitrile Rubber
- There is no particular grade of these materials specified, the industry standard is acceptable.
- Washers must not be made of polymeric material.

**4.3 Machining**

**4.3.1 Tolerances**

- Drawing tolerances must be maintained to ensure successful assembly
- Components that have an important fit within an assembly shall be machined as a matched pair.
- The dimensional tolerances on the drawings must be met after all processes, such as finishing, have been completed.

**4.3.2 Machining Finishes (excluding sealing faces)**

- All components to have a fine machined surface finish, to better than 1.6µm roughness (unless specified better on the drawing or a sealing face).
- All surfaces to be smooth without objectionable tool marks.
- Surface roughness specification applies to all surfaces and is applicable both before and after subsequent application of finish (such as anodising).
- Surface finish should, unless otherwise stated, have a machined finish rather than a shot peened, buffed or polished finish.
- It is desirable that assemblies have the same direction cutting patterns to avoid a mismatched appearance. This also applies to ensure consistent and uniform surface finishes

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## 4.4 Cleaning

### 4.4.1 Clean for Clean Room Environment

Unless specified otherwise on the drawing, all components are required to be supplied clean (as per the definition below) for use in a ISO 7 (class 10000) clean room.

- All burrs to be removed
- Swarf and cutting material to be cleared from all holes (especially blind holes and threaded holes) using high pressure air-line.
- Residual contamination to be removed by washing out, swabbing or rinsing with a general purpose solvent.
- All machining fluids, greases or dirt to be removed using hot water, detergent and cleaning wipes followed by Isopropanol and a clean lint free cloth prior to any post machining finish such as anodising.
- Specific attention is drawn to all holes especially tapped holes where cutting residue and contamination can be difficult to remove
- Surfaces should be checked for signs of contamination by rubbing surfaces with lint free cloth. There should be no sign of dirt on the cloth. If dirt is found, the cleaning process must be repeated until there is no dirt on the cloth.
- All cleaning is to be thorough and inspected prior to packaging and as appropriate, in preparation for further treatment
- Cleaning of components to be repeated after finishing treatments and prior to assembly.

Supplier cleaning procedures may be used if given approval by STFC.

## 4.5 Finishes

### 4.5.1 Anodising

Where anodising is the specified finish on the drawing, the finish shall be:

- Hard anodising for improved wear resistance
- Jet black colour
- 25µm thick (range 25µm-50µm acceptable)
- Free from scratches, inclusions, defects
- Uniform and consistent appearance across all assembly components
- Threaded holes shall be masked or threads made good after anodising
- Holes with specified fits (e.g. H7) shall be masked and be free from anodising or may be machined after anodising
- Anodising around holes must not be damaged or incomplete through the process of masking or making good of threads.
- The dimensional tolerances on the drawings must be met after anodising. Any machining must take into consideration the expected anodising thickness. Since anodising converts rather than deposits, some of the anodising thickness will ingress

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the material and some will be growth out of the material – typically 50%, but manufacturers shall confirm with anticipated anodising supplier.

In order to ensure the quality of anodising required, it expected that the supplier will

- Ensure all surfaces on an assembly of components have a similar machining finish providing uniform and consistent anodising finish across each assembly.
- Ensure all surfaces are free from oils, greases, dirt and debris prior to anodising.
- Ensure that the anodising process is appropriately controlled, timings etc. calculated and monitored.
- The method of supporting components in the anodising bath is considered to avoid un-anodised or poorly anodised regions due to contact of support on component.
- Where anodising suppliers or procedures are not known, it is expected that the supplier will arranged sample anodising to be approved by STFC to ensure the quality of the final product

#### 4.6 Assembly

The supplier is responsible for specifying the appropriate springs, kinematic mounts and adjusters to meet the requirements of the drawings and specification. Proposed purchases must be approved by STFC.

The supplier is not responsible for supplying pico motors on 100J mirror mounts. STFC will provide manual adjusters for these mounts to enable assembly and testing.

On some assembly drawings there are off the shelf components specified. The supplier is welcome to propose their own alternative should they be able to provide their own alternative without compromising the overall design and specification. Any proposed changes must be approved by STFC.

However, motorised stages must be procured from the stated supplier as these need to interface to our control system.

The supplier will assemble the goods to ensure that they are fit for purpose, appropriately support the mass of the optical components, and provide the resolution and range of movement specified. The supplier must give due regard to the cleanliness requirements stated, by ensuring:

- Nitrile gloves are worn when handling cleaned components during assembly
- Assembly to occur in a clean and dust free environment
- Components are assembled square and flat
- All fittings and fasteners shall be appropriately tightened for purpose
- No thread-lock is to be used on any of the assemblies
- Spring tensions should be assembled adequate for purpose
- Sliding surfaces move cleanly and smoothly

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A final clean of the assembly shall occur before packing to remove any contamination occurring during the assembly process

#### 4.7 Testing

All assemblies to be demonstrated using a dummy optical mass.

It is desirable for the mirror assemblies to be tested with a dummy reflective mirror to confirm stability of the mount over the full range of travel, resolution and range of motion. The supplier shall identify whether they have the capability to provide dummy optics and a laser set-up to achieve this in the tender response.

Where the supplier has not provided bespoke optical mounts (of this nature) to CLF before, the supplier shall supply one off of each type of 100J bespoke optical mount in this contract is manufactured, assembled and tested prior to ordering components for the full order of 100J components. These assemblies can be part of the complete order if deemed acceptable by STFC.

#### 4.8 Packaging

- Nitrile gloves must be worn during packaging.
- Bubble wrap and sealable plastic bags shall be used as a packaging material for components and assemblies.
- Additional protective packaging of assemblies is to be such that the assembly is not damaged during transportation or storage.
- Sealing faces must be especially protected to avoid surface scratches and damage, with the method of packaging removal considered. The location of sealing faces should be labelled on the outside of the packaging.
- All packaging is to be labelled, with the component or assembly drawing number, quantity (if more than one) and with any other information deemed necessary by the supplier.

### 5 Communication

The supplier is expected and encouraged to raise any concerns or questions where any query arises, no matter how small, insignificant or inconsequential they appear.

Similarly the supplier is expected and encouraged to voice their concerns or opinions if a design or assembly does not appear correct.

Any recommendations on simple design changes that facilitate the achievement of our quality expectation are welcome from the supplier.

Any deviations from the specification or drawing must be agreed in writing by both parties.

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Where any changes to the drawing are required, from a supplier request or STFC necessity, the drawing shall be re-issued by STFC at a higher version (based on increasing letter from A – Z). Upon the receipt of a newly issued drawing, all copies (hard or electronic) of previous versions must be deleted by the supplier to prevent incorrect manufacture of parts.

## 6 Quality Assurance, Control & Testing

The supplier shall provide details of their quality assurance programme and specific processes including tests and inspections they intend to carry out so as to ensure that finished product meets this specification. Activities will include retention of material certificates, proposed inspection of components manufactured in house or by sub-contractor, testing procedure of completed assemblies and documentation produced.

A quality inspection and test plan shall be provided by the contractor together with the processes and procedures that they intend to follow and all testing and confirmatory quality checks that they shall carry out on product to assure conformity to this specification.

This shall, as a minimum, cover the following areas:

- Materials sourcing including material certificates, verification and record keeping
- Manufacturing processes (QC on machining, finishes, cleanliness etc.) and record keeping
- Anodising process (including QC on prior cleaning, process temperatures, process source materials, inspections, etc.)
- Cleaning (including QC on process pressures, process source materials, inspections, etc.)
- Assembly and testing of finished product including verification QA
- Pre-delivery inspection process and sign-off by an appropriately qualified person (e.g. the contractors Quality Manager).

STFC reserve the right to enter the contractor’s premises or those of any of their subcontractors at any time during the execution period of the contract in order to undertake quality inspections. The visits will focus on verifying that processes and quality control requirements, as stipulated by the contractor in their quality inspection and test plan are being applied appropriately.

The attention of the contractor is drawn to the following:

Appendix A shows the minimum quality verification that STFC wish to directly witness, however, STFC anticipates that the supplier will wish to undertake significant additional QC activities. These should be detailed in the quality inspection and test plan.

STFC will require evidence of the understanding of and previous experience of manufacturing bespoke optical mounts.

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Appendix A

Inspection and Test Plan								
General Fine Bundle								
Quality Control Requirements: A - Approval, I - Inspection, S – Submission, V – Verification, H – Hold Point, W – Witness								
No	Activity	Ref Document	Acceptance Criteria	Frequency	Responsible Person	QC Req	Resulting Documents	Remarks
1	Machining, Finishing, Cleaning & Assembly	Design drawings and Manufacturing Specification	Measurement of critical assembly dimensions, witness of testing to demonstrate specification met (dummy or mirror?)	Once, 1 off. 100J mirror mounts, 1 off 100J Lens mount	STFC	H	Sign off sheet	If the supplier has already provided STFC with bespoke optical mounts of this type, this check is not required
2	Machining, Finishing and Cleaning	Design drawings and Manufacturing Specification	Visual inspection, measurement of some critical dimensions, wipe with lint free cloth	Sample of components, when high priority list complete	STFC	H	Sign off sheet, photographs	
3	Assembly	Design drawings and Manufacturing Specification	Measurement of critical assembly dimensions, witness of testing to demonstrate specification met (dummy or mirror?)	Every mount assembly prior to delivery	STFC	W, H	Sign off sheet, photographs	

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