

LT CL SERIES

COLLIMATED (TELECENTRIC) LED ILLUMINATORS



Our Collimated Light (CL) LED illuminators are the best choice for back lighting objects imaged by a telecentric lens because of:

1) *COMPLETE LIGHT COUPLING* (all the light output is collected by the telecentric lens and delivered to the detector) ensuring VERY HIGH signal-to-noise ratios for high speed measurement applications.



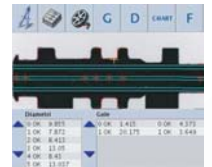
2) *BORDER EFFECTS REMOVAL*. Diffusive backlighters often make images difficult to be interpreted and objects smaller than in the real world; collimated sources help in overcoming all of these problems.

3) *FIELD DEPTH AND TELECENTRICITY IMPROVEMENT*. This illumination geometry increases a telecentric lens natural field depth and telecentricity far beyond its specs.

OPTICAL AND MECHANICAL FEATURES

4) *FOR EVERY TELECENTRIC LENS SIZE WE ARE ABLE TO PROVIDE A PERFECTLY FITTING COLLIMATED SOURCE ...*

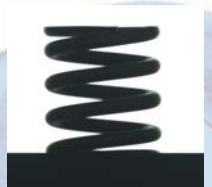
Part Number (*)	Beam diameter (mm)	Length (mm)	Outer diameter (mm)	Compatible Telecentric Lenses					
				TC13xx xx=	TC12xx xx=	TC23xx xx=	TC4Mxx xx=	TC2Mxx xx=	TCLxx xx=
LT CL 16/x	20	86,7	38		16	16	16	16	
LT CL 24/x	30	100,0	44		24	24	24	24	
LT CL 36/x	45	138,9	61	36	36	36	36	36	
LT CL 48/x	60	174,0	75		48	48	48	48	
LT CL 56/x	70	197,3	80		56	56	56	56	
LT CL 64/x	80	219,5	100	64	64	64	64	64	60
LT CL 80/x	100	264,2	116		80	72, 80	72, 80	80	80
LT CL 96/x	120	309,6	143	96	96	85, 96	85, 96	96	120
LT CL 120/x	150	395,2	180		120	110, 120	110, 120	120	
LT CL 144/x	180	454,7	200		144	130, 144	130, 144	144	
LT CL 192/x	250	595,1	260		192	172, 192	172, 192	192	
LT CL 240/x	300	756,8	322			200, 240	200, 240		



tubes and shafts



seals and o-rings



coils and springs



screws and nuts

SOME EXAMPLES OF SUCCESSFUL APPLICATIONS

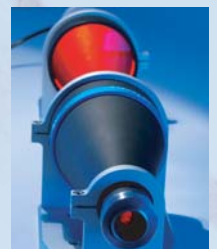
... WITH WHATEVER KIND OF COLOUR SELECTION:

The illuminator light colour can be selected among the following options:

/R: Red /G: Green /B: Blue /W: White /IR890: IR@890 nm /IR940: IR@940 nm

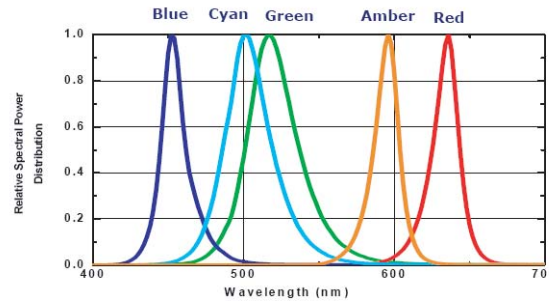
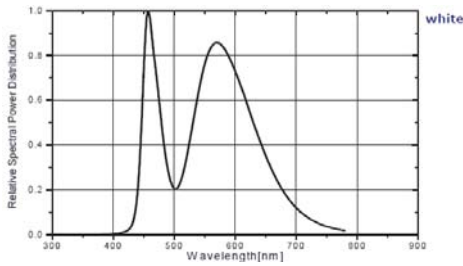
(*) The second part of the Part Number, /x, defines the source's colour.

For example *LT CL 64 /G* defines a collimated source *LT CL 64* type equipped with *Green (/G)* LEDs. Other colours are available on demand.



MECHANICAL DRAWINGS: see next pages >>

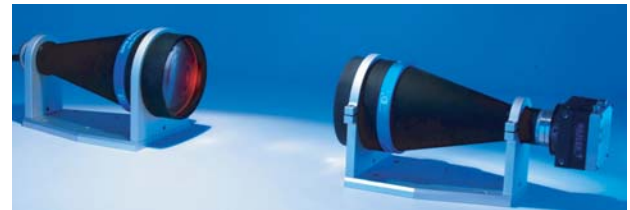
LED TYPICAL SPECTRUM:



/IR890 version: peak emission wavelength 890 nm, optical bandpass +/- 30 nm FWHM (class IIIb)
 /IR940 version: peak emission wavelength 940 nm, optical bandpass +/- 30 nm FWHM (class IIIb)

5) CLAMPING MECHANICS FOR FINE ILLUMINATOR AND TELECENTRIC LENS ALIGNMENT AVAILABLE

Every collimated source up to LTCL96 size can be mounted on the same clamping mechanics - *Teleclamps* - used to fix and align our telecentric lenses. Visit our website to achieve more details about these mechanical components.



ELECTRICAL FEATURES

6) OPTICAL THROUGHPUT IS STABILIZED BY TUNABLE, BUILT-IN ELECTRONICS ...



These LED devices integrate built-in switching electronics which control the current flow through the LED. This ensures both high light stability and a longer lifetime of the product. The device light intensity can be tuned by removing the protection plastic cap in the rear and by screwing or unscrewing the trimmer inside.

BUILT-IN ELECTRONICS POWER RATINGS:
 Voltage 12 to 24 V DC
 Power Consumption < 2 watt

.. BUT YOU CAN PASS-BY INNER ELECTRONICS AND DIRECTLY DRIVE THE LED BY YOURSELF



The inner circuitry can be passed-by in order to directly drive the LED inside this device thus allowing pulsed operation of this component. For this reason, three cables are exiting the rear part of the illuminator. Instead of connecting *black* and *brown* wire leads, the *black* and *blue* wires must be connected to your power supply ensuring the below listed values are not exceeded.

LED DIRECT DRIVE RATINGS:
 for /W, /B and /G versions:
 Max Forward Voltage 3.5 V DC
 Max Forward Current 350 mA

 for /R version:
 Max Forward Voltage 2.5 V DC
 Max Forward Current 350 mA

 for /IR890 and /IR940 versions:
 Max Forward Voltage 1.6 V DC
 Max Forward Current 500 mA



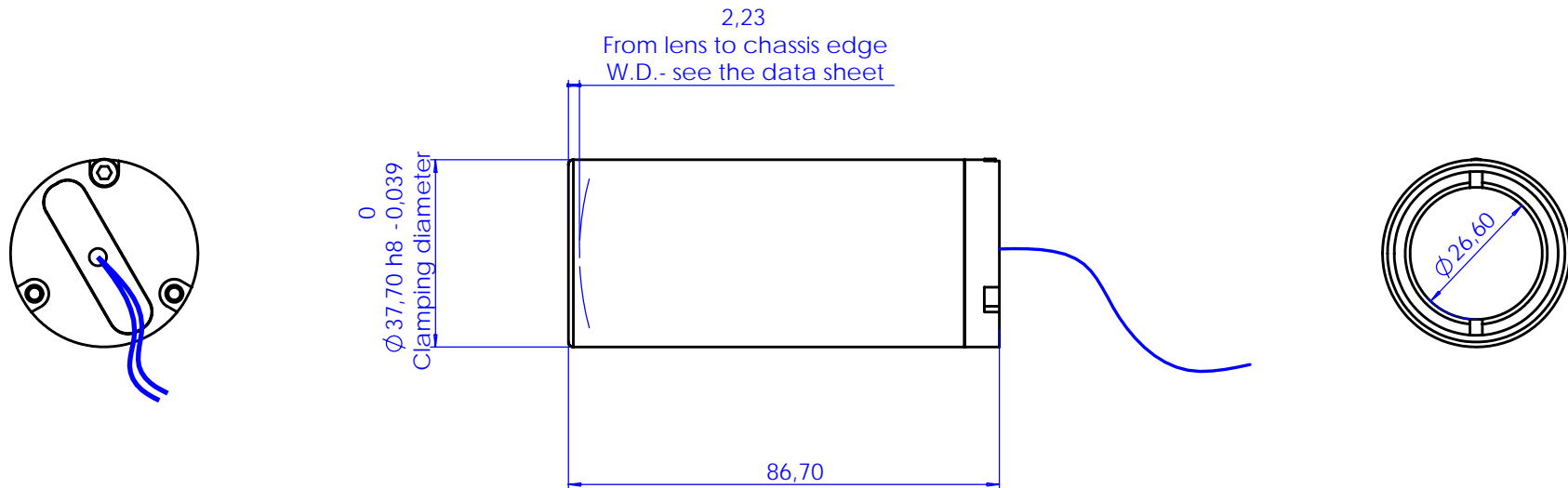
OPTO ENGINEERING S.R.L.

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 46100 MANTOVA - ITALY
 TEL: +39 (0)376 263525
 FAX: +39-(0)376 262432
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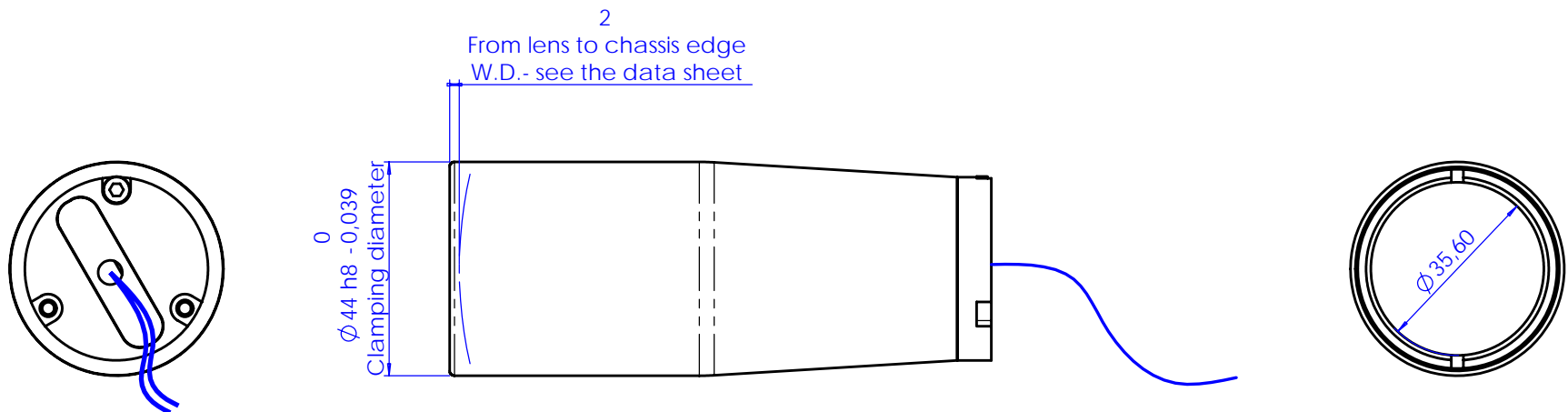
MECHANICAL DRAWINGS: see next pages >>

Rev No.	Description	Date	Name
D	First light	20/02/06	A.Vismara



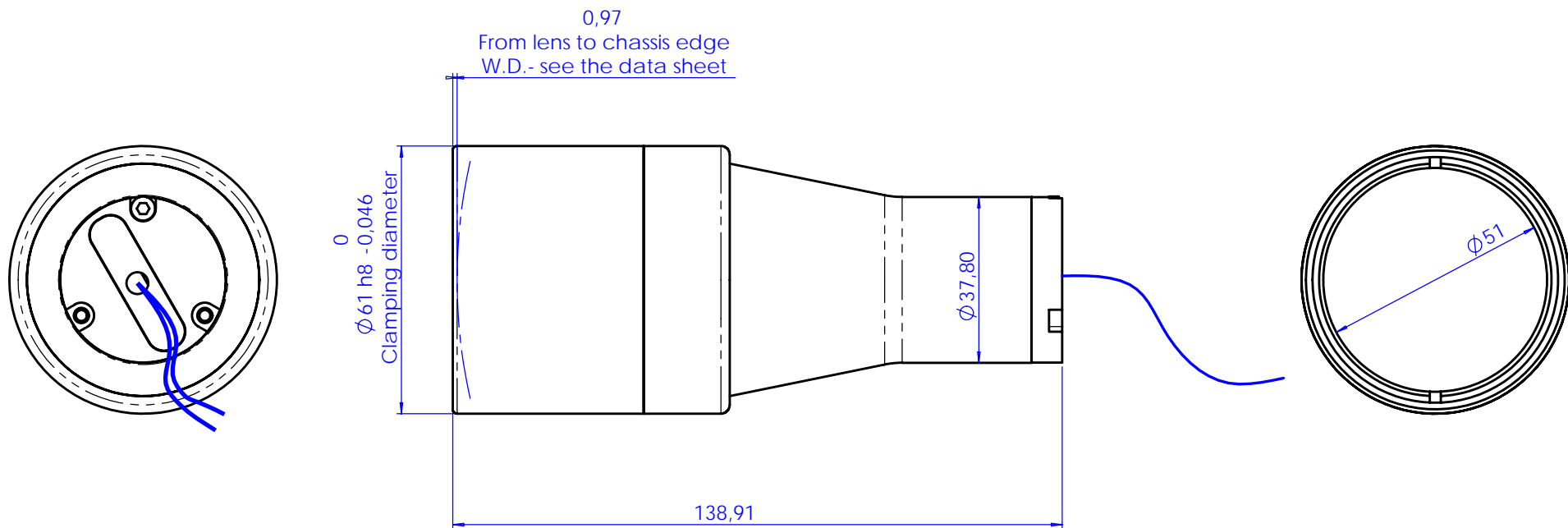
Material		N.A.			Mass	0.20 kg	Scale	1:1
Surface treatment		N.A.			Project-Prod.Item/Instrument LT CL 16			
Geometrical tolerance (ISO 2768-2)				Class	K	Undimensioned bevels		1x45°
Linear tolerance (ISO 2768-2)				Class	m	Undimensioned radii		R 0.5
0.5 +3	>3- 6	>6- 30	>30- 120	>120 +400	>400- 1000	>1000 +2000	>2000 +4000	Description Assembly
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	
		Date		Name		Drawing No.		Sheet
		Designed		A.Vismara		01271-0-D		1/1
		Draw		A.Vismara				
		Checked		C. Sedazzari		Reproduction forbidden without specific authorization		

Rev No.	Description	Date	Name
D	First light	07/06/06	A.Vismara



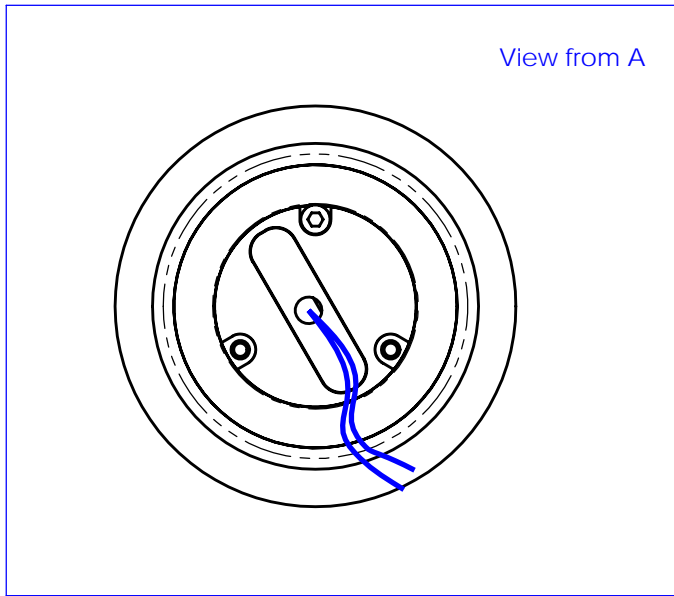
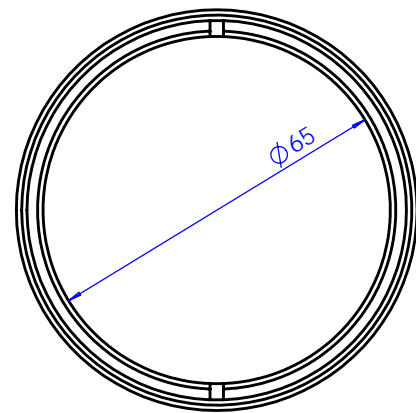
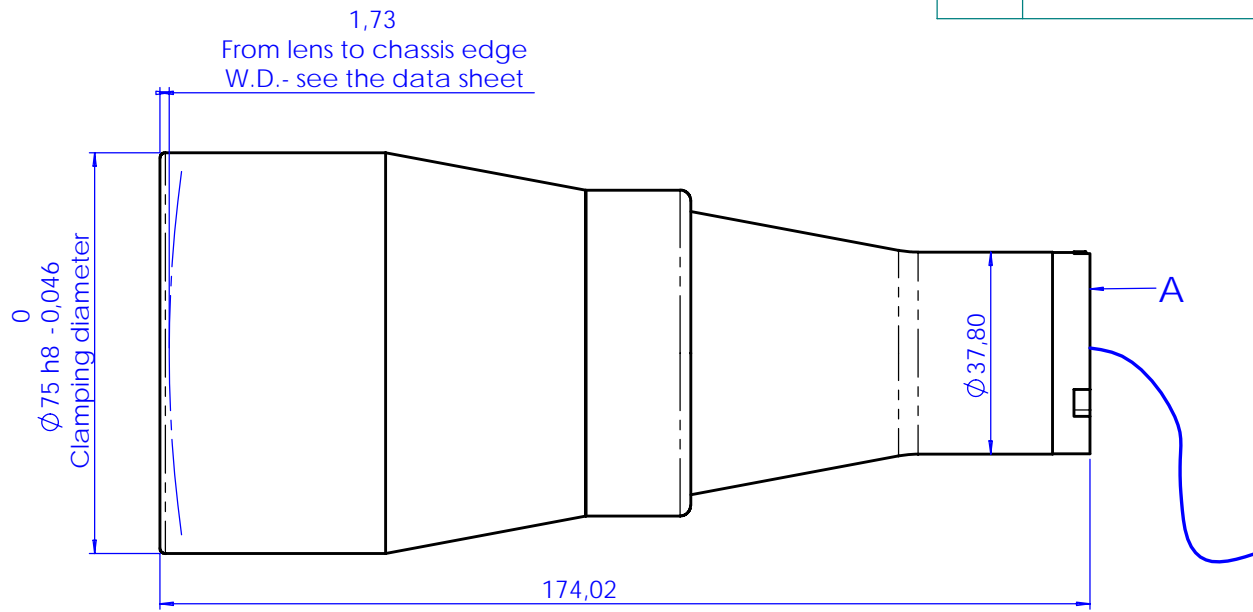
Material	N.A.			Mass	0.30 kg	Scale	1:1	
Surface treatment	N.A.			Project-Prod.Item/Instrument LT CL 24				
Geometrical tolerance (ISO 2768-2)			Class	K	Undimensioned bevels 1x45°	Description Assembly	Drawing No. 01277-0-D	
Linear tolerance (ISO 2768-2)			Class	m				Undimensioned radii R 0.5
0.5 +3	>3- 6	>6- 30	>30- 120	>120 +400	>400- 1000	>1000 +2000	>2000 +4000	Date 07/06/06
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	
			Date		Name		Sheet 1/1	
			Designed	07/06/06	A.Vismara			
			Draw	07/06/06	A.Vismara			
www.opto-engineering.com			Checked	X	C. Sedazzari		Reproduction forbidden without specific authorization	
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Rev No.	Description	Date	Name
D	First light	23/03/06	A.Vismara



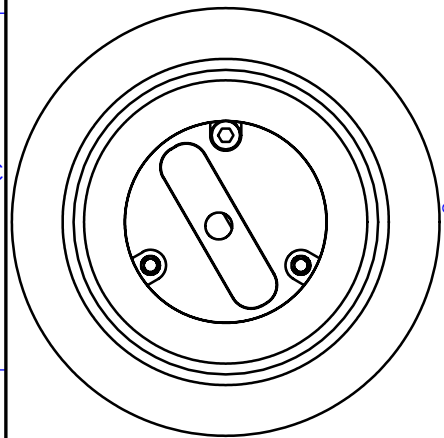
Material	N.A.			Mass	0.42 kg	Scale	1:1
Surface treatment	N.A.			Project-Prod.Item/Instrument LT CL 36			
Geometrical tolerance (ISO 2768-2)			Class	K	Undimensioned bevels	1x45°	Description Assembly
Linear tolerance (ISO 2768-2)			Class	m			
0.5	>3-	>6-	>30-	>120	>400-	>1000	>2000
+3	6	30	120	+400	+1000	+2000	+4000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
www.opto-engineering.com			Date	Name		Drawing No.	
			Designed	23/03/06	A.Vismara		01274-0-D
			Draw	23/03/06	A.Vismara		
			Checked	X	C. Sedazzari		
OPTO ENGINEERING S.r.l. - 46100 Mantova Italy - Via Cremona, 28 - Tel. +39 0376 229585 - e-mail: info@opto-engineering.com - http://www.opto-engineering.com					Sheet		1/1
Reproduction forbidden without specific authorization							

Rev No.	Description	Date	Name
D	First light	06/02/07	A.Vismara

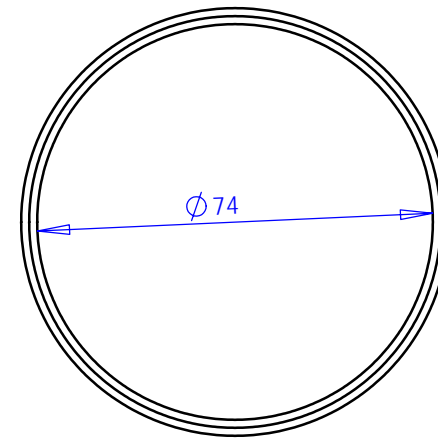
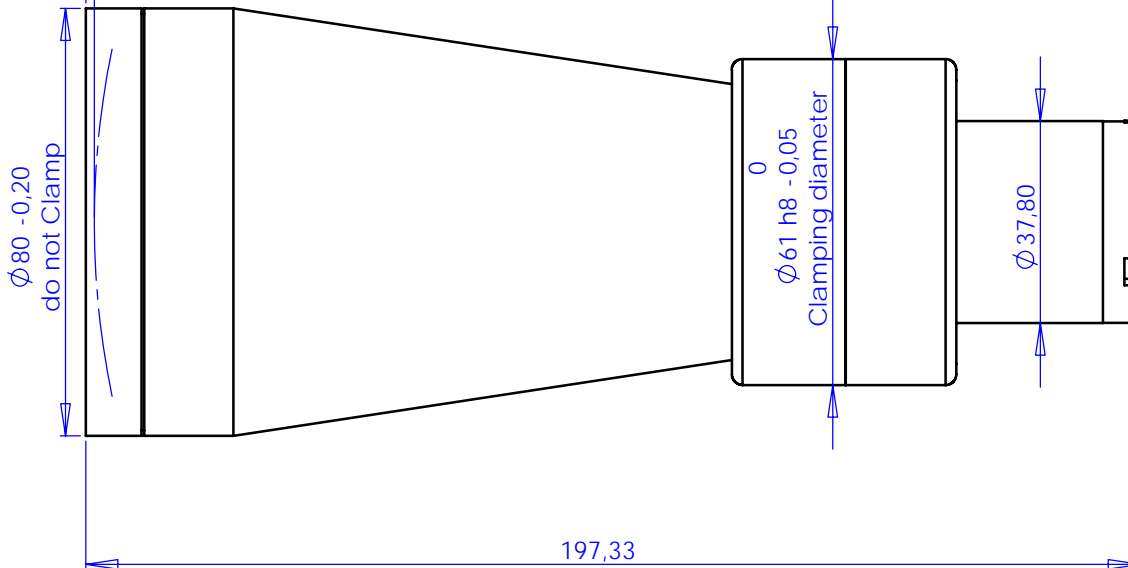


Material	N.A.		Mass	0.63 kg	Scale	1:1
Surface treatment	N.A.		Project-Prod.Item/Instrument	LT CL 48		
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned bevels	1x45°	Description
Linear tolerance (ISO 2768-2)		Class	m			
0.5	>3-	>6-	>30-	>120	>400-	>1000
+3	6	30	120	+400	+1000	+2000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2
						Date
						Name
 www.opto-engineering.com		Designed	06/02/07	A.Vismara		
		Draw	06/02/07	A.Vismara		
		Checked	X	C. Sedazzari		
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<i>Reproduction forbidden without specific authorization</i>						

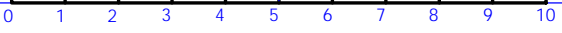
Rev No.	Description	Date	Name
D	First Sight	27/02/07	A. Bnà



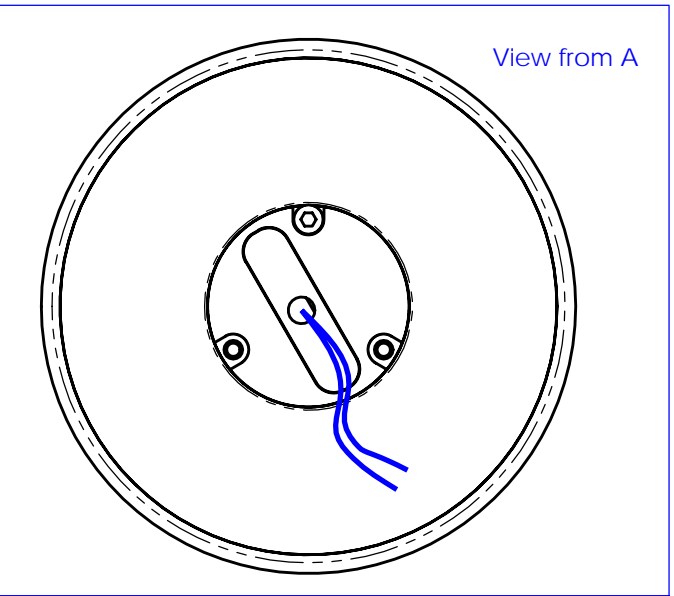
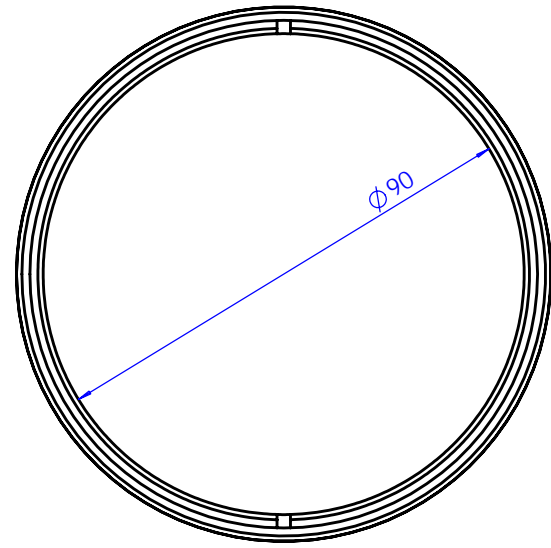
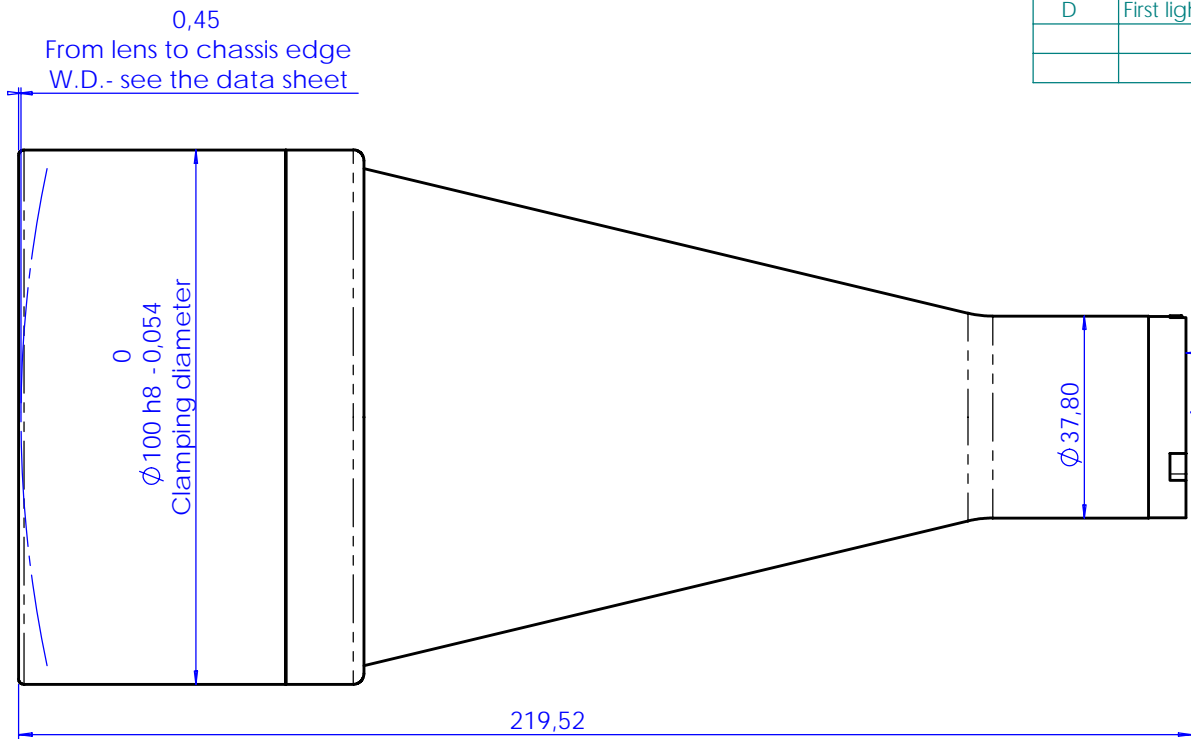
1,60
From lens to chassis edge
W.D. - see the data sheet



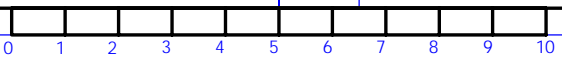
Material	N.A.		Mass	Scale	2:1					
Surface treatment	N.A.		Project-Prod. Item/Instrument	LT CL 56						
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned bevels	1x45°					
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned radii	R 0.5					
0.5	>3-	>6-	>30-	>120	>400-	>1000	>2000	Description	Assembly	
+3	6	30	120	+400	1000	+2000	+4000	Drawing No.	13669-0-D-LTCL56	Sheet
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2	Date	27/02/07	Name
		Designed	27/02/07	A. Bnà	Drawing No. 13669-0-D-LTCL56		Sheet 1/1			
www.opto-engineering.com		Draw	27/02/07	A. Bnà	Checked X C. Sedazzari		Reproduction forbidden without specific authorization			
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Rev No.	Description	Date	Name
D	First light	23/03/06	A.Vismara

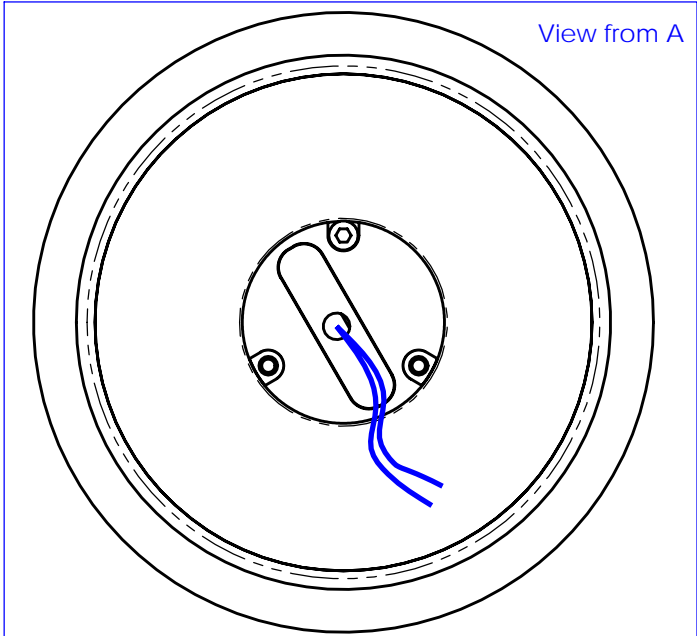
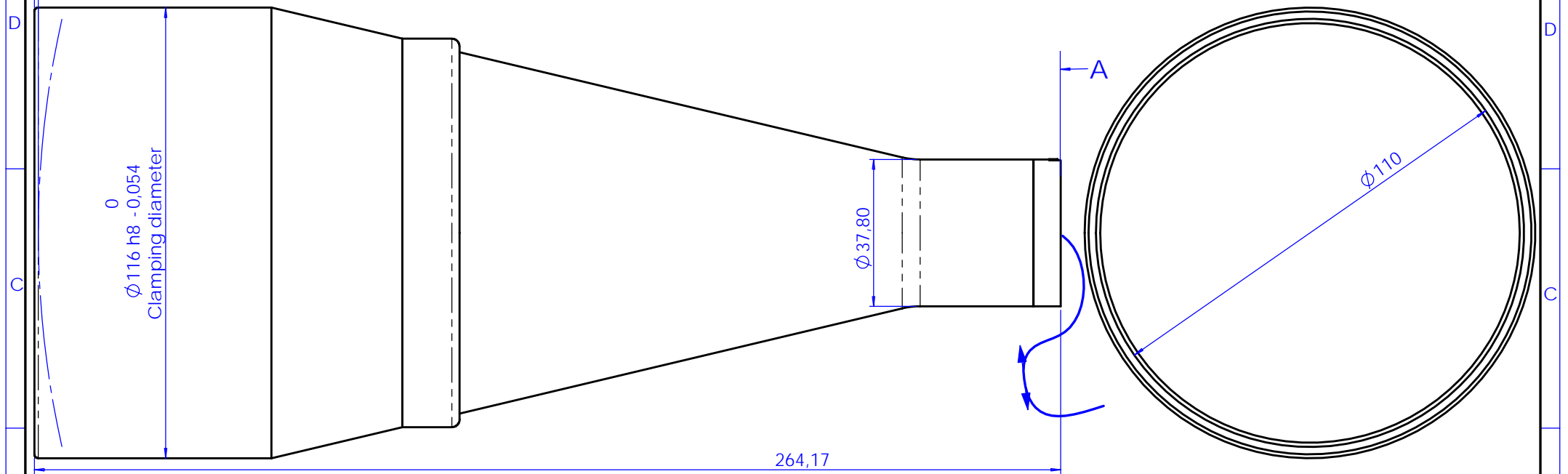


Material	N.A.		Mass	0.99 kg	Scale	1:1	
Surface treatment	N.A.		Project-Prod.Item/Instrument	LT CL 64			
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned bevels	1x45°	Description Assembly	
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned radii	R 0.5		
0.5 +3	>3- 6	>6- 30	>30- 120	>120 +400	>400- 1000	>1000 +2000	>2000 +4000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2
www.opto-engineering.com		Date		Name		Drawing No.	Sheet
		Designed	23/03/06	A.Vismara		01275-0-D	1/1
		Draw	23/03/06	A.Vismara			
		Checked	X	C. Sedazzari			
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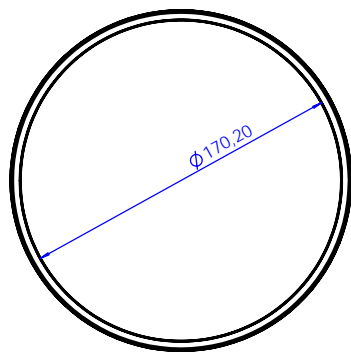
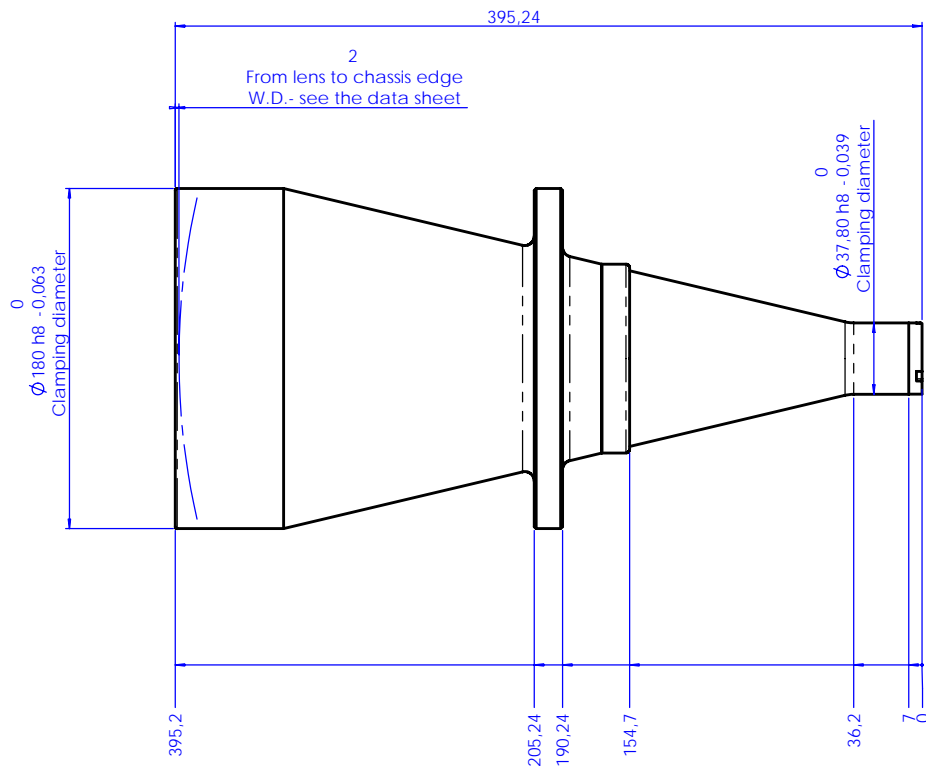
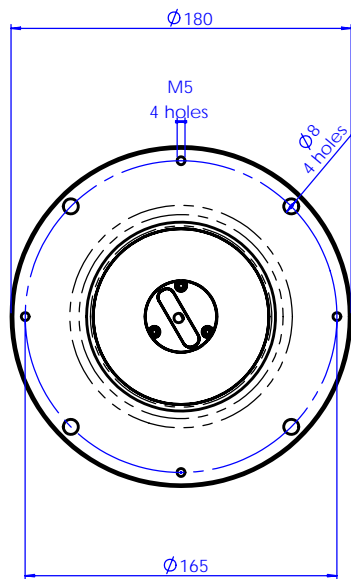
Rev No.	Description	Date	Name
D	First light	10/05/06	A.Vismara

1
From lens to chassis edge
W.D. - see the data sheet



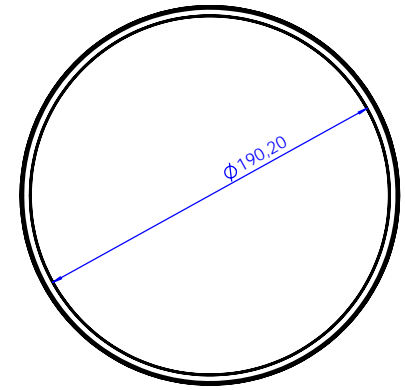
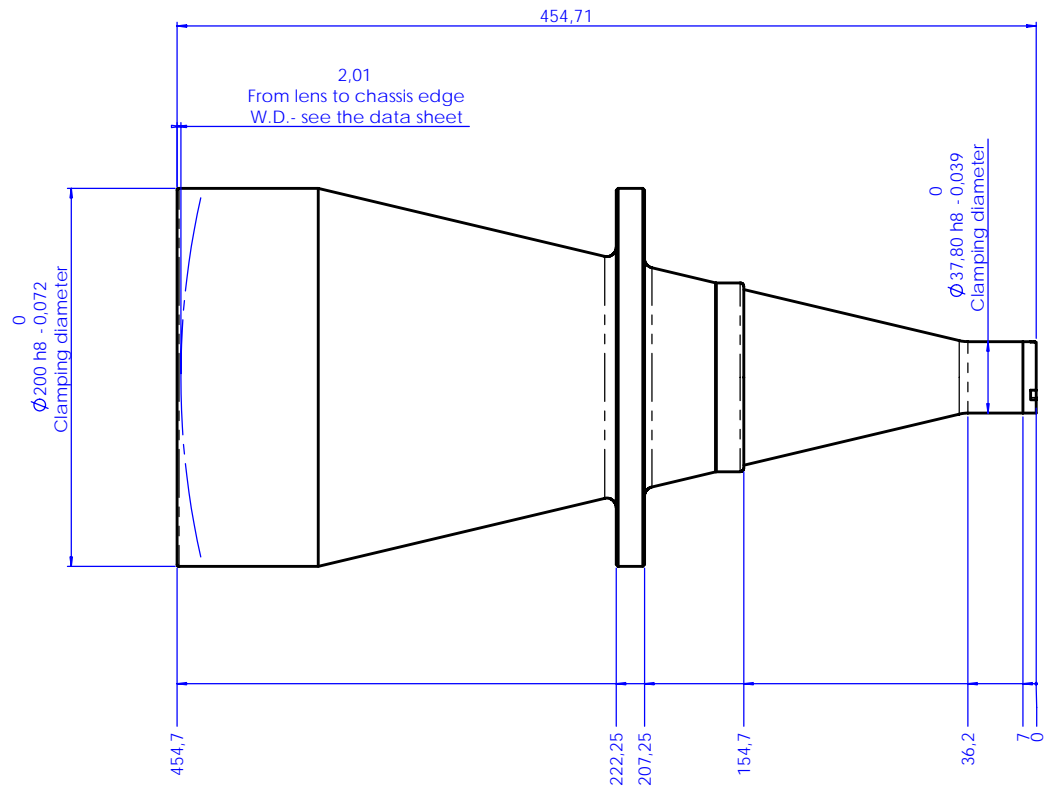
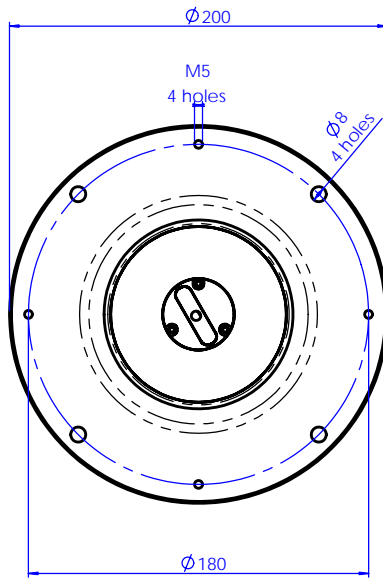
Material	N.A.		Mass	1.48 kg	Scale	1:1			
Surface treatment	N.A.		Project-Prod.Item/Instrument	LT CL 80					
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned bevels	1x45°	Description Assembly			
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned radii	R 0.5				
0.5 +3	>3- 6	>6- 30	>30- 120	>120 +400	>400- 1000	>1000 +2000	>2000 +4000	Drawing No. 01276-0-D	Sheet 1/1
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8	±1.2	±2		
		Date	Name		Drawing No.		Sheet		
Designed		10/05/06	A.Vismara		01276-0-D		1/1		
Draw		10/05/06	A.Vismara						
Checked		X	C. Sedazzari						
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Rev No.	Description	Date	Name
A	First light	06/02/07	A.Vismara



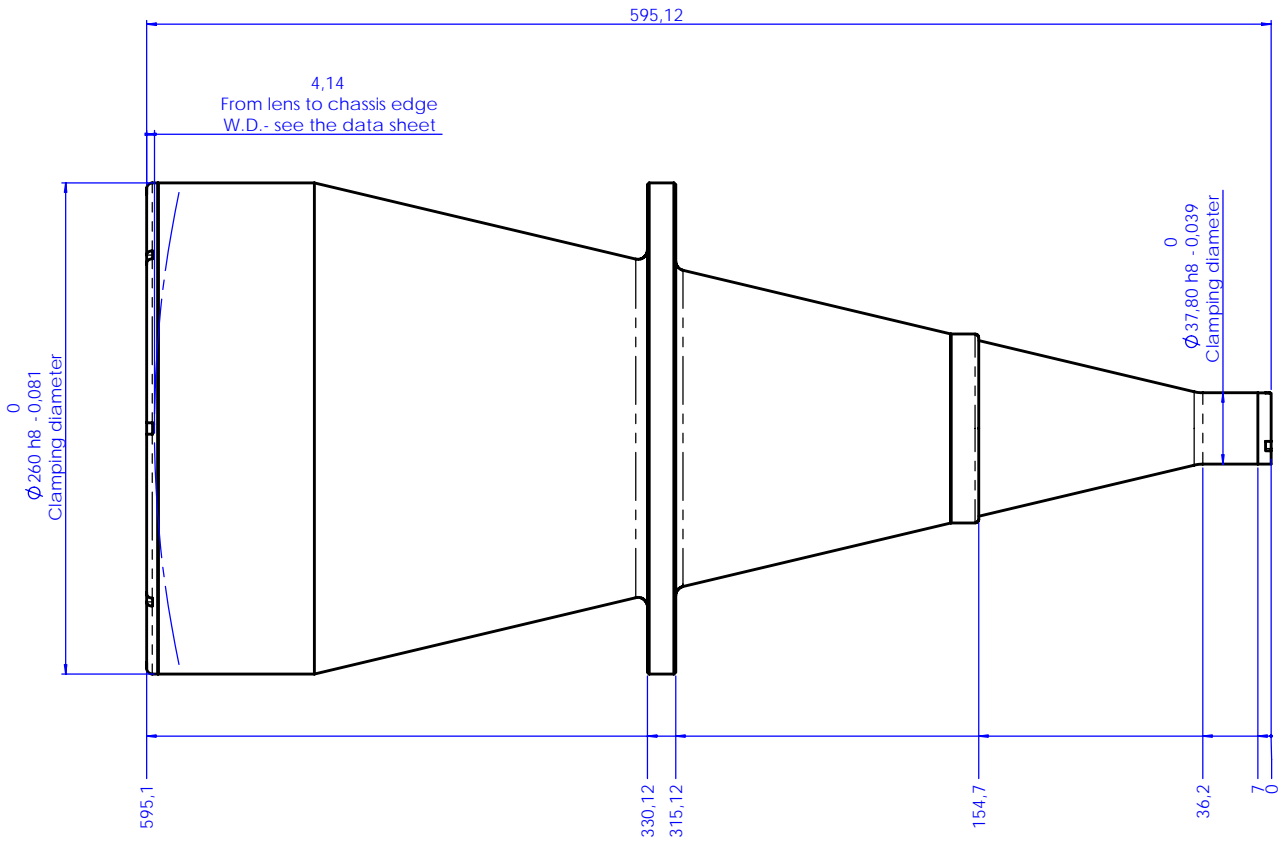
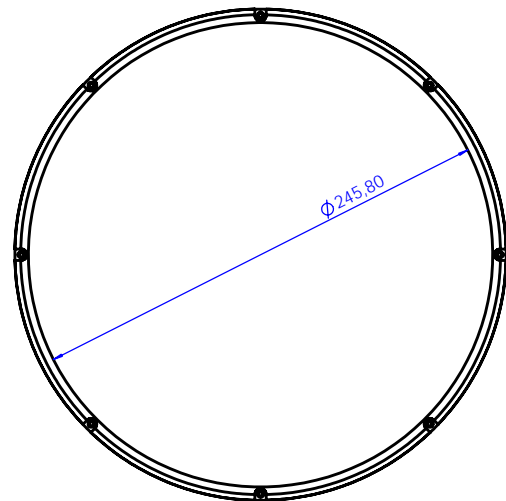
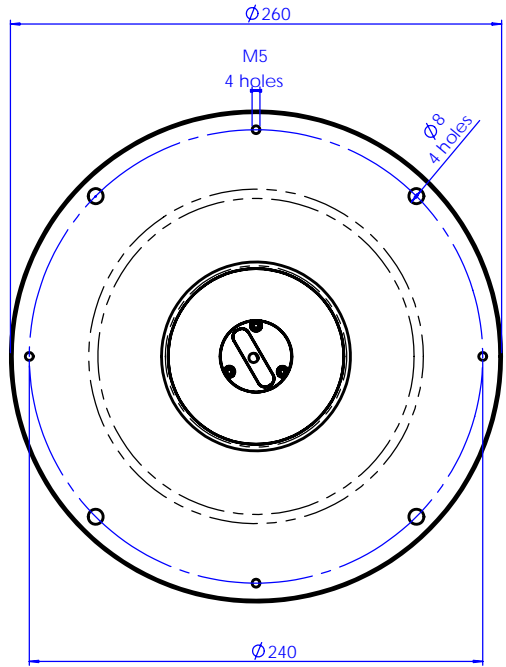
Material	N.A.	Mass	5.2 kg	Scale	1:2
Surface treatment	N.A.	Project/Prod./Item/Instrument	LT CL 120		
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned Bevels	1x45°
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned Radii	R 0.5
0.5	>3-	>6-	>30-	>120	>400-
-3	A	30	120	400	1000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8
					±1.2
Date		Name		Drawing No.	
Designed 06/02/07		A.Vismara		01281-0-A	
Draw 06/02/07		A.Vismara		Sheet 1/1	
Checked x		C.Sedazzari		Reproduction forbidden without specific authorization	
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Rev. No.	Description	Date	Name
A	First light	06/02/07	A.Vismara



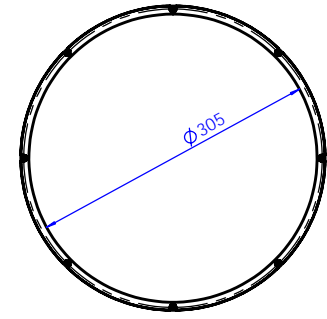
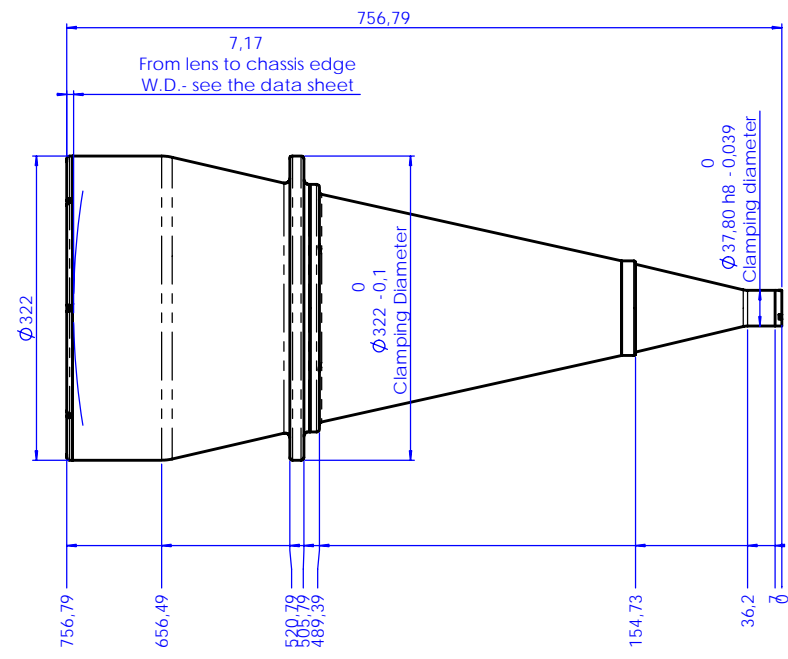
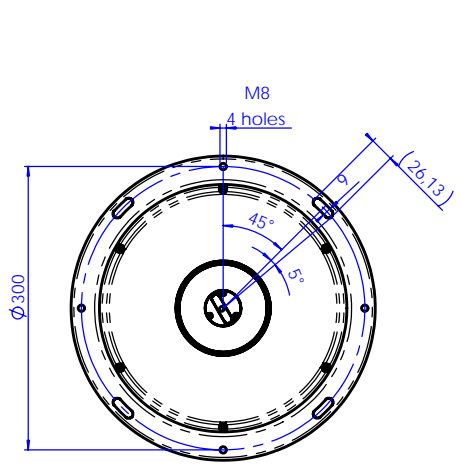
Material	N.A.	Mass	6.5 kg	Scale	1:2
Surface treatment	N.A.	Project-Prod.Item/Instrument	LT CL 144		
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned Bevels	1x45°
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned radii	R 0.5
0.5	>3-	>6-	>30-	>120	>400-
-3	6	30	120	400	1000
+0.1	+0.1	+0.2	+0.3	+0.5	+0.8
					+1.2
Date		Name		Drawing No.	
Designed 06/02/07		A.Vismara		01282-0-A	
Draw 06/02/07		A.Vismara		Sheet 1/1	
Checked x		C.Sedazzari		Reproduction forbidden without specific authorization	
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Rev No.	Description	Date	Name
A	First light	06/02/07	A.Vismara



Material	N.A.	Mass	11.3 kg	Scale	1:2
Surface treatment	N.A.	Project-Prod.Item/Instrument	LT CL 192		
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned Bevels	1x45°
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned radii	R 0.5
0.5	>3-	>6-	>30-	>120	>400-
-3	6	30	120	400	1000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8
		Class	m	±1.2	
		Date	Name		
		Designed	06/02/07	A.Vismara	
		Draw	06/02/07	A.Vismara	
		Checked	x	C.Sedazzari	
		Drawing No.		Sheet	
		01283-0-A		1/1	
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Rev No.	Description	Date	Name
A	First light	06/02/07	A.Vismara



Material	N.A.	Mass	20.8 kg	Scale	1:4
Surface treatment	N.A.	Project-Prod.Item/Instrument	LT CL 240		
Geometrical tolerance (ISO 2768-2)		Class	K	Undimensioned Bevels	1x45°
Linear tolerance (ISO 2768-2)		Class	m	Undimensioned Radii	R 0.5
0.5	>3-	>6-	>30-	>120	>400-
-3	6	30	120	400	1000
±0.1	±0.1	±0.2	±0.3	±0.5	±0.8
					±1.2
www.opto-engineering.com		Date	Name		
Designed		06/02/07	A.Vismara		
Draw		06/02/07	A.Vismara		
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