



Laser Assisted RObotic Surgery of the anterior Eye Segment

Project full title:	Laser Assisted Robotic Surgery of the anterior Eye Segment
Project Acronym:	LA-ROSES
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Deliverable no.:	D 7.4
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Organization Short Name of Milestone Leading Partner	EKY
Organization Short Name of Other Participants	IFAC, FAST
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Version	1
Tasks contributing to this deliverable	7
Dissemination Level ¹	RE
Total number of pages (including cover page)	6



¹ Dissemination Level:

PU Public

PP Restricted to other programme participants (including the Commission Services)

RE Restricted to a group specified by the consortium (including the Commission Services)

CO Confidential, only for members of the consortium (including the Commission Services)



Version Management

Version	Date	Status	Author	Modification
1	10/01/2015	Setup	Ekymed	Creation of document
2	19/09/2016	Final	Ekymed	Final Revision



Summary

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1 Executive Summary

The present deliverable D 7.4 aims to describe the LA-ROSES handpiece last release version, as the final evolution of the deliverable D 3.4 and according to the deliverable 2.1. All the components are included, in order to simplify the vision and understanding of the general views, screw, spines are not included, but are, of course, present and included in the CAD file.

2 Main variation

Several improvements and modifications has been implemented in the Handpiece in this last version, considering 4 revisions of the project realised. Two objectives guided the design: from one side an simpler assembly procedure, from the other side to improve the set-up of the camera regulations (focus and depth of view, in particular). Respect to the previous versions, the main modifications are:

1. the realisation of a component that cover the side part of the camera but with two openings able to give the operator the access to the regulations
2. the substitution of the “z axis” motor due to several problems evidenced in the previous version.

The second point outlined before was very critical because the solutions previously adopted has not proved reliable as product itself.

3 List of components

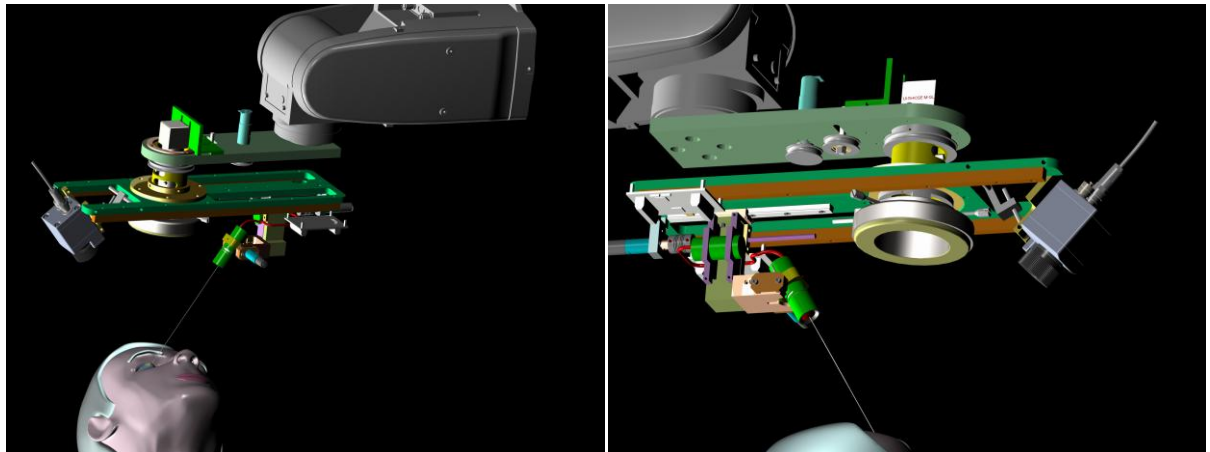
The next table shows the list of all the components, including name, quantity, material, supplier (if the component will be bought by a supplier or classified “new component” if it is a new part.

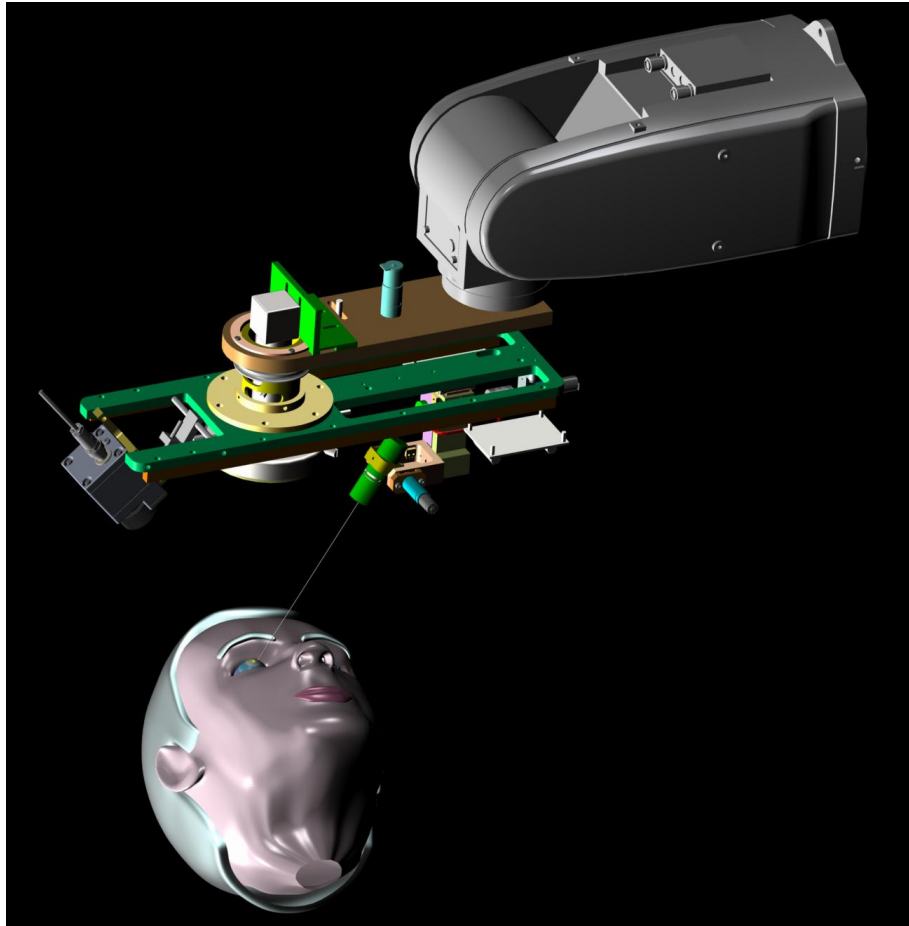
Class	Name of component	Quantity	Draw. Rev.	Type	Supplier
Sub-Assembly	HUMAN_EYE_ANY	1	-	-	
Part	OSELA_LASER_LENS	1	-	on the market	Osela
Part	LASER HOLDER_REV2	1	2.0	new	-
Part	LASER HOLDER_ROTATORY_REV3	1	3.0	new	-
Part	X_MOTOR_CONNECTOR_REV2	1	2.0	new	-
Part	PU9TR_SLIDER	1	-	on the market	NSK
Part	PU9TR4017_501_RAIL	1	-	on the market	NSK
Part	SLIDER_BOARD_TILT_REV3	1	3.0	new	-
Sub-Assembly	MAIN_BOARD	1		new	-
Part	MAIN_BOARD_REV2	1	2.2	new	-
Part	AM1524_GH6	1	-	on the market	Fahulaber
Part	BOCCOLA_ZMOTOR	1	1.0	new	-
Part	CUSCINETTO_SOST	1	-	on the market	SKF
Part	BEARING_SUPPORT_REV1	1	1.0	new	-
Part	BOCCOLA1_ZMOTOR	1	1.0	new	-
Part	PERNO_BOCCOLA_RINVIO	1	1.0	new	-
Part	BOCCOLA2_ZMOTOR	1	1.0	new	-
Part	NIR_CAMERA_TRUE	1	-	on the market	-
Part	NIR_CAMERA_SUPPORT_REV2	1	1.0	new	-
Part	BLOCCO1_CUSCINETTO	1	1.0	new	-
Part	CUSCINETTO_BOCCOLA1	1	1.0	new	-
Part	REINFORCEMENT_SLIDER_BOARD	2	1.0	new	-
Part	BEARING HOLDER	2	1.0	new	-
Part	SHAFT	1	1.0	new	-
Part	W_618_4	2	-	on the market	SKF
Part	RING_LASER_DISTANCE	2	1.0	new	-
Part	LASER_MOTOR_HOLDER_REV2_SX	1	2.0	new	-
Part	12_5_9STAGES	2	-	on the market	Fahulaber
Part	AM1020-2R_-01	1	-	on the market	Fahulaber

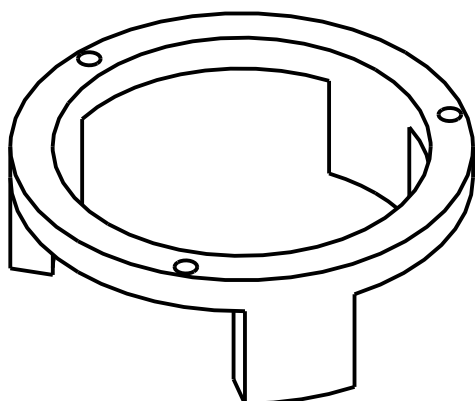
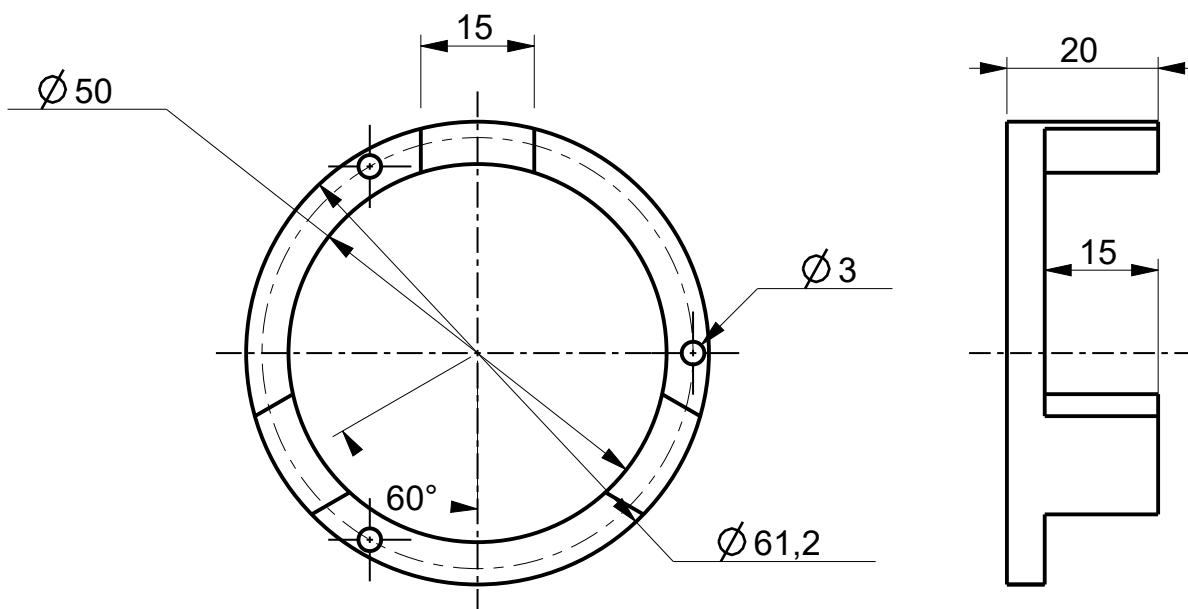
Part	LASER_MOTOR_HOLDER_REV2_DX	1	2.0	new	-
Part	LASER_HOLDER_CUP	1	1.0	new	-
Part	XSLIDE_MOTOR_HOUSING	1	1.0	new	-
Part	ADM1220S-_2R_-_31	1	-	on the market	Fahulaber
Part	COUPLING_REDUCUTOR	1	1.0	new	-
Part	MWS15-3-3-SS	1	-	on the market	Ruland
Part	ORIZZONTAL_AXIS_SCREW	1	1.0	new	-
Part	NUT_M4X05	1	1.0	new	-
Part	OSELA_DRIVER_HOLDER	2	1.0	new	-
Part	OSELA_LASER_DRIVER	1	1.0	new	-
Part	CYLINDER_REV2	1	2.0	new	-
Part	ANELLO_LIGHTER	1	1.0	new	-
Part	LIGHTER	1	-	on the market	
Part	THERMAL_ORIENTATION_PLATE_REV2	1	2.0	new	-
Part	TC_CAMERA_TILT1	1	1.0	new	-
Part	SHAFT_CAMERA_TIL_REV2	1	2.0	new	-
Part	DISTANCE_TC_CAMERA1	2	1.0	new	-
Part	SHAFT_TC_CAMERA1	1	1.0	new	-
Part	PI2XX-48G-OPTIK_ANY	1	-	on the market	Optris
Part	MICROSWITCH_FARNELL	2	-	on the market	Farnell
Part	MICROSWITCH_SUPPORT	1	1.0	new	-
Part	MICROSWITCH_SPINE	1		new	-
Part	MCST_3601_CONTROL_UNIT	3	-	on the market	Fahulaber

Tab. 1 - Bill of materials

In the next picture some general views of the final version of the Handpiece are reported.

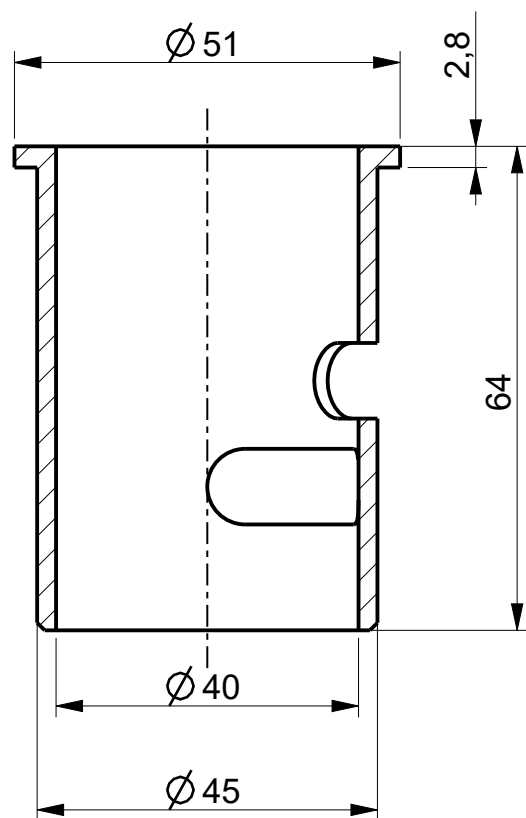
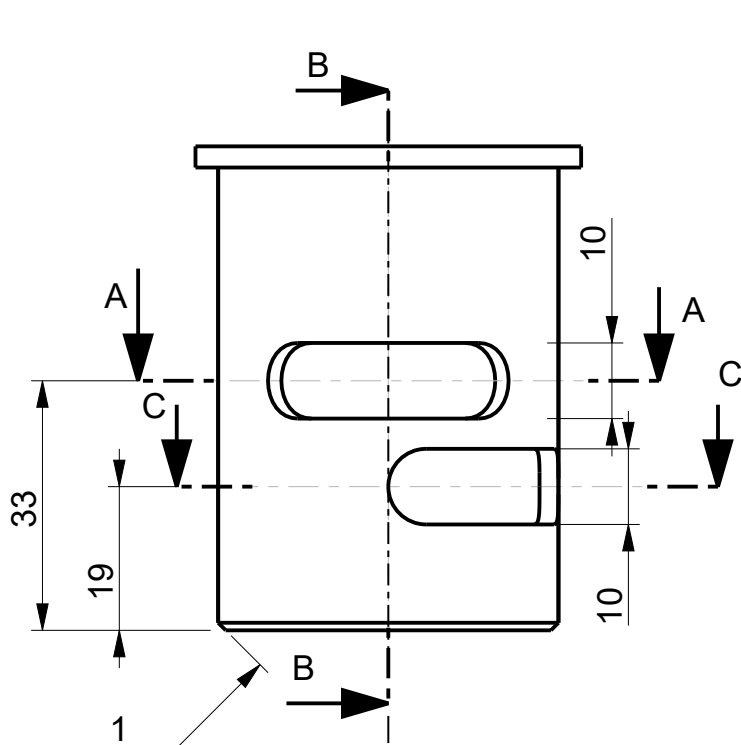




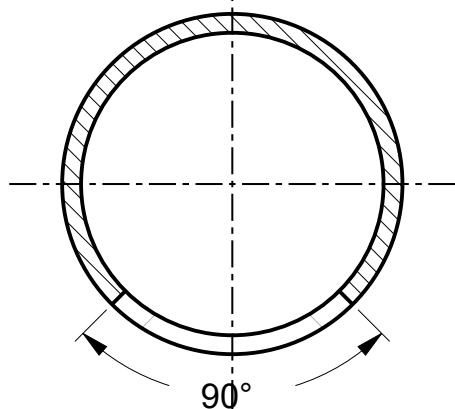


Posizione		Esp. Rev.	Data	Firma	Descrizione revisione disegno			
Position		Exp. Rev.	Date	Sign	Drawing review description			
Denominazione		Anello Lighter			Codice			
Part name					Part Code			
Completamento		Handpiece			Data		20/11/2016	
Assembly					Disegnato da:		BM	
Via Boccioni 2 - 56037 Peccioli (PI)		La Roses			Disegnato da:		BM	
Italy					Disegnato da:		BM	
Phone +39 0587 677 713					Disegnato da:		BM	
Fax +39 0587 677 714					Disegnato da:		BM	
http://www.akymed.com					Disegnato da:		BM	
Client		-			Disegnato da:		BM	
Customer					Disegnato da:		BM	
Foglio		1/1	Formato	A4	Tolleranze di lavorazione		UNI EN	
Sheet			Format		Manufacturing tolerances		22768 1-2	
Scale		1,000	Materiale	Anticorrosione	Trattamento		normale	
Scale			Material		Treatment			
							Quantità	
							Quantity	
							1	

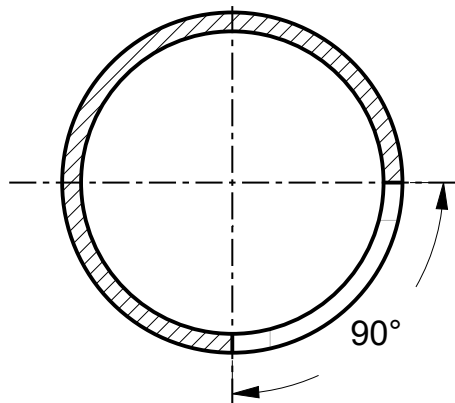
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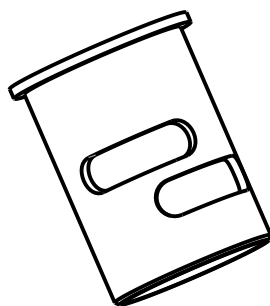
SECTION B-B



SECTION A-A



SECTION C-C

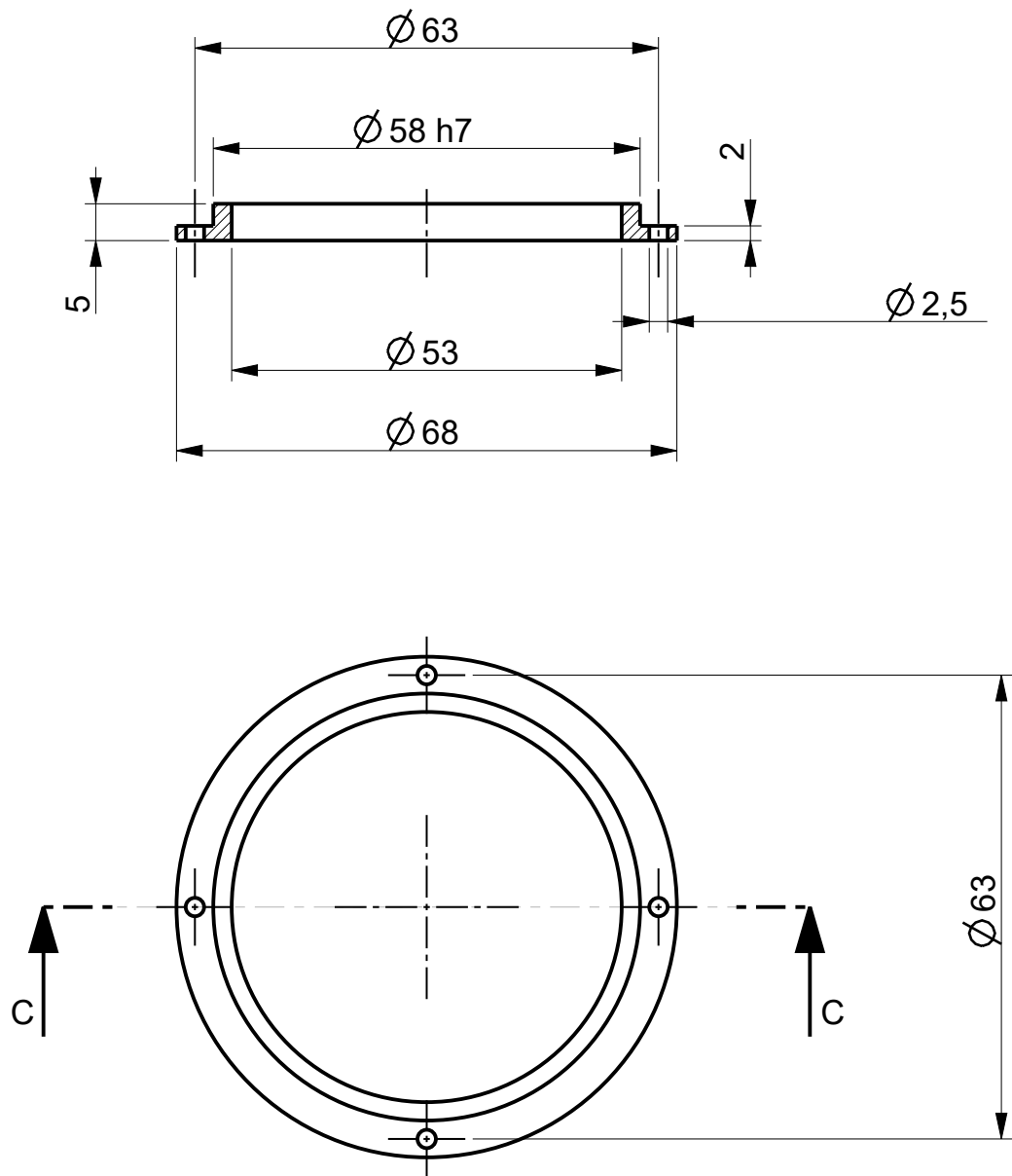


SCALE 0,500

Posizione	Esp. Rev.	Data	Firma	Descrizione revisione disegno Drawing review description				
				Denominazione Part name	Bearing Support Rev 1		Codice Part Code	
				Complesso Assembly	Main Board		Data Date	20/06/2018
				Progetto Project	La Roses		Disegnato da Drawn by:	BM
				Cliente Customer			Approvato da Approved by:	BM
				Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances
				Scala Scale	1,000	Materiale Material	Anticondrol	Trattamento Treatment
							/	UNI EN 22768 1-2
								Quantità Quantity
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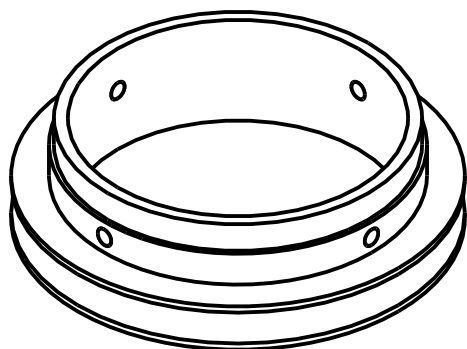
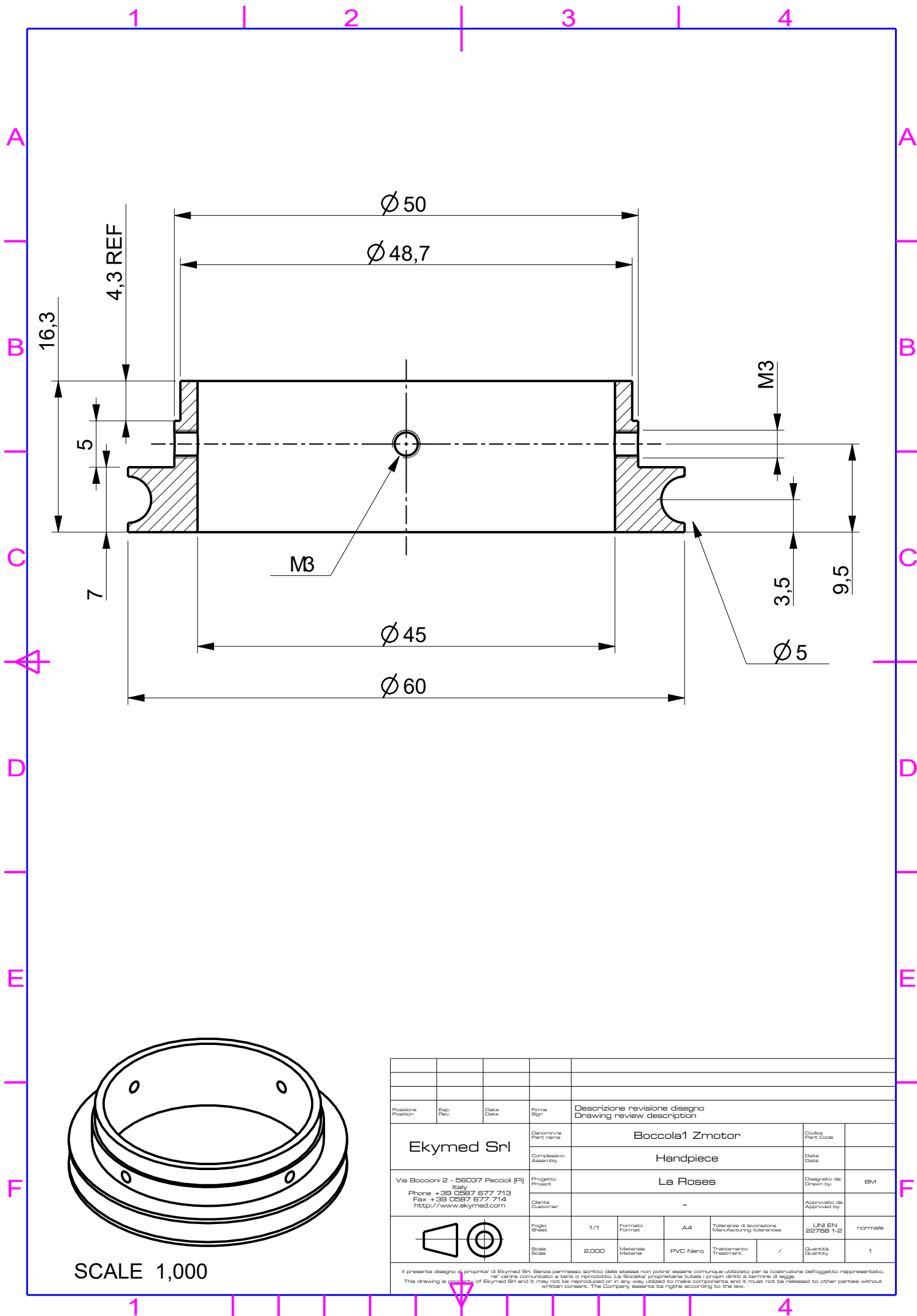
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SECTION C-C



Posizione		Esp. Rev.	Data	Firma	Descrizione revisione disegno Drawing review description				
Ekymed Srl					Denominazione Part name		Blocco1 cuscinetto		
					Completamento Assembly		Main Board		Codice Part Code
Via Boccioni 2 - 56037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com					Progetto Project		La Roses		Data Date
					Cliente Customer		-		20/06/2018
					Foglio Sheet		1/1	Formato Format	A4
					Scala Scale		1,000	Materiale Material	Anticondrol
					Tolleranze di lavorazione Manufacturing tolerances		UNI EN 22768 1-2		normale
					Trattamento Treatment		/		Quantità Quantity
									1

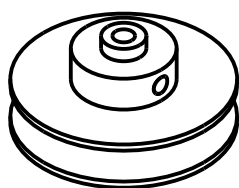
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SCALE 1,000

Posizione		Esp. Rev.		Data		Firma		Descrizione revisione disegno	
								Drawing review description	
Ekymed Srl		Denominazione		Boccola1 Zmotor		Codice			
		Completamento		Handpiece		Data			
Via Bocconi 2 - 56037 Peccioli (PI)		Progetto		La Roses		Disegnato da:		BM	
Phone +39 0587 677 713		Cliente				Disegnato da:			
Fax +39 0587 677 714						Disegnato da:			
http://www.ekymed.com						Disegnato da:			
		Foglio		1/1		Formato		A4	
		Scala		2,000		Materiale		PVC Nero	
						Trattamento		/	
						UNI EN		22765 1-2	
						Quantità		1	

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1 | 2 | 3 | 4

A

B

C

D

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F

A

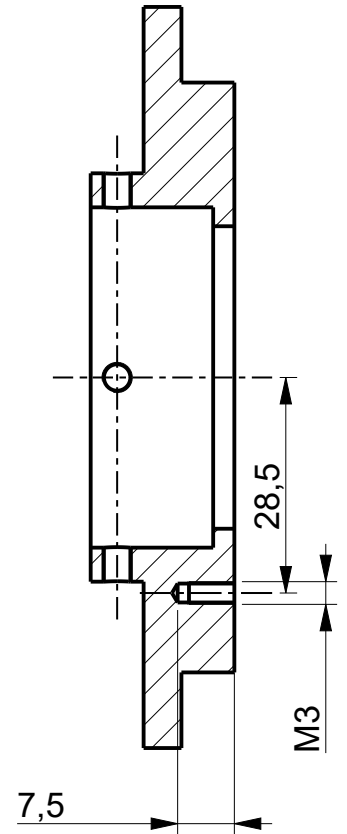
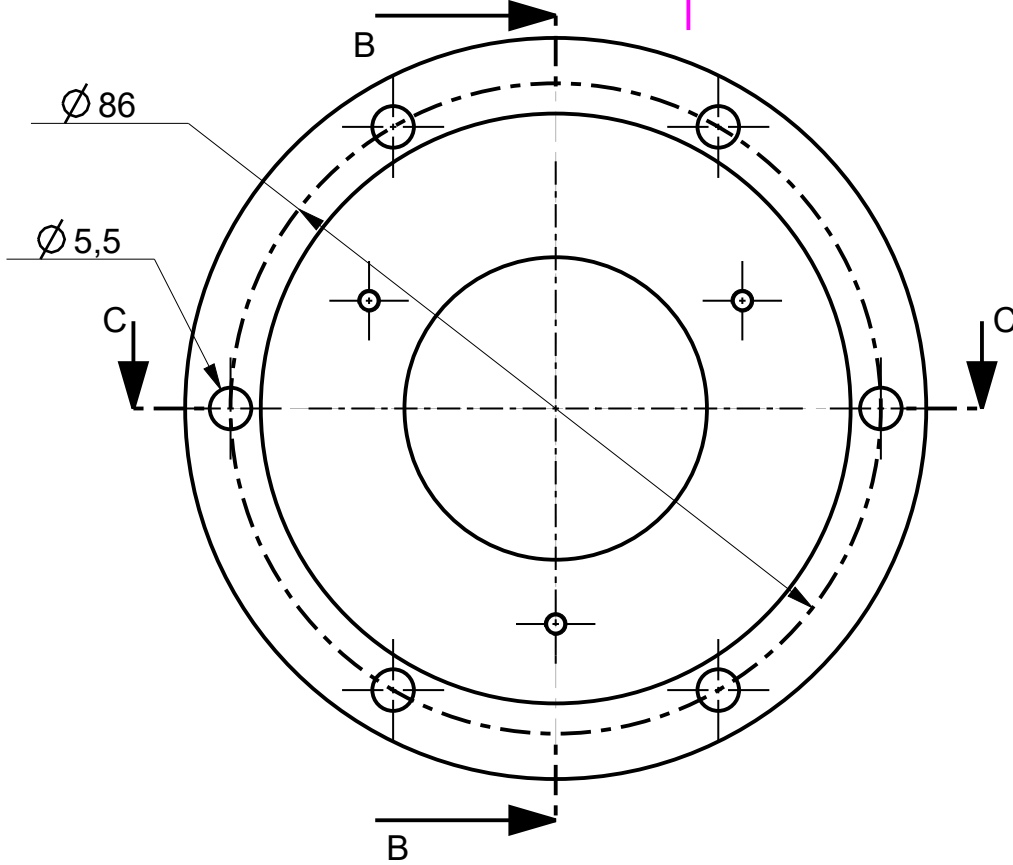
B

C

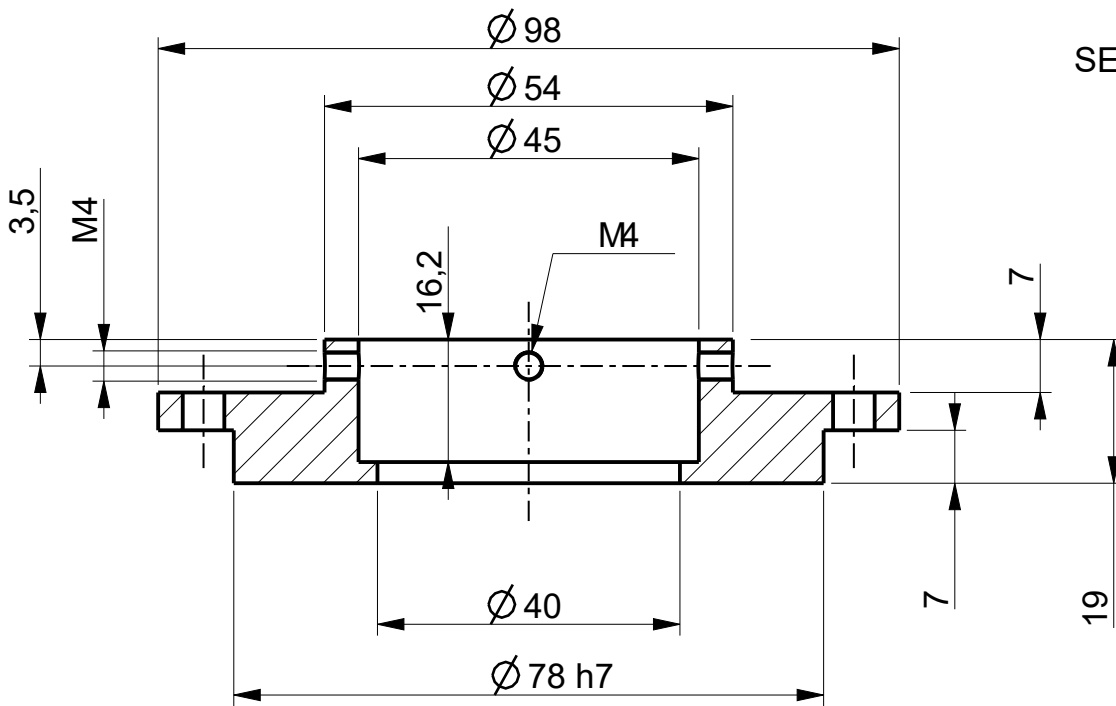
D

E

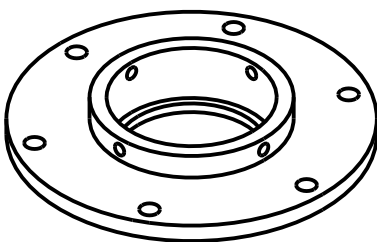
F



SECTION B-B



SECTION C-C

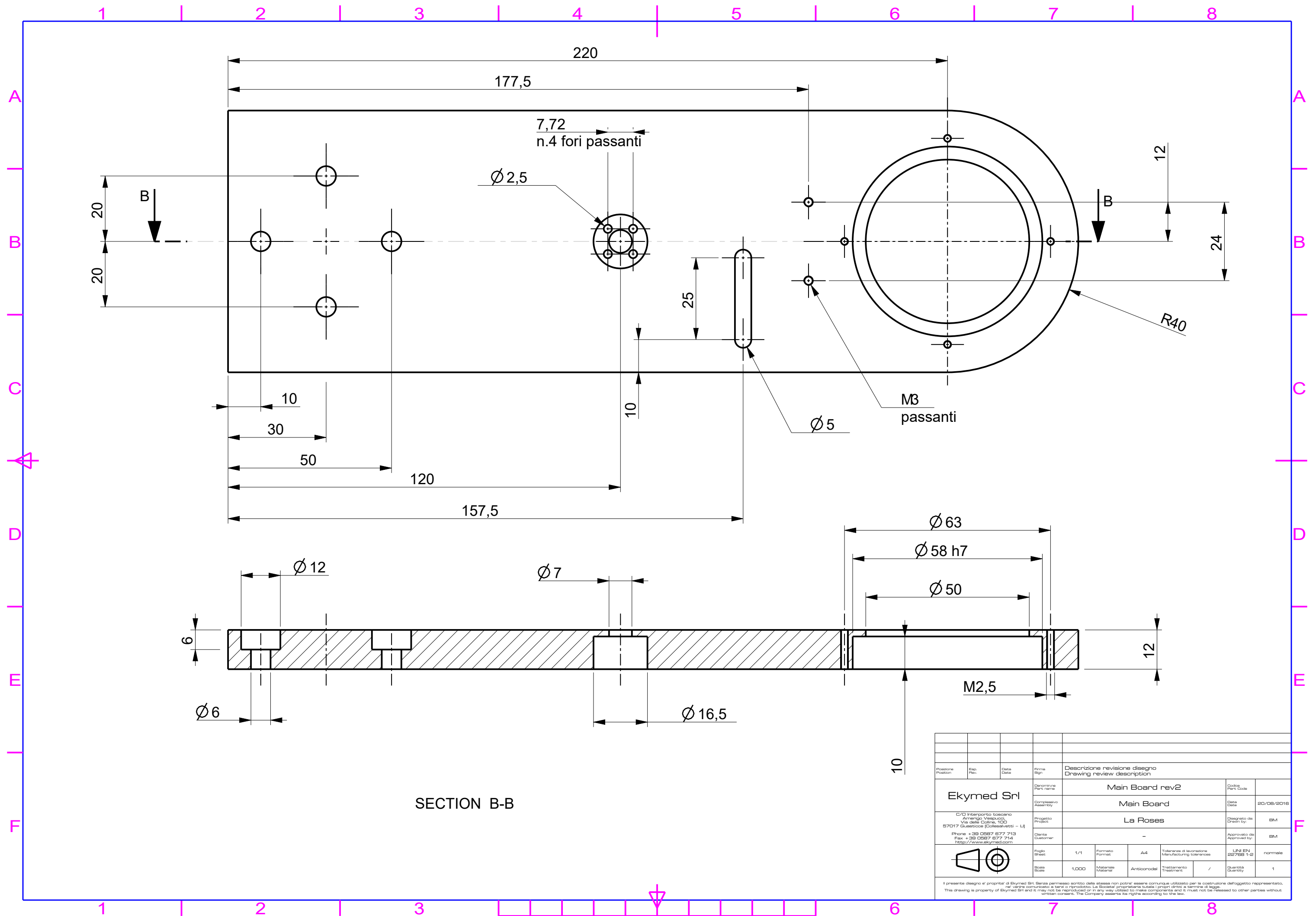


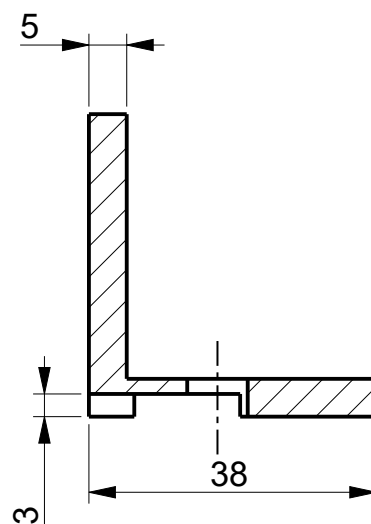
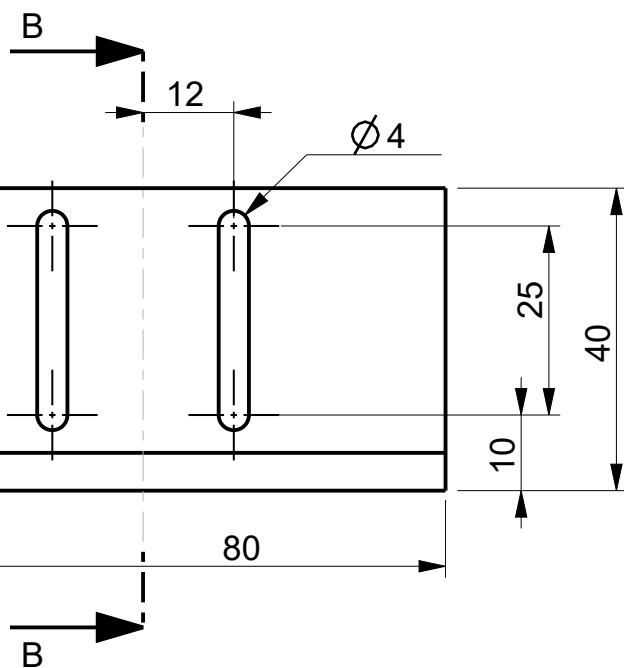
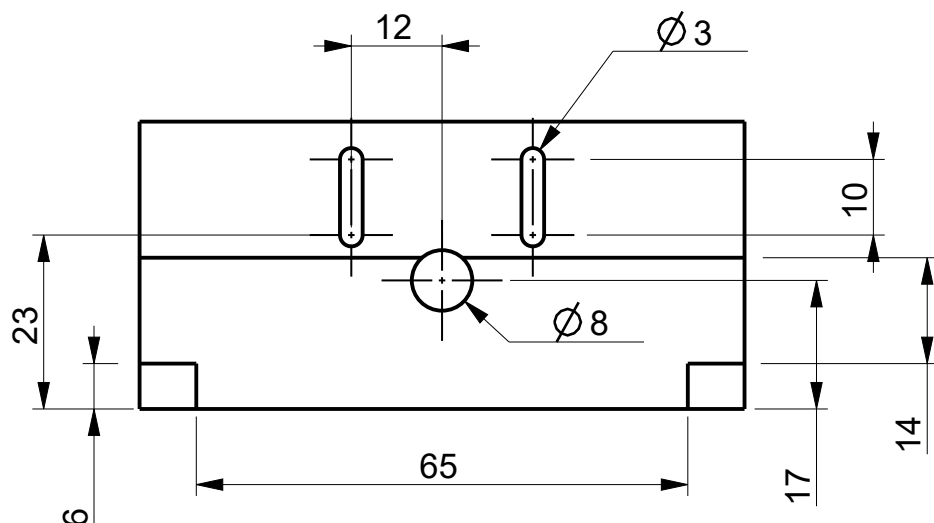
SCALE 0,500

Posizione	Exp. Rev.	Data	Firma	Descrizione revisione disegno Drawing review description			
				Denominazione Part name	Cylinder Rev2	Codice Part Code	
				Completivo Assembly	Handpiece	Data Date	20/11/2016
				Progetto Project	La Roses	Disegnato da: Drawn by:	BM
				Cliente Customer	-	Approvato da: Approved by:	BM
				Foglio Sheet	1/1	Formato Format	A4
				Scala Scale	1,000	Tolleranze di lavorazione Manufacturing tolerances	UNI EN 22768 1-2
						Trattamento Treatment	/
						Quantità Quantity	1

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1 | 2 | 3 | 4

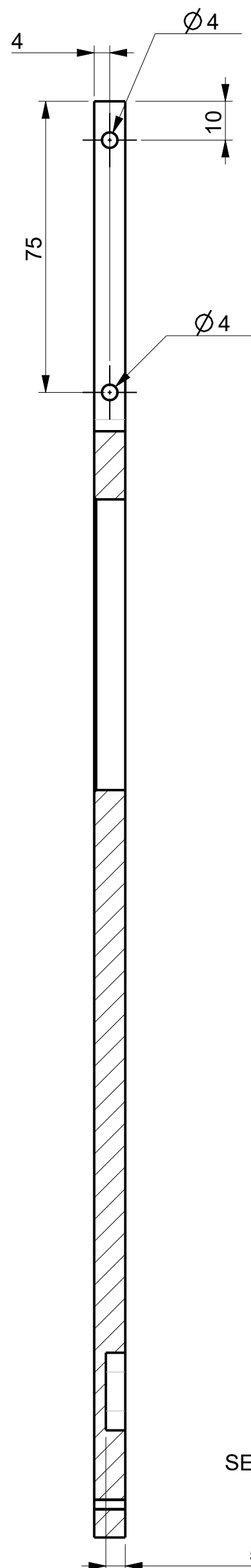
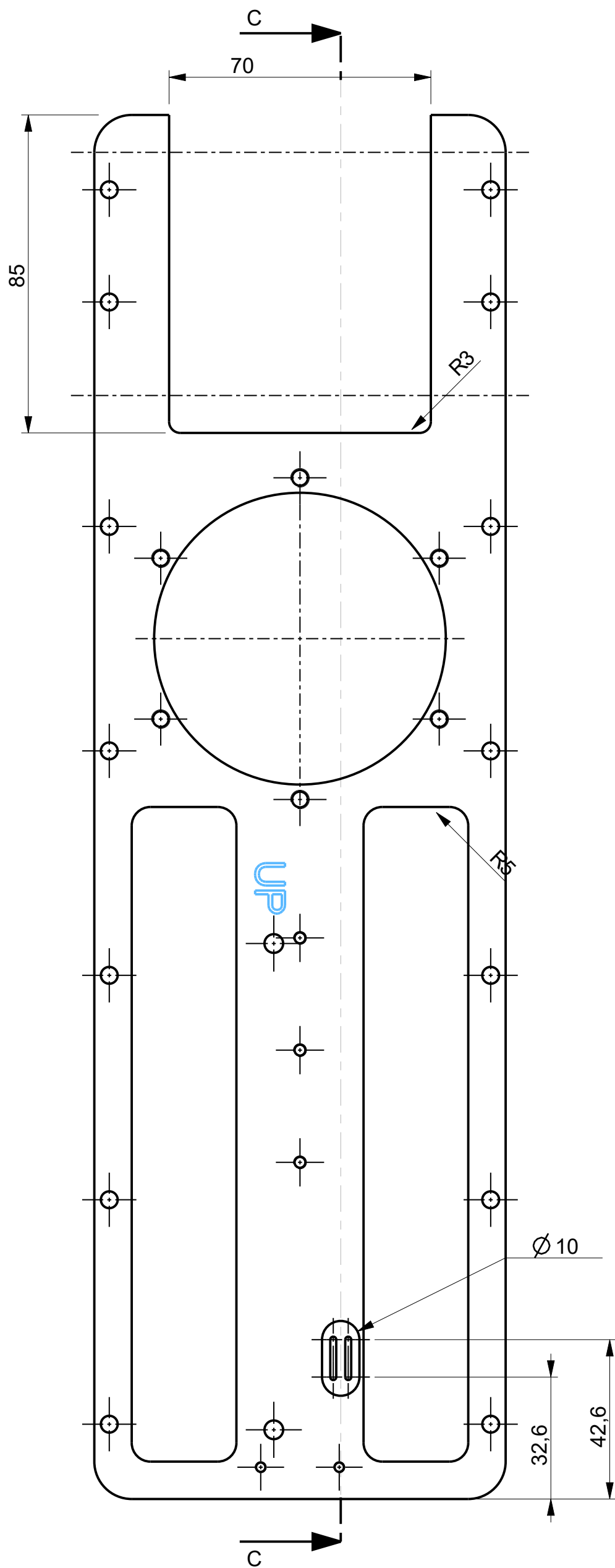


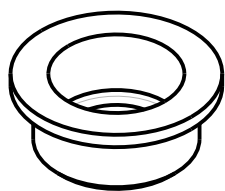


SECTION B-B

SCALE 0,500

[illegible]

[illegible]



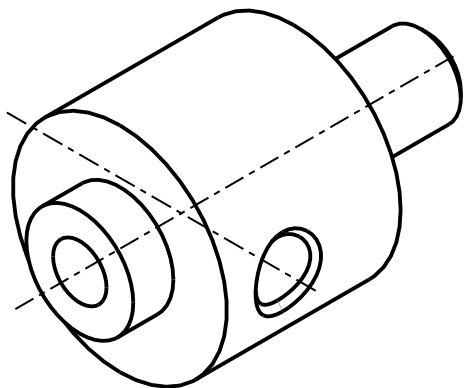
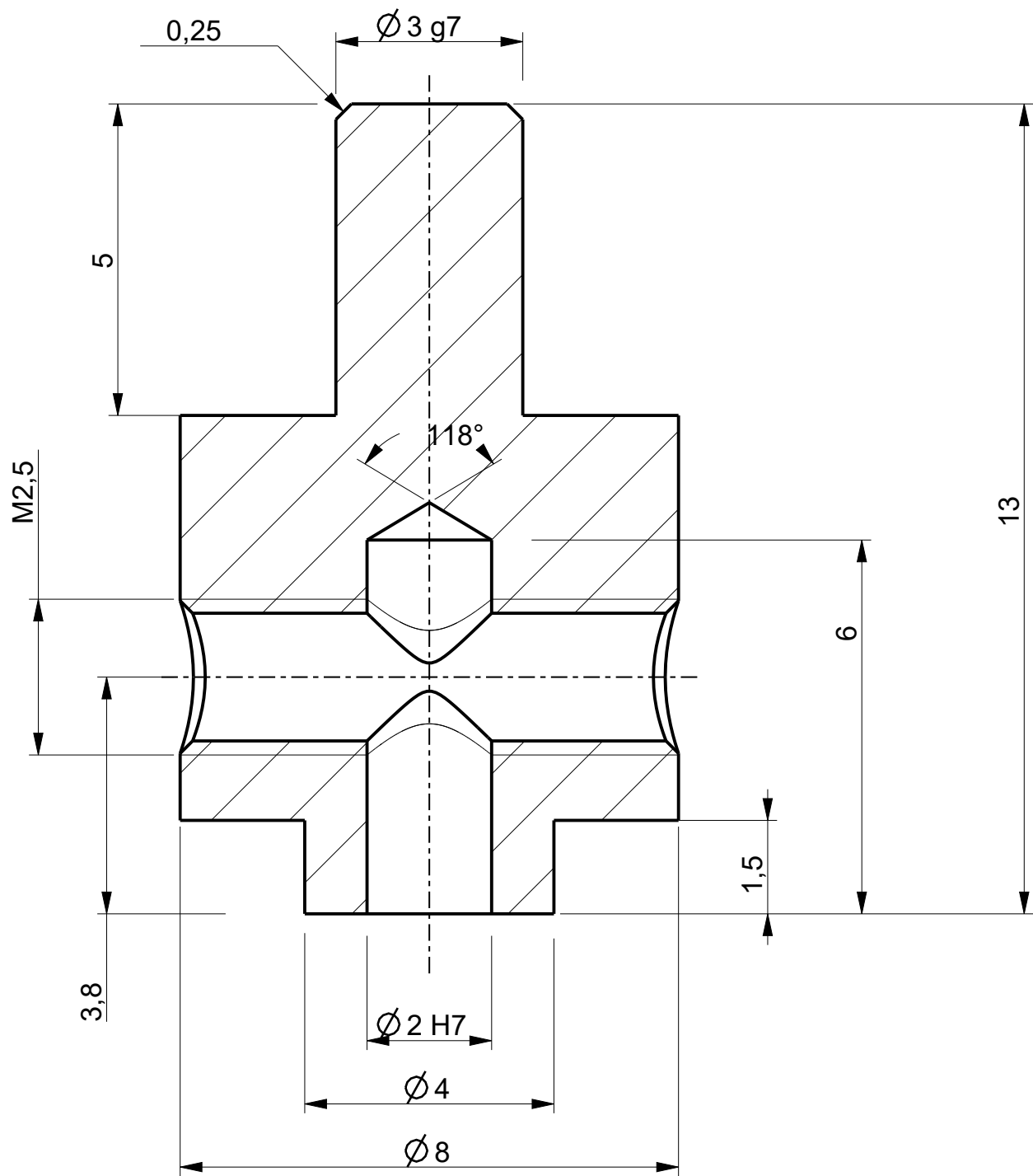
Technical drawing of a mechanical part (Fig. 1.10) showing a cross-section. The part has an outer diameter of $\varnothing 14$ and an inner diameter of $\varnothing 9$ H7. A central hole has a diameter of $\varnothing 7$ and a depth of 5. The total length of the part is 5,8. The fillet radius at the transition is R0,25. The drawing includes a dashed line indicating the center of the hole.

Posizione Position	Esp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description					
Ekymed Srl				Bearing Holder				Codice Part Code	LA_BEH
				Handpiece				Date Date	
Via Bocconi 2 - 56037 Peccioli [PI] Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com	Progetto Project Italy			La Roses				Disegnato da: Drawn by:	BM
	Cliente Customer			Ekymed				Approvato da: Approved by:	BM
	Foglio Sheet	1 / 1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances			UNI EN 22768-1-2	normale
	Scala Scale	4,000	Materiale Material	Anticondusa	Treatment	/	Quantità Quantity	2	

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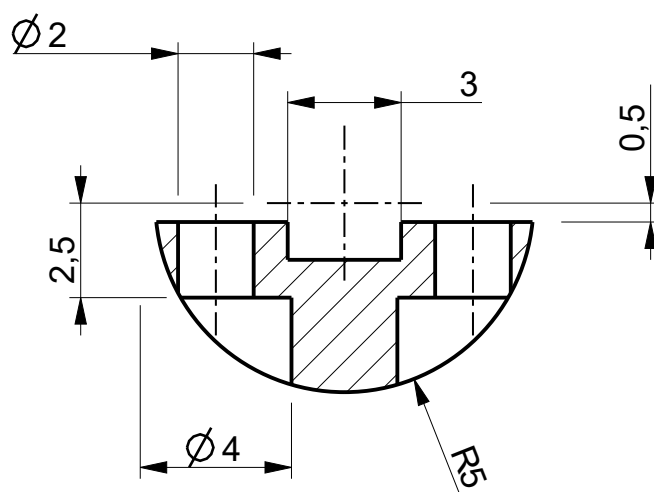
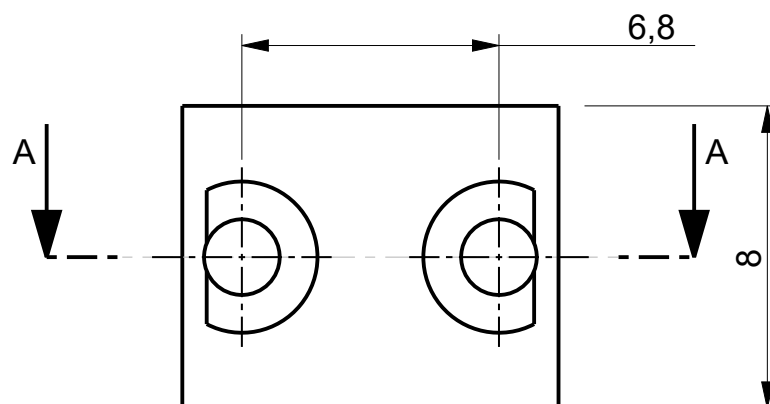
A
B
C
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SECTION A-A
SCALE 10,000

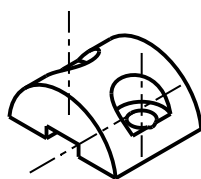


SCALE 5,000

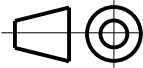
Posizione Position	Exp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description						
Ekymed Srl				Denominazione Part name	Coupplig Reductor				Codice Part Code	LA_CR
				Completivo Assembly	Handpiece				Data Date	
Via Boccioni 2 - 59037 Peccioli (PI) Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com				Progetto Project	La Roses				Disegnato da Drawn by	BM
				Cliente Customer	Ekymed				Approvato da Approved by	BM
		Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances			UNI EN 82768 1-2	normale
		Scala Scale	1,000	Materiale Material	AISI 303		Trattamento Treatment	/	Quantità Quantity	1
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SECTION A-A

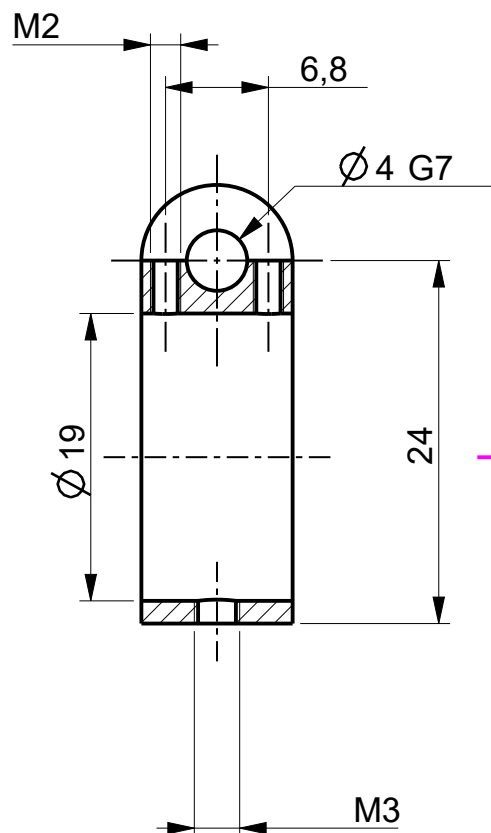
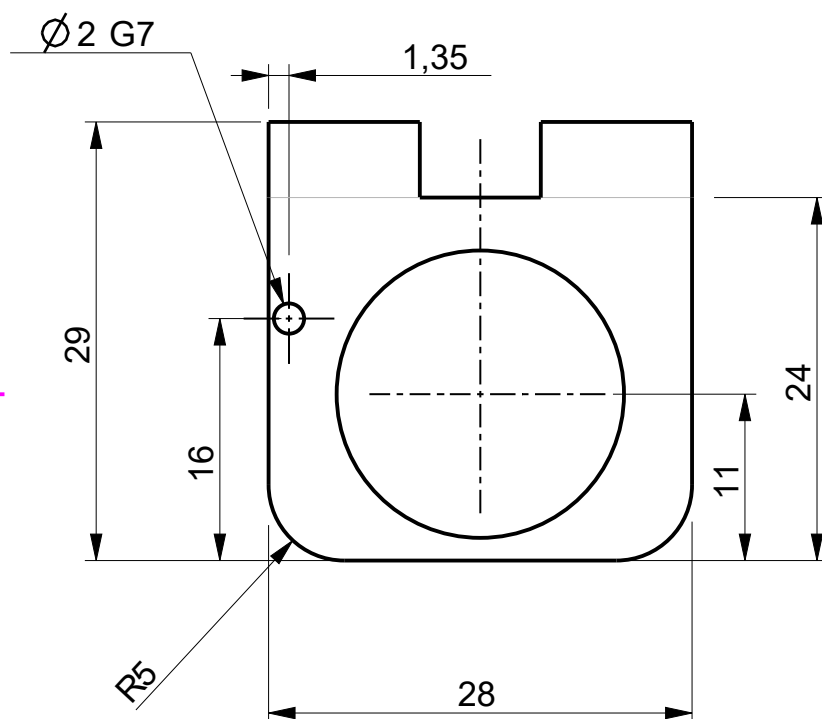


SCALE 2,000

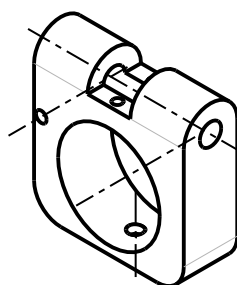
Posizione		Esp. Rev.		Data		Firma		Descrizione revisione disegno	
								Drawing review description	
Ekymed Srl		Denominazione		Laser Holder Cup		Codice		LA_LHP	
		Part name				Data			
Via Boccioni 2 - 58037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com		Completivo		Handpiece		Disegnato da:		BM	
		Project		La Roses		Disegnato da:		BM	
		Cliente		Ekymed		Approvato da:		BM	
		Customer				Approvato da:			
Foglio		1/1		Formato		A4		Tolleranze di lavorazione	
Scale		5,000		Material		AISI 303		Trattamento	
						/		Quantità	
								1	

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SCALE 2,000

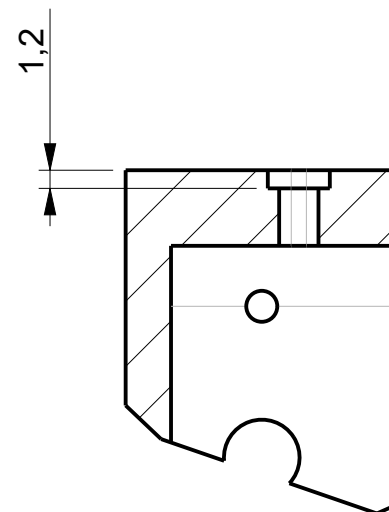
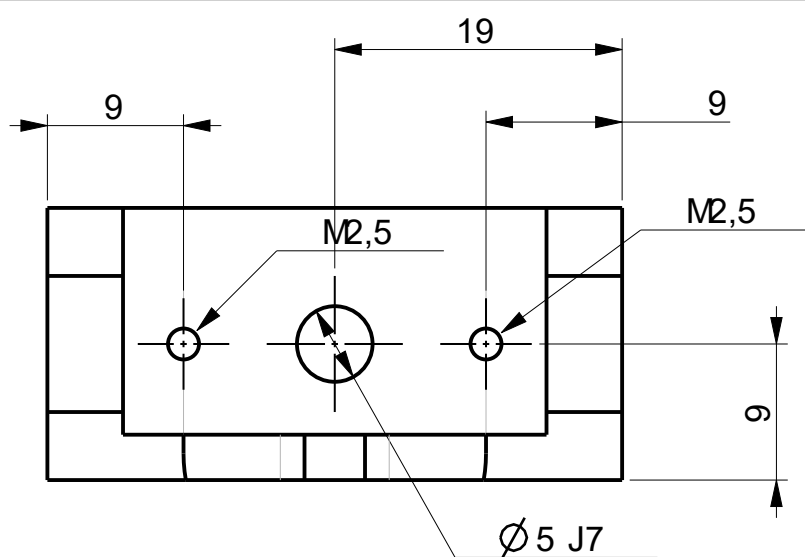


SECTION B-B



Posizione		Exp. Rev.	Data	Rev.	Firma		Descrizione revisione disegno		Drawing review description	
Ekymed Srl					Denominazione		Laser Holder r.2		Codice	
					Completivo		Handpiece		Data	
Via Boccioni 2 - 56037 Peccioli (PI)					Progetto		La Roses		Disegnato da:	
Phone +39 0587 677 713					Project				Drawn by:	
Fax +39 0587 677 714					Cliente		Ekymed		Approvato da:	
http://www.ekymed.com					Customer				Approved by:	
					Foglio		1/1	Formato	A4	Tolleranze di lavorazione
					Sheet			Material	Anticorrosione	Manufacturing tolerances
					Scale		1,000	Treatment	/	Quantity
										1

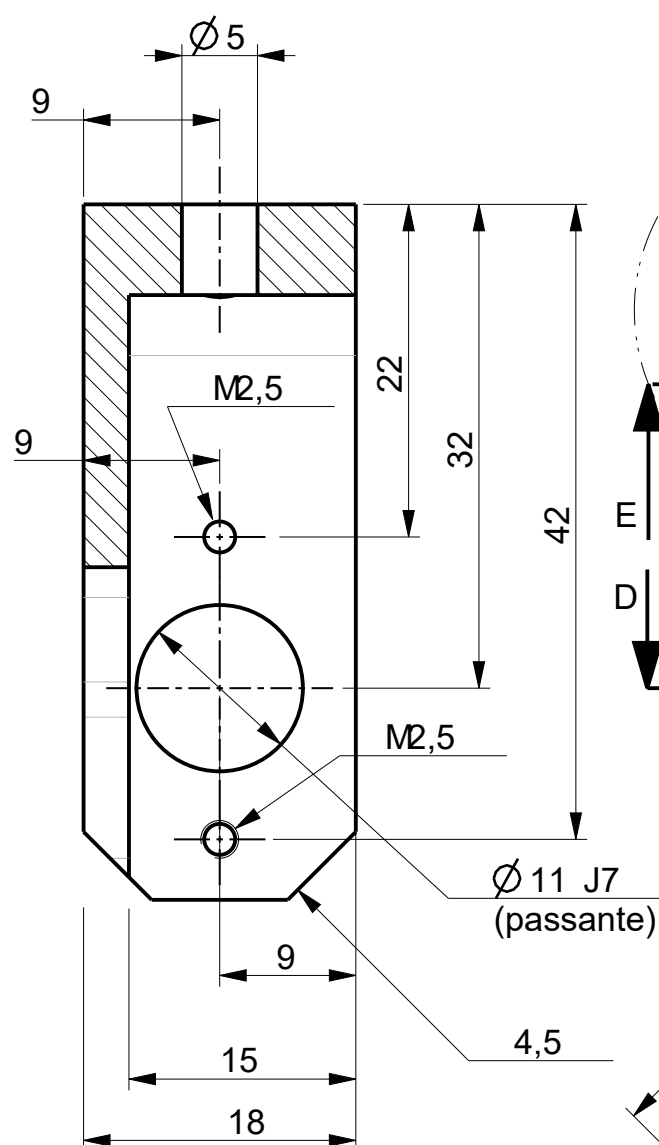
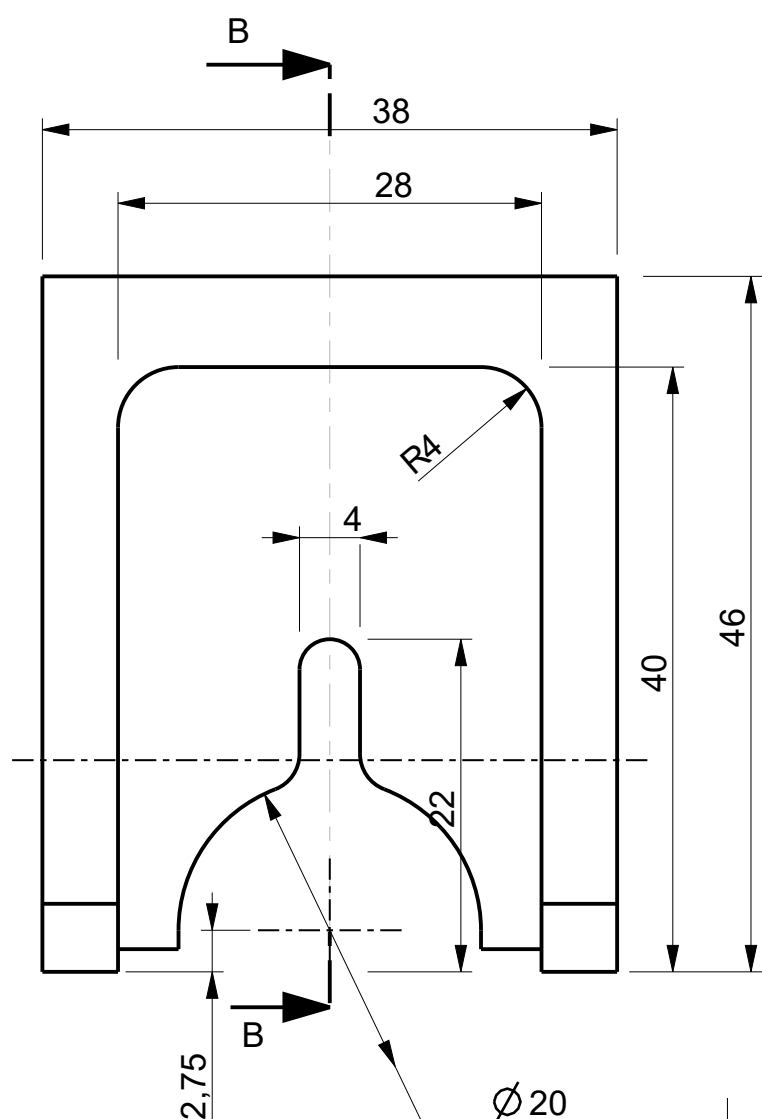
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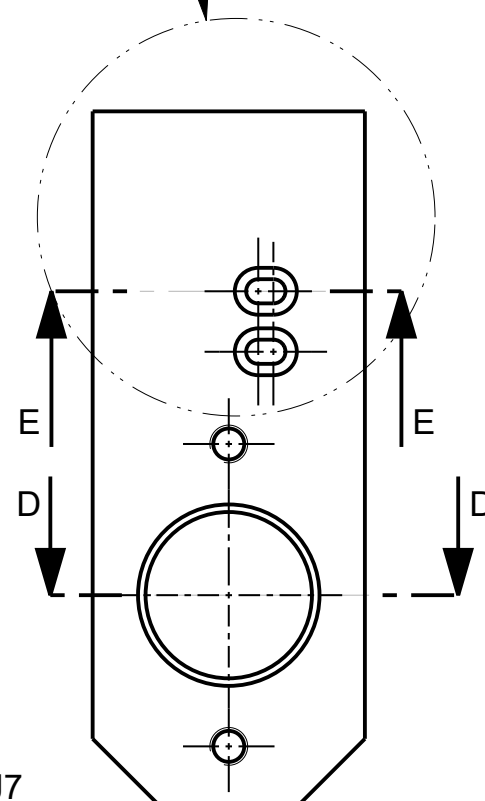
SECTION E-E

SEE DETAIL

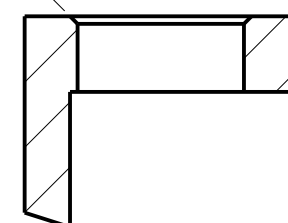
A-



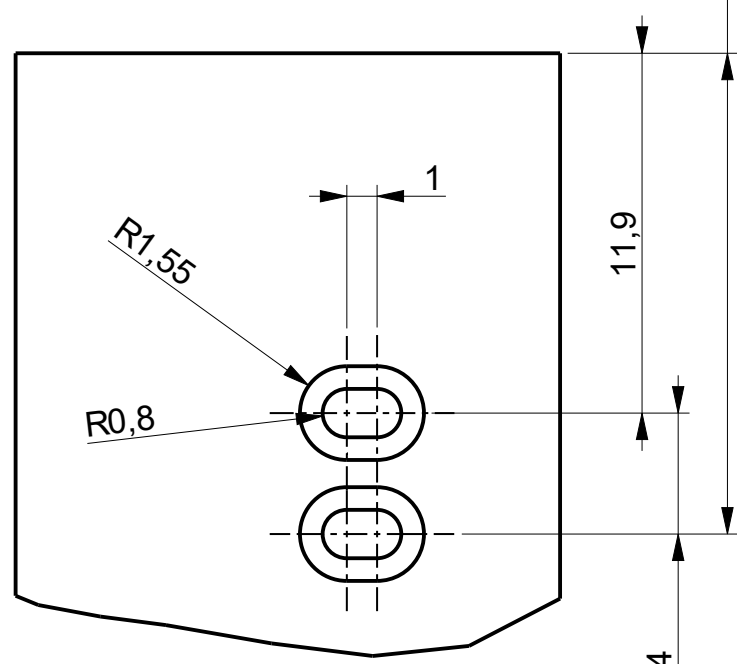
SECTION B-B



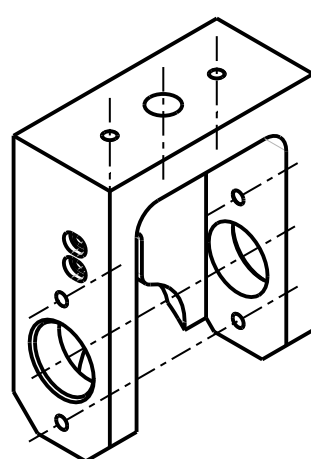
smusso 0,5
(entrambi i lati)

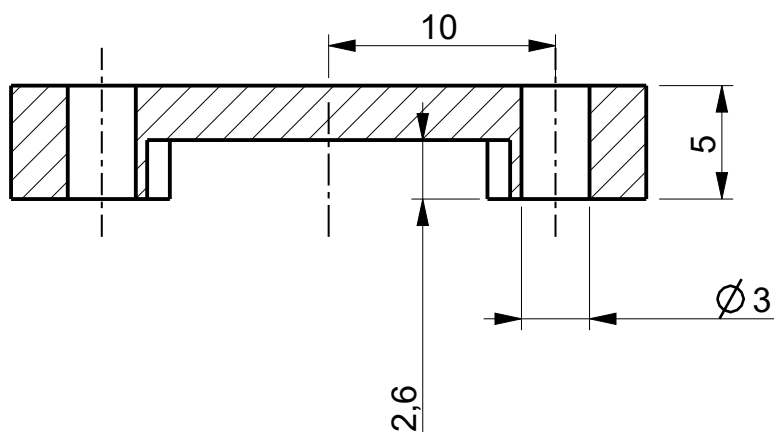
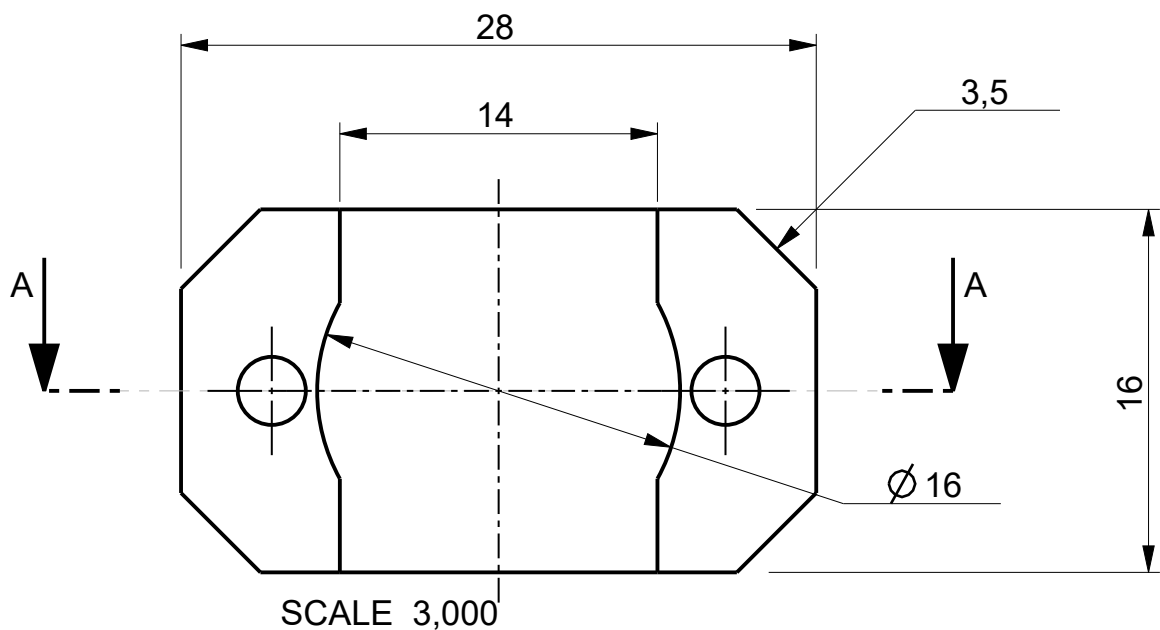


SECTION D-D

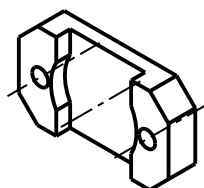


DETAIL A
SCALE 4,000

[illegible]



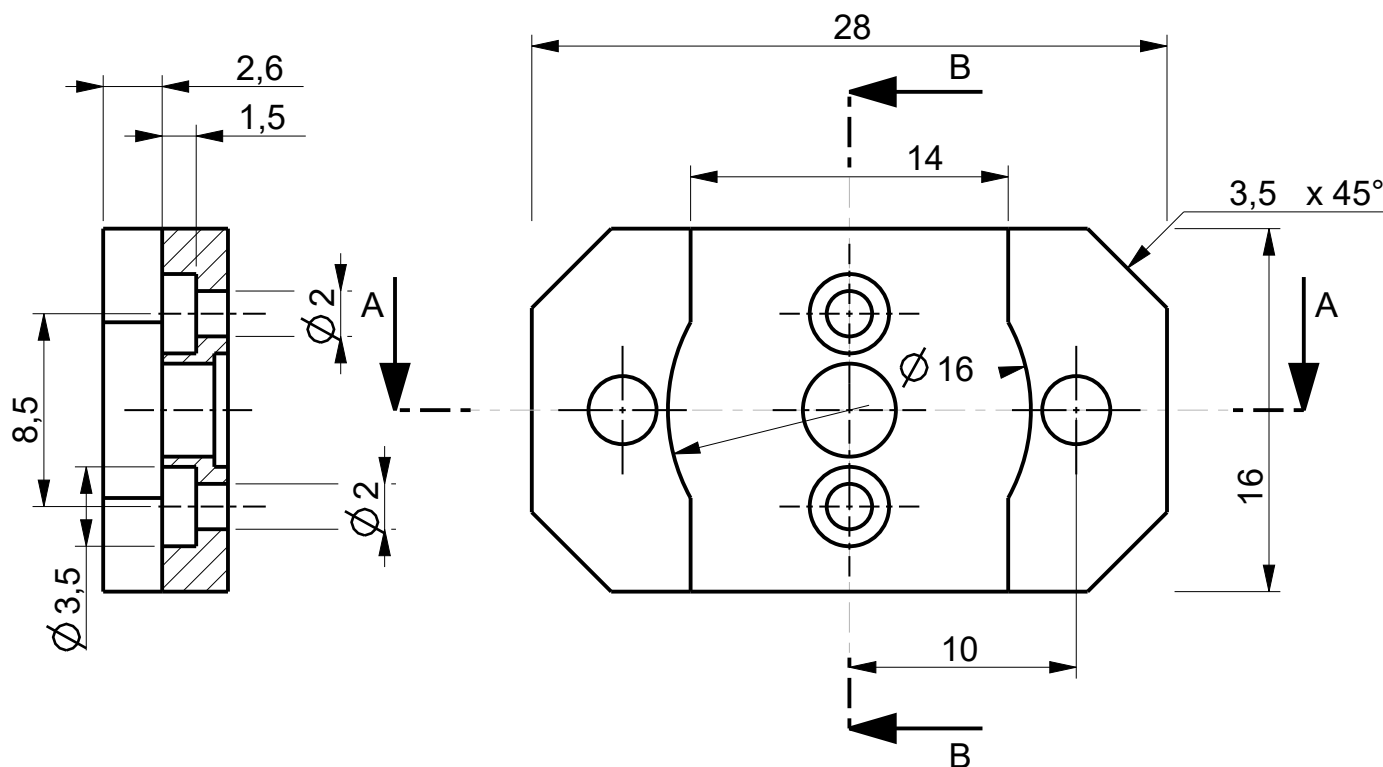
SECTION A-A



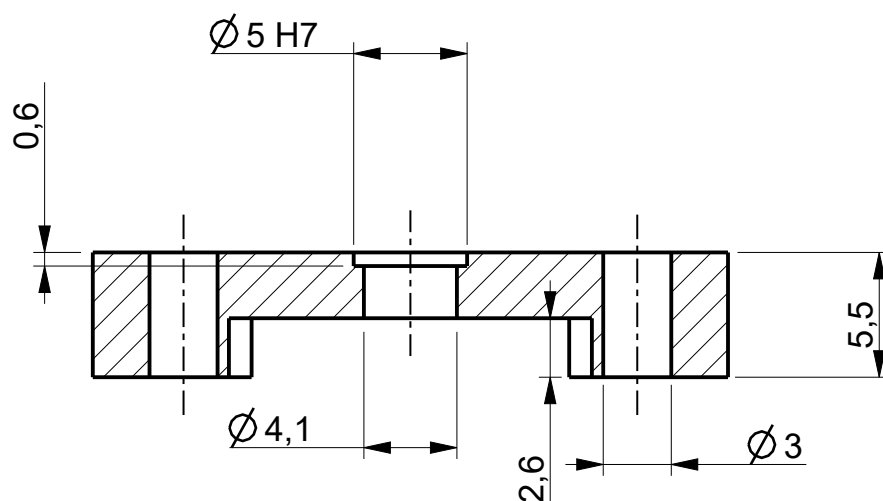
Posizione Position	Esp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description								
Ekymed Srl				Denomina Part name	Laser motor holder n.2 DX					Codice Part Code	LA_LMH DX	
				Completivo Assembly	Handpiece					Data Date		
Via Boccioni 2 - 56037 Peccioli (PI) Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com				Progetto Project Italy	La Roses					Disegnato da: Drawn by:	BM	
				Cliente Customer	Ekymed					Approvato da: Approved by:	BM	
				Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances		UNI EN 22765 1-2	normale	
				Scala Scale	1,000	Materiale Material	Anticorrosione	Trattamento Treatment	/	Quantità Quantity	1	

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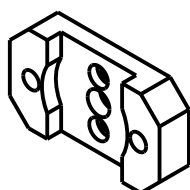
SCALE 3,000



SECTION B-B

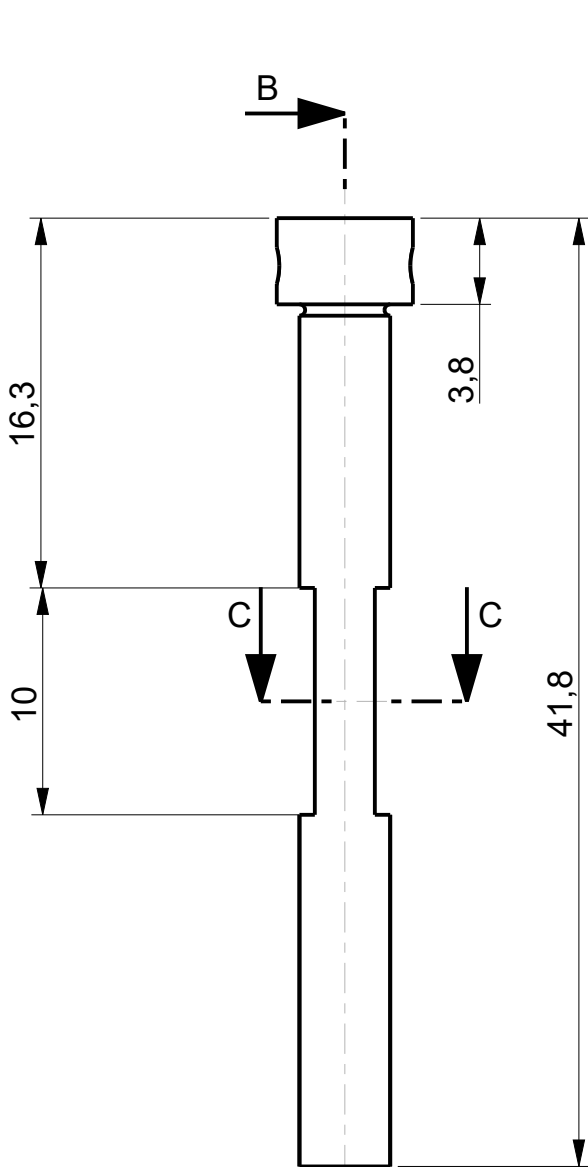


SECTION A-A



Posizione Position	Exp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description				
Ekymed Srl	Denominazione Part name			Laser motor holder n.2 SX		Codice Part Code	LA_LMH SX	
	Completivo Assembly			Handpiece		Data Date		
Via Bocconi 2 - 56037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com	Progetto Project			La Roses		Disegnato da: Drawn by:	BM	
	Cliente Customer			Ekymed		Approvato da: Approved by:	BM	
	Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances		UNI EN 22768 1-2	normale
	Scala Scale	1,000	Materiale Material	Anticorodal	Trattamento Treatment	/	Quantità Quantity	1

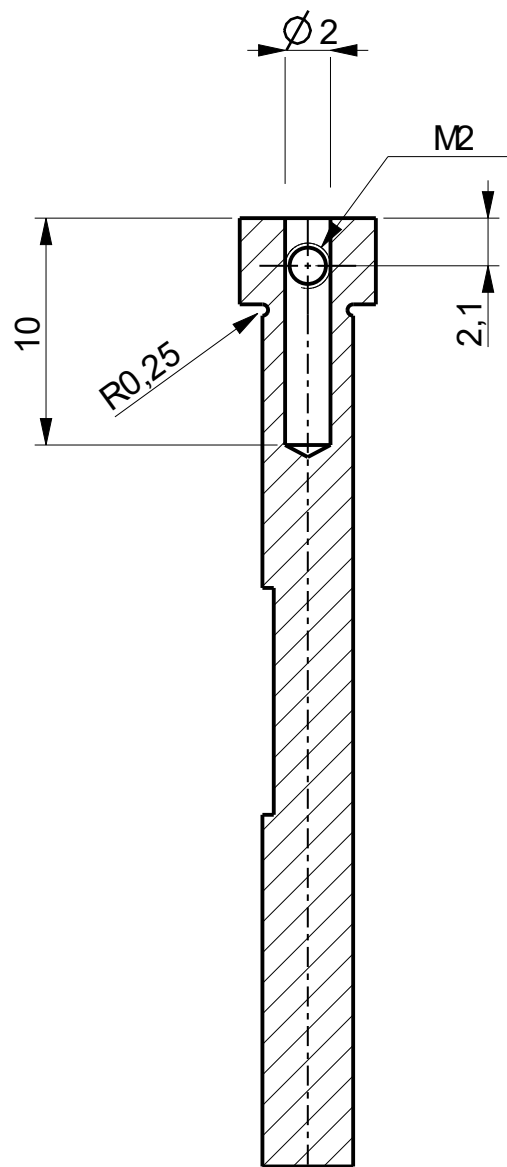
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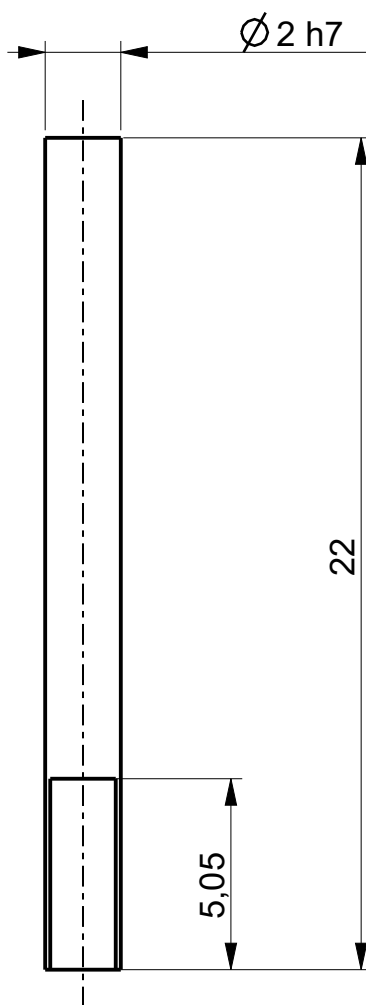


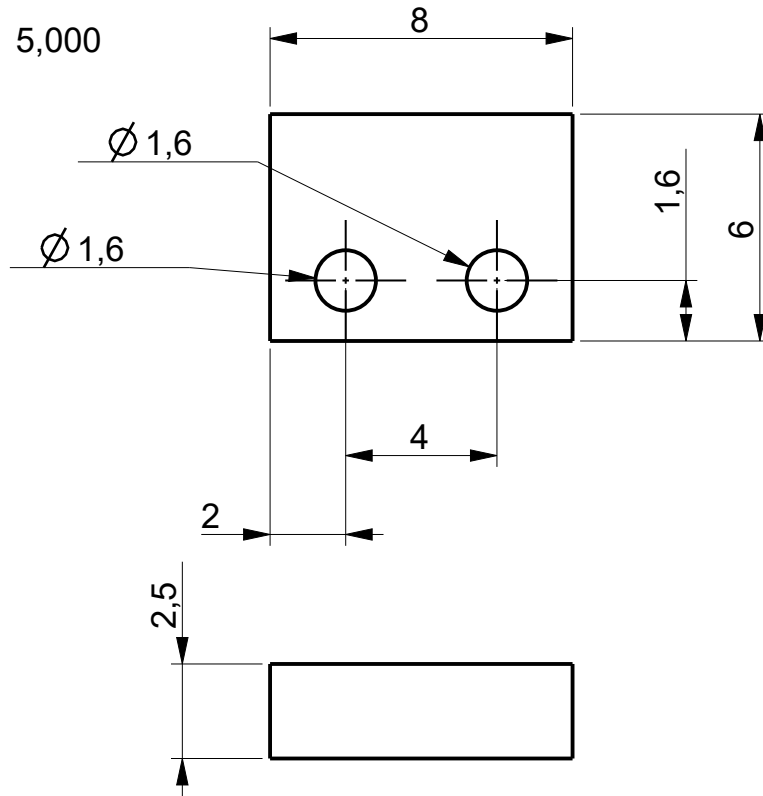
SECTION B-B

SECTION C-C

Posizione Position	Exp. Rev.	Date Date	Firma Sign	Descrizione revisione disegno Drawing review description						
Ekymed Srl				Denominazione Part name	Laser Shaft			Codice Part Code	LA_LAS	
				Compleativo Assembly	Handpiece			Date Date		
Via Boccioni 2 - 58037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com				Progetto Project	La Roses			Disegnato da Drawn by:	BM	
				Cliente Customer	Ekymed			Approvato da Approved by:	BM	
				Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances	UNI EN 22768 1-2	normale
				Scala Scale	3,000	Materiale Material	AISI 303	Trattamento Treatment	/	Quantità Quantity

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[illegible]

[illegible]

1 2 3 4

A

B

C

D

E

F

A

B

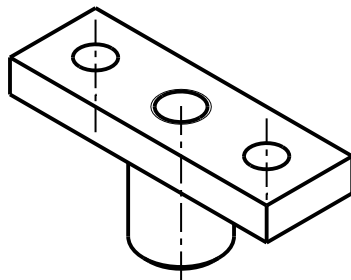
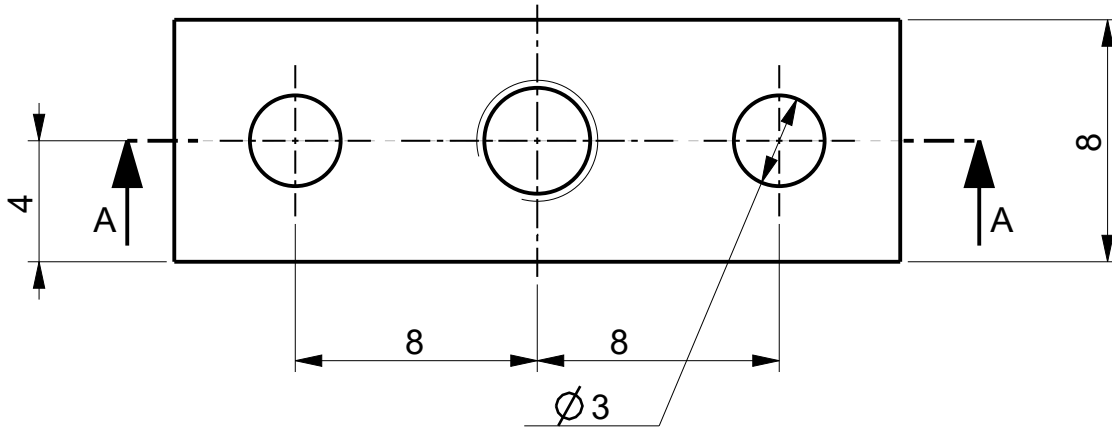
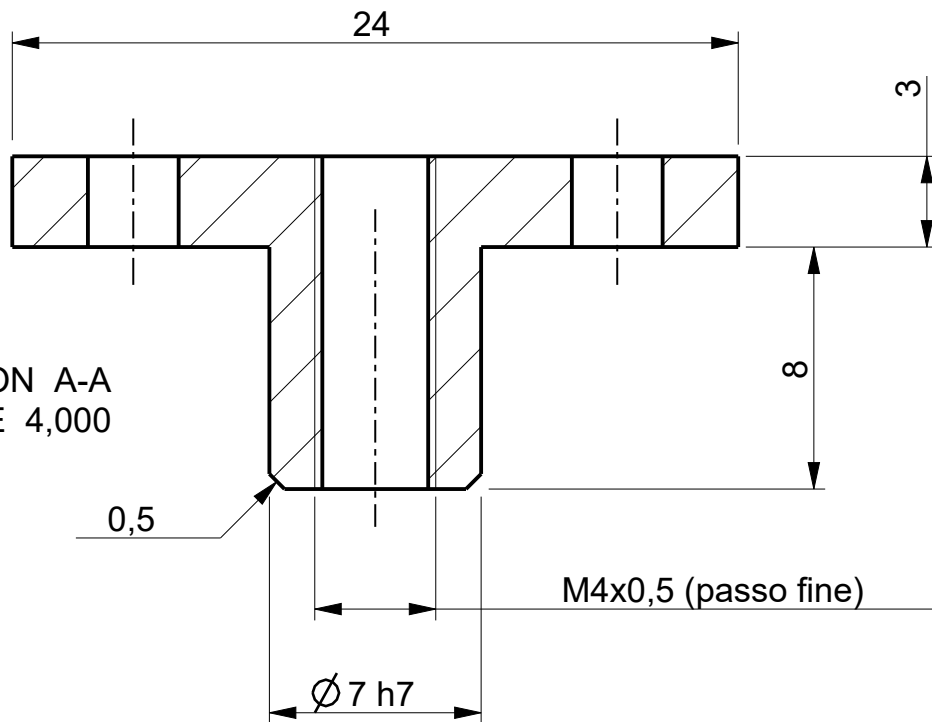
C

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F

SECTION A-A
SCALE 4,000



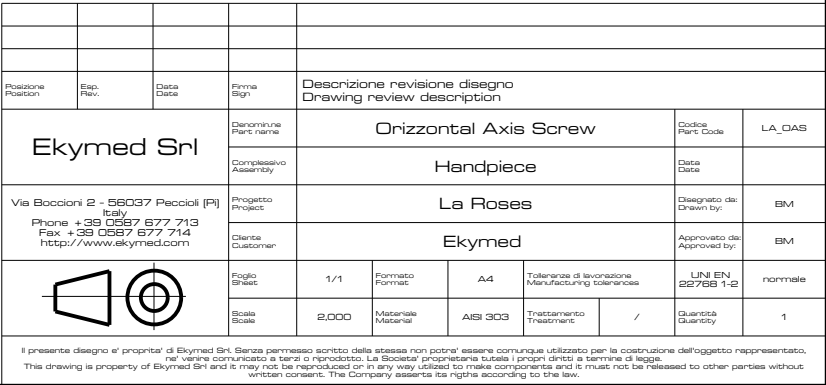
SCALE 2,000

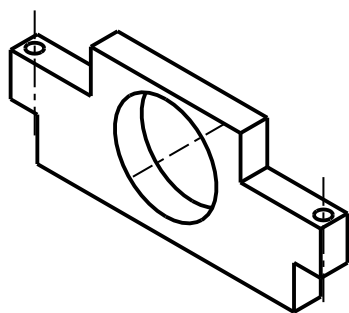
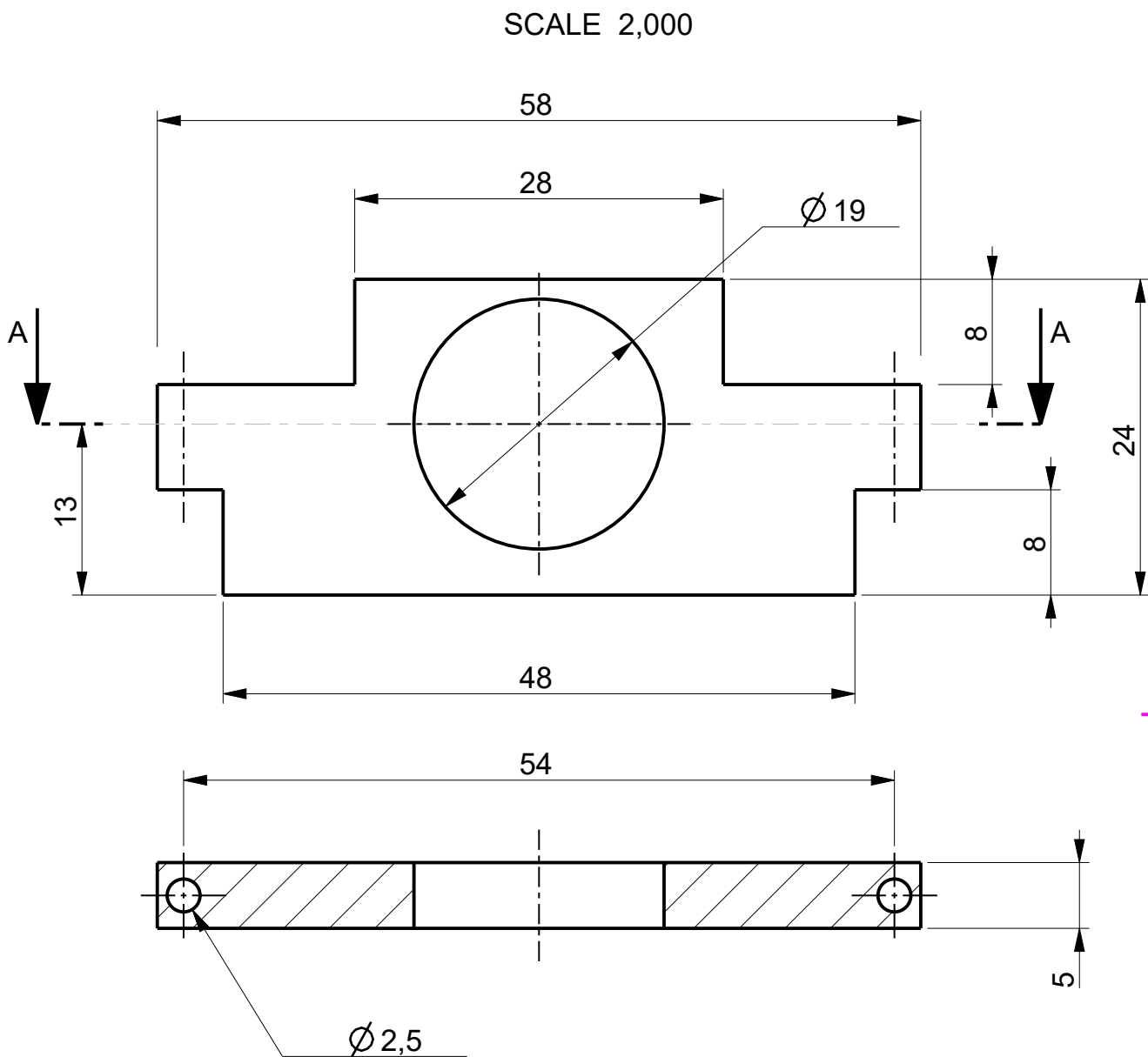
Posizione	Exp. Rev.	Data	Firma	Descrizione revisione disegno Drawing review description			
Ekymed Srl				Denominazione Part name	Nut M4 x 0,5		Codice Part Code
Via Boccioni 2 - 56037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com				Completivo Assembly	Handpiece		Data Date
Progetto Project				Disegnato da: Drawn by:	La Roses		BM
Cliente Customer				Approvato da: Approved by:	Ekymed		BM
Foglio Sheet				1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances
Scala Scale				1,000	Materiale Material	AlSi 303	Trattamento Treatment
						/	Quantità Quantity
							1

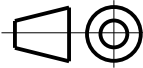
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1 2 3 4

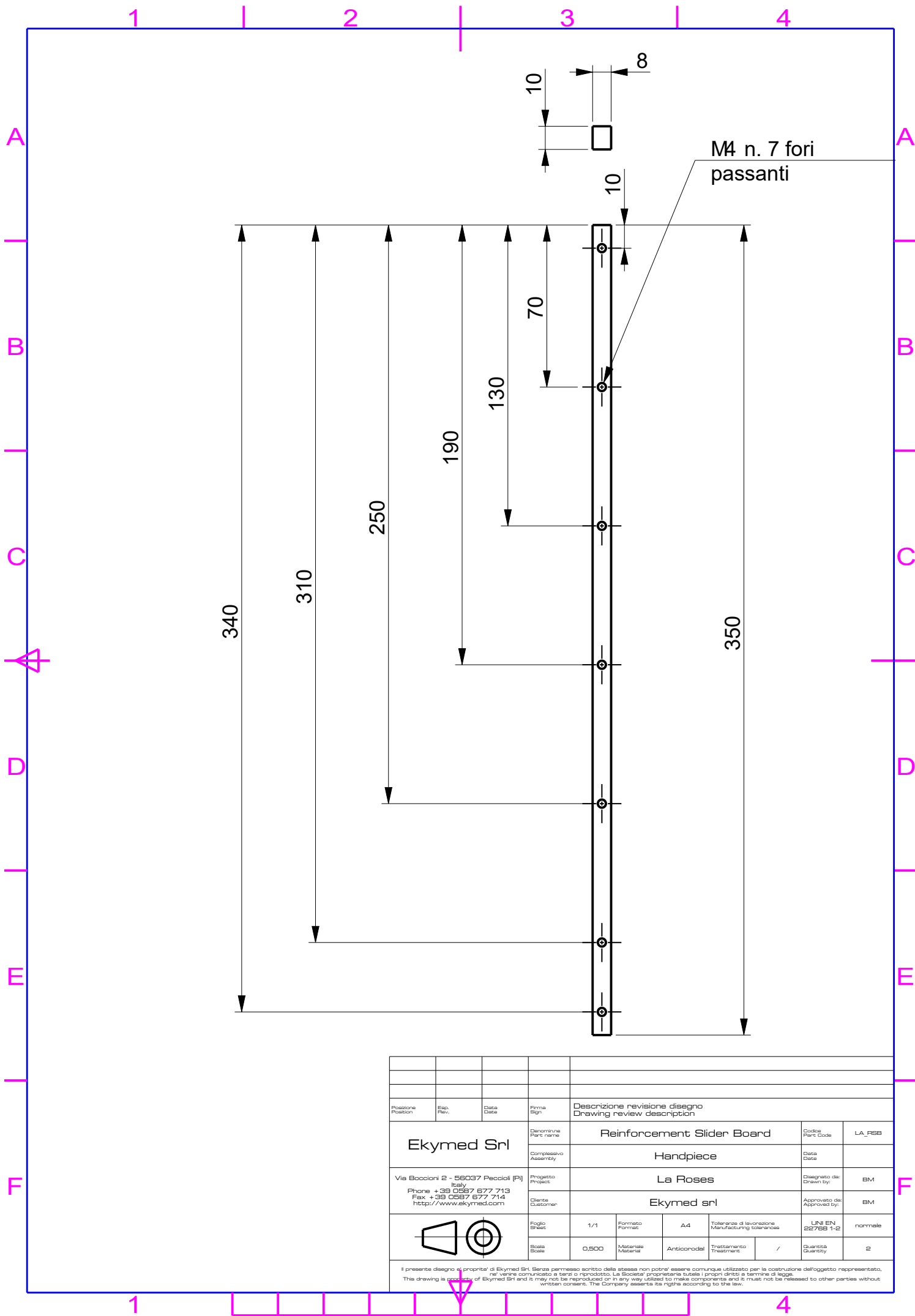
G

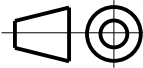




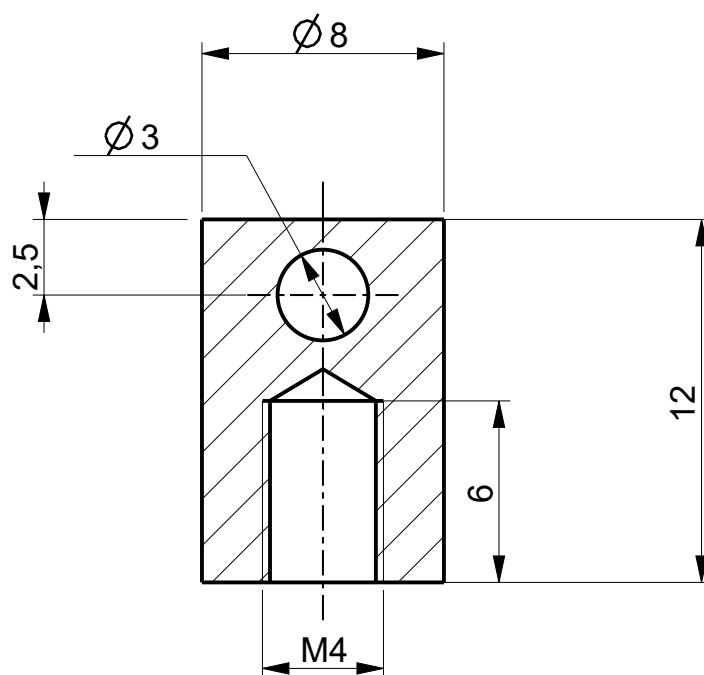
Posizione Position		Esp. Rev.		Data Date		Firma Sign		Descrizione revisione disegno Drawing revision description			
Ekymed Srl		Denominazione Part name		Completivo Assembly		Progetto Project		Osela driver holder		Codice Part Code	LA_OOH
								Handpiece		Data Date	
Via Boccioni 2 - 56037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com		Cliente Customer		Progetto Project		Ekymed		La Roses		Disegnato da: Drawn by:	BM
								Ekymed		Approvato da: Approved by:	BM
		Foglio Sheet		1/1		Formato Format		A4		Tolleranze di lavorazione Manufacturing tolerances	
Scala Scale		1,000		Materiale Material		PVC Nero		Trattamento Treatment		/	
										Quantità Quantity	1

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Posizione Position	Esp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description					
Ekymed Srl			Denominazione Part name	Reinforcement Slider Board			Codice Part Code	LA_FSB	
			Completivo Assembly	Handpiece			Data Date		
Via Boccioni 2 - 58037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com			Progetto Project	La Roses			Disegnato da: Drawn by:	BM	
			Cliente Customer	Ekymed srl			Approvato da: Approved by:	BM	
		Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances		UNI EN 22768 1-2	normale
		Scala Scale	0,500	Materiale Material	Anticorrosione	Trattamento Treatment	/	Quantità Quantity	2

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SECTION A-A

[illegible]

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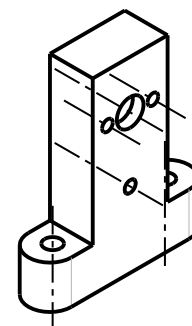
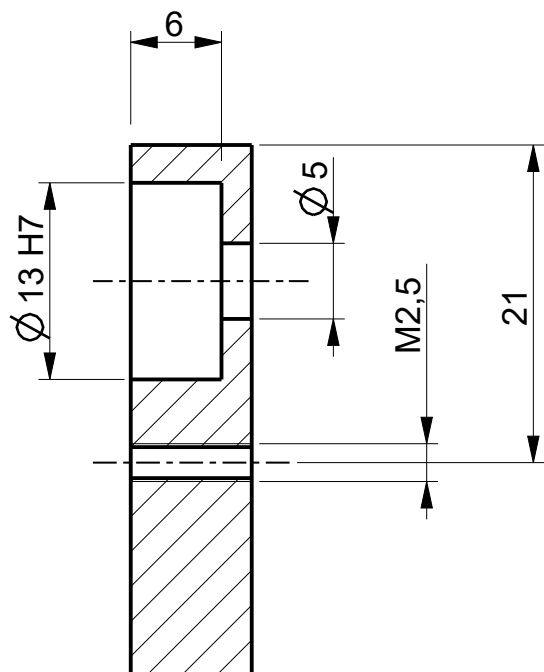
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3

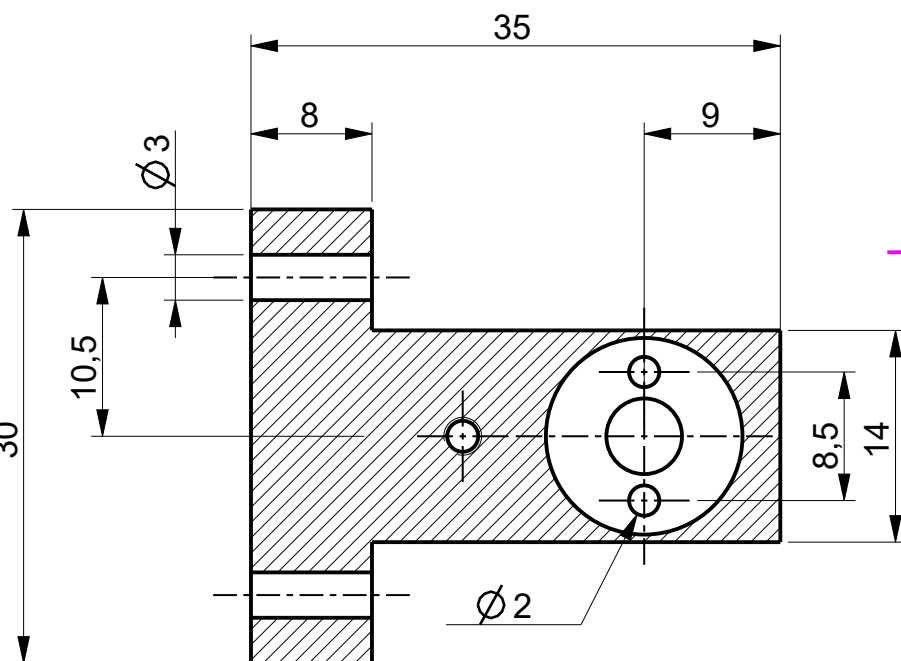
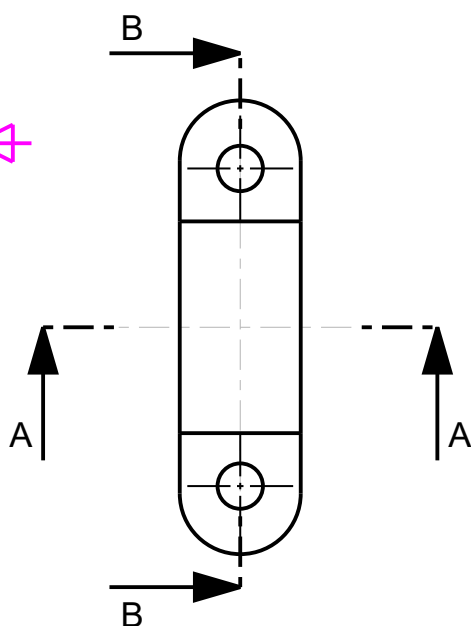
4

Posizione Position	Esp. Rev.	Data Date	Firma Sign	Descrizione revisione disegno Drawing review description									
Ekymed Srl				Slider Board Tilt						Codice Part Code	LA_5BT		
				Handpiece						Data Date			
				Completivo Assembly									
Via Bocconi 2 - 58037 Peccioli (PI) Italy Phone +39 0587 677 714 Fax +39 0587 677 714 http://www.ekymed.com				La Roses						Disegnato da: Drawn by:	BM		
Cliente Customer										Approvato da: Approved by:	BM		
		Foglio Sheet	1/1	Formato Format	A4	Tolleranze di lavorazione Manufacturing tolerances			UNI EN 22788 1-2 normale				
Scala Scale	0,800		Materiale Material	Anticorodal		Trattamento Treatment	/		Quantità Quantity	1			
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SECTION A-A



SCALE 1,000



SECTION B-B

Posizione	Exp. Rev.	Data	Firma	Descrizione revisione disegno Drawing review description			
Ekymed Srl				Denominazione Part name	Xslide Motor Housing		Codice Part Code
				Completivo Assembly	Handpiece		Data
Via Bocconi 2 - 56037 Peccioli (PI) Italy Phone +39 0587 677 713 Fax +39 0587 677 714 http://www.ekymed.com				Progetto Project	La Roses		Disegnato da: Drawn by:
				Cliente Customer	Ekymed		Approvato da: Approved by:
				Foglio Sheet	1/1	Formato Format	A4
				Scala Scale	2,000	Materiale Material	Anticorrosione
						Trattamento Treatment	/
						UNI EN 22765 1-2	normale
						Quantità Quantity	1

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