 SOLARIS <small>NATIONAL SYNCHROTRON RADIATION CENTRE</small>	Solaris Standards & Recommended Practices	
	Front end components for BM source fixed mask and absorbers	Page 1 of 22
		Date 15.05.2024
	Final	Version: 2.0

Front end components to the Solaris bending magnet section


Version:	2.0
Status:	Final
Owner:	Marcin Zajac; mar.zajac@uj.edu.pl
Reviewed by:	
Approved by:	
Location:	Front end_Solaris-BM-description
Filename:	Appendix FE2 - components
Last update:	15.05.2024

Revision history

Version	Date	Description	Sign
1.0	15.01.2020	Definition of fixed masks and cooling safety shutters designed for Solaris' bending magnet source	Marcin Zajac
2.0	15.05.2024	Definition of slit unit and FATU designed for Solaris' bending magnet source	Marcin Zajac

Authors:

Marcin Zajac

	Solaris Standards & Recommended Practices	
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		Date 15.05.2024
	Final	Version: 2.0

1 Introduction

This Appendix provides a background to the procurement of the bending magnet front end (FE) for the Solaris storage ring (1.5 GeV). It contains top assembly drawings of the already designed and used components for Solaris' bending magnet (BM) source front end section. The main components are as follow: both fixed mask (apertures), heat absorber, slits, fluorescent screen, cooling safety shutters and filter holder. The vendor is free to suggest modifications or alternative solutions to the presented devices suggested in this Appendix. In this case the vendor shall clearly indicate the technical advantages and disadvantages of these alternatives as well as their possible impact on the price. The buyer, however, reserves the right to reject any modifications that the buyer considers detrimental to the operation or performance of the front end.

2 Background and information


For Solaris' BM source front end few masks, slits, filter holders and cooling safety shutters have already been designed and can be used in final design of the BM front end section in upgraded version. In the following pages the general top level drawings were added.

2.1 The fixed mask1 (FM1) and heat absorber (HA) section

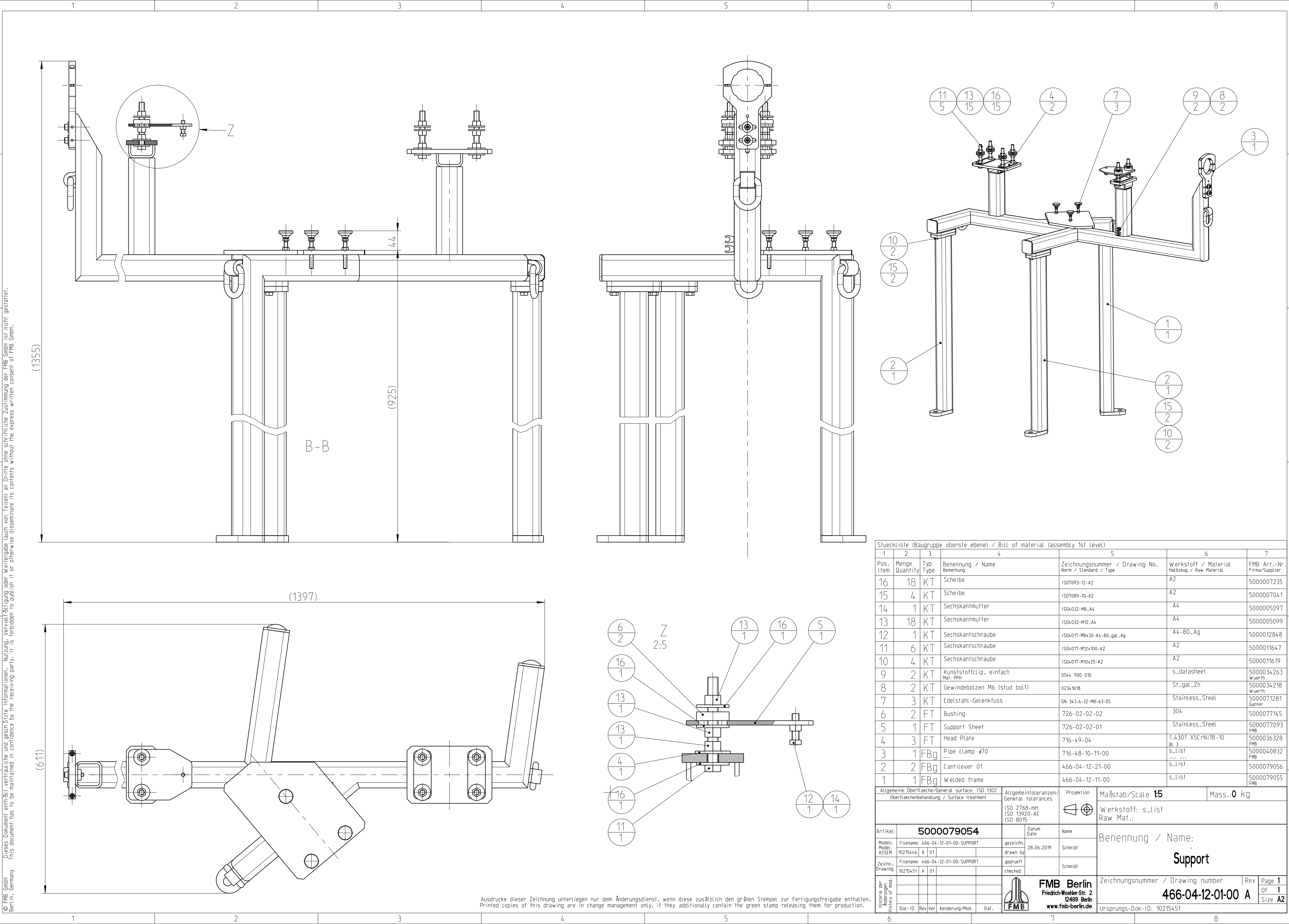
2.2 The SLITS unit

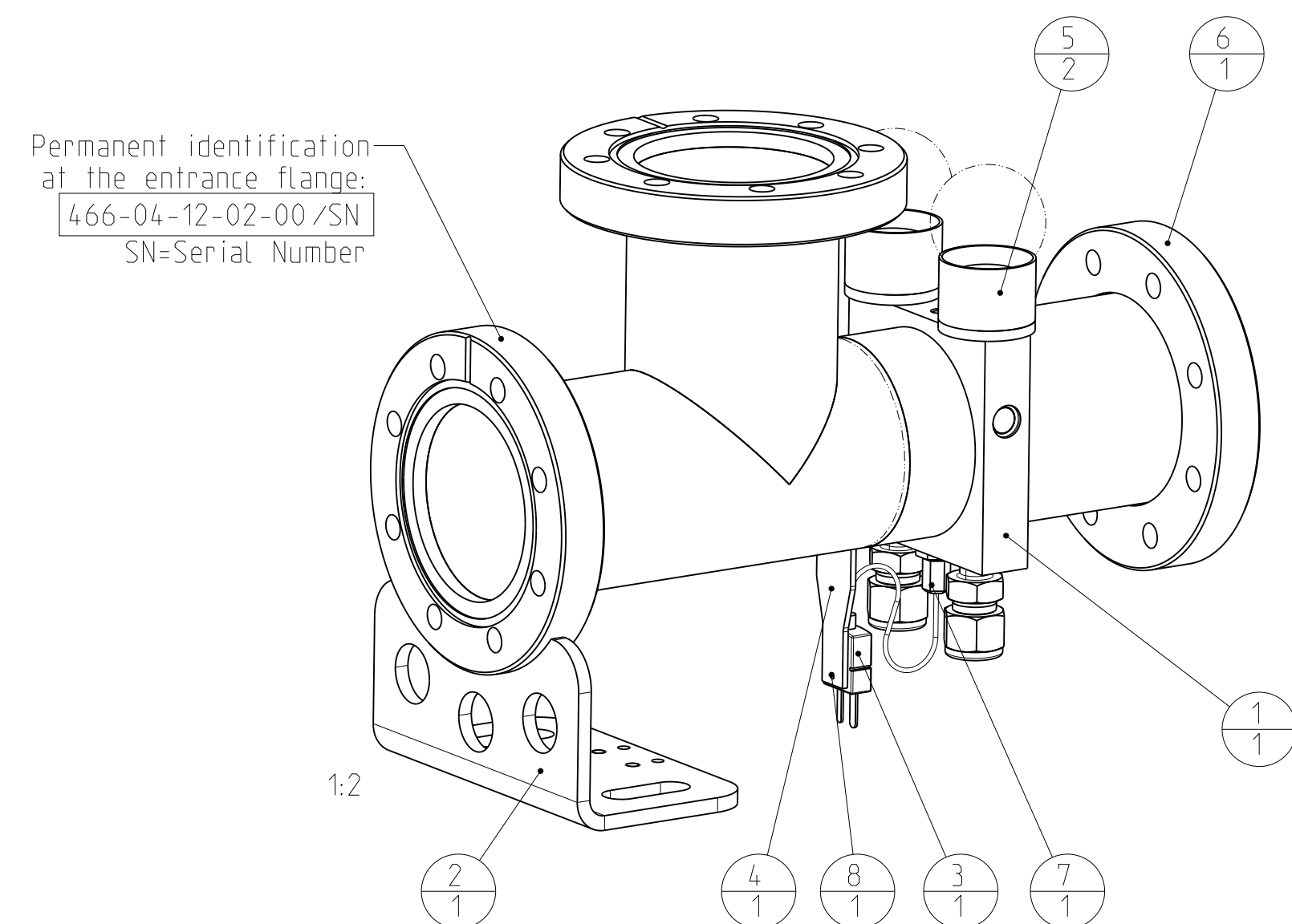
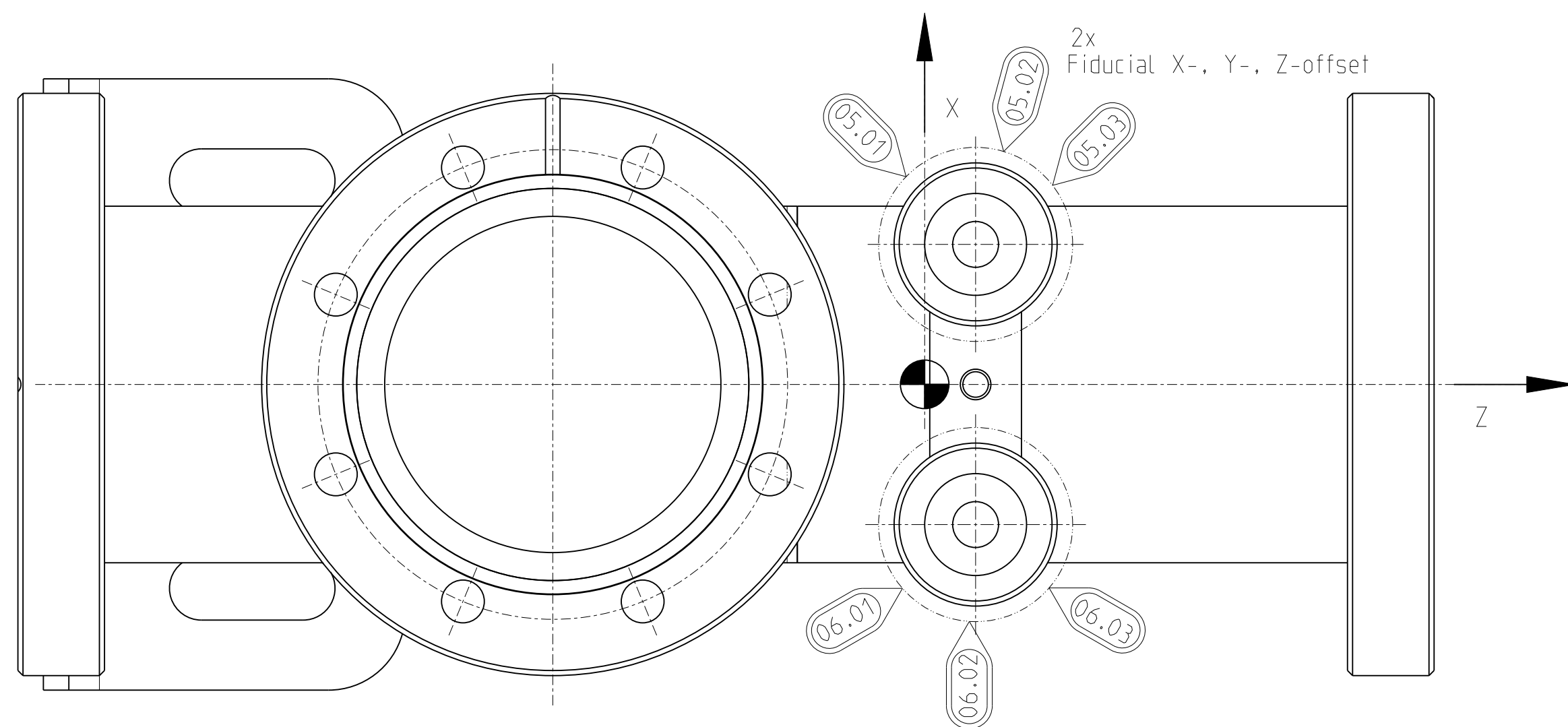
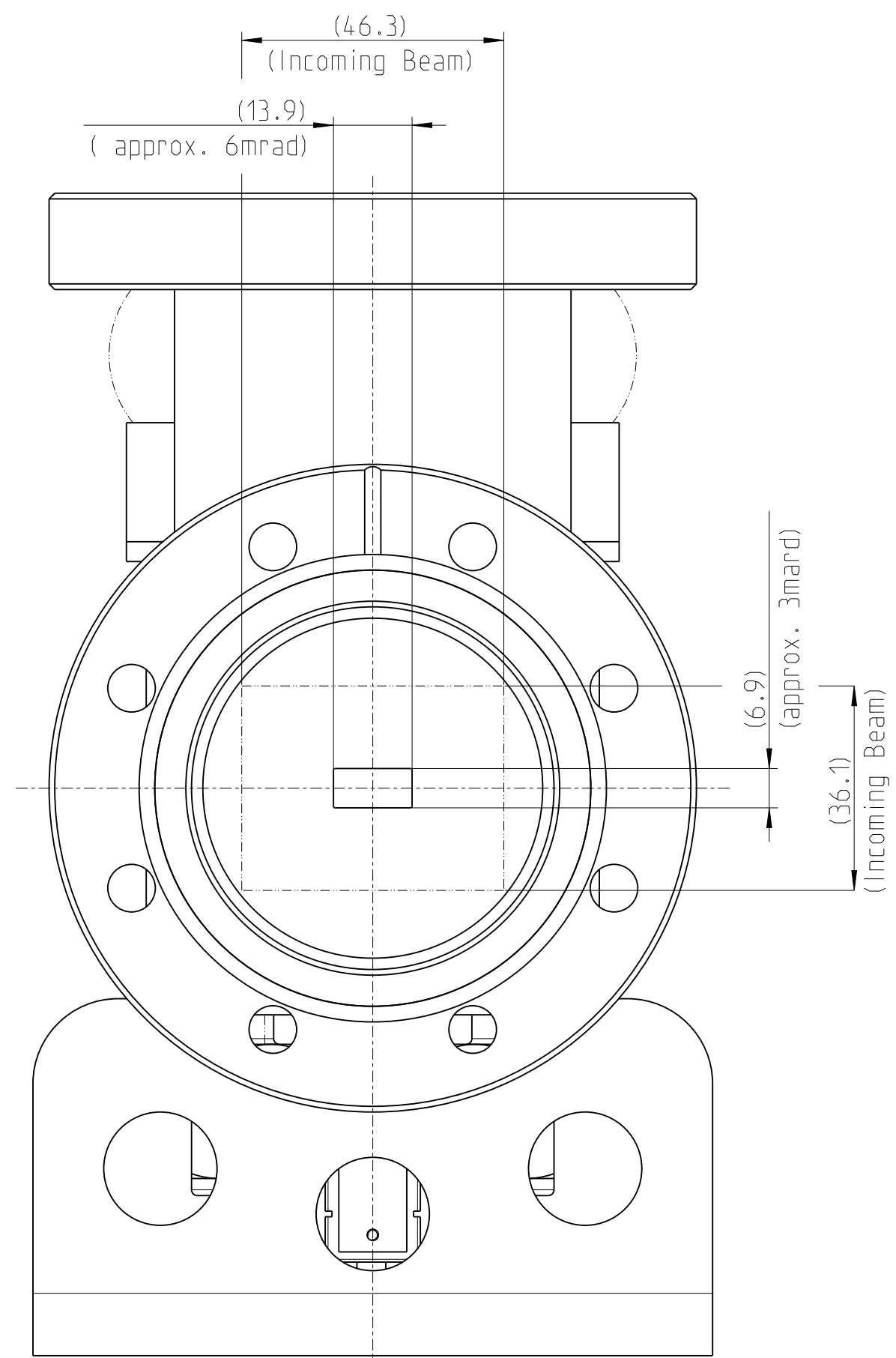
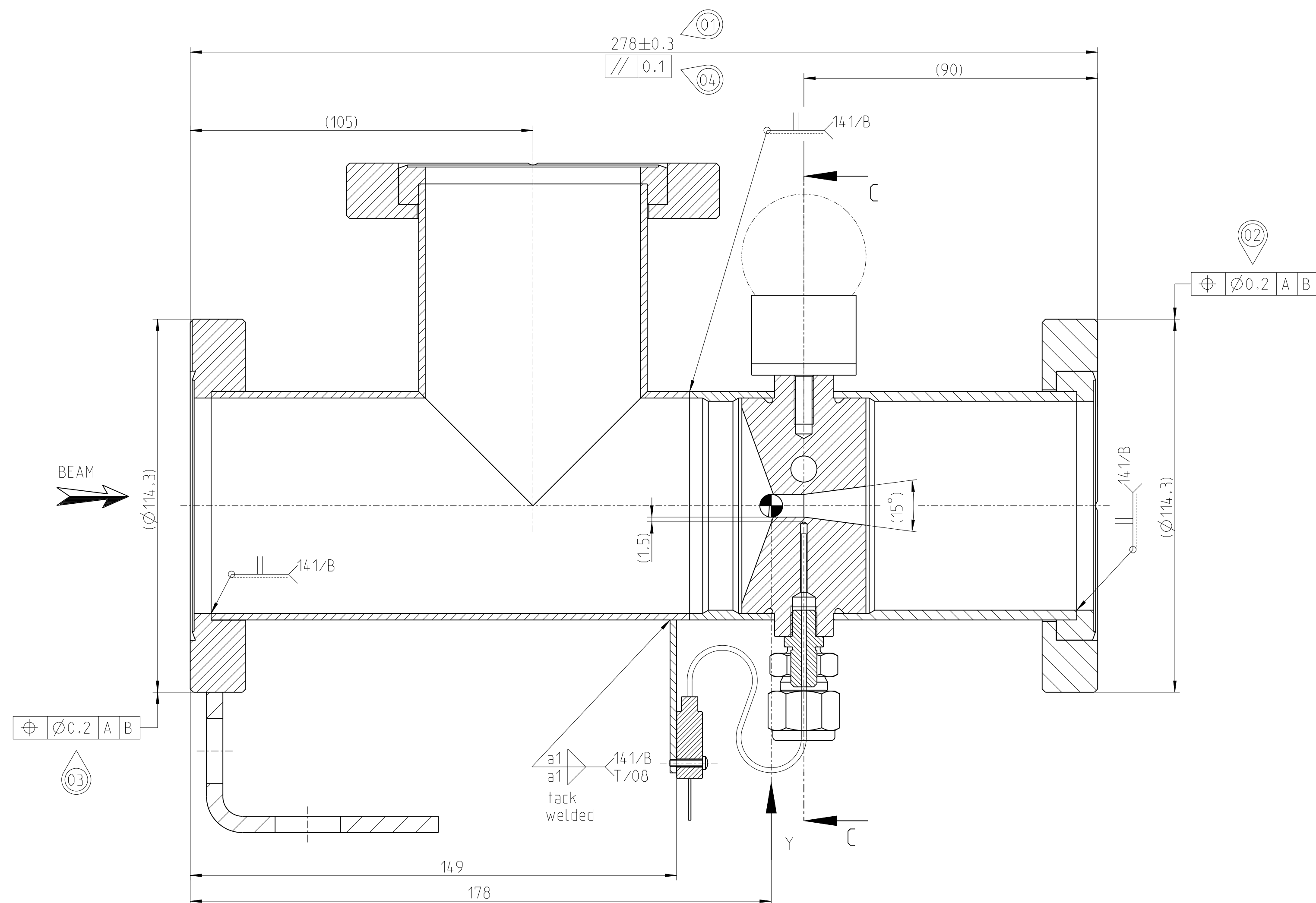
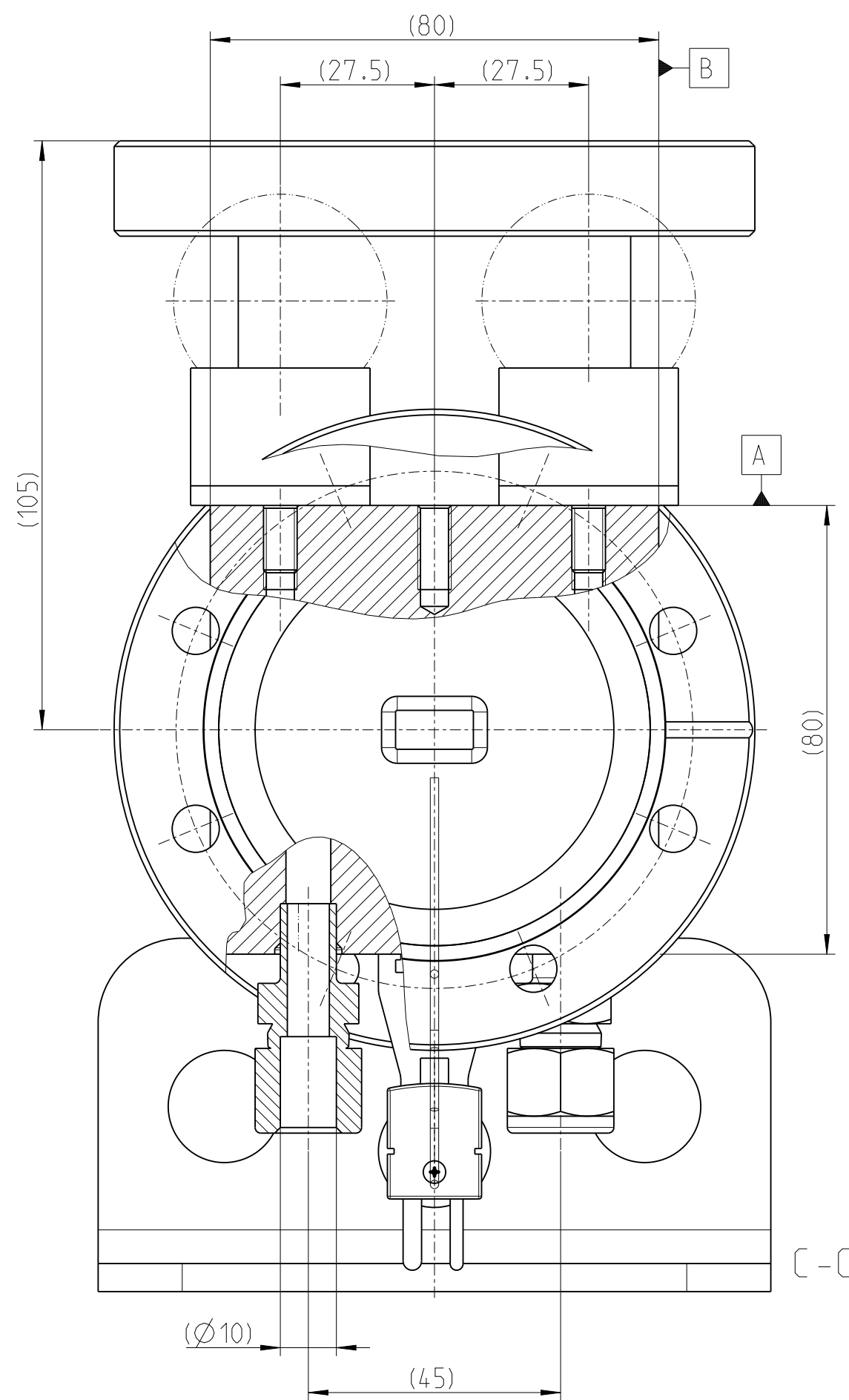
2.3 The fluorescent screen (FLSC), cooling safety shutter-stoppers (SS1 & SS2) and fixed mask2 (FM2)

2.4 The filter assembly trigger unit (FATU)

 SOLARIS <small>NATIONAL SYNCHROTRON RADIATION CENTRE</small>	Solaris Standards & Recommended Practices	
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2.1 The fixed mask1 (FM1) and heat absorber (HA) section





Pruefspezifikation / test specification

Pruefung / Test name	Sollwert / Specified value	Einheit / Unit
Bake-out cycle with RGA (1-100 AMU): Temperature Time RGA: Sum of all AMU >28 (except 44) must be less than 1% of total pressure	max. 250 >24 <input type="checkbox"/> passed	°C hours
Final pressure	<1x10E-10	mbar
He-leaktest: Before bake-out at room temperature: After bake-out at room temperature: (Cooling cycles have to be filled with ~10bar Helium)	<1x10E-10 <1x10E-10	mbar l/s mbar l/s
Desorption rate	<1x10E-12	mbar l/s cm ²
inner surface	680	cm ²
Flow rate: Pressure drop (to be added) :	3.4	l/min bar
Dimensional test (see drawing): (room temp. 23±3 °C)	<input type="checkbox"/> passed	
Visual internal and external inspection:	<input type="checkbox"/> passed	
Functional test under vacuum: - Thermocouple (comparison measurement)	<input type="checkbox"/> passed	

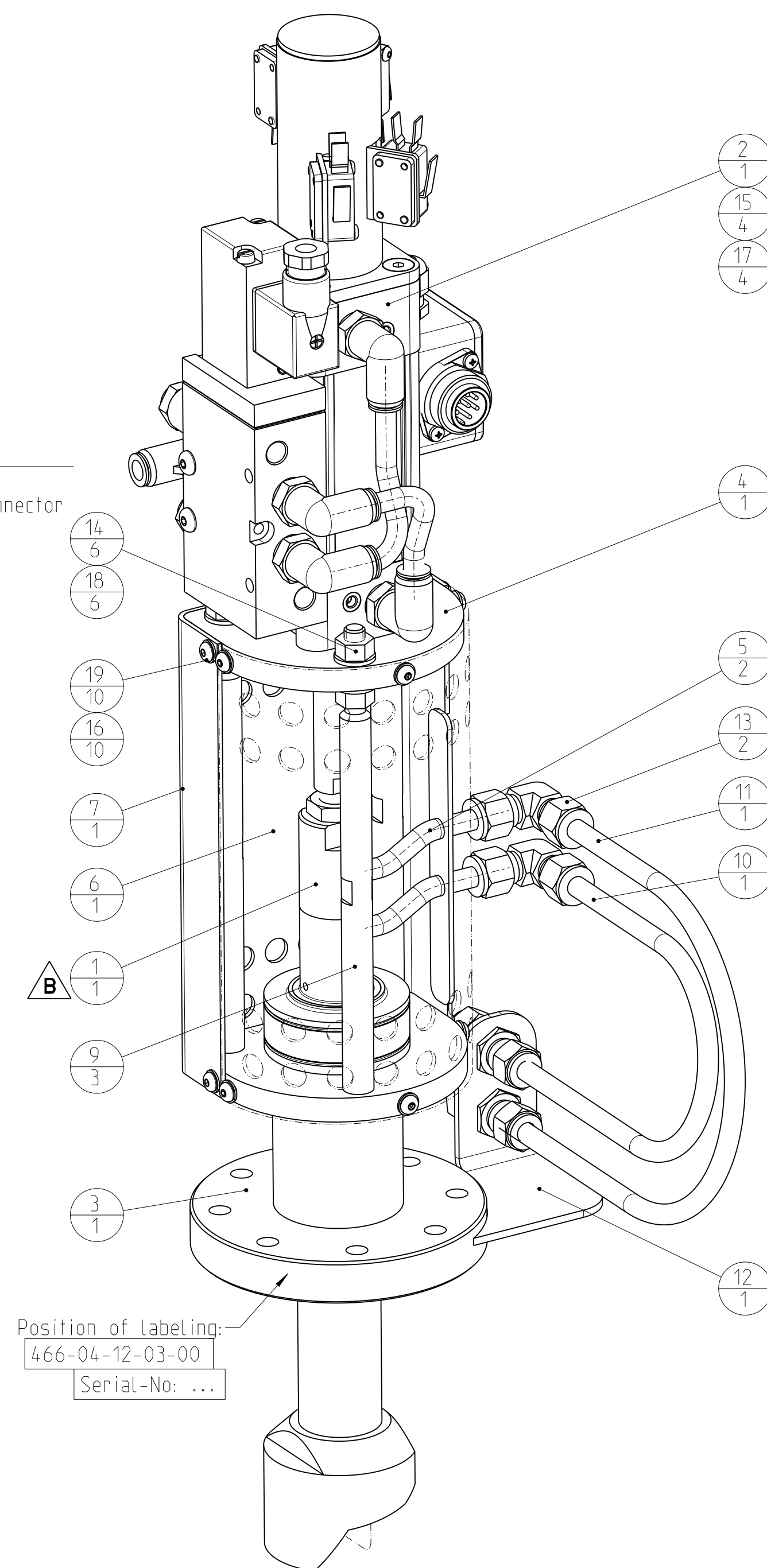
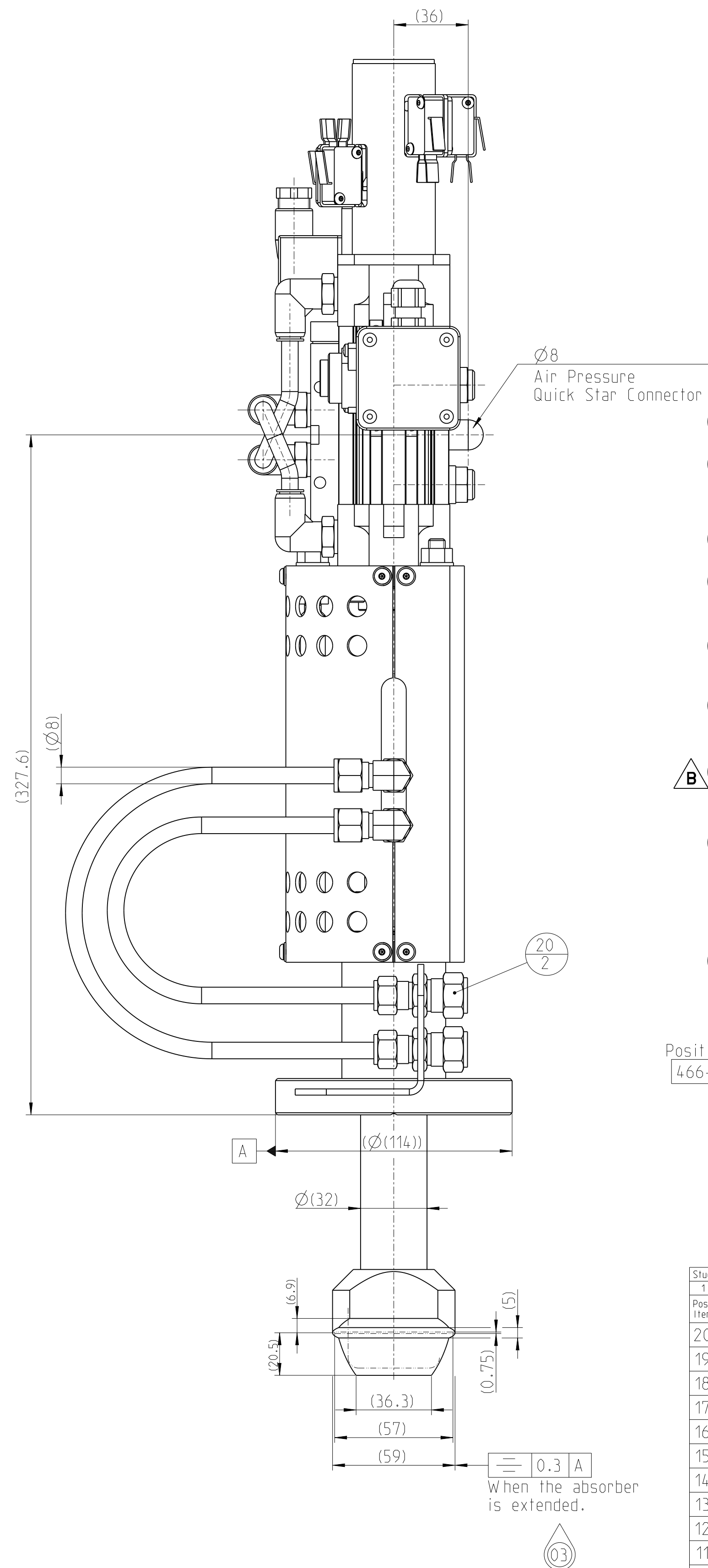
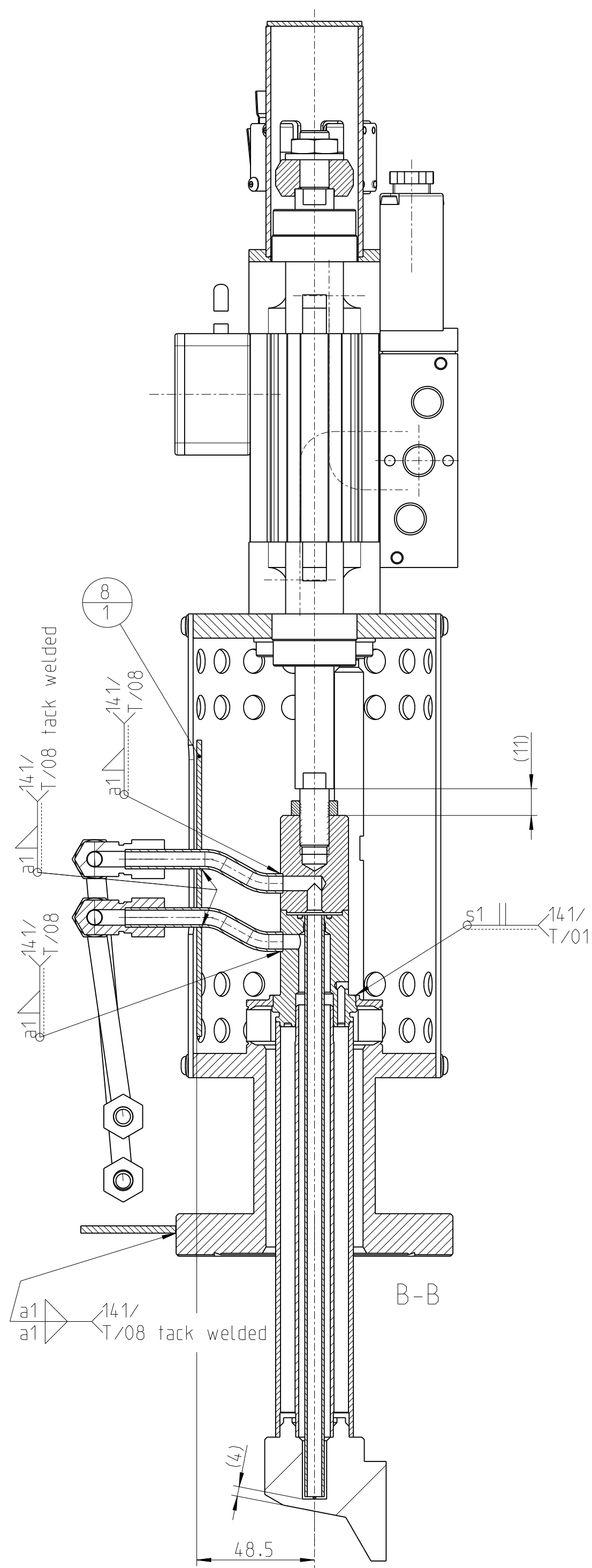
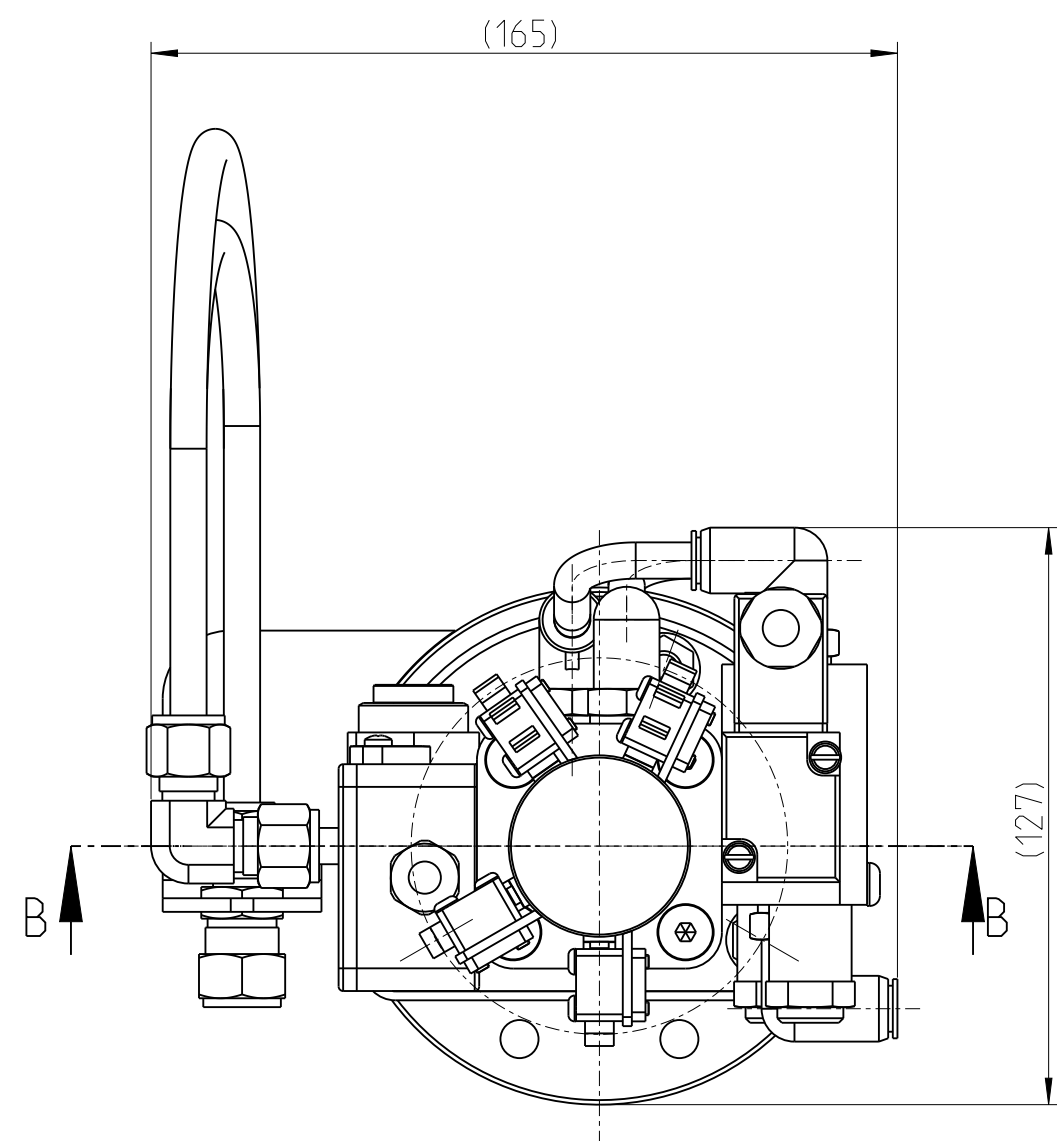
Stückliste (Bauprinzip übersie eben!)			/ Bill of material (assembly 1st level)			
1	2	3	4	5	6	7
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung	Zeichnungsnummer / Drawing No. Norm / Standards / Type	Werkstoff / Material Haltezug / Raw Material	FMB Art.-Nr. Firma/Supplier
8	1	KT	Limssenschraube	IS07045-1-M2x0.42	A2	5000018849
7	1	KT	Thermo Couple Joint. Ø1.5. Mx1	S05192-1.5-Mx1-0.1	5.s.dasheet Thermoelementverschraubung	500003545.5 Gral
6	1	KT	CF-Flansch. rot.	CF063-R. 304L	304L	5000004597
5	2	KBg	1.5" Nestl. M6 Free issue part.			5000056859 Salaris
4	1	FT	Plug Holder	726-10-07	304L Bl 2 214x	5000056084 FMB
3	1	FBg	Thermo Element	726-10-06	s.list	5000056083 FMB
2	1	FBg	T-Piere	466-04-12-22-00	s.list	5000079556
1	1	FBg	FMB1 (brazing)	466-04-12-12-00	s.list	5000079562 FMB
Allgemeine Oberfläche/General surface: ISO 1902			Allgemeintoleranzen/ General tolerances		Projektion	Maßstab/Scale 1:1
Oberflächenbehandlung / Surface treatment					Werkstoff: s.list	Mass.: 0 kg
Glass blasted. UHRV						
5000079076						
Artikelnr:	File name: 466-04-12-02-00-FM1-POLYX	gezeichnet: 04.09.2020	Name friedmann		Benennung / Name: FMI unit POLYX	
Modell: 4355N	File name: 466-04-12-02-00-FM1-POLYX	geprüft: 07.09.2020	Name schmidt			
Zeichn. drawing	File name: 466-04-12-02-00-FM1-POLYX	geprüft: checked				
Zeichnungs- history of mod.					Zeichnungsnummer / Drawing number	Rev. Page 1 of 1
					466-04-12-02-00 A	Size A
	Doc-Id	Rev	Änderung/Mod.	Dat.	Ursprungs-Dok-Id: 10225556	
				FMB Berlin Friedrich-Wöhler-Str. 2 12469 Berlin www.fmb-berlin.de		

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Zeichnungsnummer / Drawing number	466-04-12-02-
Ursprungs-Dok-ID: 10215556	



Stueckliste (Baugruppe oberste Ebene) / Bill of Material (assembly 1st level)																																			
1			2			3			4			5			6			7			8														
Pos. / Item	Menge / Quantity	Type	Benennung / Name Bewertung			Zeichnungsnummer / Drawing No. Norm. / Standards / Type			Werkstoff / Material Halbzeug. / Raw Material			FMB Art.-Nr. FMB Liefer.-Nr.																							
20	2	KT	Gerade Reduzierverschraubung			SS-10M0-6-8M			Stainless-Steel			5000025568																							
19	10	KT	Halbrundschraube			ISO7380-M6x10-A2			A2			5000019426																							
18	6	KT	Scheibe			ISO7089-B-A2			A2			5000007060																							
17	4	KT	Scheibe			ISO7089-B-A2			A2			5000007038																							
16	10	KT	Scheibe			ISO7089-A-A2			A2			5000007036																							
15	4	KT	Zylinderschraube			ISO4762-M6x25-A2			A2			5000035031																							
14	6	KT	Sechskantmutter			ISO4312-M6-A4-80_gal_Ag			A4-80_gal_Ag			5000005187																							
13	2	KT	Winkelverschraubung			SS-8M0-9			Stainless-Steel			5000025610 Swagelok																							
12	1	FT	Joint Holder			726-02-10-04			304 Bl. 3 5x64			5000075625 FMB																							
11	1	FT	Cooling_Hose PA12NH-Tecalon, transparent			726-02-01-91 (-) TR 8 / 6 w/nr. No. 2.47795.1			PA Schlauch 8x1			5000075627 FMB																							
10	1	FT	Cooling_Hose PA12NH-Tecalon, transparent			726-02-01-90 (-) TR 8 / 6 w/nr. No. 2.47795.1			PA Schlauch 8x1			5000075626 FMB																							
9	3	FT	Column			725-43-07			1.4301 X5CrNi18-10 Ro 12 207			5000005432 FMB																							
8	1	FT	Protective Sheet			725-43-06			1.4301 X5CrNi18-10 Bl. 2 12x46			5000005436 FMB																							
7	1	FT	Protective Cover			725-43-05			3.2315 AlMgSi1 Bl. 2 13x193			5000005436 FMB																							
6	1	FT	Protective Cover			725-43-03			3.2315 AlMgSi1 Bl. 2 12x93			5000005435 FMB																							
5	2	FT	Elbow			725-42-02			1.4301 X5CrNi18-10 Ro 8x1 73			5000005411 FMB																							
4	1	FT	Actuator Plate			725-42-01			3.2315 AlMgSi1 Bl. 102x84 12			5000005413 FMB																							
3	1	FBg	Basis Flange			725-43-01-00			S.1list			50000054298 FMB																							
2	1	FBg	Manipulator			466-04-12-33-00			S.1list			5000079080 FMB																							
1	1	FBg	Absorber Holder/Cooler			466-04-12-33-00			S.1list			5000080600 FMB																							
Allgemeine Oberflächeneigenschaften / Surface: ISO 1302 Oberflächenbehandlung / Surface treatment						Allgemeintoleranzen / General tolerances ISO 2768-mS ISO 13920-HE ISO 80/5						Projektion Maßstab/Scale 35 Werkstoff: S.1list Raw Mat.:						Mass.: 7234 kg																	
UHRV																																			
Artikelnr.			5000079081															Datum 12.10.2020			Name			Benennung / Name:											
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Zeichn. drawing:			File name: 466-04-12-03-00-HEAT-ABSORBER			geprüft: checked			Schmidt																										
10223803 B 01			KLingenmonteur			23.11.2020						Zeichnungsnummer / Drawing number																							
Doc-ID Rev Ver			Änderung/Mod. Dat.									466-04-12-03-00 B																							
10223803 B 01			KLingenmonteur			23.11.2020						Ursprungs-Dok.-ID: 10216515																							
10223803 B 01			Änderung/Mod. Dat.									Rev Page 1 Dr. / Size A1																							


Prüfspezifikation / Test specification	
Test	Specification
metr. Vermessung	Prüfmaße
He-Lecktest / Leakage test	<5 E-10 mbar l/s
Bake out, outgassing and RGA	<1 E-12 mbar l/s cm ²
Base pressure	<5 E-10 mbar
Drucktest / Pressure test	15/30 bar/min

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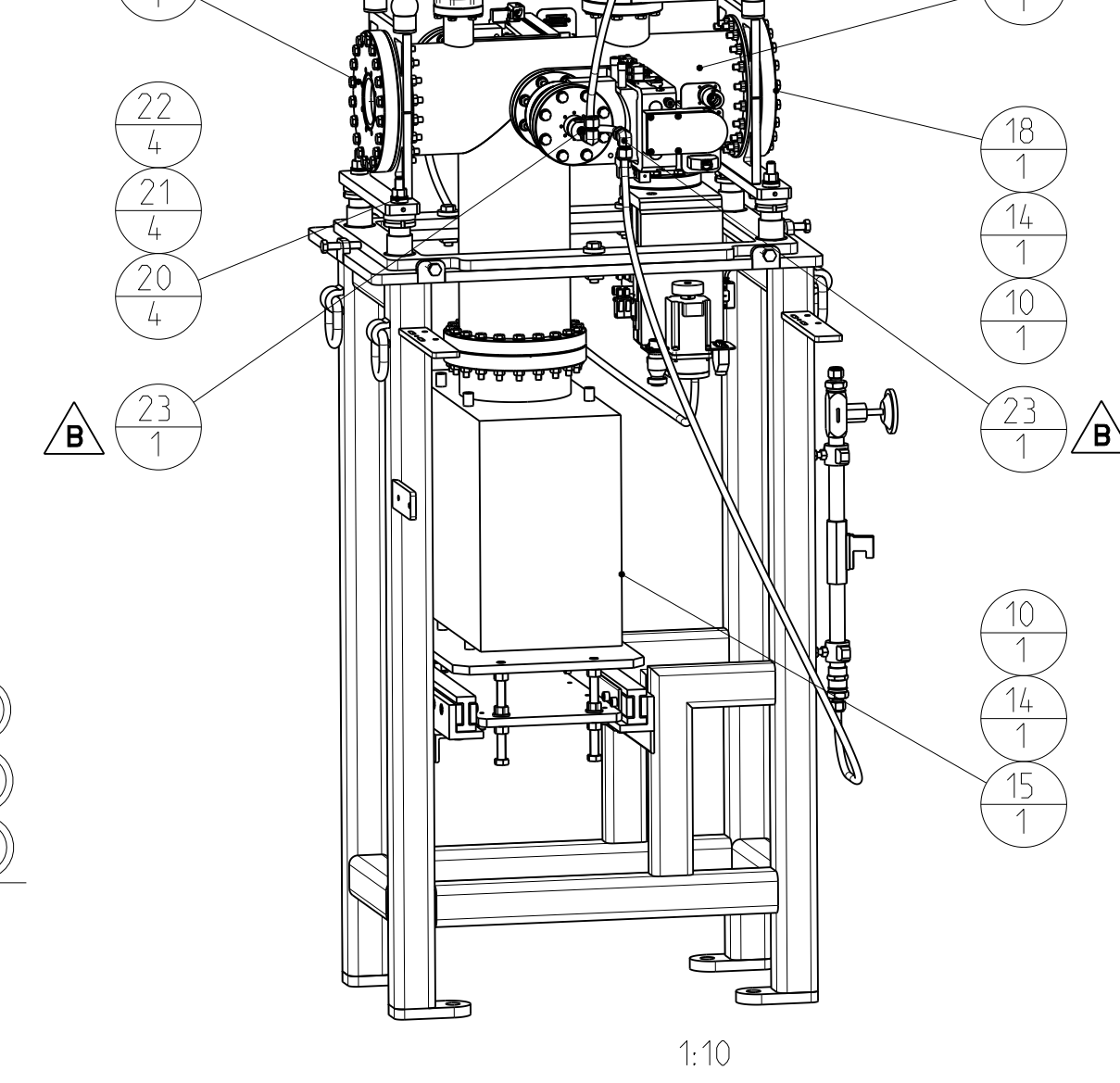
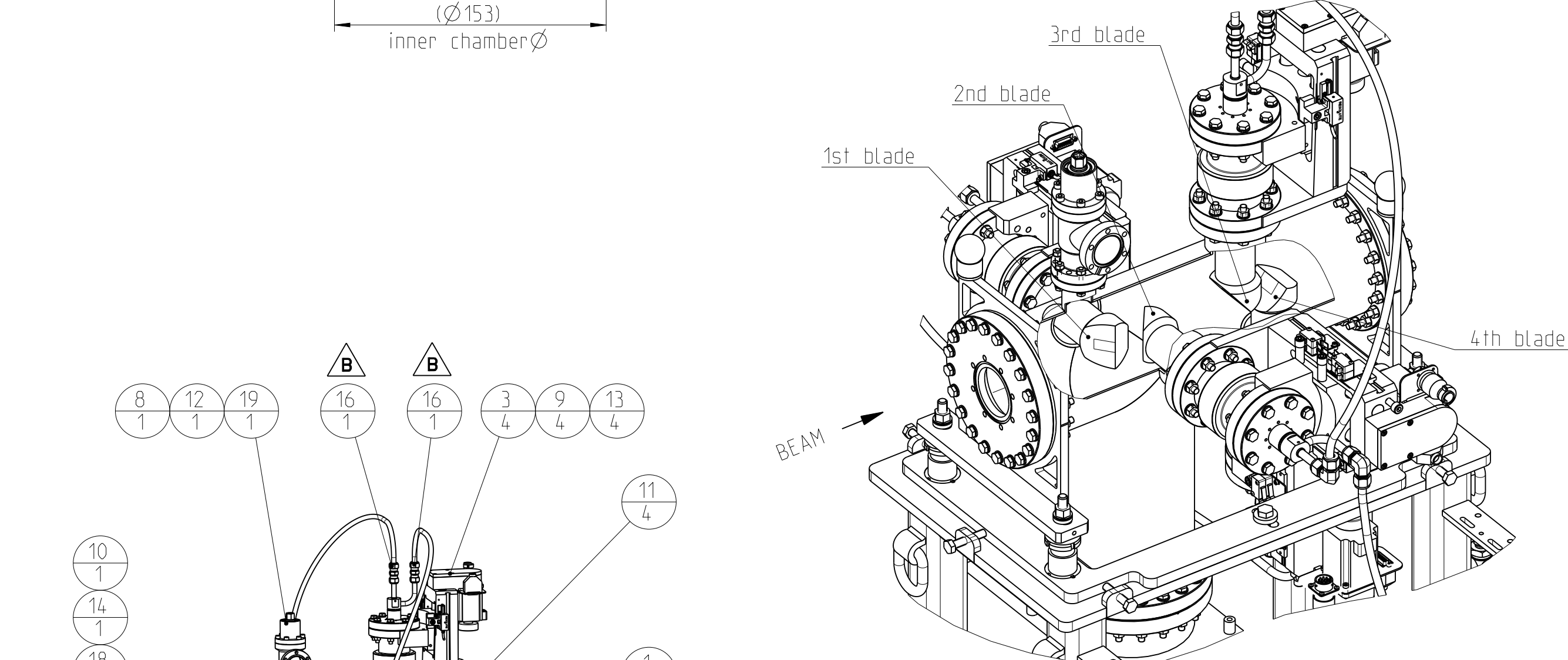
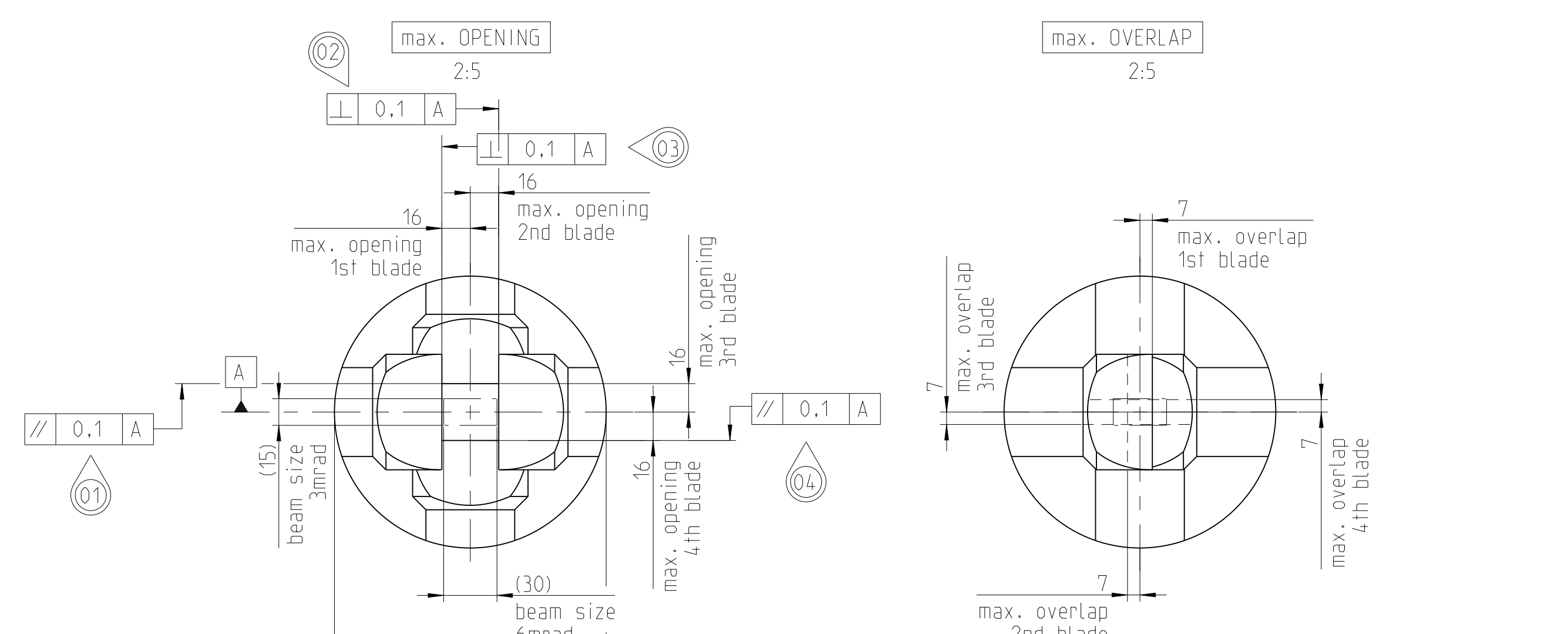
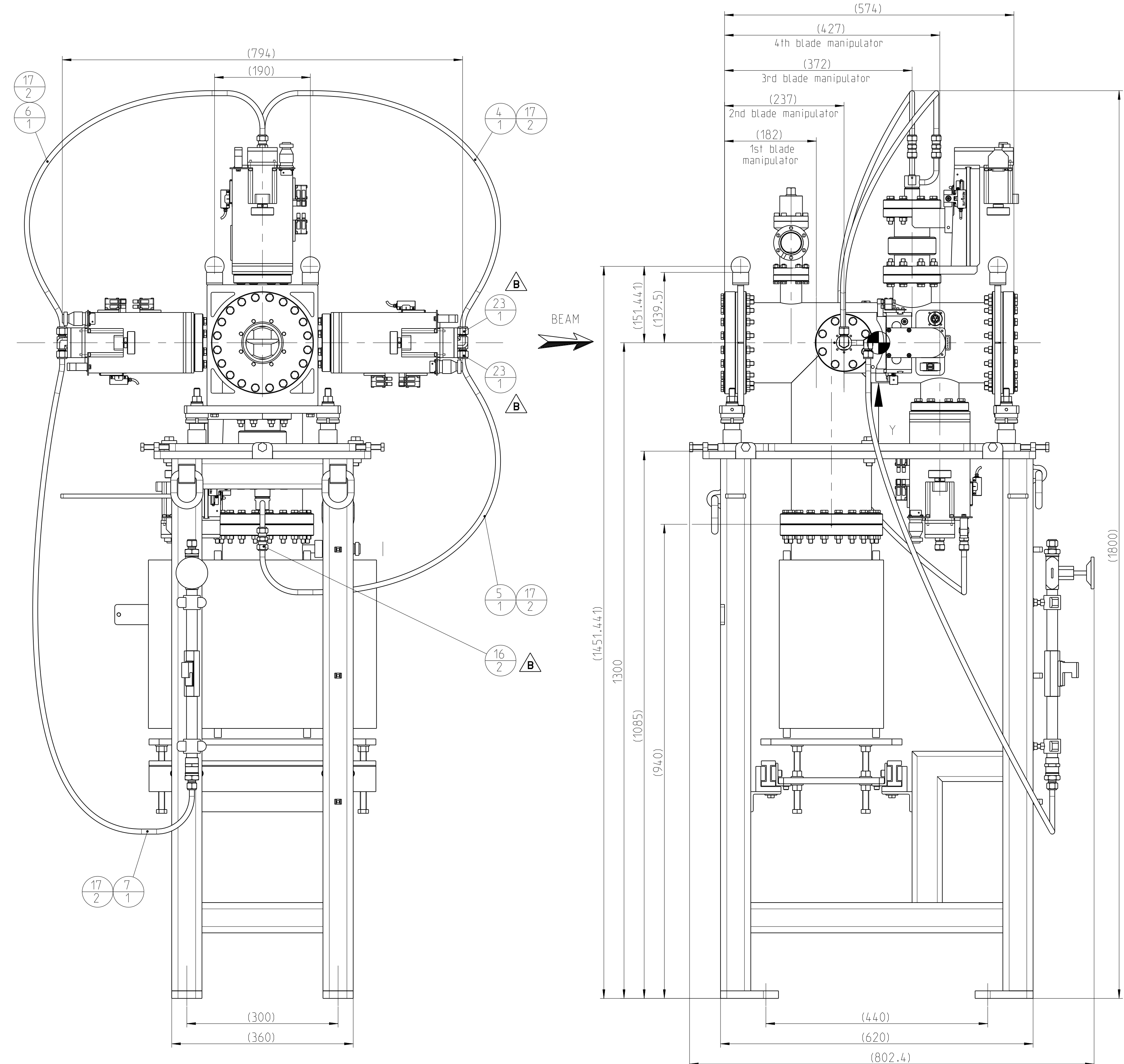


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Zeichnungsnummer / Drawing number	Rev	Page 1
466-04-12-03-00 B		Of 1
		Size A
Ursprungs-Dok-ID: 10215615		

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	Front end components for BM source fixed mask and absorbers	Page 8 of 22
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	Final	Version: 2.0

2.2 The SLITS unit



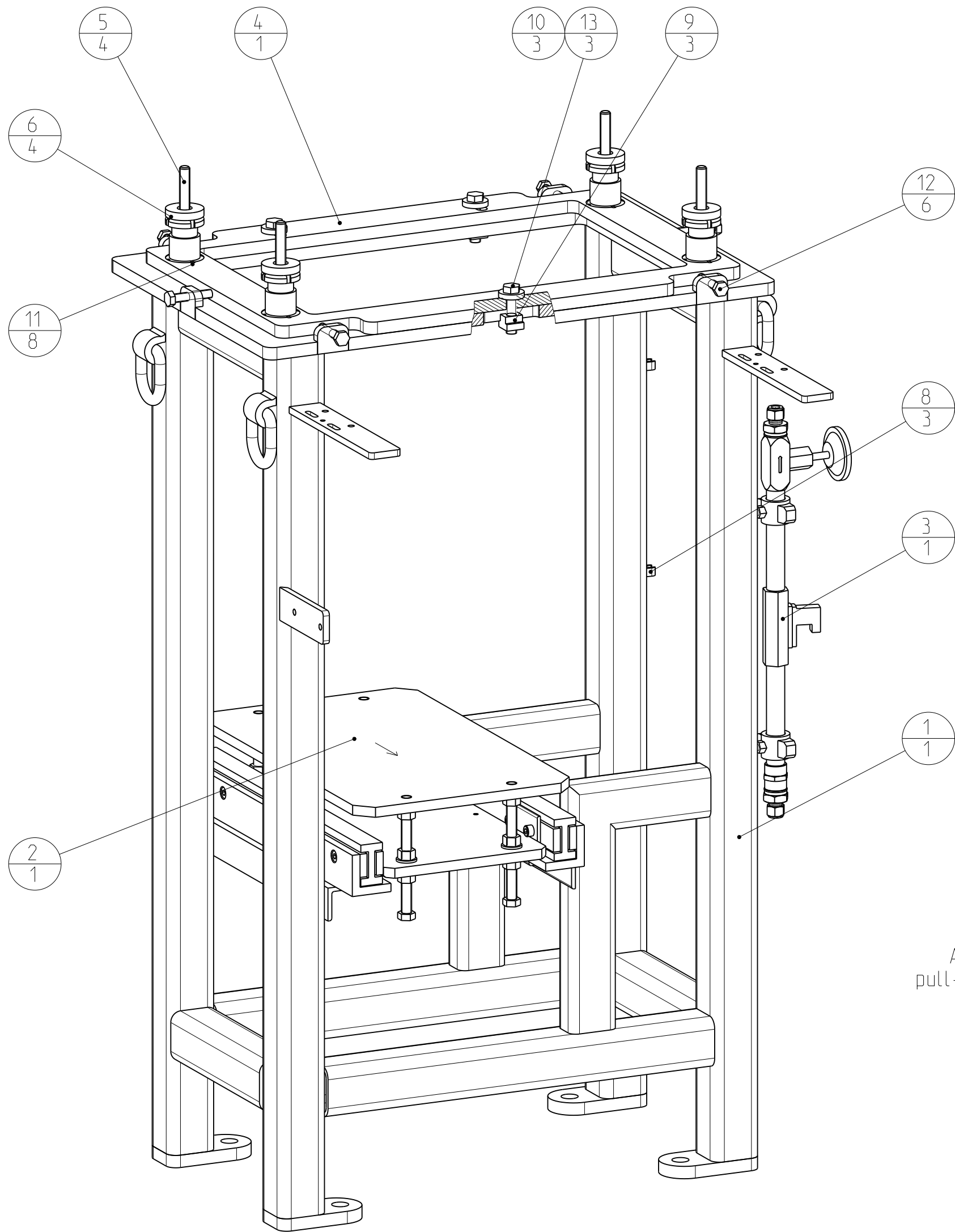
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Pruefung / test name	Sollwert / specified value	Einheit / unit
metr. Vermessung (Prüfmaße)		
He-Lecktest/Leakage test	<5 E-10 mbar l/s	

Fiducial X, Y, Z offset

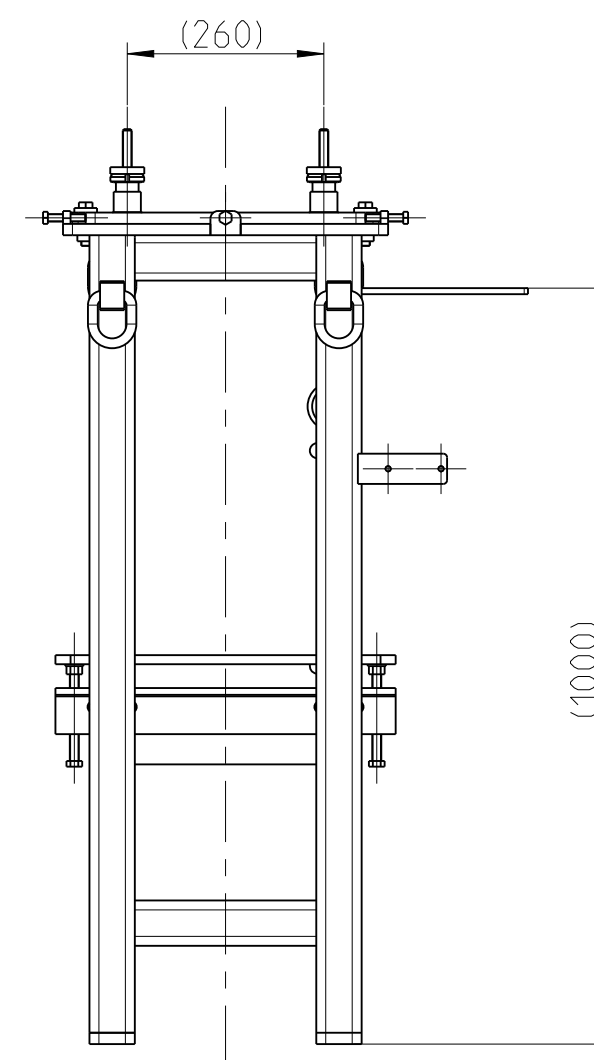
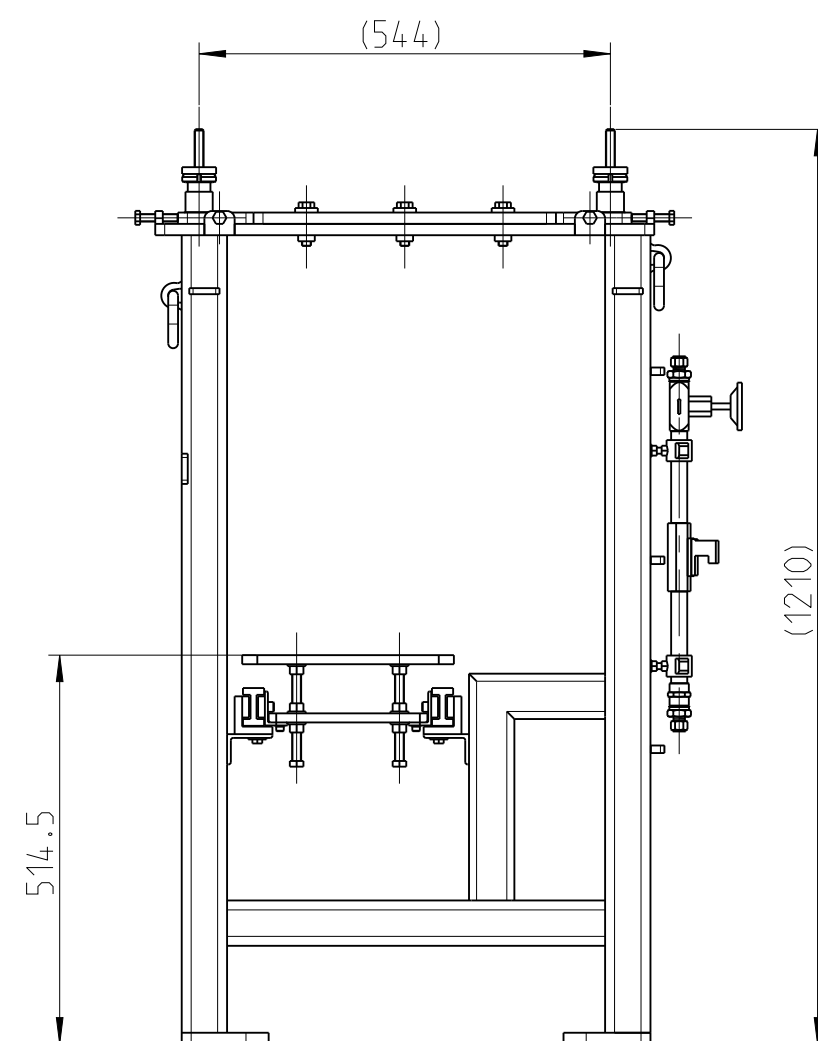
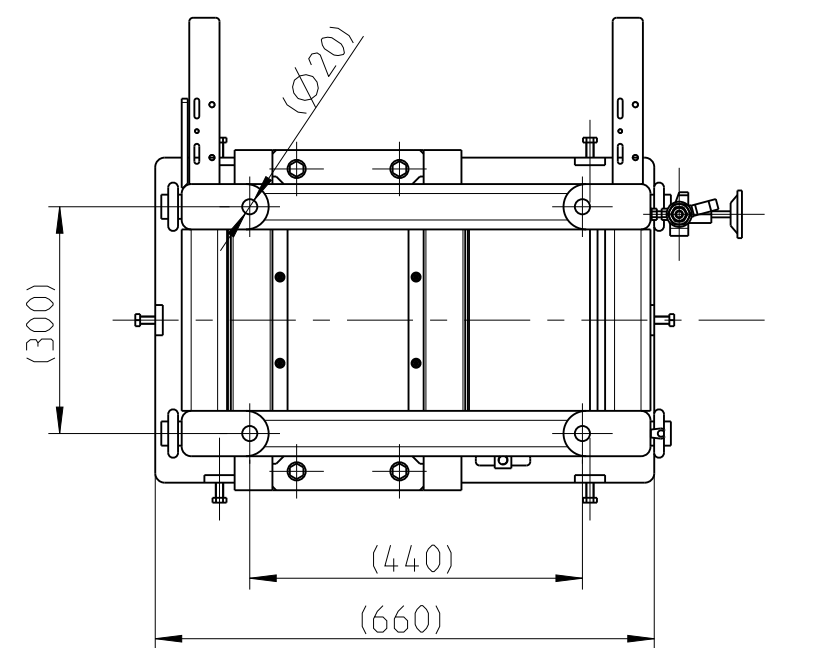
Stueckliste (Baugruppe oberste ebene) / Bill of material (assembly 1st level)						
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23	4	KT	Winkelverschraubung	SS-XM0-9	Stainless Steel	5000025564
22	4	KT	Sechskantmutter	ISO4032-M12-A4	A4	5000005099
21	4	KT	Kegelpfanne	DIN6319-D14-Z-A2	A2	5000006993
20	4	KT	Kugelscheibe	DIN6319-C13-A2	A2	5000006981
19	1	KT	UHV-Eckventil DN40CF	sa132-GE02	s.datasheet	5000052921 VAI
18	2	KT	CF-Reduziertfl. mit Fase	CF-ISO-063-2RC-316LN-ESR	316LN-ESR	5000026828 Trinos
17	9	KT	Stützflase	SS-XM0-8M	Stainless Steel	5000044204 SWAGELOK
16	4	KT	Gerade Verschraubung Tube Ø0,10	SS-XM0-6	Stainless Steel	5000025562 Swagelok
15	1	KT	Ion Pump 300l/s, tall profile	300T-D1-85-SC-220-N	s.datasheet	5000077719 Garmetvacuum
14	3	KT	CF-Dichtung	CF-ISO-D-DFHC-w	DFHC-Cu	5000002867
13	4	KT	CF-Dichtung	CF063-D-DFHC-w	DFHC-Cu	5000002863
12	1	KT	CF-Dichtung	CF035-D-DFHC-w	DFHC-Cu	5000002860
11	4	KBg	1,5" Nest, M6 Free issue part.			5000056859 Salaris
10	3	KBg	CF150 Set (20xBolt/20xNut) Bolts Ag	CF-ISO-SBN-A4-80	A4-80 ISO4016-MBx60, ISO4032-MB	5000026142
9	4	KBg	CF063 Set (6xBolt/6xNut) Bolts Ag	CF063-SBN-A4-80	A4-80 ISO4016-MBx50, ISO4032-MB	5000026140
8	1	KBg	CF135 Set (6xBolt/6xNut) Bolts Ag	CF035-SBN-A4-80	A4-80 ISO4016-MBx35, ISO4032-MB	5000026138
7	1	FT	Flexible pipe PA12PH-Tecalan, transparent	466-04-32-04 (-) TR 10 / 8 w.rfl. No. 2.477931.1	PA Hose 10x1 1/5	5000079896 Tecalan
6	1	FT	Flexible pipe PA12PH-Tecalan, transparent	466-04-32-03 (-) TR 10 / 8 w.rfl. No. 2.477931.1	PA Hose 10x1 1007	5000079895 Tecalan
5	1	FT	Flexible pipe PA12PH-Tecalan, transparent	466-04-32-02 (-) TR 10 / 8 w.rfl. No. 2.477931.1	PA Hose 10x1 973	5000079894 Tecalan
4	1	FT	Flexible pipe PA12PH-Tecalan, transparent	466-04-32-01 (-) TR 10 / 8 w.rfl. No. 2.477931.1	PA Hose 10x1 1010	5000079893 Tecalan
3	4	FBg	Blade unit	466-04-32-21-00	s.list	5000079224 FMB
2	1	FBg	Support	466-04-32-02-00	s.list	5000079229 FMB
1	1	FBg	Slit chamber	466-04-32-01-00	s.list	5000079212 FMB
Allgemeine Oberflächen/General surface: ISO 1302 Oberflächenbehandlung / Surface treatment			Allgemeintoleranzen/General tolerances		Projektion	Maßstab/Scale 1:5
			ISO 2768-mH ISO 13020-AE ISO 8015			Mass.: 0 kg
Artikel: 5000079211			Datum		Benennung / Name:	
Modell: ASSM 102202001 B 01			14.06.2020		Friedmann	
Zeichn. 10220201 B 01			gezeichnet		Movable aperture unit	
Datei: 466-04-32-00-HVARIABLE-APERTURE			geprüft			
10220201 B 01			07.10.2020		Schmidt	
Rev. 1			Änderung/Mod.		Datei: 466-04-32-00-HVARIABLE-APERTURE	
					10220201 B 01	
					Rev. 1	
					Page 1	
					Of 1	
					Size A1	
					Ursprungs-Dok-ID: 10216106	

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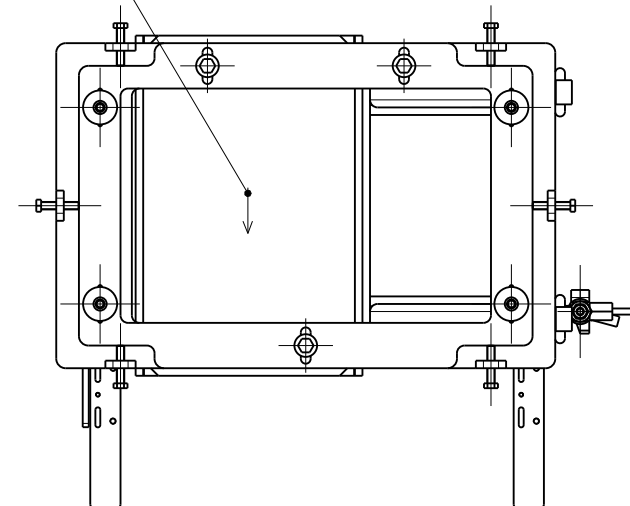






B-B
1:5

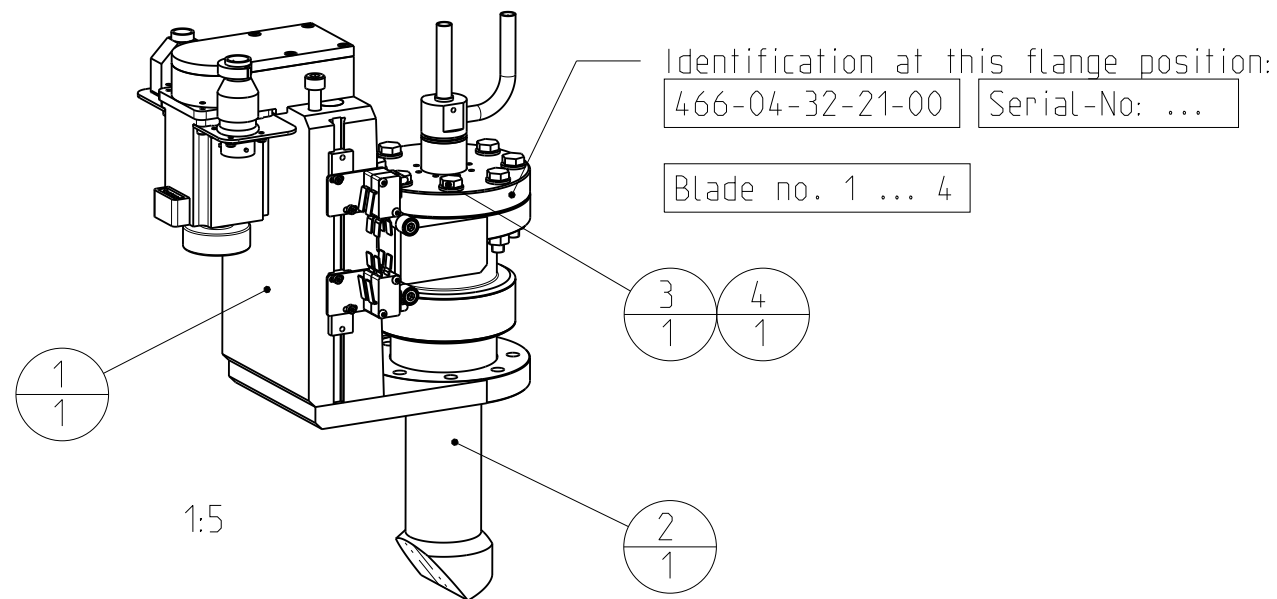
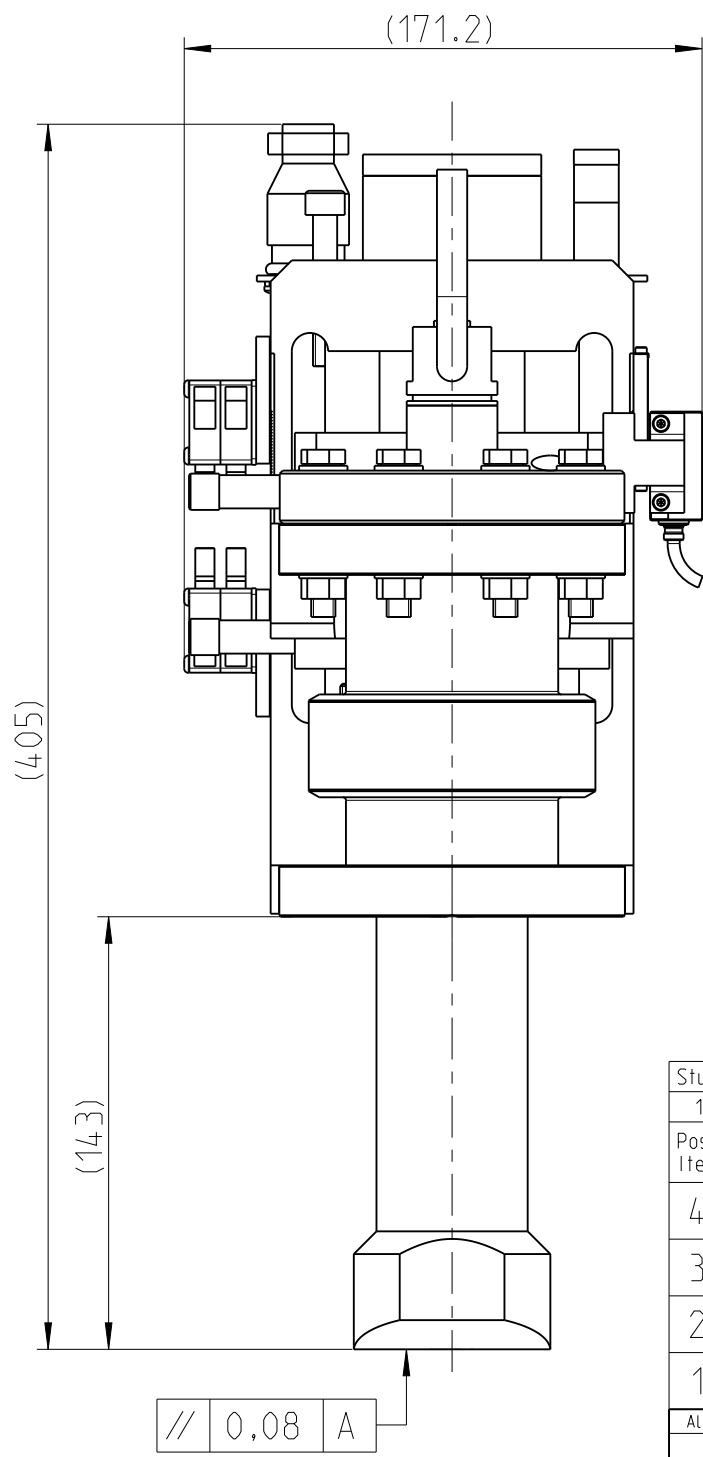
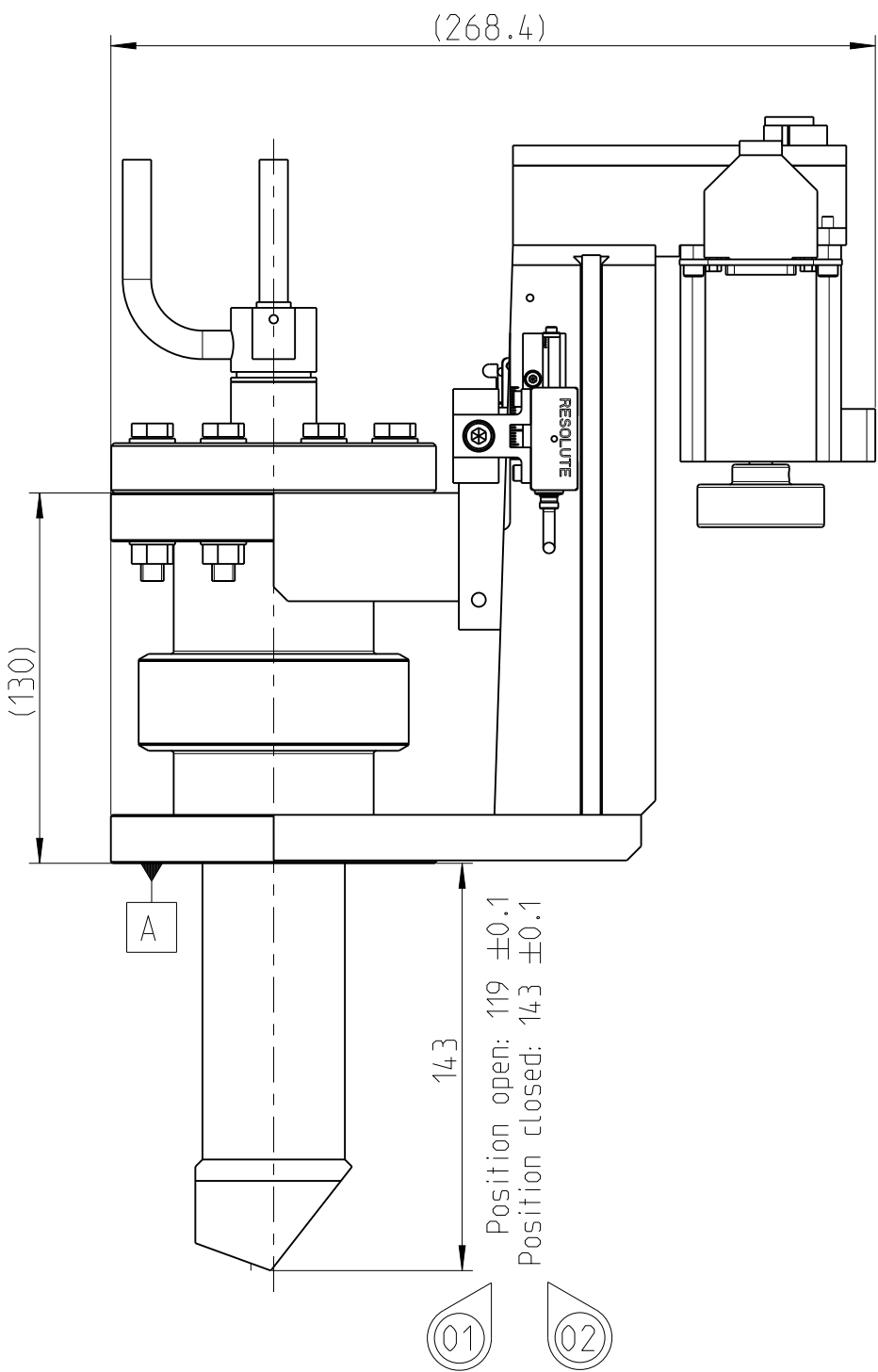


Auszugrichtung "Pump stage"
pull-out direction "Pump stage"



Stueckliste (Baugruppe oberste Ebene) / Bill of material (assembly 1st level)													
1	2	3	4			5		6		7			
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung			Zeichnungsnummer / Drawing No. Norm / Standard / Type		Werkstoff / Material Halbzeug / Raw Material		FMB Art.-Nr Firma/Supplier			
13	3	KT	Sechskantschraube			IS04017-M12x50-A2		A2		5000011640			
12	6	KT	Sechskantschraube (ger.) abgerundet mit R25			IS04017-M10x50-A4-80		A4-80		5000044885			
11	8	KT	Zylinderstift			IS02338-5m6x14-A2		A2		5000022167			
10	3	KT	Scheibe			DIN7349-12-A4		A4		5000039140			
9	3	KT	T-Nutenstein			DIN508-M12x14-A2		A2		5000035941			
8	3	KT	Wuerth-Kunststoffclip Mat: PPH			0544 900 008		s_dafasheet		5000034184 Wuerth			
7	3	KT	Gewindebolzen M6 (stud bolt)			02341618		St_gal_Zn		5000034218 Wuerth			
6	4	KT	Kugelverstell-Schraube			KVS30-17.5		1.7225 42CrMo4		5000027365 WASI			
5	4	KT	Threaded Rod			DIN975-M12x125-A4-80		A4-80 Gewindestange M12 125		50000041513			
4	1	FT	Bolt plate			466-04-32-02-01		304		5000079233 FMB			
3	1	FBg	Water Flow Unit			726-02-61-01-00		s_list		5000075703 FMB			
2	1	FBg	Pump Stage Usable to install in Frames to exchange Ion Pumps.			716-39-00		s_list		5000035583 FMB			
1	1	FBg	Base frame			466-04-32-12-00		s_list		5000079215 FMB			
Allgemeine Oberflaeche/General surface: ISO 1302 Oberflaechenbehandlung / Surface treatment			Allgemeintoleranzen/ General tolerances ISO 2768-mH ISO 13920-AE ISO 8015			Projektion 		Maßstab/Scale 1:10 Mass.: 0 kg					
Artikel: 5000079229			Dateiname: 466-04-32-02-00-SUPPORT			gezeichnet 14.10.2020		Benennung / Name: Support					
Modell: Model: ASSEM			10216154 A 01			gezeichnet drawn by					Schmidt		
Zeichn.- Drawing:			Dateiname: 466-04-32-02-00-SUPPORT			geprüft					Schmidt		
			10216161 A 01			checked							
Historie der Änderungen History of mod.								Zeichnungsnummer / Drawing number			Rev	Page 1	
												Of 1	
											Size A2		
Doc-Id			Rev	Ver	Aenderung/Mod.		Dat.		466-04-32-02-00 A				
						www.fmb-berlin.de		Ursprungs-Dok-Id: 10216161					


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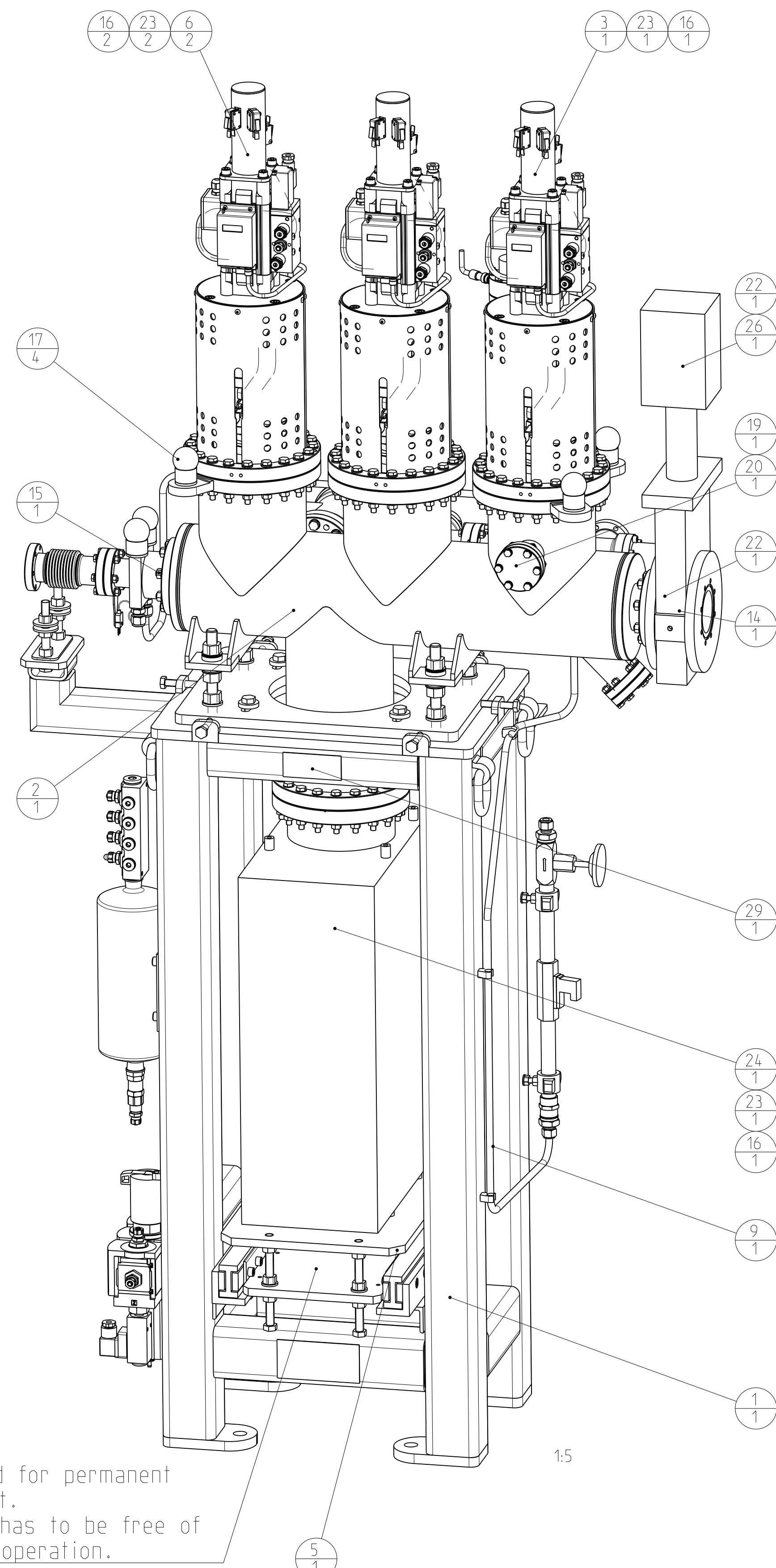
Pruefspezifikation / test specification		
Pruefung / test name	Sollwert / specified value	Einheit / unit
metr. Vermessung (Prüfmaße)		
He-Lecktest/Leakage test	<5 E-10 mbar l/s	
Drucktest / Pressure test	15/30 bar/min	
Durchflusstest / Flowrate	Istwert messen l/min	

Stueckliste (Baugruppe oberste ebene) / Bill of material (assembly 1st level)						
1	2	3	4	5	6	7
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung	Zeichnungsnummer / Drawing No. Norm / Standard / Type	Werkstoff / Material Halbzeug / Raw Material	FMB Art.-Nr. Firma/Supplier
4	1	KT	CF-Dichtung	CF063-D_OFHC_w	OFHC-Cu	5000002863
3	1	KBg	CF063 Set (8xBolt/8xNut) Bolts Ag	CF063-SBN_A4-80	A4-80 ISO4014-M8x50, ISO4032-M8	5000026140 -
2	1	FBg	Cooled blade	466-04-32-21-02-00	s_list	5000079223 FMB
1	1	FBg	Linear feedthrough LD63-25 RESOLUTE	284-31-00	s_list	5000079414 FMB
Allgemeine Oberflaeche/General surface: ISO 1302 Oberflaechenbehandlung / Surface treatment				Allgemeintoleranzen/ General tolerances ISO 2768-mH ISO 13920-AE ISO 8015	Projektion 	Maßstab/Scale 2.5 Werkstoff: s_list Raw Mat.:
Artikel: 5000079224				Datum Date 14.08.2020	Name friedmann	Benennung / Name: Blade unit
Modell: Model: ASSEM	Filename: 466-04-32-21-00-BLADE-UNIT	gezeich. drawn by	10220185 B 01	geprueft checked	schmidt	
Zeichn.: Drawing:	Filename: 466-04-32-21-00-BLADE-UNIT	geprueft checked	10220186 B 01			
Historie der Änderungen History of mod.				FMB Berlin Friedrich-Woehler-Str. 2 12489 Berlin www.fmb-berlin.de		Zeichnungsnummer / Drawing number 466-04-32-21-00 B
Doc-ID Rev Ver Aenderung/Mod. Dat.				Ursprungs-Dok-ID: 10216144		Rev Of Size 1 1 A3

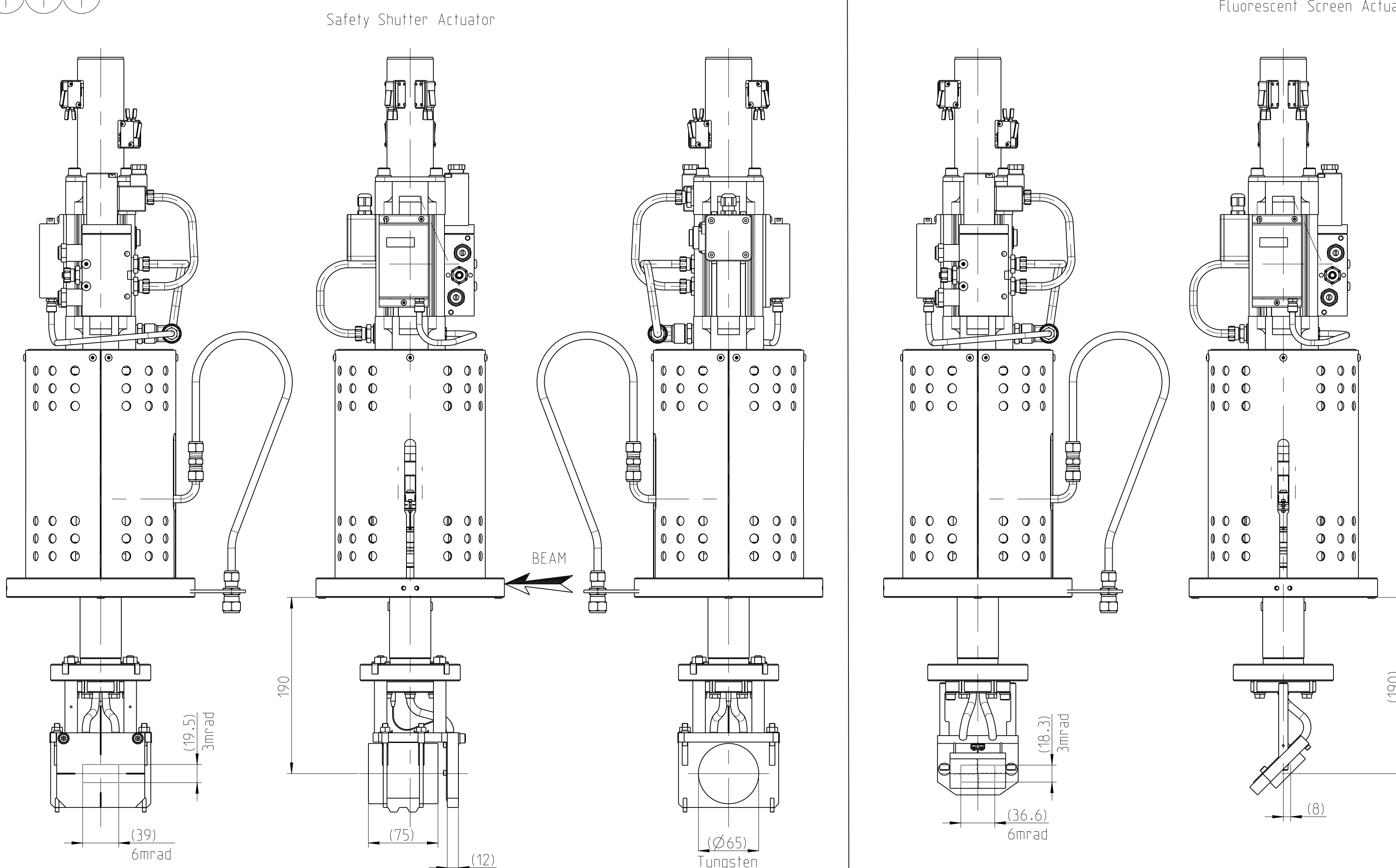
Ausdrucke dieser Zeichnung unterliegen nur dem Änderungsdienst, wenn diese zusätzlich den grünen Stempel zur Fertigungsfreigabe enthalten.
Printed copies of this drawing are in change management only, if they additionally contain the green stamp releasing them for production.

 SOLARIS <small>NATIONAL SYNCHROTRON RADIATION CENTRE</small>	Solaris Standards & Recommended Practices	
	Front end components for BM source fixed mask and absorbers	Page 12 of 22
		Date 15.05.2024
	Final	Version: 2.0

2.3 The fluorescent screen (FLSC), cooling safety shutter-stoppers (SS1 & SS2) and fixed mask2 (FM2)

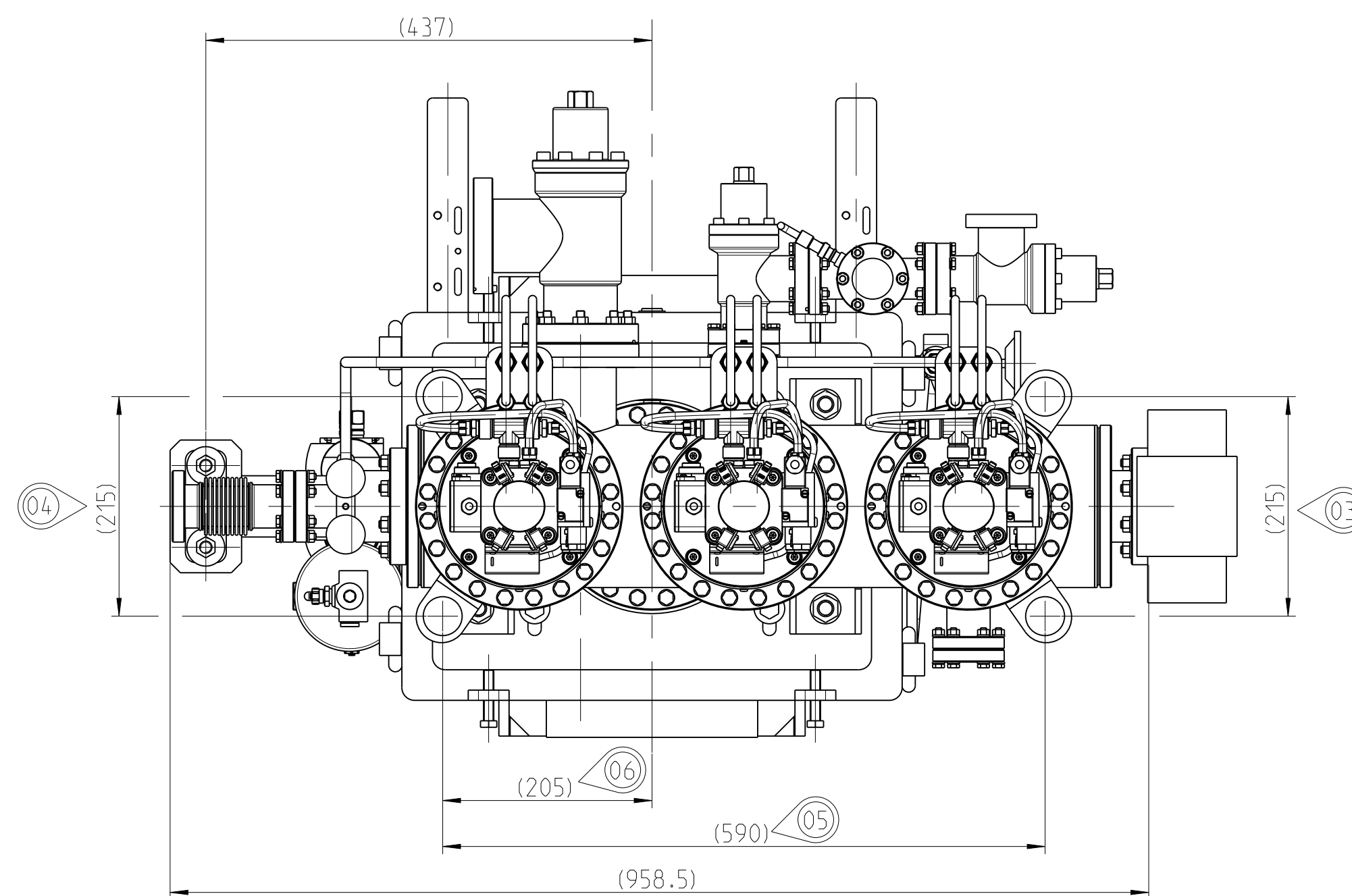


Not intended for permanent
pump support.
Pump stage has to be free of
load during operation.



Pruefspezifikation / test specification

Test name / Aufhebung /	Sollwert / Specified value	Einheit / Unit
Bake-out cycle with RGA (1-100 AMU): Temperature Time RGA: Sum of all AMU >28 (except 44) must be less than 1% of total pressure	max. 250 >24 <input type="checkbox"/> passed	°C hours
Final pressure	<1x10E-10	mbar
He-leaktest: Before Bake-out at room temperature: After Bake-out at room temperature: (Cooling cycles have to be filled with ~10bar Helium)	<1x10E-10 <1x10E-10	mbar l/s mbar l/s
Desorption rate inner surface	<1x10E-12 28.200	mbar l/s cm² cm²
Water pressure test Total test time Intervals of recording	16 30 5	bar min min
No evidence of water leakage:	<input type="checkbox"/> passed	
Flow rate: Pressure drop:	3,4 ? (to be added)	l/min bar
Air pressure test: Test of tightness:	<input type="checkbox"/> passed	
Dimensional test (see drawing): (room temp. 23±3 °C)	<input type="checkbox"/> passed	
Visual internal and external inspection:	<input type="checkbox"/> passed	
Functional test under vacuum: - Thermocouple (comparison measurement) - Set up limit switches acc. to stroke - Drive over total stroke - Function of Counter	<input type="checkbox"/> passed <input type="checkbox"/> passed <input type="checkbox"/> passed <input type="checkbox"/> passed	
Note for storage and shipping: Chamber covered with plastic flanges.		



Stückliste (Baugruppe oberste Ebene / Bill of material assembly for level)				5	6	7
1	2	3	4			
Item	Quantity	Item Type	Bezeichnung / Name	Zeichnungsnummer / Drawing No.	Verfahren / Material	PMB oder Teil-Nummer
32	12	KT	Scheibe	150788-01-00	Al	5000025662
31	6	KT	Schneiknurlauf	150476-00-00-40	Al-80	5000025656
30	6	KT	Schneiknurlaufschraube	150476-00-00-00-00-kg	Al-80_Kg	5000019277
29	1	KT	PMB Typenschild, nach, eingetrag in PMB		Al	5000028574
28	1	KT	UMF-Seventric DMSCF	5410-9020-000	s.dalabsheet	5000266545
27	2	KT	UMF-Seventric DMSCF	5410-9020-000	s.dalabsheet	5000266545
26	1	KT	UMF-Seventric CF63, nach, resistent zu	5410-9020-000	s.dalabsheet	5000275446
25	1	KT	HR-Residual Gas Analyzer	150788-01-00-00-00-00	s.dalabsheet	5000080777
24	1	KT	Ion Pump 500L/s, 1kV, DC, 230V heated	5001-00-01-1220-N	s.dalabsheet	5000273671
23	4	KT	CF-Dichtung	150476-01-00-00-00-00	BfH-C	5000026826
22	3	KT	CF-Dichtung	150476-01-00-00-00-00	BfH-C	5000026826
21	1	KT	CF-Fensterflansch	150476-01-00-00-00-00	304L	5000026826
20	1	KT	CF-80-flansch, fest	150476-01-00-00-00-00	304L	5000026826
19	9	KT	CF-Dichtung	150476-01-00-00-00-00	BfH-C	5000026826
18	1	KBG	1-91kV DMSCF	42991500	304L	500026826
17	4	KBG	15-150kV, HG			500026826
16	4	KBG	CF50 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
15	1	KBG	CF63 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
14	1	KBG	CF63 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
13	1	KBG	CF63 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
12	1	KBG	CF63 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
11	1	KBG	CF35 Set (20kV/20kV/20kV)	150476-00-00-00-00-00	Al-80	5000026162
10	2	FT	Flang and Pipe	726-75-00	2.0009-SF-Cu	5000075446
9	1	FT	Cooling Pipe	726-72-60-19	2.0009-SF-Cu	5000075446
8	1	FT	Cooling Pipe	726-65-42-01	2.0009-SF-Cu	5000075446
7	1	FT	CF-Tube	726-77-00-10	304L 304L	5000071474
6	1	FT	Hydro-formed Bellows (CF40/CF400)	726-78-00-00	s.lit	5000070020
5	2	FT	Safety Shutter Actuator	726-61-00	s.lit	5000025222
4	1	FT	Pump Stop	716-39-00	s.lit	5000025222
3	1	FT	Flange to be used in flange to exchange Ion Pump	726-65-42-00	s.lit	5000079183
2	1	FT	Fluorescent Screen Chamber	726-65-42-02-00	s.lit	5000079066
1	1	FT	Safety Shutter Chamber	726-65-42-02-00	s.lit	5000079066
1	1	FT	Substrat	726-65-42-02-00	s.lit	5000079066

Approved: **Dr. rer. oec. Dr. rer. nat. Dr. rer. med. Dr. rer. phil. Dr. rer. theol. Dr. rer. jur. Dr. rer. agr. Dr. rer. vet. Dr. rer. for. Dr. rer. oec. Dr. rer. nat. Dr. rer. med. Dr. rer. phil. Dr. rer. theol. Dr. rer. jur. Dr. rer. agr. Dr. rer. vet. Dr. rer. for.**

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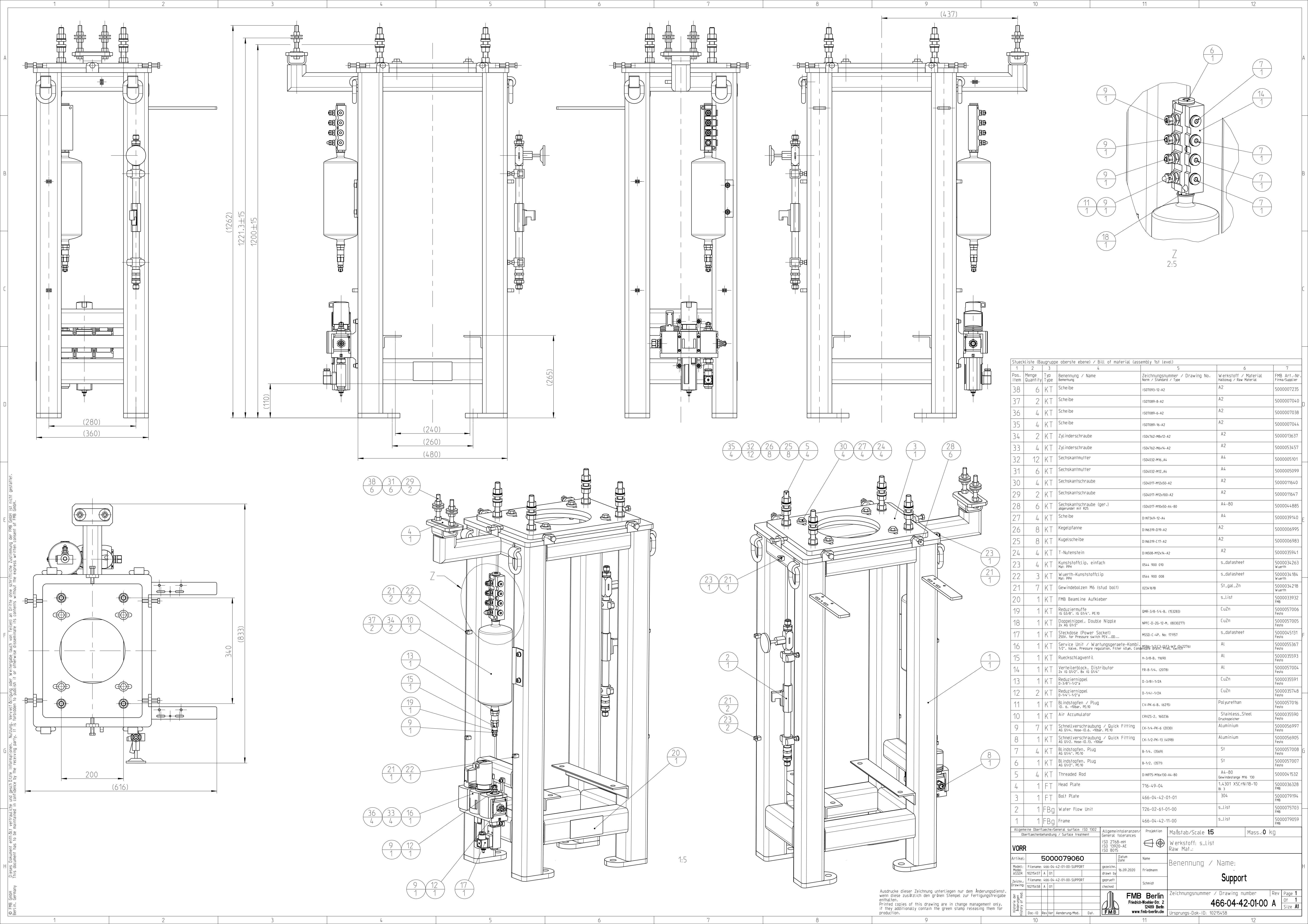
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Approved: **Dr. rer. oec. Dr. rer. nat. Dr. rer. med. Dr. rer. phil. Dr. rer. theol. Dr. rer. jur. Dr. rer. agr. Dr. rer. vet. Dr. rer. for.**

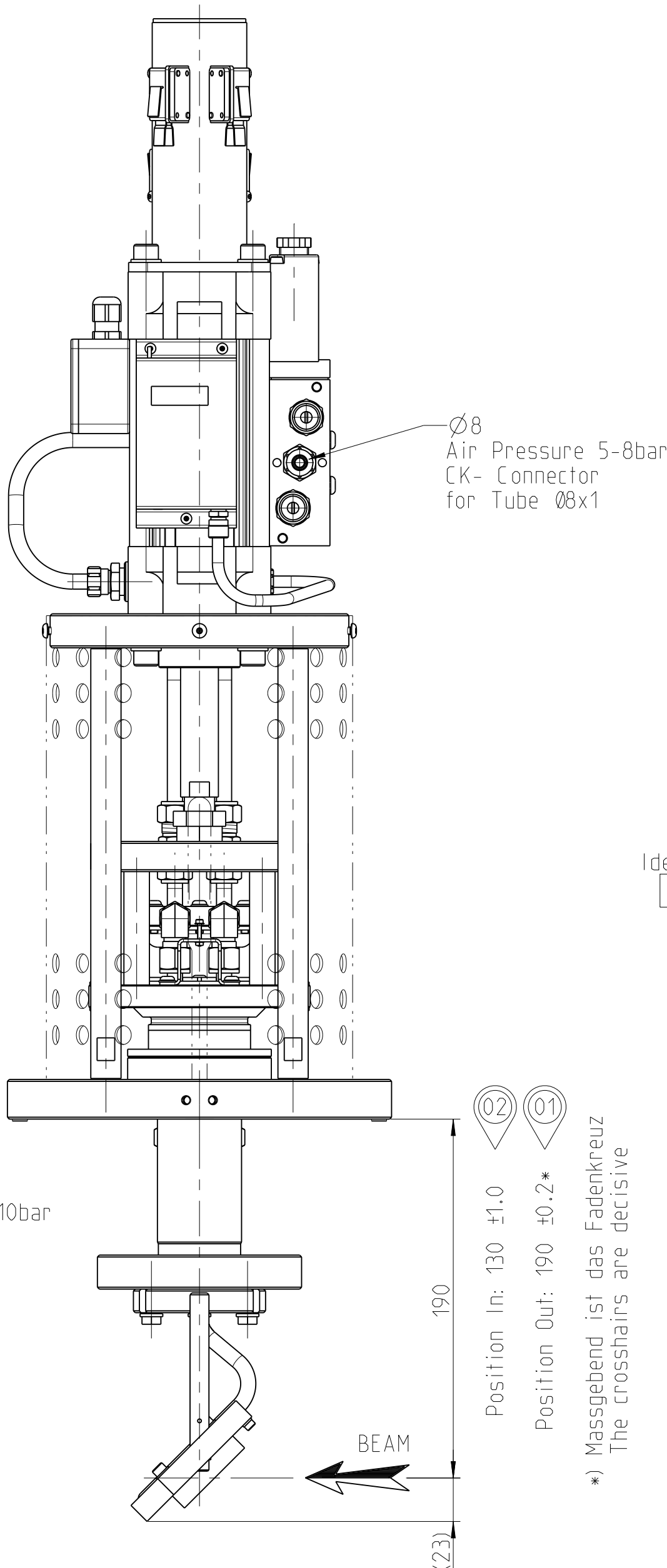
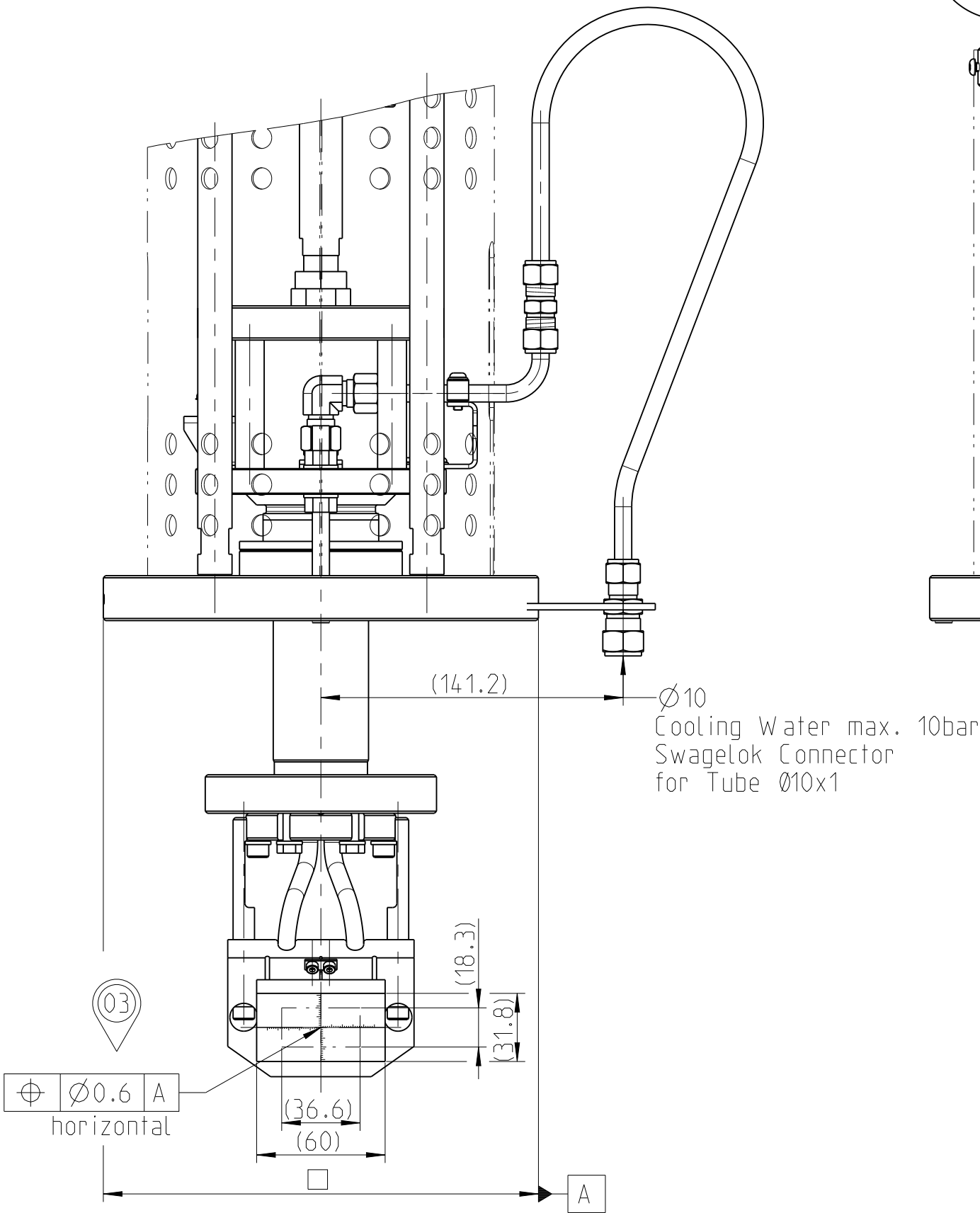
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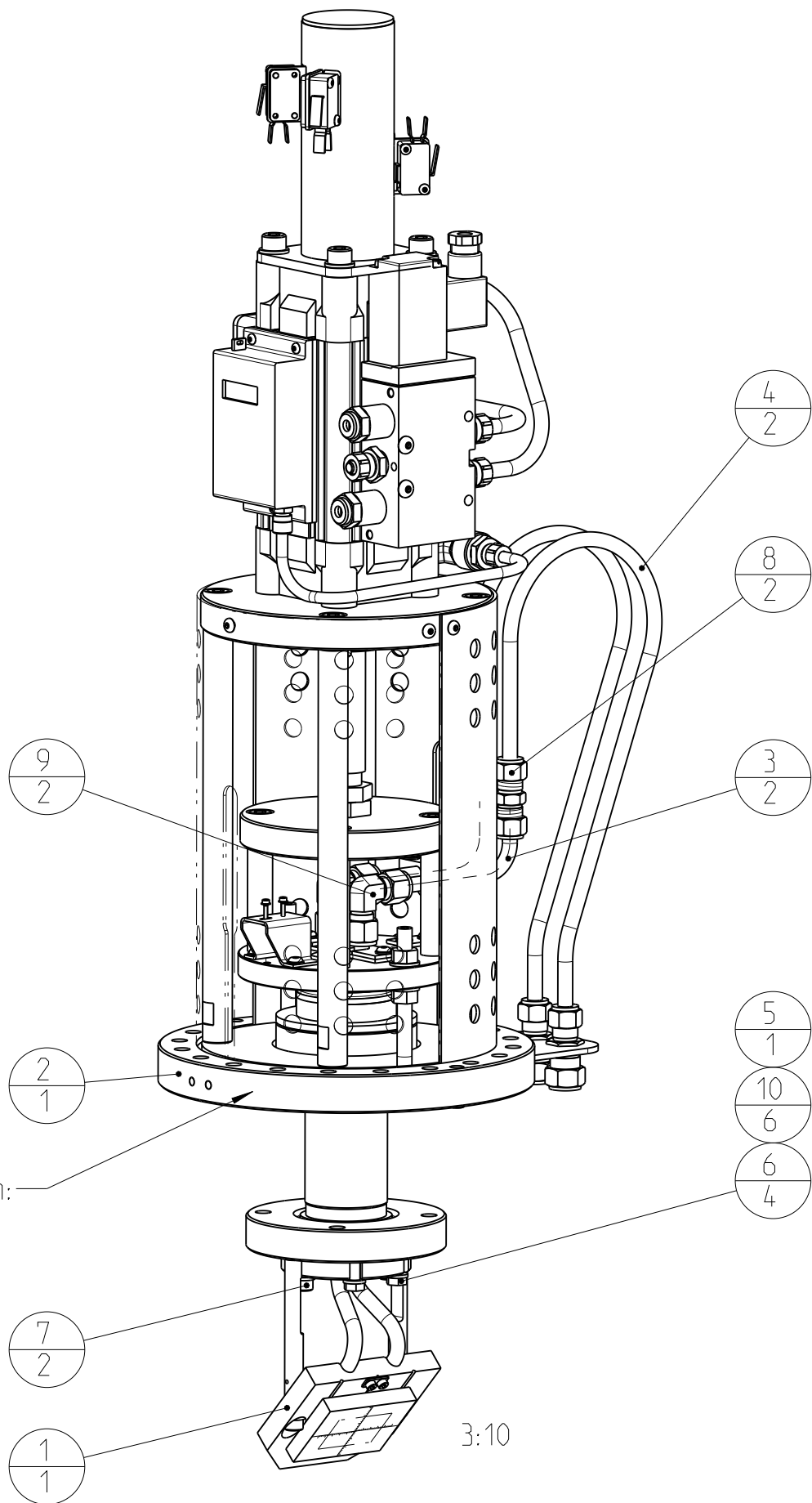


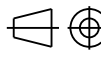

1	2	3	4	5	6	7	8
Pruefspezifikation Zwischentest / Interim test specification							
Pruefung / Test name		Sollwert / Specified value		Einheit / Unit			
He-leaktest at room temperature		<1x10E-10		mbar L/s			
Water pressure test		16		bar for 30min			
Air pressure test		8		bar			
Dimensional test (see drawing): (room temp. 23±3°C)				<input type="checkbox"/> passed			
Function test, visual inspection		Adjustment of Limit Switches Electrical Wiring		<input type="checkbox"/> passed			

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Identification at this flange position:
466-04-42-03-00 Serial-No: ...

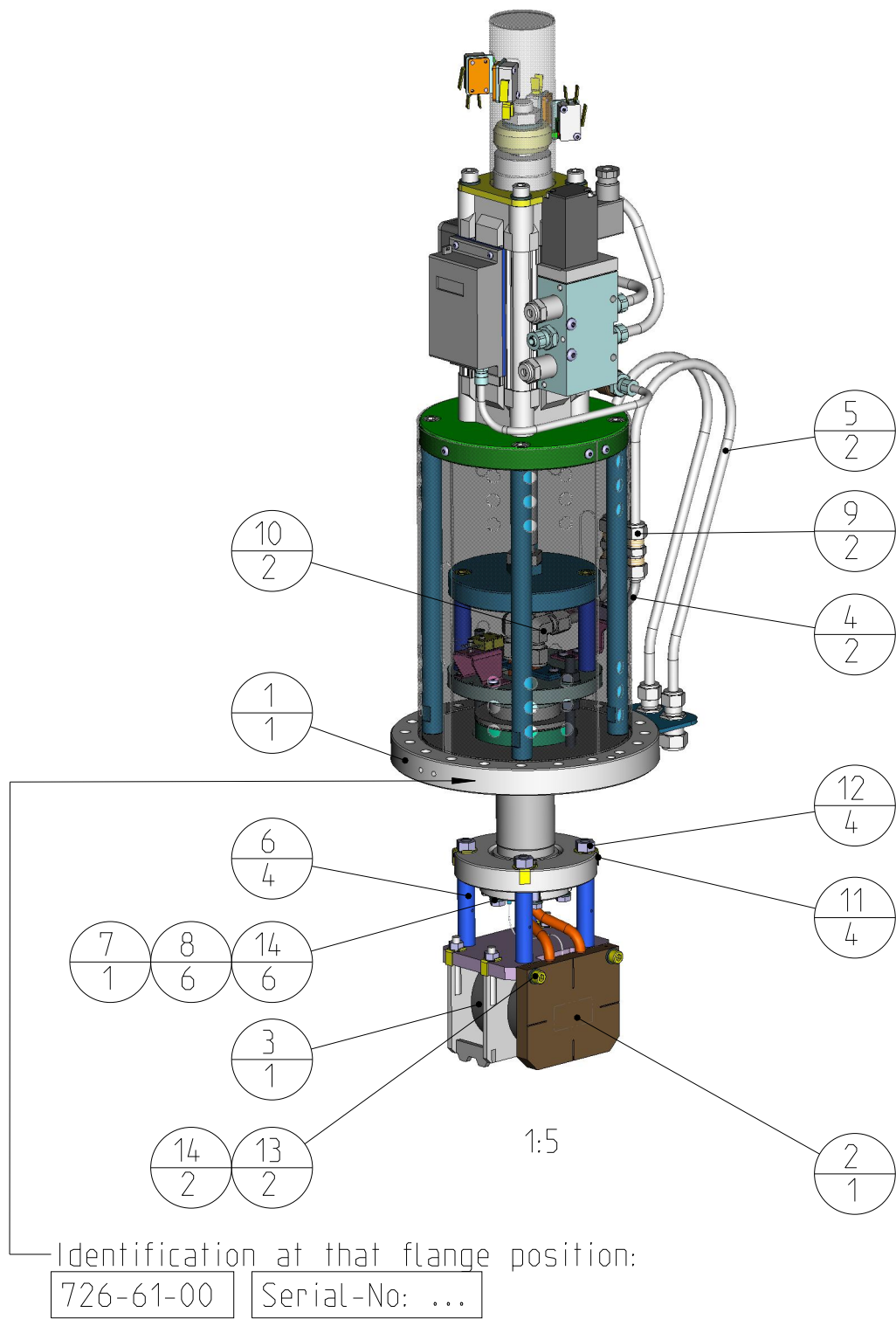
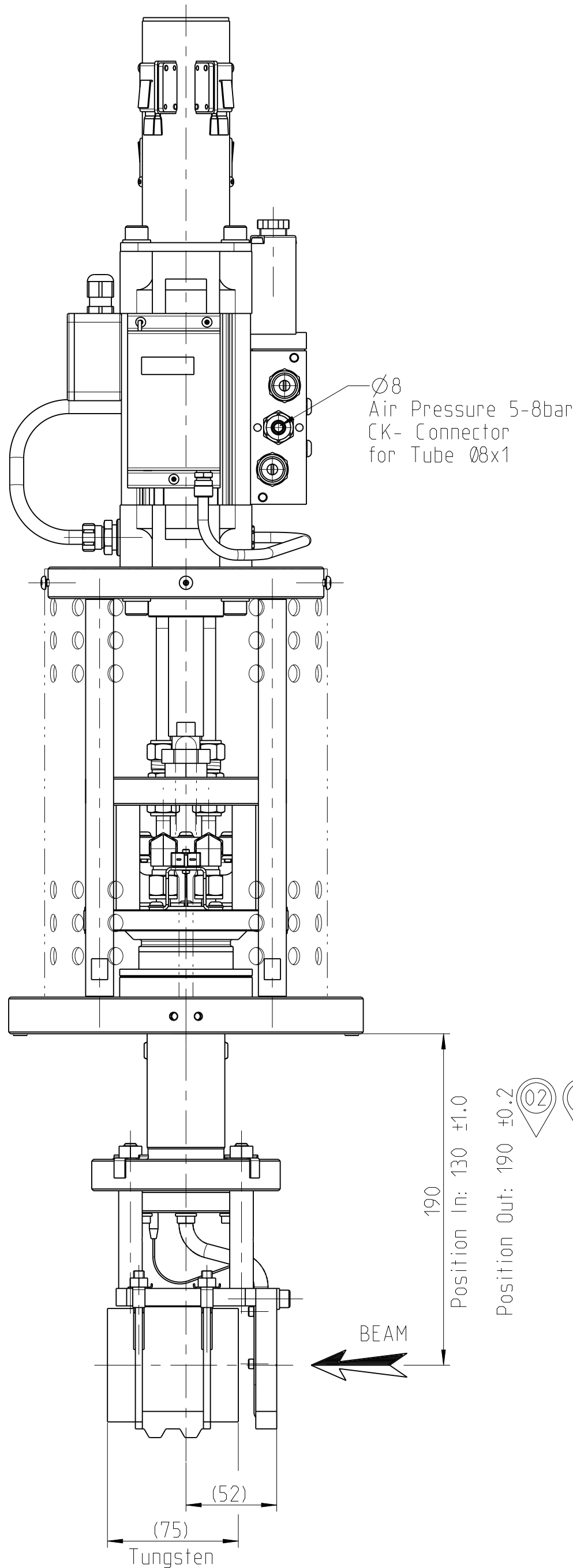
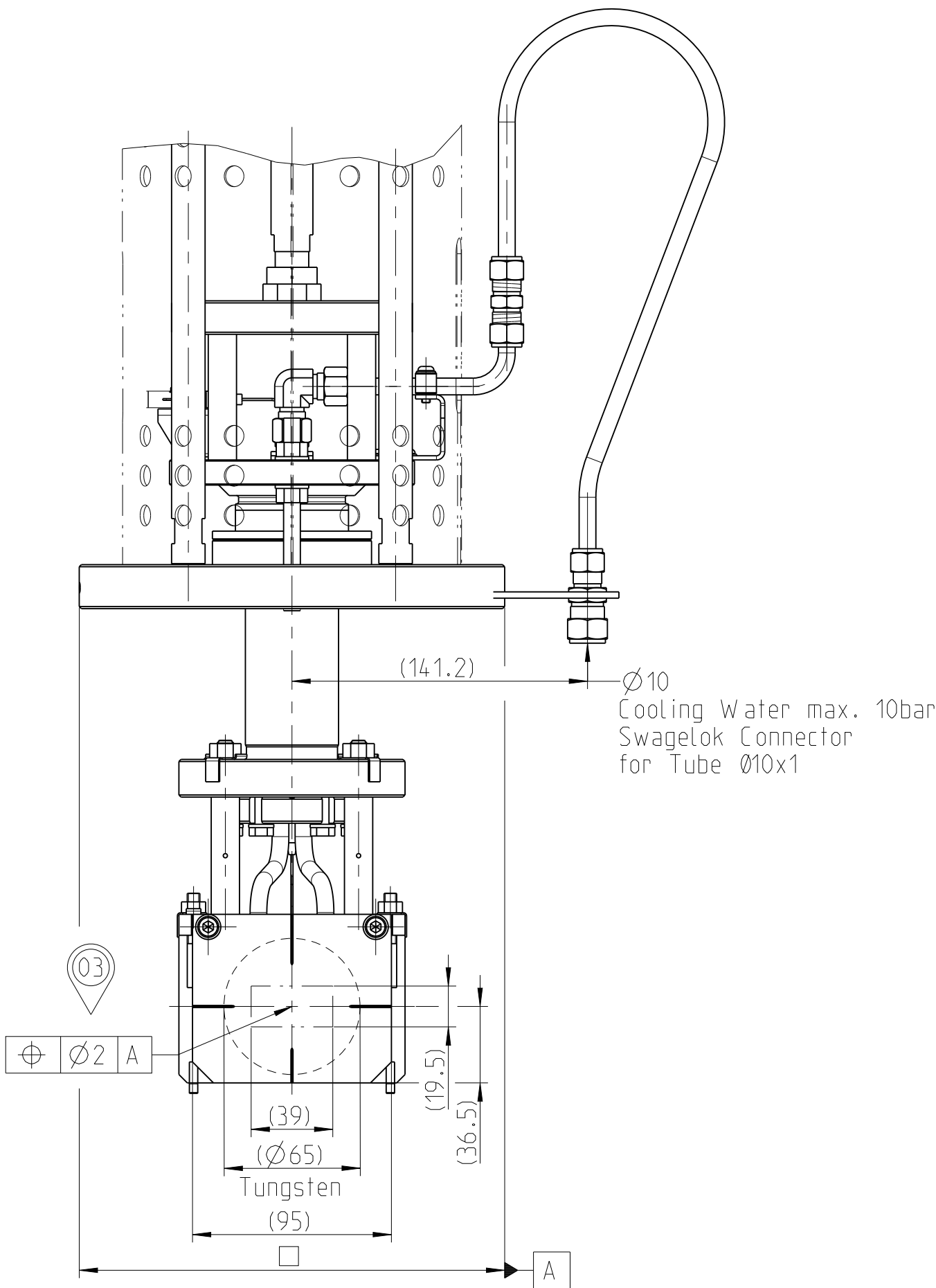




Stueckliste (Baugruppe oberste Ebene) / Bill of material (assembly 1st level)							
1	2	3	4	5	6	7	
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung	Zeichnungsnummer / Drawing No. Norm / Standard / Type	Werkstoff / Material Halbzeug / Raw Material	FMB Art.-Nr. Firma/Supplier	
10	6	KT	Scheibe	ISO7089-6-A2	A2	5000007038	
9	2	KT	Winkelverschraubung	SS-BM0-9	Stainless_Steel	5000025610 Swagelok	
8	2	KT	Gerade Verschraubung	SS-BM0-6	Stainless_Steel	5000025608 Swagelok	
7	2	KT	Zylinderschraube entlueftet	ISO4762-M6x22-A2_E_Ag	A2_Ag	5000014472 ALMA	
6	4	KT	Sechskantschraube entlueftet	ISO4017-M6x22-A2_E_Ag	A2_Ag	5000011925 ALMA	
5	1	KT	CF-Dichtung	CF035-D_OFHC_w_gal_Ag	OFHC -Cu	5000002886	
4	2	FT	Cooling Hose PA12PH-Tecalan, transparent	726-31-02 (-) TR 8 / 6 w nf. No. 2.477751.1	PA Schlauch 8x1 650	5000056221 FMB	
3	2	FT	Elbow	726-31-01	1.4571 X6CrNiMoTi17-12-2 Ro 8x1 124	5000056210 FMB	
2	1	FBg	Shutter Actuator	726-01-00	s_list	5000056197 FMB	
1	1	FBg	Screen Holder	466-04-42-13-00	s_list	5000079066 FMB	
Allgemeine Oberflaeche/General surface: ISO 1302 Oberflaechenbehandlung / Surface treatment			Allgemeintoleranzen/ General tolerances	Projektion	Maßstab/Scale 25		Mass.: 0 kg
UHVR			ISO 2768-mH ISO 13920-AE ISO 8015		Werkstoff: s_list Raw Mat.:		
Artikel:		5000079068		Datum Date	Name		
Modell: Model: ASSEM		Filename: 466-04-42-03-00-SCREEN-ACTUATOR 10215488 A 01		gezeichnet: drawn by 14.08.2020	friedmann		
Zeichn.: Drawing:		Filename: 466-04-42-03-00-SCREEN-ACTUATOR 10215489 A 01		geprueft: checked	schmidt		
Historie der Änderungen History of mod.							
Doc-ID Rev Ver Aenderung/Mod. Dat.				FMB Berlin Friedrich-Woehler-Str. 2 12489 Berlin www.fmb-berlin.de			
Zeichnungsnummer / Drawing number					Rev	Page 1	
466-04-42-03-00 A					Of	1	
Ursprungs-Dok.-ID: 10215489					Size	A2	

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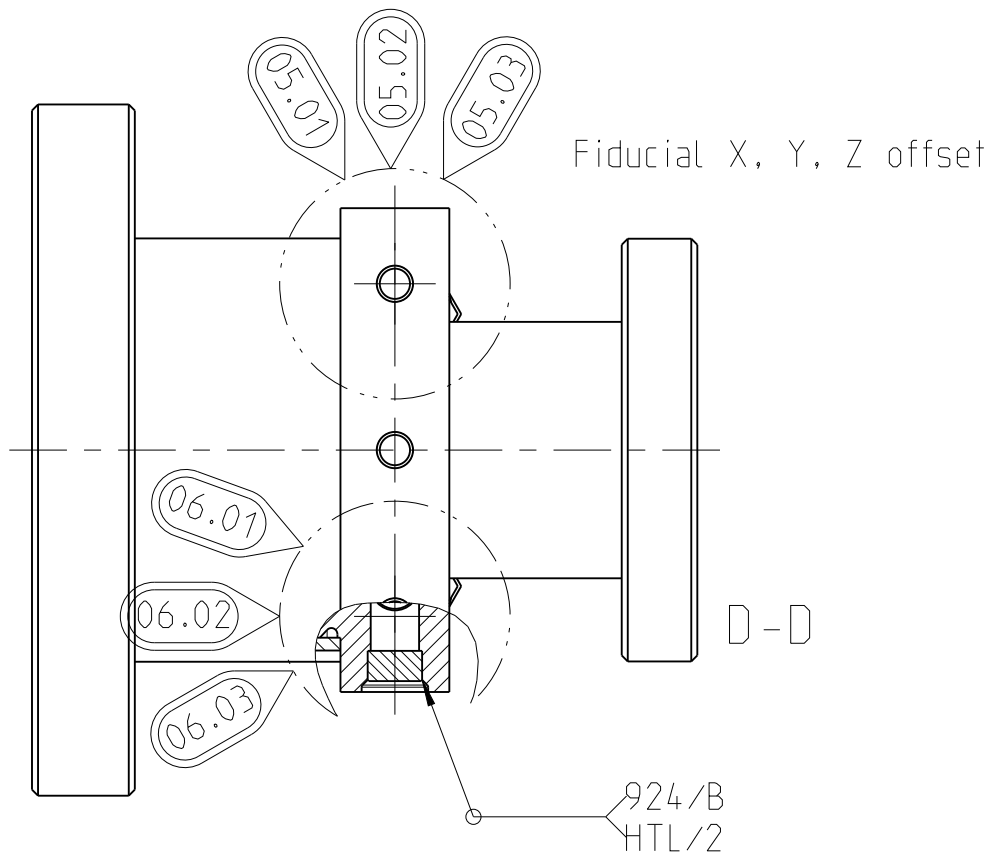
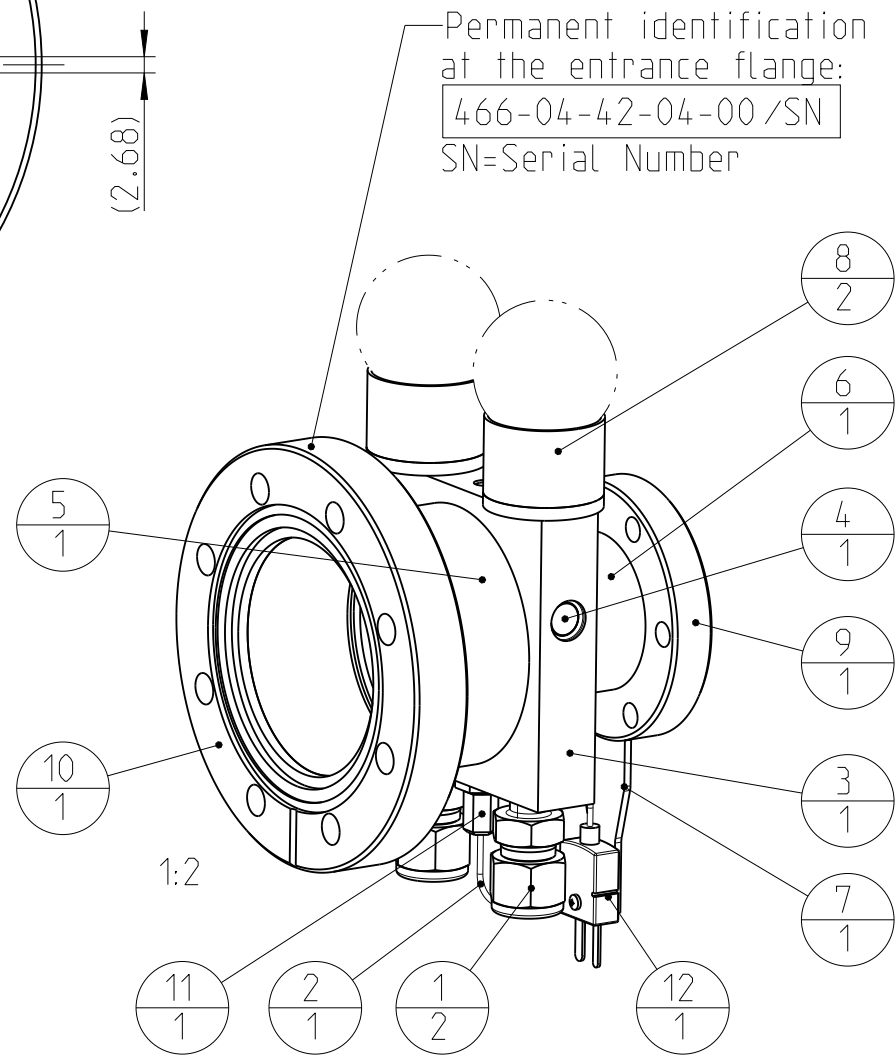
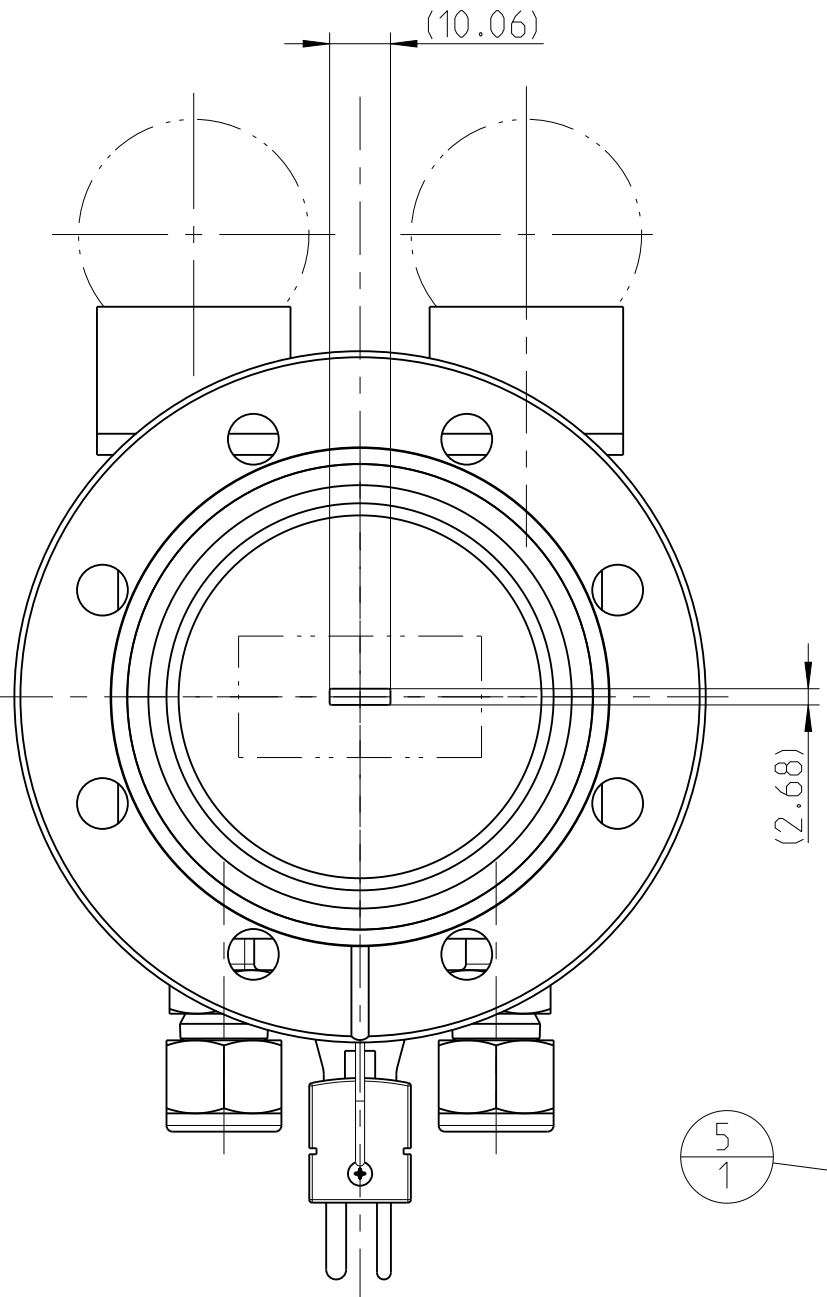
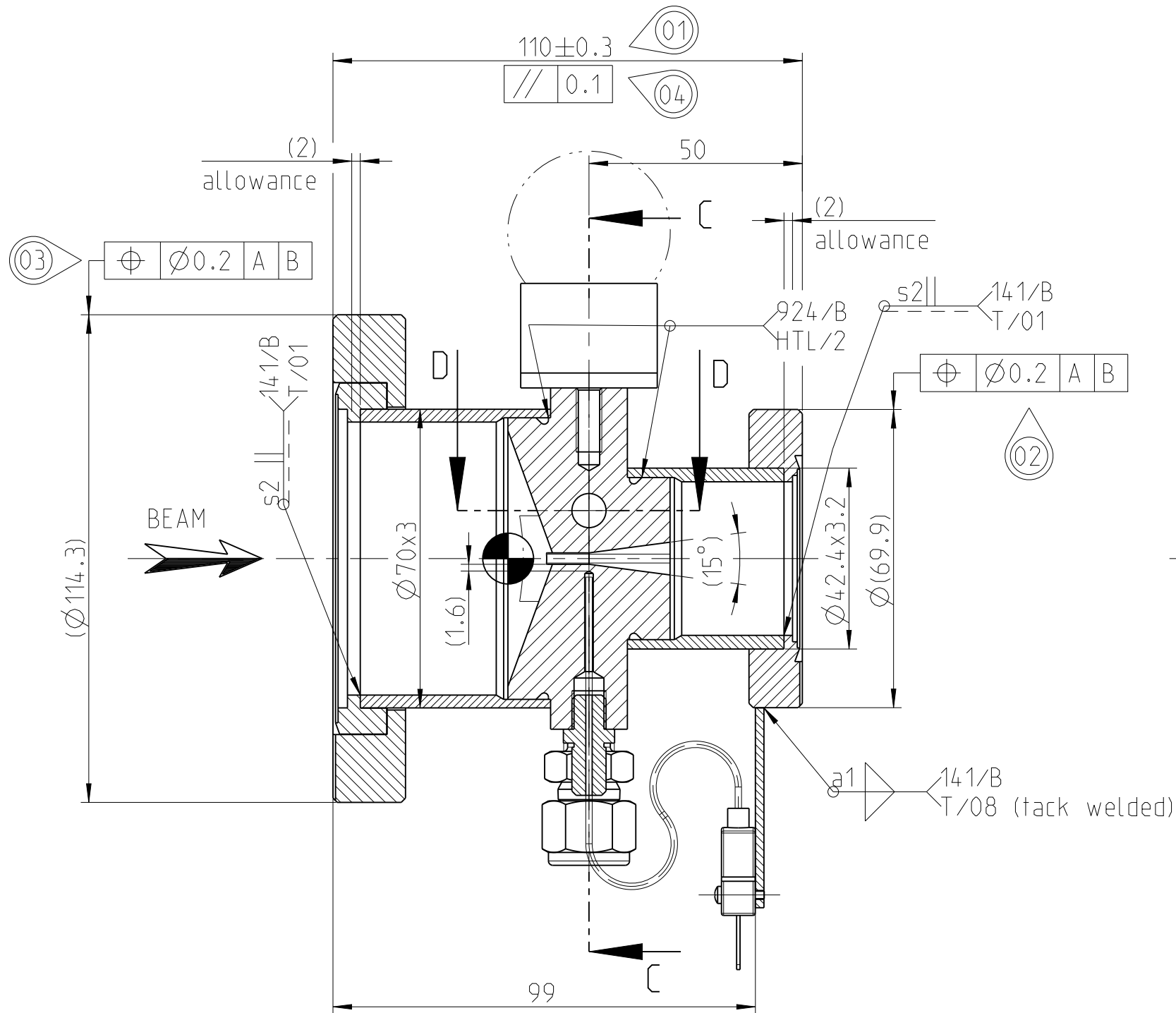
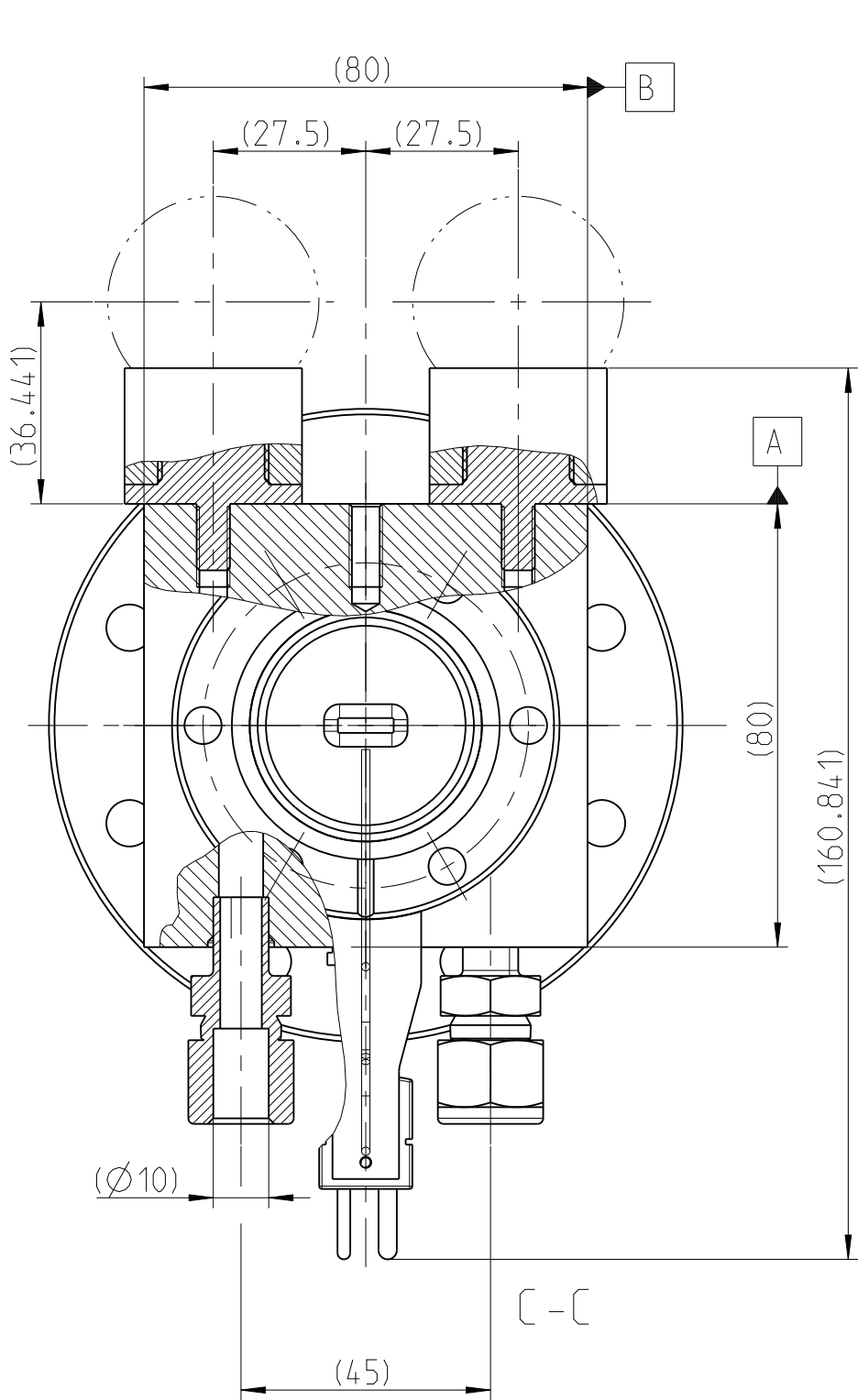
1	2	3	4	5	6	7	8
Pruefspezifikation Zwischentest / Interim test specification							
Pruefung / Test name		Sollwert / Specified value		Einheit / Unit			
He-leaktest at room temperature		<1x10E-10		mbar l/s			
Water pressure test		16		bar for 30min			
Air pressure test		8		bar			
Dimensional test (see drawing): (room temp. 23±3°C)				<input type="checkbox"/> passed			
Function test, visual inspection		Adjustment of Limit Switches Electrical Wiring		Movement <input type="checkbox"/> passed			

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Stueckliste (Baugruppe oberste Ebene) / Bill of material (assembly 1st level)							
1	2	3	4	5	6	7	
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung	Zeichnungsnummer / Drawing No. Norm / Standard / Type	Werkstoff / Material Halbzeug / Raw Material	FMB Art.-Nr. Firma/Supplier	
14	8	KT	Scheibe	IS07089-6-A2	A2	5000007038	
13	2	KT	Zylinderschraube	IS04762-M6x22-A2_gal_Ag	A2_Ag	5000014595	
12	4	KT	Sechskantmutter	IS04032-M8_A4_Ag	A4_Ag	5000005247	
11	4	KT	Sicherungsblech	DIN463-A8.4_A2	A2	5000030128	
10	2	KT	Winkelverschraubung	SS-8M0-9	Stainless_Steel	5000025610 Swagelok	
9	2	KT	Gerade Verschraubung	SS-8M0-6	Stainless_Steel	5000025608 Swagelok	
8	6	KT	Sechskantschraube entluettet	IS04017-M6x22-A2_f_Ag	A2_Ag	5000011925 ALMA	
7	1	KT	CF-Dichtung	CF035-D_OFHC_w_gal_Ag	OFHC-Cu	5000002886	
6	4	FT	Hollow Shaft	726-61-01	304L Ro 13.5x2.6 57	5000056241 FMB	
5	2	FT	Cooling Hose PA12PH-Tecalan, transparent	726-31-02 (-) TR 8 / 6 w nf. No: 2.477751.1	PA Schlauch 8x1 650	5000056221 FMB	
4	2	FT	Elbow	726-31-01	1.4571 X6CrNiMoTi17-12-2 Ro 8x1 124	5000056210 FMB	
3	1	FBg	Tungsten Block	726-61-02-00	s_list	5000056236 FMB	
2	1	FBg	Absorber	726-61-01-00	s_list	5000056230 FMB	
1	1	FBg	Shutter Actuator	726-01-00	s_list	5000056197 FMB	
Allgemeine Oberflaeche/General surface: ISO 1302 Oberflaechenbehandlung / Surface treatment			Allgemeintoleranzen/ General tolerances	Projektion	Maßstab/Scale 25	Mass.:0.000 kg	
UHV cleaned / UHV-gereinigt.			ISO 2768-mH ISO 13920-AE ISO 8015		Werkstoff: s_list Raw Mat.:		
Artikel:	5000056222		Datum Date	Name	Benennung / Name:		
Modell: Model: ASSEM	Filename: 726-61-00-SHUTTER-ACTUATOR 10081968 A 01		gezeichnet. drawn by	20.02.2014 henninger	Saftey Shutter Actuator		
Zeichn.: Drawing:	Filename: 726-61-00-SHUTTER-ACTUATOR 10081969 A 01		geprueft checked	henninger			
Historie der Änderungen History of mod.	Doc-ID	Rev	Ver	Aenderung/Mod.	Dat.		
				FMB Berlin Friedrich-Woehler-Str. 2 12489 Berlin www.fmb-berlin.de	Zeichnungsnummer / Drawing number	Rev	Page 1
					726-61-00 A	Of	1
					Ursprungs-Dok-ID: 10081969	Size	A2

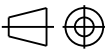

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Pruefspezifikation / test specification

Pruefung / Test name	Sollwert / Specified value	Einheit / Unit
Bake-out cycle with RGA (1-100 AMU): Temperature Time RGA: Sum of all AMU >28 (except 44) must be less than 1% of total pressure	max. 250 >24 <input type="checkbox"/> passed	°C hours
Final pressure	<1x10E-10	mbar
He-leaktest: Before bake-out at room temperature: After bake-out at room temprature: (Cooling cycles have to be filled with ~10bar Helium)	<1x10E-10 <1x10E-10	mbar l/s mbar l/s
Desorption rate	<1x10E-12	mbar l/s cm ²
inner surface	200	cm ²
Water pressure test Total test time Intervals of recording	16 30 5	bar min min
No evidence of water leakage:	<input type="checkbox"/> passed	
Flow rate: Pressure drop (to be messured):	3.4	l/min bar
Dimensional test (see drawing): (room temp. 23±3°C)	<input type="checkbox"/> passed	
Visual internal and external inspection:	<input type="checkbox"/> passed	
Functional test under vacuum: - Thermocouple (comparison measurement)	<input type="checkbox"/> passed	

Ausdrucke dieser Zeichnung unterliegen nur dem Änderungsdienst, wenn diese zusätzlich den grünen Stempel zur Fertigungsfreigabe enthalten.
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Stueckliste (Baugruppe oberste ebene) / Bill of material (assembly 1st level)						
1	2	3	4	5	6	7
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung	Zeichnungsnummer / Drawing No. Norm / Standard / Type	Werkstoff / Material Halbzeug / Raw Material	FMB Art.-Nr. Firma/Supplier
12	1	KT	Linsenschraube	IS07045-H-M2x10-A2	A2	5000018849
11	1	KT	Thermo Couple Joint. Ø1.5. M8x1 complete made of SS	S051124-1.5-M8x1-D	s_datasheet Thermoelement verschraubung Omega	5000035445
10	1	KT	CF-Flansch, rot.	CF063-R_304L	304L	5000004597
9	1	KT	CF-Flansch, fest	CF035-F_304L	304L	5000004547
8	2	KBg	1.5" Nest. M6 Free issue part.			5000056859 Solaris
7	1	FT	Plug Holder	726-10-07	304L Bl 2 21x49	5000056084 FMB
6	1	FT	Tube	726-02-11-03	304	5000075198 FMB
5	1	FT	Tube	726-02-11-02	304 47	5000075197 FMB
4	1	FT	Plug	607-07-02-03	OFHC-Cu Rd 10 6	5000048704
3	1	FT	Cu-block (FM2)	466-04-42-04-01	OFHC-Cu Bl 42 84x84	5000079182 FMB
2	1	FBg	Thermo Element	726-10-06	s_list	5000056083 FMB
1	2	FBg	Connector	722-11-05 SS-10M0-1-4W	s_list	5000039483 FMB
Allgemeine Oberfläche/General surface: ISO 1302 Oberflächenbehandlung / Surface treatment			Allgemeintoleranzen/ General tolerances	Projektion	Maßstab/Scale 4:5	Mass.:0 kg
Glass bead blasted. UHVR			ISO 2768-mH ISO 13920-AE ISO 8015		Werkstoff: s_list Raw Mat.:	
Artikel:	5000079183		Datum Date	Name	Benennung / Name: FM2 unit POLYX	
Modell: Model: ASSEM	Filename: 466-04-42-04-00-FM2-POLYX 10216044 A 01		gezeichnet drawn by	14.08.2020 friedmann		
Zeichn.: Drawing:	Filename: 466-04-42-04-00-FM2-POLYX 10216045 A 01		geprüft checked	Schmidt		
Historie der Änderungen History of mod.		Doc-ID	Rev/Ver	Änderung/Mod.		
				FMB Berlin Friedrich-Wohler-Str. 2 12489 Berlin www.fmb-berlin.de		
				Zeichnungsnummer / Drawing number		
				466-04-42-04-00 A		
				Ursprungs-Dok.-ID: 10216045		
				Rev Page 1 Of 1 Size A2		

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	Front end components for BM source fixed mask and absorbers	Page 18 of 22
		Date 15.05.2024
	Final	Version: 2.0



2.4 The filter assembly trigger unit (FATU)



A-A
1:5



Prüfungspezifikation / test specification		
Prüfung / test name	Sollwert / specified value	Einheit / unit
metr. Vermessung (Prüfmaße)	-	-
Drucktest / Pressure test	15/30	bar/min
Durchflusstest / Flowrate	Istwert messen	l/min
He-Lecktest/Leakage test	<5 E-10	mbar l/s
-	-	-

Stueckliste (Baugruppe oberste ebene) / Bill of material (assembly 1st level)										
1	2	3	4			5		6		7
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung			Zeichnungsnummer / Drawing No. Norm / Standard / Type		Werkstoff / Material Halbzeug / Raw Material		FMB Art.-Nr. Firma/Supplier
20	1	KT	UHV-Schieber CF40 pneum.. rad. resist			A132-CE44-AHJ1		s_datasheet		500073582 VAT
19	6	KT	Stützölse f. øx1			SS-ØM5-6M		Stainless-Steel		5000057514 SW AGELOK
18	4	KT	Gerade Reduzierschraubung			SS-ØM0-6-6M		Stainless-Steel		5000028716 Swagelok
17	1	KT	Ion Pump 300L/s. tall profile			300T-D1-ØS-SC-220-N		s_datasheet		5000077719 GammaVacuum
16	1	KT	CF-Dichtung			CF150-D-ØFHC_w		ØFHC-Cu		5000002867
15	3	KT	CF-Dichtung			CF063-D-ØFHC_w		ØFHC-Cu		5000002863
14	2	KT	CF-Dichtung			CF035-D-ØFHC_w		ØFHC-Cu		5000002860
13	1	KBg	CF150 Set (20xBolt/20xNuf) Bolts Ag			CF150-SBN-A4-Ø0		A4-Ø0 ISO4014-M8x60, ISO4032-M8		5000026142 -
12	3	KBg	CF063 Set (8xBolt/8xNuf) Bolts Ag			CF063-SBN-A4-Ø0		A4-Ø0 ISO4014-M8x50, ISO4032-M8		5000026140
11	2	KBg	CF35 Set (6xBolt) Bolts Ag			CF035-SB-A4-Ø0		A4-Ø0 ISO4017-M6x20		5000026151 -
10	1	FT	Flexible pipe PA12PH-Tecalan, transparent			466-04-52-04 (-) TR 8 / 6 w nf, No: 2.477751.1		PA Hose 8x1 842		5000079925 Tecalcan
9	1	FT	Flexible pipe PA12PH-Tecalan, transparent			466-04-52-03 (-) TR 8 / 6 w nf, No: 2.477751.1		PA Hose 8x1 842		5000079924 Tecalcan
8	1	FT	Flexible pipe PA12PH-Tecalan, transparent			466-04-52-02 (-) TR 8 / 6 w nf, No: 2.477751.1		PA Hose 8x1 763		5000079923 Tecalcan
7	1	FT	Cooling Pipe			466-04-52-05		2.0090 SF-Cu Ro 10x1 628		5000079926 FMB
6	1	FT	Cooling Pipe			466-04-52-01		2.0090 SF-Cu Ro 10x1 1648		5000079901 FMB
5	1	FBg	Hydro-formed Bellows CF40F/CF40R ---			726-88-00 ---		s_list		5000057020 FMB
4	1	FBg	Be-W indow			466-04-52-04-00		s_list		5000079367 FMB
3	2	FBg	Filter unit			466-04-52-03-00		s_list		5000079117 FMB
2	1	FBg	Chamber			466-04-52-02-00		s_list		5000079115 FMB
1	1	FBg	Support			466-04-52-01-00		s_list		5000079190 FMB
Allgemeine Oberfläche/General surface: ISO 1302			Allgemeintoleranzen/ General tolerances			Projektion 		Maßstab/Scale 1:10		Mass.:0 kg
Oberflächenbehandlung / Surface treatment								Werkstoff: s_list Raw Mat.:		
Artikel:	5000079120		Datum Date		Name		Benennung / Name: Filter & trigger unit			
Modell: Model: ASSEM	Filename: 466-04-52-00-FATU-BW-UNIT 10220252 B 01		gezeichnet, drawn by		14.08.2020 friedmann					
Zeichn.: Drawing:	Filename: 466-04-52-00-FATU-BW-UNIT 10220253 B 01		geprüft checked		schmidt					
Historie der Änderungen History of mod.	10220253 B 01									
	10220253 B 01		piping		07.10.2020					
	Doc-ID Rev Ver		Änderung/Mod.		Dat.					
				FMB Berlin Friedrich-Woehler-Str. 2 12489 Berlin www.fmb-berlin.de		Zeichnungsnummer / Drawing number		Rev	Page 1 Of 1 Size A2	
						466-04-52-00 B				
						Ursprungs-Dok-ID: 10215771				

Ausdrücke dieser Zeichnung unterliegen nur dem Änderungsdienst, wenn diese zusätzlich den grünen Stempel zur Fertigungsfreigabe enthalten.
Printed copies of this drawing are in change management only, if they additionally contain the green stamp releasing them for production.

Stueckliste (Baugruppe oberste ebene) / Bill of material (assembly 1st level)											
1	2	3	4			5		6		7	
Pos. Item	Menge Quantity	Typ Type	Benennung / Name Bemerkung			Zeichnungsnummer / Drawing No. Norm / Standard / Type		Werkstoff / Material Halbzeug / Raw Material		FMB Art.-Nr. Firma/Supplier	
7	1	KT	CF-Dichtung			CF063-D_OFHC_w		OFHC-Cu		5000002863	
6	1	KT	CF-Dichtung			CF025-D_OFHC_w		OFHC-Cu		5000002859	
5	1	KBg	CF063 Set (8xBolt/8xNut) Bolts Ag			CF063-SBN_A4-80		A4-80 ISO4014-M8x50, ISO4032-M8		5000026140 -	
4	1	KBg	CF25 Set (4xBolt/4xNut) 4 Bolts Ag (ISO-Standard)			CF025-SBN_A4-80		A4-80 ISO4014-M6x35, ISO4032-M6		5000055744 -	
3	1	FBg	Filter rack (complete)			466-04-52-23-00		s_list		5000079154 FMB	
2	1	FBg	Connecting tube			466-04-52-13-00		s_list		5000079118 FMB	
1	1	FBg	Linear feedthrough LD63-100 resolute encoder			284-27-00 LD63-100S-4LS-RESOLUTE		s_list		5000065104 FMB	
Allgemeine Oberflaeche/General surface: ISO 1302 Oberflaechenbehandlung / Surface treatment			Allgemeintoleranzen/ General tolerances ISO 2768-mH ISO 13920-AE ISO 8015			Projektion 		Maßstab/Scale 2:5		Mass.:0 kg	
								Werkstoff: s_list Raw Mat.:			
Artikel: 5000079117					Datum Date		Name		Benennung / Name: Filter unit		
Modell: Model: ASSEM		Filename: 466-04-52-03-00-FILTER-UNIT 10215765 A 01		gezeichn. drawn by		17.08.2020		friedmann			
Zeichn.:		Filename: 466-04-52-03-00-FILTER-UNIT 10215769 A 01		geprueft checked				schmidt			
Drawing:											
Historie der Änderungen History of mod.											
Doc-ID Rev Ver			Änderung/Mod. Dat.				FMB Berlin Friedrich-Woehler-Str. 2 12489 Berlin www.fmb-berlin.de		Zeichnungsnummer / Drawing number 466-04-52-03-00 A		
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									Ursprungs-Dok-ID: 10215769		

