

assembly instruction

rotation unit RDH- XS, S, M
rotation unit with gearbox.

Item number: 266xxx xxxx

Manufacturer:

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Register court Fulda, register number: 8643

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1 General

Dear Customer,
dear operator,

with this assembly instruction we would like to support you in your work on the rotation unit RDH - XS, S, M, hereinafter referred to as the machine. It contains information and everything you need to know about the machine and will be a helpful companion for you.

NOTE	
	<p>Before commissioning the machine, working with the machine or making additions or changes to the electrical installation of the machine/in the control cabinet of the machine, be sure to read carefully:</p> <ul style="list-style-type: none"> > the safety instructions in this assembly instruction as well as > the safety instructions for the attachment parts in the applicable documents.

If you still have questions, please contact us. Despite all due care, we cannot rule out printing errors and mistakes. If you notice any printing errors or mistakes or if you see any possibilities for improving our technical documentation, we would be grateful for any information or suggestions!

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1.1 Importance of documentation

This assembly instruction and the related documentation are a part of the rotation unit. The operator is obliged to keep the assembly instruction for the entire service life of the rotation unit and to grant access to the personnel working with the machine.

If the rotation unit undergoes modifications, the assembly instruction and associated documentation shall be revised accordingly. If the rotation unit is dismantled and reassembled at a new location, the owner is obliged to pass on the assembly instruction and the associated documentation to the new owner.

The assembly instruction in German language is the original assembly instruction. All other language versions are translations of the original assembly instruction.

1.2 Scope of delivery

The scope of delivery of the rotation unit RDH - XS, S, M 266xxx xxxx includes:

- Assembly instructions with installation declaration according to Machinery directive 2006/42/EC
- Fastening material
- possible accessories (optional)

1.3 Co-Applicable Documents

Apart from the assembly instruction the following documents for the use of the machine are necessary. These documents are partially submitted in annexe in the printed form of the machine or are contained as PDF document on the data medium (USB data medium) for the installation data of the provided control software remoteNC / proNC. The number specified in /<number>/ can be found as the leading number in the file name of the document.

Applicable documentsisel Germany GmbH

No.	Document
/1/	Dimensional drawing

Applicable documents from third-party manufacturers

1.4 EU-Declaration of incorporation acc. to Machinery directive 2006/42/EC Annex II B

The manufacturer

isel Germany GmbH
Bürgermeister-Ebert-Str. 40
D-36124, Eichenzell

hereby declares that the following product

product description:	rotation unit with gearbox RDH - XS, S, M
model name:	RDH - XS, S, M
item number:	266xxx xxxx

meets the essential health and safety requirements of Machinery directive 2006/42/EC Annex II.

The following harmonized norms were applied:

DIN EN ISO 12100:2011-03	Safety of machinery - General principles for design - Risk assessment and risk reduction.
DIN EN 60204-1:2019-06; VDE 0113-1:2019-06	Safety of machinery - Electrical equipment of machines - Part 1: General requirements

The technical documentation for this machine has been prepared in accordance with Annex VII, part B. The manufacturer undertakes to electronically transmit these specific technical documentations to national authorities on request.

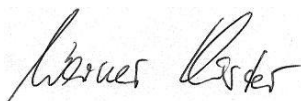
The authorized representative for the compilation of the special technical documentation is:

name:	Christian Bley	capacity:	CE coordinator
company:	isel Germany GmbH	address:	Bürgermeister-Ebert-Str. 40, D-36124, Eichenzell

The product (incomplete machine) is intended for incorporation into a machine or for assembly with other incomplete machines into a machine within the meaning of MRL, 2006/42/EC, Article 1, Section (1), letter a.

The commissioning of the incomplete machine (product) is prohibited until the machine in which this product has been incorporated or of which it is a component complies with the requirements of all relevant directives and this complete machine has a CE marking.

Eichenzell, 27.05.2024



Werner Kister, Chairperson isel Germany GmbH

1.5 General data, contact persons

Manufacturer	isel Germany GmbH Bürgermeister-Ebert-Str. 40 D-36124, Eichenzell +49 6659 981 800 +49 6659 981 782 info@isel.com
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You can reach our contact persons for technical advice and sales as well as service using the contact details listed here.

Technical advice and sales	+49 6659 981 800 +49 6659 981 800
Service and support	+49 6659 981 800 support@isel.com






1.6 User requirements

User groups

Capacity	Training, qualification
Operator/skilled worker	Instruction in the operation of the machine
Machine setter	Instruction in the operation of the machine Instruction in the safety functions of the machine
Electrical maintenance engineer	Electrician Instruction in the operation of the machine Instruction in the safety functions of the machine
Mechanical maintenance engineer	Specialist in pneumatics Instruction in the operation of the machine Instruction in the safety functions of the machine

1.7 Explanation of symbols and instructions

Notes on hazards that occur in connection with work on the machine are marked as follows in these assembly instruction. They warn you of possible personal injury or property damage or give you work aids.

NOTE	
	If, when a dangerous situation occurs, the consequence of an accident is at most damage to property, the notice bears the mark "NOTE".
⚠ CAUTION	
	If, when a dangerous situation occurs, the result of an accident is at most a minor injury, the notice bears the marking "CAUTION".
⚠ WARNING	
	If an accident resulting in serious or fatal injury is possible when a hazardous situation occurs, the notice carries the label "WARNING".
Information	
	Indicates important information, application tips and useful hints for proper work.
Environment	
	Information concerning environmental protection is marked in this way.
/ Number /	
Refers to a document in the list of applicable documents. See chapter 1.3	

1.8 List of abbreviations

	Explanation	
EN	European Standard	Harmonised European standard
ISO	International Organization for Standardization	International Organisation for Standardisation
PSA	Personal protective equipment	e.g. gloves, work shoes, safety goggles, hearing protection

1.9 Symbols used in the assembly instruction and on the machine

The use of the symbols is carried out in compliance with the valid regulations of the operator's country.

Warning symbol	Description
	General warning sign
	Warning against hazardous electrical voltage
	Warning against hand injuries
	Warning against pneumatic pressure
	Warning against hot surfaces
	Labelling on the control cabinet. "Pull the mains plug before opening the device."
	Labelling on the control cabinet. "Discharge time longer than 1 minute". Wait for 5 minutes after pulling the power plug before opening the control cabinet.
Mandatory signs	Description
	Use eye protection!
	Use glove!
	Use foot protection!
	Designation of the load handling points for the spars of the forklift forks.

2 Overview

2.1 General information

The isel-rotation units RDH are ready-to-install rotary modules with Harmonic Drive[®] gears that are primarily used for machining and positioning tasks in factory automation, handling technology and mechanical engineering.

These rotation units are available in various sizes with different reduction ratios. The possible horizontal or vertical position of the rotation axis of the RDH-series offers the user a wide spectrum for the realisation of his design ideas.

2.2 Functionality of the rotation unit

The rotation units series RDH and DSH are modular in design.

These rotation units are based on heavy-duty Harmonic Drive[®]- gearing with their well-known high precision.

These are connected to a drive motor directly (solid shaft version), or via a toothed belt stage (hollow shaft version) and are housed in a completely sealed cast aluminium body.

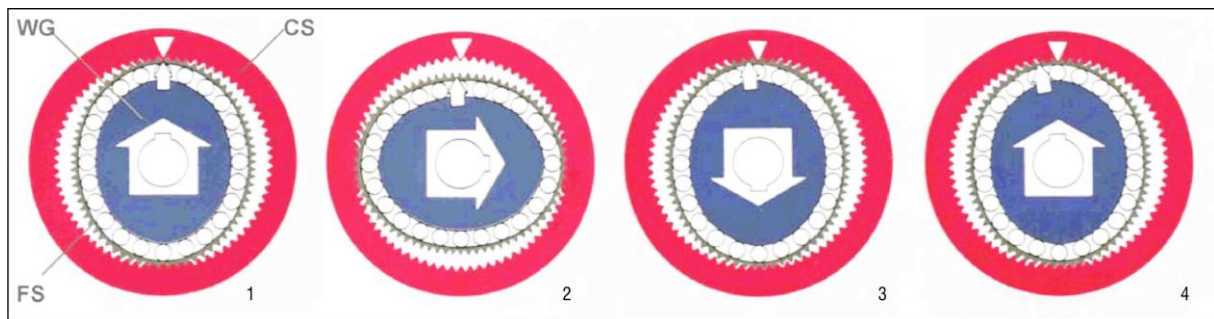


Fig. 1 - Operating principle of the Harmonic Drive[®]-gearing

Harmonic Drive gears consist of only three concentric components:

- the Circular Spline (CS), a rigid cylindrical ring with internal splines
- the Flexspline (FS), a deformable cylindrical steel sleeve with external serrations
- the Wave Generator (WG), an elliptical steel disc with a centric hub and a mounted thin-ring ball bearing

The driven, elliptical Wave Generator (WG) deforms the Flexspline (FS) via the ball bearing, which is in mesh with the internally toothed, fixed Circular Spline (CS). As the WG rotates, the large ellipse axis shifts and with it the tooth meshing area. Since the FS has two teeth less than the CS, after a half turn of the WG there is a relative movement between FS and CS by the size of one tooth (after a full turn by the size of two teeth). When the CS is fixed, the FS as the output element rotates in the opposite direction to the input.

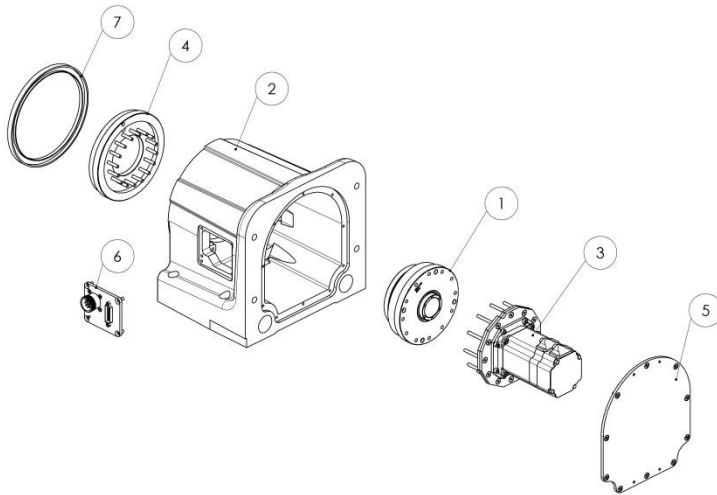
This functional principle results in the following advantages:

- Reduction ratios from 30:1 to 320:1 with minimal installation space
- Peak torques from 0.5 to 15000 Nm
- Efficiencies of over 90% at rated operating conditions
- Absolute positioning accuracy under one angular minute
- Repeatability only a few angular seconds
- Backlash-free gearing
- Very low tooth wear due to the low sliding speed between the teeth

2.3 Execution of the RDH series

Usually the RDH– DSH series are plug-in units with integrated drive modules. The RDH-S and RDH-M units are also available as hollow shaft versions.

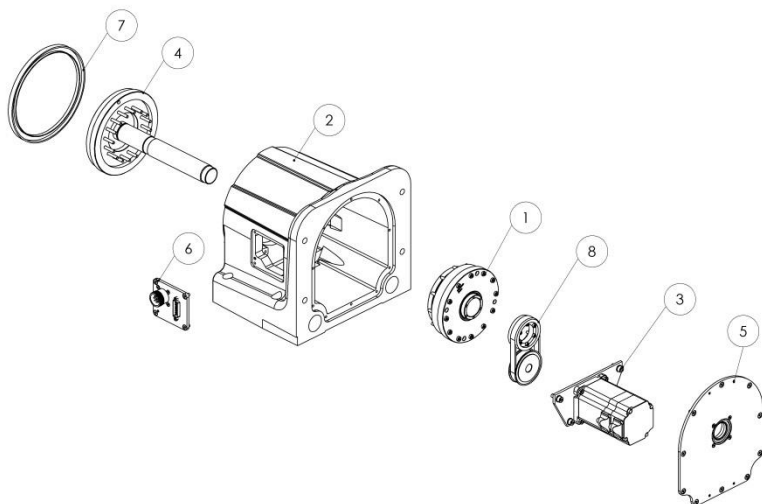
2.3.1 rotation unit RDH as solid shaft version



1. Harmonic Drive Gear
2. Cast aluminium housing
3. Drive module
4. Output flange solid shaft
5. Cover
6. Connection panel
7. Oil seal

Fig. 2 - Exploded view of the solid shaft version

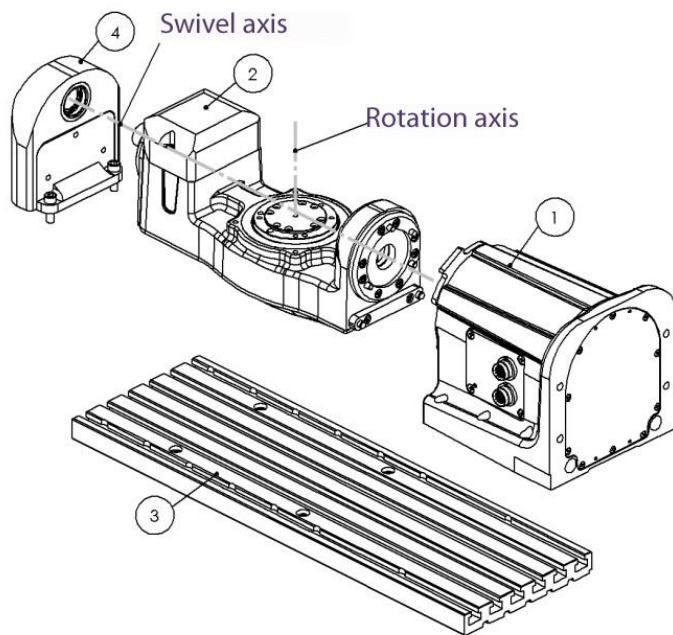
2.3.2 rotation unit RDH as hollow shaft version



1. Harmonic Drive Gear
2. Cast aluminium housing
3. Drive module
4. Driven flange hollow shaft with pipe fairlead
5. Cover with lead-in and sealing ring
6. Connection panel
7. Shaft sealing ring
8. Toothed belt step

Fig. 3 - Exploded view of the hollow shaft version

2.3.3 rotation unit RDH as rotary swivel unit DSH-S

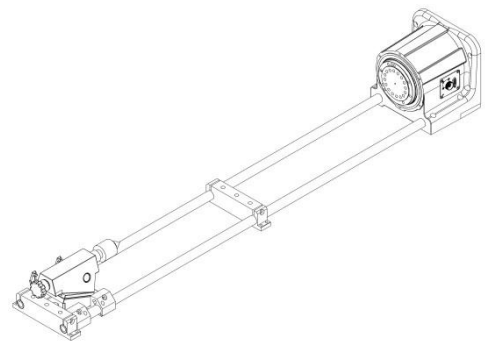
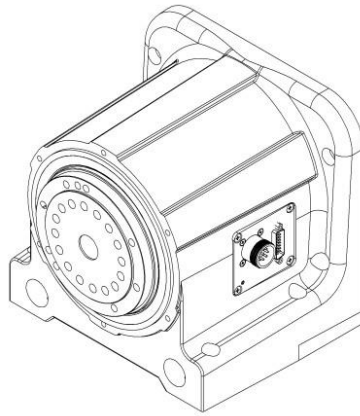
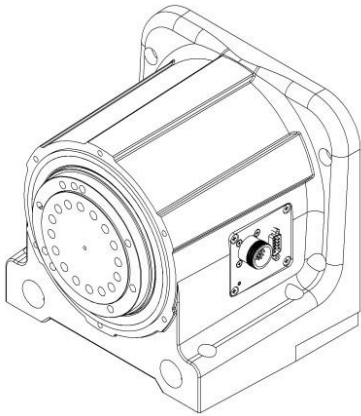


1. Swivel module (RDH-S)
2. Rotation axis
3. Base plate
4. Counter bearing

Fig. 4 - Configuration of the DSH-S rotary-swivel unit

2.3.4 Ordering key

RDH-M



RDH-M (solid shaft version)

RDH-M (hollow shaft version)

RDH-M with tailstock unit RE M

Ordering key

2 6 6 2 X X 0 X 0 0

Flanged shaft

- 0 = solid shaft
- 1 = hollow shaft

Transmission reduction

- 0 = 101
- 1 = 51

Motors

- 0 = stepper motor MS 200 HAT with encoder (400 imp., 3-channel, RS422)
- 4 = brushed DC servomotor DC 100
- 5 = Stepper motor without encoder
- 6 = brushless EC servomotor EC 60TM

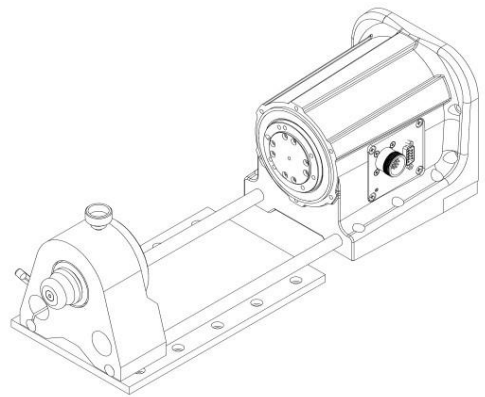
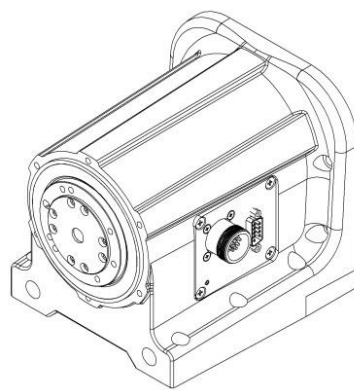
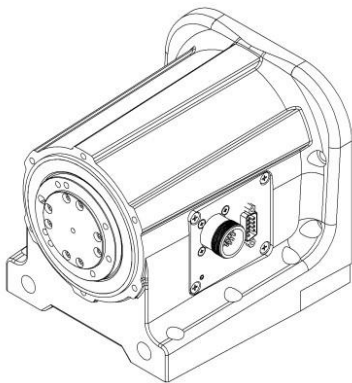
Tailstock unit RE M

Item no.: 269100 2100 (1000 mm)

Item no.: 269100 2150 (1500 mm)

Item no.: 269100 2200 (2000 mm)

RDH-S



RDH-S (solid shaft version)

RDH-S (hollow shaft version)

RDH-S with tailstock unit RE S

Ordering key

2 6 6 1 X X 0 X 0 0

Flanged shaft

- 0 = solid shaft
- 1 = hollow shaft

Transmission reduction

- 0 = 101
- 1 = 51

Motors

- 0 = stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
- 2 = brushless DC servomotor RE 40
- 5 = Stepper motor without encoder
- 6 = brushless EC servomotor EC 40TM

Tailstock unit RE S

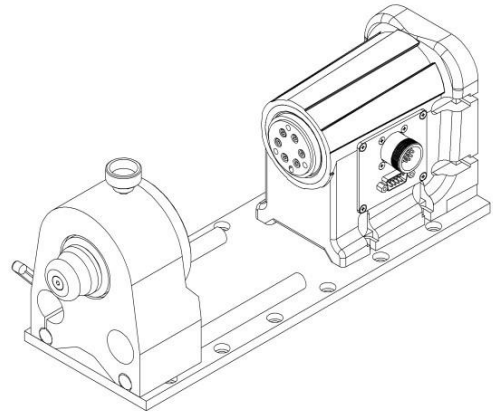
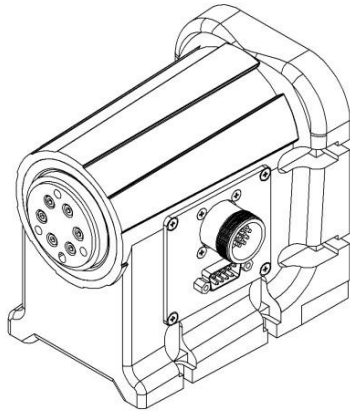
Item no.: 269100 1020 (200 mm)

Item no.: 269100 1030 (300 mm)

Item no.: 269100 1040 (400 mm)

Item no.: 269100 1050 (500 mm)

RDH-XS



RDH-XS (solid shaft version)

Ordering key

2 6 6 0 0 X 0 X 0 0

Transmission reduction

- 0 = 100
- 1 = 50

Motors

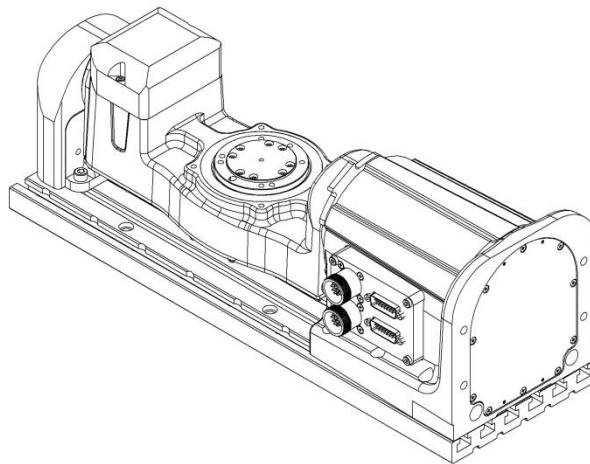
- 0 = stepper motor MS 045 HT with encoder (400 imp., 3-channel, RS422)
- 2 = brushed DC servomotor RE 40
- 5 = Stepper motor without encoder
- 6 = brushless EC servomotor EC 40TM

RDH-XS with tailstock unit RE XS

Tailstock unit RE S

- Item no.: 269100 0020 (200 mm)
- Item no.: 269100 0030 (300 mm)
- Item no.: 269100 0040 (400 mm)
- Item no.: 269100 0050 (500 mm)

DSH-S



DSH-S as a rotary-swivel unit

Ordering key

2 6 5 4 1 X 0 X 0 0

Motors

- 0 = stepper motor MS 045 HT with encoder (400 imp., 3channel, RS422)
- 2 = brushed DC servomotor RE 40
- 5 = stepper motor without encoder
- 6 = brushless EC servomotor EC 40TM

Transmission reduction

- 0 = 101
- 1 = 51

2.4 Type plate

The type plate is attached to the front left of the rotation unit. Maintain the type plate in legible condition.


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<hr/>		
Rotation unit RDH - XS, S, M		
Item no:	266xxx xxxx	
Date of manufacture:	10/2021	
Serial no:	xxxxxx	
Made in Germany		

Fig. 5 - Type plate

2.5 Technical data

2.5.1 Mechanical data and dimensions

2.5.1.1 Rotation unit RDH - M

Technical Data

	Stepper motor MS 200HT ¹		EC servo motor EC 60TM (brushless)		DC servo motor DC 100 (brushed)	
Reduction ratio	1:51	1:101	1:51	1:101	1:51	1:101
Rated output speed [1/min]	4	2	20	10	22	11
	at 1500 Hz (225 1/min)		at 1000 1/min		at 1100 1/min	
Max. Output speed [1/min]	24	12	78	40	59	30
	at 8000 Hz		at 4000 1/min		--	
Nominal torque [Nm]	24	46	20	38	7	14
	at 1500 Hz		--		--	
Max. Torque (short-term) [Nm]	--	--	42	80	39	73
Rated holding torque (static load) [Nm]	55	108	26	51	15	30
Max. Load capacity of the gearbox [Nm]	98	157	98	157	98	157
	Limit for repeatable peak torque					
Basic dynamic load rating C [N]	21800					
Basic static load rating C ₀ [N]	35800					
Weight [kg]	13.7					

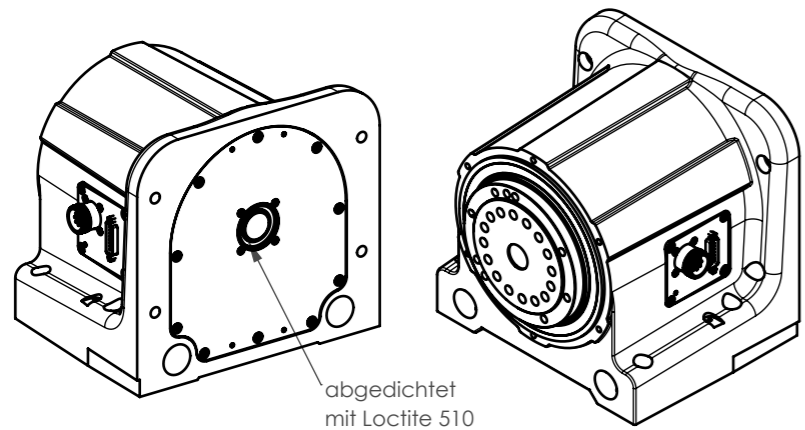
Table 1 - Technical data RDH-M

2.5.1.1.1 Dimension sheet RDH M - Solid and hollow shaft version according to EZ3929

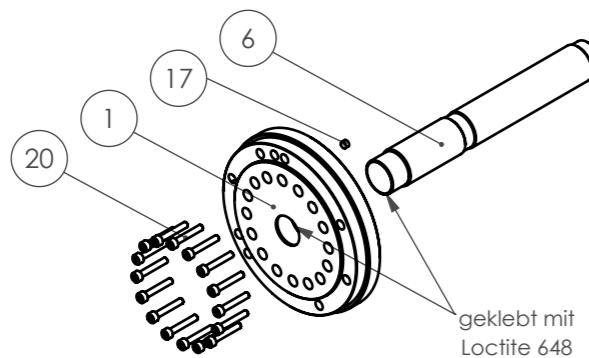
¹ Values for half-step operation

Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	660510 3915	1	EZ3908 09 15 Adapterflansch - xx	EZ3915	
2	660510 0002	1	EZ3917 Grundkörper - 25	EZ3917	
3	660510 39181	1	EZ3918 Abdeckung - unten Ausf Hohlwelle	EZ3918	
4	siehe Tabelle	1	EZ3919-3 Abdeckung - Anschluss	EZ3919	
5	660510 391905	1	EZ3919 Abdeckung - Anschluss - gespiegelt	EZ3919	eloxiert
6	660510 3920	1	EZ3920 Innenrohr	EZ3920	
7	660510 3921	1	EZ3921 Flansch - Rohrdichtung	EZ3921	
8	siehe Tabelle	1	EZ3922 Motorbefestigungsplatte	EZ3922	
9	siehe Tabelle	1	EZ3923 Zahnriemenscheibe HTD3 - Z52 mit Bordscheibe	EZ3923	
10	660510 3924	1	EZ3924 Zahnriemenscheibe HTD3 - Z52	EZ3924	hartcoatiert
11	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934	
12	siehe Tabelle	1	Motormodul		
13	siehe Tabelle	1	HarmDrive Getriebe		
14	616510 0267	1	Zahnriemen CXP HTD 267 -3M - 9 (Z89)		
15	893400 0025	1	Wellendichtung BABSL 130-150-7,5 Simrit 72 NBR902		
16	893400 0026	1	Wellendichtung BABSL 25-35-6 Simrit 72 NBR902		
17	632501 0002	1	Neodym-Blockmagnet_3mm		
18	891122 0351	12	Zylinderschraube DIN 6912 8.8 M 4 x 35		
19	891101 0141	6	Zylinderschraube DIN 912 8.8 VZ M3 x 14		
20	891102 0255	16	Zylinderschraube DIN 912 8.8 VA M4 x 25		
21	891103 0145	4	Zylinderschraube DIN 912 8.8 VZ M5 x 14		
22	891132 0161	4	Senkschraube DIN 7991, M 4 x 16		
23	891191 0085	8	Senkschraube DIN 965 4.8 VA M 3 x 8		
24	891192 0085	18	Senkschraube DIN 965 4.8 VA M 4 x 8		
25	891541 0095	1	Blechschrabe DIN 7982 VA 2,9 x 9,5		
26	891372 0045	6	Gewindestift DIN 913 VA M 4 x 4		
27	891373 0161	1	Gewindestift DIN 913 M 5 x 16		
28	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
29	893053 0001	4	Scheibe DIN 125 ST 5,3		

Artikelnummer	Ausführung	Pos. 4	Pos. 8	Pos. 9	Pos. 12	Pos.13
266210 0000	Schrittmotor MS200 HT mit Encoder U1:101	660510 39191	660510 39222	660510 39231	398701 0001	660510 1000
266210 0500	Schrittmotor MS200 HT U1:101	660510 39198	660510 39222	660510 39231	398701 0002	660510 1000
266211 0000	Schrittmotor MS200 HT mit Encoder U1:51	660510 39191	660510 39222	660510 39231	398701 0001	660510 1001
266211 0500	Schrittmotor MS200 HT U1:51	660510 39198	660510 39222	660510 39231	398701 0002	660510 1001
266210 0600	bürstenloser EC-Servomotor EC60 TM 200W 48V U1:101	660510 3919	660510 39224	660510 39234	398725 0001	660510 1000
266210 0700	bürstenloser EC-Servomotor EC60 TM 200W 310V U1:101	660510 3919	660510 39224	660510 39234	398725 0002	660510 1000
266211 0600	bürstenloser EC-Servomotor EC60 TM 200W 48V U1:51	660510 3919	660510 39224	660510 39234	398725 0001	660510 1001
266211 0700	bürstenloser EC-Servomotor EC60 TM 200W 310V U1:51	660510 3919	660510 39224	660510 39234	398725 0002	660510 1001

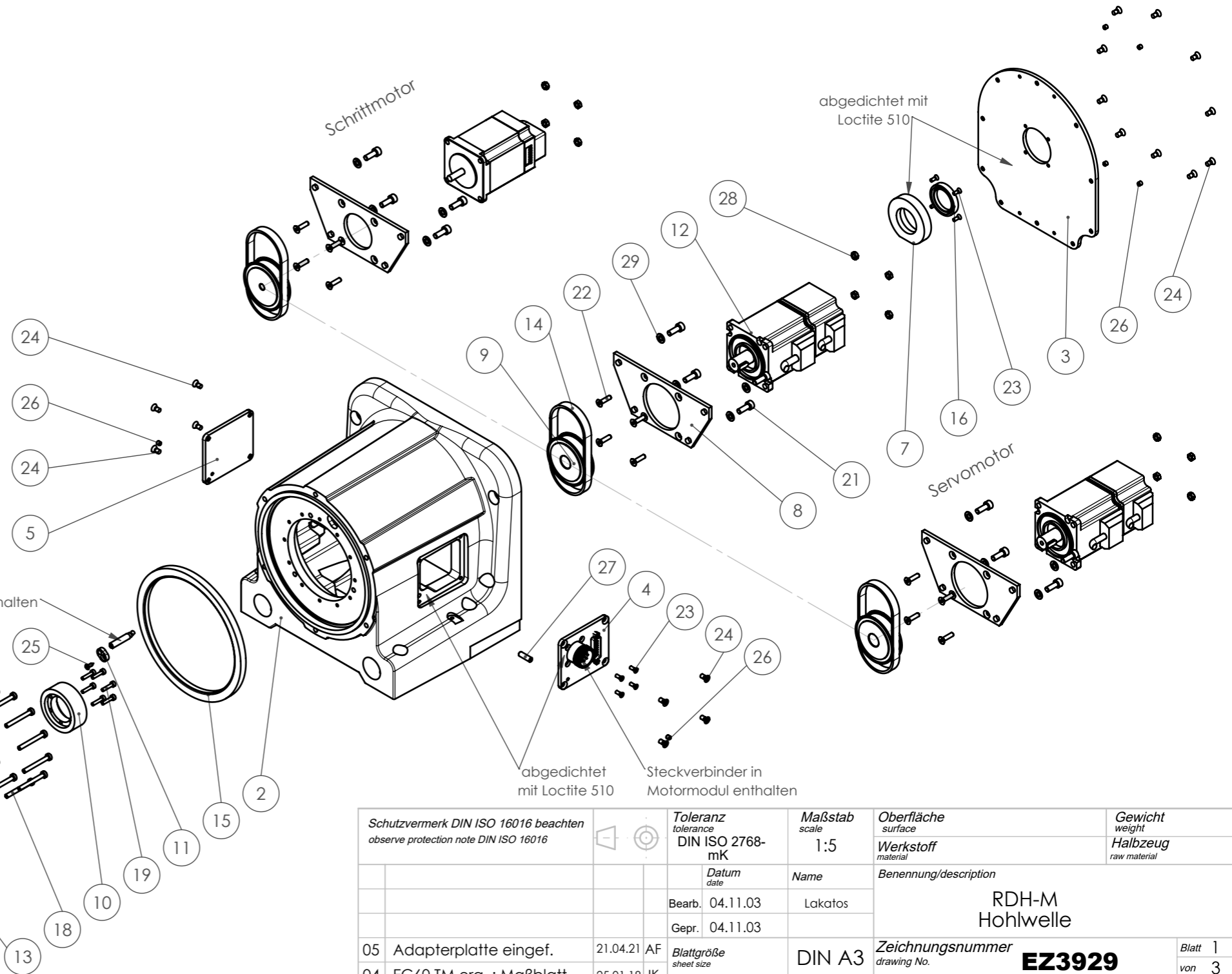


abgedichtet mit Loctite 510



geklebt mit Loctite 648

Magnetsensor in Motormodul enthalten

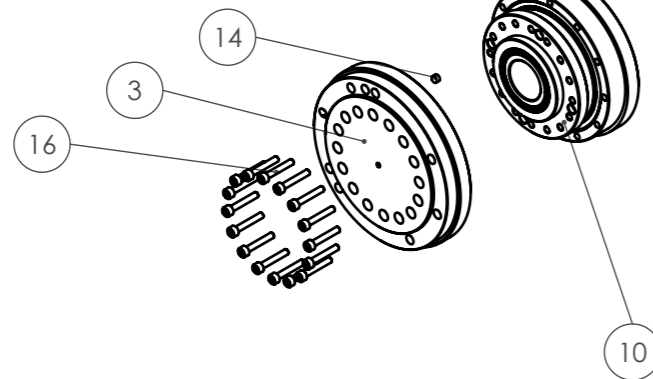
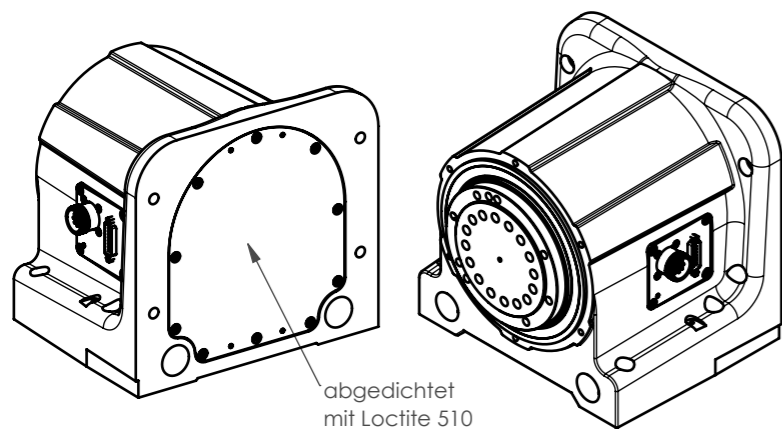


Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016		Toleranz tolerance DIN ISO 2768-mK		Maßstab scale 1:5	Oberfläche surface Werkstoff material	Gewicht weight Halbzeug raw material
		Datum date		Name	Benennung/description	
		Bearb. 04.11.03		Lakatos	RDH-M Hohlwelle	
		Gepr. 04.11.03				
05	Adapterplatte eingef.	21.04.21	AF	Blattgröße sheet size DIN A3	Zeichnungsnummer drawing No.	Blatt 1 von 3
04	EC60 TM erg. ; Maßblatt	25.01.18	JK		Artikelnummer article No.	EZ3929
03	Steckeranschluss beidseitig	24.02.14	JK		Baugruppe assembly	siehe Zeichnung
02	2 Motorausführung	15.04.04	IL	Projektbezeichnung project name		Rundschalttisch
Zust. Änderung/modifikation		Datum/date		Name		

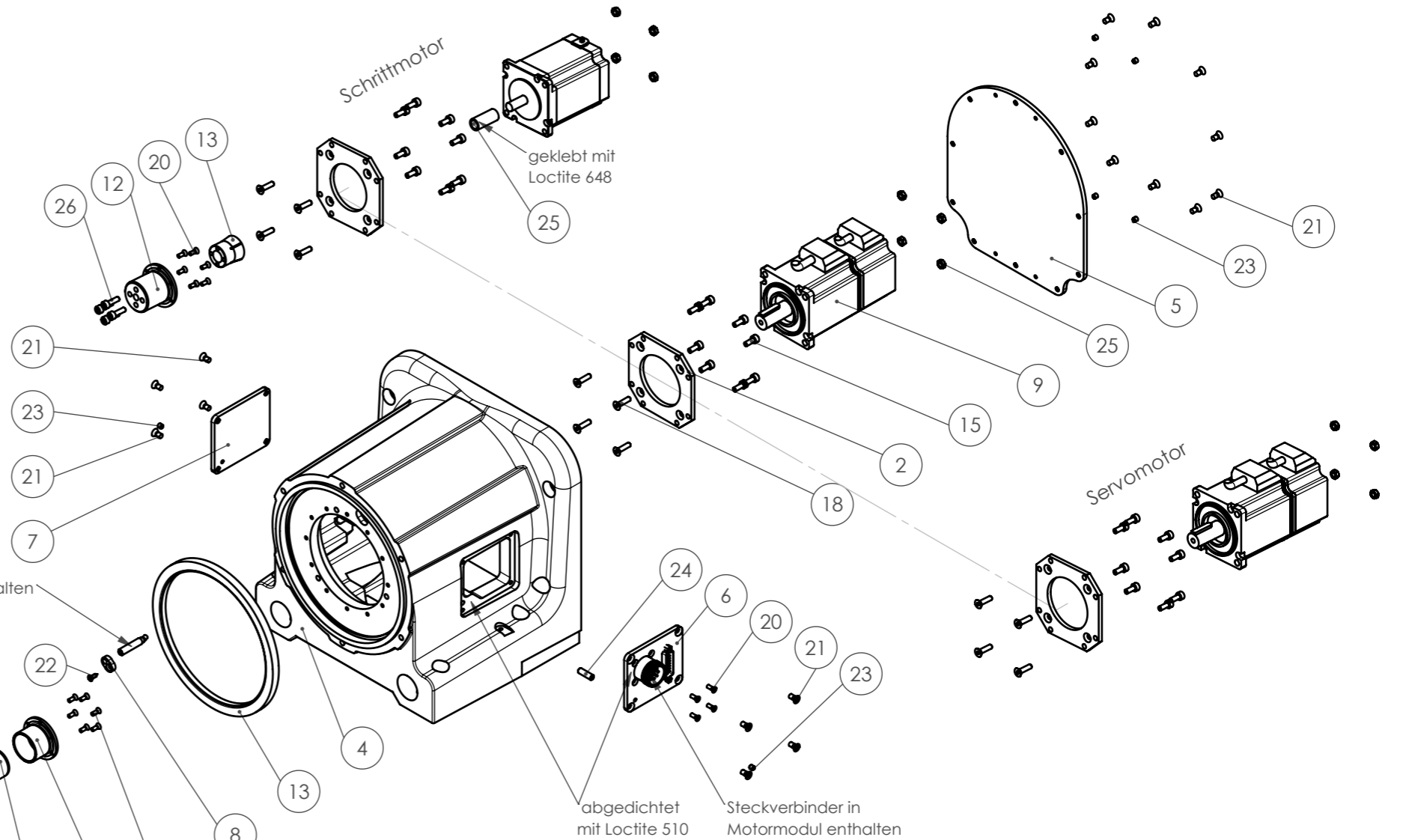


Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	675015 5944	1	DU5944 - Adapterplatte RDH-M	DU5944	
2	siehe Tabelle	1	EZ3907 Motoradapter	EZ3907	
3	660510 3909	1	EZ3909 Adapterflansch - 25	EZ3909	
4	660510 0002	1	EZ3917 Grundkörper - 25	EZ3917	
5	660510 39182	1	EZ3918 Abdeckung - unten Ausf Standard	EZ3918	
6	siehe Tabelle	1	EZ3919-3 Abdeckung - Anschluss	EZ3919	
7	660510 391905	1	EZ3919 Abdeckung - Anschluss - gespiegelt	EZ3919	eloxiert
8	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934	
9	siehe Tabelle	1	Motormodul		
10	siehe Tabelle	1	HarmDrive Getriebe		
11	siehe Tabelle	1	Kupplungsteil für Spannange		brüniert
12	siehe Tabelle	1	Spannbuchse		
13	893400 0025	1	Wellendichtung BABSL 130-150-7,5 Simrit 72 NBR902		
14	632501 0002	1	Neodym-Blockmagnet_3mm		
15	891102 0101	8	Zylinderschraube DIN 912 8.8 VZ M4 x 10		
16	891102 0255	16	Zylinderschraube DIN 912 8.8 VA M4 x 25		
17	891102 0351	12	Zylinderschraube DIN 912 8.8 VZ M4 x 35		
18	891132 0161	4	Senkschraube DIN 7991, M 4 x 16		
19	891191 0081	6	Senkschraube DIN 965 4.8 VZ M 3 x 8		
20	891191 0085	4	Senkschraube DIN 965 4.8 VA M 3 x 8		
21	891192 0085	18	Senkschraube DIN 965 4.8 VA M 4 x 8		
22	891541 0095	1	Blechschrabe DIN 7982 VA 2,9 x 9,5		
23	891372 0045	6	Gewindestift DIN 913 VA M 4 x 4		
24	891373 0161	1	Gewindestift DIN 913 M 5 x 16		
25	892023 0002	4	Sechskantmutter DIN 934 8 M 4		
26	siehe Tabelle	1	Adapter Motorwelle		
27	siehe Tabelle	4	Zylinderschraube DIN912 M4x14		

Artikelnummer	Ausführung	Pos. 2	Pos. 6	Pos. 9	Pos. 10	Pos. 11	Pos. 12	Pos.26	Pos.27
266200 0000	Schrittmotor MS200 HT mit Encoder U1:101	660510 39072	660510 39191	398701 0001	660510 1000	660510 1158	635003 1101	660510 39253	891102 0141
266200 0500	Schrittmotor MS200 HT U1:101	660510 39072	660510 39198	398701 0002	660510 1000	660510 1158	635003 1101	660510 39253	891102 0141
266201 0000	Schrittmotor MS200 HT mit Encoder U1:51	660510 39072	660510 39191	398701 0001	660510 1001	660510 1158	635003 1101	660510 39253	891102 0141
266201 0500	Schrittmotor MS200 HT U1:51	660510 39072	660510 39198	398701 0002	660510 1001	660510 1158	635003 1101	660510 39253	891102 0141
266200 0600	bürstenloser EC-Servomotor EC60 TM 200W 48V U1:101	660510 39076	660510 3919	398725 0001	660510 1000	660510 28241	898132 6171	entfällt	entfällt
266200 0700	bürstenloser EC-Servomotor EC60 TM 200W 310V U1:101	660510 39076	660510 3919	398725 0002	660510 1000	660510 28241	898132 6171	entfällt	entfällt
266201 0600	bürstenloser EC-Servomotor EC60 TM 200W 48V U1:51	660510 39076	660510 3919	398725 0001	660510 1001	660510 28241	898132 6171	entfällt	entfällt
266201 0700	bürstenloser EC-Servomotor EC60 TM 200W 310V U1:51	660510 39076	660510 3919	398725 0002	660510 1001	660510 28241	898132 6171	entfällt	entfällt

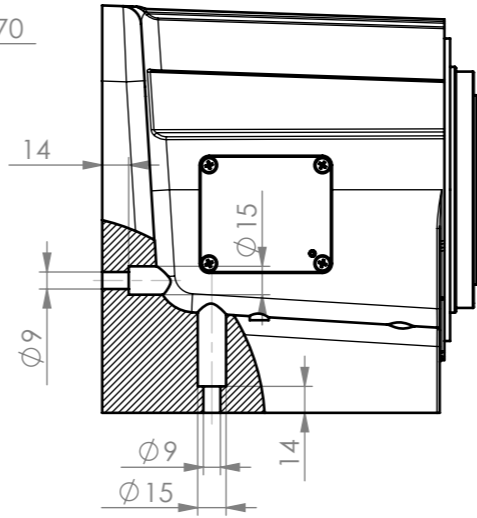
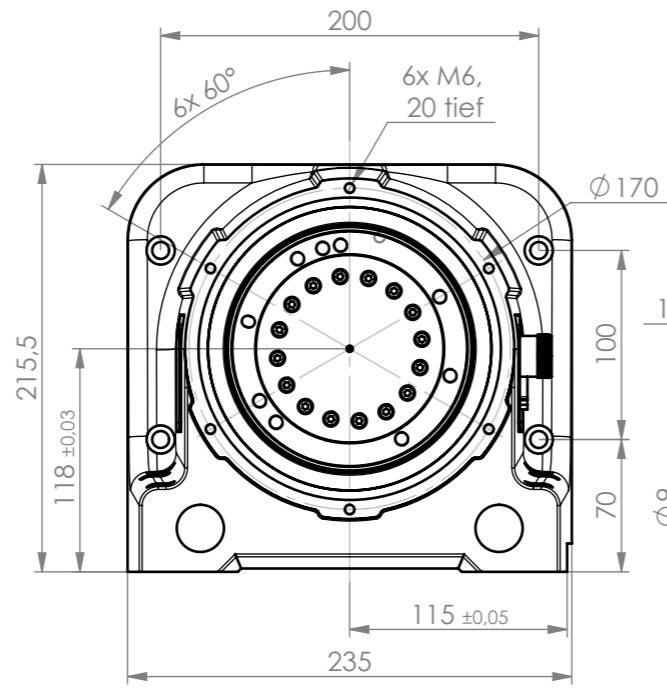
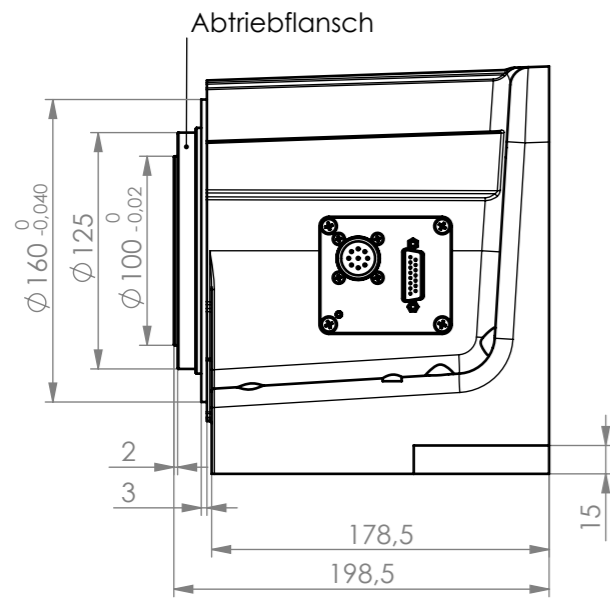


Magnetsensor in Motormodul enthalten

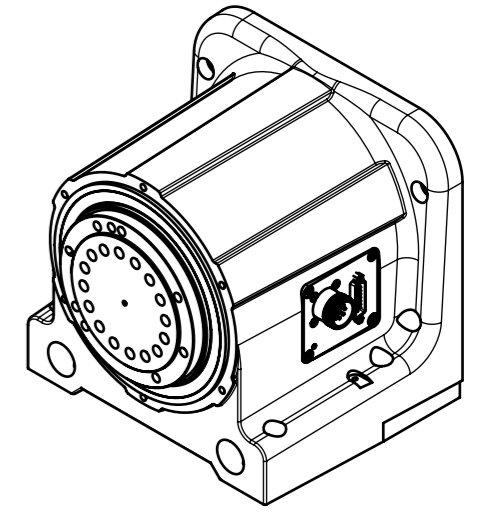
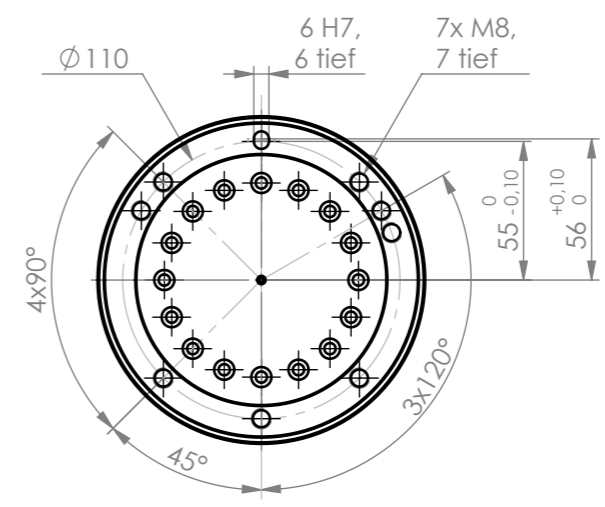


Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016		Toleranz tolerance DIN ISO 2768-mK		Maßstab scale 1:5	Oberfläche surface Werkstoff material	Gewicht weight Halbzeug raw material
Datum date		Name		Benennung/description		
Bearb. 04.11.03		Lakatos		RDH-M Vollwelle		
Gepr. 04.11.03						
05	Adapterplatte eingef.	21.04.21	AF	Blattgröße sheet size DIN A3	Zeichnungsnummer drawing No.	Blatt 2 von 3
04	EC60 TM erg. ; Maßblatt	25.01.18	JK		Artikelnummer article No.	EZ3929
03	Steckeranschluss beidseitig	24.02.14	JK		Baugruppe assembly	siehe Zeichnung
02	2 Motorausführung	15.04.04	IL	Projektbezeichnung project name		Rundschalttisch
Zust. Änderung/modifikation		Datum/date Name				

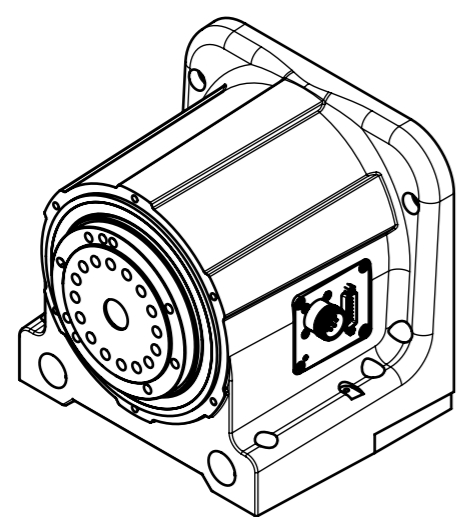
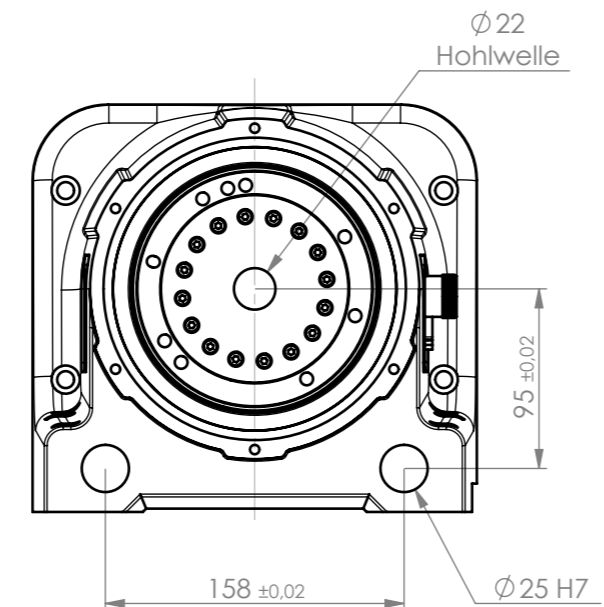
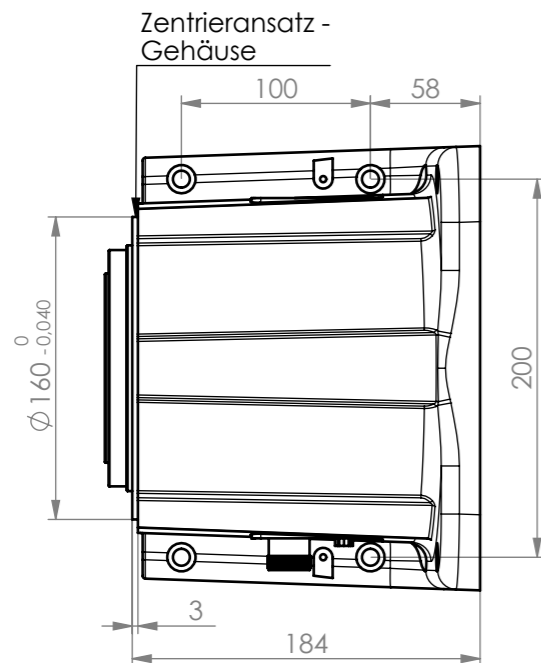
RDH-M Vollwelle



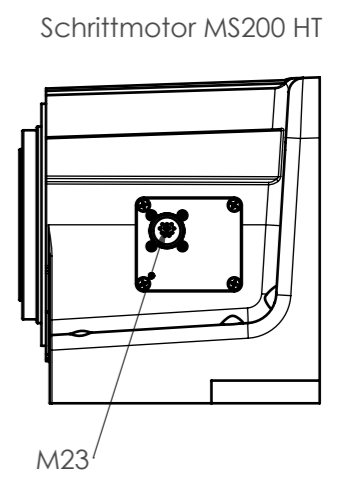
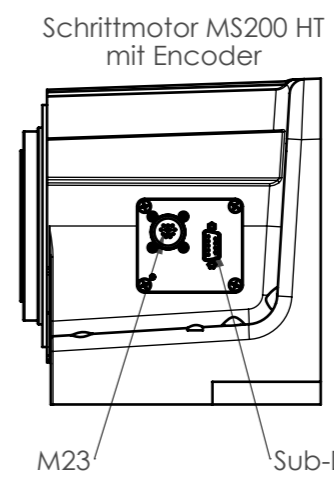
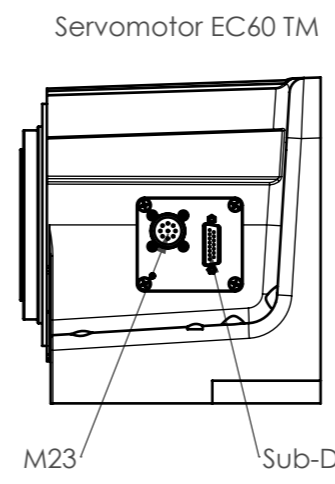
RDH-M Abtriebsflansch M 1:2



RDH-M Hohlwelle



Anschluss



Artikelnummernschlüssel

2 6 6 2 X X 0 X 0 0

- Flanschwellen**
- 0 = Vollwelle
- 1 = Hohlwelle
- Getriebeuntersetzung**
- 0 = 101
- 1 = 51
- Motoren**
- 0 = Schrittmotor MS200 HT mit Encoder
- 5 = Schrittmotor MS200 HT
- 6 = bürstenloser EC-Servomotor EC60 TM 200W 48V
- 7 = bürstenloser EC-Servomotor EC60 TM 200W 310V

Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016		Toleranz tolerance DIN ISO 2768-mK		Maßstab scale 1:4		Oberfläche surface Werkstoff material		Gewicht weight Halbzeug raw material	
Datum date		Name		Benennung/description					
Bearb. 04.11.03		Lakatos		RDH-M Vollwelle					
Gepr. 04.11.03									
05 Adapterplatte eingef.		21.04.21 AF		Blattgröße sheet size DIN A3		Zeichnungsnummer drawing No.		Blatt 3 von 3	
04 EC60 TM erg. ; Maßblatt		25.01.18 JK				EZ3929		Artikelnummer article No.	
03 Steckeranschluss beidseitig		24.02.14 JK		isel [®]				Baugruppe assembly	
02 2 Motorausführung		15.04.04 IL				Projektbezeichnung project name		Rundscharftisch	
Zust. Änderung/modifikation		Datum/date Name							

2.5.1.2 Rotation unit RDH - S

Technical Data

	Stepper motor MS 045HT ¹		EC servo motor EC 40TM (brushless)		DC servo motor RE 40 (brushed)	
Reduction ratio	1:51	1:101	1:51	1:101	1:51	1:101
Rated output speed [1/min]	4	2	22	11	22	11
	at 1500Hz (225 1/min)		at 1100 1/min		at 1100 1/min	
Max. Output speed [1/min]	24	12	98	50	69	35
	at 8000 Hz		at 5000 1/min		--	
Nominal torque [Nm]	7	11	4.8	9.2	4.6	9
	bei 1500 Hz		--		--	
Max. Torque (short-term) [Nm]	--	--	7	11	7	11
Rated holding torque (static load) [Nm]	7	11	7	11	7	11
Max. Load capacity of the gearbox [Nm]	18	28	18	28	18	28
	Limit for repeatable peak torque					
Basic dynamic load rating C [N]	5800					
Basic static load rating C ₀ [N]	8600					
Weight [kg]	4.6					

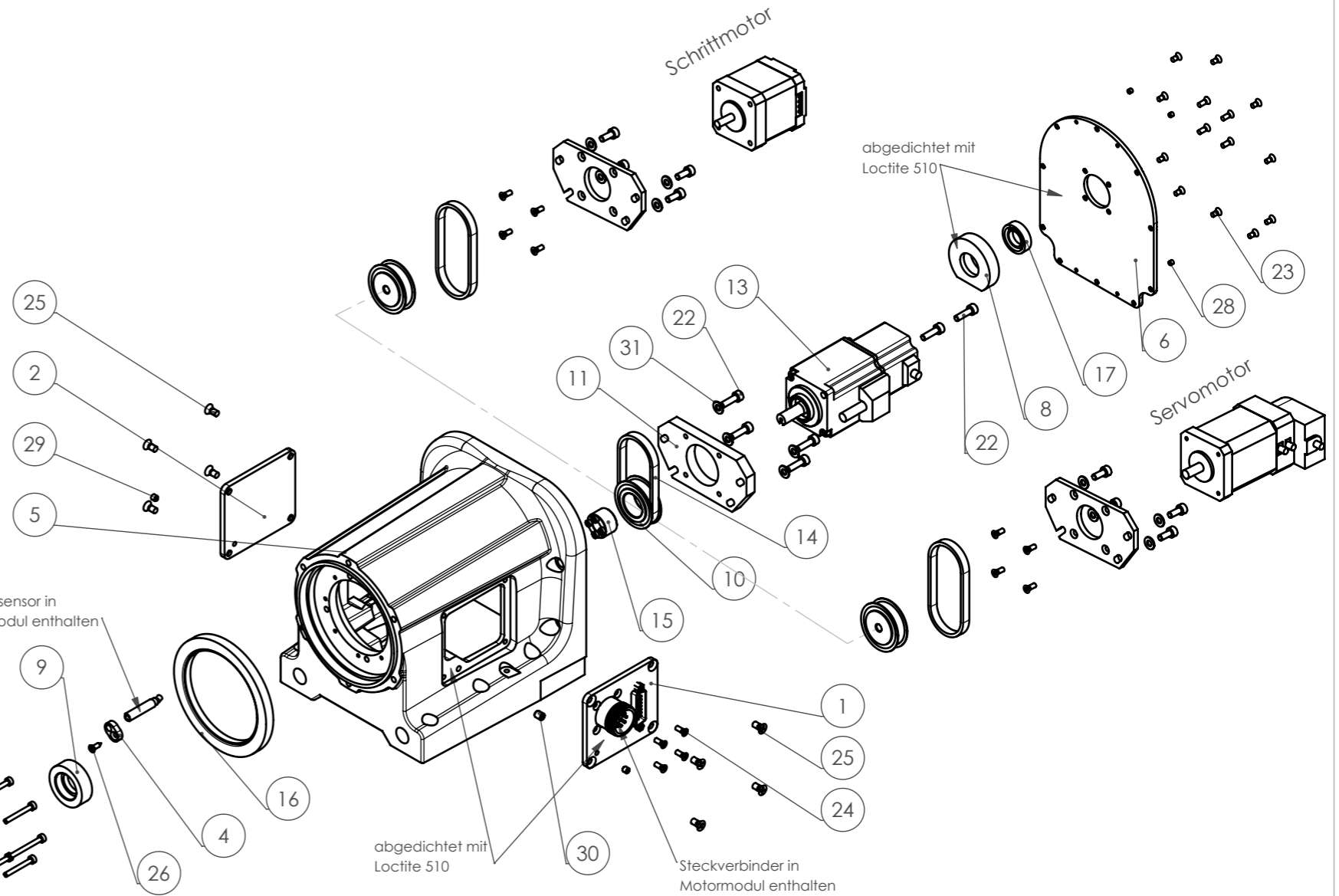
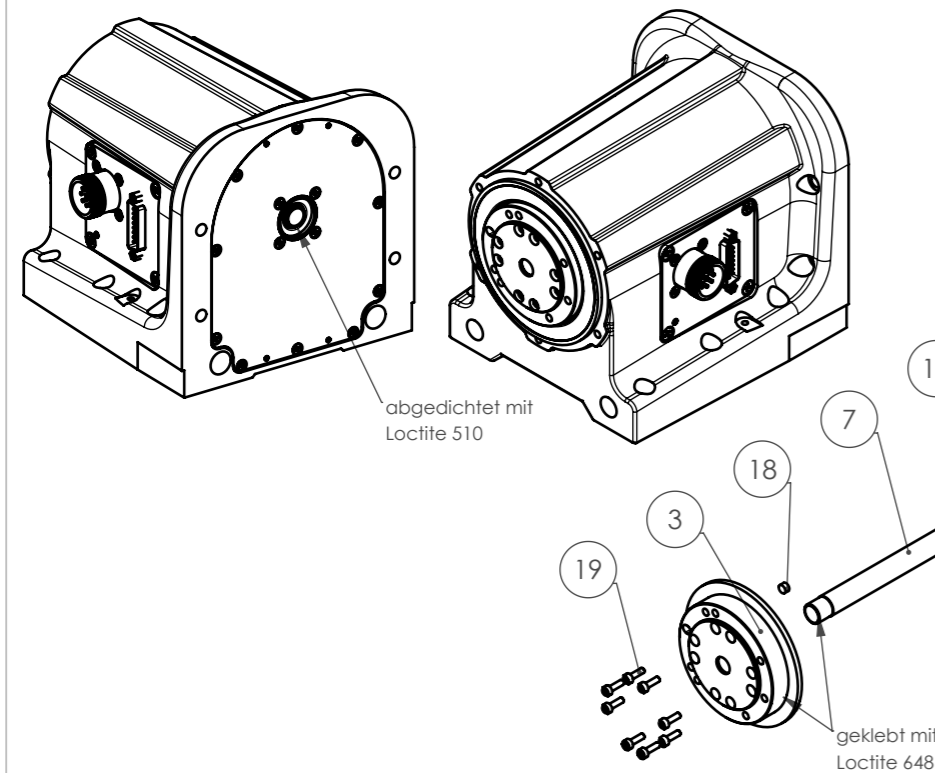
Table 2 - Technical data RDH-S

2.5.1.2.1 Dimension sheet RDH S - Solid and hollow shaft design according to EZ3959

¹ Values for half-step operation

Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	siehe Tabelle	1	EZ3919-3 Abdeckung - Anschluss	EZ3919	
2	660510 39190S	1	EZ3919 Abdeckung - Anschluss - gespiegelt	EZ3919	eloxiert
3	660500 3931	1	EZ3931 Adapterflansch - 14 Hohlwelle	EZ3930	
4	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934	
5	660500 0002	1	EZ3937 Grundkörper - 14	EZ3937	
6	660500 39381	1	EZ3938 Abdeckung - unten Ausf Hohlwelle	EZ3938	
7	660500 3940	1	EZ3940 Innenrohr	EZ3940	
8	660500 3941	1	EZ3941 Flansch - Rohrdichtung_14	EZ3941	
9	660500 3944	1	EZ3944 Zahnriemenscheibe HTD3 - Z34	EZ3944	
10	siehe Tabelle	1	Zahnriemenscheibe HTD3 - Z34 mit Bordscheibe		
11	siehe Tabelle	1	Motorbefestigungsplatte		trowalisieren
12	siehe Tabelle	1	HFUS - 14 - X - 2UH		
13	474100 0048	1	Motormodul		
14	616504 0660	1	Zahnriemen CXP HTD 180 -3M - 6 (Z60)		
15	siehe Tabelle	1	Spannbuchse 8-18-11 (Mädler; 615708 00)		
16	893400 0027	1	Wellendichtung BABSL 90-70-7 Simrit 72 NBR902		
17	893400 0028	1	Wellendichtung BABSL 12-22-6 Simrit 72 NBR902		
18	632501 0002	1	Neodym-Blockmagnet_3mm		
19	891101 0105	8	Zylinderschraube DIN 912 8.8 VA M3 x 10		
20	891101 0251	5	Zylinderschraube DIN 912 8.8 VZ M3 x 25		
21	891101 0301	3	Zylinderschraube DIN 912 8.8 VZ M3 x 30		
22	siehe Tabelle	n	Zylinderschraube DIN 912 8.8 VZ M4		
23	891191 0065	10	Senkschraube DIN 965 4.8 VA M 3 x 6		
24	siehe Tabelle	n	Senkschraube DIN 965 4.8 VA M 3 x 8		
25	891192 0085	8	Senkschraube DIN 965 4.8 VA M 4 x 8		
26	891541 0095	1	Blechschrabe DIN 7982 VA 2,9 x 9,5		
27	891371 0031	3	Gewindestift DIN 913 M 3 x 3		
28	891371 0035	4	Gewindestift DIN 913 VA M 3 x 3		
29	891372 0045	2	Gewindestift DIN 913 VA M 4 x 4		
30	891373 0061	1	Gewindestift DIN 913 M 5 x 6		
31	893051 0001	4	Scheibe DIN 125 ST 4,3		

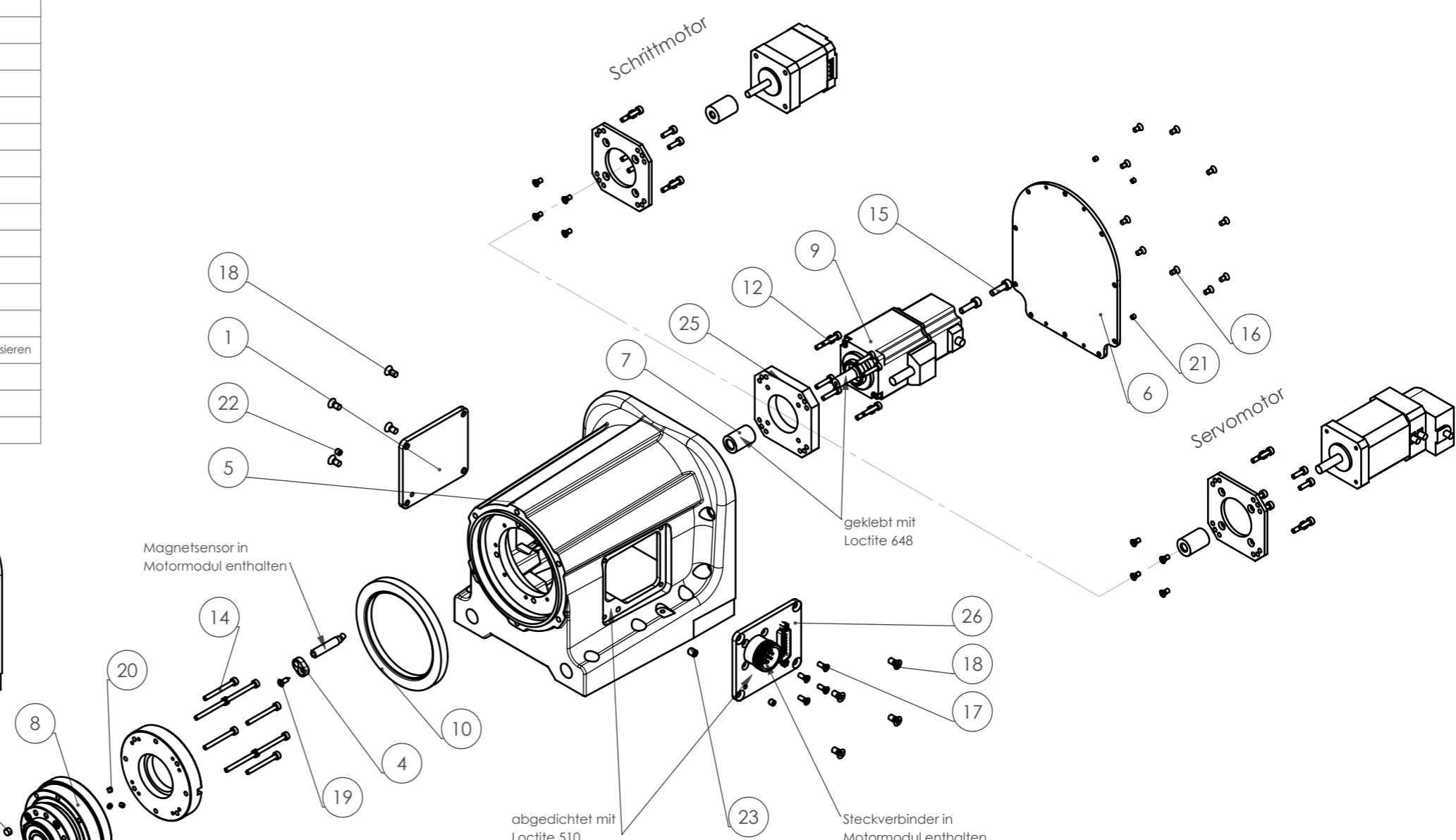
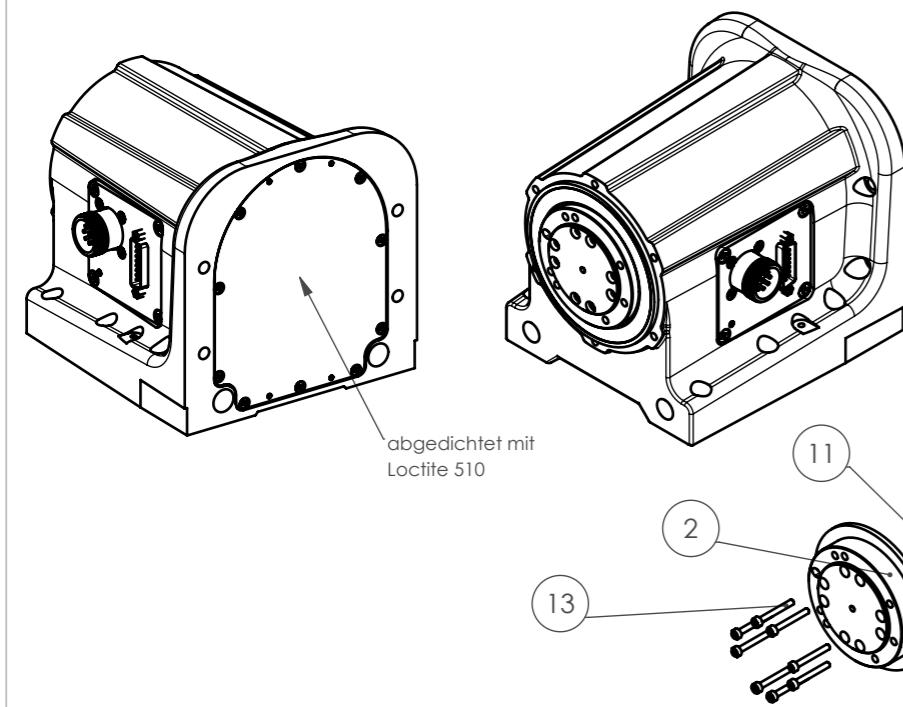
Artikelnummer	Ausführung	Pos. 1	Pos. 10	Pos. 11	Pos. 12	Pos. 13	Pos. 15	Pos. 22	Pos. 24
266110 0000	Schrittmotor MS045 HT mit Encoder U1:101	660510 39191	660500 39431	660500 3942	665330 1000	398702 0001	entfällt	4x891102 0101	12x891191 0081
266110 0500	Schrittmotor MS045 HT U1:101	660510 39198	660500 39431	660500 3942	665330 1000	398702 0002	entfällt	4x891102 0101	12x891191 0081
266111 0000	Schrittmotor MS045 HT mit Encoder U1:51	660510 39191	660500 39431	660500 3942	650200 0002	398702 0001	entfällt	4x891102 0101	12x891191 0081
266111 0500	Schrittmotor MS045 HT U1:51	660510 39198	660500 39431	660500 3942	650200 0002	398702 0002	entfällt	4x891102 0101	12x891191 0081
266110 0300	bürstenloser Servomotor EC42 U1:101	660510 3919	660500 39431	660500 3942	665330 1000	398703 0004	entfällt	4x891102 0101	12x891191 0081
266111 0300	bürstenloser Servomotor EC42 U1:51	660510 3919	660500 39431	660500 3942	650200 0002	398703 0004	entfällt	4x891102 0101	12x891191 0081
266110 0600	bürstenloser Servomotor EC40 TM U1:101	660510 3919	660500 4174	675015 2657	665330 1000	396410 50602	634600 9003	6x891102 0141	8x891191 0081
266111 0600	bürstenloser Servomotor EC40 TM U1:51	660510 3919	660500 4174	675015 2657	650200 0002	396410 50602	634600 9003	6x891102 0141	8x891191 0081



Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016	Toleranz tolerance DIN ISO 2768-mK	Maßstab scale 1:4	Oberfläche surface Werkstoff material Benennung/description	Gewicht weight Halbzeug raw material
	Datum date Bearb. 18.11.03 Gepr. 18.11.03	Name Lakatos	Zeichnungsnummer drawing No. EZ3959	Blatt 1 von 3
04 Motormodul geän. 28.04.20 KG 03 EC40 TM erg.; Maßblatt 06.04.18 JK 02 überarbeitet 20.02.14 JK	Blattgröße sheet size DIN A3	Artikelnummer article No. siehe Zeichnung	Baugruppe assembly Projektbezeichnung project name Rundscharftisch HarmDrive	
Zust. Änderung/modifikation Datum/date Name				

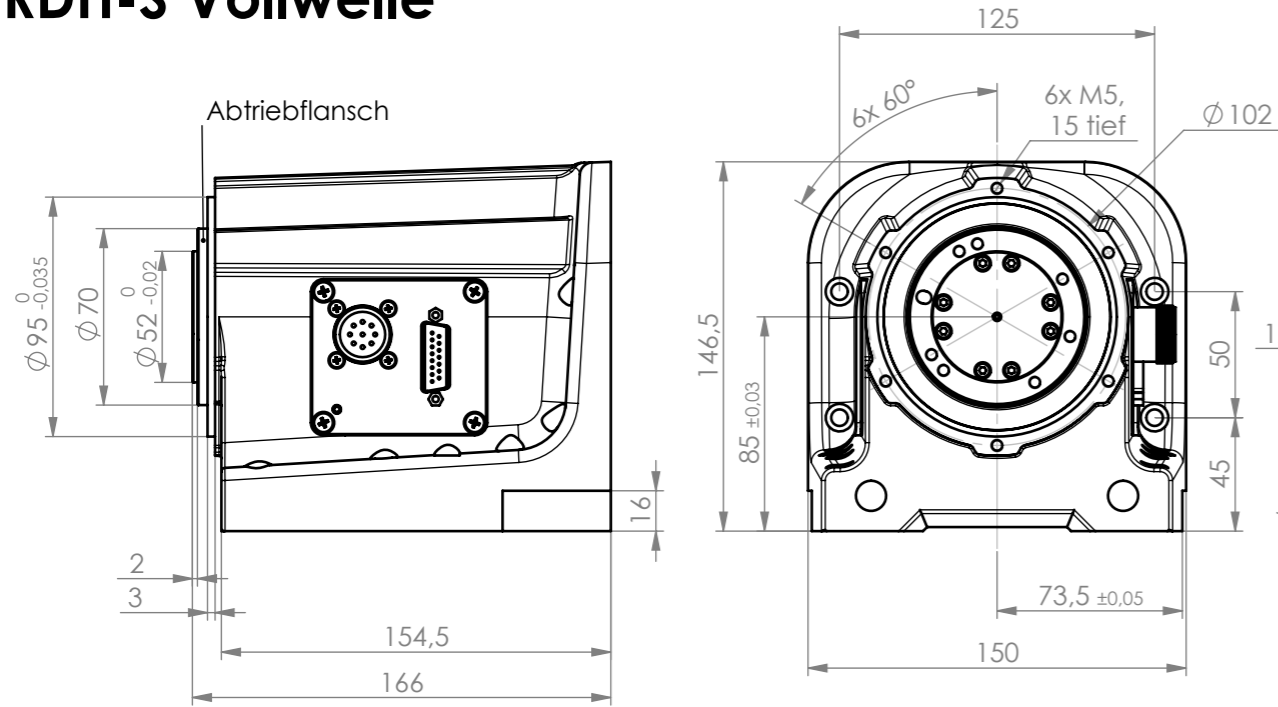
Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	660510 39190S	1	EZ3919 Abdeckung - Anschluss - gespiegelt	EZ3919	eloxiert
2	660500 3930	1	EZ3930 Adapterflansch - 14	EZ3930	
3	660500 3932	1	EZ3932 Motoradapter_14	EZ3932	
4	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934	
5	660500 0002	1	EZ3937 Grundkörper - 14	EZ3937	
6	660500 39382	1	EZ3938 Abdeckung - unten Ausf Standard	EZ3938	
7	siehe Tabelle	1	EZ3945 Kupplungsteil D8	EZ3945	brüniert
8	siehe Tabelle	1	HFUS - 14 - X - 2UH		
9	474100 0048	1	Motormodul		
10	893400 0027	1	Wellendichtung BABSL 90-70-7 Simit 72 NBR902		
11	632501 0002	1	Neodym-Blockmagnet_3mm		
12	891101 0141	8	Zylinderschraube DIN 912 8.8 VZ M3 x 14		
13	891101 0255	8	Zylinderschraube DIN 912 8.8 VA M3 x 25		
14	891101 0301	8	Zylinderschraube DIN 912 8.8 VZ M3 x 30		
15	siehe Tabelle	2	Zylinderschraube DIN 912 8.8 VZ M4		
16	891191 0065	10	Senkschraube DIN 965 4.8 VA M 3 x 6		
17	891191 0085	4	Senkschraube DIN 965 4.8 VA M 3 x 8		
18	891192 0085	8	Senkschraube DIN 965 4.8 VA M 4 x 8		
19	891541 0095	1	Blechschaube DIN 7982 VA 2,9 x 9,5		
20	891371 0031	3	Gewindestift DIN 913 M 3 x 3		
21	891371 0035	4	Gewindestift DIN 913 VA M 3 x 3		
22	891372 0045	2	Gewindestift DIN 913 VA M 4 x 4		
23	891373 0061	1	Gewindestift DIN 913 M 5 x 6		
24	563005	1	Reed Sensor, Öffner		
25	675015 2636	1	DU2636 - Motoradapter - EC40-TM	DU2636	trowalisieren
26	660510 3919	1	EZ3919-3 Abdeckung - Anschluss - Ausf Sub-D 15 M23	EZ3919	
27	550103 0000 / 550104 0009	1	Gerätesteckverbinder M23 - Stift 9polig		
28	555514 0067	1	Sub-D Stecker 26 CONEC		

Artikelnummer	Ausführung	Pos. 1	Pos. 8	Pos. 9	Pos. 10	Pos. 11	Pos. 17
266100 0000	Schrittmotor MS045 HT mit Encoder U1:101	660510 39191	660500 39453	660500 39331	665330 1000	398702 0001	entfällt
266100 0500	Schrittmotor MS045 HT U1:101	660510 39198	660500 39453	660500 39331	665330 1000	398702 0002	entfällt
266101 0000	Schrittmotor MS045 HT mit Encoder U1:51	660510 39191	660500 39453	660500 39331	650200 0002	398702 0001	entfällt
266101 0500	Schrittmotor MS045 HT U1:51	660510 39198	660500 39453	660500 39331	650200 0002	398702 0002	entfällt
266100 0300	bürstenloser Servomotor EC42 U1:101	660510 3919	660500 39452	660500 39331	665330 1000	398703 0004	entfällt
266101 0300	bürstenloser Servomotor EC42 U1:51	660510 3919	660500 39452	660500 39331	650200 0002	398703 0004	entfällt
266100 0600	bürstenloser Servomotor EC40 TM U1:101	660510 3919	660500 39451	675015 2636	665330 1000	396410 50602	891102 0141
266101 0600	bürstenloser Servomotor EC40 TM U1:51	660510 3919	660500 39451	675015 2636	650200 0002	396410 50602	891102 0141

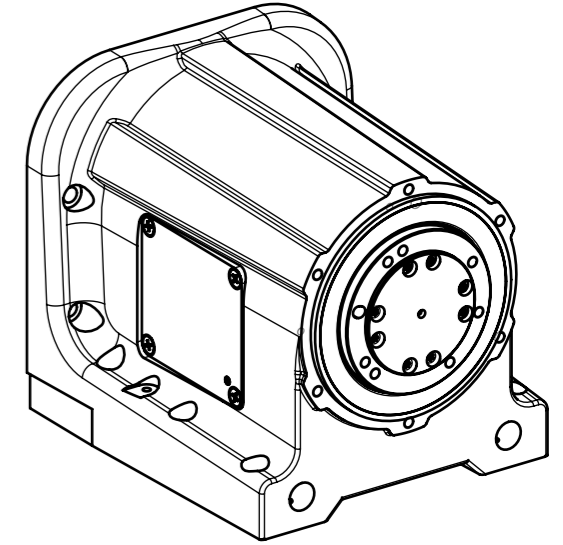
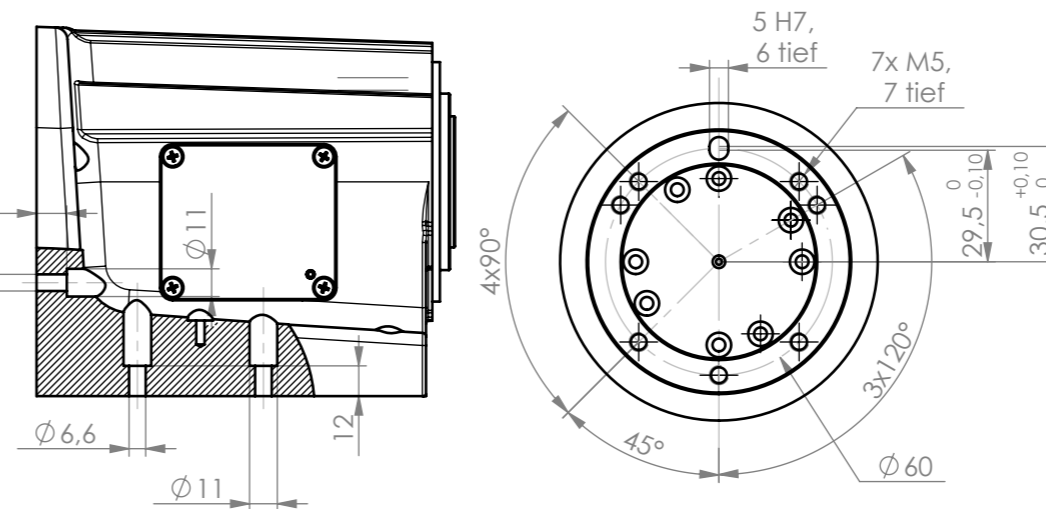


Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016	Toleranz tolerance DIN ISO 2768-mK	Maßstab scale 1:4	Oberfläche surface Werkstoff material Benennung/description	Gewicht weight Halbzeug raw material
	Datum date Bearb. 18.11.03 Gepr. 18.11.03	Name Lakatos	Zeichnungsnummer drawing No. EZ3959	Blatt 2 von 3
04 Motormodul geän. 28.04.20 KG 03 EC40 TM erg.; Maßblatt 06.04.18 JK 02 überarbeitet 20.02.14 JK	Blattgröße sheet size DIN A3	Artikelnummer article No. siehe Zeichnung	Baugruppe assembly Projektbezeichnung project name Rundscharftisch HarmDrive	
Zust. Änderung/modifikation Datum/date Name				

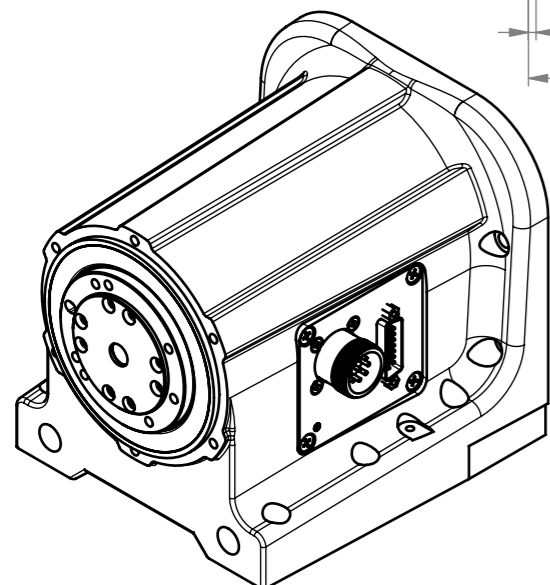
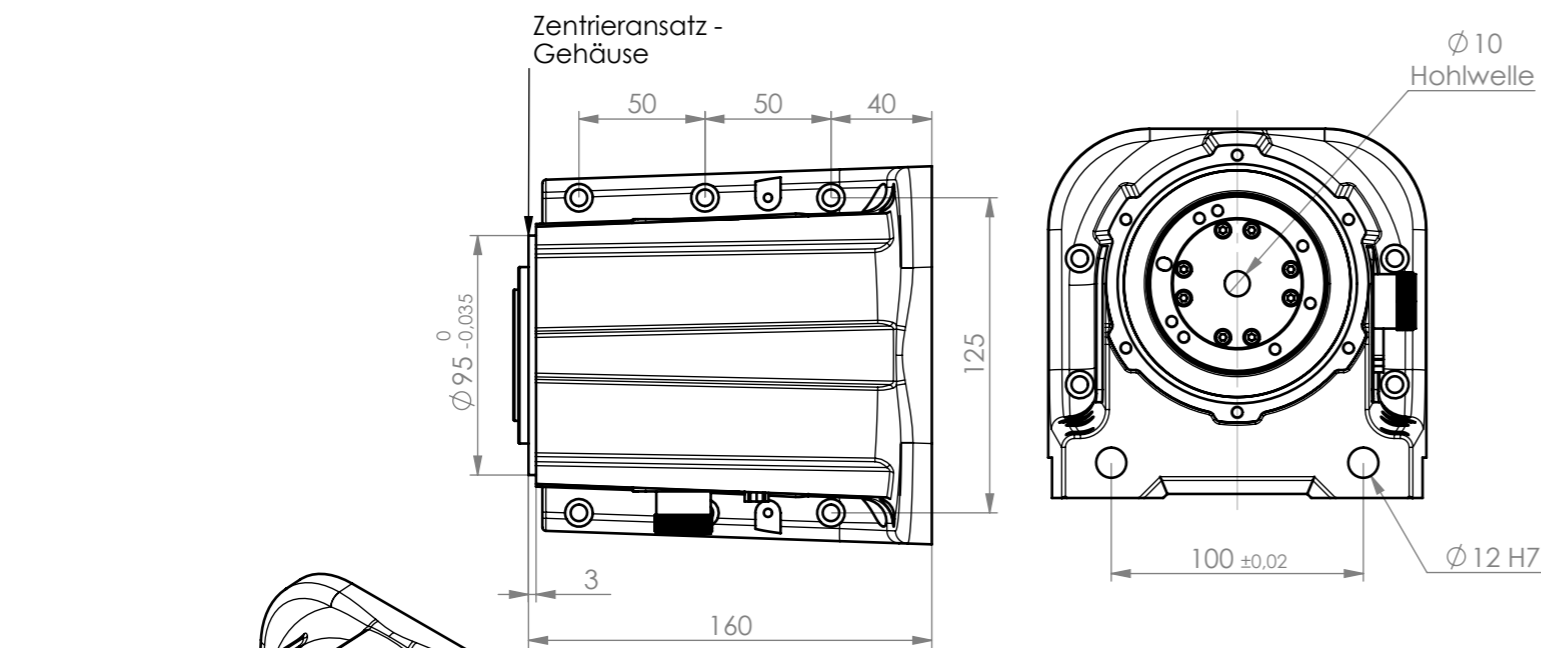
RDH-S Vollwelle



RDH-S Abtriebsflansch M 1:2

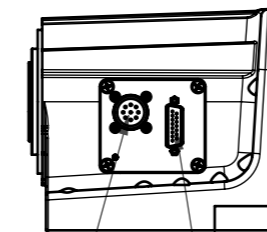


RDH-S Hohlwelle



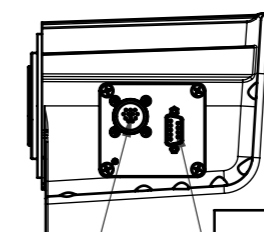
Anschluss

Servomotor EC42/EC40 TM



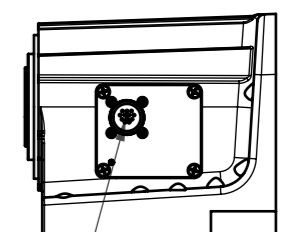
M23 Sub-D15

Schrittmotor MS 045 HT mit Encoder



M23 Sub-D9

Schrittmotor MS 045 HT



M23

Artikelnummernschlüssel

2 6 6 1 X X 0 X 0 0

Flanschwellen
0 = Vollwelle
1 = Hohlwelle

Getriebeuntersetzung
0 = 101
1 = 51

Motoren
0 = Schrittmotor MS 045 HT mit Encoder
3 = bürstenloser EC-Servomotor EC42
5 = Schrittmotor MS 045 HT
6 = bürstenloser EC-Servomotor EC40 TM

Schutzvermerk DIN ISO 16016 beachten observe protection note DIN ISO 16016		Toleranz tolerance DIN ISO 2768-mK		Maßstab scale 1:3		Oberfläche surface Werkstoff material		Gewicht weight Halbzeug raw material	
		Datum date		Name		Benennung/description			
		Bearb. 18.11.03		Lakatos		RDH-S Maßzeichnung			
		Gepr. 18.11.03							
		Blattgröße sheet size		DIN A3		Zeichnungsnummer drawing No.		Blatt 3 von 3	
04 Motormodul geän.		28.04.20		KG		Artikelnummer article No.		EZ3959	
03 EC40 TM erg.; Maßblatt		06.04.18		JK		Baugruppe assembly			
02 überarbeitet		20.02.14		JK		Projektbezeichnung project name			
Zust. Änderung/modifikation		Datum/date		Name		Rundscharftisch HarmDrive			

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2.5.1.3 Rotation unit RDH - XS

Technical Data

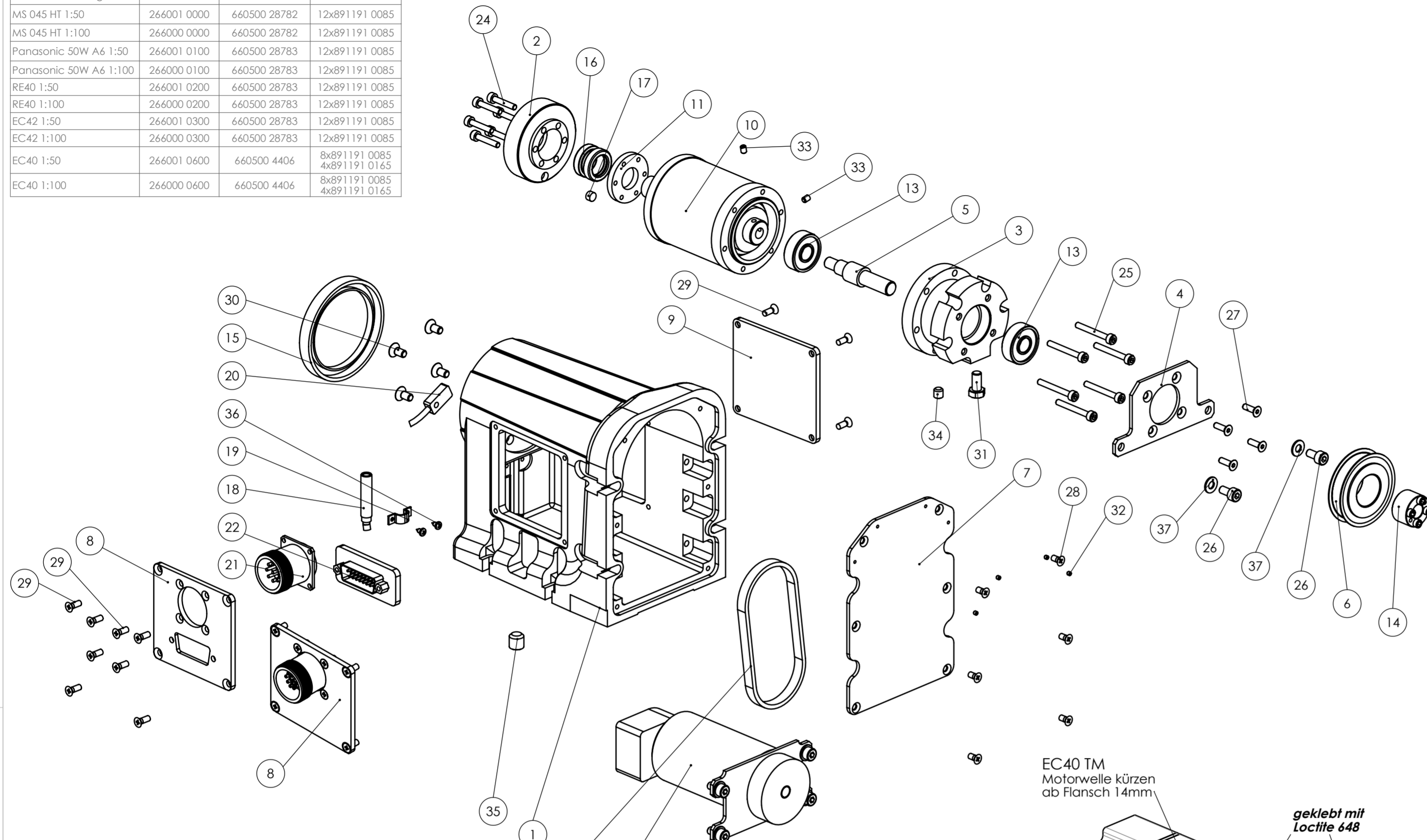
	Stepper motor MS 045HT ¹		EC servo motor EC 40TM (brushless)		DC servo motor RE 40 (brushed)	
Reduction ratio	1:50	1:100	1:50	1:100	1:50	1:100
Rated output speed [1/min]	5	2	60	30	22	11
	at 1500Hz (225 1/min)		at 3000 1/min		at 1100 1/min	
Max. Output speed [1/min]	24	12	100	50	70	35
	at 8000 Hz (1200 1/min)		at 5000 1/min		--	
Nominal torque [Nm]	5	7	5	7	5	7
	at 1500 Hz (225 1/min)		--		--	
Max. Torque (short-term) [Nm]	--	--	9	14	5	7
Rated holding torque (static load) [Nm]	5	7	5	7	5	7
Max. Load capacity of the gearbox [Nm]	9	14	9	14	9	14
	Limit for repeatable peak torque					
Basic dynamic load rating C [N]	392					
Basic static load rating C ₀ [N]	392					
Weight [kg]	2.3					

Table 3 - Technical data RDH-XS

2.5.1.3.1 Dimension sheet RDH XS - Solid and hollow shaft version according to EZ4162

¹ Values for half-step operation

Ausführung	Artikelnummer	Pos.8	Pos.29
MS 045 HT 1:50	266001 0000	660500 28782	12x891191 0085
MS 045 HT 1:100	266000 0000	660500 28782	12x891191 0085
Panasonic 50W A6 1:50	266001 0100	660500 28783	12x891191 0085
Panasonic 50W A6 1:100	266000 0100	660500 28783	12x891191 0085
RE40 1:50	266001 0200	660500 28783	12x891191 0085
RE40 1:100	266000 0200	660500 28783	12x891191 0085
EC42 1:50	266001 0300	660500 28783	12x891191 0085
EC42 1:100	266000 0300	660500 28783	12x891191 0085
EC40 1:50	266001 0600	660500 4406	8x891191 0085 4x891191 0165
EC40 1:100	266000 0600	660500 4406	8x891191 0085 4x891191 0165



Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	660500 0000	1	EZ4150 Grundkörper - XS - bearbeitet	EZ4150	
2	660500 4152	1	EZ4152 Adapterflansch_XS	EZ4152	
3	660500 4153	1	EZ4153 Getriebeaufsatz	EZ4153	
4	660500 4154	1	EZ4154 Getriebebefestigung	EZ4154	verzinkt
5	660500 4155	1	EZ4155 Welle_Getriebeeingang	EZ4155	brüniert
6	660500 4159	1	EZ4159 Zahnriemenscheibe HTD3 - Z40 mit Bordscheibe	EZ4159	
7	660500 4156	1	EZ4156 Abdeckung_hinten	EZ4156	
8	siehe Tabelle	1	Anschlussblende - RDH-XS		
9	660500 28781	1	DZ2896 - Blindblech - RDH-XS	DZ2896	pulverbeschichtet
10	660500 0010	1	HDUC-14-50-1U-CC		
11	660500 4164	1	EZ4164 Spanning		
12		1	Motormodul		
13	896010 8224	2	Einreihige Rillenkugellager mit Dichtscheiben 608-2RS1		
14	634600 9003	1	Spannbuchse B-18-11(Mädler: 615708 00)		
15	843400 0030	1	Wellendichtung BABS1 45-58-7 Simrit 72 NBR902		
16	898120 1218	1	Spieth Druckhülse AK 12-18 L12		
17	632501 0002	1	Neodym-Blockmagnet_3mm		
18	563005	1	Reed Sensor, Öffner		
19	582132	1	Magnetsensorbefestigung		
20	562015 4000	1	indukt. Näherungsschalter - IFFM 08 P37 A6-L - pnp		
21	550103 0000 / 550104 0009	1	Gerätsteckverbinder M23 - Stift 9polig		
22	555514 0067	1	Sub-D Stecker 26 CONEC		
23	616504 0722	1	Zahnriemen HTD 3M CXP b=6 L216 (Z=72)		
24	891101 0161	6	Zylinderschraube DIN 912 8.8 VZ M3 x 16		
25	891101 0251	6	Zylinderschraube DIN 912 8.8 VZ M3 x 25		
26	891102 0081	2	Zylinderschraube DIN 912 8.8 VZ M4 x 8		
27	891131 0101	4	Senkschraube DIN 7991, M 3 x 10		
28	891191 0065	6	Senkschraube DIN 965 4.8 VA M 3 x 6		
29	891191 0000	n	Senkschraube DIN 965 4.8 VA M 3 x L		
30	891132 0085	4	Senkschraube DIN 7991 VA, M 4 x 8		
31	891053 0101	1	Sechskantschraube DIN 933 M5x10		
32	891378 0025	4	Gewindestift DIN 913 VA M 2 x 2		
33	891371 0041	2	Gewindestift DIN 913 M 3 x 4		
34	891373 0051	1	Gewindestift DIN 913 M 5 x 5		
35	891375 0085	1	Gewindestift DIN 913 VA M 8 x 8		
36	891530 0051	2	Blechschrube DIN 7981 VZ 2,2 x 4,5		
37	893051 0001	2	Scheibe DIN 125 ST 4,3		

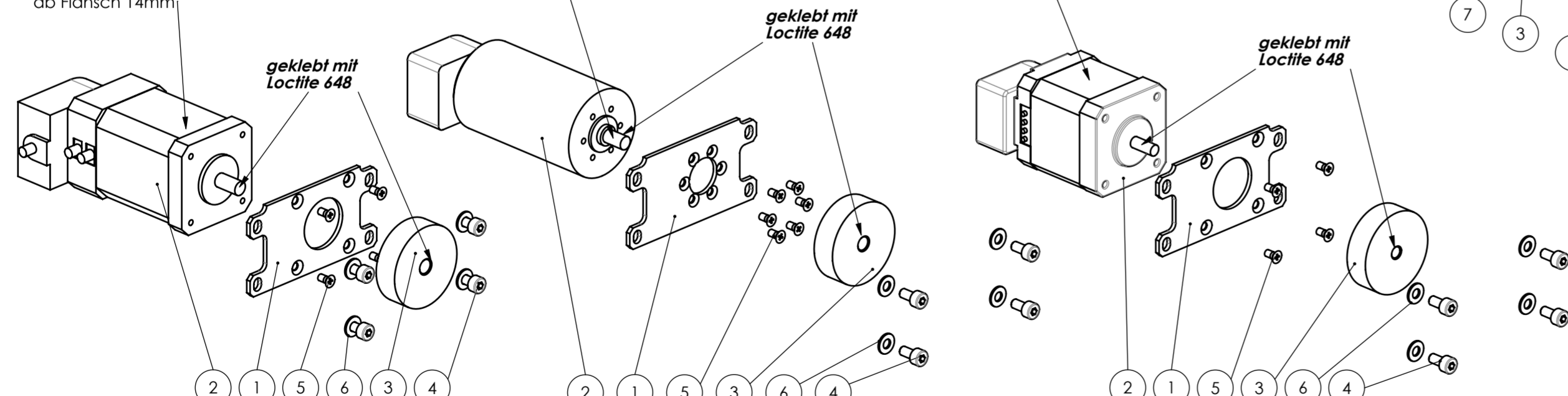
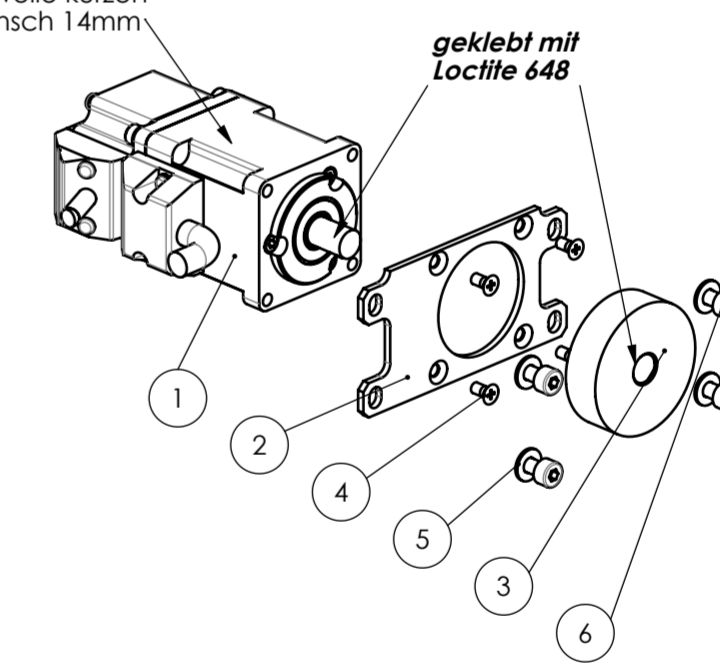
Panasonic A6 Motorwelle kürzen ab Flansch 14mm

EC40 TM Motorwelle kürzen ab Flansch 14mm

EC42 Motorwelle kürzen ab Flansch 14mm

RE 40 bürstenbehaftet Motorwelle kürzen ab Flansch 14mm

MS 045 HT Motorwelle kürzen ab Flansch 14mm



Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr
1	660500 41514	1	EZ4151 Motorbefestigung	EZ4151
2	660500 4405	1	DU4405 - Zahnriemenscheibe HTD3 - Z40 - EC40TM	DU4405
3	474100 0048	1	Motormodul EC40 TM	
4	891102 0081	4	Zylinderschraube DIN 912 8.8 VZ M4 x 8	
5	891132 0121	2	Senkschraube DIN 7991, M 4 x 12	
6	893051 0001	4	Scheibe DIN 125 ST 4,3	
7	892023 0002	2	Sechskantmutter DIN 934 8 M 4	

Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr
1	474421 0200	1	Panasonic - A6 Serie - MSMF5AZL1C2 - 50W	
2	660500 41513	1	EZ4151 Motorbefestigung	EZ4151
3	660500 41581	1	EZ4158 Zahnriemenscheibe HTD3 - Z40 D=8	EZ4158
4	891191 0065	4	Senkschraube DIN 965 4.8 VA M 3 x 6	
5	893051 0001	4	Scheibe DIN 125 ST 4,3	
6	891102 0081	4	Zylinderschraube DIN 912 8.8 VZ M4 x 8	

POS.-NR.	Artikelnummer	MENGE	BENENNUNG	Zeich.- Nr
1	660500 41512	1	EZ4151 Motorbefestigung Auf MS045 MUM505	EZ4151
2	398703 0005	1	EC-Servo bürstenlos - 42BL5	DZ1171
3	660500 41584	1	EZ4158 Zahnriemenscheibe HTD3 - Z40 D=6,35	EZ4158
4	891102 0081	4	Zylinderschraube DIN 912 8.8 VZ M4 x 8	
5	891191 0065	4	Senkschraube DIN 965 4.8 VA M 3 x 6	
6	893051 0001	4	Scheibe DIN 125 ST 4,3	

POS.-NR.	Artikelnummer	MENGE	BENENNUNG	Zeich.- Nr
1	660500 41511	1	EZ4151 Motorbefestigung Auf RE40	EZ4151
2	398702 1002	1	RE40	
3	660500 41583	1	EZ4158 Zahnriemenscheibe HTD3 - Z40 D=5	EZ4158
4	891102 0081	4	Zylinderschraube DIN 912 8.8 VZ M4 x 8	
5	891191 0065	6	Senkschraube DIN 965 4.8 VA M 3 x 6	
6	893051 0001	4	Scheibe DIN 125 ST 4,3	

POS.-NR.	Artikelnummer	MENGE	BENENNUNG	Zeich.- Nr
1	660500 41512	1	EZ4151 Motorbefestigung Auf MS045 MUM505	EZ4151
2	470480 0100	1	Schrittmotor MS 045 HT mit Encoder	
3	660500 41582	1	EZ4158 Zahnriemenscheibe HTD3 - Z40 D=5	EZ4158
4	891102 0081	4	Zylinderschraube DIN 912 8.8 VZ M4 x 8	
5	891191 0065	4	Senkschraube DIN 965 4.8 VA M 3 x 6	
6	893051 0001	4	Scheibe DIN 125 ST 4,3	

Diese Zeichnung ist nach DIN ISO 16016 urheberrechtlich geschützt.

Toleranz DIN ISO 2768-mK

Oberfläche

Maßstab 1:2

Werkstoff

Gewicht

Pos. Nr.

Datum Name

Bearb. 02.09.04 Lokatos

Gepr. 02.09.04

Blattgröße

DIN A2

Benennung

RDH-XS

Zeichnungsnummer

EZ4162

Blatt 1 von 2

Artikelnummer

siehe Tabelle

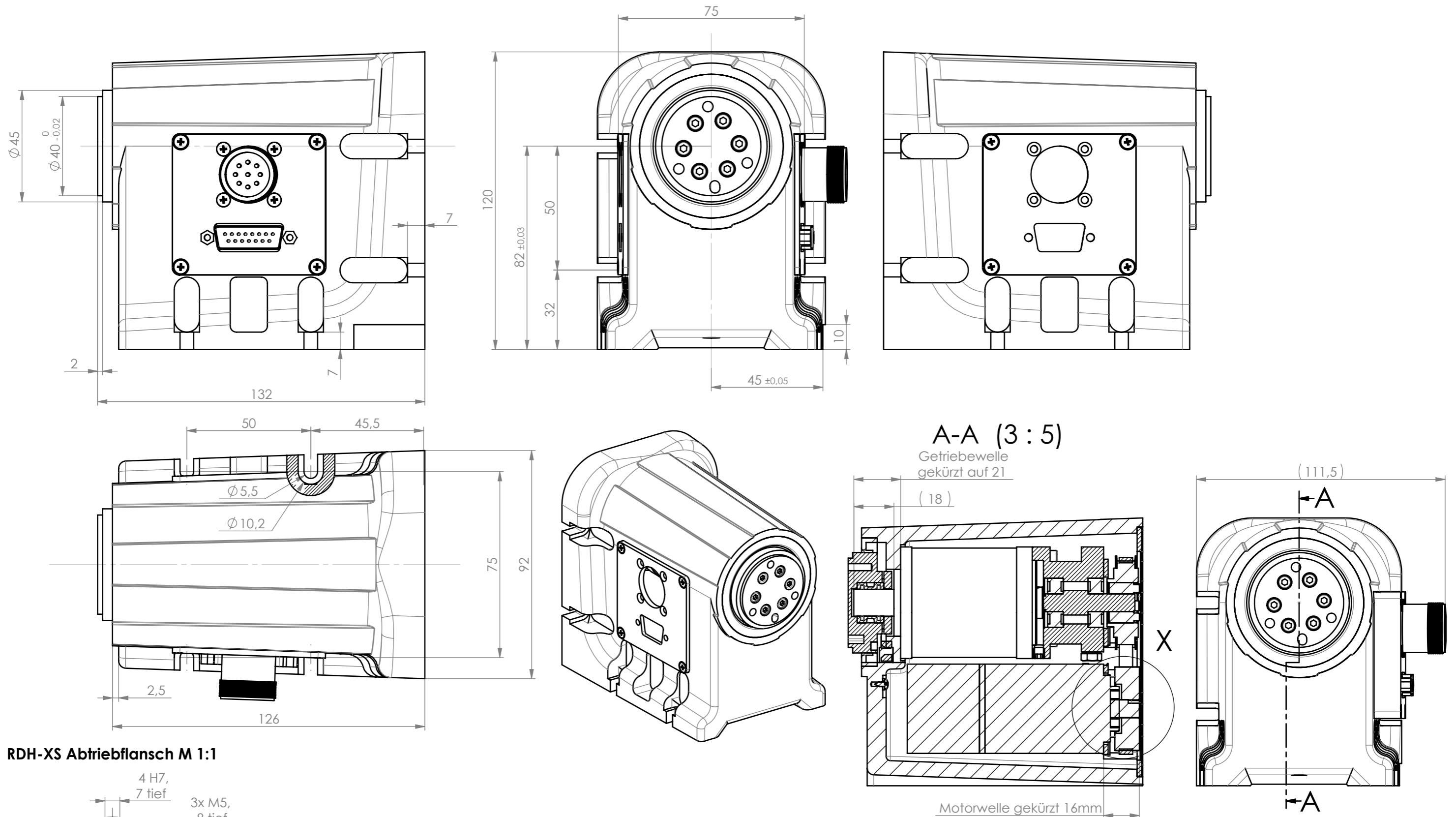
Baugruppe

Projektbezeichnung

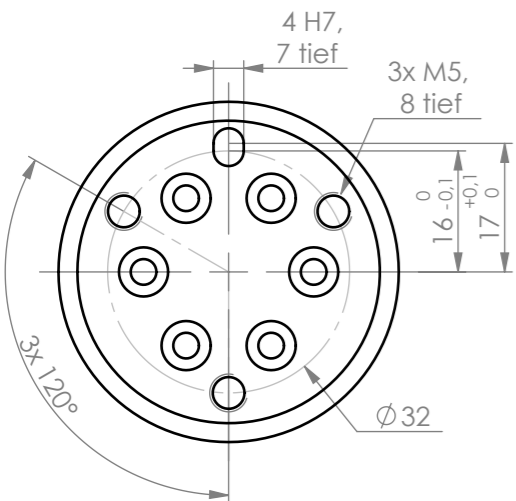
isel

Zust. Änderung

Datum Name



RDH-XS Abtriebsflansch M 1:1



Artikelnummernschlüssel

26600X 0X00

Getriebeuntersetzung
 0 = 100
 1 = 50

Motoren
 0 = Schrittmotor MS 045 HT mit Encoder
 1 = EC Servomotor Panasonic 50W A6
 2 = bürstenbehafteter DC-Servomotor RE40
 3 = bürstenloser EC-Servomotor EC42
 6 = bürstenloser EC-Servomotor EC40 TM

Diese Zeichnung ist nach DIN ISO 16016 urheberrechtlich geschützt.		Toleranz DIN ISO 2768-mK		Oberfläche	Maßstab 2:3	Gewicht	Pos. Nr.
					Werkstoff	Halbzeug	
		Datum		Name	Benennung		
07	EC40 TM überarbeitet	13.08.20	JK	Bearb. 02.09.04	Lokatos	RDH-XS	
06	Maßblatt, EC42, EC40	21.08.19	JK	Gepr. 02.09.04			
05	Blindblech geändert	16.07.17	JK	Blattgröße		DIN A3	Zeichnungsnummer EZ4162
04	Anschluss beidseitig	19.08.13	JK				Blatt 2 von 2
03	Anschluss geändert, überarbeitet	22.06.09	JK				Artikelnummer siehe Tabelle
02	überarbeitet	13.07.06	IL				Baugruppe
Zust.	Änderung	Datum	Name				Projektbezeichnung



2.5.1.4 Turning/swivel unit DSH-S

Technical Data

	Stepper motor MS 045HT ¹		EC servo motor EC 40TM (brushless)		DC servo motor RE 40 (brushed)	
Reduction ratio	1:51	1:101	1:51	1:101	1:51	1:101
Rated output speed [1/min]	4	2	22	11	22	11
	at 1500Hz (225 1/min)		at 1100 1/min		at 1100 1/min	
Max. Output speed [1/min]	24	12	98	50	69	35
	at 8000 Hz		at 5000 1/min			
Nominal torque [Nm]	7	11	4.8	9.2	4.6	9
	bei 1500 Hz		--		--	
Max. Torque (short-term) [Nm]	--	--	7	11	7	11
Rated holding torque (static load) [Nm]	7	11	7	11	7	11
Max. Load capacity of the gearbox [Nm]	18	28	18	28	18	28
	Limit for repeatable peak torque					
Basic dynamic load rating C [N]	5800					
Basic static load rating C ₀ [N]	8600					
Weight [kg]	12.0					

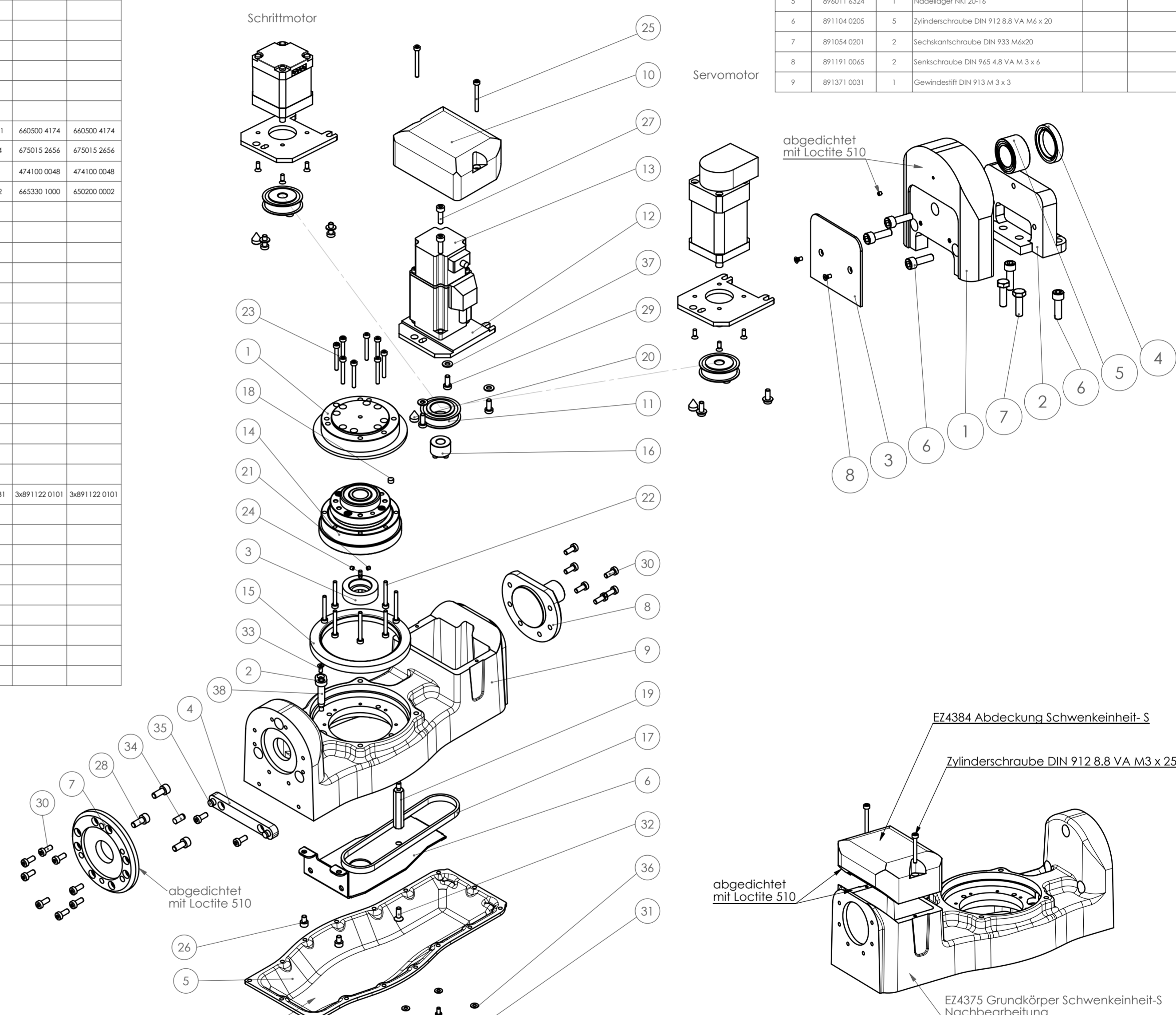
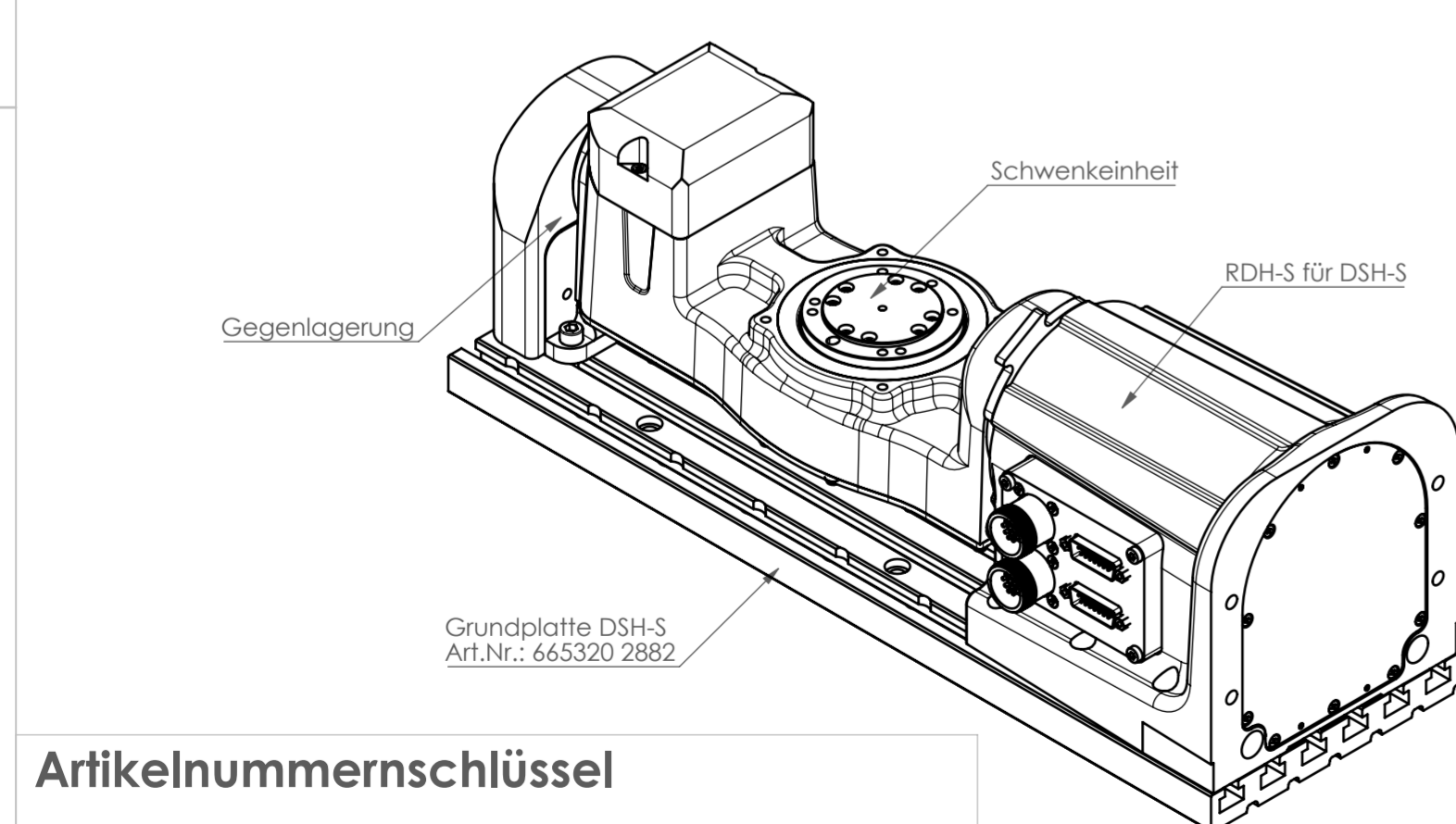
Table 4 - Technical data DSH-S

2.5.1.4.1 Dimension sheet Rotary swivel unit DSH-S according to EZ4373

¹ Values for half-step operation

Baugruppe Schwenkeinheit												
Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	665410 0001 MS045HT m. Enc. 1:101	665410 1001 MS045HT m. Enc. 1:51	665413 0001 EC42 1:101	665413 1001 EC42 1:51	665410 0001o MS045HT 1:101	665410 1001o MS045HT 1:51	665416 0001 EC40 1:101	665416 1001 EC40 1:51
1	660500 3930	1	EZ3930 Adapterflansch - 14	EZ3930								
2	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934								
3	660500 3944	1	EZ3944 Zahnriemenscheibe HTD3 - Z34	EZ3944								
4	665320 4340	1	EZ4340 Stifffestigung	EZ4340								
5	665320 43431	1	EZ4343 Grundkörper- Deckel Schwenkeinheit- S	EZ4343								
6	665320 4345	1	EZ4345 Trennblech- S	EZ4345								
7	665320 4366	1	EZ4366 Flansch- S Antriebsseite	EZ4366								
8	665320 4367	1	EZ4367 Flansch- S Gegenlagerungsseite	EZ4367								
9	665320 4375	1	EZ4375 Grundkörper Schwenkeinheit- S Nachbearbeitung	EZ4375								
10	665320 4384	1	EZ4384 Abdeckung Schwenkeinheit- S	EZ4384								
11	siehe Tabelle	1	Zahnriemenscheibe HTD3 - Z34 mit Bordscheibe		660500 39431	660500 39431	660500 39431	660500 39431	660500 39431	660500 39431	660500 4174	660500 4174
12	siehe Tabelle	1	Motorbefestigung		665320 4344	665320 4344	665320 4344	665320 4344	665320 4344	665320 4344	675015 2656	675015 2656
13	siehe Tabelle	1	Motormodul		396048 V0002	396048 V0002	474062 0048	474062 0048	470481	470481	474100 0048	474100 0048
14	siehe Tabelle	1	HFUS - 14 - X - 2UH		665330 1000	650200 0002	665330 1000	650200 0002	665330 1000	650200 0002	665330 1000	650200 0002
15	893400 0027	1	Wellendichtung BABSL 90-70-7 Simrit 72 NBR902									
16	634600 9003	1	Spannbuchse 8-18-11(Mädler; 615708 00)		entfällt	entfällt	entfällt	entfällt	entfällt	entfällt		
17	616504 0660	1	Zahnriemen CXP HTD 318 -3M - 6 (Z106)									
18	632501 0002	1	Neodym-Blockmagnet_3mm									
19	582026	1	Distanzbolzen 1113-40 (M4) Fa Schaefer									
20	890365 0101	1	TE2770-4 Gewindestift M8x0,75 mit 60 Spitze	TE2770								
21	891371 0031	3	Gewindestift DIN 913 M 3 x 3									
22	891101 0251	5	Zylinderschraube DIN 912 8.8 VZ M3 x 25									
23	891101 0255	8	Zylinderschraube DIN 912 8.8 VA M3 x 25									
24	891101 0301	3	Zylinderschraube DIN 912 8.8 VZ M3 x 30									
25	891101 0305	2	Zylinderschraube DIN 912 8.8 VA M3 x 30									
26	891102 0061	2	Zylinderschraube DIN 912 8.8 VZ M4 x 6									
27	891102 0141	2	Zylinderschraube DIN 912 8.8 VZ M4 x 14		entfällt	entfällt	entfällt	entfällt	entfällt	entfällt		
28	891103 0125	3	Zylinderschraube DIN 912 8.8 VA M5 x 12									
29	siehe Tabelle	n	Schraube		4x891191 0081	4x891191 0081	4x891191 0081	4x891191 0081	4x891191 0081	4x891191 0081	3x891122 0101	3x891122 0101
30	891122 0101	16	Zylinderschraube DIN 6912 A2 M 4 x 10									
31	8911110085	16	Zylinderschraube DIN 7984 8.8 M 3 x 6									
32	891132 0121	1	Senkschraube DIN 7991, M 4 x 12									
33	891541 0095	1	Blechschrabe DIN 7982 VA 2,9 x 9,5									
34	895024 0126	1	Zylinderstift DIN 6325 d5x 12									
35	895025 0126	2	Zylinderstift DIN 6325 d6x 12									
36	893050 0005	16	Scheibe DIN 125 ST 3,2									
37	893051 0001	3	Scheibe DIN 125 ST 4,3									
38	563005	1	Reed Sensor, Öffner									

Baugruppe Gegenlager Art.Nr.: 660001 9012					
Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr	Oberfläche
1	665320 4331	1	EZ4331 Gegenlagerungsblock- S	EZ4331	
2	665320 4369	1	EZ4369 Befestigung Gegenlagerungsblock- S	EZ4369	eloxiert
3	665320 4385	1	EZ4385 Abdeckung Gegenlagerungs- S	EZ4385	eloxiert
4	893400 0026	1	Wellendichtung BABSL 25-35-6 Simrit 72 NBR902		
5	896011 6324	1	Nadellager NKI 20-16		
6	891104 0205	5	Zylinderschraube DIN 912 8.8 VA M6 x 20		
7	891054 0201	2	Sechskantschraube DIN 933 M6x20		
8	891191 0065	2	Senkschraube DIN 965 4.8 VA M 3 x 6		
9	891371 0031	1	Gewindestift DIN 913 M 3 x 3		



Artikelnummernschlüssel

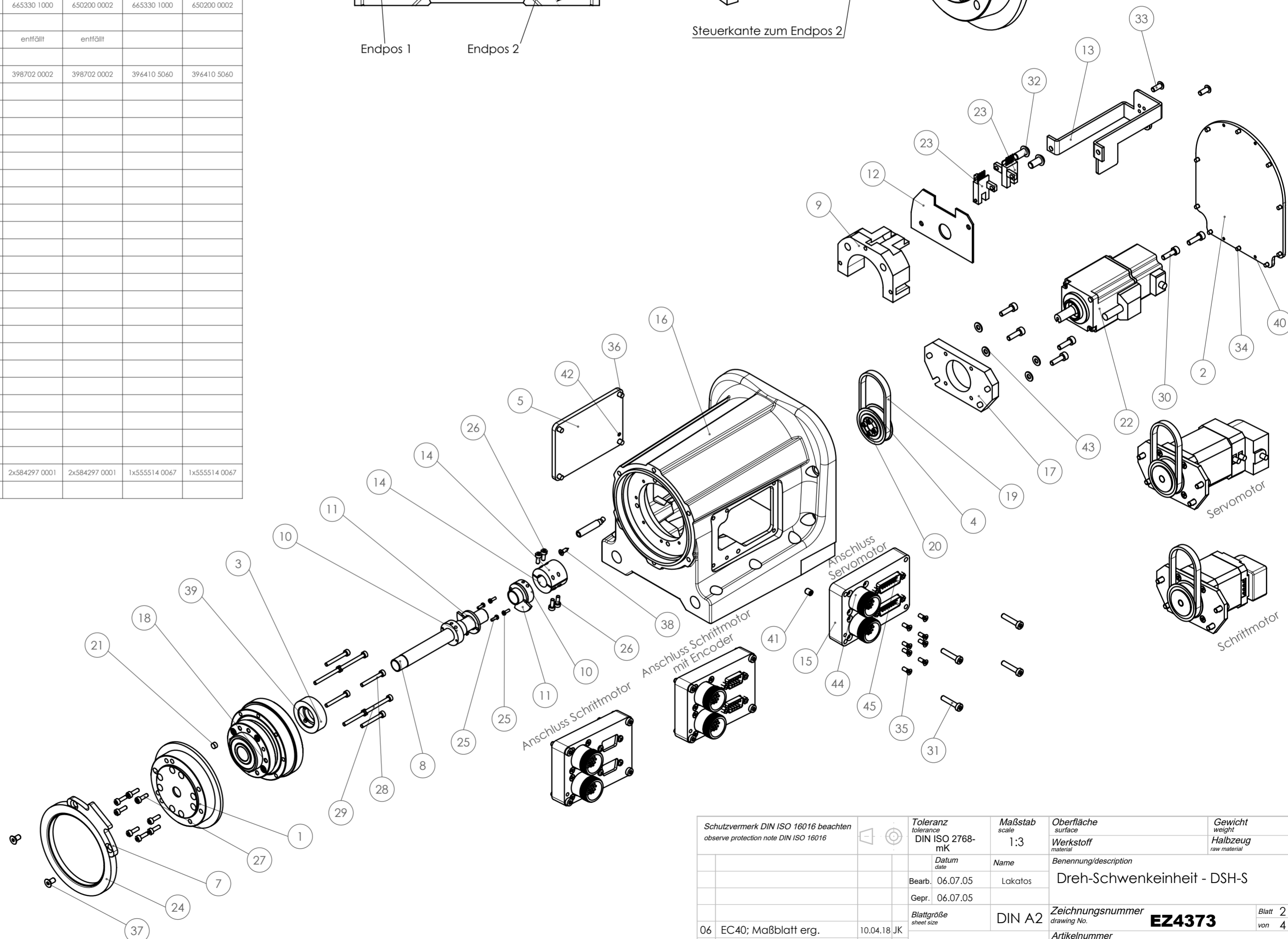
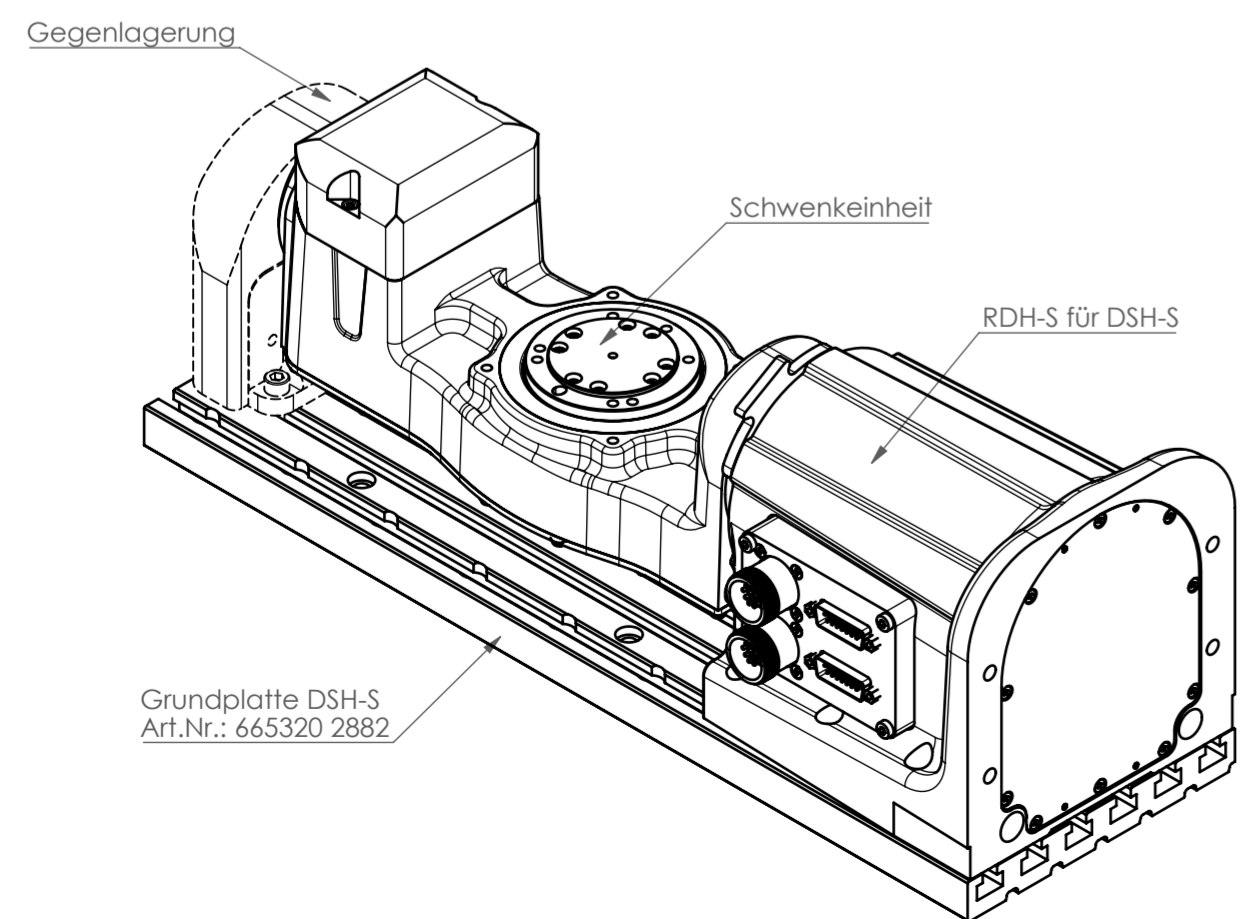
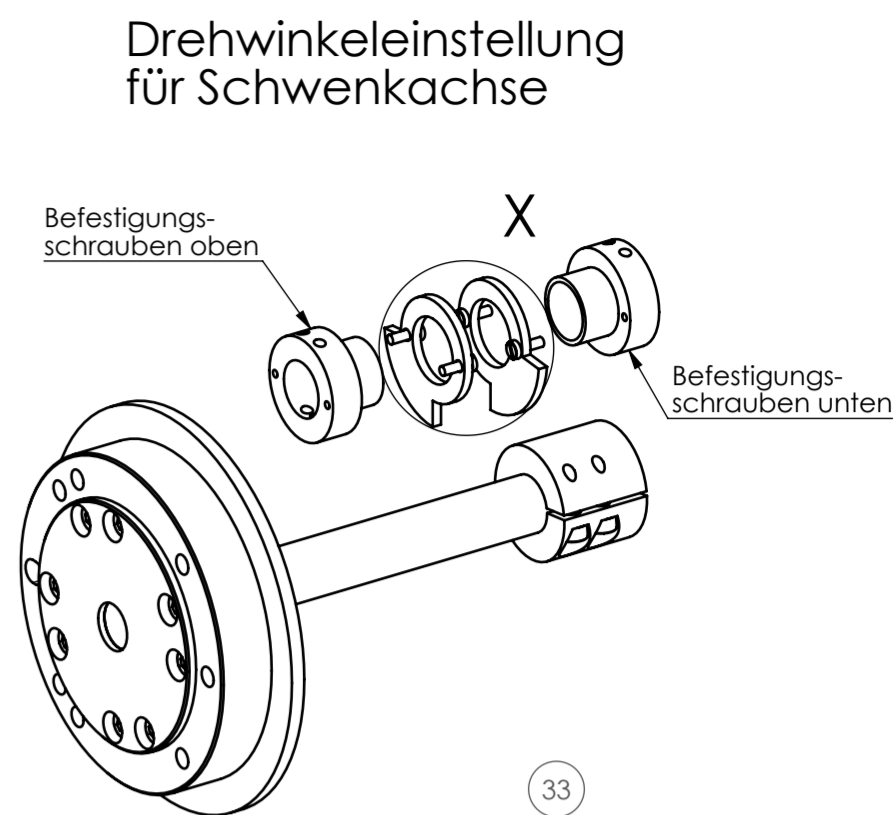
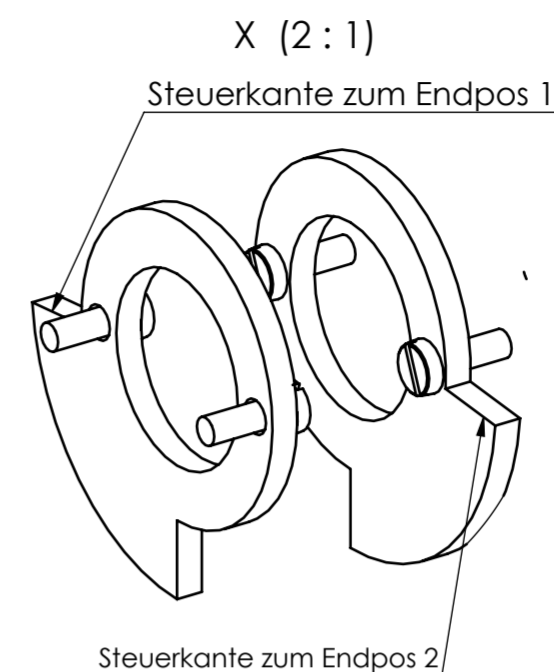
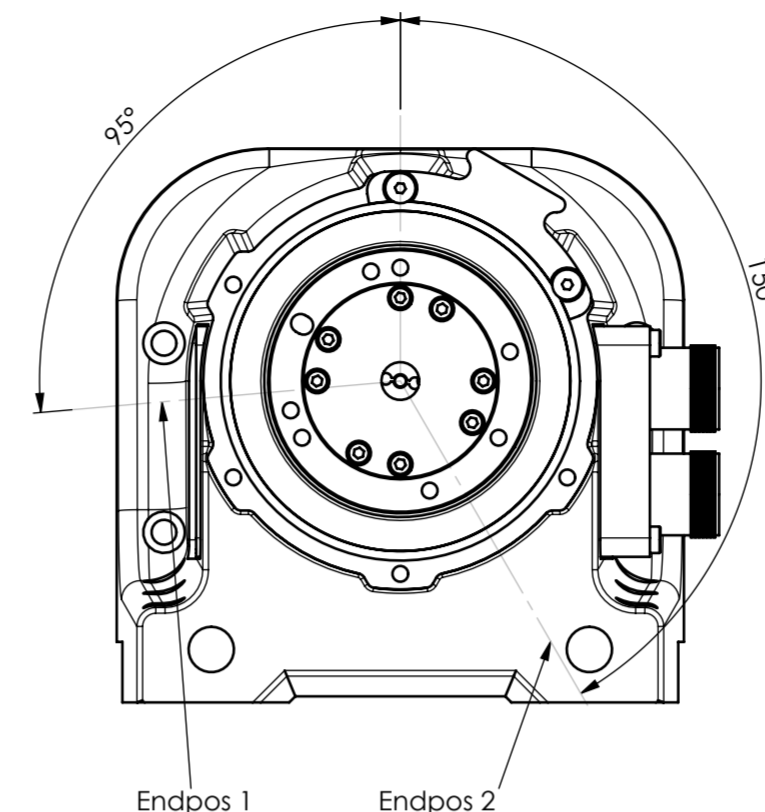
2 6 5 4 1 X 0 X 0 0

Motoren
 0 = Schrittmotor MS 045 HT mit Encoder
 3 = bürstenloser EC-Servomotor EC42
 5 = Schrittmotor MS 045 HT
 6 = bürstenloser EC-Servomotor EC40 TM

Getriebeuntersetzung
 0 = 101
 1 = 51

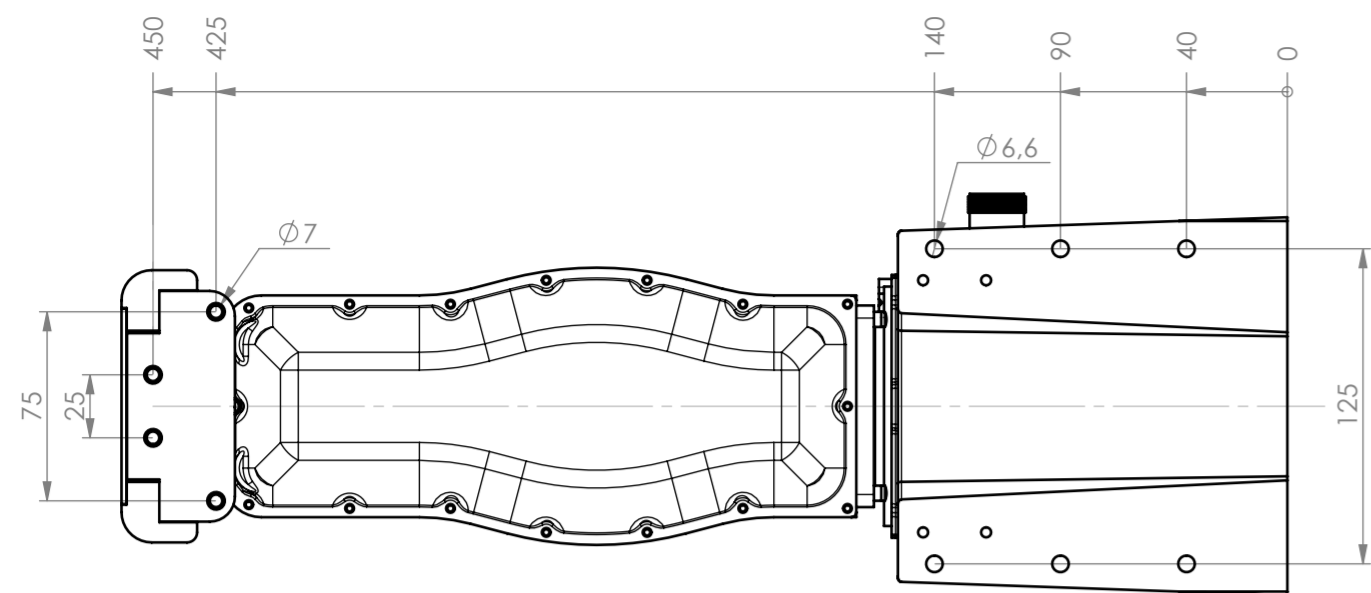
Schutzvermerk DIN ISO 18016 beachten observe protection note DIN ISO 18016		Toleranz tolerance DIN ISO 2768-mK		Maßstab scale 1:3		Oberfläche surface Werkstoff material		Gewicht weight Halbzeug raw material	
Datum date		Name		Benennung/description		Zeichnungsnummer drawing No.		Blatt 1 von 4	
Bearb. 06.07.05		Lokatos		Dreh-Schwenkeinheit - DSH-S		EZ4373			
Gepr. 06.07.05									
Blattgröße sheet size		DIN A2		Artikelnummer article No.		Baugruppe assembly		Projektbezeichnung project name	
Zust. Änderung/modifikation		Datum/date Name		isel®					

Baugruppe Rotationseinheit												
Pos.-Nr.	Artikelnummer	Menge	Benennung	Zeich.-Nr.	665410 0002 MS045HT m. Enc. 1:101	665410 1002 MS045HT m. Enc. 1:51	665413 0002 EC42 1:101	665413 1002 EC42 1:51	665410 0002o MS045HT 1:101	665410 1002o MS045HT 1:51	665416 0002 EC40 1:101	665416 1002 EC40 1:51
1	660500 3931	1	EZ3931 Adapterflansch - 14 Hohlwelle	EZ3930								
2	660500 39382	1	EZ3938 Abdeckung - unten Aust Standard	EZ3938								
3	660500 3944	1	EZ3944 Zahnradscheibe HTD3 - Z34	EZ3944								
4	siehe Tabelle	1	Zahnriemenscheibe HTD3 - Z34 mit Bordscheibe		660500 39431	660500 39431	660500 39431	660500 39431	660500 39431	660500 39431	660500 4174	660500 4174
5	660510 4184	1	DZ4184 - Abdeckblech - Sonder - imes 450l	DZ4184								
6	660510 3934	1	EZ3934 Magnetschalterbefestigung	EZ3934								
7	665320 4251	1	EZ4251-4 Anschlag - rechts	EZ4251								
8	665320 42521	1	EZ4252 Innenrohr_14 Achskombination L=112,5	EZ4252								
9	665320 4256	1	EZ4256 Endschaltermodul Ring LS	EZ4256								
10	665320 4257	2	EZ4257 Einstellring LS mit Steuerscheibe	EZ4257								
11	665320 4258	2	EZ4258 Steuerscheibe	EZ4258								
12	665320 4259	1	EZ4259 Trennblech	EZ4259								
13	665320 4262	1	EZ4262 Kabelbefestigung	EZ4262								
14	665320 4263	2	EZ4263 Kabelbefestigung-Rohr									
15	siehe Tabelle	1	DZ2868 - Anschluss - DSH-S	DZ2868	665320 2868	665320 2868	665320 2868	665320 2868	665320 2868	665320 2868	665320 28681	665320 28681
16	660500 0012	1	DZ2869 - Bearbeitung DSH-S - Servo	DZ2869								
17	siehe Tabelle	1	DU2657 - Motorbefestigungsplatte EC40-1M		660500 3942	660500 3942	660500 3942	660500 3942	660500 3942	660500 3942	675015 2657	675015 2657
18	siehe Tabelle	1	HFUS - 14 - X - 2UH		665330 1000	650200 0002	665330 1000	650200 0002	665330 1000	650200 0002	665330 1000	650200 0002
19	616504 0660	1	Zahnriemen CXP HTD 180 - 3M - 6 [Z60]									
20	634600 9003	1	Spannbuchse 8-18-11(Mödlar; 615708 00)		entfällt	entfällt	entfällt	entfällt	entfällt	entfällt		
21	632501 0002	1	Neodym-Blockmagnet_3mm									
22	siehe Tabelle	1	Motormodul		398702 0001	398702 0001	398703 0004	398703 0004	398702 0002	398702 0002	396410 5060	396410 5060
23	665320 0001	2	Gabellichtschranke PM-T54P									
24	893400 0027	1	Wellendichtung BABSL 90-70-7 Simit 72 NBR902									
25	89114x 0061	4	Zylinderschraube DIN 84 4.8 VG M 2 x 6									
26	891101 0081	4	Zylinderschraube DIN 912 8.8 VZ M3 x 8									
27	891101 0105	8	Zylinderschraube DIN 912 8.8 VA M3 x 10									
28	891101 0251	5	Zylinderschraube DIN 912 8.8 VZ M3 x 25									
29	891101 0301	3	Zylinderschraube DIN 912 8.8 VZ M3 x 30									
30	891102 0141	6	Zylinderschraube DIN 912 8.8 VZ M4 x 14									
31	891122 0201	4	Zylinderschraube DIN 6912 A2 M 4 x 20									
32	891594 0120	2	Linsenkopfschraube DIN 7380 M 6 x 12									
33		2	Linsenkopfschraube DIN 7380 M 4 x 10									
34	891191 0065	10	Senkschraube DIN 965 4.8 VA M 3 x 6									
35	891191 0085	8	Senkschraube DIN 965 4.8 VA M 3 x 8									
36	891192 0085	4	Senkschraube DIN 965 4.8 VA M 4 x 8									
37	891132 0085	2	Senkschraube DIN 7991 VA, M 4 x 8									
38	891541 0095	1	Blechschrabe DIN 7982 VA 2,9 x 9,5									
39	891371 0031	3	Gewindestift DIN 913 M 3 x 3									
40	891371 0035	4	Gewindestift DIN 913 VA M 3 x 3									
41	891373 0061	1	Gewindestift DIN 913 M 5 x 6									
42	891372 0045	2	Gewindestift DIN 913 VA M 4 x 4									
43	893051 0001	4	Scheibe DIN 125 ST 4,3									
44	550103 0000 / 550104 0012	1	Gerätesteckverbinder M23 - Stift 12polig									
45	siehe Tabelle	n	Anschluss Sub-D		1x555501 0067	1x555501 0067	1x555514 0067	1x555514 0067	2x584297 0001	2x584297 0001	1x555514 0067	1x555514 0067
46	563005	1	Reed Sensor, Öffner									

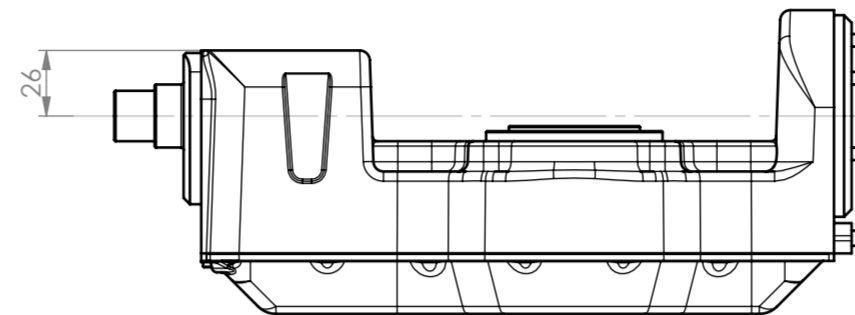


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Datum date		Name		Benennung/description		Dreh-Schwenkeinheit - DSH-S			
Bearb. 06.07.05		Lokatos		Zeichnungsnummer drawing No.		EZ4373		Blatt 2 von 4	
Gepr. 06.07.05		DIN A2		Artikelnummer article No.					
Blattgröße sheet size				Baugruppe assembly					
Zust. Änderung/modifikation		Datum/date Name		Projektbezeichnung project name					

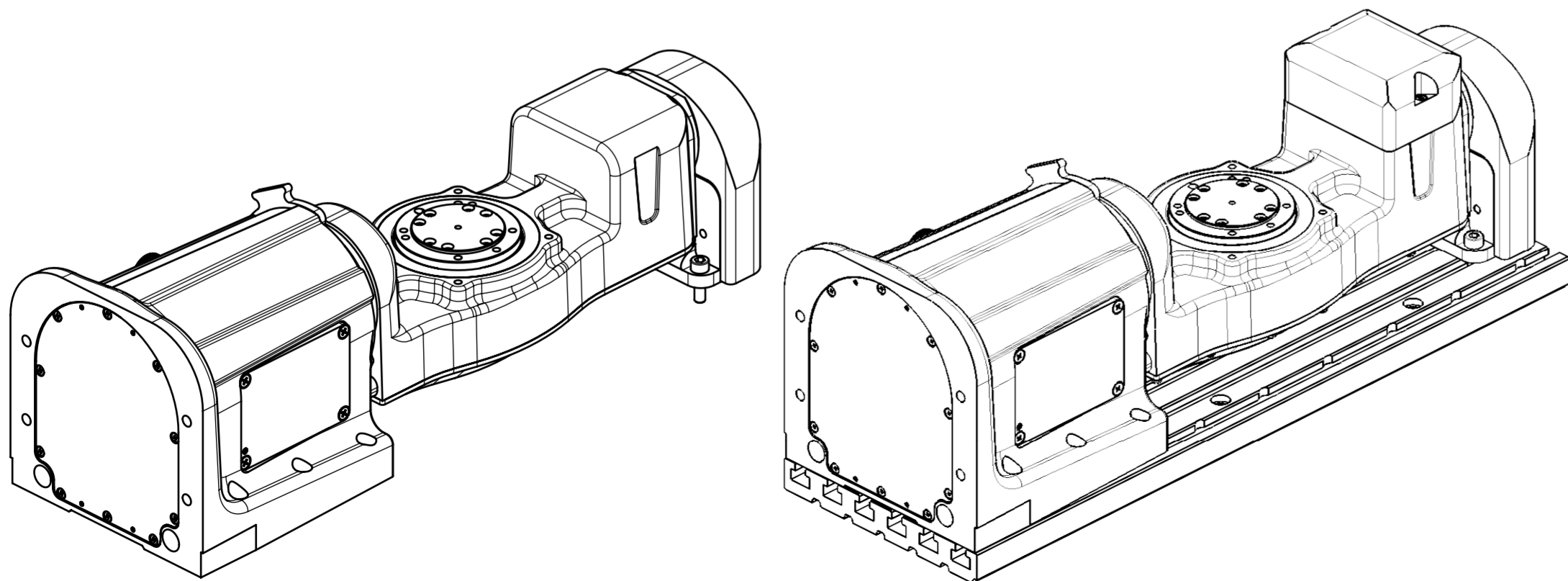
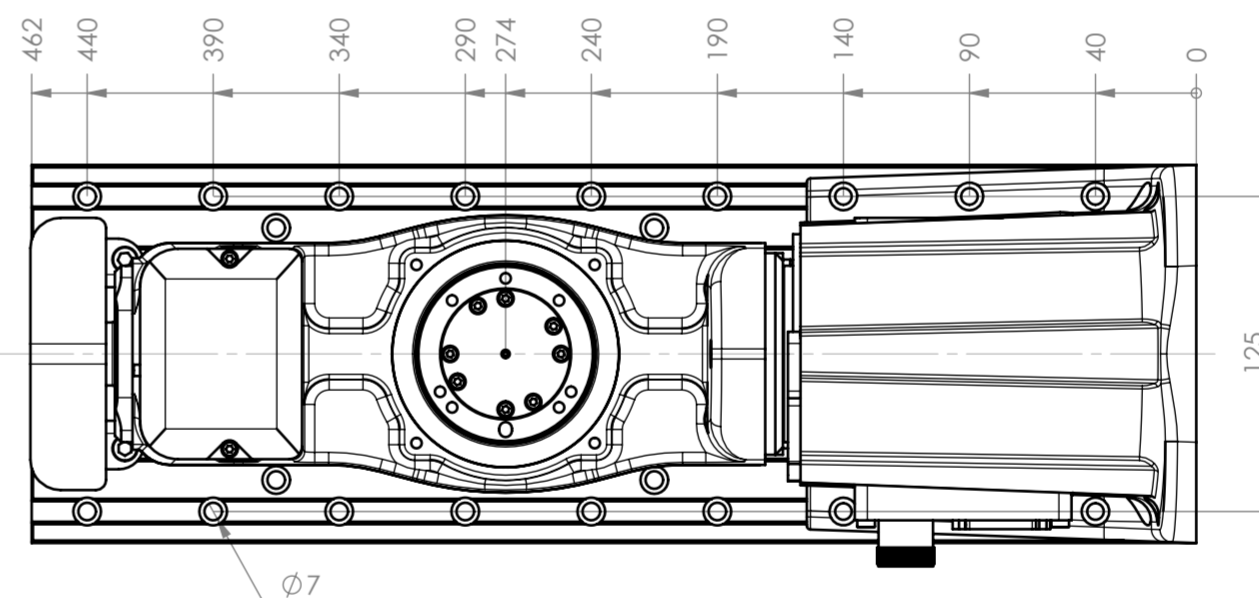
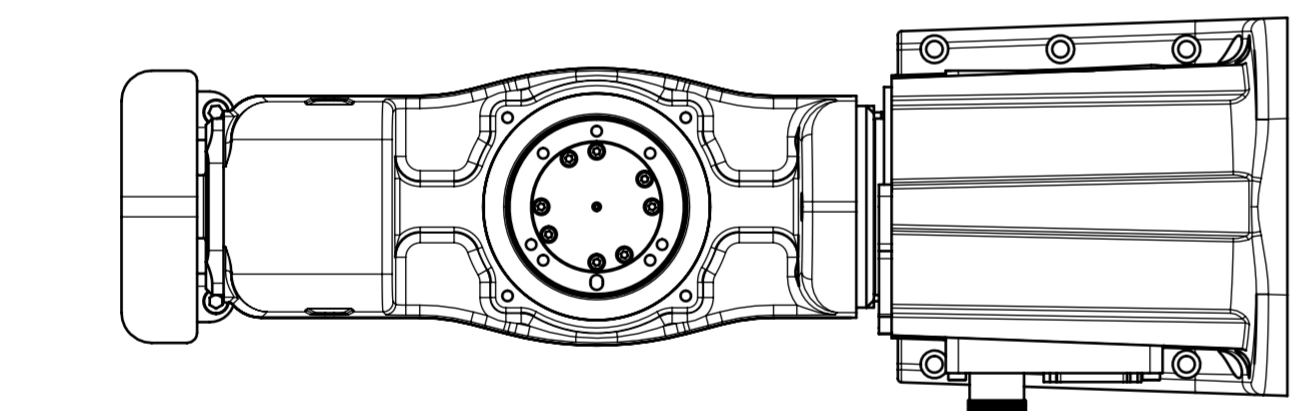
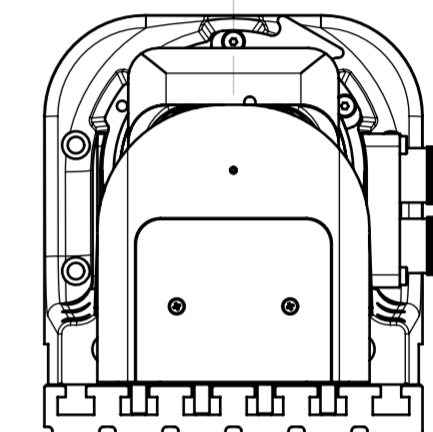
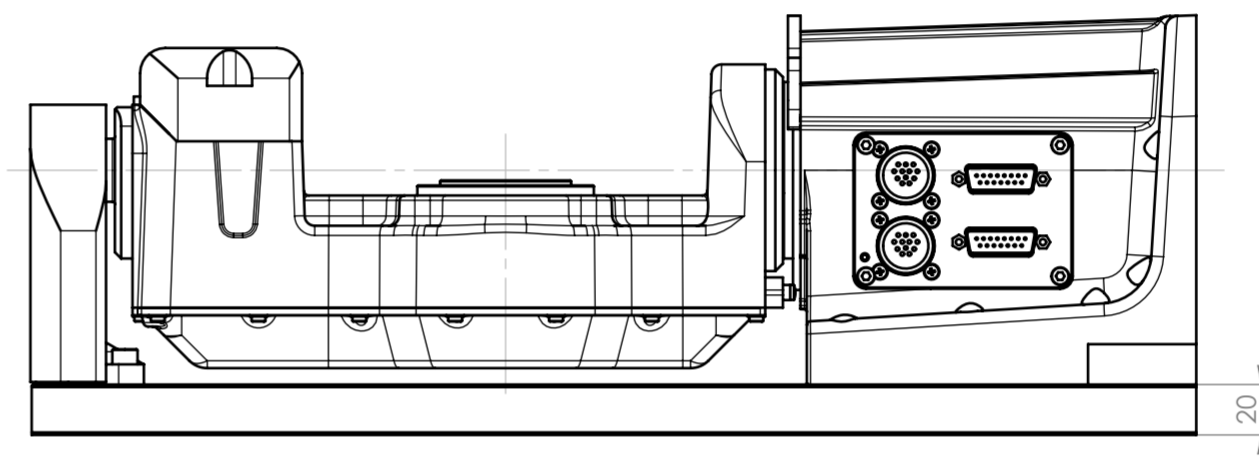
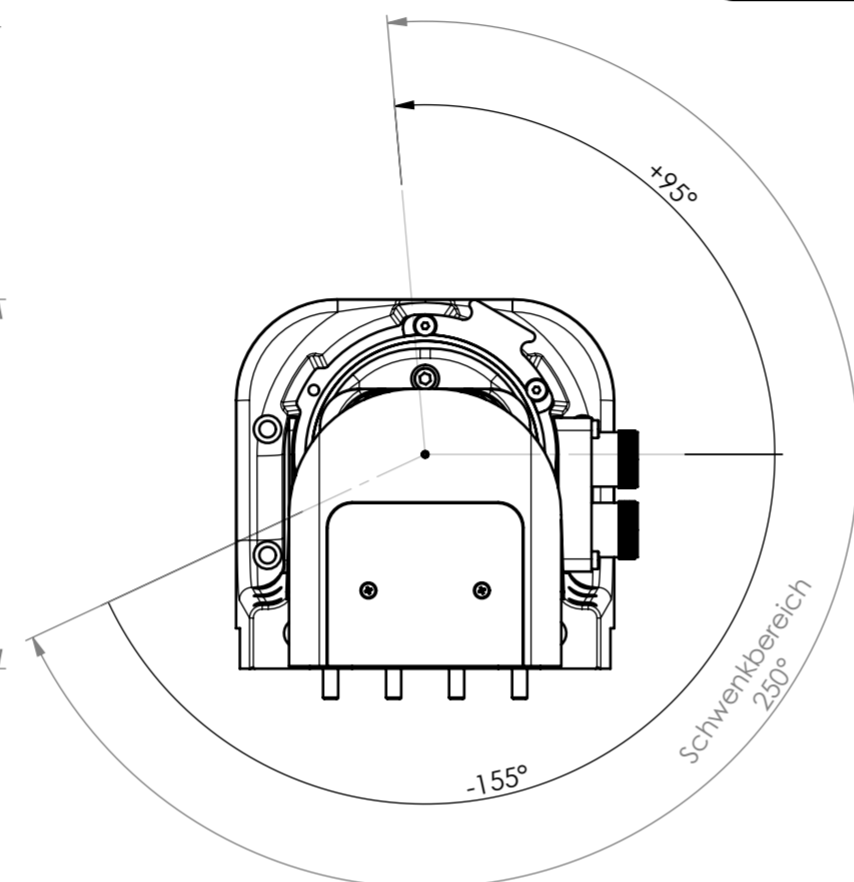
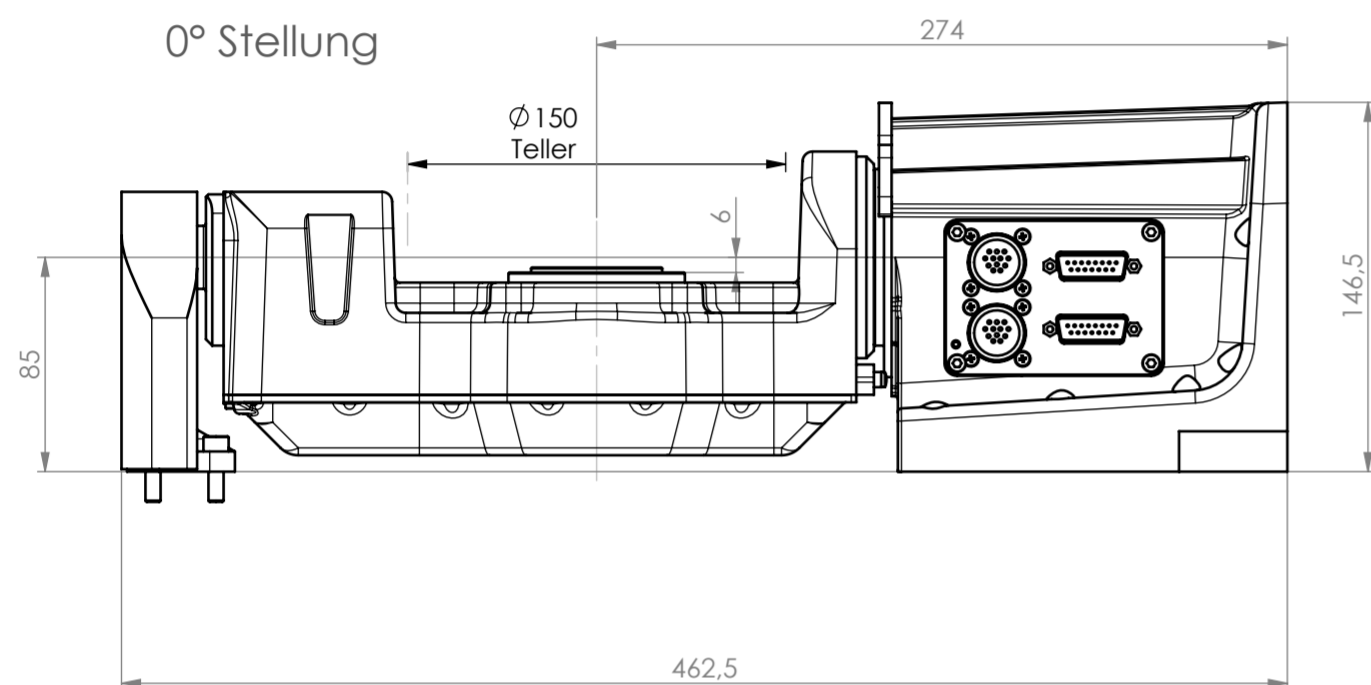
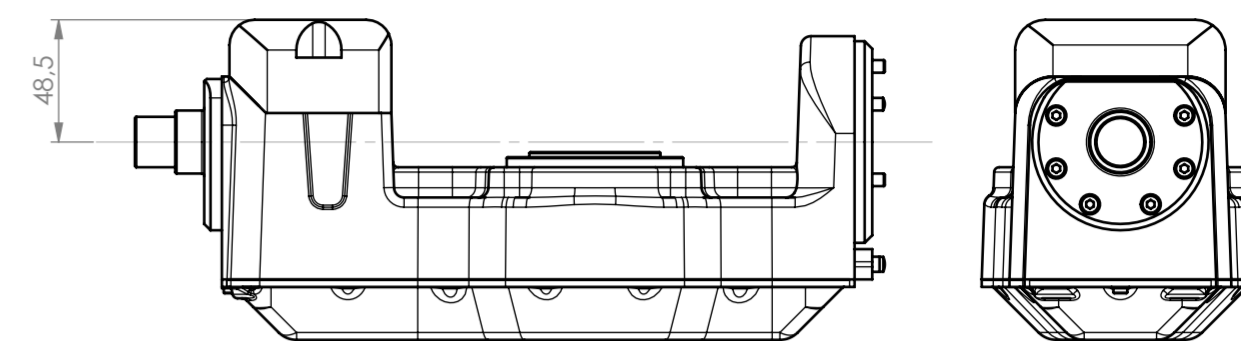




Ausführung
Schrittmotor



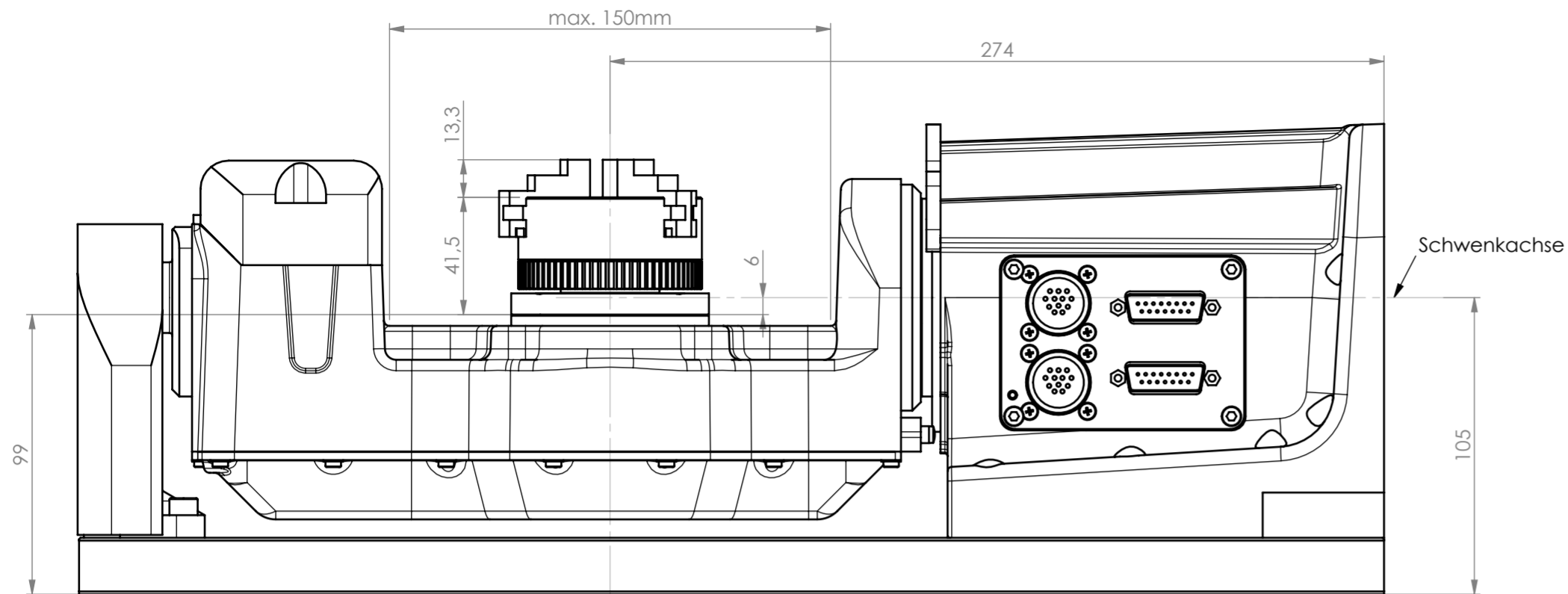
Ausführung
Servomotor



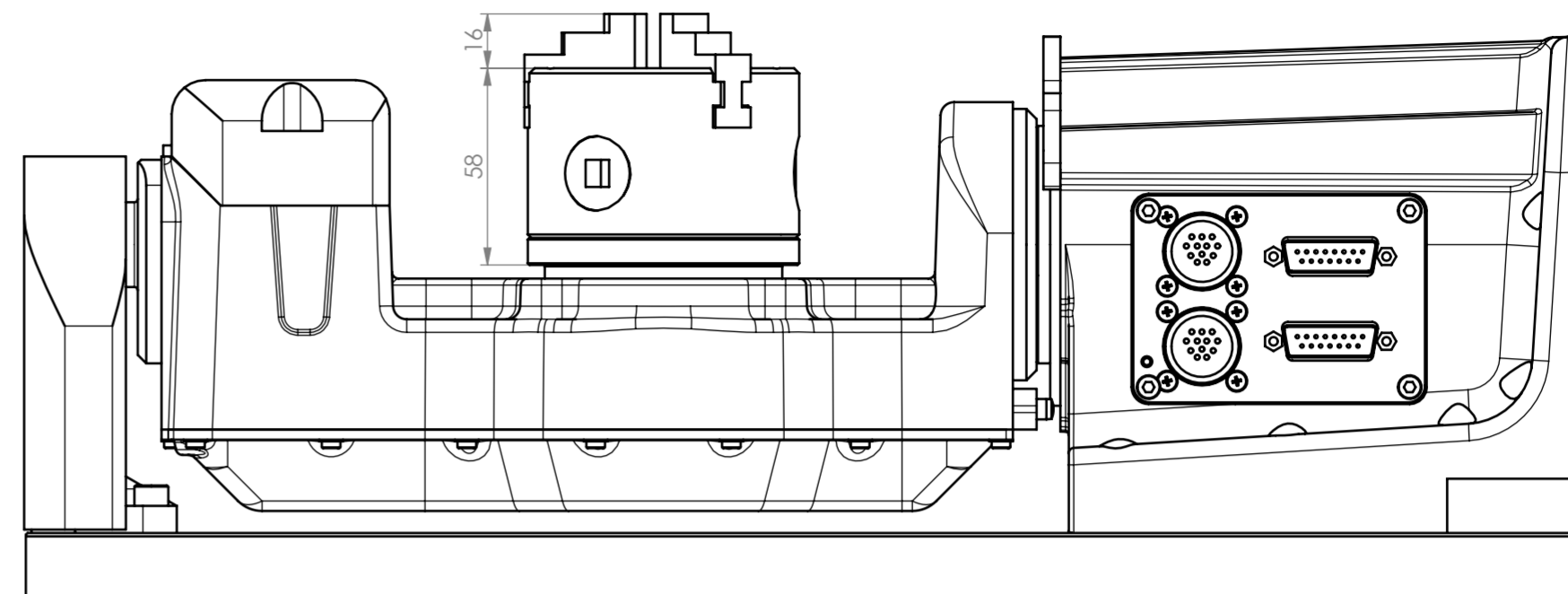
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		Datum date		Name		Benennung/description			
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		Gepr. 06.07.05							
		Blattgröße sheet size		DIN A2		Zeichnungsnummer drawing No.		Blatt 3 von 4	
06 EC40; Maßblatt erg.		10.04.18 JK				EZ4373			
05 überarbeitet		26.07.10 KO				Artikelnummer article No.			
04 überarbeitet		12.07.06 IL				Baugruppe assembly			
Zust. Änderung/modifikation		Datum/date Name				Projektbezeichnung project name			



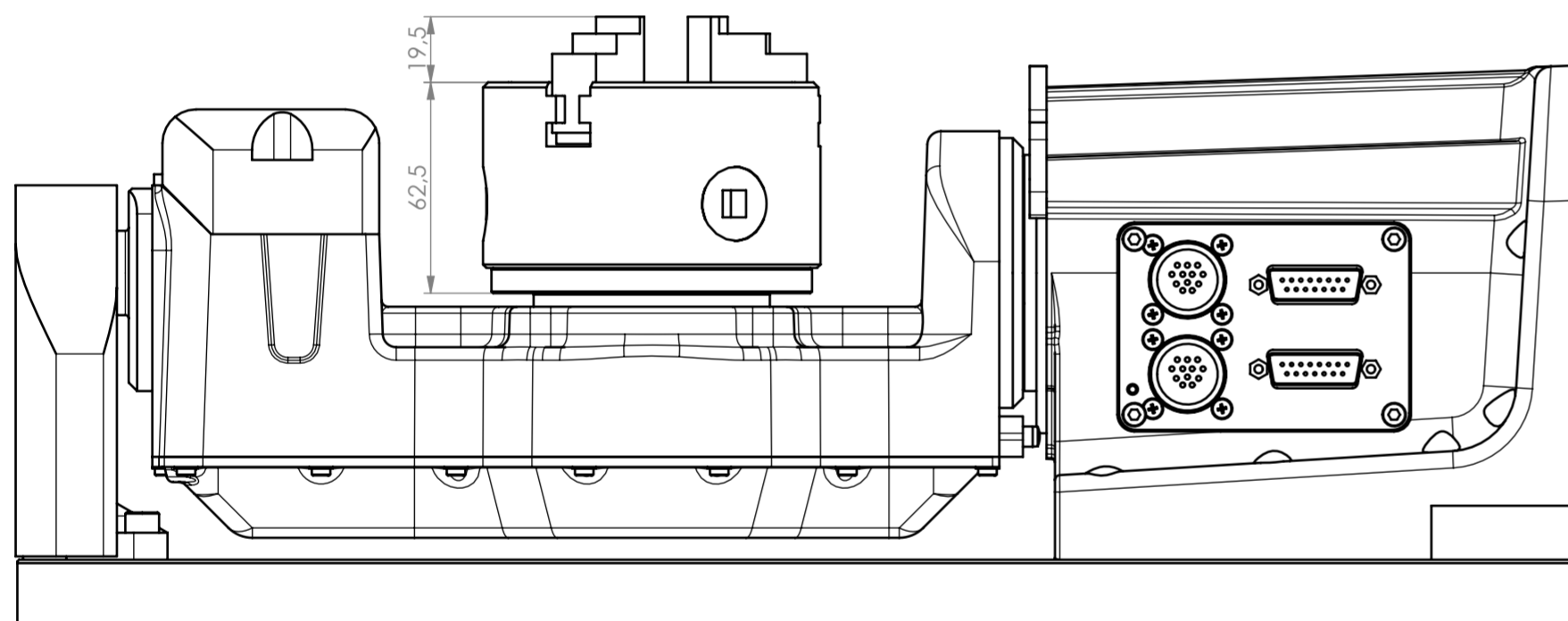
Dreh-Schwenkeinheit DSH-S
mit Dreibackenspannfutter $\varnothing 65\text{mm}$ Art.Nr.: 269060 3065



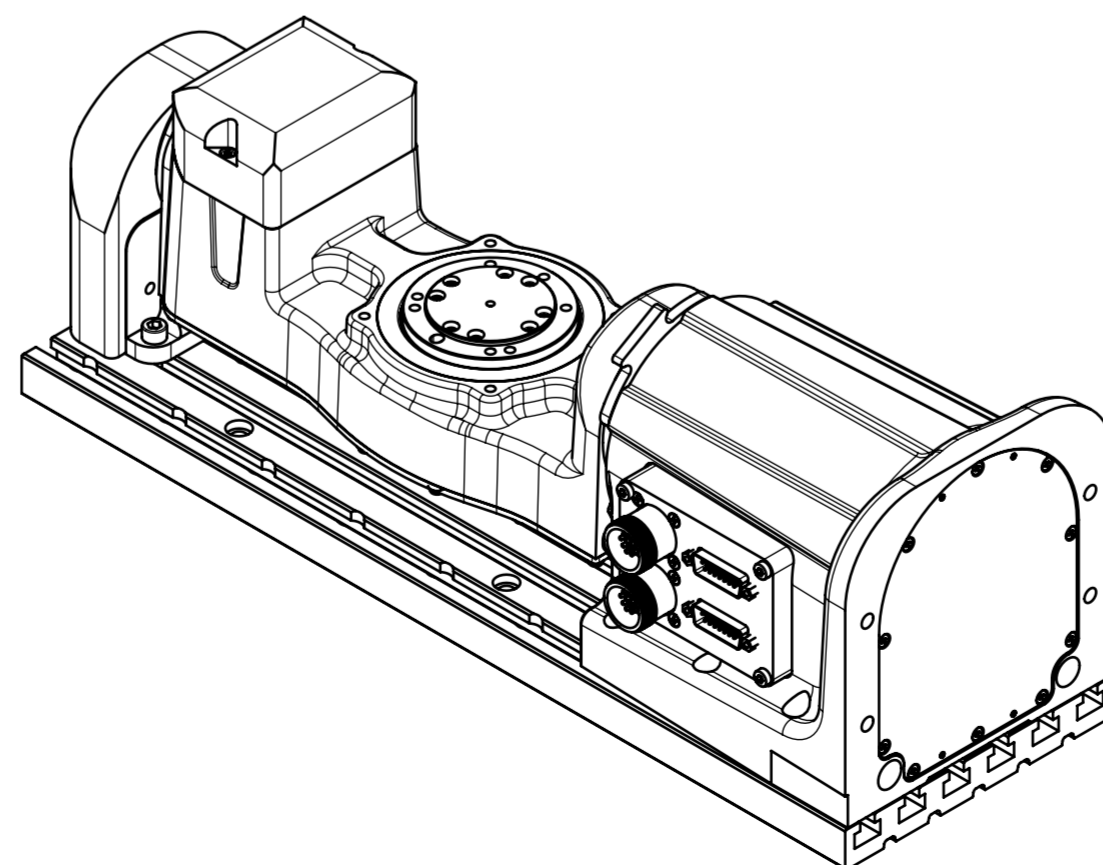
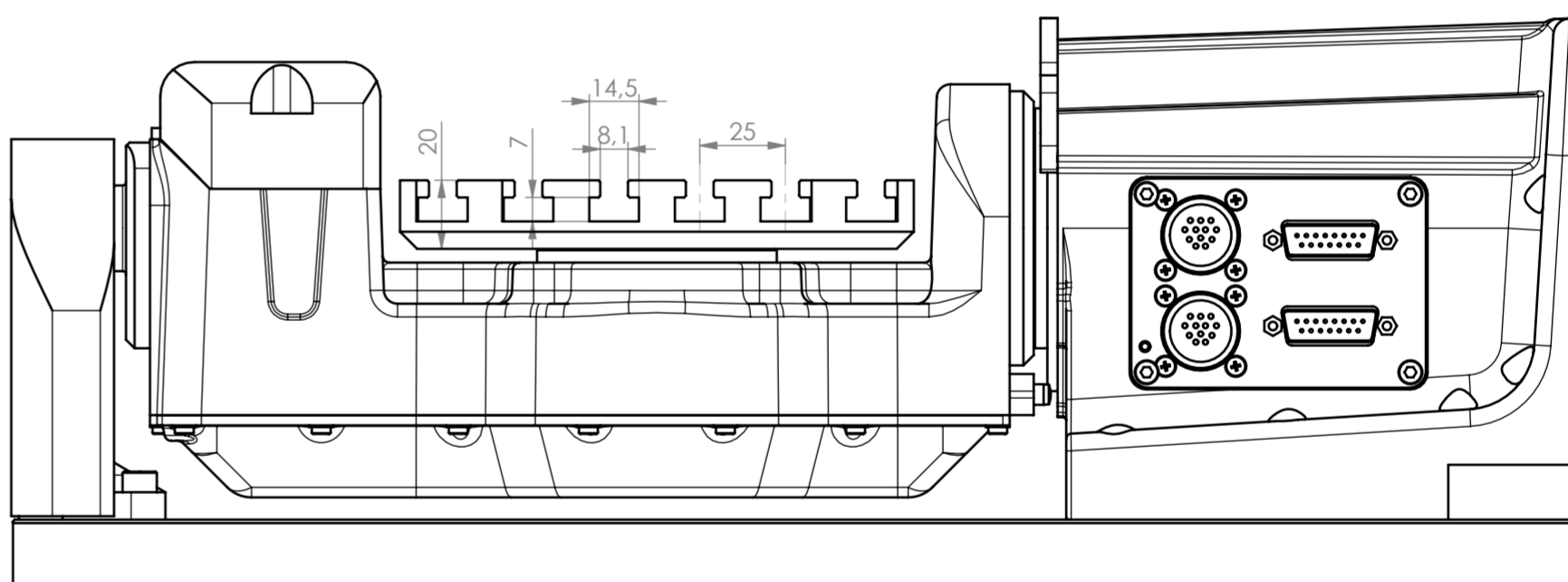
Dreh-Schwenkeinheit DSH-S
mit Dreibackenspannfutter $\varnothing 80\text{mm}$ Art.Nr.: 269060 2080



Dreh-Schwenkeinheit DSH-S
mit Dreibackenspannfutter $\varnothing 100\text{mm}$ Art.Nr.: 269060 2100



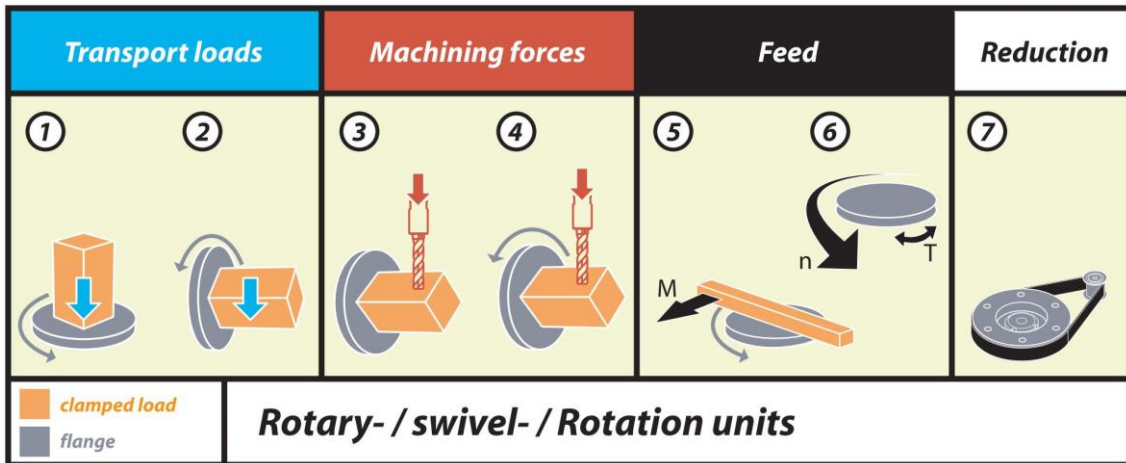
Dreh-Schwenkeinheit DSH-S
mit Rundteller $\varnothing 150\text{mm}$ Art.Nr.: 269050 0150



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		Datum date		Name	Benennung/description	
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		Gepr. 06.07.05				
		Blattgröße sheet size		DIN A2	Zeichnungsnummer drawing No. EZ4373	
06 EC40; Maßblatt erg.		10.04.18 JK			Blatt 4 von 4	
05 überarbeitet		26.07.10 KO			Artikelnummer article No.	
04 überarbeitet		12.07.06 IL			Baugruppe assembly	
Zust. Änderung/modifikation		Datum/date		Name	Projektbezeichnung project name	



2.5.2 Transport loads, machining forces, feed rate



Rotation unit	1 ¹	2 ²	3	4	5	6	7
RDH-M (Step)	100kg	45kg	55Nm	24Nm	24Nm	4 rpm.	1: 51
RDH-M (Step)	160kg	70kg	108Nm	45Nm	45Nm	2 rpm.	1: 101
RDH-M (EC-Servo/brushless)	110kg	50kg	26Nm	9Nm	9Nm	22 rpm.	1: 51
RDH-M (EC-Servo/brushless)	180kg	80kg	51Nm	17Nm	17Nm	11 rpm.	1: 101
RDH-M (DC-Servo/brushed)	110kg	50kg	15Nm	7Nm	7Nm	22 rpm.	1: 51
RDH-M (DC-Servo/brushed)	180kg	80kg	30Nm	14Nm	14Nm	11 rpm.	1: 101
RDH-S (Step)	30kg	15kg	7Nm	7Nm	7Nm	4 rpm.	1: 51
RDH-S (Step)	48kg	24kg	11Nm	11Nm	11Nm	2 rpm.	1: 101
RDH-S (EC-Servo /brushless)	30kg	15kg	7Nm	4,6Nm	4,6Nm	22 rpm.	1: 51
RDH-S (EC-Servo /brushless)	48kg	24kg	11Nm	4,6Nm	9,2Nm	11 rpm.	1: 101
RDH-S (DC-Servo/brushed)	25kg	13kg	7Nm	4,6Nm	4,6Nm	22 rpm.	1: 51
RDH-S (DC-Servo/brushed)	40kg	20kg	11Nm	8,7Nm	8,7Nm	11 rpm.	1: 101
RDH-XS (Step)	30kg	10kg	5Nm	5Nm	5Nm	24 rpm..	1: 50
RDH-XS (Step)	30kg	10kg	7Nm	7Nm	7Nm	12 rpm.	1: 100
RDH-XS (EC-Servo/brushless)	30kg	10kg	5Nm	5Nm	5Nm	59 rpm.	1: 50
RDH-XS (EC-Servo/brushless)	30kg	10kg	7Nm	7Nm	7Nm	30 rpm.	1: 100
RDH-XS (DC-Servo/brushed)	30kg	10kg	5Nm	5Nm	5Nm	70 rpm.	1: 50
RDH-XS (DC-Servo/brushed)	30kg	10kg	7Nm	7Nm	7Nm	35 rpm.	1: 100

Table 5 - Transport loads, machining forces, feeds rotation unit RDH

Performance data of the drive bearing			RDH-M	RDH-S / DSH-S	RDH-XS
dynamic load rating	C	[N]	21800	5800	-
static load rating	C ₀	[N]	35800	8600	-
Permissible dynamic tilting moment ³	M	[Nm]	258	74	5
Permissible static tilting moment ⁴	M ₀	[Nm]	1070	144	5
resistance against tilt	K _b	[Nm/arcmin]	114	25	-
permissible axial load ⁵	F _a	[N]	11504	3044	392

¹ Guide values that vary depending on the application

² Guide values that vary depending on the application

³ Applies to rotating gears

⁴ Applies to stationary gearboxes with static safety 1.5

⁵ based on normal load, average speed 15 min-1, service life 15000h

permissible radial load ¹	F_r	[N]	7708	2039	392
The data apply only to one load		$M, M_0 \rightarrow F_a = F_r = 0$ $F_a \rightarrow F_r = 0, M = 0$ $F_r \rightarrow F_a = 0, M = 0$			
The service life is calculated in the same way as for rolling bearings using the equivalent dynamic load, load factors, the average output speed and the service factor for the basic load ratings.					

Table 6 - Performance data of the drive bearing

¹ based on normal load, average speed 15 min-1, service life 15000h

2.5.3 Drive modules

Various drive modules with stepper motors, brushed servo motors (BDC) and brushless servo motors (BLDC) are integrated for the rotation units RDH as standard.

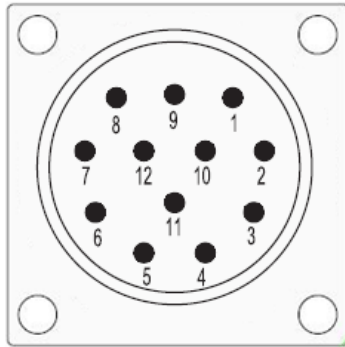
	Drive module	RDH-XS	RDH-S	RDH-M	DSH-S	Item-No.
Stepper motor	MS-045 HAT	X	X		X	398702 0002
	MS-200 HAT			X		398701 0002
EC servo motor	EC 40TM (brushless)	X	X		X	396410 50602
	EC 60TM (brushless)			X		398725 0001
DC servo motor	RE 40 (brushed)	X	X		X	398700 0001
	DC 100 (brushed)			X		398700 0012

Table 7 - Overview drive modules of the rotation units RDH - XS, S, M

2.5.4 Pin assignment of the motors

Pin assignment M23 12-pin for stepper motors

motor connection



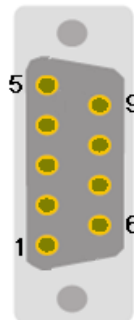
view of plug pins on plug side

M23 12-pin plug

- 1 motor phase 1A
 - 2 motor phase 1B
 - 3 motor phase 2A
 - 4 motor phase 2B
 - 5 +24V switches
 - 6 +24V brake
 - 7 GND switches
 - 8 GND brake
 - 9 limit switch 1
 - 10 limit switch 2
 - 11 ---
 - 12 ---
- case - cable shield

Pin assignment Sub-D 9-pin for stepper motors

motor connection



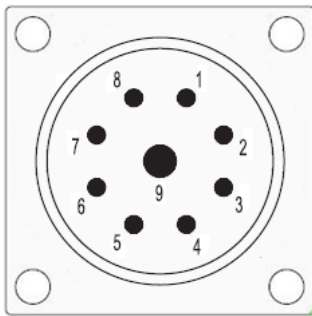
view of plug pins on plug side

Sub-D-9-pin plug

- 1 motor phase 1A
 - 2 motor phase 1B
 - 3 motor phase 2A
 - 4 motor phase 2B
 - 5 +24V switches
 - 6 +24V brake
 - 7 limit switch 2
 - 8 GND brake
 - 9 limit switch 1
- case - cable shield

Pin assignment for brushless EC-servo-motors (BLDC) - 48V

motor connection

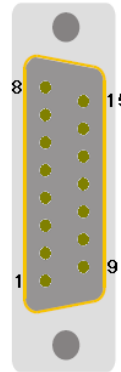


view of plug pins on plug side

M23 9-pin (8+1) plug

- 1 motor phase U
- 2 motor phase V
- 3 motor phase W
- 4 ---
- 5 +24V brake
- 6 GND brake
- 7
- 8
- 9 protected earth PE case - cable shield

encoder connection



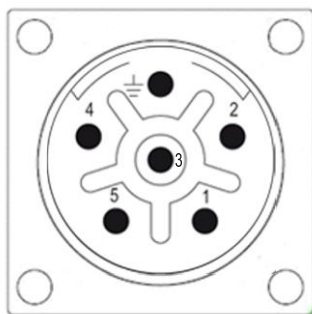
view of plug pins on plug side

Sub-D 15-pin plug

- 1 Hall signal A
- 2 +5V encoder/Hall
- 3 encoder line /Z
- 4 encoder line /B
- 5 encoder line /A
- 6 +24V switches
- 7 limit switch 1
- 8 GND switches
- 9 Hall signal B
- 10 GND encoder
- 11 encoder line Z
- 12 encoder line B
- 13 encoder line A
- 14 Hall signal C
- 15 limit switch 2* case - cable shield

Pin assignment for brushless EC-servo-motors (BLDC) - 48V, 400W

motor connection



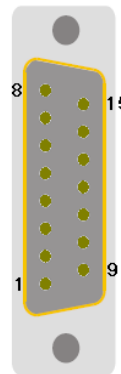
view of plug pins on plug side

M23 9-pin (8+1) plug

- 1 motor phase U
- 2 motor phase V
- 3 motor phase W
- 4 +24V brake
- 5 GND brake
- PE protected earth PE

case - cable shield

encoder connection



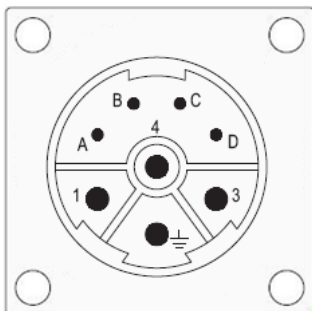
view of plug pins on plug side

Sub-D 15-pin plug

- 1 Hall signal A
- 2 +5V encoder/Hall
- 3 encoder line /Z
- 4 encoder line /B
- 5 encoder line /A
- 6 +24V switches
- 7 limit switch 1
- 8 GND switches
- 9 Hall signal B
- 10 GND encoder
- 11 encoder line Z
- 12 encoder line B
- 13 encoder line A
- 14 Hall signal C
- 15 limit switch 2 case - cable shield

Pin assignment for brushless EC-servo-motors (BLDC) - 310V

motor connection

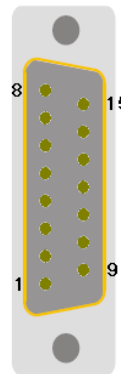


view of plug pins on plug side

M23 9-pin (4+3+1) plug

- 1 motor phase U
- PE protected earth PE
- 3 motor phase W
- 4 motor phase V
- A +24V brake
- B GND brake
- 7 ---
- 8 ---
- case - cable shield

encoder connection



view of plug pins on plug side

Sub-D 15-pin plug

- 1 Hall signal A
- 2 +5V encoder/Hall
- 3 encoder line /Z
- 4 encoder line /B
- 5 encoder line /A
- 6 +24V switches
- 7 limit switch 1
- 8 GND switches
- 9 Hall signal B
- 10 GND encoder
- 11 encoder line Z
- 12 encoder line B
- 13 encoder line A
- 14 Hall signal C
- 15 limit switch 2 case - cable shield


* Limit switch 2 not applicable for motor modules of rotation units → jumper to PIN 6

3 Safety

This chapter informs you about possible dangers and about your protection options against these dangers when handling the machine.

You will receive information on personal and accident protection and on safety-related behaviour when working with this machine. The basic prerequisite for the safe handling and trouble-free operation of this machine is the knowledge of the safety instructions, the safety regulations and the safety equipment of the machine as well as their function. This information, in particular the safety instructions, must be observed by all persons working on the machine.

In addition, the generally applicable rules and regulations for accident prevention must be observed.

⚠ DANGER!	
	<p>Failure to observe the safety instructions in the operating instructions</p> <p>Failure to observe the safety instructions will result in serious injury or death!</p> <ul style="list-style-type: none"> > Carefully read this section of the operating instructions before connecting and commissioning the machine! > As with all technical systems, perfect functioning and operational safety are only guaranteed with this machine if the usual safety precautions as well as the special safety instructions are observed during operation. > Store the operating instructions near the machine

3.1 Operator's liability

Instruction duty

The safety in the plant can only be implemented in operational practice if all necessary measures have been taken. It is the operator's duty of care to plan these measures and to monitor the execution of the same.

- The operator must instruct the employees before the initial start-up of the potential risks, remaining risk and measures during the use of this machine so that they can use it. This instruction must be given to every employee operating the system or being in the immediate danger zone. The operating personnel must have understood the instruction and it must be ensured that it is complied with.
- The knowledge of the operation and maintenance according to the following maintenance, repair and cleaning regulations of the machine is a prerequisite for the perfect machine operation. The machine operator must have an appropriate qualification for such tasks (to be able to carry out the corresponding work according to the state of the art). This qualification includes the ability to assess the remaining risks.
- The plant may only be used under a technically perfect condition as well as according to its intended purpose and with regard to safety and dangers by taking into consideration these operating instructions! Especially, malfunctions which could impair safety must be remedied immediately!
- The machine operator is responsible for ensuring that these operating instructions are supplemented and followed by in-house instructions concerning work instructions, supervision and reporting duty, organization of work, personnel qualifications, etc. The individual competencies related to the different tasks on and with the machine and in the immediate vicinity of the same must be clearly defined, identified and observed by the operator. In this context, potential hazards and risks must be taken into account.
- The applicable work safety regulations as well as any other applicable rules and regulations concerning work safety and health protection must be observed.

- The competences for the various activities in the context of the operation, maintenance and repair of the plant must be clearly defined and complied with. This is the only way to avoid wrongdoing - especially in dangerous situations.
- The operator must oblige the operating personnel to wear personal protective equipment if this is provided by the local regulations. If necessary or required by the regulations, an additional personal protective equipment must be used.
- If safety-relevant changes to the operating behaviour or malfunctions occur on the plant, the latter must be immediately shut down and the process must be reported to the responsible body/person in charge!

Determination of technological parameters

- The machine operator is responsible for the selection and processing of the materials. In addition, a risk assessment of the workplace according to the paragraphs 5 and 6 of the Work Protection Law ArbSchG must be carried out.

3.2 Intended use

The rotary units are used for the rotary movement and positioning of loads permanently mounted on the output flange in non-hazardous environments under the operating and ambient conditions defined for this product. The mounting position can be optional (horizontal, vertical or inclined).

The rotary units are an incomplete machine (compare article 2g of the Machinery directive 2006/42/EC. Here the incomplete machine is defined as follows (quote):

"An incomplete machine is an assembly that almost forms a machine, but cannot perform a specific function on its own. A drive system constitutes a partly completed machine. Partly completed machinery is only intended to be incorporated into or assembled with other machinery or other partly completed machinery or equipment to form, together with them, machinery within the meaning of this Directive."

The rotation units RDH - XS, S, M are intended for installation in a machine or in other incomplete machines.

The product is **not** intended for the transport of persons.

The intended use includes:

- the observance of the assembly instruction, the safety instructions and accident prevention regulations
- the operation and maintenance of the rotation unit exclusively by instructed qualified personnel
- the use of the rotation unit exclusively in technically proper condition
- the compliance with the intervals specified in the maintenance plan
- the use exclusively of the materials and accessories approved by the isel Germany GmbH, materials as well as the spare parts listed in the assembly instruction
- the use of the rotation unit in dry rooms (workshops, laboratories or similar rooms) and industrial plants (maximum ambient temperature: 40°C).

Do not use the product:

- outdoors
- for transportation of people
- in the food industry
- in the clean room


Any other use than that described above is not in accordance with the intended use and may result in injury to persons and damage to property.

3.2.1 Reasonably foreseeable misuse

Reasonably foreseeable misuse includes

- any use beyond the intended use.
- the processing/use of non-approved components.
- operation outside the specified performance data.
- disregarding the documentation
- unauthorized additions and modifications that impair safety
- if faults are not rectified immediately, that affect safety

3.3 Safety instructions

⚠ WARNING!	
	<p>Non-compliance with the safety instructions in the operating manual</p> <p>Non-observance of the safety instructions may cause slight to severe injuries and damage to the machine!</p> <ul style="list-style-type: none"> > Read this section of the operating manual carefully before connecting and commissioning the machine! > As with all technical systems, perfect functioning and operational safety of this machine can only be guaranteed if both the generally applicable safety measures and the special safety instructions are observed during operation. > Keep the operating instruction near the machine

3.3.1 General safety instructions

Safety instructions

The following safety and hazard warnings are for your protection, the protection of third parties and the protection of the product. You should therefore observe them without fail.




- Observe all instructions attached to the product.
- The safety rules and regulations of the country in which the product is used/applied must be observed.
- The valid regulations for accident prevention and environmental protection must be observed.
- Persons who assemble, operate, disassemble or maintain this product must not be under the influence of alcohol, other drugs or medicines that influence the ability to react.
- Check the product for obvious damage and only use it in a technically perfect condition.
- The product must not come into direct contact with moisture or water. The system (the machine/plant in which the product is installed) is only suitable for dry indoor areas. When changing from cold to warm environments, allow the product to warm up for a few hours before use, otherwise damages from condensated water may occur.
- Do not install the product near equipment that generates strong electromagnetic fields. This could interfere with the function. Avoid environments with direct sunlight, intense heat, cold, humidity or wetness.
- Only accessories and spare parts approved by isel Germany GmbH may be used in order to avoid personal hazards due to unsuitable spare parts.
- Observe the technical data and ambient conditions specified in the product and accessory documentation.
- Do not put the product into operation until it has been determined that the end product (for example, a machine or system) in which the product is installed complies with the country-specific regulations, safety regulations and standards of the application.
- Ensure that the product is not modified or converted unless permitted in the product documentation.


- Never disassemble the product.
- Parts of the product can become very hot during the operation. Allow these parts to cool before touching.
- Do not place any loose objects on the product.

3.3.2 Special safety instructions


You have to work on and with the machine exclusively with authorised, trained and instructed personnel. These personnel must have received special instruction about potential dangers (especially about remaining risk).

product-specific safety instructions

NOTE!	
	<p>Service life / wear Failure to observe the safety instructions may result in damage to property!</p> <ul style="list-style-type: none"> > The rotation units are not designed for continuous use and must be serviced at regular intervals. In order to be able to detect possible failures due to wear or material fatigue at an early stage, regular visual and functional checks must be carried out. > Unauthorized conversion and / or modification of the rotation unit is not permitted. > The rotation unit under no circumstances subject it to inadmissible mechanical stress. Observe the technical data in this assembly instruction. > The rotation unit must not be covered during operation by supply lines, objects or tarpaulins, packaging material or substances, etc., as this may result in mechanical damage or heat accumulation and possibly fire.
NOTE!	
	<p>electric drives Failure to observe the safety instructions may result in damage to property and/or personal injury!</p> <ul style="list-style-type: none"> > Before handling the product, read and observe the safety instructions in the manuals for the motor, controller and control unit.
NOTE!	
	<p>Transport Failure to observe the safety instructions may result in damage to property and/or personal injury!</p> <ul style="list-style-type: none"> > Observe the transport instructions. > When transporting the product, support it only at the points provided for this purpose. > Observe the weight and use suitable and tested load handling attachments for lifting and transport.


NOTE!	
	<p>Commissioning / Operation</p> <p>Failure to observe the safety instructions may result in damage to property and/or personal injury!</p> <ul style="list-style-type: none"> > Only start up a fully installed and fixed product. > Do not reach into moving parts. > Wear suitable hearing protection in case of excessive noise. > Ensure that only persons authorized by the operator operate adjustment devices on components and parts within the scope of the intended use of the rotation unit and have access to the working area of the rotation unit. > Ensure that only persons authorized by the operator have access to the immediate product. > In case of emergency, error or other irregularities, shut down the product and secure it against restarting. > Observe safety functions and devices and do not disable them.

3.3.3 Fire protection

ATTENTION!	
	<p>Risk of fire if machine parts overheat due to overload, dust formation and irregular cleaning / maintenance of motors and storage of drives!</p> <p>Non-observance of the safety instructions may result in damage to the rotation unit and the environment!</p> <ul style="list-style-type: none"> > Regular instruction of the operating personnel. > Pollutions on the components must be removed immediately. > Regularly check the tool for wear. > Do not operate components such as motors and gears above the specified nominal values. > Maximum feed speed (with optional drive motor mounted) must not be exceeded.


3.4 Personal Protective Equipment

In the following chapters, the operating instructions explicitly describe the use of the personal protective equipment.

⚠ WARNING!	
	<p>Do not wear personal protective equipment!</p> <p>If you do not wear the specified personal protective equipment or you use faulty personal protective equipment, you may be involved in an occupational accident.</p> <ul style="list-style-type: none"> > Always wear the instructed personal protective equipment. > Immediately exchange damages personal protective equipment.

4 Transport

Below you will find information on how to transport the machine correctly, without damaging it and without endangering persons.

NOTE!	
	<p>Improper lifting of the rotation unit</p> <p>If you do not lift the rotation unit correctly, damage may occur due to deflection!</p> <p>If you do not lift the rotation unit correctly, injuries to the musculoskeletal system may occur due to incorrect lifting!</p> <ul style="list-style-type: none"> > Find out about the weight of the unit. > Please observe the DGUV and BG instructions for the correct carrying and lifting of loads. > Avoid long transport distances after lifting. If necessary, use a transport table or place the unit on a pallet to transport it further with a suitable industrial truck.

The following specifications should be observed:

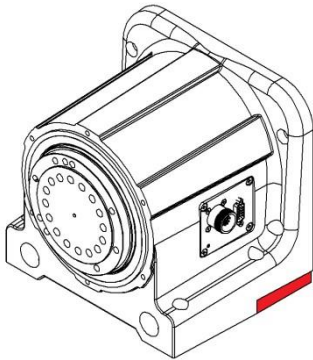
- Lifting by one person:
 - max. ≤ 20 kg and/or max. ≤ 1000mm length.
 - Encompassing the unit with two hands, with maximum distance between the right and left hand.
- Lifting by two persons:
 - max. ≤ 40 kg and/or max. ≤ 2000mm length.
 - Encompassing the unit with two hands, with maximum distance between the right and left hand.
 - Encompassing the unit at the beginning and end of the last third to prevent the unit from bending in the middle.
- Lifting by several persons:
 - max. ≤ 60 kg und/oder max. ≤ 3000mm Länge.
 - Encompassing the unit with two hands, with maximum distance between the right and left hand.
 - Encompassing the unit at the beginning or end of the last third and in the middle to prevent the unit from bending in the middle.

5 Assembly and commissioning

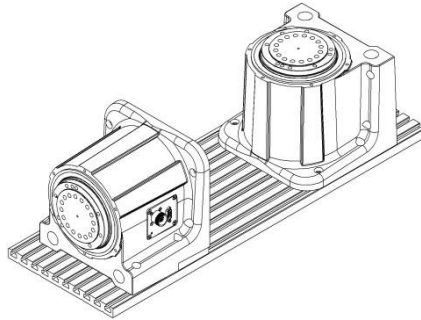
5.1 Assembly

Before you can mount your new rotation unit, you must remove any transport lock.

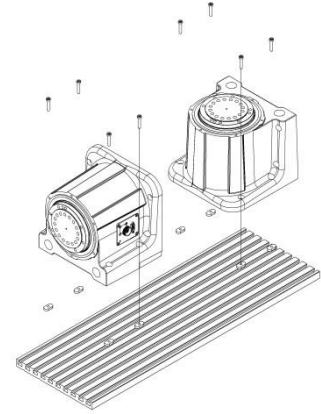
Assembly and adjustment instructions



A: Alignment surface



B: Free installation



C: Rack mounting

A - Alignment surface

The rotation units RDH have an alignment surface on the connection side of the housing with a defined distance to the axis of rotation. (Distances can be found in the respective dimensional drawings). In addition, the rotation units have two flat mounting surfaces, parallel and perpendicular to the rotary axis, which allow the rotation units to be used as a rotary axis and as a rotary indexing table.

B - Free installation


You can place the rotation units on a stand, worktable or other suitable, i.e. load-bearing, surface.



Select the installation location so that the product cannot fall down by itself or due to impact or pull on the cable.

C - rack mounting (recommended)

To mount the rotation units to your rack, use the countersink in the base body of the rotation units to fix it using suitable cylinder head screws and the matching T-nuts / threaded rails (accessories).


	Ensure that the mounting surfaces are sufficiently clean and flat.


The base bodies of the rotation units are castings that are subject to tolerances due to their manufacturing process. The reference surfaces of these basic bodies are over-milled so that a high degree of precision is achieved. However, in order to achieve the desired accuracy of the running behavior, it is necessary to mount the rotation units on an appropriately accurate support surface or to align it using leveling plates. In this way, concentricity or axial runout tolerances of a minimal of 0.05mm are achieved on the output flange.

5.2 Commissioning

The commissioning of the rotation units takes place after the wiring of the respective drive modules. To do this, follow the corresponding instructions in the documentation of the motor modules, power stages or entire control system used.

1. Switch off the controller and check that it is secured.
2. Mount the rotation unit / rotary - swivel unit firmly on a suitable work surface.
3. Connect the encoder cable.
4. Connect the motor cable.
5. Switch on the control and check the correct function of the rotation unit / rotary swivel unit.
6. Carry out a test run- first with slow traverse movements,- then under operating conditions.

	There is an increased risk in the event of incorrect installation (including loading of the axis system), wiring or commissioning.

	Unauthorized persons must be prevented from carrying out work on the control system and in the control cabinet. Persons could suffer an electric shock; the system builder is responsible for this.

6 Mounting parts

In this chapter you will find information about the components that are mounted when your axis is delivered.

6.1 Tailstock units

Tailstock unit RE M

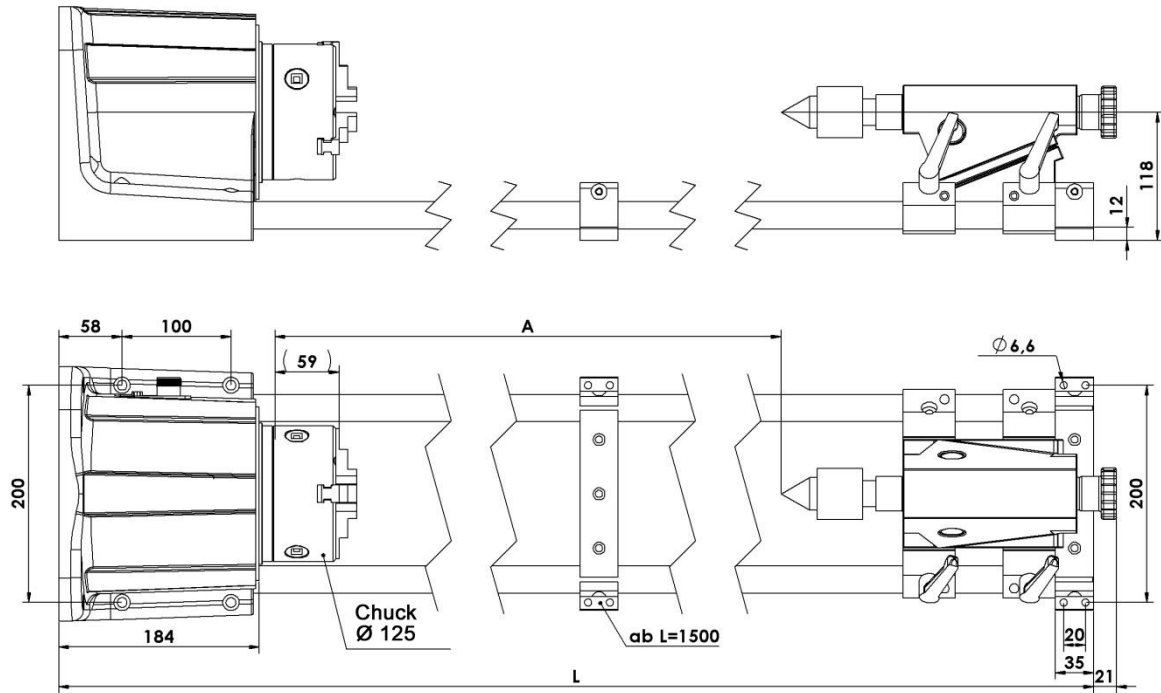


Fig. 6 - Dimension drawing rotation unit RDH-M with tailstock unit RE M

Versions	Item-No.	L	A
Tailstock unit RE-M 1000 mm	269100 2100	1110	624.5
Tailstock unit RE-M 1500 mm	269100 2150	1610	1,124.5
Tailstock unit RE-M 2000 mm	269100 2200	2110	1,624.5

Tailstock unit RE S

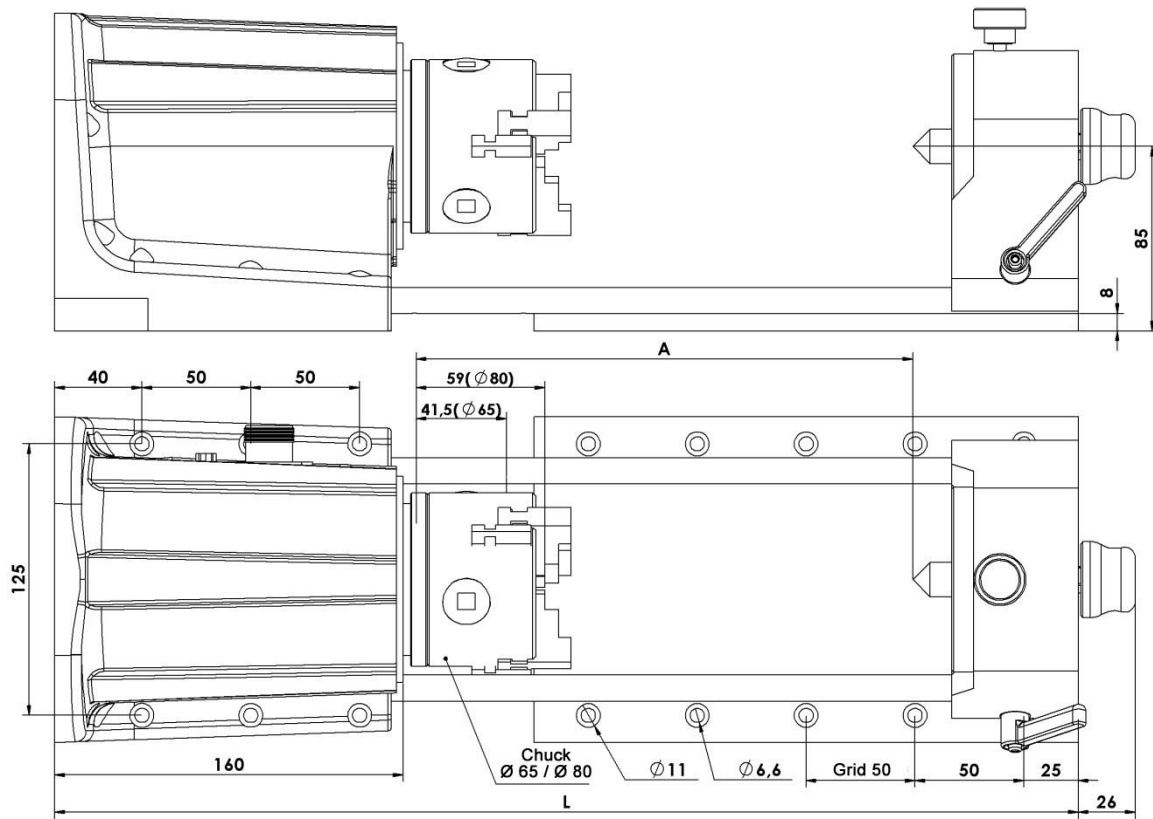


Fig. 7 - Dimension drawing rotation unit RDH-S with tailstock unit RE S

Versions	Item-No.	L	A
Tailstock unit RE-S 200 mmm	269100 0020	370	128
Tailstock unit RE-S 300 mmm	269100 1030	470	228
Tailstock unit RE-S 400 mmm	269100 1040	570	328
Tailstock unit RE-S 500 mmm	269100 1050	670	428

Tailstock unit RE XS

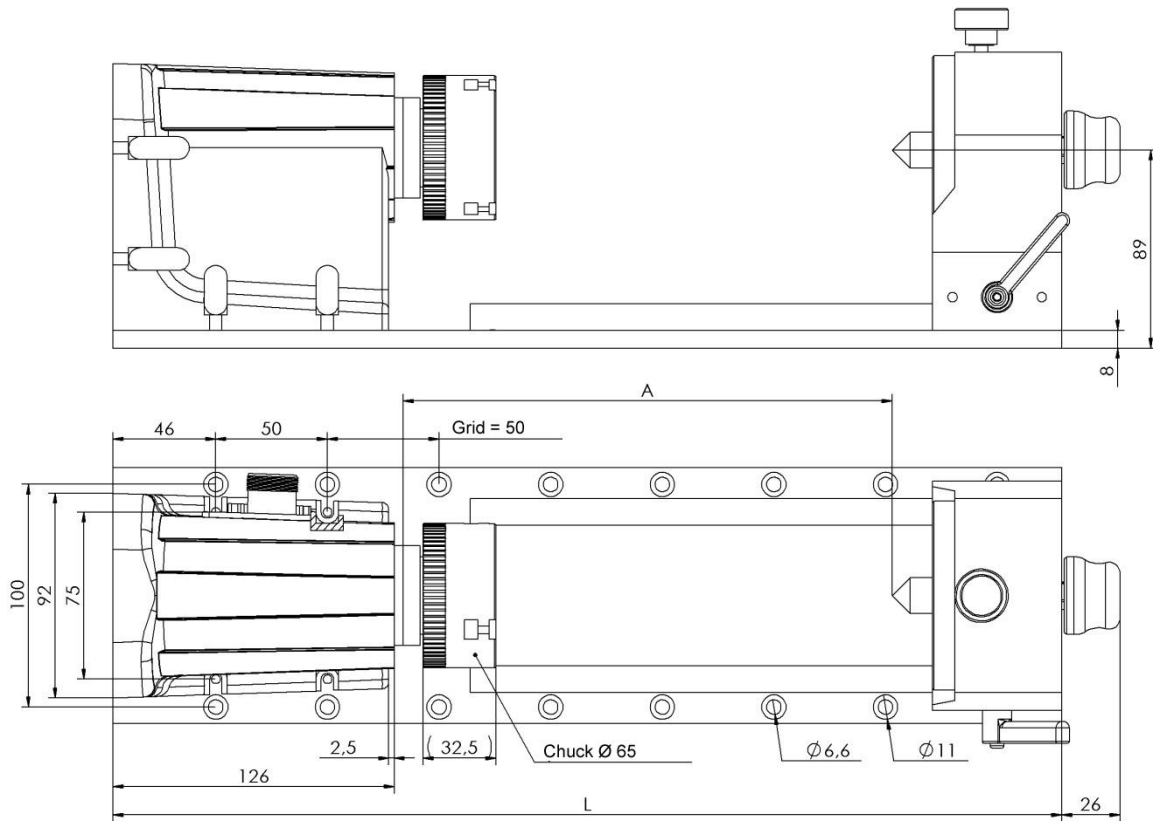
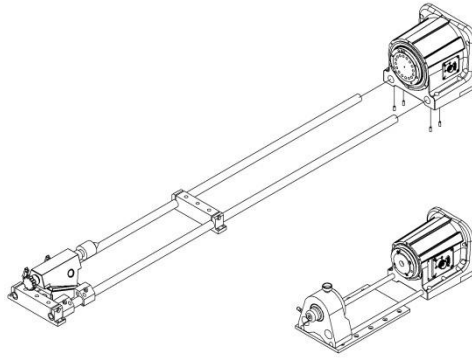


Fig. 8 - Dimension drawing rotation unit RDH-XS with tailstock unit RE XS

Versions	Item-No.	L	A
Tailstock unit RE-XS 200 mm	269100 0020	325	117
Tailstock unit RE-XS 300 mm	269100 0030	425	217
Tailstock unit RE-XS 400 mm	269100 0040	525	317
Tailstock unit RE-XS 500 mm	269100 0050	625	417

Assembly of the tailstock unit

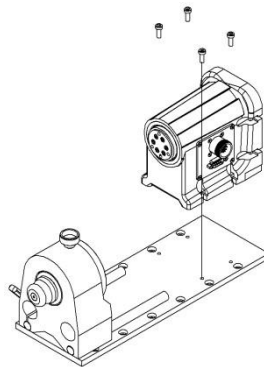


A - Mounting tailstock unit RE M / RE S

Position the two guide shafts of the RE S / RE M tailstock unit in the two through holes of the rotation units DH-S / RDH-M in such a way that they can be fixed via matching set screws on the underside of the rotation units.

In the case of the RE M tailstock unit, bring the guide beam (facing the rotation unit) to a middle position between the rotation unit and the quill and fix the two guide beams to the work surface using suitable screws.

The position of the RE S tailstock unit must be secured by additionally screwing the base plate of the tailstock unit to the work surface.




B - Mounting tailstock unit RE XS

1. First fasten the rotation unit RDH-XS to the base plate of the tailstock unit (4x M5). Leave the screws still loose.
2. Now align the rotation unit axially to the tailstock unit and tighten the screws.
3. Now fasten the entire unit to your work surface (in the case of T-slot plates, using T-slot blocks and the matching screws, see Accessories). Leave the screws still loose.
4. Align the unit exactly to the existing axis system and fix the screws.

7 Maintenance, service and cleaning

Regular maintenance and preventive maintenance are prerequisites for the safety of the personnel who are in the machine area. In addition, maintenance contributes to maintaining the value and functionality of the machine.

Carry out the work listed in the maintenance schedule within the specified intervals. Should it become apparent during machine operation that the intervals mentioned are too long or too short, adjust the intervals accordingly.

Information	
	<p>In the following cases, any claim under guarantee or warranty automatically expires:</p> <ul style="list-style-type: none"> • improper maintenance by the operator or third parties, • Installation of production parts that are not manufactured by isel Germany GmbH <p>isel Germany GmbH shall not be liable for any personal injury or property damage in this case. Ensure that safety equipment is regularly maintained and checked for proper functioning.</p>

The rotation units operates with high precision and reliability. Therefore, the maintenance effort is comparatively low. The maintenance of the rotation unit is limited to their regular cleaning from coarse dirt and impurities.

Harmonic Drive gears are factory lubricated for life with a grease fill and require no relubrication and the axis system can be started up immediately.

7.1 Cleaning


- Clean the surface of the cast housing and the output flange of the rotation unit with a lint-free, dry / slightly damp cloth.
- Do not use any harsh cleaning or scouring agents.


7.2 Maintenance plan

Maintenance interval	Maintenance
If required	Cleaning the rotation unit
300 - 700 operating hours	Visual inspection of seals, fasteners
2 years	Toothed belt replacement (if present) Exchange oil seals

7.3 Troubleshooting

The table below includes some general solutions to potential problems occurring when using the machine; they can be rectified independently by the operator if necessary.

Information	
	<p>If the problem can not be solved, please get in touch with the maintenance personnel or contact our service/support department. See chapter _RS.</p>


	<p>Only have repairs to the electrical components of the product carried out by a qualified specialist. Otherwise there is a danger to life from electric current!</p>

Problem/Error	Possible cause(s)	Remedy
Increased running noise	Pollution Lack of lubricating film	Cleaning the rotation unit in the area of the seals
Stiffness	Pollution Tension	Cleaning the rotation unit Alignment, adjustment
Deteriorated positioning or repeatability accuracy	Too high load	Reduce load



Important!

Interference may occur in unfavorable electromagnetic environments.

	<p>Do not manipulate the controller or the output stage of the rotation unit!</p>

8 Dismantling and disposal

After the machine has reached the end of its service life, it must be dismantled and disposed of in an environmentally friendly manner.

8.1 Safety instructions for dismantling and disposal

Safety instructions for dismantling and disposal

Personnel required:

- Specialist staff
- Maintenance staff
- Manufacturer

Protective equipment:



⚠ DANGER!	
	<p>In the event of improper dismantling and disposal of the machine</p> <p>Improper dismantling of the machine can result in serious injuries due to angular components, points, corners, sharp edges, vapours, lubricants, liquids, etc.! Observe the safety regulations, accident prevention regulations and safety data sheets!</p> <ul style="list-style-type: none"> > Disassembly may only be carried out by specially trained personnel! > Work on the electrical system may only be carried out by qualified electricians! > The corresponding warning notices must be visibly displayed in the areas!
⚠ DANGER!	
	<p>Danger to life due to electric shock!</p> <p>Touching live parts or damaging insulation poses a risk to life (danger to life and limb) due to electric shock!</p> <ul style="list-style-type: none"> > When carrying out maintenance, servicing and cleaning work, always disconnect the machine from the mains first and wait a few minutes before starting work. > To avoid electric shock, do not insert any objects into the machine, except for the intended replacement of parts in accordance with these operating instructions.
⚠ CAUTION!	
	<p>Danger to the environment due to improper disposal!</p> <p>Improper disposal may pose a hazard to the environment! Disposal of materials may only be carried out by qualified personnel and in accordance with legally applicable regulations. When handling hazardous substances, the respective safety data sheet must be observed and, if necessary, personal protective equipment must be used!</p> <ul style="list-style-type: none"> > Disposal must be carried out by qualified personnel and in accordance with legally applicable regulations. > Suitable personal protective equipment must be used! > When disposing of the hazardous substances, they must be handled in accordance with the instructions on the relevant safety data sheet!

8.2 Disassembly

Disassembly

Important notes before disassembly:

- Make sure you have enough space before starting work!
- Handle open sharp-edged components with care!
- Pay attention to order and cleanliness in the working area. Loose components and tools lying on top of or around each other are sources of accidents!
- Make sure that the components are dismantled properly!
- Please note that some of the components have a high dead weight. If necessary, use lifting gear!
- Secure components against falling down and toppling over!
- Do not breathe in any vapours or dusts!
- Fire, naked lights and smoking are prohibited in the areas!
- Eating and drinking is prohibited in the areas!
- Consult the manufacturer if anything is unclear!

Decommissioning

Before starting disassembly, be sure to follow these steps

1. Switch off the machine (see chapter [RS](#)).
2. Disconnect the machine from all media (power supply network, compressed air supply, cooling water supply, hydraulic supply, etc.).
3. Physically disconnect the entire power supply from the machine and discharge residual energy.
4. Remove all remaining operating and auxiliary materials as well as all processing materials. Dispose of them in an environmentally friendly way according to your local regulations.
5. Then clean and dismantle the components professionally in compliance with the locally applicable occupational health and safety and environmental protection regulations.
 - ✓ Machine decommissioned and prepared for dismantling

Information



Dismantling may only be started after all work required for decommissioning has been carried out and after approval by an authorised specialist.

Dismantling is defined as the dismantling of the machine for relocation to another installation site or for scrapping.




The electrical and electronic components belonging to the machine as well as the operating materials contained in the machine to make it ready for operation are to be disposed of exclusively in a professional manner, in accordance with the valid jurisdiction of the country of operation. Disposal via household or general commercial waste is strictly prohibited!

8.3 Disposal

Disposal

If no take-back or disposal agreements have been made, recycle the dismantled components.

- Scrap all metals
- Give all glass and plastic elements for recycling
- Sort the remaining components according to their material composition
- Dispose of hazardous substances such as oils, oil-water mixtures, emulsions, greases, fuels, coolants and lubricants properly!

Electronic components	
	<p>Return and collection systems</p> <ul style="list-style-type: none"> • Users of electrical and electronic equipment are obliged to collect old equipment separately in accordance with the country-specific regulations. Waste electrical and electronic equipment must not be disposed of together with household waste. Separate collection is a prerequisite for recycling and recovery, which helps to conserve resources in the environment. • Separate collection is a prerequisite for recycling and recovery, which conserves resources in the environment. The local waste management companies have created disposal options for this purpose.

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