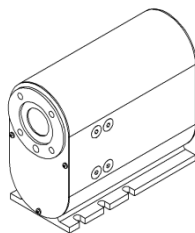
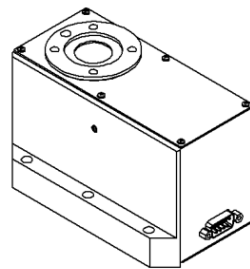


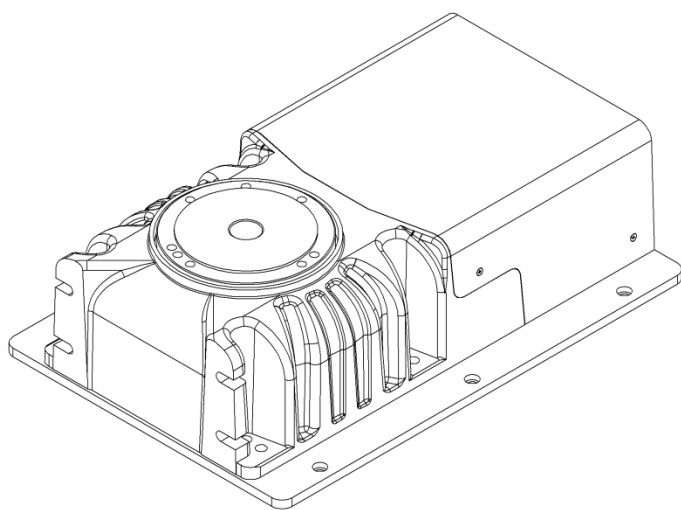
**ZD 30**



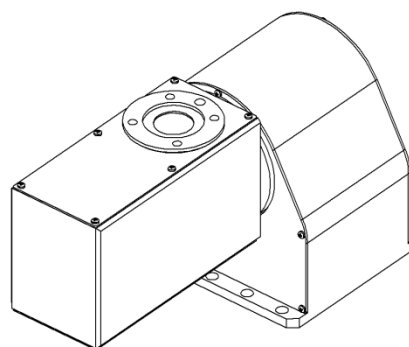
**MD 1**



**ZR 20**



**RF 1**



**ZDS 2030**

## Rotary units

**MD 1, RF 1, ZD 30, ZR 20,  
ZDS 2030**

### Assembly instruction with:

- Installation instructions
- Maintenance instructions
- Declaration of incorporation

for a drive system  
(A partly completed machine as defined in Machine Directive 2006/42/EG)

## About these assembly instructions

### Abbreviations

MD = Machine Directive 2006/42/EG

AC = Alternating Current, AC servomotor (always synchronous motor)

BDC = Brushed DC, brush type Direct Current (DC) servomotor

BLDC = Brushless DC servomotor





PDF = Portable Document Format

### Terminology

In these assembly instructions "product" always refers to a Rotary Unit.

### Symbols used

In these instructions, you will find various symbols which are there to alert you to important information/facts and hazards:

Symbol	Signal word	Meaning
	<b>Danger</b>	Warning of possible serious to fatal injuries to persons
	<b>Caution! Fatal Voltage!</b>	The lightning symbol is a clear warning of danger from electric current! Failure to heed this warning can lead to personal injuries with fatal consequences.
	<b>Warning, caution!</b>	Warning of possible minor injuries to persons, of possible faults or destruction of the product or possible damage to property. Failure to take account of the circumstances indicated by this symbol (text, picture or table) can result in serious damage to property.
	<b>Important information or note</b>	Important information or note on how the product works.

### Observing the safety instructions



Before commissioning the Rotary Units (as partly completed machines), working with them, or making any additions or modifications to the electrical installation, it is essential you read carefully:

- the safety guidelines in these assembly instructions
- the safety guidelines for electric drives and control systems in the instruction manual of the positioning module, drive controller, drive module or drive control used.

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Although every care has been taken to avoid printing errors and mistakes, these cannot be ruled out. We would be grateful for any suggestions for improvements or information on possible mistakes or unclear formulation of facts and illustrations.

### **Note on CE compliance for partly completed machines:**





*isel* rotary units comply with CE Directives. They are deemed partly completed machines as defined in Machine Directive 2006/42/EG and are accordingly not marked explicitly with the CE symbol.

Only after the compliance assessment procedures for the machine have been completed is the (complete) machine or system in which these linear units are installed awarded the CE mark by the manufacturer or distributor of the machine.

All other machine parts and/or machine components to which the CE safety Directives apply must not be commissioned until all the relevant requirements of Machinery Directive 2006/42/EC are met.

*isel* Germany AG does not accept any responsibility for any modifications you make to the rotary unit.

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**Version of this documentation:** April 2021

### **Other documentation from *isel* Germany AG:**

'Nothing is so good it can't be improved upon.' In accordance with this motto, as the manufacturer, we are constantly improving all our manuals (including operating instructions and assembly instructions) at considerable cost to ourselves.

We are committed to doing so since this is of benefit to both you as our customers and us:

We want you to be able to work efficiently with the relevant manuals and find the information you are looking for quickly. Many details in the manuals are the result of information we have received from our customers.

To support you, all the manuals are available to download in PDF format on our homepage:

<http://www.isel-data.de/manuals>



### **In your own interest:**

Please read these assembly instructions carefully and keep them in a safe place. These instructions form an integral part of the "Rotary Unit MD 1, RF 1, ZD 30, ZR 20, ZDS 2030" product, regardless of whether these instructions are supplied/available in the form of an electronic storage medium (as a PDF file on a CD, DVD or memory stick) or as a printed version.

Please read and follow the safety guidelines in these assembly instructions.

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## 1 General

This manual contains all important information about the assembly / installation, commissioning and maintenance of your rotary units. In addition, it provides information and important notes for your safety.

The isel-rotary units RF 1, MD 1, ZD 30, ZR 20, ZDS 2030 are rotary modules ready to install. They are for use mainly in machining and positioning tasks in factory automation, handling systems and light machinery construction.

These rotary units are available in different standard sizes with various gear reductions.

The options for horizontal or vertical positioning of the rotary axes of the rotational units means users can build a wide variety of constructions to suit their requirements.

**Please note:**

**The product is classed as 'partly completed machine' and not a (complete) machine according to MD 2006/42/EC.**

## 1.1 Safety guidelines



The following guidelines on safety and hazards are intended to protect you, third parties and the product. It is therefore essential you follow them.

### Operating environment

- The surrounding medium must not have a corrosive effect on aluminium alloys, stainless steels (1.4305) or ABS plastics.
- When moving the product from cold to warm conditions, allow the product to adjust to the change in temperature for a few hours, to avoid possible damage from condensation.
- Do not install the product near devices which generate powerful electromagnetic fields. This could impair its operation.
- Avoid environments exposed to direct solar radiation, considerable heat, cold, humidity or moisture.

### Power supply (only applies to products with multiphase motors, brushed DC/brushless DC or AC servomotors and a suitable motor amplifier / controller)

- Connect the power supply for the amplifier of the multiphase motor, for the iMD10/iMD20 amplifiers, the intermediate circuit of the iMD40 servomotor (L, N and PE terminals) or the isel single axis/multi-axis controller (e.g. iMC-P/iMC-S8, MC-1-series, iPU-series, etc.) only to a grounded mains socket with a mains voltage of 230V AC/50...60 Hz (single phase of the AC grid).
- It is preferable to use for the final stage of the multiphase motor or the final stage of the iMD10/iMD20 servomotor the original power supply recommended by isel Germany AG (primary power supply: 230V AC, secondary: 48V DC). Using a different, inappropriate power supply renders the warranty null and void. In addition, using an unsuitable power supply is associated with risks from electrical currents, such as electric shock, fire or short circuit!
- If you observe faults, push the EMERGENCY STOP button on the (single axis) controller, the CNC control panel/CNC control console, the switchgear cabinet/switchgear box or a manual control device. Activating the EMERGENCY STOP button interrupts the power supply to the motor amplifier. If the power supply used is damaged, you must not use it. Have a qualified technician check and if necessary repair the product.

### The rotary unit

- For safety reasons you must not convert and/or modify the rotary unit on your own.
- In operation, the rotary unit must not be concealed by supplies (electricity or compressed air), objects (e.g. tools) or tarpaulins, packaging or other materials etc. (e.g. clothing), because this can lead to mechanical damage or heat obstruction and sometimes fire.
- If using a single-axis/multi-axis controller to control a linear unit (equipped with an AC, brushed DC (BDC) or a brushless DC (BLDC) servo motor), you need to ensure that the controller or motor amplifier used (in a control cabinet or on a mounting rack) is placed in a well ventilated environment.

### Operation

**(applies only to products supplied with a motor and a suitable motor amplifier or a suitable controller, e.g. a single-axis controller)**

Only if the product is assembled correctly and the motor, the touch or inductive limit switches, the brake and the incremental measuring system (encoder) are correctly connected to the motor final stage/controller, will parameterisation, commissioning and operation/programming of the product (as a fully-functioning drive system) function correctly.

The technical details of special versions may differ from the following versions.

If the product malfunctions or you are unclear about its operational status, you should consult the relevant operating instructions/assembly instructions.

<http://www.isel-data.de/manuals>

Here you will find instructions and information on how to check the functions you require and remove the causes of a possible malfunction or have these removed.

You must always carry out the instructions you find completely and correctly in order to ensure the product functions correctly.

Never allow children or other persons who are vulnerable or at risk to operate the product unsupervised.

If you are still unclear about its operational status, it is highly recommended that you consult isel Germany AG, quoting the type and part number or serial number.

## 1.2 Proper use

The rotary units serve to rotate and position securely attached loads on the output flange in an environment where there is no danger of Exploded views and in accordance with the operational and environmental conditions specified for this product. The device can be installed in any position (horizontally, vertically or at an angle).



The rotary units are a partly completed machine (compare Article 2g in the MD 2006/42/EC). A partly completed machine is also defined here as follows (quote):

"An partly completed machine is a unit which almost forms a machine, but cannot fulfil any given function independently".

A drive system is an partly completed machine.

A partly completed machine is only intended to be installed in other machines or in other partly completed machines or equipment or be combined with it to form a machine together with it as defined in this directive."

The rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030 are intended for installation into a machine or into other partly completed machines.

The product should not be used to transport people.

Any use other than as described above is improper and can lead to personal injury and damage to property.

## 1.3 Deliverables

**The deliverables include:**

- Assembly instructions and declaration of incorporation according to MD 2006/42/EC
- Fixing material
- Accessories (if any)



## 2 Installation instructions and overview of functions

First, this section provides an overview of the mechanical structure, installation or assembly of the rotary units and a description of their functions.

The instructions for commissioning/configuring the rotary unit and its programming by users depend on the motors used and the relevant controllers with amplifiers; they can be found in their documentation.

### 2.1 Functions

The rotary units RF 1, MD 1, ZD 30, ZR 20 und ZDS 2030 are of modular construction.

The rotary units are based on electrical drive units (stepped and servo-motor) with rotation/torque transmitted via reduction gearing to drive shaft / flange via toothed belt drive.

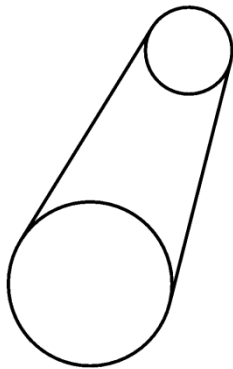
Toothed belt drives provide for the smooth and synchronous transfer of power. The drives are low-maintenance and very economical. Efficiencies of up to 98% are achievable depending on the number of teeth per disk and the type of belt used.

Individual pair transmission ratios are determined by the relationship between the driving and driven elements. For gear wheels - the number of teeth on the pinions:  $i = \frac{z_{\text{Abtrieb}}}{z_{\text{Antrieb}}}$ , and in accordance

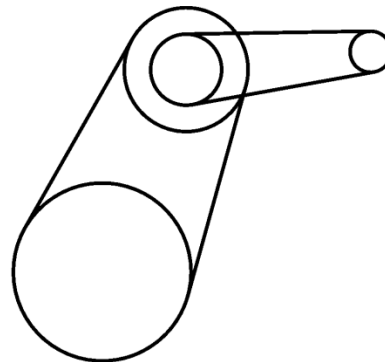
thereto - the number of turns of the pinions:  $i = \frac{n_{\text{Antrieb}}}{n_{\text{Abtrieb}}}$ . If losses are ignored, the torque transmitted is

inversely proportional to the rotational speed:  $i = \frac{M_{\text{Abtrieb}}}{M_{\text{Antrieb}}}$ . If - as in the case of rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030 - the speed of the driving element is greater than the speed of the driven element ( $i > 1$ ), this is generally referred to as reduction.

where two or more transmissions are combined, the resulting transmission ratio is the product of the individual transmission ratios ( $i_{\text{ges}} = i_1 * i_2 * \dots * i_n$ ).



single transmission



dual transmission

## 2.2 Changing the toothed disk (installation set RF 1)

The procedure for changing the toothed disk on rotary unit RF 1 is as follows.  
In order to alter the transmission, the toothed disk must be changed.

Transmission	Toothed disk
1 : 24	24 teeth
1 : 52	52 teeth
1 : 100	100 teeth

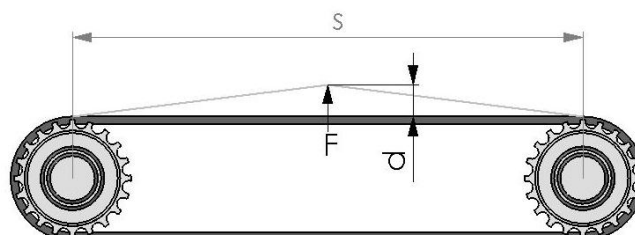
<b>1</b>	First remove the cover (4 screws (1)).	
<b>2</b>	Loosen the 4 external screws (2) and the eccentric screw (3).	
<b>3</b>	Remove the toothed belt (4) and loosen the screw fixing the collet to the gear shaft (5).	
<b>4</b>	Fit the new toothed disk and re-tighten the fixing screw (5) (for installation set 1:100, the assembly nut is tightened using a special spanner (6)).	
<b>5</b>	Fit the matching toothed belt.	
<b>6</b>	Set the belt tension by turning the eccentric screw (3). A force of $F_e = 15\text{N}$ applied to the centre of the belt span should move it 4-5 mm.	
<b>7</b>	Re-tighten the eccentric screw and the motor and cover screws.	



Unnecessarily high prestressing reduces the working life of the drive, increases the load on the bearings and wear on the teeth as well as tending to increase the noise level in operation.



Too low a tension can lead to the belt teeth not engaging perfectly in the gearing and jumping out on overload.



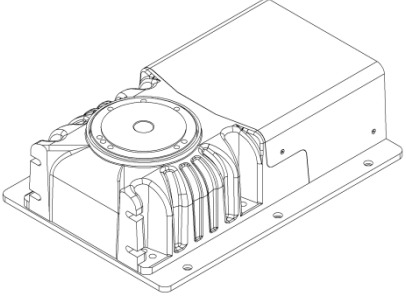
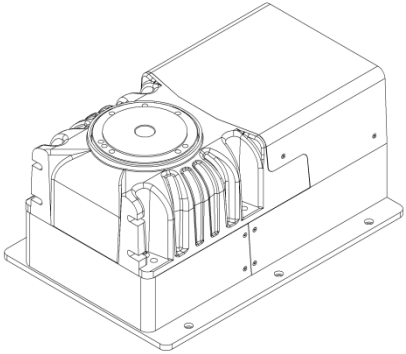
## 2.3 Assembly of the rotary units /drive elements

The following illustrations, drawings and item lists illustrate the structure of the rotary units.

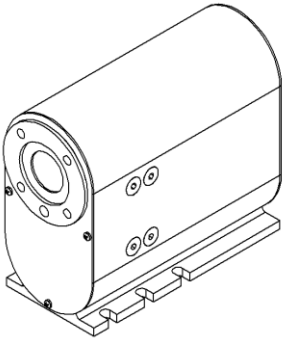
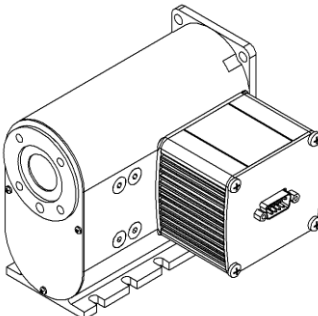
### Options

Rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030 are usually supplied ready for connection and with an integrated drive module.

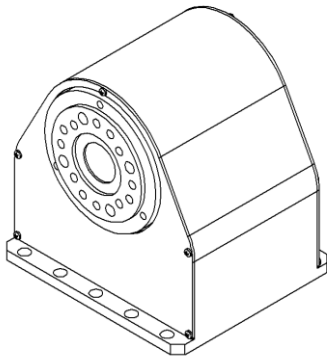
### RF 1

							
RF 1 (with multiphase motor)	RF 1 (with servo-motor)						
<p><b>Bestellschlüssel</b></p> <p>2 6 0 2 4 X X X 0 0</p> <table border="0"> <tr> <td data-bbox="199 1048 287 1075"><b>Motoren</b></td> <td data-bbox="667 1048 742 1075"><b>Bremse</b></td> <td data-bbox="928 1048 1098 1075"><b>Anschlusstecker</b></td> </tr> <tr> <td data-bbox="199 1077 614 1160">                     1 = Schrittmotor MS 200 HT ohne Encoder                      4 = bürstenbehafteter DC-Servomotor DC 100                      5 = bürstenloser EC-Servomotor EC 60S                 </td> <td data-bbox="667 1077 842 1133">                     0 = ohne Bremse                      1 = Magnetbremse                 </td> <td data-bbox="928 1077 1230 1133">                     1 = Servomotor: M23 + SubD15                      2 = Schrittmotor: SubD9                 </td> </tr> </table>		<b>Motoren</b>	<b>Bremse</b>	<b>Anschlusstecker</b>	1 = Schrittmotor MS 200 HT ohne Encoder 4 = bürstenbehafteter DC-Servomotor DC 100 5 = bürstenloser EC-Servomotor EC 60S	0 = ohne Bremse 1 = Magnetbremse	1 = Servomotor: M23 + SubD15 2 = Schrittmotor: SubD9
<b>Motoren</b>	<b>Bremse</b>	<b>Anschlusstecker</b>					
1 = Schrittmotor MS 200 HT ohne Encoder 4 = bürstenbehafteter DC-Servomotor DC 100 5 = bürstenloser EC-Servomotor EC 60S	0 = ohne Bremse 1 = Magnetbremse	1 = Servomotor: M23 + SubD15 2 = Schrittmotor: SubD9					

### MD1

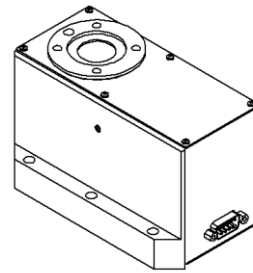
			
closed design	closed with installation plate		
<p><b>Bestellschlüssel</b></p> <p>2 6 1 0 1 0 0 X 1 0</p> <table border="0"> <tr> <td data-bbox="199 1832 284 1859"><b>Motoren</b></td> </tr> <tr> <td data-bbox="199 1861 571 1939">                     0 = Schrittmotor MS 045 HT                      2 = bürstenbehafteter DC-Servomotor RE 40                      3 = bürstenloser EC-Servomotor EC 42                 </td> </tr> </table>		<b>Motoren</b>	0 = Schrittmotor MS 045 HT 2 = bürstenbehafteter DC-Servomotor RE 40 3 = bürstenloser EC-Servomotor EC 42
<b>Motoren</b>			
0 = Schrittmotor MS 045 HT 2 = bürstenbehafteter DC-Servomotor RE 40 3 = bürstenloser EC-Servomotor EC 42			

**ZD 30, ZR 20, ZDS 2030**



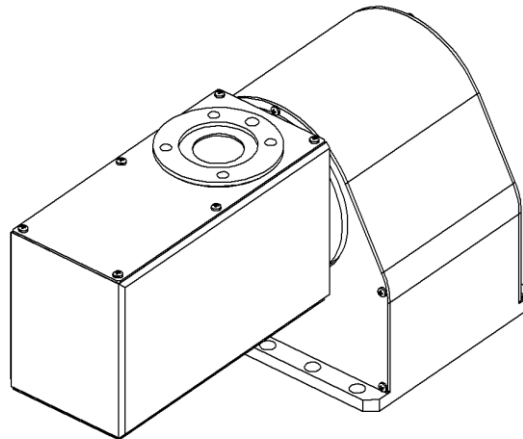
ZD 30 rotary spindle

**Ordering data:**  
ZD 30 rotary spindle  
**261100 0000**



ZR 20 circular switching bench

**Ordering data:**  
ZR 20 circular switching bench  
**260300 0000**

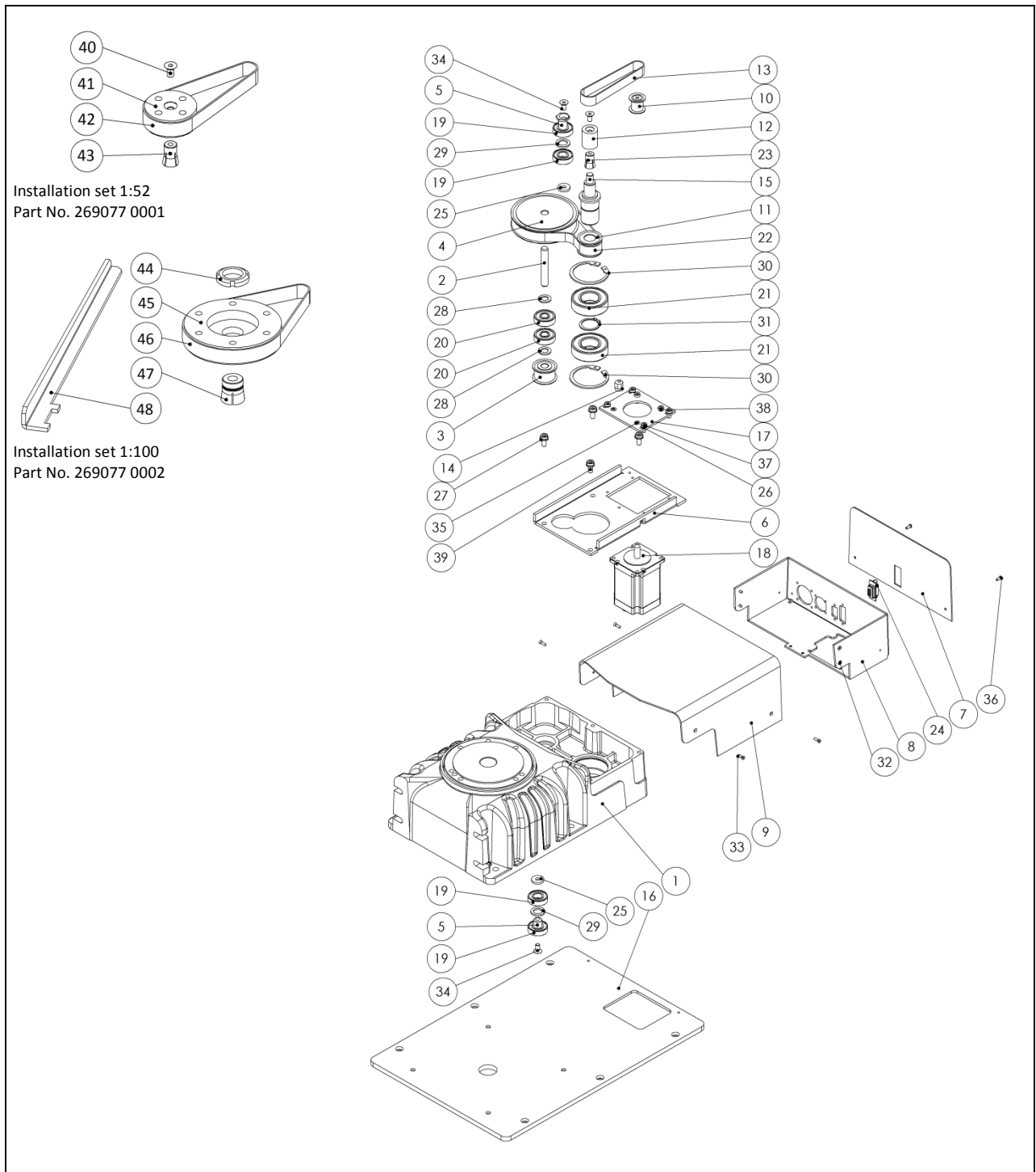


Rotary tilting unit ZDS 2030

**Ordering data:**  
Rotary tilting unit ZDS 2030  
**265000 0000**



**Explosion RF 1 multiphase motor**

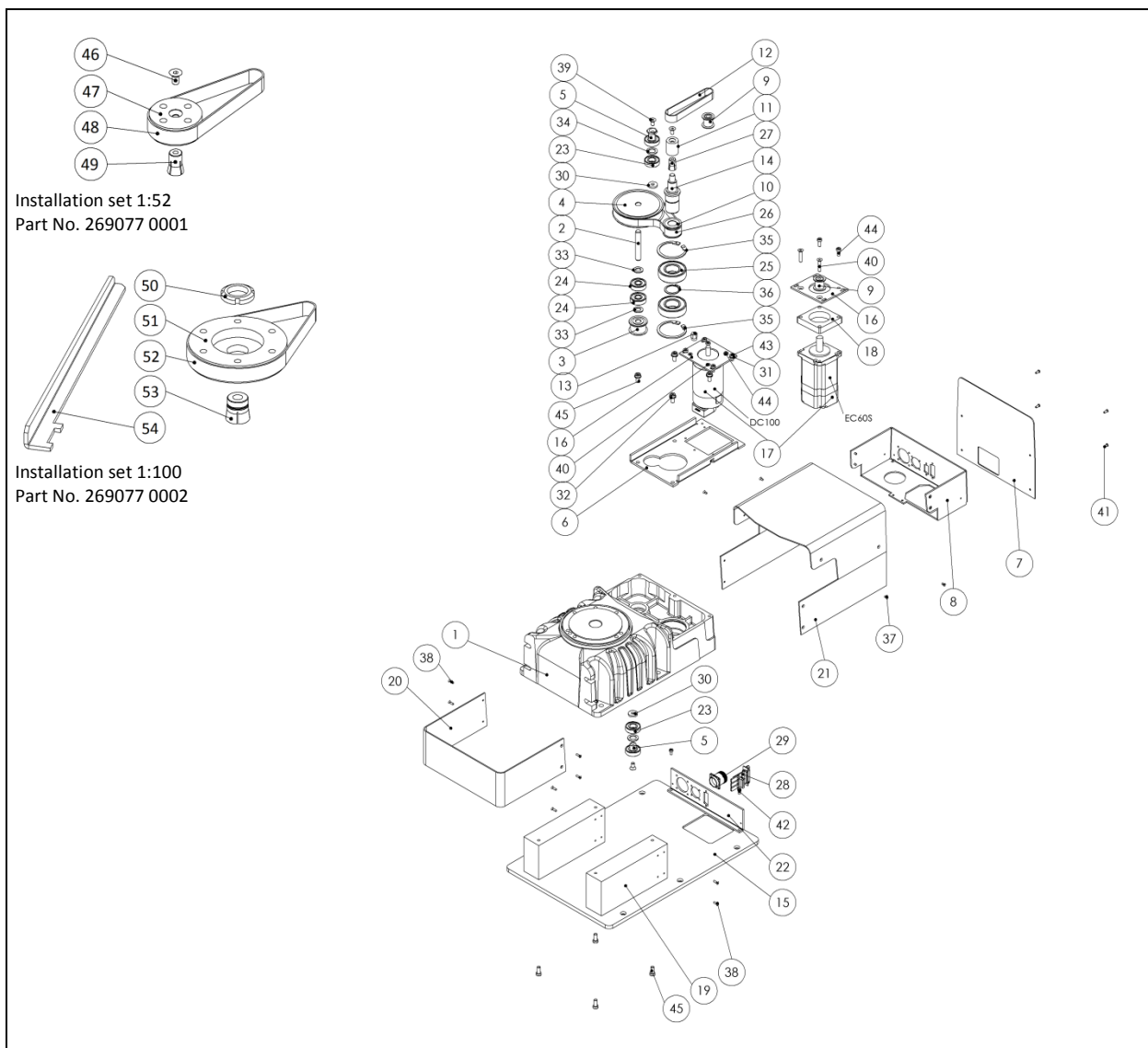


<b>Parts list RF 1 multiphase motor</b>				
Item no.	Part number	Quantity	Name	Drawing no.
1 *	660001 9001	1	EZ0092 - RF1 Main axis base body	EZ0092
2	660007	1	TE0591 - Circular switching bench R1 - gear shaft	TE0591
3	616004	1	TE0598 - Circular switching bench R1 - toothed belt wheel AT5 Z19 bØ10 with flanged wheel	TE0598
4	616005	1	TE0599 - R1 - toothed belt wheel AT5 Z57 with flanged wheel	TE0599
5	660008 0002	2	EZ3079 Tensioning roller bolts	EZ3079
6	663003 4376	1	EZ4376 baseplate - motor	EZ4376
7	663003 43774	1	EZ4377 back plate	EZ4377
8	663003 43781	1	EZ4378 mounting sheet - standard version	EZ4378
9	603003 4379	1	EZ4379 sheet cladding upper I	EZ4379
10	616506 0181	1	EZ0104-4 belt pulley HTD3 Z18	EZ0104
11	616004 0190	1	EZ0105-4 belt pulley AT5 Z19	EZ0105

12	616506 0240	1	EZ0100-4 belt pulley HTD3 Z24	EZ0100
13	616504 0852	1	Toothed belt HTD3 CXP b15 Z85	
14	660008 0001	1	EZ0086-4 eccentric bolts	EZ0086
15	663003 0001	1	EZ0097-4 shaft	EZ0097
16	663003 0200	1	EZ0099-3 carriage plate	EZ0099
17	663003 0007	1	EZ0095-4 Motor mounting	EZ0095
18	470581 0100	1	DZ1188 - multiphase motor	DZ1188
19	896011 2282	4	Single-row groove ball bearings with cover disks 6001-ZZ	
20	896011 0304	2	Single row deep groove ball bearing with sealing disks 6200-2RS1	
21	896012 5524	2	Single row deep groove ball bearing with sealing disks 6205-2RS1	
22	616502 0390	1	Toothed belt AT5 b15 Z78	
23	635002	1	TE0617 collet 9.52mm	TE0617
24	555501	1	Sub-D plug - 9 pin - pin	
25	890805 0004	2	EZ3083 washer 3mm	EZ3083
26	893051 0001	4	Disk DIN 125 ST 4.3	
27	893054 0001	4	Disk DIN 125 ST 6.4	
28	893047 0001	2	Disk DIN 433 10.5	
29	893048 0001	2	Disk DIN 433 13	
30	894030 0550	2	Seeger rings for mounting holes DIN 472 - J30	
31	894020 0240	1	Seeger rings for shafts DIN 471 - A25	
32	891191 0061	4	Countersunk screw DIN 965 4.8 VZ M 3 x 6	
33	891191 0101	4	Countersunk screw DIN 965 4.8 VZ M 3 x 10	
34	891134 0121	3	Countersunk screw DIN 7991, M 6 x 12	
35	890133 0121	2	TE0174 - countersunk screw with torx 20 M5x12	TE0174
36	891591 0081	2	Roundhead screw DIN 7380 M 3 x 8	
37	891123 0101	4	Panhead screw DIN 6912 8.8 M 5 x 10	
38	891123 0121	2	Panhead screw DIN 6912 8.8 M 5 x 12	
39	891124 0141	4	Panhead screw DIN 6912 8.8 M 6 x 14	
40	891134 0121	1	Countersunk screw DIN 7991, M 6 x 12	
41	616506 0520	1	EZ0101-4 - Toothed belt pulley HTD3 - Z52	EZ0101
42	616504 1002	1	Toothed belt CXP5-15-Z100	
43	635002	1	TE0617 collet 9.52mm	TE0617
44	892252 0011	1	Fixing nut M20x1(Fa SKF) KM4	
45	616506 1000	1	EZ0102-4 - Toothed belt pulley HTD3 - Z100	EZ0102
46	616504 1282	1	Toothed belt CXP5-15-Z128	
47	635002 0952	1	EZ0085-4 male thread collet Ø 9.52	EZ0085
48	663003 0201	1	EZ0707 - hook wrench KM4	EZ0707

1\* main axis explosion base body, see page 18

**Explosion RF 1 servo-motor**



Versions	Item 9	Item 16	Item 17	Item 28	Item 40
DC100	616506 0181	663003 0017	471022 0020	479055 1000 (DZ4770)	890133 0121
EC60S	616506 0183	663003 0020	474156 0048	479056 XXXX (DZ4771)	891133 0251

**Parts list RF 1 servo-motor**

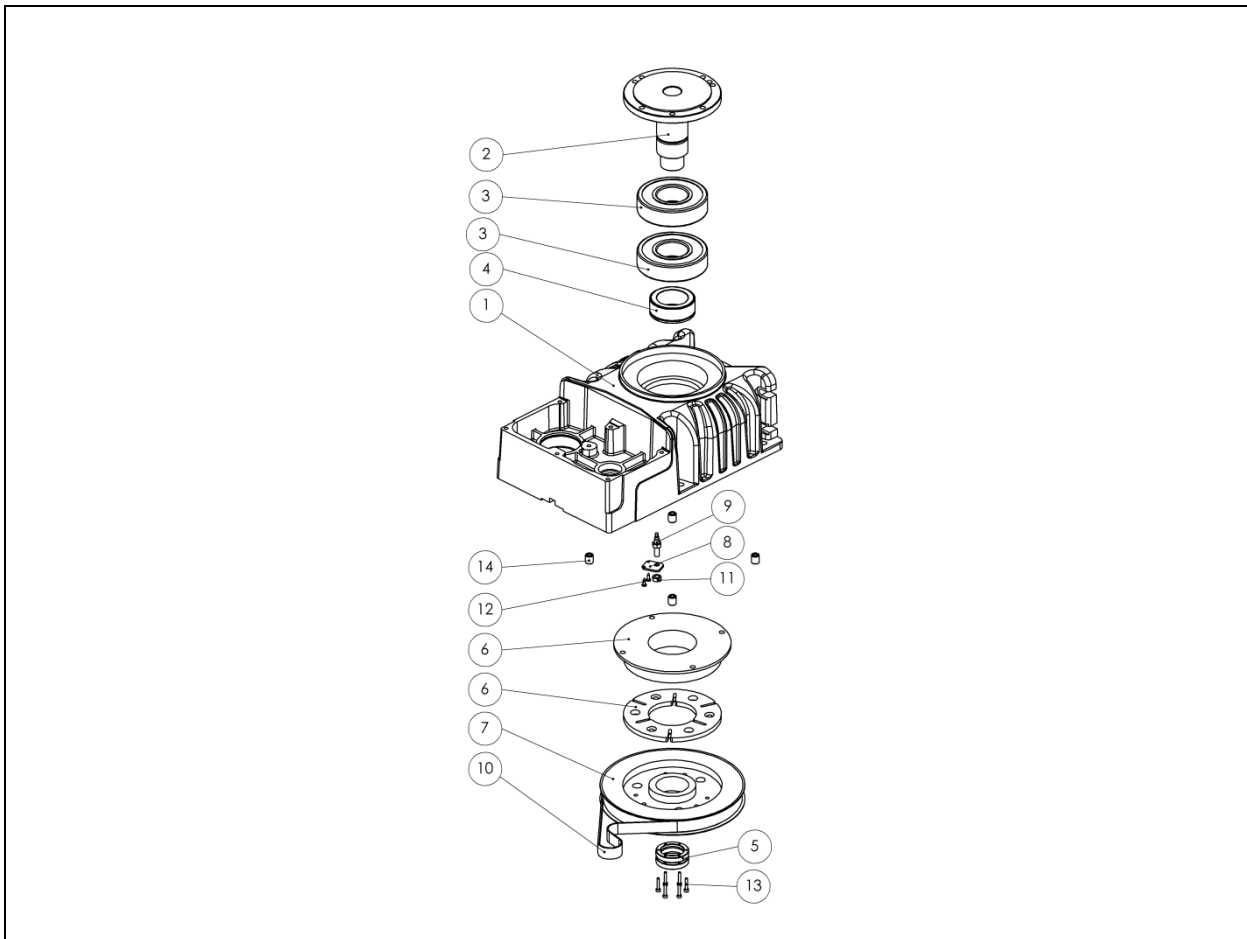
Item no.	Part number	Quantity	Name	Drawing no.
1 *	660001 9001	1	EZ0092 - RF1 Main axis base body	EZ0092
2	660007	1	TE0591 - Circular switching bench R1 - gear shaft	TE0591
3	616004	1	TE0598 - Circular switching bench R1 - toothed belt wheel AT5 Z19 bØ10 with flanged wheel	TE0598
4	616005	1	TE0599 - Circular switching bench R1 - toothed belt wheel AT5 Z57 with flanged wheel	TE0599
5	660008 0002	2	EZ3079 Tensioning roller bolts	EZ3079
6	663003 4376	1	EZ4376 baseplate - Motor	EZ4376
7	663003 43775	1	EZ4377 back plate	EZ4377
8	663003 43781	1	EZ4378 mounting sheet - EC version	EZ4378
9	See table	1	EZ0104-4 belt pulley HTD3 Z18	EZ0104
10	616004 0190	1	EZ0105-4 belt pulley AT5 Z19	EZ0105
11	616506 0240	1	EZ0100-4 belt pulley HTD3 Z24	EZ0100
12	616504 0852	1	Toothed belt HTD3 CXP b15 Z85	
13	660008 0001	1	EZ0086-4 eccentric bolts	EZ0086
14	663003 0001	1	EZ0097-4 shaft	EZ0097
15	663003 0200	1	EZ0099-3 carriage plate	EZ0099



16	663003 0007	1	EZ0095-4 motor mounting	EZ0095
17	See table	1	Motor	
18	663003 2867	1	DZ2867 - spacer EC60 motor module RF1	DZ2867
19	663003 4372	2	EZ4372 circular switching bench - spacer	EZ4372
20	663003 4386	1	EZ4386 sheet cladding, side	EZ4386
21	663003 4387	1	EZ4387 sheet cladding, upper II	EZ4387
22	663003 0012	1	EZ0109-4 back plate fastener	EZ0109
23	896011 2282	4	Single-row groove ball bearings with cover disks 6001-2Z	
24	896011 0304	2	Single row deep groove ball bearing with sealing disk 6200-2RS1	
25	896012 5524	2	Single row deep groove ball bearing with sealing disks 6205-2RS1	
26	616502 0390	1	Toothed belt AT5 b15 Z78	
27	635002	1	TE0617 collet 9.52mm	
28	See table	1	Connecting circuit board encoder Sub-D15 pin UNC	
29	550063 0009	1	Plug connector M23 - pin 9-pin	
30	890805 0004	2	EZ3083 washer 3 mm	EZ3083
31	893051 0001	4	Disk DIN 125 ST 4.3	
32	893054 0001	4	Disk DIN 125 ST 6.4	
33	893047 0001	2	Disk DIN 433 10.5	
34	893048 0001	2	Disk DIN 433 13	
35	894030 0550	2	Seeger rings for mounting holes DIN 472 - J30	
36	894020 0240	1	Seeger rings for shafts DIN 471 - A25	
37	891191 0061	8	Countersunk screw DIN 965 4.8 VZ M 3 x 6	
38	891191 0101	8	Countersunk screw DIN 965 4.8 VZ M 3 x 10	
39	891134 0121	3	Countersunk screw DIN 7991, M 6 x 12	
40	See table	2	Motor fixing screws	
41	891591 0081	4	Roundhead screw DIN 7380 M 3 x 8	
42	891122 0081	2	Panhead screw DIN 6912 8.8 M 4 x 8	
43	891123 0101	4	Panhead screw DIN 6912 8.8 M 5 x 10	
44	891123 0121	2	Panhead screw DIN 6912 8.8 M 5 x 12	
45	891124 0141	8	Panhead screw DIN 6912 8.8 M 6 x 14	
46	891134 0121	1	Countersunk screw DIN 7991, M 6 x 12	
47	616506 0520	1	EZ0101-4 - Toothed belt pulley HTD3 - Z52	EZ0101
48	616504 1002	1	Toothed belt CXP5-15-Z100	
49	635002	1	TE0617 collet 9.52mm	TE0617
50	892252 0011	1	Fixing nut M20x1(Fa SKF) KM4	
51	616506 1000	1	EZ0102-4 - Toothed belt pulley HTD3 - Z100	EZ0102
52	616504 1282	1	Toothed belt CXP5-15-Z128	
53	635002 0952	1	EZ0085-4 male thread collet $\varnothing$ 9.52	EZ0085
54	663003 0201	1	EZ0707 - hook wrench KM4	EZ0707

1\* explosion main axis base body, see page 18

**Explosion RF 1 main axis base body**

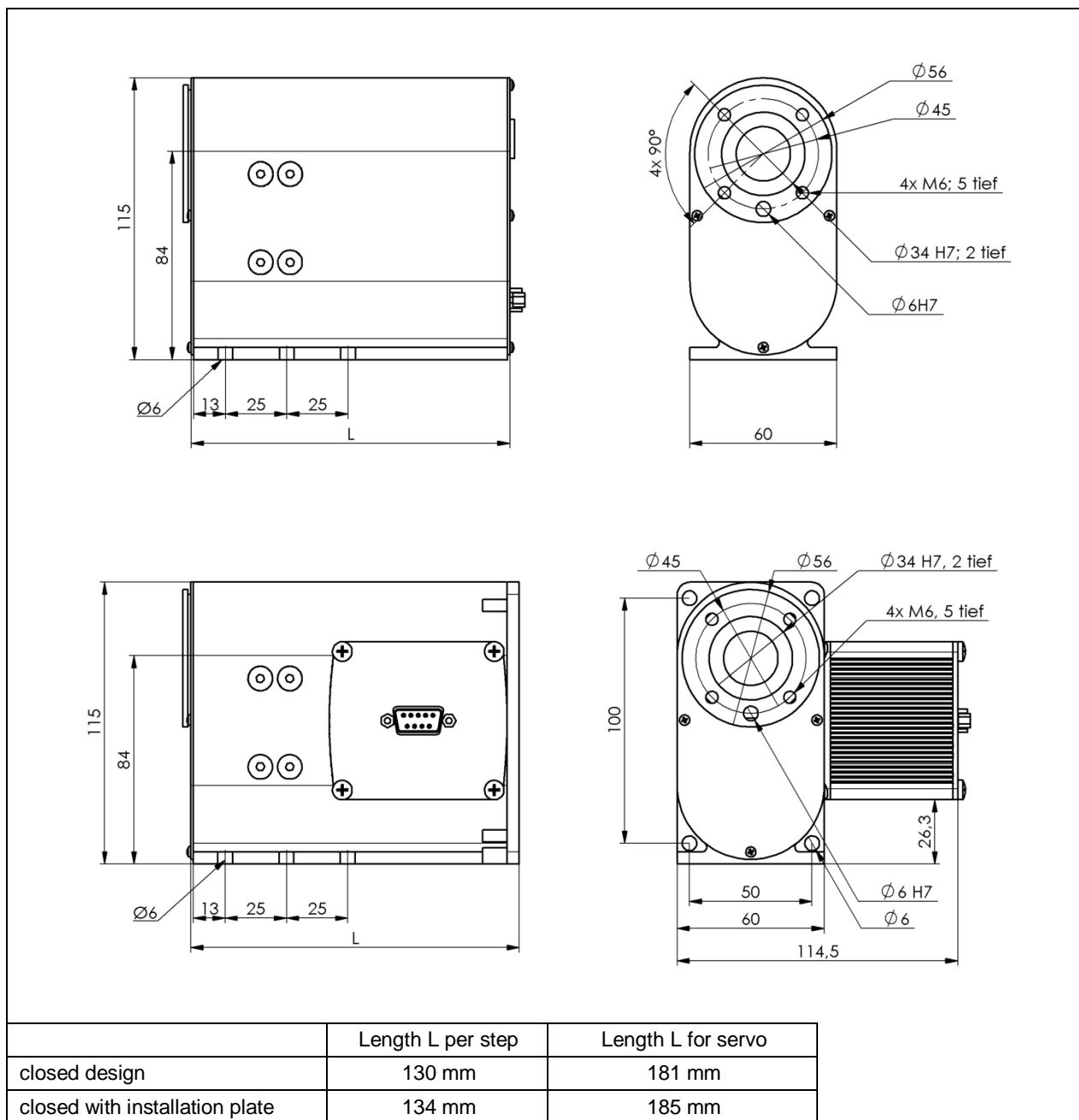


**Parts list RF 1 main axis base body**

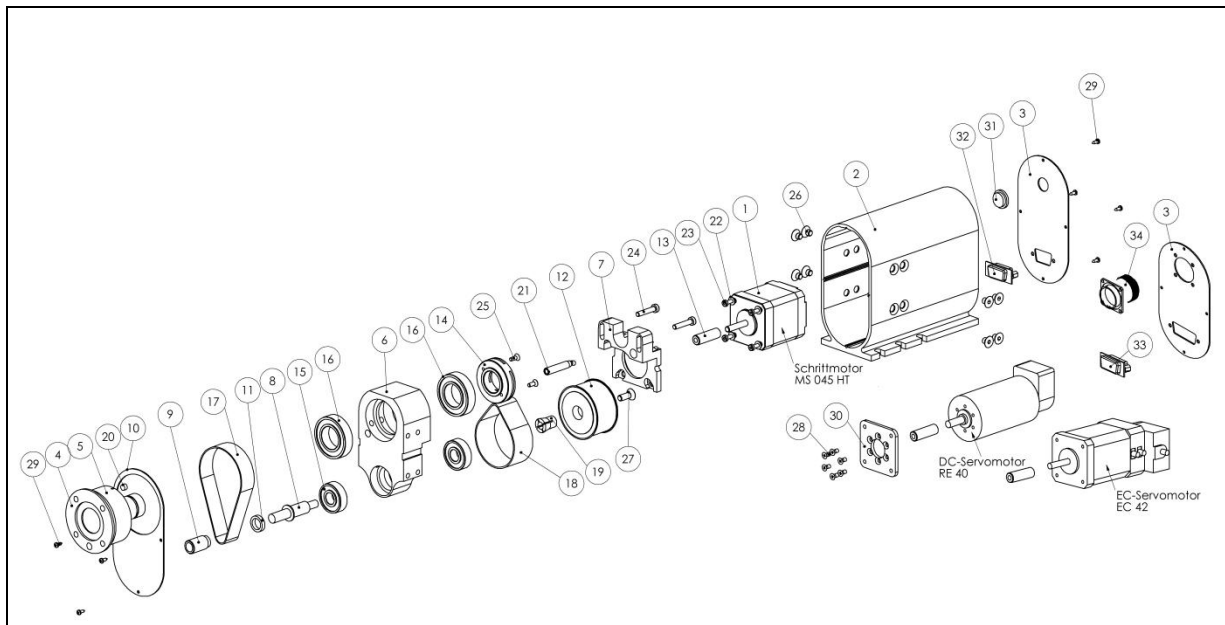
Item no.	Part number	Quantity	Name	Drawing no.
1	663003 4371	1	EZ4371 circular switching bench, base body with gear unit	EZ4371
2	660009	1	TE0536 - R1 circular switching bench with flanged shaft	TE0536
3	896014 0904	2	Single-row groove ball bearings with sealing disks 6308-2RS1	
4	660014	1	Adjusting nut, Spieth MSA 40-1.5	
5	898304 2171	1	TE0551 - clamping bush 30x42x17	TE0551
6	479001	1	Lenze magnetic brake 14 115 12 13	
7	616003	1	TE0586 - toothed belt wheel AT5 Z114	TE0586
8	660003	1	TE0587 - R1 circular switching bench - limit switch plate	TE0587
9	563005	1	Magnetic sensor	
10	616501 0750	1	Toothed belt 16 AT5 750 (for base unit)	
11	892025 0019	2	Hexagonal nut DIN 934 8 M 6 x 0.75	
12	891531 0101	2	Self-tapping screw DIN 7982 VA 2.9 x 9.5	
13	891101 0161	6	Panhead screw DIN 912 8.8 VZ M3 x 16	
14 *	892367 0121	4	Threaded bush M10-M6	

14\* not required for RF1 servo version

**Dimension sheet MD1**



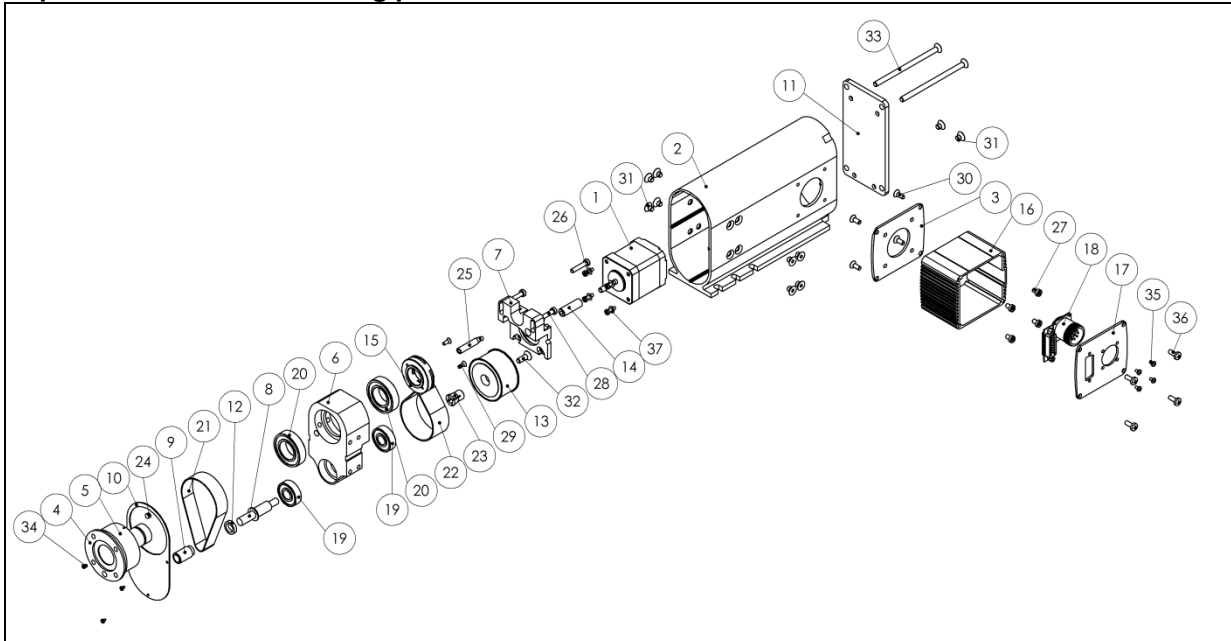
**Explosion MD1**



**Parts list MD1**

Item no.	Part number	Quantity	Name	Drawing no.	MS 045HT 261010 0010	RE40 261010 0210	EC 42 261010 0310
1	See table	1	Motor		470480 0001	471150	474062 0048
2	See table	1	mini rotary axis MD1 - cladding element	EZ0574 EZ0589	661010 0011	661010 0012	661010 0012
3	630112 0081	1	Ez0573-4 - mini lifting unit MH1 - back plate for multiphase motor	EZ0573	630112 0081	EZ0578	EZ0578
4	661010 0002	1	EZ0580 - main shaft	EZ0580			
5	616506 0521	1	EZ0581 - toothed belt pulley HTD-3M-Z52	EZ0581			
6	661010 0005	1	Ez0583-4 - mini rotation axis - bearing plate	EZ0583			
7	661010 0006	1	Ez0584-4 - mini rotation axis - motor support	EZ0584			
8	661010 0004	1	Ez0585-4 - mini rotation axis MD1 - auxiliary shaft	EZ0585			
9	616506 0133	1	EZ0586 - toothed belt pulley HTD-3M-Z13	EZ0586			
10	661010 0008	1	Ez0587-4 - mini rotation axis MD1 - front cover	EZ0587			
11	661010 0007	1	EZ0597-4 - flanged wheel	EZ0597			
12	616013 0070	1	EZ0423 - belt pulley MXL-Z70	EZ0423			
13	See table	1	EZ0149 - belt pulley MXL - Z14	EZ0149	614013 0014	EZ0149	616013 0141
14	660014 0001	1	TE1732 D1 - clamping nut	TE1732			
15	896011 0262	2	d10 D26 b8 single-row groove ball bearings with cover disks 6000-ZZ				
16	896012 0374	2	Single-row groove ball bearings with sealing disks 61904-2RS1				
17	61504 0712	1	Toothed belt HTD-3-CXP- Z71 - b15				
18	616500 0076	1	Toothed belt MXL-Z76 - b22				
19	610500	1	TE0729 collet 6.35mm				
20	632501 0002	1	Neodymium block magnet 3 mm				
21	563005	1	Magnetic sensor				
22	893050 0001	4	Disk DIN 125 ST 3.2				
23	891121 0101	4	Panhead screw DIN 7984 8.8 M 3 x 10				
24	891122 0201	4	Panhead screw DIN 6912 8.8 M 4 x 20				
25	891131 0081	2	Countersunk screw DIN 7991, M 3 x 8				
26	891133 0061	8	Countersunk screw DIN 7991, M 5 x 6				
27	891133 0141	1	Countersunk screw DIN 7991, M 5 x 14				
28	891191 0061	6	Countersunk screw DIN 965 4.8 VZ M 3 x 6			including	
29	891530 0071	7	Self-tapping screw DIN 7981 VZ 2.2 x 6.5				
30	661010 0016	1	DZ2893 - motor mounting - RE 40 - MD1	DZ2893		including	
31	610006	1	Part No. 610006 Kapsto cover GPN 910		including		
32	5555 01	1	Sub-D 9-pin plug		including		
33	5555 08	1	Sub-D 15-pin plug			including	including
34	550063 0009	1	Plug connector M23 - Pin 9-pin			including	including
35	581090	2	6 - KT. Threaded bolts UNC 4-40, 13.5mm				

**Explosion MD1 with mounting plate**

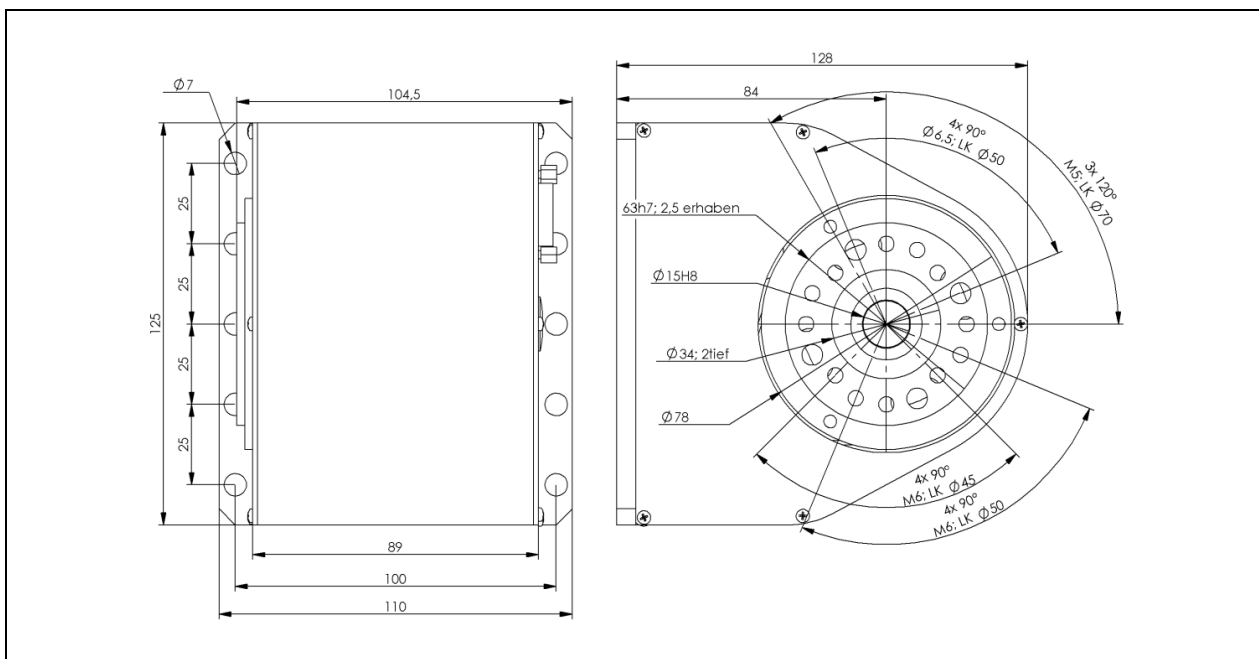


Options	Part number	Item 1	Item 2	Item 14	Item 17	Item 18	Item 35
MS 045HT	261010 0010	470480 0001	DZ2898 L=128	616013 0141	610110 3002	5555 01	-
RE 40	261010 0210	471150	DZ2898 L=179	616013 0147	610110 0003	550063 0009/555508	4
EC 42	261010 0310	474062 0048	DZ2898 L=179	616013 0141	610110 0003	550063 0009/555508	4

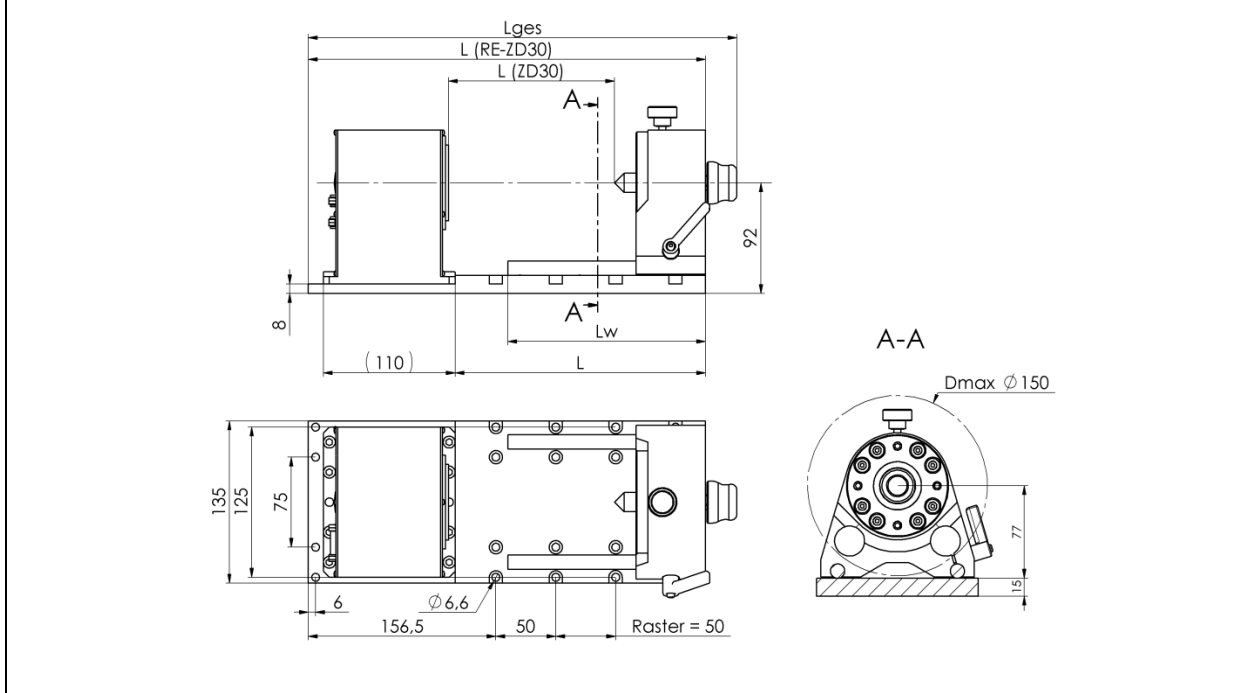
**Parts list MD 1 with mounting plate**

Item no.	Part number	Quantity	Name	Drawing no.
1	See table	1	Motor	
2	661010 0017	1	DZ2897 - mini rotation axis MD1 - cladding element - side connection	DZ2897
3	610110 2898	1	DZ2898 - cover for motor element 4 - MD1	DZ2898
4	661010 0002	1	EZ0580 - main shaft	EZ0580
5	616506 0521	1	EZ0581 - toothed belt pulley HTD-3M-Z52	EZ0581
6	661010 0005	1	Ez0583-4 - mini rotation axis - bearing plate	EZ0583
7	661010 0006	1	Ez0584-4 - mini rotation axis - motor support	EZ0584
8	661010 0004	1	Ez0585-4 - mini rotation axis MD1 - auxiliary shaft	EZ0585
9	616506 0133	1	EZ0586 - toothed belt pulley HTD-3M-Z13	EZ0586
10	661010 0008	1	Ez0587-4 - mini rotation axis MD1 - front cover	EZ0587
11	661010 0200	1	Ez0590-4 - mounting plate	EZ0590
12	661010 0007	1	EZ0597-4 - flanged wheel	EZ0597
13	616013 0070	1	EZ0423 - belt pulley MXL-Z70	EZ0423
14	See table	1	EZ0149 - belt pulley MXL - Z14	EZ0149
15	660014 0001	1	TE1732 D1 - clamping nut	TE1732
16	204044 0050	1	Motor element 4 - 72.50 x 64.50 L=50	
17	See table	1	Connecting sheet	
18	See table	1	Connecting version	
19	896011 0262	2	d10 D26 b8 single-row groove ball bearings with cover disks 6000-2Z	
20	896012 0374	2	Single-row groove ball bearings with sealing disks 61904-2RS1	
21	61504 0712	1	Toothed belt HTD-3-CXP- Z71 - b15	
22	616500 0076	1	Toothed belt MXL-Z76 - b22	
23	610500	1	TE0729 collet 6.35mm	
24	632501 0002	1	Neodymium block magnet 3 mm	
25	563005	1	Magnetic sensor	
26	891121 0101	4	Panhead screw DIN 7984 8.8 M 3 x 10	
27	891122 0061	4	Panhead screw DIN 6912 M4x6	
28	891122 0201	4	Panhead screw DIN 6912 8.8 M 4 x 20	
29	891131 0081	2	Countersunk screw DIN 7991, M 3 x 8	
30	891132 0101	4	Countersunk screw DIN 7991, M 4 x 10	
31	891133 0061	10	Countersunk screw DIN 7991, M 5 x 6	
32	891133 0141	1	Countersunk screw DIN 7991, M 5 x 14	
33	891133 0901	2	Countersunk screw DIN 7991, M 5 x 90	
34	891530 0051	3	Self-tapping screw DIN 7981 VZ 2.2 x 4.5	
35	891181 0041	n	Roundhead screw DIN 7985 4.8 VZ M 2.5 x 4	
36	891182 0101	4	Roundhead screw DIN 7985 4.8 VZ M 4 x10	
37	893050 0001	4	Disk DIN 125 ST 3.2	

**Dimension sheet ZD 30**

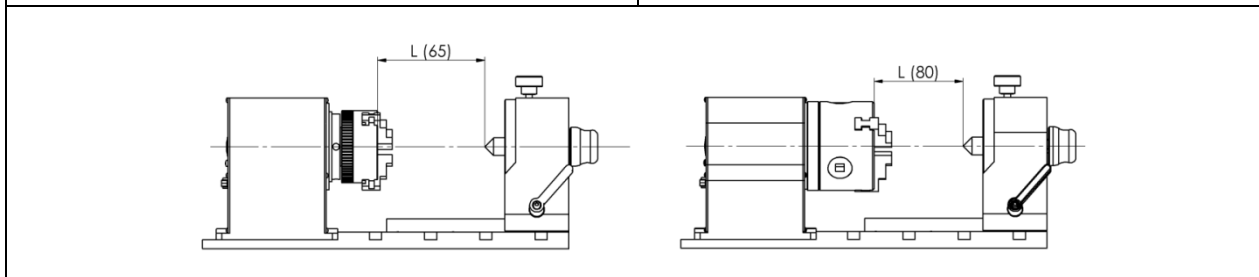


**Dimension sheet ZD 30 with tailstock unit RE-ZD 30**



Tailstock unit RE-ZD30 with three-jaw chuck  $\varnothing$  65

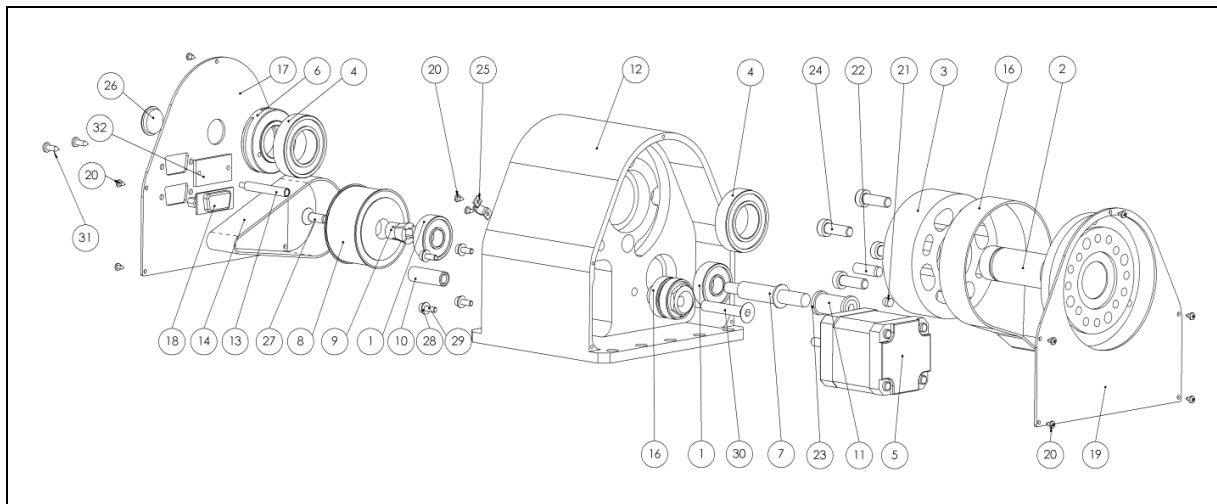
Tailstock unit RE-ZD30 with three-jaw chuck  $\varnothing$  80



Options	Part no.	L overall	L	L (ZD30)	L (RE-ZD30)	Lw	L (65)	L (80)
Tailstock unit RE-ZD30 200 mm	269100 1060	358	209	138.5	331.5	165	97	80.5
Tailstock unit RE-ZD30 300 mm	269100 1070	458	309	238.5	431.5	265	197	180.5

Tailstock unit RE-ZD30 400 mm	269100 1080	558	409	338.5	531.5	365	297	280.5
Tailstock unit RE-ZD30 500 mm	269100 1090	658	509	438.5	631.5	465	397	380.5

**Explosion ZD 30**

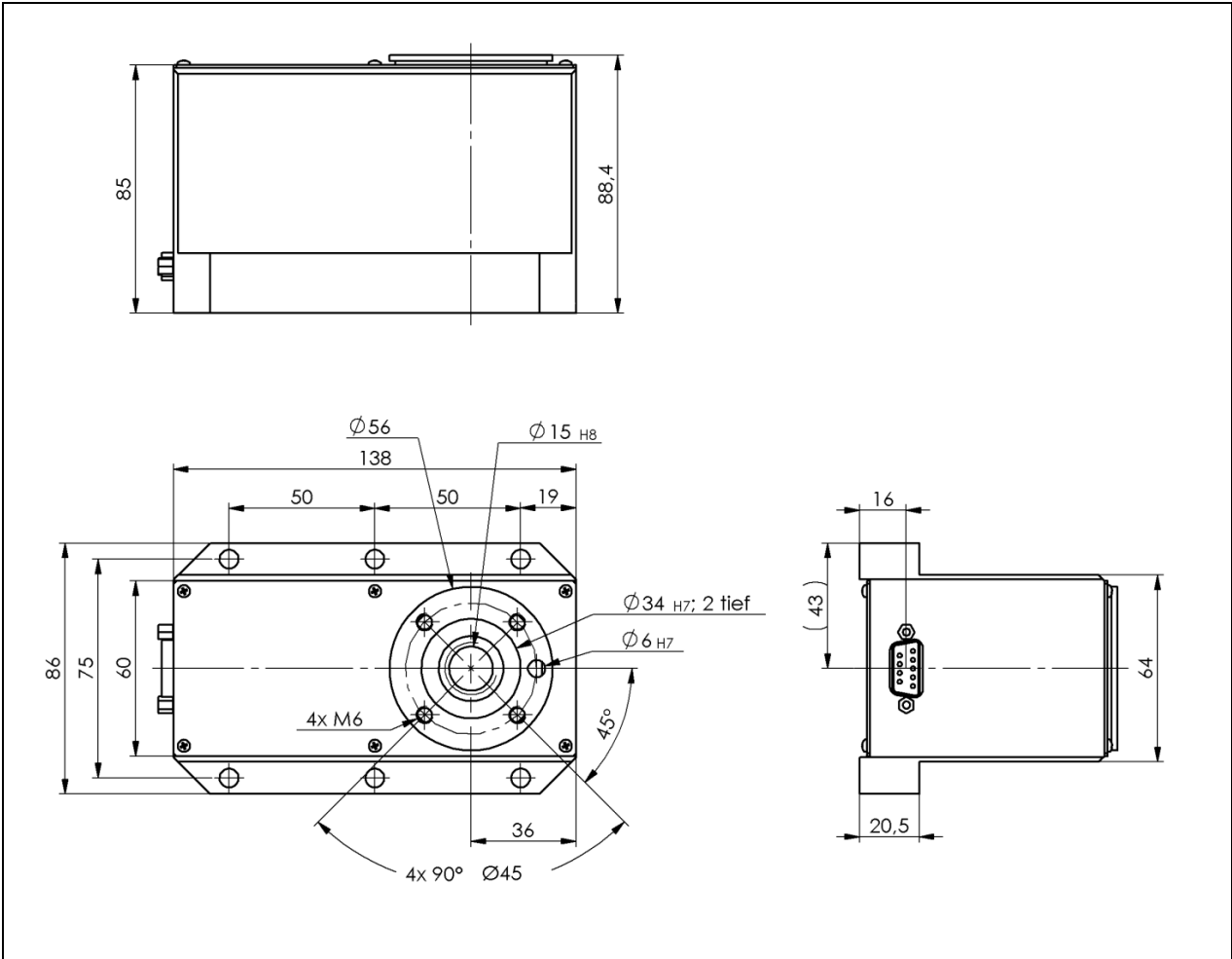


**Parts list ZD 30**

Item no.	Part number	Quantity	Name	Drawing no.
1	896011 0264	2	Single row deep groove ball bearing with sealing disk 6200-2RS1	
2	661100 0010	1	EZ1062 - main shaft for rotation axis ZD30	EZ1062
3	616506 0780	1	EZ1063 - belt pulley HTD-3M-Z78	EZ1063
4	896012 0374	2	Single-row groove ball bearings with sealing disks 61904-2RS1	
5	470480	1	MS 045 HT multi-phase motor	
6	660014 0001	1	TE1732 D1 - clamping nut	TE1732
7	661100 0020	1	EZ1054 - auxiliary shaft for rotary indexing table ZR20	EZ1054
8	616013 0070	1	EZ0423 - belt pulley MXL-Z70	EZ0423
9	610500	1	TE0729 collet 6.35 mm	TE0729
10	616013 0014	1	EZ0149 - belt pulley MXL - Z14	EZ0149
11	616506 0135	1	EZ1064 - Toothed belt pulley HTD3 - Z13	EZ1064
12	661100 0060	1	EZ1061 - chassis for rotation axis ZD30	EZ1061
13	563005 1001	1	Reed sensor MK3 - K001- 600	
14	616500 0110	1	Toothed belt MXL-Z110 - b22	
15	616400	1	Tensioning roller for toothed belt LF4-LF5	
16	616504 0892	1	Toothed belt HTD-3-CXP-Z89	
17	661100 0040	1	EZ1065 - cover sheet with 9-pin Sub-D	EZ1065
18 *	5555 01	1	Sub-D 9-pin plug - male	
19	661100 0050	1	EZ1066 - Front plate for rotation axis ZD30	EZ1066
20	891530 0051	12	Self-tapping screw DIN 7981 VZ 2.2 x 4.5	
21	632501 0002	2	Neodymium block magnet	
22	895025 0206	1	Grubscrew DIN 6325 d6x 20	
23	661100 0030	2	EZ1068 - flanged wheel for rotation axis ZD30	EZ1068
24	891124 0181	4	Panhead screw DIN 6912 8.8 M 6 x 18	
25	582132	1	Magnetic sensor mounting	
26	610019 0002	1	Cover cap PA - type	
27	891133 0141	1	Countersunk screw DIN 7991, M 5 x 14	
28	893050 0001	4	Disk DIN 125 ST 3.2	
29	891101 0081	4	Panhead screw DIN 912 8.8 VZ M3 x 8	
30	891134 0351	1	Countersunk screw DIN 7991, M 6 x 35	
31 *	891531 0101	2	Self-tapping screw DIN 7982 VA 2.9 x 9.5	
32 *	584297 0001	1	AZ0297 - cover Sub-D9	

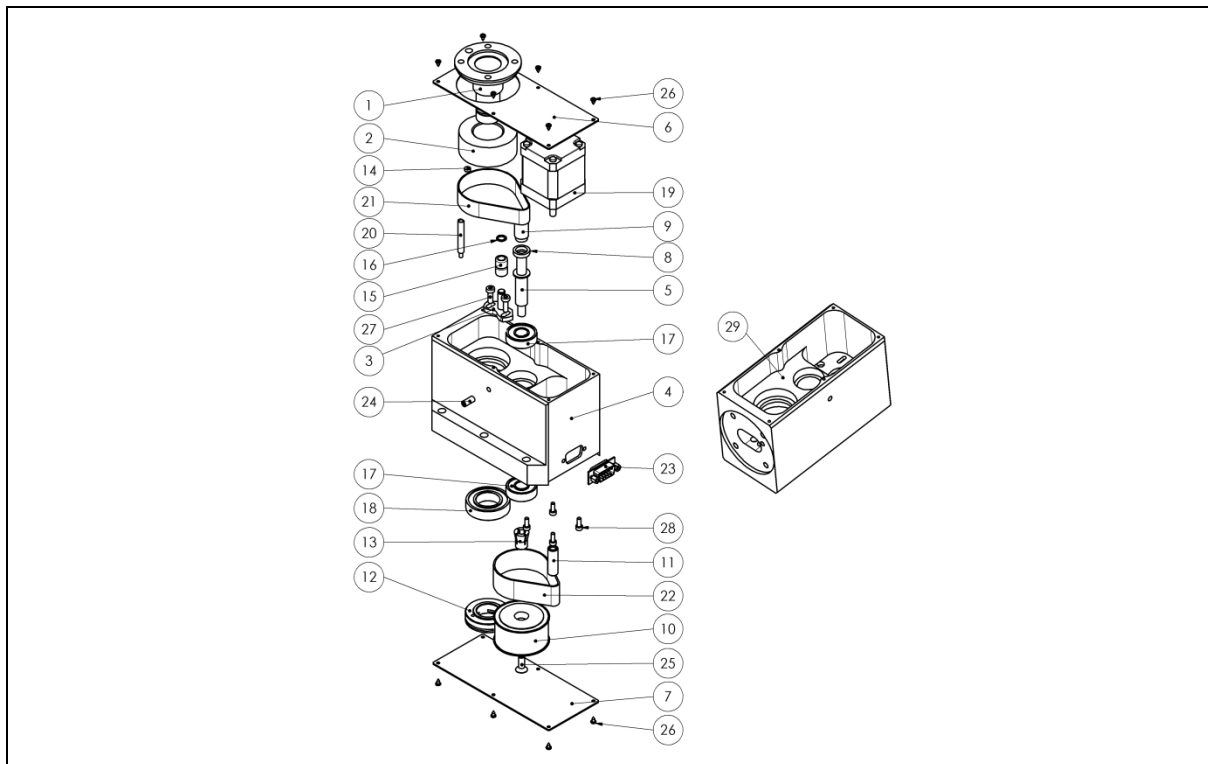
Items 31\* and 32\* are not included in the ZDS 2030 version  
Item 18\* in ZDS 2030 version, 2 of

**Dimension sheet ZR 20**





**Explosion ZR 20**



**Parts list ZR 20**

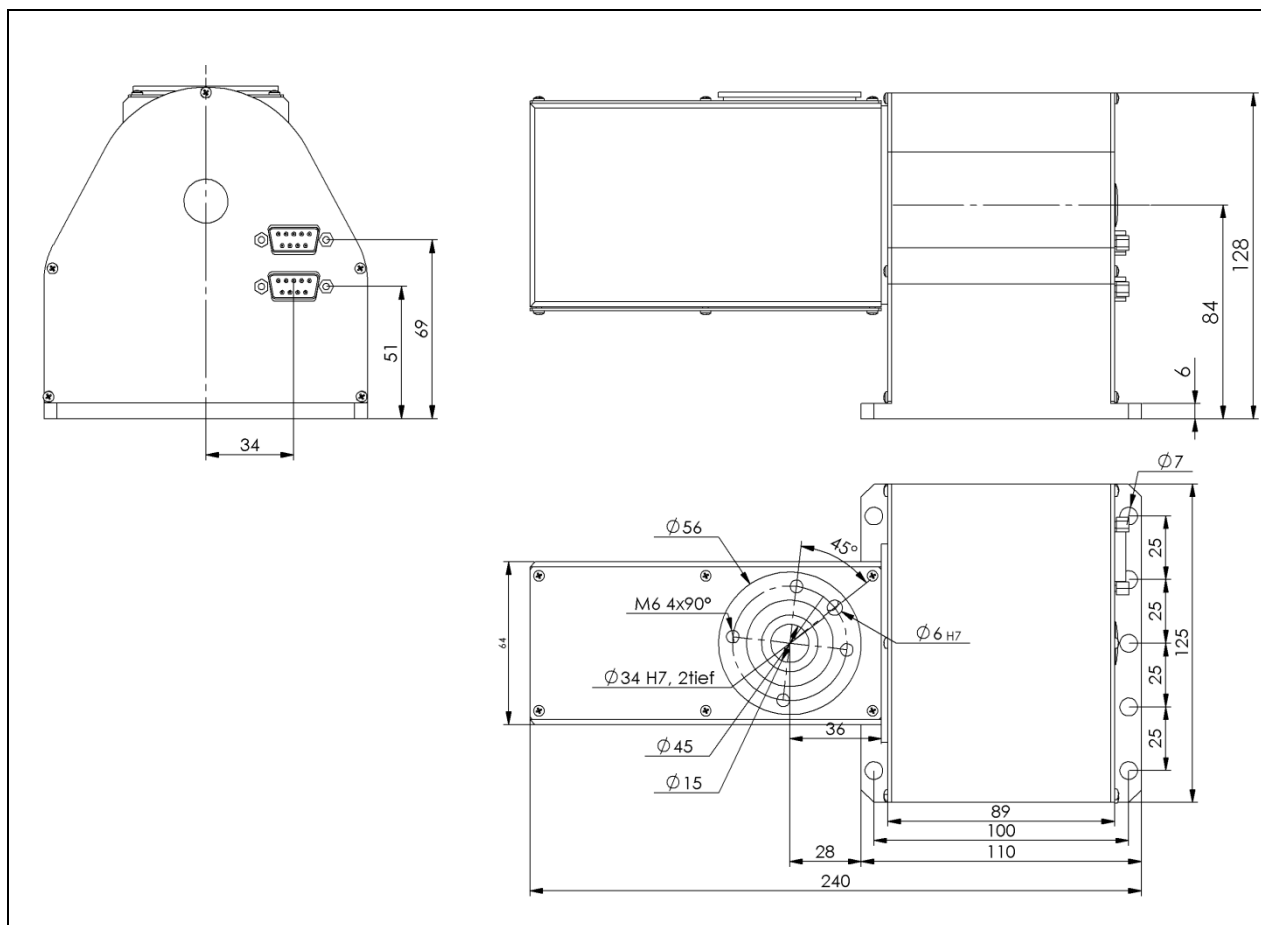
Item no.	Item number	Quantity	Name	Drawing no.
1	661010 0002	1	EZ0580 - main shaft	EZ0580
2	616506 0521	1	EZ0581 - toothed belt pulley HTD3 - Z52	EZ0581
3	660300 0040	1	EZ1057 - tensioning bolts for needle rollers	EZ1057
4 *	660300 0010	1	EZ1055 - chassis for circular switching bench ZR20	EZ1055
5	661100 0020	1	EZ1054 - auxiliary shaft for rotary indexing table ZR20	EZ1054
6	660300 0020	1	EZ1052 - front cover for rotary indexing table ZR20	EZ1052
7	660300 0030	1	EZ1051 - rear cover for circular switching bench ZR20	EZ1051
8	661010 0007	1	EZ0597-4 - flanged wheel	EZ0597
9	616506 0133	1	EZ0586 - Toothed belt pulley HTD3 - Z13	EZ0586
10	616013 0070	1	EZ0423 - belt pulley MXL-Z70	EZ0423
11	See table	1	EZ0149 - belt pulley MXL - Z14	EZ0149
12	660014 0001	1	TE1732 D1 - clamping nut	TE1732
13	610500	1	TE0729 collet 6.35 mm	TE0729
14	632501 0002	1	Neodymium block magnet	
15	896090 0608	2	Needle bush HK 0608	
16	894020 0060	1	Seeger retaining ring for shafts - SW6	
17	896011 0264	2	Single row deep groove ball bearing with sealing disk 6200-2RS1	
18	896012 0374	2	Single-row groove ball bearings with sealing disks 61904-2RS1	
19	470480	1	MS 045 HT multi-phase motor	
20	563005 1001	1	Reed sensor MK3 - K001- 600	
21	616504 0622	1	Toothed belt HTD-3-CXP- Z62 - b15	
22	616500 0083	1	Toothed belt MXL-Z83 - b20	
23 *	5555 01	1	Sub-D 9-pin plug - male	
24	891393 0121	1	Grubscrew DIN 914 M 5 x 12	
25	891133 0141	1	Countersunk screw DIN 7991, M 5 x 14	
26	891530 0051	12	Self-tapping screw DIN 7981 VZ 2.2 x 4.5	
27	891122 0121	2	Panhead screw DIN 6912 8.8 M 4 x 12	
28	891101 0081	4	Panhead screw DIN 912 8.8 VZ M3 x 8	
29 *	660300 0011		EZ1053 - chassis for ZS20	EZ1053

\* Item 4 not included in ZDS 2030 version

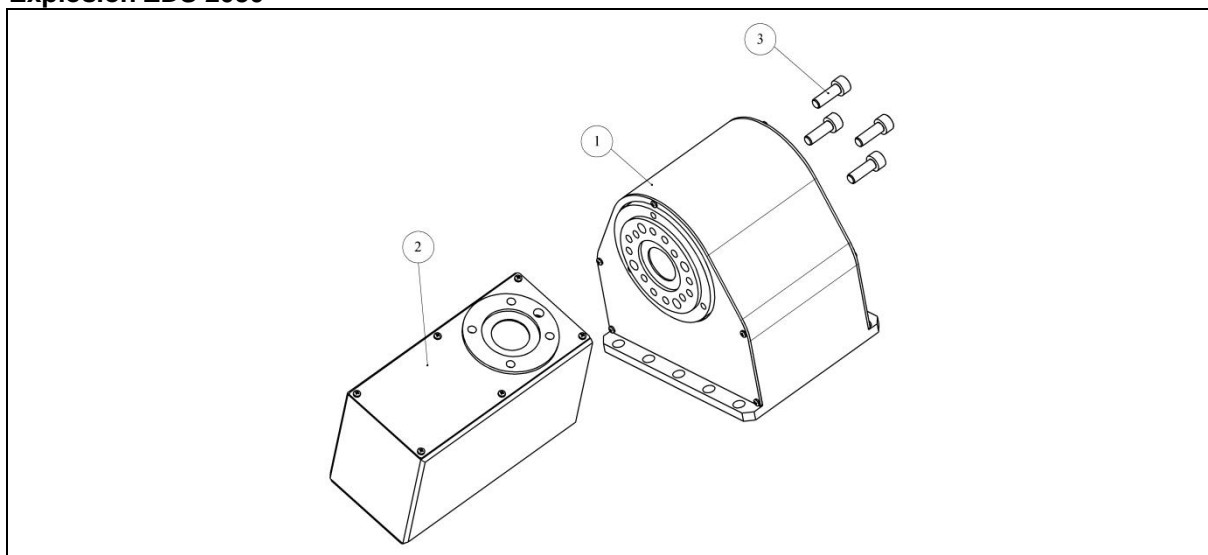
\* Item 23 not included in ZDS 2030 version

\* Item 29 not included in ZR 20 version

**Dimension sheet ZDS 2030**



**Explosion ZDS 2030**



**Parts list ZDS 2030**

Item no.	Quantity	Name
1	1	Rotation axis ZD 30
2	1	ZR 20 circular switching bench
3	4	Panhead screw DIN 912 8.8 VZ M3 x 18

Explosion unit, see ZD 30 / ZR 20

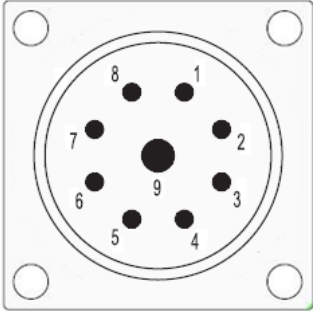
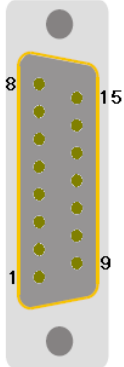
### Drive modules

Various drive modules with multiphase motors, brushed servo motors (BDC) and brushless servo motors (BLDC) are fitted as standard on rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030.

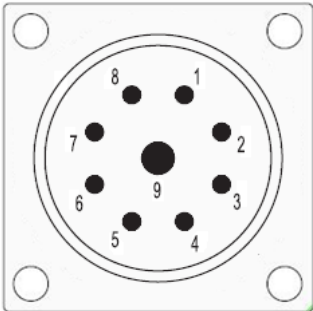
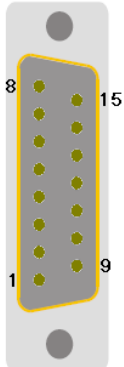
	Drive module	RF 1	MD 1	ZD 30	ZR 20	ZDS 2030	Part no.
Multiphase motor	MS-045 HT		X	X	X	X	398702 0002
	MS-200 HT	X				X	
EC servo motor	EC 42 (brushless)		X				398703 0005
	EC 60S (brushless)	X					398703 0003
DC servo motor	RE 40 (brushed)		X				398700 0001
	DC 100 (brushed)	X					398700 0012

## 2.4 Pin assignment for rotary units

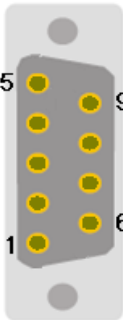
### Pin assignment for brushed DC servo motors (BDC)

<p><b>Motor connection</b></p>  <p>Insert pin mating view on the plug side</p>	<p><b>M23 9-pin (8+1) pin</b></p> <ol style="list-style-type: none"> <li>1 Motor phase 1 (V+)</li> <li>2 Motor phase 2 (V-)</li> <li>3 Motor phase 1 (V+)*</li> <li>4 Motor phase 2 (V-)*</li> <li>5 +24V brake</li> <li>6 GND brake</li> <li>7 ---</li> <li>8 ---</li> <li>9 Earthing lead</li> </ol> <p>Casing - cable shield</p> <p>* Motor phases are partly connected via two wires</p>	<p><b>Encoder connection</b></p>  <p>Insert pin mating view at the insertion side</p>	<p><b>Sub-D 15-pin Pin</b></p> <ol style="list-style-type: none"> <li>1 ---</li> <li>2 +5V encoder</li> <li>3 Encoder track /Z</li> <li>4 Encoder track /B</li> <li>5 Encoder track /A</li> <li>6 +24V switch</li> <li>7 Limit switch 1</li> <li>8 GND switch</li> <li>9 ---</li> <li>10 GND encoder</li> <li>11 Encoder track Z</li> <li>12 Encoder track B</li> <li>13 Encoder track A</li> <li>14 Reference switches</li> <li>15 Limit switch 2</li> </ol> <p>Casing – cable shield</p>
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### Pin assignment for brushless EC servomotors (BLDC) 48V

<p><b>Motor connection</b></p>  <p>View of pin insert at the insertion side</p>	<p><b>M23 9-pin (8+1) pin</b></p> <ol style="list-style-type: none"> <li>1 Motor phase U</li> <li>2 Motor phase V</li> <li>3 Motor phase W</li> <li>4 ---</li> <li>5 +24V brake</li> <li>6 GND brake</li> <li>7 ---</li> <li>8 ---</li> <li>9 Earthing lead</li> </ol> <p>Casing – cable shield</p>	<p><b>Encoder connection</b></p>  <p>View of pin insert at the insertion side</p>	<p><b>Sub-D 15-pin Pin</b></p> <ol style="list-style-type: none"> <li>1 Hall signal A</li> <li>2 +5V encoder/Hall</li> <li>3 Encoder track /Z</li> <li>4 Encoder track /B</li> <li>5 Encoder track /A</li> <li>6 +24V switch</li> <li>7 Limit switch 1</li> <li>8 GND switch</li> <li>9 Hall signal B</li> <li>10 GND encoder</li> <li>11 Encoder track Z</li> <li>12 Encoder track B</li> <li>13 Encoder track A</li> <li>14 Hall signal C</li> <li>15 Limit switch 2</li> </ol> <p>Casing – cable shield</p>
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### Pin assignment for Sub-D 9-pin multi-phase motors

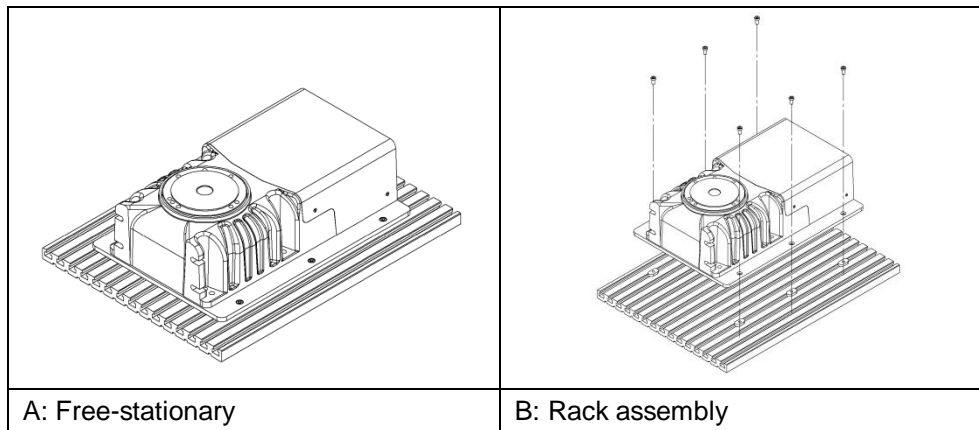
<p><b>Motor connection</b></p>  <p>View of pin insert at the insertion side</p>	<p><b>Sub-D-9-pin Pin</b></p> <ol style="list-style-type: none"> <li>1 Motor phase 1A</li> <li>2 Motor phase 1B</li> <li>3 Motor phase 2A</li> <li>4 Motor phase 2B</li> <li>5 +24V switch</li> <li>6 +24V brake</li> <li>7 Limit switch 2</li> <li>8 GND brake</li> <li>9 Limit switch 1</li> </ol> <p>Casing – cable shield</p>
--	---

### 3 Assembly of the rotary unit

Before you can assemble your new rotary unit you must remove any securing devices used in transport.

#### 3.1 Mounting and adjustment instructions

You have several options for mounting the components individually:



#### Adjustment:

The rotary units have one- or two-plane alignment/adjustment surfaces lying parallel or perpendicular to the axis of rotation. These make it possible to set the rotary units as rotation axes or circular switching benches.

In order to ensure optimal rotary unit function, the axis of rotation must be precisely positioned/aligned to the system reference axis.

#### A) Freestanding installation of the rotary unit

You can place the rotary unit on a rack, a workbench or any other suitable, i.e. sturdy level base.



Choose the location carefully so that the product cannot fall or be knocked over by any impact or tug on the cables.

#### B) Rack mounting (recommended)

Use the depression in the base of the rotary unit to mount the rotary unit on your rack. Use appropriate panhead screws and the matching T-grooves/threaded rails (accessories) to secure it.



Make sure the fixing surfaces are sufficiently clean and sufficiently level.

The surface areas of these base bodies are plane-milled to achieve a high degree of precision.

However, to achieve the desired guide accuracies and running performance, the rotary unit must either be laid out over an appropriately flat surface or arranged over levelling plates. This achieves round or axial run-out tolerances of 0.02 to maximum 0.06 mm (according to rotary unit) at the transmission flange.

## 4 Commissioning, general information

The rotary unit is commissioned after mounting the relevant drive modules and any necessary cables.

Follow the relevant instructions in the documentation of the motor modules, amplifiers or complete controller used.

### Procedure:

- **Switch off the controller and check that it is isolated.**
- Mount the rotary unit/rotary-swivel unit securely on a suitable work surface
- Connect the encoder lead.
- Connect the motor lead.
- Switch the controls on and check that the rotary unit/rotary-swivel unit is working correctly
- Carry out a test run
  - first at a slow travel speed,
  - then under operating conditions



Incorrect assembly (including loading on the axis system), cabling or commissioning increases the risks.




Unauthorised individuals should not be given access to the controller or the switch cabinet. Danger to personnel from electric shock! The system constructor is responsible for protecting personnel from the possibility of electric shock!

## 5 Fault list



Repairs to the product's electrical components should only be performed by a qualified electrician. Otherwise there is a risk of electric current causing fatal injuries.

Problem/Fault	Possible cause(s)	Remedy
Increased noise while running	Dirt Toothed belt wear	Clean the rotary unit in the area around the seals Check the belt tension
Stiffness	Dirt Incorrect tension	Clean the rotary unit Alignment , adjustment
Impaired positioning accuracy or repeatability	Overload	Reduce load
 Important: a hostile electromagnetic environment can result in operational malfunctions.		



Do not attempt to manipulate the controller or amplifier of the rotary unit.

## 6 Technical specification

### 6.1 Mechanical specification

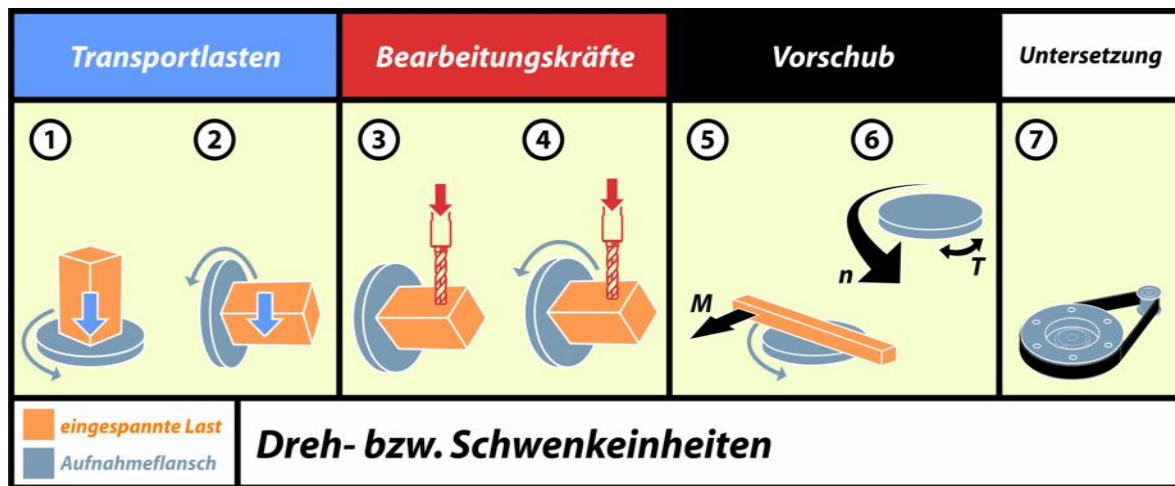
Technical specification RF 1	Multi-phase motor MS 200HT*			Servomotor DC 100/EC 60S		
Reduction ratio	1 : 24	1 : 52	1 : 100	1 : 24	1 : 52	1 : 100
speed [rpm]	0 - 50	0 - 23	0 - 12	0 - 125	0 - 58	0 - 30
Operating torque (0 - 500Hz) [Nm]	20	42	75	--		
Operating torque (500 - 1000Hz) [Nm]	18	38	75	--		
Rated torque [Nm]	--			6 / 10	13 / 22	25 / 42
Nominal holding torque (static load) [Nm]	37	75	75	7 / 12	16 / 16	30 / 50
Increment, min. [minutes of arc]	2.5	2	2	2	2	2
Radial run-out / axial run-out [mm]	0.02					
Weight [kg]	14.6					
* Values for half-stepping mode						

Technical specification MD 1	Multi-phase motor MS 045 HT*	DC servomotor RE 40	EC servomotor EC 42
Reduction ratio	1 : 20	1 : 20	1 : 20
speed [rpm]	0 - 60	0 - 175	0 - 150
Operating torque (0 - 1600Hz) [Nm]	8	--	--
Rated torque [Nm]	--	3	3.2
Nominal holding torque (static load) [Nm]	14	3.9	4
Increment, min. [minutes of arc]	3.5	2	2
Radial run-out/axial run-out [mm]	0.03		
Weight [kg]	from 1.35 (according to version)		
* Values for half-stepping mode			

Technical specification ZD 30	Multi-phase motor MS 045 HT*	Technical specification ZR 20	Multi-phase motor MS 045 HT*
Reduction ratio	1 : 30	Reduction ratio	1 : 20
speed [rpm]	0 - 40	speed [rpm]	0 - 60
Operating torque (0 - 1600Hz) [Nm]	12	Operating torque (0 - 1600Hz) [Nm]	8
Nominal holding torque (static load) [Nm]	20	Nominal holding torque (static load) [Nm]	14
Increment, min. [minutes of arc]	2.5	Increment, min. [minutes of arc]	3.5
Radial run-out/axial run-out [mm]	0.03	Radial run-out/axial run-out [mm]	0.06
Weight [kg]	2.9	Weight [kg]	2.1
* Values for half-stepping mode		* Values for half-stepping mode	

Technical specification for ZDS 2030 are identical to those of ZD 30 and ZR 20





Rotary unit	1*	2*	3	4	5	6	7
RF 1 (step)	60 kg	30 kg	37 Nm	17.5 Nm	17.5 Nm	50 rpm	1 : 24
RF 1 (step)	100 kg	50 kg	75 Nm	38 Nm	38 Nm	23 rpm	1 : 52
RF 1 (step)	150 kg	75 kg	75 Nm	75 Nm	75 Nm	12 rpm	1 : 100
RF 1 (DC-Servo / EC-Servo)	70 kg	35 kg	7/12 Nm	6/10 Nm	6/10 Nm	125U/min.	1 : 24
RF 1 (DC-Servo / EC-Servo)	110 kg	55 kg	16/26 Nm	13/22 Nm	13/22 Nm	58 rpm	1 : 52
RF 1 (DC-Servo / EC-Servo)	160 kg	80 kg	30/50 Nm	25/42 Nm	25/42 Nm	30 rpm	1 : 100
MD 1 (step)	5 kg	2.5 kg	14 Nm	8 Nm	8 Nm	60 rpm	1 : 20
MD 1 (DC-Servo)	6 kg	3 kg	3.9 Nm	3 Nm	3 Nm	175 rpm	1 : 20
MD 1 (EC-Servo brushless)	6 kg	3 kg	4 Nm	3.2 Nm	3.2 Nm	150 rpm	1 : 20
ZR 20 (step)	10 kg	5 kg	14 Nm	8 Nm	8 Nm	60 rpm	1 : 20
ZD 30 (step)	14 kg	8 kg	20 Nm	12 Nm	12 Nm	40 rpm	1 : 30
* Standard values may deviate depending on the application							

		RF 1	MD 1	ZD 30	ZR20	ZDS 2030
Rotational units						
dynamic load factor	C [N]	40500	7000	7000	7000	see ZD 30 ZR20
static load factor	C <sub>0</sub> [N]	24000	3650	3650	3650	
Added dynamic breakdown torque <sup>1</sup>	M [Nm]	770	109	160	96	
Added static breakdown torque <sup>2</sup>	M <sub>0</sub> [Nm]	648	172	255	152	
Added axial load <sup>3</sup>	F <sub>a</sub> [N]	8368	1293	1293	1293	
Added radial load <sup>3</sup>	F <sub>r</sub> [N]	19019	2940	2940	2940	
<sup>1</sup> applies to turning drives <sup>2</sup> applies to stationary drives with static safeguard 1.5 <sup>3</sup> is on the basis of a normal load, average rotational speed 15 rpm, working life 15000h  This data only applies to a load of → $  \begin{aligned}  &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  \end{aligned}  $						
working life is calculated similarly to the roller bearings through the dynamic equivalent load, load factors, the average output speed and the service factor to the load ratings						

## 6.2 Electrical specification

You will find motor specifications, amplifier mains supply values and controller specifications in the relevant documentation.

<http://www.isel-data.de/manuals>

## 7 Maintenance and cleaning

### 7.1 Maintenance instructions

The maintenance of rotary units RF1, MD1, ZD 30, ZR 20 and ZDS 2030 is restricted to the regular removal of coarse dirt particles and contaminants together with toothed belt replacement.

Maintenance interval	Maintenance work
When necessary	Clean the rotary unit
300 – 700 hours run	Visual check of seals, attachments
2 years	Toothed belt replacement Replace shaft seal rings (if fitted)

### 7.2 Cleaning

Clean the surface of the rotary unit's cast housing and the output flange with a lint-free, dry/slightly damp cloth. Do not use harsh cleaning agents or abrasive cleaners.

## 8 Decommissioning / disposal



The symbol on the product or its packaging indicates that the product must not be disposed of with normal household waste.

Users must deliver the products/used devices to a collection point for used electrical and electronic devices. The separate collection and proper disposal of your products/used devices helps to conserve natural resources and guarantees recycling, which in turn protects people's health and the environment. You can get information on where to find collection points for your used devices from your local borough council, local waste disposal companies or on the Internet.

## 9 CE Compliance



*Rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030* are classified as 'partly completed machines' under MD 2006/42/EC and therefore comply with CE Directives (see declaration of incorporation of the manufacturer, isel Germany AG).

As an 'partly completed machine' the product does not carry the CE mark, although it still conforms to the relevant European Directives.

isel Germany AG hereby confirms that the product complies with the following directives:

EC Directive 2006/42/EC 'Machinery Directive'

EU directive 2006/95/EG "Electrical equipment for use within given voltage limits"/"Low voltage directive"



EU directive 2004/108/EG "Electromagnetic Compatibility (EMC)"

The installation declaration for *rotary units RF 1, MD 1, ZD 30, ZR 20 and ZDS 2030* is an integral part of these assembly instructions.



## 10 Service

For service and configuration of controllers/motor amplifiers (if in the deliverables) you can get advice from:

**Mr Frank Hecht (Dermbach - Thüringen plant):**

 **Tel:** +49 (0)6659 981-763  
 **Email:** support@isel.com

**Mr Frank Jansen (Eichenzell - Hessen plant):**

 **Tel:** +49 (0)6659 981-765  
 **Email:** support@isel.com

## 11 Warranty

### Warranty:

Over and above the seller's statutory liability and subject to the conditions below, as the manufacturer we guarantee the durability and flawless operation of properly used products from isel Germany AG. The warranty covers the functioning of isel Germany AG products and includes all defects that are demonstrably attributable to manufacturing or material faults.

### Warranty exclusions:

All replaceable individual components, e.g. screws, connecting pins etc. are excluded from this warranty. Furthermore, we accept no liability for damage caused by:

inappropriate or improper use

faulty or negligent handling

failure to observe installation instructions and instructions on care, as well as modifications or repairs carried out by users themselves

effects on the material's surface caused by chemical or physical agents, as well improper use, e.g.

damage by sharp objects

### We do not accept any liability for consequential damage!

We do not accept any liability for damage to persons or property that is caused by incorrect handling or failure to obey the safety guidelines. In cases such as these no claim can be made under the warranty.

### Warranty conditions:

Our warranty only covers at our discretion repair or replacement of the product free of charge for first/end users within the warranty period.





### Warranty period:

The warranty period under our Terms and Conditions of Trading (isel Germany AG's T&C, section VI) is one year.

For complaints, please contact the seller or manufacturer direct, quoting the invoice/delivery note number.

### Manufacturer: **isel Germany AG**

**Bürgermeister-Ebert-Straße 40  
D-36124 Eichenzell, Germany**

 **Tel:** +49 (0)6659 981-0  
 **Fax:** +49 (0)6659 981-776  
 **Email:** [automation@isel.com](mailto:automation@isel.com)  
 **Website:** [www.isel-germany.com](http://www.isel-germany.com)

## 12 Declaration of incorporation in accordance with MRL 2006/42/EG

### Declaration of incorporation according to EC Machinery Directive 2006/42/EC, Appendix II B

The manufacturer **isel** Germany AG  
 Bürgermeister-Ebert-Straße 40  
 D-36124 Eichenzell, Germany

hereby declares that the product (**partly completed machine**)

Product description:	<b>Rotary unit RF 1</b>	<b>Part number: 26024x xx00</b>
	<b>Rotary unit MD 1</b>	<b>Part number: 261010 0x10</b>
	<b>Rotary unit ZD 30</b>	<b>Part number: 261100 0000</b>
	<b>Rotary unit ZR 20</b>	<b>Part number: 260300 0000</b>
	<b>Rotary unit ZDS 2030</b>	<b>Part number: 265000 0000</b>

**complies with** the basic **health and safety requirements** of EC Machine Directive 2006/42/EG Appendix I.

#### The following harmonised standards were applied:

EN ISO 12100-1:2003 Safety of machinery - Basic concepts, general principles for design - Part 1: Basic terminology, methodology  
 EN ISO 12100-2:2003 Safety of machinery - Basic concepts, general principles for design - Part 2: Technical principles  
 EN 349:2008-09 Safety of machinery - Minimum gaps to avoid crushing of parts of the human body  
 EN 14121-1:2007 Safety of machinery – Risk assessment – Part 1: Principles  
 EN 60204-1:2006 Safety of machinery - Electrical equipment of machines - Part 1: General requirements

#### The following additional EC Directives relevant to this product were applied:

Low voltage directive 2006/95/EC

The **technical documentation** for this partly completed machine was produced in accordance with Appendix VII Part B. The manufacturer undertakes to pass on these technical documents to national authorities in electronic form on request.

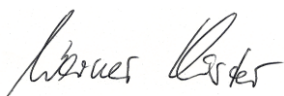
**The member of staff responsible** for producing the technical documents or assembly instructions/installation declaration is: **Mr Helmut Danz**

The product (partly completed machine) is intended for installation in a machine or for combining with other partly completed machines to form a single machine as defined in MRL 2006/42/EC, Article 1, Section (1) a.

***This partly completed machine (product) must not be commissioned until the machine in which this product is installed or or which it forms a component meets the provisions of all the relevant directives (especially MD 2006/42/EC) and this (complete) machine carries a CE mark.***

Place, date:

Dernbach, 5 February 2012



Werner Kister, CEO

**13 Index**

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## 14 Appendix

### 14.1 A1: Accessories

#### RF1



**Chuck assembly**

- 3-jaw chuck Ø 65

Item no.: 269063 2125



**Aluminium T-key plate**

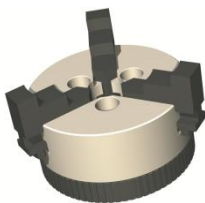
- Ø 240 mm / PT 25  
Part no.: 269050 0240
- Ø 365 mm / PT 25  
Part no.: 269050 0365



**Installation set**

- Reduction 1:52  
Part no. 269077 0001
- Reduction 1:100  
Part no. 269077 0002

#### MD1



**Chuck assembly**

- 3-jaw chuck Ø 65

Item no.: 269060 2065\*

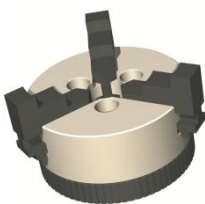
\* including flange



**Clamping ring housing**

Clamping ring housing SK 20  
for tools Ø 2 – 13 mm,  
with mounting ring  
Part no.: 239122 9001

#### ZD 30



**Chuck assembly**

- 3-jaw chuck Ø 65

Part no.: 269060 2065\*

\* including flange



**Chuck assembly**

- 3-jaw chuck Ø 80

Part no.: 269063 3080\*

\* including flange



**Clamping ring housing**

Clamping ring housing SK 20  
for tools Ø 2 – 13 mm,  
with mounting ring

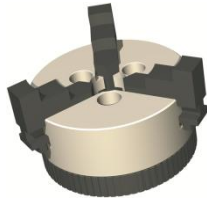
Part no.: 239122 9001



**Tailstock unit**

200 mm  
Part no.: 269100 1060  
(L331)  
300 mm  
Part no.: 269100 1070  
(L431)  
400 mm  
Part no.: 269100 1080  
(L531)  
500 mm  
Part no.: 269100 1090  
(L631)

ZR 20, ZDS 2030



**Chuck assembly**

- 3-jaw chuck Ø 65
- Part no.: 269060 2065\*
- \* including flange



**Clamping ring housing**

- Clamping ring housing SK 20
- for tools Ø 2 – 13 mm,
- with mounting ring
- Part no.: 239122 9001

Threaded strips/sliding nut	Part number	Note	
Threaded strips M6 (50 raster)	209011	VE 3 units at 1m	
M6 sliding nut	209001 0005	VE 100 units	
Sliding nut 2 x M6	209002 0004	VE 50 units	
M5 sliding nut	209006 0001	VE 20 units	
Angled sliding nut 2 x M6	209021 0003	VE 25 units	
Special angled sliding nut 3x M6	209022 0003	VE 25 units	

## 14.2 A2: Miscellaneous

Assembly instructions [product] identification no.: 970261 BD 0002/02-2012