Operating Instruction
Rolling System Radial E/EW

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1. General

1.1 Introduction

The *rolling system* has been constructed according to the state of the art in accordance with the recognized safety rulesand standards and manufactured in accordance with TÜV-CERT DIN ISO 9001 and VDA 6.4.

The operatings instructions apply solely to *rolling system* described in the operating instructions.

Terms in italics are defined as a collective term at the appropriate place:

- In using the collective term the information relates to all single terms.
- In using the singular term the information relates solely to the single term.

NOTE

The collective term *rolling system* includes the single terms rolling head, all accessories, conumables, and spare parts.

The illustrations and information contained in these operating instructions are subject to technical changes that are necessary to improve the *rolling system*.

NOTE

Modifications or amendments to these operating instructions made at a later time can be found online under www.lmt-tools.de/dokumente-downloads.

The operating instructions are written with the intention to be read, understood and observed in all respects by those who are responsible for the use of the *rolling system*.

A safe and error-free use of the *rolling system* is only possible if the contents of the operating instructions are understood by the competent persons and observed in all respects.

NOTE

Work instructions are supplemented by position numbers.
Compare the information with the figure in Chapter 7.

Improper use of the *rolling system* can endanger people and cause property damage. No liability shall be assumed for any damage or malfunctions resulting from failure to observe these operating instructions.

NOTE

Note all warnings and safety instructions and the operating instructions for the machine.

Storage of the operating instructions

The entire operating instructions must be stored carefully and always kept with the *rolling system* as part of the product.

The operating instructions must be kept near the rolling system so that they are available to all persons working with the *rolling system* as required.

Warranty and technical support

We guarantee proper function of the delivered product with purchase.
We are not liable for damage in case of:

- improper use of the *rolling system.*
- use of non-original components.
- use of accessories not authorized by us.
- modifications undertaken without our authorization.
- use of damaged components,

Modifications to the components are permitted only after written agreement with us.

We undertake modifications to the *rolling system* to adapt the *rolling system* to the requirements of the operator. We inform the operator of the modifications and impact on the use of the rolling systems. The operating instructions describe the use of a *rolling system* without modifications.

If you encounter any problems or have any questions, please contact our Service Hotline, which will be glad to help.

We offer training specially tailored to your needs for your staff at your site. We also hold regular seminars in the LMT Group Academy, our subsidiaries and representatives.

1.2 Operator´s obligation of diligence

The operator of the *rolling system* must ensure that

- the intended use of the *rolling system* is ensured at all times.
- the *rolling system* is always in a perfect and functioning condition.
- only qualified and authorized personnel assemble and operate the *rolling system* in accordance with these operating instructions.
- the qualified and authorized personnel are regularly informed about all these necessary rules of occupational safety and environmental protection.
- the qualified and authorized personnel are informed in detail about modifications made and their impact. .
- there is sufficient necessary protective equipment for the qualified and authorized personnel that is in good condition and that such equipment is worn.
- the operating instructions are available in legible condition and in full at the installation site of the *rolling system*.

1.3 Contact

Service-Hotline:

Team Rollen
Grabauer Strasse 24
21493 Schwarzenbek
Germany
Phone.: +49 4151 12 391
Fax: +49 4151 12 502
teamrollen@lmt-tools.com

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Postal address:
LMT Fette Werkzeugtechnik
GmbH & Co KG
Postfach 1180
D-21484 Schwarzenbek

Delivery address:
LMT Fette Werkzeugtechnik
GmbH & Co. KG
Grabauer Strasse 24
21493 Schwarzenek
Germany

1.4 Copyright

2. Safety

2.1 Explanation of symbols and instructions

All safety instructions and warnings in the operating instruction are structured as follows:

Danger level/Signal word

Type and source of the danger

Measures to avoid danger

Hazard symbols

The operating instructions differentiate between three hazard symbols, which allow an initial allocation of hazards. The yellow triangle indicates a general risk to people, property, animals or the environment.

Danger level

General danger to people, property, animals or the environment from the rolling system.
Measure to avoid the danger

The red, octagonal hazard symbol with the signal word IMPORTANT indicates a potentially harmful situation for the *rolling system*. Observing the operational steps, guidelines and instructions avoids damage to or destruction of the *rolling system*.

IMPORTANT

A potentially harmful situation for the *rolling systems*.

Fellow all operational steps, guidelines and instructions in order to avoid damage or destruction to the *rolling system*.

The third hazard symbol with the signal word NOTE indicates important information and tips for the user.

NOTE

No direct danger
Important information and additional tips for the user on using the *rolling system*.

Danger levels/Signal word

In the case of the yellow triangle the danger level indicates the degree of danger. Three danger levels are used. Each word is chracterized by a color that illustrate the danger levels.

CAUTION

The danger level indicates a hazard with a low level of risk which, if not avoided, may result in slight or moderate injury.

WARNING

The danger level indicates a hazard with a medium level of risk which, if not avoided, may result in death or serious injury.

DANGER

The danger level indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.

Example:

DANGER
 General risk due to the use of the *rolling system* by unqualified or unauthorized personnel. Use of the *rolling system* only by qualified and authorized personnel.

2.2 Basic safety instruction

DANGER

General danger when using the *rolling system*.

Follow the operating instructions.

These include

- the basic safety instructions from the entire chapter 2 for the entire operating instructions,
- the preceding instructions for a particular chapter and
- the embedded instructions for a particular step.

Follow all local health and safety and operational safety regulations.

Chapter 2, Safety, informs you about the basic safety instructions to ensure safe and trouble-free use of the *rolling system*.

- Please contact the operator in the event of any changes to the *rolling system*.
- Refrain from any methods of working which could compromise safety.
- Only ever perform work on the rolling system when the machine is at standstill and if necessary take the *rolling system* out of the machine room.
- Before starting work on the *rolling system*, secure the drives and additional devices of the machine against accidental activation.
- Make sure there is sufficient space in the machine and pay attention to the risk of injury originating from adjacent tools and machine parts.
- Before any commissioning, check that the screws on the *rolling system* are tightened.

WARNING

The *rolling system* is made of various materials (e.g. nickel), which can trigger an allergic reaction.
General risk of injury from sharp edges.

Wear protective gloves and protective eyewear when using the *rolling systems*.

The weight of the rolling system may cause harm when it falls down.
General risk of injury during transportation/lifting of the rolling system.

- Ensure that the *rolling system* is protected of falling down or tipping over.
- Wear safety boot/hard-toed boot at all times. .
- Use suitable hoisting devices.

2.3 Intended use

IMPORTANT

The *rolling system* may only be used for the intended use.
Make sure that the *rolling system* is free of chips at all times.
Never apply force when using the *rolling system*.

The *rolling system* must only be used as a tool on a processing machine for chip-free manufacture of profiles on the outside of rationally symmetrical work pieces.

NOTE

Note that the *rolling system* is customized to the requirements specified by the operator.
Please contact our Service Hotline if you wish to use the *rolling system* in any way other that the agreed use.

The scope of application for the *rolling system* is to carry out a *rolling process*.
The *rolling process* includes the following manufacturing processes:

- threading
- knurling
- burnishing
- reducing and
- Cold forming of rotationally symmetrical workpieces, to produce other profiles.

} *rolling process*

NOTE

The collective term *rolling process* includes the production processes of threading, knurling, burnishing, pipe forming, smoothing and cold forming of rotationally symmetrical workpieces for manufacturing other profiles.

Burnishing/Smoothing is a surface compression.
Sizing by smoothing, to perform a tolerance constriction, is not possible.

IMPORTANT

Be sure to use a torque wrench for all work on the rolling head and observe the tightening torque for each bolt (see chapter 3.7).

Caution

Bear in mind that the rolling head contains tensioned springs. If sufficient care is not taken, they can come loose and cause injury to yourself or to bystanders.

Wear protective eyewear when working with the *rolling system*!

NOTE

Use other than the intended use is only allowed after written agreement with us.
Any use other than the intended use is considered improper use. We shall not be liable for any damage resulting from improper use. The risk is borne by the operator.

Intended use includes the observance of these operating instructions.

Coolants and lubricants

Liquids that are also used during machining are suitable as coolants and lubricants:

- emulsions in dilutions ranging from 1: 10 to 1: 20 (in some cases with high-pressure additives),
- low viscosity cutting oils and
- molybdenum (IV) sulfide.

NOTE

Observe the information and instructions provided by the manufacturer.

You can increase the service life of the rolls by using high-pressure additives, because high-pressure additives improve the sliding characteristics between the rolls and the workpiece.
Please contact our Service Hotline if you want to undertake dry processing with the *rolling system*.

IMPORTANT

Ensure that the cooling lubricant is free from chips or particles to prevent foreign bodies from being rolled into the thread and to prevent undue wear of the thread rolls and of the rolling head.

The rolling process is negatively affected by strong presence of swarf. Make sure that the rolling head is connected to the central lubrication/cooling system of the processing machine.
Install the rolling head into the processing machine in such a way as to ensure minimu exposure to chips directly. The chip guard included in the delivery should be used.

IMPORTANT

Only use coolants and lubricants for the rolling system that meet the above mentioned properties in ordert o avoid corrosion of the *rolling system*.
Observe the stated storage temperature and relative humiditiy in order to prevent corrosion on the *rolling system*.

Reasonably foreseeable misuse

Reasonably foreseeable misuse of the *rolling system* includes:

- use of the *rolling system* by non-qualified or unauthorized personnel.
- leaving tools in the *rolling system*.
- over rolling the thread.
- rolling outside of the permissible rolling speed. .
- rolling outside of the permissible operating range.
- Non-compliance with the operating instructions.

IMPORTANT

Avoid any reasonably foreseeable misuse of the *rolling system.*
We are not liable for damage resulting misuse.

2.4 Authorized personnel and responsibilities

DANGER

General risk due to the use of the *rolling system* by unqualified or unauthorized personnel.
Use of the *rolling system* only by qualified and authorized personnel.

Authorized personnel

- The *rolling system* may only be used by qualified and authorized personnel. These personnel must have received special instruction from the operator about possible hazards.
- The complete operating instructions must be read and understood by every person who deals with the use of the rolling system. We recommend the operator has this confirmed in writing.
- The qualification includes at least one mechanical technical training. In addition, we recommend staff training given by us at your site, training in our LMT Group Academy, our subsidiaries or our local representatives.
- The operator is responsible for ensuring that work is undertaken by staff being trained only under the supervision of qualified and authorized personnel.
- The operator is responsible for ensuring that unauthorized persons have no access to the *rolling system* under any circumstances.

Responsibilities

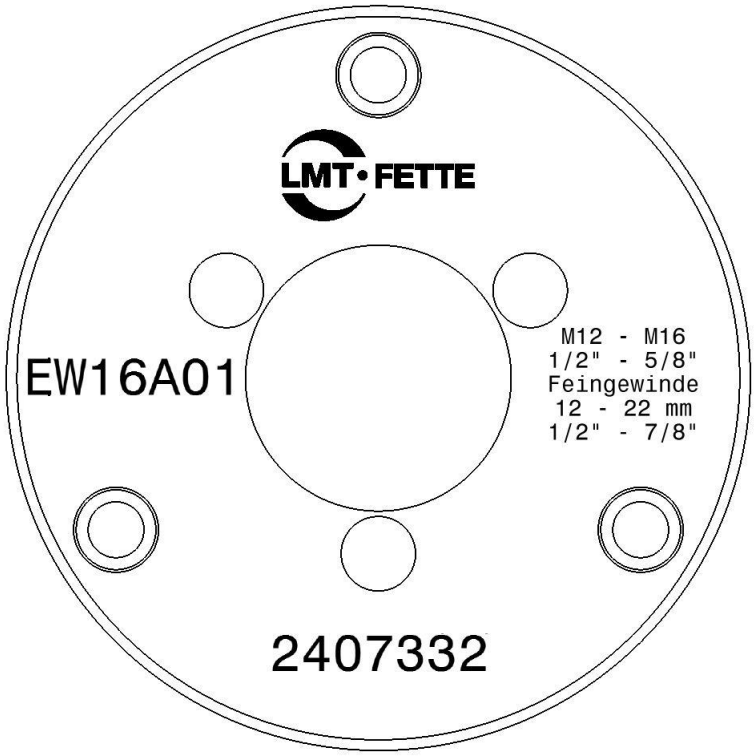
- The operator must define all responsibilities for the use of the *rolling system* so that there are no ambiguities in terms of responsibility for safety aspects.
- The operator must clearly define the responsibilities of the personnel for each of the activities on the *rolling system*.

3. The *rolling system*

Radial rolling heads are placed in axial direction above the workpiece in the working position. The pushed trigger machanism realeses the rolls, which are forming the required profile within a single rotation.
The *rolling process* is performed by chipless cold forming.

Labeling of the *rolling system*

The labeling of the *rolling system* is placed on the front plate (see Figure 1).



LMT-Fette:	Company
EW16A01:	Description
EW:	Trigger mechanism
16:	Rolling head size
A:	Spindle turning direction
01:	Machine adaption
2407332:	ID Number
M12-M16:	Working range

Figure 1: Labeling of the *rolling system* (Example EW16A01)

NOTE

The ID number is labeled on the spring housing.

The moduls of the *rolling system*

The *rolling system* consists of three components:

- Rolling head
- Machine adaption
- rolls

} *rolling system*

The three components of the *rolling system* are shown in figure 2.

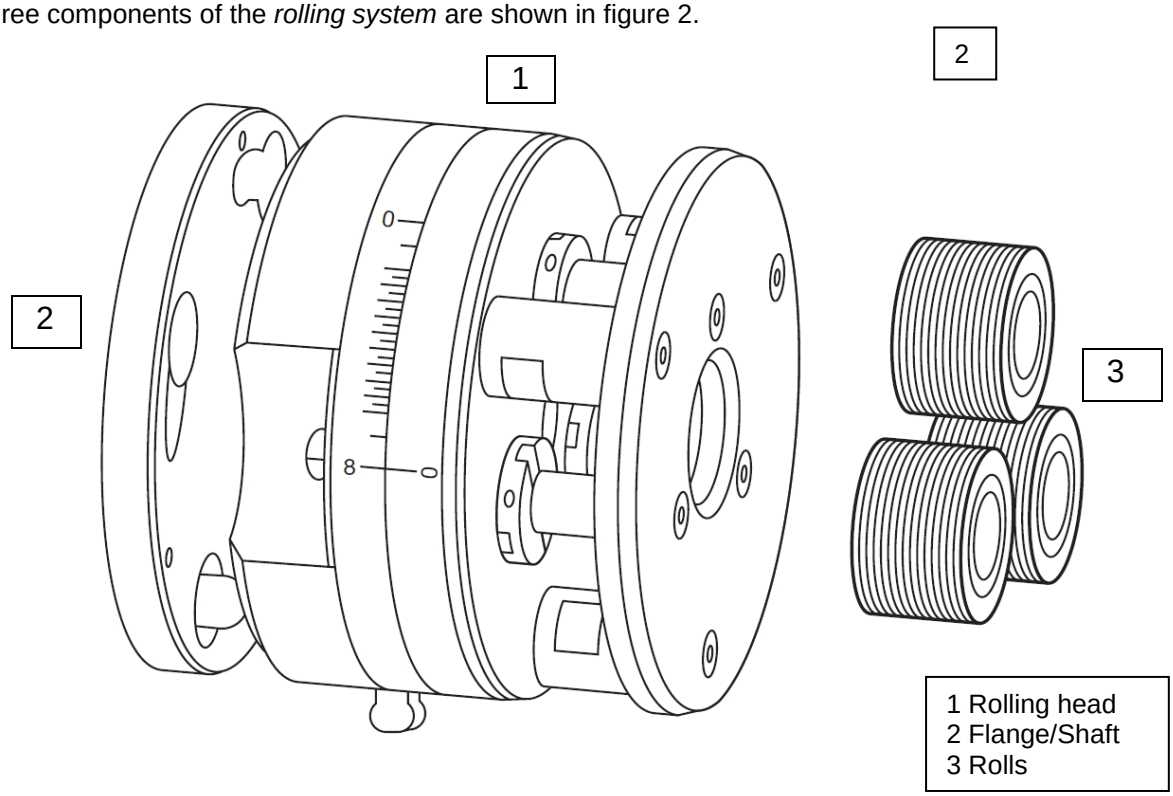


Figure 2: The three components of the *rolling system*

3.1 Rolling head

The rolling head stores the rolls and has a section for the machine adaption.
The machine adaption is normally a roundshank or a flange adaption. Several short descriptions/abbreviations are used, here follows a description.

Radial rolling heads are produced in two different styles E and EW:

- „E“: External triggered
- „EW“ Internal triggered

The spindle direction determines if version A or B is needed:

- „A“: for clockwise spindle turning direction
- „B“: for counterclockwiese spindle turning direction

The machine adaption is defined by:

- „00“ for flange version
- „01“ for shank version

NOTE

Considering the used machine and the rolling head dimension we advise to choose the rolling head who will operate within the lower 2/3 of its working range.

Rolling systems in radial style E – external trigger – are available in the following sizes:

- E8A00 | E8A01
- E10A00 | E10A01
- E13A00 | E13A01
- E16A00 | E16A01
- E23A00 | E23A01
- E30A00 | E30A01

Figure 3 shows a radial *rolling system* E16A00 which stands for:

- E: external triggered
- „16“ rolling head size
- „A“ spindle turning direction: clockwise
- „00“ machine adaption: flange

external trigger

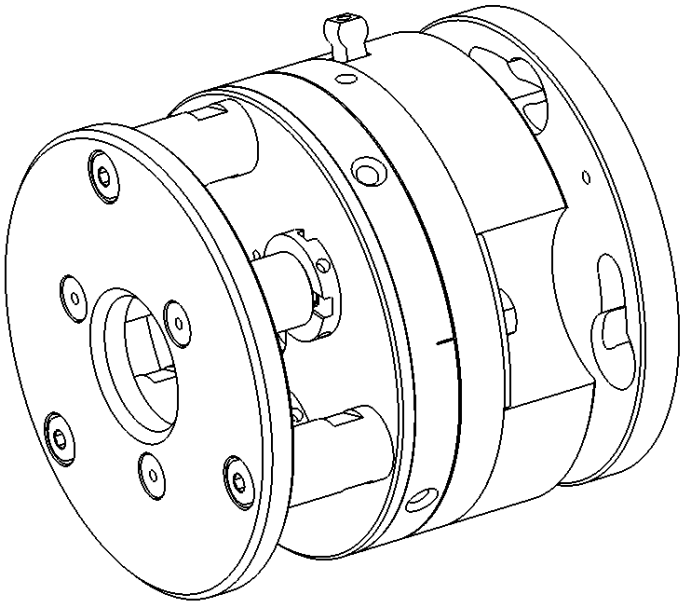


Figure 3: Rolling head E16A00

Die *Rolling systems* in radial style EW – internal trigger – are available in the following sizes:

- EW10A00 | EW10A01
- EW13A00 | EW13A01
- EW16A00 | EW16A01
- EW23A00 | EW23A01
- EW30A00 | EW30A01

Figure 4 shows a radial *rolling system* EW13A00 which stands for:

- "EW“: internal trigger
- „13“ rolling head size
- „A“ spindle turning direction: clockwise
- „00“ machine adaption: flange

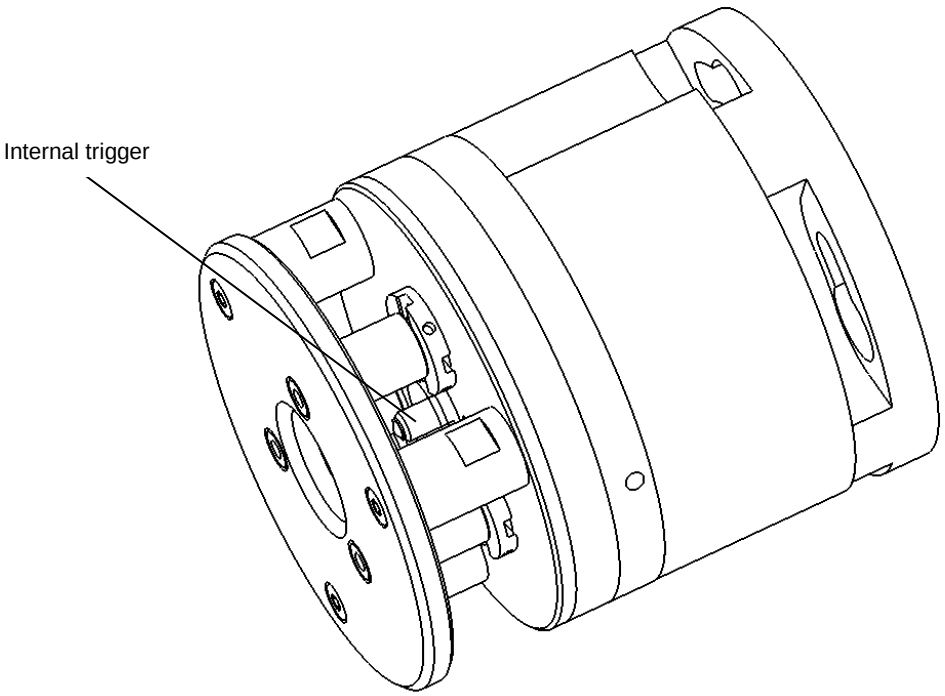


Figure 4: Rolling head EW13A00

3.2 Machine adaption

The radial rolling head is mounted to the operating machine via roundshank or flange adaption.
Different machine adaptions are available on request.

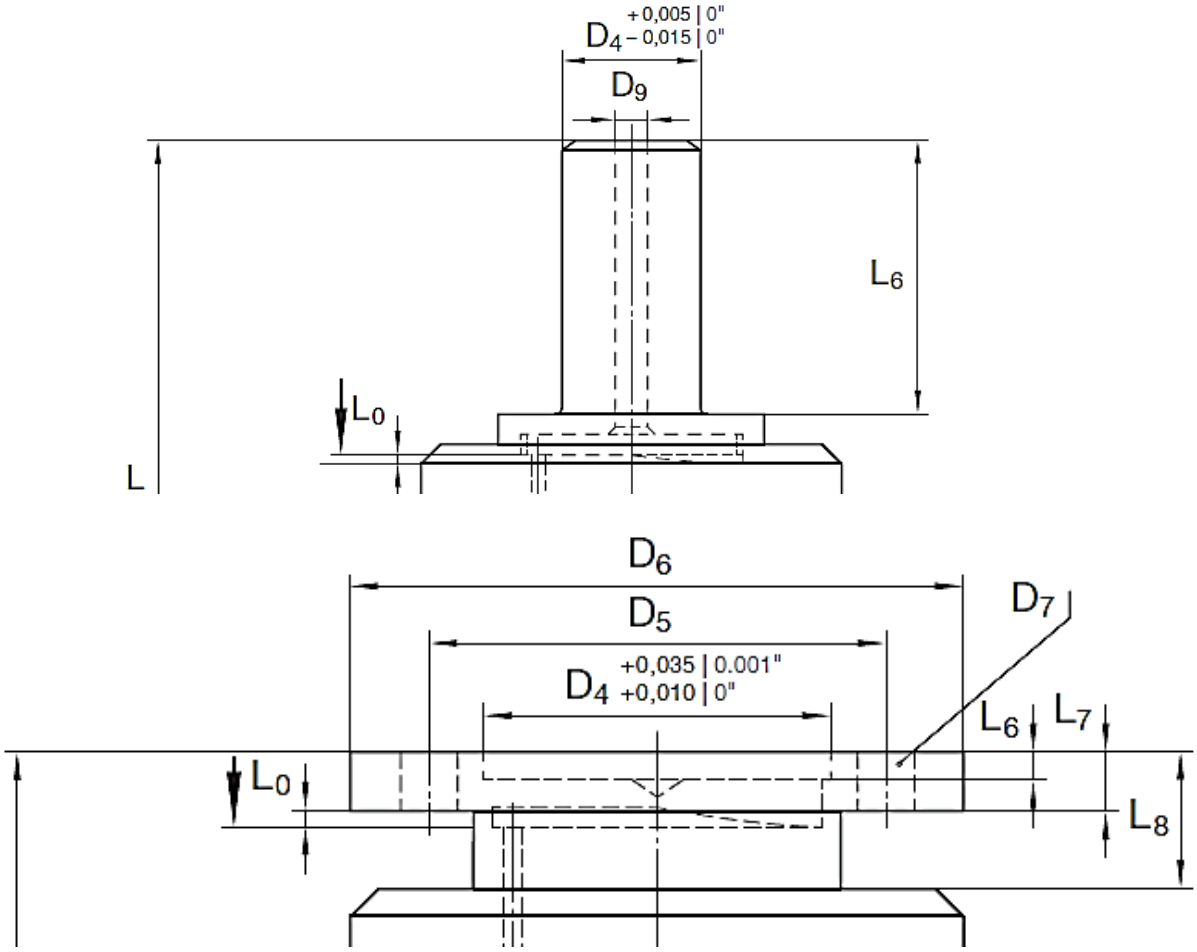


Figure 5: Machine adaption roundhsank and flange version

The following shanks are standard for radial rolling heads:

- Flange version „00“
- Roundshank „01“
- VDI-shank „03“

NOTE

Other shanks on request.

.

3.3 Rolls

IMPORTANT

Use rolls only in the sets delivered by us. Do not combine rolls from different sets.

Check that the roll set number (serial number) is the same.

Labeling of the rolls

NOTE

The label on the rolls varies depending on the *rolling process*, but at the same point there is always

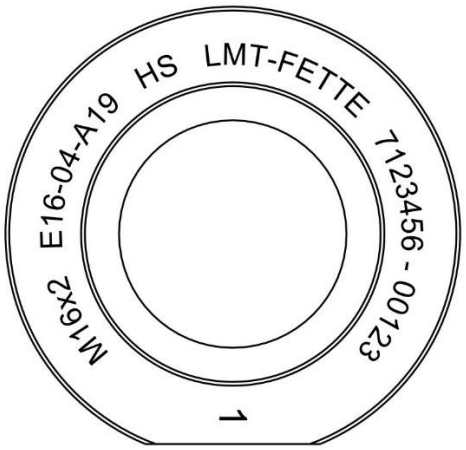
- the ID number
- The numbers (1, 2, 3)

labeled on the rolls.

When contacting the Service Hotline always state the ID-number of the roll.

Each roll has a number side and a letter side, which is shown as an example in figure 6.

E16-04-A19
E: rolling head type
16: rolling head size
04: seq. number
A: for clockwise
19: roll width



M16x2 : thread dimension
HS : roll material
7123456 ID number
00123 : Serial bumber
1 : number 1, 2, 3

Figure 6: labeling of the rolls

As standard, LMT Fette Werkzeugtechnik delivers the following thread tolerances:

- 6g (for threads in acc. with DIN)
- 7e[1] (for threads in acc. with DIN)
- 2A (for UN threads in acc. with ANSI)

Different tolerances on request.

Following is the general design of a radial roll shown:

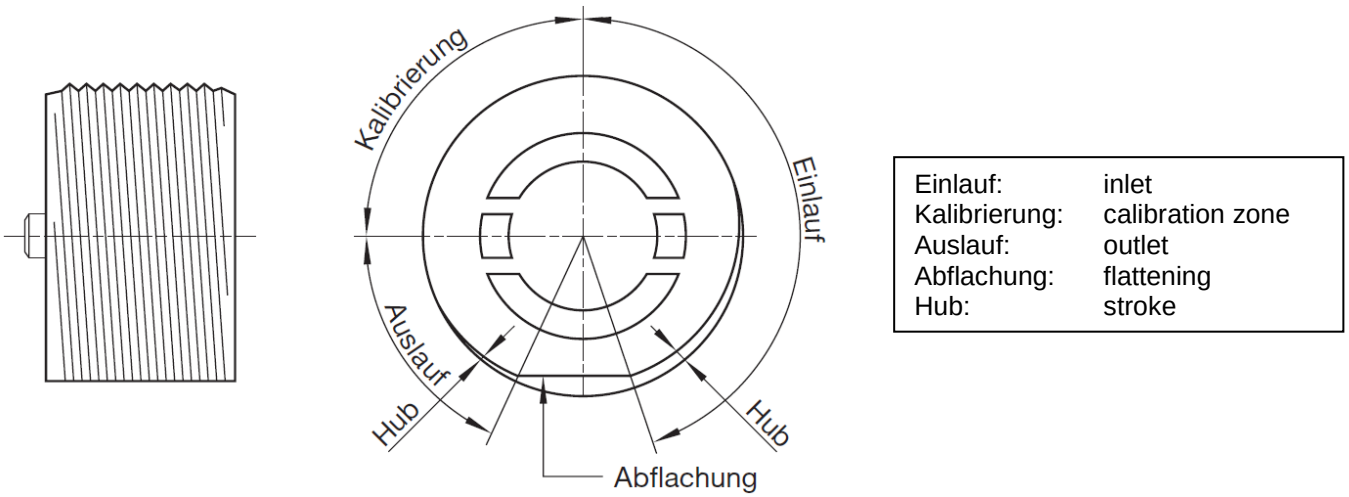


Figure 7: design of a radial roll

Tool life

The tool life of the rolls is influenced by the following factors:

- material properties (particularly tensile strength and elongation at fracture)
- hardness increase behavior oft he material under cold forming
- degree of roll out of the profile
- execution of chamfers during workpiece preperation
- correct adjustment of the tool
- rolling speed and operating feed
- sufficient supply of clean coolant
- avoidance of chips on workpieces and rolls prior ro the rolling process
- profile roll start and run-out

Review your application and discuss it with our personnel (chapter 1.3). They will be pleased to give you useful advice with regard to the ideal design of your roll.

When the rolls are worn, they must be replaced with new ones.

[1] For trapezodial threads

3.4 Dimension of the *rolling system*

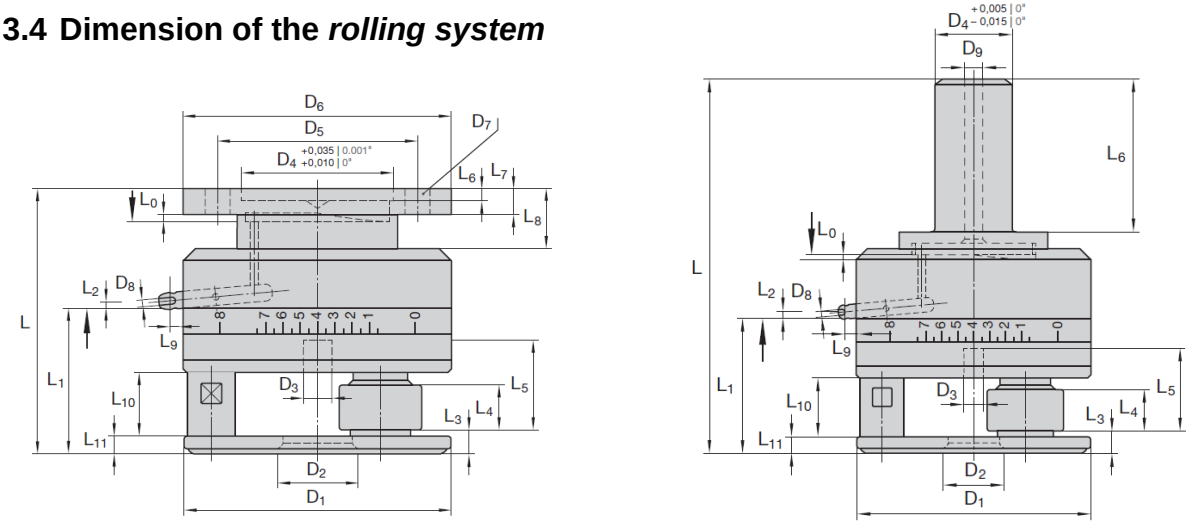


Figure 8: Dimension of the *rolling systems* radial type E

	E8A00 | A01	E10A00 | A01	E16A00 | A01	E23A00 | A01	E30A00 | A01
D1	64	100	140	170	230
D2	15	26	40,5	50	68
D2max	22	30	50	66	80
D3	3	9	18	25	32
D4	70 | -	70 | -	92 | -	110 | -	140 | -
D5	95 | -	95 | -	110 | -	140 | -	170 | -
D6	125 | -	125 | -	140 | -	170 | -	200 | -
D7	11 | -	11 | -	13 | -	13 | -	13 | -
D8	M3	M5	M5	M5	M5
D9	10,5	- | 12,5	- | 12,5	- | 12,5	- | 12,6
L	83,1 | 115,6	114 | 164,5	142 | 212,5	173 | 261,5	186 | 307,5
L0	0,5	1,1	1,1	1,6	1,6
L1	39,5	58,2	79,7	100,7	113
L2	2,2	3,5	4,4	4,5	3,9
L3	5,2	6,2	10,2	13,2	16,2
L4 max.	11,6	19,6	29,6	34,6	39,6
L5	30,4	50	61	76	86
L6	8,5 | 40	8,5 | 60	8,5 | 80	8,5 | 100	8,5 | 120
L7	12,5 | -	12,5 | -	12,5 | -	12,5 | -	20 | -
L8	20 | -	28 | -	28 | -	28 | -	35 | -
L9	3,6	7,1	8,1	11	13
L10	15	25	36	43	50
L11	5	6	10	13	16
weight rolling head	ca. 2,0 kg | ca. 1,6 kg	ca. 4,3 kg	ca. 9,9 kg | ca. 10,9 kg	ca. 18,8 kg | ca. 20,0 kg	ca. 35,3 kg | ca. 41,9 kg
weight rolls	ca.0,1 kg	ca. 0,4 kg	ca. 1,5 kg | ca. 1,5 kg	ca. 3,2 kg	ca. 5,6 kg
overall weight	ca. 2,1 kg | ca.1,7 kg	ca. 4,7 kg	ca. 11,4 kg | ca. 12,4 kg	ca. 22,0 kg | ca. 23,2 kg	ca. 40,9 kg | ca. 47,5 kg

Table 1: Dimension of the *rolling systems* radial type E

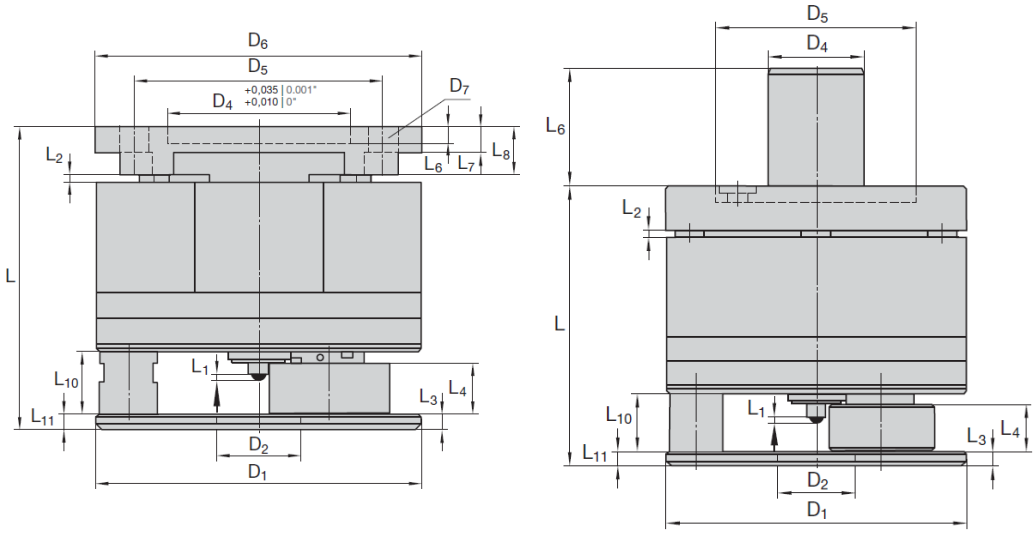


Figure 9: Dimension of the *rolling systems* radial type EW

	EW10A00 | A01	EW13A00 | A01	EW16A00 | A01	EW23A00 | A01
D1	100	125	140	170
D2	26	32	40,5	50
D2max	30	41	50	66
D3	-	-	-	
D4	70 | -	70 | -	92 | -	110 | -
D5	95 | -	95 | 83	110 | 92	140 | -
D6	125 | -	125 | -	140 | -	170 | -
D7	11 | -	11 | -	13 | -	13 | -
D8	-	-	-	-
D9	-	-	-	-
L	144 | 145	152 | 153	174 | 175	199 | 200
L0	-	-	-	-
L1	ca. 2	ca. 2	ca. 3,5	ca. 2,5
L2	3,5	3,5	5	4
L3	6,2	8,2	10,2	13,2
L4 max.	19,6	24,6	29,6	34,6
L5	-	-	-	-
L6	8,5 | 60	8,5 | 80	8,5 | 80	8,5 | 80
L7	12,5 | -	12,5 | -	12,5 | -	12,5 | -
L8	35,5 | -	24 | -	24 | -	26 | -
L9	-	-	-	-
L10	25	30	36	43
L11	6	8	10	13
weight rolling head	ca. 6,0 kg | ca. 6,8 kg	ca. 9,5 kg | ca. 11,0 kg	ca. 13,7 kg | ca. 16,0 kg	ca. 23,6 kg | ca. 27,0 kg
weight rolls	ca. 0,4 kg	ca. 0,8 kg | ca. 0,8 kg	ca. 1,5 kg	ca. 3,2 kg
overall weight	ca. 6,4 kg| ca. 7,2 kg	ca. 10,3 kg | ca. 11,8 kg	ca. 15,2 kg | ca. 17,5 kg	ca. 26,8 kg | ca. 30,2 kg

Table 2: Dimension of the *rolling systems* radial type E

3.5 Working ranges and rollable materials

Working ranges								
	cylindrical threads					taper threads		
Rolling head	Standard thread mm|inch		Major Ø mm | inch	Fine threads max. lead | min. TPI/"	Roll width mm|inch	Norm Standard	min.	max.
	min.	max.	min.-max.	min. - max.				
E 8	M3x0,5 1/8-40	M10x1,5 3/8-16	3-10 1/8-3/8	1,5 | 16	11,6 | 0.46	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.1	M6x1 keg. R1/16-28 R1/8-28 1/16-27 NPT(NPTF)	M10x1 keg. R1/8-28 R1/8-28 1/8-27 NPT(NPTF)
E 10 **EW 10**	M8x1,25 5/16-22	M10x1,5 3/8-16	8-14 3/8 - 9/16	1,5 | 16	19,6 | 0.77	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.2	M8x1 keg. R1/16-28 R1/8-28 1/16-27 NPT(NPTF)	M14x1,5 keg. R1/4-19 R1/4-19 1/4-18 NPT(NPTF)
E 13 **EW 13**	M10x1,5 7/16-14	M12x1,7 1/2-12	10-18 7/16- 11/16	1,5 | 16	24,6 | 0.97	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.3	M10x1 keg. R1/8-28 R1/8-28 1/8-27 NPT(NPTF)	M18x1,5 keg. R1/4-19 R1/4-19 3/8-18 NPT(NPTF)
E 16 **EW 16**	M12x1,7 5 1/2-12	M16x2 5/8-11	12-22 1/2-7/8	2,0 | 13	29,6 | 1.17	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.4	M12x1,25 keg. R1/4-19 R1/4-19 1/4-18 NPT(NPTF)	M22x1,5 keg. R1/2-14 R1/2-14 1/2-14 NPT(NPTF)
E 23 **EW 23**	M16x2 5/8-11	M22x2,5 3/4-10	16-30 5/8-1 3/16	2,0 | 12	34,6 | 1.36	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.5	M16x1,5 keg. R3/8-19 R3/8-19 1/16-27 NPT(NPTF)	M30x2 keg. R3/4-14 R3/4-14 3/4-14 NPT(NPTF)
E 30 **EW 30**	M22x2,5 3/4-10	M27x3	22-40 13/16-1 37/64	2,0 |13	39,6 | 1.56	DIN 158 DIN 2999 DIN 3858 ANSI B1.20.6	M22x1,5 keg. R3/4-28 R3/4-28 3/4-14 NPT(NPTF)	M42x2 keg. R1 1/4-11 R1 1/4-11 1 1/4-11.5 NPT(NPTF)

Table 3: Working range radial system E/EW

Rollable materials

A large number of characteristics and properties influence the rollability of materials and the resulting profile quality. In order to reduce the complexity the chosen properties:

- elongation and
- tensile strength

enable an evaluation of the rollability of materials suitable for everyday use.

IMPORTANT

The following property values aren´t hard limits, rather empirical values who define the feasible.

Metallic materials with the following properties can be rolled with a *rolling system* TK EVO:

- elongation $\sigma_B \geq 7\%$ und
- tensile strenght $\sigma_Z \leq 1000\ MPa$

Please contact our Service Hotline if you wish to perform *rolling processes* outside of these limits or very near them.

3.6 Tightening torques

IMPORTANT

Observe the tightening torques.

Dimension	Tigehtening torque
M3	1,28 Nm
M4	2,97 Nm
M5	3,03 Nm
M6	10,25 Nm
M8	24,93 Nm
M10	49 Nm
M12	86 Nm

Table 4: Tightening torque

3.7 Condition upon delivery

We deliver your *rolling system* in the following condition separately:

- the rolling head with tools (without set of rolls)
  - normally with integrated machine adaption
- the set of rolls
- machine adaption

NOTE

Please note that the delivered components are matched to the size of the *rolling system*. Only use the supplied components for the delivered *rolling system*.

The condition upon delivery is the proper storage condition.

CAUTION

The components of the *rolling system* are sprayed with a commercially available creeping oil to protect them against corrosion. Touching the oily surface of the components may result in skin irritations. Avoid skin contact, especially in case of allergies or open skin lesions.

Do not touch the oiled surface if you have an open lesion. Do not touch the oiled surface if you are worried about an allergic reaction. Call the service hotline to find out the contents of the creeping oil and check your tolerability.

4. Installation

IMPORTANT

Please contact our Service Hotline in the event of initial insallation of the *rolling system*.
We will gladly advise you on

- inserting the rolls into the *rolling system*,
- functional testing of the *rolling system*,
- inserting the rolling head into the rolling head holder, and
- installing the *rolling system* into the processing machine.

WARNING

General risk of injury from sharp edges.
The *rolling system* is made of various materials (e.g. nickel), which can trigger an allergic reaction.

Wear protective gloves and protective eyewear when using the *rolling systems*.

The weight of the rolling system may cause harm when it falls down.
General risk of injury during transportation/lifting of the rolling system.

- Ensure that the *rolling system* is protected of falling down or tipping over.
- Wear safety boot/hard-toed boot at all times. .
- Use suitable hoisting devices.

4.1 Machine requirements

Rotating workpiece, non rotating rolling head
In the case of a rotating workpiece, the machine tool must have a device for moving the rolling head to the working position, e.g. turret, longitudinal slide or tailstock quill.

Rotating rolling head
In the case of a rotating rolling head, the machine tool must have a device with which the clamped workpiece can be brought into the working position, e.g. a centrically clamping vice on a longitudinal slide.

Collision check

CAUTION

General risk of collision.

Don´t equipe the machine with a *rolling system* without a collision check.
Please contact our Service Hotline in the event of initial equipment or change of a *rolling system* on your machine. We will be happy to guide you through.

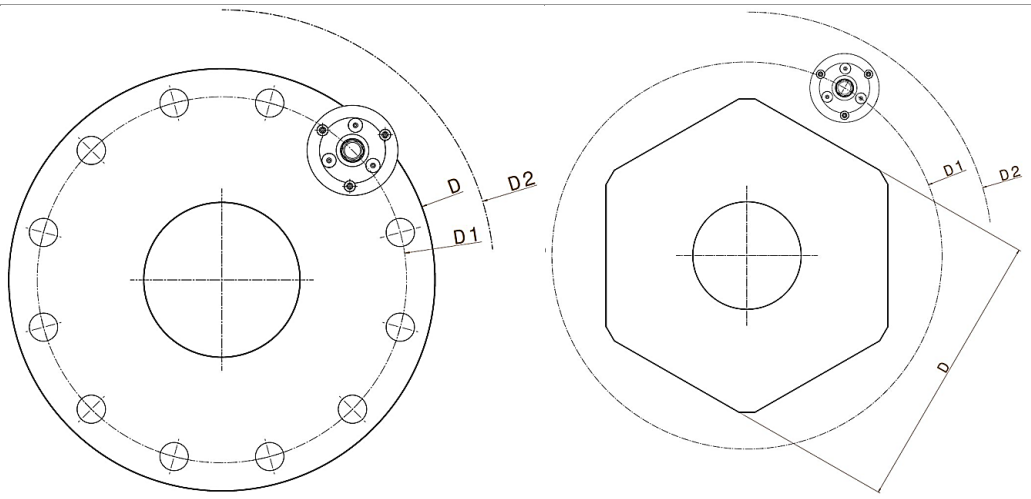


Figure 10: schematic illustration of a *rolling system* on a turret

NOTE

D Outer-Ø of the turret
D1 tool-position-Ø
D2 max. swing circle-Ø

In order to ensure a collision free operation of the *rolling system* the outer diameter of the rolling head must be added to the tool-position-Ø (D1). The sum of D1 and outer-Ø of the rolling head must be smaller than the max. swing circle-Ø of the machien.

Condition:

Outer-Ø rolling head + D1 < D2

See chapter 3.4 for *rolling system* dimensions.

4.2 Inserting the rolls into the *rolling systems*

NOTE

A set of rollers is required for each thread dimension.
Only use rolls with the same code number. Check also thread dimension, rolling head type and thread width.

A set consists of three different rollers. They are marked with the numbers 1, 2 and 3.
The position of the rollers in the rolling head is prescribed. The rollers are to be installed in the order 1-2-3 clockwise, seen against the front edge of the front plate. This applies to right-hand and left-hand threads.

The direction of rotation of the machine spindle determines the design type "A" or "B" for the rolling head. The rollers are also differentiated according to this. For example, rollers with the designation "A" may only be installed in the rolling heads of the "A" design.

1. The release lever (internal or external) must be tensioned when installing the rollers.
2. Loosen the cap screws (10) and pull off the front plate (4).

IMPORTANT

In order to ensure a good friction coefficient between roll (22) and eccentric bolt (9) and carbide bushing (15), be sure to lubricate sufficiently the roll bore and the carbid bushing using molybdenum sulfide grease. (e.g. Molykote).

3. Place the rolls clockwise on the carbide bushings (15) and eccentric bolts (9) as shown in Fig. 11.

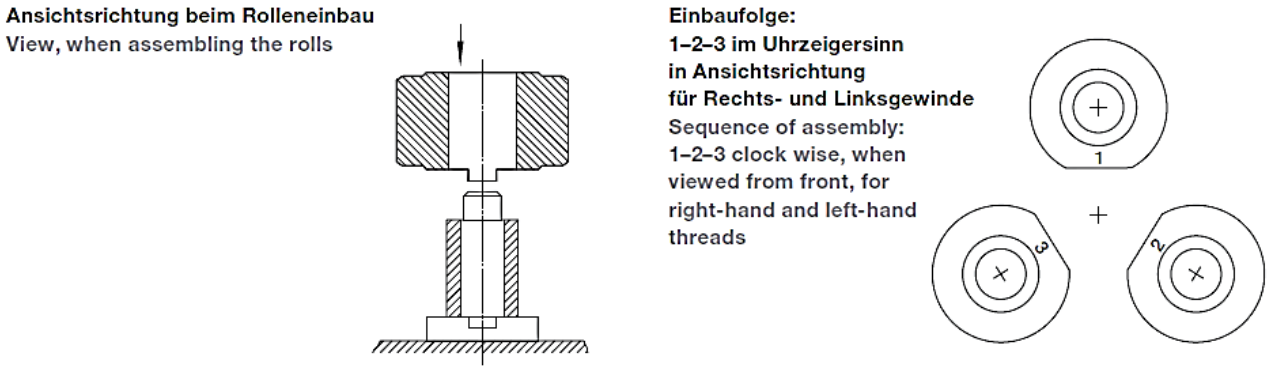


Figure 11: Inserting the rolls

4. Put on the front panel (4).
5. Tighten the cap screws (10) firmly .

4.3 Adjusting the diameter to workpiece dimension

The thread diameter is adjusted by means of the two eccentric bolts.

1. Loosen the hex nuts (26).

2. Turn the gear rim (8) to adjust the infeed of the thread rolls

3. When rolling the first thread, we recommend that you set the thread rolls as far apart as possible. Approach the desired tolerance position with gradual infeed of the rolls.

4. Tighten the hex nut (26).

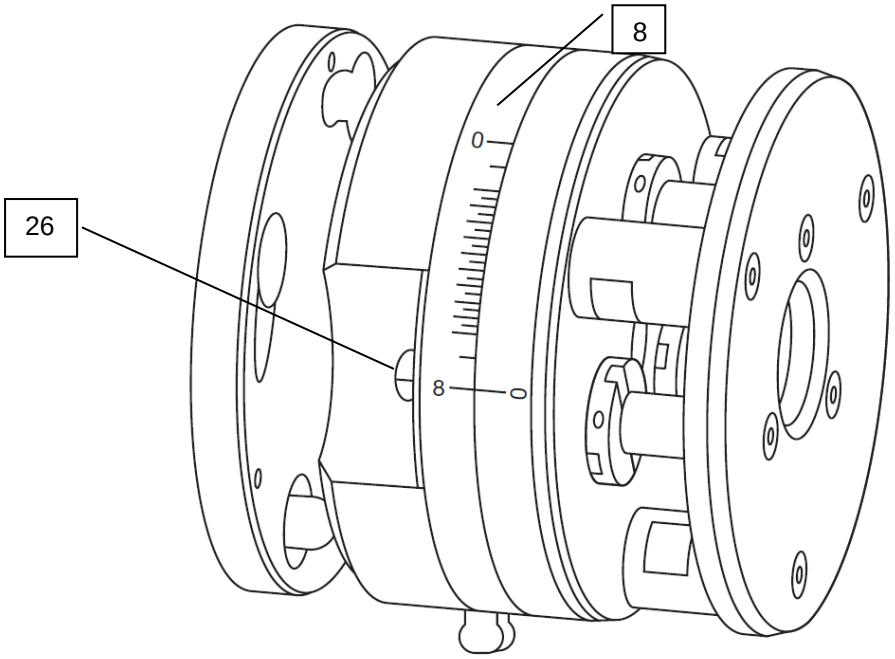


Figure 12: adjusting the diameter to workpiece diameter

By narrower positioning of the rolls, more material is pressed into the thread top. Thus, the outer diameter of the thread automatically becomes larger.

- If the flank diameter is correct after closing the rolling head, the thread tooth, however, is excessively shaped, than you have to reduce the original diameter so that less material will flow into the thread top. Under these circumstances, the rolling head possibly can be opened easily.
- If the flank diameter is correct after closing the rolling head, the outer diameter, however, is too small, you have to increase the original diameter. Thus, more material will flow into the tooth top. Possibly, you will have to close the rolling head as well.

IMPORTANT

Don´t perform a second *rolling process* on a once rolled profile.

4.4 Installing the *rolling system* in the processing machine

WARNING

General risk of injury from sharp edges.
The *rolling system* is made of various materials (e.g. nickel), which can trigger an allergic reaction.

Wear protective gloves and protective eyewear when using the *rolling systems*.

The weight of the *rolling system* may cause harm when it falls down.
General risk of injury during transportation/lifting of the *rolling system.*

- Ensure that the *rolling system* is protected of falling down or tipping over.
- Wear safety boot/hard-toed boot at all times. .
- Use suitable hoisting devices.

1. Check if you need and have suitable hoisting devices
    - We recommend the use of hoisting devices for the transportation from a weight of 5 kg or higher

NOTE

Suitable hoisting devices are for example:

- A sling
- Hoisting Chain
- Lift cable

Please contact your occupational safety specialist before transportating the *rolling system*.

2. Insert the *rolling system* in the processing machine.

3. Fix and secure the mounting position of the *rolling system*.

NOTE

Ensure the work piece is sufficiently clamped in the processing machine so that the torque generated by the *rolling process* can be absorbed.

4.5 Setting the thread length

The maximum rollable thread length depends on the roll width L4 (see chapter 3.5 Dimensions of the *rolling system*) and the thread pitch p and is calculated as follows:

$$L_{max} = L_4 - 2 \cdot p \ [mm]$$

The rolling process for **radial *rolling systems* E** is triggered by the push of the external lever by a device. At the time of release, the desired thread length is set by positioning the workpiece to the top edge of the rollers, see Figure 13.

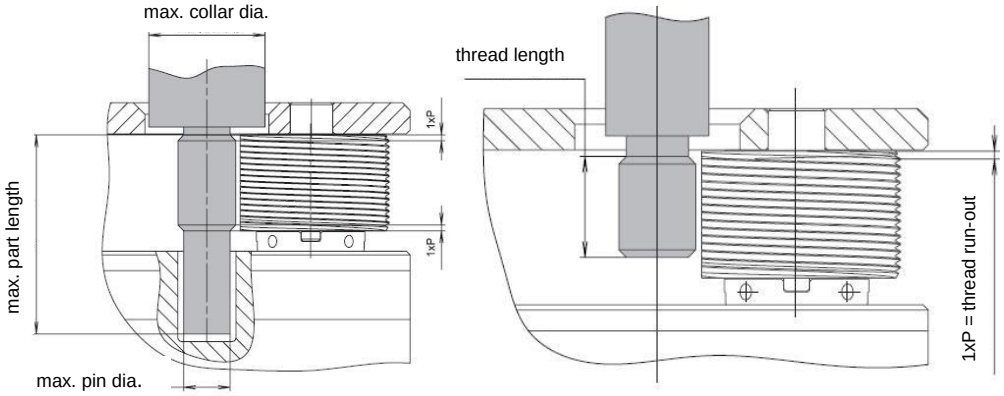


Figure 13: Setting the thread using the *rolling system* radial E

The rolling process for **EW radial *rolling systems*** is triggered by the workpiece actuating the internal lever (50). Therefore, the position of the stop must be adapted to the desired thread length.

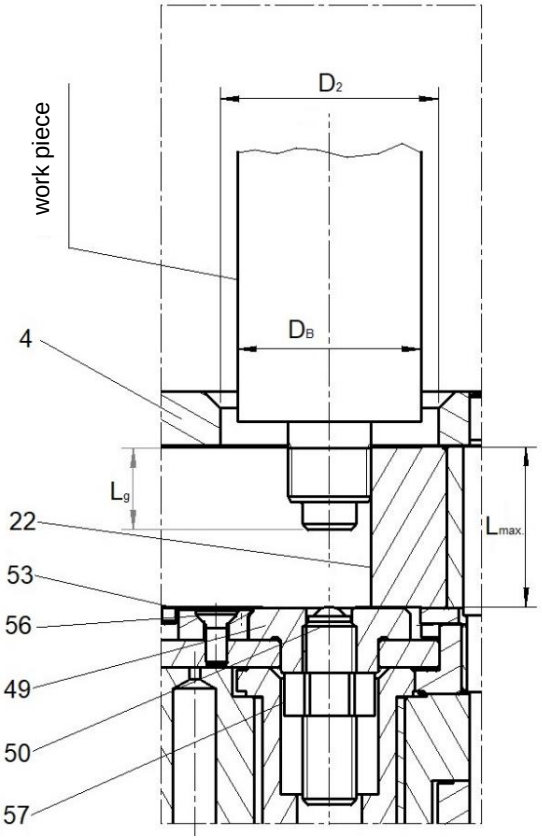


Figure 14: Setting the thread using the *rolling system* radial EW 1/2

To change the preset thread length:

1. Remove the front plate (4)
   by loosening the cap screws (33)
2. Insert the rolls (22)
3. Measure the set thread length L (see Figure 15) between the top edge of the roller and the stop screw (50) inside the roller head using a caliper gauge

NOTE

The difference between the desired thread length and the measured length is the dimension, by which the internal lever (50) must be adjusted.

4. Loosen the screw (56)
5. Remove the retaining ring (53) and the stop as well as the adjacent components (49, 50, 57).
6. Adjust the stop screw (50) by the determined difference between the desired thread length and the measured dimension between the desired thread length and the measured dimension
7. Tighten the hex nut (57)
8. Mount the removed components (49, 50, 57) and the retaining ring (53).
9. Mount the screw (53)
10. Mount the front plate (4) and the cap screws (33).

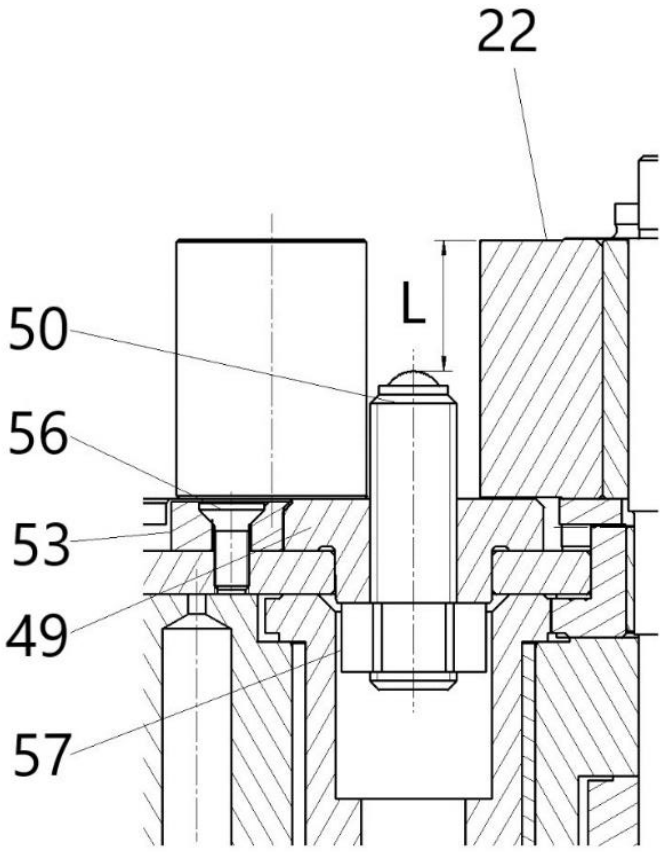


Figure 15: Setting the thread using the *rolling system* radial EW 2/2

4.6 Set the roll start position

Radial *rolling system* E

The rolling head is only ready for operation when the spring mechanism is tensioned and the clutch is engaged.

NOTE

The tensioned rolling head can be recognized by the fact that either the driving lugs of the synchronous gears (5) are aligned radially or the grooves of the driving discs (12) or the flattening of the rollers are aligned tangentially, see Figure 16.

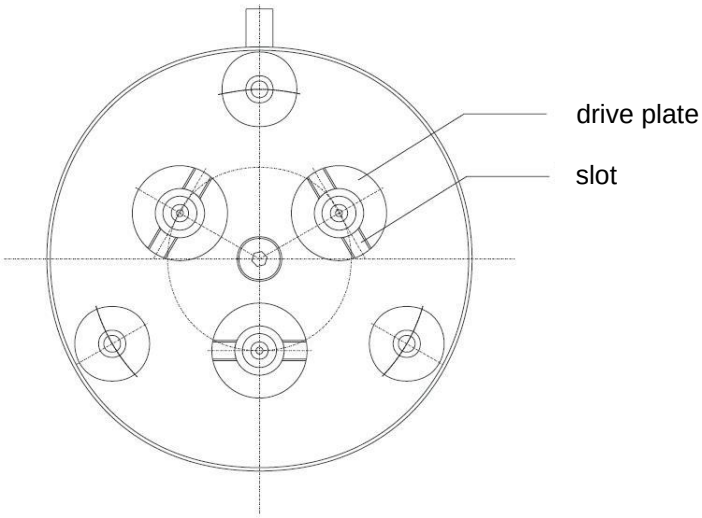


Figure 16: Radial rolling head E with tensioned spring mechanism (top view without front plate)

If this is not the case, the rolling head must be tensioned:

1. Insert the supplied hexagon socket wrench into the center gear (6)
2. Turn the center gear (6) until the rollers engage and are ready for operation in the start position, see Figure 17.

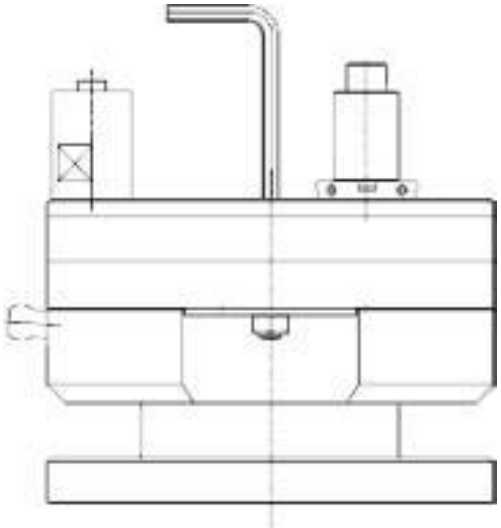


Figure 17: Set the roll start position / Tensioning the radial rolling head E

Radial *rolling system* EW

The rolling head is only ready for operation when the spring mechanism is tensioned and the clutch is engaged.

NOTE

A tensioned rolling head can be recognized by the fact that either the driving noses of the synchronous gears (5) are aligned radially or the grooves of the driving discs (12) or the flattening of the rollers are aligned tangentially, see Figure 18.

The rollers cannot be rotated in the direction of roller rotation (counterclockwise).

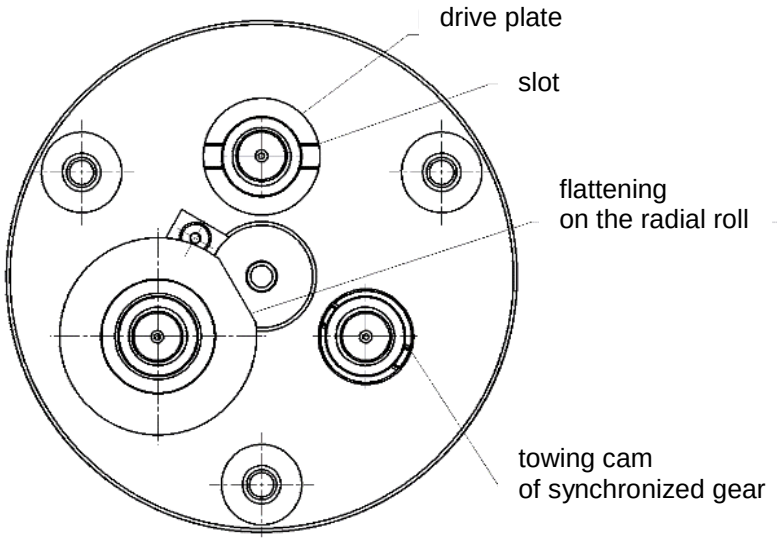


Figure 18: Tensioned radial rolling head EW (top view without front plate)

If this is not the case, the rolling head must be tensioned:

3. Insert a mandrel into one of the circumferential holes of the drive plate (12)
4. Turn the drive plate (12) until the rollers engage and are thus ready for operation in the start position.

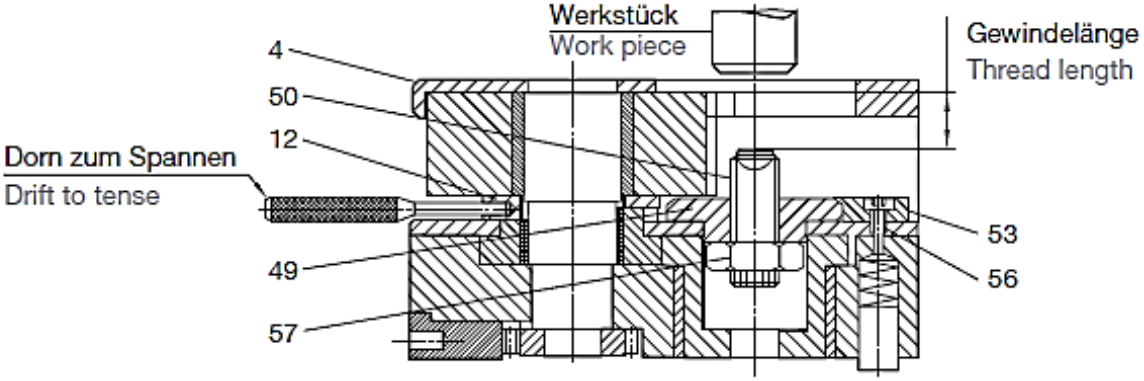


Figure 19: Set the roll start position / Tensioning the radial rolling head E

5. Operation

IMPORTANT

First follow the instruction in chapter 4, installation.

Please contact our Service Hotline in the event of initial commissioning of the *rolling system*.

We will gladly advice on:

- preparing the workpiece,
- defining the process variables and
- fine-adjusting the *rolling system*.

WARNING

General risk of injury from sharp edges.

The *rolling system* is made of various materials (e.g. nickel), which can trigger an allergic reaction.

Wear protective gloves and protective eyewear when using the *rolling systems*.

The weight of the rolling system may cause harm when it falls down.

General risk of injury during transportation/lifting of the rolling system.

- Ensure that the *rolling system* is protected of falling down or tipping over.
- Wear safety boot/hard-toed boot at all times. .
- Use suitable hoisting devices.

5.1 Preparing the workpiece

The rolling diameter (initial diameter) d2 corresponds approximately to the pitch diameter of the thread to be rolled. Deviations are possible depending on the material, strength, etc. The workpieces are to be chamfered at an angle α = 10° - 25° to the workpiece axis. However, if an undercut is provided, chamfering must be carried out according to the sketch. The diameter-d_1 must be below the core diameter of the thread

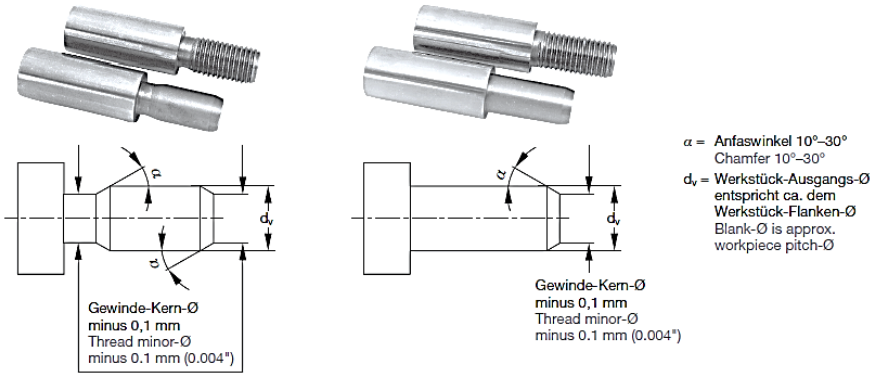


Figure 20: Preparing the workpiece

Characteristics of threads

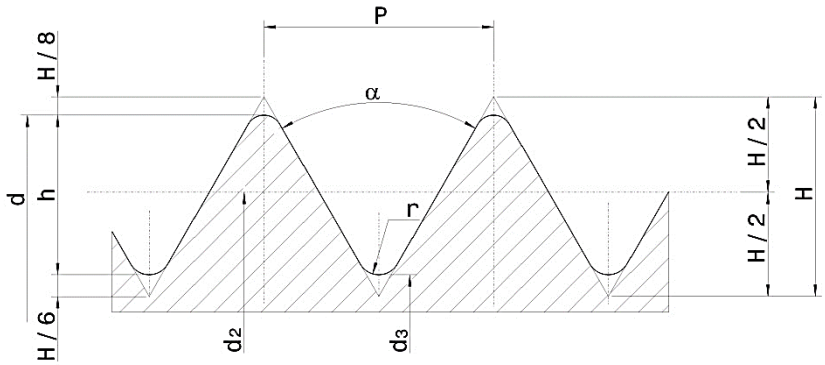


Figure 21: Characteristics of threads (e.g.: ISO metric threads)

NOTE

P : Thread pitch (for multiple threads: thread pitch) [mm]
α : Flank angle [°]
H : Theoretical profile height [mm]
h : Profile depth [mm]
r : Core radius [mm]
d : Nominal thread diameter [mm]
d_2 : Pitch diameter [mm]
d_3 : Core diameter [mm]

NOTE

For the geometry of the workpiece, note

- the blank diameter,
- the chamfer and
- the undercut.

Blank diameter

The resulting blank diameter must be complied with a tolerance of -0,02mm.

- for threading:

NOTE

$d_V \approx d_2 - 0{,}03$ mm

d_V : Blank diameter [mm]
d_2 : Pitch diameter [mm]

If you increase/decrease the blank diameter d_v, the nominal thread diameter d increases/decreases by three to five times as much.

- for knurling:

NOTE

$d_V \approx d - h_Z$

d_V : Blank diameter [mm]
d : Nomiinal thread diameter[mm]
h_Z : Tooth depth acc. to DIN [mm]

Chamfer

NOTE

Only chamfer the work piece under the following *rolling processes*:

- Threading,
- Knurling and,
- Cold forming of rotationally symmetrical work pieces, to produce other profiles.

Perform the chamfering in accordance with figure 15:

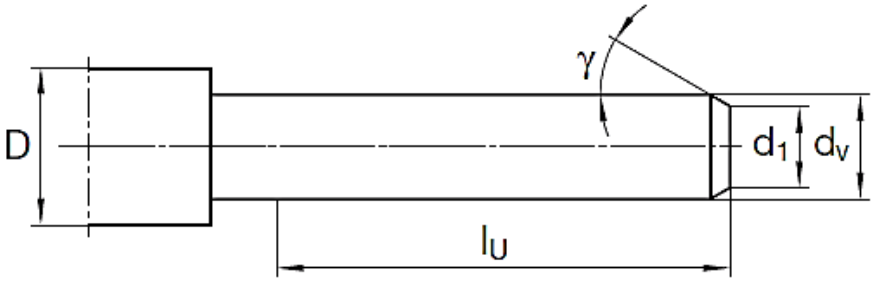


Figure 22: Preparing the work piece without undercut (thread runout)

NOTE

γ : Chamfer angle [°]
D : Collar diameter [mm]
d_1 : End face diameter [mm]
d_V : Blank diameter [mm]
l_U : length to be formed of the work piece

- The chamfer angle should be γ = 10°– 30°.
- The interior diameter d_1 must be smaller than the core diameter.

NOTE

$d_1 \leq d_3 - 0{,}1$ mm

d_1 : interior (end face) diameter [mm]
d_3 : core diameter [mm]

5.2 Rolling process

Radial rolling heads were primarily developed for short threads with very short run-out.

Either the *rolling system* is rotating and the workpiece is stationary or the *rolling system* is stationary and the workpiece is rotating.

After the rolling head is placed in rolling position and the release is actuated, the rolling operation is completed in a single roll revolution, see Figure 23.

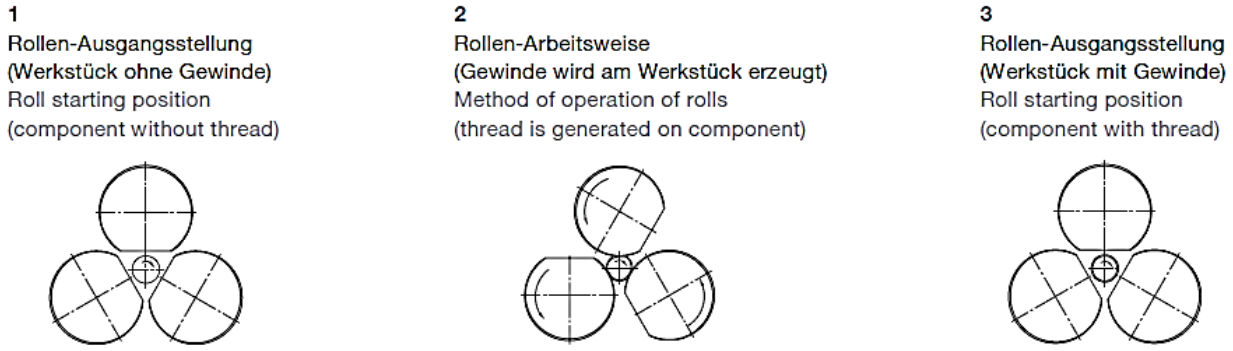


Figure 23: rolling process functional prinicple

Radial *rolling system* E

1. The radial *rolling system* is brought into rolling position on the machine above the workpiece in axial direction. The distance between the upper edge of the roller (not the front plate) and the workpiece face corresponds to the thread length produced.

IMPORTANT

The center of the rolling head must exactly coincide with the spindle axis of the lathe.

2. By means of one of the two release levers (either internal or external), the rolling head is released and the rolling process starts.
3. After one roll revolution, the thread is formed and the *rolling system* or the workpiece can be retracted in axial direction.

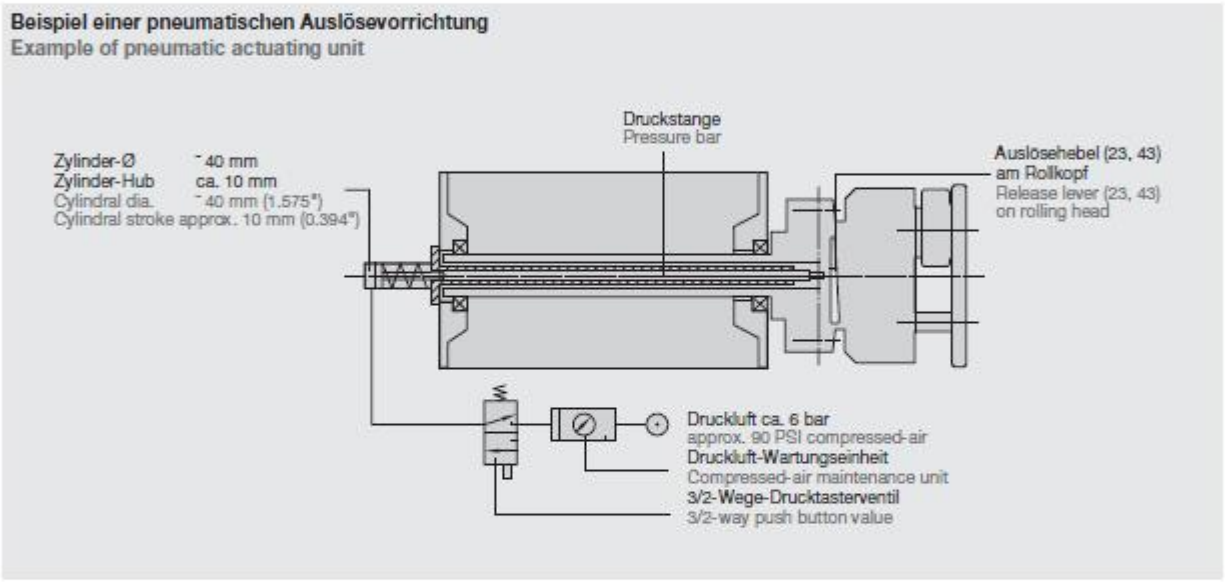
NOTE

An external release device is mandatory for radial rolling heads of type E, but this allows the overall lengths of these types to be kept relatively short.

The switching path of the release lever can be taken from L2 and the technical dimensions of the respective *rolling system.*

Figure 24 shows the process sequence with triggering device.

Rollköpfe Rolling heads	Auslösekraft bei max. Rollgeschwindigkeit 30 m/min Tripping power at max. rolling speed of 30 m/min (90 SFM)
E 8, E 10, E 13	approx. 200 N
E 16, E 23	approx. 400 N
E 30	approx. 600 N



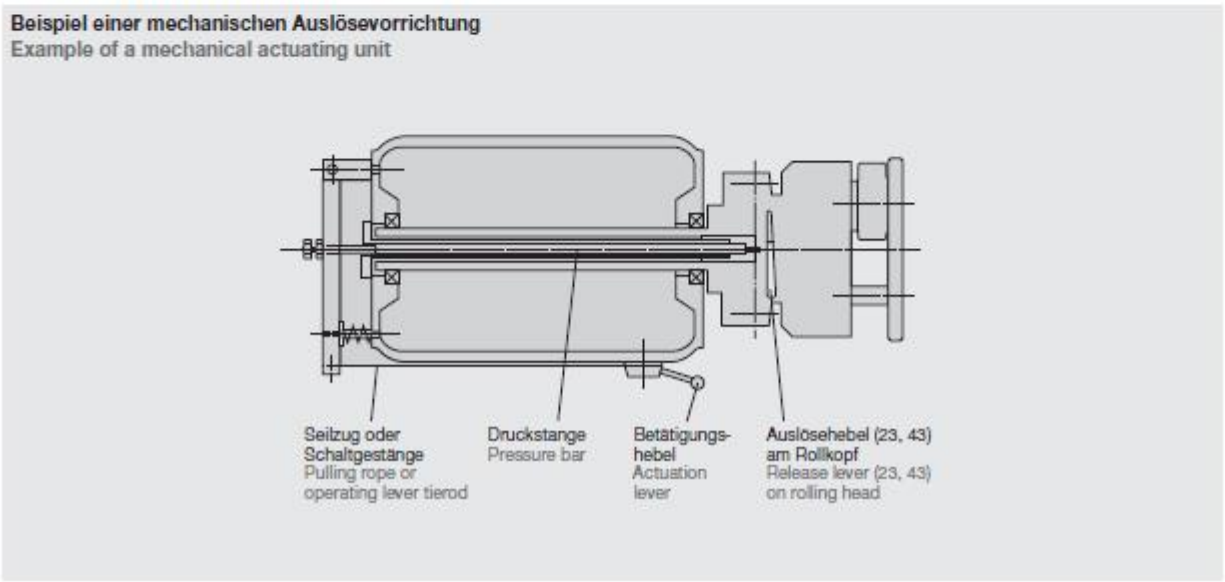


Figure 24: Process sequence release device for radial rolling head type E

Radial rollling system EW

Type EW radial rolling heads do not require an external triggering device. Due to the rotatable inner stop, the rolling head is triggered by the workpiece.

To avoid relative movements between the rolling head and the workpiece during the rolling process, the front part of the rolling head is floating.

1. The radial *rolling system* is brought into rolling position on the machine above the workpiece in axial direction (in rapid traverse) up to the 1st stop position. as

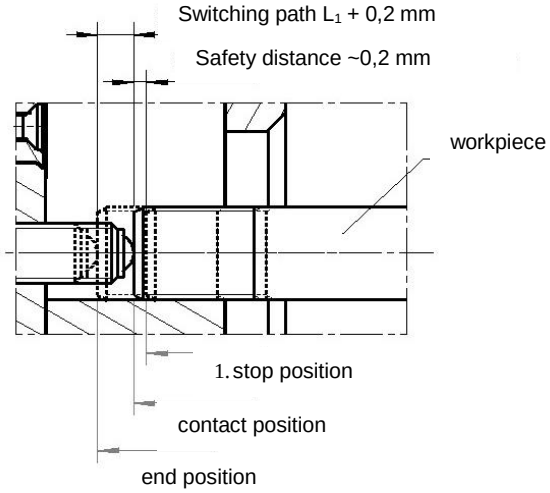
IMPORTANT

The center of the rolling head must be exactly aligned with the spindle axis of the lathe.
The release lever must be set for the desired thread length.

2. For the release, the *rolling system* and the workpiece are moved axially towards each other at a slow feed rate from the 1st stop position,
3. so that the workpiece touches the inner release lever and moves on.
4. until the release path L_1 is reached, see Fig. 25.
   For safety, move approx. 0.2mm further than L_1
   and remain in this position according to the rolling time.
5. the rolling process is started after the release distance has been reached.
6. After one roll revolution, the thread is formed and the *rolling system* or the workpiece can be retracted in axial direction.

IMPORTANT

The release path L_1 must be smaller than the release stroke L_2.
The values for L_1 and L_2 can be found in the technical dimensions of the respective *rolling systems*.



Rollköpfe Rolling heads	Auslösekraft bei max. Rollgeschwindigkeit 30 m/min Tripping power at max. rolling speed of 30 m/min (90 SFM)
E 8, E 10, E 13	approx. 200 N
E 16, E 23	approx. 400 N
E 30	approx. 600 N

Figure 25: Release the trigger mechanism of a radial *rolling system* EW

5.3 Rolling speed and machine speed

Rolling speed

IMPORTANT

When starting the rolling process/operation, select a rolling speed between:

20 and 30 m/min.

A low rolling speed should be used for

- high forming capacities (large pitch),
- long thread length,
- high material strength,
- and with revolving rolling heads.

Contact our rolling team if you want to increase the rolling speeds.

Symbols: ☺ good rollability ☹ rollable ☹ conditionally rollable

Material	Tensile strength N/mm²	Material code	Material number	Rollability	Rolling speed m/min
Ferrous metals					
General structure steels	500	S235JRC	1.0120	☺	40-80
	500-600	S550GD	1.0531	☺	30-60
	750-900	C50	1.0540	☺	20-50
	630-850	C45E	1.1191	☺	20-50
Case hardening steel	590-780	C15E	1.1141	☺	40-70
	780-1080	16MnCr5	1.7131	☹	30-50
Nitriding steels	780	34CrAl6	1.8504	☹	20-50
	900-1300	31CrMoV9	1.8519	☹	20-40
Free cutting steels	350-530	10S10	1.0711	☺	30-60
	360-760	11SMnPb30	1.0718	☺	30-60
	590-830	35S20	1.0726	☺	30-60
Heat treatable steels	630-780	C35	1.0501	☺	40-70
	850-1000	C60E	1.1221	☹	30-60
	1100-1300	42CrMo4	1.7225	☹	20-50
	1250-1450	30CrMoV9	1.7707	☹	20-40
	1200-1400	34CrNiMo6	1.6582	☹	20-40
	1100-1300	51CrV4	1.8159	☹	20-40
Tool steels	800-850	X210Cr12	1.2080	☹	30-50
	800-1000	X130W5	1.2453	☹	20-40
	760-810	115CrV3	1.2210	☹	30-50
High speed steel	920	HS6-5-2C	1.3343	☹	20-40
	880	HS6-5-2-5	1.3243	☹	20-40
Stainless steels	650-730	X12Cr13	1.4006	☹	30-50
	800-950	X17CrNi16-2	1.4057	☹	30-50
	650-850	X14CrMoS17	1.4104	☹	30-50
	500-700	X5CrNi18-10	1.4301	☺	35-55
	500-750	X8CrNiS18-9	1.4305	☺	35-55
	500-700	X5CrNiMo17-12-2	1.4401	☹	30-50
	500-700	X6CrNiMoTi17-12-2	1.4571	☹	30-50
Cast steels	380-530	GE200	1.0420	☺	40-60
	540	G36Mn5	1.1176	☺	40-60
	1000-1200	G50CrMo4	1.7232	☹	30-50
	450	EN-GJMB-450-06	EN-JM 1140	☹	30-60

Malleable cast iron	650	EN-GJMB-650-02	EN-JM 1180	😐	30-60
Cast iron	400	EN-GJS-400-15	EN-JS 1030	☺	30-60
	500	EN-GJS-500-7	EN-JS 1050	😐	30-50
	600	EN-GJS-600-3	EN-JS 1060	😐	30-50
High temperature materials	≥970	NiCo20Cr20CoMoTi (Nimonic 263)	2.4650	😐	30-50
	700-950	NiMo16Cr15W (Hastelloy C276)	2.4819	😐	20-40
Nickel alloys	580-800	NiCr15Fe (Inconell 600)	2.4816	☹	20-40
Non-ferrous metals					
Copper	240-300	E-Cu	CW004A	☺	40-80
Copper alloys (Brass	310	CuZn37	CW508L (R310)	☺	40-80
	410	CuZn38Pb2	CW608N (R410)	😐	40-70
	360	CuZn38Pb2	CW608N (R360)	☺	40-70
	430	CuZn39Pb3	CW614N (R430)	😐	40-70
Aluminium alloys	150-240	AlMg2	EN AW-5251	☺	40-70
	160-310	AlSi1MgMn	EN AW-6082	😐	40-70
	220-350	AlZn4,5Mg1	EN AW-7020	☹	30-50
	220-440	AlCu4Mg1	EN AW-2024	😐	30-50
	275-540	AlZn5,5MgCu	EN AW-7075	😐	30-50
Titanium alloys	390-540	Ti2	3.7035	☺	30-60
	540-650	TiCu2	3.7124	☺	30-60
	750-950	TiAl5Sn2,5	3.7115	😐	30-60
	1030-1100	Ti6Al4V	3.7164.7	😐	20-40

Table 5: Recommended rolling speed depending on the material

Tensile strength (yield) and elongation at fracture of the material:

For materials with high tensile strength, operate at 20-30 m/min. Bear in mind that the rolling speed depends on the tensile strength. Choose low rolling speeds for high tensile strength, and for low tensile strength choose high rolling speeds.

Machine speed

NOTE

The machine speed is calculated as follows:

$$n = \frac{1000 \cdot v}{d_A \cdot \pi} \quad n = \frac{1000 \cdot v}{d_A \cdot \pi} \ [\text{min}^{-1}]$$

n : machine speed [min^{-1}]

v : rolling speed [m/min]

d_A : blank diameter [mm]

5.4 Driving power and torque

Since the entire length of the thread is produced by only one roll revolution, a high torque is required for a short time..

Required drive power:

$$N \approx 0{,}105 \cdot 10^{-3} \cdot n \cdot M \quad [kW]$$

Torque:

$$M \approx 8{,}8 \cdot 10^{-3} \cdot K_R \cdot K_w \cdot p \cdot L \cdot d^2 \quad [Nm]$$

Rolling head constant K_R:

Rolling head-type	E10/EW10	E13/EW13	E16/EW16	E23/EW23	E30/EW30
K_R	1,8	1,3	1	0,7	0,4

material constant K_w:

material	free cutting steel	unalloyed steel	stainless steel	alloyed steel
K_w	1,0	1,25	1,4	1,8

Example

M16x2 ; 20 mm

Rolling head E16 ; free cutting steel

Dimension	d	= 16 mm
pitch	p	= 2 mm
RPM	n	= 400 min^{-1}
Rolling head constant	K_r	= 1,0
material constant	K_w	= 1,0
Thread length	L	= 20 mm

Torque:

$$M \approx 8{,}8 \cdot 10^{-3} \cdot 1{,}0 \cdot 1{,}0 \cdot 2 \cdot 20 \cdot 16^2 \quad [Nm]$$

$$M \approx 90{,}11\,Nm$$

Driving power:

$$N \approx 0{,}105 \cdot 10^{-3} \cdot 400 \cdot 90{,}11 \quad [kW]$$

$$N \approx 3{,}78\,kW$$

By reducing the speed/speed, the required drive power can be lowered

5.5 Rolling time

1. When calucalting with the RPM:

$$t_r = \frac{60}{n} \cdot \left(\frac{K_t}{d_v} - 1 \right) \quad [s]$$

2. When calucalting with the rolling speed:

$$t_r = \frac{0{,}188}{v} \cdot (K_t - d_v) \quad [s]$$

K_t = Rolling head constant [mm]

Rolling head-type	E10/EW10	E13/EW13	E16/EW16	E23/EW23	E30/EW30
K_t	42	54	66	90	120

Example:

Dimension-Ø:		M 16 x 1,5
Rolling head:		E 16
Blank-Ø	:	15 mm
Rolling speed	:	20 m/min
RPM:		424 min–1

Calculating with RPM: $t_r = \frac{60}{424} \cdot \left(\frac{66}{15} - 1 \right) = 0{,}48s$

Calculating with rolling speed $t_r = \frac{0{,}188}{20} \cdot (66 - 15) = 0{,}48s$

5.6 Fine adjustemnt of the *rolling system*

The thread diameter is adjusted by means of the two eccentric bolts.

1. Loosen the hex nuts (26).
2. Turn the gear rim (8) to adjust the infeed of the thread rolls
3. When rolling the first thread, we recommend that you set the thread rolls as far apart as possible. Approach the desired tolerance position with gradual infeed of the rolls.
4. Tighten the hex nut (26).

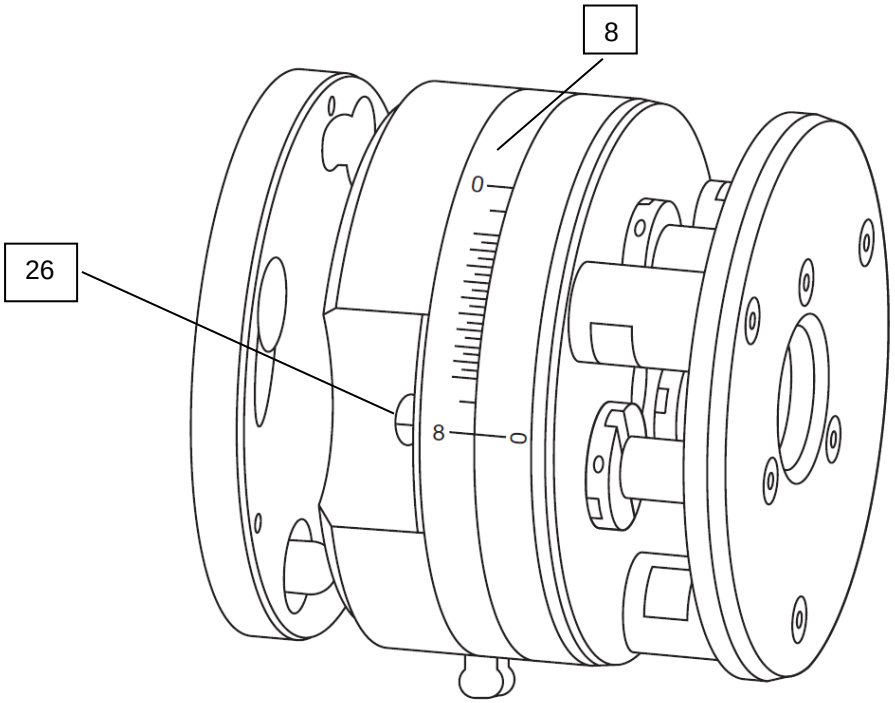


Figure 26: Fine adjustment of the *rolling system*

IMPORTANT

Don´t perform a second *rolling process* on a once rolled profile.

Following our instructions, you will probably produce a non-completely formed profile tooth. If the pitch diameter is too large or the external diameter too small, make the following adjustments:

1. Decrease the roll adjustment on the scale.

2. As a result of reducing the axle distance, more material is pressed into the tooth crest. This automatically increases the external diameter of the thread.

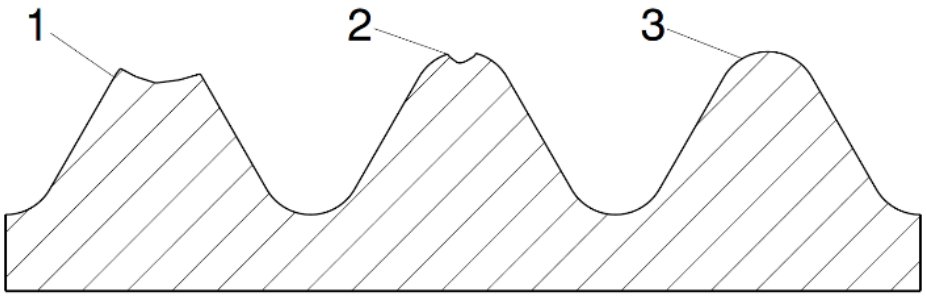


Figure 27: Degree of forming at the profile tooth

Closely inspect the rolled profile. Figure 27 shows the possible degrees of forming of a profile tooth:

- Tooth 1 represents a profile tooth that is **not completely formed.** This degree of forming normally yields a stable profile. In most applications this degree of forming I aimed for.
- Tooth 2 represents a thread tooth that is **completely formed**. This degree of forming is used to meet the highest requirements in optics and tightness.
- Tooth 3 represents a profile tooth that is **overformed**.

NOTE

Bear in mind, that the degree of forming effects the produced diameter. Check the produced dimension, to ensure that they meet the tolerances.

NOTE

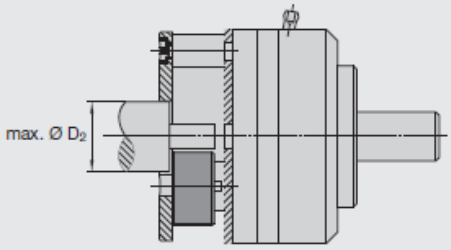
After rolling, the work piece external diameter d must not have a burnished finish and must not be overformed in the profile crests. This leads to increased roll wear.

The infeed of the rollers presses more material into the tooth tip. This automatically increases the outer diameter of the thread:

- If the flank diameter is correct after closing the rolling head, the thread tooth, however, is excessively shaped, than you have to reduce the original diameter so that less material will flow into the thread top. Under these circumstances, the rolling head possibly can be opened easily.
- If the flank diameter is correct after closing the rolling head, the outer diameter, however, is too small, you have to increase the original diameter. Thus, more material will flow into the tooth top. Possibly, you will have to close the rolling head as well.

5.7 Special application

Vergrößerte Frontplattenbohrung
Enlarged front plate bore

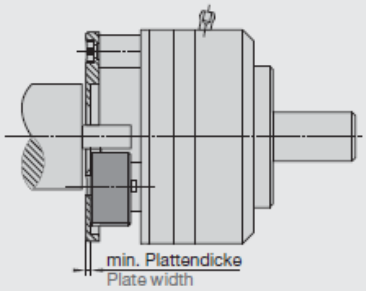


Der Bund-Ø des Werkstückes kann je nach Arbeitsfall größer sein als die Frontplattenbohrung D_2 in Standardausführung. Die max. möglichen Frontplattenbohrungs-Ø können für die verschiedenen Typen aus der Tabelle entnommen werden.

In some cases the shoulder diameter of the component is larger than the standard front plate bore diameter D_2. The maximum front plate bore diameter for the different types is shown in the following table.

Rollkopf Rolling head	E8	E10 EW10	E13 EW13	E16 EW16	E23 EW23	E30 EW30
Sonderausführung **Special version** **max. Ø D_2**	22 0.866"	30 1.181"	41 1.614"	50 1.968"	66 2.598"	80 3.15"
Standard **Ø D_2**	15 0.591"	26 1.024"	32 1.26"	40,5 1.594"	50 1.968"	68 2.677"

Dünnere Frontplattenausführung
Thin front plate version

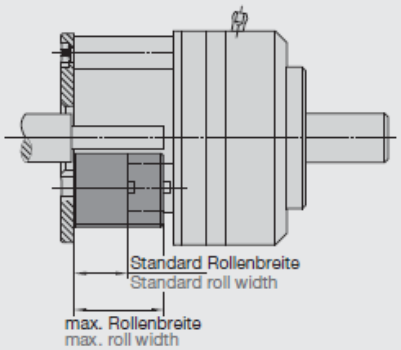


Für größere Werkstückbund-Ø als die max. Frontplattenbohrung besteht die Möglichkeit, den Rollkopf mit einer dünneren Frontplatte zu versehen. In der Tabelle sind die min. Frontplattendicken für die verschiedenen Typen aufgeführt.
Gewindeauslauf = Frontplattendicke + 1 x Steigung.

It is possible to supply the rolling head with a thin front plate, when the component shoulder diameter is larger then the maximum front plate bore permissible. The minimum front plate width for the different types is shown in the following table.
Thread run-out = front plate width + (1 x pitch).

Rollkopf Rolling head	E8	E10 EW10	E13 EW13	E16 EW16	E23 EW23	E30 EW30
Plattendicke **Sonderausführung** **Plate width special**	2,0 0.079"	2,0 0.079"	2,0 0.079"	2,5 0.098"	2,5 0.098"	3,0 0.118"
Plattendicke **Standard** **Plate width standard**	5,0 0.197"	6,0 0.236"	8,0 0.315"	10,0 0.394"	13,0 0.512"	16,0 0.63"

Verlängerte Rollenbreite
Extended roll cage for longer threads



Die größte rollbare Gewindelänge entspricht der Rollenbreite. Je nach vorliegendem Arbeitsfall kann die Rollenbreite in Abhängigkeit vom Werkstück-Ø, Gewindelänge, Steigung und Werkstoff-Festigkeit verlängert werden. Haben Werkstücke lang vorgelagerte Zapfen, so ist die verlängerte Rollkopfausführung auch mit Standardrollen zu nutzen.

The largest thread length possible to be rolled is equal to the roll width. In special cases, depending on component diameter, thread length, pitch and material strength, the roll width can be increased. It is also possible to roll with the elongated rolling head with standard rolls, if the thread to be rolled is too far from the end of the component. Special drive plates are required.

Rollkopf Rolling head	E8	E10 EW10	E13 EW13	E16 EW16	E23 EW23	E30 EW30
Rollenbreite **Sonderausführung** **Roll width special**	auf Anfrage on request					
Rollenbreite **Standard** **Roll width standard**	11,6 0.457"	19,6 0.772"	24,6 0.968"	29,6 1.165"	34,6 1.362"	39,6 1.559"

6. Disassembly after operation

IMPORTANT

Please conctact our Service Hotline in the event of dismounting:

- removing the *rolling system* from the processing machine.
- Dismounting the rolling head
- dismounting the thread rolls.

Check all modules of the *rolling system* for wear and damage. Please contact the operator if you notice wear or wear on a component of the *rolling system*.

CAUTION

Risk of injuries the hands!

During decommissioning, dismounting or disposal activities there is a risk of sustaining injuries caused by rough, sharp surfaces of transport crates, boxes, pallets or packaging aides.

Wear safety gloves to avoid injuries by cutting.

WARNING

General risk of injury from sharp edges.
The *rolling system* is made of various materials (e.g. nickel), which can trigger an allergic reaction.

Wear protective gloves and protective eyewear when using the *rolling systems*.

The weight of the *rolling system* may cause harm when it falls down.
General risk of injury during transportation/lifting of the *rolling system*.

- Ensure that the *rolling system* is protected of falling down or tipping over.
- Wear safety boot/hard-toed boot at all times. .
- Use suitable hoisting devices.

6.1 Removing the *rolling system* from the processing machine

WARNING

Risk of burns from the hot surface of the *rolling system*.

Only remove the *rolling system* after the *rolling system* has cooled down.

Risk of cuts due to chips adhering to the *rolling system*.
Remove any chips adhering to the system from the *rolling system* before removing the *rolling system* form the processing machine.

1. Check if you need and have suitable hoisting devices
   - We recommend the use of hoisting devices for the transportation of F RN *rolling systems*
   - Place the hoisting device on a suitable area. You will find a bore hole for a ring bolt on the outer surface of the *rolling system.*

NOTE

Suitable hoisting devices are for example:

- A sling
- Hoisting Chain
- Lift cable

Please contact your occupational safety specialist before transportating the *rolling system*.

2. Make sure that the *rolling system* or components do not fall down.

3. Unclamp the *rollig system* in the processing machine.

4. Remove *the rolling system*.

6.2 Removing the rolls

1. Place the *rolling system* in such a way that front plate shows upwards.
2. Ensure that the *rolling system* is protected of falling down or tipping over.
3. Remove the screws and remove the front plate.
4. Remove the rolls.
5. Place the front plate back in position and mount the screws.

NOTE

Only use rolls with the same code number (check also thread dimension, rolling head type, thread width).In order to ensure a good friction coefficient between roll (8) and eccentric bolt and carbide bushing, be sure to lubricate sufficiently the roll bore and the carbid bushing using molybdenum sulfide grease. (e.g. Molykote).

If you replace/change the rolls make sure to check the produced thread. Maybe some adjustments need to be done.

7. Wear parts, parts list

Wear parts

NOTE

Wear parts are:

- eccentric bolts (9),
- carbide bushing (16),
- clutch stop (18),
- rolls (22).

Please contact the operator if you notice wear or wear on a component of the *rolling system*.

Part list

NOTE

When ordering spare parts be sure to state the ID number.

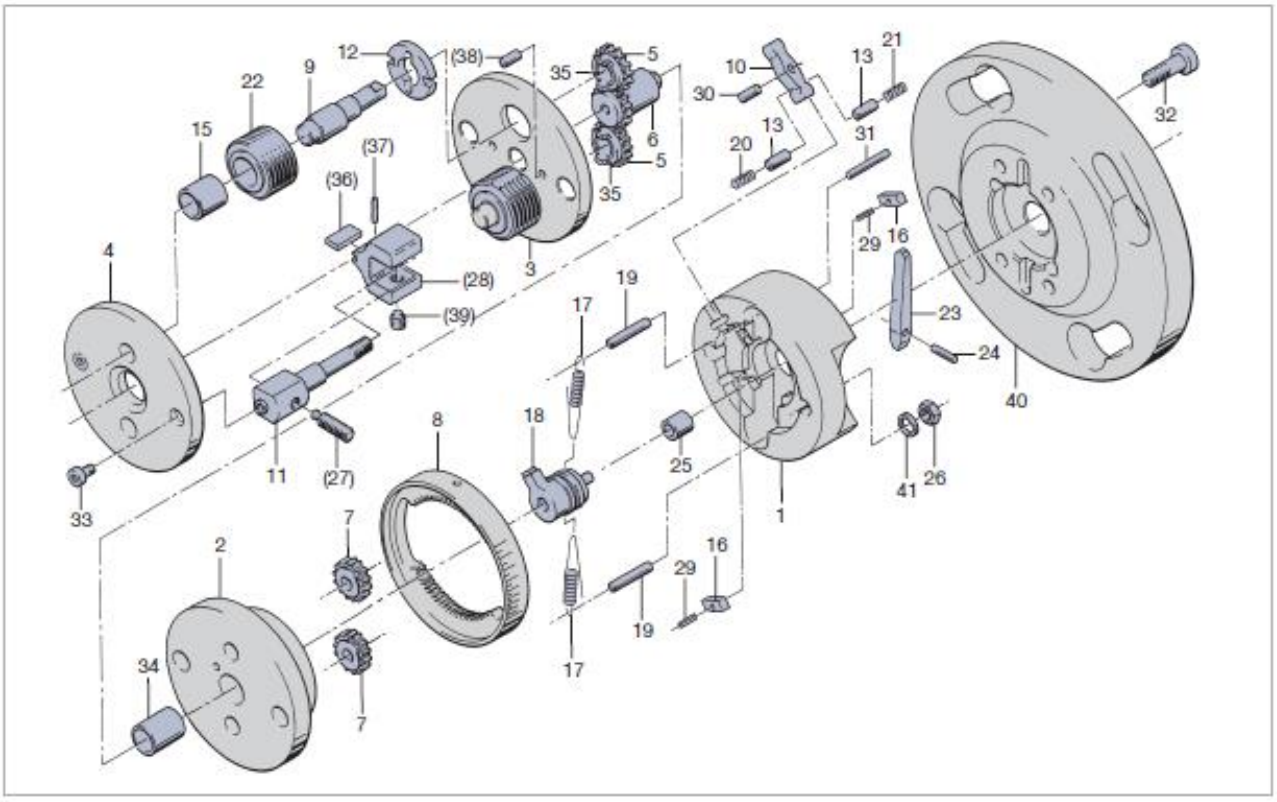
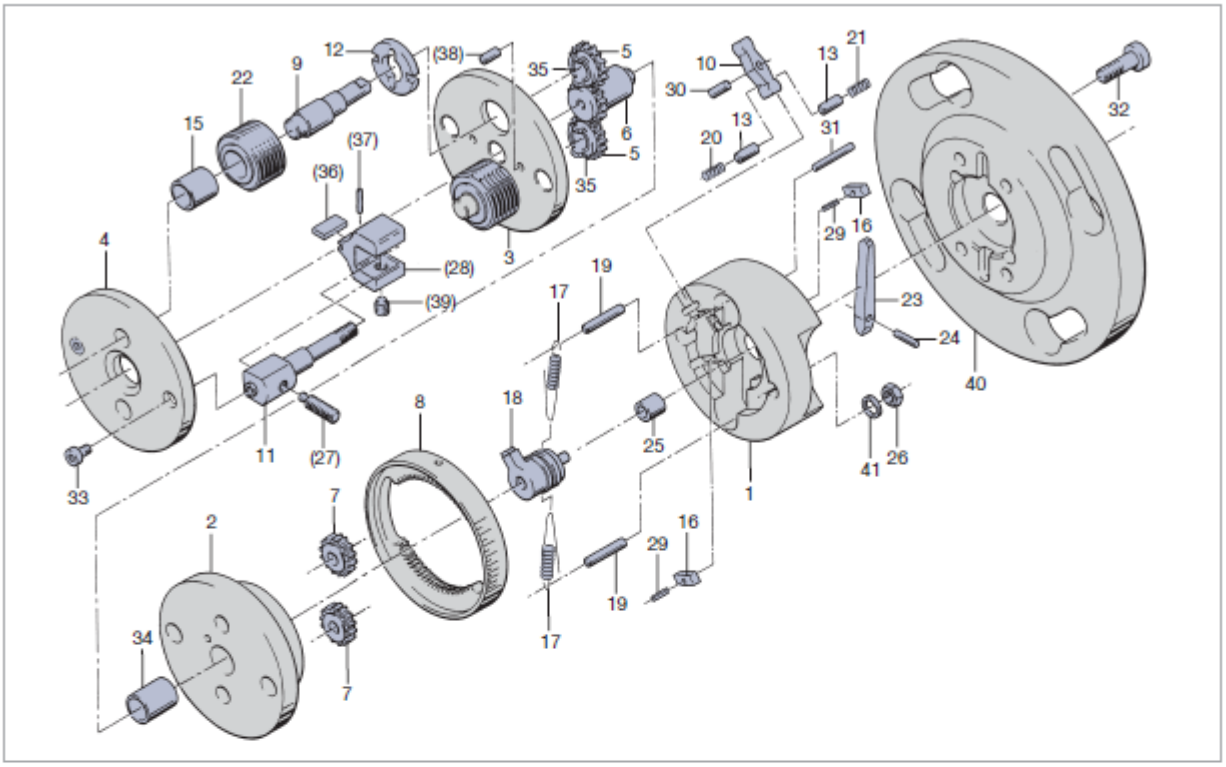


Figure 28: Exploded view

Ersatzteile für Radial-Rollkopf E8A00
Spare parts for radial type rolling head E8A00



Ersatzteile für Radial-Rollkopf E8A01
Spare parts for radial type rolling head E8A01

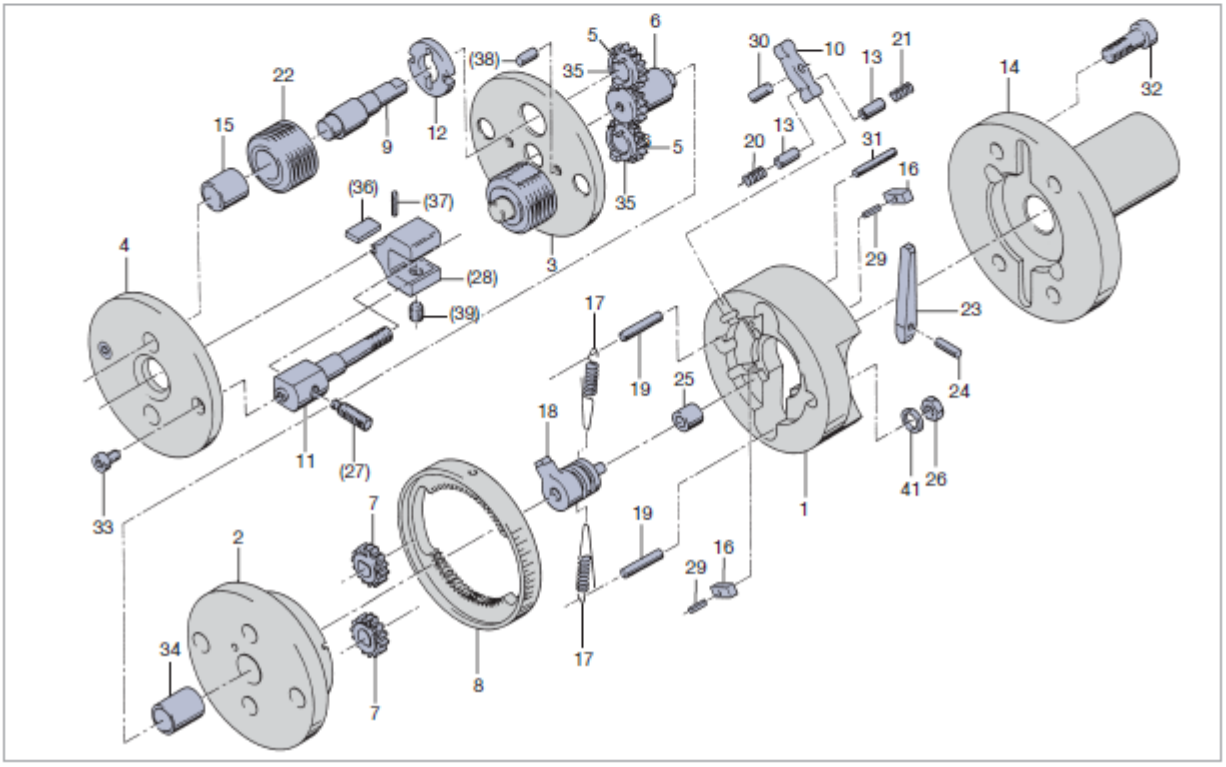


Figure 29: Exploded view, spare parts E8A00 and E8A01

Ersatzteile für Radial-Rollkopf E8A00 und E8A01
Spare parts for radial type rolling head E8A00 and E8A01

Rollkopf / Rolling head			E8A00 E8A01
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
1	1	Federgehäuse / Spring housing	2173498
2	1	Getriebeplatte / Drive gear plate	2173499
3	1	Deckplatte / Cover plate	2173500
4	1	Frontplatte / Front plate	2173501
5	2	Synchronzahnrad mit DU-Buchse / Synchronized gear with bushing	2173502
6	1	Mittelzahnrad / Centre gear	2173503
7	2	Verstellzahnrad / Adjusting gear	2173504
8	1	Zahnkranz / Gear rim	2173505
9	2	Exzenterbolzen / Eccentric spindle	2173506
10	1	Äußerer Auslösehebel / External trip release lever	2173507
11	2	Distanzbolzen / Spacer pin	2173508
12	2	Mitnehmerscheibe / Drive plate	2173509
13	2	Kupplungsbolzen / Coupling pin	2173510
15	2	Laufbuchse / Bushing	2173512
16	4	Passfeder / Fitting key	2173511
17	1	Zugfeder-Satz (2 Stück) / Tension spring set (2 pieces)	2173516
18	1	Anschlag / Clutch stop	2173519
19	2	Zylinderstift / Pin	2141231

Rollkopf / Rolling head			E8A00 E8A01
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
20	1	Druckfeder, stark / Pressure spring, heavy	2173520
21	1	Druckfeder, schwach / Pressure spring, light	2127419
22	2	Rolle / Roll	s. Einzelfall / s. individual
23	1	Innerer Auslösehebel / Internal trip release lever	2173521
24	1	Zylinderstift / Pin	2141229
25	1	DU-Buchse / Bushing	2148853
26	2	Sechskantmutter / Hexagon nut	2148393
29	4	Spannhülse / Roll pin	2142561
30	1	Zylinderstift / Pin	2142649
31	1	Stift / Pin	2173526
32	4	Zylinderschraube / Cap screw	2142016
33	2	Zylinderschraube / Cap screw	2141881
34	1	DU-Buchse / Bushing	2148884
35	2	DU-Buchse (s. auch Teil Nr. 5) / Bushing (see part no. 5)	2148865
40	1	Flansch / Flange	2173528
41	2	Scheibe / Washer	2141464
Zusätzliche Ersatzteile E8A01 / Additional spare parts E8A01			
14	1	Schaft / Shank	siehe Tabelle / see table
24	1	Zylinderstift / Pin	2142644

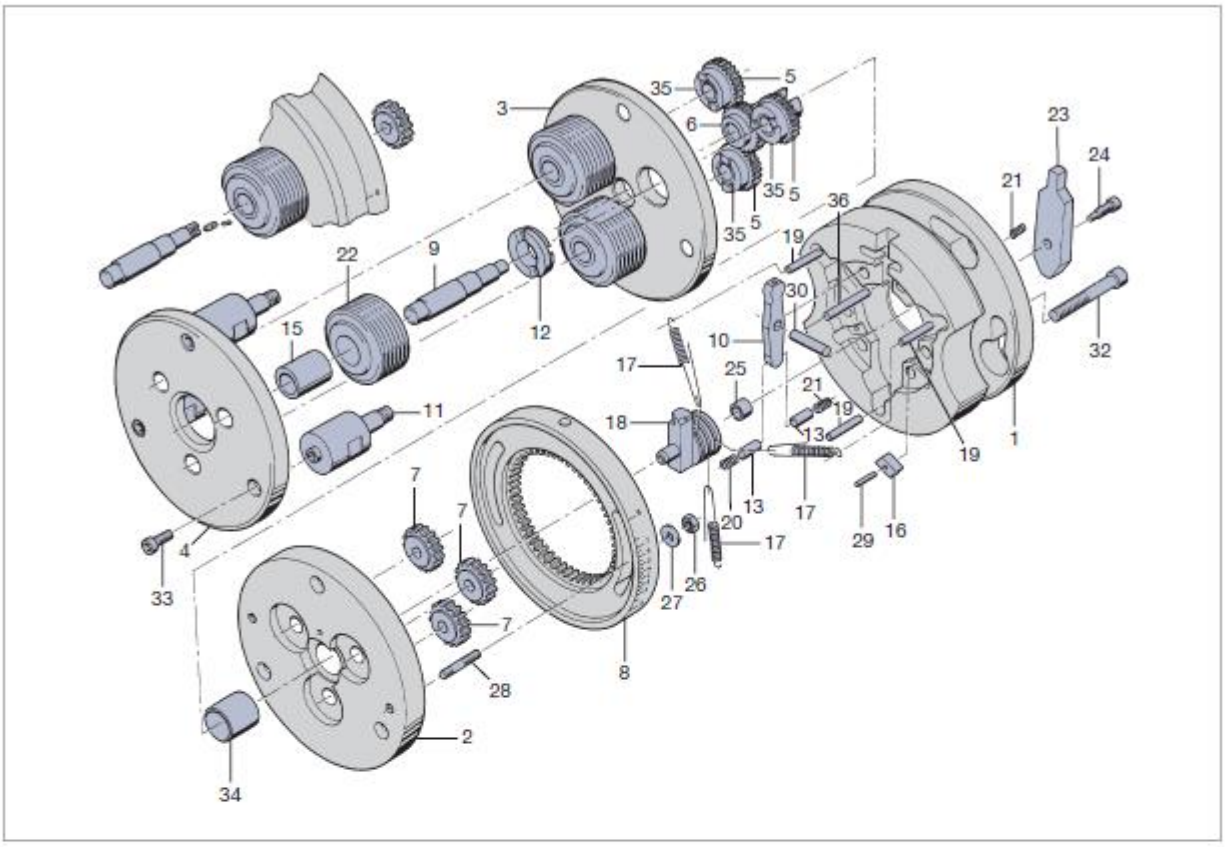
Schäfte für Rollkopf E8A01 / Shanks for rolling head E8A01			
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
14	1	Rundschaft 20 mm / Round shank 20 mm	2173531
14	1	Rundschaft 25 mm / Round shank 25 mm	2173532
14	1	Rundschaft 30 mm / Round shank 30 mm	2173533
14	1	Rundschaft 3/4" / Round shank 3/4"	2173534
14	1	Rundschaft 1" / Round shank 1"	2173535
14	1	Rundschaft 1 1/4" / Round shank 1 1/4"	2173536

Führungsstück[1] / Guide piece			
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
	1	**Führungsstück komplett[1]** / Guide piece complete	2170134
27	1	Gewindestift / Set screw	2173522
28	1	Führungsstück m. Hartmetallplatte / Guide piece with carbide	2173523
36	1	Hartmetallplatte s. lfd. Nr. 28 / Carbide plate see part no. 28	2173525
37	1	Zylinderstift / Pin	2142644
38	1	Zylinderstift / Pin	2142658
39	1	Gewindestift / Locking screw	2148366

[1] Bei Bedarf bitte zusätzlich bestellen. Pro Rollkopf werden 2 Stück benötigt.
Please order additionally if required. For each rolling head 2 pieces are needed.

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben! Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf E10A00
Spare parts for radial type rolling head E10A00



Ersatzteile für Radial-Rollkopf E10A01
Spare parts for radial type rolling head E10A01

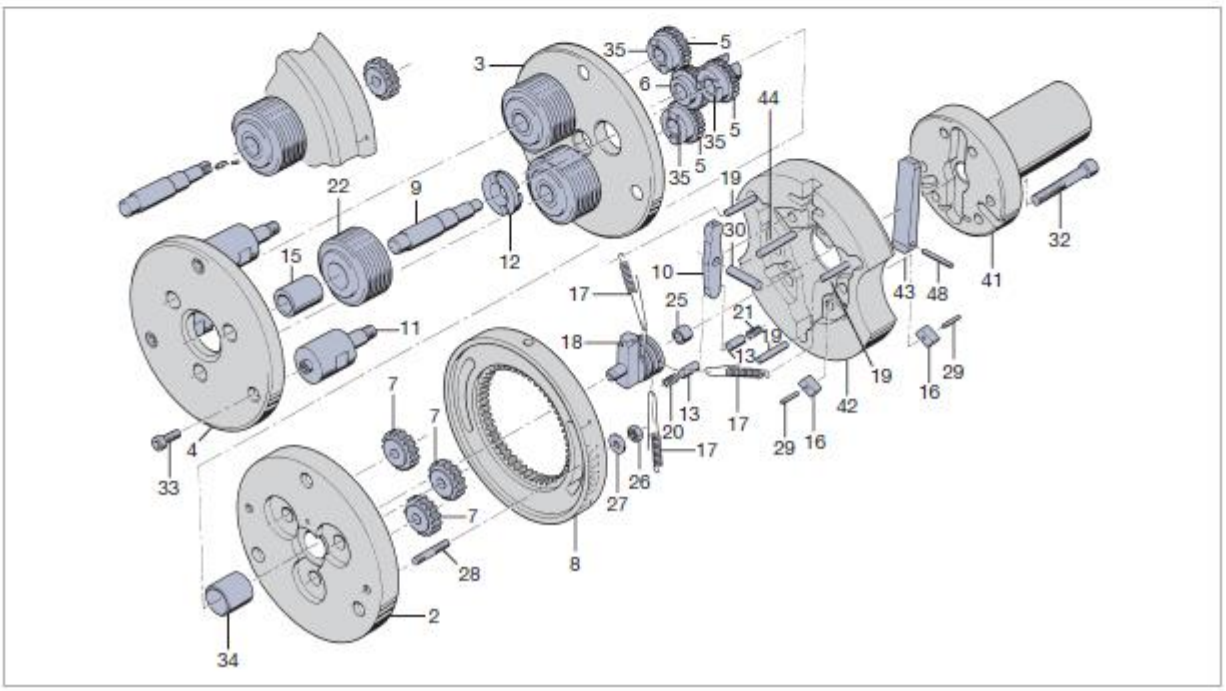


Figure 30: Exploded view, spare parts E10A00 and E10A01

Ersatzteile für Radial-Rollkopf E10A00 und E10A01
Spare parts for radial type rolling head E10A00 and E10A01

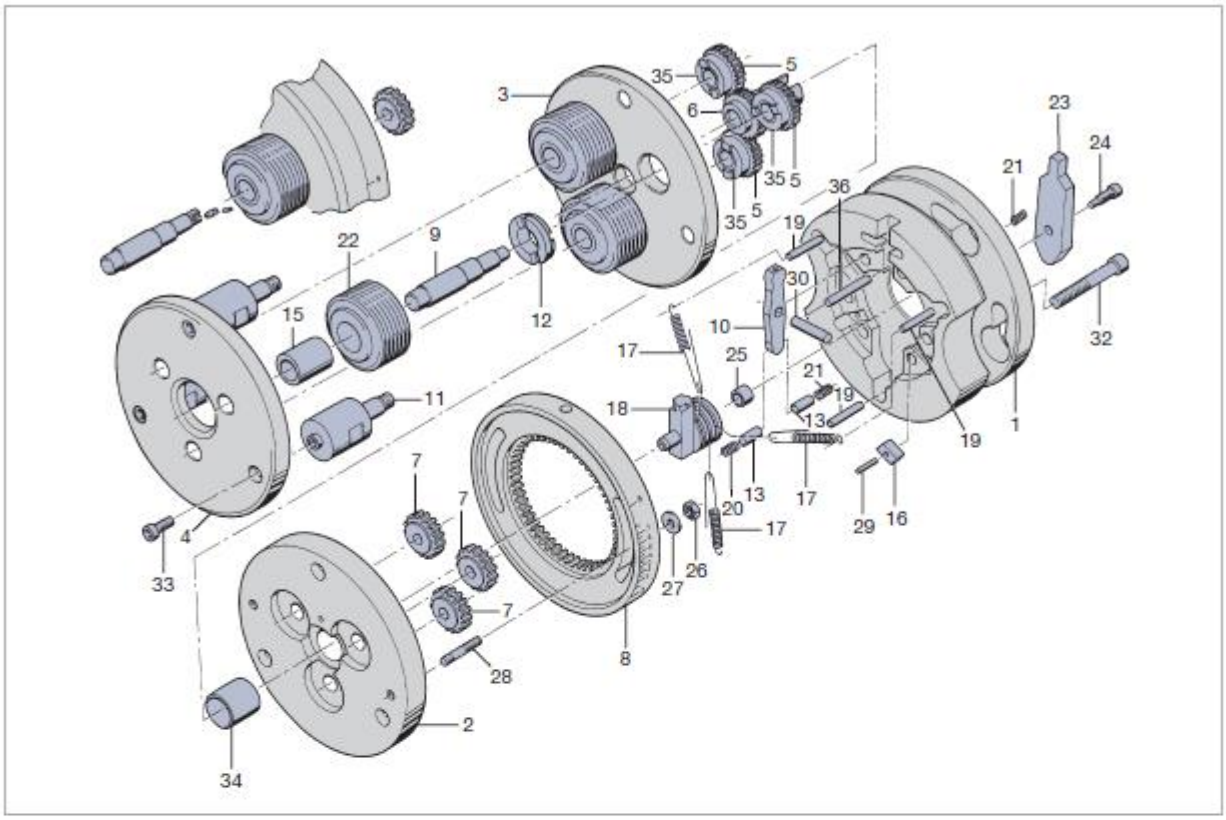
Rollkopf / Rolling head			E10A00 E10A01	Rollkopf / Rolling head			E10A00 E10A01
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.	Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
1	1	Flansch (E10A00) / Flange	2173659	19	3	Zylinderstift / Pin	2141260
2	1	Getriebeplatte / Drive gear plate	2173660	20	1	Druckfeder, stark / Pressure spring, heavy	2173679
3	1	Deckplatte / Cover plate	2173661	21	2	Druckfeder, schwach / Pressure spring, light	2127414
4	1	Frontplatte / Front plate	2173662	22	3	Rolle / Roll	s. Einzelfall / s. individual
5	3	Synchronzahnrad mit DU-Buchse / Synchronized gear with bushing	2173663	23	1	Innerer Auslösehebel (E10A00) / Internal trip release lever	2173680
				24	1	Zylinderschraube (E10A00) / Cap screw	2173681
6	1	Mittelzahnrad / Centre gear	2173664	25	1	DU-Buchse / Bushing	2148851
7	3	Verstellzahnrad / Adjusting gear	2173665	26	2	Sechskantmutter / Hexagon nut	2142394
8	1	Zahnkranz / Gear ring	2173666	27	2	Scheibe / Washer	2173682
9	3	Exzenterbolzen / Eccentric spindles	2173667	28	2	Stiftschraube / Stud	2148824
10	1	Äußerer Auslösehebel / External trip release lever	2173668	29	2	Spannhülse / Roll pin	2142576
11	3	Distanzbolzen / Spacer pin	2173669	30	1	Zylinderstift / Pin	2142678
12	3	Mitnehmerscheibe / Drive plate	2173670	32	6	Zylinderschraube / Cap screw	2148362
13	2	Kupplungsbolzen / Coupling pin	2173671	33	3	Zylinderschraube / Cap screw	2142992
15	3	Laufbuchse / Bushing	2173672	34	1	DU-Buchse / Bushing	2148858
16	2	Passfeder / Fitting key	2173673	35	3	DU-Buchse (s. auch Teil Nr. 5) / Bushing (see part no. 5)	2148865
17	1	Zugfedersatz (3 Stück) / Tension spring set (3 pieces)	2173674	36	1	Zylinderstift (E10A00) / Pin	2178549
18	1	Anschlag / Clutch stop	2173678				

Schäfte für Rollkopf E10A01 / Shanks for rolling head E10A01			
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
41	1	Rundschaft 20 mm / Round shank 20 mm	2173683
41	1	Rundschaft 25 mm / Round shank 25 mm	2173684
41	1	Rundschaft 30 mm / Round shank 30 mm	2173685
41	1	Rundschaft 32 mm / Round shank 32 mm	2173686
41	1	Rundschaft 3/4" / Round shank 3/4"	2173687
41	1	Rundschaft 1" / Round shank 1"	2173688
41	1	Rundschaft 1 1/4" / Round shank 1 1/4"	2173689

Zusätzliche Ersatzteile E10A01 / Additional spare parts E10A01			
41	1	Schaft / Shank	siehe Tabelle / see table
42	1	Federgehäuse / Spring housing	2173690
43	1	Innerer Auslösehebel / Internal trip release lever	2173691
44	1	Druckstift / Pressure pin	2178550
48	1	Lagernadel / Needle roller bearings	2148819

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf E13A00
Spare parts for radial type rolling head E13A00



Ersatzteile für Radial-Rollkopf E13A01
Spare parts for radial type rolling head E13A01

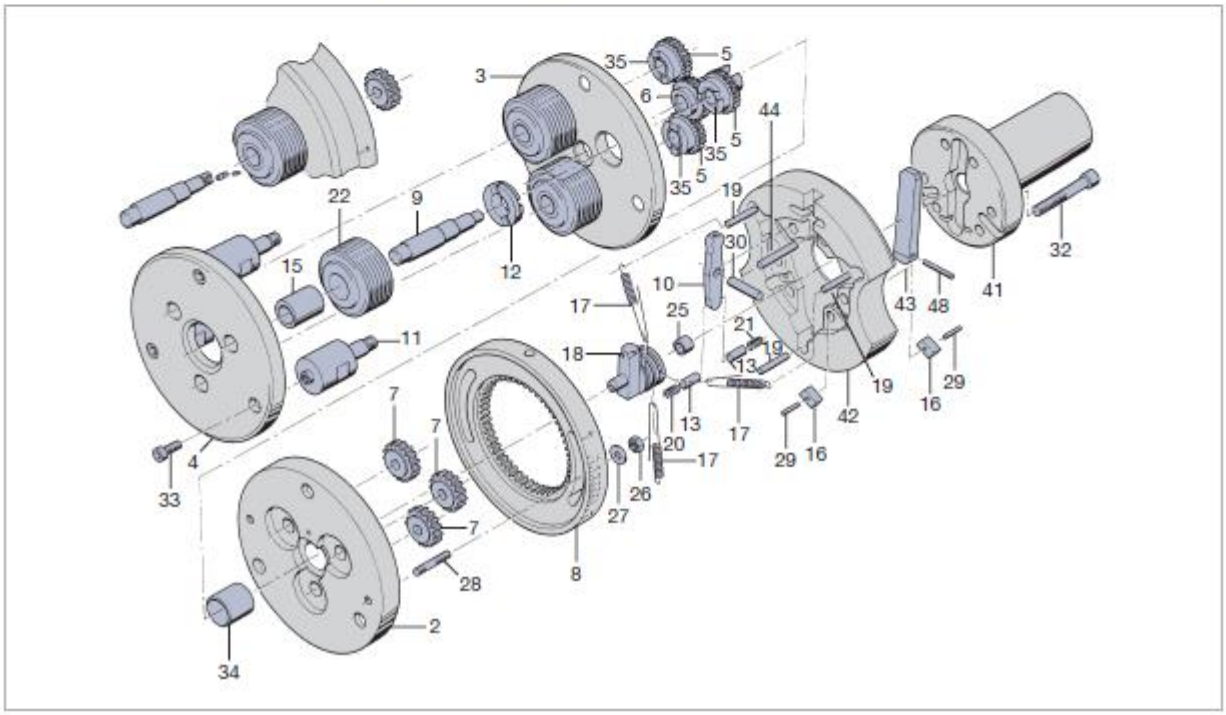


Figure 31: Exploded view, spare parts E13A00 and E13A01

Ersatzteile für Radial-Rollkopf E13A00 und E13A01
Spare parts for radial type rolling head E13A00 and E13A01

Rollkopf / Rolling head			E13A00 E13A01
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
1	1	Flansch (E13A00) / Flange	2173694
2	1	Getriebeplatte / Drive gear plate	2173695
3	1	Deckplatte / Cover plate	2173696
4	1	Frontplatte / Front plate	2173697
5	3	Synchronzahnrad mit DU-Buchse / Synchronized gear with bushing	2173698
6	1	Mittelzahnrad / Centre gear	2173699
7	3	Verstellzahnrad / Adjusting gear	2173700
8	1	Zahnkranz / Gear ring	2173701
9	3	Exzenterbolzen / Eccentric spindles	2173702
10	1	Äußerer Auslösehebel / External trip release lever	2173703
11	3	Distanzbolzen / Spacer pin	2173704
12	3	Mitnehmerscheibe / Drive plate	2173705
13	2	Kupplungsbolzen / Coupling pin	2173671
15	3	Laufbuchse / Bushing	2173706
16	2	Passfeder / Fitting key	2173673
17	1	Zugfedersatz (3 Stück) / Tension spring set (3 pieces)	2173707
18	1	Anschlag / Clutch stop	2173711

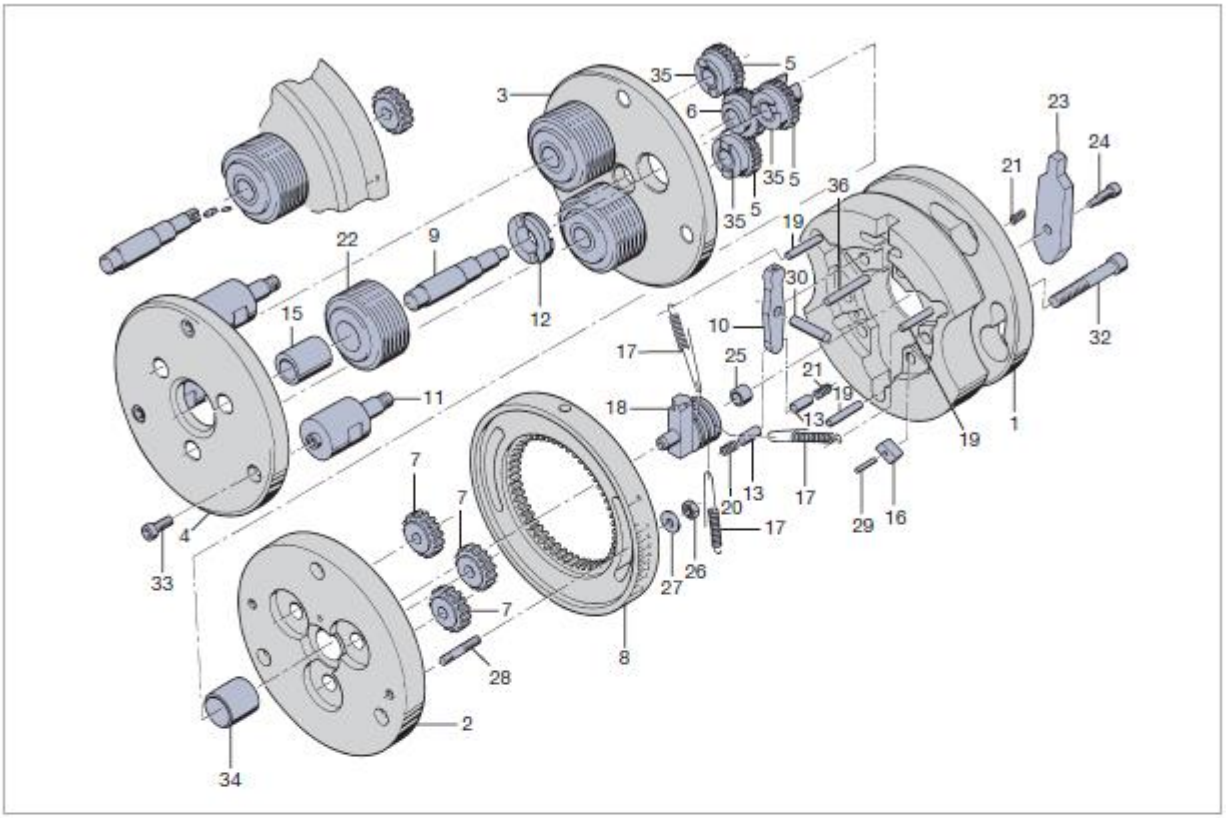
Rollkopf / Rolling head			E13A00 E13A01
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
19	3	Zylinderstift / Pin	2141260
20	1	Druckfeder, stark / Pressure spring, heavy	2173679
21	2	Druckfeder, schwach / Pressure spring, light	2127414
22	3	Rolle / Roll	s. Einzelfall / s. individual
23	1	Innerer Auslösehebel (E13A00) / Internal trip release lever	2173712
24	1	Zylinderschraube (E13A00) / Cap screw	2173713
25	1	DU-Buchse / Bushing	2148851
26	2	Sechskantmutter / Hexagon nut	2142394
27	2	Scheibe / Washer	2173714
28	2	Stiftschraube / Stud	2148841
29	2	Spannhülse / Roll pin	2142576
30	1	Zylinderstift / Pin	2142678
32	6	Zylinderschraube / Cap screw	2148362
33	3	Zylinderschraube / Cap screw	2143007
34	1	DU-Buchse / Bushing	2148856
35	3	DU-Buchse (s. auch Teil Nr. 5) / Bushing (see part no. 5)	2148854
36	1	Zylinderstift (E13A00) / Pin	2178549

Schäfte für Rollkopf E13A01 / Shanks for rolling head E13A01			
Teil Nr. / Part No.	Stück / Qty.	Benennung / Part description	Ident No.
41	1	Rundschaft 30 mm / Round shank 30 mm	2173715
41	1	Rundschaft 40 mm / Round shank 40 mm	2173720
41	1	Rundschaft 1 ¼" / Round shank 1 ¼"	2173721
41	1	Rundschaft 1 ½" / Round shank 1 ½"	2173722

Zusätzliche Ersatzteile E13A01 / Additional spare parts E13A01			
41	1	Schaft / Shank	siehe Tabelle / see table
42	1	Federgehäuse / Spring housing	2173716
43	1	Innerer Auslösehebel / Internal trip release lever	2173717
44	1	Druckstift / Pressure pin	2178550
48	1	Lagernadel / Needle roller bearings	2148869

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf E16A00
Spare parts for radial type rolling head E16A00



Ersatzteile für Radial-Rollkopf E16A01
Spare parts for radial type rolling head E16A01

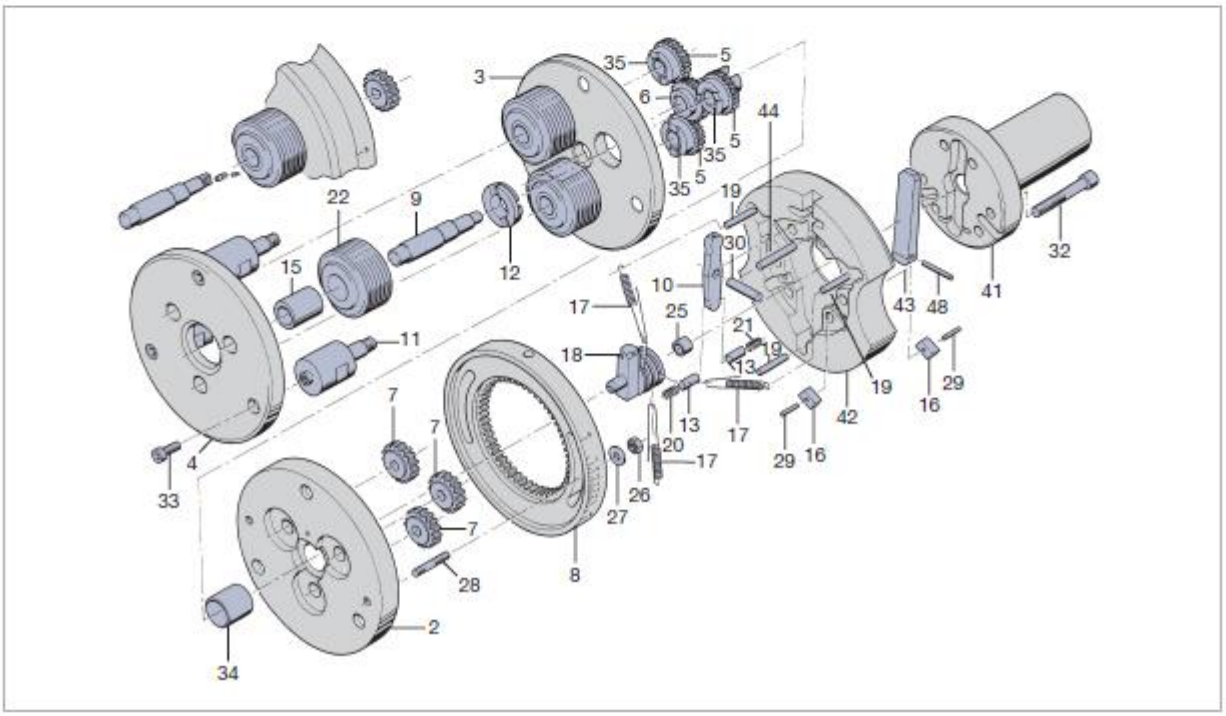


Figure 32: Exploded view, spare parts E16A00 and E16A01

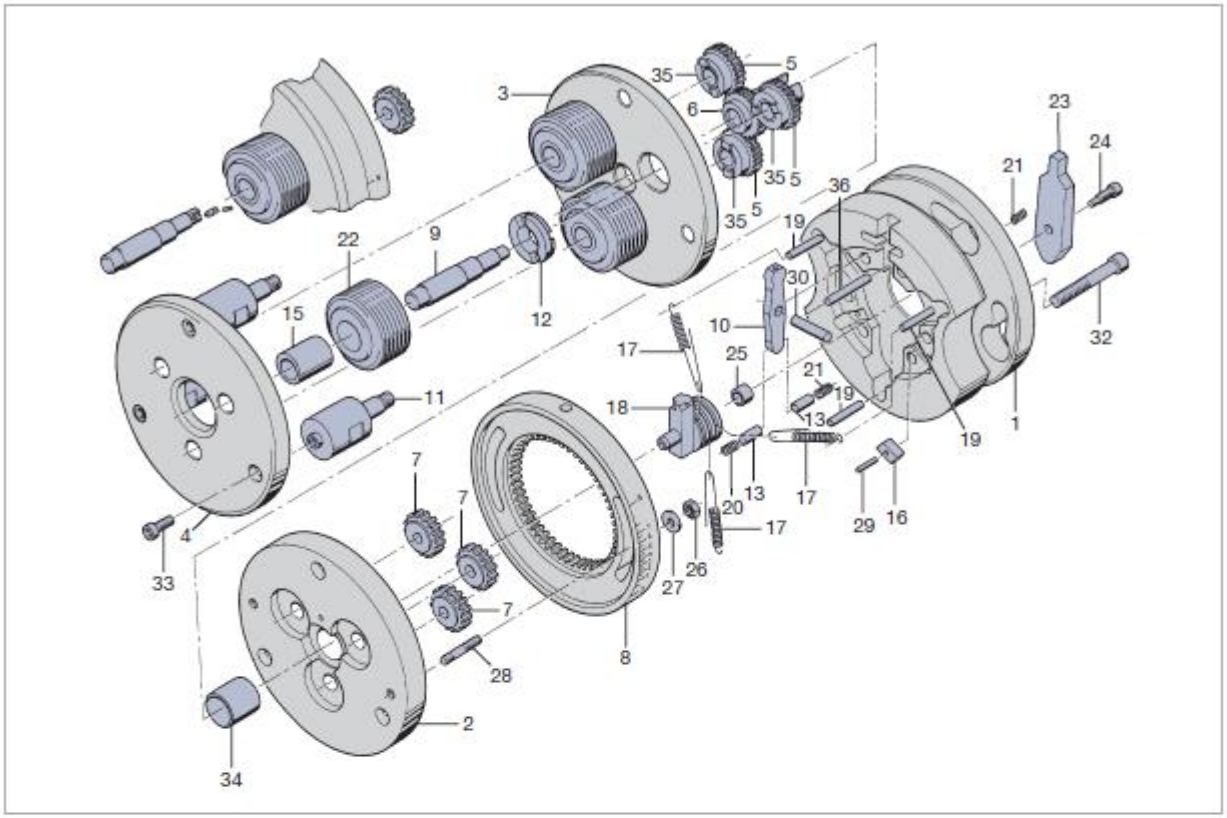
Ersatzteile für Radial-Rollkopf E16A00 und E16A01
Spare parts for radial type rolling head E16A00 and E16A01

Rollkopf Rolling head			E16A00 E16A01	Rollkopf Rolling head			E16A00 E16A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.	Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Flansch (E16A00) Flange	2173729	20	1	Druckfeder, stark Pressure spring, heavy	2173749
2	1	Getriebeplatte Drive gear plate	2173730	21	2	Druckfeder, schwach Pressure spring, light	2127416
3	1	Deckplatte Cover plate	2173731	22	3	Rolle Roll	s. Einzelfall s. individual
4	1	Frontplatte Front plate	2173732	23	1	Innerer Auslösehebel (E16A00) Internal trip release lever	2173750
5	3	Synchronzahnrad mit DU-Buchse Synchronized gear with bushing	2173733	24	1	Zylinderschraube (E16A00) Cap screw	2173751
				25	1	DU-Buchse Bushing	2148865
6	1	Mittelzahnrad Centre gear	2173734	26	2	Sechskantmutter Hexagon nut	2148398
7	3	Verstellzahnrad Adjusting gear	2173735	27	2	Scheibe Washer	2173752
8	1	Zahnkranz Gear ring	2173736	28	2	Stiftschraube Stud	2167020
9	3	Exzenterbolzen Eccentric spindles	2173737	29	2	Spannhülse Roll pin	2142576
10	1	Äußerer Auslösehebel External trip release lever	2173738	30	1	Zylinderstift Pin	2142678
11	3	Distanzbolzen Spacer pin	2173739	32	6	Zylinderschraube Cap screw	2142034
12	3	Mitnehmerscheibe Drive plate	2173740	33	3	Zylinderschraube Cap screw	2143155
13	2	Kupplungsbolzen Coupling pin	2173741	34	1	DU-Buchse Bushing	2148861
15	3	Laufbuchse Bushing	2173742	35	3	DU-Buchse (s. auch Teil Nr. 5) Bushing (see part no. 5)	2148857
16	2	Passfeder Fitting key	2173743	36	1	Druckstift (E16A00) Pressure pin	2178547
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173744	37	3	Passfeder Fitting key	–
18	1	Anschlag Clutch stop	2173748	38	3	Zylinderstift Pin	–
19	3	Zylinderstift Pin	2141261				

Schäfte für Rollkopf E16A01 Shanks for rolling head E16A01				Zusätzliche Ersatzteile E16A01 Additional spare parts E16A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.	41	1	Schaft Shank	siehe Tabelle see table
41	1	Rundschaft 40 mm Round shank 40 mm	2173753	42	1	Federgehäuse Spring housing	2173757
41	1	Rundschaft 50 mm Round shank 50 mm	2173754	43	1	Innerer Auslösehebel Internal trip release lever	2173758
41	1	Rundschaft 1 ½" Round shank 1 ½"	2173755	44	1	Druckstift Pressure pin	2178548
41	1	Rundschaft 2" Round shank 2"	2173756	48	1	Lagernadel Needle roller bearings	2148869

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!

Ersatzteile für Radial-Rollkopf E23A00
Spare parts for radial type rolling head E23A00



Ersatzteile für Radial-Rollkopf E23A01
Spare parts for radial type rolling head E23A01

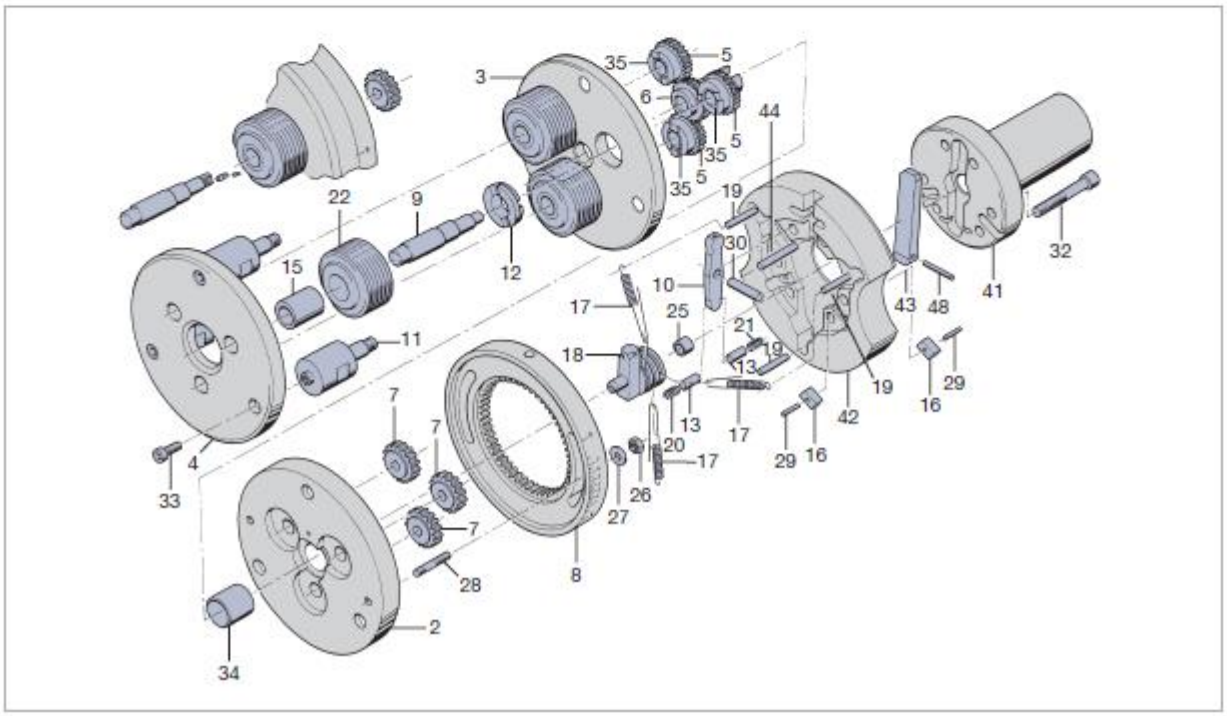


Figure 33: Exploded view, spare parts E23A00 and E23A01

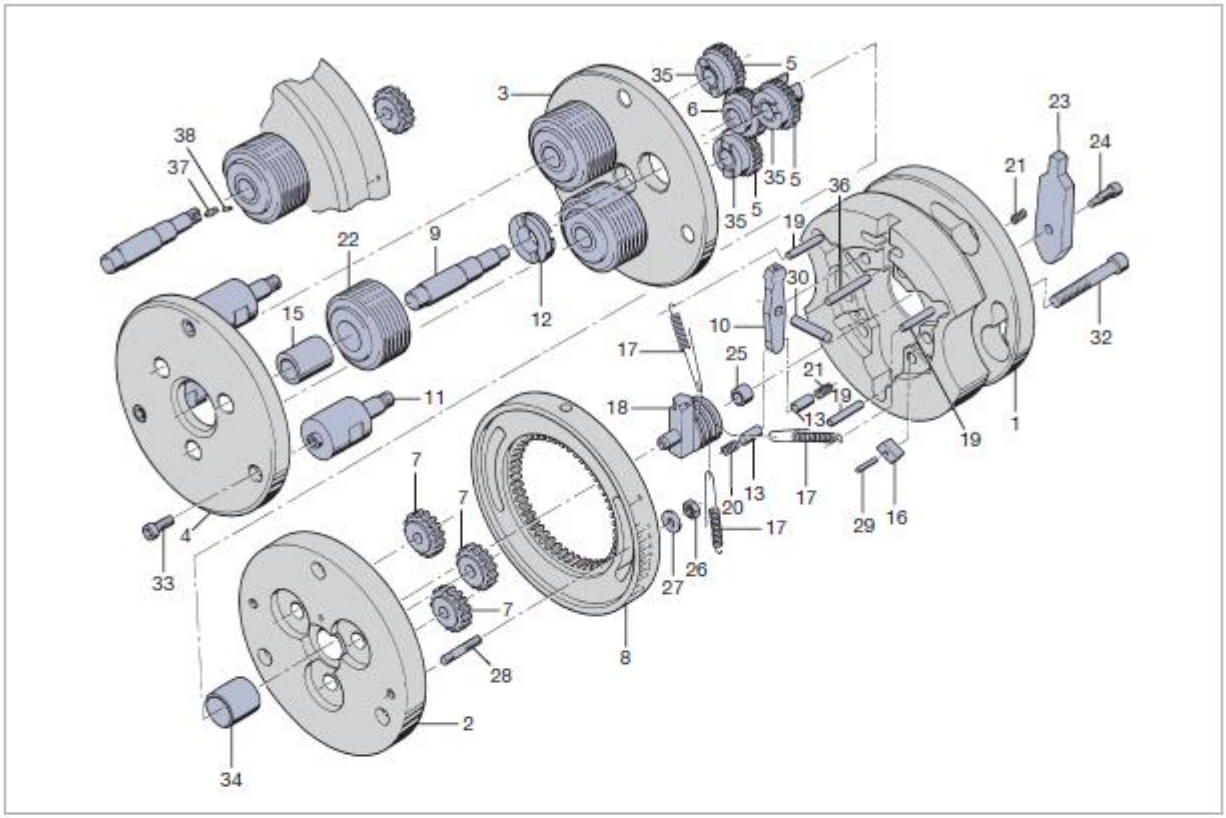
Ersatzteile für Radial-Rollkopf E23A00 und E23A01
Spare parts for radial type rolling head E23A00 and E23A01

Rollkopf Rolling head			E23A00 E23A01	Rollkopf Rolling head			E23A00 E23A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.	Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Flansch (E23A00) Flange	2173761	19	3	Zylinderstift Pin	2141309
2	1	Getriebeplatte Drive gear plate	2173762	20	1	Druckfeder, stark Pressure spring, heavy	2127402
3	1	Deckplatte Cover plate	2173763	21	2	Druckfeder, schwach Pressure spring, light	2127401
4	1	Frontplatte Front plate	2173764	22	3	Rolle Roll	s. Einzelfall s. individual
5	3	Synchronzahnrad mit DU-Buchse Synchronized gear with bushing	2173765	23	1	Innerer Auslösehebel (E23A00) Internal trip release lever	2173781
				24	1	Zylinderschraube (E23A00) Cap screw	2173751
6	1	Mittelzahnrad Centre gear	2173766	25	1	DU-Buchse Bushing	2148865
7	3	Verstellzahnrad Adjusting gear	2173767	26	2	Sechskantmutter Hexagon nut	2148398
8	1	Zahnkranz Gear ring	2173768	27	2	Scheibe Washer	2173752
9	3	Exzenterbolzen Eccentric spindles	2173769	28	2	Stiftschraube Stud	2148839
10	1	Äußerer Auslösehebel External trip release lever	2173770	29	2	Spannhülse Roll pin	2142576
11	3	Distanzbolzen Spacer pin	2173771	30	1	Zylinderstift Pin	2142691
12	3	Mitnehmerscheibe Drive plate	2173772	32	6	Zylinderschraube Cap screw	2142036
13	2	Kupplungsbolzen Coupling pin	2173773	33	3	Zylinderschraube Cap screw	2143017
15	3	Laufbuchse Bushing	2173774	34	1	DU-Buchse Bushing	2148866
16	2	Passfeder Fitting key	2173775	35	3	DU-Buchse (s. auch Teil Nr. 5) Bushing (see part no. 5)	2148862
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173776	36	1	Druckstift (E23A00) Pressure pin	2178546
18	1	Anschlag Clutch stop	2173780				

Schäfte für Rollkopf E23A01 Shanks for rolling head E23A01				Zusätzliche Ersatzteile E23A01 Additional spare parts E23A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.	41	1	Schaft Shank	siehe Tabelle see table
41	1	Rundschaft 50 mm Round shank 50 mm	2173782	42	1	Federgehäuse Spring housing	2173786
41	1	Rundschaft 60 mm Round shank 60 mm	2173783	43	1	Innerer Auslösehebel Internal trip release lever	2173787
41	1	Rundschaft 2" Round shank 2"	2173784	44	1	Druckstift Pressure pin	2178547
41	1	Rundschaft 2 1/2" Round shank 2 1/2"	2173785	48	1	Lagernadel Needle roller bearings	2148869

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!

Ersatzteile für Radial-Rollkopf E30A00
Spare parts for radial type rolling head E30A00



Ersatzteile für Radial-Rollkopf E30A01
Spare parts for radial type rolling head E30A01

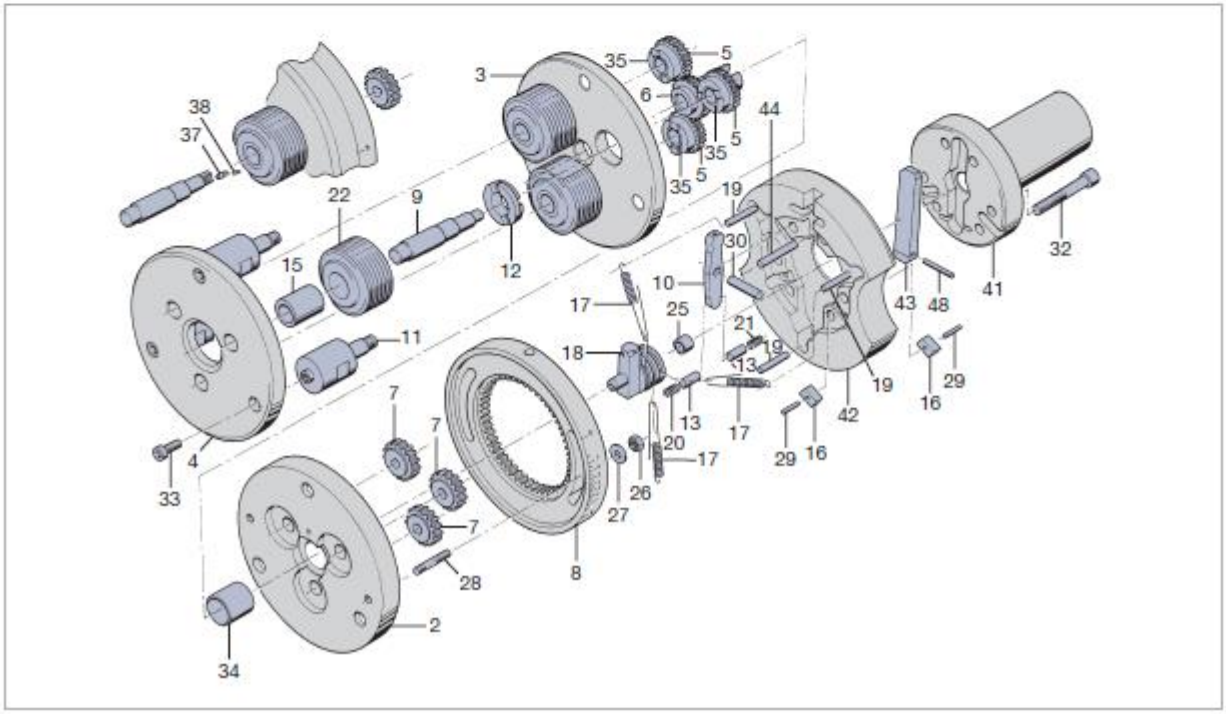


Figure 34: Exploded view, spare parts E30A00 and E30A01

Ersatzteile für Radial-Rollkopf E30A00 und E30A01
Spare parts for radial type rolling head E30A00 and E30A01

Rollkopf Rolling head			E30A00 E30A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Flansch (E30A00) Flange	2173790
2	1	Getriebeplatte Drive gear plate	2173791
3	1	Deckplatte Cover plate	2173792
4	1	Frontplatte Front plate	2173793
5	3	Synchronzahnrad mit DU-Buchse Synchronized gear with bushing	2173794
6	1	Mittelzahnrad Centre gear	2173795
7	3	Verstellzahnrad Adjusting gear	2173796
8	1	Zahnkranz Gear ring	2173797
9	3	Exzenterbolzen Eccentric spindles	2173798
10	1	Äußerer Auslösehebel External trip release lever	2173799
11	3	Distanzbolzen Spacer pin	2173800
12	3	Mitnehmerscheibe Drive plate	2173801
13	2	Kupplungsbolzen Coupling pin	2173802
15	3	Laufbuchse Bushing	2173803
16	2	Passfeder Fitting key	2173804
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173805
18	1	Anschlag Clutch stop	2173809
19	3	Zylinderstift Pin	2141308

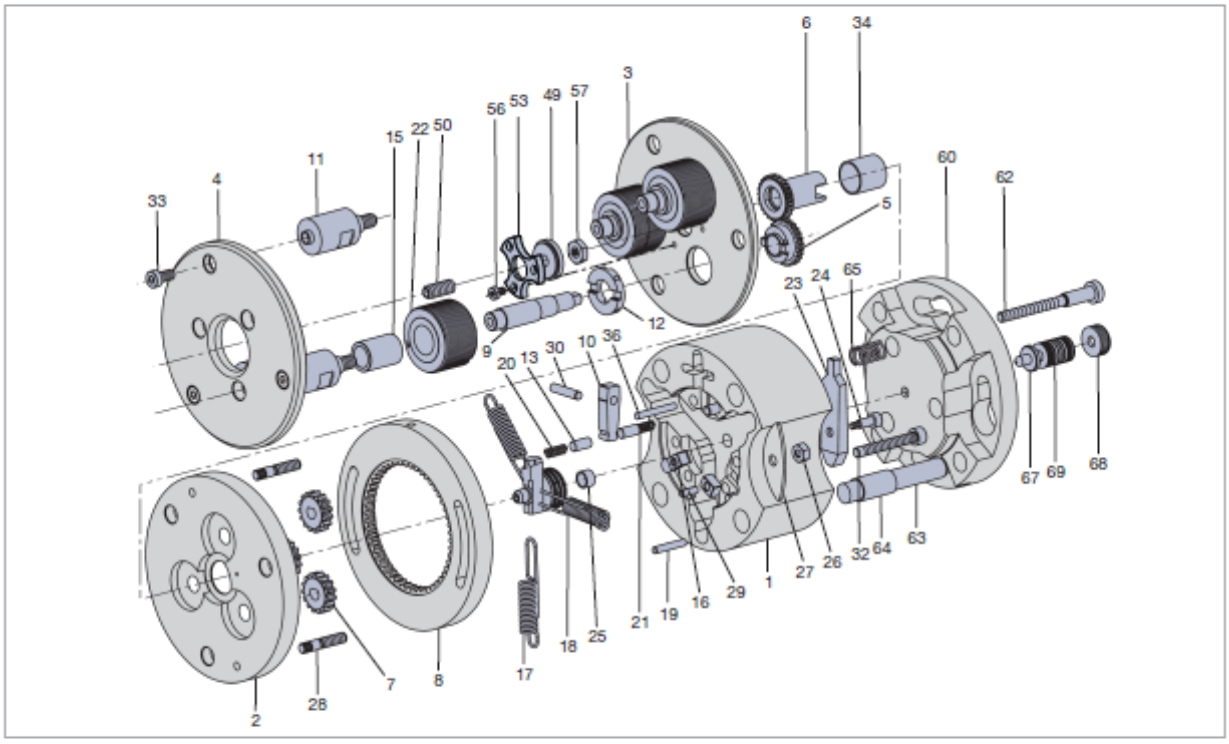
Rollkopf Rolling head			E30A00 E30A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
20	1	Druckfeder, stark Pressure spring, heavy	2173810
21	1	Druckfeder, schwach Pressure spring, light	2127398
22	3	Rolle Roll	s. Einzelfall s. individual
23	1	Innerer Auslösehebel (E30A00) Internal trip release lever	2173811
24	1	Zylinderschraube (E30A00) Cap screw	2173751
25	1	DU-Buchse Bushing	2148865
26	2	Sechskantmutter Hexagon nut	2148399
27	2	Scheibe Washer	2173812
28	2	Stiftschraube Stud	2148827
29	2	Spannhülse Roll pin	2148848
30	1	Zylinderstift Pin	2142691
32	6	Zylinderschraube Cap screw	2142052
33	3	Zylinderschraube Cap screw	2143053
34	1	DU-Buchse Bushing	2148863
35	3	DU-Buchse (s. auch Teil Nr. 5) Bushing (see part no. 5)	2148860
36	1	Druckstift Pressure pin	2148812
37	3	Passfeder Fitting key	2165595
38	3	Zylinderstift Pin	2141237

Schäfte für Rollkopf E30A01 Shanks for rolling head E30A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
41	1	Rundschaft 80 mm Round shank 80 mm	2173813
41	1	Rundschaft 3" Round shank 3"	2173814

Zusätzliche Ersatzteile E30A01 Additional spare parts E30A01			
32	6	Zylinderschraube Cap screw	2141974
41	1	Schaft Shank	siehe Tabelle see table
42	1	Federgehäuse Spring housing	2173815
43	1	Innerer Auslösehebel Internal trip release lever	2173816
44	1	Druckstift Pressure pin	2148812
48	1	Lagernadel Needle roller bearings	2142678

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!

Ersatzteile für Radial-Rollkopf EW10A00
Spare parts for radial type rolling head EW10A00



Ersatzteile für Radial-Rollkopf EW10A01
Spare parts for radial type rolling head EW10A01

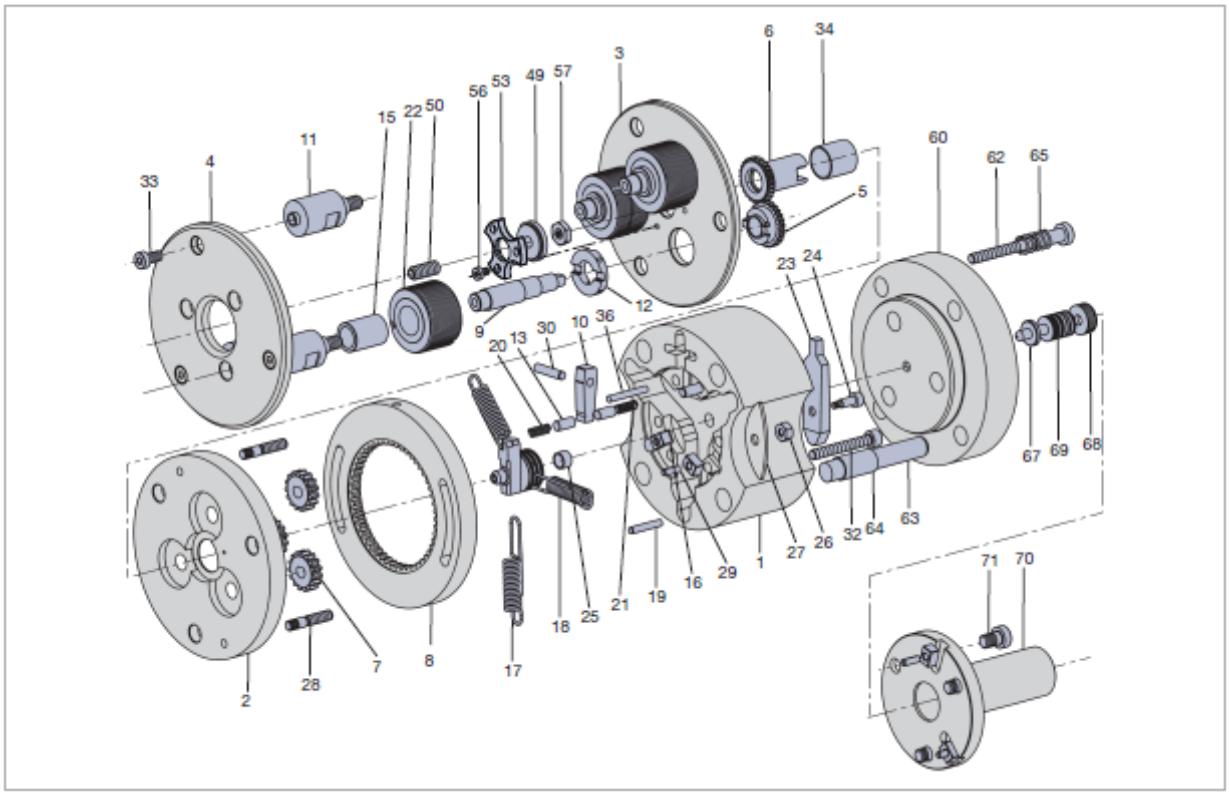


Figure 35: Exploded view, spare parts EW10A00 and EW10A01

Ersatzteile für Radial-Rollkopf EW10A00 und EW10A01
Spare parts for radial type rolling head EW10A00 and EW10A01

Rollkopf Rolling head			EW10A00 EW10A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Federgehäuse Spring housing	2173027
2	1	Getriebeplatte Drive gear plate	2173660
3	1	Deckplatte Cover plate	2173190
4	1	Frontplatte Front plate	2173662
5	3	Synchronzahnrad m. DU-Buchse Synchronized gear with bushing	2173663
6	1	Mittelzahnrad Centre gear	2178068
7	3	Verstellzahnrad Adjusting gear	2173665
8	1	Zahnkranz Gear ring	2173666
9	3	Exzenterbolzen Eccentric spindles	2173667
10	1	Äußerer Auslösehebel External trip release lever	2173196
11	3	Distanzbolzen Spacer pin	2173669
12	3	Mitnehmerscheibe Drive plate	2173670
13	2	Kupplungsbolzen Coupling pin	2173671
15	3	Laufbuchse Bushing	2173672
16	2	Passfeder Fitting key	2173673
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173674
18	1	Anschlag Clutch stop	2173678
19	3	Zylinderstift Pin	2141260
20	1	Druckfeder, stark Pressure spring, heavy	2173679
21	1	Druckfeder, schwach Pressure spring, light	2127414
22	3	Rolle Roll	s. Einzelfall s. individual
23	1	Innerer Auslösehebel Internal trip release lever	2173680
24	1	Zylinderschraube Cap screw	2173681
25	1	DU-Buchse Bushing	2148851

Rollkopf Rolling head			EW10A00 EW10A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
26	2	Sechskantmutter Hexagon nut	2142394
27	2	Scheibe Washer	2173682
28	2	Stiftschraube Stud	2148824
29	4	Spannhülse Roll pin	2142576
30	1	Zylinderstift Pin	2142678
32	3	Zylinderschraube Cap screw	2148362
33	3	Zylinderschraube Cap screw	2142992
34	1	DU-Buchse Bushing	2148858
36	1	Druckstift Pressure pin	2178549
49	1	Anschlagbuchse Bushing	2173191
50	1	Kugeldruckschraube Ball screw	2173026
51	1	Laufbuchse[1] (EW10A00) Bushing	2173192
53	1	Haltering Holding ring	2173179
56	3	Zylinderschraube Cap screw	2173025
57	1	Kontermutter Counter nut	2141675
60	1	Mitnehmer (EW10A00) Tappet	2173112
62	3	Distanzschraube Distance screw	2173028
63	4	Zylinderstift Pin	2142735
64	12	DU-Buchse Bushing	2173032
65	3	Druckfeder Pressure spring	2173033
67	1	Druckbolzen Bolt	2173031
68	1	Spannschraube Clambing screw	2170869
69	21	Tellerfeder Spring	2170870

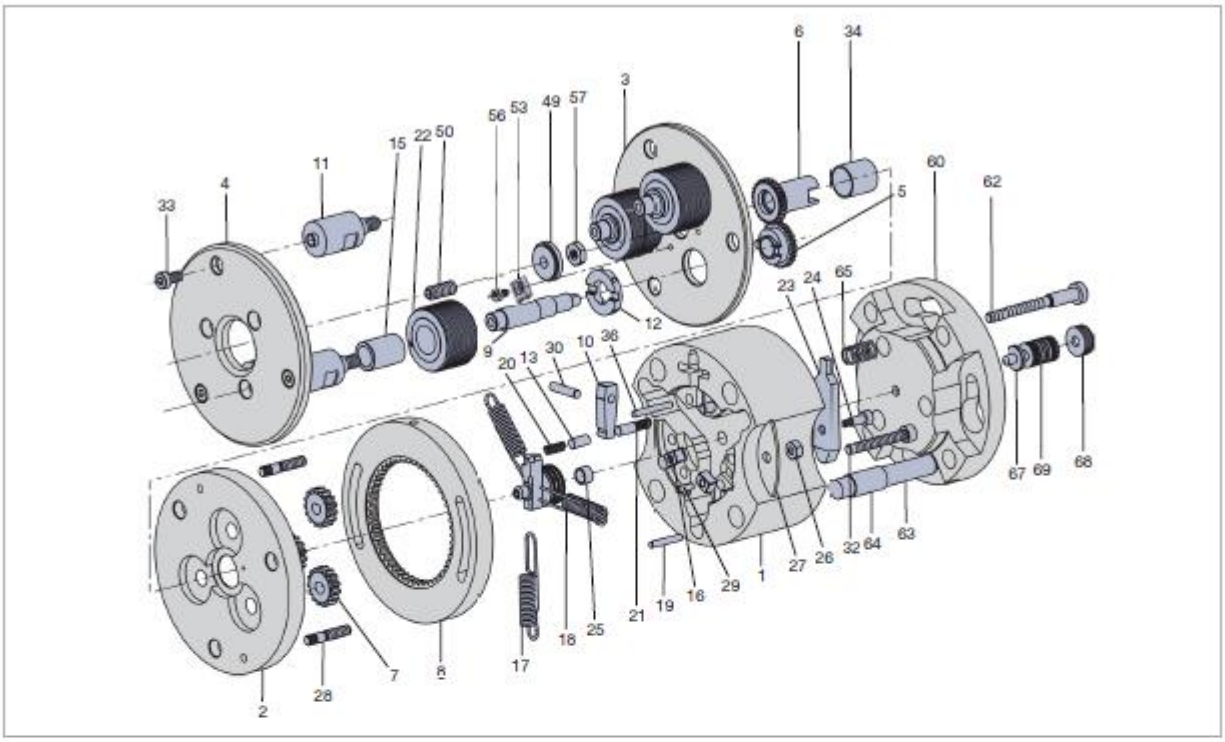
Schäfte für Rollkopf EW10A01 Shanks for rolling head EW10A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
70	1	Rundschaft 20 mm Round shank 20 mm	2171734
70	1	Rundschaft 25 mm Round shank 25 mm	2173030
70	1	Rundschaft 30 mm Round shank 30 mm	2173036
70	1	Rundschaft 3/4" Round shank 3/4"	2171507
70	1	Rundschaft 1" Round shank 1"	2172585
70	1	Rundschaft 1 1/4" Round shank 1 1/4"	2173139

Zusätzliche Ersatzteile EW10A01 Additional spare parts EW10A01			
51	1	Laufbuchse[1] Bushing	2173193
60	1	Mitnehmer Tappet	2173029
70	1	Schaft Shank	siehe Tabelle see table
71	3	Zylinderschraube Cap screw	2143015

[1] Nicht dargestellt Not shown in the sketch

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf EW13A00
Spare parts for radial type rolling head EW13A00



Ersatzteile für Radial-Rollkopf EW13A01
Spare parts for radial type rolling head EW13A01

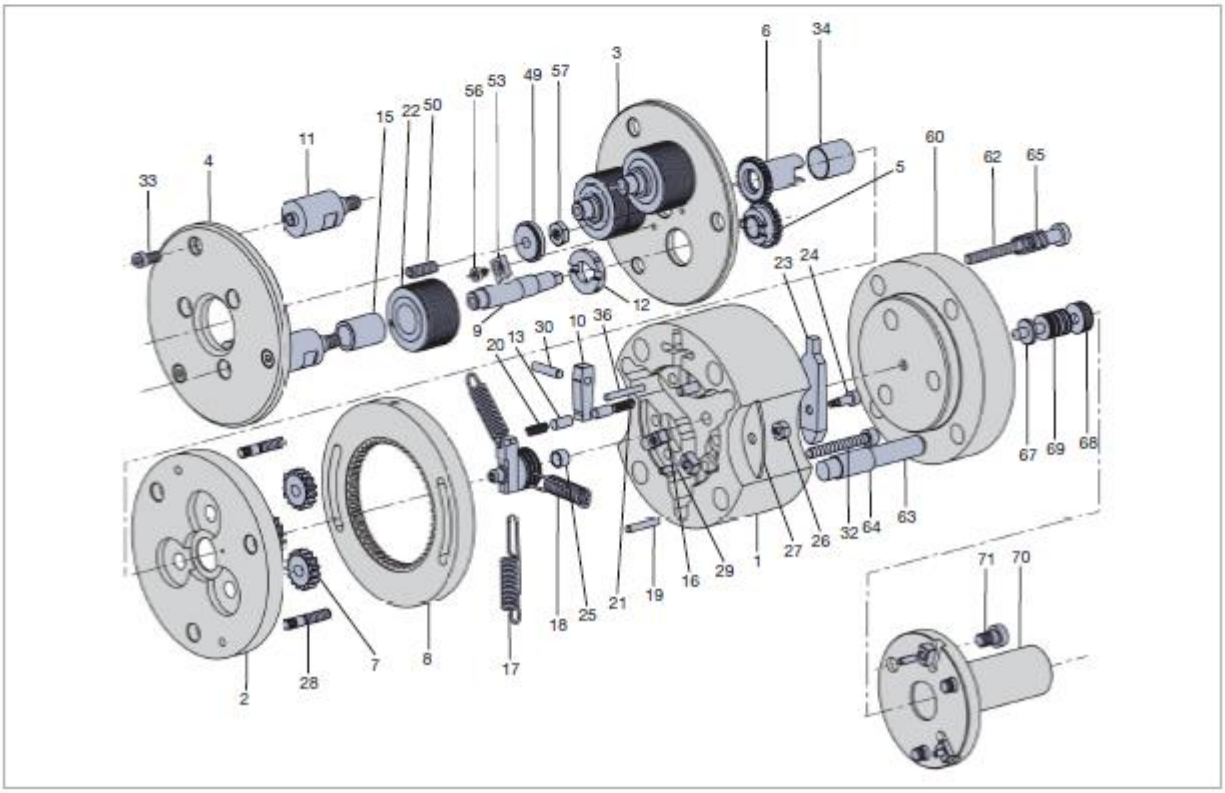


Figure 36: Exploded view, spare parts EW13A00 and EW13A01

Ersatzteile für Radial-Rollkopf EW13A00 und EW13A01
Spare parts for radial type rolling head EW13A00 and EW13A01

Rollkopf Rolling head			EW13A00 EW13A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Federgehäuse Spring housing	2173062
2	1	Getriebeplatte Drive gear plate	2173695
3	1	Deckplatte Cover plate	2173059
4	1	Frontplatte Front plate	2173697
5	3	Synchronzahnrad m. DU-Buchse Synchronized gear with bushing	2173698
6	1	Mittelzahnrad Centre gear	2173060
7	3	Verstellzahnrad Adjusting gear	2173700
8	1	Zahnkranz Gear ring	2173701
9	3	Exzenterbolzen Eccentric spindles	2173702
10	1	Äußerer Auslösehebel External trip release lever	2173215
11	3	Distanzbolzen Spacer pin	2173704
12	3	Mitnehmerscheibe Drive plate	2173705
13	2	Kupplungsbolzen Coupling pin	2173671
15	3	Laufbuchse Bushing	2173706
16	2	Passfeder Fitting key	2173673
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173707
18	1	Anschlag Clutch stop	2173711
19	3	Zylinderstift Pin	2141260
20	1	Druckfeder, stark Pressure spring, heavy	2173679
21	1	Druckfeder, schwach Pressure spring, light	2127414
22	3	Rolle Roll	s. Einzelfall s. individual
23	1	Innerer Auslösehebel Internal trip release lever	2173712
24	1	Zylinderschraube Cap screw	2173713
25	1	DU-Buchse Bushing	2148851

Rollkopf Rolling head			EW13A00 EW13A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
26	2	Sechskantmutter Hexagon nut	2142394
27	2	Scheibe Washer	2173714
28	2	Stiftschraube Stud	2148841
29	4	Spannhülse Roll pin	2142576
30	1	Zylinderstift Pin	2142678
32	3	Zylinderschraube Cap screw	2148362
33	3	Zylinderschraube Cap screw	2143007
34	1	DU-Buchse Bushing	2148856
36	1	Druckstift Pressure pin	2178549
49	1	Anschlagbuchse Bushing	2173057
50	1	Kugeldruckschraube Ball screw	2173055
51	1	Kugeldruckschraube[1] Ball screw	2173056
53	1	Halteleiste Fillet	2173058
56	1	Zylinderschraube Cap screw	2142990
57	1	Kontermutter Counter nut	2141676
60	1	Mitnehmer (EW13A00) Tappet	2173111
62	3	Distanzschraube Distance screw	2173028
63	4	Zylinderstift Pin	2170616
64	8	DU-Buchse Bushing	2170621
65	3	Druckfeder Pressure spring	2173033
67	1	Druckbolzen Bolt	2173065
68	1	Spannschraube Clambing screw	2173066
69	16	Tellerfeder Spring	2173067

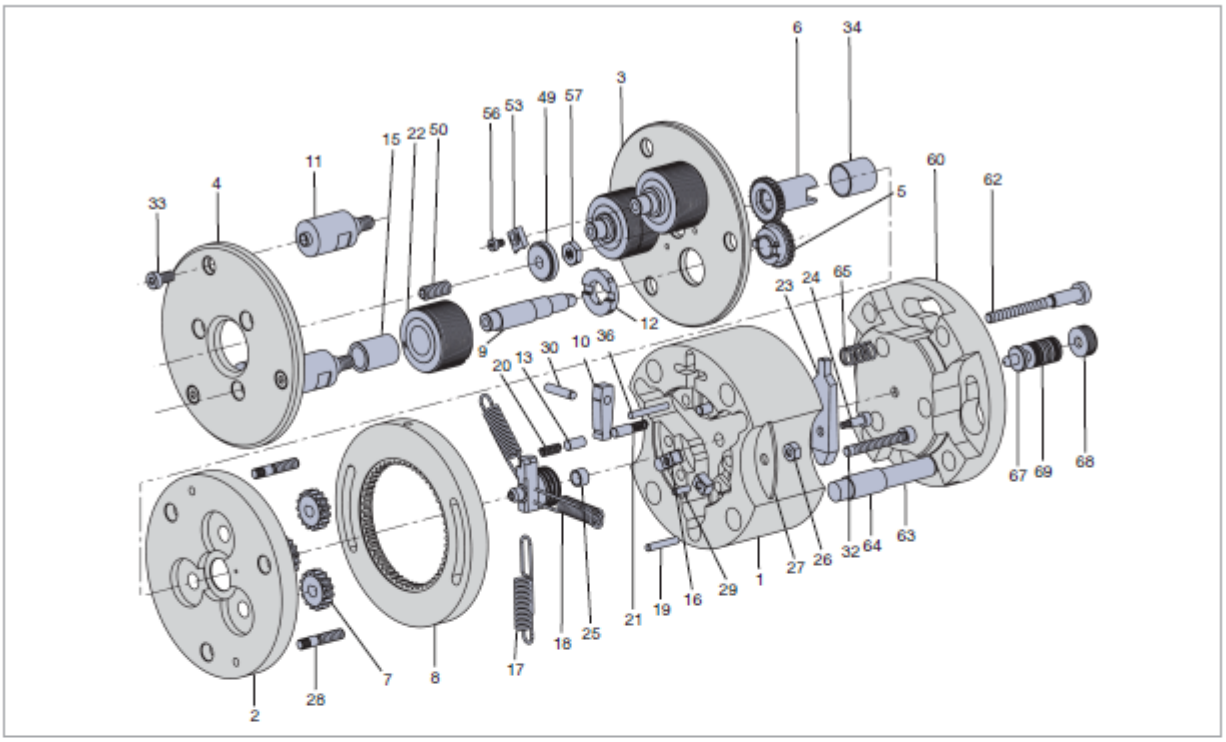
Schäfte für Rollkopf EW13A01 Shanks for rolling head EW13A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
70	1	Rundschaft 25 mm Round shank 25 mm	2171914
70	1	Rundschaft 30 mm Round shank 30 mm	2173116
70	1	Rundschaft 40 mm Round shank 40 mm	2408102
70	1	Rundschaft 1" Round shank 1"	2408897
70	1	Rundschaft 1 1/4" Round shank 1 1/4"	2173141
70	1	Rundschaft 1 1/2" Round shank 1 1/2"	2408777

Zusätzliche Ersatzteile EW13A01 Additional spare parts EW13A01			
60	1	Mitnehmer Tappet	2173063
70	1	Schaft Shank	siehe Tabelle see table
71	3	Zylinderschraube Cap screw	2143015

[1] Nicht dargestellt Not shown in the sketch

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf EW16A00
Spare parts for radial type rolling head EW16A00



Ersatzteile für Radial-Rollkopf EW16A01
Spare parts for radial type rolling head EW16A01

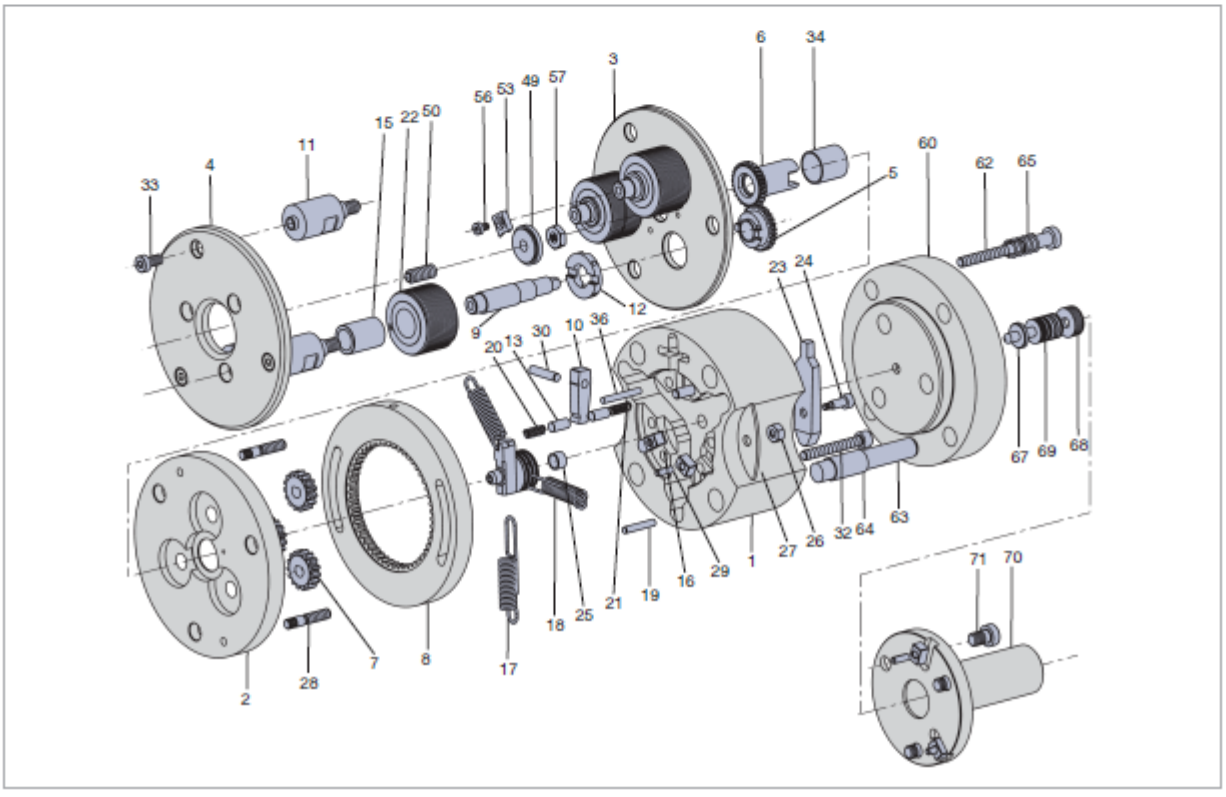


Figure 37: Exploded view, spare parts EW16A00 and EW16A01

Ersatzteile für Radial-Rollkopf EW16A00 und EW16A01
Spare parts for radial type rolling head EW16A00 and EW16A01

Rollkopf Rolling head			EW16A00 EW16A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Federgehäuse Spring housing	2170611
2	1	Getriebeplatte Drive gear plate	2173730
3	1	Deckplatte Cover plate	2173731
4	1	Frontplatte Front plate	2173732
5	3	Synchronzahnrad m. DU-Buchse Synchronized gear with bushing	2173733
6	1	Mittelzahnrad Centre gear	2173734
7	3	Verstellzahnrad Adjusting gear	2173735
8	1	Zahnkranz Gear ring	2173736
9	3	Exzenterbolzen Eccentric spindles	2173737
10	1	Äußerer Auslösehebel External trip release lever	2173213
11	3	Distanzbolzen Spacer pin	2173739
12	3	Mitnehmerscheibe Drive plate	2173740
13	2	Kupplungsbolzen Coupling pin	2173741
15	3	Laufbuchse Bushing	2173742
16	2	Passfeder Fitting key	2173743
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173744
18	1	Anschlag Clutch stop	2173748
19	3	Zylinderstift Pin	2141261
20	1	Druckfeder, stark Pressure spring, heavy	2173749
21	1	Druckfeder, schwach Pressure spring, light	2127416
22	3	Rolle Roll	s. Einzelfall s. individual
23	1	Innerer Auslösehebel Internal trip release lever	2173750
24	1	Zylinderschraube Cap screw	2170620
25	1	DU-Buchse Bushing	2148865

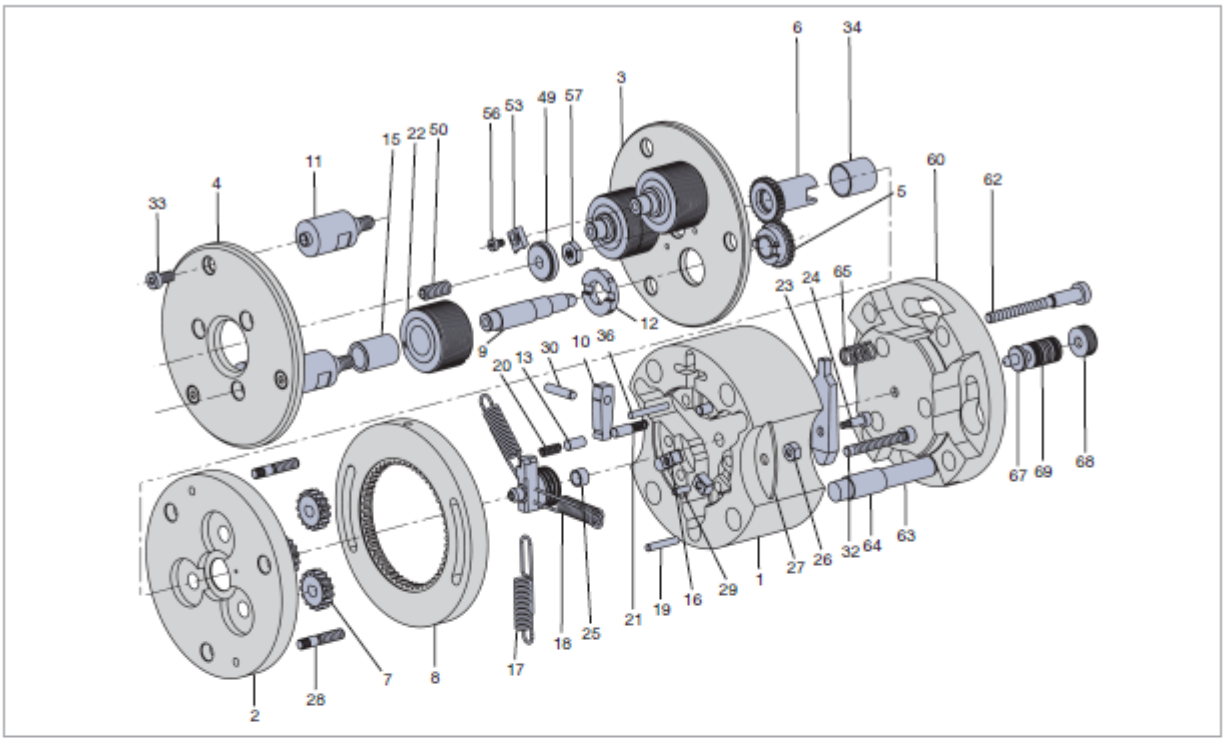
Rollkopf Rolling head			EW16A00 EW16A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
26	2	Sechskantmutter Hexagon nut	2148398
27	2	Scheibe Washer	2173752
28	2	Stiftschraube Stud	2167020
29	4	Spannhülse Roll pin	2142576
30	1	Zylinderstift Pin	2142678
32	3	Zylinderschraube Cap screw	2141932
33	3	Zylinderschraube Cap screw	2143155
34	1	DU-Buchse Bushing	2148861
36	1	Druckstift Pressure pin	2178548
49	1	Anschlagbuchse Bushing	2170473
50	1	Kugeldruckschraube Ball screw	2173020
53	1	Halteleiste Fillet	2170957
56	1	Senkschraube Countersunk screw	2143245
57	1	Kontermutter Counter nut	2170958
60	1	Mitnehmer (EW16A00) Tappet	2170658
61	1	Druckplatte Pressure plate	2170614
62	3	Distanzschraube Distance screw	2170615
63	4	Zylinderstift Pin	2170616
64	8	DU-Buchse Bushing	2170621
65	3	Druckfeder Pressure spring	2170623
67	1	Druckbolzen Bolt	2170617
68	1	Spannschraube Clambing screw	2170618
69	18	Tellerfeder Spring	2170622

Schäfte für Rollkopf EW16A01 Shanks for rolling head EW16A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
70	1	Rundschaft 25 mm Round shank 25 mm	2407333
70	1	Rundschaft 30 mm Round shank 30 mm	2408889
70	1	Rundschaft 40 mm Round shank 40 mm	2170982
70	1	Rundschaft 50 mm Round shank 50 mm	2170981
70	1	Rundschaft 1 ¼" Round shank 1 ¼"	2408361
70	1	Rundschaft 1 ½" Round shank 1 ½"	2408891

Zusätzliche Ersatzteile EW16A01 Additional spare parts EW16A01			
60	1	Mitnehmer Tappet	2170613
70	1	Schaft Shank	siehe Tabelle see table
71	3	Zylinderschraube Cap screw	2143015

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

Ersatzteile für Radial-Rollkopf EW23A00
Spare parts for radial type rolling head EW23A00



Ersatzteile für Radial-Rollkopf EW23A01
Spare parts for radial type rolling head EW23A01

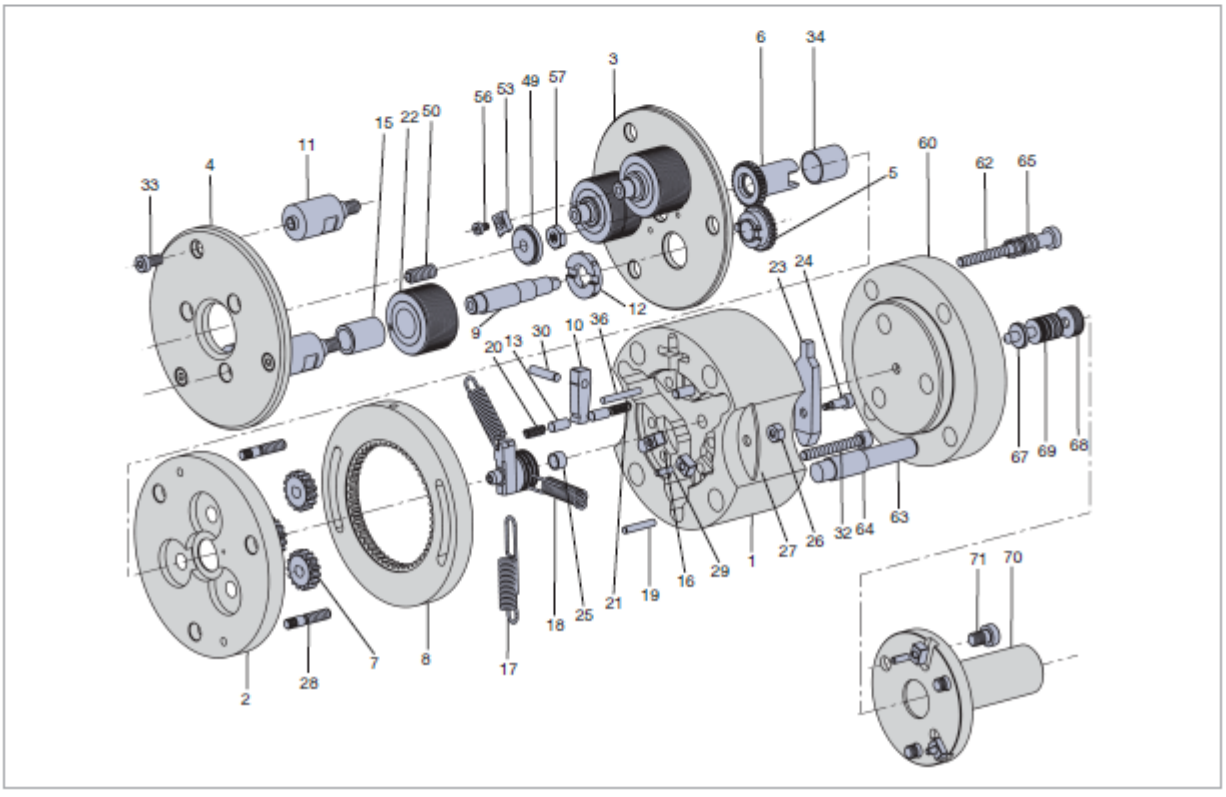


Figure 38: Exploded view, spare parts EW23A00 and EW23A01

Ersatzteile für Radial-Rollkopf EW23A00 und EW23A01
Spare parts for radial type rolling head EW23A00 and EW23A01

Rollkopf Rolling head			EW23A00 EW23A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
1	1	Federgehäuse Spring housing	2173091
2	1	Getriebeplatte Drive gear plate	2173762
3	1	Deckplatte Cover plate	2173086
4	1	Frontplatte Front plate	2173764
5	3	Synchronzahnrad m. DU-Buchse Synchronized gear with bushing	2173765
6	1	Mittelzahnrad Centre gear	2173766
7	3	Verstellzahnrad Adjusting gear	2173767
8	1	Zahnkranz Gear ring	2173768
9	3	Exzenterbolzen Eccentric spindles	2173769
10	1	Äußerer Auslösehebel External trip release lever	2173214
11	3	Distanzbolzen Spacer pin	2173771
12	3	Mitnehmerscheibe Drive plate	2173772
13	2	Kupplungsbolzen Coupling pin	2173773
15	3	Laufbuchse Bushing	2173774
16	2	Passfeder Fitting key	2173775
17	1	Zugfedersatz (3 Stück) Tension spring set (3 pieces)	2173776
18	1	Anschlag Clutch stop	2173780
19	3	Zylinderstift Pin	2141309
20	1	Druckfeder, stark Pressure spring, heavy	2127402
21	1	Druckfeder, schwach Pressure spring, light	2127401
22	3	Rolle Roll	s. Einzelfall s. individual
23	1	Innerer Auslösehebel Internal trip release lever	2173781
24	1	Zylinderschraube Cap screw	2173751

Rollkopf Rolling head			EW23A00 EW23A01
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
25	1	DU-Buchse Bushing	2148865
26	2	Sechskantmutter Hexagon nut	2148398
27	2	Scheibe Washer	2173752
28	2	Stiftschraube Stud	2148839
29	4	Spannhülse Roll pin	2142576
30	1	Zylinderstift Pin	2142691
32	3	Zylinderschraube Cap screw	2142035
33	3	Zylinderschraube Cap screw	2143017
34	1	DU-Buchse Bushing	2148866
36	1	Druckstift Pressure pin	2173102
49	1	Anschlagbuchse Bushing	2173088
50	1	Kugeldruckschraube Ball screw	2173085
53	1	Halteleiste Fillet	2173089
56	1	Zylinderschraube Cap screw	2141882
57	1	Kontermutter Counter nut	2142398
60	1	Mitnehmer (EW23A00) Tappet	2173143
62	3	Distanzschraube Distance screw	2173093
63	4	Zylinderstift Pin	2173094
64	12	DU-Buchse Bushing	2148856
65	3	Druckfeder Pressure spring	2173096
67	1	Druckbolzen Bolt	2173097
68	1	Spannschraube Clambing screw	2173098
69	8	Tellerfeder Spring	2173099

Schäfte für Rollkopf EW23A01 Shanks for rolling head EW23A01			
Teil Nr. Part No.	Stück Qty.	Benennung Part description	Ident No.
70	1	Rundschaft 40 mm Round shank 40 mm	2173142
70	1	Rundschaft 50 mm Round shank 50 mm	2172324
70	1	Rundschaft 1 ½" Round shank 1 ½"	2408893
70	1	Rundschaft 2" Round shank 2"	2408895

Zusätzliche Ersatzteile EW23A01 Additional spare parts EW23A01			
60	1	Mitnehmer Tappet	2173092
70	1	Schaft Shank	siehe Tabelle see table
71	3	Zylinderschraube Cap screw	2143015

Bei Bestellung von Rollköpfen, Ersatzteilen und Rollen gleicher, bereits gelieferter Ausführungen, unbedingt aufsignierte Bezeichnung, Teil Nr. und Ident No. angeben!
Important! When ordering rolling head spare parts and rolls identical to those already supplied, it is essential to give the type, size, Part No. and Ident No.

8. Maintenance

Maintenance

Daily:

Check all components oft he *rollings system* for wear and damage.

Weekly:

1. Follow the instructions in chapter 6.
2. Follow the instructions in chapter 4.

Maintenance when replacing the roll set

1. Follow instructions in chapter 6.
2. Follow instructions in chapter 4.

Maintenance intervals

Be sure do adhere to the maintenance intervals listed in table 11. If the *rolling system* is used under more difficult conditions, the cleaning and maintenance intervals must be shorter.

Interval	Activity	Desricption
Weekly (preferable daily)	Machine operator	- Check the rolls for wear or other damages. - Clean the rolls from chips.
Weekly	Machine setter	- Lubricate the rolls and the roll axis with molybdenumsulfide (e.g. Molykote).

Table 6: Cleaning and maintenance intervals

9. Storage

NOTE

The storage state is the condition upon delivery.

4. Follow the instruction in Chapter 6.
5. Conserve the *rolling system*.
6. Store the *rolling system*.

Storage temperature: –10 °C maximal +30 °C
Relative humidity: < 60 %

10. Disposal

NOTE

Dispose the *rolling system* with harmful coatings such as oils and fats properly. Improper disposal of the used materials is harmful to the environment. When you dispose materials, comply with national and local regulations.

Ensure that all national and local safety requirements are met:

- After discarding the rolling head, sorted disposal must be performed.
- Seperate iron, non-ferrous metals, etc.

Grease, oils and objects and lines which are soiled with grease or oil must be disposed separately.

11. Troubleshooting

NOTE

Perform a visual and functional inspection prior to each troubleshooting.

	Fault	Cause	Solution
1	Thread pitch and outer-Ø too big	Blank-Ø too big	accurate pre-machining of blank diameter (chapter 5.1)
2	Thread pitch and outer-Ø too small	Blank-Ø too small	accurate pre-machining of blank diameter (chapter 5.1)
3	Threa pitch-Ø too bigl and outer-Ø within tolerance	Blank-Ø too big	Reduce blank-Ø and reduce the axis distance of the rolling head
4	Flanken-Ø des Gewindes zu small, Außen-Ø im Toleranzbereich	Blank-Ø too small	increase the axis distance of the rolling head
5	Pitch-Ø within tolerance and Outer-Ø too big	Axis distance to narrow or blank-Ø too big	Increase the axis distance of the rolling head or Reduce the blank-Ø
6	Pitch-Ø within tolerance and Outer-Ø too small	Blank-Ø too small	accurate pre-machining of blank diameter (chapter 5.1) Increase the blank-Ø
7	Profile not smooth	a) non-circular blank b) material with bad rollability c) overpressure	a) circular pre machining b) choose different material c) reduce blank-Ø
8	Damaged threads, marks on the workpiece	a) Rolls from different dimdenions are mixed b) Rolls are wrong assembled c) rolling speed too high d) Rolling head not coincide with workpiece e) Dwell time too short	a) Check roll code labled on the rolls b) Insert the rolls according to chapter 4.2 c) recommended rolling speed 20-30 m/min. d) Reset the rolling head position e) set the dwell time depending on the rolling time

Table 7: Troubleshooting

Digital Version vom 25.02.2021

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