driven by technology

EN

Translation of the original operating manual
Power Chuck DURO-A

Store for reference

Version 1.3 • 21.01.2020

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1 About this Operating Manual

This operating manual describes in detail the use, installation, assembly and maintenance of the power chuck DURO-A. The efficiency of the power chuck depends primarily on correct use and careful maintenance. This operating manual serves as the leading document and is provided on delivery of the product. The personnel must have carefully read and understood the operating manual before beginning any work. Observance of all safety instructions and instructions for use in this operating manual is the basic prerequisite for safe work with the power chuck. In addition to the regulations listed here, the local and user-related operating instructions and the professional accident prevention regulations are to be observed.

1.1 Manufacturer Details

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1.2 Copyright

1.3 Warranty and Liability

Standard warranty 1 year or 500,000 clamping cycles

The warranty period begins with delivery of the goods. The pre-condition for the warranty is full payment of the purchase price. The operating manual is to be taken into account in all stages of life of the product.

- Observe transport and storage conditions.
- Observe commissioning instructions.
- Observe maintenance and cleaning instructions.
- No warranty on wear parts and parts which come into contact with workpieces.
- Claims are excluded which are
  - due to incorrect handling or the effect/influences of external force (e.g. scratches, dents, distortions etc.);
  - due to visible wear and continual use (scratches etc.);
  - due to incorrect supply of media;
  - due to conversion, repair or other manipulations on the clamping devices insofar as this has not been carried out by personnel authorised by RÖHM.
- All liability for consequential damage is excluded.

(Incorrect operation or maintenance renders the warranty null and void)

Extended warranty 3 years

RÖHM GmbH offers a warranty of up to 36 months on the power chuck DURO-A purchased by you after delivery of the goods. The warranty is extended by a further 12 months in each case (max. 2 times/36 months) if a fee-based inspection is carried out by RÖHM GmbH within the first 12 months after purchase of the product.

The owner is responsible for carrying out the inspection measure in time.

- All parts wear parts and those coming into contact with workpieces are excluded from the warranty.
- The prescribed maintenance intervals must be observed, documented and signed as legally binding.
- Warranty claims are subject to German law.

1.4 Conventions of Presentation

1.4.1 Text Display

To improve legibility and comprehension of the text, the following conventions were agreed:

Text type	Marking	Function
Operating instruction	1. 2., etc.	Marks a sequence of actions
	•	Marks an individual operating instruction
	➢	Marks an intermediate result of an operating instruction
	✓	End result of an operating instruction
List	▪	Marks elements of a list
	○	Marks comments within a list

Contains useful information or further information.

1.4.2 Display of Safety and Warning Instructions

Safety and warning instructions are marked by pictograms. The signal word and the colouring show the level of danger.

Observe the safety instructions to prevent personal injury and damage to property.

⚠ DANGER

Indicates an imminently dangerous situation

which may lead to death or permanent personal injury if not avoided.

- ➢ List of all measures which must be taken to prevent consequences.

⚠ WARNING

Indicates a possible danger

which may lead to permanent personal injury or death if not avoided.

- ➢ List of all measures which must be taken to prevent consequences.

⚠ CAUTION

Indicates a possible danger

which may lead to minor reversible injuries if not prevented.

- ➢ List of all measures which must be taken to prevent consequences.

NOTICE

Indicates a possible danger

which may lead to damage to property if not avoided.

- ➢ List of all measures which must be taken to prevent consequences.

2 Safety

Safety instructions and safety equipment serve to prevent accidents and damage when working on the power chuck. The safety instructions contain warnings and basic safety instructions. In addition to the safety instructions in this chapter, the following chapters contain action-related warnings. Maximum protection of personnel and the environment from dangers and trouble-free operation is only possible when all safety instructions and warnings in this operating manual are observed.

2.1 Intended Use

The power chuck DURO-A is used to clamp regularly and irregularly shaped workpieces. Only metal workpieces may be clamped into thepower chuck DURO-A. Other materials are only permissible by arrangement with RÖHM GmbH.

To ensure safe clamping of the workpiece with the machining forces occurring, the clamped material must have adequate rigidity for the clamping force and may only be slightly compressible. The clamping force is given in the clamping force diagram (**Clamping Force-Speed Diagram [▷ 21]**).

Depending on the construction size of the power chuck DURO-A, the maximum permissible actuating force and speed must be observed (**Overview of Construction Sizes [▷ 19]**).

The power chuck DURO-A may be installed in machine tools for cutting and non-cutting processes. The power chuck DURO-A may be installed and used both horizontally and vertically (standing or suspended). Stationary machining without rotation of the power chuck DURO-A is permitted.

Only original RÖHM base jaws and top jaws may be used. Third-party products may impair the safety of the power chuck DURO-A and lead to damage.

The jaws used must comply with the following specifications:

- The jaws must be designed as light as possible;
- The clamping point of the jaws must lie as close as possible to the power chuck.
- The jaws must be adapted to the size (equal or smaller), the weight (equal or lighter) and the rigidity (equal or higher) of the jaws assigned to the power chuck. If the jaws are heavier, larger or less rigid than the jaws assigned to the power chuck, the higher centrifugal force and the higher load of the power chuck must be taken into account. The necessary clamping force and maximum speed must be reduced.

The maximum permissible clamping diameter of the jaws and the limits of the jaws must be observed.

The DURO-A may only be operated when the guard is closed (exception: set-up mode).

The power chuck DURO-A can be used for both wet and dry machining. The permissible usage and environmental conditions must be observed (**Environmental and Operational Conditions [▸ 20]**).

The power chuck DURO-A is only intended for commercial use.

2.2 Improper Use

If the power chuck is operated for a purpose other than the intended use as specified in this operating manual, this is deemed to be improper use.

Any utilisation beyond the scope of the intended use poses risks and is not approved by RÖHM GmbH.

Improper use refers to the following:

- Use of the power chuck DURO-A for suspending loads;
- Use of non-OEM parts as replacement parts;
- Use of defective jaws (e.g. sprockets on base jaw broken off or cracks in the jaws);
- Use of welded jaws;
- Use of the power chuck DURO-A in explosive atmospheres;
- Operation with modifications not approved by the manufacturer;
- Operation outside of the defined operating parameters;
- Operation with insufficient maintenance;
- Operation without or with insufficiently clamped workpiece;
- Clamping of unsuitable materials (compressible materials);
- Clamping of unauthorised materials (plastics, rubber, glass or other non-metals) without the approval of RÖHM GmbH;
- Direct pointing of compressed air or coolant spray at guide gap or lubricating nipple;
- Clamping of regular workpieces with an asymmetric position of the jaws;
- Clamping of workpieces which are too heavy or too long (see document "RÖHM Standard RN 1391 - General Information and Guidelines for the Use of Power-Operated Clamping Devices") **Basic Principles [▸ 37]**;
- Clamping of workpieces with a clamping diameter > chuck diameter;
- Eccentric clamping of workpieces (**Dangers due to Imbalanced Workpieces [▸ 14]**);
- Removal of swarf during operation;
- Operation without effective safety equipment;
- Assembly of the power chuck and accessory parts with incorrect torque (see **Checking the Tightness of Screw Connections [▸ 42]**).

2.3 Obligations of the Owner

Before all work on and with the power chuck, the owner is to ensure:

- that the operating manual is available to the responsible personnel;
- that the responsible personnel are sufficiently qualified for their work;
  - This applies in particular to assembly, maintenance and repair.
- that the responsible personnel have read and understood the operating manual;
  - RÖHM GmbH recommends that this be documented in a suitable form.
- that all safety equipment is correctly mounted and operational;
  - Safety equipment must never be by-passed, manipulated or shut down.
- that the power chuck is in perfect working order;
- that all damaged and defective parts are replaced immediately.

The machine manufacturer or the operator has to ensure with suitable measures that the specified technical data of the power chuck cannot be exceeded

The machine manufacturer or the operator must ensure that the power chuck can only be operated when the separating safety guard is closed. Exception: Set-up mode.

In set-up mode:

- it must be ensured that no machining can be carried out;
- the operating pressure must be reduced to the lowest possible value;
- the machine spindle speed must be considerably reduced.

To prevent the tension being released when the tool or machine spindle is rotated, the machine control must be programmed accordingly.

Before initial machining is carried out, the operator must check (e.g. by calculation) whether the generated clamping force under speed is sufficient with the existing friction to safely hold the workpiece with the available machining forces. This also applies to processing access with blunt or broken tools.

The power chuck does not have its own guard and the clamping system is not self-locking in a mechanically secure way. Therefore, the power chuck may only be operated via a control which has a safety device. This safety device must prevent the clamped workpiece / tool from being able to leave the clamp even if the clamping energy (e.g. electricity, hydraulic system, pneumatic system etc.) fails and under the influence of external forces (e.g. machining force, centrifugal force).

In the event of a sudden drop or failure of the actuation energy, machining must be interrupted immediately and the tool or machine spindle stopped immediately.

Before beginning any work, it must be ensured that, in the machine operating mode “Set-up mode” with the machine door open and with an enabling device, rotation of the power chuck is only permitted at a reduced speed or a movement on the power chuck is only permitted at reduced speed. Rotational movements and movements on the power chuck at the same time are not permitted.

2.4 Qualification of Operating and Specialist Personnel

Trained personnel

Trained personnel have been instructed in correct handling and possible dangers when using the power chuck. In particular, the personnel must have been instructed in the safety equipment.

Qualified personnel

Personnel without experience of handling a power chuck are exposed to increased risks of injury in the event of incorrect conduct, especially during assembly and maintenance work, due to the clamping movements and forces.

Therefore, the power chuck may only be assembled, maintained and serviced by persons who have received special training or instruction for this purpose or who have extensive experience. The qualified personnel must be able to read and understand the displays (e.g. pressure, force etc.) and to act accordingly. The qualified personnel must have read and understood this operating manual.

In particular, qualified personnel are:

- mechanics

Work on the mechanical equipment may only be carried out by a trained mechanic or by personnel under the direction and supervision of a trained mechanic. Work on gas, pneumatic and hydraulic equipment may only be carried out by mechanics trained for this purpose.

2.5 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

Wear protective gloves

Wear safety goggles

Wear safety shoes

Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▸ 12]**).

2.6 General Dangers

When using the device there is a special potential of residual risks

- during assembly and set-up work,
- during operation and
- during maintenance and service work.

This potential risk cannot be completely eliminated considering the functional availability of the operating manual. Therefore, all individual regulations of this operating manual are to be observed.

2.6.1 Dangers due to Flying Parts

During operation, the connection between the clamped workpiece and the power chuck DURO-A may become loose due to mechanical failure (e.g. due to defective parts) or incorrect operation (e.g. excessive speed). The workpiece may then fly out and cause serious crushing and impact injuries.

To prevent cutting and crushing injuries, ensure perfect functioning of the power chuck DURO-A before each operation. Also ensure that unauthorised persons cannot rotate the power chuck DURO-A unintentionally.

- **The maximum permissible speed is only permitted at maximum clamping force.**
- The power chuck only reaches the maximum specified clamping force total when the maximum actuation force is applied.
- The clamping force must be checked **regularly**.
- Operation is only permitted with an effective safety guard.

The maximum torque which can be transmitted by the power chuck to the workpiece depends on the technical design of the top jaws.

2.6.2 Skin Irritation due to Operating Materials

The lubricant consists of substances which may lead to skin irritations in the event of frequent skin contact.

In order to minimise the risk of skin irritations, wear long work clothing and avoid contact with the lubricant. Also observe the safety data sheet of the lubricant and wear safety goggles and protective gloves during maintenance work when handling lubricants.

2.6.3 Eye Injuries due to Metal Chips

Dangerous metal chips may be produced during machining of metal. During operation or when cleaning the power chuck DURO-A, sharp metal chips may be stirred up and cause eye injuries and cuts.

To prevent eye injuries and cuts, wear personal protective equipment during operation and cleaning work. Cleaning with compressed air or a high-pressure cleaner is not permitted.

2.6.4 Risk of Burns due to Hot Surfaces

The power chuck DURO-A may heat up during operation.

To prevent burns, do not touch the power chuck DURO-A after machining and allow to cool down before carrying out assembly and maintenance work.

2.6.5 Dangers due to Imbalanced Workpieces

With rotating spindles, clamping of imbalanced workpieces generates a centrifugal force which affects smooth running of the power chuck DURO-A. The power chuck DURO-A has a balance quality of G 6.3 as per DIN ISO 21940. Additional risks may occur due to insufficient rotational balance. This applies in particular in the case of

- high speeds;
- when clamping asymmetrical workpieces;
- when using different top jaws or
- for all asymmetries of the power chuck DURO-A.

Imbalanced workpieces endanger the personnel, the power chuck DURO-A and the machine.

In order to compensate for unwanted imbalances and to prevent resulting damage, the symmetrical mass distribution must be restored and the power chuck DURO-A must be dynamically balanced with the workpiece.

2.6.6 Dangers due to Power Failure

An unexpected power failure during operation may lead to immediate failure of the clamping force of the power chuck. The workpiece may then fly out and cause serious crushing and impact injuries.

To prevent workpieces flying out, ensure perfect functioning of the power supply before each operation. In addition, the operator and the machine manufacturer must ensure by means of effective safety equipment that the actuating and clamping forces are maintained without interruption until the machine comes to a standstill and the workpiece remains tightly clamped.

2.6.7 Danger of Crushing

The machine manufacturer and/or operator must ensure that all danger to persons due to unavoidable travel movements is excluded. For this purpose, 2-handed operation, for example, or preferably suitable safety guards can be used.

If there is a gap of **less than 25 mm** after the distance is travelled, there is generally a risk of crushing extremities. For this reason,

- the speed of movement of components moving towards each other must generally be reduced to no more than 2 m/min (specification as per DIN EN ISO 23125). This also applies to **commissioning work, set-up mode** and **service work.**
- or the workpiece loading in normal mode must be carried out either mechanically or with a ramrod in the case of clamping equipment with clamping movements.
- or the object to be clamped must be fixed with a permanently or temporarily attached workpiece holder (e.g. prism) before the movement is started.
- or, for example, in the case of cylinders and comparable moving components, the gap must be covered by a safety guard so as to be inaccessible.

2.6.8 Procedure in the Event of Danger and Accidents

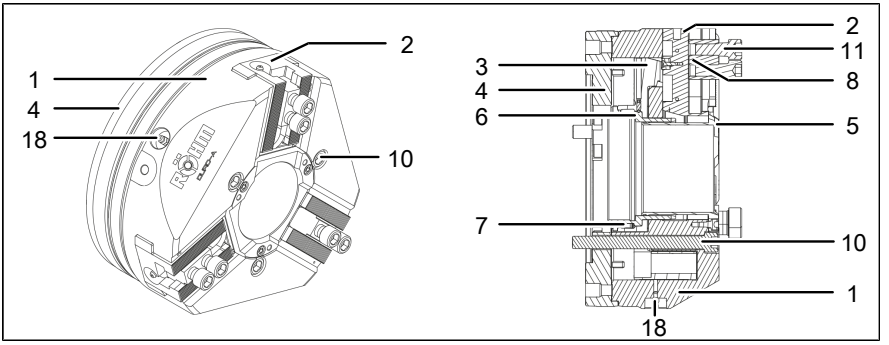
In the event of danger and accidents, it must be ensured that first aid measures can be taken immediately.

1. Shut the machine down immediately via the Emergency-Stop button.
2. Remove the person involved from the danger zone and sit or lay the person down.
3. Call a doctor.
   - ➢ Do not make any changes to the accident site.
4. Administer first aid.
   - ➢ Stop any bleeding.
   - ➢ Cool burns.
5. Report all accidents to a superior.

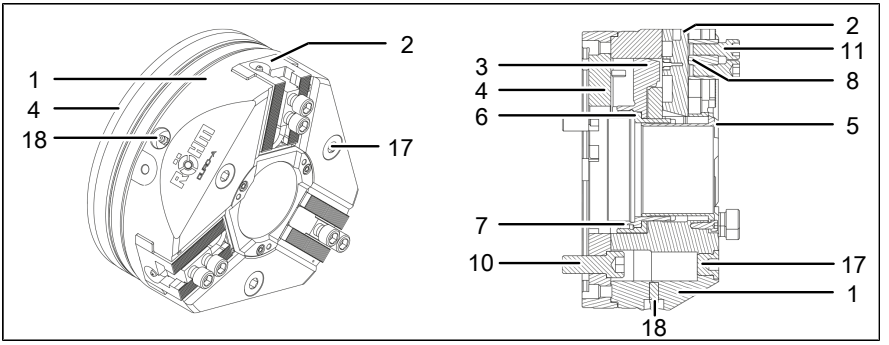
3 Product Description

3.1 About this Power Chuck

Power chuck without screw plug



Power chuck with screw plug



1	Body	7	Holding ring
2	Base jaws	8	Slot nut
3	Piston	10	Chuck holding screws
4	Flange	11	Jaw holding screws
5	Protective bushing	17	Screw plug
6	Threaded ring	18	Conical lubricating nipple

The power chuck DURO-A is a 3-jaw chuck which is used to clamp regularly and irregularly shaped workpieces.

The power chuck is attached to the machine spindle via a cylindrical or short-conical holder. In case of conical holders, an adaption via the intermediate flange is possible. The actuating force is generated via a clamping cylinder (electric, hydraulic or pneumatic).

The power chuck consists of the basic body (1), piston (3), flange (4), protective bushing (5), threaded ring (6), holding ring (7), conical lubricating nipple (18) and base jaws (2).

The piston (3) is connected to the draw tube of the clamping cylinder via a threaded ring (6). Due to the axial movement of the piston (3), the 3 base jaws (2) are moved and carry out a radial stroke.

3.2 Technical Specifications

3.2.1 Overview of Construction Sizes

ID no.:	183700	183701	183702	183703	183704
Size/outer Ø	110	135	165	210	254
Jaw stroke [mm]	3.2	3.2	3.5	4.5	5.5
Chuck height [mm]	72	82	91	101	117.5
Connection dimension [mm]	ZA60	ZA115	ZA140	ZA170	ZA170
Piston stroke [mm]	12	12	13	17	20.5
Pass [mm]	27	34	46	54	79
Connection thread	M34x1,5	M38x1,5	M54x1,5	M74x1,5	M94x1,5
Max. actuating force [kN]	17	25	30	38	52
Max. total clamping force [kN]	48	70	86	110	150
Max. speed [rpm]	8500	8000	8000	6500	5000
Moment of inertia [kg*m²]	0.007	0.018	0.04	0.12	0.3
Weight without jaws [kg]	4.3	7	11.5	19.6	33
Adaption to short taper mounting DIN ISO 702-1	KK4	KK4/ KK5	KK4/ KK5/ KK6	KK5/ KK6/ KK8	KK6

ID no.:	183705	183706	183707	183708
Size/outer Ø	254	315	315	400
Jaw stroke [mm]	5.5	6.2	6.2	7.5
Chuck height [mm]	117.5	126.5	126.5	153.5
Connection dimension [mm]	ZA220	ZA220	ZA300	ZA380
Piston stroke [mm]	20.5	23	23	28
Pass [mm]	79	98.5	98.5	133
Connection thread	M94x1,5	M114x2	M114x2	M148x2
Max. actuating force [kN]	52	62	62	90
Max. total clamping force [kN]	150	180	180	250
Max. speed [rpm]	5000	4200	4200	3150
Moment of inertia [kg*m²]	0.3	0.82	0.82	2.5
Weight without jaws [kg]	33	56.8	56.8	108.7
Adaption to short taper mounting DIN ISO 702-1	KK6/KK8/ KK11	KK8	KK11	KK11/ KK15

3.2.2 Environmental and Operational Conditions

The power chuck is designed for the following environmental and operating conditions:

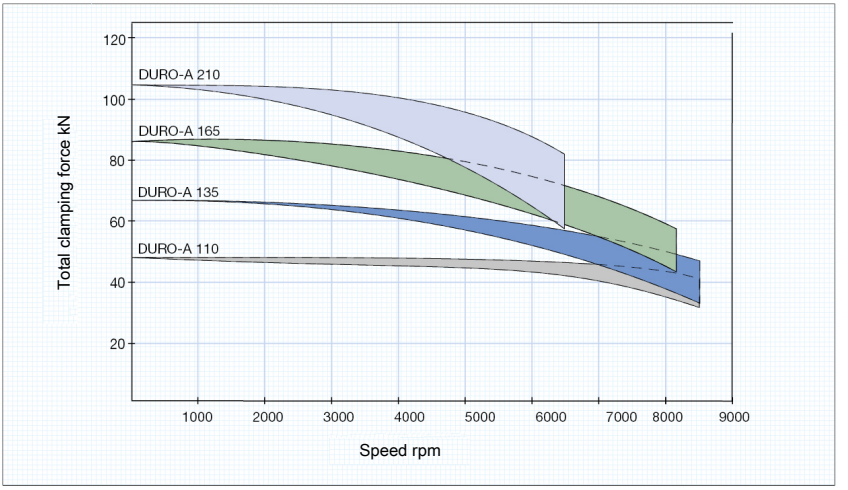
Ambient medium	Air, non-corrosive/non-aggressive fluids and gases
Place of use	Interior
Vibration speeds	< 5 mm/s as per DIN ISO 10816-3
Relative humidity (at +40 °C)	< 100% Use in very humid conditions leads to faster corrosion and may shorten the useful life
Potentially explosive environments	No
Ambient temperature at place of operation	+5 °C to +60 °C
Ambient temperature for storage	+5 °C to +60 °C
Dry and wet machining	Wet machining permitted with cooling lubricants
Service life	500,000 clamping cycles

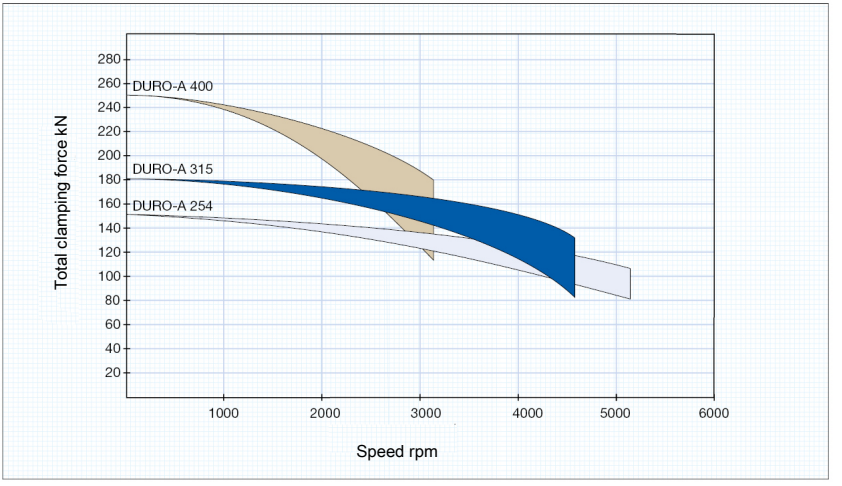
Pollution of the machine's surroundings caused by the machine itself is permitted. However, perfect operation of the power chuck must be ensured and checked regularly. With each jaw and tool change, the power chuck must be cleaned of coarse dirt with a broom or brush. Cleaning with compressed air is not permitted.

3.2.3 Clamping Force-Speed Diagram

The reduction in clamping force is experimentally determined with the jaws assigned to the power chuck. It is largely independent of the initial clamping force at a speed = 0.

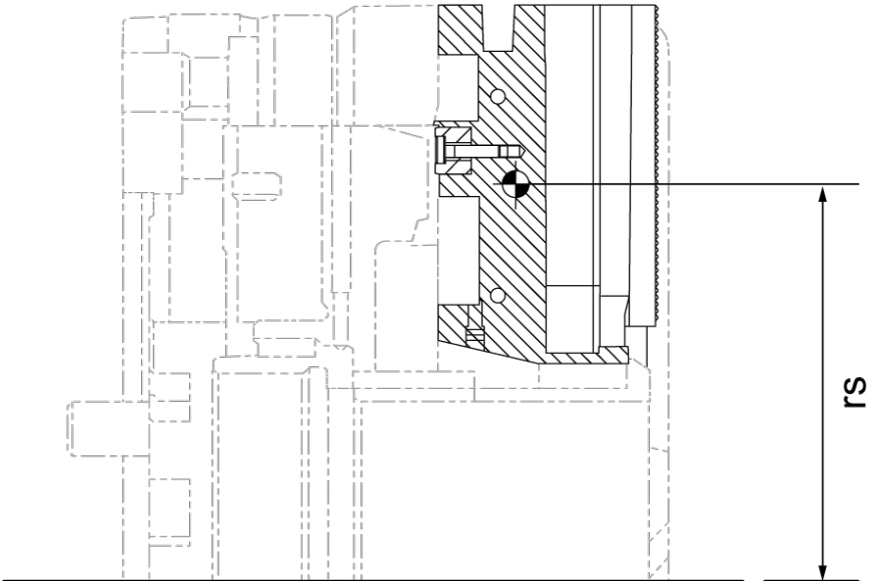
Total clamping force kN – speed rpm





3.2.4 Radius of the Centre of Gravity

The base jaws are in outermost position.
The power chuck is opened.



Size	110	135	165	210	254	315	400
rs [mm]	37.7	45.5	56.0	69.2	87.0	107.3	138.1
mGB in [kg]	0.16	0.24	0.40	0.61	1.14	1.40	3.30

3.2.5 Permissible Operating Materials

The following grease is authorised for the power chuck DURO-A:

- RÖHM grease F 80

If a different lubricant to the one specified is used, the clamping force may be reduced considerably.

4 Transport

⚠ WARNING

Crushing injuries in the event of unsecured transport of the power chuck.

Falling of the power chuck.

- ➢ Use suitable hoisting gear and slings.
- ➢ Wear personal protective equipment.
- ➢ Do not remain under suspended loads.

4.1 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

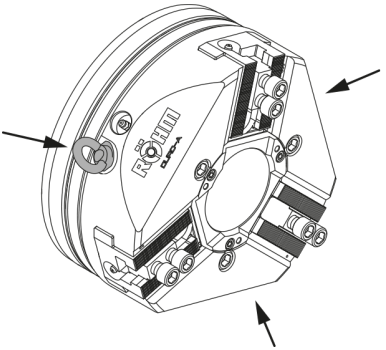
Wear protective gloves

Wear safety goggles

Wear safety shoes

Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▸ 12]**).

4.2 Tapped Holes for Transport Purposes



With a weight of more than 15 kg, the power chuck must be safely transported with suitable slings over the tapped transport holes.

Size	110	135	165	210	254	315	400
Weight [kg]	4.3	7.0	11.5	19.6	33.0	56.8	108.7
Size of suspension threads	---	---	---	M8	M10	M10	M10

5 Assembly

⚠ WARNING	
	**Injuries due to insufficient securing on assembly, incorrect tightening torque of the screws.** Crushing due to falling of the power chuck. ➢ Use tapped holes for transport purposes. ➢ Observe tightening torque of the screws. ➢ Wear personal protective equipment.

⚠ WARNING	
	**Crushing injuries and cuts due to start-up of the machine during set-up work.** Flying parts may cause serious injuries. ➢ Disconnect the power supply before assembly. ➢ Protect the machine against being re-started. ➢ Wear personal protective equipment.

5.1 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

Wear protective gloves

Wear safety goggles

Wear safety shoes

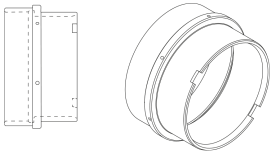
Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▷ 12]**).

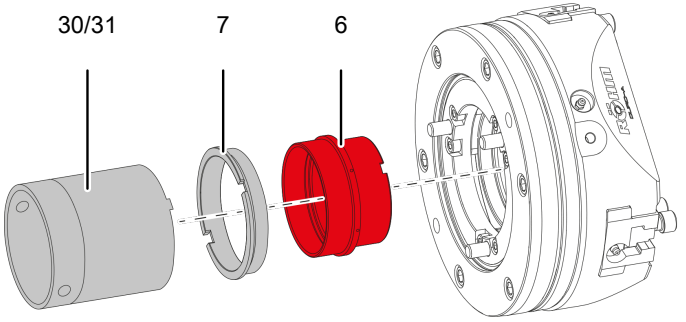
5.2 Disassembly / Assembly of the Threaded Ring

Generally, a special threaded ring/adapter will be necessary for most machine tools to connect the available draw connection.

Variations of the threaded rings:

a) With collar

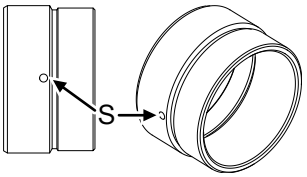


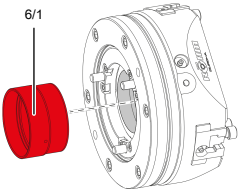


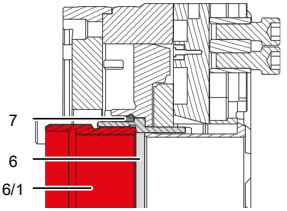
1. Unscrew the holding ring (7) from the piston (3) with the assembly key provided (30/31).
2. Take out the threaded ring (6).
3. Insert the special threaded ring/adapter with collar for the corresponding draw connection (machine) into the piston.
4. Screw in the holding ring (7) with the assembly key (M).
5. Carry out assembly as described in Chapter **Assembly of power chuck on machine spindle or intermediate flange [▷ 30]**.

It must be possible to turn the threaded ring/adapter.

b) With thread:







1. Insert the special threaded ring/adapter with thread (6/1) for the corresponding draw connection (machine) into the threaded ring (6) and tighten.
   - ➢ A groove, flat or borehole is usually fitted on the circumference (S) to hold it.
2. Carry out assembly as described in Chapter **Assembly of power chuck on machine spindle or intermediate flange [▷ 30]**.

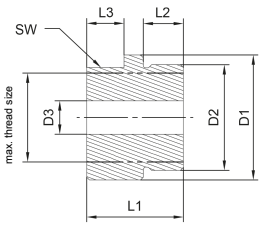
Alternatively:

1. Previously mount the special threaded ring/adapter with thread (6/1) for the corresponding draw connection (machine) onto the draw tube.
2. Carry out assembly as described in Chapter **Assembly of power chuck on machine spindle or intermediate flange [▷ 30]**.

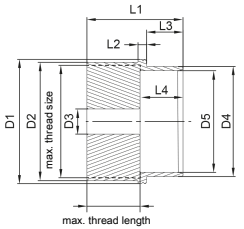
Threaded rings

For this purpose, RÖHM GmbH offers neutral threaded rings:

Threaded rings with thread (up to size 210)



Threaded ring with collar (from size 245)



ID no.	183968	183969	183970	183971	183972	183973	183974
Size	110	135	165	210	254	315	400
D1	38	45	58	80	103.8	126.3	166.3
D2	M34x1,5	M38x1,5	M54x1,5	M74x1,5	99	121	157.5
D3	10	12	16	20	21	25	30
D4	---	---	---	---	92	114	148.5
D5	---	---	---	---	85	107	141.5
L1	30	35	40	48	80.5	90	110
L2	12.5	14.5	16.5	16.5	30.5	36	46
L3	13.5	13.5	13.5	20	7.2	7.7	7.2
L4	---	---	---	---	36	42	52
Max. thread size	M28	M32	M48	M66	M94	M114	M148
Max. thread length	---	---	---	---	44.5	48	58
Wrench size	34	36	55	75	---	---	---

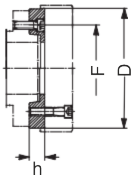
5.3 Assembly of intermediate flange on machine spindle

- The intermediate flange is cleaned.
- The machine spindle is cleaned.

1. Place the intermediate flange on the machine spindle in the correct position and fix with the fixing screws.
2. Check the radial and axial run-out of the intermediate flange on the check collar and align if necessary.
3. Carry out assembly as described in Chapter **Assembly of power chuck on machine spindle or intermediate flange [▷ 30]**.

Steel intermediate flange with cylindrical centring take-up as per DIN 6353 for 3-jaw chucks

Attachment from front as per ISO 702-1 (DIN 55026/55021) and ASA B 5.9 A1/A2 with metric fixing screws (spindle side).



ID no.	Size of spindle head	Chuck size	h [mm]	F [mm]	D [mm]
174525[1)]	4	110	25	82.6	60
174526[1)]	4	135	18	82.6	115
145125[1)]	4	165	18	82.6	140
174527	5	135	32	104.8	115
174528	5	165	21	104.8	140
145127	5	210	21	104.8	170
145129	6	165	35	133.4	140
174529	6	210/254	27	133.4	170
145131	6	254	27	133.4	220
145135	8	210	39	171.4	170
174530	8	254/315	39	171.4	220
145143	11	254	48	235	220
174531	11	315	36	235	300
145147	11	400	40	235	380
174532	15	400	50	330.2	380

[1)] DIN 55021 upon request.

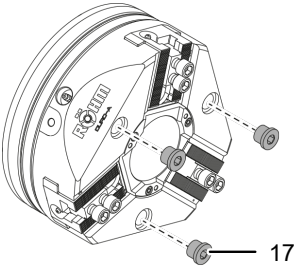
All attachment parts are included.

5.4 Assembly of power chuck on machine spindle or intermediate flange

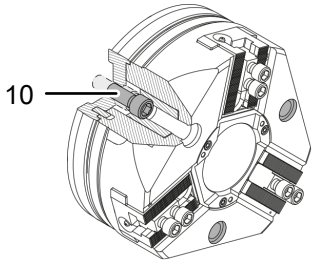
- The machine is switched off and protected against being switched on again.
- The machine spindle or intermediate flange is clean.
- The machine spindle head or finished intermediate flange has been checked for radial and axial run-out.

For sizes 110-210

1. Move the draw tube into the front position.
2. Move the piston (3) of the power chuck into the front position (jaws in "open" position).
3. Undo the screw plugs (17) on the front of the power chuck and remove.



4. Press the chuck holding screws (10) inwards as far as they will go.



5. Screw the eyebolt into the power chuck (only for size 210).
6. Correctly attach the load-bearing equipment to the eyebolt (only for size 210).
7. Position the power chuck on the machine spindle.
8. Screw the power chuck onto the draw tube as far as it will go.
   - ➢ Ensure that the draw tube thread is flush.
9. Turn back the power chuck until the drill holes of the machine spindle head are flush with the chuck holding screws (10).
10. Power chuck must be pressed against the spindle holder and screwed onto the machine spindle alternately with the three chuck fixing screws (10) (provisionally 5 Nm).
11. Remove the load-bearing equipment from the eyebolt and the eyebolt from the power chuck (only for size 210).

12. Check the radial and axial run-out of the power chuck on the check collar and align if necessary.
13. Tighten the three chuck holding screws (10) on the machine spindle with the permissible tightening torque (**Checking the Tightness of Screw Connections [▷ 42]**).
14. Check for correct operation, see **Checking the Device for Correct Operation [▷ 44]**.
15. Check the jaw stroke, see **Checking Jaw Stroke [▷ 44]**.
16. Check the clamping force, see **Checking the Clamping Force [▷ 44]**.
17. Turn in the screw plug (17).

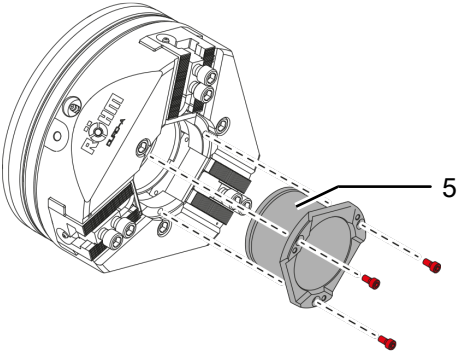
    ✓ Power chuck is mounted on the machine spindle.

Disassembly/dismantling from the machine spindle

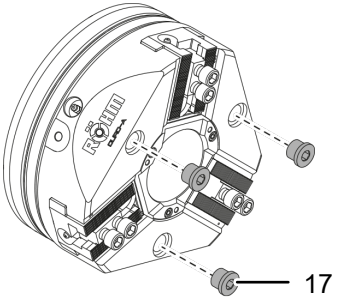
Disassembly or dismantling of the power chuck from the machine spindle is carried out in reverse order.

For sizes 254-400

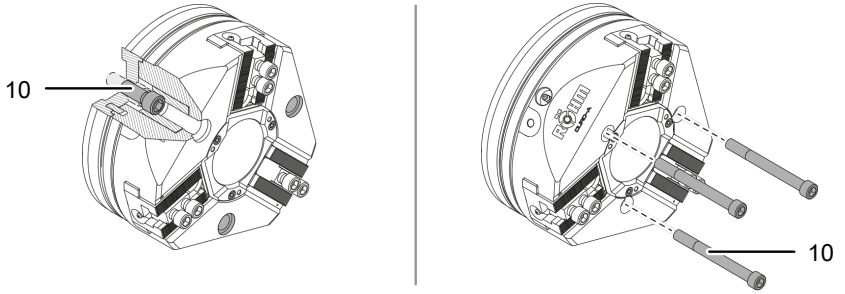
1. Disassemble the protective bushing (5).



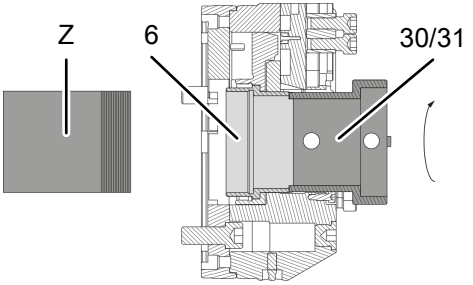
2. Move the draw tube into the front position.
3. Move the piston (3) of the power chuck into the front position (jaws in "open" position).
4. Undo the screw plug (17), if fitted, on the front of the power chuck and remove.



5. Press the chuck holding screws (10) inwards.



6. Screw the eyebolt into the power chuck.
7. Correctly attach the load-bearing equipment to the eyebolt.
8. Position the power chuck on the machine spindle.
9. Screw the threaded ring (6) of the power chuck onto the draw tube (Z) as far as it will go with the assembly tool (30/31) provided.
   - ➢ It must be easy to turn the threaded ring (6). Otherwise, readjust the height of the crane.



10. Power chuck must be pressed against the spindle holder and screwed onto the machine spindle alternately with the three chuck fixing screws (10) (provisionally 5 Nm).
11. Remove the load-bearing equipment from the eyebolt and the eyebolt from the power chuck.
12. Check the radial and axial run-out of the power chuck on the check collar and align if necessary.
13. Tighten the three chuck holding screws (11) on the machine spindle with the permissible tightening torque (**Checking the Tightness of Screw Connections [▸ 42]**).
14. Check for correct operation, see **Checking the Device for Correct Operation [▸ 44]**.
15. Check the jaw stroke, see **Checking Jaw Stroke [▸ 44]**.

16. Check the clamping force, see **Checking the Clamping Force [▷ 44]**.
17. Turn in the screw plug (17) if fitted.
18. Re-assemble the protective bushing (5).
    ✓ Power chuck is mounted on the machine spindle.

Disassembly/dismantling from the machine spindle

Disassembly or dismantling of the power chuck from the machine spindle is carried out in reverse order.

6 Operation

⚠ CAUTION	
	**Danger of crushing when clamping the power chuck.** Trapping of fingers. ➢ Do not hold fingers between the workpiece and the top jaws or between the top jaws when clamping the power chuck.

⚠ CAUTION	
	**Risk of burns due to hot surfaces.** Burns on hands. ➢ Do not touch the power chuck when in operation. ➢ Allow the power chuck to cool down before carrying out necessary work. ➢ Wear personal protective equipment.

⚠ CAUTION	
	**Skin irritations due to contact with lubricants.** Lubricants may cause irritations in the event of contact with the skin. ➢ When handling the power chuck, wear safety goggles, long work clothes and gloves. ➢ Avoid skin contact with lubricants.

6.1 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

Wear protective gloves

Wear safety goggles

Wear safety shoes

Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▸ 12]**).

6.2 Basic Principles

The procedure for determining the clamping force and speed is given in the document "**RÖHM Standard RN 1391 - General Information and Guidelines for the Use of Power-Operated Clamping Devices**").

This document can either be requested from RÖHM GmbH or viewed/downloaded at www.roehm.biz/service/betriebsanleitungen → General free of charge.

The actual clamping force must be checked regularly. See **Checking the Device for Correct Operation [▸ 44]**.

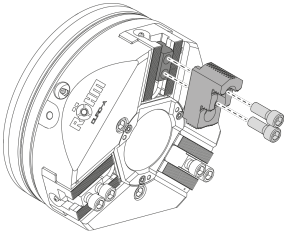
6.3 Mounting the Top Jaws onto Base Jaws

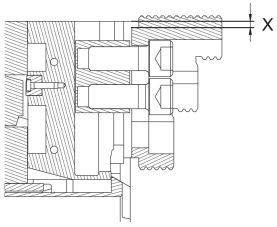
⚠ WARNING

Injuries due to insufficient securing on assembly, incorrect tightening torque of the top jaws.

Flying top jaws may cause serious injuries.

- ➢ Observe tightening torque of the jaw holding screws.
- ➢ Observe screw length of the jaw holding screws.
- ➢ Operation only with effective guard.





- The machine is switched off and protected against being switched on again.
- The base and top jaws are clean.
- The slot nuts are clean.

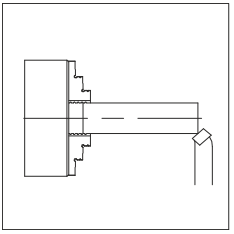
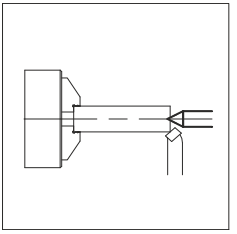
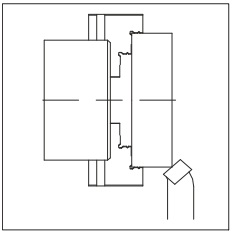
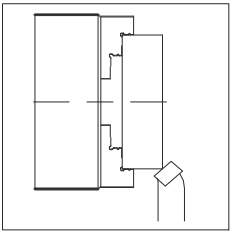
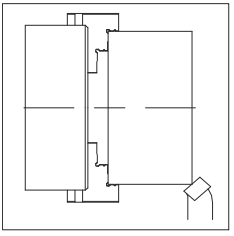
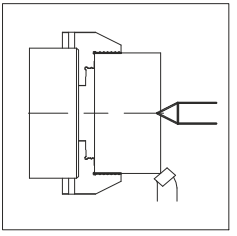
1. Insert the slot nuts into the base jaws.
2. Place the top jaws on the base jaws and fix to the slot nuts with the jaw fixing screws. Observe the labelling of the jaws. (Top jaw 1 on base jaw 1, top jaw 2 on base jaw 2, top jaw 3 on base jaw 3.)
   - ➢ On assembly, always ensure that the dimension X is the same for all jaws.
   - ✓ The top jaws are mounted.

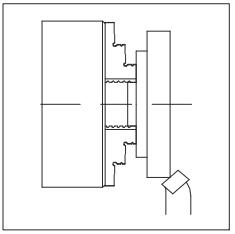
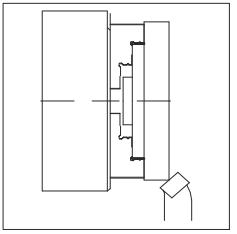
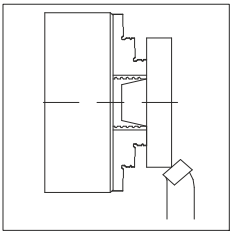
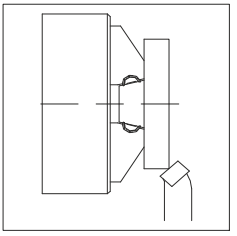
Tightening torques of the jaw holding screws in Nm

Strength class	M6	M8	M10	M12	M16	M20
12.9	15	28	52	75	160	120

6.4 Clamping the Workpiece

1. Fully open the power chuck (external clamping).
   - ➢ The jaws move to the outermost position.
2. Position the workpiece.
3. Close the power chuck.
   - ➢ The jaws fix the workpiece.
   - ✓ The workpiece is clamped.

Incorrect	Correct
Clamping length too short, projection length too long 	Additional support with centre or bezel 
Clamping Ø too large 	Insert larger chuck 
Workpiece too heavy and jaw step too short 	Support with centre or jaw step extended 

Incorrect	Correct
Clamping Ø too small 	Clamping on largest possible clamping Ø 
Workpieces with cast iron or forged tapers 	Clamping with self-seating inserts 

7 Maintenance

7.1 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

Wear protective gloves

Wear safety goggles

Wear safety shoes

Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▸ 12]**).

7.2 Maintenance Interval

The regular maintenance work is described in the following:

Activity	Interval
Check attachment of the chuck and jaw holding screws. See **Checking the Tightness of Screw Connections [▸ 42]**.	Weekly.
Lubricate conical lubricating nipple. See **Lubricating Conical Lubricating Nipples [▸ 43]**.	After 20 h without or 8 h with coolant application or at the latest after 10,000 clamping cycles.
Check clamping force with the F-Senso Chuck clamping force measurement system. See **Checking the Device for Correct Operation [▸ 44]**.	After 30,000 clamping cycles or after 3 months depending on the conditions of use.

Activity	Interval
Visually inspect wear parts.	Weekly.
Visually inspect jaw screws. Replace defective screws.	Weekly.
Replace jaw screws.	Annually.
Inspection of the power chuck. See **Inspection of the Power Chuck [▸ 45]**.	Annually or at the latest after 500,000 clamping cycles.

7.3 Maintenance Work

7.3.1 Checking the Tightness of Screw Connections

If screws are replaced or undone, incorrect replacement or incorrect attachment may lead to dangers for persons and objects. For this reason, for all holding screws, the tightening torque recommended by the manufacturer of the screw must be applied in accordance with the screw grade.

For **cylinder head screws** of the conventional sizes M4 – M24 and strength classes 8.8, 10.9 and 12.9, the following tightening torque table applies:

Tightening torque in Nm

Strength class	M3	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24
8.8	1.27	3.0	5.9	10.1	24.6	48	84	133	206	295	415	567	714
10.9	1.79	4.6	8.6	14.9	36.1	71	123	195	302	421	592	807	1,017
12.9	2.14	5.1	10	17.4	42.2	83	144	229	354	492	692	945	1,190

The table values do **not** apply to tightening torques expressly specified elsewhere!

When replacing the original screws, the strength class specified by the manufacturer is to be observed. In the case of mounting screws for clamping devices, clamping inserts, top jaws, rigid stops, pre-clamped covers, equalising weights and comparable elements, strength class 12.9 is always to be used.

7.3.2 Lubricating Conical Lubricating Nipples

⚠ CAUTION

Skin irritations due to contact with lubricants.

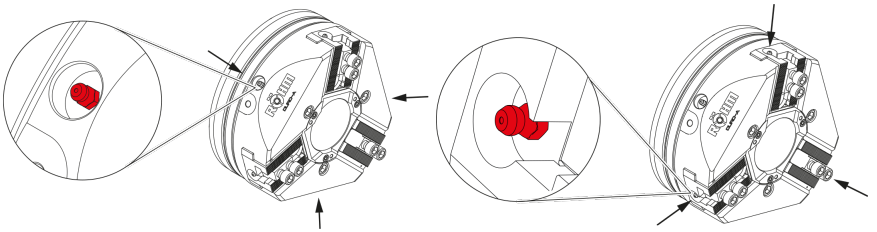
Lubricants may cause irritations in the event of contact with the skin.

- ➢ When handling the power chuck, wear safety goggles, long work clothes and gloves.
- ➢ Avoid skin contact with lubricants.

Construction size	Quantity of grease [strokes per lubricating nipple]
110 - 165	1.4 cm^3 [1 stroke]
210 - 254	2.8 cm^3 [2 strokes]
315	4.5 cm^3 [3 strokes]
400	5.6 cm^3 [4 strokes]

Recommended grease gun	ID no.:
RÖHM grease gun	329093

Recommended RÖHM grease F 80	ID no.:
0.1 kg	630886
0.25 kg	304345
0.5 kg	308555
1.0 kg	028975
5 kg	318310
25 kg	658047



1. Press RÖHM grease F 80 into the conical lubricating nipple of the basic body and the base jaws with the grease gun (for grease quantity, see table).

2. Move through the complete stroke several times.
   - ➢ The grease is distributed.
   - ➢ After 400 clamping cycles, move through the complete stroke again at least twice.
   - ✓ The power chuck is lubricated.

7.3.3 Checking the Device for Correct Operation

Correct operation of the power chuck must be checked during commissioning after assembly and in the course of maintenance work.

7.3.3.1 Checking Jaw Stroke

- Move the clamping cylinder once into the foremost and rearmost position. Measure the jaw stroke of the base jaws and compare with the table (Overview of Construction Sizes).
  - ➢ The jaw stroke must correspond to the value given in the table (Overview of Construction Sizes).

In the event of faults, the two end positions (opened and closed) and the piston stroke of the clamping cylinder must be checked.

7.3.3.2 Checking Clamping Cylinder End Position

1. Measure the end positions of the clamping cylinder with the installed power chuck.
   - ➢ Clamping piston stroke limitation forwards in the clamping cylinder, backwards to machine spindle or flange.
2. Compare the measured dimensions with the recorded dimensions (Assembly on Machine Spindle) without installed power chuck.

7.3.3.3 Checking the Clamping Force

- Check clamping force with clamping force measurement system.

Recommended clamping force measurement system	ID no.:
F-Senso Chuck (only for external clamping force measurement)	179800

Suitable jaws may have to be used. In the case of internal clamping, only the external clamping force can be measured.

7.3.4 Inspection of the Power Chuck

⚠ CAUTION

Skin irritations due to contact with lubricants.

Lubricants may cause irritations in the event of contact with the skin.

- ➢ When handling the power chuck, wear safety goggles, long work clothes and gloves.
- ➢ Avoid skin contact with lubricants.

Warranty by the service department of RÖHM GmbH

If the annual inspection of the power chuck is carried out by the service department of RÖHM GmbH, the warranty is extended to up to 3 years.

If the inspection is not carried out by the service department of RÖHM GmbH, the extended warranty lapses.

For inspection, the power chuck must be completely dismantled, cleaned and re-assembled. Worn or damaged components must be replaced during the inspection.

Dismantling the power chuck

- The power chuck is dismantled from the intermediate flange or the machine spindle.

1. Undo and remove the fixing screws of the protective bushing (5).
2. Pull off the protective bushing (5) with the extraction thread.
3. Undo the fixing screws on the flange (4) and remove.
4. Remove the flange (4) to the rear with the extraction thread.
5. Loosen the holding ring (7) with the assembly key supplied (30/31) and remove the threaded ring (6) (only for size 254-400).
6. Pull the piston (3) out of the power chuck to the rear.
7. Remove all fitting keys from the base jaws (2).
8. Remove all base jaws (2) from the basic body (1).
9. Unscrew the conical lubricating nipple (18) from the power chuck.
   - ➢ The power chuck is dismantled.

Replacement of wear parts

1. Check the dismantled power chuck for wear and damage.
2. Replace worn and damaged parts with OEM replacement parts.
   ✓ Wear parts are replaced.

Thorough cleaning the power chuck

- Thoroughly clean the dismantled power chuck with a broom, brush or cleaning cloth and remove grease residue, dirt and abrasion.
  ✓ The power chuck is clean.

Cleaning with compressed air or a high-pressure cleaner is not permitted.

Assembly of the power chuck

The power chuck is assembled in reverse order. Observe correct numbering and position of the base jaws (2) and the piston (3).

8 Cleaning the Device

⚠ CAUTION

Skin irritations due to contact with lubricants.

Lubricants may cause irritations in the event of contact with the skin.

- ➢ When handling the power chuck, wear safety goggles, long work clothes and gloves.
- ➢ Avoid skin contact with lubricants.

The power chuck must be cleaned with a broom or brush before each assembly and every time a jaw and workpiece is replaced.

Cleaning with compressed air or a high-pressure cleaner is not permitted.

8.1 Personal Protective Equipment and Personnel Qualification

When working on and with the power chuck DURO-A, personal protective equipment must be worn. The owner is responsible for providing personal protective equipment.

- Personal protective equipment must be in perfect condition when carrying out work. Defective safety equipment is to be replaced immediately.
- Observe information on personal protective equipment posted in the working area.
- During **rotational operation** of the power chuck DURO-A, **no** protective gloves are to be worn! Hand protection is only to be worn during transport, assembly and maintenance and as long as the power chuck DURO-A is at a standstill.

Wear protective gloves

Wear safety goggles

Wear safety shoes

Work on and with the power chuck may only be carried out by qualified operating and specialist personnel (see **Qualification of Operating and Specialist Personnel [▸ 12]**).

9 Storage

If the power chuck is not in use, the power chuck is to be stored in a dry, protected place in accordance with the storage temperature (**Environmental and Operational Conditions [▷ 20]**).

In the case of longer storage (one year or more), the power chuck must be cleaned and lubricated before assembly.

10 Troubleshooting

Fault	Possible cause	Measure
The power chuck runs with an imbalance.	The jaws are not in the same position. Unbalanced workpiece clamped.	Check jaw position and correct if necessary. Measure distance of the jaws to the outer Ø. Balance workpiece or reduce speed.
The tensile force is not reached.	The cylinder is incorrectly adjusted.	Check settings and correct if necessary.
The workpiece cannot be inserted.	The workpiece diameter is greater than the clamping diameter of the power chuck.	Use suitable top jaws or power chuck.

11 Disposal

NOTICE

Operating materials are hazardous waste!

Incorrect disposal may lead to serious damage to the environment.

➢ Used operating materials must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

After final disassembly, the materials must be disposed of in an environmentally way in accordance with the valid regulations.

- Metal

Metals must be recycled. Disposal must be carried out in accordance with the applicable regulations and local regulations.

- Plastics

They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.

- Rubber (e.g. O-rings)

They must be disposed of in accordance with the valid regulations and the applicable local provisions. Obtain relevant information from the authorities.