



LVE Instruction manual

Front-end chuck LVE 125-350 / LVE 400-1000 air-operated

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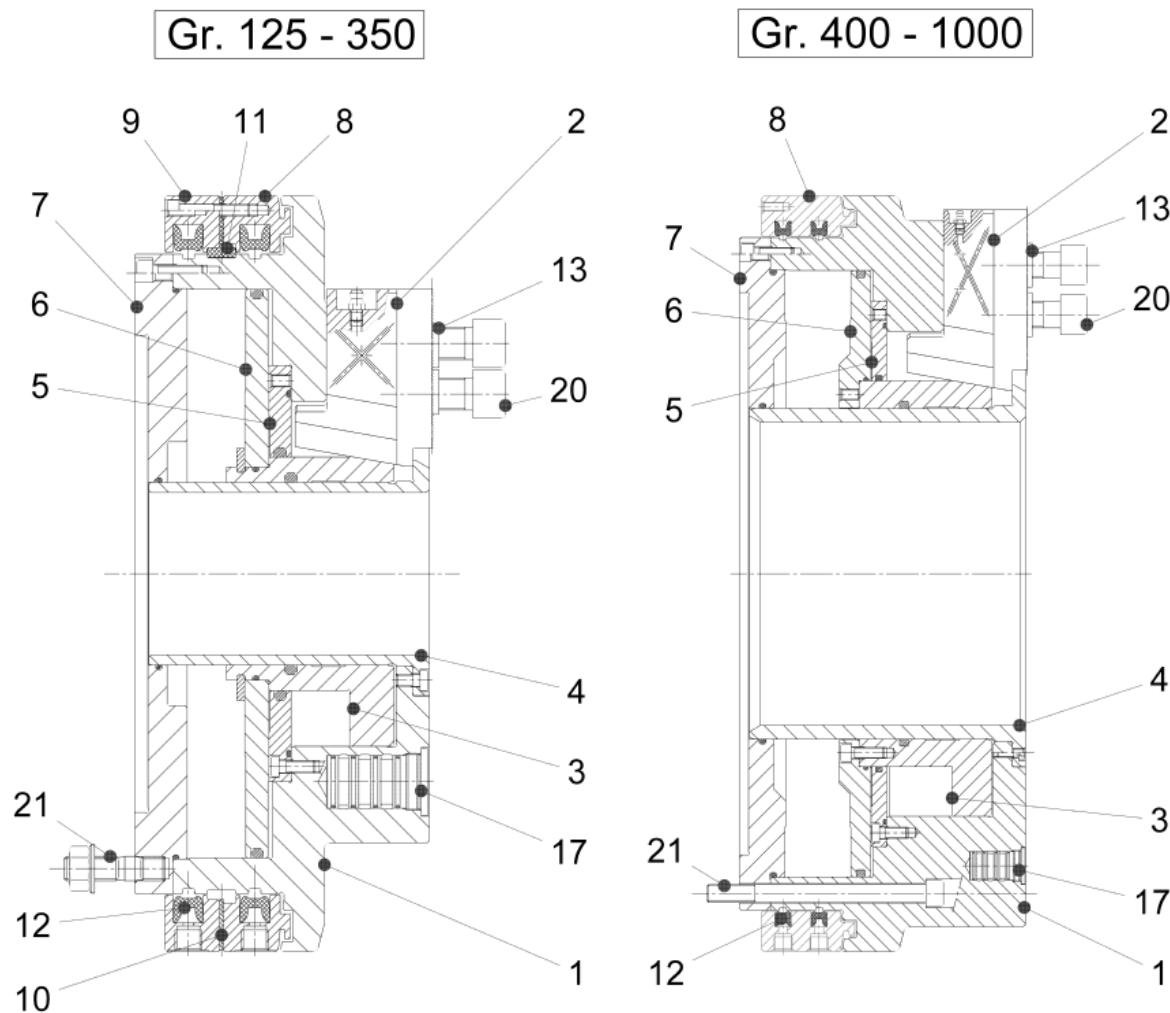
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- Preliminary note:**
1. This operating manual has been compiled with due consideration being given to DIN EN 1550, DIN EN ISO 12100-1, DIN EN ISO 12100-2, DIN EN 12415 and associated and relevant standards.
Individual explanations of DIN EN 1550 and DIN EN 12415 are treated in Chapter "**General Warnings**", due to their respective importance. However, we would like to stress that notice should be taken of the entire contents of DIN EN 1550 and DIN EN 12415!
 2. Individual part names mentioned in the following text are always accompanied by their item number (item) from assembly drawing . These item numbers are equivalent to those in the **RÖHM** piece list.

The LVE with its most important individual parts

LVE front-end chuck

1. The LVE front-end chuck with the most important individual parts



Item	Designation
1	Body
2	Base jaw
3	Piston
4	Protection bush
5	Intermediate disc
6	Piston disc
7	Flange
8	Distributor ring
9	Distributor ring
10	Spacer ring
11	Centering ring
12	Seal
13	Slot nut
17	Control valve
20	Jaw mounting screw
21	Chuck mounting screw

2. Safty instructions

I. Qualifications of operating personnel

Personnel lacking any experience in the handling of clamping fixtures are at particular risk of sustaining injury due to incorrect handling and usage, such injuries emanating in particular from the clamping movements and forces involved during setup work.

Clamping fixtures should therefore only be used, set up or repaired by personnel specially trained or instructed for this purpose and/or who have long years of experience.

Chuck functionality should be tested after mounting prior to commissioning. Two important points are:

Clamping force: The clamping force specified for the clamping device (+15%) should be achieved at max. actuation force/pressure.

Stroke monitoring: The clamping piston stroke should have a safety range in the front and rear end position. The machine spindle should only start if the clamping piston has passed through the safety range. Only limit sensors should be used for monitoring the clamping distance, and these should meet the requirements for safety limit sensors specified in VDE 0113/12.73 Section 7.1.3.

II. Injury risks

This module can, for technical reasons, consist in part of individual components with sharp edges and corners. Any tasks involving this module should be carried out with extreme care to prevent risks of injury!

1. Integrated energy storage

Moving parts which are pretensioned with pressure springs, tractive springs and other springs, or other flexible elements, are a potential source of risk, due to the intrinsic energy stored. Underestimation of this can lead to serious injury caused by uncontrolled, flying parts being propelled through the air.

Before performing further work on the associated components, this stored energy must be dissipated. Clamping fixtures which are to be dismantled should be inspected for such sources of danger with the assistance of the respective assembly drawings.

The fixture should be dismantled by authorized Röhm personnel if it should prove impossible to "safely" dissipate this stored energy.

2. Maximum permissible speed

A clamping cylinder may be operated with the max. permissible speed only with applied max. permissible actuation force/pressure and with clamping devices that are functioning perfectly.

Failure to observe this basic principle can lead to a loss of residual clamping force and, consequently, workpieces being thrown out of the chuck and the risk of injury associated with this.

The clamping fixture should only be used at high speeds under an adequately-dimensioned safety guard.

If the max.speed specification only applies when certain accessory parts (e.g., top jaws) are used, the operating speed when these accessory parts aren't used might have to be drastically reduced.

3. Exceeding the permissible speed

This equipment is intended for revolving operation. Centrifugal forces created by excessive speed and/or peripheral speed can result in individual parts loosening and becoming potential sources of danger for personnel or objects in the near vicinity. In addition to this, clamping devices which are only designed for use at lower speeds but are operated at high

speeds can result in unbalance which adversely affects safety and the machining results achieved.

Operation at speeds higher than those permitted for these units is prohibited for the above-mentioned reasons.

The max. speed and actuation force/pressure are engraved on the body and should not be exceeded. This means that the max. speed of the machine being used should not exceed that of the clamping fixture (i.e. it should be limited accordingly).

Even a singular incident where the permitted values are exceeded can lead to damage or injury and represent a hidden source of risk, even if not immediately detected. The manufacturer should be informed immediately in such cases so that an inspection of functional and operational safety can be conducted. Further safe operation of the clamping unit can only be guaranteed in this manner.

4. Unbalance

An unbalance (or one-sided mass) in rotating spindles produces a centrifugal force which disturbs the smooth running of the clamping device. This centrifugal force affects, among other things, the work process and the service life of the machine spindle bearings.

Remaining risks can be posed by insufficient rotation compensation. See § 6.2 no. e) EN 1550. This particularly applies at high speeds, for the clamping of asymmetric workpieces, when using different top jaws or for all asymmetries of the clamping device.

In order to balance unwanted unbalance and the resulting damage, mass must be re-distributed symmetrically. This is the only way to prevent one-sided centrifugal forces from acting on the machine spindle bearings.

The chuck should be dynamically balanced with the workpiece mounted in accordance with ISO 1940 to prevent any resulting damage.

5. Calculating the required clamping forces

The required clamping forces and/or permissible maximum speed for the chuck should be determined for a specific task in accordance with VDI Guideline 3106 (governing the determination of permissible speeds for rotary chucks (jawed chucks)).

High centrifugal forces associated with special clamping inserts which, due to their design, are heavier or larger than the clamping inserts allocated to the clamping medium should be taken into consideration when determining the required clamping force and permissible speed.

6. Use of other/additional clamping sets/workpieces

VDI Guideline 3106 governing the determination of permissible speeds for rotary chucks (jawed chucks) should always be consulted when using clamping inserts/workpieces.

1. Use of other/additional clamping inserts

The user must rule out use of the chuck at an inordinately excessive speed and, consequently, the generation of excessive centrifugal force if clamping inserts other than those intended for this clamping device are used. Also, the external forces acting due to the type of clamping task (e.g. machining forces, acceleration forces) must be taken into account. A risk exists otherwise that the workpiece will not be adequately clamped.

The chuck manufacturer and/or designer should therefore be consulted in all such cases.

For rapidly rotating jawed chucks, the following rules are to be observed:

- The clamping jaws should be designed as light as possible and lie near the front side of the clamping device (clamping points which are spaced further apart cause higher surface pressure in the jaw guide and can lower the clamping force considerably).
- Welded jaw constructions should be avoided, if possible, or the welding seams should be checked with regard to the centrifugal and clamping force stress.
- Arrange the fastening screws so that the highest possible effective torque/moment is reached.

2. Danger due to ejection

So as to protect the operator against ejected parts and in line with DIN EN 12415 a separating protective equipment must be fitted to the machine tool, the resistance capability of which is specified in so-called resistance classes.

Should new clamping sets be used on the machine, their approved suitability must first be checked. This also includes clamping sets and/or clamping set parts manufactured by the user himself. This approved suitability is influenced by the **resistance class** of the protective equipment, the **mass** of the possible ejected parts (determined by calculation or weighing), the max.possible **chuck diameter** (measure) as well as the max. possible **speed** of the machine. In order to reduce the possible impact force to the permissible value, the permissible mass and RPM must be determined (e.g. enquiry at the machine manufacturer) and then the max. RPM of the machine restricted (if required). However, the clamping set parts (e.g. top jaws, workpiece supports, face clamping claws etc.) should be designed to be as light as possible.

3. Clamping other/additional workpieces

Special clamping sets designed for use with this clamping fixture (jaws, clamping inserts, locating fixtures, aligning elements, position fixing elements, point centers, etc.) should be used exclusively for clamping those types of workpiece for which they are de-

signed and in the manner intended. Failure to observe this can lead to injury or material damage resulting from insufficient clamping forces or unfavorable positioning.

Written permission should therefore be obtained from the manufacturer if it is intended to clamp other/similar workpieces with the same clamping set.

7. Checking clamping force/Clamping fixtures without permanent application of pressure

1. Checking clamping force (general)

Static clamping force measurement fixtures must be used in accordance with § 6.2 No. d) EN 1550 to check the service condition at regular intervals in accordance with the servicing instructions. Clamping force should therefore be inspected after approx. 40 operating hours (i.e. regardless of clamping frequency).

Special clamping force measuring jaws or fixtures (pressure measurement cells) should be used if necessary for this purpose.

Recommended clamping force measuring system EDS: (only external clamping)		
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EDS 50 (compl.).	Id.-No.	161425
EDS 100 (compl.).	Id.-No.	161426
EDS 50/100 (compl.)	Id.-No.	161427

2. Clamping force check (special)

Hydraulic supplies, especially those with large line cross-sections, involve a danger that the peak pressure - and with this, also the actuation force peaks - is considerably higher than the set pressure, due to dynamic effects. This can lead to mechanical overloading of the components. For this reason, during commissioning, the actually reached total clamping force is to be measured. The pressure may only be set to a level where the max. total clamping force (at a standstill), specified on the drawing or in the operating instructions, is not exceeded.

3. Clamping fixtures without permanent application of pressure

Clamping fixtures exist where the connection to the hydraulic or pneumatic pressure source can be interrupted during operation (e.g. for LVE/HVE). This can result in a gradual drop in pressure. Clamping force can be reduced so much as a result that the workpiece is no longer adequately clamped. Clamping pressure should therefore be activated for at least 10 seconds every 10 minutes for safety reasons to compensate for this loss of pressure.

This also applies after long periods of inoperation (e.g. where machining has been interrupted overnight and only resumed the following morning).

8. Rigidity of the workpiece to be clamped

The material to be clamped should possess a rigidity suitable for the clamping force involved and should only be minimally compressible if secure workpiece clamping under the machining forces which occur is to be ensured.

Non-metallic material (e.g. plastic, rubber, etc.) may only be clamped and machined with the express written permission of the manufacturer!

9. Clamping movements

Short distances are covered in brief periods of time under the exertion of (at times) extreme force (e.g. through clamping movements or, possibly, setup movements, etc.).

It is therefore imperative that drive elements intended for chuck actuation be deactivated in every case involving assembly or setup work. However, if clamping movement cannot be ruled out in setup mode and clamping distances are greater than 4 mm

- a fixed (or temporary) workpiece holding fixture should be mounted on the fixture
or
- an independently-actuated retention fixture (e.g. centering jaws with power chucks) should be provided,
or

- a workpiece loading aid (e.g. charging stock),
or
- setup work should be carried out in hydraulic, pneumatic and/or electrical jogging mode
(respective control should be possible!)

The type of auxiliary setup fixture employed depends on the machine being used and should be purchased separately if necessary!

The machine user must ensure that every risk of injury caused by movement of the clamping medium is ruled out during the entire clamping procedure. 2-handed actuation for clamping should be provided for this purpose, or, even better, suitable safety features.

The stroke monitor should be adjusted to suit the new situation if the clamping device is changed.

10. Manual loading and unloading

Mechanical risks to fingers in cases where clamping distances greater than 4 mm are involved must also be taken into consideration during manual loading and unloading procedures. This danger can be countered by

- the provision of an independently-actuated retention fixture (e.g. centering jaws with center chucks and face clamping chucks),
or
- use of a workpiece loading aid (e.g. charging stock),
or
- a reduction (e.g. by throttling the hydraulic energy supply) to clamping speeds not greater than 4 mm s^{-1} is provided.

11. Fixing and replacing screws

Inferior replacements or inadequate fixing of screws which are being changed or become loose can lead to risks of both injury to personnel and material damage. It is therefore imperative that, unless otherwise expressly specified, only such tightening torque as expressly recommended by the screw manufacturer and suitable for the screw quality be applied when tightening fixing screws.

Note: All specified torques must be adhered to with the usual tolerance of the torque wrench of about $\pm 10\%$.

The following torque table applies for the common sizes M5 - M24 and qualities 8.8, 10.9 and 12.9:

Quality	M5	M6	M8	M10	M12	M14	M16	M18	M20	M22	M24	
8.8	5.9	10.1	24.6	48	84	133	206	295	415	567	714	Nm
10.9	8.6	14.9	36.1	71	123	195	302	421	592	807	1017	Nm
12.9	10	17.4	42.2	83	144	229	354	492	692	945	1190	Nm

Attention: The values in the table do not apply when the tightening torque is expressly specified elsewhere.

Screw quality 12.9 should be selected in cases of doubt when replacing original screws. 12.9 quality should be selected in all cases involving fixing screws for clamping inserts, top jaws, fixed stops, cylinder covers and similar elements.

All fixing screws which, due to the purpose for which they are intended, are loosened frequently and must then be tightened again (e.g. during conversion work) should have their threads and the bearing surface of their heads coated with a lubricating medium every six months (grease paste).

Even securely tightened screws can become loose under adverse outside conditions such as, for instance, vibrations. In order to prevent this happening, all safety-related screws (clamping fixture fastening screws, clamping set fastening screws etc.) must be checked and, if necessary, tightened at regular intervals.

12. Service work

Reliability of the clamping fixture can only be ensured if service regulations in the operating instructions are followed exactly. The following should be noted in particular:

- The lubricant recommended in the operating instructions should be used for lubricating. (Unsuitable lubricant can reduce the clamping force by more than 50%).
- All surfaces requiring lubrication should be reachable where manual lubrication is involved. (Tight component fits mean that high application pressure is required. A high-pressure grease gun should therefore be used if necessary).
- Grease is best distributed for internal moving components during **manual lubrication** by running on the end positions several times, lubricating them again and then checking the clamping force.
- Lubricating impulses should ideally occur while the clamping device is in the open phase for the best lubricant distribution results during **central lubrication**.

Clamping force should be checked with a clamping force measuring instrument prior to recommencing serial work and between service intervals. "Regular checking is the only guarantee for optimum safety".

It is advantageous to run on several times the end positions of internal moving components after 500 clamping operations at the latest. (Lubricant which has been pressed out is reapplied to the pressure surfaces as a result. The clamping force is maintained for a longer period of time as a consequence).

13. Collision

Before the clamping device can be used again after a **collision**, it must be subjected to a specialist and qualified crack test.

14. T-slot nuts

If the top jaws are connected to the basic jaws with screws and T-slot nuts, the T-slot nuts may only be replaced by ORIGINAL RÖHM T-slot nuts.

When attaching top jaws, make sure that the used screws are of quality 12.9 and have the correct length.

When screwed in and tightened, the screws must be screwed in between 0 and up to max. 3 mm before the lower edge of the T-slot nut. It is not permissible for the end of the screw to project beyond the T-slot nut.

For slot nuts of the established sizes M6 - M20, the following tightening torque table applies:

Screw thread	M6	M8	M10	M12	M16	M20	
Tightening torque	15	28	52	75	160	230	Nm

Note: All specified torques must be adhered to with the usual tolerance of the torque wrench of about $\pm 10\%$.

III. Environmental hazards

Different lubricating, cooling and other media are required when operating a clamping fixture. These are generally applied to the clamping device via the distributor housing. The most frequently encountered of such media are hydraulic oil, lubricating oil/grease and coolant. Careful attention must be paid to these substances when handling the clamping device to prevent them penetrating the soil or contaminating water. **Danger! Environmental hazard!**

This applies in particular

- during mounting/dismounting, as residual quantities can still be present in pipelines, piston chambers and/or oil drainage screws,
- to porous, defective or incorrectly-fitted seals,
- to lubricants which, due to design-related reasons, emerge from or spin out of the clamping device during operation.

These emerging substances should therefore be collected and reused (or disposed of in accordance with applicable regulations)!

IV. Technical safety requirements relating to force-actuated clamping fixtures

1. The machine spindle should only be started after clamping pressure has built up in the clamping cylinder/oil distributor and clamping has been achieved within the permitted working range.
2. Unclamping must only be possible when the machine spindle is stationary.
An exception is permitted if loading/unloading is intended during the entire procedure and if the design of the distributor/cylinder permits this.
3. A signal should shut down the machine spindle immediately if the clamping energy fails.
4. The workpiece should remain securely clamped until the machining spindle is stationary in the event of the clamping energy failing.
5. An alteration of the current position should not be possible in the event of an electric power failure and re-activation.

3. Startup operations

Note: When commissioning the full clamping device, great care must be taken that no dirt is allowed to penetrate the pneumatic system of the clamping device.

3.1. Attaching the front end chuck to the machine spindle

Preparation:

Check the machine spindle head or the processed intermediate flange on the machine for radial and axial run-out (authorised - 0.005mm according to DIN 6386 and ISO 3089). The flange must be formed so that the chuck lies on its axial side. The axial side on the flange or spindle must be completely level.

3.1.1. Attachment of chuck size 125-350

Using 6 pin screws turned into the chuck (M12 size 125-350), the front end chuck is screw connected with the freely turning back flange side "over corner" with the already fixed flange on the spindle head.

The cylindrical, precisely turned centering attachment on the flange must be turned in 6._{-0.2}mm deep so that the system on the outer machined chuck edge is secured.

3.1.2. Attachment of chuck size 400-1000

Using 12 cylinder head screws found on the chuck (M12 or M16 size 400-1000) the front end chuck is screw connected from the front onto the front flange side "over corner" with the already fixed flange on the spindle head.

The cylindrical, precisely turned centering attachment on the flange must be turned in 7.5._{-0.2}mm deep so that the system on the outer machined chuck edge is secured.

Note: In order to avoid a larger jib length for the chuck, the chuck end cover with centering intake can be exchanged for one with a short cone for corresponding direct mounting to the spindle seat in accordance with DIN55027 or a camlock (DIN55029). This, of course, also applies to exchanging the chuck from a direct intake to a different one, whereby attention must be paid to the inner and outer o-ring for static sealing.

3.2. Fixing the distributor ring

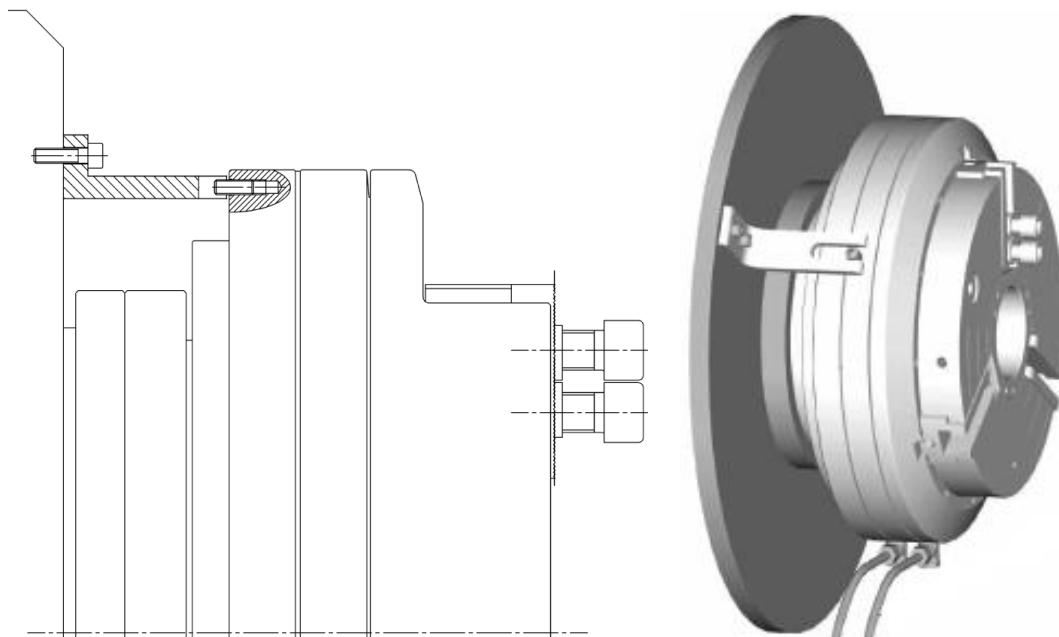
The supply of the chuck with compressed air is implemented over the distributor ring. Unlike the remaining component parts of the chuck, it is also shut down in case of rotating spindle. Since the pneumatic supply lines are connected to this distributor ring, it must be secured against accompanying rotation, otherwise the pressure lines can be torn off. There are two different possibilities, provided as series standard, to fix the distributor ring to the machine housing. In case of the sizes 125-315, both possibilities can be selected, and in case of the sizes 400-1000 only a stationary fixing of the distributor ring is provided.

3.2.1. Floating attachment of the distributor ring using the centering ring

The distributor ring is centred and pivoted using plastic segments on the chuck body. The maximum speeds are not possible (see assembly drawings) for this type of fixing.

On the rear face side are arranged 6 threaded holes at 60° to each other in each case, in order to enable the securing of the distributor ring against rotation by means of a threaded pin. The threaded pin is turned into the threaded hole which brings the pneumatic connections into a suitable position so that the pneumatic supply lines can be laid with the shortest distance to the control unit. In a rigid mounted fork in the spindle box or machine bed, the threaded pin must be free in each direction of rotation but may not be able to swing more than 3 mm. Similarly the fork must be produced and mounted so it does not exercise an **axial or radial** pressure on the distributor ring.

Therefore ONLY flexible connection lines may be used.



If the plastic segments of the distributor ring wear during the course of time on the upper support position to the chuck body, it can be rotated further by removing the 6 cylinder head screws. The 6 cylinder head screws keep both parts of the distributor ring and plastic segments together.

The pulled up axial surface of the chuck body around the distributor ring prevent dirt and chippings penetrating between the distributor ring and chuck body. Coolants and emulsions can drain away using special drill holes which are arranged by the customer at the lowest point of the upright distributor ring.

The cylinder head screws on the distributor ring should be lightly tightened. Both parts of the distributor ring can now be aligned by lightly tapping them. Retighten the screws.

Wear on the profile seals can only happen when the chuck is operated using the control unit during rotation, which is generally restricted by the connection of electrical locks on the machine.

3.2.2. Stationary fixing of the distributor ring

In case of a stationary fixing of the distributor ring, the speed can be increased to the maximum value engraved in the chuck. The stationary installation can be carried out using the existing M6 and/or M8 threaded holes on the rear face side of the distributor ring. It is to be ensured that the distributor ring is aligned contact-free with respect to the chuck body. With this type of securing, the distributor ring must be equipped with a spacing ring instead of the plastic segments (size 125-350), which is enclosed loose in the packing with every front-end chuck. If the distributor ring should be attached stationary, however, the front-end chuck is equipped with centering ring, this must be replaced with the enclosed spacing ring.

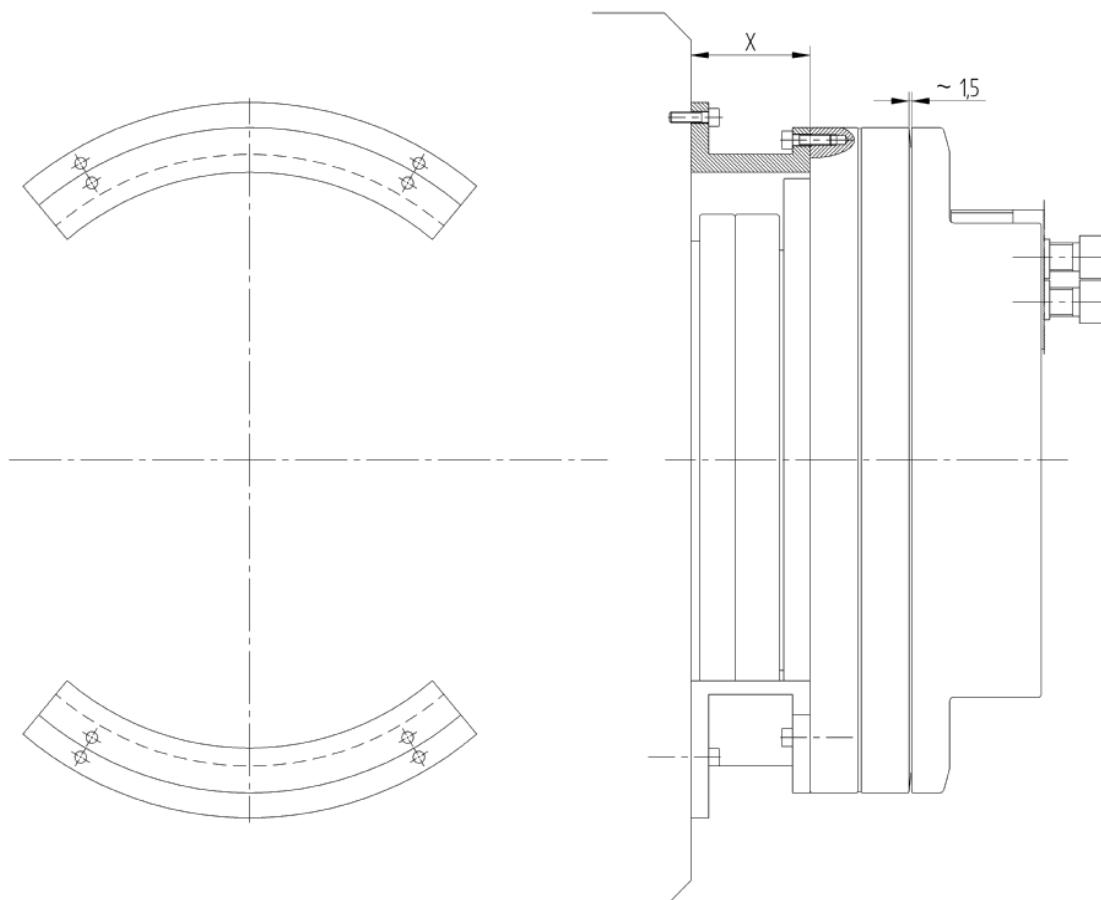
For stationary fixing of the distributor ring, the chuck is a completely separate component with respect to the chuck and is centered and held, axial and radial, stationary on the spindle rod of the lathe with a spacer console.

After initial setup of the chuck on the spindle head of the lathe, the height size X of the spacer console is determined. For implementation of the spacer console, it is important whether the top end screw-on surface on the spindle box of the lathe is worked and unworked.

The axial labyrinth gap between the chuck body and the distributor ring must be 1.5 mm for all front-end chucks. This is the only way of guaranteeing the correct transfer of air from the distributor ring to the chuck body.

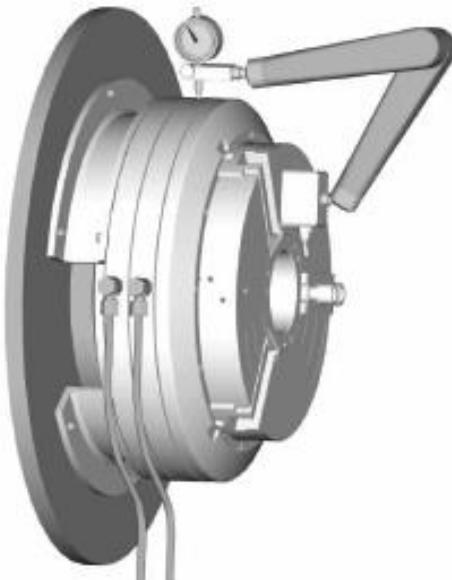
The height size X of the console results from the sum of distances between the axial side of the spindle box and the axial side of the distributor ring. With a processed spindle box axial surface, the determined size X should be considered as a height size for the spacer console. With the unworked top end of the spindle box, the height size X should be specified from the sum of individual distances minus 4-5mm. The spacer console consisting of 2 cases is purposefully welded from steel plate. The main size corresponding with the individual chuck sizes can be taken from the assembly drawing.

For the fixing of the spacer console, 6x M6 or M8 threaded holes are placed at 60° to each other in the distributor ring of the front-end chuck. After completion of the fixing screw taps on the spindle box, and the holes in the spacer console, these are screwed with the distributor ring.



The front-end chuck with distributor ring as well as the spacer console is now finally screwed onto the spindle nose. The outer diameter of the distributor ring corresponds with the maximum outer chuck diameter. This means that the distributor ring can be precisely aligned and screw connected centrally to the chuck using a ruler.

The distributor ring must be aligned to the outer chuck diameter so that a radial and axial run-out tolerance of 0.1mm is achieved.



When dismantling the chuck from the spindle nose, the clearance console is not dismantled from the distributor ring and is just loosened from the spindle box.

4. Maintenance

The service condition of the clamping device is decisive when it comes to its functionality, clamping force, precision and service life expectancy.

Daily maintenance or every 8 operating hours:

Coat the 2 grease nipples - item 67 - with approx. 0.5 cm³ of grease.

Grease the cone of the taper sleeve - item 15.

After every greasing, carry out 3-4 empty strokes so that the grease can distribute itself.

Grease type: To do this, a acid-free, viscous grease with MoS₂-additives must be used.
We recommend our **F80*** grease.

Blowing out: Never blow into jaw guides or guide gaps.

Preventative service measures:

Check	Frequency	Procedure	Possible malfunction
Clamping force inspection (only for external clamping force measurement) (Radial clamping)	every 6 months	Pressure measuring cell or ¹ EDS clamping force measuring system**	Worn seals in the cylinder, insufficient lubrication, faults in the connection elements
Axial force check (Moving point)	every 6 months	Pressure measuring cell ² + steel disc	Worn seals in the cylinder, insufficient lubrication, faults in the connection elements
Oil residue / accumulated lubricant inside the chuck	every 6 months	Oil drain screw	Unbalance, clamping force loss, blockage

4.1. Servicing

The clamping fixture should be removed from the machine and subject to a general cleaning at intervals of a longer duration (these can only be determined under practical circumstances), but at the latest when running is noticeably sluggish, imprecise and/or there is a reduction in clamping force. The clamping device should be dismantled into its individual parts for this purpose, checked for wear, cleaned and reassembled after repairing defective components. It is particularly recommended that sealing elements subject to dynamic stress be replaced during this operation. A set of wear parts and sealing elements (marked in the piece list with an "X" in column "PTyp") should therefore be available at all times for such cases.

Ensure with the greatest of care that marked components are reinserted in the positions intended for them when reassembling the clamping device.

Rebalancing of the previously dismantled clamping device is usually unnecessary if this is observed. However, attention should be paid to the running smoothness of the clamping device during a test run after the general inspection. The clamping device can be re-balanced at the manufacturer's facility or with a mobile balancing unit by a RÖHM service technician at the customer's premises if chuck balance should prove unsatisfactory (an additional charge is involved here).

* Recommended grease F80:
100 g Id.-No. 630869
250 g Id.-No. 304345
500 g Id.-No. 308555
1000 g Id.-No. 028975
5000 g Id.-No. 318310
25000 g Id.-No. 658047

**Recommended EDS clamping force measuring system:		
(only for external clamping force measurement)		
EDS 50 (compl.).	Id.No.	161425
EDS 100 (compl.).	Id.No.	161426
EDS 50/100 (compl.)	Id.No.	161427

¹ e.g. model 339H manufactured by ERICHSEN/AMETEK, 40670 Meerbusch

² e.g. model 329 manufactured by ERICHSEN/AMETEK, 40670 Meerbusch

4.2. Disassembly

1. Dismantle the chuck from the machine spindle. Refer to the corresponding chapter.

Note: The distribution ring Item 08 must not be dismantled and can remain on the casing on the machine spindle.

2. Loosen the two venting screws Item 14 by 2 - 3 turns from the axial surface of the body Item 01. Only loosen - do not unscrew.

Caution: One of the two cylinder chambers, even after longer chuck down-time and non-actuation, can remain under pneumatic pressure. As a result of loosening the two venting bolts Item 14, this pressure is reduced slowly and in a controlled way.

3. Unscrew the two control valves Item 17 in front from the flat surface of body Item 01 and remove.
4. Loosen the socket head bolts Item 22 in flange Item 07, and screw out.
5. Take down the flange Item 07 at rear from the body Item 01. In order to facilitate this, several press screw threads are located in the flange Item 07.
6. Loosen the socket head bolts Item 23 in the piston disk Item 06, and screw out.
7. Take down the piston disk Item 06 at rear from piston Item 03. In order to facilitate this, several press screw thread are located in the piston disk Item 06.
8. Loosen the socket head bolts Item 25 in the intermediate disk Item 05 and remove together with this at rear from the body Item 01. In order to facilitate this, several press screw threads are located in the intermediate disk Item 05.
9. Loosen the socket head bolts Item 26 in the protection bushing Item 04, and pull out, together with the protection bushing Item 04, from the chuck bore to the front. In order to facilitate this, several press screw threads are located in the shoulder of the protection bushing Item 04.
10. Take the piston Item 03 from the chuck hole at the back. The jaw bases Item 02 move towards the centre of the chuck.
11. Once the piston has been pulled out to the back, the jaw bases Item 02 can be inserted one after the other in the chuck hole and therefore taken out of their guide in the body, Item 01.

4.3. Cleaning and replacing spare parts

1. **Only if defective:** replace both control valves, Item 17.
You are advised to avoid repairs or replacing the sealing rings on the control valves, Item 17, because they are essential and safety relevant components.
2. Remove both seals Item 12 inwards out of the distributor ring Item 08.
3. Blow out the distributor ring Item 08.
4. Dismantle all O-rings.
5. Screw out the hydraulic-type lubricating nipples of the base jaws Item 02
6. Clean all individual parts of the chuck with a suitable solvent and then blow out with compressed air.

Note: Remove the old grease from the lubrication bores of the base jaws Item 02, which could not be eliminated through washing and blowing off, with a corresponding drill.

7. Replace the worn-out or damaged profile ring seals and reinstall in the cleaned individual parts.
8. Screw the cone lubrication nipples into the base jaws Item 02 again.
9. Lubricate the cone lubrication nipple in the jaw bases Item 02 with a grease press until the grease comes out of all outlet openings.
10. Replace defective or worn O-rings and reinsert them slightly oiled in the corresponding individual parts.
11. The piston hole in the body Item 01 as well as both holes for the control valves Item 17 in the body Item 01 should also be lightly oiled.
12. Lightly grease the guides of the base jaws Item 02, as well as the grooves in body Item 01, with F80 grease.

4.4. Assembly

Caution: Before inserting the individual parts, please check whether all seals are available and undamaged and whether they are installed correctly.

All screws are to be tightened with their strength class according to the tightening torque. Refer to the "Safety notes" chapter.

During assembly of the chuck, the greatest possible care must be taken and attention paid that no dirt is allowed to penetrate inside or into the pneumatic system.

1. Insert the base jaws Item 02 one after each other from the chuck bore into the base jaw guides of the body Item 01, and slide out to the limit stop.

Note: The jaw bases Item 02 are marked with the numbers "1", "2" or "3". The guide pairs in the body Item 01 as well. Due to accuracy reasons, attention must be paid when inserting the jaw bases Item 02 that the jaw bases numbers match the guide numbers.

2. Insert the pistons Item 03 on the correct side from behind into the chuck hole so that the numbers on the wedge suspensions of the piston Item 03 matches the numbers of the jaw bases Item 02 to be suspended. Slide the piston Item 03 up to the wedge suspensions of the jaw bases Item 02.
3. Slide the base jaws Item 02 so far to the chuck middle that their wedge suspensions are capable of being inserted in the pistons Item 03. Then slide these to the limit stop in body Item 01 to the front. In this case, all base jaws Item 02 move out together.
4. Insert the protective socket Item 04 on the correct side from the front into the chuck hole and screw-on with the cylinder screws Item 26 crosswise onto the body Item 01.
5. Slide the intermediate disk Item 05, on the correct side from behind, over the piston Item 03 and insert into the receptacle bore of body Item 01. Note here that the bolt countersinks in the intermediate disk Item 05 match up with the screw taps in the body Item 01.
6. With the cylinder screws Item 25, screw-on the intermediate disk Item 05 crossed onto the body Item 01.
7. Place the piston disk Item 06 on the correct side and location, from behind, onto the piston Item 03. Note here that the bolt countersinks in the piston disk Item 06 match up with the screw taps in the piston Item 03.
8. With the cylinder screws Item 23, screw connect the piston disc Item 06 and the piston Item 03.
9. Clean the screw-on surface and the centering diameter for the flange Item 07 in the body Item 01 and check for unevenness. Equal out any possible errors.
10. Place the flange Item 07 on the correct side, from behind, onto the body Item 01. Note here that the bolt countersinks in flange Item 07 match up with the screw taps in the body Item 01.
11. With the cylinder screws Item 22, screw-on the flange Item 07 crosswise onto the body Item 01.

12. Lightly oil both control valves Item 17 and insert on the correct side from the front into the hole on the axial surface of the body Item 01 then tighten. Tightening torque approximately 50 Nm.
13. Tighten both venting screws Item 14.
14. Mount the chuck back on the machine spindle. Refer to the corresponding chapter.

4.5. Malfunctions: causes and remedies

Malfunctions	Causes and remedies
Outer or inner tension: The chuck clamps but opens again immediately	Both control valves, Item 17, do not perform the switch movement: Remove the control valves Item 17, clean bores and blow off, as well as lightly oil these and the valves. Install the two control valves Item 17 again.
Audible air discharge under the distributor ring Item 08 on actuation, and after implemented jaw movement	Seals Item 12 are dirty: Dismantle distributor ring Item 08, dismantle the seals Item 12, wash, knead through with grease, oil and mount again.
Distributor ring Item 08 becomes hot, machine spindle runs with difficulty.	The seals Item 12 are contacting the body Item 01 and wearing: Check the pressure at the connections of the distributor ring Item 08; during spindle rotation both connections "A" and "B" must be pressure-free. Replace the seals Item 12.
The distributor ring Item 08 becomes hot (stationary fixing)	Readjust distributor ring Item 08: The slot between distributor ring Item 08 and body Item 01 must be uniform.
The clamping force reduces with longer processing times	Seals Item 12 or control valves Item 17 defective: Dismantle chuck, clean and replace defective control valves Item 17 and seals.
Audible loss of air in the clamped status	Pistons sealing ring not available or defective.

5. Controls

After mounting the chuck on the machine spindle, this still needs to be connected with the pneumatic connections on the control unit.

For operation of the front end chuck LVE, there are different controls adapted to the respective requirements for selection:

Pneumatic control unit LSV Type 525-91

Electronic control unit Type 525-60/70/80/90 for automatic impulse safety control with start-up protection through the pneumatic control unit and switch boxes.

When using a Röhm control unit, the specified notes in the operating manual must be considered

If a different control unit is used, the following point must be observed:

The "clamping" or "release" process may only take place with the chuck at a standstill otherwise the special seals in the distributor ring can be destroyed.

For all supply line pipes or hoses, the inner diameter must be a minimum of Ø14mm.

To maintain operational safety, an air maintenance unit must be used in front of the pneumatic valves.

6. Spare parts

Please note that only ORIGINAL RÖHM spare parts or components acquired from suppliers authorized by RÖHM GmbH should be used. RÖHM GmbH accepts no liability for injury or damage resulting from the use of components from other manufacturers.

Note: Details of the 6 or 7 digit identity number engraved on the module and the manufacturing number (if available) are required to facilitate spare parts or individual components ordering. The manufacturing number consists of a letter followed by 2 numbers and, possibly, an incremental number, this being either on the nameplate or in the near vicinity of the identity number.

Manufacturer's address:

Firma
Röhm GmbH
Röhmstr. 6
89407 Dillingen/Donau
GERMANY

KOB Dillingen, date of issue: 08.11.16

Mr. M. Kunz