



OPERATION MANUAL FOR HONING DEVICE

Version 1.0

Engine	L 32/40	621-023-000
	V 32/40	621-040-000
	40/54	621-022-000
	L 48/60	621-020-000
	V 48/60	621-031-000
	58/64	621-021-000

Revision 1.0

GERUS Apparatebau GmbH & Co KG

Engelschalkstrasse 16
D-86316 Friedberg

e-mail: info@gerus-apparatebau.de

Tel.: +49-0) 821-588662-0

Fax: +49-0) 821-588662-10



EG-Konformitätserklärung

Wir, die Firma

GERUS Apparatbau GmbH&CO.KG
Engelschalkstrasse 16, 86316 Friedberg,
Deutschland,

erklären hiermit, dass die nachfolgend bezeichnete Maschine aufgrund ihrer Konzipierung und Bauart sowie in der von uns in Verkehr gebrachten Ausführung den einschlägigen Sicherheits- und Gesundheitsanforderungen den nachfolgenden angeführten EG-Richtlinien entspricht.

Maschinenrichtlinie 2006/42/EG
 EMV-Richtlinie 2004/108/EG

Bezeichnung der Maschine:
 Description of the machine:

Typ:
 Type:

Serien-Nr.:
 Serial No.:

Angewandte harmonisierte Normen:
 Applied harmonized standards:

Bevollmächtigter für techn.Dokumentation:
 Authorized person for techn.documentation:

Ort und Datum:
 Place and date:

Name und Position des Unterzeichners:
 Name and position of signer:

EC-Declaration of Conformity

We, the company

GERUS Apparatbau GmbH&CO.KG
Engelschalkstrasse 16, 86316 Friedberg,
Germany,

declare hereby that the following described machine in its conception, construction and form put by us into circulation is in accordance with all the relevant essential health and safety requirements of the following EC directives.

Machinery directive 2006/42/EC
 EMC directive 2004/108/EC

Honvorrichtung
 Honing device

HD-

EN 12100, EN 60204

Dipl.Ing. H. Müschenborn

Friedberg, 25.07.2011

Dipl.Ing. R. Schroll, Geschäftsführer
 Dipl.Ing. R. Schroll, Business manager

Unterschrift des Unterzeichners
 Signature of signer



REACH Erklärung

Wir, die Firma

GERUS Apparatebau GmbH&CO.KG
Engelschalkstrasse 16, 86316 Friedberg,
Deutschland,

erklären hiermit, dass wir als Hersteller von Maschinen und Werkzeugen zur Überholung und Instandsetzung von Großmotoren von der Verordnung nur als nachgeschalteter Anwender betroffen sind und daher nicht zur Registrierung und Vorregistrierung verpflichtet sind.

Beim Gebrauch unserer Maschinen werden keine Schadstoffe im Rahmen von Artikel 7.1 und 7.2 der Verordnung freigesetzt

Ort und Datum:
Place and date:

Name und Position des Unterzeichners:
Name and position of signer:

REACH Declaration

We, the company

GERUS Apparatebau GmbH&CO.KG
Engelschalkstrasse 16, 86316 Friedberg,
Germany,

declare hereby that as a manufacturer of machines and tools for overhauling and maintenance of large bore engines we are only concerned by the regulation as downstream user and, therefore, we are not bound to register or pre-register.

Under normal use of our machines, no harmful substances within the scope of Article 7.1 and 7.2 of the regulation are released.

Friedberg, 03.11.2011

Dipl.Ing. R. Schroll, Geschäftsführer
Dipl.Ing. R. Schroll, Business manager

Unterschrift des Unterzeichners
Signature of signer

Safety instructions

When using this machine, basic safety precautions should always be followed to reduce the risk of electric shock, personal injury and fire. Read these safety instructions and the operating instructions before attempting to operate this machine.

1. Consider work area environment

Don't expose the machine to water. Keep work area well lit.

2. Dress properly

Don't wear loose clothing which may be caught in moving parts. Wear protective hair covering to contain long hair.

3. Use safety glasses

The chips produced when refacing may cause eye injuries.

4. Don't abuse cables

Never carry machine or power supply unit by cable. Don't yank cables to disconnect it from receptacles.

5. Secure cables

Make sure cables are kept away from the range of the revolving tool head. Keep cables from oil, grease, heat and sharp edges.

6. Unplug power cable when machine is not in use

When not in use, during breaks and before carrying out any work on the machine disconnect the machine from the power supply by removing power cable plug from mains.

7. Maintain machine with care

Inspect cables, plugs and switches periodically. Have damaged and defective parts properly repaired or replaced by a qualified expert.

8. Intended use

Use this machine exclusively for valve seat refacing. The use of any accessory or attachment other than recommended in this operating instructions may present a risk of personal injury.

9. Disconnect the airpressure-connection by standstill

Before all services on the machine as well as at standstill of the machine and workbreaks please disconnect the airpressure-connection.

10. Use the machine with carefullness

Check constantly hosepipes, couplings and valves. Broken and damaged parts can only be changed by authorised experts.

11. Intendend use of the machine

The machine can only be used for the honing of cylinder-liners. Not intendend use of the maschine as well as the assignment of not recommended accessory can lead to personal risk of injury. Please use only accessory which is recommended by supplier.

Symbols

The following symbols are used in the instruction manual:



Indicates a hazardous situation which, if not avoided, will result in a serious injury.



Indicates a property damage message



Information and Tips

Explanation for installation:

The honing device is shown in figure 1 in an assembled or built in foldable design.

Recommended sequence of construction-assembly of honing device:

General: The assembly is mounted with caution and prudence.

1. The adapter item 022 is screwed onto the free-standing cylinder cover screws and tightened with a pivot pin by hand.
2. The guide tube 004 items on the two adapters is screwed. (depending on thread execution, the guide tube can also be screwed directly onto the cylinder head bolt)
3. The extension tubes item 003 can be screwed into the guide tubes item 004.
4. The traverse item 002 can now be placed on the extension tubes item 003 to the cross arm for this purpose are assembled on each side a guide pin which fits the respective extension tube. Using the supplied hex screw then this guide pin is screwed into the extension tube. At this traverse item 002 of the lift motor item 001 assembled with its already operating device already.
5. The liquid container item 012 can now be mounted laterally on the traverse.
6. Now the guide arm with the details of item 006 / 007 at the cable hook, see section group 7.1 hooked.
7. The other part as item 008 air tube and the drive item 009 can be mounted in combination. (this section is to assist – 7.5 beam with driving). The parts for the drive are pre-assembled.
8. The weight of item 010 is clamped approximately in the middle of the air tube item 008
9. As long as the cable from item 001 was not extended, the honing head can now be heading down item 011 mounted to the drive unit item 009 (see figure 5 – mounting honing head-).

Thus now is the construction of the honing device finished.

Now there are other small installations to be made.

- a. The air supply unit – see figure 3 – must be submitted on a safe ground. The hoses are suitable to be coupled. Permutations are not possible through various couplings.
- b. The connection 1 (figure 6), this tube is pre-assembled, is inserted at the other end attached to the connector plug into the air supply unit.
- c. The other connection, see figure 7, is already fixed to the traverse and can be also connected to the air supply unit. Thus, all necessary for the operation of the honing device connected air connections.
- d. Now is to couple the tiny hose connections – see group 7.2- item 018 and item 018 pictured above image below. These two hose connections are necessary in order to be able to press down the honing stones.
- e. The hose connection for the supply of the honing liquid is to be connected to figure 8.

Further details on the commissioning of the following description refer to.

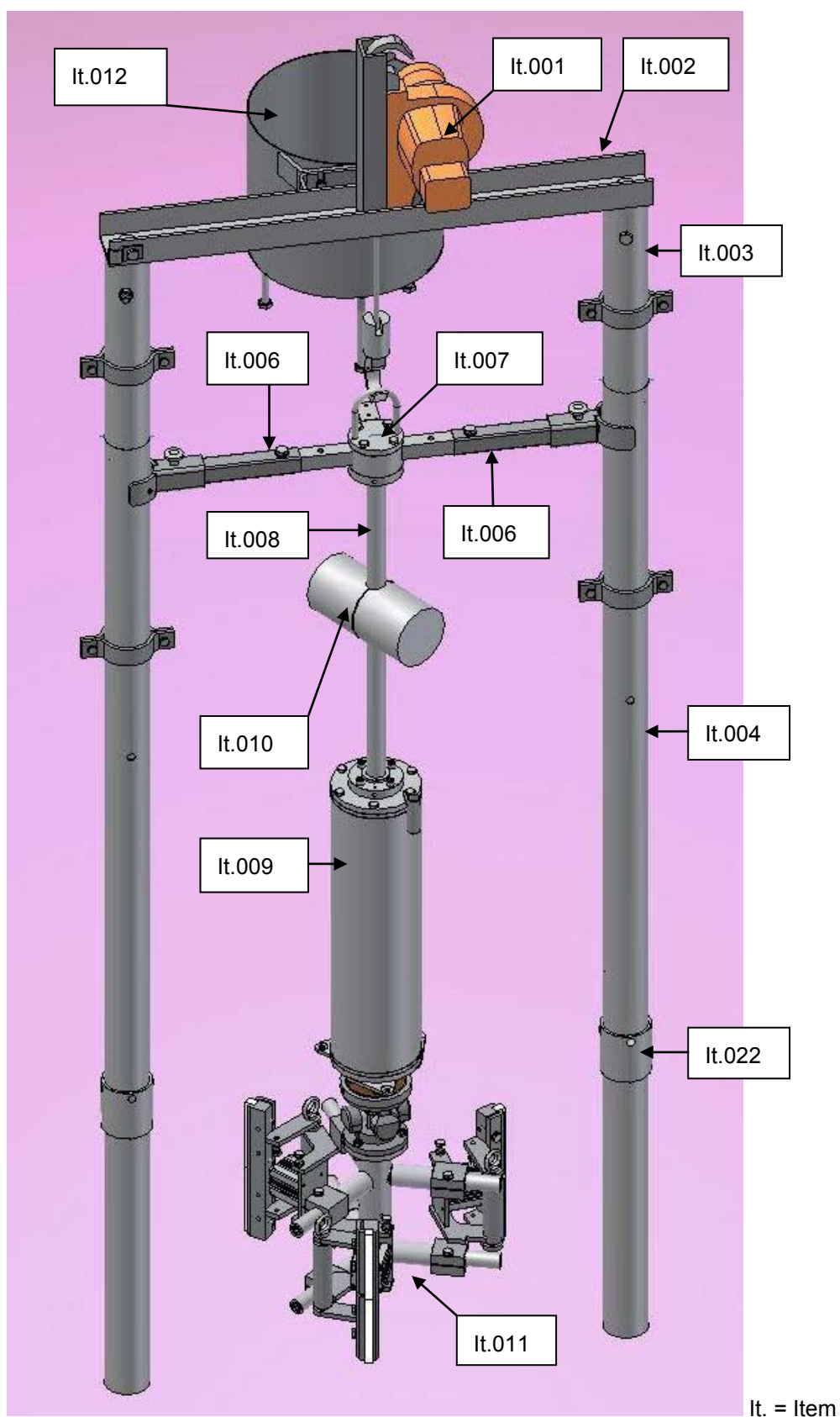


Fig. 1 - General view: Honing device

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1 General Safety Instructions

1.1 Precautions for Protecting the Inhaled Air

The GERUS honing device is operated pneumatically. For servicing and lubricating the mobile parts and valves within the air-conduction system, a certain quantity of oil is added to the compressed air. The absence of oil in the evacuated working air can therefore not be guaranteed. For a safe exclusion of any health injuries it is necessary to provide sufficient fresh-air feeding during the operation. If this cannot be guaranteed, appropriate safety actions must be provided by the user.

1.2 Requirement of a strong Standing Position

In order to guarantee the freedom from bodily harm a strong and safe standing position is absolutely necessary during the operation of the machine. The operator must occupy a strong and safe standing position during the working actions. This standing position is defined as a position which permits the operator operating the valves on the pylon in any situation without manual securing of the position and of the body posture. Prior to starting the work, it is absolutely necessary to provide such a standing surface.

1.3 Safety Spacing and Stay Areas

The honing device includes several mobile parts mounted without contact prevention means. For safely preventing accidents, it is necessary to keep a minimum spacing of 1 m with regard to all mobile parts during the working process. The following danger areas are existing:

lift limitations on the pylon pipes (bruises),

liner border (rotating honing stones),

liner (working space of the honing head),

rotating honing head,

honing stone fastening device,

engine room (during the working action any service activities are forbidden within the engine room),

staying below the honing head is not allowed.

The moment of the lift inversion can be identified on the stops Pos.1 and 2. When the guidances are reaching a stop, the direction must be changed by actuating the keys of the lifting device (Item 1 = upper stop piece, Item 2 = lower stop piece – fig. 2).

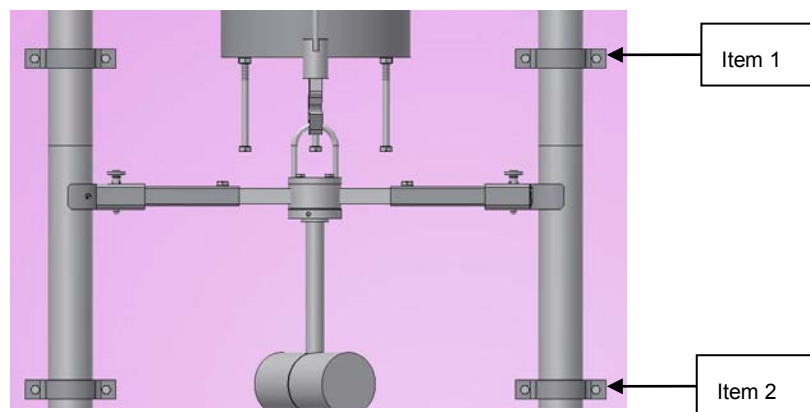


Fig.2 - Guide

The check of the results of the honing action may only be carried out with closed main valve; only in this status the risk of accident by moving machine parts can safely be excluded.

For safety reasons the stopping must take place in the following sequence:

Immediately after passing the lower reversal point, the lift movement must be stopped, and the sliding valve for pressing-against of the honing stone must be closed simultaneously.

Close the ball valve of the rotation movement.

For checking the work result, bring the honing head into the desired position by means of a tackle line.

Close the main cock on the air supply station.

2 Structure of the honing device

2.1 Work Preparation

Prior to starting the work always provide a safe standing position of the operator as well as a good illumination. The standing surface of the operator must be even, strong, free of oil and of grease and must permit the safe operation of the honing device with the required distance from the honing device. The illumination must permit a visual check of the work result without additional lighting means.

2.2 Description of pressure-reducing station

The pressure-reducing station is foreseen for furnishing the working medium (compressed air) for the honing device with the defined pressures and quantities.

On input side the station is equipped with an 1 ¼" connection, which can be fed with a pressure = up to 18 bar. For higher pressures = up to 30 bar the station can be delivered with an additional pressure-reducing valve, which will permit a standard operating.

On output side the station is equipped with 3 connections as defined below:



Fig. 3- Air-Supply Station

No.	Unit	Connection Description
1	Lift	In flow direction, right hand (G 1/2")
2	Rotation	Center (G1")
3	Pressing-against	In flow direction, left hand (G1/2")

In case of alteration of the connections the warranty and the reliability of the manufacturer will expire, as in this case a safe operating will no longer be possible and the device can be disturbed and damaged. The supply of the single units must in any case be carried out with the help of the hose material joined to the delivery. Inappropriate hose material can lead to conduit damage and to injuries of persons.

The air-supply station can be delivered in two versions:

maximum feeding pressure = 18 bar;

maximum feeding pressure = 30 bar (in connection with an additional pressure reducer valve only).



Both the versions are delivered with factory-adjusted correct operating pressures.

2.3 Setting-up of the pylon

For mounting the pylon, the cylinder head must have been drawn off. Both the elongation pipes (Item 004) (L/V32/40: length= 1085mm, Inner thread M48x3; L/V48/60, 40/54, 5 8/64: length=1250mm, Inner thread M64x4) will be screwed with the adapters (Item 022, only 40/54, 48/60) onto two cylinder head screws arranged diagonally to each other.

Motor Type	Inner Thread of Adapter	Outer Thread of Adapter
40/54, 48/60	M56x4	M64x4

Respectively two of the four stops (Item 2, fig. 2) are slid onto the pipes. A stop will remain on the lower end and the other stop will slightly be pre-fastened on the upper end. The definitive adjustment will only be carried out after the complete mounting of the honing device, and then the honing head is already within the cylinder liner. The adjustment of the stops will be carried out on the respective reversal points when the honing head is in the standstill. For this, the stops are applied respectively to the guiding arm in these positions of the honing head (also see § Commissioning).

In order to have the right correspondence between the device and 40/54, 48/60, 58/64 (lift), for this type an elongation of 350 mm (Item 004) will be screwed onto the pylon pipes (Item 003).

These elongations are mounted on the upper end (see assembling drawing).

The cross arm (Item 002) connected to the lifting motor will be mounted on both the upper pipe ends.

2.4 Pre-mounting of the honing device

The pneumatic driving unit (Item 009) will be screwed to the elongation (Item 008) by means of 4 hexagon screws DIN 933-M8x30. Then, the guide arm (Item 007) is connected to the elongation in the same manner. Thanks to slip-on sliders (Item 006), it is possible to adjust the length of the guiding arm. For this, the following lengths must be met for the different engine types:

Motor type	Length of the Guide arm
32/40	571 mm
40/54	659 mm
48/60	782 mm
58/64	902 mm

As shown in the drawing, the driving unit pre-mounted in this way is connected to the eye screw by means of the hook of the pneumatic tackle line (Item 001) and is lifted accordingly (caution, risk of back-swing). On the guiding arm the sliding clamp under-parts are pushed entirely up to the center, then the guide arm is rotated around the cylinder axis until the quarter shells of the clamp upper parts are applied to the pylon pipes (Item 004). The guidance will be closed by sliding the clamp under-parts to the outside until these under-parts will also be applied to the pipes and up to the securing of these pipes by means of the suspended locking bolts.

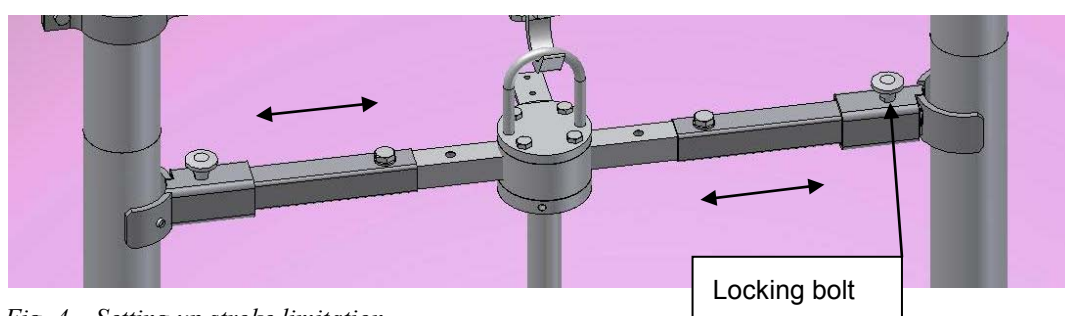


Fig. 4 – Setting up stroke limitation

In order to permit lifting and lowering the unit the air-supply of the lifting equipment will be connected (for this, take into consideration the connection of the air supply).

2.5 Mounting-On of the honing head

Both the wood seatings are laid onto the upper end of the cylinder liner and the honing head (Item 011) will be positioned in a coaxial way with the liner axis (see assembling drawing). The pneumatic lifting equipment (Item 001) must be lowered until the honing head directed upwards can be fastened on the pneumatic driving unit (Item 009) by means of the 3 screws DIN 933 M8x25.

For weighting of honing head is a weight (Item 010 - fig.1) screwed on the extension

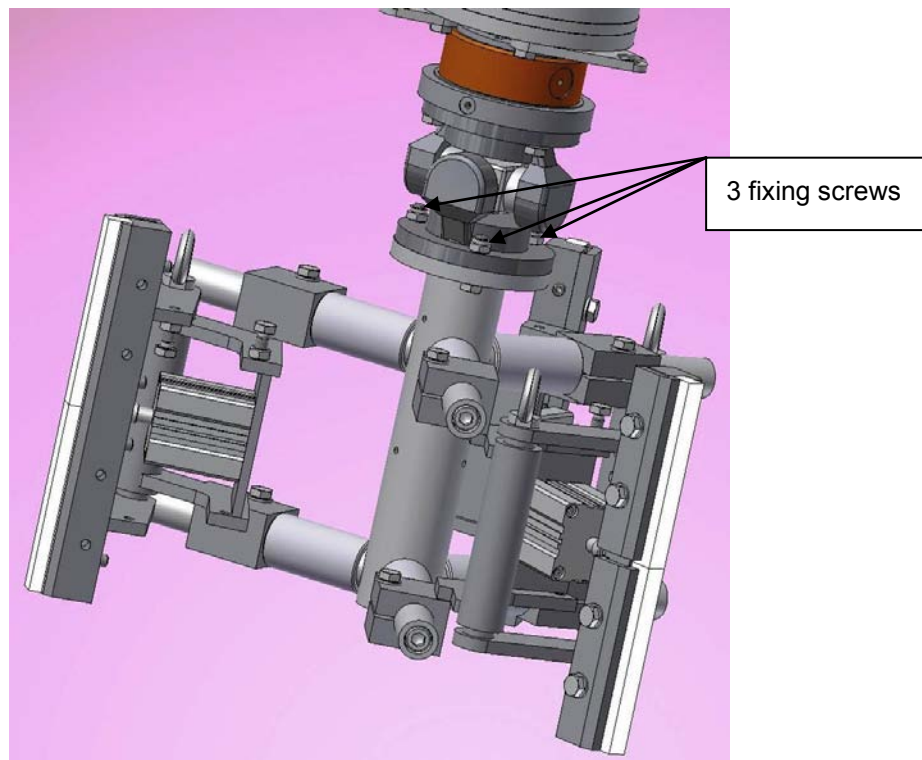


Fig. 5 – Mounting-On of the Honing Head

2.6 Connection of the air-supply

ATTENTION:

Make sure that for connecting the conduits the main cock of air-supply station is closed!

The lifting motor (pneumatic tackle line Item 001) will directly be connected to the lifting motor by means of the suitable hose oncoming from connection 1 (fig. 3) of supply station (fig. 6).

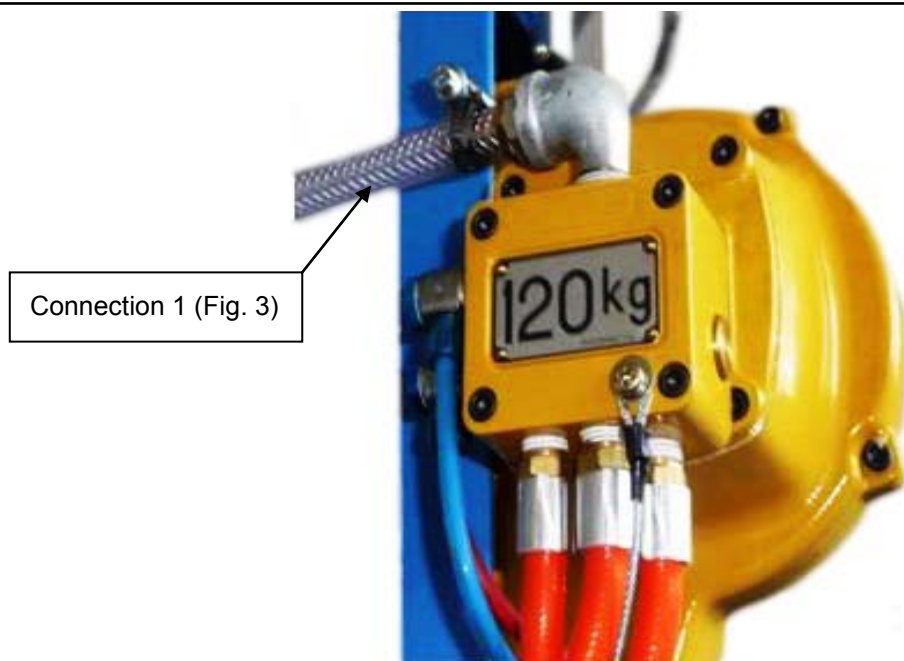


Fig. 6- Air connection lifting motor

The pneumatic driving unit (Item 009) will be connected to the connection 2 (fig. 3) of the supply unit by means of the suitable hose. The driving unit has a fixed piping equipped with a ball valve mounted on the guidance arm. The hose is connected directly to this valve.

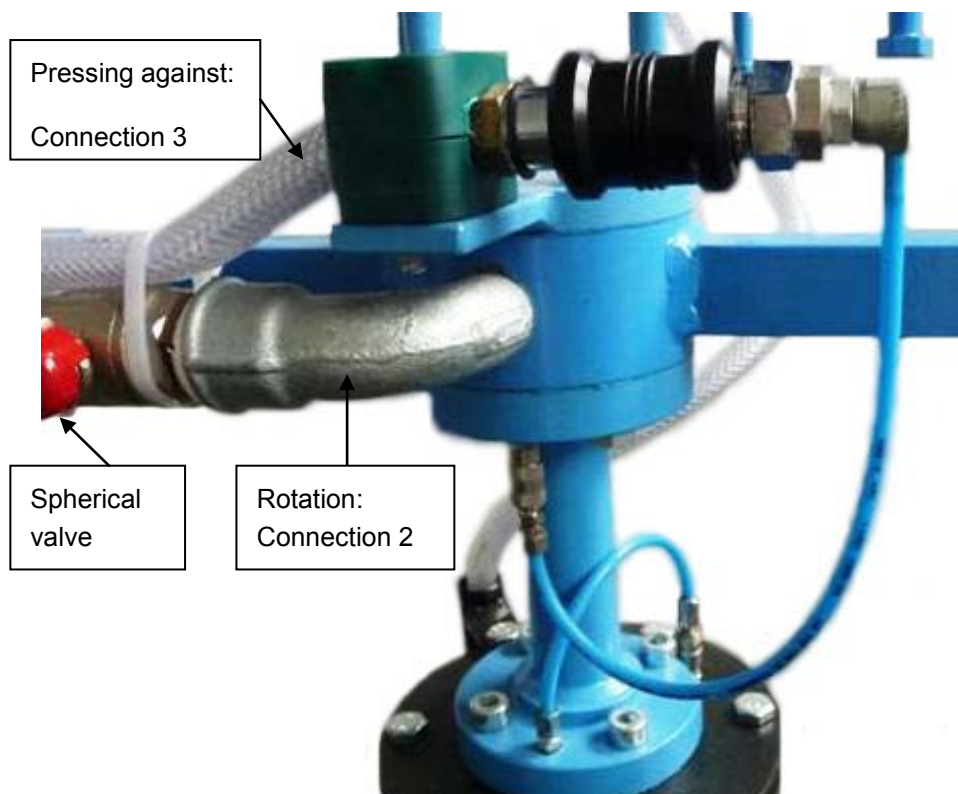


Fig. 7 – Air connections: Rotation and Pressing-against

The supply of the pressing-against unit takes place via the suitable hose mountable between the connection 3 (Fig. 3) of air-supply station and the sliding valve mounted on the guidance arm.

The small junction hose mounted on the sliding valve is to be connected to the driving unit (Item 009).

The supply hose mounted on the honing head (Item 011) must also be connected to the driving unit, which is equipped with a fixed air junction accessible via both the connections.

2.7 Mounting-On of the lubricant tank

The lubricant tank (Item 012) optionally can be installed on two places.

Free positioning next to the guiding rod. When choosing the setting-up place, make that the location is safe and on higher level guaranteeing the flow of the fluid. This solution is especially recommended in case of V-type machines.

Mounting of the lubricant tank on the pylon cross arm (Item 002). This mounting-on can simplify the handling during the honing of L-shaped machines.

In both the cases the connection is via a hose from the lubricant tank to the distributor unit to the drive unit. A spherical valve separates the lubricant admission.

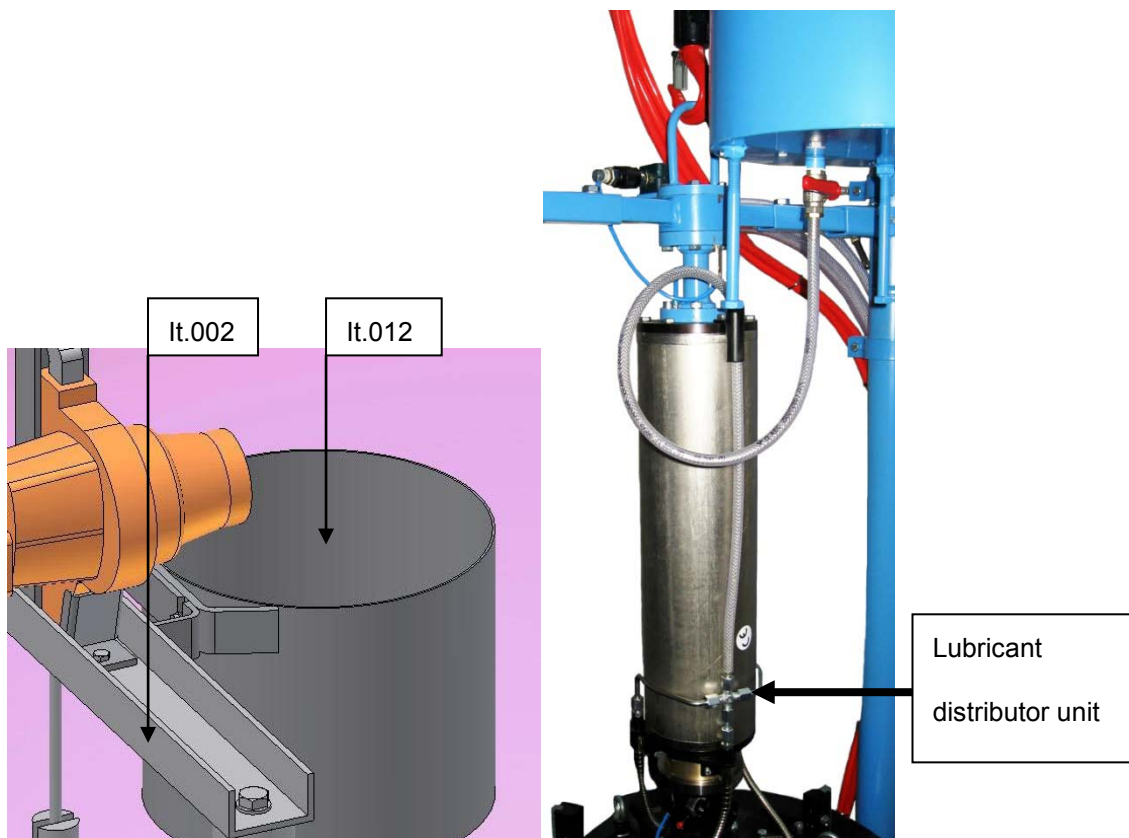


Fig. 8 – Mounting lubricant tank and hose connection

2.8 Adjustment and replacement of the honing stones

Like the honing lubricant the honing stones to be used are not delivered by GERUS, as the stones and the size are exclusively selected by the engine manufacturer.

Respectively two honing stones (Item 2) are to be mounted without any gap and without any step into one of the 3 pressing-against arms of the honing head (Item 011).

For inserting new honing stones, open the straining screws (Item 4) and screw back the Hexagon socket set screw (Item 5) in such a way that the stones will be applied on the honing stone fastening device (Item 1). For fastening, tighten the straining screws (Item 4). After the insertion of the honing stones it is necessary to verify if the dimension h complies with the minimum requirements of 1.5 mm. If these requirements are not complied with, the honing stone can be re-adjusted up to the necessary dimension after having slightly loosened the straining screws (Item 4).

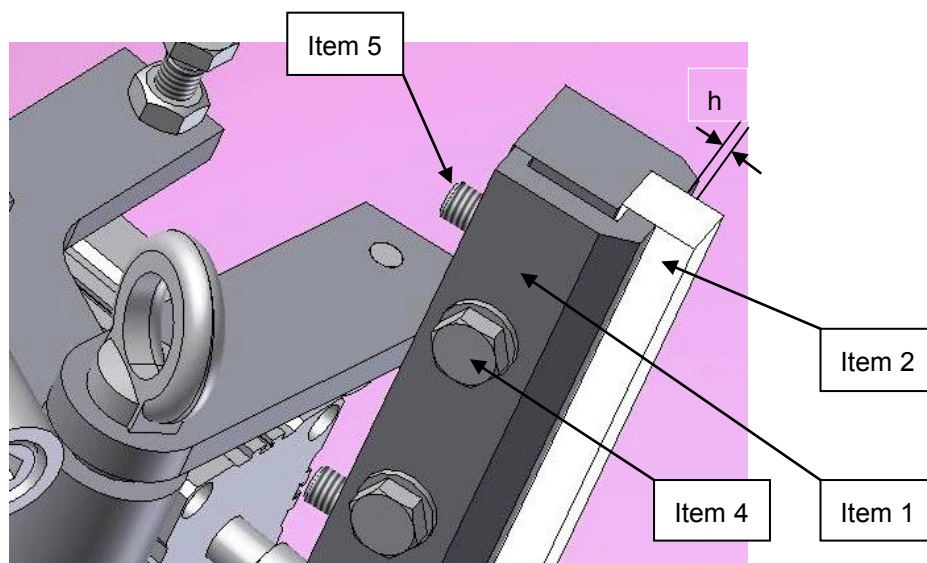


Fig. 9 – Installation of the honing stones

For adjusting the dimension h loosen the straining screws (Item 4) until the honing stones can be slid with the help of the setting screws (Item 5). Each rotation of the setting screw lifts the stone by 1 mm. For preventing any breaking of the stone make sure that all setting screws of a same rail will be tightened uniformly during the infeed.

The honing stone is to be replaced as soon as the dimension h is smaller than

1.5 mm and as soon as a further infeed cannot be carried out with the help of the setting screws.

The honing result does not depend on the identical dimension h on all pressing-against arms. The pneumatic pressing-against regulation gives a uniform pressing-against pressure independent of dimension h . In this way, a uniform honing result will also be obtained in the case of different height dimensions on the arms.

2.9 Mounting-On of the collecting funnel

For preventing the penetration of excess honing liquid into the engine room, the joined tissue funnel (Item 013) - as shown in the assembling drawing - is tensed with the joined tightening strap (Item 016) on lower border of liner within the engine room.

After the completion of the honing action the container will be emptied via the central discharge and will be re-dismounted. The collected honing liquid contains oil and must consequently be disposed of according to the local disposal directions.

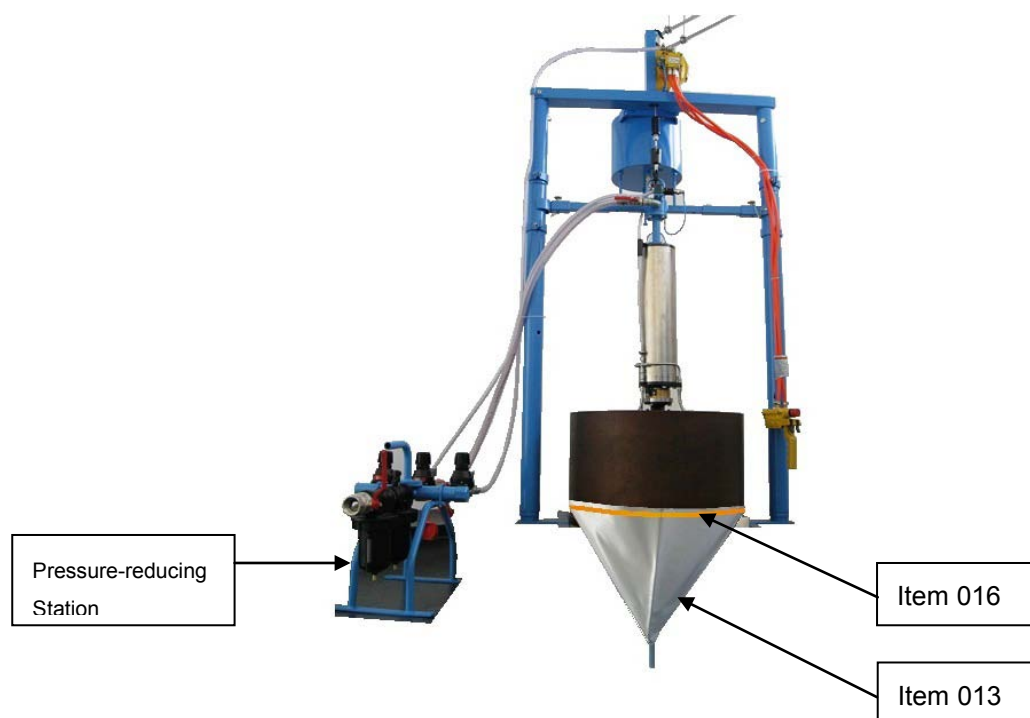


Fig. 10 – Mounting-On of the collecting funnel

3 Operating of the honing device

Prior to commissioning it is necessary to adjust the honing angle required by the engine manufacturer by determining the ratio between rotation speed and lifting speed. For this, both the pressure reducing valves of the air-supply station are to be brought into the corresponding necessary position. The honing angle will be determined by means of

$$\alpha \tan = \left(\frac{V_{\text{rot}}}{V_{\text{lift}}} \right)$$

(the lifting angle will be adjusted by the manufacturer at the moment of the delivery). The adjustment of the honing angles carried out by the engine manufacturer may not be altered by persons which have not been trained accordingly.

Just before the commissioning always check the honing stones for correct status. Stones, which are damaged, worn (height of honing stone >1.5 mm above the stone fastening device) or strongly soiled must be replaced by corresponding new stones. For operational and result-dependent reasons always replace all honing stones. After all working steps bring the stone into the provided home position for preventing any accidental contacts of stones with other objects.

Caution

The honing head will be suspended in the bearing structure by means of the eye and of the bearing cable and will slowly be lifted by means of the pneumatic motor (caution: risk of back-swing) and will be introduced into the cylinder liner with retracted honing head. The honing head will be lowered into the liner until reaching the highest honing point required by the engine manufacturer. In this position, the pre-fixed stop (Item 001, fig. 2) will be applied with contact above the guiding arm and will be tightened strongly. This stop constitutes the limitation for the upper lifting position. The honing head continues to be lowered until reaching the lower reversal point. In this position the prefixed stop (Item 002, fig. 2) will also be mounted below the guiding arm and will be tightened strongly. This stop constitutes the lower limitation for the lifting movement.

The lifting and lowering actions permit checking the positions of the stops and re-adjusting the stop positions, if necessary (check of lifting length indicated by the engine manufacturer). For the commissioning the honing head must be placed in the highest position. The check of the tightness will be carried out with closed main cock. The honing head must keep the position when the tightness is correct.

The pressing-against pressure with which the honing stones are pressed against the wall of the liner can vary between 2 and 6 bar. Please also take into account the indications of the engine manufacturer. The honing liquid recommended by the engine manufacturer will be filled into the corresponding container (Item 012) with a quantity indicated by the engine manufacturer. The hose connected to the container is to be laid in such a way that the hose can neither be buckled nor nipped or damaged by the operated honing device.

4 Commissioning

Please verify if the honing head is in the upper reversal position and if the honing stones are retracted. If these conditions are not fulfilled, check the appliance for leakiness or damage, remove any leakiness or damage, if necessary, and bring the device into the above-described position.

Make sure that no objects remain on the border of the liner and no foreign matters remain in the cylinder liner which could cause injuries by commissioning. Make sure, that nobody stays within the engine room and always remain at a safety distance = 1 m from the pylon during the operation. Make sure, that the tackle line runs freely and is not blocked by objects or hindrances.

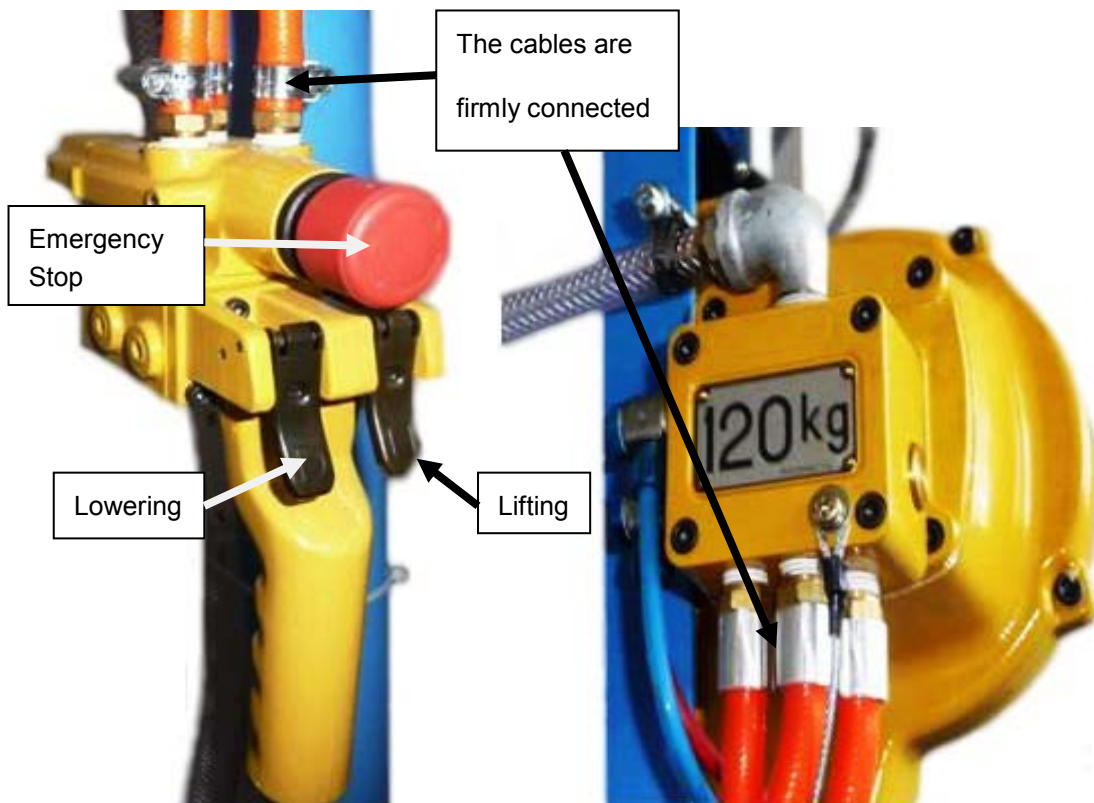


Fig. 11 – Lift Operation

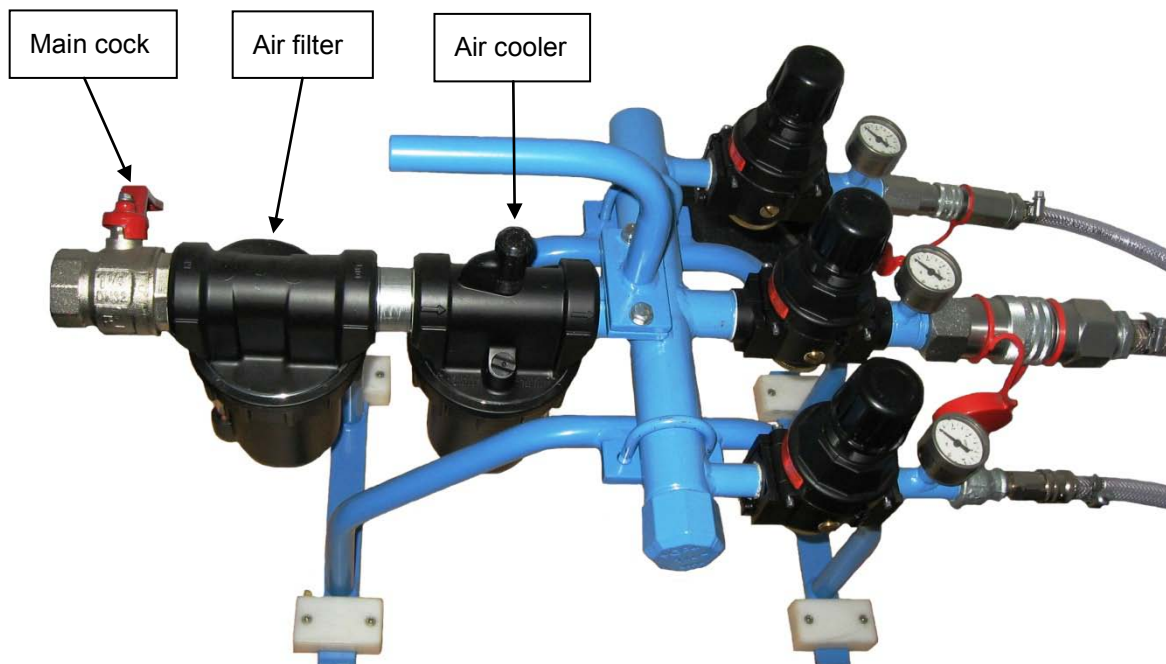


Fig. 12 – Main cock with filter and oiler

Now change over the position of the main cock and actuate the following valves in the indicated sequence:

1. actuate the ball valve for rotation of honing head (Fig. 7)
2. actuate simultaneously the slider for pressing against and lifting device LOWERING (D)
3. when reaching the lower reversal point, actuate lifting device LIFTING (U)
4. when reaching the upper reversal point, actuate lifting device LOWERING
5. repeat these actions until reaching the number of lifting actions required by the engine manufacturer or until obtaining a satisfactory result

5 Stopping

The last lifting action is a LIFTING of the honing head. Immediately after passing the lower reversal point the switching-off routine must take place in the following sequence.

1. Immediately after having passed the lower reversal point, stop the lifting movement; at the same time the sliding valve for pressing-against of the honing stone will be closed.
2. Close the ball valve for rotation movement.
3. For checking the working result, bring the honing head into a desired position by means of the tackle line.
4. Close the main cock on the air-supply station

6 Dismounting of the honing head

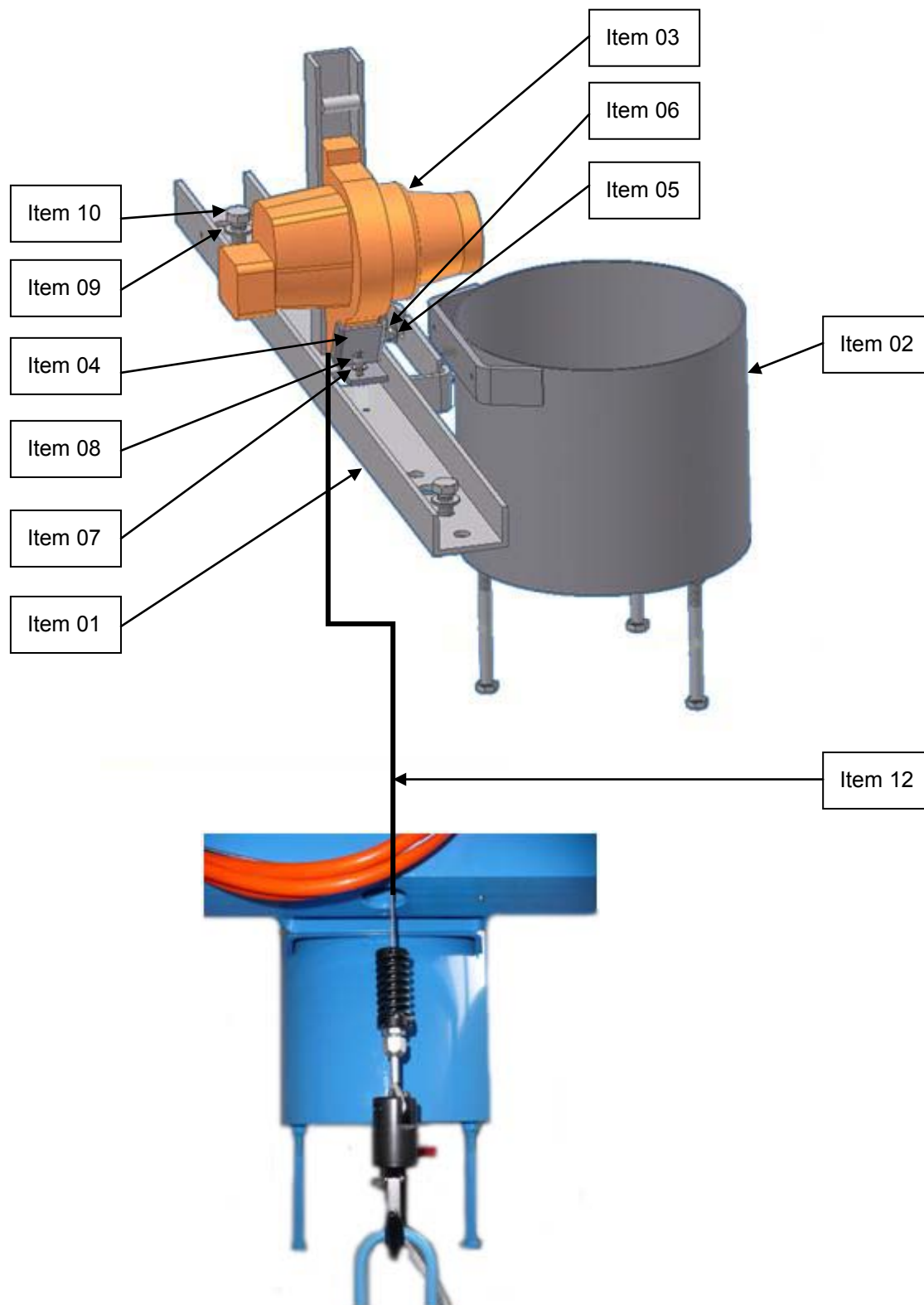
For dismounting the honing head it is necessary to draw off the honing head from the cylinder liner. For avoiding the dismounting of the stops, the honing unit can be lifted along the stops by opening the rod guidances. For this, proceed as indicated below.

1. Close the main cock of the air-supply unit.
2. Remove the blocking bolt from the guiding clamps.
3. Push back and radially the shell under-part, now the guiding arm can be rotated around the liner axis and out of the guiding pipes.
4. Open the main cock on the air-supply unit.
5. Lift the unit until the honing head will stay by approx. 20 cm above the liner border
6. Re-close the main cock of the air-supply unit.
7. Lay seating timbers (Item 024) above the liner border.
8. Lower the honing head onto the timbers with closed main cock (in this way, the system becomes free of pressure).
9. Remove the hose junctions to air-supply unit.

After the end of this action the honing head can be dismounted, serviced or repaired without any risk.

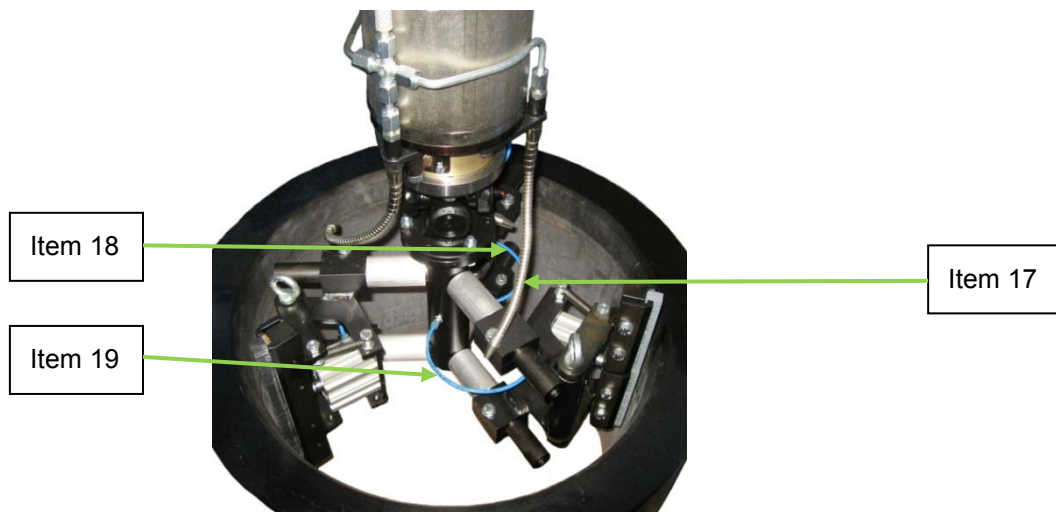
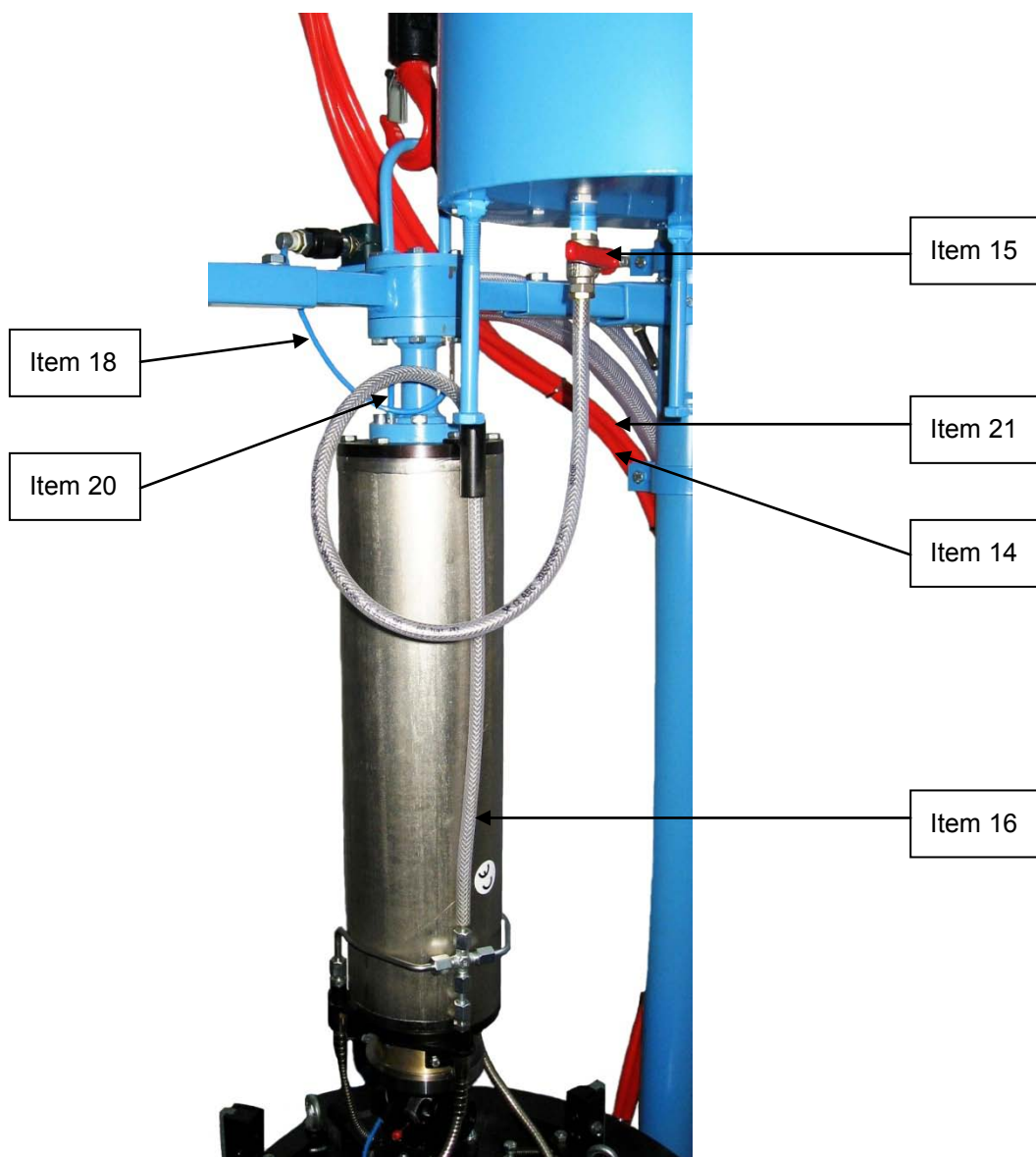
7 Spare parts checklist for the honing device

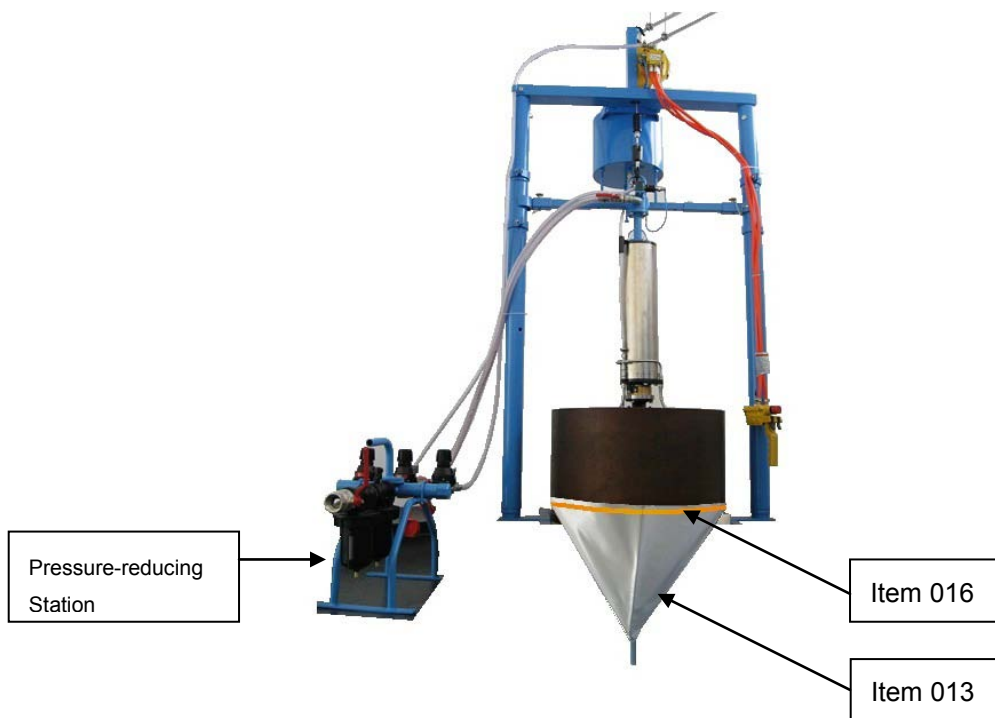
7.1 Cross bar with pneumatic tackle line and lubricant tank





7.2 Compressed-air-line and lubricant drain



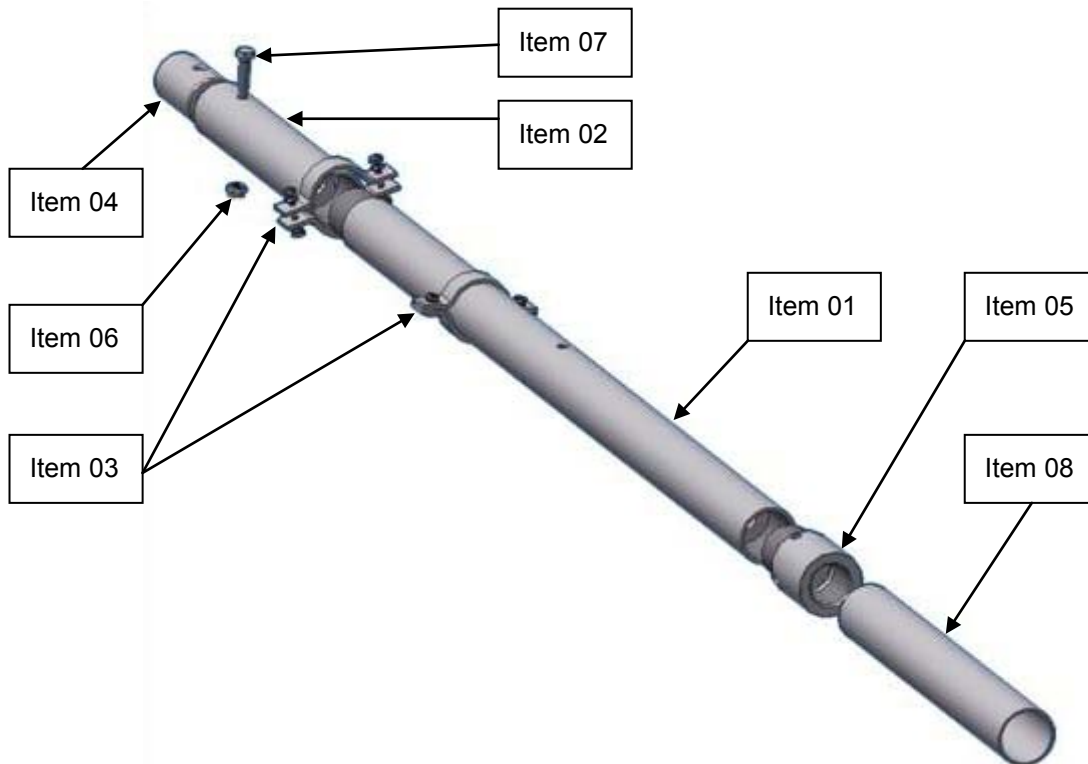


7.3 Partslist: Fastener with lubricant tank and lifting motor

Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-020	Cross bar 775mm	-	-	1	-
	621-021-020	Cross bar 895mm	-	-	-	1
	621-022-020	Cross bar 650mm	-	1	-	-
	621-023-024	Cross bar 551mm	1	-	-	-
02	621-020-014	Lubricant tank	1	1	1	1
03	621-020-001	Pneum. tackle line	1	1	1	1
04	621-020-514	Angle support	1	1	1	1
05	DIN125-8,4	Washer	2	2	2	2
06	DIN 933-M8x25	Hexagon head set screw	2	2	2	2
07	DIN125-8,4	Washer	1	1	1	1
08	DIN933-M8x16	Hexagon head set screw	1	1	1	1
09	DIN125-17	Washer	2	2	2	2
10	DIN933-M16x30	Hexagon head set screw	2	2	2	2

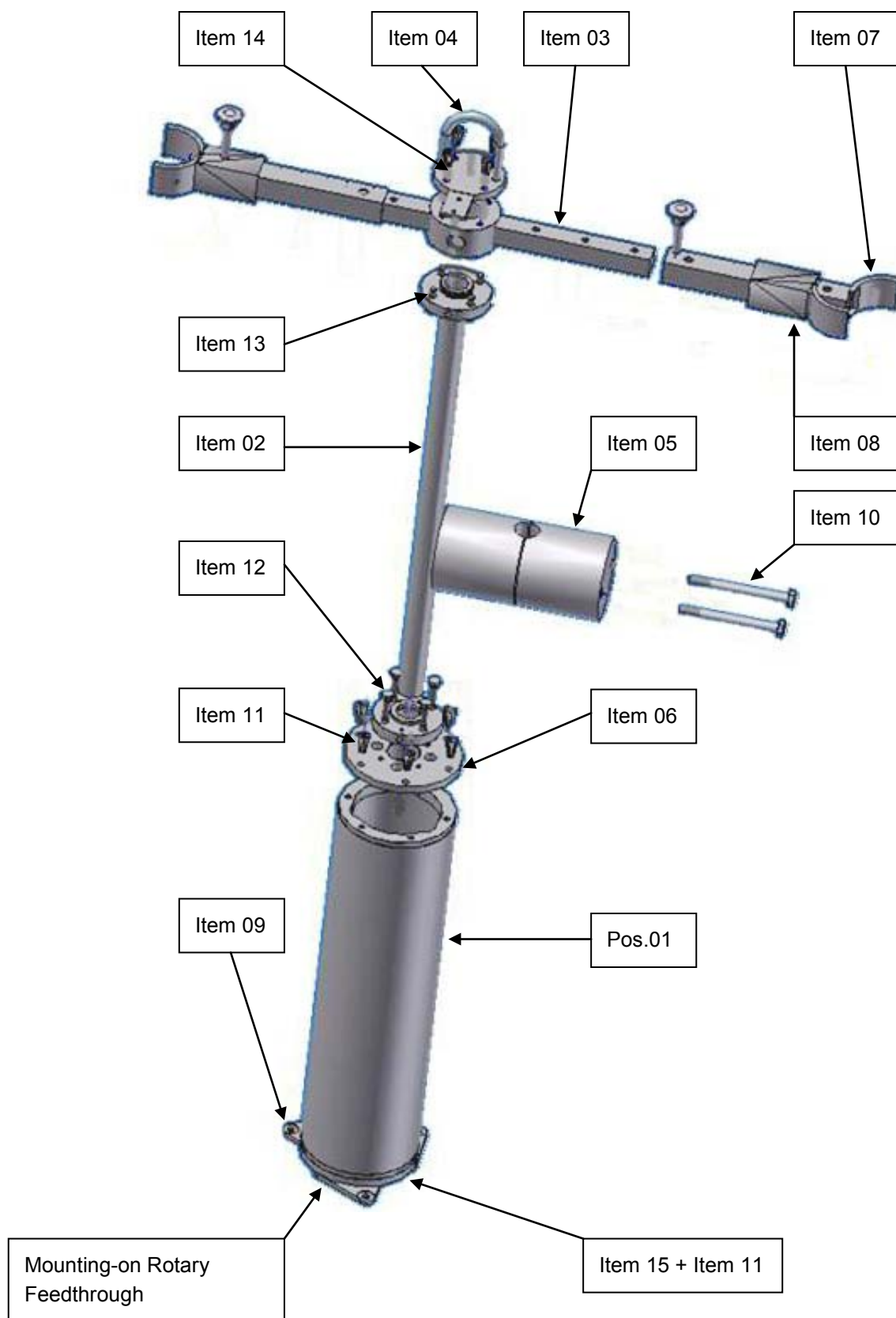
Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
11	621-020-019-1	Air hose for lifting motor	1	1	1	1
12	621-020-003	Spare wire for pneum. Tackle line	1	1	1	1
13	621-020-007	Spare hose set for manual control of tackle line	1	1	1	1
14	621-020-019-3	Air hose for pneumatic drive	1	1	1	1
15	621-020-505	Main cock 1/4"/a	1	1	1	1
16	423SPVC ME06	Hose for honing liquid	1	1	1	1
17	621-020-518	Spray nozzle	3	3	3	3
18	001-000-007	Air hose 250mm	2	2	2	5
19	001-000-006	Air hose 195mm	-	-	3	-
20	001-000-009	Air hose 100mm	4	4	1	1
21	621-020-019-2	Air hose for honing head	1	1	1	1
22	621-020-015	Collecting funnel	1	1	1	1
23	621-020-501	Tightening strap	1	1	1	1

7.4 Cross bar support



Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-005	Extension pipe 1250	-	2	2	2
	621-023-029	Extension pipe 1085	2	-	-	-
02	621-020-004	Extension pipe 350	-	2	2	2
03	621-020-008	stroke limitation stopper	4	4	4	4
04	621-020-024	Adapter	2	2	2	2
05	621-020-241	Threaded fitting	-	2	2	-
06	DIN 985-M12	Hexagon nut, self locking	2	2	2	2
07	DIN933-M12x90	Hexagon head set screw	2	2	2	2
08	621-020-064	Support tube 480mm	-	-	2	-
	621-021-062	Support tube 587,5mm	-	-	-	2
	621-022-063	Support tube 392mm	-	2	-	-
	621-023-061	Support tube 440mm	2	-	-	-

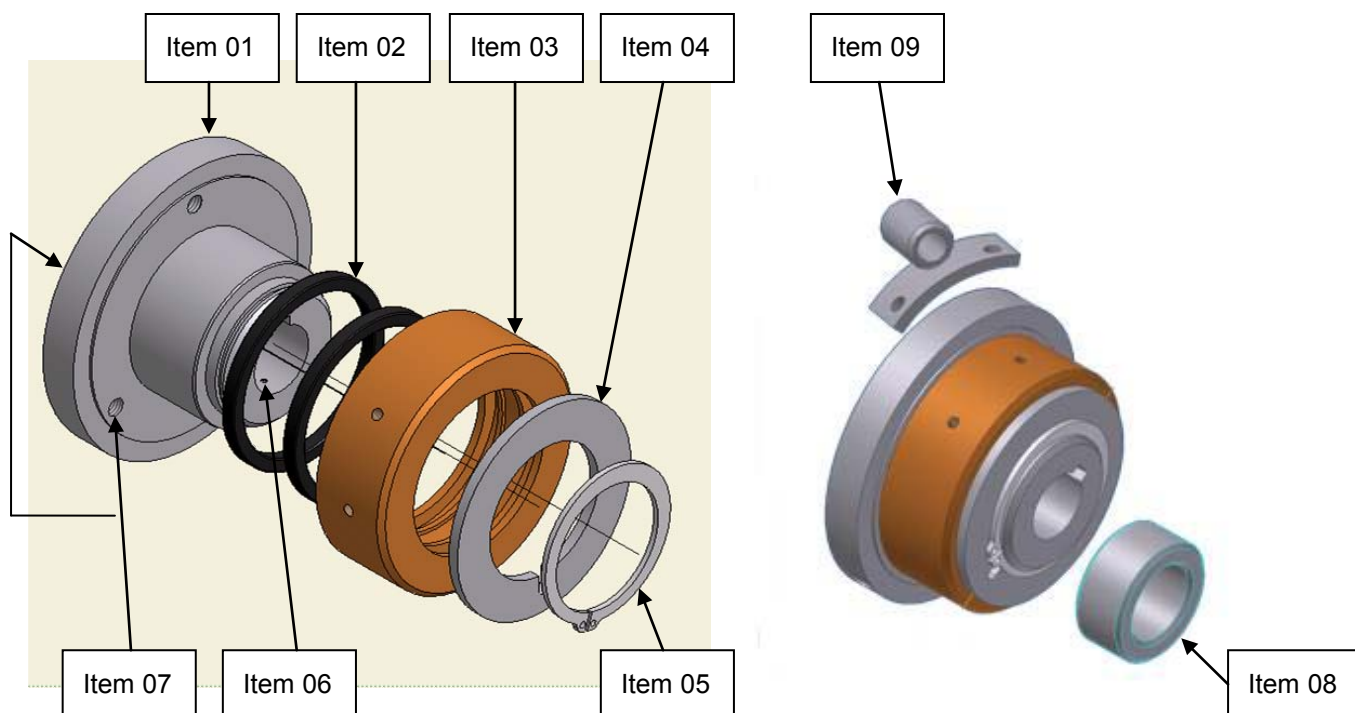
7.5 Guide arm with drive unit



7.6 Partslist: Guide arm with drive unit

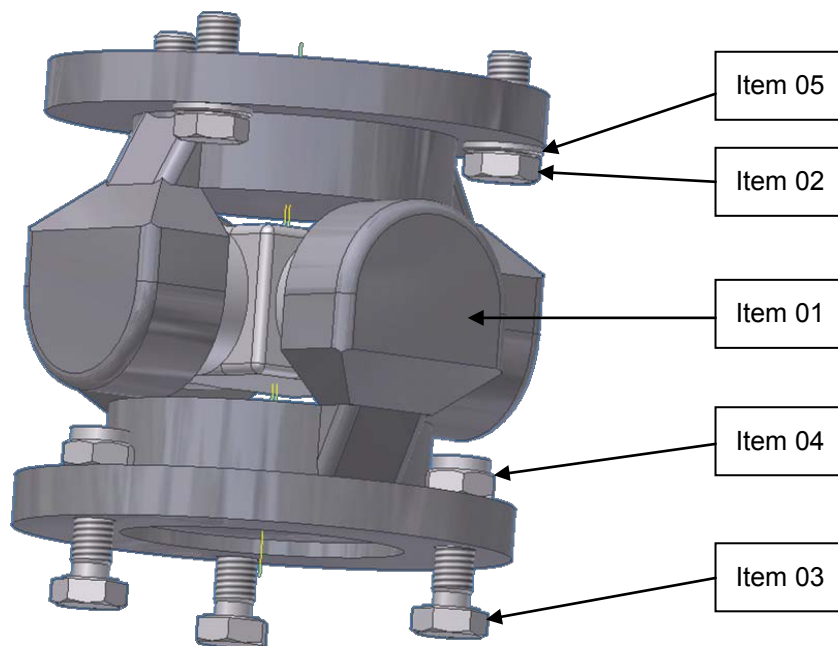
Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-111	Assembly of frame	1	1	1	1
02	621-020-103	Extension 800mm	-	-	-	1
	621-020-104	Extension 100mm	1	-	-	-
	621-020-105	Extension 600mm	-	-	1	-
	621-022-102	Extension 400mm	-	1	-	-
03	621-020-080-2	Guide arm	-	-	1	1
	621-022-081-1	Guide arm	-	1	-	-
	621-023-086	Guide arm	1	-	-	-
04	621-020-086	Attachement	1	1	1	1
05	621-020-016	Balancing Weight	-	-	1	1
06	621-020-034	Cover plate	1	1	1	1
07	621-020-420	Sliding clamp upper-part	-	2	2	2
	621-023-419	Sliding clamp upper-part	2	-	-	-
08	621-020-421	Ass. sliding clamp under-part	2	2	2	2
09	621-020-040	Plate	3	3	3	3
10	DIN931-M10x100	Hexagon head set screw	-	-	2	2
11	DIN933-M8x20	Hexagon head set screw	12	12	12	12
12	DIN912-M8x30	Cylinderhead screw	4	4	4	4
13	DIN933-M8x25	Hexagon head set screw	4	4	4	4
14	DIN933-M8x16	Hexagon head set screw	4	4	4	4
15	621-020-033	Flange	1	1	1	1

7.7 Rotary feedthrough



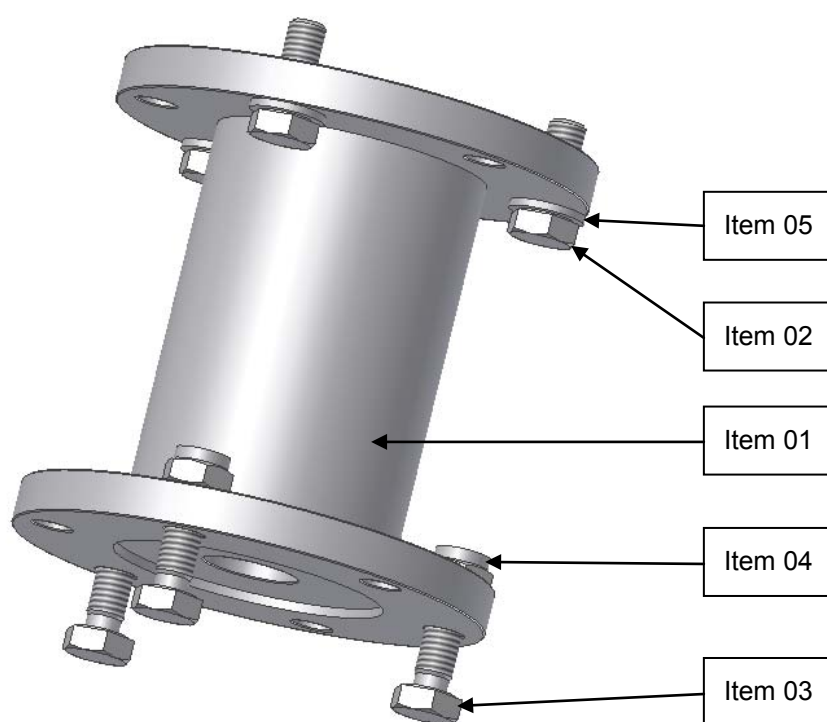
Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
Ass.	621-020-067	Rotary feedthrough	1	1	1	1
01	621-020-068	Drive flange	1	1	1	1
02	QRAR04333-N7004	Square ring NBR, 70 Shore	2	2	2	2
03	621-020-070	Ring	1	1	1	1
04	621-020-069	Driving plate	1	1	1	
05	DIN 471-50x2	Snap ring	1	1	1	1
06	DIN 1481-2x20	Spring pin	1	1	1	1
07	DIN 553-M5x8	Threaded pin	1	1	1	1
08	621-020-515	Ring	1	1	1	1
09	621-020-513	Fastener for air hose	1	1	1	1

7.8 Cardan joint (only in-line engines)



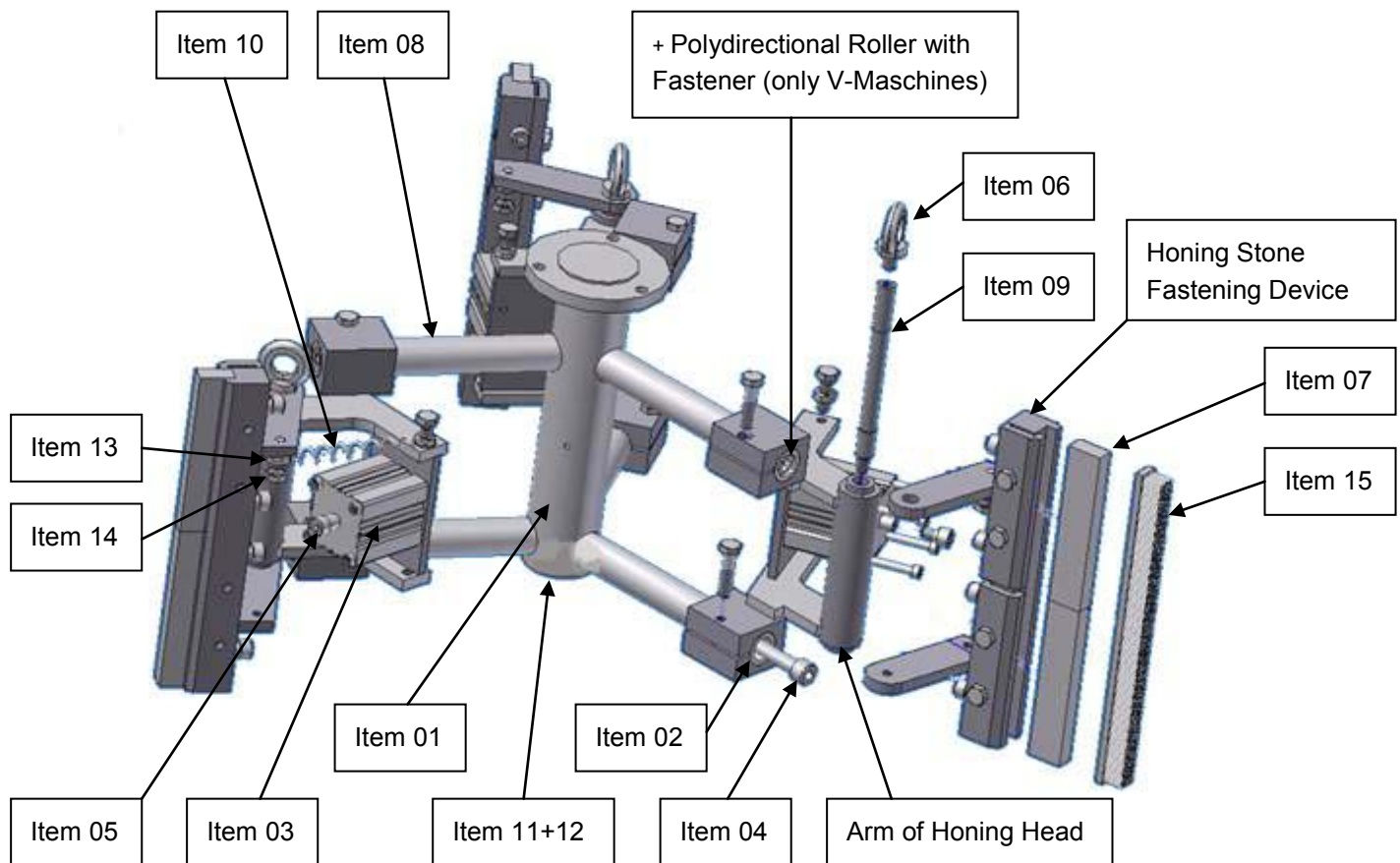
Item	Order No.	Designation	Type / Quantity			
			L32/40	40/54	L48/60	58/64
01	621-020-042	Cardan joint	1	1	1	1
02	DIN 933-M8x20	Hexagon head set screw	3	3	3	3
03	DIN 933-M8x25	Hexagon head set screw	3	3	3	3
04	DIN 985-M8	Hexagon nut, self locking	3	3	3	3
05	DIN 125-8,4	Washer	3	3	3	3

7.9 Coupling (only V-engines)



Item	Order No.	Designation	Type / Quantity	
			V32/40	V48/60
01	621-020-041	Coupling	1	1
02	DIN 933-M8x20	Hexagon head set screw	3	3
03	DIN 933-M8x30	Hexagon head set screw	3	3
04	DIN 985-M8	Hexagon nut, self locking	3	3
05	DIN 125-8,4	Washer	3	3

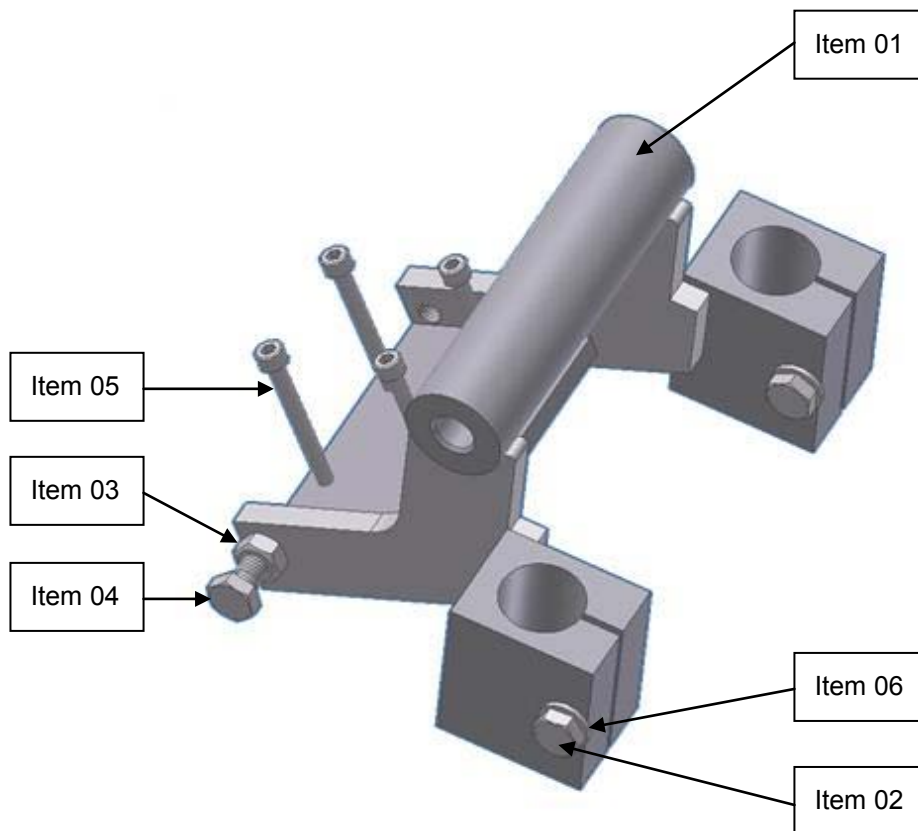
7.10 Assembly of honing head



Pos.	Order Nr.	Designation	Typ / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-139	Support	1	1	1	1
02	621-020-138	Bushing L=175mm	-	6	6	6
	621-023-138	Bushing L=123,5mm	6	-	-	-
03	CQ2B40TF-30DZ	Pneumatic cylinder	-	3	3	3
	ECQ2B40-10D	Pneumatic cylinder	3	-	-	-
04	DIN912-M10x180	Cylinder head screw	6	6	6	6
05	DIN912-M8x12	Cylinder head screw	3	3	3	3
06	DIN580-M8-C15	Eye bolt	3	3	3	3

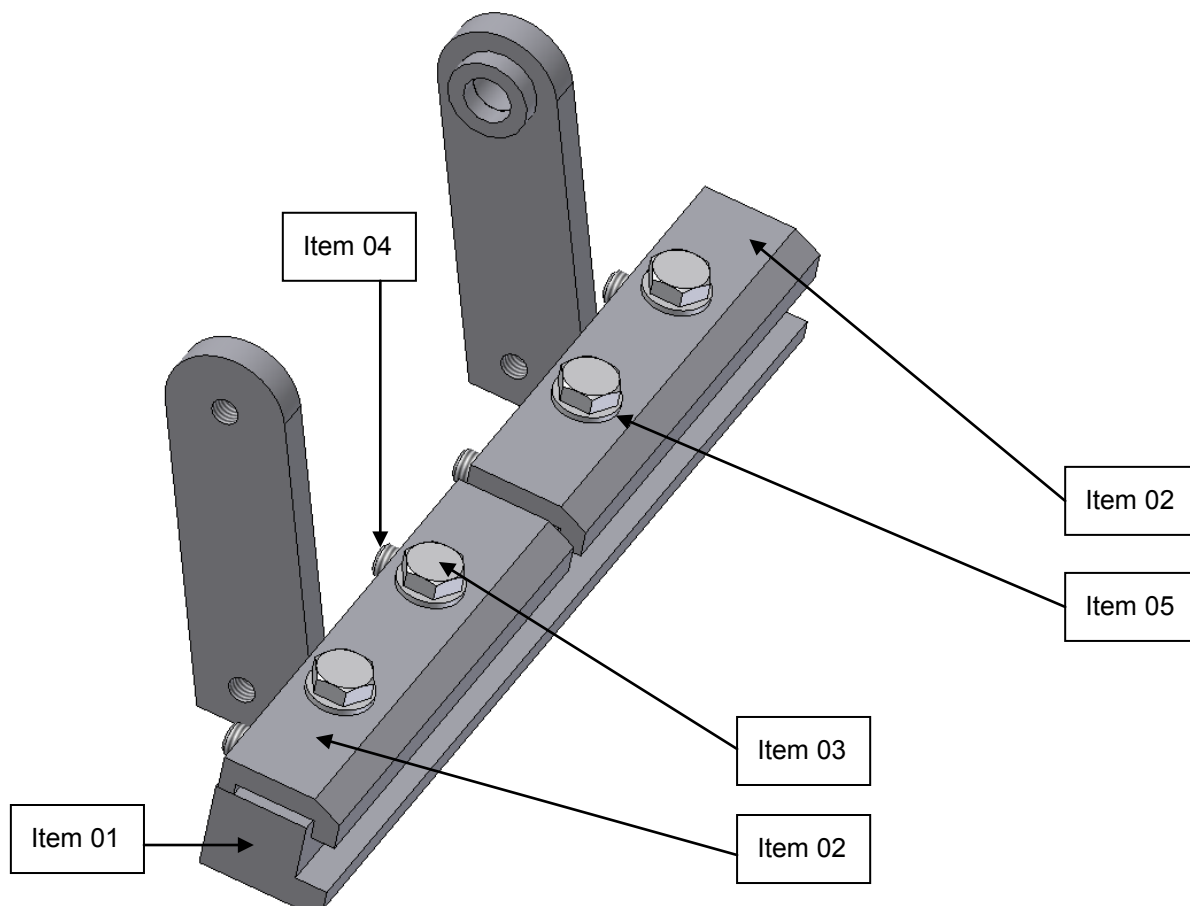
Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
07	621-020-521	Honing stone prior honing 13x16x120mm	6	6	6	6
	621-020-523	Honing stone honing for top of stroke 13x16x20mm	6	6	6	6
	621-020-522	Honing stone for plateau honing 13x16x120mm	6	6	6	6
08	621-020-240	Spacing ring L=11mm	6	6	-	-
	621-020-242	Spacing ring L=65mm	-	-	6	-
	621-021-140	Spacing ring L=120mm	-	-	-	6
09	621-020-405	Axle	3	3	3	3
10	621-020-150	Screw plug	-	3	3	3
	621-023-152	Screw plug	3			
11	DIN908-G ¼"	Hexagon socket screw plug	1	1	1	1
12	001-017-053	Teflon-coated washer	1	1	1	1
13	DIN 934-M8	Hexnut	3	3	3	3
14	DIN 933-M8x25	Hexagon head set screw	3	3	3	3
15	621-020-023	Cleaning brush	3	3	3	3

7.11 Arm of honing head



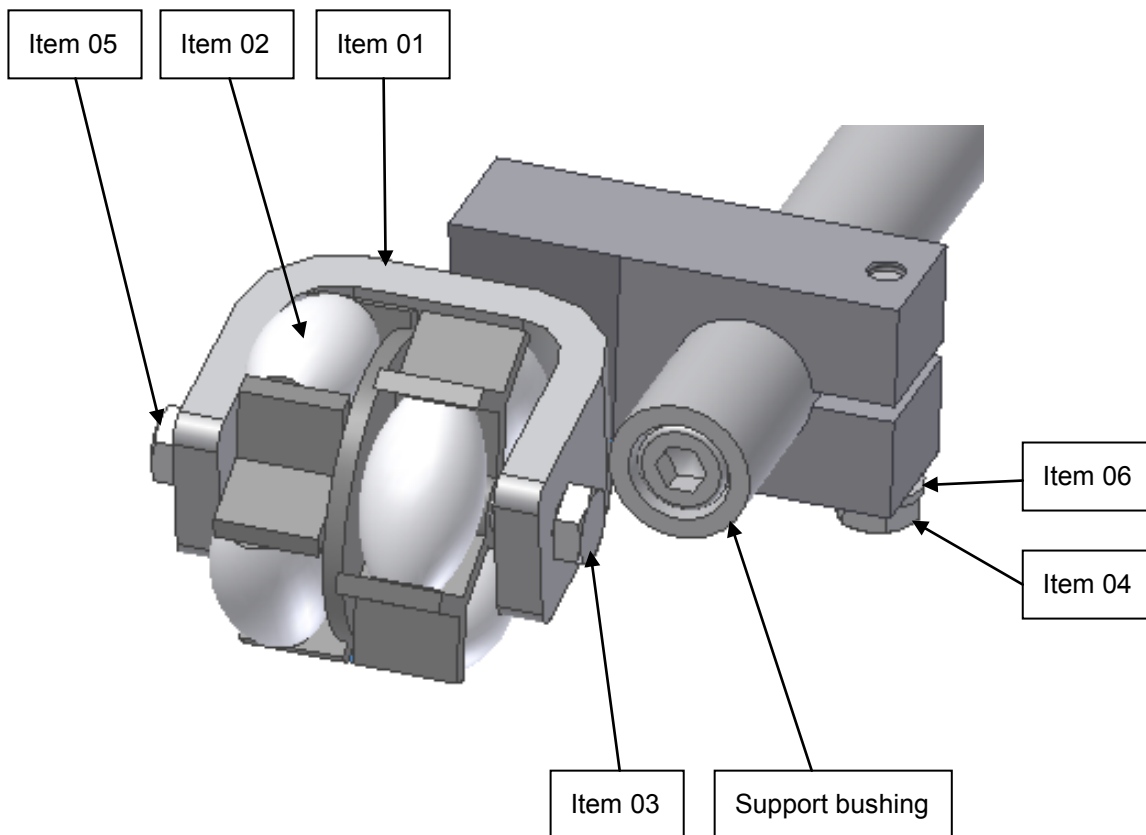
Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-150	Arm of honing head	-	3	3	3
	621-023-151	Arm of honing head	3	-	-	-
02	DIN 933-M8x35	Hexagon head set screw	6	6	6	6
03	DIN 934-M8	Hexnut	6	6	6	6
04	DIN 933-M8x25	Hexagon head set screw	6	6	6	6
	DIN 912-M5x40	Cylinder head screw	12	-	-	-
	DIN 912-M5x60	Cylinderhead screw	-	12	12	12
06	DIN 125A-8,4	Washer	6	6	6	6

7.12 Honing stone fastening device



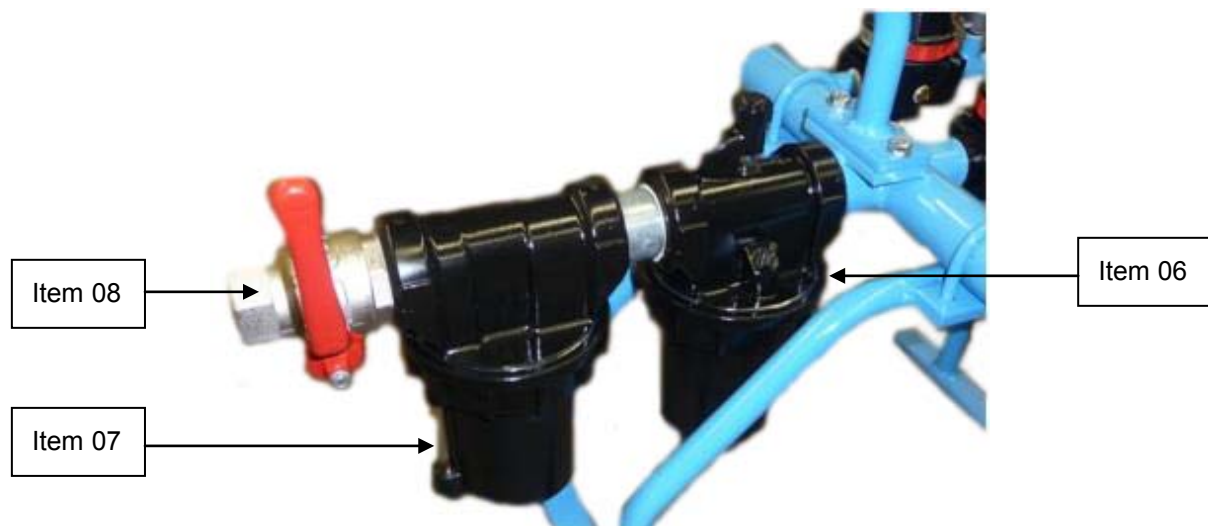
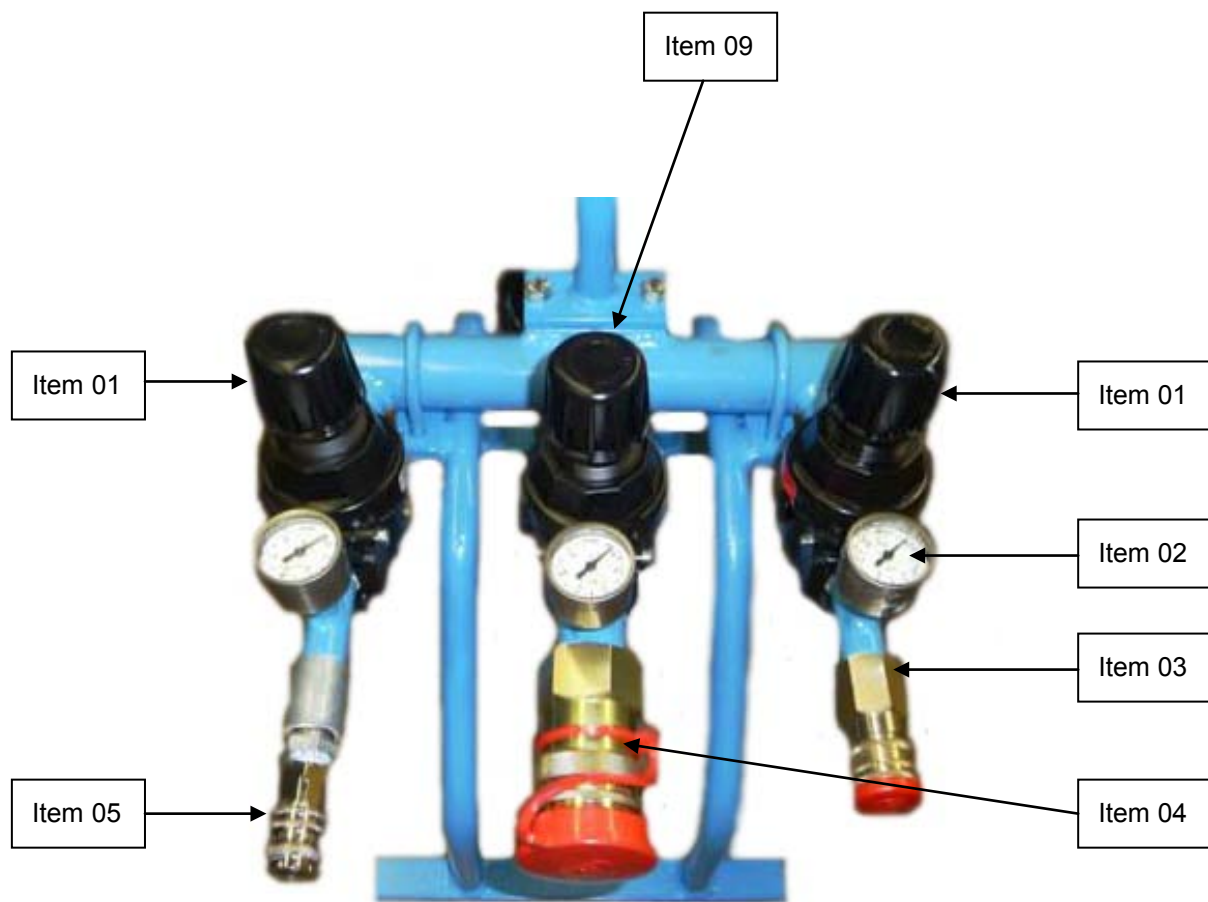
Item	Order No.	Designation	Typ / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-418	Honing stone strip	3	3	3	3
02	621-020-424	Terminal strip for honing stone	6	6	6	6
03	DIN 933-M8x25	Hexagon head set screw	12	12	12	12
04	DIN 913-M8x25	Hexagon socket set screw	12	12	12	12
05	DIN 125A-8,4	Washer	12	12	12	12

7.13 Polydirectional roller (only V-engines)



Item	Order No.	Designation	Type / Quantity	
			V32/40	V48/60
Ass.	621-020-030	Polydirectional roller with fastener	3	3
01	621-020-428	Fastener of polydirectional roller	3	3
02	621-020-427	Polydirectional roller, double	3	3
03	DIN 931-M8x70	Hexagon head set screw	3	3
04	DIN 931-M8x40	Hexagon head set screw	3	3
05	DIN 934-M8	Hexnut	3	3
06	DIN 125-8,4	Washer	3	3

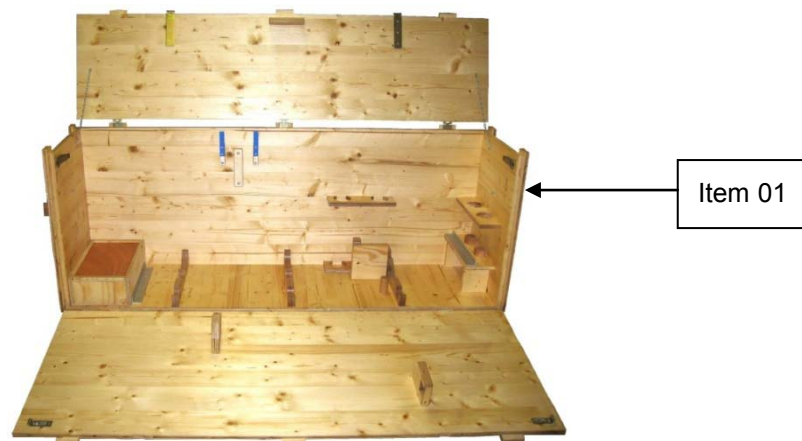
7.14 Pressure-reducing station



7.15 Partslist: Pressure-reducing station

Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	R20-04C	Pressure valve G1/2"	2	2	2	2
02	001-017-046	Pressure gauge 0-10 bar	3	3	3	3
03	10 415 12 05	Coupling G1/2" IG NBR	1	1	1	1
04	10 705 12 03	Coupling G1" IG NBR	1	1	1	1
05	10 321 11 52	Coupling G1/4"KRAG NBR	1	1	1	1
06	L 606-10W	Standard Oiler G1 1/4"	1	1	1	1
07	F 602 G10WJ/N	Standard Air filter G1 1/4"	1	1	1	1
08	621-020-507	Main cock G1 1/4" i/o	1	1	1	1
09	R20-08C	Pressure valve G1"	1	1	1	1

7.16 Transport packaging



Item	Order No.	Designation	Type / Quantity			
			L/V 32/40	40/54	L/V 48/60	58/64
01	621-020-021	Wooden box 1900x800x460 mm	1	1	1	1

8 Service notes

The function of the pressure reducing station is ensured by the fact if

- the air filter has been cleaned, that it always is in use.
- the oiler before using and always correctly filled with sufficient and proper oil.
- oil for the lubricator is included in the honing device.

The rope of the hoist should always have a slight oily film, so that the hoist rope superposed windings cannot rub.

All the parts are honing device and to be handled and stored, so that they are always ready.

It proposes that only the honing stones are used, which were recommended by the engine manufacturer and delivered. Honing stones with other properties can affect the honing and honing result decisively. It should be stockpiled enough always honing stones, so that honing is possible at any time.

The pneumatic cylinder in the honing head must be checked for smooth and clean, if given.

9 Troubles, defects and correction of defects

Problems can arise in the drives,

- when the intended air oiler is not set correctly,
- if it is operated without or with the wrong oil.

Elimination:

- check setting – so that oil is slightly encouraged.
- oil viscosity compared with the supplied oil

Problems can arise,

- when the air pressure cannot be kept constant,
- when the air inlets are too small.

Elimination:

- air leaks in the supply lines,
- unexpected withdrawals from the compressed air network
- examine air intake cross-sections.
- check air filter in the air supply unit and if necessary clean.

Problems can arise,

- when work pressures are too small
- or is a defect in the air supply unit of the pressure-reducing valves.

Elimination: Set check pressures at the air supply unit.

Honing angle is not as desired. Speed of the hoist speed honing head do not fit together.

Elimination:

- The speed of the honing head by pressure change in mean pressure reducing valve (see figure 3 – air supply unit) to adjust. Smaller pressure corresponds to lower speed, honing angle is steeper. Greater pressure corresponds to higher speed, honing angle is shallower.
- One can also alter the lifting speed. This is done with the left pressure reducing valve (see figure 3 – air supply unit). Smaller pressure corresponds to lower lifting speed, resulting in shallower honing angle. Greater pressure corresponds to higher lifting speed, honing angle is steeper.

Surface roughness is not reached.

Elimination:

- The pressure should be checked. The pressure reducing valve is to the right (see figure 3 – air supply unit). If necessary, increase the pressure.
- At the rotary feedthrough (see 7.7 rotary feedthrough), the rings worn out and blown out by Item 002 – replace the rings. (are included in the parts set). Wearing is present in the honing device.