

Preface

Dear Customers!

We congratulate you on your happy choice of purchase of one product of high quality. This machine is a high-tech industrial product.

The mechanical and electrical elements are on a level with the highest world standards and provide precise operation of the machine.

Easy handling and ergonomic design provide its high productive capacity and reliability.

The work safety has been a subject of special attention during the machine designing and meets high requirements of the European Community Regulations, which is proved by mark **CE**.

To enjoy safe and faultless work on our machine and to study all available advantages given by it, we kindly ask you to read carefully this Service Manual.

Good luck in mastering your production program!

Yours faithfully

Machinery Scandinavia AB

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1. Important Hints

Text marked with the sign in the right shows some danger.
Read carefully!



1.1 Serial Number

- Information given in this Instruction Manual applies **only** to a machine with the serial number printed on the cover of the book.
- Specify the serial number of your machine always when you raise a claim or order spare parts.

1.2 For the User

All persons engaged with installation, service, maintenance and repair of the machine should declare in written that they have read and understood the prescriptions of this Service Manual.

See too that the Service Manual is to be found for the operators or servicemen of the machine.

Pay special attention to the section "Safety".

2. Application

This drilling machine is a general - purpose machine tool.

It is applied for special tools and operations specified as follows:

- **Tools:**
 - rotary
 - rotational - symmetrical
 - rotational - symmetrical cutting
- **Or**
 - cutting, which causes a force couple around the axis of rotation?

Engineering parameters specified by the manufacturer should be observed.

- **Feeding motion:** in the direction of the axis of the tool rotation.
- **Feeding force:** is applied in the direction of the axis of rotation.

Use the machine only if it is in working order following its direct application and all safety rules given in this Service Manual. Failures affecting safe work of the machine should be eliminated without delay.

Observe the following instructions when using the machine:

- Provide sufficient lighting to the operator's place.
- Remove all auxiliaries from the working zone.
- Prior to the machine starting check whether the auxiliary tools as centre key or chuck key have been removed from the rotation space of the spindle.
- Be careful that a work piece is properly clamped on the working table or dead stop to avoid its shifting during machining.
- Check if there are any damaged details before further use of the tool and clamping device.
- Be sure that the tool mounted in the machine is suitable for the desired application.

- Switch off the main breaker and insure it against accident start during repair or preventive maintenance of the machine (for example, you may lock it with padlock).
- Use only original spare parts supplied by manufacturer. You may cause damages and losses for your company if you use spare part of unknown origin.
- The machine should be established on foundation.



and spindle.

ATTENTION!

There is a danger of squeeze: at dismounting the intermediate table and the base; at lifting the intermediate table between it

3. Safety

3.1. Work Safety Rules

Dangerous places which may cause work accidents when operating on column drilling machine model AS 50 and AS55 are as follows:

- Chuck;
- Drill (or any other tool in use);
- Chips ejected at drilling.

For protection from industrial injuries and accidents the machine operator should observe the following rules:

- To eliminate the possibility of being injured for himself and other people working in the same room.
- To pay attention whether the tools and work pieces has been properly clamped before beginning of the work.
- Not to wear working clothes with loose and wide sleeves to avoid biting between moving parts.
- To control the quality of machined work piece after the machine has been stopped, the same being applied for its adjustment, clamping of new work pieces, repair and change of the cutting tools.
- To clean chips from the working place with brush but not by hand and after the machine shutting down.
- In the event of continuos chips during drilling, cut it by feed stopping from time to time.
- In the event of any machine fault switch off the main breaker.
- Use only appropriate and healthy tools and accessories.
- Clean the machine every day.

3.2. Electric Safety Rules

To provide safe and trouble-free operation of the electric installation of the machine be aware of and observe the following rules:

- Do not open the doors of the electric cabinet during the machine operation.
- The electric installation should be inspected and repaired by authorised persons of appropriate qualification only.

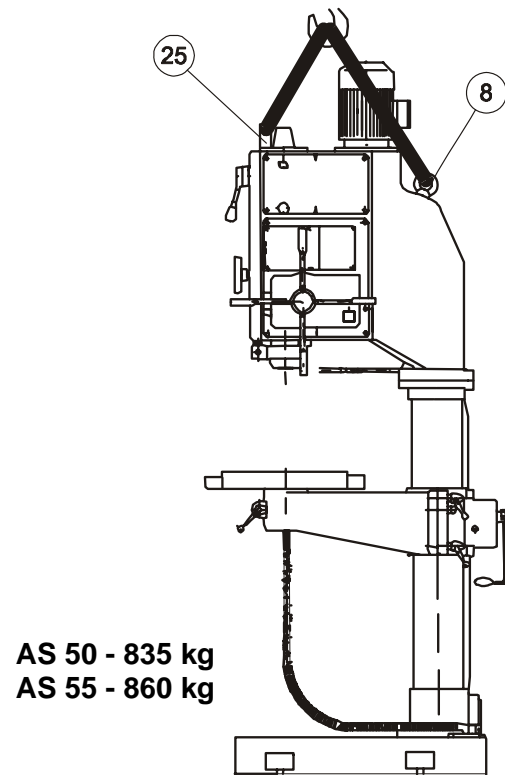
- Always shut down the main breaker of the electric cabinet before repairing of the mechanical part of the machine.
- Do not leave sharp things nearby the inlet for connecting power supply to the machine, because they can damage the cable between the end of steel pipe and the union nipple.
- The electric panels should be water - protected.
- Protect the grounded cable from breakdown and do regular inspections of its serviceability.
- For trouble-free operation of the machine provide the supply voltage not to vary more then 10% from its nominal value.

4. Transportation

From the factory the machine is delivered packed in wooden case, placed over skid in horizontal position. The machine is erected by means of crane or winch.

Spindle should be provided with shock and over-load protection. Any pressure over aluminium and other machine parts should be eliminated.

Pass hoist rope of the carrying capacity appropriate to the machine weight through the rings 25 and 8 and carefully set the machine upright. In such position the machine may be moved to the place of its foundation or to some other place.



ATTENTION!

During erection and moving the machine can be shacked. Do not stay under or in the vicinity of shaking machine!



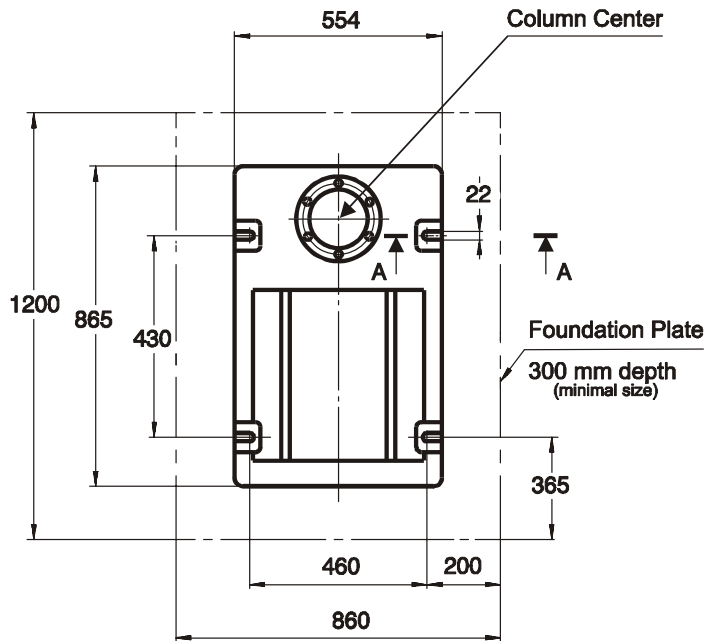
5. Installation

The machine should be fixed on the foundation.

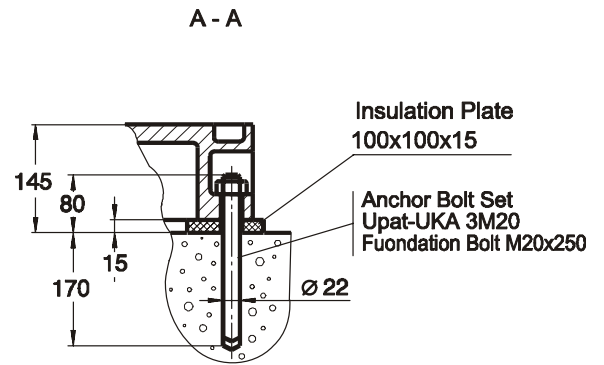
- Machine levelling (it is levelled being placed on the floor).
- Generally a special foundation is necessary. It is sufficient to level the machine on the floor by means of levelling cotters.
- Sometimes, however, when the working conditions impose to have foundation, there are provided four holes at the base of the machine.
- In that case under the base should be put isolating pads, through which pass the foundation bolts. With the help of these foundation bolts noise and vibrations are damped. After the bolts have been placed the machine flatness can be adjusted through metal or wooden pads.
- Foundation bolts, pads and cotters are not supplied by the manufacturer.

5.1 Foundation Plan of AS 50and AS 55

Placement of Foundation Bolts



A - A Section



5.2 Cleaning

- After its foundation the machine should be properly cleaned.
- Remove all anticorrosive coating from the machine.
- Use only carbon - based cleaners, e.g. petroleum.

Never use benzole!



ATTENTION!

Careless and incorrect use of the cleaners may hurt your eyes and skin! Never use open fire during cleaning the machine! Provide sufficient ventilation!

5.3 Electric Connections



ATTENTION!

Main breaker should be in "OFF" position, protected against accidental starting (for example locked with padlock). For testing the direction of rotation disengage feeds and check the handles for speeds selection (to eliminate danger of the mechanism breakdown).

- Power supply should be connected by an electric technician.
- While connecting electric supply to the machine follow strictly the electric diagram.
- Values of the working voltage, total consumed power (current) and other electrical parameters are indicated on the machine name plate or electric diagram.

- The electrical connection of the machine should provide right-hand rotation. (**Check if feed drive is disengaged and handles for speed selection are locked.**)
- The electric connection of the machine is done by means of an electric cable 3x2,5 mm² + 1x1,5 mm² to terminals L1, L2, L3 and PE of terminal line Z1 in the electric cabinet.

ATTENTION !

When power supply cable is coming out of the floor, it must be protected (for example in metal tube or armature) and outlying from the machine in enough distance, providing free rotation of the intermediate table around the column.



5.4 Putting Into Operation

Prior to putting the machine into operation fill it with oil up to the marked level.

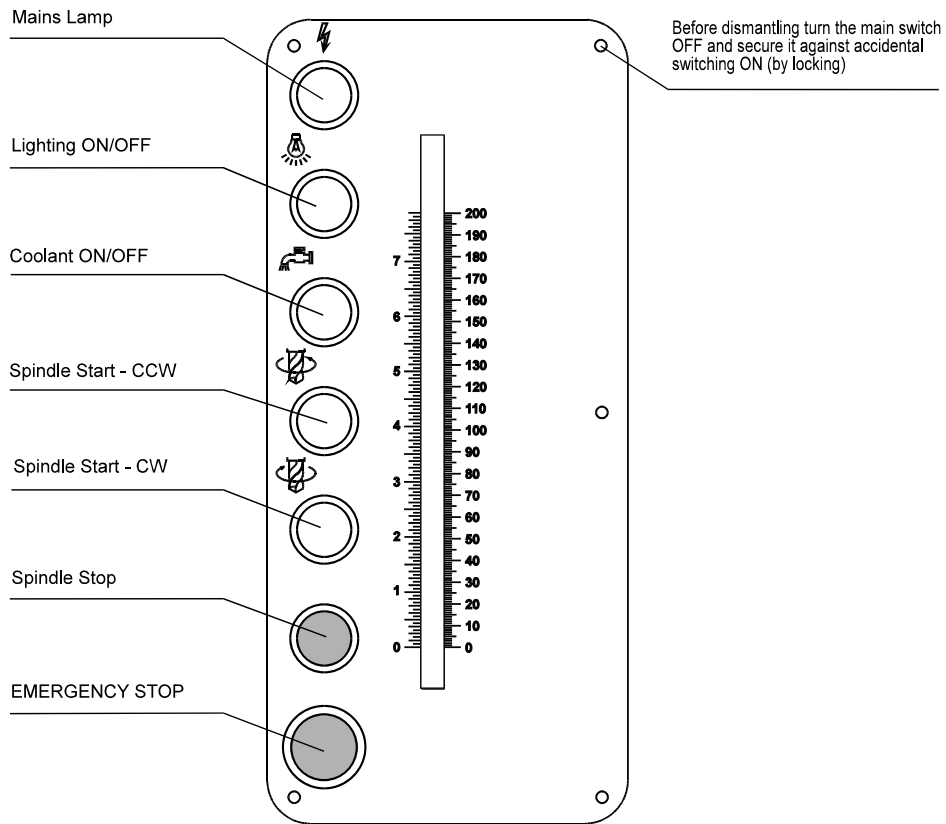
After main cleaning the column should be properly lubricated (see part 9.3 Lubrication").

Move the intermediate table several times, because it may have condensed water.

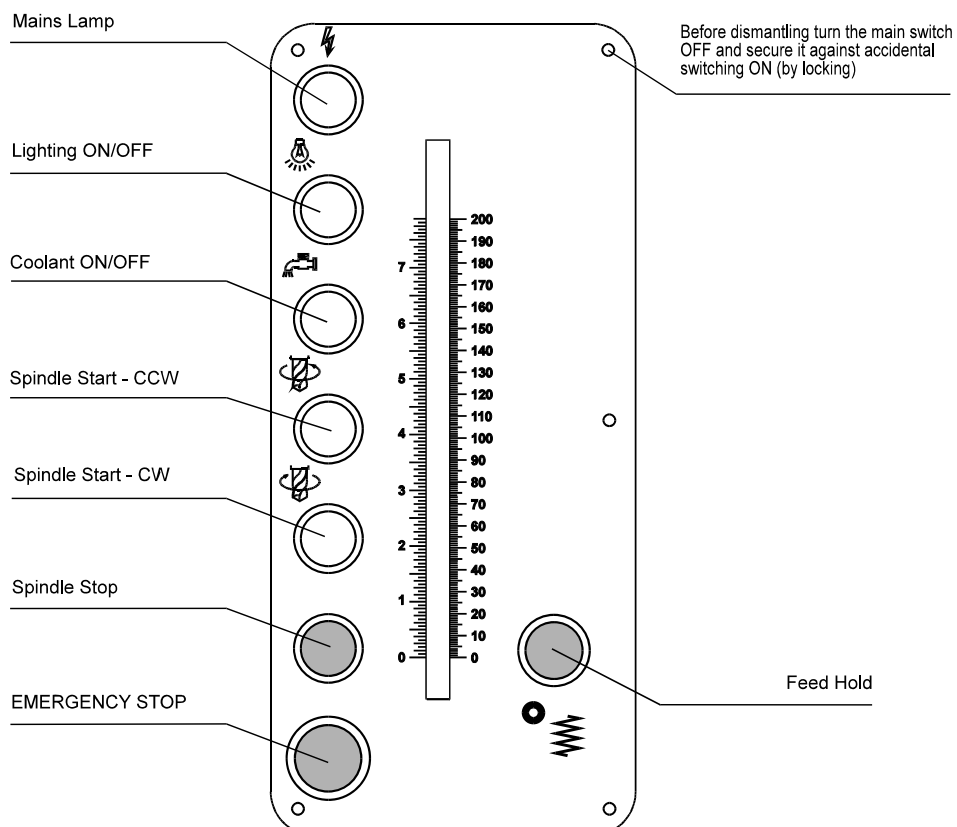
6. Controls

6.1 Operator's Panel

6.1.1 Operator's Panel – AS 50, AS55

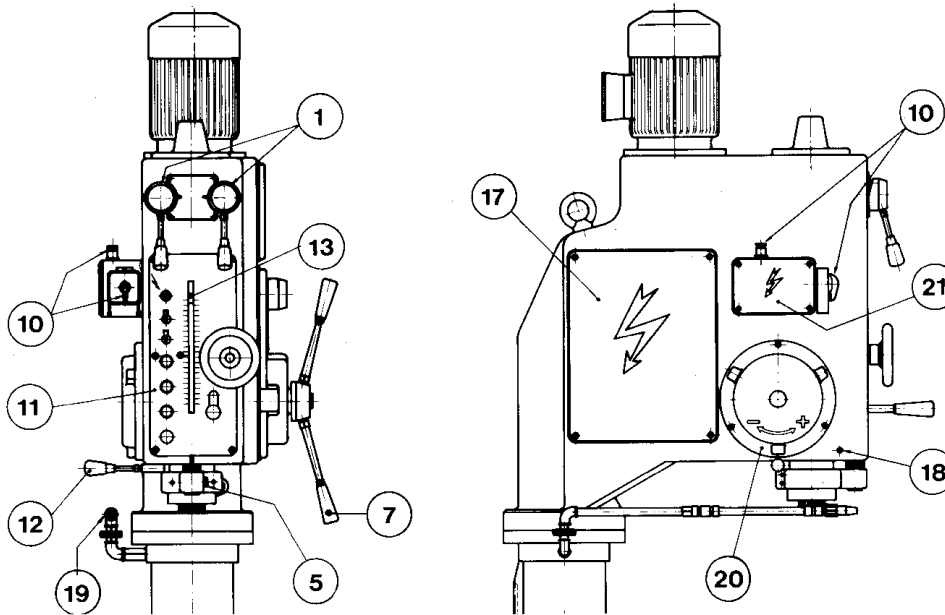


6.1.2 Operator's Panel – AS 50ME, AS55 ME

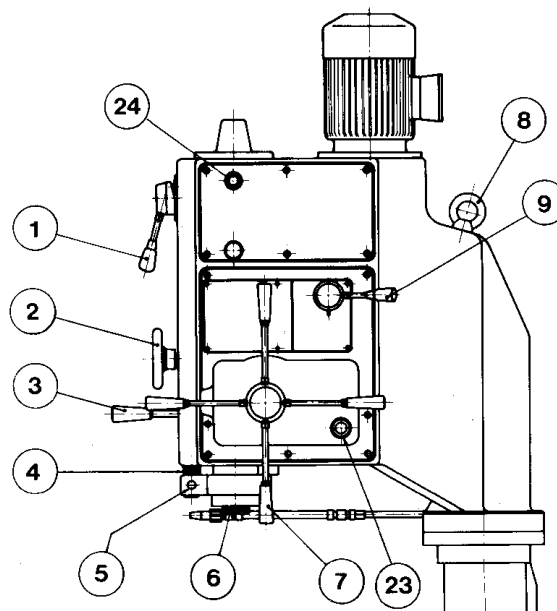


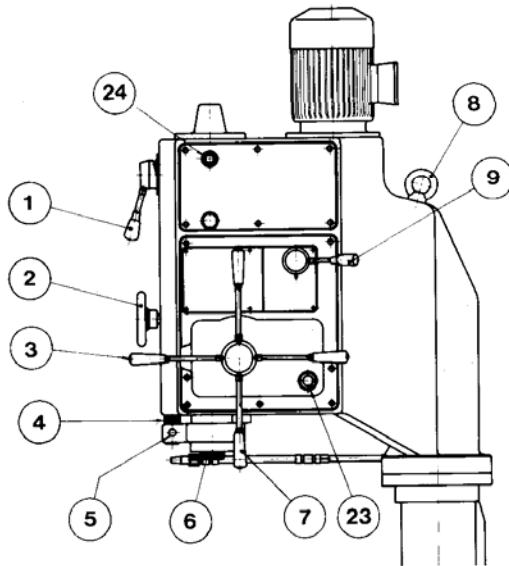
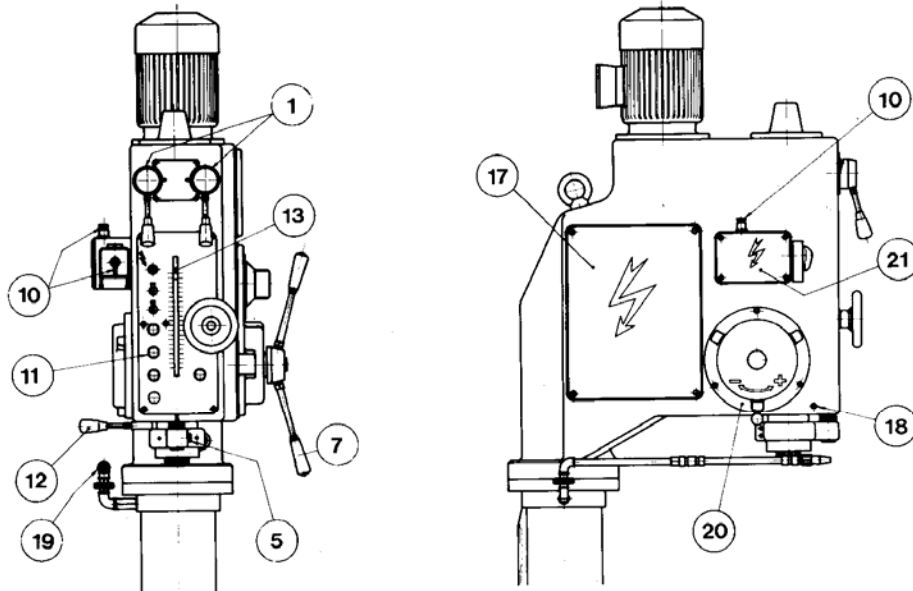
6.2 General Description

- | | | | |
|----|------------------------------------|----|--------------------------------------|
| 1 | Speed selector | 13 | Spindle depth stop |
| 2 | Fine feed hand wheel | 14 | Revolving table locking mechanism |
| 3 | Clutch lever for automatic feed | 15 | Locking mechanism for column support |
| 4 | Depth stop adjustment | 16 | Table raising mechanism |
| 5 | Depth stop locking screw | 17 | Electrical panel |
| 6 | Manual control for gear box | 18 | Axial spindle locking screw |
| 7 | Rapid manual feed control | 19 | Coolant flow adjuster and outlet |
| 8 | Eye bolt for lifting machine | 20 | Spring tension adjuster |
| 9 | Feed selector | 21 | Main switch cover |
| 10 | Main switch and current connection | 22 | Coolant pump |
| 11 | Depth gage and operating panel | 23 | Minimum oil level indicator |
| 12 | Tool ejector lever | 24 | Oil pump control sight gage |



AS 50
AS 55



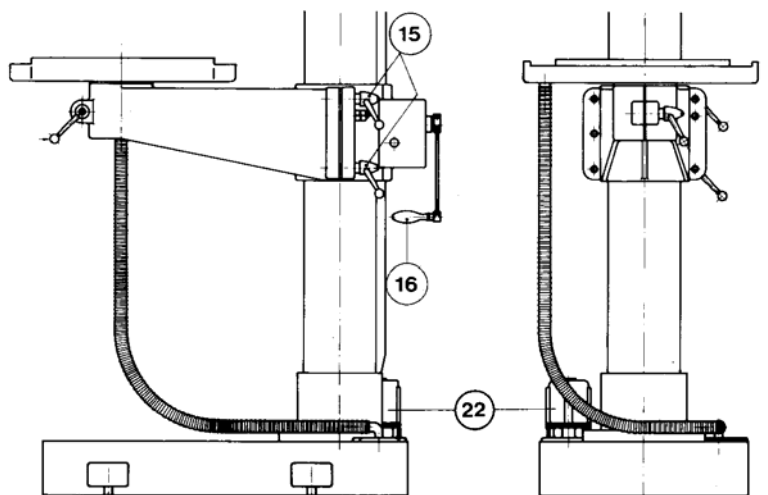


AS 50 ME
AS 55 ME

7. Operation Procedure

(The described elements hereby you can see on the diagram in Part 6.2)

- The supply voltage is engaged by switching on the main breaker, which should be indicated by the lamp "Supply Voltage ON".
- The spindle rotation is engaged by pushing one of two available buttons : "Spindle Start - Right" or "Spindle Start - left".
- Stop the spindle by pushing the button "Spindle Stop".
- The operator's place lighting is engaged by the switch "Lighting".
- The coolant pump is engaged by pushing the button "Cooling".



- Button "Emergency Stop" is provided for cutting off rotation of the spindle and the coolant pump. For further operation release the button .
- The working position of an operator should be in front of the machine facing the control panel.

7.1 Main Drive

The main drive provides 9 speed rates available through shifting the gears drive. Levers (1) are provided for the speeds changing.

ATTENTION !

While changing the speeds switch on the "Emergency Stop" and protect the machine against accident start.



Fix the left-hand lever on one of three available colours (white, green or red). The required speeds should be selected in accordance with the chosen colour.

ATTENTION !

Change speeds only when the machine is idle, otherwise there is a danger of work piece damage.



7.2 Feeds

7.2.1 Manual Feeds by Cock Handle

ATTENTION !

For manual feeding shift the lever (9) to the "0" position.



Manual feeding is available through the handle (7). The size adjustment is effected by means of the hand wheel (4) according to the scale indication.

Higher sensitivity is achieved when the quill is absolutely pure and clean from grease.

7.2.2 Work with Hand Feed Wheel for Fine Feeding

ATTENTION !

For fine feeding with the wheel shift the lever (9) to the "0" position.



The fine feeding is available by means of the hand wheel (2). This method of feeding is applied for chamfering and countersinking.

For achieving higher production capacity use the following procedure :

- By means of the cock handle (7) move the tool as close as possible to the work piece.
- Switch on power feeding by means of the level (3).
- Fulfil the fine feeding through the hand heel (2), the reached operating size being indicated :
 - By scale - for individual production;
 - By adjustment of the drill depth limiter (13), which disengaged the lever (3) when the required depth is achieved - for series production.

7.2.3 Power Feeds – AS 50, AS 55

The power feeds are engaged by mechanical way as follows :

- Push the cock handle lever (7) inside;
- Lift the lever (3) for engaging power feeds.
- Select required feed rate from the rating nameplate with the lever (9) before or during operation, as follows : - for AS 50, AS 55 - 0,10 mm/rev, 0,20 mm/rev, 0,30 mm/rev or 0,40 mm/rev;
- The feeds can be shifted more easily when the spindle is at idle stroke.
- The drill depth is limited by the drill depth limiter (13).
- The required drill depth is indicated by scale.
- When the required drill depth is achieved the feeding is automatically disengaged. Then the quill returns to its initial position under the influence of return spring.



ATTENTION !

In this situation there is a danger from a stroke or bite - the hub with handles is still rotating!

- At the reverse direction the limiter needs not to be adjusted at the required depth as the safety clutch is provided for the purpose.

7.2.4 Automatic feed -

- The feed is switched on electrically, by pushing the buttons (3), only when the spindle is rotated CW (clockwise). When the spindle is rotated CCW (counter clockwise) the automatic feed can not be engaged.
- Select required feed rate from the rating nameplate with the lever (9) before or during operation, as follows :
- for AS 50ME and AS 55ME - 0,10 mm/rev, 0,20 mm/rev, 0,30 mm/rev or 0,40 mm/rev.
- The feeds can be shifted more easily when the spindle is at idle stroke.
- The drill depth is limited by the drill depth limiter (13).
- The required drill depth is indicated by scale.
- When the required drill depth is achieved the feed is automatically disengaged.
- For disengaging the feed during automatically operation before reaching the depth, set by depth limiter, the “FEED HOLD” button can be used.
- After disengaging the feed the quill returns to its initial position under the influence of return spring.



ATTENTION !

In this situation there is a danger from a stroke or bite - the hub with handles is rotating backwards!

7.3 Return Spring

The return spring is provided for return of the quill in its initial position after fulfilment of operation. For tightening or re-tightening of the spring release fixing bolts in the box (20). Turn it in "+" direction for tightening of the spring, and in "-" direction - for its stretching.



ATTENTION !

Keep the handles (7) pressed inwards when you are tightening the spring!

ATTENTION !

For safe operation adjust the spring to move the quill with a moderate speed when returning to its initial position.



7.4 Safety Clutch

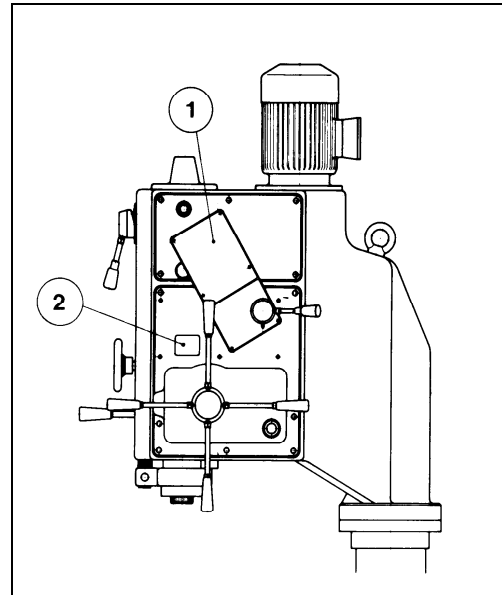
The feed drive is provided with one safety clutch for overload protection.

Overloading means for example the event, when the tool is operating after the feeding has been stopped.

After an event of overloading is over the feeding is actuated again.

The adjustment of the clutch is made by the manufacturer, as the axial effort is measured by dynamometer.

The adjustment is effected through the small window (2) after the cover (1) has been removed. That is why better do not tighten the nut too hard to avoid eventual accidents.

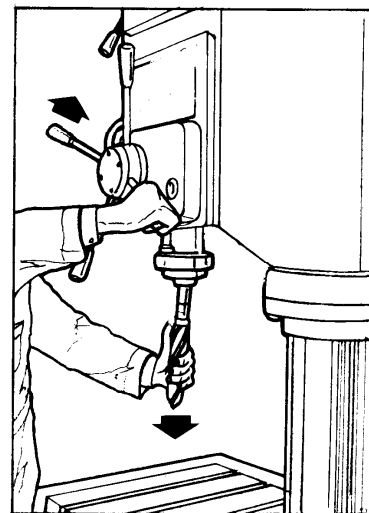


7.5 Automatic Knock - Out Of the Tool

The spindle is adjusted at a minimum gap between the quill and the quill hole. Radial play is also checked precisely. If any deviation arises while drilling, at first check the tool. Bad sharpening and incorrect centring of the tool may be the reason for drilling deviations.

The automatic knock - out of the tool built-in the spindle provides easy tool replacement.

The most convenient position of the operator during the tool changing is at the right side of the machine (see the diagram).



The lever (12) (art. 6.2) provides the quill support. For knocking the tool out move the lever to the machine. Hold the tool slightly with hand. By means of the cock handle (7) move the quill sharply and with effort, and the tool will be knocked out.

In the event of the tool blocking knock it out with wedge and hammer, as be careful not to damage the quill. For the purpose put a wooden block under the tool.

BE CAREFUL !

There is a danger of hurting hand by the sharp edges of the tool !



7.5.1 Tool Change of AS 50 and AS 55

The spindle chuck provides easy tool changing of ISO30/40 tool holders.

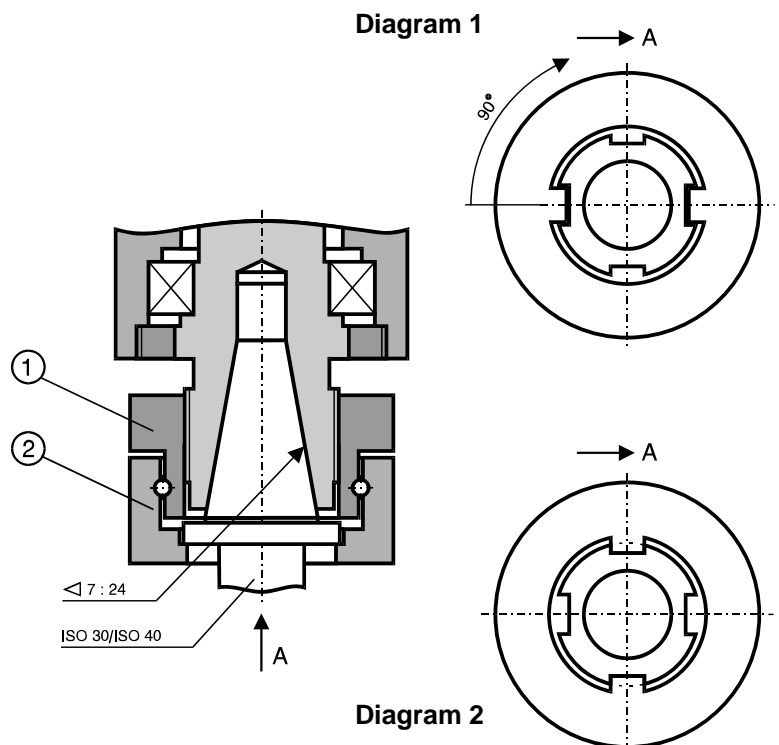
The chuck is opened by releasing of nut (1). The gears of the gripping bush (2) are aligned with the gaps on the tool holder (Diagram 1). The tool holder and the bush are rotated together until the tool enters the spindle. After that the bush (2) is turned on 90^0 as shown on Diagram 2. By means of the nut (1) the tool is fastened in the spindle.

The releasing of the tool is made on opposite order.



ATTENTION!

There is a danger of tool falling when the bush (2) is turned on position for change!



7.6 Table Moving

For vertical moving of the table or its axial swivel around the column, release the handles (15) (see art. 6.2). The vertical movement of the table is available by turning the handle (16).

For the table swivel, unscrew the handle (14).

For machining tighten the handles (14) and (15) again.

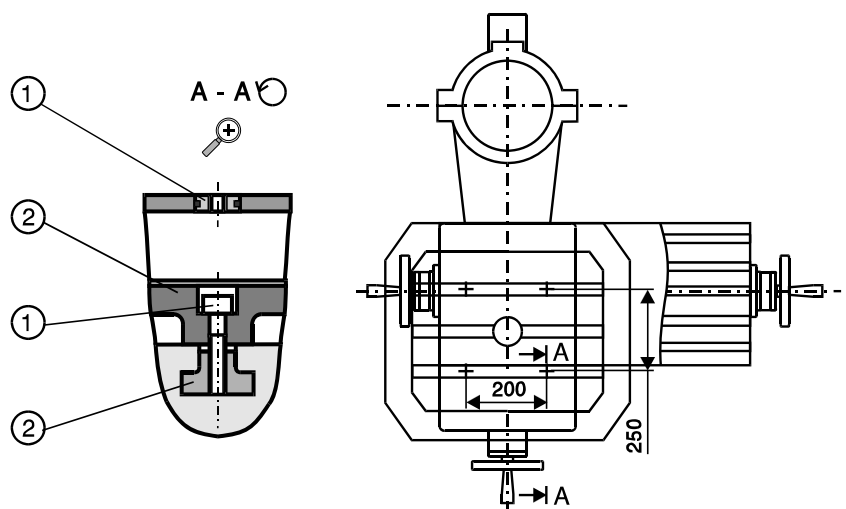
Keep the column clean. Do not move the table with power.

7.6.1 Mounting of coordinate table K200.

For mounting of the coordinate table you must remove the plugs (1) and safety strips (2).

In the grooves of intermediate table are inserted "T"-nuts (3) as shown on the schema.

With bolts (4) the coordinate table is fastened on the table. The safety strips and plugs are mounted back on the table.



ATTENTION!

There is a danger of hurting hands when settle the coordinate table on the intermediate table!

7.7 Thread Cutting

7.7.1 Thread cutting by buttons.

(Controls described below are shown in art. 6 and 7.)

- With the buttons "Spindle Start - Right" or "Spindle start - left" select the initial direction of rotation in accordance with required thread.
- For right-hand thread cutting push the button "Spindle Start - Right". Press the tap to the cutting bore with the handle (7) till cutting-in, after which the self-contained cutting is going on.
- The handle (7) helps to resist the force of the return spring.
- When the required depth of thread cutting is achieved, stop the spindle by the button "Spindle - Stop", immediately after which push the button "Spindle Start - Left", which returns the tap to its initial position.

ATTENTION !

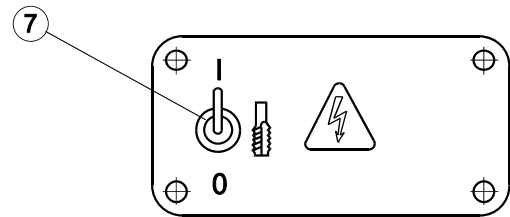
*For thread cutting never use power feeds !
This is a danger of the tool breaking, or work piece damage, or machine parts hurt.*



7.7.2 Tread-cutting Device

Arrangement

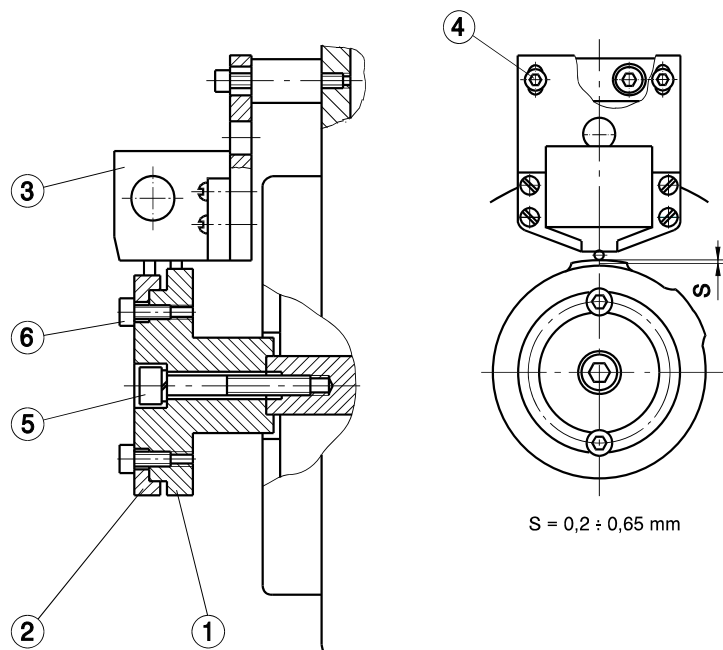
1. Fixed cam
2. Cam for depth adjustment
3. Control switch
4. Adjusting bolts for the control switch
5. Fixing bolt
6. Fixing bolts for cam (2)
7. "Thread-cutting cycle" switch



Thread-cutting device is adjusted at the factory - manufacturer, but may be damaged in transit or erection.

Operation:

- For beginning a thread-cutting cycle turn on the switch (7).
- Select the direction of rotation in accordance with required thread type by means of the buttons "Spindle Start - Right" or "Spindle Start - Left".
- For right-hand thread cutting push the button "Spindle Start - Right". Move the tapping tool by turning the levers of the cock handle until it starts to cut, and during thread-cutting use the levers for a slight assistance in resisting the force of the return lever. The return spring may be adjusted as per the



procedure described in art. 7.3, if necessary. The required cutting depth is adjusted by cam (2). After adjustment lock it with fixing bolts (6).

- The cam (1) is fixed by bolt (5) in the position, always oriented to the control switch (3).

At achieving the required depth of cutting the machine changes the direction of rotation automatically and the tap returns to its initial position. Then the direction of rotation is changed again by means of the cam 1 and the machine is ready for a new thread cutting cycle.

Working stroke of the control switch is $S = 0,2 - 0,65$ mm. It can be adjusted by shifting in vertical direction, after which the switch is locked by fixing bolts (4).



ATTENTION !

When you perform thread-cutting do not use power feeds. There is a danger of breaking the tool or damage of work piece and machine parts !

7.8 Coolant System

The design of the machine base (25) provides its use as a cooling tank. The pump (22), mounted on the base, injects coolant to the system.

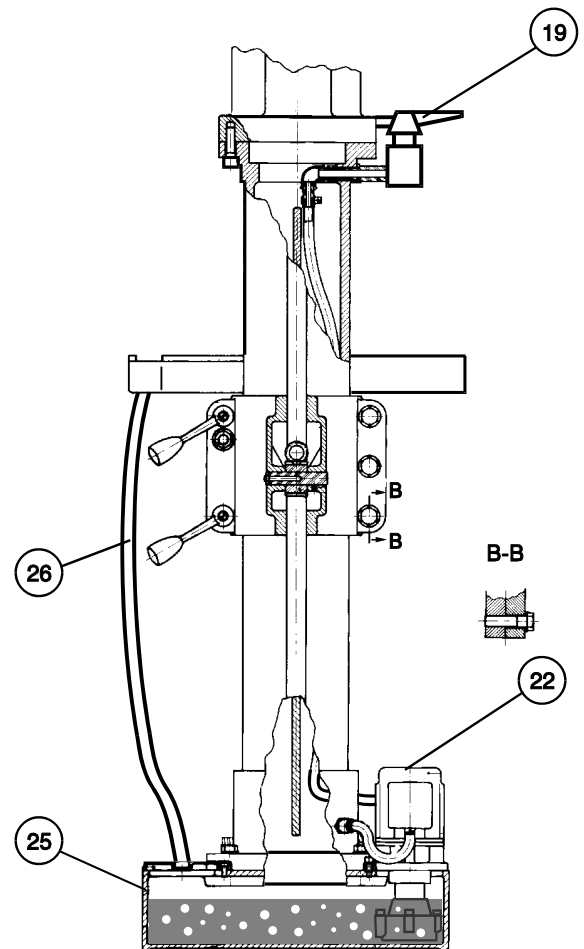
Tank storage capacity :

- AS 50 - 12,5 L;
- AS 55 - 12,5 L.

The pump is switched on with button "Coolant Switch" (art. 6.).

The flow is adjusted by faucet (19), and coolant is drained out through a flexible nose (26).

Observe the requirements and instructions of the manufacturer for the coolant use and change.



7.9 Emergency Brake

By pushing the button "Emergency Brake" the machine is entirely disengaged.

Release it to re-start the machine.



ATTENTION !

Before releasing the emergency brake be sure that the reason of its actuation is eliminated!

8. Sequence of Work (Drilling)

- Tighten the drill;
- Shift handles (1) to an appropriate position in accordance with the required speeds;
- Select feed rate with handle (9);
- Shift switch (7) (thread cutting option) to the position "Thread cutting";
- Place the depth limiter (13) at the required depth read on scale;

- Switch on the main breaker (10);
- Switch on lighting (if necessary);
- Press the button "Spindle Start - Right";
- Switch on the coolant pump (if necessary);
- Switch on feeds by means of the levers of the cock handle (7) or the lever (3).

9. Maintenance

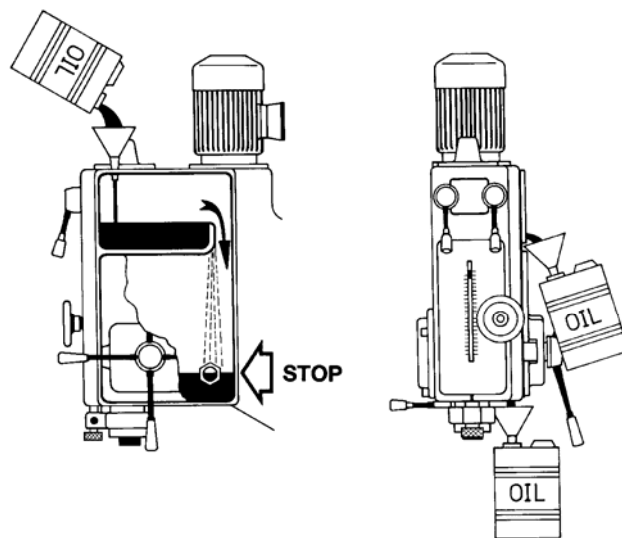
ATTENTION !

For the time of the machine repair or preventive maintenance switch OFF the main breaker and provide it against accident start (for example, by locking).



9.1 Change of Oil

- 1 - Oil fill plug
- 2 - Oil level plug
- 3 - Oil pump
- 4 - Pump control plug
- 5 - Oil filter
- 6 - Drain plug for the low tank
- 7 - Drain plug for the top tank

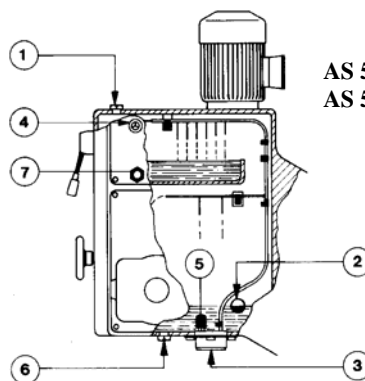


ATTENTION

Machines are delivered without oil.

Follow the following instruction for filling the machine with oil :

- Unscrew the Oil fill plug (1);
- Pour oil through a funnel;
- At first fill the top tank (gear box), after which the oil passes through the overflow to the low tank (feed box);
- When the oil reaches the marked level, stop filling;
- Do not overflow the oil because oil in excess runs out through the spindle and control panel;
- If in spite of all this has happened, unscrew the plug (6) and pour out the excess oil till the middle of the oil-indicating window.



AS 50 - 7,5
AS 55 - 7,5

ltrs
ltrs

9.2 Oil Drain

At first drain the oil off the gear box tank. For the purpose unscrew the plug (7) and leave the oil to pour out through a funnel into a container.

The same procedure should be done for draining the oil from the feed box tank using the plug (6).

9.4 Dismounting Of the Quill

- Remove the hand wheel for fine feeds (2) (see art. 6.2). Unscrew lever (3);
- Dismount the control panel without disconnecting the cables;
- Remove the limiter (13);



ATTENTION !

Put a wooden block on the table under the spindle. There is a danger of the spindle fall and bite !

- By turning the levers (7) release the quill rack, as the quill is slightly supported by hand;
- Turn the levers (7) in the reverse direction till the return spring tension is entirely release;
- Remove the quill.

ATTENTION !

*Do not leave the levers (7) free during the dismounting procedure !
Hazard of hit and bite !*



- Mount the quill in the reverse sequence as described above.
- For adjustment the return spring see art. 7.3.

9.5 Change of the Return Spring

- Fulfil the dismounting procedure as per art. 9.4;
- Unscrew the three bolts and remove the return spring (20) together with the cover;

ATTENTION !

*Never remove the spring out of the cover !
Hazard of operator' hurt !*



- Mount a new spring set by inserting the folded edge into the feed shaft slot;
- Mount all other part according to the procedure described in art. 9.4 in the reverse direction.
- To adjust the counterbalance refer to art. 7.3.

Annex 1: Technical Data

			AS 50	AS 55
Max. boring diameter in steel St60, mm			50	55 70 (F0,1)
Max. bore diameter in cast iron GG20, mm			60	65
Max. thread cutting diameter in steel St 60, mm			M 42	M 42
Max. thread cutting diameter in cast iron GG 20, mm			M 60	M 60
Number of speeds			9	9
Speed range, rpm			54-75-109- 169-237-344- 507-712- 1032	54-75-109- 169-237- 344-507- 712-1032
Number of feeds			4	4
Feed range, mm/rev			0,10-0,20 0,30-0,40	0,10-0,20 0,30-0,40
Spindle taper			MK 4	MK 5
Max. stroke of spindle, mm			230	230
Distance between spindle shaft and column, mm			370	370
Column diameter, mm			200	200
Working surface of the table, mm			520 x 620	520 x 620
T-slots, number, width, length, mm			3 x 18 x 490	3 x 18 x 490
Distance between spindle and table-min/max, mm			142 / 773	100/730
Working surface of the base, mm			550 x 530	550 x 530
T - slots - number - width - length, mm			2 x 18 x 355	2 x 18 x 355
Distance between spindle and base, mm			1300	1300
Electric motor :				
- speed, rpm			1500	1500
- power, kW			3	4
Electric pump :				
- flow, l/min			30	30
- speed, rpm			2800	3600
- power, kW			0,090	0,090
Overall dimension of the machine:				
- length, mm			1040	1040
- width, mm			575	575
- height, mm			2473	2473
Machine weight, kg			835	860
Noise level at the working place, dB			<85	<85

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Max. thread cutting diameter in steel St 60, mm			M 42	M 42
Max. thread cutting diameter in cast iron GG 20, mm			M 60	M 60
Number of speeds			9	9
Speed range, rpm			54-75-109- 169-237-344- 507-712- 1032	54-75-109- 169-237- 344-507- 712-1032
Number of feeds			4	4
Feed range, mm/rev			0,10-0,20 0,30-0,40	0,10-0,20 0,30-0,40
Spindle taper			ISO 40	ISO 40
Max. stroke of spindle, mm			230	230
Distance between spindle shaft and column, mm			370	370
Column diameter, mm			200	200
Working surface of the table, mm			520 x 620	520 x 620
T-slots, number, width, length, mm			3 x 18 x 490	3 x 18 x 490
Distance between spindle and table- min/max, mm			85 / 715	85 / 715
Working surface of the base, mm			550 x 530	550 x 530
T - slots - number - width - length, mm			2 x 18 x 355	2 x 18 x 355
Distance between spindle and base, mm			1300	1300
Electric motor :				
- speed, rpm			1500	1500
- power, kW			3	4
Electric pump :				
- flow, l/min			30	30
- speed, rpm			2800	3600
- power, kW			0,090	0,09
Overall dimension of the machine:				
- length, mm			1040	1040
- width, mm			575	575
- height, mm			2473	2473
Machine weight, kg			835	860
Noise level at the working place, dB			<85	<85

Annex 2: Chart of recommended lubricants

DIN 51 502	CL 32	CL 68	CGLP 220	K2K-20	GP 00 G-10	KPF 2K-20
Lieferant Supplier	Viskosität 32 mm ² /s	Viskosität 68 mm ² /s	Viskosität 220 mm ² /s	Walkpenetration NGLI-Klasse 2	Walkpenetration NGLI-Klasse 00	Walkpenetration NGLI-Klasse 2
ARAL	Aral Vitam DE 32 Aral Sumrol CM 32	Aral Vitam GF 68 Aral Vitam DE 68 Aral Degol CL 68	Aral Deganit B 220	Aral Aralub HL 2	Aral Aralub FD 00	Aral Mehrzweckfett F
BP	BP Energol HLP-HM 32	BP Energol HLP-HM 68	BP Maccurat 220 D BP Energol HP-C 220 BP Energol CHL 220	BP Energ grease LS 2 BP Langzeitfett	BP Energ grease - HT (X) EP BP Energ grease - FG (X) EP	BP Mehrzweckfett L 21 M
Castrol	Castrol Hyspin AWS 32; Castrol Hidraulik Öl HLPD 32	Castrol Hyspin AWS 68; Castrol Hidraulik Öl HLPD 68	Castrol Magnaglide D 220	Castrol Spheerol AP 2	Castrol Impervia MMO	Castrol LZV - EP
ELF	ELF MISOLA H 32 ELF POLITELIS 32 ELFOLNA 32	ELF MISOLA H 68 ELF POLITELIS 68 ELFOLNA 68	ELF MOGLIA 220 ELF MOGLIA HXE 220	ELF ROLEXA 2 ELF MULTI	ELF EPEXA 0 ELF GA 0 EP	MULTI MOS 2
Esso	NUTO H 32 (HLP 32) TERESSO 32	NUTO H 68 (HLP 68) TERESSO 68	FEBIS K 220	BEACON 2 EXXON- MEHRZWECKFETT	FIBRAX EP 370 FIBRAX 370 (GP 0 M-20)	ESSO MULTI- PURPOSE GREASE (MOLY)
FUCHS	RENOLIN DTA 32 RENOLIN MR10 VG32	RENOLIN DTA 68 RENOLIN MR10 VG68	RENEP 220 K RENEP 5 VG 220	RENOLIT FWA 160 RENOLIT MP	RENOSOD GFB RENAX GLS 00 RENOSOD GFO 35	RENOLIT FLM 2
Q8	Q8 Holst 32 Q8 Verdi 32 Q8 Van Gogh 32	Q8 Holst 68 Q8 Verdi 68 Q8 Van Gogh 68	Q8 Vagner 220	Q8 Rembrandt 2 Q8 Rembrandt EP2	Q8 Rembrandt EP00 - liverseift	Q8 Rembrandt Moly
PETROFER	ISOLUBRIC VG 32 ISOLUBRIC VG 32 L	ISOLUBRIC VG 68 ISOLUBRIC VG 68 L	WAYLUBRIC VG 220	GREASE U	GREASE GP 00	GREASE KPF 2
KLOBER Lubrication		CRUCOLAN 68	LAMORA SUPER POLADD 220	CENTOPLEX 2	MICROLUBE GB 00	UNIMOLY GL 402
MOBIL	Mobil DTE Oil Light Mobil Vactra Oil Light	Mobil DTE Oil Heavy Medium; Mobil Vactra Oil Heavy Medium	Mobil Vactra Oil No4	Mobilux 2	Mobilux P 023 (NLGI-Klasse 000)	Mobilgrease Special
Shell	Shell Tellus Öl C 32	Shell Tellus Öl C 68 Voltol Gleitöl 68	Shell Tonna Öl T 220 Shell Tonna Öl TX 220	Shell Alvania Fett R 2 Shell Alvania Fett G 2	Shell Spezial- Getriebefett H; Shell Grease S.3655 Shell Simnia Grease 0	Shell Retinax AM
DEA	Astron HL 32	Astron HL 68 Wetex W 68	Novan CGLp 220	Glissando 20	Orona 00 Orona FG 0	Caron EP 2
Zet-Ge	Zet-Ge GWA 1 ISO 32 Zet-Ge DHG 32 ISO	Zet-Ge GWA 3 ISO 68 Zet-Ge DHG 68 ISO	Zet-Ge GWA T 12 EP ISO 220	Zet-Ge Fett M 51	Zet-Ge Fett N 42	Zet-Ge Fett MO 80