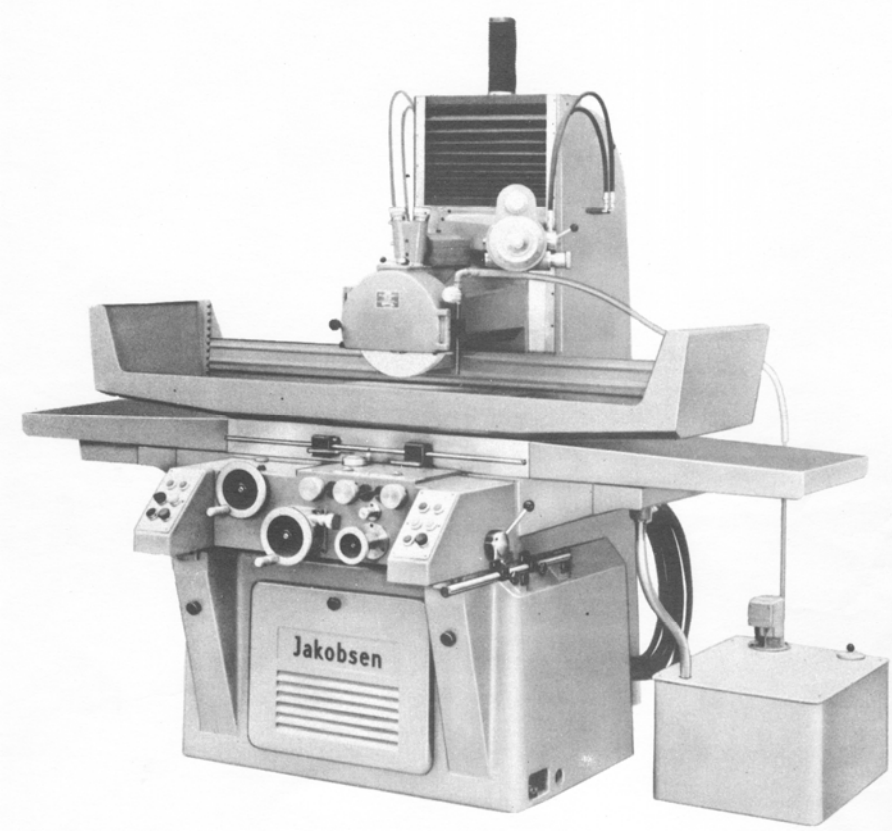
JAKOBSEN

OPERATION MANUAL



SJ24 MACHINE

Version 1GB

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CHAPTER 1: INSTALLATION

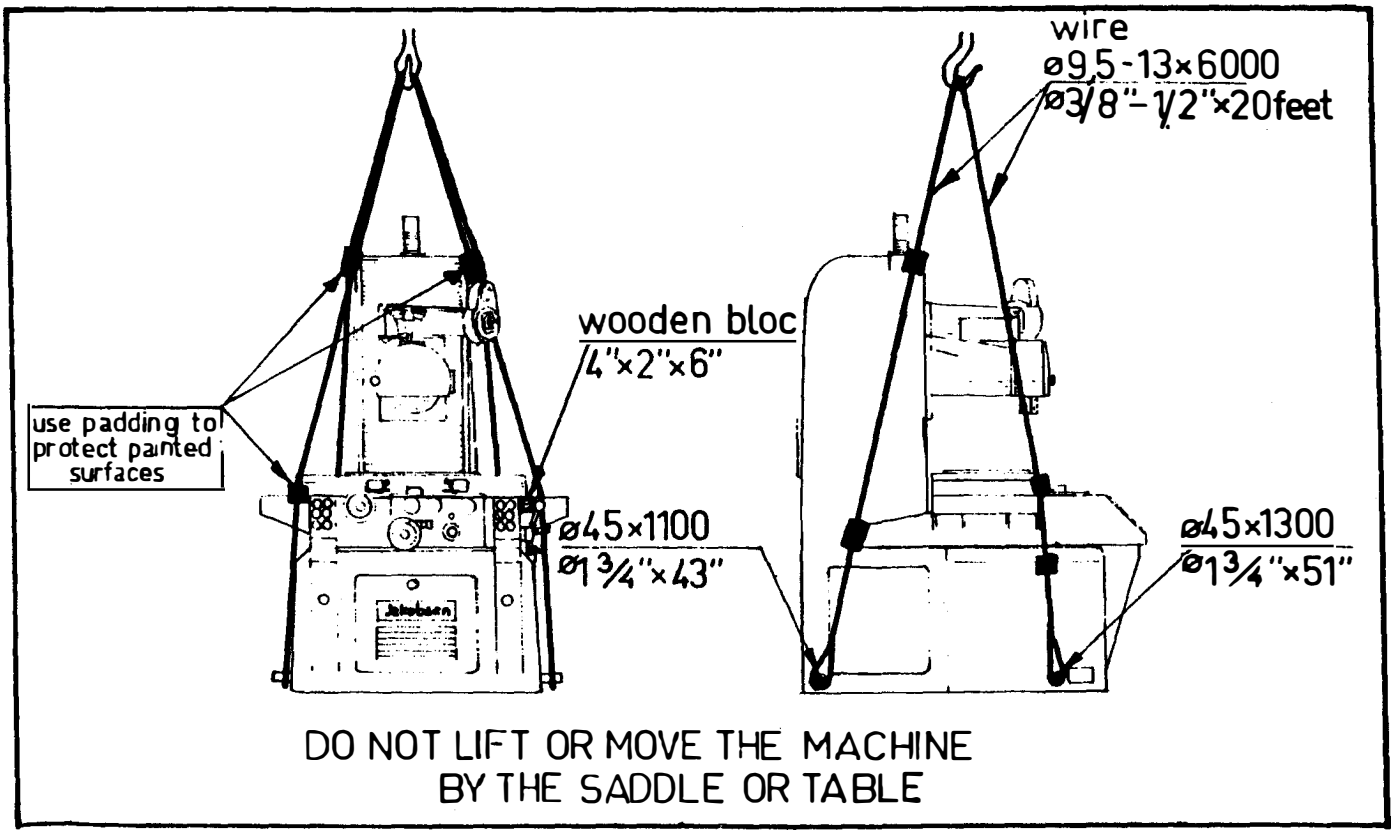
UNCRATING

Your JAKOBSEN Surface Grinder has been carefully crated for shipment to insure its accuracy when it reaches your plant. It is important that the crate is removed carefully so as not to damage the machine.

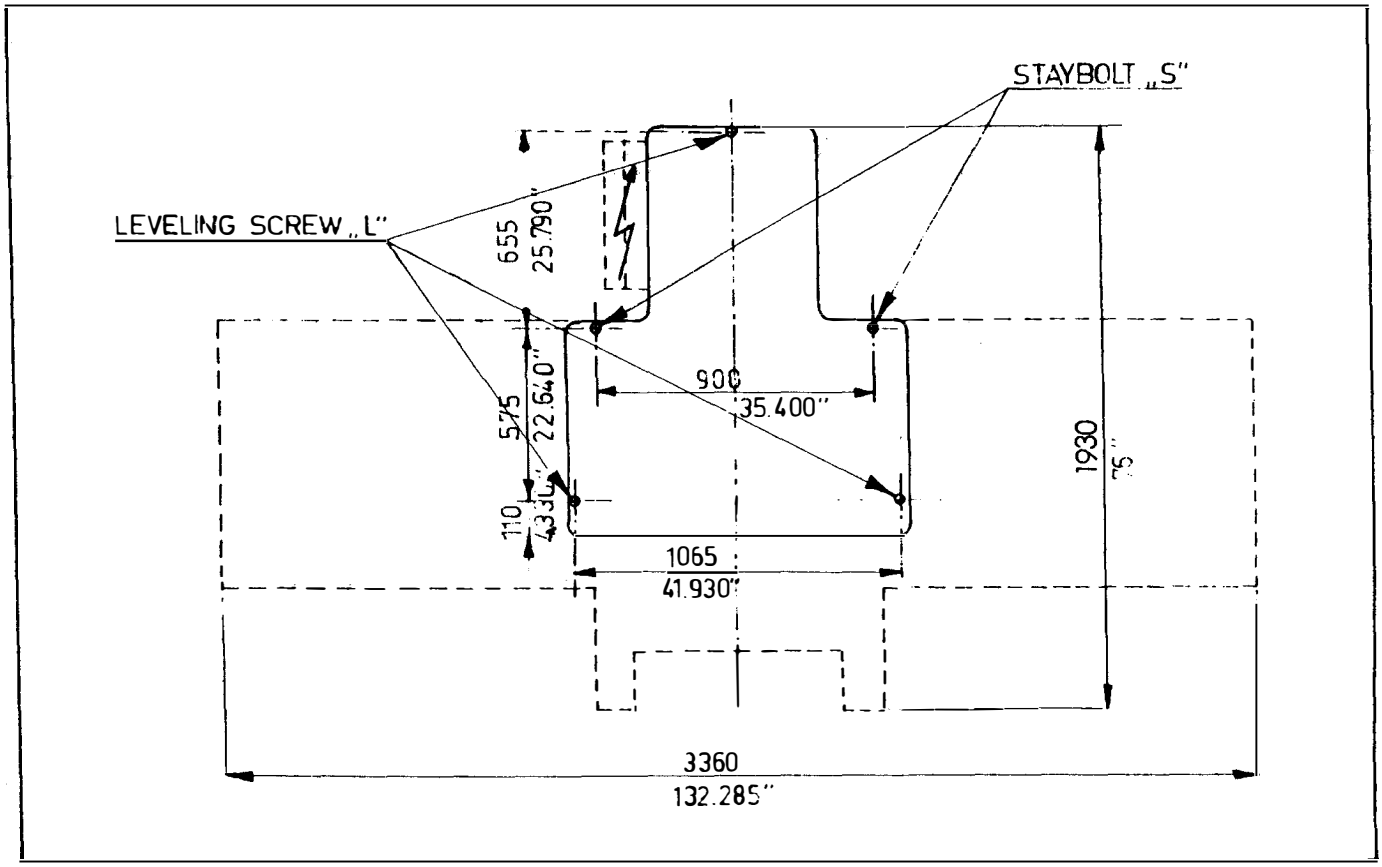
1) Remove table end guards, coolant tank and any other accessories, which have been attached to the bot om of the packing-case.
2) Inspect the machine for broken or damaged parts.
3) Remove the bolts attaching the machine to the bottom of the packing-case.

LIFTING INSTRUCTIONS

The machine should only be lifted in a manner illustrated below. Use two rods 1 3/4" diameter, one 1300 mm (51") long and the other 1100 mm (43"), and two straps approx. 6 m (20 ft) long.



This is the correct method of lifting the grinder


STAYBOLT „S"
LEVELING SCREW „L"
655
25.790"
575
22.640"
110
4.330"
900
35.400"
1930
75"
1065
41.930"
3360
132.285"

CLEANING

Before shipment all unpainted surfaces were coated with a rust preventive compound. This may be removed by wiping with rags saturated with paraffin oil (petroleum). It is especially important to clean the free ends of the longitudinal guide ways.

After the cleaning compound has been removed, wipe all finished surfaces with a cloth moistened with lubricating oil.

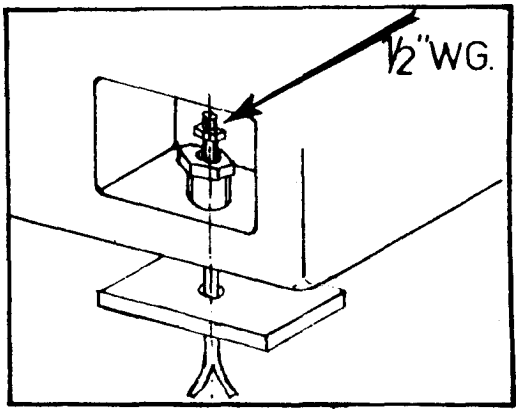
DO NOT MOVE ANY OF THE CONTROLS OR MOVING PARTS UNTIL THE MACHINE HAS BEEN THOROUGHLY CLEANED AND LUBRICATED.

INSTALLATION ON FLOOR

For maximum stability and consistent accuracy of work to be produced on this machine the foundation should be as solid as possible. A special foundation is not necessary. Any floor is suitable provided it is strong enough to support the weight of the machine without vibration.

The Grinder should be as free as possible from vibrations set up by other equipment. These outside vibrations have a definite effect on the finish produced by the Grinder.

The machine must be leveled by means of the three leveling screws (L) and the two stay-bolts (S). It is recommended to place five steel plates 100 x 100 x 12 mm (4" x 4" x ½") as baseplates under the leveling screws and stay bolts.

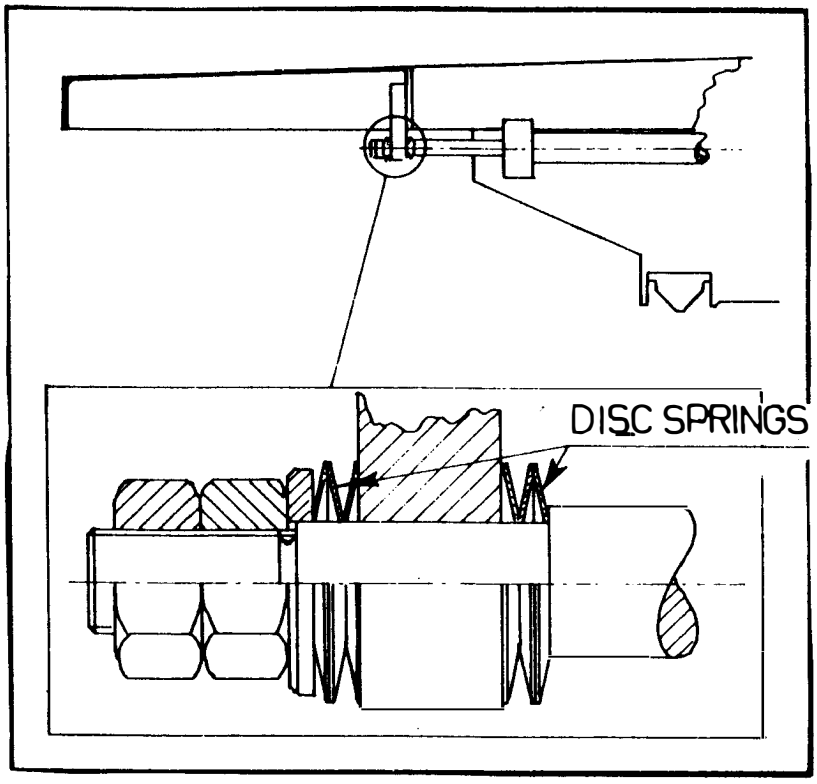


With a machine spirit level placed on the ground top surface of the table, level first the machine in the longitudinal direction and thereafter crosswise whereupon the longitudinal direction is controlled again.

NOTE: It is a condition for the accuracy of the machine that it is leveled by means of the three leveling screws, pos. L, whereas the stay bolts S afterwards are thread down until they support.

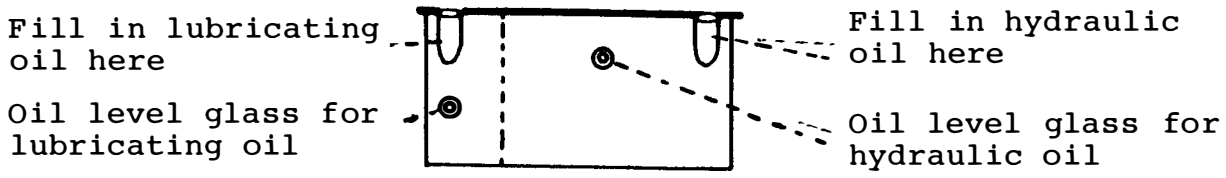
ASSEMBLY

1) Fasten the table end guards to the table by means of the screws placed in the table ends. Do not forget to fit the packing between the end guard and the table ends.
2) Fit cover plate for rack under table (Optional equipment)
3) Fit the rail for crossfeed trip dogs.



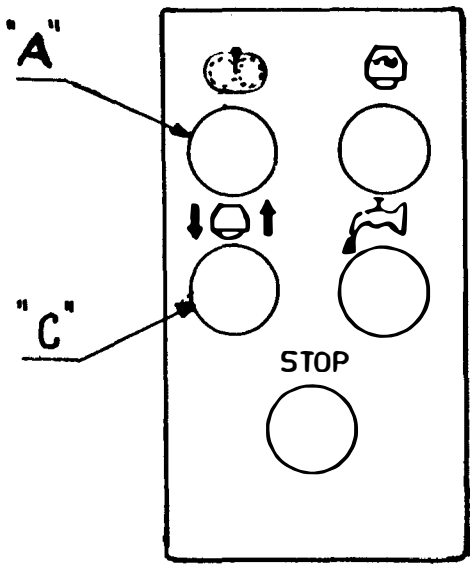
OILFILLING

Remove front cover from machine base and fill in hydraulic oil at the right hand side of the oil tank to the centre of the oil level glass. The capacity of the tank is approx. 45 litres. The lubricating oil is filled in the left hand side of the tank. The tank contains approx. 3.0 litres.



We recommend MOBIL OIL VACOULINE 1405 as hydraulic oil, but other makes can also be used in accordance with the lubrication chart page 14.

As lubricating oil we recommend MOBIL OIL VACTRA No. 2 or as stated in the lubrication chart page 14.


"A"
"C"
STOP

Regarding lubricating points and change and control of oil level see page 14

ELECTRICAL CONNECTIONS

Before connecting the machine to the power supply, make sure that the supply corresponds with the setting of the motors stated in the control cabinet.

The power supply is connected in the control cabinet at the left side of the column.

Control the direction of rotation by means of the wheel up- and down switch pos. (C).

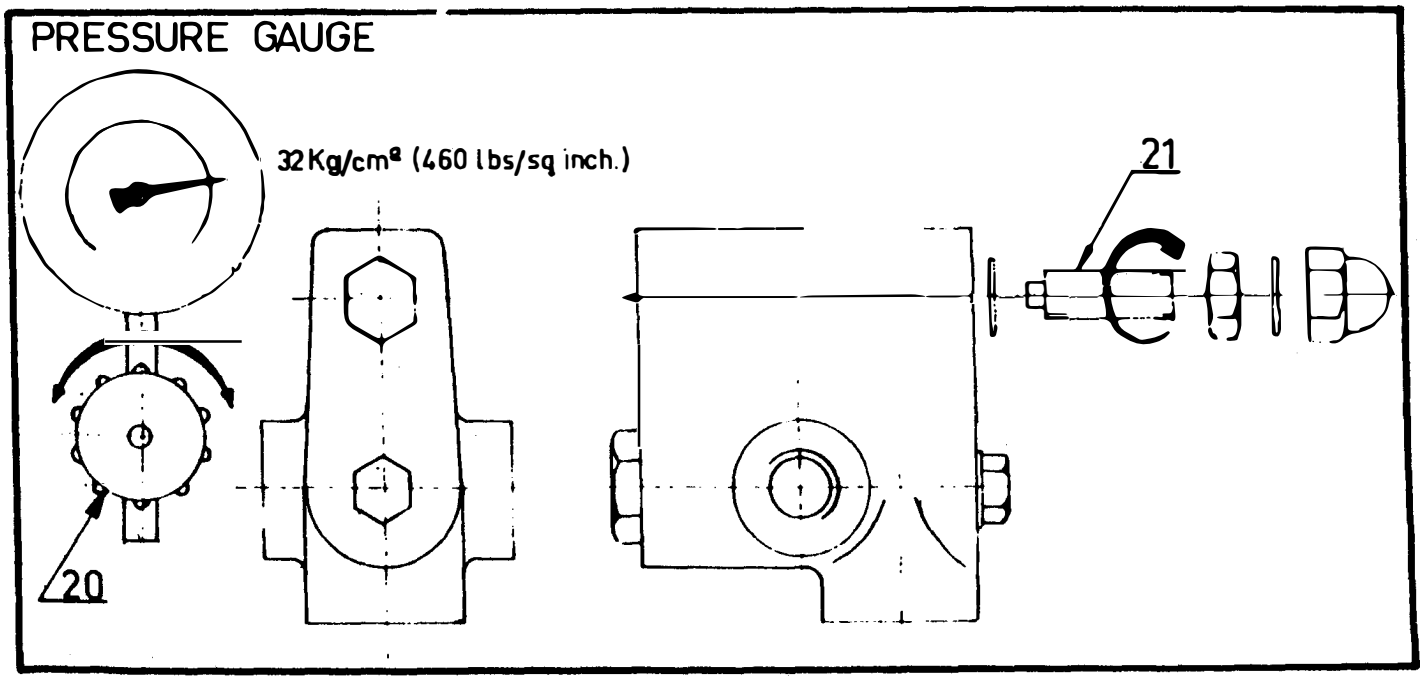
If the symbols do not correspond with the movements, two of the main-phases must be interchanged and all motors will then automatically have the correct direction of rotation.

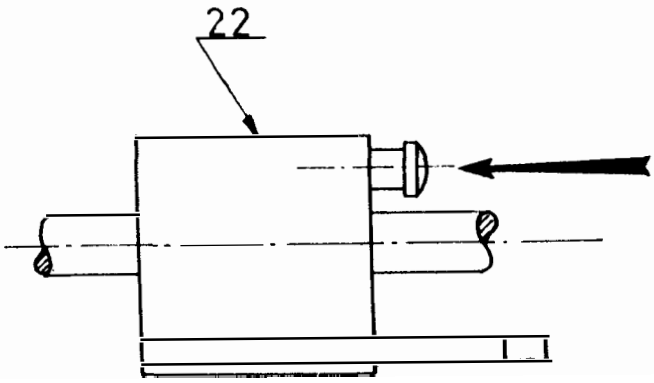
DO NOT USE THE GRINDING WHEEL MOTOR FOR CONTROLLING THE DIRECTION OF ROTATION.

STARTING-UP AND RUNNING IN

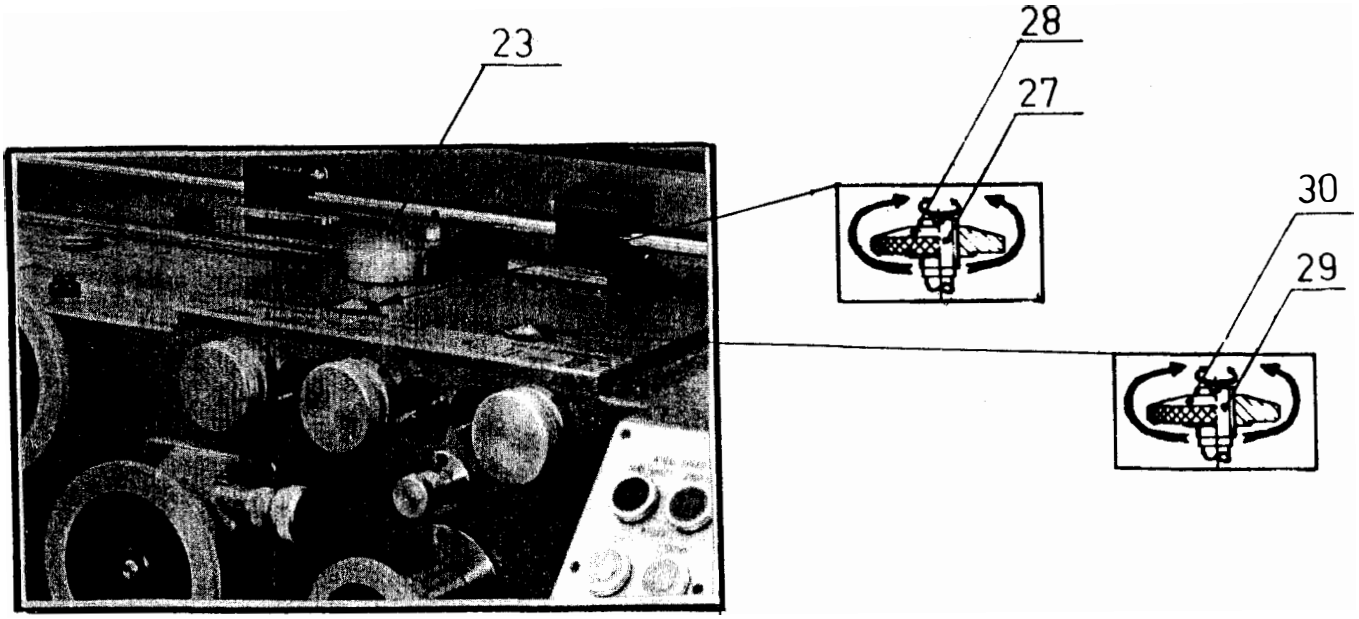
1) Start the hydraulic pump by operating push button (A).
2) Remove the front cover from base of the machine and turn Table Speed Control Lever (24) to blue mark position. Check oil pressure. Pressure on the gauge must only be 32 kg/cm^2 (460 lbs/sq.in.)

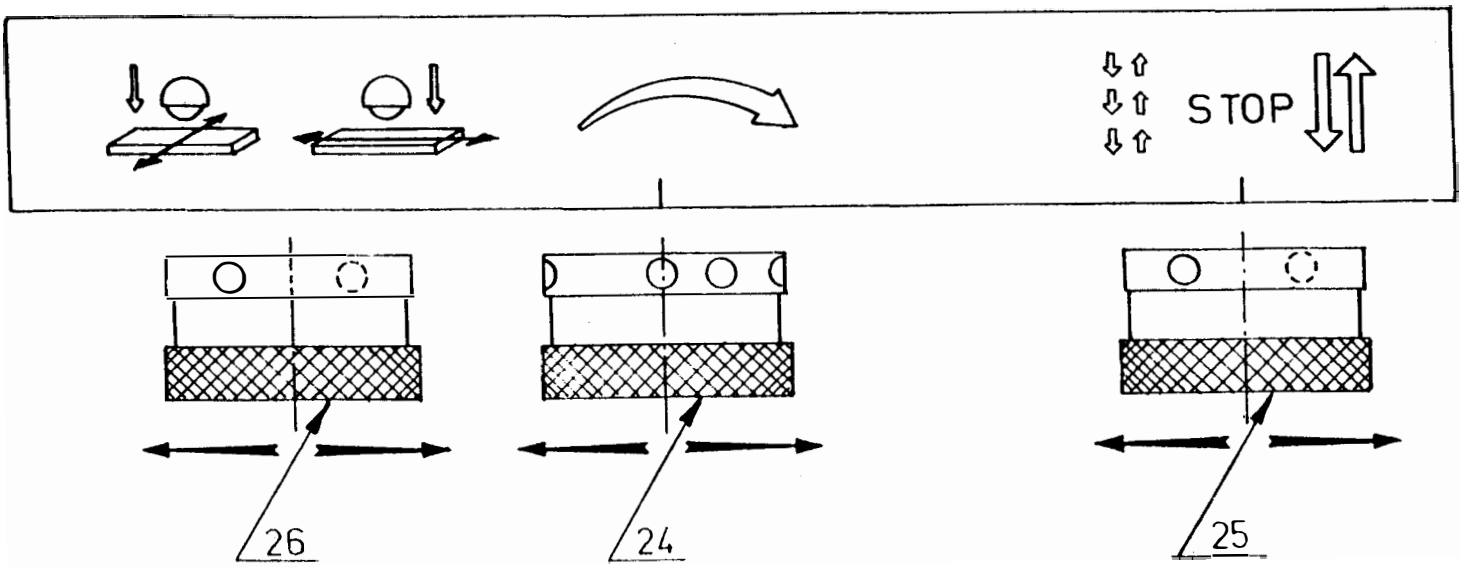
The pressure is adjusted by means of the regulating screw No. 21. Do not forget to shut off the pressure gauge valve (20) after checking the pressure.





The spacing of the trip dogs determines the length of table travel. Adjust the position of each dog by pressing the button and sliding the dog along its track. Locate the trip dogs so that the grinding wheel will contact all of the work surface.





THE LONGITUDINAL MOVEMENT

Hydraulic table travel

Set the table trip dogs (22) to give the required traverse length. Ensure that the table reversing lever (23) is between the dogs. Now turn the table speed control lever (24) clockwise and the table will start traversing between the dogs. The table speed control lever has four positions,namely:

red mark: stop position
yellow -: minimum table speed
green -: maximum table speed
blue -: Manual table feed and for operation of hydraulic wheel dresser.

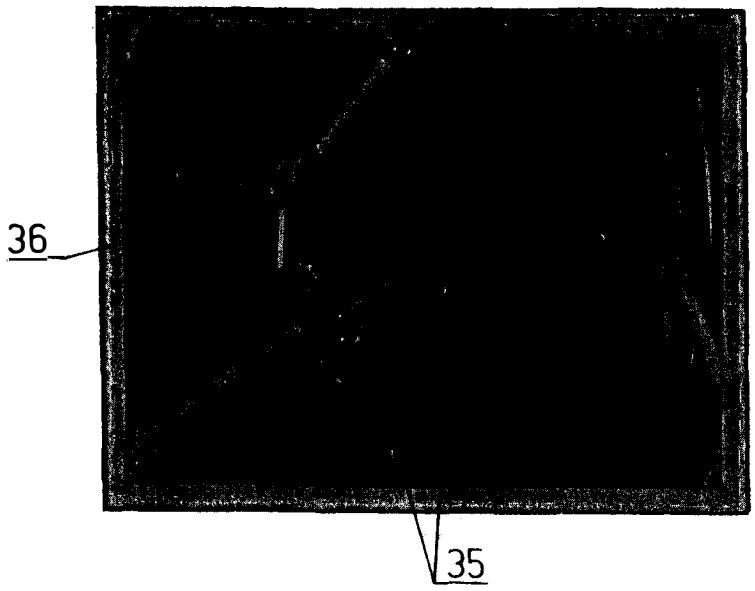
Note: When starting-up the machine in the morning, table speed control lever should be opened only slightly to give a slow rate of travel until the oil has circulated thoroughly. If the machine is cold, maximum table speed may not be obtained until the hydraulic oil has reached operating temperature.

NOTE:

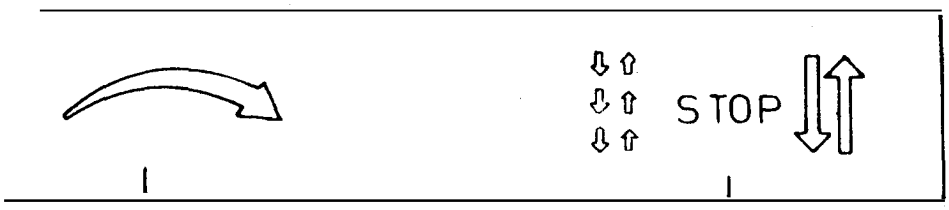
The longitudinal table cylinder is cleared of air by moving the trip dogs out in their extreme position and let the table bottom 5-6 times at each end at a very low speed. Whenever the motions become jerky or unstable this de-airing operation should be performed.

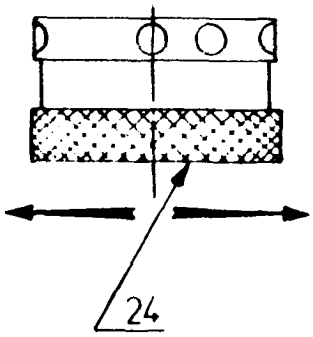
ADJUSTMENT OF THE TABLE OVERTRAVEL

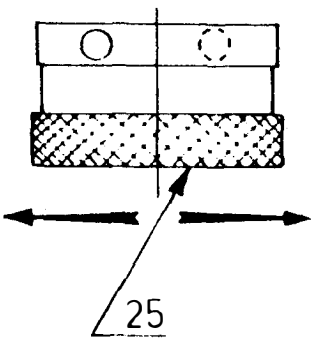
The overtravel is the distance the table travels at the end of its stroke AFTER the dogs has tripped the table reversing lever. Table overtravel will be greater at high table speeds and when the machine is cold. The overtravel can be adjusted (reduced) by means of the adjusting screws No. 27 (Longitudinal movement) and No. 29 (Cross movement). Loosen the lock nut (28) and turn the adjusting screw (27) slightly anticlockwise, using a screw driver, until the required overtravel is obtained. Then loosen lock nut (30) and adjust the cross movement adjusting screw (29) so that the cross saddle has travelled its full feed before the table trip dog, after having reversed the table movement, passes the table reversing lever again.

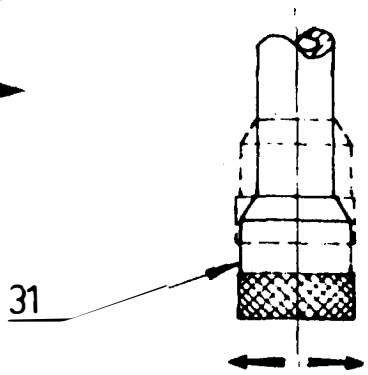


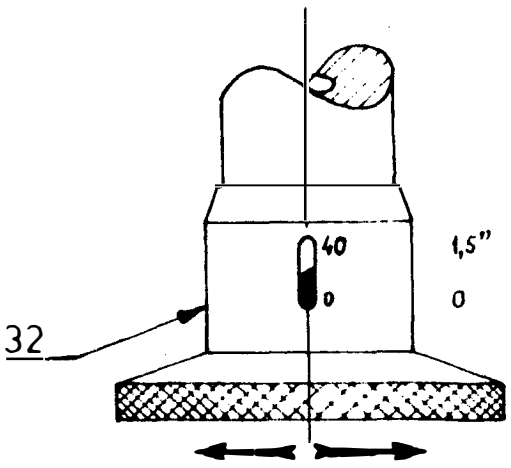
Set the crossfeed trip dogs (35) for the desired total saddle travel in each direction. The saddle will automatically reverse, when the crossfeed reversing lever (36) contacts the trip dogs.









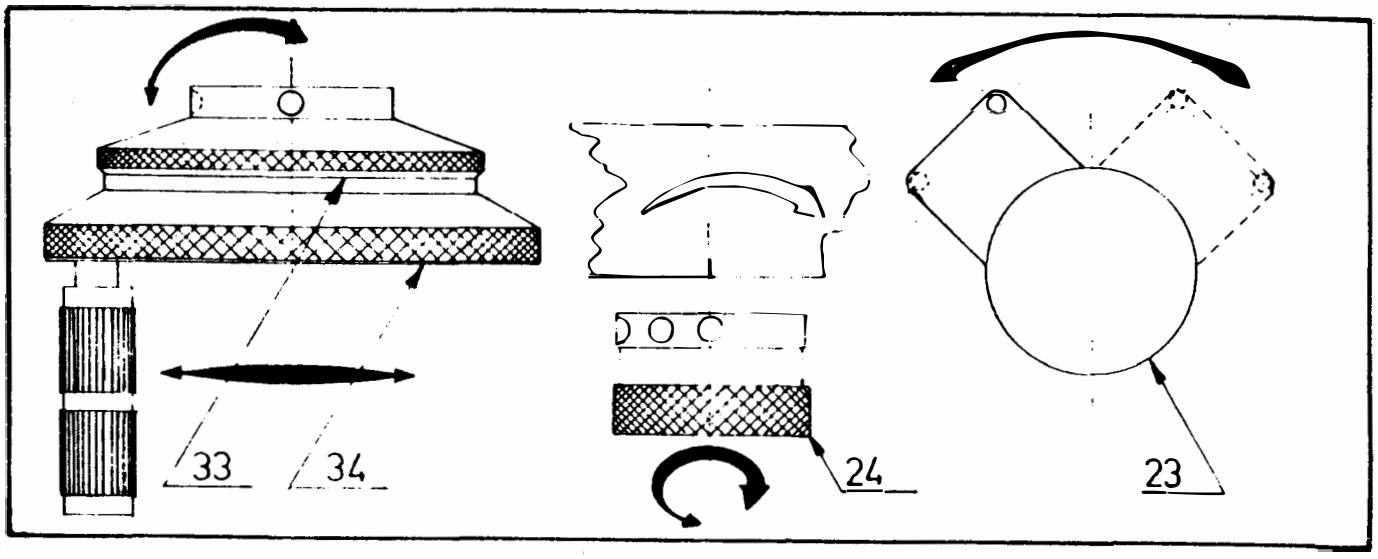


THE MANUAL TABLE TRAVEL

If manual table travel is desired, the table speed control lever (24) must be turned anti-clockwise to the blue mark position, and the table reversing lever (23) in left position.

Now turn the inner handwheel (33) clockwise until the blue mark position, whereafter the table is ready for manual operation by means of the manual handwheel (34).

REMEMBER TO TURN THE INNER HANDWHEEL (33) OUT OF ENGAGEMENT (FULLY ANTICLOCK WISE) AGAIN BEFORE THE HYDRAULIC MOVEMENT IS STARTED AGAIN.



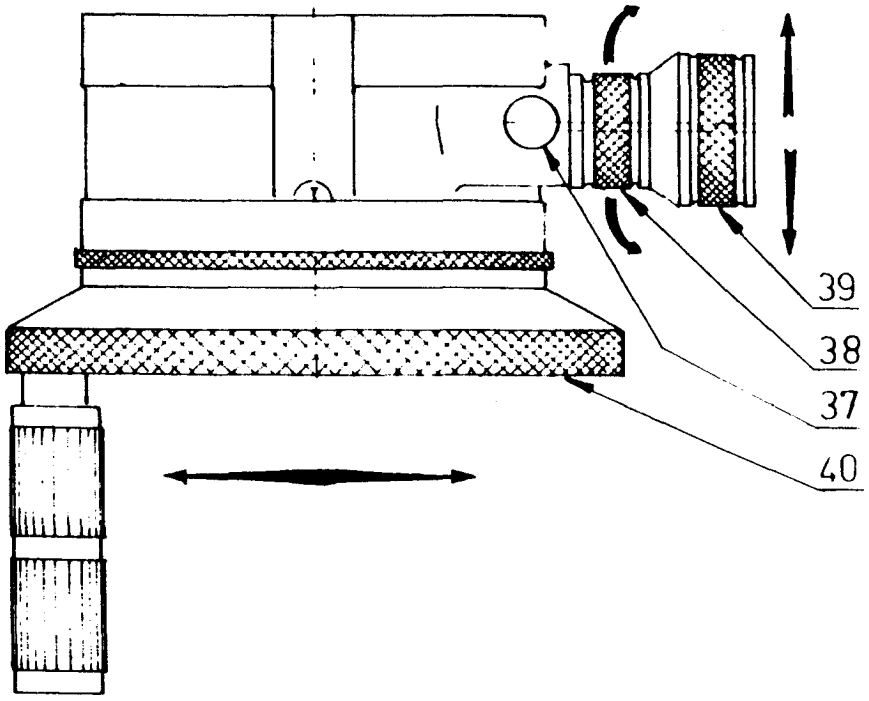
THE CROSS MOVEMENT

Hydraulic intermittent cross feed.

Set the crossfeed trip dogs (35) for the desired total saddle travel. Ensure that the cross feed reversing lever (36) is between the trip dogs.

Now turn the cross feed control lever (25) in left position and turn table speed control lever (24) clockwise.

The crossfeed is infinitely variable from 2 - 40 mm (.08" - 1.6") by means of the cross feed increment adjusting control (32).


39
38
37
40

Hydraulic rapid crossfeed

The hydraulic rapid cross movement is started by turning the crossfeed control lever (25) fully to the right.

The direction is chosen with crossfeed reversing lever (36).

NOTE:
The cross cylinder is cleared of air by placing the cross trip dogs (35) in their extreme position and let the saddle bottom 5 - 6 times in both ends at low speed, using the rapid cross movement. Whenever the motions becomes jerky or unstable this de-airing operation should be performed.

MANUAL CROSSFEED

When the manual crossfeed handwheel (40) is to be used: place the cross trip dogs (35) in their extreme position and run the saddle towards the column, using the hydraulic rapid crossfeed; leave the pump running; when changing again to hydraulic cross feed the cross saddle must manually be turned to its inside position whereafter the saddle can be moved outwards hydraulically by changing direction of the crossfeed reversing lever.

FINE CROSS FEED KNOB

The manual cross feed is equipped with a worm gearing for fine adjustment, The worm is engaged by loosening the screw (37) and turn the bushing (38) until the worm is put in gear, whereafter the screw (37) is tightened again. The fine cross feed knob (39) is gratuated in 0,002 mm (.0001").

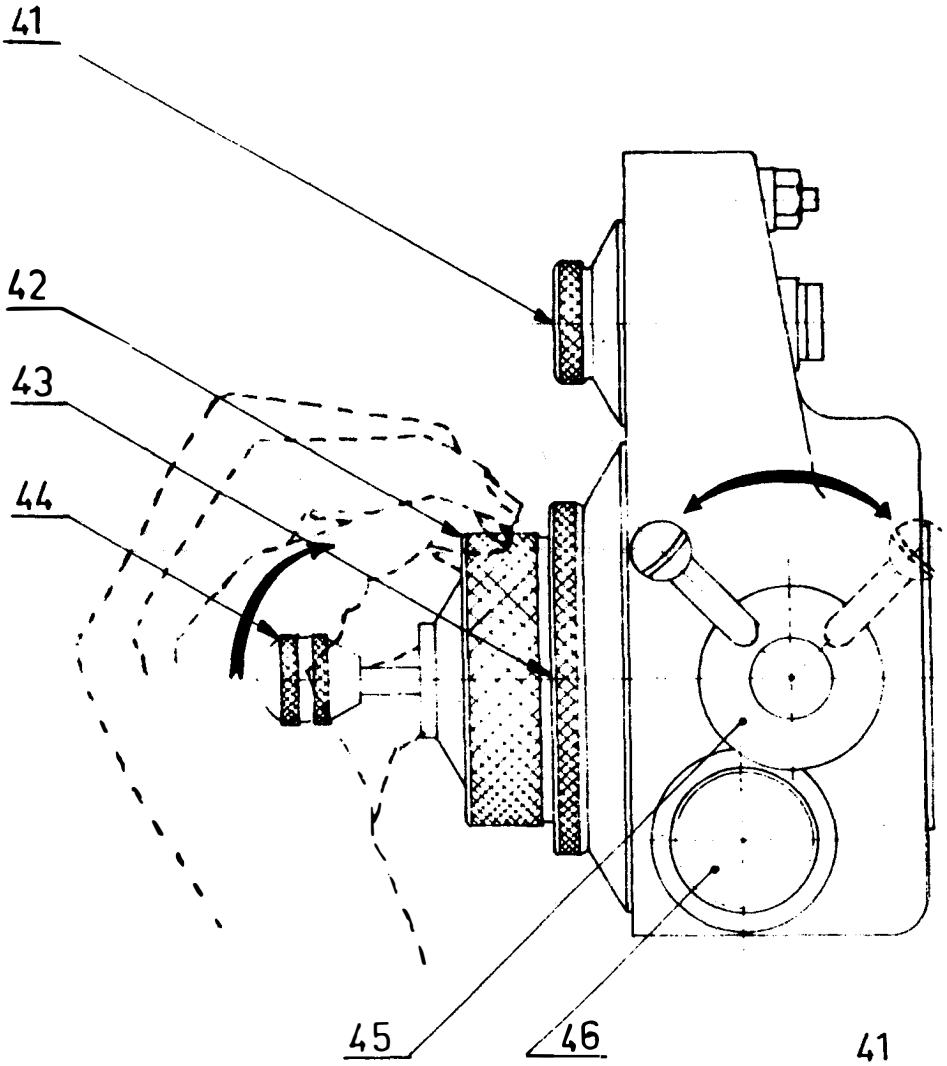
When the adjustment screw is engaged the handwheel cannot be used.

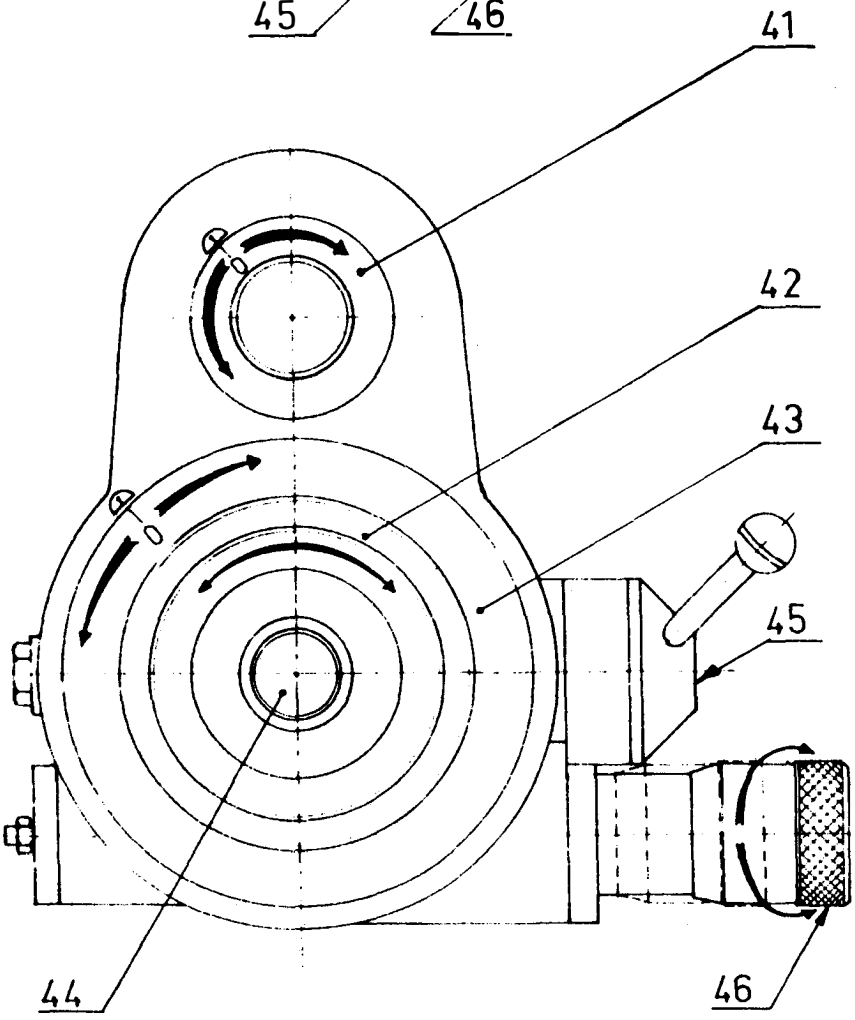
VERTICAL FEED

Hydraulic Automatic Downfeed.

The built-in automatic downfeed control consists in two units:

1) Multiple revolution selector (41)
2) The downfeed handwheel (42) with adjustable dial (43), engaging lever (45) and downfeed increment adjusting knob (46)


41
42
43
44
45
46


41
42
43
45
44
46

1) The multiple revolution selector (41) counts the revolutions of the handwheel (42) and is operated manually.

   The digits on the scaleknob (41) directly show the amount of vertical travel adjustable from 0,2 to 3,0 mm (.01" - .16").

   With the scaleknob (41) on infinite (∞) the automatic downfeed will continue without automatic stop.

2) The adjustable dial (43) is graduated in 0.002 mm (.0001"). Each revolution of the downfeed handwheel (42) will produce 0,2 mm (.01") downfeed.

   To turn the adjustable dial (43) press the disengaging lever (44) upwards, while keeping the downfeed handwheel (42) in same position (see illustration).

If you want to grind off a total of o,1 mm (.005 in.)(half a revolution of the downfeed handwheel) then disengage the adjustable dial (43) as described above, set the dial on 0,1 mm (.005 in.) and the scale-knob (41) at "0".

If less then 0,2 mm (.01") is to be removed, set the scale-knob at zero.

If it is desired to grind off a total of 0,5 mm (.0025") automatically, set the scaleknob (41) on 0,4 (.02 in.) and the remaining 0,1 mm (.005") by means of the adjustable dial (43) as mentioned above. The two downfeed handwheel revolutions account for 0,4 mm (.12") stock removal, and the amount set on the adjustable dial for the remaining 0,1 mm (.005").

Manual Vertical Downfeed

The manual vertical feed is operated by the handwheel (42). One revolution of the handwheel equals 0,2 mm (.01") downfeed. Remember to set the engaging lever (45) in front position.

Rapid Vertical Feed

The rapid vertical traverse of the spindle headstock is operated by the wheel up and down switch (C)

NOTE: Ensure the engaging lever (45) is disengaged (in front position) when using the rapid vertical traverse.

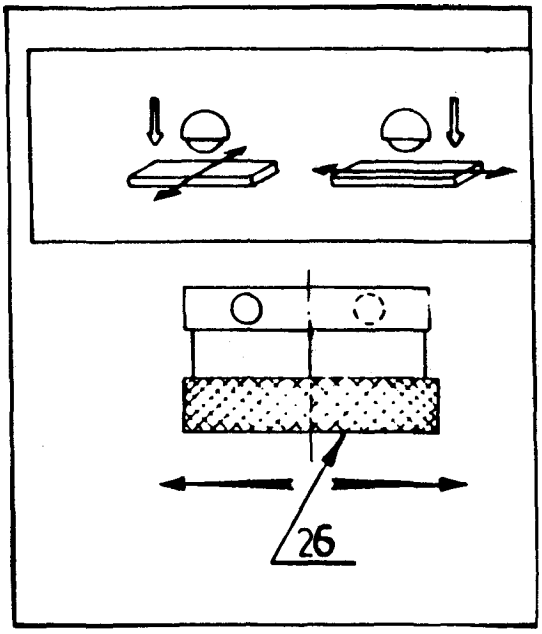
The engaging lever (45) has two positions:

Forward position: manual downfeed, and rapid vertical feed.

Rear position: hydraulic automatic downfeed.

The depth of each cutting is variable from 0.002 - 0.03 mm (.0001" - .001") and is adjusted by means of the downfeed increment adjusting knob (46).

The downfeed control lever (26) on front of the machine has two positions:



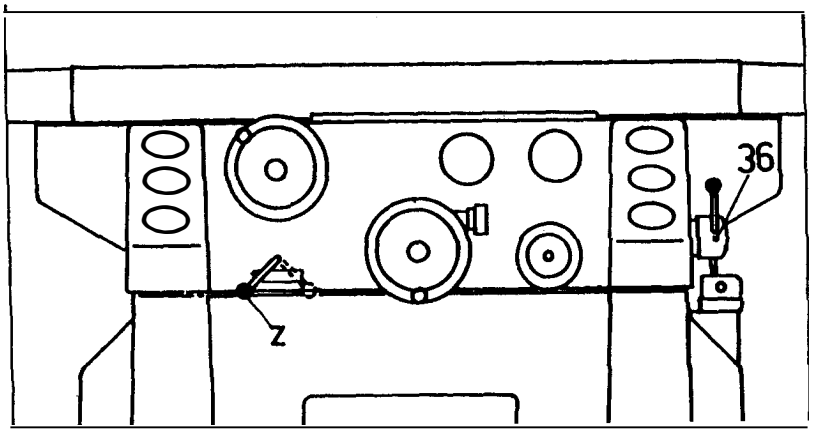
left position: automatic downfeed at every saddle reversals.

right position: automatic downfeed at the table reversal in each end. (This position is for plunge grinding only).

Saddle Locking Device

The locking of the cross saddle (Optional equipment) is made by turning Lever (Z) to the left. When the desired placing of the cross saddle is obtained then lock the saddle by means of the lever (Z). The movement of the saddle is made manually as described on page 8.

DO NOT FORGET TO DISENGAGE THE LOCKING DEVICE BEFORE MOVING THE CROSS SADDLE.



CHAPTER 3

PREPARATION FOR OPERATION

Dressing the Wheel.

The grinding wheel is carefully fitted on the wheel hub and mounted on the wheel spindle, whereafter it is dressed until it is round. Eventually the sides are dressed until they are running.

The wheel is dressed by means of a diamond mounted in a holder and placed on the table or magnetic chuck. The position of the diamond on the table with respect to the grinding wheel is important for proper dressing. The diamond should be located slightly to the left of the wheel centerline (about 12 mm - ½ in). This is a safety precaution to prevent the diamond from digging into the wheel.

The diamond is passed across the wheel by means of the Hydraulic Rapid Cross Movement (see page 8).
Choose the direction of cross saddle with crossfeed reversing lever (36) and turn the crossfeed control lever (25) slightly to the right until the required feed is obtained.

FOR GOOD DRESSING IT IS ESSENTIAL THAT THE DIAMOND IS SHARP SO ABRASIVE GRAINS WILL BE COMPLETELY FRACTURED AND PROJECT FROM WHEEL BOND.

Instructions for the use of the Hydraulic Over-the-Wheel Dresser accessory are given on page 17.

Balancing the Wheel.

Balancing of the wheel hub and grinding wheel is done by means of the balancing arbor and the balancing stand. Release all 3 balancing weights. Find the heaviest spot and place one of the weights here. By placing and moving the other weights symmetrically in proportion to the first placed weight the unit is balanced as carefully as possible.

To dress and balance the wheel proceed in the following manner:

1) Fit the wheel to the wheel hub and mount the unit on the wheel spindle. Note that the nut, which fastens the hub to the spindle has left hand thread. Note the safety nut.
2) Dress the wheel.
3) Remove the wheel assembly from wheel spindle and balance the wheel as descriped above.
4) Remount assembly on the wheel spindle and redress wheel before putting into operation.

"Grinding in" the magnetic chuck

The surfaces of the chuck have been ground at the factory, but to insure accuracy, it is neccessary to "grind in" the chuck on the Grinder with which it is to be used. The following procedure is recommended for a new chuck: each time the chuck is removed from the machine, the top surface should again be ground, to insure parallelism between this surface and the saddle and table ways,

1) carefully clean and degrease the new chuck.
2) Grind the top (holding) surface of the chuck first. Place the chuck on the table and block in place. Do not clamp the chuck down. Use a coarse dressed grinding wheel.
3) Dress the grinding wheel.
4) Remove chuck. Clean chuck and table surface and place chuck on the table with holding surface down. Block chuck in place. Grind bottom of chuck until it is flat.
5) Remove chuck and place it in normal position with holding surface up. Use table clamps this time.
6) Grind top surface until it is flat. The final cut should be at 0.004 mm (.0002 in) downfeed and 20 mm (.80 in) crossfeed.

GRINDING INSTRUCTIONS

In surface grinding the choice is between two methods: Face grinding and edge grinding.
Face grinding means grinding with a large cross feed and a small cutting depth of about .0004" - .0008" (0.01-0.02 mm) and this will in most cases be the most economical way and will give the best planparallel result.

By edge grinding we recommend to use a large cutting depth up to .0125" (0,3 mm) and manual operated cross feed.

Which method to prefer is an individual choice and to a great extend a matter of experience depending on the material, the dimension and partly on the grinding wheel used.

Generally speaking it is recommended to use face grinding particularly on machine with automatic downfeed and cross travel.

Edge grinding cannot be advised, when grinding wide surfaces, as there is a risk for the wheel to be worn out before the whole width has been ground, giving a non plan-parallel working piece.

LUBRICATION

The saddle- and table ways are power lubricated by means of two lubrication pumps energized by the hydraulic system. The circuits for the lubricant and the hydraulic oil are separate.

The function is checked at the control glass (K), see page 16, on top of the saddle, and impulse should appear at every table reversal.

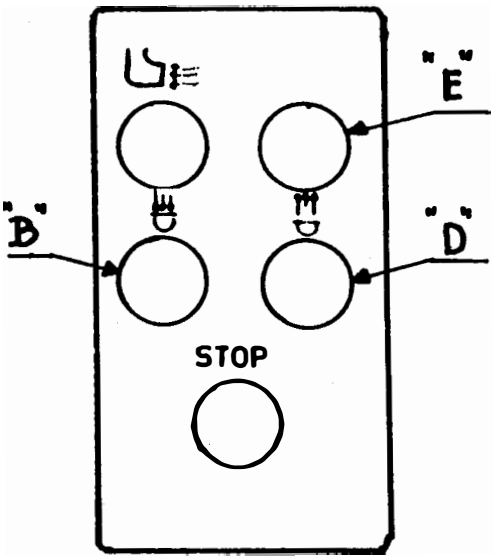
Moving parts which are not to be lubricated according to the lubrication chart, page 16, are running in permanently greased sealed bearings. They should be lubricated only when parts are disassembled for overhaul. This includes the wheel spindle.

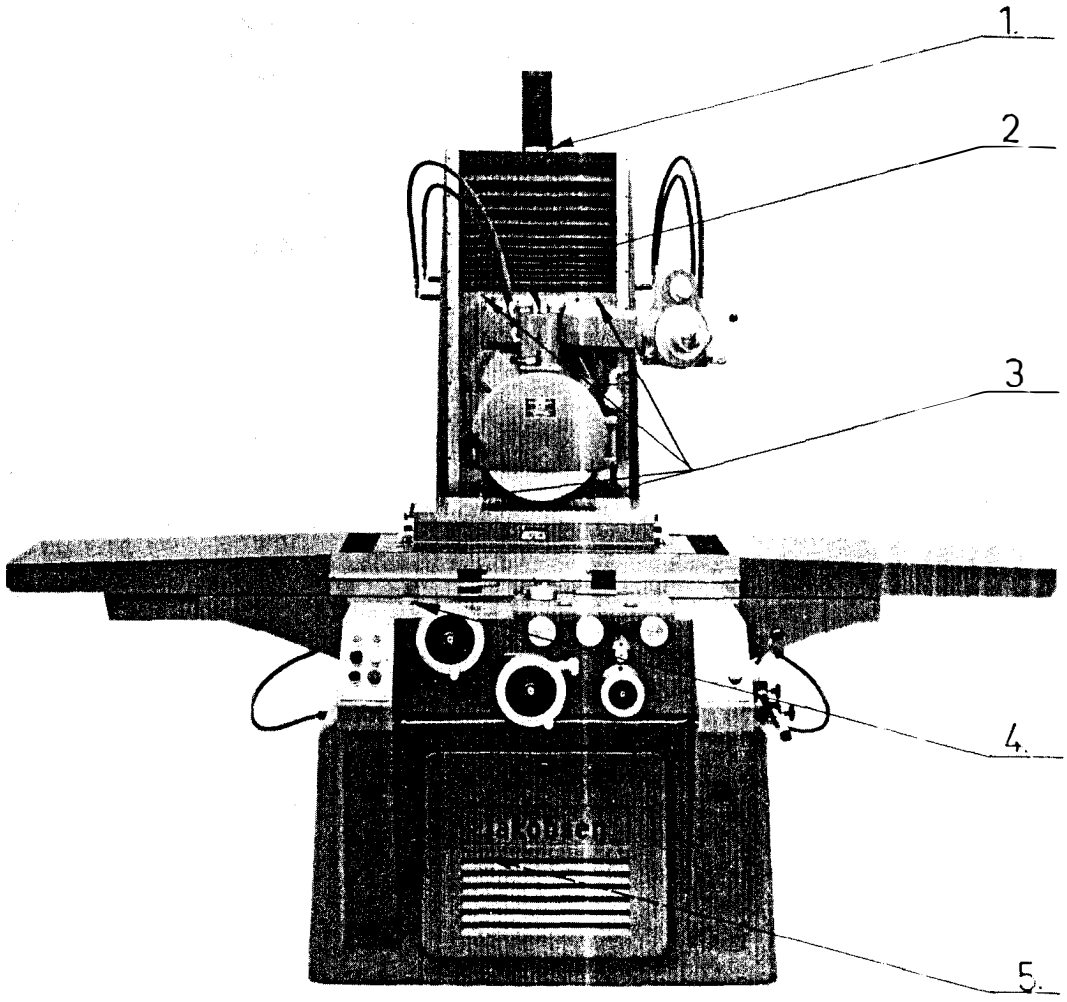
ELECTROMAGNETIC CHUCK

The chuck is connected to the Electro-Magnetic Rectifier (optional equipment) which again is connected in the control cabinet at the left hand side of the machine column.

The chuck is "switched on" by turning push button B' to the right and is demagnetized by "switching off" the chuck (push button " B to the left) and a short press on button "D".

When "switching on" the chuck, the green control lamp "L" will be alight.

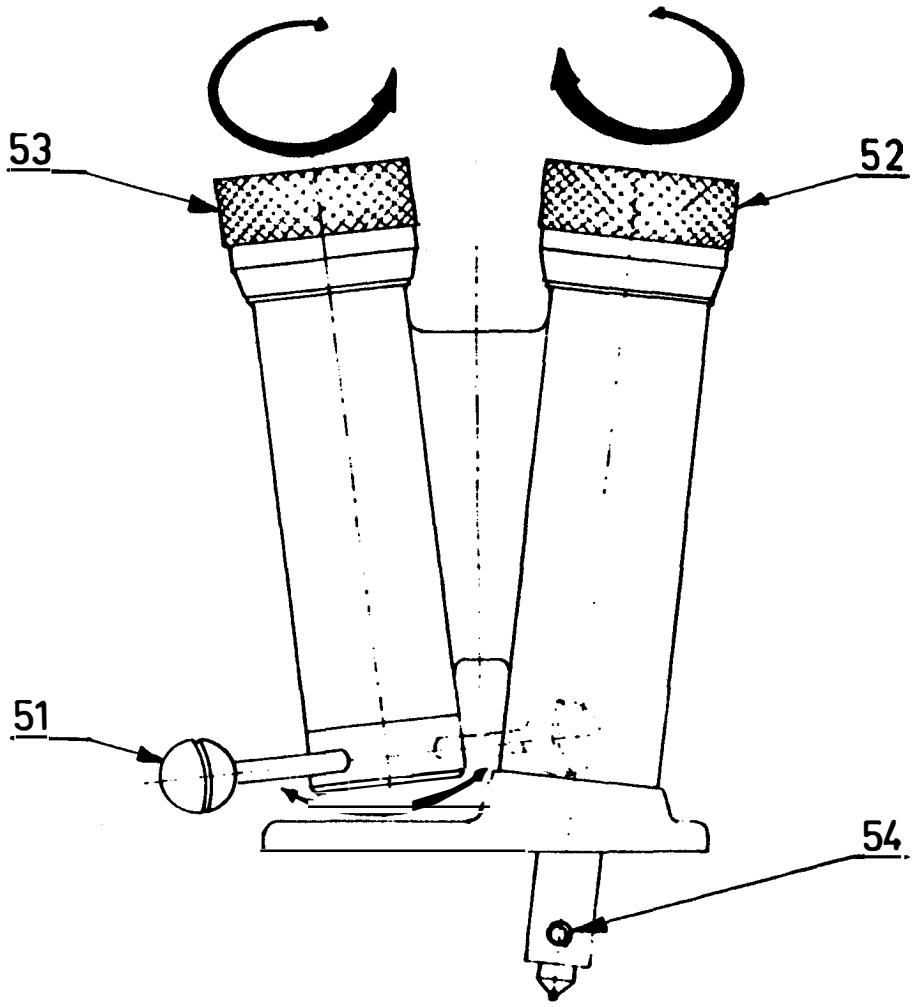




Pos.	Smøresteder Lubricating points Schmierstellen Lieux d'huilage	INTERVAL INTERVALLE Arbejdstimer Working hours Arbeitsstunden Heures de travail	Olie - Oil - Öl - Huile						
			Mobil Oil	BP Energol	Caltex	Castrol	Esso	Gulf	Shell
1	Vertikalspindel Vertical spindle Vertikalspindel Broche verticale	48	Vactra nr. 2	HP 20 C	Way lubric. D	Magna BD	Febis K 53	Gulfway 52	Tonna 33
2	Afretter Dresser Abrichter Dresseur	Hver måned Each month Je monat Par mois	Vactra nr. 2	HP 20 C	Way lubric. D	Magna BD	Febis K 53	Gulfway 52	Tonna 33
3	Vertikalføringer Vertical ways Vertikalführungen Guides verticaux	24	Vactra nr. 2	HP 20 C	Way lubric D	Magna BD	Febis K 53	Gulfway 52	Tonna 33
4	Smørekontrol Lubrication Control Smierungskontrolle Contrôle de la lubrification	Hver måned Each month Je monat Par mois	Vactra nr. 2	HP 20 C	Way lubric D	Magna BD	Febis K 53	Gulfway 52	Tonna 33
5	Hydraulikolie Hydraulic oil Hydrauliköl Huile hydraulique	Udskift hvert år Change each year Jährlich umwechsel Échanger tous les ans	Vacouline 1405	HL 80	Regal oil A (R&O)	Hyspin 80 ss	Teresso 47	Harmony 47	Tellus 27

HYDRAULIC WHEEL DRESSING ATTACHMENT

The over-the-wheel dresser (optional equipment) is mounted on the top of the wheel guard and permits dressing of wheel without removing the work from the chuck. This device is very useful on production grinding applications.



HOW TO USE THE "OVER-THE-WHEEL" DRESSER

Turn table speed lever (24) to blue mark position

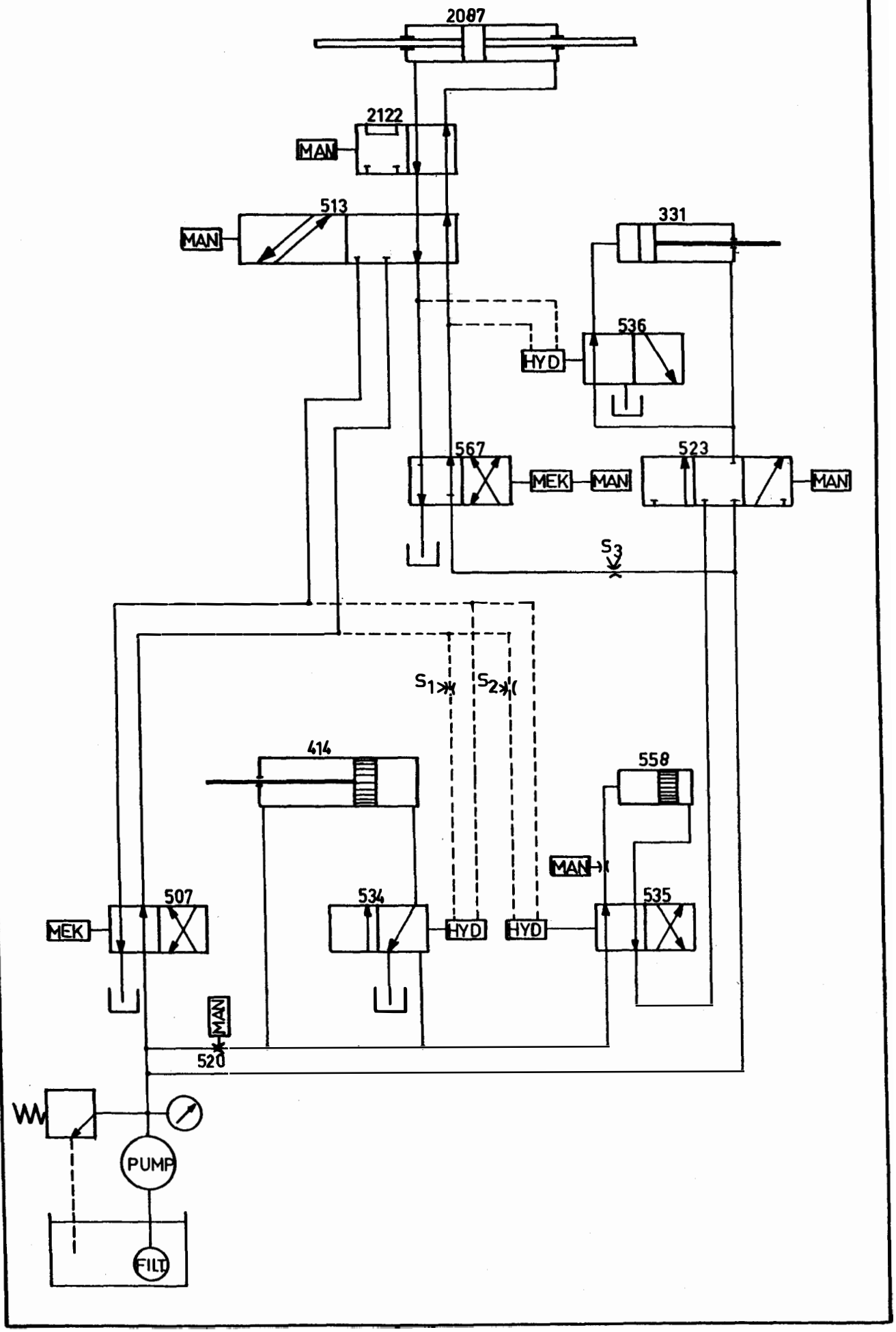
Feed the diamond across the wheel face by turning the lever (51) to the right.

The diamond is fed down vertically by means of the knob (52) calibrated in 0,05 mm (.002") increments and the speed by which the diamond is fed across the wheel face is adjusted by means of the knob (53). The diamond can be rotated or removed by loosening the set screw (54) shown above.

As to lubrication of the wheel dresser, see lubrication chart page 16.

By irregular movement of the dresser, clear the cylinder of air by setting the knob(53) at max. speed and let the piston bottom 5-6 times in inner and outer position.

HYDRAULISK SYSTEM HYDRAULIC SYSTEM HYDRAULISCHES SYSTEM
SYSTEME HYDRAULIQUE



TEST SHEET for Surface Grinder
Model SJ
Serial No.:

	Test	Tolerance permitted	Tolerance measured
1 a	Bed level – longitudinal direction	0,02 mm in 1000 mm	
1 b	Bed level – transverse direction	0,02 mm in 1000 mm	
2	Surface of table parallel to the longitudinal travel	0,015 mm in 1000 mm	
3	Surface of table parallel to the transversal travel	0,01 mm in table width	
4	T-grooves of table parallel to the longitudinal travel	0,015 mm in 1000 mm	
5	T-grooves of table at right angles to the transversal travel	0,03 mm in 300 mm	
6 a	Runout of spindle, radial	0,01 mm	
6 b	Runout of spindle, axial	0,01 mm	
7	Grinding spindle parallel to table. Measured at 180° swivelling Arm 100 mm = 4"	0,02 mm in 300 mm	
8	Grinding spindle at right angles to the T-grooves of table. Measured at 180° swivelling Arm 200 mm = 8"	0,02 mm in 300 mm	
9	Vertical movement of wheelhead at right angles to the transversal direction of table	0,02 mm in 100 mm	

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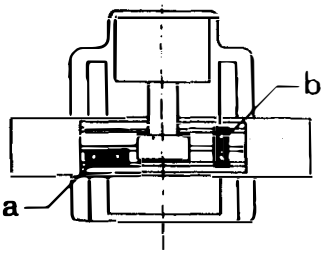
Warranted Tested by

ILLUSTRATION TIL PRØVESKEMA
ILLUSTRATION FOR TEST CHART
ILLUSTRATION FÜR PRÜFKARTE
ILLUSTRATION POUR SCHÉMA DE CONTROL

1



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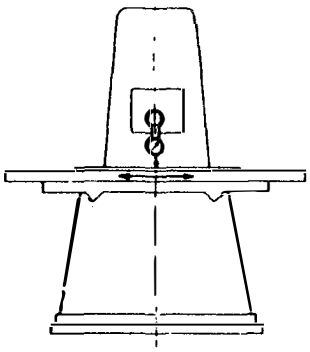

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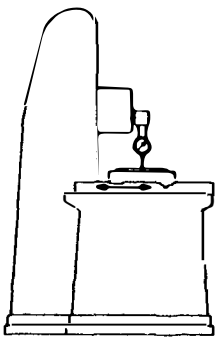

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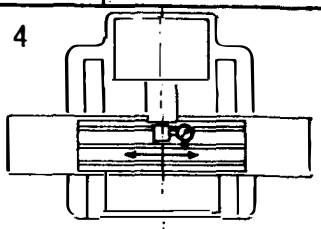

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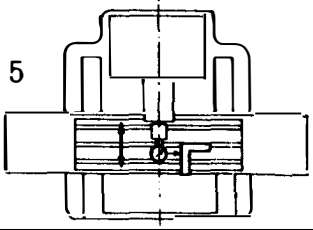

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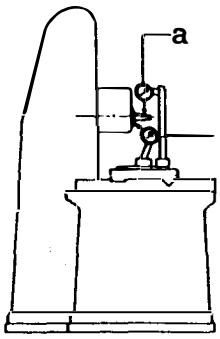
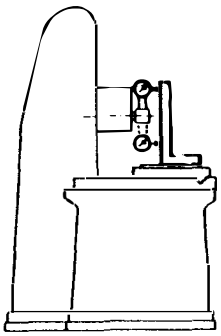


7



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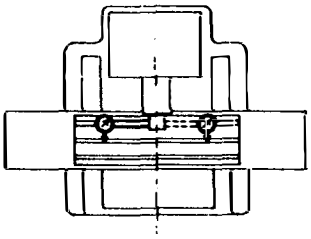
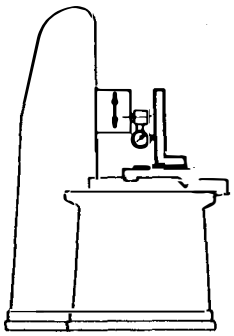


9



Elektromotorer - Electrical motors - Elektromotoren - Électromoteurs

Spænding Voltage Spannung Voltage	V.	Frekvens Frequenzy Frequenz Fréquence	Hz.

	HK - HP PS - chev.	omdr./min - RPM umdr./min. - rév/min.	Serie nr. — Serial no. Serien nr. — Série no.
Spindelmotor Spindlemotor Spindelmotor Moteur de l'arbre			
Pumpemotor Pumpmotor Pumpenmotor Moteur de la pompe			
Vertikalmotor Verticalmotor Vertikalmotor Moteur vertical			