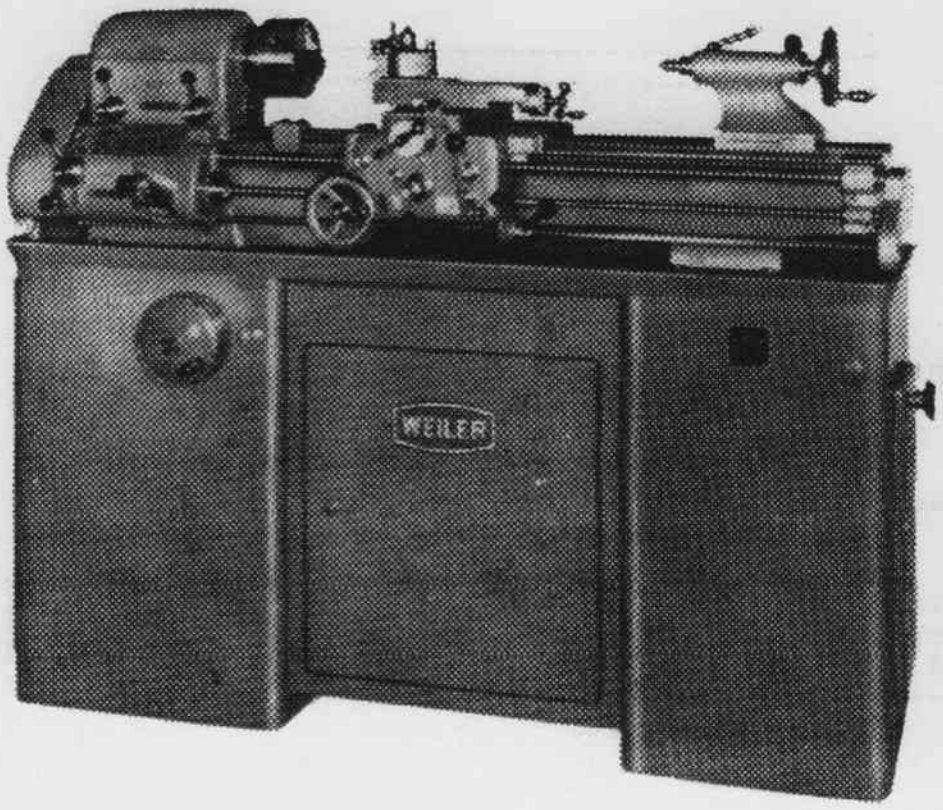
280

Precision Sliding Surfacing and Scrwcutting Lathes

Model LZ 280 S
With main drive by two-speed 2.2/1.0 HP motor and variable-speed vee-belt drive for infinitely adjusable spindle speeds from 26 to 2000 RPM.
Also available with single-speed 2 HP motor for spindle speeds from 52 to 2000 RPM. with stepless control range.



INSTRUCTION MANUAL

for

11" SWING PRECISION S.S. & S.C.

QUICK CHANGE GEAR CENTRE LATHE

WEILER

Series

LZ 280

Type LZ 280 S

Serial-No. :

Type LZ 280 GN

Serial-No. :

RECEIVED
MAR 27 1974

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OPERATING INSTRUCTIONS

FOR

"WEILER" Series LZ-280

11" SWING PRECISION S.S. & S.C. QUICK CHANGE GEAR CENTRE LATHE

TYPE _____

SERIAL-No. _____

I N D E X

PACKING AND SHIPMENT

Every WEILER Standard Lathe, when ordered for shipment from the factory in export packing, is carefully packaged in use of a single case which is of rigid construction and thoroughly lined with waterproof paper.

The lathe is mounted by lock screw bolts on a skid-bottom and adequately blocked and braced through stiffening ribs, to provide maximum practical protection.

Accessories and extra attachments, ordered optionally, are packed in a separate small box, which is securely anchored insids of large box.

Protective coating preservation of all bright surfaces of the lathe and its accessory equipment is made by treatment with waterproof grease or oil that is easily removed.

1.1 - UNPACKING

Upon receipt of shipment, be sure that the packing as well as the lathe has not been damaged in transit. If damaged in any way, inform at once the transporting agency or the shipping company, respectively who is responsible for safe forwarding to destination.

For unpacking the lathe, open the case from front side, which is marked "Open Here".

Remove front and rear bording by pulling the plank nails, then loosen the mounting bolts located at both side ends of bottom and take off the top boarding together with side plankings. Do all with care, also when removing the stiffening ribs placed across the bedways of lathe.

To facilitate moving on the floor, it is recommended to leave the skid-bottom under the lathe until the machine has been skidded next to its location area.

1.2 - CHECKING OF DELIVERY

After the lathe has been unpacked, check carefully the equipment and accessories supplied for completion according to the Delivery Note.

In case of claims, for any deficiency in quantity or quality or for fault in the equipment, the buyer must immediately upon receipt give written notice to his seller, specifying the nature of claim and referring to the Serial Number of lathe. The serial number is stamped on the front guideway of bed on tailstock end.

1.3 - TRANSPORT OF UNPACKED MACHINE

When moving in use of a crane, the lathe should be, by means of sufficiently thick hemp ropes (never use chains or wire cables) so slung, as to avoid stressing unduly any part thereof. Consideration must be given to the distribution of weight and to the horizontal suspension of machine.

Place the hemp rope under the headstock and tailstock ends of chip tray, close to external side face of each pedestal. Use soft wood blocks or stuffings as spacers for preventing the rope to contact the machine or any part thereof, in order to protect the paint as well as the members of machine against damage.

INSTALLATION

This Lathe after assembly in the factory has been carefully checked for alignment and tested for accuracy.

To maintain the same degree of accuracy as specified on the issued and accompanying inspection test sheet, the lathe must be set level and solid.

Precautions should be taken to avoid the transmission of vibrations to the lathe from cutside source, if it should be used for precision work requiring a high degree of finish. It is essential that the lathe is not placed under such conditions in the proximity of heavy machines used for roughing operations, or those machines having heavy reciprocating parts.

As a means of accomplishing these results, it is suggested to provide a rigid foundation.

2.1 - FOUNDATION

To prevent the effect of deflection and vibration which often results from a springy floor, a concrete foundation for the lathe, where possible, is the best and of particular advantage.

After the machine has been moved to its place provided, slacken the lock bolts holding the legs to the skid-bottom. When then removing the skid-bottom from under the lathe, care should be taken that the machine does not overthrew.

The boltsholes in the legs provided for mounting the lathe, to its skids for shipment, are also used to bolt to the foundation.

The foundation area should be arranged in dimensions approximate to specifications given on "Plan of Foundation". For setting and bolting the lathe in concrete, cement in the foundation belts, in distances required, at the same time when preparing the foundations.

2.2 - LEVELING

On setting the machine down on the floor it requred leveling accurately before being bolted or grouted in place.

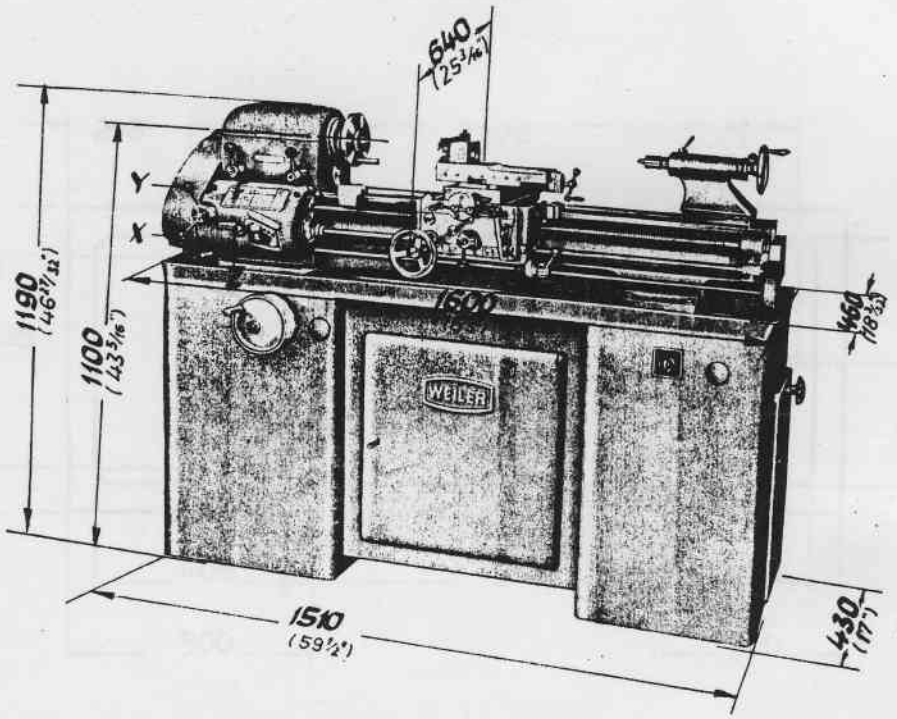
For this important operation a precision bulb level with a sensitivity of about 0.02mm per 1000 mm. (.00025 in. per foot) for each deflected division should be used.

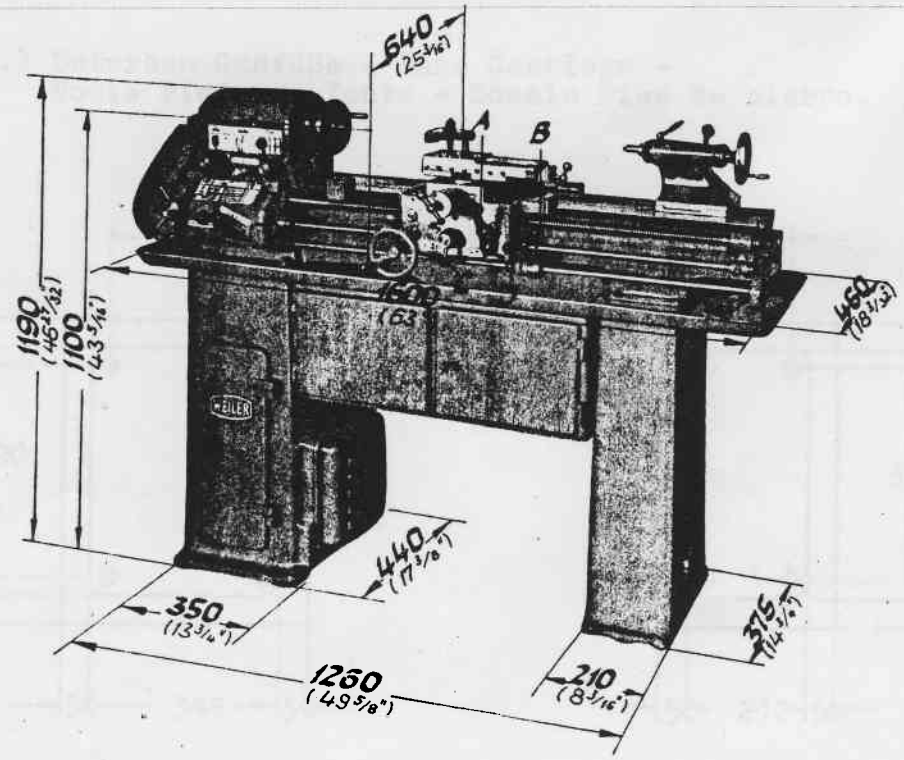
To facilitate setting, first of all, four metal wedges are placed beneath the pedestal legs in direction of centre line of machine for longitudinal alignment, and the foundation bolt screws are pulled down to lag the machine to keep it tight enough to the floor, Next, place metal plates under each of the legs at several points to compensate for any depressions in the floor,

The level is then mounted, successively, longitudinally on the front flat bedway and transversally across the bed close to the headstock and to the tailstock end, and the wedges are adjusted in accordance with the readings of the level which should be the same at each point. By repeating this operation several times, both the headstock and tailstock end of the bed will be brought to a perfect level. If the level is not long enough, support it on accurate parallel strip.

When having properly leveled, finally the lathe base will be grouted thoroughly with cement.

WEILER	Gesamtansicht General View - Vue Générale Vista Completa	Typ: LZ 280

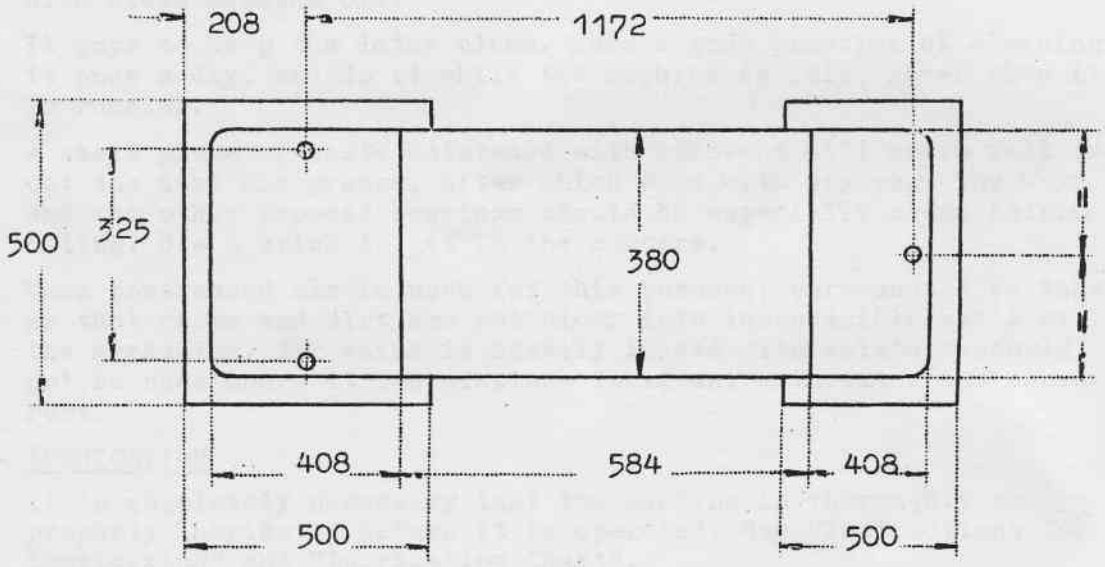




	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg	Fig. 1

1-4 Fundamentplan - Foundation Plan -
Plan de Fondation - Plano de Fondacion.

a.) Unterbau Stahl - Base Steel -
Socle Acier - Zócalo Acero.



b.) Unterbau Gußfüße - Base Castlegs -
Socle Pieds en fonte - Zócalo Pies de hierro.

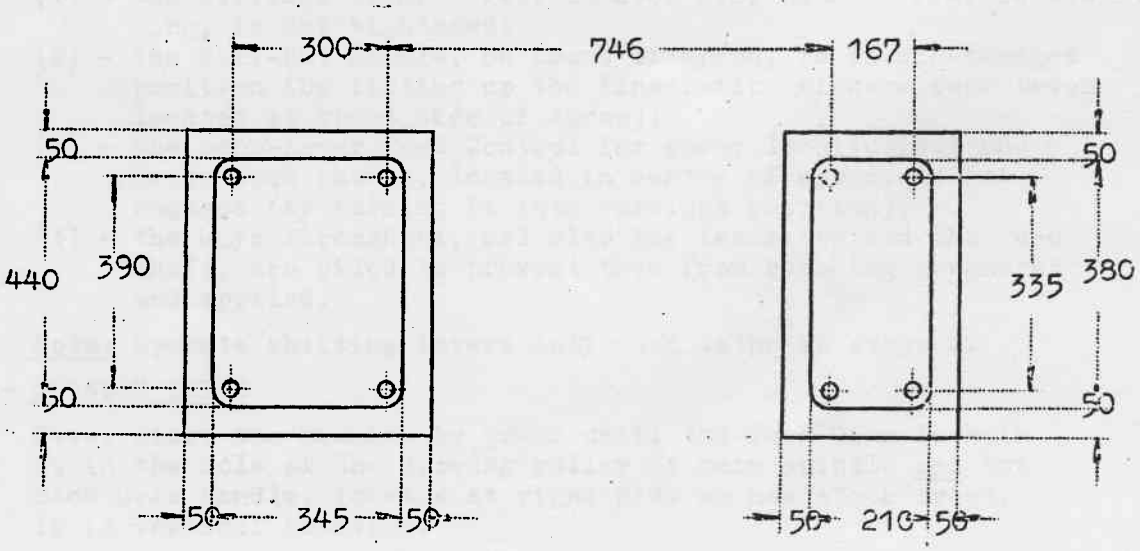


Abb. 2

3.1 - CLEANING

Remove all slushing compound with which the various finished parts of the lathe are covered for rust prevention. This can be best done with a rag saturated with petrol or kerosene, and then by wiping off all the bright and bearing parts with a dry waste. To cover all these parts with a protecting oil film, go over them with clean machine oil.

It pays to keep the lathe clean. Make a good practice of cleaning it once a day, and do it while the machine is idle; never when it is running.

A small piece of waste moistened with kerosene will serve well to cut the dirt and grease, after which wipe with dry rag. The ways and the other exposed bearings should be especially clean before oiling. Use a stick to get in the corners.

When compressed air is used for this purpose, care should be taken so that chips and dirt are not blown into inaccessible parts of the mechanism. Air which is heavily loaded with moisture should not be used where it can displace lubricant with water and cause rust.

3.2 - LUBRICATION

It is absolutely necessary that the machine is thoroughly and properly lubricated before it is operated. See "Instructions for Lubrication" and "Lubrication Chart".

Note: Take care to have Oil Bath Reservoir of headstock, housing the feed drive sliding gear, filled up with oil in keeping the oil level within midth of sight glass.

3.3 - UNLOCKING

Before starting the lathe, move the carriage by the hand feed to make sure that:

(1) - the Carriage Clamp Screw, located over back of rear saddle wing, is not tightened;

(2) - the Half-Nut Handle, on front of apron, is in dis-engaged position (by lifting up the Finger-tip Quick-release Lever located at right side of apron);

(3) - the Mono-Lever Feed Control for power longitudinal and cross feed change, located in centre of apron, is not engaged (by turning it into vertical position);

(4) - the Ways throughout, and also the Leadscrew and the Feed-shaft, are oiled to prevent them from becoming roughened and spoiled.

Note: Operate shifting levers only when lathe is stopped.

3.4 - SPINDLE DRIVE

Never start the machine by power until the Face Gear Lockpin is in the hole of the driving pulley of main spindle and the Back Gear Handle, located at right side on headstock front, is in vertical position.

3.4 - Spindle Drive (ctnd.)

Note: Back-Gears are engaged by putting out the Face Gear Lock-Pin and moving the Back Gear Handle to the left. For shifting this handle must be pulled toward the operator, until the index pin fitted opposite at control shaft housing plate is out of the indexing hole provided inside of control hub, and turned away to lock it again in a similar hole.

Feed Drive Sliding Gear, transmitting the power from spindle and pinion of main spindle to the pick-off change gear train and quick-change gear box, is controlled by the left ball lever on headstock front. Moving the Feed Drive Control engages the feed drive motion.

Feed Reversal is operated by a sliding gear enclosed in the quick-change gear box, and is controlled by the lower handle on left side of gear box housing.

3.5 - MOTOR ADJUSTMENT FOR BELT TENSIONING

When regularly mounted in headstock section of lathe base, the motor is fastened by 4 hexagon bolts to a hinged plate which is provided with means for adjusting and maintaining proper belt tension. Adjustment should set so that belt slippage is avoided.

See also Instructions and Drafting "Drive Arrangement" annexed to supplement.

3.6 - POWER SUPPLY INSTALLATION

The lathe, when furnished with motor factory mounted and switched ready for connection on service line, includes protected internal wiring from the motor to the reversing switch gear, being built in the bed casting at tailstock end, and from control switch unit to the terminal box located on tailstock end side of pedestal below the chip pan.

Switching on to mains is direct by connecting the incoming three-core cable to the terminal box connectors marked R-S-T.

To give complete wiring protection, it is advisable to make supply line installation in using flexible and liquid-tight metal conduit.

3.7 - ELECTRIC COOLANT SYSTEM

With the models mounted on cast-iron pedestal base, the tailstock column is designed to serve as a coolant reservoir and has provisions at its right side to be equipped with a flange-type motor pump.

With the models on steel cabinet stand mounting, a separate compartment at tailstock end of base provided to take a portable type coolant tank, made from sheet steel, with self-contained motor-pump.

In either case the 0.1 HP motor pump of the rotary vane immersion type has built-in toggle switch for stop-start control to give independant service application.

3.7 - Electric Coolant System (ctnd.)

When ordered with the lathe, the coolant system is supplied factory installed and switched on to terminal box. Equipment includes necessary piping and fittings.

The motor coolant pump must be checked for direction of rotation. Incorrect revolution of the rotary vane will be indicated by failure of pressure resulting in missing the coolant or cutting oil when opening the piping cutlet. Correction can easily be made in changing the connections of core ends switched to the terminal box.

Caution: When using coolant or cutting oil for whatever type of machining operation, care should be taken that it will be of non-acid and non-corroding properties to prevent the exposed sliding surfaces and other vital members of the lathe from rust damages and also the paint from descomposition.

CHECKING THE LATHE FOR ALIGNMENT

--- TURNING TEST ---

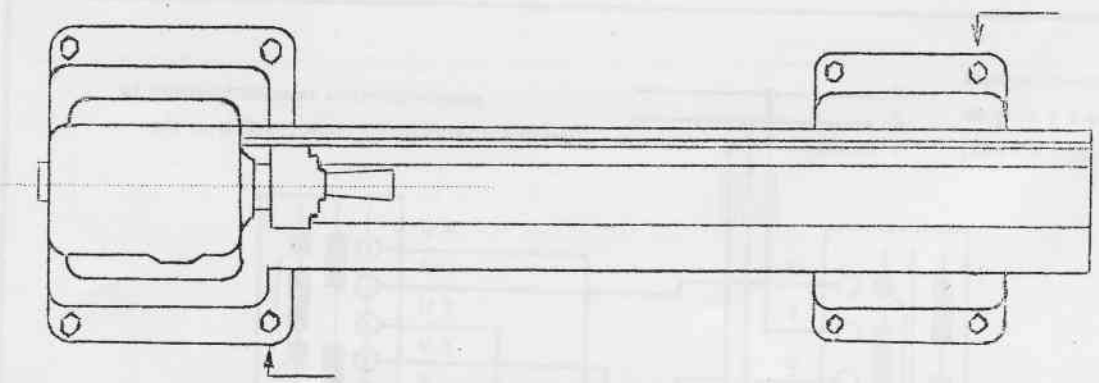
If a sufficiently sensitive precision bulb level is not available for setting up the lathe accurately, the levelling can be made perfect by taking a Turning Test which, with the machine having been bolted down securely but not grouted in place, should be carried out as follows:

A piece of steel bar of at least 3/4" (20mm.) diameter and about 3" to 4" (75 to 100mm.) in length, held in the chuck, is turned with keen tool bit taking a very slight cut of a fine feed.

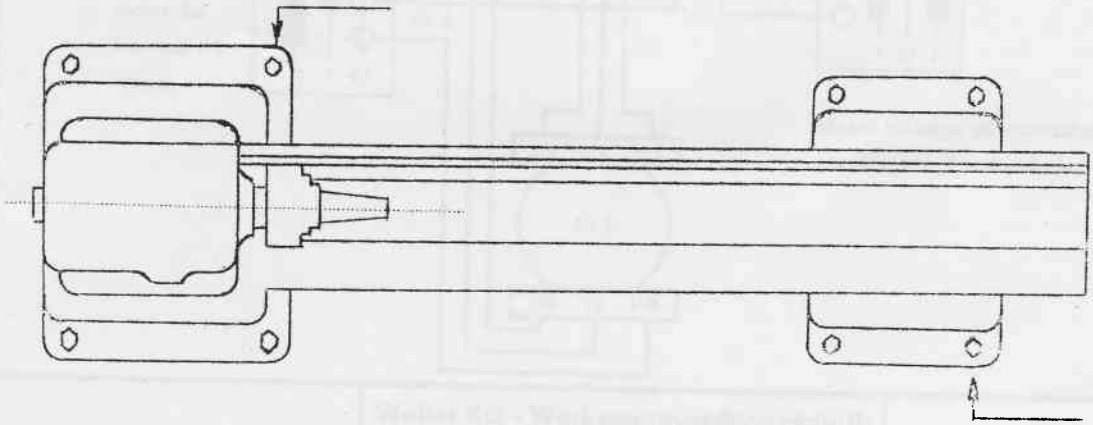
Measuring the diameters at both ends of the turned piece with a dial indicator, mounted on the carriage in horizontal plane to the work, the reading should be the same. Should there be any difference, the indications are that, due to faulty levelling, the lathe bed will have been caused to twist, thus threwing the headstock out of alignment with the bedways and resulting in the lathe turning taper. (Take care, above all, to ascertain that wedges or shims were places under the machine correctly and the machine was not bolted down too tight.)

Necessary corrections can be made by adjusting the MOUNTING BOLTS in the Cast Iron Legs (or, with bench-type lathe model, in the feet of the lathe bed). If adjustments are made, check by repeating the test until half the difference between both the end diameters of the test piece have been eliminated on the dial indicator reading.

(A) IF the DIAMETER AT THE FREE END is LARGER than that at the chucked end, it should, first, be tightened the Bolt At Right Corner in Front of Headstock End and, if malalignment is considerable, also the bolt at right corner in back of tailstock end:

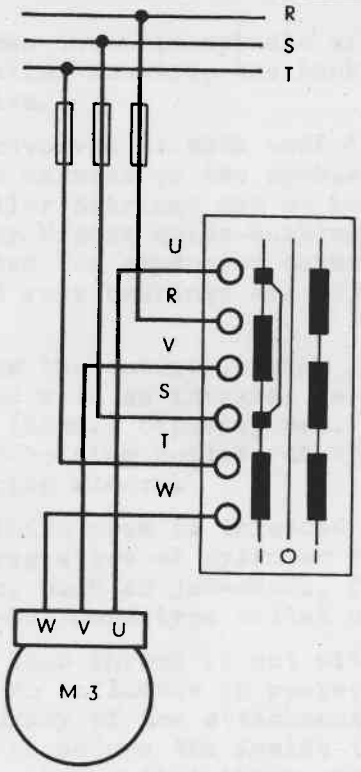


(B) IF the DIAMETER AT THE FREE END is SMALLER than that at the chucked end, proceed in a vice-versa manner, by first tightening the Bolt At Right Corner in Back of Headstock End and then, as far as necessary, the bolt at right corner in front of tailstock end:



WEILER	**Schaltplan - Wiring Diagram** **Schema des Connexions** **Esquema de Conesiones**	**Typ:** **LZ 280** **LZ 300**

a) Drehstrommotor
mit einer Drehzahl

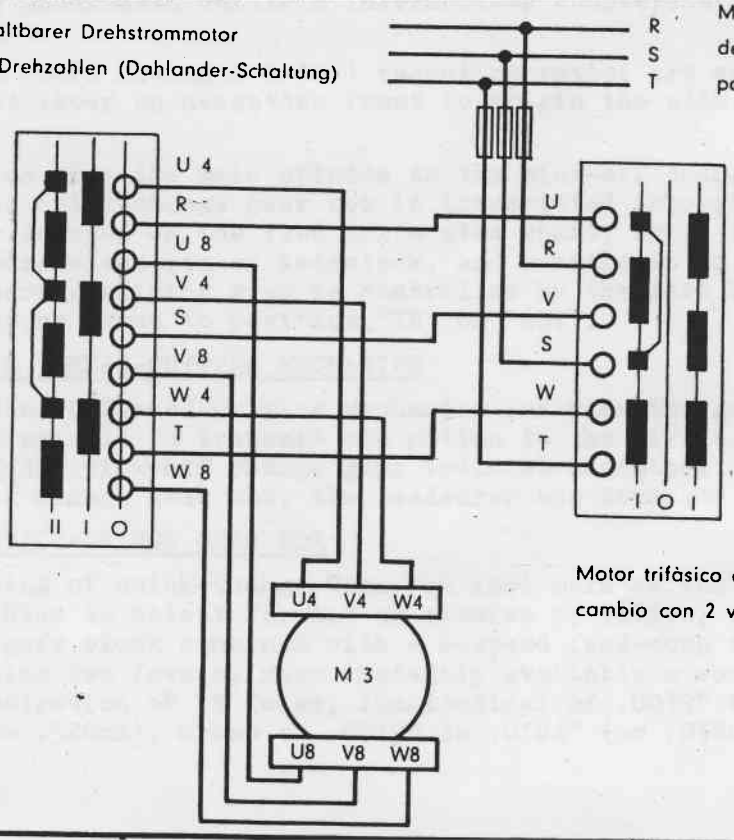


Moteur èlectrique pour CA triphasè
avec vitesses de broche

Electrical motor
for 3-phase AC
supply with
spindle speeds

Motor trifàsico con velocidades

b) Polumschaltbarer Drehstrommotor
mit zwei Drehzahlen (Dahlander-Schaltung)



Moteur commutatif
de pòle à 2 vitesses
pour CA triphasè

Twospeed
reversing
motor for
3-phase AC
supply

Motor trifàsico de conmutador de
cambio con 2 velocidades

	Weiler KG - Werkzeugmaschinenfabrik **Herzogenaurach - Nürnberg/Germany**	**Fig. 3**

4.1 - HEADSTOCK

The headstock houses the main spindle with its assembly parts and the driving pulley mounted, the back gearing and the feed drive gear mechanism.

The Main Spindle revolves at both ends in two large anti-friction bearings, at front carried on two opposed, pre-loaded High Precision Tapered Roller Bearings and at rear on a taper-adjustment special style alloy bronze guide-bushing. The antifriction spindle mounting compensated for expansion caused by temperature rise. Both the front and rear bearings are adjustable for endplay eliminating.

The spindle, hollow the entire length, is bored taper at the front end and is provided with an integral seat to accept push-type collets of 25/32" (20mm.) capacity max. directly, or to receive draw-in type split-holding collets of 1/2" (13mm.) cap. max. with the use of a reducing sleeve.

The outside of Spindle nose is threaded and provided with high-finish centering registers of cylinder design for accurate mounting of attachments, such as jaw-chuck, face plate, step chuck closers, or a pre-set nose-type collet chuck attachment.

Note: The Spindle Nose Thread is cut with a slight clearance which is of no influence in respect to the true running and working accuracy of the attachments mounted. The thread serves only to secure the inside threaded attachments to the spindle nose, whilst their correct and accurate alignment is given and maintained through the centering surfaces.

The drive to the main spindle pulley is transmitted by V-belts from the underneath built-in intermediate countershaft and the motor.

The Back Gears having a 6-to-1 reduction ratic, are engaged by the right lever on headstock front to obtain the slow spindle speeds.

The motion from the main spindle to the pick-off change gear train and quick-change gear box is transmitted through the sliding gear carried on the feed drive stud shaft, which is located in a separate section of headstock, and running in an oil bath. The feeddrive sliding gear is controlled by the left ball lever on headstock front to position "IN" or "OUT".

4.2 - FEEDING & THREAD-CUTTING MECHANISM

The Feeding & Thread-Cutting Mechanism includes the gearing from the main spindle to transmit the motion to the carriage and consists of the pick-off change gear train at headstock and of bed, the quick-change gear box, the leadscrew and separate feed shaft.

4.21 - QUICK-CHANGE GEAR BOX

The casting of Quick-Change Gear Box incorporates the Feed Reversal Sliding Gear to select forward or reverse operation, and a 3-speed sliding gear block combined with a 6-speed feed-cone of gears which, by shifting two levers, make instantly available a coarse ratic ranged selection of 18 feeds, longitudinal of .0039" to .0208" (of .076mm to .528mm), cross of .0019" to .0104" (or .038mm to .264mm).

4.21 - Quick-Change Gear Box (Ctnd.)

and 18 screw threads (4 to 28 TPI). It enables furthermore to obtain, by only interchanging both the dependent compound gears 48 and 24 tooth positioned in the feed gear train close to the quick-change gear box, another selection in fine compound ratio range of 18 feeds (longitudinal of .0007" to .0052", or 0.019mm to 132mm - cross of .0004" to .0026", or 0.010mm to 0.066mm) and threads up to 112 TPI.

In use of a set of 12 change and conversion gears, supplied as standard equipment with the lathe, a full range of commonly used Standard American, English, Metric and Module threads can be produced.

Selective finest feed ratios within the fine-compound range permit exceptionally high-finish cuts to be made, eliminating the necessity of emplying subsequent machining operations in numerous turning jobs.

By the provision of neutralizing the gear box mechanism through 1-to1 gear ratio engagement any thread pitch within the capacity of the lathe, irrespective of system and if standard or non-standard, is made possible to be cut in use of correlative pick-off change gears applied in the feed gear train.

Pick-off gears for additional or special threads can be furnished on extra order. See "Feed & Thread Chart".

A small Index Plate on gear box housing indicates the quickly available pitches of thread and the corresponding amount of feed. A complete "Feed & Thread Chart" of sheet metal is fixed inside of the hinged cover protecting the change gear feed train.

4.22 - PICK-OFF GEAR TRAIN

The detachable pick-off gears,which by combination in a suitable train as indicated on the self-reading Feed & Thread Chart, furnish the desired feed ratio, have key-drive bore throughout for interchangeability and are supported on stud shafts or revolving shafts.

The feed drive shaft, arranged directly below the end of main spindle, and the quick-change gear drive shaft have key-drive shaft ends to totate the change gears attached.

The gears for compounding are mounted in use of key-drive bushings onto stud shafts, one of which is carried by a quadrant arranged to pivot on the feed drive shaft bearing and having an elongated slot in which the stud shaft may be adjusted to permit the various gears to be interchanged to provide the required ratios.

4.23 - FEED SHAFT

The splined feed shaft, arranged along the bed, transmits the motion by worm-and-worm-wheel drive to either the feed-rack pinion in the apron, which meshes with the feed rack to move the whole carriage, or to the cross-feed pinion which is keyed to the cross-feed screw, for automatic sliding and surfacing operations in either directions.

4.23 - Feed Shaft (Ctnd.)

It is fitted with tight and stops and has an adjustable stop collar which can be set to stop automatically the carriage longitudinal feed at any desired point.

By provision of a safety slip-clutch of spring-loaded key-drive design., located in the end bearing of feed shaft at quick-change gear box, protection is assured against overload.

4.24 - LEADSCREW

The Lead Screw, which is precision machined without a spline and extends along the bed above the feed shaft, transmits, by closing the half-nuts, positive motion to the apron and is exclusively used for cutting threads, thus preserving the initial thread accuracy of lead screw for long lasting dependable service.

At the change-gear box end the lead screw is taken up in, and fitted to, a connecting sleeve which is carried on and driven through the split-pin secured cone-gear shaft. The split-pin, acting as a safety shear-pin to prevent the lead screw and the feed box gearing from overload and accidental damages, is driven in a bore which passes through the lead screw connecting sleeve and the cone gear shaft.

At the tailstock end it is supported by a rigid bracket and is held between a shoulder and the adjusting and locking nuts, with a thrust ball bearing in each side of the bracket, providing accurate adjustment to eliminate endplay.

The design of lead screw incorporates an exclusive, valuable feature in that it is constructed in such a way which enables to place it the "ends turned over" when worn out on one side.

Note: To invert the lead screw, proceed as follows:
First, disengage the half-nuts from mesh with the lead screw. Second, loosen locking and adjusting nuts. Third, remove the lead screw bearing at tailstock end by unscrewing the socket cap screws and punching both the alignment pins. Then, withdraw the lead screw, exercising care so as not to damage the lead screw thread or the thrust ball bearings.
When re-assembling and adjusting the lead screw in altered arrangement, have the parts clean; set up the screws, pins and nuts tight enough, but not too tight; take care to fit the thrust ball bearings properly to give accurate running fit free from end-play, but not to have too much pressure.

4.3 - CARRIAGE

The carriage, with a wide cross bridge carrying the cross slide and the compound rest, has long bearing surfaces on the bed and is guided by the compound angle flat way in front and the rear Vee of combined double-vee way in back. A vee-gib of ample dimensions is provided the entire length of rear V-guideways, adjustment being by means of a number of screws and lock nuts.

CONE PULLEY TRAIN V-BELT DRIVE EQUIPMENT

The principle of power transmission, which is used in "WEILER" Model LZG-280N and Model LZU-280N Lathes, incorporates V-belt cone pulley driving from the motor through an Intermediate Countershaft assembly unit, arranged in pivoting arm mounting and running in two preloaded precision ball bearings, to the main spindle.

The drive is by an endless Ve-Belt, size 1/2"x30" long (13x1000 mm-DIN 2215), from the two-stepmotor pulley to countershaft, and by another endless V-belt, size 1/2"x59" long (13x1500mm DIN 2215), from countershaft to the three-step pulley of main spindle, providing 6 open-belt driven and 6 back-geared spindle speeds.

A 1.1 HP, single-speed, ball bearing, squirrel cage, reversing type 3-phase AC motor (1500 rpm-50 cy., or 1800 rpm-60cy.) is standard equipment, The motor, located in the well ventilated section of lathe base, is mounted on a hinged plate near the floor.

Control of motor for start-stop-reverse spindle operation is by a suitable reversing switch which, being incorporated in tailstock end of the bed, is actuated through a control rod operating ball lever, located at apron.

SPEED SELECTION

Speeds are selected manually by changing the belts on cone pulleys, from main spindle to countershaft and/or from countershaft to motor.

The reading Speed Chart placed at front of headstock, shows the spindle Revolutions per Minute available, and the letters and numbers indicated within the Drive diagram thereon refer to the belt positions for setting the 12 various Spindle Speeds ranging from 38 to 1600 rpm.

ADJUSTMENT OF BELT TENSION

The driving belts are properly tensioned by means of the Belt Tension Adjustment Screw (D2) located at the hinged Motor Plate (D) and used for clamping with motor plate Set Rail (D1), the end of which is fitted with a locking notch to catch the motor plate when withdrawing it for belt changing.

Adjustment should not be set too tight, but only to give just enough tension to take the cuts without slipping.

Caution: The weight of the motor must not be allowed to serve for tensioning the driving belts. Putting belts under too much tension, will cause the belts to stretch and overload the bearings of both the motor and the intermediate countershaft.

Both the V-belts, made of high-quality rubber composition, will stand heavy loads and get a long servide lifetime even in continuous working operation. In case of replacement, the upper belt for being taken off requires the main spindle and the back gear shaft to be dismounted. For this purpose, loosen the adjustment screw and withdraw the motor plate, until it is catched from the locking-notch set rail, thus releasing the belt tension automatically; then proceed as per instructions given in addition to drafting "Cross View of Headstock".

Note: To avoid the V-belts of becoming rotted, see that no grease or oil gets on them.

4.3 - Carriage (Ctnd.)

A Clamping block located over back of rear guideway and controlled by a quick-action screw handle, enables the carriage to be clamped in any position for facing and cutting-off operations.

The movement of the carriage lengthwise of bed is by hand and by power, through the handwheel operated pinion rack gearing or, respectively through the feed shaft worm drive or the lead screw half-nut drive in the apron to which it is attached.

4.31 - COMPOUND REST

The compound rest is of sturdy design to assure accuracy and rigidity for maximum cuts without deflection. The Cross Slide, supported on extremely long bearing surfaces, and the Top Slide have dovetailed guideways and are fitted with flat gibs, being adjustable by a number of headless screws and lock nuts, to provide means or proper adjustment and take-up for wear. The top slide rest having a 180-degree swivel base, is clamped in position by a T-slot double binder locking device.

Both the cross and top slides get the movement through precision cut trapezoidal-form feed screws and alloy bronze nuts. The top slide is controlled manually by the crank handle. The cross slide is moved by hand and by power in either direction, and the cross feed screw is provided with a safety stop clutch preventing the cross slide from running-off in the reverse power feed motion.

The large high-visibility, zero-setting micrometer collars, having friction fit adjustable by a grub screw and a small brass pin inserted in the graduated ring, give accurate direct readings in terms of thousandths of an Inch or in 1/20ths of a millimeter, respectively.

4.32 - APRON

The Apron houses the worm-and-worm-wheel drive and the tumbler gearing for transmitting the motion from the splined feed shaft to the carriage for power longitudinal and cross feeding, and the half-nuts which are engaged with the lead screw when cutting threads, and also contains the hand feed pinion-rack drive for manual sensitive and quick-action motion traverse of carriage.

The feed shaft worm drive is engaged by a Mono-Lever Control in centre of apron, permitting quick feed change of both power longitudinal and cross feeding operations.

Note: When the Power Feed Mono-Lever is vertical, it is in the "idle" position. Turning the control handle to the right engages the power longitudinal feed drive - turning the handle to the left engages the power cross feed drive.

The extra-long Half-Nuts, arranged in hinge-joint system mounting of modern, exclusive design and having cam-action control, are actuated by a large snap-lock Engaging Lever, located at right on front of apron.

4.32 - Apron (ctnd.)

The Half-Nut Engaging Lever is interlocked with a smaller finger-touch quick-action Release Lever located at right side of apron and allows positive control to cut the lead screw drive instantly at all times.

Note: The Half-Nut Engaging Lever when pulled toward the operator, closes the half-nuts and engages the lead screw drive. Disengaging is by slight tipping the Half-Nut Quick-Release Lever upward.

A built-in safety interlocking device prevents the simultaneous engagement of the feed shaft drive and the lead screw half-nut drive.

4.4 - TAILSTOCK

The tailstock, supported by the inner flat way in front and the top-Vee of combined double prismatic guideway in back, has lever controlled eccentric binder clamping device for quick-acting motion to and clamping in any position of the bed.

The tailstock spindle, securely and quickly lockable by means of a binder screw clamp lever, has a key-guided travel of 3 in.(80mm) and is bored and ground to take No. 2 Morse shanked centre which is self-ejecting. Graduations on the spindle are in 1/16ths of an Inch (or in millimeter terms, respectively). It is moved in and out by means of the handwheel which is attached to the feed screw engaging a tapped alloy bronze bush inserted and secured by two grub screws in the rear of spindle.

By set-over base adjustment, means are provided for turning slight tapers and for lining up the tailstock with the centre-line of the bed. The binding screw, provided at tailstock end between top and bottom plate for securing against lateral disadjustment, must be loosened before, and tightened after each setting of set-over adjusting screw. The design of tailstock permits the compound rest top slide to be used parallel to it.

When using a handlever operated boring sleeve attachment which is available for production work as extra equipment, the handwheel and feed screw operated spindle assembly is removed from back of handwheel side. For this purpose, loosen the spindle lockinglever next unscrew the 3 countersunk screws of the bearing cap on tail-stock end and retract the whole assembly, finally unscrew the key-guide screw on bottom of spindle front end.

4.5 - DRIVE

The drive to the spindle is obtained from the motor through - depending on the type of lathe - either a 6-step Cone Pulley Train Drive, or an Infinitely Variable Speed Drive equipment, respect-ively. Power transmission is by V-belts.

The motor is operated by a control rod which extends along the bed below the apron and actuates through a chain-and-sprocket-wheel drive the reversing control switch being built in the extreme of bed casting at tailstock end.

4.5 - Drive (Ctnd.)

The control lever for start-stop-reverse motor operation is placed on right side of apron bottom within easy reach of the operator. (This control rod equipment does not apply to D.C. supply).

For details pertaining to drive equipment see Drafting and Instructions "Drive Arrangement" annexed as supplement.

5.1 - GENERAL INFORMATIONS

The adjustments of bearings and slides are accurately "factory set" throughout to a minimum of, respectively, clearance and endplay required to assure close tolerances on size and concentricity to be held and exceptionally exact precision work to be produced on any turning or threading job.

It is advisable not to run the lathe, like it is practice with an automobile or other technical equipment, during the first days of use at the highest spindle speeds, and make sure that the effects of frictional heat which may usually occur in bearings, when starting a new lathe the first time, will be kept within admissible limits.

Lubrication is a matter of utmost importance and is closely connected to bearing clearance. Insufficient lubrication will not only cause friction, but is, in fact, sometimes the cause of chatter. It is therefore necessary that all bearings are lubricated carefully with quality lubricants well suited for the purpose determined. Unsuitable lubricants are very often the cause for troubles and damages incurring considerable costs. The use of high grade quality lubricating oils and grease will pay itself.

If adjustments will become necessary after the lathe has been installed, since distortion may have been incurred in shipment, or due to careless handling, or after the lathe has been operated for several months, be careful to proceed any adjustment in a proper manner. It is good rule not to have too much pressure on the bearings and to make adjustments always by the method of intermittent setting.

If it is required to take a unit apart, use the wrench or screw driver that fits, and keep the parts together in a suitable box. When assembling and adjusting, have the parts clean, and be careful to set up the screws and bolts tight enough, but not too tight.

5.2 - MAIN SPINDLE ADJUSTMENT

When adjusting the two spindle bearings, both of them should first be slackened off, after which the front bearing should be adjusted followed by the rear bearing.

Both the main spindle bearings, when adjusted correctly, may, in running the lathe in continuous service at high speeds, become well handwarm. The admissible maximum heating by friction should not exceed a temperature of 50 degrees Celsius (equal to 120° Fahrenheit or 40° Réaumur). If this condition will not be attained, the main spindle bearings should be properly re-adjusted.

5.21 - ADJUSTMENT OF FRONT SPINDLE BEARINGS

The front spindle bearing consists of two pre-loaded High Precision Tapered Roller Bearings, which are arranged opposite to another and spaced by a shim ring for adjusting the cups, and held between the spindle front bearing cap and lock nuts which serves to force the cones together.

5.21 - Adjustment of Front Spindle Bearings (Ctnd.)

Adjustment of front Tapered roller spindle bearings, which will not require attention over a long period of ordinary service, is effected by means of the Adjusting Nut (K1) located directly behind the front housing and secured by Lock (jam) Nut (K). First loosen the jam nut (K) slightly to break the clamping action, and tighten the adjusting nut (K1) so as to remove the endplay as required. Then tighten the lock nut (K), after the adjustment is made.

If the bearings will have been adjusted too tight, repeat adjustment. To make this, first loosen both the nuts, and increase the clearance of spindle by effecting a slight blow with a light metal mallet against the rear end of the spindle which for this procedure must be protected by means of a piece of wood.

5.22 - ADJUSTMENT OF REAR SPINDLE BEARING

To adjust the Taper-Adjustment Special Style Alloy Guide-Bushing, first remove the oil bath cover above the reversing gear train. Then loosen the Lock Nut (L1) located opposite to spindle end gear, tighten the Adjusting Cap Nut (L2) on rear end of spindle. The correct setting can be determined by the fact that too tight adjustment will cause a drag on the spindle. Now tighten the Lock Nut (L1) to secure adjustment.

5.3 - DISMOUNTING OF MAIN SPINDLE

For how to dismount the main spindle and the back gear shaft, which must be taken apart for replacing the upper V-belt, see directions given on drafting "Sectional View of Headstock".

5.4 - SETTING-UP CHANGE GEARS

When changing gears, first put Reverse Gear Lever in neutral (idle) position to avoid any change of the gears moving if the lathe should be started accidently.

Then loosen by means of a screw driver the slotted countersunk screws - most of them need only slight removing to take off the end collars which retain the gears and spacers in position -, the socket head cap screw on pivoting end of bracket, and finally the binding nut on back of Quadrant gear stud, being careful not to let the quadrant gear(s) fall too hard against the bottom of the bracket.

When the gears on the intermediate stud of lead screw shaft or on all are changed as desired, lift the gear on adjustable quadrant stud to engage the feed drive gear, pinching a piece of paper between them to allow for clearance, and tighten the quadrant stud binding nut, then swing the bracket to pinch paper between the quadrant gear and the fixed stud intermediate gear and tighten the socket head screw of bracket.

Always put on the gears with the numbered side out, so that the number of teeth may be determined quickly. When removing the change gears have the slot of end collars on bottom so they will not fall out.

Caution: Be careful that after changing of gears the bracket (quadrant) is always adjusted properly and tightened correctly to avoid damaging of teeth-gears.

5.5 ADJUSTMENT OF COMPOUND REST FEED SCREWS

Should the cross slide feed screw or the compound rest top slide feed screw require adjustment to eliminate endplay, proceed as follows:

first remove "Seeger" snap ring, located on feed screw shaft directly before and retaining the micrometer collar, by spreading it in use of two punches to be inserted in the eyes and withdrawing it. Then loosen by means of a small screw driver the grub screw inserted radially in periphery of the collar and draw back the graduated collar. Next loosen the locking nut to be seen in front, then tighten the adjusting nut behind it to reduce the clearance of feed screw mounting, and finally tighten the locking nut to secure adjustment.

5.6 REPLACING BELTS

Should injury or wear necessitate replacement, the upper of both the endless V-belts will be accessible after the main spindle and the back gear shaft have been dismounted. For instructions see drafting "Sectional View of Headstock".

5.7 TROUBLES

For help with troubles or damages of any kind whatsoever, contact your dealer or the manufacturer in giving full specifications of the nature of problem and making reference to the serial number of lathe which is stamped on the front guideway of bed on tailstock end.

Directions for Dismounting of Main Spindle

After having slackened off both the front and rear spindle bearings by untightening the adjusting and locking nuts provided (see chapter 5.2 Main Spindle Adjustment), turn Back Gear Handle (E) in vertical position and Feed Drive Control Handle (F) into "IN"-position. Then proceed as follows:

(1) - Remove Oil Bath Cover (L)
(2) - Spread the "Seeger" Snap Ring (M) in use of two punches to be inserted into the eyes, and remove it back.
(3) - Unscrew Spindle Front Bearing Cap (S).
(4) - Put Hardwood Piece of suitable dimensions at (K2) in space between Spindle Face Gear and Spindle Front Bearing Housing. This will serve, when removing the spindle from out of the assembly parts, to retain (a) the spindle face (bull) gear backed from, and to be locked for belt drive by means of ball spring tension Lockpin to, (b) the cone pulley which is carried by a radial load ball bearing and a free-running hollow sleeve with integrally machined small gear; and (c) the key-mounted spindle end pinion. Be careful that hardwood piece will fit properly, and pay attention not to distort the Oil Splash Ring (M1).
(5) - Push back the Main Spindle (N) in direction to the right (as arrow shows). For this purpose, effect some slight blows with a light metal mallet against rear end spindle which, in doing so, must be protected by means of a piece of wood.

Note: In moving the spindle out of headstock housings, care should be taken as not to let fall out the assembly parts. When re-mounting the spindle, see that:
(a) the "Nilos" Packing Ring (M2) fits correctly the circular centering groove machined into rear side of Spindle Face Gear;
(b) the Oil Splash Ring (M1) in put in vertical position onto the spindle to secure proper fit, which is best done by laying it against Lock Nut (L1) and thus pushing-in the spindle.
(c) the "SIMMER" Radial Packing Ring "M3" is positioned so that it will stand vertically to the main spindle.

Directions for Dismounting of Back Gear Shaft

(1) - Have the Back Gear Handle (F) in vertical position.
(2) - Unscrew the Flat-Head Cap Screw (P1) retaining the Control Hub (P2) of back gear handle by means of a pressure disc and spring, and remove control handle. Next unscrew Index-Pin Plate (P3) mounted by 3 flat headed cap screws. Then withdraw Control Shaft (P4) with bevel gear fitted at end to bring this out of mesh with bevel gear controlling the Eccentric Shaft (P5).
(3) - Unscrew Eccentric Shaft Bushing (P) held by 2 flat-head cap screws and push out it from bearing by moving, from above, the sleeve (quill) with back gears fitted to the right.
(4) - Remove both the eccentric shaft bushing (P) and Eccentric Shaft (P5) itself from spindle nose side of headstock end, and catch simultaneously, from above, the back gear sleeve (quill).

For re-assembly of dismounted Main Spindle and/or Back Gear Shaft operate vice-versa, exercising greatest care in mounting correctly all components and adjusting properly both the main spindle bearings.

INSTRUCTIONS FOR LUBRICATION

Lubrication is a factor of greatest importance to produce the accuracy incorporated on the work and to secure the long trouble-free service life expected of the lathe.

The lathe should be thoroughly and properly lubricated before starting.

Lubrication, like as cleaning, should always be done while the machine is idle, never when it is running.

The ways and other exposed bearings should be especially clean before oiling. Oil the guide-way and other flat bearings - the dovetail bearing surfaces of cross and compound rest slides and over back of the bed where the carriage adjustment gib slides - by rubbing on the oil with the fingers. Do not allow dust, dirt or chips to accumulate on them.

When grinding or polishing with emery cloth, place a cloth or sheet of paper over the ways to protect them from the abrasive dust.

Use the best grade of refined machine oil and lubricating grease, to be of non-resinous and non-acid characteristics.

Lubricating hole fittings require keeping clear for refilling; be sure that they are not stopped up with dirt. Check oil bath reservoir in headstock daily. See that all bearings are carefully lubricated and watch that none runs hot.

The oil and grease fittings provided are of the spring loaded ball type, with the only exception of the oiler arranged on the rear bearing of main spindle housing which is a flap covered one.

Frequent attention must be paid to lubricate regularly and carefully the bearing points referred to on the Lubrication Chart enclosed. Unless otherwise specified, fill

every oiler daily

and

every grease gun nipple weekly

WEILER

Vorschübe und Gewinde
Feeds and Threads-Avances y Roscas
Avances et Filetages

Typ:
LZ 280 / LZ 300
h = 6 mm

Fig.	a	c_1	c_2	d	48 = C	e	f	= 24 B	24 = C	e	f	= 48 B
					A				A			

mm / ○ = 1/2

No.1	30	95	-	60	1	0,528	0,264	0,132	0,132	0,066	0,033
					2	0,480	0,240	0,120	0,120	0,060	0,030
					3	0,432	0,216	0,108	0,108	0,054	0,027
					4	0,384	0,192	0,096	0,096	0,048	0,024
					5	0,352	0,176	0,088	0,088	0,044	0,022
					6	0,304	0,152	0,076	0,076	0,038	0,019

mm

No.1	25	95	-	60	1	5,0	2,5	1,25	1,25	0,625	
					3	4,0	2,0	1,0	1,0	0,5	0,25
	30				1	6,0	3,0	1,5	1,5	0,75	0,375
					3		2,4	1,2	1,2	0,6	0,3
	35				1	7,0	3,5	1,75	1,75	0,875	
					3		2,8	1,4	1,4	0,7	0,35
	36				1		3,6	1,8	1,8	0,9	0,45
					2		3,2	1,6	1,6	0,8	0,4
	45				1		4,5	2,25	2,25	1,125	
No.2	30	60	(65)	120	3	2,6	1,3	0,65	0,65	0,325	
	(33)	36	60		3	4,4	2,2	1,1	1,1	0,55	0,275
	45	30	(65)		1	5,5	2,75				
					5	6,5	3,25				

"

No.2	30	120	127	60	1	4	8	16	16	32	64
					2	4 ½	9	18	18	36	72
					3	5	10	20	20	40	80
					4	5 ½	11	22	22	44	88
					5	6	12	24	24	48	96
					6	7	14	28	28	56	112
				45	2		6 ¾	13 ½	13 ½	27	54
	36			(46)	2		5 ¾	11 ½	11 ½	23	46
				60	2	3 ¾	7 ½	15	15	30	60
				(62)	2			15 ½	15 ½	31	62
	30	95		60	5	4 ¾	9 ½	19	19	38	76
		120		(65)	5	6 ½	13	26	26	52	104

mm/"

No.2	36	25	60	120	4	2,0	1,0	0,5	0,5	0,25	
	45				4	2,5	1,25	0,625	0,625		
	36		45		4	1,5	0,75	0,375	0,375		
	42				4	1,75					

DP

Fig.	a	b	c_1	c_2	d							
						1		16	32	32	64	128
						2		18	36	36	72	144
						3	10	20	40	40	80	160
No.3	42	25	(40)	95	120	4	11	22	44	44	88	
						5	12	24	48	48	96	
						6	14	28	56	56	112	
No.2			120		(65)	1	13	26	52	52	104	
					60	3	15	30	60	60	120	

12 ○ =	24	25	30	35
	36	42	45	48
	60	95	120	127

Fig. No.1

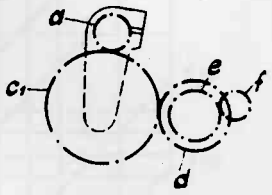


Fig. No.2

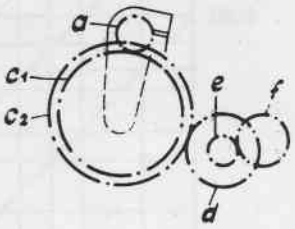
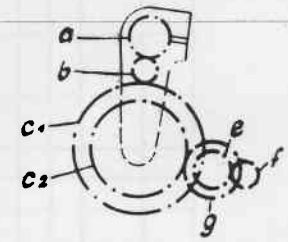


Fig. No.3

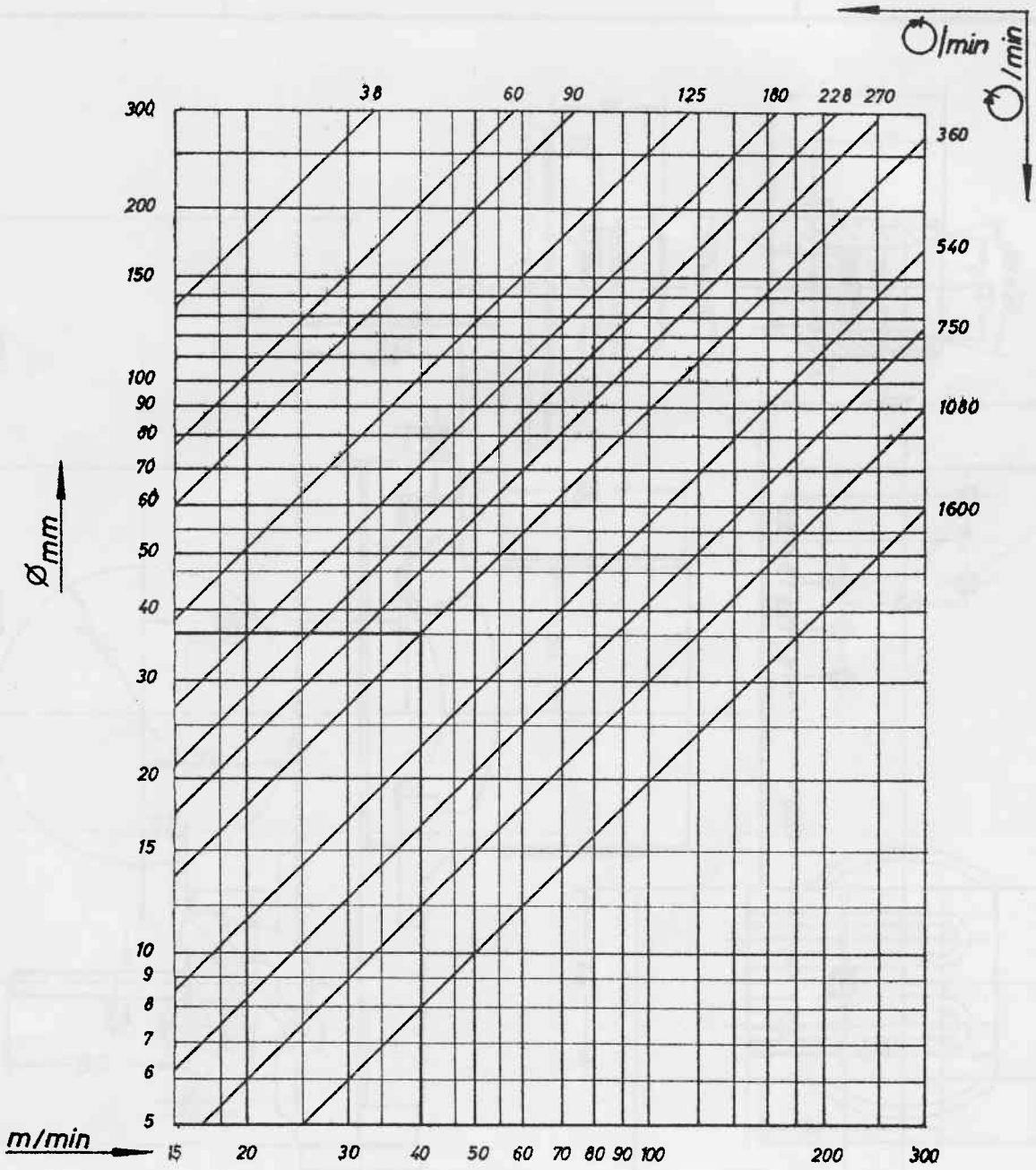


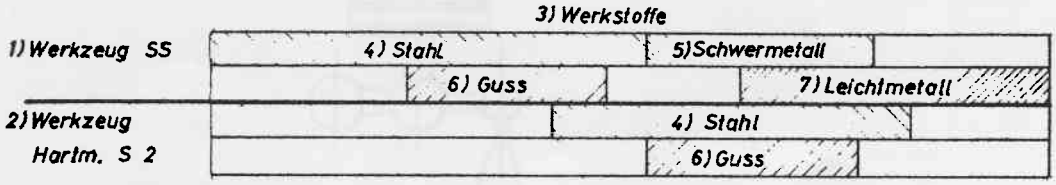
Bei Hebelstellung A-1 ist das Nortongetriebe 1:1 übersetzt.
LEVERS IN POSITION A-1 GIVE 1-TO-1 GEAR RATIO.
Leviers en Positions A-1 Donent a la Boîte Norton le Rapport 1:1.
CON PALANCAS ENPOSICION A-1 LA REDUCCION DE CAJA NORTON ES DE 1:1.

Zahnräder in Klammern sind als Sonderzubehör erhältlich.
CHANGE GEARS IN PARENTHESIS ARE AVAILABLE AS EXTRAS.
Pignons entre parenthèses sont disponibles comme supplemets
ENGRANAJES DE CAMBIO ENTRE PARENTESIS ESTAN DE VENTA COMO ESPECIALES.

Schnittgeschwindigkeitstabelle
CUTTING SPEED CHART
TABLEAU DE VITESSE DE COUPE
TABLA DE VELOCIDAD DE CORTE

LZ 280



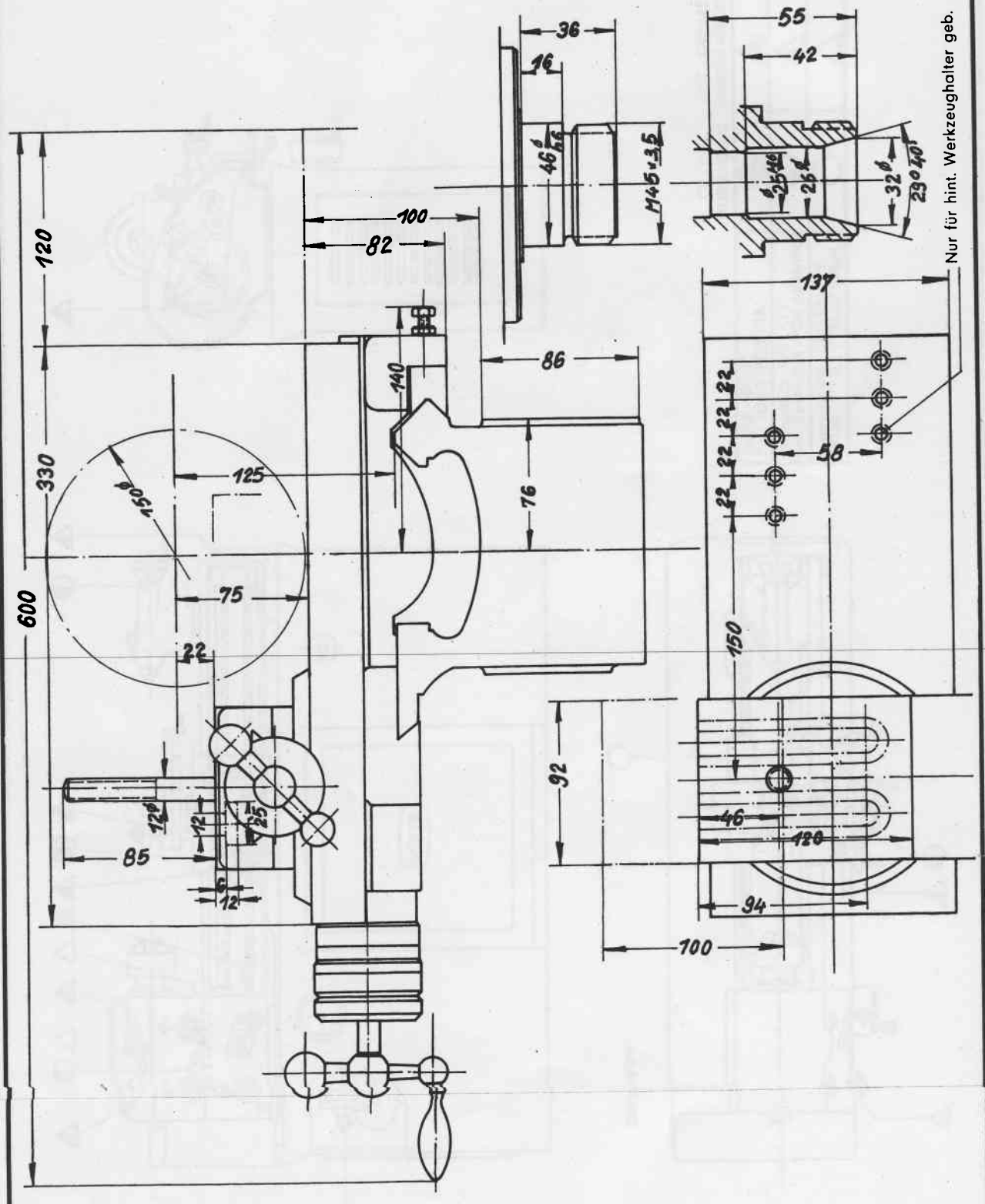


1) Tool - High speed steel
Outil - Acier rapide
Herramienta - Acero rapido

2) Tool - Tungsten carbide
Outil - Carbure de tungstene
Herramienta - Carburo de tungsteno

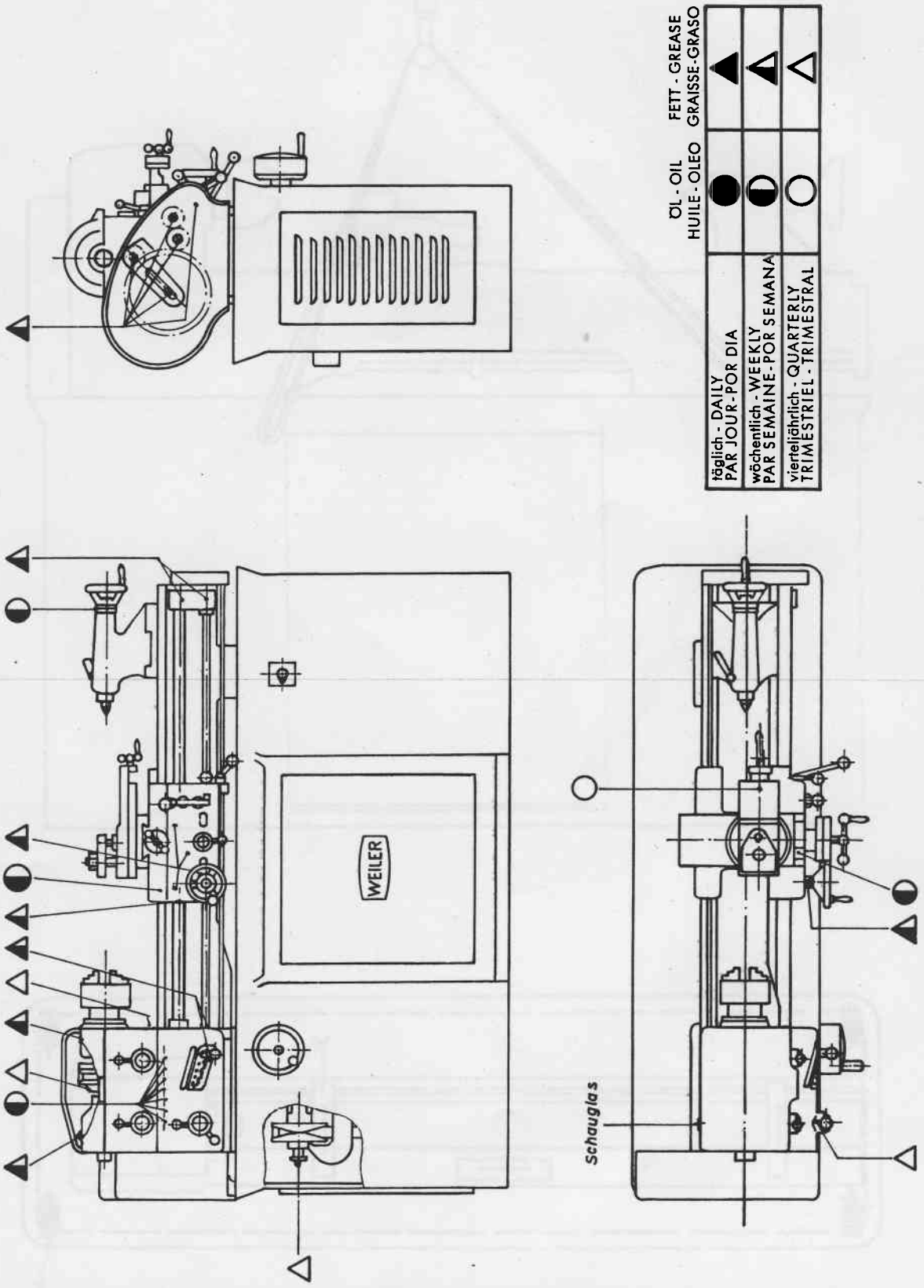
3) Material – Matiere – Materiel
4) Steel – Acier – Acero
5) Heavy metal – Metal lourd – Metal pesado
6) Cast iron – Fonte grise – Fondicion gris
7) Light metal – Metal leger – Metal liviano

WEILER	Übersicht für den Anbau zusätzlicher Einrichtungen	Typ: LZ 280



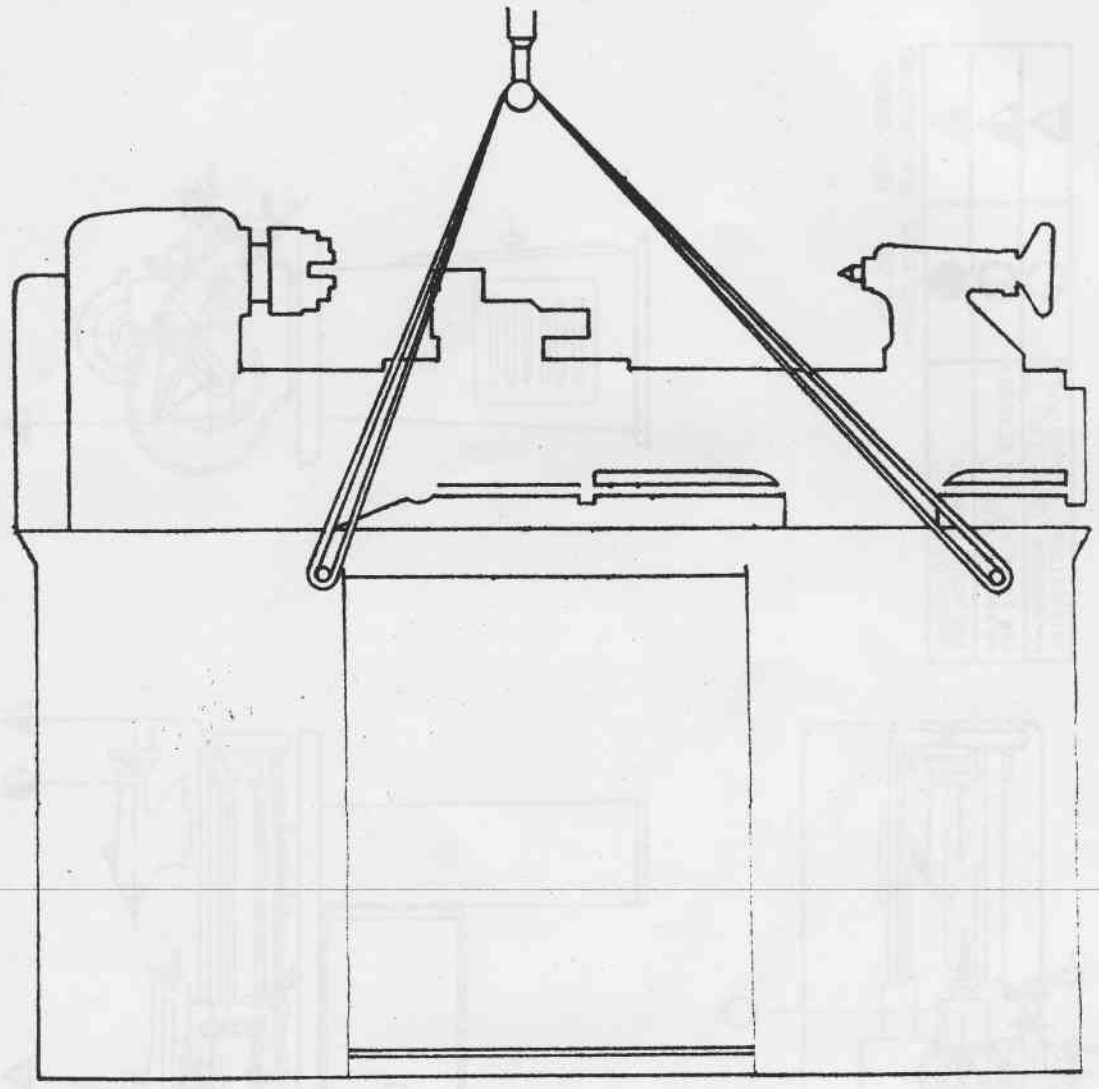
	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg/Germany	Fig. 7

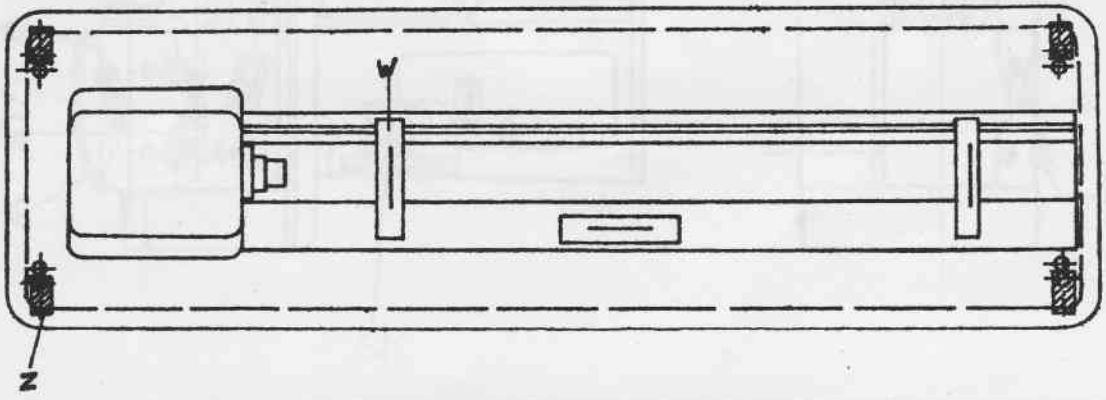
WEILER	Schmierplan Lubrication Chart - Plan de Lubrification Charta de Lubrificaciòn	Typ: LZ 280 S



	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg/Germany	Fig. 8

WEILER	Eingang der Maschine Receipt of Machine Reception de la Machine Reception de la Maquina	LZ 300 LZ 280



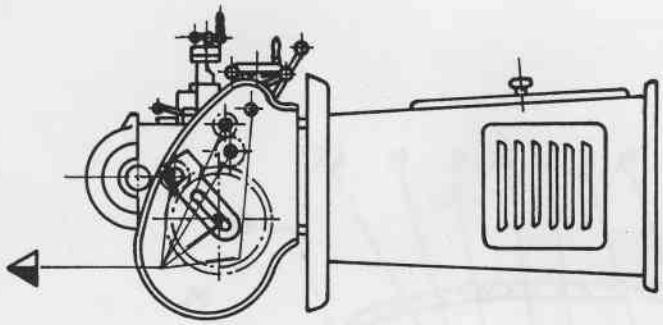


	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg/Germany	Fig. 1

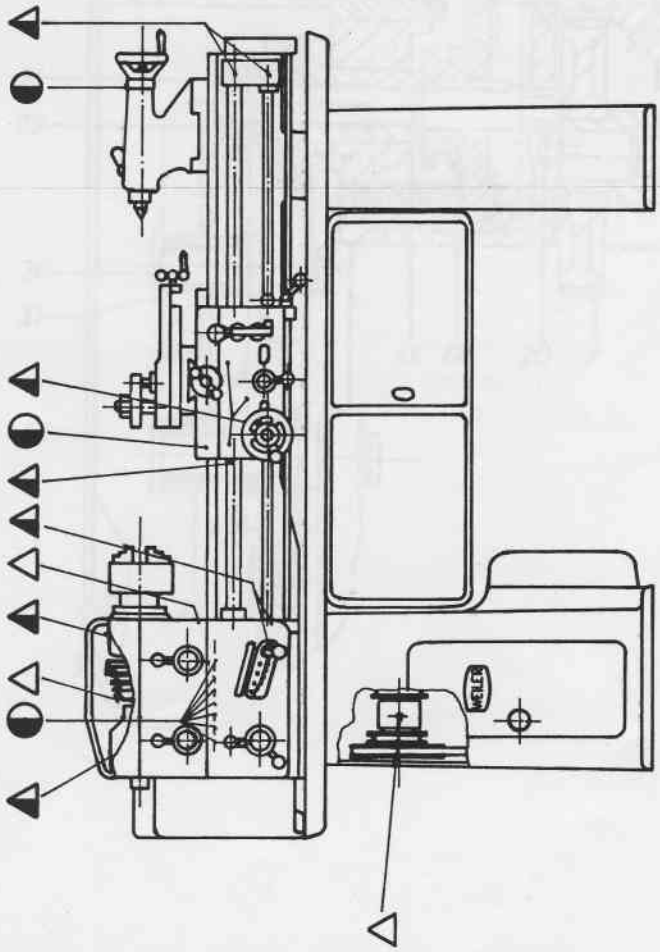
WEILER

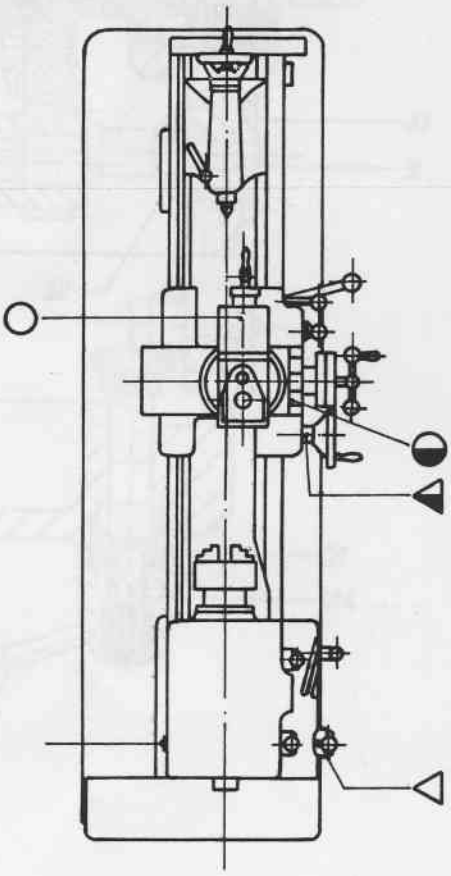
Schmierplan
Lubrication Chart - Plan de Lubrification
Charta de Lubrification

Typ:
LZG 280 N



	ÖL - OIL HUILE - OLEO	FETT - GREASE GRAISSE - GRASO
täglich - DAILY PAR JOUR - POR DIA	●	◀
wöchentlich - WEEKLY PAR SEMAINE - POR SEMANA	◑	◀
vierteljährlich - QUARTERLY TRIMESTRIEL - TRIMESTRAL	○	△

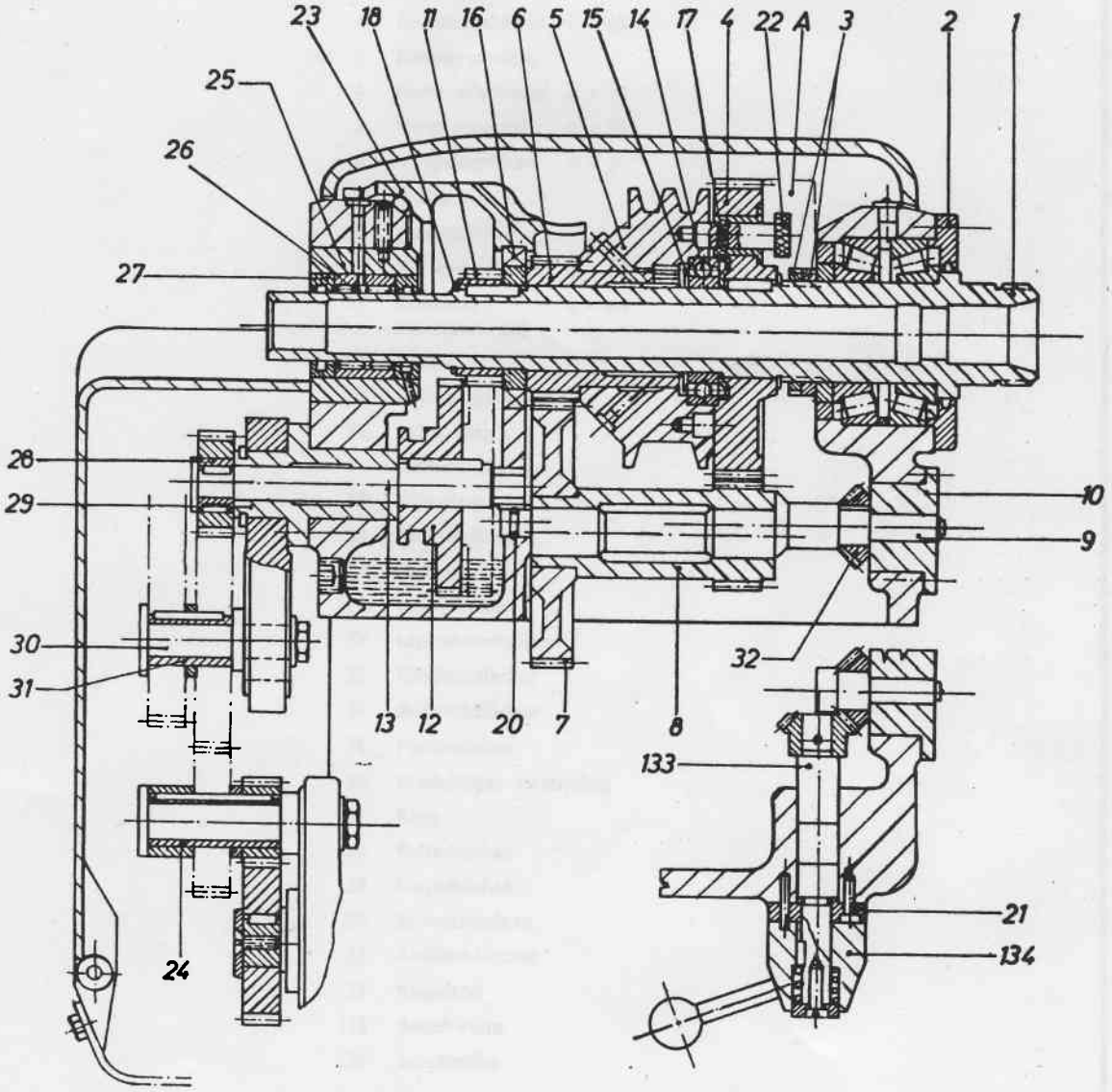




Weiler KG - Werkzeugmaschinenfabrik
Herzogenaurach - Nürnberg

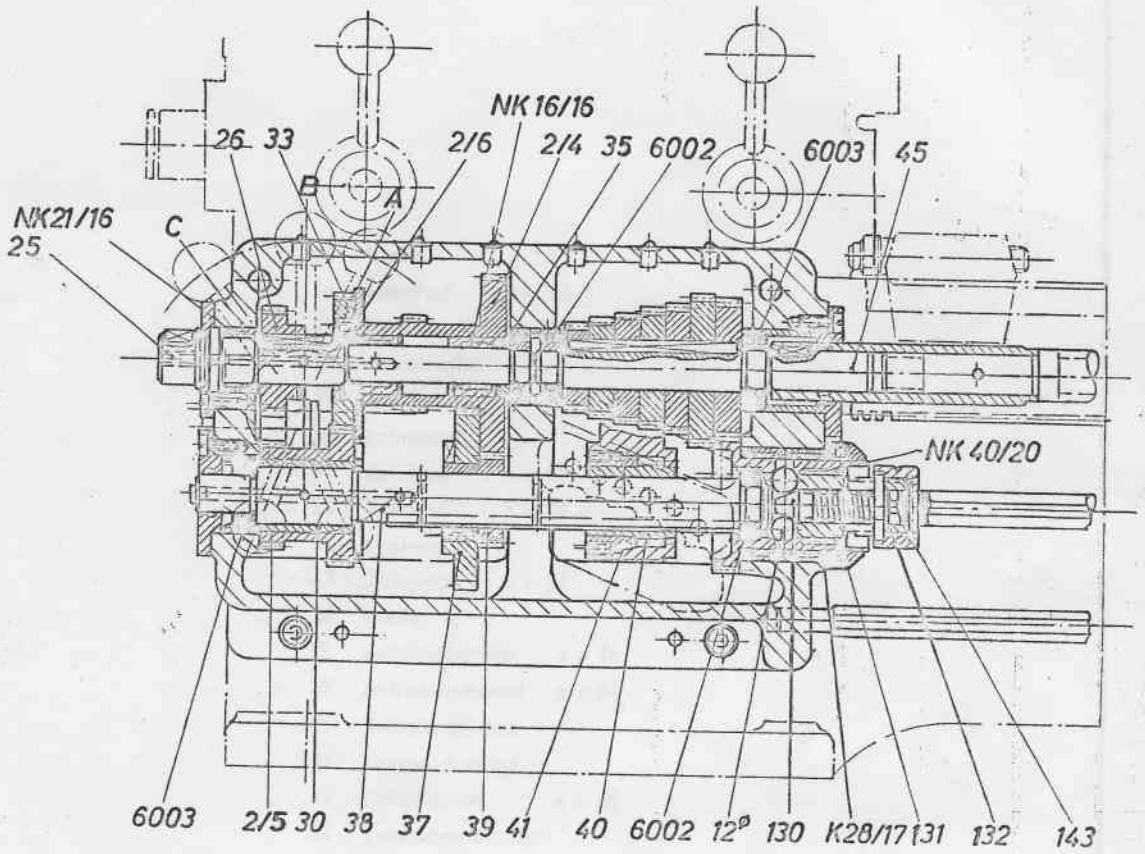
Fig. 10

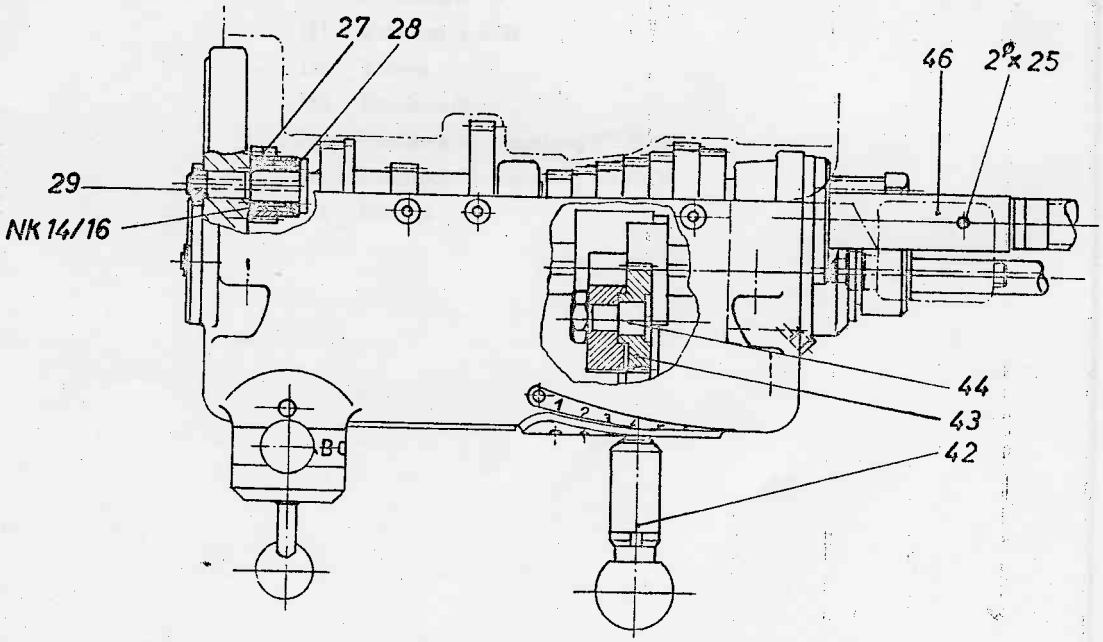
WEILER	Spindelstock Headstock - Poupee Fixe Cabezal Fijo	Typ: LZ 280



WEILER	Spindelstock	Typ: LZ 280

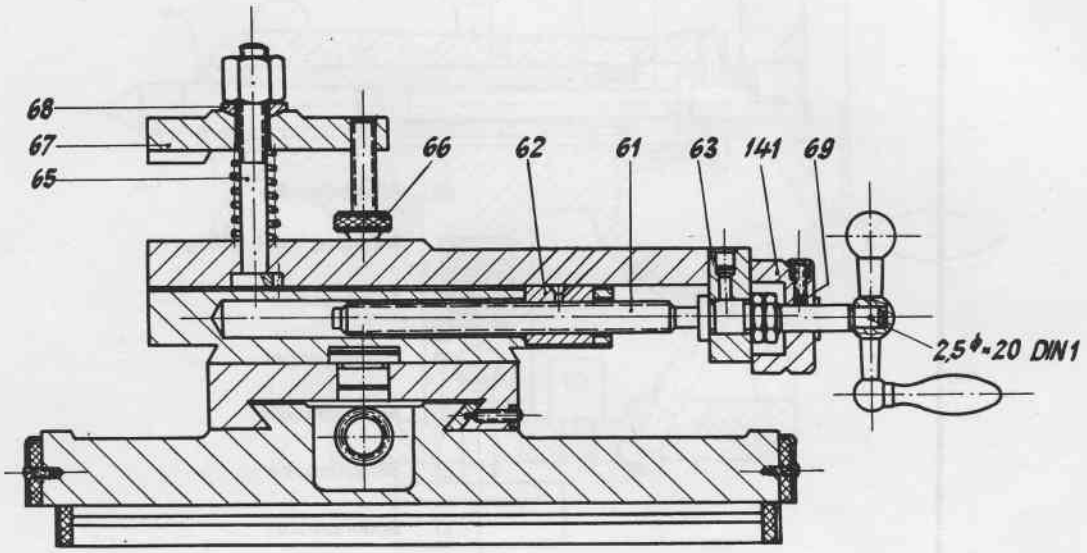
1	Drehspindel	
2	Deckscheibe	
3	Nutmutter	
4	Spindelzahnrad	z = 63
5	Riemenscheibe	
6	Hohlwellenritzel	z = 28
7	Vorgelegerad	z = 56
8	Vorgelegeritzel	z = 21
9	Welle	
10	Lagerbüchse	
11	Spindelzahnrad	z = 32
12	Zahnrad (Vorschubrad)	z = 64
13	Welle	
14	Rillenkugellager	
15	Nilos-Ring	
16	Radialdichtring	
17	Nilosring	
18	Seeger-Ring	
20	O-Ring	
21	Rastscheibe	
22	Mitnehmerbolzen	
23	Ölschutzdeckel	
24	Aufsteckbüchse	
25	Futterbüchse	
26	Nadellager zweireihig	
27	Ring	
28	Futterbüchse	
29	Lagerbüchse	
30	Scherenbolzen	
31	Aufsteckbüchse	
32	Kegelrad	
133	Schaltwelle	
134	Schaltnabe	

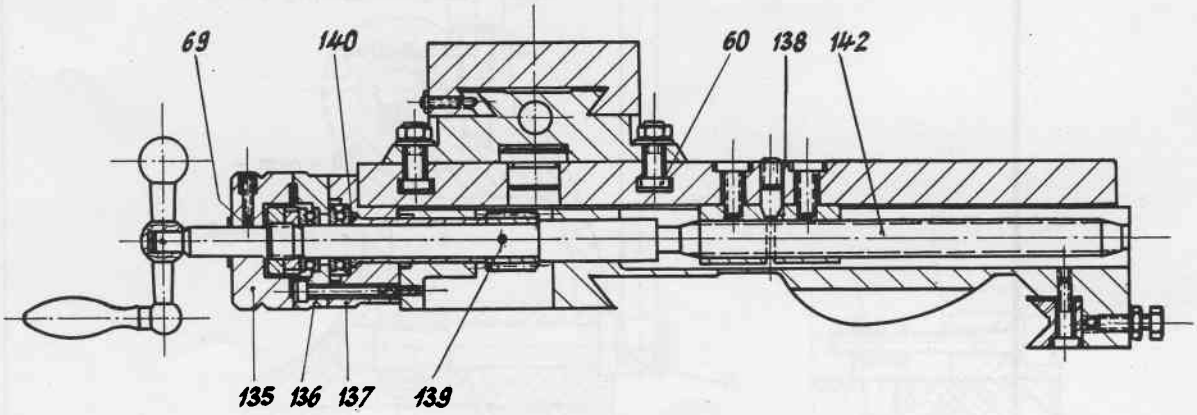

NK 16/16
26
33
2/6
2/4
35
6002
6003
45
B
A
C
NK21/16
25
NK 40/20
6003
2/5
30
38
37
39
41
40
6002
12°
130
K28/17
131
132
143


27
28
46
2°x 25
29
NK 14/16
44
43
42
B
1
2
3
4

25	Welle	
26	Zahnrad	z = 30
27	Zwischenrad	z = 20
28	Laufscheibe	
29	Radbolzen	
30	Laufbüchse	
31	Zahnrad	z = 39
33	Zahnrad	z = 39
35	Laufring	
37	Zahnrad	z = 52
38	Welle	
39	Zahnradbüchse	z = 26
40	Antriebszahnrad	z = 24
41	Zwischenbüchse	
42	Nortonschwinge	
43	Zwischenrad	z = 30
44	Zwischenradbolzen	
45	Welle	
46	Hülse	
130	Druckkegel	
131	Zahnrad	z = 39
132	Buchse	
143	Gewindering	
2/4	Radblock m. Kupplung	z = 29/52
2/5	Radblock m. Kupplung	z = 30/39
2/6	Scheibe	

WEILER	Werkzeugschlitten Carriage - Chariot Carro del Torno	Typ: LZ 280





	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg	ET 3-258

60 Ankerschraube

61 Supportspindel – längs –

62 Spindelmutter

63 Führungslager

65 Spannschraube

66 Stützschraube

67 Spannpratze

68 Unterlegscheibe

69 Messingplättchen

135 Skalenring – Planspindel –

136 Aufnahmedeckel

137 Führungslager

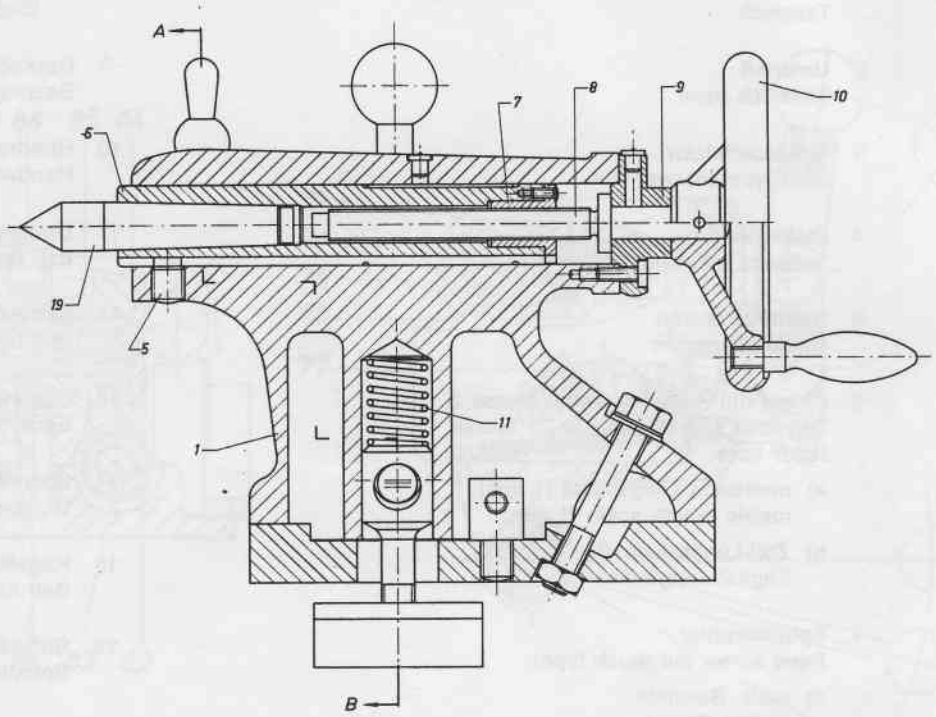
138 Planspindelmutter – zweiteilig –

139 Planspindelzahnrad z = 15

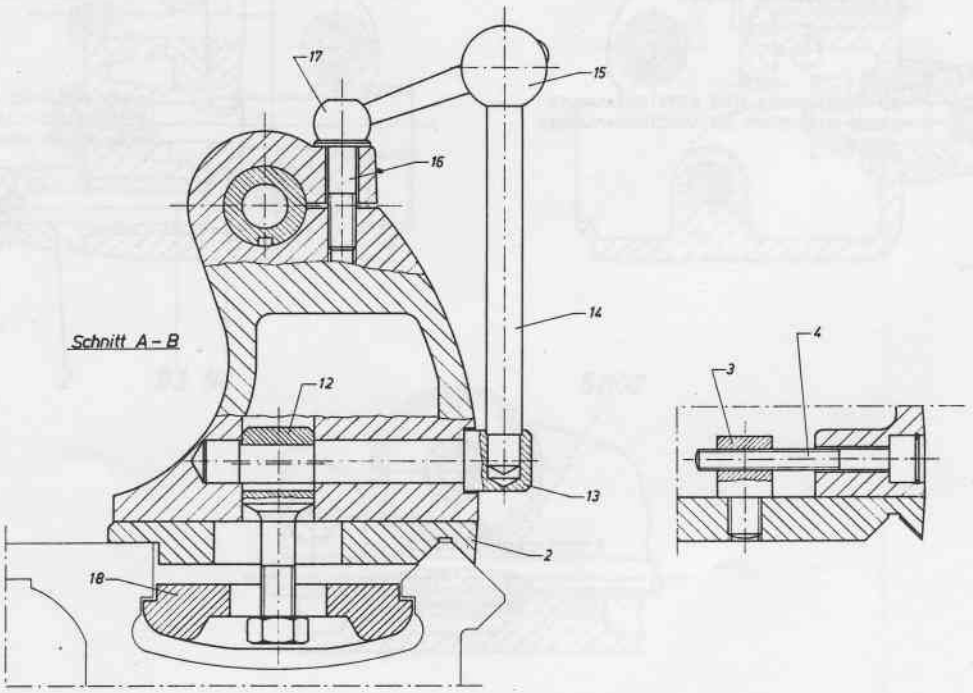
140 Distanzbüchse

141 Skalenring

142 Supportspindel – plan –



Reitstock
Tailstock
Contre-poupée
Cabezal móvil
Contropunta



Ersatzteilliste Nr. ET 4 - 68
für Reitstock LZ 280

Parts List No. ET 4 - 68
for Tailstock LZ 280

1 Reitstock
Tailstock

2 Unterteil
Tailstock base

3 Gewindebolzen
Stud type set-over nut

4 Stellschraube
Set-over adjusting screw

5 Gleitfederbolzen
Guide-key screw

6 Pinole mit Aufnahmekegel Morse 2
Tailstock spindle with no. 2 Morse taper bore
a) metrische Längsskala (1 mm)
metric length scale (1 mm)
b) Zoll-Längsskala ($^1/_{16}$")
English length-scale ($^1/_{16}$")

7 Spindelmutter
Feed screw nut (bush type)
a) metr. Gewinde
metric thread
b) Zoll-Gewinde
English thread

8 Reitstockspindel
Spindle feed screw
a) metr. Gewinde
metric thread
b) Zoll-Gewinde
English thread

9 Deckscheibe
Bearing cap

10 Handrad mit Ballengriff
Handwheel with handle

11 Druckfeder
Eye bolt spring

12 Spannbolzen
Eye bolt

13 Spannexzenter
Eccentric shaft

14 Spannhebel
Quick-clamp lever

15 Kugelknopf
Ball knob

16 Stiftschraube
Spindle locking pad screw

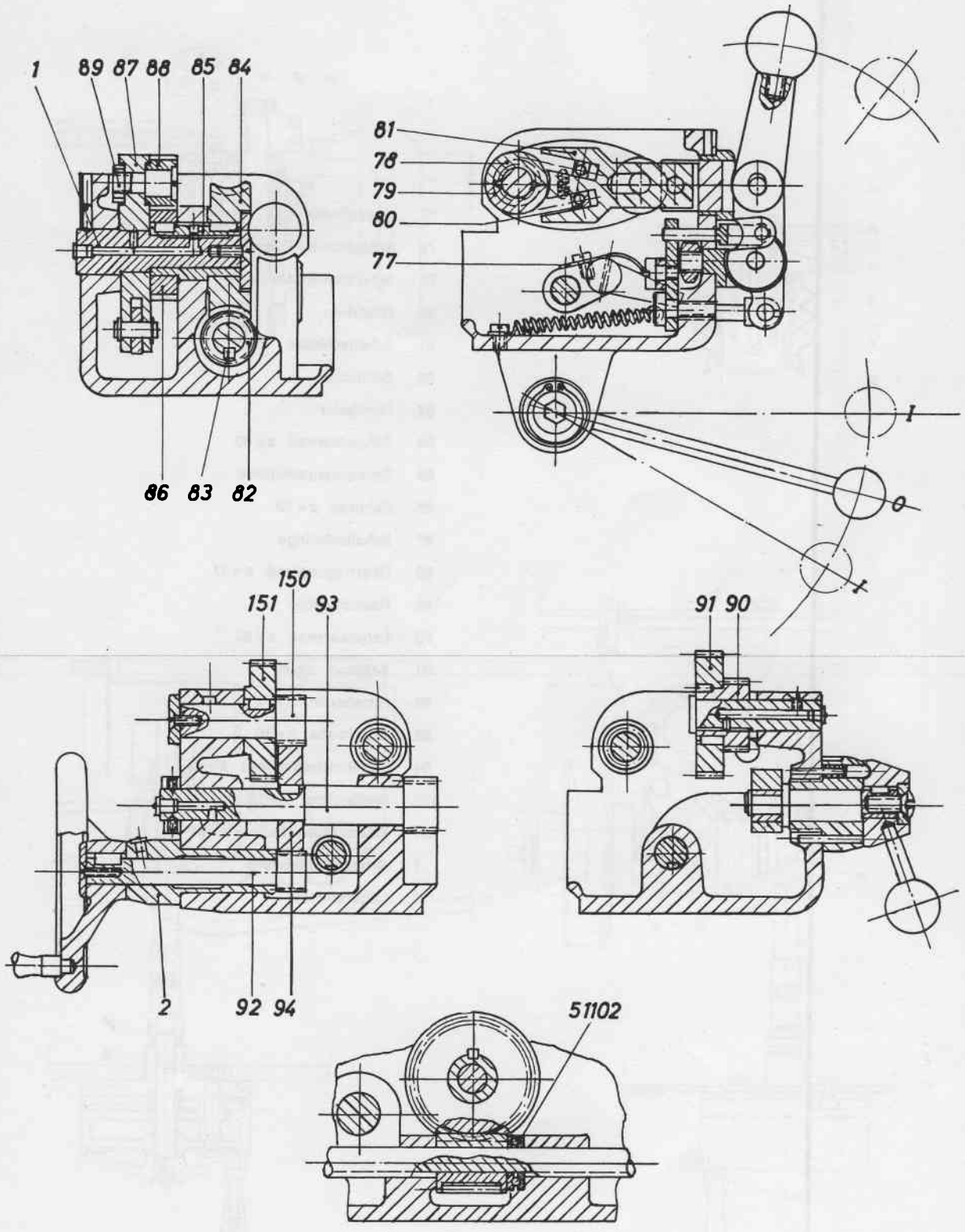
17 Kugelgriff
Ball grip

18 Spannpratze
Tailstock clamp plate

19 Körnerspitze
Male centre

BEI BESTELLUNGEN BITTE STETS DIE NUMMER DIESER LISTE SOWIE DIE MASCHINEN-NUMMER ANGEBEN.

WHEN ORDERING REPLACEMENT PARTS, PLEASE SPECIFY LATHE SERIAL NUMBER AND MENTION NUMBER OF THIS LIST.


1
89
87
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I
O
II
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2
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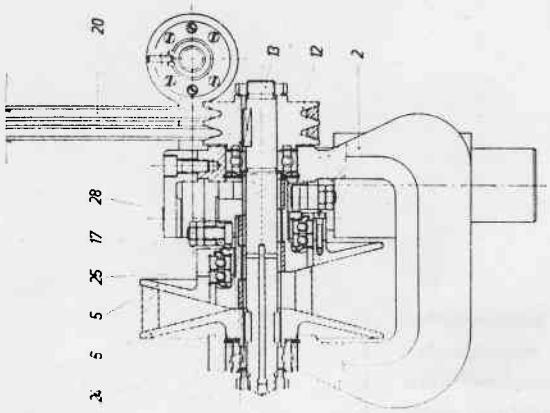
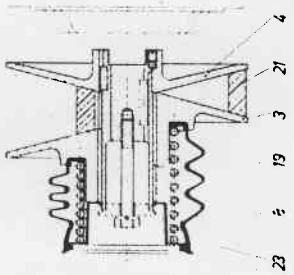
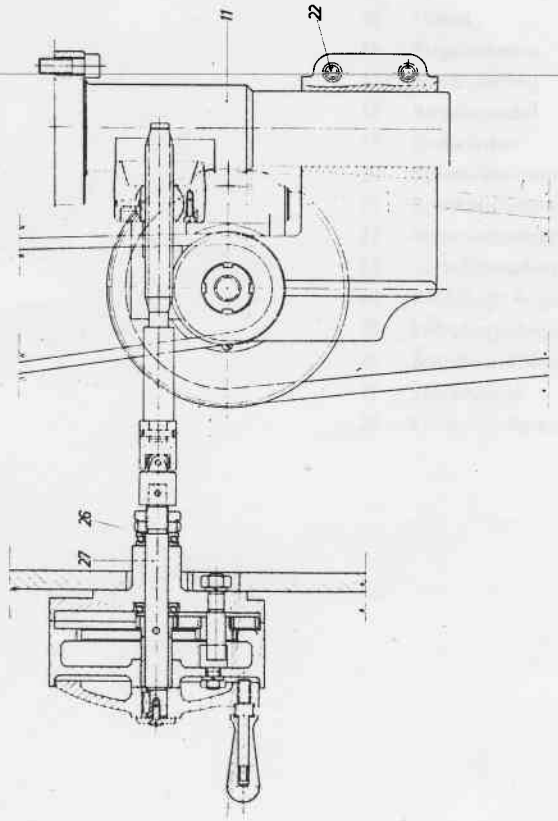
90
51102

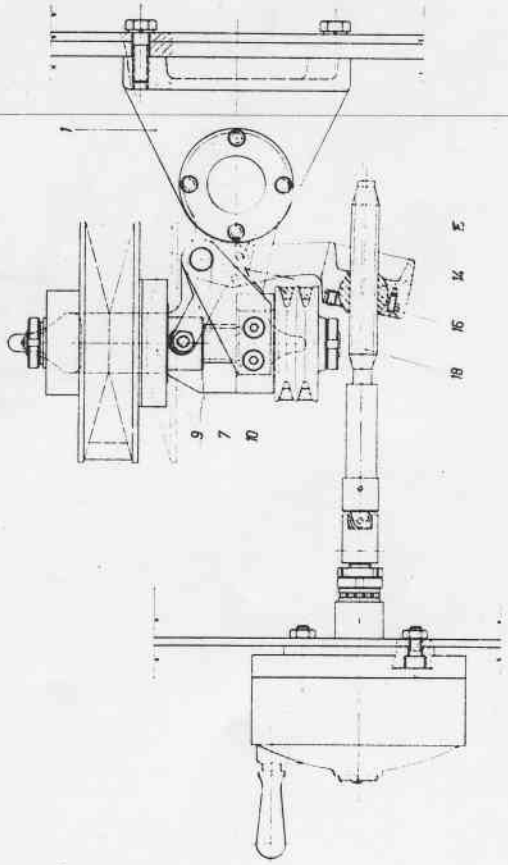
77	Einrastfeder
78	Schloßmutter-Oberteil
79	Schloßmutter-Unterteil
80	Gleitstein
81	Schaltschieber
82	Schnecke
83	Gleitfeder
84	Schneckenrad z = 40
85	Schneckenradbüchse
86	Zahnrad z = 30
87	Schaltschwinge
88	Übertragungsrad z = 17
89	Radschraube
90	Lagerzahnrad z = 22
91	Zahnrad z = 40
92	Ritzelwelle z = 12
93	Ritzelwelle z = 16
94	Ritzelwellenzahnrad z = 42
150	Wellenritzel z = 15
151	Wellenritzelzahnrad z = 38
1	Schneckenradwelle
2	Lagerbüchse

WEILER	Stufenlos - Regeltrieb Vari-Speed Drive Variateur de Vitesse Variador de Velocidades	Typ: LZ 280 S LZ 300 W MD 260 W





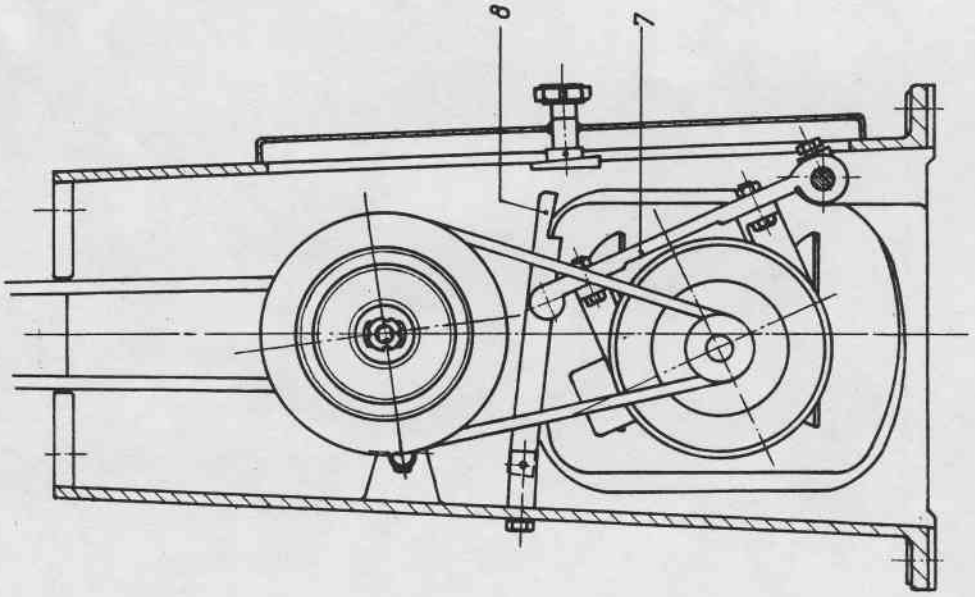


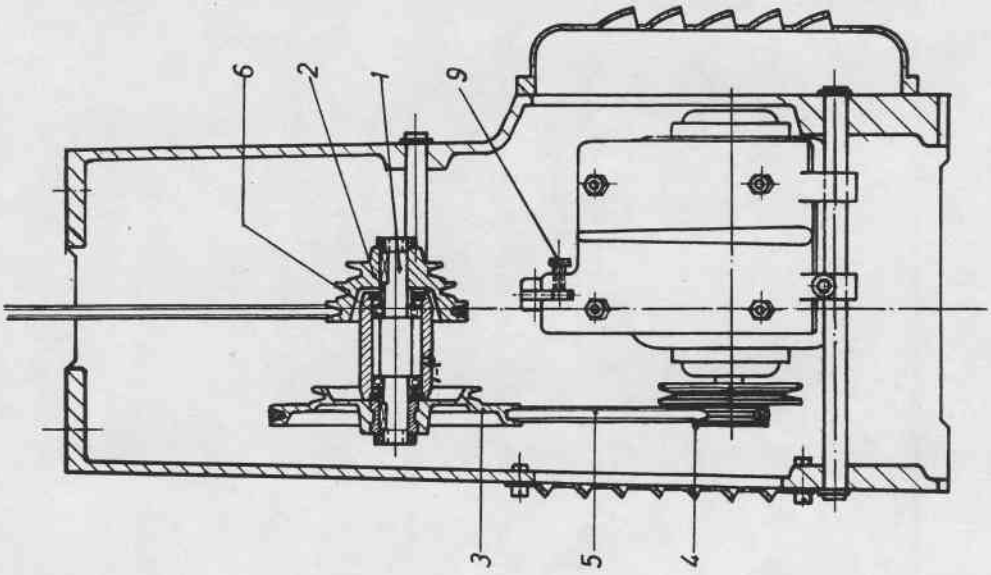


	Weiler KG - Werkzeugmaschinenfabrik Herzogenaurach - Nürnberg/Germany	ET 6-U 1/3

1	Aufnahmebock
2	Aufnahmearm
3	Getriebescheibe
4	Motor-Getriebescheibe
5	Getriebescheibe
6	Getriebescheibe
7	Steuergabel
8	Faltenbalg
9	Lagergehäuse
10	Stützplatte
11	Aufnahmerohr
12	Riemenscheibe
13	Welle
14	Spindelmutter
15	Hebel
16	Kugelscheibe
17	Zwischenring
18	Regelspindel
19	Druckfeder
20	Schmalkeilriemen
21	Breitkeilriemen
22	Innensechskantschraube
23	Sechskantschraube
24	Rillenkugellager
25	Rillenkugellagerpaar
26	Scheiben-Rillenlager
27	Steuerwelle
28	Exzenterscheibe

WEILER	Stufen-Antrieb	Typ: LZG 280 N





WEILER	Stufen-Antrieb	Typ: LZG 280 N

1 Lagerwelle
2 Keilriemenscheibe
3 Stufenscheibe
4 Keilriemenscheibe
5 Keilriemen
6 Rillenkugellager
7 Motorplatte
8 Rastenhebel
9 Stellschraube