

## GENERAL INSTRUCTIONS FOR JONSEREDS WOODWORKING MACHINES

These instructions apply to all machines. For certain machines there are also issued special instructions.

### ERECTION AND DRIVING.

1) The machines are delivered with all machined or polished surfaces covered with **anti-rusting paint**. Before the machine is installed this antirusting paint must be carefully washed off with benzine, as the machine otherwise cannot be supposed to function satisfactorily.

2) The machine is to be erected on a steady basement in accordance with the **erection drawing** sent. A concrete basement is always best and is strongly recommended for the following machines: band resaws, dovetail jointers, double tenoning machines for 2 met. or longer pieces of work, drum sanders and grinding machines for 3 met. grinding length or more.

The machine is erected by means of wedges, preferably iron wedges, which are to be laid on iron plates. The wedges consequently must not be laid directly on the concrete. The plates should have a thickness of  $\frac{1}{4}$ " to  $\frac{3}{8}$ " (6 to 10 mm), length and width corresponding to the dimensions of the wedges. The plates and the wedges are suitably placed near the holes for the foundation bolts or, if the distance between these holes is great, also between these holes, and are cautiously driven in so that no wedge will lose contact with the machine. By means of a level the horizontal position of the table surfaces, and of any other machined surfaces, are controlled. The level is placed both in the longitudinal and transverse direction at both the infeed and outfeed ends, i. e. on surfaces situated far from each other.

The **planeness of the table surfaces** are tested by means of a straight edge, suitably a board with planed edge.

The testing of the table surfaces of a **hand planer** may serve as an example. The straight-edge, a board of length not less than that of the total machine and with planed edge, is placed:

- a) parallel to the left table edges,
- b) lengthwise centrally on the tables,
- c) parallel to the right table edges,
- d) diagonally both ways.

Narrow paperstrips of the same thickness max. 0.004" (0.1 mm) are laid on short intervals between table and straightboard. If all papers fasten in their position, the tables are plane and the foundation bolts can be tightened.

3) **The countershaft** is placed according to the erection drawing and a straight edge, for instance a board with planed edge, serves to control that the belt pulleys are placed in line with the respective belt pulleys of the machine. If, contrary to expectation, a belt pulley has to be moved laterally on the countershaft, this displacement, with regard to the balancing of the complete countershaft, must take place strictly observing that the pulleys are not turned in relation to the shaft. It is therefore recommended to draw a scribed line along the shaft and a corresponding line in the hub of the belt pulley by means of a steel scriber before the displacement.

Control that the speed of the countershaft is correct.

4 Regarding **the belts** observe:

- a) that all belt joints are well made,
- b) that all belts are running freely everywhere and are properly stretched,
- c) that endless belts are running in the right direction and with the right side against the pulleys.

5) Observe before the first starting that **all lubrication points** are well greased according to the general and eventually special lubrication instructions below.

6) Observe further before the starting that **no loose parts** are lying on the machine, that **all nuts and screws**, especially cutter screws etc., are well tightened, that all tools are carefully fixed and that **all guards** are in their places.

7) **If the tool spindles** and the feed are not started at the same time the first mentioned are **to be started first**. The feed is not started until the tool spindles have reached the full speed.

8) If a gear box is opened the jointing surfaces must be coated with "Collexin" before the assembly in order to achieve safe tightening. "Collexin" can be obtained from Jonsereds Fabrikers A.-B.

## SPARE PARTS.

All the parts in Jonsereds machines are stamped with a number. In ordering spare parts these numbers must always be stated. For our control the manufacturing number of the machine is also to be mentioned.

## CARE AND MAINTENANCE OF BALL AND ROLLER BEARINGS.

**Treat ball and roller bearings with utmost care.** Avoid blows and strokes on the shaft, as such may cause the balls to make marks in the rings. Even if these marks are hardly visible for the naked eye, they cause a clattering sound, when the machine is working, and the bearing is soon worn out.

Pulleys and couplings should usually not have a tighter fitting than a suction-fit, i. e. they should be able to be pushed by hand to ab. half the length of the shaft. They are then pressed up against the shoulder of the shaft by the aid of a screw, inserted in a threaded hole in the shaft, and a suitable washer or bar. If the mentioned hole should not exist, it is necessary to drive the pulley with **gentle** knocks in its proper place, whereby a **counter-support** must be applied to the other end of the shaft.

Machine parts, needing a tighter fit, are provided with smaller bored holes and must consequently be warmed to ab. 150°C by fitting.

By pulling off pulleys and couplings a suitable tool and screws is used, the latter inserted in the mentioned, threaded hole in the shaft-end, or if this hole does not exist, the screw is supported against the shaft-end.

**Exercise due cleanliness when opening the ball-bearings** for cleaning or lubrication. Rub the cover and the housing before dismounting, to avoid getting dust and dirt into the bearing.

**From the sound** of a ball-bearing when working, you can judge if the lubrication is satisfactory. The best way to "sound" this, is to put the ear to a wrench or metal bar, which with the one end is resting against the housing, when the machine is working. If the bearing is all right a faint humming sound is heard. A piping sound means that the bearing has gone dry. A scraping or thumping sound means that the balls or the cage are damaged.

**Don't pull the bearing from the shaft** before this is absolutely necessary, i. e. when the bearing is damaged or must be removed for dismounting of other machine parts. Don't pull in the outer ring of the bearing, but use a ball-bearing puller, which by the aid of the cover presses against the innerring. Warm the innerring a little (max. 100°C) if necessary.

By fitting a bearing on the shaft, same ought first to be warmed to 70°C and thereafter pushed on to the shaft by aid of a pipe, suiting the innerring.

If the innerring rotates on the shaft and the bearing consequently is damaged, it is not sufficient to replace same by a new bearing. Very often the shaft is also damaged and must be replaced. If the damage is discovered in time, the shaft can be repaired if returned to us.

## GENERAL INSTRUCTIONS FOR LUBRICATION.

For good economy it is of great importance to use **suitable** lubricants and to carry out lubrication rationally. Below general advice on lubrication is given, but we wish to point out that operating conditions may sometimes justify deviations from these rules.

Find carefully out all lubrication points on the machine and remember that:

1) Every movable shaft has **at least 2 lubrication points**.

2) **Every part** that is rotating, pendling or on the whole movable mounted on a shaft must be greased at the bearing either by means of a lubricant nipple on the part that is movably or by means of a nipple at the end of the shaft (bored through) or in another way.

3) Lubrication points are **often placed inside** doors and swivel sheet covers.

4) There are often **lubrication points** not furnished with lubricant nipples or oil refilling pipes, as for example slides, gears for operating organ etc.

**Electric motors** are usually to be lubricated with grease acc. to pos. A, below. Oil is to be used only in certain machines acc. to special instruction. When the motors are delivered from the works, the ball and roller bearings are filled with grease in suitable quantity. This filling is sufficient for several years by a running of ab. 8 h/day and supposing normal conditions. By longer work time, by specially heavy strain or if the air is mixed with corrosive gases the lubrication must be done more often.

Most ball bearing housings have no openings for lubrication. They must therefore be opened. Clean the housing and the cover well from dust and dirt, and remove the cover. If there are sliprings outside the bearings remove the slipring housing, but don't dismantle sliprings and brushes. The rotor is to be pushed as far out as fan and windings allow, so that the bearing will be free and sufficient space is obtained between motor shield and cover or housing for inspection cleaning and refilling of the bearing.

After removing of the old grease the bearing is to be washed with a pure cleaning fluid as specified under pos. A, until the offrunning fluid is quite clear. Petroleum is not allowed because of its inclination to cause rusting. Balls and rollers are inspected. In case of any faults or rust spots the bearing should be exchanged. Finally the bearing is to be filled with new grease to  $\frac{2}{3}$  of the volume of the housing and the cover replaced.

Below general recommendations for lubricants are given. For some machines there are also special directions, which are also to be found in the instructions for the respective machines. **Always examine if the machine instruction contains lubrication recommendations, which depart from the general lubrication or contain special directions.**

#### A. Ball and roller bearings (speeds up to 6000 revs/min.

All ball bearing housings are provided with lubricant nipples for pressure lubrication and are, as a rule, lubricated with grease. It is important that these bearings should not be greased as frequently as plain bearings. In general it is quite sufficient to insert a small quantity of grease into the bearings once every 3 months. The temperature is apt to rise if too much grease is fed to the bearings.

If the bearings are lubricated with ordinary lime grease, which cannot endure a higher temperature than about 45°C, the grease may decompose and the oil separate. This oil will flow out of the bearing and involve two disadvantages. First the surroundings become dirty and second the lubricating quality of the remaining grease is considerably diminished. If a sufficient quantity of grease is decomposed, the bearing will run hot and be ruined.

If a **first class alkaline grease**, specially manufactured for ball and roller bearings, is used instead of lime grease a rise in the temperature only causes part of the grease to be thrown out or flow out of the bearing. This kind of grease will not decompose and, when the more space in the bearing is thus available, the temperature usually falls and the remaining grease recovers its original consistence.

If possible, the ball bearings should be taken apart once a year and the bearings properly cleaned. Cleaning should be done with Renolin (BP), Varnolene (Standard), Crystal Oil (Shell), Withe Spirit (Caltex), Vitalin (Wahlén & Block) or similar extra pure kerosene, which should be kept in a metal container, preferably with explosion protection device. Care must be taken that no dirt whatsoever enters the bearings. As soon as the bearing is quite dry, it should be completely filled with a first class ball bearing grease by hand or by means of a smooth sandpapered wooden splinter or the like. On the other hand, only the lower half of the housing should be filled with grease.

Bearings furnished with **grease valves** for ejecting surplus grease, f. inst. in FM-P, H-45K, H-65B, SN-R and SN-S, should be lubricated **every 8 hours** or after after want. When possible pump in the grease by running spindle, until the surplus grease comes out through the outlet opening. This grease is to be cleaned away.

As suitable lubricants we recommend:

BP Energrease LS2, Caltex Regal Starfak No. 2, Esso Andok M-275, Mobil Mobilgrease BRB No. 1, Shell Nerita Grease 2, SKF 28, Wabo No. 150 Light, Wakefield Spheerol "S".

#### B. High speed Spindles (above 6000 revs/min)

mounted in **ball bearings**, are found in shaping and recessing machines, mortising machines and dovetailing machines. The bearings should be lubricated when necessary, from once a day up to once a month. **Oil** is used for LB-B and FM-C, **grease as under pos. A** for the other machines.

As suitable oils for LB-B and FM-C we recommend:

BP Energol CS 40, Caltex Spindura Oil AA, Esso Spinesso 34, Mobil Velocite Oil No. 6, Shell Vitrea Oil 13, Wabo Oil S. S., Wakefield Hyspin 40.

By 17—20000 r/m (FM-G/J) is recommended BP Energrease LS 2, Caltex Regal Starfak No. 2, Mobil Mobilgrease BRB Lifetime, Esso Andok B, Shell grease R 175, SKF 28, Wakefield Spheerol "S".

#### C. Plain bearings lubricated with grease.

These bearings should be lubricated with a grease gun about once every 8 hours.

As suitable lubricants we recommend:

BP Energrease LS2, Caltex Regal Starfak No. 2, Esso Estan 2, Mobil Mobilgrease BRB No. 1, Shell Nerita Grease 2, Wabo no. 150 Light, Wakefield Spheerol "L" or alternatively the greases recommended above for ball and roller bearings.

## D. Gear boxes and roller chains.

Always make sure that the box is filled with oil to the correct level. Refilling should be done when required. It is advisable to drain the oil once a year (if the machine is run continuously). In a new machine the first draining and cleaning of the oil should be done as soon as one or two months after the start in order to remove ev. remaining filings. Clean the whole box and refill it with new oil. The drained oil — if it is of high grade — may be cleaned in a cotton waste filter and used anew.

As suitable oils we recommend:

BP Energol CS 200, Caltex Regal Oil E, Esso Teresso, 65, Mobil DTE Oil Extra Heavy, Shell Vitrea Oil 41, Wabo Oil Extra Heavy, Wakefield Alpha 417.

**Winter time.** For machines standing out of doors or in unheated locals, where the temperature can sink below zero (0°C or 32°F), a special winter oil ought to be used.

We recommend:

BP Energol Hydraulic 100, Caltex Regal Oil C, Esso Esstic 50, Mobil Vactra Oil No. 1, Shell Talpa Oil 20, Wabo Oil Extra Heavy, Wakefield Alpha 317.

## E. Worm gears.

What is said above regarding gear boxes also applies to worm gears. As the quantity of oil, as a rule, is very small it hardly pays to clean the used oil, and the gear box should therefore always be filled with new oil. The drained oil must not be mixed with the gear box oil.

As suitable oils we recommend:

BP Energol Gear 300 EP, Caltex Meropa Lubricant 4, Esso Pen-O-Led EP3, Mobil Cylinder Oil 600W, Shell Macoma Oil 73, Wabo Extreme Oil No. 4, Wakefield Alpha 817.

**Winter time.** For machines standing out of doors or in unheated premises, where the temperature can sink to zero (0°C or 32°F), a special winter oil ought to be used.

We recommend:

BP Energol Gear 100 EP, Esso-Pen-O-Led EP1, Mobil Vactra Oil No. 4, Shell Macoma Oil 69, Wabo Extreme Oil No. 2, Wakefield Alpha 717.

## F. Oils for automatic lubrication apparatuses (Åssa apparatuses).

Before the oil pipes are connected, the apparatus must be run until the oil flows evenly without air bladders. The wanted quantity of oil through the different pipes can be regulated by means of the screws underneath the top cover on the apparatus and according to their markings.

Once a year the apparatus is to be cleaned and the dismounting is effected by loosening the pump-body from the foot-piece.

By lubricating against steam or air pressure blocking valves must be placed at the different lubrication-points.

If one of the outlets is not to be used, the corresponding regulation-screw is to be fully unscrewn. **The outlet must not be plugged**, as this would create a risk for damaging the apparatus.

For oiling slide rails for feeding chains (SN-R/J, SN-S/J, TM-23R/J) and travelling beds (H-65B, P-2MB) a. s. o. from central lubricators is to be used a good machine oil of adhesive character.

As suitable lubricants we recommend:

BP Energol HP 20, Caltex Textol E, Esso Millcot K-55, Mobil Vactra Oil Heavy Medium, Shell Trochus Oil 37, Wabo Oil Heavy Medium, Wakefield Perfecto NN.

## G. Mortising chain tools.

For lubricating of mortising chains and guide bars (S-KE, KEB) is to be used an oil with a high viscosity (ab. 30—35° Engler at 50°C and 4—5° Engler at 100°C) and high inflammability (ab. 280°C).

Very suitable oils are:

BP Energol CS 550, Caltex Regal Oil K, Esso Cantona 170, Mobil DTE Oil HH, Shell Vitrea Oil 79, Wabo Light Valve No. 29, Wakefield Alpha 817.

## H. Hydraulic oil unit (S-BA/J, S-BB/J).

As suitable oils we recommend:

BP Energol Hydraulic 100, Caltex Regal Oil C (R & O), Esso Teresso 52, Mobil DTE Oil Heavy Medium, Shell Turbo Oil 33, Wabo Oil Heavy Medium, Wakefield Perfecto NN.

# ELECTRIC EQUIPMENT

This instruction applies to all machines which are delivered with electric motor.

Before the electric motor is connected to the net voltage it must be controlled that the motor is stamped for the working voltage accessible. Concerning 3-phase motors note that the motor by changing-over at the terminal can be delta or star connected. The working voltage of the star connected motor will be 70 % higher than of the delta connected. It is thus not always certain that the voltage stamped on the motor plate equals the working voltage. A motor which is stamped 220 volt D, i. e. 220 volt delta connected, may for instance also be used for 380 volt star connected.

Most machines with their motors fixed to the machine frame are delivered from the factory with starter and all wiring fitted between starter and motor. In such cases the feeding cable is only to be connected to the starter and the machine is ready for operation.

The feeding cable ought to be chosen with such an area as to allow the use of cut-outs for at least the same amperage as that of the **starting current** of the motor. A somewhat smaller area of cables can be used, but only in connection with slow melting fuses.

## MAGNITUDE OF THE STARTING CURRENT.

### 1) 3-phase motors.

#### a) Squirrel-cage motors.

The starting current for squirrel-cage motors in case of direct start, which is generally used for small motors up to about 3 HP only, is for totally enclosed 2-pole motors, that are mostly used on woodworking machines, rather high and amounts to about 6 à 7 times the normal current.

By using star-delta-start, which is generally employed for motors above 3 HP, the starting current is reduced to only about 2 times the normal current.

#### b) Slip-ring motors.

The magnitude of the starting current for a slip-ring motor entirely depends on the way the starting rheostat is handled at the start. If the starter is rapidly moved over from start to driving position the starting current may be considerable, but if the starter is moved very slowly it may not exceed the normal current very much.

### 2) D. C. motors.

D. C. motors are always started by means of a starting rheostat and what is said about slip-ring 3-phase motors will thus apply. The current stamped on the motor plate is the normal current of the motor.

## ALLOWED CURRENT FOR INSULATED COPPER CABLES.

Area mm <sup>2</sup>	Current max. amp.	Melting metal fuses max. amp.	Area mm <sup>2</sup>	Current max. amp.	Melting metal fuses max. amp.
1,5	14	10	35	125	100
2,5	20	15	50	160	125
4	27	20	70	200	160
			95	240	200
6	34	25	120	280	225
10	44	35	150	325	260
16	75	60	185	380	300
25	100	80	240	450	350

### CARE AND MAINTENANCE OF ELECTRIC MOTORS AND APPARATUSES.

#### 1) 3-phase motors.

##### a) Squirrel-cage motors.

Squirrel-cage motors are the most durable and reliable motors to be had. They have no movable parts except the shaft and the rotor and there is thus no wear except in the bearings. The only care such a motor requires is that the bearings, which always are ball or roller bearings, must be inspected from time to time. The bearings must then be cleaned and filled with new grease according to the instructions sent with the motor.

As mentioned the starters for squirrel-cage motors are of two types, either for direct start or for star-delta-start. Both types can be designed with the contacts working either in air or in oil. The care of the starters working in air is very simple. Inspection must be carried out only once a year to ascertain that the contacts are not burnt. If burnt the contacts are cleaned with fine emery-cloth. For starters with contacts in oil it must also be controlled that the oil level is the right one. Generally there is a red line on the oil box showing the proper level.

##### b) Slip-ring motors.

What is mentioned regarding squirrel-cage motors applies also to these motors but inspection of slip-rings and brushes is to be added. It must thus be controlled that the coal-brushes are not worn out too much. Replacement of the coal-brushes must not be put off until the coal is entirely worn out, so that the brush-holder is dragging on the slip-ring. Both brush-holder and slip-ring may then be spoiled. Most slip-ring motors are furnished with device for lifting the brushes and a cable connection between the rings when in drive so as to diminish the wear of rings and brushes. It must be remembered to move the handle on the slip-ring housing serving this purpose as soon as the motor has reached full speed. When the motor is stopped the handle is instantly to be placed in starting position. The contact surface of the starting rheostat must now and then be inspected and, if burnt, be ground with a fine emery-cloth.

#### 2) D. C.-motors.

What is said above also applies to D. C. motors but inspection of commutator and brushes is to be added. The commutator is a rather delicate thing,

which requires a careful control to function satisfactorily in the long run. It must thus repeatedly be ground with a fine emery-cloth so that the surface always is clean, and further the coal brushes must be replaced as described under slipping motors. The contact surface of the starter must now and then be inspected and, if burnt, be ground with a fine emery cloth.

#### LUBRICATION.

For the lubrication of electric motors we refer to the instructions accompanying the motors, and to instruction 1, page 2 and 3 and to the special instructions for each machine-type.

#### CONTACTOR EQUIPMENTS.

Big machines with a number of motors are usually delivered with built-in contactor equipment. Starting the motors is thus effected by means of push buttons, which actuate the contactors. The care of the contactors mainly lies therein that the contactors are now and then inspected and, if burnt, they are cleaned or replaced with new ones. The contactors are always furnished with thermal relays to protect the motor against overload. The contacts of the thermal relays are connected in such a way that when one motor is cut out all contactors will be disconnected. A signal lamp is lit on an indicating panel on the contactor table, showing the motor that has caused the release. Having cooled down during some minutes after the release the relay can be re-set

by depressing the push-button intended for this purpose. It must be remembered that the thermal relays are adjusted for a current that corresponds to the normal current stamped on the motor. It is absolutely repudiable to adjust the relays for a higher intensity of current in order thus to avoid release. If any motor should show tendency of cutting out often the real fault must instead be found, which often is due to the corresponding tool working with too high a load, depending on either too deep cutting, too high feed speed or eventually dull tools.

#### ELECTRIC CUTTER BRAKING.

When specially ordered certain machines are provided with contactor for counter-current braking. These machines are also in standard execution furnished with the two corresponding push buttons, marked "Brake" and "Start". Obviously these push buttons are only to be used, when the braking contactor is applied.

The braking contactor is to be connected between the frequency changer and the machine.

For braking the push-button "Brake" is to be kept depressed, and then the button for the spindle, which should be braked, is pushed. Only when the spindle is near standstill, the button "Brake" is let loose. **Only one spindle** can be braked at a time.

After braking the braking contactor is set back to initial position for drive, by pressing the button "Start".