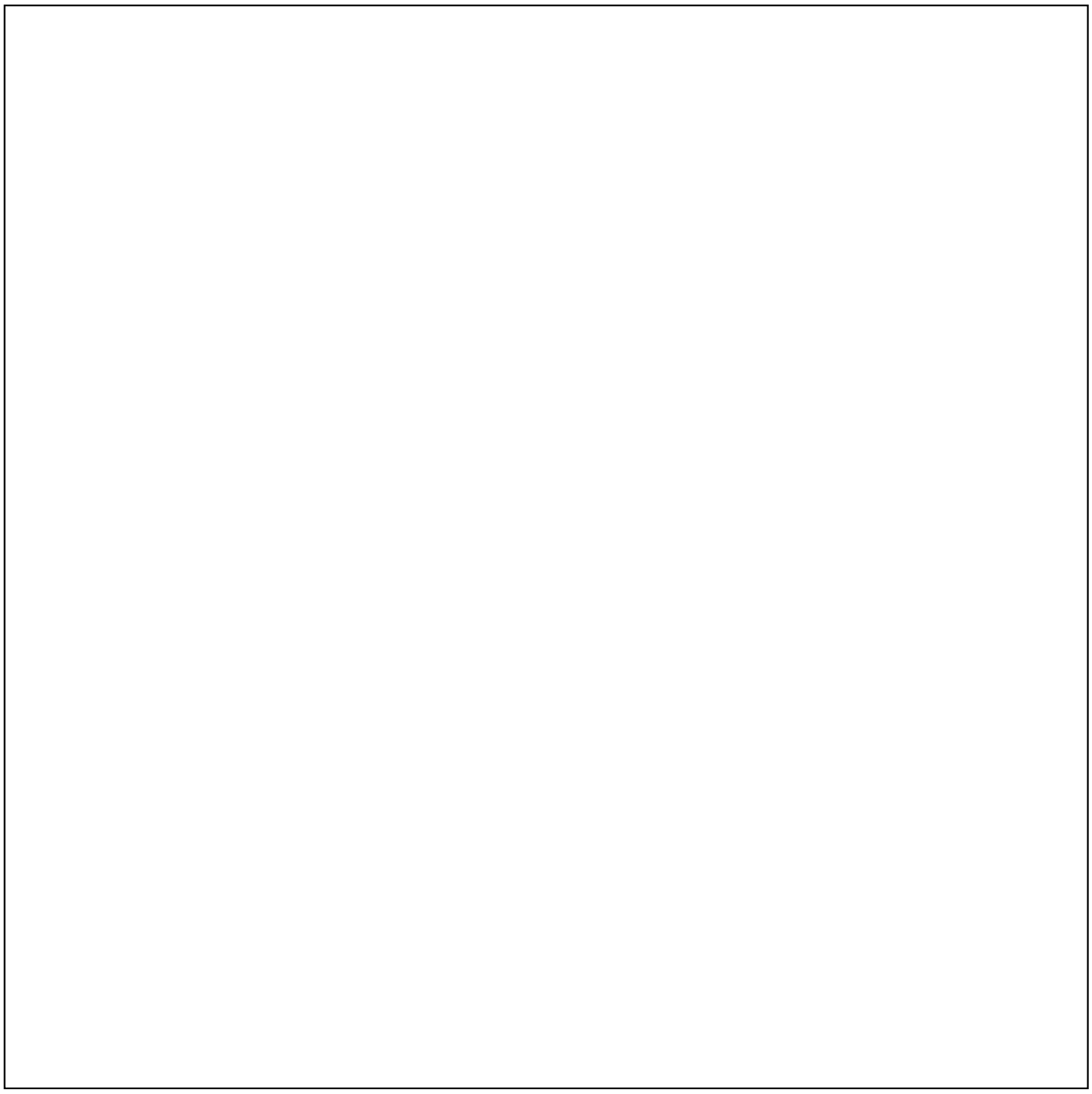
Centrifuge

Series 69 712 6x 161

Operating Instructions



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Version 0806

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1. Preface

These operating instructions should make it easier for personnel to familiarize themselves with the centrifuge and to use it in the various application areas for which it was designed.

The operating instructions contain important information on operating the components safely, correctly and economically. These instructions must be followed in order to avoid danger, reduce repair costs and down times and increase the reliability and working life of your machine.

The instructions must be made accessible to every person working with the filter.

Furthermore, these instructions must be supplemented as necessary with the applicable national regulations regarding accident prevention and environmental protection (in particular the disposal of removed parts).

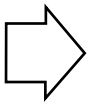
We reserve the right to make technical modifications to the filter and/or modify the content of these operating instructions.

2. Safety

2.1 Warnings and symbols

This symbol designates all passages in the operating instructions relevant to safety. Ignoring these instructions may endanger personnel.

This symbol designates all instructions in the operating instructions which must be followed in order to prevent damage to or destruction of components.



This symbol indicates that special attention must be paid to these instructions in order to ensure trouble-free, economical operation.

2.2 Proper use

The centrifuge is constructed in accordance with the state of the art and the recognised safety specifications. However, the centrifuge may result in danger to the user or third parties or damage to the centrifuge and other material property may occur if

– the centrifuge is not used as specified

– the operating conditions are altered

– modifications are made without consulting the manufacturer

– maintenance and repair work is not carried out as necessary

Use the centrifuge only if in perfect condition and in accordance with the respective technical specifications, observing correct procedures regarding safety and danger, and in compliance with the maintenance instructions. In particular, malfunctions that may affect safety must be eliminated immediately.

The centrifuge is intended for filtering lubricating oils. Other applications, e.g. filtering liquid foods or luxury goods, aggressive, combustible and/or explosive materials, is considered incorrect use. In this case, the manufacturer/ supplier will reject all liability in event of resultant damage.

The risk shall be borne by the user alone.

Specified use presupposes compliance with operation manual instructions and fulfilment of inspection and maintenance requirements.

The filter manufacturer accepts **no** liability for hazards or risks resulting from the materials being filtered. This applies in particular in event of processing materials which pose a hazard to health or the environment. The operator of the centrifuge is responsible for providing the necessary and specified safeguards.

2.3 Operational safety

The centrifuge must only be maintained and operated by qualified, authorised personnel.

All modes of operation must be avoided that may affect operational safety of the centrifuge.

It is imperative that the operator check the centrifuge once a week for externally visible signs of damage or faults, and immediately report such alterations (including function) that may affect operational safety.

Unauthorised modifications and alterations to the centrifuge are in general not authorised for reasons of safety. **Furthermore, the manufacturer's warranty would immediately become invalid.**

For all work involving commissioning, operation, modifications of conditions of use and modes of operation, maintenance, inspection and repair, the shutdown procedures specified in the operating instructions must be followed.

All labelling and identification marks on the centrifuge must be kept in a legible condition.

3. Functional description

Centrifuges basically consist of a housing and a rotor.

The oil diverted from the main circuit in a bypass line flows through a connection at the side of the housing lower section into the centrifuge and through the central hollow shaft to the rotor.

After flowing through the rotor, the pressurised oil is directed to the drive nozzles mounted at the bottom of the rotor.

The reaction forces generated as the oil leaves the nozzles impart to the rotor a high rotational speed dependent on the oil pressure.

The thus generated centrifugal force throws the contaminants contained in the oil against the inner wall of the rotor, where they are retained as a homogenous layer of dirt.

The cleaned oil flows at zero pressure through the large outlet in the centrifuge base to the engine oil pan or a separately mounted oil tank.

4. Maintenance/repair

Unless otherwise specified by the respective engine manufacturer, maintenance must be carried out at each engine oil change, or no later than after 200 to 300 operating hours, or after 10,000 to 20,000 kilometers' travel.

Warranty is not accepted if one or more of the following points leads to a failure of the centrifuge:

– natural wear

– incorrect handling

– deficient maintenance or repair work

– assembly errors during installation or removal

– unauthorised modifications

– corrosion damage during transportation

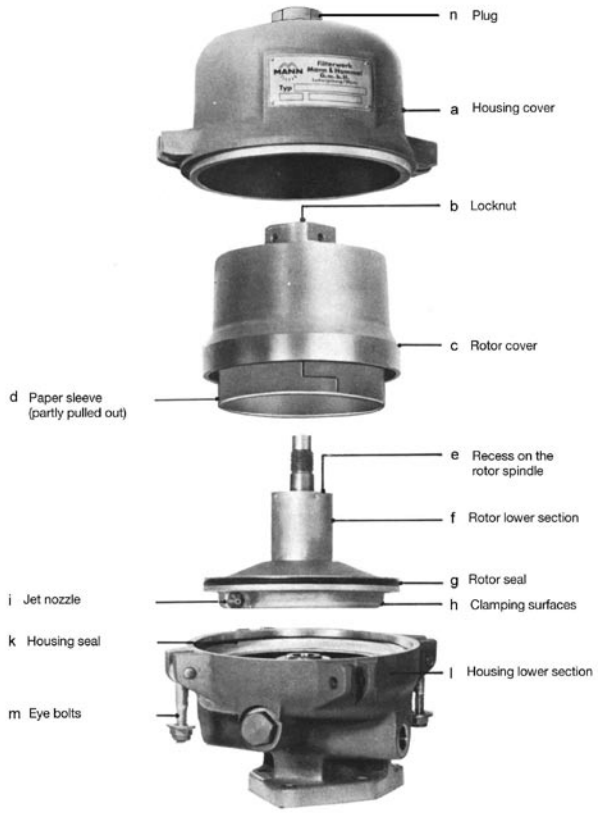


Fig. 1: Design (standard version)

4.1 Disassembling centrifuge

Carry out all inspection and services only during engine standstill.

– Release eye bolts (m) and remove housing cover (a). Then lift the exposed rotor carefully out of the housing and allow oil to drain.

Fig. 2: Removing rotor

– Lightly clamp the rotor with the clamping surfaces (h) of its lower section in a vice with protective jaws. Release locknut (b) on rotor cover (c) turning anticlockwise with socket wrench and remove rotor cover.

Take care not to damage bearings and bearing journals!

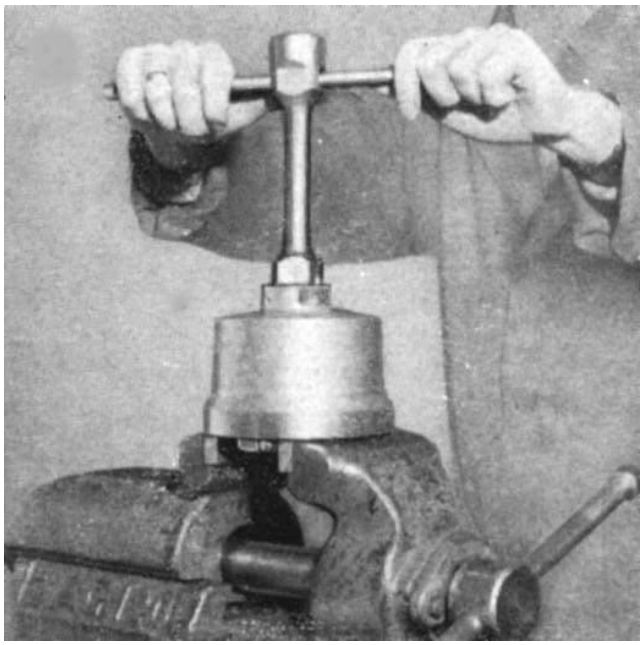


Fig. 3: Disassembling rotor

– Remove used paper sleeve (d) and dispose of it in accordance with regulations.

– Blow out jet nozzles (i) on rotor lower section (f) with compressed air.

Fig. 4: Blowing out nozzles

– Carefully clean all sealing surfaces, bearings and fits.

4.2 Assembling centrifuge

– Check rotor seal (g) and housing seal (k) for damage, replace as necessary.

– Check bushes in housing cover and housing lower section for wear.

Replacement of the bushes is recommended if:

a. The collar bush inner diameter in the housing is greater than 25.150 mm or the inner diameter of the bush in the cover is greater than 16.120 mm.

b. The bore in the housing collar bush is more than 25 µm out of round, or the bore in the cover bush is more than 25 µm.

c. The rated speed of the centrifuge has dropped by more than 20% (rated speed at 3 bar: 1500 rpm, minimum speed 1200 rpm; rated speed at 6 bar: 2400 rpm, minimum speed 2000 rpm).

When necessary, replace bushes as follows:

– Withdraw bush from housing lower section by gripping at at least 3 points on the lower face side.

– Remove plug from housing cover, then press out thrust ring and bush in housing cover using a mandrel (diameter 11 - 12 mm). For removing the bushes, expect to use a maximum force of approx. 2000 daN.

– Clean bores of dirt and remaining adhesive, and eliminate any burrs caused during removal.

– Degrease housing bores and outer diameters of the new bushes.

– Apply a suitable adhesive (e.g. Loctite 270) to the joints.

– Using a spindle press and an installation mandrel, press new bushes in vertically and screw plug with new sealing ring into cover (tightening torque 18 ± 2 Nm).

– Fit new paper sleeve (d) in rotor cover (c).

– The locking pin must be seated in the appropriate bore (see Fig. 5).

– Carefully fit the rotor cover over the rotor lower section (f). In so doing, turn the rotor cover on the axis of the lower section until the cast-in guide lugs in the cover engage in the appropriate recesses on the spindle of the rotor lower section (see Fig. 5).

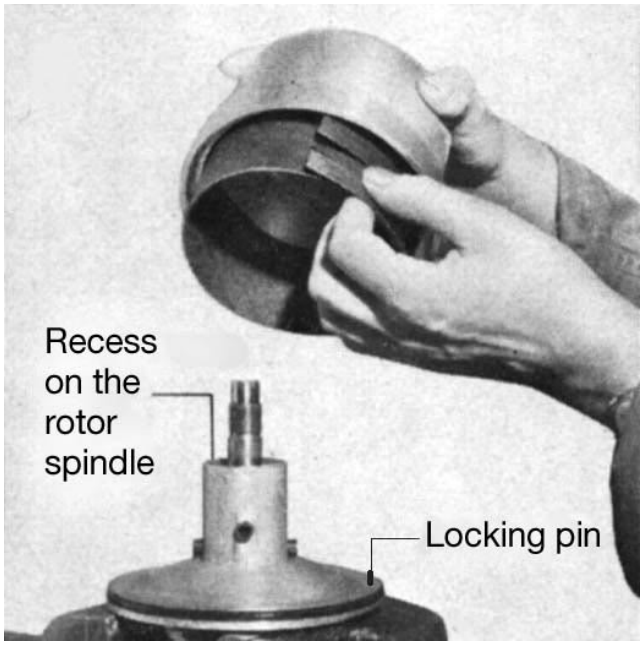


Fig. 5: Assembling rotor

– Tighten locknut (b) on rotor cover (c) to 80 ± 8 Nm.

– Insert complete rotor (b - i) into housing lower section and check ease of movement.

– Fit housing cover and tighten eye bolts (tightening torque 23 ± 2 Nm).

– After starting engine, check for leaks.