A 01.00 Fuel

A 01.10 Fuel tank

–

Preparations: –
Dismantling:
– Loosen drain plug **1** and drain off fuel or close off fuel supply pipe **2**.
– Remove (pull off) fuel hoses **2...3** from fuel filter and fuel tank.
– Unscrew respectively remove all retaining components in question, including fuel tank **4**.
– Remove fuel filter **5** with retaining components if necessary.

Inspection / repair:
– Visual inspection.
– Check fuel tank for cracks and/or any other damage.
– Check all rubber parts for ageing etc.
Maintenance according to instruction book!

Assembly:
– Re-assemble and re-connect fuel tank **4** and fuel filter **5** as well as fuel hoses **2...3**. Tighten all retaining items uniformly to obtain a stress free assembly of the fuel tank.
– Remove clamp tool and/or tighten drain plug **1**.

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A 02.00 Combustion air

A 02.10 Oil bath air filters

–

General:
The oil bath air filter is fitted by means of an intermediate flange which adapts from the triangle-type flange at cylinder head to the twin-screw flange of oil bath air filter. This flange also holds the glow plug in case a pre-heating system is fitted.

Preparations: –
Dismantling:
– Disconnect cable connection from glow plug if fitted.
– Remove in numerical sequence **1...9**. Studs and Hex.-head screw plug or glow plug may remain.
Don't tip oil bath air filter !

Inspection / repair:
– Visual inspection.
– Check air filter body for cracks and/or any other damage.
Maintenance according to instruction book!
NOTE:
Never „repair“ an oil bath air filter by welding/soldering etc.
It causes total damage to the part and may lead to engine failure!

Assembly:
– Assemble in reverse sequence **9...1**. Ensure the correct amount of gaskets are used and parts seal properly to avoid infiltrated air.
When fixing the oil bath air filter take care for correct position of kidney-shaped washers **3**, convex side faces retaining nuts **1**.
– Reconnect cable connection to glow plug if so fitted.

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A 02.00 Combustion air

A 02.20 Pre-cleaners; cyclons

 –

Version A 02.20.1
Cyclon fitted at bottom side inlet port.
Front inlet port and through holes plugged.

Preparations: –
Dismantling:
– Loosen hose clip and remove cyclon **1**.

Inspection / repair:
– Visual inspection.
– Check closing plugs for tightness.
Maintenance according to instruction book!
Don't use oily cleansers.

Assembly:
Place cyclon **1** and tighten hose clip.

Version A 02.20.2
Cyclon fitted to front side inlet port.
Bottom inlet port closed.

Preparations: –
Dismantling:
– Remove front cover **1** including cyclon system.Closing cap at bottom side remains.
– Remove in numerical sequence **2...5**.

Inspection / repair:
– Visual inspection.
– Check rubber elbow for material ageing, replace if necessary.
Maintenance according to instruction book!
Don't use oily cleansers.

Assembly:
– Assemble in reverse sequence **5...1**.

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A 04.00 Start mechanical / pneumatic

A 04.11 Starting handle supports

–

General:
Version A 04.11.1
Part without replaceable bushing.
Version A 04.11.2
Part with replaceable bushing.
ATTENTION !
Take care, a worn guiding shell can cause serious injuries.

Preparations: –
Dismantling:
– Remove in numerical sequence **1...3/4**.
NOTE:
Engines working under extremly dusty conditions should be equipped with a protection plate **4** which avoids access of dust to the contact area of camshaft seal ring.

Inspection / repair:
– Visual inspection.
– Check bore for wear and/or any other damage.
Version A 04.11.1
– In case bore is worn (oval) replace guiding shell.
Version A 04.11.2
– In case bore/bushing is worn (oval) replace guiding bushing **5**.

Assembly:
– Assemble in reverse sequence **4/3...1**.
Apply locking agent as specified!
Use starting handle to align guiding shell before tightening Allen screws.

A 04.12 Cranking claws

- 25 -

General:
Version A 04.12.1
Part is bonded into camshaft.
Version A 04.12.2
Parts fitted loose in camshaft.
ATTENTION !
Take care, a worn or damaged cranking claw can cause serious injuries.

Preparations:
– Remove guiding support if so fitted.

Dismantling:
Version A 04.12.1
– Weld (spots and arc-welding only) M8 nut onto crank jaw.
For removal of crank jaw use tool **- 25 -**
Protect area around camshaft to avoid any damage.
Version A 04.12.2
– Remove parts (pull) by hand in numerical sequence **1...3**.

Inspection / repair:
– Visual inspection.
Replace crank jaw in case of wear.
Assembly:
Version A 04.12.1
– Apply high strenght locking agent around location pin and insert (push) crank claw firmly in.
Version A 04.12.2
– Bring location groove in camshaft to TOP-position.
– Put location pin **3** onto crank jaw **2**.
– Insert parts together into bore
– Place and tighten Allen screw **1**.
Apply locking agent as specified!
– Assemble guiding support if so fitted.

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A 09.60 Low idle speed stabilization

- 5 - 30 -

General:
Several engine applications require a very precise speed governing also in the range of low idle, for example engines with hydraulic pumps in cold condition.
For this case the low idle speed stabilization is available.

Function:
– The main governor spring is approx. 1 mm shorter than the standard one so that it is deactivated at engine speeds below 1000 rpm.
– Governor lever **1** is working over the full speed range.
– The retainer spring **2** is connected to an adjustable lever **3** and works as governor spring at the speed range below 1000 rpm.
– The stabilization spring **4** is fitted to stabilize the overreaction of the governor lever when the speed control lever is turned back into „low“ position.
It can be adjusted by the eccentric disk **5**.
– The standard stop screw **6** is turned back a few threads to ensure it is out of function.

Basic adjustment:
– Turn screw **II** so that eccentric disc **5** is facing towards timing cover.
Flat surface at outer end of screw **II** is now parallel with timing cover.
– Turn screw **III** into a position that the stabilization spring **4** is slightly tuching the eccentric disc **5**.
This is the final position.
Lock screw **III** by tightening the counter nut.
– Turn screw **II** approx. 180° counter clockwise (Stabilization spring **4** now is forced as far as possible towards crankcase).
– Turn screw **I** so that lever **3** is facing vertical downwards (pin **7** is also in a vertical position).

Fine tuning:
(with engine running)
– Connect rev. counter **- 30 -**
– Set low idle speed to approx. 600 rpm.
If engine speed drops too far and engine stops, than turn screw **I** in direction „+“ (counter clockwise).
If such low speed can not be obtained turn screw **I** in direction „-“ (clockwise) or turn screw **6** back for some threads.
– Turn screw **I** slightly in counter clockwise direction until the aspired speed is reached and lock screw with counter nut.
– Turn screw **II** clockwise (use tool **- 5 -**) until the stabilizing spring is just touching the governor lever. This is indicated by an additional rise of the engine speed (max. 5 rpm).
Lock screw by tightening the counter nut.
– Finally seal all adjustment screws with sealing wax.

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A 15.00 Housings - flanges - adaptors

A 15.20 Adaptor housings

–

Preparations:
– Remove starter motor if so fitted.

Dismantling:
– Remove in numerical sequence **1...7** depending on kind of application.
Parting sheet **9** may remain.
NOTE:
Removal of parting sheet requires dismantling of flywheel **8**.

Inspection / repair:
– Visual inspection.
– Check housing for cracks or any other damage.

Assembly:
– Assemble in reverse sequence **9...1**.
– Assemble starter motor if so fitted.

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M 02.00 Crankshaft

M 02.20 Crankshaft gearwheel and stubshafts

- 12 - 14 -

General:
Crankshaft gearwheel respectively stubshaft are shrink fitted.

Preparations:
Ref.: M-Disassembly cross reference scheme.

Dismantling:
– Remove gearwheel **1** respectively stubshaft **2**.
  For removal use tool **- 14 -**

Inspection / repair:
– Check gearwheel or stubshaft for wear or any other damage.

Assembly:
– Put engine onto flywheel side (flywheel fitted) to avoid damaging of flywheel side thrust plate.
– Heat crankshaft gearwheel respectively stubshaft.
  In case heating is done on a heater plate put parts onto special heating insert **- 12 -** to obtain proper distribution of heat over the whole part.
– Strike crankshaft gearwheel respectively stubshaft onto crankshaft until final position using a plastic tip hammer.

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M 09.00 Pushrods / Protection tubes

- 3 -

General:
Pushrod tubes can be removed to replace the „O"-Rings in case of any oil leaks without removing the cylinder head.

Dismantling:
– Remove rocker shaft and rockers.
– Remove pushrods **1**.
– Release and move circlip **6** approx. 30 mm toward cyl.-head.
– Press pushrod tube unit **2** firmly down and remove (tilt) complete unit out of its seat position in cyl.-head.
The complete unit **2** may remain pre-assembled, respectively dismantled if necessary.

Inspection / repair:
– Check circlips for possible overstretching.
– Check pushrod caps for wear, seating or any other damage.

Assembly:
– Prepare pre-assembled protection tube **2**
Retaining ring **4** slightly V-shaped, convex side facing cyl.-head.
– Slide pre-assembled protection tubes firmly back into position, starting first at crankcase bore.
– Locate and fix protection tubes in the upper position in the cyl.-head.
For assembly use tool **- 3 -**
– Force i.e. press circlip **6** against spring load firmly down into final position in ring groove.
For assembly use open end wrench.
– Re-insert pushrods **1**.
Ensure proper position of pushrods in cam followers !
– Finish assembly.

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M 26.00 Cowling / Air duct

–

Preparations:
Ref.: M-Disassembly cross reference scheme.

Dismantling:
– Due to the different variants in connection with electric start, handstart, anti- or clockwise direction of rotation etc. take care which parts like adaptor housing or any other parts in connection with the cowling system are fitted to avoid any mix up.

Inspection / repair:
– Check sealing strips as well as all other rubber parts for ageing etc.

Assembly:
– All corresponding parts according to the respective variants are identified and listed in the appropriate spare parts list and have to be fitted accordingly.

NOTE:
Never operate an engine with an incomplete cowling system.
A loss of cooling air may cause engine failure !

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A 01.40 Fuel feed pumps

- 25 -

I. Fuel feed pump
General:
When connecting the fuel feed pump take care for arrangement of suction and supply hose.

Preparations:
– Disconnect fuel supply from fuel feed and injection pump.

Dismantling:
– Remove in numerical sequence **1 ... 3**.
NOTE:
When removing the upper nut, make sure that the stud **4** does not turn in the crankcase as it serves as the anchor pin for the governor lever retainer spring. If turning of the stud cannot be avoided, remove the spring from the pin. The front cover must be removed to remove the spring.
Ref.: Chapt. M 11.00

Inspection / repair:
– Visual inspection.
For further repair proceed as follows:
– Remove in numerical sequence **5 ... 14**.
Required only if irregularities such as poor suction / pumping action i.e. contaminated strainer or leaks have been noted.
– Check and replace all parts in question.

Assembly:
– Pre-assemble in reverse sequence **14...5**.
– Assemble in reverse sequence **3 ... 1**.
– Ensure actuating lever **16** is in bottom position and „O"-Ring **3** remains in its groove when assembling.
– After installation and a short test run, check the fuel system for leaks.

II. Fuel feed pump drive
General:
Models Z/U/C
Bushing **15** is replaced by the actuating lever **16**.
Models S/T
Plug **17** is replaced by the plug **18** with ring groove.

Preparations:
– Remove fuel feed pump.
– Remove timing cover.
Ref.: Chapt. M 11.00

Dismantling:
– Remove part **20/21** and lever **16**.
– Remove shaft **19**.
For removal use tool **- 25 -**
Plug **18** remains in crankcase.

Inspection / repair:
– Visual inspection.
– Check parts for wear and/or any other damage.

Assembly:
– Assemble in reverse sequence .
– Press in shaft **19** to a protrusion of 52 ± 0,5 mm.
Extractor thread must face front!Models **Z/U/C**
Ensure all gear timing marks match!
– Finish assembling.

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A 02.00 Combustion air

A 02.11 Dry type air filters

–

Version A 02.11.3
Fixation of filter element by front cover assembly.

Preparations: –
Dismantling:
– Disconnect cable connection from heater flange if so fitted.
– Remove in numerical sequence **1...11**.
– If necessary dismantle cover retaining assembly to replace sealing sleeve (rubber) between centering and front cover.

Inspection / repair:
– Visual inspection.
– Check filter element **2** and sealing strip around cover **1**.
Maintenance according to instruction book!

Assembly:
– Assemble in reverse sequence **11...1**. Take care for correct position of insulating flange in between, correct amount of gaskets and proper sealing of all parts to avoid infiltrated air.
– Reconnect cable connection to heater flange if so fitted.

Version A 02.11.4 (A 1 D...)
Fixation of filter element separately by retaining plate, flat washers and Hex.-nuts.

Preparations: –
Dismantling
– Disconnect cable connection from heater flange if so fitted.
– Remove in numerical sequence **1...15**.

Inspection / repair:
– Visual inspection.
– Check filter element **8**, „O“-Ring around retaining cover **11** and insulation plate **12**.
Maintenance according to instruction book!

Assembly:
– Assemble in reverse sequence **15...1**. Take care for correct position of insulating flanges in between, correct amount of gaskets and proper sealing of all parts to avoid infiltrated air.
– Reconnect cable connection to heater flange if so fitted.

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