

New Sulzer Diesel

**New Sulzer Diesel Ltd
Winterthur, Switzerland**

Description and Operating Instructions for Sulzer Diesel Engines ZAL40S

Installation / Vessel:

Type:

Engine No.:

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FOR PARTICULAR ATTENTION

This manual is put at the disposal of the recipient solely for use in connection with the corresponding type of Sulzer Diesel Engine.

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Before the operator attempts to use the engine or before maintenance work is undertaken, the Operating Manual or the Maintenance Manual respectively is to be read carefully.

To ensure the best efficiency, reliability and lifetime of the engine and its components, only original spare parts should be used.

It is to be ensured as well that all equipment and tools for maintenance are in good condition.

The extent of any supplies and services is determined exclusively by the relevant supply contract.

The data, instructions and graphical illustrations etc. in this manual are based on drawings made by **New Sulzer Diesel Ltd.** and correspond to the actual standard at the time of printing (year of printing is indicated on title page). Those specifications and recommendations of the classification societies, which are essential for the design, have been considered therein. It must be recognized that such data, instructions and graphical illustrations may be subject to changes due to further development, widened experience or any other reason.

This manual is primarily intended for use by the engine operating and maintenance personnel. It is assumed that it will always be at the disposal of such personnel for the operation of the engines and/or for the required maintenance work.

This manual has been prepared on the assumption that operation and maintenance of the engines concerned will always be carried out by personnel having the special knowledge and skill needed to handle in a workman-like manner diesel engines of the corresponding size, the associated auxiliary equipment, as well as fuel and other operating media.

Therefore, generally applicable rules, which may also concern such items as protection against danger, are specified in this manual in exceptional cases only. It is generally assumed that the operating and maintenance personnel are familiar with the rules concerned.

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New Sulzer Diesel
Limited

Winterthur
Switzerland

Listing of Groups

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CRANKSHAFT MAIN BEARING

The crankshaft main bearing is equipped with an upper bearing shell 6 and a lower bearing shell 6a. The upper and lower bearing shells are **not** identical and therefore not interchangeable.

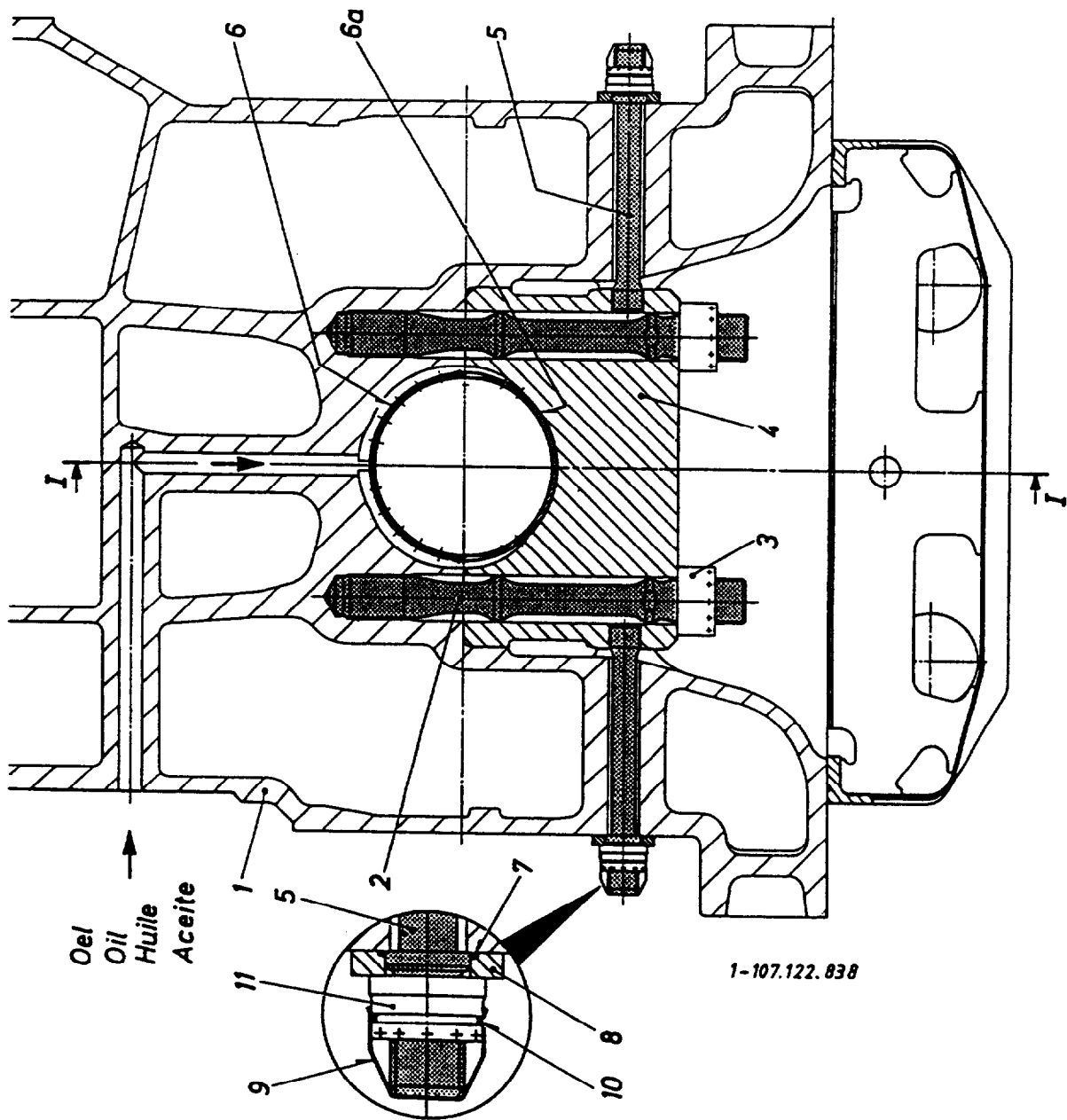
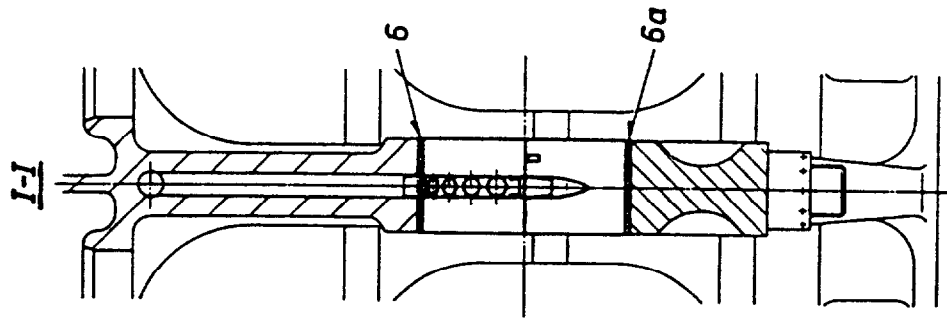
The upper bearing shells have several holes and a central groove through which the lubricating oil enters the bearing from the rear side. The lower bearing shells are completely even with the exception of a short oil inlet groove. The crankshaft main bearing studs are pre-tensioned hydraulically (please refer to the Maintenance Manual, sheet 1201).

Transverse tie rods screwed into the crankshaft bearing cap from each side are equally tightened by hydraulic pre-tensioning.

Damaged crankshaft journals can be reground up to a limited undersize, for which bearing shells with a smaller bore are to be used (please refer to the Maintenance Manual sheet 1201).

Key to Illustration 1201–20

1 Engine housing	6a Lower crankshaft main bearing shell
2 Crankshaft main bearing stud	7 O-ring
3 Round nut to item 2	8 Sealing disc
4 Crankshaft bearing cap	9 Protective cap
5 Transverse tie rod	10 O-ring
6 Upper crankshaft main bearing shell	11 Round nut for item 5



CRANKSHAFT THRUST BEARING

The crankshaft thrust bearing guides the crankshaft axially maintaining its designed position. The upper and lower bearing shell of the thrust bearing are identical. The same bearing shells are also used as the **upper** bearing shell for the **crankpin** bearing.

The lubricating oil reaches the load bearing parts of the thrust bearing through bores in the crankshaft leading from the first crank.

The thickness of the thrust ring halves determines the axial clearance of the crankshaft (please refer to the clearance table in the Maintenance Manual).

Undersize bearing shells

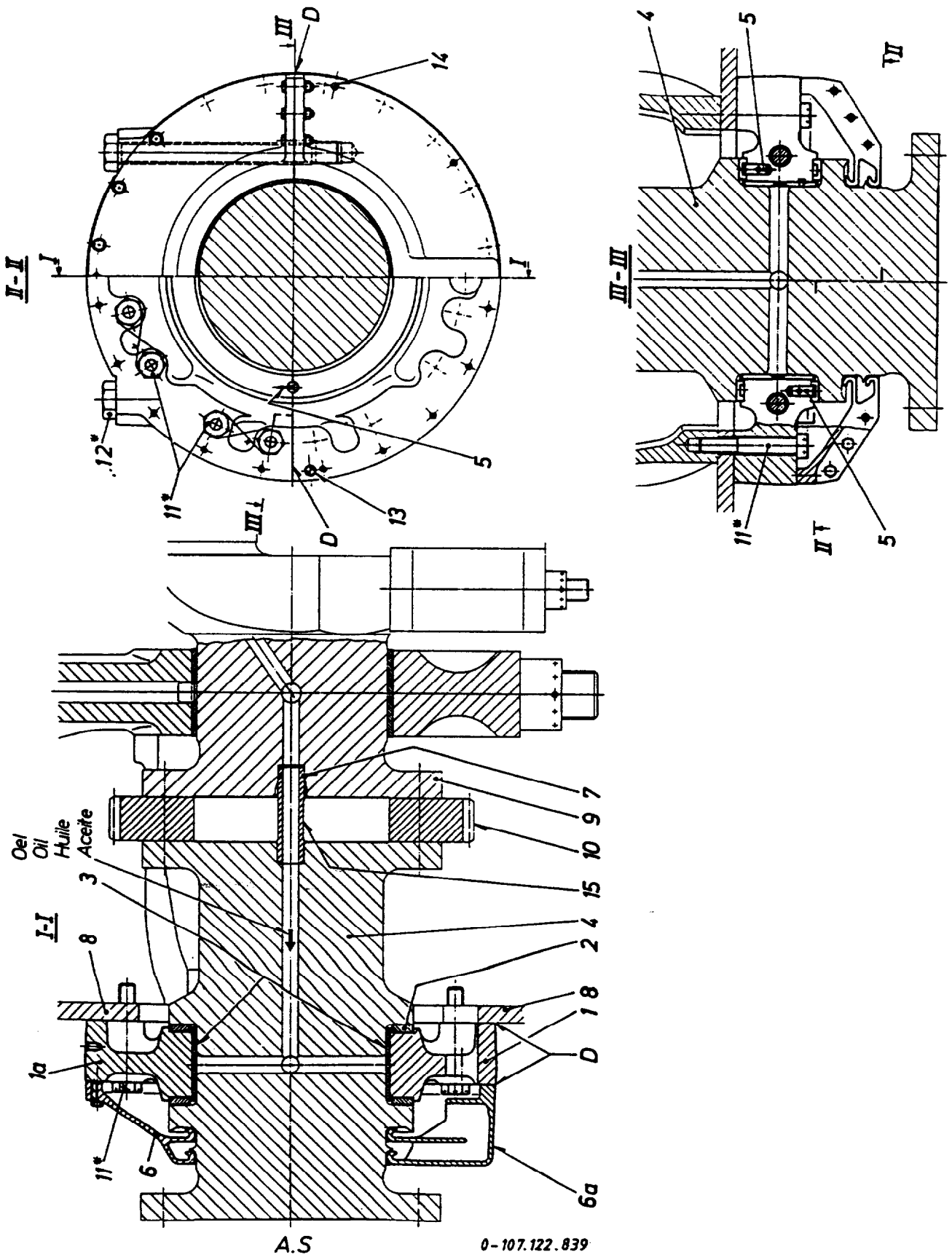
As it concerns the same shells as those in the crankpin bearing of the connecting rod, please observe the information given under group 3302 of the Maintenance Manual.

Oversize thrust ring halves

Should it become necessary to re-machine the shaft collars on the thrust bearing shaft, then the original axial clearance must be maintained by fitting thicker thrust ring halves (please refer to the corresponding table in group 1202 of the Maintenance Manual).

Key to Illustration 1202-20

- 1 Casing of thrust bearing - lower part
- 1a Casing of thrust bearing - upper part
- 2 Thrust bearing ring halves
- 3 Bearing shells
- 4 Thrust bearing shaft
- 5 Cylindrical dowel pin
- 6 Oil catcher - upper part
- 6a Oil catcher - lower part
- 7 O-ring
- 8 Engine end plate
- 9 Crankshaft
- 10 Camshaft driving gear wheel
- *11 Screw
- *12 Screw
- 13 Tapered dowel pin (long)
- 14 Tapered dowel pin (short)
- 15 Oil connecting piece
- AS Driving end
- D Utilize sealing compound
- * Tighten in accordance with instructions in the Maintenance Manual



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VENTING OF THE CRANK CASE

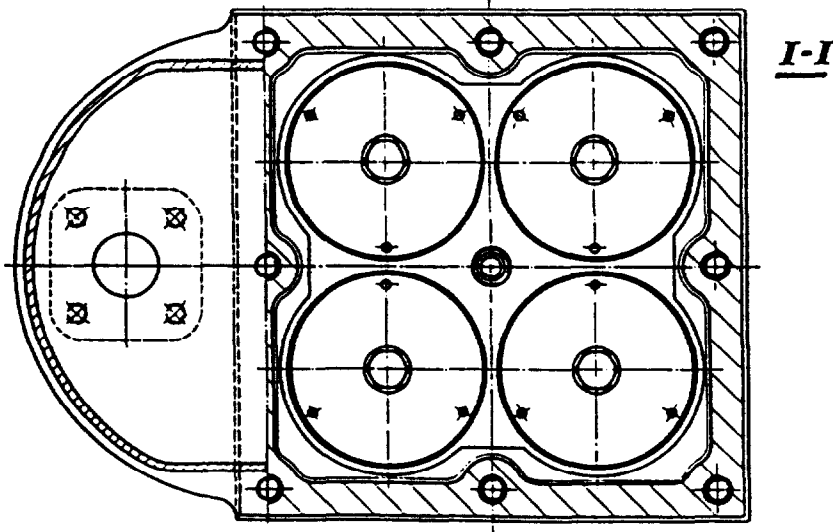
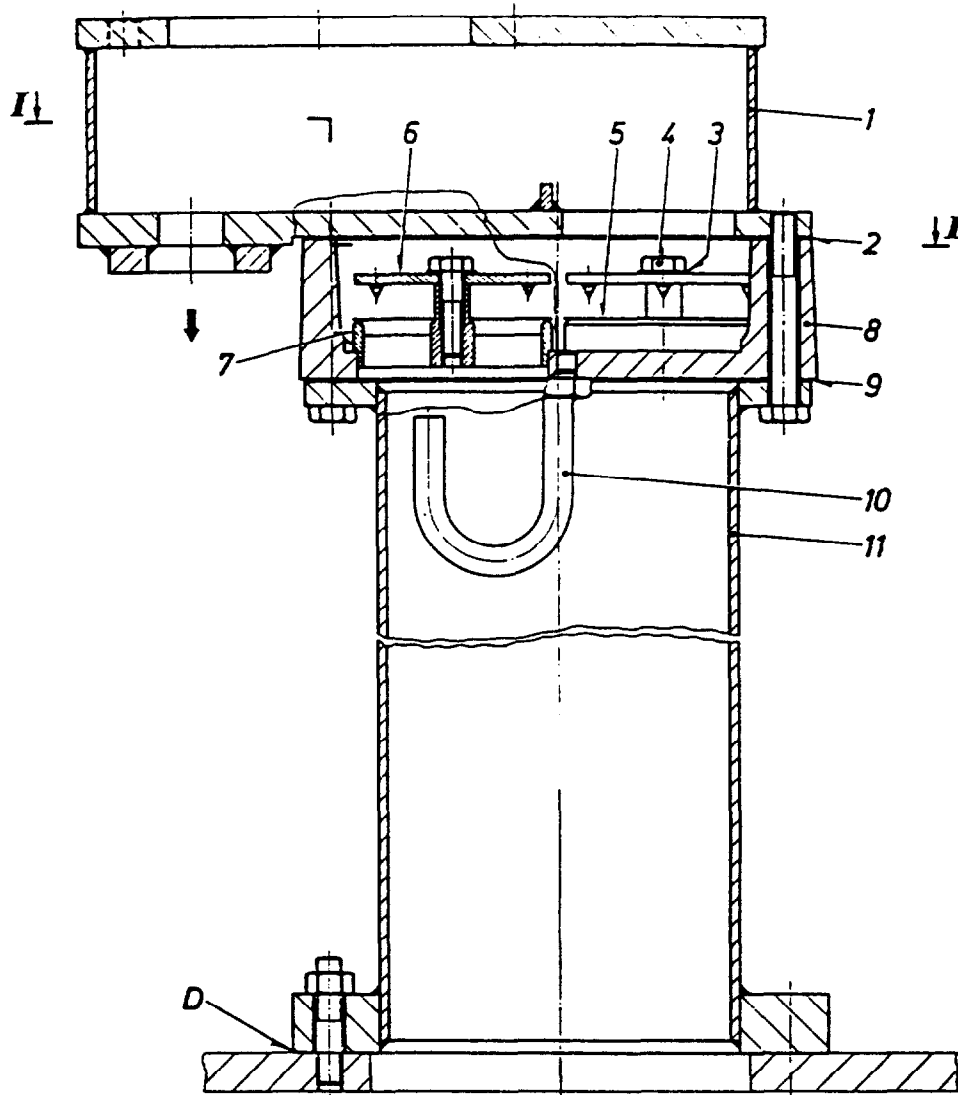
(Please refer to sheet 1601-20)

To prevent the build-up of pressure in the crank case the engine casing has been equipped with a venting device. It permits the oil mist to escape from the crank case but prevents the entry of fresh air into it.

Key to Illustration Fig. 1601-20

- 1 Water separator
- 2 Joint (1 mm)
- 3 Spring washer
- 4 Screw (fitted with LOCTITE)
- 5 Valve plate
- 6 Strike plate
- 7 Valve seat (fitted with LOCTITE No. 0675)
- 8 Valve casing
- 9 Joint (1 mm)
- 10 Drain pipe (oil)
- 11 Spacer pipe

- D Sealed with sealing compound
- B Connection for drain pipe
(condensate)



1 - 107.121.747

COVERS AND SAFETY VALVES TO
THE CRANKCASE

The safety (relief) valves or explosion flap valves are mounted to the covers 3 of the crankcase (see illustration 1603–20 Figs. 'A' and 'B'). The number of covers with safety valves as well as their arrangement is determined by the requirements of the classification societies and may therefore not be altered.

In case of a possible crankcase explosion the safety valve already opens at a differential pressure (interior/exterior) of 0.1 bar and allows the hot gases or flames to escape sideways. By the restoring force of the compression spring 9 the valve is immediately shut again by means of the spring carrier 8, thus shutting off the entry of fresh air into the crankcase and preventing further explosions.

If a crankcase explosion has been observed the engine must be stopped immediately. Do not open any covers to the crankcase until the engine has cooled down and allow no one in the vicinity of the safety valves. Later the cause of the crankcase explosion has to be found.

Depending on the engine equipment various makes of safety valve may be fitted on the engine.

The cover 3 must always be fitted with both feet 'F' at the bottom.

Key to Illustration 1603–20

- A Safety valve Make BICERI (explosion flap valve)
- B Safety valve Make HOERBIGER
- 1 Flame arrestor (A)
- 2 Flame arrestor (B)
- 3 Cover
- 4 Engine housing
- 5 Tubular joint
- 6 Washer
- 7 Screw M16
- 8 Spring carrier (flap)
- 9 Compression spring

