maag

industrial pumps

Part of Pump Solutions Group

A DOVER COMPANY

Disassembly & Reassembly

S Series
Twin Screw Pumps

Where Innovation Flows

www.maag.com

MAAG-14020-E-01

TABLE OF CONTENTS

INTRODUCTION

The following instructions have been divided into three sections to accommodate the different Twin Screw pump types: 2H, 2HE, 2HM, 2HC, 2HR, 2VE and 2VM.

All disassembled parts, such as gear wheels, spacer bushes, adjusting rings, etc., must be labeled immediately in order to avoid confusion during reassembly. After disassembling the screw pump, all parts must be cleaned thoroughly and checked to ensure that they are reusable. Before reassembly, the surfaces of the individual parts should be carefully cleaned and checked.

The following parts should not be reused for operational safety reasons:

- Flange Gasket
- O-rings
- Oil Seal

SAFETY PRECAUTIONS

This manual contains basic references that are to be observed during pump transportation, installation, operation and maintenance, and, therefore, should be kept as part of the permanent pump records and readily accessible as a reference to any person working or maintaining the pumping unit.

The instructions within this manual must be thoroughly reviewed in their entirety and fully understood prior to pump installation, operation or maintenance care.

These pumps have been designed for safe and reliable operation when properly used and maintained in accordance with the instructions contained within this manual. A pump is a pressure-containing device with rotating parts that can be hazardous. Failure to read and comply with installation, operation and maintenance instructions will void the responsibility of the manufacturer and may result in bodily injury or equipment damage.

NOTE: In addition to the Safety Precautions identified in this section, special safety information is included within proceeding chapters where appropriate.

Markings and Instructions on Pump Unit

Direct instructional references regarding direction of rotation, fluid-flow orientation, safety warning, etc., are clearly marked on the pump. Please observe and follow all indicated safety markings and instructions.

NOTE: Failure to observe safety references can result in the following dangers:

- Equipment failure
- Maintenance and service policies voided
- Environmental pollution due to hazardous-substance leakage
- Personal endangerment by subject of electrical, mechanical and chemical influences

Qualified Personnel & Training

All persons installing, operating, maintaining and inspecting the pumping unit must have the required qualifications for work to be performed. All instructions and safety markings must be observed, understood and adhered to by all personnel working on or around the pumping unit. If installation or operational knowledge is inadequate, training must be provided. The scope of the personnel responsibilities, competency and supervisory duties must be closely controlled by the customer.

Safety References for Customers

- All work performed on or around the pumping unit must be completed by qualified personnel.
- Machine components that are either hot or cold must be protected on-site to prevent personal endangerment.
- Safety shield on the pumping unit must not be removed from the machine while the pump is running.
- Leakage of hazardous media (i.e., toxic, flammable, explosive, etc.) must be collected in a way that no damage to personnel or environment occurs.
- If the pumped media is explosive, toxic or flammable, a warning or alarm device must be installed, pump casing must be well-ventilated and the operating site must be a no smoke/fire zone.
- To prevent electrical damage, all electrical devices must be safely protected, functional and controlled.

Pump Operating Parameters

Unless there is written admission by S Series, the pump must not be operated at higher parameters than specified. Adhering to these specifications prevents danger to personnel and equipment damage.

Pump Monitoring

Suitable measuring devices must be installed to inspect and control the pump during operation. Generally, pressure gauges are to be installed on suction and discharge lines near the pump.

SPECIAL TOOLS REQUIRED FOR DISASSEMBLY/REASSEMBLY

Please refer to the table below for the appropriate tools to be used during disassembly or reassembly of pump.

No.	Name	Qty.
1	Sleeve for Mechanical Seal	1
2	Inner Sleeve for Oil Seal	2
3	Outer Sleeve for Oil Seal	1
4	Bushing for Bearing	1
5	Set Bushing for Bearing	1
6	Dismantling Screw	2
7	Anti-Rotation Copper Pipe	1

DISASSEMBLY

NOTE: For part reference, please refer to the appropriate pump in Section 2 Cross-Sectional Diagrams.

Disassembly of Gear Box

See Figure 1. Unscrew drain plug (130), loosen air strainer (107) and drain lubricating oil from gear box (04). Collect the lubricating oil in a suitable container. Lift off gear box (04) after lock nuts (121) have been removed.

ATTENTION: If the pump has an end-side coupling half, disassemble before disassembling the gear box. Remove the key on the shaft end at this time.

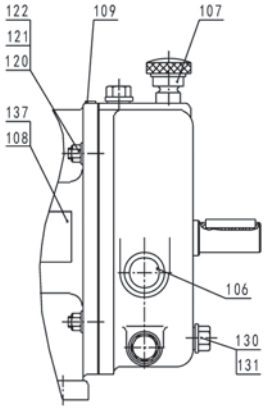


FIGURE 1

Disassembly of Pump Casing

Disassemble hexagon nut (118) with plain washer (119) of pump casing (01) and bearing housing (03). Disassemble pump casing (01) by tightening two forcing screws.

ATTENTION: Threaded holes are located in bearing housing (03).

Disassembly of Screws

See the applicable Cross-Sectional Diagram in Section 2; loosen bolt (141), disassemble pressing board (21) of screws and then disassemble left-hand screw and right-hand screw together. Remove key (135), screw adjusting ring (20) and mechanical seal adjusting ring (26). Next, label the dismantled items.

Disassemble the rotating and stationary ring unit of the mechanical seal. If space plate (50) is present, unscrew screw (146) and disassemble spacer plate (50).

ATTENTION:

- Immediately label all dismantled parts in order to avoid confusion during reassembly.
- If seal boxes (09) are in good condition, do not disassemble them! Otherwise, loosen socket screws (110) and disassemble the seal boxes respectively.

Disassembly of Timing Gears

See Section 2 Cross-Sectional Diagrams and Figure 2.

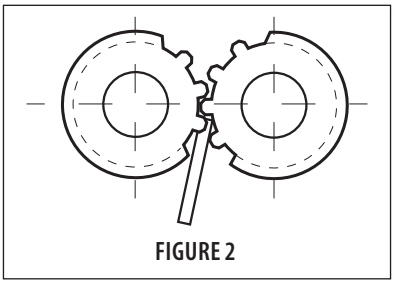


FIGURE 2

Jam the teeth of the gear wheels (13 & 14) with a copper sheet, loosen and remove the back-stop washer (129) and locking nut (128) on the driving shaft (05), remove bolt (115) and spring washer (116) on the driven shaft, use tools (such as a drag wheel tool) to remove gear (13 & 14), remove key (134). Loosen screw (126), remove bearing cover (11) and spacer (17). Be sure to label all disassembled components.

ATTENTION:

- Only when the replacement of new timing gears is required, bolts (112) can be unscrewed so that gear wheel (14) and gear sleeve (15) are separated. At this time, bolts (112) must be replaced.
- Mark the starting point of meshing before removing the timing gears.
- Immediately label all dismantled parts in order to avoid confusion during reassembly.

Disassembly of Bearings

See Section 2 Cross-Sectional Diagrams.

Affix the appropriate-sized auxiliary tool on the side of the screw sleeve that is on the shaft (05 & 06), use special tool to hit the auxiliary tool, hit out the shafts (05 & 06) from bearing housing respectively.

Disassemble bearings (101 & 102) and internal, external spacer bushing (18 & 19) from the driving and driven shafts (05 & 06). Next, label the dismantled items.

ATTENTION: Immediately label all dismantled parts in order to avoid confusion during reassembly.

REASSEMBLY

NOTE: For part reference, please refer to the appropriate pump Cross-Sectional Diagrams; see Section 2 for pump diagram.

Install O-rings (103) and oil seal (104) on sealing box (09). Fasten sealing box (09) to bearing housing (03) with screw (110). (If spacer plate (50) is present, fasten sealing box (09) to spacer plate (50) and then fasten both of them to bearing housing).

Install bearings (101) onto driving and driven shafts (05 & 06), and then strike outer ring of the bearing (101) with appropriate tool, insert them into driving (shaft) and driven (shaft) bearing bores of bearing housing (03).

In sequence, assemble the internal and external spacer bushings (18 & 19) and the bearings (102) to driving and driven shafts (05 & 06) with appropriate tools.

Tighten bearing cover (11) onto bearing housing (03) with screws (126).

Assemble the labeled stationary ring of mechanical seal into the sealing box (09) and rotating ring of mechanical seal onto driving and driven shafts (05 & 06) at the original location.

Install the labeled mechanical sealing adjustment ring (20) and screw sleeve adjustment ring (26) onto the driving and driven shafts (05 & 06) according to the original location marked during disassembly.

Position the screws (07 & 08) onto the driving and driven shafts (05 & 06) by the key (135). Use bolt (141) and spring washer (142) to push the plate (21) allowing the screws (07 & 08) to be located on the driving and driven shafts (05 & 06).

Place the gasket between bearing housing (03) and pump casing (01), secure with bolts (117), nuts (118) and flat washers (119).

Individually mount spacer bushings (17) on shafts (5 & 6) and insert key (134) onto shafts. Mount gear wheels (13 & 14) on shafts (5 & 6), fasten gear wheel (13) to driving shaft (05) with lock nuts (128) and lock washers (129). Next, mount the pressing board (16) on the driven shaft, fasten with spring washers (116) and screw bolts (115).

Fasten gear box unit (04) and gasket (28) to bearing housing (03) with stud screw bolts (120), screw nuts (121) and flat washers (122).

Fasten drain screw plug (130), open feed screw plug and pour clean gear oil. For oil level reference, please see Figure 3.

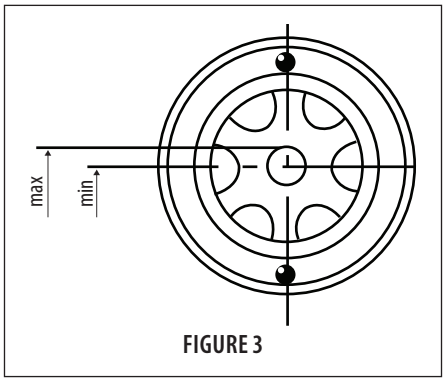
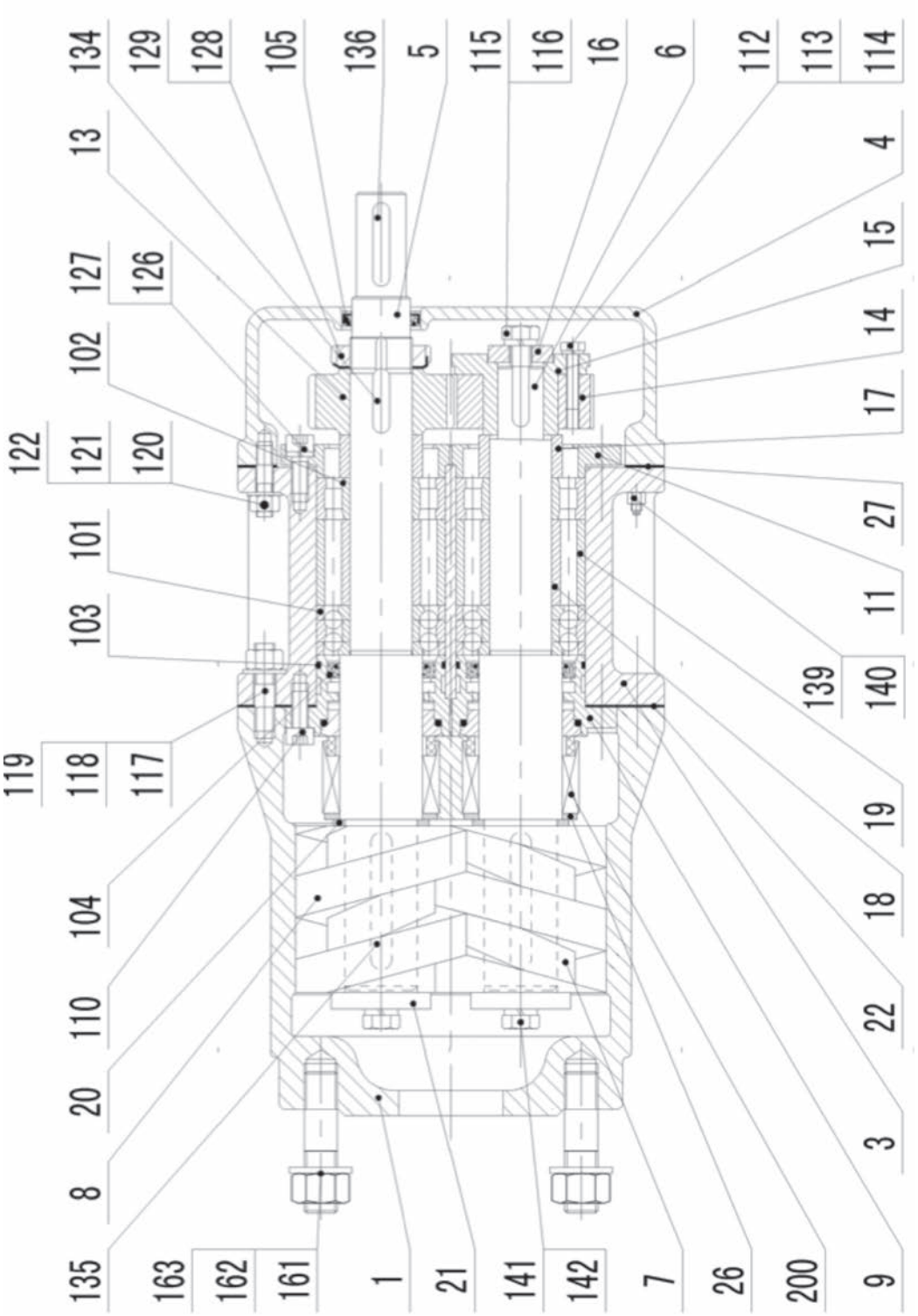


FIGURE 3

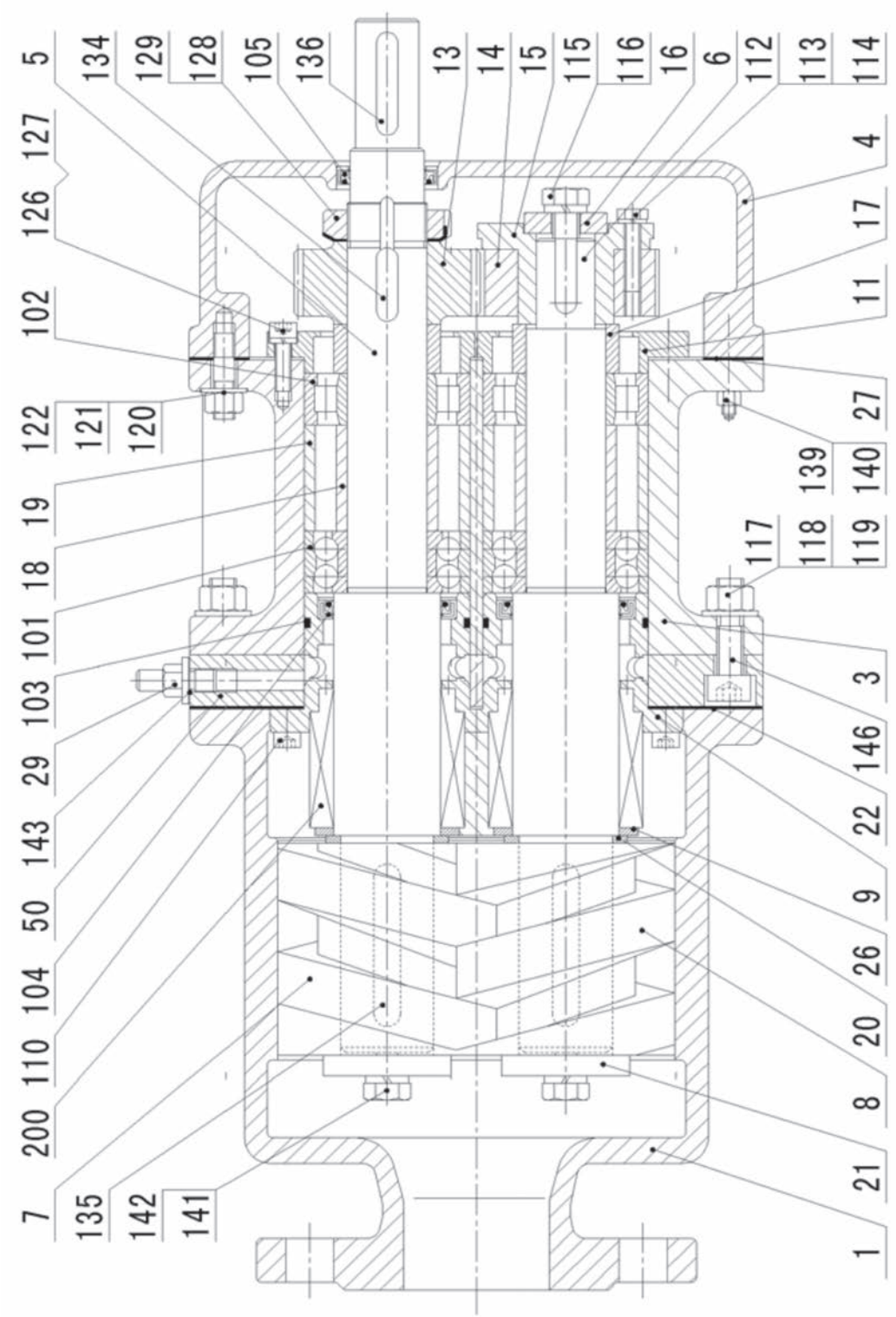
CROSS-SECTIONAL DIAGRAMS

2H...B/F PUMPS



CROSS-SECTIONAL DIAGRAMS

2H...G PUMPS



DISASSEMBLY

NOTE: For part reference, please refer to the appropriate pump cross-sectional diagram; see Section 3 for pump diagram.

Disassembly of Pedestal

If pedestal (45) is present continue with the following instructions:

Remove screw bolts (120), hexagon nuts (121) and spring washer (122) that connect pump casing (01) and pedestal (45). Next, remove pedestal.

Disassembly of Back Bearing Housing

Loosen hexagon nuts (118) and washer (119) that connect the pump casing and the back bearing housing. Next, remove the back bearing housing.

ATTENTION: Threaded holes are located on the back bearing housing.

Disassembly of Back Bearing

Loosen bolts (115), remove spring washer (116) and end plate (40). Remove bearing (102) from the driving and driven shaft by a pulling device. Remove spacer bushings (16 & 17).

ATTENTION: Immediately label all dismantled parts in order to avoid confusion during reassembly.

Dismantle the Bearing Cover

Remove the lubricating pipe (400), next loosen bolts (126) and spring washer (127). Remove the front bearing covers (11 & 12). Remove O-ring (103) from bearing cover (11 & 12). Next, remove the stationary mechanical seal ring from the driving shaft bearing cover (11).

Remove the rotating ring and O-ring, loosen the set screw, remove the rotating casing, remove the adjustable ring (19) from the driving shaft and label them appropriately. Loosen the round nut (128) and remove tab washer (129). Loosen the bolt (115) and remove the spring washer (116) and end plate (40) that are located near the front bearing.

ATTENTION: Place disassembled mechanical seal in a secure place to avoid damage. Immediately label all dismantled parts in order to avoid confusion during reassembly.

Disassembling Front Bearing Housing

ATTENTION: Before proceeding with disassembly instructions, first stop the drive shaft from moving axially.

Perform operations in the non-driving direction of the pump in order to fix the drive shaft axially. Install a metal plate on the driving and driven shafts end with bolts (115) and end plate (40). The metal plate contacts with the pump casing in order to stop the shaft from moving axially.

Remove the front bearing housing assembly (including front bearing housing (02), front bearing (101), etc.) from shafts with two dismantling screws. Remove the adjustable ring from the driven shaft and label appropriately to avoid confusion during reassembly.

Disassembly of Timing Gears

Remove gears (13 & 14) with the appropriate pulling mechanism from shafts (05 & 06) separately. Remove key (134).

Disassembly of Bearing Housing Unit

Disassembly of Front Bearing: Remove hexagonal bolt (110) and spring washer (111). Next, remove positioning bearing cover (09 & 10) from the front bearing housing. Remove front bearing (101) from front bearing housing with the appropriate tools.

Disassembly of Back Bearing: Remove screw (140), spring washer (141) and back-positioning bushing (32). If necessary, pull the shaft assembly from pump casing, including shafts (05 & 06) and screws (07 & 08).

REASSEMBLY

NOTE: For part reference, please refer to the appropriate pump Cross-Sectional Diagram; see Section 3 for pump diagram.

Push front positioning bearing cover (09) into front bearing housing (02) and fasten with bolts (110) and spring washer (111) to form front bearing housing assembly.

Push positioning bushing (32) into back bearing housing (03) and fasten with screw (140) and spring washer (141) to form back bearing housing assembly.

Insert O-rings into driving and driven shaft bearing cover (11 & 12). Mount mechanical sealing stationary ring and O-ring into drive shaft bearing cover to form drive shaft bearing cover assembly.

Affix the twin shaft assembly together and insert into the appropriate mounting holes.

Mount key (134) into driving and driven shafts assembly separately. Next, mount the timing gears into the drive shaft together in accordance with the meshing position marked during disassembly.

ATTENTION: The meshing position must be in accordance with the position marked during disassembly.

Mount driving spacer bushing (16) and driven spacer bushing (17) separately.

Next, mount back bearing (102) onto shafts (05 & 06), then tighten the end plate (40) with the bolt (115) and spring washer (116).

Mount front bearing housing assembly and gasket (22) onto pump casing surface and fasten with double-ended studs (117), hexagonal nut (118) and plain washer (119).

Lock this bearing with round nut (128) and tab washer (129). Place mechanical seal adjustable ring (19) onto driving shaft (05), mount the rotary casing, O-ring and rotary ring of the mechanical seal. Fasten the assembly of driving shaft bearing cover into the front bearing housing (02) with bolts (126) and spring washer (127).

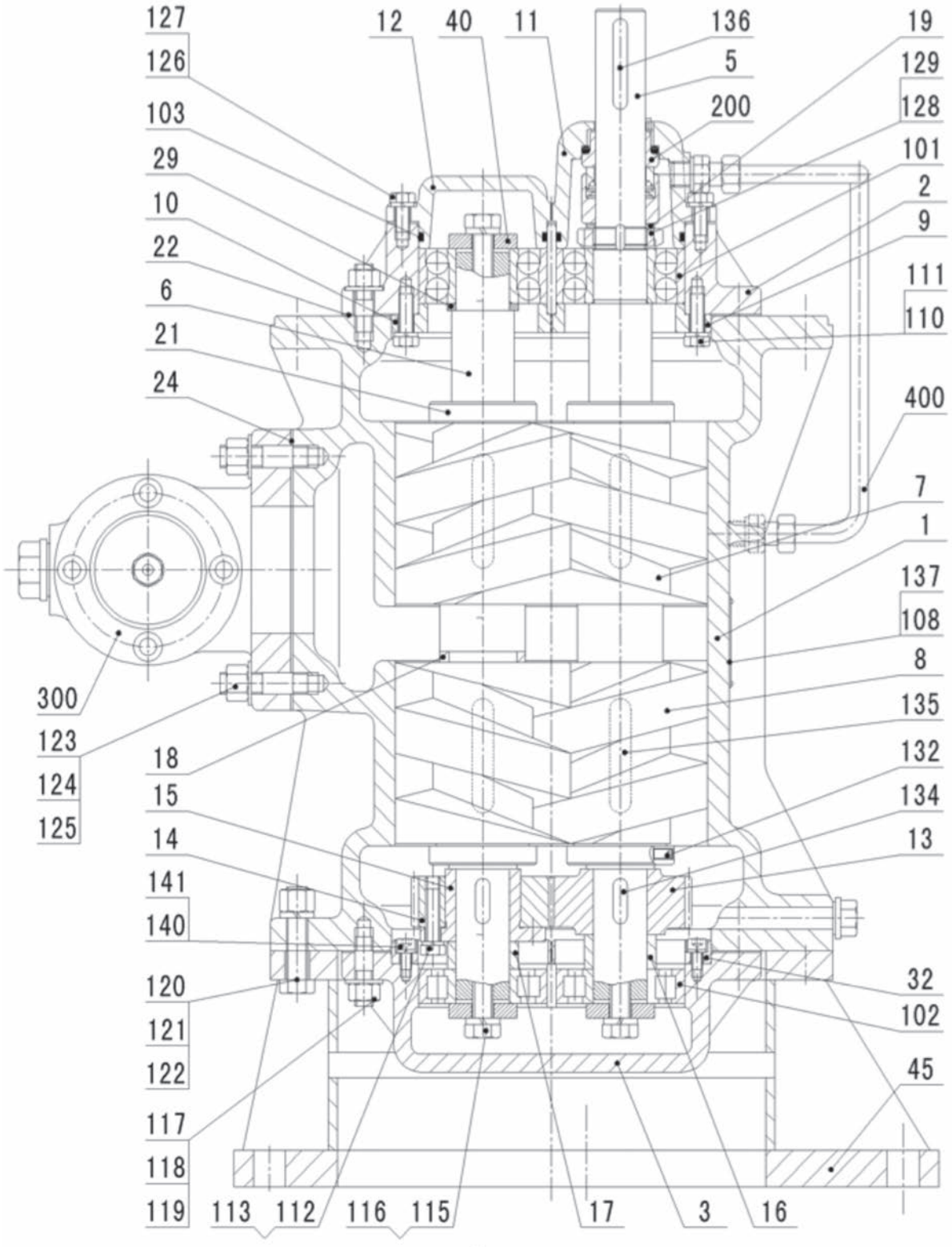
Install the adjustable ring (29) of bearing (which was labeled during disassembly) onto driven shaft (06) and push bearing (101) with the appropriate tool. Fasten the assembly of bearing cover (12) into the front bearing housing (02) with bolts (126) and spring washer (127).

Fasten back bearing housing (03) and gasket (22) onto pump casing (01) with double-ended studs (117), plain washer (119) and nuts (118).

If applicable, mount pedestal (45) onto pump casing (01) with bolts (120), nuts (121) and spring washer (122).

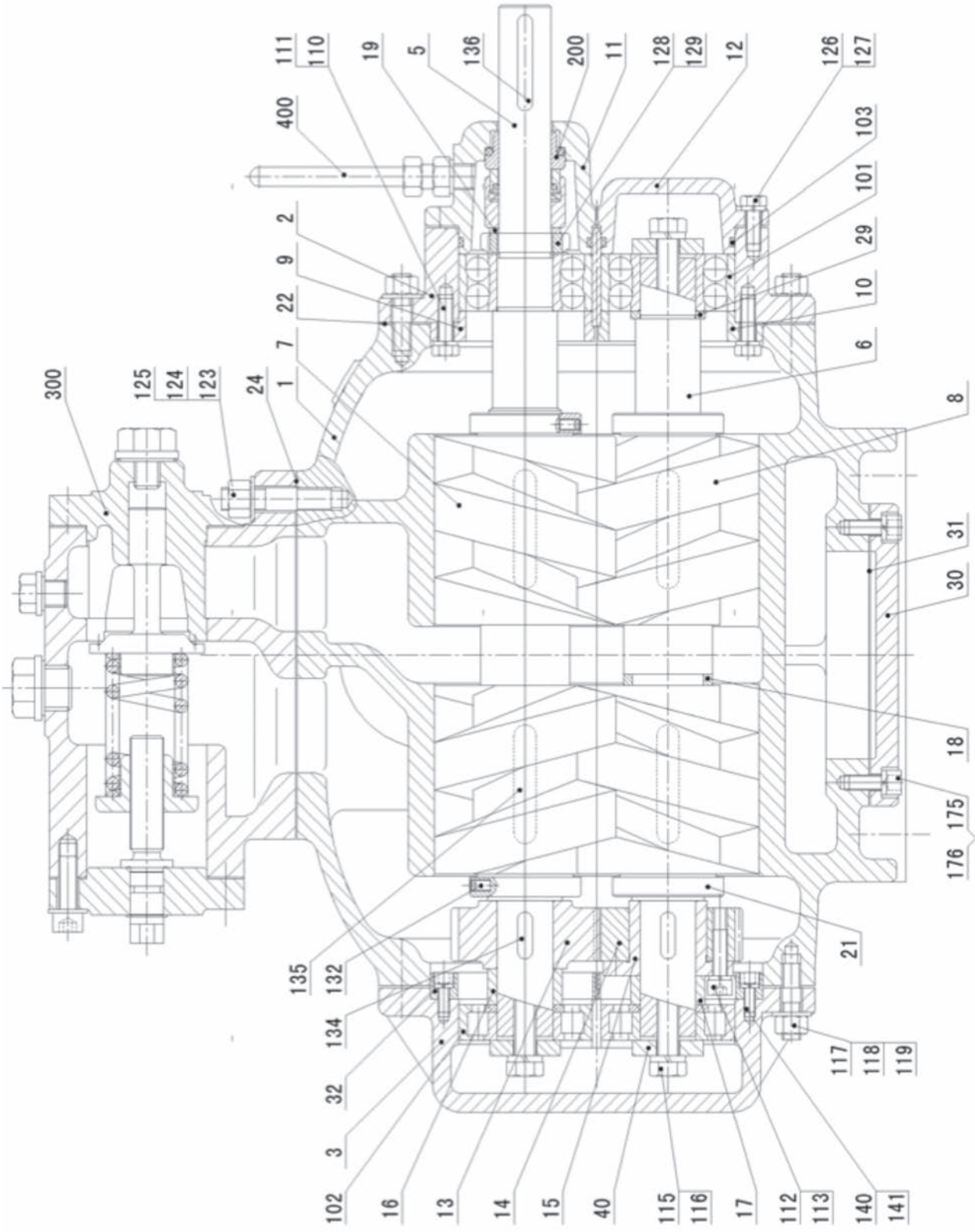
CROSS-SECTIONAL DIAGRAMS

2VE PUMPS



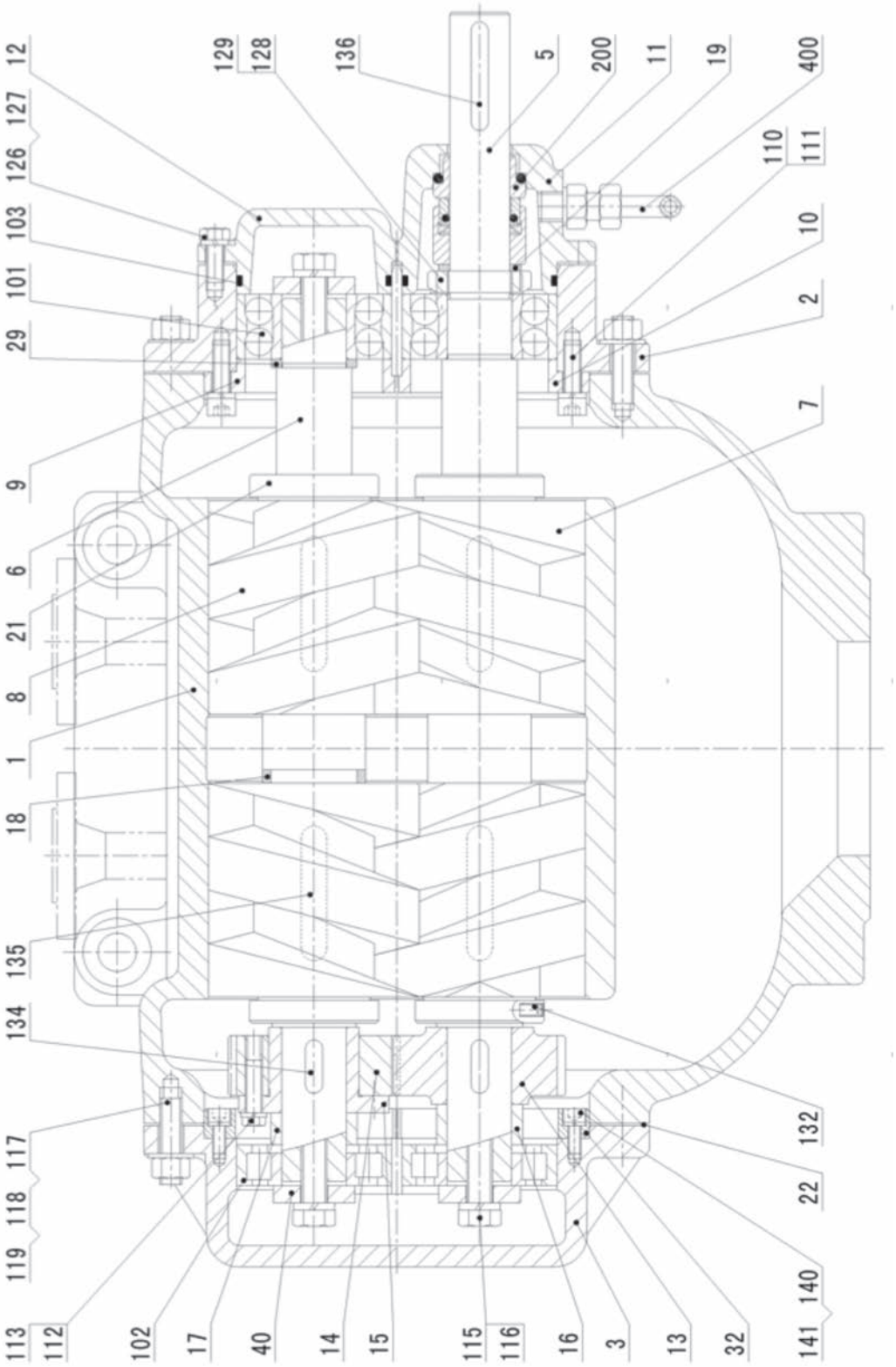
CROSS-SECTIONAL DIAGRAMS

2HE...A PUMPS



CROSS-SECTIONAL DIAGRAMS

2HE...B PUMPS



DISASSEMBLY

NOTE: For part reference, please refer to the appropriate pump Cross-Sectional Diagram; see Section 4 for pump diagram.

Disassembly of Bottom Foot

If bottom foot is present, please perform the following disassembly instructions:

Remove hexagonal bolt (160), nuts (161) and flat washers (162) from bottom foot (45) that is connected to pump casing (01). Next, remove bottom foot (45).

Disassembly of Gear Box

See Figure 5. Remove drain screw plug (130) and gasket (131), open air filter (107) and drain lubricating oil from gear box (04).

Collect the lubricating oil in an environmentally safe container.

Install drain screw plug (130) and gasket (131) on gear box (04).

Remove gear box (04) once nuts (121) and flat washers (122) have been removed.

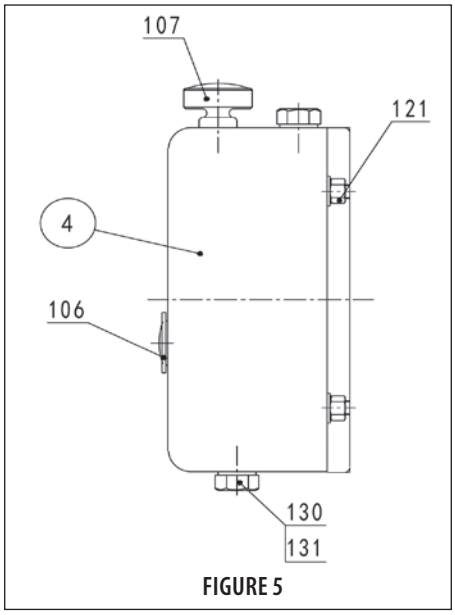


FIGURE 5

Disassembly of Timing Gears

See Figure 6. Jam the teeth of the gear wheels (13 & 14) with a copper sheet.

Remove bolt (115), spring washer (116) and end plate (16).

Remove gear wheels (13 & 14), keys (134) and space bushing (17).

Next, label the dismantled items.

ATTENTION:

- Only when the replacement of new timing gears, new shafts or new screws is required, bolts (112) can be loosened and the gear wheel (14) and gear sleeve (15) can be separated. In case of reassembly, normally, the removed bolts (112), spring washers (113) and flat washers (114) must be replaced.
- Mark the starting point of meshing before removing the timing gears.
- Immediately label all dismantled parts in order to avoid confusion during reassembly.

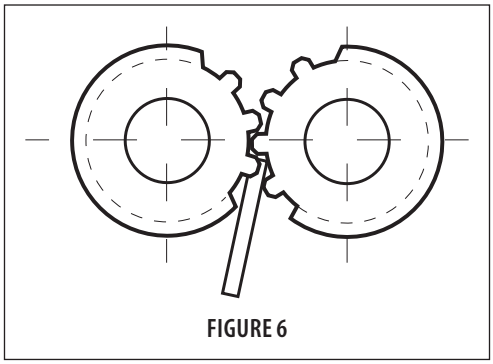


FIGURE 6

Disassembly of Bearing Housing (Driven-Side)

Remove hexagonal nuts (118) and flat washers (119) from rear bearing housing (03). By two forcing screws, remove rear bearing housing and rear bearing (102) together from the shaft. The forcing screw hole is in bearing housing (03).

ATTENTION: Do not damage the stationary ring of mechanical seal!

Remove the stationary ring unit and O-rings from sealing box 09. Loosen screws (110) and spring washers (111), remove sealing box (09) from rear bearing housing (03) by forcing screw and removing oil seal (104).

Remove inner spring clip (133) using a caliper. Reverse inner rim of rear bearing 180° and reinsert it into rear bearing (102), hit the inner rim of the bearing with a copper rod gently, remove the outer rim unit of bearing (102) and remove the outer adjusting ring (20) for the bearing housing.

ATTENTION: Immediately label all dismantled parts to avoid confusion during reassembly.

Disassembly of Bearing Covers

Tighten rear bearing housing (03) to pump casing (01) by two nuts (118), install gear (13), space sleeve (17) onto shaft (05), let gear flank contact bearing housing flank, tighten the other flank of gear with end plate (16) and bolt (115) in place to prevent the axial movement of driving and driven shaft.

Loosen the set screw in the coupling of pump side, pull the coupling off driving shaft with tools, remove key (136).

Loosen bolts (126), spring washer (127) and remove bearing covers (11 & 12). Next, remove O-rings (103) from bearing covers (11 & 12) and oil seal (105) from bearing cover (11).

If applicable, loosen set screws (138) and remove shaft sleeve (25).

Loosen locking washers (129) and locking nuts (128) from driving shaft (05). Next, loosen locking washers (129) and locking nuts (128) from idle shaft (06).

Disassembly of Bearing Housing (Driving-Side)

ATTENTION: Before proceeding with disassembly instructions, first stop the drive shaft from moving axially.

Remove hexagonal nuts (118) and flat washers (119) from driving side bearing housing (02) that is connected with pump casing (01). Using two forcing screws, remove driving side bearing housing (02) unit (together with the bearing 101) from shafts. The forcing screw hole is in front bearing housing (02).

ATTENTION: Immediately label removed adjusting ring in order to avoid confusion during reassembly.

Loosen bolt (115), remove space sleeve (17) and gear (13), loosen nut (118) and remove rear bearing housing (03).

Remove the stationary ring unit and O-ring of mechanical seal from sealing box (09).

Loosen screws (110) and spring washers (111) on sealing box (09), then remove sealing box (09) from front bearing housing (02 or 03) with forcing screw, remove oil seal (104). Hit bearing (101) out from the front bearing housing (02) with copper rod gently. Remove the front bearing adjusting ring (20).

Remove the rotating ring unit of mechanical seal, remove adjusting ring (19) of mechanical seal.

ATTENTION: Immediately label adjusting ring (19) of mechanical seal in order to avoid confusion during reassembly.

Pull out the shaft unit (05 and 06) with screw (07 and 08) from pump casing (01).

REASSEMBLY

ATTENTION: In order to facilitate the assembly of the oil seal (104) and avoid damage during assembly, S Series suggests the conical installation bushing for oil seal (see Figure 7), to achieve the gradual transition from a small diameter to a bigger diameter.

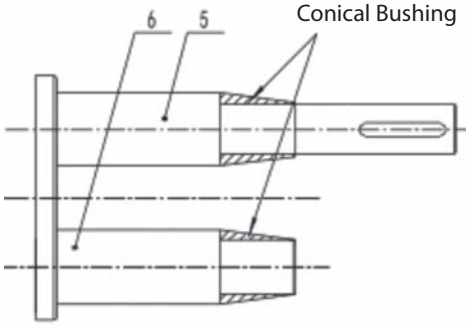


FIGURE 7

Mesh the shaft assembly unit (05 & 06) together and place them into the 8-shaped hole of pump casing (01) in the proper, original position.

Install the mechanical seal adjusting ring (19) to driving and driven shaft (05 & 06) at the original position.

Separately fasten sealing box units (09) and gasket (27) to bearing housings (02 & 03) with screws (110) and spring washers (111), install oil seal (104) to bearing housings (02 & 03) so that the front and rear bearing housing unit is created.

ATTENTION: The lip of the oil seal deviates from the atmospheric side.

Install O-ring (103) into the driven shaft bearing cover (12) to form driven shaft bearing cover unit.

Install O-ring (103) and oil seal (105) on driving shaft bearing cover (11) to form driving shaft bearing cover unit.

According to Figure 7, install conical installation bushing for oil seal, tighten front bearing housing unit (02) and gasket (22) to pump casing (01) with stud screw (117), flat washer (119), nut (118), and then remove conical installation bushing for oil seal.

Insert double-row ball bearing (101) and fasten it on the driving shaft (05) with locking nut (128) and locking washer (129).

Insert driving shaft bearing cover unit (11) into bearing housing (02), tighten with bolts (126) and spring washers (127) to front bearing housing (02).

Insert adjusting ring (20) into the bore of driven shaft bearing housing (02). Or, install the adjusting ring (29) on the driven shaft.

Next, insert double-row ball bearing (101) and fasten it on the driven shaft (06) with locking nuts (128) and locking washers (129). Then, install driven shaft bearing cover (12) unit to the bearing housing (02), tighten with screws (126) and spring washers (127).

According to Figure 8, install two conical installation bushings for oil seal on the no-driving side of the driving and driven shaft (05 & 06). Install gasket (22). Tighten rear bearing housing unit (03) to pump casing (01) with stud screw (117), flat washer (119), nut (118) and remove conical installation bushings for oil seal.

Install the previous adjusting ring (20) and bearing (102) into rear bearing housing (03), then install inner C-clip (133).

ATTENTION: When installing the cylinder roller bearing with curb-side on inner ring, the curbside must be on the side farthest away from pump.

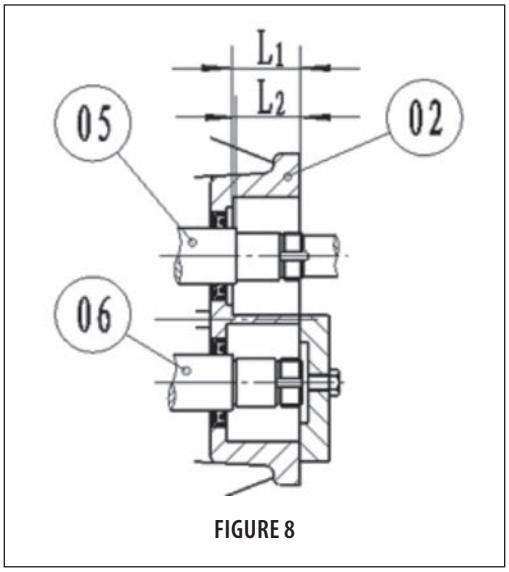


FIGURE 8

Install space sleeve (17) on driving and driven shaft (05 & 06). Install key (134) on driving shaft (05); install driving gear wheel (13) on driving shaft (05); install end plate (16), spring washer (116) and tighten with bolt (115). By the meshing point between gear wheel (13) and (14), install driven gear wheel unit (14); install key (134) on driven shaft (06); install end plate (16), spring washer (116) and tighten with bolt (115).

Install stud screws (120) and oil glass (106) on gear box (04) to form gear box unit. Next, install the gear box unit and gasket (28) onto rear bearing housing (03). Tighten with stud screw (120), nuts (121) and flat washers (122).

Fasten drain screw plug (130) and pour lubrication oil into gearbox. Please reference Figure 9 for proper oil level before tightening screw plug (140) with flat washer (141).

NOTE: If using bottom foot (45), fasten the bottom foot to the pump casing (01) with hexagonal bolt (160), nuts (161) and spring washers (162).

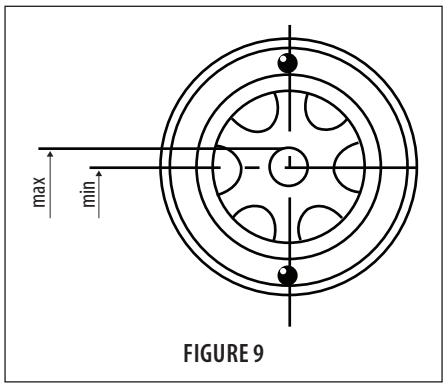
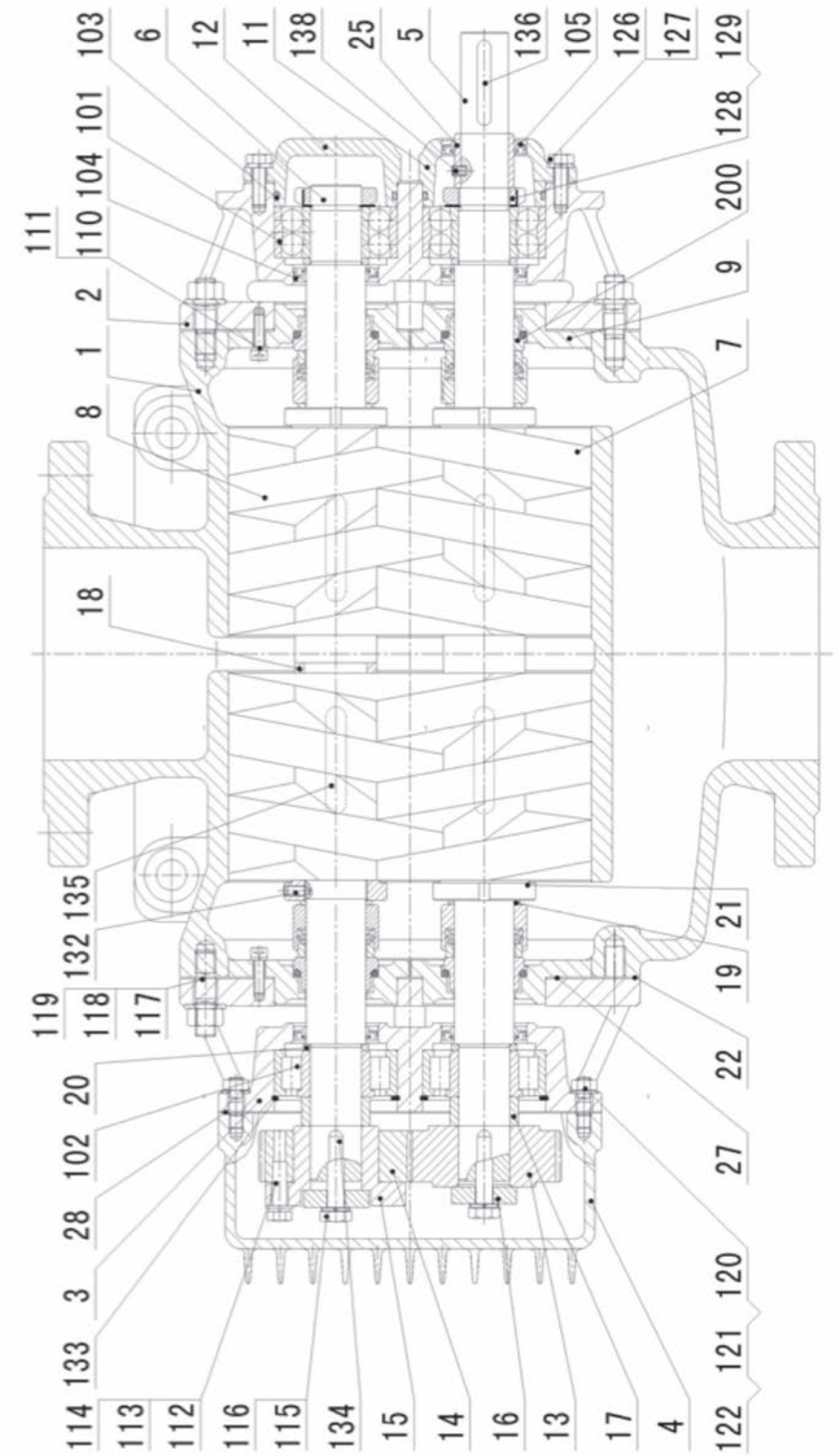


FIGURE 9

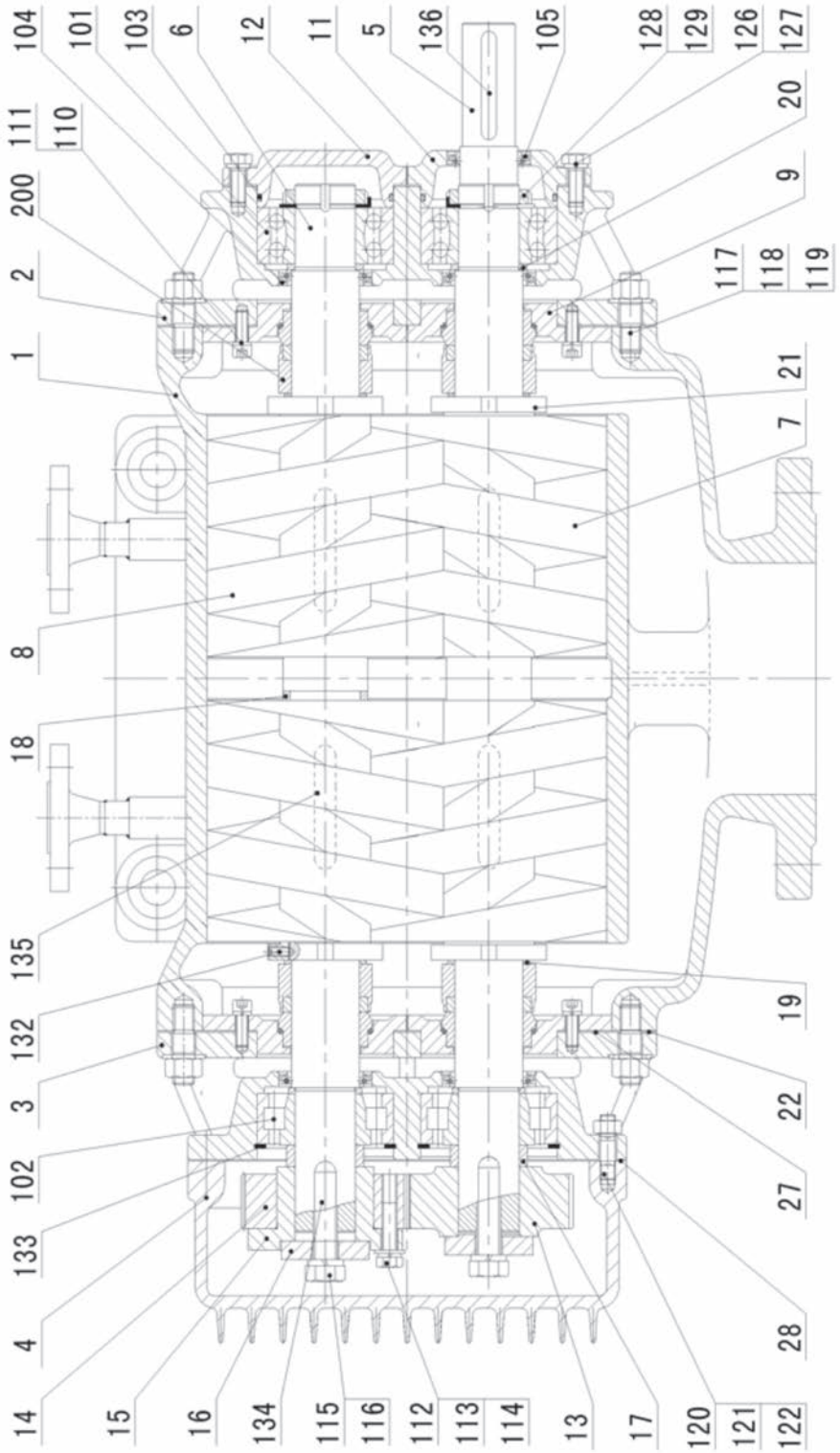
CROSS-SECTIONAL DIAGRAMS

2HC...AP PUMPS



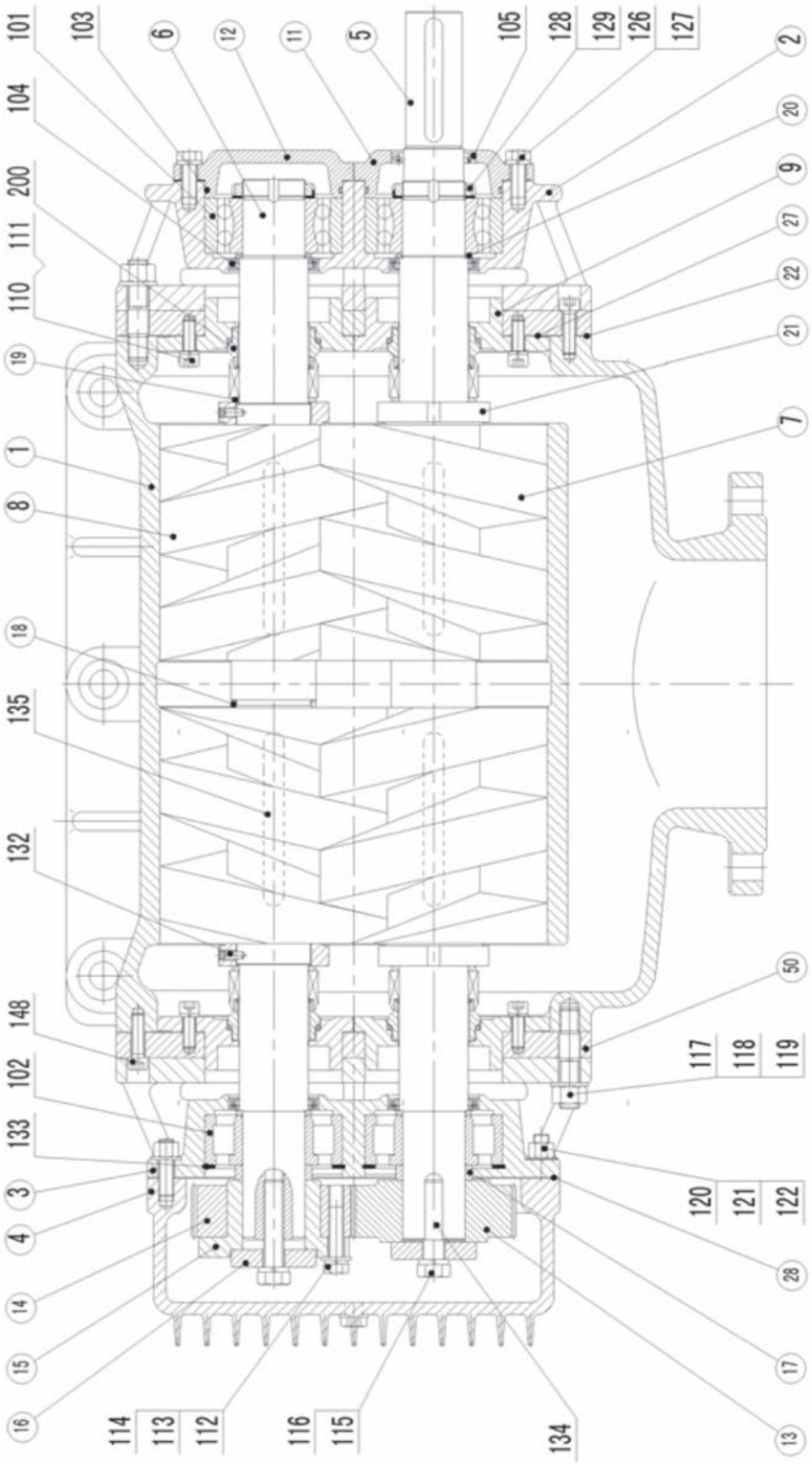
CROSS-SECTIONAL DIAGRAMS

2HC...BP PUMPS



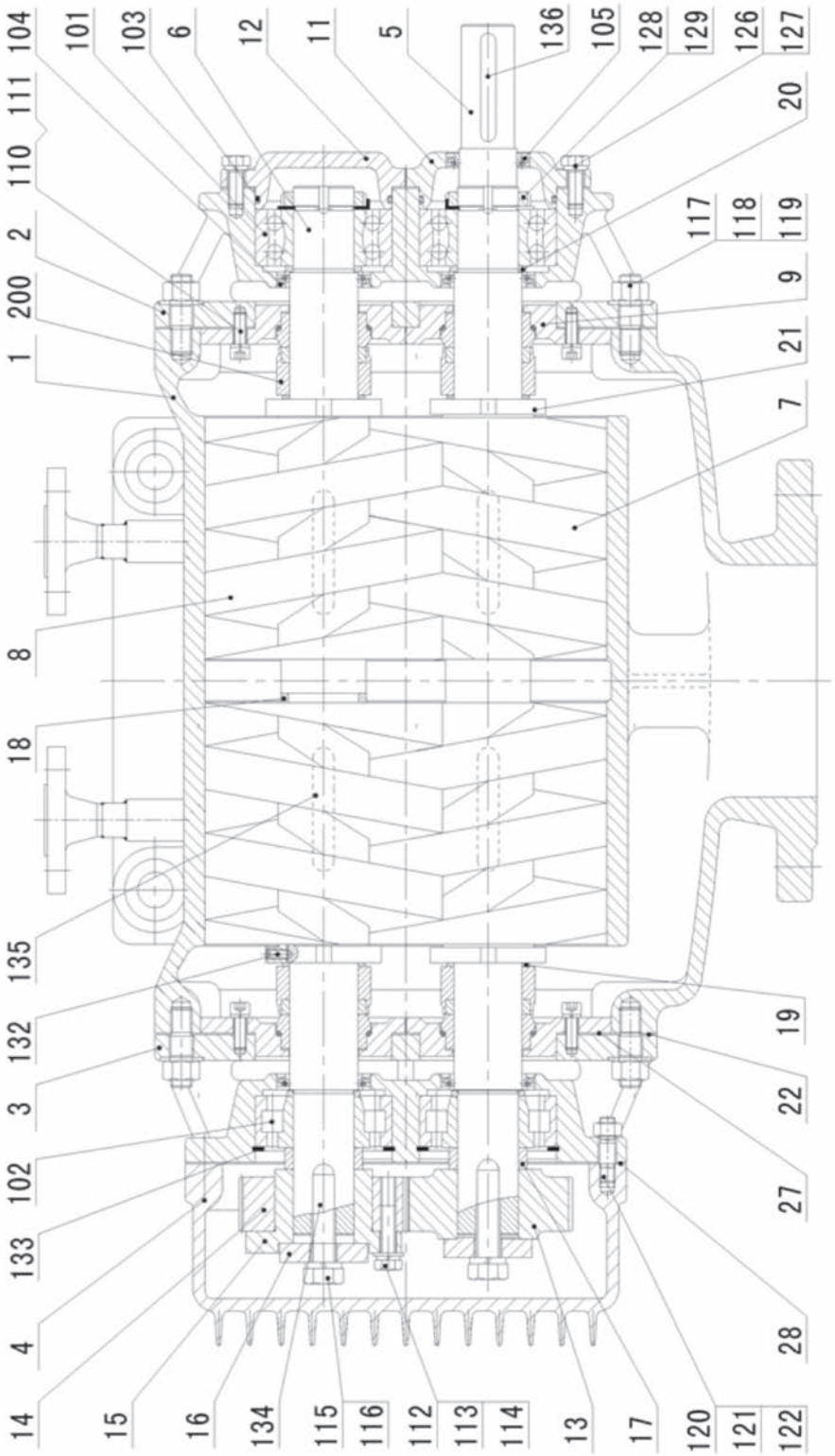
CROSS-SECTIONAL DIAGRAMS

2HCG...B PUMPS



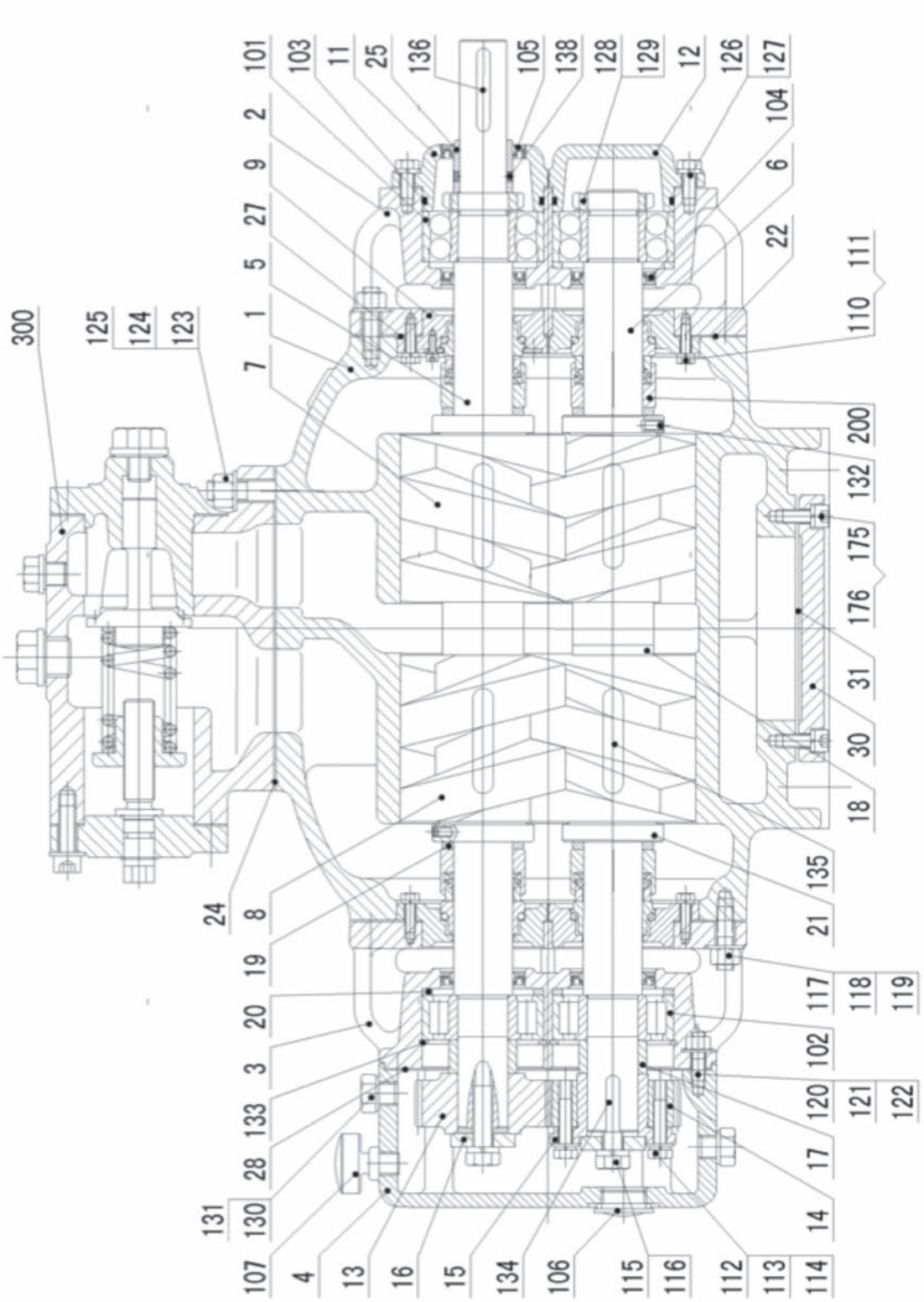
CROSS-SECTIONAL DIAGRAMS

2HC...P PUMPS



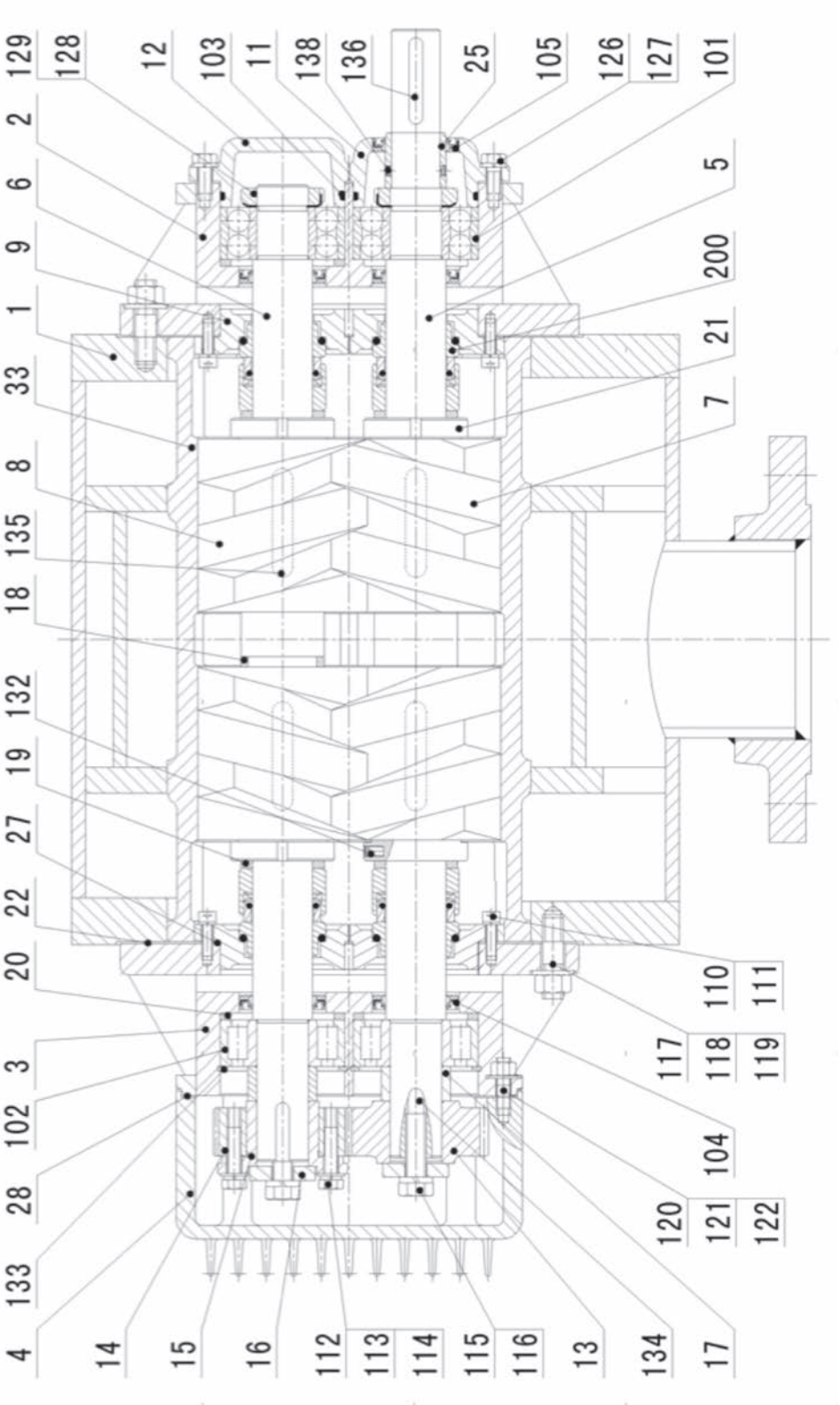
CROSS-SECTIONAL DIAGRAMS

2HM...A PUMPS



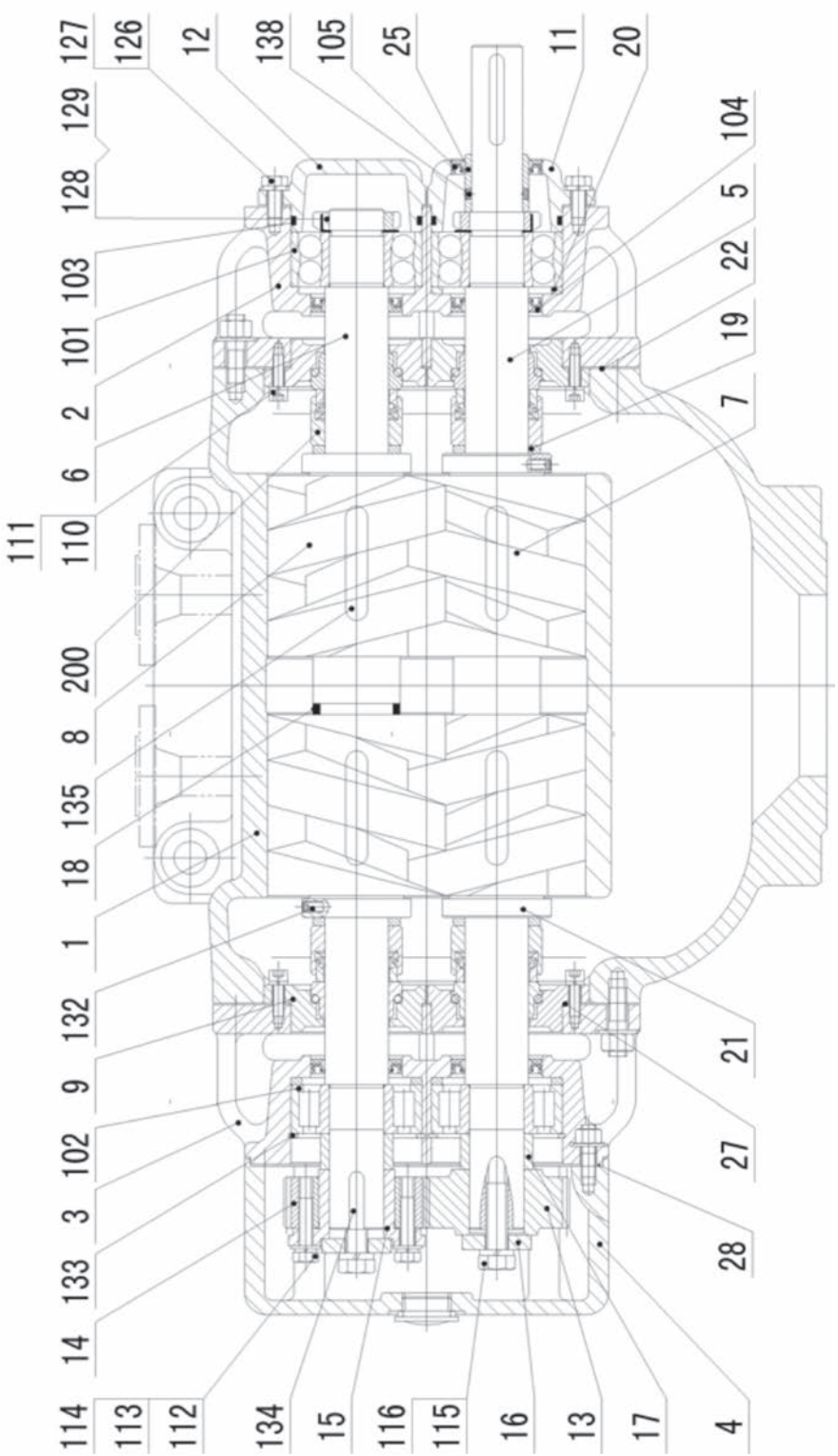
CROSS-SECTIONAL DIAGRAMS

2HMB PUMPS



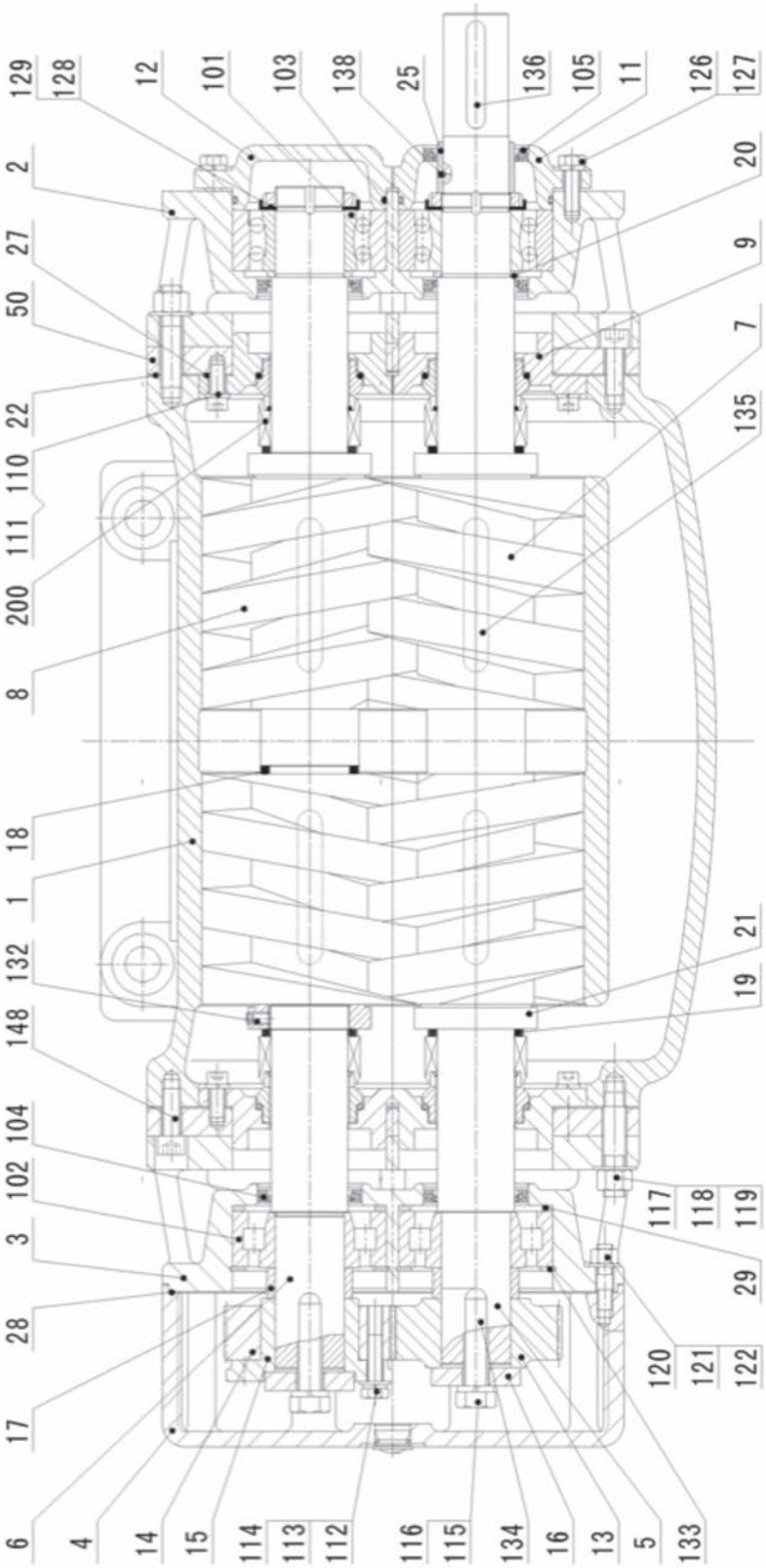
CROSS-SECTIONAL DIAGRAMS

2HM...B PUMPS



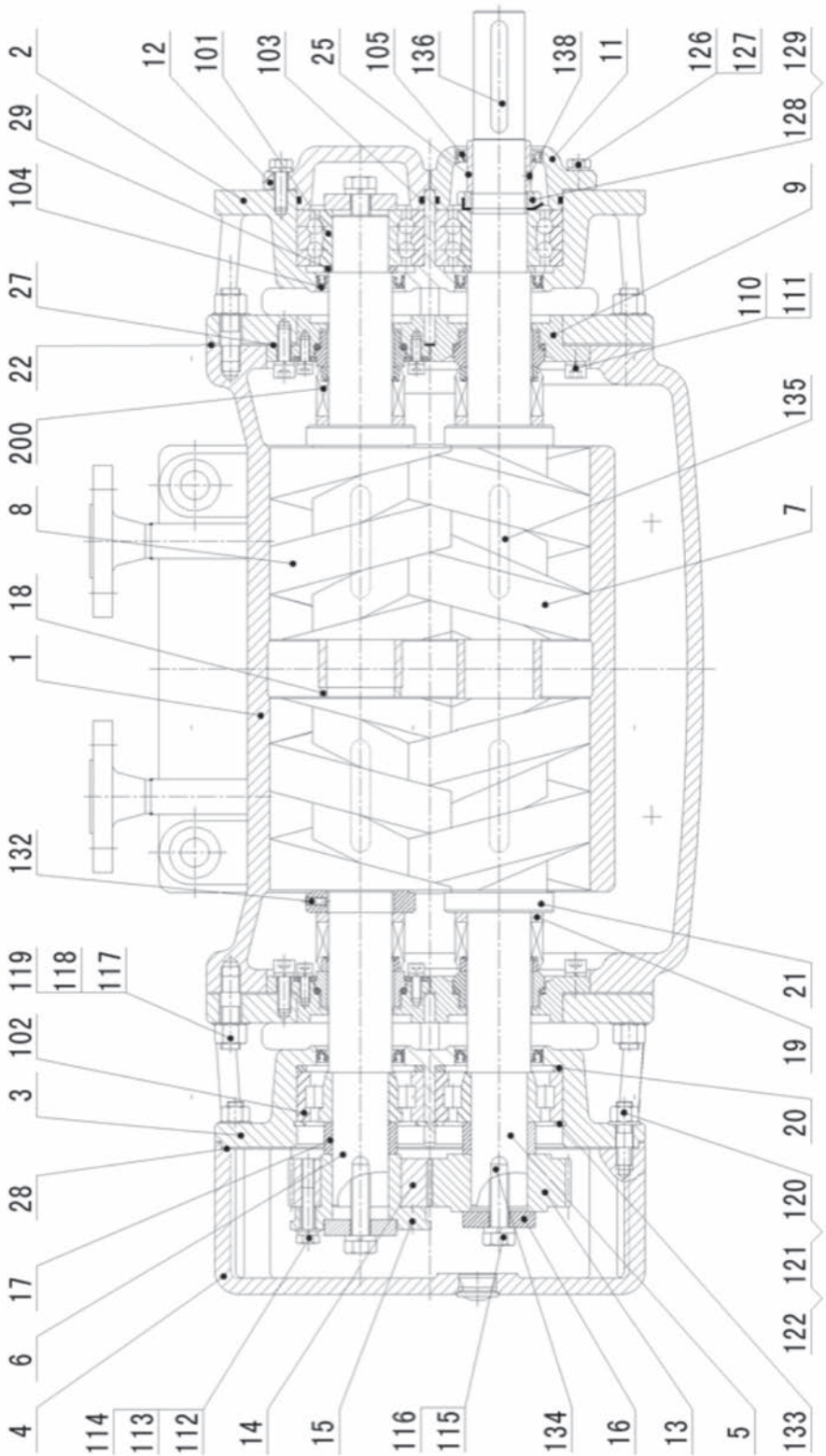
CROSS-SECTIONAL DIAGRAMS

2HMG...C PUMPS



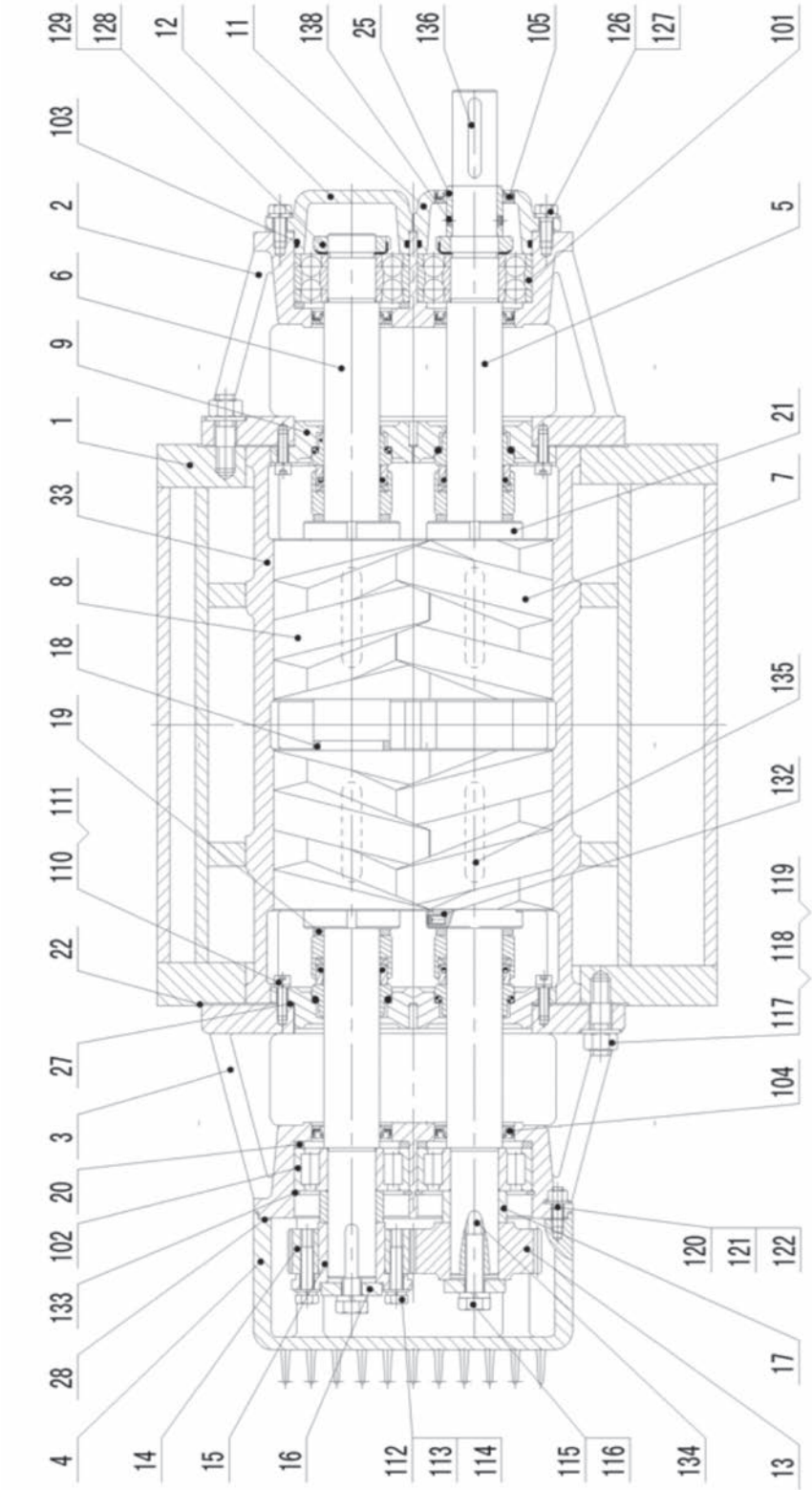
CROSS-SECTIONAL DIAGRAMS

2HM...P PUMPS



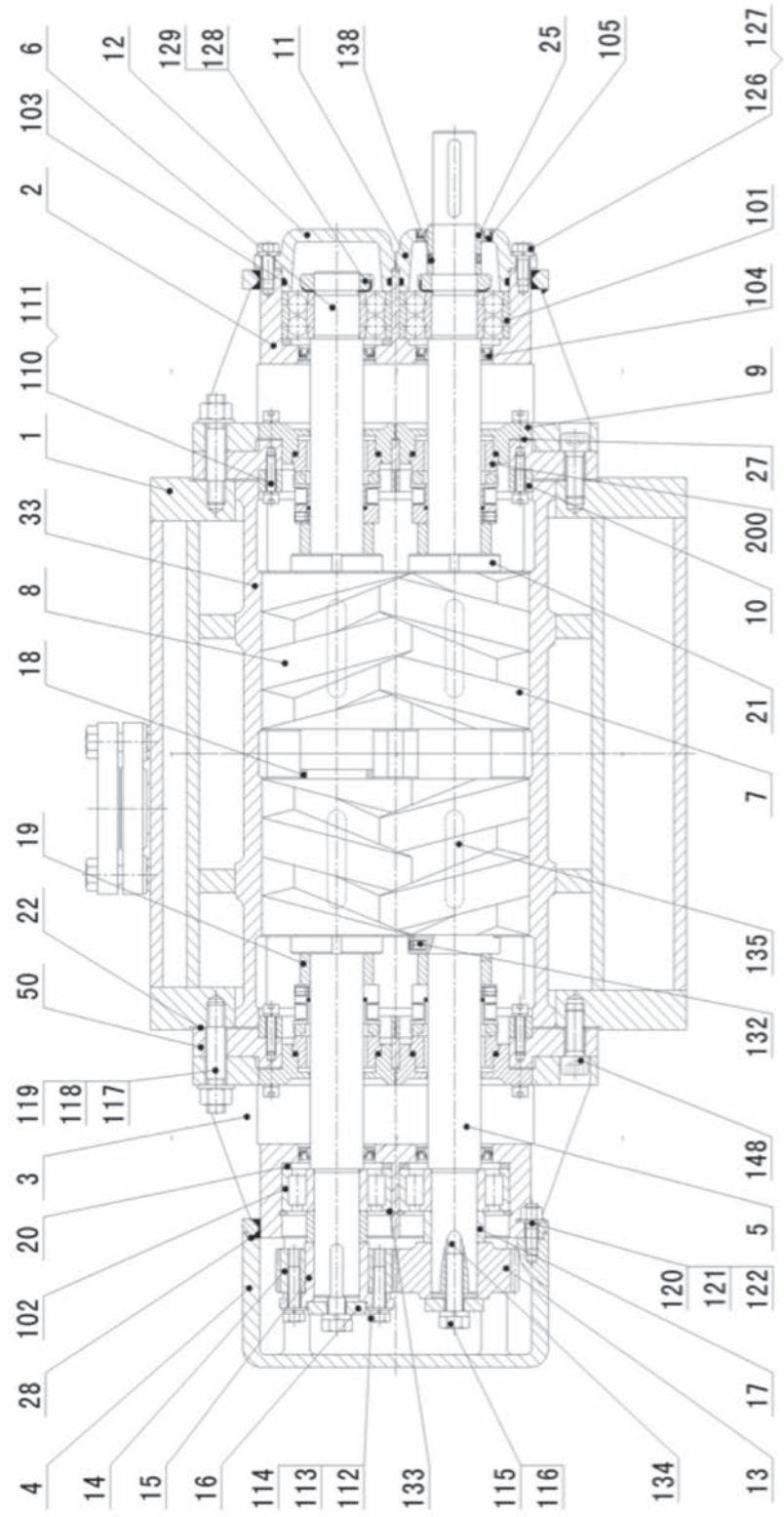
CROSS-SECTIONAL DIAGRAMS

2HRA PUMPS



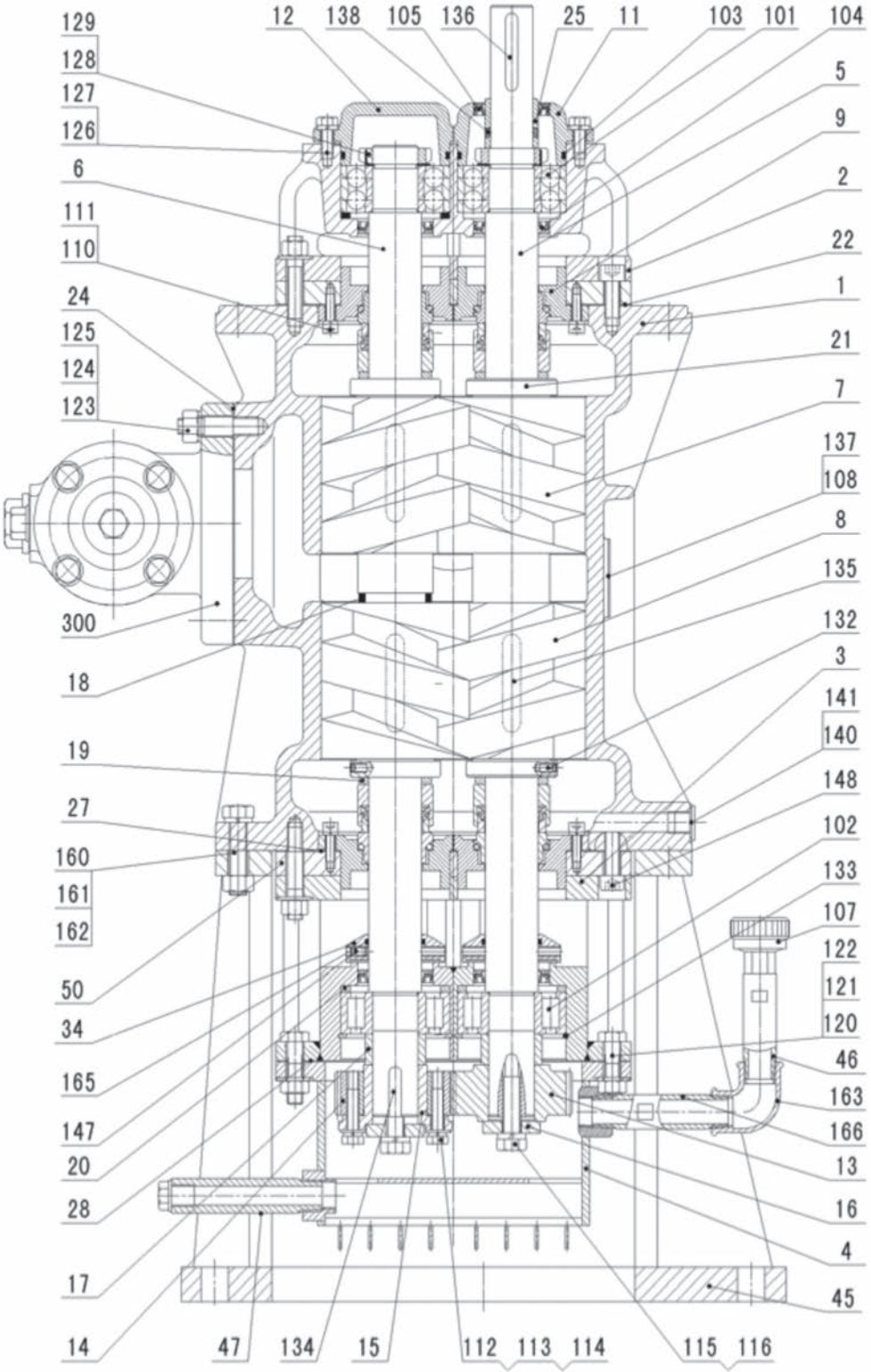
CROSS-SECTIONAL DIAGRAMS

2HRG PUMPS



CROSS-SECTIONAL DIAGRAMS

2VM PUMPS



DISASSEMBLY/REASSEMBLY FOR INDEPENDENT, PRESSURE-LIMITED VALVES

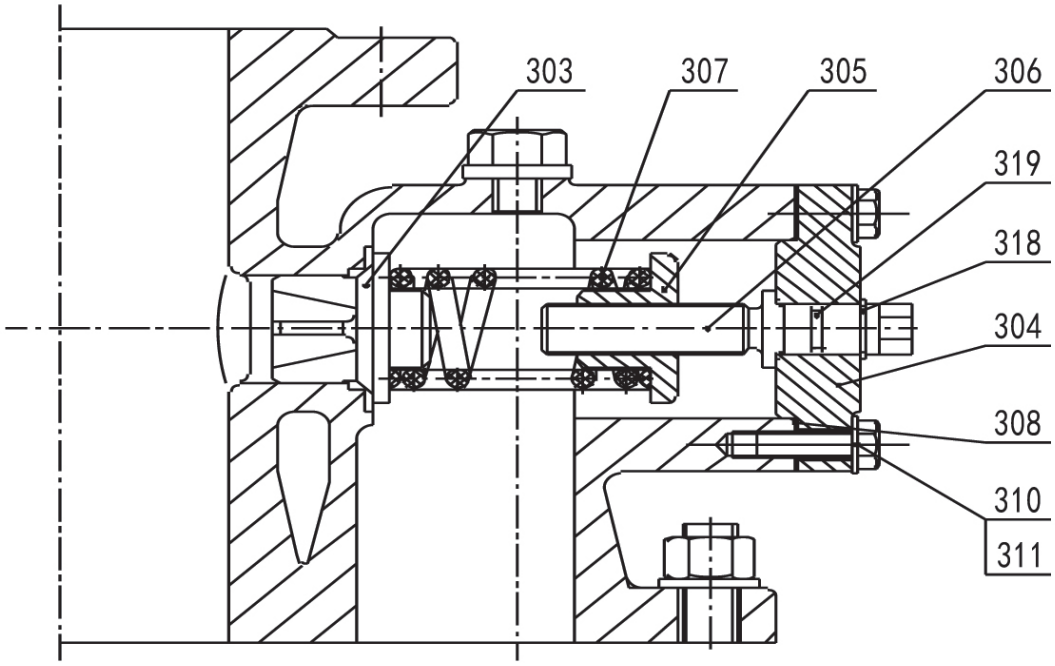


FIGURE 10

INTERNAL SPRING STRUCTURE (SIDE-IN, TOP-OUT)

NOTE: The following instructions for independent, pressure-limited valves apply only to the following pumps: 2HE, 2HCE, 2HM, 2HC and 2HR-series.

ATTENTION: Only when the spring of the valve is relaxed can the bonnet (304) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the number of revolutions completed.

Loosen screws (310) and spring washers (311). Remove valve bonnet (304), adjusting spindle (306) and spring holder (305) as one unit.

Remove spring (307) and valve core (303).

Remove spring holder (305) and spring clip (318). Pull adjusting spindle (306) from valve bonnet (304), and remove the O-ring (319) and gasket (308).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, the O-ring (319) and gasket (308) must be replaced.

Install O-ring (319) into the groove of adjusting spindle (306), put them into the hole of valve bonnet (304) and assemble spring clip (318) to form valve bonnet unit.

Install valve core (303), spring (307), gasket (308) and valve bonnet (304) unit. Tighten this unit to valve casing (301) with screws (310) and washers (311).

Adjust the tension of the spring (307), readjust spindle (306) clockwise by the number of revolutions completed that was previously recorded.

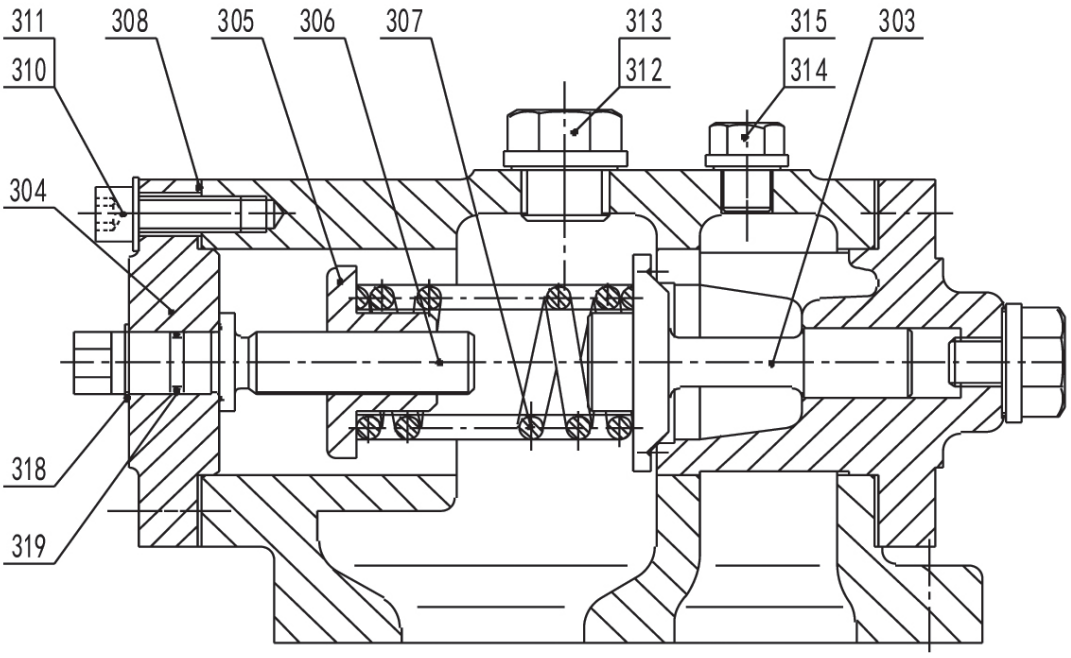


FIGURE 11

INTERNAL SPRING STRUCTURE (SIDE-IN, SIDE-OUT)

NOTE: The following instructions apply only to the following pumps: 2HE, 2HCE, 2VE, 2HM, 2HC, 2HR and 2VM-series.

ATTENTION: Only when the spring of the valve is relaxed can the bonnet (304) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the number of revolutions completed.

Loosen screws (310) and spring washers (311). Remove valve bonnet (304), adjusting spindle (306) and spring holder (305) as one unit.

Remove spring (307) and valve core (303).

Remove spring holder (305) and spring clip (318). Pull adjusting spindle (306) from valve bonnet (304), and remove the O-ring (319) and gasket (308).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, the O-ring (319) and gasket (308) must be replaced.

Install O-ring (319) into the groove of adjusting spindle (306). Place into the hole of valve bonnet (304) and assemble spring clip (318) to form valve bonnet unit.

Install valve core (303), spring (307), gasket (308) and valve bonnet (304) unit, tighten this unit to valve (301) with screws (310) and washers (311).

Adjust the tension of the spring (307), readjust spindle (306) clockwise the number of revolutions completed that was previously recorded.

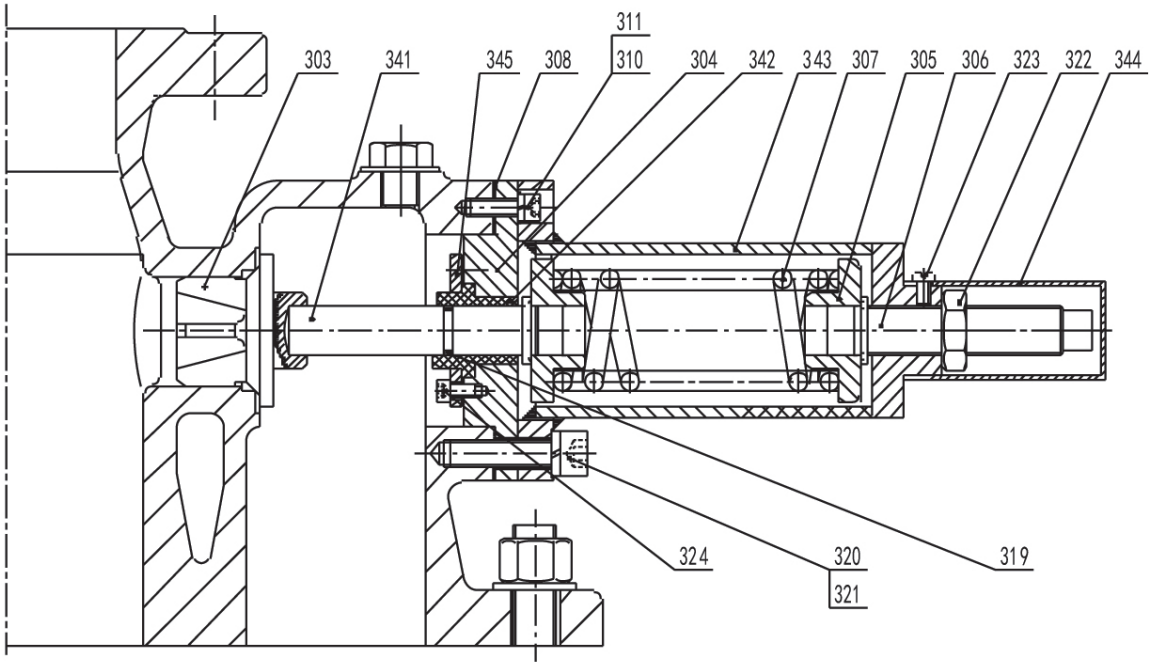


FIGURE 12

EXTERNAL SPRING STRUCTURE

NOTE: The following instructions apply only to the following pumps: 2HM, 2HC and 2HR-series.

ATTENTION: Only the when the spring of the valve is relaxed can the spindle base (343) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Loosen screws (323) and remove cover (344).

Remove the nut (322), turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the number of revolutions completed.

Loosen screws (320) and spring washers (321). Remove adjusting spindle base (343), adjusting spindle (306) and spring holder (305) as one unit. Remove spring holder (305) from adjusting spindle (306). Turn adjusting spindle (306) out of adjusting spindle base (343).

Remove spring (307) and the spring holder (305).

Loosen screws (310) and spring washers (311). Then, remove valve bonnet (304), push bar (341), guide sleeve (342) and locating plate (345) and O-ring (319) as one unit.

Loosen screws (324) and remove locating plate (345), guide sleeve (342), push bar (341) and O-ring (319).

Remove valve core (303).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, the O-ring (319) and gasket (308) must be replaced.

Install valve core (303).

Install guide sleeve (342) into valve bonnet (304) and tighten locating plate (345) with screw (324).

Install O-ring (319) on the push bar (341) and insert into guide sleeve (342) to form valve bonnet unit.

Install valve bonnet unit and gasket (308) into valve casing (301), then fasten with screws (310) and spring washers (311).

Install spring holder (305) on push bar (341) and place spring (307) on the holder.

Turn adjusting spindle (306) into adjusting spindle base (343) until it cannot turn.

Install spring holder (305) and spring (307) on adjusting spindle (306).

Tighten adjusting spindle base unit with screws (320) and spring washers (321) to the valve bonnet (304).

Adjust the tension of the spring (307), readjust spindle (306) clock-wise by the number of revolutions completed that was previously recorded.

Locate the spindle (306) by turning the nut (322) toward the surface of spindle base (343).

Install cover (344) and tighten with screw (323).

DISASSEMBLY/REASSEMBLY FOR BUILT-IN PUMP CASING, PRESSURE-LIMITED VALVE

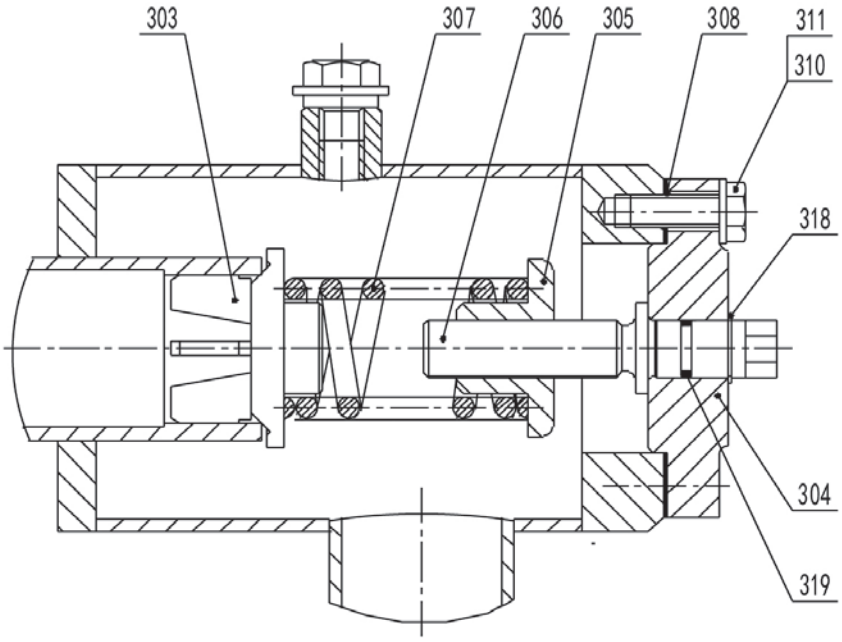


FIGURE 13

INTERNAL SPRING STRUCTURE (WELDED)

NOTE: The following instructions apply only to the following pumps: 2HE, 2HCE, 2VE, 2HM, 2HC, 2HR and 2VM-series.

ATTENTION: Only when the spring of the valve is relaxed can the bonnet (304) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the revolutions quantity.

Loosen screws (310) and spring washers (311). Remove valve bonnet (304), adjusting spindle (306) and spring holder (305) as one unit.

Remove spring (307) and valve core (303).

Remove spring holder (305) and spring clip (318). Pull adjusting spindle (306) from valve bonnet (304), and remove the O-ring (319) and gasket (308).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, the O-ring (319) and gasket (308) must be replaced.

Install O-ring (319) into the groove of adjusting spindle (306). Place into the hole of valve bonnet (304) and assemble spring clip (318) to form valve bonnet unit.

Install valve core (303), spring (307), gasket (308) and valve bonnet (304) unit. Tighten this unit to valve casing (301) with screws (310) and washers (311).

Adjust the tension of the spring (307), readjust spindle (306) clockwise by the number of revolutions completed that was previously recorded.

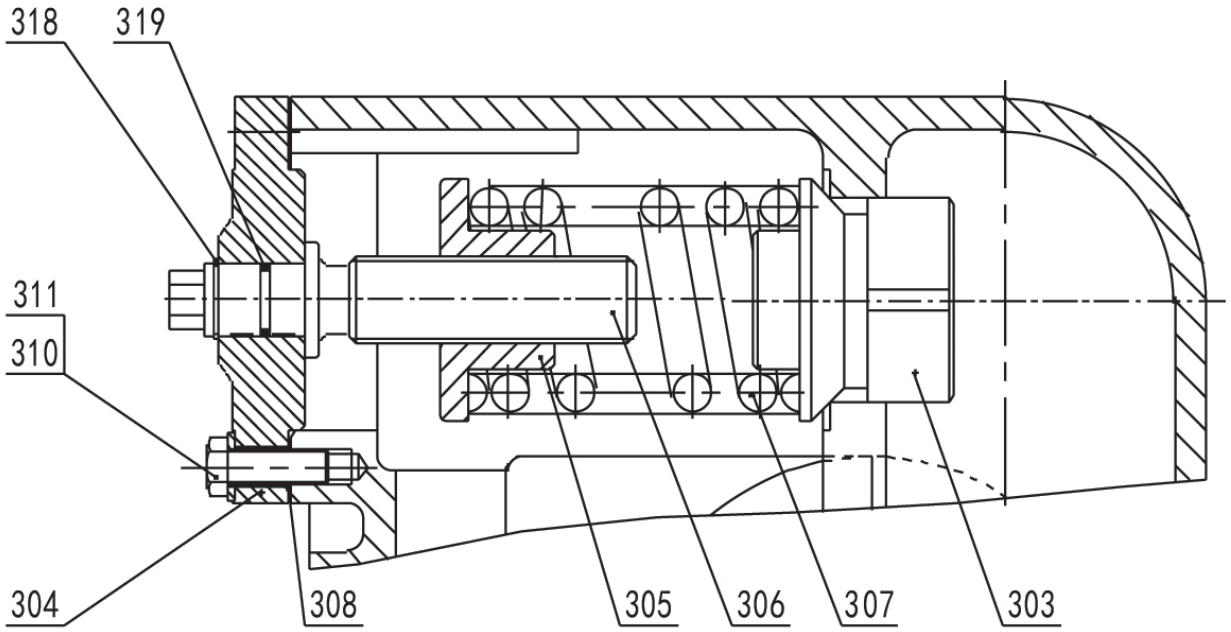


FIGURE 14

INTERNAL SPRING STRUCTURE (CASTED)

NOTE: The following instructions apply only to the following pumps: 2HCE, 2HM, 2HC and 2HR-series.

ATTENTION: Only when the spring of the valve is relaxed can the bonnet (304) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the number of revolutions completed.

Loosen screws (310) and spring washers (311). Remove valve bonnet (304) and adjusting spindle (306) and spring holder (305) as one unit.

Remove spring (307) and valve core (303).

Remove spring holder (305) and spring clip (318). Pull adjusting spindle (306) from valve bonnet (304), and remove the O-ring (319) and gasket (308).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, the O-ring (319) and gasket (308) must be replaced.

Install O-ring (319) into the groove of adjusting spindle (306), put them into the hole of valve bonnet (304) and assemble spring clip (318) to form valve bonnet unit.

Install valve core (303), spring (307), gasket (308) and valve bonnet (304) unit. Tighten this unit to valve casing (301) with screws (310) and washers (311).

Adjust the tension of the spring (307), readjust spindle (306) clockwise by the number of revolutions completed that was previously recorded.

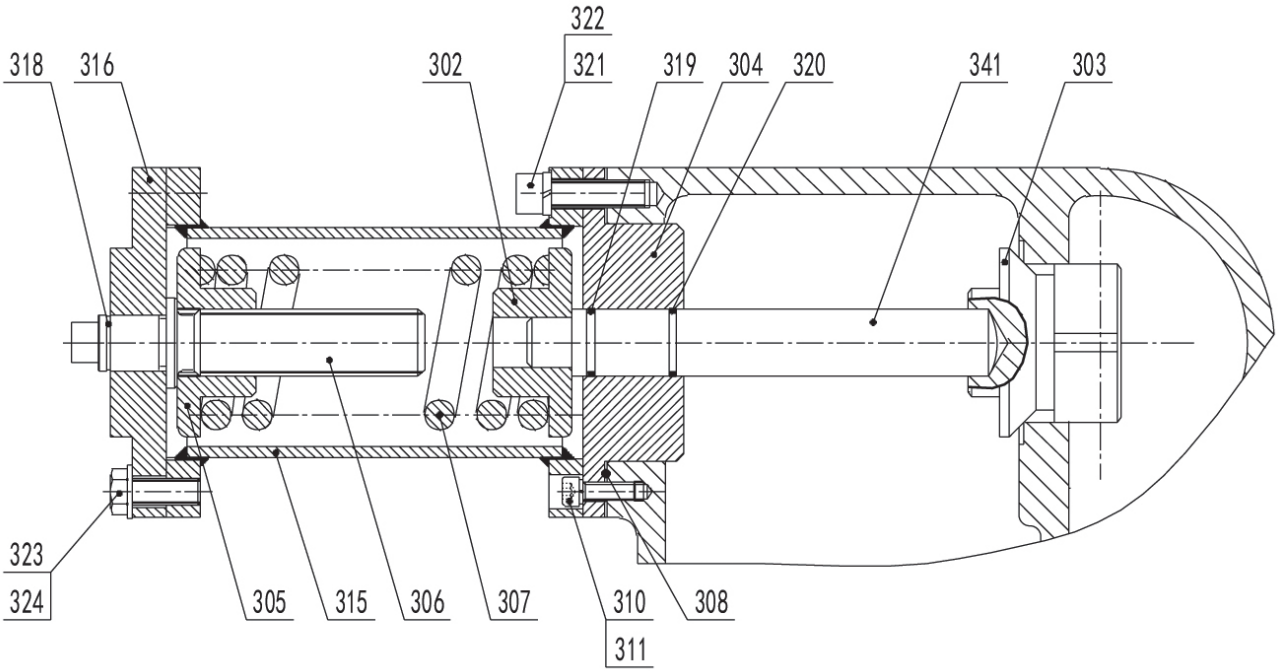


FIGURE 15

EXTERNAL SPRING STRUCTURE

NOTE: The following instructions apply only to the following pumps: 2HM, 2HC, 2HR and 2VM-series.

ATTENTION: Only when the spring of the valve is relaxed can the bonnet (304) be opened. In order to keep spring tension after reassembly (to ensure the release pressure is the same) S Series suggests to record the number of revolutions completed to relax the spring.

Disassembly of Pressure-Limited Valve

Turn the adjusting spindle (306) counter-clockwise until it cannot be turned and record the number of revolutions completed.

Loosen screws (323) and washers (324). Remove spring cover (316), adjusting spindle (306), spring holder (305) and spring clip (318) as one unit. Next, remove spring (307).

Remove spring holder (305) from adjusting spindle (306) and remove spring clip (318). Pull the adjusting spindle (306) out of spring cover (316).

Loosen screws (321) and spring washers (322). Next, remove sleeve casing (315) and remove spring holder (302).

Loosen screw (310) and spring washer (311). Remove valve bonnet (304), push bar (341), gasket (308) and O-ring (319 & 320) as one unit. Pull push bar (341) from valve bonnet (304) and remove O-ring (319 & 320) from push bar (341).

Remove valve core (303).

Reassembly of Pressure-Limited Valve

ATTENTION: If any nicks, gouges or abrasive wear is identified, O-rings (319 & 320) and gasket (308) must be replaced.

Install valve core (303).

Install O-ring (319 & 320) onto push bar (341). Insert into valve bonnet (304) to form valve bonnet unit.

Place gasket (308) between valve and valve bonnet unit and tighten with screw (310) and spring washer (311).

Install spring holder (302) onto push bar (341).

Tighten sleeve casing (315) to valve bonnet (304) with screws (321) and spring washers (322).

Turn spring holder (305) to the end of adjusting spindle (306) and insert into spring cover (316). Next, install spring clip (318) to form spring cover unit.

Place spring (307) onto spring holder (302) and tighten spring cover unit to sleeve casing (315) with screws (323) and washers (324).

Adjust the tension of the spring (307), readjust spindle (306) clockwise by the number of revolutions completed that was previously recorded.

DISASSEMBLY/REASSEMBLY FOR MECHANICAL SEALS

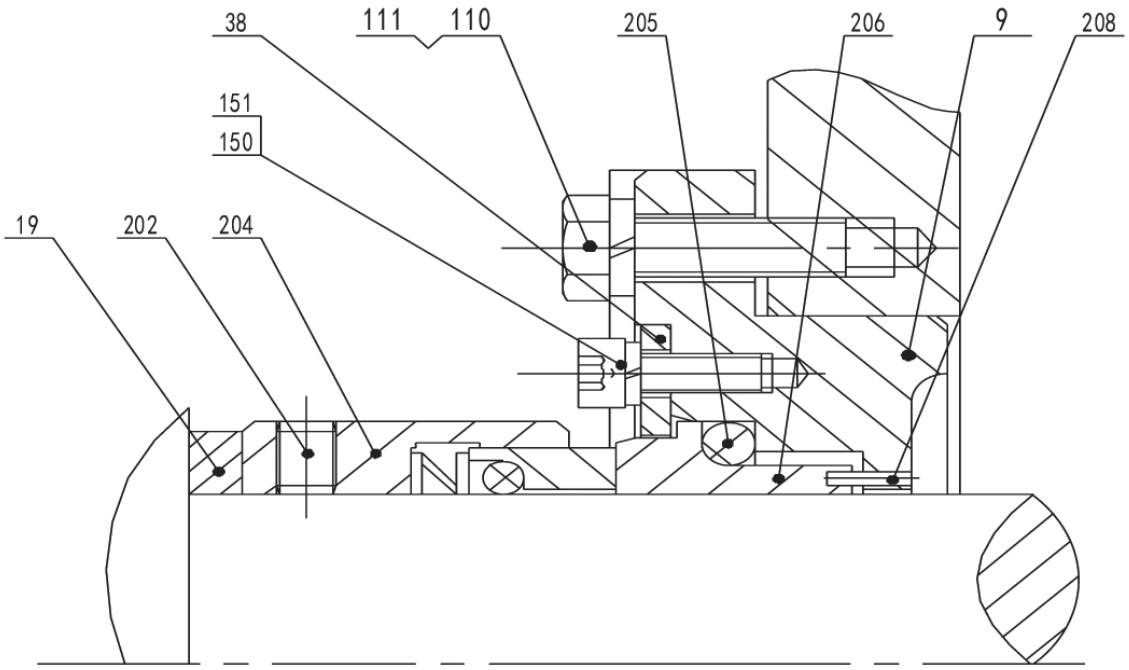


FIGURE 16

SINGLE MECHANICAL SEAL

ATTENTION: It is necessary to dismantle some parts of the pump prior to the disassembly of the mechanical seal. Mechanical seals must be disassembled with care to ensure that the sealing slide rings are not damaged. Immediately mark or label all disassembled parts in order to avoid confusion at time of reassembly. After disassembling, all parts should be carefully cleaned and checked prior to reuse; any defective parts should be replaced.

SINGLE MECHANICAL SEAL

NOTE: The following instructions apply to the following pumps: 2H, 2HE, 2HCE, 2VE, 2HM, 2HC, 2HR and 2VM-series.

Disassembly of Mechanical Seal

If screws (150) are present, loosen the screws (150) and spring washers (151) before removing pressing board (38).

Disassemble stationary seal ring (206) and O-ring (205).

Disassemble rotating ring and O-ring.

Loosen set screws (202) and remove the rotating casing (204).

Remove adjusting ring (19) and label appropriately.

Reassembly of Mechanical Seal

ATTENTION: Clean the sliding interface of the mechanical seals with silicon oil or water.

Install the rotating casing (204) of the mechanical seal onto shafts (05 & 06), adhere to the adjusting ring (19) and fasten with set screw (202). Assemble rotating ring and O-ring to the rotating casing.

Press stationary ring (206) and O-ring (205) into sealing box (09) by hand.

ATTENTION: The stationary ring must be affixed by doweling (208).

Mount the pressing board (38) (if present) on the sealing box (09) with screw (150) and spring washers (151).

Continue with appropriate pump assembly instructions.

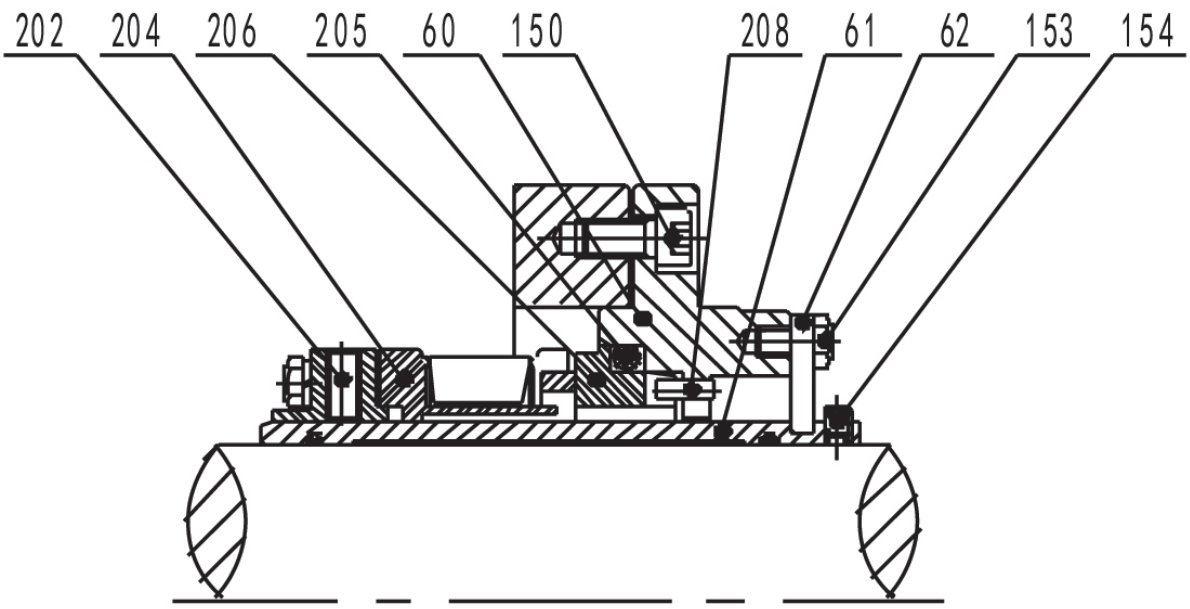


FIGURE 17

SINGLE CARTRIDGE-TYPE

NOTE: The following instructions apply only to the following pumps: 2HE, 2HCE, 2VE, 2HM, 2HC, 2HR and 2VM-series.

Disassembly of Mechanical Seal

Loosen screws (150) and set screw (154) and remove sealing box (60), shaft sleeve (61) and mechanical seal unit.

ATTENTION: Before disassembly, install pressing board (62) onto the groove of the shaft sleeve (61).

Loosen set screws (202) and disassemble rotating rings unit (204).

ATTENTION: Before further disassembly, label and measure the relative position of set screw (202) and shaft sleeve (61).

Unscrew screw (153) and disassemble shaft sleeve (61) and pressing board (62).

Disassemble the stationary seal ring (206) and O-ring (205).

Reassembly of Mechanical Seal

ATTENTION: Clean the sliding interface of the mechanical seals with silicon oil or water.

Press stationary seal ring (206) and O-ring (205) into sealing box (60) by hand.

ATTENTION: The stationary seal ring must be affixed by doweling (208).

Mount rotating ring units of mechanical seal onto shaft sleeve (61) and fasten with set screw (202) as originally marked in disassembly section.

Fasten cartridge-type singe mechanical seal with screw (150); fasten set screw (154).

Mount pressing board (62) onto sealing box (60) with screw (153) and fasten shaft sleeve (61).

Loosen screw (153), move pressing board (62) out of the groove in shaft sleeve (61), then fasten screw (153).

Continue with appropriate pump assembly instructions.

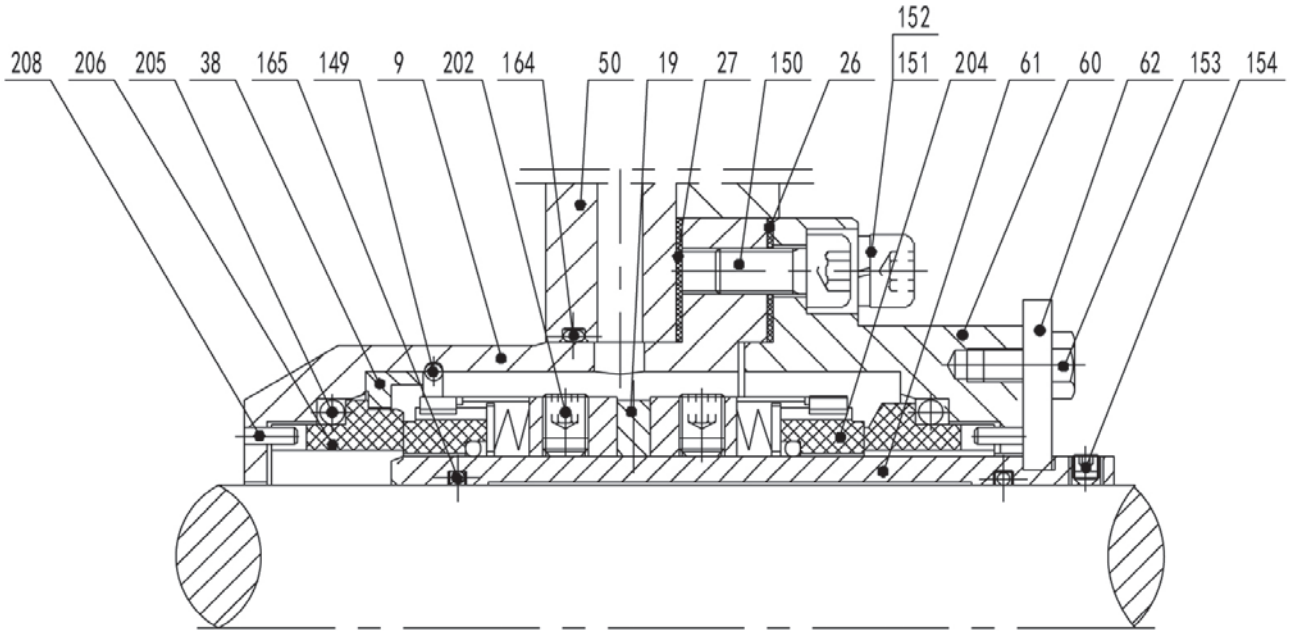


FIGURE 18

DOUBLE CARTRIDGE-TYPE

NOTE: The following instructions apply only to the following pumps: 2HM, and 2HR-series.

ATTENTION: These instructions will only be applicable to 2HM and 2HR series Pumps.

Disassembly of Mechanical Seal

Disassemble screw (151) and spring washer (152) then loosen set screw (154). Next, remove the cartridge-type mechanical seal. Remove gasket (27) and O-ring (164).

ATTENTION: Before disassembly, install pressing board (62) onto the groove of shaft sleeve (61).

Unscrew (150) and disassemble sealing box (09) and sealing box (60) unit. Remove gasket (26).

Disassemble C-clip (149), pressing board (38), stationary ring (206) and O-ring (205).

Loosen screw (153) and disassemble pressing board (62). Remove shaft sleeve (61) and rotating ring (204) unit; remove O-ring (165).

Loosen set screw (202) and disassemble rotating ring (204) unit and adjusting ring (19). Label and measure the relative position of set screw (202). Label these parts to avoid confusion during reassembly.

Disassemble the stationary seal rings (206) and O-ring (205).

Reassembly of Mechanical Seal

ATTENTION: Clean the sliding interface of the mechanical seals with silicon oil or water.

Press stationary ring (206) and O-ring (205) into sealing box (60) by hand.

ATTENTION: The stationary ring must be affixed by doweling (208).

Install rotating ring (204) unit and adjusting ring (19) on shaft sleeve (61), fasten with set screw (202) at the original position (marked during disassembly) and install O-ring (165).

Place the pressing board (62) into the groove of the sleeve (61) and tighten to sealing box (60) with bolt (153).

Insert stationary ring (206) and O-ring (205) into sealing box (09) by hand. Next, install pressing board (38) and C-clip (149).

ATTENTION: The stationary ring must be affixed by doweling (208).

Place gasket (26) between sealing box (09) unit and sealing box (60) unit and tighten with screw (150).

Install O-ring (164) in the groove on the space plate (50), install cartridge-type mechanical seal and gasket (27) on space plate (50); tighten with screw (151) and spring lock washer (152).

Fasten set screw (154) to the shaft.

Loosen bolt (153), remove pressing board (62) out of the groove in shaft sleeve (61), then fasten bolt (153).

Continue with appropriate pump assembly instructions.

NOTES

maag industrial pumps
Part of Pump Solutions Group

WARRANTY

Maag, a Dover Company, warrants its products free from defects in materials and workmanship under normal use and service for which its products were designed. This warranty is for a period of 12 months after installation or 18 months after shipment from the factory, whichever comes first. This standard warranty applies unless specific warranty conditions are granted in writing by Maag. If its products should fail through defect in workmanship or material within the stated warranty period, Maag must be notified in writing within the warranty period of such defects and shall have the option of requiring return of parts or product to its factory for verification of any claim. The warranty is in lieu of any other liability for defects.

MAAG MAKES NO WARRANTY OF MERCHANTABILITY AND NO WARRANTY THAT ITS PRODUCTS SHALL BE APPROPRIATE FOR ANY PARTICULAR PURPOSE, nor are there any other warranties, expressed or implied, by operation of law or otherwise. This warranty does not cover any expense (labor, lost production, travel expenses, etc.), incurred in repairs or alteration made outside the Maag factory without prior authorization, nor does it cover in any way the performance of equipment which has been revised or altered by others. The customer is wholly responsible for establishing the suitability of the product for his particular application and for operating conditions, which do not exceed published product limitations. Maag shall not be liable for damages or delay resulting from or related to defective products, nor for consequential, special or contingent damages for breach of warranty.

PLEASE PRINT OR TYPE AND FAX TO MAAG

PUMP INFORMATION

Item # _____ Serial # _____

Company Where Purchased _____

YOUR INFORMATION

Company Name _____

Industry _____

Name _____ Title _____

Street Address _____

City _____ State _____ Postal Code _____ Country _____

Telephone _____ Fax _____ Email _____ Web Address _____

Number of pumps in facility? _____ Number of Maag pumps? _____

Types of pumps in facility (check all that apply): ☐ Diaphragm ☐ Centrifugal ☐ Gear ☐ Submersible ☐ Lobe

☐ Other _____

Media being pumped? _____

How did you hear of Wilden Pump? ☐ Trade Journal ☐ Trade Show ☐ Internet/Email ☐ Distributor

☐ Other _____

ONCE COMPLETE, FAX TO (909) 783-3440

PSG Brands

ABAQUE™
PERISTALTIC PUMPS
mouvex.com

ALMATEC®
AIR-OPERATED
DOUBLE-DIAPHRAGM PUMPS
almatec.de

AUTOMATIK
PELLETIZING SYSTEMS
maag.com

BLACKMER®
VANE PUMPS & COMPRESSORS
blackmer.com

FLUID DYNAMICS™
POLYMER BLENDING SYSTEMS
fluiddynamics1.com

GRISWOLD™
CENTRIFUGAL PUMPS
griswoldpump.com

MAAG
FILTRATION
PLASTIC MANUFACTURING &
PROCESSING FILTRATION
maag.com

MAAG
INDUSTRIAL PUMPS
GEAR & SCREW PUMPS
maag.com

MAAG
PUMP SYSTEMS
EXTRUSION PUMPS & SYSTEMS
maag.com

MOUVEX®
ECCENTRIC DISC PUMPS,
VANE PUMPS &
COMPRESSORS
mouvex.com

NEPTUNE™
DIAPHRAGM (METERING) PUMPS,
POLYMER SYSTEMS & MIXERS
neptune1.com

QUATTROFLOW™
QUATERNARY DIAPHRAGM
PUMP TECHNOLOGY
quattroflow.com

REDSCREW™
SCREW PUMPS
redscrewpump.com

SYSTEM ONE®
CENTRIFUGAL PUMPS
blackmer.com

WILDEN®
AIR-OPERATED
DOUBLE-DIAPHRAGM PUMPS
wildenpump.com

PSG®
PUMP SOLUTIONS GROUP
A DOVER™ COMPANY

Where Innovation Flows

maag
Part of Pump Solutions Group
A DOVER COMPANY

1809 Century Avenue SW
Grand Rapids, Michigan 49503-1530, U.S.A.
T: +1 (616) 241-1611
F: +1 (616) 241-3752
www.maag.com

Authorized Representative: