

CONSTRUCTION	GH - RA - A3
PUMP SERIES	TBH & BT 1000
"C" in mm	90.2
"A" nominal in mm	20

Tab. 4

Machining of faces 1-5-6 must be such that total clearance "D + E" given in tab 3 is maintained.

Total clearance "D + E" is obtained by subtracting dimension "A" from dimension "B" and then adding thickness of gasket "G1".

NOTE: Impellers are free floating on the pump shaft, impellers will find their centre by hydraulic forces once the pump is started therefore clearances "D" and "E" will become of equal value.

Machining of pump parts will result in a decrease of total pump length. If the total decrease of pump length is more than 1 mm pump there may be problems in reassembling the pump, therefore each pump stage must keep dimension "C" value per tab. 4.

Dimension "C" can be corrected by increasing the thickness of gasket for clearance "G2" or adding more gaskets as shown in fig. 8.

CAUTION: Machining of the components will result in a decrease of pump performance, decrease is relative to the decrease of impeller nominal dimension "A".

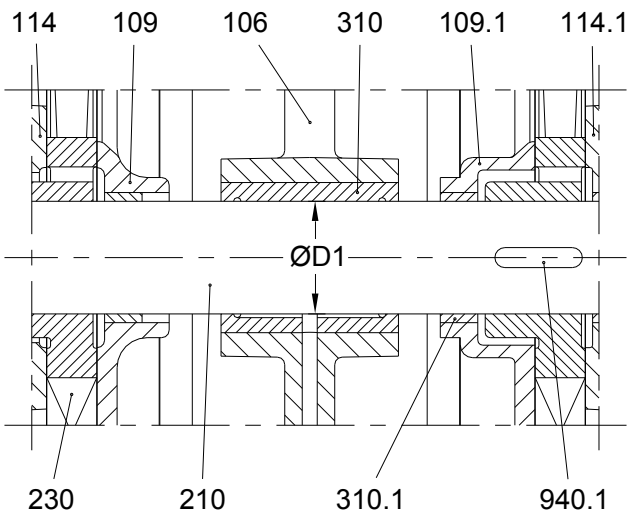


Fig. 9

Tab. 5
INSIDE DIAMETER OF BUSHINGS VDMA 310 & 310.1
AS FITTED IN SUCTION CASING AND ELEMENTS
(see fig. 9)

PUMPS SERIES	Ø D1	MATERIAL
TBH & BT 1000	45 B9 +0.242 +0.180	Bronze & Carbon

7 - PUMP ASSEMBLY

Inspect every pump component making certain that they are in good condition. If the parts are in acceptable condition, proceed with cleaning procedure using suitable cleaning products. Those parts that are reusable but require machining should be reworked as discussed in chapter 6.

When mixing new original parts with used and re-machined parts, make sure that the dimensions of the later are compatible with those from the original parts. For recommended spare parts see chapter 9.

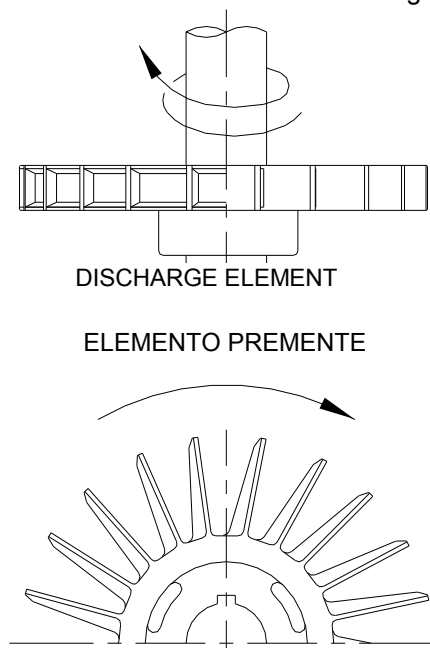
For mechanical seals assembly see chapter 3. See sections in chapter 11 for identification of the item numbers.

NOTE: Assembly sequence given below assumes that the pump is completely disassembled.

- 1 - Place the pump shaft VDMA 210 in a bench vice vertically and with the drive side downward. Insert on the shaft the seal retaining ring VDMA 485. Lubricate shaft and seal rotating part VDMA 433.1 with compatible liquid then insert rotating part of mechanical seal over the shaft. If mechanical seals are with conical springs designed for one specific rotation, the seal to be mounted here is the one for C.C.W. or left hand shaft rotation. Where applicable, press fit seal seat holder VDMA 542 in the bearing housing VDMA 357. Insert radial seal ring VDMA 421 in bearing housing VDMA 357. Lubricate (with suitable fluid) the mechanical seal O-Ring and press fit the stationary part into the bearing housing VDMA 357 or seal seat holder VDMA 542.
- 2 - Clean the 2 mechanical seal faces. Insert over the shaft the bearing housing and keep compressed the mechanical seal spring.
- 3 - Insert spacer VDMA 505 over the shaft. Fit the bearing VDMA 320 on the shaft until it bottoms against the shaft shoulder, block the bearing with shaft nut VDMA 923. Place the bearing cover VDMA 360.1 on the bearing housing and lock it in place with bolts VDMA 914. Remove shaft from vice.

- 4 - Place gasket VDMA 400.2 on the bearing housing then slide shaft and bearing housing assembly in the discharge casing VDMA 107, then tighten the assembly to the casing with bolts VDMA 914.1. Make sure the draining opening of the bearing housing is located at the bottom in same direction of pump feet.
- 5 - Place the assembly in the vertical position resting on bearing cover VDMA 360.1 and the pump casing flange toward you. Place the gasket "G2" VDMA 400 on the discharge casing keeping it in place with a few drops of compatible oil (see tab. 3 and 4 for gasket thickness and clearances).
- 6 - Place discharge right element VDMA 114 on discharge casing VDMA 107 as indicated in the assembly schematic and based on the pumps number of stages (see chapter 8).

Fig. 10



NOTE: This schematic allocates the rotation of stage sets (suction/discharge elements) depending on the number of pump stages, keeping in mind that every stage set, made by one suction and discharge plate plus the impeller, must be placed with the elements matching marking grooves lined up with each other.

Fit on the shaft the key VDMA 940.1 for the first impeller VDMA 230. Slide the impeller on the shaft with the impeller hub pointing down so that flat part of the blades is facing the pump rotation, in other words the impeller blades must "bite" into the liquid when rotating, see fig. 10.

NOTE: The key VDMA 940.1 must fit perfectly in the impeller key-way but the impeller must be allowed to freely slide over the shaft.

Place gasket "G1" VDMA 400 on the right discharge plate VDMA 114, then add the right suction plate VDMA 109 with the 2 reference grooves lined up.

- 7 - At this point the steps from point 6 will be repeated as many times as the number of stages to be built. Carefully place the orientation of the suction and discharge plates as illustrated in the schematics of chapter 8.
- 8 - Introduce the suction casing VDMA 106 with flange in the horizontal position and at right side of flange from discharge casing VDMA 107. Starting fitting the left suction element VDMA 109.1, add key VDMA 940.1, impeller VDMA 230, Gasket VDMA 400, left discharge element VDMA 114.1. Continue the assembly of gaskets, suction elements, keys, impellers, discharge elements as per sections 6 and 7 but with the left elements until the discharge casing VDMA 107.

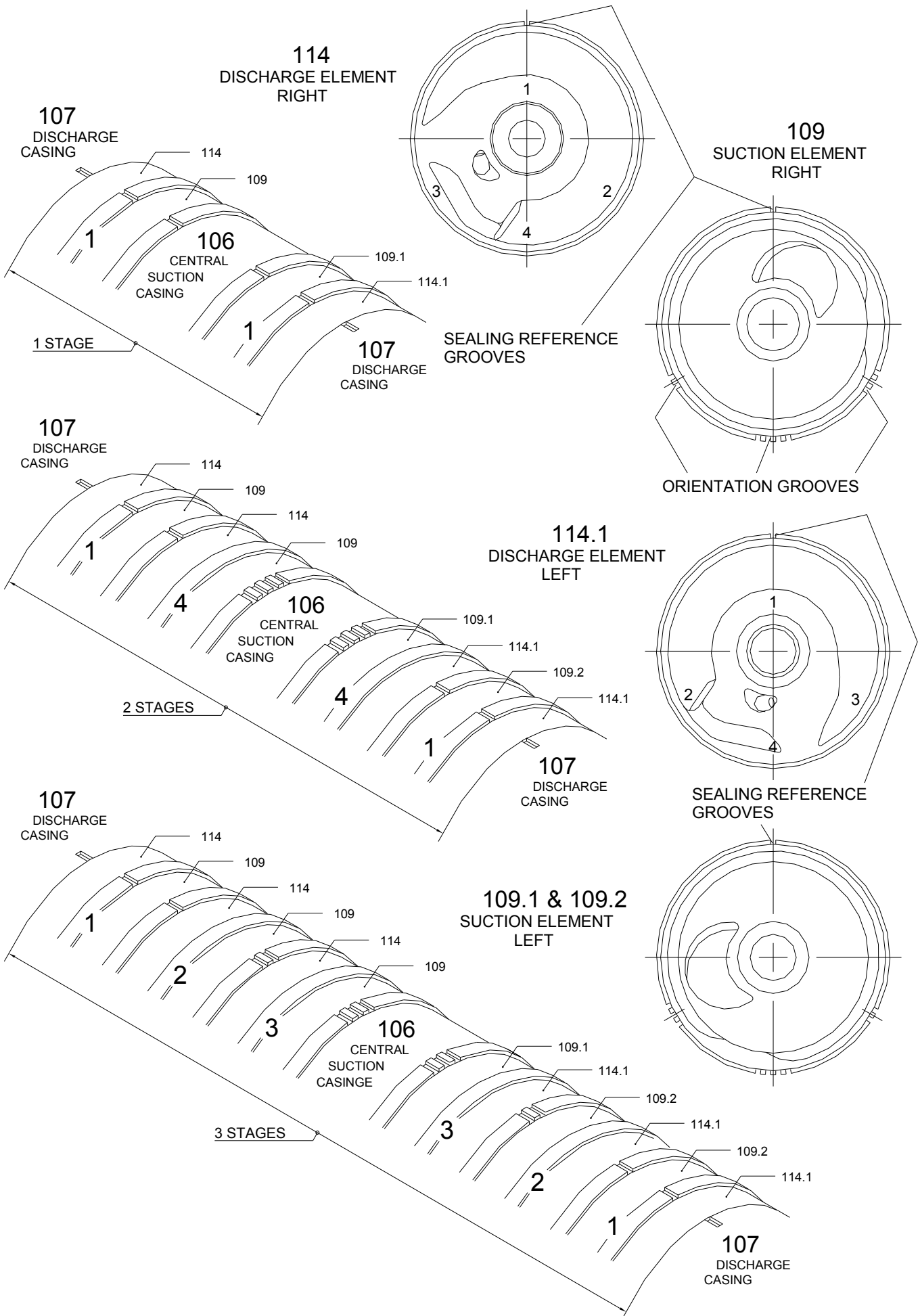
NOTE: In case mechanical seal is the type to be affixed to the shaft by means of set screws, prior to installing discharge casing VDMA 107, it is necessary to fit seal retaining ring VDMA 485 on the shaft as well as the rotating component of mechanical seal VDMA 433.2.

Install the tie bolts VDMA 905 and tighten the nuts finger-tight. Place the pump horizontally on its feet on a flat base for alignment. Torque the tie bolts with a torque wrench. Torque values are listed in tab. 6.

- 9 - Fit seal locating ring VDMA 485 over the shaft, verify that the distance from the shaft shoulder holding the seal and the external face of the discharge casing VDMA 107 is given on tab. 1. Lubricate with compatible oil and insert rotating part of seal VDMA 433.2 over the shaft until it rests against the locating ring. If the mechanical seal is not bi-directional type, the seal should be suitable for C.W. (right) rotation. Lubricate the O-Ring of the seal stationary part VDMA 433.2 and press-fit it in the bearing housing VDMA 357. Clean both seal faces. Install the bearing housing on the discharge casing VDMA 107 with gasket VDMA 400.2 in between and tighten the bolts VDMA 914.1. Make sure the draining opening of the bearing housing is located at the bottom in same direction of pump feet.
- 10 - Insert the spacer VDMA 505 on the shaft so that the bearing inner ring resting against the spacer will be about 1 mm out in relation to the landing face on the bearing housing for the bearing outer ring. Fit the bearing on the shaft and against the spacer. Fit the snap ring VDMA 932 on the shaft. Place the bearing cover VDMA 360 on the bearing and secure it with bolts VDMA 914.
- 11 - Be sure that the pump rotor rotates freely by hand. Install manifold VDMA 147 on pump discharge casings with proper flange gaskets VDMA 400.8 and lock with nuts and bolts VDMA 901.8. Turn the pump upside down, install central foot VDMA 183 using bolts VDMA 901. Connect "T" fitting VDMA 731.5 to the two elbows VDMA 731.3 on the 2 casings by means of tubing VDMA 701. Hydro-test pump to 1.2 times the maximum attainable working pressure for the pump series (NOTE: not the operating pressure) and make sure that there are no leaks.

Tab. 6
TIE-BOLT TORQUE
VALUES

PUMPS SERIES	TORQUE VALUE	
	Kgm	Nm
TBH & BT 1001 (1 stage)	8	78.5
TBH & BT 1002 & 1003 (2 & 3 stages)	8.5	83.4



9 - SPARE PARTS

When ordering the pump it is good practice to also order the recommended spare parts, especially when there are no stand-by units in the installation. This will minimise unnecessary down times in the event of pump failure.

Therefore, depending upon the type of pump and the number of pumps installed, the quantity of spare parts to be kept on hand should be determined.

Following are the minimum recommended spare parts:

1	Impeller	1	Set packing, where applicable
1	Suction Plate (Left & Right)	1	Set mechanical seals, where applicable
1	Discharge Plate (left & Right)	2	Sets gaskets
1	Shaft assembly	1	Set of spacers
1	Bearing set		

When ordering spare parts always provide the information printed on the pump nameplate: Pump model, serial number and year of manufacture.

Provide also the part item number, description and quantity required. Sectional drawings and parts list can be found in chapter 11 and 10 respectively.

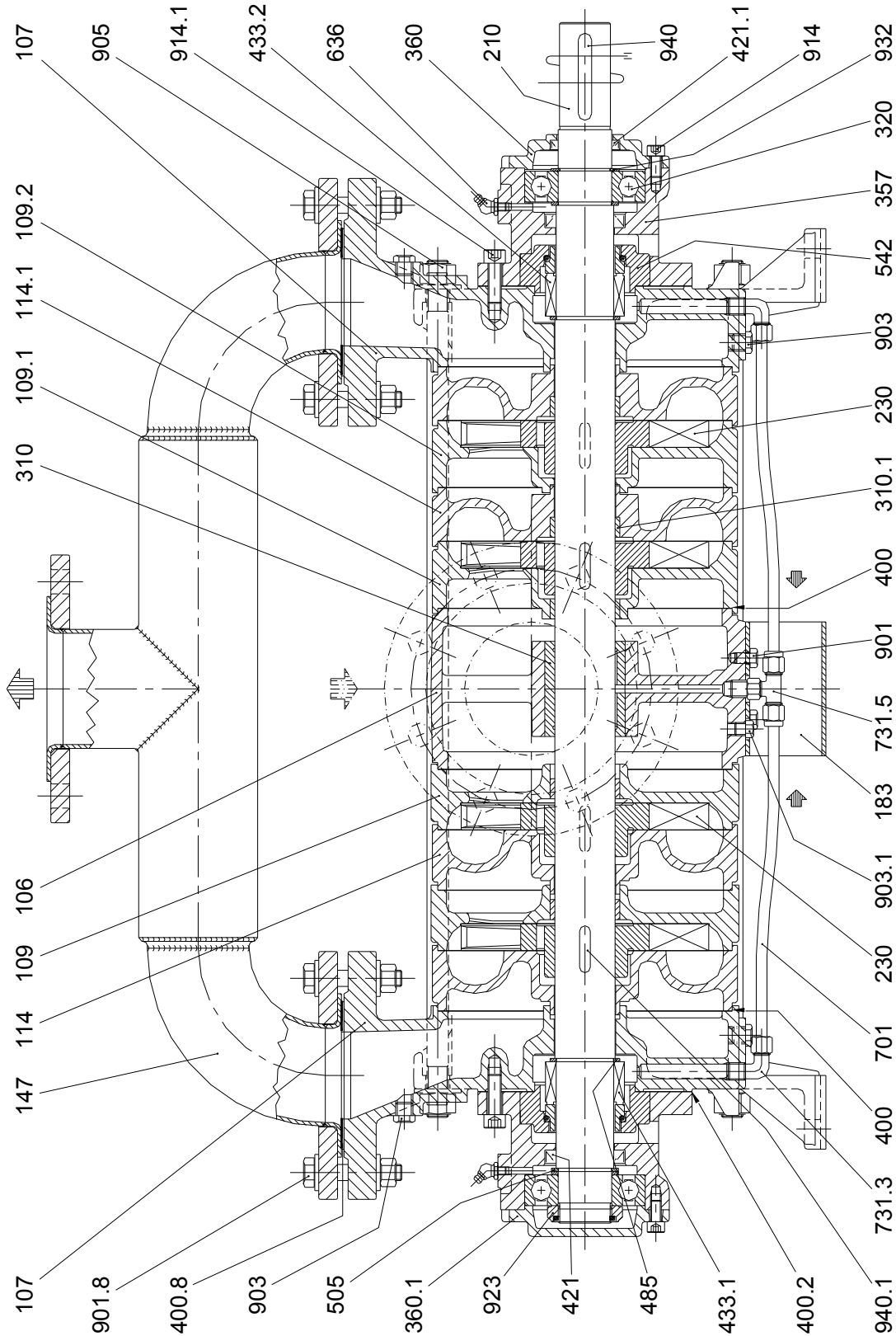
To avoid losing the manufacturer guarantee, the use of original spares are recommended all the times. POMPETRAVAINI declines any responsibility for pump performance or reliability when parts or repairs are from unauthorized sources.

10 - PARTS LIST

VDMA No.	DESCRIPTION
106	Suction casing
107	Discharge casing
109	Suction plate, right
109.1	Suction plate, left
109.2	Suction plate, right
114	Discharge plate, right
114.1	Discharge plate, left
116...	Cooling half-chamber
147	Manifold
183	Pump foot
210	Shaft
230	Impeller
310	Sleeve bearing
310.1	Sleeve bearing casing
320	Ball bearing
357	Mechanical seal and bearing housing
360	Bearing cover
360.1	Bearing cover
400	Gasket
400.2	Gasket
400.8	Gasket
421	Radial seal ring

VDMA No.	DESCRIPTION
431.1	Radial seal ring
433.1	Mechanical seal, CCW
433.2	Mechanical seal, CW
485	Retainer ring, mechanical seal
505	Spacer ring, bearing
542	Seal insert
636	Grease nipple
701	Tubing
731.3	Elbow fitting
731.5	"T" fitting
901	Screw
901.8	Bolt
903	Plug
903.1	Plug
905	Tie-bolt with washers and nuts
914	Screw
914.1	Screw
923	Bearing nut
932	Snap ring
932.3	Snap ring for bore
940	Key
940.1	Key

11 - SECTION DRAWING

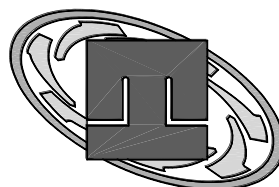
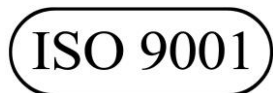


Pump model TBH & BT 1002/2 construction /C

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Continuing research of POMPETRAVAINI results in product improvements: therefore any specifications may be subject to change without notice.



pompetravaini S.p.A.

20022 CASTANO PRIMO (Milano) ITALY
 Via per Turbigo, 44 - Zona Industriale
 Tel. 0331 889000 - Fax 0331 889090
 www.pompetravaini.com