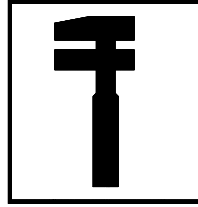


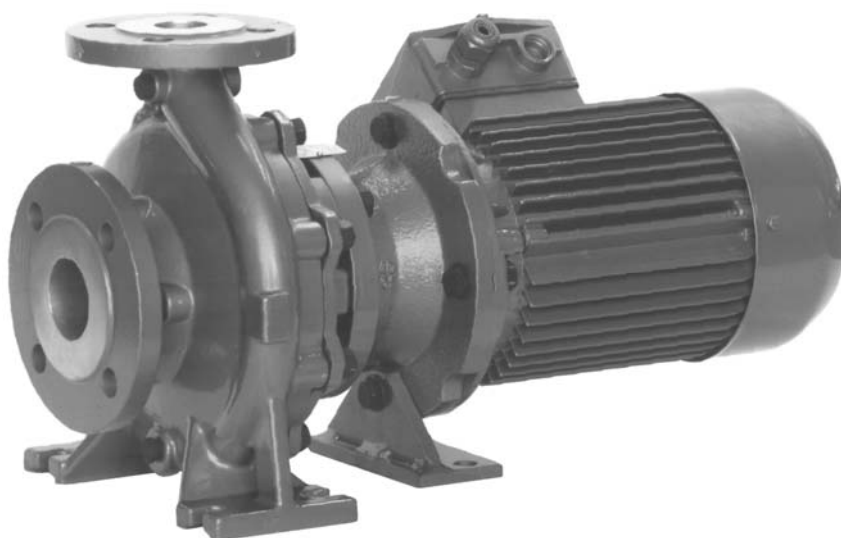
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(Rev. 2.0_10-2010)



DISASSEMBLY & ASSEMBLY INSTRUCTIONS SINGLE STAGE CENTRIFUGAL PUMPS

TCHM & TCTM



INTRODUCTION

These instructions are for the maintenance personnel for maintenance and/or repair of the indicated pump series. Disassembly and assembly require expertise and knowledge of the procedures, therefore the work must be carried out by qualified personnel.

These instructions must be carefully read and understood in conjunction with the section drawings and tables contained in the manual and enclosed, prior to attempt any work on the pumps.

For safety, installation and maintenance instructions consult the manual "INSTALLATION & OPERATING INSTRUCTIONS FOR CENTRIFUGAL PUMPS" attached to the pump at time of shipment. Consult also any other attached instructions for accessories and/or components included with the pumps such as mechanical seals, heat exchangers, flushing systems, instrumentation, etc.

Before operating or working on the pump it is recommended to adopt safety precautions wearing safety attire (hat, glasses, gloves, shoes, etc.) and have ready the necessary tools required for the work to be done.

Do not subject the pump or its components to sudden mechanical impacts and/or distortions.

Do not damage or scratch the sealing faces. Pay particular attention not to damage flat gaskets and O-Rings.

Careful not to leave foreign matters such as moults, screws, washers, rags, etc. in the pump.

When requesting spare parts or technical information for the pump, always quote the pump model number and serial number which is printed on the pump nameplate: therefore it is recommended not to remove the pump nameplate or, in case this action will be necessary, write the serial number on the pump (for example on the flange).

Should additional information be required, please do not hesitate to contact POMPETRAVAINI or the closest representative. Should there be any difficulties in repairing the pump, it is recommended to send the pump for repair to POMPETRAVAINI or the local authorised representative.

Pump repairs and/or service carried out by customer or unauthorised personnel are not guaranteed by POMPETRAVAINI or by its subsidiaries.

Note: Pump parts list identify all pump components by item number (VDMA) in connection with the sectional drawings.

All drawings are for reference purpose and not certified for construction, however should additional information be required, contact POMPETRAVAINI or its closest representative.

INDEX

- 1 - **Steps to be followed prior to pump disassembly**
- 2 - **Disassembly and assembly**
 - 2.1- *Disassembly*
 - 2.2- *Assembly*
- 3 - **Spare parts**
- 4 - **Section drawings**
- 5 - **Nomenclature of pump parts**
- 6 - **Engineering tables**



The liquids handled by the pumps and also their parts could be potentially dangerous for persons and environment: provide their eventual disposal in conformity with the laws into force and a proper environment management.



The present manual is not as signed for pumps subjected to the ATEX 94/9/CE directive. In case the pump is assigned in environments subjected to the application ATEX 99/92/CE directive or in case the pump is provided with a nameplate indicating the ATEX stamp, it is strictly forbidden proceed to start up the pumps but necessary to consult POMPETRAVAINI for clarifications.

For pumps subjected to the ATEX 94/9/CE directive it is available a dedicated integrative manual.

In preparing this manual, every possible effort has been made to help the customer and operator with the proper installation and operation of the pump. Should you find errors, misunderstandings or discrepancies please do not hesitate to bring them to our attention.

1 - STEPS TO BE FOLLOWED PRIOR TO PUMP DISASSEMBLY

Should pump repairs be required, it is recommended to acquire full familiarity of the procedures to be followed by studying these instructions and the "Operating Manual for Centrifugal Pumps".



FOLLOW THE SAFETY INSTRUCTIONS LISTED UNDER CHAPTER 2 OF THE AFOREMENTIONED OPERATING MANUAL.

It is important to adhere to the following before working on the pump:

- use the appropriate steps to stop the pump
- close the isolating valves at suction and discharge piping
- wear the safety clothing (hard hat, safety glasses, gloves, safety booths, etc.)
- disconnect the electrical power to the motor and all the electrical instrumentation and, if necessary, disconnect the electrical cables
- if the pump is handling hot liquids, let it cool down to ambient temperature
- drain the pump casing through by removing the drain plugs, rinse the pump with neutral liquid, if required



- adopt all safety precautions when the pump handles hazardous liquids, pollutant or toxic; these liquids as well as the liquid used for rinsing the pump must be collected and disposed of with the maximum caution and always in compliance with the local safety regulations.

To remove the pump and the motor (if required) from the installation proceed as follows:

- remove the bolts on the suction and discharge flanges
- disconnect any flushing lines, accessories and/or instrumentation connected to the pump assembly
- remove the motor, if necessary, by removing the anchor bolts from the motor flange
- remove the pump by removing the bolts from the pump's feet
- disconnect the pump from the installation with caution, do not damage any components
- refer to the "Operating manual for centrifugal pumps" for instructions on transporting the pump.

2 – DISASSEMBLY AND ASSEMBLY

2.1 – DISASSEMBLY

(Refer to sectional drawings fig. 1 and 2 of chapter 4).

To remove the impeller VDMA 230 from the pump casing VDMA 102 remove the nuts from the studs VDMA 902.2. Pumps fitted with Vortex type impeller, series TCMT, remove spacer ring VDMA 110 from pump casing or casing cover VDMA 161. Remove impeller nut VDMA 925, impeller VDMA 230 and impeller key VDMA 940.2 from shaft VDMA 210.

Measure (making a record) the location for seal locating ring VDMA 485, or mark its location on the shaft, then loosen the set screw VDMA 904, remove the locating ring from the shaft and remove the seal rotating part VDMA 433.2.

In the event the mechanical seal is fixed on the shaft with its own set screws then the locating ring may not be in the pump assembly.

Remove the nuts from studs VDMA 902.1, remove casing cover VDMA 161 from lantern flange VDMA 341.

Particular care should be given when removing the mechanical seal components from the pump, mechanical seals are fragile and may easily get damaged when mishandled.

Remove the stationary mechanical seal face from the casing cover, replace if necessary.

For complete pump disassembly proceed as follows.

Remove bolts VDMA 901, remove motor from lantern flange, remove snap ring VDMA 932.1 and shaft complete with snap ring VDMA 932 and ball bearing VDMA 320.

Remove snap ring VDMA 932 and the ball bearing from the shaft.

Finally remove the radial seal ring VDMA 421 from bushing VDMA 542.

2.2 – ASSEMBLY

Proceed with visual and dimensional inspections of the components to be replaced (use only original parts from Pompetravaini), check the parts for wear and tear (for critical dimensions see tab.1 and 2 on chapter 6).

When in doubt, contact Pompetravaini or the closest representative.

To replace the wear rings (only for TCHM series) VDMA 502, it is necessary to remove the set screws VDMA 904 and remove the wear rings with a gear puller or, if it is too difficult, machine them off with a lathe.

It is good practice to replace all gaskets even if they do not show any defects, replace also bearings and mechanical seals that have excessive play or grooved faces.

Thoroughly clean the parts with suitable cleaning products that are also compatible with the pump materials.

The bearings should be washed with a solvent or Diesel fuel, let them dry and then oil them. To facilitate their installation over the shaft it is required to pre-heat the bearings to about 80°C.

If there are no complications and the components are free from defects, wear or markings over the sealing areas, the pump assembly can be done proceeding with the sequences in the reverse of the disassembly.

Assembly of the pump wear ring should be done without force to prevent damages. To help keeping the gaskets firm in their respective sealing faces, it is suggested the use of compatible liquids such as oil or equivalent fluid.

Fig. 3 in chapter 6 lists recommended torque values for various screws and bolts in relation to their diameter.

ONLY FOR TCHM

Insert and press the wear ring VDMA 502.1 (if it is being replaced) in the pump casing VDMA 102, drill and tap between the wear ring and pump casing then install set screw VDMA 904 to secure the wear ring.

Fill radial seal VDMA 421 with grease and press it in the bushing VDMA 542.

Place shaft VDMA 210 in a vice with the threaded end upward, slide the ball bearing VDMA 320 over the shaft until it rests against the shaft shoulder and lock the bearing with snap ring VDMA 932. Do not to scratch the face of the radial seal ring. Slide shaft with bearing in the lantern face VDMA 341, careful not to damage the radial seal ring, then install the snap ring VDMA 932.1.

Place the motor vertically with the flange facing the top, place the pump shaft assembly on the motor flange guiding its shaft to engage the hollow pump shaft VDMA 210, then tighten bolts VDMA 901. Motor shaft and the key must slide precisely without being forced into the pump shaft.

Clean the seal cavity in cover VDMA 161 where the stationary seal part VDMA 433.2 will fit. Remove any incrustations, oxidations and deposits created by the flushing fluid.

Lubricate seal cavity and seal O-Ring with oil compatible with the materials.

Press the stationary part of the mechanical seal in the cavity lining up the driving pin VDMA 562 if there is one.

When considering a new mechanical seal, different than the original, it is very important to compare the major working dimensions with those of the original seal and the materials of construction must be compatible with the pumped liquid. It is recommended to read the mechanical seal instructions if supplied with the seal. For further information and working dimensions see tab. 1 in chapter 6 or contact Pompetravaini or the nearest representative.

Install the housing cover on the lantern face and tighten it with bolts VDMA 902.1.

The position should be so that the internal lubrication bore in the housing cover is pointing to the right hand and lined up with the arrow on the lantern frame cast; in the event tapped holes for the pump foot are drilled on the lantern frame, they should be directed downward.

Lubricate the seal rotating part and pump shaft with compatible oil, clean the seal faces with a soft non-abrasive tissue and slide the seal rotating part over the shaft until it rests against the face of the stationary seal face. Seal must be suitable for clockwise rotation unless it is a bi-directional type.

Slide and locate the seal locating ring in the original location which had been marked or at the measured location, then tighten the two set screws.

To prevent seal damages and breakdowns it is recommended not to use excessive force when fitting the seals, their components can be fragile

ONLY FOR TCHM

Slide impeller VDMA 230 over the shaft and lock it in place with impeller nut VDMA 925.

Place the gasket VDMA 400.1 on casing cover.

ONLY FOR TCTM

Place the proper gasket VDMA 400.1 on the casing cover and position casing spacer VDMA 110.

Slide impeller VDMA 230 over the shaft and lock it in place with impeller nut VDMA 925.

Place the gasket VDMA 400.1 on casing spacer.

Install pump casing VDMA 102; fix it in place with nuts and washers.

Pump casing should be positioned in such a way that, with the pump feet pointing downwards, the bore for internal lubrication in the casing cover is positioned on the right.

Place the pump in the horizontal position and make sure it turns freely by hand.

Following the pump assembly it is recommended to hydrotest the pump to make sure there are no outward leakages.

The recommended pressure test should be at least 1,2 times the maximum working pressure but in any case not less than 4 bar.

3 - SPARE PARTS

When ordering the pump it is good practice to also order the necessary spare parts, especially when there are no stand-by pumps in the installation. This will minimize unnecessary down times in the event of pump failure or routine maintenance. Following spare parts are suggested for each pump size:

1	Impeller
1	Wear ring (only for TCHM)
1	Shaft assembly
1	Ball bearing
1	Mechanical seals
2	Sets of gaskets

However for proper parts management, consult the VDMA 24296 standard that recommends the quantity of spare parts to be stocked in relation to the number of pumps installed.

On the pump nameplate are printed the pump model, the year of manufacture and the pump serial number: always provide this information when requesting spare parts.

Specify also the VDMA number of the required part, as seen on the pump sectional drawing and parts list for proper identification of spare parts.

We recommend the use of original spares: in case this is not respected, POMPETRAVAINI declines any responsibility for eventual damages caused by not original spare parts.

4 - SECTION DRAWINGS

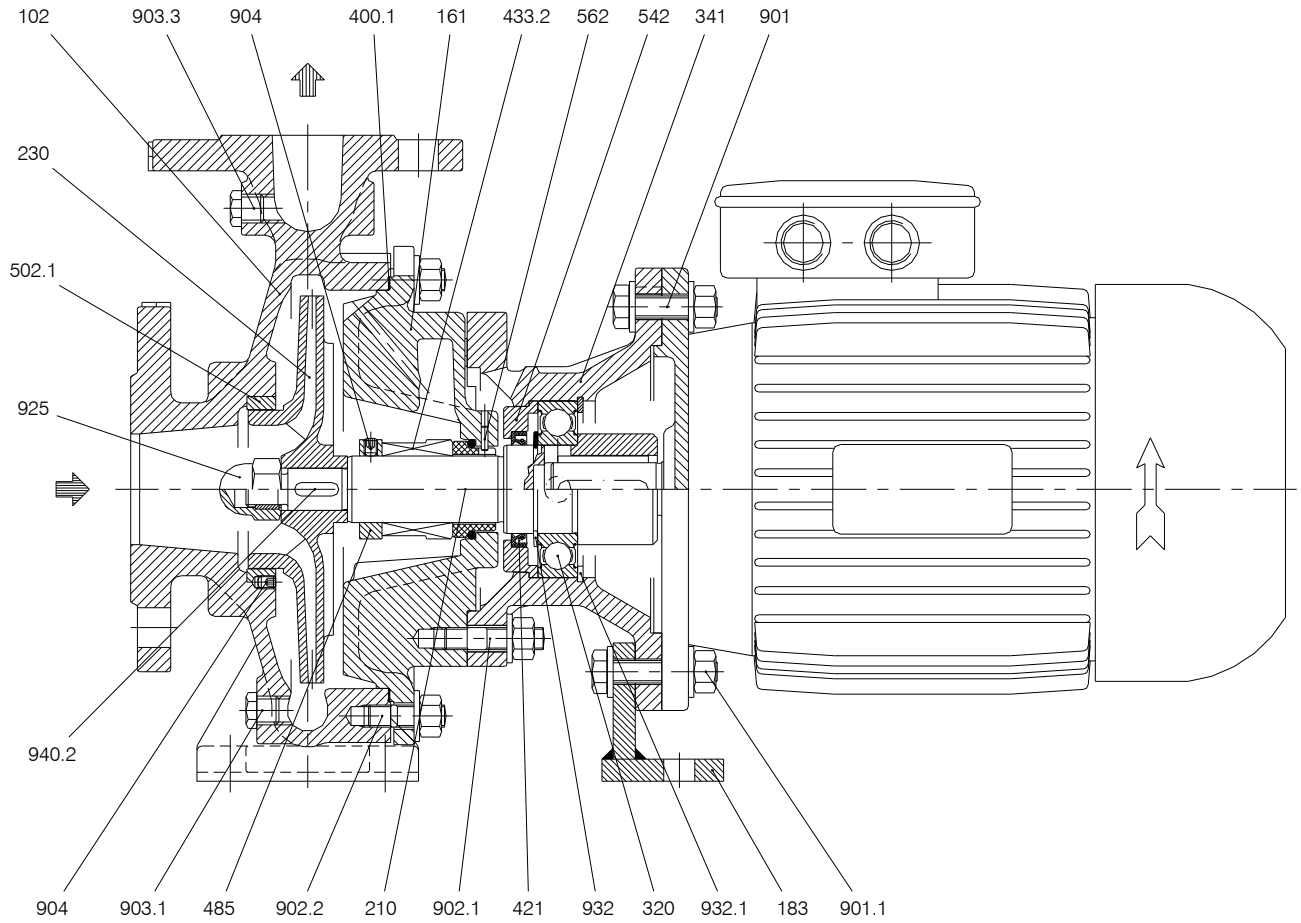


Fig. 1 - Pump series TCHM gr. 1 and 2 design /1-C = Single mechanical seal and motor frame 80 and 90

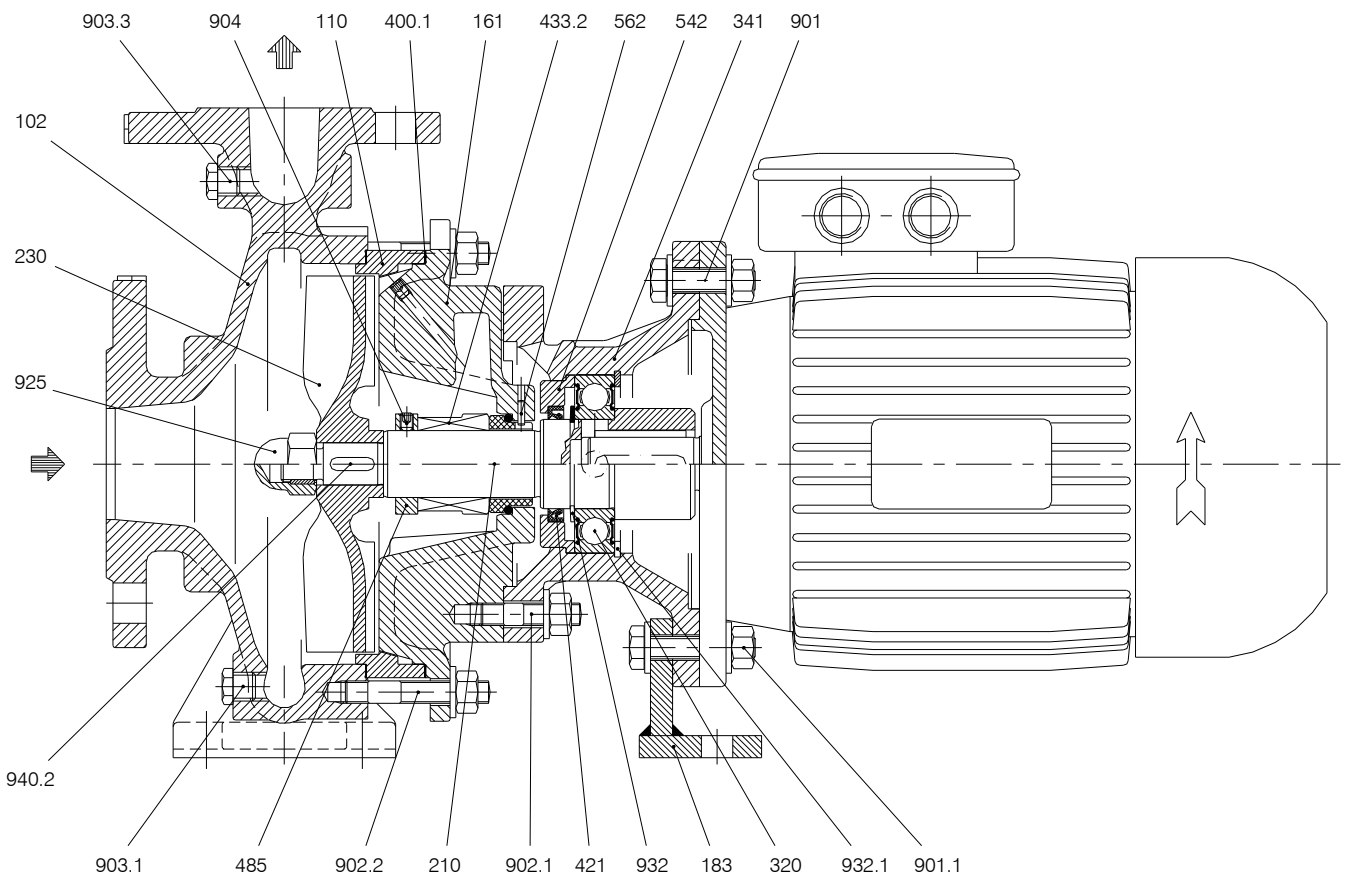


Fig. 2 - Pump series TCTM gr. 1 and 2 design /1-C = Single mechanical seal and motor frame 80 and 90

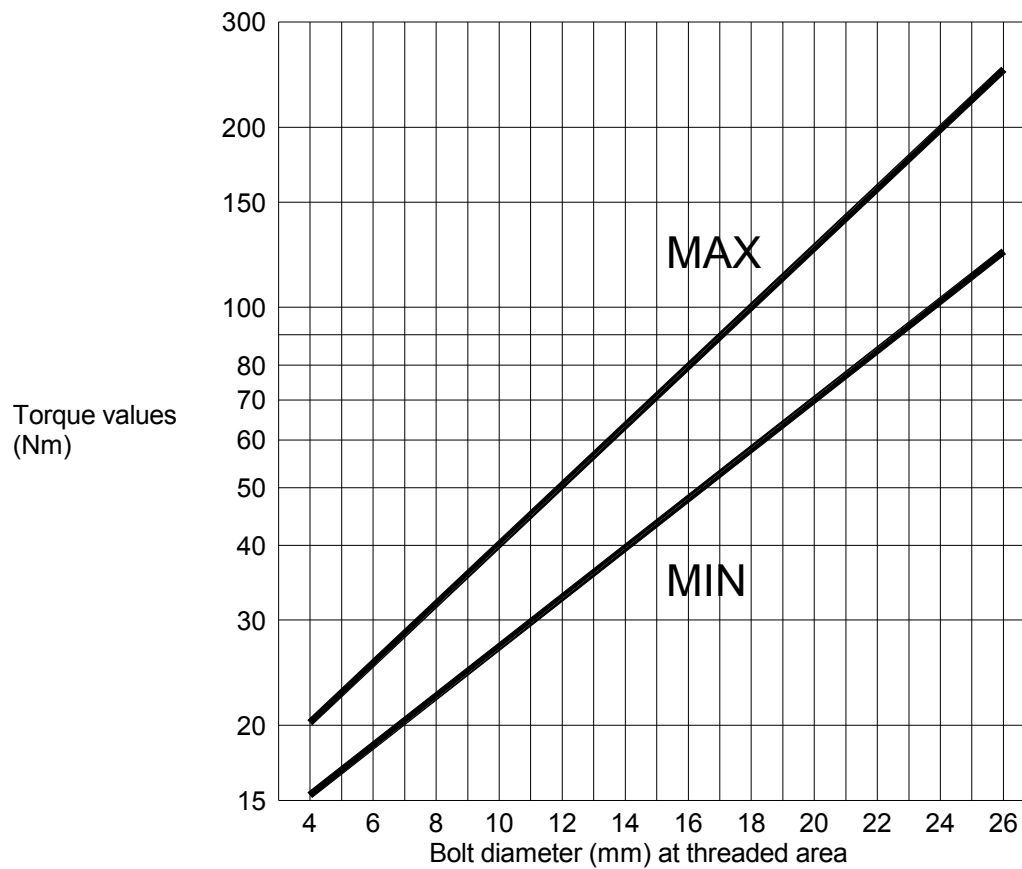
5 - NOMENCLATURE OF PUMP PARTS

VDMA N°	DESCRIPTION
102	Suction casing
110	Spacer ring
161	Casing cover
183	Support foot
210	Shaft
230	Impeller
320	Ball bearing
341	Lantern
400.1	Gasket
421	Radial seal ring
433.2	Mechanical seal

VDMA N°	DESCRIPTION
485	Seal locating ring
502.1	Wear ring
542	Mechanical seal bush
562	Pin
901...	Screw
902...	Stud
903...	Plug
904	Grab screw
925	Impeller locking nut
932...	Circlip
940...	Key

6 - ENGINEERING TABLES

Fig. 3 - Torque values for various bolt sizes



Tab. 1

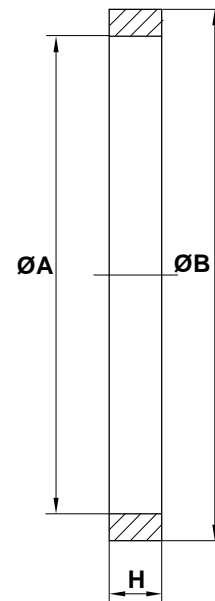
	PUMP MODEL	BEARINGS TYPE					RADIAL SEAL RINGS TYPE for SHAFT					* MECHANICAL SEAL Ø (mm)
		Motor frame					Motor frame					
		80 90	100 112	132	160 180	200	80 90	100 112	132	160 180	200	
Group 1	25-125	6208.2RS (40x80x18)	6011.2RS (55x90x18)	---	AS40527 (40x52x7)	AS55708 (55x70x8)	---	3	0			
	25-160											
	25-200											
	32-125 ●											
	32-160 ●											
	32-200 ●											
	40-125 ●											
	40-160 ●											
	40-200 ●											
	50-125 ●											
50-160 ●												
50-200 ●												
Group 2	32-250	6011.2RS (55x90x18)	6214.2RS (70x125x24)	AS55708 (55x70x8)	AS709010 (70x90x10)	45						
	40-250 ●											
	40-315											
	50-250 ●											
	65-125											
	65-160 ●											
	65-200 ●											
	65-250 ●											
	80-160 ●											
	80-200 ●											
	80-250 ●											
100-200 ●												
Group 3	100-250	---	6214.2RS (70x125x24)		---	AS709010 (70x90x10)		55				
	125-250 ●		6214.2RS (70x125x24)			AS709010 (70x90x10)						
	150-250 ---		6214.2RS (70x125x24)			AS709010 (70x90x10)						

● Available on TCTM design *

According to DIN 24960 standards

Tab. 2

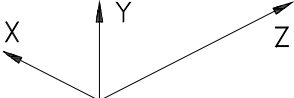
PUMP MODEL	NOMINAL DIMENSIONS OF WEAR RINGS			DIAMETRICAL CLEARANCE in mm BETWEEN IMPELLER NECK AND WEAR RING		IMPELLER MINIMUM BALL SIZE mm
				DESIGN		
	A	B	H	F - RA	A3	
25-125	72	84	13	0,33 - 0,48	0,43 - 0,58	6
25-160	72	84	13	0,33 - 0,48	0,43 - 0,58	6
25-200	72	84	13	0,33 - 0,48	0,43 - 0,58	5
32-125	72	84	13	0,33 - 0,48	0,43 - 0,58	6
32-160	72	84	13	0,33 - 0,48	0,43 - 0,58	5
32-200	72	84	13	0,33 - 0,48	0,43 - 0,58	5
32-250	85	97	13	0,44 - 0,59	0,74 - 0,89	6
40-125	85	97	13	0,34 - 0,49	0,44 - 0,59	10
40-160	85	97	13	0,34 - 0,49	0,44 - 0,59	7,5
40-200	85	97	13	0,34 - 0,49	0,44 - 0,59	6
40-250	95	110	16	0,44 - 0,59	0,74 - 0,89	6,5
40-315	95	110	16	0,44 - 0,59	0,74 - 0,89	8
50-125	95	110	16	0,34 - 0,49	0,44 - 0,59	16
50-160	95	110	16	0,34 - 0,49	0,44 - 0,59	13
50-200	95	110	16	0,34 - 0,49	0,44 - 0,59	9
50-250	105	120	16	0,44 - 0,59	0,74 - 0,89	5
50-315	105	120	16	0,44 - 0,59	0,74 - 0,89	7,5
65-125	105	120	16	0,44 - 0,59	0,74 - 0,89	20,3
65-160	120	135	16	0,44 - 0,59	0,74 - 0,89	18
65-200	120	135	16	0,44 - 0,59	0,74 - 0,89	14
65-250	120	135	16	0,44 - 0,59	0,74 - 0,89	12
80-160	135	150	16	0,44 - 0,61	0,74 - 0,91	25
80-200	135	150	16	0,44 - 0,61	0,74 - 0,91	21
80-250	135	150	16	0,44 - 0,61	0,74 - 0,91	15
100-200	150	170	18	0,44 - 0,61	0,74 - 0,91	27
100-250	150	170	18	0,44 - 0,61	0,84 - 1,01	18
125-250	180	200	20	0,44 - 0,61	0,84 - 1,01	30
150-250	215	235	20	0,45 - 0,62	0,85 - 1,02	48



NOTES

PUMP model	Serial Number	Computer Number	Year of manuf.
---------------------	------------------------	--------------------------	-------------------------

LIQUID handled	Capacitym ³ /h	Suction Pressurem	Discharge Press.m	Temperature°C		
<input type="checkbox"/> Lethal	<input type="checkbox"/> Toxic	<input checked="" type="checkbox"/> Noxious	<input type="checkbox"/> Corrosive	<input type="checkbox"/> Irritant	<input checked="" type="checkbox"/> Malodorous
<input type="checkbox"/> Clean	<input type="checkbox"/> Dirty	<input type="checkbox"/> With suspended parts	Spec. Gravity.....	Viscosity.....	PH.....	

TOTAL WEIGHT MAXKGs.	<p>MINIMUM DIMENSIONS</p>  <p>X =c m Y =c m Z =c m</p>	<p>NOISE (measured at 1 m)</p> <p>Pressure =dB(A) Power =dB(A)</p>
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INSTALLATION

Inside Outside

Explosive area

SERVICE

Continuous Intermittent

.....

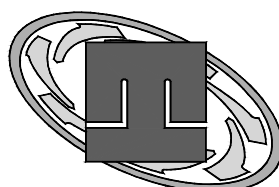
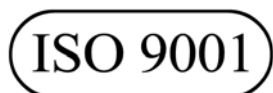
MOTOR type / Frame	No Poles	No RevolutionsRPM	Absorbed powerAmp	Installed PowerkW /HP
FrequencyHz	SupplyVolt	Enclosure IP.....	Insulation class	Absorbed PowerkW /HP

COMMENTS

NA5.SM.TCHM.GB00 / PRINTED IN ITALY

Smontaggio TCHM-TCTM Inglese

POMPETRAVAINI'S continuing research results in product improvement, 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