under this warranty will not extend the original warranty period.

CERTIFICATIONS

NSF standard 169 listed pumps (PA, MA and CA series).
NSF 169 listed pumps that meet the requirements of the low lead American law AB 1953 (PB, MB and CB).
WRAS certified pumps (PW, MW and CW).

The product complies with the following Directives:

- Directive 94/9/EC of the European Parliament and of the Council, of 23rd March 1994, related to equipments and protection devices intended to be used in potentially explosive environments - ATEX.
- D.M. 174/04 of the Health Ministry, of 6th April 2004, on materials and devices that may be used in fixed catching, treatment, adduction and distribution installations of waters destined for human use.
- EC Regulation n.1935/2004 of the European Parliament and the Council of 27th October 2004 on materials and articles intended to come into contact with food products and for which there are migration tests with photo A as required by DM n.338 of 22nd July 1998 Encl.1 Chapter 1.

Groups equipped with motors satisfy the requirements of the following Directives for the member states' legislations approaching:

- Directive 2004/108/EC of the European Parliament and of the Council, of 15th Dec 2004, related to the Electromagnetic Compatibility – EMC.
- Directive 2006/95/EC of the European Parliament and of the Council, of 12th Dec 2006, related to the electric material intended to be used within specified voltage limits – DBT.
- Directive 94/9/EC of the European Parliament and of the Council, of 23rd March 1994, related to equipments and protection devices intended to be used in potentially explosive environments - ATEX.
- Directive 2011/65/EU of the European Parliament and of the Council, of 08th June 2011, on the restriction of the use of certain hazardous substances in electrical and electronic equipment – RoHS.

MANUAL - PO/MO/CO en – 07/14 Ed.

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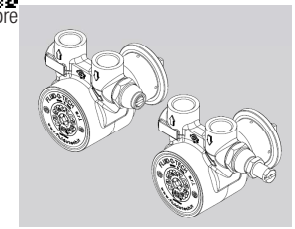
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INSTRUCTION MANUAL



DIRECT DRIVE ROTARY VANE PUMPS
MO/CO 30-200, PO 70-400 AND PO 500-1000 SERIES

INSTALLATION

The pump has to be installed exclusively by authorized staff. Handle with care.

WARNING

For food applications the pumps (even when NSF listed or WRAS approved) need to be sanitized by circulating water at 80 °C (176 F) for at least 20 minutes. The water used for this operation must not be reused, either during the sterilization or later.

It is recommended not pulling out the two protection sponge caps placed on the inlet and outlet of the pump before mounting the fittings and connecting the pipes, to avoid the incidental entrance of any solid extraneous object which might damage the internal components of the pump.The Fluid-o-Tech PO, MO and CO rotary vane pumps look identical in their shape, within each range, although the flow rates are different.

For this reason, in case of replacement, you should make sure that the flow rate of the new pump is the same of the previous pump you had.

Changing the pump with a model of different capacity may damage the system, the motor and the pump itself. The "CO" series pumps are not equipped with weep holes, therefore the normal condensation may not evaporate. In this case it is necessary coupling the pump to a motor with 4 holes at 90° in the coupling area.

If continuous operation is needed, the unit has to be mounted in an airy space in order to dissipate the heat produced by the motor.

The pump must be mounted horizontally.

To avoid noise and vibrations of mechanical parts, it's advisable to mount the motor on rubber shock-absorbing supports.

The use of the dumper coupling kit for 48YZ frame motors (92-80-04) is suggested in order to grant a proper alignment between the pump and the motor.

MOUNTING THE PUMP ONTO THE MOTOR

a) Motor with clamp mounting (type 48YZ)

- Make sure the motor is unplugged from the electric line
- Insert the clamp on the pump (shaft side)
- Couple the pump to the motor by inserting the pump shaft into the motor shaft and pushing it till it stops
- Turn the pump to the desired position
- Position the clamp in order to surmount the pump and the motor rings
- Tighten the clamp screw using 1-1.5Nm torque maximum
- Make sure that the clamp screw is tight enough to prevent the rotation of the pump on the motor
- Should the pump be noisy during the startup, it is necessary to untighten the clamp screw, reposition the pump and tighten it again
- If the pump continues being noisy we suggest you interpose the 48YZ optional coupling (92-80-04) between the pump and the motor.

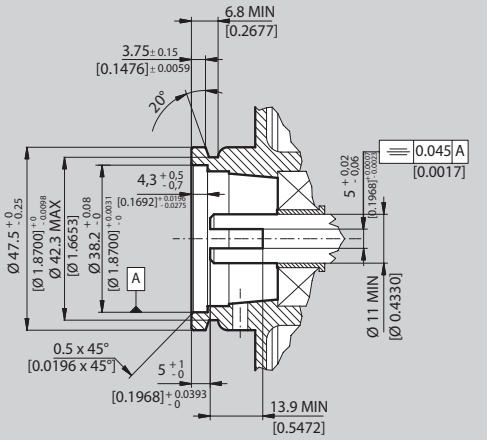
b) Motor with B14 or NEMA 56C mounting

- Make sure that the motor is unplugged from the electric line
- Mount the motor side of the coupling on the motor
- Tighten the set screw (only for the couplings equipped with the set screw)
- Insert the shock absorber in the coupling on the motor side
- Insert the pump side of the coupling in the shock absorber
- Mount the adapter on the motor flange and tighten the screws
- Insert the pump shaft into the coupling

- Position the clamp in order to surmount the pump and the adapter rings
- Turn the pump to the desired position
- Tighten the clamp screw using 1-1.5 Nm maximum torque.
- Make sure that the clamp screw is tight enough to prevent the rotation of the pump on the motor.

DIMENSIONAL REQUIREMENTS OF THE MOTOR FOR A CORRECT COUPLING WITH THE ROTARY DIRECT DRIVE FLUID-O-TECH PUMPS

The AT-190-1 tool, available on request, allows to easily check the conformity of the coupling area of the motor to what is shown in the drawing.



Dimensions in mm [inches]

CONNECTING THE PUMP TO THE CIRCUIT

The circuit should be carefully flushed before connecting the pump.

It's strongly recommended using, on the inlet port of the pump, pipes and connections of suitable size for the pump capacity, (8 mm for "CO 30-200" pumps with capacities up to 150 l/h, 10 mm for "PO 70-400" series pumps with capacities up to 500 l/h, 15 mm for "PO 500-1000" pumps with capacities up to 1000 l/h.

The pumps - although identical in their aspect – may have GAS or NPT threaded ports. The thread of the fitting should match the thread of the pump port. If the pump has GAS threads the sealing is provided by an o-ring which is pressed against the flat surface of the port. With the NPT thread, the sealing is provided by the contact between the threads.

Using a fitting with a GAS thread on a pump with NPT ports, or vice versa, may cause filaments in the pump pipes and possible breaks in the pump (especially on the inlet side) and cause the pump to fail.

In this case a few turns of PTFE tape around the fittings are necessary. Do not exceed in using PTFE tape as pieces of it may fall into the pump (especially on the Inlet side) and cause the pump to fail.

The use of pipe dope (liquid sealant) should be avoided. Particular care is needed while mounting the fittings, to avoid liquid leaks.

Hold the pump with a wrench in the area marked with the arrows indicating the inlet-outlet ports and the rotation sense, without over-tightening.

It is recomended not exceeding 15 Nm torque when tightening the fittings because the threads on the pump might be damaged.

It is suggested the use of aluminium sheet on each side of the pump to avoid damage to the ports. Do not use the motor as pump support when tightening the fittings, in order to avoid a possible misalignment and stress of the shafts.

If the pump is made of stainless steel the fittings have to be made of stainless steel or plastic, not in brass, to avoid problems of corrosion.

WIRING THE MOTOR TO THE POWER SUPPLY

- The power supply must be consistent with the electrical data stamped on the motor plate, with particular regard to voltage and frequency.
  The power supply needs to be switched off during installation.
- The motor rotation must be clockwise (looking the motor in front).
  If operated counter-clockwise, the pump won't work.
  In case the rotation is counter-clockwise, proceed according to the scheme generally enclosed in the electrical wiring box.
- If the pump fails or some estraneous object enters it, the pump-motor unit may stop or work in critical conditions; for this reason the motor should have a thermal protection to avoid overheating or a current protection to avoid overloading.

OPERATING CONDITIONS

For particular applications, please contact Fluid-o-Tech or the nearest authorized Fluid-o-Tech distributor.

- For applications that require temperatures higher than 80 ° C (176 F), please contact Fluid-o-Tech.
- The maximum differential pressure must not exceed 16 bar (230 psi)
- The maximum system pressure must not exceed 20 bar (290 psi)
- A hydraulic circuit with elbows and sudden changes in the diameter of the pipes, causes turbulence in the water and resonance in the machine
- Although Fluid-o-Tech may give technical support, the final approval of the pumps is responsibility of the Customer, in fact the performances and reliability may be affected by particular operating conditions and/or hydraulic circuits.

USEFUL TIPS FOR A LONG LASTING LIFE OF THE ROTOFLOW PUMPS

The Rotoflow pump is designed to handle clean fluids only. It is necessary for this reason to install before the pump a 10 µm filter with a filtering area big enough, so as not to cause flow-pressure losses in the circuit.

Place the filter at least 50 cm before the inlet port of the pump in order to avoid cavitation.

It is also important to check periodically the filter cartridge. In order to keep the filter under control, it is advisable to install a vacuum gauge before and after the filter. In case the vacuum increases more than 0.1 bar, the cartridge should be cleaned or changed.

A dirty filter, which doesn't allow enough flow of liquid through it, causes cavitation and fast wear of the pump. For the pump with a built-in filter it's recommended the periodic cleaning of the filter with alcohol and compressed air. If the filter is external it's necessary to clean it or to replace it periodically.

The rotary vane pumps are self-priming, but the dry running may cause overheating and failure of the mechanical seal and internal components and therefore possible leaks.

Before operation it is advisable to pour little water into the pump to keep the seal area wet in the first seconds of operation.

If the line is subject to scarce pressure or flow it is necessary to fit a low pressure switch before the pump in order to switch the motor off in case of water shortage.

In order to avoid cavitation, if the tank is at atmospheric pressure, do not install the pump more than 1 m above the maximum liquid level of the tank.

It is also necessary to protect the system from incidental overpressures with safety devices such as a pressure relief valve or a pressure switch connected to the motor.

If possible it's advisable to install the pump as close as possible to the tank.

The bypass valve is set at 12 bar (170 psi) unless otherwise requested.

The bypass valve is a relief valve and must not be used as a flow regulator. If used as a flow regulator, the water in excess will recirculate inside the pump heating and accelerating the deposit of limestone on the pump components. The maximum differential pressure should be at least 3 bar (43 psi) lower than the bypass valve setting in order to avoid operation with the bypass valve open. The maximum differential pressure must not exceed 16 bar (230 psi).

A few drops of water from the drain holes of the pump are normal during the first hours of operation. In case the leaking persists, contact Fluid-o-Tech.

The rotary vane pumps maintenance, and the replacement of the parts subject to wear has to be done by Fluid-o-Tech or a repair center authorized by Fluid-o-Tech.

WARRANTY

Every new pump is guaranteed to be free of defects when leaving the factory for a period of 12 months from the production date stamped on the pump's housing, plus a period of 3 months to cover the warehouse and transit time, or for a period of maximum 15 months from the purchasing date. In no event shall this period exceed 15 months from the date of the original invoice.

Fluid-o-Tech will repair or replace at its judgement part or all of the product not conform to this warranty. Fluid-o-Tech's responsibility under this warranty is limited to the repair or replacement of defective equipment returned to us on a D.A.P. basis, providing that our analysis discloses that such part or parts were defective at the time of sale.

The warranty is not recognized if:

- The directions on how to handle, install or operate the pump are disregarded
- The pump has been disassembled or modified by anyone other than a Fluid-o-Tech (or authorized by Fluid-o-Tech) engineer or repaired with non original components
- The pump operated dry or in cavitation
- Solid extraneous particles are found in the pump
- Evident signs of over pressure are observed compared to the values reported in the data sheet or in the specifications provided by the customer and accepted by Fluid-o-Tech.
- The pump has been utilized for an application where the operating conditions and/or the pumped liquid were incompatible with the pump itself. Furthermore the pump was not explicitly approved by Fluid-o-Tech for such an application
- The operating pressure results to be less than 1 bar below the bypass valve setting.

The adjustment or replacement of defective parts made

Fluid-o-Tech®
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Brass and stainless steel rotary vane pumps PO 500-1000 series

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The high volume rotary vane pumps manufactured by Fluid-o-Tech® and sold worldwide under the trademark Rotoflow® are available in six flow ratings to meet the needs of high volume pumping.



Technical features and manufacturing characteristics

The rotary vane pump with brass or stainless steel body utilizes a stainless steel AISI 303 rotor, while the pumping chamber and the vanes are in carbon graphite. Inlet and outlet ports are 1/2" GAS or NPT threaded and the pump could be equipped with a built-in adjustable relief valve. The pump can be connected to coupling direct motor with a metallic clamp or to M71 and M80 UNELMEC frame motors with the Fluid-o-Tech® coupling and adapter set. Maximum operative temperature: 70 °C (158 F)

Available upon request:

- Viton®/EPDM seals
- Built-in relief valve
- Flange mount
- California AB 1953 compliant brass

NSF

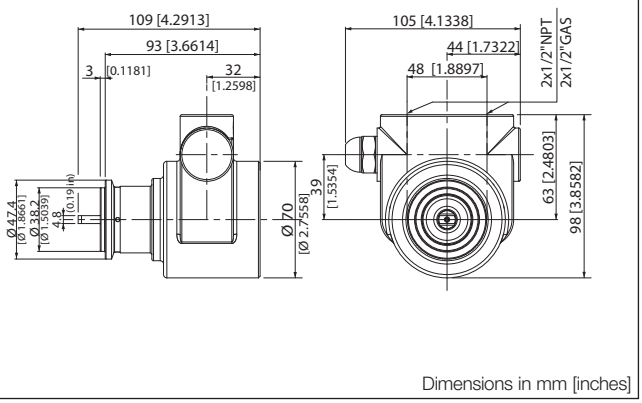
WRAS APPROVED PRODUCT

MAIN APPLICATIONS

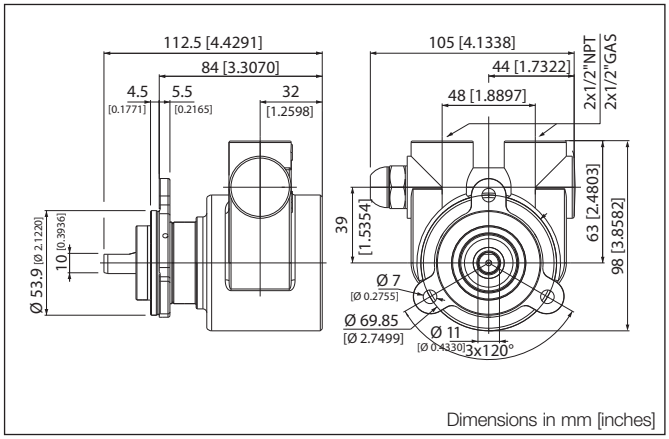
- Post mix drink dispensers
- Water treatment
- Cooling systems
- Booster systems

TECHNICAL INFORMATION

Pump housing material	Brass or stainless steel	Max static pressure	20 bar/290 psi
Pumping chamber	Carbon graphite	Pump weight	Clamp mount 1.9 kg (4.2 lb)
Ports	1/2" GAS or NPT		Flange mount 2 Kg (4.4 lb)
Speed limit	1725 rpm		

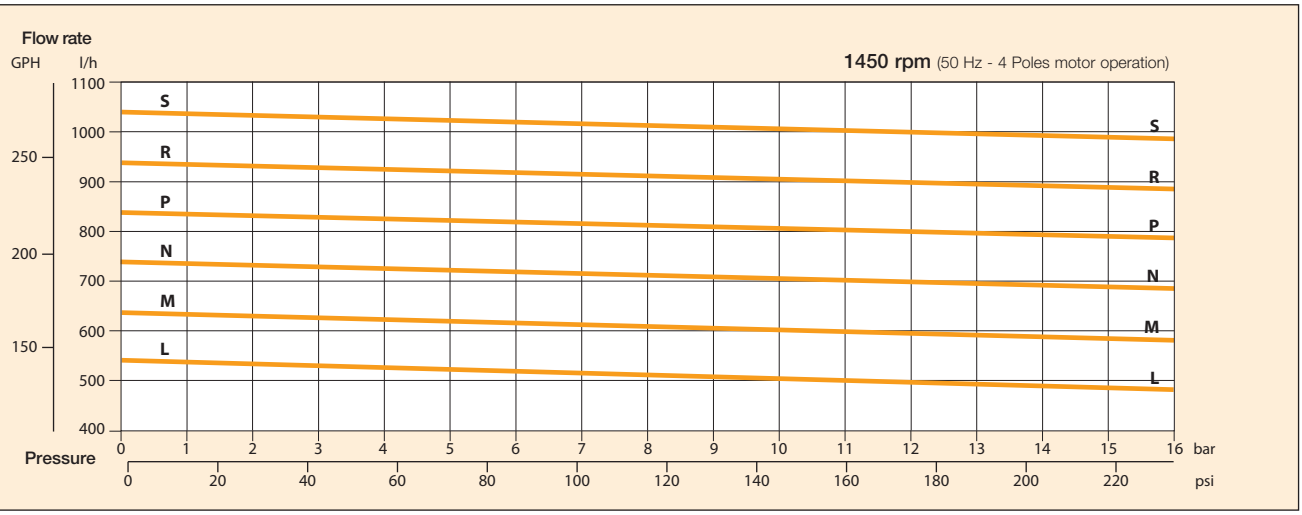


Dimensions in mm [inches]

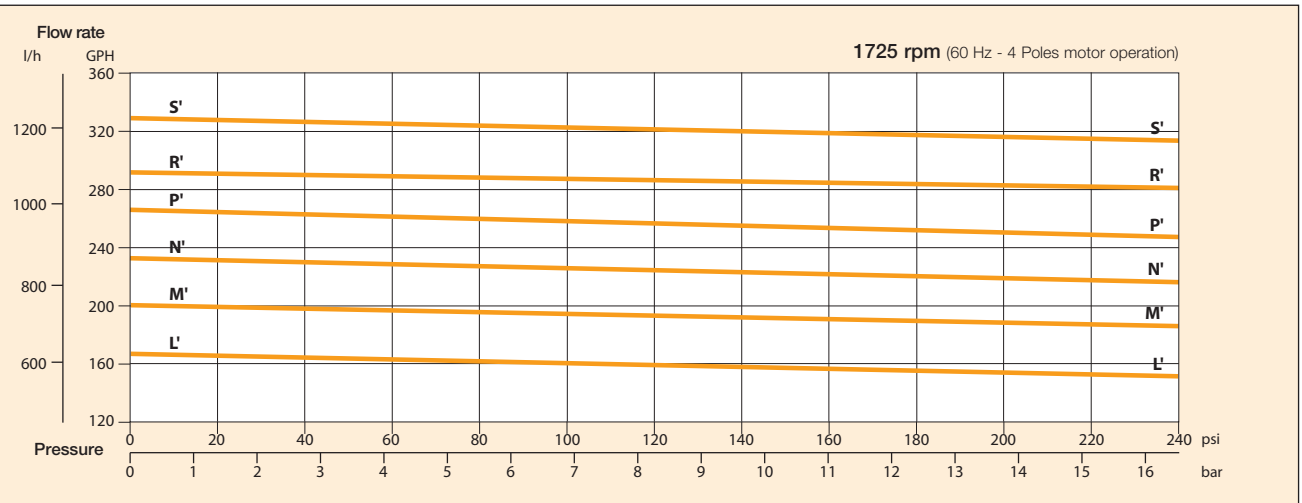


Dimensions in mm [inches]

Model PO/PA/PW Brass	500	501	500F	501F	600	601	600F	601F	700	701	700F	701F	800	801	800F	801F	900	901	900F	901F	1000	1001	1000F	1001F
Model PO/PA/PW Stainless Steel	**510**	**511**	**510F**	**511F**	**610**	**611**	**610F**	**611F**	**710**	**711**	**710F**	**711F**	**810**	**811**	**810F**	**811F**	**910**	**911**	**910F**	**911F**	**1010**	**1011**	**1010F**	**1011F**
Figure	L-L				M-M				N-N				P-P				R-R				S-S			
Relief valve	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Flange mount	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
Clamp mount	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO



Model PO/PA/PW Brass	500	501	500F	501F	600	601	600F	601F	700	701	700F	701F	800	801	800F	801F	900	901	900F	901F	1000	1001	1000F	1001F
Model PO/PA/PW Stainless Steel	**510**	**511**	**510F**	**511F**	**610**	**611**	**610F**	**611F**	**710**	**711**	**710F**	**711F**	**810**	**811**	**810F**	**811F**	**910**	**911**	**910F**	**911F**	**1010**	**1011**	**1010F**	**1011F**
Figure	L'-L'				M'-M'				N'-N'				P'-P'				R'-R'				S'-S'			
Relief valve	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Flange mount	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES
Clamp mount	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO



Note: Characteristics at constant motor speed, with water at 20 °C (68 F) and bypass blocked - Figures of flow are averages.
For applications involving other fluids, high temperatures or unusual processing conditions, please consult the factory or an authorized Fluid-o-Tech distributor.

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Brass and stainless steel rotary vane pumps PO 500-1000 series

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POS	DESCRIPTION	MATERIAL	CODE	NOTES
1	HOUSING WITH BYPASS	BRASS	28-01-02	NPT PORTS
		S.S.	28-01-11	NPT PORTS
1A	HOUSING WITH BYPASS AND FLANGE	BRASS	28-01-05	NPT PORTS
		S.S.	28-01-14	NPT PORTS
2	BALL BEARING	STEEL	90-22-01	
3	WASHER	S.S.	22113	
4	MECHANICAL SEAL	CERAMIC/NBR	90-40-01	NSF/WRAS
		CERAMIC/VITON®	90-40-03	
		CERAMIC/EPDM	90-40-05	
5	REAR FLANGE	GRAPHITE	28-03-04	
6	ROTOR	S.S.	28-02-01	
6A	"D" ROTOR (FLANGE)	S.S.	28-02-02	
7	VANE PIN	S.S.	28-07-08	500 l/h
			28-07-09	600 l/h
			28-07-10	700 l/h
			28-07-11	800 l/h
			28-07-12	900 l/h
			28-07-13	1000 l/h
8	VANE	GRAPHITE	28-04-02	
9	LINER	GRAPHITE	28-05-10	500 l/h
			28-05-11	600 l/h
			28-05-12	700 l/h
			28-05-13	800 l/h
			28-05-14	900 l/h
			28-05-15	1000 l/h

POS	DESCRIPTION	MATERIAL	CODE	NOTES
10	FRONT FLANGE	GRAPHITE	28-03-06	
11	ALIGNMENT PIN	S.S.	28008	
12	CAP O-RING	NBR	90-23-93	NSF/WRAS
		VITON®	90-23-95	
		EPDM	90-23-94	
13	CAP	S.S.	28015	
14	SOLID BYPASS VALVE	BRASS	22-16-02	
		S.S.	22-16-03	
		PLASTIC	22-16-18	
15	SPRING	S.S.	22505	
16	WASHER	NYLON®	22-12-01	NSF/WRAS
17	BYPASS NUT	BRASS	22-20-01	
		S.S.	22-20-04	
18	BYPASS SCREW	BRASS	28071	
		S.S.	28072	
19	BYPASS SCREW O-RING	NBR	90-23-16	NSF/WRAS
		VITON®	90-23-20	
		EPDM	90-23-24	
20	ASSEMBLED CLAMP	S.S.	94-80-01	
21	FRONT SEEGER CIRCLIP	STEEL	28016	
22	REAR SEEGER CIRCLIP	STEEL	22083	
23	O-RING	NBR	90-23-26	

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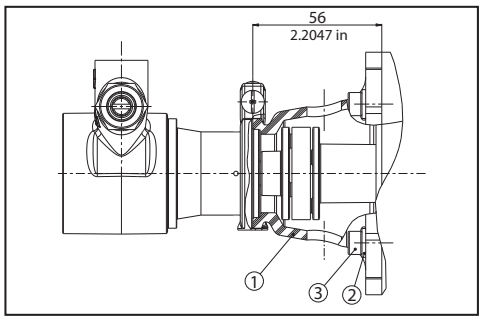
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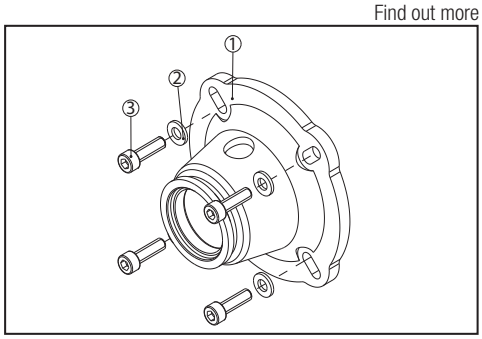
Fluid-o-Tech
POWER THE FLOW

Rotary vane pumps
Adapters and Couplings

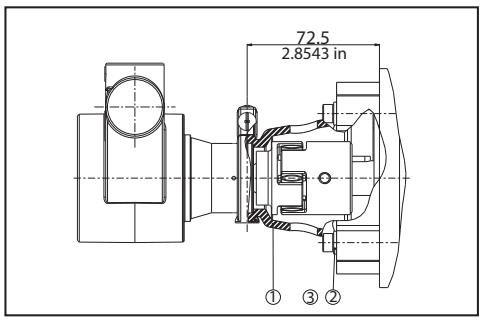
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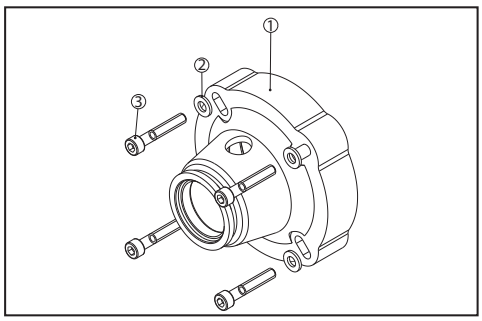
M71 - B14 (92-80-01)



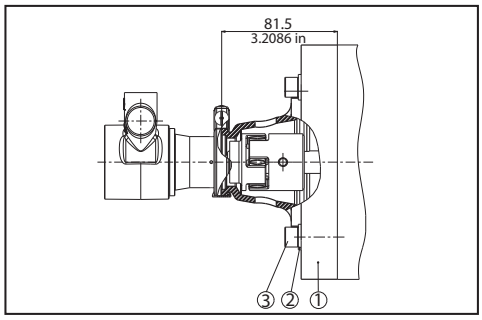
POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**ADAPTER M71 - B14**	PLASTIC	92-01-01	1
2	**6 MM FLAT WASHER**	STEEL	90-21-07	4
3	**SCREW M6X20 mm**	STEEL	90-01-02	4



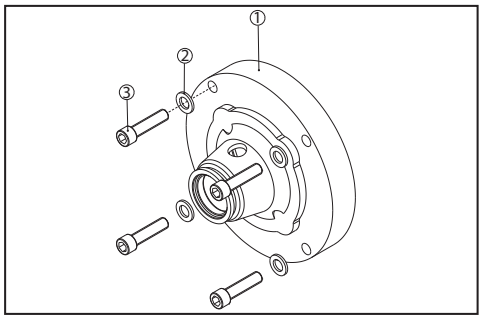
M80 - B14 (92-80-02)



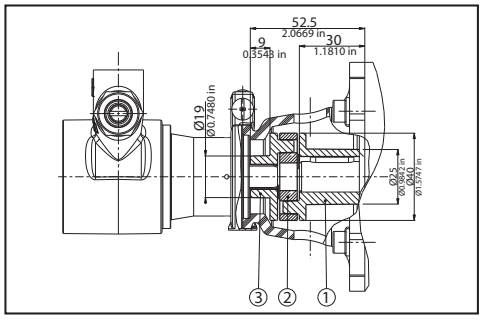
POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**ADAPTER M80 - B14**	PLASTIC	92-01-02	1
2	**6 MM FLAT WASHER**	STEEL	90-21-07	4
3	**SCREW M6X35 MM**	STEEL	90-01-04	4



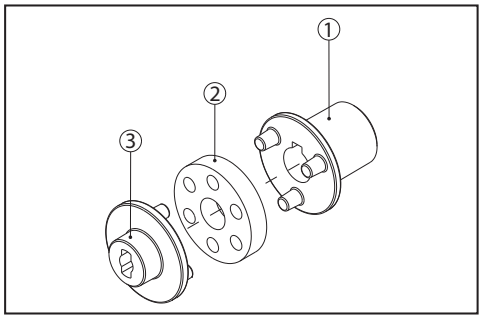
NEMA 56C (92-80-03)



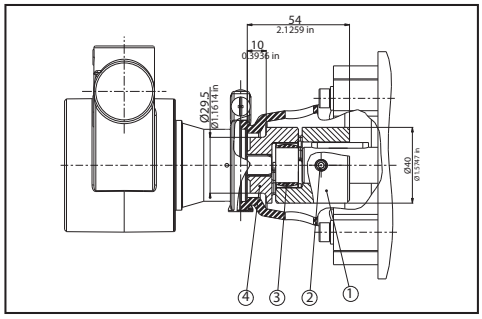
POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**ADAPTER NEMA 56C**	PLASTIC	92-01-03	1
2	**10 mm FLAT WASHER**	STEEL	90-21-08	4
3	**SCREW 3/8" 16X1-1/2"**	STEEL	90-01-02	4



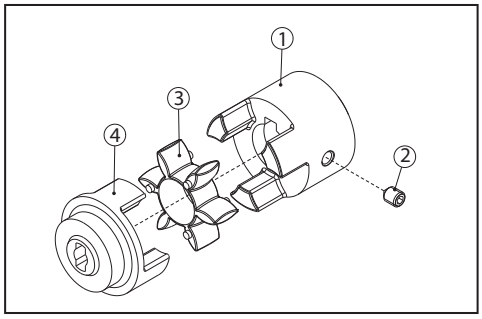
M71 - B14 (91-81-05)



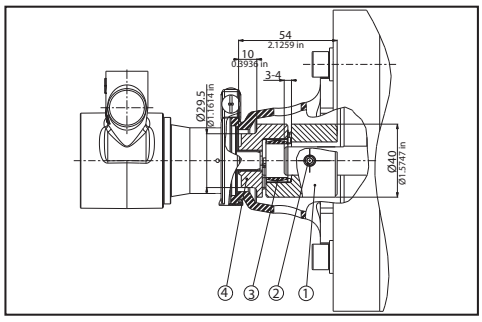
POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**COUPLING WITH 14 mm BORE**	BRASS	91-01-06	1
2	**INSERT**	RUBBER	91-02-03	1
3	**COUPLING - FLAT SIDE**	BRASS	91-01-03	1



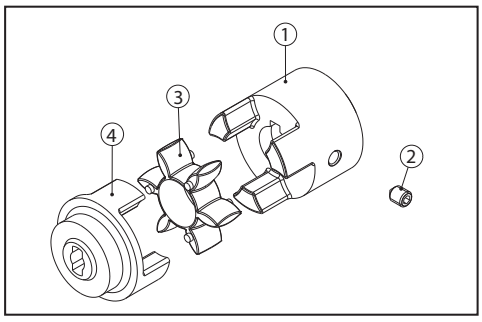
M80 - B14 (91-81-08)



POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**COUPLING WITH 19 mm BORE**	CAST IRON	91-01-12	1
2	**SET SCREW M6X8 mm**	STEEL	90-03-05	1
3	**INSERT**	RUBBER	91-02-02	1
4	**COUPLING - FLAT SIDE**	CAST IRON	91-01-08	1



NEMA 56C(91-81-11)



POS	DESCRIPTION	MATERIAL	CODE	QUANTITY
1	**COUPLING WITH 5/8" BORE**	CAST IRON	91-01-11	1
2	**SET SCREW M6X8 mm**	STEEL	90-03-05	1
3	**INSERT**	RUBBER	91-02-02	1
4	**COUPLING - FLAT SIDE**	CAST IRON	91-01-08	1

Fluid-o-Tech reserves the right to alter the specifications indicated in this catalogue at any time and without prior notice.

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DIRECT DRIVE ROTARY VANE PUMPS PO-PA SERIES WARRANTY

Every new pump manufactured by Fluid-o-Tech is guaranteed to be free of defects in workmanship and material when leaving the factory for a period of 12 months from the production date stamped on the pump's housing, plus a period of 3 months to cover the warehouse and transit time, or for a period of maximum 15 months from the purchasing date to the product use. In no event shall this period exceed 15 months from date of original invoice.
Fluid-o-Tech will repair or replace at its judgement part or all of the product not conforming to this warranty. Fluid-o-Tech's responsibility under this warranty is limited to the repair or replacement of defective equipment returned to us on a D.A.P. basis, providing that our analysis discloses that such part or parts were defective at the time of sale.

The warranty is not recognized if:

- The directions on how to handle, install or operate the pump are disregarded
- The pump has been disassembled or modified by anyone other than a Fluid-o-Tech (or authorized by Fluid-o-Tech) engineer or repaired with non original components
- The pump operated dry or in cavitation
- Solid extraneous particles are found in the pump
- Evident signs of over pressure are observed compared to the values reported in the data sheet or in the specifications provided by the customer and accepted by Fluid-o-Tech
- The pump has been utilized for an application for which it was not intended to be used where the operating conditions and/or the pumped liquid were incompatible with the pump itself. Furthermore the pump was not explicitly approved by Fluid-o-Tech for such an application
- The operating pressure results to be less than 1 bar below the bypass valve setting.

The adjustment or replacement of defective parts made under this warranty will not extend the original warranty period.