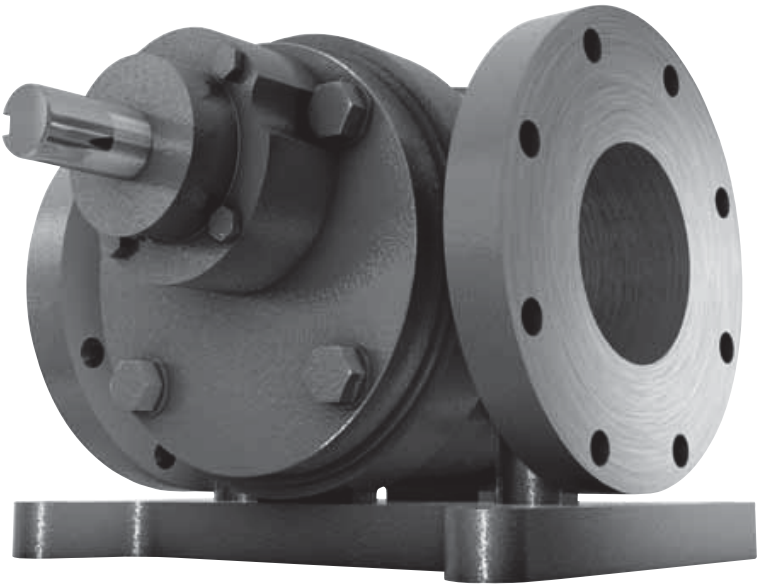
EGP Series



Installation, Operation, and Maintenance Manual

Model EGP, API676

ARYA SEPEHR KAYHAN

Product Safety Information

IMPORTANT

General - The following information is important in ensuring safety. It **must** be brought to the attention of personnel involved in the selection of the equipment, those responsible for the design of the machinery in which it is to be incorporated and those involved in its installation, use and maintenance.

Our equipment will operate safely provided it is selected, installed, used and maintained properly. As with any pumping equipment **proper precautions must be taken** as indicated in the following paragraphs, to ensure safety.

Potential Hazards - these are **not** necessarily listed in any order of severity as the degree of danger varies in individual circumstances. It is important therefore that the list is studied in its entirety:-

1) Fire/Explosion
   (a) Oil mists and vapour are generated within gear units. It is therefore dangerous to use naked lights in the proximity of the pump openings, due to the risk of fire or explosion.
   (b) In the event of fire or serious overheating (over 300 °C), certain materials (rubber, plastics, etc.) may decompose and produce fumes. Care should be taken to avoid exposure to the fumes, and the remains of burned or overheated plastic/rubber materials should be handled with rubber gloves.
2) Guards - Rotating shafts and couplings must be guarded to eliminate the possibility of physical contact or entanglement of clothing. It should be of rigid construction and firmly secured.
3) Noise - High speed gearboxes and gearbox driven machinery may produce noise levels which are damaging to the hearing with prolonged exposure. Ear defenders should be provided for personnel in these circumstances. Reference should be made to the Department of Employment Code of Practice for reducing exposure of employed persons to noise.
4) Lifting - Where provided (on larger units) only the lifting points or eyebolts must be used for lifting operations (see maintenance manual or general arrangement drawing for lifting point positions). Failure to use the lifting points provided may result in personal injury and/or damage to the product or surrounding equipment. Keep clear of raised equipment.
5) Lubricants and Lubrication
   (a) Prolonged contact with lubricants can be detrimental to the skin. The manufacturer's instruction must be followed when handling lubricants.
   (b) The lubrication status of the equipment must be checked before commissioning. Read and carry out all instructions on the lubricant plate and in the installation and maintenance literature. Heed all warning tags. Failure to do so could result in mechanical damage and in extreme cases risk of injury to personnel.
6) Electrical Equipment - Observe hazard warnings on electrical equipment and isolate power before working on the unit or associated equipment, in order to prevent the machinery being started.
7) Installation, Maintenance and Storage
   (a) In the event that equipment is to be held in storage, for a period exceeding 6 months, prior to installation or commissioning, we must be consulted regarding special preservation requirements. Unless otherwise agreed, equipment must be stored in a building protected from extremes of temperature and humidity to prevent deterioration.

   The rotating components (gears and shafts) must be turned a few revolutions once a month (to prevent bearings brinelling).
   (b) External pump components may be supplied with preservative materials applied, in the form of a "waxed" tape overwrap or wax film preservative. Gloves should be worn when removing these materials. The former can be removed manually, the latter using white spirit as a solvent.

   Preservatives applied to the internal parts of the pump do not require removal prior to operation.
   (c) Installation must be performed in accordance with the manufacturer's instructions and be undertaken by suitably qualified personnel.
   (d) Before working on the pump or associated equipment, ensure that the load has been removed from the system to eliminate the possibility of any movement of the machinery and isolate power supply. Where necessary, provide mechanical means to ensure the machinery cannot move or rotate. Ensure removal of such devices after work is complete.
   (e) Ensure the proper maintenance of gearboxes in operation. Use only the correct tools and our approved spare parts for repair and maintenance. Consult the Maintenance Manual before dismantling or performing maintenance work.
8) Hot Surfaces and Lubricants
   (a) During operation, pumps may become sufficiently hot to cause skin burns. Care must be taken to avoid accidental contact.
   (b) After extended running the pump may reach temperatures sufficient to cause burns. Allow equipment to cool before servicing or performing adjustments.
9) Selection and Design
   (a) Where gear units provide a backstop facility, ensure that back-up systems are provided if failure of the backstop device would endanger personnel or result in damage.
   (b) The driving and driven equipment must be correctly selected to ensure that the complete machinery installation will perform satisfactorily, avoiding system critical speeds, system torsional vibration, etc.
   (c) The equipment must not be operated in an environment or at speeds, powers, torques or with external loads beyond those for which it was designed.
   (d) As improvements in design are being made continually the contents of this catalogue are not to be regarded as binding in detail, and drawings and capacities are subject to alterations without notice.

The above guidance is based on the current state of knowledge and our best assessment of the potential hazards in the operation of the pump.

Any further information or clarification required may be obtained by contacting our Application Engineers.

Table of Contents

Safety Warning Symbols

Electrical Hazard
Could result in death or serious injury

Danger
Could result in serious, slight or minor injuries

Danger (Touch Hazard)
Could result in death or serious injury

Damaging Situation
Could result in damage to gear unit or driven machinery

Important notes on Explosion Protection

Cleaning
Periodic cleaning necessary

1 General Information

The following instructions will help you achieve a satisfactory installation, operation & maintenance of ASK EGP series gear pump.

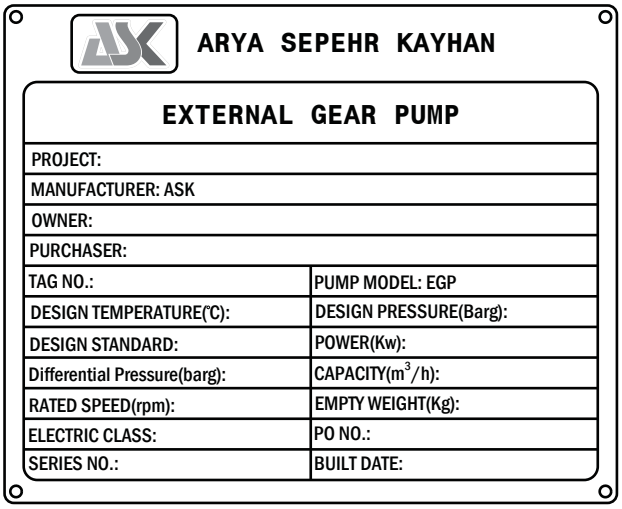
EGP pumps are of simple design using a minimum number of moving parts ensuring that if correctly installed will provide the best possible conditions for a long and trouble free operation.

All units are tested and checked prior to despatch, a great deal of care is taken in packing and shipping arrangements to ensure that the unit arrives at the customer in the approved condition.

2 External Protection

All EGP gear pumps are provided with protection against normal weather conditions. Where pumps are to operate in extreme conditions, or where they are to stand for long periods without running, e.g. during plant construction, consult our application engineers so that arrangements for adequate protection can be made.

3 Reading the Nameplate



ARYA SEPEHR KAYHAN

EXTERNAL GEAR PUMP

PROJECT:	
MANUFACTURER: ASK	
OWNER:	
PURCHASER:	
TAG NO.:	PUMP MODEL: EGP
DESIGN TEMPERATURE(℃):	DESIGN PRESSURE(Barg):
DESIGN STANDARD:	POWER(Kw):
Differential Pressure(barg):	CAPACITY(m^3/h):
RATED SPEED(rpm):	EMPTY WEIGHT(Kg):
ELECTRIC CLASS:	PO NO.:
SERIES NO.:	BUILT DATE:

3.1 Unit Identification

When requesting further information, or service support quote the following information from the nameplate:

- Pump Size
- Design Standard
- Serial number / Built date

3.2 Pump Unit Rating

The flow capacity rating (m^3/h) pump speed (rpm), design/operating pressures and power consumption are marked on the nameplate – Check that these details match the requirements of the machine prior to installation.

4 Explosion Protection

If the pump is supplied as a motorised package it is important to check the nameplates of both the pump and the motor (or any other equipment fitted) corresponds with the classification of the potentially explosive atmosphere in which the unit is to be installed.

5. Installation

5.1 Safety Warning

WARNING!

The customer shall be responsible for the proper use of articles supplied by the company, particularly rotating shafts between the driving members, and the provision of safety guarding.

The company shall not be responsible for any injury or damage sustained as a result of the improper use of the articles supplied.

Attention is hereby drawn to the danger of using naked lights in proximity of EGP pumps manufacturerd by ASK, and the company shall not be liable for any claim for injury or damage arising from any action in contravention of this warning.

5.2 Prior to Installation

5.2.1 Check the pump unit has not been damaged.
5.2.2 Check the pump unit / motor nameplate matches the requirements of the machine the pump unit is to be installed on.
5.2.3 Thoroughly clean the shaft and mounting surfaces that are to be used of anti-corrosion agents using a commercially available solvent. Ensure solvent does not make contact with the oil seals.

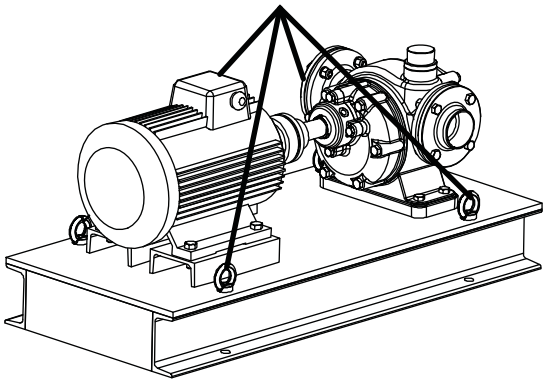
5.3 Lifting

5.3.1 Prior to lifting and moving the pump or pump and motor on a common base plate find out the following:

- Total weight and center of gravity
- Maximum outside dimensions
- Lifting points location

5.3.2 The load-bearing capacity must be proper to the weight of the pump or the pump set.
5.3.3 The pump or pump set must always be raised and transported in horizontal position.
5.3.4 It is absolutely forbidden to stand beneath or nearby a raised load.
5.3.5 A load should never remain in a raised position for longer than necessary.
5.3.6 Accelerating and braking during the lifting process must be performed such that there is no danger to persons.

When lifting the pump or complete pump set lift them as shown in following figure respectively to avoid any distortion (epecially do not use the motor eyebolt for carrying the complete unit).



5.4 Fitting of Components to the Pump Drive Shaft

5.4.1. Ensure shaft extension, bores & keys etc are cleaned.

5.4.2. The input shaft extension diameter tolerance is to ISO tolerance k5 (for shaft diameter ≤12.5mm) and m6 (for shaft diameter > 12.5mm) and the fitted components should be to ISO tolerance M7 (for bore diameter ≤50mm) and k7 (for bore diameter > 50mm)

5.4.3. Items (such as gears, sprockets, couplings etc) should not be hammered onto these shafts since this would damage the shaft support bearings.

5.4.4. Bores of Metallic Items may be heated to 80/100°C to aid assembly.

5.5 Mounting to Base Foundation or Machine Flange

5.5.1. Ensure the base foundation or machine flange mounting surface is flat[1], vibration absorbing and torsionally rigid. ([1] Maximum permissible flatness error for the mounting surface is 0.12mm)

5.5.2. Align the pump unit with the driving shaft or motor shaft (see Appendix 1).

Note: It is important to ensure when aligning unit on a base plate or flange that all machined mounting points are supported over their full area.

Check that all mounting points are fully supported and adjust if necessary by using steel packing's. If steel packing's are used between the equipment and base plate, these packing's should be placed at either side and as close to the foundation bolt as possible.

During final bolting ensure the pump unit, base plate or flange is not distorted as this could cause strains in the pump housing resulting alignment errors of shafts and rotors.

Secure using heavy duty bolts to ISO grade 8.8 minimum.

Torque tighten the bolts to value's specified in Table 1 except for aluminium flange motors

Bolt torques for aluminium flanged motors should be 75% of the values listed below:
Fit shaft / coupling guards where appropriate.

Bolt Size	Torque
M6	10 Nm
M8	25 Nm
M10	50 Nm
M12	85 Nm
M16	200 Nm
M20	350 Nm
M24	610 Nm
M30	1220 Nm
M36	2150 Nm

Table 1

5.6 Mounting to Pipe Work

5.6.1 It is recommended that suitable priming facilities i.e. U-shaped bends are installed in the pipe work at the suction side to prevent the pump starting dry, a filling port should be provided at the highest point of the suction pipe work for initial priming, where the pump ports are to be mounted vertically a non-return valve (or similar) should be incorporated in the suction line.

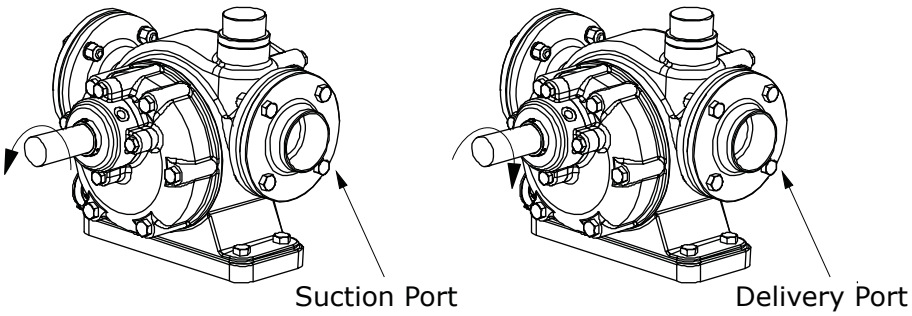
5.6.2 It is essential priming facilities are provided where a suction lift of greater than 2.4 Metres is required or the pump is to be used in a potentially explosive (ATEX) atmosphere

5.6.3 If the pump is to be connected to rigid pipe work ensure the pipes and fittings are made correctly to size so that errors in the pipe work when bolted to the pump do not impose strains in the pump housing resulting alignment errors of shafts and rotors.

5.7 Direction of Rotation

5.7.1 EGP pumps may be operated in either direction of rotation. If direction of rotation is changed the direction of flow will be reversed.

5.7.2 The direction of rotation and flow relationship are shown below:



5.8 Special Instructions for use in a Potentially Explosive Atmosphere

5.8.1 If the pump unit has been damaged in transit do not use. (Remove all transport fixtures and packing's prior to start up)

5.8.2 Check nameplate of unit corresponds with the sites potentially explosive atmosphere classification.

5.8.3 Make sure no potentially explosive atmosphere exists during installation.

5.8.4 Make sure that pump unit is sufficiently ventilated with no external heat input – cooling air temperature should not exceed 40°C

5.8.5 Check motors, couplings or any other equipment to be fitted to the pump unit has ATEX approval.

Check information listed on the nameplates correspond to the environmental conditions of the site.

5.8.6 Ensure the pump is not subjected to any loading greater than those marked on the name plate.

5.8.7 Pumped media must contain a lubricant and not contain any solid matter, Petrol and Solvents are not permitted.

5.8.8 For units operated with inverter drives, check motor suitability for use with the inverter.

Ensure that the inverter parameters do not exceed those of the motor.

5.8.9 For belt driven units, check all belts fitted are of sufficient electrical leakage resistance. ($< 10^9\ \Omega$).

5.8.10 Ensure the pump unit and other equipment fitted is electrically grounded (Earthed).

5.8.11 Ensure pump cannot be run dry (dry running is not permissible), priming facilities must be provided (See section 5.6)

5.8.12 Check and adjust safety guards and covers so that there is no ignition source from sparks that may be thrown by moving parts making contact with guards etc.

5.8.13 Ensure safety guards and covers etc... are designed dust tight or designed to prevent a build up of dust deposits from forming when the unit is used in dust atmosphere classi -fication areas (Zone 21 or Zone 22).

6 Lubrication

6.1 EGP gear pumps are completely self lubricating using the fluid being pumped for lubricating purposes. It is essential that the pumped fluid contains a suitable lubricant and is kept free from impurities.

7 Motor Connections

RISK OF ELECTRIC SHOCK

To mains:

7.1 Connection of the electric motor to the mains supply should be made by a qualified person. The current rating of the motor will be identified on the motor plate, and correct sizing of the cables to electrical regulations is essential.

Motor terminal connection:

7.2 The motor should be wired in accordance with the manufacturers instructions.

8 Starting Up

STOP

8.1 Prior to Starting Up

8.1.1 Ensure all operational safety devices are in place (i.e. guards fitted). Check and adjust guards and covers so that there is no ignition source from sparks that may be thrown by moving parts making contact with guards etc. Ensure coupling guards, covers etc are dust tight or are designed in such a way that a build up of dust deposits cannot form when the unit is used in Zone 21 & Zone 22 classification areas.

8.1.2 Check the pump unit has been assembled correctly for the required direction flow and shaft rotation.

DANGER Pinch Points Watch Your Hands

8.1.3 Remove any temporary safety devices / locks fitted to prevent personal injury during assembly.

8.1.4 Starting up should only be performed or supervised by suitably qualified personnel.

CAUTION

Caution: Any deviation from normal operating conditions, (increased temperature, noise, Vibrations, power consumption etc) suggest a malfunction, inform maintenance personnel immediately.

9 Operation

9.1 Noise

Check the noise level of the pump and surrounding equipment
Ear protection should be worn when working in close proximity of the pump when the noise level exceeds 85db(A)

9.2 General Safety

CAUTION

Potential hazards which can be encountered during installation, maintenance and operation of pump units is covered in greater detail in the product safety page at the front of this book let.

Advice is also given on sensible precautions which need to be taken to avoid injury or damage.
PLEASE READ!

9.3 Pump Units for Use in a Potentially Explosive Atmosphere

After 1 hour of operation check the pump surface temperature. The temperature should not exceed the values shown in the table below, If the temperature exceeds this limit, shut down immediately and contact our application engineers

Temperature Class	Max Temperature
T3	200°C
T4	135°C
T5	100°C

10 Maintenance

10.1 Prior to any maintenance operations

10.1.1 De-energise the drive and secure against un-intentional switch on.

10.1.2 Wait until the unit has cooled down – Danger of skin burns & pressure build up.

10.2 Replacing Oil Seals

Periodically worn oil seals may require replacement
These instructions apply only to pump units fitted with rubber lip type seals,
(for units fitted with mechanical seals consult the seal manufacturer's instructions)

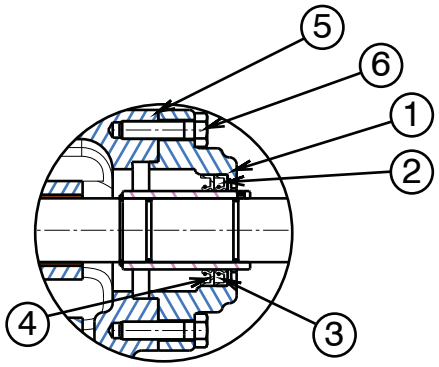
10.2.1 Place a tray under the pump unit to collect any spillage and remove the pump from the machine and pipe work. Warning take care when loosening fastenings as there may be a pressure build up within the pump which may cause fluid to eject.

10.2.2 Drain all internal fluid from the pump unit. Note: it is recommended that the fluid in the pump should be slightly warm, (40-50°C) when drained.

10.2.3 Remove the seal housing (1) from the pump and remove the worn seals, clean away any sealant and degrease the housing facings (5). Warning rubber gloves should be worn when handling worn oil seals

10.2.4 Fit new seals:

- Apply *grease to the seal (2) lip and outer ring diameter and fit the first seal into the housing as shown below, pack the internal cavity (3) with *grease.
- Fit the second seal (4) into the seal housing using the same procedure as above.
- Apply a suitable **liquid gasket to the housing facing (5), fit the seal and housing assembly to the pump taking care not to damage the seal lips, tighten the housing bolts (6) to the torque shown in table 1 (page 5), wipe away any excess grease or gasket material.



* Use a high temperature NLGI grade 2 grease

** Liquid gasket material – Loctite 5366 or equivalent High Performance Clear Silicone

10.3 Bearings

10.3.1 For Ex marked units bearings should be checked after 3 years operation, and replaced them (if necessary)

10.4 Cleaning

10.4.1 With the drive stationary, periodically clean any dirt or dust from the pump unit and the electricmotor cooling fins and fan guard to aid cooling.

10.4.2 Ensure any dust build up does not exceed 5mm (maximum)

11 Fault diagnosis

11.1 Pump Unit Problems:

Symptom	Possible Causes	Remedy
Not Enough or No Liquid is Delivered	Lack of Prime	*Fill the pump and its suction pipe completely with the liquid being handled, Bleed the pump and piping to remove air.*
	Pump Drive is Interrupted or Speed is Too Low	*Check drive coupling and motor connection*
	Discharge Head too High	*Check discharge line for blockages. Check that valves and other safety devices are working correctly, Check that the size and design of the delivery line meets the specification of the pump*
	Suction Lift Too High	*Check suction line for blockages. Check that the size and design of the suction line meets the specification of the pump*
	Wrong Direction of Rotation	*Check and correct as detailed in section 5.7*
	Filter Blockage	*Check filter elements, clean or replace.*
	Fluid or Air Leakage	*Check for leaks in the pipe work and connection flanges, Replace worn gaskets & seals as appropriate*
	Suction Pipe not Fully Submerged	*Check fluid reserve level or pipe work design*
Discharge Pressure is Too Low	Speed is Too Low.	*Check drive speed is appropriate for the duty*
	Gas or Vapour in the system.	*Bleed the pump and piping to remove the air from the system*
	Worn Pump Internal Parts.	*Contact our Sales Engineers*
	Worn Gaskets or Seals	*Replace or Contact our Sales Engineers*
	Obstruction in the Suction line	*Check and clear suction line of any blockages*
Cavitation (excessive noise)	Suction pipe not fully submerged	*Check fluid reserve level or pipe work design*
	Pumped Fluid Contains Air	*Check the system design - rid the fluid of air*
	Suction Lift Too High	*Check suction line for blockages. Check that the size and design of the suction line meets the specification of the pump*
Pump Overloads the Drive	Discharge Head Too High	*Check discharge line for blockages. Check that valves and other safety devices are working correctly, Check that the size and design of the delivery line meets the specification of the pump*
	Speed Too High	*Check drive speed is appropriate for the duty*
	Pump Housing Distorted	*Check the connection to mounting flange or base foundation and pipe work comply with sections 5.5 and 5.6*
	Pump Drive Shaft Misalignment	*Check drive shaft connection is correctly aligned (see appendix 1)*
Excessive Vibration or Noise	Gas or Vapour in the system.	*Check the tightness of the pipe work fasteners Bleed the pump and piping to remove the air from the system*
	Pump Drive Shaft Misalignment	*Check drive shaft connection is correctly aligned (see appendix 1)*
	Non Rigid Foundation	*Check foundation design and revise as appropriate*
	Worn Pump Internal Parts.	*Contact our Sales Engineers*
	Worn Gaskets or Seals	*Replace or Contact our Sales Engineers*
	Suction Lift Too High	*Check suction line for blockages. Check that the size and design of the suction line meets the specification of the pump*
Excessive Fluid or Pump Temperature	Debris in the Fluid	*Check filters for blockage, Check pump bores and clean away any debris Check for damage to the rotor teeth - Contact our sales engineers*
	Elimination of Internal Rotor Clearance	*This is indicative of bearing wear - Contact our sales engineers.*
	Closed or Sticking Valve	*Check all valves are correctly set and working.*

Any further information or clarification required may be obtained by contacting our sales office

When contacting our sales office please have the following information available:

- Nameplate data (complete)
- Type and extent of the problem encountered
- The time and the circumstances the problem occurred
- A possible cause

Appendix 1

Shaft Alignment

Errors of alignment fall into categories of Angularity (fig1) and Eccentricity (fig 2) or a combination of both, errors of angularity should be checked & corrected before the errors of eccentricity

Errors of Angularity

Errors of angularity can be checked using the following method:

Place a mark on both driving and driven hubs and measure the gap between them adjacent to the marks using a block gauge and feelers at position 1 (see fig 3) then rotate both shafts together a quarter turn keeping the marks aligned and take a another measurement at position 2, further measurements should be taken at positions 3 and 4 The difference between readings at position 1 and 3 can be used to calculate the error in the vertical plane and difference between positions 2 and 4 should be used to calculate the error in the horizontal plane.

The errors of angularity across the coupling diameter can be calculated in both the vertical and horizontal planes, The maximum error of angularity should be checked and adjusted to be within the coupling manufacturer's recommendations.

If the coupling faces are perfectly true then a stationary method can be used to check the errors of angularity: Keeping both shafts stationary and take the horizontal and vertical measurements at the four positions (see fig 3)

Figure 1

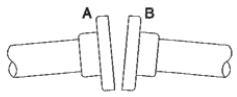


Figure 2

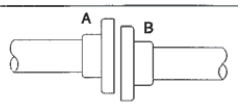
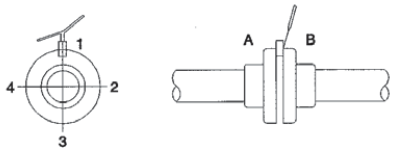


Figure 3

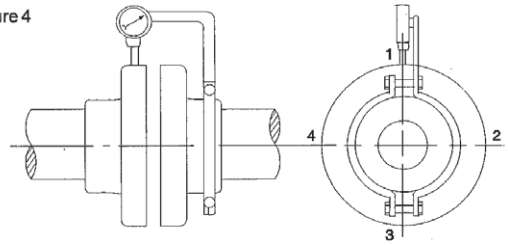


Shaft Alignment

Errors of eccentricity require measurements to be taken in the radial direction, the simplest and most convenient method* is to securely attach a dial indicator to one of the coupling hubs (as shown in fig 4) and rotate the hub taking measurements at four points as shown, the difference between measurement points 1 and 3 represent the vertical eccentricity and the difference between points 2 and 4 represent horizontal eccentricity.

The maximum error of eccentricity should be checked and adjusted to be within the coupling manufacturer's recommendations.

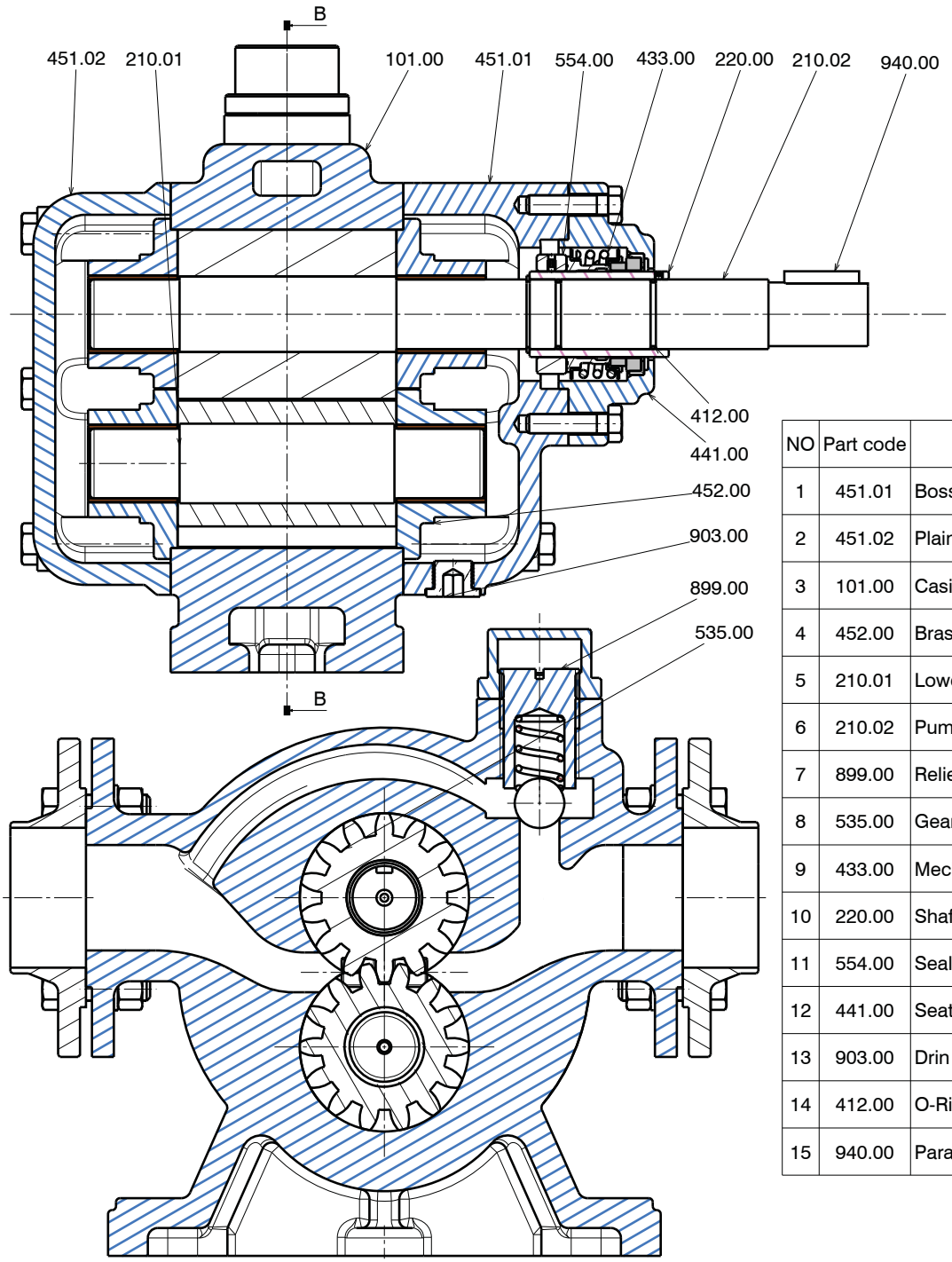
Figure 4



* More accurate alignment measuring processes such as laser alignment should be used when available

Appendix 2

Part List



NO	Part code	Part name
1	451.01	Boss plug
2	451.02	Plain plug
3	101.00	Casing
4	452.00	Brass bushing
5	210.01	Lower gear shaft
6	210.02	Pump drive shaft
7	899.00	Relief valve
8	535.00	Gear
9	433.00	Mechanical seal
10	220.00	Shaft sleeve
11	554.00	Seal Clamp Bush
12	441.00	Seat of mechanical seal
13	903.00	Drin Plug
14	412.00	O-Ring
15	940.00	Parallel Key

Arya Sepehr Kayhan Co.

ARYA SEPEHR KAYHAN

Pump & Electro Power System

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