KESTNER
Engineering Co. Limited

Bredgar Road, Gillingham,
Kent, ME 8 6 PN.
England

Telephone 01634 ~ 386683
Fax 01634 ~ 386684
Intl Tel + 44 ~1634 ~ 386683
Intl Fax + 44 ~1634 ~ 386684

Internet www.kestner-eng.co.uk
E-mail Sales@kestner-eng.co.uk

INSTALLATION AND INITIAL START-UP INSTRUCTIONS FOR KSI MODEL HORIZONTAL PUMPS.

PLEASE READ CAREFULLY BEFORE START-UP.

GENERAL.

1.1 *We undertake to guarantee the suitability of the material of construction used only on condition that the pump is operated in accordance with the duty conditions specified and confirmed by us.*

1.2 *Pump testing may be conducted if specified at the time of purchase, or at a later date if requested, at extra cost. By observing the following instructions, the pump will give trouble free operation, and meet the specified design parameters.*

1.3 *Each pump unit is provided with a stainless steel nameplate fixed to the bearing frame. When ordering spare parts, please quote the pump serial number, pump type, the description of the parts, and the part number as given in the parts list.*

1.4 Nameplate details give the following serial number which is unique to the unit supplied. I.e. :- 23547/CFH/00000-00

1.5 The following spare parts are recommended for two years continuous operation

Part No.	***Description***	***Material***
210	*Drive shaft*	*Steel*
230	*Impeller*	*High Silicon Iron*
322	*DE Bearing*	*-*
323	*NDE Bearing*	*-*
400.1	*Gasket*	*CNAF*
400.2	*Gasket*	*CNAF*
400.3	*Gasket*	*CNAF*
411	*Gasket*	*CNAF*
412.1	*'O' Ring*	*Viton/Neoprene*
412.2	*'O' Ring*	*Viton/Neoprene*
	Mechanical Seal	*PTFE*
420.1	*Oil seal*	*Nitrile*
420.2	*Oil seal*	*Nitrile*
507	*Flinger*	*Stainless Steel*

NOTE:- ALWAYS USE ORIGINAL MANUFACTURERS PARTS WHEN RE-FURBISHING THE PUMP.

IMPORTANT WARNINGS:-

DO NOT OPERATE THE PUMP UNIT WITH THE PUMP CASING DRY OR RUN THE MECHANICAL SEAL WITH PURE WATER OR DAMAGE TO THE PTFE SEAL FACE WILL OCCUR – IF WATER TESTING IS REQUIRED CHECK WITH JOHN CRANE AND ENSURE THAT A SUITABLE WETTING AGENT IS USED.

DO NOT OPERATE THE PUMP WITH THE PVC SEAL SPLASH GUARD REMOVED.

HANDLING.

2.0 WHILE LIFTING THE PUMP UNIT OUT OF THE BOX USE NYLON OR JUTE ROPE, AVOID THE USE OF STEEL ROPES – SEE APPENDIX 'A'.

INSTALLATION,

3.0 Preparation of foundations; Prepare the foundation keeping in mind the type of soil at the site. The top face of the foundation should be flat and horizontal. Place pipe sleeves for the foundation bolts while the foundations are being cast. Suitable allowance for grouting should be made.

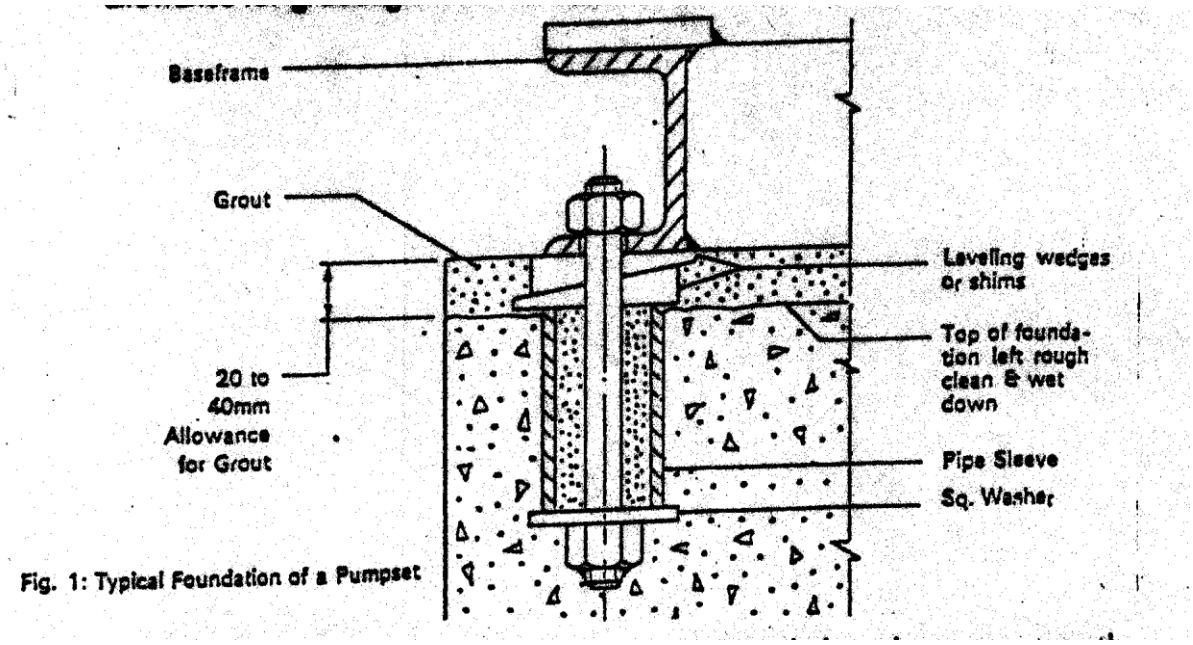


Fig. 1: Typical Foundation of a Pumpset

3.1 Suspend the foundation bolts from the baseplate and place the pumpset on the foundation. Level it with the aid of a spirit level placed on the pump shaft/ discharge nozzle. Insert suitable shims or levelling wedges under the baseplate to level the pumpset (see Fig.1 above.) After this, grout the foundation bolts. When the foundation bolts are set firmly, tighten the baseplate, making sure that the levelling of the pumpset is not disturbed. Now grout the baseplate to the foundation with non shrinking mortar. Ensure that no cavities are left unfilled. It is ***very important*** *that the alignment of the coupling and drive is then re-checked.*

3.2 Coupling Alignment; Correct alignment of the shaft is an important consideration in the correct operation of the unit. Even if the pump and motor are supplied from the factory in an aligned condition, there is every possibility of the alignment being disturbed during transit or while tightening the baseplate to the foundation. Therefore, it should be checked before putting the pump into service.

3.3 Piping; Connect the pipework to the delivery and suction flanges of the pump respectively. The weight of the pipework should ***not*** *be allowed to act upon the pump and should be adequately supported.* ***It is important that the suction and delivery pipes do not exert any strain on the pump flanges.*** *The nominal sizes of the pipelines should be at least equal to or larger than the nominal sizes of the pump nozzles.*

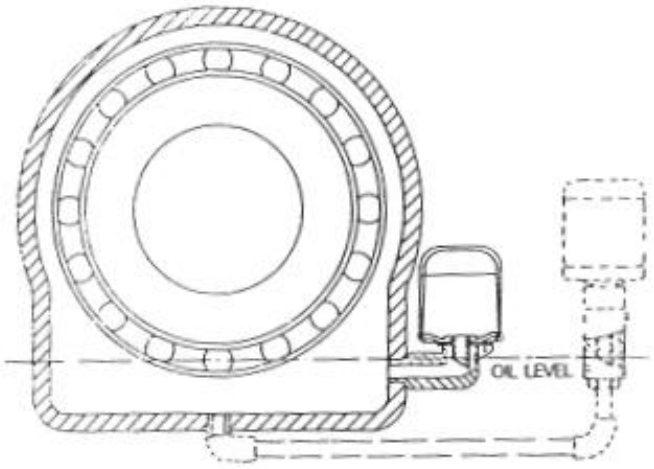
We also recommend that check valves or non-return valves and isolating valves are installed in the system, depending upon the type of installation. Also consideration should be given to compensate for any possible thermal expansion in the pipelines so that they do not impose any additional loadings on the pump branches. These loads can cause distortion of the unit causing seal failure, and bearing failure etc.

3.4 Auxiliary piping connections; Please ensure that auxiliary pipework connections, such as seal flushing, quenching, sealing, cooling etc. are correctly connected and supply the specified flowrate and pressure for correct operation.

3.5 Coupling guard; To ensure safe operation and prevent accidents the pump should ***only*** *be operated when the unit is correctly fitted with the coupling guard.*

COMMISSIONING.

4.0 Check the lubricating oil level in the bearing pedestal. Fill the oil up to the level shown on the indicator fitted on the bearing frame. Do not put excess oil in the unit as this may cause overheating of the bearings. See the enclosed data sheet for correct grade of oil. Do not mix oil types or grades. Always maintain the oil level by regularly replenishing the quantity of oil lost in normal operation.
Where a constant level oiler is provided, the procedure for oil filling is as follows; Unscrew the breather plug. Pour in the correct grade of oil through the breather plug using a suitable funnel after having hinged down the reservoir of the constant level oiler until oil appears in the elbow of the constant level oiler. Then fill the reservoir of the oiler and snap it back into its normal operating position. Fit the breather plug. Allow a few minutes to elapse, re-check the oil level in the reservoir. The reservoir should always remain filled.



Constant level oilers, depending on type are mounted into either oil level plug or drain plug holes. The cut-off tube MUST be vertical. Final oil level adjustments can be made by filing the cut-off tube or in the case of the VABL by the adjustment screw. To ensure the correct oil level, the gearbox MUST be filled using the oil feeder tube of the constant level.

The enclosed Lubrication chart gives details of the correct grade and type of mineral oil to ensure long bearing life under normal operating conditions.

NOTE:- IT IS VERY IMPORTANT THAT THE ALIGNMENT OF THE COUPLING AND DRIVE IS RE-CHECKED AFTER GROUTING INTO FINAL POSITION AND PIPEWORK INSTALLATION.

BEARING LUBRICATION.

5.0 The recommended oils to ensure long bearing life, are given in the table below. Care should be taken to ensure that oil types are not mixed and oil changes made at the specified intervals.

BEARING HOUSING TEMPERATURE °C	***PUMP SPEED***	***ISO VISCOSITY***
ABOVE 80° CENT	*1450 / 1750 RPM* *2900 / 3500 RPM*	*46 VG - TELLUS 46*
30°C TO 80°C CENT	*1450 / 1750 RPM* *2900 / 3500 RPM*	*32 VG - TELLUS 32*
-8°C TO 30°C CENT	*1450 / 1750 RPM* *2900 / 3500 RPM*	*15 VG - TELLUS 15*

NOTE:- Although Shell Oils have been specified, all the major oil companies will supply equivalents. Oil life is reduced by sustained use above 85° Cent. Frequent oil changes and the use of the oil cooler should be considered.

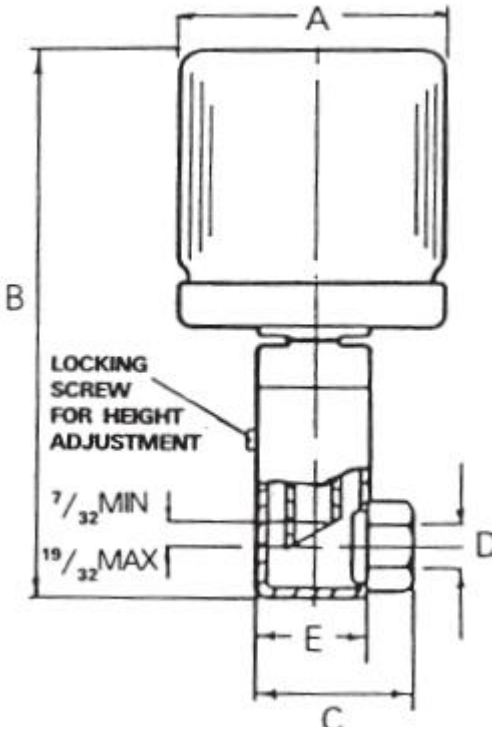
5.1 Lubrication; ***The first oil change should be carried out after 300 hours of operation.*** *The magnetic drain plug (903) should be removed using a hexagon key and the magnet wiped with a clean lint free cloth to remove any metallic particles from the magnet. After this, change the oil after* ***every 3,000 hours of operation.*** *The procedure for changing the oil is given in section. 4.0.*

IMPORTANT NOTE.

5.2 Some models of the KSI range are now fitted with a variable level Constant Level Oiler. The setting screw should be adjusted to give the maximum oil level

i.e. Dimension 'B' = 5. 1/2" (140mm)

Dimension 'F' = 19/32" (15 mm)



FILLING:- Unscrew the breather plug. Pour in the oil through the breather plug hole after removing the glass bottle portion, until oil appears in the bottom of the inlet pipe of the constant level oiler. Remove the glass reservoir bottle from the dip pipe tube and fill with oil. Replace the dip tube pipe onto the glass bottle. Place a finger on the angle of the outlet tube and invert. Then push the dip tube into the fixed oiler until the circlip grips the tube. Fit the breather plug and wait for a few minutes. Check the oil level in the reservoir.

*The Constant Level Oiler reservoir should **always** remain filled during operation of the unit - check frequently.*

ROUTINE CHECKS.

5.3 *Check the pump for free rotation. The supply voltage should be checked with the motor nameplate. The phasing of the supply should be in accordance with the information plate on the motor. Check the direction of rotation of the motor before coupling the pump to the motor. This must agree with the direction arrow indicated on the bearing housing.*

Check the auxiliary pipelines are in order. See attached section regarding the use of mechanical shaft seals if fitted.

Check the pump is fully primed if it is working against a suction lift. Remove any air in the suction pipeline by venting it by means of a vacuum pump or any other suitable equipment.
Check that the isolating valve in the discharge line is fully closed.

***SWITCHING ON**; Close the discharge line valve fully. Start the pump unit. Open the isolating valve gradually only after the motor has attained its full operating speed. Adjust the operating point until the correct flowrate has been achieved. Check that the electric motor is not overloaded by checking the current drawn by the motor, the full load current is stated on the motor nameplate.*
Check the bearing temperature after the correct operating temperature has been attained. Check all pipelines for leakages. Check the leakage through the gland packing at the stuffing box. Even though excessive leakage is not recommended, the gland should drip a little and with some regularity.
***SWITCHING OFF**; Close the discharge line valve. If a non-return valve is used, the isolating valve can remain open. Stop the motor. Close the auxiliary pipe connections, if any, only after stopping the motor. Stop the cooling water supply to the oil cooler, if fitted.*

GENERAL OPERATION.

5.4 *The following points should be checked at regular intervals.*
The pump should run smoothly, free from vibration.
The electric motor should not be overloaded. The pressure gauge reading and the power consumption should not exceed the specified ratings.
Avoid prolonged running of the pump against a closed valve in the discharge line as this will generate excessive heat due to 'churning' which is not desirable.
The bearing temperature should not exceed 50 deg. Cent. above the ambient.
The maximum temperature allowed is 85 deg. Cent.
Auxiliary pipework connections should not be closed whilst the pump is running.
Wherever necessary, provide a pressure gauge with a cock on the discharge line near to the pump discharge nozzle. A suction line gauge is also strongly recommended.
Provision of an Ammeter to maintain a constant check on the current drawn by the motor so as to avoid overloading of the motor is also advisable.

DISMANTLING.

6.0 Isolate or disconnect the electrical supply to the motor.
Drain the oil from the bearing housing by removing the drain plug (903) and remove the coupling guard.
Disconnect the spacer coupling by removing the flexible tyre. If no spacer type coupling is fitted, remove the electric motor,
Disconnect any auxiliary piping connections, such as flushing, seal quenching, or oil cooler supply and drain.
Drain the pump casing and remove the unit from the baseplate..
Remove the body clamp bolts (910) and split the casing assembly.
Remove the rotor (230) by unscrewing from the main drive shaft (210), remove the gland assembly and pump backplate (161) complete with the rotor (230).
Now remove the gland follower (454) gland packing set (461) lantern ring (458) Flinger (507) from the casing backplate (161). Carefully remove the 'O' rings (412) Inspect each 'O' ring carefully and replace if necessary.
In the case where a mechanical shaft seal is fitted as standard, unscrew the two seal housing clamp bolts, remove the impeller, backplate and seals as complete unit.
Remove the seal clamp plate and seal housing and remove the rear seal and using a suitable drift carefully push the impeller through the pump backplate and the remove the front seal. The mechanical seal seats can then be removed from both the seal housing and the pump backplate by using a suitable drift and carefully applying a light firm pressure. The seal seat 'O' rings or square section seals may then be fully inspected and replaced if necessary.
Remove the bearing housing (330), both the drive end (322) and non drive end (323) bearings may then be removed for inspection.
Drive out the shaft (210) by light tapping on the shaft with a soft faced mallet or wooden block from the impeller side. The drive end bearing (322) will come out with the shaft.
Remove the circlip (932) from the shaft and remove the drive end bearing housing (363), remove the circlip (931) and the bearing may then be removed with a puller.
The non drive end bearing (323) may then be removed with a puller.
Inspect the oil seals (420.1 and 420.2) and replace if necessary.
Clean all of the components and carefully check them for wear and tear, especially the drive shaft, stuffing box components, bearings. Replace all damaged or worn parts with new items.

RE-ASSEMBLY OF THE UNIT.

7.0 Usually the assembly proceeds in the reverse sequence to the dismantling operation. Mechanical seal assembly should be done as per the following instructions. Take care while mounting the bearings, bearing covers along with the oil seals on the drive shaft to ensure that the oil seal lips are not damaged.

*7.1 **Always** ensure that both the Steel Coupling guard and PVC Seal Splash Guard are re-fitted before placing the unit into services.*

7.2 After re-assembly of the unit, the rotor should turn freely without touching the volute casing etc. There may be a little resistance from the gland packing set if they are fitted or from the mechanical seal face friction. This resistance is always different from the feeling of internal components touching.

ASSEMBLY OF SINGLE MECHANICAL SEALS.

7.3a See the enclosed Fitting and Installation instructions for John Crane Type 10T & 10R PTFE Single mechanical shaft seals.

ASSEMBLY OF DOUBLE MECHANICAL SEALS.

7.3b The procedure given below is for the initial fitment of double type 59U Eurodin John Crane mechanical shaft seals, assuming that all items are new, in clean and unused condition. (USING GROUP 1 BEARING FRAME)

Ensure that the rotor setting dimension of 2mm is correctly set between the rotor (230) and the backplate (161).

If this is not correct proceed as follows:-
The method of achieving the correct setting clearance is to first machine a steel setting washer approx. 80mm O/dia by 50mm I/dia by 2.0 mm thick. Slide the setting washer onto the rotor stalk and then place the rotor stalk through the backplate bore with the setting washer sandwiched between the back of the rotor and the face of the backplate. Screw the assembly onto the pump drive shaft (940) until fully engaged on the thread. Loosen the cap screws (914.1) and tighten/or loosen the grubscrews (916) until the

back of the rotor is tightly pulled against the setting washer and backplate. Tighten the cap screws (914.1) to lock into position.
Remove the rotor, setting washer and backplate from the drive shaft. Remove the special setting washer and retain in a safe place for future use.

With the rotor on a bench with the shaft upwards, fit the mechanical seal seat to the backplate (161). Slide the pump backplate over the rotor shaft. Slide the mechanical seal with the face towards the seat onto the rotor shaft and then remove the setting clips. Using a tubular spacer exactly 68.0mm long push the seal onto the rotor shaft with the tube until the tube end is exactly in line with the end of the rotor shaft and the tighten the three seal clamping grubscrews.*
Fit the outboard seal seat to the stainless steel seal housing. Slide the second outboard mechanical seal onto the rotor shaft and slide down until the backs of both seals touch. Tighten the outboard seal grubscrews.
Fit the seal housing gasket, after fitting the 1/8"BSP drain plugs (if fitted) to the seal housing, and coat the mating faces with red 'Hermatite' sealant. Fit the seal clamp plate (471) onto the securing studs (902.2) but do not tighten yet. (leave the nuts loose.)
(* = Note:- This dimension is applicable to Group 1 bearing frames only - see the relevant assembly drawing for Group 11 Bearing frame setting dimensions.)

Place the seal housing (471) onto the backplate (161) assembly with the rotor and mechanical seals, and then screw the assembly onto the pump drive shaft.
Fit the clamp bracket (110) with the volute casing secured in situ with the special bolts (903.3 and 935) to the pump bearing frame (330) after inserting the gasket (400.3). Tighten the body clamp bolts (920.2) to the correct torque setting. Then fully tighten the seal housing retaining studs evenly, until the clamp plate is tight. (Some distortion of the seal housing clamp plate may occur.) Fit the sealant flush inlet/outlet hoses and hydrostatically pressure test the seal chamber to 100 LBS/sq inch. for approx. 15 minutes, rotate the drive shaft in the correct direction occasionally to check for any leakage, prior to re-commissioning the unit.

NOTE:- It is strongly advised that spare gaskets, joints and mechanical seals are held on site for emergency repairs.

BEARING FRAME	*SIZE*	*SETTING WASHER DIMENSIONS*
GROUP 1 FRAMES	*40/160*	*80mm O/D x 50mm I/D x 2.0mm TH'K*
	40/200	*80mm O/D x 50mm I/D x 2.0mm TH'K*
	50/160	*80mm O/D x 50mm I/D x 2.0mm TH'K*
	50/200	*80mm O/D x 50mm I/D x 2.0mm TH'K*
GROUP 11 FRAMES	*50/250*	*100mm O/D x 65mm I/D x 2.0mm THK*
	50/315	*100mm O/D x 65mm I/D x 2.0mm THK*
	80/200	*100mm O/D x 65mm I/D x 2.0mm THK*
	80/250	*100mm O/D x 65mm I/D x 2.0mm THK*
	100/200	*100mm O/D x 65mm I/D x 2.0mm THK*

NOTE:- ***FOR DETAILS OF GROUP 11 SEAL SETTING POSITION REFER TO THE SECTIONAL ASSEMBLY DRAWING***

NOTE:- ***GROUP 11 SETTING INSTRUCTIONS ETC ARE NOT APPLICABLE FOR CONTRACT NO:- 23547/CFH***

KESTNER ENGINEERING. CO. LTD.
RECOMMENDED 'MAXIMUM' TORQUE SETTINGS.

KSI MODEL PUMP SIZE	*BODY CLAMP BOLTS*		*SUCTION FLANGE BOLTS*		*DISCHARGE FLANGE BOLTS*	
	Size	*Kgf-cm*	*Size*	*Kgf-cm*	*Size*	*Kgf-cm*
40 / - - -	*M12*	*300*	*65 M16*	*200*	*40 M16*	*225*
50 / - - -	*M12*	*350*	*80 M16*	*200*	*50 M16*	*225*
80 / - - -	*M16*	*500*	*125 M16*	*250*	*80 M16*	*300*
100 / - - -	*M16*	*550*	*125 M16*	*250*	*100 M16*	*300*

lb - ft = kgf - cm x 9.807
100 x 1.3558

REV 01 1/9/96

DO NOT EXCEED THE 'MAXIMUM' TORQUE SETTINGS.

LONG TERM STORAGE.

8.0 The pump unit should be stored in a dry vibration free location preferably in the horizontal position. The pump unit should be rotated at least weekly and the motor checked for free rotation prior to installation. (See separate notes regarding long term mechanical seal storage.)

NOTE:-

ALWAYS USE ORIGINAL MANUFACTURERS PARTS WHEN RE-FURBISHING THE PUMPUNIT.

KESTNER ENGINEERING. CO. LTD.
TROUBLE SHOOTING GUIDE.

PROBLEM	*CAUSE*	*REMEDY*
Rate of flow low.	*Pump rotates in wrong direction.*	*Reverse the connections to the to motor terminal.*
	Impeller or strainer clogged.	*Clean respective part.*
	Sealing clearance increased.	*Replace worn components.*
	Delivery head requirement higher than specified.	*Consult manufacturer for fitting larger dia. impeller.*
	Pump speed too low.	*Voltage drop or low frequency, use motor of correct speed.*
	Frictional losses higher than specified.	*Increase pipe size.*
	Viscosity of liquid higher than specified.	*Consult manufacturer for possibility of changing the impeller.*
	Impeller worn.	*Replace with new component.*
Pump discharge too high.	*Delivery head lower than specified.*	*(a) Throttle discharge valve.* *(b) By-pass part of the capacity.* *(c) Reduce impeller diameter.* *(d) Fit orifice plate in discharge line.*
Pump vibrates.	*Pump starves.*	*Check suction conditions.*
	Impeller out of balance due to clogging.	*Clean impeller.*
	Misalignment.	*Check and Re-align unit.*
	Bearing worn out.	*Change bearings.*
	Undue stress on pump flanges.	*Anchor pipelines correctly.*
	Foundation not rigid.	*Check foundation and correct.*
	Rotating part rubbing.	*Check rotating assembly.*
Motor overloaded.	*Specific gravity of liquid higher than specified.*	*Use motor of higher rating.*

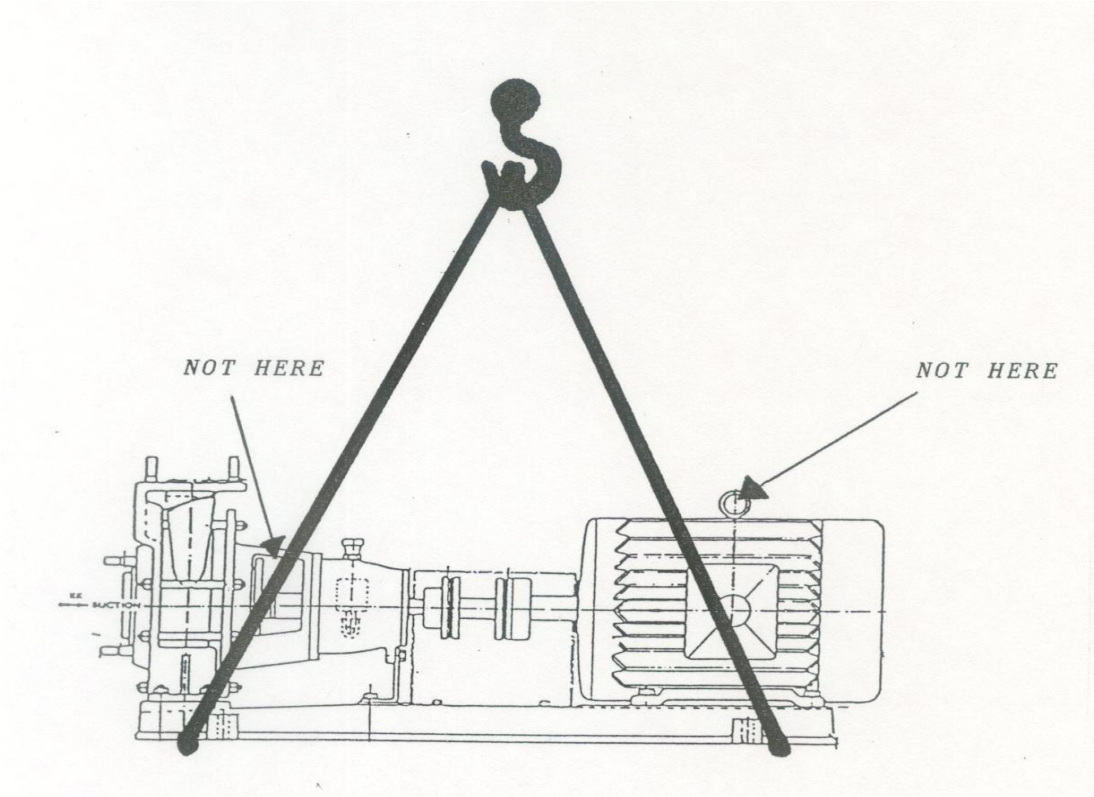
Viscosity higher than specified.	*Regulate viscosity or consult the manufacturer.*
Impeller rubbing against backplate/suction cover	*Check the internal operating clearances.*
Heavy friction in stuffing box bush and sleeve.	*Check clearances, shaft straightness and alignment.*
Excessive flowrate.	*Throttle the valve on discharge side.*

KESTNER ENGINEERING. CO. LTD.
HORIZONTAL LONG COUPLED PUMP UNITS.

APPENDIX 'A'

WARNING.

IT IS VERY IMPORTANT THAT WHEN LIFTING HORIZONTALLY MOUNTED PUMPS, THE LIFTING SLINGS ARE USED TO LIFT THE COMPLETE BEDPLATE AND NOT THE PUMP OR MOTOR



NOTE:-

AFTER FIXING THE UNIT IN ITS FINAL POSITION AND GROUTING TO FOUNDATION IT IS IMPORTANT THAT THE ALIGNMENT IS CORRECTLY CHECKED AND INSTALLATION AND OPERATION IS IN ACCORDANCE WITH THE INSTRUCTION MANUAL.

SPECIAL INSTRUCTIONS REGARDING SILICON IRON PUMPS.

High Silicon iron process equipment has been serving the chemical and associated industries for nearly eighty years. The corrosion resistance of this alloy has been claimed by many to be unexcelled by any other commercially available metal, or alloy, together with its excellent corrosion resistance High Silicon Iron by virtue of its hardness finds many applications where corrosion and / or erosion is present.
The greatest hindrance to the wide-spread use of this alloy has been its susceptibility to thermal and mechanical shock. It is therefore important that the following points are considered to achieve a long and trouble free service life.

(1) *Thermal shock should be minimised, and if possible gradually heat equipment to elevated working temperatures.*

(2) *Do not allow staff to 'hose down' equipment working at high temperatures. Rapid changes in ambient temperature may induce thermal shock, however, gradual temperature changes generally cause no service difficulties.*

(3) *Fitment of pipework expansion bellows, compatible with the pumped fluid, will reduce any mechanical loads or vibrations and is* ***" Highly "*** *recommended.*

(4) *Check the correct alignment of suction and discharge pipework this should be adequately and independently supported. The pump casing should* ***not*** *be used as a pipework support.*

(5) *Reduce any imposed pipework loading by not overtightening pipe flange connections. (see torque chart for maximum recommended values).*

(6) *High Silicon Iron alloys are very hard and machining of holes is very difficult, welding of castings is also impractical and should not be attempted.*

(7) *Metal pumps should have Compressed Non-Asbestos Fibre or similar jointing gasket material 1-2mm thick between the pump branches and connecting pipework. The joint material must be compatible with the pumped fluid.*

LUBRICATION CHART.

EQUIVALENT OIL GRADES.

SHELL	*B.P*	*CASTROL*	*MOBIL*	*ESSO*	*ELF*	*TOTAL*
TELLUS 15	*ENERGOL 15*	*HYSPIN AWS 15*	*DTE 11 M*	*NUTO H 15*	*ELFOLNA 15*	*AZOLLA 10*
TELLUS 32	*ENERGOL 32*	*HYSPIN AWS 32*	*DTE 32 M*	*NUTO H 32*	*ELFOLNA 32*	*AZOLLA 32*
TELLUS 46	*ENERGOL 46*	*HYSPIN AWS 46*	*DTE 46 M*	*NUTO H 46*	*ELFOLNA 46*	*AZOLLA 46*

EQUIVALENT GREASE GRADES.

SHELL	*B.P*	*SKF*	*MOBIL*	*ESSO*	*ELF*	*TOTAL*
ALVANIA R3	*ENERGREASE LS3*	*ALFALUB LG MT3*	*MOBILUX EP3*	*BEACON 3*	*MULTI 3*	*MULTI SPECIAL 3*

KESTNER
Engineering Co. Limited

Bredgar Road, Gillingham,
Kent, ME 8 6 PN.
England

Telephone 01634 ~ 386683
Fax 01634 ~ 386684
Intl Tel + 44 ~1634 ~ 386683
Intl Fax + 44 ~1634 ~ 386684

Internet www.kestner-eng.co.uk
E-mail Sales@kestner-eng.co.uk

INSTALLATION INSTRUCTIONS FOR FENNER TYPE FENAFLEX TYRE SPACER COUPLINGS.

ASSEMBLY

1.0 *Thoroughly Clean all components paying particular attention to the removal of the protective coating in the flange bores and bushes*

1.1 *Place each cleaned "Taper Lock Bush" in its respective flange and slide the flange onto its shaft. If keys are required, side fitting keys with top clearance should be used.*

1.2 *Using a straight edge line up the faces indicated with the shaft ends. Using a Dial clock gauge check the run-out of the spacer flange.*

1.3 *Position the " Fenaflex" flange on the spacer shaft to dimension "Y" shown in the Table 3 below*

1.4 Locate Spacer sub assembly on to the spacer flange and engage spigot, align holes and insert screws and tighten to the torques indicated in Table 4

1.5 Open out the Tyre to fit over the coupling flanges ensuring that the tyre bead seats properly on the flanges. To ensure proper seating it may be necessary to strike the tyre with a small soft head mallet. When seated there should be a gap in the tyre as shown in Table 2

1.6 Tighten clamping ring screws alternatively and evenly (approx half a turn at a time) working around each flange until required screw torque is achieved, see Table 1

DISMANTLING

1.1 Support the spacer sub-assembly

1.2 Remove the clamping ring screws progressively and evenly (half a turn at a time) to prevent distortion of the clamping rings

1.3 Remove the tyre

1.4 Remove the Spacer flange screws and lift out the spacer sub-assembly

Table 1

Coupling size	*F40*	*F50*	*F60*	*F70*	*F80*	*F90*	*F100*	*F110*	*F120*	*F140*	*F160*
M mm	*22*	*25*	*33*	*24*	*26*	*29*	*29*	*29*	*29*	*33*	*30*
Size mm	*M6*	*M6*	*M6*	*M8*	*M8*	*M10*	*M10*	*M10*	*M12*	*M12*	*M16*
Torque Nm	*15*	*15*	*15*	*24*	*24*	*40*	*40*	*40*	*50*	*55*	*80*

ASSEMBLY OF TYRE COUPLINGS

1.0 Thoroughly clean all components, paying particular attention to the removal of the protective coating in the bore of the flanges

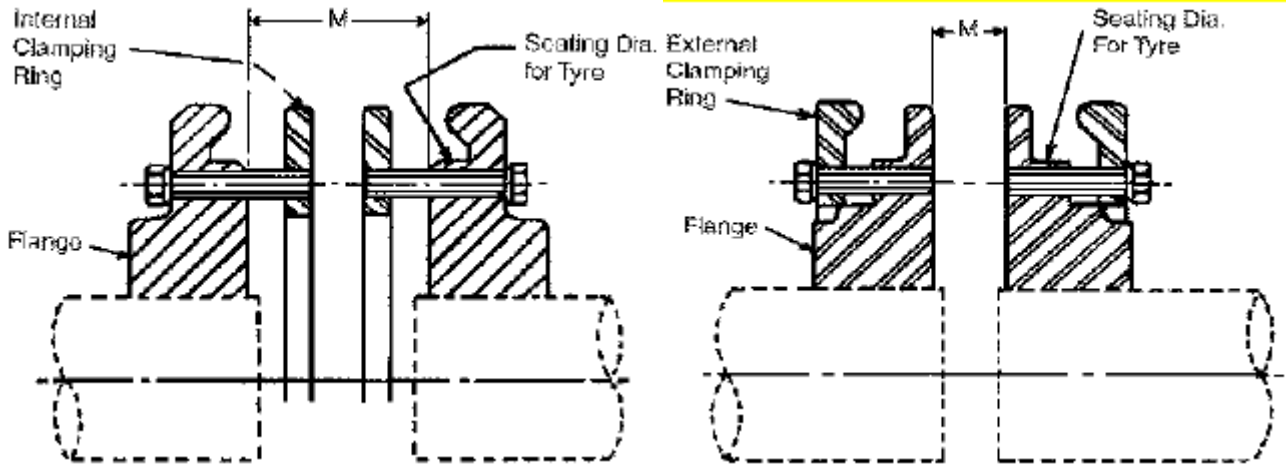
1.1 Fit the flanges to the shafts after placing the external clamp rings on the shafts. (where Taper Lock Bushes are used see separate fitting instructions supplied) Locate the flanges so that the dimension 'M' is obtained (see Section 1.2). Flanges with internal clamping rings should then have the clamping rings fitted, engaging only two of the threads of the screws at this time

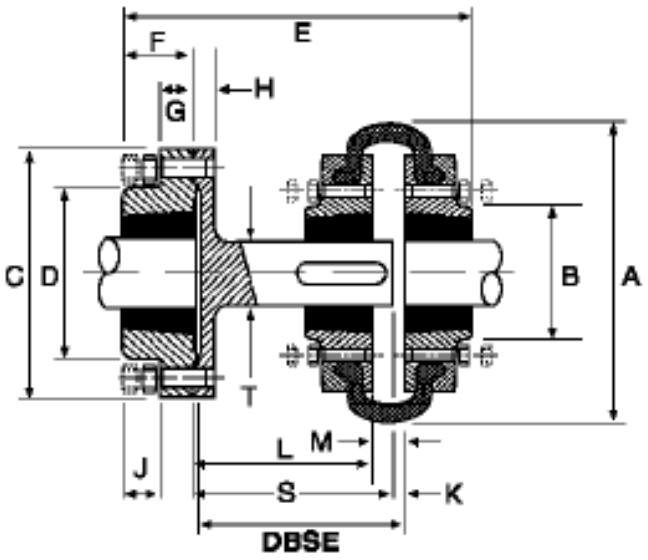
1.2 Bring the shafts into line until dimension 'M' is obtained (Table 1). If shaft end float is to occur, locate the shafts at the mid position of the end float when checking dimension 'M'. Note that the shaft ends may project beyond the faces of the flanges if required. In this event, allow sufficient space between shaft ends for end float and mis-alignment. Flanges should be fitted flush with the end of the shaft when used with Mill-Motor flanges.

1.3 Check parallel alignment by laying a straight edge across the flanges at several positions around the circumference. Check angular alignment by measuring the gap between the flanges at several positions around the circumference. It is desirable to align the coupling as accurately as possible, particularly on high speed applications.

1.4 Open out the tyre and fit over the coupling flanges ensuring that the tyre beads seat properly on the flange and/or clamping rings. To ensure proper seating, it may be necessary to strike the outside diameter of the tyre with a small soft head mallet. When seated there should be a gap between the ends of the tyre as shown in Table 2

1.5 Tighten the clamping ring screws alternately and evenly (half a turn at a time) working around each flange until the required screw torque is achieved (Table 2)





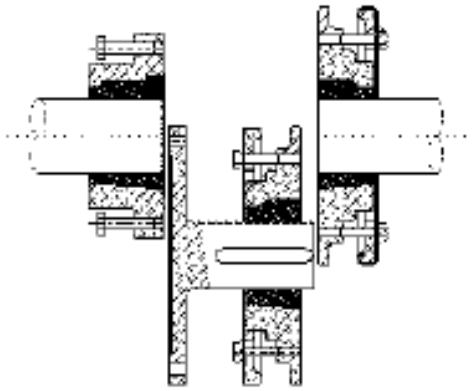


Table 2

Coupling size	*F40 to F60*	*F70 to F120*	*F140 to F160*	*F180 to F250*
Tyre Gap (mm)	*2.0*	*3.0*	*5.0*	*6.0*

Table 3

	Dimension 'S' For Nominal DBSE		
	100mm	*140mm*	*180mm*
F40	*94*	*134*	
F50	*94*	*134*	
F60	*94*	*134*	*174*
F70	*94*	*134*	*174*
F80	*94*	*134*	*174*
F90		*134*	*174*
F100		*134*	*174*
F110		*134*	*174*
F120		*134*	*174*
F140		*134*	*174*

Table 4

Flange Size	*Screws*	*Torque (Nm)*
SM16	*M10*	*20*
SM25	*M12*	*25*
SM30	*M16*	*40*
SM35	*M16*	*90*

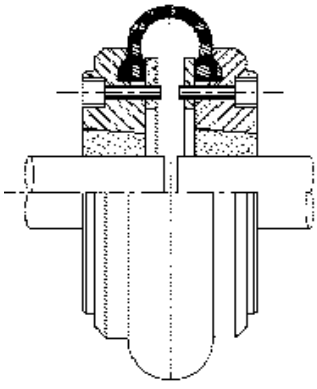
Note:- ***If necessary the DBSE may be extended. The maximum DBSE possible is achieved when the spacer shaft end and driven shaft end are flush with the face of their respective Taper Lock Bushes.***

FOR CONTRACT No:- 23547/CFH

The Fenaflex FRAS Coupling tyre is supplied loose in the Sheet Steel Coupling Guard. Adjust the Flange positions to give the correct clearance (M) and then fit the tyre in accordance with the instructions.

Pump Shaft
F50F Flange 1210 x 24

Spacer Shaft
F50H Flange 1210 x 32

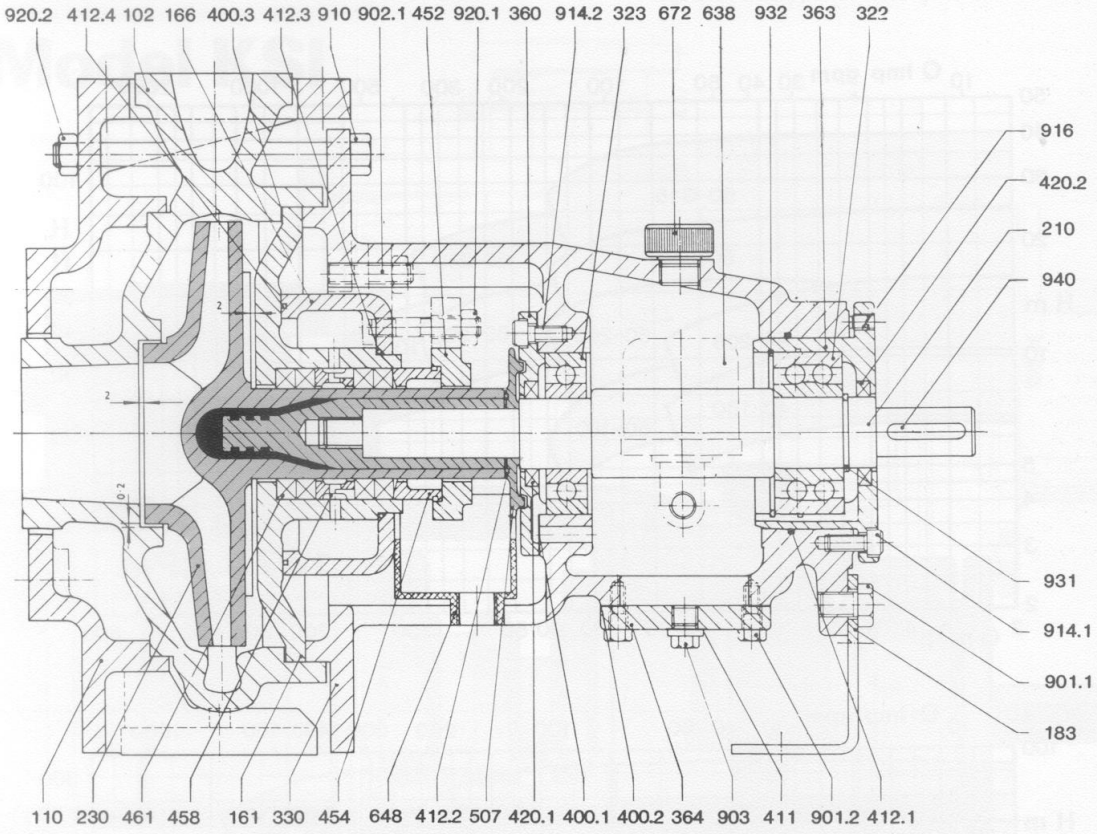


100mm NOMINAL DBSE (DISTANCE BETWEEN SHAFT ENDS)

	SM16 SPACER	
	Min (mm)	*Max (mm)*
F50 COUPLING	*100mm*	*116mm*

Sectional Drawing and Parts List

The sectional drawing and parts lists shown refer to model KSI equipped with a soft packing and without bearing frame cooling. Additional parts are needed for the mechanical and hydrodynamic shaft sealing options and for bearing frame cooling.



Part No.	Designation	Construction Material	Part No.	Designation	Construction Material
102	Casing	Alloy*	420.2	Oil seal	Ntr. Rubber
110	Casing clamping plate	GG20	452	Gland	1.4500
161	Casing back plate	Alloy*	454	Gland follower	1.4500
166	Cooling chamber	GG20	458	Lantern ring	1.4500
183	Support foot	St 37-2	461	Gland packing	
210	Shaft	C-45	507	Flinger	1.4500
230	Impeller	Alloy*	638	Constant level oiler	Plastic
322	Bearing D.E.		648	Drip tray	1.4500
323	Bearing N.D.E.		672	Breather plug	Brass
330	Bearing Housing	GG20	901.1	Hex screw	DIN 601 4.6
360	Bearing cover	GG20	901.2	Hex screw	DIN 601 4.6
363	Bearing cartridge	GG20	902.1	Stud	DIN 939 4.6
364	Window cover	GG20	903	Collared plug	DIN 910 5.8
400.1	Gasket	IT400	910	Hex head bolt	DIN 931 4.6
400.2	Gasket	IT400	914.1	Cap screw	DIN 7984 8.8
400.3	Gasket	IT400	914.2	Cap screw	DIN 7984 8.8
411	Joint ring	IT400	916	Grub screw (Dog point)	DIN 915 8.8
412.1	O-ring	Neoprene	920.1	Hex nut	DIN 934 4.6
412.2	O-ring	Viton Rubber	920.2	Hex nut	DIN 934 4.6
412.3	O-ring	Viton Rubber	931	Circlip internal	Spring Steel
412.4	O-ring	Viton Rubber	932	Circlip external	Spring Steel
420.1	Oil seal	Ntr. Rubber	940	Coupling key	St 60

*Liquid end parts are cast in different alloys depending on application, such as high silicon iron (14 to 15% Si) or Ni-Hard 2B.