

# OPERATION AND PARTS MANUAL



## SLUDGE PUMP



**MODEL: TSLP-150**

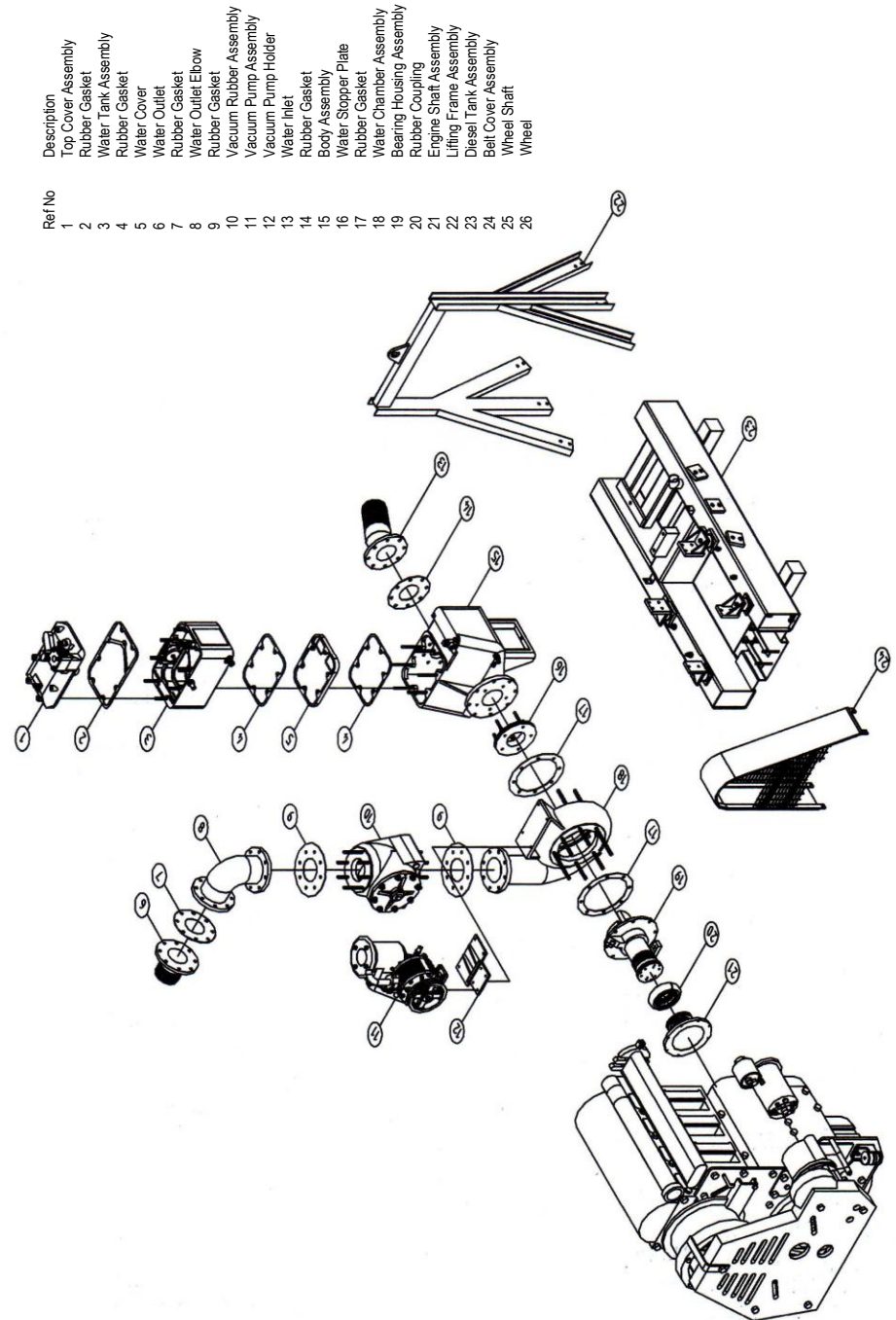
THIS MANUAL MUST ACCOMPANY THE EQUIPMENT AT ALL TIMES

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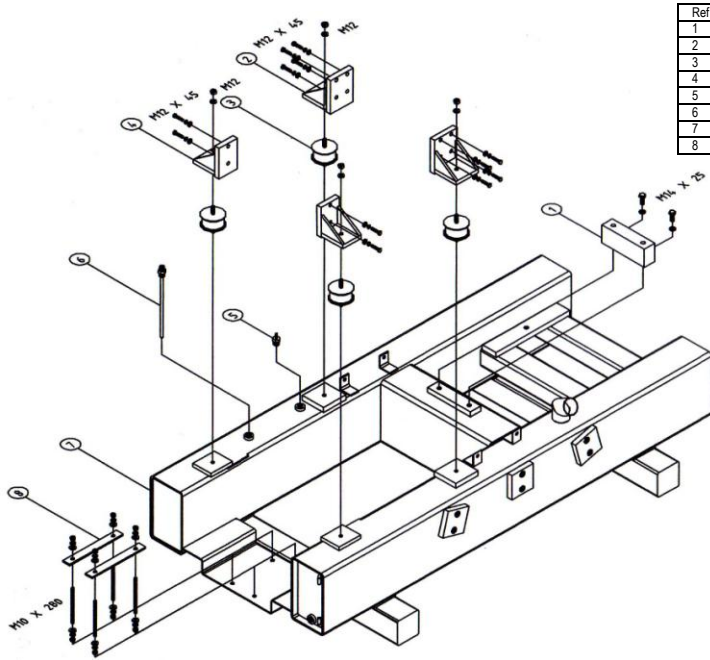
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## SLUDGE PUMP – TSLP-150 SPARE PARTS LIST



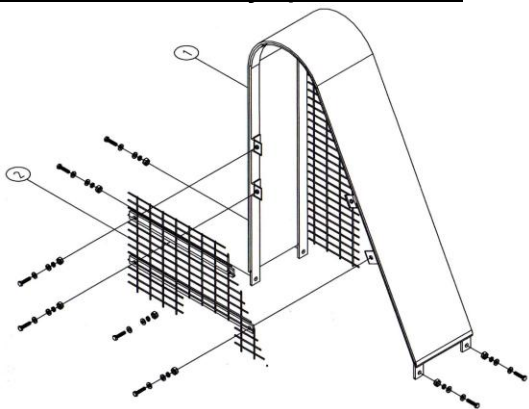
## SLUDGE PUMP - PART LIST

### Diesel Tank Assembly Spare Part List.



| Ref No | Description        |
|--------|--------------------|
| 1      | Support Bracket    |
| 2      | Engine Bracket 1   |
| 3      | Rubber Mounting    |
| 4      | Engine Bracket 2   |
| 5      | Diesel Nut         |
| 6      | Diesel Suction Nut |
| 7      | Diesel Tank        |
| 8      | Battery Clamp      |

### Belt Cover Assembly Spare Part List.



| Ref No | Description  |
|--------|--------------|
| 1      | Belt Cover   |
| 2      | Belt Cover 2 |

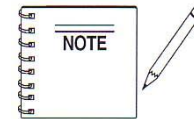
## SLUDGE PUMP - SAFETY MESSAGE ALERT SYMBOLS

### FOR YOUR SAFETY AND THE SAFETY OF OTHERS!

Safety precautions should be followed at all times when operating this equipment. Failure to read and understand the Safety Messages and Operating Instructions could result in injury to yourself and others.



Potential hazards associated with the operation of this equipment will be referenced with Hazard Symbols which appear throughout this manual, and will be referenced in conjunction with Safety Message Alert Symbols.



This Owner's Manual has been developed to provide complete instructions for the safe and efficient operation of the Sludge Pump.

Refer to the engine manufacturer's instructions for data relative to its safe operation.

**Before using this centrifugal pump, ensure that the operating individual has read and understands all instructions in this manual.**

### SAFETY MESSAGE ALERT SYMBOLS

The three (3) Safety Messages shown below will inform you about potential hazards that could injure you or others. The Safety Messages specifically address the level of exposure to the operator, and are preceded by one of three words: **DANGER**, **WARNING**, or **CAUTION**.

#### **⚠ DANGER**

You **WILL** be **KILLED** or **SERIOUSLY INJURED** if you **DO NOT** follow these directions.

#### **⚠ WARNING**

You **CAN** be **KILLED** or **SERIOUSLY INJURED** if you **DO NOT** follow these directions.

#### **⚠ CAUTION**

You **CAN** be **INJURED** if you **DO NOT** follow these directions.

### HAZARD SYMBOLS

#### **⚠ WARNING - Lethal Exhaust Gases**

Engine exhaust gases contain poisonous carbon monoxide. This gas is colorless and odorless, and can cause death if inhaled. **NEVER** operate this equipment in a confined area or enclosed structure that does not provide ample free flow air.



#### **⚠ WARNING - Explosive Fuel**

**Gasoline** is extremely flammable, and its vapors can cause an explosion if ignited. **DO NOT** start the engine near spilled fuel or combustible fluids.



**DO NOT** fill the fuel tank while the engine is running or hot. **DO NOT** overfill tank, since spilled fuel could ignite if it comes into contact with hot engine parts or sparks from the ignition system. Store fuel in approved containers, in well-ventilated areas and away from sparks and flames.

#### **⚠ WARNING - Burn Hazards**

Engine components can generate extreme heat. To prevent burns, **DO NOT** touch these areas while the engine is running or immediately after operations. Never operate the engine with heat shields or heat guards removed.



#### **⚠ CAUTION - Respiratory Hazard**

**ALWAYS** wear approved *respiratory* protection when required.



## SLUDGE PUMP - SAFETY MESSAGE ALERT SYMBOLS

### CAUTION - Rotating Parts

**NEVER** operate equipment with covers, or guards removed. Keep fingers, hands, hair and clothing away from all moving parts to prevent injury.

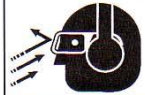


### CAUTION - Accidental Starting

**ALWAYS** place the engine ON/OFF switch in the **OFF** position, when the pump is not in use.



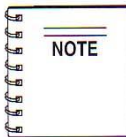
### CAUTION - Sight and Hearing Hazards



**ALWAYS** wear approved eye and hearing protection.

### CAUTION - Equipment Damage Messages

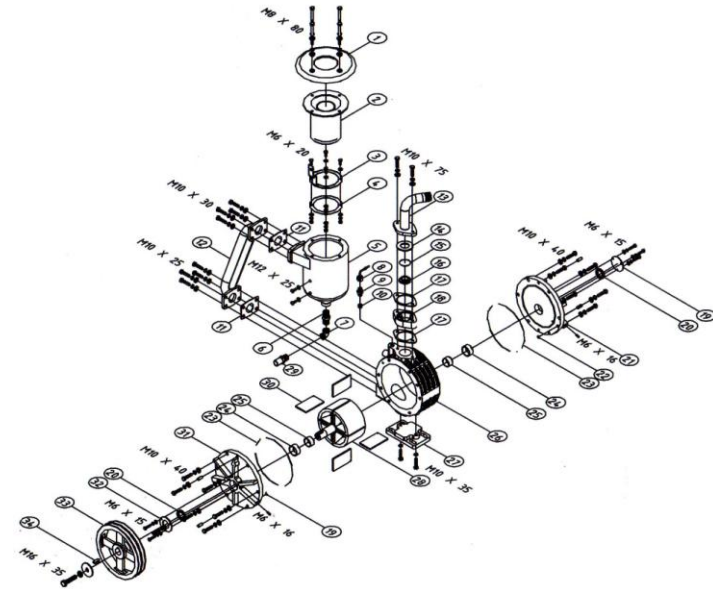
Other important messages are provided throughout this manual to help prevent damage to your pump, other property, or the surrounding environment.



This pump, other property, or the surrounding environment could be damaged if you do not follow instructions.

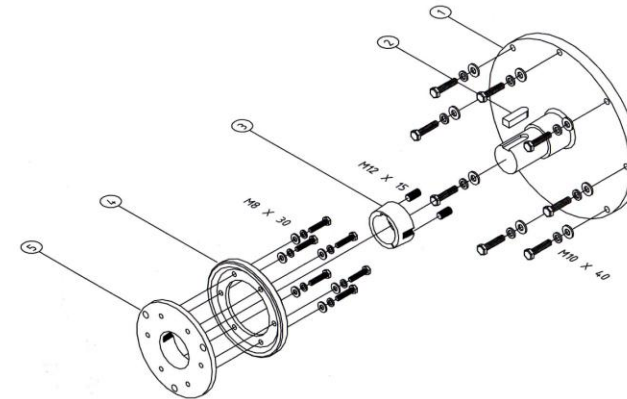
## SLUDGE PUMP - PART LIST

### Vacuum Pump Assembly Spare Part List.



| Ref No | Description       |
|--------|-------------------|
| 1      | Oil Tank Cover    |
| 2      | Oil Cooler Tank   |
| 3      | Bracket A         |
| 4      | Bracket B         |
| 5      | Oil Tank          |
| 6      | Nipple            |
| 7      | Elbow             |
| 8      | Hydraulic Fitting |
| 9      | Nipple            |
| 10     | Brass Nut         |
| 11     | Rubber Gasket     |
| 12     | Connecting Pipe   |
| 13     | Vacuum Inlet      |
| 14     | Vacuum Washer     |
| 15     | Vacuum Plate      |
| 16     | Spring            |
| 17     | Rubber Gasket     |
| 18     | Vacuum Spacer     |
| 19     | Cover A           |
| 20     | Oil Seal          |
| 21     | Vacuum Cover B    |
| 22     | O Ring            |
| 23     | O Ring            |
| 24     | Bearing           |
| 25     | Cone              |
| 26     | Vacuum Housing    |
| 27     | Vacuum Pump Base  |
| 28     | Vacuum Shaft      |
| 29     | Nipple 2          |
| 30     | Fiber             |
| 31     | Vacuum Cover A    |
| 32     | Cover B           |
| 33     | Pulley            |
| 34     | Key               |

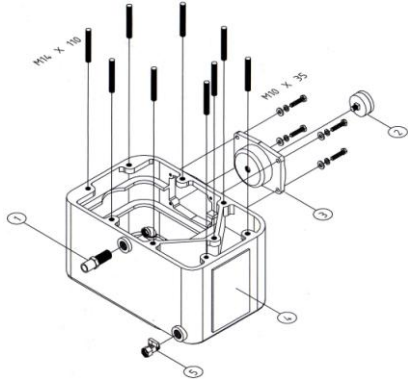
### Engine Shaft Assembly Spare Part List.



| Ref No | Description      |
|--------|------------------|
| 1      | Engine Shaft     |
| 2      | Key              |
| 3      | Coupling Bush 1  |
| 4      | Coupling Plate 1 |
| 5      | Coupling Cover   |

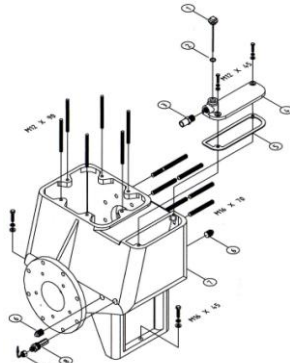
## SLUDGE PUMP – PART LIST

### Water Tank Assembly.



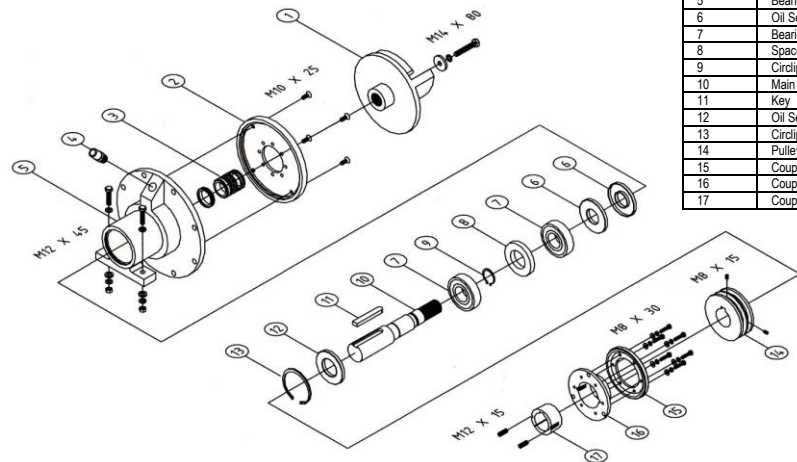
| Ref No | Description |
|--------|-------------|
| 1      | Nipple 1    |
| 2      | Meter       |
| 3      | Meter Cover |
| 4      | Water Tank  |
| 5      | Ball Valve  |

### Body Assembly Spare Part List.



| Ref No | Description       |
|--------|-------------------|
| 1      | Oil Lover         |
| 2      | O Ring            |
| 3      | Nipple 2          |
| 4      | Oil Cover         |
| 5      | Rubber Gasket     |
| 6      | Plug              |
| 7      | Body              |
| 8      | Oil Filter        |
| 9      | Hydraulic Fitting |

### Bearing Housing Assembly Spare Part List.



| Ref No | Description     |
|--------|-----------------|
| 1      | Impeller        |
| 2      | Cover           |
| 3      | Mechanical Seal |
| 4      | Nipple 2        |
| 5      | Bearing Housing |
| 6      | Oil Seal        |
| 7      | Bearing         |
| 8      | Spacer          |
| 9      | Circlip         |
| 10     | Main Shaft      |
| 11     | Key             |
| 12     | Oil Seal        |
| 13     | Circlip         |
| 14     | Pulley          |
| 15     | Coupling Cover  |
| 16     | Coupling Plate  |
| 17     | Coupling Bush   |

## SLUDGE PUMP - RULES FOR SAFE OPERATION

- **NEVER** run engine without air cleaner. Severe engine damage may occur.
- **ALWAYS** read, understand, and follow procedures in Operator's Manual before attempting to operate equipment.
- **ALWAYS** be sure the operator is familiar with proper safety precautions and operation techniques before using pump.
- **ALWAYS** store equipment properly when it is not being used. Equipment should be stored in a clean, dry location out of the reach of children.
- **NEVER** leave the pump unattended, turn off engine when unattended.
- Unauthorized equipment modifications will void all warranties.
- **NEVER** pump volatile, explosive, flammable or low flash point fluids. These fluids could ignite or explode.
- **NEVER** operate the pump in an **explosive** atmosphere.
- Before starting the pump, check that the clean-out cover is securely fasten.
- **ALWAYS** ensure pump is on level ground before use.
- Become familiar with the components of the pump before operating.
- **ALWAYS** replace any worn or damaged warning decals.
- **NEVER** pump corrosive chemicals or water containing toxic substances. These fluids could create serious health and environmental hazards. Contact local authorities for assistance.
- **NEVER** open the priming plug when pump is hot. Hot water inside could be pressurized much like the radiator of an automobile. Allow pump to cool to the touch before loosening plug. The possibility exists of scalding, resulting in severe bodily harm.
- **NEVER** open the pump housing during operation or start the pump with the clean-out cover removed. The rotating impeller inside the pump can cut or sever objects caught in it.
- **NEVER** block or restrict flow from discharge hose. Remove kinks from discharge line before starting pump. Operation with a blocked discharge line can cause water inside pump to overheat.
- **ALWAYS** fill the pump casing with water before starting the engine. Failure to maintain water inside the pump housing will cause severe damage to the pump.
- In winter drain water from pump housing to prevent freezing.

### Maintenance Safety:

- **NEVER** lubricate components or attempt service on a running machine.
- **ALWAYS** allow the machine a proper amount of time to cool before servicing.
- Keep the machinery in proper running condition.
- Fix damage to the machine immediately and always replace broken parts.
- Dispose of hazardous waste properly. Examples of potentially hazardous waste are used motor oil, fuel and fuel filters.
- **DO NOT** use food or plastic containers to dispose of hazardous waste.
- **DO NOT** pour waste, oil or fuel directly onto the ground, down a drain or into any water source.

### TRANSPORTING

- **ALWAYS** shutdown engine before transporting.
- Tighten fuel tank cap securely and close fuel cock to prevent fuel from spilling.
- Drain fuel when transporting pump over long distances or bad roads.
- **ALWAYS** tie down the pump during transportation by securing the pump's guard frame with rope.

### EMERGENCIES

- **ALWAYS** know the location of the nearest **fire extinguisher**.
- **ALWAYS** know the location of the nearest **first aid kit**.
- In emergencies **always** know the location of the nearest phone or **keep a phone on the job site**. Also know the phone numbers of the nearest **ambulance, doctor** and **fire department**. This information will be invaluable in case of an emergency.



- **NEVER** disconnect any **"emergency or safety devices"**. These devices are intended for operator safety. Disconnection of these devices can cause severe injury, bodily harm or even death! Disconnection of any of these devices will void all warranties.

## SLUDGE PUMP – DESCRIPTION OF EQUIPMENT

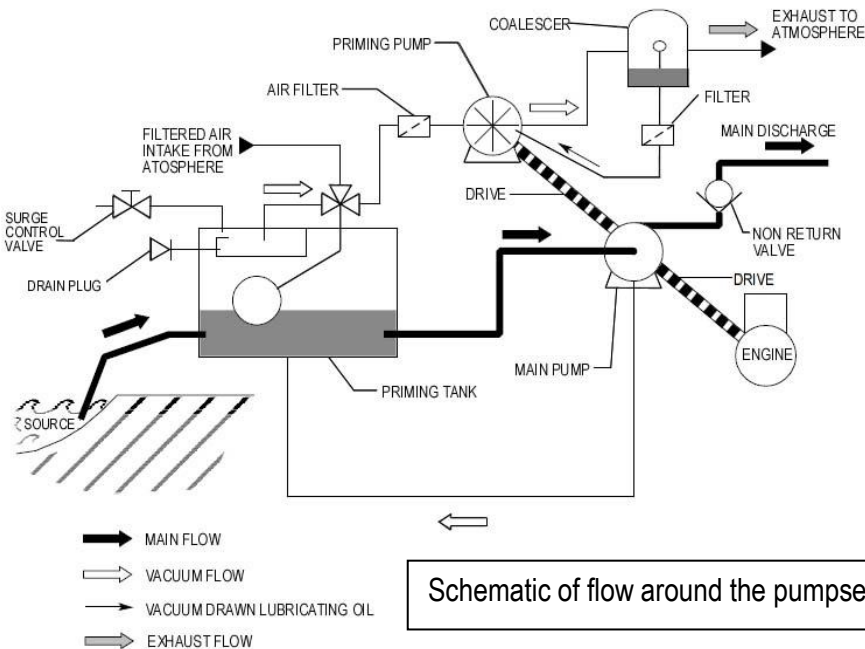
### General Description

- The TSLP-150 is a general purpose, self priming, free standing site pumps. The pumps can be used in a range of environmental conditions, including tropical temperatures.
- The pump is capable of passing solids up to 100mm maximum diameter, provided the solids are in suspension; a typical example being ditch water containing soil and rock particles. Slurries may also be pumped, if concentration of solid matter is not too high. The pump can also handle abrasive materials at the expense of higher wear rate.
- TSLP-150 pump are normally powered by a diesel engine with electric start.

### Technical Description

#### Overview

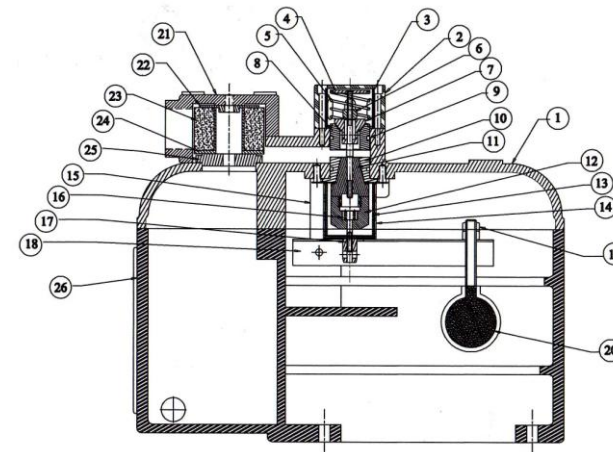
- This section identifies the main components of the standard pump and provides general technical and performance data. It does not cover any special options or modifications made to suit customer requirements.
- \* Note: Tolerances are given in Maintenance, Section 7.
- \* Note: By adjusting the 'surge control valve', when the pump is fully primed, the operator can prevent continual air valve cycling –an effect referred to as 'snoring'.
- Illustrates, schematically, the pumpset's principle of operation.



Schematic of flow around the pumpset.

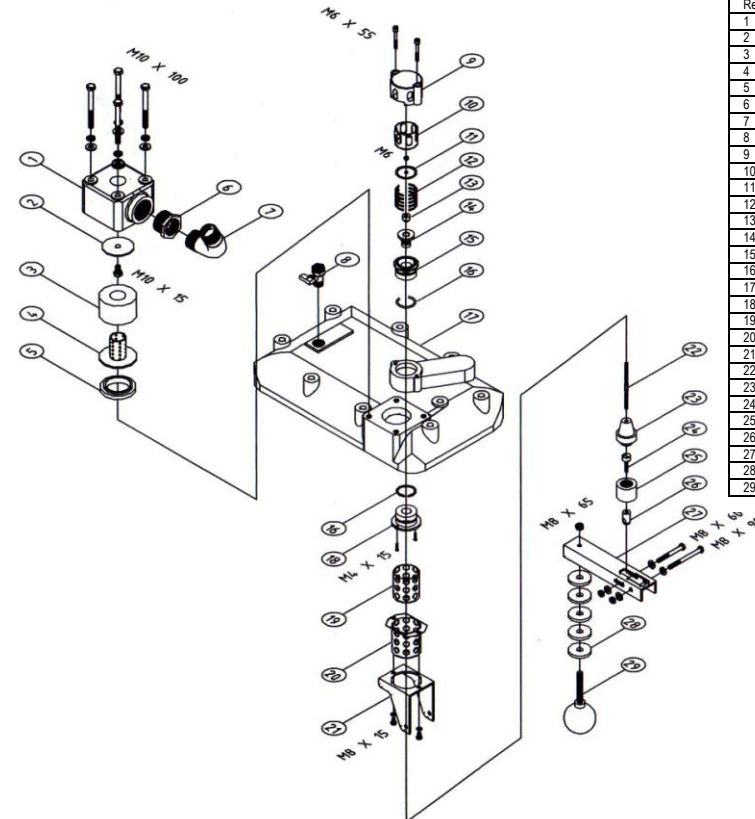
## SLUDGE PUMP – PART LIST

### Priming Tank Air Filter, Surge Control Valve and Air Valve.



| Ref No | Description       |
|--------|-------------------|
| 1      | Top Cover         |
| 2      | Water Lever Cover |
| 3      | Filter Bush       |
| 4      | Plate             |
| 5      | Spring            |
| 6      | Nylon Plug        |
| 7      | Nylon Stopper     |
| 8      | Nylon Bush 1      |
| 9      | O Ring            |
| 10     | Nylon Bush 2      |
| 11     | Nylon Upper Pin   |
| 12     | Nylon Low Pin     |
| 13     | Stopper Bush      |
| 14     | Stopper Bracket   |
| 15     | Bracket           |
| 16     | Control Pin       |
| 17     | Control Bush      |
| 18     | Arm               |
| 19     | Nut               |
| 20     | Float Ball        |
| 21     | Vacuum Cover      |
| 22     | Stopper Plate     |
| 23     | Span              |
| 24     | Sponge Bracket    |
| 25     | Vacuum Bush       |
| 26     | Water Tank        |

### Top Cover Assembly Spare Part List.

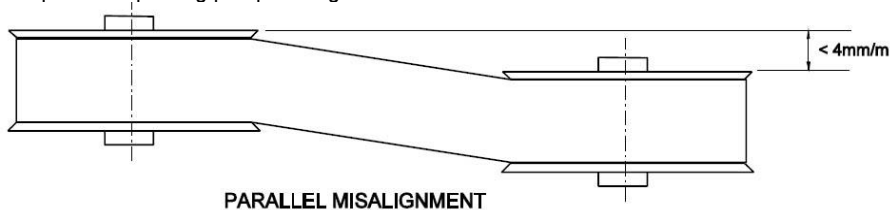


| Ref No | Description       |
|--------|-------------------|
| 1      | Vacuum Cover      |
| 2      | Stopper Plate     |
| 3      | Span              |
| 4      | Sponge Bracket    |
| 5      | Vacuum Bush       |
| 6      | Reducing Bush     |
| 7      | Elbow             |
| 8      | Ball Valve        |
| 9      | Water Lever Cover |
| 10     | Filter Bush       |
| 11     | Plate             |
| 12     | Spring            |
| 13     | Nylon Plug        |
| 14     | Nylon Stopper     |
| 15     | Nylon Bush 1      |
| 16     | O Ring            |
| 17     | Top Cover         |
| 18     | Nylon Bush 2      |
| 19     | Stopper Bush      |
| 20     | Stopper Bracket   |
| 21     | Bracket           |
| 22     | Screw             |
| 23     | Nylon Upper Pin   |
| 24     | Control Pin       |
| 25     | Nylon Low Pin     |
| 26     | Control Bush      |
| 27     | Arm               |
| 28     | Washer            |
| 29     | Ball              |

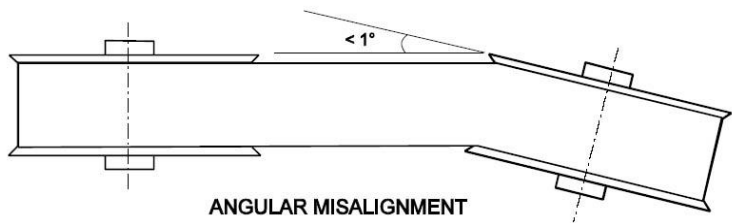
## SLUDGE PUMP – ADJUSTING BELT TENSION & RENEWING BELT

### Adjusting belt tension

- Remove vacuum drive guard.
- Loosen the vacuum pump mounting holding down nuts.
- Reposition the vacuum pump to adjust the tension of the belt. (At the correct tension a force of 2.5kg is needed to deflect the belt 10-13mm at the midpoint between the pulleys).
- When the vacuum pump is in the correct position, tighten the vacuum pump holding down nuts.
- Using a straight edge, ensure that the priming pump and main pump pulleys are aligned so that parallel misalignment is less than 5mm per meter between pulley centers, and angular misalignment does not exceed  $\frac{1}{4}$ . (refer to Figure 6). Correct the alignment if necessary.
- Replace the priming pump drive guard.



PARALLEL MISALIGNMENT



ANGULAR MISALIGNMENT

### Renewing the Belt

- Remove vacuum drive guard.
- Loosen the vacuum pump holding down nuts and slacken the belt.
- Disassemble the drive coupling (referring to the manufacturer's operation and maintenance instructions for the type of coupling used).
- Remove the timing belt from its pulleys, fit a new belt and adjust the tension. (ensuring correct teeth/pulley seating).
- Reassemble the drive coupling as per manufacturer's instructions.
- Replace all guarding.

## SLUDGE PUMP - SPECIFICATIONS/DIMENSIONS

| MODEL                              | TSLP-150                         |
|------------------------------------|----------------------------------|
| Type                               | Self-priming Centrifugal         |
| Suction x Delivery Diameter (inch) | 6" x 6"                          |
| Total Head (m)                     | 33                               |
| Max. Flow (liter/second)           | 87                               |
| Axle Seal Material                 | Mechanical Seal (Ceramic-carbon) |
| Suction m(ft)                      | 8 (26)                           |
| Engine                             | BEINEI F3L912                    |
| Engine Type :                      | Air-cooled Diesel                |
| Max. Output (hp/rpm)               | 32HP / 1500RPM                   |
| Starting System                    | Electric Start                   |
| Total Weight (kg)                  | 960                              |
| Dimension (L x W x H) (mm)         | 2000 x 1200 x 1650               |

### Main Pump

| PARAMETER                                     | TSLP-150                        |
|---|---------------------------------|
| Standard Pump Body (Volute) Material          | Cast Iron                       |
| Volute Size                                   | 100mm                           |
| Intake and Discharge Ports                    | 150mm BSTD Flange               |
| Solids Handling Capability (Maximum Diameter) | 50mm                            |
| Maximum Lift (Theoretical)                    | 10m                             |
| Maximum Discharge Head                        | 38m                             |
| Maximum Flow                                  | 320m <sup>3</sup> / hr          |
| Pump Bearing Grease                           | Shell Alvania EP2 or Equivalent |
| Nominal Speed                                 | 1500 rpm                        |

### Vacuum Pump

| COMPONENT / PARAMETER    | 25 cfm  |
|--------------------------|---|
| Vacuum Pump Displacement | 12 liters/s   |
| Vacuum Level             | 9 m   |
| Lubricating Oil          | 30 SAE Viscosity Below 30°C<br>10W30 SAE above 30°C |
| Nominal Speed            | 1550 rpm  |

## SLUDGE PUMP - SPECIFICATIONS/DIMENSIONS

### Engine, Drives and Fuel System

| COMPONENT / PARAMETER                                | COMMENTS  | SPECIFICATION                         |
|--|---|---------------------------------------|
| Engine   | Drives Main and Vacuum Pumps                        | BEINEI F3L912                         |
| Main Pump Coupling                                   | High Misalignment Tolerance and Vibration Isolation | Fennaflex Tyre Coupling               |
| Vacuum Pump Transmission                             |   | Fenner Toothed Drive Belt and Pulleys |
| Battery  |   | 12V 669<br>540 Ah                     |
| Fuel Tank  |   | 110 liters                            |
| Approximate Running Time on Full Tank , at Max. Load |   | 22 hrs                                |
| Nominal Speed  |   | 1500 rpm                              |

### Weight

The below Table provides approximate component weight for the pumpset and its major components. The weight given are typical and may vary by  $\pm 20\%$  for individual machines. Therefore, ensure that all lifting and towing equipment used have a safe working load of at least 120% of the relevant indicated weight.

Approximate Component and Combined Weights:

| COMPONENT  | WEIGHT (Kg) |
|--|-------------|
| Engine   | 260         |
| Main Pump  | 450         |
| Main Pump, Priming Tank, Engine and Coupling                           | 775         |
| Priming Tank   | 45          |
| Gross Weight inc. Chassis & Full Tank of Fuel for 4-Wheel Site Trailer | 1175        |

## SLUDGE PUMP – GENERAL INSTRUCTIONS AND PRECAUTIONS

### General Instructions and Precautions

#### WARNINGS

ALWAYS ensure that slings, shackles etc. are adequate for the weight being lifted.  
Chock and stabilize the chassis BEFORE commencing work.

#### CAUTION

Drain main pump volute and priming tank.  
ALWAYS remove major component to clean workshop conditions for overhaul.

- Disconnect the wiring loom from the control panel.
- Disconnect and remove the battery.
- Disconnect the fuel hoses and from the engine.
- Disconnect all guarding.
- Remove all guarding.
- Disconnect the engine from its mounts and the pump bearing frame.
- Disconnect the drive coupling.
- Lift engine by its lifting points (Lifting Gear will be required).
- Disconnect the pump from its mounts.
- Using suitable lifting straps, remove pump end assembly.

#### Vacuum Pump Drive Belt

The vacuum pump pulley arrangement is illustrated below in Figure 5.

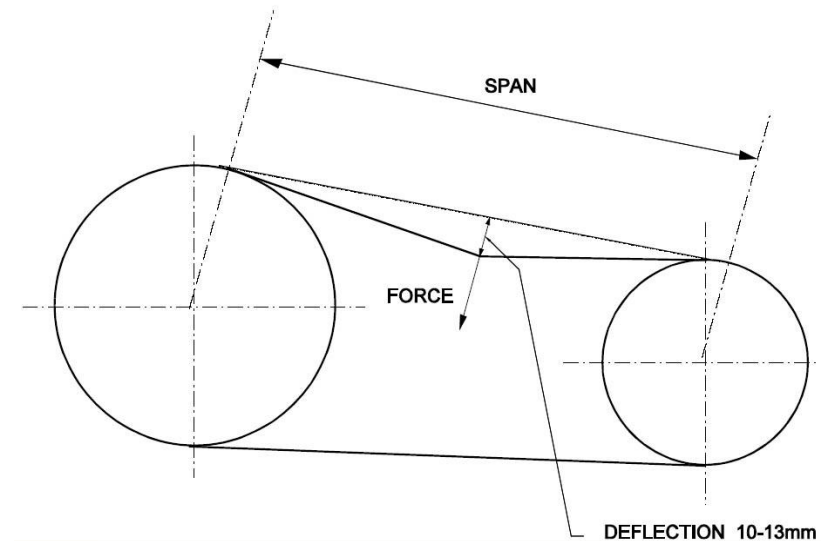


Figure 5 Vacuum pump pulley arrangements



## SLUDGE PUMP – PRIMING SYSTEM FAULT DIAGNOSIS

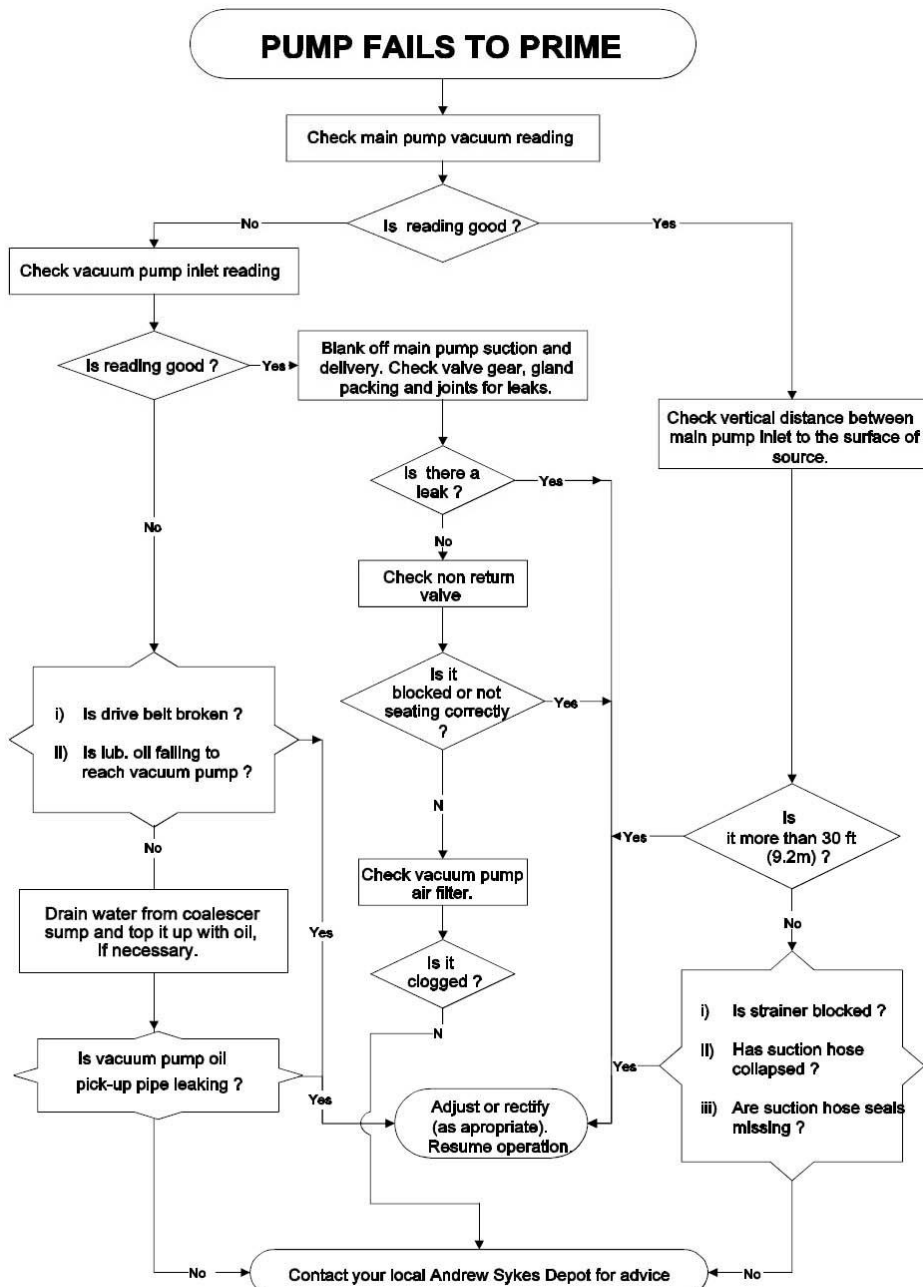


Figure 4 Priming fault diagnosis chart

## SLUDGE PUMP – HANDLING AND OPERATION

### Lifting and Transportation

All Pumpset variants are equipped with the Single Point Lifting Eye by which they may be Lifted using a suitable chain.

### WARNINGS

DO NOT attempt to lift pump with suction and discharge hoses in place.

ALWAYS ensure that Lifting Gear are adequate for the weight being lifted.

### Controls and Connection Points

Main Control Panel

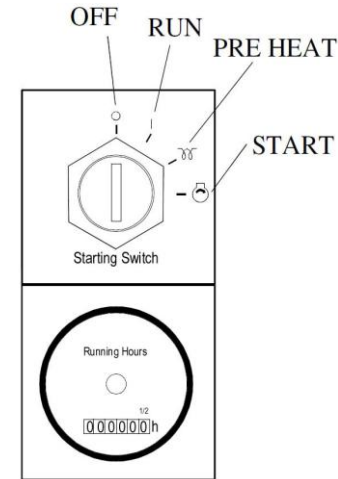


Figure 2. Main Panel for Electric Start Lister TR Engines, only

### Operating Instructions

#### General Precautions

### WARNINGS

DO NOT attempt to insert anything into the pump intake and discharge ports while the engine is running.

Ensure the pumpset is stable and immobilized BEFORE starting the pump.

### WARNINGS

BEWARE of fire risks. DO NOT place any flammable material near or around the engine or exhaust. Allow adequate ventilation.

The engine, exhaust and coalesce become HOT during operation.

ENSURE that any discharge into rivers or watercourses, or to soak away onto land, is environmentally acceptable.

The pump body retains liquid which could be hazardous to health. Flush the pump with clean water BEFORE disconnecting the hoses or working on the pump.

\* Note: In the event of an emergency, STOP the engine IMMEDIATELY using the engine key on the main control pane.

## SLUDGE PUMP – STARTING UP & SHUTTING DOWN

### Starting up

- Follow this procedure before each engine start-up.

#### WARNINGS

Make sure you are familiar with the engine manufacturer's safety instructions BEFORE running the engine.

#### CAUTION

ALWAYS top up using oil of correct specification. See the manufacturer's handbook for details of engine oil, details of vacuum pump oil.

- Drain any water in the coalesce through the drain tap provided.
- Check and top up, if necessary;  
The Engine Fuel, Oil and Radiator Water Levels;  
The Oil Level in the Coalescer.
- \* Note: Oil surface should be just visible when looking into the filler strainer.
- Ensure that all drain taps are closed.
- Screw in fully the priming tank surge control valve, to allow the system to prime.
- Submerge the suction hose in the source.
- Refer to Figure 2. Turn the ignition key to ON position.
- Turn the key to WARM UP position for 15 seconds.
- Turn the key clockwise to START position and release as soon as the engine starts. If the engine fails to start within 30 seconds, release the key and attempt to restart after allowing time for all moving parts to come to rest.
- When the pump is fully primed, re-adjust the surge control valve, as necessary, to avoid 'snoring'.

### Shutting Down

\* Note: TO STOP – Turn the engine key to the STOP position and push in fully the surge control valve knob to release the vacuum and empty the priming tank and the intake hose.

#### CAUTION

ALWAYS drain the pump; before removing it, or if it is being left unused for a while – especially in cold weather.

The procedure is as stated below.

- Flush the pump with clean water.
- Drain water from the following, through the drain taps or plugs provided.  
The main pump;  
The priming tank; and,  
The non-return valve.  
The coalesce.
- Follow the engine manufacturer's instructions relating to engine being left unused for a period of time.

If the pump is to be moved to a new site, disconnect the hoses and follow the instructions in Section 6.1, Lifting and Transportation, page 17.

#### CAUTION

NEVER leave water in the pumps or hoses if there is any risk of it freezing.

## SLUDGE PUMP – PUMP PERFORMANCE FAULT DIAGNOSIS

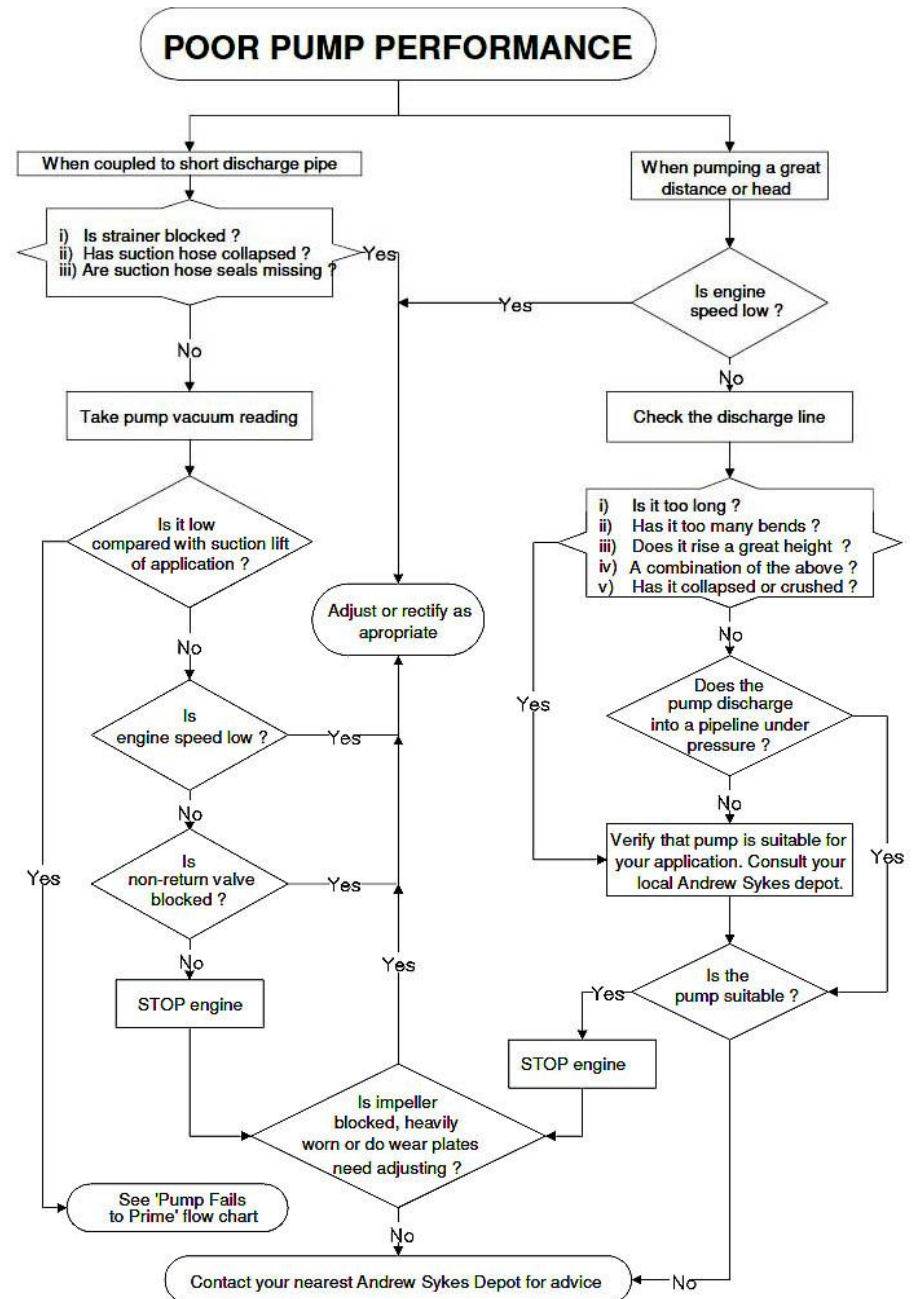


Figure 3 Pump fault diagnosis flowchart