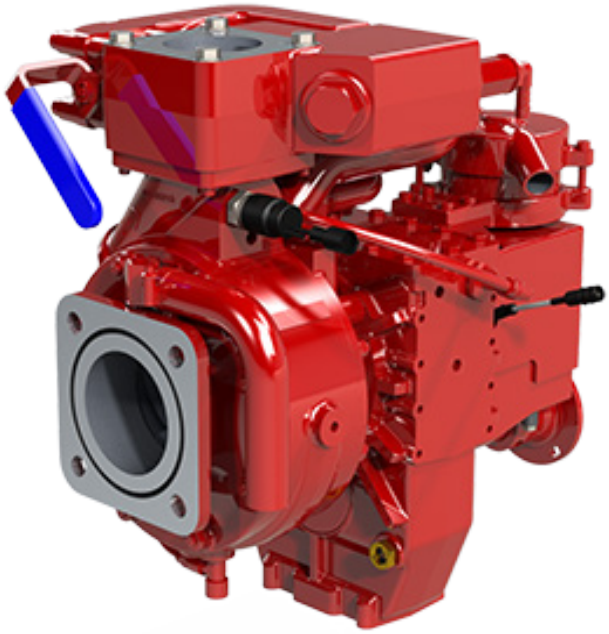
KP1 and KP2
Vehicle Mounted Fire Pump



Installation and Operation Manual

Publication: GP/311
Issue 5, February 2020

Amendment Record

Model: KP1_1510 / KP2_1510 Pump

Modification No.	Date	Page/s	Amendment	New Issue Number
-	January 2016	-	-	1
1	May 2016	5	Add safety information on protecting moving parts during installation	2
2	May 2016	5, 8	Add maximum allowable inlet pressure of 12 bar	2
3	May 2016	5, 28	Add information on not running the pump dry	2
4	March 2018	12, 13	Add information on torque figure for bolts securing pump to chassis	3
5	June 2019	31-32	Information on delivery valve maintenance	4
6	February	8, 13, 14, 16, 31,	8 - Viewed on drive flange, not from. 13 - Improved image 14 - Wiring connections improved descriptions 16 - Add “High-Low” text to image 31 - Delivery valve, add text on instantaneous connectors	5

CONTENTS

INTRODUCTION

This publication provides information relating to the installation, commissioning and operation of the KP series pumps. It covers both the KP1 model - discharge of low pressure only and the KP2 model - simultaneous low and high pressure discharge. The KP series pump is designed for rear or midship mounting.
The pump discharge rating is defined as -
KP1_1510 is rated at 1500 l/min @ 10 Bar for low pressure.
KP2_1510 is rated at 1500 l/min @ 10 Bar for low pressure and 250 l/min @ 40 Bar for high pressure.
Both models are available in aluminium or bronze materials for the main castings.

Important Notes

Spares
Use only approved replacement parts as recommended by Godiva Ltd. Use of non-approved parts or unauthorised modification of the Godiva Fire Pump may result in death or injury and invalidate any product warranty.

Ordering
When ordering replacement parts please state:

- Model – e.g KP1A1510, where -
  KP = Name of pump
  1 = Single pressure, 2 = Twin pressure
  A = Aluminium, B = Bronze
  1510 = 1500 l/min @ 10 Bar

- Serial number - stamped on the side of the volute.

- Year of manufacture

- All the above details are also provided on a plate which will be attached to the side of the pump bay by the vehicle builder.

Spares parts for the KP series are available in kits, which include a number of parts relevant to that section.

Pump
Godiva products may only be repaired or serviced by persons trained in said procedures by either Godiva Ltd., or their approved agents.

SAFETY

Please read this manual before operating the machinery.
Safety notices -

 = non-compliance could affect safety

IMPORTANT = in case of damage to pump

ATTENTION = in case of personal hazards

Installation and Commissioning

- Once packaging has been removed, installer should ensure rotating parts are not accessible.

In operation

- Rotating parts must be guarded against accidental contact.
- Do not insert items into the suction tube when pump is running.
- Discharge hoses must not be disconnected when the unit is running.
- No components must be unfastened when the unit is running.
- When installing or removing the pump, suitable lifting equipment must be used.
- Suitable ear protection must be worn when pump is running – if necessary.
- When filling the gearbox - avoid spilling oil onto the floor to prevent the danger of slipping.
- Maximum allowable inlet pressure is 12 bar
- Do not run the pump without water for more than one minute as dry running will damage the seal

Training

Godiva pumps must only be operated by trained personnel.

Maintenance

The user must maintain the equipment in an operational condition, as per regulation 5 in the Provision and Use of Work Equipment Regulations 1998.

Environmental Protection

Used oil from the pump bearing housing must be disposed of in accordance with your local regulations

Risk Assessment

It is the duty of the pump installer to make a method statement and risk assessment of their operations when installing the pump, please contact Godiva Ltd. if assistance is required.

Transportation and Storage

The pump is supplied mounted on a wooden pallet and covered with a tri-walled cardboard box. This protection is suitable for standard methods of freight handling using forklift trucks. No more than one pump should be stacked on top of another. The tri-walled cardboard box is not suitable for storage outside, or when open to the elements. The pump is sprayed internally with a moisture inhibitor when leaving the factory, this treatment may be required if the pump is in long term storage (6 months or more) before use. On receipt of the pump a full inspection must be carried out, if any damage has occurred please contact Godiva Ltd.

Post-production Cleaning Fluid

Immediately after production a special cleaning solution is used to clear the pump of any oil or grease that may be remaining inside the pump. Occasionally this cleaning solution leaves a deposit. This deposit has no effect on the performance and will be flushed away when the pump is first used.

Cleaning fluid deposit – will be flushed away when pump is used

Warranty

For all issues relating to warranty claims please contact Godiva Ltd. Please be prepared to quote the six figure pump serial number located on the pump volute.

Associated Publications

Publication	Part No
Workshop Manual	GP/316
Spare Parts Manual	GP/317

Pump specification numbering

Typical pump model will be KP1A1510

KP	1	A	1510
= pump series	1 = Single pressure 2 = Multi-pressure	A = Aluminium B = Bronze	15 = nominal flow in litres per minute 10 = pressure in bars

Serial numbering - 616123 = typical serial number, located on the side of the volute body.

KP1_1510 and KP2_1510 Spares

Spare parts for the KP pump are supplied in kit form for the various parts of the pump. Please refer to the KP Pump Spare Parts List. part number GP/317.

Technical Data

Features unique to KP1 or KP2 model only are indicated, other parts are common

Description

Pump type KP1	Single stage - centrifugal
Pump type KP2	Two stage. 1st stage centrifugal, 2nd stage regenerative
Shaft	Stainless steel
Seal	Self-adjusting mechanical type
Material	Aluminium or bronze (applies to main castings) See Materials of Construction list for details
Direction of rotation (impeller)	Clockwise and Counter Clockwise available (when viewed on drive flange)
Priming system	Reciprocating, positive displacement piston
Temperature range	-15°C to +40° ambient (ref: EN1028-1)
Lubrication - Gearbox	1.1 litre. Use fully synthetic ISO VG 220 oil, to ensure five years running with no oil change. If not available use gear oil EP80/90 (to be changed every year) See recommended oil list below.

Recommended Oil Suppliers for the ISO VG 220 oil - for 5 year period

Manufacturer	Specification	Contact information
Millers Oils	Millgear SHC 220	www.millersoils.co.uk
Motul	Motul Gear SY 220	www.motul.com

Safety devices	42°C Thermal relief valve (74°C option). Fitted as standard on KP2, optional on KP1 KP2 only - Suction pressure relief valve opens at 13 Bar
Angle of inclination	15° in any plane
Maximum inlet pressure	12 bar
Accessories	Foam systems

Mass moment of inertia -

	Aluminium		Bronze	
Gearbox ratio	KP1A	KP2A	KP1B	KP2B
1.90:1	0.17134 Kg m²	0.17882 Kg m²	0.21307 Kg m²	0.22055 Kg m²
2.33:1	0.19755 Kg m²	0.20879 Kg m²	0.26031 Kg m²	0.27154 Kg m²
2.91:1	0.23527 Kg m²	0.25280 Kg m²	0.23339 Kg m²	0.24094 Kg m²

EN Designation (EN 1028:-1:2002)

Godiva Description and specification	European standard	Classification	Limit pressure pa lim bar
Fire fighting centrifugal pump KP1_1510, low pressure	EN 1028-1	FPN 10 – 750 FPN 10-1000 FPN 10-1500 FPN 15-1000	17
Fire fighting centrifugal pump KP2_1510 - high pressure	EN 1028-1	FPN 10-750 / FPH 40-250 FPN 10-1000 / FPH 40-250 FPN 10-1500 / FPH 40-250 FPN 15-1000 / FPH 40-250	54.5

Materials of construction

	Material	Material
Component	**Aluminium alloy pump**	**Gunmetal pump**
Volute casing	Aluminium alloy	Gunmetal
Pump head - KP1	Aluminium alloy	Gunmetal
Pump head - KP2	Stainless steel	Stainless steel
Suction cover	Aluminium Alloy	Gunmetal
L.P. Impeller	Aluminium Alloy	Gunmetal
Front wear ring	Acetal copolymer	Acetal copolymer
Rear rear wing	Acetal copolymer	Acetal copolymer
Gearbox	Aluminium alloy	Aluminium alloy
Input shaft	Stainless steel	Stainless steel
Pump shaft	Stainless steel	Stainless steel
Mechanical seal	Silicon carbide / Carbon	Silicon carbide / Carbon
Other mechanical seal components	Stainless steel	Stainless steel
H.P. Impeller – KP2 only	Stainless steel	Stainless steel
Cover Plate – KP2 only	Stainless steel	Stainless steel

Figure 1. Cross Section of Prima KP1 Pump – Typical

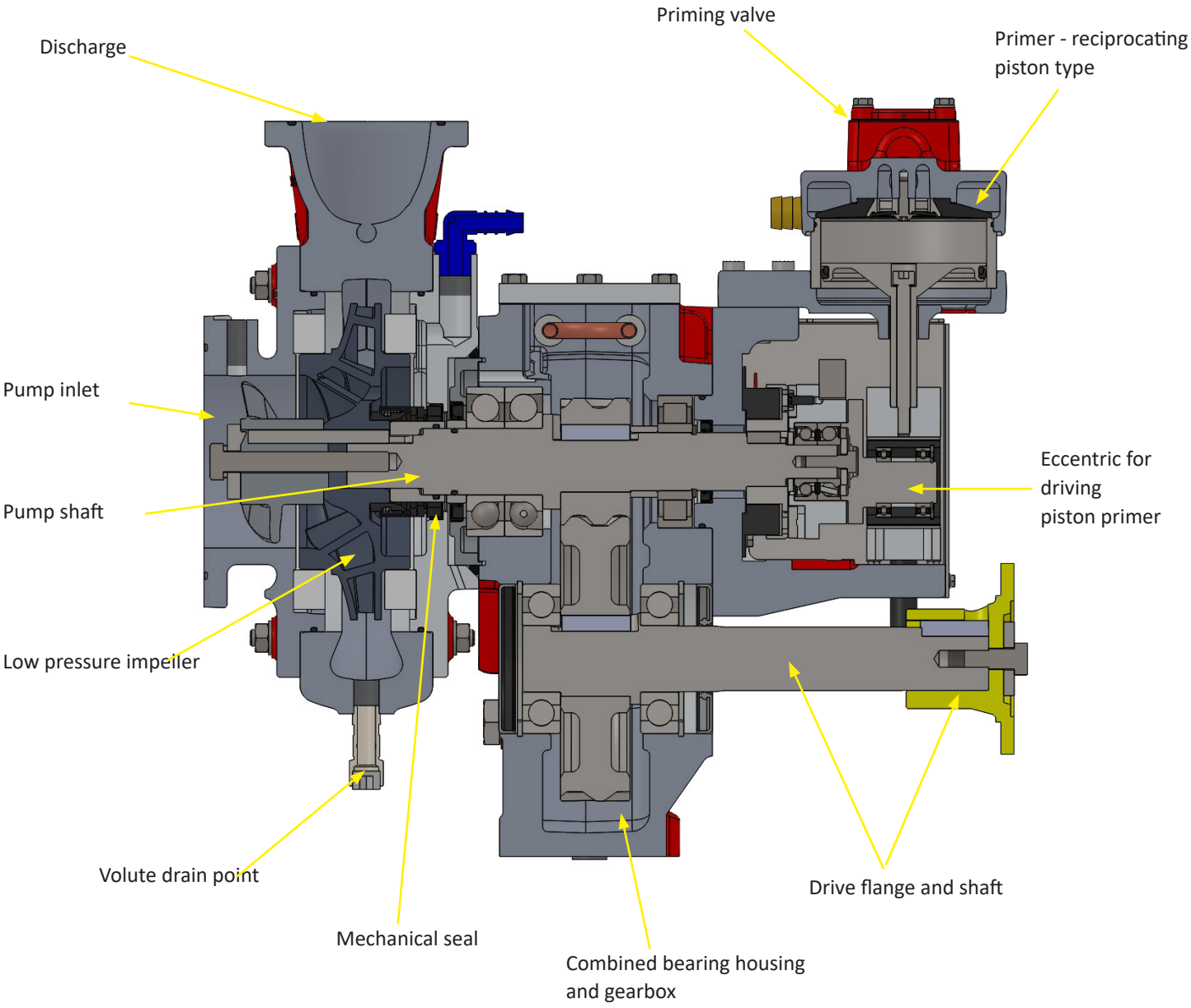
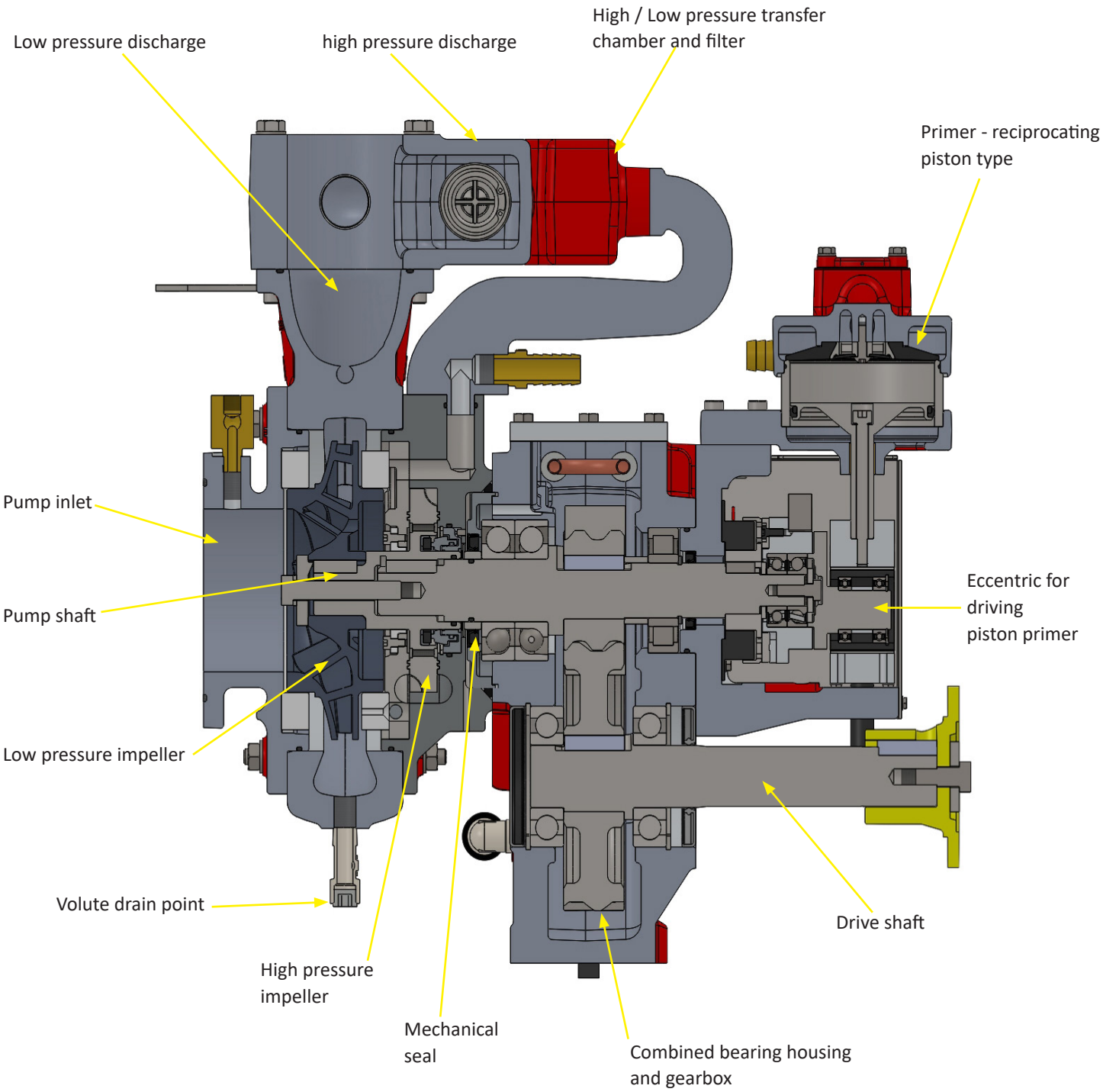


Figure 2. Cross Section of Prima KP2 Pump – Typical



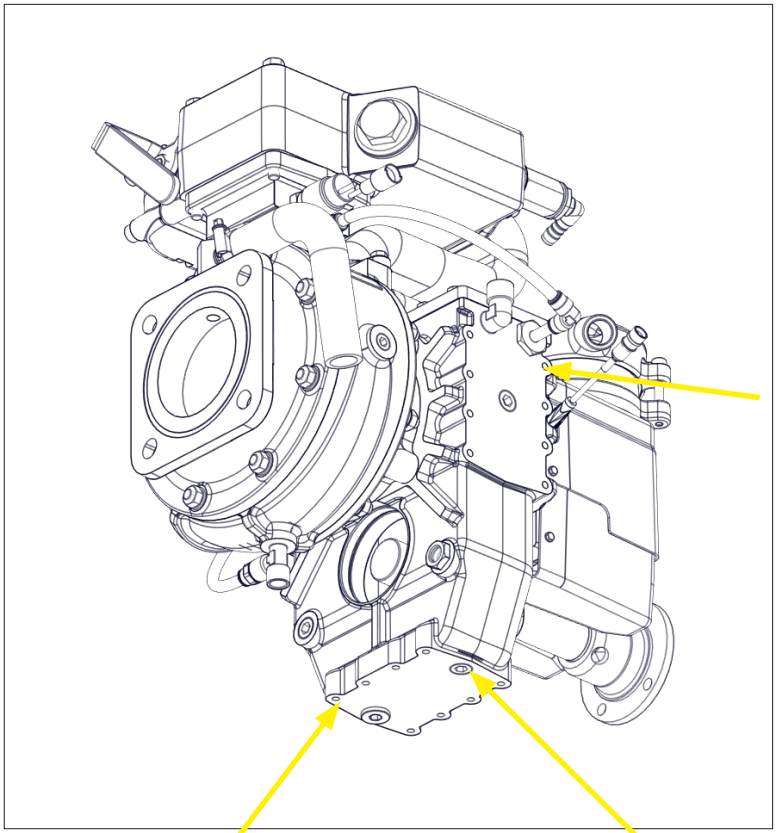
Essential installation data

Fastening bolts, pump to chassis cross-member	8 off M8 x 1.25, Grade 8.8, Minimum 12mm Engagement. Torque to 14Nm
Alignment of pump drive lines	7° Equivalent single joint angle - maximum
Tank to suction pipework	Ø 100mm Must incorporate a pliable element for flexibility.
Pump speed sensor	Electronic. Please see diagram DS651 for the wiring connection details (page xx).
Fasteners	ISO specification
Utility requirements	Water supply to pump inlet Electricity supply to clutch, 24V/5A or 12V/10A
Special assembly tools for installation	Connector tool for attaching plugs (where supplied)
Angle of installation (in any plane)	± 15°

INSTALLATION

1. Before installation check the pump for any transit damage.

2. Mounting - Securing pump
The pump is secured to the vehicle chassis by eight M8 bolts, the corresponding bolt holes on the pump will be located on the gearbox. Note: the gearbox can be supplied in three positions - left, right and down, so the location of the fixing holes will vary according to the gearbox position.
The full bolt specification is M8 x 1.25, Grade 8.8, Minimum 12mm Engagement. Torque to 14Nm.
This photograph shows the gearbox in the down position.



For pump mounting with gearbox to right side. The same holes are provided on the left side for left side mounting

For mounting gearbox in down position
Pump mounting points - Use 8 x M8 Bolts

Oil drain plug

3. Mounting - Provision for external pipes
Provision must be made for the oil drain plug and the cooling pipes in left and right position gearboxes. Refer to the KP1 and KP2 installation drawing for further installation information.

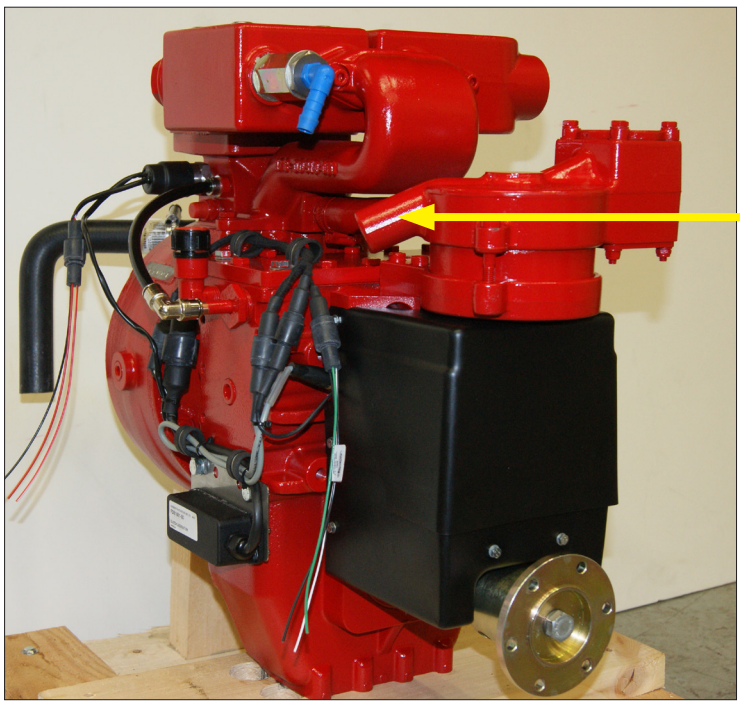
4. Priming System

Connect a flexible pipe (32mm, 1¼ inch internal dia.) to the discharge port on the side of the primer. The discharge options for the primer are -

Discharge can be piped to the ground. Point discharge away from the operator.

Discharge can be piped to a separate holding tank.

Discharge can be piped back to main tank – if no foam system is used.



Connect discharge pipe to primer here - 32mm, 1¼ inch internal diameter flexible pipe.

5. Wiring connections - Primer disengagement and Tachometer
The pump is supplied with the main disengaging components connected. It is the external power supply that needs to be connected to the pressure switch and tachometer.

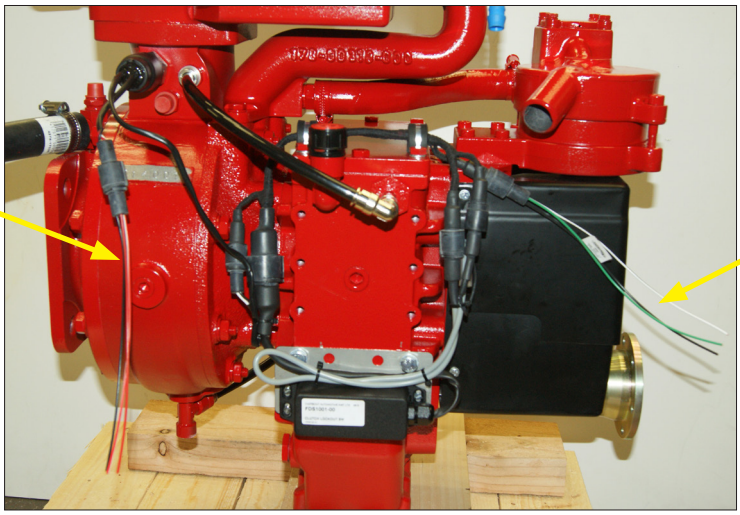
Pressure Switch
Connect these wires to -

Red = 12/24V Pos(+)

Red/White = to earth

Black = 12/24V(-) ground

Also see page 24 for wiring diagram.



Tachometer
Connect these wires to -

Green = 12/24V Pos(+)

White/Black = Signal to tacho

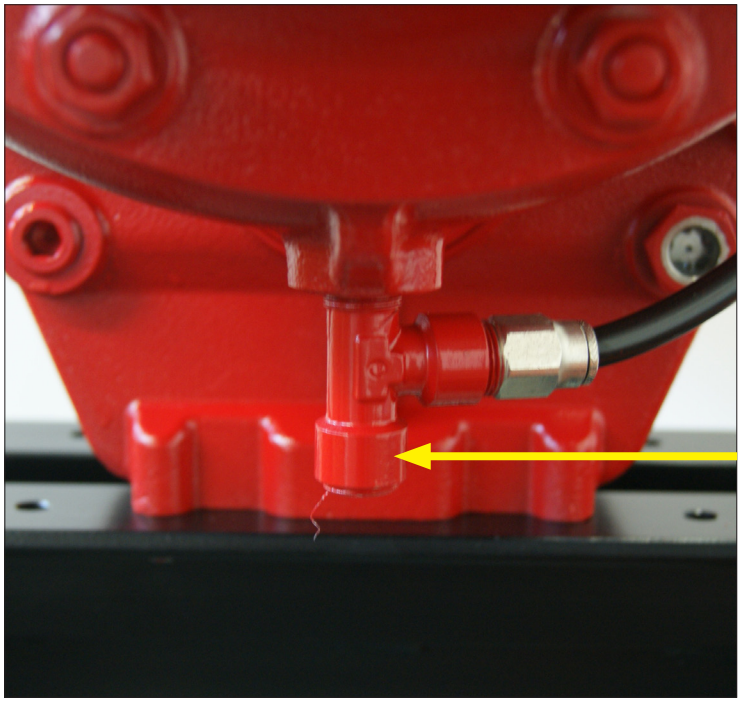
Black = 12/24V Neg(-) ground

Also see page 25 for wiring diagram.

6. Pump Draining

The volute and gearbox drain point must be connected to suitable drain taps.

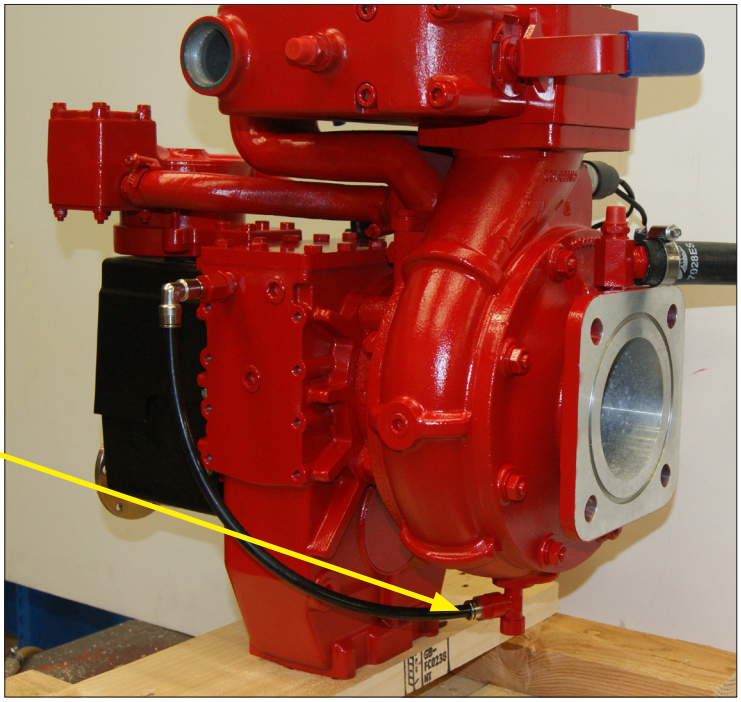
This photograph shows the pump drain and gearbox cooling circuit connected to a drain point at the front of the pump.



Volute drain port - This connection is a G3/8 inch, for a tap or fitting to attach a minimum Ø9.5mm hose.

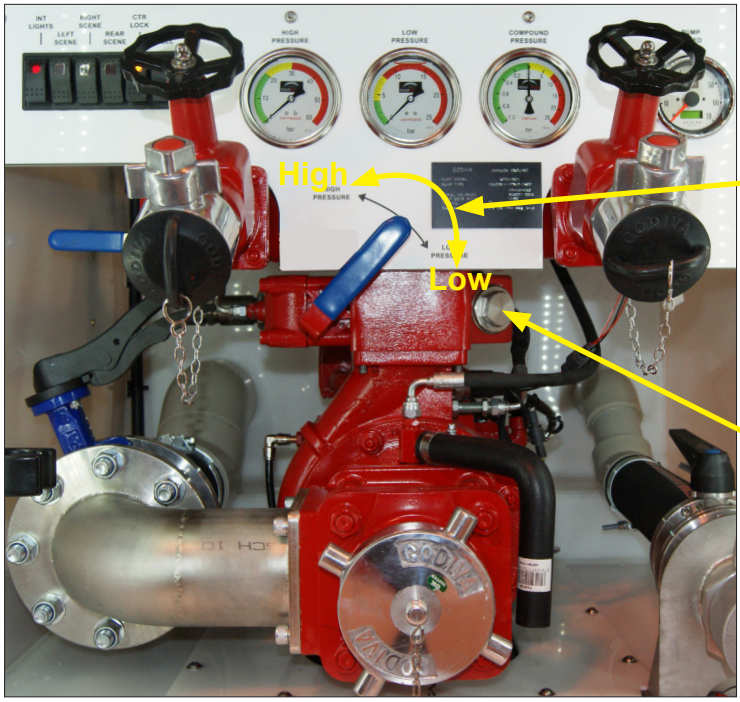
7. Gearbox Draining

The gearbox cooling circuit is also drained at this point



8. Suction – Sideline Connection
A tank to suction line can be accommodated if the special adaptor is fitted to the suction flange. The tank to pump line must incorporate a flexible coupling to allow for any movement.
The adaptor can be rotated to suit different tank to suction line configurations.

9. Filter – KP2 model only
The high pressure filter limits particles entering the high pressure stage.
It should be regularly removed, flushed with clean water and replaced. This should be carried out when pump is not in operation



High pressure / Low pressure selector lever

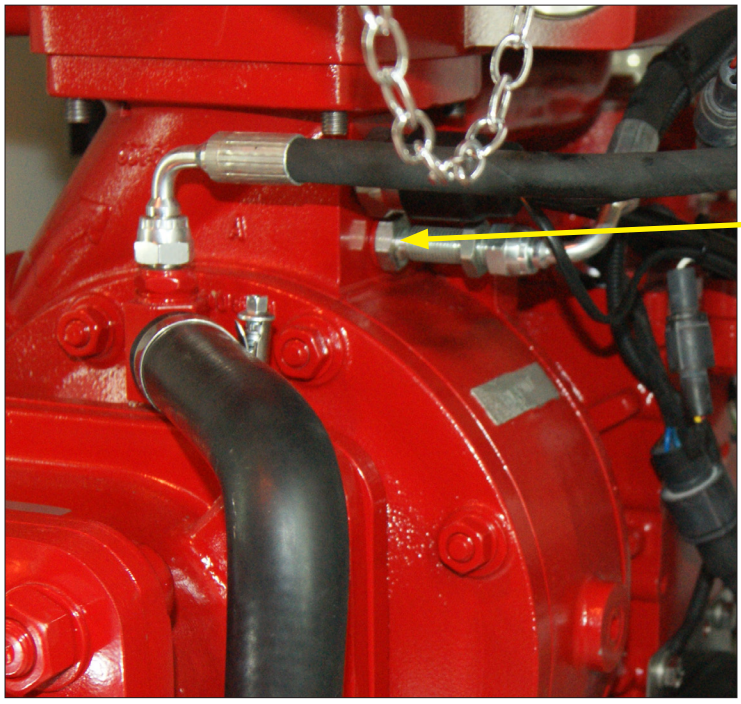
High pressure filter. Remove with 38mm A/F (1½in) spanner

10. High pressure selector valve – KP2 model only
The position of this valve allows the handle to project through an instrument panel attached to the front of the pump. When the handle is down, low pressure is available in the hose reels. With the handle up high pressure is available in the hose reels. Note: Low pressure water is available on the high pressure outlet when high pressure is not selected.

11. Pipework for Instrumentation and Safety Devices

Vacuum and pressure gauge connection points are indicated in the pictures below. All connections and tubing must have a minimum working pressure rating of 19 bar.

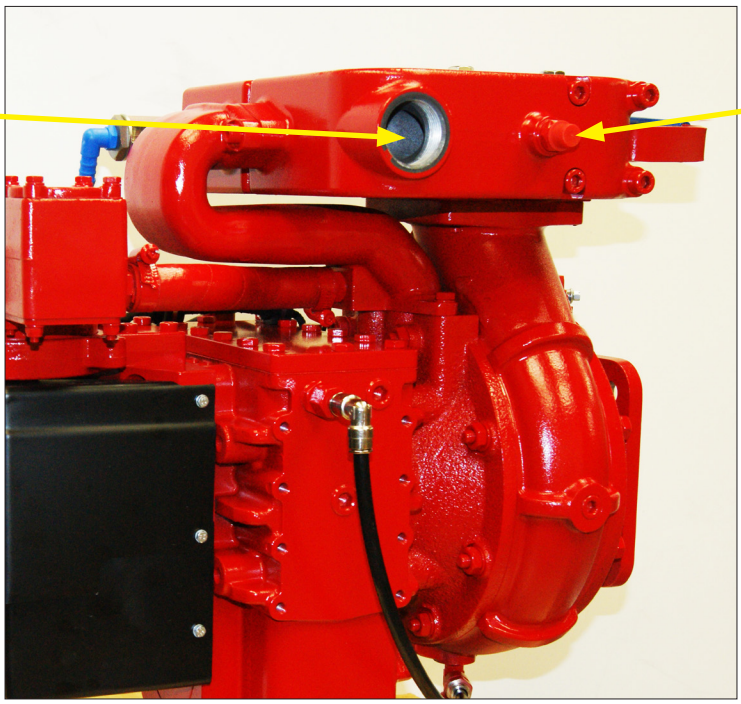
KP1 and KP2 models - low pressure gauge connection – on side of volute.



Low pressure gauge connection, Rp ¼”

KP2 model - High pressure gauge connection – on side of high pressure discharge manifold

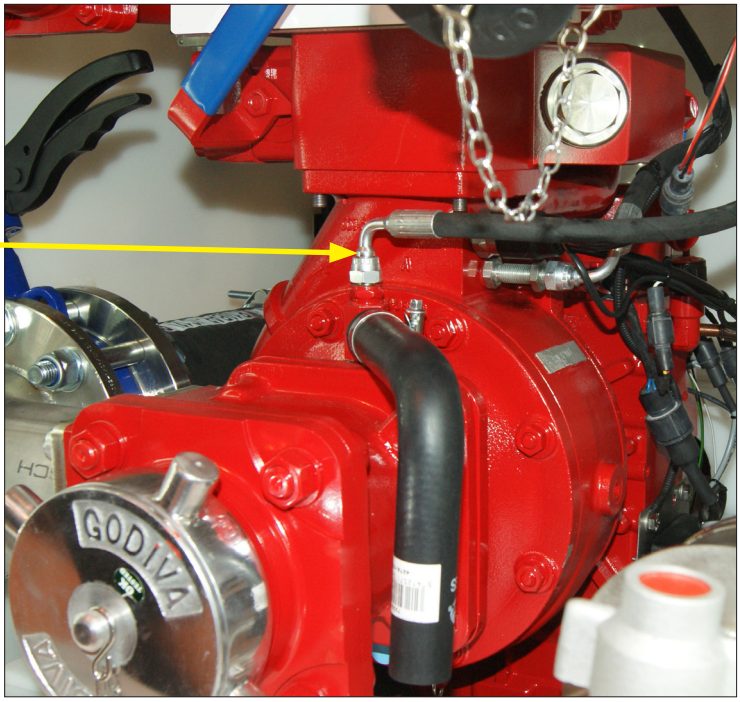
High pressure outlet connection Rp 1¼



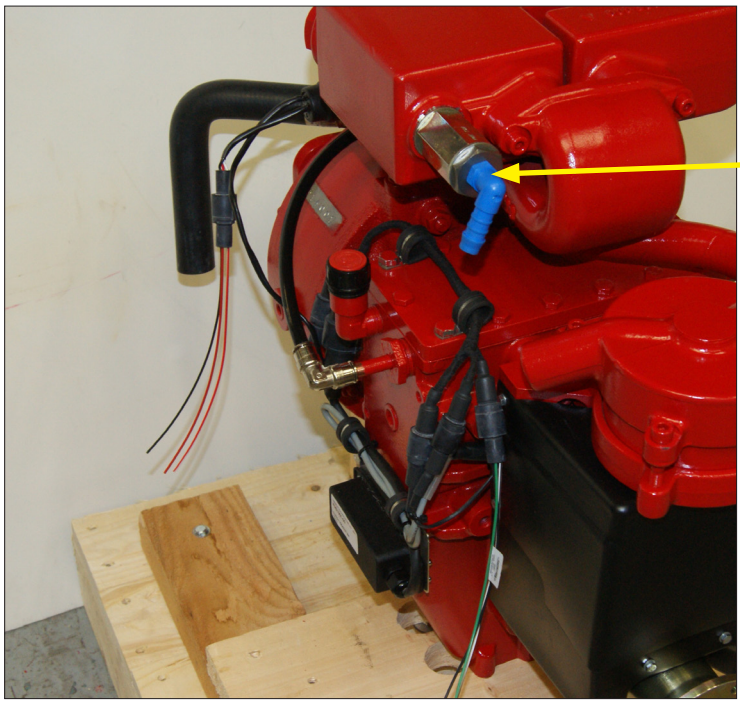
High pressure gauge connection, Rp ¼”

Vacuum gauge connection – on suction tube

Vacuum gauge connection, Rp ¼”



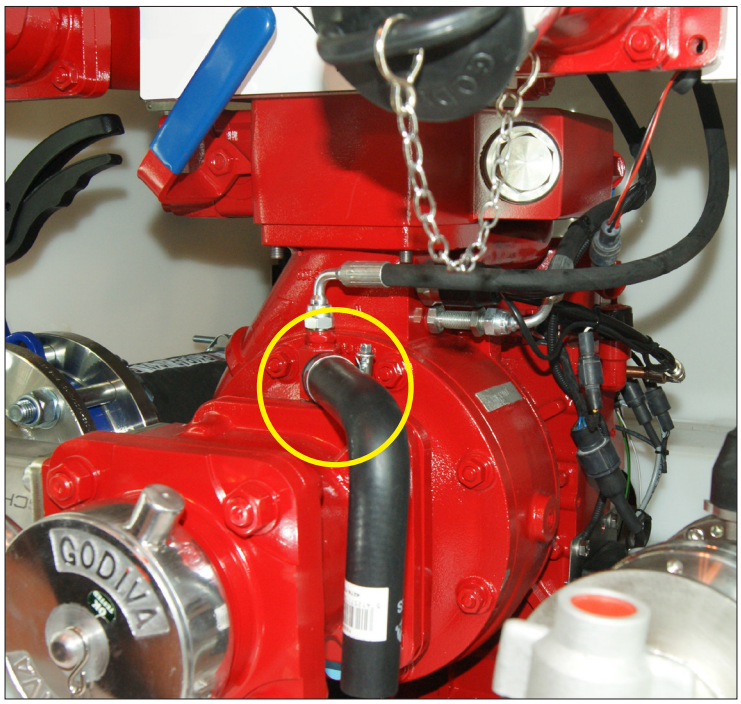
Thermal Relief Valve (TRV)
Elbow accepts 12mm (1/2 in) bore flexible hose
DO NOT PLUG THIS VALVE. FEED DISCHARGE AWAY FROM OPERATOR.
MAY BE FED INTO TANK IF FOAM IS NOT USED – available in two ratings, 42°C and 74°C.



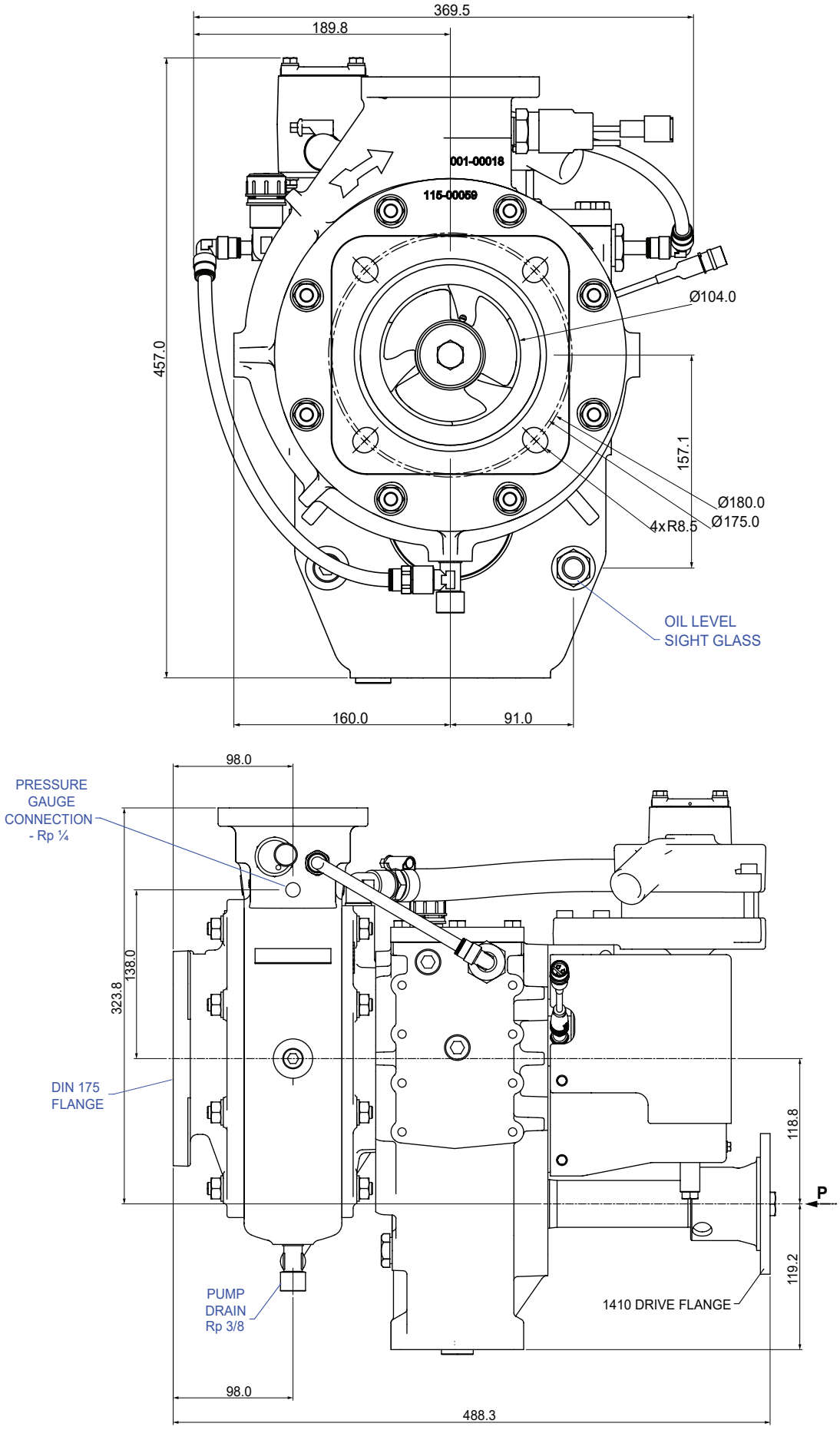
Note: TRV is shown on a KP2 model, located on high/low pressure transfer module.

KP1 model - TRV is located on low pressure discharge manifold (which is an optional item) or if no manifold fitted the TRV is provided loose.

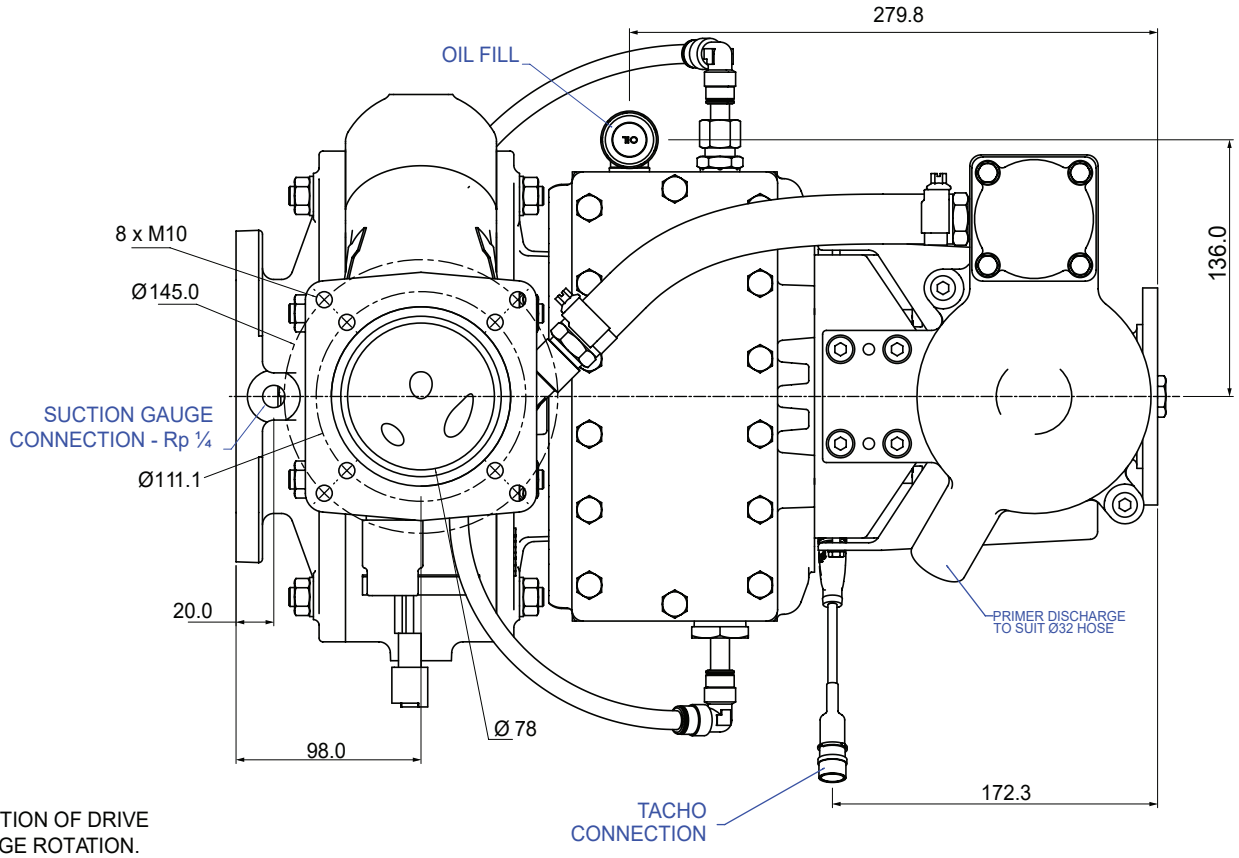
Suction Pressure Relief Valve
Pressure relief valve is fitted to relieve high pressure in hose reels when discharge nozzles are closed.
The valve must discharge to atmosphere.



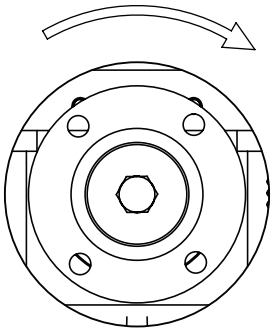
General Arrangement Drawing - KP1, Part 1



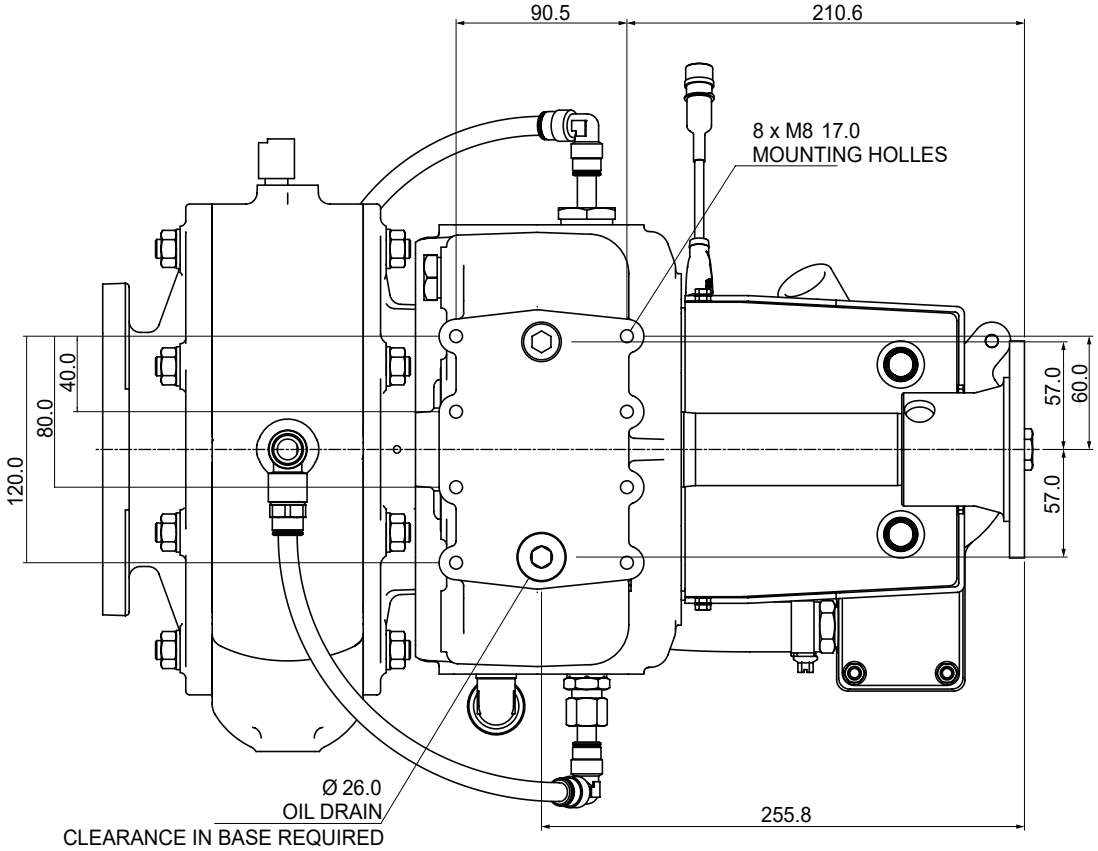
General Arrangement Drawing - KP1, Part 2



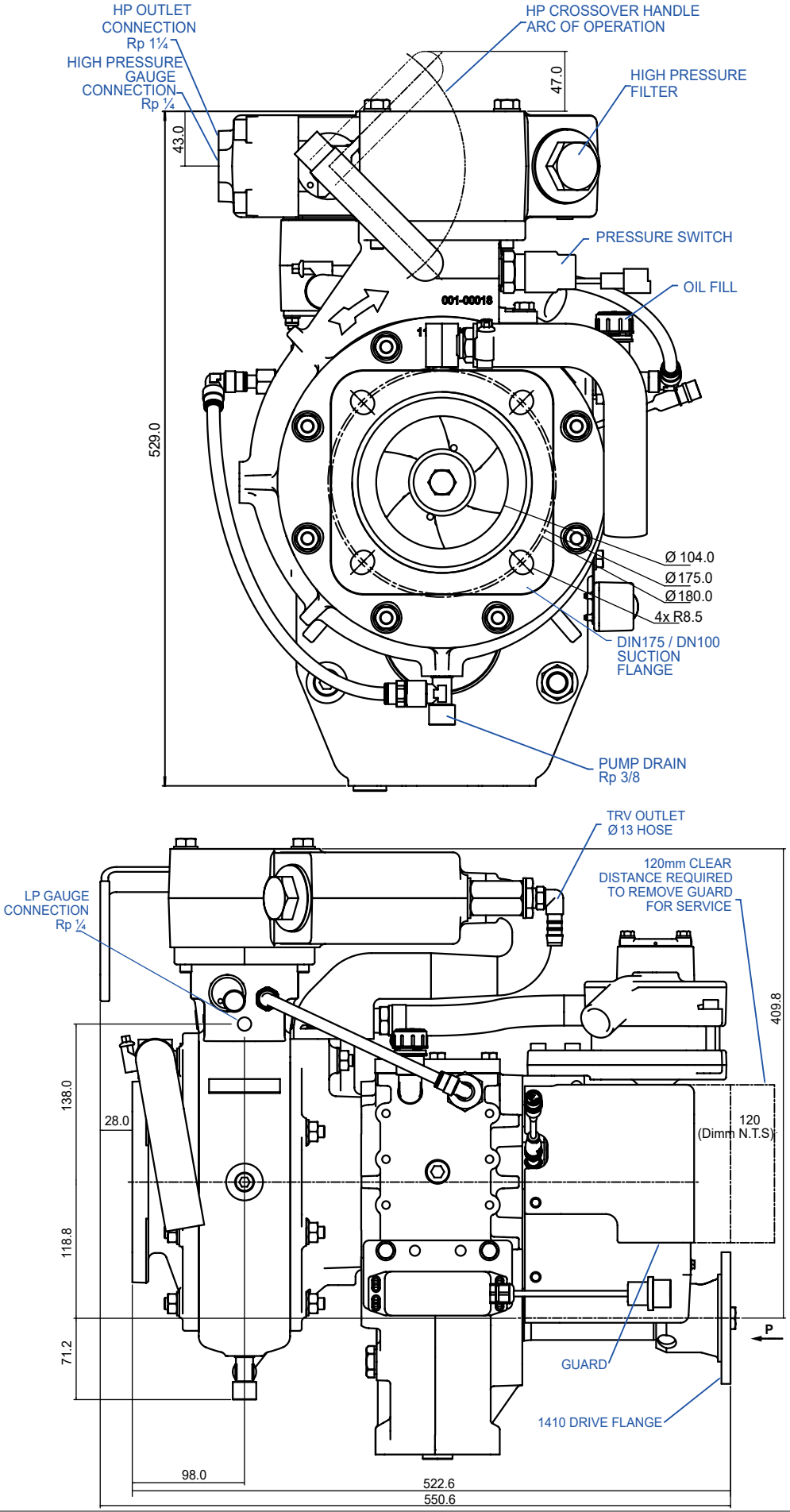
DIRECTION OF DRIVE
FLANGE ROTATION.
CLOCKWISE DIRECTION SHOWN.
COUNTER CLOCKWISE
ALSO AVAILABLE



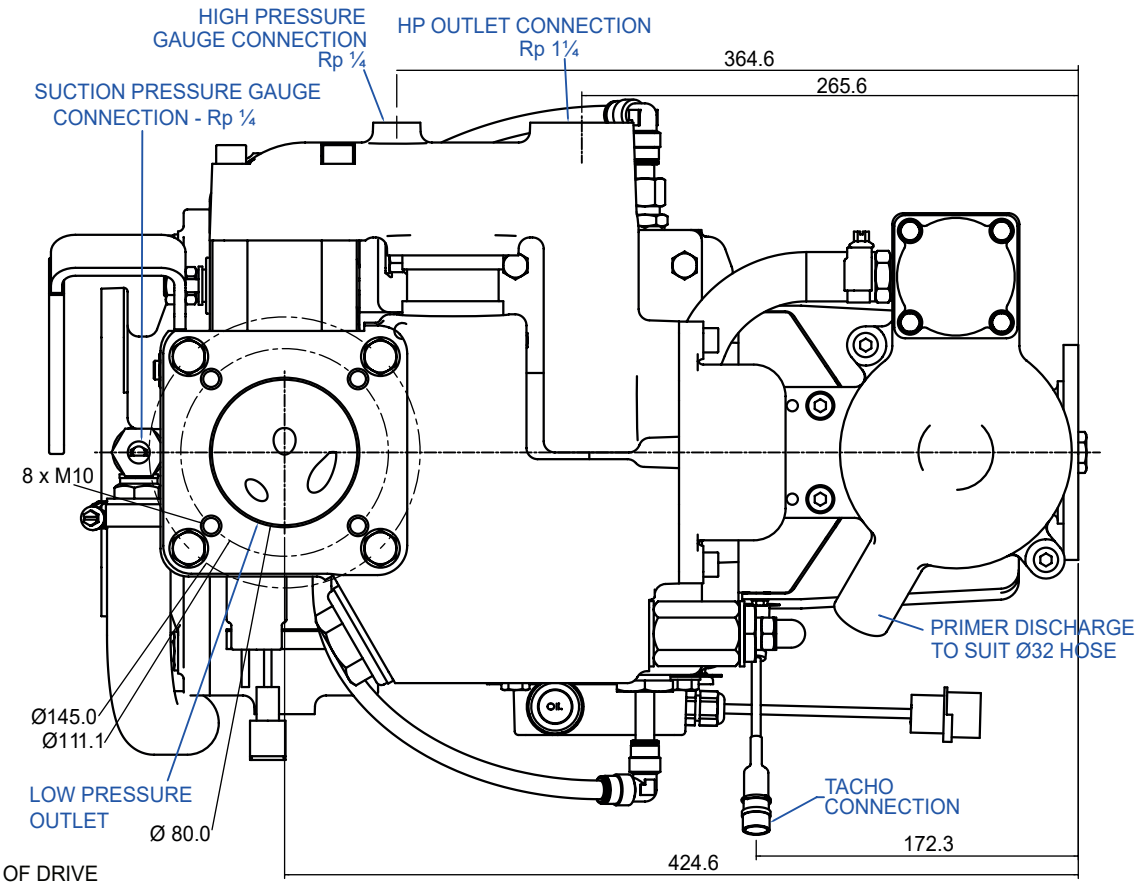
VIEW P



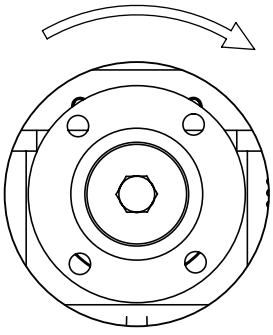
General Arrangement Drawing - KP2, Part 1



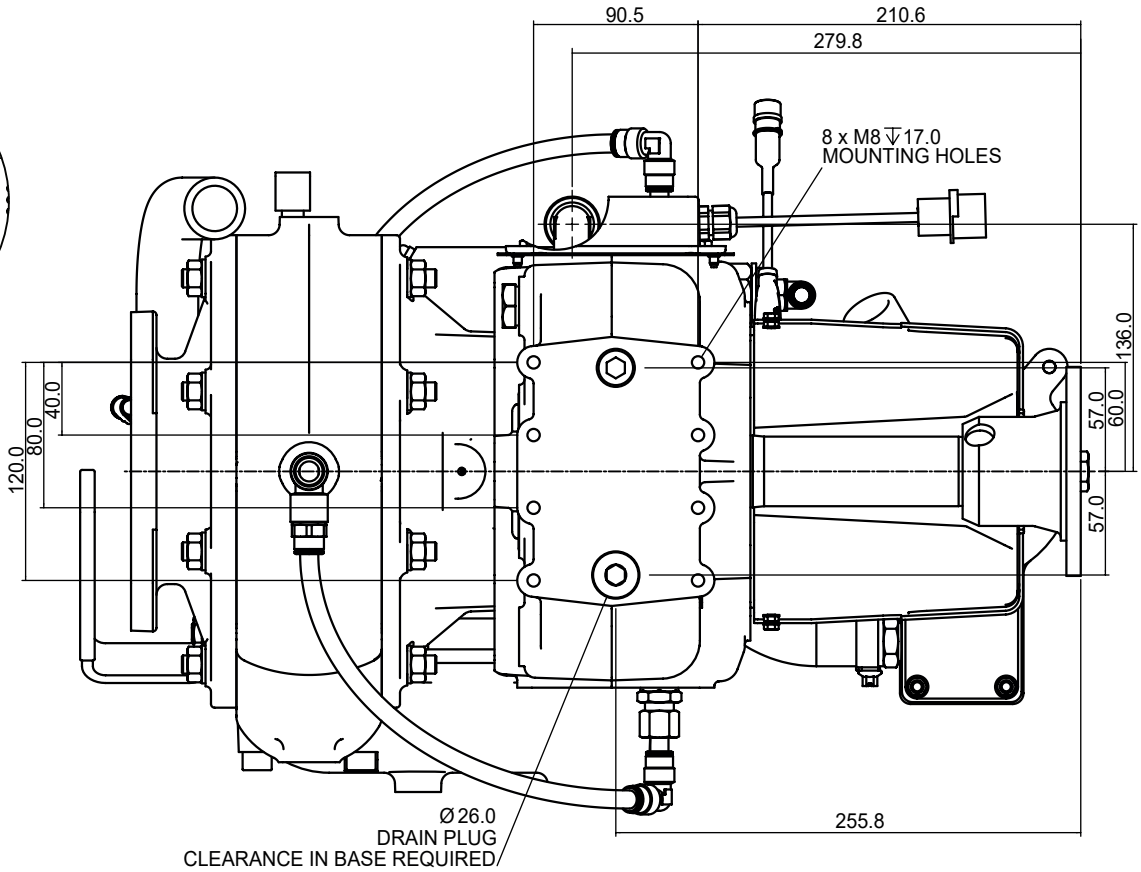
General Arrangement Drawing - KP2, Part 2



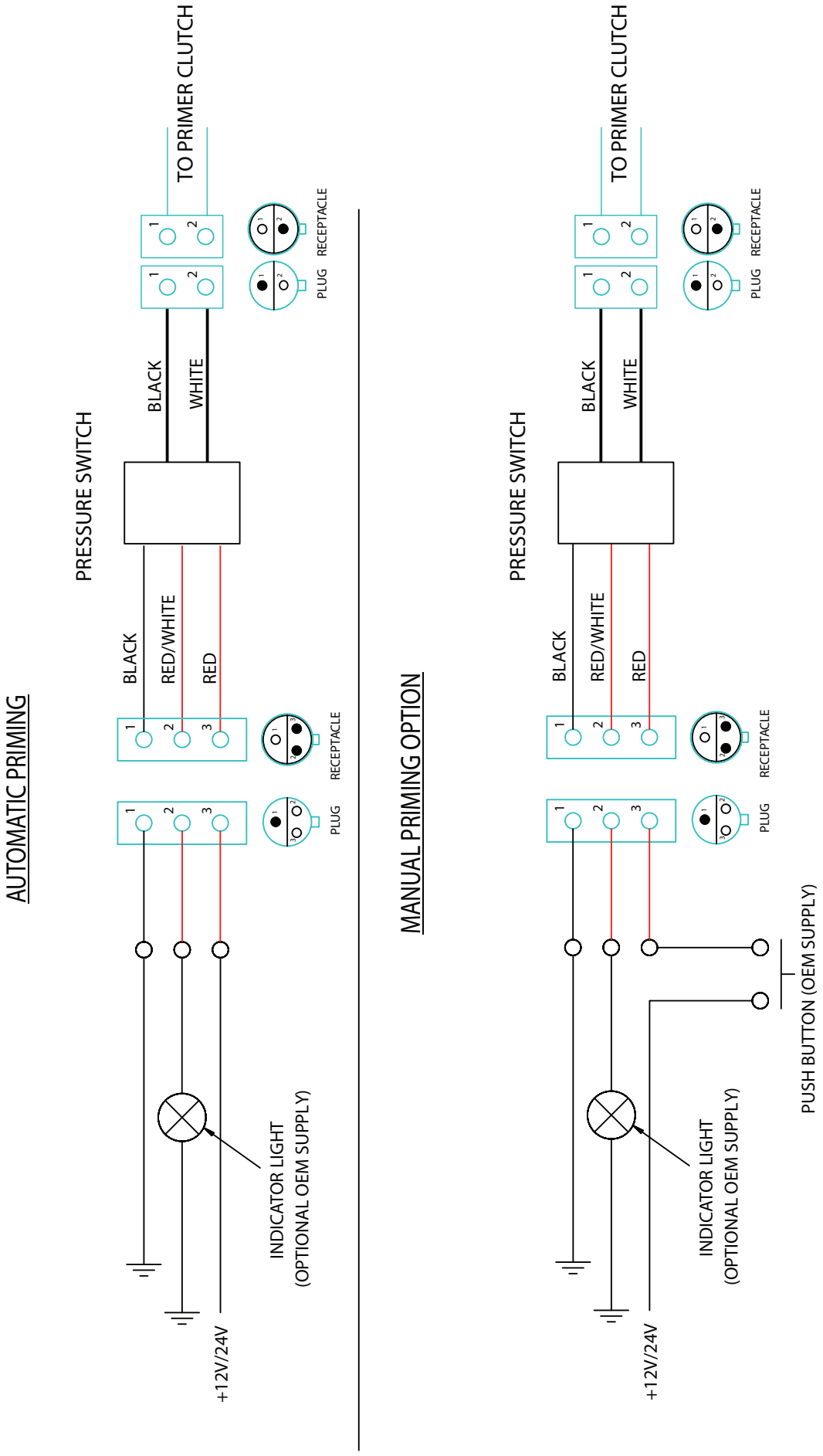
DIRECTION OF DRIVE FLANGE ROTATION.
CLOCKWISE DIRECTION SHOWN.
COUNTER CLOCKWISE ALSO AVAILABLE



VIEW P

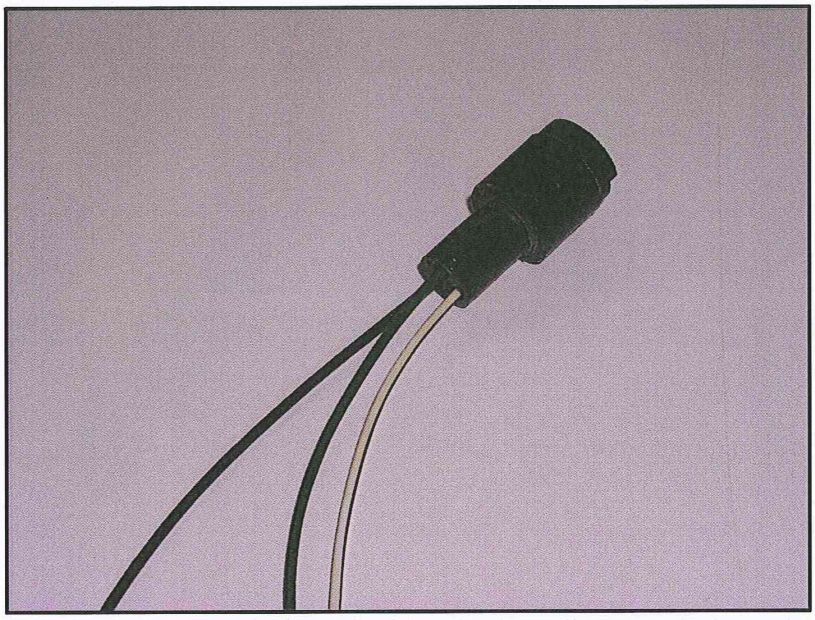


Priming Wiring

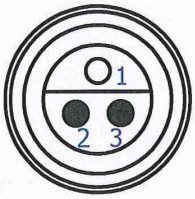


Tachometer sender unit wiring

GODIVA IDEX CORPORATION



SENDER UNIT'S WIRE INFORMATION



SENDER UNIT VIEWED FROM CONNECTION END

GREEN WIRE, SOCKET 1 = 12/24V POS(+) FUSED SWITCHED SUPPLY

△2 WHITE/BLACK WIRE, PIN 2 = SIGNAL TO TACHO

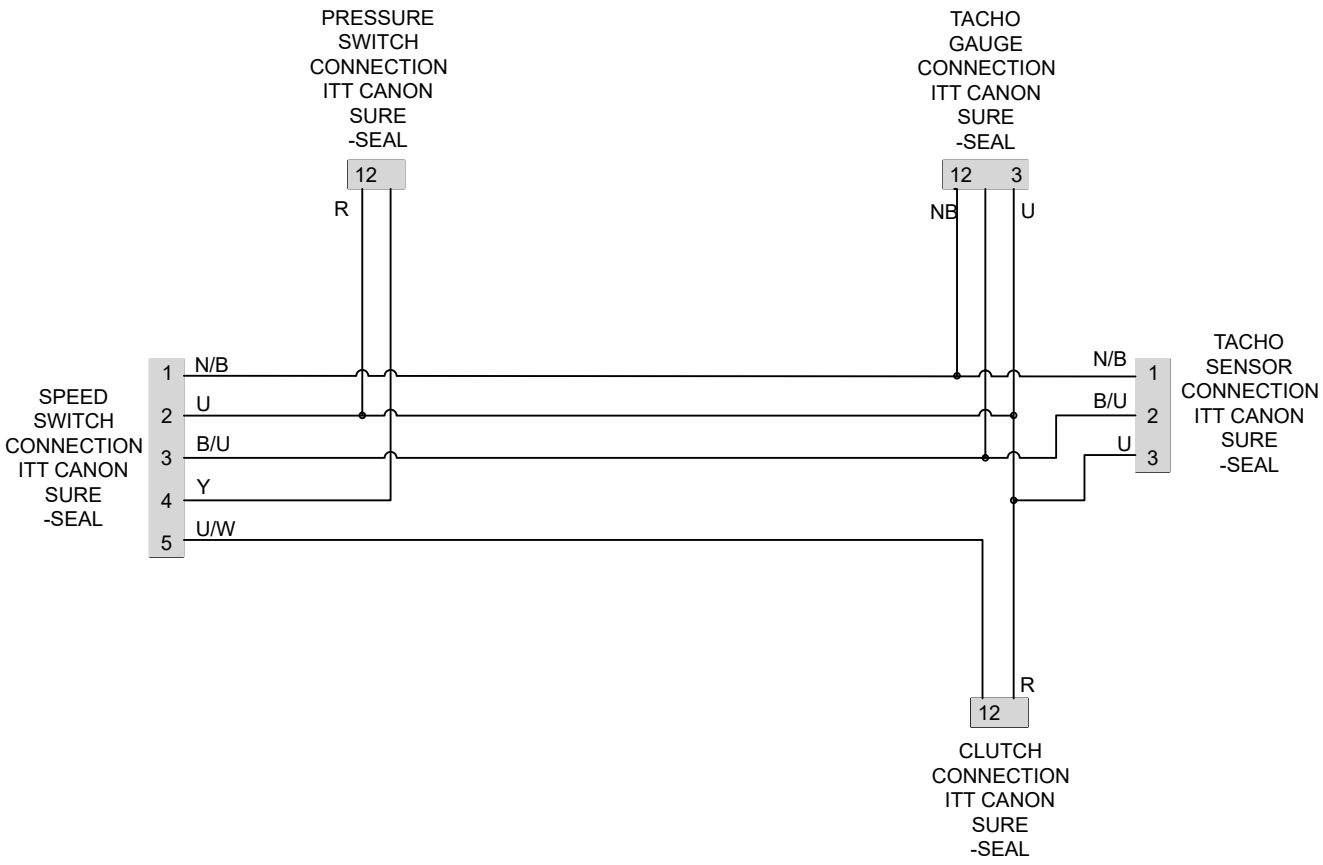
BLACK WIRE, PIN 3 = 12/24V NEG(-) SUPPLY

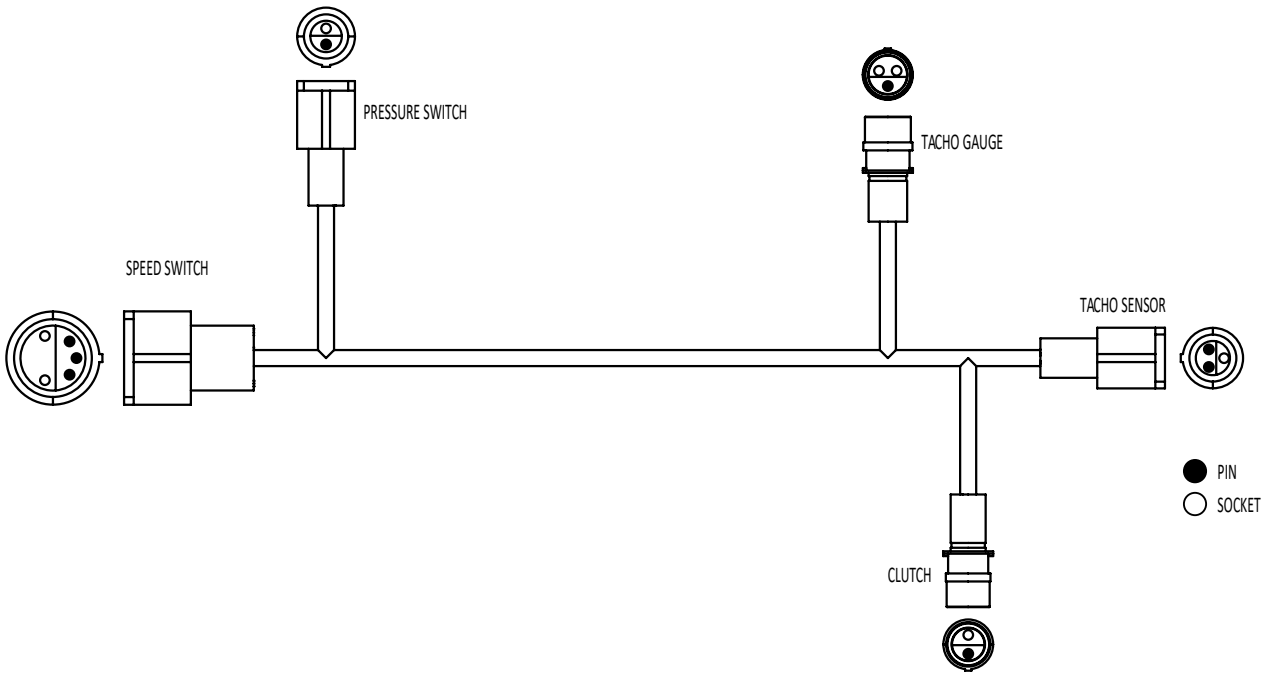
ISS.	CHANGE NOTE NO.	DATE	BY
2	C00588	30 SEP 10	ACS
1		24 JUN 10	ACS

TITLE
65627 - TACHO SENDER CONNECTION INFORMATION

DS651

Priming - Harness Wiring Schematic



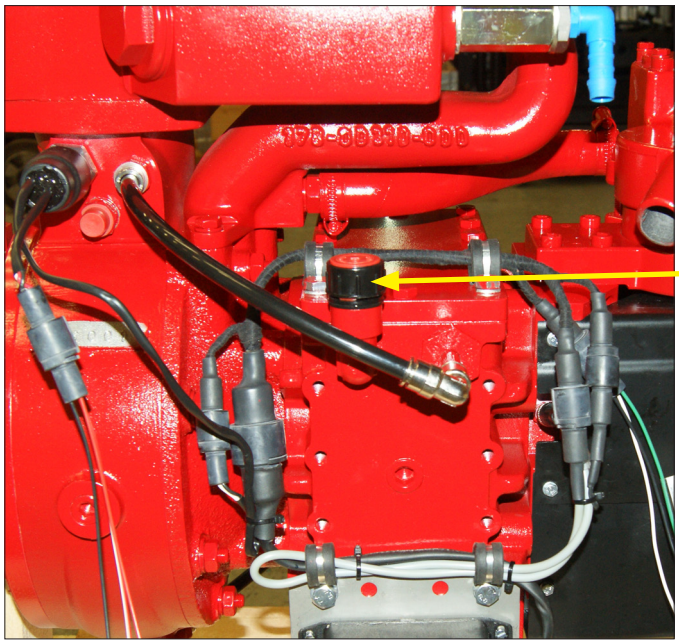


COMMISSIONING

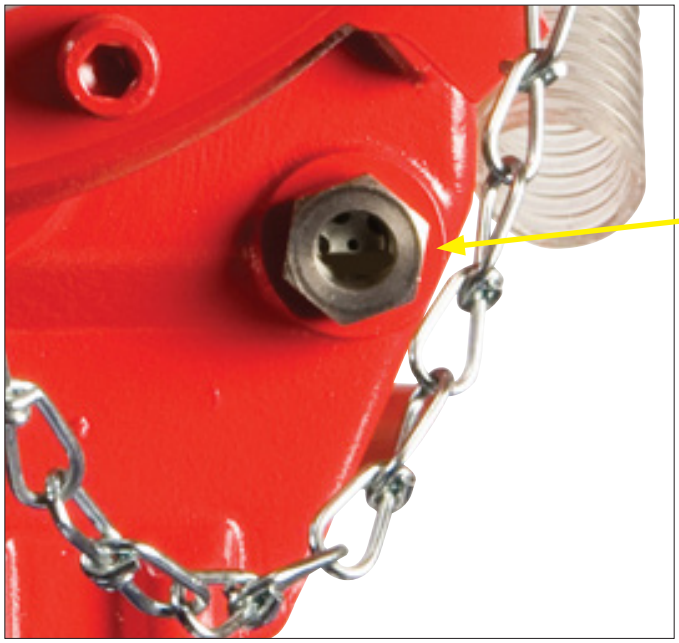
Check all mountings are secure.
Check all pipework has been connected.
Check engine rotation against PTO rotation.
Ensure drive is connected.
Ensure water is available and connected
Ensure power is available and connected.

Preparation for use

Fill the bearing housing with the specified grade and quantity of oil (see Technical Data).
Check oil level only when vehicle is stationary and level. If the pump has been running, allow 5 minutes for the oil to settle.



Gearbox oil filler/ breather



Oil level site glass - oil should be at mid-point in the glass

Check that any electrical components are functioning correctly, e.g. the primer mechanism, instrument panel gauges, tachometer.

OPERATION

Do not use the pump in explosive environments.
Do not use the pump without the inlet screen fitted.
Do not run the pump without water for more than one minute, as dry running will damage the seal.

The Godiva KP pump is designed for extinguishing fires with an unrestricted water source.
Water must be as clean as possible and can be fresh water or sea water. For long term use with sea water, gunmetal material pumps are strongly recommended.

Operator Controls

Operation of the pump is by two basic controls – discharge valve and pump speed control.

Discharge valve. Screw down type shown, turn clockwise to close, anti-clockwise to open.

Operation – from an open water source, Piston Priming

Ensure that a suitable strainer is secured to the end of the suction hose and suspended below the water but not resting in mud or sand.
Connect the suction hoses securely to the suction tube and close the discharge valves.
Engage the pump drive and increase the pump speed to 2500rpm.

The pump priming mechanism will engage automatically when water pressure is below 0.75 bar in the pump volute. When the pump is running, and water pressure is above 0.75 bar the priming mechanism disengages.

IMPORTANT

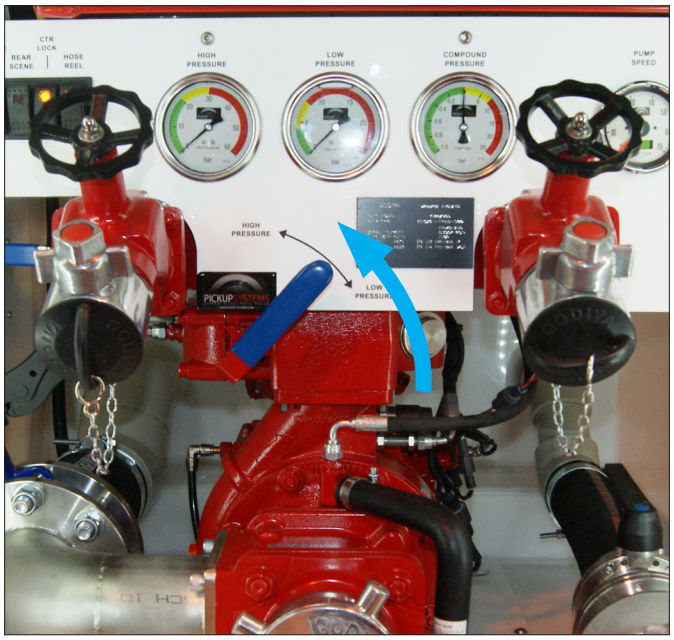
Do not operate the pump for extended periods with the discharge valves closed. This may cause the pump to overheat. On KP2 pumps a thermal relief valve is fitted as standard to help prevent overheating.

Operation – from a pressurised source, e.g. hydrant or vehicle tank

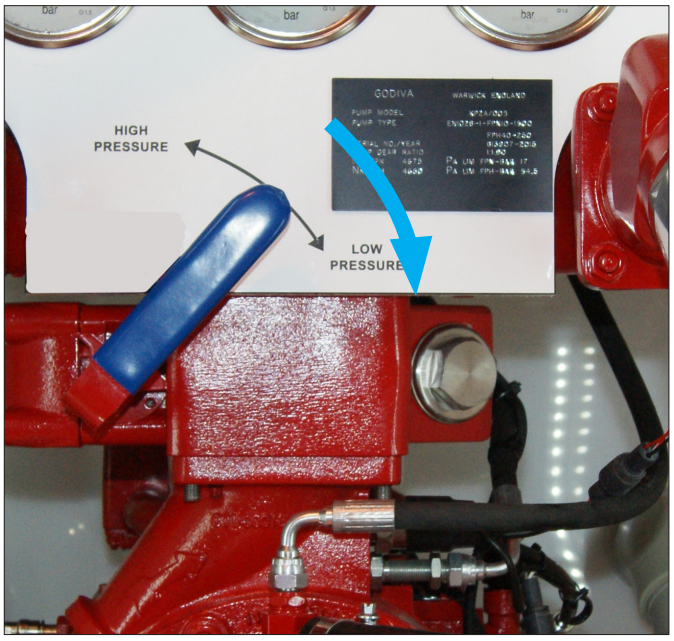
If water is supplied from a pressurised source then priming is not necessary.

KP2 model - High Pressure Operation

By moving the High/Low pressure selector lever to –



Up – High pressure will be available to the hose reels
Low pressure also available at low pressure discharge



Down – Low pressure only available to hose reels
Low pressure also available at low pressure discharge

When not required the high/low pressure selector lever should be left in the low pressure position (down). This will minimise pump power demand, consume less fuel and produce less emissions and noise.

Shutdown

Return the pump to idling speed before disengaging the pump drive.
Drain the pump of any water by opening the drain tap at the bottom of the mounting platform (or at the bottom of the volute if no platform is fitted).

MAINTENANCE

Maintenance intervals and action required

Interval	Action required	Items Required
After each use –	Flush pump through with clean water and drain volute	Supply of clean water
Delivery Valves (applies primarily to UK screw down type)	Check the valves open and close freely. Do not overtighten in either direction.	If the valve is stiff, report to workshop for repair.
Delivery valve	Check for leaks around the spindle	If valve is leaking, report to workshop for repair.
Delivery valve - for valves fitted with Instantaneous Connection (typically UK pumps)	Check the twist release mechanism operates freely and the seal inside the outlet is in place	If the twist release mechanism is stiff, report to workshop for repair.
Delivery valve	Check visually for any damage	Report to workshop for repair
Every Three Months -		
Check oil level in gearbox housing	Check oil level in sight glass on side of gearbox	Fully Synthetic ISO VG 220 oil for 5 year use, or EP80 or 90 gear oil for 1 year use. 1.1 litre
Vacuum test	See separate instructions on page 33	
Pressure test – for tracing location of vacuum leak	See separate instructions on page 33	Access to pressurised water source
KP2 - High pressure filter	Remove the filter from the housing and flush with clean water	
Delivery valve	Examine non-return flap rubber and pivot pin, spindle	Report to workshop for repair

MAINTENANCE - CONTINUED

Maintenance intervals and action required

Interval	Action required	Items Required
Every 1 year -		
Change oil in gearbox housing - if EP80/90 oil used.	Drain oil from housing and refill with new oil	EP80 or 90 gear oil. 1.1 litre
Every 2 years -		
Piston primer seal in cover and body	See procedure in Workshop Manual	Repair kits Special tools (contact Godiva)
Thermal Relief Valve Test	See separate instructions on page 33	
Delivery valve	Examine valve spindle, re-grease or replace. Examine twist release mechanism	Report to workshop for repair
Every 5 years -		
Change oil in gearbox housing - if fully synthetic ISO VG 220 oil used.	Drain oil from housing and refill with new oil	Fully Synthetic ISO VG 220 oil for 5 year use. 1.1 litre

Vacuum Test

Place the blanking cap(s) in position on the inlet(s) of the pump and close the delivery valves. Run the pump at 1300-1500 rpm and observe the vacuum/compound needle. When a vacuum of 0.81bar is obtained, stop the pump. This vacuum should be maintained for at least 15 seconds or drop no more than 0.07bar in a minute.

If the pump will not hold the vacuum with the blanking caps in position, a leak is present in the pump, and the pressure test detailed below must be carried out to trace it.
Should the pump not reach a vacuum of 0.81bar but will hold a lower pressure, a fault in the priming system is indicated.

Pressure Test – carried out without pump running.

This test is to be carried out if the pump will not hold a vacuum with blanking cap(s) in position, and is intended to trace the leaks responsible for the loss of vacuum.
Apply a water pressure of 3.5 - 7.0 bar to the pump and check for leaks. The area causing the leak should be visible, and can be dismantled and rectified.
Check the primer drain hole for water leakage. If leakage is found, replace the primer seals and O rings as described in the Maintenance Manual Procedures.
If the pump will not achieve 0.81 bar vacuum, and will not hold what it does achieve, there is a leak, and possibly also a fault, in the priming system.

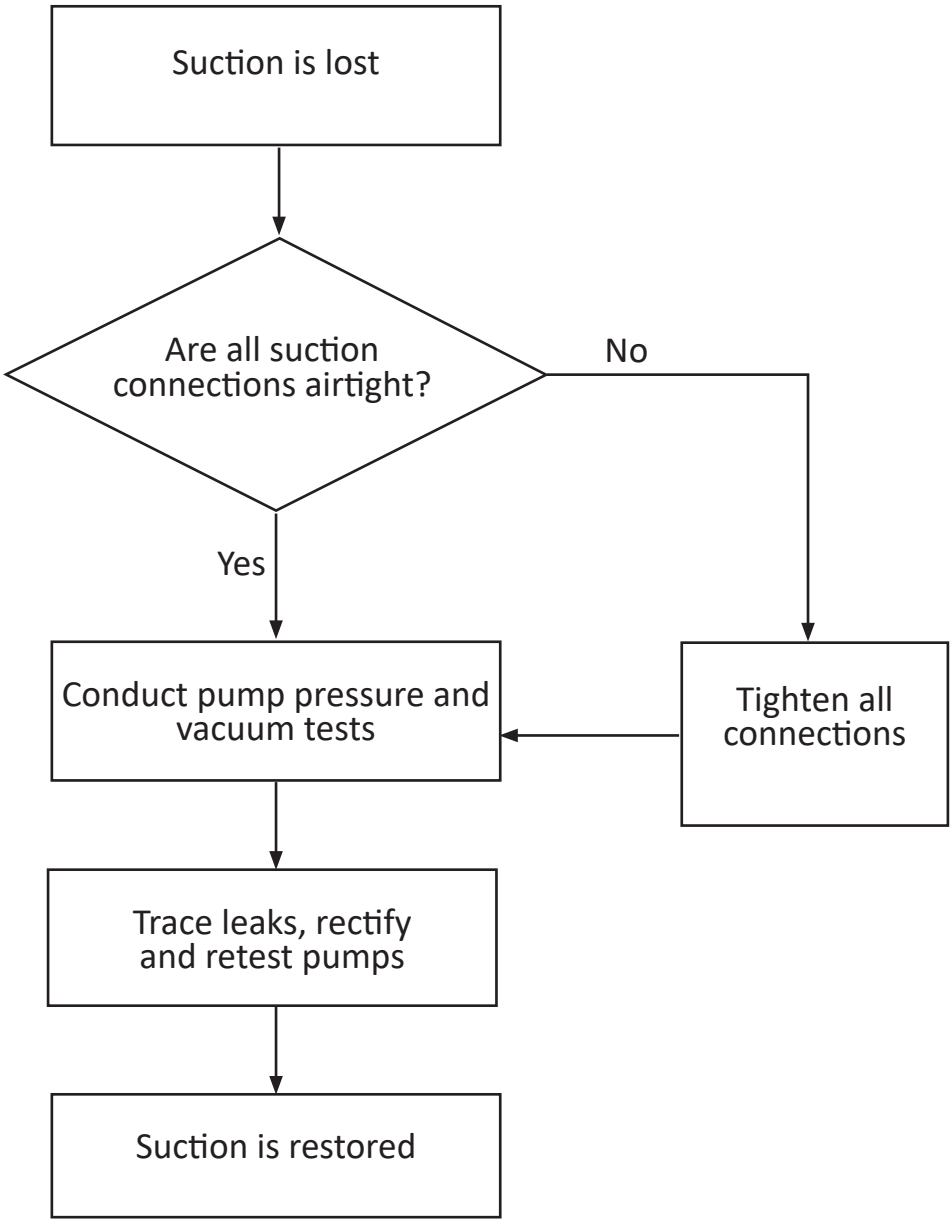
If no leaks are apparent, the leakage must lie between the priming valve and the primer. Points to be checked are:
The inlet seal in the primer end cap
The priming valve diaphragm

KP2 - Thermal Relief Valve (TRV) Test

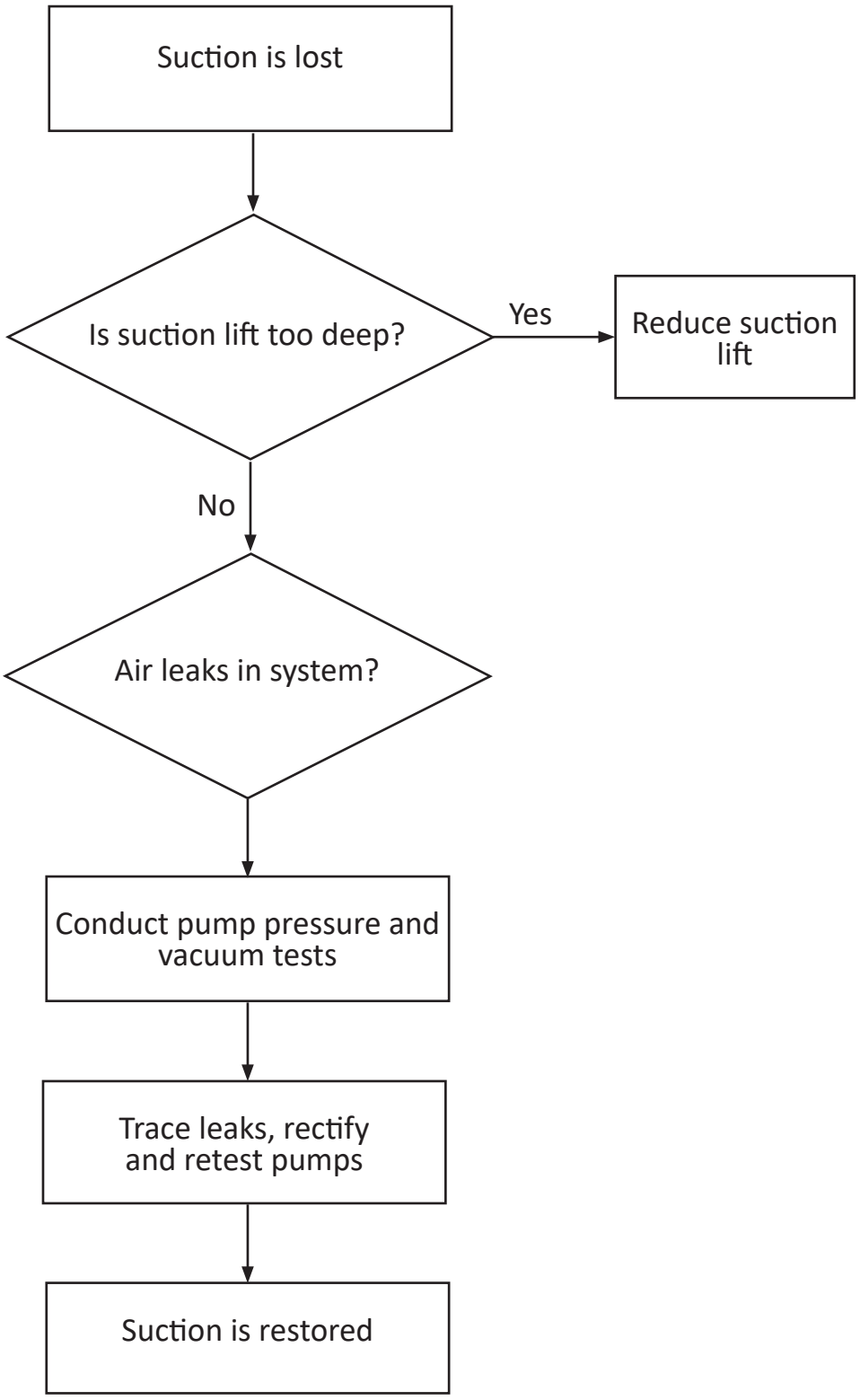
With the pump primed, close all discharges. Run the pump, with high pressure selected, at approximately 2800rpm to permit it to heat up. The TRV should open and discharge water when the pump temperature is in the order of 45 - 55°C with the standard temperature option and 70-75°C with the high temperature option. Observe the valve discharge, if it is open to atmosphere, or feel the discharge pipe become warm if it returns to the vehicle tank. Open a pump discharge valve to permit cool water to enter the pump. The flow from the TRV should now cease.

FAULT FINDING

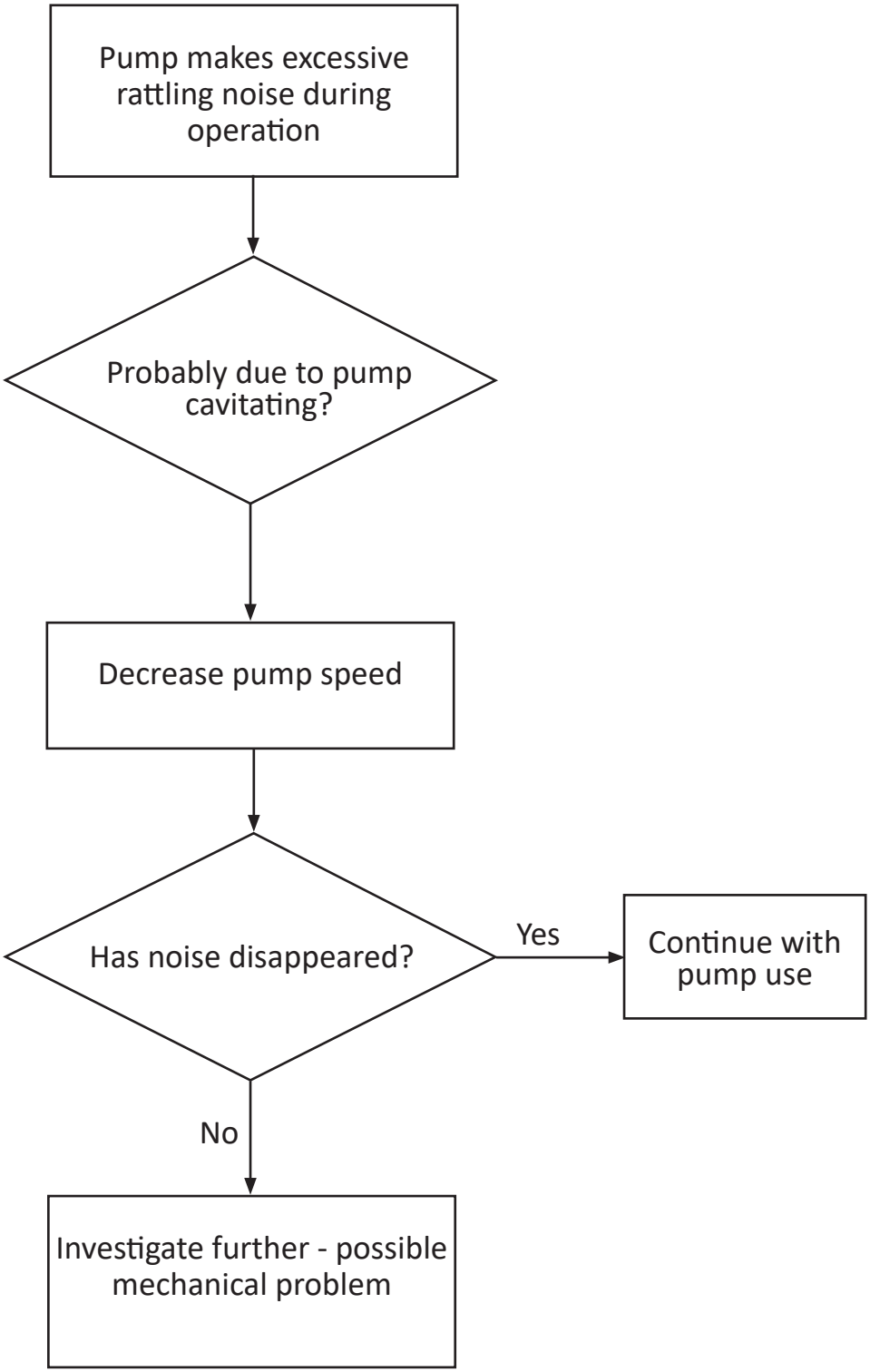
The following conditions may occur –
Loss of suction 1



Loss of suction 2 -



Cavitation –



OPERATOR MAINTENANCE LOG

Pump serial number . . . . . .

Use this log to record faults, part replacements and major overhauls.
Please contact Customer Service at **Godiva Ltd.** prior to any proposed return of either a single part, or a complete assembly.

Date	Hours run	Inspection/fault	Parts renewed	Reason for renewal	Initial

RTP - ROUND THE PUMP FOAM SYSTEM

Introduction

The Godiva KP Series range of pumps can be fitted with a Round the Pump foam system (RTP) capable of inducing up to 120 litres per minute of foam compound into the pump. The system is compact, self-contained and is mounted on the pump suction tube and volute.

Foam Compound

The RTP system is suitable for all commercially-available Protein, Fluoroprotein and Aqueous Film-Forming Foam (AFFF) compounds, commonly called Class B foams. Operation with thixotropic alcohol resistant foams will cause inaccuracy in metering.

Induction Rate

The induction rate is controlled by a variable control knob with calibrated incremental markings from 0 to 120 litres per minute of foam.

The following table indicates the necessary foam flow setting required to maintain certain foam percentages in a discharge of 230 and 475 l/min when the number of branch nozzles increase.

Foam quantities for maintaining 1%, 3%, 6% with 230 l/min rated branch				
% Foam Required in water flow	Branch nozzles in use 1	2	3	4
	Set foam flow regulation knob to these settings -			
1%	2.3 l/min	4.6 l/min	6.9 l/min	9.2 l/min
3%	6.9 l/min	13.8 l/min	20.7 l/min	27.6 l/min
6%	13.8 l/min	27.6 l/min	41.4 l/min	55.2 l/min

Foam quantities for maintaining 1%, 3%, 6% with 475 l/min rated branch				
% Foam Required in water flow	Branch nozzles in use 1	2	3	4
	Set foam flow regulation knob to these settings -			
1%	4.8 l/min	9.5 l/min	14.3 l/min	19 l/min
3%	14.3 l/min	28.5 l/min	42.8 l/min	57 l/min
6%	28.5 l/min	57 l/min	85.5 l/min	114 l/min

Materials

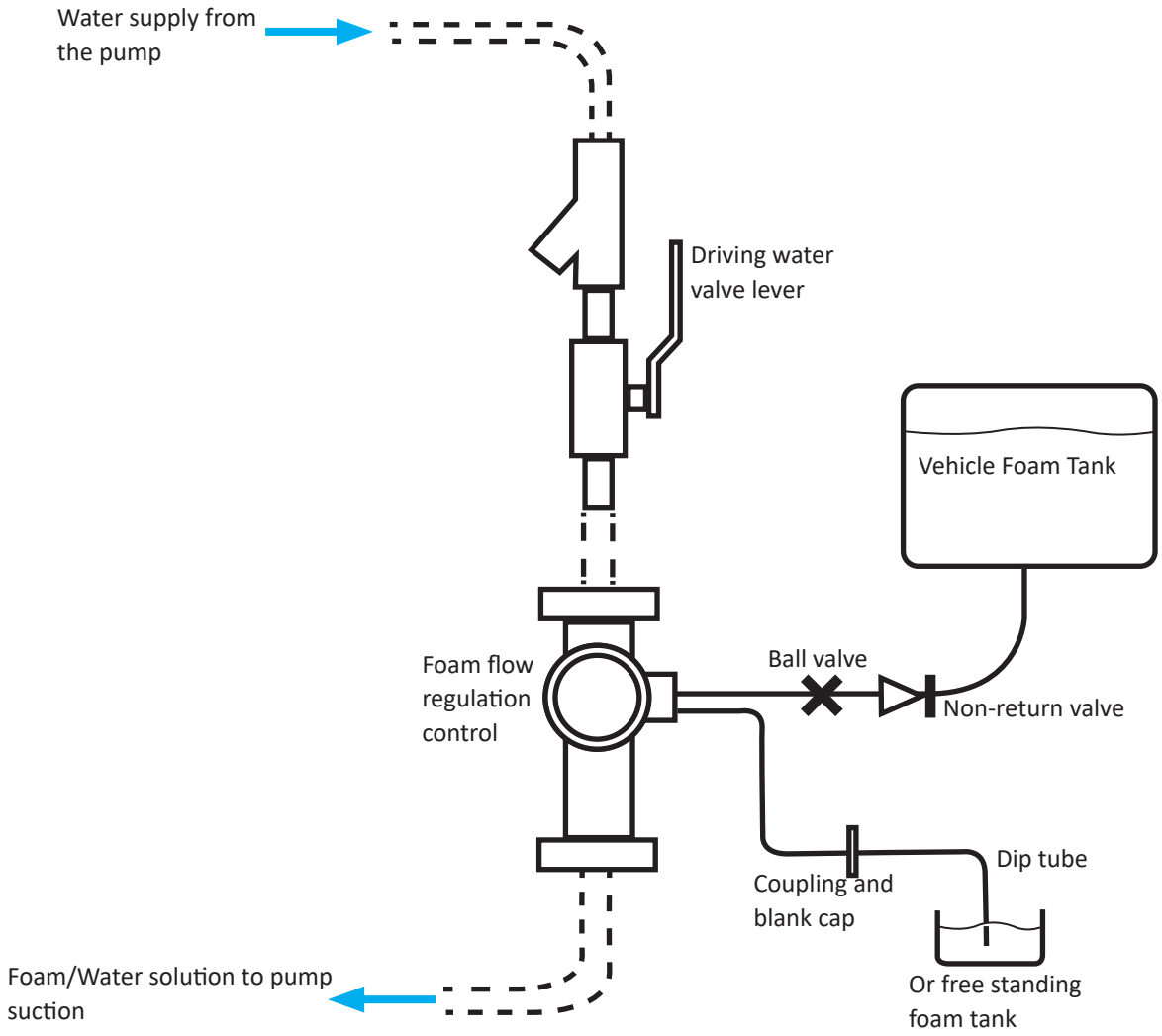
To minimise any potential corrosion problems, the system is available in materials compatible with that of the main pump.

For light alloy pumps, the inductor is made from aluminium alloy and is hard-anodised. For bronze pumps, gunmetal components are used throughout.

Installation

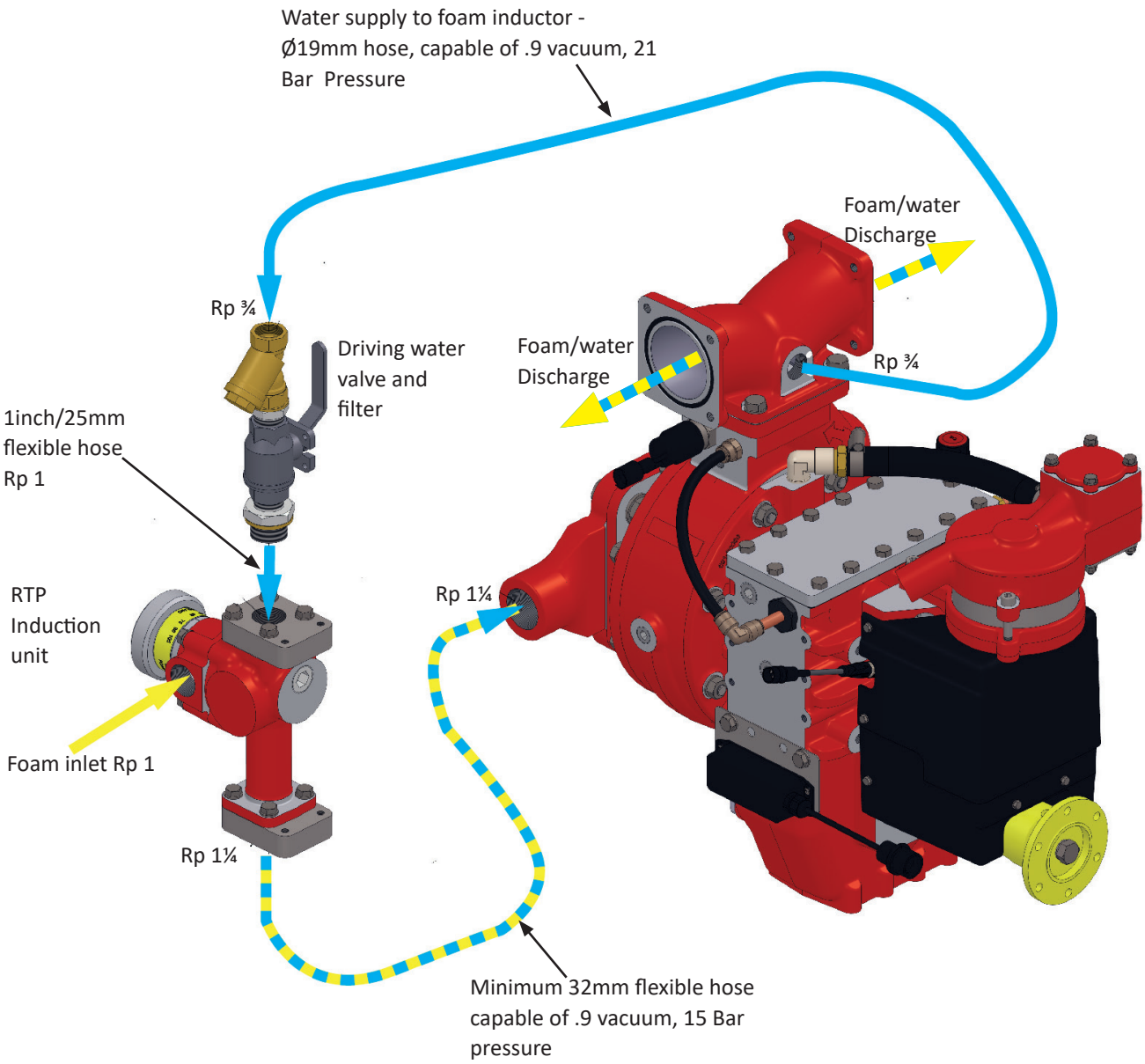
The RTP foam system is compact, but the builder of the fire appliance must mount the foam induction unit close to the pump. Tubing must be connected from the pump discharge manifold to the driving water valve, then to the foam induction unit, and then to the pump suction

Foam compound can be supplied to the inductor from a free-standing tank or a vehicle-mounted tank. Either foam source is connected to the threaded connection on the side of the inductor. The type of connection can be altered to suit customer requirements. A non-return valve can be fitted in the foam supply line from the vehicle foam tank.



Note: if situated lower than the pump, make provision for draining water in freezing conditions. Insert a drain tap at the lowest point in the oioework.

Insert hose fittings where indicted in the diagram above. Connect the components together with the tubing size indicated. Note the specifications of the adaptor/connector threads.



Operation

The RTP foam system is suitable for use when the pump is being supplied with water from –

A Vehicle mounted tank
B Free standing tank or open water
C Pressure fed source

The system is very simple to operate.
First check the amount of water flow discharging through the branch nozzles in use.
For best results this should be at the maximum possible flow rate for the nozzles, typically 230 or 475l/min of water.
By Opening the driving water valve and selecting the required foam flow on the inductor regulation knob, the correct volume of foam is introduced into the water stream entering the pump at the suction eye. The system operates satisfactorily with main pump pressure between 5 – 15 bar.

Normal Pumping – Non-foam Operation
Check that the driving water valve is closed (lever in down position).
Check that the ball valve in the foam supply tube from the vehicle tank or free standing tank is closed (if fitted)
Set the foam flow regulation knob to zero.
The pump can now be operated in conventional form.

Note: The driving water valve is adjacent to the foam flow regulation knob. When open, this valve allows some of the pump flow to pass from the volute through the RTP system and back to the suction tube.

Class B operation from vehicle water tank or open water
Check that the foam flow regulation knob is at zero
Check that the driving water valve is closed
Start pump as per normal procedure
Prime pump and maintain a normal pressure
Open the driving water valve
Set main pump pressure to suit foam branch in use
Select the required foam compound flow rate on the inductor foam flow regulation knob and use the pump as required. The table on page 38 provides a guide to the foam setting required for different numbers of branch nozzles used with a 230 or 475l/min water flow.

On completion of pumping operations, flush the system thoroughly with clean water through the inductor and driving water valve.
To do this, close the vehicle foam tank valve, fully open the foam flow regulation knob and open the driving water valve. Reset the system to normal pump mode.

Class B Operation – Using a Hydrant
Check that the inductor foam flow regulation knob is at zero
Check that the driving water valve is closed. Start pump as per hydrant pumping procedure.
Connect the foam tube to the free standing tank and open the valve, if fitted, or
the foam tank valve if supplying from a vehicle foam tank.
Open the driving water valve.
Set the main pump pressure to suit foam branches in use and the suction pressure.
Select the required foam compound flow rate on the inductor foam flow regulation knob and use the pump as required.

When the pump is operated with a pressurised (boosted) suction, the pump pressure must be increased to ensure satisfactory foam induction. A ratio between delivery pressure and suction pressure must be maintained as tabulated below.

$$\text{Driving ratio} = \frac{\text{Pump pressure}}{\text{Suction pressure}}$$

RTP Flow rate l/min	Min. Driving Ratio
Up to 30	3.5
30 – 60	4.0
60 – 90	4.5
Above 90	5.5

On completion of pumping operations, flush the system thoroughly e.g. induct clean water through the inductor and driving water valve.
To do this, close the vehicle foam tank valve, fully open the inductor foam flow regulation knob and then open the driving water valve.
Reset the system to normal pump mode.

Pressurised pump suction example
If pump flow is 1425 l/min with a 3% foam induction.

The required foam quantity is $\frac{1425 \times 3}{100}$ = 42.75 l/min foam concentrate

If inlet pressure = 2bar
The driving ratio will be 4.0 (as 42.75 l/min foam is in the range 30-60 in the RTP Flow rate given above).

Therefore the pump pressure required is the driving ratio x suction pressure.
4 x 2 bar = 8.0 bar

8.0 bar will be the minimum pressure required on the pump gauge.

Maintenance
Immediately after use, thoroughly flush the system with clean water to remove any deposits of foam solution remaining in the RTP system.

Important
Always ensure that the foam flow regulation knob is in the closed (zero) position and that the ball valve in the foam supply pipe is closed to prevent water entering the foam compound supply tank.

If a dip-tube and free standing foam tank are used, the system may be flushed by placing the dip-tube into a suitable source of water and operating the system as for normal foam induction from a free-standing tank.

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