KP1 and KP2
Vehicle Mounted Fire Pump

Installation and Operation Manual
## Amendment Record

**Model**: KP1_1510 / KP2_1510 Pump

<table>
<thead>
<tr>
<th>Modification No.</th>
<th>Date</th>
<th>Page/s</th>
<th>Amendment</th>
<th>New Issue Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>May 2015</td>
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<td>7</td>
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</table>
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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 1510 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

**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.

**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 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
<table>
<thead>
<tr>
<th>Publication</th>
<th>Part No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop Manual</td>
<td>GP/316</td>
</tr>
<tr>
<td>Spare Parts Manual</td>
<td>GP/317</td>
</tr>
</tbody>
</table>

Pump specification numbering
Typical pump model will be KP1A1510

<table>
<thead>
<tr>
<th>KP</th>
<th>1</th>
<th>A</th>
<th>1510</th>
</tr>
</thead>
<tbody>
<tr>
<td>=</td>
<td>=</td>
<td>=</td>
<td></td>
</tr>
<tr>
<td>pump series</td>
<td>Single pressure</td>
<td>Aluminium</td>
<td>nominal flow in litres per minute</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>B</td>
<td>10 = pressure in bars</td>
</tr>
<tr>
<td>1 =</td>
<td>2 =</td>
<td>Multi-pressure</td>
<td>Bronze</td>
</tr>
</tbody>
</table>

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 (viewed from drive flange),
- **Priming system**: Reciprocating, positive displacement piston
- **Temperature range**: -15°C to +40° ambient (ref: EN1028-1)
- **Lubrication**: 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**

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Specification</th>
<th>Contact information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millers Oils</td>
<td>Millgear SHC 220</td>
<td><a href="http://www.millersoils.co.uk">www.millersoils.co.uk</a></td>
</tr>
<tr>
<td>Motul</td>
<td>Motul Gear SY 220</td>
<td><a href="http://www.motul.com">www.motul.com</a></td>
</tr>
</tbody>
</table>

**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

**Accessories**: Foam systems

**Mass moment of inertia -**

<table>
<thead>
<tr>
<th>Gearbox ratio</th>
<th>Aluminium</th>
<th>Bronze</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>KP1A</td>
<td>KP2A</td>
</tr>
<tr>
<td>1.90:1</td>
<td>0.17134 Kg m²</td>
<td>0.17882 Kg m²</td>
</tr>
<tr>
<td>2.33:1</td>
<td>0.19755 Kg m²</td>
<td>0.20879 Kg m²</td>
</tr>
<tr>
<td>2.91:1</td>
<td>0.23527 Kg m²</td>
<td>0.25280 Kg m²</td>
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</tbody>
</table>
### EN Designation (EN 1028:-1:2002)

<table>
<thead>
<tr>
<th>Godiva Description and specification</th>
<th>European standard</th>
<th>Classification</th>
<th>Limit pressure (pa) lim (bar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fire fighting centrifugal pump KP1_1510, low pressure</td>
<td>EN 1028-1</td>
<td>FPN 10 – 750 FPN 10-1000 FPN 10-1500 FPN 15-1000</td>
<td>17</td>
</tr>
<tr>
<td>Fire fighting centrifugal pump KP2_1510 - high pressure</td>
<td>EN 1028-1</td>
<td>FPN 10-750 / FPH 40-250 FPN 10-1000 / FPH 40-250 FPN 10-1500 / FPH 40-250 FPN 15-1000 / FPH 40-250</td>
<td>54.5</td>
</tr>
</tbody>
</table>

### Materials of construction

<table>
<thead>
<tr>
<th>Component</th>
<th>Aluminium alloy pump</th>
<th>Gunmetal pump</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volute casing</td>
<td>Aluminium alloy</td>
<td>Gunmetal</td>
</tr>
<tr>
<td>Pump head - KP1</td>
<td>Aluminium alloy</td>
<td>Gunmetal</td>
</tr>
<tr>
<td>Pump head - KP2</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Suction cover</td>
<td>Aluminium Alloy</td>
<td>Gunmetal</td>
</tr>
<tr>
<td>L.P. Impeller</td>
<td>Aluminium Alloy</td>
<td>Gunmetal</td>
</tr>
<tr>
<td>Front wear ring</td>
<td>Acetal copolymer</td>
<td>Acetal copolymer</td>
</tr>
<tr>
<td>Rear rear wing</td>
<td>Acetal copolymer</td>
<td>Acetal copolymer</td>
</tr>
<tr>
<td>Gearbox</td>
<td>Aluminium alloy</td>
<td>Aluminium alloy</td>
</tr>
<tr>
<td>Input shaft</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Pump shaft</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Mechanical seal</td>
<td>Silicon carbide / Carbon</td>
<td>Silicon carbide / Carbon</td>
</tr>
<tr>
<td>Other mechanical seal components</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>H.P. Impeller – KP2 only</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Cover Plate – KP2 only</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
</tbody>
</table>
Figure 2. Cross Section of Prima KP2 Pump – Typical

- Low pressure discharge
- high pressure discharge
- High / Low pressure transfer chamber and filter
- Primer - reciprocating piston type
- Eccentric for driving piston primer
- Drive shaft
- Combined bearing housing and gearbox
- Mechanical seal
- High pressure impeller
- Volute drain point
- Low pressure impeller
- Pump shaft
- Pump inlet

Godiva Ltd. policy is one of continuous development. We therefore reserve the right to amend specifications without notice or obligation.
### Essential installation data

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fastening bolts, pump to chassis cross-member</td>
<td>M8, 8 off</td>
</tr>
<tr>
<td>Alignment of pump drive lines</td>
<td>7° Equivalent single joint angle - maximum</td>
</tr>
<tr>
<td>Tank to suction pipework</td>
<td>Ø 100mm Must incorporate a pliable element for flexibility.</td>
</tr>
<tr>
<td>Pump speed sensor</td>
<td>Electronic. Please see diagram DS651 for the wiring connection details (page xx).</td>
</tr>
<tr>
<td>Fasteners</td>
<td>ISO specification</td>
</tr>
<tr>
<td>Utility requirements</td>
<td>Water supply to pump inlet</td>
</tr>
<tr>
<td></td>
<td>Electricity supply to clutch, 24V/5A or 12V/10A</td>
</tr>
<tr>
<td>Special assembly tools for installation</td>
<td>Connector tool for attaching plugs (where supplied)</td>
</tr>
<tr>
<td>Angle of installation (in any plane)</td>
<td>± 15°</td>
</tr>
</tbody>
</table>
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. This photograph shows the gearbox in the down position.

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.

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.

Connect these wires to -

Red = 12/24V Pos(+) Fused switch display
Red/White = to earth
Black = to earth
Also see page 24 for wiring diagram.

Tachometer
Connect these wires to -

Green = 12/24V Pos(+) Fused switch display
White/Black = Signal to tacho
Black = 12/24V Neg(-) supply
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 BSP, 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.

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.

KP2 model - High pressure gauge connection – on side of high pressure discharge manifold
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.
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General Arrangement Drawing - KP1, Part 2
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Tachometer sender unit wiring

**Sender Unit's Wire Information**

- **Green Wire, Socket 1 = 12/24V POS(+) Fused Switched Supply**
- ** треугольник**- **White/Black Wire, Pin 2 = Signal to Tacho**
- **Black Wire, Pin 3 = 12/24V NEG(-) Supply**
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.

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.

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.

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

<table>
<thead>
<tr>
<th>Interval</th>
<th>Action required</th>
<th>Items Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>After each use –</td>
<td>Flush pump through with clean water and drain volute</td>
<td>Supply of clean water</td>
</tr>
<tr>
<td>Every 3 months -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Check oil level in gearbox housing</td>
<td>Check oil level in sight glass on side of gearbox</td>
<td>Fully Synthetic ISO VG 220 oil for 5 year use, or EP80 or 90 gear oil for 1 year use. 1.1 litre</td>
</tr>
<tr>
<td>Vacuum test</td>
<td></td>
<td>See separate instructions on page</td>
</tr>
<tr>
<td>Pressure test – for tracing location of vacuum leak</td>
<td>See separate instructions on page</td>
<td>Access to pressurised water source</td>
</tr>
<tr>
<td>KP2 - High pressure filter</td>
<td>Remove the filter from the housing and flush with clean water</td>
<td></td>
</tr>
<tr>
<td>Every 1 year -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change oil in gearbox housing - if EP80/90 oil used.</td>
<td>Drain oil from housing and refill with new oil</td>
<td>EP80 or 90 gear oil. 1.1 litre</td>
</tr>
<tr>
<td>Every 2 years -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piston primer seal in cover and body</td>
<td>See Maintenance Manual procedures</td>
<td>Repair kits Special tools (contact Godiva)</td>
</tr>
<tr>
<td>Thermal Relief Valve Test</td>
<td></td>
<td>See separate instructions on page</td>
</tr>
<tr>
<td>Every 5 years -</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change oil in gearbox housing - if fully synthetic ISO VG 220 oil used.</td>
<td>Drain oil from housing and refill with new oil</td>
<td>Fully Synthetic ISO VG 220 oil for 5 year use. 1.1 litre</td>
</tr>
</tbody>
</table>
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.
The following conditions may occur –
Loss of suction 1

- **Suction is lost**
- **Are all suction connections airtight?**
  - **Yes**: Conduct pump pressure and vacuum tests → Trace leaks, rectify and retest pumps → Suction is restored
  - **No**: Tighten all connections

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Loss of suction 2 -

Suction is lost

Is suction lift too deep?

Yes → Reduce suction lift

No →

Air leaks in system?

Yes → Conduct pump pressure and vacuum tests

No → Trace leaks, rectify and retest pumps

Suction is restored
Cavitation –

Pump makes excessive rattling noise during operation

Probably due to pump cavitating?

Decrease pump speed

Has noise disappeared?

Yes
Continue with pump use

No
Investigate further - possible mechanical problem
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.

<table>
<thead>
<tr>
<th>Date</th>
<th>Hours run</th>
<th>Inspection/fault</th>
<th>Parts renewed</th>
<th>Reason for renewal</th>
<th>Initial</th>
</tr>
</thead>
<tbody>
<tr>
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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.

<table>
<thead>
<tr>
<th>% Foam in water flow</th>
<th>Branch nozzles in use</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
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<tr>
<td>1%</td>
<td>2.3 l/min</td>
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<tr>
<td>3%</td>
<td>6.9 l/min</td>
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<tr>
<td>6%</td>
<td>13.8 l/min</td>
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<thead>
<tr>
<th>% Foam in water flow</th>
<th>Branch nozzles in use</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1%</td>
<td>4.8 l/min</td>
</tr>
<tr>
<td>3%</td>
<td>14.3 l/min</td>
</tr>
<tr>
<td>6%</td>
<td>28.5 l/min</td>
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</table>

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 indicated in the diagram above. Connect the components together with the tubing size indicated. Note the specifications of the adaptor/connector threads.

Water supply to foam inductor - Ø19mm hose, capable of .9 vacuum, 21 Bar Pressure

Foam/water Discharge

Minimum 32mm flexible hose capable of .9 vacuum, 15 Bar pressure

RTP Induction unit

Foam inlet Rp 1

1inch/25mm flexible hose Rp 1

Driving water valve and filter

Foam/water Discharge

Rp ¾

Rp 1¼

Rp ¾

Rp ⅜
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 37 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.

\[
\text{Driving ratio} = \frac{\text{Pump pressure}}{\text{Suction pressure}}
\]

<table>
<thead>
<tr>
<th>RTP Flow rate l/min</th>
<th>Min. Driving Ratio</th>
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<tbody>
<tr>
<td>Up to 30</td>
<td>3.5</td>
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<tr>
<td>30 – 60</td>
<td>4.0</td>
</tr>
<tr>
<td>60 – 90</td>
<td>4.5</td>
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<tr>
<td>Above 90</td>
<td>5.5</td>
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</table>

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 \[
\frac{1425 \times 3}{100} = 42.75 \text{ l/min foam concentrate}
\]

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.
\[
4 \times 2 \text{ bar} = 8.0 \text{ bar}
\]

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.