

RTP / High Pressure Foam System

for use with Godiva Prima Pumps

Operating Manual



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AMENDMENT RECORD

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IMPORTANT NOTES

Please read this manual before operating the pump.



CRITICAL: The pump Bearing Housing and Gearbox (if fitted) are **NOT** filled with oil ex works. Refer to the main Prima Pump manual (Oil Filling Points) before operation.

Correct lubrication and maintenance is essential if satisfactory performance is to be maintained.

Do not run the pump for without water in the pump casing.

The terms 'Left Hand' (LH) and 'Right Hand' (RH) apply when the pump unit is viewed from the suction tube end; For the purposes of this document, this is regarded as the front of the assembly.

SAFETY - RELEVANT DATA

Thank you for purchasing a Godiva Pump.

Godiva Pumps are designed to give safe and reliable service. BEFORE use however, it is essential that the Operating and Installation Instructions are carefully read and understood.

Maintenance

It is the responsibility of the user to ensure that the equipment is maintained in a safe operational condition. Local legislative conditions may apply. UK only, Maintenance (Regulation 5) of the Provision and Use of Work Equipment Regulations 1998 applies.

Training

It is **ESSENTIAL** that Godiva pumps are operated **ONLY** by **TRAINED PERSONNEL**. Please contact Godiva Ltd to discuss your training needs.

Follow the operating procedures laid down in this document and avoid personal injury.

Safety Points

The following points apply to pumps driven by petrol, diesel or other means:

DO NOT OPERATE the unit close to flammable materials or structures.

DO NOT SMOKE while operating the unit.

DO NOT inhale fumes or gases.

Avoid prolonged skin contact with fluids, particularly if corrosive or carcinogenic.

When in use, keep ALL UNTRAINED people AWAY from the unit.

Where appropriate, eye protection should be worn.

Isolate the electrical supply when working on the pump.

Batteries produce **EXPLOSIVE GASES**, do not expose to sources of heat and naked flames.

DO NOT lift heavy weights without assistance.

DO NOT remove protective guards or shields.

Noise

Operators must wear suitable **EAR PROTECTION** if noise levels dictate.

ENVIRONMENTAL PROTECTION

It is prohibited to pour engine oil and other contaminants onto the ground, down sewers, drains, or into water courses.

Dispose of lubricants through authorised waste disposal contractors, licensed waste disposal sites, or to the waste reclamation trade.

If in doubt, contact your Local Environmental Agency for advice regarding disposal policies.

Simon Tudor , Director of Engineering

INTRODUCTION

RTP Foam System

The Godiva Prima 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 between the pump suction tube, volute and discharge manifold

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 230l/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 475l/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 pipework and inductor are made from aluminium alloy, the inductor is hard-anodised. For bronze pumps, gunmetal components are used throughout.

INSTALLATION

The RTP foam system is compact and self-contained, the only connection to be made by the builder of the fire appliance is to vehicle foam tank.

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 twin elbow on the underside of the inductor. The opposite side of the elbow is then fitted with a blanking plug or additional pipework, valve or coupling if desired. 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. A ball valve must be fitted to this foam supply line to stop the foam flow into the RTP when water/foam solution is not needed.

IMPORTANT: Please note the internal dimensions specified for the foam feed pipeline (for connecting to the twin elbow) are as follows –

RTP system
120 l/min

Minimum pipeline I/D
32mm

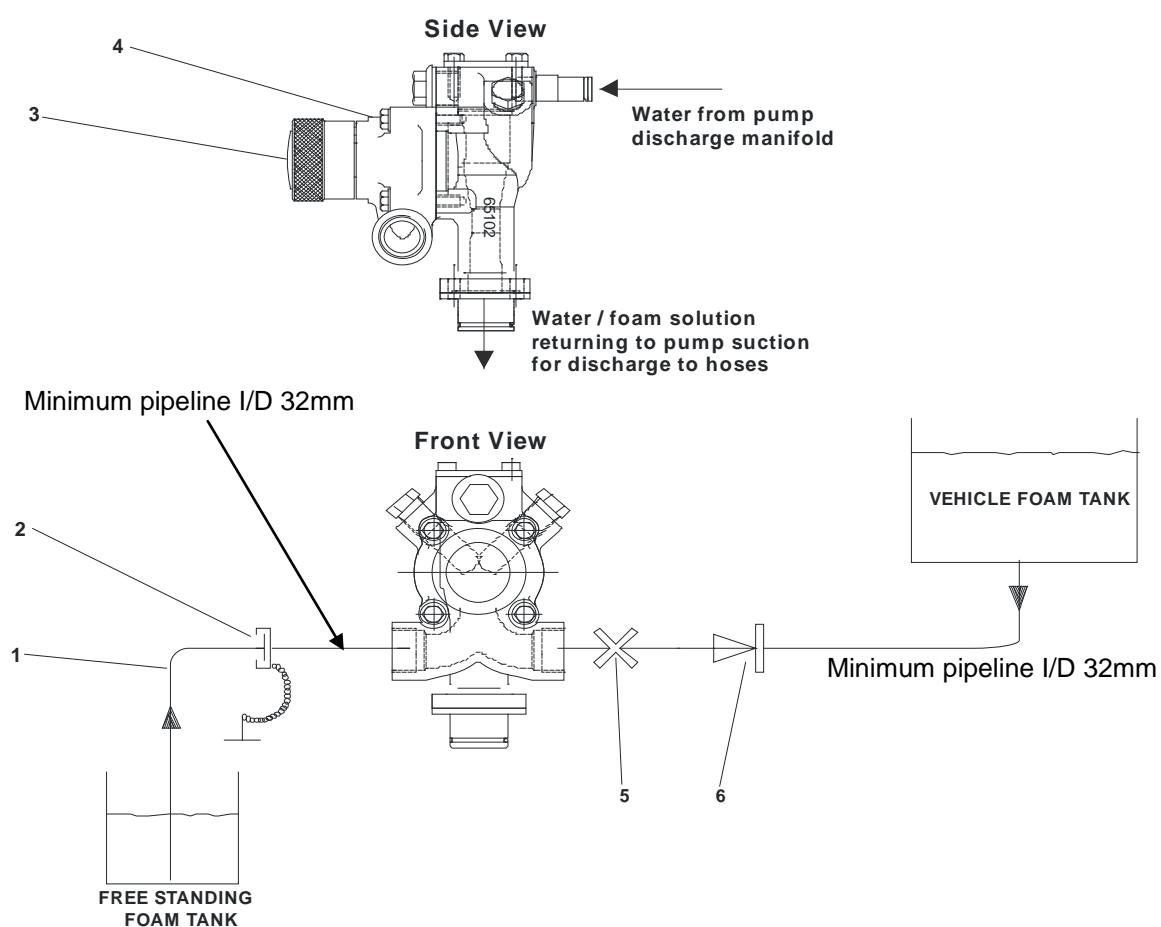


Fig.1. RTP System

1. Dip tube 2. Coupling and blank cap 3. Foam flow regulation knob
4. RTP inductor unit 5. Foam supply valve 6. Non-return valve

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 475 l/min of water.

With the Prima pump water is always circulating through the RTP system but foam solution is not mixed until the foam supply valve is opened and foam concentrate induced into the water flow. By opening the foam supply 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 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.

Class B foam operation from vehicle water tank or open water

Check that the foam flow regulation knob is at zero

Start pump as per normal procedure

Prime pump and maintain a normal pressure

Open the foam supply 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 7 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.

To do this, close the vehicle foam tank valve and fully open the foam flow regulation knob
Reset the system to normal pump mode.

Class B Operation – Using a Hydrant

Check that the inductor foam flow regulation knob is at zero.

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.

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 by inducing clean water through the inductor.

To do this, close the vehicle foam tank valve and fully open the inductor foam flow regulation knob.

Reset the system to normal pump mode.

Pressurised pump suction example

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

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

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.

Filter (item 14) – depending on the amount of use, this filter will require removal and cleaning to ensure a clear flow of foam concentrate through the system. If the system does not induct foam, this may indicate the filter is blocked.

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.

Inductor

To dismantle the inductor system for cleaning, due to excessive contamination, proceed as follows (item numbers refer to Fig. 3)

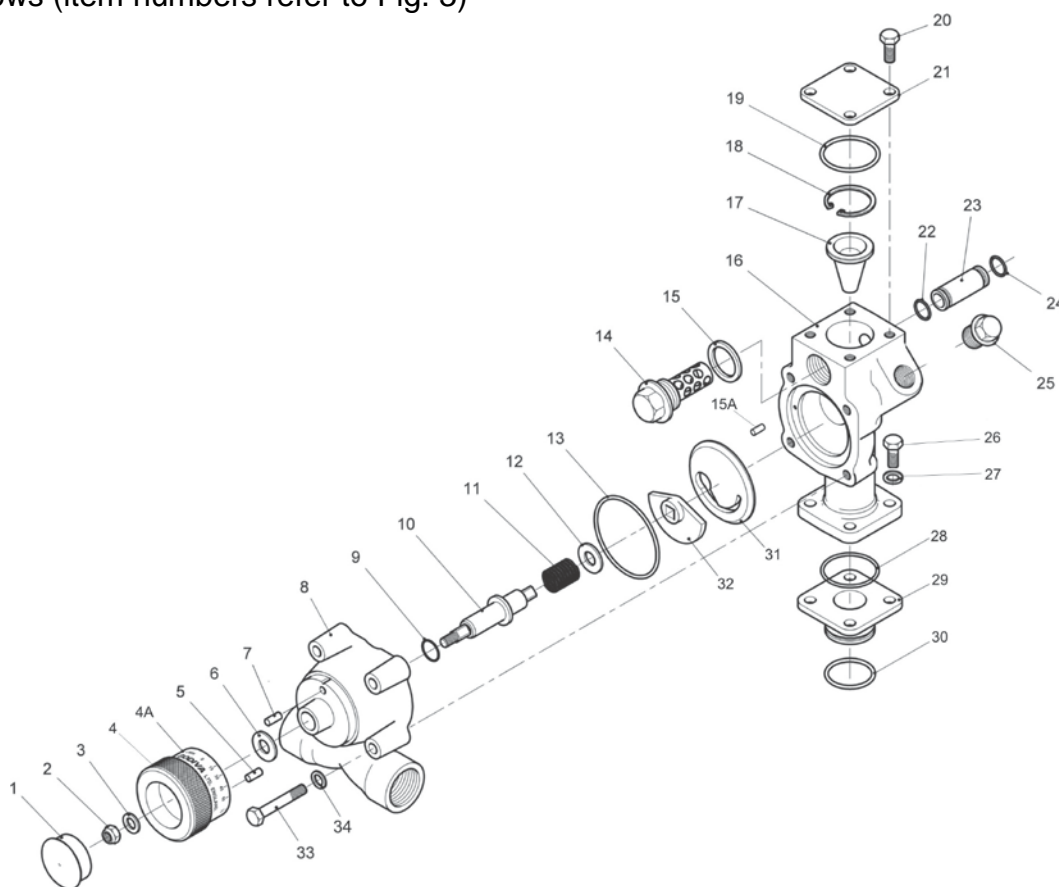


Fig. 3 Foam Inductor Components

Removal

Remove the four bolts and plain washers (33, 34) securing the valve housing (8) to the inductor body (16). This will release the internal components for inspection, cleaning or renewal.

If there is any contamination present, thoroughly clean all components and inspect for damage or wear. Pay particular attention to the orifice plate (31).

Refit

Fit the orifice plate (31) with the largest end of the hole at the "3-o-clock" position and the location hole over the spirol pin (15A). The chamfer must be facing outwards i.e. towards the operator.

Locate the O ring (13) against the chamfer of the orifice plate.

Zero the foam regulation knob (4) by turning clockwise against the stop so that the "0" on the calibration label aligns with the cutaway in the valve housing.

Fit the compression spring (11) over the valve spindle (10) followed by the special washer (12).

Position the control plate (32) on the squared end of the valve spindle (10) so that, when assembled, the control plate will completely cover the elongated flow channel of the orifice plate (31).

Carefully locate the valve housing (8) on the inductor body (16) ensuring that the O ring (13) is not disturbed and that the control plate (32) remains located on the valve spindle (10).

Refit the four bolts and plain washers (33, 34) securing the valve housing (8) to the inductor body (16) and fully tighten.

Check for freedom of operation by turning the control knob (4) through the full operating range.

IMPORTANT

Excessive foam contamination indicates insufficient flushing following the use of foam in the system. Ensure all pump operatives are fully conversant with the post-operation flushing procedure.

Changing the Inductor Nozzle

Remove the inductor unit (16) from the pump suction tube and pipe connecting it to the discharge manifold.

The inductor nozzle (17) is a push-fit into the inductor body.

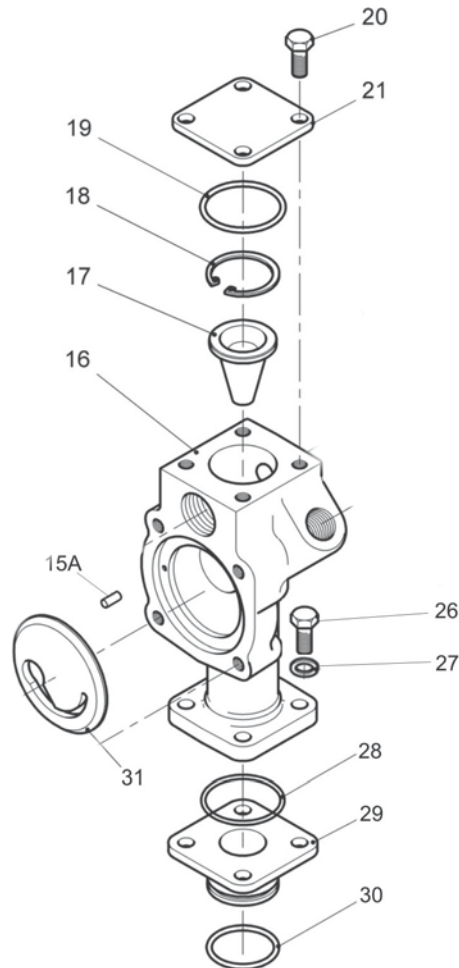


Fig. 4.

Support the inductor body and allow sufficient clearance to push out the nozzle, if necessary use a drift tool.

Check and clean the nozzle before refitting to the inductor body. If necessary replace with a new nozzle.

Refit the inductor unit to the pump suction tube and elbow using new o rings (19, 28, 30).

HIGH PRESSURE FOAM SYSTEM

The high pressure foam system is an additional unit to the RTP Class B unit, and has been developed to induce the very low quantities of foam necessary for operations from the high-pressure hose-reel nozzles only. The high pressure foam system works in conjunction with the RTP system and is automatically switched on and off with the operation of the high pressure nozzles.

There are 2 types of high pressure foam system available –

Fixed Foam Flow Rate

Fixed jets for 1%, 3% and 6% foam (only interchangeable in the workshop) are incorporated in the automatic valve unit. Precise quantities of foam are metered through these nozzles via the foam inductor of the RTP system to give economic use of foam from the high-pressure nozzles.

Variable Foam Flow Rate

If it is necessary to vary the percentage of foam available at the pump an additional Metering unit can be installed in the high pressure foam supply line between the on/off ball valve and the automatic high pressure valve unit. The metering unit control knob is usually mounted in the pump instrument panel.

When a metering valve unit is used, the fixed flow jets are no longer fitted in the automatic valve unit. The 1%, 3% and 6% foam supply is selected manually by a rotary control. There are two different water flow rates available to select – 80 l/min and 125 l/min to each hose reel.

INSTALLATION

To enable the high pressure foam system to operate, it is pre-requisite that a RTP system is already fitted. The RTP system provides the necessary vacuum that draws the foam into the water stream. The high pressure foam supply is connected to the side of the RTP inductor body through a separate connection point to the Class B foam.

Installation guides for the two types of high pressure foam system, with metering valve and without, are shown in Fig.5 and 6.

If there are any queries concerning the installation of this system, please do not hesitate to contact Godiva Ltd.

When ordering spare parts, always quote the pump serial number, this is stamped on the top left hand side of the volute body.

Important

The minimum pipeline size for the foam feed pipeline –

Up to 6% with metering valve	16mm I/D
Up to 6% without metering valve	16mm I/D

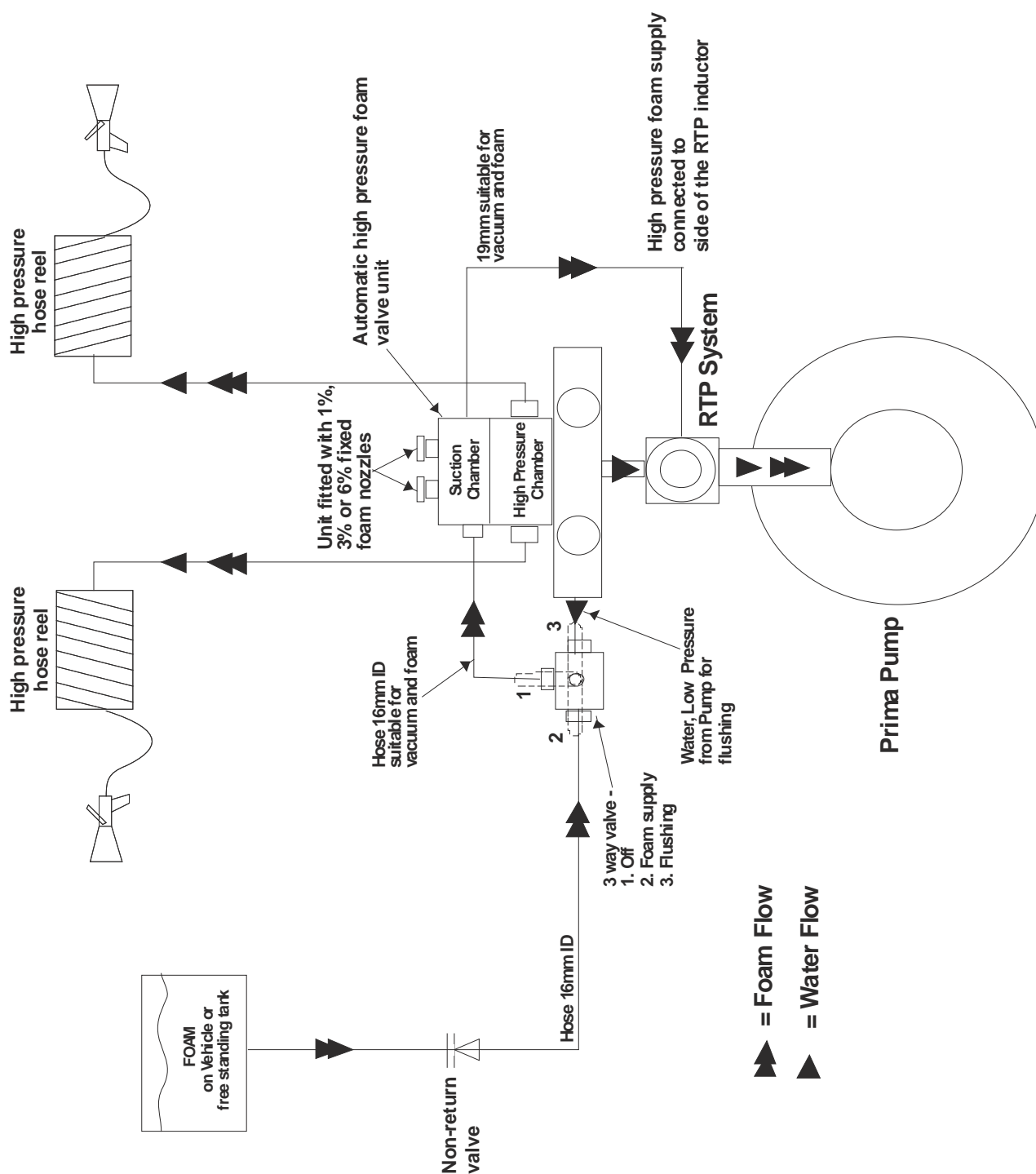


Fig.5. Fixed Foam Flow Rate

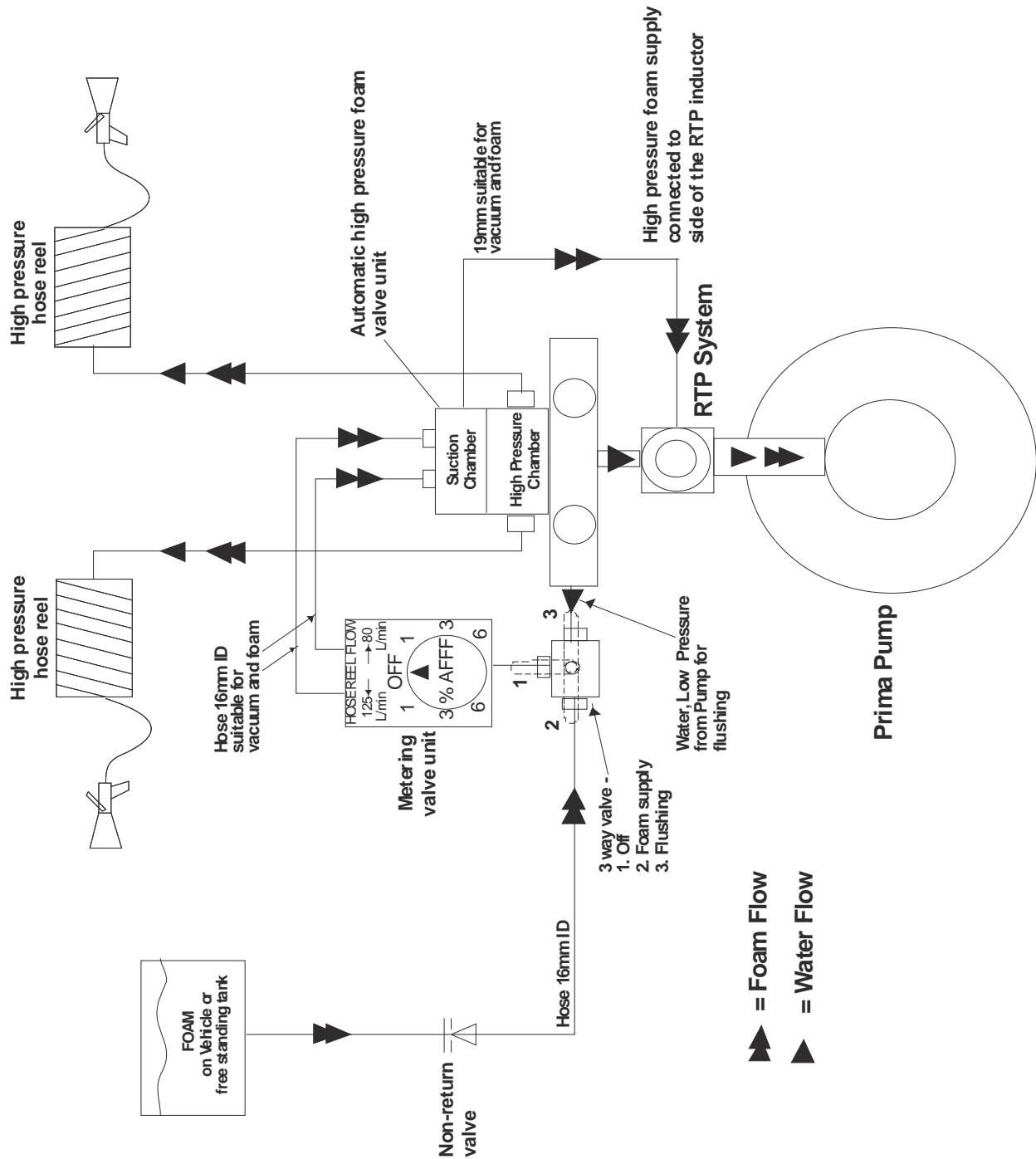


Fig.6. Variable Foam Flow Rate

OPERATION

Set the pump to run in normal high pressure discharge mode by turning the high-low cross-over valve to high pressure.

Set the foam flow regulation knob of the RTP system to zero (this prevents any Class B foam from entering the system).

Open the foam supply valve from the free-standing tank or the vehicle tank that is supplying the high pressure foam concentrate.

In addition, the high pressure foam system incorporates a 3-way valve in the foam supply line (see Fig.7). The positions on this valve are -

1. Off – no foam or flushing water supplied.
2. Foam on – foam supplied to metering unit
3. Flushing water on – water is supplied from the low pressure section of the pump to flush the high pressure foam system after use.

The 3-way valve is located on the side of the high/low pressure filter housing at the top of the pump (left hand side for clockwise rotation pumps, right hand side for anti-clockwise rotation pumps).

Turn the valve to Foam on position

For Variable Foam Flow Rate units -

Select the required foam setting 1%, 3% or 6% for the hose reel flow in use – there are two flow rates available 125 l/min or 80 l/min depending on branch flowrate rating, by turning the metering control on the front of the unit.

Foam discharge is automatically triggered by use of the high-pressure hose reel guns.

When hose reel use is complete –

Close the foam supply valve from the free standing tank or vehicle tank.

Flush the RTP and high pressure foam valve unit with clean water. The high pressure system must be flushed by turning the 3-way valve to flushing water on.

MAINTENANCE

Cleaning and changing foam nozzles

High pressure foam system with fixed foam flow rate.

It is possible to remove, and if necessary, change the two foam nozzles in the high pressure valve unit for an alternative percentage. 1%, 3% and 6% foam nozzles are available. (3% foam nozzles are considered the standard size to fit).

The two foam nozzles are located on the top of the high pressure valve (see **A** Fig.7). Unscrew each nozzle for inspection and cleaning. If necessary clean inside the high pressure valve to remove any visible foam contamination. Item 14 in Fig.7.

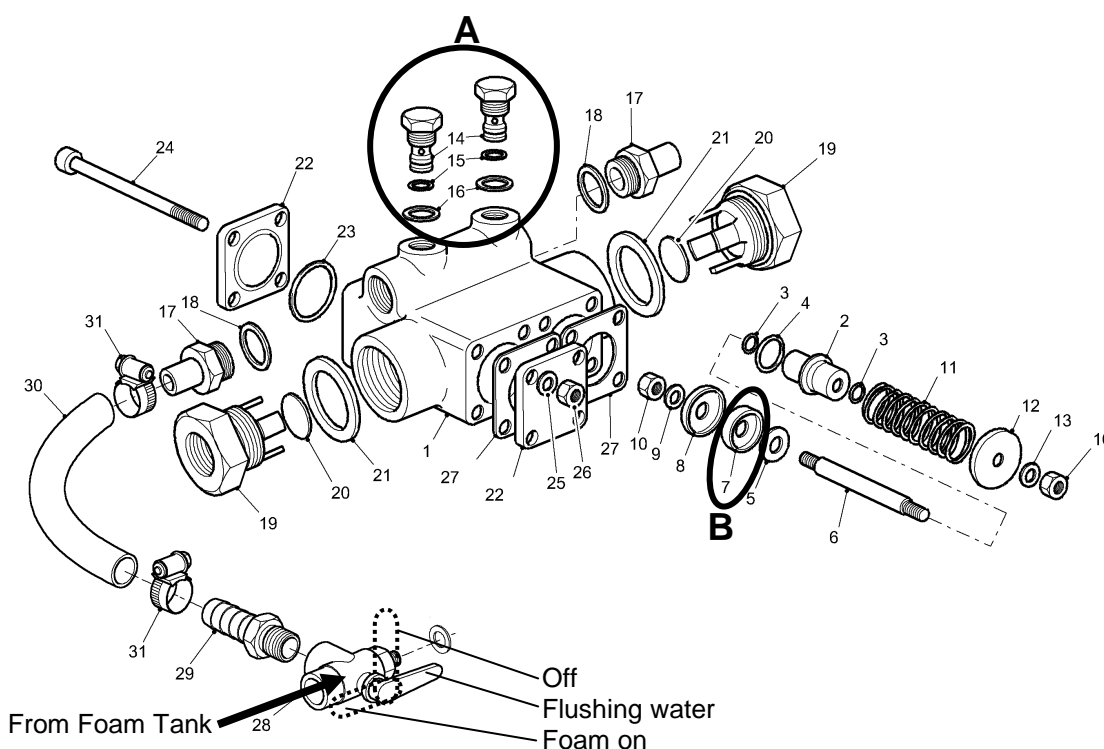


Fig.7. Automatic high pressure system with fixed percentage foam nozzles

Check the nozzle seals and sealing washers before replacing. Item 15, 16 in Fig. 7.

Cleaning high pressure system with Variable Foam Flow Rate

The high pressure system and Twin Metering valve should be flushed with clean water by turning the 3-way valve to supply water from the low pressure side of the pump.

The high pressure valve chambers can be inspected for foam contamination by removing the two foam inlet connections (item 14 in Fig.8.) and inspecting the internal parts of the valve

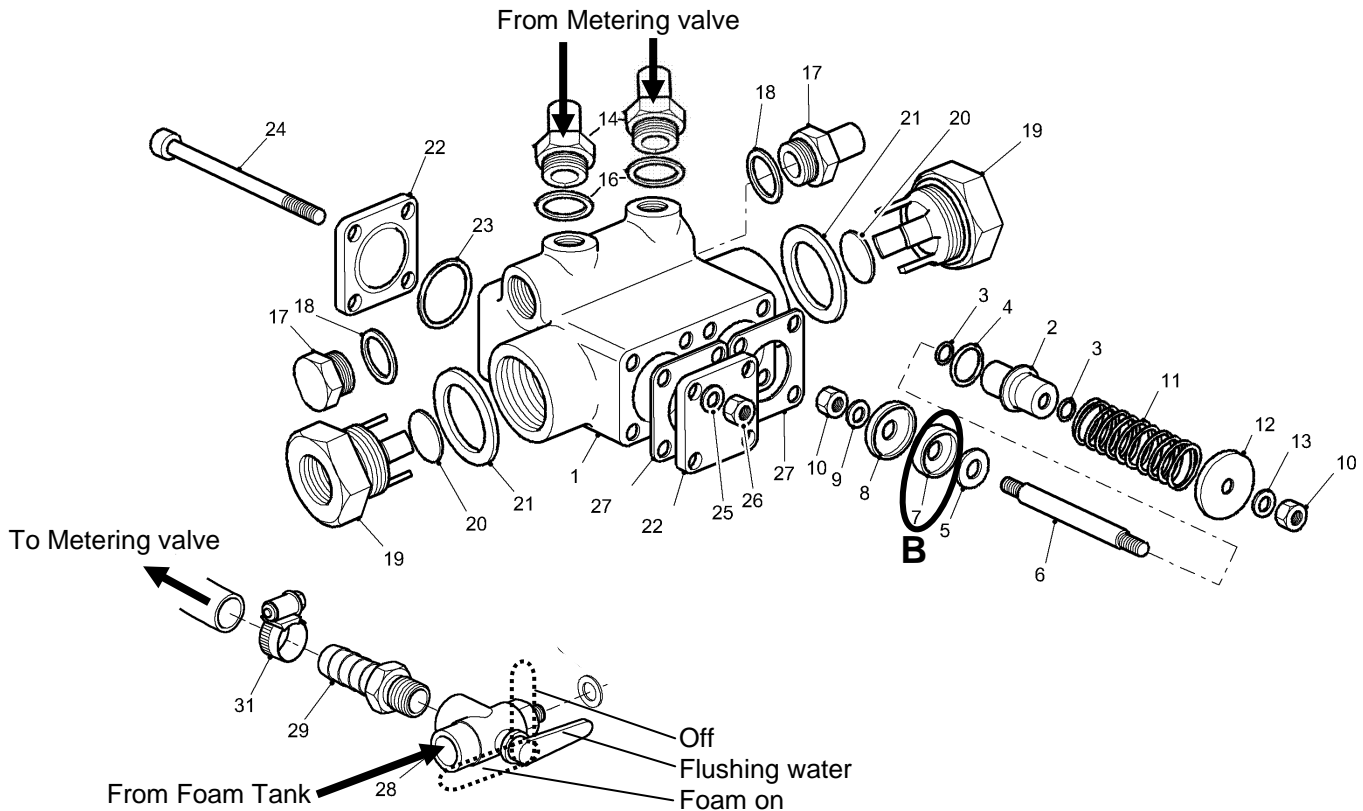


Fig.8. High pressure foam system with twin metering valve

Renewing Rubber Valve of the Automatic High Pressure Valve Unit

For both Fixed Foam Flow Rate and Variable Foam Flow Rate

Reference B in Fig.7 and Fig.8. Item 7.

The rubber valve inside the high pressure foam unit should be inspected for wear and replaced if necessary.

To access the valve, isolate the high pressure foam unit from the foam supply and remove the unit from the pump.

Unscrew and remove the Seal Plates on both sides of the valve (22).

Carefully unscrew the nut (10) retaining the spring loaded valve assembly.

This is on the suction chamber side of the valve

Be careful of any unreleased spring tension in the assembly.

Carefully remove the bonded seal, washer and valve rubber from the end of the spindle (9, 8, 7).

Thoroughly clean and inspect all parts for damage or wear and renew as necessary.

Refit

Refitting is a reversal of the removal procedure.