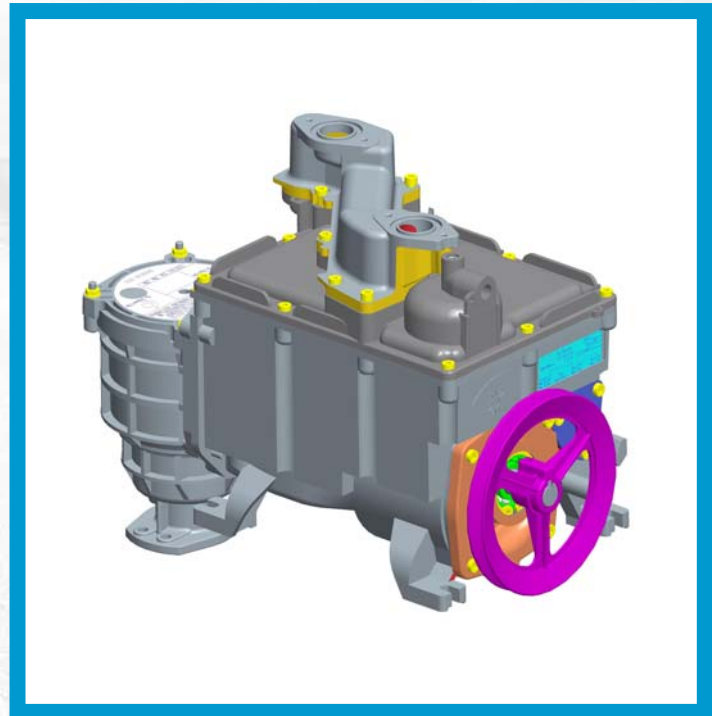




**TQP-HS™** Patent Pending

**Pumping Unit**

**Component Technical Manual**



Document Ref 942005-001  
Rev - 2  
11/2011



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Please contact your nearest service department, at the relevant address printed on the back cover of this manual, should any aspect of this manual be unclear.

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		1-1	EPZ Manual reference note added
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		2-2	Typeplate serial no. changed
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		2-3	New drawing for TQP-HS 130 L/Min
		2-4	Change to the text for Hydraulic performance

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**PLEASE REFER TO THE PASV3 COMPONENT TECHNICAL MANUAL 903647 REGARDING ANY TECHNICAL INFORMATION AND SPARE PARTS USED BEFORE THE PUBLICATION DATE OF THIS MANUAL.**

## 1 INTRODUCTION

### 1.1 How to Use this Manual

It is recommended that all relevant persons familiarise themselves with the contents of this manual prior to carrying out any operations or procedures.

This manual is divided into sections which are described as follows: -

#### **Section 1 - Introduction**

This section contains information on how to use the manual, the scope of equipment covered, recommendations on qualified technicians and contact information. It also includes relevant health and safety information required for the safe installation of the product.

#### **Section 2 - Product Information**

This section contains the system descriptions and operating principles of Tokheim's TQP-HS pumping unit.

#### **Section 3 - Failure Diagnosis**

This section provides the failure diagnosis flow charts for the TQP-HS.

#### **Section 4 - Troubleshooting**

This section gives information on troubleshooting problems with the TQP-HS.

#### **Section 5 - Spare Parts & Maintenance Tools**

Section 5 lists the assembly drawings and part identification lists for the TQP-HS including specific tools and maintenance kits.

### 1.2 Product Scope

This manual is designed to cover the TQP-HS pumping unit in Quantum 10 series dispensers.

### 1.3 Authorised Technicians

Only qualified technicians familiar with the contents of this manual should carry out the procedures contained herein.



**WARNING : ANY ATTEMPTS TO CARRY OUT THE PROCEDURES OF THIS MANUAL, BY UNQUALIFIED OR UNAUTHORISED PERSONS, MAY RESULT IN SERIOUS INJURY OR LOSS OF LIFE.**

**NOTE : THIS MANUAL IS NOT INTENDED TO REPLACE THE SERVICES OF A FULLY QUALIFIED TECHNICIAN.**

### 1.4 Contact Information

For information relating to the contents of this manual please contact: -

Technical Author  
Tokheim UK Ltd.  
Dundee, Scotland

For technical assistance please contact the appropriate service division listed on the back cover of this manual.



## 1.5 Health & Safety

### 1.5.1 SAFETY CHECKLIST

- It is obligatory that this checklist be fully complied with during all work at the petrol station, particularly construction or repair work.
- It is the duty of the contractor to ensure that all workers employed by him obey each and all of the relevant laws, directives and other regulations.

#### **Areas where special caution is required**

- The insides of tanks, tubes, dome shafts, filling shafts, change over shafts, vessels and dispensers.
- All areas in which fuel vapour that is heavier than air can accumulate, e.g. fuel separator, draining shafts, low located rooms, cellars, excavations, pipe trenches etc.
- The areas around the outlets of tank ventilation pipes, especially during the filling phase.
- All areas near dispensers, tanker lorries and other vehicles while they are being tanked up, and particularly when there is a lack of wind.
- A radius of 1.0 metres around petrol carrying pipes, as well as pipes that are not vapour free.
- Silt traps.

### 1.5.2 DUTIES OF THE EMPLOYEES

- To ensure optimal accident prevention in our company, in addition to general rules applying to worker's protection, it is necessary to take into account all the national protection of workers legislation and to actively support all measures which enhance safety standards.
- It is an employee's duty to follow all company directives regarding the prevention of accidents, unless such directives can be proved to be unfounded.
- Employees should not follow any instructions that go against safety standards.
- Employees are only permitted to use equipment for its original purpose, and this is defined by the company alone.
- If an employee detects equipment that is deficient in terms of safety, he shall eliminate this deficiency immediately. If such safety rectification is not part of his defined area of activities, or if his knowledge is insufficient to carry out such work he must immediately inform his superior about the detected safety deficiency.

This equally applies to:

- 1) **Work Materials** which have not been correctly packed or correctly marked in order to meet safety requirements.
- 2) **Work Methods** or work processes which have not been correctly coordinated or controlled in order to meet safety requirements.
- 3) **Where dangerous activities are carried out by several persons**, the need for a permanent faultless communication between them in order to avoid dangerous events shall require the appointing of one person in order to carry out overall supervision.

1.5.3 HAZARDS

Prior to starting work, the dispenser must be isolated (i.e. entirely disconnected from the mains supply) and the mains supply switch locked in the OFF position. The submerged pump (if applicable) and control signals from the dispenser must also be isolated. This is done to provide safety for the technician. As a further precaution, switch off the mains supply in the service station shop and place a clear notice on the switch to avoid it being turned on again inadvertently.



**WARNING : THE CONNECTION AND DISCONNECTION OF ELECTRICAL CONNECTIONS MAY ONLY BE CARRIED OUT BY QUALIFIED PERSONNEL AUTHORISED FOR SUCH ACTIVITIES. WORK IN DANGEROUS AREAS MUST BE MADE SAFE BY OBSERVING ALL THE NATIONAL SAFETY REQUIREMENTS IN FORCE.**

It is not permitted to put a fuel dispenser into operation before an authorised official has inspected it and released it. This depends upon the national regulations in force.



Dismantled packaging and cladding must be stored in such a way as to avoid damage to components or injuries to persons. Covers that can be opened, such as the calculator housing, should be handled with care. Ensure that the retaining catch is placed in the correct position to prevent the cover falling onto the head of the service engineer or other persons in the area.

At unattended service stations, every end-user should be able to read the User Instructions. They should be visible on a notice board or integrated into the DIT and should be sufficiently well lit so that they can be read at night.

At unattended service stations break away couplings must always be used to reduce the danger caused by a motorist driving off with the nozzle still in the tank.

1.5.4 WARNING SIGNS

The following warning signs are fitted as standard, on the dispenser, however they may vary according to individual country requirements or customer specifications.

SIGN	MEANING	POSITION
	Do not use mobile phones	Visible from both sides of dispenser
	No naked flames	Visible from both sides of dispenser



Do not spill fuel on the ground

Visible from both sides of dispenser



Smoking forbidden

Visible from both sides of dispenser



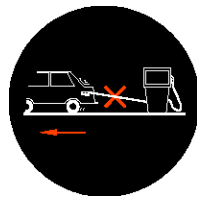
Stop vehicle engine

At Diesel high speed dispensers near the nozzle boots



Trucks only

Visible from both sides of dispenser



Do not drive away with nozzle in tank

Visible from both sides of dispenser

**For more information see User Manual available at this station**

Next to User Instructions near the nozzle boot

### 1.5.5 PERSONAL PROTECTIVE EQUIPMENT (PPE)

#### PROTECTIVE CLOTHING

The following clothing should be worn **at all times** during installation and maintenance procedures:-

- Protective helmet.
- Protective shoes (conductive).
- Protective gloves and/or protective hand cream.
- Anti static clothing.
- Eye protection.

**SAFETY EQUIPMENT FOR WORKING IN HAZARDOUS AREAS**

The following safety equipment is required for working in hazardous areas:-

- Only spark free tools are permitted for work on dispensers.
- Work on bearings is only permitted using the standard workshop tools authorised for this kind of work.
- The use of all electrical tools is strictly prohibited.
- Only the use of explosion protected work lights is permitted.
- The use of telecommunications equipment in hazardous areas is strictly prohibited.

**SAFETY INSTRUCTIONS**

The following safety instructions must be adhered to during installation and maintenance procedures:-

- Inhalation of petrol vapour must be avoided. Suitable precautions must be taken and where necessary respirators used.
- Avoid direct contact of fuel with the skin.
- Use suitable protective clothing, protective gloves and/or protective hand cream.
- Avoid fuel spills.
- No smoking, no naked flames are permitted.
- Long hair and ties can get caught in moving parts. Hair must be suitably covered.

**1.6 Standards & Certificates**

Tokheim TQP-HS pumping units are constructed in conformity with the requirements of all the applicable European Directives (Machinery 2006/42/EC; EMC 89/336/EEC; ATEX 94/9/EC).

The TQP-HS, MID cert TC7186 fulfills the requirements as mentioned in Annex 1 and Annex MI-005 of the Directive 2004/22/EC.

TQP-HS pumping units are incorporated into Tokheim fuel dispensers which conform to the essential requirements of the Machinery Directive 2006/42/EC.

The components used within the TQP-HS are selected in accordance with the European Standard EN BS 60079-0 (Electrical Apparatus for explosive gas atmospheres) and the supplementary Standards listed therein.

The production and end test is controlled through the Quality Assurance systems within the Tokheim Manufacturing Centres, and has received Quality Assurance Notification from a Notified Body.

No modification to the component may be performed without express permission from Tokheim and must always use original components or Tokheim retrofit kits. Failure to comply with the above will invalidate product conformance with the relevant European Directives and Tokheim will no longer accept product liability.

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## 2 PRODUCT INFORMATION





### 2.1 Definitions

**TQP-HS:** Commercial name of the TQP-HS  
 There is one hydraulic block for both 80l/min and 130l/min flow

**TQP-HS 80:** Name used when the delivery is 80 l/min (4.8 m<sup>3</sup>/h)  
 The TQP-HS 80 is equipped with a 1kW 1400 rpm motor

**TQP-HS 130:** Name used when the delivery is 130 l/min (7.8 m<sup>3</sup>/h)  
 The TQP-HS 130 is equipped with a 1.5kW 2800 rpm motor

**Type plate:**

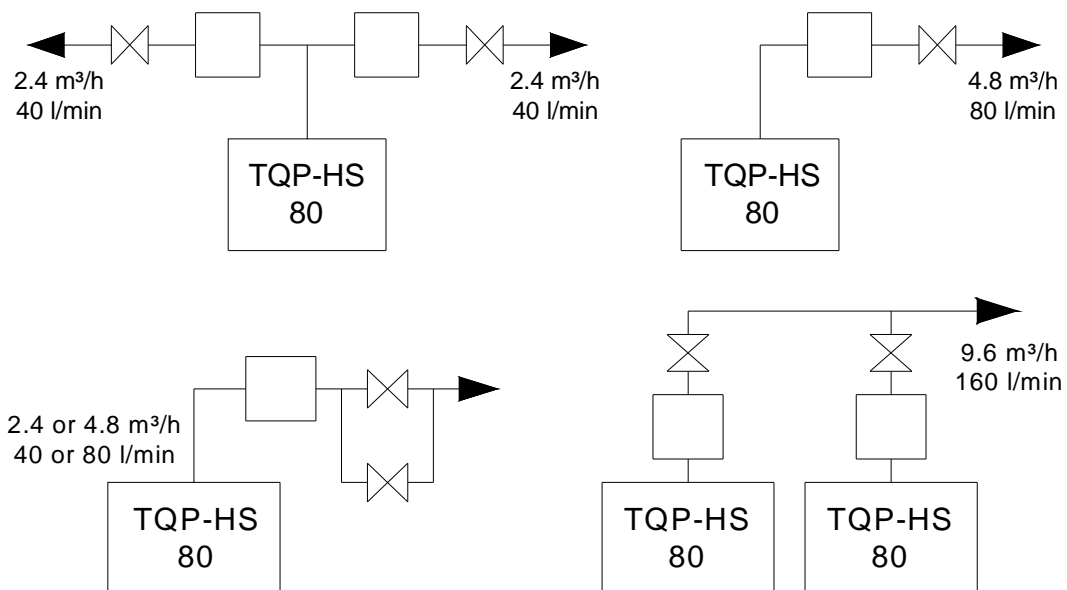
 Dundee, Scotland Temp Range: -10°C to +55°C	Gas Separator for liquid fuel.	PAS V3/TQP-HS: <input type="text"/>
	Year/Serial No: 2007G0#1	
  II 2 G EEx c T3 File Reference: TR801	W&M Cert: TC7186	MMQ: 2 l
Qmax 130 l/min	Diesel	Pmax 3.5 bar
Qmax 80 l/min	Gasoline/Diesel	Pmax 3.5 bar
		Pmin 2.3 bar
		Pmin 1.7 bar
		Environment Class: C

**IMPORTANT NOTE**

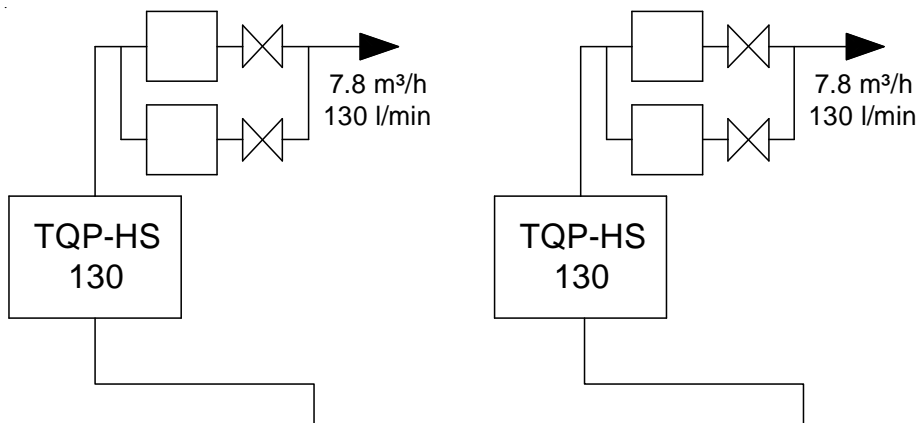
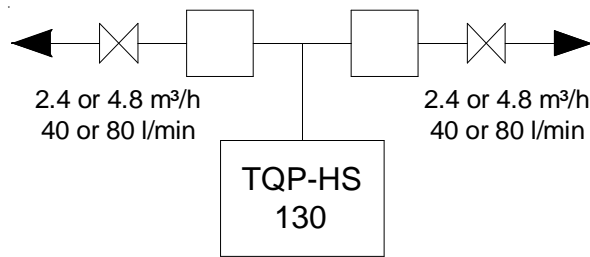
When reporting a case of anomaly or malfunction, the name TQP-HS must be reported together with the serial number indicated on the type plate near the pump pulley (see above diagram). Please complete the problem report form in section 4.8 before contacting Tokheim.

### 2.2 Configurations

#### 2.2.1 TQP-HS 80 L/MIN



2.2.2 TQP-HS 130 L/MIN



**IMPORTANT NOTE**

Do not install TQP-HS pumps, 80 or 130 lpm, in series on the same suction line. Separate suction lines are required as shown above.

## 2.3 Technical Characteristics

### DIMENSIONS

Width x height x length	225 x 450 x 490 mm including motor, filter and mounting bracket
Weight	37 kg
Suction pipe	Ø 1.5 or 2 inches (40 l/min) Ø 2 inch (80 and 130 l/min)
Inlet of the filter housing	DN Ø 40/49 mm (1.5")

TQP-HS Type	Motor power	Ø of motor pulley	Ø of pump pulley
TQP-HS 80	1 kW / 1400rpm	95 mm	150 mm
TQP-HS 130	1.5 kW / 2800rpm	71 mm	150 mm

### HYDRAULIC PERFORMANCES

The hydraulic performance indicators listed below are for a standard installation (i.e. one pumping unit on the pipeline to the storage tank). The pump has a static lift of 4m, pipe diameter of 2 inches and pipe length of 40m with a fuel temperature of 20°C.

Flow rate:	40 and 80 l/min (motor of 1 kW) or 130 l/min (motor of 1.5 kW)
Pressure:	1.7 ≤ P ≤ 3.5 bar for TQP-HS 80 l/min 2.3 ≤ P ≤ 3.5 bar for TQP-HS 130 l/min
Suction capacity:	vacuum pressure dry pump is 350 mbar vacuum pressure wet pump (with oil) is 700 mbar
Pump intake depth	1.5 to 4 meters depending on installation conditions
Air separator	fulfils the EEC regularisation for systems without sight glass
Filters	12 or 25 µm paper mesh and 90 µm plastic mesh (can be cleaned and re-used). The filter can easily be replaced without spillage, and without losing the priming on the suction line due to the foot valve in the bottom of the filter box.
Liquids	fuels with a viscosity lower than 10 <sup>-4</sup> m <sup>2</sup> /s
Minimum inlet vacuum for correct operation	300mB @ 80 l/min 300mB @ 130 l/min



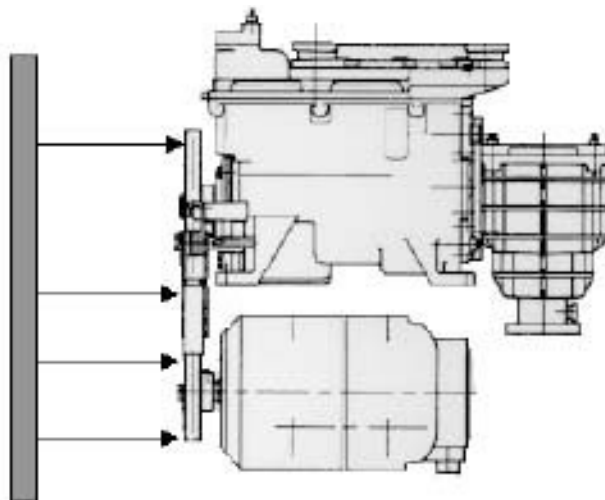
**ENVIRONMENTAL CONDITIONS**

Climate	Marine, tropical, industrial and polar
Ambient temperature range	-40°C to +55°C
Temperature of liquid	-40°C to +55°C
Relative humidity	5% to 95% non condensing
Altitude	Sea level up to 2000 m

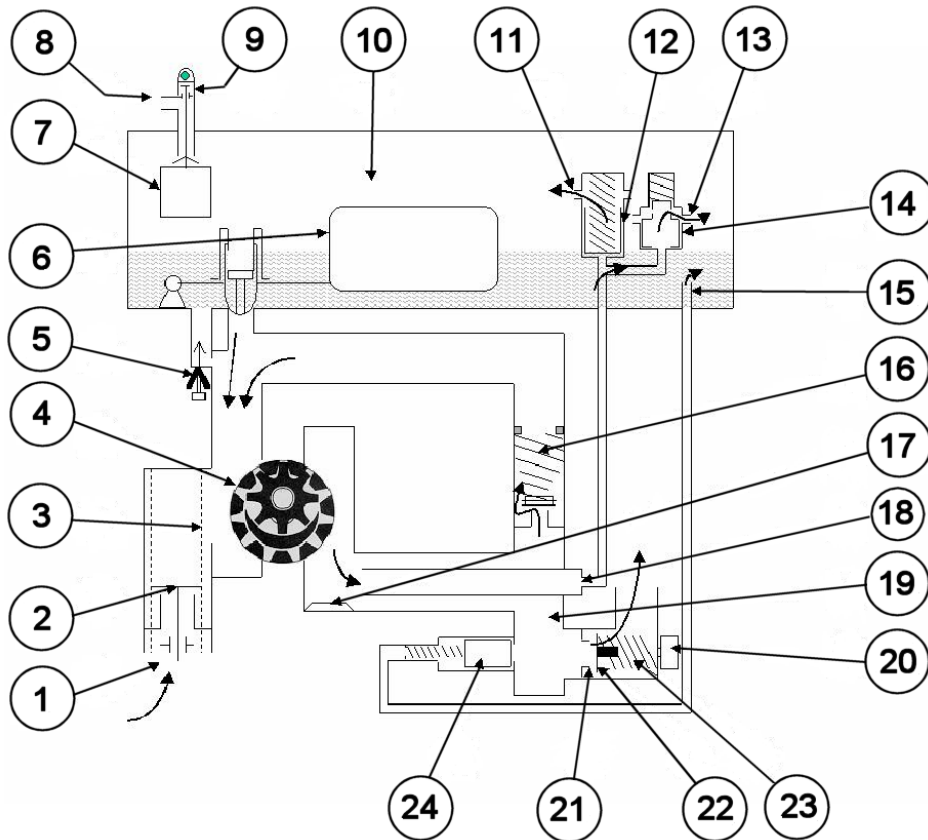
**2.4 Alignment of the Pump**

When installing the TQP-HS the following measures have to be taken into consideration regarding the V-belt.

Adjust the pulleys of the motor and pump in such a way that they are positioned in one plane. A flat plate can be used to position the pulleys correctly. In this case, the plate must touch the pulleys at four points (refer to diagram below):-



2.5 Schematic Diagram of Operating Principles



**SCHEMATIC DIAGRAM REFERENCES**

- |                                      |  |
|--------------------------------------|--|
| 1) Inlet pipe                        | 15) Outlet valve reference to atmosphere |
| 2) Foot valve                        | 16) By-pass                              |
| 3) Filter                            | 17) Vortex centrifugal inlet             |
| 4) Gear pump                         | 18) Air separation channel               |
| 5) Drain                             | 19) High-pressure chamber                |
| 6) Float system                      | 20) Drain and pressure plug              |
| 7) Vent float (non overflow device)  | 21) Outlet valve seat                    |
| 8) Vent                              | 22) Outlet valve                         |
| 9) Top vent plug                     | 23) Outlet valve spring                  |
| 10) Recovery chamber                 | 24) Aeration valve                       |
| 11) Permanent air separation leak    |  |
| 12) Vortex regulating valve          |  |
| 13) Low pressure air separation leak |  |
| 14) Low pressure vortex valve        |  |

## 2.6 Operating Description

### 2.6.1 PUMPING, FILTRATION & BY-PASS

The fuel held in the storage tank underground is raised by the gear pump [4] and passes through the filter [3] and the foot valve [2].

The gear pump forces the product through the vortex system [17] into the high-pressure chamber [19].

When the flow pressure exceeds the reference pressure, adjusted by the by-pass screw, the by-pass valve [16] opens and the excess fuel in the high-pressure chamber [19] is channelled back to the intake. Thus, the outlet pressure is kept constant regardless of the flow drawn off by the fuel distribution hose(s).

### 2.6.2 ABOVE GROUND TANK APPLICATIONS

The Tokheim suction pumps have been specifically designed to work in conjunction with underground tanks where the fuel level inside varies between 0.5 and 4 meters below the pump shaft. On suction pumps, minimal vacuum held on the suction line must be greater than 80mB to allow normal operation of pump and air elimination device.

#### **Important!**

Should dispensers be connected to 'above ground tanks' (partial or total), special care must be taken to avoid siphoning storage tanks via air vents or in case of leak/accident on connecting pipes, by using properly installed anti-siphon valves.

Please refer to state of the art equipment currently available and compliant with local/national rules/requirements. Eg: OPW anti-siphon valves.

Recommendation is to install this device at its highest point of piping, to allow for maximum protection.

**Note : Tokheim cannot be held responsible for any equipment failure, accident or injury should these instructions not be followed.**

### 2.6.3 AIR SEPARATION

The flow is channelled tangentially into the vortex where the shape of the inlet [17] imparts a helical movement to the flow producing a centrifugal effect.

Due to the strong centrifugal effect, air/vapour is extracted from the flow with the heavier liquid product molecules in the flow forced by the centrifugal pressure towards the outside walls of the vortex channel and then directed away to the high-pressure chamber. The lighter air/vapour molecules remain trapped in the centre of the vortex channel and are then directed away through the vortex tube and vortex valves into the recovery chamber.

The purpose of the vortex valves is to regulate the flow at different pressures. The pressure depends on the amount of air in the flow. After the vortex valves, the particles move into the recovery chamber [10].

The vortex body exists of two valves in parallel:-

- **The vortex regulating valve [12]**

A piston spring loaded valve which gives a constant headloss between the air separation channel and the recovery chamber. This valve stays open to keep the air separation system working at any pressure or flow.

- **Low-pressure vortex valve [14]**

A piston spring loaded valve which opens when the pressure is less than 1 bar.

#### 2.6.4 OUTLET VALVE

Once the liquid has had the air/vapour extracted, it enters the high-pressure chamber located on the down-stream circuit after the vortex. In this chamber, a spring loaded non-return outlet valve [22] performs the dual function of:-

- An authorisation valve (opening when the pressure is sufficient) and
- A non-return valve which will keep pressure on the measuring system. This is necessary to avoid start up errors at the next pumping cycle. Within the valve, a pressure overload vent limits this pressure.

An aeration valve is placed on the other side of the outlet channel. This valve performs air separation in two stages:-

- at high level presence of air, the aeration valve opens to keep the pump at low pressure (up to 0.7 bar) and the outlet valve is closed. The air is then removed from the pump via the vent [8].
- as the air proportion reduces, the pressure in the pump increases and the aeration valve closes. Fuel and air pass through the vortex separation system and the pump is then ready to distribute fuel when the nozzle is opened.

#### 2.6.5 RECOVERY CHAMBER

In the recovery chamber [10] the following flows are collected back:-

- The vapour/liquid flow from the central canal of the vortex [18]
- The flow through the aeration valve in the outlet channel [24] (only when the pressure is < 0.7 bar)

These flows are necessary for the functioning of the system and together they amount to approximately 8 l/min. These flows are brought back to the pump inlet by the recovery float valve [6]. The specially designed recovery float valve maintains the liquid at a constant level.

#### 2.6.6 VENT TO ATMOSPHERE

A vent [8], located at the highest point on the cover, maintains the recovery chamber at atmospheric pressure.

The gas that is extracted from the central channel of the vortex is released into the atmosphere by this vent. According to certain local regulations, a pipe or hose must be connected to this vent. A non-overflow device [7], made by a float operated valve, is put in the vent channel.

**NOTE:-** If this vent (internal thread R  $\frac{3}{8}$ "") is connected to an atmospheric pressure equalising pipe, the pipe has to have a minimum internal diameter of 12mm.

### 2.6.7 DRAINING THE TQP-HS

The TQP-HS is provided with a double drain [5] located at the lowest point of the housing. The pump can easily be drained without spillage by carrying out the following actions:-

- Open the filter box
- Remove the foot valve (to allow the fuel go back to the storage tank)
- Unscrew the drain screw [5] and pull it partially down to allow the recovery chamber [10] to empty into the filter box

If the fuel cannot go back to the storage tank (for example if there is a non-return valve in the pipeline or if the ground tank is higher than pump), it is still possible to drain the TQP-HS by completely removing the drain screw [5] and catching the excess fuel in a suitable container.

### 2.6.8 V-BELT TRANSMISSION

The speed of the pumping unit is determined by the selection of the motor, motor pulley and V-belt. Refer to the relevant dispenser Parts Manual or check the number on the old V-belt before ordering replacement V-belts. There are no options on the pumping unit itself, only one pump pulley is available. On most Tokheim dispensers, the motor is fixed onto a support bracket which can be adjusted to get the correct tension on the V-belt.

### 2.6.9 MOTORS

The power required is proportional to the flow rate and pressure:-

- For the 80 l/min version: 1 kW at 1400 rpm
- For the 130 l/min version: 1.5 kW at 2800 rpm

The motors correspond to European safety regulations: EExd. The body of the motor must always be earthed.

Refer to the relevant dispenser Parts Manual for ordering spare parts.

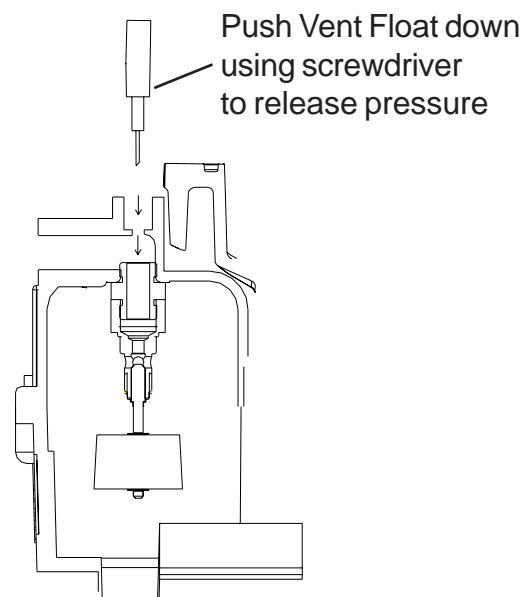
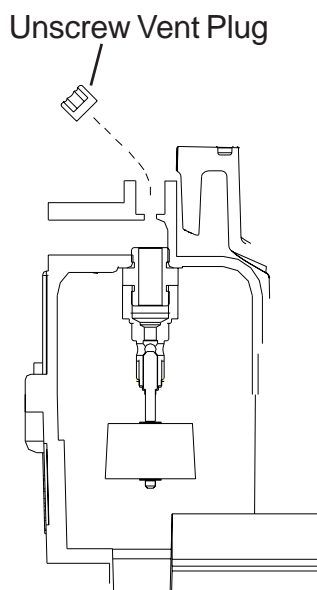
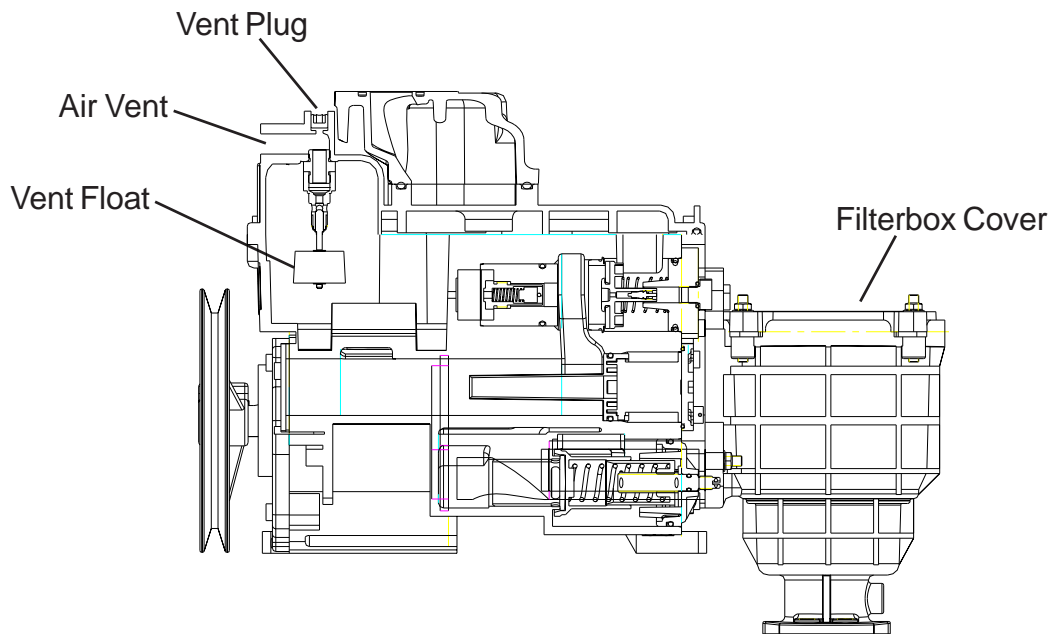
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### 3 FAILURE DIAGNOSIS

- 1) Before starting any maintenance procedure, ensure that the standard safety measures are taken:-
  - Ensure that all necessary tools and replacement parts are available.
  - Ensure the dispenser is isolated and all power is turned off.
  - When working on or near a dispenser, always act in accordance with general safety rules and regulations.
  - Cordon off the dispenser under repair.
  - Wear appropriate Personal Protective Clothing.
- 2) When the TQP-HS is stopped, ensure that the pumping unit is not pressurised due to the closing of the vent float valve. If there is no air coming from the air vent when the filterbox cover is removed, the vent float is closed and the pump is pressurised. Pressure can be released by unscrewing the top vent plug (reference item [9] in the schematic diagram of operating principles), and pushing the float down carefully with a screwdriver or pin.





### **3.1 Failure Diagnosis**

Prior to performing fault diagnosis/search, check the condition of the belt drives.

Following any repair action to the pumping unit, ensure that all the necessary procedures required by Weights & Measures and applicable safety legislation are correctly followed.

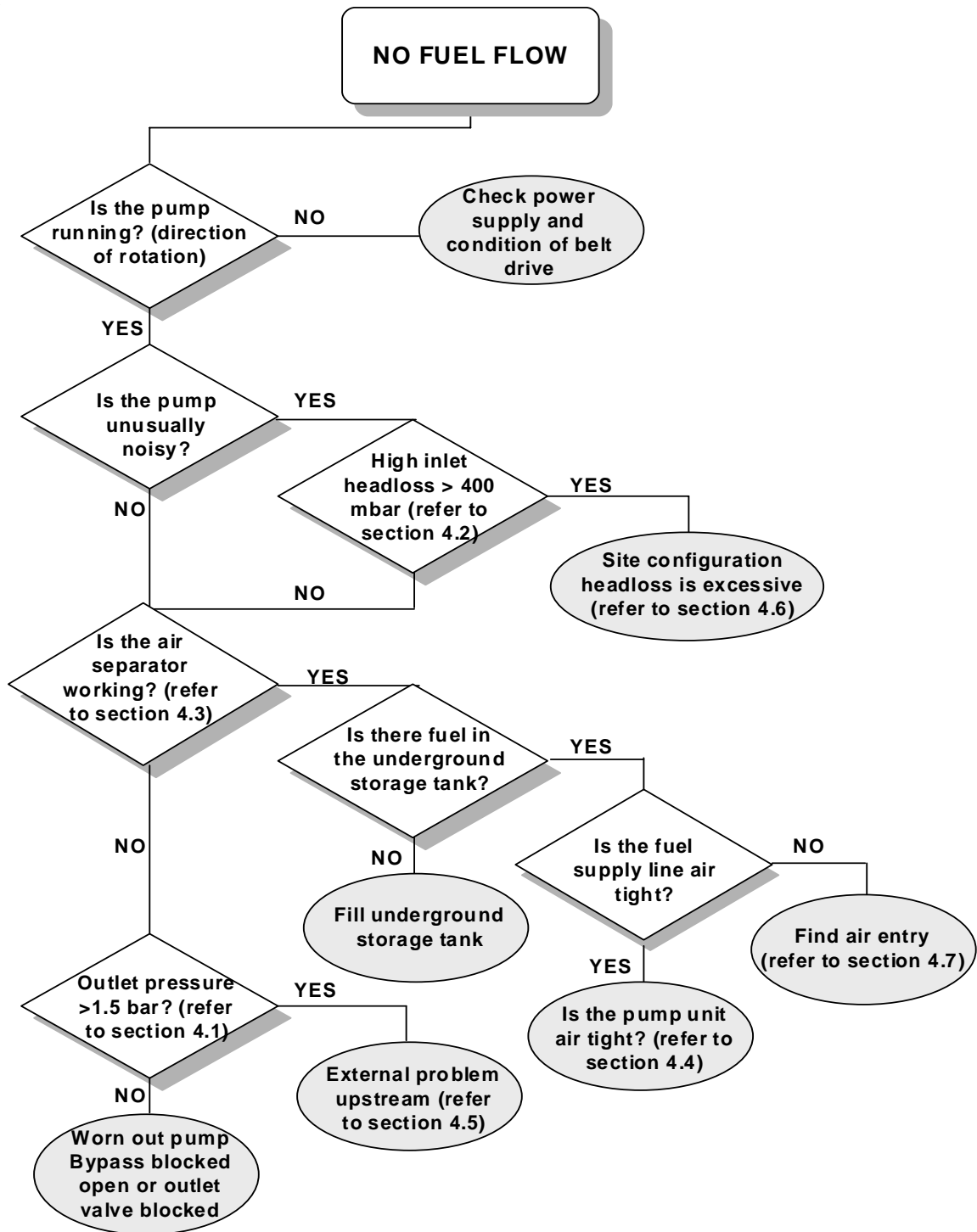
**NOTE : Once an O-ring has been removed, it must not be re-used.**

Check the normal operation of the pumping unit for one or more of the following problems:-

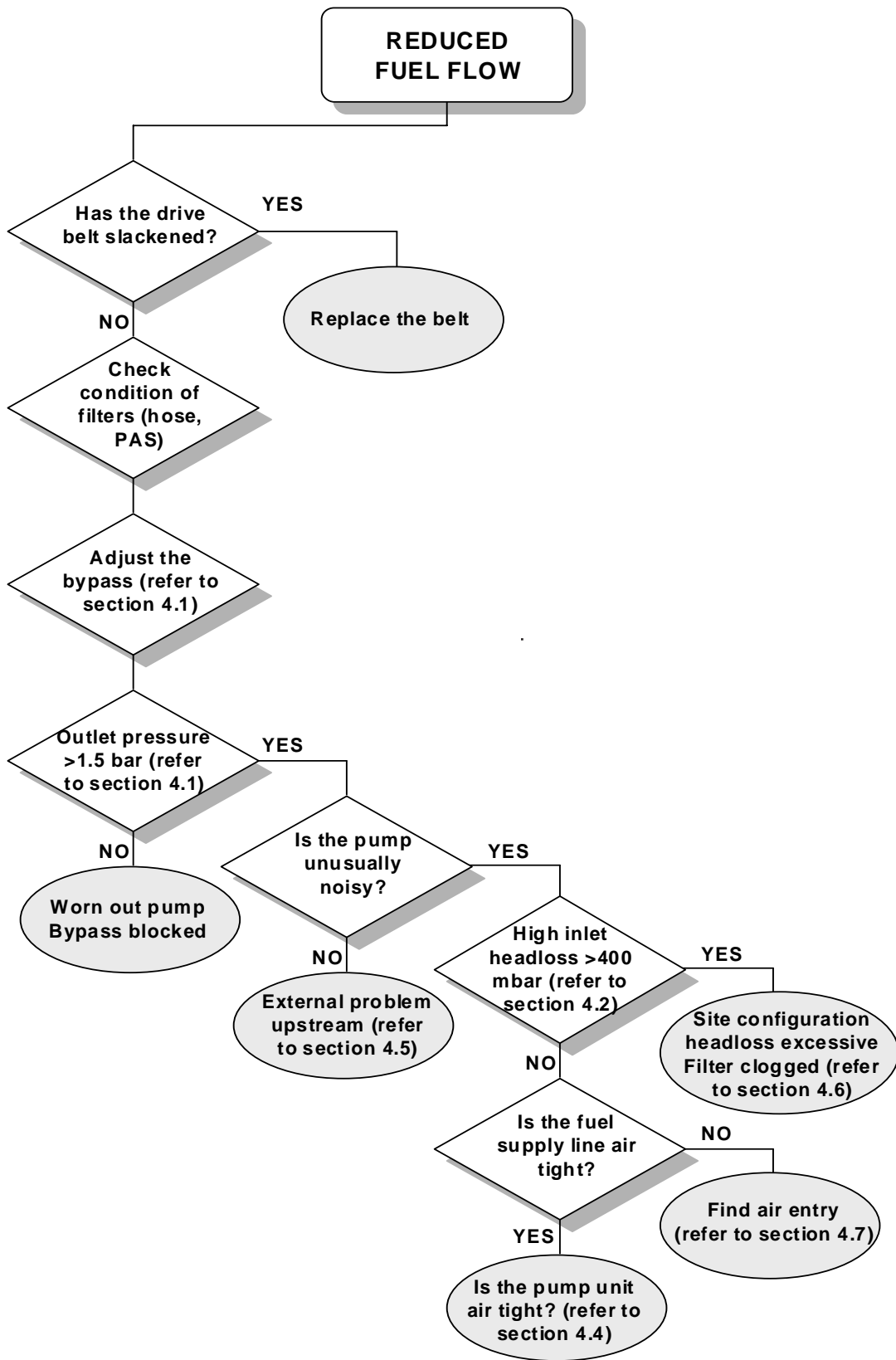
- No fuel flow (refer to section 3.2.1)
- Reduced fuel flow (refer to section 3.2.2)
- Uneven (pulsing) fuel flow (refer to section 3.2.3)
- Closing of the overflow valve (refer to section 3.2.4)
- Excessive noise (refer to section 3.2.5)

3.2 Flow Charts

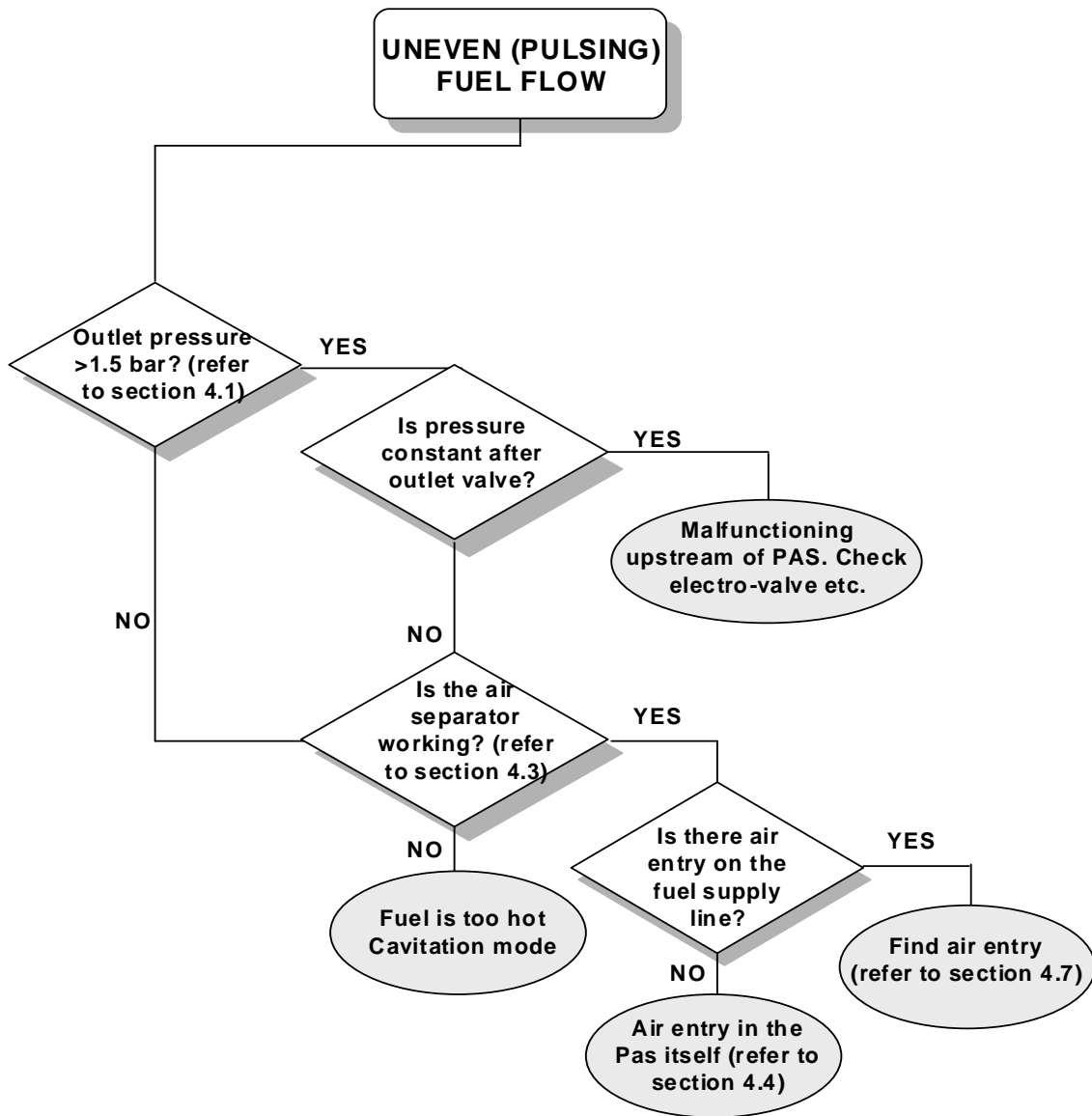
3.2.1 NO FUEL FLOW



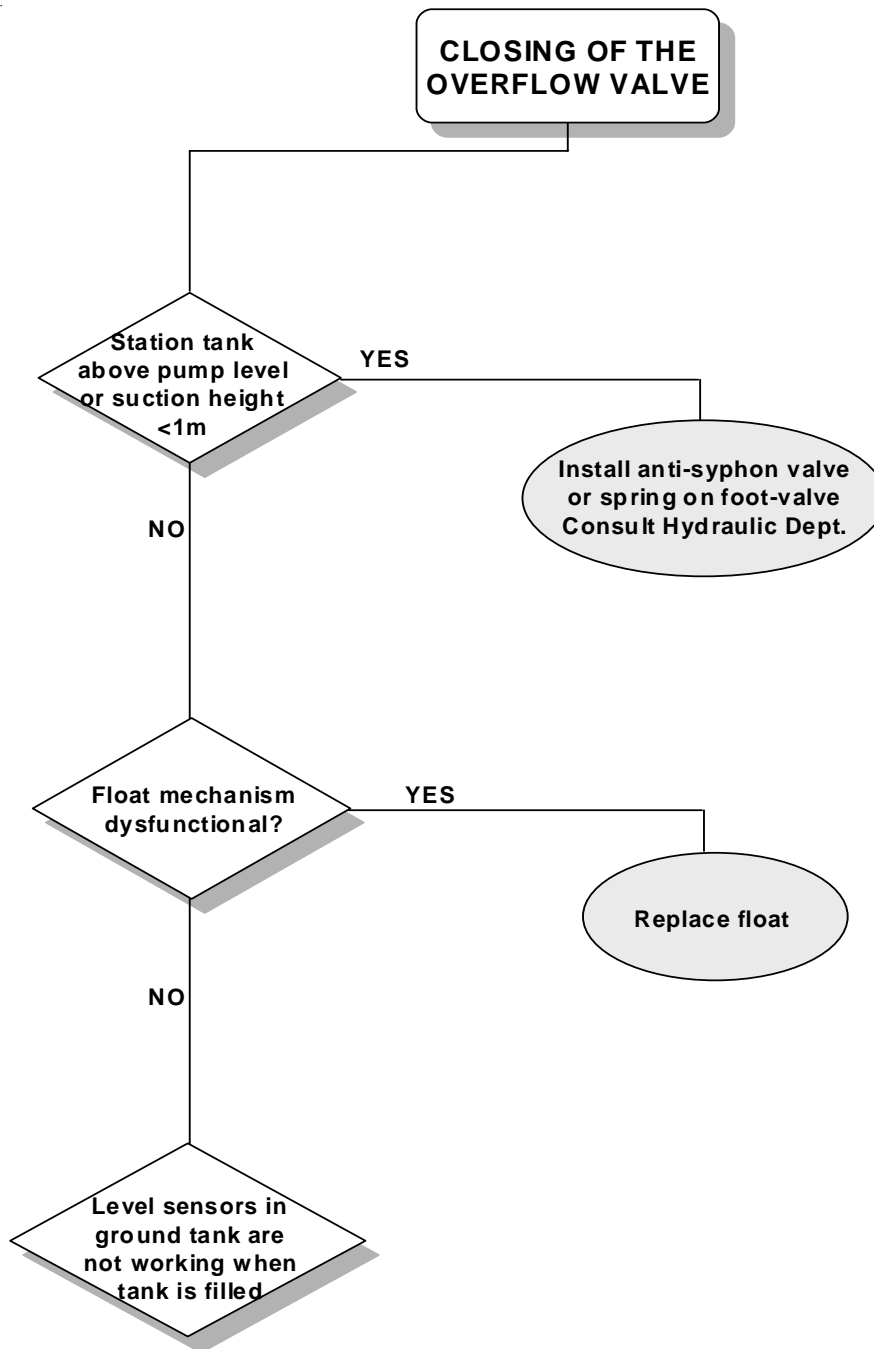
3.2.2 REDUCED FUEL FLOW



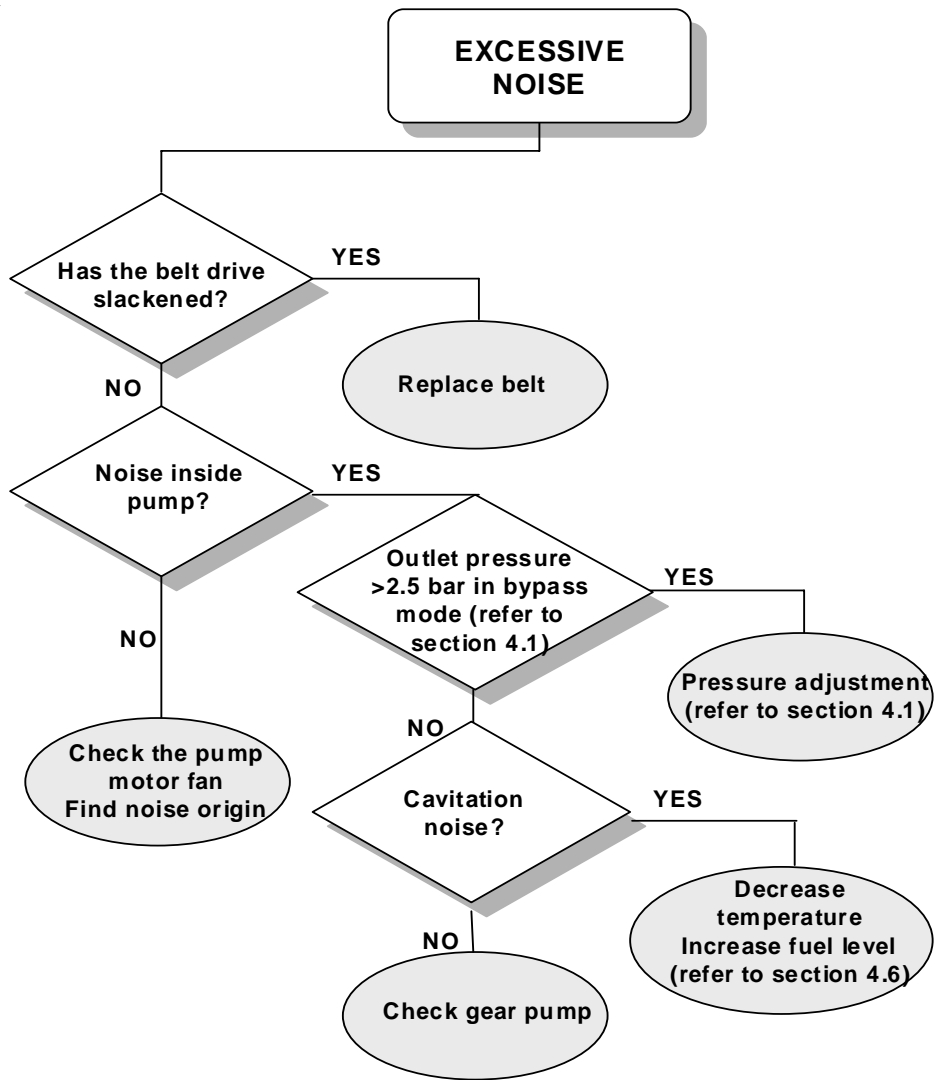
3.2.3 UNEVEN FUEL FLOW



3.2.4 CLOSING OF THE OVERFLOW VALVE



3.2.5 EXCESSIVE NOISE



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## 4 TROUBLESHOOTING

### 4.1 Outlet Pressure

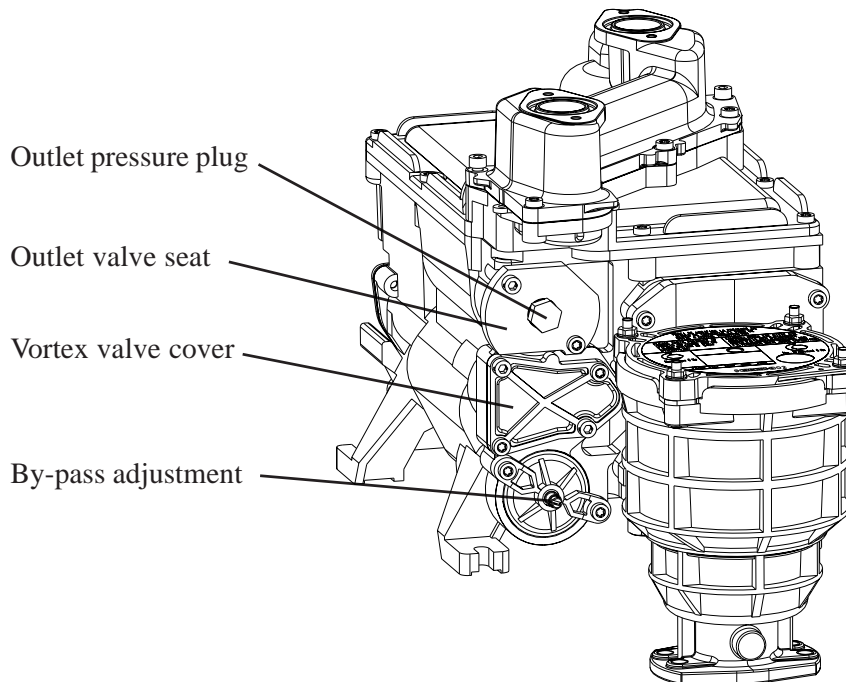
The flow of the TQP-HS is regulated with the outlet pressure. To adjust the outlet pressure:-

- 1) Unscrew the pressure plug (item [20] in the schematic diagram).
- 2) Connect the pressure gauge via the flexible pipe into the hole of the outlet-cover (refer to section 5.3 for specific tools).
- 3) Lift the nozzle out of its holder. When the pump starts to run (with the nozzle still closed), check the pressure at the pressure gauge. On top of the by-pass cover, + and - indicate which way the by-pass screw must be turned to increase (+) or decrease (-) the pressure. When the desired pressure is adjusted, check whether the correct flow is reached.

### OUTLET PRESSURE VALUES

The exact pressure value will depend upon certain installation characteristics. However, when adjusting the outlet pressure, the following values for the pressure are to be respected:-

- For the TQP-HS 80 l/min models, the normal working pressure in by-pass mode should be between 2 and 2.5 bar and should always be  $>1.7$  bar.
- For the TQP-HS 130 l/min models, the pressure should be between 2.5 and 3.5 bar.
- For dispensers delivering 160 l/min or 9.6 m<sup>3</sup>/h (i.e. two TQP-HS 80 pumping units in parallel), the pressure of one pumping unit must be 0.2 bar higher than the other one.





## 4.2 Inlet Pressure

The inlet pressure can be measured using a special filter box cover (refer to section 5.3 for specific tools) and a pressure gauge with range -1 bar up to 3 bar.

At full flow (i.e. two nozzles at 40 l/min), the inlet pressure measured is the pressure loss caused by the resistance of the site configuration (i.e. the height of pump in comparison to the storage tank and the length of the pipework).

If the inlet pressure is too high, check the following:-

- Condition of the filter. Clean and/or replace as required.
- Operation of the foot valve. Repair or replace as required.
- Installation pipework back to the storage tank i.e. operation of the non-return valve, dirt blocking the flow, tank filter clogged etc. Repair and/or replace as required.

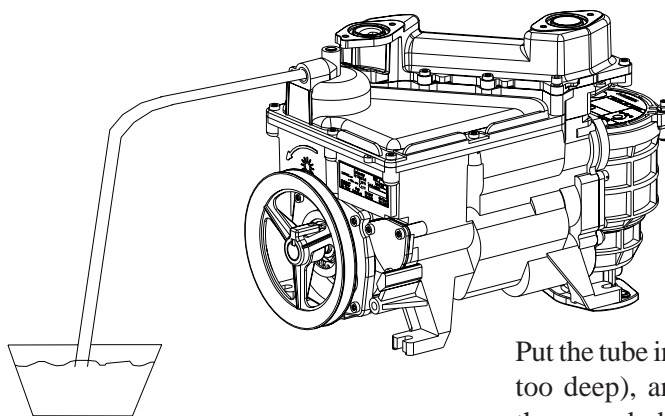
Re-check the inlet pressure and repeat the above procedures until a satisfactory measurement is obtained.

## 4.3 Air Vent

Place one end of a tube (inner diameter 12mm) with a  $\frac{3}{8}$ " BSP thread coupling on the vent and drop the other end of the tube into a small container with fuel (same fuel as storage tank).

Start the pump in by-pass mode by lifting the nozzle from its holder and letting it run for a while before opening the nozzle. Check for the following:-

- Bubbles appearing constantly - this means that there is an air entry in the pump or the installation before the pump.
- Fuel is being sucked into the pump - this means the recovery float valve is not closing properly.



Put the tube in the tank (not too deep), and observe if there are bubbles.

### NOTE

If the vent is difficult to reach, try to feel with your hand if a stream of air or vapour is expelled from the vent.

#### 4.4 Internal Air Entry in the Pump

Possible causes for air to enter the pump are as follows:-

- The filter cover O-ring is incorrectly positioned or dilated.
- The O-ring between the filter box and the pump body is incorrectly positioned or dilated.
- One of the sealing rings between the connection to ground piping and filter box is defective or insufficiently tightened.
- The float assembly is blocked in an open position, incorrectly installed or contains loose particles in between.

#### 4.5 External Problems up-stream the TQP-HS

To test for problems up-stream the TQP-HS pumping unit:-

- Check the operation of a non-return valve (where fitted). If the valve is defective (if mounted according to dispenser model), replace the valve.
- Check for a blockage in the volume meter. If the meter is blocked, replace the volume meter.
- Check the condition of the nozzle filter and nozzle. If the nozzle filter is clogged, clean or replace the filter as required.
- Check the operation of the electronic valve. If the valve is blocked, replace the electronic valve.

#### 4.6 Excessive Head Loss

When the ambient temperature increases, the ability to pump fuel is reduced due to the formation of vapour locks. Check if the pipework and manifold are sufficiently insulated (as installed) from ambient heat sources.

To reduce the temperature build-up, the manhole chimneys can be filled with sand and the manhole covers can be painted white.

If a satisfactory technical solution cannot be found, try to maintain normal operation by keeping the storage tank filled as much as possible as this will reduce problems coming from high ambient temperatures.

To test for problems with excessive head loss:-

- 1) Check the head loss resulting from the specific configuration of each fuel line by comparing the measured head loss under each dispenser at the point where the same fuel from the same underground storage tank arrives.
  - If these various measured head loss values are comparable:-
    - Check the expected (theoretical) head loss values are indeed comparable to those measured. If not, then the fuel line may be obstructed by an unknown object.
  - If these various measured head loss values are not comparable:-
    - Check the connection between each pump and the relevant underground pipework (e.g. manifold, non-return valve blocked).

- 2) Check the condition of the pump filter.
- 3) If the dispenser is the only one delivering this product, check the complete line from the storage tank to the dispenser, noting the distance between the pump and the storage tank, the height of the product in the tank and the various accessories (plugs, valves etc.). It may be possible to solve the problem by filling the tank before trying to cool down the fuel.

#### **4.7 Air Entry on the pipework to the Storage Tank**

Check if there is a leak in the fuel line from the storage tank to the dispenser.

In pipework systems with more than one pumping unit per suction line, check the non-return valves on each derivation (where fitted).

If there are no special valves for this purpose, the valves of the filter box take over this function (they must be present on all dispensers). It is possible that one of these valves is not closing properly and is allowing air into the pipeline. When the problem cannot be found, a sight glass can be mounted underneath the pump filter box to check for leakages and to define the leakage (contact Tokheim Hydraulic Department for further advice).

A defective foot valve can be detected by delivering about 20 litres with each pump and observing if the delivery is immediately starting when the motor starts and stays constant.

4.8 Problem Report form for the TQP-HS pump

Issued by: _____	Report Date: _____
Station Name: _____	Meter Reading 1: _____ l
City: _____	Meter Reading 2: _____ l
Country: _____	Ground Pipework: _____
TQP-HS no.: _____	-Length _____ m
Installation Date: _____	-Height _____ m
Kind of Fuel: _____	-Diameter _____ m
Dispenser Type: _____	More pumps on one pipeline <input type="checkbox"/> yes <input type="checkbox"/> no

**Problem description**

1. No fuel flow

a) Is the pump running?  yes  no

b) Is the pump unusually noisy?  yes  no

*If the answer is yes, go to point 4. If the answer is no:*

c) Is there enough fuel in the underground tank?  yes  no

d) Is air coming out of the air vent?  yes  no

e) What is the outlet pressure (measured at the outlet plug)? \_\_\_\_\_ mbar

2. Reduced fuel flow

a) What is the outlet pressure when running in bypass mode? \_\_\_\_\_ bar

b) What is the inlet pressure at the filter box? \_\_\_\_\_ mbar

c) Are the following parts in good order: is the filter box clean, v-belt?  yes  no

3. Pulsating flow

a) Is the outlet pressure constant?  yes  no

b) Is air coming out of the air vent?  yes  no

4. Excessive noise

a) Is the noise coming from inside the pump?  yes  no

b) What is the outlet pressure in bypass mode? \_\_\_\_\_ bar

c) What is the inlet pressure at the filter box? \_\_\_\_\_ mbar

d) Is it cavitation noise?  yes  no

**Cause of the Problem**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Actions done to solve the problem (list part numbers of new parts used)**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Further actions required**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Remarks about special environmental or other circumstances**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**CONTENTS**

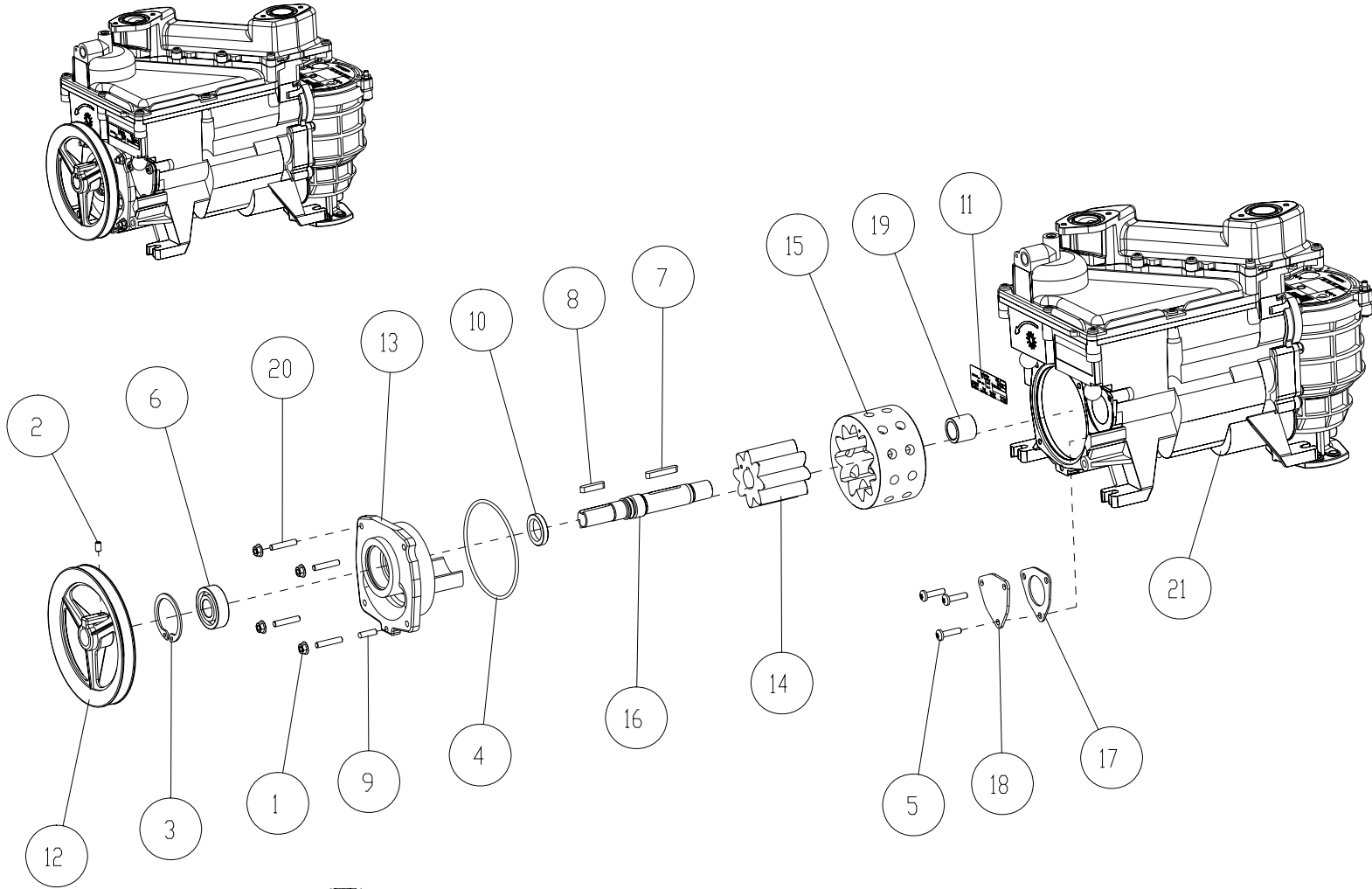
**5 SPARE PARTS AND MAINTENANCE TOOLS ..... 5-2**

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  - 5.1.1 Front View ..... 5-2
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## 5 SPARE PARTS AND MAINTENANCE TOOLS

### 5.1 Exploded Views and Parts Lists

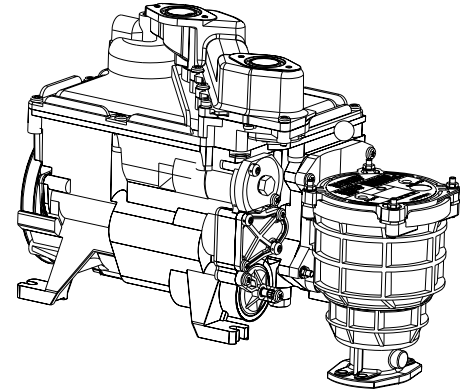
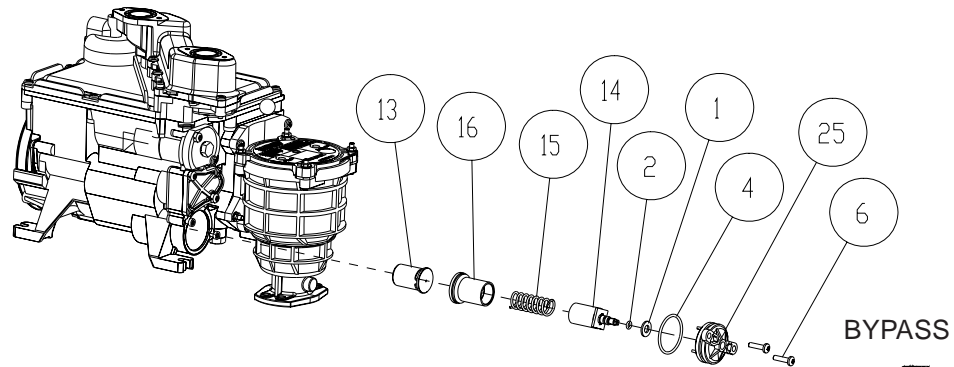
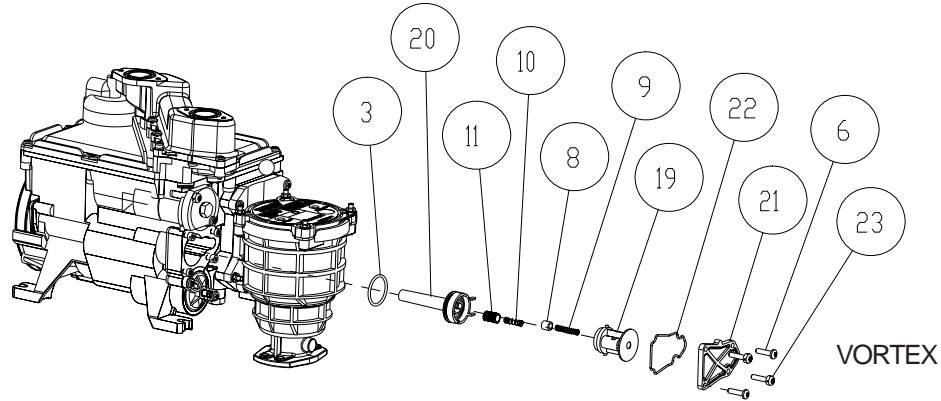
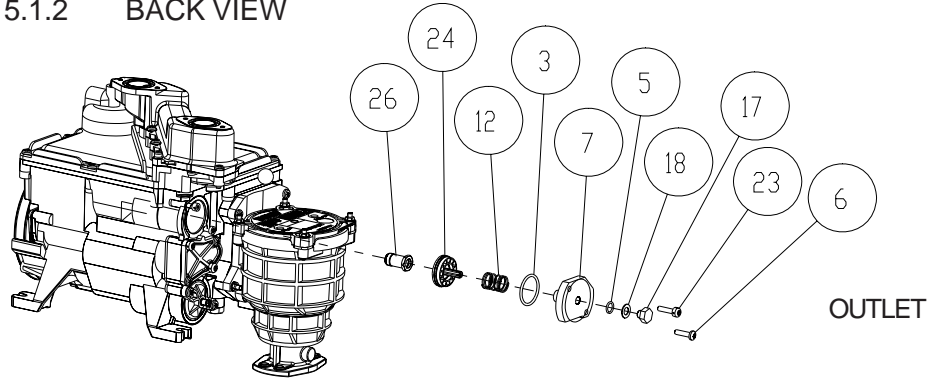
#### 5.1.1 FRONT VIEW



## FRONT VIEW PARTS LIST

Item No	Description	Désignation Français	Part No	Comments
1	Nut Hex Self Lock M6	Ecrou Bride Autobloquant M6	900013-003	
2	Screw HSS Cup Point M6x10	Vis HCCU M6x10	900019-001	
3	Ring Retain Bore D50	Anneau Elast Int D50	900049-002	
4	O-Ring 105,00x3,50	Joint Torique 105,00x3,50	900050-023	Low Temperature option
	O-Ring 107.54x3.53	Joint Torique 107.54x3.53	900050-108	
5	Screw Torx Thr Form BH M6x25	Vis Torx Auto FTCBL Tril M6x25	900053-004	
6	Ball Bearing D20xD47x14	Roulement a Billes D20xD47x14	900070-001	
7	Cotter Pin 6x6x40	Clavettes Paralleles 6x6x40	901321-001	
8	Cotter Pin 6x6x30	Clavettes Paralleles 6x6x30	901321-002	
9	Parallel Pin 6x20mm	Goup. Cylind. C 6x20mm	901348-001	
10	Lip Seal 25x35x6	Joint de Levre 25x35x6	901350-001	Low Temperature option
	Lip Seal 25x35x7	Joint de Levre 25x35x7	905102-002	
11	Label PASV3	Etiquette PASV3	901662	
12	Pulley SPA150	Poulie SPA150	902373	
13	Pump Flange	Flasque de Pompe	902378	
14	Pinion	Pignon	902381	
15	Crown	Couronne	902382	
16	Pump Shaft	Axe de Pompe	902387	
17	Vortex/Housing Seal	Joint Vortex/Cuve	902389	
18	Vortex Cover	Plaque de Vortex	902392	
19	Pump Shaft Bearing Bush	Palier Axe de Pompe	902397	
20	Stub Threaded Specific M6x32	Goujon special M6x32	909271	
21	Machined Body	Corps Usinee	946483	

5.1.2 BACK VIEW



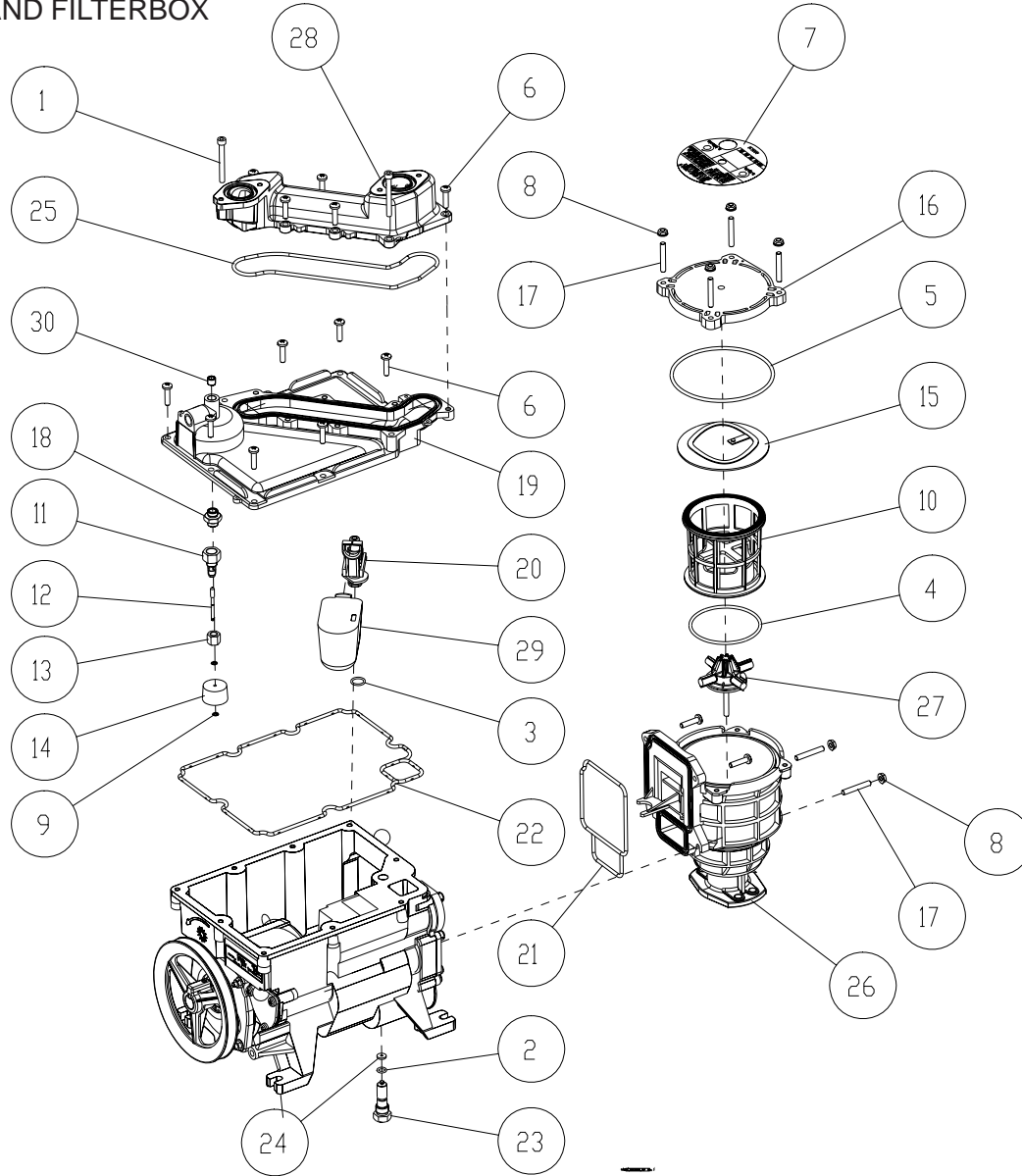


## BACK VIEW PARTS LIST

Item No	Description	Désignation Français	Part No	Comments
1	Washer PI M10	Rondelle PI M10	900008-014	
2	O-Ring 6,00x2,30	Joint Torique 6,00x2,30	900050-020	
3	O-Ring 35,00x3,00 O-Ring 38x3	Joint Torique 35,00x3,00 Joint Torique 38x3	900050-024 900050-109	Low Temperature only
4	O-Ring 46,00x3,00	Joint Torique 46,00x3,00	900050-026	
5	O-Ring 11.5x2	Joint Torique 11.5x2	900050-110	Low Temperature only
6	Screw Torx Thr Form BH M6x25	Vis Torx Auto FTCBL Tril M6x25	900053-004	
7	Outlet Cover Outlet Cover Groove 4.1	Couvercle de Sortie Couvercle de Sortie Gorge 4.1	900640 948715	Low Temperature only
8	Vortex Piston	Piston de Vortex	900642	
9	Vortex Piston Spring	Ressort Piston de Vortex	900649	
10	Vortex Valve Spring	Ressort Valve de Vortex	901701	
11	Vortex Valve Piston	Piston Valve de Vortex	901702	
12	Outlet Valve Spring	Ressort Valve de Sortie	901703	
13	Bypass Valve	Clapet de Bypass	902368	
14	Assy Bypass Screw	Vis de Bypass Montee	902369	
15	Bypass Spring	Ressort de Bypass	902370	
16	Bypass Damper	Assourdisseur de Bypass	902371	
17	Drain Screw M10x1.00	Bouchon M10x1.00	902375	
18	Flat Seal D10x18x1	Joint Plat D10x18x1	902376	Standard only, NOT Low Temp.
19	Vortex Valve Body	Corps Valve de Vortex	902383	
20	Vortex Valve Tube	Tube Valve de Vortex	902384	
21	Vortex Valve Cover	Couvercle Valve de Vortex	902385	
22	Vortex Valve Cover Seal	Joint Couvercle Valve de Vortex	902395	
23	Screw Torx Drill 2 hole M6x25	Vis Torx Percée 2 Trous M6x25	910027-001	
24	Outlet Valve Equiped	Clapet de Sortie Equipe	944356	
25	Bypass Cover Groove 4.1 Bypass Cover	Couvercle de Bypass Gorgre 4.1 Couvercle de Bypass	948716 902374	Low Temperature only
26	Aeration Valve	Clapet d'Aeration	949892	



5.1.3 TOP VIEW AND FILTERBOX



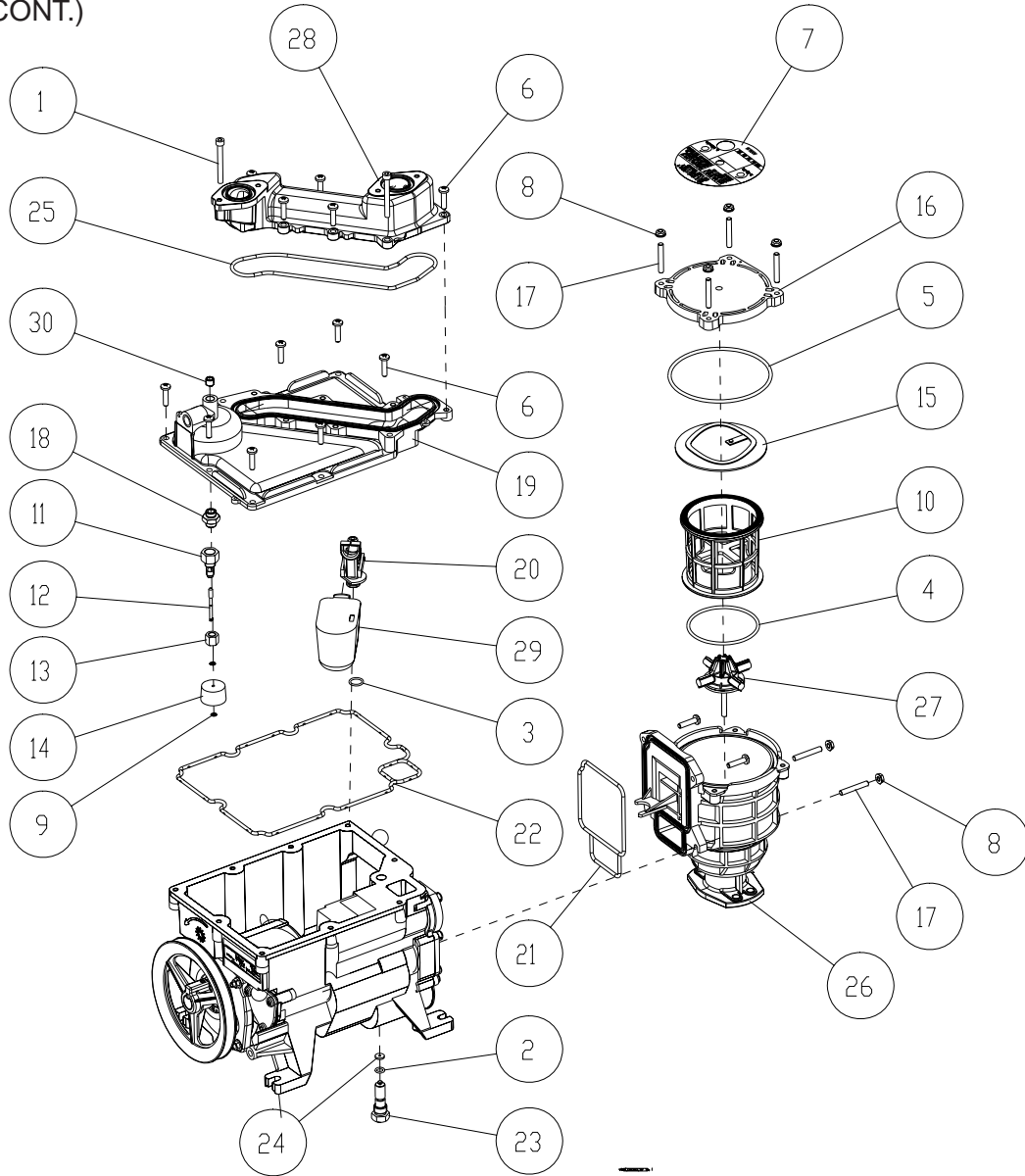
## TOP VIEW &amp; FILTERBOX PARTS LIST

Item No	Description	Désignation Français	Part No	Comments
1	Screw HSHC M6x55	Vis CHC M6x55	900017-040	
2	O-Ring 8,00x2,00	Joint Torique 8,00x2,00	900050-021	
3	O-Ring 14,00x2,00	Joint Torique 14,00x2,00	900050-022	
4	O-Ring 82,14x3,53	Joint Torique 82,14x3,53	900050-025	
5	O-Ring 120,00x4,00	Joint Torique 120,00x4,00	900050-027	Low Temperature only
	O-Ring 120,00x4,00 LT	Joint Torique 120,00x4,00 GF	900050-096	
6	Screw Torx Thr Form BH M6x25	Vis Torx Auto FTCBL Tril M6x25	900053-004	
7	Sticker Filterbox Cover	Autocollant Couvercle Boite de Filtre	900636	Low Temperature only
	Sticker Filterbox Cover LT	Autocollant Couvercle Boite de Filtre GF	900636-002	
8	Nut Hex Serpress M6	Ecrou Serpress M6	901295-001	
9	Washer Spring Retain Shaft D3	Anneau D'Arret Pour Axe D3	901313-001	
10	Filter 90 Microns	Filtre 90 Microns	901612	Standard
	Filter 25 Microns	Filtre 25 Microns	901613	Option
	Filter 12 Microns	Filtre 12 Microns	901614	Option
11	Valve Housing	Corps de Valve	901663	
12	Needle Valve	Valve de Aiguille	901664	
13	Gland Nut	Ecrou de Joint	901665	
14	Cork Float	Flotteur de Lity	901666	
15	Spring Plate	Plaque Support Equipee	901693	
16	Filter Box Cover	Couvercle Boite de Filtre	901694	
17	Stud M6x40 (18-4-18)	Goujon M6x40 (18-4-18)	901695	
18	Vent Float Nipple	Raccord de Flotteur d'Event	902372	
19	Housing Cover	Couvercle de Cuve	902379	
20	Recovery Valve	Vanne de Recup.	902386	
21	O-ring Filterbox Support	Joint Platine BAF	902388	
22	Cover Seal	Joint Couvercle	902390	
23	Drain Screw	Vis de Purge	902391	

(CONT.)



5.1.3 TOP VIEW (CONT.)



## TOP VIEW PARTS LIST (CONT.)

Item No	Description	Désignation Français	Part No	Comments
24	Drain Screw Flat Seal	Joint Plat vis de Purge	902394	
25	Meter Support Cover Seal	Joint Liaison Mesureurs	902396	
26	Filterbox	Boite de Filtre	902398	
27	Footvalve Filterbox	Clapet Filterbox	943260	
28	Cover Meter Support PAS	Couvercle Liaison Mesureurs	947839	
29	PAS V3 Float	Floteur PAS V3	948373	
30	HS Pipe Plug M10 x 1	Bouchon HC M10 x 1	948972-001	

## 5.2 Frequently Used Spare Parts

Reference	Description
902373	Pump pulley SPA 150
901321-002	Key A6 x 6 x 30 for motor and pump pulleys
900050-027	O-ring Viton Ø 4 x 120 for filter box cover
900050-002	O-ring Viton Ø 4 x 34 for outlet flange of PAS
901614	Paper filter 12 µm Gasoline (according to country specification)
901613	Paper filter 25 µm Diesel (according to country specification)
901612	Cleanable plastic filter 90 µm mesh, all fuels.
900028-004	V-belt A29/13 13A760MC used in Quantum T with 95 mm pulley
900028-005	V-belt A27/13 13A720MC used in Quantum T with 71 mm pulley
* * * * *	With V-belts always: check code on V-belt before ordering

## 5.3 References to Specific Tools

902324	Tool for disassembling outlet insert
9231221014	Filter box cover for pressure measuring (vacuum)
9231221013	Filter box with pressure point before foot valve
9508012519	Flexible extension (male/female) M10 x 1.00 for pressure measurement
SR	Manometer (-1 to 3 bar) to measure pressure or vacuum
SR	Torx key (shape T30)
902325	Tool for mounting lip-seal
902327	Tool for mounting outlet valve seat
902328	Vortex remover <b>Note : remove from the front of the pump to the back</b>

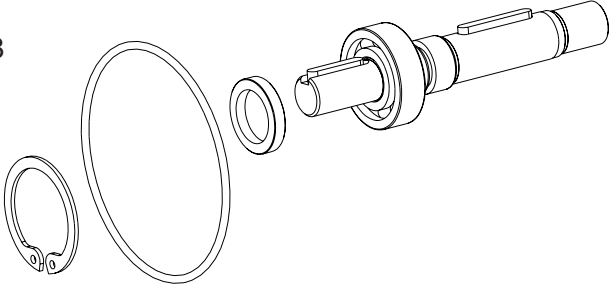
SR: Tools from local stores.

5.4 Maintenance Kits

**Gear Repair kit**

Contains a shaft + ball bearing (already assembled), a retaining ring, lip seal and O-ring.

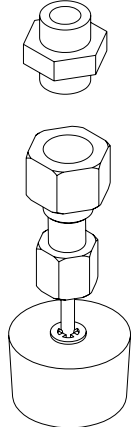
Order Number : 902298



**Air Vent Repair kit**

Contains a gland nut + valve housing + needle valve + cork float + spring washers (already assembled) and a nipple.

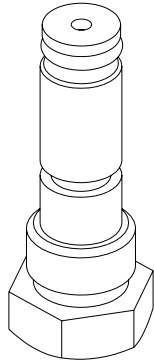
Order Number : 902299



**Drain Screw Repair kit**

Contains a drain screw, O-ring + flat seal (already assembled).

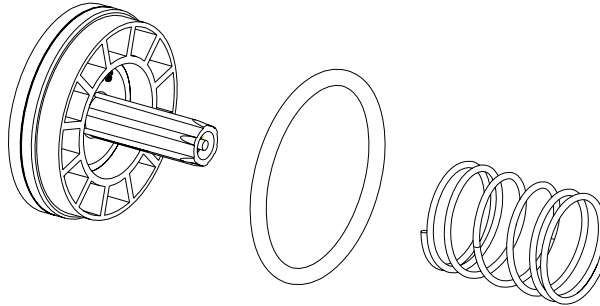
Order Number : 902304



**Outlet Valve Repair kit**

Contains an outlet valve assembly + spring + O-ring cover.

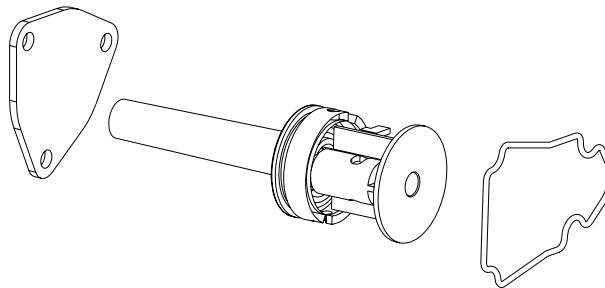
Order Number : 902301



**Vortex Repair kit**

Contains a valve tube + valves + springs + vortex body + O-ring (already assembled), seal vortex valve front-side and seal vortex rear-side.

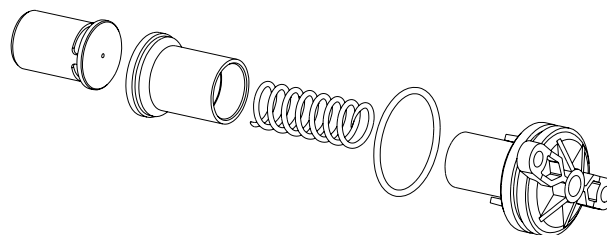
Order Number : 902302



**By-Pass Valve Repair kit**

Contains a cover, O-ring, pressure nut + iron washer (already assembled) and an O-ring, spring, valve and damper.

Order Number : 902303





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