8.2 Replacement of steam inlet/exhaust valves and seats

Please ensure the safety recommendations are observed before commencing with any maintenance of this product.

To replace the steam inlet and exhaust valve and seats

1. Remove the cover and old gasket (see cover gasket replacement procedure Section 7.1).
2. Lift the cover assembly to a bench or other convenient working surface and clamp securely, avoiding contact with the gasket face.
3. Carefully remove the circlip, washer and the inlet valve spring (item 27) from the end of the steam inlet valve (item 17).
4. Remove the three M8 bolts (items 20) using the 13 mm A/F socket.
5. Lift away the pump bracket assembly as this will allow access to the valve seats.
6. Using the 24 mm socket unscrew both the steam inlet and exhaust seats.
7. The seats, metal gaskets and steam inlet valve can now be removed.
8. Carefully clean the threads and gasket faces within the cover assembly ensuring all residues are removed.
9. Insert the replacement steam valve assembly (item 16 and item 17) according to Figure 27.

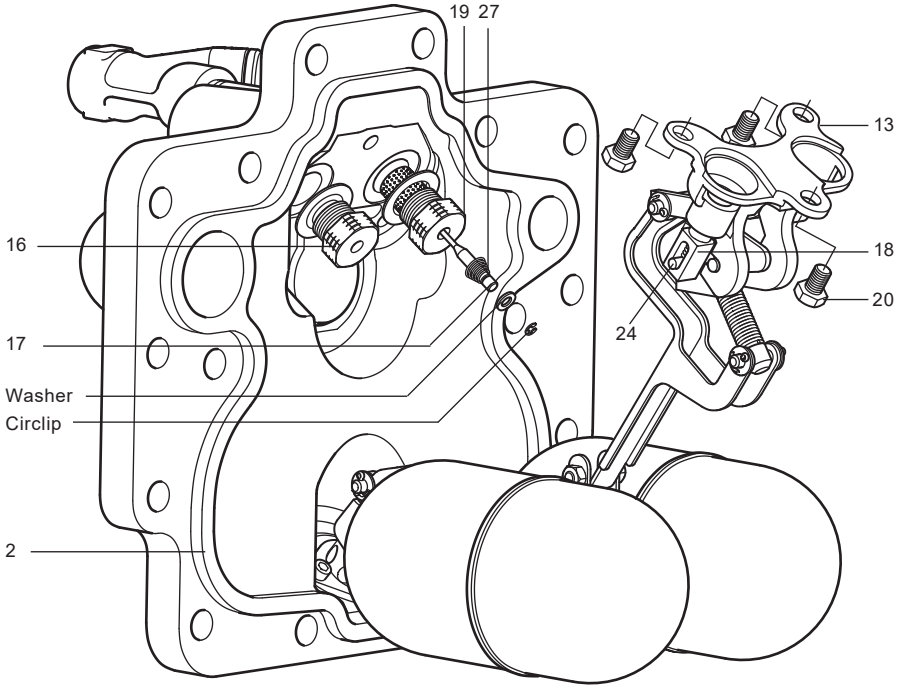


Fig. 27 APT14 shown

10. Place a new metal gasket (item 19) onto the threads of the seat before tightening into the cover.

11. Tighten the seat using the 24 mm socket to 125 ± 7 N m (92 ± 5 lbf ft).

12. The exhaust seat can be replaced in a similar way.

13. Refit the bracket to the cover and tighten the three M8 bolts using the 13 mm A/F socket to 18 ± 2 N m (13 ± 1.5 lbf ft).

14. It is important to ensure a new circlip is fitted to the steam inlet valve after the bracket has been bolted in place.

15. To remove the exhaust valve (item 18), remove split pins, washers, and shafts (X and Y) from the top spring pivot point and pump pivot point (See Figure 28).

16. Remove the spring and anchor assembly.

17. Draw the actuator arm with the exhaust valve downwards within its slots until it becomes free. It may be necessary to slide the exhaust valve backwards against its internal spring to free it from the pump bracket guide (item 13).

18. Remove the exhaust valve from the actuator arm.

19. Fitting the replacement exhaust valve is the opposite to removal, remembering to compress the small spring within the new valve before refitting to the spigot of the actuator arm.

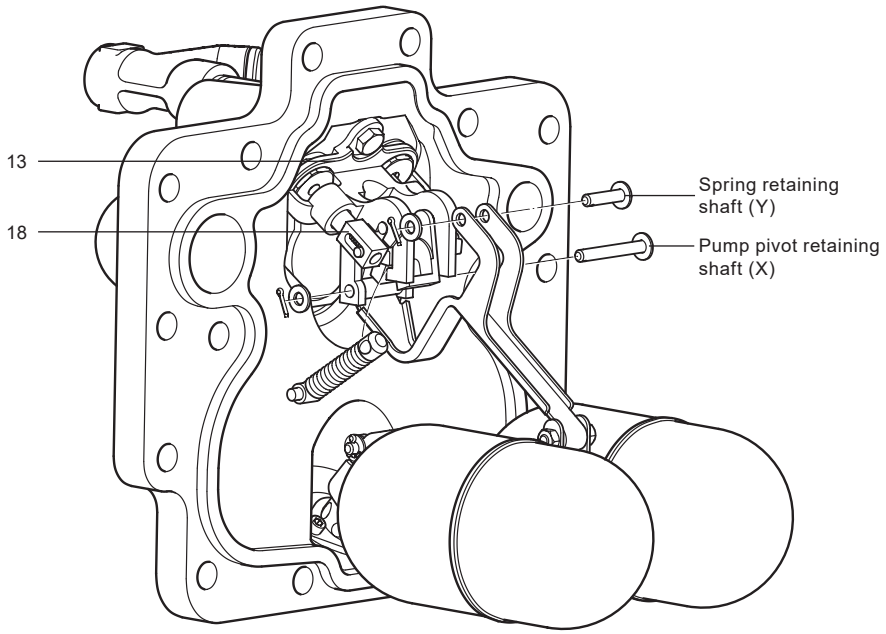


Fig. 28 APT14 shown

20. Ensure the actuator is correctly aligned and located within the slots of the pump bracket (item 13).

21. Once this is correctly located, ensure the exhaust valve can slide easily within its guides.

22. When refitting the spring retaining shaft (Y) (30 mm long) and pump pivot retaining shaft (X) (52 mm long), always use new split pins and washers.

23. Check that the mechanism snaps over and opens and closes the valves by moving the floats to their upper and lower limits of travel.
Note: The valve gear has been designed to be adjustment-free, simplifying the fitting of new parts. If after assembly the mechanism does not operate correctly, check all the parts are assembled and aligned as per Figure 28.

24. With the mechanism fully assembled, refit the cover assembly to the body, ensuring the gasket faces are carefully aligned and no parts of the gasket are trapped or pinched outside the sealing areas. To ensure accurate alignment of the cover and body, it is recommended the lower part of the cover's gasket seal is located into the body first. The top part of the seal can then be easily aligned.

25. Refit the cover bolts ensuring they are sequentially tightened in opposing pairs, gradually increasing torque to 63 ± 5 N m (46.5 ± 4 lbf ft).

26. Carefully reconnect the motive steam supply and the exhaust lines to the connections marked (S) and (E). The APT14, APT14HC or APT14SHC is now ready to recommission.

27. Make sure that the Spirax Sarco motive supply strainer (with 100 mesh screen) is reinstated to the motive supply connection (item 28).

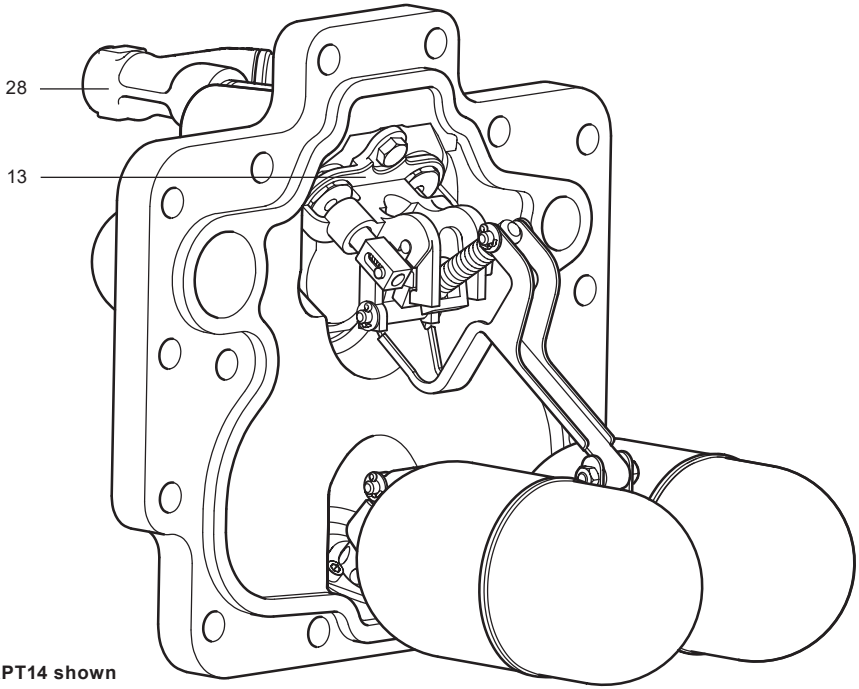


Fig. 28 APT14 shown

9. Fault finding guide

Caution

Installation and trouble shooting should only be performed by qualified personnel. Please read Section 1.12 regarding the safe lifting of this product before actioning any installation or maintenance procedure.
Before any maintenance is attempted, ensure any residual internal pressure in the product or connecting lines is carefully relieved. Also ensure any hot parts have cooled to prevent risk of injury from burns. Always wear appropriate safety clothing before carrying out any installation or maintenance work.
When dismantling this product, care should be taken to prevent injury from the snap action mechanism. Always handle with care.

The APT14, APT14HC and APT14SHC are thoroughly tested before leaving the factory. This includes a comprehensive functional test. If the unit has failed to operate it is likely that an installation problem could exist. Please check the following before commencing with the trouble-shooting chart.

9.1 Trouble areas to check first:-

- Are all isolating valves open?
- Is the condensate inlet strainer (as recommended in Figure 11, page 21) clean and free from debris?
- Is the motive supply strainer clean and free of debris?
- Does the installation head available exceed 0.2 m (8") from the base of the pump?
- Is the available motive pressure higher than the total backpressure? (recommended 3 to 4 bar g (44 to 58 psi g) but not exceeding 13.8 bar g (200 psi g))
- Is the exhaust balance line (E) connected to the outlet of the equipment being drained and is it free from obstruction (refer to installation diagram Figure 11, page 21)?
- Is the direction of flow though the unit correct, indicated by the flow arrow?

9.2 Quick reference trouble-shooting guide

SYMPTOM	APT fails to operate on start-up.
CAUSE 1	No motive presure.
CHECK and CURE (1)	Motive supply pressure exceeds total backpressure.
CHECK and CURE (2)	Check supply is not isolated by manual or fail safe valve. Check reason for fail safe valve closure. Ensure reason resolved and reset valve to open position.
CAUSE 2	Inlet isolation valve maybe closed.
CHECK and CURE	Inlet pipe is free from obstructions and the isolation valve is open.
CAUSE 3	Motive inlet and exhaust lines incorrectly connected.
CHECK and CURE	Motive = S, Exhaust = E.
CAUSE 4	The rate of condensate produced by the process maybe very low, causing the APT to cycle slowly.
CHECK and CURE	The process being drained is operating correctly.
SYMPTOM	**Equipment flooded - but APT appears to cycle normally.**
CAUSE 1	APT is undersized for the application.
CHECK and CURE	Check system parameters agree with the custom sizing sheet/graph.
SYMPTOM	**Equipment flooded and APT has stopped cycling.**
CAUSE 1	Blocked exhaust line.
CHECK and CURE	Balance line is free from obstruction and is not waterlogged. Refer to installation diagram Figure 10, page 16.
CAUSE 2	Blocked condensate inlet line.
CHECK and CURE	Inspect and clean the strainer mesh, check for blockages.
CAUSE 3	Blocked condensate outlet line.
CHECK and CURE	Inspect line for blockages.
CAUSE 4	Damaged mechanism.
CHECK and CURE	Mechanism operates as per Section 6. Replace malfunctioning part(s).
CAUSE 5	No motive steam available.
CHECK and CURE (1)	Steam supply to APT is available and at the correct pressure. Motive pressure must exceed total backpressure. Ensure motive supply strainer is clear of debris. Clean or replace if necessary.

SYMPTOM	**Equipment flooded and APT has stopped cycling (continued)**
CAUSE 5	Check supply is not isolated by manual or fail safe valve. Check reason for fail safe valve closure. Ensure reason resolved and reset valve to open position.
CHECK and CURE (2)	
CAUSE 6	Leaking motive inlet valve.
CHECK and CURE	If the APT body is hot (observe safety note), this indicates the APT's mechanism is stuck on the discharge cycle. Check mechanism for excessive friction as per Section 6. Check motive inlet valve and spring for correct operation - replace malfunctioning part as per Section 8.
CAUSE 7	Broken spring.
CHECK and CURE	If the APT body is cold, this indicates the APT's mechanism is stuck on the filling cycle. Check pump mechanism spring - replace malfunctioning part as per Section 7.
CAUSE 8	Blocked condensate inlet line.
CHECK and CURE	Inspect and clean the filter, check for blockages.
SYMPTOM	**Chattering or banging of the APT during cold start-up.**
CAUSE 1	Hydraulic pulsing of the inlet check valve.
CHECK and CURE	Reduce installation head to APT - install throttling valve on APT condensate inlet.
SYMPTOM	**Chattering or banging in the return line after APT discharges.**
CAUSE 1	Live steam entering discharge line.
CHECK and CURE	Ensure steam traps draining the motive supply line are discharging to a non-flooded condensate return and the condensate return is adequately sized.