



APCO ACS-1200/1700 COMBINATION SLOW CLOSING AIR/VACUUM VALVE



Instruction **D12025**
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DeZURIK

APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves

Instructions

These instructions provide installation, operation and maintenance information for APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves. They are for use by personnel who are responsible for installation, operation and maintenance of APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves.

Safety Messages

All safety messages in the instructions are flagged with an exclamation symbol and the word Caution, Warning or Danger. These messages indicate procedures that must be followed exactly to avoid equipment damage, personal injury or death. Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death.

Safety label(s) on the product indicate hazards that can cause equipment damage, personal injury or death. If a safety label becomes difficult to see or read, or if a label has been removed, please contact DeZURIK for replacement label(s).



WARNING!

Personnel involved in the installation or maintenance of valves should be constantly alert to potential emission of pipeline material and take appropriate safety precautions. Always wear suitable protection when dealing with hazardous pipeline materials. Handle valves, which have been removed from service with suitable protection for any potential pipeline material in the valve.

Inspection

Your APCO ACS-1200/1700 Slow Closing Air/Vacuum Valve has been packaged to provide protection during shipment; however, it can be damaged in transport. Carefully inspect the unit for damage upon arrival and file a claim with the carrier if damage is apparent.

Parts

Recommended spare parts are listed on the assembly drawing. These parts should be stocked to minimize downtime.

Order parts from your local DeZURIK sales representative, or directly from DeZURIK. When ordering parts, please include the 7-digit part number and 4-digit revision number (example: **9999999R000**) located on the data plate attached to the valve assembly. Also include the part name, the assembly drawing number, the balloon number and the quantity stated on the assembly drawing.

DeZURIK Service

DeZURIK service personnel are available to maintain and repair all DeZURIK products. DeZURIK also offers customized training programs and consultation services.

For more information, contact your local DeZURIK sales representative or visit our website at www.dezurik.com.

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APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves

Description

The APCO Slow Closing Air/Vacuum Valve actually consists of a standard Air/Vacuum Valve mounted on top of a Surge Check Unit. It is designed to eliminate critical shock conditions occurring in those installations where the operating conditions cause a regular air valve to slam closed. This slow closing feature protects the Air/Vacuum valve itself and at the same time prevents the Air/Vacuum valve from creating a surge in the pipeline by slamming shut.

This type Slow Closing Air/Vacuum Valve should not be considered as relief for shock conditions which develop elsewhere in the system. However, actual field tests prove the Surge Check Unit may protect the Air/Vacuum Valve in cases where it may be destroyed by severe shut-off shock.

This protection far outweighs the small cost of the Surge Check Unit when you consider the tremendous field damage that can result from an Air/Vacuum Valve failure.

Handling and Storage

Lifting the valve improperly may damage it. Do not fasten lifting devices to piping or attached components. Lift the valve with slings, chains or cables fastened around the valve body, or fastened to bolts or rods through bolt holes in the flanges.

If installation will be delayed, place valve indoors in secure, weather tight storage. If temporary outside storage is unavoidable, make sure a vermin proof rain cover (water shedding tarp, etc.) is secured around/over the valve to keep off rain and mud. Skid and set the assembly on a flat, solid, and well drained surface for protection from ground moisture, runoff and pooled rain water.

Installation

The Slow Closing Air/Vacuum Valve should always be installed in a vertical position. An isolation valve between this unit and the transmission (pipeline) system is recommended. Where to use:

- High points in pipelines where the hydraulic gradient and flow conditions are such that a negative pressure can possibly occur.
- High points on sections of pipeline having water velocities in excess of 10 F.P.S.
- Adjacent to any quick closing valve in a pipeline such as a check or gate valve where vacuum can occur upon closure.
- On the discharge of larger deep well turbine pumps between the pump and the check valve.

Note to Engineer: If an Air/Vacuum Valve is to be installed inside a pump house, use threaded or flanged connections and pipe back into the well or to outside. This will greatly muffle the high noise level caused by the air being discharged and provide for drainage of any small amount of water or water vapor that may accumulate.

- Before installation, remove foreign material such as weld spatter, oil, grease, and dirt from the pipeline.
- Prepare pipe ends and install valves in accordance with the pipe manufacture's instructions for the joint used.
- Tighten the flange bolts or studs in a crisscross pattern and minimum of four stages.

Fusion/Powder Coated Valves

**CAUTION!**

Valves with fusion/powder coated exterior paint require flat washers to be installed under the flange nuts when installing the valve to the pipeline flange to prevent the paint from cracking or chipping.

Maintenance

The APCO ACS-1200/1700 Slow Closing Air/Vacuum Valve is automatic in operation and requires very little maintenance. It should always be installed in a vertical position.

A semi-annual visual inspection for leakage is recommended. A malfunction of the Air/Vacuum Valve can be identified by the seepage of water through the exhaust port, while that of the Surge Check Valve would be a substantial amount of spillage through the Air/Vacuum exhaust port during pump start-up. Should a malfunction occur, the following steps should be taken to repair the valve;

Disassembly Procedure

See Figures 1 and 2 for part identification.

Air Release Valve

**WARNING!**

Servicing the Air/Vacuum Valve while the pipeline is under pressure can cause personal injury or equipment damage. Relieve pipeline pressure or shut off isolation valve before servicing the Air/Vacuum Valve.

1. Relieve pipeline pressure or shut off isolation valve before servicing the Air Valve.
-

**WARNING!**

Do not completely remove pipe plug or cover screws while the valve is under pressure.

2. Slowly remove pipe plug in cover (1) to relieve internal pressure
3. Remove cover screws (4) and cover (2). All internals are attached to cover.
4. If cover gasket (3) is torn or damaged, clean flange surfaces of cover (2) and body (1).
5. Inspect sealing surface of needle (7) and seat (6) for nicks, wear or sediment coating from chemicals in the media.
6. Clean or replace needle (7) and seat (6).
7. Inspect float (14) to insure that it is not damaged or that it does not have liquid in it.
8. Inspect all connections of linkage for excessive wear.
9. Clean all surfaces before re-assembly.

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Maintenance (Continued)

Air/Vacuum Valve

10. Check to see if foreign matter or dirt is preventing float (14) from seating properly against seat (6). Clean as necessary.
11. Remove cover screws (4) and cover (2).
12. Remove seat screws (16) and lift out seat (6) from recess in cover (2).
13. Inspect seat (6) and float (14) seating surfaces for damage. Replace if necessary.
14. Inspect all other parts of valve such as guide bushings (26 & 43) and bumper (40).

Surge Check Valve

15. Remove studs (9) and nuts (10) and remove Air/Vacuum Valve body (1) from Surge Check Valve body (1).
16. Loosen seat retaining screw (7), located on the face of seat (2). Push down plug (3), to compress spring (4), then release plug to knock out seat.
17. Remove plug (3), spring (4), retaining ring (5B) and bushing (5A) from body (1).
18. Clean all surfaces before re-assembly. Replace all defective parts.

Assembly Procedure

See Figures 1 and 2 for part identification.

Surge Check Valve

1. Install the parts inside the body (1) in the following order:
 - a. Bushing (5) at the center of the hub.
 - b. Spring (4) centering on the bushing (5).

Note: If conical spring, smaller diameter of spring should fit the outside diameter of bushing.

- c. Plug (3) with the concave side facing upward.
 - d. Seat (2). Tighten seat retaining screw (7) when flush with flange face.
2. If gasket (8) is damaged, install new gasket making sure gasket fully covers the seat (2) face.
3. Assemble Air/Vacuum Valve body (1) to Surge Check Valve body (1).

Air/Vacuum Valve

4. Clean surface of recess in cover (2) and install seat (6) with seat screws (16). Buna-N seat hardness (Durometer) should correspond to operating pressure as shown in Table A:

APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves

Maintenance (Continued)

Table A: Buna-N seat hardness (Durometer)

Valve Size	Working Pressure, psi				
	0-10	11-50	51-100	101-200	201-300
4"	45	65	85	85	Metal
6"	65	85	85	85	Metal
8"	65	85	85	85	Metal
10"	65	85	85	85	Metal
12"	65	85	85	85	Metal
14"	Metal	Metal	Metal	Metal	Metal
16"	Metal	Metal	Metal	Metal	Metal
18"	Metal	Metal	Metal	Metal	Metal
20"	Metal	Metal	Metal	Metal	Metal
24"	Metal	Metal	Metal	Metal	Metal

Note: Stainless Steel metal seats have Buna-N molded ring.

5. Install bumper (40) and float (14) in place.
6. Assemble cover (2) and gasket (3) to body (1). Tighten cover screws (4) opposite each other in rotation.

Air Release Valve

7. Assemble cover (2) assembly to body (1), installing new gasket (3) if necessary. Tighten cover screws (4) opposite each other in rotation.
8. Install and secure pipe plug in cover (2).
9. If valve was removed from pipeline, place valve in pipeline, and open isolation valve on inlet to Air Valve. Valve is now back in service.

Operation

The Surge Check Unit operates on the interphase between the kinetic energy in the relative velocity flows of air and water. The Surge Check is a normally open valve, spring loaded, so that air passes through unrestricted. When water rushes into the Surge Check unit, the disc begins to close against the spring tension and reduces the rate of flow of water into the air valve by means of throttling holes in the disc. This ensures normal gentle closing of the Air/Vacuum Valve regardless of the initial velocity flows involved and minimizes pressure surges when the valve closes.

As soon as the Air/Vacuum Valve is closed, the pressure on both sides of the Surge Check Valve disc equalizes and the disc automatically returns to its open position. This means the Air/Vacuum Valve does not need an incipient vacuum to open, but can open at any time the water level drops and line pressure approaches atmospheric and immediately have full re-entry flow of air into the pipeline before a vacuum can form.

This type of valve **should not** be considered as a relief for shock conditions which develop elsewhere in the system. However, actual field tests prove the Surge Check Unit may protect the Air/Vacuum Valve where it may be destroyed by severe shut-off shock.

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Drawings

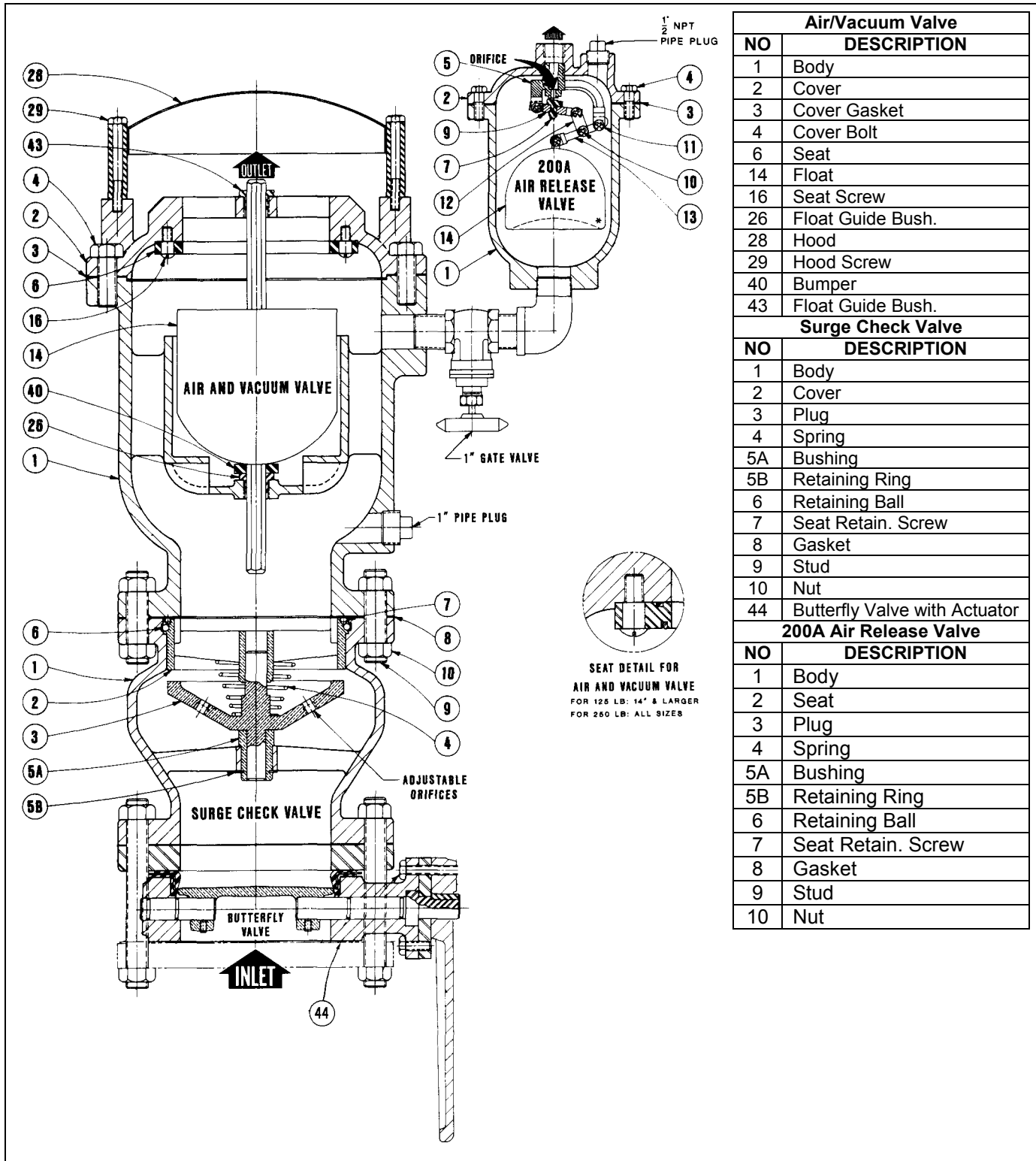


Figure 1: ACS-1200 Combination Slow Closing Air/Vacuum Valves

APCO ACS-1200/1700 Slow Closing Air/Vacuum Valves

Drawings (Continued)

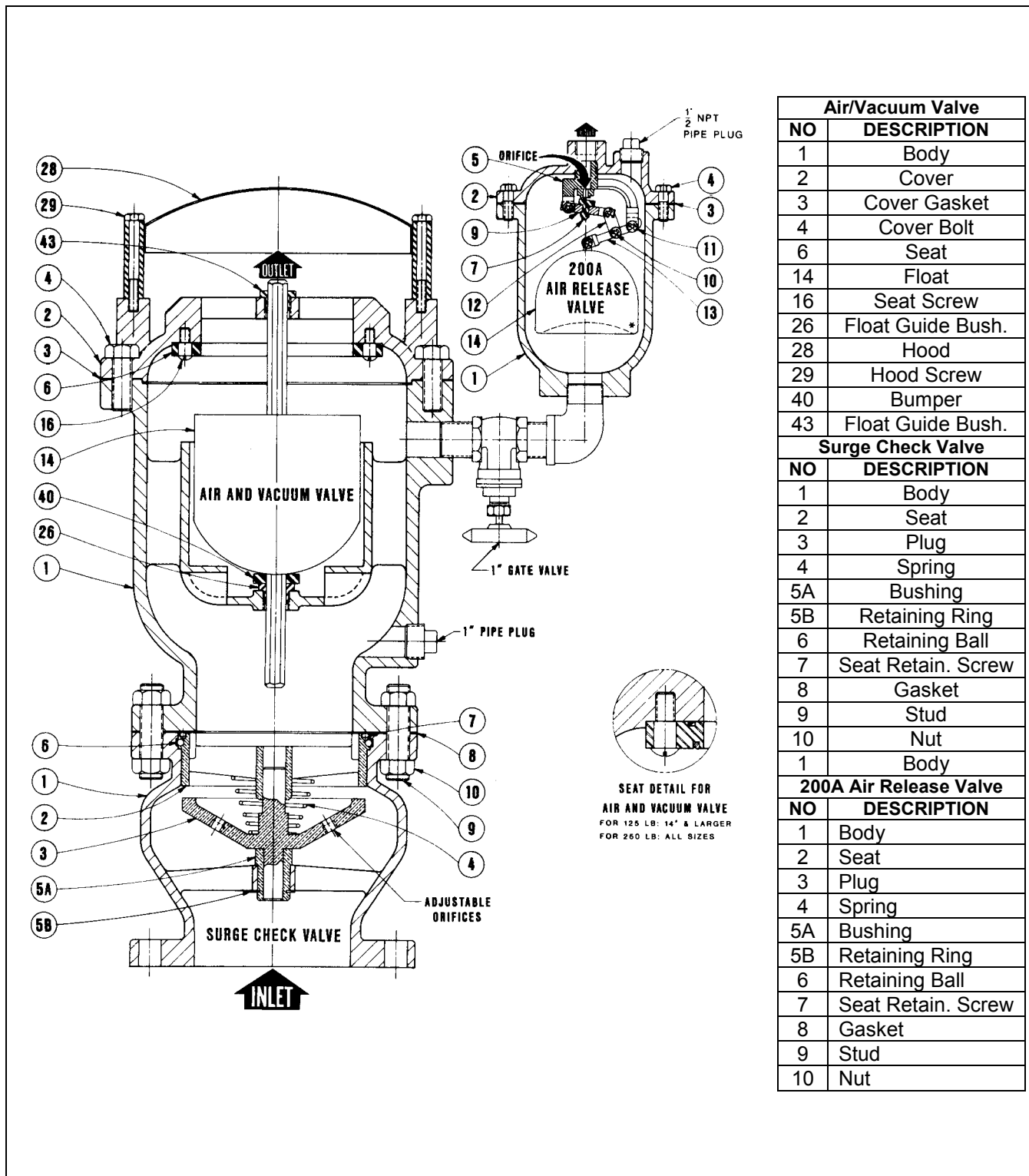


Figure 2: ACS-1700 Combination Slow Closing Air/Vacuum Valves

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Troubleshooting

Condition	Possible Cause	Corrective Action
Valve leaks at flange joint.	Loose flange bolting.	Tighten flange bolting.
	Blown flange gasket.	Replace flange gasket.
	Miss-alignment or damage to field piping and supports.	Adjust miss-alignment or repair piping or supports.
	Damaged flange face/s or improper flange connections.	Repair flange, replace valve body or adjust flange connections.
Valve leaks out of Outlet port.	Dirty needle and/or seat.	Clean needle and/or seat.
	Worn needle and/or seat.	Replace needle and/or seat.
	Dirty seat and/or float.	Clean seat and/or float.
	Worn seat and/or float.	Replace seat and/or float.
	Line pressure is under 10 psi.	Replace seat with softer seat.
	Float linkage is dirty.	Clean float linkage.

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Sales and Service

For information about our worldwide locations, approvals, certifications and local representative:

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