

## TECHNICAL BULLETIN

Prepared By: Mike Macdonald	Pages: 3
Reference: Atwood & Morrill FREE FLOW REVERSE CURRENT VALVE®	

**Subject: Free Flow Reverse Current Check Valves**

**Bulletin No. 2.0** 08/10

**PRODUCT** Free Flow Reverse Current, Extraction Steam Check Valves with Internally Balanced Shaft (IBS). Most A&M® valves 12" and smaller have the IBS design. IBS design allows a free swinging disc without packing friction.

**PURPOSE** Our field service reports have noted improperly adjusted A&M® IBS Check Valves. Visual inspection of the valve, while in service, can help maintenance personnel identify incorrect air cylinder piston rod adjustments. This bulletin provides instructions to identify and correct improper setups to avoid the possibility of valve failure and help prevent damage to steam turbines.  
**Quick, In-Line, Visual Inspection Can Identify Potential Problems.**

**BACKGROUND** The FREE FLOW REVERSE CURRENT VALVE® features a two step closing method. First it acts as a swing check valve. Second, the side air cylinder provides a positive closure mechanism. The cylinder does not open the valve.

When the side air cylinder is energized (piston extended), the shaft and shaft dog are turned to allow the disc to act as a free swinging check. It will open under positive flow conditions. The disc will close under its own weight when the flow has stopped or a flow reversal occurs. Releasing the air from the cylinder allows the spring to give a closing force to the disc.

Check Valves must be setup correctly to operate and protect turbine.

**VISUAL INSPECTION** A valve which has been improperly setup can quickly be spotted by looking at the Inspection lever arm adjustment nuts. Wide Gaps between the flange nut faces and lever arm indicate that the valve may not function as designed. The valve needs to be reset as soon as possible.

**Note:** Adjustments for proper setup can only be done with the valve cover removed.

Quick visual inspection is not an assurance that the valve has been properly set, as the exact disc position is not known.



*Incorrect Setup: more than 1/8" between bottom Flange Nut Face and Lower Arm.*

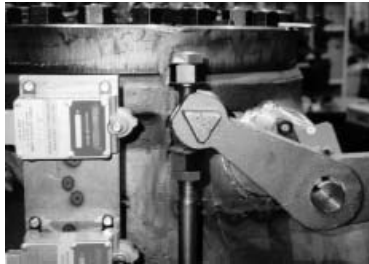
**External Visual Inspection is NOT a Substitute for Internal Inspection by a Trained Technician!**

**RECOMMENDED INSPECTION**

Verify that the air cylinder is “open”, i.e., the normal air supply pressure is being applied underneath the air cylinder piston and the lever arm should be set: push rod is fully extended.

- **Tight Against the Bottom (Cylinder) Side Flanged Nut**
- **Within 1/8” (One Turn) Clearance from the Top Flanged Nut**

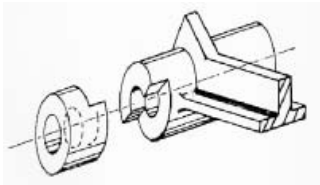
Inspect the clearance between the lever arm and the flange nuts on the air cylinder piston rod.



*Correct Setup: Flange Nut Face within 1/8” of Lever Arm on IBS FREE FLOW REVERSE CURRENT VALVE®*

The valve will require adjustment during the next available shutdown if these conditions are not met. **Do not make any adjustments at this time.**

**ADJUSTMENT PROCEDURE FOR CYLINDER PISTON, NUTS AND LEVER ARM**



- Remove the valve cover.
- Remove the top flanged and jam nuts.
- Apply 70-100 psi air below the piston of the operating cylinder. This will extend the piston rod.
- Lift the disc directly by pulling upwards on the disc arm. Do not raise the disc using the lever assembly.
- Fully open the disc assembly until the disc arm stop firmly contacts the body. Ensure that the disc itself is not contacting the valve body.
- With the disc in the fully open position, rotate the shaft counterclockwise (move the lever assembly in the closed direction), until the shaft dog barely contacts the disc arm cutout. This places the lever in the correct position.
- Thread both the upper and lower flanged nuts within one turn (1/8”) of contact with the shaft lever assembly and lock in place using the jam nuts.
- Lower the disc to the body seat.
- Exhaust the air pressure from the cylinder. The upper flanged nut should now force the lever connection down which in turn engages the shaft dog to the disc arm and firmly holds the disc against the body seat.
- Verify that the shaft dog does not interfere with proper seat to disc contact.
- Verify that the lever arm strokes easily between the two flanged nuts. If the lever arm does not stroke easily, this indicates that the valve packing is too tight, or that there is some misalignment of the piston rod and lever arm.
- Reinstall the valve cover using a new gasket.

**REPLACEMENT PARTS**

The following valve replacement parts should be available at the beginning of a scheduled repair:

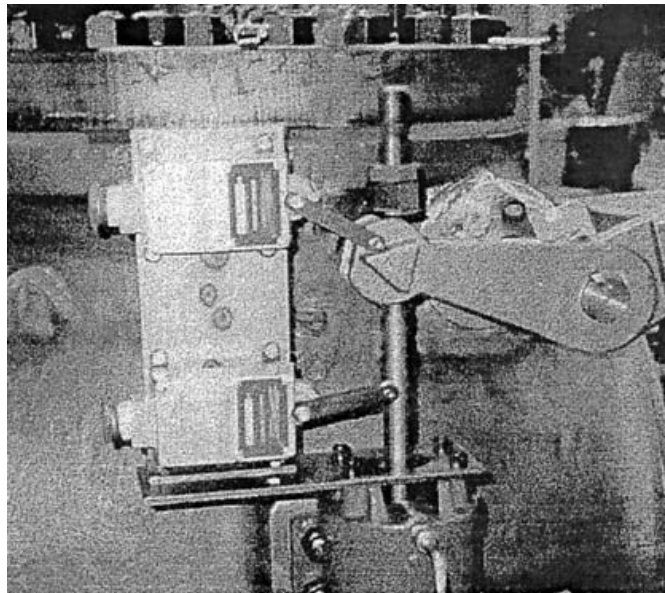
**LARGER VALVES - NOT IBS**

- Cover Gasket
- Shaft Dog Key
- Shaft Dog
- Lever Arm Key
- Packing

**RECOMMENDED INSPECTION**

A&M® Valves 14” and larger do not normally use the IBS design. These valves have only one set of adjusting nuts on the top side of the lever arm.

If you encounter valves larger than 12” with an upper and lower adjusting nut, contact our office for resolution. This arrangement may be the result of incorrect maintenance or a special valve design.



**RECOMMENDATIONS**

Please contact WVC at 978-744-5690 with any questions or to schedule a service appointment.

ATWOOD & MORRILL®, A&M®, FREE FLOW REVERSE CURRENT VALVE® and TRICENTRIC® are registered trademarks of Weir Valves & Controls USA Inc.