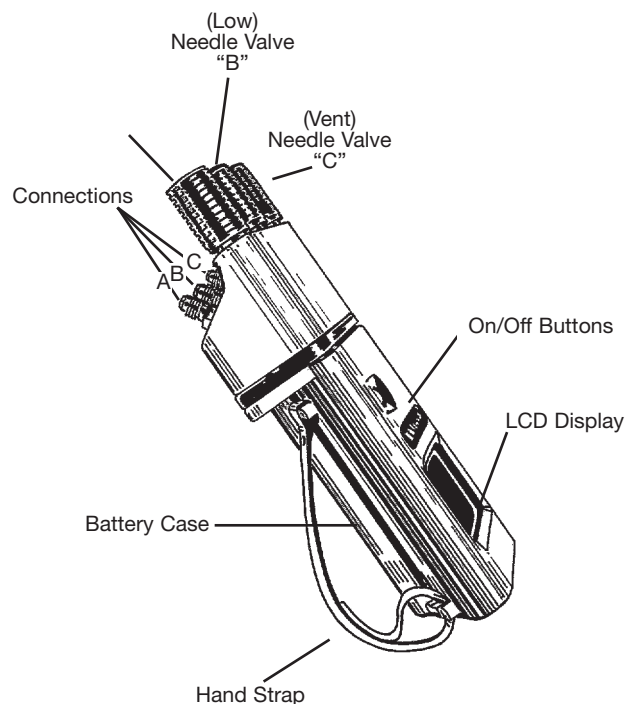


Watts TK-99D

Digital Backflow Preventer Test Kit Delta Lite™

Features

- Compact hand-held size for ease of use
- State-of-the-art accuracy of .25% of full scale for reliable testing of all types of backflow prevention assemblies.
- Easy to read high contrast LCD Display
- Low Battery Indicator shows when batteries are needed
- Automatic shutdown feature conserves battery life by turning test kit off after 15 minutes without pressure on the gauge.
- Large 5/8" Differential Character Display insures accurate reading of the gauge
- Durable High Impact ABS case provides water resistance
- Adjustable hand and shoulder straps for field use
- Color-coded hoses to assist tester in using test kit
- Corrosion resistant Stainless Steel needle valves with renewable seats
- Inlet pressure readout to assist in troubleshooting
- Separate "A" and "B" readings for duplex type readings



Specifications

- Maximum working pressure - 200 PSIG
- Maximum working temperature - 210°F
- Differential Pressure Readout - 0-200psi
- Separate inlet pressure readout - 0-200psi
- Adapters included
- Hoses - Three 36" color-coded hoses with female swivel couplings
- One moisture resistant instruction guide
- High contrast LCD display
- .25% Full scale accuracy
- Needle Valves - Three Stainless Steel needle valves
- Adjustable packing gland
- High impact ABS housing

Note: To replace batteries remove (2) battery case set screws. Test Kit serial number is located on inside of battery case.

Caution: To avoid freeze damage to the test kit, it should be stored in a dry, warm area when not in use.

The Watts TK-99D hand-held digital test kit is an advanced test instrument designed to test PVB'S, SVB'S, DCVA'S, DCDA'S, RP'S, and RPDA'S. The TK-99D features a high contrast LCD display with a large 5/8" height Differential Character. This compact test kit features .25% Full Scale Accuracy in addition to a low battery indicator and an automatic shutdown feature to conserve battery life.

WATTS®

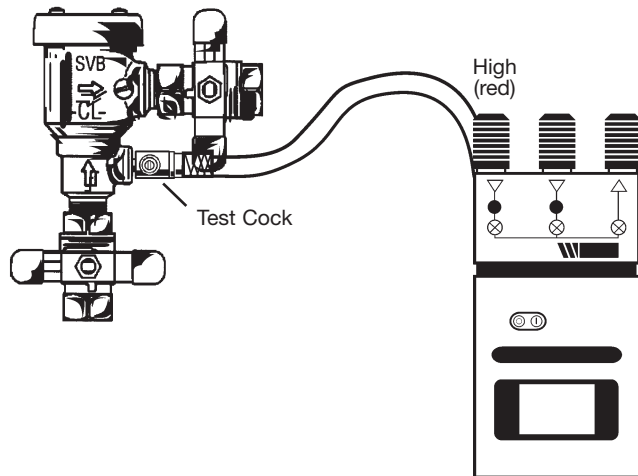
Test Procedure for Anti-Spill Vacuum Breaker

The following test procedure is one of several that is recognized throughout the United States for verification of the functioning of Backflow Preventers.

The following procedure is not a specific recommendation. The Watts series of test kits are capable of performing any of the recognized Backflow Preventer test procedures.

Note: For all of the following tests the test kit must be held at the same level as the assembly being tested.

- A. Before starting test, all needle valves on the test kit must be closed.
- B. Flush test cocks before testing.



Test No. 1 and 2, Watts 008QT shown

Turn Test Kit On

Test No. 1 - Differential Test

Requirement: Differential pressure across check must be 1.0 PSID or above.

- Step 1 Remove two screws on top of hood then remove hood.
- Step 2 Install hose between test cock and connection "A" high side (red) of test kit.
- Step 3 Open test cock then open needle valve "A" and vent or bypass needle valve. Bleed air from hose then close vent needle valve.
- Step 4 Close shutoff valve No. 2 then shutoff valve No. 1 on the assembly.
- Step 5 Slowly unscrew bleed screw on spill proof vacuum breaker body to relieve pressure down stream of check (about 3 turns)
- Step 6 When dripping from bleed screw stops and gauge stabilizes, record the differential pressure and re-tighten bleed screw.

Test No. 2 - Air Inlet - Vent Opening

Requirement: Air inlet must start to open when supply pressure is 1.0psi or above. Air inlet must be fully open when supply pressure is atmospheric.

- Step 7 Slowly open vent needle valve until gauge reads 1.0 PSID then close vent needle valve holding pressure at 1.0 PSID.
- Step 8 Visually inspect that the vent on top is slightly open, about 1/32", to pass test.
- Step 9 Open vent needle valve fully until dripping from vent connection stops.

Step 10 Visually inspect that the vent is fully open to pass test.

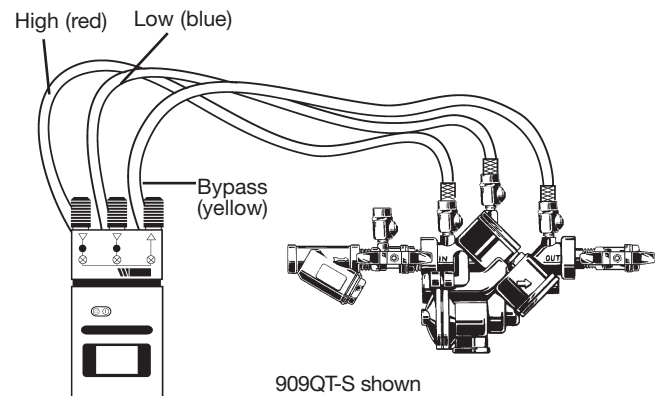
Step 11 Replace hood and two screws on top of assembly.

Step 12 Restore valve to original working condition.

Note: After test, leave all valves on test kit must be fully open and hose removed to prevent freeze damage to test kit.

Test Procedure for Reduced Pressure Assembly

- A. All needle valves must be closed on test kit.
- B. Open test cock No. 4 and flush test cocks Nos. 1, 2 and 3 on reduced pressure assembly. Close test cock No. 4.
- C. Attach hoses as shown. High side hose between TC #2 and low side hose to TC #3 and close No. 2 shutoff. Bleed air from kit by opening TC #4 to establish flow through the backflow preventer and prevent premature opening of the relief valve. Open TC#3, needle valve "B", and vent needle valve. Close needle valve "B". Open TC#2 and needle valve "A", close needle valve "A" and TC #4. Attach vent (yellow) hose to TC#4 and vent needle valve. Open TC #4 and loosen hose at vent needle valve connection bleeding air from test kit. Re-tighten hose to vent needle valve.



909QT-S shown

Turn Test Kit On

Test No. 1 - Check Valve No. 2

Purpose: To test check valve No. 2 for tightness against reverse flow.

Requirements: Valve must be tight against reverse flow under all pressure differentials.

- Step 1 With vent needle valve open, slowly open needle valve "A". (keep "B" closed)
- Step 2 Indicated pressure differential will decrease slightly. If pressure differential continues to decrease (until the relief valve opens) the No. 2 check valve is reported as "leaking".

Test No. 2 - Shutoff Valve No. 2

Purpose: To test shutoff valve No. 2 for tightness.

- Step 1 After passing Test No. 1, continue to test No. 2 by closing test cock No. 2.
- Step 2 The indicated pressure differential will decrease slightly. If pressure differential continues to decrease (approaching Zero), the No. 2 shutoff valve is reported to be leaking. Note: A leaking No. 2 shutoff will give a false reading in tests No. 3 and 4.

Test No. 3 - To test No. 1 check valve

Purpose: To test check valve No. 1 for tightness.

Requirements: Valve must be tight against reverse flow under all pressure differentials.

- Step 1 Close needle valve "A" high side (red) and open test cock No. 2

- Step 2 Close test cock No. 4. Disconnect bypass hose (yellow) at test cock No. 4. Close vent needle valve.
- Step 3 Open needle valve "B" and vent or bypass needle valve, bleeding to atmosphere, then closing needle valve "B" restores the system to a normal static condition.
- Step 4 Observe the pressure differential gauge. If there is a decrease in the indicated value, the No. 1 check valve is reported as leaking.

Test No. 4 - Pressure Differential Relief Valve

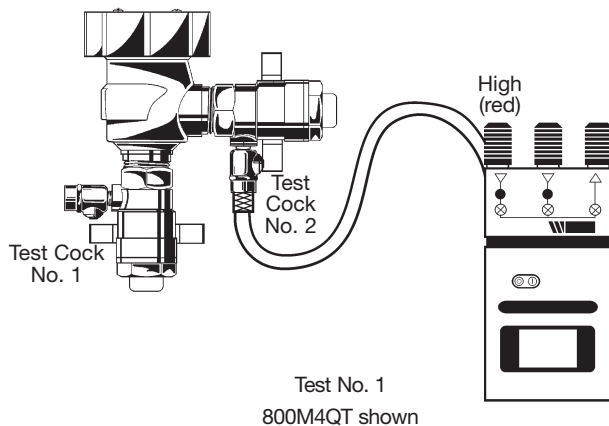
Purpose: To test Operation of pressure differential relief valve
 Requirements: The pressure differential relief valve must operate to maintain the "zone" between the two check valves at least 2psi less than the supply pressure.

- Step 1 Close vent or bypass needle valve
- Step 2 Open needle valve "A" high side.
- Step 3 Open needle valve "B" low very slowly until the differential reading starts to drop.
- Step 4 Hold the valve at this position and observe the reading at the moment the first discharge is noted from the relief valve. Record this as the opening differential pressure of the relief valve. Note: it is important the differential reading drop slowly.
- Step 5 Close test cocks Nos. 2 and 3.
- Step 6 Use bypass hose (yellow) to relieve pressure from test kit by opening needle valve "A", "B", and vent needle valve.
- Step 7 Remove all test equipment and open No. 2 shutoff valve of the device.

Test Procedure for Pressure Type Vacuum Breaker

Note: For both of the following tests the test kit must be held at the same level as the assembly being tested.

- A. Before starting test all needle valves must be closed.
- B. Flush test cock #2 and #1.



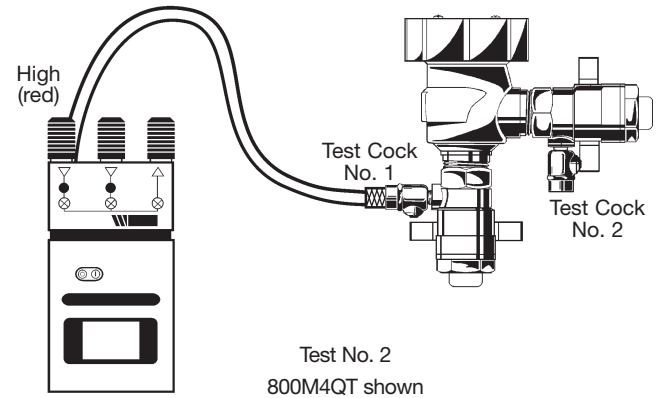
Turn Test Kit On

Test No. 1 - Air Inlet

Requirement: Air inlet must start to open when down stream pressure is 1.0psi or above.

- Step 1 Remove two screws on top of hood and remove hood.
- Step 2 Install hose between test cock No. 2 and connection "A" on high side(red) on test kit.
- Step 3 Open test cock No. 2 and needle valve "A" high side (red) on test kit.
- Step 4 Open vent needle valve and bleed air from hose. Then close vent valve.

- Step 5 Close shutoff valve No. 2 then shutoff valve No. 1.
- Step 6 Slowly open vent needle valve just as air inlet opens. Record differential pressure.
- Step 7 Close test cock No. 2 and remove hose.
- Step 8 Close vent needle valve.
- Step 9 Open shutoff valve No. 1.



Test No. 2 - Test check Valve Pressure Drop

Requirement: Supply pressure drop must be 1.0 PSID or more when water flow stops from test cock No. 2.

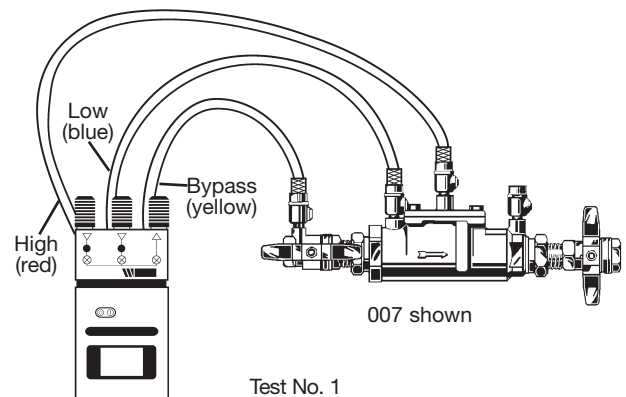
- Step 10 Install hose between test cock No.1 and connection "A" high side (red) on test kit.
- Step 11 Open test cock No. 1 and bleed valve by opening vent needle valve. Bleed air from hose then shut vent needle valve
- Step 12 Close shutoff valve #1.
- Step 13 Open test cock No. 2. When flow of water out of test cock No. 2 stops, the differential reading is the pressure drop reading.
- Step 14 Close test cock No. 1 and test cock No. 2. Remove hoses.
- Step 15 Replace hood and two screws on top of hood.

Note: After test, all valves must be open and hoses removed to prevent damage to test kit.

Test Procedure for Double Check Valve Assembly

- A. Before starting test, all needle valves on test kit must be closed.
- B. Flush test cocks before test.

Turn Test Kit On



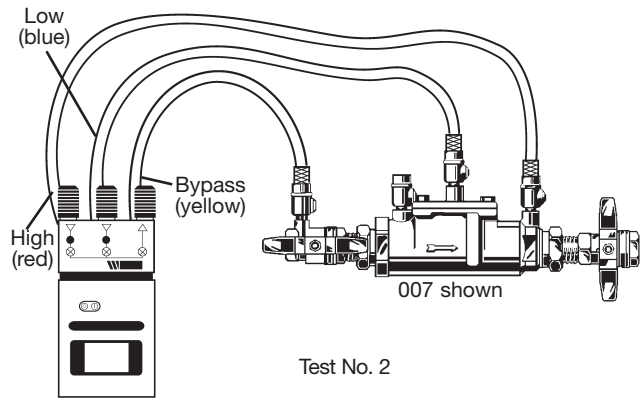
Test No. 1 - Check Valve No. 1

- Step 1 Insure shutoff No. 1 is open, shutoff No. 2 is closed.
- Step 2 Install high side hose between connection "A" high side and test cock No. 3, low side hose between "B" low side and test cock No. 2 and open both test cock No. 2 and No. 3.
- Step 3 Open vent needle valve and bleed air by opening needle valve "A". Close "A" then open needle valve "B" bleeding air and then closing "B".
- Step 4 Connect bypass hose between vent needle valve and loosely connect to test cock No. 1. Open needle valve "A" high side and vent needle valve to vent air from bypass hose. Tighten bypass hose at test cock No. 1, open test cock No. 1.
- Step 5 Close shutoff No. 1. Slowly loosen hose connection at TC# 2 until differential gauge rises to about 2psi then tighten. If the differential reading does not decrease record check valve as tight.
- Step 6 Close all test cocks. Then close needle valves "A", "B", and vent needle valve.

Test No. 2 - Check Valve No. 2

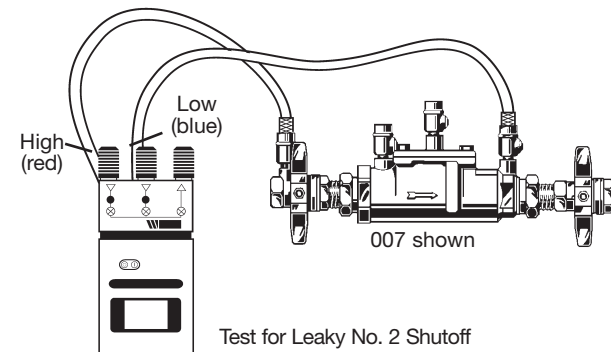
- Step 7 Move the high side hose to test cock No. 4, low side hose to test cock No. 3 and open both test cock No. 3 and 4. Remove bypass hose from test cock No. 1, open shutoff valve No. 1.
- Step 8 Open vent needle valve and needle valve "A" to bleed air. Close needle valve "A". Open needle valve "B" to bleed air and then close "B" and vent needle valve.
- Step 9 Connect bypass hose loosely to test cock No. 1. Open needle valves "A" high side and vent needle valve to relieve air from the bypass hose. Tighten bypass hose at test cock No. 1, open test cock No. 1.
- Step 10 Close shutoff No. 1. Slowly loosen hose connection at TC#3 until differential gauge rises to about 2psi, then tighten. If the differential reading does not decrease record check as tight. Close all test cocks and remove hoses.

Note: The assembly will fail both the first and second check valve tests above, if shutoff No. 2 leaks excessively. To test for a leaky No. 2 shutoff, use the following procedure.



Test for Leaky No. 2 Shutoff

- Step 11 Connect the high side hose to test cock No. 1, low side hose to test cock No. 4. Open test cocks No. 1 and 4. Close shutoffs No. 1 and 2.
- Step 12 Close vent needle valve. Open needle valve "A" high side, then open needle valve "B" low side + turn, loosen hose at test cock No. 4 to remove air. Retighten hose.
- Step 13 If the differential gauge rises above 0 there is excessive leakage at shutoff No. 2 and it must be replaced to test the assembly.



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