

Explanation of Symbols

WARNING



Potential hazard situation which can cause serious personal injury or death if the safety instruction is not observed.

CAUTION



Potential hazard situations that can cause minor or moderate personal injury if the safety instruction is not observed.

CAUTION

Potential hazard situations that can cause material loss if the safety instruction is not observed.

! Important instructions, information or tips that you should always observe.

- List
- Step

! Carefully read through all the safety information before starting the testing.

General safety instructions

WARNING



Only qualified skilled personnel with specific system knowledge are authorized to perform the device testing at the test bench.

Comply with the company and national accident prevention/health & safety regulations.

CAUTION



Danger of bodily injury

Undo the screw plugs, hoses and equipment parts only when the respective lines have been vented.

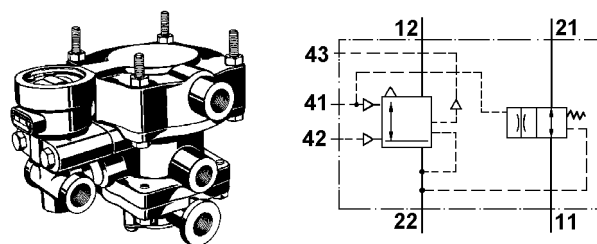


Fig. 1 Trailer Control Valve 973 002 ... 0 / functional symbol

Test instruction for device 973 002 ... 0

500	505
501	508
503	

Equipment/tools required

- Test bench 435 197 000 0 or adequate testing equipment (see fig. 3 and 4)
- Rake angle (with fixing nuts M8 (2x) for devices), see the adjacent diagram
- Two tees
- Soapsuds and brush
- Nozzle: \varnothing 1.3 mm



Additional documents required

- ! The documents are available on the WABCO website <http://www.wabco-auto.com> - simply enter the product or document number in INFORM.
- Test Bench 435 197 000 0 - Operating Instructions
- General Repair and Test Information

Testing

WARNING Do not install a repaired device in the vehicle unless it has passed the following tests.



! Perform the following test steps in the specified order.

Never start testing until you have read and understood all the information required for the test.

Test the device on a calibrated test bench only.

In case of doubt, use test values specified by the vehicle manufacturer.

While testing the device, always adhere to the contents of this test instruction.

Default value V and test value P see table 3.

If test values do not fit, the device must be readjusted.

Reservoir pressure is 8 bar max.

1 External inspection

- Inspect the device for external visible damage.
- Visually inspect all the device's ports for blockages.

2 Preparations

Test bench

- Before starting each test, ensure that the stopcocks are in their correct normal position (see table 1). The output side of pressure regulator D must be unpressurised.

Shut-off cocks	A	B	C	F	L	V	2	3	4	6	7	11	12	21	22
open	x		x										x		x
closed		x		x	x	x	x	x	x	x	x		x		x

Table 1: Normal position of stopcocks on the test bench

! If you do not have test bench 435 197 000 0 you must test the device according to the following testing diagram (see fig. 3).

CAUTION Never directly clamp the device in the vice. This could damage the device.

- Fix the rake angle on the device and clamp into the bench vice.
- Connect the device to the test bench ports (see fig. 2) or according to the test diagram.

! Test bench

Set pressure regulator D to 8 bar.

CAUTION **Danger of bodily injury**

Ensure that the plug-in connections on the test bench and the device are securely inserted.

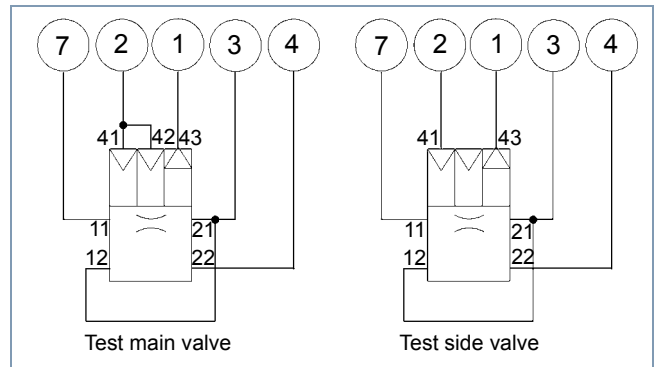


Fig. 2 Connection diagram for test bench 435 197 000 0

3 Test main valve

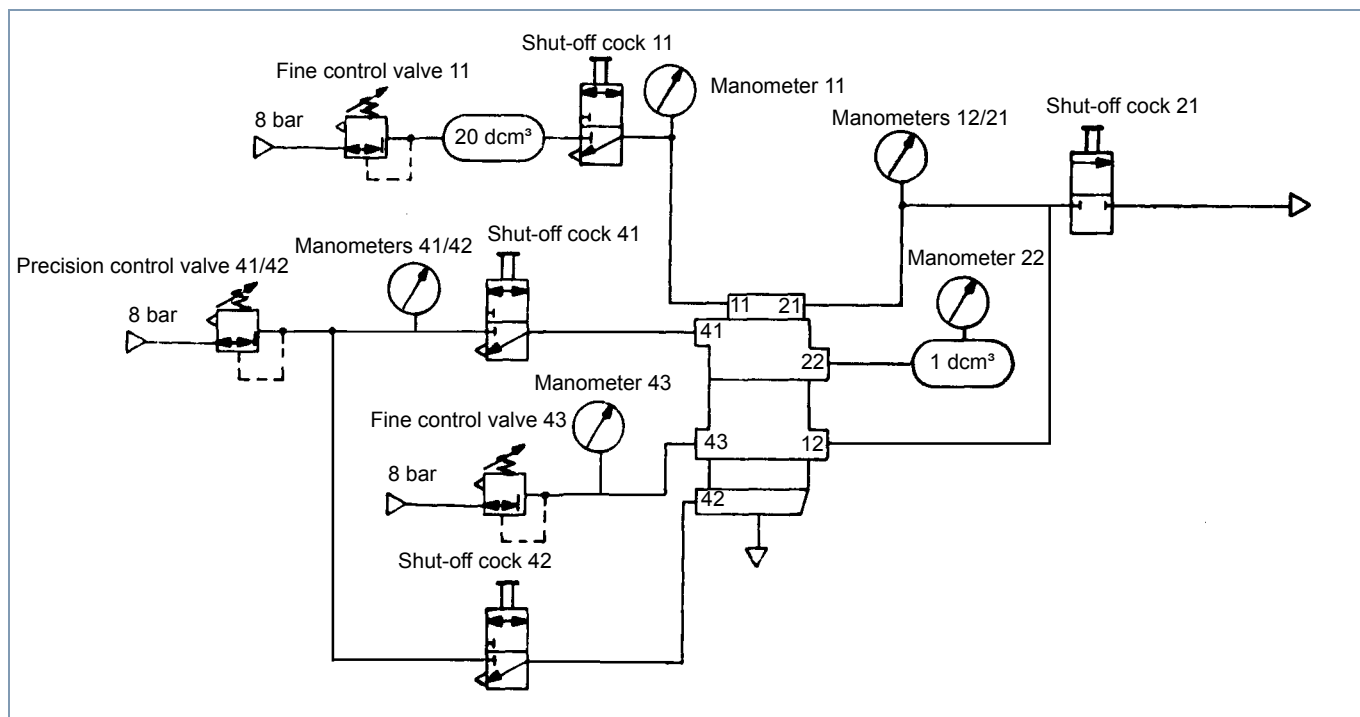







Fig. 3 Test diagram "Main Valve"

Test step	Manometer (M)						Comment
	Default value				Test value		
	M 11 bar	M 41 bar	M 42 bar	M 43 bar	M 12 / M 21 bar	M 22 bar	
Shut-off cocks 11, 12/21 and 43: Open the pass.	0	0	0	0	0	0	
Fine control valves 11 and 43: Increase pressure slowly.	8	0	0	8	8	0	
Fine control valve 43: Increase and lower the pressure rapidly twice.	8	0	0	8...0	-	-	M 22 (test bench: Manometer 4) must display an immediate rise or drop in pressure.
Check for leaks Check tightness at exhaust of the shut-off cock 42 and at the exhaust of the device.	8	0	0	8	-	-	Permissible leakage: 8 cm ³ /min WARNING Never install a leaking trailer control valve on the vehicle. 

Test step	Manometer (M)						Comment
	Default value			Test value			
	M 11 bar	M 41 bar	M 42 bar	M 43 bar	M 12 / M 21 bar	M 22 bar	
Fine control valve 43: Increase pressure slowly.	8	0	0	≥6.6	-	>0	M 22 (test bench: M 4) must indicate pressure.
	8	0	0	6,6...0	-	-	M 22 (test bench: M 4) must display an immediate rise in pressure.
Check for leaks Check tightness at exhaust of the shut-off cocks 41 and 43.	8	0	0	0	-	7,2...7,8	Permissible leakage: 8 cm ³ /min WARNING  Never install a leaking trailer control valve on the vehicle.
Fine control valve 43: Increase pressure slowly.	8	0	0	0...0,5	-	-	Start of drop in pressure at M 22 (Test bench: M 4).
Fine control valve 43: Increase pressure quickly.	8	0	0	0,5...7,7	-	-	M 22 (test bench: M 4) must display an immediate drop in pressure.
	8	0	0	7,1...7,7	-	0	
	8	0	0	8	-	0	
Shut-off cock 41: Open the pass.	8	0	0	8	-	0	
Fine control valve 41: Increase and lower the pressure rapidly twice.	8	0...8	0	8	-	0...8	M 22 (test bench: Manometer 4) must display an immediate rise or drop in pressure.
	8	8...0	0	8	-	8...0	
Fine control valve 41: Increase pressure slowly.	8	>0...≤0,3	0	8	-	>0	M 22 (test bench: M 4) must indicate pressure.
 Perform this step only for variant 501 and 505 :	8	2...3	0	8	-	P1	Value at M 22 (Test bench: M 4) adjust via adjusting screw 891 200 700 2 by venting device.
 Perform this step only for variant 505 :	8	8	0	8	-	-	
 Perform this step only for variant 505 : Fine control valve 41: Increase and lower the pressure rapidly three times.	8	8...0	0	8	-	-	
	8	0...8	0	8	-	-	

Test instruction for Trailer Control Valves

973 002 (E)

Test step	Manometer (M)						Comment
	Default value			Test value			
	M 11 bar	M 41 bar	M 42 bar	M 43 bar	M 12 / M 21 bar	M 22 bar	
<p>! Perform this step only for variant 505:</p> <p>Fine control valve 41: Lower and increase pressure.</p>	8	2...3	0	8	-	M41 0.2 0	Value at M 22 (Test bench: M 4) adjust via adjusting screw 891 221 250 4 by venting device (final adjustment).
Pressure progression test (upwards)	8	2...3	0	8	-	P2	
Fine control valve 41: Increase the pressure slowly until a change is detected at M 22 (test bench: M 4). Stop the pressure increase at this point and test M 22.	8	-	0	8	-	Pressure stage: max. 0.3 bar in comparison to the value in the line before.	
Fine control valve 41: Increase pressure slowly.	8	V3	0	8	-	P3	
Pressure progression test (upwards)	8	V4	0	8	-	-	Pressure display at M 22 (test bench: M 4).
Fine control valve 41: Increase pressure slowly.	8	3...2	0	8	-	P5	
Lower the pressure further until a change is detected at M 22 (test bench: M 4). Stop decreasing pressure at this point and test M 22.	8	-	0	8	-	Pressure stage: max. 0.3 bar in comparison to the value in the line before.	
Fine control valve 41: Carry on decreasing the pressure slowly.	8	0	0	8	-	0...0,1	Residual pressure
Shut-off cock 42: Open the pass.	8	0	0	8	-	-	


Test step	Manometer (M)						Comment
	Default value				Test value		
	M 11 bar	M 41 bar	M 42 bar	M 43 bar	M 12 / M 21 bar	M 22 bar	
Fine control valve 42: Increase pressure slowly.	8	0	0...1,4	8	-	>0	M 22 (test bench: M 4) must indicate pressure.
	8	0	8	8	-	≥7.4	
Fine control valve 41: Increase pressure slowly.	8	8	8	8	8	P6	
Check for leaks Check the tightness of the entire device (separation joints including exhaust).	8	8	8	8	8	P7	Permissible leakage: 8 cm ³ /min WARNING  Never install a leaking trailer con- trol valve on the vehicle.
Precision control valves 11, 41, 42 and 43: Reduce the pressure.	0	0	0	0	0	-	

Table 2: Test steps "Main Valve"

Test and default values

973 002 ... 0 Variant	P1	P2	V3	P3	V4	P5	P6	P7
500	-	M41-0.2	8	≥7.7	≥7.2	M41+0.2	≥7.7	≥7.7
501	M41+0.2±0.1	M41+0.2±0.1	7.5...8	8	≥7.2	M41+0.7 ⁰ _{-0.4}	-	-
503	-	M41-0.2	8	≥7.7	≥7.2	M41+0.2	≥7.7	≥7.7
505	M41+1	M41 ^{+0.2} ₋₀	7.2...7.8	8	7.2...7.8 ^{-0.8} _{-1.2}	M41+0.2	≥7.7	≥7.7
508	-	M41-0.2	8	≥7.7	≥7.2	M41+0.2	-	-

Table 3: Test and default values:

4 Test side valve

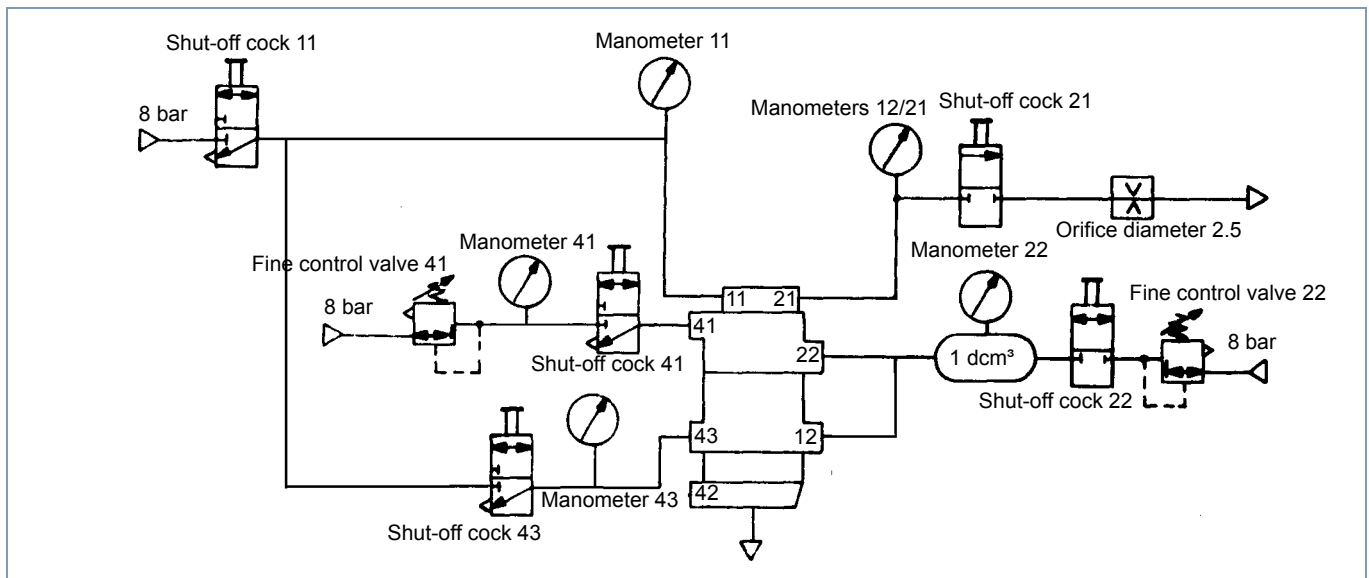


Fig. 4 Test diagram "Side Valve"

Test step	Manometer (M)					Comment
	Default value				Test value	
	M 11 bar	M 41 bar	M 22 bar	M 43 bar	M 12 / M 21 bar	
Shut-off cocks 12, 21 and 22: Open the pass. Shut-off cock 12/21: Shut the pass.	0	0	0	0	0	
Fine control valve 41: Increase pressure.	0	2,7	0	0	0	
Fine control valve 22: Increase pressure.	0	2,7	2,5	0	0	
Fine control valves 11 and 43: Increase pressure.	5,5	2,2	2,5	5,5	-	Pressure flows off via nozzle at connection 21:
Fine control valve 41: Increase the pressure until the pressure drops by 3.5 bar at M 12/21 (test bench: M 3). Wait for this value at M 12/21, then test M 41 (test bench: M 2).	-	2,7	2,5	5,5	M 12/21 - 3.5 bar in compari- son to the value in the line before.	
	-	4,5...5,3	2,5	5,5	-	
Precision control valve 11, 22, 41 and 43: Reduce the pres- sure.	0	0	0	0	0	

Test step	Manometer (M)					Comment
	Default value				Test value	
	M 11 bar	M 41 bar	M 22 bar	M 43 bar	M 12 / M 21 bar	
Shut-off cocks 12, 21 and 22: Shut the pass. Shut-off cocks 11, 41, 42 and 43: Open the vent.	0	0	0	0	0	Clean device and unclamp.

Table 4: Test steps "Side Valve"