

Test instruction

i Prior to testing read carefully the safety instructions.

Safety Instructions



WARNING

Testing the device on the test bench is to be made only by qualified personnel with a specific system knowledge.

Always start testing only after you have read and understood all information required for testing.

Test the device only on a calibrated test bench.

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

While testing the device implicitly observe this test instruction.



CAUTION

Comply with internal as well as national accident prevention regulations.

Unlock screws, hoses and equipment parts only when the respective lines of the test bench are vented.

Test instruction for device 461 307 ... 0

200	207	216	350	516
202	208	250	370	520
204	211	254	500	521

Symbols and signal terms




WARNING

Possible danger: Any non-compliance can result in severe personal injuries or death.



CAUTION

Possible danger: Any non-compliance can result in minor or medium severe personal injuries.

- Handling
- Enumeration
- i** Instructions, explanations, information, tips
-  Gauge indication

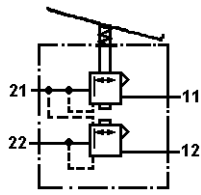
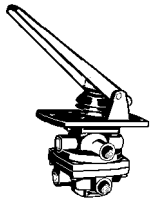


Fig. 1 + 2 Brake valve 461 307 ... 0, functional symbol

i Necessary equipment/tools

- Test Bench 435 197 000 0 or an adequate testing equipment
- Adequate equipment:
 - for clamping the brake valve,
 - for actuating the pedal with ° graduation.

i Additional documents:
(see www.wabco-auto.com => INFORM)

- Test Values 2/2:
to be found by entry of the product number in INFORM
- Test Bench - Operating Instructions:
435 197 000 0
- General Repair and Test Hints:
820 001 074 3 (de)
820 001 075 3 (en)
820 001 076 3 (es)
820 001 077 3 (fr)
820 001 078 3 (it)

Check sequence

i Perform test procedure as per specified sequence
Find test values P1 to P12 and G1 to G6 in document "test values 2/2".
Reservoir pressure is 8.0 bar max. / 7.0 bar min.



CAUTION

Before starting any test ensure that cut-off cocks are in their correct normal position (see table 1).

Cock	A	B	C	D	F	L	V	2	3	4	6	7	11	12	21	22
on	x												x		x	
off		x	x	x	x	x	x	x	x	x	x	x		x		x

Table 1: Normal position of cut-off cocks on the test bench

1. External evaluation

- Inspect device for external visible damage.
- Check all ports of the device for free passage by visual inspection.

2. Preparations

2.1 Adjustment arrangement of brake valves

- Assemble the brake valve except for the insertion of fully assembled graduating piston and the flange of the whole actuation.
- Measure dimensions a and b (see fig. 3), dimension $C = b - a$.

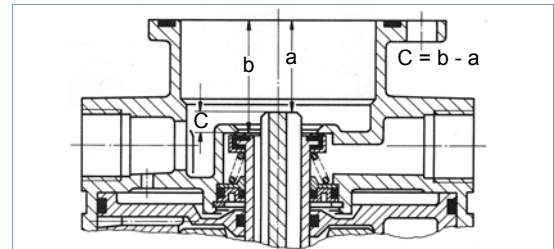


Fig. 3 Dimension C

- Adjust dimension $d = C + 0,8$ mm in the graduating piston by turning the set screw (see fig. 4).

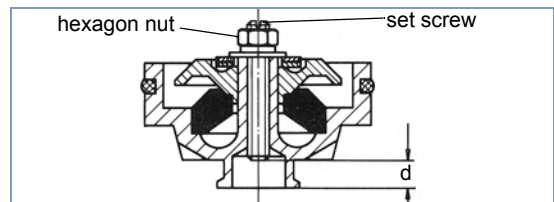


Fig. 4 Dimension d (Device with one rubber spring)

- Counter set screw by turning the hexagon nut (see fig. 4).

i The adjustment levels off also at devices with longer graduation travel (two rubber springs), see fig. 5.

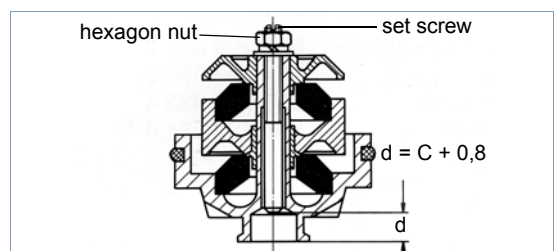


Fig. 5 Dimension d (Device with two rubber springs)

- Assemble the device.
- Fix device in clamping equipment.
- Connect device to test bench ports (see fig. 6).

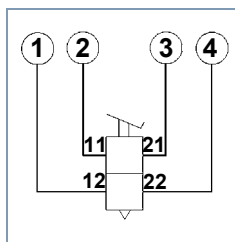


Fig. 6 Test bench ports



CAUTION

Make sure that plug-in connections on test bench and device are safely plugged.

- Close one of the port 21 and 22 with screw plug M 22x1.5.

3. Check tightness



WARNING

Never install an untightened brake valve on the vehicle.

3.1 Exhaust

- i** From a non-actuated device no air must exceed from the exhaust.
- Vent ports 11 and 12 with P1.
- Fully operate device several times.
- Wait until excess pressure has decreased.
- Check exhaust of the device for tightness.

i No leakages admissible.

3.2 Complete device

- Fix measuring scale to device.
- i** 0-position of the pedal means 0-position of the graduation at the same time.
- Adjust pedal to G1 (stop within device).
- Gauges 3 and 4 must indicate P2.
- Cover complete device with soap and check tightness.
- i** No leakages admissible.
With soap bubbling the device is not tight.
- Re-adjust pedal to 0°.
- Gauges 3 and 4 must indicate 0 bar.

4. Obtain maximum pressure

- Adjust pedal to G1 (stop within device).
- i** Pressure must increase immediately.

Gauges 3 and 4 must indicate P2.

- Re-adjust pedal to 0°.

Gauges 3 and 4 must indicate 0 bar.

5. Adjust pedal

- Adjust stop screw for the pedal without clearance.

i The stem must not execute any stroke movement at the same time.

- Counter stop screw with M = 20 Nm.

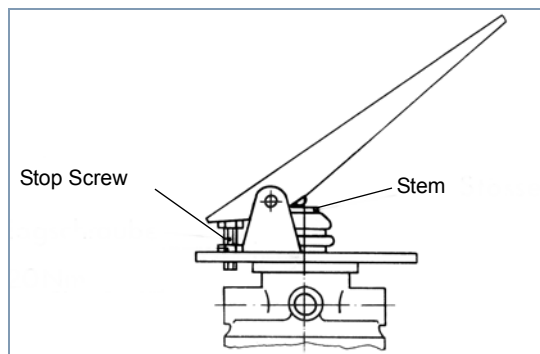


Fig. 7 Position of stop screw in the device

6. Graduability

i In all pressure scopes incremental steps of max. 0.3 bar must be possible.

7. Check pressure increase

- Operate pedal several times.
- Gauges 3 and 4 must indicate immediate pressure increase resp. decrease.
- i** In accordance with the type of device, one circuit must have predominance.

7.1 Check sudden pressure increase

- Adjust pedal to G2.
- Gauge 3 must indicate P3.
Gauge 4 must indicate P4.

7.2 Distance until venting of P5/P6

- Adjust pedal to G3.
- Gauge 3 must indicate P5.
Gauge 4 must indicate P6.

7.3 Adjust predominance

- i** Carry out test step only on variants 250 and 254.

The exact adjustment can be done by insertion or removing of compensation washers.

Use washers with the following composition:

Material: Steel

Surface protection: gal Zn 6 c yellow

Washer (approx. 0.4 bar pressure change)	Diameter: 25 cm Thickness: 4 cm
Washer (approx. 0.05 bar pressure change)	Diameter: 25 cm Thickness: 0.5 cm

- Adjust exact pressure with the cap (see fig. 8).
 - i** Clockwise rotation: pressure increase
 - Counter-clockwise rotation: pressure decrease

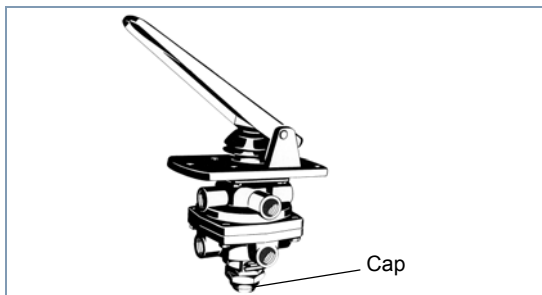


Fig. 8 Position of cap in the device

- Counter cap by turning the hexagon nut.
 - Adjust pedal to G3.
 - ⊖ Gauge 3 must indicate P5.
 - Gauge 4 must indicate P6.
 - Re-adjust pedal to 0°.
 - ⊖ Gauges 3 and 4 must indicate 0 bar.
 - Adjust pedal to G4.
 - ⊖ Gauge 3 must indicate P7.
 - Gauge 4 must indicate P8.
- 7.4 Check predominance**
- Adjust pedal to G3.
 - ⊖ Gauge 3 must indicate P5.
 - Gauge 4 must indicate P6.

7.5 Distance until venting of P9/P10

- Adjust pedal to G5.
 - i** Pressure must increase immediately.
 - ⊖ Gauge 3 must indicate P9.
 - Gauge 4 must indicate P10.

7.6 Distance until venting of P11/P12

- Adjust pedal to G6.
 - i** Pressure must increase immediately.
 - ⊖ Gauge 3 must indicate P11.
 - Gauge 4 must indicate P12.

7.7 Distance until venting of P2

- Adjust pedal to G1 (stop within device).
 - i** Pressure must increase immediately.
 - ⊖ Gauges 3 and 4 must indicate P2.
- Re-adjust pedal to 0°.
 - ⊖ Gauges 3 and 4 must indicate 0 bar.


8. Circuit failure**8.1 Failure of circuit 1**

- Vent port 11 to 0 bar.
 - ⊖ Gauge 1 must indicate 0 bar.
- Adjust pedal to G1.
 - ⊖ Gauge 3 must indicate 0 bar.
 - Gauge 4 must indicate P2.
- Re-adjust pedal to 0°.
 - ⊖ Gauges 3 and 4 must indicate 0 bar.
- Vent port 11 with P1.

8.2 Failure of circuit 2

- Vent port 12 to 0 bar.
- Adjust pedal to G1.
 - ⊖ Gauge 3 must indicate P2.
 - Gauge 4 must indicate 0 bar.
- Re-adjust pedal to 0°.
 - ⊖ Gauges 3 and 4 must indicate 0 bar.

9. Completion of test

- Vent port 11 to 0 bar.
-  Gauges 1 and 2 must indicate 0 bar.



CAUTION

Disconnect pipe connections only after having exhausted the device to 0 bar before.

- Remove device from fixture.
- Cleaning device.