

BEML - TATRA 815

26RR36 22 255 6x6.1R/50T, 51T

Workshop manual

Part 16 – CENTRAL TYRE INFLATION SYSTEM

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16 C.T.I.S. SYSTEM

16.1 Description and Main Technical Specifications

The **Central Tyre Inflation System** on vehicles BEML - TATRA T 815 - 26RR36 22 255 6x6.1R/50T and BEML - TATRA T 815 - 26RR36 22 255 6x6.1R/51T has been designed to control the tyres air pressures on the move from inside the driver's cabin to achieve better off-road mobility through sandy or muddy terrain (possibility of the tires deflation and repeated inflation on the move) or to allow an emergency drive with a defective tyre, from which the air leaks (permanent tire inflation on the move). If you want to use this system, first open the shut-off valves on vehicle wheels prior to move-off (See Fig. 16.1). The C.T.I.S. control is described in the Driver's Manual.

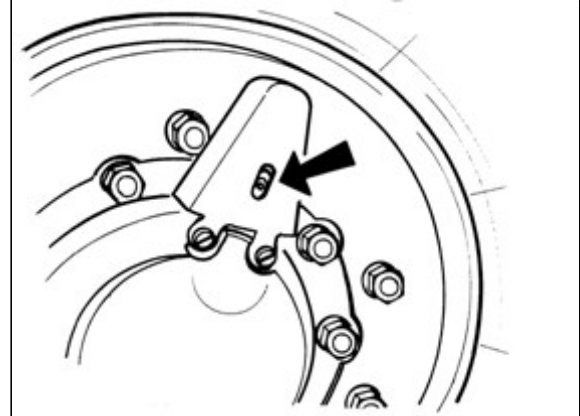
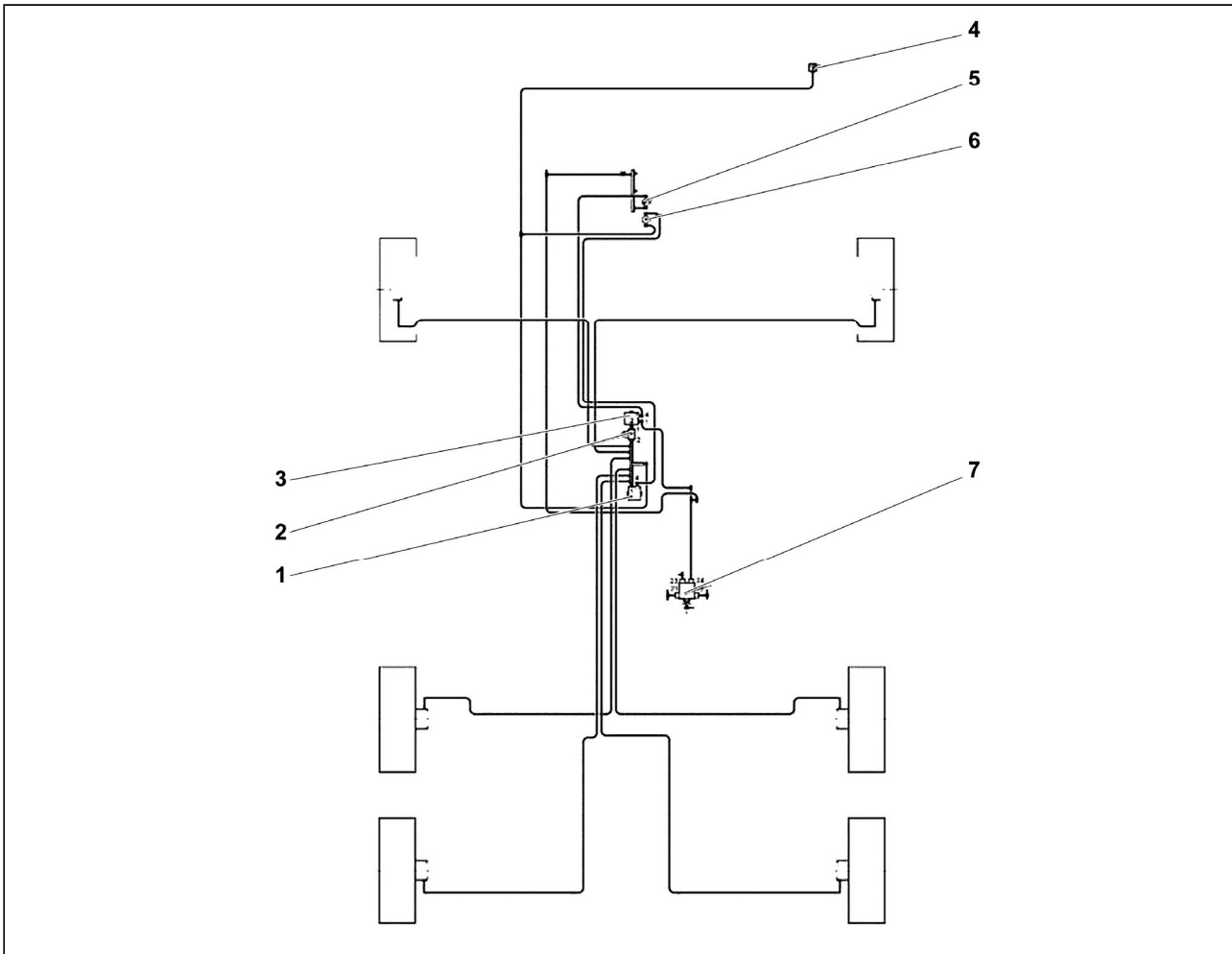
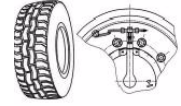


Fig. 16.1 Shut-off valve

The C.T.I.S. diagram is shown in(See Fig. 16.2).

From outlet "24" of the reducing valve 7 the air pressure is routed to the inflation control valve 3 and simultaneously to air cocks 5 and 6 for inflation and deflation in the system of air cocks. By moving the respective cock, the "control" air pressure is directed to the inflation or deflation control valve and the air pressure increases or decreases in tyres (provided that the shut-off valves in wheels are open). To prevent the tyre from damage due to the air pressure increase above the maximum allowable value of **0.41 MPa (4.1 kg/sq.cm)**, the maximum air pressure is limited by the reducing valve 2. The control valves 1 and 3 are also designed to keep the residual air pressure in tyres on the value of **0.09 MPa (0.9 kg/sq.cm)** not to allow the complete air release during tyres deflation resulting in damage to tyres on the move. The air pressure in tyres can be controlled by the pressure gauge 4 on the instrument board.



Legend: 1-deflation control valve, 2-reducing valve, 3-inflation control valve, 4-pressure gauge, 5-inflation air cock, 6-deflation air cock, 7-relief valve

Fig. 16.2 C.T.I.S. diagram

A way of the air distribution for the front axle is shown in the figure (See Fig. 16.3). Through manifolds and hoses the pressure air is supplied to the screwed connection, which is screwed in the steering knuckle 1 in the spot 2. Further on, the air is drawn via port in the steering knuckle 1, planet wheels housing 3, planet wheels housing cover 5 and wheel reduction gear cover 6. Then via the neck, which is screwed in the wheel reduction housing in the spot 4, shut-off valve 4 (See Fig. 16.4) and air tube extension 3 to the tyre air tube.

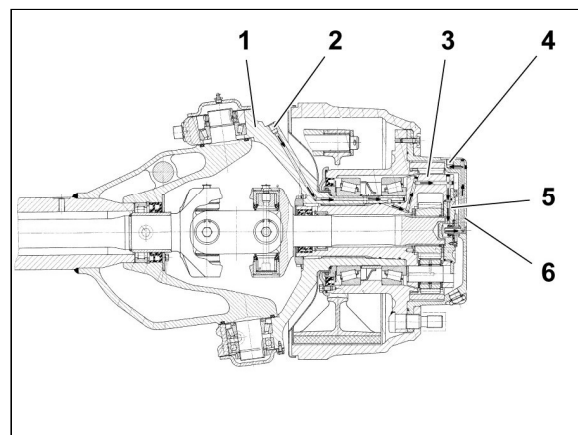


Fig. 16.3 Air passage for the tyres inflation on front axle



A way of the air distribution for rear axles is shown in the figure (See Fig. 16.5).

Through manifolds and hoses the pressure air is supplied to the screwed connection, which is screwed in the axle shaft 1 in the spot 2. Further on, the air is drawn via port in the axle shaft 1, planet wheels housing 7, planet wheels housing cover 8 and wheel reduction gear cover 9. Then via hollow screw 5, ring connection 6, shut-off valve 4 and air tube extension 3 into the tyre air tube.

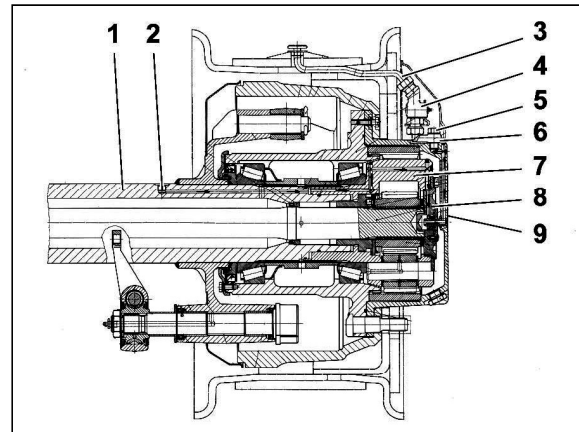
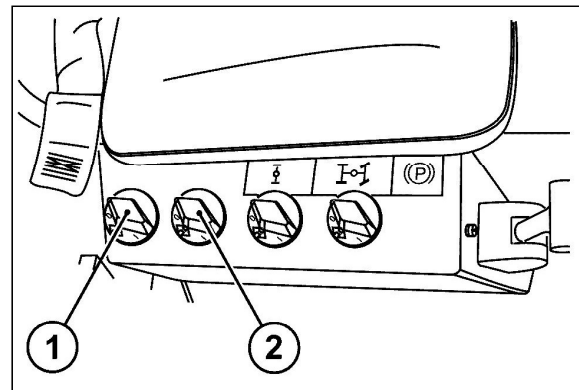


Fig. 16.4 Air passage for the tyres inflation on rear axles

The C.T.I.S. is controlled by cocks on the panel of the manual brake valve in the driver's cabin.



Legend: 1 - tyres deflation, 2 - tyres inflation

Fig. 16.5 Control cocks

The air overpressure in tyres can be checked on the air pressure gauge 1 (See Fig. 16.5) on the instrument board in the driver's cabin. The air pressure gauge is marked with item 4 in the C.T.I.S. diagram (Viz Fig. 16.2)

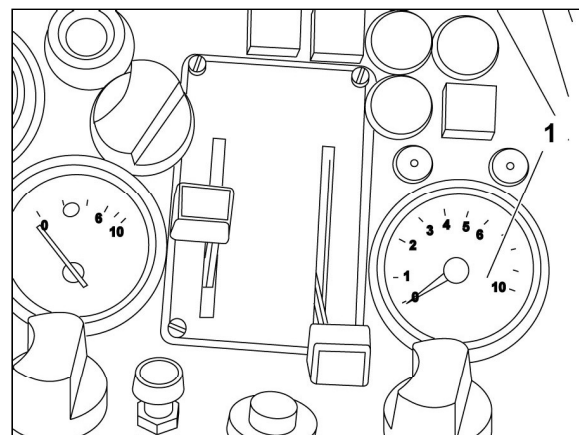


Fig. 16.6 Air overpressure gauge in tyres

The tyres pressures can be controlled within the range of **100 kPa - 475 kPa (1.00 - 4.75 kg/sq.cm)** in relation to driving conditions for Barum/Matador tyres. Top driving speeds related to tires inflation pressures



are mentioned in the table below (See Tab. 16.2).

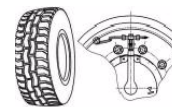
Tab. 16.1 Driving speeds related to tyres inflation pressures (Barum/Matador tyres)

Overpressure in tyres	Maximum speed
100 kPa (1 kg/sq.cm) – in terrain	20 km/hr
up to 150 kPa (1.5 kg/sq.cm) – in terrain	30 km/hr
up to 300 kPa (3 kg/sq.cm) – in terrain	60 km/hr
475 kPa (4.75 kg/sq.cm)	90 km/hr

The tyres pressures can be controlled within the range of **170 kPa - 415 kPa (1.70 - 4.15 kg/sq.cm)** in relation to driving conditions for MRF - tyres. Top driving speeds related to tires inflation pressures are mentioned in the table below (See Tab. 16.3).

Tab. 16.2 Driving speeds related to tyres inflation pressures (MRF tyres)

Overpressure in tyres	Maximum speed
170 kPa (1.7 kg/sq.cm) – in terrain	15 km/hr
up to 275 kPa (2.75 kg/sq.cm) – in terrain	48 km/hr
up to 415 kPa (4.15 kg/sq.cm) – in terrain	64 km/hr
415 kPa (4.15 kg/sq.cm)	90 km/hr



16.2 Faults Causes and Troubleshooting

Fault	Cause	Remedy	Mentioned in:
The relief valve cannot be set and it is not releasing air within the specified range	Faulty relief valve	Replace the relief valve	(See Subchapter 16.5.1)
Leaky relief valve	Faulty relief valve	Replace the relief valve	(See Subchapter 16.5.1)
The inflation control valve is not releasing air into the vehicle wheels tires inflation system	Faulty inflation control valve	Replace the inflation control valve	(See Subchapter 16.5.2)
Leaky inflation control valve	Faulty inflation control valve	Replace the inflation control valve	(See Subchapter 16.5.2)
The vehicle wheels cannot be deflated although the control air pressure is supplied to the control valve	Faulty deflation control valve	Replace the deflation control valve	(See Subchapter 16.5.3)
Leaky deflation control valve	Faulty deflation control valve	Replace the deflation control valve	(See Subchapter 16.5.3)
Vehicle wheels cannot be inflated / deflated	Faulty shut-off valves	Replace shut-off valves	(See Subchapter 16.5.4)
Leaky connecting manifold	Loose screwed connection	Tighten the screwed connection	(See Subchapter 16.5.1), (See Subchapter 16.5.2), (See Subchapter 16.5.3), (See Subchapter 16.5.4)
	Damaged seal	Replace the damaged seal	
	Damaged manifolds or hoses	Replace damaged manifolds or hoses	



16.3 List of Special Tools

No special tools have been prescribed for the mentioned technological procedures related to the C.T.I.S of the vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T**.



16.4 Survey of Torque Specifications

No torque specifications have been prescribed for the mentioned technological procedures related to the C.T.I.S of the vehicles BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/50T** and BEML - TATRA **T 815 - 26RR36 22 255 6x6.1R/51T**.



16.5 Working Procedures

16.5.1 Removal and Installation of the Inflation Relief Valve

a) Reasons for Removal

1. The valve is not releasing the air within the specified pressure range.
2. Leaky screwed connection of the inflation control valve.
3. Leaky valve.

b) Technical Conditions

1. The relief valve must be set within the by-pass pressure of 0.74 ± 0.02 MPa (as the spare part, the valve is delivered being adjusted).
2. Install the genuine valve in accordance with Spare Parts Catalogue of the vehicle manufacturer only.
3. Replace sealing rings, shaped rings and seals with new ones.

c) Removal Procedure

1. Set the vehicle parking brake.
2. Release the air from the source air reservoir using the manual drain valve.
3. Dismount hollow screw **11** on manifold **12** from the inflation control valve **9**.
4. Dismount hollow screw **10** on manifold **8** from the inflation control valve **9**.
5. Unscrew union nut **2** on the inflation manifold **1** from neck **3**.
6. Dismount low nut **4** from neck **3** and move the valves out of the holder **5**.
7. Clamp the control valve **9** into a clamping device, loosen the low nut **7** and unscrew the relief valve **6** from control valve **9**.

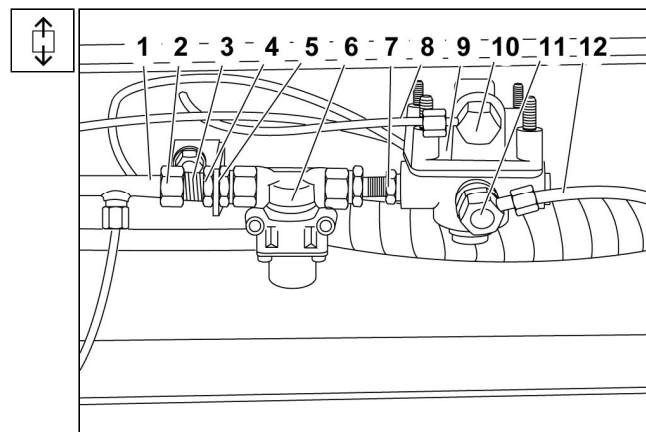


Fig. 16.7 Inflation relief valve - removal



8. Withdraw the O-ring **6** and thrust ring **5** from neck **3**.
9. Unscrew the low nut **4** from neck **3**.
10. Unscrew the neck **3** from relief valve **2**.
11. Unscrew the neck **1** from relief valve **2**.

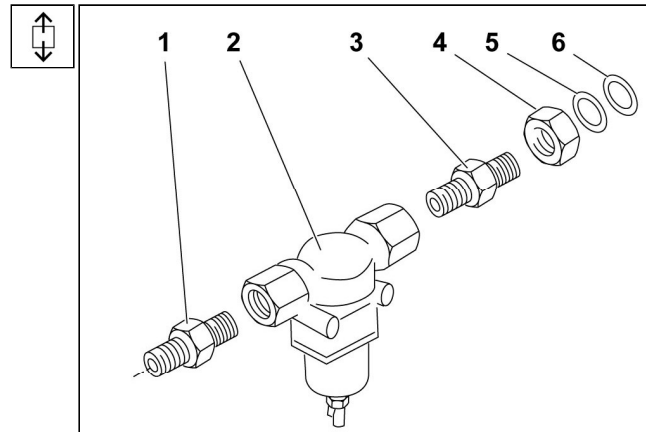


Fig. 16.8 Inflation relief valve necks - removal

d) Installation Procedure

1. Mount the neck **1** into relief valve **2**.
2. Mount the neck **3** into relief valve **2**.
3. Screw the low nut **4** on neck **3**.
4. Fit the thrust ring **5** and O-ring **6** on neck **3**.

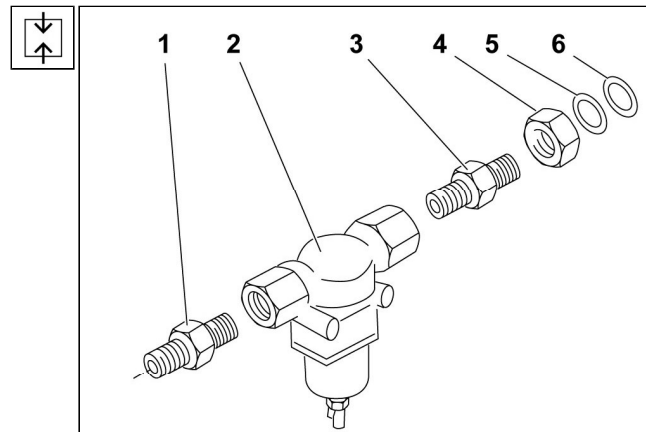


Fig. 16.9 Inflation relief valve necks - installation

5. Unscrew both valves **6** and **9** and secure them using the low nut **7** in position.
6. Slide the assembled valves with neck **3** into holder **5** and secure them with the low nut **4** in position.
7. Install the seal between neck **3** and inflation manifold **1**, mount and tighten the union nut **2** to neck **3**.
8. Use the hollow screw **10** with sealing rings to connect the manifold **8** to the inflation control valve **9**.
9. Use the hollow screw **11** with sealing rings to connect the manifold **12** to the inflation control valve **9**.

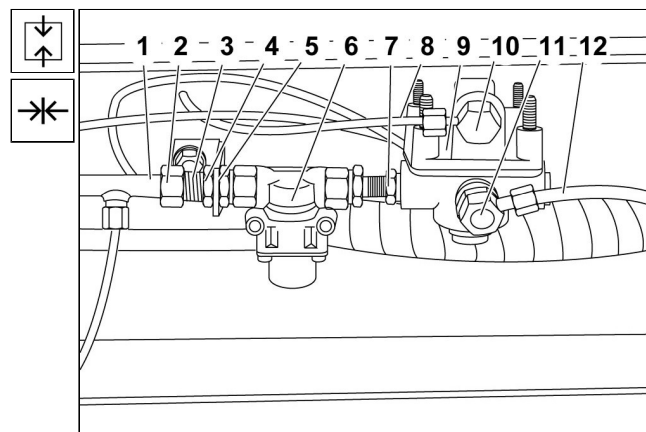


Fig. 16.10 Inflation relief valve - installation



16 Central Tyre Inflation System

03-0254-ENG/00



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10. Pressurize the vehicle pneumatic system to the operating pressure.
 11. Check the inflation relief valve for leaks and a correct function.



16.5.2 Removal and Installation of the Inflation Control Valve

a) Reasons for Removal

1. The valve is not releasing air into the vehicle wheels inflation system.
2. Leaky valve.
3. Mechanical damage to valve.

b) Technical Conditions

1. Install the genuine valve as per Spare Parts Catalogue of the vehicle's manufacturer.
2. Replace sealing rings, shaped rings and seals with new ones.

c) Removal Procedure

1. Remove the inflation control valve in accordance with the procedure mentioned in (See Subchapter 16.5.1), points 1 through 6.
2. Clamp the inflation control valve **2** into a suitable clamping device and dismount the threaded insert **4** and plugs **1** and **3** from the valve.

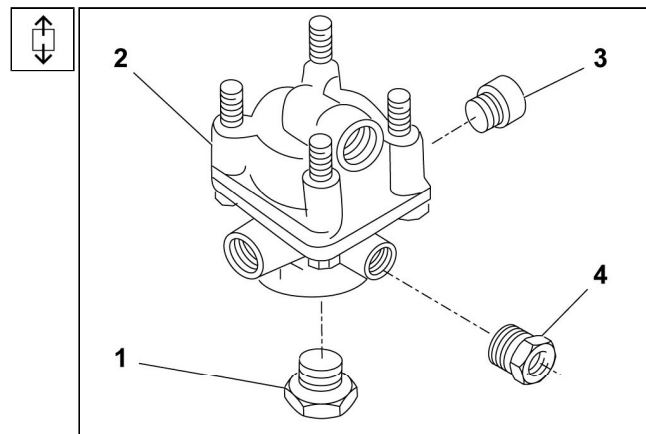


Fig. 16.11 Inflation control valve - removal



d) Installation Procedure

1. Clamp the inflation control valve **2** into a suitable clamping device and mount and tighten the threaded insert **4** and plugs **1** and **3** into the valve.

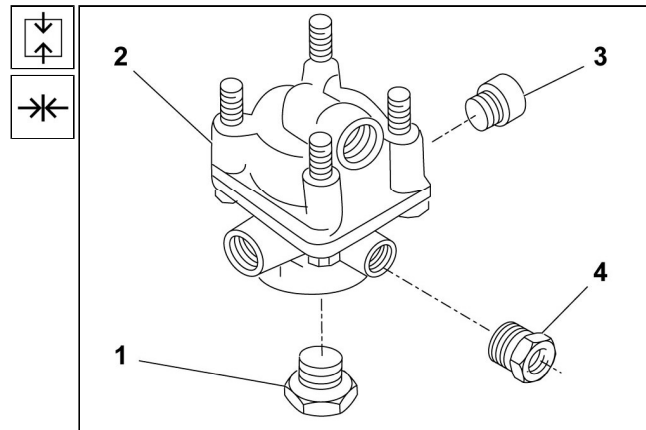


Fig. 16.12 Inflation control valve - installation

2. Install the inflation control valve in accordance with the procedure mentioned in (See Subchapter **16.5.1**), points 5 through 9.
3. Pressurize the pneumatic system to the operating pressure.
4. Check the inflation control valve for leaks and a correct function.



16.5.3 Removal and Installation of the Deflation Control Valve

a) Reasons for Removal

1. Leaky valve.
2. Leaky valve screwed connection.
3. The vehicle wheels cannot be deflated.

b) Technical Conditions

1. Mount the control valve as specified in the respective Spare Parts Catalogue for the vehicle.
2. Replace sealing rings with new ones.
3. To remove (replace) the valve, remember to close the shut-off valves on vehicle wheels.

c) Removal Procedure

1. Set the vehicle parking brake.
2. Dismount hollow screw **3** on the manifold **2** from the deflation control valve **1**.
3. Unscrew the union nut **7** on the inflation manifold **8** from neck **6**.
4. Unscrew the low nut **5** from neck **6** and remove the control valve **1** from holder **4**.

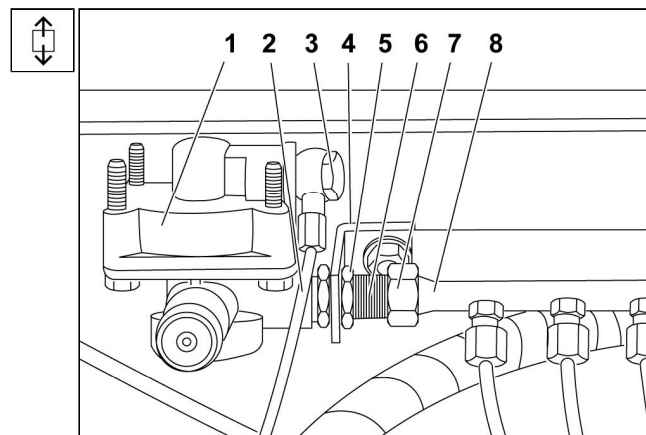


Fig. 16.13 Deflation control valve - removal

5. Clamp the control valve **1** into a suitable clamping device and unscrew the reduction with flap **5** from coupling **4**.
6. Unscrew coupling **4**, plug **2**, and neck **3**.



d) Installation Procedure

1. Clamp the deflation control valve **1** into a suitable clamping device; mount and tighten coupling **4**, neck **3**, and plug **2** into the valve.
2. Screw and tighten the reduction with flap **5** into coupling **4**.

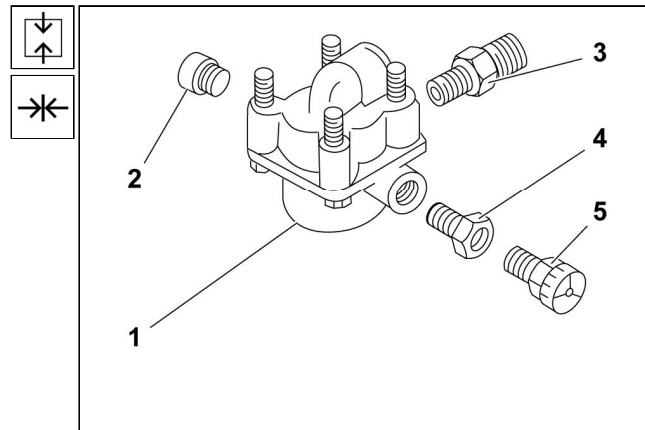


Fig. 16.14 Parts of the deflation control valve - installation

3. Slide the control valve **1** through neck **6** into a hole in the holder **4**.
4. Mount the low nut **5** on neck **6**, adjust the position of the control valve and tighten the nut.
5. Insert the sealing ring between neck **6** and inflation manifold **8**, mount and tighten the union nut **7** onto neck **6**.
6. Use the hollow screw **3** c/w sealing rings to connect the manifold **2** to valve **1**.

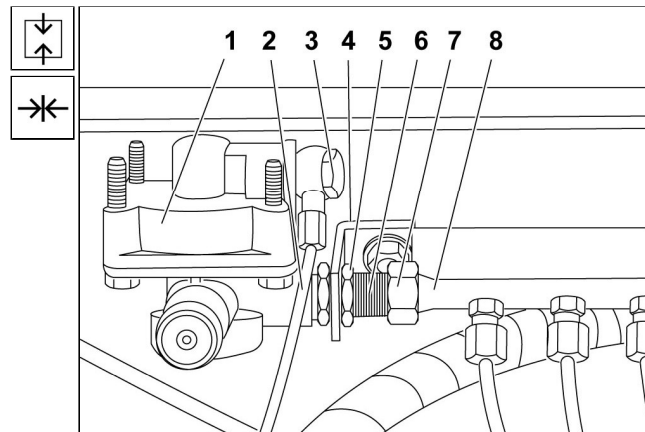


Fig. 16.15 Deflation control valve - installation

7. Open the ball shut-off valves on vehicle wheels and check the deflation control valve for leaks and a correct function.



16.5.4 Removal and Installation of the Shut-off Valve

a) Reasons for Removal

1. The vehicle tires cannot be inflated by means of the Central Tire Inflation System.
2. Leaky shut-off valve.

b) Technical Conditions

1. Inflation and deflation control cocks in position "0".

c) Removal Procedure

1. Set the vehicle parking brake.
2. Unscrew bolts **1** c/w spring washers.
3. Withdraw the valve cover **2** from the wheel reduction gear cover.

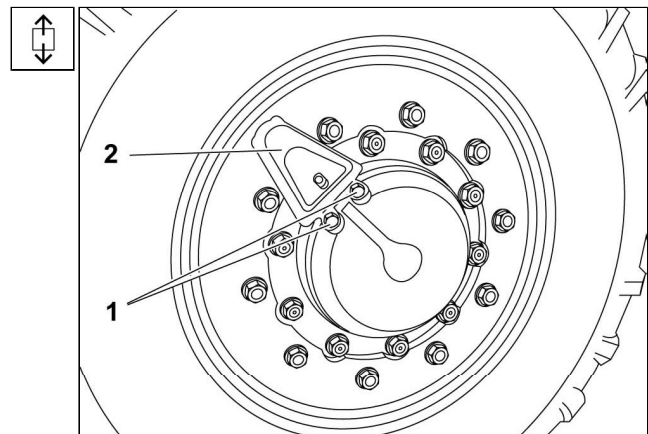


Fig. 16.16 Valve cover - removal

4. Loosen union nuts **4** and **2**.

Note:

If there is a full air overpressure in the tire during removal, mount the valve elongation piece from the vehicle outfit onto the air tube extension **1** to prevent air leakage from tire.

5. Lift the shut-off valve **3**, withdraw it from neck **5** and air tube extension **1**.

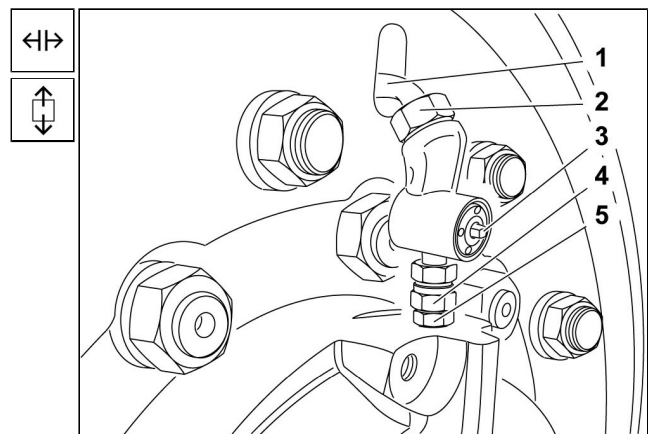


Fig. 16.17 Shut-off valve - removal



d) Installation Procedure

1. Unscrew the valve elongation piece from the air tube extension **1** - if screwed on the air tube extension.
2. Slide the shut-off valve **3** on the air tube extension **1** and then on neck **5**.
3. Tighten union nuts **2** and **4**.
4. Open the shut-off valve **3** and check the system for leaks (close the valve after check).

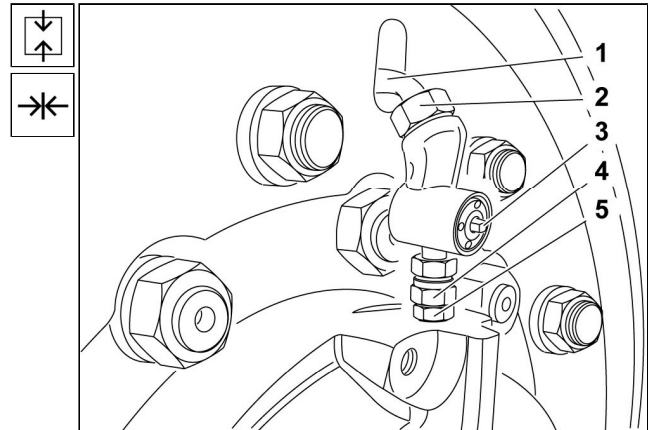


Fig. 16.18 Shut-off valve - installation

5. Fit the valve cover **2** to the wheel reduction gear cover and attach it using bolts **1** c/w spring washers.

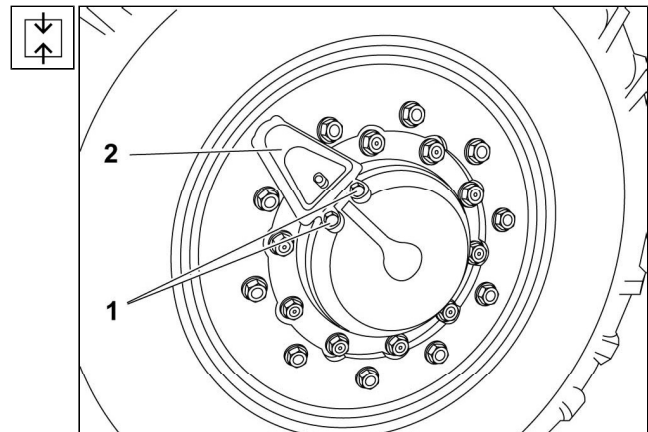


Fig. 16.19 Valve cover - installation