NOTE: This instruction describes the replacement procedures for the service components applicable to the Carlisle Spring Applied Hydraulic Release Brake Actuation Assembly. Information contained in this publication is subject to change without notice or liability.

WARNING: For optimum results and safety, Carlisle recommends that all work should be carried out by a suitably trained fitter/mechanic. If it is decided to replace used components or assemblies, always use genuine Carlisle replacement parts. If in doubt seek professional help.

HAZARD: Do not attempt to dismantle the actuation cylinder assemblies. The Internal components are held under significant spring pressure. Any attempt to remove internal components could result in serious personal injury. Any defective cylinder assembly must be replaced with a new genuine Carlisle assembly.

WARNING: This unit contains special synthetic rubber components. Use only Mineral Brake Oil recommended by the vehicle manufacturer. Failure to use the correct brake oil can lead to premature failure of components.

CAUTION: Always ensure appropriate safety glasses and gloves are worn when carrying out the procedures detailed below.
1. Park the vehicle on hard ground and chock the front wheels. Ensure the vehicle ignition system is switched off and the key removed. Jack up the rear axle and fit suitable axle stands securely. Remove the rear wheels.

2. Ensure the parking brake is applied and no hydraulic pressure is held in the system.

3. Remove any dirt from the spring applied brake actuation assembly. Ensure the rubber dust excluders fitted to the actuation cylinders are not damaged.

**CAUTION:** Never use an air line to blow dust or debris from the brake area. If inhaled any form of dust can at best be an irritant, at worst dangerous. Wipe the area with a damp cloth, never try to accelerate drying time by using an air line.

**Actuation Cylinder Assembly Replacement**

**Actuation Cylinder Removal**

4. Remove the hydraulic pipe connection from the cylinder port.

**CAUTION:** Ensure any residue brake oil from the disconnected hydraulic pipe is caught in a suitable container and/or wiped clean with a suitable cloth. Dispose of any residue brake oil or contaminated cloth in accordance with local environmental regulations.

5. Remove the dust excluder (5) from the support shaft (2) end of the cylinder assembly (1) and discard. This will allow access to the ‘Nyloc’ locknut (4) (Fig 2).

6. Using a 19mm spanner, tighten the ‘Nyloc’ locknut (4) against the cylinder body (1). This action will cause the screw (3) and cylinder piston to be retracted. Continue to tighten the locknut until the brake linkage is in the ‘off’ position. This will ensure the spring pressure in the cylinder is released.

7. Disconnect the clevis (8) from the vehicle brake linkage.

**CAUTION:** The piston must not be allowed to rotate during any following procedure. If the piston is allowed to rotate the seals within the cylinder bore may be damaged leading to premature hydraulic failure of the assembly.

8. Locate a suitable 9mm spanner on the hexagon head of the screw (3) and hold in position to prevent the screw from rotating.

9. Using a 19mm spanner wind back the ‘Nyloc’ nut (4) until there is free space between the nut and the cylinder body (1). This will ensure the cylinder is returned to the applied condition.

10. At the clevis end of the cylinder assembly, disengage the rubber dust excluder (6) from the location on the cylinder body to allow access to the cylinder piston.

11. Locate a suitable 22mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating (Fig 3).

12. Using a suitable 9mm spanner on the hexagon head of the screw (3), remove the screw and ‘Nyloc’ nut (4) from the cylinder body (1).

13. Carefully slide the cylinder assembly (1) off the support shaft assembly (2).

14. Remove all traces of grease from the end of the support shaft assembly.

**CAUTION:** Ensure any grease removed from the support shaft assembly, or contaminated cloth, is disposed of in accordance with local environmental regulations.
Actuation Cylinder Fitment

15. Check the condition of the two O ring seals (9) fitted to the support shaft (2) (Fig 4) for signs of damage. If there is any doubt in the suitability for further service, the O ring seals should be replaced.

**CAUTION:** Damage to the O ring seals will lead to insufficient sealing of the assembly allowing water ingress and corrosion. This could result in premature hydraulic failure of the assembly.

16. Apply new grease to the end of the support shaft in accordance with the vehicle manufacturers recommendations.

**CAUTION:** The piston must not be allowed to rotate during any following procedure. If the piston is allowed to rotate the seals within the cylinder bore may be damaged leading to premature hydraulic failure of the assembly.

17. Locate the new cylinder assembly (1) in position, with the hydraulic port A facing inboard, and carefully slide the cylinder body on to the support shaft (2). Ensure the hole in the support shaft (2) is aligned with the open end of the cylinder body (1) (Fig. 5).

18. Fit the new screw (3) into the cylinder.

19. Carefully detach the dust excluder (6) from its location on the cylinder body and peel back to expose the cylinder piston.

20. Locate a suitable 22mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating. Using a 9mm spanner on the hexagon head of the new screw (3), tighten the screw into the piston to a torque value of 5 – 8 Nm (Fig. 6).

**CAUTION:** NEVER use power tools, air or electric, to tighten the screw (3) into the cylinder piston.

21. Fit the new ‘Nyloc’ locknut (4) onto the screw (3). Using a 9 mm spanner, hold the head of the screw to prevent it from turning and using a 19 mm spanner, tighten the locknut (4) until it abuts the cylinder body.

22. Locate a suitable 22mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating (Fig 3).

23. Using a 19mm spanner, tighten the ‘Nyloc’ locknut (4) against the cylinder body (1). This action will cause the screw and cylinder piston to be retracted. Continue to tighten the locknut until the brake linkage is in the ‘off’ position. This will ensure the spring pressure in the cylinder is released.

24. Attach the clevis (8) to the brake linkage.

25. Locate a suitable 9mm spanner on the hexagon head of the screw (3) and hold in position to prevent it from rotating.

26. Using a 19mm spanner wind back the ‘Nyloc’ nut (4) until there is free space between the nut and the cylinder body. This will ensure the cylinder is returned to the applied condition.

27. Fit the new dust excluder (5) over the screw head and ensure it is securely located on the head of the new screw (3).

28. Fit the opposite end of the dust excluder (5) onto the cylinder housing (1) and ensure it is securely located.
29. Refit the piston dust excluder (6) to the cylinder body (1) and ensure it is securely located.

30. Fit the hydraulic pipe connection to the cylinder port, taking care not to cross thread the connection. Tighten to a value of 23 - 27Nm.

31. Repeat steps 4 to 30 for the second cylinder assembly, where applicable.

32. Bleed the hydraulic brake system, following the bleeding procedure recommended by the vehicle manufacturer, and check all disturbed hydraulic connections for leaks. Rectify as necessary.

33. Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Support Shaft Assembly Replacement

Shaft Assembly Removal

34. Following steps 4 to 13 (Actuation Cylinder Replacement) remove the cylinder assemblies (1) from the existing support shaft assembly (2).

35. Where applicable, remove any ancillary equipment which has been attached to the support shaft assembly (2).

36. Note the orientation and position of the existing support shaft (2) assembly to aid fitment of the new support shaft assembly.

37. Remove the four fixing screws securing the support shaft assembly (2) to the vehicle.

38. Remove the support shaft assembly from the vehicle.

Shaft Assembly Fitment

CAUTION: The new support shaft assembly (2) is factory assembled with the shaft locked in the correct orientation in the brackets by two hex screws (10) (Fig. 7). DO NOT tamper with the screws (10) or attempt to move the shaft in relation to the brackets. This may compromise the installation and result in premature failure of components.

39. Locate the new support shaft assembly (2) on the vehicle and secure with the four retaining screws. Do not fully tighten the screws at this stage.

40. Refit the cylinder assemblies (1) following steps 16 to 21 (Actuation Cylinder Replacement).

NOTE: If the ‘Nyloc’ locknut (4) on the screw (3) becomes easy to turn by hand, without a spanner, it must be replaced.

41. Tighten the four support shaft bracket retaining screws to the torque value recommended by the vehicle manufacturer.

42. Check the condition of the dust excluders (5 & 6) for signs of damage.

NOTE: Dust excluders which show signs of cracking, embrittlement, swelling or any other damage must be replaced. If there is any doubt in the suitability for further service, the excluders should be replaced.

CAUTION: Damage to the dust excluders will lead to insufficient sealing of the assembly allowing water ingress and corrosion. This could result in premature hydraulic failure of the assembly.

43. Clean the head of the screw (3) paying particular attention to the dust excluder location area.

44. Clean the piston and screw dust excluder location areas on the cylinder body.

45. Refit the piston dust excluder (6) to the cylinder body and ensure it is securely located.

46. Fit the dust excluder (5) over the head of the screw (3) and ensure the excluder is securely located in the location area.

47. Fit the opposite end of the dust excluder (5) onto the cylinder housing and ensure it is securely located.

48. Attach the clevis (8) to the brake linkage.

49. Fit the hydraulic pipe connection to the cylinder port, taking care not to cross thread the connection. Tighten to a value of 23 - 27Nm.
50. Bleed the hydraulic brake system, following the bleeding procedure recommended by the vehicle manufacturer, and check all disturbed hydraulic connections for leaks. Rectify as necessary.

51. Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

52. Remove the dust excluder (5) from the support shaft (2) end of the cylinder assembly and discard. This will allow access to the screw head and ‘Nyloc’ locknut (Fig 2).

53. Locate a 9 mm spanner on the hexagon head of the screw (3) and hold in position to prevent it from rotating.

54. Using a 19 mm spanner wind back the ‘Nyloc’ nut (4) until the is free space between the nut and the cylinder body.

55. At the clevis end of the cylinder assembly, disengage the rubber dust excluder (6) from the location on the cylinder body to allow access to the cylinder piston.

56. Locate a 22 mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating (Fig 3).

57. Using a 9 mm spanner on the hexagon head of the screw (3), remove the screw and ‘Nyloc’ locknut (4) from the cylinder body.

58. Fit the new screw (3) into the cylinder body.

59. Locate a 22 mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating. Using a 9 mm spanner on the hexagon head of the new screw (3), tighten the screw into the piston to a torque value of 5 – 8 Nm (Fig. 6).

60. Fit the new ‘Nyloc’ locknut (4) onto the screw (3). Using a 9 mm spanner, hold the head of the screw to prevent it from turning and using a 19 mm spanner, tighten the locknut until it abuts the cylinder body.

61. Fit the new dust excluder (5) over the screw head and ensure it is securely located on the head of the new screw (3).

62. Fit the opposite end of the dust excluder (5) onto the cylinder housing and ensure it is securely located.

63. Refit the piston dust excluder (6) to the cylinder body and ensure it is securely located.

64. Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

Screw, ‘Nyloc’ Locknut & Dust Excluder Replacement

**CAUTION:** The piston must not be allowed to rotate during any following procedure. If the piston is allowed to rotate the seals within the cylinder bore may be damaged leading to premature hydraulic failure of the assembly.

65. Clean the area around the cylinder assembly (1), dust excluders (5 & 6) and clevis (8) to prevent the introduction of debris which may contaminate the cylinder assembly.

66. Check the rubber dust excluders (5 & 6). They should be soft and flexible and fit tightly in the locating grooves on the housing and around the push rod and screw head.

**NOTE:** Dust excluders which show signs of cracking, embrittlement, swelling or any other damage must be replaced. If there is any doubt in the suitability for further service, the excluders should be replaced.

67. Peel back the dust excluder (5) from the support shaft (2) end of the cylinder assembly (1) to allow access to the ‘Nyloc’ locknut (4) (Fig 2).

Clevis Replacement

**CAUTION:** The piston must not be allowed to rotate during any following procedure. If the piston is allowed to rotate the seals within the cylinder bore may be damaged leading to premature hydraulic failure of the assembly.

68. CAUTION: Damage to the dust excluders will lead to insufficient sealing of the assembly allowing water ingress and corrosion. This could result in premature hydraulic failure of the assembly.
68. Using a 19mm spanner, tighten the 'Nyloc' locknut (4) against the cylinder body. This action will cause the screw (3) and cylinder piston to be retracted. Continue to tighten the locknut until the brake linkage is in the 'off' position. This will ensure the spring pressure in the cylinder is released.

69. Disconnect the clevis (8) from the vehicle brake linkage.

70. Locate a suitable 9mm spanner on the hexagon head of the screw (3) and hold in position to prevent it from rotating.

71. Using a 19mm spanner wind back the 'Nyloc' nut (4) until there is free space between the nut and the cylinder body. This will ensure the cylinder is returned to the applied condition.

72. Peel back the dust excluder (6) from the clevis end of the cylinder assembly to expose the cylinder piston.

73. Locate a suitable 22mm spanner on the flat edges of the piston and hold in position to prevent the piston from rotating (Fig 3).

74. Remove the clevis (8) and locknut (7) from the cylinder pushrod and discard.

75. Loosely fit the new locknut (7) and clevis (8) to the cylinder pushrod.

76. Adjust the position of the locknut (7) and clevis (8) to a dimension of 66.25mm, from the face of the cylinder piston to the rear of the locknut (7) (Fig 8).

77. Tighten the locknut (7) against the clevis (8) to a torque value of 10 – 15 Nm to secure the clevis in the set position.

78. Locate a suitable 9mm spanner on the hexagon head of the screw (3) and hold in position to prevent it from rotating.

79. Using a 19mm spanner, tighten the 'Nyloc' locknut (4) against the cylinder body. This action will cause the screw (3) and cylinder piston to be retracted. Continue to tighten the locknut until the brake linkage is in the 'off' position. This will ensure the spring pressure in the cylinder is released.

80. Attach the clevis (8) to the brake linkage.

81. Locate a suitable 9mm spanner on the hexagon head of the screw (3) and hold in position to prevent it from rotating.

82. Using a 19mm spanner wind back the 'Nyloc' nut (4) until there is free space between the nut and the cylinder body. This will ensure the cylinder is returned to the applied condition.

83. Relocate the dust excluders (5 & 6) onto the cylinder housing, at the support shaft and clevis end of the cylinder. Ensure the excluders are securely located.

84. Refit the road wheels, remove the axle stands and lower the vehicle to the ground.

**Dust Excluder & Support Shaft ‘O’ Ring Replacement**

![Dust Excluder & Support Shaft ‘O’ Ring Replacement](image)

**CAUTION:** The piston must not be allowed to rotate during any following procedure. If the piston is allowed to rotate the seals within the cylinder bore may be damaged leading to premature hydraulic failure of the assembly.

**Dust Excluder - Piston/Clevis Side**

85. Remove the clevis (8) and locknut (7) from the cylinder pushrod as described in steps 65 to 73 (Clevis Replacement).

86. Remove the old dust excluder (6) and discard.

87. Clean the dust excluder location area on the cylinder body.

88. Fit the new dust excluder (6) over the pushrod and slide the excluder towards the cylinder body.

89. Locate a suitable spanner on the flat edges of the piston and hold in position to prevent the piston from rotating (Fig 3).

90. Refit the clevis (8) and locknut (7) as described in steps 74 to 82 (Clevis Replacement).

91. Fit the dust excluder (6) onto the cylinder housing and ensure the excluder is securely located.
Dust Excluder - Screw/Locknut Side

92. Detach the dust excluder (5) from its location on the cylinder body.

93. Peel back the dust excluder and remove from the location on the screw (3). Discard the old dust excluder (5).

94. Clean the head of the screw (3) paying particular attention to the dust excluder location groove.

95. Clean the dust excluder location area on the cylinder body.

96. Fit the new dust excluder (5) over the head of the screw (3) and ensure the excluder is securely located in the location groove of the screw.

97. Fit the opposite end of the dust excluder onto the cylinder housing and ensure the excluder is securely located.

Support Shaft O rings

98. Remove one of the actuator cylinder assemblies (1) as described in steps 4 – 13 (Actuation Cylinder Replacement).

99. Remove all traces of grease from the end of the support shaft assembly (2).

![CAUTION: Ensure any grease removed from the support shaft assembly, or contaminated cloth, is disposed of in accordance with local environmental regulations.]

100. Carefully remove the two O ring seals (9) from the support shaft (2).

![CAUTION: Do not use any type of sharp implement to remove the O ring seals (9). Any damage to the O ring seal location grooves on the shaft will prevent correct O ring seating and may lead to insufficient sealing and premature failure of components.]

101. Lightly lubricate the end of the support shaft (2) with new unused brake oil.

102. Carefully slide the new O ring seals (9) onto the support shaft (2) and ensure they seat correctly in the location grooves.

103. Refit the actuation cylinder assembly (1) following the procedures detailed in steps 16 to 30 (Actuation Cylinder Replacement).

104. Repeat for the opposite side of the support shaft, where applicable.

105. Bleed the hydraulic brake system, following the bleeding procedure recommended by the vehicle manufacturer, and check all disturbed hydraulic connections for leaks. Rectify as necessary.

106. Refit the road wheels, remove the axle stands and lower the vehicle to the ground.