



Bulletin HY30-5506-M1/UK

# Service Manual Series V12

Effective: February, 2014  
Supersedes: May, 2013

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**Conversion factors**

|                   |                            |
|-------------------|----------------------------|
| 1 kg              | = 2.2046 lb                |
| 1 N               | = 0.22481 lbf              |
| 1 bar             | = 14.504 psi               |
| 1 l               | = 0.21997 UK gallon        |
| 1 l               | = 0.26417 US gallon        |
| 1 cm <sup>3</sup> | = 0.061024 in <sup>3</sup> |
| 1 m               | = 3.2808 feet              |
| 1 mm              | = 0.03937 in               |
| 1 °C              | = 1.8°F + 32               |

**WARNING**

**FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.**

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The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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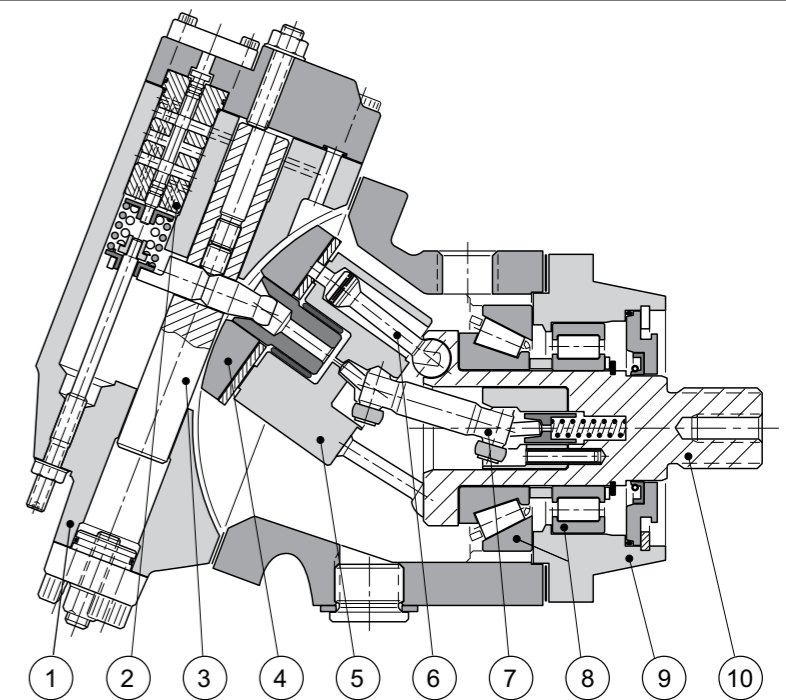
**Specifications**

| V12 frame size                             | 60   | 80   |
|--|------|------|
| <b>Displacement [cm<sup>3</sup>/rev]</b>   |      |      |
| at 35° (max)                               | 60   | 80   |
| at 6,5° (min)                              | 12   | 16   |
| <b>Operating pressure [bar]</b>            |      |      |
| max intermittent <sup>1)</sup>             | 480  | 480  |
| max continuous                             | 420  | 420  |
| <b>Operating speed [rpm]</b>               |      |      |
| max intermittent at 35° <sup>1)</sup>      | 4400 | 4000 |
| max continuous at 35°                      | 3600 | 3100 |
| max intermittent at 6.5°-20° <sup>1)</sup> | 7000 | 6250 |
| max continuous at 6.5°-20°                 | 5600 | 5000 |
| min continuous                             | 50   | 50   |
| <b>Flow [l/min]</b>                        |      |      |
| max intermittent <sup>1)</sup>             | 265  | 320  |
| max continuous                             | 215  | 250  |
| <b>Output torque [Nm]</b>                  |      |      |
| at 100 bar (theor.)                        | 95   | 127  |
| <b>Max output power [kW]</b>               |      |      |
| max intermittent <sup>1)</sup>             | 150  | 175  |
| max continuous                             | 95   | 105  |
| <b>Corner power [kW]</b>                   |      |      |
| max intermittent <sup>1)</sup>             | 335  | 400  |
| continuous                                 | 235  | 280  |
| <b>Mass moment of inertia</b>              |      |      |
| (x10 <sup>-3</sup> ) [kg m <sup>2</sup> ]  | 3.1  | 4.4  |
| <b>Weight [kg]</b>                         | 28   | 33   |

<sup>1)</sup> Max 6 seconds in any one minute.

**V12 cross section**

1. End cap
2. Servo control valve
3. Setting piston
4. Valve segment
5. Cylinder barrel
6. Spherical piston with laminated piston ring
7. Synchronizing shaft
8. Heavy-duty roller bearings
9. Bearing housing
10. Output shaft



**Assembling, shaft package**



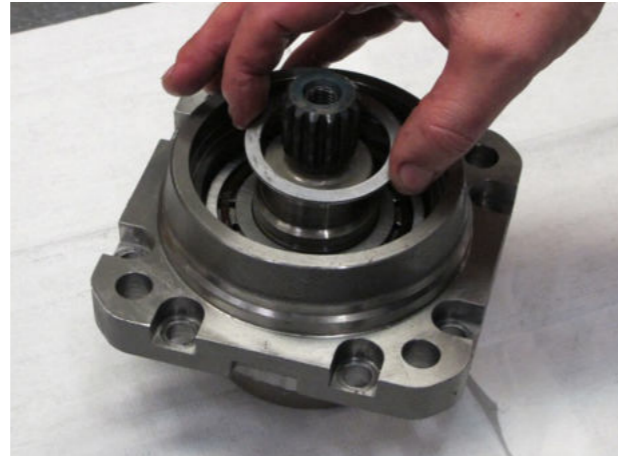
1. Press down the big tapered roller bearing and the inner ring for the roller bearing in two steps. **Note!** On V12-060 there is a distance between the bearings.



2. Press down the roller bearing with the text upwards into the flange and assemble it on the shaft package.



3. Assemble the bearing ring with the text downwards.



4. Assemble the shim.

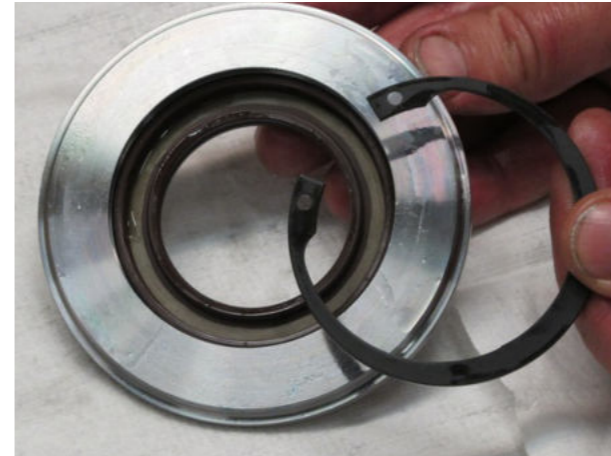


5. Assemble the retaining ring. Make sure it is all the way into the groove. Check the pre-load of the bearings, not too tight and no back-lash.



6. Assemble the O-ring.

**Assembling, shaft package, cylinder barrel, joint shaft and cover**



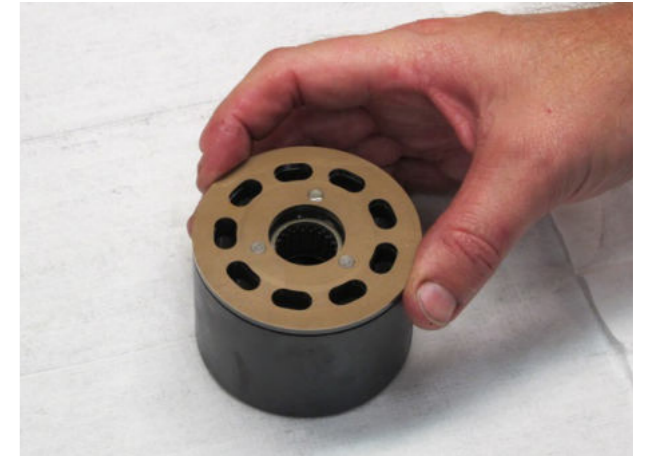
7. Press down the shafts seal in the seal carrier and assemble the retaining ring.



8. Assemble the seal carrier with shaft seal and the retaining ring. Make sure it is all the way into the groove.



9. Assemble the guide pins.



10. Assemble the sliding plate.

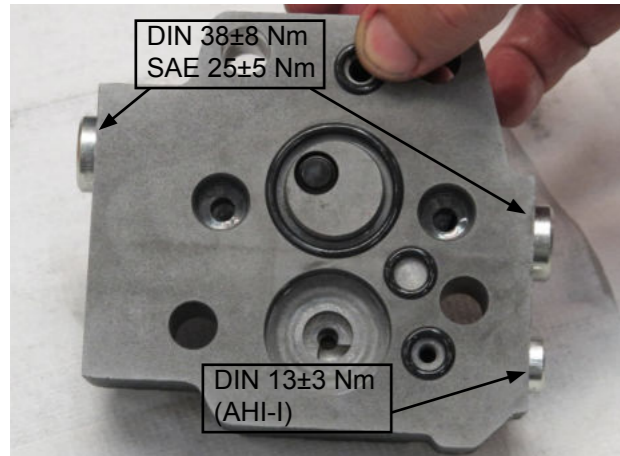


11. Assemble the joint rollers on the joint shaft. Make sure the step on the joint rollers is fitted inwards.

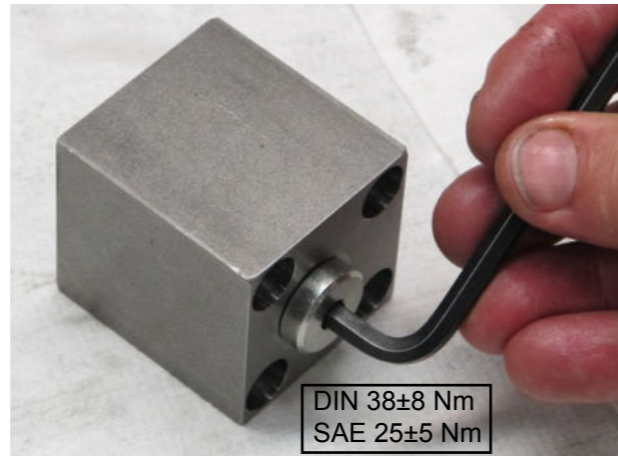


12. Assemble the displacement setting screw, seal nut and the O-ring.

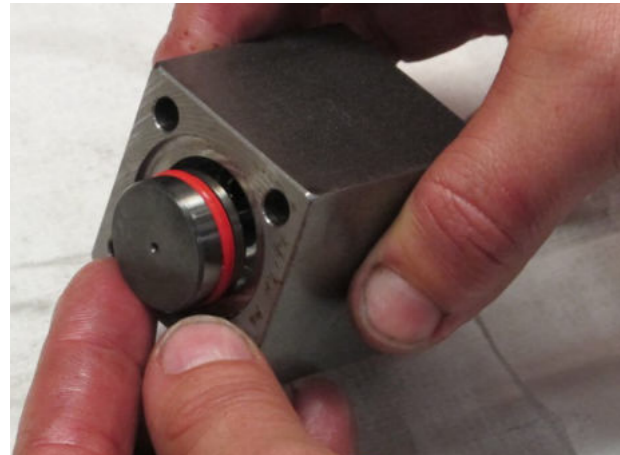
**Assembling, control cover**



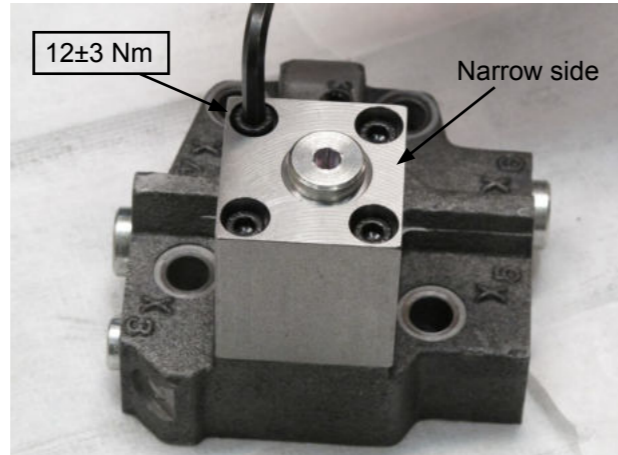
13. Assemble the O-rings and plugs that are required for the specific control cover. AH-control is shown in the picture.



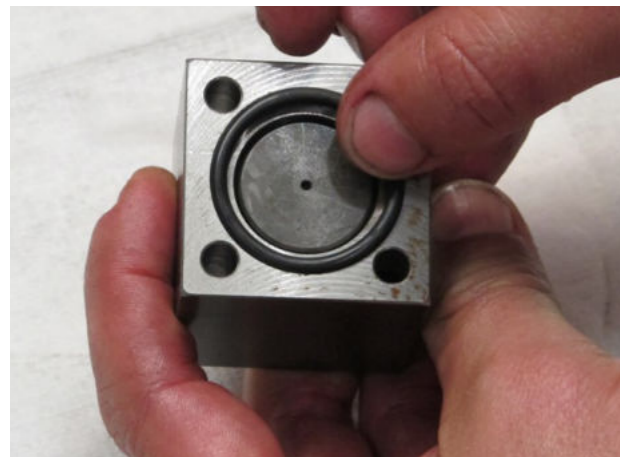
16. Assemble the hexagon plug.



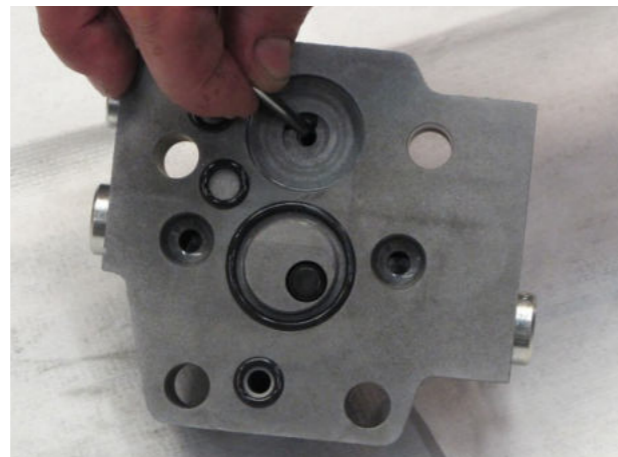
14. Assemble the control piston in the AH-housing.



17. Assemble the AH-housing. The narrow side against X5.

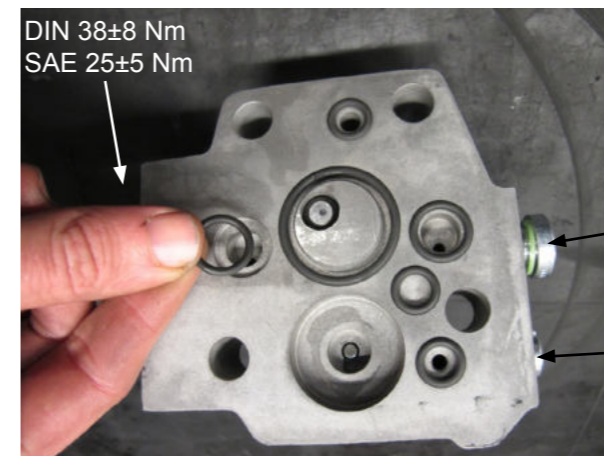


15. Assemble the O-ring.



18. Put some grease on the guide pin and assemble it in the control cover.

**Assembling, control cover, New version without valve cones and valve guides**

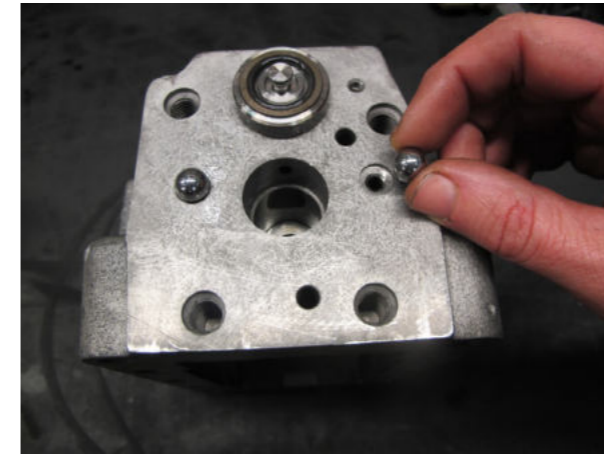


A. Assemble the O-rings and plugs that are required for the specific control cover. AH-control is shown in the picture.

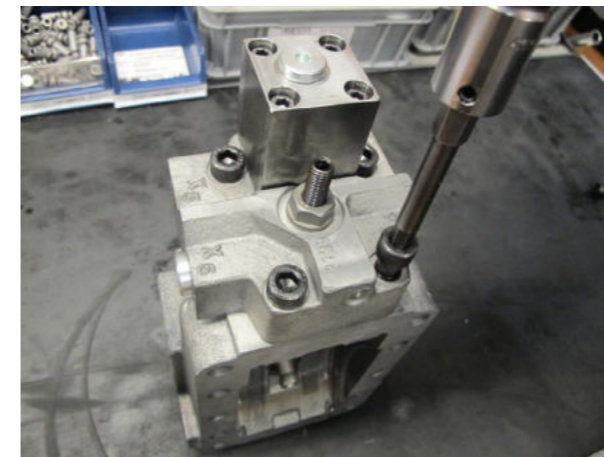
The control cover shown in picture is bi-directional.

DIN 38±8 Nm  
SAE 25±5 Nm

DIN 13±3 Nm  
(AHI-I)

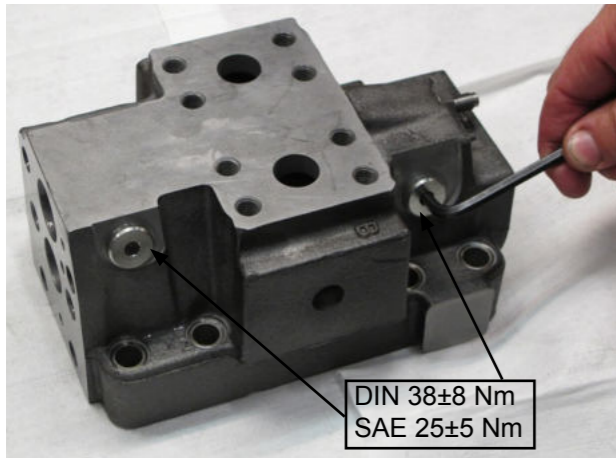


B. Assemble the check balls.

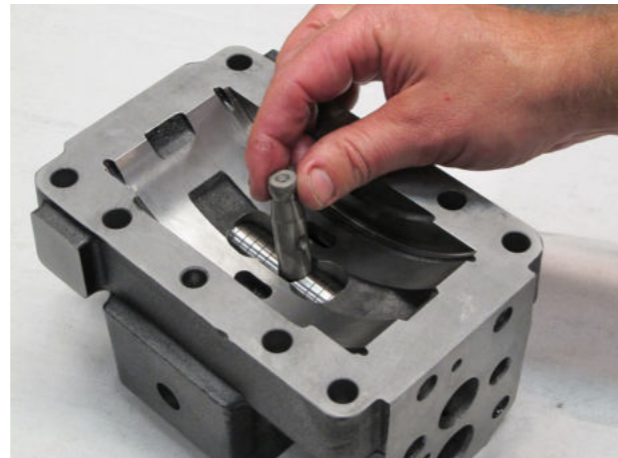


C. Assemble the control cover and torque the screws to 65±10 Nm for V12-60, -80 and -110. 105±20 Nm for V12-160.

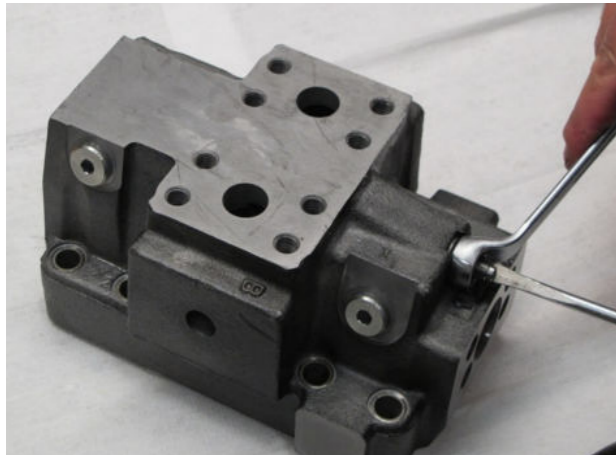
Assembling, end cap



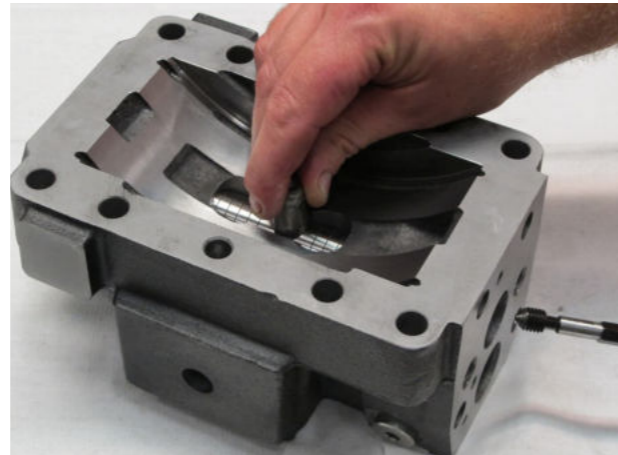
19. Assemble the hexagon plugs.



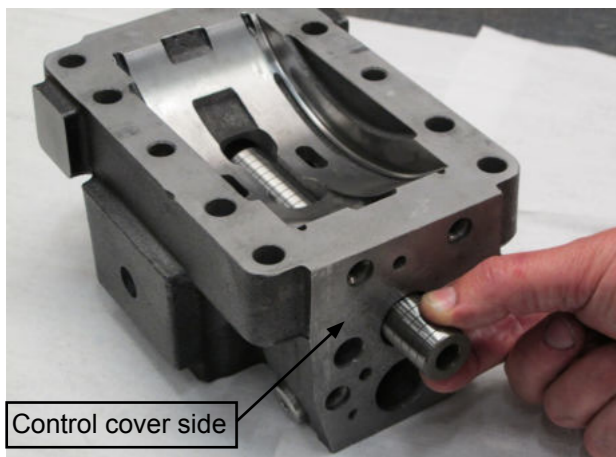
22. Assemble the companion pin in the setting piston. Make sure the location hole is against the control cover side.



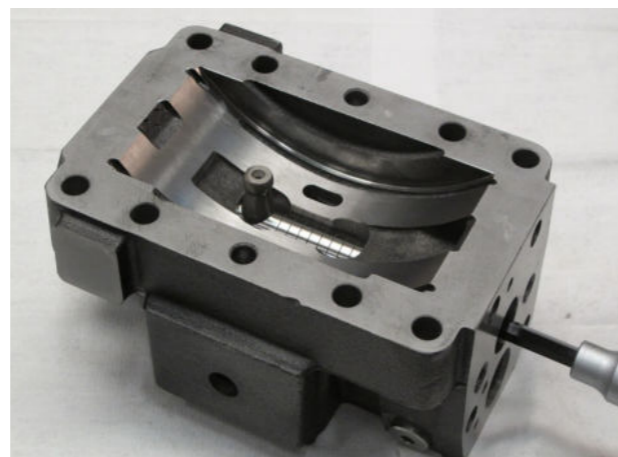
20. Assemble the adjusting screw and seal nut.



23. Assemble the set screw with the pointed end. Make sure that it hits the location hole in the companion pin.

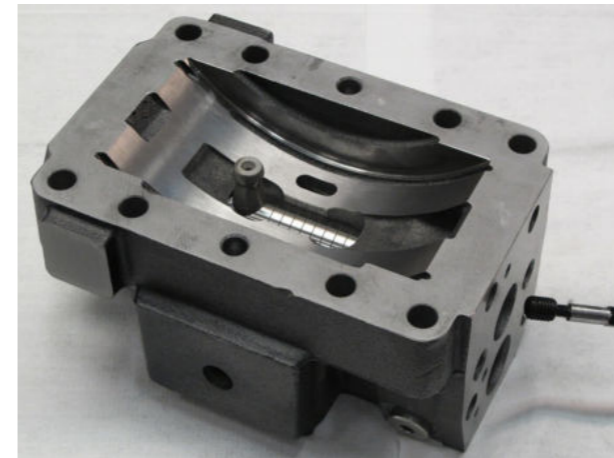


21. Assemble the setting piston in the end cap. Make sure the thread is against the control cover side.

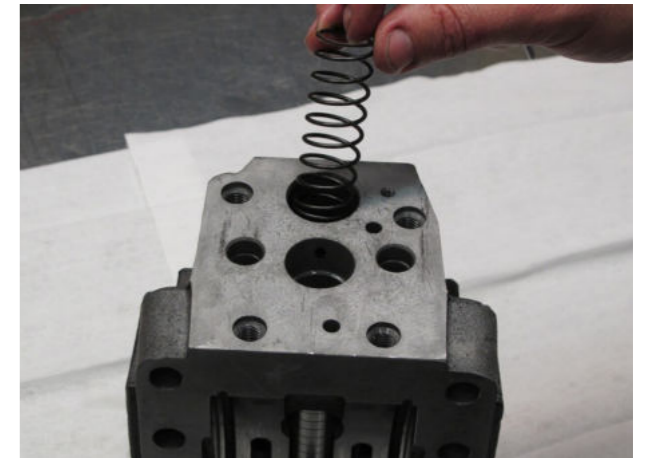


24. Torque the set screw to 14±4 Nm.

Assembling, end cap



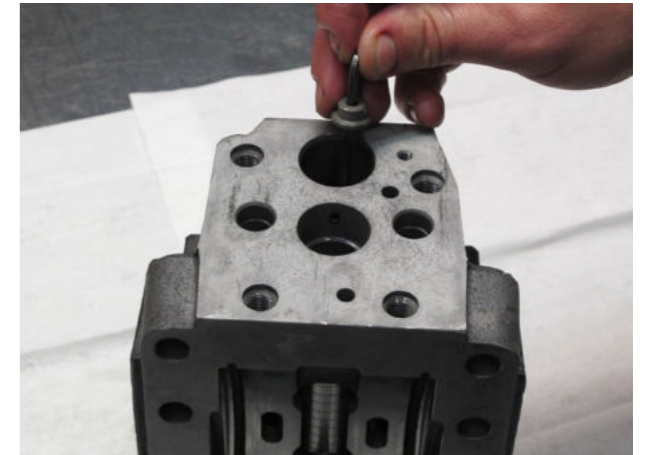
25. Assemble the set screw with the flat end.



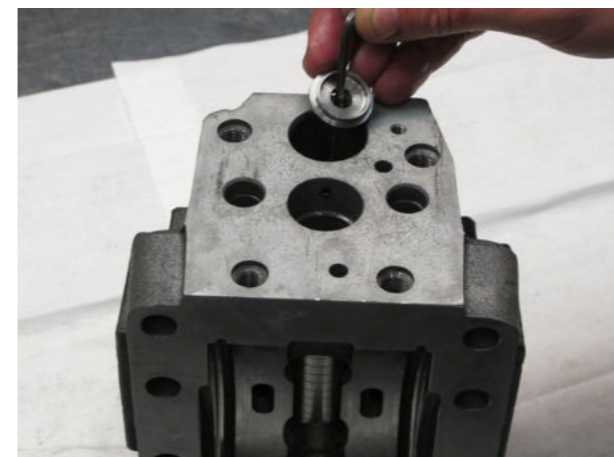
28. Assemble the modulating spring.



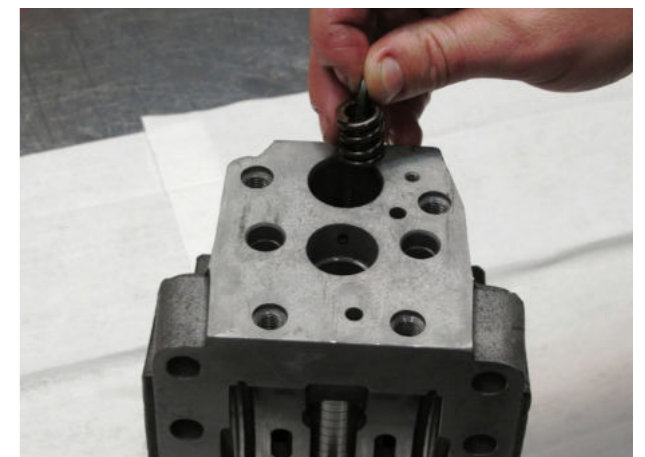
26. Torque the set screw to 26±6 Nm. Move the companion pin back and forward to make sure it moves smooth.



29. Assemble the spring seat.

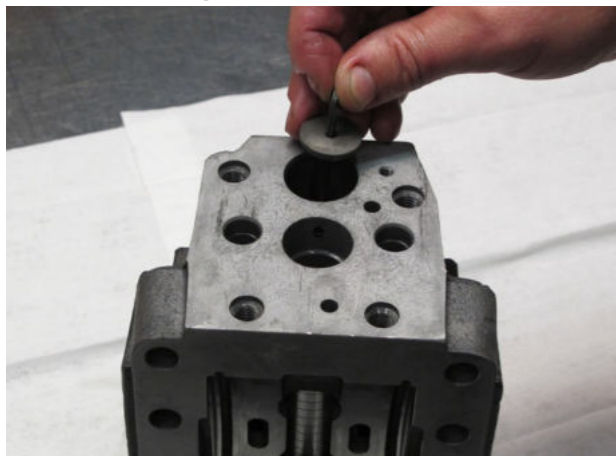


27. Assemble the spring guide. Use a long allen key to locate the spring guide.

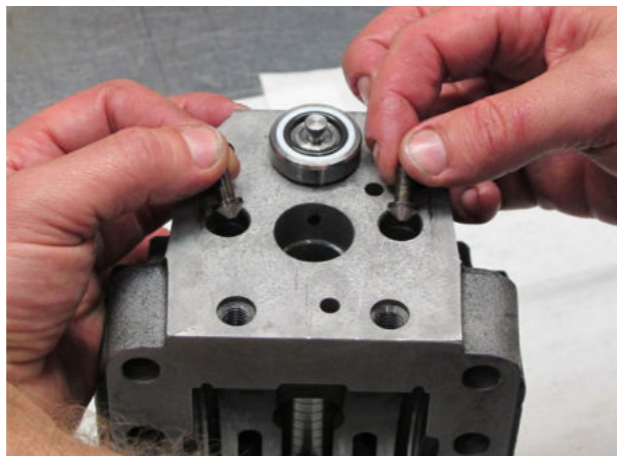


30. Assemble the threshold spring.

**Assembling, end cap**



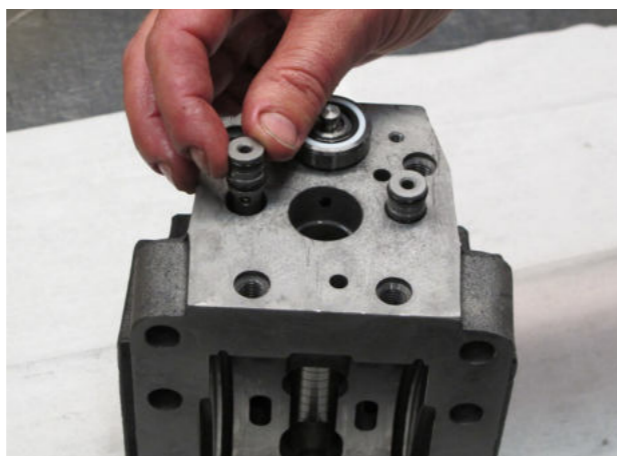
31. Assemble the spring seat.



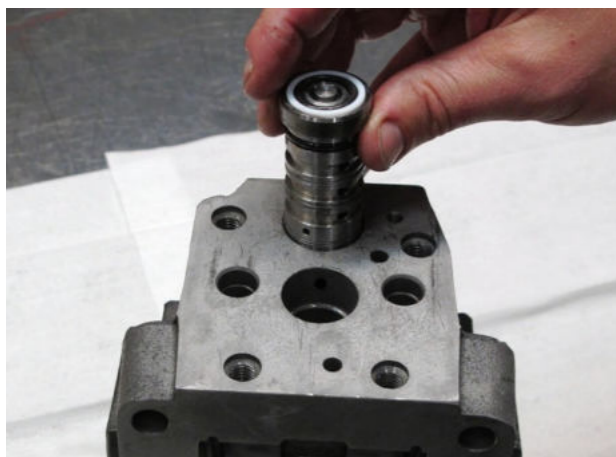
34. Assemble the valve cones.



32. Assemble the nozzles and torque them to  $1,2 \pm 0,2$  Nm.



35. Assemble the valve guides assy. Carefully tap them down with a hammer.

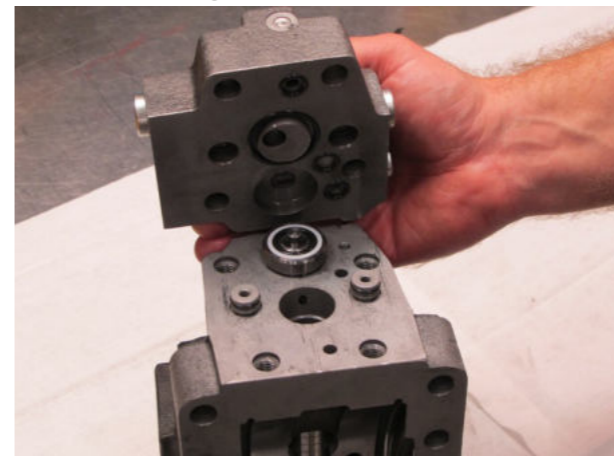


33. Assemble the valve sleeve assy. Make sure the spool hits the guide hole in the spring seat.

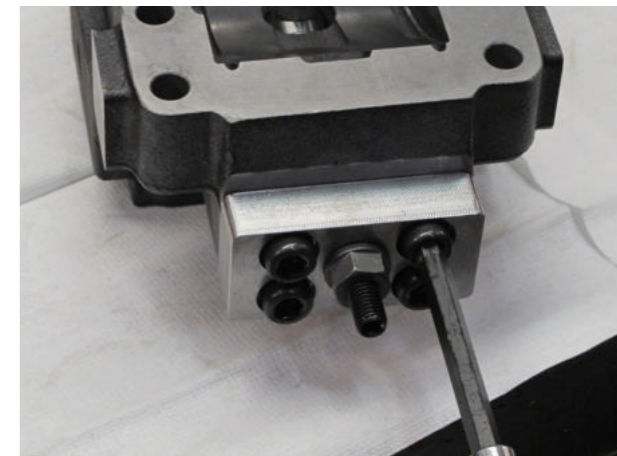


36. Assemble the nozzles and torque them to  $1,2 \pm 0,2$  Nm.

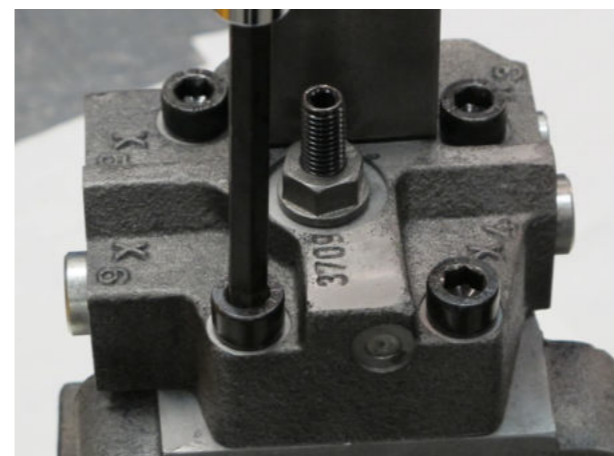
**Assembling, end cap**



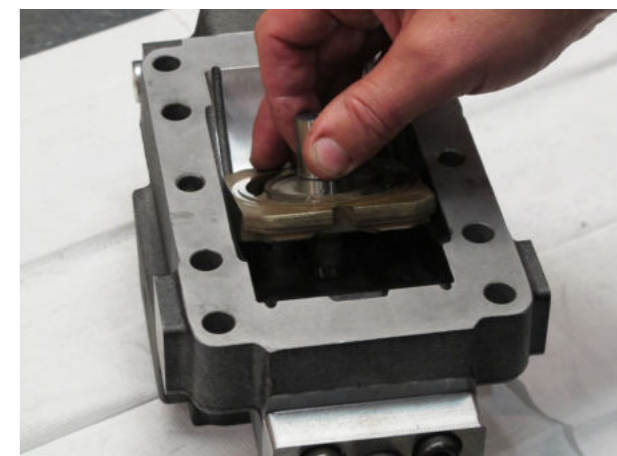
37. Assemble the control cover assy. Make sure the O-rings are in correct position.



40. Torque the screws to  $65 \pm 10$  Nm for V12-60 -- 110,  $105 \pm 20$  Nm for V12-160.



38. Torque the screws to  $65 \pm 10$  Nm for V12-60 -- 110,  $105 \pm 20$  Nm for V12-160.

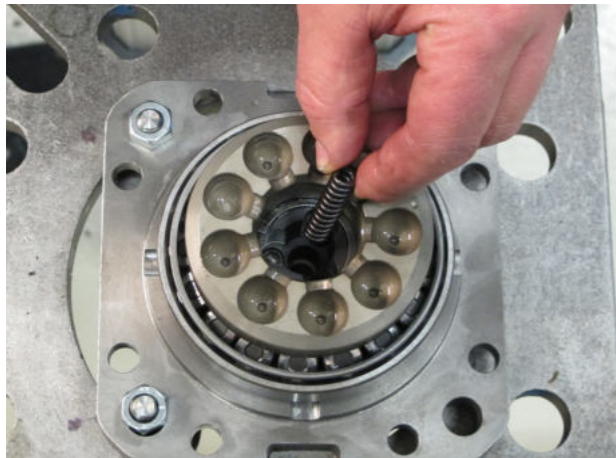


41. Assemble the valve segment in the end cap. The slot in the valve segment against the cover side.

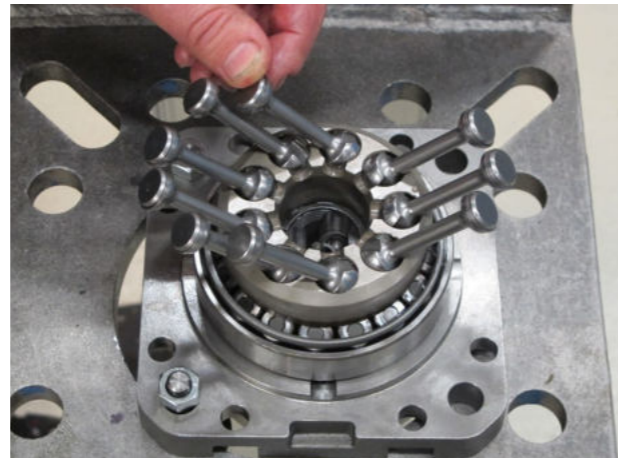


39. Assemble the cover assy. Make sure not to damage the O-ring.

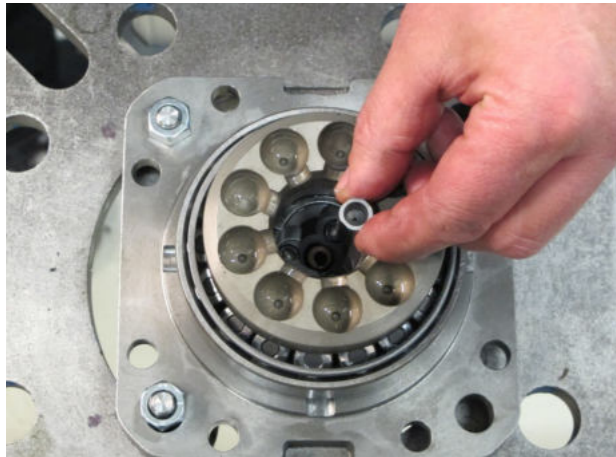
**Assembling, complete unit**



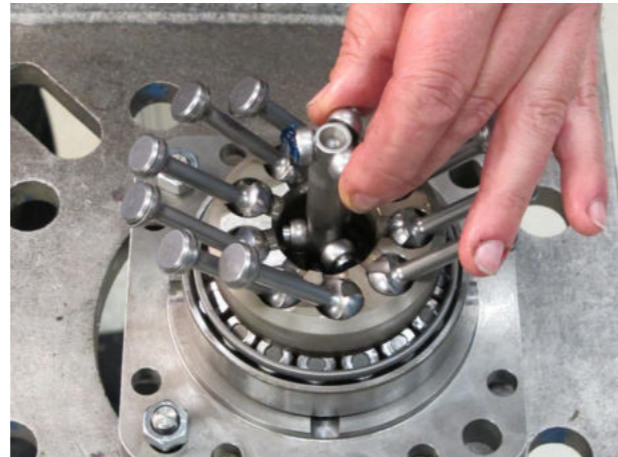
42. Place the bearing package in a fixture. Assemble the compression spring.



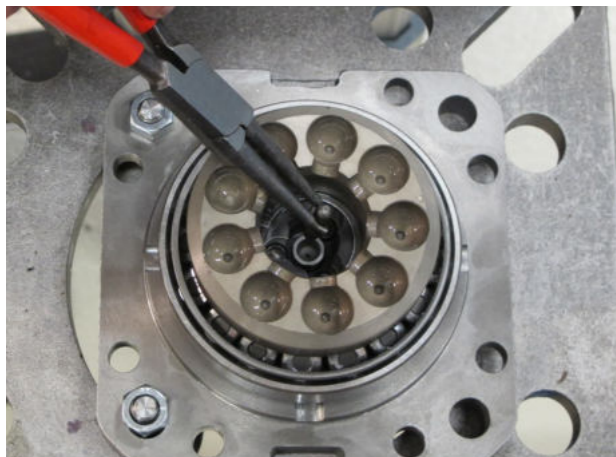
45. Assemble the pistons and line them up as shown in picture.



43. Assemble the guide pin.



46. Assemble the joint shaft with joint rollers. Add some grease to keep the joint rollers in place.

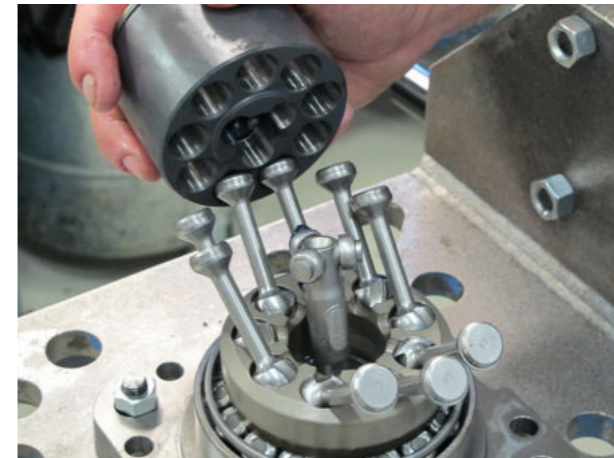


44. Assemble the support pin.

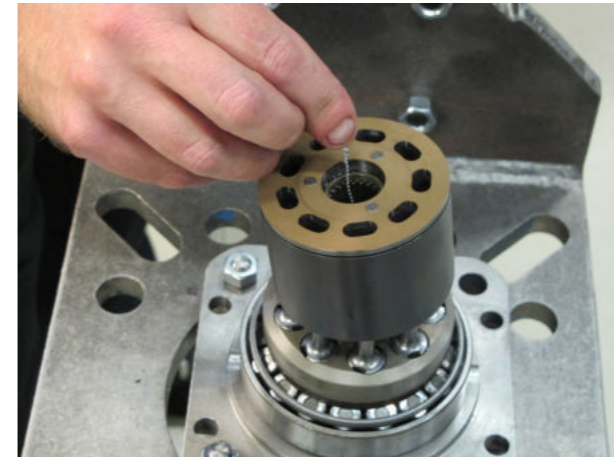


47. Assemble the support pin. Use a lot of grease to keep it in place.

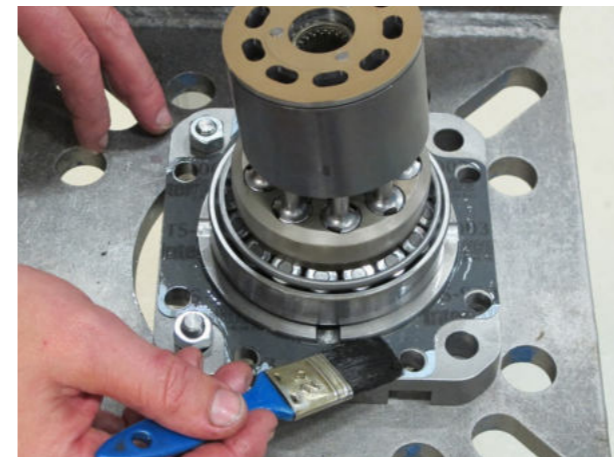
**Assembling, complete unit**



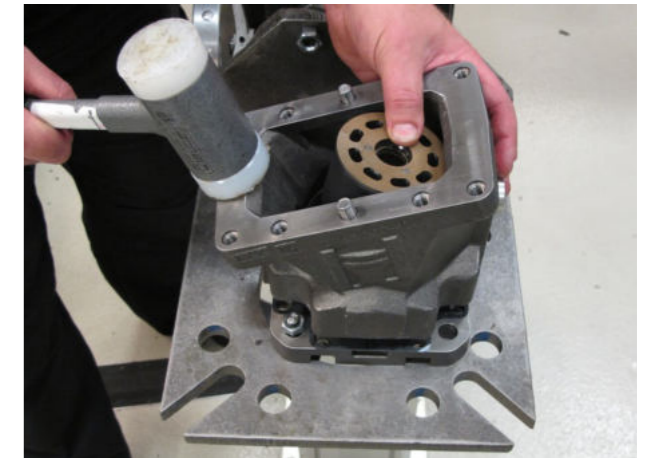
48. Assemble the cylinder barrel. Make sure that all rollers are in place.



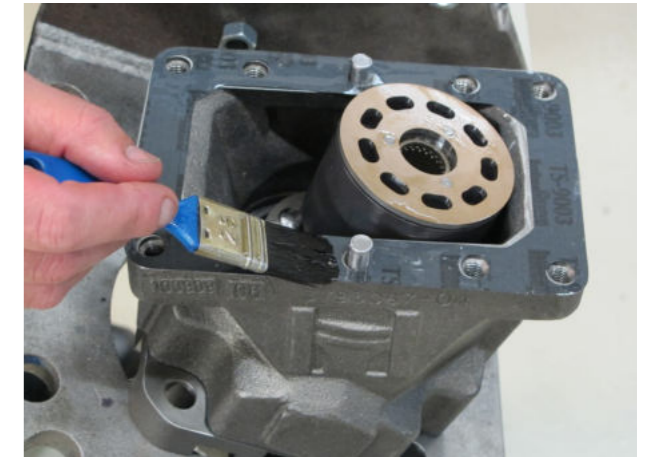
49. Make sure the support pin is in correct position by using a steel wire.



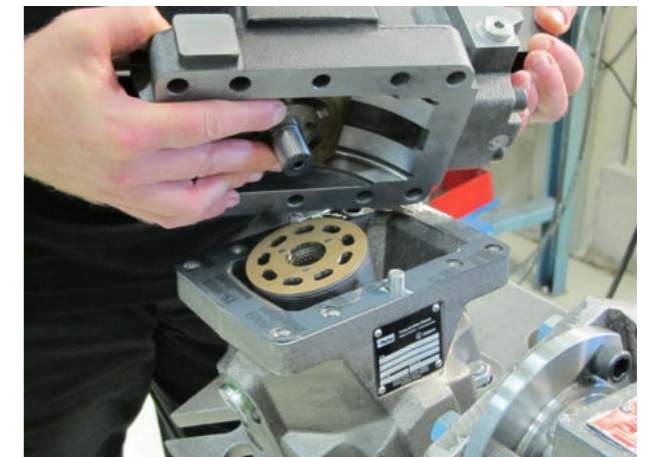
50. Assemble the gasket and lubricate it with hydraulic oil.



51. Assemble the bearing housing. Carefully knock it down with a plastic hammer. Secure the housing by assembling one screw.

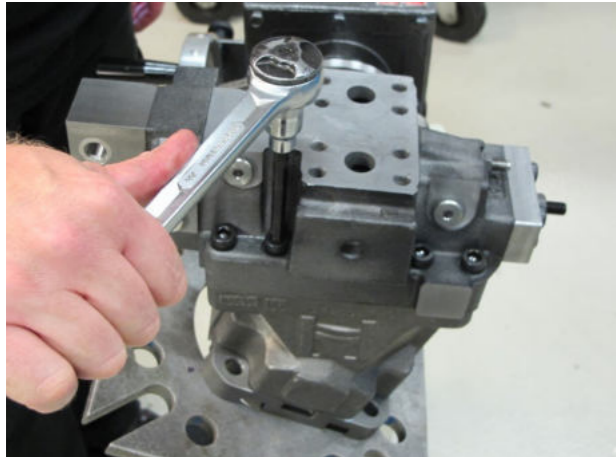


52. Assemble the gasket and lubricate it with hydraulic oil.



53. Assemble the end cap assy. Mind your fingers, don't squeeze them. Refer to page 14 for end cap location.

**Assembling, complete unit**

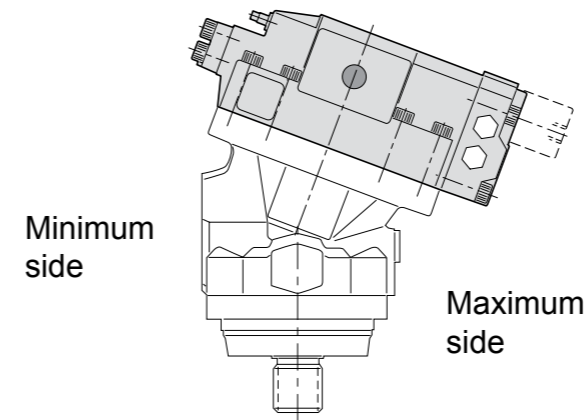


54. Assemble the screws and torque the screws to 65±10 Nm for V12-60/80 and 105±20 Nm for V12-110/160.

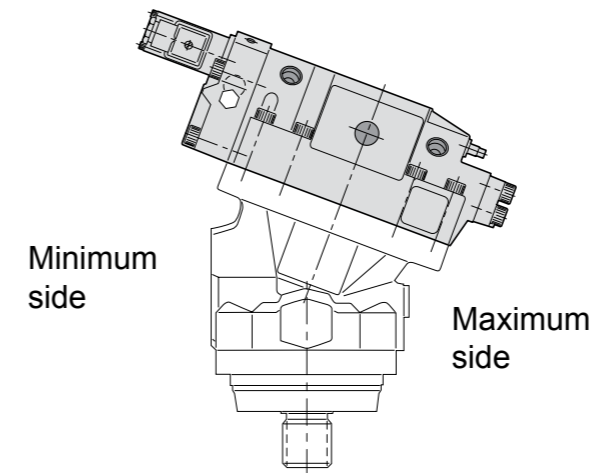


55. Assemble the screws and torque the screws to 65±10 Nm for V12-60/80 and 105±20 Nm for V12-110/160.

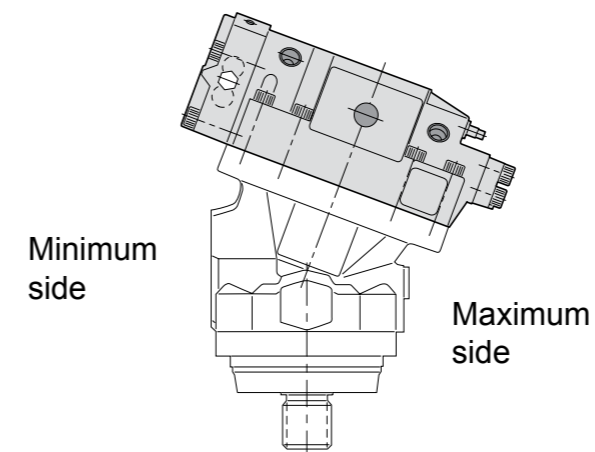
**End cap location**



AC and AH control should be assembled with the control cover at the maximum side.



EO and EP control should be assembled with the control cover at the minimum side.



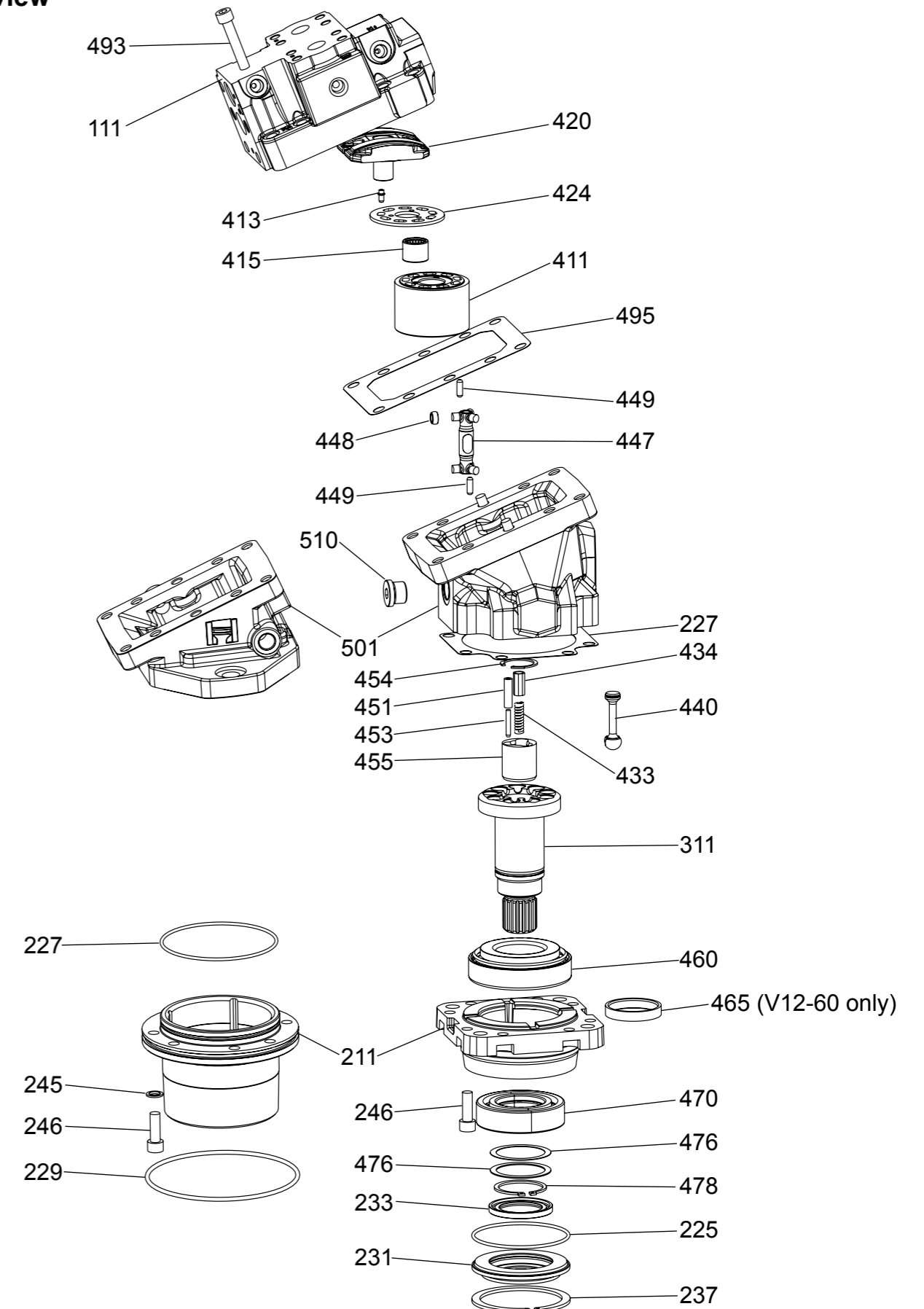
HO and HP control should be assembled with the control cover at the minimum side.



General Parts

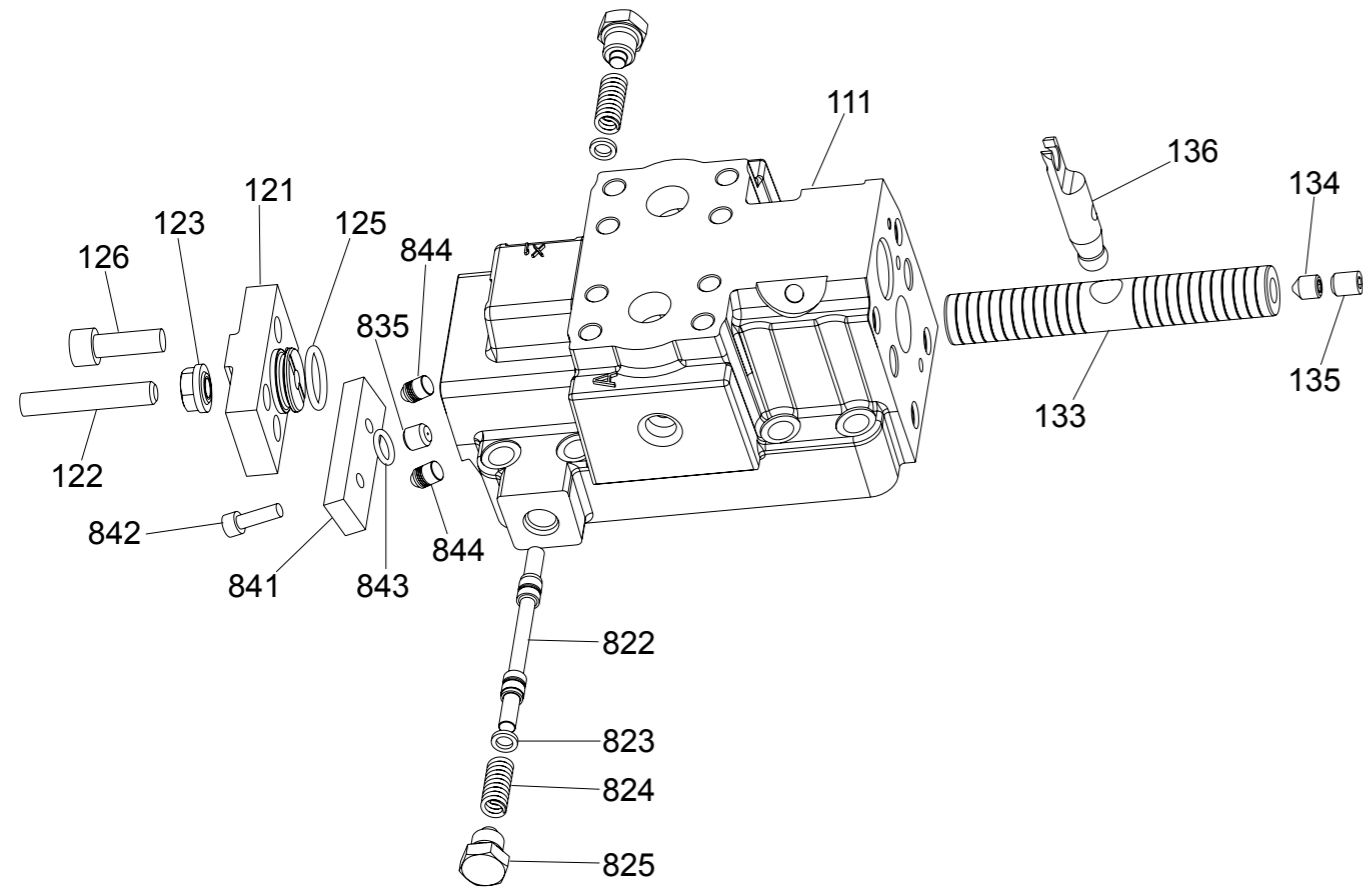
| Item | Title              | Benämning           |
|------|--------------------|---------------------|
| 111  | End Cap            | Ansl. Block         |
| 211  | Bearing Housing    | Lagerhus            |
| 225  | O-Ring             | O-Ring              |
| 227  | Gasket             | Packning            |
| 227  | O-Ring             | O-Ring              |
| 229  | O-Ring             | O-Ring              |
| 231  | Seal Carrier       | Tättringshållare    |
| 233  | Shaft Seal         | Tättningsring       |
| 237  | Retaining Ring     | Spårring            |
| 245  | Seal Washer        | Tätbricka           |
| 246  | Hex Socket Screw   | Insexskruv          |
| 311  | Shaft              | Axel                |
| 411  | Cylinder Barrel    | Cylindertrumma      |
| 413  | Guide Pin          | Styrstift           |
| 415  | Needle Bearing     | Nålbuskning         |
| 420  | Valve Segment      | Ventilsegment       |
| 424  | Sliding Plate      | Glidplatta          |
| 433  | Compression Spring | Tryckfjäder         |
| 434  | Guide Pin          | Styrpinne           |
| 440  | Piston Assy        | Kolv KPL            |
| 447  | Joint Shaft        | Synkroniseringsaxel |
| 448  | Joint Roller       | Rulle               |
| 449  | Support Pin        | Stödpinne           |
| 451  | Spring Pin         | Rörpinne            |
| 453  | Pin                | Pinne               |
| 454  | Retaining ring     | Spårring            |
| 455  | Joint Coupling     | Medbringare         |
| 460  | Tap Rol Bearing    | Kon Rullager        |
| 465  | Spacer Sleeve      | Distanshylsa        |
| 470  | Cyl Bearing        | Cyl Lager           |
| 476  | Spacer Washer      | Distansbricka       |
| 476  | Spacer Washer      | Distansbricka       |
| 478  | Retaining Ring     | Spårring            |
| 493  | Hex Socket Screw   | Insexskruv          |
| 495  | Gasket             | Packning            |
| 501  | Bearing Housing    | Lagerhus            |
| 510  | Hexagon Plug       | Insexpropp          |

Split view



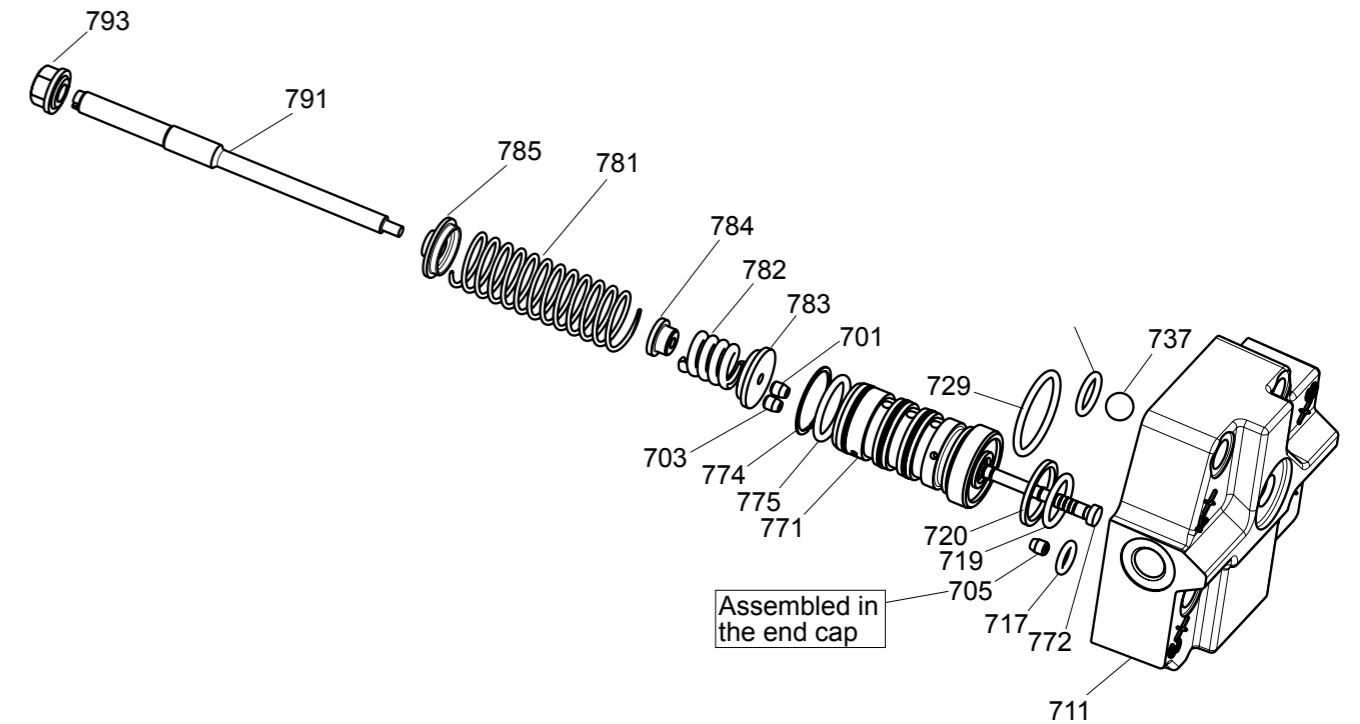
**General Parts End Cap**

| Item Title             | Benämning        |
|------------------------|------------------|
| 111 End Cap            | Anslutningsblock |
| 121 Cover              | Lock             |
| 122 Set Screw          | Ställskruv       |
| 123 Seal Nut           | Tätmutter        |
| 125 O-Ring             | O-Ring           |
| 126 Hex Socket Screw   | Insexskruv       |
| 133 Setting Piston     | Ställkolv        |
| 134 Set Screw          | Stoppskruv       |
| 135 Set Screw          | Stoppskruv       |
| 136 Companion Pin      | Medbringartapp   |
| 822 Shuttle            | Spolkolv         |
| 823 Washer             | Bricka           |
| 824 Compression Spring | Tryckfjäder      |
| 825 Hexagon Plug       | Sexkantpropp     |
| 835 Nozzle             | Munstycke        |
| 841 Protective Cover   | Skyddslock       |
| 842 Hex Socket Screw   | Insexskruv       |
| 843 O-Ring             | O-Ring           |
| 844 Expanding Plug     | Expanderplugg    |

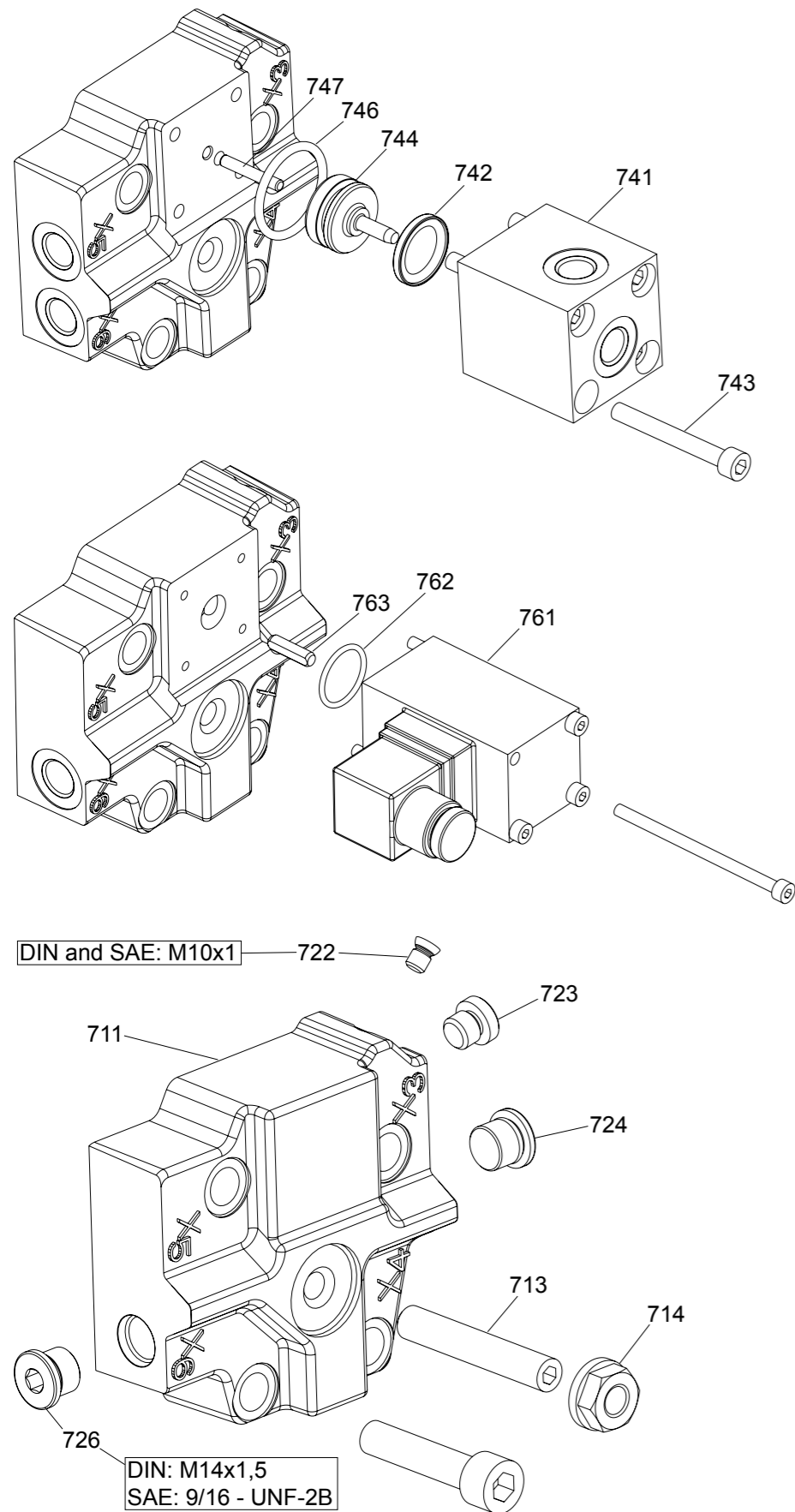


**General Parts Control**

| Item Title                   | Benämning           |
|------------------------------|---------------------|
| 701 Nozzle                   | Munstycke           |
| 703 Nozzle                   | Munstycke           |
| 705 Nozzle                   | Munstycke           |
| 711 Control Cover            | Regulatorlock       |
| 719 O-Ring                   | O-Ring              |
| 720 Support Ring             | Stödring            |
| 729 O-Ring                   | O-Ring              |
| 735 Valve Cone               | Ventilkägla         |
| 736 Valve Guide              | Ventilsäte          |
| 737 O-Ring with Support Ring | O-Ring med Stödring |
| 771 Valve Sleeve             | Ventilfoder         |
| 772 Valve Spool              | Ventilslid          |
| 774 Piston Ring              | Lamelling           |
| 775 O-Ring                   | O-Ring              |
| 781 Modulating Spring        | Tryckfjäder         |
| 782 Threshold Spring         | Tryckfjäder         |
| 783 Spring Seat              | Fjädersäte          |
| 784 Spring Seat              | Fjädersäte          |
| 785 Spring Guide             | Fjädersäte          |
| 791 Adjusting Screw          | Ställskruv          |
| 793 Sealing Nut              | Tätmutter           |



General Parts Controls

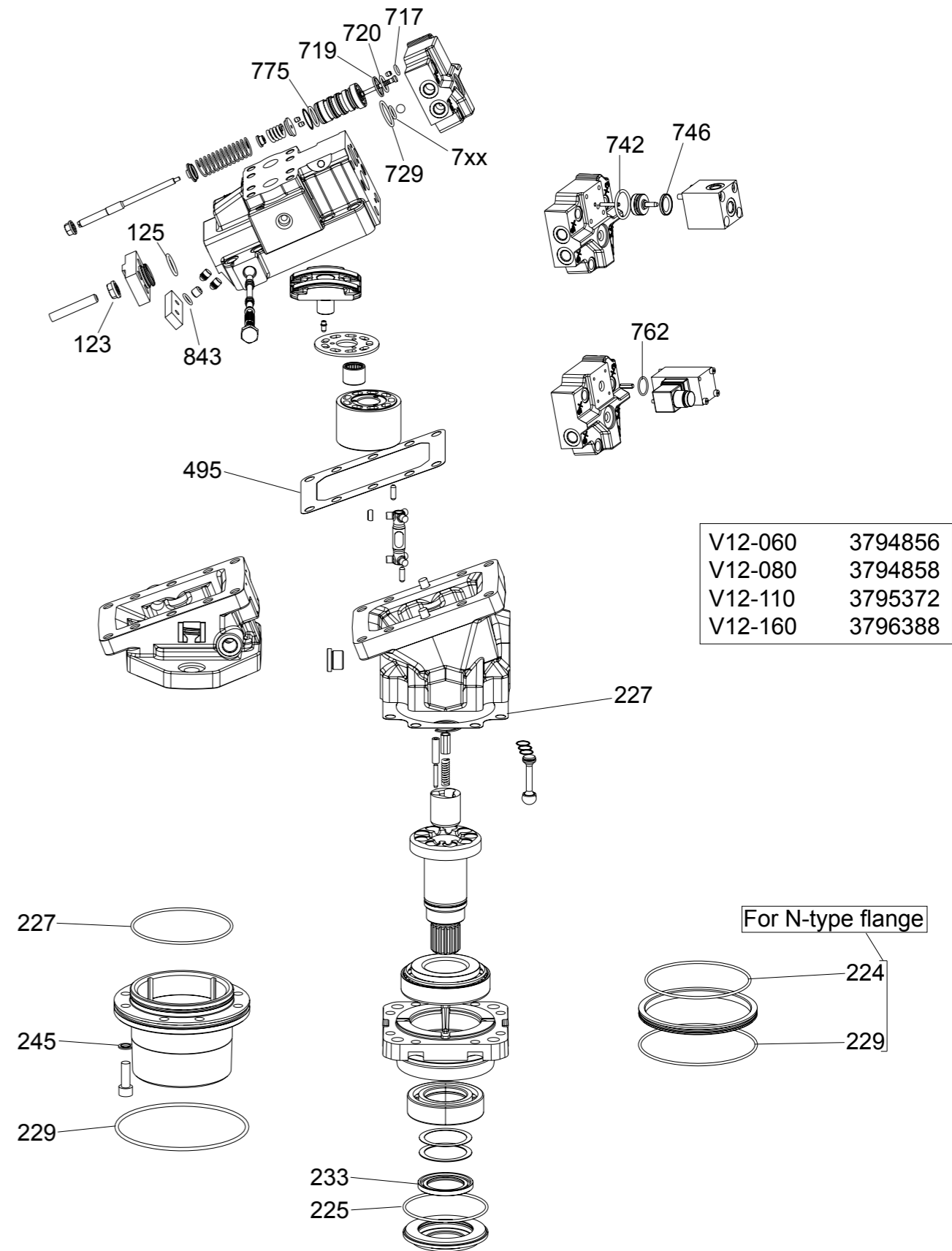


- | Item | Title          |
|------|----------------|
| 741  | AH Housing     |
| 742  | O-Ring         |
| 743  | Hex S Screw    |
| 744  | Control Piston |
| 746  | Piston Seal    |
| 747  | Guide Pin      |

- | Item | Title     |
|------|-----------|
| 761  | Solenoid  |
| 762  | O-Ring    |
| 763  | Guide Pin |

- | Item | Title         |
|------|---------------|
| 711  | Control Cover |
| 713  | Set Screw     |
| 714  | Seal Nut      |
| 722  | Seal Plug     |
| 723  | Hexagon Plug  |
| 724  | Hexagon Plug  |
| 726  | Hexagon Plug  |

Seal Kit Specification



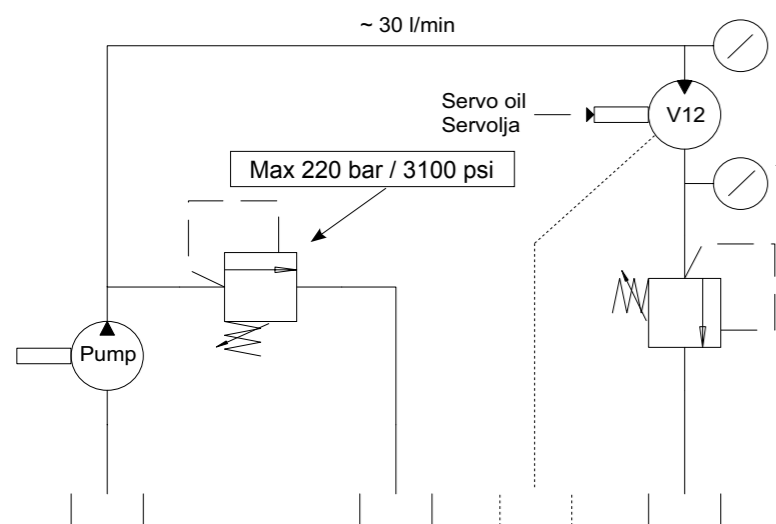
|         |         |
|---------|---------|
| V12-060 | 3794856 |
| V12-080 | 3794858 |
| V12-110 | 3795372 |
| V12-160 | 3796388 |

**Test procedure**

Use a test stand that supplies a flow of about 30 l/min. and pressures of up to 300 bar. A secondary flow of 3-5 l/min. at a pressure of 25 bar is required to supply low pressure for externally supplied controls. EP control requires an amplifier supplying correct current according to specification.

**Test**

1. Fill housing with hydraulic fluid and start the pump in the test stand.
2. Increase the pressure with the restrictor valve on the return line. Max allowed pressure is 150 bar / 2150 psi.
3. Check the drain flow and compare with the table.



**Funktionskontroll**

För funktionskontroll behövs en provbänk med kapacitet 30l/min och 300 bar. Ett sekundärflöde på 3-5 l/min och tryck 25 bar krävs för ställdon med extern matning. EP ställdon kräver en förstärkare.

**Test**

1. Fyll V12 med olja i huset och starta pumpen i testbänken.
2. Öka trycket med strypventilen på returledningen. Trycket får inte överstiga 150 bar / 2150 psi.
3. Mät läckflödet och kontrollera mot tabellen

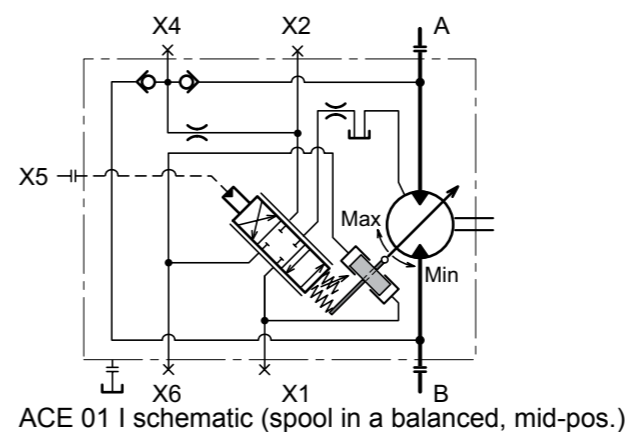
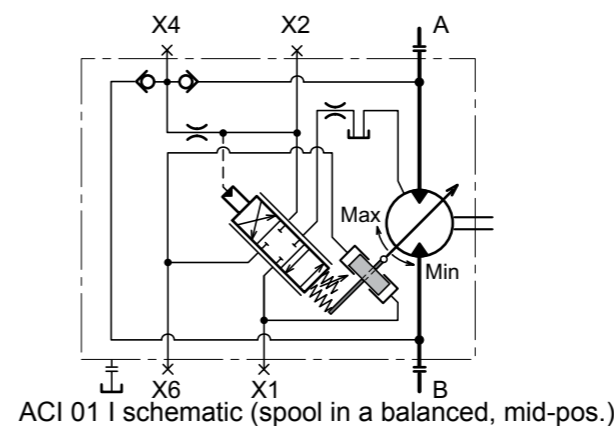
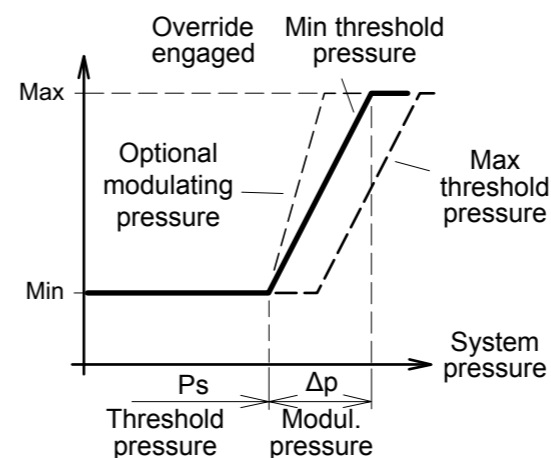
Max 150 bar / 2150 psi

|             |               |
|-------------|---------------|
| V12-60, -80 | V12-110, -160 |
| 3.0         | 4.0           |

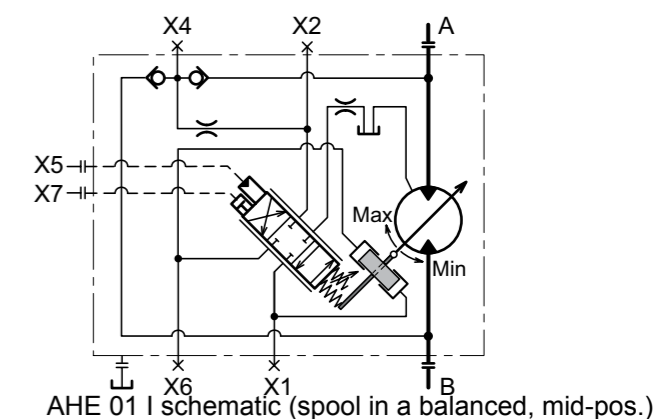
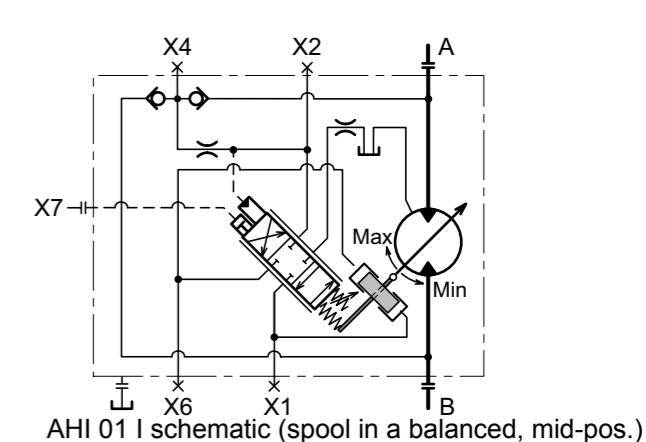
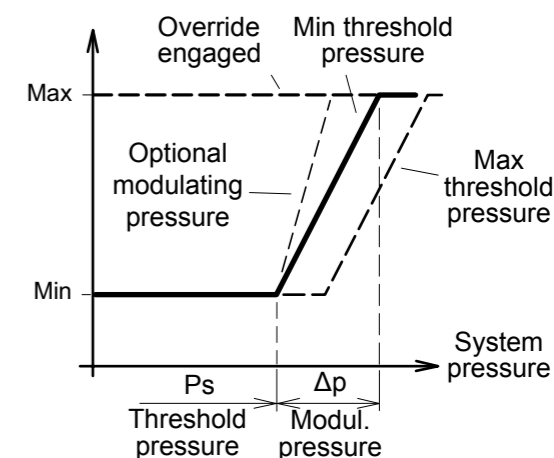
Drain flow (l/min.), control not activated.

- Gauge/Pilot ports (AC and AH control)**
- X1 Setting piston pressure (increasing displ.)
  - X2 Servo supply pressure (after orifice)
  - X4 Servo supply pressure (before orifice)
  - X5 External pilot pressure
  - X6 Setting piston pressure (decreasing displ.)
  - X7 Override pressure (only AH control)
- Ports are:**
- M14x1.5 (ISO and cartridge versions)
  - 9/16"-18 O-ring boss (SAE version)

Displacement (setting piston position)



Displacement (setting piston position)



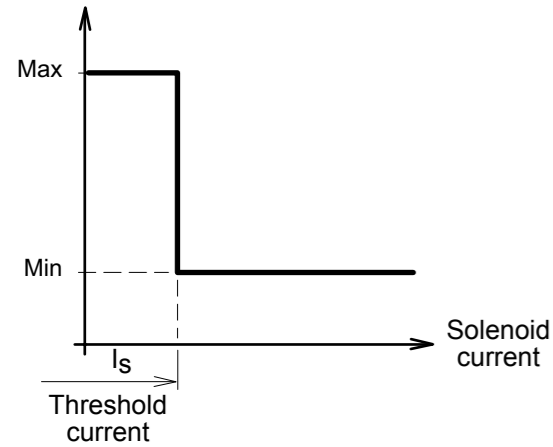
**Gauge/Pilot ports (EO and EP control)**

- X1 Setting piston pressure (max-to-min, EO)
- X1 Setting piston pressure (decreasing displ. EP)
- X2 Servo supply pressure (after orifice)
- X4 Servo supply pressure (before orifice)
- X6 Setting piston pressure (min-to-max, EO)
- X6 Setting piston pressure (increasing displ. EP)

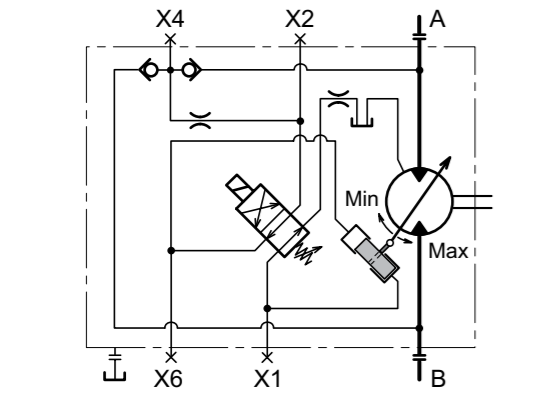
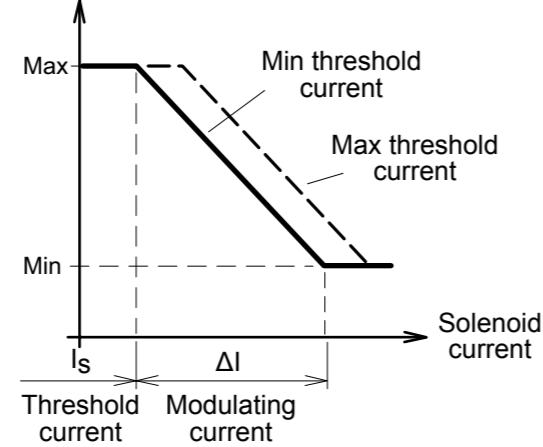
**Ports are:**

- M14x1.5 (ISO and cartridge versions)
- 9/16"-18 O-ring boss (SAE version)

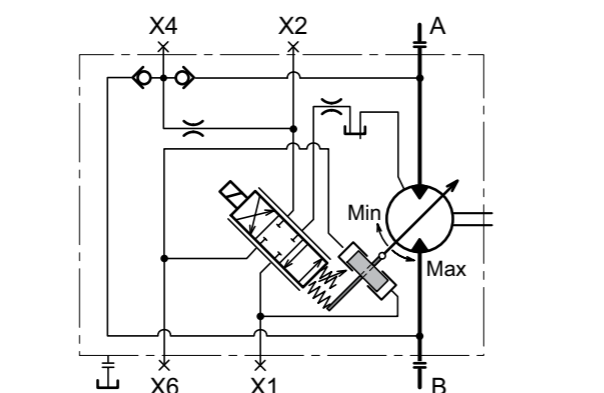
Displacement  
(setting piston position)



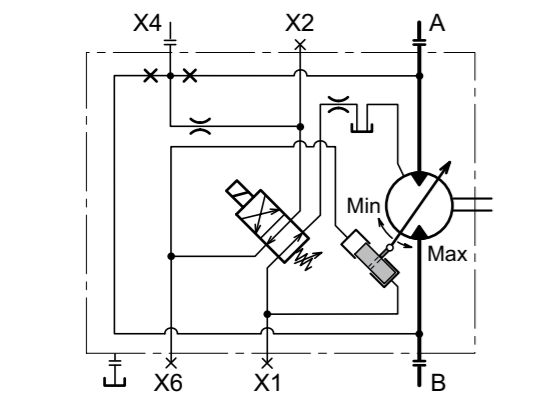
Displacement  
(setting piston position)



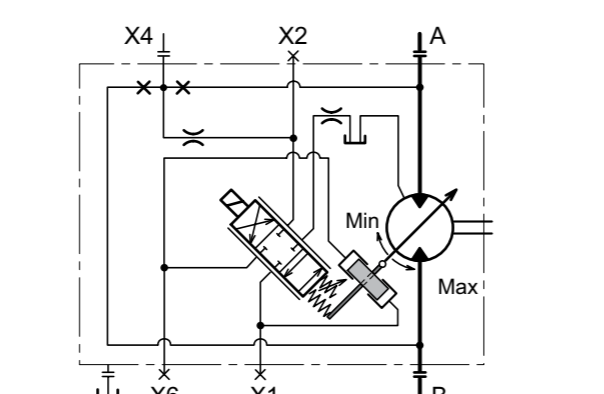
EOH 01 I schematic (non-activated solenoid)



EPH 01 I schematic (spool in balanced, mid-pos.)



EOH 01 E schematic (non-activated solenoid)



EPH 01 E schematic (spool in balanced, mid-pos.)

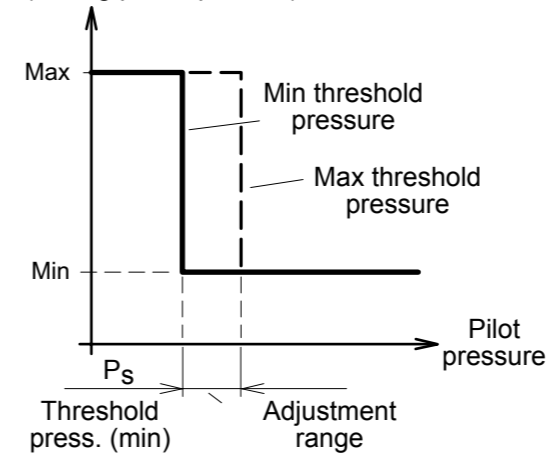
**Gauge/Pilot ports (HO and HP control)**

- X1 Setting piston pressure (max-to-min, HO)
- X1 Setting piston pressure (decreasing displ. HP)
- X2 Servo supply pressure (after orifice)
- X4 Servo supply pressure (before orifice)
- X5 External pilot pressure (max 100 bar)
- X6 Setting piston pressure (min-to-max, HO)
- X6 Setting piston pressure (increasing displ. HP)

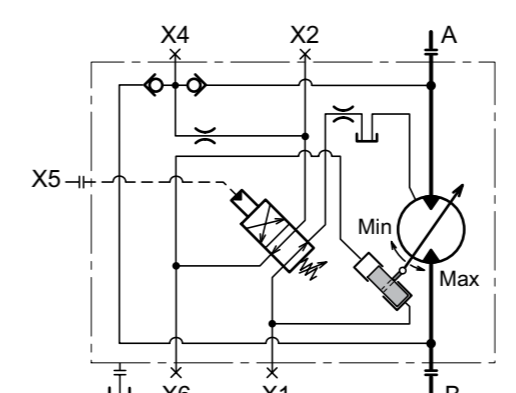
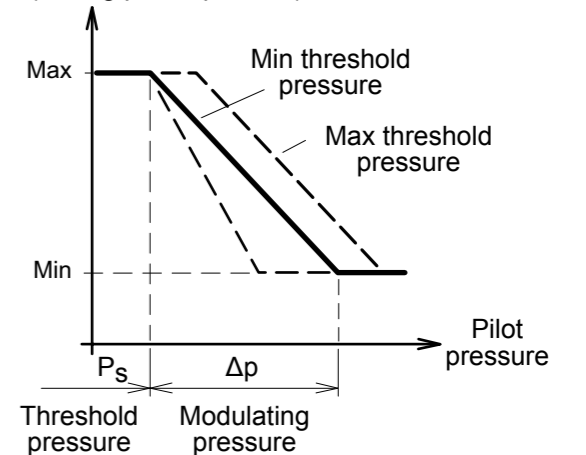
**Ports are:**

- M14x1.5 (ISO and cartridge versions)
- 9/16"-18 O-ring boss (SAE version)

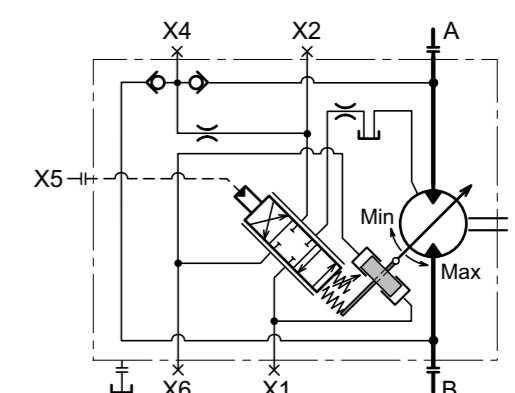
Displacement  
(setting piston position)



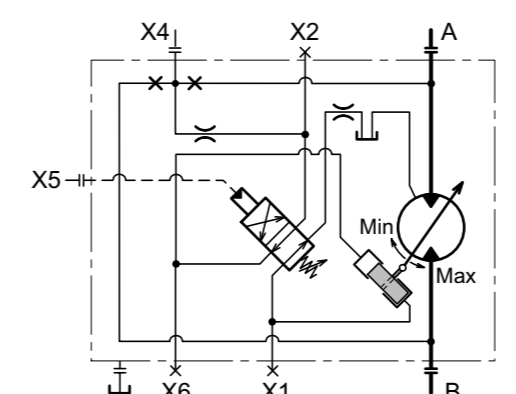
Displacement  
(setting piston position)



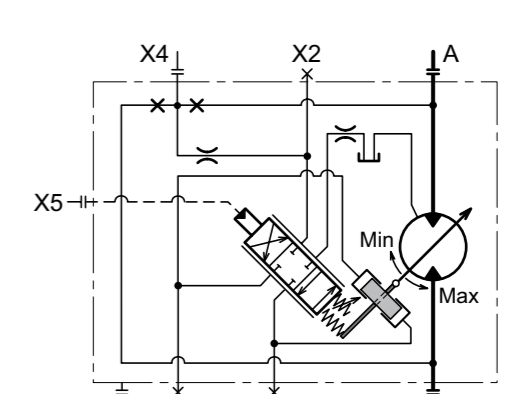
HO S 01 I schematic (X5 not pressurized)



HP S 01 I schematic (spool in a balanced, mid-pos.)



HO S 01 E schematic (X5 not pressurized)



HP S 01 E schematic (spool in a balanced, mid-pos.)





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