Bulletin HY30-5506-M1/UK

Service Manual
Series V12

Effective: February, 2014
Supersedes: May, 2013

List of contents

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^3	= 0.061024 in^3
1 m	= 3.2808 feet
1 mm	= 0.03937 in
1 °C	= 1.8°F + 32

Parker Hannifin
Pump and Motor Division
Trollhättan, Sweden

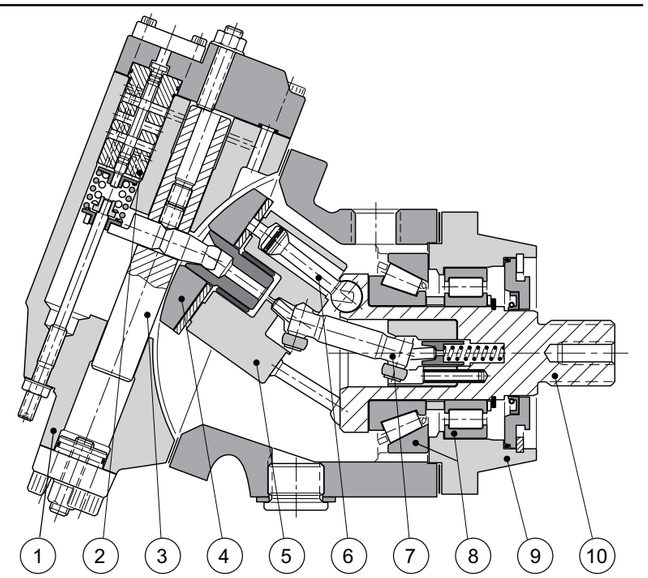
Specifications

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

[1] 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



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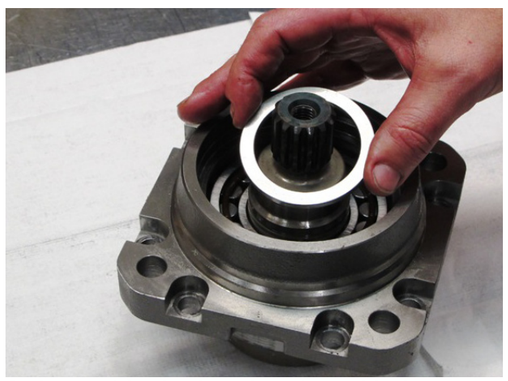
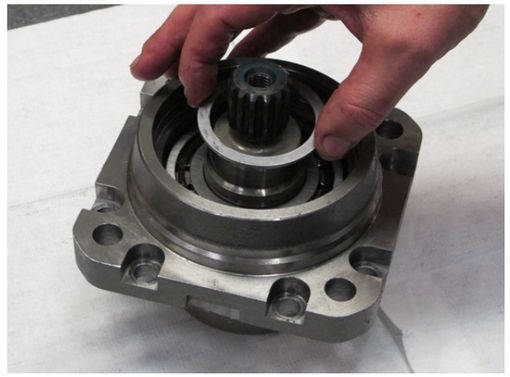
Assembling, shaft package

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

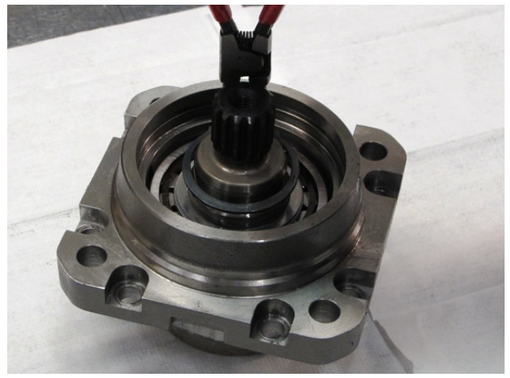
2. Press down the roller bearing with the text upwards into the flange and assemble it on the shaft package.



3. Assemble the bearing ring with the text downwards.



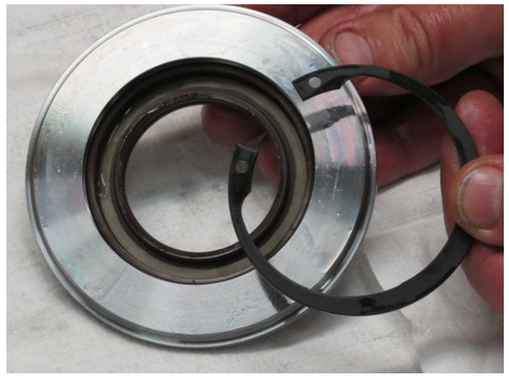
4. Assemble the shim.



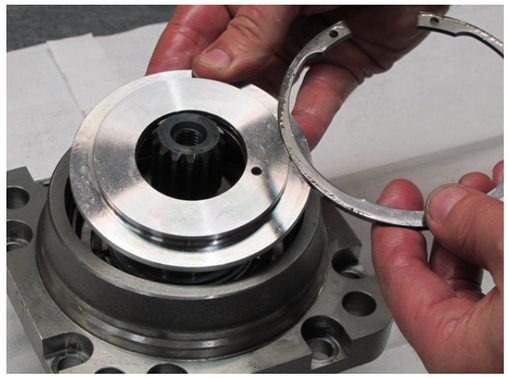
5. Assemble the retaining ring. Make sure it is all the way into the groove. Check the pre-load of the bearings, not to tight and no back-lash.

6. Assemble the O-ring.

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

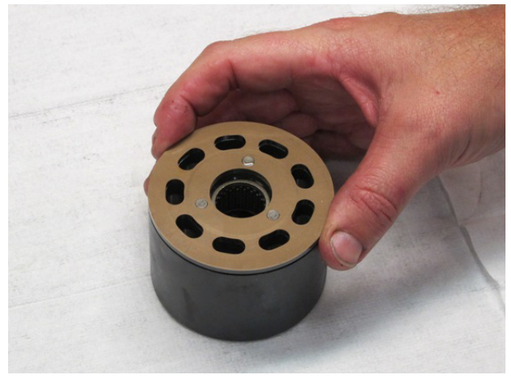


7. Press down the shafts seal in the seal carrier and assemble the retaining ring.



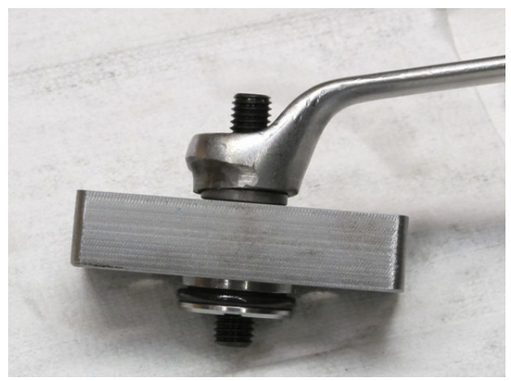
8. Assemble the seal carrier with shaft seal and the retaining ring. Make sure it is all the way into the groove.

9. Assemble the guide pins.



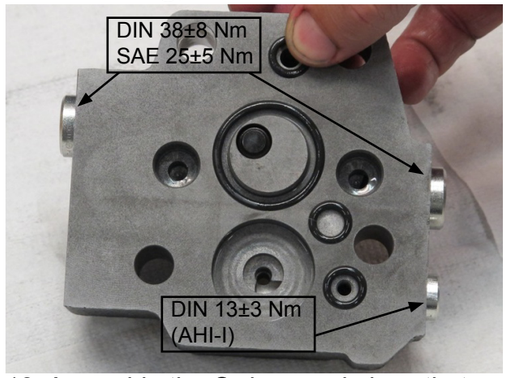
10. Assemble the sliding plate.

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

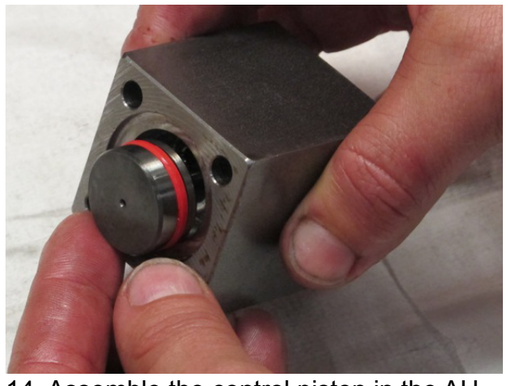


12. Assemble the displacement setting screw, seal nut and the O-ring.

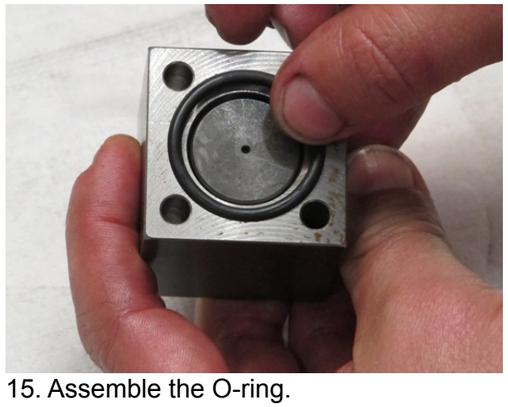
Assembling, control cover



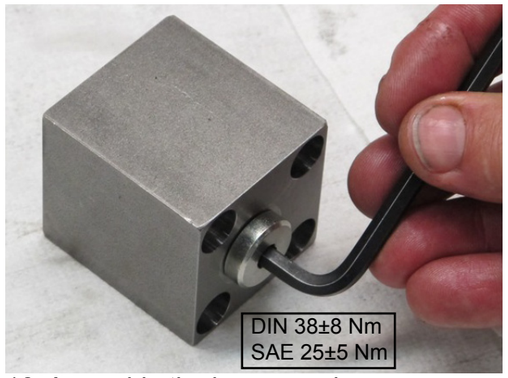
13. Assemble the O-rings and plugs that are required for the specific control cover. AH-control is shown in the picture.



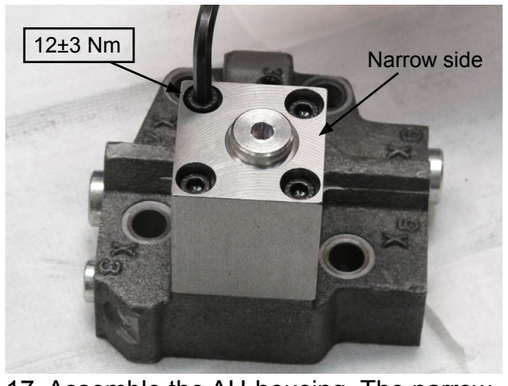
14. Assemble the control piston in the AH-housing.



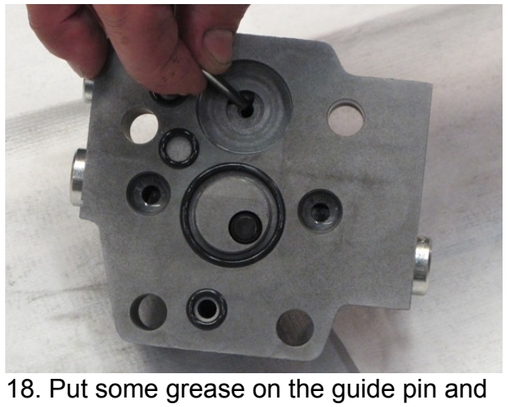
15. Assemble the O-ring.



16. Assemble the hexagon plug.

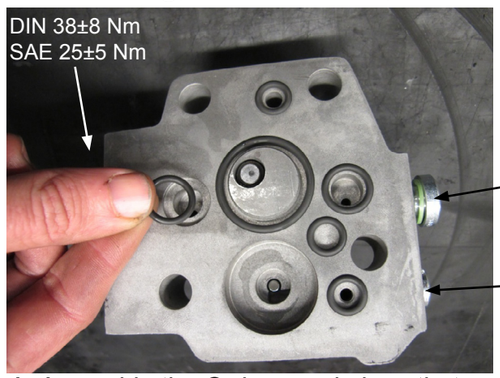


17. Assemble the AH-housing. The narrow side against X5.



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

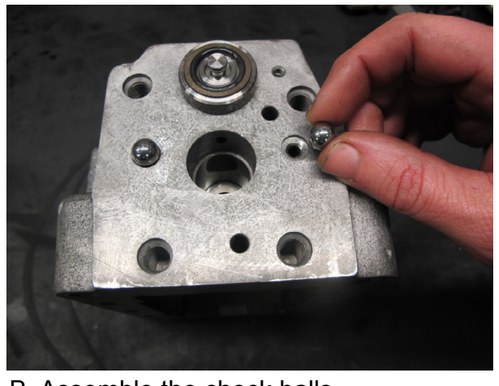


The control cover shown in picture is bi-directional.

DIN 38±8 Nm
SAE 25±5 Nm

DIN 13±3 Nm
(AHI-I)

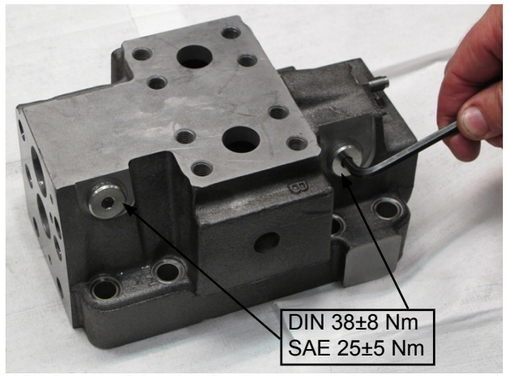
A. Assemble the O-rings and plugs that are required for the specific control cover. AH-control is shown in the picture.



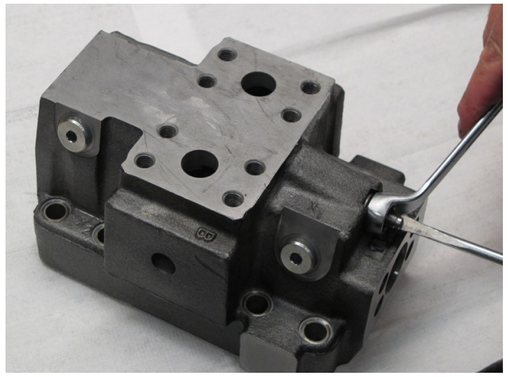
B. Assemble the check balls.

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.

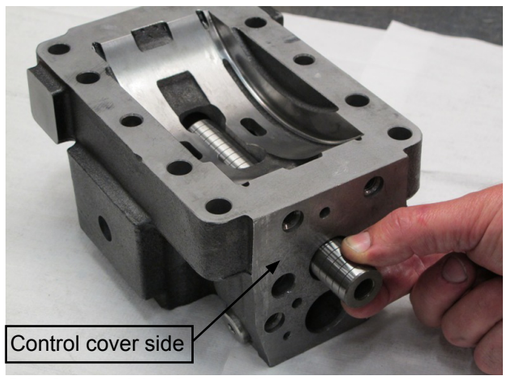
Assembling, end cap



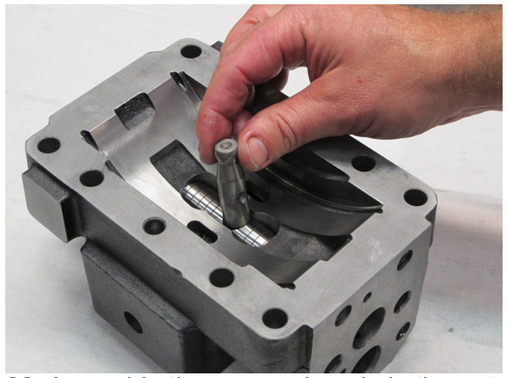
19. Assemble the hexagon plugs.



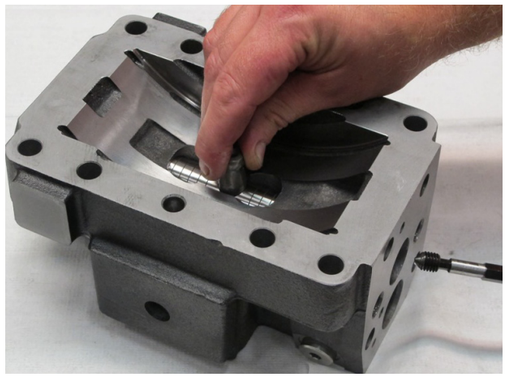
20. Assemble the adjusting screw and seal nut.



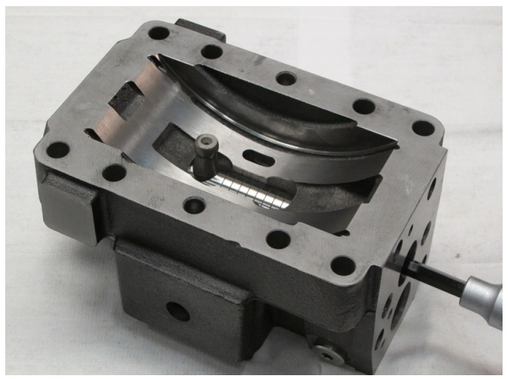
21. Assemble the setting piston in the end cap. Make sure the thread is against the control cover side.



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

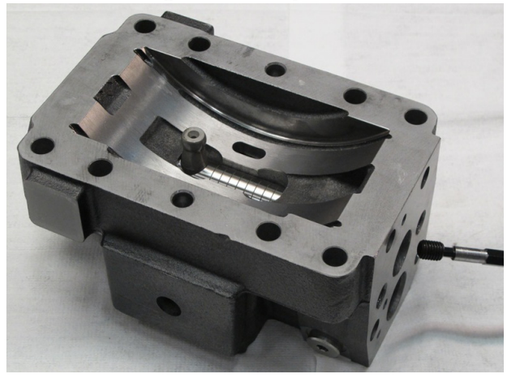


23. Assemble the set screw with the pointed end. Make sure that it hits the location hole in the companion pin.

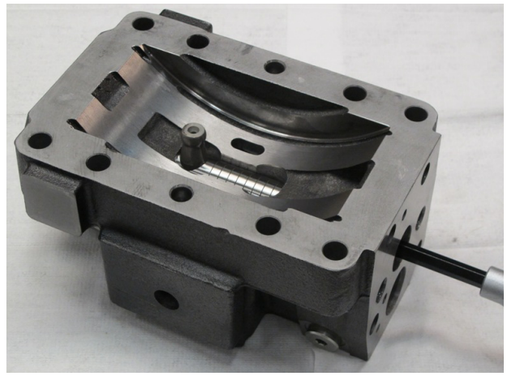


24. Torque the set screw to 14±4 Nm.

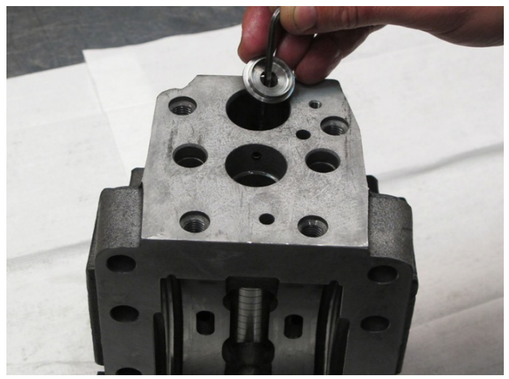
Assembling, end cap



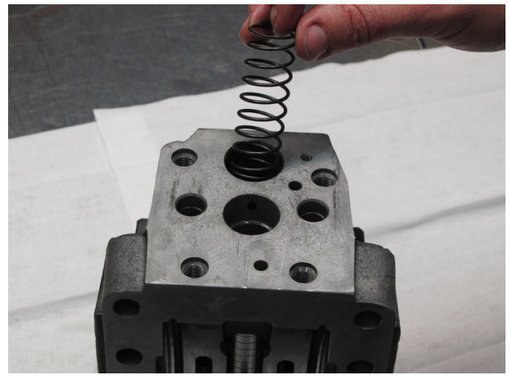
25. Assemble the set screw with the flat end.



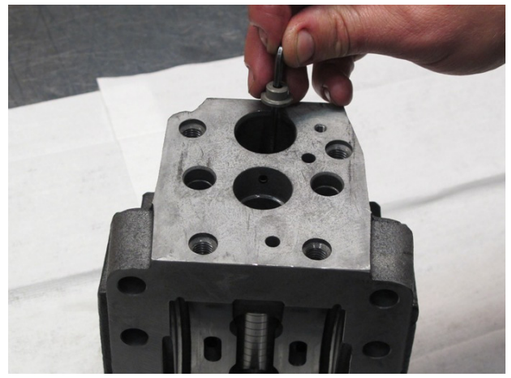
26. Torque the set screw to 26±6 Nm. Move the companion pin back and forward to make sure it moves smooth.



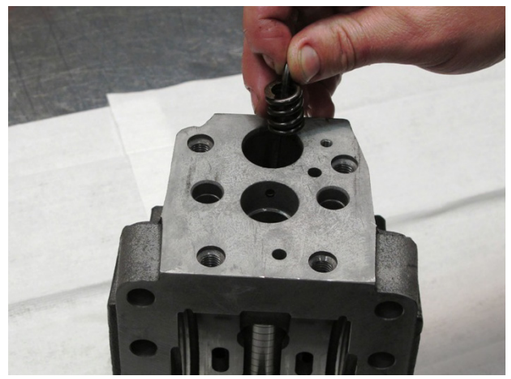
27. Assemble the spring guide. Use a long allen key to locate the spring guide.



28. Assemble the modulating spring.

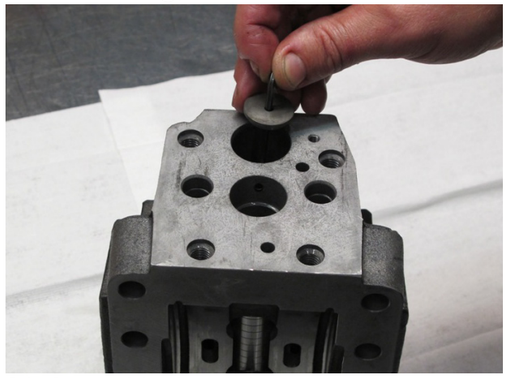


29. Assemble the spring seat.



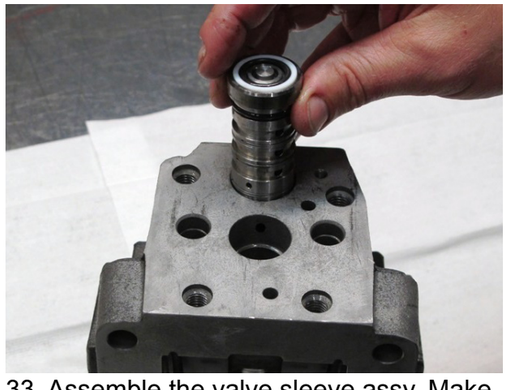
30. Assemble the threshold spring.

Assembling, end cap

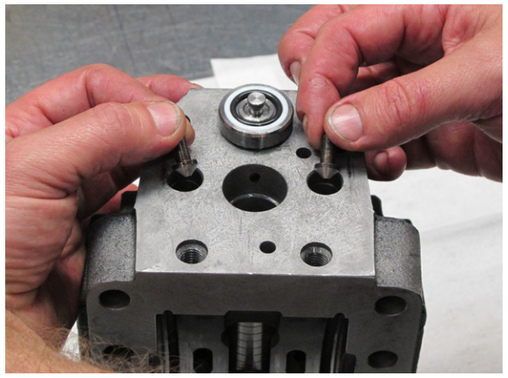


31. Assemble the spring seat.

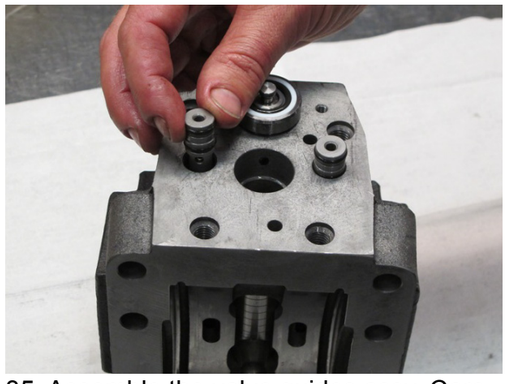
32. Assemble the nozzles and torque them to 1,2±0,2 Nm.



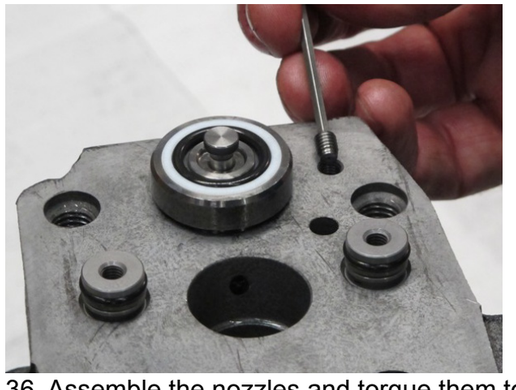
33. Assemble the valve sleeve assy. Make sure the spool hits the guide hole in the spring seat.



34. Assemble the valve cones.

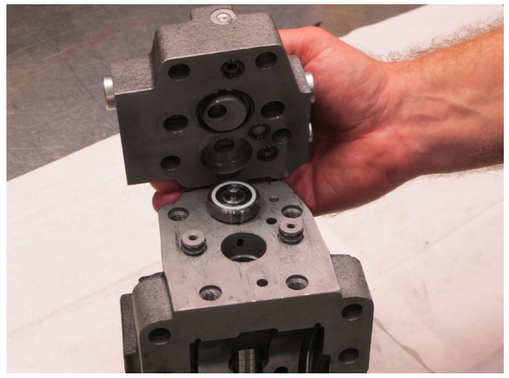


35. Assemble the valve guides assy. Carefully tap them down with a hammer.

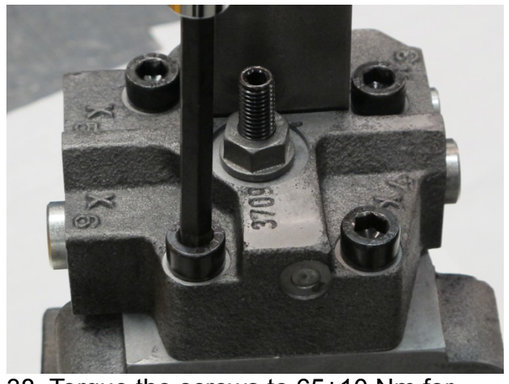


36. Assemble the nozzles and torque them to 1,2±0,2 Nm.

Assembling, end cap

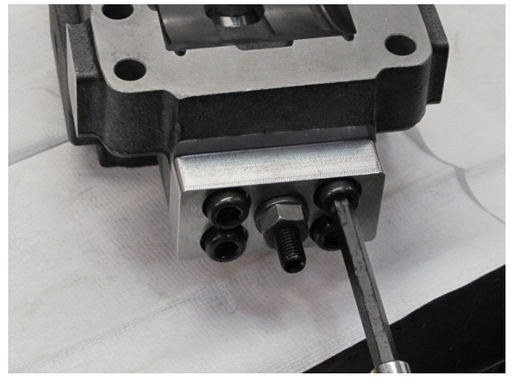


37. Assemble the control cover assy. Make sure the O-rings are in correct position.

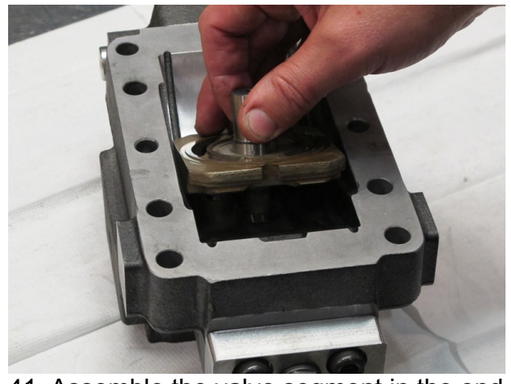


38. Torque the screws to 65±10 Nm for V12-60 -- 110, 105±20 Nm for V12-160.

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

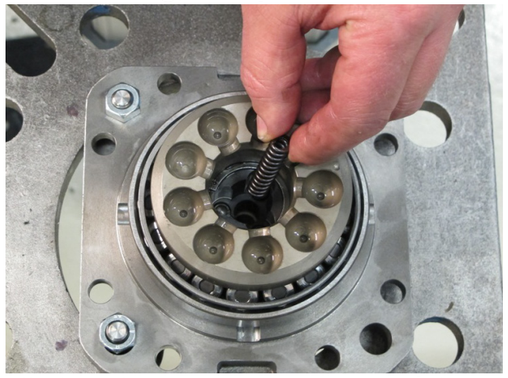


40. Torque the screws to 65±10 Nm for V12-60 -- 110, 105±20 Nm for V12-160.

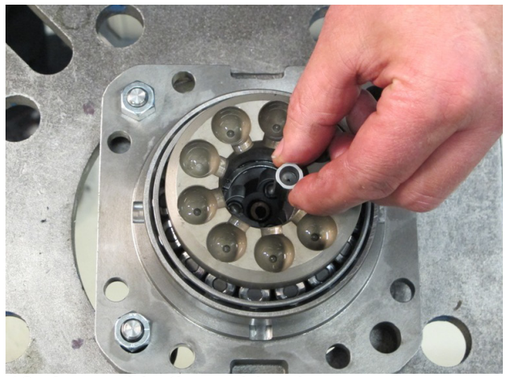


41. Assemble the valve segment in the end cap. The slot in the valve segment against the cover side.

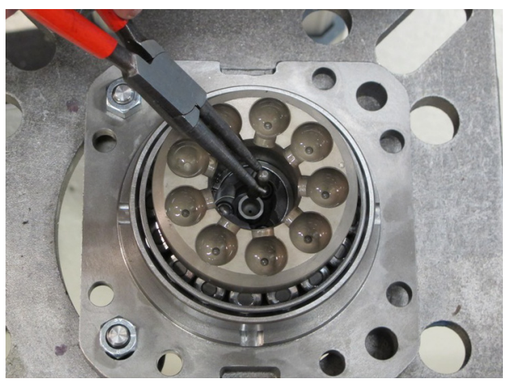
Assembling, complete unit



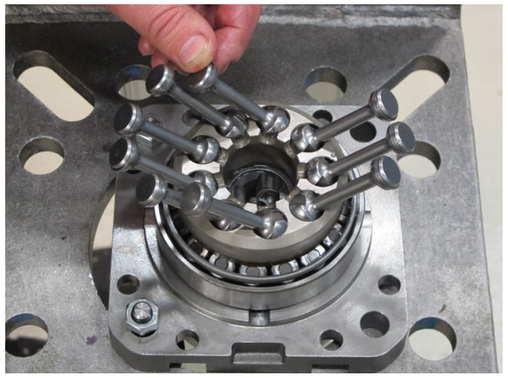
42. Place the bearing package in a fixture. Assemble the compression spring.



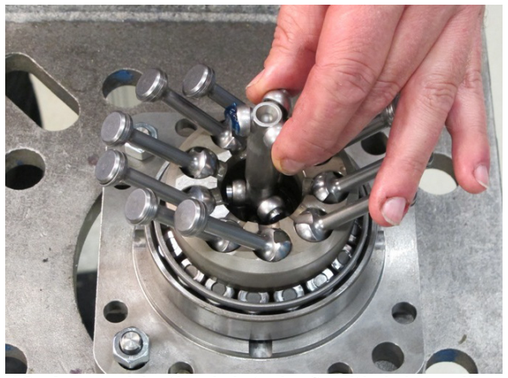
43. Assemble the guide pin.



44. Assemble the support pin.



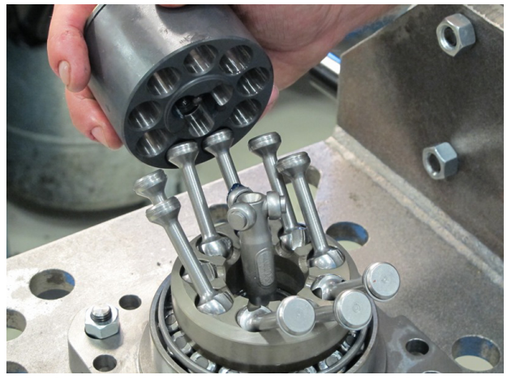
45. Assemble the pistons and line them up as shown in picture.



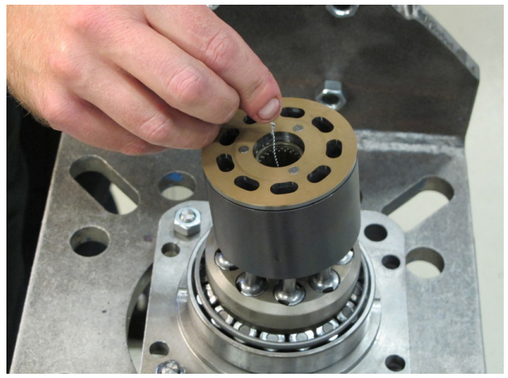
46. Assemble the joint shaft with joint rollers. Add some grease to keep the joint rollers in place.

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

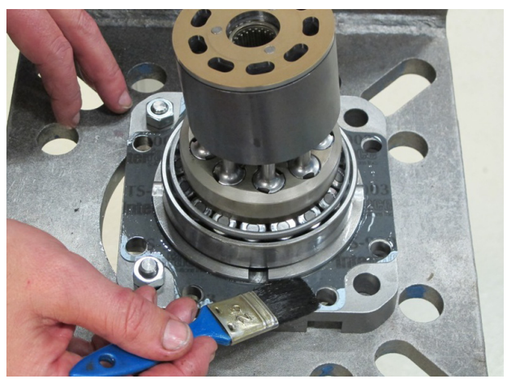
Assembling, complete unit



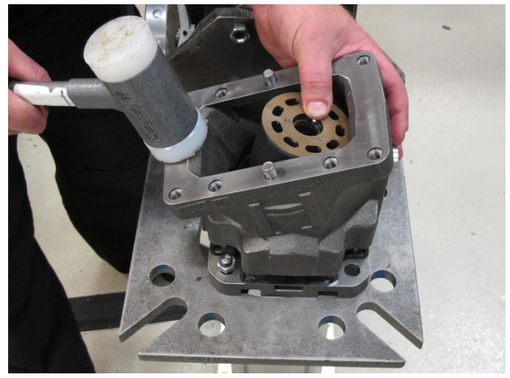
48. Assemble the cylinder barrel. Make sure that all rollers are in place.



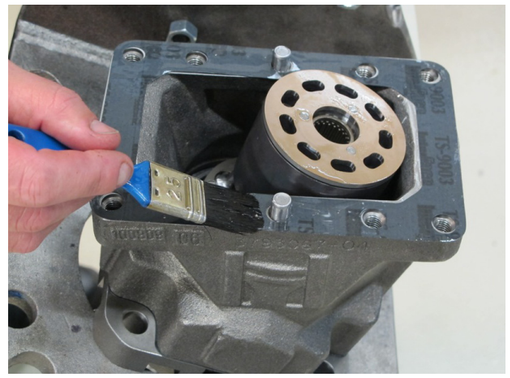
49. Make sure the support pin is in correct position by using a steel wire.



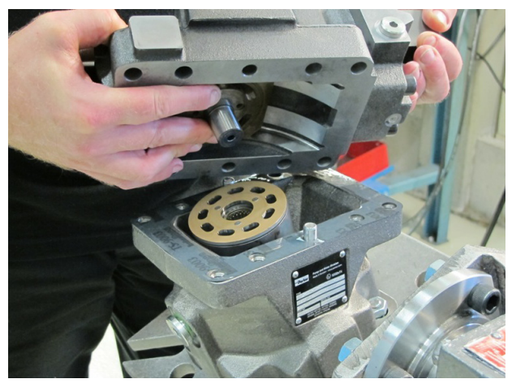
50. Assemble the gasket and lubricate it with hydraulic oil.



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

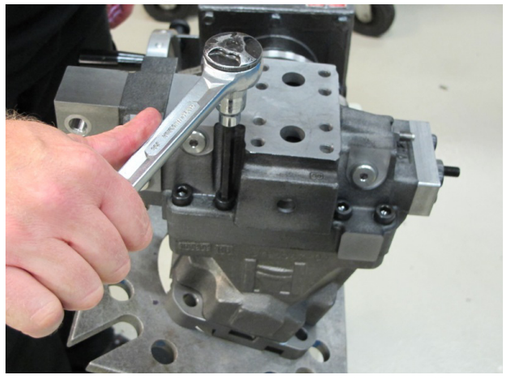


52. Assemble the gasket and lubricate it with hydraulic oil.

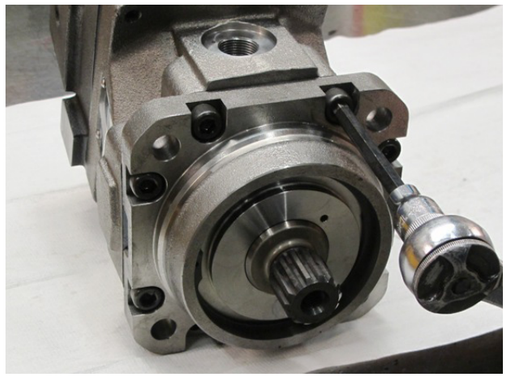


53. Assemble the end cap assy. Mind your fingers, don't squeeze them.
Refer to page 14 for end cap location.

Assembling, complete unit

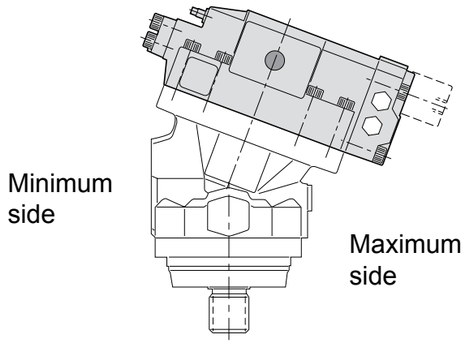


54. Assemble the screws and torque the screws to 65±10 Nm for V12-60/80 and 105±20 Nm for V12-110/160.

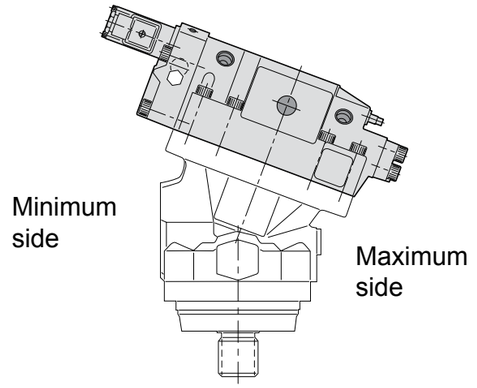


55. Assemble the screws and torque the screws to 65±10 Nm for V12-60/80 and 105±20 Nm for V12-110/160.

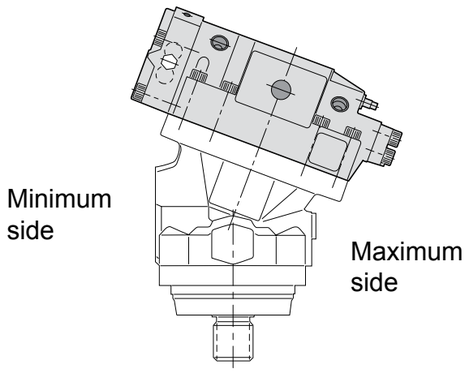
End cap location



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



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

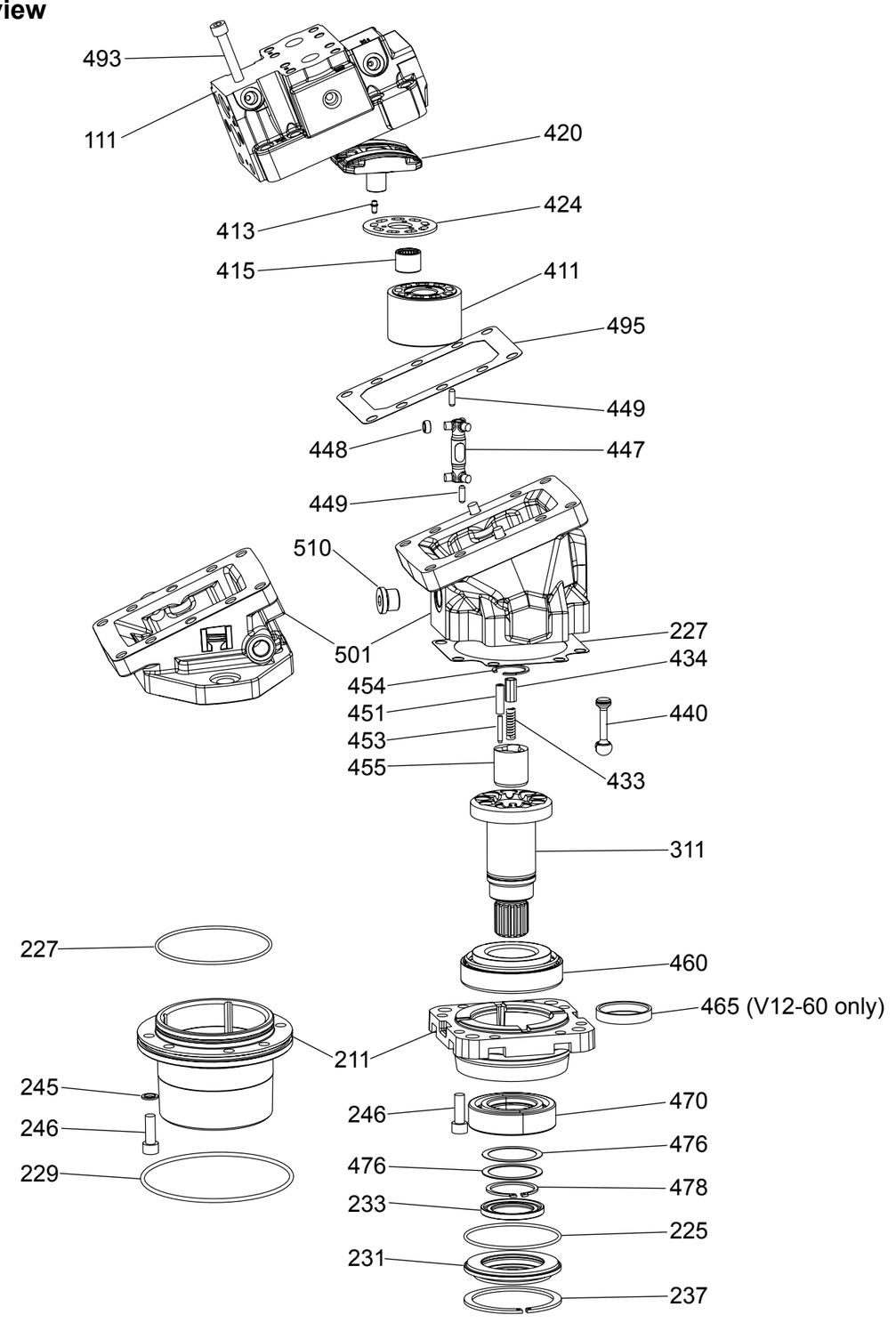


HO and HP control shold be assembled with the control cover at the minimum side.

General Parts

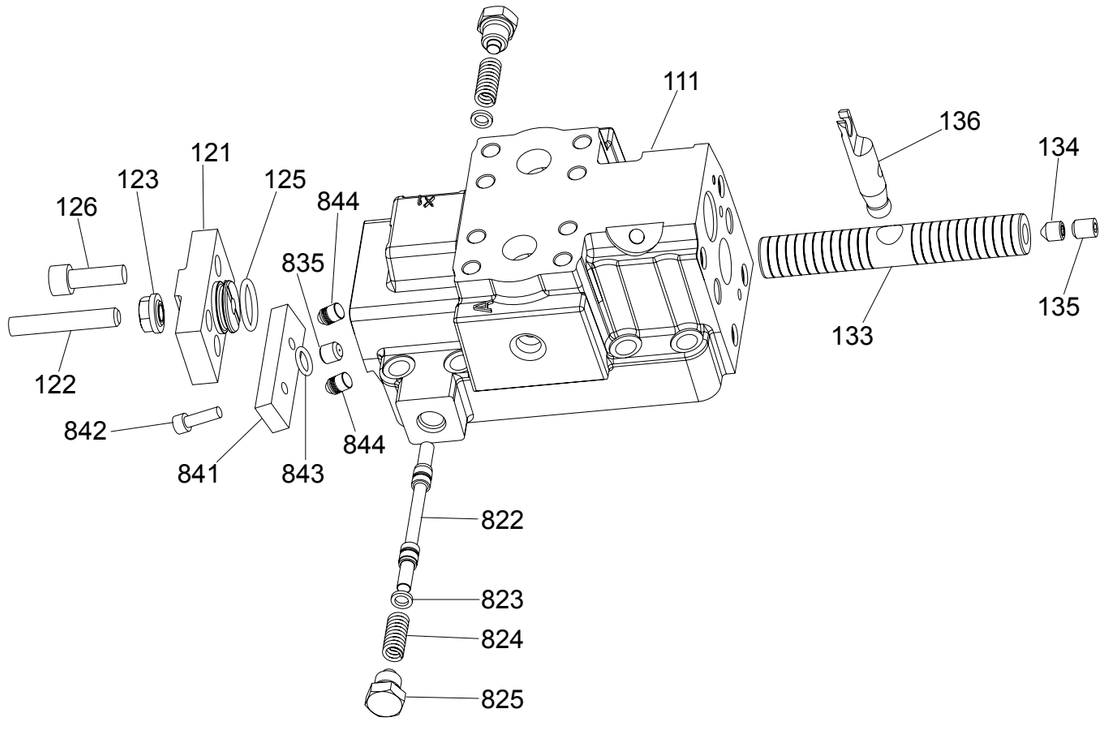
Item	Title	Benämning
111	End Cap	Ansl. Block
211	Bearing Housing	Lagerhus
225	O-Ring	O-Ring
227	Gasket	Packning
227	O-Ring	O-Ring
229	O-Ring	O-Ring
231	Seal Carrier	Tätringshållare
233	Shaft Seal	Tätningsring
237	Retaining Ring	Spårring
245	Seal Washer	Tätbricka
246	Hex Socket Screw	Insexskruv
311	Shaft	Axel
411	Cylinder Barrel	Cylindertrumma
413	Guide Pin	Styrstift
415	Needle Bearing	Nålbussning
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



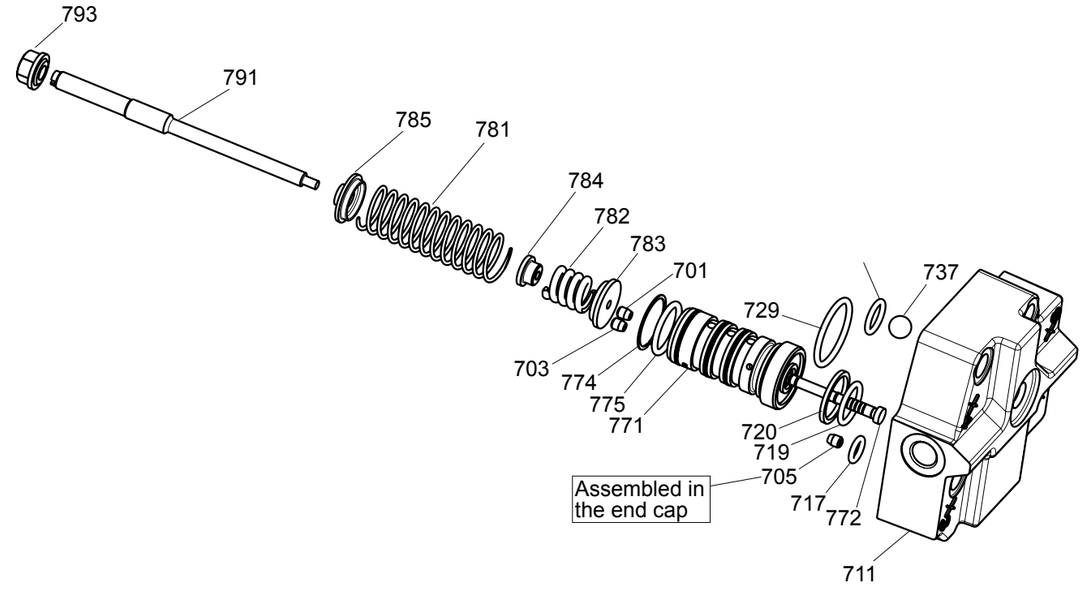
General Parts End Cap

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

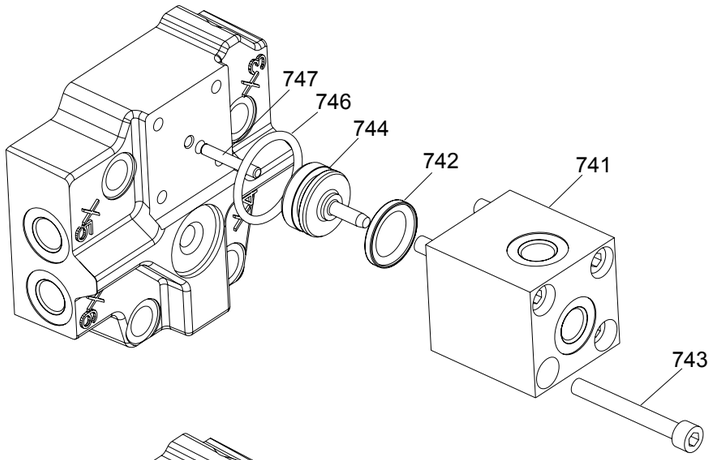


General Parts Control

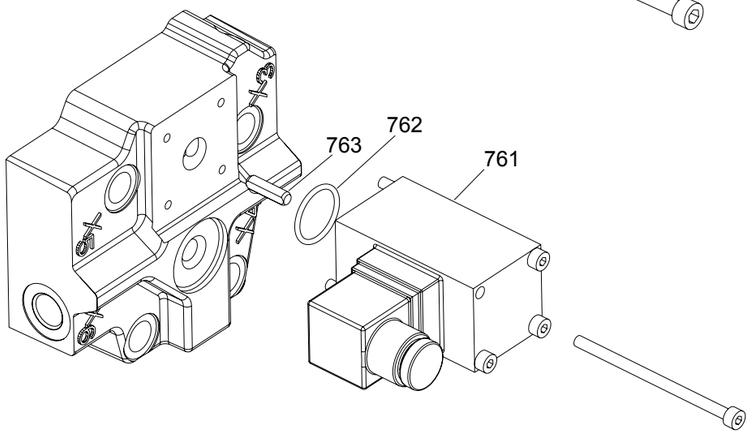
Item	Title	Benämning
701	Nozzle	Munstycke
703	Nozzle	Munstycke
705	Nozzle	Munstycke
711	Control Cover	Regulatorlock
719	O-Ring	O-Ring
720	Support Ring	Stödring
729	O-Ring	O-Ring
735	Valve Cone	Ventilkägla
736	Valve Guide	Ventilsäte
737	O-Ring with Support Ring	O-Ring med Stödring
771	Valve Sleeve	Ventilfoder
772	Valve Spool	Ventilslid
774	Piston Ring	Lamellring
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



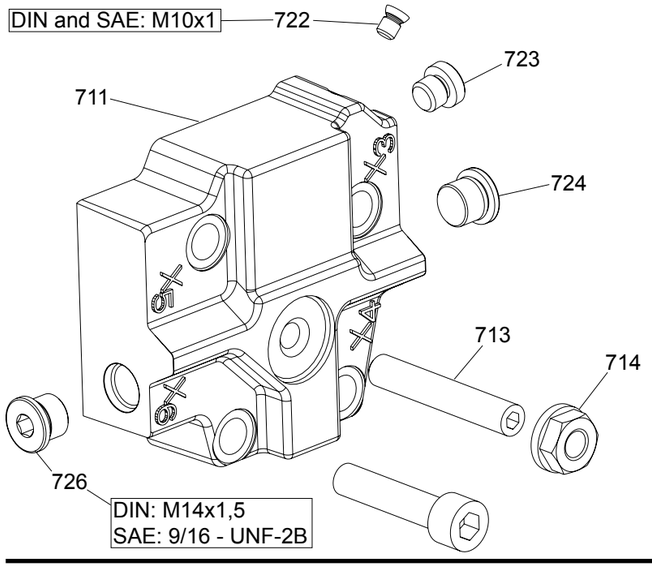
General Parts Controls



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

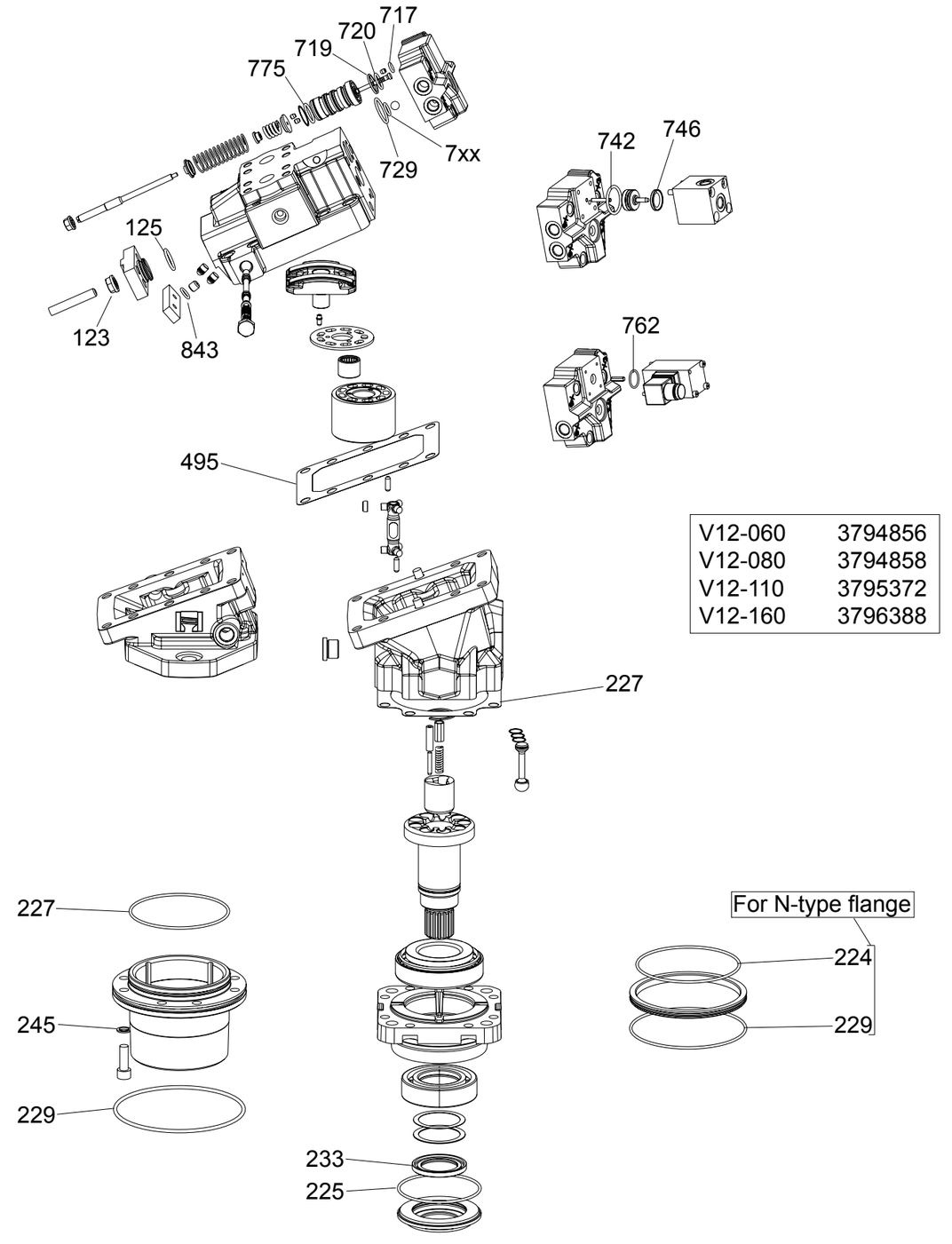


Item	Title
761	Solenoid
762	O-Ring
763	Guide Pin



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

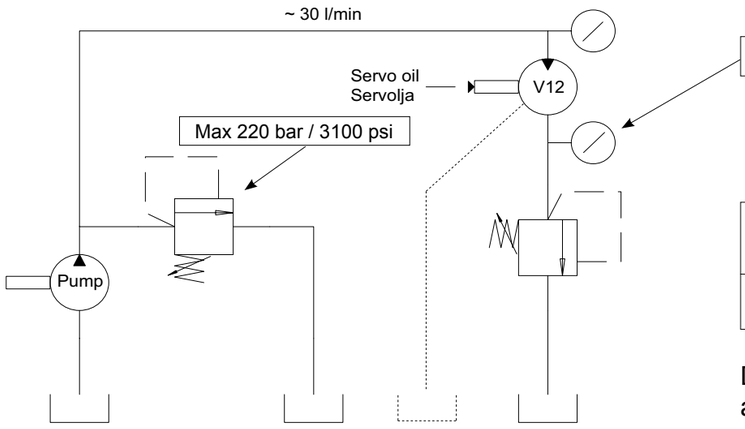
För funktionskontroll behövs en provbänk med kapacitet 30l/min och 300 bar. Ett sekundärflöde på 3-5 l/min och tryck 25 bar krävs för ställdon med extern matning. EP ställdon kräver en förstärkare.

Test

1. Fyll V12 med olja i huset och starta pumpen i testbänken.

2. Öka trycket med stryp-ventilen på returledningen. Trycket får inte överstiga 150 bar / 2150 psi.

3. Mät läckflödet och kontrollera mot tabellen



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

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

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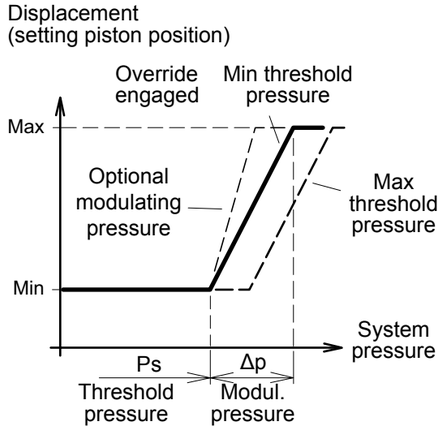
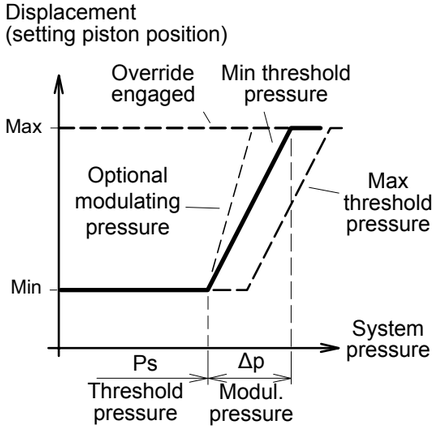
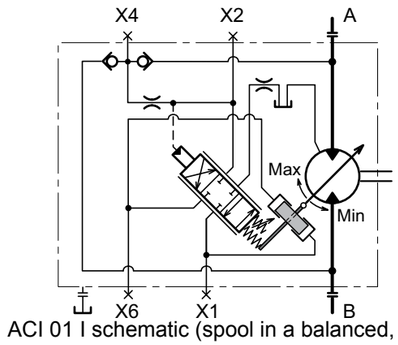
Pump and Motor Division
Trollhättan, Sweden

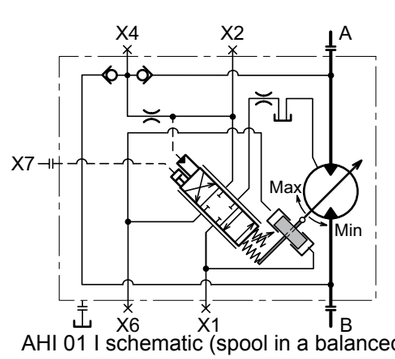
Gauge/Pilot ports (AC and AH control)	
X1	Setting piston pressure (increasing displ.)
X2	Servo supply pressure (after orifice)
X4	Servo supply pressure (before orifice)
X5	External pilot pressure
X6	Setting piston pressure (decreasing displ.)
X7	Override pressure (only AH control)
Ports are:	
-	M14x1.5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



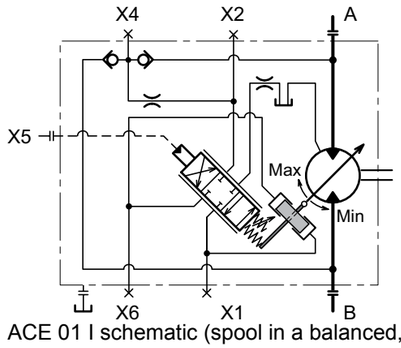




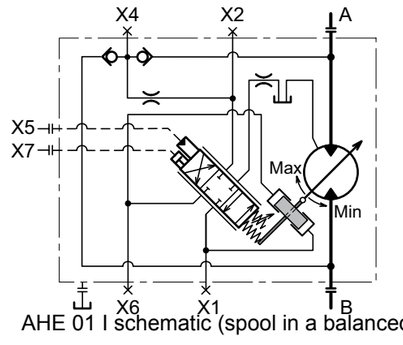
ACI 01 I schematic (spool in a balanced, mid-pos.)



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



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



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

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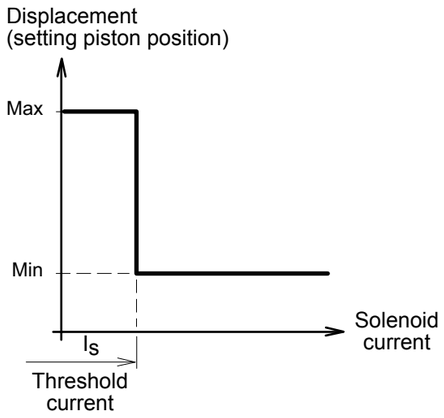
Trollhättan, Sweden

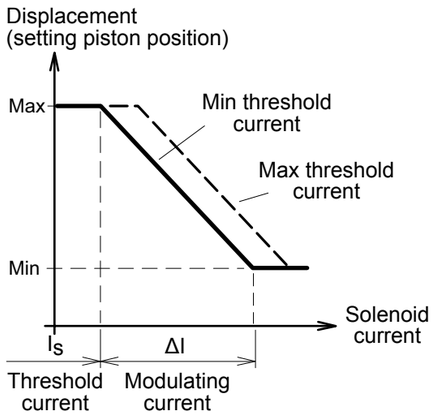
Gauge/Pilot ports (EO and EP control)

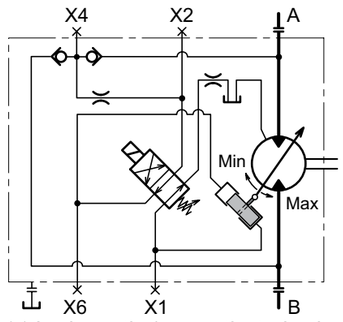
X1	Setting piston pressure (max-to-min, EO)
X1	Setting piston pressure (decreasing displ. EP)
X2	Servo supply pressure (after orifice)
X4	Servo supply pressure (before orifice)
X6	Setting piston pressure (min-to-max, EO)
X6	Setting piston pressure (increasing displ. EP)

Ports are:

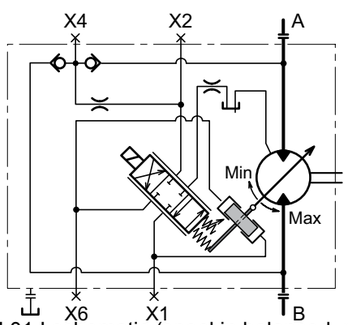
- M14x1.5 (ISO and cartridge versions)
- $^{9}/_{16}$"-18 O-ring boss (SAE version)



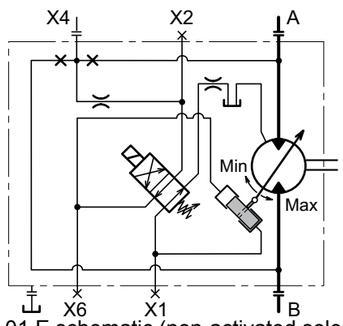




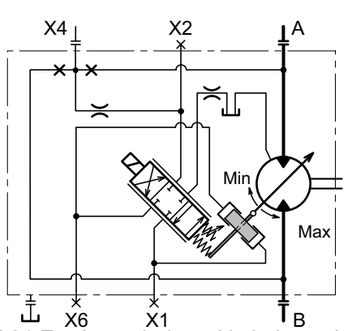
EOH 01 I schematic (non-activated solenoid)



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



EOH 01 E schematic (non-activated solenoid)



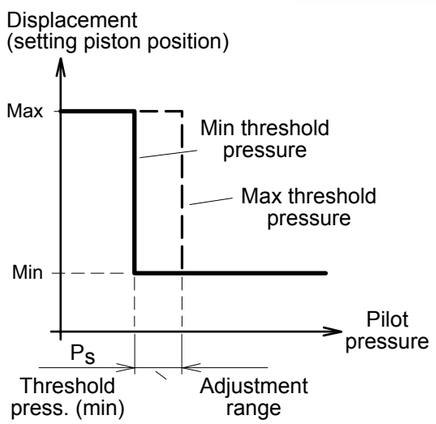
EPH 01 E schematic (spool in balanced, mid-pos.)

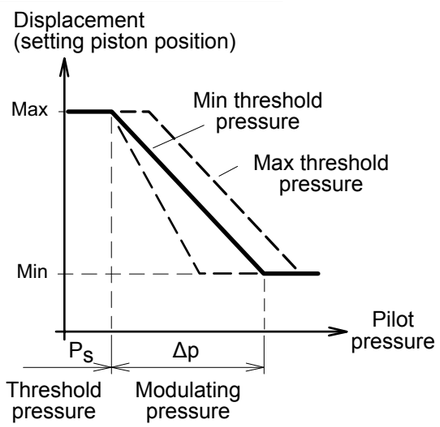
Gauge/Pilot ports (HO and HP control)

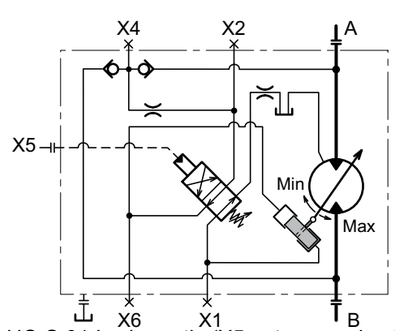
X1	Setting piston pressure (max-to-min, HO)
X1	Setting piston pressure (decreasing displ. HP)
X2	Servo supply pressure (after orifice)
X4	Servo supply pressure (before orifice)
X5	External pilot pressure (max 100 bar)
X6	Setting piston pressure (min-to-max, HO)
X6	Setting piston pressure (increasing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

Ports are:

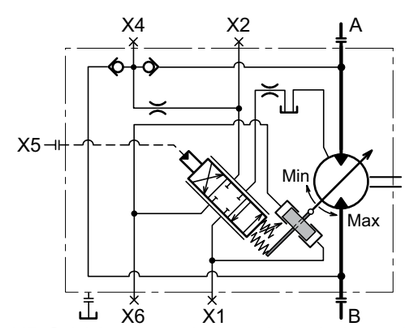
- M14x1.5 (ISO and cartridge versions)
- $^{9}/_{16}$"-18 O-ring boss (SAE version)



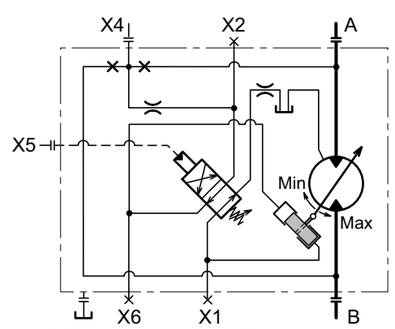




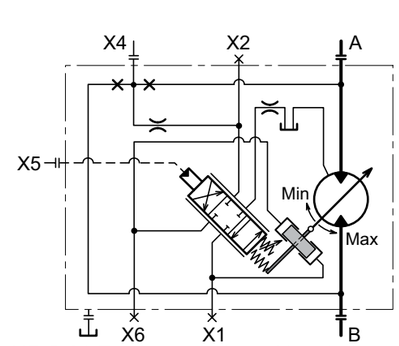
HO S 01 I schematic (X5 not pressurized)



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.)

HY30-5506-M1/UK
Service Manual
Series V12

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