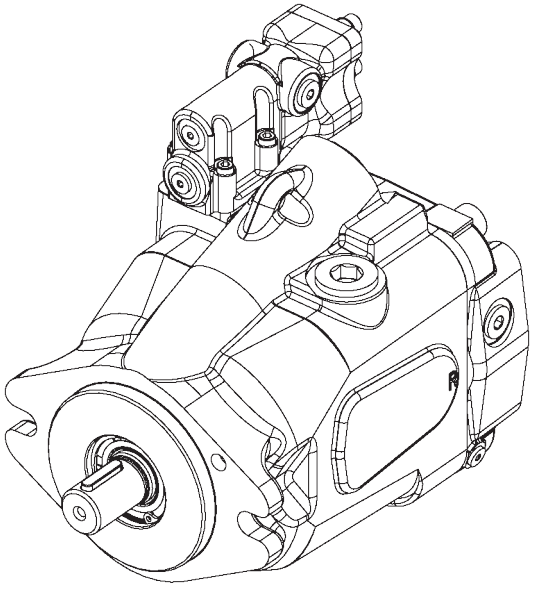
ENGINEERING
TOMORROW

Service Manual

X20 Series
420 Mobile Piston Pump



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Revision history

Table of revisions

Date	Changed	Rev
July 2024	Replaced compensator image	0202
November 2023	Converted to Danfoss Formatting	0201
October 2023	First edition	0101

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58	937166	1	Cover, Tamper proof (Compensator adj. screws)	-
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84	70142-600	1	Cover plate, Aux. mount	-
85	16007-14	1	O-ring, Cover plate	-
86	16032-606	2	Screw, Cap (Cover plate)	-

m Bearing Shim Kit Required: 9900194-008

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(continued)

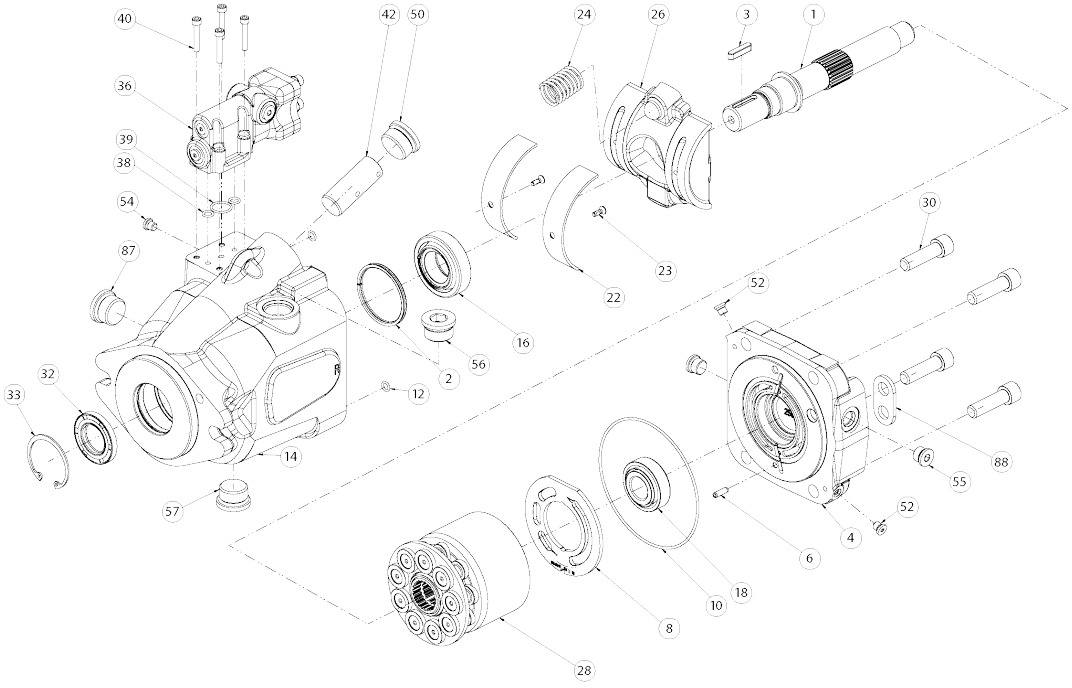
Item	Part Number	Quantity	Description	Page Number

■ Standard Seal Kit: 9900633-000 (Polyacrylate Shaft Seal)/Optional Seal Kit: 9900634-000 (Fluorocarbon Shaft Seal), 9900620-001 Single Fluorocarbon Shaft S

△ Adjustable Maximum Displacement Volume Stop Kit: 9900194-004

Service parts

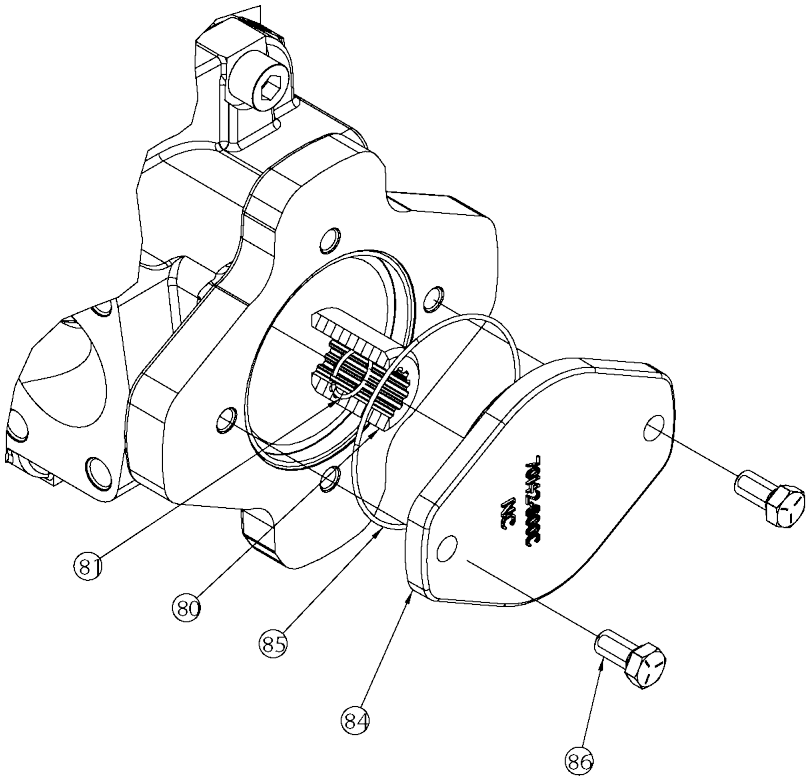
Exploded Assembly



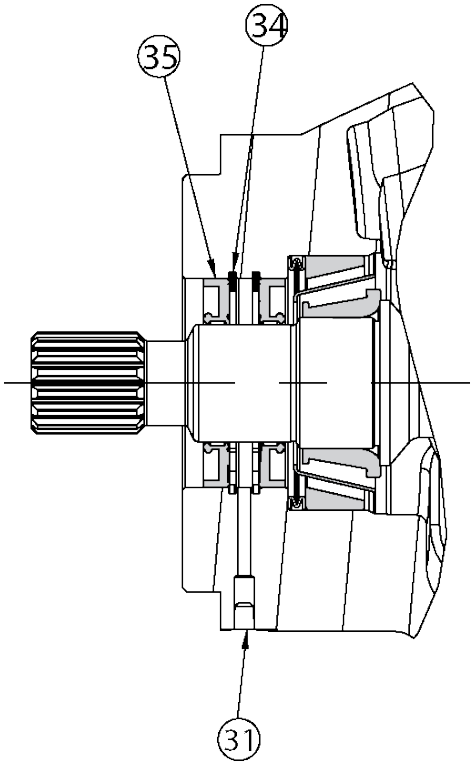
Service parts

Optional Assembly

Thru-Drive Part Option



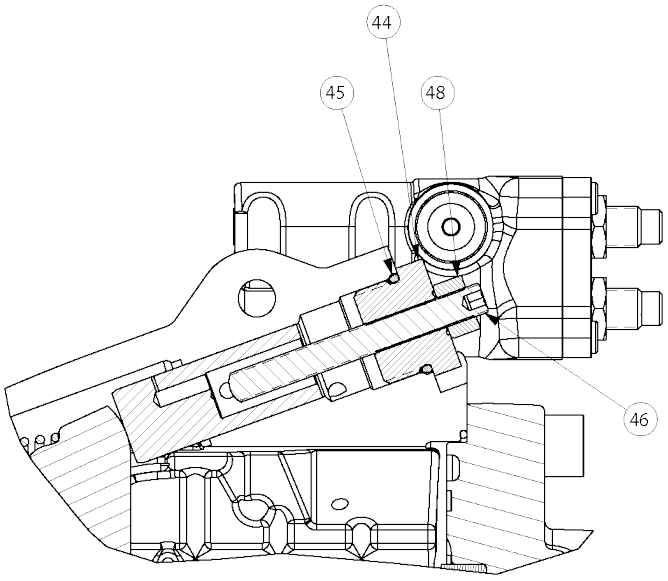
Dual Seal Option



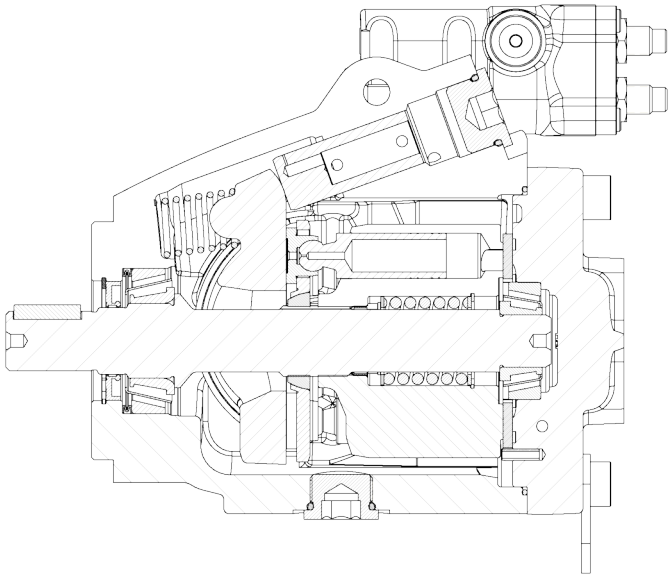
Service parts

Adjustable Maximum Stop Option

(Replaces plug sub-assembly item 50-reference kit 9900194-004)



Side View



Service parts

Drive Shaft

420 Series Mobile Piston Pump Drive Shaft

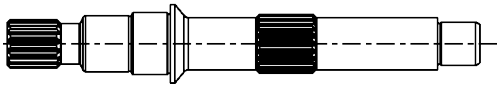


Table 1 - Drive Shaft (Item 1)

Code Position			Key (Item 3)	Part Number	Description
8,9	24,25	26			
01	00	0,1,2	24500-619	4997174-005	.875 Dia. w/key, 1.62 Ext.
01	AA	0,1,2	24500-619	4997177-013	.875 Dia. w/key, 1.62 Ext.
02	00	0,1,2	16246-516	4997174-004	1.00 Dia. w/key, 1.81 Ext.
02	AA	0,1,2	16246-516	4997177-007	1.00 Dia. w/key, 1.81 Ext.
02	AC	0, 1, 2	16246-516	4997177-009	1.00 Dia. w/key, 1.81 Ext.
04	00	0, 1, 2	20100-25	4997174-002	SAE J744- 25-3 Taper
04	AA	0, 1, 2	20100-25	4997177-002	SAE J744- 25-3 Taper
04	AC	0, 1, 2	20100-25	4997177-003	SAE J744- 25-3 Taper
04	AB	0, 1, 2	20100-25	4997177-004	SAE J744- 25-3 Taper
05	00	3	-	4995082-003	13 Tooth, 1.62 Ext. (Dual Seal)
05	00	0, 1, 2	-	4997174-003	13 Tooth 16/32, 1.62 Ext.
05	AA	0, 1, 2	-	4997177-010	13 Tooth
05	AB	0, 1, 2	-	4997177-011	13 Tooth, 16/32, 1.62 Ext.
05	AC	0, 1, 2	-	4997177-012	13 Tooth, 16/32, 1.62 Ext.
08	00	3	-	4995082-001	15 Tooth, 1.81 Ext. (Dual seal)
08	00	0, 1, 2	-	4997174-001	15 Tooth, 16/32, 1.81 Ext.
08	AC	0, 1, 2	-	4997177-001	15 Tooth 16/32, 1.81 Ext.
08	AA	0, 1, 2	-	4997177-005	15 Tooth, 16/32, 1.81 Ext.
08	AB	0, 1, 2	-	499177-006	15 Tooth, 16/32, 1.81 Ext.
08	AC	3	-	4997596-001	15 Tooth, 1.81 Ext. (Dual Seal)
30	00	0, 1, 2	-	4997174-006	1.00 Taper W/.375-24 Thd.
30	AA	0, 1, 2	-	4997177-016	1.00 Taper W/.375-24 Thd.
30	AB	0, 1, 2	-	4997177-017	1.00 Taper W/.375-24 Thd.
30	AC	0, 1, 2	-	4997177-018	1.00 Taper W/.375
31	00	0, 1, 2	16246-516	4997174-007	1.00 Dai. w/key & .375 Thd.
32	00	3	-	499581-001	14 Tooth 12/24, 2.18 Ext.

Service parts

End Cover

420 Series Mobile Piston Pump End Cover Views

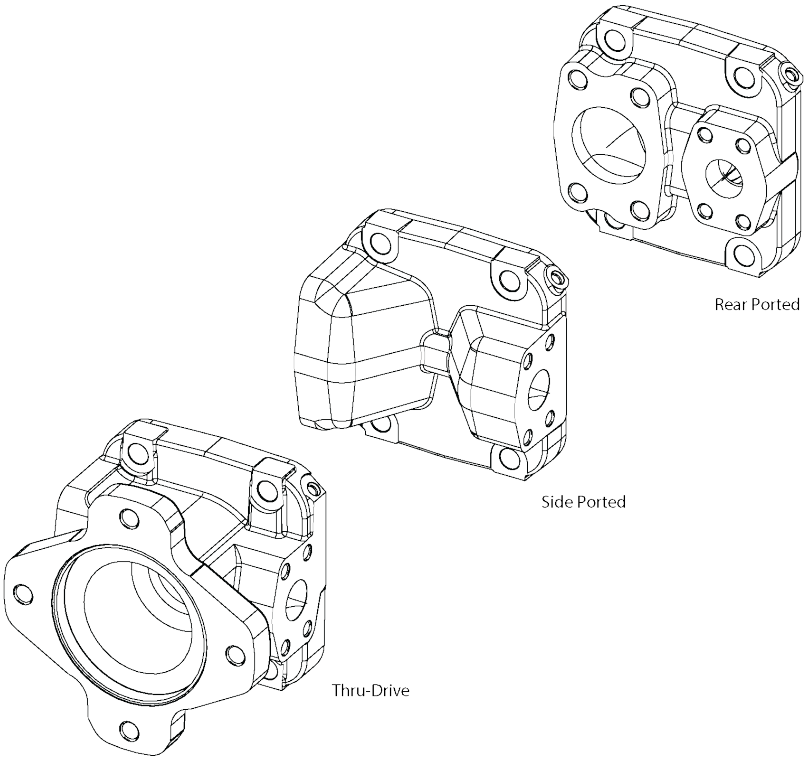


Table 2 - End Cover (Item 4)

Code Position				Kit Number	Part Number	Description
4, 5, 6	10, 11	13	24, 25			
041	AF	0	00	9900267-013	5992843-001	Endcover, Rear Port, SAE Threaded, 2.50
041	AF	0	00	9900267-014	5992847-001	Endcover, Side Port, SAE Threaded, 2.50
041	AF	0	AA	9900267-015	5992851-001	Endcover, Thru-Drive Dual A, SAE Threaded, 2.50
041	AF	0	AC	9900267-016	5992851-002	Endcover, Thru-Drive Dual B, SAE Threaded, 2.50
049	AB	0	AC	9900267-003	5992825-001	Encover, Thru-Drive Dual B, Code 61, 3.00
049	AD	0	AC	9900267-004	5992825-002	Endcover, Thru-Drive Dual B, Code 61, 3.00 Metric
049	AB	3	00	9900267-007	5992831-001	Endcover, Side Port, Code 61, 3.00
049	AD	0	00	9900267-008	5992831-002	Endcover, Side Port, Code 61, 3.00 Metric
049	AA	0	00	9900267-009	5992837-001	Endcover, Rear Port, Code 61, 3.00
049	AC	0	00	9900267-010	5992837-002	Endcover, Rear Port, Code 61, 3.80 Metric
062/080	AB	0	AC	9900267-001	5992823-001	Endcover, Thru-Drive Dual B, Code 61, 3.80
062/080	AD	0	AC	9900267-002	5992823-002	Endcover, Thru-Drive Dual B, Code 61, 3.80 Metric
062/080	AB	0	00	9900267-005	5992829-001	Endcover, Side Port, Code 61, 3.80
062/080	AD	0	00	9900267-006	5992829-002	Endcover, Side Port, Code 61, 3.80 Metric
062/080	AA	0	00	9900267-011	5992839-001	Endcover, Rear Port, Code 61, 3.80
062/080	AC	0	00	9900267-012	5992839-002	Endcover, Rear Port, Code 61, 3.80 Metric

Service parts

Timing Plate

Timing Plate Identification

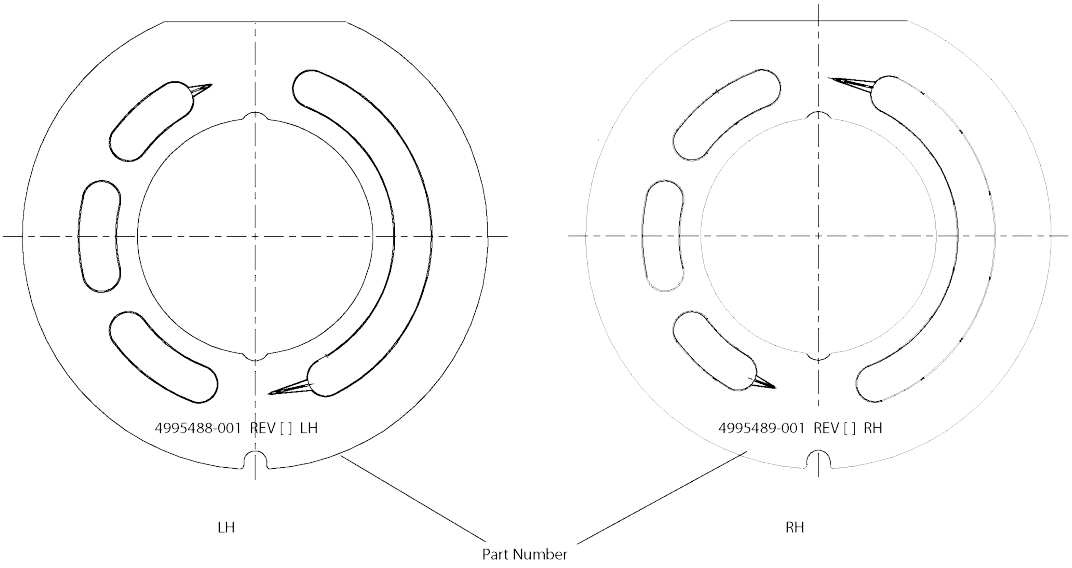


Table 3 - Timing Plate (Item 8)

Code Position		Part Number	Description
4, 5, 6	**7**		
041	L	4997402-013	Plate, Valve 41cc (LH, 2.50)
041	R	4997403-013	Plate, Valve 41cc (RH, 2.50)
049	L	4995488-014	Plate, Valve 41cc (LH, 3.00)
049	R	4995489-014	Plate, Valve 49cc (RH, 3.00)
062	L	4995491-001	Plate, Valve 62cc (LH, 3.80)
062	R	4995492-001	Plate, Valve 62cc (RH, 3.80)
080	L	5986963-001	Plate, Valve 80cc (LH, 4.88)
080	R	4998319-001	Plate, Valve 80cc (RH, 4.88)

Service parts

Housing

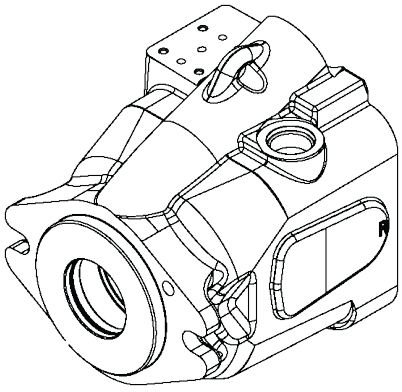


Table 4 - Housing (Item 14)

Code Position				Part Number	Description
8, 9	12	26	27, 28		
not 32	1, 2	3	not AB, AC	5999819-001	Housing (Double Seal)
not 32	3, 4	3	not AB, AC	5999819-002	Housing (Double Seal, Metric)
not 32	1, 2	3	AB	5999819-003	Housing (Double Seal, Swash Sensor)
not 32	1, 2	not 3	not AB, AC	5999590-001	Housing
not 32	3, 4	not 3	not AB, AC	5999590-002	Housing (Metric)
not 32	1, 2	not 3	AB	5999590-003	Housing (Swash Sensor)
32	1, 2	3	0	5999592-001	Housing (C Mount, Double Seal)
not 32	1, 2	not 3	not AB, AC	5999591-001	Housing Torque Control
not 32	1, 2	3	not AB, AC	5999593-001	Housing (C Mount, Double Seal) Torque Control

Rotating Groups

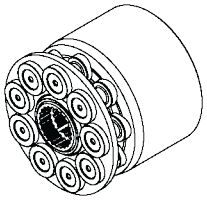


Table 5 - Rotating Group (Item 28)

Code Position		Part Number	Description
4, 5, 6	27, 28		
41	not AC	4993556-001	Rotating Group S/A 41cc (2.50 in^3)
49	not AC	4993463-001	Rotating Group S/A 49cc (3.00 in^3)
62	not AC	4993735-001	Rotating Group S/A 62cc (3.80 in^3)
80	not AC	4998046-001	Rotating Group S/A 80cc (4.88 in^3)

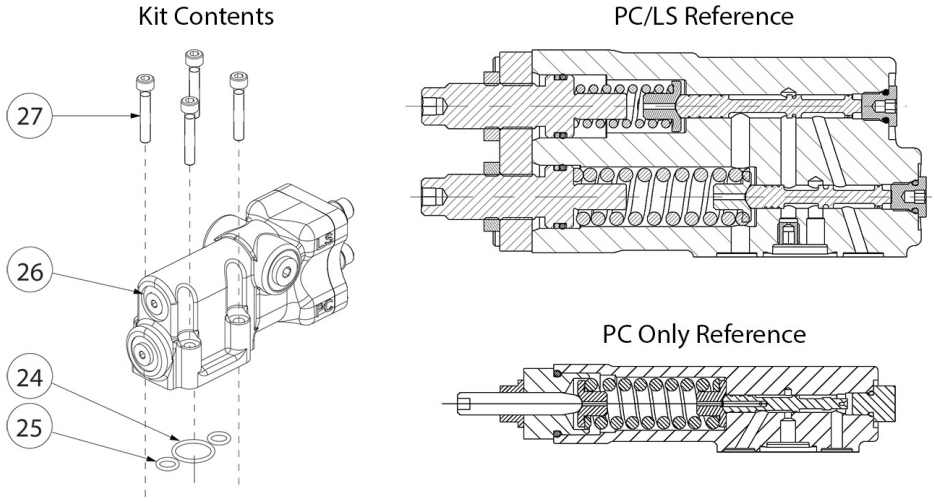
Service parts

Shaft Seals

Table 6 - Shaft Seal (Item 32)

Code Position		Part Number	Description
8, 9	26		
Not 32	2 or 3	16253-218	Seal, Shaft, Fluorocarbon, SAE B
Not 32	1	4993012-001	Seal, Shaft, Polyacrylate, SAE B
32	3	4998834-001	Seal, Shaft, Fluorocarbon, SAE C Shaft
Not 32	4	16253-18	Seal, Shaft, Nitrile, SAE B

Compensator Kits - Factory Set



The compensator has been redesigned. Please see *X20 Compensator Design Change* on page 15 for the old compensator design and how to identify which compensator is on the unit.

Table 7 - Compensator (Pump Controls) (Item 36)

Code 14	Code 15, 16	Pressure Limit Setting	Code 17, 18	Flow Setting	Code 21, 22	Kit Number
A	27	199.9-206.8 bar [2900-3000 lbf/in^2]	25	23.44-26.89 bar [340-390 lbf/in^2]	00	9901219-003
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	10	9.65-12.41 bar [140-180 lbf/in^2]	0A	9901219-013
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	00	9901219-022
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	0A	9901219-026
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	23	23.10-25.17 bar [180-220 lbf/in^2]	00	9901219-001
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	24	22.75-25.51 bar [330-370 lbf/in^2]	00	9901219-032
A	28	206.8-213.7 bar [3000-3100 lbf/in^2]	30	28.27-31.72 bar [410-460 lbf/in^2]	00	99901219-017

Service parts

Table 7 - Compensator (Pump Controls) (Item 36) (continued)

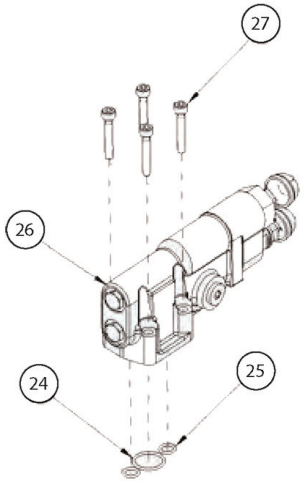
Code 14	Code 15, 16	Pressure Limit Setting	Code 17, 18	Flow Setting	Code 21, 22	Kit Number
A	32	226.5-233.4 bar [3285-3385 lbf/in^2]	16	13.79-16.55 bar [200-240 lbf/in^2]	00	9901219-002
A	35	241.3-248.2 bar [3500-3600 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	00	9901219-028
A	36	246.5-253.4 bar [3575-3675 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	00	9901219-014
A	36	246.5-253.4 bar [4000-4100 lbf/in^2]	22	20.68-23.44 bar [300-340 lbf/in^2]	0A	9901219-031
A	40	262.0-268.9 bar [3800-3900 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	0A	9901219-005
A	40	262.0-268.9 bar [3800-3900 lbf/in^2]	10	9.65-12.41 bar [140-180 lbf/in^2]	00	9901219-027
A	42	272.4--279.3 bar [3950-4050 lbf/in^2]	10	9.65-12.41 bar [140-180 lbf/in^2]	00	9901219-007
A	42	272.4--279.3 bar [3950-4050 lbf/in^2]	10	9.65-12.41 bar [140-180 lbf/in^2]	0A	9901219-006
A	43	275.8-282.7 bar [4000-4100 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	00	9901219-010
A	43	275.8-282.7 bar [4000-4100 lbf/in^2]	14	12.41-15.17 bar [180-220 lbf/in^2]	0A	9901219-015
A	43	275.8-282.7 bar [4000-4100 lbf/in^2]	16	13.79-16.55 bar [200-240 lbf/in^2]	00	9901219-008
A	43	275.8-282.7 bar [4000-4100 lbf/in^2]	24	22.75-25.51 bar [330-370 lbf/in^2]	00	9901219-018
B	28	206.8-213.7 bar [3000-3100 lbf/in^2]	24	22.75-25.51 bar [330-370 lbf/in^2]	00	9901219-012
B	28	206.8-213.7 bar [3000-3100 lbf/in^2]	28	26.20-28.96 bar [380-420 lbf/in^2]	0A	9901219-019
B	43	275.8-282.7 bar [4000-4100 lbf/in^2]	24	22.75-25.51 bar [330-370 lbf/in^2]	00	9901219-011
C	12	137.9-144.8 bar [2000-2100 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-021
C	19	168.9-175.8 bar [2450-2550 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-023
C	21	179.3-186.2 bar [2600-2700 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-029
C	28	206.8-213.7 bar [3000-3100 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-016
C	43	275.8-282.7 bar [4000-4100 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-009
C	45	306.8-313.7 bar [4450-4550 lbf/in^2]	00	No Flow Comp. Setting	00	9900512-004

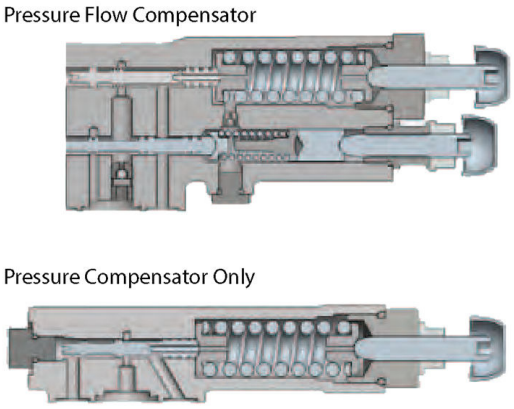
Service parts

X20 Compensator Design Change

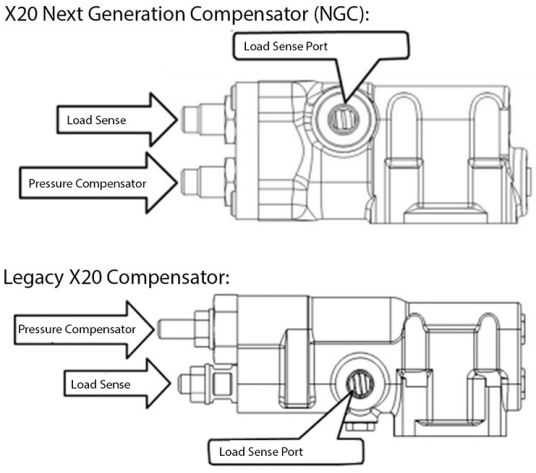
The X20 compensator has been redesigned. The information below details the old design and how to identify the design used on the unit.

Legacy compensator design





X20 compensator identification



Mounting Screws

Table 8 - Compensator Mounting Screw (Item 40)

Code Position			Part Number	Description
14	**19, 20**	**21, 22**		
A, B, C	00	00, 0A	114953-030	Screw, Cap (Compensator Mounting)

Service parts

Plug Assemblies

Table 9 - Plug Subassemblies (Items 55, 56, 57)

Code Position			Part Number	Description
10, 11	12	13		
Side Port	1, 2	3	16103-304	Plug (Diagnostic Ports) .4375-20 Thd.
Rear Port	1, 2	1	16103-306	Plug (Diagnostic Ports) .5625-18 Thd.
Side Port	3, 4	4	9237-002	Plug (Diagnostic Ports) M12 x 1.5 Thd.
Rear Port	3, 4	2	9237-003	Plug (Diagnostic Ports) M14 x 1.5 Thd.
-	2	1, 3	16103-312	Plug (Top Case Drain Port) 1.0625-12 Thd.
-	4	2, 4	9237-009	Plug (Top Case Drain Port) M27 x 2 Thd.
-	1	1, 3	16103-312	Plug (Bottom Case Drain Port) 1.0625-12 Thd.
-	3	2, 4	9237-005	Plug (Bottom Case Drain Port) M27 x 2 Thd.
-	6	0	9170-005	Plug (Bottom Case Drain Port) G 3/4 BSPP

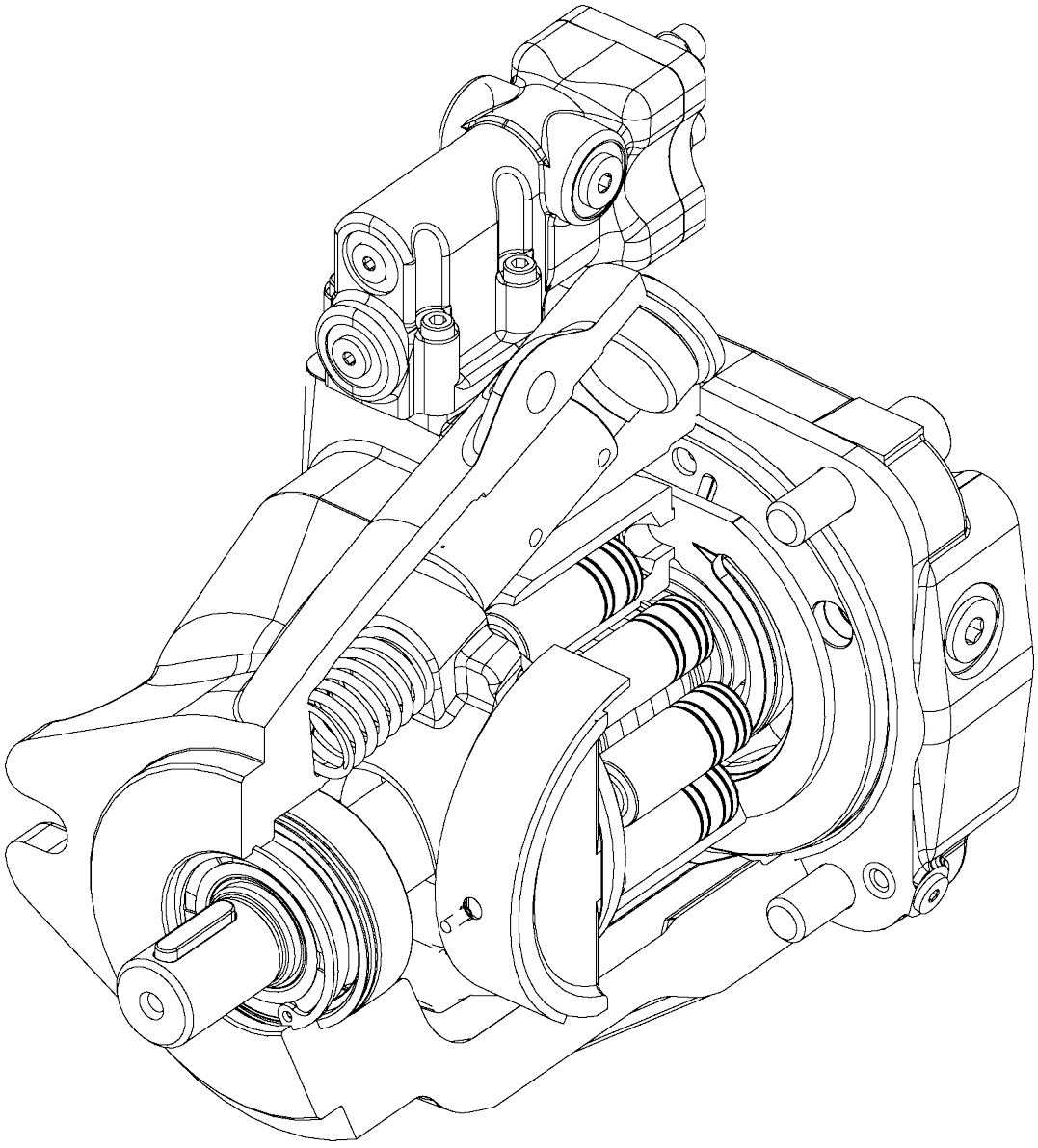
Thru-Drive Couplings

Table 10 - Thru-drive Couplings (Item 80)

Code Position	Part Number	Description
24, 25		
AB	70111-687	Coupler, 11 Tooth (SAE A)
AC	70411-638	Coupler S/A, 13 Tooth (SAE B)
AE	5987377-001	Coupler, 9 Tooth (SAE A)

Repair

420 Mobile Piston Pump Repair



General Information

Read this assembly manual thoroughly before starting work on the pumps.

This manual assumes appropriately trained technicians with specialized knowledge of mechanical and hydraulic component assembly and disassembly.

Replacement Parts

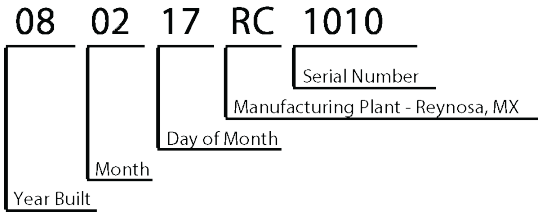
When ordering replacement parts, give the product number, date code, part name, part number and quantity of parts required. This product information is found stamped on the tag which is located on the side of the housing.

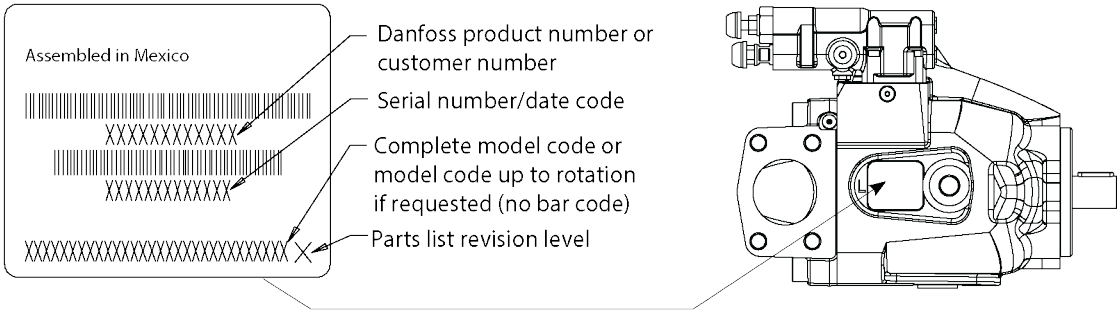
When the Danfoss model 420 pressure, pressure-flow compensated piston pump is repaired, thoroughly clean the pump before any repairs are attempted.

Repair

The part number and serial number are on the tag.

Serial Number/Date Code Interpretation





Required Tools

Standard tools for disassembly

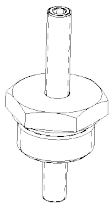
- Ball peen hammer
- Plastic tip hammer
- Flat tip screwdriver
- Snap ring pliers
- Torque wrench
- Magnet stick
- 1-1/4" wrench
- 1-3/8" wrench
- 4mm Allen wrench
- 3/32" Allen wrench
- Impact screwdriver
- Sliding bearing remover hammer
- Dial indicator and accessories
- Marker or paint pen
- Petroleum jelly
- Cleaning solvent

Repair

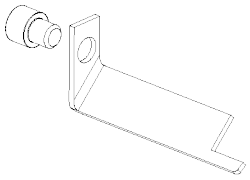
Special Tools

Assembly Tool Kit 9900275-000 (includes)

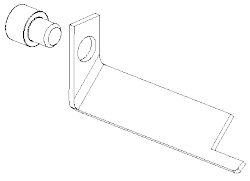
- Swashplate Locator Tool



- Swashplate Retainer Tool



- Shaft Retainer Tool

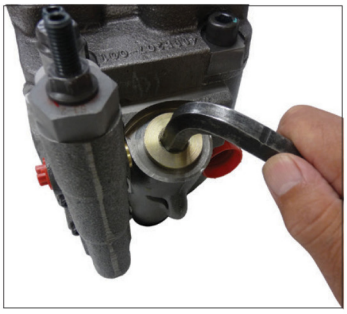


Repair

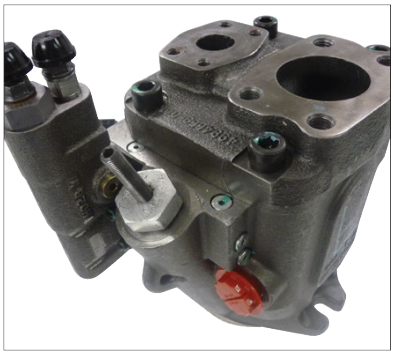
Disassembly

Before attempting to disassemble, clean the pump exterior. Dispose of leakage oil and oily cloths in an environmentally responsible manner. All parts within the unit must be kept clean during the overhaul process. Handle each part with great care, marking as necessary to ensure proper reassembly. The close tolerance of the parts makes this requirement very important. Clean all parts that are removed from the unit with a commercial solvent that is compatible with the system fluid. Compressed air may be used in the cleaning process. However, it must be filtered to remove water and other contamination.

1. Remove Control Piston Plug Assembly



2. Install Swash Plate Locator Tool

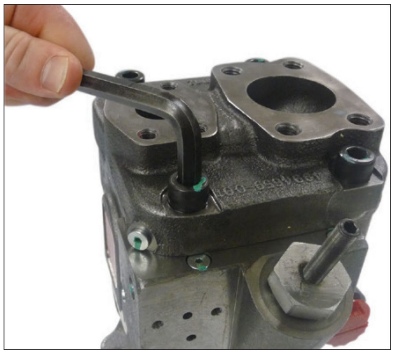


Adjustment will take place in step 11

Repair

3. Remove Compensator

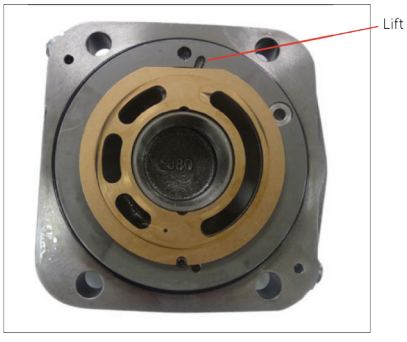
4. Remove End Cover



Mark the housing and end cover to ensure orientation. Remove the four cap screws that hold the end cover in place.

The valve plate may stick to end cover. Use caution so valve plate does not fall off.

5. Remove Valve Plate



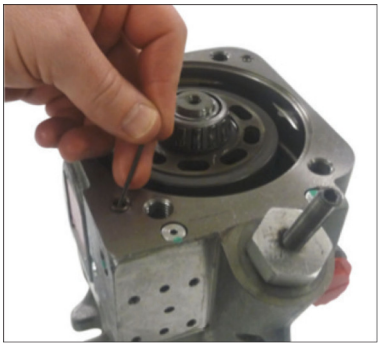
6. Remove O-ring Seal

Repair

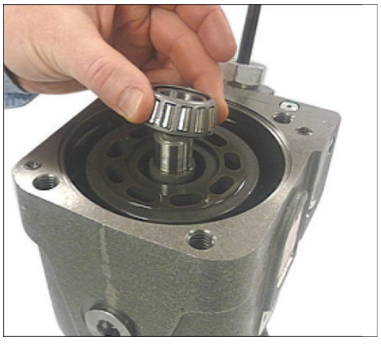
7. Remove Bearing Race

The bearing race is pressed in and will require the use of a sliding bearing removal hammer or similar tool to remove it.

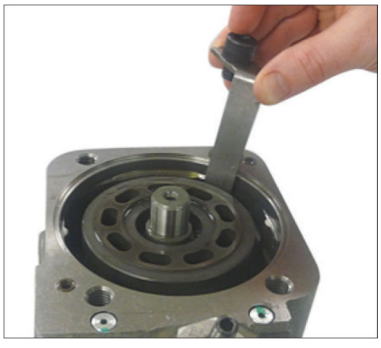
8. Remove Housing O-rings



9. Remove Bearing



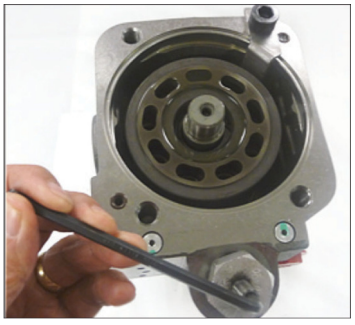
10. Install Swashplate Retainer



Install the swash plate hold down tool and tighten the cap screw 16147-804. This will prevent the swash plate from moving.

Repair

11. Swashplate Locator Adjustment



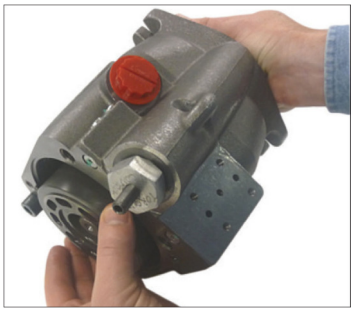
With the hold down tool in place, tighten the adjustment screw so the control piston spring is compressed.

This step is designed to force the swashplate to a neutral position to enable easy removal of the rotating group, and to retain the swashplate.

12. Install Shaft Retainer Tool

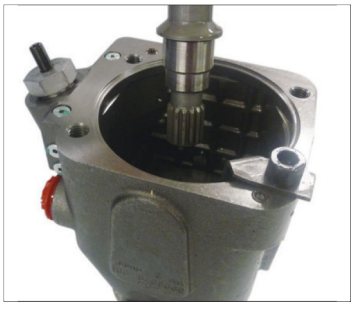
Tighten the set screw while being careful not to damage shaft.

13. Remove Rotating Group



Position shaft upwards and carefully remove rotating group.

14. Remove Shaft

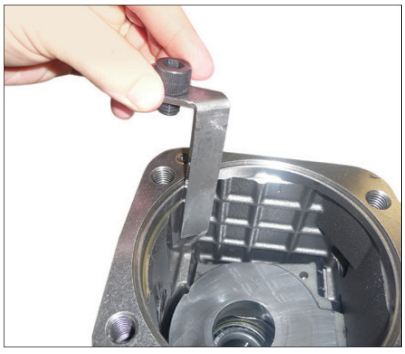


Remove shaft retainer tool and lift out shaft. Use caution when moving shaft through shaft seal.

Repair

15. Remove Swashplate Locator

16. Remove Swashplate Retainer



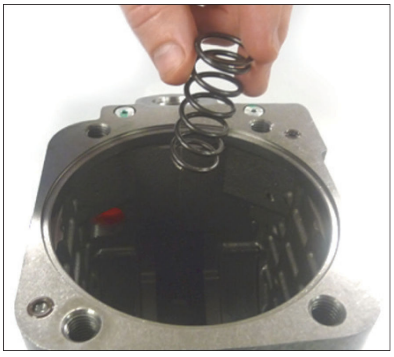
17. Remove Control Piston

Note Orientation.

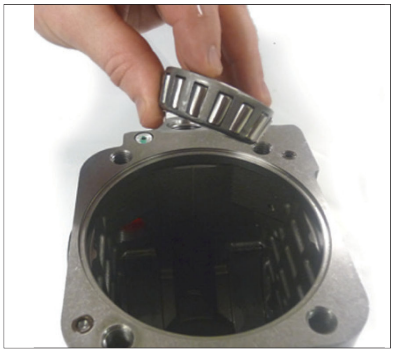
18. Remove Swashplate

Repair

19. Remove Bias Spring



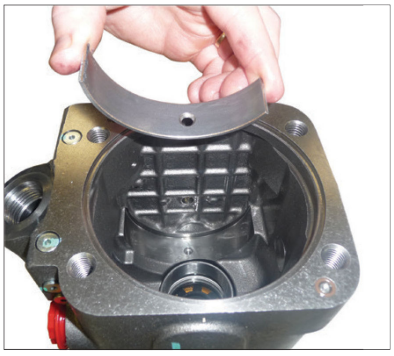
20. Remove Bearing



21. Remove Cradle Bearing Screws

Caution: Socket head cap screws are easily damaged during repair with improper tool.

22. Remove Cradle Bearings

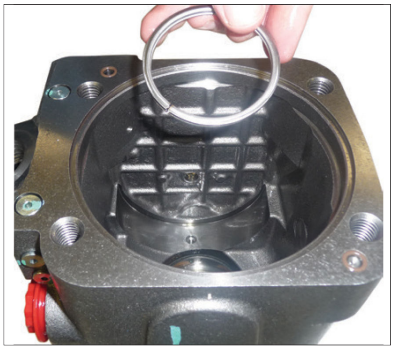


The cradle bearings are asymmetrical. Note proper orientation shown in picture.

Repair

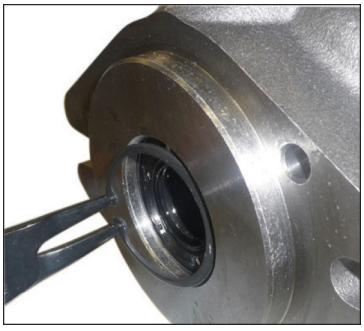
23. Remove Front Bearing Race

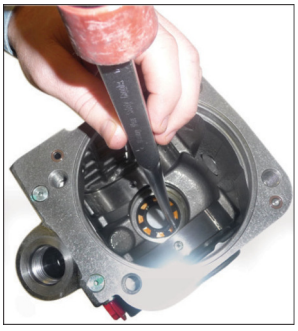
24. Remove Crush Ring



The crush ring located under the bearing cup in the housing does not need to be removed. The only time the crush ring needs to be removed is when the front or rear shaft tapered roller bearings, bearing cups, drive shaft, end cover or housing assembly is replaced. A shim kit is required if the crush ring is replaced.

25. Remove Shaft Seal





With the seal retaining ring removed use a punch or similar tool to knock out the shaft seal.

Repair

Inspection, Repair & Part Replacement

Inspection

Before inspection of parts, clean with a solvent that is compatible with system fluid.

Do not lap the face of piston block assembly.

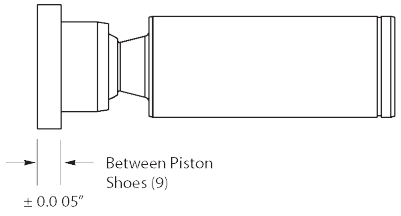
Rotating Group Parts

1. Inspect cylinder block face for wear, scratches, and/or erosion. If cylinder block condition is questionable, replace the entire rotating group.
2. Remove the pistons, spider, and spider pivot from piston block. The piston block assembly doesn't need to be disassembled unless the internal pins or spring are damaged.
3. Check each cylinder block bore for excessive wear. Use the piston and shoe S/A (37) for this purpose. The pistons should be a very close fit and slide in and out of the cylinder block bores. NO BINDING CAN BE TOLERATED. If binding occurs, clean the cylinder block and pistons. Lubricate the cylinder block bores with clean fluid and try again. Even minor contamination of the fluid may cause a piston to freeze up in a cylinder bore.
4. Inspect each of the nine piston and shoe subassemblies (31) for a maximum end play of 0.005 inch between the piston and shoe. Also check the face dimension of each shoe. The face dimension must be within 0.001 inch.
5. Inspect spider and spider pivot for wear and/or scratches. If condition is questionable, replace entire rotating group.

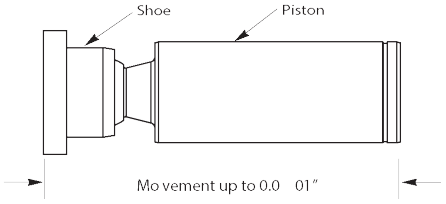
Piston S/A Tolerance

Shoe face rides on swash plate. Shoe must swivel smoothly on ball .

End play must not exceed 0.005 inch .



This dimension must be maintained on all nine shoes within 0 .001 inch .



Repair

End Cover & Associated Parts

1. Inspect end cover for erosion, cracks, and burrs. Clean up minor burrs with an India stone. If erosion or cracks are found, replace the valve block.
2. Inspect roller bearing and bearing race for nicks and pitting. Make sure the roller bearing turns freely within the bearing race. If the roller bearing needs replacement, both the roller bearing and the bearing race must be replaced.
3. Inspect valve plate for erosion, excessive wear, heavy scratches, and cracks. If any of the above conditions are found, replace the valve plate.
4. Inspect control piston and maximum displacement screw for burrs, scratches and cracks. Clean up minor scratches with 500 grit paper. Remove burrs with an India stone. The control piston should move freely in the bore.

Swashplate Parts

1. Inspect swashplate face for wear, roughness or scoring. Check the swashplate hubs and bearing surfaces for wear and cracks. Replace if defective.
2. Inspect saddle bearing surfaces for wear, pitting, and smooth operation. Replace if necessary.

Shaft/Housing Parts

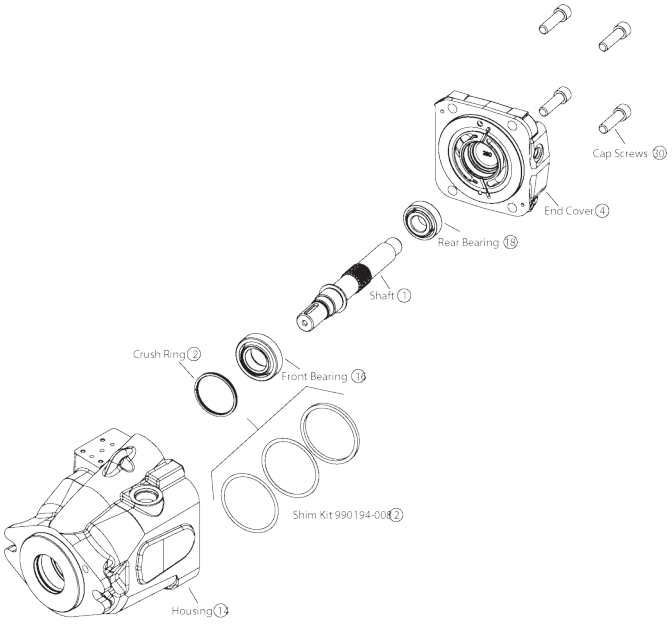
1. Inspect drive shaft for wear, stripped splines, and burrs. Remove burrs with an India stone. Inspect the contact area of bearing and shaft seal). Replace the drive shaft if wear or scoring is greater than 0.005 T.I.R. (total indicator reading).
2. Inspect drive shaft bearing for roughness, pitting of rollers, and excessive end play. Replace, if defective. If the bearing needs to be replaced, the bearing race also requires replacement.
3. Inspect housing mounting flange for nicks and burrs. Remove minor nicks and burrs with an India stone. Also check the housing for damaged or stripped threads. If any thread is damaged, replace the housing.
4. Check remaining pump parts for excessive wear, damaged threads, burrs, cracks and erosion. Replace any part that is in questionable condition.

Kit 9900194-008

Shimming Process

Installation Information

This skim kit is to replace the crush ring within the pump housing. If the housing, drive shaft, shaft bearings or end cover is replaced during servicing, the original crush ring can no longer be used to assure proper bearing set.



Repair

Shimming Procedures

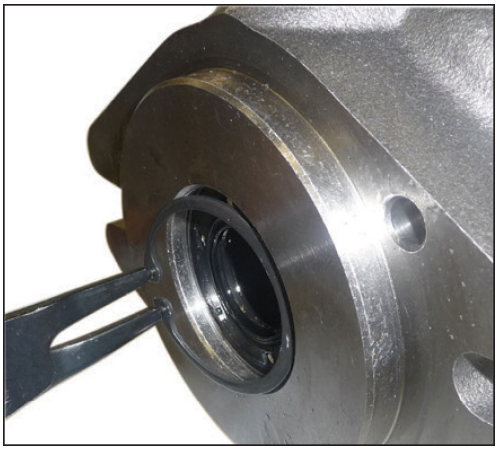
1. Measure the thickness of the existing crush ring.
2. To obtain a starting point, stack shims to a few thousandth of an inch less than the measurement of existing crush ring. Then insert shims into the housing in the same location as the removed crush ring.
3. Assemble the housing (without interface 0-ring seals), shaft bearings, shaft and end cover. Install the end cover cap screws and torque to 97+/- 9 lb-ft.
4. Using a dial indicator, measure drive shaft end play. Target bearing set range is .001" clearance to . 002" interface (preload). Add shims to achieve proper bearing set. If no movement of the shaft is observed, shims will need to be removed and steps 3 and 4 repeated.
5. Finish the assembly of the pump.

Repair

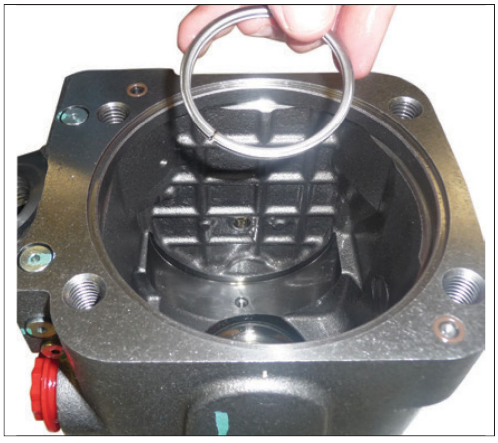
Assembly

Assembly must be conducted in a clean environment. Dispose of leakage oil and oily cloths in an environmentally responsible manner. Before assembly carefully clean all parts and blow out holes with compressed air. Tighten all screws plugs to the specified torque (see Appendix A). Exceptions are specified in the text. Lubricate O-rings and shaft sealing rings lightly with acid free lubricant for easier installation and to hold the O-ring in place in its groove or cavity.

1. Install Snap Ring and Shaft Seal



2. Install Crush Ring



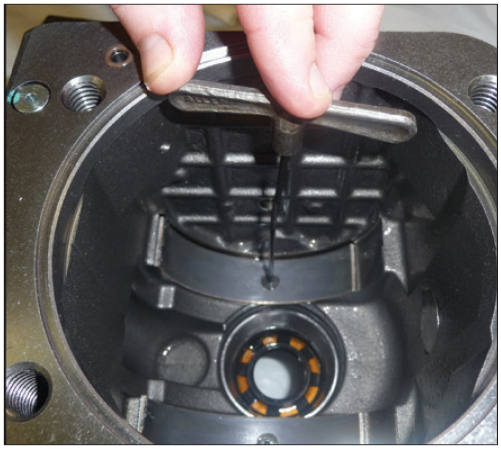
3. Insert the Shaft Bearing Race

Repair

4. Install Cradle Bearings

The cradle bearings are asymmetrical. Install as shown in the picture.

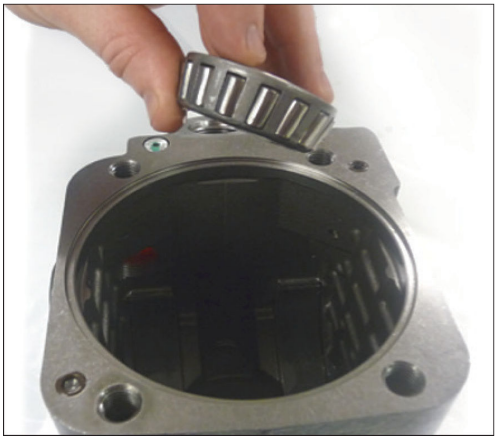
5. Install Cradle Bearing



The old cap screws cannot be reused and must be replaced with new ones because the screws will be damaged during disassembly. The new cap screw threads will be coated with loctite.

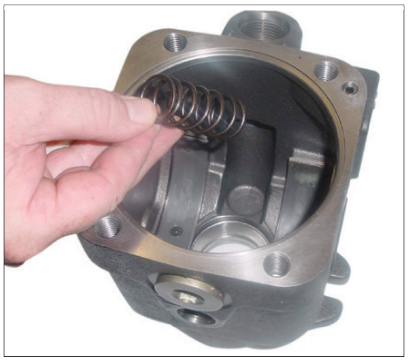
Kit #9900194-002 (2) bearings and (2) screws per kit.

6. Install Bearing

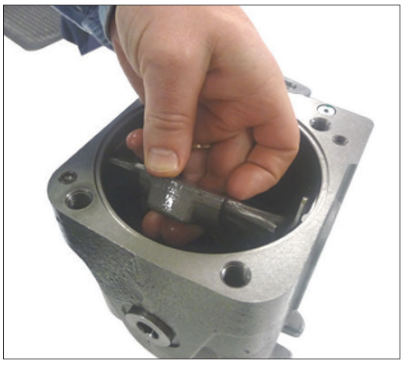


Repair

7. Install Bias Spring

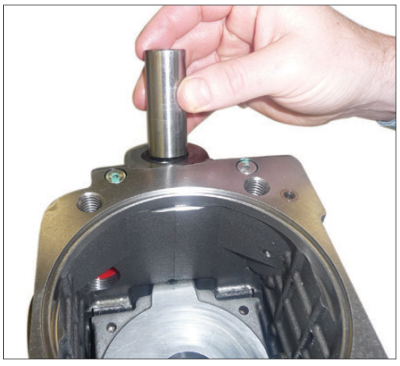


8. Install Swashplate

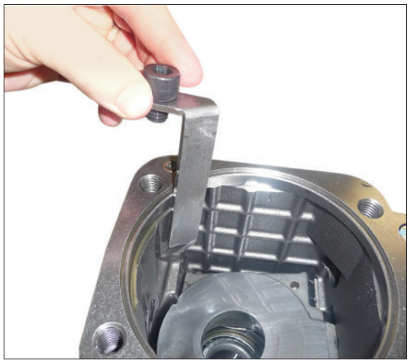


With the bias spring in place, tilt the swash plate toward the spring and install the swash plate.

9. Install Control Piston



10. Install Swashplate Retainer

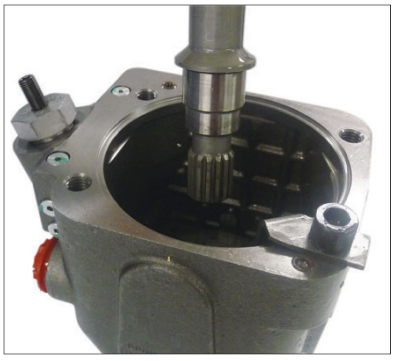


Repair

11. Install Swashplate Locator

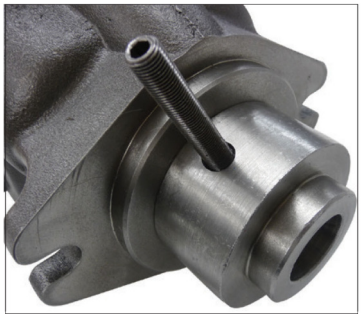
Adjust the screw until the swashplate is near neutral (will look flat in housing).

12. Install Shaft

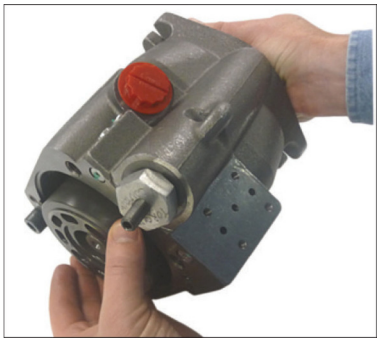


Caution: Use care while inserting shaft end through shaft seal.

13. Install Shaft Retainer Tool



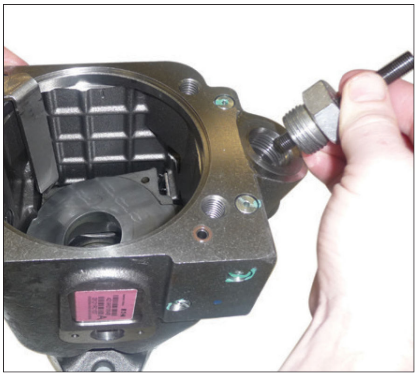
14. Install the Rotating Group



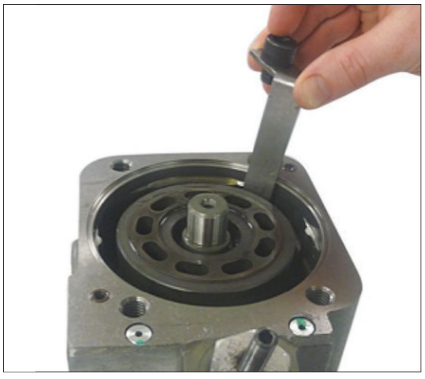
Position shaft upwards and carefully install rotating group.

Repair

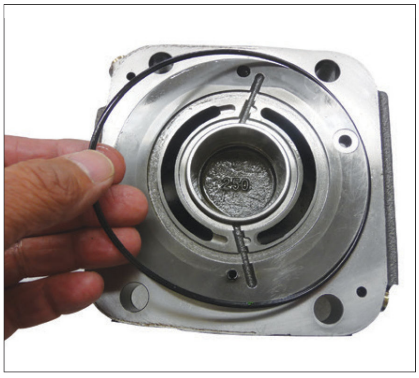
15. Remove Swashplate Locator



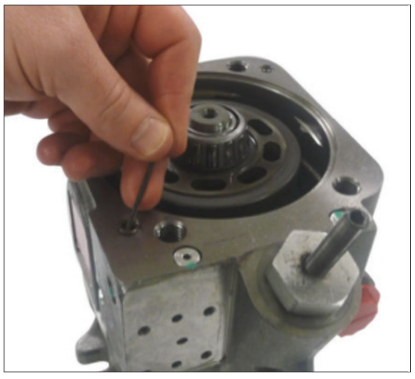
16. Remove Swashplate Retainer



17. Install O-ring Seal

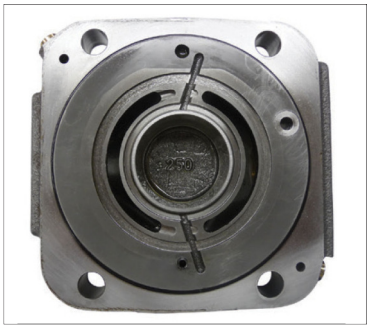


18. Install Housing O-rings



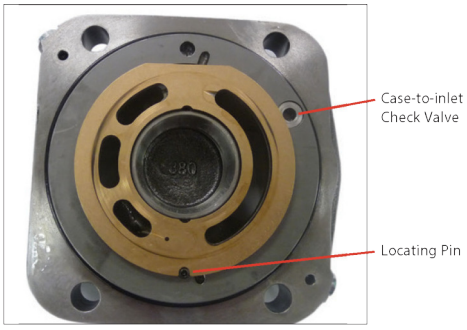
Repair

19. Install Bearing Race



Using a press, install the bearing race.

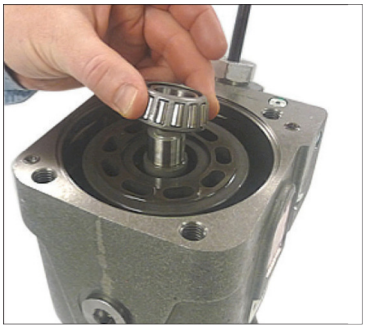
20. Install Valve Plate



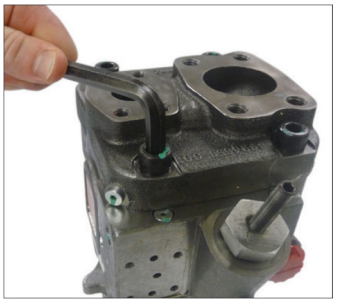
Lightly coat the back plate side of the valve plate with petroleum jelly for retention during assembly.

Install the valve plate over the bearing race aligning the small slot on the outside of the valve plate with the dowel pin in the back plate.

21. Install Bearing



22. Install End Cover



Ensure correct orientation. Use caution so valve plate does not fall off.

Repair

23. Install Control Piston Plug Assembly

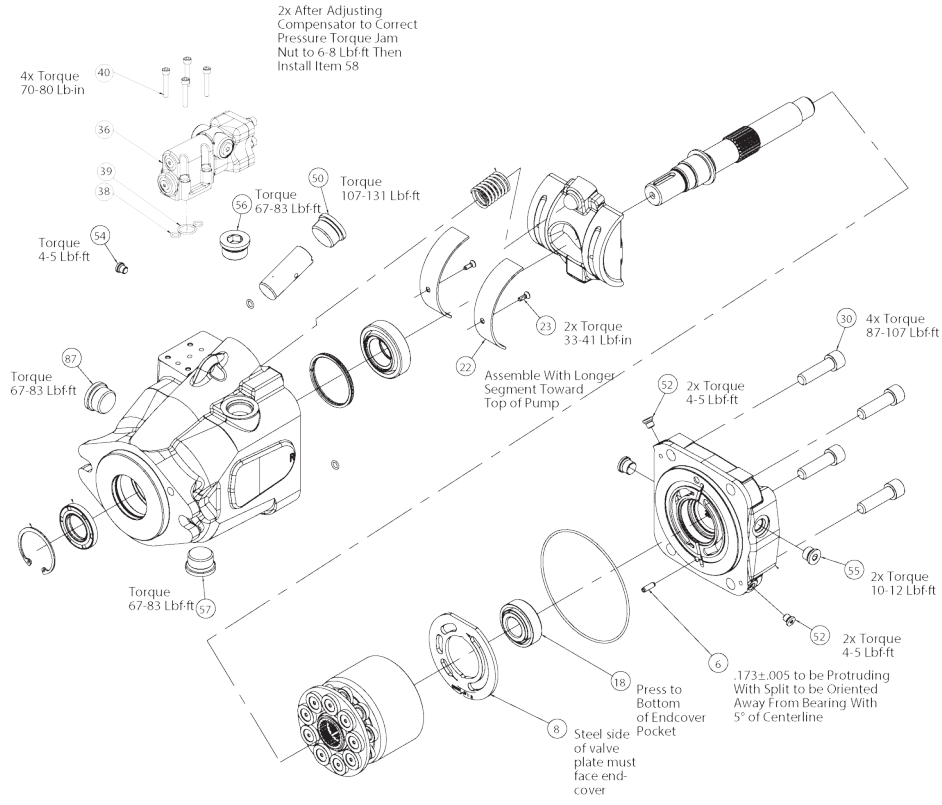
24. Install Compensator

25. Testing

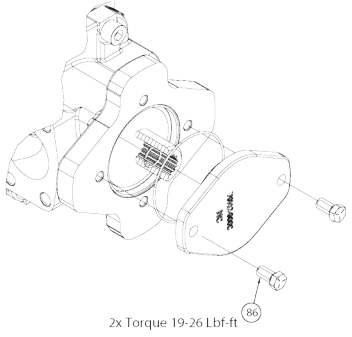
Perform functional test on pump according to Danfoss test procedure.

Repair

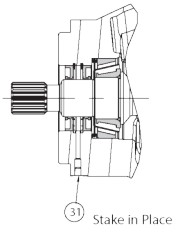
Assembly Torque Values



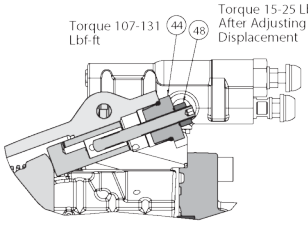
Thru-Drive Part Option



Dual Shaft Seal Option



Adjustable Maximum Stop Option



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