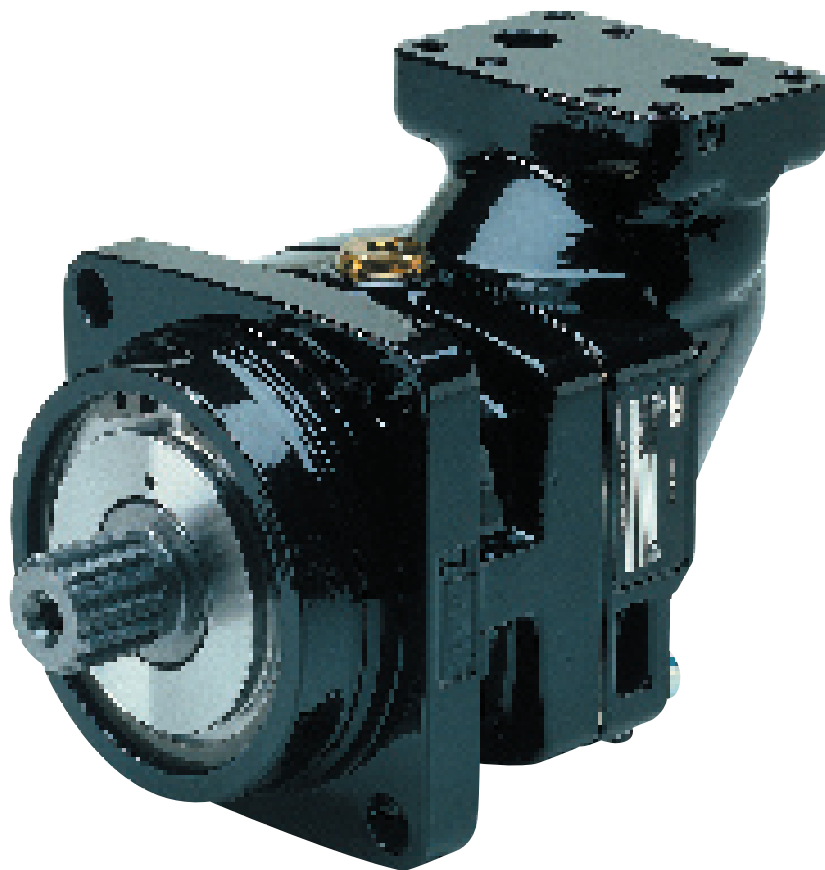




Bulletin HY30-5504-M1/UK


Service Manual Series F12

Effective: June, 2006
Supersedes: August, 2003



List of contents	Page
General information	3
Specifications	4
Disassembling	5 - 10
Assembling	11 - 16
Change of shaft seal	17
Valve plates	18

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
9/5 °C + 32 = °F	



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.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application, including consequences of any failure, and review the information concerning the product or system in the current product catalogue. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

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.

Offer of Sale

Please contact your Parker representation for a detailed "Offer of Sale".

General information

F12 is bent axis, fixed displacement heavy-duty motor/pump series. They can be used in numerous applications in both open and closed loop circuits.

Series F12 conforms to current ISO and SAE mounting flange and shaft end configurations. A very compact cartridge version is also available.

Frame sizes: F12-30, -40, -60, -80, -90, -110 and -125.

Thanks to the unique spherical piston design, F12 motors can be used at unusually high shaft speeds. Operating pressures to 480 bar provides for the high output power capability.

The 40° angle between shaft and cylinder barrel allows for a very compact, lightweight motor/pump.

The laminated piston ring offers important advantages such as low internal leakage and thermal shock resistance.

The pump version has highly engineered valve plates for increased selfpriming speed and low noise, available with left and right hand rotation.

The F12 motors produce very high torque at start-up as well as at low speeds.

Our unique timing gear design synchronizes shaft and cylinder barrel, making the F12 very tolerant to high 'G' forces and torsional vibrations.

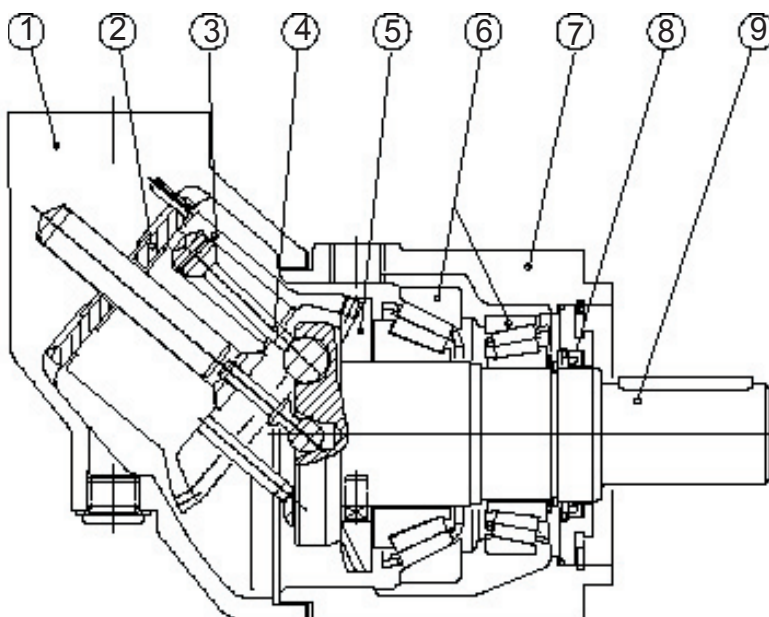
Heavy duty roller bearings permit substantial external axial and radial shaft loads.

The F12's have a simple and straightforward design with very few moving parts, making them very reliable motors/pumps.

The unique piston locking, timing gear and bearing set-up as well as the limited number of parts add up to a very robust design with long service life and, above all, proven reliability.

F12 cross section

1. Barrel housing
2. Valve plate
3. Cylinder barrel
4. Piston with piston ring
5. Timing gear
6. Tapered roller bearing
7. Bearing housing
8. Shaft seal
9. Output/input shaft



Frame size	F12-030	F12-040	F12-060	F12-080	F12-090	F12-110	F12-125
Displacement (cm ³ /rev)	30.0	40.0	59.8	80.4	93.0	110.1	125.0
Operating Pressure							
max intermittent ¹⁾ (bar)	480	480	480	480	420	480	480
max continuous (bar)	420	420	420	420	350	420	420
Motor operating speed							
max intermittent ¹⁾ (rpm)	7 300	6 700	5 800	5 300	5 000	4 800	4 600
max continuous (rpm)	6 700	6 100	5 300	4 800	4 600	4 400	4 200
min continuous (rpm)	50	50	50	50	50	50	50
Max pump selfpriming speed²⁾							
L or R function; max (rpm)	3150	2870	2 500	2 300	2 250	2 290	2 100
Motor input flow							
max intermittent ¹⁾ (l/min)	213	256	335	418	467	517	567
max continuous (l/min)	168	200	257	322	359	396	426
Main circuit temp.³⁾							
max (°C)	80	80	80	80	80	80	80
min (°C)	-40	-40	-40	-40	-40	-40	-40
Mass moment of inertia							
(x10 ⁻³) (kg m ²)	1.7	2.9	5.0	8.4	8.4	11.2	11.2
Weight							
(kg)	12.0	16.5	21.0	26.0	26.0	36.0	36.0

- 1) Intermittent: max 6 seconds in any one minute.
- 2) Selfpriming speed valid at sea level.
- 3) See also below, operating temperature.

Operating temperature

The following temperatures should not be exceeded (type **H** and **N** shaft seals):
Drain fluid: 90 °C.

FPM shaft seals (type **E**, type **V**) can be used to 115 °C drain fluid temperature.

NOTE: The temperature should be measured at the utilized drain port.

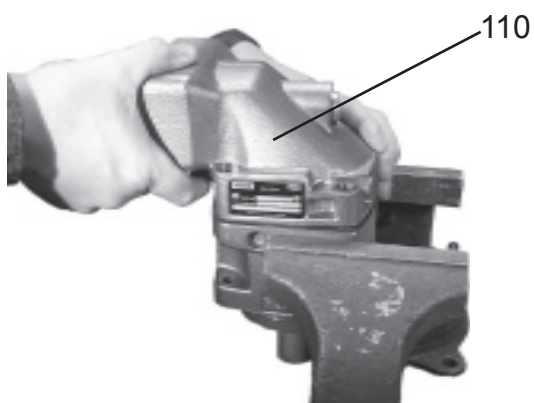
Continuous operation may require case flushing in order to meet the viscosity and temperature limitations.

For further information we refer to:
Catalogue HY17-8249/UK

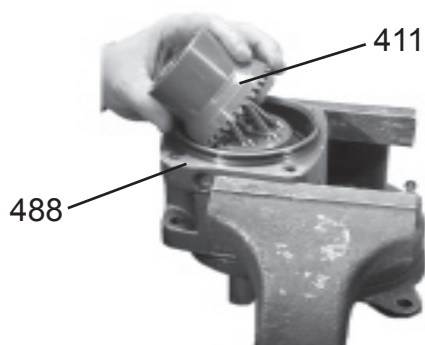
Disassemble



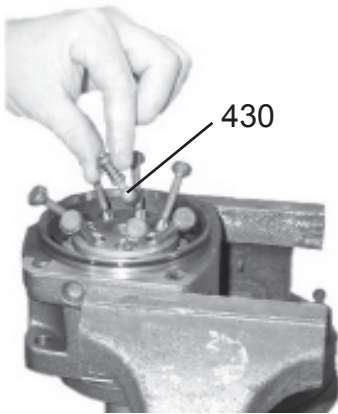
Fasten the unit in a vice. Loosen the 4 bolts (item 491).



Lift off the barrel housing (item 110). Make sure that the valve plate doesn't fall out when lifting the barrel housing off.



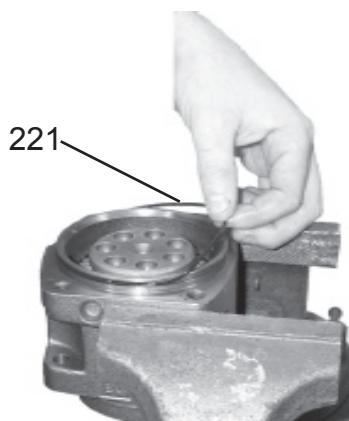
Lift off the cylinder barrel (item 411). Take the shim (item 488) away.



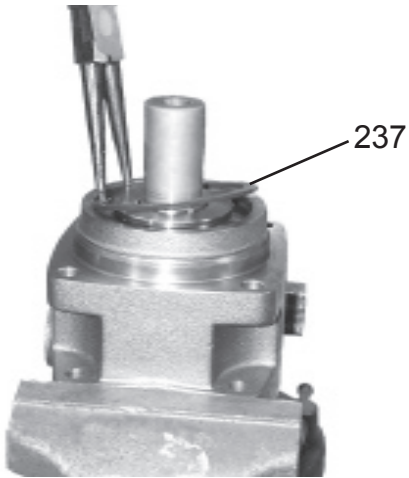
Lift off the barrel support (item 430).



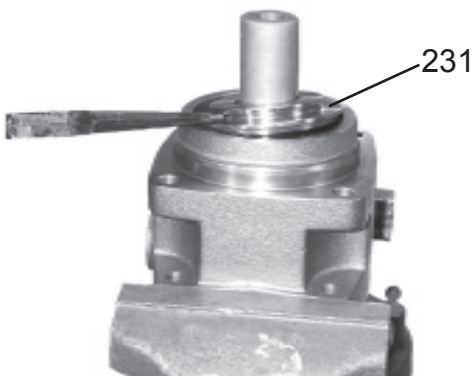
Remove the pistons (item 440).



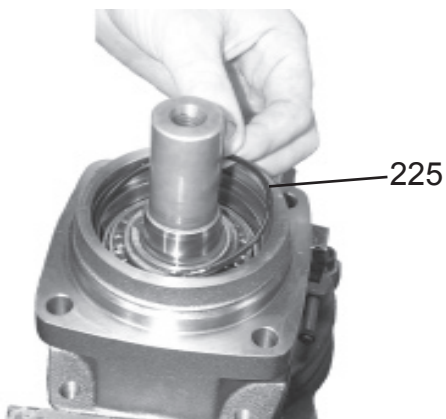
Remove the O-ring (item 221).



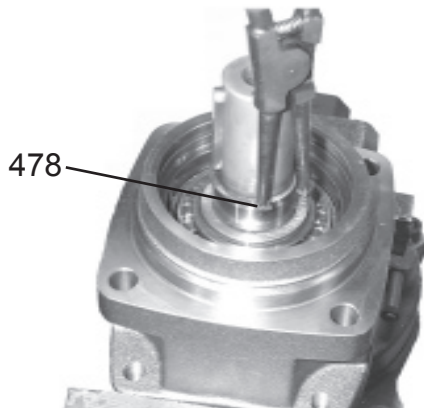
Remove the retaining ring (item 237).



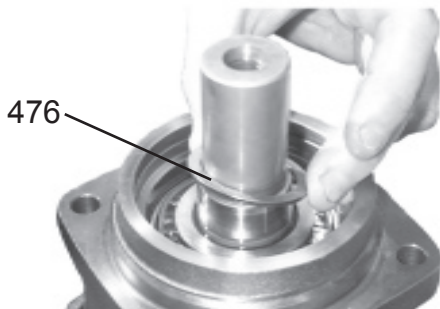
Remove the seal carrier (item 231).



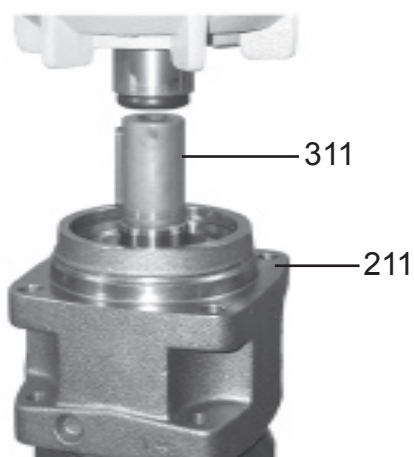
Remove the O-ring (item 225).



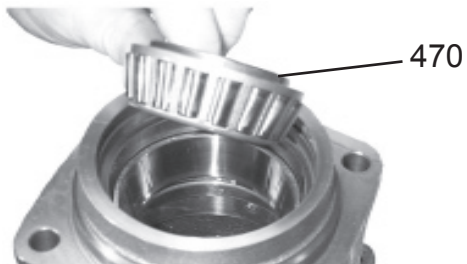
Remove the retaining ring (item 478).



Lift off the spacer washer (item 476).



Place the bearing housing (item 211) on a tube.
Push out the shaft (item 311) with a press.



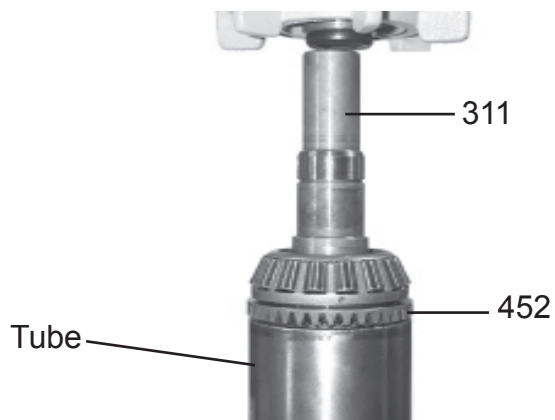
Remove the small tapered roller bearing (item 470).



Tap the small bearing ring off with a mandrel.



Tap the large bearing ring off with a mandrel.



Place the ring gear (item 452) on a tube.
Push out the shaft (item 311) with a press.

Assemble



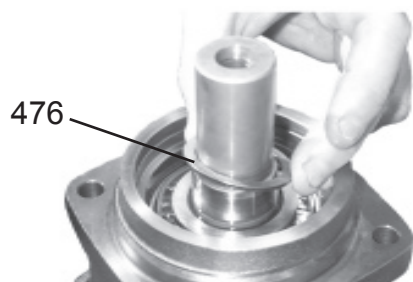
Push on the tapered roller bearing (item 460) and the ring gear (item 452) on the shaft with a press. Use a tube (see page 16).



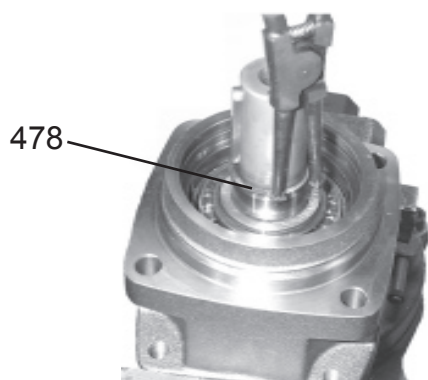
Push on the bearing ring (item 460) in the bearing housing (item 211) with a press. Use a tube to match the outer diameter off the bearing ring.



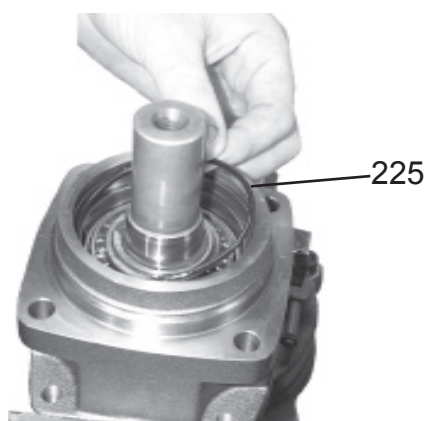
Push on the bearing ring (item 470) in the bearing housing (item 211) with a press. Use a tube to match the outer diameter off the bearing ring.



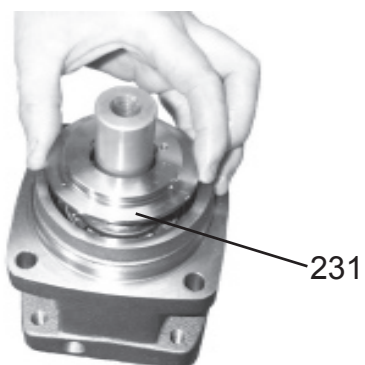
Push on the Bearing (item 470) with a press until correct preload is achieved. Install the spacer washer (item 476).



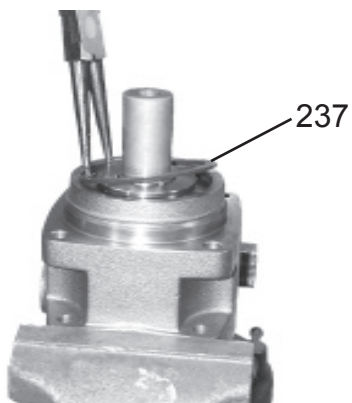
Install the retaining ring (item 478).



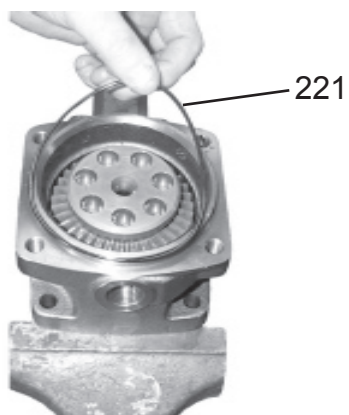
Install the O-ring (item 225).



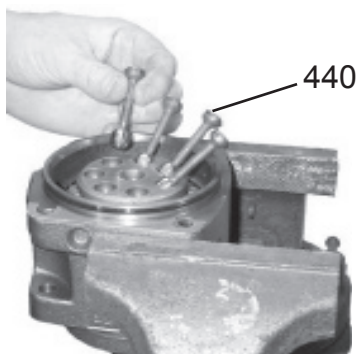
Install the seal carrier (item 231).



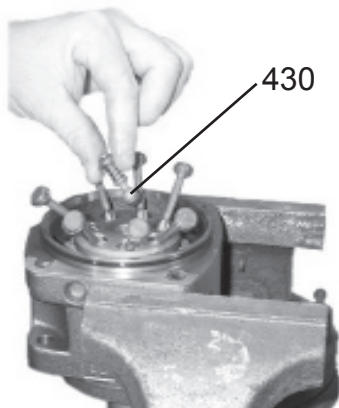
Install the retaining ring (item 237).



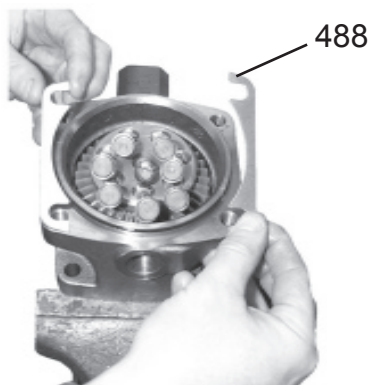
Install the O-ring (item 221).



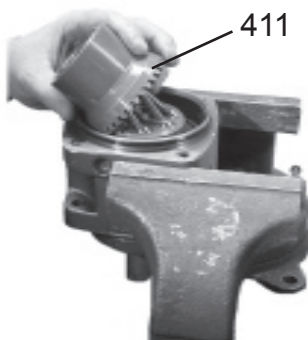
Install the pistons (item 440).



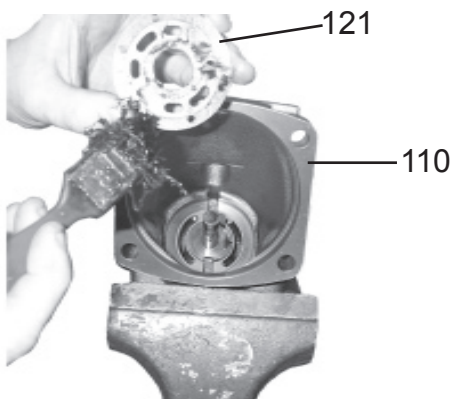
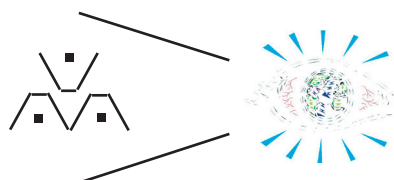
Install the barrel support (item 430).



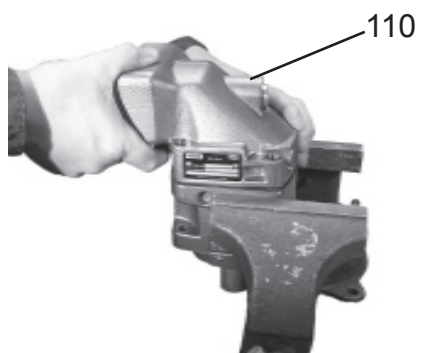
Install the shim (item 488).



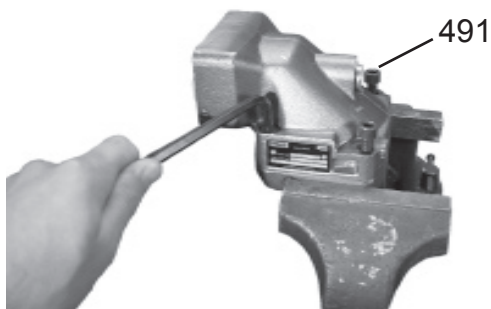
Install the cylinder barrel (item 411). Ensure correct timing. (Marking, punch mark)



Put some grease on the valve plate (item 121) and install it into the barrel housing (item 110).
 Make sure you have installed the valve plate correct (see page 18).



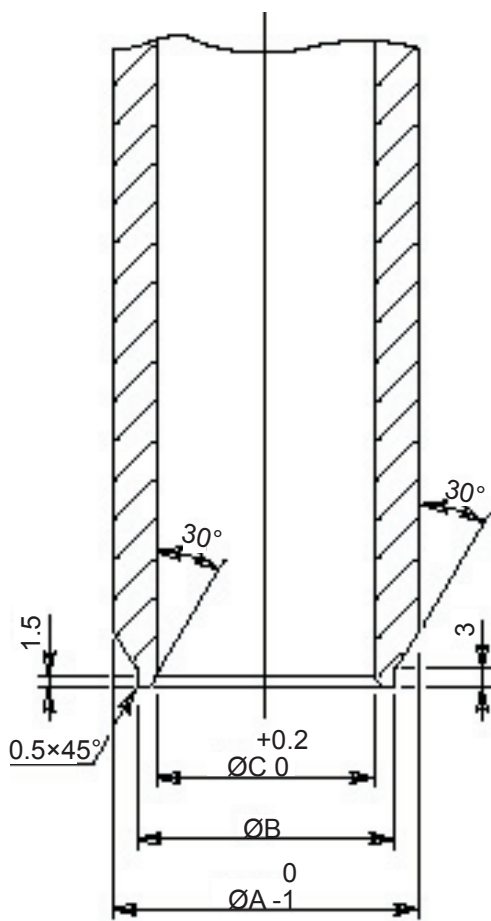
Install the barrel housing (item 110).



Fasten the 4 bolts (item 491) to specified torque.

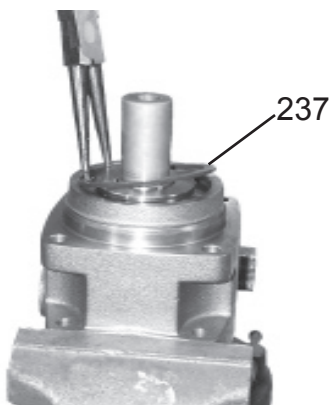
F12-030	60 ± 10 Nm
F12-040	60 ± 10 Nm
F12-060	60 ± 10 Nm
F12-080	105 ± 20 Nm
F12-090	105 ± 20 Nm
F12-110	105 ± 20 Nm
F12-125	105 ± 20 Nm

Tools to be used to facilitate the installation of the tapered roller bearings.

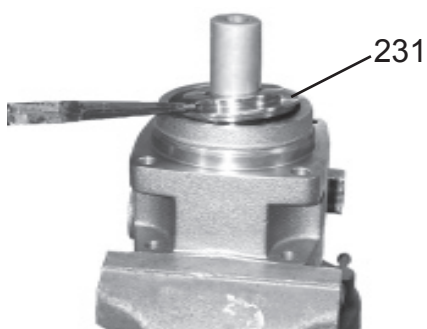


Type	ØA	ØB	ØC
F12-030	60	49	42
F12-040	65	58	52
F12-060	73	64	57
F12-080	74	70	62
F12-110	82	75	67

Change of shaft seal



Remove the retaining ring (item 237).



Remove the seal carrier (item 231).




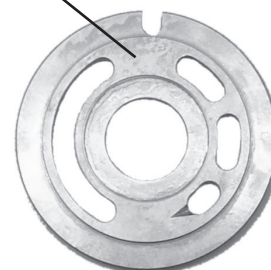
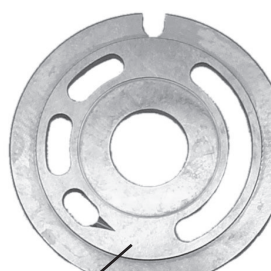
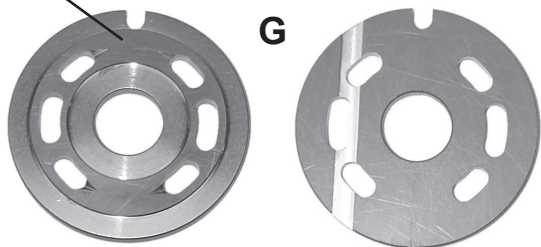
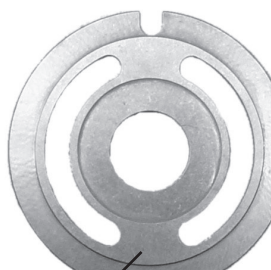
Tap the shaft seal out with hammer and mandrel.



Tap the new shaft seal back with a tube and a hammer.
The outside diameter on the tube is 65mm.

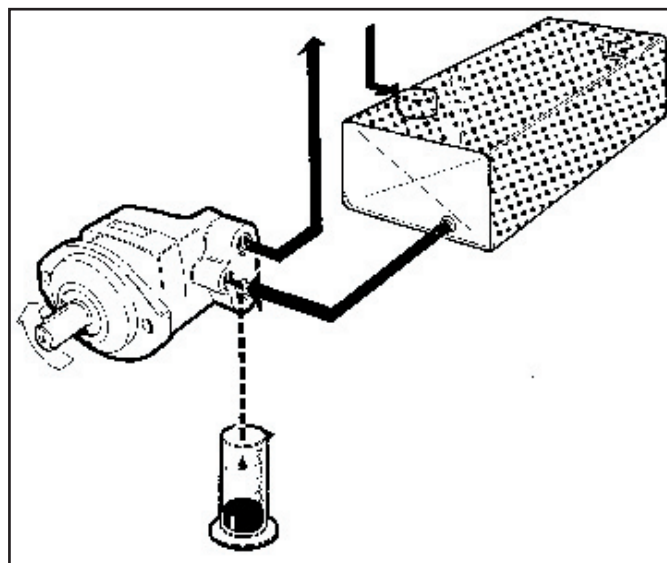
Valve plates F12

Following valve plates can be fitted in F12.

	M	M = Bi-directional, motor operation
<i>Against cylinder barrel</i>		
	L	L = L.H. rotation, pump operation
	R	R = R.H. rotation, pump operation
<i>Against cylinder barrel</i>		
	G	G = L.H. rotation, internal drain, motor operation
	X	X = Bi-directional, pump operation, high self priming speed
<i>Against cylinder barrel</i>		

The general condition of the unit can be established by checking the drain flow. Remove the drain line and keep the drain port above a suitable container. Run the unit at normal speed and pressurize the system to 2000-3000 psi. (150 - 200 bar)

Measure the drain flow for one minute; if it exceeds the maximum figures shown below, the unit is worn or damaged internally and should be replaced or repaired. Also, check for leakage at the shaft seal and between the bearing and barrel housings.



Series	Normal cu.in./min	Normal l/min	Max gpm.	Max l/min
F12-030	24	0.4	.55	2.0
F12-040	30	0.5	.65	2.5
F12-060	43	0.7	.70	2.7
F12-080	61	1.0	.80	3.0
F12-090	61	1.0	.80	3.0
F12-110	61	1.0	.80	3.0
F12-125	61	1.0	.80	3.0



Parker Hannifin
Pump and Motor Division
Flygmotorvägen 2
SE-461 82 Trollhättan
Sweden
Tel: +46 (0)520 40 45 00
Fax: +46 (0)520 371 05
www.parker.com