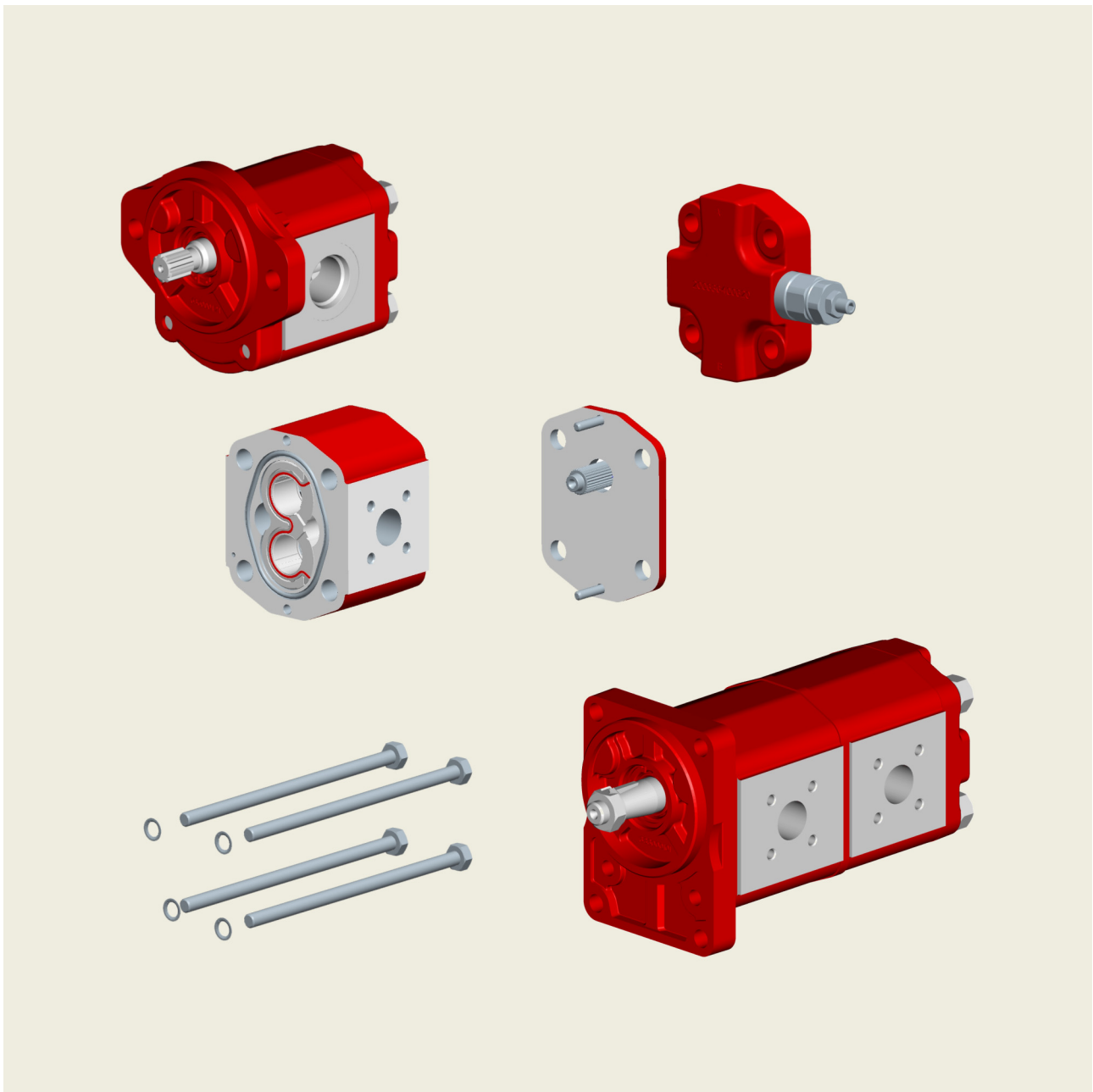


AP212 Gear Pumps

Dedicated catalogue for Dealers (with spare parts, instructions, etc.)

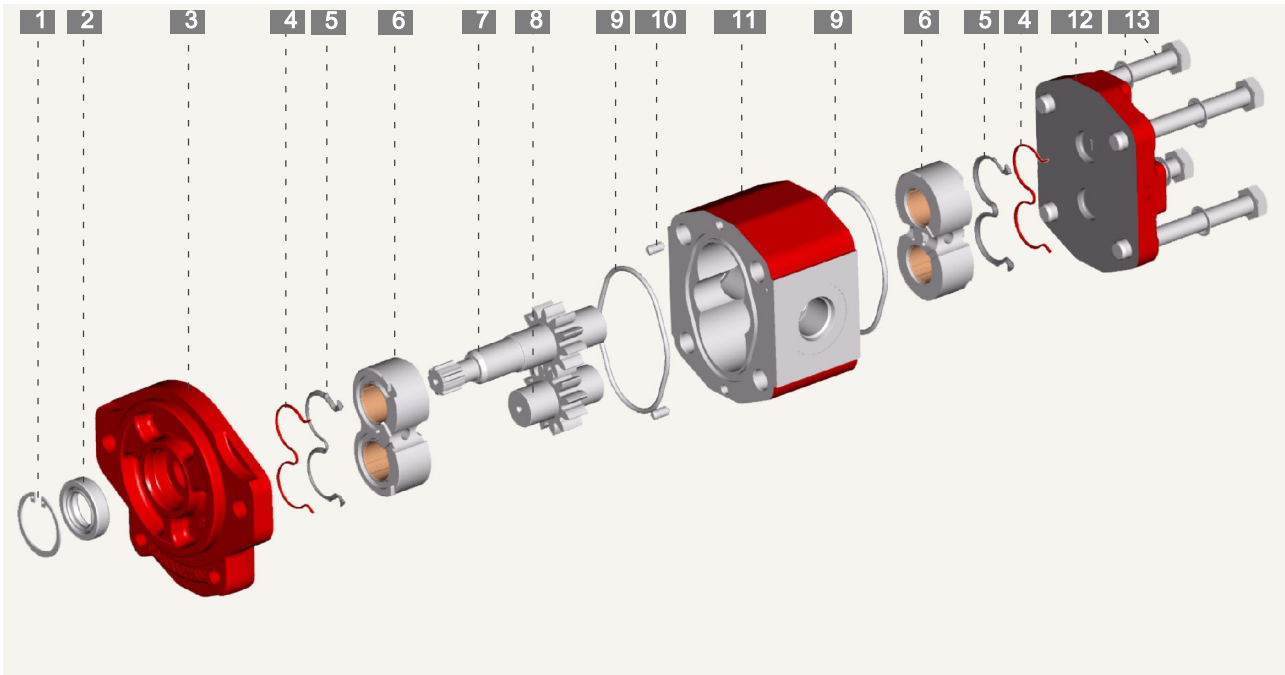


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External gear pumps components



1. Retaining ring
2. Shaft seal
3. Front cover
4. Balancing seal
5. Back up seal
6. Balancing block
7. Drive gear

8. Driven gear
9. Oil seal
10. Centering pin
11. Pump body
12. Back cover
13. Fixing screw and washer

1 General information

The product range of Bucher Hydraulics SpA includes single pumps 05-100-212-300 (corresponding with the common group denominations: 05-1-2-3) and several combinations of double pumps, triple pumps, and so on, that can be assembled together according to versions of displacement, flanging, and auxiliary valves .

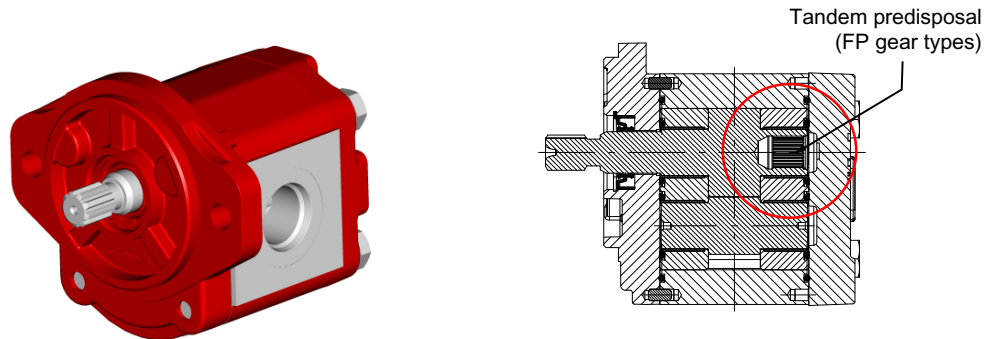
External gear pumps are widely used in modern hydraulic systems due to their high performance, long service life and low purchase and maintenance costs.

Here following we introduce you a dedicated catalogue for dealers (with spare parts, instructions, etc) for the new AP212 family range.



1.1 What you can do with the information contained in this catalog?

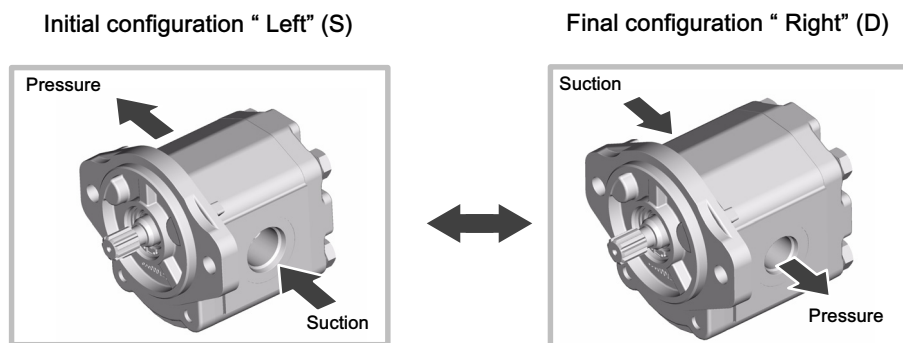
1.1.1 You can order a complete group 2 external gear pump with right rotation - left rotation (see section 2)



All the pumps in every different configuration (front covers, back covers, shafts, connections, etc) can be ordered; their part number can be found in the first pages of this catalog; you can then receive a complete assembled pump, already tested and run-in according to Bucher Hydraulics production standards, which can be put in service without any additional operation.

Before putting the pump in service, be sure that the chosen pump meets the requested operational conditions. Please note that our pumps can be easily used in multiple pumps assemblies (predisposal already included); no other operations are required if it is used as a single pump.

1.1.2 You can change the direction of rotation of a pump already available (see section 3)



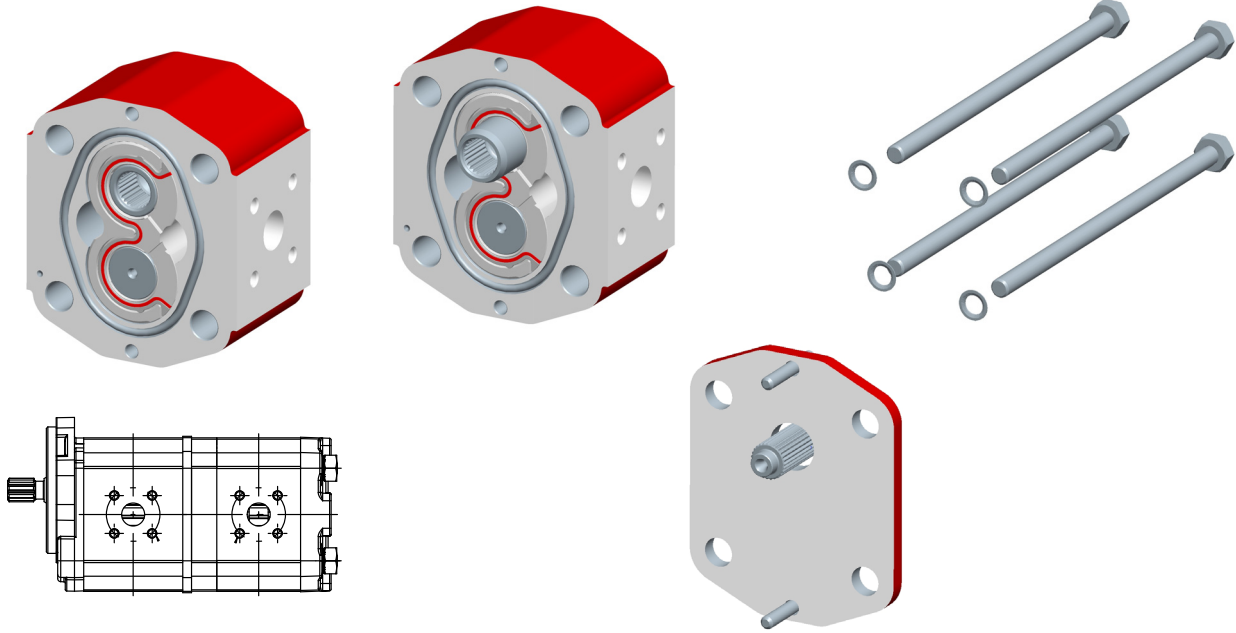
If you have an AP212 pump in stock in left-rotation version and you need it in right-rotation, following the instructions contained in this catalog, it will be easy to change the sense of direction.

Be sure to follow the provided step-by-step instructions, working in a clear environment and using the appropriate toolings.

At the end, always use a torque wrench to tighten the pump screws (torque values are shown in this catalog).

No further "first-run-in" operations are needed; however, during the first period of operation, be sure to use a reduced working pressure. It will be allowed to increase the pump pressure only after a detailed general control of the system (i.e. no leakages, correct alignment of all components, no unusual noises, etc.)

1.1.3 You can order a set of components that will allow you to obtain multiple pumps (see section 4)

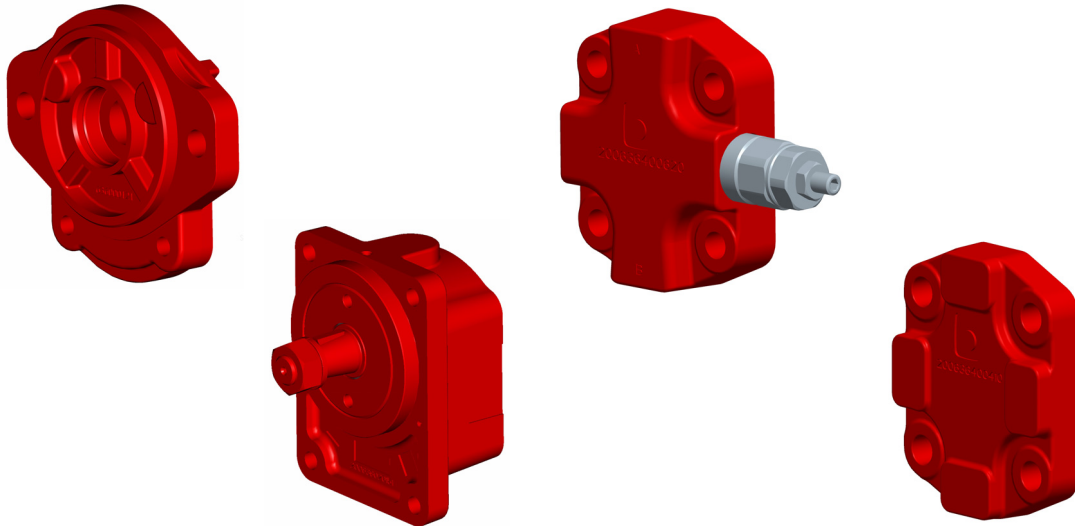


In section 4 of this catalog, a set of pre-assembled components are shown; combining them in a proper way, you can easily obtain a multiple pump.

With simple steps, starting from a single pump, a multiple pump can be assembled in many different variants.

Appropriate instructions and warnings are available in this catalog; they will allow you to obtain a reliable multiple pump.

1.1.4 You can modify a pumps structure (replacing its front/rear covers) to match your application requirements (see section 5)



In this catalog, you can find a set of pre-assembled components that allows you to obtain different pumps configurations.

Front covers are available in different materials and with shaft seals manufactured in different materials.

Rear covers are available; they can also include valves which allow an hydraulic circuit simplification.

1.2 Technical data

Features	
Fluid temperature range (mineral oil)	NBR HNBR
Recommended fluids	hydraulic mineral oil-based
Viscosity range:	Recommended Permitted Permitted for starting
Cleanliness:	recommended for operating pressure > 170 bar recommended for operating pressure < 170 bar
Standard seals material (valves not included)	NBR + HNBR standard (ISO1629)

Type	AP212 Displacement		Max. pressure*						n min.	n min.	n min.	n max.
	cm ³ /rev	Cu.In.P.R.	P1 (continuous)		P2 (intermittent)		P3 (peak)		P2 < 100 bar	100 < n < 180 bar	180 < n < P2	
			bar	P.S.I.	bar	P.S.I.	bar	P.S.I.	rpm	rpm	rpm	
4.5	4.4	.269	250	3600	280	4000	300	4300	600	1200	1400	4000
6.5	6.4	.391	250	3600	280	4000	300	4300	600	1200	1400	4000
8.5	8.4	.513	250	3600	280	4000	300	4300	600	1000	1400	4000
11	11.1	.677	250	3600	280	4000	300	4300	500	900	1200	3500
15	15.1	.921	250	3600	280	4000	300	4300	500	750	1000	3500
19	19.2	1.172	210	3000	240	3500	260	3700	500	750	1000	3000
22	22.2	1.355	180	2600	210	3000	230	3300	500	750	900	3000
26	26.2	1.599	170	2500	200	2850	220	3150	500	750	1000	2800
22**	22.2	1.355	220	3150	240	3450	260	3700	500	750	900	3000
26**	26.2	1.599	200	2850	230	3300	250	3600	500	750	1000	2800

* Referred to pumps and motors with flanged ports. Utilising threaded ports, please to consider a significantly de-rated performances. The mechanical stress localised on threaded ports cause a reduced pump life performances

** Particular pumps not included in this catalogue and obtained with a specific balancing plate, please contact our Sales Center



IMPORTANT!: Please consult Bucher Hydraulics if even one of the operating limits indicated in the table (temperature, pressure, rpm) is exceeded, as well as in the case of two or more maximum values at the same time, or for applications with particularly heavy-duty cycles

1.3 Pressure

Pressure levels:

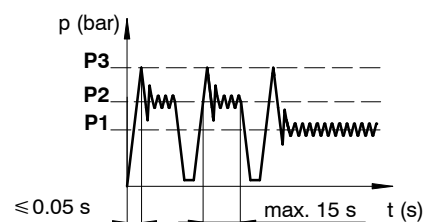
P1 = continuous pressure

P2 = intermittent pressure

P3 = peak pressure

The recommended oil speed in the pressure pipes is:

v = 2 to 5 m/s



1.4 Suction

The absolute suction pressure must be $P_{in} \geq 0.75 \text{ bar}$ (11 PSI); therefore, the following must be avoided:

- large height differences between pump and tank
- long stretches of piping
- special features such as:
 - bends
 - reductions in diameter
 - quick couplings
 - etc.

It is also advisable to choose a filter of a suitable size to minimise any pressure drop and to take measures to prevent gradual clogging over time.

(Example 1)

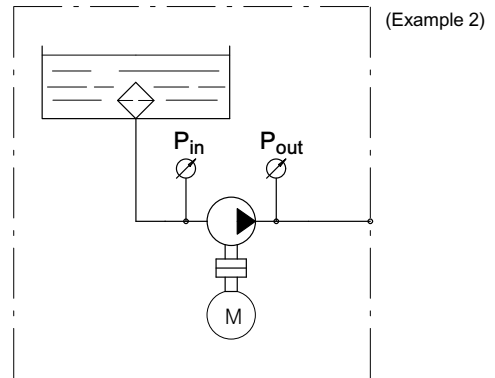
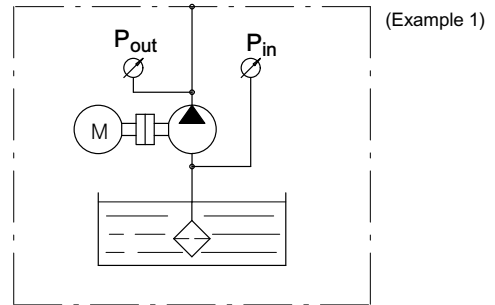
In certain cases, the suction pressure can exceed 1 bar (14.3 PSI), or atmospheric pressure.

Please contact our Sales Department, solution for $P_{in} \leq 3.5 \text{ bar}$ (50 PSI), are available.

If in a particular application the P_{in} pressure is higher than the recommended value, contact our Sales Office.

The diameter of the suction pipe should ensure that the oil speed will fall within the range: $v = 0.6 - 1.2 \text{ m/s}$.

(Example 2)



1.5 General precaution

In addition to the recommendations regarding fluids, filtration, coupling, etc., we suggest the following:

- Always check the rotation direction of the pump's drive shaft; it must be compatible with the rotation direction of the pump itself.
- Be particularly careful in cleaning and make sure, when connecting the suction and pressure piping, that no chips, rag threads, teflon tape, etc. get into the pump circulation system.
- Check the tightness of the suction and pressure fittings, the correct positioning of the O-Ring, and make sure there is no dirt between the flange and the pump body.
- The first pump start-up can be facilitated by manually filling the suction piping and the pump itself with oil. To facilitate air bleeding, start the pump with the circuit not pressurised.

- To ensure the best heat distribution inside the tank, make sure the return pipe is not too close to the pump's suction piping. The pipings themselves should be below oil tank level to prevent the formation of foam.
- Do not subject the pumps to operating conditions different from those indicated on section 1.1.2; for extreme operations, always contact our Technical Department.
- Never use fluids different from those indicated in section 1.1.2 and do not use fluids incompatible with the pump seals (i.e. HNBR)
- In the event of pump painting, do not use solvents or paints that are incompatible with the material of the seals. Do not bake paint with excessively high temperatures. Do not paint over the product identification plate.

1.5.1 Directives and standards

Atex



Attention: The equipment and protective systems of these catalogue ARE NOT intended for use in potentially explosive atmospheres that is to say where there is an explosive atmosphere referred to in Article 2 of the Directive 99/92/EC and referred to Article 1.3 of the Directive 94/9/EC

Machinery safety

Hydraulic pumps are excluded by Directive 98/37/EC
ISO 9001: 2000

Bucher Hydraulics S.p.A. is certified for research, development and production of directional control valves, gear pumps and motors, power units, electro pumps, cartridge valves and integrated manifolds for hydraulic applications.

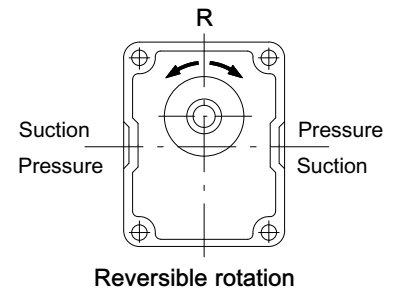
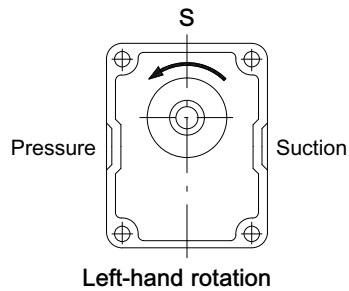
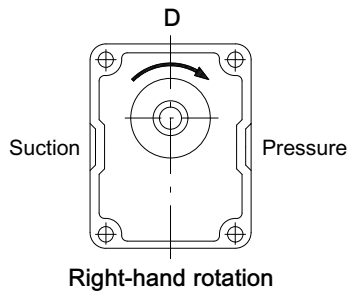
1.6 Identifying the rotation direction

The rotation direction of a gear pump is identified by looking at the pump from the front and with the drive gear turned upwards (see figures below).

Pumps with clockwise rotation (D) have a drive gear which turns clockwise, with the suction port on the left and the pressure port on the right.

Pumps with counterclockwise rotation (S) have a drive gear which turns counterclockwise, with the suction port on the right and the pressure port on the left. The figure also shows the pressure flow inside the pumps as the oil is transferred from the suction port to the pressure port.

Pumps with a unidirectional rotation (D or S) have the denomination AP.



1.7 Motor-pump coupling

Absolutely no radial or axial forces should be transmitted to the drive shaft in the motor-pump coupling.

Such forces cause rapid and irregular wear on the balancing surface of the bushings and gear support, with a consequent worsening in pump performance.

The coupling joint must be able to absorb any discrepancies in the coaxial alignment of the motor-pump shafts without placing any load on the pump shaft.

In the couplings between splined shafts, the connecting sleeve must be free to move along its axis.

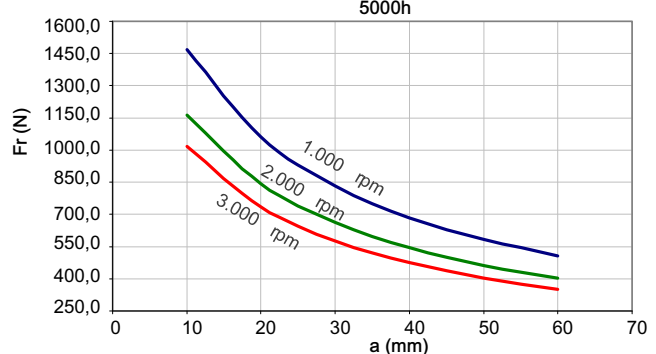
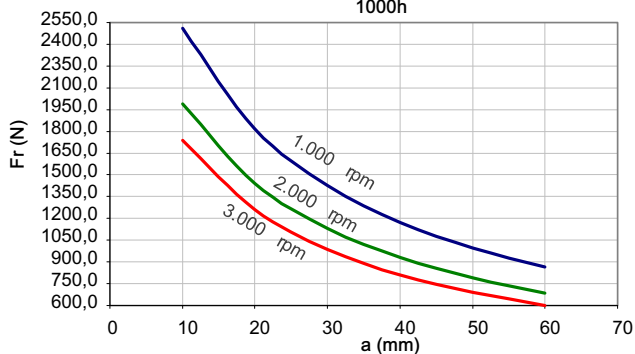
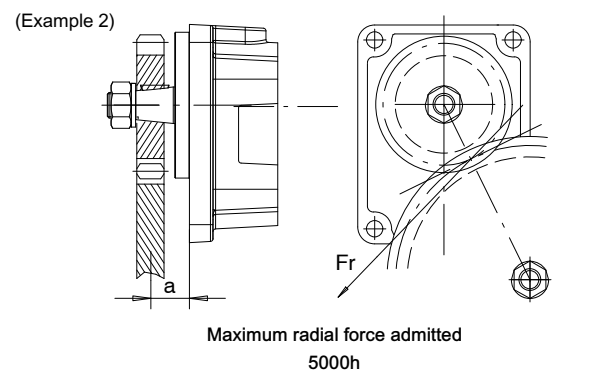
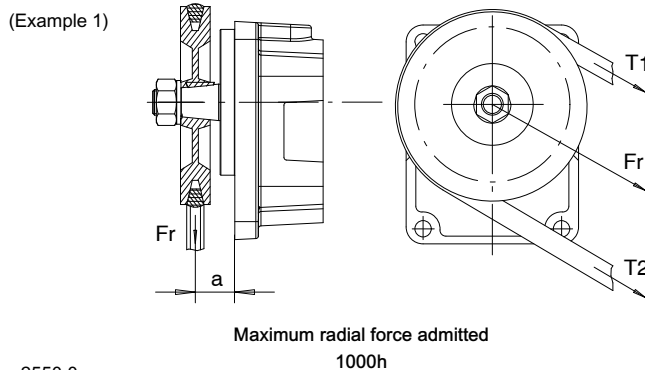
The length of the sleeve must be sufficient to cover the splined sections of the motor-pump shafts completely in any position.

A clearance between shaft ends is necessary.

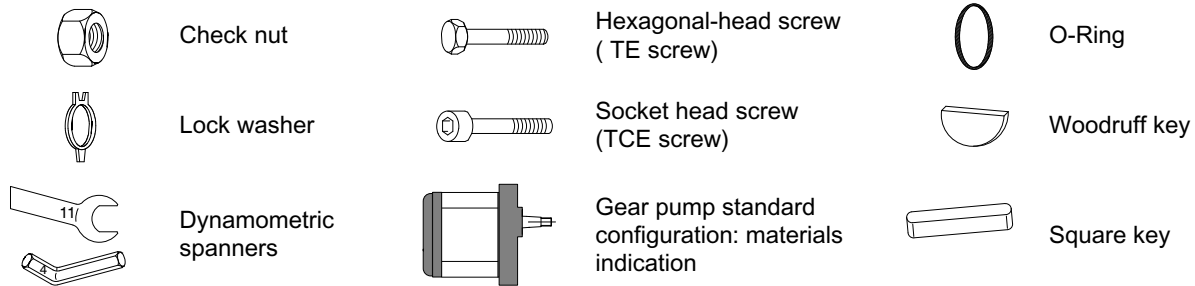
Make sure that the splined coupling is suitably lubricated to protect it against rapid deterioration.

If there are radial and/or axial loads on the drive shaft, such as when it is driven by a V-belt and pulley or pair of gear wheels, it should be fitted with a front cover with supporting bearings. (See examples 1 and 2)

Depending on the pump model concerned, these supports can replace the front cover of the pump (see section 5.1.1 Front bearing) or can be fitted in addition to and over the front cover.



1.8 Non-standard symbols used in the text



1.9 Calculating the specification of a gear pump

The following parameters are defined:

V_c = (cm³/rev) pump displacement;

n = (rev/min) no. of rpms of the drive shaft;

Q = (l/min) flow rate;

p = (bar) operating pressure;

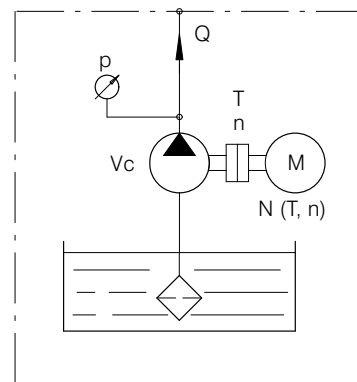
T = (Nm) drive torque;

N = (kW) Absorbed power;

η_v = (%) volumetric efficiency;

η_m = (%) mechanical efficiency;

η_t = (%) total efficiency



$$Q = \frac{V_c \cdot n}{100000} \cdot \eta_v$$

$$T = 1.59 \cdot \frac{p \cdot V_c}{\eta_m}$$

$$N = \frac{Q \cdot p}{6.12 \cdot \eta_t}$$

Example

AP212/11 $V_c = 11.1 \text{ cm}^3/\text{r}$ $n = 1500 \text{ r/min}$ $p = 200 \text{ bar}$ $\eta_v = 94\%$ $\eta_m = 90\%$ $\eta_t = 84.6\%$

$$Q = \frac{11.1 \cdot 1500}{100000} \cdot 94 = 15.65 \text{ l/min.}$$

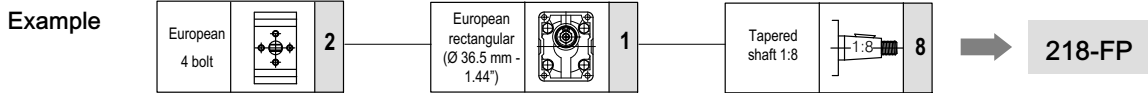
$$T = 1.59 \cdot \frac{200 \cdot 11.1}{90} = 39.2 \text{ Nm}$$

$$N = \frac{15.65 \cdot 200}{6.12 \cdot 84.6} = 6.05 \text{ kW}$$

2 Overview standard types (see section 1.1.1)

This pumps configuration are considered as "standard".

218-FP	818-FP	225-FP	227-FP	235-FP	245-FP	237-FP	247-FP
259-FP	887S-FP	880-FP	887S-NPTF-FP	880-NPTF-FP	287S-B-FP	280-B-FP	287S-SAEB-FP

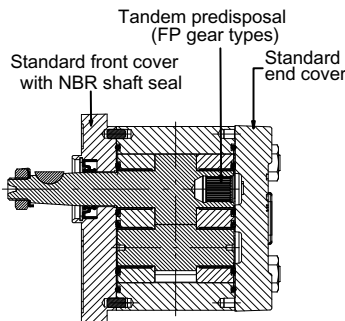


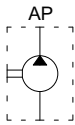
In the next pages, front, rear cover, and seals materials are listed for each pump series. For ordering purposes, it is enough to outline the complete pump description (for example: AP212/4.5 D 218-FP).

In case of a different configuration request (or a combination of different features, such as port threads, front flange materials, etc.), the description configurator shown in section 3.1 can be easily used.

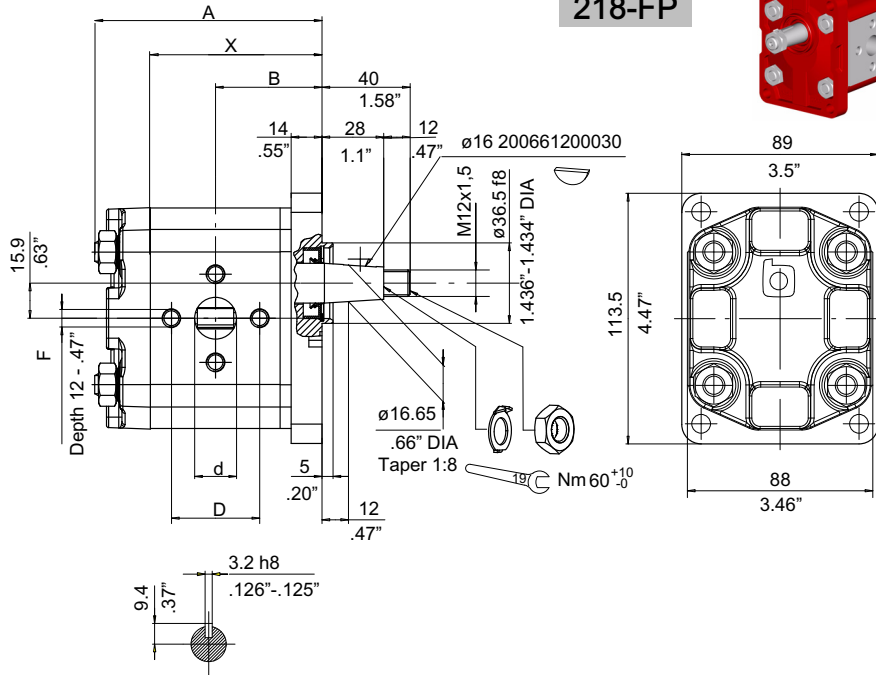
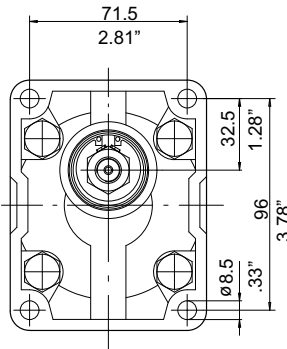
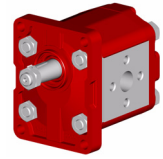
2.1 Standard configuration

Port type			Aluminium front cover type			Drive shaft		
European 4 bolt flanged		2	European rectangular (Ø 36.5 mm - 1.44")		1	Tapered shaft 1:8		8
German 4 bolt flanged		2	German rectangular (Ø 80 mm - 3.15 inches)		2	Tapered shaft 1:5		5
BSPP Threaded ports		8	Through 2 bolts (Ø 50 mm - 1.97")		3	Tang drive 8 mm - 0.32 inches		9
SAE Threaded ports		8	Through 2 bolts (Ø 50 mm - 1.97")		4	9 Teeth external spline B17X14 DIN5482		7
NPTF Threaded ports		8	Through 2 bolts (Ø 52 mm - 2.045")		5	9 teeth external spline SAE J 498-9T 16/32 DP		7S
			SAE-A 2 bolts (Ø 82.55 mm - 3.25 inches)		8	Straight keyed Ø 15.85 mm - 0.62 inches		0
			Cast iron front cover type					
			SAE-B 2 bolts (Ø 101,6 mm - 4 inches)		8			

Series	page	Series	page	Series	page
218-FP	13	818-FP	14	225-FP	15
227-FP	16	235-FP - 245-FP	17 18	237-FP - 247-FP	19 20
259-FP	21	887S-FP	22	880-FP	23
887S-NPTF-FP	24	880-NPTF-FP	25	287S-B-FP	26
280-B-FP	27	287S-SAEB-FP	28	<p>Tandem predisposal (FP gear types)</p>  <p>Standard front cover with NBR shaft seal</p> <p>Standard end cover</p>	



Serie
218-FP

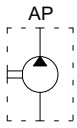


Gear pump material	
Front cover:	aluminium
Body:	aluminium
Back cover:	cast iron
Seals:	NBR + HNBR

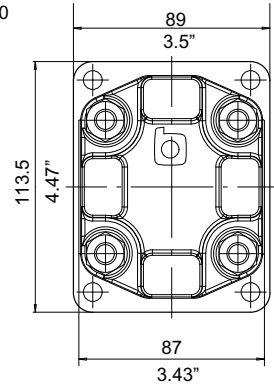
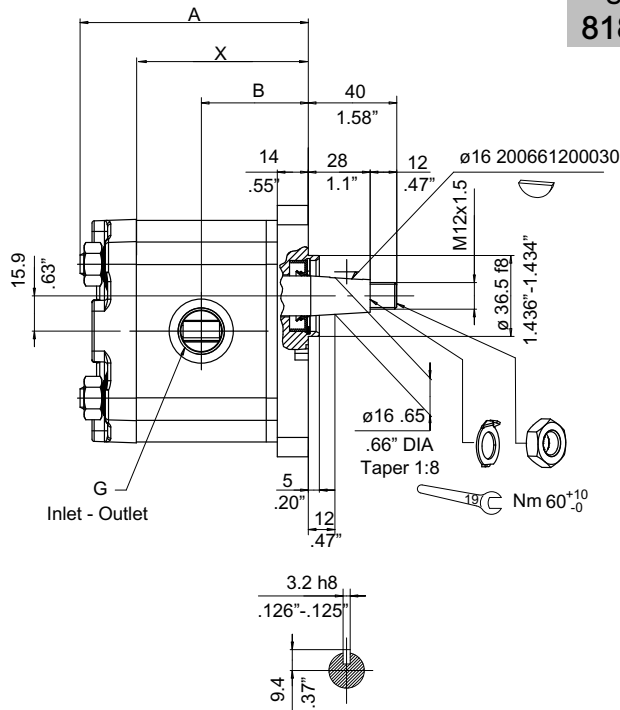
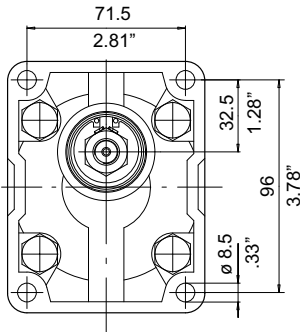
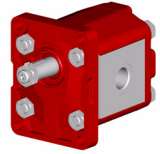
Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction					Pressure					
		A		B		X		d		D		F	d		D		F	
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	
4.5	4.4	94	3.70	43.3	1.70	67.6	2.66	13.5	.53	30	1.18	M6X1	13.5	.53	30	1.18	M6X1	
6.5	6.4	97	3.82	44.8	1.76	70.6	2.78											
8.5	8.4	100	3.94	46.3	1.82	73.6	2.90											
11	11.1	104	4.09	48.3	1.90	77.6	3.06	19	.75	40	1.58	M8X1.25	19	.75	40	1.58	M8X1.25	
15	15.1	110	4.33	51.3	2.02	83.6	3.29											
19	19.2	114	4.49	54.3	2.14	89.6	3.53											
22	22.2	118	4.65	56.5	2.22	94	3.70											
26	26.2	124	4.88	59.5	2.34	100	3.94											

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/4.5 D 218-FP	200102113223	AP212/4.5 S 218-FP	200102113318	Tandem predisposal (FP gear types)
AP212/6.5 D 218-FP	200102213228	AP212/6.5 S 218-FP	200102213319	
AP212/8.5 D 218-FP	200102313230	AP212/8.5 S 218-FP	200102313324	
AP212/11 D 218-FP	200102413253	AP212/11 S 218-FP	200102413330	
AP212/15 D 218-FP	200102513244	AP212/15 S 218-FP	200102513333	
AP212/19 D 218-FP	200102613241	AP212/19 S 218-FP	200102613325	
AP212/22 D 218-FP	200102713229	AP212/22 S 218-FP	200102713320	
AP212/26 D 218-FP	200102813236	AP212/26 S 218-FP	200102813326	



Serie
818-FP

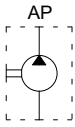


Gear pump material	
Front cover:	aluminium
Body:	aluminium
Back cover:	cast iron
Seals:	NBR + HNBR

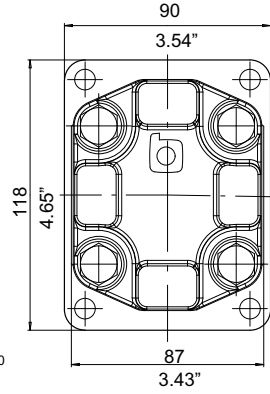
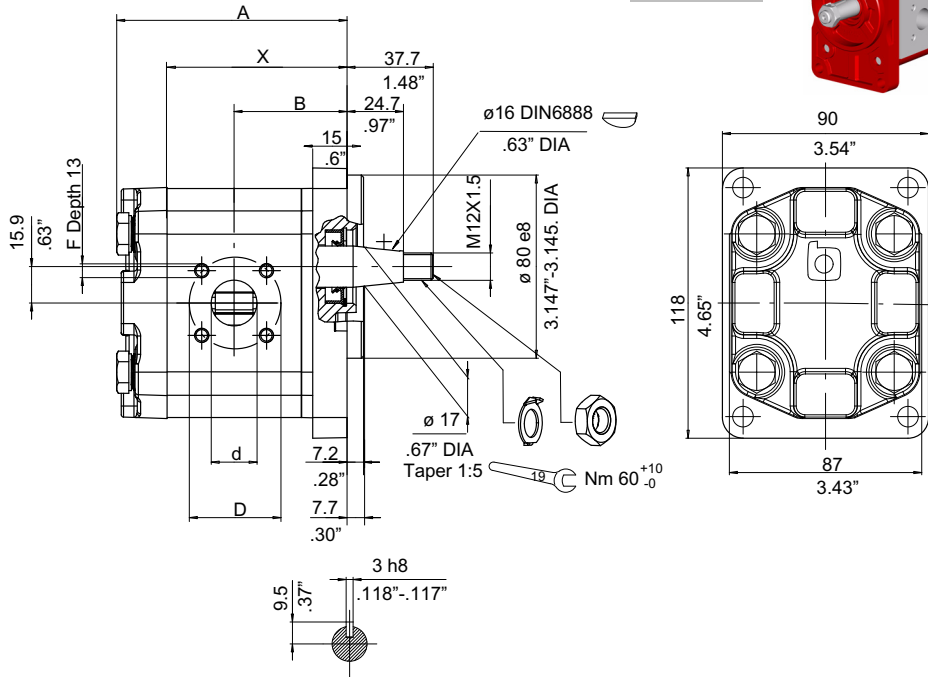
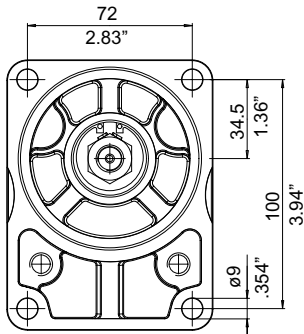
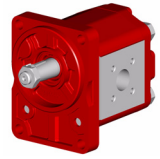
Tightening torque: see section 3.5 -5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction G BSPP	Pressure G BSPP
		A		B		X			
		mm	inch	mm	inch	mm	inch		
4.5	4.4	94	3.70	43.3	1.70	67.6	2.66	3/8"	3/8"
6.5	6.4	97	3.82	44.8	1.76	70.6	2.78		
8.5	8.4	100	3.94	46.3	1.82	73.6	2.90		
11	11.1	104	4.09	48.3	1.90	77.6	3.06	1/2"	1/2"
15	15.1	110	4.33	51.3	2.02	83.6	3.29		
19	19.2	114	4.49	54.3	2.14	89.6	3.53	3/4"	1/2"
22	22.2	118	4.65	56.5	2.22	94	3.70		
26	26.2	124	4.88	59.5	2.34	100	3.94		

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/4.5 D 818-FP	200102113224	AP212/4.5 S 818-FP	200102113319	Tandem predisposal (FP gear types)
AP212/6.5 D 818-FP	200102213229	AP212/6.5 S 818-FP	200102213320	
AP212/8.5 D 818-FP	200102313231	AP212/8.5 S 818-FP	200102313325	
AP212/11 D 818-FP	200102413254	AP212/11 S 818-FP	200102413331	
AP212/15 D 818-FP	200102513246	AP212/15 S 818-FP	200102513334	
AP212/19 D 818-FP	200102613242	AP212/19 S 818-FP	200102613326	
AP212/22 D 818-FP	200102713230	AP212/22 S 818-FP	200102713321	
AP212/26 D 818-FP	200102813237	AP212/26 S 818-FP	200102813327	



Serie
225-FP



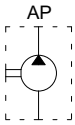
Gear pump material

Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

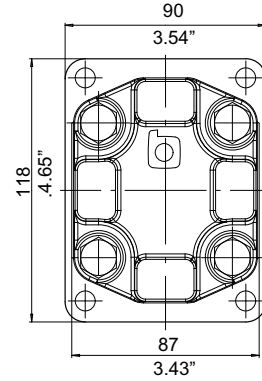
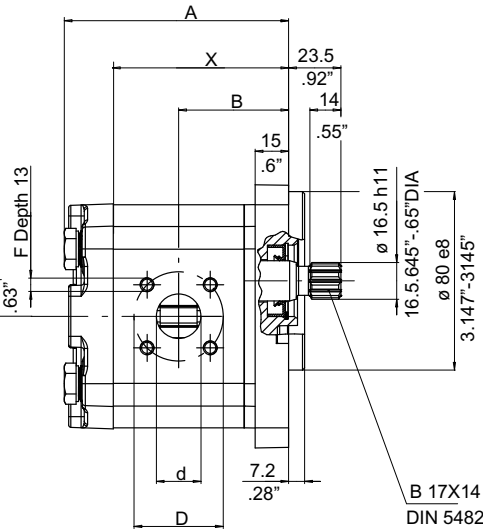
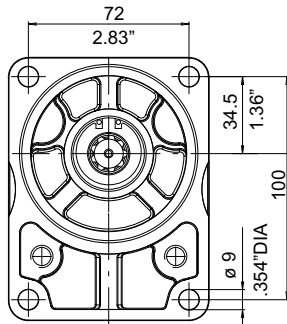
Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d	D	F	d	D	F				
		mm	inch	mm	inch	mm	inch	mm	inch	mm		mm	inch	mm	inch	mm	
4.5	4.4	91	3.85	44.3	1.74	68.6	2.70	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	94	3.70	45.8	1.80	71.6	2.82										
8.5	8.4	97	3.82	47.3	1.86	74.6	2.94										
11	11.1	101	3.98	49.3	1.94	78.6	3.09	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	107	4.21	52.3	2.06	84.6	3.33										
19	19.2	113	4.45	55.3	2.18	90.6	3.56										
22	22.2	117	4.61	57.5	2.26	95	3.74										
26	26.2	123	4.84	60.5	2.38	101	3.98										

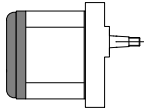
Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 225-FP	200102122207	AP212/4.5 S 225-FP	200102122308	
AP212/6.5 D 225-FP	200102222209	AP212/6.5 S 225-FP	200102222306	
AP212/8.5 D 225-FP	200102322213	AP212/8.5 S 225-FP	200102322307	
AP212/11 D 225-FP	200102422211	AP212/11 S 225-FP	200102422306	
AP212/15 D 225-FP	200102522212	AP212/15 S 225-FP	200102522307	
AP212/19 D 225-FP	200102622208	AP212/19 S 225-FP	200102622306	
AP212/22 D 225-FP	200102722210	AP212/22 S 225-FP	200102722304	
AP212/26 D 225-FP	200102822204	AP212/26 S 225-FP	200102822302	



Serie
227-FP



Gear pump material

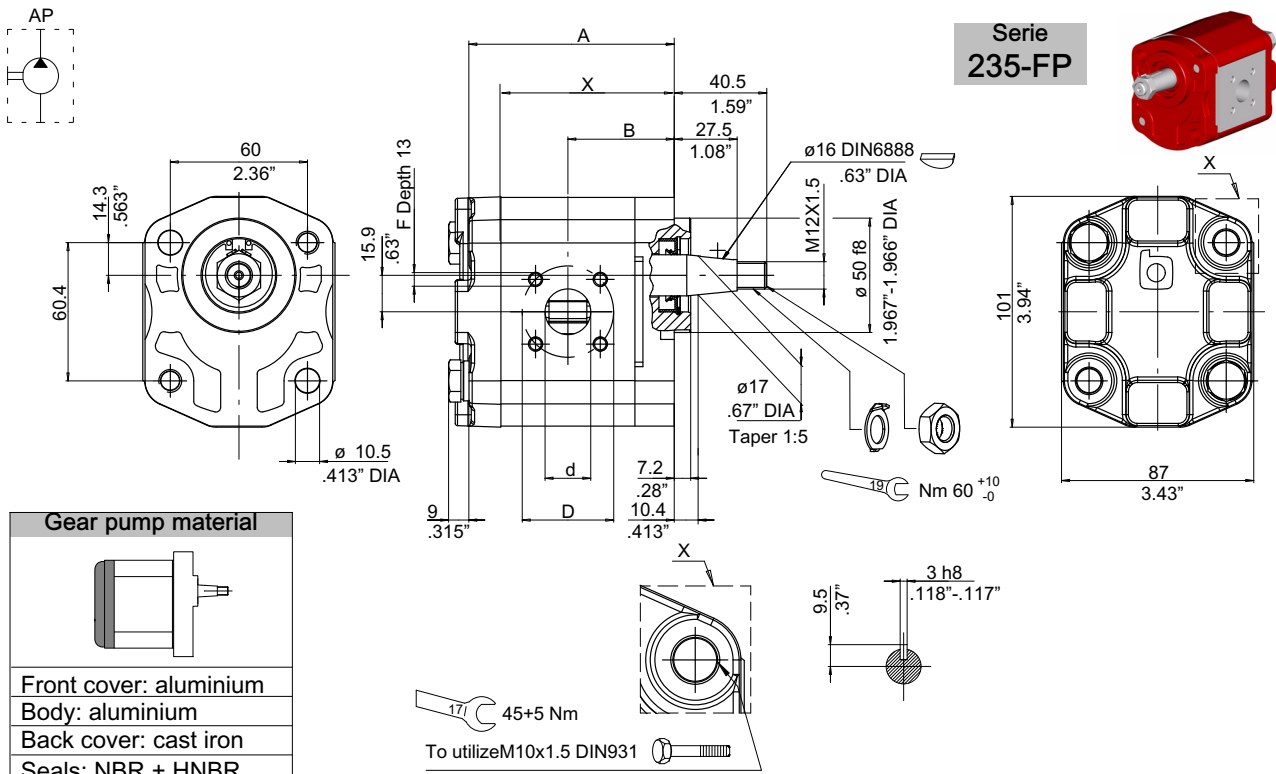


Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d		D	F	d		D	F		
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	
4.5	4.4	91	3.85	44.3	1.74	68.6	2.70	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	94	3.70	45.8	1.80	71.6	2.82										
8.5	8.4	97	3.82	47.3	1.86	74.6	2.94										
11	11.1	101	3.98	49.3	1.94	78.6	3.09	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	107	4.21	52.3	2.06	84.6	3.33										
19	19.2	113	4.45	55.3	2.18	90.6	3.56										
22	22.2	117	4.61	57.5	2.26	95	3.74										
26	26.2	123	4.84	60.5	2.38	101	3.98										

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/4.5 D 227-FP	200102125204	AP212/4.5 S 227-FP	200102125304	Tandem predisposal (FP gear types) Standard end cover Standard front cover with NBR shaft seal
AP212/6.5 D 227-FP	200102225204	AP212/6.5 S 227-FP	200102225304	
AP212/8.5 D 227-FP	200102325209	AP212/8.5 S 227-FP	200102325306	
AP212/11 D 227-FP	200102425204	AP212/11 S 227-FP	200102425310	
AP212/15 D 227-FP	200102525204	AP212/15 S 227-FP	200102525310	
AP212/19 D 227-FP	200102625205	AP212/19 S 227-FP	200102625308	
AP212/22 D 227-FP	200102725205	AP212/22 S 227-FP	200102725307	
AP212/26 D 227-FP	200102825205	AP212/26 S 227-FP	200102825304	



Gear pump material

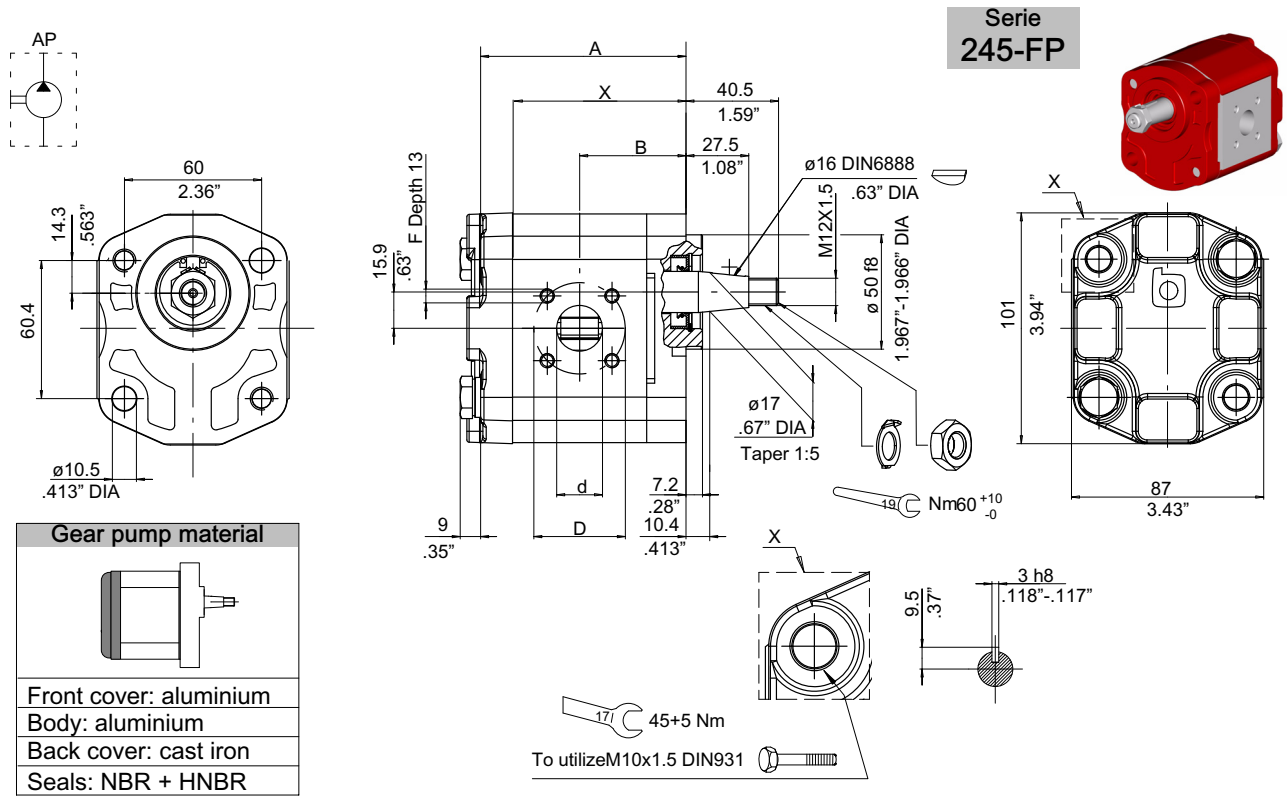
Front cover: aluminium
 Body: aluminium
 Back cover: cast iron
 Seals: NBR + HNBR

Shaft max torque: see section 3.3

Tightening torque: see section 5.2

Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d	D	F	d	D	F				
		mm	inch	mm	inch	mm	inch	mm	inch	mm	mm	inch	mm	inch	mm		
4.5	4.4	80	3.15	41.5	1.63	65.8	2.59	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	83	3.27	43	1.69	68.8	2.70										
8.5	8.4	86	3.39	44.5	1.75	71.8	2.83										
11	11.1	90	3.54	46.5	1.83	75.8	2.98	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	96	3.78	49.5	1.95	81.8	3.22										
19	19.2	102	4.02	52.5	2.07	87.8	3.46										
22	22.2	106	4.17	54.8	2.16	92.4	3.64										
26	26.2	112	4.41	57.8	2.28	98.4	3.87										

Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 235-FP	200102132204	AP212/4.5 S 235-FP	200102132304	
AP212/6.5 D 235-FP	200102232204	AP212/6.5 S 235-FP	200102232307	
AP212/8.5 D 235-FP	200102332205	AP212/8.5 S 235-FP	200102332305	
AP212/11 D 235-FP	200102432204	AP212/11 S 235-FP	200102432311	
AP212/15 D 235-FP	200102532204	AP212/15 S 235-FP	200102532309	
AP212/19 D 235-FP	200102632207	AP212/19 S 235-FP	200102632311	
AP212/22 D 235-FP	200102732207	AP212/22 S 235-FP	200102732305	
AP212/26 D 235-FP	200102832202	AP212/26 S 235-FP	200102832302	

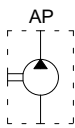


Shaft max torque: see section 3.3

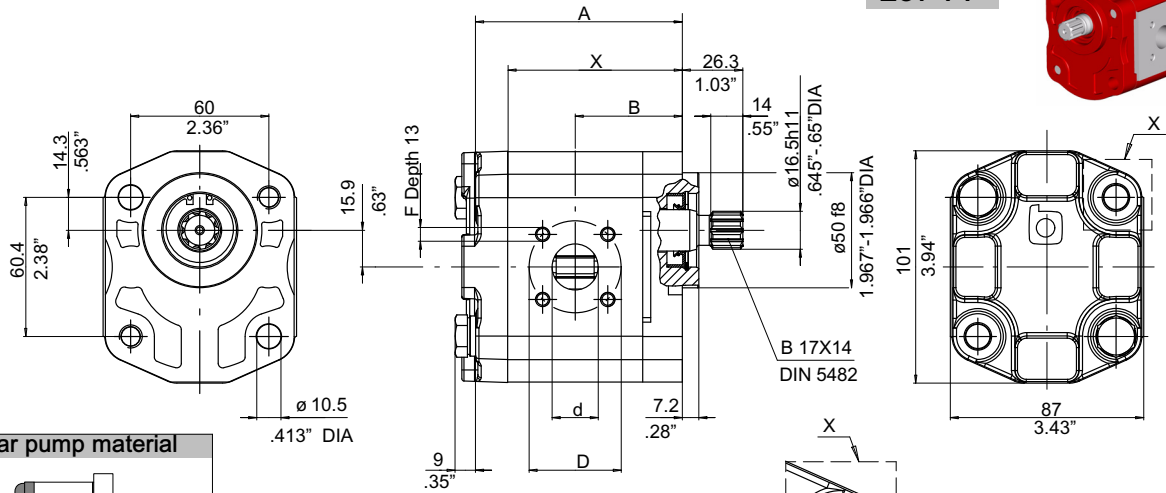
Tightening torque: see section 5.2

Type	Displacement cm ³ /rev	Dimensions						Suction			Pressure						
		A		B		X		d	D	F	d	D	F				
Type	AP212	mm	inch	mm	inch	mm	inch	mm	inch	mm	mm	mm	inch	mm	inch	mm	
4.5	4.4	80	3.15	41.5	1.63	65.8	2.59	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	83	3.27	43	1.69	68.8	2.70										
8.5	8.4	86	3.39	44.5	1.75	71.8	2.83										
11	11.1	90	3.54	46.5	1.83	75.8	2.98	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	96	3.78	49.5	1.95	81.8	3.22										
19	19.2	102	4.02	52.5	2.07	87.8	3.46										
22	22.2	106	4.17	54.8	2.16	92.4	3.64										
26	26.2	112	4.41	57.8	2.28	98.4	3.87										

Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 245-FP	200102142204	AP212/4.5 S 245-FP	200102142304	
AP212/6.5 D 245-FP	200102242204	AP212/6.5 S 245-FP	200102242304	
AP212/8.5 D 245-FP	200102342205	AP212/8.5 S 245-FP	200102342304	
AP212/11 D 245-FP	200102442204	AP212/11 S 245-FP	200102442304	
AP212/15 D 245-FP	200102542205	AP212/15 S 245-FP	200102542305	
AP212/19 D 245-FP	200102642204	AP212/19 S 245-FP	200102642304	
AP212/22 D 245-FP	200102742204	AP212/22 S 245-FP	200102742305	
AP212/26 D 245-FP	200102842202	AP212/26 S 245-FP	200102842302	



Serie
237-FP



Gear pump material

Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

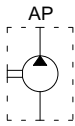
Shaft max torque: see section 3.3
Tightening torque: see section 5.2

To utilize M10x1.5 DIN931

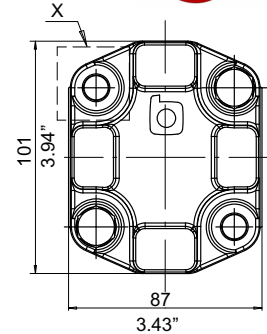
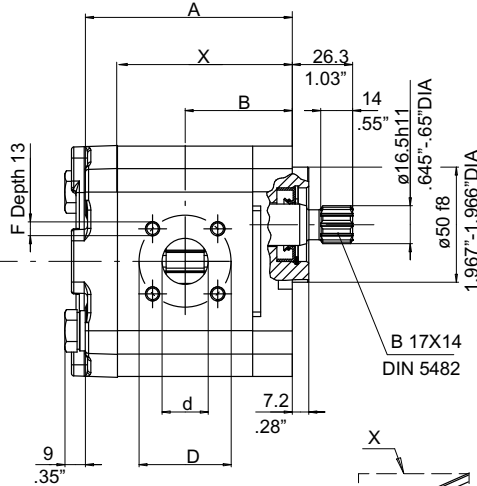
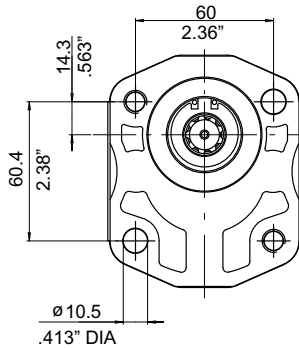
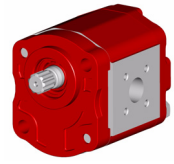


Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure								
		A		B		X		d		D		F		d		D		F	
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
4.5	4.4	80	3.15	41.5	1.63	65.8	2.59	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1		
6.5	6.4	83	3.27	43	1.69	68.8	2.70												
8.5	8.4	86	3.39	44.5	1.75	71.8	2.83												
11	11.1	90	3.54	46.5	1.83	75.8	2.98	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1		
15	15.1	96	3.78	49.5	1.95	81.8	3.22												
19	19.2	102	4.02	52.5	2.07	87.8	3.46												
22	22.2	106	4.17	54.8	2.16	92.4	3.64												
26	26.2	112	4.41	57.8	2.28	98.4	3.87												

Clockwise rotation: D		Counter-clockwise rotation: S		Standard end cover	Standard front cover with NBR shaft seal
Standard	Code	Standard	Code		
AP212/4.5 D 237-FP	200102135201	AP212/4.5 S 237-FP	200102135301		
AP212/6.5 D 237-FP	200102235203	AP212/6.5 S 237-FP	200102235303		
AP212/8.5 D 237-FP	200102335203	AP212/8.5 S 237-FP	200102335303		
AP212/11 D 237-FP	200102435204	AP212/11 S 237-FP	200102435303		
AP212/15 D 237-FP	200102535202	AP212/15 S 237-FP	200102535305		
AP212/19 D 237-FP	200102635205	AP212/19 S 237-FP	200102635303		
AP212/22 D 237-FP	200102735205	AP212/22 S 237-FP	200102735303		
AP212/26 D 237-FP	200102835204	AP212/26 S 237-FP	200102835303		



Serie
247-FP



Gear pump material

Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

17/1 45+5 Nm

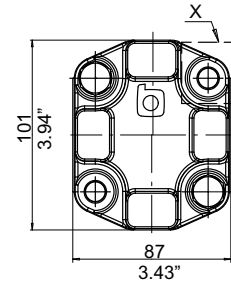
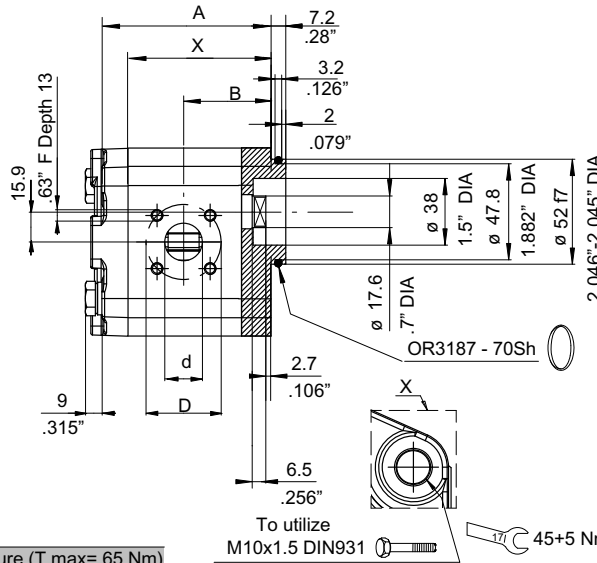
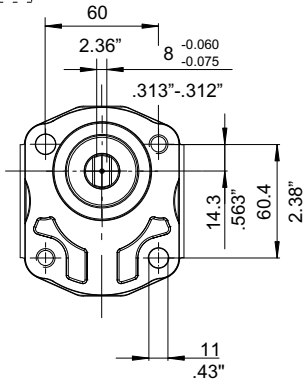
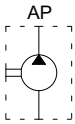
To utilize M10x1.5 DIN931

Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d		D		F	d		D		F
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	
4.5	4.4	80	3.15	41.5	1.63	65.8	2.59	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	83	3.27	43	1.69	68.8	2.70										
8.5	8.4	86	3.39	44.5	1.75	71.8	2.83										
11	11.1	90	3.54	46.5	1.83	75.8	2.98	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	96	3.78	49.5	1.95	81.8	3.22										
19	19.2	102	4.02	52.5	2.07	87.8	3.46										
22	22.2	106	4.17	54.8	2.16	92.4	3.64										
26	26.2	112	4.41	57.8	2.28	98.4	3.87										

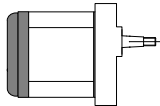
Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 247-FP	200102145203	AP212/4.5 S 247-FP	200102145301	
AP212/6.5 D 247-FP	200102245202	AP212/6.5 S 247-FP	200102245303	
AP212/8.5 D 247-FP	200102345203	AP212/8.5 S 247-FP	200102345303	
AP212/11 D 247-FP	200102445202	AP212/11 S 247-FP	200102445303	
AP212/15 D 247-FP	200102545203	AP212/15 S 247-FP	200102545303	
AP212/19 D 247-FP	200102645203	AP212/19 S 247-FP	200102645303	
AP212/22 D 247-FP	200102745203	AP212/22 S 247-FP	200102745303	
AP212/26 D 247-FP	200102845202	AP212/26 S 247-FP	200102845303	

Serie
259-FP



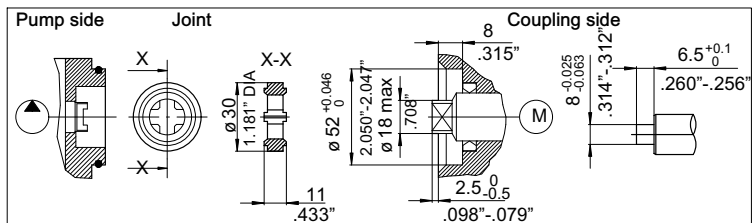
Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Gear pump material



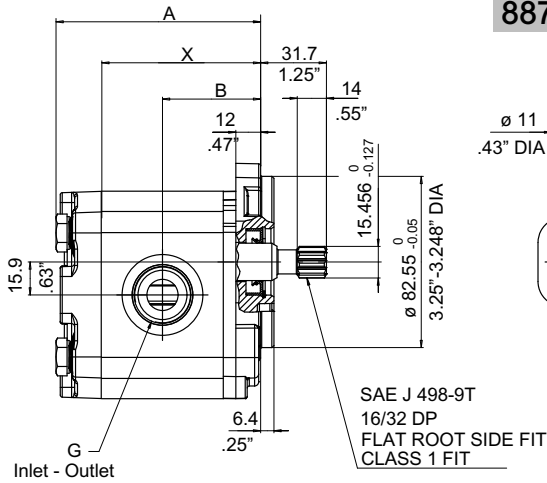
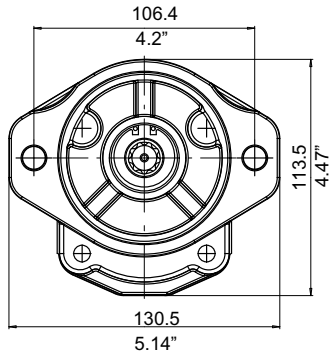
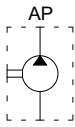
Pump	Max pressure (T max= 65 Nm) bar (PSI)		
	P1	P2	P3
AP212/15	180 (2600)	210 (3000)	230 (3300)
AP212/19	140 (2000)	165 (2400)	185 (2650)
AP212/22	120 (1700)	145 (2050)	165 (2350)
AP212/26	100 (1450)	120 (1750)	140 (2000)

Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

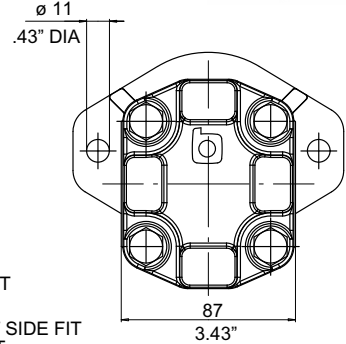
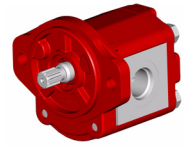


Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d	D	F	d		D		F		
		mm	inch	mm	inch	mm	inch	mm	inch	mm	mm	inch	mm	inch	mm		
4.5	4.4	80	3.15	41.5	1.63	65.8	2.59	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	83	3.27	43	1.69	68.8	2.70										
8.5	8.4	86	3.39	44.5	1.75	71.8	2.83										
11	11.1	90	3.54	46.5	1.83	75.8	2.98	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	96	3.78	49.5	1.95	81.8	3.22										
19	19.2	102	4.02	52.5	2.07	87.8	3.46										
22	22.2	106	4.17	54.8	2.16	92.4	3.64										
26	26.2	112	4.41	57.8	2.28	98.4	3.87										

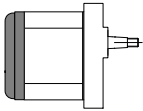
Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types) Standard end cover Standard front cover with NBR shaft seal
Standard	Low Noise	Standard	Low Noise	
AP212/4.5 D 259-FP	200102154205	AP212/4.5 S 259-FP	200102154307	
AP212/6.5 D 259-FP	200102254207	AP212/6.5 S 259-FP	200102254306	
AP212/8.5 D 259-FP	200102354207	AP212/8.5 S 259-FP	200102354308	
AP212/11 D 259-FP	200102454205	AP212/11 S 259-FP	200102454308	
AP212/15 D 259-FP	200102554204	AP212/15 S 259-FP	200102554308	
AP212/19 D 259-FP	200102654204	AP212/19 S 259-FP	200102654307	
AP212/22 D 259-FP	200102754204	AP212/22 S 259-FP	200102754304	
AP212/26 D 259-FP	200102854202	AP212/26 S 259-FP	200102854301	



Serie
887S-FP



Gear pump material

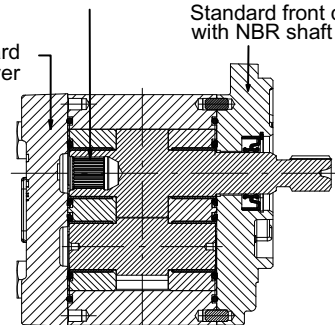


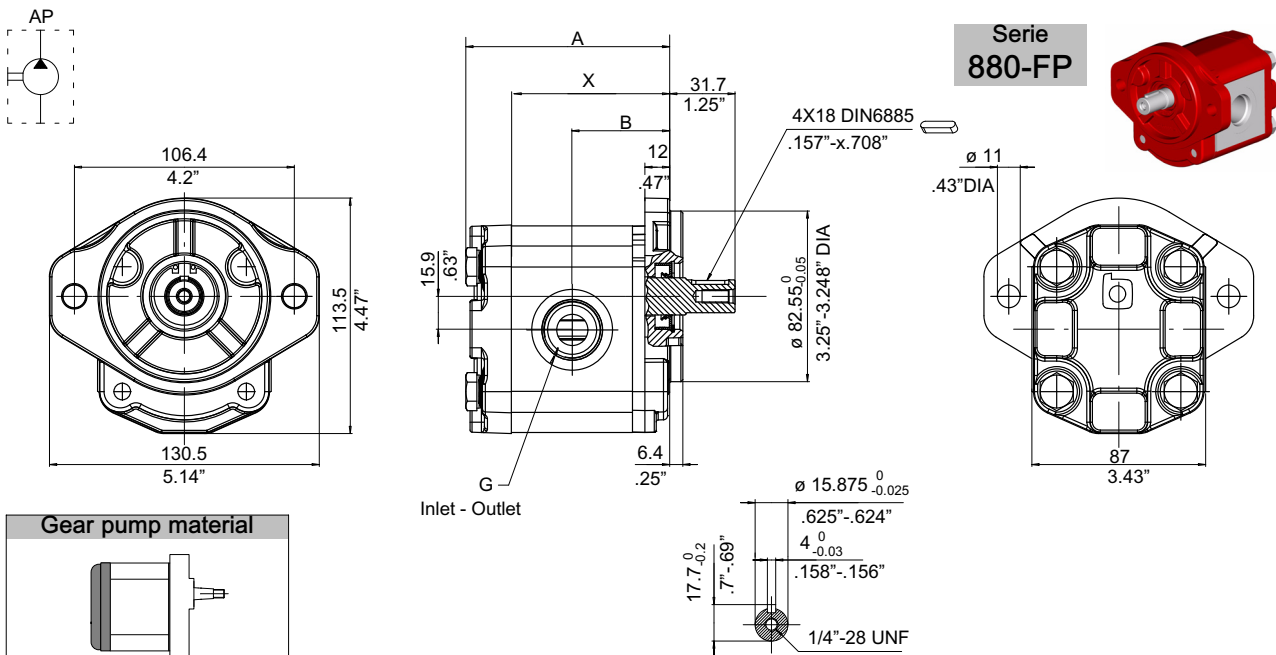
Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Tightening torque: see section 3.5 - 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction G UNF	Pressure G UNF
		A		B		X			
		mm	inch	mm	inch	mm	inch		
4.5	4.4	88.5	3.48	42.5	1.67	67	2.64	1-1/16" 12 (SAE12)	7/8" 14 (SAE10)
6.5	6.4	91.5	3.60	44	1.73	70	2.76		
8.5	8.4	94.5	3.72	45.5	1.79	73	2.87		
11	11.1	98.5	3.88	47.5	1.87	77	3.03		
15	15.1	104.5	4.11	50.5	1.99	83	3.27		
19	19.2	110.5	4.35	53.5	2.11	89	3.50		
22	22.2	115	4.52	55.5	2.18	93	3.66		
26	26.2	121	4.76	58.5	2.30	99	3.90		

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Low Noise	Standard	Low Noise	
AP212/4.5 D 887S-FP	200102186209	AP212/4.5 S 887S-FP	200102186308	Tandem predisposal (FP gear types) Standard front cover with NBR shaft seal Standard end cover
AP212/6.5 D 887S-FP	200102286214	AP212/6.5 S 887S-FP	200102286306	
AP212/8.5 D 887S-FP	200102386213	AP212/8.5 S 887S-FP	200102386308	
AP212/11 D 887S-FP	200102486311	AP212/11 S 887S-FP	200102486217	
AP212/15 D 887S-FP	200102586227	AP212/15 S 887S-FP	200102586317	
AP212/19 D 887S-FP	200102686213	AP212/19 S 887S-FP	200102686314	
AP212/22 D 887S-FP	200102786215	AP212/22 S 887S-FP	200102786319	
AP212/26 D 887S-FP	200102886219	AP212/26 S 887S-FP	200102886310	



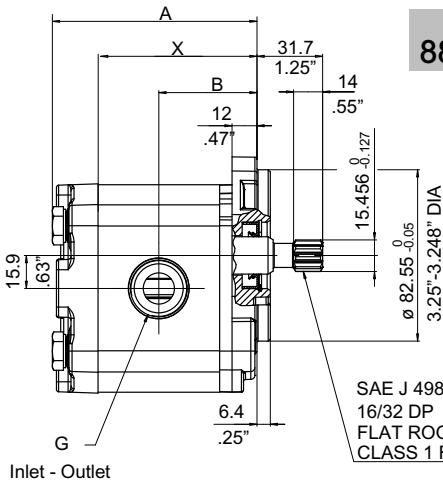
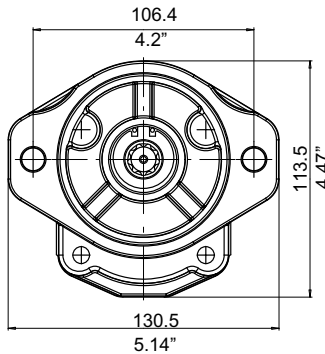
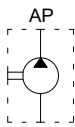


Gear pump material	
Front cover:	aluminium
Body:	aluminium
Back cover:	cast iron
Seals:	NBR + HNBR

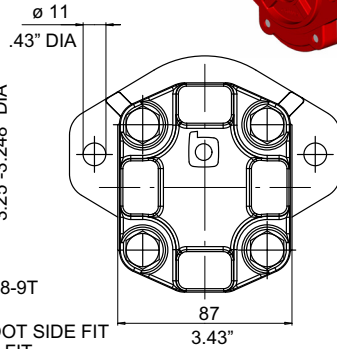
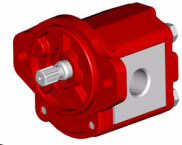
Tightening torque: see section 3.5 - 5.2
 Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction G UNF	Pressure G UNF
		A		B		X			
		mm	inch	mm	inch	mm	inch		
4.5	4.4	88.5	3.48	42.5	1.67	67	2.64	1-1/16" 12 (SAE12)	7/8" 14 (SAE10)
6.5	6.4	91.5	3.60	44	1.73	70	2.76		
8.5	8.4	94.5	3.72	45.5	1.79	73	2.87		
11	11.1	98.5	3.88	47.5	1.87	77	3.03		
15	15.1	104.5	4.11	50.5	1.99	83	3.27		
19	19.2	110.5	4.35	53.5	2.11	89	3.50		
22	22.2	115	4.52	55.5	2.18	93	3.66		
26	26.2	121	4.76	58.5	2.30	99	3.90		

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/4.5 D 880-FP	200102180211	AP212/4.5 S 880-FP	200102180309	
AP212/6.5 D 880-FP	200102280210	AP212/6.5 S 880-FP	200102280312	
AP212/8.5 D 880-FP	200102380213	AP212/8.5 S 880-FP	200102380309	
AP212/11 D 880-FP	200102480218	AP212/11 S 880-FP	200102480309	
AP212/15 D 880-FP	200102580216	AP212/15 S 880-FP	200102580309	
AP212/19 D 880-FP	200102680217	AP212/19 S 880-FP	200102680311	
AP212/22 D 880-FP	200102780217	AP212/22 S 880-FP	200102780311	
AP212/26 D 880-FP	200102880214	AP212/26 S 880-FP	200102880310	



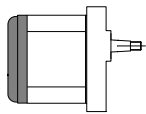
Serie
887S-NPTF-FP



SAE J 498-9T
16/32 DP
FLAT ROOT SIDE FIT
CLASS 1 FIT

Inlet - Outlet

Gear pump material



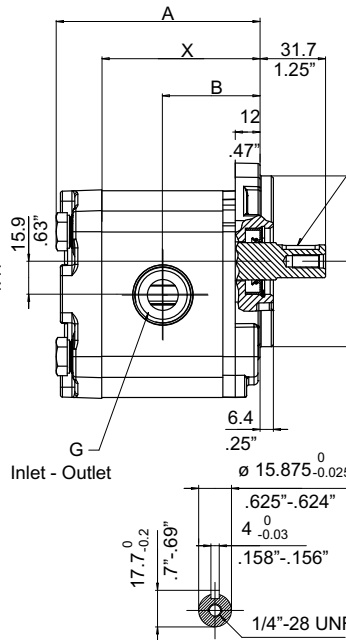
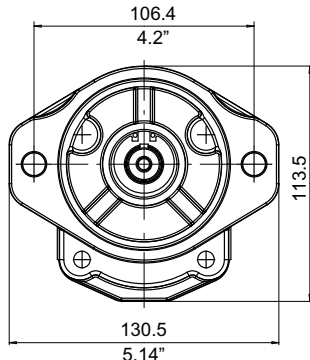
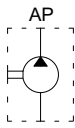
Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Tightening torque: see section 3.5 - 5.2

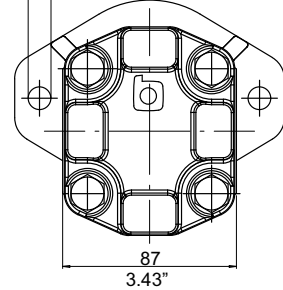
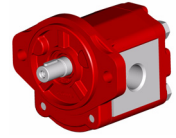
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction G NPTF	Pressure G NPTF
		A		B		X			
		mm	inch	mm	inch	mm	inch		
4.5	4.4	88.5	3.48	42.5	1.67	67	2.64	1/2"	1/2"
6.5	6.4	91.5	3.60	44	1.73	70	2.76		
8.5	8.4	94.5	3.72	45.5	1.79	73	2.87		
11	11.1	98.5	3.88	47.5	1.87	77	3.03	3/4"	1/2"
15	15.1	104.5	4.11	50.5	1.99	83	3.27		
19	19.2	110.5	4.35	53.5	2.11	89	3.50		
22	22.2	115	4.52	55.5	2.18	93	3.66		
26	26.2	121	4.76	58.5	2.30	99	3.90		

Clockwise rotation: D		Counter-clockwise rotation: S		Standard end cover	Tandem predisposal (FP gear types)	Standard front cover with NBR shaft seal
Standard	Code	Standard	Code			
AP212/4.5 D 887S-NPTF-FP	200102186211	AP212/4.5 S 887S-NPTF-FP	200102186310			
AP212/6.5 D 887S-NPTF-FP	200102286216	AP212/6.5 S 887S-NPTF-FP	200102286308			
AP212/8.5 D 887S-NPTF-FP	200102386215	AP212/8.5 S 887S-NPTF-FP	200102386310			
AP212/11 D 887S-NPTF-FP	200102486219	AP212/11 S 887S-NPTF-FP	200102486314			
AP212/15 D 887S-NPTF-FP	200102586229	AP212/15 S 887S-NPTF-FP	200102586319			
AP212/19 D 887S-NPTF-FP	200102686215	AP212/19 S 887S-NPTF-FP	200102686316			
AP212/22 D 887S-NPTF-FP	200102786217	AP212/22 S 887S-NPTF-FP	200102786321			
AP212/26 D 887S-NPTF-FP	200102886221	AP212/26 S 887S-NPTF-FP	200102886312			



Serie
880-NPTF-FP



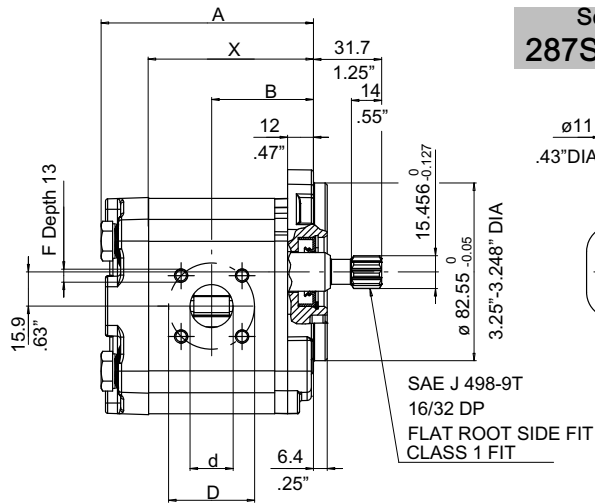
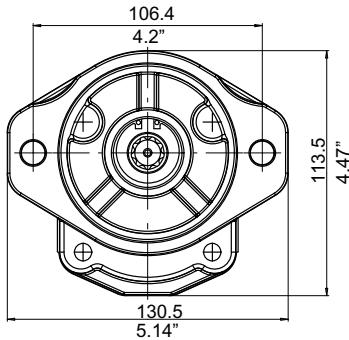
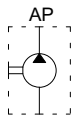
Gear pump material	
Front cover:	aluminium
Body:	aluminium
Back cover:	cast iron
Seals:	NBR + HNBR

Tightening torque: see section 3.5 - 5.2

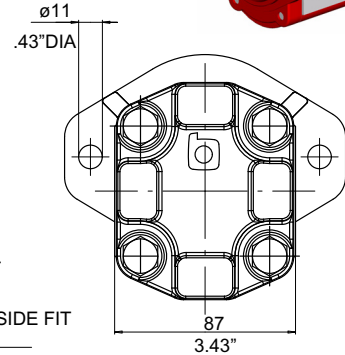
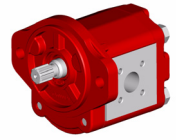
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev		Dimensions						Suction G NPTF	Pressure G NPTF
	AP212	AP212LN	A		B		X			
			mm	inch	mm	inch	mm	inch		
4.5	4.4	4.5	88.5	3.48	42.5	1.67	67	2.64	1/2"	1/2"
6.5	6.4	6.6	91.5	3.60	44	1.73	70	2.76		
8.5	8.4	8.7	94.5	3.72	45.5	1.79	73	2.87		
11	11.1	11.5	98.5	3.88	47.5	1.87	77	3.03	3/4"	1/2"
15	15.1	15.7	104.5	4.11	50.5	1.99	83	3.27		
19	19.2	19.8	110.5	4.35	53.5	2.11	89	3.50		
22	22.2	23	115	4.52	55.5	2.18	93	3.66		
26	26.2	27.1	121	4.76	58.5	2.30	99	3.90		

Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 880-NPTF-FP	200102180213	AP212/4.5 S 880-NPTF-FP	200102180311	
AP212/6.5 D 880-NPTF-FP	200102280212	AP212/6.5 S 880-NPTF-FP	200102280314	
AP212/8.5 D 880-NPTF-FP	200102380215	AP212/8.5 S 880-NPTF-FP	200102380311	
AP212/11 D 880-NPTF-FP	200102480220	AP212/11 S 880-NPTF-FP	200102480311	
AP212/15 D 880-NPTF-FP	200102580218	AP212/15 S 880-NPTF-FP	200102580311	
AP212/19 D 880-NPTF-FP	200102680219	AP212/19 S 880-NPTF-FP	200102680313	
AP212/22 D 880-NPTF-FP	200102780219	AP212/22 S 880-NPTF-FP	200102780313	
AP212/26 D 880-NPTF-FP	200102880216	AP212/26 S 880-NPTF-FP	200102880312	



Serie
287S-B-FP



SAE J 498-9T
16/32 DP
FLAT ROOT SIDE FIT
CLASS 1 FIT

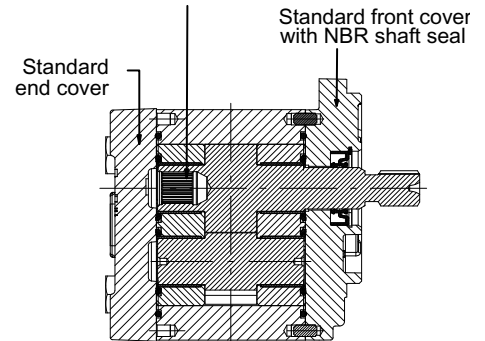
Gear pump material

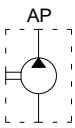
Front cover: aluminium
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Tightening torque: see section 5.2
Shaft max torque: see section 3.3

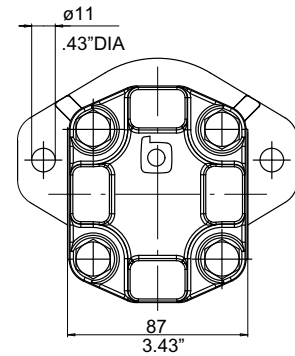
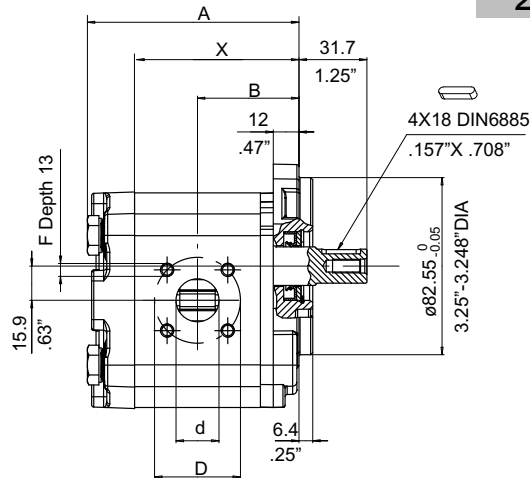
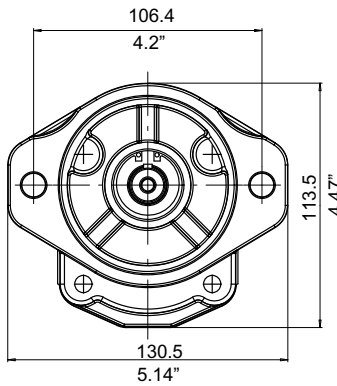
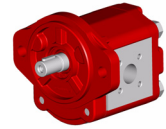
Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure							
		A		B		X		d	D	F	d	D	F					
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm				
4.5	4.4	88.5	3.48	42.5	1.67	67	2.64	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1	
6.5	6.4	91.5	3.60	44	1.73	70	2.76											
8.5	8.4	94.5	3.72	45.5	1.79	73	2.87											
11	11.1	98.5	3.88	47.5	1.87	77	3.03	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1	
15	15.1	104.5	4.11	50.5	1.99	83	3.27											
19	19.2	110.5	4.35	53.5	2.11	89	3.50											
22	22.2	115	4.52	55.5	2.18	93	3.66											
26	26.2	121	4.76	58.5	2.30	99	3.90											

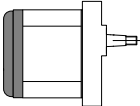
Clockwise rotation: D		Counter-clockwise rotation: S		Tandem predisposal (FP gear types)
Standard	Code	Standard	Code	
AP212/4.5 D 287S-B-FP	200102186210	AP212/4.5 S 287S-B-FP	200102186309	
AP212/6.5 D 287S-B-FP	200102286215	AP212/6.5 S 287S-B-FP	200102286307	
AP212/8.5 D 287S-B-FP	200102386214	AP212/8.5 S 287S-B-FP	200102386309	
AP212/11 D 287S-B-FP	200102486218	AP212/11 S 287S-B-FP	200102486313	
AP212/15 D 287S-B-FP	200102586228	AP212/15 S 287S-B-FP	200102586318	
AP212/19 D 287S-B-FP	200102686214	AP212/19 S 287S-B-FP	200102686315	
AP212/22 D 287S-B-FP	200102786216	AP212/22 S 287S-B-FP	200102786320	
AP212/26 D 287S-B-FP	200102886220	AP212/26 S 287S-B-FP	200102886311	

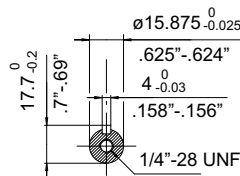




Serie 280-B-FP

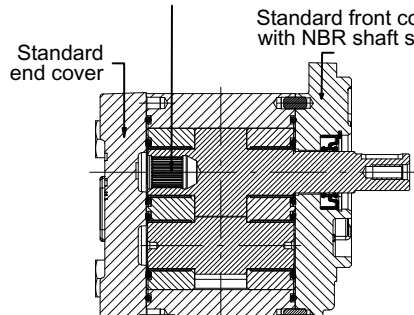


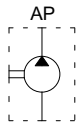
Gear pump material	
	
Front cover:	aluminium
Body:	aluminium
Back cover:	cast iron
Seals:	NBR + HNBR



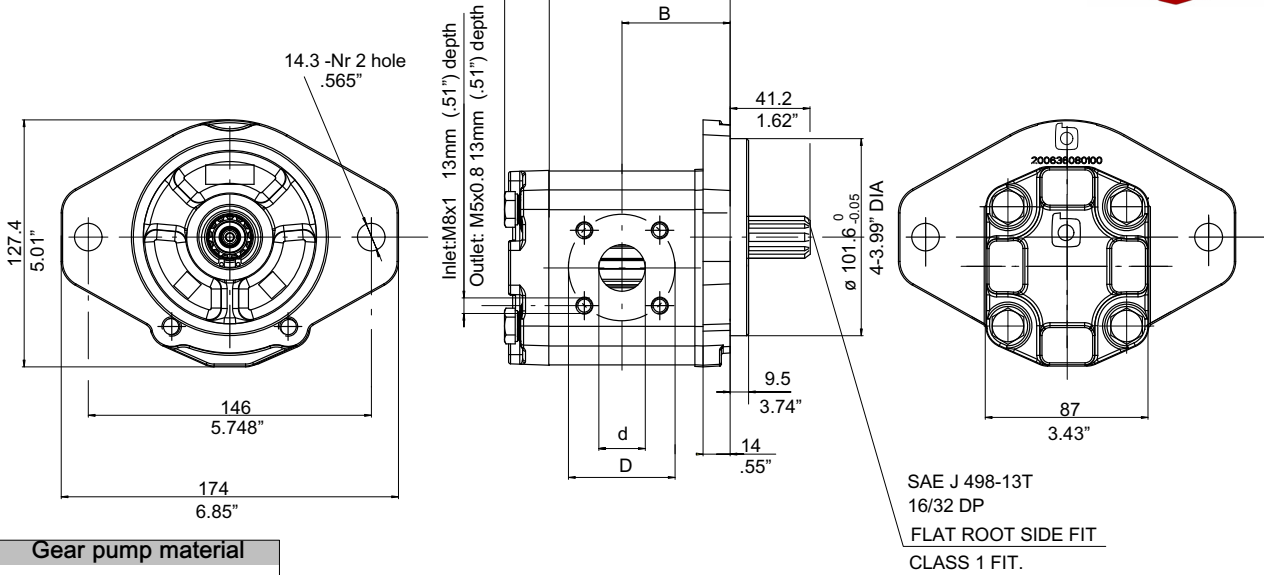
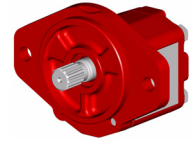
Tightening torque: see section 5.2
Shaft max torque: see section 3.3

Type	Displacement cm ³ /rev AP212	Dimensions						Suction			Pressure						
		A		B		X		d		D	F	d		D		F	
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	
4.5	4.4	88.5	3.48	42.5	1.67	67	2.64	15	.59	40	1.58	M6X1	15	.59	35	1.38	M6X1
6.5	6.4	91.5	3.60	44	1.73	70	2.76										
8.5	8.4	94.5	3.72	45.5	1.79	73	2.87										
11	11.1	98.5	3.88	47.5	1.87	77	3.03	20	.79	40	1.58	M6X1	15	.59	35	1.38	M6X1
15	15.1	104.5	4.11	50.5	1.99	83	3.27										
19	19.2	110.5	4.35	53.5	2.11	89	3.50										
22	22.2	115	4.52	55.5	2.18	93	3.66										
26	26.2	121	4.76	58.5	2.30	99	3.90										

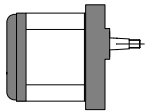
Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/4.5 D 280-B-FP	200102180212	AP212/4.5 S 280-B-FP	200102180310	
AP212/6.5 D 280-B-FP	200102280211	AP212/6.5 S 280-B-FP	200102280313	
AP212/8.5 D 280-B-FP	200102380214	AP212/8.5 S 280-B-FP	200102380310	
AP212/11 D 280-B-FP	200102480219	AP212/11 S 280-B-FP	200102480310	
AP212/15 D 280-B-FP	200102580217	AP212/15 S 280-B-FP	200102580310	
AP212/19 D 280-B-FP	200102680218	AP212/19 S 280-B-FP	200102680312	
AP212/22 D 280-B-FP	200102780218	AP212/22 S 280-B-FP	200102780312	
AP212/26 D 280-B-FP	200102880215	AP212/26 S 280-B-FP	200102880311	



Serie
287S-SAEB-FP



Gear pump material



Front cover: cast iron
Body: aluminium
Back cover: cast iron
Seals: NBR + HNBR

Shaft max torque: see section 3.3



Attention! It is not possible to change the rotation direction. Please order always with the right code

Type	Displacement cm ³ /rev AP212	Dimensions						Suction					Pressure				
		A		B		X		d		D		F	d		D		F
		mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	mm	inch	mm	inch	mm
19	19.2	110.5	4.35	53.5	2.11	88.8	3.50	24	.95	55	2.17	M8x1	15	.59	35	1.38	M5x0.8
22	22.2	115	4.53	55.5	2.18	92.8	3.65										
26	26.2	121	4.76	58.5	2.30	98.8	3.89										

Clockwise rotation: D		Counter-clockwise rotation: S		
Standard	Code	Standard	Code	
AP212/19 D 287S-SAEB-FP	200102686216	AP212/19 S 287S-SAEB-FP	200102686317	
AP212/22 D 287S-SAEB-FP	200102786218	AP212/22 S 287S-SAEB-FP	200102786322	
AP212/26 D 287S-SAEB-FP	200102886222	AP212/26 S 287S-SAEB-FP	200102886313	

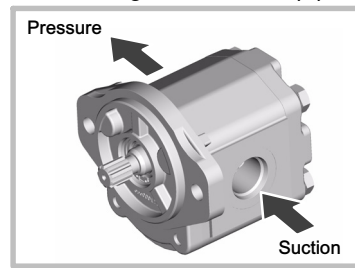
For availability of other displacements bodies please contact our Sales Center

3 Rotation changing instructions (see section 1.1.2)

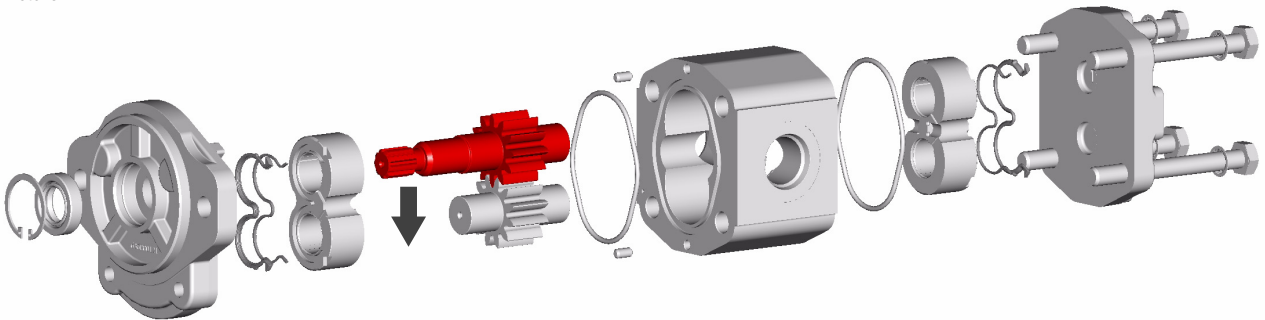
For the AP212** pumps with unidirectional left or right rotation (not for 287S-SAEB-FP pump) it is possible to change the rotation direction of the entire range without having to replace any component. To ensure a good technical result, we recommend in any case that such inversion should be carried out in our factory.

In the following pictures, a procedure for the pump rotation inversion is shown (in this example, a counter-clockwise rotation pump (S) is changed into a clockwise-rotation one (D)).

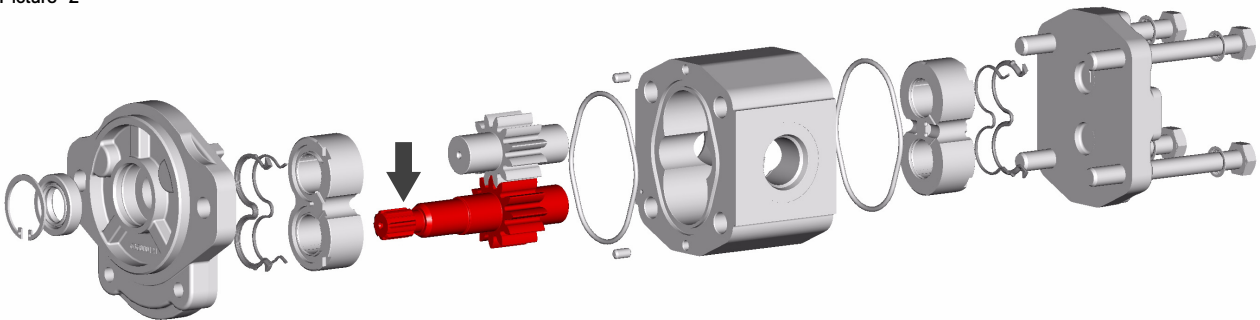
Initial configuration "Left" (S)



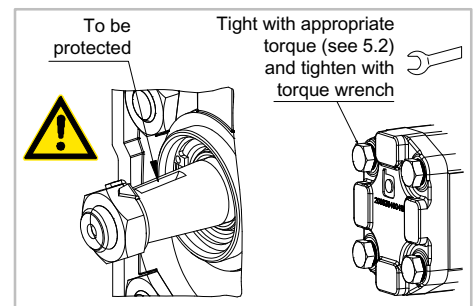
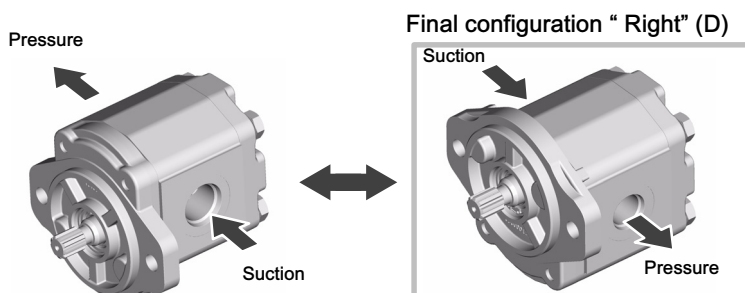
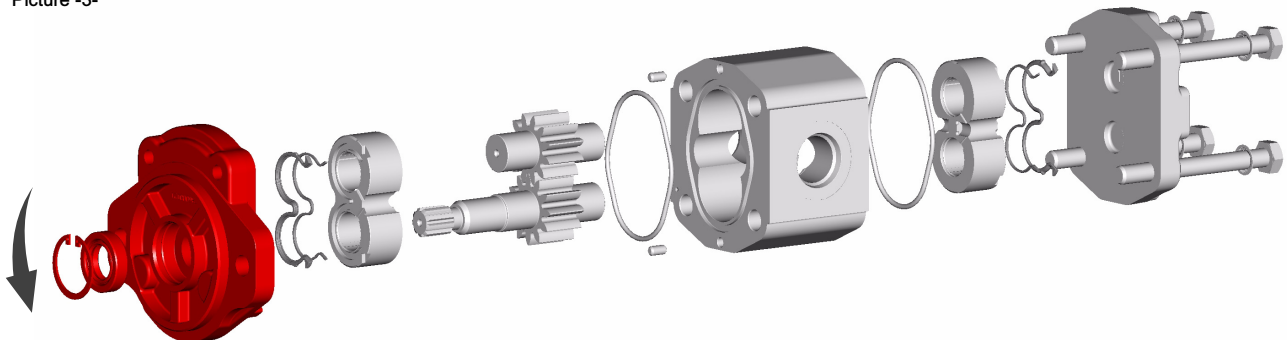
Picture -1-



Picture -2-



Picture -3-



4 Interface kit for multiple pumps (see section 1.1.3)

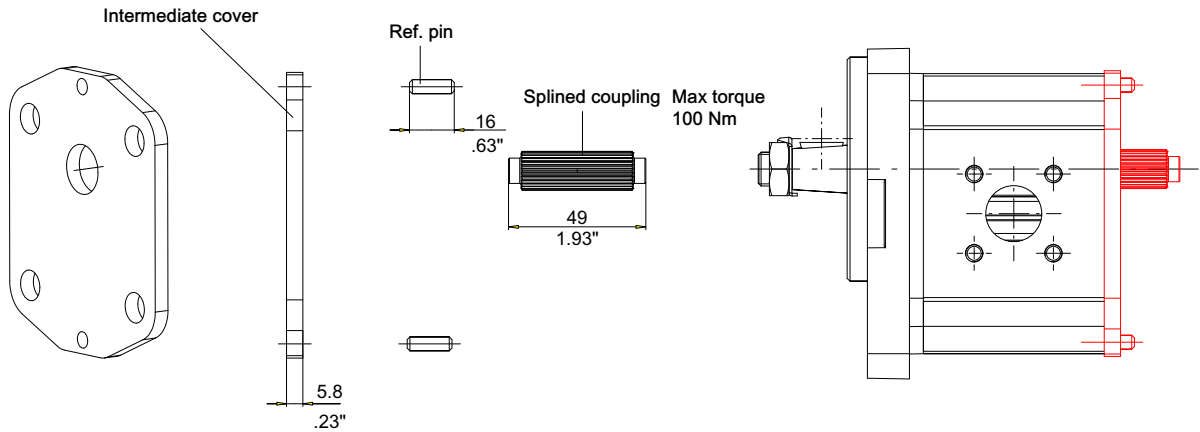
In the next pages, single components and sub-assembly kits are shown; they are useful to assemble different kinds of

single or multiple pumps. Please read with all attention the important notes related to the assembly phase.

4.1 Tandem without shaft seal

**Interface kit AP212 MP
code**

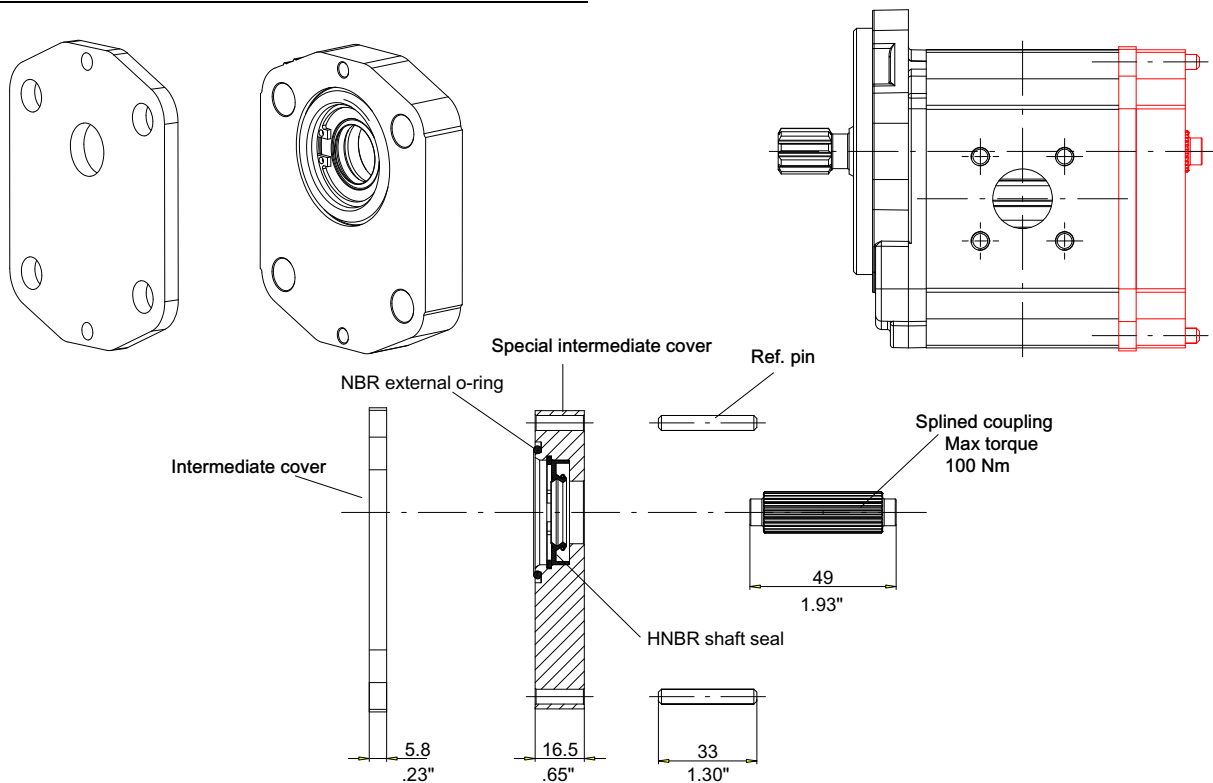
200960400680



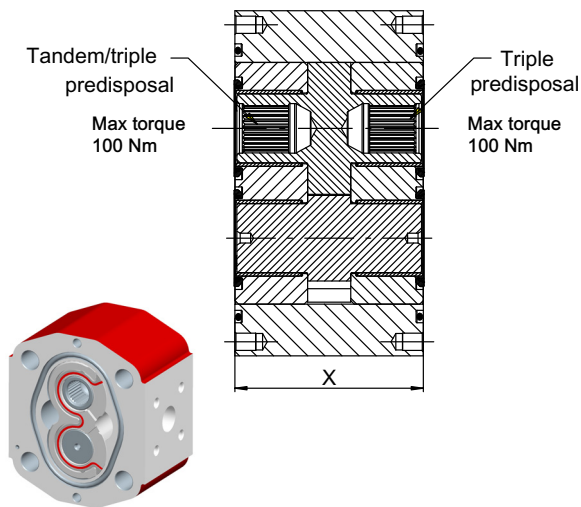
4.2 Tandem with shaft seal

Interface kit AP212 MPS code

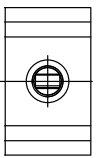
200960400690



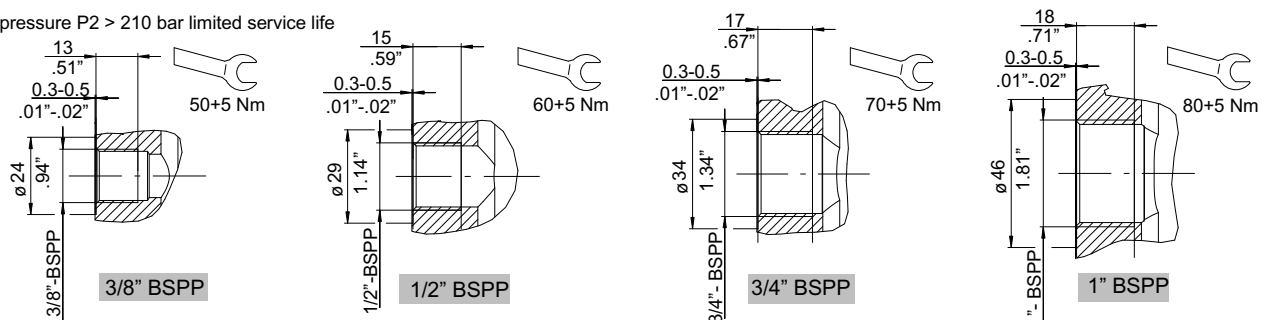
4.3 Intermediate body KIT tandem/triple predisposal (without shaft seal)



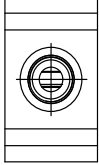
Displacement cm ³ /rev	X	
	mm	inch
4.5	48.6	1.91
6.5	51.6	2.03
8.5	54.6	2.15
11	58.6	2.31
15	64.6	2.54
19	70.6	2.78
22	75	2.95
26	81	3.19

Port type	Suction	Pressure	Description*	Ordering code (without shaft seal)
 BSPP threaded ports	3/8"	3/8"	AP212/4,5 S 4A-MP	200948910010
	3/8"	3/8"	AP212/6,5 S 4A-MP	200948920010
	3/8"	3/8"	AP212/8,5 S 4A-MP	200948930010
	1/2"	3/8"	AP212/11 S 4B-MP	200948940010
	1/2"	3/8"	AP212/15 S 4B-MP	200948950010
	3/4"	1/2"	AP212/19 S 4C-MP	200948960010
	3/4"	1/2"	AP212/22 S 4C-MP	200948970010
	3/4"	1/2"	AP212/26 S 4C-MP	200948980010

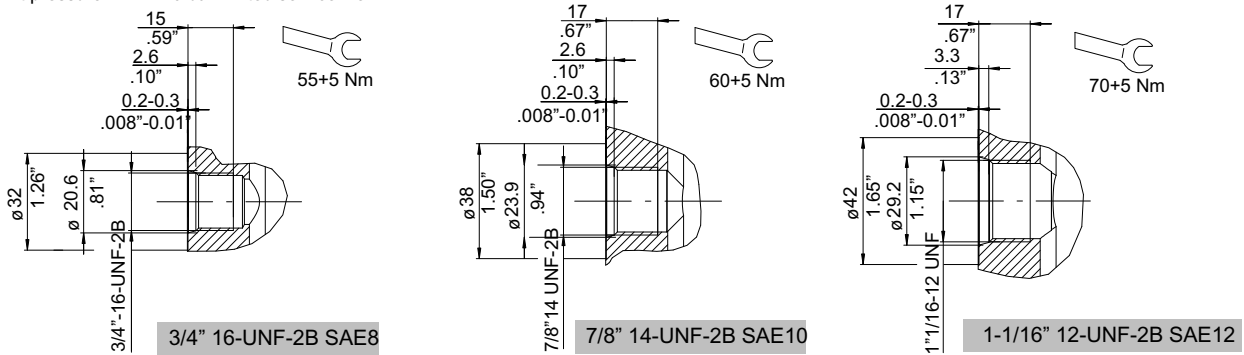
At pressure P2 > 210 bar limited service life

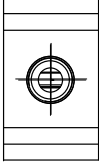


* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

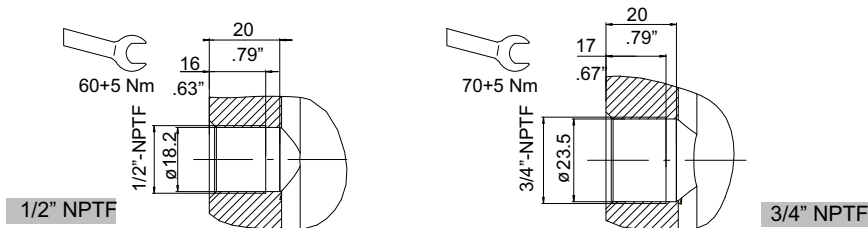
Port type	Suction	Pressure	Description*	Ordering code (without shaft seal)
 <p>SAE threaded ports</p>	1-1/16" 12UNF (SAE12)	7/8" 14UNF (SAE10)	AP212/4,5 S 8A-MP	200948910020
			AP212/6,5 S 8A-MP	200948920020
			AP212/8,5 S 8A-MP	200948930020
			AP212/11 S 8A-MP	200948940020
			AP212/15 S 8A-MP	200948950020
			AP212/19 S 8A-MP	200948960020
			AP212/22 S 8A-MP	200948970020
			AP212/26 S 8A-MP	200948980020

At pressure P2 > 210 bar limited service life

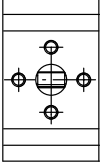


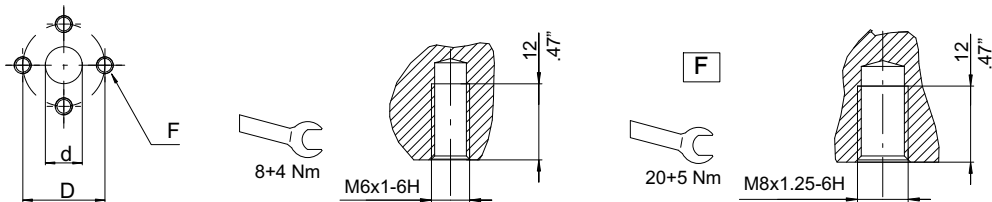
Port type	Suction	Pressure	Description*	Ordering code (without shaft seal)
 <p>NPTF threaded ports</p>	1/2"	1/2"	AP212/4,5 S 6A-MP	200948910030
			AP212/6,5 S 6A-MP	200948920030
			AP212/8,5 S 6A-MP	200948930030
	3/4"	1/2"	AP212/11 S 6B-MP	200948940030
			AP212/15 S 6B-MP	200948950030
			AP212/19 S 6B-MP	200948960030
			AP212/22 S 6B-MP	200948970030
			AP212/26 S 6B-MP	200948980030

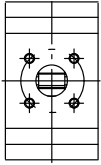
At pressure P2 > 210 bar limited service life

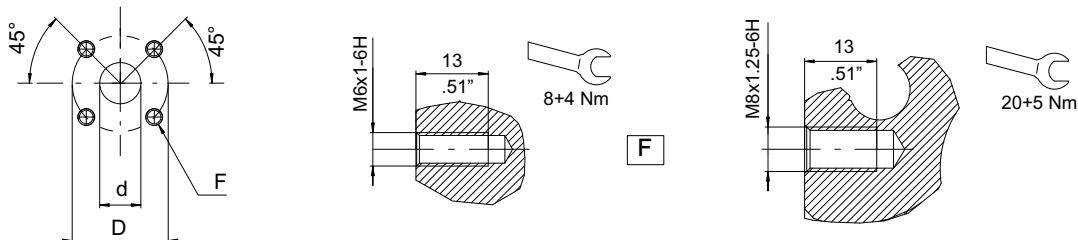


* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

Port type		Suction	Pressure	Description*	Ordering code (without shaft seal)
	European 4 bolt	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	AP212/4,5 S 3A-MP	200948910040
				AP212/6,5 S 3A-MP	200948920040
				AP212/8,5 S 3A-MP	200948930040
		19 - .75 (d) 40 - 1.58 (D) M8 (F)	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	AP212/11 S 3B-MP	200948940040
				AP212/15 S 3B-MP	200948950040
				19 - .75 (d) 40 - 1.58 (D) M8 (F)	19 - .75 (d) 40 - 1.58 (D) M8 (F)
		AP212/22 S 3C-MP	200948970040		
		AP212/26 S 3C-MP	200948980040		

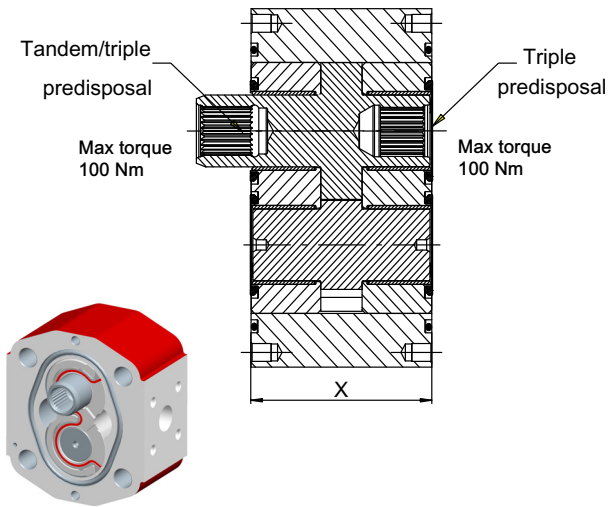


	German 4 bolt flanged	15 - .59 (d) 40 - 1.58 (D) M6 (F)	15 - .59 (d) 35 - 1.38 (D) M6 (F)	AP212/4,5 S 2A-MP	200948910050
				AP212/6,5 S 2A-MP	200948920050
				AP212/8,5 S 2A-MP	200948930050
		AP212/11 S 2B-MP		200948940050	
		AP212/15 S 2B-MP		200948950050	
		AP212/19 S 2B-MP		200948960050	
	20 - .79 (d) 40 - 1.58 (D) M6 (F)	AP212/22 S 2B-MP	200948970050		
			AP212/26 S 2B-MP	200948980050	
			German 4 bolt flanged 287S-SAEB	24 - .95 (d) 55 - 2.17 (D) M8 (F)	15 - .59 (d) 35 - 1.38 (D) M5 (F)
	AP212/22 S 2C-MP	200948970060			
	AP212/26 S 2C-MP	200948980060			

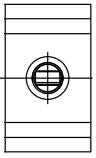


* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

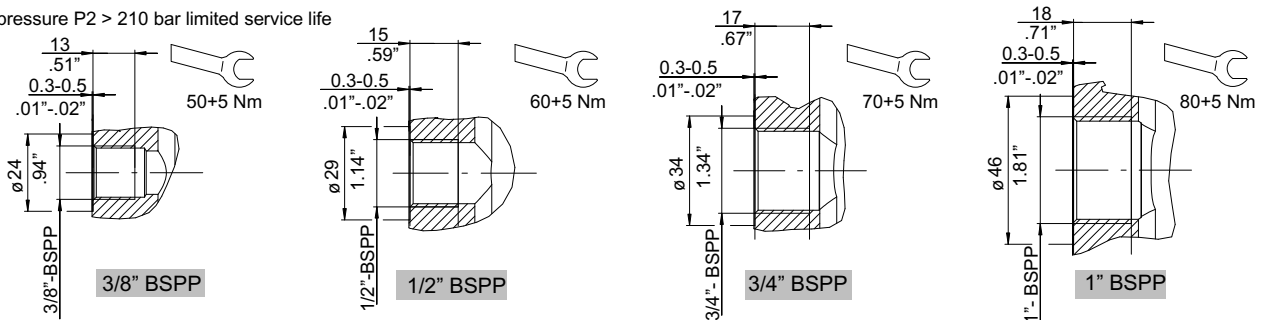
4.4 Intermediate body KIT tandem/triple predisposal (with shaft seal)



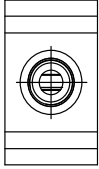
Displacement cm ³ /rev	X	
	mm	inch
4.5	48.6	1.91
6.5	51.6	2.03
8.5	54.6	2.15
11	58.6	2.31
15	64.6	2.54
19	70.6	2.78
22	75	2.95
26	81	3.19

Port type	Suction	Pressure	Description*	Ordering code (with shaft seal)
 BSPP threaded ports	3/8"	3/8"	AP212/4,5 S 4A-MPS	200948910070
	3/8"	3/8"	AP212/6,5 S 4A-MPS	200948920070
	3/8"	3/8"	AP212/8,5 S 4A-MPS	200948930070
	1/2"	3/8"	AP212/11 S 4B-MPS	200948940070
	1/2"	3/8"	AP212/15 S 4B-MPS	200948950070
	3/4"	1/2"	AP212/19 S 4C-MPS	200948960070
	3/4"	1/2"	AP212/22 S 4C-MPS	200948970070
	3/4"	1/2"	AP212/26 S 4C-MPS	200948980070

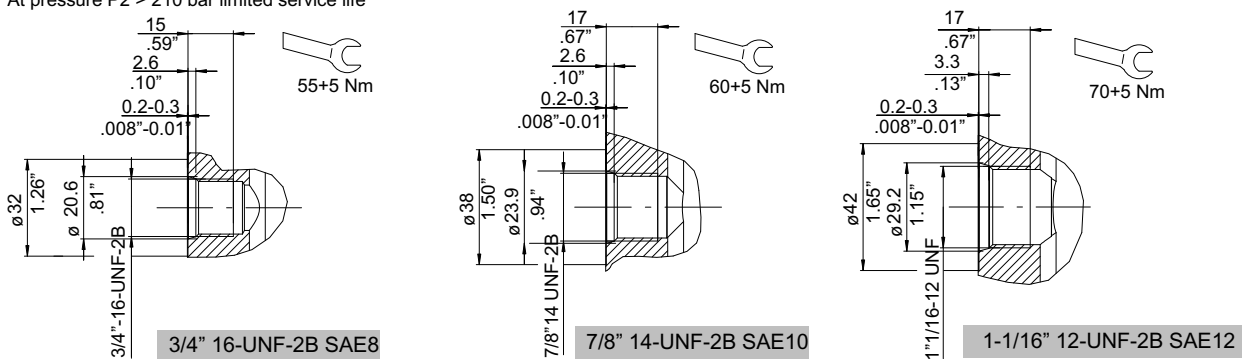
At pressure P2 > 210 bar limited service life




* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

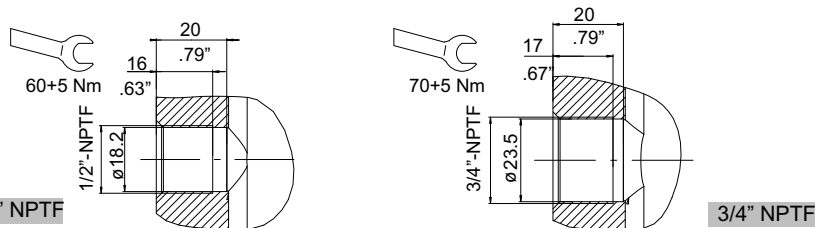
Port type		Suction	Pressure	Description*	Ordering code (with shaft seal)
	SAE threaded ports	1-1/16" 12UNF (SAE12)	7/8" 14UNF (SAE10)	AP212/4,5 S 8A-MPS	200948910080
				AP212/6,5 S 8A-MPS	200948920080
				AP212/8,5 S 8A-MPS	200948930080
				AP212/11 S 8A-MPS	200948940080
				AP212/15 S 8A-MPS	200948950080
				AP212/19 S 8A-MPS	200948960080
				AP212/22 S 8A-MPS	200948970080
				AP212/26 S 8A-MPS	200948980080

At pressure P2 > 210 bar limited service life

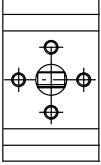


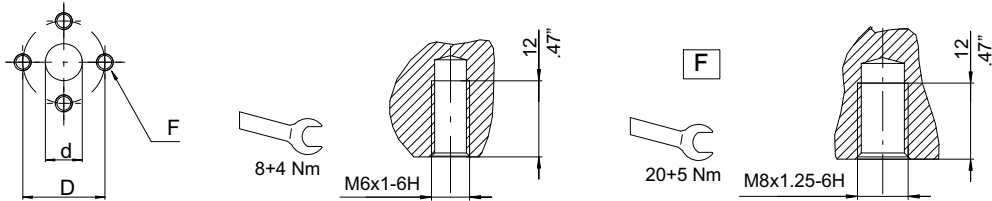
Port type		Suction	Pressure	Description*	Ordering code (with shaft seal)
	NPTF threaded ports	1/2"	1/2"	AP212/4,5 S 6A-MPS	200948910090
				AP212/6,5 S 6A-MPS	200948920090
				AP212/8,5 S 6A-MPS	200948930090
		3/4"	1/2"	AP212/11 S 6B-MPS	200948940090
				AP212/15 S 6B-MPS	200948950090
				AP212/19 S 6B-MPS	200948960090
				AP212/22 S 6B-MPS	200948970090
				AP212/26 S 6B-MPS	200948980090

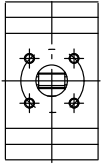
At pressure P2 > 210 bar limited service life

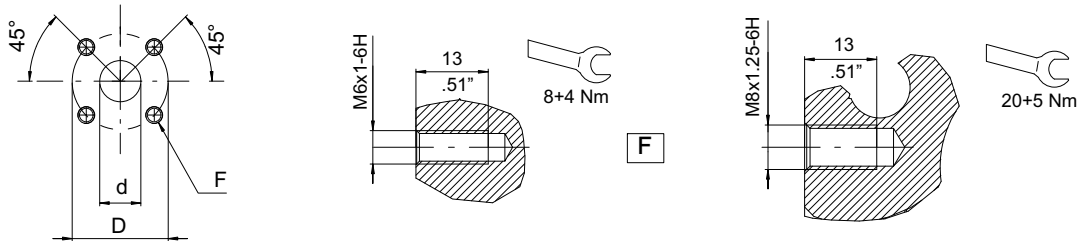


* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

Port type		Suction	Pressure	Description*	Ordering code (with shaft seal)
	European 4 bolt	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	AP212/4,5 S 3A-MPS	200948910100
				AP212/6,5 S 3A-MPS	200948920100
				AP212/8,5 S 3A-MPS	200948930100
		19 - .75 (d) 40 - 1.58 (D) M8 (F)	13.5 - .53 (d) 30 - 1.18 (D) M6 (F)	AP212/11 S 3B-MPS	200948940100
				AP212/15 S 3B-MPS	200948950100
		19 - .75 (d) 40 - 1.58 (D) M8 (F)	19 - .75 (d) 40 - 1.58 (D) M8 (F)	AP212/19 S 3C-MPS	200948960100
				AP212/22 S 3C-MPS	200948970100
				AP212/26 S 3C-MPS	200948980100



	German 4 bolt flanged	15 - .59 (d) 40 - 1.58 (D) M6 (F)	15 - .59 (d) 35 - 1.38 (D) M6 (F)	AP212/4,5 S 2A-MPS	200948910110
				AP212/6,5 S 2A-MPS	200948920110
				AP212/8,5 S 2A-MPS	200948930110
		20 - .79 (d) 40 - 1.58 (D) M6 (F)		AP212/11 S 2B-MPS	200948940110
				AP212/15 S 2B-MPS	200948950110
				AP212/19 S 2B-MPS	200948960110
				AP212/22 S 2B-MPS	200948970110
		AP212/26 S 2B-MPS	200948980110		
	German 4 bolt flanged 287S-SAEB	24 - .95 (d) 55 - 2.17 (D) M8 (F)	15 - .59 (d) 35 - 1.38 (D) M5 (F)	AP212/219 S 2C-MPS	200948960120
				AP212/22 S 2C-MPS	200948970120
			AP212/26 S 2C-MPS	200948980120	



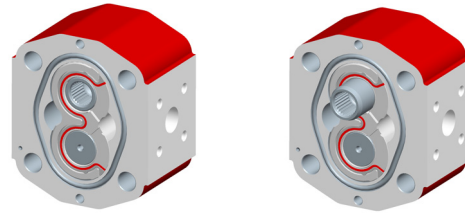
* Counter-clockwise rotation codes only. It is possible to change the rotation directions, see the instructions in section 4.5

4.5 Rotation changing instructions (see section 1.1.2)

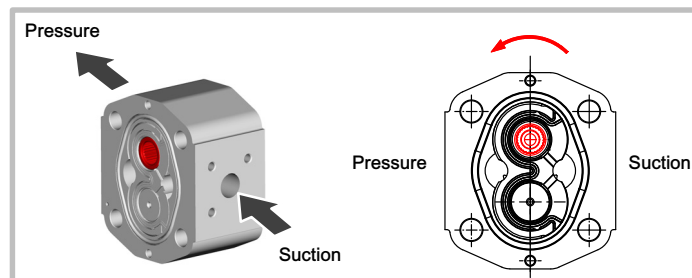
For the intermediate body Kit tandem/triple predisposal with unidirectional left or right rotation, it is possible to change the rotation direction of the entire range without having to replace any component.

To ensure a good technical result, we recommend to operate in very clean ambient. This operation must be performed by a skilled worker.

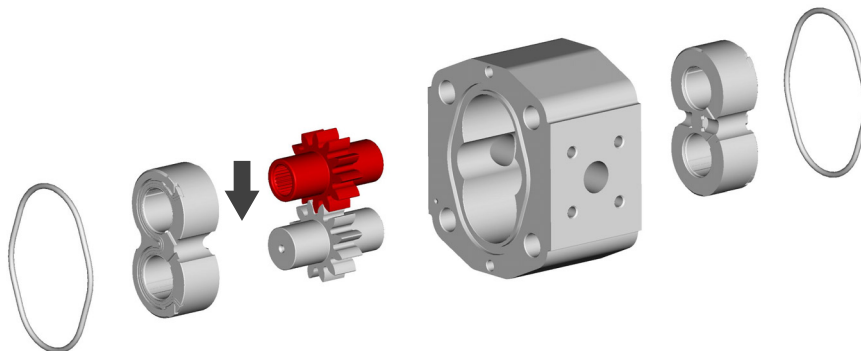
In the following pictures, a procedure for the pump rotation inversion is shown (in this example, a counter-clockwise rotation pump (S) is changed into a clockwise-rotation one (D)).



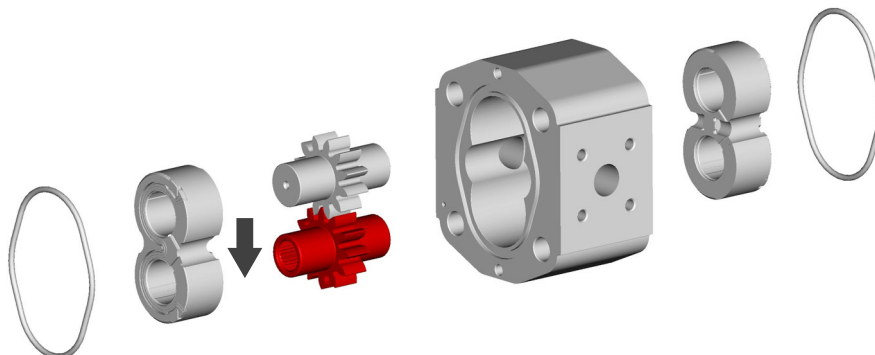
Initial configuration "Left" (S)



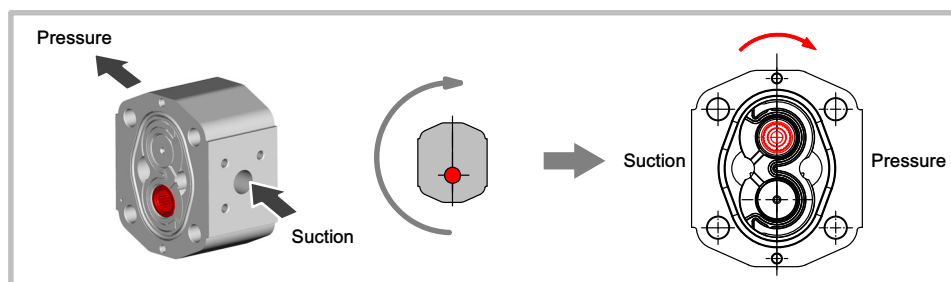
Picture -1-



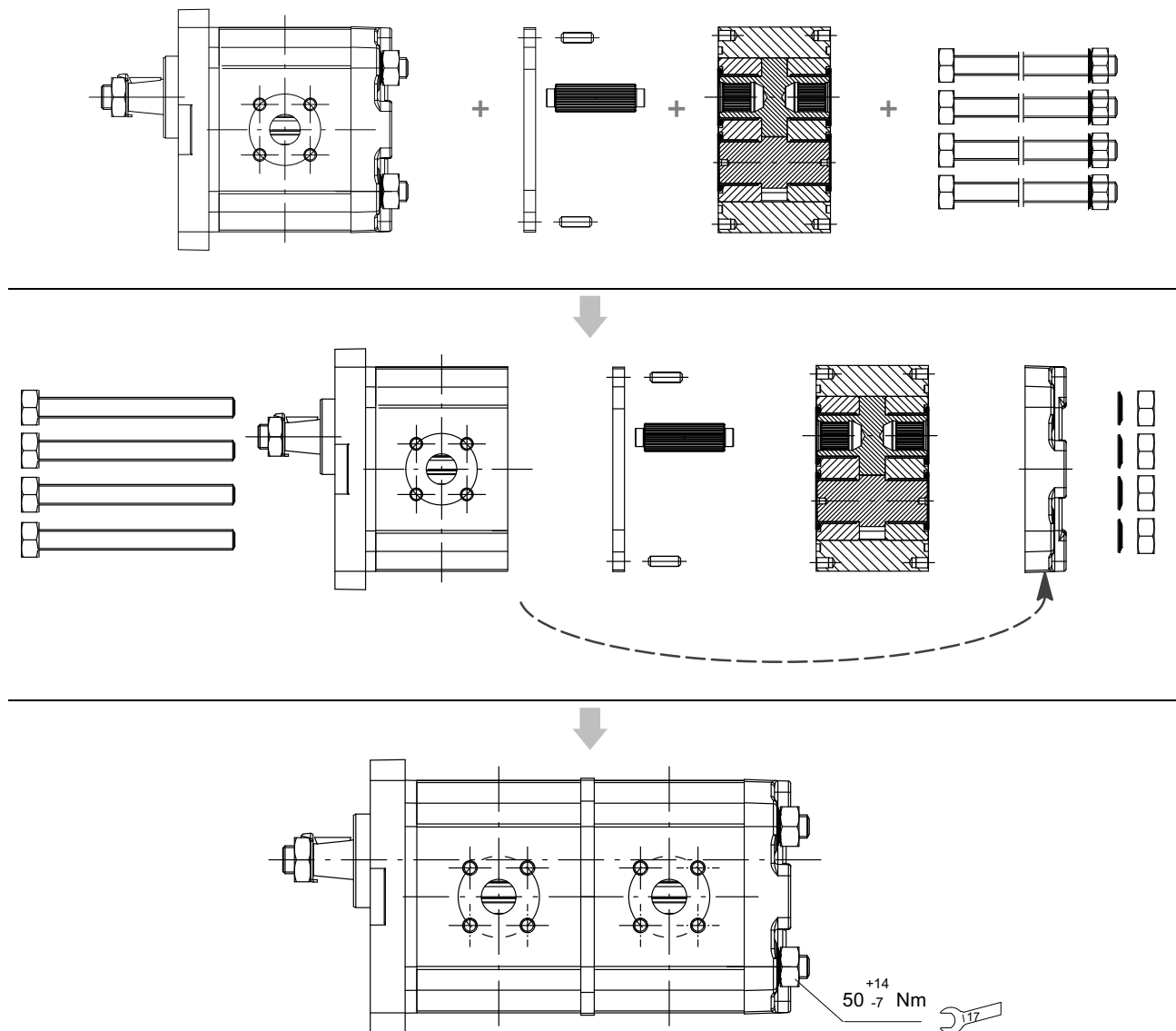
Picture -2-



Final configuration "Right" (D)



4.6 How to transform a single pump into a tandem pump (without shaft seal)

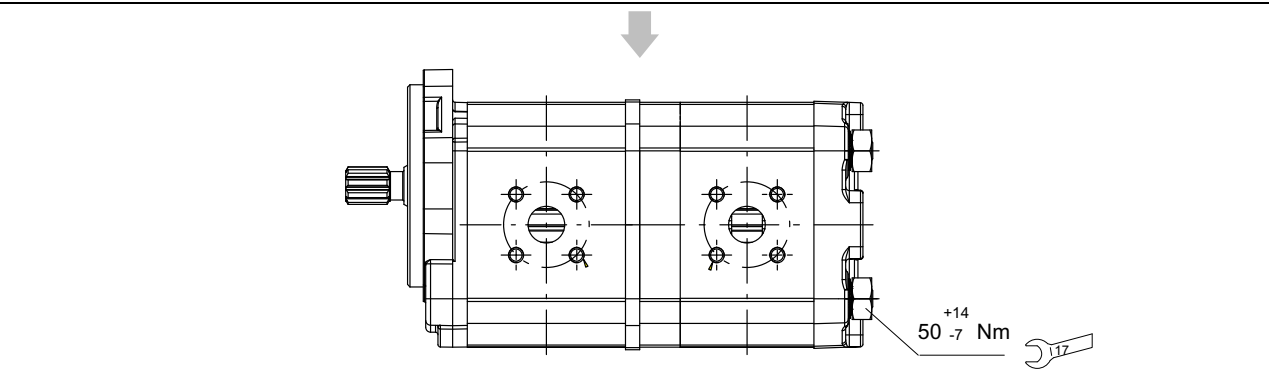
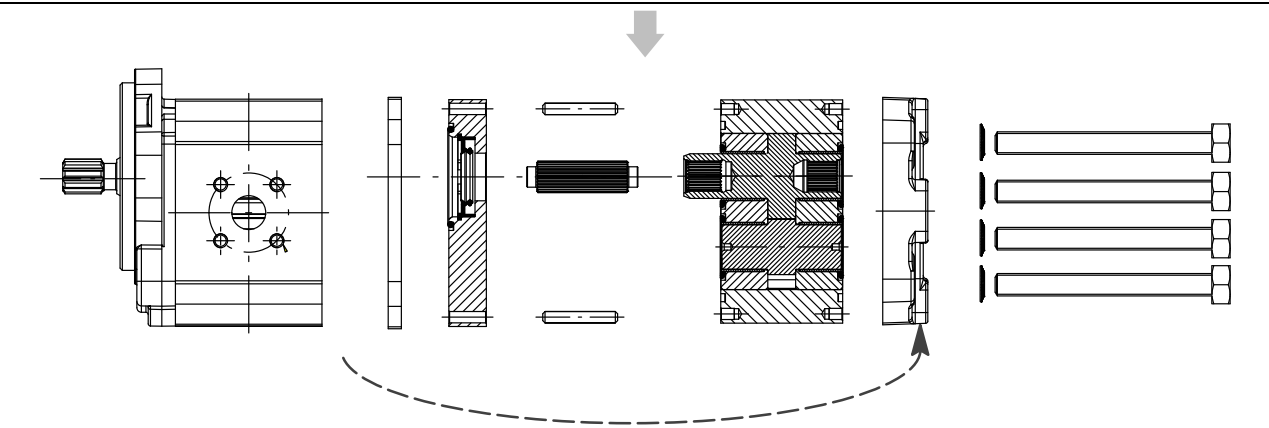
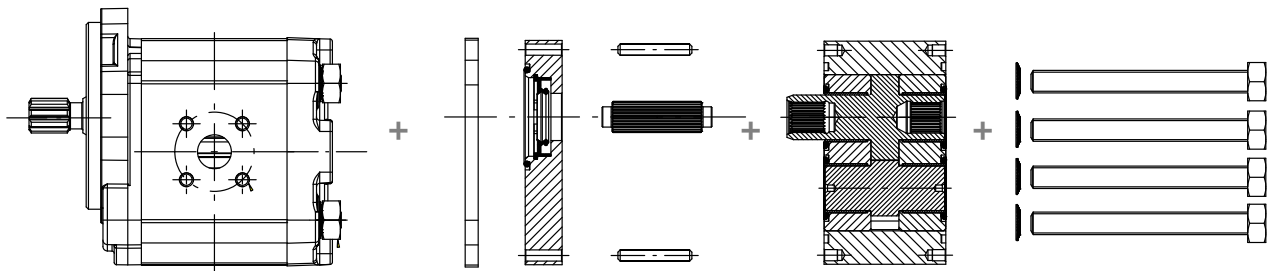


Before disassembling/re-assembling the pumps, please follow the warnings listed in the section 4.10

The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

Please check if pressures/torques meet the requested operational limits.

4.7 How to transform a single pump into a tandem pump (with shaft seal)

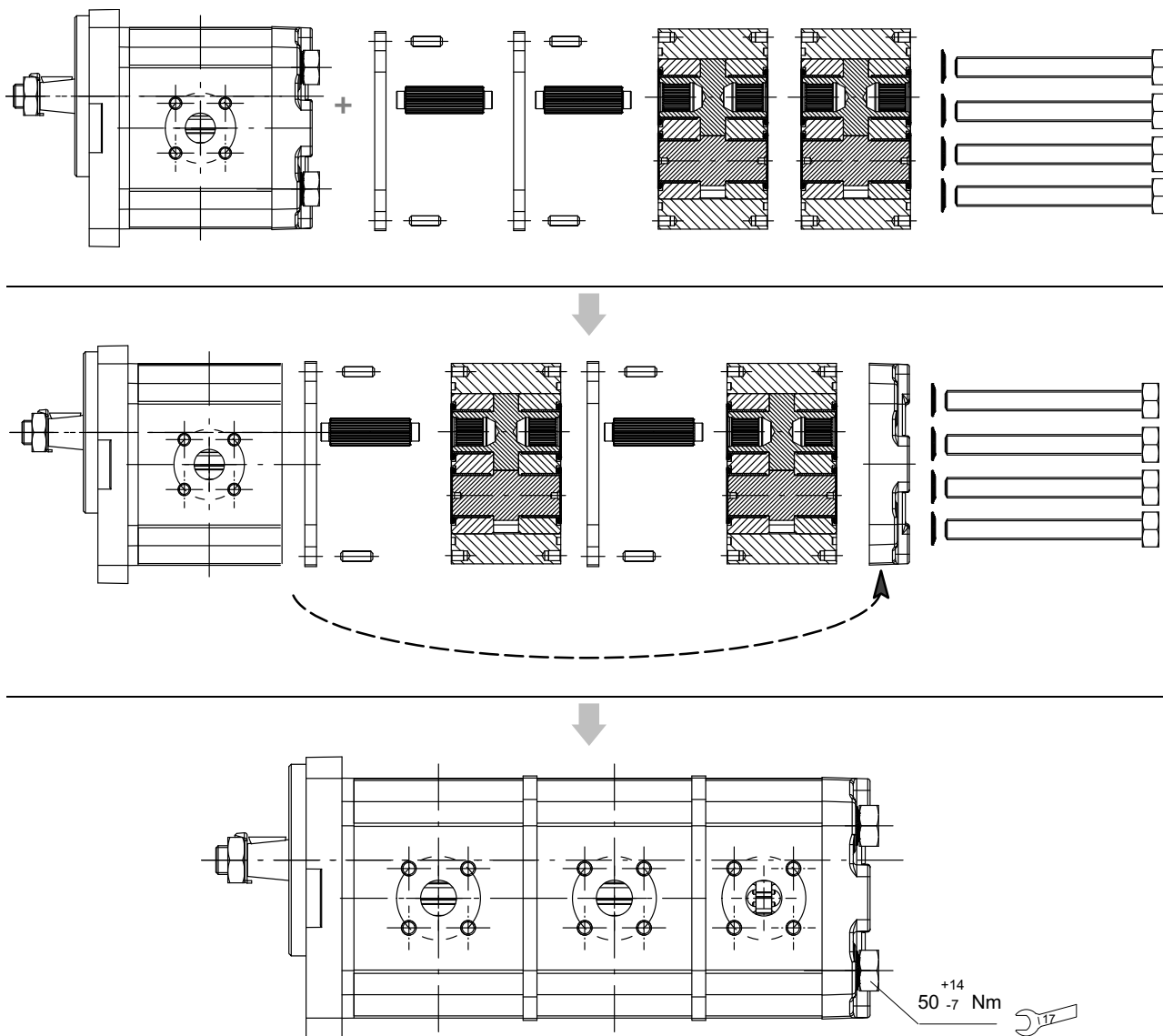


Before disassembling/re-assembling the pumps, please follow the warnings listed in the section 4.10

The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

Please check if pressures/torques meet the requested operational limits.

4.8 How to transform a single pump into a triple pump (without shaft seal)

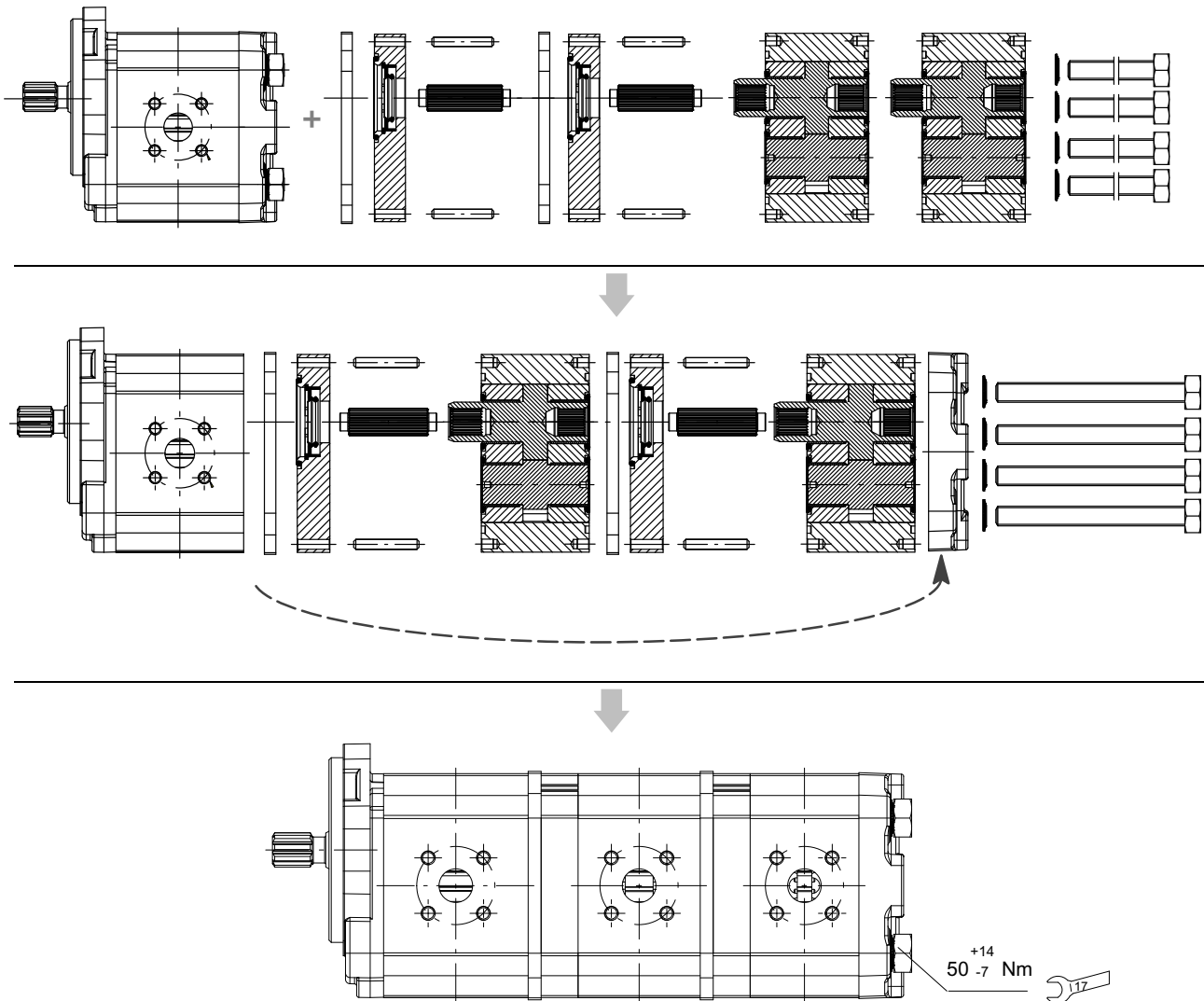


Before disassembling/re-assembling the pumps, please follow the warnings listed in the section 4.10

The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

Please check if pressures/torques meet the requested operational limits.

4.9 How to transform a single pump into a triple pump (with shaft seal)



Before disassembling/re-assembling the pumps, please follow the warnings listed in the section 4.10

The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

Please check if pressures/torques meet the requested operational limits.

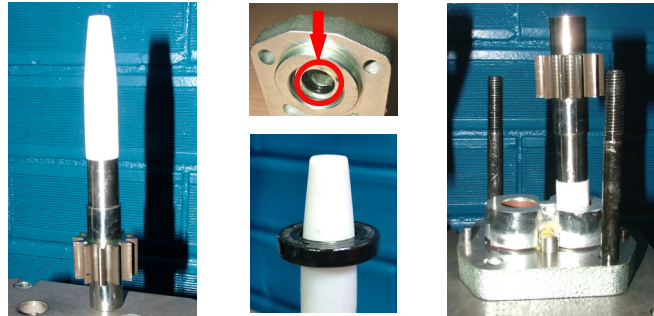
4.10 Warnings



Attention:

1- In order to avoid damages to the shaft seal during the assembly phase, it is necessary to use an appropriate ogiva adapter.

Be sure that the ogiva material, as well as its roughness, is not aggressive against the shaft seal.

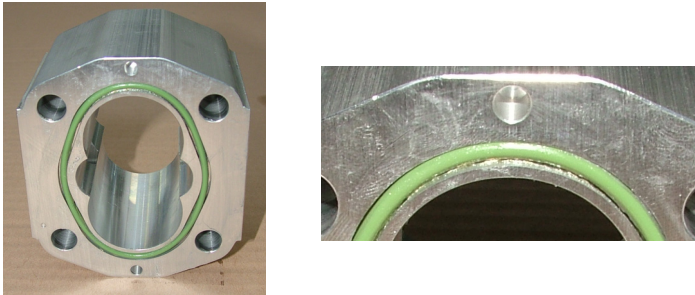


2- During the assembly phase, pay attention to the correct body seals position.

Help yourself using grease, to avoid the wrong positioning of the seals.

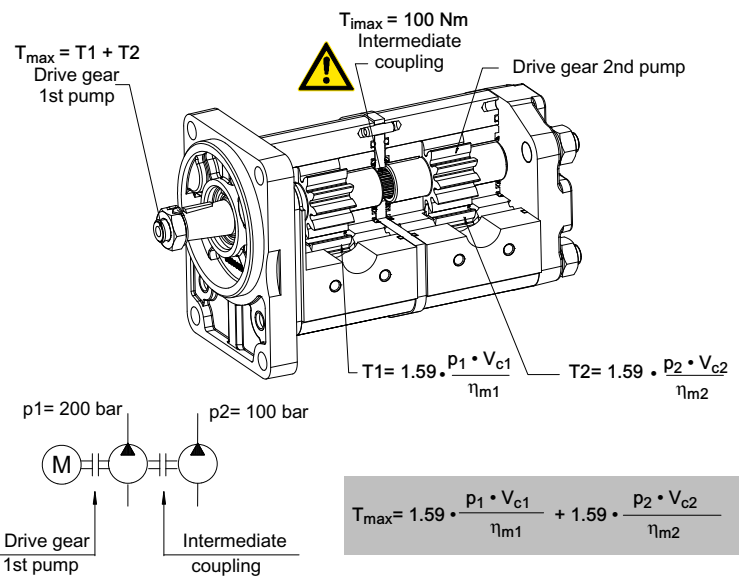
The grease helps to maintain the seal in the correct position.

Do not exceed with grease quantity; it might be pushed out of the body during the first operating working hours (especially when the oil is hot).



3- Pay attention to the maximum admitted torque, especially in presence of tandem or triple pumps.

The max. admitted torque value does not depend only on gear shaft limits but also on the pump pressure limits.

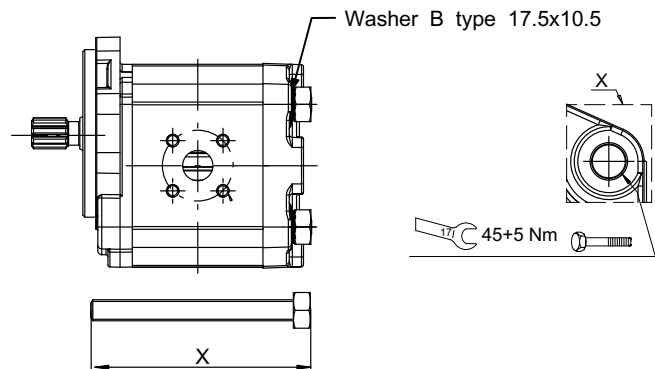


Example: AP212/19 + AP212/15

$$T_{\max} = 1.59 \cdot \frac{19.2 \cdot 200}{90} + 1.59 \cdot \frac{15.1 \cdot 100}{90} = 68 + 26.7 = 94.7 \text{ Nm}$$

$$T_{\max} = 94.7 \leq 130 \text{ Nm (taper 1:8)} \quad T_2 = 26.7 \leq M_{\max} 100 \text{ Nm}$$

4.11 Screws



Single pump		
Serie	Displacement	Lenght (mm)
218 818	4,5	85
	6,5	90
	8,5	90
	11	95
	15	100
	19	105
	22	110
	26	115
225 227 235 245 237 247 259 887S 880 887S-NPTF 880-NPTF 287S-B 280-B	4,5	80
	6,5	80
	8,5	85
	11	90
	15	95
	19	100
	22	105
	26	110
287S-SAEB	19	100
	22	105
	26	110



Attention:

In order to tight the bolts correctly, please be sure to use high quality steel bolts (such as 10.9 UNI5737) and to respect the suggested torque value.



The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

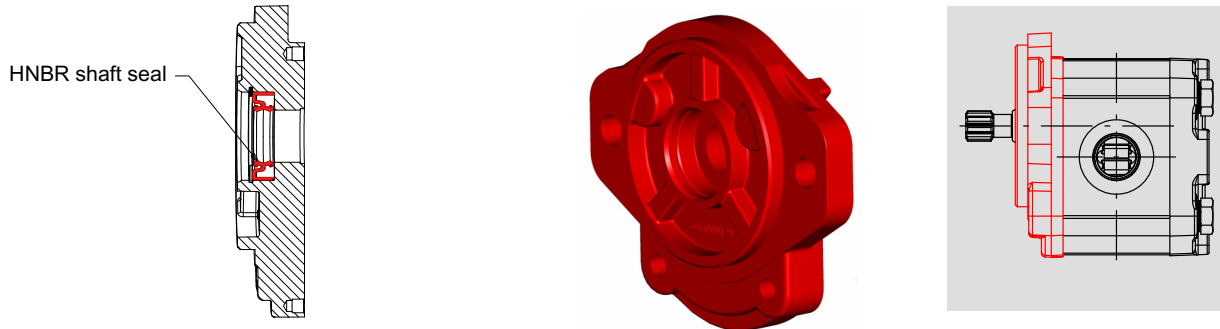
5 Sub-assembly components (see section 1.1.4)

The front covers are supplied with shaft seal assembled, therefore no further operations are needed.

In order to avoid damages to the shaft seal during the assembly phase, it is necessary to use an appropriate ogiva adapter.

Be sure that the ogiva material, as well as its roughness, is not aggressive against the shaft seal.

5.1 Sub-assembly front cover type

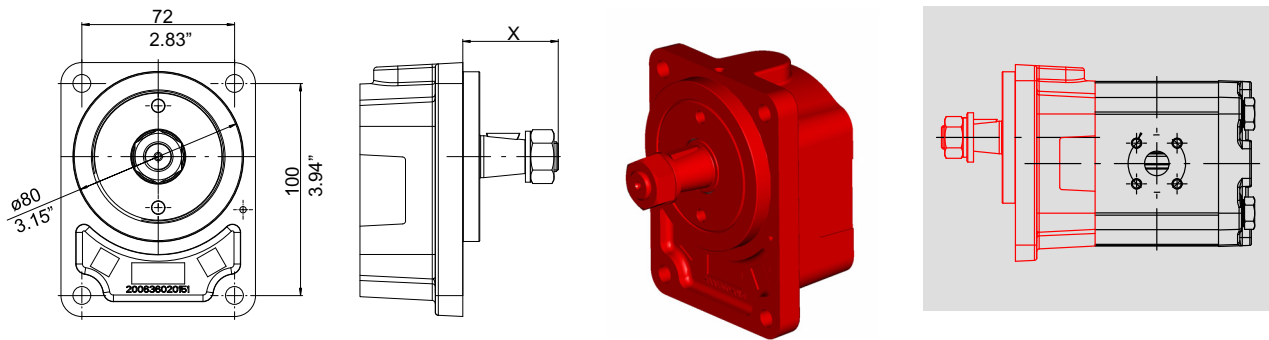


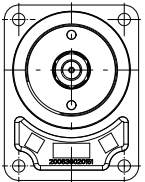
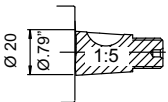
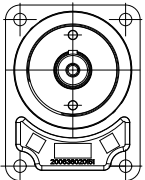
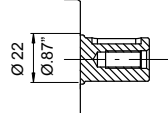
Type	Aluminium			Cast iron			Cast iron + bearing	
	Shape		Ordering code	Shape		Ordering code	Shape	Ordering code
German rectangular (Ø 80 mm - 3.15 inches)		A	200936020011		B	200936020310		See section 5.1.1
European rectangular (Ø 36.5 mm - 1.44")		D	200936010011		E	200936010361		*
Through 2 bolts (Ø 50 mm - 1.97")		G	200936030011		H			*
Through 2 bolts (Ø 50 mm - 1.97")		L	200936040011		M			*
Through 2 bolts (Ø 52 mm - 2.045")		O	200936050081		P	200636050072		
SAE-A 2 bolts (Ø 82.55 mm - 3.25 inches)		R	200936080011		S	200936080262		*

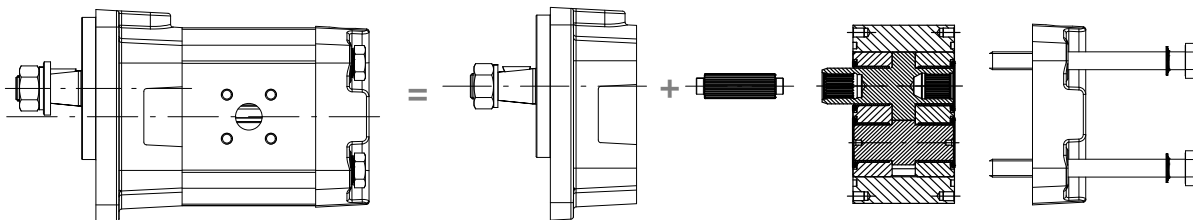
Aluminium and cast iron front cover dimensions: see standard pumps data sheet

* Please contact our Sales Department

5.1.1 Front bearing application

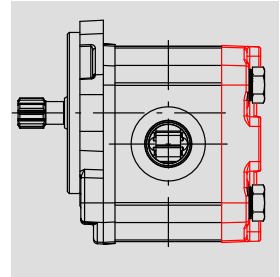
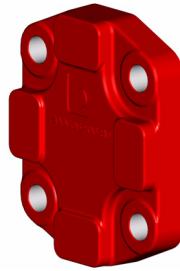
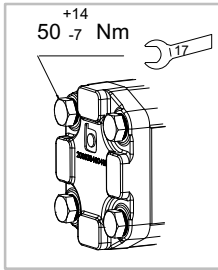


				Code		
	+		+	P1= Shaft seal material: HNBR	=	200936020420
	+		+	C1= Shaft seal material: HNBR	=	200936020440
		T max = 100 Nm X = 45 mm (1.77 inches)				
		Straight 22 mm - 0.87 inches X = 48.5 mm (1.91 inches)				

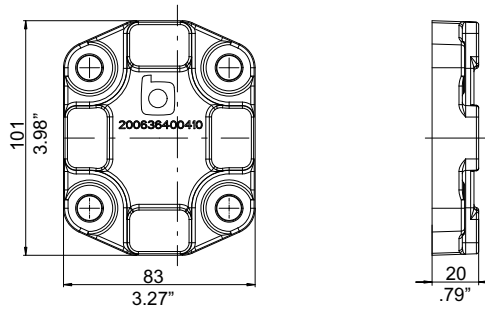


The length of the screws depends on the different pump displacement as well as the pump series (front and rear covers). Please consult our Sales Centre.

5.2 Sub-assembly back covers



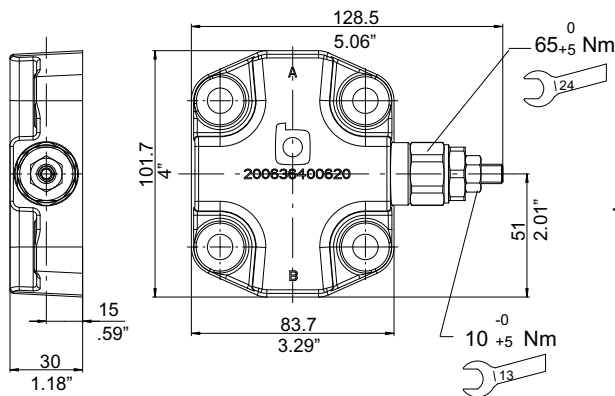
5.2.1 Cast iron back cover - Standard version for unidirectional pump



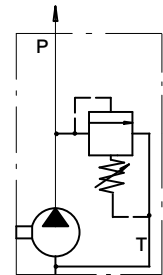
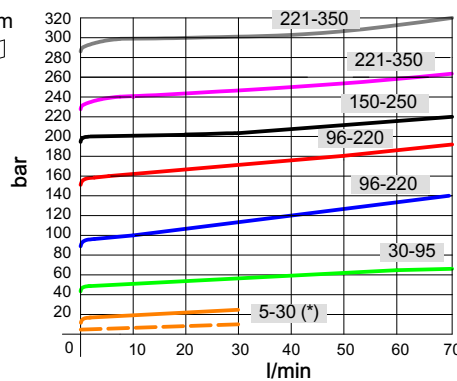
Type	Description	Ordering code
Back cover, standard version, cast iron material	GH	200636400420

5.2.2 Cast iron back cover with relief valve VI

It is necessary to order separated components body and valves (single codes are shown)

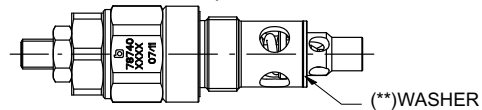


Pressure viscosity characteristic 46 cSt at 40°C



(**) Assembly instruction:

Check the correct position of the front copper washer and tighten with a torque wrench at the indicated value



Type	Setting range (bar)	Q max (l/min)	Cartridge valve ordering code only	Back cover ordering code only
- Cast iron back cover with relief valve. Return to internal pump suction - Cartridge pressure relief valve	5 ÷ 30	30 (*)	200987403600	200636400720
	30 ÷ 95	60	200987403480	
	96 ÷ 220	60	200987403420	
	150 ÷ 250	60	200987403470	
	221 ÷ 350	60	200987403430	

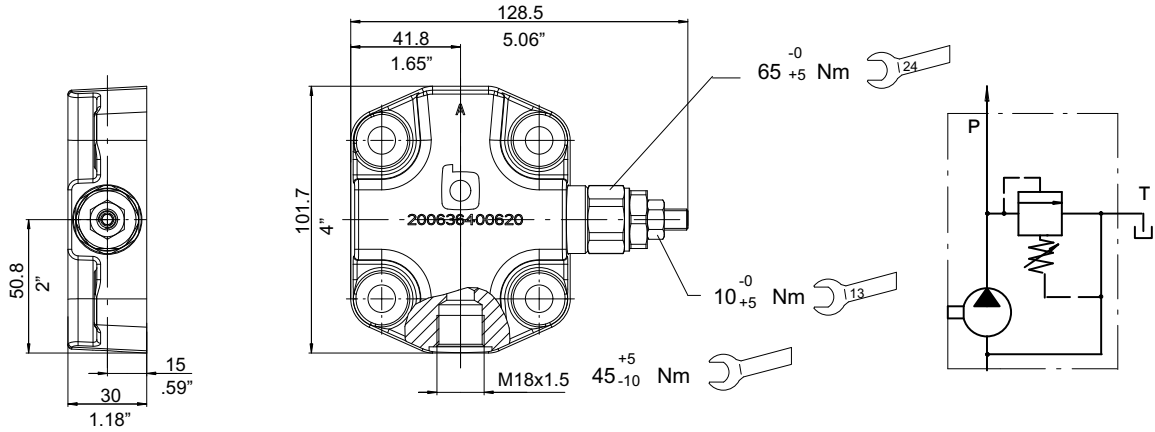
(*) see performances trace/minimum pressure setting (---)



: * Please take care that when the relief valve open, oil temperature increase quickly. These conditions have effect in the pump performances and life

5.2.3 Cast iron back cover with relief valve VE

It is necessary to order separated components body and valves (single codes are shown)

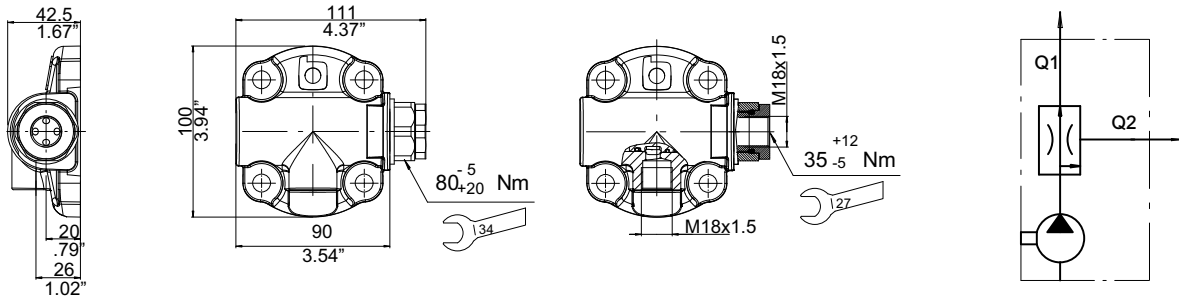


Type	Setting range (bar)	Q max (l/min)	Cartridge valve ordering code only	Back cover ordering code only
- Cast iron back cover with relief valve. Return to external pump tank - Cartridge pressure relief valve	5 ÷ 30	30 (*)	200987403600	200636400710
	30 ÷ 95	60	200987403480	
	96 ÷ 220	60	200987403420	
	150 ÷ 250	60	200987403470	
	221 ÷ 350	60	200987403430	

(*) see performances trace/minimum pressure setting (- - -)

5.2.4 Aluminium back cover with priority valve VP

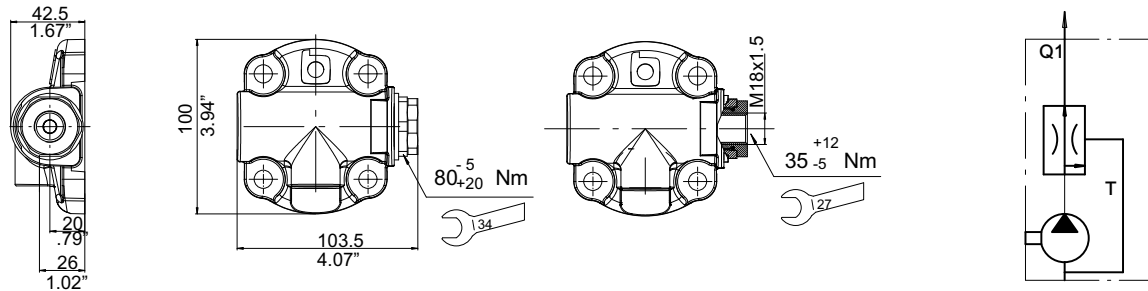
It is necessary to order separated components body and valves (single codes are shown)



Type	Priority valve code	Standard setting value +15% / -10% (l/min)	Orifice ordering code only	Back cover ordering code only	
- Aluminium back cover with priority valve cavity - Priority valve	VP	200987200520	02	2.5	200653610010
			03	3.5	200653610020
			05	5	200653610030
			06	6	200653610040
			08	8.5	200653620010
			10	10.5	200653620020
			13	13	200653620030
			12	12	200653620040
			16	16	200653620050
			20	20	200653630010
24	24	200653630020			
				200636400050	

5.2.5 Aluminium back cover with flow regulator valve QI

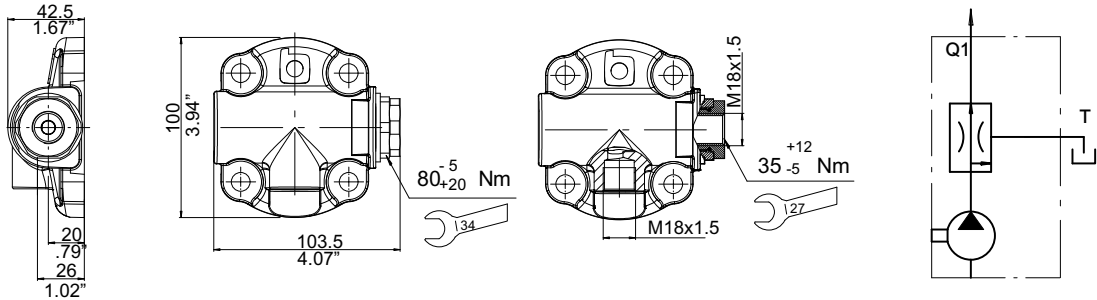
It is necessary to order separated components body and valves (single codes are shown)



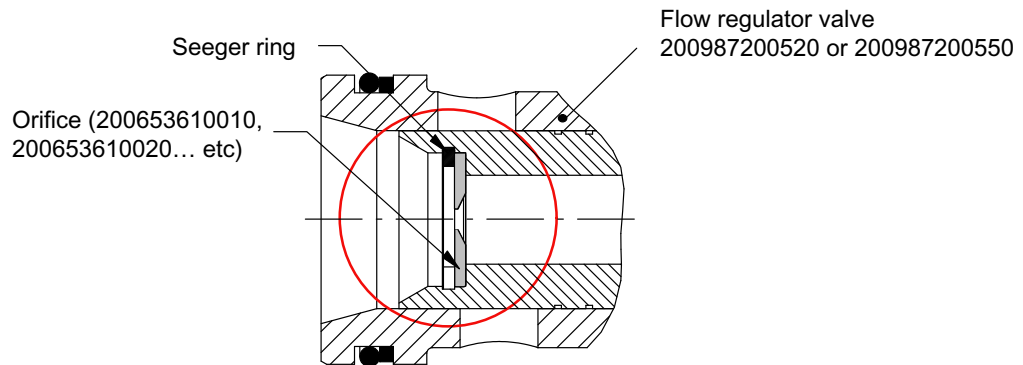
Type	Flow regulator valve code	Standard setting value -10% (l/min)	Orifice ordering code only	Back cover ordering code only	
- Aluminium back cover with flow regulator valve cavity, internal drain - Flow regulator valve	QI	200987200550	02	2	200653610010
			03	3.5	200653610020
			05	5	200653610030
			06	6	200653610040
			08	7.5	200653620010
			09	9	200653620020
			11	11	200653620030
			12	12	200653620040
			13	13.5	200653620050
			16	16	200653630010
			19	19	200653630020
			23	23	200653630030
				200636400060	

5.2.6 Aluminium back cover with flow regulator valve QE

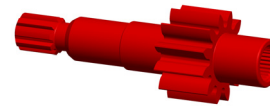
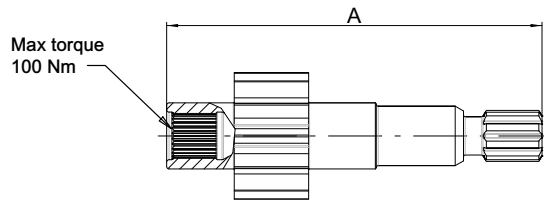
It is necessary to order separated components body and valves (single codes are shown)

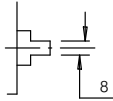
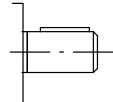
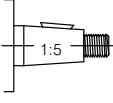
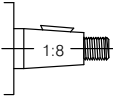


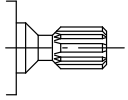
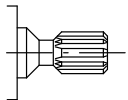
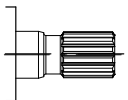
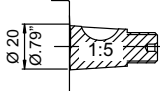
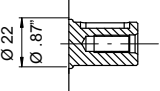
Type	Flow regulator valve code	Standard setting value -10% (l/min)	Orifice ordering code only	Back cover ordering code only	
Aluminium back cover with flow regulator valve cavity, external drain - Flow regulator valve	QE	200987200550	02	2	200653610010
			03	3.5	200653610020
			05	5	200653610030
			06	6	200653610040
			08	7.5	200653620010
			09	9	200653620020
			11	11	200653620030
			12	12	200653620040
			13	13.5	200653620050
			16	16	200653630010
			19	19	200653630020
			23	23	200653630030
				200636400050	



<p>E.g.= 200987200520 Ordering this code you will receive the cartridge valve with all the components and without orifice inside.</p>	<p>E.g.= 200653610040 Ordering this code you will receive the orifice only (e.g.= 200653610040= setting value 6 l/min). Please take care to order the orifice code according to the setting value desired.</p>	<p>Take away the assembled seeger ring (1), put the orifice (2) inside the spool, taking in consideration the right side direction, than re-assemble the seeger ring and assemble the complete valve inside the rear cover with the suggested tightening torque.</p>

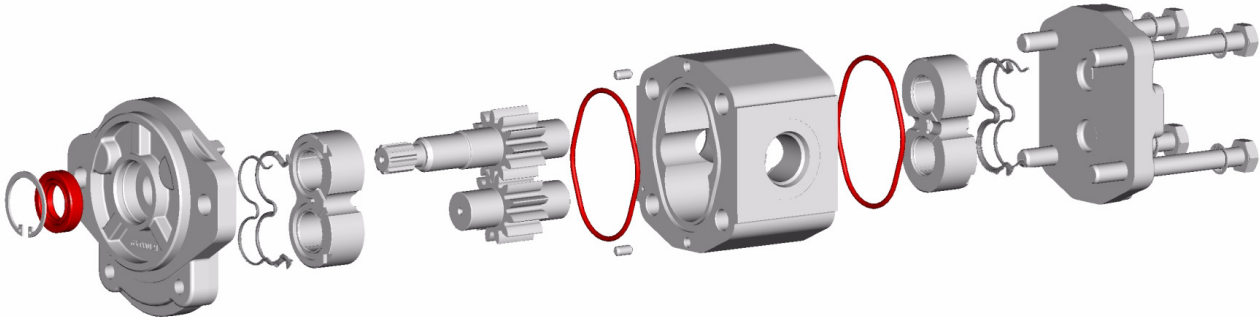


Shaft end type	Max torque	Displacement cm ³ /rev	A		Code
			mm	inch	
 <p>Tang drive 8 mm - 0.32 inches</p>	T max = 65 Nm	4.5	62.5	2.46	200616410101
		6.5	65.6	2.58	200616420111
		8.5	68.5	2.70	200616430121
		11	72.5	2.85	200616440131
		15	78.5	3.14	200616450121
		19	84.5	3.33	200616460121
		22	89	3.50	200616470111
 <p>Straight keyed Ø 15,85 mm - 0.62 inches</p>	T max = 65 Nm	4.5	97.7	3.85	200616010081
		6.5	100.7	3.96	200616020081
		8.5	103.7	4.08	200616030101
		11	107.7	4.24	200616040081
		15	113.7	4.48	200616050081
		19	130.2	5.13	200616060081
		22	130.2	5.13	200616070081
 <p>Tapered shaft 1:5</p>	T max = 65 Nm	4.5	105.7	4.16	200616210081
		6.5	108.7	4.28	200616220091
		8.5	111.7	4.40	200616230101
		11	115.7	4.55	200616240111
		15	121.7	4.79	200616250101
		19	127.7	5.03	200616260091
		22	132.2	5.20	200616270081
 <p>Tapered shaft 1:8</p>	T max = 135 Nm	4.5	107	4.21	200616310071
		6.5	110	4.33	200616320111
		8.5	113	4.45	200616330121
		11	117	4.61	200616340111
		15	123	4.84	200616350101
		19	129	5.08	200616360091
		22	133.5	5.26	200616370071
	26	139.5	5.49	200616380071	

Shaft end type		Max torque	Displacement cm ³ /rev	A		Code
				mm	inch	
	9 Teeth external spline B17X14 DIN5482	T max = 110 Nm	4.5	91.5	3.60	200616510081
			6.5	94.5	3.72	200616520081
			8.5	97.5	3.84	200616530091
			11	101.5	4.00	200616540111
			15	107.5	4.23	200616550111
			19	113.5	4.47	200616560101
			22	118	4.64	200616570091
			26	124	4.88	200616580111
	9 teeth external spline SAE J 498-9T 16/32 DP	T max = 90 Nm	4.5	97.7	3.85	200616610081
			6.5	100.7	3.96	200616620081
			8.5	103.7	4.08	200616630081
			11	107.7	4.24	200616640091
			15	113.7	4.48	200616650081
			19	119.7	4.71	200616660101
			22	124.2	4.89	200616670121
			26	130.2	5.13	200616680101
	13 teeth external spline SAE J 498-13T 16/32 DP	T max = 270 Nm	4.5	107.4	4.23	200616610120
			6.5	107.4	4.23	200616620120
			8.5	113.4	4.46	200616630120
			11	117.4	4.62	200616640130
			15	123.4	4.86	200616650100
			19	129.4	5.09	200616660140
			22	133.9	5.27	200616670140
			26	139.9	5.51	200616680140
	Bearing application 1:5	T max = 100 Nm	See section 5.1.1			
	Bearing application Straight 22 mm - 0.87 inches	T max = 100 Nm	See section 5.1.1			

6 Pumps seal kit NBR standard type

The seal Kit code includes:
OR and shaft seal



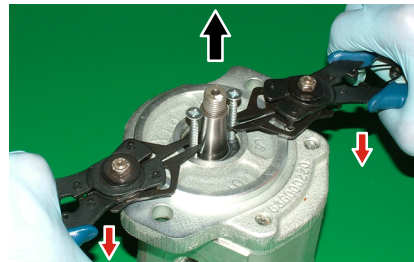
Type	Code
AP212	200974001570

Minimum kit order quantity is requested: please contact our Sales Center

6.1 How to replace the HNBR shaft seal - Instructions

6.1.1 Disassembly instruction

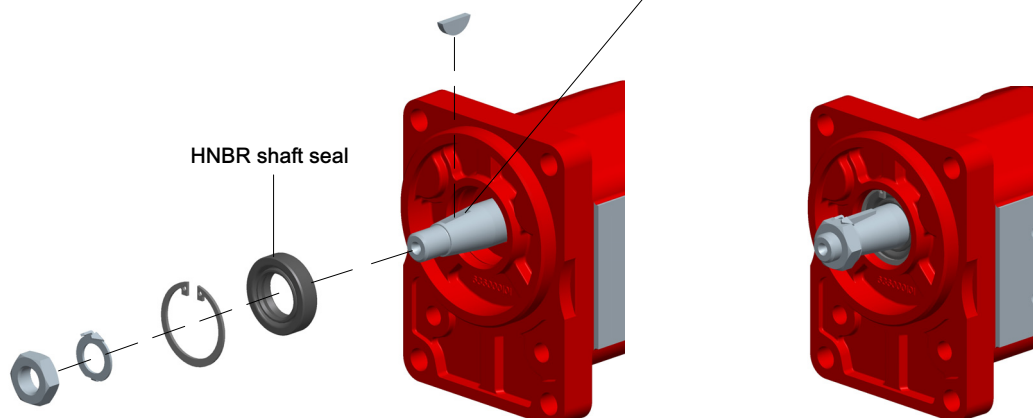
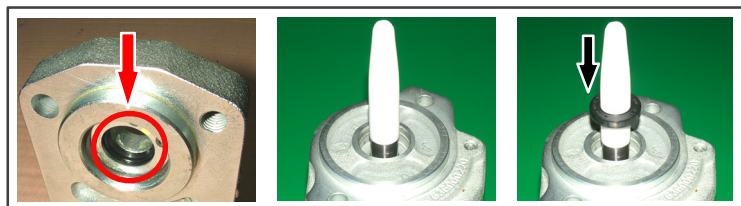
Remove the old shaft seal pay attention not to damage front cover or gear shaft surfaces.
Help yourself utilising a couple of screws, than using two pliers and pull out the old shaft seal.



6.1.2 Assembly instruction

Attention:

In order to avoid damages to the shaft seal during the assembly phase, it is necessary to use an appropriate ogiva adapter. Be sure that the ogiva material, as well as its roughness, is not aggressive against the shaft seal.



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www.bucherhydraulics.com

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Classification: 410.110.000