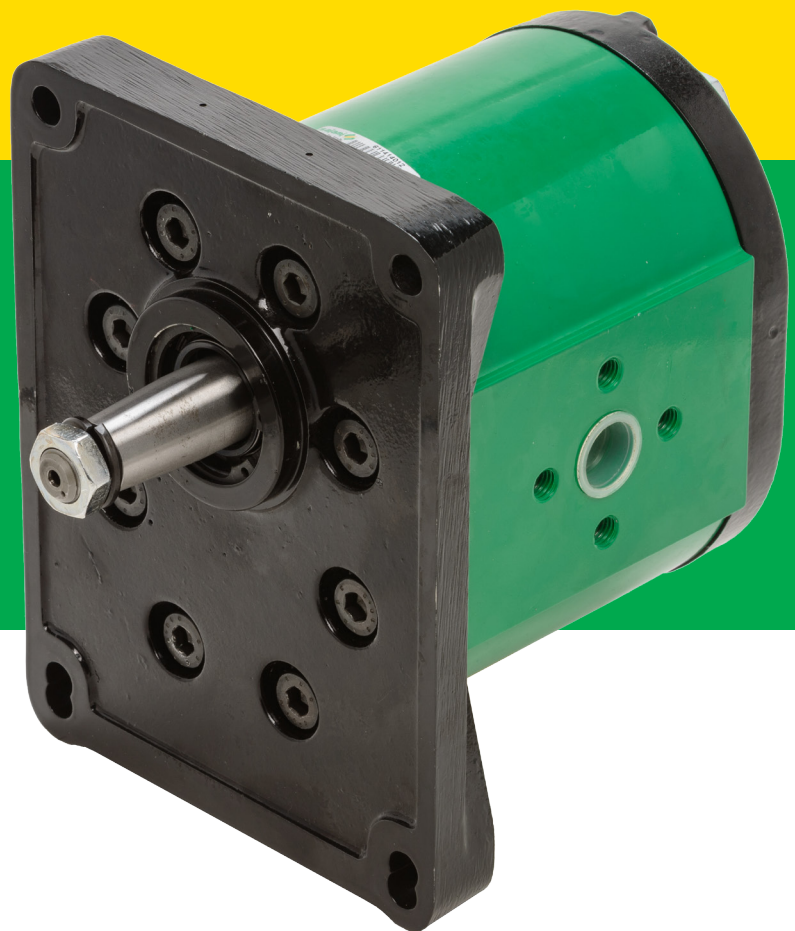

3.5PC

Aluminium gear pumps

Technical Catalogue

E0.114.0219.02.00IM05



GEAR PUMPS

SALAMI gear pumps are available with displacements from 1.4 cm³/rev to 99 cm³/rev (*from 0.09 cu.in/rev to 6.03 cu.in/rev*).

Multiple pumps can always be relized combining stages taken from different or same series.

Several options of shafts, flanges and ports as for European, German and American standards are available for all the pumps.

SALAMI gear pumps offer:

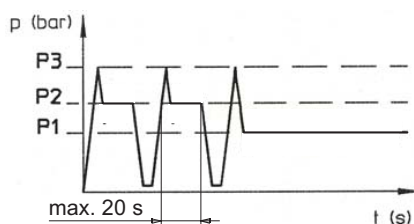
- High volumetric efficiency thanks to an innovative design and an accurate control of machining tolerances.
- Axial compensation achieved by the use of floating bushes that allow high volumetric efficiency throughout the working pressure range.
- DU bearings to ensure high pressure capability.
- 12 teeth integral gear and shaft.
- Aluminium body.
- Cast iron flange and cover.
- Double shaft seals.
- Nitrile seals as standard and Viton seals in high temperature applications.
- All pumps are hydraulically tested after assembly to ensure the highest standard performance.
- Gear pumps are ideal for mobile equipment including: snow plows, light duty equipment, farm vehicles, town trucks, cherry pickers, lift gates, utility vehicles, aerial devices, hoists, spreaders, fan drive.
- Also available Bidirectional rotation.

TECHNICAL DATA

- Pump inlet pressure (absolute pressure)	0.8 to 1.5 bar (11.6 to 21.7 psi)
- Minimum operating fluid viscosity	12 mm ² / sec
- Max starting viscosity	800 mm ² / sec
- Suggested fluid viscosity range	17 - 65 mm ² / sec
- Fluid operating temperature range	-20 to 80 °C
- Fluid operating temperature range with FPM seals (Viton)	-15 to 110°C
- Fluid operating temperature range with HNBR seals*	-30 to 110°C
- Hydraulic fluid	mineral oil

*Available on request.

DEFINITION OF PRESSURES



- P3 = Peak pressure
- P2 = Intermittent operating pressure (1/3 of working time)
- P1 = Continuous operating pressure

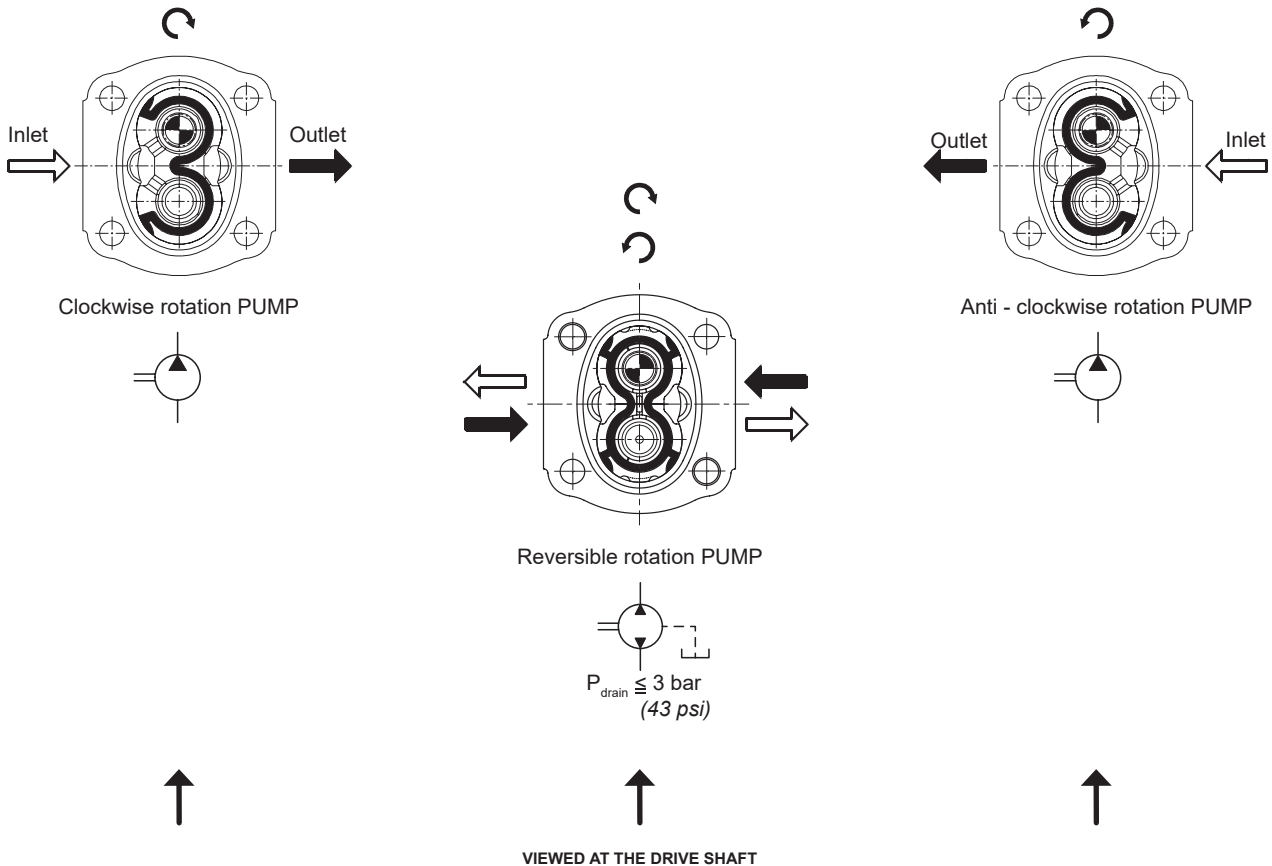
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DRIVE SHAFTS

Radial and axial loads on the shafts must be avoided since they reduce the life of the unit. In order to avoid misalignment during the assembly with the primary engine, a connection with “Oldham” coupling (or coupling having convex toothed hub) is recommended.

ROTATION



HYDRAULIC PIPE LINE

To ensure favorable suction conditions it is important to keep pressure drop in suction pipe line to a minimum value (see TECHNICAL DATA). To calculate hydraulic pipe line size, the designer can use; as an approximate guide, the following fluid speed figures:

From 1 to 2 m/sec on suction pipe line
From 6 to 10 m/sec on pressure pipe line

From 3.28 to 6.36 ft/sec on suction pipe line
From 19.7 to 32.8 ft/sec on pressure pipe line

The lowest fluid speed values in pipe lines is recommended when the operating temperature range is high and/or for continuous duty.

The highest value is recommended when the temperature difference is low and/or for intermittent duty.

When tandem pumps are supplied by 2 different reservoirs with 2 different fluids it is necessary to specify “AS” version.



FILTRATION INDEX RECOMMENDED

Working pressure	>200 bar/2900 psi	<200 bar/2900 psi
Contamination class NAS 1638	9	10
Contamination class ISO 4406	19/18/15	20/19/16
Achieved with filter $\beta_x=75$	15 μm	25 μm

FIRE RESISTENT FLUID

Type	Description	Max pressure	Max speed (rpm)	Temperature
HFB	Oil emulsion with 40% water	130 bar/1880 psi	2500	3°C+65°C
HFC	Water glycol	180 bar/2600 psi	1500	-20°C+65°C
HFD	Phosphate esters		1750	-10°C+80°C

COMMON FORMULAS FOR PUMPS

$$C = \text{Input torque} = \frac{q \cdot \Delta p}{62.8 \cdot \eta_m} \text{ (Nm)}$$

$$P = \text{Input power} = \frac{q \cdot n \cdot \Delta p \cdot 10^{-3}}{600 \eta_m} \text{ (kW)}$$

$$Q = \text{Outlet flow} = \frac{q \cdot n \cdot \eta_v}{1000} \text{ (l/min)}$$

LEGENDA

Δp = Working pressure (bar)

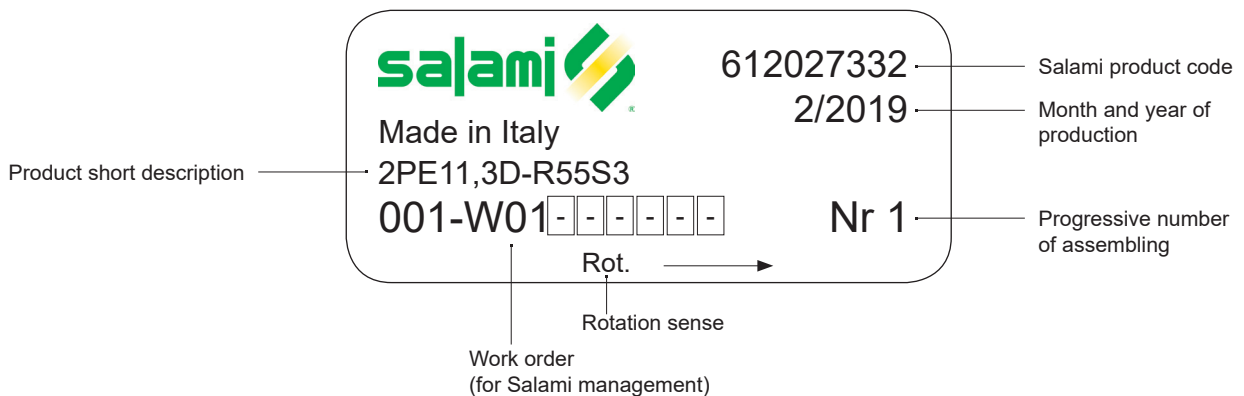
q = Displacement (cm^3/rev)

n = Speed (min^{-1})

η_m = Mechanical eff. (0.92)

η_v = Volumetric eff. (0.95)

IDENTIFICATION LABEL



WORKING CONDITIONS

GROUP 1.5 - E SERIES	Displacement		Continuous pressure P ^{1**}		Intermittent pressure P ²		Peak pressure P ³		Max. speed	Min. speed
	cm ³ /rev	cu.in/rev	bar	psi	bar	psi	bar	psi		
1.5PE - 1.4	1.4	0.09	250	3625	270	3915	290	4205	5000	700
1.5PE - 2.1	2.1	0.13	250	3625	270	3915	290	4205	5000	700
1.5PE - 2.8	2.8	0.17	250	3625	270	3915	290	4205	4500	700
1.5PE - 3.5	3.5	0.21	250	3625	270	3915	290	4205	4500	700
1.5PE - 4.1	4.1	0.25	250	3625	270	3915	290	4205	4000	700
1.5PE - 5.2	5.2	0.32	230	3335	250	3625	270	3915	4000	700
1.5PE - 6.2	6.2	0.38	230	3335	250	3625	270	3915	3600	600
1.5PE - 7.6	7.6	0.46	200	2900	220	3190	250	3625	3300	600
1.5PE - 9.3	9.3	0.57	180	2610	200	2900	240	3480	3000	600
1.5PE - 11	11	0.67	170	2465	190	2755	220	3190	3000	600

GROUP 2 - E SERIES	cm ³ /rev	cu.in/rev	bar	psi	bar	psi	bar	psi	min ⁻¹	
2PE - 3.2*	3.2	0.19	250	3625	280	4060	300	4350	4000	600
2PE - 3.9*	3.9	0.24	250	3625	280	4060	300	4350	4000	600
2PE - 4.5	4.6	0.27	250	3625	280	4060	300	4350	4000	600
2PE - 6.5	6.5	0.4	250	3625	280	4060	300	4350	4000	600
2PE - 8.3	8.2	0.5	250	3625	280	4060	300	4350	3500	500
2PE - 10.5	10.6	0.65	250	3625	280	4060	300	4350	3500	500
2PE - 11.3	11.5	0.68	250	3625	280	4060	300	4350	3500	500
2PE - 12.5	12.7	0.77	250	3625	280	4060	300	4350	3500	500
2PE - 13.8	13.8	0.84	250	3625	280	4060	300	4350	3500	500
2PE - 16	16.6	1.01	250	3625	280	4060	300	4350	3000	400
2PE - 19	19.4	1.15	220	3190	240	3480	260	3750	3000	400
2PE - 22.5	22.9	1.37	200	2900	220	3190	240	3480	2750	400
2PE - 26	25.8	1.58	180	2610	200	2900	220	3190	2500	400

*Available only as rear pump

GROUP 2.5 - B SERIES	cm ³ /rev	cu.in/rev	bar	psi	bar	psi	bar	psi	min ⁻¹	
2.5PB - 5.5*	5.97	0.36	250	3625	280	4060	300	4350	3000	600
2.5PB - 8.3*	8.29	0.50	250	3625	280	4060	300	4350	3000	600
2.5PB - 11.5*	11.76	0.72	250	3625	280	4060	300	4350	3000	600
2.5PB - 13.8*	14.07	0.86	250	3625	280	4060	300	4350	3000	600
2.5PB - 16	16	0.97	250	3625	280	4060	300	4350	3000	600
2.5PB - 19	19.3	1.17	250	3625	280	4060	300	4350	3000	600
2.5PB - 22	22.2	1.35	250	3625	280	4060	300	4350	3000	500
2.5PB - 25	25.2	1.53	250	3625	280	4060	300	4350	3000	500
2.5PB - 28	27.6	1.68	250	3625	280	4060	300	4350	3000	500
2.5PB - 32	32.4	1.97	230	3335	250	3625	260	3750	3000	500
2.5PB - 38	38.1	2.32	200	2900	220	3190	240	3480	2750	400
2.5PB - 44	44.2	2.69	170	2465	190	2755	210	3040	2500	400

*Available only as rear pump. Displacements 11.5-13.8 are available as single pump only with drive shaft “55”.



WORKING CONDITIONS

	Displacement		Continuous pressure P ^{1**}		Intermittent pressure P ²		Peak pressure P ³		Max. speed	Min. speed
	cm ³ /rev	cu.in/rev	bar	psi	bar	psi	bar	psi		
GROUP 3 - E SERIES									min ⁻¹	
3PE - 21	20.6	1.26	250	3625	280	4060	300	4350	3000	600
3PE - 27	27	1.65	250	3625	280	4060	300	4350	3000	600
3PE - 33	33.5	2.04	250	3625	280	4060	300	4350	3000	600
3PE - 38	38.7	2.36	250	3625	280	4060	300	4350	2750	500
3PE - 46	46.9	2.86	250	3625	270	3915	280	4060	2750	500
3PE - 55	54.1	3.3	220	3190	240	3480	250	3625	2500	400
3PE - 65	63.1	3.85	200	2900	220	3190	240	3480	2500	400
3PE - 75	73.4	4.48	180	2610	200	2900	220	3190	2500	400

GROUP 3.5 - C SERIES	cm ³ /rev	cu.in/rev	bar	psi	bar	psi	bar	psi	min ⁻¹	
3.5PC - 55	54.8	3.34	250	3625	280	4060	300	4350	2750	400
3.5PC - 64	63.2	3.85	250	3625	280	4060	300	4350	2750	350
3.5PC - 75	74.7	4.55	230	3335	250	3625	280	4060	2500	300
3.5PC - 87	88	5.36	210	3040	230	3330	260	3750	2250	300
3.5PC - 98*	99	6.03	200	2900	220	3190	250	3625	2000	300

*Displacement 98 are special release, please contact sales department.

**For working conditions, using exclusively pressure P¹, the value of max. speed must be reduced of 10%.

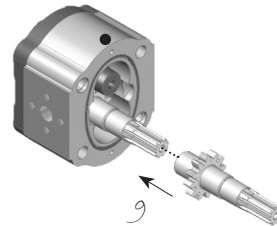
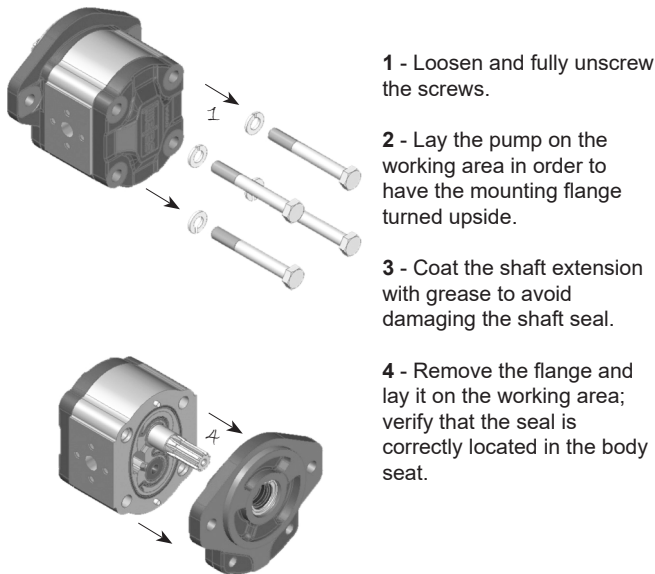
For bidirectional pump the max pressure has to be reduced of 10%.

The max pressure is referred to pumps with flanged ports, using the threaded ports the pump life could be reduced.

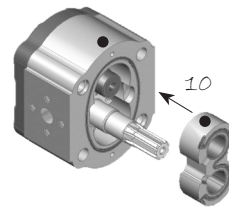


ROTATION CHANGING INSTRUCTIONS FOR UNITS

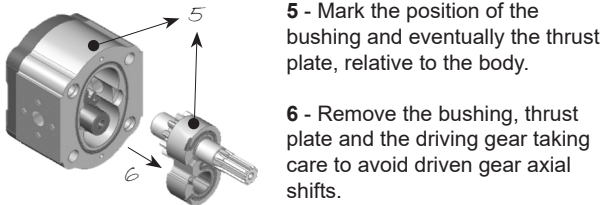
Before starting, be sure that the pump is cleaned externally as well as the working area to avoid that particles dangerous for pump working can find their way into the pump. Pump represented is a clockwise rotation pump.
To obtain an anti_clockwise rotation read carefully the following instructions.



9 - Re-locate the driving gear in the position previously occupied by the driven gear.



10 - Replace the bushing and thrust plate taking care that:
- marks are located as on the picture
- surface containing the seal is visible
- seal and its protection are correctly located.



11 - Clean body and mounting flange refaced surfaces.

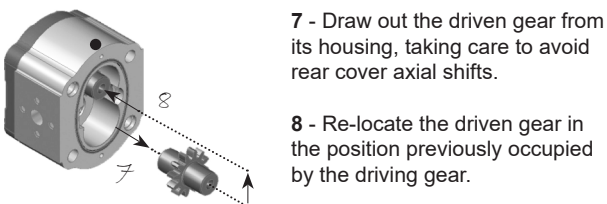
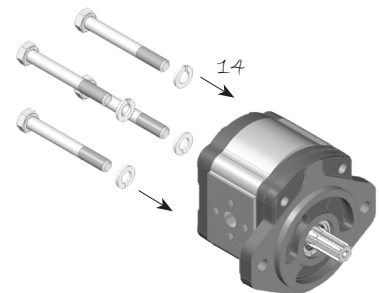
12 - Verify that the two plugs are located in the body.

13 - Refit the mounting flange, turned 180° from its original position.

14 - Replace the clamp bolts and tighten crosswise evenly to an appropriate torque.

15 - Check that the shaft rotates freely.

16 - Mark on the flange the new direction of rotation.



ANTI - CLOCKWISE ROTATION

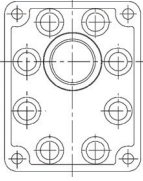
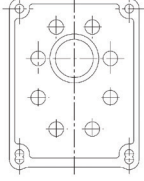
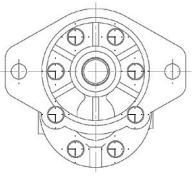
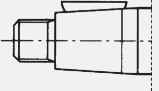

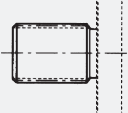



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SHAFTS AND FLANGES COMBINATION

3.5PC			
	CODE P3 European standard Ø60.3	CODE P4 European standard Ø63.5	CODE S3 SAE B 2 Bolts Ø101.6
 CODE 48 - Tapered 1:8 Ø24.64	48P3		
 CODE 49 - Tapered 1:8 Ø31.75		49P4	
 CODE 55 - SAE B Splined 13T			55S3
 CODE 56 - SAE BB Splined 15T			56S3

Note: other versions available, see shafts and flanges information.



Displacements up to 6.03 cu.in./rev
Pressure up to 4350 psi



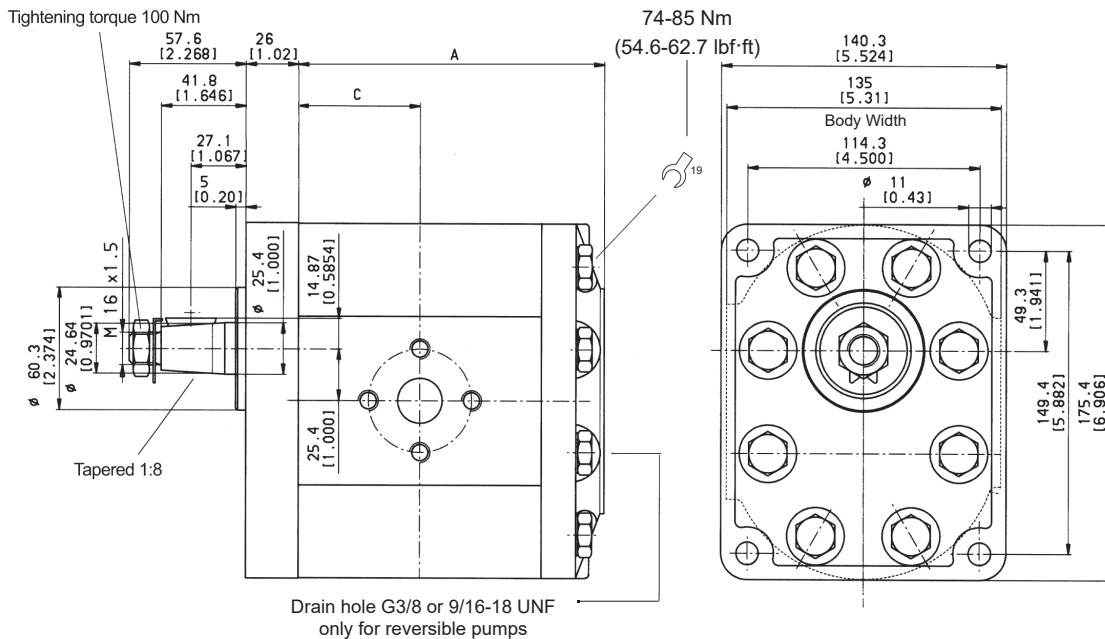
GEAR PUMPS

Displacements up to 99 cm³/rev
Pressure up to 300 bar

ASSEMBLING DIMENSIONS AND WORKING CONDITIONS

Type		55	64	75	87	98*	
Displacement	cm ³ /rev	54.8	63.2	74.7	88	99	
	cu.in./rev	3.34	3.85	4.55	5.36	6.03	
Dimension A	mm	165	177	184	192	197	
	in	6.49	6.96	7.24	7.55	7.75	
Dimension C	mm	80	86	89.5	93.5	96	
	in	3.14	3.38	3.52	3.68	3.77	
Continuous pressure	P ¹	bar	250	250	230	210	200
		psi	3625	3625	3335	3040	2900
Intermittent pressure	P ²	bar	280	280	250	230	220
		psi	4060	4060	3625	3335	3140
Peak pressure	P ³	bar	300	300	280	260	250
		psi	4350	4350	4060	3750	3625
Max speed	rpm	2750	2750	2500	2250	2000	
Min speed	rpm	400	350	300	300	300	
Weight	kg	10.70	11.40	11.90	12.50	12.80	
	lbs	23.54	25.08	26.18	27.55	28.21	

*Available for quantity.



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Displacements up to 6.03 cu.in./rev
Pressure up to 4350 psi

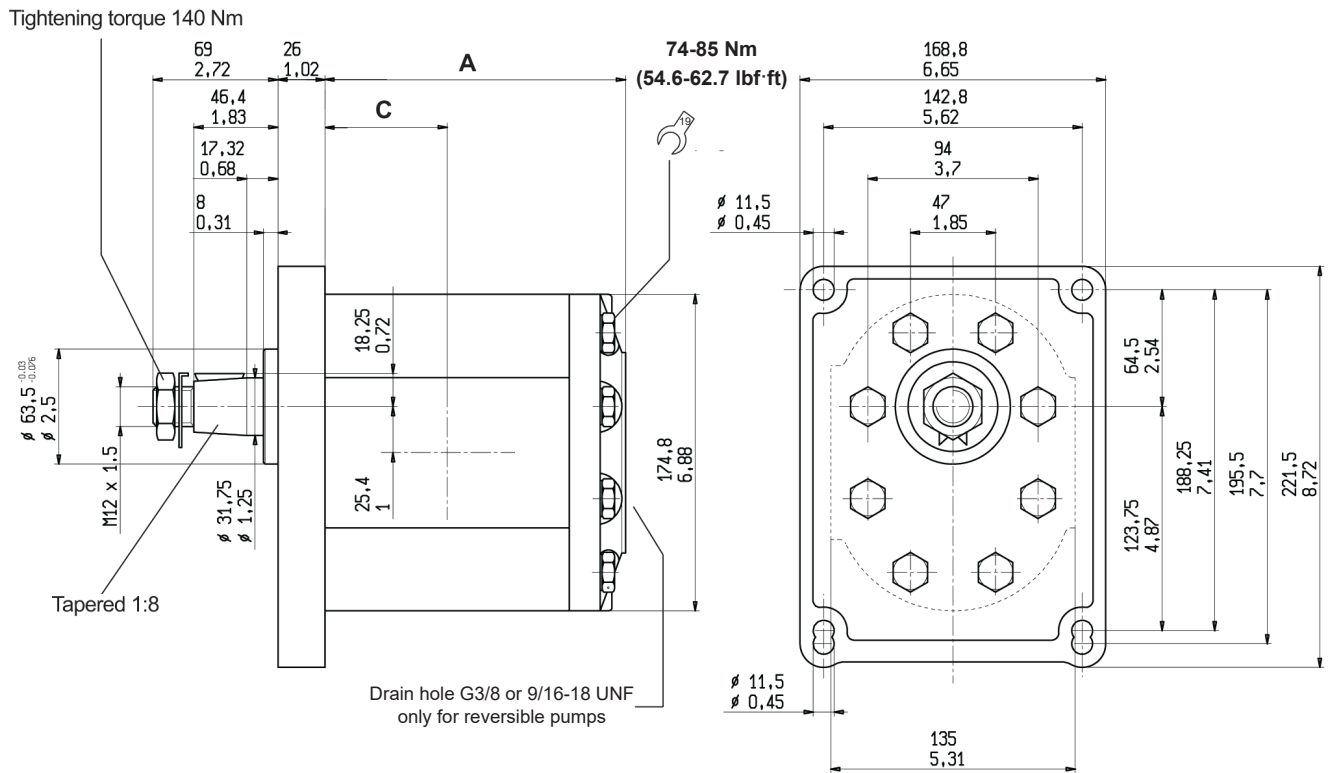


Displacements up to 99 cm³/rev
Pressure up to 300 bar

**CONFIGURATION 49P4
(4PB)**

Type		75	87	98*
Displacement	cm ³ /rev	74.7	88	99
	cu.in./rev	4.55	5.36	6.03
Dimension A	mm	184	192	197
	in	7.24	7.55	7.75
Dimension C	mm	89.5	93.5	96
	in	3.52	3.68	3.77
Weight	kg	12.50	13.00	14.00
	lbs	27.55	28.66	30.86

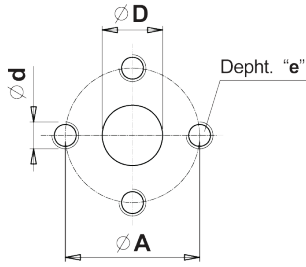
*Available for quantity.



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FLANGED AND THREADED PORTS



code P

Flanged ports
european standard



TYPE	INLET				OUTLET			
	Ø A	Ø D	d	e	A	Ø D	d	e
55	51 (2.01")	27 (1.06")	M10	16 (0.63")	51 (2.01")	22 (0.87")	M10	16 (0.63")
64	62 (2.44")	33 (1.30")	M12	22 (0.86")				
From 75 to 98	72,5 (2.85")	38 (1.50")	M12					



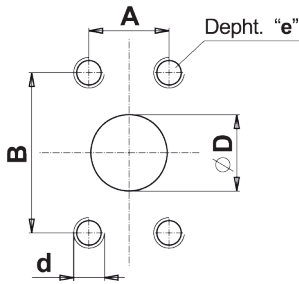
BI-DIRECTIONAL PUMPS Special version available on request.

For version 49P4:

Tightening torque for different threads

M10=50Nm

M12=90Nm



code S

Flanged ports
SAE J518
AMERICAN STANDARD
THREAD

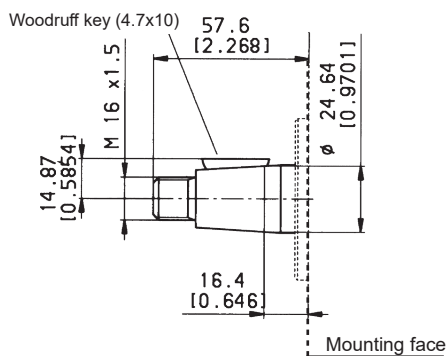


TYPE	INLET				OUTLET			
	Ø D	B	A	d	Ø D	B	A	d
From 55 to 64	32 (1.26")	58.7 (2.31")	30.2 (1.26")	7/16-14 UNC	19 (0.75")	47.6 (1.87")	22.22 (0.87")	3/8-16 UNC
From 75 to 98	38 (1.50")	69.8 (2.75")	35.7 (1.41")		26 (1.02")	52.4 (2.06")	26.2 (1.03")	



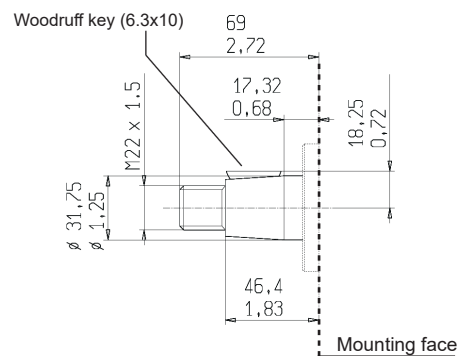
BI-DIRECTIONAL PUMPS Special version available on request.

DRIVE SHAFTS



code 48 Max torque 420 Nm

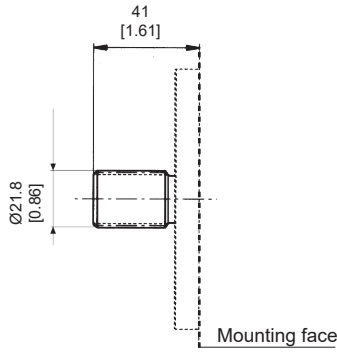
Tapered 1:8



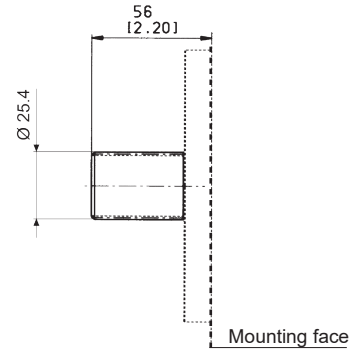
code 49 Max torque 460 Nm

Tapered 1:8 (only for P4)



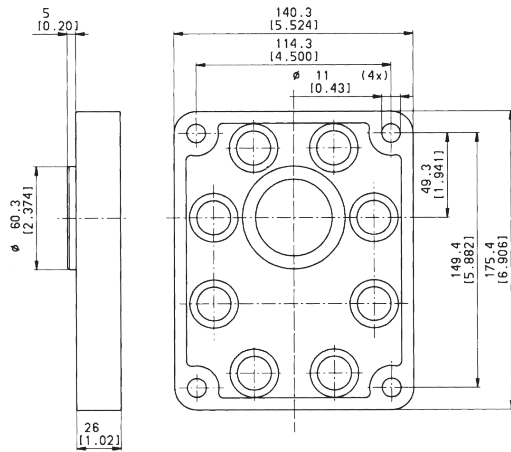


code 55 Max torque 300 Nm
SAE B Splined 13T-16/32DP
Ansi B92 1a 1976

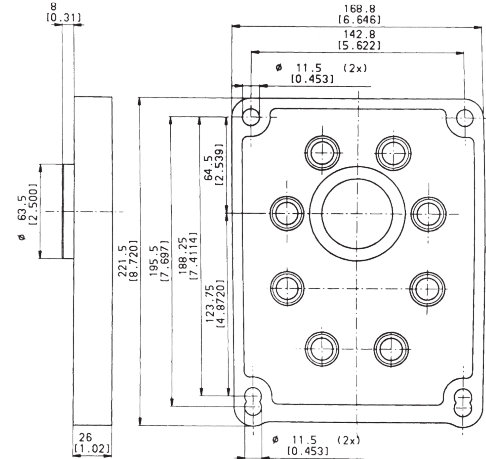


code 56 Max torque 460 Nm
SAE BB Splined 15T-16/32DP Ansi
B92 1a 1976

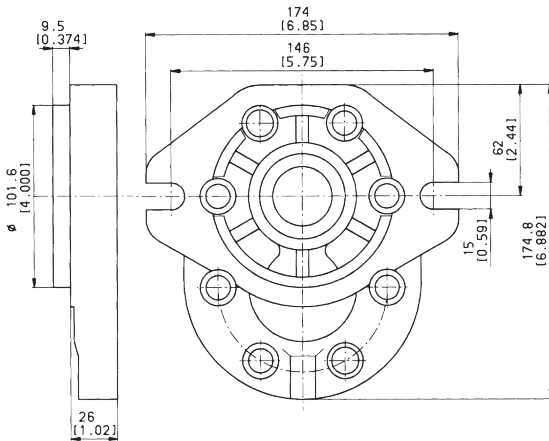
MOUNTING FLANGES



P3 European standard Ø60.3
With shaft code 48



P4 European standard Ø63.5
With shaft code 49



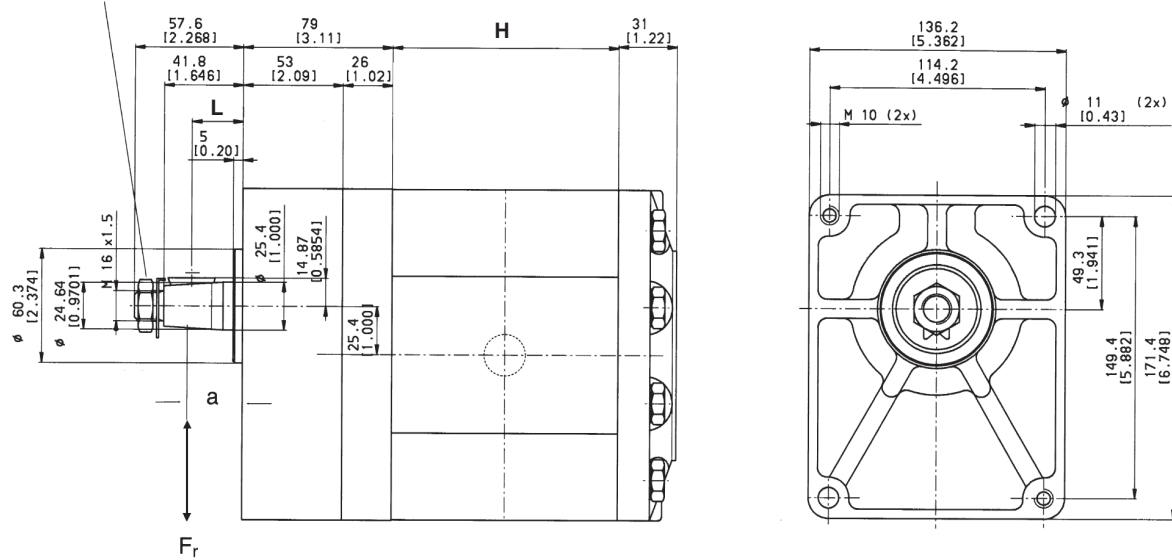
S3 SAE B 2 bolts
With shaft code 55-56

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OUTRIGGER BEARING

Tightening torque 100 Nm



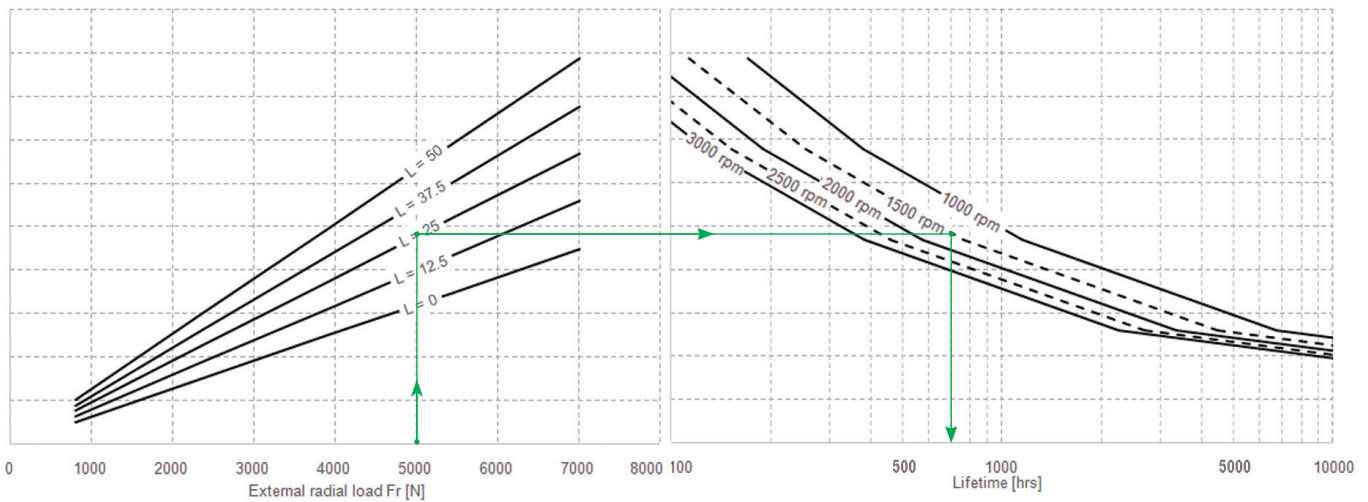
The following diagrams show radial load capability of the bearing.
Calculation according to ISO 281 at 10 cSt.

CP	European standard Ø60.3
With shaft code 48	

TYPE	H
75	184 (7.24")
87	192 (7.55")
98	197 (7.75")

L=Distance between mounting flange and radial force point of application.

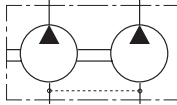
Example:
Fr = 5000 N → Expected life: 700 hrs
L = 25
Speed = 1500 rpm



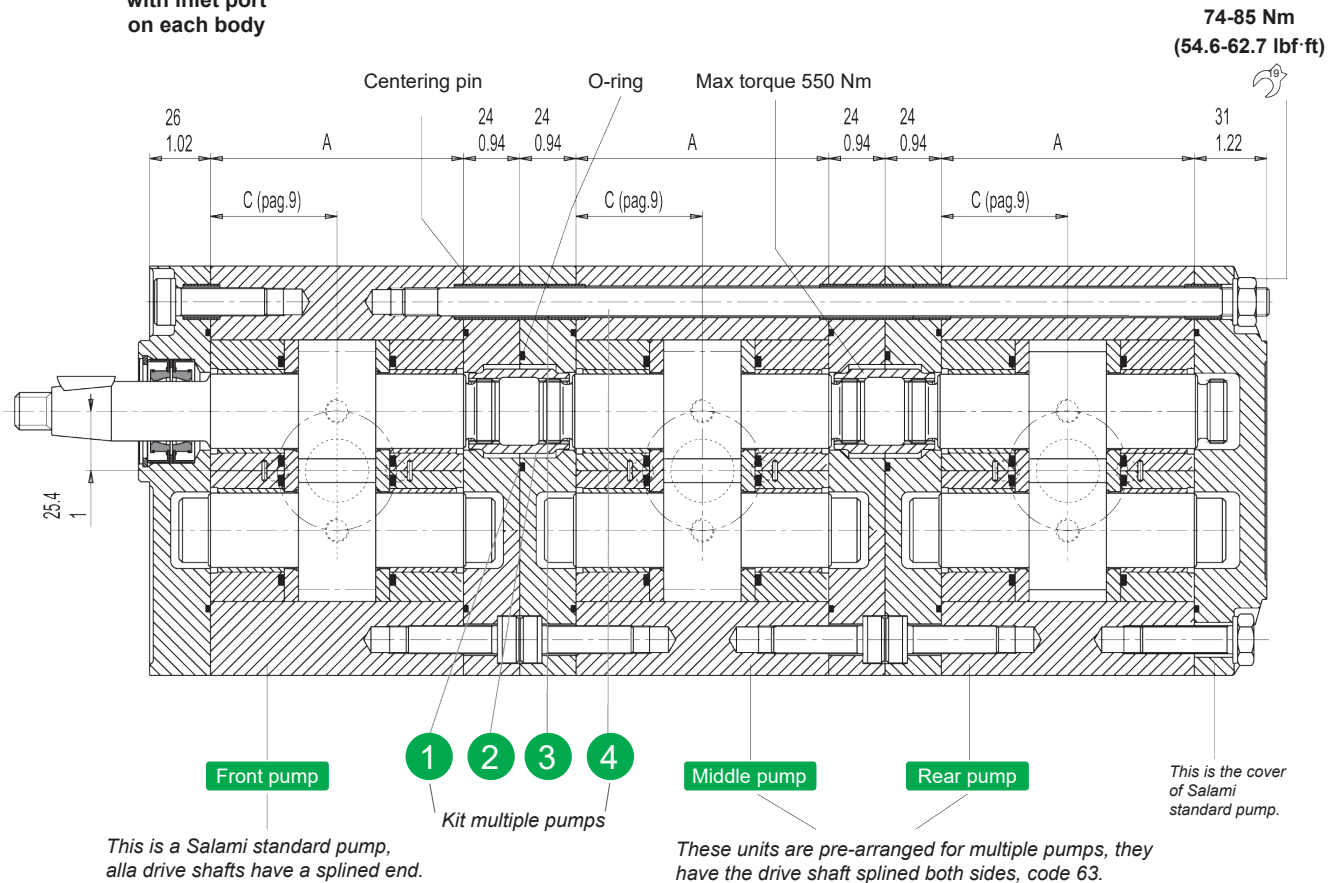
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**MULTIPLE GEAR PUMPS
ASSEMBLING DIMENSIONS**



**MULTIPLE
GEAR PUMPS
with inlet port
on each body**



The 3.5PC pumps can be easily transformed into front pump in the multiple units. All drive shafts are pre-arranged and have a splined end according DIN 5482. The first unit must always be the same size or bigger than following units. The features and performances are the same of the corresponding single units: only in the case of simultaneous operating you have to verify that the inlet torque is lower than the max. transmissible by the drive shaft. In case of common inlet port, to avoid too high value of oil speed, 40l/min is the max. sucked flow for the downstream pump. Finally to assembly the multiple pump you need to order bolts of the right length.

Type		55	64	75	87	98
Dimension A	mm	108	120	127	135	140
	in	4.25	4.72	5.00	5.31	5.51
Dimension C	mm	80	86	89.5	93.5	96
	in	3.14	3.38	3.52	3.68	3.77

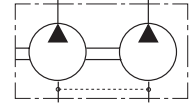
EO:114.0219.02.001M05



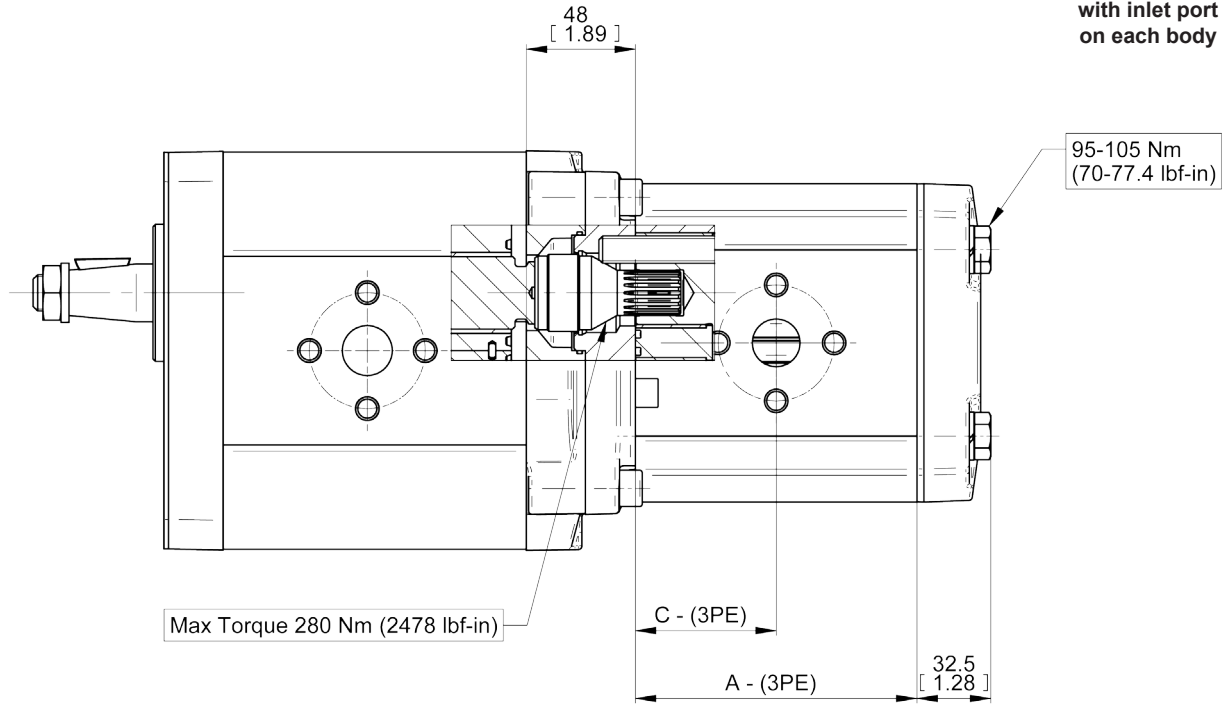
3.5PC COMBINATION WITH 3PE

PD3

Kit multiple pumps
Pre-arranged for 3PE rear



**MULTIPLE
GEAR PUMPS
with inlet port
on each body**



3PE-Type		21*	27	33	38	46	55	65	75*
Dimension A - 3PE	mm	74	79	84	88	104	110	117	124
	in	2.91	3.11	3.31	3.46	4.09	4.33	4.61	4.88
Dimension C - 3PE	mm	37	39.5	42	44	52	55	58.5	62
	in	1.46	1.56	1.65	1.73	2.05	2.17	2.30	2.44

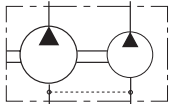
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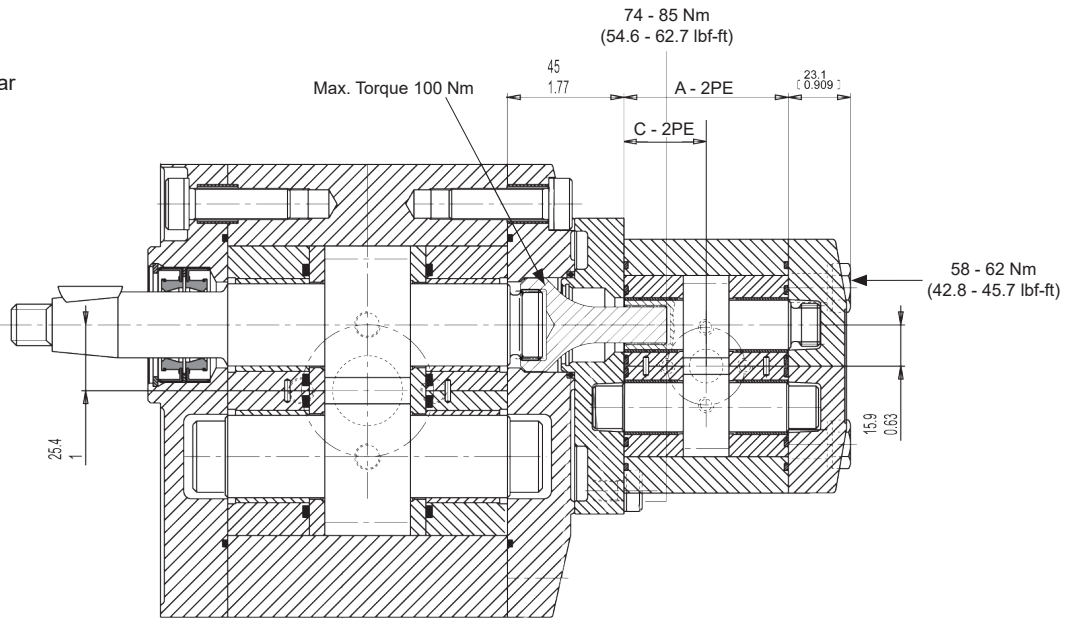
3.5PC COMBINATION WITH 2PE

PD2

Kit multiple pumps
Pre-arranged for 2PE rear



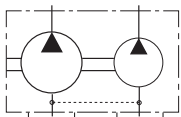
MULTIPLE GEAR PUMPS with inlet port on each body



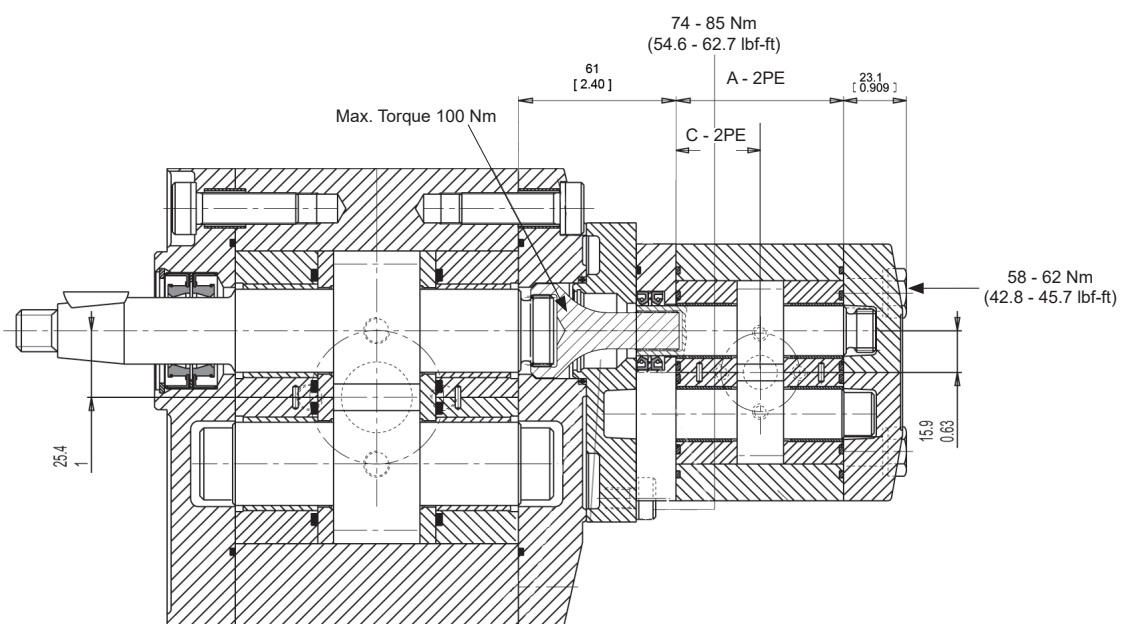
2PE-Type		3.2*	3.9*	4.5	6.5	8.3	10.5	11.3	12.5	13.8	16	19	22.5	26
Dimension A - 2PE	mm in		47.1 1.83		49.95 1.97	52.8 2.07	56.3 2.22	59.7 2.35	63.5 2.5	67.5 2.65	75.6 2.97	81 3.19	86.8 3.42	
Dimension C - 2PE	mm in		23.55 0.93		25 0.98	26.4 1.04	28.15 1.11	29.75 1.17	31.75 1.25	33.75 1.33	37.80 1.49	40.5 1.59	43.4 1.71	

*Available only as rear pump

code AS



MULTIPLE GEAR PUMPS with separated stages



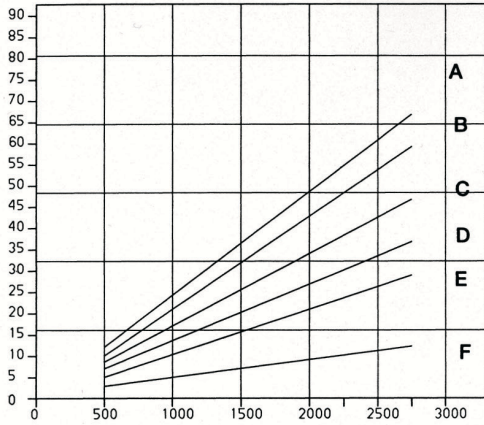
EO:114.0219.02.001M05



PERFORMANCE CURVES

Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

Input power (kW)



3.5PC - 55

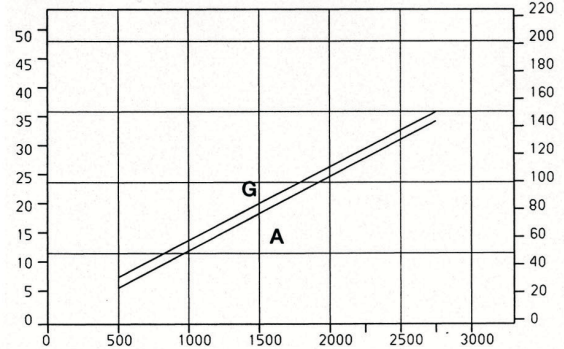
- A=250bar - (3625 psi)
- A1=230bar - (3335 psi)
- B=220bar - (3190psi)
- C=175bar - (2538 psi)
- D=140bar - (2030 psi)
- E=105bar - (1522 psi)
- F=50bar - (725 psi)
- G=7bar - (101 psi)

Shaft speed r.p.m

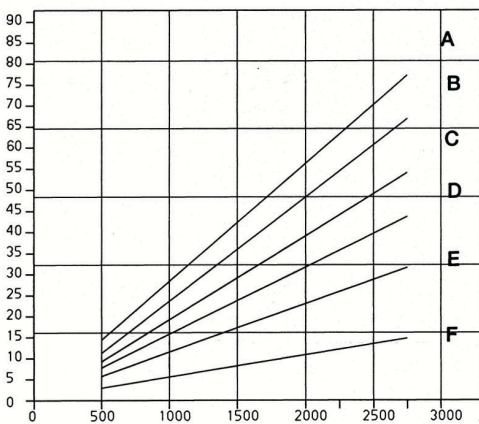
Flow

U.S. g p m

l/min



Input power (kW)

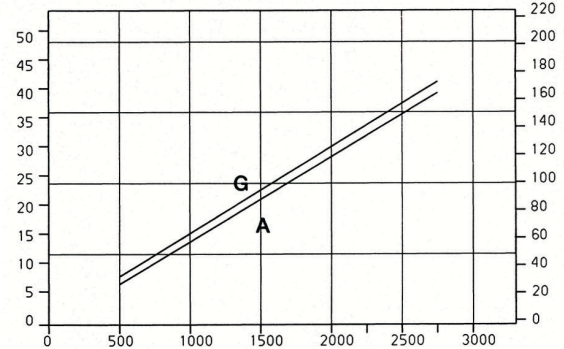


3.5PC - 64

Flow

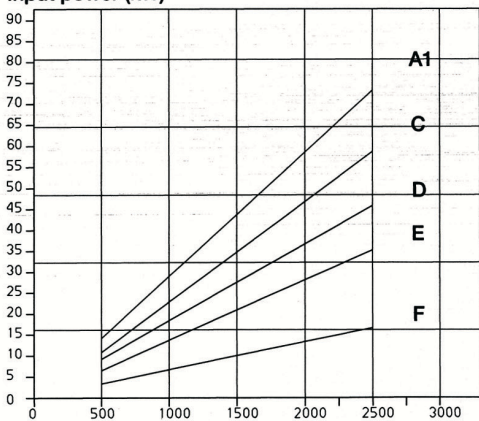
U.S. g p m

l/min



Shaft speed r.p.m

Input power (kW)

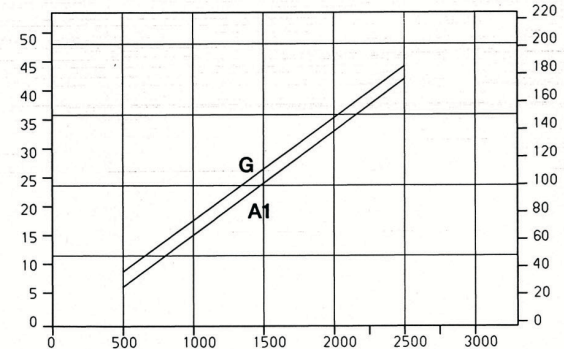


3.5PC - 75

Flow

U.S. g p m

l/min



Shaft speed r.p.m

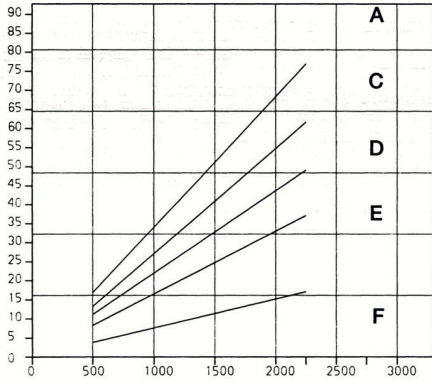
E0.114.0219.02.00IM05



PERFORMANCE CURVES

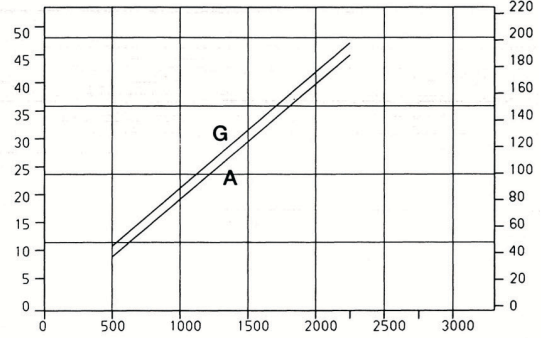
Performance curves carried out with oil viscosity at 21 cSt and oil temperature at 50°C

Input power (kW)



A=250bar - (3625 psi)
A1=230bar - (3335 psi)
B=220bar - (3190psi)
C=175bar - (2538 psi)
D=140bar - (2030 psi)
E=105bar - (1522 psi)
F=50bar - (725 psi)
G=7bar - (101 psi)

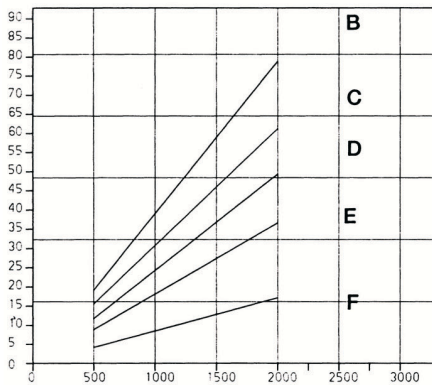
Flow
U.S. g p m



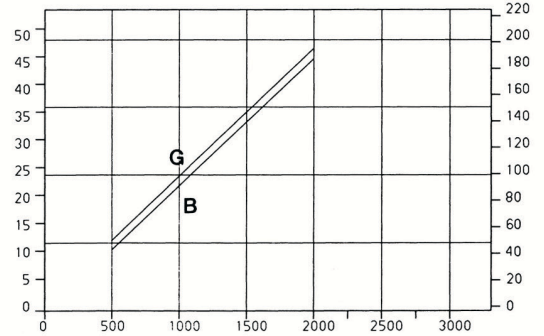
Shaft speed r.p.m

3.5PC - 87

Input power (kW)



Flow
U.S. g p m



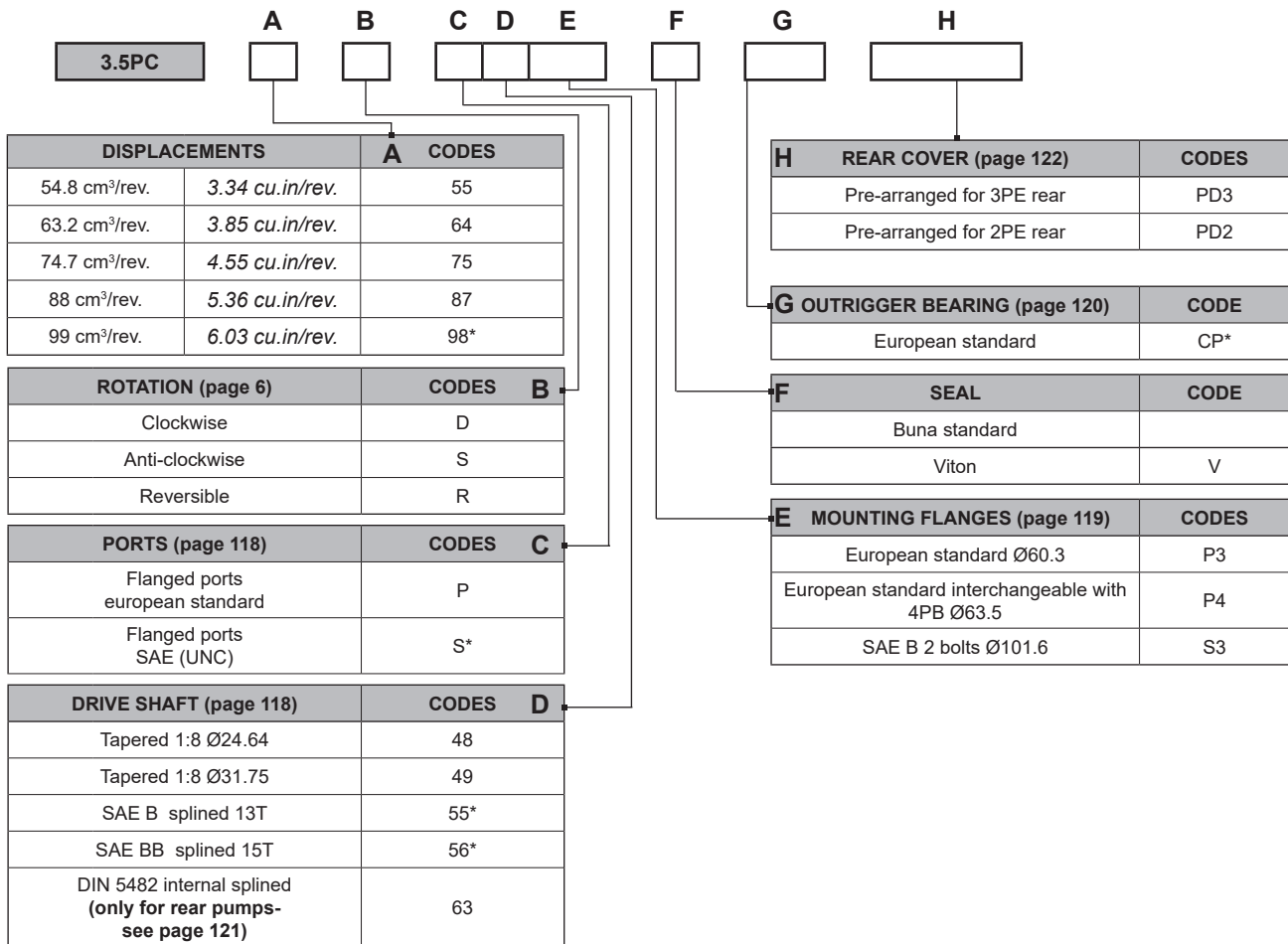
Shaft speed r.p.m

3.5PC - 98

EO:114.0219.02.001M05



SINGLE PUMPS

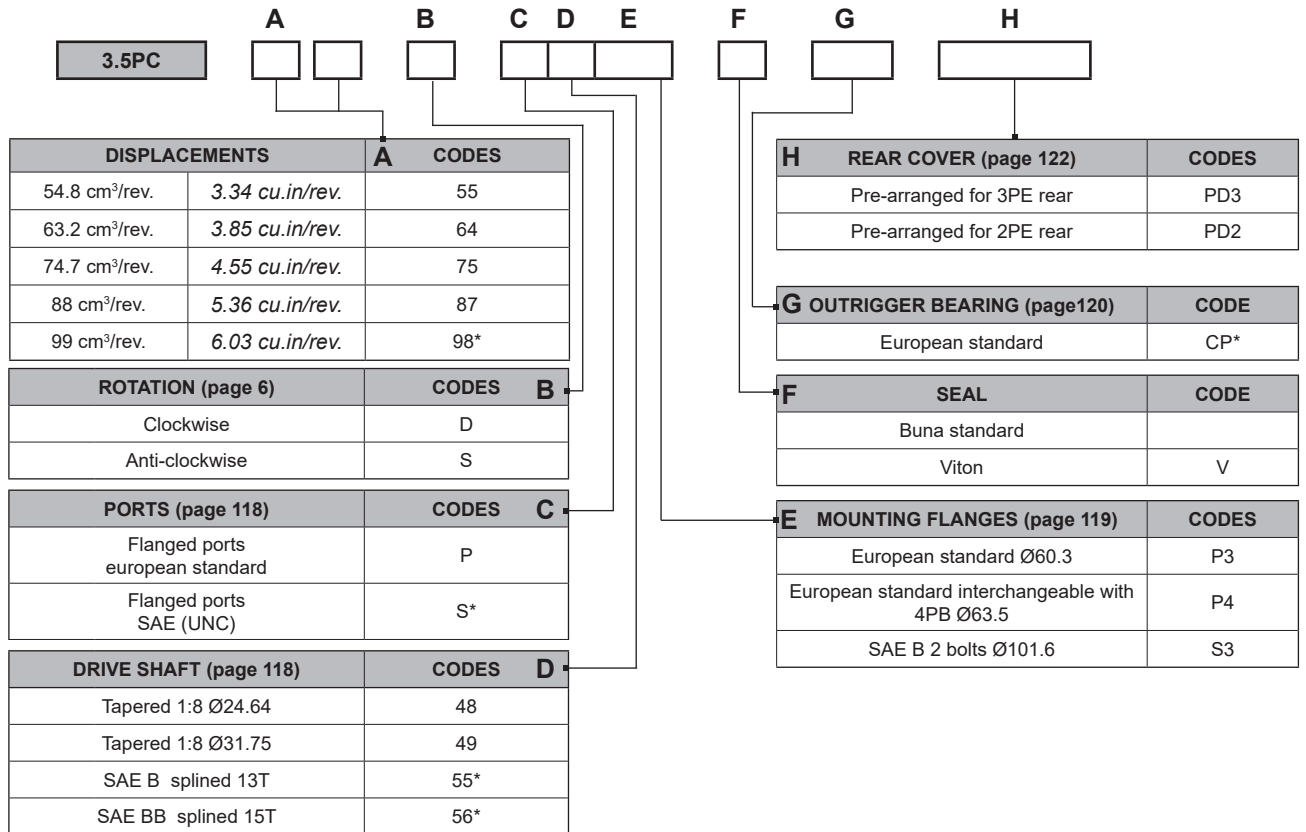


*Available for quantity, please contact our sales department.

Order example: 3.5PC 64D, ports european standard (P), drive shaft (48), mounting flange (P3)
3.5PC64D-P48P3



MULTIPLE PUMPS



*Available for quantity, please contact our sales department.

Order example: 3.5PC 75/64D, ports SAE (S), drive shaft (56), mounting flange (S3):

3.5PC75/64D-S56S3

Order example: 3.5PC 75, 3PB 38S ports european standard (P), drive shaft (48), mounting flange (P3):

3.5PC75/3PB38S-P48P3

Order example: 3.5PC 64/2PE 16D, ports european standard (P), drive shaft (49), mounting flange (P4) - separated stages (AS):

3.5PC64/2PE16D-P49P4-AS



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