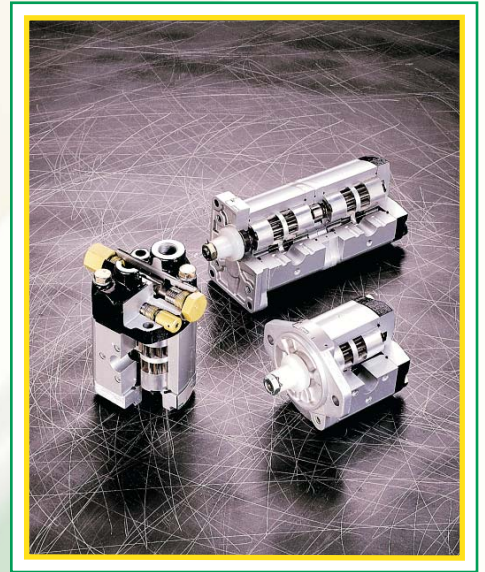




## PRODUCT CARD



## GEAR PUMPS "Z" SERIES

E0.11.0602.02.00



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The data on this catalogue refer to the standard product.

The policy of Salami consist of a continuous improvement of its products.It reserves the right to change the specifications of the different products whenever necessary and without giving any information.If any doubts, please get in touch with our sales departement.

### GENERAL

ZENIT gear pumps are low noise units with double gear.

They are available at the moment in one serie, giving options of displacements from  $5 \text{ cm}^3/\text{rev}$  to  $22.5 \text{ cm}^3/\text{rev}$  (from  $0.30 \text{ cu.in./rev}$  to  $1.37 \text{ cu.in./rev}$ ).

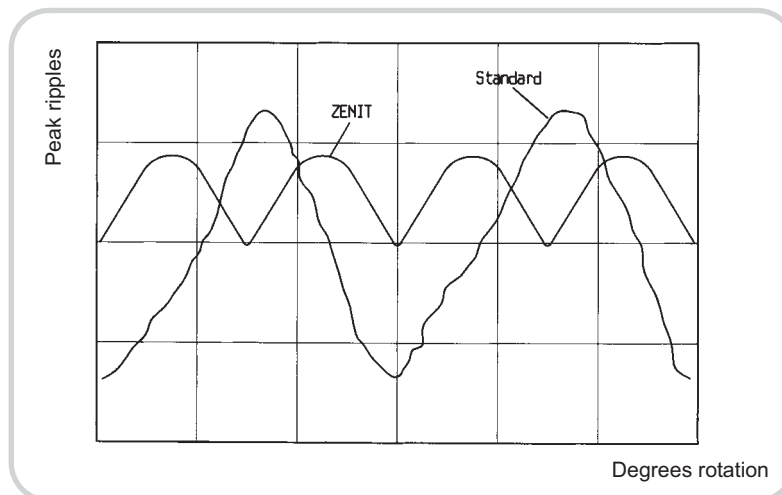
All pumps are available also as multiple units.

With all sizes of pumps there are options of shafts, flanges and ports as per European, German and SAE standards.

ZENIT gear pumps offer:

- Double gear construction to reduce the instantaneous flow amplitude, that is the noise level generetor.

### FLOW MEASUREMENT



### TECHNICAL FEATURES

- High volumetric efficiency by innovative design and accurate control of machining tolerances
  - Axial compensation is achieved by the use of floating bushes that allow high volumetric efficiency throughout the pressure range
  - DU bearings ensure high pressure capability
  - 12 teeth integral gear and shaft
  - Extruded aluminium body
  - Die cast aluminium end cover and flange
  - Double shaft seals
  - Nitrile seals as standard and viton seals in high temperature applications
- All pumps are tested after assembly and run in to ensure the high standard require by SALAMI engineers.

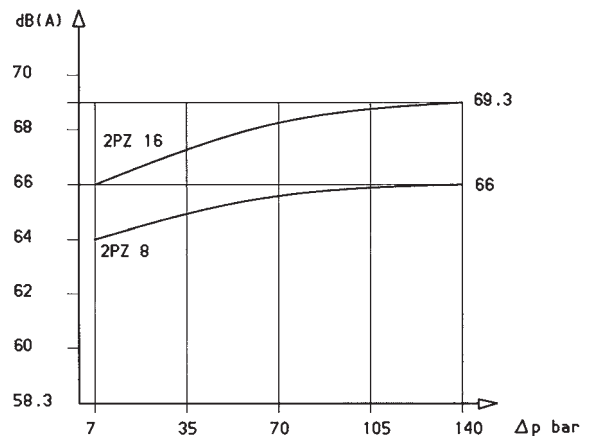
**NOISE LEVEL**

Noise level reduction up to 2.5 dB(A) at low pressure and up to 3.5 dB(A) at high pressure, compared with the standard similar pumps.  
The noise reduction is improved when a flexible couple is used.  
ZENIT pump can improve noise reduction by 1 - 2 dB(A) in the hydraulic circuit.

**Test example:**

- Pumps displacement                      0.50 cu.in./rev  
    1.01 cu.in./rev
- Rotation speed                              1500 rpm
- Room noise                                    58 dB (A)
- Measurement distance                    1m

**Noise measurement**



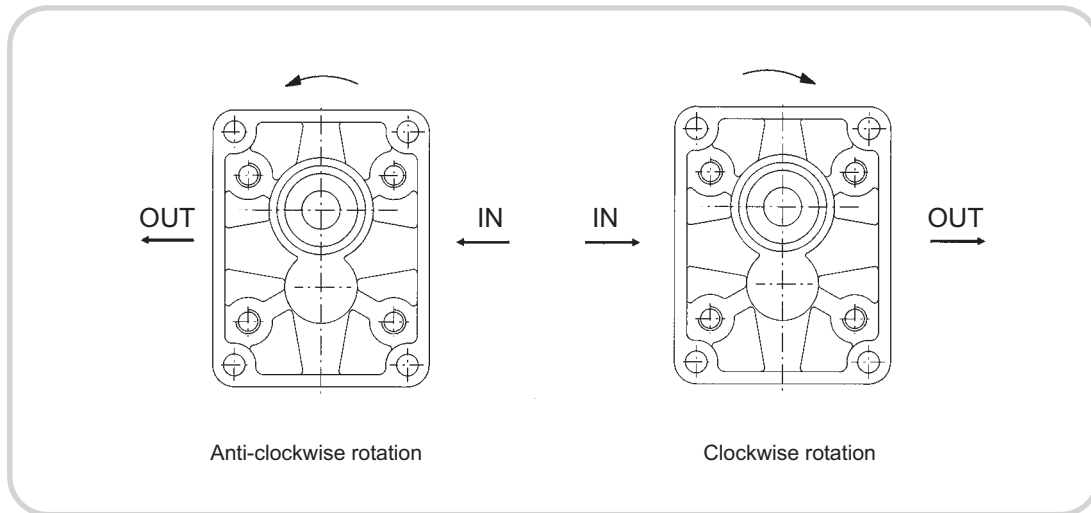
**WORKING CONDITIONS**

- Inlet pressure pump ..... 0,7 to 2,5 bar (abs)  
    10 to 35 psi (abs)
- Return line pressure range motors max continuos ..... 2,5 bar - 36 psi
- Return line pressure range motors max interm. 6 bar for ..... 15 sec - 85 psi
- Return line pressure range motors max ..... 15 bar(peak) - 215 psi
- Minimum viscosity ..... 12 mm<sup>2</sup> / sec
- Max starting viscosity ..... 800 mm<sup>2</sup> / sec
- Viscosity from ..... 17 - 65 mm<sup>2</sup> / sec
- Oil temperature ..... -15 to +85 °C
- Hydraulic fluid ..... mineral oil

**FIRE RESISTENT FLUID**

Type	Description	Max pressure	Max speed (rpm)	Temperature
HFB	Water in oil emulsion with 40% water	130 bar	2500	+1°C +65°C
HFC	Water glycol	180 bar	1500	-20°C +65°C
HFD	Phosphate esters		1750	-10°C +80°C

### PUMP ROTATION DIRECTION VIEWED AT THE DRIVE SHAFT



### HYDRAULIC LINE

To ensure favorable suction conditions it is important to keep pressure drop in inlet line to a minimum (see WORKING CONDITION).

To calculate hydraulic pipe size for a machine, the designer can use as an approximate guide the following figures:

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

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

The lowest speed in pipes is recommended when the temperature difference 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 two different reservoirs it is necessary to specify "AS" version.** (Available for series quantity)

**FILTRATION INDEX RECOMMENDED**

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

**COMMON FORMULAS**

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

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

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

$\Delta p$  = Working pressure (bar)

$q$  = Displacement ( $\text{cm}^3/\text{rev}$ )

$n$  = Speed ( $\text{min}^{-1}$ )

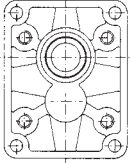
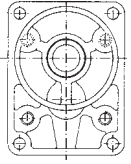
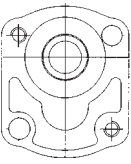
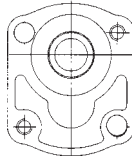
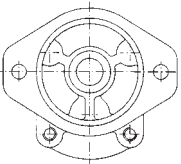
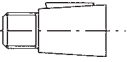
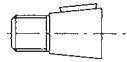
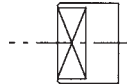
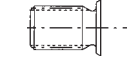
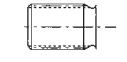
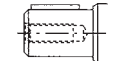

$\eta_m$  = Mechanical eff. (0.92)

$\eta_v$  = Volumetric eff. (0.95)

# Quick reference

## GEAR PUMPS "Z" SERIES

### COMBINATION WITH TYPES OF FLANGES AND DRIVES SHAFTS AVAILABLE

2PZ	 P1	 B1	 B2	 B3	 S2
 28	28 P1				
 25		28 B1			
 03			03 B2	03 B3	
 52					52 S2
 54					54 S2
 82					82 S2
 85					85 S2



Available for series quantities

# 2PZ / Group 2

Displacements up to 1.37 cu.in./rev  
Pressure up to 3950 psi

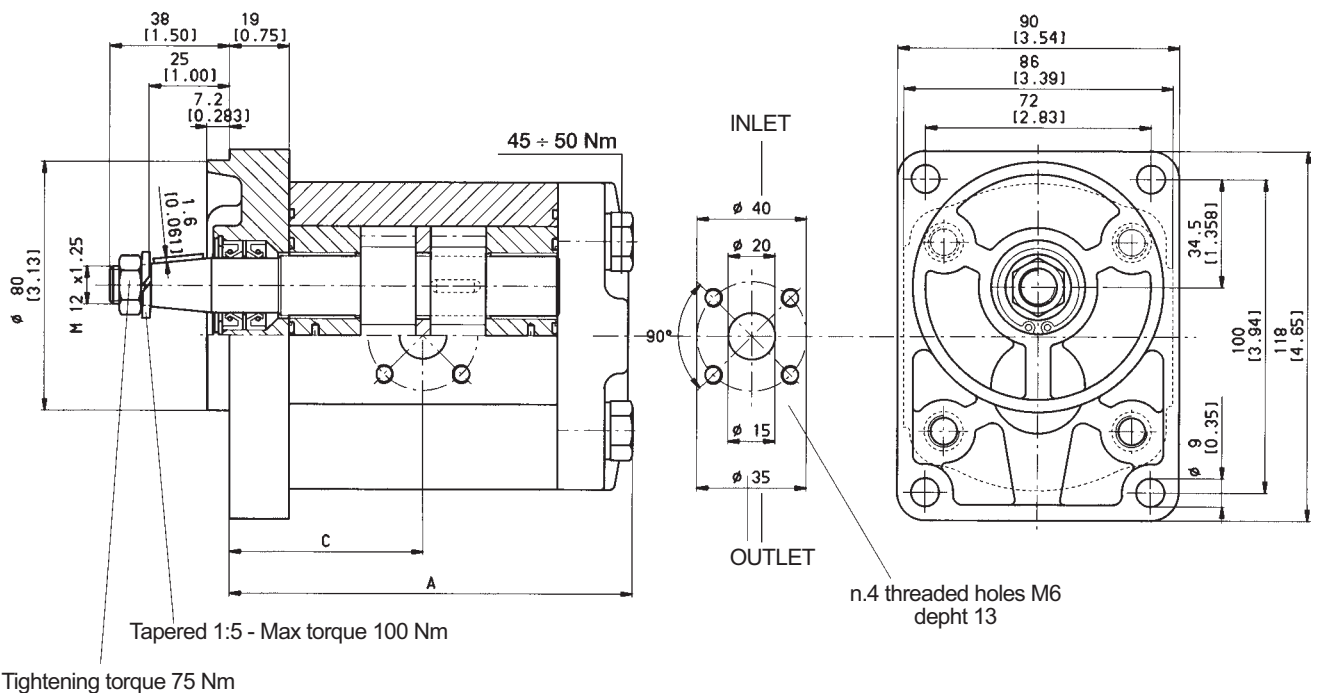
Displacements up to 22,5 cm<sup>3</sup>/rev  
Pressure up to 275 bar



Gear pumps  
2PZ series

## ASSEMBLING DIMENSIONS AND VALUES OF PRESSURE AND SPEED

Type		5	8	11	14	16	19	22,5*
Displacement	cm <sup>3</sup> /rev	5	8	10.9	13.9	16	19	22.5
	cu.in./rev	0.30	0.49	0.66	0.85	0.98	1.16	1.37
Dimension A	mm	90.1	95.8	106.5	110	117	123.4	128.8
	in	3.51	3.73	4.15	4.29	4.56	4.81	5.02
Dimension C	mm	42.5		50.7	52.5	56	59.2	61.9
	in	1.65		1.97	2.04	2.18	2.30	2.41
Working pressure	p1	bar	220			210	190	180
		psi	3140			3000	2715	2600
Intermittent pressure	p2	bar	250			230	210	200
		psi	3600			3300	3000	2900
Peak pressure	p3	bar	275			250	230	220
		psi	3950			3600	3300	3140
Max speed at	p2	4000		3500		3000		2750
Min speed at	p1	600		500		400		
Weight	rpm	2.1	2.25	2.5	2.65	2.8	2.95	3.1
	lbs	4.6	4.9	5.5	5.8	6.1	6.4	6.8

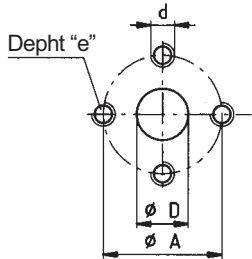


The pump shown is : 2PZ 14 D - B25B1



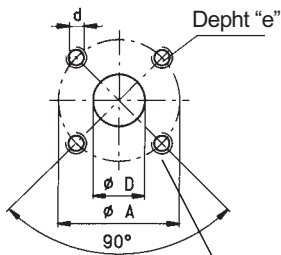
# 2PZ / Group 2

## FLANGED PORTS



TYPE	INLET				OUTLET			
	ØD	ØA	d	e	ØD	ØA	d	e
5 and 8	13 (0.51")	30 (1.19")	M6	13 (0.51")	13 (0.51")	30 (1.19")	M6	13 (0.51")
From 11 to 22,5	20 (0.78")	40 (1.56")	M8					

code P

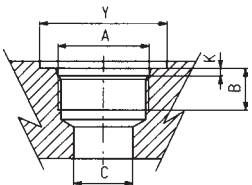


TYPE	INLET				OUTLET			
	ØD	ØA	d	e	ØD	ØA	d	e
From 5 to 22,5	20 (0.78")	40 (1.56")	M6	13 (0.51")	15 (0.59")	35 (1.38")	M6	13 (0.51")

M6 tightening torque 10 Nm - M8 tightening torque 22 Nm

code B

## THREADED PORTS



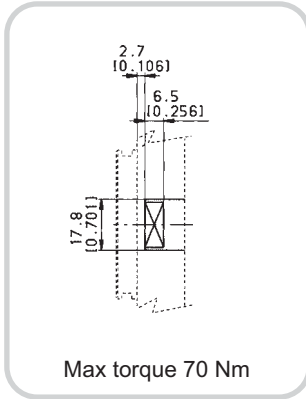
TYPE	INLET					OUTLET				
	A	B	C	Y	K	A	B	C	Y	K
From 4,5 to 26	1-1/16 UNF (SAE 12)	16 (0.62")	20 (0.78")	41 (1.59")	3,3 (0.12")	7-8/14 UNF (SAE 10)	14 (0.54")	13 (0.50")	34 (1.32")	2,5 (0.09")

code R

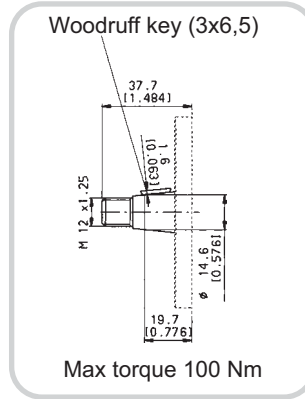
SAE threaded (ODT).

Note: for unidirectional motor inlet/outlet ports are reversed

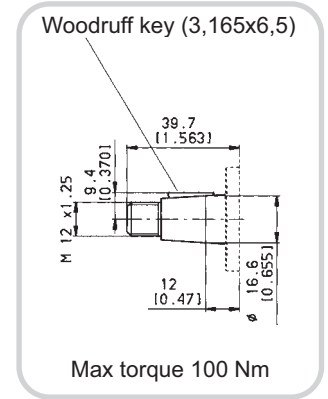
## DRIVE SHAFTS



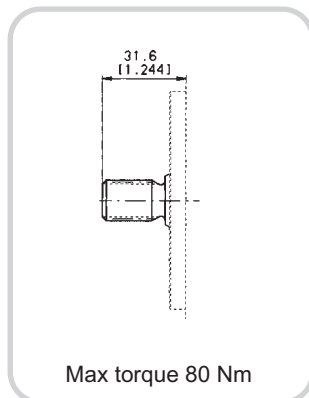
**code 03** Tang drive for electric motors



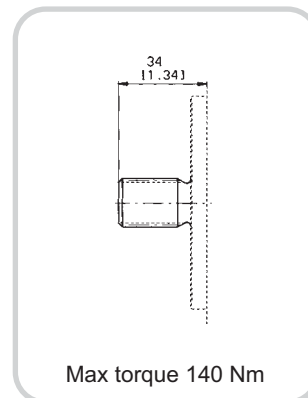
**code 25** Tapered 1:5



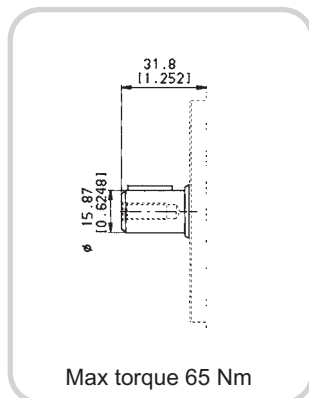
**code 28** Tapered 1:8



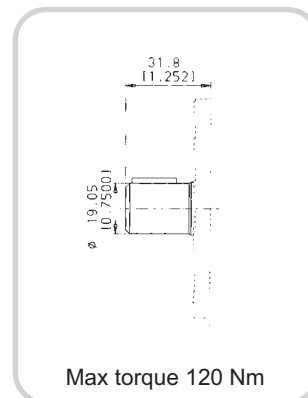
**code 52** Available for series quantities



**code 54** For pumps type : 14, 16, 19, 22,5 available for series quantities



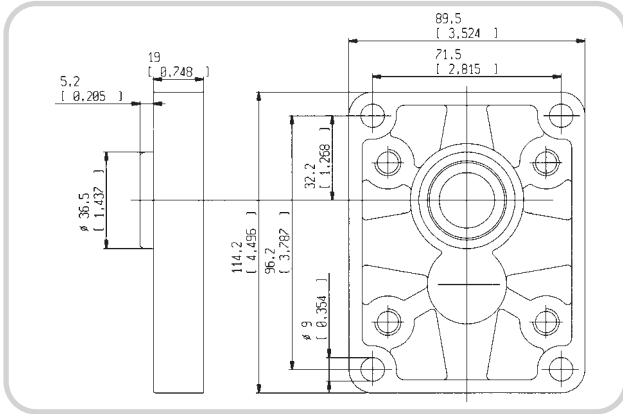
**code 82** For pumps type : 11,14, 16,19, available for series quantities



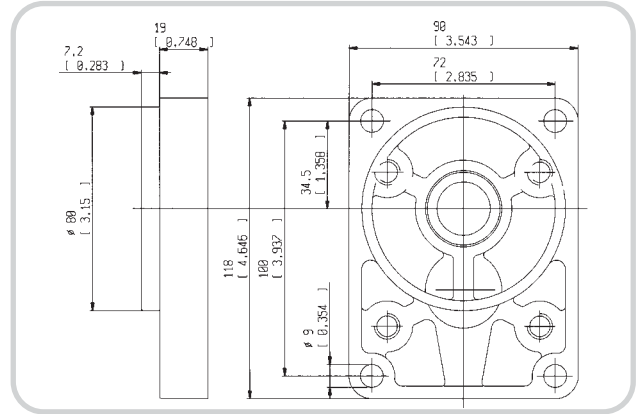
**code 85** For pumps type : 16, 19, 22,5 available for series quantities

# 2PZ / Group 2

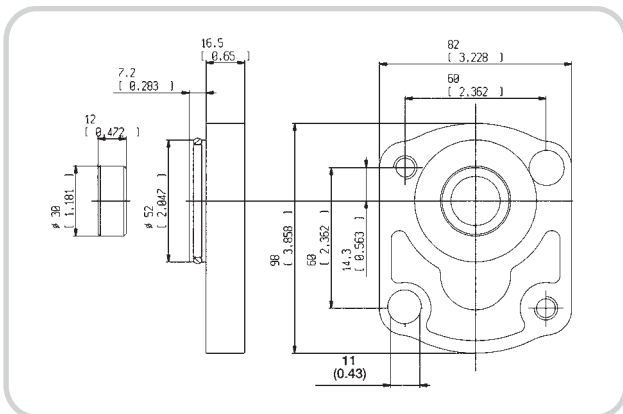
## MOUNTING FLANGES



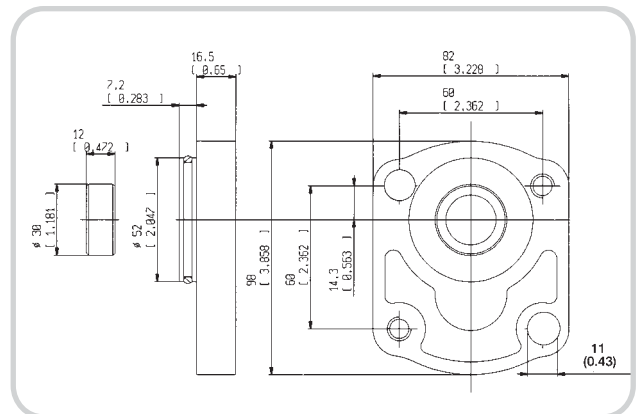
**code P1** With shaft code 28



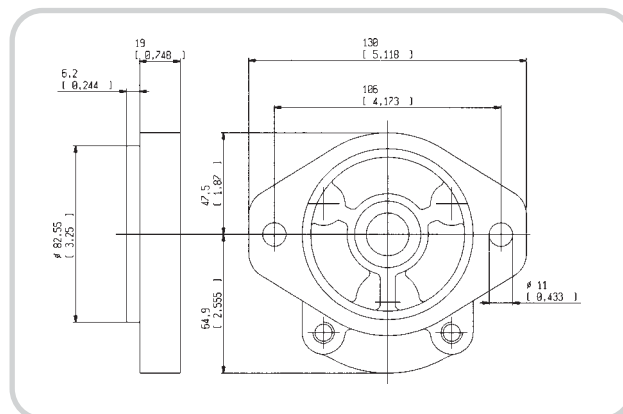
**code B1** With shaft code 25



**code B2** With shaft code 03

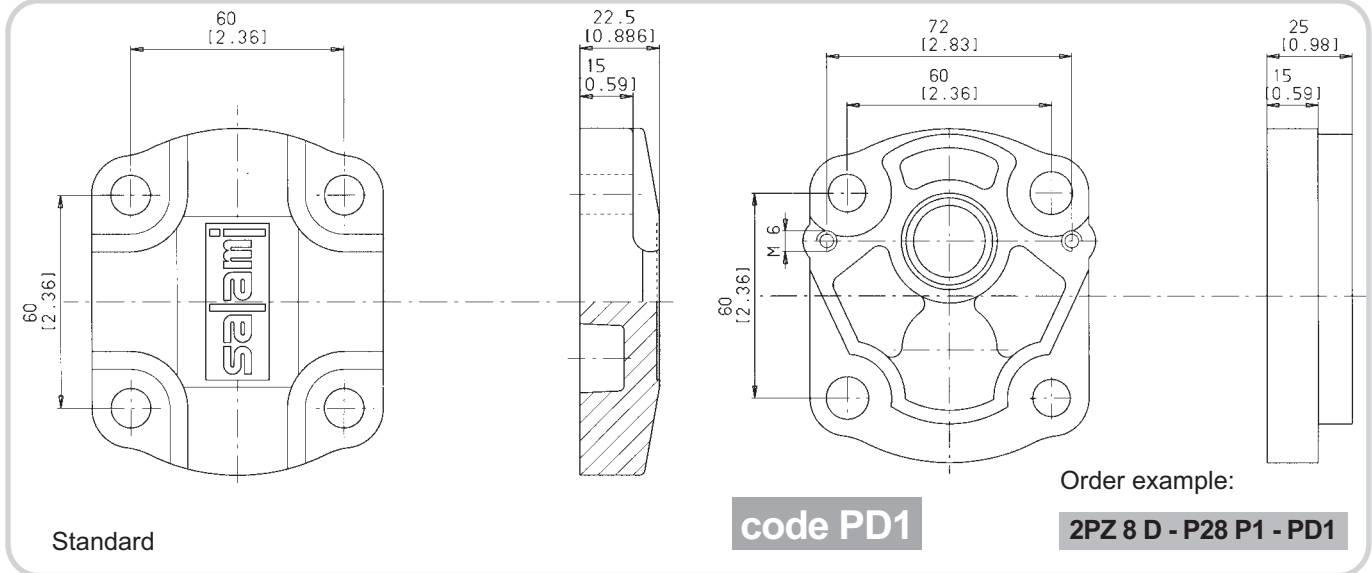


**code B3** With shaft code 03

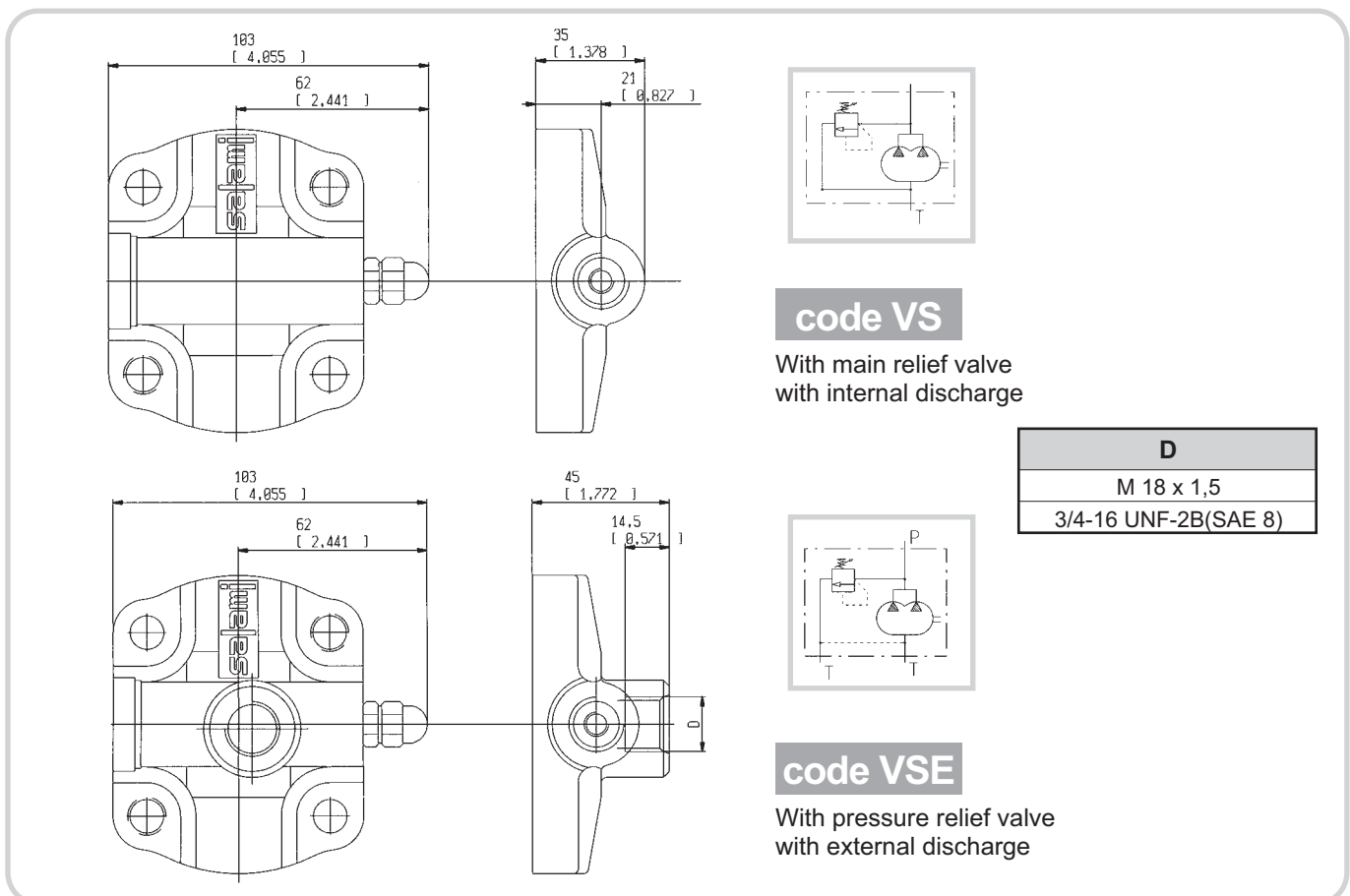


**code S2** With shaft code: 52,54,82,85

## REAR COVERS



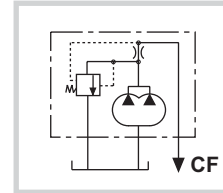
## REAR COVERS WITH MAIN RELIEF VALVES



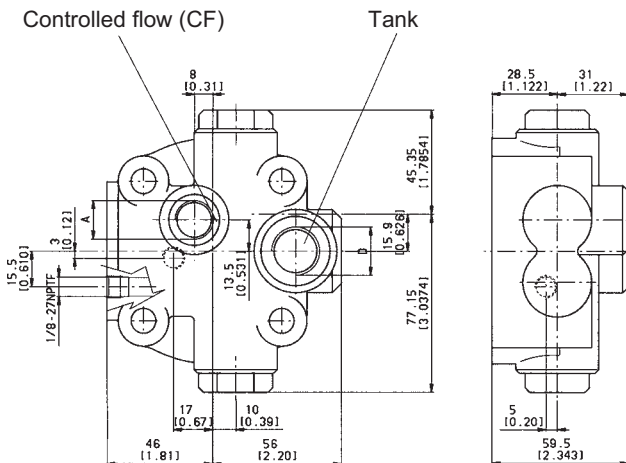
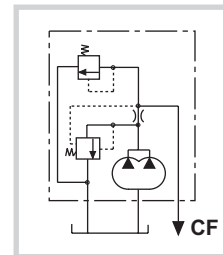
# 2PZ / Group 2

## REAR COVER WITH FLOW CONTROL VALVES

**code VR** Flow regulating valve with excess flow to tank



**code VRS** Like VR with relief valve

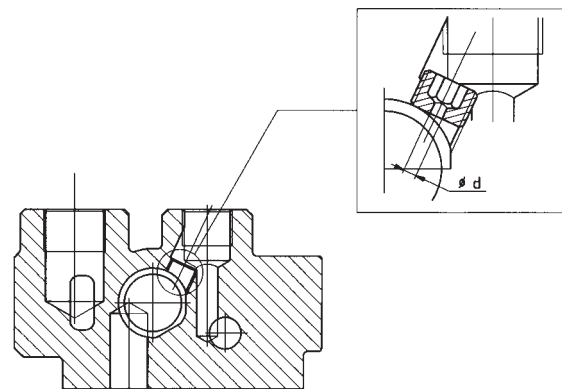


A	D
G 3/8	G 1/2
9/16-18 UNF-2B (SAE 6)	3/4-16 UNF-2B (SAE 8)

### FLOW CONTROL VALVE (VR - VRS)

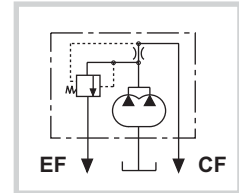
3-way flow control valve housed in a special cast iron cover which ensures constant flow regardless pump speed and system pressure variations. It can also be supplied with adjustable pressure relief valve whose relieved flow goes into excess pump flow line. In this way the max fluid temperature is lower than that obtained if the excess flow returned directly to pump inlet. The flow regulated is determined by the diameter of hole on the threaded dowel (see table).

CALIBRATED ORIFICE Ø d(mm)	FLOW RATE l / min ± 10%
1,5	2,5
2	4
2,4	6
2,8	8
3,1	10
3,5	12,5
4	16
4,4	20
4,9	25

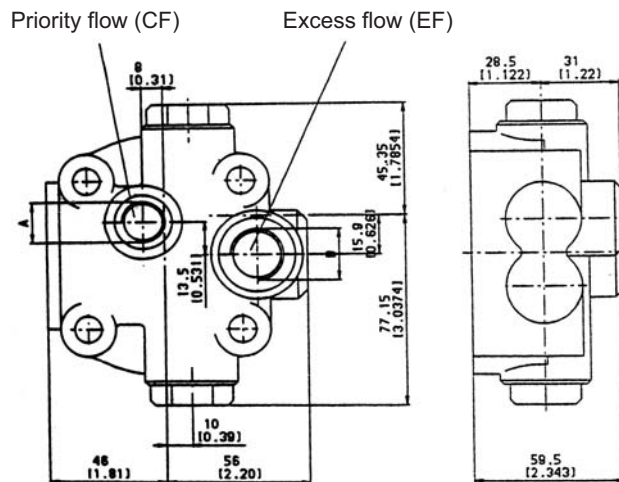
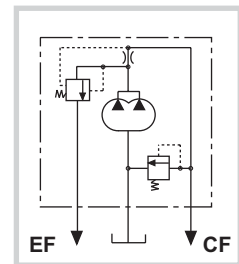


## REAR COVER WITH PRIORITY FLOW DIVIDER VALVES

**code VP** Priority flow divider excess flow to second actuator



**code VPS** Like VP with relief valve



A	D
G 3/8	G 1/2
9/16-18 UNF-2B (SAE 6)	3/4-16 UNF-2B (SAE 8)

### PRIORITY FLOW DIVIDERS (VP - VPS)

These are basically the same as VR valves differing only because the two flows can be loaded at the same time for supplying two separate circuits defined priority flow remains constant regardless of pump speed and system pressure variations. The second defined excess flow is directly proportional to pump speed. Priority flow is determined by diameter of hole on threaded dowel (see table). The max pressure of the priority circuit can be limited by valve which relieves into pump suction.

CALIBRATED ORIFICE Ø d(mm)	FLOW RATE l / min ± 10%
1,5	2,5
2	4
2,4	6
2,8	8
3,1	10
3,5	12,5
4	16
4,4	20
4,9	25

# 2PZ / Group 2

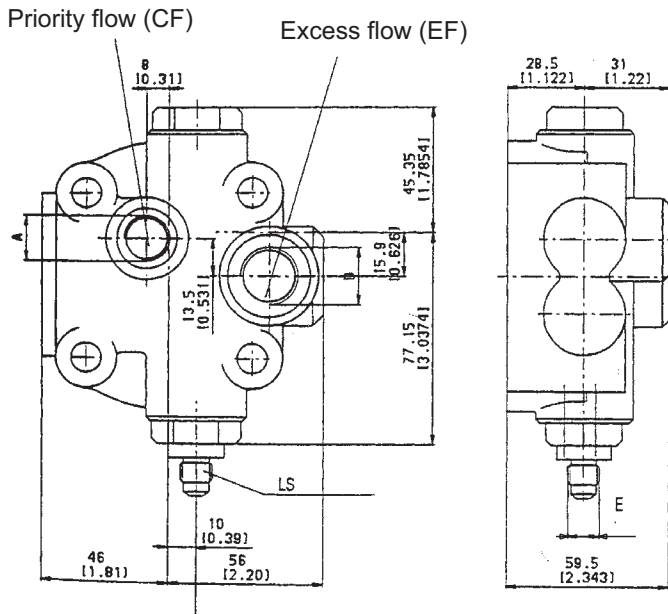
## REAR COVER WITH LOAD-SENSING PRIORITY VALVES

**code VPL**

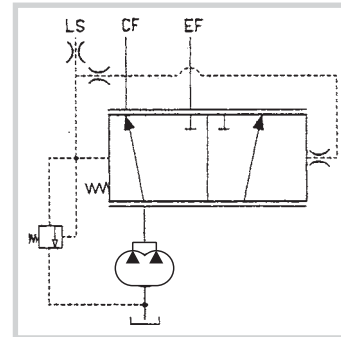
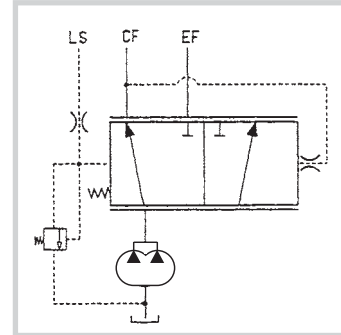
Load sensing priority valve with main relief valve

**code VPD**

Load sensing priority valve with dynamic signal and main relief valve

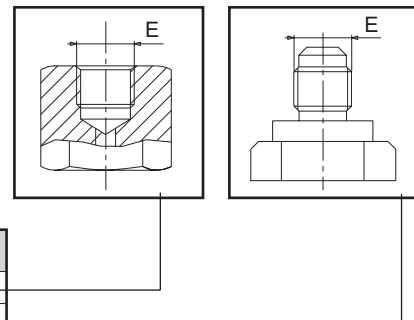


Minimum load sensing signal (LS) = 4 bar (28 psi)



LS = Signal load sensing  
CF = Priority flow  
EF = Excess flow

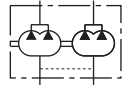
PRIORITY FLOW RATE	
l / min ± 10%	gpm ± 10%
8	2.10
10.5	2.61
12.5	3.78
16	4.17
20	5.22



A	D	E
G 3/8	G 1/2	G 1/4
9/16-18 UNF-2B (SAE 6)	3/4-16 UNF-2B (SAE 8)	7/16 UNF

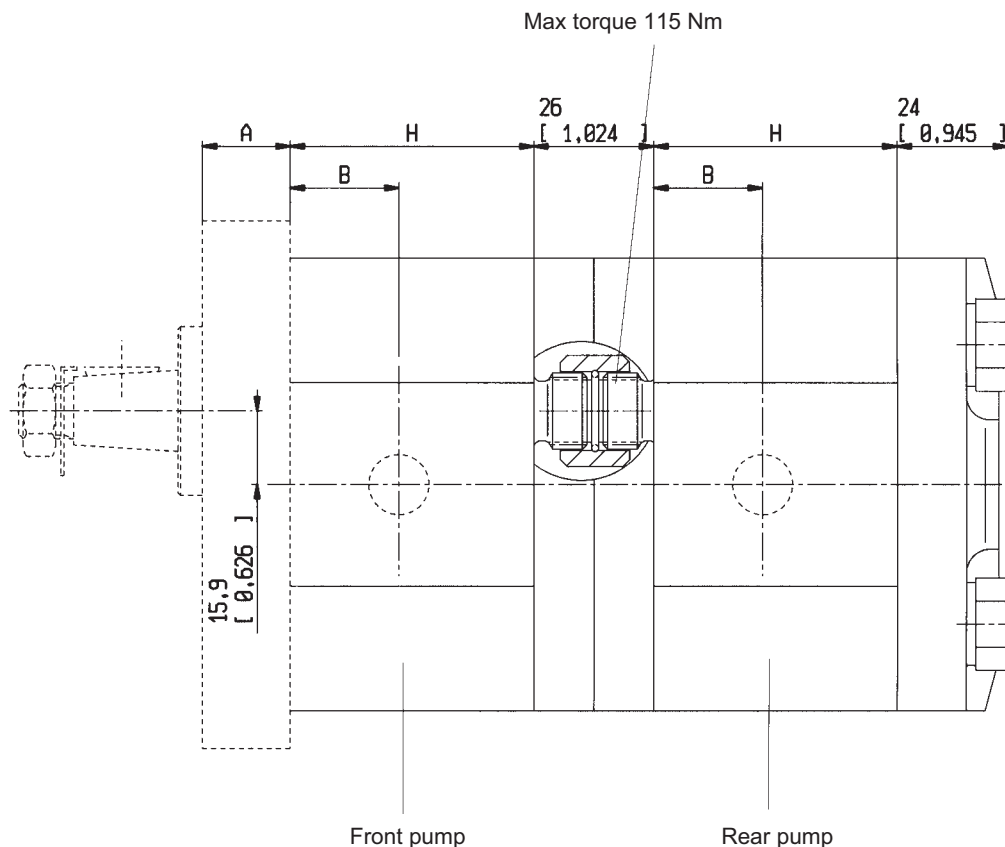
Side ports also available. Please specify with note.

## MULTIPLE GEAR PUMPS



Multiple gear pumps

TYPE		5	8	11	14	16	19	22,5*
Dimension A (flanges B2 - B3)	mm in				16,5 0,65			
Dimension A (flanges P1 - B1)	mm in				19 0,75			
Dimension B	mm in	23,5 0,92		31,7 1,25	33,5 1,32	37 1,46	40,2 1,58	42,9 1,69
Dimension H	mm in	47,1 1,85	52,8 2,10	63,5 2,50	67 2,64	74 2,91	80,4 3,16	85,8 3,38

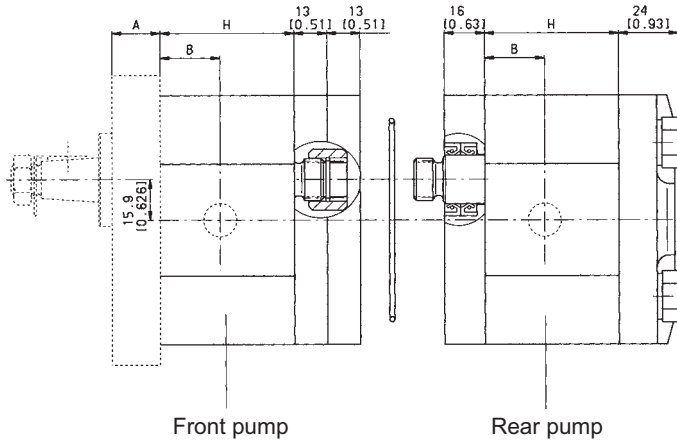


The **2PZ** pumps can be easily transformed into multiple units. All drive shafts are pre-arranged and have a splined end DIN 5482. The first unit must always be the same size or bigger than following units. The features and performances are the same of the corresponding single units: only in the case of simultaneous operating you have to verify that the inlet torque is lower than the max. transmissible by the drive shaft.

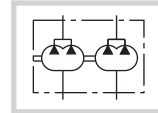


# 2PZ / Group 2

## MULTIPLE PUMPS WITH SEPARATED STAGES



Available for series quantities



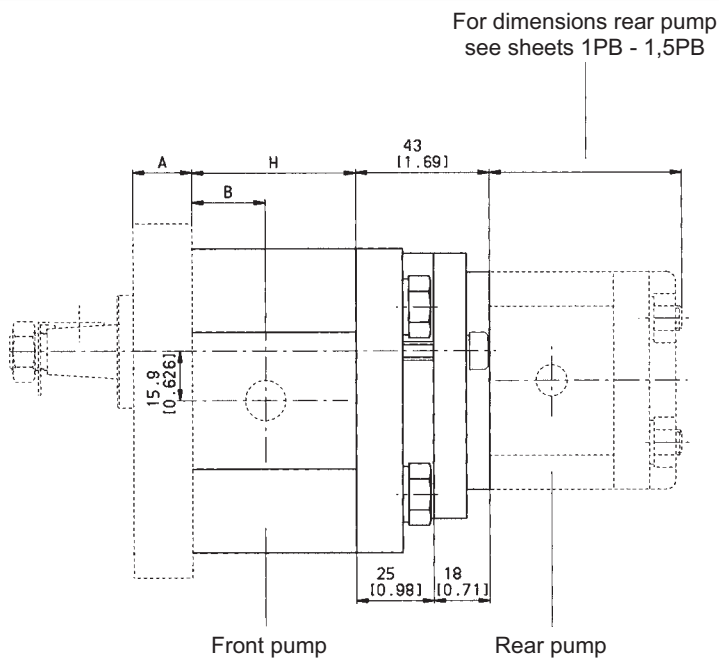
code AS

Order example:

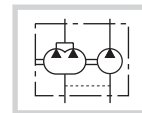
**2PZ 11 / 8 D-P28P1-AS**

For dimension (A B H) see page 9

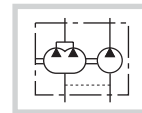
## 2PZ COMBINATION WITH 1PB - 1.5 PB PUMP



For dimensions rear pump  
see sheets 1PB - 1,5PB



2PZ/1pB



2PZ/1,5pB

Order examples:

**2PZ 8 / 1pB 3D - P28 P1**

**2PZ 11 / 1,5pB 3,6S - B25 B1**

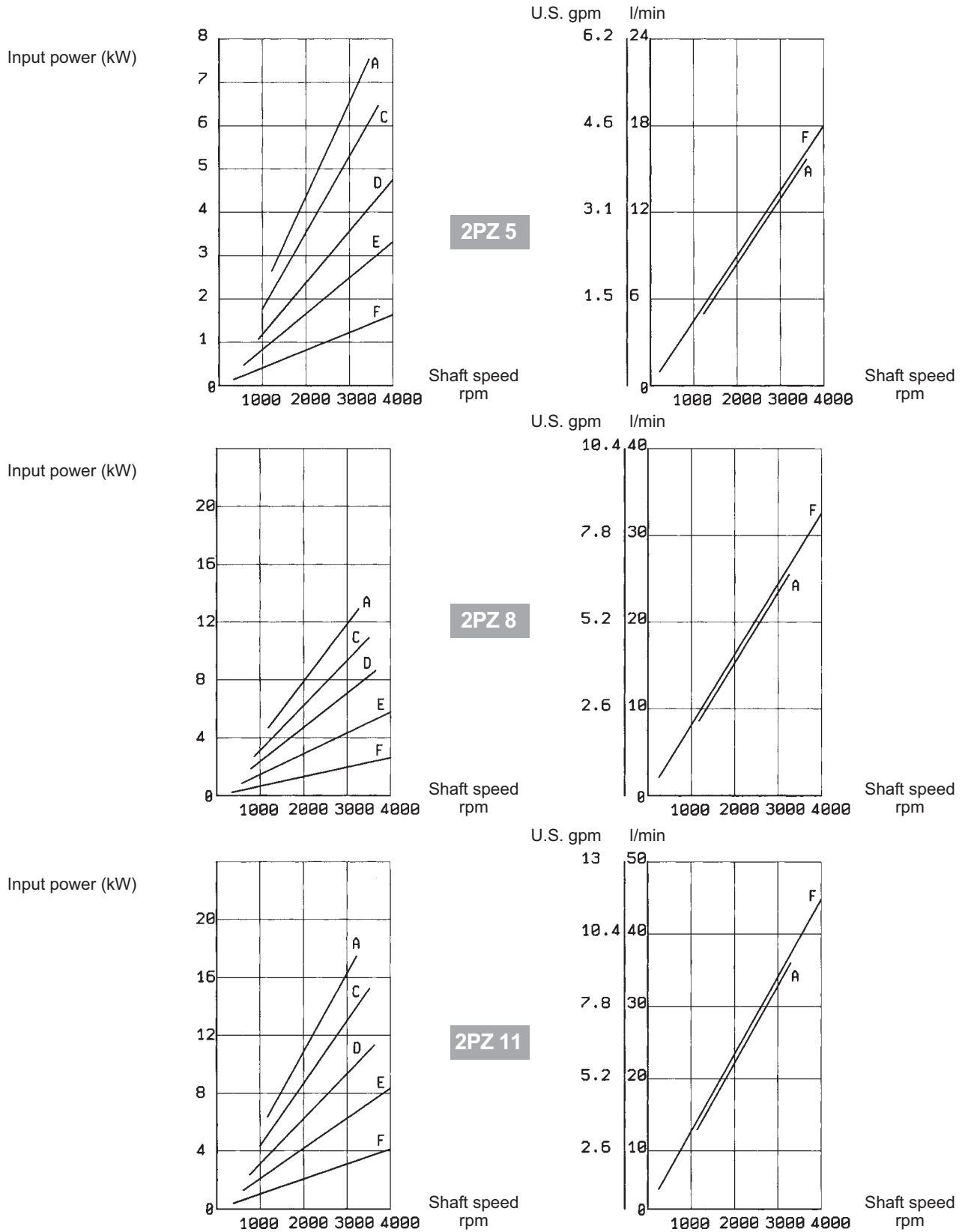
For dimension (A B H) see page 9

A=250 bar (3600 psi)  
 B=225 bar (3250 psi)  
 C=200 bar (2900 psi)  
 D=150 bar (2175 psi)  
 E=100 bar (1450 psi)  
 F=50 bar (725 psi)

# 2PZ / Group 2

Performance curves carried out with oil viscosity at 16 cST and oil temperature at 65 °C

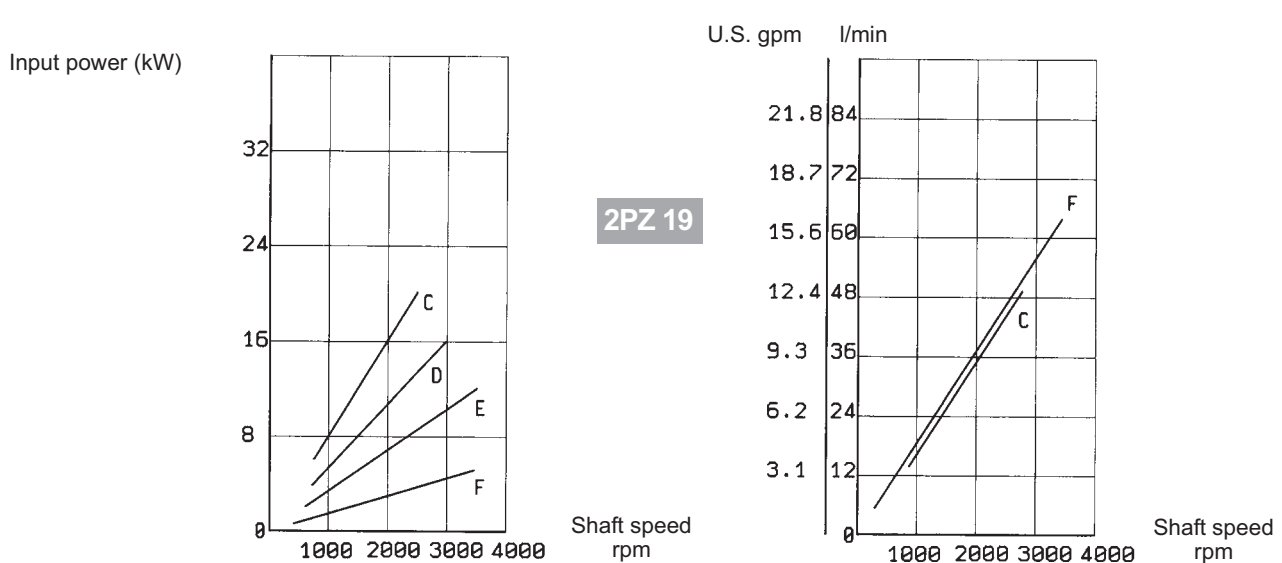
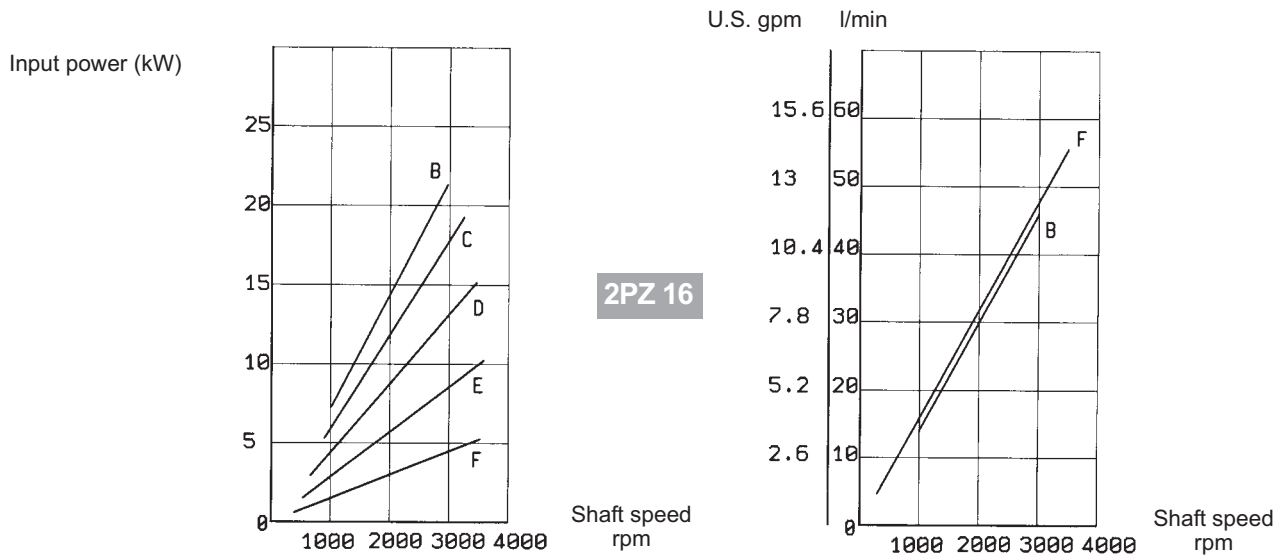
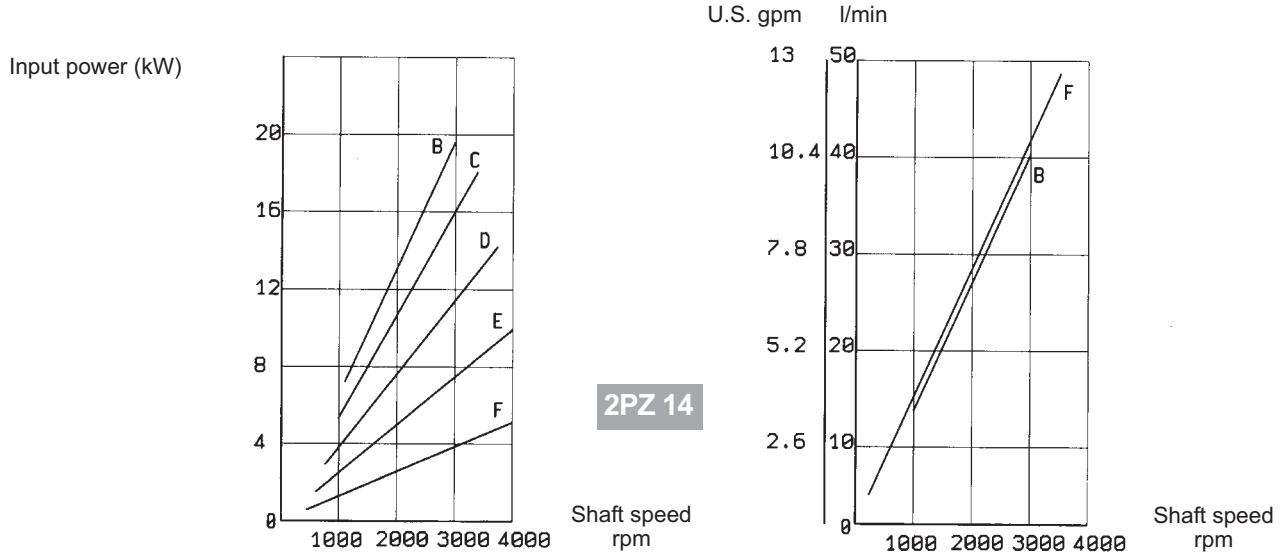
## PUMP PERFORMANCE CURVES



# 2PZ / Group 2

A=250 bar (3600 psi)  
 B=225 bar (3250 psi)  
 C=200 bar (2900 psi)  
 D=150 bar (2175 psi)  
 E=100 bar (1450 psi)  
 F=50 bar (725 psi)

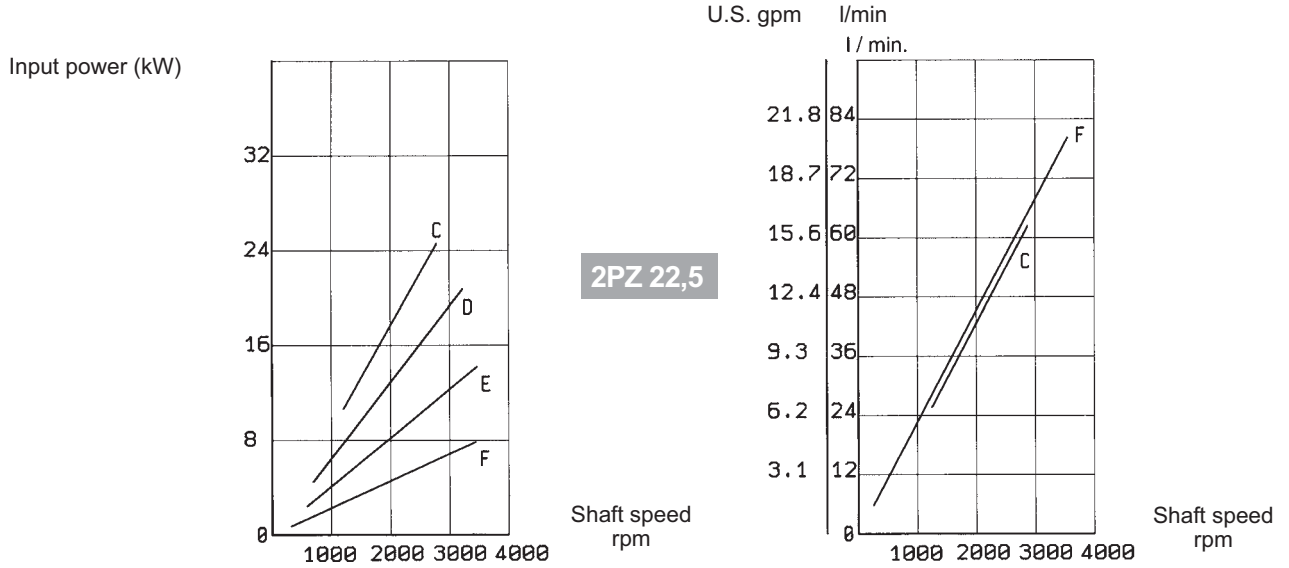
Performance curves carried out with oil viscosity at 16 cST and oil temperature at 65 °C



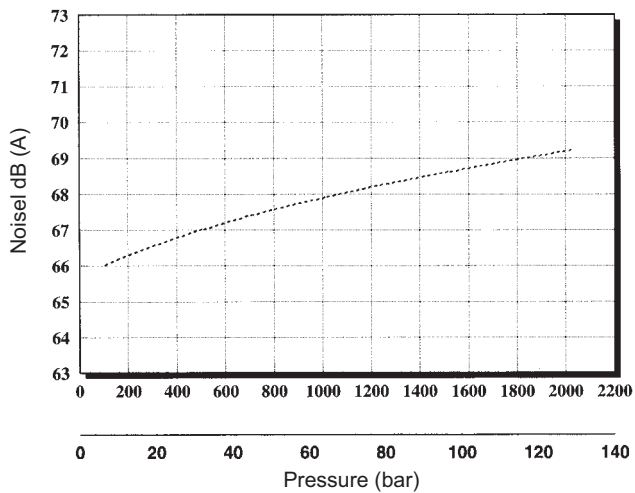
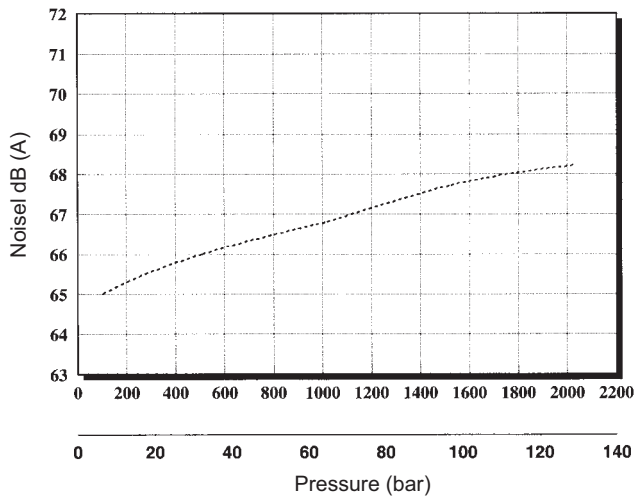
A=250 bar (3600 psi)  
 B=225 bar (3250 psi)  
 C=200 bar (2900 psi)  
 D=150 bar (2175 psi)  
 E=100 bar (1450 psi)  
 F=50 bar ( 725 psi)

# 2PZ / Group 2

Performance curves carried out with oil viscosity at 16 cST and oil temperature at 65 °C



## PUMP NOISE CURVES

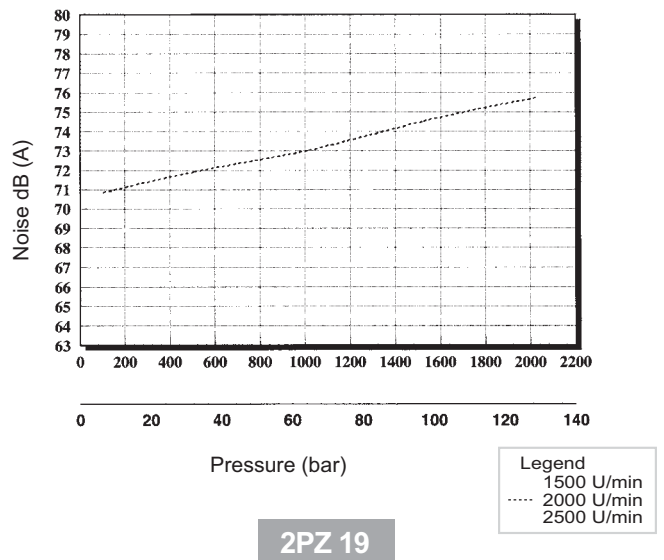
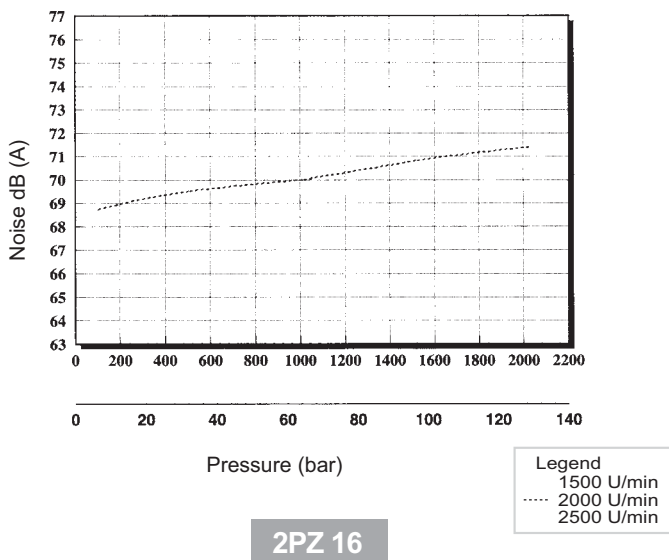
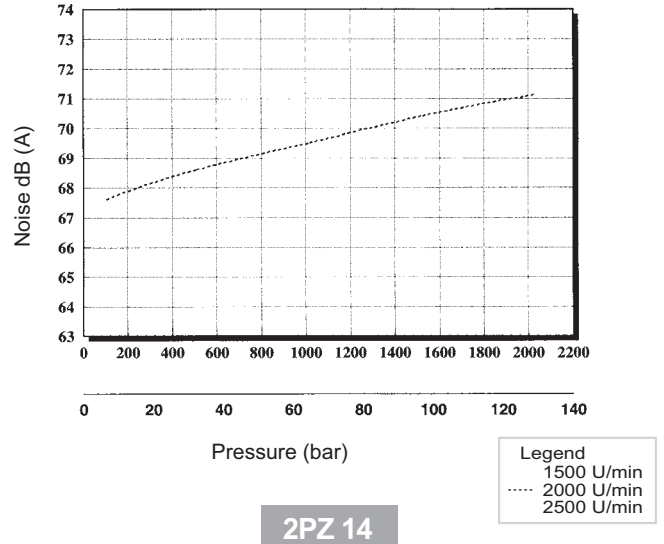
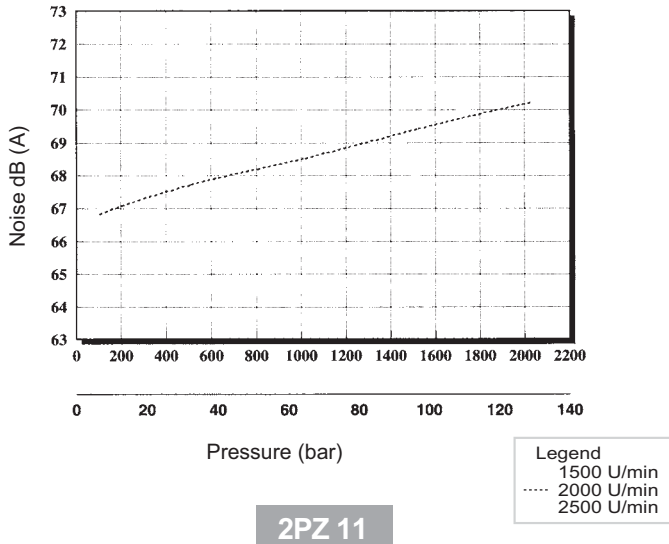


# 2PZ / Group 2

Performances carried out with oil viscosity at 16 cST and oil temperature at 65°C

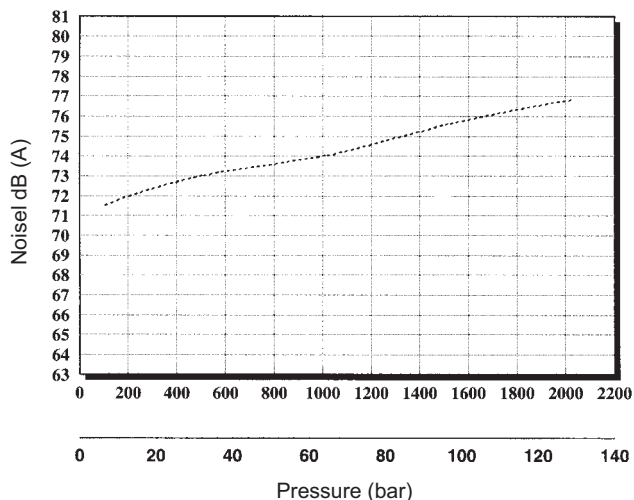
Noise tests conditions:

- Room noise 58 dB (A)
- Measurement distance 1 m



# 2PZ / Group 2

Performance curves carried out  
with oil viscosity at 16cST  
and oil temperature at 65°C



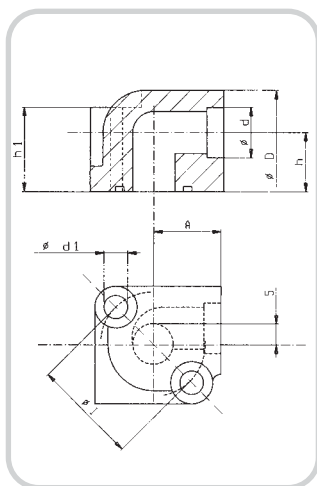
Noise tests conditions:

- Room noise 58 dB (A)
- Measurement distance 1 m

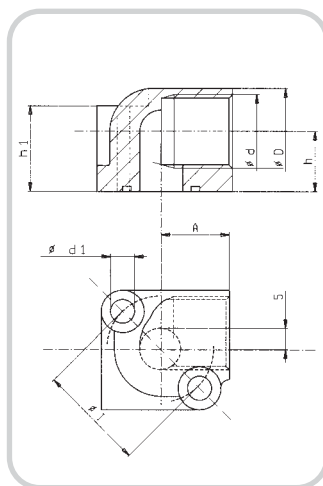
**2PZ 22,5**

Legend  
 — 1500 U/min  
 ..... 2000 U/min  
 - - - 2500 U/min

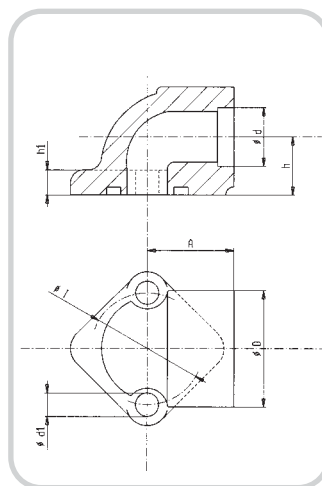
## PORT CONNECTORS



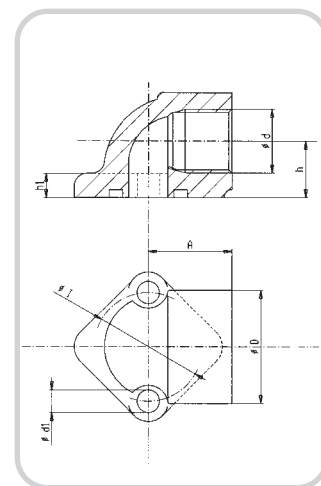
type GSB



type GB



type GS



type G

TYPE	h1	h	A	Ø D	Ø I	Ø d1	Ø d	ORDERING CODES COMPLETE OF SCREW - SPRING WASHER - O-RING SIZE
2 G	11	21	36	38	40	8,5	G 3/4	4352 7011 0
2 GS	11	21	36	38	40	8,5	25,25	4353 7002 0
2 GB	33	21	25	34	40	6,5	G 3/4	4352 7012 0
2 GSB	33	21	25	34	40	6,5	25,25	4353 7013 0

These port connectors are for suction side.

TYPE	h1	h	A	Ø D	Ø I	Ø d1	Ø d	ORDERING CODES COMPLETE OF SCREW - SPRING WASHER - O-RING SIZE
1 G/1	9	17	25	30	30	6,5	M18x1,5	4352 7004 0
1 G/2	9	17	25	30	30	6,5	G 3/8	4352 7005 0
1 G/3	9	17	25	30	30	6,5	G 1/2	4352 7006 0

These port connectors are for pressure side.

# How to order/Group 2

## GEAR PUMPS "Z" SERIES

### SINGLE PUMPS

2 P Z 16 D - P 28 P1 - V - PD1 - VS

#### DIMENSION

FUNCTION	CODE
Pump	P

#### SERIES

TYPE	DISPLACEMENT	
5	5 cm <sup>3</sup> /rev.	0,30 cu.in/rev.
8	8 cm <sup>3</sup> /rev.	0,49 cu.in/rev.
11	10,9 cm <sup>3</sup> /rev.	0,66 cu.in/rev.
14	13,9 cm <sup>3</sup> /rev.	0,85 cu.in/rev.
16	16 cm <sup>3</sup> /rev.	0,98 cu.in/rev.
19	19 cm <sup>3</sup> /rev.	1,16 cu.in/rev.
22,5	22,5 cm <sup>3</sup> /rev.	1,37 cu.in/rev.

ROTATION	CODE
Clockwise	D
Anti-clockwise	S

PORTS	CODE
Flanged ports european standard	P
Flanged ports german standard	B
SAE Threaded ports (ODT)	R

DRIVE SHAFT	CODE
Tang drive for electric motors	03
Tapered 1:5	25
Tapered shaft 1:8	28
SAE A splined 9 T	52
SAE A splined 11 T	54
SAE A parallel shaft Ø 15,87	82
SAE A parallel shaft Ø 19,05	85

Setting main relief valve (bar)

Adjusted flow l/min

VALVE IN THE COVER	CODE
Adjustable main relief valve	VS
Fixed setting main relief valve	VSF
Like VS with external discharge	VSE
Like VSF with external discharge	VSEF
Flow regulator with excess flow to tank	VR
Priority flow divider with excess flow to 2 nd actuator	VP
Like VR with main relief valve	VRS
Like VP with main relief valve	VPS
Priority flow divider with Load-sensing	VPL
Like VPL with dynamic signal	VPD

PD1 = pre-arranged for 1pB - 1,5pB rear

PORTS POSITION	CODE
Lateral ports standard	

SEAL	CODE
Buna Standard	
Viton	V

MOUNTING FLANGE	CODE
European standard	P1
German standard Ø 80	B1
German standard Ø 52	B2 - B3
SAE A 2 bolts	S2

Available for series quantities

Example to order a 2PZ pump with priority flow divider and main relief valve:  
2PZ 19D - P28 P1 - VPS12.5/180

## MULTIPLE PUMPS

2PZ 16 / 14 D - P 28 P1 - V AS - PD1 VSE

TYPE	DISPLACEMENT	
5	5 cm <sup>3</sup> /rev	0,30 cu.in/rev
8	8 cm <sup>3</sup> /rev	0,49 cu.in/rev
11	10,9 cm <sup>3</sup> /rev	0,66 cu.in/rev
14	13,9 cm <sup>3</sup> /rev	0,85 cu.in/rev
16	16 cm <sup>3</sup> /rev	0,98 cu.in/rev
19	19 cm <sup>3</sup> /rev	1.16 cu.in/rev
22,5	22.5 cm <sup>3</sup> /rev	1.37 cu.in/rev

ROTATION	CODE
Clockwise	D
Anti-clockwise	S

PORTS	CODE
Flanged ports european standard	P
Flanged ports german standard	B
SAE Threaded ports (ODT)	R

DRIVE SHAFT	CODE
Tang drive for electric motors	03
Tapered 1:5	25
Tapered shaft 1:8	28
SAE A splined 9 T	52
SAE A splined 11 T	54
SAE A parallel shaft Ø 15,87	82
SAE A parallel shaft Ø 19,05	85

Valves (see corresponding single pumps)

PD1 = pre-arranged for 1PB - 1,5PB rear

PORTS POSITION	CODE
Lateral ports standard	

SUCTION TYPE	CODE
Common suction	UA*
Separated tank	AS

SEAL	CODE
Buna standard	
Viton	V

MOUNTING FLANGE	CODE
European standard	P1
German standard Ø 80	B1
German standard Ø 52	B2 - B3
SAE A 2 bolts	S2

 Available for series quantities

\*UA (1 or 2) : in case of common suction, the number 1 or 2, correspond to the body where inlet is located.

Example:

UA 1 = Common inlet port in Front Pump

UA 2 = Common inlet port in Rear Pump

**Example to order a tandem pump with common suction: 2PZ 16/8D - P28 P1 - UA1**



## **WARRANTY**

- We warrant products sold by us to be free from defects in material and workmanship.
- Our sole obligation to buyer under this warranty is the repair or replacement, at our option, of any products or parts thereof which, under normal use and proper maintenance, have proven defective in material or workmanship, this warranty does not cover ordinary wear and tear, abuse, misuse, averloading, alteration.
- No claims under this warranty will be valid unless buyer notifies SALAMI in writing within a reasonable time of the buyer's discovery of such defects, but in no event later than twelve (12) months from date of shipment to buyer.
- Our obligation under this warranty shall not include any transportation charges or cost of installation, replacement, field repair, or other charges related to returning products to us; or any liability for direct, indirect or consequential damage or delay. If requested by us, products or parts for which a warranty claim is made are to be returned transportation prepaid to our factory. The risk of loss of any products or parts thereof returned to SALAMI will be on buyer.
- No employee or representative is authorized to change any warranty in any way or grant any other warranty unless such change is made in writing and signed by an officer of SALAMI.



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