### 13 100/112 ED





### DFP FIXED DISPLACEMENT VANE PUMPS SERIES 20

### **OPERATING PRINCIPLE**



 The DFP pumps are fixed displacement vane pumps made in four different sizes, each size having five different nominal displacement. They are available with one pumping element (single pump) or with double pumping element (double pump). See par. 15 ÷ 20 for the combinations of double pumps.

— The pumping group is composed of a cartridge type compact element that contains the rotor, the vanes, the cam ring and the head disks. The cartridge is easily removable without the need to disconnect the pump from the hydraulic circuit, thus simplifying the maintenance operations.

— The special elliptical profile of the cam ring, with double suction and delivery chambers one against the other, eliminates the radial thrusts on the rotor, decisively reducing wear of the pump. In addition, the use of a 12-vane rotor reduces the delivery pressure pulsations, suppressing the vibrations and noise level of the pump.

#### **TECHNICAL SPECIFICATIONS**

DFP PUMP SIZE	1	2 3 4				
Displacement range	cm <sup>3</sup> /rev	18 ÷ 45,9	40,1 ÷ 67,5	69 ÷ 121,6	138,6 ÷ 193,4	
Flow rate range (at 1.500 rpm)	ow rate range (at 1.500 rpm) I/min.		58,8 ÷ 99,8	101,4 ÷ 177,3	203,4 ÷ 285	
Operating pressures			see table 3 - p	performances		
Rotation speed			see table 3 - p	performances		
Rotation direction		clockwis	e or anticlockwise	(seen from the sha	ft side)	
Loads on the shaft			axial loads are	e not allowed		
Hydraulic connection		flange fittings SAE J518 (see par. 22)				
Type of fastening		flanged SAE				
Mass (single pump) kg		12	15	23	34	

Ambient temperature range	°C	-20 / +50	
Fluid temperature range (see par. 4)	°C	-10 / +70	
Fluid viscosity range	see par. 4.2		
Recommended true viscosity	cSt	25 ÷ 50	
Degree of fluid contamination	see par. 4.3		

### HYDRAULIC SYMBOL



### **1 - IDENTIFICATION CODE**



### **2 - PORTS ORIENTATION**



PUMP SIZE	NOMINAL DIMENSION	DISPLACEMENT [cm <sup>3</sup> /rev]	MAX. FLOW RATE (at 1500 rpm) [I/min.]	MAX. OPERATING PRESSURE (at 1500 rpm) [bar]	MAX. ROTATION SPEED [rpm] (see par. 5)	MIN. ROTATION SPEED [rpm]
		10	00.4			
	05	18	26,1			
	08	27,4	39,4	210		
DFP1	11	36,4	52,6		2700	600
	12	39,5	58,7	160		
	14	45,9	69,6	140		
	12	40,1	58,8			
	14	45,4	65,7			
DFP2	17	55,2	80,2	210	2500	600
	19	60,1	88,7			
	21	67,5	99,8			
	21	69	101,4			
	25	81,6	120,1			
DFP3	30	97,7	141,2	210	2400	600
	35	112,7	167,2			
	38	121,6	177,3			
	42	138,6	203,4			
DFP4	47	153,5	222,7			
	50	162,2	234	175	2200	600
	57	183,4	267			
	60	193,4	285			

### 3 - PERFORMANCES (obtained with mineral oil with viscosity of 32 cSt at 40°C)

### 4 - HYDRAULIC FLUID

#### 4.1 Fluid type

ТҮРЕ	MAXIMUM PRESSURE (bar)			MAXIMUM SPEED (rpm)				Maximum Fluid	
OF FLUID	DFP1	DFP2	DFP3	DFP4	DFP1	DFP2	DFP3	DFP4	TEMPERATURE [°C]
HFD PHOSPHATE ESTERS	175	175	175	175	1200	1200	1200	1200	<u>≤</u> 70
HFC WATER GLYCOL	140	140	140	140	1500	1500	1500	1500	<u>≤</u> 50

**NOTE 1**: The maximum suction pressure allowed, with all fluid types, is 1,4 bar. The minimum suction pressure varies from -0,2 bar with mineral oil to -0,1 bar with the other fluid types (the pressure values are to be considered relative).

The pressures, the maximum allowed speeds and the recommended temperatures according to the different types of hydraulic fluids used are shown in the table.

### 4.2 - Fluid viscosity

The operating fluid viscosity must be within the following range:

minimum viscosity	16 cSt	referred to the maximum temperature of 80 °C of the fluid
optimum viscosity	25 ÷ 50 cSt	referred to the operating temperature of the fluid in the tank
maximum viscosity	800 cSt	limited to only the pump start-up phase

When choosing the fluid type, verify that the true viscosity at the operating temperature is within the above range.

### 4.3 - Degree of fluid contamination

The maximum degree of fluid contamination must be according to ISO 4406:1999 class 20/18/15; therefore, use of a filter with  $\beta_{20} \ge 75$  is recommended. A degree of maximum fluid contamination according to ISO 4406:1999 class 18/16/13 is recommended for optimum endurance of the pump. Hence, use of a filter with  $\beta_{10} \ge 100$  is recommended.

If there is a filter installed on the suction line, be sure that the pressure at the pump inlet is not lower than the values specified in the note 1, at paragraph 3. The suction filter must be equipped with a by-pass valve and, if possible, with a clogging indicator.



### **5 - MAXIMUM SPEED CORRECTION FACTOR**

If the pressure in the suction line is different than zero, the maximum rotation speed shown in table 3 must be multiplied by the correction factor obtained from the diagram seen on the left.

6 - PRESSURE PEAK (values obtained with mineral oil with viscosity of 32 cSt at 40°C, delivery pressure 140 bar and suction pressure 0 bar)

The maximum allowed over pressure on the pump delivery according to the pressure peak residency time is shown in the diagrams. The curves are valid for both single pumps and double pumps.





The diagram curves were measured in a semi-anechoic room according to ISO 4412/1 at a distance of 1 m from the pump. The values refer to the intermediate size pump.



### 8 - DFP1 PUMP CHARACTERISTIC CURVES (obtained with mineral oil with viscosity of 32 cSt at 40°C)

# FLOW RATE/PRESSURE CURVES (measured at 1500 rpm)



8 - DFP2 PUMP CHARACTERISTIC CURVES (obtained with mineral oil with viscosity of 32 cSt at 40°C)

## FLOW RATE/PRESSURE CURVES (measured at 1500 rpm)



# ABSORBED POWER/PRESSURE CURVES (measured at 1500 rpm)

**ABSORBED POWER/PRESSURE CURVES** 

(measured at 1500 rpm)



#### 9 - DFP3 PUMP CHARACTERISTIC CURVES (values obtained with mineral oil with viscosity of 32 cSt at 40°C)



FLOW RATE/PRESSURE CURVES

(measured at 1500 rpm)

### ABSORBED POWER/PRESSURE CURVES (measured at 1500 rpm)



10 - DFP4 PUMP CHARACTERISTIC CURVES (values obtained with mineral oil with viscosity of 32 cSt at 40°C)



### FLOW RATE/PRESSURE CURVES (measured at 1500 rpm)



# ABSORBED POWER/PRESSURE CURVES (measured at 1500 rpm)



### 11 - DFP1 PUMP OVERALL AND MOUNTING DIMENSIONS



12 - DFP2 PUMP OVERALL AND MOUNTING DIMENSIONS



### 13 - DFP3 PUMP OVERALL AND MOUNTING DIMENSIONS



### 14 - DFP4 PUMP OVERALL AND MOUNTING DIMENSIONS





### 15 - DFDP21 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS

### 16 - DFDP31 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS





### 17 - DFDP32 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS

18 - DFDP41 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS



#### dimensions in mm 3 324 12.7 212 ø25.4 119.3 42.9 135.8 /<u>3/8"-16UNC</u> Prof.19.1 ø17.5 2 fori 102.4 93.6 Ф ø127-126.95 45° ø181 16 ø148 162 69.9 35.7 E 1/2"-13UNC 69.9 12.7 Prof.23.8 38.07.38.05 12.37-42.14 120.7 Suction port 1 ¢ 9.5x54.6 SAE 3 1/2" Pump delivery port 2 shaft side 5/8"-11UNC SAE 1 1/2" ø88.9 ø38.1 Prof.31.8 1.5x45 Pump delivery port (1)2 3 cover side SAE 1" 88

### 19 - DFDP42 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS

### 20 - DFDP43 DOUBLE PUMP OVERALL AND MOUNTING DIMENSIONS



### 21 - INSTALLATION

- The DFP pumps can be installed with the shaft oriented in any position.
- Check that the rotation direction of the motor is according to the rotation direction of the pump before start up.
- The pump start up, especially at a cold temperature, should occur with the pump unloading.
- The suction line must be suitably sized to facilitate the flow of oil.
  Bends and restrictions or an excessive line length can impair correct functioning of the pump.
- The pumps are normally positioned directly above the oil tank.
  Flooded suction port installation of the pumps is advisable in the case of circuits with high flow rates and pressures.
- The motor-pump coupling must be made directly with a flexible coupling.
  Couplings that generate axial or radial loads on the pump shaft are not allowed.
- Refer to paragraph 4.3 for the characteristics and installation of the filtering elements.

#### dimensions in mm D G С B А F 2 - E Flange Bolts Flange p<sub>max</sub> 1 N. 4 SHC bolts ØA ØВ С D Ε F G н 2 L code description [bar] code 0610719 SAE - 3/4" 345 3/4" BSP 19 18 36 19 22,2 47,6 50 65 OR 4100 3/8" UNC 0530612 x 1 1/2" 0610713 SAE - 1" 345 1" BSP 25 18 38 22 26.2 52,4 55 70 OR 4131 0610720 SAE - 1 1/4" 276 1 1/4" BSP 32 21 41 30.2 58.7 68 79 7/16" UNC x 1 1/2" 0530613 OR 4150 22 0610714 SAE - 1 1/2" 1 1/2" BSP 24 70 78 OR 4187 207 38 25 45 35,7 93 1/2" UNC 0610721 SAE - 2" 0530638 OR 4225 207 2" BSP 51 25 45 30 43 77.8 90 102 x 1 3/4" 0610722 SAE - 2 1/2" 172 2 1/2" BSP 63 25 50 30 50,8 89 105 116 OR 4175 0610723 SAE - 3" 3" BSP OR 4337 138 73 27 50 34 62 106,4 116 134 0610724 SAE - 3 1/2" OR 4387 34 3 1/2" BSP 89 27 48 34 69,8 120,7 136 152 5/8" UNC x 2" 0530658 77,77 0773528 SAE - 4" 34 4" BSP 99 27 48 34 130,18 146 162 OR 4437 The fastening bolts and the O-Rings must be ordered separately.

### 22 - SAE J518 CONNECTION FLANGES



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