

# Multiple pumps type PFEX, PFRX, PVPCX2E

vane, piston, fixed or variable displacement

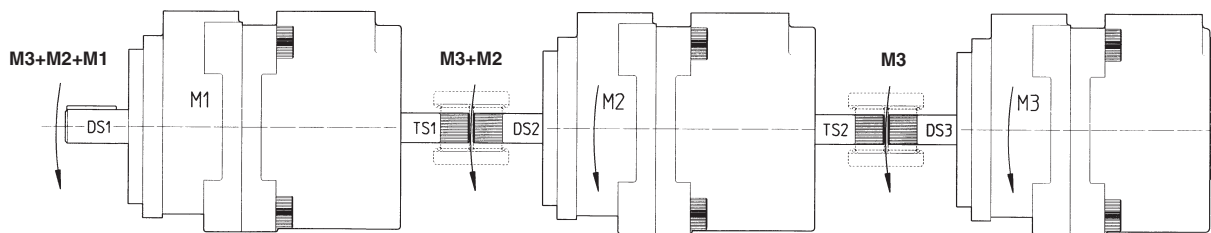
Multiple pumps are composed by various vane, radial piston or axial piston pumps modularly assembled:

**PFEX**, see section [1], are composed by vane pumps PFE (table A005 and A007) or PFED (table A180);

**PFRX**, see section [2], are composed by radial piston pumps PFR (table A045) and vane pumps PFE (table A005 and A007)

**PVPCX2E**, see section [3], are composed by axial piston pumps PVPC (table A160) and vane pumps PFE (table A005 and A007)

For multiple pumps must be verified that the max torques applied on each single drive shaft and on each single through shaft are not higher than the max allowed limits. In particular, must be considered that the total torque applied to the drive shaft of the first element is the sum of the single torque needed for operating each single pump.



In the figure are shown:

M1, M2, M3, = torque needed to operate each single pump (obtainable from "torque versus pressure diagram" of each single pump).

$L_{DS1}$ ,  $L_{DS2}$ ,  $L_{DS3}$  = limits of torque for drive shafts;

$L_{TS1}$ ,  $L_{TS2}$  = limits of torque at the end of through shafts.

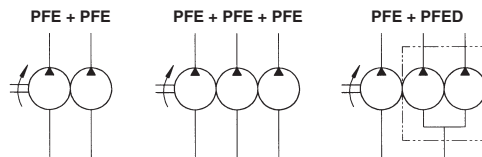
The values of torque needed to operate each single pump and the allowed limit torque values for drive shafts and through shafts are shown on technical tables of individual basic pumps.

**For multiple pumps, the following verifications must be executed:**

- a)  $M3 \leq L_{TS2}$
- b)  $M3 + M2 \leq L_{DS2}$
- c)  $M3 + M2 \leq L_{TS1}$
- d)  $M3 + M2 + M1 \leq L_{DS1}$

## 1 PFEX2, PFEX3, PFEXD MULTIPLE VANE PUMPS

PFEX\* are fixed displacement multiple vane pumps. They can be double (composed by two pumps type PFE) or triple pumps (composed by three PFE or by one PFE and one PFED).



For technical characteristics of PFE-\*1 pumps, see tab. A005; for technical characteristics of PFE-\*2 see tab. A007; for technical characteristics of PFED pumps, see tab. A180.

### 1.1 MODEL CODE FOR PFEX\*

PFEX	2	- 42	045	/31028	/	3	D	T	**	/*
Fixed displacement multiple vane pump										Seals material: omit for NBR (mineral oil & water glycol) <b>PE</b> = FPM
<b>2</b> = double pump composed of two pumps type PFE <b>3</b> = triple pump composed of three pumps type PFE <b>D</b> = triple pump composed of one pump type PFE and one pump type PFED Pumps are assembled in decreasing order of size									Series number	Port orientation, see section 1.2
Size of first pump: <b>31, 41, 51, 32, 42, 52</b>									Direction of rotation (as viewed at the shaft end): <b>D</b> = clockwise (supplied standard if not otherwise specified) <b>S</b> = counterclockwise Note: PFE are not reversible	
Displacement of first pump [cm <sup>3</sup> /rev] for PFE 31: 016, 022, 028, 036, 044 for PFE 41: 029, 037, 045, 056, 070, 085 for PFE 51: 090, 110, 129, 150 for PFE 32: 022, 028, 036, for PFE 42: 045, 056, 070, 085 for PFE 52: 090, 110, 129, 150									Drive shaft cylindrical keyed: <b>1</b> = (only for PFE-31, 41, 51) standard <b>2</b> = (only for PFE-41 and PFE-51) according to ISO/DIN 3019 <b>3</b> = for high torque applications splined <b>5</b> = standard <b>6</b> = for high torque applications for PFEX*-3 according to SAE B 16/32 DP, 13 teeth; for PFEX*-4 according to SAE C 12/24 DP, 14 teeth;	
Size and displacement [cm <sup>3</sup> /rev] of second (and third) pump										

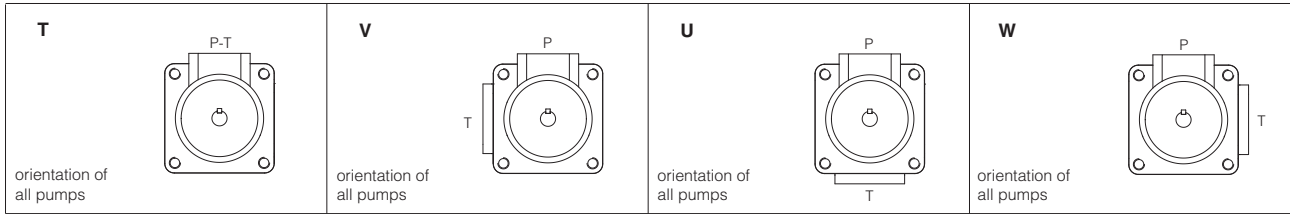
Note:  
multiple pumps are supplied with inlet and outlet ports in line. Ports orientation can be easily changed by rotating the pump body that carries inlet port.

## 1.2 PORT ORIENTATION

### -PFEX2, PFEX3

Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated.  
In PFEX2 and PFEX3 multiple pumps, the port orientation is the same for first, second (third) pumps.

Model code example: PFEX2-42045/41037/5DT



P1 outlet port ; T1 inlet port

### -PFEXD

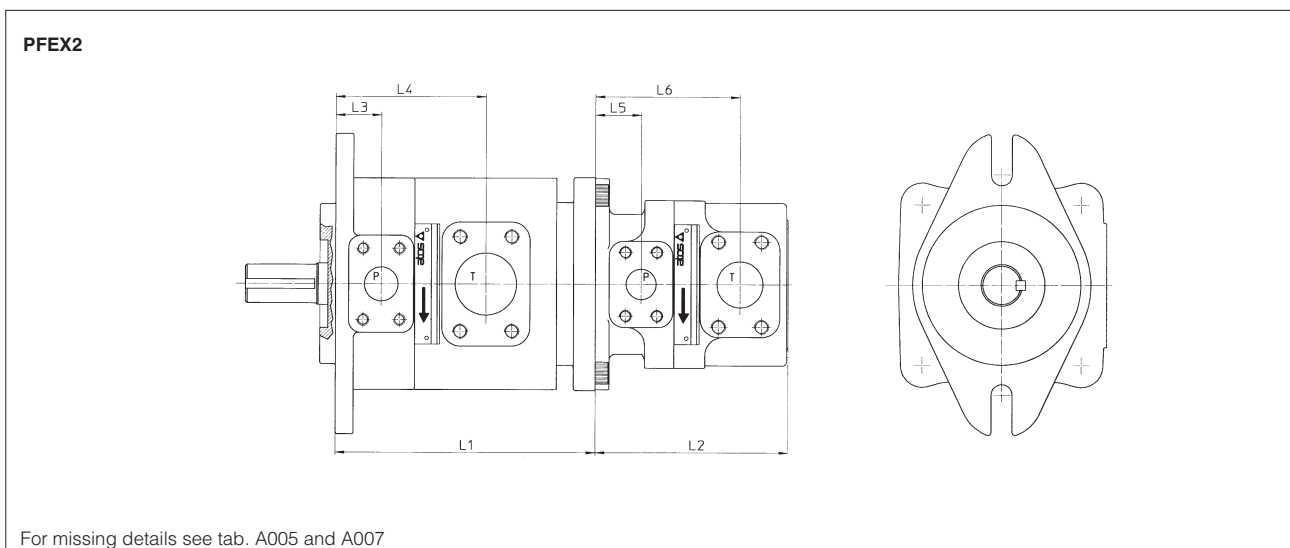
Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated..  
In PFEXD, the ports orientation of second / third pump (PFED), can be selected according following table.  
The ports orientation of first pump depends to the selected orientation of second / third pumps.

Model code example: PFEXD-42045/43037/016/5DTP

1 <sup>st</sup> PUMP PFEX*	2 <sup>nd</sup> / 3 <sup>th</sup> PUMP PFED*							
	<b>TO</b> P2-T2-P3	<b>TA</b> P2-T2 P3	<b>TB</b> P2-T2 P3	<b>TC</b> P2-T2 P3	<b>TD</b> P2-T2 P3	<b>TE</b> P2-T2 P3	<b>TF</b> P2-T2 P3	<b>TG</b> P2-T2 P3
	<b>WO</b> P2-P3 T2	<b>WA</b> P2 P3 T2	<b>WB</b> P2 P3 T2	<b>WC</b> P2 P3 T2	<b>WD</b> P2 P3 T2	<b>WE</b> P2 P3 T2	<b>WF</b> P2 P3 T2	<b>WG</b> P2 P3 T2
	<b>UO</b> P2-P3 T2	<b>UA</b> P2 P3 T2	<b>UB</b> P2 P3 T2	<b>UC</b> P2 P3 T2	<b>UD</b> P2 P3 T2	<b>UE</b> P2 P3 T2	<b>UF</b> P2 P3 T2	<b>UG</b> P2 P3 T2
	<b>VO</b> P2-P3 T2	<b>VA</b> P2 P3 T2	<b>VB</b> P2 P3-T2	<b>VC</b> P2 P3 T2	<b>VD</b> P2 P3 T2	<b>VE</b> P2 P3 T2	<b>VF</b> P2 P3 T2	<b>VG</b> P2 P3 T2

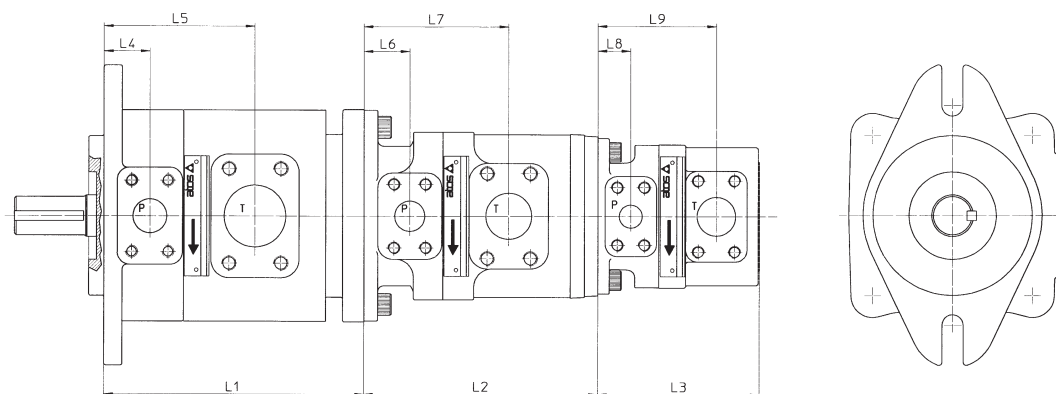
P1 outlet port of first element; P2 outlet port of second element; P3 outlet port of third element; T1 inlet port of first element; T2 inlet port of second element

## 1.3 DIMENSIONS OF MULTIPLE PUMPS TYPE PFEX2, PFEX3, PFEXD [mm]



Composed pump	First element	Second element	L1	L2	L3	L4	L5	L6
PFEX2-32***/31***/*	PFEXA-32***/*	PFE-31***/5	164	134,5	27,5	98,5	27,5	98,5
PFEX2-42***/31***/*	PFEXA7-42***/*	PFE-31***/7	194	134,5	38	120	27,5	98,5
PFEX2-42***/41***/*	PFEXB7-42***/*	PFE-41***/7	203	160	38	120	38	120
PFEX2-52***/31***/*	PFEXA7-52***/*	PFE-31***/7	206	134,5	38	125	27,5	98,5
PFEX2-52***/41***/*	PFEXB7-52***/*	PFE-41***/7	215,5	160	38	125	38	120
PFEX2-52***/51***/*	PFEXC-52***/*	PFE-51***/5	230	186,5	38	125	38	125

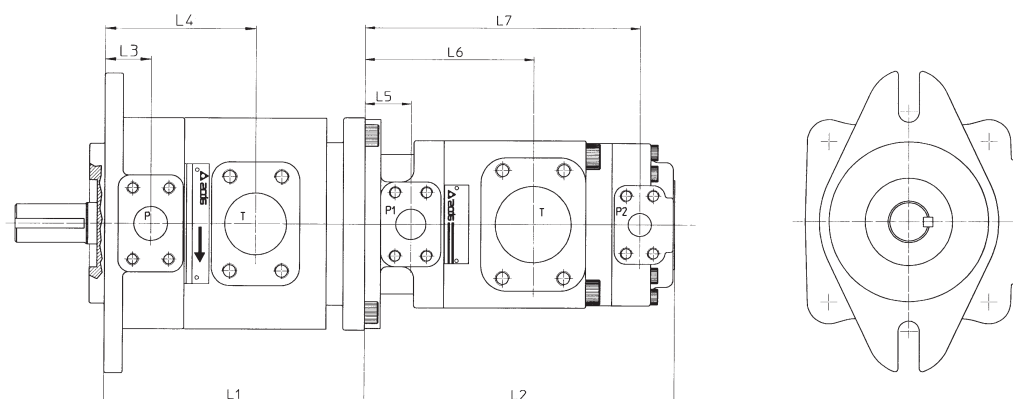
### PFEX3



For missing details see tab. A005 and A007

Composed pump	First elem.	Second elem.	Third elem.	L1	L2	L3	L4	L5	L6	L7	L8	L9
PFEX3-32***/31***/31***/*	PFEXA-32***/*	PFEXA-31***/5	PFE-31***/5	164	164	134,5	27,4	98,5	27,4	98,5	24,7	98,5
PFEX3-42***/31***/31***/*	PFEXA7-42***/*	PFEXA-31***/7	PFE-31***/5	203	164	134,5	38	120	27,4	98,5	24,7	98,5
PFEX3-42***/41***/31***/*	PFEXB7-42***/*	PFEXA7-41***/7	PFE-31***/7	203	194	134,5	38	120	38	120	24,7	98,5
PFEX3-42***/41***/41***/*	PFEXB7-42***/*	PFEXB7-41***/7	PFE-41***/7	203	203	160	38	120	38	120	38	120
PFEX3-52***/31***/31***/*	PFEXA7-52***/*	PFEXA-31***/7	PFE-31***/5	206	164	134,5	38	125	24,7	98,5	24,7	98,5
PFEX3-52***/41***/31***/*	PFEXB7-52***/*	PFEXA7-41***/7	PFE-31***/7	215,5	194	134,5	38	125	38	120	24,7	98,5
PFEX3-52***/41***/41***/*	PFEXB7-52***/*	PFEXB7-41***/7	PFE-41***/7	215,5	203	160	38	125	38	120	38	120
PFEX3-52***/51***/31***/*	PFEXC-52***/*	PFEXA7-51***/5	PFE-31***/7	230	206	134,5	38	125	38	125	24,7	98,5
PFEX3-52***/51***/41***/*	PFEXC-52***/*	PFEXB7-51***/5	PFE-41***/7	230	206	160	38	125	38	125	38	120
PFEX3-52***/51***/51***/*	PFEXC-52***/*	PFEXC-51***/5	PFE-51***/5	230	230	186,5	38	125	38	125	38	125

### PFEXD

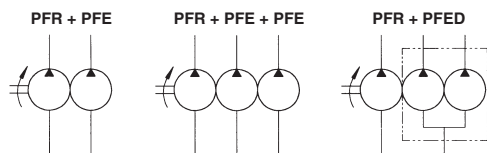


For missing details see tab. A005 and A007, A180

Composed pump	First element	Second element	L1	L2	L3	L4	L5	L6	L7
PFEXD-42***/43***/0**	PFEXB7-42***/	PFED-43***/0**/7	203	256	38	120	38	139,6	227,7
PFEXD-52***/43***/0**	PFEXB7-52***/	PFED-43***/0**/7	215,5	256	38	125	38	199,6	227,7
PFEXD-52***/54***/0**	PFEXC-52***/	PFED-54***/0**/5	230	288	38	125	38	152,3	261,8

## 2 PFRX2E, PFRX3E, PFRXDE MULTIPLE RADIAL PISTON/VANE PUMPS

PFRX\*E are fixed displacement multiple piston/vane pumps. They can be double (composed by one pump type PFR and one pump type PFE) or triple pumps (composed by one pump type PFR and one pump type PFEX2 or by one PFR and one PFED).



For technical characteristics of PFR pumps see tab. A045, for technical characteristics of PFE-1\* pumps see tab. A005; for technical characteristics of PFE-\*2 see tab. A007, for technical characteristics of PFED pumps, see tab. A180.

### 2.1 MODEL CODE FOR PFRX\*E

<b>PFRX</b>	<b>2E</b>	<b>-</b>	<b>5</b>	<b>22</b>	<b>/</b>	<b>31044</b>	<b>/</b>	<b>D</b>	<b>*</b>	<b>/</b>	<b>**</b>	<b>/</b>	<b>/*</b>
Multiple fixed displacement piston/vane pump													Seals material: omit for NBR (mineral oil & water glycol) <b>PE</b> = FPM
Composition: <b>2E</b> = double: PFR + PFE <b>3E</b> = triple: PFR + PFEX2 <b>DE</b> = triple: PFR + PFED The pumps are assembled in decreasing order of size.												Series number	
Size of first pump type PFR: <b>3, 5</b>												Port orientation, see section 2.3	
Displacement of first pump type PFR [cm <sup>3</sup> /rev] for <b>PFR-3</b> = 08, 11, 15 for <b>PFR-5</b> = 18, 22, 25													Direction of rotation (as viewed at the shaft end): <b>D</b> = clockwise (supplied standard if not otherwise specified) <b>S</b> = counter clockwise Note: PFRX*E are not reversible
													Size and displacement [cm <sup>3</sup> /rev] of PFE second (and third) pump for PFE 31: 016, 022, 028, 036, 044 for PFE 41: 029, 037, 045, 056, 070, 085 for PFE 51: 090, 110, 129, 150 for PFE 32: 022, 028, 036, for PFE 42: 045, 056, 070, 085 for PFE 52: 090, 110, 129, 150

### 2.2 PORT ORIENTATION

#### -PFRX2E, PFRX3E

Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated. Referred to the first element (PFRX\*), in second / third pumps the ports can be oriented as indicated in the picture. The third element is always oriented as the second element.

Model code example: PFRX2E-522/31044/DT

1 <sup>st</sup> PUMP PFRX*	2 <sup>nd</sup> / 3 <sup>th</sup> PUMP PFE			
	<b>T</b> 	<b>P-T</b> 	<b>V</b> 	<b>U</b> 
	<b>W</b> 			

P1 outlet port ; T1 inlet port

#### -PFRXDE

Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated. In PFRXDE, can be select the orientation of second / third pump (PFED)

Model code example: PFRXDE-522/43045/022/DT0

1 <sup>st</sup> PUMP PFRX*	2 <sup>nd</sup> / 3 <sup>th</sup> PUMP PFED*							
	<b>TO</b> P2-T2-P3 	<b>TA</b> P2-T2 P3 	<b>TB</b> P2-T2 P3 	<b>TC</b> P2-T2 P3 	<b>TD</b> P2-T2 P3 	<b>TE</b> P2-T2 P3 	<b>TF</b> P2-T2 P3 	<b>TG</b> P2-T2 P3 
	<b>WO</b> P2-P3 T2 	<b>WA</b> P2 P3 T2 	<b>WB</b> P2 P3 T2 	<b>WC</b> P2 P3 T2 	<b>WD</b> P2 P3 T2 	<b>WE</b> P2 P3 T2 	<b>WF</b> P2 P3 T2 	<b>WG</b> P2 P3 T2 
	<b>UO</b> P2-P3 T2 	<b>UA</b> P2 P3 T2 	<b>UB</b> P2 P3 T2 	<b>UC</b> P2 P3 T2 	<b>UD</b> P2 P3 T2 	<b>UE</b> P2 P3 T2 	<b>UF</b> P2 P3 T2 	<b>UG</b> P2 P3 T2 
	<b>VO</b> P2-P3 T2 	<b>VA</b> P2 P3 T2 	<b>VB</b> P2 P3 T2 	<b>VC</b> P2 P3 T2 	<b>VD</b> P2 P3 T2 	<b>VE</b> P2 P3 T2 	<b>VF</b> P2 P3 T2 	<b>VG</b> P2 P3 T2 

P1 outlet port of first element; P2 outlet port of second element; P3 outlet port of third element; T1 inlet port of first element; T2 inlet port of second element

### 2.3 OPERATING CHARACTERISTICS OF STANDARD DOUBLE PUMPS TYPE PFRX2E

(at 1450 rpm and based on mineral oil ISO VG46 at 50° C)

Standard model (1)	Speed range [rpm] (2)	RADIAL PISTON PUMP			VANE PUMP			Total flow [l/min]			
		Displacement [cm <sup>3</sup> /rev]	Flow [l/min] (3)	Max pressure [bar] (4)	Displacement [cm <sup>3</sup> /rev]	Flow [l/min] (3)	Max pressure [bar] (5)				
PFRX2E-308/31036	600-1800	8	12,6	350	36,5	51	210	63,6			
PFRX2E-308/31044					43,7	63	210	75,6			
PFRX2E-308/41070					69,9	101	180	113,6			
PFRX2E-308/41085					85,3	124	150	136,6			
PFRX2E-308/51110					109,6	157	180	169,6			
PFRX2E-308/51129					129,2	186	150	198,6			
PFRX2E-311/31044		11,4	16,5	350	43,7	63	210	79,5			
PFRX2E-311/41070					69,9	101	180	117,5			
PFRX2E-311/41085					85,3	124	150	140,5			
PFRX2E-311/51110					109,6	157	180	173,5			
PFRX2E-311/51129					129,2	186	150	202,5			
PFRX2E-315/41056					14,7	21,5	350	55,8	80	210	101,5
PFRX2E-315/41070		69,9	101	180				122,5			
PFRX2E-315/51110		109,6	157	180				178,5			
PFRX2E-315/51129		129,2	186	150				207,5			
PFRX2E-518/31044		18,1	26	350				43,7	63	210	89
PFRX2E-518/41070								69,9	101	180	127
PFRX2E-518/41085					85,3	124	150	150			
PFRX2E-518/51110					109,6	157	180	183			
PFRX2E-518/51129					129,2	186	150	212			
PFRX2E-522/41056					21,8	31,5	350	55,8	80	210	111,5
PFRX2E-522/41070		69,9	101	180				132,5			
PFRX2E-522/51110		109,6	157	180				188,5			
PFRX2E-522/51129		129,2	186	150				217,5			
PFRX2E-525/41070		25,4	37	350				69,9	101	180	138
PFRX2E-525/51110								109,6	157	180	194
PFRX2E-525/51129					129,2	186	150	233			

(1) Further composition of PFR and PFE double pumps are available on request. Other composition of PFRX2E must subject to verification of max torque limits allowed by the drive shafts of PFR and PFE and by the through shaft of PFR (320 Nm).

(2) Max speed is 1800 rpm for /PE versions; 1000 rpm for water glycol fluid

(3) Flow rate and power consumption are proportional to revolution speed

(4) Max pressure is 250 bar for /PE versions, 175 bar for water glycol fluid

(5) Max pressure is 160 bar for /PE and water glycol fluid.

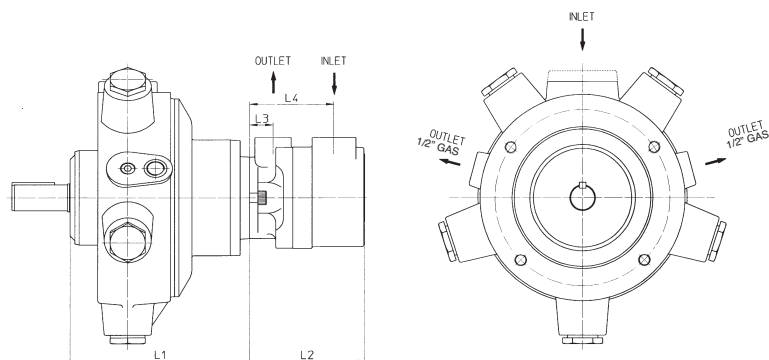
The shaft of the PFR pump has an eccentric cam which rotates with the shaft generating the stroke of the pistons and thus generating the flow rate. For best functioning a balanced coupling should be provided between the shaft of the motor and the shaft of the pump. See tab. A045

### 2.4 TRIPLE PUMPS TYPE PFRX3E AND PFRXDE

Many triple pump compositions PFRX3E = PFR + PFEX2 or PFRXDE = PFR + PFED can be realized but they must be subject to verification of max torque-limits allowed by drive shaft and through shaft of each individual basic pump according to description of first page.

### 2.5 DIMENSIONS OF MULTIPLE PUMPS TYPE PFRX2, PFRX3, PFRXD [mm]

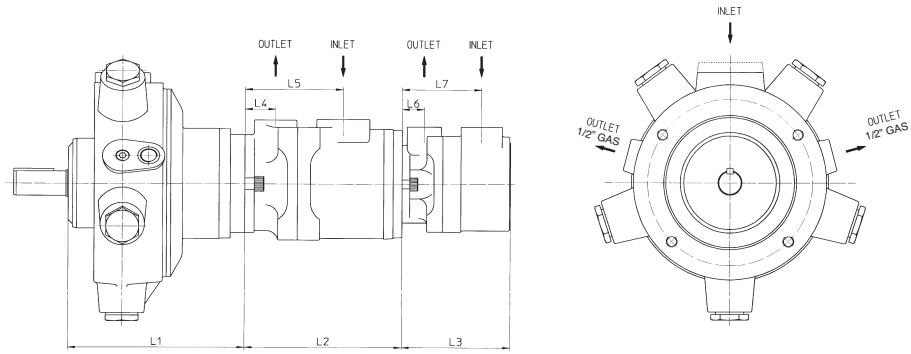
#### PFRX2E



For missing details see tab. A045, A005 and A007

Composed pump	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4
PFRX2E-3**/31***	PFRXA-3**	PFE-31***	200	134,5	27,5	98,5
PFRX2E-3**/41***	PFRXB-3**	PFE-41***	209	160	38	120
PFRX2E-3**/51***	PFRXC-3**	PFE-51***	224	186,5	38	125
PFRX2E-5**/31***	PFRXA-5**	PFE-31***	210	134,5	27,5	98,5
PFRX2E-5**/41***	PFRXB-5**	PFE-41***	219,5	160	38	120
PFRX2E-5**/51***	PFRXC-5**	PFE-51***	234	134,5	38	125

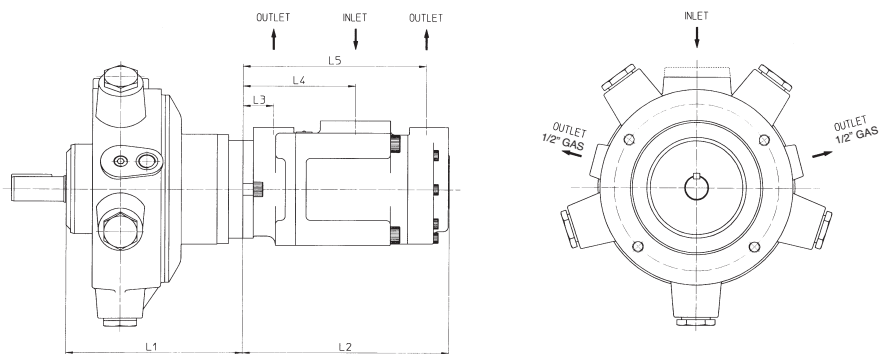
**PFRX3E**



For missing details see tab. A045, A005 and A007

Composed pump	First element - piston pump -	Second element - vane pump -	Third element - vane pump -	L1	L2	L3	L4	L5	L6	L7
PFRX3E-3**/31**/31***	PFRXA-3**	PFEXA-31***	PFE-31***	200	164	134,5	27,5	98,5	27,5	98,5
PFRX3E-3**/41***/31***	PFRXB-3**	PFEXA-41***	PFE-31***	209	194	134,5	38	120	27,5	98,5
PFRX3E-3**/41***/41***	PFRXB-3**	PFEXB-41***	PFE-41***	209	203	160	38	120	38	120
PFRX3E-3**/51***/31***	PFRXC-3**	PFEXA-51***	PFE-31***	224	206	134,5	38	125	27,5	98,5
PFRX3E-3**/51***/41***	PFRXC-3**	PFEXB-51***	PFE-41***	224	215,5	160	38	125	38	120
PFRX3E-3**/51***/51***	PFRXC-3**	PFEXC-51***	PFE-51***	224	230	186,5	38	125	38	125
PFRX3E-5**/31***/31***	PFRXA-5**	PFEXA-31***	PFE-31***	210	164	134,5	27,5	98,5	27,5	98,5
PFRX3E-5**/41***/31***	PFRXB-5**	PFEXA-41***	PFE-31***	219,5	194	134,5	38	120	27,5	98,5
PFRX3E-5**/41***/41***	PFRXB-5**	PFEXB-41***	PFE-41***	219,5	203	160	38	120	38	120
PFRX3E-5**/51***/31***	PFRXC-5**	PFEXA-51***	PFE-31***	234	206	134,5	38	125	27,5	98,5
PFRX3E-5**/51***/41***	PFRXC-5**	PFEXB-51***	PFE-41***	234	215,5	160	38	125	38	120
PFRX3E-5**/51***/51***	PFRXC-5**	PFEXC-51***	PFE-51***	234	230	186,5	38	125	38	125

**PFRXDE**



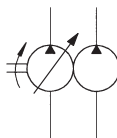
For missing details see tab. A045 and A180

Composed pump	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4	L5
PFRXDE-3**/43***/0**	PFRXB-3**	PFED-43***/0**	209	256,5	38	139,6	227,7
PFRXDE-3**/54***/0**	PFRXC-3**	PFED-54***/0**	224	288	38	152,3	261,8
PFRXDE-5**/43***/0**	PFRXB-5**	PFED-43***/0**	219,5	256,5	38	139,6	227,7
PFRXDE-5**/54***/0**	PFRXC-5**	PFED-54***/0**	234	288	38	152,3	261,8

PFRX\*E pumps are supplied with WFA-32 inlet flange for PFR, and set of inlet, outlet flanges for PFE or PFED;

### 3 PVPCX2E MULTIPLE AXIAL PISTON/VANE PUMPS

PVPCX2E are double pumps composed by one variable displacement axial piston pump type PVPC and one vane pump type PFE. They have two separated inlet ports and two separated outlet ports.



For technical characteristics of PVPC pumps, see tab. A160; for technical characteristics of PFE pumps see tab. A005 and A007.

#### 3.1 MODEL CODE FOR PVPCX2E with standard hydraulic controls

<b>PVPCX</b>	<b>2E</b>	<b>- C</b>	<b>- 4</b>	<b>046</b>	<b>/ 31044</b>	<b>/ 1</b>	<b>D</b>	<b>X</b>	<b>24DC</b>	<b>10</b>	<b>/*</b>
Variable displacement axial piston pump											Seals material: omit for NBR (mineral oil & water glycol) <b>PE</b> = FPM See notes under section 2
<b>2E</b> = with a fixed displacement pump type PFE (see tab. A005)											
Type of control: <b>C</b> = manual pressure compensator <b>CH</b> = manual pressure compensator, with venting <b>R</b> = remote pressure compensator <b>L</b> = load sensing (pressure & flow) <b>LW</b> = constant power (combined pressure & flow)											
Size: <b>3</b> = for displacement 029 <b>4</b> = for displacement 046 <b>5</b> = for displacement 073 and 090											
Max displacement of axial piston pump: <b>029</b> = 29 cm <sup>3</sup> /rev <b>046</b> = 46 cm <sup>3</sup> /rev <b>073</b> = 73 cm <sup>3</sup> /rev <b>090</b> = 88 cm <sup>3</sup> /rev											
Size and displacement [cm <sup>3</sup> /rev] of PFE second (and third) pump for PFE 31: 016, 022, 028, 036, 044 for PFE 41: 029, 037, 045, 056, 070, 085 for PFE 51: 090, 110, 129, 150 for PFE 32: 022, 028, 036, for PFE 42: 045, 056, 070, 085 for PFE 52: 090, 110, 129, 150											
Direction of rotation (viewed at the shaft end) <b>D</b> = clockwise <b>S</b> = counterclockwise											
Shaft (SAE Standard): <b>1</b> = keyed (7/8" for 029 - 1" for 046 - 1 1/4" for 073 and 090) <b>5</b> = splined (13 teeth for 029 - 15 for 046 - 14 for 073 and 090)											
<b>X</b> = without connector											
Supply voltage: 12 DC            24/50 AC 24 DC            110/50 AC 220/50 AC											

1) pumps with ISO 3019/2 mounting flange and shaft (option /M) are available on request

#### 3.2 MODEL CODE FOR PVPCX2E with electrohydraulic proportional controls

<b>PVPCX</b>	<b>2E</b>	<b>- PERS</b>	<b>- BC</b>	<b>- 4</b>	<b>046</b>	<b>/31044</b>	<b>/ *</b>	<b>/1</b>	<b>D / 18</b>	<b>10</b>	<b>/*</b>
Variable displacement axial piston pump											Seals material: omit for NBR (mineral oil & water glycol) <b>PE</b> = FPM See notes under section 2
<b>2E</b> = with a fixed displacement pump type PFE (see tab. A005)											
Type of control (see section 5, 6 and 7): <b>CZ</b> = proportional pressure compensator <b>LQZ</b> = proportional flow control (load sensing) <b>LZQZ</b> = proportional pressure & flow control (load sensing) <b>LZQZR</b> = as LZQZ plus sequence module <b>PES</b> = closed loop integral digital P/Q controller <b>PERS</b> = as PES plus sequence module											
Communication interface, only for PES and PERS versions <b>PS</b> = RS232 serial <b>BP</b> = PROFIBUS-DP <b>BC</b> = CAN-Bus											
Size: <b>3</b> = for displacement 029 <b>4</b> = for displacement 046 <b>5</b> = for displacement 073 and 090											
Max displacement of axial piston pump: <b>029</b> = 29 cm <sup>3</sup> /rev <b>046</b> = 46 cm <sup>3</sup> /rev <b>073</b> = 73 cm <sup>3</sup> /rev <b>090</b> = 88 cm <sup>3</sup> /rev											
Size and displacement [cm <sup>3</sup> /rev] of PFE second (and third) pump for PFE 31: 016, 022, 028, 036, 044 for PFE 41: 029, 037, 045, 056, 070, 085 for PFE 51: 090, 110, 129, 150 for PFE 32: 022, 028, 036, for PFE 42: 045, 056, 070, 085 for PFE 52: 090, 110, 129, 150											
Direction of rotation (viewed at the shaft end) <b>D</b> = clockwise <b>S</b> = counterclockwise											
Shaft (SAE Standard): <b>1</b> = keyed (7/8" for 029 - 1" for 046 - 1 1/4" for 073 and 090) <b>5</b> = splined (13 teeth for 029 - 15 for 046 - 14 for 073 and 090)											
Pressure setting (only for PERS): <b>200</b> = 200 bar <b>250</b> = 250 bar <b>280</b> = 280 bar (not available for 090)											
<b>Options, see sections 4 and 7:</b> <b>18</b> = with 18 Vdc coil instead of standard 12 Vdc coil (only for CZ, LQZ, LZQZ) <b>for versions PES and PE(R)S:</b> <b>C</b> = predisposed to receive 4 ÷ 20 mA feedback signal from the remote pressure transducer <b>X</b> = with integral pressure transducer (only for PERS) <b>S</b> = additional closed loop pressure control with multiple PID parameters set - <b>only for -PS</b> <b>Z</b> = as S but with double power supply, enable and fault - <b>only for -BC and -BP</b>											

1) pumps with ISO 3019/2 mounting flange and shaft (option /M) are available on request

### 3.3 OPERATING CHARACTERISTICS OF STANDARD DOUBLE PUMPS TYPE PVPCX2E (with PFE-31, 41 and 51)

(at 1450 rpm and based on mineral oil ISO VG46 at 40° C)

Standard model	Speed range [rpm] (1)	AXIAL PISTON PUMP			VANE PUMP			Total flow [l/min]																
		Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (3)	Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (4)																	
PVPCX2E-*-3029/31016	800-2800	29	42	280/350	16,5	23	210	65																
PVPCX2E-*-3029/31022					21,6	30		72																
PVPCX2E-*-3029/31028					28,1	40		82																
PVPCX2E-*-3029/31036					35,6	51		93																
PVPCX2E-*-3029/31044					43,7	63		105																
PVPCX2E-*-3029/41029	800-2500				29	42		280/350	29,3	41	210	83												
PVPCX2E-*-3029/41037									36,6	52		94												
PVPCX2E-*-3029/41045									45,0	64		106												
PVPCX2E-*-3029/41056									55,8	80		122												
PVPCX2E-*-3029/41070									69,9	101		143												
PVPCX2E-*-3029/41085	800-2000								29	42		280/350	85,3	124	210	166								
PVPCX2E-*-4046/31016	800-2600												46	66,7		280/350	16,5	23	210	89,7				
PVPCX2E-*-4046/31022																	21,6	30		92,7				
PVPCX2E-*-4046/31028																	28,1	40		102,7				
PVPCX2E-*-4046/31036																	35,6	51		113,7				
PVPCX2E-*-4046/31044		43,7	63	129,7																				
PVPCX2E-*-4046/41029	800-2500	46	66,7	280/350			29,3										41	210		107,7				
PVPCX2E-*-4046/41037							36,6										52			118,7				
PVPCX2E-*-4046/41045							45,0										64			130,7				
PVPCX2E-*-4046/41056							55,8										80			146,7				
PVPCX2E-*-4046/41070					69,9	101	167,7																	
PVPCX2E-*-4046/41085	800-2000				46	66,7	280/350	85,3			124						210			190,7				
PVPCX2E-*-5073/31016	800-2200							73			105,8									280/350	16,5	23	210	128,8
PVPCX2E-*-5073/31022																					21,6	30		135,8
PVPCX2E-*-5073/31028																					28,1	40		145,8
PVPCX2E-*-5073/31036									35,6	51		156,8												
PVPCX2E-*-5073/31044									43,7	63		168,8												
PVPCX2E-*-5073/41029									29,3	41		146,8												
PVPCX2E-*-5073/41037									36,6	52		157,8												
PVPCX2E-*-5073/41045									45,0	64		169,8												
PVPCX2E-*-5073/41056									55,8	80		185,8												
PVPCX2E-*-5073/41070		69,9	101	206,8																				
PVPCX2E-*-5073/41085	800-2000	73	105,8	280/350					85,3	124		210	229,8											
PVPCX2E-*-5073/51090	90,0								128	233,8														
PVPCX2E-*-5073/51110	109,6								157	262,8														
PVPCX2E-*-5073/51129	129,2								186	291,8														
PVPCX2E-*-5073/51150	150,2				215	320,8																		
PVPCX2E-*-5090/31016	800-2200				88	127,6	280/350	16,5	23	210	150,6													
PVPCX2E-*-5090/31022								21,6	30		157,6													
PVPCX2E-*-5090/31028								28,1	40		167,6													
PVPCX2E-*-5090/31036								35,6	51		178,6													
PVPCX2E-*-5090/31044								43,7	63		190,6													
PVPCX2E-*-5090/41029								29,3	41		168,6													
PVPCX2E-*-5090/41037								36,6	52		179,6													
PVPCX2E-*-5090/41045								45,0	64		191,6													
PVPCX2E-*-5090/41056								55,8	80		207,6													
PVPCX2E-*-5090/41070								69,9	101		228,6													
PVPCX2E-*-5090/41085	800-2000	88	127,6	280/350				85,3	124		210	251,6												
PVPCX2E-*-5090/51090	90,0							128	255,6															
PVPCX2E-*-5090/51110	109,6							157	284,6															
PVPCX2E-*-5090/51129	129,2							186	313,6															
PVPCX2E-*-5090/51150	150,2							215	342,6															

(1) Max speed is 1800 rpm for /PE versions; 1000 rpm for water glycol fluid

(2) Flow rate and power consumption are proportional to revolution speed

(3) Max pressure is 190 bar for /PE versions, 160 bar for water glycol fluid

(4) Max pressure is 160 bar for /PE and water glycol fluid



### 3.4 OPERATING CHARACTERISTICS OF STANDARD DOUBLE PUMPS TYPE PVPCX2E (with PFE-32, 42 and 52)

(at 1450 rpm and based on mineral oil ISO VG46 at 40° C)

Standard model	Speed range [rpm] (1)	AXIAL PISTON PUMP			VANE PUMP			Total flow [l/min]										
		Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (3)	Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (4)											
PVPCX2E*-3029/32022	1200-2500	29	42	280/350	21,6	30	300	72										
PVPCX2E*-3029/32028					28,1	40		82										
PVPCX2E*-3029/32036					35,6	51		93										
PVPCX2E*-3029/42045	1000-2200				29	42	280/350	45,0	64	280	106							
PVPCX2E*-3029/42056								55,8	80		122							
PVPCX2E*-3029/42070								69,9	101		143							
PVPCX2E*-3029/42085	800-2000							29	42	280/350	85,3	124	280	166				
PVPCX2E*-4046/32022	1200-2500										46	66,7		280/350	21,6	30	300	92,7
PVPCX2E*-4046/32028															28,1	40		102,7
PVPCX2E*-4046/32036		35,6	51	113,7														
PVPCX2E*-4046/42045	1000-2200	46	66,7	280/350									45,0		64	280	130,7	
PVPCX2E*-4046/42056													55,8		80		146,7	
PVPCX2E*-4046/42070					69,9	101	167,7											
PVPCX2E*-4046/42085	800-2000				46	66,7	280/350						85,3		124	280	190,7	
PVPCX2E*-5073/32022	1200-2500												73		105,8		280/350	21,6
PVPCX2E*-5073/32028								28,1	40	145,8								
PVPCX2E*-5073/32036								35,6	51	156,8								
PVPCX2E*-5073/42045	1000-2200							73	105,8	280/350	45,0	64		280		169,8		
PVPCX2E*-5073/42056											55,8	80				185,8		
PVPCX2E*-5073/42070		69,9	101	206,8														
PVPCX2E*-5073/42085	800-2000	73	105,8	280/350							85,3	124		280		229,8		
PVPCX2E*-5073/52090	800-2000										90,0	128				233,8		
PVPCX2E*-5073/52110					109,6	157	262,8											
PVPCX2E*-5073/52129					129,2	186	291,8											
PVPCX2E*-5073/52150	800-1800				73	105,8	280/350				150,2	215	210	320,8				
PVPCX2E*-5090/32022	1200-2500										88	127,6	280/350	21,6	30	300	157,6	
PVPCX2E*-5090/32028								28,1	40	167,6								
PVPCX2E*-5090/32036								35,6	51	178,6								
PVPCX2E*-5090/42045	1000-2000							88	127,6	280/350				45,0	64	280	191,6	
PVPCX2E*-5090/42056		55,8	80	207,6														
PVPCX2E*-5090/42070		69,9	101	228,6														
PVPCX2E*-5090/42085	800-2000	88	127,6	280/350										85,3	124	280	251,6	
PVPCX2E*-5090/52090	1000-2000													90,0	128		255,6	
PVPCX2E*-5090/52110					109,6	157	284,6											
PVPCX2E*-5090/52129					129,2	186	313,6											
PVPCX2E*-5090/52150	800-1500				88	127,6	280/350				150,2	215	210	342,6				

(1) Max speed is 1800 rpm for /PE versions; 1500 rpm for water glycol fluid

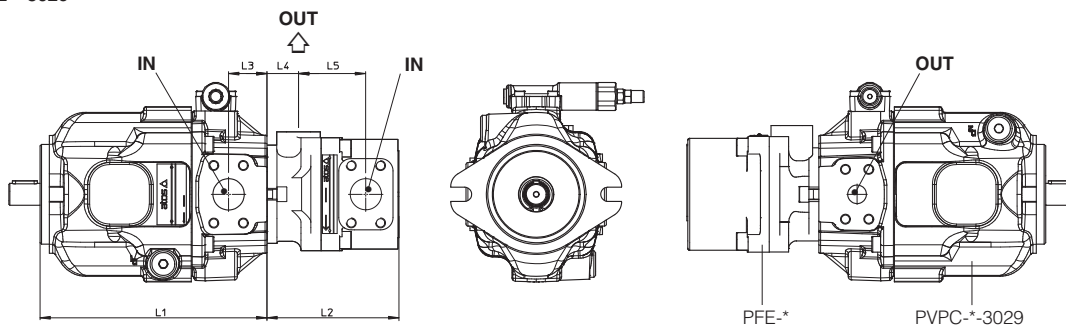
(2) Flow rate and power consumption are proportional to revolution speed

(3) Max pressure is 190 bar for /PE versions, 160 bar for water glycol fluid

(4) Max pressure is 160 bar for /PE and water glycol fluid.

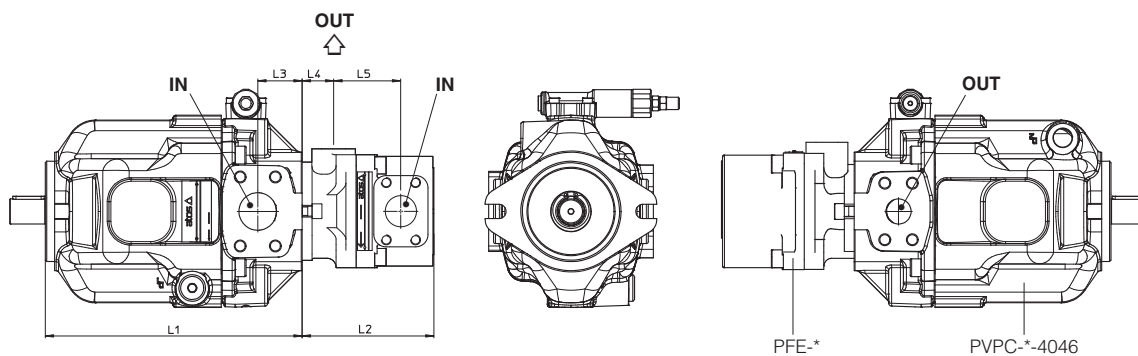
3.5 DIMENSIONS OF MULTIPLE PUMPS TYPE PVPCX2E [mm]

PVPCX2E-\*-3029



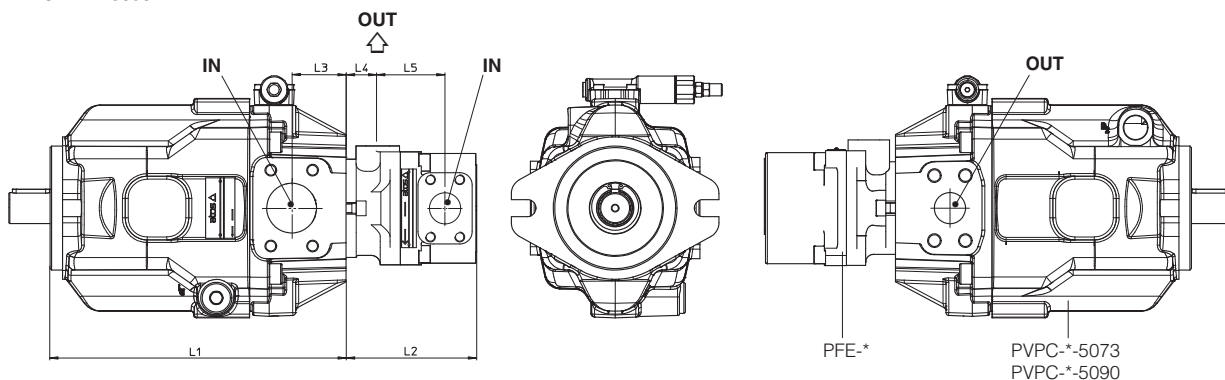
Composed pump	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4	L5
PVPCX2E-*-3029/3****	PVPCXA-*-3029	PFE-3****	231,2	134,5	39	27,5	71
PVPCX2E-*-3029/3****	PVPCXB-*-3029	PFE-4****	231,2	160	39	38	82

PVPCX2E-\*-4046



Composed pump	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4	L5
PVPCX2E-*-4046/3****	PVPCXA-*-4046	PFE-3****	259	134,5	45	27,5	71
PVPCX2E-*-4046/4****	PVPCXB-*-4046	PFE-4****	259	160	45	38	82

PVPCX2E-\*-5073  
PVPCX2E-\*-5090



Composed pump	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4	L5
PVPCX2E-*-5073/3****	PVPCXA-*-5073	PFE-3****	303,6	134,5	55,7	27,5	71
PVPCX2E-*-5073/4****	PVPCXB-*-5073	PFE-4****	303,6	160	55,7	38	82
PVPCX2E-*-5073/5****	PVPCXC-*-5073	PFE-5****	303,6	186,5	55,7	38	87
PVPCX2E-*-5090/3****	PVPCXA-*-5090	PFE-3****	303,6	134,5	55,7	27,5	71
PVPCX2E-*-5090/4****	PVPCXB-*-5090	PFE-4****	303,6	160	55,7	38	82
PVPCX2E-*-5090/5****	PVPCXC-*-5090	PFE-5****	303,6	186,5	55,7	38	87