Multiple pumps type PFEX, PFRX, PVPCX2E

vane, piston, fixed or variable displacement

Multiple pumps are compact groups made by single pumps factory assembled in modular execution, designed to be driven by a single motor. They are suitable to perform control logics such as high / low flow circuits or for applications where each individual stage of the pump feeds a specific line of the hydraulic circuit.

Multiple pumps are available in execution with double or triple fixed displacement vane pumps, or single vane pumps coupled to fixed displacement radial piston pumps or variable displacement axial piston pumps.

Multiple vane pumps, fixed displacement - see section 1
PFEX2 double pump made by two vane pumps type **PFE**
PFEX3 triple pump made by three vane pumps type **PFE**
PFEXD triple pump made by one vane pump type **PFE** coupled with double vane pump type **PFED**

Multiple radial piston + vane pumps, fixed displacement - see section 2
PFRX2E double pump made by radial piston pumps type **PFR** coupled with one vane pumps type **PFE**
PFRX3E triple pump made by radial piston pumps type **PFR** coupled with two vane pumps type **PFE**
PFRXE triple pump made by one vane pane type **PFR** coupled with double vane pump type **PFED**

Multiple axial piston, variable displacement + vane pump, fixed displacement - see section 3
PVPCX2E double pump made by one axial piston pumps type **PVPC** coupled with one vane pump type **PFE**

Note: for tech. tables of single pumps see section 4

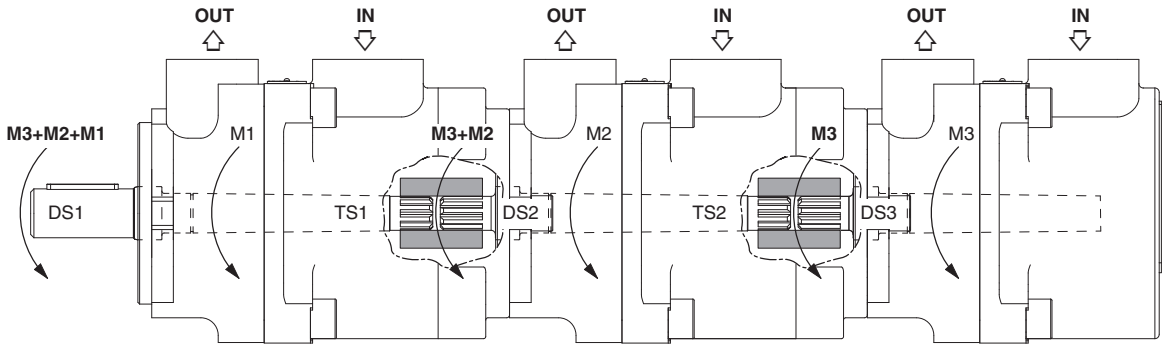


Fig.1

Sizing criteria

The total torque applied to the drive shaft of the first pumps is the sum of the single torque required to operate each single pump.

- It must be verified that the total torque applied to the drive shaft of the first pumps does not exceed the max allowed limit specified in the tech table of the specific pump
- It must be verified that the max torque applied on each single drive shaft and on each single through shaft are not higher than the max allowed limit specified in the tech table of each single pump

With reference to above Fig.1:
M1, M2, M3 = torque required to operate each single pump
DS1, DS2, DS3 = limits of torque for drive shafts
TS1, TS2 = limits of torque at the end of through shafts

The following conditions must be verified:
a) **M3** ≤ **TS2**
b) **M3** + **M2** ≤ **DS2**
c) **M3** + **M2** ≤ **TS1**
d) **M3** + **M2** + **M1** ≤ **DS1**

1 MODEL CODE OF PFEX*

1.1 MODEL CODE OF PFEX2, PFEX3

PFEX	2	-	42	045	/	31028	/	31016	/	3	D	T	*	/	*

Fixed displacement multiple vane pump

Execution
2 = double pump (two pumps type PFE)
3 = triple pump (three pumps type PFE)

Size of first pump:
31, **41**, **51**, **32**, **42**, **52**

Displacement of first pump
for PFE 31: **010, 016, 022, 028, 036, 044**
for PFE 41: **029, 037, 045, 056, 070,085**
for PFE 51: **090, 110, 129, 150**
for PFE 32: **016, 022, 028, 036**
for PFE 42: **045, 056, 070, 085**
for PFE 52: **090, 110, 129, 150**

Size and displacement of second pump - see first pump **(1)**

Size and displacement of third pump - see first pump **(1)**

Drive shaft
cylindrical keyed:
1 = (only for PFE-31, 41, 51) standard
2 = (only for PFE-41 and PFE-51) according to ISO/DIN 3019
3 = for high torque applications

splined
5 = standard
6 = 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;

Direction of rotation viewed at the shaft end:
D = clockwise (supplied standard)
S = counterclockwise
Note: PFE are not reversible

Port orientation, see section 1.4

Series number

Seals material:
- = NBR (mineral oil & water glycol)
PE = FPM

(1) Second and third pumps must be selected with equal or smaller size than the first pump

1.2 MODEL CODE OF PFEXD

PFEX	D	-	42	045	/	43037	/	022	/	3	D	T	*	/	*

Fixed displacement multiple vane pump

Execution
D = triple pump (one pump type PFE and one pump type PFED)

Size of first pump:
41, **51**, **42**, **52**

Displacement of first pump
for PFE 41: 029, 037, 045, 056, 070,085
for PFE 51: 090, 110, 129, 150
for PFE 42: 045, 056, 070, 085
for PFE 52: 090, 110, 129, 150

Size and displacement of PFED first element
for PFED **43: 029, 037, 045, 056, 070, 085**
for PFED **54: 090, 110, 129, 150**

Displacement of PFED second element
for PFED 43: **016, 022, 028, 036, 044**
for PFED 54: **029, 037, 045, 056, 070, 085**

Drive shaft
cylindrical keyed:
1 = (only for PFE-31, 41, 51) standard
2 = (only for PFE-41 and PFE-51) according to ISO/DIN 3019
3 = for high torque applications

splined
5 = standard
6 = 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;

Direction of rotation viewed at the shaft end:
D = clockwise (supplied standard)
S = counterclockwise
Note: PFE are not reversible

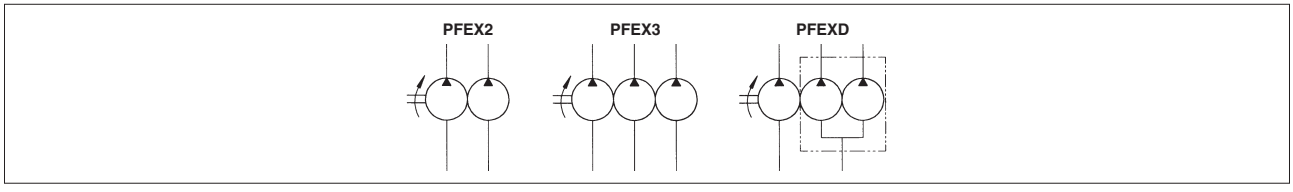
Port orientation, see section 1.4

Series number

Seals material:
- = NBR (mineral oil & water glycol)
PE = FPM

(1) PFEXD-41 and 42 can be coupled only with PFED-43

1.3 HYDRAULIC SYMBOL

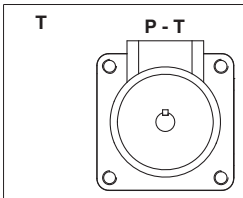
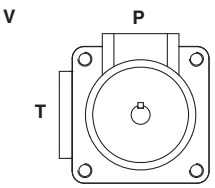
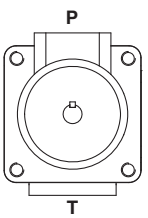
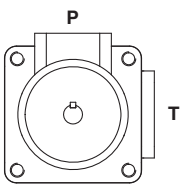


1.4 PORT ORIENTATION

-PFEX2, PFEX3

Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated.
The port orientation is defined by code **T, U, V, W** and it is the same for first, second (third) pumps.
Ports orientation can be easily changed by rotating the pump body that carries inlet port.

Model code example: PFEX2-42045/41037/5D**T**

			
orientation of all pumps	orientation of all pumps	orientation of all pumps	orientation of all pumps

P = outlet port; **T** = 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-42045/43037/016/5D**TO**

1st PUMP PFEX*	2nd / 3th PUMP PFED*							
P1-T1	**TO** P2-T2-P3	**TA** P2-T2 P3	**TB** P2-T2 P3	**TC** P2-T2 P3	**TD** P2-T2 P3	**TE** P2-T2 P3	**TF** P2-T2 P3	**TG** P2-T2 P3
P1 T1	**WO** P2-P3 T2	**WA** P2 P3 T2	**WB** P2 T2 P3	**WC** P2 T2 P3	**WD** P2 T2 P3	**WE** P2 T2 P3	**WF** P2 P3-T2	**WG** P2 P3 T2
P1 T1	**UO** P2-P3 T2	**UA** P2 P3 T2	**UB** P2 T2 P3	**UC** P2 T2 P3	**UD** P2 P3-T2	**UE** P2 P3 T2	**UF** P2 P3 T2	**UG** P2 P3 T2
P1 T1	**VO** P2-P3 T2	**VA** P2 P3 T2	**VB** P2 P3-T2	**VC** P2 T2 P3	**VD** P2 T2 P3	**VE** P2 T2 P3	**VF** P2 P3 T2	**VG** P2 P3 T2

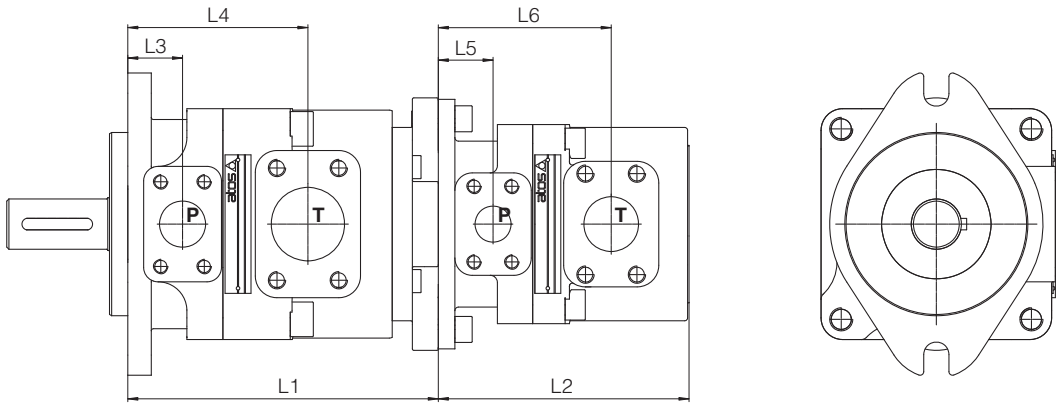
P1 outlet port of first element; **P2** outlet port of second element; **P3** outlet port of third element; **T1** inlet port of first element; **T2** inlet port of second element

1.5 OPERATING CHARACTERISTICS OF PFEX*

See technical table of single pumps:
A005 for PFE-31, 41, 51 **A007** for PFE-32, 42, 52

1.6 DIMENSIONS OF PFEX* [mm]

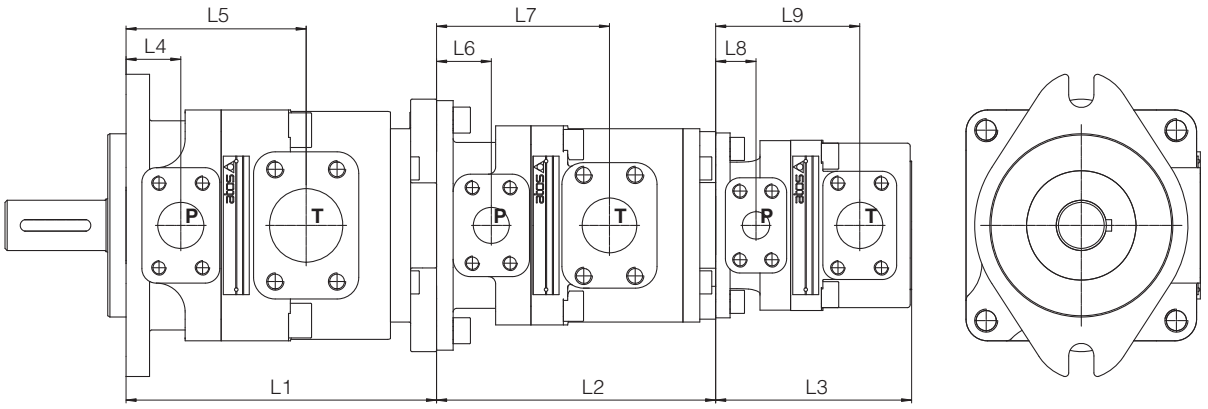
PFEX2



For missing details see tab. A005 and A007

Model code	First pump	Second pump	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

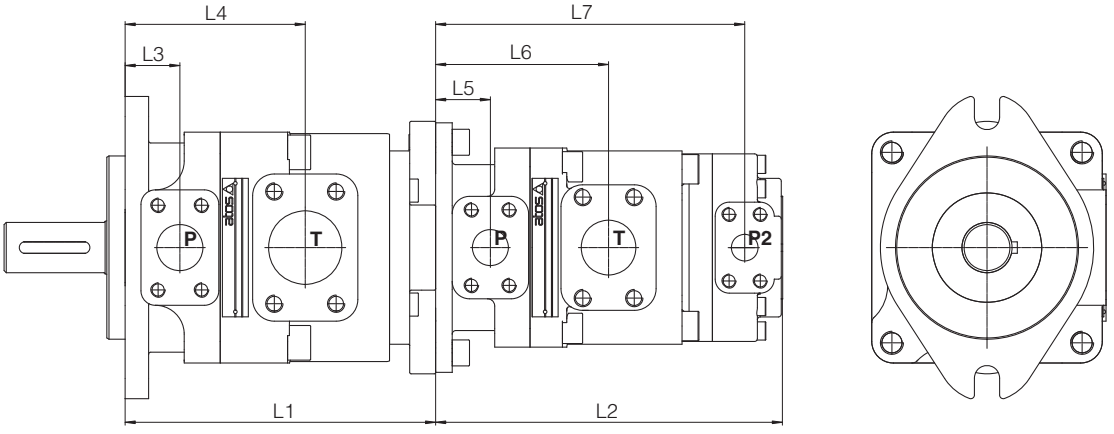
PFEX3



For missing details see tab. A005 and A007

Model code	First pump	Second pump	Third pump	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

Model code	First pump	Second pump	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 MODEL CODE OF PFRX*E

2.1 MODEL CODE OF PFRX2E, PFRX3E

PFRX	2E	-	3	08	/	31044	/	31028	/	D	*	*	/	*

Multiple fixed displacement radial piston/vane pump

Execution
2E = double: PFR + PFE
3E = triple: PFR + PFEX2

Size of first pump type PFR
3

Displacement of first pump type PFR [cm³/rev]
for PFR-3: **08**, **11**, **15**

Size and displacement of PFE second (and third) pump
for PFE 31: 010, 016, 022, 028, 036, 044
for PFE 41: 029, 037, 045, 056, 070,085
for PFE 51: 090, 110, 129
for PFE 32: 016, 022, 028, 036
for PFE 42: 045, 056, 070, 085
for PFE 52: 090, 110, 129

Size and displacement of PFE third pump
for PFE 31: 010, 016, 022, 028, 036, 044
for PFE 41: 029, 037, 045, 056, 070,085
for PFE 51: 090, 110, 129
for PFE 32: 016, 022, 028, 036
for PFE 42: 045, 056, 070, 085
for PFE 52: 090, 110, 129

Direction of rotation viewed at the shaft end:
D = clockwise (supplied standard if not otherwise specified)
S = counter clockwise
Note: PFRX*E are not reversible

Port orientation, see section 2.4

Series number

Seals material:
- = NBR (mineral oil & water glycol)
PE = FPM

2.2 MODEL CODE OF PFRXDE

PFRX	DE	-	3	08	/	43045	/	036	D	*	*	/	*

Multiple fixed displacement radial piston/vane pump

Execution
DE = triple: PFR + PFED

Size of first pump type PFR
3

Displacement of first pump type PFR [cm³/rev]
for PFR-3: **08**, **11**, **15**

Size and displacement of PFED first element [cm³/rev]
for PFED **43: 029, 037, 045, 056, 070, 085**
for PFED **54: 090, 110, 129**

Displacement of PFED second element [cm³/rev]
for PFED 43: **016, 022, 028, 036, 044**
for PFED 54: **029, 037, 045, 056, 070, 085**

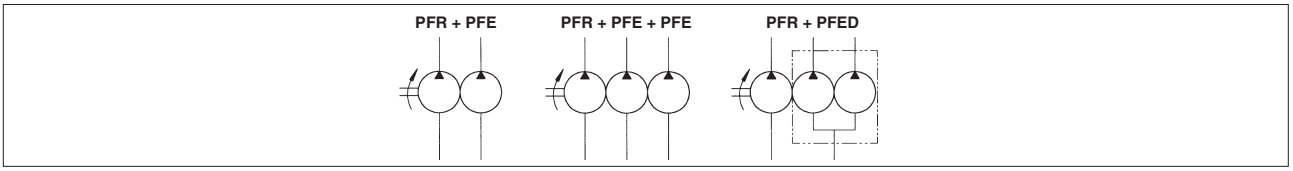
Direction of rotation viewed at the shaft end:
D = clockwise (supplied standard if not otherwise specified)
S = counter clockwise
Note: PFRX*E are not reversible

Port orientation, see section 2.4

Series number

Seals material:
- = NBR (mineral oil & water glycol)
PE = FPM

2.3 HYDRAULIC SYMBOL

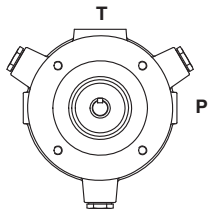
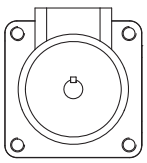
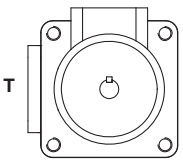
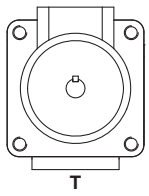
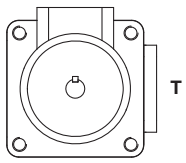


2.4 PORT ORIENTATION

-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 pump is always oriented as the second pump.

Model code example: PFRX2E-315/31044/D**T**

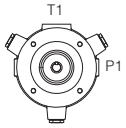
1st PUMP PFRX*	**2nd / 3th PUMP PFE**			
	**T** 	**V** 	**U** 	**W** 

P = outlet port; **T** = inlet port

-PFRXDE

Pumps can be supplied with oil ports oriented in different configurations viewed from shaft end, as below indicated.
The port orientation of second and third pump (PFED) is defined by codes T*, W*, U*, V* as per below table

Model code example: PFRXDE-315/43045/022/D**TO**

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

2.5 OPERATING CHARACTERISTICS OF PFRX2E

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

Model code (1)	Speed range [rpm] (2)	RADIAL PISTON PUMP			VANE PUMP			
		Displacement [cm³/rev]	Flow [l/min] (3)	Max pressure [bar] (4)	Displacement [cm³/rev]	Flow [l/min] (3)	Max pressure [bar] (5)	Total flow [l/min]
PFRX2E-308/31010	600-1800	8	12,6	350	10,5	15	160	27,6
PFRX2E-308/31016					16,5	23	210	35,6
PFRX2E-308/31022					21,6	30		42,6
PFRX2E-308/31028					28,1	40		52,6
PFRX2E-308/31036					36,5	51		63,6
PFRX2E-308/31044					43,7	63		75,6
PFRX2E-308/41029					29,3	41		53,6
PFRX2E-308/41037					36,6	52		64,6
PFRX2E-308/41045					45	64		76,6
PFRX2E-308/41056					55,8	80		92,6
PFRX2E-308/41070					69,9	101		113,6
PFRX2E-308/41085					85,3	124		136,6
PFRX2E-308/51090					90	128		140,6
PFRX2E-308/51110					109,6	157		169,6
PFRX2E-308/51129					129,2	186		198,6
PFRX2E-311/31044		11,4	16,5	350	43,7	63		79,5
PFRX2E-311/41070					69,9	101		117,5
PFRX2E-311/41085					85,3	124		140,5
PFRX2E-311/51110					109,6	157		173,5
PFRX2E-311/51129					129,2	186		202,5
PFRX2E-315/41056		14,7	21,5	350	55,8	80		101,5
PFRX2E-315/41070					69,9	101		122,5
PFRX2E-315/51110					109,6	157		178,5
PFRX2E-315/51129					129,2	186		207,5

(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 HFDU, HFDR fluids; 1000 rpm for HFC fluids
(3) Flow rate and power consumption are proportional to revolution speed
(4) Max pressure is 250 bar for HFDU, HFDR fluids, 175 bar for HFC fluids
(5) Max pressure is 160 bar for HFDU, HFDR, HFC fluids

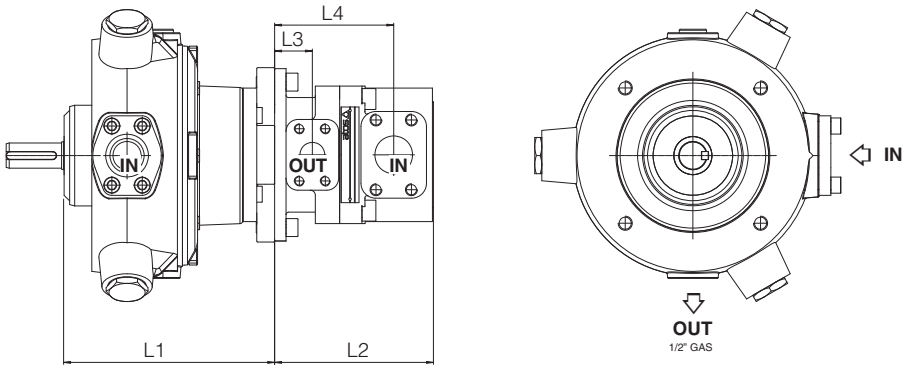
The shaft of the PFR pump has an eccentric cam which rotates with the shaft generating the stroke of the pistons and thus generating the flow rate.
For best functioning a balanced coupling should be provided between the shaft of the motor and the shaft of the pump.
See tab. A045

2.6 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.

2.7 DIMENSIONS OF PFRX* [mm]

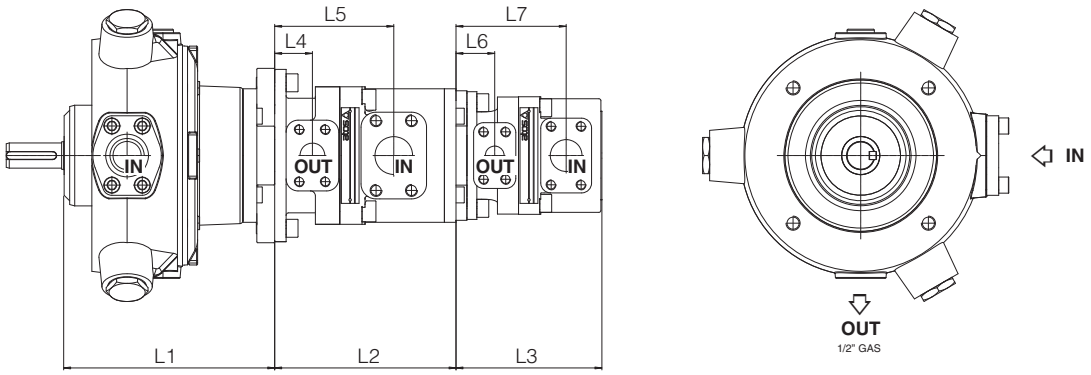
PFRX2E



For missing details see tab. A045, A005 and A007

Model code	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

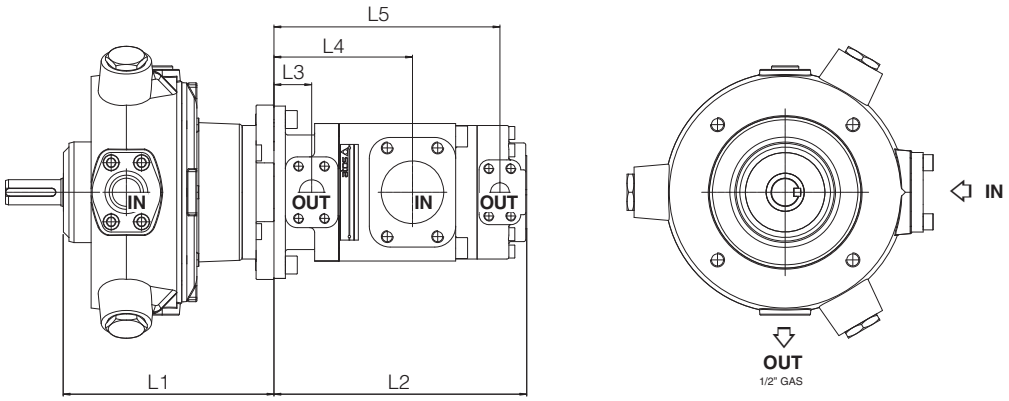
PFRX3E



For missing details see tab. A045, A005 and A007

Model code	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

PFRXDE



For missing details see tab. A045 and A180

Model code	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

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

3 MODEL CODE OF PVPCX2E

3.1 MODEL CODE FOR PVPCX2E with mechanical controls

PVPC | **X2E** - **C** - **4046** / **31044** / **1** | **D** | **X** | **24DC** | * / *

Variable displacement axial piston pump

X2E = coupled with a fixed displacement pump type PFE (see tab. A005, A007)

Type of control:
C = manual pressure compensator
CH = manual pressure compensator, with venting
R = remote pressure compensator
L = load sensing (pressure & flow)
LW = constant power (combined pressure & flow)

Size and max displacement of axial piston pump:
3029 = 29 cm³/rev **5073** = 73 cm³/rev
4046 = 46 cm³/rev **5090** = 88 cm³/rev

Size and displacement of PFE second pump
for PFE 31: **010, 016, 022, 028, 036, 044** for PFE 32: **016, 022, 028, 036**
for PFE 41: **029, 037, 045, 056, 070, 085** for PFE 42: **045, 056, 070, 085**
for PFE 51: **090, 110, 129, 150** for PFE 52: **090, 110, 129, 150**

Shaft (SAE Standard):
1 = keyed (7/8" for 029 - 1" for 046 - 1 1/4" for 073 and 090)
5 = splined (13 teeth for 029 - 15 for 046 - 14 for 073 and 090)

Direction of rotation viewed at the shaft end:
D = clockwise
S = counterclockwise

X = without connector

Coil voltage - only CH version:
12DC 24/50AC
24DC 110/50AC
220/50AC

Series number

Seals material:
– = NBR
PE = FKM
See notes under sect. 2

3.2 MODEL CODE FOR PVPCX2E with electrohydraulic proportional controls

PVPC | **X2E** - **PERS-SP** - **BC** - **4046** / **31044** / * / **1** | **D** / **18** | * / *

Variable displacement axial piston pump

X2E = coupled with a fixed displacement pump type PFE (see tab. A005, A007)

Type of control
CZ = proportional pressure control
LQZ = proportional flow control (load sensing)
PES-SP = closed loop integral digital P/Q driver
PERS-SP = as PES plus sequence module

Fieldbus interfaces, USB port always present (Only for PES and PERS):
NP = Not present
BC = CANopen **EW** = POWERLINK
BP = PROFIBUS DP **EI** = EtherNet/IP
EH = EtherCAT **EP** = PROFINET RT/IRT

Size and max displacement of axial piston pump:
3029 = 29 cm³/rev **4046** = 46 cm³/rev
5073 = 73 cm³/rev **5090** = 88 cm³/rev

Size and displacement [cm³/rev] of PFE second pump
for PFE 31: **010, 016, 022, 028, 036, 044** for PFE 32: **016, 022, 028, 036**
for PFE 41: **029, 037, 045, 056, 070, 085** for PFE 42: **045, 056, 070, 085**
for PFE 51: **090, 110, 129, 150** for PFE 52: **090, 110, 129, 150**

Pressure setting, only for PERS: **200** = 200 bar **250** = 250 bar **280** = 280 bar

Shaft (SAE Standard):
1 = keyed (7/8" for 029 - 1" for 046 - 1 1/4" for 073 and 090)
5 = splined (13 teeth for 029 - 15 for 046 - 14 for 073 and 090)

Direction of rotation viewed at the shaft end
D = clockwise **S** = counterclockwise

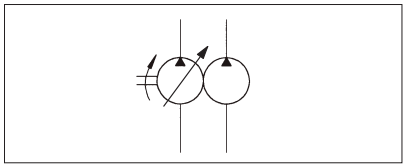
Coil voltage, for CZ, LQZ - see section 18:
18 = optional coil 18 VDC for low current drivers instead of standard 12 VDC

Electronics options, for PES and PERS **(4):**
C = current feedback for pressure transducer 4÷20 mA (omit for std voltage ±10VDC)
I = current reference input and monitor 4÷20 mA (omit for std voltage ±10VDC)
X = on-board pressure transducer with pre-configured pressure settings (only for PERS)
S = with 2 on-off inputs for multiple pressure PID selection for NP execution or double power supply for fieldbus execution, plus dedicated connector for remote pressure transducer

Series number

Seals material:
– = NBR
PE = FKM
See notes under sect. 2

3.3 HYDRAULIC SYMBOL



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.

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

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

Model code	Speed range [rpm] (1)	AXIAL PISTON PUMP			VANE PUMP			
		Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (3)	Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (4)	Total flow [l/min]
PVPCX2E-*-3029/31010	800-2400	29	42	280/350	10,5	15	160	57
PVPCX2E-*-3029/31016	800-2800				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	800-2500				43,7	63		105
PVPCX2E-*-3029/41029					29,3	41		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				85,3	124		166
PVPCX2E-*-4046/31010	800-2400	46	66,7	280/350	10,5	15	160	81,7
PVPCX2E-*-4046/31016	800-2600				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	800-2500				43,7	63		129,7
PVPCX2E-*-4046/41029					29,3	41		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				85,3	124		190,7
PVPCX2E-*-5073/31010	800-2400	73	105,8	280/350	10,5	15	160	120,8
PVPCX2E-*-5073/31016	800-2200				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				85,3	124		229,8
PVPCX2E-*-5073/51090	800-2200				90,0	128		233,8
PVPCX2E-*-5073/51110					109,6	157		262,8
PVPCX2E-*-5073/51129					129,2	186		291,8
PVPCX2E-*-5073/51150	800-1800				150,2	215		320,8
PVPCX2E-*-5090/31010	800-2400	88	127,6	250/315	10,5	15	160	142,6
PVPCX2E-*-5090/31016	800-2200				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				85,3	124		251,6
PVPCX2E-*-5090/51090	800-2200				90,0	128		255,6
PVPCX2E-*-5090/51110					109,6	157		284,6
PVPCX2E-*-5090/51129					129,2	186		313,6
PVPCX2E-*-5090/51150	800-1800				150,2	215		342,6

(1) Max speed is 1800 rpm for HFDU, HFDR fluids; 1000 rpm for HFC fluids
(2) Flow rate and power consumption are proportional to revolution speed
(3) Max pressure is 190 bar for HFDU, HFDR fluids, 160 bar for HFC fluids
(4) Max pressure is 160 bar for HFDU, HFDR, HFC fluids

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

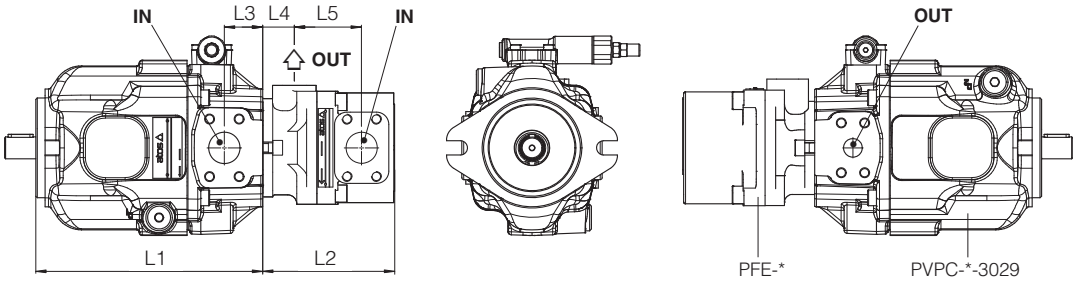
(at 1450 rpm and based on mineral oil ISO VG46 at 40° C)

Standard model	Speed range [rpm] (1)	AXIAL PISTON PUMP			VANE PUMP			
		Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (3)	Displacement [cm³/rev]	Flow [l/min] (2)	Max pressure [bar] (4)	Total flow [l/min]
PVPCX2E-*-3029/32016	1200-2500	29	42	280/350	16,5	23	210	65
PVPCX2E-*-3029/32022					21,6	30	300	72
PVPCX2E-*-3029/32028					28,1	40		82
PVPCX2E-*-3029/32036					35,6	51		93
PVPCX2E-*-3029/42045	1000-2200				45,0	64	280	106
PVPCX2E-*-3029/42056					55,8	80		122
PVPCX2E-*-3029/42070					69,9	101		143
PVPCX2E-*-3029/42085	800-2000				85,3	124		166
PVPCX2E-*-4046/32016	1200-2500	46	66,7	280/350	16,5	23	210	89,7
PVPCX2E-*-4046/32022					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				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				85,3	124		190,7
PVPCX2E-*-5073/32016	1200-2500	73	105,8	280/350	16,5	23	210	128,8
PVPCX2E-*-5073/32022					21,6	30	300	135,8
PVPCX2E-*-5073/32028					28,1	40		145,8
PVPCX2E-*-5073/32036					35,6	51		156,8
PVPCX2E-*-5073/42045	1000-2200				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				85,3	124		229,8
PVPCX2E-*-5073/52090	800-2000				90,0	128	250	233,8
PVPCX2E-*-5073/52110					109,6	157		262,8
PVPCX2E-*-5073/52129					129,2	186		291,8
PVPCX2E-*-5073/52150	800-1800				150,2	215	210	320,8
PVPCX2E-*-5090/32016	1200-1850	88	127,6	280/350	16,5	23	210	150,6
PVPCX2E-*-5090/32022					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	1000-1850				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	800-1850				85,3	124		251,6
PVPCX2E-*-5090/52090	1000-1850				90,0	128	250	255,6
PVPCX2E-*-5090/52110					109,6	157		284,6
PVPCX2E-*-5090/52129					129,2	186		313,6
PVPCX2E-*-5090/52150	800-1800				150,2	215	210	342,6

(1) Max speed is 1800 rpm for HFDU, HFDR versions; 1500 rpm for HFC fluids
(2) Flow rate and power consumption are proportional to revolution speed
(3) Max pressure is 190 bar for HFDU, HFDR fluids, 160 bar for HFC fluids
(4) Max pressure is 160 bar for HFDU, HFDR, HFC fluids

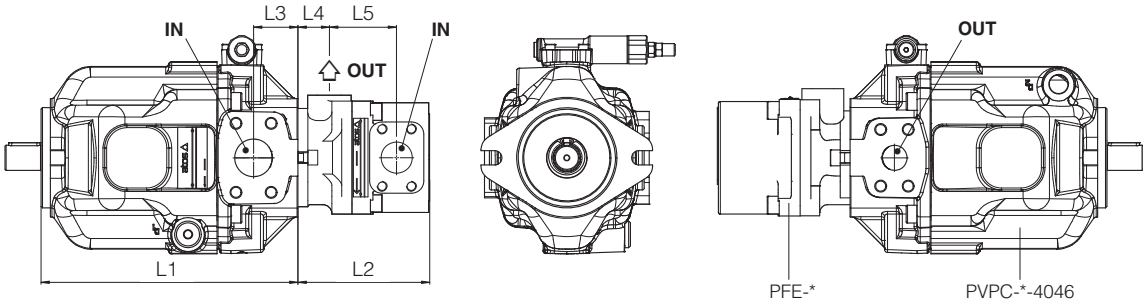
3.6 DIMENSIONS OF MULTIPLE PUMPS TYPE PVPCX2E [mm]

PVPCX2E-*-3029



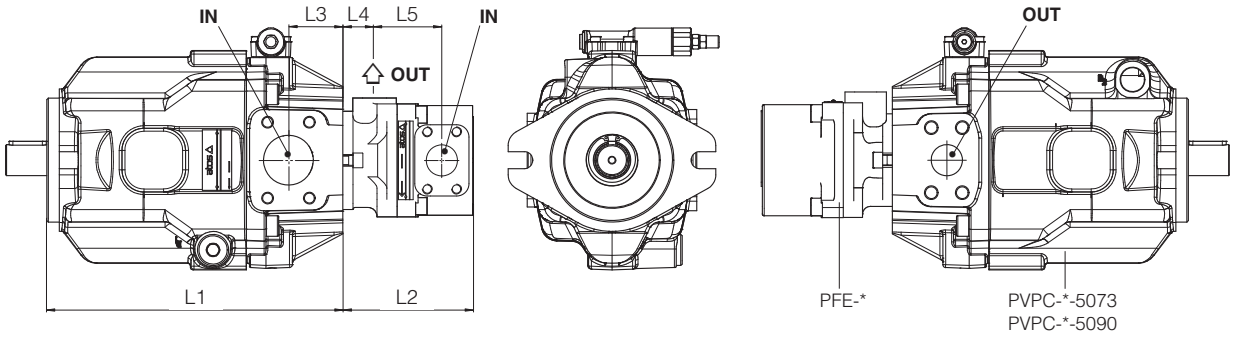
Model code	First element - piston pump -	Second element - vane pump -	L1	L2	L3	L4	L5
PVPCX2E-*-3029/3****	PVPCXA-*-3029	PFE-3****	231,2	134,5	39	27,5	71
PVPCX2E-*-3029/4****	PVPCXB-*-3029	PFE-4****	231,2	160	39	38	82

PVPCX2E-*-4046



Model code	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



Model code	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

4 RELATED DOCUMENTATION

A005, A007	Vane pumps type PFE	**A160, AS170**	Axial piston pumps type PVPC
A180	Double vane pumps type PFED	**A900**	Operating and maintenance information for pumps
A045	Radial piston pumps type PFR		