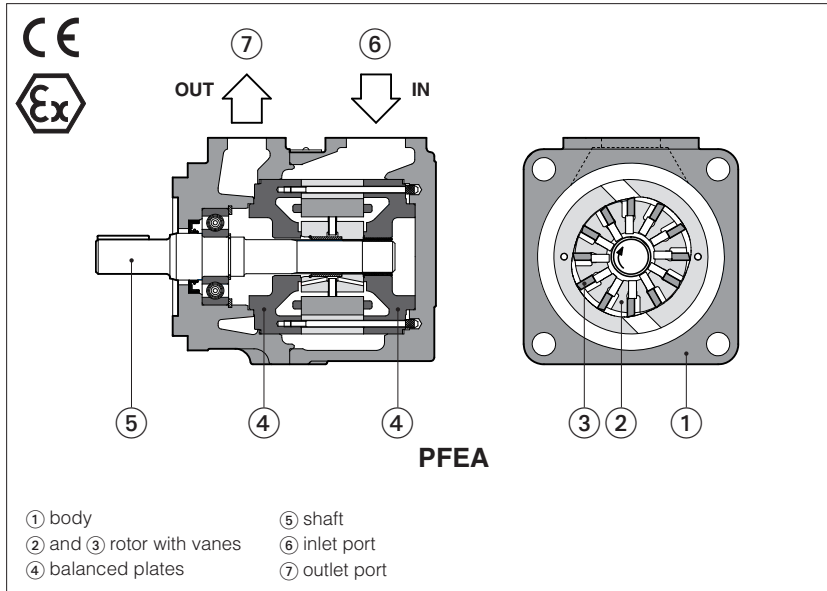


Ex-proof vane pumps type PFEA

fixed displacement - for potentially explosive atmospheres - ATEX



PFEA are fixed displacement-twelve-vane pumps available in threebody sizes and two different executions.

They are certified for application in potentially explosive atmospheres according to ATEX 2014/34/EU, protection mode

Ex II 2/2G Ex h IIC T5, T4 Gb, and Ex II 2/2D Ex h IIIC T100°C, T135°C Db (group II for surface plants with gas, vapours and dust environment, category 2, zone 1, 2, 21 and 22).

The external surface temperature of the pump is in accordance with the certified class, to avoid the self ignition of the explosive mixture present in the environment.

PFEA are available in two executions:

PFEA-*1 max pressure **210** bar

PFEA-*2 max pressure **300** bar

Displacements up to **150** cm³/rev.

1 MODEL CODE

PFEA	XA - 31	036 /	1	D	T /	7	* /	*
Fixed displacement vane pump with ex-proof certification								
Additional suffix for pumps with through shaft, for coupling with 2nd pump type PFEA: XA = for coupling with PFEA-31 XB = for coupling with PFEA-41 (only for PFEA-41, 42 and PFEA-51, 52) XC = for coupling with PFEA-51 (only for PFEA-51 and 52) XO = with through shaft, without rear flange								
Size: 31, 41, 51 (standard) 32, 42, 52 (high pressure and low noise)								
Displacement of PFEA-31, 41, 51 [cm ³ /rev] for PFEA-31: 010, 016, 022, 028, 036, 044 for PFEA-41: 029, 037, 045, 056, 070, 085 for PFEA-51: 090, 110, 129, 150								
Displacement of PFEA-32, 42, 52 [cm ³ /rev] for PFEA-32: 016, 022, 028, 036 for PFEA-42: 045, 056, 070, 085 for PFEA-52: 090, 110, 129, 150								
							Seals material: omit for NBR (mineral oil & water glycol) PE = FKM (2)	
							Series number	
							Option: 7 = for ambient temperature up to 70°C (2)	
							Port orientation , see section 8: T = standard U, V, W = on request	
							Direction of rotation (viewed from the shaft end): D = clockwise S = counterclockwise Note: PFEA* are not reversible	
							Drive shaft: cylindrical, keyed (not for PFEA rear pumps to be coupled with PFEAX*) 1 = standard (only for PFEA 31, 41, 51) 2 = long version (only for PFEA-41 and PFEA-51) 3 = for high torque applications	
							splined 5 = for signal and through-shift pumps (1) 6 = for signal and through-shift pumps (only first position) 7 = for signal and through-shift pumps (only second and third position)	only PFEA-31,42 PFEA-32,42

(1) Shaft type 5 has to be selected for PFEA rear pumps to be coupled with PFEAX* first pumps

(2) Pumps with option /7 are always equipped with seals FKM

2 GENERAL CHARACTERISTICS

Assembly position	Any position
Loads on the shaft	Axial and radial loads are not allowed on the shaft. The coupling should be sized to absorb the power peak.
Ambient temperature range	-20°C to +70°C
Recommended pressure on inlet port	from -0,15 to 1,5 bar for speed up to 1800 rpm; from 0 to +1,5 bar for speed over 1800 rpm
Compliance	Explosion proof protection "Ex h", see section 6 RoHs Directive 2011/65/EU as last update by 2015/65/EU REACH Regulation (EC) n° 1907/2006

3 OPERATING CHARACTERISTICS of PFEA - 31,41,51 at 1450 rpm (based on mineral oil ISO VG 46 at 50°C)

Model	Displacement cm ³ /rev	Max pressure (1)	Speed range rpm (2)	7 bar (3)		140 bar (3)		210 bar (3)		
				l/min	kW	l/min	kW	l/min	kW	
PFEA-31010	10,5	160	800-2400	15	0,2	12	5	-	-	
PFEA-31016	16,5			23	0,5	19	5	16	8,3	
PFEA-31022	21,6		800-2800	30	0,6	26	7	23	10,8	
PFEA-31028	28,1			40	0,8	36	10	33	14	
PFEA-31036	35,6			51	1	46	12,5	43	17,8	
PFEA-31044	43,7			63	1,3	58	15,5	55	22	
PFEA-41029	29,3			41	0,8	37	10	34	14,7	
PFEA-41037	36,6			800-2500	52	1	48	12,5	45	18,3
PFEA-41045	45,0		64		1,3	60	16	57	22,6	
PFEA-41056	55,8		80		1,6	75	21	72	28	
PFEA-41070	69,9		101		2	95	26	91	35	
PFEA-41085	85,3		800-2000		124	2,4	118	32	114	43
PFEA-51090	90,0				128	2,7	119	33	114	45
PFEA-51110	109,6		800-2200	157	3,2	147	40	141	55	
PFEA-51129	129,2			186	3,7	174	47	168	65	
PFEA-51150	150,2		800-1800	215	4,2	204	55	197	75	

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

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

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

4 OPERATING CHARACTERISTICS of PFEA - 32, 42, 52 at 1450 rpm (based on mineral oil ISO VG 46 at 50°C)

Model	Displacement cm ³ /rev	Max pressure (1)	Speed range rpm (2)	7 bar (3)		140 bar (3)		at max. pressure (3)	
				l/min	kW	l/min	kW	l/min	kW
PFEA-32016	16,5	210 bar	1000-2500	23	0,35	20	6	16	10
PFEA-32022	21,6			30	0,6	26	7	20	16
PFEA-32028	28,1	300 bar	1200-2500	40	0,8	36	10	30	20
PFEA-32036	35,6			51	1	46	12,5	40	26
PFEA-42045	45	280 bar	1000-2200	64	1,3	60	16	56	31
PFEA-42056	55,8			80	1,6	75	21	70	40
PFEA-42070	69,9	250 bar		101	2	95	26	90	42
PFEA-42085	85,3	210 bar	800-2000	124	2,4	118	32	114	43
PFEA-52090	90	250 bar	1000-2000	128	2,7	119	33	111	54
PFEA-52110	109,6			157	3,2	147	40	138	66
PFEA-52129	129,2			186	3,7	174	47	163	78
PFEA-52150	150,2	210 bar	800-1800	215	4,2	204	55	197	80

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

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

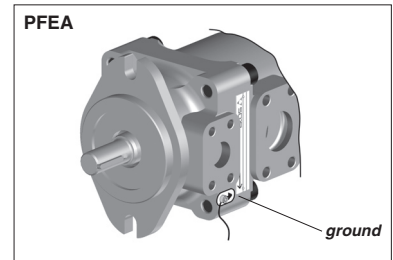
(3)Flow rate and power consumption are proportional to the rotation speed

5 SEALS AND HYDRAULIC FLUIDS - for other fluids not included in below table, consult our technical office

Seals, recommended fluid temperature	NBR seals (standard) = -20°C ÷ +60°C, with HFC hydraulic fluids = -20°C ÷ +50°C FKM seals (/PE option) = -20°C ÷ +80°C		
Recommended viscosity	15÷100 mm ² /s - max start-up viscosity = 1000 mm ² /s		
Max fluid contamination level	normal operation	ISO4406 class 21/19/16 NAS1638 class 10	see also filter section at www.atos.com or KTF catalog
	longer life	ISO4406 class 19/17/14 NAS1638 class 8	
Hydraulic fluid	Suitable seals type	Classification	Ref. Standard
Mineral oils	NBR, FKM	HL, HLP, HLPD, HVLP, HVLDP	DIN 51524
Flame resistant without water	FKM	HF DU, HF DR	ISO 12922
Flame resistant with water	NBR	HFC	

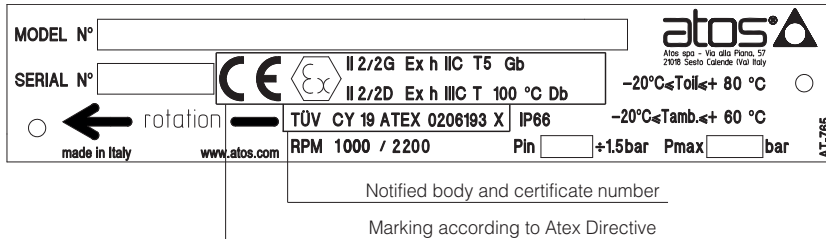
6 CERTIFICATION MAIN DATA

Certification	ATEX	
Protection mode	Ex II 2/2G Ex h IIC T5, T4 Gb, Ex II 2/2D Ex h IIIC T100°C, T135°C Db	
Type examination certificate	TUV CY 19 ATEX 026182X	
Pump version	(std and /PE)	/I /PE
Temperature class	T6	T5
Surface temperature	≤ 85 °C	≤ 100 °C
Ambient temperature	-20 ÷ +60 °C	-20 ÷ +70 °C
Max inlet fluid temperature	+60 °C	+80 °C
Protection degree	IP 66	



6.1 EXAMPLE OF PFEA NAMEPLATE MARKING

At side are resumed the pumps marking according to ATEX certification



- Ex** = Equipment for explosive atmospheres
- II** = Group II for surfaces plants
- 2/2** = Pump category
- G** = For gas and vapours
- D** = For dust
- h** = Marking includes one or more of the following types of protection ("c", "b", "k")
- IIC** = Gas group (acetylene, hydrogen)
- IIIC** = Conductive dust
- T*** = Temperature class (T6, T5)
- T**°C** = Max surface temperature (85, 100)
- Zone 1 (gas) and 21 (dust)** = Possibility of explosive atmosphere during normal functioning
- Zone 2 (gas) and 22 (dust)** = Low probability of explosive atmosphere

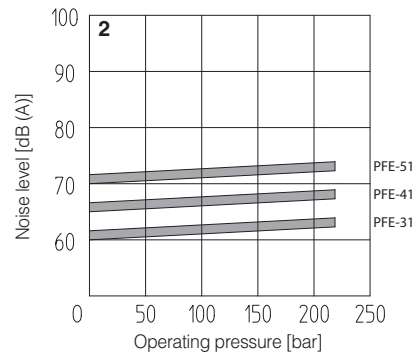
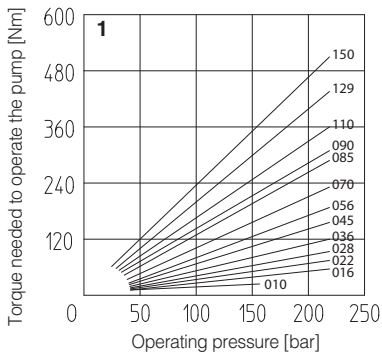
6.2 Related documentation

X010	Basics for electrohydraulics in hazardous environments
X020	Summary of Atos ex-proof components certified to ATEX, IECEx, EAC, PESO
AX900	Operating and maintenance information for ex-proof pumps

7 DIAGRAMS for PFEA -31, 41, 51 (Fbased on mineral oil ISO VG 46 at 50°C)

1 = Torque versus pressure diagram

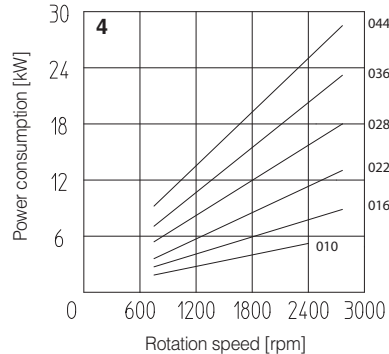
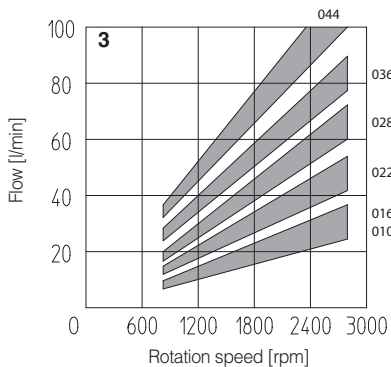
2 = Ambient noise levels measured in compliance with ISO 4412-1 oleohydraulics -Test procedure to define the ambient noise level - Pumps
Shaft speed: 1450 rpm.



PFE-31:

3 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

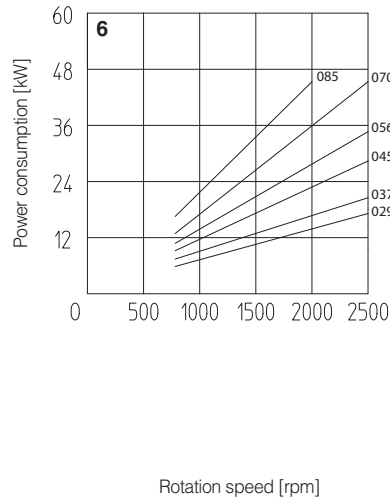
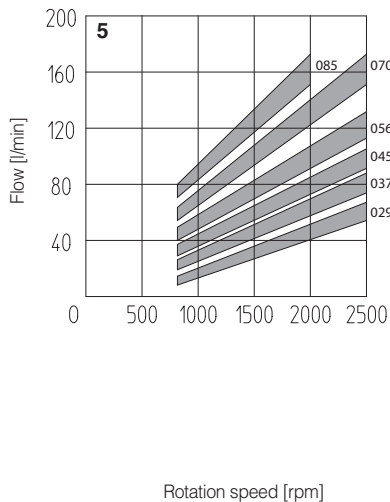
4 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.



PFE-41:

5 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

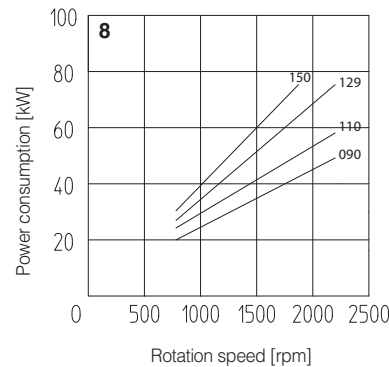
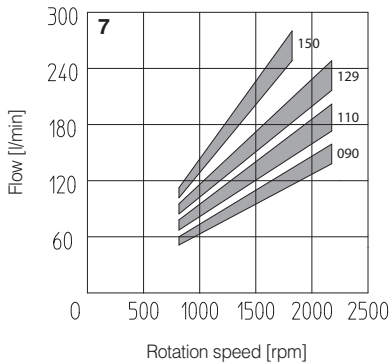
6 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.



PFE-51:

7 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

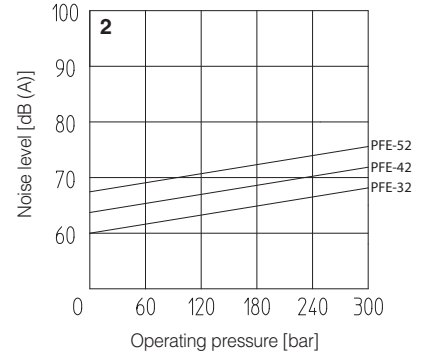
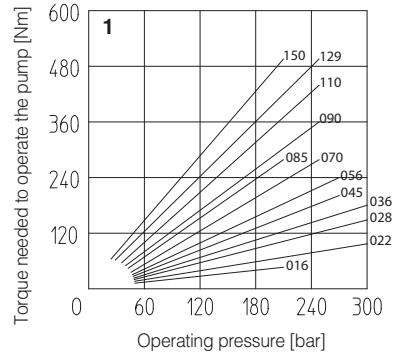
8 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.



8 DIAGRAMS for PFEA -32, 42, 52 (based on mineral oil ISO VG 46 at 50°C)

1 = Torque versus pressure diagram

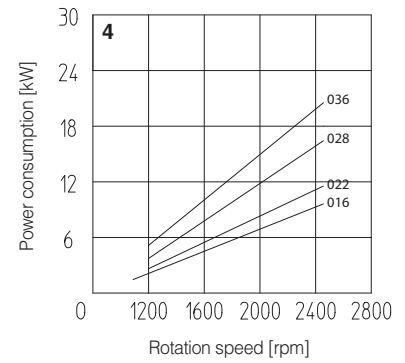
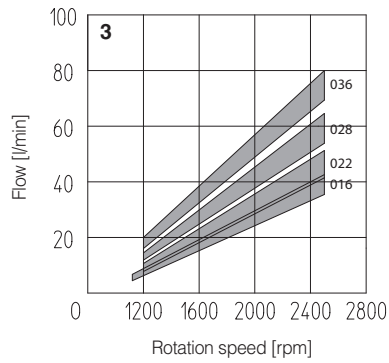
2 = Ambient noise levels measured in compliance with ISO 4412-1 oleohydraulics -Test procedure to define the ambient noise level - Pumps
Shaft speed: 1450 rpm.



PFE-32:

3 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

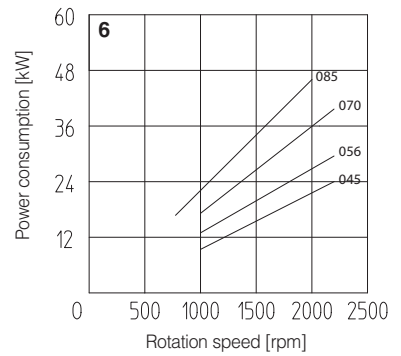
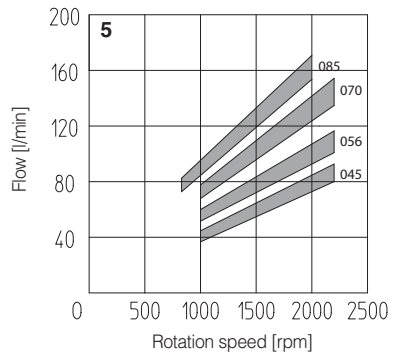
4 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.



PFE-42:

5 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

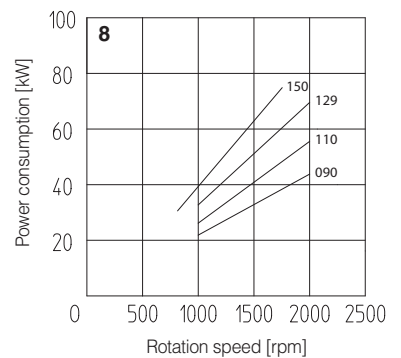
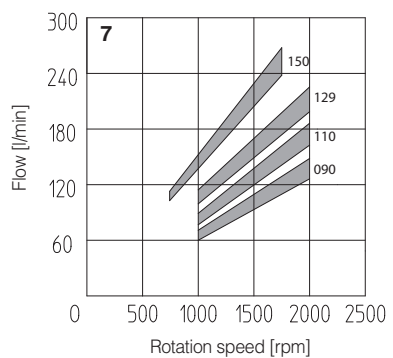
6 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.



PFE-52:

7 = Flow versus speed diagram with pressure variation from 7 bar to 210 bar.

8 = Power consumption versus speed diagram at 140 bar. Power consumption is proportional to operating pressure.

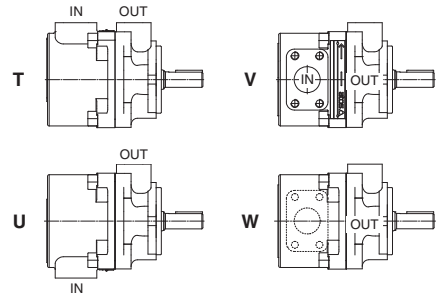


9 PORT ORIENTATION

Single pumps can be supplied with oil ports oriented in different configuration in relation to the drive shaft, as follows (viewed from the shaft end);

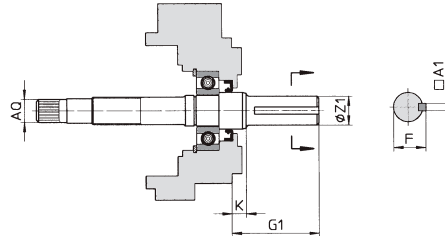
- T** = inlet and outlet ports on the same axis (standard)
- U** = outlet orientated 180° with respect to the inlet
- V** = outlet oriented 90° with respect to the inlet
- W** = outlet oriented 270° with respect to the inlet

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



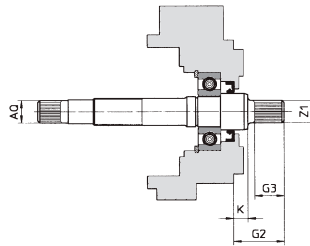
10 DRIVE SHAFT

CYLINDRICAL SHAFT KEYED



PFEA Model	PFEA - 31,41,51						PFEA - 41,51						ALL VERSIONS					
	Keyed shaft type 1 (only PFEA - 31,41,51)						Keyed shaft type 2 (only PFEA - 41,51)						Keyed shaft type 3					
	A1	F	G1	K	ØZ1	Ø AQ	A1	F	G1	K	ØZ1	Ø AQ	A1	F	G1	K	ØZ1	Ø AQ
31,32	4,78	21,11	56,00	8,00	19,05	SAE 16/32-9T	-	-	-	-	-	-	4,78	24,54	56,00	8,00	22,22	SAE 16/32-9T
	4,75	20,94			19,00								4,75	24,41			22,20	
41,42	4,78	24,54	59,00	11,40	22,22	SAE 32/64-24T	6,36	25,03	71,00	8,00	22,22	SAE 32/64-24T	6,38	28,30	78,00	11,40	25,38	SAE 32/64-24T
	4,75	24,41			22,20		6,35	24,77			22,20		6,35	28,10			25,36	
51,52	7,97	35,33	73,00	14	31,75	SAE 16/32-13T	7,95	35,33	84,00	8,10	31,75	SAE 16/32-13T	7,97	38,58	84,00	14	34,90	SAE 16/32-13T
	7,94	35,07			31,70		7,94	35,07			31,70		7,94	38,46			34,88	

SPLINED SHAFT



PFEA Model	Splined shaft type 5					Splined shaft type 6					Splined shaft type 7				
	G2	G3	K	Z1	Ø AQ	G2	G3	K	Z1	Ø AQ	G2	G3	K	Z1	Ø AQ
31,32	32,00	19,50	6,50	SAE 16/32-9T	SAE 16/32-9T	41,00	28	8,00	SAE 16/32-13T	SAE 16/32-9T	32,00	19	8,00	SAE 16/32-13T	SAE 16/32-9T
41,42	41,25	28	8,00	SAE 16/32-13T	SAE 32/64-24T	55,60	42	8,00	SAE 12/24-14T	SAE 32/64-24T	41,60	28	8,00	SAE 12/24-14T	SAE 32/64-24T
51,52	56,00	42	8,10	SAE 12/24-14T	SAE 16/32-13T	-	-	-	-	-	-	-	-	-	-

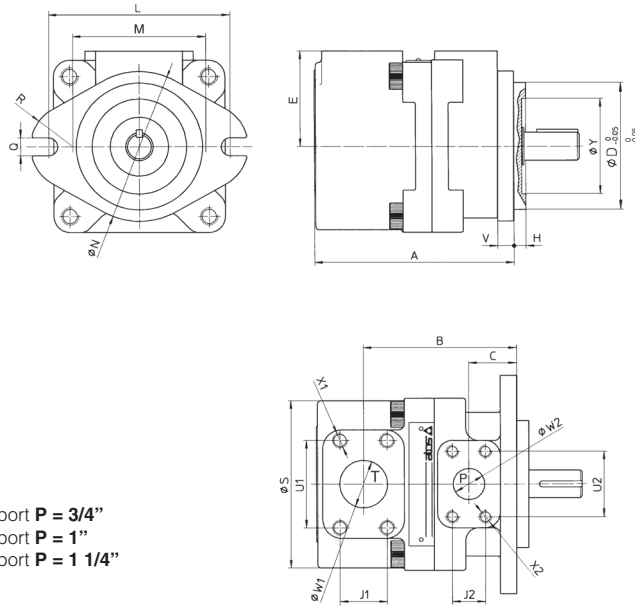
11 LIMITS OF SHAFT TORQUE

PFEA Model	Maximum driving torque [Nm]						Maximum torque available at the end of the through shaft [Nm]
	Shaft type 1	Shaft type 2	Shaft type 3	Shaft type 5	Shaft type 6	Shaft type 7	Any type of shaft
31,32	160	-	240	110	240	240	130
41,42	250	250	400	200	400	400	250
-51,52	500	500	850	450	-	-	400

The values of torque required to operate the pumps are shown for each type on the "torque versus pressure" diagram at section 4. In multiple pumps the total torque applied to the shaft of the first element (drive shaft) is the sum of the single torque needed for operating each single pump and it is necessary to verify that this total torque applied to the drive shaft is not higher than the values indicated in the table.

12 DIMENSIONS OF PFEA - 31, 41, 51 SINGLE PUMPS [mm]

T = inlet port
P = outlet port



SAE FLANGES

PFEA-31: port T = 1 1/4";
PFEA-41: port T = 1 1/2";
PFEA-51: port T = 2;

port P = 3/4"
port P = 1"
port P = 1 1/4"

Mass:

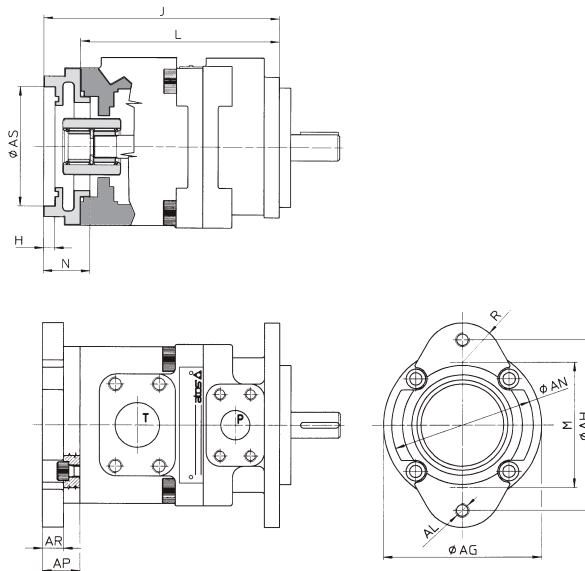
PFE-31 = 9 kg
PFE-41 = 14 kg
PFE-51 = 25,5 kg

SAE flanges can be supplied with the pump

Model	A	B	C	ØD	E	H	L	M	ØN	Q	R
PFEA-31	136	100	28	82,55	70	6,4	106	73	95	11,1	28,5
PFEA-41	160	120	38	101,6	76,2	9,7	146	107	120	14,3	34
PFEA-51	186,5	125	38	127	82,6	12,7	181	143,5	148	17,5	35
Model	ØS	U1	U2	V	ØW1	ØW2	J1	J2	X1	X2	ØY
PFEA-31	114	58,7	47,6	10	32	19	30,2	22,2	M10X20	M10X17	47
PFEA-41	134	70	52,4	13	38	25	35,7	26,2	M12X20	M10X17	76
PFEA-51	160	77,8	58	15	51	32	42,9	30,2	M12X20	M10X20	76

13 DIMENSIONS OF PFEA-31, 41, 51 WITH THROUGH-SHAFT [mm]

T = inlet port
P = outlet port



SAE FLANGES

PFEAX-31: port T = 1 1/4";
PFEAX-41: port T = 1 1/2";
PFEAX-51: port T = 2;

port P = 3/4"
port P = 1"
port P = 1 1/4"

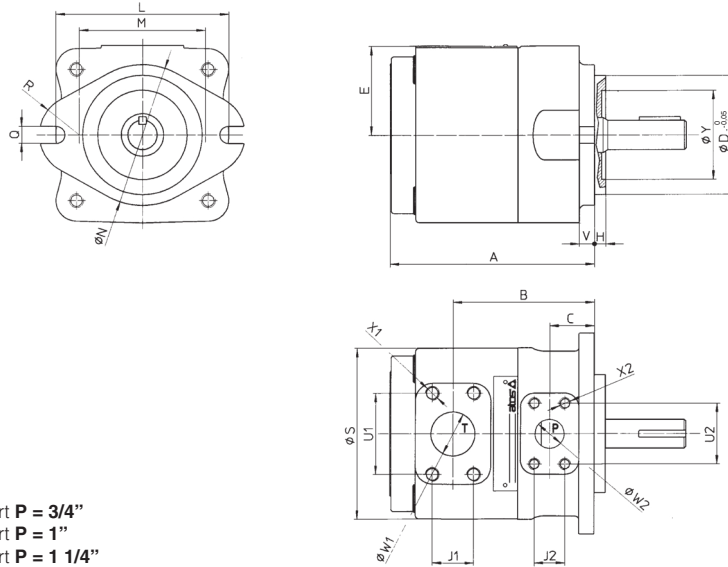
For other dimensions, see section 8

Model	Ø AG	Ø AH	AL	Tightening torque (Nm) ⁽¹⁾	Ø AN	AP	AR	Ø AS	H	J	L	M	N	R
PFEAX-31	114	106	M10X17	70	95	33	25	82,57 82,63	6,42 6,47	165,5	132,5	79	32	28,5
PFEAX-41	134	106	M10X17	70	95	23	11	82,57 82,63	6,42 6,47	194	171	73	32	28,5
PFEAX-41	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	203	171	107	41	34
PFEAX-51	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	206,2	183,5	73	32	28,5
PFEAX-51	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	215,5	183,5	107	41	34
PFEAX-51	134	181	M16	300	148	46,5	30,7	127,02 127,02	12,73 12,78	230	183,5	143,5	56	35

(1) Tightening torque for screw class 12.9

14 DIMENSIONS OF PFEA -32, 42, 52 SINGLE PUMPS [mm]

T = inlet port
P = outlet port



SAE FLANGES

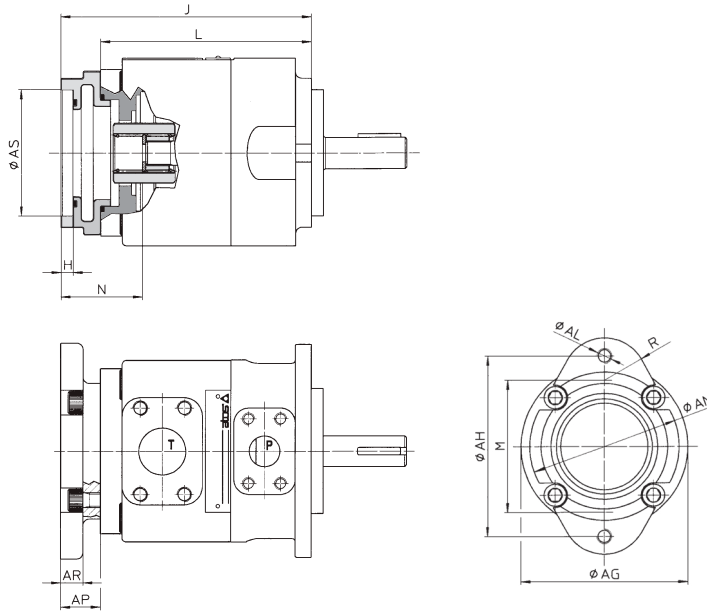
PFEA-32: port T = 1 1/4"; port P = 3/4"
PFEA-42: port T = 1 1/2"; port P = 1"
PFEA-52: port T = 2; port P = 1 1/4"

Mass:
PFE-32 = 9 kg
PFE-42 = 20,5 kg
PFE-52 = 32,1 kg

Model	A	B	C	ØD	E	H	L	M	ØN	Q	R
PFEA-32	136	100	28	82,5	70	6,4	106	73	95	11	28,5
PFEA-42	175,5	121	38	101,6	78	9,7	146	107	121	14,3	34
PFEA-52	189	125	38	127	89	12,7	181	143,5	148	17,5	35
Model	ØS	U1	U2	V	ØW1	ØW2	J1	J2	X1	X2	ØY
PFEA-32	114	58,7	47,6	10	32	19	30,2	22,2	M10X20	M10X17	47
PFEA-42	148	70	52,4	13	38	25	35,7	26,2	M12X20	M10X17	76
PFEA-52	174	77,8	58,7	16,3	50	50	42,9	30,2	M12X20	M10X20	76

15 DIMENSIONS OF PFEA - 32, 42, 52 WITH THROUGH-SHAFT [mm]

T = inlet port
P = outlet port



SAE FLANGES

PFEAX-32: port T = 1 1/4"; port P = 3/4"
PFEAX-42: port T = 1 1/2"; port P = 1"
PFEAX-52: port T = 2; port P = 1 1/4"

For other dimensions, see section 8

Model	Ø AG	Ø AH	AL	Tightening torque (Nm) ⁽¹⁾	Ø AN	AP	AR	Ø AS	H	J	L	M	N	R
PFEAX-32	114	106	M10X17	70	95	33	25	82,57 82,63	6,42 6,47	193,7	132,5	79	32	28,5
PFEAX-42	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	194	171	73	34	28,5
PFEAX-42	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	203	171	107	43	34
PFEAX-52	134	106	M10X17	70	95	22,7	11	82,57 82,63	6,42 6,47	206,2	183,5	73	34,5	28,5
PFEAX-52	134	146	M12	125	120	32	18	101,62 101,68	9,73 9,78	215,5	183,5	107	43,8	34
PFEAX-52	134	181	M16	300	148	46,7	30,7	127,02 127,02	12,73 12,78	230,2	183,5	143,5	58,5	35

(1) Tightening torque for screw class 12.9