

Standard Cylinders ISO 15552

Global product range

The P1F Series meets the specifications of the ISO 15552 standard. This means full interchangeability to any cylinder anywhere around the globe.

The P1F will be available throughout the extensive worldwide Parker Hannifin organisation – for the benefit to you and your customers.



Features

- Tie-Rods design.
- Bore sizes 160 - 320 mm.
- Stroke up to 2300 mm.
- Corrosion resistant design.
- Stainless steel piston rod.
- Polyurethane seal technology.
- Stainless steel cushioning screws on same side.
- Adjustable pneumatic cushioning.
- Full range of mountings.
- Full range of drop-in' sensors.

Design Variants

Tie-Rods round profile - P1F-T, P1F-N

Tie-Rods design for heavy duty applications. Round tube is made in anodised aluminium; Tie-Rods in stainless steel as standard.

Bore sizes Ø32 to Ø125 mm, see catalogue PDE3570TC

Large bore sizes Ø160 to Ø320 mm.



Options

High temperature

All seals in the high temperature version of P1F are developed and validated for continuous operation up to +150°C. The combination of the seal geometry and the FKM (fluoro elastomers) material ensures reliable and long service life. High temperature cylinders have no magnetic piston and cannot be fitted with sensors (the magnetic field strength in high temperatures is too low to ensure correct reliable sensor function).

Technical Data

Cylinder forces

Bore/ piston rod [mm]	Stroke	Surface area [cm ²]	Max theoretical force in N (under different pressure bar)									
			1	2	3	4	5	6	7	8	9	10
160/40	+	201.1	2011	4021	6032	8042	10053	12064	14074	16085	18096	20106
	-	188.5	1885	3770	5655	7540	9425	11310	13195	15080	16965	18850
200/40	+	314.2	3142	6283	9425	12566	15708	18850	21991	25133	28274	31416
	-	301.6	3016	6032	9048	12064	15080	18096	21112	24127	27143	30159
250/50	+	490.9	4909	9818	14726	19635	24544	29453	34361	39270	44179	49088
	-	471.2	4712	9425	14137	18850	23562	28274	32987	37699	42412	47124
320/63	+	804.2	8042	16085	24127	32170	40212	48255	56297	64340	72382	80425
	-	773.1	7731	15462	23192	30923	38654	46385	54115	61846	69577	77308

+ = outward stroke
- = return stroke

Cylinder air consumption

Bore/ piston rod [mm]	Stroke	Surface area [cm ²]	Air Consumption in l [Nl] / 10 mm (under different pressure bar)									
			1	2	3	4	5	6	7	8	9	10
160/40	+	201.1	0.400	0.598	0.797	0.995	1.193	1.392	1.590	1.789	1.987	2.186
	-	188.5	0.375	0.561	0.747	0.933	1.119	1.305	1.491	1.677	1.863	2.049
200/40	+	314.2	0.624	0.934	1.245	1.555	1.865	2.175	2.485	2.795	3.105	3.415
	-	301.6	0.599	0.897	1.195	1.492	1.790	2.088	2.386	2.683	2.981	3.279
250/50	+	490.9	0.975	1.460	1.945	2.429	2.914	3.398	3.883	4.367	4.852	5.337
	-	471.2	0.936	1.402	1.867	2.332	2.797	3.262	3.728	4.193	4.658	5.123
320/63	+	804.2	1.598	2.392	3.186	3.980	4.774	5.568	6.362	7.156	7.950	8.744
	-	773.1	1.536	2.299	3.063	3.826	4.589	5.352	6.115	6.878	7.641	8.405

+ = outward stroke
- = return stroke

Weight

Cyl.-bore [mm]	P1F-T		P1F-N		Moving parts	
	Base 0 mm [kg]	per 100 mm [kg]	Base 0 mm [kg]	per 100 mm [kg]	Base 0 mm [kg]	per 100 mm [kg]
Ø160	11.90	1.816				
Ø200	14.83	1.986				
Ø250	29.00	3.700				
Ø320	55.00	5.860				

on request

Tolerances [mm]

Cyl.- bore [mm]	L ₂ [mm]	TG [mm]	stroke tolerance	
			<= 500 mm	> 500 mm
Ø160	± 1.1	± 1.1	+ 0.3 / + 2.0	+ 0.3 / + 3.0
Ø200	± 1.6	± 1.1	+ 0.3 / + 2.0	+ 0.3 / + 3.0
Ø250	± 1.6	± 1.5	+ 0.3 / + 2.0	+ 0.3 / + 3.0
Ø320	± 2.2	± 1.5	+ 0.3 / + 2.0	+ 0.3 / + 3.0

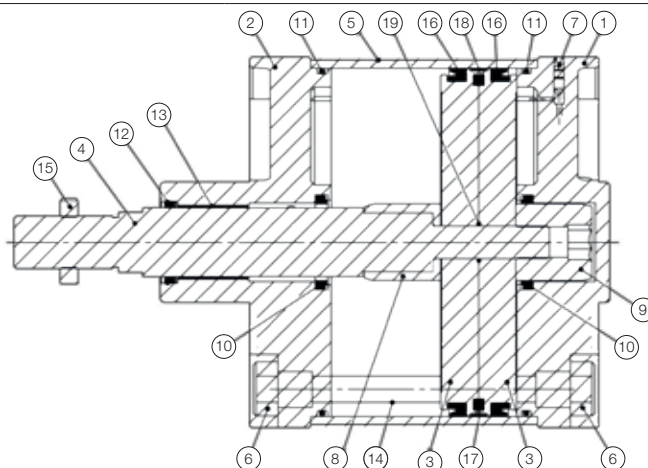
Technical Data

Product type	Standard cylinder according to ISO 15552
Bore size	160 - 320 mm
Stroke length	10 - 2300 mm
Versions	Double acting
Cushioning	Adjustable air cushioning
Position sensing	Proximity sensor
Installation	ISO cylinder and piston rod mountings



Operating and environmental data

Operating medium	For best possible service life and trouble-free operation dry filtered compressed air to ISO 8573-1:2010 quality 3.4.3 should be used. This specifies a dew point of + 3°C for indoor operation (a lower dew point should be selected for minus temperature operation and we recommend the use of an inline dryer) and is in line with the air quality from most standard compressors with a standard filter.
Operating pressure	1 to 10 bar
Ambient temperature	Standard temperature (option M): -20°C to +80°C High temperature (option F): -20°C to +150°C
Pre-lubricated	Further lubrication is normally not necessary. If additional lubrication is introduced it must be continued. Hydraulic oil type HLP (DIN 51524, ISO 11158). Viscosity by 40°C: 32 mm ² /s (cst). Example: Shell Tellus 32 or equal.
Corrosion resistance	Material and surface treatment selected for typical industrial applications with resistance to corrosion and chemicals.



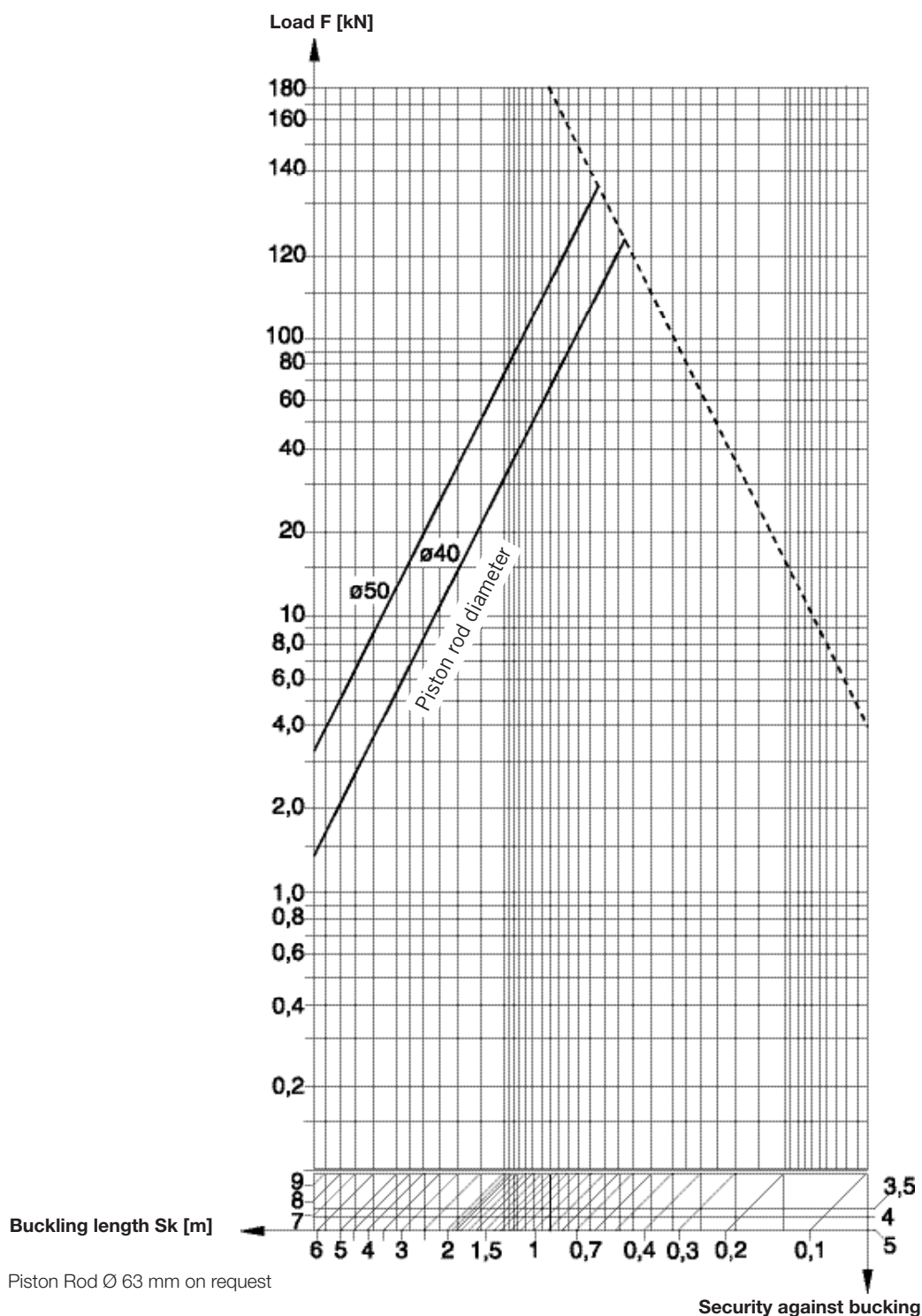
Material specification

Pos	Part	Specification
1, 2	End covers	Die-cast painted aluminium
3	Piston	Die-cast aluminium (in 2 pieces)
4	Piston rod	Austenitic Stainless steel, DIN X8 CrNiS 18-9
5	Cylinder barrel	Anodised aluminium
6	Tie rod nut	Zinc plated steel
7	Cushioning screws	Stainless steel DIN X8 CrNiS 18-9
	O-ring cushioning screws	Nitrile rubber (NBR)
		Fluoro elastomer (FKM)
8	Sleeves	Aluminium (integrated into the piston's half)
9	Piston nut	Zinc plated steel
10	Cushioning seal	Standard: Polyurethane (PUR) Optional: Fluoro elastomer (FKM)
11	O-ring end covers	Standard: Nitrile rubber (NBR) Optional: Fluoro elastomer (FKM)
12	Piston rod seal	Standard: Polyurethane (PUR) Optional: Fluoro elastomer (FKM)
13	Piston rod bearing	Self-lubricating sintered bronze
14	Tie rods	Austenitic Stainless steel, DIN X8 CrNiS 18-9
15	Piston rod nut	Zinc plated steel
16	Piston seals	Standard: Nitrile rubber (NBR) Optional: Fluoro elastomer (FKM)
17	Magnet	Magnet rubber
18	Piston bearing	PTFE and carbographite
19	O-ring piston	Standard: Nitrile rubber (NBR) Optional: Fluoro elastomer (FKM)

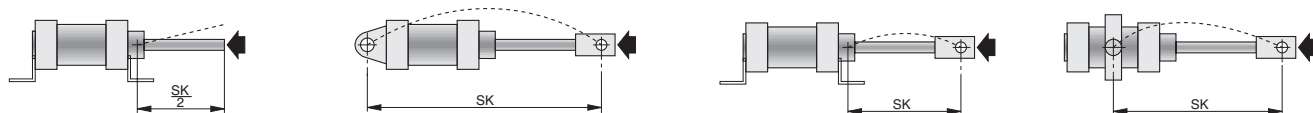
Piston rod load diagram

The piston rod diameter has to be determined to prevent the rod from buckling. Always take the maximum piston thrust force attainable at the specified operating pressure with the cylinder in question.

Loads resulting from longer strokes (as indicated in the diagram) on request. In case of special mounting conditions and transverse forces please consult. Recommended security factor against buckling: 3,5 to 5.



Buckling Possibilities of Piston Rods



Cushioning Characteristics

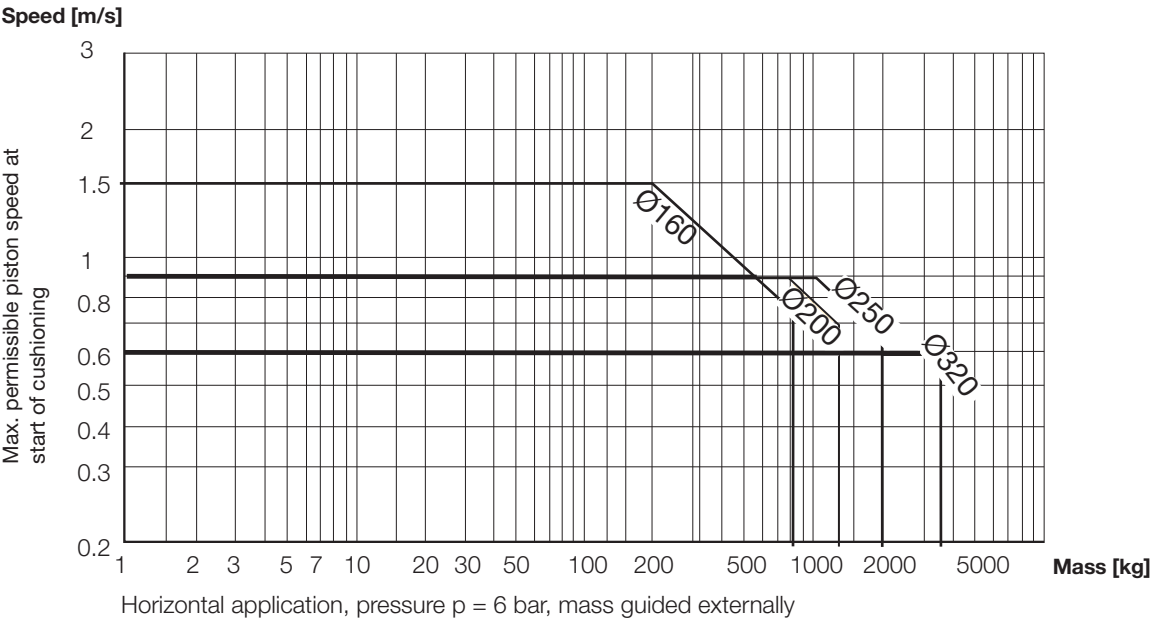
Air cushion is used to absorb kinetic energy due to load and speed at both end of stroke. This typically consists of a threaded needle screw that adjusts into an orifice in the cylinder end plate. By adjusting the screw further into the orifice you lessen the amount of air that can escape in a given time. Slowing the exhaust of air creates back pressure which slows the piston as it enters into the end cushioning seal.

Cushioning Diagram

Work out your expected moving mass and read off the maximum permissible speed at start of cushioning. Alternatively, take your desired speed and expected mass and find the cylinder size required.

Please note that piston speed at start of cushioning is typically approx. 50 % higher than the average speed, and that it is this higher speed which determines the choice of cylinder.

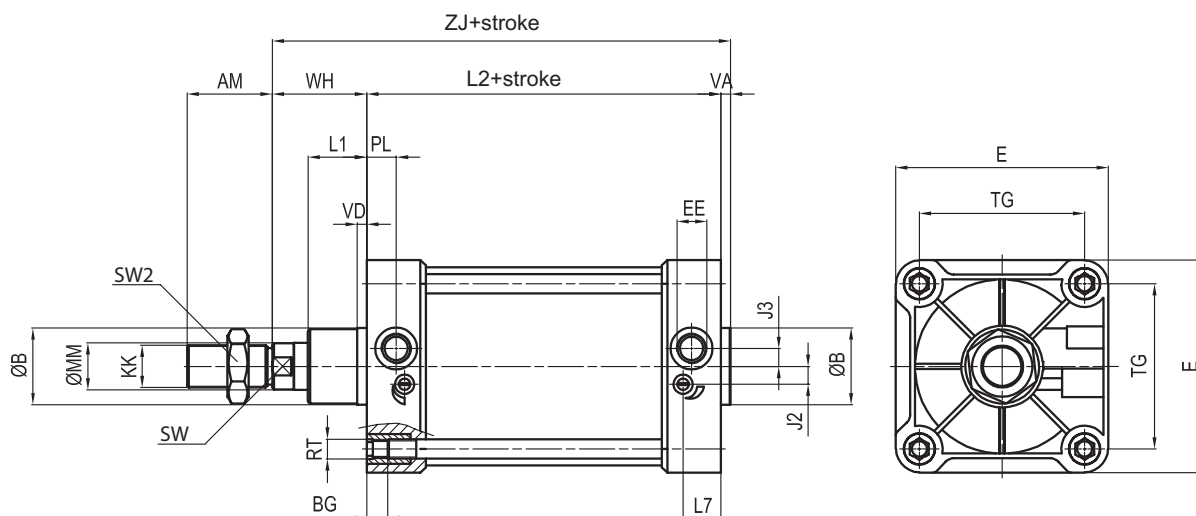
The mass is the sum of internal and external friction, plus any gravitational forces.



Dimensions

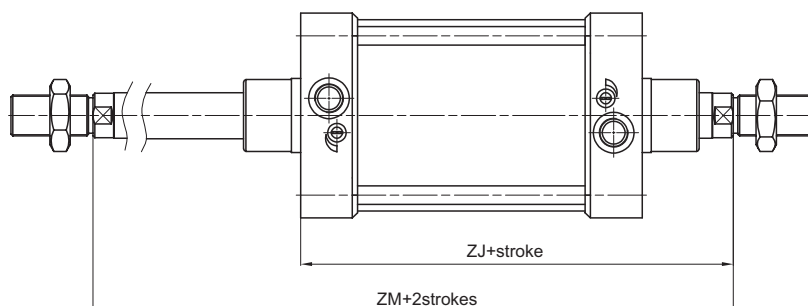
Tie-Rods with round profile design

P1F-T



Tie-Rods with through piston rod

P1F-N

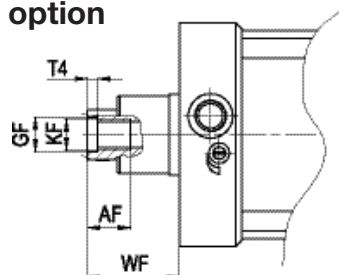


Dimensions [mm]

Cyl.- bore	AM	ØB _{d11}	BG	E	EE	J ₂	J ₃	KK	L ₁	L ₂	H	L ₇	MM _{Ø17}	PL	RT	SW	SW2	TG	VA	VD	WH	ZJ	ZJ*	ZM*
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
Ø160	72	65	24	180	3/4"	15	15	M36x2	50	180	14	32	40	25	M16	36	55	140	6	8	80	266	260	340
Ø200	72	75	24	220	3/4"	15	15	M36x2	65	180	14	34	40	25	M16	36	55	175	6	25	95	281	275	370
Ø250	84	90	25	270	1"	25	25	M42x2	75	200	20	40	50	30	M20	46	65	220	8	25	105	313	305	410
Ø320	96	110	30	350	1"	35	35	M48x2	90	220	17	45	63	30	M24	55	75	270	10	25	120	350	340	460

*for through piston rod version

Female thread option



Dimensions [mm]

Cyl.- bore	AF	KF	T4	WF	GF
[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
Ø160	36	M20	10	80	22
Ø200	36	M20	10	95	22
Ø250	40	M24	12	105	26
Ø320	50	M30	15	120	32

Order code

Order Instructions		P	1	F	-	T	1	6	0	M	S	X	0	1	6	0	-	0	0	0	0
Profile/cylinder design																					
T	Tie-Rods																				
N	Tie-Rods with through rod																				
Cylinder bore size																					
160	160 mm																				
200	200 mm																				
250	250 mm																				
320	320 mm																				
Temperature range																					
M	Standard Temperature -20°C to +80°C																				
F	High Temperature -20°C to +150°C																				
Rod extension or trunnion mounting																					
0000	without																				
P . . .	Piston rod extension in mm																				
G . . .¹⁾	Trunnion mount +90° vs. air ports																				
7 . . .¹⁾	Trunnion mount +0° vs. air ports																				
¹⁾ Trunnion position following XV dimension see page 15																					
Cylinder Stroke																					
....	Stroke length in mm																				
Piston style																					
X	Aluminium with magnet																				
A	Aluminium w/o magnet																				
Piston Rod material male thread																					
S	Stainless steel																				
Piston Rod material female thread																					
E	Stainless steel																				

Mountings

Flange MF1 / MF2 ①



Foot brackets MS1 ②



Pivot bracket with rigid bearing AB7 ③



Swivel eye bracket MP6 ④



Clevis bracket MP2 ⑤



Ø160	P1C-4SMB	P1C-4SMF	P1C-4SMDB	P1C-4SMSB	P1C-4SMTB
Ø200	P1C-4TMB	P1C-4TMF	P1C-4TMDB	P1C-4TMSB	P1C-4TMTB
Ø250	P1C-4VMB	P1C-4VMF	P1C-4VMDB	P1C-4VMSB	P1C-4VMTB
Ø320	P1C-4WMB	P1C-4WMF	P1C-4WMDC	P1C-4WMSB	P1C-4WMTB

Clevis bracket MP4 ⑥



Swivel rod eye AP6 ⑫



Clevis AP2 ⑬



Flexo coupling PM5 ⑭



Ø160	P1C-4SMEB	P1C-4SRS	P1C-4SRC	P1C-4SRF
Ø200	P1C-4TMEB	P1C-4SRS	P1C-4SRC	P1C-4SRF
Ø250	P1C-4VMEB	P1C-4VRS	P1C-4VRC	P1C-4VRF
Ø320	P1C-4WMEB	P1C-4WRS	P1C-4WRC	P1C-4WRF

Pivot brackets AT4



Intermediate trunnion MT4 ⑫



Ø160	PD24425	refer to page 15
Ø200	PD24425	refer to page 15
Ø250	PD25763	refer to page 15
Ø320	KL9130	refer to page 15

Seal Kits

Complete seal kits consisting of:

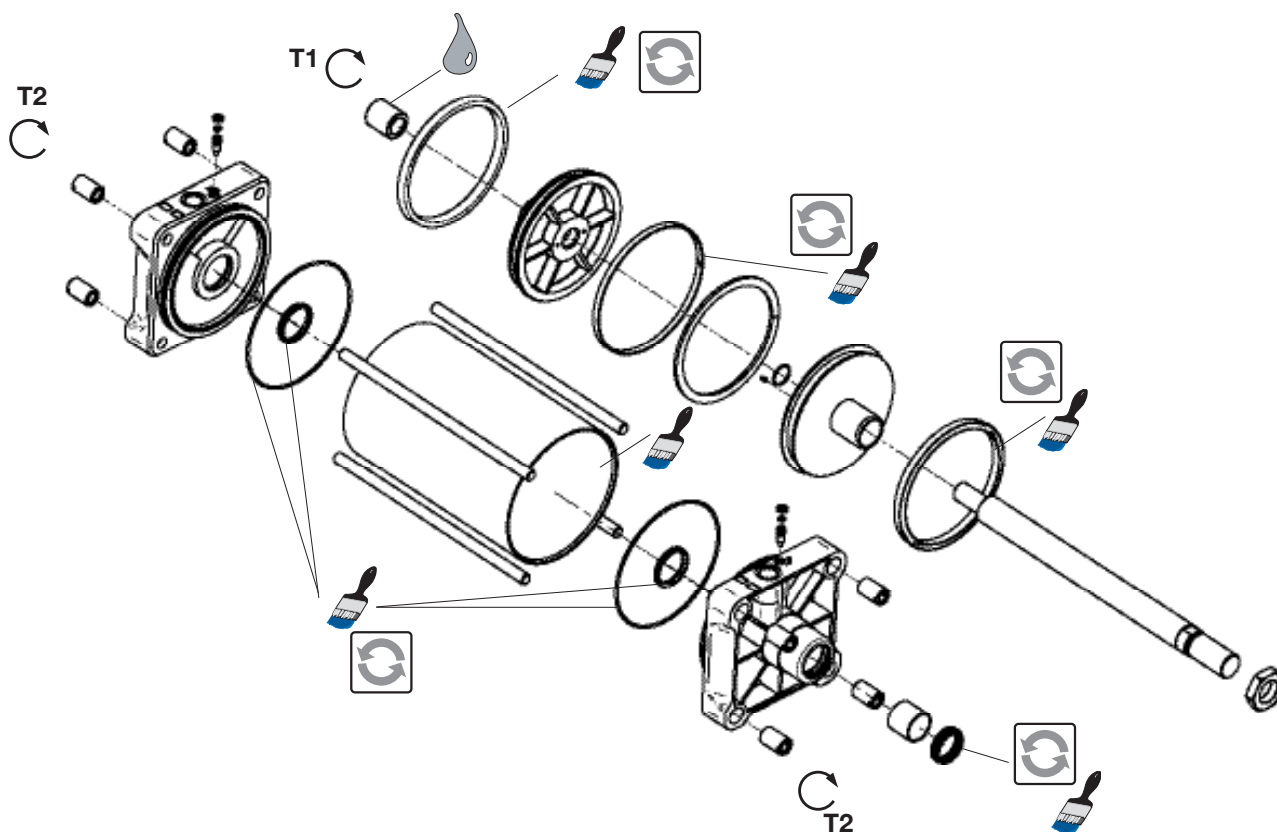
- 2 piston seals.
- 2 cushioning seals.
- 1 wiper seal.
- 1 piston rod seal, 2 for bores 250, 320 mm.
- 2 O-Rings.

Greases

	Standard temperature	30 g	9127394541
	High temperature	30 g	9127394521

Cyl.-bore [mm]	Standard temperature ¹⁾	High temperature ¹⁾
Ø160	P1F-6160RN	P1F-6160RF
Ø200	P1F-6200RN	P1F-6200RF
Ø250	P1F-6250RN	P1F-6250RF
Ø320	P1F-6320RN	P1F-6320RF

¹⁾ for through piston rod, add K at the end, ie P1F-6160RNK



Cyl.- bore [mm]	AF [mm]	Piston T1 C [Nm]		T2 Nm
Ø160	27	110-130		65-80
Ø200	27	110-130		65-80
Ø250	27	110-130		65-80
Ø320	27	110-130		65-80



= Included in seal kit



= Socket head
across flats



= Tightening torque



Lubricated with grease



Locking fluid
Loctite 243 locking fluid
must be used