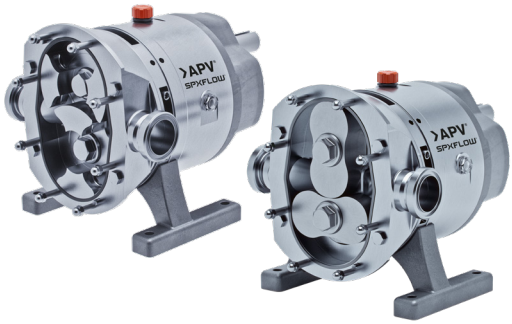
APV®

INSTRUCTION MANUAL

DW+ series

Positive Displacement Pump

Original Instructions



MODELS:	DW+1-5
FORM NO.:	PL8500013
REVISION:	02/2026

SPXFLOW®

READ AND UNDERSTAND THIS MANUAL PRIOR TO OPERATING OR SERVICING THIS PRODUCT.

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Table of Contents

EN

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Declaration of Conformity

SPXFLOW®

CE Declaration of Conformity
English original

We, SPX Flow Technology Poland Sp. z o.o.
Ul. Rolbieskiego 2, 85-862 Bydgoszcz
as the **Manufacturer**

and SPX Flow Technology Poland Sp. z o.o.
Ul. Rolbieskiego 2, 85-862 Bydgoszcz
as the **Design Center**,

declare under our sole responsibility that our

Positive Displacement Pumps
DW+ 1; DW+ 2; DW+ 3; DW+ 4; DW+ 5; DW+ 1; DW 6

to which this Declaration relates is/are in conformity with the following **EU Regulations and Directives** as well as applicable harmonized standards as per the current valid revision of these norms and statutory instruments:

Machinery Directive (MD)	*2006/42/EC*
Low Voltage Directive (LVD)	*2014/35/EU*
Electromagnetic Compatibility Directive (EMC)	*2014/30/EU*
Safety of machinery — General principles for design — Risk assessment and risk reduction	ISO 12100:2010
Safety of machinery - Hygiene requirements for the design of machinery	EN ISO 14159:2008
Pumps and pump units for liquids - Common safety requirements	EN 809:1998+A1:2009/AC:2010
Liquid pumps - Safety requirements	EN 13951:2012

Bydgoszcz, Poland 1.07.2026	Jacek Goska, Site Leader SPX Flow Technology	Jacek Goska
Place & date of the declaration	Name of the person empowered to draw up the declaration on behalf of the Manufacturer or the Authorized Representative	Signature

1. General Description

This operating manual should be read carefully by the competent operating and maintenance personnel.

It must be pointed out that we will not accept any liability for damage or faults resulting from failing to comply with this operating manual.

Descriptions and data given herein are subject to technical changes.

1.1. Intended Use

The DW+ pump is exclusively intended for pumping liquids, especially in food and beverage installations.

Refrain from using the pump in a manner which exceeds the scope and specifications stated below.

Any use exceeding the margins and specifications set forth is considered to be not intended.

The manufacturer is not liable for any damage resulting from such activities.

The user will bear the full risk.

Caution! Improper use of the pump leads to:
- damage,
- leakage,
- destruction,
- potential failures in the production process.

2. Pump Designation - EHEDG Certified Pump

2.1. Pump Type

DW+ 1-5

2.2. Surface Finish

3A version Ra < 0,8µm for all wetted parts

2.3. Connection Types

- BS 4825 part 3, DIN 32676, ISO 2852 triclamp* - in combination with special gasket according to the EHEDG Position Paper P1.
- DIN 11851* - in combination with special gasket according to the EHEDG Position Paper P1.

***Note!** Special gaskets must be applied for the two above mentioned connection types in order to be EHEDG compliant.

Note! Connections in combination with seals must be as according to EHEDG Position Paper.

Note! All connections are according to the latest version of the EHEDG Position Paper P1.

2.4. Rotor Type

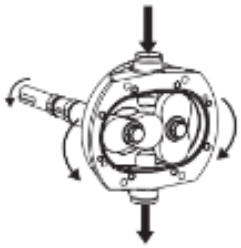
Lobe

2.5. Mechanical Seals

Single mechanical seal SiC to SiC

2.6. O-rings Material

EPDM - FDA
Full certified EPDM *)



2.7. Pump House Fully Drain-Ability Orientation

Vertical Inlet/Outlet - see drawing on the left.

2.8. Support

Baseplate
Bareshaft

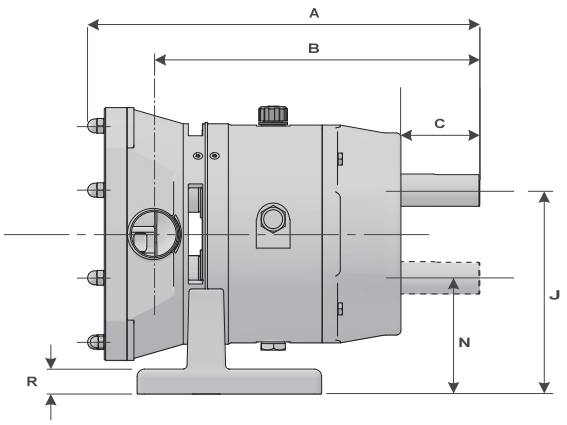
2.9. Clean in Place (CIP)

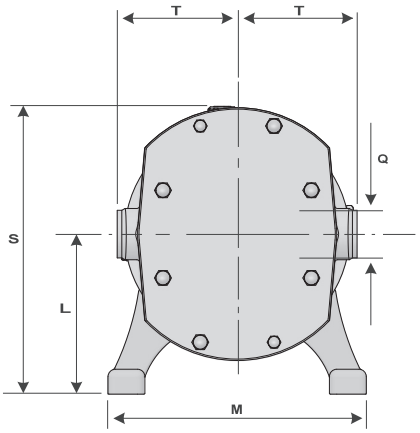
The pump has been designed for Clean in Place (CIP) operation with both 3A and EHEDG certification. However, due to variations of product, system design, cleanliness requirements and chemicals used, we recommend that users develop suitable CIP processes during commissioning on normal operation conditions and products and verify these meet the required levels of cleanliness, **ensuring a minimum flow velocity of 1,5 m/s at the the pump inlet.**

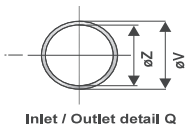
*) Full certified O-rings = Includes certificates FDA, 3A, USP Class VI and AFO

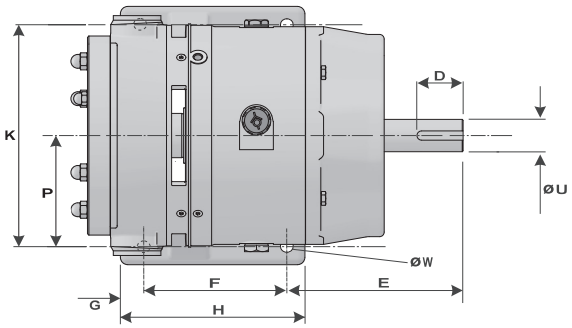
3. Pump Dimensions

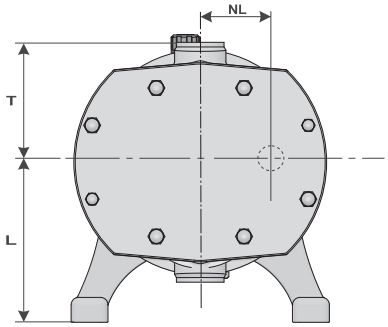
3.1. DW+1-5 Pump Dimensions

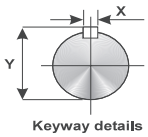












3. Pump Dimensions

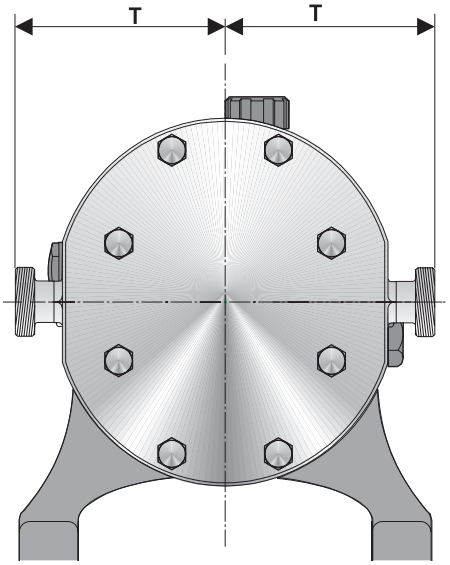
Pump model	A	B	C	D	E	F	G	H	J	K	L	M	N	NL	P	Q*	R	S	T	U	W	X	Y	Z	V	Net weight* (kg)	Oil capacity* (litres)
DW+1/003/-	260	217.2	40	38	109	121	12.5	146	150	166	122	193	94	28	83	DN15	19	218	86	⌀18	⌀8.5	6	20.5	16.0	19.0	18	0.8
DW+1/004/-	260	217.2	40	38	109	121	12.5	146	150	166	122	193	94	28	83	DN15	19	218	86	⌀18	⌀8.5	6	20.5	16.0	19.0	18	0.8
DW+1/007/-	268	222.5	40	38	109	121	12.5	146	150	166	122	193	94	28	83	1”	19	218	86	⌀18	⌀8.5	6	20.5	22.6	25.6	19	0.8
DW+2/006/-	297	248	50	36	120	142	17	176	178	194	145	228	112	33	97	1”	20	252	98	⌀22	⌀12	6	24.5	22.6	25.6	28	1.1
DW+2/007/-	297	248	50	36	120	142	17	176	178	194	145	228	112	33	97	1”	20	252	98	⌀22	⌀12	6	24.5	22.6	25.6	28	1.1
DW+2/013/-	307	252	50	36	120	142	17	176	178	194	145	228	112	33	97	$1^1/_2$”	20	252	98	⌀22	⌀12	6	24.5	35.6	38.6	29	1.1
DW+3/014/-	332	271	60	40	123	160	20	200	196	212	158	252	120	38	106	$1^1/_2$”	24	273	112	⌀25	⌀13	8	28	35.6	38.6	37	1.4
DW+3/017/-	332	271	60	40	123	160	20	200	196	212	158	252	120	38	106	$1^1/_2$”	24	273	112	⌀25	⌀13	8	28	35.6	38.6	37	1.4
DW+3/030/-	348	280	60	40	123	160	20	200	196	212	158	252	120	38	106	2”	24	273	112	⌀25	⌀13	8	28	48.6	51.6	43	1.4
DW+3/050/-	372	304	60	40	123	160	20	200	196	212	158	252	120	38	106	2”	24	273	112	⌀25	⌀13	8	28	48.6	51.6	48	1.4
DW+4/033/-	423	352	80	45	162	205	20	245	238	260	190	300	142	48	130	2”	24	328	130	⌀35	⌀14	10	38	48.6	51.6	68	2.7
DW+4/039/-	423	352	80	45	162	205	20	245	238	260	190	300	142	48	130	2”	24	328	130	⌀35	⌀14	10	38	48.6	51.6	68	2.7
DW+4/073/-	449	365	80	45	162	205	20	245	238	260	190	300	142	48	130	3”	24	328	130	⌀35	⌀14	10	38	72.9	76.7	76	2.7
DW+4/125/-	489	399	80	45	162	205	20	245	238	260	190	300	142	48	130	3”	24	328	130	⌀35	⌀14	10	38	72.9	76.7	89	2.7
DW+5/080/-	565	479	106	71	232	262	25	312	303	326	240	370	177	63	163	$2^1/_2$”	33	434	165	⌀42	⌀17	12	45	60.3	64.1	164	6.7
DW+5/093/-	565	479	106	71	232	262	25	312	303	326	240	370	177	63	163	$2^1/_2$”	33	434	165	⌀42	⌀17	12	45	60.3	64.1	164	6.7
DW+5/142/-	586	495	106	71	232	262	25	312	303	326	240	370	177	63	163	3”	33	434	165	⌀42	⌀17	12	45	72.9	76.7	166	6.7
DW+5/256/-	636	520	106	71	232	262	25	312	303	326	240	370	177	63	163	(DN125)	33	434	165	⌀42	⌀17	12	45	123.0	127.0	185	6.7

Note! See chapter: Pump dimensions with fittings.

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions (excluding those marked with “*”).

3. Pump Dimensions

3.2. DW+1-5 Pump Dimensions with Fittings

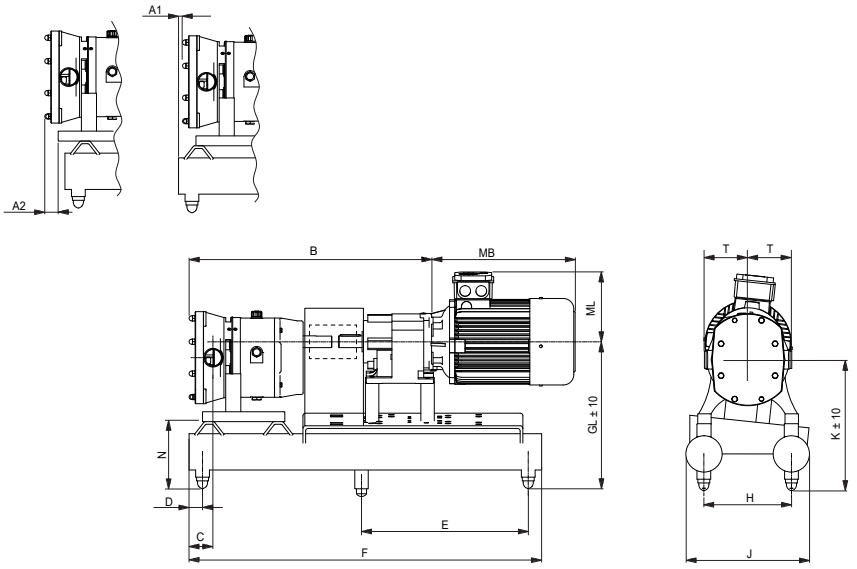


	T								
	CLAMP			MALE PARTS					
	BS 4825 part 3	ISO 2852	DIN 32676	ISO 2853	BS 4825 part 4	SMS (“1145”)	BS 4825 part 5	DIN 11851	DS 722
Pump	**1” TRI**	**1” ISO**	**DN25**	**1” ISO**	**1” IDF**	**1” SMS**	**1” RJT**	**DN25**	**1” DS**
DW+1/003/-	107.5	107.5	107.5	107.5	107.5	101	112.3	115	106
DW+1/004/-	107.5	107.5	107.5	107.5	107.5	101	112.3	115	106
DW+1/007/-	107.5	107.5	107.5	107.5	107.5	101	112.3	115	104.5
DW+2/006/-	119.5	119.5	119.5	119.5	119.5	113	124.3	127	116.5
DW+2/007/-	119.5	119.5	119.5	119.5	119.5	113	124.3	127	116.5
	1 1/2” TRI	**1 1/2” ISO**	**DN40**	**1 1/2” ISO**	**1 1/2” IDF**	**1 1/2” SMS**	**1 1/2” RJT**	**DN40**	**1 1/2” DS**
DW+2/013/-	119.5	119.5	119.5	119.5	119.5	118	124.3	131	126
DW+3/014/-	133.5	133.5	133.5	133.5	133.5	132	138.3	145	130
DW+3/017/-	133.5	133.5	133.5	133.5	133.5	132	138.3	145	130
	2” TRI	**2” ISO**	**DN50**	**2” ISO**	**2” IDF**	**2” SMS**	**2” RJT**	**DN50**	**2” DS**
DW+3/030/-	133.5	133.5	133.5	133.5	133.5	132	138.3	147	132
DW+3/050/-	133.5	133.5	133.5	133.5	133.5	132	138.3	147	132
DW+4/033/-	151.5	151.5	151.5	151.5	151.5	150	156.3	165	150
DW+4/039/-	151.5	151.5	151.5	151.5	151.5	150	156.3	165	150
	2 1/2” TRI	**2 1/2” ISO**	**DN65**	**2 1/2” ISO**	**2 1/2” IDF**	**2 1/2 ” SMS**	**2 1/2” RJT**	**DN65**	**2 1/2” DS**
DW+5/080/-	186.5	186.5	193	186.5	186.5	190	191.3	205	189
DW+5/093/-	186.5	186.5	193	186.5	186.5	190	191.3	205	189
	3” TRI	**3” ISO**	**DN80**	**3” ISO**	**3” IDF**	**3” SMS**	**3” RJT**	**DN80**	**3” DS**
DW+4/073/-	151.5	151.5	158	151.5	151.5	155	156.3	175	154
DW+4/125/-	151.5	151.5	158	151.5	151.5	155	156.3	175	154
DW+5/142/-	186.5	186.5	193	186.5	186.5	190	191.3	210	189
	5 1/2” TRI	**5 1/2” ISO**						**DN125**	
DW+5/256/-	193	193						211	

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

3. Pump Dimensions

3.3. Dimension Sketch for DW+1-5 with Horizontal In/Outlet, Baseplate Type 1 and Guard



	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A1	9	9	2	7	7	-	-	-	-	-	4	4	-	-	9	9	-	-
	A2	-	-	-	-	-	3	7	7	23	23	-	-	23	61	-	-	12	62
	C	54	54	48	56	56	52	54	54	45	45	75	75	65	27	95	95	79	54
	D	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	E	520	520	520	590	590	590	780	780	780	780	485	485	485	485	610	610	610	610
	F	600	600	600	670	670	670	860	860	860	860	1050	1050	1050	1050	1300	1300	1300	1300
	H	166	166	166	194	194	194	212	212	212	212	260	260	260	260	326	326	326	326
	J	230	230	230	258	258	258	288	288	288	288	368	368	368	368	434	434	434	434
	K	302	302	302	315	315	315	340	340	340	340	441	441	441	441	491	491	491	491
	N	180	180	180	170	170	170	182	182	182	182	251	251	251	251	251	251	251	251
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	412	412	418	452	452	456												
		GL	300	300	300	347	347	347												
	SK 172.1	B	436	436	442	511	511	515	503	503	519	519								
		GL	300	300	300	347	347	347	372	372	372	372								
	SK 372.1	B	531	531	537	563	563	567	570	570	586	586	688	688	715	753				
		GL	300	300	300	347	347	347	372	372	372	372	438	438	438	438				
	SK 572.1	B				611	611	615	639	639	655	655	701	701	732	770	844	844	865	915
		GL				347	347	347	372	372	372	372	438	438	438	438	505	505	505	505
	SK 672.1	B							660	660	676	676	715	715	742	780	859	859	880	930
		GL							372	372	372	372	438	438	438	438	505	505	505	505
	SK 772.1	B											718	718	745	783	847	847	868	918
		GL											438	438	438	438	505	505	505	505
	SK 872.1	B															926	926	947	997
		GL															505	505	505	505
	SK 972.1	B															993	993	1014	1064
		GL															505	505	505	505

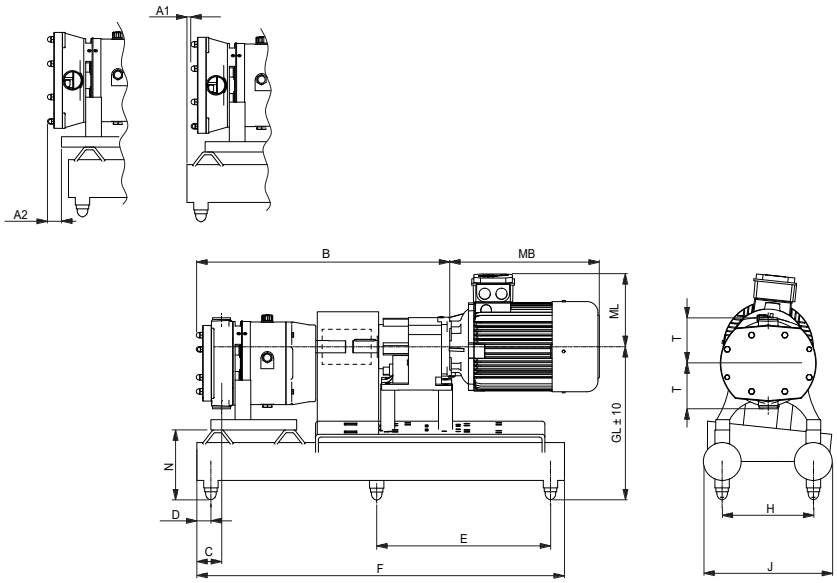
* See chapter: Pump dimensions with fittings.

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

	Motor size											
	63 S/L	71 S/L	80 S/L	90 S/L	100 L	112 M	132 S/M	160 M/L	160 LA/LB	180 M/L	200 L	225 S
MB	188	213	231	273	306	324	411	486	521	602	688	688
ML	100	109	124	129	140	150	174	234	234	259	306	306

3. Pump Dimensions

3.4. Dimension Sketch for DW+1-5 with Vertical In/Outlet, Baseplate Type 1 and Guard



	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A1	9	9	2	7	7	-	-	-	-	-	4	4	-	-	9	9	-	-
	A2	-	-	-	-	-	3	7	7	23	23	-	-	23	61	-	-	12	62
	C	54	54	48	56	56	52	54	54	45	45	75	75	65	27	95	95	79	54
	D	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	E	520	520	520	590	590	590	780	780	780	780	485	485	485	485	610	610	610	610
	F	600	600	600	670	670	670	860	860	860	860	1050	1050	1050	1050	1300	1300	1300	1300
	H	166	166	166	194	194	194	212	212	212	212	260	260	260	260	326	326	326	326
	J	230	230	230	258	258	258	288	288	288	288	368	368	368	368	434	434	434	434
	N	180	180	180	170	170	170	182	182	182	182	251	251	251	251	251	251	251	251
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	412	412	418	452	452	456												
		GL	300	300	300	347	347	347												
	SK 172.1	B	436	436	442	511	511	515	503	503	519	519								
		GL	300	300	300	347	347	347	372	372	372	372								
	SK 372.1	B	531	531	537	563	563	567	570	570	586	586	688	688	715	753				
		GL	300	300	300	347	347	347	372	372	372	372	438	438	438	438				
	SK 572.1	B				611	611	615	639	639	655	655	701	701	732	770	844	844	865	915
		GL				347	347	347	372	372	372	372	438	438	438	438	505	505	505	505
	SK 672.1	B							660	660	676	676	715	715	742	780	859	859	880	930
		GL							372	372	372	372	438	438	438	438	505	505	505	505
	SK 772.1	B											718	718	745	783	847	847	868	918
		GL											438	438	438	438	505	505	505	505
	SK 872.1	B															926	926	947	997
		GL															505	505	505	505
	SK 972.1	B															993	993	1014	1064
		GL															505	505	505	505

* See chapter: Pump dimensions with fittings.

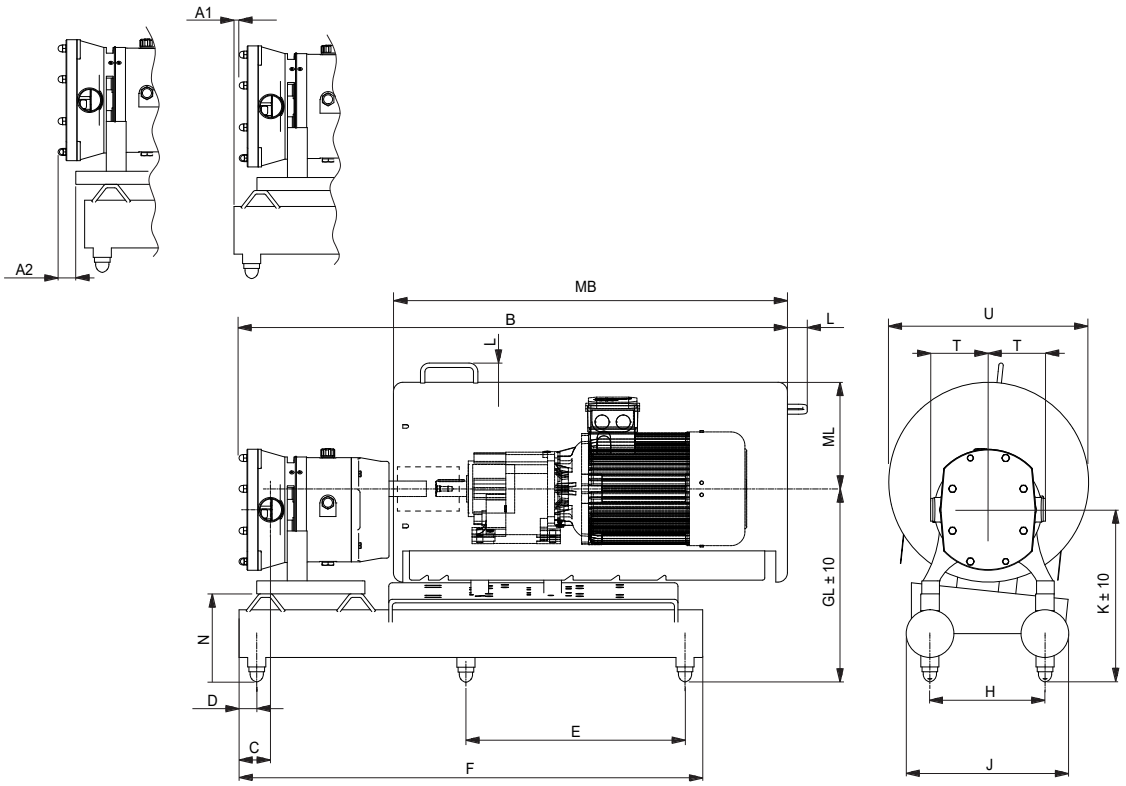
Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

	Motor size											
	63 S/L	71 S/L	80 S/L	90 S/L	100 L	112 M	132 S/M	160 M/L	160 LA/LB	180 M/L	200 L	225 S
MB	188	213	231	273	306	324	411	486	521	602	688	688
ML	100	109	124	129	140	150	174	234	234	259	306	306

3. Pump Dimensions

3.5. Dimension Sketch for DW+1-5 with Horizontal In/Outlet, Baseplate Type 1 and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.



3. Pump Dimensions

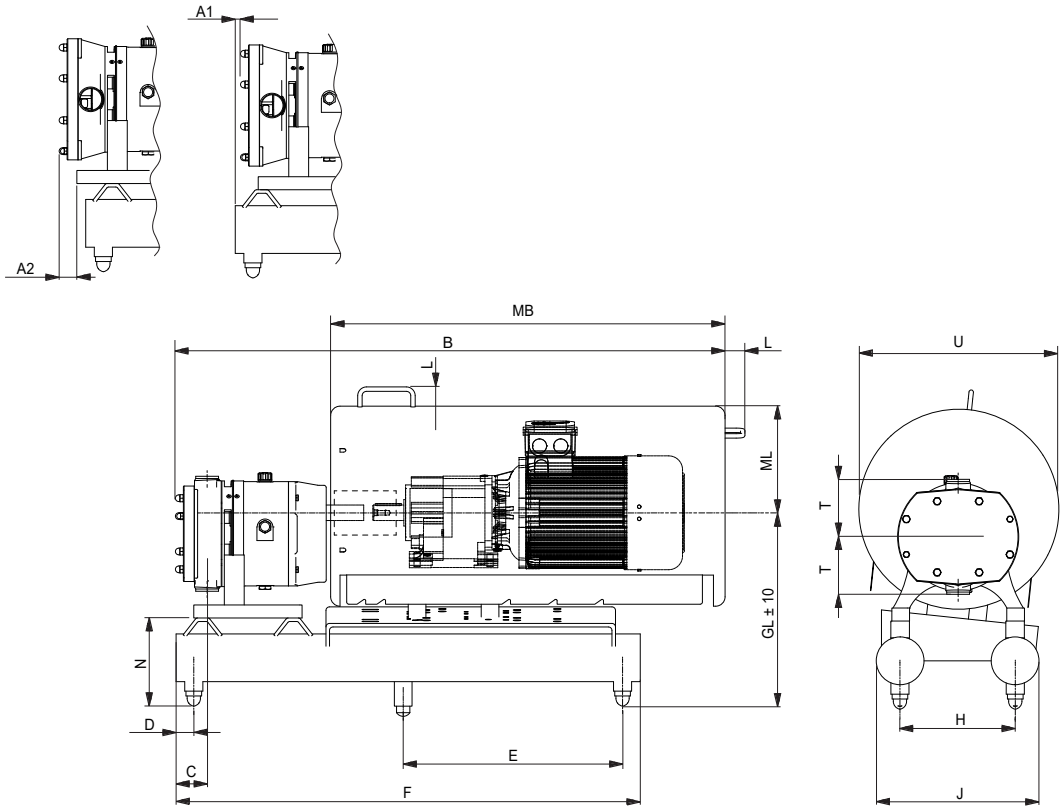
Gear unit size		Symbol	DW+ pump size																	
			DW+1			DW+2			DW+3				DW+4				DW+5			
			003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
		A1	9	9	2	7	7	-	-	-	-	-	4	4	-	-	9	9	-	-
		A2	-	-	-	-	-	3	7	7	23	23	-	-	23	61	-	-	12	62
		C	54	54	48	56	56	52	54	54	45	45	75	75	65	27	95	95	79	54
		D	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		E	520	520	520	590	590	590	780	780	780	780	485	485	485	485	610	610	610	610
		F	600	600	600	670	670	670	860	860	860	860	1050	1050	1050	1050	1300	1300	1300	1300
		H	166	166	166	194	194	194	212	212	212	212	260	260	260	260	326	326	326	326
		J	230	230	230	258	258	258	288	288	288	288	368	368	368	368	434	434	434	434
		K	302	302	302	315	315	315	340	340	340	340	441	441	441	441	491	491	491	491
		N	180	180	180	170	170	170	182	182	182	182	251	251	251	251	251	251	251	251
		T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	830	830	840	850	850	860												
		GL	300	300	300	347	347	347												
		MB	608	608	608	600	600	600												
		ML	145	145	145	185	185	185												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	910	934								
		GL	300	300	300	347	347	347	372	372	372	372								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	145	145	145	185	185	185	208	208	208	208								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	910	934	1160	1185	1225	1165				
		GL	300	300	300	347	347	347	372	372	372	372	438	438	438	438				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	158	158	158	155	155	155	208	208	208	208	208	208	208	208				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1000	1175	1175	1190	1214	1245	1245	1270	1310	1355	1355	1380	1430
		GL				347	347	347	372	372	372	372	438	438	438	438	505	505	505	505
		MB				750	750	750	898	898	898	898	898	898	898	898	898	898	898	898
		ML				188	188	188	222	222	222	222	264	264	264	264	282	282	282	282
		U				360	360	360	450	450	450	450	450	450	450	450	450	450	450	450
		L				-	-	-	45	45	45	45	45	45	45	45	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1245	1245	1270	1310	1355	1355	1380	1430
		GL							372	372	372	372	438	438	438	438	505	505	505	505
		MB							898	898	898	898	898	898	898	898	898	898	898	898
		ML							222	222	222	222	264	264	264	264	282	282	282	282
		U							450	450	450	450	450	450	450	450	450	450	450	450
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1175	1175	1190	1214	1375	1375	1400	1400
		GL											438	438	438	438	505	505	505	505
		MB											898	898	898	898	1027	1027	1027	1027
		ML											248	248	248	248	252	252	252	252
		U											450	450	450	450	450	480	480	480
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1375	1375	1400	1440
		GL															505	505	505	505
		MB															1027	1027	1027	1027
		ML															252	252	252	252
		U															480	480	480	480
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															505	505	505	505
		MB															1312	1312	1312	1312
		ML															350	350	350	350
		U															700	700	700	700
		L															45	45	45	45

* See chapter: Pump dimensions with fittings.

3. Pump Dimensions

3.6. Dimension Sketch for DW+1-5 with Vertical In/Outlet, Baseplate Type 1 and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.



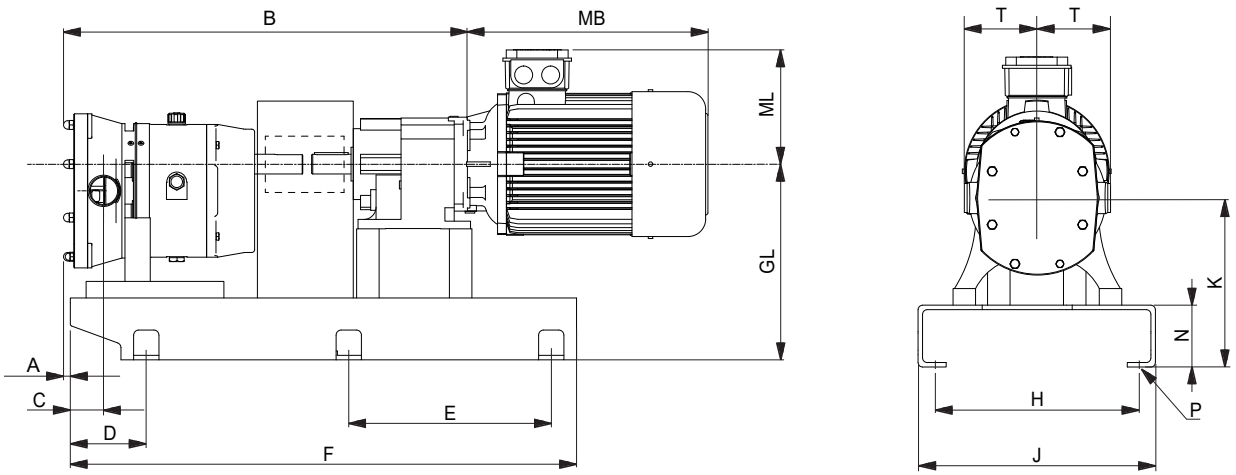
3. Pump Dimensions

		Symbol	DW+ pump size																	
			DW+1			DW+2			DW+3				DW+4				DW+5			
			003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
		A1	9	9	2	7	7	-	-	-	-	-	4	4	-	-	9	9	-	-
		A2	-	-	-	-	-	3	7	7	23	23	-	-	23	61	-	-	12	62
		C	54	54	48	56	56	52	54	54	45	45	75	75	65	27	95	95	79	54
		D	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
		E	520	520	520	590	590	590	780	780	780	780	485	485	485	485	610	610	610	610
		F	600	600	600	670	670	670	860	860	860	860	1050	1050	1050	1050	1300	1300	1300	1300
		H	166	166	166	194	194	194	212	212	212	212	260	260	260	260	326	326	326	326
		J	230	230	230	258	258	258	288	288	288	288	368	368	368	368	434	434	434	434
		N	180	180	180	170	170	170	182	182	182	182	251	251	251	251	251	251	251	251
		T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	830	830	840	850	850	860												
		GL	300	300	300	347	347	347												
		MB	608	608	608	600	600	600												
		ML	145	145	145	185	185	185												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	910	934								
		GL	300	300	300	347	347	347	372	372	372	372								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	145	145	145	185	185	185	208	208	208	208								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	910	934	1160	1185	1225	1165				
		GL	300	300	300	347	347	347	372	372	372	372	438	438	438	438				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	158	158	158	155	155	155	208	208	208	208	208	208	208	208				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1000	1175	1175	1190	1214	1245	1245	1270	1310	1355	1355	1380	1430
		GL				347	347	347	372	372	372	372	438	438	438	438	505	505	505	505
		MB				750	750	750	898	898	898	898	898	898	898	898	898	898	898	898
		ML				188	188	188	222	222	222	222	264	264	264	264	282	282	282	282
		U				360	360	360	450	450	450	450	450	450	450	450	450	450	450	450
		L				-	-	-	45	45	45	45	45	45	45	45	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1245	1245	1270	1310	1355	1355	1380	1430
		GL							372	372	372	372	438	438	438	438	505	505	505	505
		MB							898	898	898	898	898	898	898	898	898	898	898	898
		ML							222	222	222	222	264	264	264	264	282	282	282	282
		U							450	450	450	450	450	450	450	450	450	450	450	450
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1175	1175	1190	1214	1375	1375	1400	1400
		GL											438	438	438	438	505	505	505	505
		MB											898	898	898	898	1027	1027	1027	1027
		ML											248	248	248	248	252	252	252	252
		U											450	450	450	450	450	480	480	480
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1375	1375	1400	1440
		GL															505	505	505	505
		MB															1027	1027	1027	1027
		ML															252	252	252	252
		U															480	480	480	480
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															505	505	505	505
		MB															1312	1312	1312	1312
		ML															350	350	350	350
		U															700	700	700	700
		L															45	45	45	45

* See chapter: Pump dimensions with fittings.

3. Pump Dimensions

3.7. Dimension Sketch for DW+1-5 with Horizontal In/Outlet, Baseplate Type 2 and Guard



	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
	C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
	D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
	E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
	F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
	H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
	J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
	K	194	194	194	217	217	217	248	248	248	248	300	300	300	300	360	360	360	360
	N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
	P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	430	430	438	471	471	481												
		GL	165	165	165	250	250	250												
	SK 172.1	B	450	450	458	487	487	497	527	527	543	543								
		GL	165	165	165	250	250	250	285	285	285	285								
	SK 372.1	B	519	519	527	555	555	565	596	596	612	612	688	688	714	754				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
	SK 572.1	B				587	587	597	626	626	642	642	718	718	744	784	863	863	884	934
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
	SK 672.1	B							658	658	674	674	749	749	775	815	905	905	926	976
		GL							285	285	285	285	348	348	348	348	423	423	423	423
	SK 772.1	B											726	726	752	792	907	907	928	978
		GL											348	348	348	348	423	423	423	423
	SK 872.1	B															966	966	987	1037
		GL															423	423	423	423
	SK 972.1	B															1033	1033	1054	1104
		GL															423	423	423	423

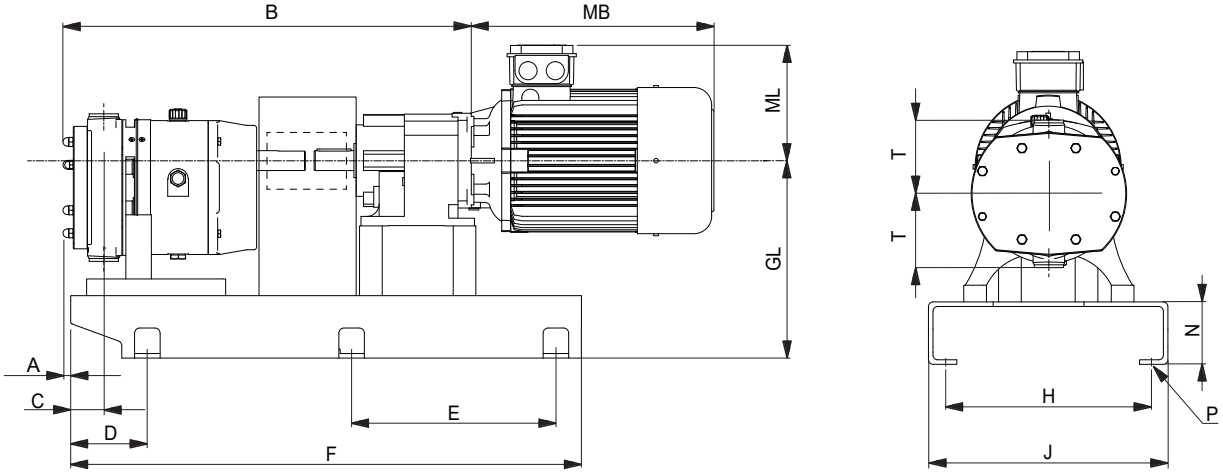
* See chapter: Pump dimensions with fittings.
** Number of holes: 4.
*** Number of holes: 6.

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

	Motor size											
	63 S/L	71 S/L	80 S/L	90 S/L	100 L	112 M	132 S/M	160 M/L	160 LA/LB	180 M/L	200 L	225 S
MB	188	213	231	273	306	324	411	486	521	602	688	688
ML	100	109	124	129	140	150	174	234	234	259	306	306

3. Pump Dimensions

3.8. Dimension Sketch for DW+1-5 with Vertical In/Outlet, Baseplate Type 2 and Guard



	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
	C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
	D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
	E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
	F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
	H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
	J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
	N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
	P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	430	430	438	471	471	481												
		GL	165	165	165	250	250	250												
	SK 172.1	B	450	450	458	487	487	497	527	527	543	543								
		GL	165	165	165	250	250	250	285	285	285	285								
	SK 372.1	B	519	519	527	555	555	565	596	596	612	612	688	688	714	754				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
	SK 572.1	B				587	587	597	626	626	642	642	718	718	744	784	863	863	884	934
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
	SK 672.1	B							658	658	674	674	749	749	775	815	905	905	926	976
		GL							285	285	285	285	348	348	348	348	423	423	423	423
	SK 772.1	B											726	726	752	792	907	907	928	978
		GL											348	348	348	348	423	423	423	423
	SK 872.1	B															966	966	987	1037
		GL															423	423	423	423
	SK 972.1	B															1033	1033	1054	1104
		GL															423	423	423	423

* See chapter: Pump dimensions with fittings.
** Number of holes: 4.
*** Number of holes: 6.

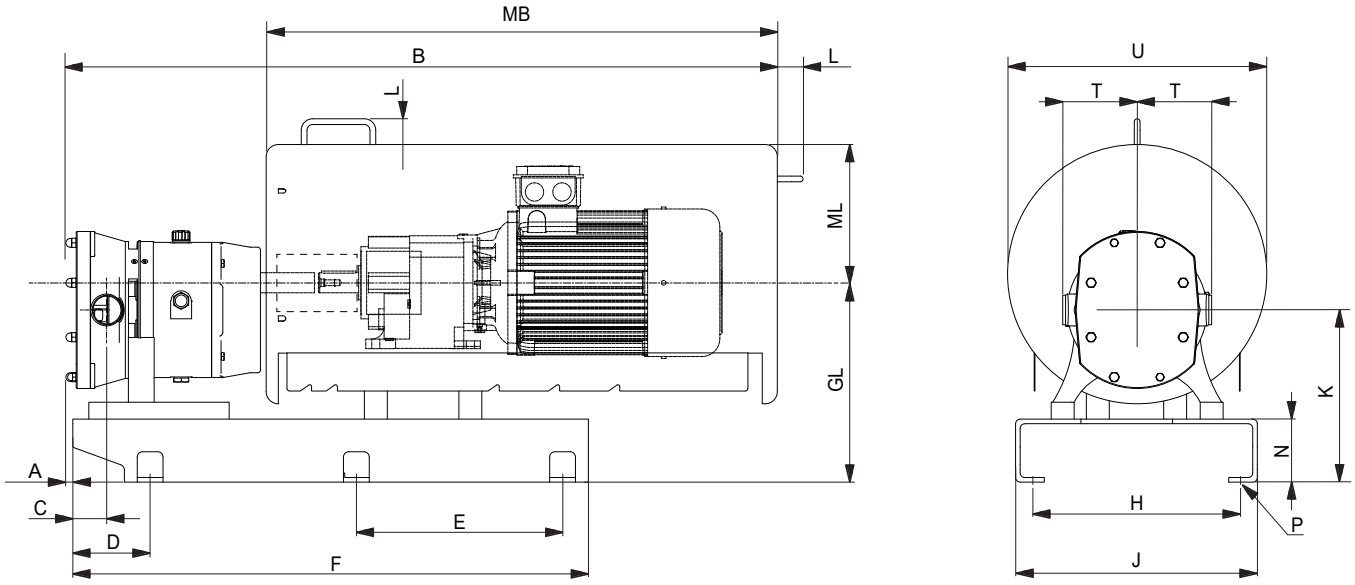
Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

	Motor size											
	63 S/L	71 S/L	80 S/L	90 S/L	100 L	112 M	132 S/M	160 M/L	160 LA/LB	180 M/L	200 L	225 S
MB	188	213	231	273	306	324	411	486	521	602	688	688
ML	100	109	124	129	140	150	174	234	234	259	306	306

3. Pump Dimensions

3.9. Dimension Sketch for DW+1-5 with Horizontal In/Outlet, Baseplate Type 2 and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.



3. Pump Dimensions

Gear unit size		Symbol	DW+ pump size																	
			DW+1			DW+2			DW+3				DW+4				DW+5			
			003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
		A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
		C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
		D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
		E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
		F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
		H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
		J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
		K	194	194	194	217	217	217	248	248	248	248	300	300	300	300	360	360	360	360
		N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
		P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
		T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	SK 072.1	B	830	830	840	850	850	860												
		GL	165	165	165	250	250	250												
		MB	608	608	608	600	600	600												
		ML	152	152	152	187	187	187												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	1052	1076								
		GL	165	165	165	250	250	250	285	285	285	285								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	152	152	152	187	187	187	223	223	223	223								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	1052	1076	1160	1160	1185	1225				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	152	152	152	187	187	187	223	223	223	223	200	200	200	200				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1010	1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
		MB				750	750	750	898	898	898	898	813	813	813	813	898	898	898	898
		ML				203	203	203	212	212	212	212	200	200	200	200	273	273	273	273
		U				360	360	360	450	450	450	450	360	360	360	360	450	450	450	450
		L				-	-	-	45	45	45	45	-	-	-	-	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL							285	285	285	285	348	348	348	348	423	423	423	423
		MB							902	902	902	902	1027	1027	1027	1027	1065	1065	1065	1065
		ML							254	254	254	254	238	238	238	238	380	380	380	380
		U							480	480	480	480	480	480	480	480	525	525	525	525
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1375	1375	1400	1440	1525	1525	1545	1595
		GL											348	348	348	348	423	423	423	423
		MB											1027	1027	1027	1027	1065	1065	1065	1065
		ML											238	238	238	238	380	380	380	380
		U											480	480	480	480	525	525	525	525
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1065	1065	1065	1065
		ML															377	377	377	377
		U															525	525	525	525
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1312	1312	1312	1312
		ML															362	362	362	362
		U															700	700	700	700
		L															45	45	45	45

* See chapter: Pump dimensions with fittings.

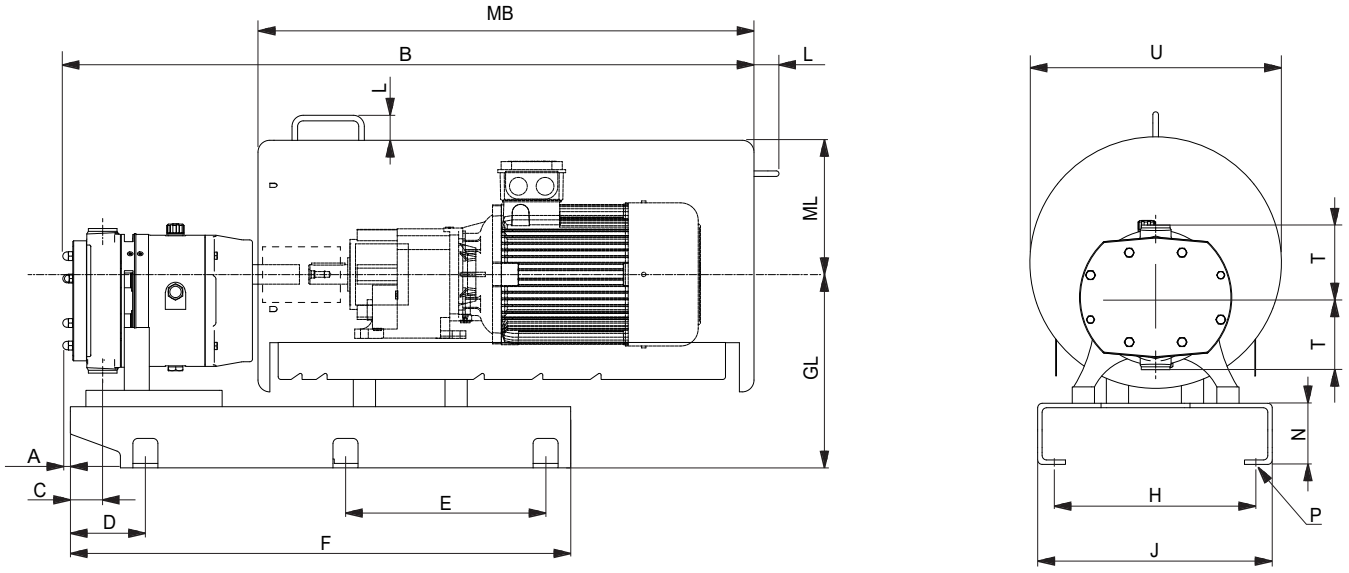
** Number of holes: 4.

*** Number of holes: 6.

3. Pump Dimensions

3.10. Dimension Sketch for DW+1-5 with Vertical In/Outlet, Baseplate Type 2 and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.



3. Pump Dimensions

	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
	C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
	D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
	E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
	F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
	H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
	J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
	N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
	P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Gear unit size	SK 072.1	B	830	830	840	850	850	860												
		GL	165	165	165	250	250	250												
		MB	608	608	608	600	600	600												
		ML	152	152	152	187	187	187												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	1052	1076								
		GL	165	165	165	250	250	250	285	285	285	285								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	152	152	152	187	187	187	223	223	223	223								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	1052	1076	1160	1160	1185	1225				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	152	152	152	187	187	187	223	223	223	223	200	200	200	200				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1010	1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
		MB				750	750	750	898	898	898	898	813	813	813	813	898	898	898	898
		ML				203	203	203	212	212	212	212	200	200	200	200	273	273	273	273
		U				360	360	360	450	450	450	450	360	360	360	360	450	450	450	450
		L				-	-	-	45	45	45	45	-	-	-	-	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL							285	285	285	285	348	348	348	348	423	423	423	423
		MB							902	902	902	902	1027	1027	1027	1027	1065	1065	1065	1065
		ML							254	254	254	254	238	238	238	238	380	380	380	380
		U							480	480	480	480	480	480	480	480	525	525	525	525
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1375	1375	1400	1440	1525	1525	1545	1595
		GL											348	348	348	348	423	423	423	423
		MB											1027	1027	1027	1027	1065	1065	1065	1065
		ML											238	238	238	238	380	380	380	380
		U											480	480	480	480	525	525	525	525
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1065	1065	1065	1065
		ML															377	377	377	377
		U															525	525	525	525
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1312	1312	1312	1312
		ML															362	362	362	362
		U															700	700	700	700
		L															45	45	45	45

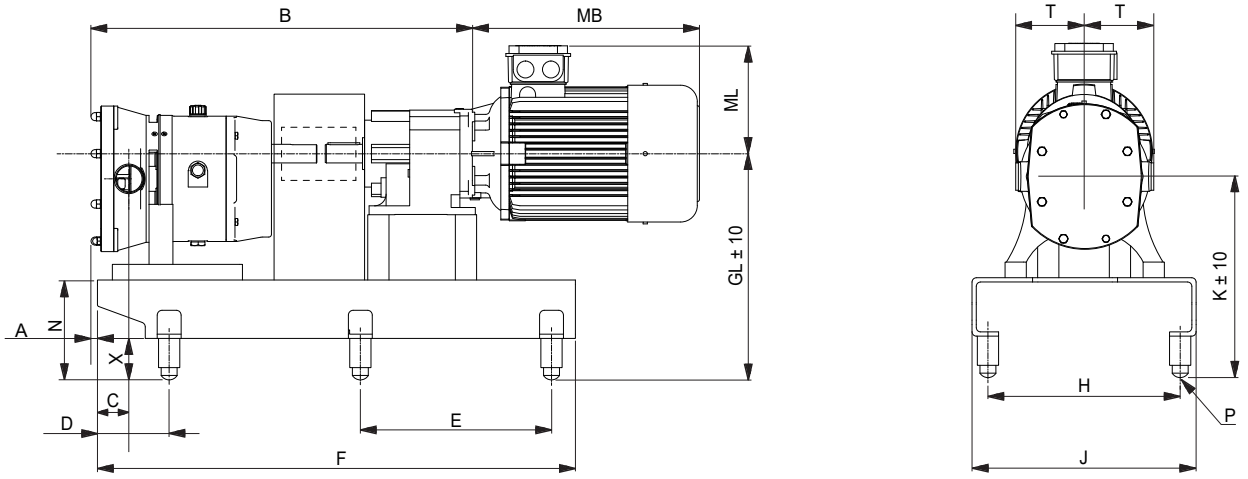
* See chapter: Pump dimensions with fittings.

** Number of holes: 4.

*** Number of holes: 6.

3. Pump Dimensions

3.11. Dimension Sketch for DW+1-5 and Horizontal In/Outlet, Baseplate Type 2 with Feet and Guard



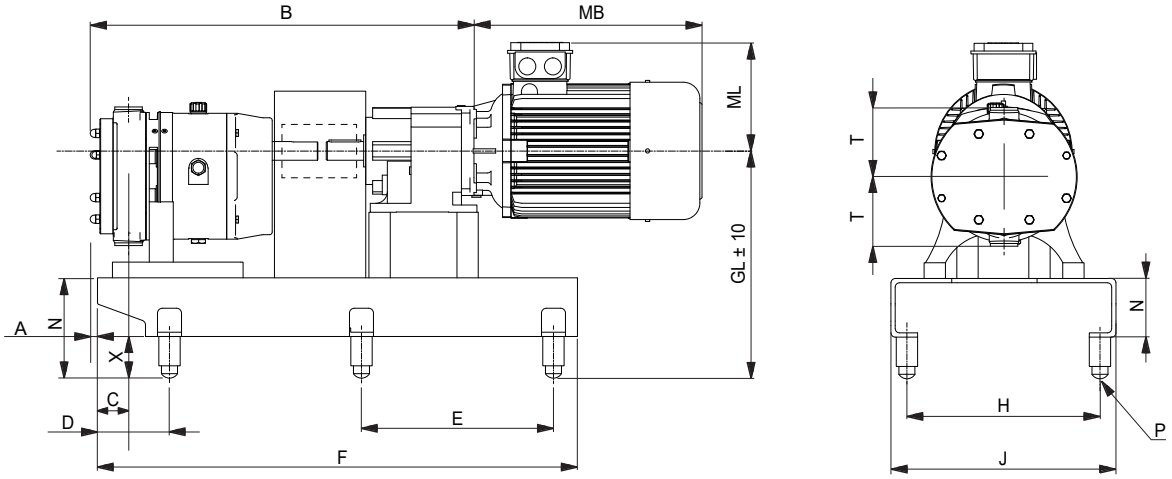
	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
	C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
	D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
	E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
	F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
	H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
	J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
	K	194	194	194	217	217	217	248	248	248	248	300	300	300	300	360	360	360	360
	N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
	P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	X	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
Gear unit size	SK 072.1	B	430	430	438	471	471	481												
		GL	165	165	165	250	250	250												
	SK 172.1	B	450	450	458	487	487	497	527	527	543	543								
		GL	165	165	165	250	250	250	285	285	285	285								
	SK 372.1	B	519	519	527	555	555	565	596	596	612	612	688	688	714	754				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
	SK 572.1	B				587	587	597	626	626	642	642	718	718	744	784	863	863	884	934
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
	SK 672.1	B							658	658	674	674	749	749	775	815	905	905	926	976
		GL							285	285	285	285	348	348	348	348	423	423	423	423
	SK 772.1	B											726	726	752	792	907	907	928	978
		GL											348	348	348	348	423	423	423	423
	SK 872.1	B															966	966	987	1037
		GL															423	423	423	423
	SK 972.1	B															1033	1033	1054	1104
		GL															423	423	423	423

* See chapter: Pump dimensions with fittings.
** Number of holes: 4.
*** Number of holes: 6.

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

3. Pump Dimensions

3.12. Dimension Sketch for DW+1-5 and Vertical In/Outlet, Baseplate Type 2 with Feet and Guard



	Symbol	DW+ pump size																	
		DW+1			DW+2			DW+3				DW+4				DW+5			
		003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
	A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
	C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
	D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
	E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
	F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
	H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
	J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
	N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
	P	** ø14	** ø14	** ø14	** ø14	**ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
	T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
	X	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
Gear unit size	SK 072.1	B	430	430	438	471	471	481												
		GL	165	165	165	250	250	250												
	SK 172.1	B	450	450	458	487	487	497	527	527	543	543								
		GL	165	165	165	250	250	250	285	285	285	285								
	SK 372.1	B	519	519	527	555	555	565	596	596	612	612	688	688	714	754				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
	SK 572.1	B				587	587	597	626	626	642	642	718	718	744	784	863	863	884	934
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
	SK 672.1	B							658	658	674	674	749	749	775	815	905	905	926	976
		GL							285	285	285	285	348	348	348	348	423	423	423	423
	SK 772.1	B											726	726	752	792	907	907	928	978
		GL											348	348	348	348	423	423	423	423
	SK 872.1	B															966	966	987	1037
		GL															423	423	423	423
	SK 972.1	B															1033	1033	1054	1104
		GL															423	423	423	423

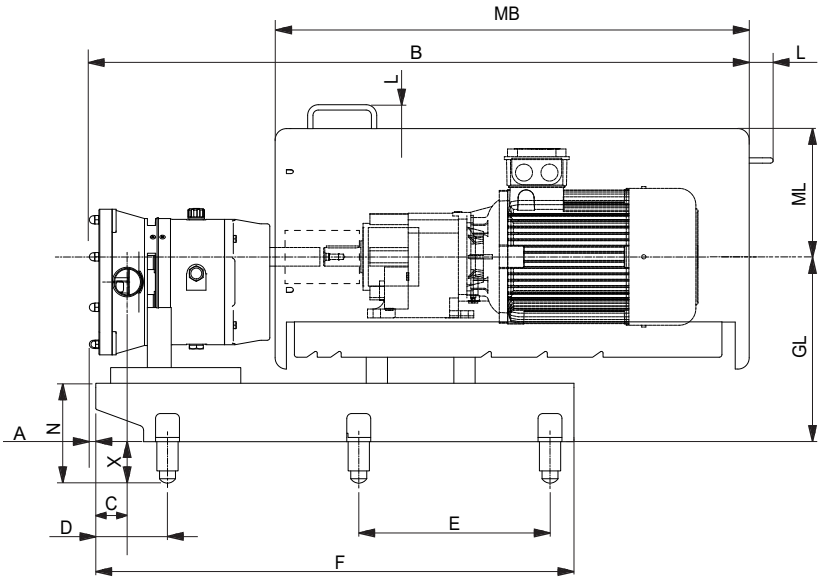
* See chapter: Pump dimensions with fittings.
** Number of holes: 4.
*** Number of holes: 6.

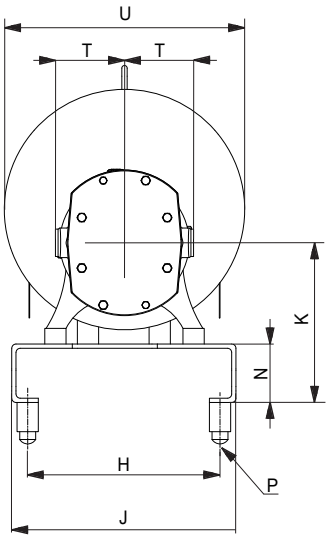
Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.

3. Pump Dimensions

3.13. Dimension Sketch for DW+1-5 and Horizontal In/Outlet, Baseplate Type 2 with Feet and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.





3. Pump Dimensions

		Symbol	DW+ pump size																
			DW+1			DW+2			DW+3				DW+4				DW+5			
			003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
		A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
		C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
		D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
		E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
		F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
		H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
		J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
		K	194	194	194	217	217	217	248	248	248	248	300	300	300	300	360	360	360	360
		N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
		P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
		T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		X	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
Gear unit size	SK 072.1	B	830	830	840	850	850	860												
		GL	165	165	165	250	250	250												
		MB	608	608	608	600	600	600												
		ML	152	152	152	187	187	187												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	1052	1076								
		GL	165	165	165	250	250	250	285	285	285	285								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	152	152	152	187	187	187	223	223	223	223								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	1052	1076	1160	1160	1185	1225				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	152	152	152	187	187	187	223	223	223	223	200	200	200	200				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1010	1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
		MB				750	750	750	898	898	898	898	813	813	813	813	898	898	898	898
		ML				203	203	203	212	212	212	212	200	200	200	200	273	273	273	273
		U				360	360	360	450	450	450	450	360	360	360	360	450	450	450	450
		L				-	-	-	45	45	45	45	-	-	-	-	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL							285	285	285	285	348	348	348	348	423	423	423	423
		MB							902	902	902	902	1027	1027	1027	1027	1065	1065	1065	1065
		ML							254	254	254	254	238	238	238	238	380	380	380	380
		U							480	480	480	480	480	480	480	480	525	525	525	525
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1375	1375	1400	1440	1525	1525	1545	1595
		GL											348	348	348	348	423	423	423	423
		MB											1027	1027	1027	1027	1065	1065	1065	1065
		ML											238	238	238	238	380	380	380	380
		U											480	480	480	480	525	525	525	525
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1065	1065	1065	1065
		ML															377	377	377	377
		U															525	525	525	525
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1312	1312	1312	1312
		ML															362	362	362	362
		U															700	700	700	700
		L															45	45	45	45

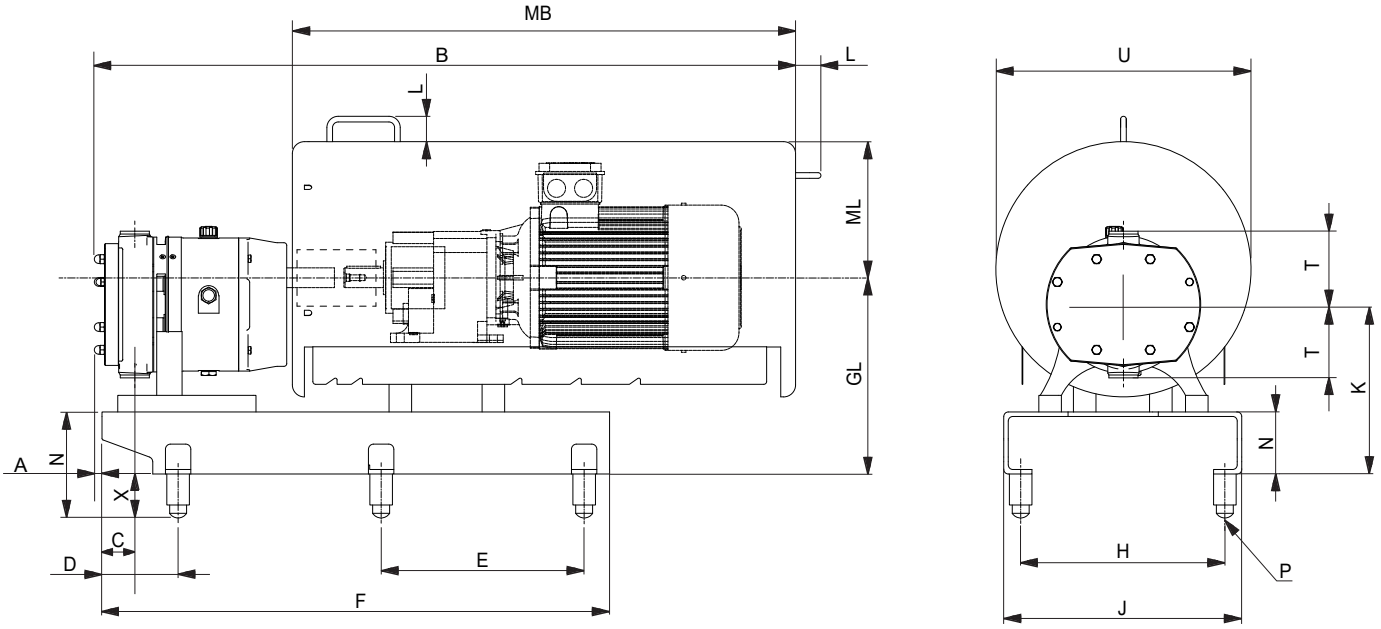
* See chapter: Pump dimensions with fittings.

** Number of holes: 4. *** Number of holes: 6.

3. Pump Dimensions

3.14. Dimension Sketch for DW+1-5 and Vertical In/Outlet, Baseplate Type 2 with Feet and Shroud

Note! Dimensions given are in accordance with ISO 2768-mK-E, which specifies the permissible deviation in dimensions unless otherwise specified in the figure.



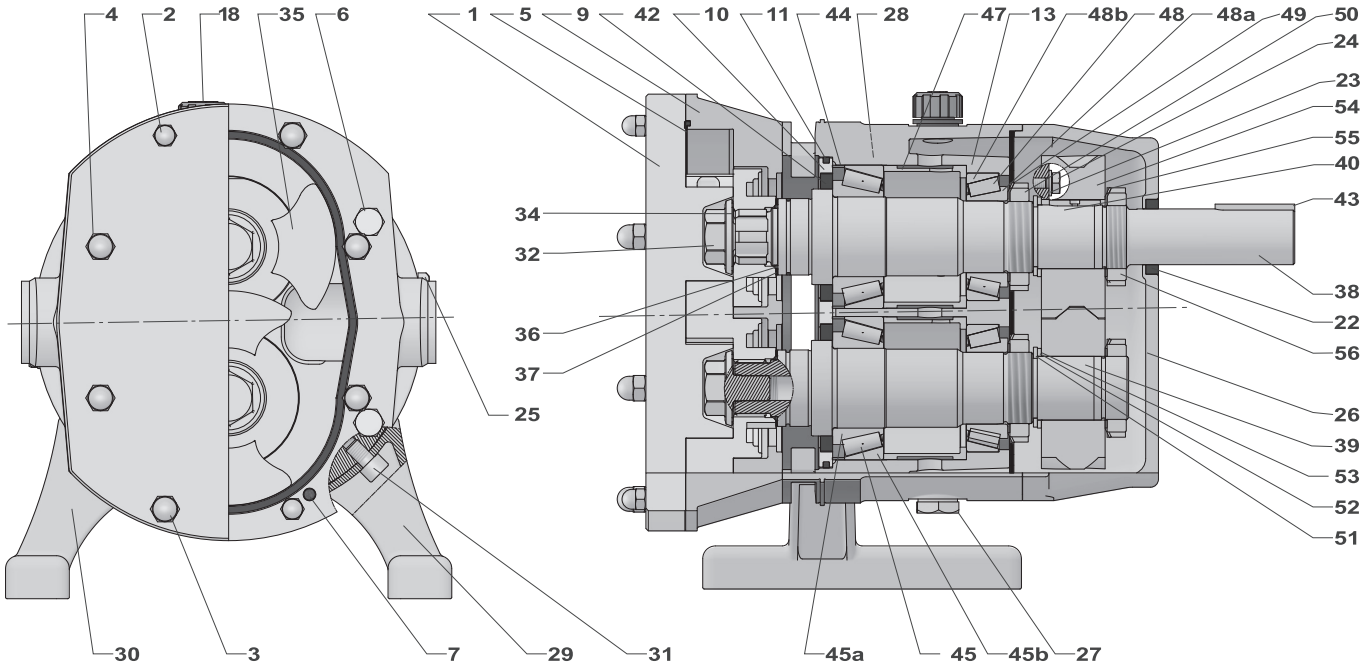
3. Pump Dimensions

Gear unit size		Symbol	DW+ pump size																	
			DW+1			DW+2			DW+3				DW+4				DW+5			
			003/-	004/-	007/-	006/-	007/-	013/-	014/-	017/-	030/-	050/-	033/-	039/-	073/-	125/-	080/-	093/-	142/-	256/-
		A	10	10	18	15	15	25	19	19	35	35	8	8	34	74	11	11	32	82
		C	33	33	28	34	34	30	42	42	33	33	63	63	50	16	75	75	59	34
		D	110	110	110	110	110	110	110	110	110	110	135	135	135	135	205	205	205	205
		E	350	350	350	440	440	440	545	545	545	545	360	360	360	360	495	495	495	495
		F	505	505	505	595	595	595	700	700	700	700	900	900	900	900	1260	1260	1260	1260
		H	198	198	198	223	223	223	278	278	278	278	362	362	362	362	392	392	392	392
		J	248	248	248	273	273	273	332	332	332	332	422	422	422	422	460	460	460	460
		K	194	194	194	217	217	217	248	248	248	248	300	300	300	300	360	360	360	360
		N	72	72	72	72	72	72	90	90	90	90	110	110	110	110	120	120	120	120
		P	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14	*** ø14
		T	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
		X	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78
	SK 072.1	B	830	830	840	850	850	860												
		GL	165	165	165	250	250	250												
		MB	608	608	608	600	600	600												
		ML	152	152	152	187	187	187												
		U	250	250	250	305	305	305												
		L	-	-	-	-	-	-												
	SK 172.1	B	830	830	840	850	850	860	890	890	1052	1076								
		GL	165	165	165	250	250	250	285	285	285	285								
		MB	608	608	608	600	600	600	617	617	617	617								
		ML	152	152	152	187	187	187	223	223	223	223								
		U	250	250	250	305	305	305	360	360	360	360								
		L	-	-	-	-	-	-	-	-	-	-								
	SK 372.1	B	830	830	840	850	850	860	890	890	1052	1076	1160	1160	1185	1225				
		GL	165	165	165	250	250	250	285	285	285	285	348	348	348	348				
		MB	608	608	608	600	600	600	617	617	617	617	813	813	813	813				
		ML	152	152	152	187	187	187	223	223	223	223	200	200	200	200				
		U	250	250	250	305	305	305	360	360	360	360	360	360	360	360				
		L	-	-	-	-	-	-	-	-	-	-	-	-	-	-				
	SK 572.1	B				1000	1000	1010	1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL				250	250	250	285	285	285	285	348	348	348	348	423	423	423	423
		MB				750	750	750	898	898	898	898	813	813	813	813	898	898	898	898
		ML				203	203	203	212	212	212	212	200	200	200	200	273	273	273	273
		U				360	360	360	450	450	450	450	360	360	360	360	450	450	450	450
		L				-	-	-	45	45	45	45	-	-	-	-	45	45	45	45
	SK 672.1	B							1175	1175	1190	1214	1160	1160	1185	1225	1355	1355	1380	1430
		GL							285	285	285	285	348	348	348	348	423	423	423	423
		MB							902	902	902	902	1027	1027	1027	1027	1065	1065	1065	1065
		ML							254	254	254	254	238	238	238	238	380	380	380	380
		U							480	480	480	480	480	480	480	480	525	525	525	525
		L							45	45	45	45	45	45	45	45	45	45	45	45
	SK 772.1	B											1375	1375	1400	1440	1525	1525	1545	1595
		GL											348	348	348	348	423	423	423	423
		MB											1027	1027	1027	1027	1065	1065	1065	1065
		ML											238	238	238	238	380	380	380	380
		U											480	480	480	480	525	525	525	525
		L											45	45	45	45	45	45	45	45
	SK 872.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1065	1065	1065	1065
		ML															377	377	377	377
		U															525	525	525	525
		L															45	45	45	45
	SK 972.1	B															1770	1770	1790	1840
		GL															423	423	423	423
		MB															1312	1312	1312	1312
		ML															362	362	362	362
		U															700	700	700	700
		L															45	45	45	45

* See chapter: Pump dimensions with fittings.

** Number of holes: 4. *** Number of holes: 6.

4. Sectional Drawing - Pump



Item	Description
1	Front cover
2	Bolt, front cover
3	Bolt, front cover stepped
4	Nut, front cover dome
5	Gasket, front cover
6	Screw, rotor case to chassis
7	Dowel
9	Rotor case
10	Oil seal plate
11	O-ring, oil seal plate
13	Chassis
18	Oil filler plug
22	Oil seal rear
23	Washer
24	Screw
25	Oil level window
26	Can
27	Oil drain plug
28	Nut
29	Foot, left
30	Foot, right
31	Screw for foot
32	Rotor screw with washer

Item	Description
34	O-ring, rotor screw
35	Rotor
36	O-ring, rotor/shaft
37	Shims, rotor
38	Shaft main
39	Shaft aux
40	Gear key
42	Oil seal front
43	Drive key
44	Front spacer
45	Bearing front
45a	Bearing front, inner bearing race
45b	Bearing front, outer bearing race
47	Spacer, rear bearing
48	Bearing rear
48a	Bearing rear, inner bearing race
48b	Bearing rear, outer bearing race
49	Bearing rear tab washer
50	Bearing rear nut
51	Circlip
52	Gear spacer
53	Gear shims
54	Gear (1 pair)
55	Gear tab washer
56	Gear nut

5. Introduction

5.1. DW+ Pump Range

This manual covers all sizes of standard DW+ pumps as well as high temperature pumps. Check the nameplate of the pump to ensure that you have one of the above versions.

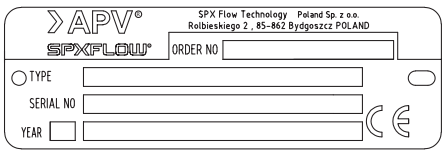
5.2. DW+ Pump, Standard and Auxiliary Equipment

The following standard options are available in the DW+ range:

- Bareshaft pump.
- Pump with constant speed geared motor, suitable for inverter drive use. Up to 37 kW these are available with stainless steel motor shroud.
- Pump with geared motor with constant or manually variable speed.
- Pump base plate and coupling guard in stainless steel.
- Lobe rotors suitable for max. 110°C or max.180°C product temperature in stainless steel AISI 316L or Non Galling Alloy (NGA).
- Piston rotors suitable for max. 110°C product temperature in stainless steel AISI 316L or NGA.
- Elastomers in EPDM, FPM (Viton) or ISOLAST™.
- Single mechanical shaft seal in SiC/Carbon or SiC/SiC, flushed or non-flushed.
- Double mechanical shaft seal in SiC/Carbon or SiC/SiC.
- Single EPDM lip seal for DW+1-5.
- Triple PTFE lip seal (confectionary) for DW+1-5.
- Packed gland with sealing thread in PTFE impregnation for DW+1-5.
- Horizontal or vertical suction and discharge ports.
- Rectangular inlet.
- Cooling/heating jacket on rotor case and front cover.
- Pressure relief valves on DW+1-5.

5.3. Identification of Pump Models

Fig. 1
(example)



A nameplate as shown in Fig. 1 is fitted on the extension frame.

Example:

Order No.:	Indicates the SPX Flow order number.
Type:	Indicates the DW+ pump type.
Serial No.:	Indicates the unique DW+ pump serial number.
Year:	Indicates the year of manufacture.

The empty field can be used to identify the pump within overall system.

5.4. Identification of Motor Models

The plate indicates the motor type and height of construction, motor capacity, speed, etc.

Caution! Check that the specifications of the motor and motor control unit are correct. This applies in particular to applications which carry a risk of explosion.

6. Safety Precautions

The safety advice listed in this operating manual, the national workplace health and safety regulation as well as internal precautions and practical advice on ways to manage the risks must be followed. It is strictly forbidden to suspend safety devices or change their mode of working.

The pump fulfils the technical demands, and the function is reliable provided that the pump is operated in compliance with the given instructions.

To avoid injuries to persons and/or damages on machinery this instruction manual will have to be strictly observed by the personnel responsible for the operation of the pump.

Inspection, regular service, and maintenance of the pump play a key role in running the pump and production. Any kind of alarms and faults, leaks etc. during operation and production must be acknowledged and necessary action to be taken to avoid any break down of the production. It is in the responsibility of the user to carry out the service and perform maintenance of the pump.

The requirements for the service media must be always met when the pump is in operation. Power cuts will cause the pump to stop, and a CIP cleaning will be required before production can be resumed.

6.1. Operator Requirements

Operators includes all persons working on or near the equipment. Only skilled, instructed, physically and mentally capable persons can work on and use this pump.

6.2. Recommended Personal Protective Equipment

It is always the operator's responsibility to wear appropriate personal protective equipment (PPE), while operating or working on this machine. This may include, but is not limited to, appropriate clothing, safety shoes, gloves, hearing protection, eye, and face protection depending on the operational circumstances.

6.3. Unexpected Stop during Production and Product Blockage

An unexpected stop during production is usually related to a power failure but may also be caused by other factors such as blockages. To remove the blockage, check the pipe system, clean any filter if necessary.

6.4. Emergency Stop

The emergency stop located on the control panel is an emergency operation intended to stop a process or movement that has become hazardous. By activating/pressing the emergency stop button the plant/machinery comes to an immediate full stop. The emergency stop must not be used as regular operation stop or shut down procedure.

6.5. Residual Risks

Despite the inherent protective safe design measures, safeguarding, and complementary protective measures, the residual risks remain.

7. Receipt, Storage, Handling and Transport

7.1. Receipt

Check the consignment for damage immediately on arrival. In case of damage, clearly mark upon the carrier's paperwork (with a brief description of the damage) that the goods have been received in a damaged condition.

7.2. Storage

After receipt and inspection, if the pump is not to be installed immediately, the pump must be repacked and placed in suitable roofed storage.

The storage location must be clean, dry and free from vibration. Plastic or gasket type port covers must be left in place.

If a moist or dusty atmosphere is used for storage, further protect the pump and unit with a suitable cover.

7.3. Handling and Transport

Act with caution when lifting the pump. All parts with a weight of more than 20 kg must be handled with a suitable hoisting device. Use a crane, forklift truck or other suitable lifting gear, and always use 2 hoisting belts in conjunction with this.

Refer to the pump weight on page 9 before selecting and using any lifting gear. Ensure that lifting equipment is correctly rated and used within the specified limits.

The drawings on the left show how the pump should be lifted.

DW+1 - DW+2 bareshaft pump: To be lifted manually with the hands. Alternally eyebolts can be fitted and the pump lifted as DW+3 - DW+5. See fig. 2.

DW+3 - DW+5 bareshaft pump: To be lifted with chain as shown in fig. 2.

DW+1 - DW+5 pump on baseplate type 1: To be lifted by putting straps below the baseplate as shown in fig. 3.

Fig. 4: DW+1 - DW+5 pump on baseplate type 2: To be lifted by putting straps below the baseplate as shown in fig. 4.

Fig. 2

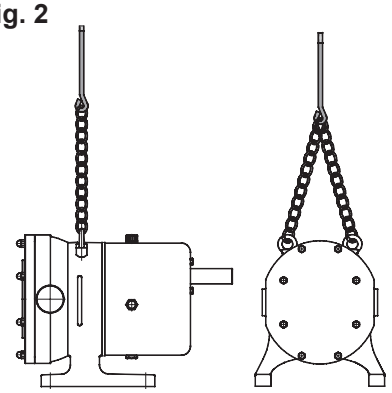


Fig. 3

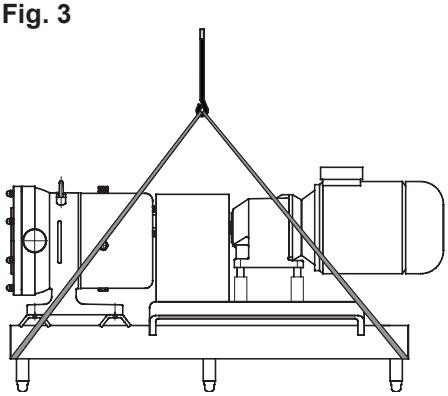
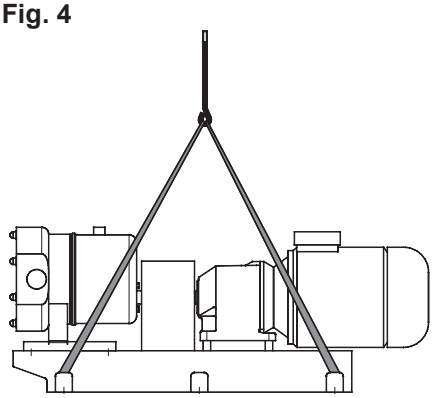


Fig. 4



Caution! Always use 2 hoisting belts and never fasten at the front of the pump body.

Caution! Never lift the pump at the shroud as it is not designed to carry the weight of the motor. Remove the shroud before lifting the pump. Always use securely fitted lifting straps when lifting with a crane or similar lifting gear.

Caution! Never go underneath a load that is being lifted!

8. Installation of Pump

Caution! Read through the instructions before installing the pump and starting it up. If in doubt, contact your local SPX Flow representative.

8.1. Positioning

Caution! Pumps should only be installed, disassembled, repaired and assembled by personnel trained in servicing of SPX Flow pumps, or by SPX Flow fitters. For further information, please contact your local SPX Flow representative.

The following must be observed:

- Install the pump as close to the liquid source as possible.
- Keep the number of bends, tees, valves and other components in the pipe system leading to the inlet of the pump to an absolute minimum.
- Install the pump as low in relation to the liquid source as possible.
- Install the pump with sufficient space for maintenance access.

8.2. Lining up the Pipe System

Ensure that pipe unions are properly aligned and assembled. Use appropriate gaskets. Support the suction and discharge piping as close to the pump as possible.

Caution! During the suction process the pump may tend to vibrate. A pipe support should be placed close to the pump suction to prevent pipework vibration creating excessive noise.

8.3. Power Supply

Caution! The installation of all electrical parts must be carried out by qualified personnel.

Connect the motor to the mains via a motor switchbox in accordance with local regulations. Connect the motor in accordance with the instructions inside the cover of the terminal box of the motor. Ensure that the pump rotational direction is correct. See chapter 8.4.

8.4. Pump Rotation

Depending on the required flow direction and the position of the shaft, the rotation direction of the pump is shown in fig. 5, 6, 7, 8. The rotation direction can be determined by looking at the motor coupling.

Fig. 5

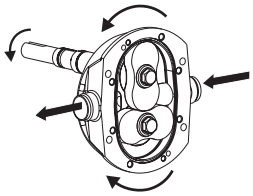


Fig. 6

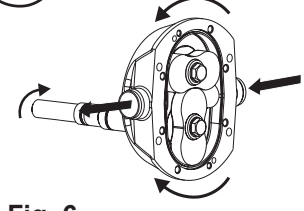


Fig. 7

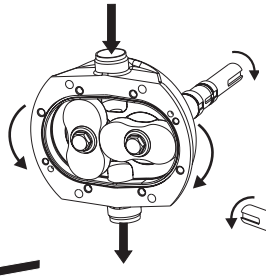


Fig. 8

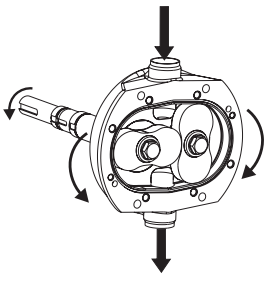
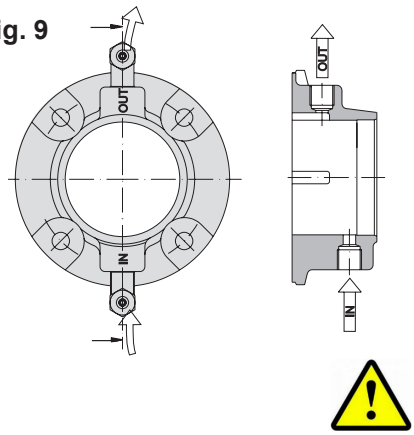


Fig. 9



8.5. Liquid Supply for Water Flushed Seals

If seal flushing is required, connect the flushing liquid to the pump. Pumps fitted with a liquid-flushed mechanical shaft seal have 2 hose connectors for flushing liquids in the seal housing. The hose connectors are M5 and fit a Ø6.0 mm hose. See chapter 14 for operating specifications.

The hose connection should always be positioned vertically with the fluid inlet below and the outlet above (Fig. 9).

Caution! Do not use these connections for flushing with steam or steam condensate. If steam or condensate flush is required, a special aseptic piping must be used.

9. Start-up and Operation

Before starting the pump, remove any dirt, debris or foreign objects which may have collected in the rotor chamber.

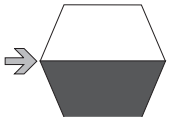
The rotors should be removed from the pump during the cleaning of the system before start-up. Flushing plugs can be used, see spare parts chapter. Use the sectional drawing for reference.

9.1. Checking the Pump for Foreign Material

Remove the pump body as described below. Use the sectional drawing for reference purposes.

1. Disconnect the power supply.
2. Undo and remove the front cover bolts (2,3,4) in the front cover (1).
3. Use the two large bolts with full length thread (2) as jacking screws in the threaded holes in the front cover (1). The front cover is removed by turning each bolt one turn at a time - this ensures that the front cover is removed in an even manner. Remove the front cover (1).
4. Rotate the rotors (35) by manually turning the coupling between the pump and motor to ensure that there are no foreign objects behind the rotors.
5. Any foreign objects in the pump must be removed. Clean with air or water, removing the rotors if necessary. See chapter 10.2.
6. Re-fit the front cover gasket (5) in the rotor case (9).
7. Re-fit the front cover (1) by positioning it on the dowels (7) in the rotor case (9), if fitted, tapping it gently in place with a plastic mallet, and fastening the front cover bolts (2, 3, 4) to the appropriate torque. See chapter 12.1.
8. Rotate the rotors (35) by manually turning the coupling between pump and geared motor carefully to ensure freedom of rotors movement inside the pump.

Fig. 10



9.2. Checking the Following before Finish of the Installation

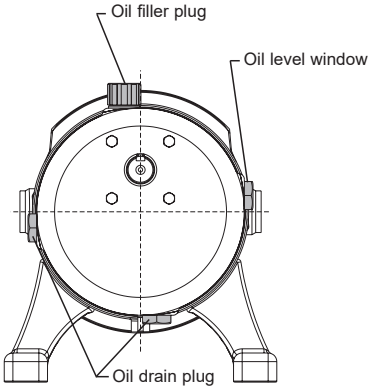
- That the oil level of the pump is visible in the oil level window (25) as shown in fig. 10,

Caution! Never allow the pump to run without liquid, as this will ruin the shaft seal.

Caution! Pumps are delivered without oil. Check the oil level when the pumps are delivered.

Note! The oil level window should be mounted on the side that gives the highest oil level. The oil level window is above centreline. See fig. 11.

Fig. 11



Pump type	DW+1	DW+2	DW+3	DW+4	DW+5
Lubricant quantities in Litre (ca.)	0.8	1.1	1.4	2.7	6.7

- that the lubricant used is of APV recommended type,
- that the pump shaft (38) and the motor shaft are properly aligned,
- that the pump port connections are tight,
- that there is liquid in the pump,

- that the pump rotates freely,
- that nothing obstructs the flow and that liquid has free access to the pump,
- that the rotational direction is correct,
- that the coupling guard has been fitted properly,
- if the pump has a flushed seal, check that the flushing flowrate is adequate. See chapter 14.5,
- that the pump is free from dirt, weld spatter or other foreign objects. See chapter 9.1.

Caution! Never start the pump before the coupling guard between the pump and motor has been securely fitted.

Caution! There are rotating parts in the pump. Never put hands or fingers into the pump while it is in operation.

Caution! Never touch the gearbox of the pump as it can become very hot.

Caution! Never touch the rotor case during operation. If the pump is being used for hot fluids, the rotor case may become very hot.

Caution! Always ensure that all pipe connections have been fitted and tightened properly before the pump is started. If the pump is used for hot and/or hazardous liquids, special care must be taken. In such cases, follow the local regulations for personal safety when working with these products.

Caution! Always remove assembly tools from the pump before starting it up.

Caution! Always ensure that no debris of any kind is present in the pump.

Caution! Always ensure that the pump is filled with liquid before it is started.

Caution! Always ensure that the pump and the motor shafts are properly aligned.

Caution! Always ensure that the suction and discharge valves isolating the pump are fully open before starting the pump.

Standard lubricants:							
Oil temp. °C	Pump/ambient temp. °C	Lubricant type		BP	Mobil	Shell	Castrol
		Mineral	Synthetic				
-20 - +120 °C	Ambient temp. t<40 °C and all DW+ pumps with product temp.<110 °C	X		Energol GR-XP 220	Mobil-gear 600 XP 220	Shell Omala S2 GX 220	Alpha SP 220
120 - +180 °C	Ambient temp. t>40 °C and all DW+ pumps with product temp.>110 °C At oil temperatures higher than 120ºC, another drain plug and oil level gauge must be used.		X	Enersyn SG-XP 220	Mobil Glygoyle 220	Shell Tivela Oil WB (S4 WE 220)	Alphasyn T220

Special lubricants for food and pharmaceutical industries:					
Oil temp. °C	Pump/ambient temp. °C	Lubricant type		Type	Approval
		Mineral	Synthetic		
-20 - +120 °C	Ambient temp. t<40 °C and all DW+ pumps with product temp.<110 °C		X	**Castrol:** Vitalube GS 220	USDA (H1)
			X	**Klüber:** Klüberoil 4UH- 220	USDA (H1)
			X	**Mobil:** DTE FM 220	FDA 178.3570 178.362 USDA (H1)a
APV recommends that the oil is changed every year.					

Caution! Always ensure that the gearbox case is filled with APV recommended gear oil to the appropriate level.

Caution! Never close or obstruct the outlet of the pump as the pressure in the system will increase above specified maximum pressure of the pump and will cause damage to the pump.

Caution! Never drop parts - especially rotors and front covers - on the floor.

Caution! Never exceed the maximum temperature specified on the pump nameplate.

Note! Synthetic and mineral lubricants must not be mixed.

9.3. After Starting the Pump

1. Listen for unusual noises.
2. Look for leaks.
3. Check that there is a flow.

9. Start-up and Operation

9.4. Fault Finding

Symptoms	Possible causes - see table below
Motor overheats:	6, 7, 14, 15, 17, 19
Pump under capacity:	2, 7, 8, 9
No flow from pump:	1, 2, 3, 5
Unsteady flow:	2, 4, 5, 7
Noise and vibration:	2, 4, 5, 6, 7, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20
Stall on start-up:	6, 7
Pump overheating:	7, 14, 15, 17, 19
Excessive rotor wear:	4, 10, 13, 14, 15, 18, 19
Excessive power absorbed:	6, 7
Pump seizure:	6, 10, 13, 14, 15, 18, 19
Shaft seal leakage:	11, 12, 13

Cause	Possible remedies
1. Incorrect rotation:	Reverse direction of motor by interchanging 2 of the phaseleads.
2. Insufficient N.P.S.H. and, as a result of this, cavitation:	Increase N.P.S.H., raise suction vessel, lower pump, reduce speed, increase suction pipe diameter, simplify and shorten suction pipe run, remove bends and other components which produce pressure loss.
3. No liquid in the pump:	Introduce liquid - vent air.
4. Air entering the pump:	Check the pump suction and system connections.
5. Blocked or restricted suction pipe:	Check the pipe system, clean any filter if necessary.
6. Discharge pressure exceeds the allowable:	Check for obstruction, lower pressure by increasing pipework diameter.
7. Product viscosity too high:	Decrease speed - increase product temperature.
8. Product viscosity too low:	Increase speed - reduce product temperature - reduce clearance between the rotor, pump housing and front cover.
9. Worn rotors:	Renew.
10. Shaft bearing wear:	Replace bearing or return pump to APV for overhaul, if necessary.
11. Worn mechanical seal:	Renew.
12. O-ring incompatible with the product:	Check chemical compatibility chart, or contact APV for alternative elastomers.
13. Worn timing gears:	Replace gears and retime rotors.
14. Insufficient lubricating oil:	Top up with correct grade of lubricant.
15. Incorrect grade of lubricating oil:	Check that the lubricant used is recommended by APV.
16. Rotor contact with the rotor case or front cover:	Drop discharge pressure, check clearances between rotors, front cover and pump housing. Check that the temperature shifts are as recommended in chapter 12.4.
17. Pump and motor misalignment:	Correct alignment.
18. Foreign objects in the product:	Fit strainer.
19. Loose bolts between the pump, motor and base frame:	Tighten the bolts. Check that the pump and motor are lined up correctly.
20. Loose bolts between the gearcase and foot:	Tighten the bolts. Check that the pump and motor are lined up correctly.

10. Dismantling and Re-Assembling the Pump

There are a few basic operations to carry out during maintenance of the pump. These are described in the following chapters.

Note! The sectional drawing shows the position of the various components mentioned in this procedure.

Caution! Never dismantle the pump before the power supply to the motor has been disconnected. The fuses should be removed and the cable disconnected from the motor.

Caution! Never dismantle the pump until the isolating valves on the suction and discharge side have been closed and the immediate pipe system has been drained. If the pump is used for hot and/ or hazardous fluids, special precautions must be taken. In such cases follow the local regulations for personal safety when working with these products.

10.1. Removing the Front Cover (1)

To remove and re-fit the front cover (1) it is necessary to follow the procedure as described below. Use the sectional drawing for reference (page 29).

1. Disconnect the power supply to the motor.
2. Shut off the flushing supply if fitted.
3. Close the isolating valves on the inlet and discharge side of the pump.
4. Undo the front cover bolts (2, 3, 4). If the pump is used for hot and/ or aggressive liquids, special precautions must be taken. In such cases, observe the local regulations for personal protection when working with these products.
5. Use two large bolts with full length thread (2) as jacking screws in the threaded holes in the front cover (1). The front cover is removed by turning each bolt one turn at a time - this ensures that the front cover is removed from the rotor case (9) in an even manner. Remove the front cover (1).

Re-fitting of the front cover:

1. Re-fit the front cover gasket (5) in the rotor case (9).
2. Re-fit the front cover (1) by positioning it on the dowels, if any, (7) located in the rotor case (9), tapping it gently in place with a plastic mallet and fastening the front cover bolts (2, 3, 4) to the appropriate torque. See chapter 12.1.
3. Rotate the rotors (35) by manually turning the coupling between the pump and geared motor carefully to ensure freedom of movement of the rotors inside the pump.

Fig. 12

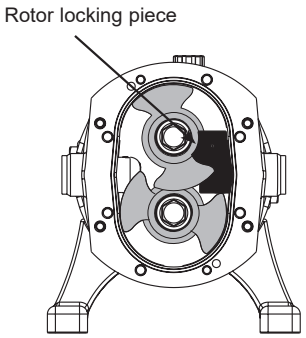


Fig. 13

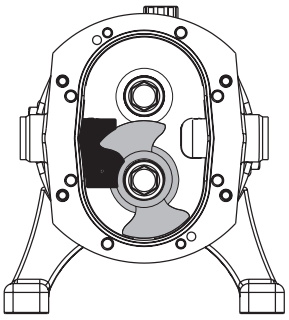


Fig. 14

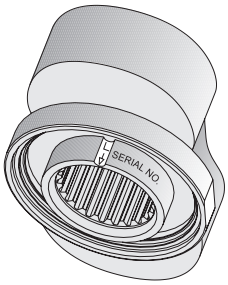
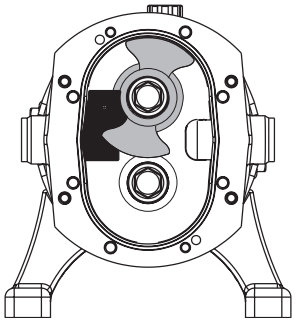


Fig. 15



10.2. Removing the Rotors (35):

To remove and re-fit the rotors it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

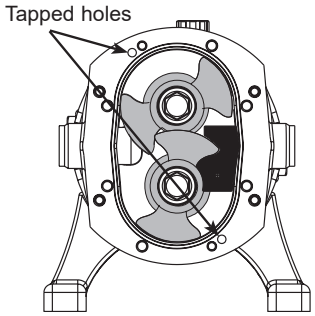
1. Remove the front cover (1) as described in chapter 10.1.
2. Position the rotors (35) and insert the fitting tool as shown in fig. 12.
3. Undo and remove the top or right rotor screw (32).
4. Remove the rotor locking piece and pull the rotor (35) out from the shaft (38). Ensure that the wings of the other rotor are not overlapping the hub of the rotor being pulled out.
5. Notice the marking of the rotors as shown in fig. 14. The rotors are marked with respectively ‘L’ for the main (long) and ‘S’ for the aux. (short) shaft. Notice that the rotors are marked on the back with the serial number.
6. Position the rotor locking piece as shown in fig. 13.
7. Undo and remove the bottom or left rotor screw (32).
8. Remove the rotor (35) as before by pulling it out from the shaft (39) with your fingers/special extractor.

Re-fitting the rotors (35):
Check the contact surfaces (B, D) of the shaft seal for debris and scratches. Use the sectional drawing for the shaft sealing for reference (page 29).

1. For re-fitting the rotors use the sectional drawing for reference (page 29). Check on DW+1-5 that the rotor marked with ‘L’ is mounted on the main (long) shaft (38) and the rotor marked with ‘S’ is mounted on the aux. (short) shaft (39). See fig. 14.

   Notice that the rotors are marked on the back with the serial number.
2. Re-fit the top or right rotor (35) on the shaft (38).
3. Position the rotor (35) and the rotor locking piece as shown in fig. 15 and tighten the screw (32) to the specified torque. See chapter 12.1. Remove the rotor locking piece.
4. Re-fit the bottom or left rotor (35) on the shaft (39).
5. Position the rotor (35) and rotor locking piece as shown in fig. 16 and tighten the screw (32) to the specified torque. See chapter 12.1. Remove the rotor lock.
6. Rotate the rotors (35) by manually turning the coupling between the pump and geared motor carefully to ensure freedom of movement of the rotors inside the pump.
7. Carry out the shimming procedure as described in chapter 10.8.

Fig. 16



10.3. Removing the Rotor Case (9)

To remove and re-fit the rotor case (9) it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Remove the stationary seal rings (D), and seal O-rings (C) with your fingers.
4. Disconnect the inlet and outlet ports of the pump from the surrounding pipework.
5. Undo the bolts (6) that attach the rotor case (9) to the chassis (13).
6. Remove the rotor case (9) by placing the bolts (6) into the two tapped holes and turn each bolt one turn at a time.

Re-fitting the rotor case (9)

1. Position the rotor case (9) on the dowels mounted in the chassis (13) and use a plastic mallet to tap the rotor case home.
2. Re-fit and tighten the bolts (6) between the rotor case (9) and the chassis (13) to the specified torque. See chapter 12.1.
3. Position the O-rings (C) on the shaft seal's stationary seal ring (D) and press the stator seal rings (the longer of the seal rings) into the rotor case (9) without using tools. Keyways in the stationary seal faces (D) must fit over drive dogs of the drive ring (G) in the rotor case (9). Check the correct mounting of the stationary seal faces by feeling the spring force when mounting them in the the rotor case (9).

10.4. Removing the Can (26)

To remove and re-fit the can (26) it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Disconnect the power supply.
2. Disconnect the pump from the geared motor. If possible, remove the pump from the pipework and put it on a work bench.
3. Drain the oil from the pump by undoing the oil drain plug (27) situated at the bottom of the can (26).
4. Remove the drive key (43).
5. Remove the can (26).

Re-fitting the can (26)

1. Check the correct mounting of the O-ring (17).
2. Refit the can (26) over the shaft (38).
3. Refit the oil level window (25). See fig. 11.

Fig. 17

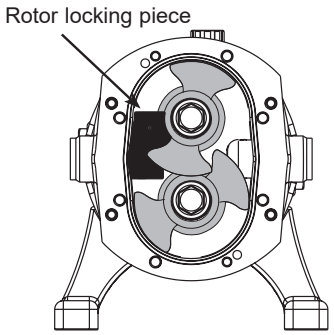


Fig. 18

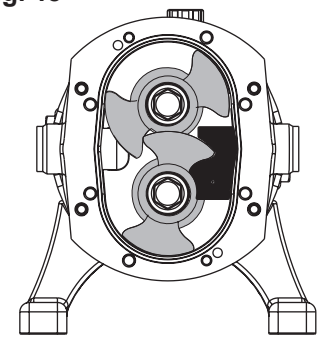


Fig. 19

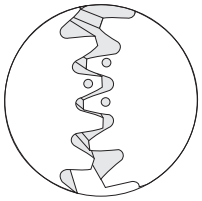


Fig. 20

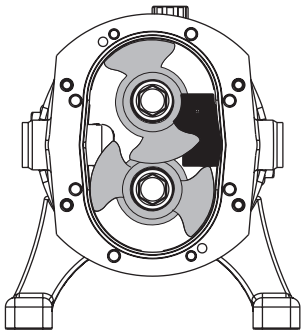
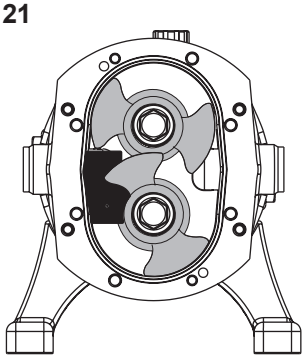


Fig. 21



4. Fill the gearbox with the recommended oil to the specified level according to fig. 10. Check for leaks. See chapter 9.2 for the required oil amount.

10.5. Removing the Timing Gears (54)

To remove and re-fit the timing gears (54) it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Remove the can (26) as described in chapter 10.4.
2. Remove the front cover (1) as described in chapter 10.1.
3. Position the rotors (35) and insert the rotor locking piece as shown in fig. 17.
4. Straighten the locking tab on the washer of the gear nut (55) at the gears (54) and undo the upper or right gear nut (56).
5. Re-position the rotor lock as shown in fig. 18.
6. Undo the bottom or left gear nut (56).
7. Remove the rotor lock and rotors (35) as described in chapter 10.2.
8. Straighten the locking tab on the washer (55) at the gears (54) and remove the washers (55).
9. Pull the gears (54) off the shafts (38, 39) using an extractor. Note by means of centre-punch marks which gear came off which shaft.

Re-fitting the timing gears (54)

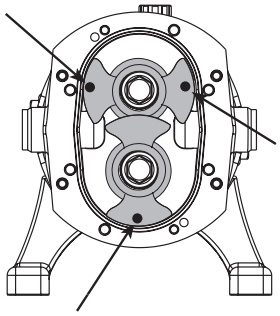
1. Refit the timing gears (54) onto the shafts (38, 39). Check that the correct gear is fitted onto the correct shaft and correct positioning of the gears as per fig. 19.
2. Position the rotors (35) as described in chapter 10.2.
3. Position the rotor locking piece as shown in fig. 20.
4. Position the washer (55) and gear nut (56) onto the drive shaft (38) and tighten the gear nut to the specified torque. See chapter 12.1.
5. Position the rotor locking piece as shown in fig. 21.
6. Refit the washer (55) and gear nut (56) onto the auxiliary shaft (39) and tighten the gear nut to the specified torque. See chapter 12.1.
7. Bend the locking tabs on the tab washers (55).

10.6. Removing the Oil Seal Plate (10)

To remove and re-fit the oil seal plate (10) it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Remove the front cover (1) as described in chapter 20.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Remove the rotor case (9) as described in chapter 10.3.
4. Remove the can (26) as described in chapter 10.4.
5. Remove the oil seal plate (10) by undoing and removing the nuts (28) and pulling the front oil seal plate out.

Fig. 22



Re-fitting the oil seal plate (10)

1. Refit the oil seal plate (10) onto the shafts and tighten the nuts (28) to the specified torque. See chapter 12.1. Ensure that the O-rings (11) and lipseals (42) are placed in the oil seal plate (10) before refitting.

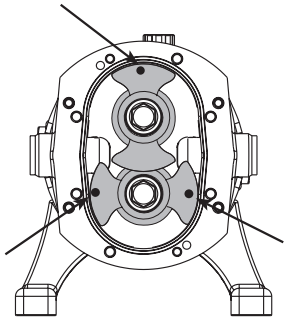
10.7. Removing the Foot (29, 30)

1. Undo and remove the screws (31). Use a hexagon socket wrench.

Re-fitting the foot (29, 30)

1. Mount the screws (31). Use Loctite 242. Use a hexagon socket screw wrench.
2. Align the assembly holes with the baseplate holes.
3. Tighten the screws (31) to the specified torque. See chapter 12.1.

Fig. 23



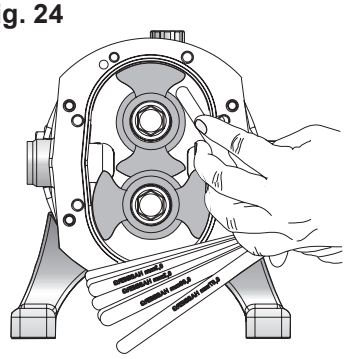
If the position of the feet and hence in- and outlet is changed, it is necessary to change the position of the oil filler plug, the oil level window etc. as shown in fig. 22.

Note! Mount the plug (14) flush with the surface. Use Loctite 242.

10.8. Adjustment of the Rotors Axial Position

To be able to operate the pump effectively and safely, it is necessary to carry out the adjustment of the rotors axial position after having dismantled and re-assembled the pump to ensure the correct axial position of the two rotors. Use the sectional drawing for reference (page 29).
The measured clearance should be as close as possible to the clearances described in chapter 12.8.

Fig. 24



1. Measure the difference in depth between rotors (35) and rotor case (9) by means of a depth micrometer. The points at which you should measure the depths are shown in fig. 22 and fig. 23. Then the rotors are turned 180° and measured again so that twelve measurements are made in total.
2. Measure the rear clearance by means of feeler gauges. See fig. 24. Never go below the min. clearance stated in chapter 12.8. The rear clearance should be measured at the same points as stated in this chapter, point 1.
3. Measure the radial clearance between rotor (35) and rotor casing (9) by means of feeler gauges. The clearance should be measured at the same rotor positions as stated in this chapter, point 1.

4. If the clearances are not within the limits stated in chapter 12.8 or if the distances measured are able to be made closer to the mean values stated in chapter 12.8, the rotors (35) are removed as stated in chapter 10.2.

5. Remove the O-rings (36) situated on the shafts (38, 39).

6. Remove the shims (37) of the shaft (38, 39). Measure the total thickness of the shims with a micrometer and add or subtract the required amount of clearance to the shim thickness (e.g. if front clearance is 0.1 mm too large, 0.1 mm must be added to the total thickness of shims).

7. Refit the shims (37) to the shafts (38, 39). The thinner shims must be inserted first.

8. Refit the O-rings (36) on the shafts.

9. Refit the rotors (35) as described in chapter 10.2.

10. Measure the front and rear clearance again. If the clearances are still outside the limits or if they can come closer to the mean values stated in chapter 12.8, repeat shimming procedure until the measured clearances are correct.

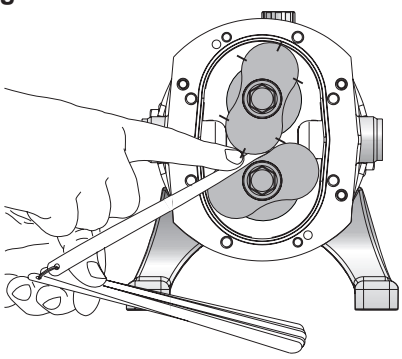
11. When the front and rear clearances are correct, check that the rotors (35) turn freely.

Adjustment of the rotors angular position
To run the pump effectively and safely, it may be necessary to carry out the adjustment of the rotors angular position after dismantling and re-assembling it to ensure the correct angular position of the two rotors. Use the sectional drawing for reference (page 29).

Note! Re-timing applies to the lobe rotors only.

Re-timing is carried out as described below:

Fig. 25



1. Measure the interlobe clearances with feeler gauges at the 6 positions as shown in fig. 25. If these clearances are outside the tolerances stated in chapter 12.8 (column “Interlobe”), it is necessary to re-time the rotors.

2. Remove the can (26) as described in chapter 10.4.

3. Choose one of the shafts to work on. Straighten the locking tab on the washer (55) and loosen the gear nut (56) (use e.g. a wedge shaped object of soft material e.g. wood, plastic or nylon wedged between the two wheels). Ease the gear (54) max. 1 mm back along the shaft (it is important not to move the gear more than 1 mm as it can cause damage to the rotors themselves).

4. Re-check the clearances and see if the rotors have shifted in the correct direction according to chapter 12.8. If the rotors have shifted in the correct direction as wanted, go to chapter 10.8, point 6.

5. If the rotors have **not** shifted in the correct direction, retighten the gear nut (56) to the specified torque as described in chapter 12.1 and bend the tab washer down again (55).
Return to chapter 10.8, point 3, but work on the other shaft.

6. Ease the second gear back along the shaft until the clearance between the rotors are as described in chapter 12.8.

7. The new distance between the spacer (52) and moved gear (54) is measured with feeler gauges. Shims (53) with total thickness corresponding to the distance measured are selected.
8. Remove the gear (54) and gear key (40) as described in chapter 10.6. from the shaft and fit the selected shims (53) on the shaft.
9. Re-fit the gear key (40) and gear (54) as described in chapter 10.6. Re-fit the tab washer (55) and gear nut (56) and tighten it to the specified torque as described in chapter 12.1.
10. Measure the interlobe clearances. If they are still not within the tolerances stated in chapter 12.8, repeat the procedure starting from chapter 10.8, point 3.
11. Check that the rotors turn freely.
12. Refit the can (26) as described in chapter 10.4.

11. Maintenance

11.1. Replacing the Rotors

The rotors of the pump can be replaced with new rotors of the same type and dimension.

It is also possible to change from piston rotor to bi-lobe rotor and vise versa on the following pump types:

DW+1/003/7.5 ⇔ DW+1/004/15
DW+2/006/10 ⇔ DW+2/007/20
DW+3/014/10 ⇔ DW+3/017/20
DW+4/033/10 ⇔ DW+4/039/20
DW+5/080/12.5 ⇔ DW+5/093/25

To change rotors it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Ensure that stationary seal rings (D) are correctly in place in the rotor case and free from debris and scratches.
4. Ensure that the rotary seal rings (B) are mounted correctly in the new rotors (35) and free from debris and scratches.
5. Refit the rotors (35) as described in chapter 10.2.
6. Carry out the shimming procedure as described in chapter 10.8.

For piston rotor to piston rotor and bi-lobe rotor to piston rotor:

7. If no dowels (7) are fitted in the rotor case (9), fit the dowels in the dowel holes in the front of the rotor case (9).
8. Tap the dowels (7) gently in place with a plastic mallet.
9. Re-fit the front cover (1) for piston rotors as described in chapter 10.1.
10. Check that the pump turns freely.

For bi-lobe rotor to bi-lobe rotor or piston rotor to bi-lobe rotor:

7. Carry out the re-timing procedure as described in chapter 10.8.
8. Check that the rotors (35) turn freely.
9. If dowels (7) are situated in the rotor case (9), remove them.
10. Refit the front cover (1) for bi-lobe rotors as described in chapter 10.1.
11. Check that the rotors (35) turn freely.

11.2. Replacing Single Mechanical Shaft Seals

See page 88.

11. Maintenance

11.3. Changing Port Orientation

It is possible to change the suction and discharge port orientation from horizontal to vertical and vice versa without making any modifications to the pump.

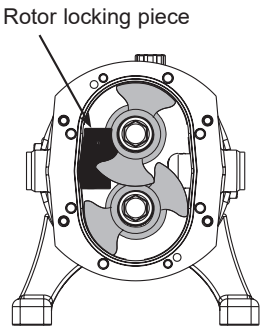
To change the port orientation it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

1. Disconnect the power supply to the motor.
2. Disconnect the pump from the motor. If possible, remove the pump from the pipework and place it on a work bench.
3. Undo the oil drain plug (27) at the bottom of the can (26) to drain the oil from the pump.
4. Exchange the plugs on the can (26). Orange oil filler plug (18) in top position. The oil level window should be mounted on the side that gives the highest oil level - oil level window (25) above the centreline. Oil drain plugs (27) at the bottom and the side below the centreline. See fig. 11.
5. Move the feet (29, 30) to the required position as described in chapter 10.8.
6. Fill the gearbox with oil to the specified level according to fig. 10. Check for leaks. See chapter 9.2 for required amount of oil and positioning of oil level window.

11.4. Changing the Bearings (45, 48)

To replace the bearings (45, 45a, 45b, 48, 48a, 48b) it is necessary to dismantle the pump as described below. Use the sectional drawing for reference (page 29).

Fig. 26



1. Remove the timing gears (54) as described in chapter 10.6.
2. Remove the gear key (40), shims (53), spacer (52) and circlip (51).
3. Straighten the locking tab on the tabwasher (49).
4. Position the rotor locking piece as shown in fig. 26 and undo the drive shaft (38) bearing lock nut (50).
5. Reposition the rotor locking piece as shown in fig. 27.
6. Undo the auxiliary shaft (39) bearing lock nut (50).
7. Remove the bearing nut (50) and tabwasher (49).
8. Remove the rotors (35) as described in chapter 10.2.
9. Remove the shims (if fitted) and shaft O-ring. Keep the shims and O-ring together as a set for each shaft. Mark each set for indentification to ensure later re-assembly on the correct shaft.
10. Remove rotor case (9) and the oil seal plate as described in chapters 10.3 and 10.7.
11. Remove the shafts (38, 39) from chassis (13) by applying force to the rear of the shafts. During this process the bearings should be pushed free. Remove the shaft and bearings.

Fig. 27

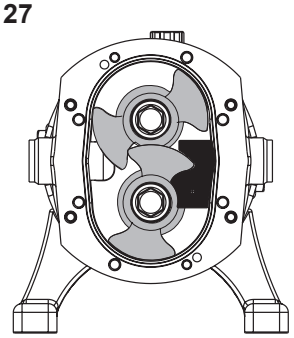


Fig. 28

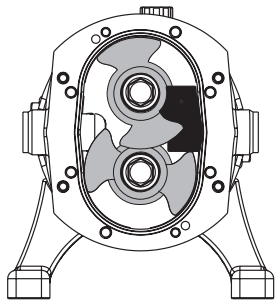
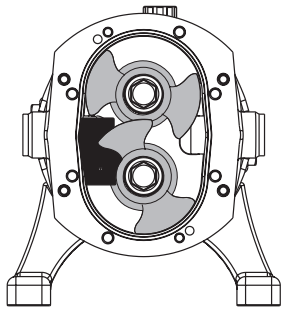


Fig. 29



12. Remove outer bearing races (45b, 48b) from the chassis and inner bearing races (45a, 48a) from the shafts (38, 39). If the shafts are damaged they should be replaced.

13. Clean bearing seats of the chassis (13) and the shafts (38, 39).

14. Fit the new outer bearing races (45b, 48b) and spacing washer (47) in the chassis (13).

15. Fit the front inner bearing race (45a) on the shafts (38, 39) by heating the bearings.

16. Place both shafts (38, 39) in the bore hole of the chassis.

17. Fit the rear inner bearing race (48a), washer (49) and bearing lock nut (50) onto the shafts (38, 39).

18. Position the shims (37) and fit the oil seal plate (10), but without lipseals (42).

19. Fit the rotor case (9) as described in chapter 10.3.

20. Fit the rotors (35) onto the shafts (38, 39) (without shaft seal) as described in chapter 10.2.

21. Position the rotor locking piece in fig. 28 and 29 respectively and tighten the bearing lock nuts (50) until no backlash can be felt in the bearing assembly.

22. Remove the rotors (35) from the shafts as described in chapter 10.2.

23. Check that the shafts (38, 39) turn freely.

24. Check that the running torque of both drive shaft (38) and auxiliary shaft (39) is as specified in the table in chapter 12.1. Measure the relevant torque without lipseals. During measuring the bearings must be lubricated with WD40. Check that the shafts can run freely.

25. If the torque is not within the specification given in chapter 12.1 then adjust the nuts (50) and repeat the procedure until the correct torque is obtained.

26. Bend the locking tab on the washer (49).

27. Refit the circlip (51), spacing ring (52) and gear key (40) on the shafts (38, 39).

28. Refit the gears (54) as described in chapter 10.6.

29. Fit the oil seal plate (10) with lipseals (42) as described in chapter 10.6 and the rotor case (9) as described in chapter 10.3.

30. Fit the rotors (35) as described in chapter 10.2. Check that the stationary seal faces (D) and O-rings (C) are in place in the rotor case (9). Check seals (B, D) for debris and scratches.

31. Re-fit the can (26) as described in chapter 10.4.

32. Re-fit the front cover (1) as described in chapter 10.1.

33. Ensure that the rotors turn freely.

11. Maintenance

11.5. Recommended Holding of Spare Parts

We recommend that both seal kits and service kits are held in stock.

Seal Kit
The seal kit consists of wearing parts of the seal.

Service Kit
The service kit is made up of a number of main components of the pump. These components are not wearing parts, but replacement may be necessary. These components are rotors (35), front cover (1), rotor case (9), rotor screws (32), spacing washers (37), shafts (38, 39), bearings (45, 48), gears (54) and gear shims (53).

The table below shows the recommended stock of spare parts for normal operation and for applications where there are special requirements, for example 24 hour operation, operation with abrasive media or processes which are sensitive to even a short production stop.

	WEARING PARTS (Seal face kit, elastomer kit) **Number of pumps in operation**			**SERVICE PARTS** **Number of pumps in operation**		
	0-5	5-20	>20	0-5	5-20	>20
	Kits	Kits	Kits/10 pumps in oper.	Kits	Kits	Kits/10 pumps in oper.
Normal operation	1	2	1	0	1	1
Special requirements	2	3	2	1	2	1

12. Technical Data

12.1. Tightening Torque Settings

Tightening torque required for bolts, nuts, and screws in the DW+ pumps:

Metric tool must be use - size shown in [mm]

	Front cover bolts/ nuts Large	Front cover bolts Small	Rotor bolts	Rotor case/ chassis Bolts	Seal housing Screws	Oilseal plate Nut	Chassis/ foot Screws	Running torque, bearings, approx. 100 rpm. Shaft	Gear nut	Lipseal holder Screws
Item No.	**(2)**	**(3)**	**(32)**	**(6)**	**(I)**	**(28)**	**(31)**		**(56)**	**(24)**
Pump	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**	**Nm**
DW+1	10 [13]	10 [13]	10 [13]	10 [10]	10 [10]	10 [10]	30 [6 UMB]	0.8-1.0 [SKF-HN05]	25 [SKF-HN04]	10 [10]
DW+2	10 [13]	10 [13]	40 [19]	10 [10]	10 [10]	20 [13]	30 [6 UMB]	1.5-1.75 [SKF-HN06]	50 [SKF-HN05]	10 [10]
DW+3	20 [17]	20 [17]	70 [22]	20 [13]	10 [10]	20 [13]	30 [6 UMB]	2.0-2.5 [SKF-HN07]	75 [SKF-HN06]	10 [10]
DW+4	20 [17]	20 [17]	220 [30]	40 [17]	20 [13]	40 [17]	55 [8 UMB]	4.1-5.0 [SKF-HN09]	100 [SKF-HN08]	20 [13]
DW+5	30 [19]	30 [19]	570 [36]	60 [19]	20 [13]	40 [19]	95 [10 UMB]	4.2-5.0 [SKF-HN10]	125 [SKF-HN09]	20 [13]

12. Technical Data

12.2. Maximum Differential and Discharge Pressures

The maximum differential pressures and discharge pressure specified below must not be exceeded.

	Differential pressure
Max. 30 bar: Max. 25 bar: Max. 20 bar: Max. 15 bar: Max. 12.5 bar: Max. 10 bar: Max. 7.5 bar: Max. 7 bar: Max. 5 bar:	 DW+5/093/25, DW+2/007/20; DW+3/017/20; DW+4/039/20 DW+1/004/15; DW+1/007/15_600; DW+2/013/15_600; DW+3/030/15_600; DW+4/073/15_600; DW+5/142/15; DW+5/080/12.5; DW+2/006/10; DW+2/013/10; DW+3/014/10; DW+3/030/10; DW+4/033/10; DW+4/073/10 DW+1/003/7.5 DW+1/007/7; DW+4/125/7_600; DW+5/256/7; DW+3/050/5; DW+4/125/5

	Discharge pressure
Max. 28 bar Max. 23 bar Max. 18 bar	DW+5 DW+2; DW+3; DW+4 DW+1

12.3. Maximum Permissable Moment

For motors of 45kW capacity onward it is recommended, due to the inertia of the motor, to equip the coupling between the pump and gear motor with a safety device ensuring that the maximum transferred moment does not exceed the pump's maximum allowable moment given in the table below.

	DW+1	DW+2	DW+3	DW+4	DW+5
Max. moment	35Nm	60Nm	140Nm	250Nm	700Nm

The coupling supplier's demands for lining up must be kept.

12.4. Maximum Permissable Temperature

Check the nameplate of the pump to see the maximum permissable temperature limit for the pump. This temperature must not be exceeded.

Furthermore, the maximum rotor temperature should be checked. Rotors with maximum temperature of 110°C are marked with . or ... or .... on the spline.

Rotors with maximum temperature of 180°C are marked with .. on the spline. See fig. 30 for DW+1-5 and the description under the illustration on the left.

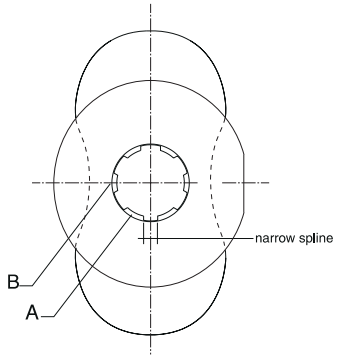
Note! An exception to the given values (110°C and 180°C) are pumps equipped with NGA rotors. For NGA rotors, the temperature data is provided in the chapter 12.6.

12.5. Sound Pressure and Sound Power Level

Measurements have been carried out in accordance with:
DS/ISO 3744 grade 2, class 2 for DW+1
DS/ISO 9614-2 for DW+2-5

Tolerance ±3dB.

Fig. 30



A = Rotor type
· = High efficiency
·· = High temperature*
··· = Multi-Duty
···· = Super tight*

B = Material
· = Stainless steel
·· = Non-galling material (NGA)
··· = Special material

* Contact the factory for clearances not specified in chapter 12.8.

12. Technical Data

LpA in dB refers to the sound pressure level at a distance of 1 metre from the surface of the pump at a height of 1.6 m above floor level, as required by 2006/42/EC.

Lwa states the sound power level.
The sound power levels have been stated for the following operating conditions:

A: Maximum differential pressure and maximum rotational speed
B: Maximum differential pressure and 50% of maximum rotational speed
C: Maximum differential pressure and 25% of maximum rotational speed
D: 50% of maximum differential pressure and maximum rotational speed
E: 50% of maximum differential pressure and 50% of maximum rotational speed
F: 50% of maximum differential pressure and 25% of maximum rotational speed

The values shown in the table apply to water at 20°C.

The noise level may increase considerably, if reducers (reduction/ expanding fittings) are mounted on the inlet/outlet.

	LpA in dB						LwA in dB					
Pump	A	B	C	D	E	F	A	B	C	D	E	F
DW+1/003/7.5	62	56	46	60	53	46	75	69	61	72	65	60
DW+1/004/15	63	57	47	59	52	45	75	69	61	72	65	60
DW+1/007/7	64	58	48	62	55	48	76	70	62	74	67	61
DW+1/007/15_600	59	53	43	57	50	43	69	63	54	67	60	54
DW+2/006/10	64	58	48	62	55	48	76	70	62	74	67	61
DW+2/007/20	65	59	49	65	58	51	76	70	62	76	69	63
DW+2/013/10	67	61	51	67	60	53	78	72	64	78	71	65
DW+2/013/15_600	62	56	46	60	53	46	70	64	55	69	62	56
DW+3/014/10	72	66	56	70	63	56	83	77	68	81	73	67
DW+3/017/20	74	68	58	70	62	55	85	79	70	81	73	67
DW+3/030/10	74	68	58	72	65	58	85	79	70	83	76	70
DW+3/030/15_600	70	58	52	66	58	52	82	70	64	78	70	64
DW+3/050/5	75	69	59	73	66	59	86	80	71	84	77	71
DW+4/033/10	75	65	62	67	62	59	86	76	73	78	73	70
DW+4/039/20	77	67	63	69	64	61	88	78	74	80	75	72
DW+4/073/10	78	68	64	70	65	62	89	79	75	81	76	73
DW+4/073/15_600	71	65	62	67	63	61	83	77	74	79	75	73
DW+4/125/5	79	69	65	71	66	63	90	80	76	82	77	74
DW+4/125/7_600	77	67	63	69	64	61	88	78	74	80	75	72
DW+5/080/12.5	80	72	68	78	71	67	91	83	79	89	82	78
DW+5/093/25	82	74	70	80	73	69	93	85	81	91	84	80
DW+5/142/15	81	73	69	79	72	68	92	84	80	90	83	78
DW+5/256/7	83	75	71	81	74	70	94	86	82	92	85	81

12.6. Temperature Changes and Maximum Temperature

The following precautions should be observed regarding product temperature changes in the pump.

High efficiency and super tight (NGA) rotors:
Pumps fitted with high efficiency or super tight rotors should be treated with caution when the product temperature changes.

Multi-duty rotors:
Pumps fitted with multi-duty rotors are designed to withstand an immediate product temperature change corresponding to the CIP cleaning regime.

High temperature rotors:
Pumps fitted with high temperature rotors are designed to withstand an immediate product temperature change corresponding to the SIP procedure.

SIP:
The pumps with high efficiency, super tight or multi-duty rotors are stationary (not running) prior to the SIP.

The permissible product temperatures and their permissible changes:

Rotor type	Max product temperature	Max ΔT
Super tight	110°C	-
High efficiency	110°C	-
Multi-Duty	110°C	80°C
High temperature	180°C	120°C

At temperature changes above max ΔT the product temperature should be increased gradually, according to the formula below:

$$\frac{\text{Required } \Delta T - \text{Max } \Delta T}{2.1°C} \times 5 \text{ sec.} = \text{TIME in sec.}$$

Note! An exception to the given values (110°C and 180°C) are pumps equipped with NGA rotors.

Rotor type with NGA	Max product temperature
Super tight	180°C
High efficiency	180°C
High temperature	210°C

In case of increased temperature changes we recommend using electronic control.

12.7. Maximum Permissable Rotational Speed

The maximum rotational speed specified below must not be exceeded.

DW+1: max. 1400 rpm
DW+2: max. 1400 rpm
DW+3: max. 1400 rpm
DW+4: max. 1200 rpm
DW+5: max. 1000 rpm
DW+1 - 4/xxx_600: max. 600 rpm

For pumps with special lip seals, see chapter 14.

12.8. Clearance of Pumps Adjustment

DW+1/003/7.5 - Piston

	High efficiency 110°C		
	Front	**Bag/Rear**	**Tip**
Min.	0.15	0.05	0.07
Max	0.21	0.11	0.15

	Multi-Duty 110°C		
	Front	**Bag/Rear**	**Tip**
Min.	0.20	0.09	0.07
Max	0.26	0.15	0.15

	Supertight		
	Front	**Bag/Rear**	**Tip**
Min.	0.07	0.04	0.05
Max	0.13	0.10	0.11

DW+1/004/15 - Lobe
DW+1/007/7 - Lobe
DW+1/007/15_600 - Lobe

	High efficiency 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.10	0.05	0.08	0.12
Max	0.16	0.11	0.16	0.24

	Multi-Duty 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.14	0.09	0.08	0.12
Max	0.20	0.15	0.16	0.24

	High temperature 180°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.16	0.10	0.11	0.18
Max	0.22	0.16	0.19	0.30

	Supertight			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.07	0.05	0.06	0.06
Max	0.13	0.11	0.12	0.18

12. Technical Data

DW+2/006/10 - Piston

High efficiency 110°C		
Front	Bag/Rear	Tip
0.16	0.05	0.07
0.22	0.11	0.15

	Multi-Duty 110°C		
	Front	Bag/Rear	Tip
Min.	0.23	0.08	0.07
Max	0.29	0.14	0.15

	Supertight		
	Front	Bag/Rear	Tip
Min.	0.12	0.04	0.05
Max	0.18	0.10	0.11

DW+2/007/20 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.05	0.10	0.14
Max	0.18	0.11	0.18	0.28

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.16	0.08	0.10	0.14
Max	0.22	0.14	0.18	0.28

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.17	0.10	0.14	0.22
Max	0.23	0.16	0.22	0.36

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.06	0.08	0.03
Max	0.18	0.12	0.14	0.17

DW+2/013/10 - Lobe

DW+2/013/15_600 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.05	0.10	0.14
Max	0.18	0.11	0.18	0.28

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.17	0.08	0.10	0.14
Max	0.23	0.14	0.18	0.28

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.18	0.10	0.14	0.22
Max	0.24	0.16	0.22	0.36

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.06	0.08	0.08
Max	0.18	0.12	0.14	0.22

12. Technical Data

DW+3/014/10 - Piston

	High efficiency 110°C		
	Front	Bag/Rear	Tip
Min.	0.17	0.06	0.09
Max	0.23	0.12	0.17

	Multi-Duty 110°C		
	Front	Bag/Rear	Tip
Min.	0.23	0.11	0.09
Max	0.29	0.17	0.17

	High temperature 180°C		
	Front	Bag/Rear	Tip
Min.	0.26	0.14	0.14
Max	0.32	0.20	0.22

	Supertight		
	Front	Bag/Rear	Tip
Min.	0.07	0.06	0.06
Max	0.13	0.12	0.12

DW+3/017/20 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.15	0.08	0.09	0.16
Max	0.21	0.14	0.17	0.30

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.18	0.11	0.09	0.16
Max	0.24	0.17	0.17	0.30

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.20	0.14	0.14	0.25
Max	0.26	0.20	0.22	0.39

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.09	0.07	0.08	0.05
Max	0.15	0.13	0.16	0.19

DW+3/030/10 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.15	0.09	0.11	0.16
Max	0.21	0.15	0.19	0.30

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.11	0.16
Max	0.25	0.17	0.19	0.30

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.20	0.14	0.16	0.25
Max	0.26	0.20	0.24	0.39

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.09	0.07	0.08	0.05
Max	0.15	0.13	0.16	0.19

DW+3/030/15_600 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.15	0.09	0.11	0.16
Max	0.21	0.15	0.19	0.30

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.16	0.16
Max	0.25	0.17	0.24	0.30

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.20	0.14	0.16	0.25
Max	0.26	0.20	0.24	0.39

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.09	0.07	0.08	0.05
Max	0.15	0.13	0.16	0.19

DW+3/050/5 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.09	0.11	0.11	0.16
Max	0.15	0.17	0.19	0.30

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.11	0.16
Max	0.25	0.17	0.19	0.30

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.09	0.07	0.08	0.05
Max	0.15	0.13	0.16	0.19

12. Technical Data

DW+4/033/10 - Piston

	High efficiency 110°C		
	Front	Bag/Rear	Tip
Min.	0.20	0.07	0.09
Max	0.26	0.15	0.25

	Multi-Duty 110°C		
	Front	Bag/Rear	Tip
Min.	0.25	0.10	0.09
Max	0.31	0.18	0.25

	High temperature 180°C		
	Front	Bag/Rear	Tip
Min.	0.29	0.14	0.17
Max	0.35	0.22	0.33

	Supertight		
	Front	Bag/Rear	Tip
Min.	0.10	0.06	0.07
Max	0.16	0.12	0.15

DW+4/039/20 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.15	0.07	0.11	0.19
Max	0.21	0.15	0.27	0.39

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.20	0.10	0.11	0.19
Max	0.26	0.18	0.27	0.39

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.22	0.14	0.17	0.30
Max	0.28	0.22	0.33	0.50

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.08	0.08	0.10
Max	0.18	0.14	0.16	0.20

DW+4/073/10 - Lobe

DW+4/073/15_600 - Lobe

	High efficiency 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.15	0.07	0.12	0.19
Max	0.21	0.15	0.28	0.39

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.12	0.19
Max	0.25	0.19	0.28	0.39

	High temperature 180°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.22	0.14	0.17	0.30
Max	0.28	0.22	0.33	0.50

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.12	0.08	0.08	0.10
Max	0.18	0.14	0.16	0.20

DW+4/125/5 - Lobe

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.20	0.19
Max	0.25	0.19	0.36	0.39

	Supertight			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.14	0.08	0.08	0.10
Max	0.20	0.14	0.16	0.20

DW+4/125/7_600 - Lobe

	Multi-Duty 110°C			
	Front	Bag/Rear	Tip	Interlobe
Min.	0.19	0.11	0.22	0.19
Max	0.25	0.19	0.38	0.49

12. Technical Data

DW+5/080/12.5 - Piston

High efficiency 110°C		
Front	**Bag/Rear**	**Tip**
0.31	0.12	0.14
0.37	0.20	0.30

	Multi-Duty 110°C		
	Front	**Bag/Rear**	**Tip**
Min.	0.36	0.14	0.14
Max	0.42	0.22	0.30

	Supertight		
	Front	**Bag/Rear**	**Tip**
Min.	0.23	0.07	0.10
Max	0.29	0.13	0.16

DW+5/093/25 - Lobe

	High efficiency 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.23	0.12	0.23	0.30
Max	0.29	0.20	0.39	0.50

	Multi-Duty 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.27	0.16	0.23	0.30
Max	0.33	0.24	0.39	0.50

High temperature 180°C			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.32	0.23	0.30	0.45
0.38	0.31	0.46	0.65

Supertight			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.15	0.10	0.12	0.15
0.21	0.16	0.18	0.29

DW+5/142/15 - Lobe

	High efficiency 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.26	0.12	0.25	0.30
Max	0.32	0.20	0.41	0.50

	Multi-Duty 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.31	0.16	0.25	0.30
Max	0.37	0.24	0.41	0.50

High temperature 180°C			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.35	0.23	0.32	0.45
0.41	0.31	0.48	0.65

Supertight			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.15	0.10	0.12	0.15
0.21	0.16	0.18	0.29

DW+5/256/7 - Lobe

	High efficiency 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.29	0.12	0.32	0.30
Max	0.35	0.20	0.48	0.50

	Multi-Duty 110°C			
	Front	**Bag/Rear**	**Tip**	**Interlobe**
Min.	0.34	0.18	0.32	0.30
Max	0.40	0.26	0.48	0.50

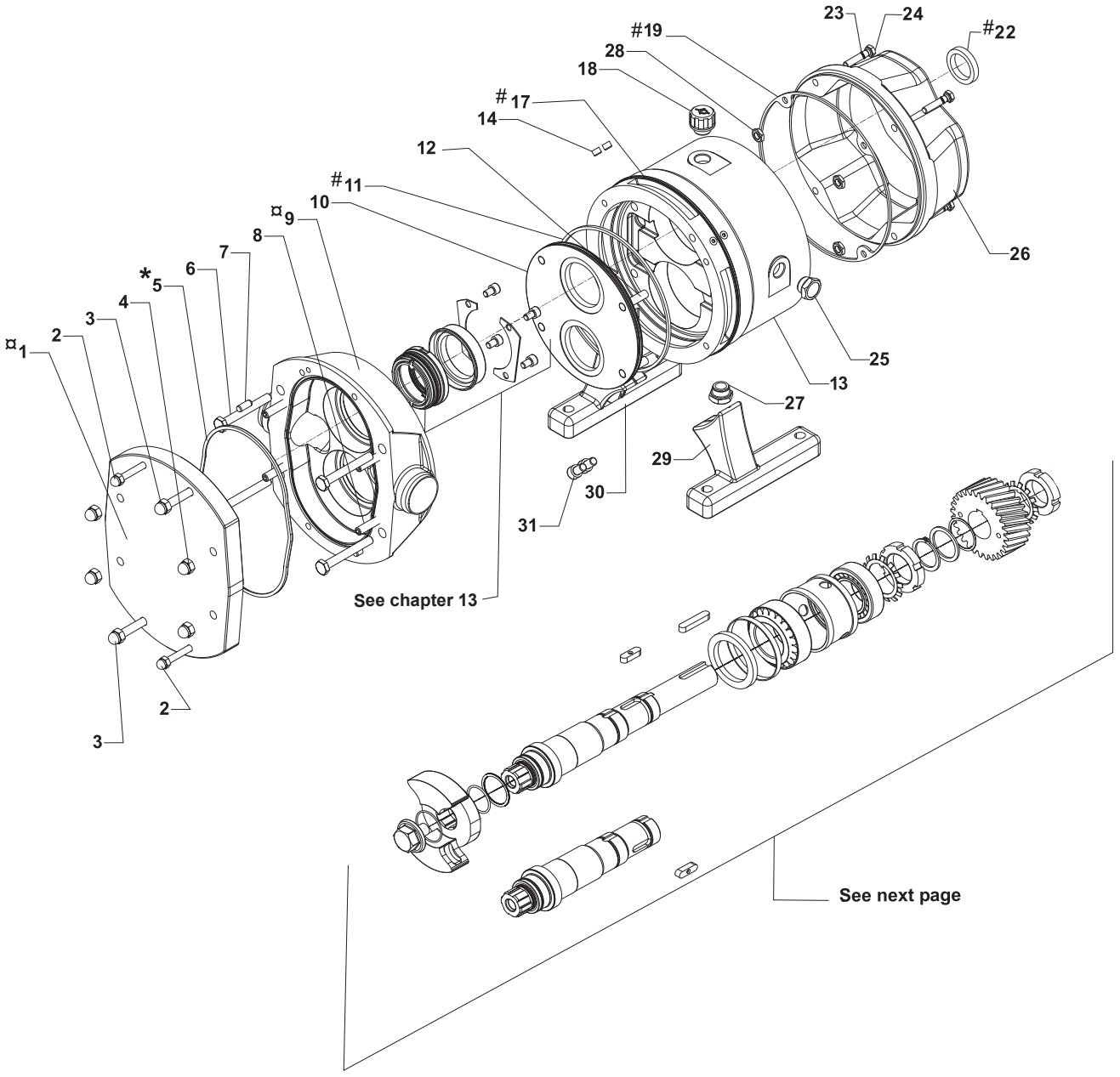
High temperature 180°C			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.38	0.22	0.39	0.45
0.44	0.30	0.55	0.65

Supertight			
Front	**Bag/Rear**	**Tip**	**Interlobe**
0.20	0.10	0.14	0.15
0.26	0.16	0.20	0.29

13. Spare Parts DW+1

13.1. Pump

13.1.1 DW+1



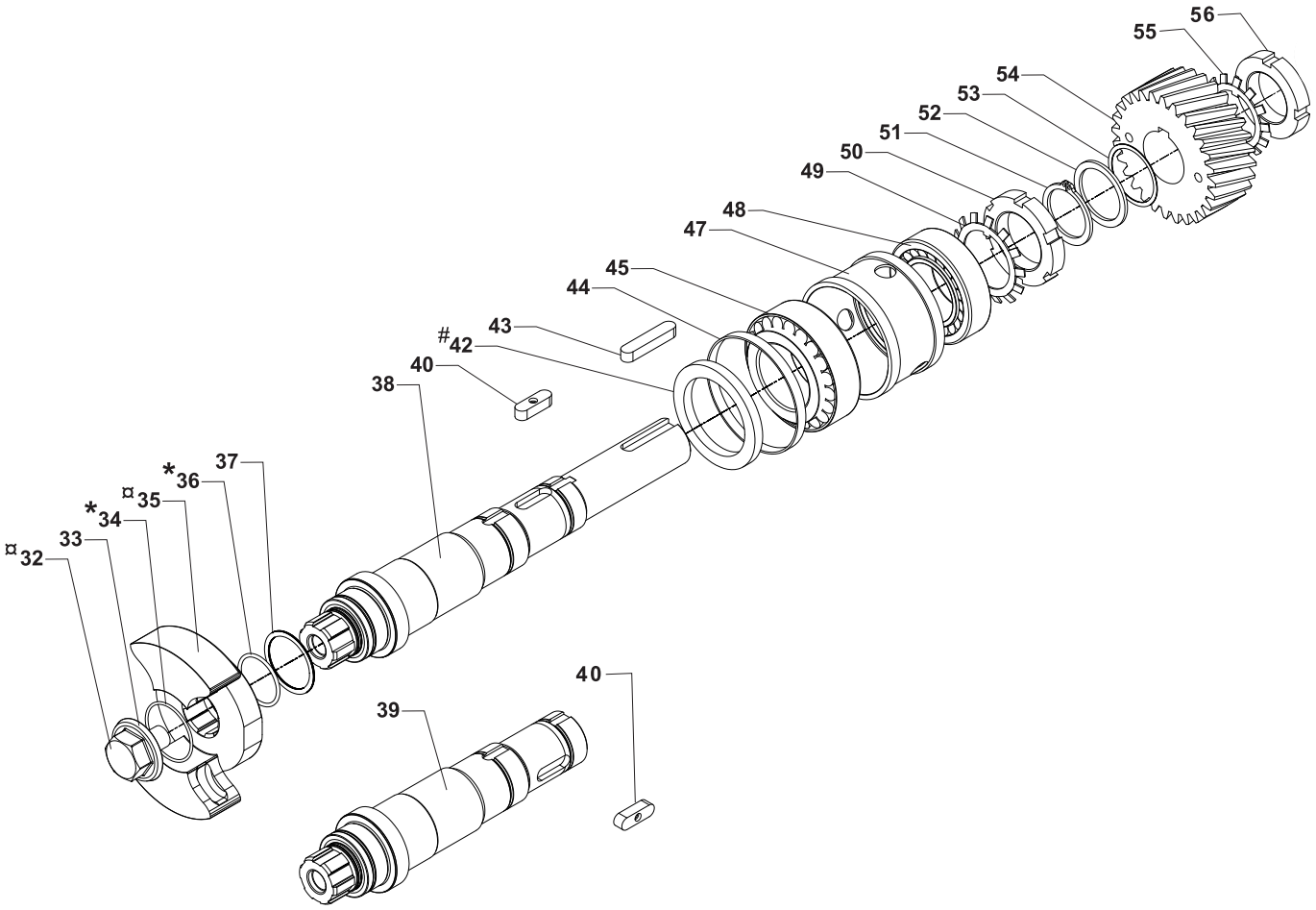
* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+1

				Piston	Lobe	Lobe	Lobe
				DW+1/003/7.5	DW+1/004/15	DW+1/007/7	DW+1/007/15_600
Item	Qty	Material	Description	Part No.			
¤1	1	AISI 316L	Front cover	LA1110101	LA1110100	LA1110100	LA1110100
2	2	AISI 304	Big bolt, front cover	LA1000100	LA1000100	LA1000100	LA1000100
3	2	AISI 304	Small bolt, front cover	LA1001200	LA1001200	LA1001200	LA1001200
4	4	AISI 304	Nut, front cover dome	L700243	L700243	L700243	L700243
6	4	AISI 304	Screw, rotor case to chassis	L773450	L773450	L773452	L773452
7	2	AISI 316L	Dowel	LA1160320			
8	4	AISI 304	Stud, front cover	LA1002100	LA1002100	LA1002100	LA1002100
¤ 9	1	AISI 316L	Rotor case	LA17991003	LA17991003	LA17991007	LA17991007
10	1	AISI 304	Oilseal plate	LA1312100	LA1312100	LA1312100	LA1312100
12	2	AISI 316L	Dowel, rotor case to chassis	LA1160320	LA1160320	LA1160320	LA1160320
13	1	AISI 304	Chassis	LA1302110	LA1302110	LA1302110	LA1302110
14	4	AISI 304	Plug	LA2000100	LA2000100	LA2000100	LA2000100
18	1	Plastic	Oil filler plug	2202000	L2202000	L2202000	L2202000
23	4	AISI 304	Washer	L701477	L701477	L701477	L701477
24	4	AISI 304	Screw	L861356	L861356	L861356	L861356
25	1	Plastic	Oil level window	L2220000	L2220000	L2220000	L2220000
26	1	LM6	Can	LA1364110	LA1364110	LA1364110	LA1364110
27	2	Plastic	Oil drain plug	L2210A000	L2210A000	L2210A000	L2210A000
28	4	AISI 304	Nut, oil seal plate	L773649	L773649	L773649	L773649
29 & 30	1	AISI 304	Feet (1 pair)	LA1145100	LA1145100	LA1145100	LA1145100
31	4	AISI 304	Screw for foot	L701057	L701057	L701057	L701057
* 5, 34 & 36	1	EPDM	Wet end seal kit	LA2380104	LA2380104	LA2380104	LA2380104
-	1	FPM (Viton)	Wet end seal kit	LA2380102	LA2380102	LA2380102	LA2380102
-	1	ISOLAST	Wet end seal kit	LA2380115	LA2380115	LA2380115	LA2380115
#11, 17, 19, 22 & 42	1	FPM (Viton)	Gear box seal kit	LA2381132	LA2381132	LA2381132	LA2381132

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+1



* Wet end seal kit.
\# Gear box seal kit.

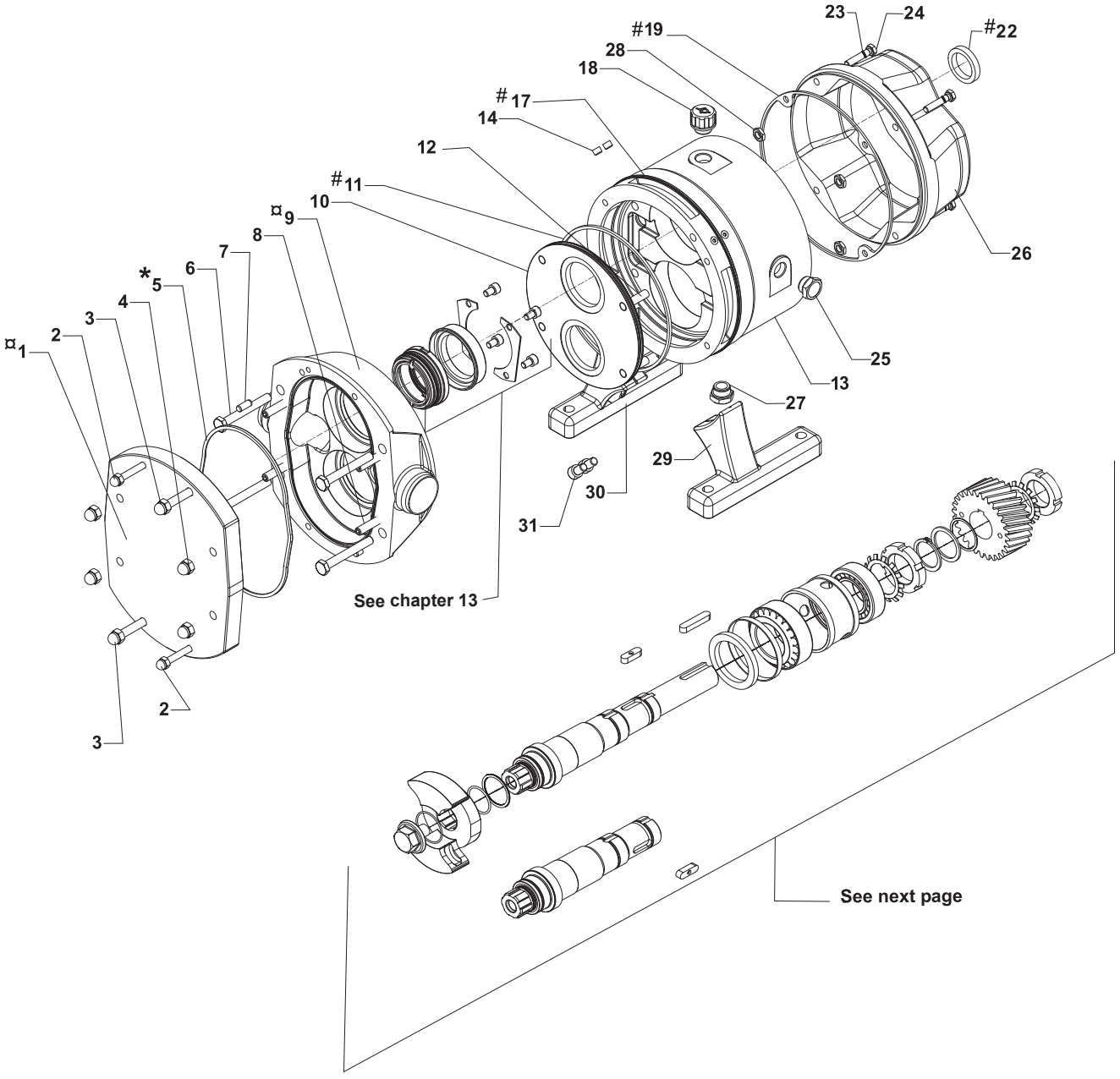
13. Spare Parts DW+1

				Piston	Lobe	Lobe	Lobe
				DW+1/003/7.5	DW+1/004/15	DW+1/007/7	DW+1/007/15_600
Item	Qty	Material	Description	Part No.			
¤32	2	AISI 329	Rotor screw with washer	LA10501003	LA10501004	LA10501006	LA105010061
33	2	18/02	Washer ring	LA2658100	LA2658100	LA2658100	LA2658100
¤35	2	AISI 316L	Rotor-high efficiency	LA141003P2SH	LA14100421SH	LA14100721SH	
-	2	AISI 316L	Rotor-Multi-Duty	LA141003P3SH	LA14100423SH	LA14100723SH	LA14100723SH
-	2	AISI 316L	Rotor-high temperature	LA141003P1SY	LA14100421SY	LA14100721SY	
-	2	NGA	Rotor-high efficiency	LA141003P4WH	LA14100424WH	LA14100724WH	LA14100724WH
-	2	NGA	Rotor-high temperature		LA14100424WY	LA14100724WY	LA14100724WY
-	2	NGA	Rotor-super tight	LA141003P5WH	LA14100425WH	LA14100725WH	LA14100725WH
37	1	AISI 316L	Shims, rotor	L2657100	L2657100	L2657100	L2657100
38	1	AISI329L	Shaft main	LA1500100	LA1500100	LA1501100	LA1502100
39	1	AISI329L	Shaft aux	LA1600100	LA1600100	LA1601100	LA1602100
40	2	EN 6A	Gear key	L2180A101	L2180A101	L2180A101	L2180A101
43	1	EN 6A	Drive key	L2181A100	L2181A100	L2181A100	L2181A100
44	2	St. 37-2	Front spacer	LA1856100	LA1856100	LA1856100	LA1856100
45	2	-	Bearing front	L2717100	L2717100	L2717100	L2717100
47	2	St. 37-2	Spacer, rear bearing	LA1861100	LA1861100	LA1861100	LA1861100
48	2	-	Bearing rear	L2718100	L2718100	L2718100	L2718100
49	2	-	Bearing rear tab washer	L2720025	L2720025	L2720025	L2720025
50	2	-	Bearing rear nut	L2719025	L2719025	L2719025	L2719025
51	2	-	Circlip	L2177100	L2177100	L2177100	L2177100
52	2	-	Gear spacer	LA1850100	LA1850100	LA1850100	LA1850100
53	1	M.S.	Gear shims	L4000000	L4000000	L4000000	L4000000
54	1	-	Gear (1 pair)	LA2750100	LA2750100	LA2750100	LA2750100
55	2	-	Gear tab washer	L2720020	L2720020	L2720020	L2720020
56	2	-	Gear nut	L2719020	L2719020	L2719020	L2719020

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+2

13.1.2 DW+2



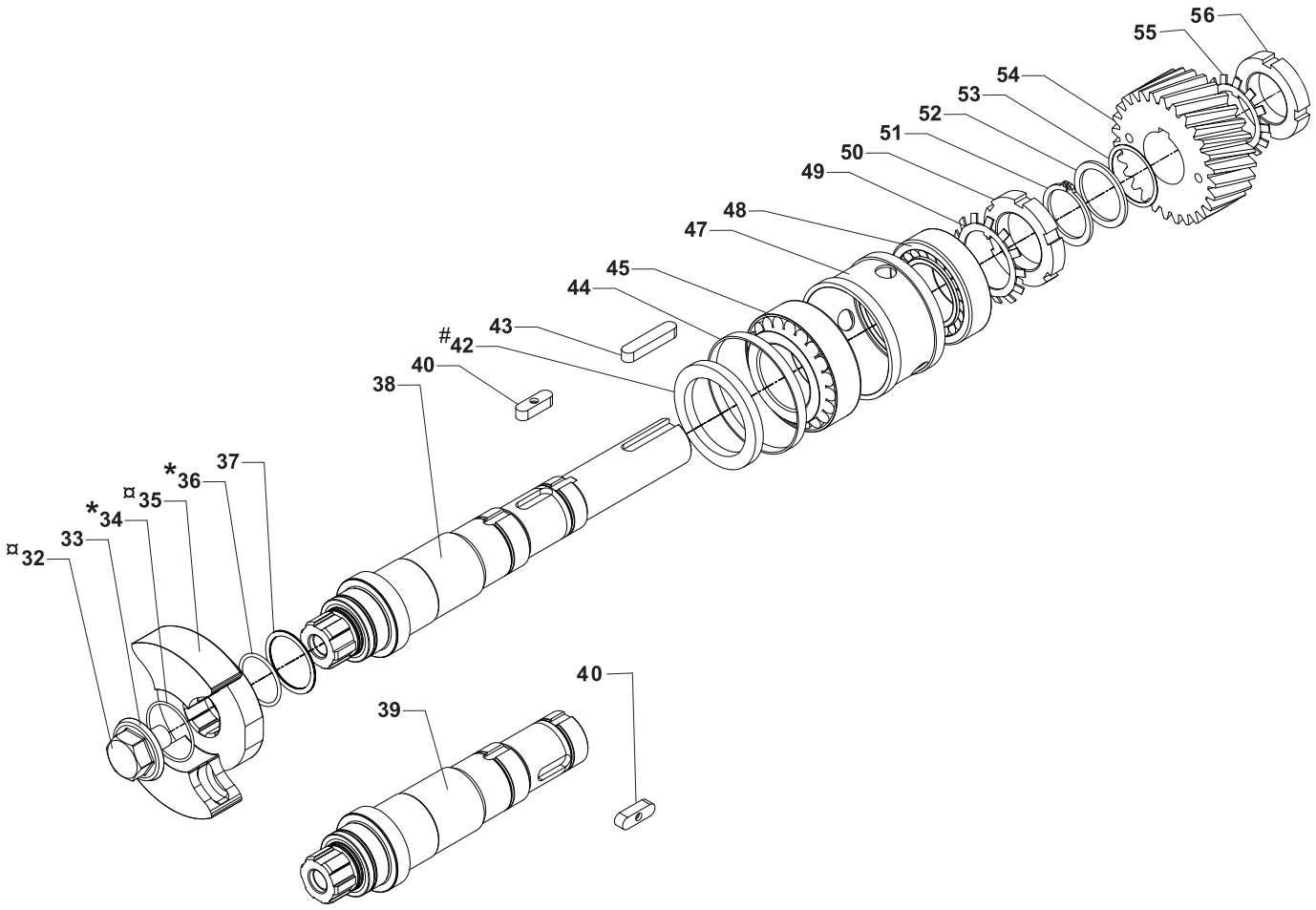
* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+2

				Piston	Lobe	Lobe	Lobe
				DW+2/006/10	DW+2/007/20	DW+2/013/10	DW+2/013/15_600
Item	Qty	Material	Description	Part No.			
¤1	1	AISI 316L	Front cover	LA1110201	LA1110200	LA1110200	LA1110200
2	2	AISI 304	Big bolt, front cover	LA1000200	LA1000200	LA1000200	LA1000200
3	2	AISI 304	Small bolt, front cover	LA1001200	LA1001200	LA1001200	LA1001200
4	4	AISI 304	Nut, front cover dome	L700243	L700243	L700243	L700243
6	4	AISI 304	Screw, rotor case to chassis	L773450	L773450	L773709	L773709
7	2	AISI 316L	Dowel	LA1160320			
8	4	AISI 304	Stud, front cover	LA1002200	LA1002200	LA1002200	LA1002200
¤9	1	AISI 316L	Rotor case	LA17992006	LA17992006	LA17992013	LA17992013
10	1	AISI 304	Oilseal plate	LA1312200	LA1312200	LA1312200	LA1312200
12	2	AISI 316L	Dowel, rotor case to chassis	LA1160320	LA1160320	LA1160320	LA1160320
13	1	AISI 304	Chassis	LA1302210	LA1302210	LA1302210	LA1302210
14	4	AISI 304	Plug	LA2000100	LA2000100	LA2000100	LA2000100
18	1	Plastic	Oil filler plug	L2202000	L2202000	L2202000	L2202000
23	4	AISI 304	Washer	L701477	L701477	L701477	L701477
24	4	AISI 304	Screw	L861410	L861410	L861410	L861410
25	1	Plastic	Oil level window	L2220000	L2220000	L2220000	L2220000
26	1	LM6	Can	LA1364210	LA1364210	LA1364210	LA1364210
27	2	Plastic	Oil drain plug	L2210A000	L2210A000	L2210A000	L2210A000
28	4	AISI 304	Nut, oil seal plate	L773650	L773650	L773650	L773650
29 & 30	1	AISI 304	Feet (1 pair)	LA1145200	LA1145200	LA1145200	LA1145200
31	4	AISI 304	Screw for foot	L701057	L701057	L701057	L701057
* 5, 34 & 36	1	EPDM	Wet end seal kit	LA2380204	LA2380204	LA2380204	LA2380204
-	1	FPM (Viton)	Wet end seal kit	LA2380202	LA2380202	LA2380202	LA2380202
-	1	ISOLAST	Wet end seal kit	LA2380215	LA2380215	LA2380215	LA2380215
#11, 17, 19, 22 & 42	1	FPM (Viton)	Gear box seal kit	LA2381232	LA2381232	LA2381232	LA2381232

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+2



* Wet end seal kit.
\# Gear box seal kit.

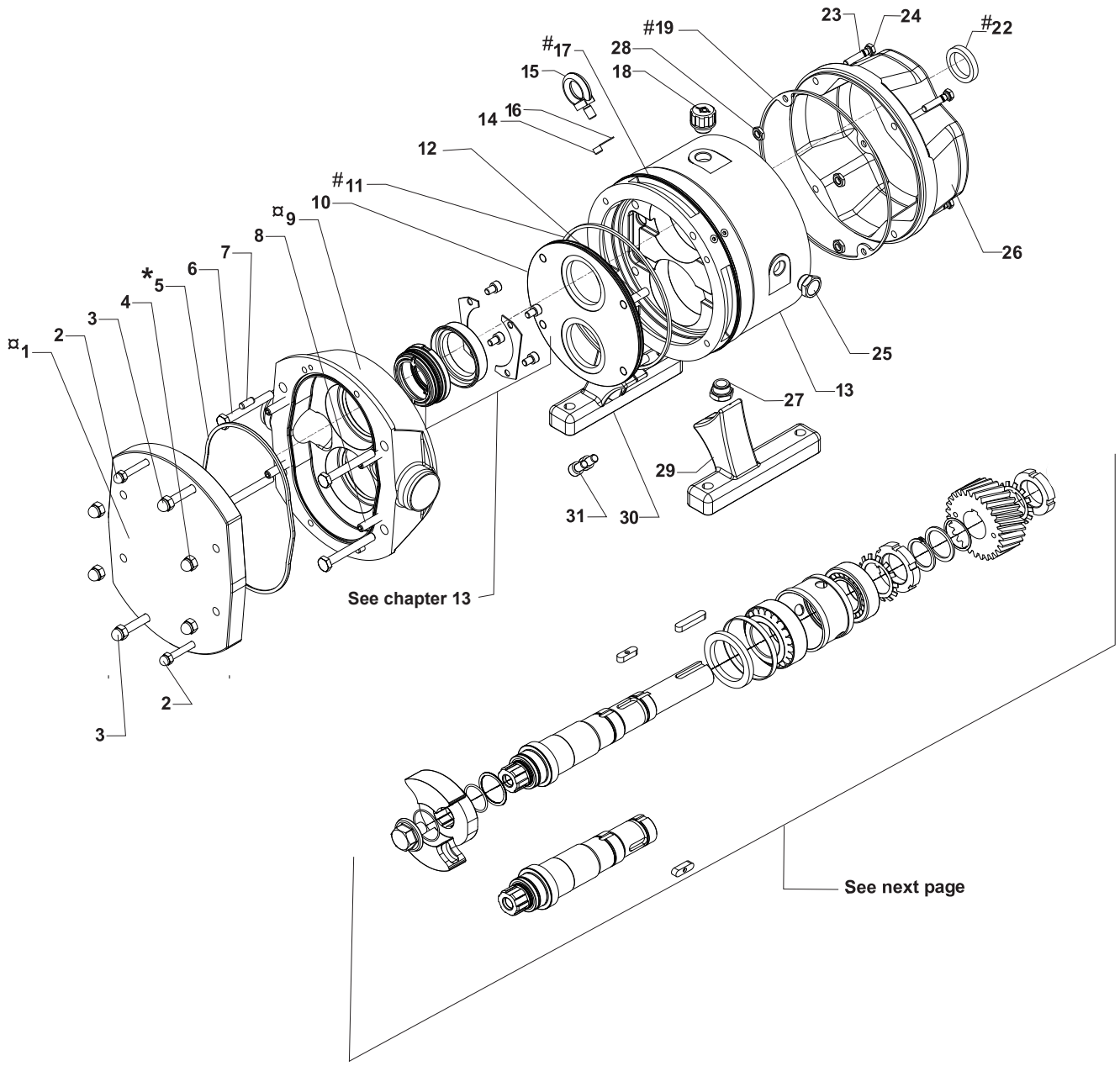
13. Spare Parts DW+2

				Piston	Lobe	Lobe	Lobe
				DW+2/006/10	DW+2/007/20	DW+2/013/10	DW+2/013/15_600
Item	Qty	Material	Description	Part No.			
¤32	2	AISI 329	Rotor screw with washer	LA10502006	LA10502007	LA10502013	LA10502013
33	2	18/02	Washer ring	LA2658200	LA2658200	LA2658200	LA2658200
¤35	2	AISI 316L	Rotor-high efficiency	LA142006P2SH	LA14200721SH	LA14201321SH	
-	2	AISI 316L	Rotor-Multi-Duty	LA142006P3SH	LA14200723SH	LA14201323SH	LA1420131523SH
-	2	AISI 316L	Rotor-high temperature	LA142006P1SY	LA14200721SY	LA14201321SY	
-	2	NGA	Rotor-high efficiency	LA142006P4WH	LA14200724WH	LA14201324WH	LA14201324WH
-	2	NGA	Rotor-high temperature		LA14200724WY	LA14201324WY	LA14201324WY
-	2	NGA	Rotor-super tight	LA142006P5WH	LA14200725WH	LA14201325WH	LA14201325WH
37	1	AISI 316L	Shims, rotor	L2657200	L2657200	L2657200	L2657200
38	1	AISI329L	Shaft main	LA1500200	LA1500200	LA1501200	LA1501200
39	1	AISI329L	Shaft aux	LA1600200	LA1600200	LA1601200	LA1601200
40	2	EN 6A	Gear key	L2180A201	L2180A201	L2180A201	L2180A201
43	1	EN 6A	Drive key	L2181A100	L2181A100	L2181A100	L2181A100
44	2	St. 37-2	Front spacer	LA1856200	LA1856200	LA1856200	LA1856200
45	2	-	Bearing front	L2717200	L2717200	L2717200	L2717200
47	2	St. 37-2	Spacer, rear bearing	LA1861200	LA1861200	LA1861200	LA1861200
48	2	-	Bearing rear	L2718200	L2718200	L2718200	L2718200
49	2	-	Bearing rear tab washer	L2720030	L2720030	L2720030	L2720030
50	2	-	Bearing rear nut	L2719030	L2719030	L2719030	L2719030
51	2	-	Circlip	L2177200	L2177200	L2177200	L2177200
52	2	-	Gear spacer	LA1850200	LA1850200	LA1850200	LA1850200
53	1	M.S.	Gear shims	L4000100	L4000100	L4000100	L4000100
54	1	-	Gear (1 pair)	LA2750200	LA2750200	LA2750200	LA2750200
55	2	-	Gear tab washer	L2720025	L2720025	L2720025	L2720025
56	2	-	Gear nut	L2719025	L2719025	L2719025	L2719025

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+3

13.1.3 DW+3



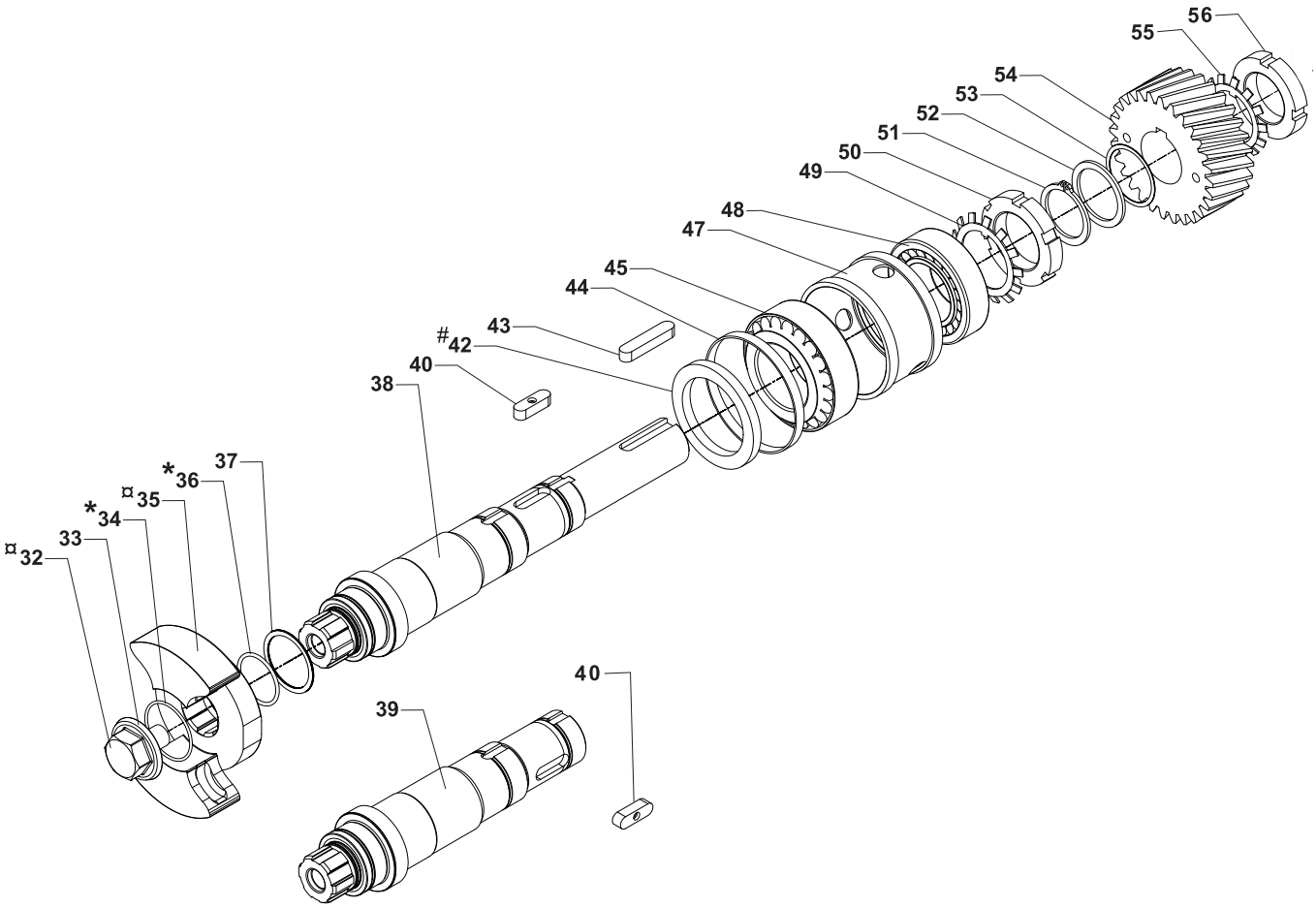
* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+3

				Piston	Lobe	Lobe	Lobe	Lobe
				DW+3/014/10	DW+3/017/20	DW+3/030/10	DW+3/030/15_600	DW+3/050/5
Item	Qty	Material	Description	Part No.				
¤1	1	AISI 316L	Front cover	LA1110301	LA1110300	LA1110300	LA1110300	LA1110300
2	2	AISI 304	Big bolt, front cover	LA1001300	LA1001300	LA1001300	LA1001300	LA1001300
3	2	AISI 304	Small bolt, front cover	LA1000300	LA1000300	LA1000300	LA1000300	LA1000300
4	4	AISI 304	Nut, front cover dome	L700244	L700244	L700244	L700244	L700244
6	4	AISI 304	Screw, rotor case to chassis	L772098	L772098	L772496	L772496	L773827
7	2	AISI 316L	Dowel	LA1160320				
8	4	AISI 304	Stud, front cover	LA1002300	LA1002300	LA1002300	LA1002300	LA1002300
¤9	1	AISI 316L	Rotor case	LA17993014	LA17993014	LA17993030	LA17993030	LA17993050
10	1	AISI 304	Oilseal plate	LA1312300	LA1312300	LA1312300	LA1312300	LA1312300
12	2	AISI 316L	Dowel, rotor case to chassis	LA1160320	LA1160320	LA1160320	LA1160320	LA1160320
13	1	AISI 304	Chassis	LA1302310	LA1302310	LA1302310	LA1302310	LA1302310
14	2	AISI 304	Plug	LA2000100	LA2000100	LA2000100	LA2000100	LA2000100
15	2	AISI 304	Lifting eye bolt	L773815	L773815	L773815	L773815	L773815
16	2	Nylon	Washer	L773813	L773813	L773813	L773813	L773813
18	1	Plastic	Oil filler plug	L2202000	L2202000	L2202000	L2202000	L2202000
23	4	AISI 304	Washer	L701477	L701477	L701477	L701477	L701477
24	4	AISI 304	Screw	L861411	L861411	L861411	L861411	L861411
25	1	Plastic	Oil level window	L2220000	L2220000	L2220000	L2220000	L2220000
26	1	LM6	Can	LA1364310	LA1364310	LA1364310	LA1364310	LA1364310
27	2	Plastic	Oil drain plug	L2210A000	L2210A000	L2210A000	L2210A000	L2210A000
28	4	AISI 304	Nut, oil seal plate	L773650	L773650	L773650	L773650	L773650
29 & 30	1	AISI 304	Feet (1 pair)	LA1145300	LA1145300	LA1145300	LA1145300	LA1145300
31	4	AISI 304	Screw for foot	L701057	L701057	L701057	L701057	L701057
*5, 34 & 36	1	EPDM	Wet end seal kit	LA2380304	LA2380304	LA2380304	LA2380304	LA2380304
-	1	FPM (Viton)	Wet end seal kit	LA2380302	LA2380302	LA2380302	LA2380302	LA2380302
-	1	ISOLAST	Wet end seal kit	LA2380315	LA2380315	LA2380315	LA2380315	LA2380315
#11, 17, 19, 22 & 42	1	FPM (Viton)	Gear box seal kit	LA2381332	LA2381332	LA2381332	LA2381332	LA2381332

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+3



* Wet end seal kit.
\# Gear box seal kit.

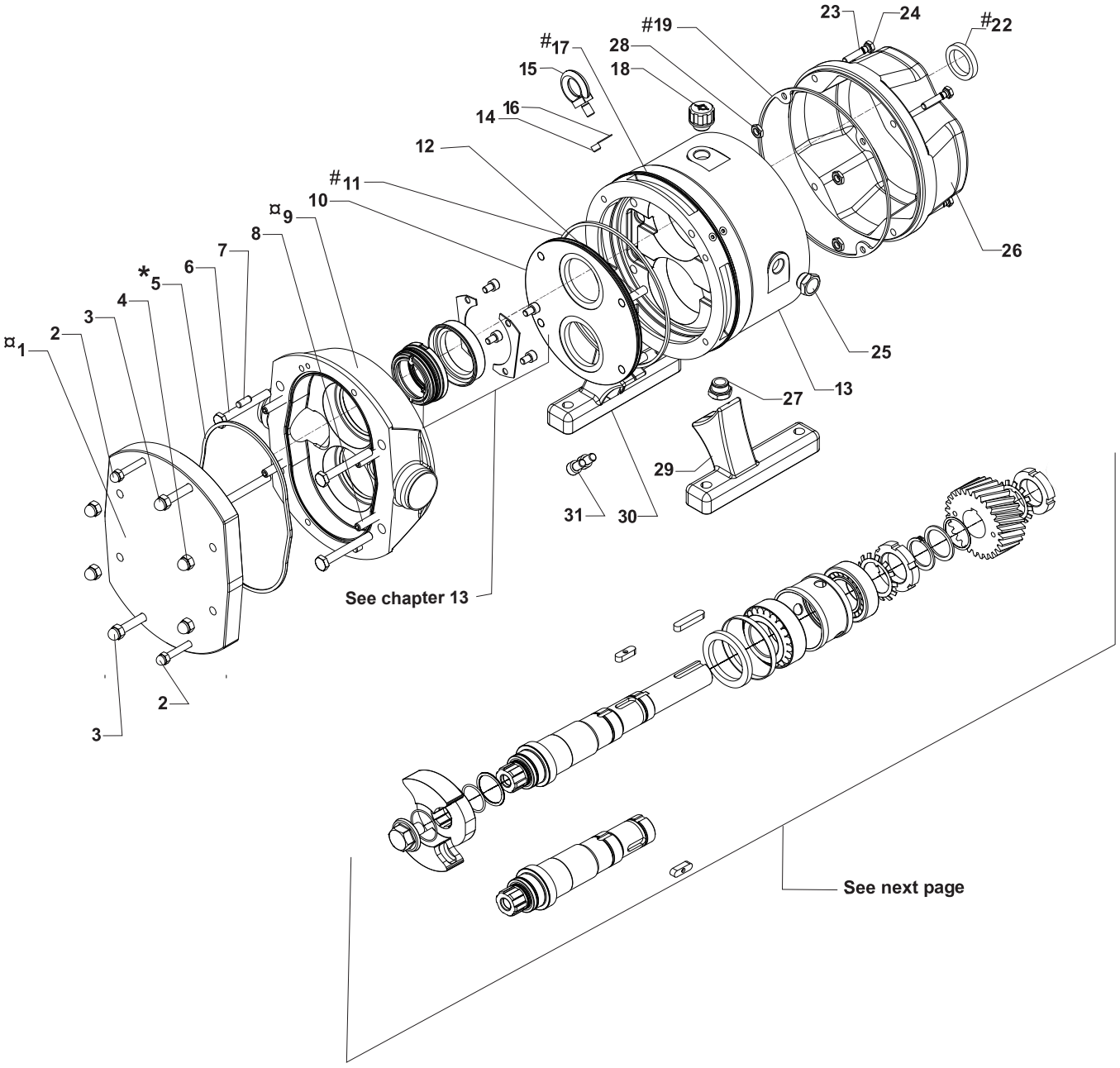
13. Spare Parts DW+3

				Piston	Lobe	Lobe	Lobe	Lobe
				DW+3/014/10	DW+3/017/20	DW+3/030/10	DW+3/030/15_600	DW+3/050/5
Item	Qty	Material	Description	Part No.				
¤32	2	AISI 329	Rotor screw with washer	LA10503014	LA10503016	LA10503030	LA10503030	LA10503050
33	2	18/02	Washer ring	LA2658300	LA2658300	LA2658300	LA2658300	LA2658301
¤35	2	AISI 316L	Rotor-high efficiency	LA143014P2SH	LA14301621SH	LA14303021SH		LA14305021SH
-	2	AISI 316L	Rotor-Multi-Duty	LA143014P3SH	LA14301623SH	LA14303023SH	LA1430301523SH	LA14305023SH
-	2	AISI 316L	Rotor-high temperature	LA143014P1SY	LA14301621SY	LA14303021SY		LA14305021SY
-	2	NGA	Rotor-high efficiency	LA143014P4WH	LA14301624WH	LA14303024WH	LA14303024WH	LA14305024WH
-	2	NGA	Rotor-high temperature	LA143014P4WY	LA14301624WY	LA14303024WY	LA14303024WY	LA14305024WY
-	2	NGA	Rotor-super tight	LA143014P5WH	LA14301625WH	LA14303025WH	LA14303025WH	LA14305025WH
37	1	AISI 316L	Shims, rotor	L2657300	L2657300	L2657300	L2657300	L2657300
38	1	AISI329L	Shaft main	LA1500300	LA1500300	LA1501300	LA1501300	LA1501300
39	1	AISI329L	Shaft aux	LA1600300	LA1600300	LA1601300	LA1601300	LA1601300
40	2	EN 6A	Gear key	L2180A301	L2180A301	L2180A301	L2180A301	L2180A301
43	1	EN 6A	Drive key	L2181A300	L2181A300	L2181A300	L2181A300	L2181A300
44	2	St.37-2	Front spacer	LA1856301	LA1856301	LA1856301	LA1856301	LA1856301
45	2	-	Bearing front	L2717301	L2717301	L2717301	L2717301	L2717301
47	2	St.37-2	Spacer rear bearing	LA1861300	LA1861300	LA1861300	LA1861300	LA1861300
48	2	-	Bearing rear	L2718300	L2718300	L2718300	L2718300	L2718300
49	2	-	Bearing rear tab washer	L2720035	L2720035	L2720035	L2720035	L2720035
50	2	-	Bearing rear nut	L2719035	L2719035	L2719035	L2719035	L2719035
51	2	-	Circlip	L2177300	L2177300	L2177300	L2177300	L2177300
52	2	-	Gear spacer	LA1850300	LA1850300	LA1850300	LA1850300	LA1850300
53	1	M.S.	Gear shims	L4000A300	L4000A300	L4000A300	L4000A300	L4000A300
54	1	-	Gear (1 pair)	LA2750300	LA2750300	LA2750300	LA2750300	LA2750300
55	2	-	Gear tab washer	L2720030	L2720030	L2720030	L2720030	L2720030
56	2	-	Gear nut	L2719030	L2719030	L2719030	L2719030	L2719030

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+4

13.1.4 DW+4



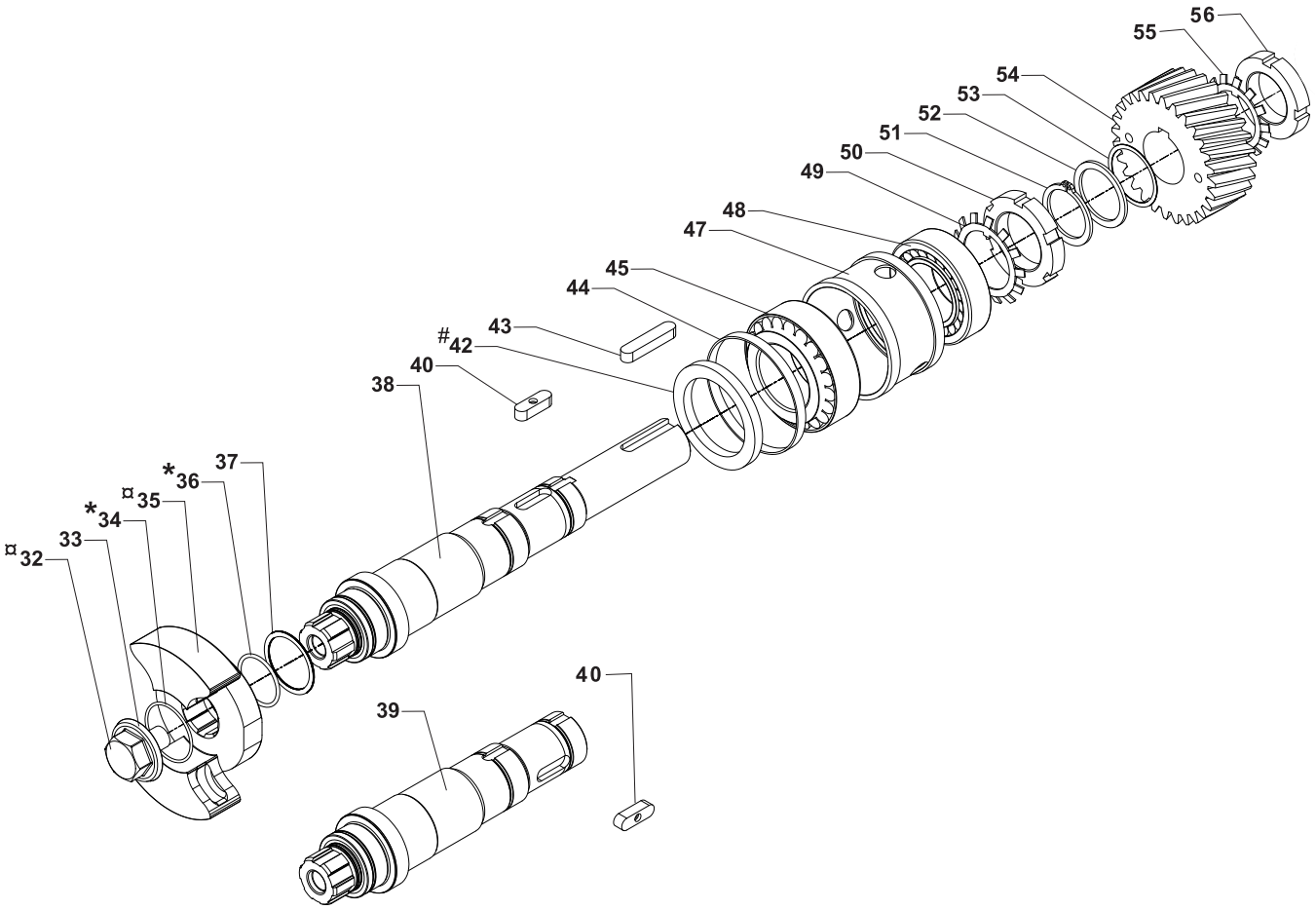
* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+4

				Piston	Lobe	Lobe	Lobe	Lobe	Lobe
				DW+4/033/10	DW+4/039/20	DW+4/073/10	DW+4/073/15 _600	DW+4/125/5	DW+4/125/7 _600
Item	Qty	Material	Description	Part No.					
¤1	1	AISI 316L	Front cover	LA1110401	LA1110400	LA1110400	LA1110400	LA1110400	LA1110400
2	2	AISI 304	Big bolt, front cover	LA1000400	LA1000400	LA1000400	LA1000400	LA1000400	LA1000400
3	2	AISI 304	Small bolt, front cover	LA1001400	LA1001400	LA1001400	LA1001400	LA1001400	LA1001400
4	4	AISI 304	Nut, front cover dome	L700244	L700244	L700244	L700244	L700244	L700244
6	4	AISI 304	Screw, rotor case to chassis	L771606	L771606	L701801	L701801	L773828	L773828
7	2	AISI 316L	Dowel	LA1160320					
8	4	AISI 304	Stud, front cover	LA1002400	LA1002400	LA1002400	LA1002400	LA1002400	LA1002400
¤9	1	AISI 316L	Rotor case	LA17994033	LA17994033	LA17994073	LA17994073	LA17994125	LA17994125
10	1	AISI 304	Oilseal plate	LA1312400	LA1312400	LA1312400	LA1312400	LA1312400	LA1312400
12	2	AISI 316L	Dowel, rotor case to chassis	LA1160420	LA1160420	LA1160420	LA1160420	LA1160420	LA1160420
13	1	AISI 304	Chassis	LA1302410	LA1302410	LA1302410	LA1302410	LA1302410	LA1302410
14	2	AISI 304	Plug	LA2000400	LA2000400	LA2000400	LA2000400	LA2000400	LA2000400
15	2	AISI 304	Lifting eye bolt	LA2101410	LA2101410	LA2101410	LA2101410	LA2101410	LA2101410
16	2	Nylon	Washer	L773655	L773655	L773655	L773655	L773655	L773655
18	1	Plastic	Oil filler plug	L2202000	L2202000	L2202000	L2202000	L2202000	L2202000
23	4	AISI 304	Washer	L701478	L701478	L701478	L701478	L701478	L701478
24	4	AISI 304	Screw	L772457	L772457	L772457	L772457	L772457	L772457
25	1	Plastic	Oil level window	L2220000	L2220000	L2220000	L2220000	L2220000	L2220000
26	1	LM6	Can	LA1364410	LA1364410	LA1364410	LA1364410	LA1364410	LA1364410
27	2	Plastic	Oil drain plug	L2210A000	L2210A000	L2210A000	L2210A000	L2210A000	L2210A000
28	4	AISI 304	Nut, oil seal plate	L773651	L773651	L773651	L773651	L773651	L773651
29 & 30	1	AISI 304	Feet (1 pair)	LA1145400	LA1145400	LA1145400	LA1145400	LA1145400	LA1145400
31	4	AISI 304	Screw for foot	L773656	L773656	L773656	L773656	L773656	L773656
*5, 34 & 36	1	EPDM	Wet end seal kit	LA2380404	LA2380404	LA2380404	LA2380404	LA2380404	LA2380404
-	1	FPM (Viton)	Wet end seal kit	LA2380402	LA2380402	LA2380402	LA2380402	LA2380402	LA2380402
-	1	ISOLAST	Wet end seal kit	LA2380415	LA2380415	LA2380415	LA2380415	LA2380415	LA2380415
#11, 17, 19, 22 & 42	1	FPM (Viton)	Gear box seal kit	LA2381432	LA2381432	LA2381432	LA2381432	LA2381432	LA2381432

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+4



* Wet end seal kit.
\# Gear box seal kit.

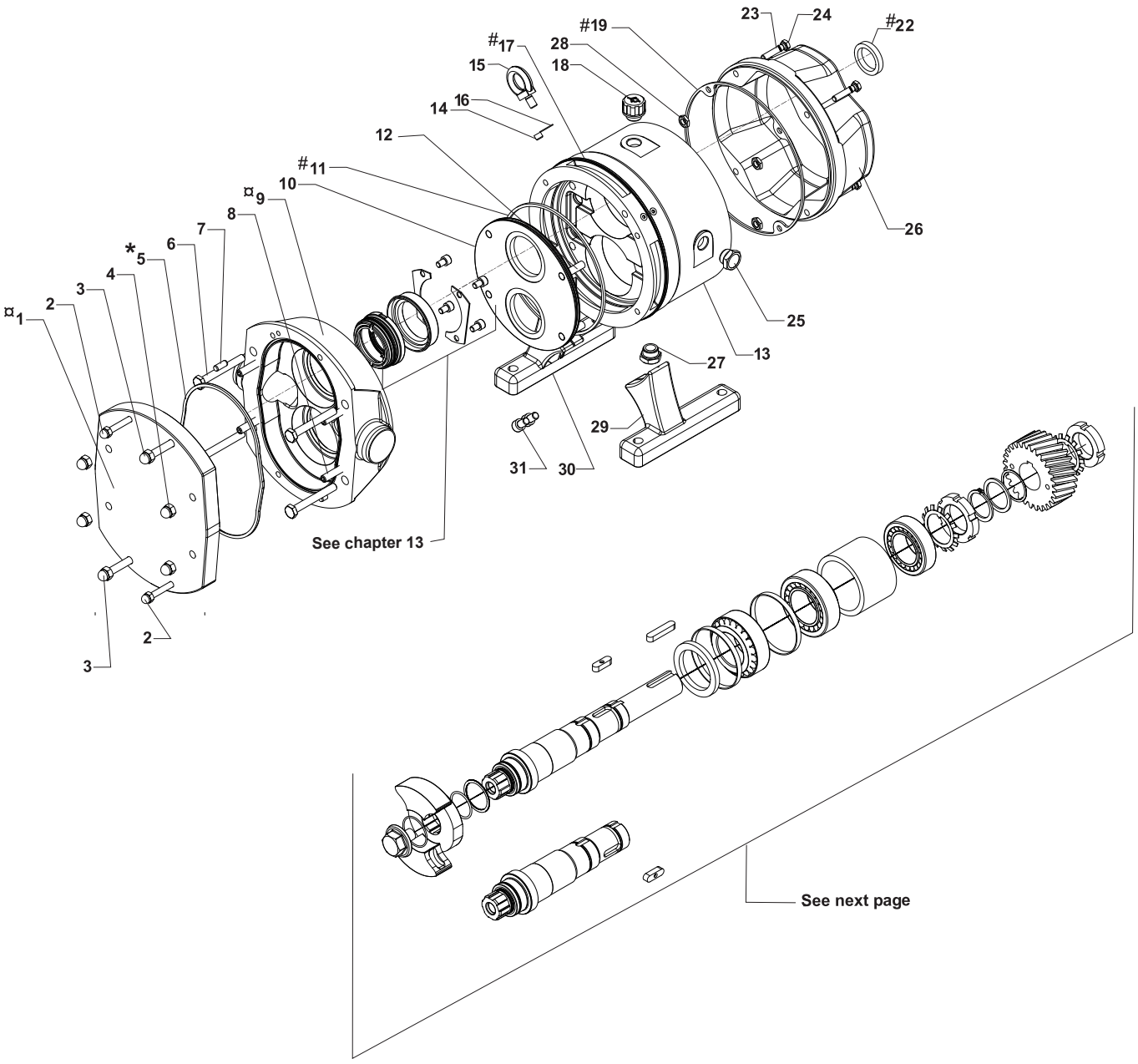
13. Spare Parts DW+4

				Piston	Lobe	Lobe	Lobe	Lobe	Lobe
				DW+4/033/10	DW+4/039/20	DW+4/073/10	DW+4/073/15_600	DW+4/125/5	DW+4/125/7_600
Item	Qty	Material	Description	Part No.					
¤32	2	AISI 329	Rotor screw with washer	LA10504033	LA10504039	LA10504039	LA10504039	LA10504125	LA10504125
33	2	18/02	Washer ring	LA2658400	LA2658400	LA2658400	LA2658400	LA2658400	LA2658400
¤35	2	AISI 316L	Rotor-high efficiency	LA144033P2SH	LA14403921SH	LA14407321SH		LA14412521SH	
-	2	AISI 316L	Rotor-Multi-Duty	LA144033P3SH	LA14403923SH	LA14407323SH	LA1440731523SH	LA14412523SH	LA144125723SH
-	2	AISI 316L	Rotor-high temperature	LA144033P1SY	LA14403921SY	LA14407321SY		LA14412521SY	
-	2	NGA	Rotor-high efficiency	LA144033P4WH	LA14403924WH	LA14407324WH	LA14407324WH	LA14412524WH	LA14412524WH
-	2	NGA	Rotor-high temperature	LA144033P4WY	LA14403924WY	LA14407324WY	LA14407324WY	LA14412524WY	LA14412524WY
-	2	NGA	Rotor-super tight	LA144033P5WH	LA14403925WH	LA14407325WH	LA14407325WH	LA14412525WH	LA14412525WH
37	1	AISI 316L	Shims, rotor	L2657400	L2657400	L2657400	L2657400	L2657400	L2657400
38	1	AISI329L	Shaft main	LA1500400	LA1500400	LA1501400	LA1501400	LA1501400	LA1501400
39	1	AISI329L	Shaft aux	LA1600400	LA1600400	LA1601400	LA1601400	LA1601400	LA1601400
40	2	EN 6A	Gear key	L2180A401	L2180A401	L2180A401	L2180A401	L2180A401	L2180A401
43	1	EN 6A	Drive key	L2181A400	L2181A400	L2181A400	L2181A400	L2181A400	L2181A400
44	2	St.37-2	Front spacer	LA1856400	LA1856400	LA1856400	LA1856400	LA1856400	LA1856400
45	2	-	Bearing front	L2717400	L2717400	L2717400	L2717400	L2717400	L2717400
47	2	St.37-2	Spacer rear bearing	LA1861400	LA1861400	LA1861400	LA1861400	LA1861400	LA1861400
48	2	-	Bearing rear	L2718400	L2718400	L2718400	L2718400	L2718400	L2718400
49	2	-	Bearing rear tab washer	L2720045	L2720045	L2720045	L2720045	L2720045	L2720045
50	2	-	Bearing rear nut	L2719045	L2719045	L2719045	L2719045	L2719045	L2719045
51	2	-	Circlip	L2177400	L2177400	L2177400	L2177400	L2177400	L2177400
52	2	-	Gear spacer	LA1850400	LA1850400	LA1850400	LA1850400	LA1850400	LA1850400
53	1	M.S.	Gear shims	L4000200	L4000200	L4000200	L4000200	L4000200	L4000200
54	1	-	Gear (1 pair)	LA2750400	LA2750400	LA2750400	LA2750400	LA2750400	LA2750400
55	2	-	Gear tab washer	L2720040	L2720040	L2720040	L2720040	L2720040	L2720040
56	2	-	Gear nut	L2719040	L2719040	L2719040	L2719040	L2719040	L2719040

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+5

13.1.5 DW+5



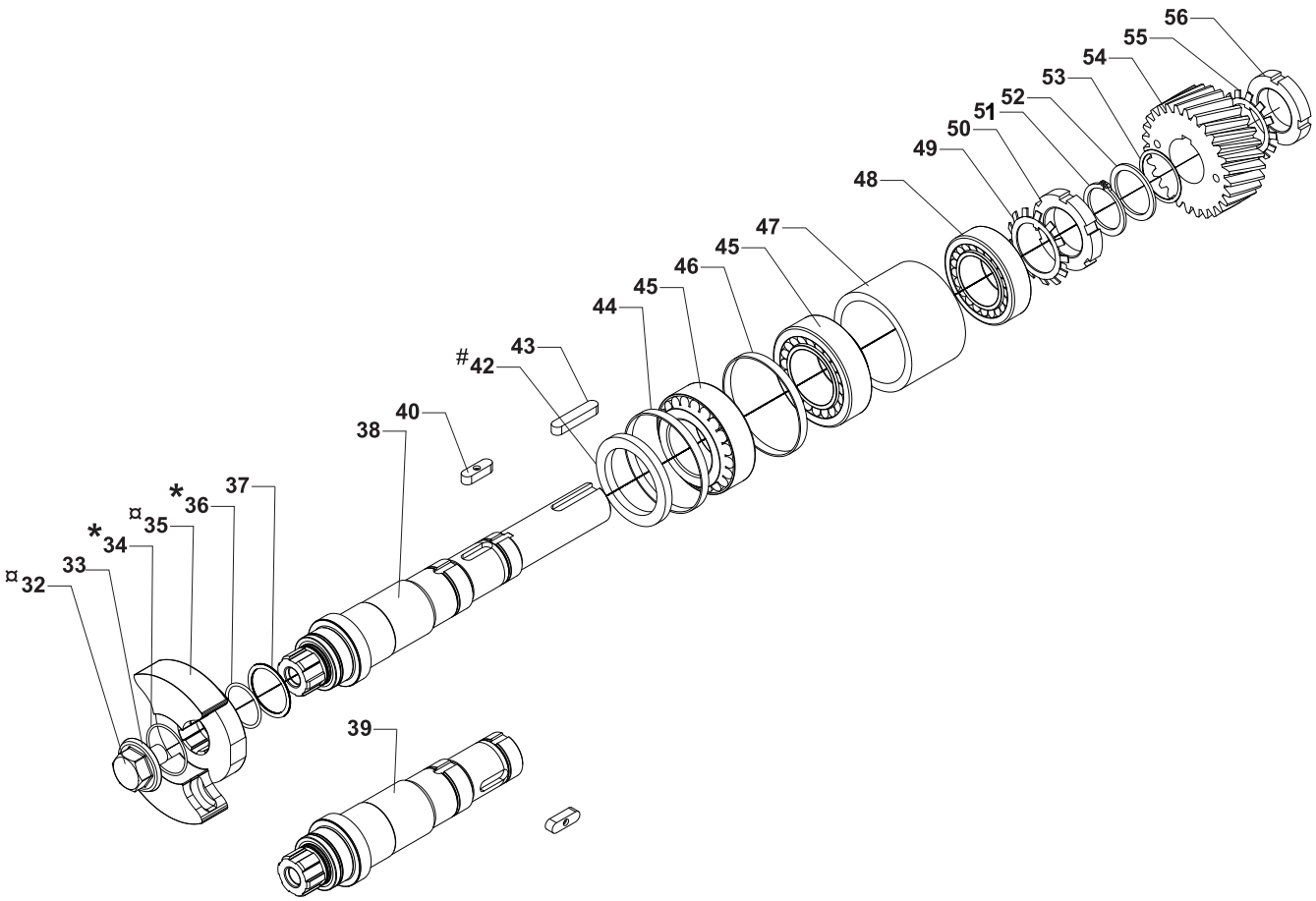
* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+5

				Piston	Lobe	Lobe	Lobe
				DW+5/080/12.5	DW+5/093/25	DW+5/142/15	DW+5/256/7
Item	Qty	Material	Description	Part No.			
¤1	1	AISI 316L	Front cover	LA1110501	LA1110500	LA1110500	LA1110500
2	2	AISI 304	Big bolt, front cover	LA1000500	LA1000500	LA1000500	LA1000500
3	2	AISI 304	Small bolt, front cover	LA1001500	LA1001500	LA1001500	LA1001500
4	4	AISI 304	Nut, front cover dome	L773456	L773456	L773456	L773456
6	4	AISI 304	Screw, rotor case to chassis	L773500	L773500	L702060	L773482
7	2	AISI 316L	Dowel	LA1160520			
8	4	AISI 304	Stud, front cover	LA1002500	LA1002500	LA1002500	LA1002500
¤9	1	AISI 316L	Rotor case	LA17995080	LA17995080	LA17995142	LA17995256
10	1	AISI 304	Oilseal plate	LA1312500	LA1312500	LA1312500	LA1312500
12	2	AISI 316L	Dowel, rotor case to chassis	LA1160520	LA1160520	LA1160520	LA1160520
13	1	AISI 304	Chassis	LA1302500	LA1302500	LA1302500	LA1302500
14	2	AISI 304	Plug	LA2000500	LA2000500	LA2000500	LA2000500
15	2	AISI 304	Lifting eye bolt	LA2101512	LA2101512	LA2101512	LA2101512
16	2	Nylon	Washer	L773654	L773654	L773654	L773654
18	1	Plastic	Oil filler plug	L2202000	L2202000	L2202000	L2202000
23	4	AISI 304	Washer	L701478	L701478	L701478	L701478
24	4	AISI 304	Screw	L772457	L772457	L772457	L772457
25	1	Plastic	Oil level window	L2220000	L2220000	L2220000	L2220000
26	1	LM6	Can	LA1364500	LA1364500	LA1364500	LA1364500
27	2	Plastic	Oil drain plug	L2210A000	L2210A000	L2210A000	L2210A000
28	4	AISI 304	Nut, oil seal plate	L773652	L773652	L773652	L773652
29 & 30	1	AISI 304	Feet (1 pair)	LA1145500	LA1145500	LA1145500	LA1145500
31	4	AISI 304	Screw for foot	L773657	L773657	L773657	L773657
*5, 34 & 36	1	EPDM	Wet end seal kit	LA2380504	LA2380504	LA2380504	LA2380504
-	1	FPM (Viton)	Wet end seal kit	LA2380502	LA2380502	LA2380502	LA2380502
-	1	ISOLAST	Wet end seal kit	LA2380515	LA2380515	LA2380515	LA2380515
#11, 17, 19, 22 & 42	1	FPM (Viton)	Gear box seal kit	LA2381532	LA2381532	LA2381532	LA2381532

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

13. Spare Parts DW+5



* Wet end seal kit.
\# Gear box seal kit.

13. Spare Parts DW+5

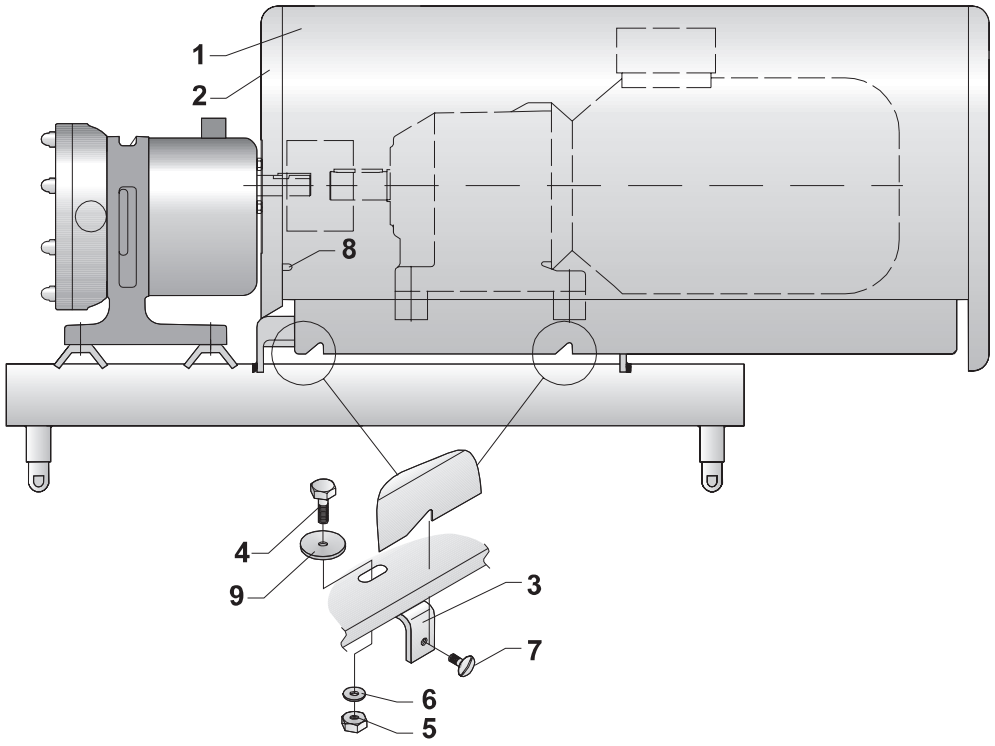
				Piston	Lobe	Lobe	Lobe
				DW+5/080/12.5	DW+5/093/25	DW+5/142/15	DW+5/256/7
Item	Qty	Material	Description	Part No.			
¤32	2	AISI 329	Rotor screw with washer	LA10505080	LA10505093	LA10505142	LA10505256
33	2	18/02	Washer ring	LA2658500	LA2658500	LA2658500	LA2658500
¤35	2	AISI 316L	Rotor-high efficiency	LA145080P2SH	LA14509321SH	LA14514221SH	LA14525621SH
-	2	AISI 316L	Rotor-Multi-Duty	LA145080P3SH	LA14509323SH	LA14514223SH	LA14525623SH
-	2	AISI 316L	Rotor-high temperature	LA145080P1SY	LA14509321SY	LA14514221SY	LA14525621SY
-	2	NGA	Rotor-high efficiency	LA145080P4WH	LA14509324WH	LA14514224WH	LA14525624WH
-	2	NGA	Rotor-high temperature	LA145080P4WY	LA14509324WY	LA14514224WY	LA14525624WY
-	2	NGA	Rotor-super tight	LA145080P5WH	LA14509325WH	LA14514225WH	LA14525625WH
37	1	AISI 316L	Shims, rotor	L2657500	L2657500	L2657500	L2657500
38	1	AISI329L	Shaft main	LA1500500	LA1500500	LA1501500	LA1501500
39	1	AISI329L	Shaft aux	LA1600500	LA1600500	LA1601500	LA1601500
40	2	EN 6A	Gear key	L2180A500	L2180A500	L2180A500	L2180A500
43	1	EN 6A	Drive key	L2181A500	L2181A500	L2181A500	L2181A500
44	2	St.37-2	Front spacer	LA1856500	LA1856500	LA1856500	LA1856500
45	4	-	Bearing front	L2717500	L2717500	L2717500	L2717500
46	2	M.S.	Spacer, front bearing	LA1860500	LA1860500	LA1860500	LA1860500
47	2	M.S.	Spacer, rear bearing	LA1861500	LA1861500	LA1861500	LA1861500
48	2	-	Bearing rear	L2718500	L2718500	L2718500	L2718500
49	2	-	Bearing rear tab washer	L2720050	L2720050	L2720050	L2720050
50	2	-	Bearing rear nut	L2719050	L2719050	L2719050	L2719050
51	2	-	Circlip	L2177500	L2177500	L2177500	L2177500
52	2	-	Gear spacer	LA1850500	LA1850500	LA1850500	LA1850500
53	1	M.S.	Gear shims	L4000A500	L4000A500	L4000A500	L4000A500
54	1	-	Gear (1 pair)	LA2750500	LA2750500	LA2750500	LA2750500
55	2	-	Gear tab washer	L2720045	L2720045	L2720045	L2720045
56	2	-	Gear nut	L2719045	L2719045	L2719045	L2719045

¤ Part No. mentioned below do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

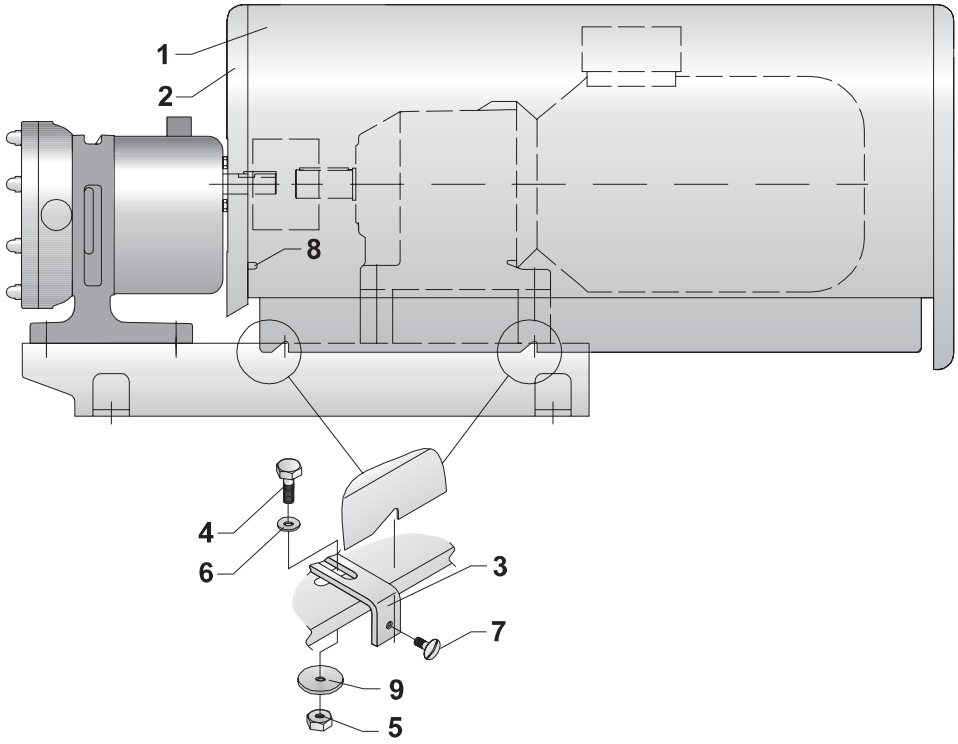
13. Spare Parts

13.2. Motor Shroud

Type 1



Type 2 +
Type 2 with Feet



13. Spare Parts

			DW+1				DW+2	
Item	Qty	Description	Part No.					
1-9	1	Shroud complete	LAK2500100	LAK2501100	LAK3050100	LAK3051100	LAK3052200	LAK3600200
1	1	Shroud	LA2775001	LA2775001	LA2775002	LA2775002	LA2775002	LA2775004
2	1	Cover	LA2776011	LA2776011	LA2776002	LA2776002	LA2776013	LA2776003
3	1 1 2	Bracket	 LA2770223	 LA2770223	 LA2770272	 LA2770272	 LA2770272	LA2770321 LA2771321
4	2 4	Screws, bracket	 L707608	L707608	 L707608	L707608	 L707608	L707608
5	2 4	Nut, bracket	 L700240	L700240	 L700240	L700240	 L700240	L700240
6	2 4	Washer, bracket	 L255550	L255550	 L255550	L255550	 L255550	L255550
7	4	Screws, bracket	L700420	L700420	L700420	L700420	L700420	L700420
8	2 4	Screws, bracket	L773113	L773113	L773113	L773113	L773113	L773113
9	2	Washer, bracket	L255550		L255550		L773464	

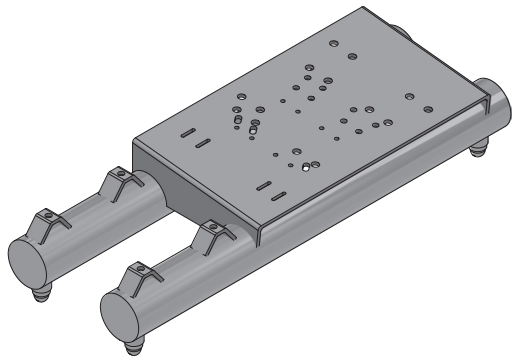
			DW+3					DW+4					
Item	Qty	Description	Part No.										
1-9	1	Shroud complete	LAK3601300	LAK3602300	LAK4501300	LAK4503300	LAK4800300	LAK3603400	LAK4505400	LAK4801400	LAK4802400	LAK4803400	LAK4804400
1	1	Shroud	LA2775006	LA2775011	LA2775007	LA2775007	LA2775010	LA2775011	LA2775007	LA2775009	LA2775009	LA2775009	LA2775009
2	1	Cover	LA2776003	LA2776003	LA2776001	LA2776001	LA2776007	LA2776005	LA2776006	LA2776007	LA2776007	LA2776007	LA2776007
3	1 1 2	Bracket	 LA2771321	 LA2771321	 LA2771357	LA2770357 LA2771357 	LA2770382 LA2771382 	 LA2772321	 LA2771357	 LA2771382	 LA2772382	LA2770382 LA2771382 	 LA2772382
4	2 4	Screws, bracket	 L707608	 L707608	 L707608	L707608	L707608	 L707608	 L707608	 L707608	 L707608	L707608	L707608
5	2 4	Nut, bracket	 L700240	 L700240	 L700240	L700240	L700240	 L700240	 L700240	 L700240	 L700240	L700240	L700240
6	2 4	Washer, bracket	 L255550	 L255550	 L255550	L255550	L255550	 L255550	 L255550	 L255550	 L255550	L255550	L255550
7	4	Screws, bracket	L700420	L700420	L700420	L700420	L700420	L700420	L700420	L700420	L700420	L700420	L700420
8	2 4	Screws, bracket	L773113	L773113	 L773113	L773113	L773113	L773113	 L773113	L773113	L773113	L773113	L773113
9	2 8	Washer, bracket	L773464	L773464	L773464			L773464	L773464	L773464	 L773464		

			DW+5					
Item	Qty	Description	Part No.					
1-9	1	Shroud complete	LAK4506500	LAK4507500	LAK4508500	LAK4509500	LAK5251500	LAK7001500
1	1	Shroud	LA2775012	LA2775007	LA2775012	LA2775007	LA2775013	LA2775014
2	1	Cover	LA2776008	LA2776008	LA2776008	LA2776008	LA2776009	LA2776010
3	1 1 2	Bracket	LA2771357 LA2773357 	LA2771357 LA2773357 	LA27713571 LA27733571 	LA27713571 LA27733571 	 LA2771421	 LA2771509
4	2 2	Screws, bracket	L700678 L773501	L700678 L773501	L700678 L773501	L700678 L773501	L700678 L773501	L700678
5	2 4	Nut, bracket	L701670 L700240	L701670 L700240	L701670 L700240	L701670 L700240	L701670 L700240	 L700240
6	2 4	Washer, bracket	L773488 L255550	L773488 L255550	L773488 L255550	L773488 L255550	L773488 L255550	 L255550
7	4	Screws, bracket	L700420	L700420	L700420	L700420	L700420	L700420
8	4	Screws, bracket	L773113	L773113	L773113	L773113	L773113	L773113

13. Spare Parts

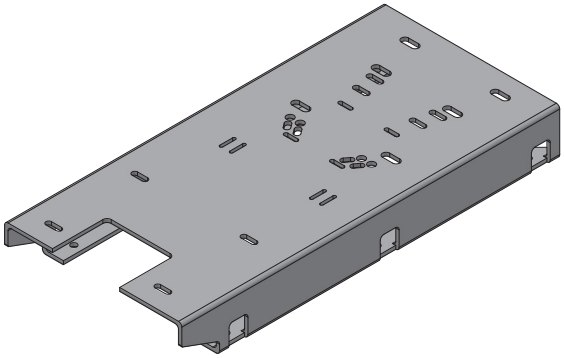
13.3. Baseplate

Type 1



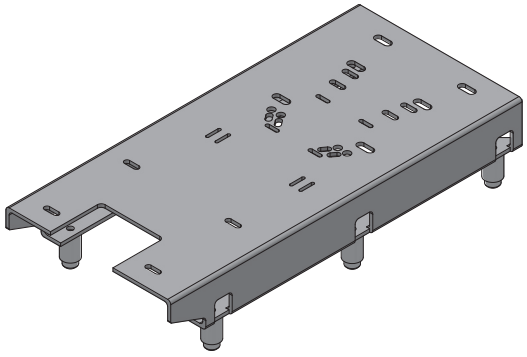
	DW+1	DW+2	DW+3	DW+4	DW+5
	Part No.				
Type 1	LA2760100	LA2760200	LA2760300	LA2760400	LA2760500

Type 2



	DW+1	DW+2	DW+3	DW+4	DW+5
	Part No.				
Type 2	LA2764100	LA2764200	LA2764300	LA2764400	LA2764500

Type 2 with feet

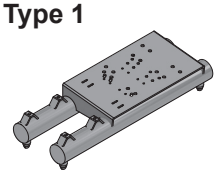


	DW+1	DW+2	DW+3	DW+4	DW+5
	Part No.				
Type 2	LA2764100	LA2764200	LA2764300	LA2764400	LA2764500
Feet	LDW0880	LDW0880	LDW0880	LDW0881	LDW0881

13. Spare Parts

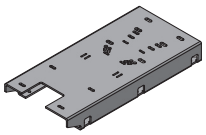
13.4. Complete Motor Shroud

Type 1



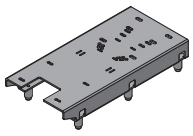
In-/outlet position	DW+1		DW+2		DW+3		DW+4		DW+5	
Gear size*	Part No.									
SK 072.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 172.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 372.1	LAK2501100	LAK3051100	LAK3052200	LAK3052200	LAK3601300	LAK3601300	LAK3603400	LAK3603400	LAK4506500	LAK4506500
SK 572.1			LAK3600200	LAK3600200	LAK3601300	LAK3601300	LAK4505400	LAK4505400	LAK4507500	LAK4507500
SK 672.1					LAK4501300	LAK3602300	LAK4505400	LAK4505400	LAK4507500	LAK4507500
SK 772.1					LAK4501300	LAK4501300	LAK4801400	LAK4801400	LAK5251500	LAK5251500
SK 872.1					LAK4503300	LAK4503300	LAK4804400	LAK4803400	LAK5251500	LAK5251500
SK 972.1									LAK7001500	LAK7001500

Type 2



In-/outlet position	DW+1		DW+2		DW+3		DW+4		DW+5	
Gear size*	Part No.									
SK 072.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 172.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 372.1	LAK2501100	LAK3051100	LAK3052200	LAK3052200	LAK3601300	LAK3601300	LAK3603400	LAK3603400	LAK4508500	LAK4508500
SK 572.1			LAK3600200	LAK3600200	LAK3601300	LAK3601300	LAK3603400	LAK4505400	LAK4509500	LAK4509500
SK 672.1					LAK4501300	LAK3602300	LAK3603400	LAK4505400	LAK4509500	LAK4509500
SK 772.1					LAK4501300	LAK4501300	LAK4802400	LAK4801400	LAK5251500	LAK5251500
SK 872.1					LAK4800300	LAK4503300	LAK4804400	LAK4803400	LAK5251500	LAK5251500
SK 972.1									LAK7001500	LAK7001500

Type 2 with feet



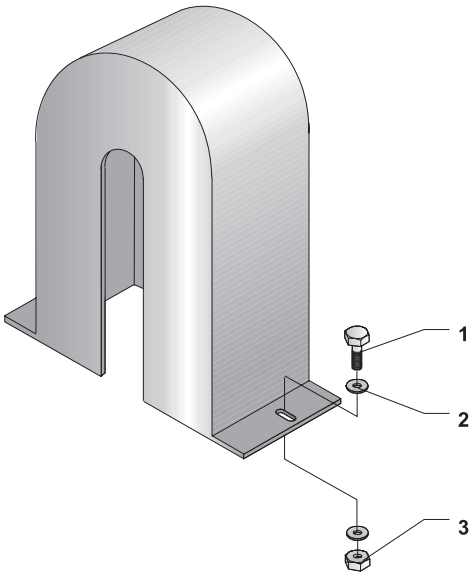
In-/outlet position	DW+1		DW+2		DW+3		DW+4		DW+5	
Gear size*	Part No.									
SK 072.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 172.1	LAK2500100	LAK3050100	LAK3052200	LAK3052200						
SK 372.1	LAK2501100	LAK3051100	LAK3052200	LAK3052200	LAK3601300	LAK3601300	LAK3603400	LAK3603400	LAK4508500	LAK4508500
SK 572.1			LAK3600200	LAK3600200	LAK3601300	LAK3601300	LAK3603400	LAK4505400	LAK4509500	LAK4509500
SK 672.1					LAK4501300	LAK3602300	LAK3603400	LAK4505400	LAK4509500	LAK4509500
SK 772.1					LAK4501300	LAK4501300	LAK4802400	LAK4801400	LAK5251500	LAK5251500
SK 872.1					LAK4800300	LAK4503300	LAK4804400	LAK4803400	LAK5251500	LAK5251500
SK 972.1									LAK7001500	LAK7001500

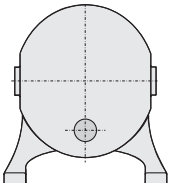
* Gear motor manufacturer: NORD.

13. Spare Parts

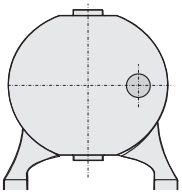
13.5. Coupling Guard

Item	Description	Qty	DW+1	DW+2	DW+3	DW+4	DW+5
1	Screw	2	L705856	L705856	L705856	L705856	L705856
2	Washer	4	L701477	L701477	L701477	L701477	L701477
3	Nut	2	L700240	L700240	L700240	L700240	L700240

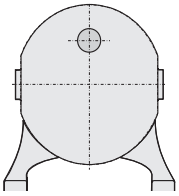




Shaft mounted at the bottom

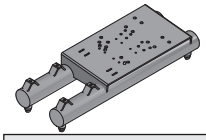


Shaft mounted horizontally (right)



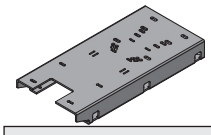
Shaft mounted on the top

Type 1



In-/outlet position	DW+1		DW+2			DW+3			DW+4			DW+5		
	B	H	B	T	H	B	T	H	B	T	H	B	T	H
Gear size*	Part No.													
SK 072.1	LA2780101	LA2780101	LA2780201											
SK 172.1	LA2780101	LA2780101	LA2780201		LA2780202	LA2780301		LA2780306						
SK 372.1	LA2780102	LA2780102		LA2780204	LA2780206	LA2780302		LA2780307	LA2780410		LA2780413	LA2780520		LA2780521
SK 572.1				LA2780205	LA2780207		LA2780308	LA2780303	LA2780411		LA2780412	LA2780522		LA2780523
SK 672.1							LA2780310	LA2780305	LA2780414		LA2780415	LA2780524		LA2780525
SK 772.1							LA2780309	LA2780313		LA2780416	LA2780417	LA2780532		LA2780527
SK 872.1										LA2780418	LA2780419		LA2780528	LA2780529
SK 972.1													LA2780530	LA2780531

Type 2

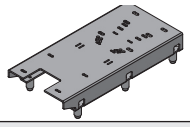


In-/outlet position	DW+1		DW+2		DW+3			DW+4			DW+5		
	B	H	B	H	B	T	H	B	T	H	B	T	H
Gear size*	Part No.												
SK 072.1	LA2780101	LA2780101	LA2780202	LA2780203	LA2780301								
SK 172.1	LA2780101	LA2780101	LA2780202	LA2780203	LA2780301		LA2780306						
SK 372.1	LA2780102	LA2780102	LA2780206	LA2780204	LA2780302		LA2780307	LA2780410		LA2780413	LA2780520		LA2780521
SK 572.1			LA2780207	LA2780205		LA2780304	LA2780308	LA2780411		LA2780412	LA2780522		LA2780523
SK 672.1						LA2780311	LA2780310	LA2780414		LA2780415	LA2780524		LA2780525
SK 772.1						LA2780312	LA2780313			LA2780417		LA2780526	LA2780527
SK 872.1									LA2780416	LA2780419	LA2780533		LA2780529
SK 972.1									LA2780418			LA2780530	LA2780531

* Gear motor manufacturer: NORD.

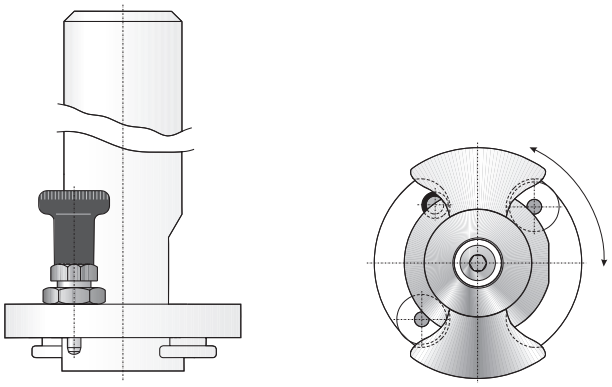
13. Spare Parts

Type 2 with feet

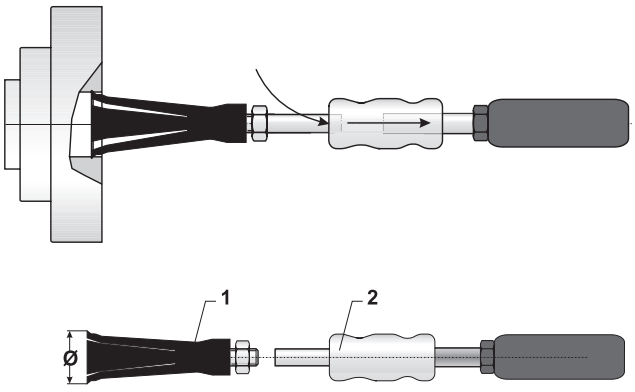


In-/outlet position	DW+1		DW+2		DW+3			DW+4			DW+5		
	B	H	B	H	B	T	H	B	T	H	B	T	H
Gear size*	**Part No.**												
SK 072.1	LA2780101	LA2780101	LA2780202	LA2780203	LA2780301								
SK 172.1	LA2780101	LA2780101	LA2780202	LA2780203	LA2780301		LA2780306						
SK 372.1	LA2780102	LA2780102	LA2780206	LA2780204	LA2780302		LA2780307	LA2780410		LA2780413	LA2780520		LA2780521
SK 572.1			LA2780207	LA2780205		LA2780304	LA2780308	LA2780411		LA2780412	LA2780522		LA2780523
SK 672.1						LA2780311	LA2780310	LA2780414		LA2780415	LA2780524		LA2780525
SK 772.1						LA2780312	LA2780313			LA2780417		LA2780526	LA2780527
SK 872.1									LA2780416 LA2780418	LA2780419	LA2780533		LA2780529
SK 972.1												LA2780530	LA2780531

13.6. DW+1-5 Removal Tool

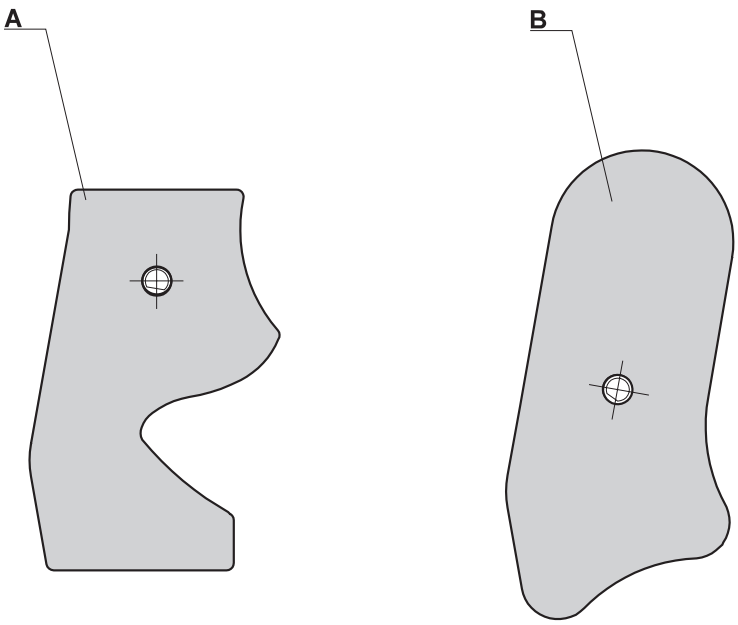


Pos.	Qty	Description	Pump type				
			DW+1	DW+2	DW+3	DW+4	DW+5
-	1	Piston removal	LAFT0041	LAFT0042	LAFT0043	LAFT0044	LAFT0045



Pos.	Qty	Description	Pump type				
			DW+1	DW+2	DW+3	DW+4	DW+5
			Ø 17	Ø 22.5	Ø 27.5	Ø 37	Ø48
1	1	Lobe removal	L773508	L773509	L773510	L773511	L773512
2	1	Impact hammer	L773507	L773507	L773507	L773507	L773507

13.7. Locking Tool

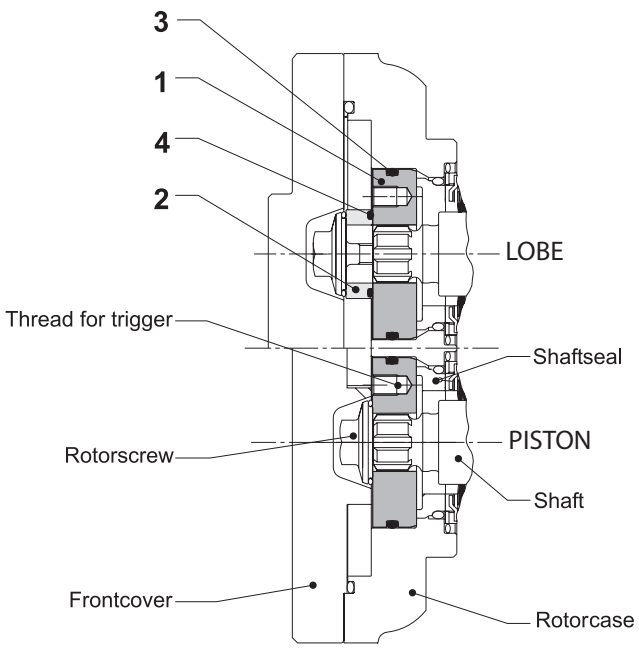


Qty	Material	Description	Pump type				
			DW+1	DW+2	DW+3	DW+4	DW+5
1	Plastic	Piston locking tool (A)	LAFT0001	LAFT0002	LAFT0003	LAFT0004	LAFT0005
1	Plastic	Lobe locking tool (B)	LAFT0011	LAFT0012	LAFT0013	LAFT0014	LAFT0015

13. Spare Parts

13.8. Fitting Tools for Pump Flushing

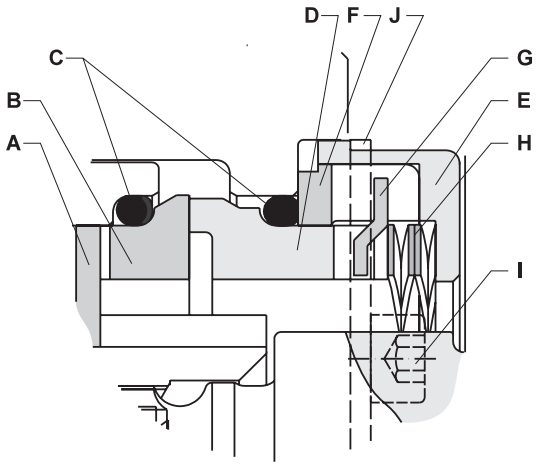
DW+1-5



				Part No.					
				Piston	Lobe	Lobe	Piston	Lobe	Lobe
Item	Qty	Material	Description	DW+1/003/-	DW+1/004/-	DW+1/007/-	DW+2/006/-	DW+2/007/-	DW+2/013/-
1-4	**-**	**-**	**Complete kit**	**LA2370100**	**LA2370101**	**LA2370103**	**LA2370200**	**LA2370201**	**LA2370203**
1	2	Plastic	Plug	L2200100	LA2200100	LA2200100	LA2200200	LA2200200	LA2200200
2	2	Plastic	Spacer		LA1852100	LA1852101		LA1852200	LA1852201
3	2	EPDM	O-ring	L25060204	L25060204	L25060204	L25042004	L25042004	L25042004
4	2	EPDM	O-ring		L2511004	L2511004		L2511004	2511004
				DW+3/014/-	DW+3/017/-	DW+3/030/-	DW+4/033/-	DW+4/039/-	DW+4/073/-
1-4	**-**	**-**	**Complete kit**	**LA2370300**	**LA2370301**	**LA2370303**	**LA2370400**	**LA2370401**	**LA2370403**
1	2	Plastic	Plug	LA2200300	LA2200300	LA2200300	LA2200400	LA2200400	LA2200400
2	2	Plastic	Spacer		LA1852300	LA1852301		LA1852400	LA1852401
3	2	EPDM	O-ring	L25061004	L25061004	L25061004	L25045004	L25045004	L25045004
4	2	EPDM	O-ring		L25029004	L25029004		L25029004	L25029004

				Lobe	Lobe	Piston	Lobe	Lobe	Lobe
Item	Qty	Material	Description	DW+3/050/-	DW+4/125/-	DW+5/080/-	DW+5/093/-	DW+5/142/-	DW+5/256/-
1-4	**-**	**-**	**Complete kit**	**LA2370313**	**LA2370413**	**LA2370500**	**LA2370501**	**LA2370505**	**LA2370503**
1	2	Plastic	Plug	LA2200300	LA2200400	LA2200500	LA2200500	LA2200500	LA2200500
2	2	Plastic	Spacer	LA1852302	LA1852402		LA1852500	LA1852501	LA1852502
3	2	EPDM	O-ring	L25061004	L25045004	L25062004	L25062004	L25062004	L25062004
4	2	EPDM	O-ring	L25029004	L25029004		L25034004	L25034004	L25034004

14. Shaft Seal



A: Rotary drive ring
B: Rotary seal face
C: O-ring, seal
D: Stationary seal face
E: Seal housing
F: Ring
G: Stationary drive ring
H: Wave spring
I: Screw, seal housing
J: Clamp, seal housing

14.1. Single Mechanical Shaft Seal

Operational Specifications

Max. pump discharge pressure: see chapter 12.2
Rotational speed per minute: see chapter 12.7
Product temperature °C: see chapter 12.4

14.1.1 Replacing Single Mechanical Shaft Seals

To change the shaft seal it is necessary to disassemble the pump as described below. Use the sectional drawing for reference (page 29 and drawing on the left).

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Remove the stationary seal face (D) and the O-ring (C) with the fingers.
4. Check the new shaft seals contact surface for dirt and scratches.
5. Mount the new stationary seal face (D) and O-ring (C) in the rotor casing (9) without using tools. The stationary seal face (D) is the longer of the two shaft seal rings. The keyway in the stationary seal face (D) must fit over the groove in the stationary drive ring (G). Check that it is correctly fitted by feeling the spring force (H) when it is pushed in over the shaft (38, 39).
6. Remove the rotary seal face (B) and O-ring (C) from the rotor (35).
7. Insert a new rotary seal face (B) and O-ring (C) in the rotor (35).
8. Mount the rotors (35) as described in chapter 10.2.
9. Mount the front cover (1) as described in chapter 10.1.
10. Check that the rotors turn freely.

Note! All types of shaft seal (single lip seal, triple lip seal, single mechanical seal, single mechanical seal with water flush, dual mechanical seal and packed gland packing) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts chapter on page 93.

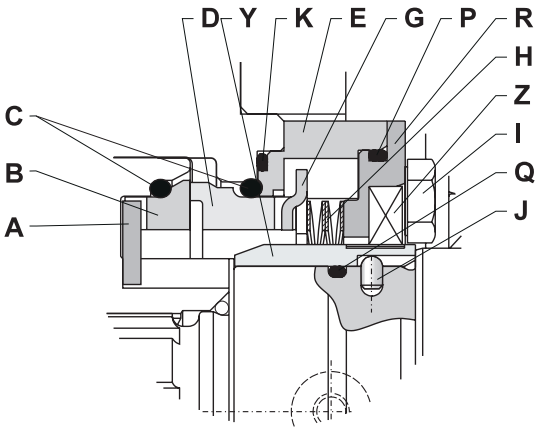
14.2. Single Mechanical Shaft Seal with Water Flush

Operational Specifications

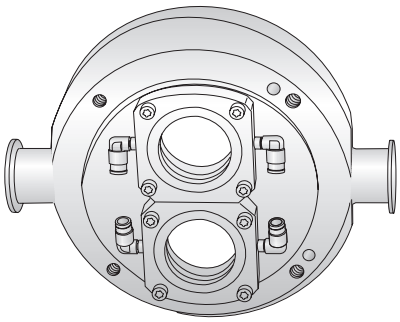
Discharge pressure: see chapter 12.2
Flushing pressure: max. 2 bar
Difference from flushing pressure to the product side: max. 2 bar
Flow, flushing pressure per seal: min. 0,1 l/min
Rotational speed per minute: see chapter 12.7
Product temperature °C: see chapter 12.4

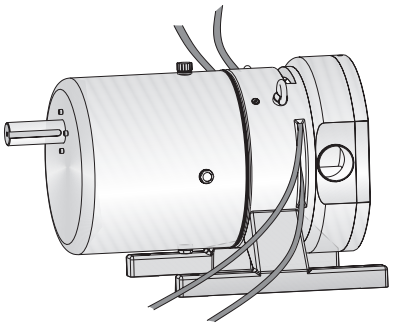
14. Shaft Seal

14.2.1 Replacement of Single Mechanical Shaft Seal with Single Mechanical Shaft Seal with Water Flush



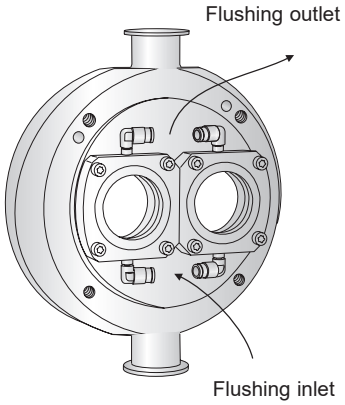
A: Rotary drive ring
B: Rotary seal face
C: O-ring, seal
D: Stationary seal face
E: Seal housing
R: Clamp plate
G: Stationary drive ring
H: Wave spring
I: Screw, seal housing
J: Pin
P: O-ring, clamp plate
Q: O-ring, shaft
Y: Sleeve
Z: Lipseal





To change the shaft seal it is necessary to disassemble the pump as described in the following. Use the sectional drawing for reference (page 29 and drawing on the left).

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Remove the stationary seal faces (D) and the O-rings (C) with the fingers.
4. Remove the rotor case (9) as described in chapter 10.3.
5. Remove the holding device from the single mechanical shaft seal.
6. Position the shafts (38, 39) such that the holes for the guide pins (J) face upwards.
7. Insert the guide pins (J) in the holes.
8. Seat the O-rings (Q) in the shaft grooves.
9. Position the shaft sleeves (Y) on the shafts (38, 39). Check that the key in the sleeve fits over the guide pin (J) – it may be necessary to lubricate with food-quality grease. The shaft sleeve is correctly mounted when the edge of the sleeve is in contact with the shaft shoulder.
10. Apply liquid sealer compound to the seat on the clamp plate (R). Position a new lip seal (Z) with the smooth side facing upwards and press home into the clamp plate. Position the seal housing in the recess on the rear of the rotor case (9). Mount the drive ring (G) first and then the spring (H) in the seal housing (E).
11. Position the clamp plate (R) on the seal housing (E) once more and tighten the screws (I) by the indicated torque – see chapter 12.1.
12. Apply liquid sealing compound or PTFE tape to the thread of the liquid inlet bends and screw into the seal housing. The bends must be positioned as in figure on the left.
13. Cut 1 meter hose into 25 cm pieces.
14. Press the hose pieces into the bends.
15. Apply food-quality grease to the shaft seals before pushing the rotor case into place.
16. Position the rotor case (9) over the guide pin in the chassis (13) and carefully tap into position with a plastic mallet. Check that the hose-ends are positioned between two of the rings forming the chassis – see figure on the left.
17. Tighten the bolts (6) which fix the rotor case (9) to the chassis (13) by the indicated torque – see chapter 12.1.
18. Check the shaft seal's contact surfaces (B, D) for dirt and scratches. Mount the stationary seal faces (D) (the stationary seal faces are the longest of the two shaft seal parts) in the rotor case without using tools. The keyways in the stationary seal faces must fit over the grooves in the drive ring (G). Check that it is correctly fitted by feeling for spring power when pushed in over the shaft.



19. Mount the rotors (35) as described in chapter 10.2.
20. Mount the front panel (1) as described in chapter 10.1.
21. Check that the rotors turn freely.

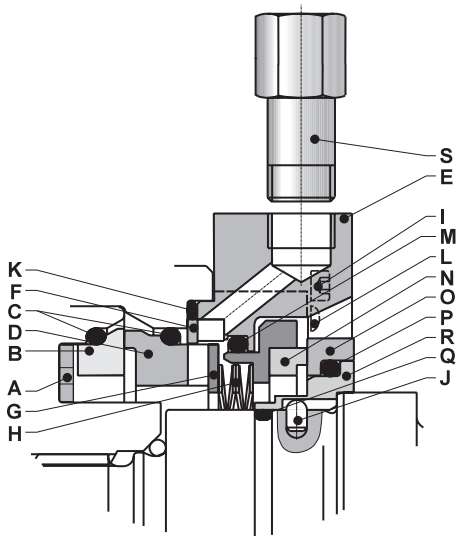
Connection for Flushing Liquid
When the pump is set up with in- and outlet vertical, the flushing liquid supply is connected to the bottom elbows, as shown in figure on the left. With horizontal inlet/outlet, the flushing liquid supply can be connected either to the left or the right elbow pair.

Replacement of Shaft Seal Stationary Seal Face (D) and Rotary Seal Face (B)
See: Replacement of single mechanical shaft seals on page 88.

Replacement of lip seal (L)
For single mechanical shaft seal with flush, see chapter 10.1.
Inspect the stationary seal face (D) and rotary seal face (B) on the shaft seal for wear and scratches and decide whether they need replacing.

Note! All types of shaft seal (single lip seal, triple lip seal, single mechanical shaft seal, single mechanical shaft seal with water flush, double mechanical shaft seal and packed gland) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts list of the shaft seal.

Caution! Do not use these connections for flushing with steam or steam condensate. If steam or condensate flush is required, a special aseptic piping must be used.



A: Rotary drive ring
B: Rotary seal face, product side
C: O-ring kit
D: Stationary seal face, product side
E: Seal housing
F: Ring
G: Stationary drive ring
H: Wave spring
I : Screw, seal housing
J: Pin
K: O-ring
L: Screw
M: O-ring, stationary seal face
N: Stationary seal face, atmosphere side
O: Rotary seal face, atmosphere side
P: O-ring, rotary seal face
Q: O-ring, shaft
R: Stopring
S: Pipe unions

14.3. Double Mechanical Shaft Seal

Operational Specifications
Discharge pressure: see chapter 12.2
Flushing pressure: max. 15 bar
Difference from flushing pressure to productside: max. 7 bar
Flow, flushing pressure per seal: min. 0,5 l/min
Rotational speed per minute: see chapter 12.7
Product temperature °C: see chapter 12.4

14.3.1 Replacement of Double Mechanical Shaft Seal

To change the shaft seal it is necessary to disassemble the pump as described in the following. Use the sectional drawing for reference (page 29 and drawing on the left).

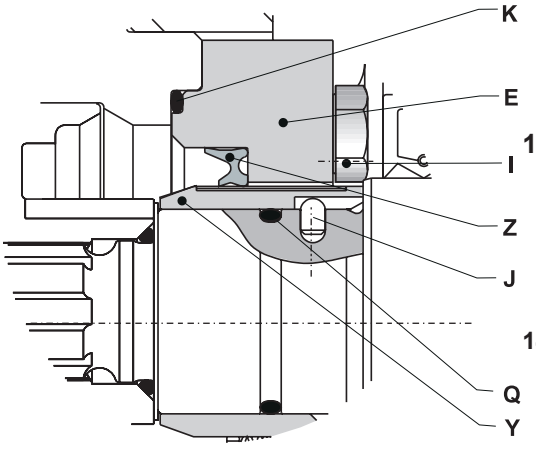
1. Remove the pipe unions (S).
2. Remove the front cover (1) as described in chapter 10.1.
3. Remove the rotors (35) as described in chapter 10.2.
4. Remove the stationary seal face (D) and the O-ring (C) with the fingers.
5. Remove the rotor case (9) as described in chapter 10.3.
6. Undo screws (I) and remove the screws (L).
7. Remove the stationary seal face (N), spring (H) and O-ring (M).

8. Remove the rotary seal face (O) and O-ring (P) from the stopring (R).
9. Check that the stopring (R) is clean and correctly positioned on the shaft (38, 39). The stopring (R) must be pushed all the way back to the shaft shoulder.
10. Mount the new O-ring (P) followed by the new rotary seal face (O) on the stopring (R).
11. Place the O-ring (M), spring (H) and the new stationary seal face (N) in the seal housing (E) and lock by turning the screws (L).
12. Mount the rotor case (9) on the chassis (13) - see chapter 10.3.
13. Check the new shaft seal's contact surface for dirt and scratches. Mount the stationary seal face (D) (the stationary seal face is the longest of the two shaft seal parts) in the rotor case (9) without using tools. The keyway in the stationary seal face (D) must fit over the cut-out in the drive ring (G). Check that it is correctly fitted by feeling for spring power when pushed in over the shaft.
14. Change the rotary seal face (B) and O-ring (C) in the rotor.
15. Mount the rotors (35) as described in chapter 10.2.
16. Mount the front cover (1) as described in chapter 10.1.
17. Check that the rotors turn freely.
18. Place the pipe unions (S) in the threaded holes.

14.3.2 Connection for Flushing Liquid

See: Connection for flushing liquid on page 89.

Note! All types of shaft seal (single lip seal, triple lip seal, single mechanical shaft seal, single mechanical shaft seal with water flush, double mechanical shaft seal and packed gland) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts chapter on page 93.



E: Seal housing
I: Screw
J: Pin
K: O-ring, seal housing
Q: O-ring, sleeve
Y: Sleeve
Z: Lip seal

14.4. Single Lip Seal

Operational Specifications

Pump discharge pressure: max. 6 bar
Rotational speed per minute: max. 400 rpm
Product temperature °C: see chapter 12.4

14.4.1 Replacement of Single Lip Seal

To replace the single shaft lip seal it is necessary to disassemble the pump as described below. Use the sectional drawing for reference (page 29 and drawing on the left).

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Use a hook, pliers or similar to extract the lip seal (Z) from the shaft seal housing (E).
4. Clean the area in which the lip seal (Z) sits.

5. Lubricate the new lip seal (Z) generously with a food-quality grease and bring the lip seal over the shaft (38, 39) onto the seal housing (E). Check that the seal has been installed with the correct side uppermost – see sectional drawing.
6. Check that the lip seal (Z) has been pushed all the way back to the shaft seal housing (E).
7. Mount the rotors (35) as described in chapter 10.2.
8. Mount the front cover (1) as described in chapter 10.1.
9. Check that the rotors turn freely.

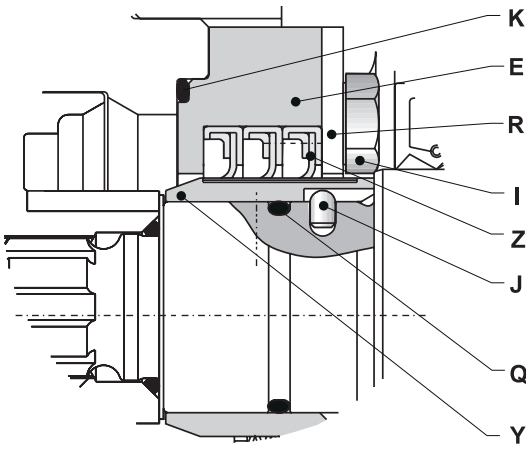
Note! All types of shaft seal (single lip seal, triple lip seal, single mechanical shaft seal, single mechanical shaft seal with water flush, double mechanical shaft seal and packed gland) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts chapter on page 93.

14.5. Triple Lip Seal

Operational Specifications
Pump discharge pressure: max. 5 bar
Rotational speed per minute: see chapter 12.7
Product temperature °C: see chapter 12.4

14.5.1 Replacement of Triple Lip Seal

To change the shaft seal it is necessary to disassemble the pump as described in the following. Use the sectional drawing for reference (page 29 and drawing on the left).



E: Seal housing
I: Screw
J: Pin
K: O-ring, seal housing
Q: O-ring, sleeve
R: Clamp plate
Y: Sleeve
Z: Lip seal

1. Remove the front cover (1) as described in chapter 10.1.
2. Remove the rotors (35) as described in chapter 10.2.
3. Remove the rotor case (9) as described in chapter 10.3.
4. Loosen and remove the screws (I) which attach the clamp plate (R) and the seal housing (E) to the rotor case (9).
5. Remove the clamp plate (R) and the seal housing (E).
6. Remove the lip seals (Z) from the seal housing (E).
7. Spread suitable liquid sealant on the outer diameter of the new lip seals (Z) and press them into the seal housing (E).
8. Then lubricate the new lip seals (Z) with food-quality grease on the inner side. Check that the lip seals have been installed with the correct side foremost - see sectional drawing.
9. Check that the shaft sleeve (Y) is clean and correctly positioned on the shaft (38, 39). The sleeve must be pushed all the way back to the shaft shoulder.
10. Mount the shaft seal housing (E) and clamp plate (R) on the rotor case (9) and tighten the screws (I) by the indicated torque - see chapter 12.1.
11. Mount the rotor case (9) as described in chapter 10.3.

12. Mount the rotors (35) as described in chapter 10.2.

13. Mount the front panel (1) as described in chapter 10.1.

14. Check that the rotors turn freely.

Note! All types of shaft seal (single lip seal, triple lip seal, single mechanical shaft seal, single mechanical shaft seal with water flush, double mechanical shaft seal and packed gland) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts chapter on page 93.

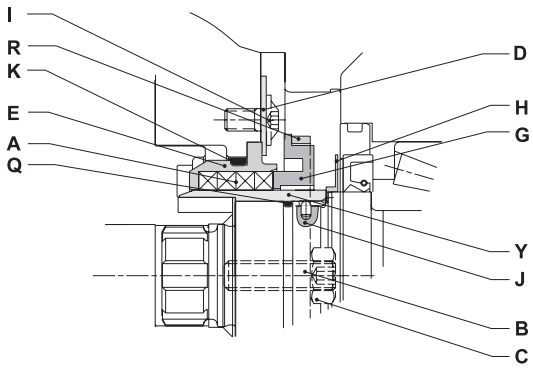
14.6. Packed Gland Seal

Operational Specifications

Max. discharge pressure: max. 10 bar
Rotational speed per minute DW+1-3: max. 700 rpm.
Rotational speed per minute DW+4: max. 600 rpm.
Rotational speed per minute DW+5: max. 500 rpm.
Product temperature °C: see chapter 12.4

14.6.1 Replacement of Packed Gland in Gland Seal

To replace the packed gland it is necessary to disassemble the pump as described below. Use the sectional drawing for reference (page 29 and drawing on the left).



A: Packed gland
B: Pointed screw
C: Lock nut
D: Washer
E: Seal housing
G: Follower
H: Deflector
I: Screw
J: Pin
K: O-ring
Q: O-ring
R: Clamp plate
Y: Sleeve

1. Remove the front cover (1) as described in chapter 10.1.

2. Remove the rotors (35) as described in chapter 10.2.

3. Remove the rotor case (9) as described in chapter 10.3.

4. Unscrew and remove the lock nut (C).

5. Remove the clamp plate (R) and the follower (G).

6. Remove the packed glands (A) from the seal housing (E).

7. Press the new packed glands (A) into the seal housing (E).

8. Mount the clamp plate (R) and the follower (G) and tighten the lock nut (C).

9. Check that the deflector (H) is lying correctly against the shaft shoulder and that the sleeve (Y) is clean and correctly positioned on the shaft (38, 39). The sleeve must be pushed all the way back to the deflector (H).

10. Mount the rotor case (9) as described in chapter 10.3.

11. Mount the rotors (35) as described in chapter 10.2.

12. Mount the front cover (1) as described in chapter 10.1.

13. Check that the rotors turn freely.

14. If necessary tighten the lock nut (C) when the pump is activated.

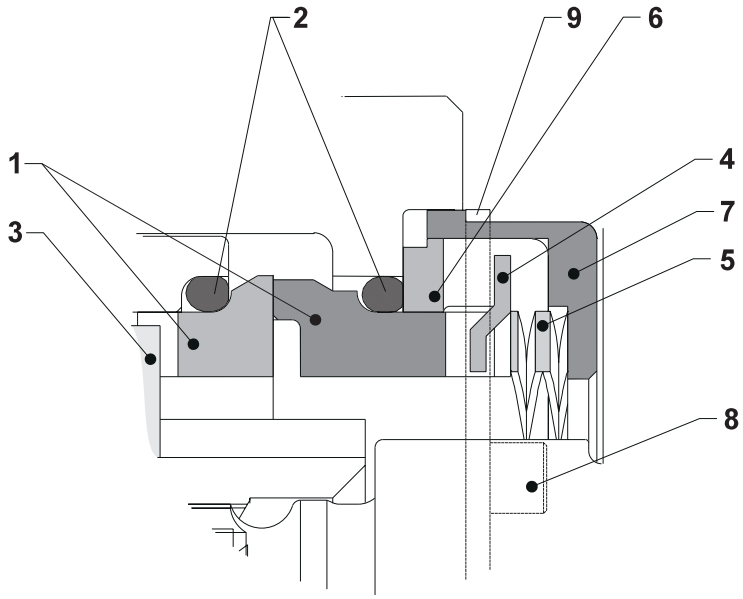
Note! All types of shaft seal (single lip seal, triple lip seal, single mechani-cal shaft seal, single mechanical shaft seal with water flush, double mechanical shaft seal and packed gland) can all be mounted on the same pump. This requires only the correct shaft seal kit. These kits are described in the spare parts chapter 14.7.

Subject to changes.

14. Shaft Seal

14.7. Spare Parts

14.7.1 DW+1-5 Single Mechanical Seal



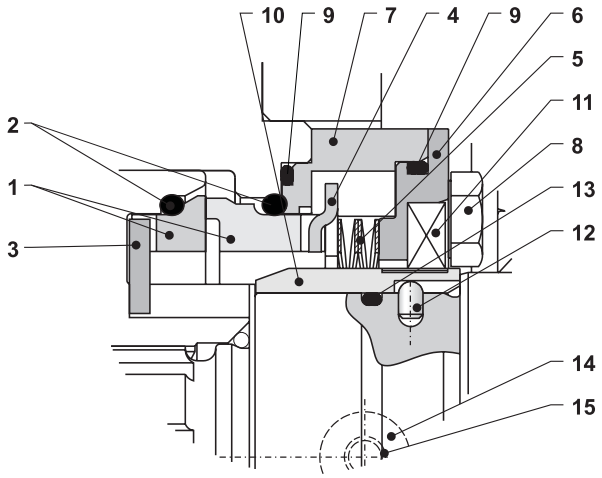
				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
1 & 2	1	SiC/C-EPDM	Seal face kit*	LA2355104	LA2355204	LA2355304	LA2355404	LA2355504
1 & 2	1	SiC/SiC-EPDM	Seal face kit*	LA2356104	LA2356204	LA2356304	LA2356404	LA2356504
2	1	EPDM	O-rings kit	LA2310104	LA2310204	LA2310304	LA2310404	LA2310504
1 & 2	1	SiC/C-FPM (Viton)	Seal face kit*	LA2355102	LA2355202	LA2355302	LA2355402	LA2355502
1 & 2	1	SiC/SiC-FPM (Viton)	Seal face kit*	LA2356102	LA2356202	LA2356302	LA2356402	LA2356502
2	1	FPM (Viton)	O-rings kit	LA2310102	LA2310202	LA2310302	LA2310402	LA2310502
1 & 2	1	SiC/C-ISOLAST	Seal face kit*	LA2355115	LA2355215	LA2355315	LA2355415	LA2355515
1 & 2	1	SiC/SiC-ISOLAST	Seal face kit*	LA2356115	LA2356215	LA2356315	LA2356415	LA2356515
2	1	ISOLAST	O-rings kit	LA2310115	LA2310215	LA2310315	LA2310415	LA2310515
3, 4 & 5	1	SS	Seal service kit**	LA2304100	LA2304200	LA2304300	LA2304400	LA2304500
6	1	AISI 304	Ring for seal	LA2363101	LA2363201	LA2363301	LA2363401	LA2363501
7	1	AISI 304	Seal housing	LA2363102	LA2363202	LA2363302	LA2363402	LA2363502
9	2	AISI 304	Clamp, seal housing	LA2363100	LA2363200	LA2363300	LA2363400	LA2363500
8	4	AISI 304	Screw, seal housing	L770496	L770496	L770496	L701227	L701227

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

* Seal face kit: Rotary seal face, stationary seal face (1) and 2 off O-rings (2).
** Seal service kit: Rotary and stationary drive ring (3 and 4) and wave spring (5).

14. Shaft Seal

14.7.2 DW+1-5 Single Mechanical Seal with Flush



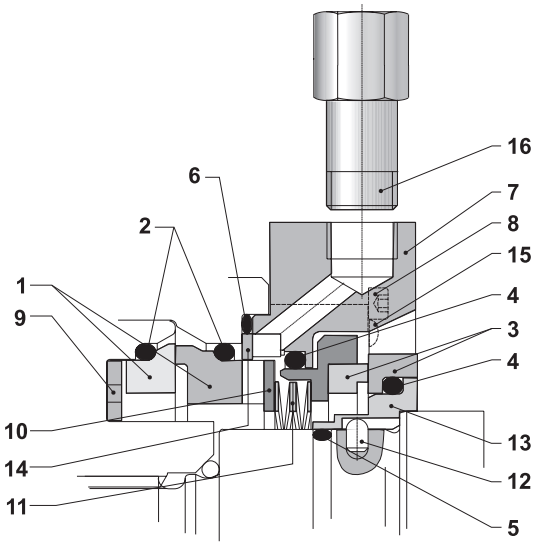
				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part no.				
1 & 2	1	SiC/C-EPDM	Seal face kit*	LA2355104	LA2355204	LA2355304	LA2355404	LA2355504
1 & 2	1	SiC/SiC-EPDM	Seal face kit*	LA2356104	LA2356204	LA2356304	LA2356404	LA2356504
2	1	EPDM	O-rings kit	LA2310104	LA2310204	LA2310304	LA2310404	LA2310504
3 - 13	1	PTFE - EPDM	Flush kit***	LA2391104	LA2391204	LA2391304	LA2391404	LA2391504
9, 11 & 13	1	EPDM	Flush seal kit	LA2364104	LA2364204	LA2364304	LA2364404	LA2364504
1 & 2	1	SiC/C-FPM (Viton)	Seal face kit*	LA2355102	LA2355202	LA2355302	LA2355402	LA2355502
1 & 2	1	SiC/SiC-FPM (Viton)	Seal face kit*	LA2356102	LA2356202	LA2356302	LA2356402	LA2356502
2	1	FPM (Viton)	O-rings kit	LA2310102	LA2310202	LA2310302	LA2310402	LA2310502
3 - 13	1	PTFE - FPM (Viton)	Flush kit***	LA2391102	LA2391202	LA2391302	LA2391402	LA2391502
9, 11 & 13	1	FPM (Viton)	Flush seal kit	LA2364102	LA2364202	LA2364302	LA2364402	LA2364502
1 & 2	1	SiC/C-ISOLAST	Seal face kit*	LA2355115	LA2355215	LA2355315	LA2355415	LA2355515
1 & 2	1	SiC/SiC-ISOLAST	Seal face kit*	LA2356115	LA2356215	LA2356315	LA2356415	LA2356515
2	1	ISOLAST	O-rings kit	LA2310115	LA2310215	LA2310315	LA2310415	LA2310515
3 - 13	1	PTFE -ISOLAST	Flush kit***	LA2391115	LA2391215	LA2391315	LA2391415	LA2391515
9, 11 & 13	1	ISOLAST	Flush seal kit	LA2364115	LA2364215	LA2364315	LA2364415	LA2364515
3, 4 & 5	1	SS	Seal service kit**	LA2304100	LA2304200	LA2304300	LA2304400	LA2304500
10	1	AISI 316L	Shaft sleeve	LA1800100	LA1800200	LA1800300	LA1800400	LA1800500
12	1	AISI 316L	Pin	L1371100	L1371100	L1371100	L1371100	L1371100
14	2	Plated	Fittings	L2297000	L2297000	L2297000	L2297000	L2297000
15	2	Nylon	Pipe Ø6	L2298100	L2298100	L2298100	L2298100	L2298100
15a	2	Nylon	Pipe 1/4”	L2298101	L2298101	L2298101	L2298101	L2298101

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

* Seal face kit: Rotary seal face, stationary seal face (1) and 2 off O-rings (2).
** Seal service kit: Rotary and stationary drive ring (3 and 4) and wave spring (5).
*** Flush Kit : Seal service kit (3,4,5), clamp plate (6), seal housing (7), screw (8), 3 off O-rings (9 and 13), sleeve (10), lip seal (11) and pin (12).

14. Shaft Seal

14.7.3 DW+1-5 Double Mechanical Seal

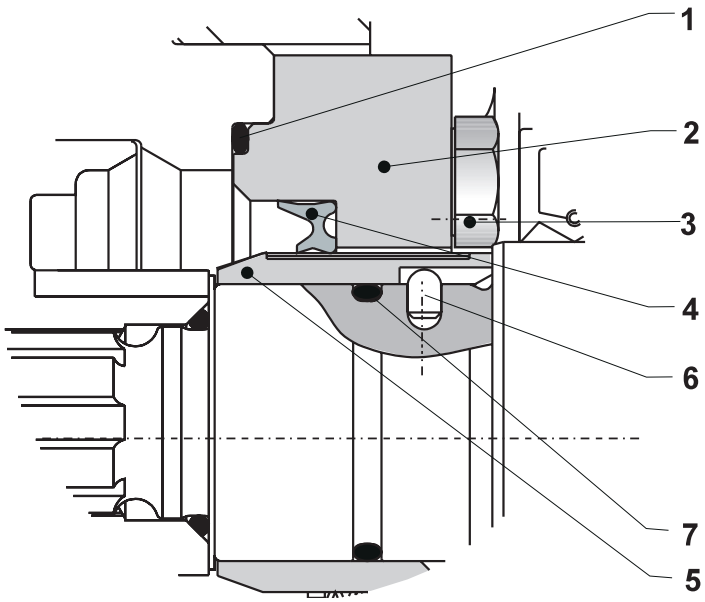


				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
1 & 2	1	SiC/C-EPDM	Seal face kit, prod.side*	LA2357104	LA2357204	LA2357304	LA2357404	LA2357504
1 & 2	1	SiC/SiC-EPDM	Seal face kit, prod.side*	LA2358104	LA2358204	LA2358304	LA2358404	LA2358504
2	1	EPDM	O-rings kit	LA2310104	LA2310204	LA2310304	LA2310404	LA2310504
3 & 4	1	SiC/C-EPDM	Seal face kit, atm. side*	LA2359104	LA2359204	LA2359304	LA2359404	LA2359504
4	1	EPDM	O-rings kit	L25060104	L25060204	L25060304	L25060404	L25060504
5 & 6	1	EPDM	O-rings kit, seal housing	LA2365104	LA2365204	LA2365304	LA2365404	LA2365504
1 & 2	1	SiC/C-FPM (Viton)	Seal face kit, prod.side*	LA2357102	LA2357202	LA2357302	LA2357402	LA2357502
1 & 2	1	SiC/SiC-FPM (Viton)	Seal face kit, prod.side*	LA2358102	LA2358202	LA2358302	LA2358402	LA2358502
2	1	FPM (Viton)	O-rings kit	LA2310102	LA2310202	LA2310302	LA2310402	LA2310502
3 & 4	1	SiC/C-FPM (Viton)	Seal face kit, atm. side*	LA2359102	LA2359202	LA2359302	LA2359402	LA2359502
4	1	FPM (Viton)	O-rings kit	L25060102	L25060202	L25060302	L25060402	L25060502
5 & 6	1	FPM (Viton)	O-rings kit, seal housing	LA2365102	LA2365202	LA2365302	LA2365402	LA2365502
1 & 2	1	SiC/C-ISOLAST	Seal face kit, prod.side*	LA2357115	LA2357215	LA2357315	LA2357415	LA2357515
1 & 2	1	SiC/SiC-ISOLAST	Seal face kit, prod.side*	LA2358115	LA2358215	LA2358315	LA2358415	LA2358515
2	1	ISOLAST	O-rings kit	LA2310115	LA2310215	LA2310315	LA2310415	LA2310515
9 -14	1	AISI 316L	Seal service kit**	LA2361100	LA2361200	LA2361300	LA2361400	LA2361500
7	1	AISI 316L	Seal housing	LA1213100	LA1213200	LA1213300	LA1213400	LA1213500
8	4	AISI 316L	Screw	L701450	L701450	L701450	L700234	L700234
15	4	AISI 304	Screw	L773751	L773737	L773737	L773737	L773737
16	2	AISI 316L	Fittings 1/8”	L2299100	L2299100	L2299200	L2299400	L2299500

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

* Seal face kit: Rotary seal face, stationary seal face (1 or 3) and 2 off O-rings (2 or 4).
** Seal service kit: Rotary drive ring (9), stationary drive ring (10), wave spring (11), pin (12), stopring (13), ring (14).

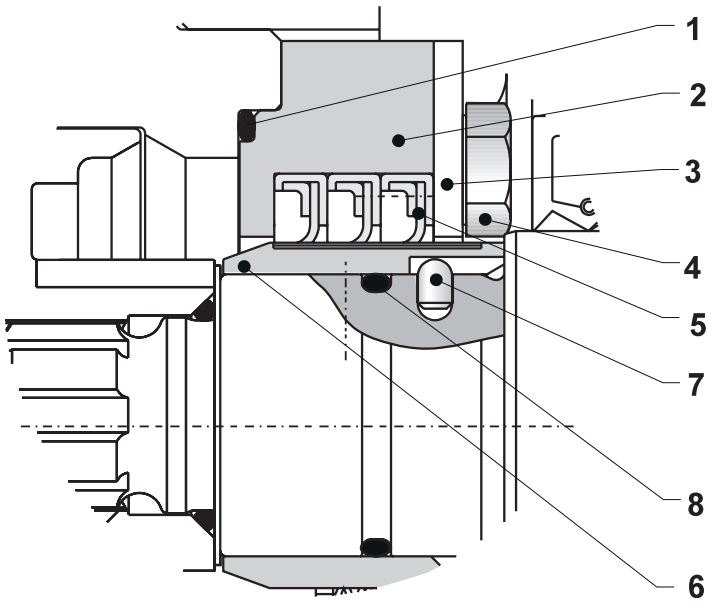
14.7.4 Single Lip Seal



				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
1 & 7	1	EPDM	O-rings kit, seal housing	LA2365104	LA2365204	LA2365304	LA2365404	LA2365504
1 & 7	1	FPM (Viton)	O-rings kit, seal housing	LA2365102	LA2365202	LA2365302	LA2365402	LA2365502
2	1	AISI 316L	Seal housing	LA1204100	LA1204200	LA1204300	LA1204400	LA1204500
3	4	AISI 304	Screw	L700678	L700678	L700678	L700234	L701686
4	1	EPDM	Rubber lipseal	L2312A104	L2312A204	L2312A304	L2312A404	L2312A504
5	1	AISI 316L	Sleeve	LA1800100	LA1800200	LA1800300	LA1800400	LA1800500
6	1	AISI 316L	Pin	L1371100	L1371100	L1371100	L1371100	L1371100

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

14.7.5 Triple Lip Seal



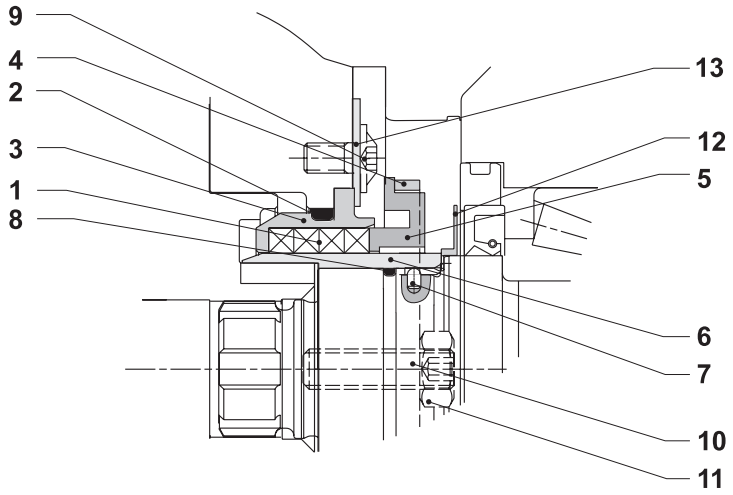
				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
1 & 8	1	EPDM	O-rings kit,seal housing	LA2365104	LA2365204	LA2365304	LA2365404	LA2365504
1 & 8	1	FPM (Viton)	O-rings kit,seal housing	LA2365102	LA2365202	LA2365302	LA2365402	LA2365502
2	1	AISI 316L	Seal housing	LA1202100	LA1202200	LA1202300	LA1202400	LA1202500
3	1	AISI 316L	Clamp plate	LA1203100	LA1203200	LA1203300	LA1203400	LA1203500
4	4	AISI 304	Screw	L700678	L700678	L700678	L700234	L701686
5	3	PTFE	Varilip seal	L23111A100	L23111A200	L23111A300	L23111A400	L23111A500
6	1	AISI 316L	Sleeve	LA1800100	LA1800200	LA1800300	LA1800400	LA1800500
7	1	AISI 316L	Drive pin	L1371100	L1371100	L1371100	L1371100	L1371100

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

Not recomended for CIP cleaning.

14. Shaft Seal

14.7.6 Packed Gland Seal



				Pump type				
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
#			Rotor case	#	#	#	#	#
1	1*	PTFE	Packed gland	–	–	–	LA2242400	LA2242500
	1**	PTFE	Packed gland	LA2242100	LA2242200	LA2242300	–	–
2	1	EPDM	O-ring	L25010004FQ	LA2310204	LA2310304	L2578004	LA2310504
	1	FPM (Viton)	O-ring	L25010002FQ	LA2310202	LA2310302	L2578002	LA2310502
3	1	SS	Seal housing	LA1205101	LA1205201	LA1205301	LA1205401	LA1205500
4	1	SS	Clamp plate	LA1203110	LA1203210	LA1203310	LA1203410	LA1203510
5	1	SS	Follower	LA1802101	LA1802201	LA1802301	LA1802401	LA1802500
6	1	SS	Sleeve	LA1206100	LA1206200	LA1206300	LA1206400	LA1206500
7	1	SS	Pin	L1371100	L1371100	L1371100	L1371100	L1371100
8	1	EPDM	O-ring	L2511004	L2544004	L25032004	L2549004	L25012004
	1	FPM (Viton)	O-ring	L2511002	L2544002	L25032002	L2549002	L25012002
9	4	SS	Screw	L773012	L773012	L700420	L773787	# #
10	2	SS	Pointed screw	L773665	L773563	L773756	L773756	# #
11	2	SS	Lock nut	L770139	L770139	L773757	L773757	# #
12	1	SS	Deflector	LA1208100	LA1208200	LA1208300	LA1208400	LA1208500
13	1	SS	Washer	–	–	–	L280445	L280445

Note! Quantities shown in table above are for single shaft only. For a pump twice the number are required = the parts chosen x 2.

Not recomended for CIP cleaning.

Special rotor case required, contact APV.
Part No. to be established.
* Contains 3 qty packing.
** Contains 4 qty packing.

Subject to change without notice.

15. Accessories

15.1. Thermal Jacket

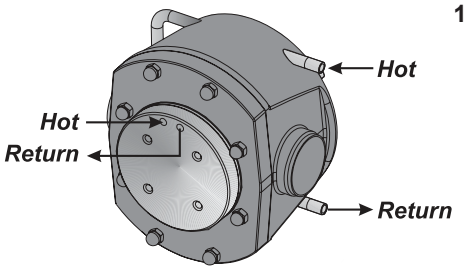
This is an appendix manual and applies only with thermal jacket. The DW+ pump fitted with thermal jacket must be put into operation or serviced only if one has read and understood the complete DW+ pump instruction manual.

15.1.1 Method of Operation

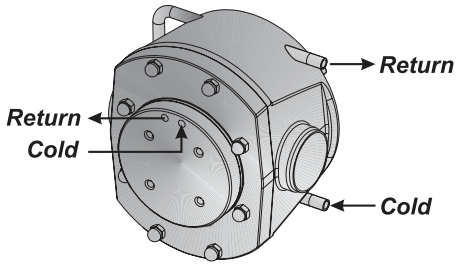
Thermal jackets facilitate the heating or cooling of the pump chamber prior to product entry. Thereafter the temperature is kept constant.

15.1.2 Connecting Thermal Jackets

When thermal jackets are used for heating purposes, the heat transferring media must be connected to the left and to the top jacket connection. The return pipe must be connected to the right and to the bottom jacket connection. See figure on the left.



When the jacket is used for cooling purposes, the cooling media must be connected to the right and to the bottom jacket connection. The return pipe must be connected to the left and to the top jacket connection. See figure on the left.



15.1.3 Heating/Cooling Transfering Media

Various media can be used for heating and cooling the pump rotorcase and front cover, e.g. steam, oil, water or refrigerants.

15.1.4 Circulation Time

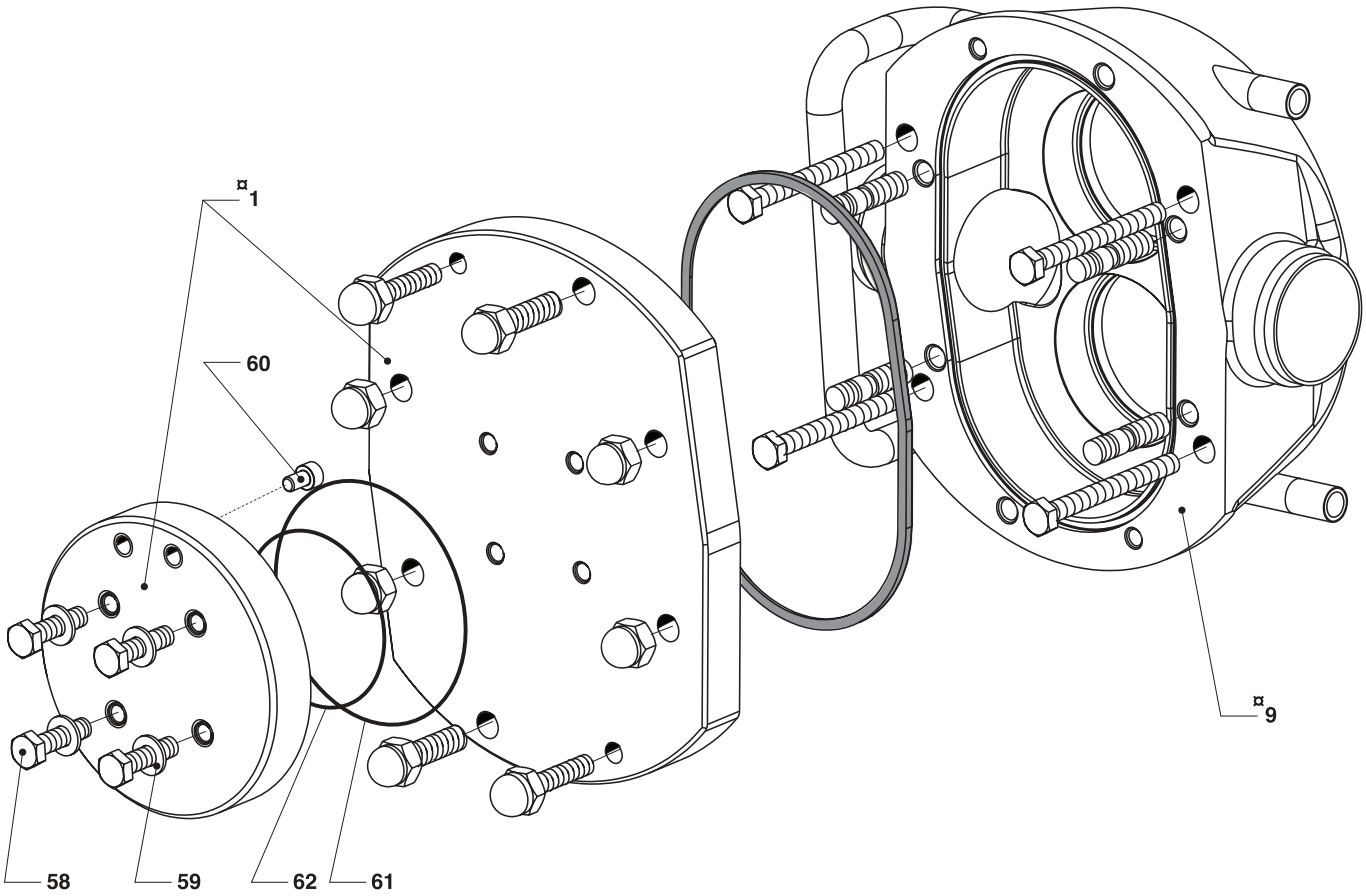
The recommended circulation time prior to start-up is 30 minutes.

15.1.5 Max. Temperature and Max. Pressure

The maximum temperature allowed for the heating/cooling transferring media is 180°C and the maximum pressure is 10 bar.

15. Accessories

15.1.6 Spare Parts



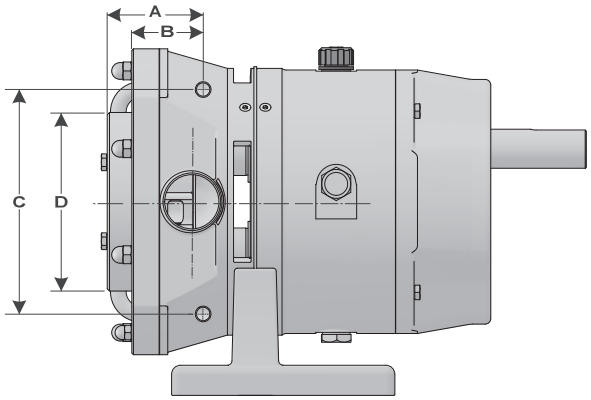
15. Accessories

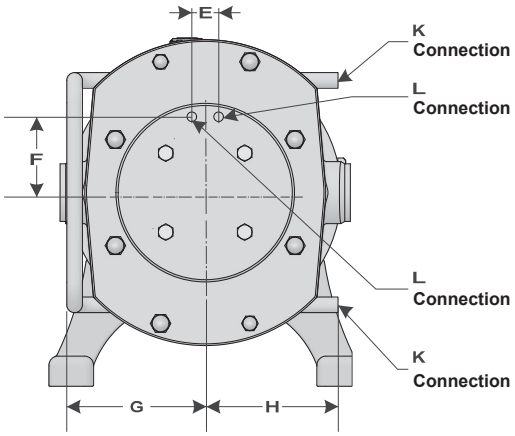
				Part No.			
				Piston	Lobe	Lobe	Lobe
Pos.	**Qty**	**Material**	**Description**	**DW+1/003/-**	**DW+1/004/-**	**DW+1/007/-**	
¤1	-	-	Complete front cover	LA1101110	LA1101111	LA1101111	
61	1	EPDM	O-ring	L772238	L772238	L772238	
62	1	EPDM	O-ring	L772241	L772241	L772241	
¤9	1	AISI 316L	Rotor case	LA17141003	LA17141003	LA17141007	
Pos.	**Qty**	**Material**	**Description**	**DW+2/006/-**	**DW+2/007/-**	**DW+2/013/-**	
¤1	-	-	Complete front cover	LA1101210	LA1101211	LA1101211	
61	1	EPDM	O-ring	L781091	L781091	L781091	
62	1	EPDM	O-ring	L772240	L772240	L772240	
¤9	1	AISI 316L	Rotor case	LA17142006	LA17142006	LA17142013	
Pos.	**Qty**	**Material**	**Description**	**DW+3/014/-**	**DW+3/017/-**	**DW+3/030/-**	**DW+3/050/-**
¤1	-	-	Complete front cover	LA1101310	LA1101311	LA1101311	LA1101311
61	1	EPDM	O-ring	L781093	L781093	L781093	L781093
62	1	EPDM	O-ring	L772241	L772241	L772241	L772241
¤9	1	AISI 316L	Rotor case	LA17143014	LA17143014	LA17143030	LA17143050
Pos.	**Qty**	**Material**	**Description**	**DW+4/033/-**	**DW+4/039/-**	**DW+4/073/-**	**DW+4/125/-**
¤1	-	-	Complete front cover	LA1101410	LA1101411	LA1101411	LA1101411
61	1	EPDM	O-ring	L781095	L781095	L781095	L781095
62	1	EPDM	O-ring	L25056504	L25056504	L25056504	L25056504
¤9	1	AISI 316L	Rotor case	LA17144033	LA17144033	LA17144073	LA17144125
Pos.	**Qty**	**Material**	**Description**	**DW+5/080/-**	**DW+5/093/-**	**DW+5/142/-**	**DW+5/256/-**
¤1	-	-	Complete front cover	LA1101510	LA1101511	LA1101511	LA1101511
61	1	EPDM	O-ring	L781097	L781097	L781097	L781097
62	1	EPDM	O-ring	L781096	L781096	L781096	L781096
¤9	1	AISI 316L	Rotor case	LA17145080	LA17145080	LA17145142	LA17145256
Pos.	**Qty**	**Material**	**Description**	**DW+1**	**DW+2-5**		
58	4	AISI 304	Screw	L701554	L701686		
59	4	AISI 316L	Washer	L701477	L701478		
60	1	AISI 304	Screw	L770496	L770496		

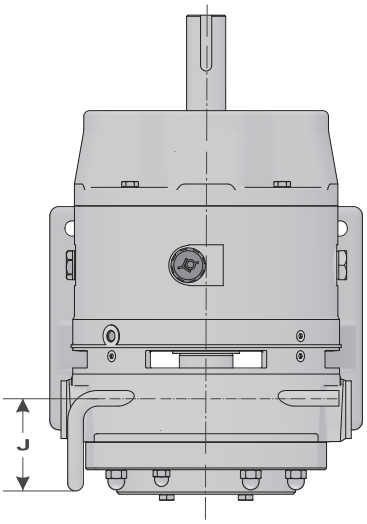
¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

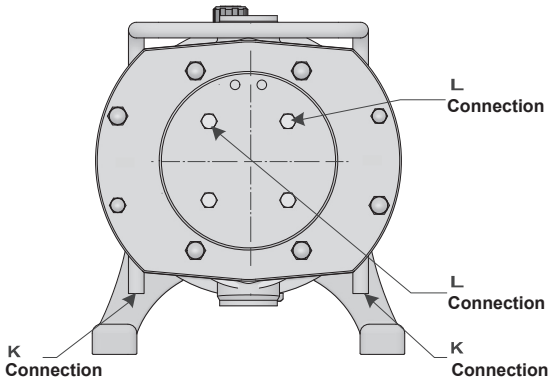
15. Accessories

15.1.7 Dimension Sketch









15. Accessories

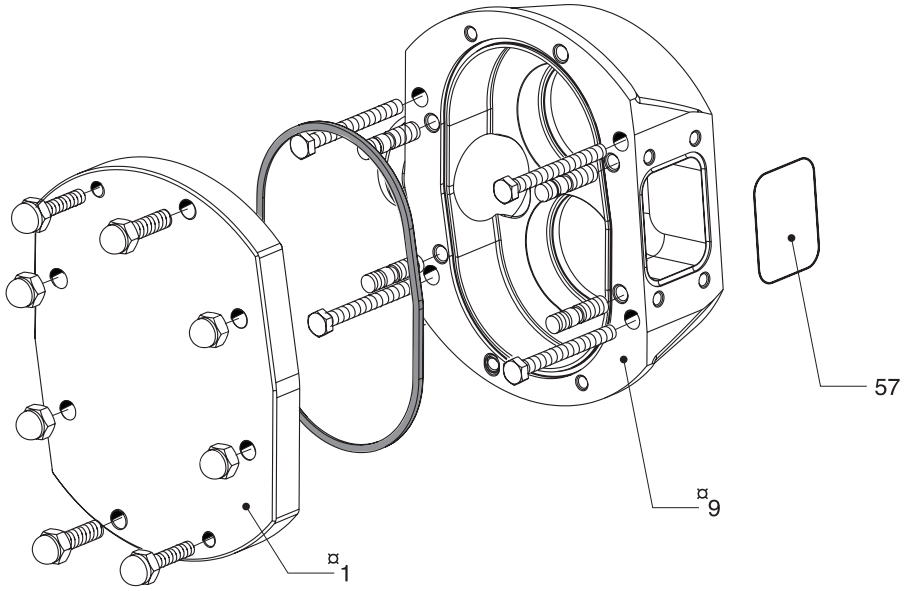
Pump model	A	B	C	D	E	F	G	H	J	K RG ISO 228-1	L
DW+1/003/-	60.0	38.0	132.0	Ø90.0	23.3	34.0	82.0	75.0	44.5	1/16”	RG3/8”
DW+1/004/-	67.0	38.0	132.0	Ø90.0	23.3	34.0	82.0	75.0	44.5	1/16”	RG3/8”
DW+1/007/-	66.1	37.1	132.0	Ø90.0	23.3	34.0	82.0	77.0	44.5	1/16”	RG3/8”
DW+2/006/-	58.1	36.1	150.9	Ø106.0	21.7	42.1	94.0	92.0	45.1	1/8”	RG3/8”
DW+2/007/-	64.1	36.1	150.9	Ø106.0	21.7	42.1	94.0	92.0	45.1	1/8”	RG3/8”
DW+2/013/-	73.8	45.8	150.9	Ø106.0	21.7	42.1	94.0	88.0	45.1	1/8”	RG3/8”
DW+3/014/-	71.7	49.7	165.0	Ø122.8	26.1	50.5	107.0	106.0	63.0	1/4”	RG3/8”
DW+3/017/-	77.7	49.7	165.0	Ø122.8	26.1	50.5	107.0	106.0	63.0	1/4”	RG3/8”
DW+3/030/-	94.0	66.0	165.0	Ø122.8	26.1	50.5	107.0	103.0	63.0	1/4”	RG3/8”
DW+3/050/-	118.1	90.1	165.0	Ø122.8	26.1	50.5	107.5	100.0	0	1/4”	RG3/8”
DW+4/033/-	86.0	64.0	201.0	Ø160.0	24.0	69.0	126.0	119.0	83.0	1/4”	RG3/8”
DW+4/039/-	93.0	64.0	201.0	Ø160.0	24.0	69.0	126.0	119.0	83.0	1/4”	RG3/8”
DW+4/073/-	118.4	89.4	201.0	Ø160.0	24.0	69.0	126.0	114.0	83.0	1/4”	RG3/8”
DW+4/125/-	158.0	129.0	201.0	Ø160.0	24.0	69.0	126.0	112.0	0	1/4”	RG3/8”
DW+5/080/-	98.5	76.5	262.0	Ø214.0	23.4	96.0	161.0	139.0	89.0	1/4”	RG3/8”
DW+5/093/-	108.0	76.5	262.0	Ø214.0	23.4	96.0	161.0	139.0	89.0	1/4”	RG3/8”
DW+5/142/-	129.5	98.0	262.0	Ø214.0	23.4	96.0	161.0	136.0	89.0	1/4”	RG3/8”
DW+5/256/-	179.3	147.8	262.0	Ø214.0	23.4	96.0	161.0	132.0	139.0	1/4”	RG3/8”

15. Accessories

15.2. Rectangular Inlet

This is an appendix manual and applies only with rectangular inlet. The DW+ pump fitted with the rectangular inlet must be put into operation or serviced only if one has read and understood the complete DW+ pump instruction manual.

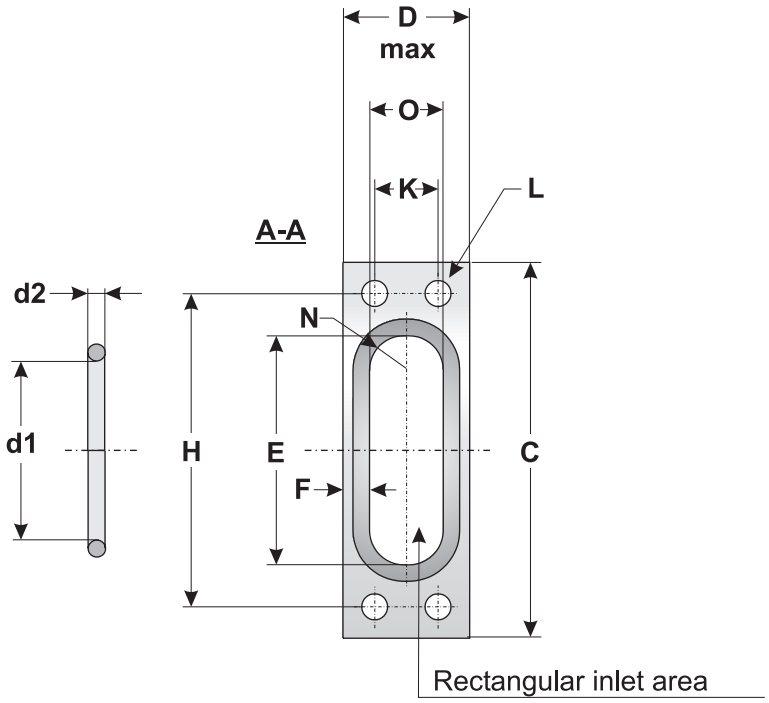
15.2.1 Spare Parts

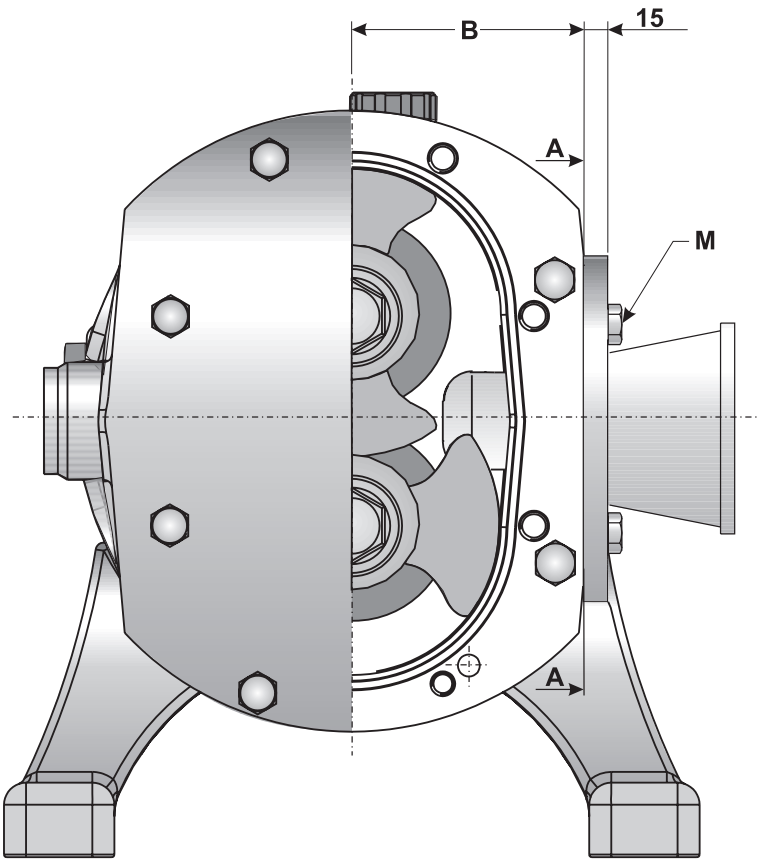


				Part No.			
				Piston	Lobe	Lobe	Lobe
Pos.	**Qty**	**Material**	**Description**	**DW+1/003/**	**DW+1/004/**	**DW+1/007/**	**DW+1/007/15_600**
¤9	1	AISI 316L	Rotor case	LAR17021003	LAR17021003	LAR17021007	LAR17021007
57	1	EPDM	O-ring	L25075104	L25075104	L25076104	L25076104
-	-	FPM (Viton)	-	L25075102	L25075102	L25076102	L25076102
-	-	ISOLAST	-	L25075115	L25075115	L25076115	L25076115
				DW+2/006/-	**DW+2/007/-**	**DW+2/013/-**	**DW+2/013/15_600**
¤9		AISI 316L	Rotor case	LAR17022006	LAR17022006	LAR17022013	LAR17022013
57	1	EPDM	O-ring	L25077204	L25077204	L772239	L772239
--	1	FPM (Viton)	-	L25077202	L25077202	L772257	L772257
--		ISOLAST	-	L25077215	L25077215	L25083215	L25083215
				DW+3/014/-	**DW+3/017/-**	**DW+3/030/-**	**DW+3/050/-**
¤9		AISI 316L	Rotor case	LAR17023014	LAR17023014	LAR17023030	LAR17023050
57	1	EPDM	O-ring	L25078304	L25078304	L25079304	L772150
--	1	FPM (Viton)	-	L25078302	L25078302	L25079302	L772153
--		ISOLAST	-	L25078315	L25078315	L25079315	L25084315
				DW+4/033/-	**DW+4/039/-**	**DW+4/073/-**	**DW+4/125/-**
¤9		AISI 316L	Rotor case	LAR17024033	LAR17024033	LAR17024073	LAR17024125
57	1	EPDM	O-ring	L772241	L772241	L25056404	L25080404
--	1	FPM (Viton)	-	L772259	L772259	L25056402	L25067602
--		ISOLAST	-	L25085415	L25085415	L25086415	L25080415
				DW+5/080/-	**DW+5/093/-**	**DW+5/142/-**	
¤9		AISI 316L	Rotor case	LAR17025080	LAR17025080	LAR17025142	
57	1	EPDM	O-ring	L25081504	L25081504	L25082504	-- -- --
--	1	FPM (Viton)	-	L25081502	L25081502	L25082502	
--		ISOLAST	-	L25081515	L25081515	L25082515	

¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

15.2.2 Dimension Sketch





15. Accessories

Pump model	B	C	D	E	F	H	K	L	M (*)	N	O	Area (mm²)	O-ring (d1 x d2)
DW+1/003/-	64	84	27	43.4	5.3	67.4	15	Ø 7	M6 x 25 (4)	R3	16	687	36.2 x 3.0
DW+1/004/-	64	84	27	43.4	5.3	67.4	15	Ø 7	M6 x 25 (4)	R3	16	687	36.2 x 3.0
DW+1/007/-	64	80	32.1	43.2	4.8	68	20.1	ø6	M5 x 25 (4)	R7	22.6	934	38.5 x 3.0
DW+2/006/-	70	97	36	52	4.8	82	20	Ø 7	M6 x 25 (4)	R5	22.6	1154	45.2 x 3.0
DW+2/007/-	70	97	36	52	4.8	82	20	Ø 7	M6 x 25 (4)	R5	22.6	1154	45.2 x 3.0
DW+2/013/-	71	100	45	54	4.4	82	30.5	Ø 7	M6 x 25 (4)	R8	35.65	1870	54.5 x 3.0
DW+3/014/-	83	104	48	62	4.7	85.4	33	Ø 7	M6 x 25 (4)	R9	35.6	2138	58.0 x 3.0
DW+3/017/-	83	104	48	62	4.7	85.4	33	Ø 7	M6 x 25 (4)	R9	35.6	2138	58.0 x 3.0
DW+3/030/-	84	102	60	62	4.5	84	19	Ø 7	M6 x 25 (6)	R10	48.6	2927	66.0 x 3.0
DW+3/050/-	83	104	74	62	4.5	85.4	28	Ø 7	M6 x 25 (6)	R10	55.4	3349	69.5 x 3.0
DW+4/033/-	101	122	58	82	4.5	103	38	ø9	M8 x 25 (4)	R10	48.6	3899	79.5 x 3.0
DW+4/039/-	101	122	58	82	4.5	103	38	ø9	M8 x 25 (4)	R10	48.6	3899	79.5 x 3.0
DW+4/073/-	101	122	82	79	5.1	103	62	ø9	M8 x 25 (4)	R10	72.9	5673	92.0 x 3.0
DW+4/125/-	101	122	102	82.6	9	104	82	ø9	M8 x 25 (4)	R10	86	7018	104.5 x 3.0
DW+5/080/-	135	153	72	110	6.8	135	52	ø9	M8 x 25 (4)	R15	60.35	6445	101.0 x 3.0
DW+5/093/-	135	153	72	110	6.8	135	52	ø9	M8 x 25 (4)	R15	60.35	6445	101.0 x 3.0
DW+5/142/-	135	153	91	110	6	134.8	71	ø9	M8 x 25 (4)	R15	72.95	7831	109.0 x 3.0

(*) off screws

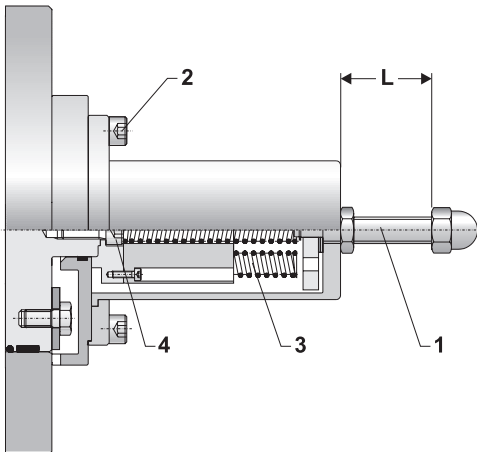
15.3. Relief Valve

This is an appendix manual and applies only with relief valve. The DW+ pump fitted with relief valve must be put into operation or serviced only if one has read and understood the complete DW+ pump instruction manual.

15.3.1 Assembly of the Relief Valve

Warning! Always unscrew the adjusting screw (1) completely so the springs are released from tension before removal of the spring housing.

Warning! Never dismantle the pressure relief valve or remove the spring housing until the isolating valves on the suction and discharge side have been closed and the immediate pipe system has been drained.



The spring housing is removed by loosening four screws (2) in the flange, then the springs (3) are removed. Now you have access to the screw in the middle (4), which holds the shaft together.
All parts can now be dismantled. Remember to mark the piston before removal, as shims may be adjusted differently at the respective ends.

If a new piston or similar is mounted, the piston ends must be readjusted. This is done by mounting the piston without shims and afterwards measuring the distance from the front cover surface to piston surface. Then place the number of shims necessary to position the piston between 0.03 and 0.05 mm under the front cover surface.

Re-assemble in the opposite order.

Adjust the opening pressure as follows:

1. You must have a pressure gauge mounted on the pressure side so you can observe the changes in pressure.
2. There must be a valve on the pressure side that can be closed to make the pressure rise.
3. The adjusting screw (1) must be screwed all the way out so the relief valve is completely open.
4. The valve on the pressure side must be closed almost completely (there must always be a slight flow to cool the pump).
5. Tighten the adjusting screw until the pressure rises to the required level.
6. Open and close the valve on the pressure side to find out whether the inertia (difference between the opening and closing pressure) is as required.
7. In spite of customer demand, the relief valve from APV will be mounted with min. 4 springs and min. (L) half way in.

   It is possible to alter spring characteristics by removing or adding springs. The main rule is that if L is under 10 mm, a spring should be added, and if over 20 mm, a spring should be removed.

   If the desired pressure cannot be achieved, it may be necessary to increase spring power by adding more springs, since excessively low pressure may be due to the viscosity or rotational speed being too low. It may also be due to the feed pressure not being around 1 bar, and if feed pressure rises, a higher spring pressure will be required to compensate for the pressure component exerted on the piston by the suction side.

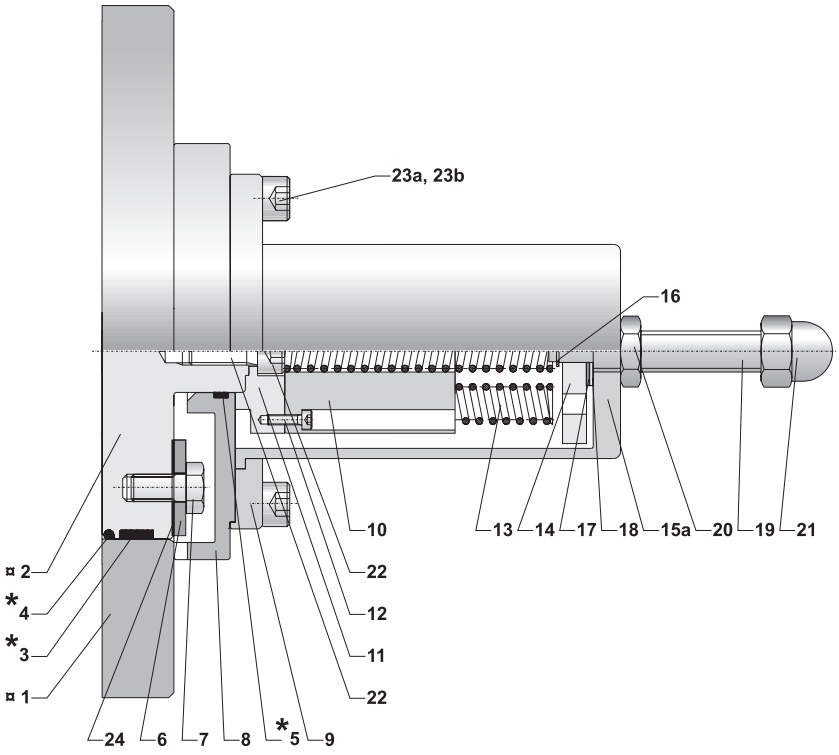
   In the case of low viscosity liquids, an extra flow loss of around 5% must be expected. The loss comes from the area over the O-ring. Max. recommended viscosity is 30,000 cp.

Pump	Max. pressure per spring bar	* Max. pressure with 7 spring bar
DW+1	2.25	15
DW+2	2.85	20
DW+3	2.85	20
DW+4	2.85	20
DW+5	3.6	25

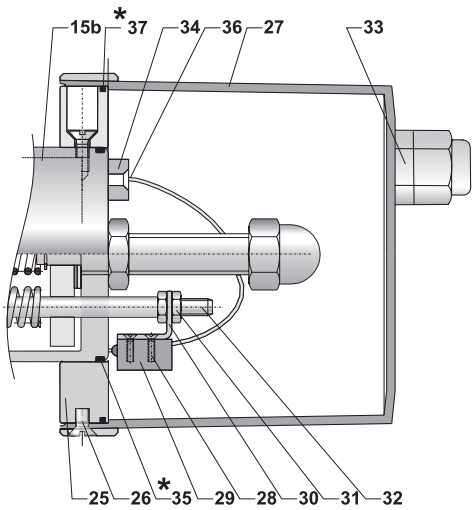
* At 1 bar feed pressure.

15.3.2 Spare Parts

Relief valve - standard



Relief valve - standard with microswitch feedback signal



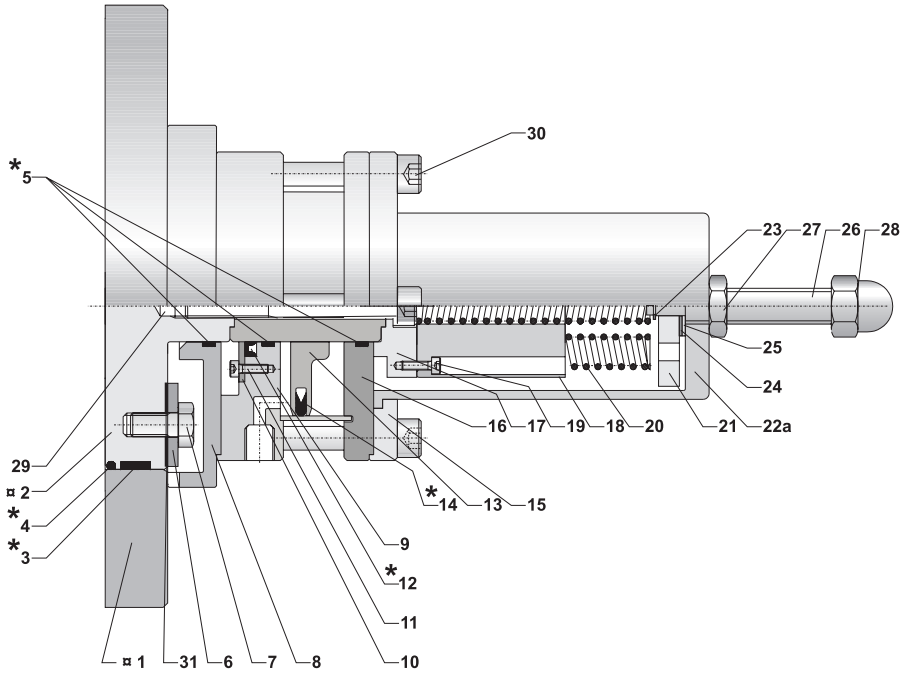
15. Accessories

				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
¤1	1	AISI 316L	Front cover - Piston	LA1115101	LA1115201	LA1115301	LA1115401	LA1115501
-	1	AISI 316L	Front cover - Lobe	LA1115100	LA1115200	LA1115300	LA1115400	LA1115500
¤2	1	AISI 316L	Valve piston - Piston	LA1106101	LA1106201	LA1106301	LA1106401	LA1106501
-	1	AISI 316L	Valve piston - Lobe	LA1106100	LA1106200	LA1106300	LA1106400	LA1106500
6	2	AISI 303	Washer for shims	LA2165005	LA2165000	LA2165006	LA2165000	LA2165000
7	2	AISI 304	Screw	L770470	L700690	L700690	L700690	L700690
8	1	AISI 304	Flange - Piston	LA1211101	LA1211200	LA1211300	LA1211400	LA1211500
-	1	AISI 304	Flange - Lobe	LA1211100	LA1211200	LA1211300	LA1211400	LA1211500
9	1	AISI 304	Clamp plate	LA1210100	LA1210100	LA1210100	LA1210400	LA1210400
10	1	PA6	Spring holder	LA1352100	LA1352100	LA1352100	LA1352400	LA1352400
11	1	AISI 304	Flange for spring housing	LA1351100	LA1351100	LA1351100	LA1351400	LA1351400
12	2	AISI 304	Screw	L773740	L773740	L773740	L771902	L771902
13	7		Spring	L773538	L773538	L773538	L773543	L773543
-	7		Spring for ATEX	L773967	L773967	L773967	L773969	L773969
14	1	AISI 304	Spring plate	LA1353100	LA1353100	LA1353100	LA1353400	LA1353400
15a	1	AISI 304	Spring housing	LA1361100	LA1361100	LA1361100	LA1361400	LA1361400
15b	1	AISI 304	Spring housing, signal back	LA1361101	LA1361101	LA1361101	LA1361401	LA1361401
16	1	AISI 304	Locking ring	L773539	L773539	L773539	L773539	L773539
17	1	PTFE	Washer	LA2175000	LA2175000	LA2175000	LA2175000	LA2175000
18	1	AISI 304	Washer	LA2165001	LA2165001	LA2165001	LA2165001	LA2165001
19	1	AISI 303	Adjustment screw	LA1051100	LA1051100	LA1051100	LA1051400	LA1051400
20	1	AISI 304	Nut	L2116500	L2116500	L2116500	L2116500	L2116500
21	1	AISI 304	Cap nut	L773456	L773456	L773456	L773456	L773456
22	1	AISI 304	Screw	L701581	L701581	L701581	L701581	L701581
23a	4	AISI 304	Screw - Piston	L701923	L773555	L773555	L773555	L773555
23b	4	AISI 304	Screw - Lobe	L773556	L773555	L773555	L773555	L773555
24	2	AISI 304	Shims	LA2659000	LA2659000	LA2659000	LA2659000	LA2659000
25	1	AISI 304	Spacer	LA2762006	LA2762006	LA2762006	-- -- --	-- -- --
26	3-6	AISI 304	Screw	L771166	L771166	L771166	L771166	L771166
27	1	PA12	Cap	LA1362400	LA1362400	LA1362400	LA1362400	LA1362400
28	2	AISI 304	Screw	L706159	L706159	L706159	L706159	L706159
29	1	-	Signal back unit	L705809	L705809	L705809	L705809	L705809
30	1	AISI 304	Bracket	LA2762004	LA2762004	LA2762004	LA2762005	LA2762005
31	2	AISI 304	Nut	L701449	L701449	L701449	L700240	L700240
32	1	AISI 303	Indicator pin	LA1161100	LA1161100	LA1161100	LA1161400	LA1161400
33	1	PP	Cable Inlet	L773221	L773221	L773221	L773221	L773221
34	1	-	Terminal block	L773540	L773540	L773540	L773540	L773540
36	1	AISI 304	Screw	L770405	L770405	L770405	L770405	L770405
*3-4-5-35-37	1	EPDM	PRV gasket kit - Lobe	LA2370104	LA2370204	LA2370304	LA2370404	LA2370504
-	1	FPM (Viton)	PRV gasket kit - Lobe	LA2370102	LA2370202	LA2370302	LA2370402	LA2370502
-	1	ISOLAST	PRV gasket kit - Lobe	LA2370115	LA2370215	LA2370315	LA2370415	LA2370515
-	1	EPDM	PRV gasket kit - Piston	LA2371104	LA2370204	LA2370304	LA2370404	LA2370504
-	1	FPM (Viton)	PRV gasket kit - Piston	LA2371102	LA2370202	LA2370302	LA2370402	LA2370502
-	1	ISOLAST	PRV gasket kit - Piston	LA2371115	LA2370215	LA2370315	LA2370415	LA2370515

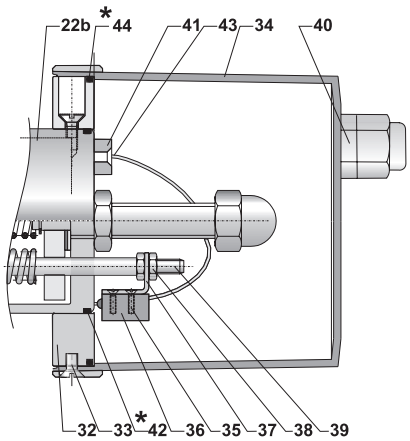
¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

15. Accessories

Relief valve - pneumatic



Relief valve - pneumatic with microswitch feedback signal



15. Accessories

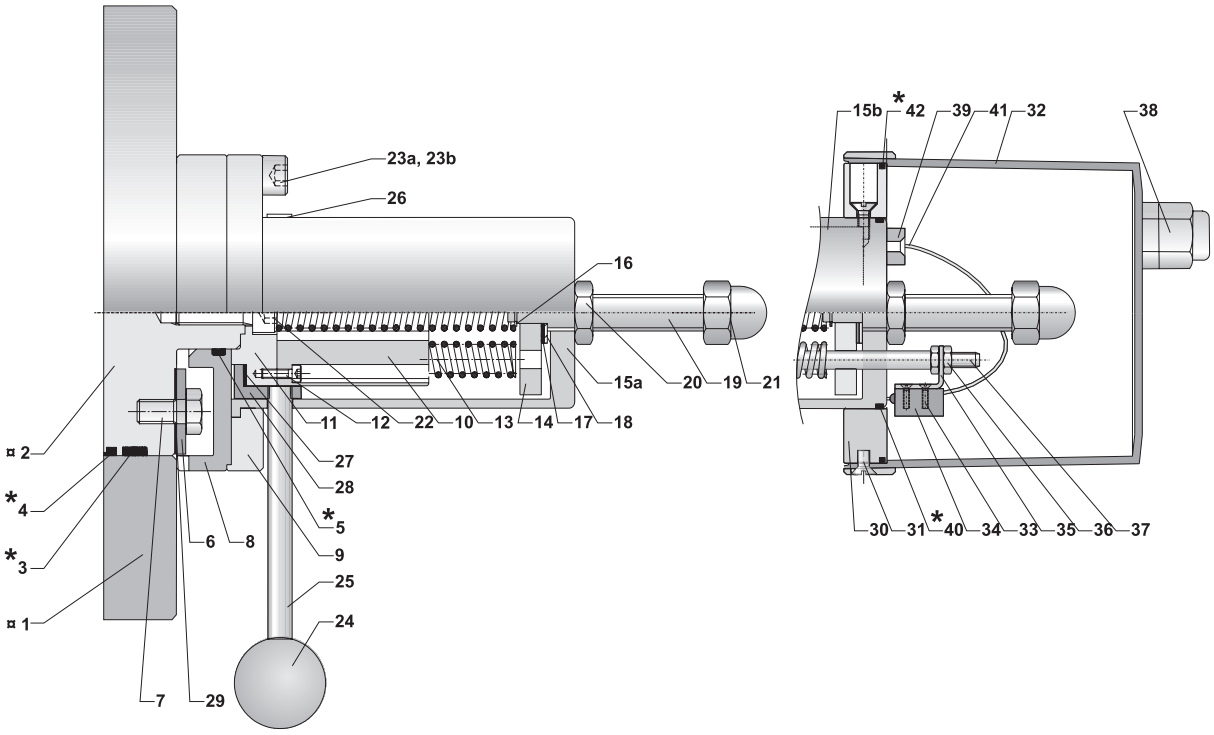
				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
¤ 1	1	AISI 316L	Front cover - Piston	LA1115101	LA1115201	LA1115301	LA1115401	LA1115501
-	1	AISI 316L	Front cover - Lobe	LA1115100	LA1115200	LA1115300	LA1115400	LA1115500
¤ 2	1	AISI 316L	Valve piston - Piston	LA1106101	LA1106201	LA1106301	LA1106401	LA1106501
-	1	AISI 316L	Valve piston - Lobe	LA1106100	LA1106200	LA1106300	LA1106400	LA1106500
6	2	AISI 303	Washer for shims	LA2165005	LA2165000	LA2165006	LA2165000	LA2165000
7	2	AISI 304	Screw	L770470	L700690	L700690	L700690	L700690
8	1	AISI 304	Flange - Piston	LA1211101	LA1211200	LA1211300	LA1211400	LA1211500
-	1	AISI 304	Flange - Lobe	LA1211100	LA1211200	LA1211300	LA1211400	LA1211500
9	1	AISI 304	Bottom part for actuator	LA1209101	LA1209101	LA1209101	LA1209401	LA1209401
10	1	AISI 304	Holder for U-sleeve	LA2165002	LA2165002	LA2165002	LA2165002	LA2165002
11	2	AISI 304	Screw	L771902	L771902	L771902	L771902	L771902
13	1	AISI 304	Piston	LA1855100	LA1855100	LA1855100	LA1855400	LA1855400
15	1	AISI 304	Spring housing flage	LA1210100	LA1210100	LA1210100	LA1210400	LA1210400
16	1	AISI 304	Clamp Plate	LA1212100	LA1212100	LA1212100	LA1212400	LA1212400
17	1	AISI 304	Flange for spring housing	LA1351100	LA1351100	LA1351100	LA1351400	LA1351400
18	1	PA6	Spring holder	LA1352100	LA1352100	LA1352100	LA1352400	LA1352400
19	2	AISI 304	Screw	L773740	L773740	L773740	L771902	L771902
20	7		Spring	L773538	L773538	L773538	L773543	L773543
21	1	AISI 304	Spring Plate	LA1353100	LA1353100	LA1353100	LA1353400	LA1353400
22a	1	AISI 304	Spring housing	LA1361100	LA1361100	LA1361100	LA1361400	LA1361400
22b	1	AISI 304	Spring housing, signal back	LA1361101	LA1361101	LA1361101	LA1361401	LA1361401
23	1	AISI 304	Locking ring	L773539	L773539	L773539	L773539	L773539
24	1	PTFE	Washer	LA2175000	LA2175000	LA2175000	LA2175000	LA2175000
25	1	AISI 304	Washer	LA2165001	LA2165001	LA2165001	LA2165001	LA2165001
26	1	AISI 304	Adjustment screw	LA1051100	LA1051100	LA1051100	LA1051400	LA1051400
27	1	AISI 303	Nut	L2116500	L2116500	L2116500	L2116500	L2116500
28	1	AISI 304	Cap nut	L773456	L773456	L773456	L773456	L773456
29	1	AISI 304	Screw	L705240	L705240	L705240	L707613	L707613
30	4	AISI 304	Screw	L773572	L773572	L773572	L772080	L772080
31	2	AISI 304	Shims	LA2659000	LA2659000	LA2659000	LA2659000	LA2659000
32	1	AISI 304V	Spacer	LA2762006	LA2762006	LA2762006	-- -- --	-- -- --
33	3-6	AISI 304	Screw	L771166	L771166	L771166	L771166	L771166
34	1	PA12	Cap	LA1362400	LA1362400	LA1362400	LA1362400	LA1362400
35	2	AISI 304	Screw	L706159	L706159	L706159	L706159	L706159
36	1	-	Signal back unit	L705809	L705809	L705809	L705809	L705809
37	1	AISI 304	Bracket	LA2762004	LA2762004	LA2762004	LA2762005	LA2762005
38	2	AISI 304	Nut	L701449	L701449	L701449	L700240	L700240
39	1	AISI 303	Indicator pin	LA1161100	LA1161100	LA1161100	LA1161400	LA1161400
40	1	PP	Cable Inlet	L773221	L773221	L773221	L773221	L773221
41	1	-	Terminal block	L773540	L773540	L773540	L773540	L773540
43	1	AISI 304	Screw	L770405	L770405	L770405	L770405	L770405
*3-4-5-12-14-42-44	1	EPDM	PRV gasket kit - Lobe	LA2372104	LA2372204	LA2372304	LA2372404	LA2372504
-	1	FPM (Viton)	PRV gasket kit - Lobe	LA2372102	LA2372202	LA2372302	LA2372402	LA2372502
-	1	ISOLAST	PRV gasket kit - Lobe	LA2372115	LA2372215	LA2372315	LA2372415	LA2372515
-	1	EPDM	PRV gasket kit - Piston	LA2373104	LA2372204	LA2372304	LA2372404	LA2372504
-	1	FPM (Viton)	PRV gasket kit - Piston	LA2373102	LA2372202	LA2372302	LA2372402	LA2372502
-	1	ISOLAST	PRV gasket kit - Piston	LA2373115	LA2372215	LA2372315	LA2372415	LA2372515

¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

15. Accessories

Relief valve - manual

Relief valve - manual with microswitch feedback signal



15. Accessories

				DW+1	DW+2	DW+3	DW+4	DW+5
Pos.	Qty	Material	Description	Part No.				
¤ 1	1	AISI 316L	Front cover - Piston	LA1115101	LA1115201	LA1115301	LA1115401	LA1115501
-	1	AISI 316L	Front cover - Lobe	LA1115100	LA1115200	LA1115300	LA1115400	LA1115500
¤ 2	1	AISI 316L	Valve piston - Piston	LA1106101	LA1106201	LA1106301	LA1106401	LA1106501
-	1	AISI 316L	Valve piston - Lobe	LA1106100	LA1106200	LA1106300	LA1106400	LA1106500
6	2	AISI 303	Washer for shims	LA2165005	LA2165000	LA2165006	LA2165000	LA2165000
7	2	AISI 304	Screw	L770470	L700690	L700236	L700236	L700690
8	1	AISI 304	Flange - Piston	LA1211101	LA1211200	LA1211300	LA1211400	LA1211500
-	1	AISI 304	Flange - Lobe	LA1211100	LA1211200	LA1211300	LA1211400	LA1211500
9	1	AISI 304	Clamp Plate	LA1210100	LA1210100	LA1210100	LA1210400	LA1210400
10	1	PA6	Spring holder	LA1352100	LA1352100	LA1352100	LA1352400	LA1352400
11	1	AISI 304	Flange for spring housing	LA1351100	LA1351100	LA1351100	LA1351400	LA1351400
12	2	AISI 304	Screw	L773740	L773740	L773740	L771902	L771902
13	7		Spring	L773538	L773538	L773538	L773543	L773543
14	1	AISI 304	Spring Plate	LA1353100	LA1353100	LA1353100	LA1353400	LA1353400
15a	1	AISI 304	Spring housing	LA1361102	LA1361102	LA1361102	LA1361402	LA1361402
15b	1	AISI 304	Spring housing, signal back	LA1361103	LA1361103	LA1361103	LA1361403	LA1361403
16	1	AISI 304	Locking ring	L773539	L773539	L773539	L773539	L773539
17	1	PTFE	Washer	LA2175000	LA2175000	LA2175000	LA2175000	LA2175000
18	1	AISI 304	Washer	LA2165001	LA2165001	LA2165001	LA2165001	LA2165001
19	1	AISI 303	Adjustment screw	LA1051100	LA1051100	LA1051100	LA1051400	LA1051400
20	1	AISI 304	Nut	L2116500	L2116500	L2116500	L2116500	L2116500
21	1	AISI 304	Cap nut	L773456	L773456	L773456	L773456	L773456
22	1	AISI 304	Screw	L701581	L701581	L701581	L701581	L701581
23a	4	AISI 304	Screw - Piston	L701923	L773555	L773555	L773555	L773555
23b	4	AISI 304	Screw - Lobe	L773556	L773555	L773555	L773555	L773555
24	1		Knob	L2105300	L2105300	L2105300	L2105300	L2105300
25	1	AISI 304	Lever	LA1051101	LA1051101	LA1051101	LA1051101	LA1051101
26	1	AISI 304	Lever screw	LA1051102	LA1051102	LA1051102	LA1051102	LA1051102
27	1	PTFE	Washer	LA2165003	LA2165003	LA2165003	LA2165004	LA2165004
28	1	AISI 304	Lever ring	LA1351101	LA1351101	LA1351101	LA1351401	LA1351401
29	2	AISI 304	Shims	LA2659000	LA2659000	LA2659000	LA2659000	LA2659000
30	1	AISI 304	Spacer	LA2762006	LA2762006	LA2762006	-- -- --	-- -- --
31	3-6	AISI 304	Screw	L771166	L771166	L771166	L771166	L771166
32	1	PA12	Cap	LA1362400	LA1362400	LA1362400	LA1362400	LA1362400
33	2	AISI 304	Screw	L706159	L706159	L706159	L706159	L706159
34	1	-	Signal back unit	L705809	L705809	L705809	L705809	L705809
35	1	AISI 304	Bracket	LA2762004	LA2762004	LA2762004	LA2762005	LA2762005
36	2	AISI 304	Nut	L701449	L701449	L701449	L700240	L700240
37	1	AISI 303	Indicator pin	LA1161100	LA1161100	LA1161100	LA1161400	LA1161400
38	1	PP	Cable Inlet	L773221	L773221	L773221	L773221	L773221
39	1	-	Terminal block	L773540	L773540	L773540	L773540	L773540
41	1	AISI 304	Screw	L770405	L770405	L770405	L770405	L770405
*3, 4, 5, 40&42	1	EPDM	PRV gasket kit - Lobe	LA2370104	LA2370204	LA2370304	LA2370404	LA2370504
-	1	FPM (Viton)	PRV gasket kit - Lobe	LA2370102	LA2370202	LA2370302	LA2370402	LA2370502
-	1	ISOLAST	PRV gasket kit - Lobe	LA2370115	LA2370215	LA2370315	LA2370415	LA2370515
-	1	EPDM	PRV gasket kit - Piston	LA2371104	LA2370204	LA2370304	LA2370404	LA2370504
-	1	FPM (Viton)	PRV gasket kit - Piston	LA2371102	LA2370202	LA2370302	LA2370402	LA2370502
-	1	ISOLAST	PRV gasket kit - Piston	LA2371115	LA2370215	LA2370315	LA2370415	LA2370515

¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

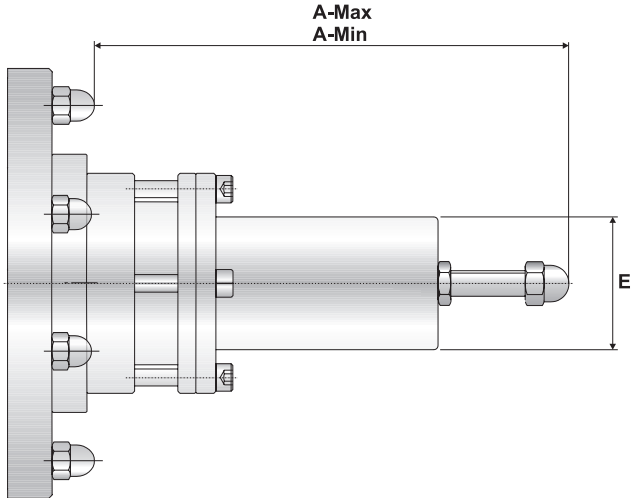
15. Accessories

Description	Material	DW+1	DW+2	DW+3	DW+4	DW+5
		Part No.				
Complete relief valve - standard - Piston	EPDM	LA2000141	LA2000241	LA2000341	LA2000441	LA2000541
Complete relief valve - standard - Piston	FPM	LA2000121	LA2000221	LA2000321	LA2000421	LA2000521
Complete relief valve - standard - Lobe	EPDM	LA2000140	LA2000240	LA2000340	LA2000440	LA2000540
Complete relief valve - standard - Lobe	FPM	LA2000120	LA2000220	LA2000320	LA2000420	LA2000520
Complete relief valve - standard with signal back unit - Piston	EPDM	LA2002141	LA2002241	LA2002341	LA2002441	LA2002541
Complete relief valve - standard with signal back unit - Piston	FPM	LA2002121	LA2002221	LA2002321	LA2002421	LA2002521
Complete relief valve - standard with signal back unit - Lobe	EPDM	LA2002140	LA2002240	LA2002340	LA2002440	LA2002540
Complete relief valve - standard with signal back unit - Lobe	FPM	LA2002120	LA2002220	LA2002320	LA2002420	LA2002520
Complete relief valve - pneumatic - Piston	EPDM	LA2001141	LA2001241	LA2001341	LA2001441	LA2001541
Complete relief valve - pneumatic - Piston	FPM	LA2001121	LA2001221	LA2001321	LA2001421	LA2001521
Complete relief valve - pneumatic - Lobe	EPDM	LA2001140	LA2001240	LA2001340	LA2001440	LA2001540
Complete relief valve - pneumatic - Lobe	FPM	LA2001120	LA2001220	LA2001320	LA2001420	LA2001520
Complete relief valve - pneumatic with signal back unit - Piston	EPDM	LA2003141	LA2003241	LA2003341	LA2003441	LA2003541
Complete relief valve - pneumatic with signal back unit - Piston	FPM	LA2003121	LA2003221	LA2003321	LA2003421	LA2003521
Complete relief valve - pneumatic with signal back unit - Lobe	EPDM	LA2003140	LA2003240	LA2003340	LA2003440	LA2003540
Complete relief valve - pneumatic with signal back unit - Lobe	FPM	LA2003120	LA2003220	LA2003320	LA2003420	LA2003520
Complete relief valve - manual - Piston	EPDM	LA2004141	LA2004241	LA2004341	LA2004441	LA2004541
Complete relief valve - manual - Piston	FPM	LA2004121	LA2004221	LA2004321	LA2004421	LA2004521
Complete relief valve - manual - Lobe	EPDM	LA2004140	LA2004240	LA2004340	LA2004440	LA2004540
Complete relief valve - manual - Lobe	FPM	LA2004120	LA2004220	LA2004320	LA2004420	LA2004520
Complete relief valve - manual with signal back unit - Piston	EPDM	LA2005141	LA2005241	LA2005341	LA2005441	LA2005541
Complete relief valve - manual with signal back unit - Piston	FPM	LA2005121	LA2005221	LA2005321	LA2005421	LA2005521
Complete relief valve - manual with signal back unit - Lobe	EPDM	LA2005140	LA2005240	LA2005340	LA2005440	LA2005540
Complete relief valve - manual with signal back unit - Lobe	FPM	LA2005120	LA2005220	LA2005320	LA2005420	LA2005520

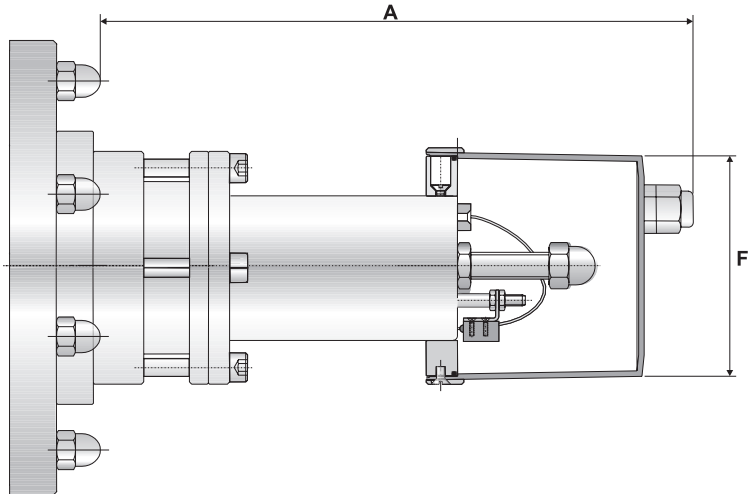
¤ Part No. mentioned above do not cover pumps sold with 3.1 certificate.
For 3.1 spare parts, contact APV.

15.3.3 Dimension Sketch

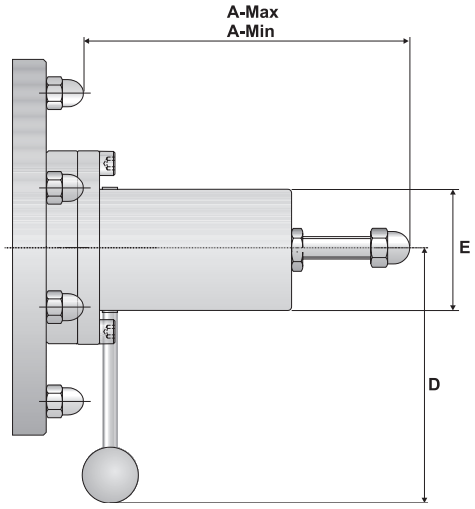
Pneumatic



Pneumatic
with microswitch feedback signal

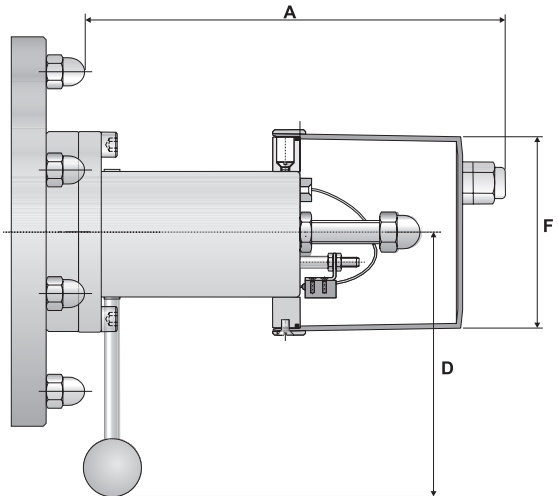


Standard/manual



15. Accessories

Standard/manual with microswitch feedback signal



		A-Max	A-min	D*	E	F
Pneumatic	**DW+1**	229	137	-	62.8	
	DW+2	225	190	-	62.8	
	DW+3	220	185	-	62.8	
	DW+4	284	273	-	98.8	
	DW+5	279	268	-	98.8	
Pneumatic with microswitch feedback signal	**DW+1**	279		-		106
	DW+2	275		-		106
	DW+3	270		-		106
	DW+4	309		-		106
	DW+5	304		-		106
Standard/manual	**DW+1**	174	137	137	62.8	
	DW+2	190	170	137	62.8	
	DW+3	185	165	137	62.8	
	DW+4	229	193	137	98.8	
	DW+5	224	188	137	98.8	
Standard/manual with microswitch feedback signal	**DW+1**	224		137		106
	DW+2	270		137		106
	DW+3	215		137		106
	DW+4	217		137		106
	DW+5	249		137		106

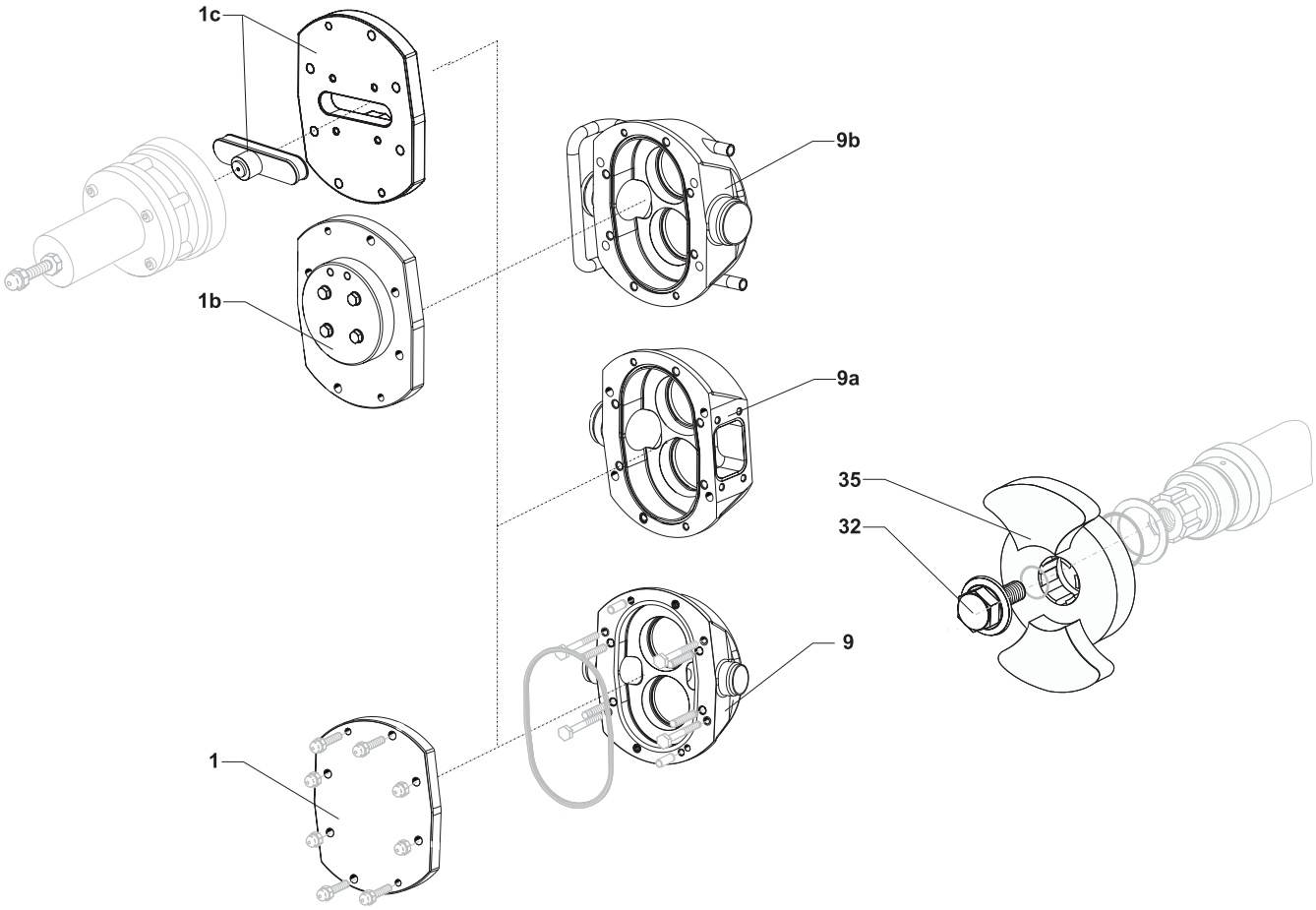
* The handle is only available with the manual version.

15. Accessories

15.4. Electropolished

This is an appendix manual and applies only with electropolished pump. The electropolished DW+ pump must be put into operation or serviced only if one has read and understood the complete DW+ pump instruction manual.

15.4.1 Spare Parts



15. Accessories

				Piston	Lobe	Lobe	Lobe	Lobe
				DW+1/003/7.5	DW+1/004/15	DW+1/007/7	DW+1/007/15_600	
Pos.	Qty	Material	Description	Part No.				
1	1	AISI 316L	Front cover standard	LA1110101EL	LA1110100EL	LA1110100EL	LA1110100EL	
1b	1	AISI 316L	Front cover thermal jacket	LA1101110EL	LA1101111EL	LA1101111EL	LA1101111EL	
1c	1	AISI 316L	Front cover relief valve	LA1115101EL	LA1115100EL	LA1115100EL	LA1115100EL	
-	1	AISI 316L	Valve piston	LA1106101EL	LA1106100EL	LA1106100EL	LA1106100EL	
9	1	AISI 304	Rotor case for standard	LA17991003EL	LA17991003EL	LA17991007EL	LA17991007EL	
9a	1	AISI 304	Rotor case for rectangular inlet	LAR17021003EL	LAR17021003EL	LAR17021006EL	LAR17021006EL	
9b	1	AISI 304	Rotor case for thermal jacket	LA17141003EL	LA17141003EL	LA17141007EL	LA17141007EL	
32	1	AISI 329	Rotor screw with washer	LA10501003EL	LA10501004EL	LA10501006EL	LA105010061EL	
35	1	AISI 316L	Rotor-high efficiency 110°	LA141003P2SHEL	LA14100421SHEL	LA14100721SHEL		
-	1	AISI 316L	Rotor-Multi-Duty 110°	LA141003P3SHEL	LA14100423SHEL	LA14100723SHEL	LA14100723SHEL	
-	1	AISI 316L	Rotor-high temperature 180°		LA14100421SYEL	LA14100721SYEL		
				DW+2/006/10	DW+2/007/20	DW+2/013/10	DW+2/013/15_600	
Pos.	Qty	Material	Description	Part No.				
1	1	AISI 316L	Front cover standard	LA1110201EL	LA111020EL	LA1110200EL	LA1110200EL	
1b	1	AISI 316L	Front cover thermal jacket	LA1101210EL	LA1101211EL	LA1101211EL	LA1101211EL	
1c	1	AISI 316L	Front cover relief valve	LA1115201EL	LA1115200EL	LA1115200EL	LA1115200EL	
-	1	AISI 316L	Valve piston	LA1106201EL	LA1106200EL	LA1106200EL	LA1106200EL	
9	1	AISI 304	Rotor case for standard	LA17992006EL	LA17992006EL	LA17992013EL	LA17992013EL	
9a	1	AISI 304	Rotor case for rectangular inlet	LAR17022006EL	LAR17022006EL	LAR17022013EL	LAR17022013EL	
9b	1	AISI 304	Rotor case for thermal jacket	LA17142006EL	LA17142006EL	LA17142013EL	LA17142013EL	
32	1	AISI 329	Rotor screw with washer	LA10502006EL	LA10502007EL	LA10502013EL	LA10502013EL	
35	1	AISI 316L	Rotor-high efficiency 110°	LA142006P2SHEL	LA14200721SHEL	LA14201321SHEL	LA1420131523SHEL	
-	1	AISI 316L	Rotor-Multi-Duty 110°	LA142006P3SHEL	LA14200723SHEL	LA14201323SHEL		
-	1	AISI 316L	Rotor-high temperature 180°		LA14200721SYEL	LA14201321SYEL		
				DW+3/014/10	DW+3/017/20	DW+3/030/10	DW+3/030/15_600	DW+3/050/5
Pos.	Qty	Material	Description	Part No.				
1	1	AISI 316L	Front cover standard	LA1110301EL	LA1110300EL	LA1110300EL	LA1110300EL	LA1110300EL
1b	1	AISI 316L	Front cover thermal jacket	LA1101310EL	LA1101311EL	LA1101311EL	LA1101311EL	LA1101311EL
1	1	AISI 316L	Front cover relief valve	LA1115301EL	LA1115300EL	LA1115300EL	LA1115300EL	LA1115300EL
	1	AISI 316L	Valve piston	LA1106301EL	LA1106300EL	LA1106300E	LA1106300E	LA1106300E
9	1	AISI 304	Rotor case for standard	LA17993014EL	LA17993014EL	LA17993030EL	LA17993030EL	LA17993050EL
9a	1	AISI 304	Rotor case for rectangular inlet	LAR17023014EL	LAR17023014EL	LAR17023030EL	LAR17023030EL	LAR17023050EL
9b	1	AISI 304	Rotor case for thermal jacket	LA17143014EL	LA17143014EL	LA17143030EL	LA17143030EL	LA17143050EL
32	1	AISI 329	Rotor screw with washer	LA10503014EL	LA10503016EL	LA10503030EL	LA10503030EL	LA10503050EL
35	1	AISI 316L	Rotor-high efficiency 110°	LA143014P2SHEL	LA14301621SHEL	LA14303021SHEL		LA14305021SHEL
-	1	AISI 316L	Rotor-Multi-Duty 110°	LA143014P3SHEL	LA14301623SHEL	LA14303023SHEL	LA1430301523SHEL	LA14305023SHEL
-	1	AISI 316L	Rotor-high temperature 180°	LA143014P1SYEL	LA14301621SYEL	LA14303021SYEL		LA14305021SYEL

15. Accessories

				Piston	Lobe	Lobe	Lobe	Lobe	Lobe
				DW+4/033/10	DW+4/039/20	DW+4/073/10	DW+4/073/15_600	DW+4/125/5	DW+4/125/7_600
Pos.	Qty	Material	Description	Part No.					
1	1	AISI 316L	Front cover standard	LA1110401EL	LA1110400EL	LA1110400EL	LA1110400EL	LA1110400EL	LA1110400EL
1b	1	AISI 316L	Front cover thermal jacket	LA1101410EL	LA1101411EL	LA1101411EL	LA1101411EL	LA1101411EL	LA1101411EL
1c	1	AISI 316L	Front cover relief valve	LA1115401EL	LA1115400EL	LA1115400EL	LA1115400EL	LA1115400EL	LA1115400EL
-	1	AISI 316L	Valve piston	LA1106401EL	LA1106400EL	LA1106400EL	LA1106400EL	LA1106400EL	LA1106400EL
9	1	AISI 304	Rotor case for standard	LA17994033EL	LA17994033EL	LA17994073EL	LA17994073EL	LA17994125EL	LA17994125EL
9a	1	AISI 304	Rotor case for rectangular inlet	LAR17024033EL	LAR17024033EL	LAR17024073EL	LAR17024073EL	LAR17024125EL	LAR17024125EL
9b	1		Rotor case for thermal jacket	LA17144033EL	LA17144033EL	LA17144073EL	LA17144073EL	LA17144125EL	LA17144125EL
32	1	AISI 329	Rotor screw with washer	LA10504033EL	LA10504039EL	LA10504039EL	LA10504039EL	LA10504125EL	LA10504125EL
35	1	AISI 316L	Rotor-high efficiency 110°	LA144033P2SHEL	LA14403921SHEL	LA14407321SHEL		LA14412521SHEL	
-	1	AISI 316L	Rotor-Multi-Duty 110°	LA144033P3SHEL	LA14403923SHEL	LA14407323SHEL	LA1440731523SHEL	LA14412523SHEL	LA144125723SHEL
-	1	AISI 316L	Rotor-high temperature 180°	LA144033P1SYEL	LA14403921SYEL	LA14407321SYEL		LA14412521SYEL	

				DW+5/080/12.5	DW+5/093/25	DW+5/142/15	DW+5/256/15
Pos.	Qty	Material	Description	Part No.			
1	1	AISI 316L	Front cover standard	LA1110501EL	LA1110500EL	LA1110500EL	LA1110500EL
1b	1	AISI 316L	Front cover thermal jacket	LA1101510EL	LA1101511EL	LA1101511EL	LA1101511EL
1c	1	AISI 316L	Front cover relief valve	LA1115501EL	LA1115500EL	LA1115500EL	LA1115500EL
-	1	AISI 316L	Valve piston	LA1106501EL	LA1106500EL	LA1106500EL	LA1106500EL
9	1	AISI 304	Rotor case for standard	LA17995080EL	LA17995080EL	LA17995142EL	LA17995256EL
9a	1	AISI 304	Rotor case for rectangular inlet	LAR17025080EL	LAR17025080EL	LAR17025142EL	
9b	1	AISI 304	Rotor case for thermal jacket	LA17145080EL	LA17145080EL	LA17145142EL	LA17145256EL
32	1	AISI 329	Rotor screw with washer	LA10505080EL	LA10505093EL	LA10505142EL	LA10505142EL
35	1	AISI 316L	Rotor-high efficiency 110°	LA145080P2SHEL	LA14509321SHEL	LA14514221SHEL	LA14525621SHEL
-	1	AISI 316L	Rotor-Multi-Duty 110°	LA145080P3SHEL	LA14509323SHEL	LA14514223SHEL	LA14525623SHEL
-	1	AISI 316L	Rotor-high temperature 180°	LA145080P1SYEL	LA14509321SYEL	LA14514221SYEL	LA14525621SYEL

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Revision History

Rev.	Description of the change	Date
0-3	The DW+ pump manual has been revised to consolidate all documentation related to pump accessories into a single comprehensive guide. Additionally, updates have been made to the spare parts index and to the operational guidelines for pump usage.	07/2025
4	Updated shaft drawing for DW+5.	11/2025
5	Added the “Pump Designation - EHEDG Certified Pump” chapter.	11/2025
6	Updated the “Temperature Changes and Maximum Temperature” chapter by adding a table with temperatures related to pumps equipped with NGA rotors. Change of the washer ring index.	02/2026

APV®

DW+ series
Positive Displacement Pump

Original Instructions

Models: DW+1-5

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