

Alfa Laval SX

Rotary lobe pumps

Introduction

The Alfa Laval SX Rotary Lobe Pump is designed with optimized pump head geometry and multi-lobe rotors to ensure low-shear operation with minimum pulsation. This makes the SX the best choice for maintaining the integrity of delicate products.

The pump is designed according to the most stringent hygienic design standards and with verified, effective Cleaning-in-Place (CIP) and Sterilization-in-Place (SIP).

Applications

The SX Rotary Lobe pump is designed for gentle transportation of process fluids in hygienic and ultra-clean applications in the biotechnology and pharmaceutical industries, in the home and personal care sector, and for demanding food applications.

The SX Rotary Lobe Pump is available with 14 different pump head displacements based on seven different gearbox modules to handle flow rates up to 115 m³/h and differential pressures up to 15 bar.

Benefits

- Low pulsation and very gentle pumping, making the pump ideal for sensitive products.
- Minimized shearing for protecting end-product quality.
- Low maintenance, increased process uptime.
- Maximized performance and minimized risk of contamination.

Standard design

All media contacting steel components, like the rotor case, front cover, rotors and rotor nuts, are in W. 1.4404 (AISI 316L). The robust cast iron gearbox provides maximum shaft rigidity and easy oil seal replacement. The gearbox design is universal which enables the flexibility of mounting pumps with the inlet and outlet ports in either a vertical or horizontal plane by changing the foot and its position.

The standard Alfa Laval SX has four-lobe rotors rated to 302°F, facilitating use with CIP and SIP processes.

Fully front-loading and fully interchangeable single, single flushed, and double mechanical shaft seals are available. All



media contacting elastomers are controlled compression joints, the latest technology where static and dynamic elastomer seals are used to prevent leakage of pumped media to the atmosphere.

The Alfa Laval SX can be supplied either as a bare shaft pump or mounted on a base plate complete with coupling, guard, gear motor and shroud for easy, plug-and-play installation.

Working principle

A gear train in the pump gearbox drives the rotors and provides accurate synchronization of the multi-lobe rotors. The movement of the counter-rotating rotors creates a partial vacuum that allows atmospheric pressure or other external pressures to force fluid into the pump chamber. As the rotors revolve, an expanding cavity forms, filling with fluid. As the blades disengage, each dwell forms a cavity. As the rotor blades engage, the cavity diminishes, and fluid is displaced into the outlet port.

TECHNICAL DATA

Standard specification

Product wetted steel parts:	W. 1.4404 (316L)
Inside surface finish:	Mech Ra $\leq$ 32
Gearbox:	Cast iron
Base plate:	Stainless steel
Coupling guard:	Stainless steel
Rotor:	Four-lobe
Product wetted elastomers:	EPDM
Other elastomers:	FPM
Shaft seal:	Single mechanical (R00)
Rotary seal face:	Carbon
Stationary seal face:	Stainless steel

Shaft seals

Single, single flush and double mechanical available. All options are fully front loading and interchangeable.

Max flush pressure, single flush:	7.25 psi
Max flush pressure, double mechanical:	1 bar over product pressure
Water consumption, flushed or double mechanical:	0.13 gallon/min
Flush connections:	BSPT or NPT

Temperature

Max process and CIP temperature	302°F
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Motor

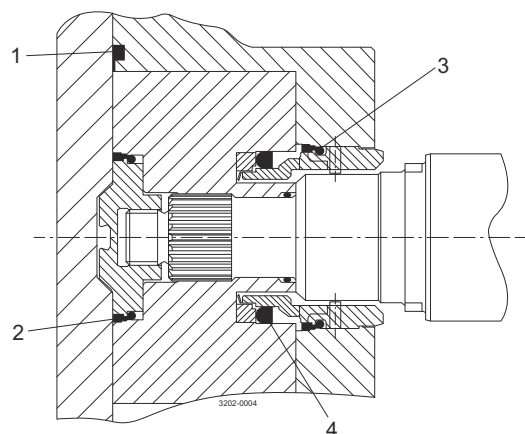
Gear motor, 4 poles, to IEC metric standard, 50/60 Hz, suitable for frequency conversion, IP55, insulation class F.

Warranty

Extended 3-years warranty on SX pumps. The warranty covers all non wear parts on the condition that genuine Alfa Laval Spare Parts are used.

Media contacting elastomers

All media contacting elastomers are controlled compression joints, the latest technology where static and dynamic elastomer seals are used to prevent pumped media leaking to atmosphere.



1. Front cover compression joint
2. Spline sealing cup seal
3. Cup seal
4. Squad ring

Flows/Pressures/Connections

SX Series	SX Model	Displacement			Inlet and Outlet Connection Size		Differential Pressure (see note 1)		Maximum Speed
		Litre/rev	Imp gall/100 rev	US gall/100 rev	mm	in	bar	psi	rev/min
1	SX1NLD	0.05	1.11	1.32	25	1	12	175	1200
	SX1WLD	0.07	1.54	1.85	40	1.5	7	100	1200
2	SX2NLD	0.128	2.82	3.38	40	1.5	15	215	1000
	SX2WLD	0.181	3.98	4.78	50	2	7	100	1000
3	SX3NLD	0.266	5.85	7.03	50	2	15	215	1000
	SX3WLD	0.35	7.70	9.25	65	2.5	7	100	1000
4	SX4NLD	0.46	10.12	12.15	50	2	15	215	1000
	SX4WLD	0.63	13.86	16.65	65	2.5	10	145	1000
5	SX5NLD	0.82	18.04	21.67	65	2.5	15	215	600
	SX5WLD	1.15	25.30	30.38	80	3	10	145	600
6	SX6NLD	1.40	30.80	36.99	80	3	15	215	500
	SX6WLD	1.90	41.80	50.20	100	4	10	145	500
7	SX7NLD	2.50	55.00	66.05	100	4	15	215	500
	SX7WLD	3.80	83.60	100.40	150	6	10	145	500

Note 1. These pressure ratings may vary for pumps with certain threaded connections.

Maximum Solid Size Capability

Pump sizes	Max. size of spherical solids (in)
SX1	0.28
SX2	0.39
SX3	0.51
SX4	0.63
SX5	0.75
SX6	0.98
SX7	1.10

Weight

Model	Bare Shaft Pump (lbs.)	
	Horizontal porting	Vertical porting
SX1NLD	37	39
SX1WLD	39	41
SX2NLD	75	77
SX2WLD	77	79
SX3NLD	130	134
SX3WLD	134	138
SX4NLD	247	254
SX4WLD	260	267
SX5NLD	342	342
SX5WLD	364	364
SX6NLD	613	613
SX6WLD	639	639
SX7NLD	741	758
SX7WLD	789	807

Shaft Seal Options

- Single or single flush/quench (steam barrier for aseptic application) R00 type mechanical seals.
- Double R00 type mechanical seal for flush.

All sealing options are fully front loading and fully interchangeable without the need for additional housings or pump component changes. Specialised seal setting of the mechanical seal is not required as the seal is dimensionally set on assembly. This feature further enhances fast and efficient on-site seal interchangeability.

Materials for Mechanical Seals

Carbon/Stainless Steel, Silicon Carbide/Silicon Carbide or variations of these materials to suit fluid being pumped and/or application requirements. The seal seat and face material combinations are all EHEDG compliant.

Standard Specification Options

- Tri-clamp inlet and outlet ports standard.
- Screwed male inlet and outlet ports to DIN11851, DIN11864, SMS, ISS/IDF, RJT or Tri-clamp.
- Heating/Cooling Jacket for Rotorcase Cover.
- ATEX compliance.
- Complete pump unit comprising: Pump + Baseplate (mild or stainless steel) + coupling with guard + Geared electric motor suitable for (or supplied with) frequency speed control or manual variable speed drive (advise motor enclosure and electrical supply).

Pump Sizing

In order to correctly size a rotary lobe pump some essential information is required. Provision of this information listed below enables our Technical Support personnel to obtain the optimum pump selection.

Product/Fluid Data

- Fluid to be pumped
- Viscosity
- SG/Density
- Pumping temperature, minimum, normal and maximum
- Cleaning in Place temperature(s), minimum, normal and maximum

Performance Data

- Flow rate, minimum, normal and maximum
- Discharge head/pressure (closest to pump outlet)
- Suction condition

Bareshaft Pump Dimensions

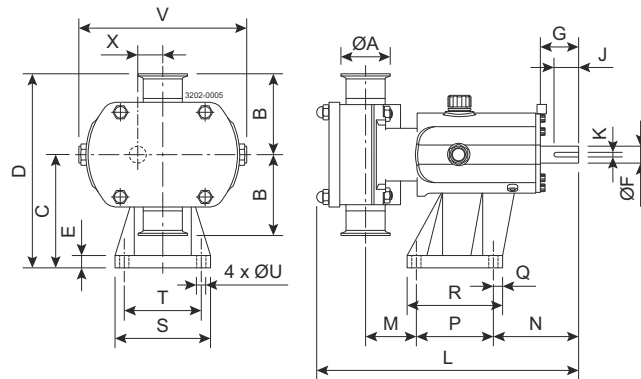


Figure 1. Vertically ported

All dimensions in inches, except where noted

PUMP	A	B	C	D	E	F	G	J	K	L	M	N	P	Q	R	S	T	U	V	X
SX1NLD	1.00	3.74	4.45	8.19	0.63	0.63	1.57	1.18	0.20	11.14	2.11	3.94	3.15	0.87	4.49	4.09	3.15	0.39	7.05	0.93
SX1WLD	1.50	3.74	4.45	8.19	0.63	0.63	1.57	1.18	0.20	11.65	2.36	3.94	3.15	0.87	4.49	4.09	3.15	0.39	7.05	0.93
SX2NLD	1.50	4.13	5.79	9.92	0.63	0.87	1.97	1.26	0.24	12.87	2.30	4.37	3.94	0.47	4.88	4.88	3.94	0.47	8.62	1.28
SX2WLD	2.00	4.13	5.79	9.92	0.63	0.87	1.97	1.26	0.24	13.50	2.58	4.37	3.94	0.47	4.88	4.88	3.94	0.47	8.62	1.28
SX3NLD	2.00	4.92	6.89	11.81	0.87	1.10	2.36	1.57	0.31	17.09	2.85	5.59	6.10	0.59	7.28	6.10	4.92	0.55	9.96	1.48
SX3WLD	2.50	4.92	6.89	11.81	0.87	1.10	2.36	1.57	0.31	17.72	3.07	5.59	6.10	0.59	7.28	6.10	4.92	0.55	9.96	1.48
SX4NLD	2.00	5.91	8.39	14.29	0.98	1.50	3.15	2.48	0.39	20.35	2.95	6.85	7.87	0.67	9.21	7.24	5.91	0.55	12.09	1.95
SX4WLD	2.50	5.91	8.39	14.29	0.98	1.50	3.15	2.48	0.39	21.10	3.20	6.85	7.87	0.67	9.21	7.24	5.91	0.55	12.09	1.95
SX5NLD	2.50	6.89	10.12	17.01	1.06	1.77	4.33	2.76	0.55	23.70	2.40	10.39	7.87	0.79	9.45	8.66	7.09	0.55	13.81	2.36
SX5WLD	3.00	6.86	10.12	17.01	1.06	1.77	4.33	2.76	0.55	24.80	3.17	10.39	7.87	0.79	9.45	8.66	7.09	0.55	13.81	2.36
SX6NLD	3.00	7.48	11.61	19.09	1.06	1.89	4.33	2.76	0.55	27.20	3.07	10.51	10.24	0.79	11.81	9.84	8.27	0.55	15.75	2.76
SX6WLD	4.00	7.48	11.61	19.09	1.06	1.89	4.33	2.76	0.55	28.31	3.54	10.51	10.24	0.79	11.81	9.84	8.27	0.55	15.75	2.76
SX7NLD	4.00	8.07	14.37	22.44	1.02	2.36	4.33	3.54	0.71	30.20	3.70	11.34	11.02	0.98	12.99	11.42	9.45	0.71	18.70	3.21
SX7WLD	6.00	8.07	14.37	22.44	1.02	2.36	4.33	3.54	0.71	32.32	4.76	11.34	11.02	0.98	12.99	11.42	9.45	0.71	18.70	3.21

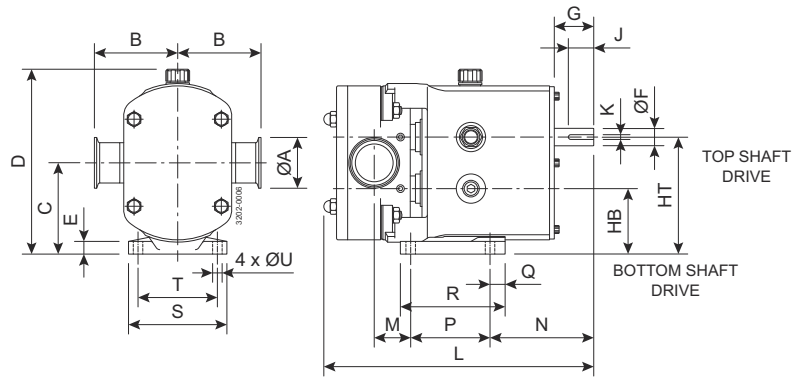


Figure 2. Horizontally ported

All dimensions in inches, except where noted

PUMP	A	B	C	D	E	F	G	HB	HT	J	K	L	M	N	P	Q	R	S	T	U
SX1NLD	1.00	3.74	3.54	7.40	0.39	0.63	1.57	2.62	4.47	1.18	0.20	11.14	1.16	4.61	3.15	0.98	4.53	3.94	3.15	0.39
SX1WLD	1.50	3.74	3.54	7.40	0.39	0.63	1.57	2.62	4.47	1.18	0.20	11.65	1.69	4.61	3.15	0.98	4.53	3.94	3.15	0.39
SX2NLD	1.50	4.13	4.53	9.17	0.63	0.87	1.97	3.25	5.81	1.26	0.24	12.87	1.52	5.16	3.94	0.75	5.20	4.88	3.94	0.47
SX2WLD	2.00	4.13	4.53	9.17	0.63	0.87	1.97	3.25	5.81	1.26	0.24	13.50	1.79	5.16	3.94	0.75	5.20	4.88	3.94	0.47
SX3NLD	2.00	4.92	5.43	10.75	0.71	1.1	2.36	3.96	6.91	1.57	0.31	17.09	2.74	6.89	4.92	1.18	7.13	6.06	4.92	0.55
SX3WLD	2.50	4.92	5.43	10.75	0.71	1.1	2.36	3.96	6.91	1.57	0.31	17.72	2.95	6.89	4.92	1.18	7.13	6.06	4.92	0.55
SX4NLD	2.00	5.91	6.42	12.80	0.79	1.5	3.15	4.47	8.37	2.48	0.39	20.35	2.95	8.81	5.91	1.38	7.95	7.24	5.91	0.55
SX4WLD	2.50	5.91	6.42	12.80	0.79	1.5	3.15	4.47	8.37	2.48	0.39	21.10	3.21	8.81	5.91	1.38	7.95	7.24	5.91	0.55
SX5NLD	2.50	6.89	7.68	15.04	0.87	1.77	4.33	5.31	10.04	2.76	0.55	23.70	2.60	10.98	7.09	1.38	9.45	8.27	7.09	0.55
SX5WLD	3.00	6.89	7.68	15.04	0.87	1.77	4.33	5.31	10.04	2.76	0.55	24.80	3.37	10.98	7.09	1.38	9.45	8.27	7.09	0.55
SX6NLD	3.00	7.48	8.86	17.17	0.87	1.89	4.33	6.10	11.61	2.76	0.55	28.20	3.07	10.51	10.2	0.79	11.81	8.66	7.48	0.55
SX6WLD	4.00	7.48	8.86	17.17	0.87	1.89	4.33	6.10	11.61	2.76	0.55	28.31	3.54	10.51	10.2	0.79	11.81	8.66	7.48	0.55
SX7/NLD	3.94	8.07	10.89	20.63	1.06	2.36	4.33	7.68	14.09	3.54	0.71	30.20	3.90	10.75	11.42	0.98	13.39	11.42	9.45	0.71
SX7/WLD	5.91	8.07	10.89	20.63	1.06	2.36	4.33	7.68	14.09	3.54	0.71	32.32	4.96	10.75	11.42	0.98	13.39	11.42	9.45	0.71