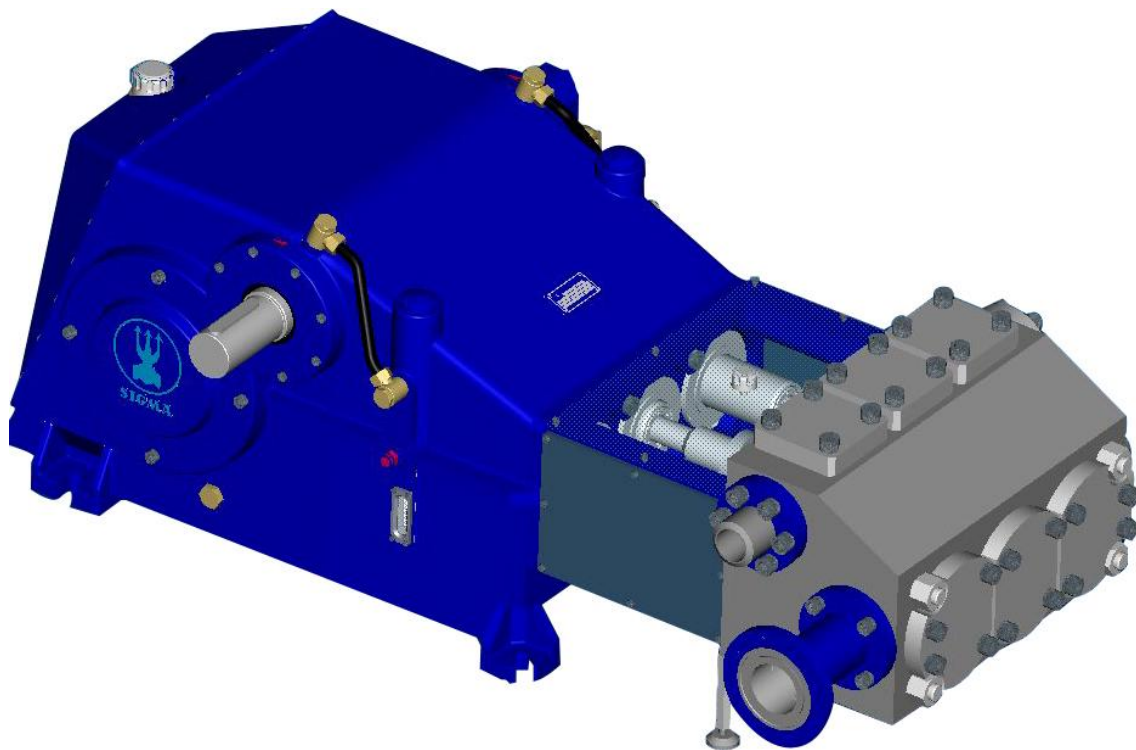




SIGMA PUMPY HRANICE



HIGH PRESSURE HORIZONTAL TRIPLEX PLUNGER PUMP

PAX-3-160

SIGMA PUMPY HRANICE, s.r.o.

Tovární 605, 753 01 Hranice
tel.: 581 661 111, fax: 581 602 587
Email: sigmahra@sigmahra.cz

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High Pressure Horizontal Triplex Plunger Pump type PAX-3-160

Application

High pressure horizontal plunger pumps PAX-3-160 are intended for handling of clean water, emulsions, oils and other chemically non-active liquids or solutions when keeping following properties of liquid: pH value from 6 to 8, volume content of nonabrasive admixtures up to 1 %, maximum size of particle of admixtures up to 50 µm, temperature of liquid up to 50° C.

The pumps are usually used as a source of high pressure medium for hydraulic systems of forming machines, in pressurizing stations and for high pressure water jet cleaning or maintenance. The pumps are suitable to be built-in mobile machines because of their low weight and compact design.

Material design

Majority of components of mechanical part are made mainly from nodular cast iron, ev. aluminium castings. Insert extension piece is made of grey cast iron. All parts of the hydraulic end which are wetted with pumped liquid are made from chrome stainless steel, eventually from other rustless materials. Material of special high pressure packing cord is chosen in dependence on pumped liquid and on working characteristic of the pump. Screws and other joint material coming into contact with ambient are protected against corrosion with zincing.

To customer's request it is possible to make parts of this pump from other materials which are more suitable for certain application.

Drive, Rotation, Control

Taking into consideration the wide scale of gear ratio of the built-in gearbox it is possible to drive the pump through flexible coupling by driving motor (electric motor, engine, hydraulic motor, ...) directly in the majority of cases. In the case that you need to reach different revolutions it is possible to put any external gear box between the pump and driving motor. Final gear ratio you will get when you multiply the gear ratio of the built-in gearbox and the one of the external gear box. Revolutions of crank shaft must be from 100 to 376 R.P.M., which is standard working range. When using the pump for lower speeds it is necessary to consult it with the manufacturer. The pumps are supplied either as left workmanship (taken out cylindrical end shaft on left side) or right workmanship viewing from mechanical part to hydraulic end. There is clockwise rotation at left workmanship and anticlockwise at the right one. Flow capacity of the pump can be controlled with continuous change of speeds, eventually with external control armature or with step control. A step control can be ensured through putting in and out operation of motor or with suction valve lifting (it is about lossless regulation through suction valve cones with pneumatic rollers).

Flange arrangement

Both suction and delivery channels are taken out on left and right sides of body of hydraulic end symmetrically. That's why it is possible to mount suction or delivery branch both on left and right sides of the pump independently each others. We recommend to connect suction line to both sides of body of hydraulic end in the case of higher flow capacities or some special duty applications in order to ensure sufficient feeding of pump. Safety valve is connected as a rule to opposite side than delivery line and discharge branch.

Design

Horizontal triplex plunger pumps type PAX-3-160 have crank mechanism and built-in gearbox.

Mechanical part (Power end):

Basic part of mechanical part is sturdy crank box made of cast iron. There is crank shaft supported on two antifriction bearings in the crank box. Guide of crossheads, which crossheads with adapters are moving in, are part of crank box. These ones, crank shaft and connecting rods form complete crank mechanism that transfers rotary movement of the crank shaft to reciprocating movement of plungers. Crank shaft is driven by countershaft through pair of helical gears. The countershaft is supported on two roller bearings and mounted diagonally above the crank shaft. Gear ratio of this built-in gearbox can be chosen on the scale from 3,95 to 5,47 at eight steps according to concrete customer's demand.

Oil gear pump is driven with countershaft, too. The gear pump serves as a source of pressure oil to lubricate all sliding or rolling surfaces of the mechanical part of the pump. The gear pump is equipped with pressure gauge to control pressure of lubricating oil and with full-flow oil filter. Pressure of lubricating oil is adjusted with regulating screw which you can find on the crank box. This pump is supplied including automatic oil pressure switch which controls sufficient pressure of oil in lubricating circuit of the pump.

There is high efficiency water cooler of oil fill of mechanical part on the bottom of crankcase. It is possible to use as a cooling medium the pumped liquid by the way that before the liquid enters the pump its portion flows through cooler and then it flows back to suction line. In the case of special conditions the cooler can be fed from any external source of cooling medium.

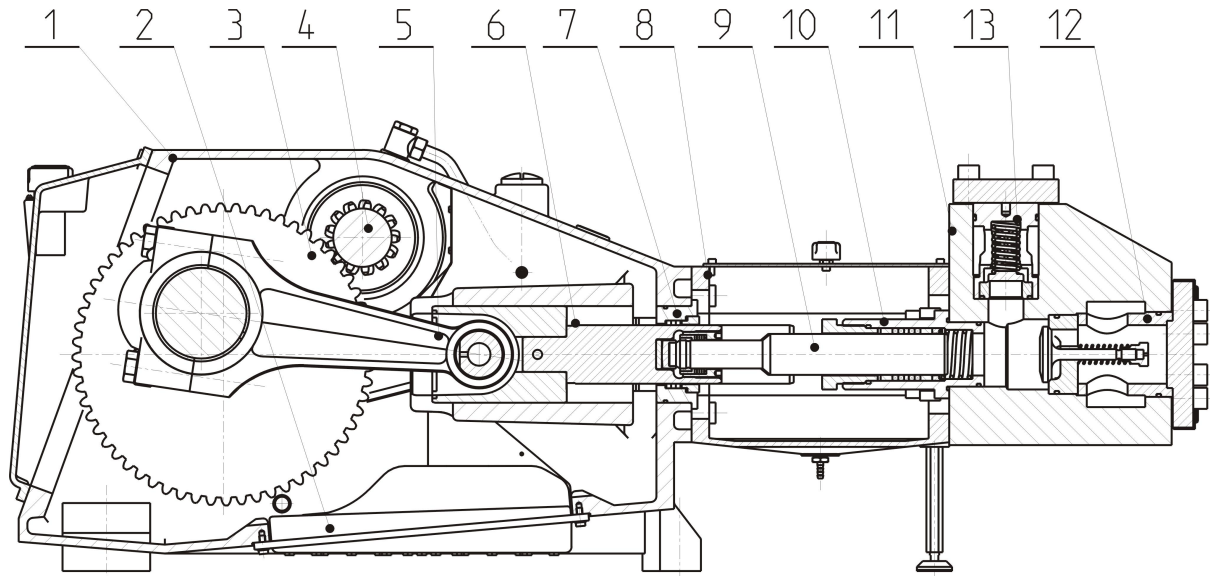
Hydraulic part (Fluid end) :

Hydraulic end is that working space of pump. In standard design the suction valves are mounted on hydraulic end in horizontal position, axially to plungers centre lines. Discharge plate valves are mounted vertically. Stuffing box is high pressure rigs type. Plunger is made from stainless steel and coated with rustless high-hardness layer. Our design of this hydraulic part makes possible to exchange all important elements of hydraulic end, i.e. stuffing box, plungers, suction and delivery valves, without necessity to dismantle hydraulic end body or suction and discharge flanges. Design and position of valves as well as type of sealing elements in the stuffing box can be offered individually according to conditions of the certain operation.

Mechanical and hydraulic parts are jointed each other through insert extension piece which from design point of view is a „border“ between power end and hydraulic end. This piece is a design element for fixing of respective parts and it also forms sealed chambers which serve for retaining of dropping of main stuffing box and to protect working parts of plunger adaptors or surface of plungers against powdered impurities penetration.

The pump is supplied including safety valve. This safety valve is setted on required operating pressure for the certain diameter of plunger by the manufacturer in order to protect the pump from eventual excessive delivery pressure.

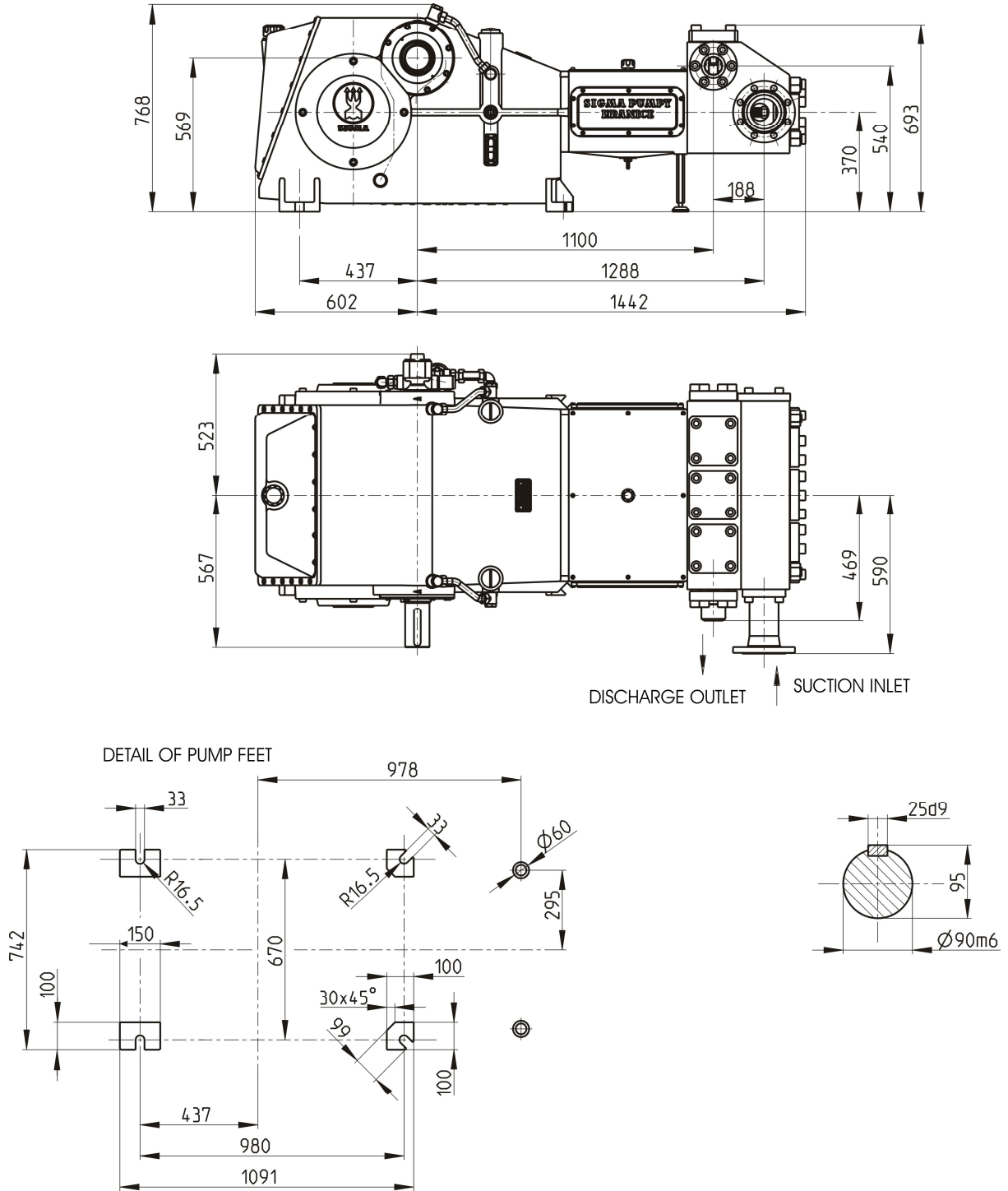
Informative sectional drawing of the pump



- | | |
|-----------------------------------|-------------------------------|
| 1 Crank box | 8 Insert extension piece |
| 2 Cooler | 9 Plunger |
| 3 Crank shaft | 10 High pressure stuffing box |
| 4 Countershaft | 11 Hydraulic end body |
| 5 Connecting rod | 12 Suction valve |
| 6 Crosshead with adapter | 13 Discharge valve |
| 7 Seal protecting from dust entry | |

High Pressure Horizontal Triplex Plunger Pump type PAX-3-160

Dimensional Drawing



High Pressure Horizontal Triplex Plunger Pump type PAX-3-160

Technical data

input revolutions 550

Crank shaft revolutions			R.P.M.	100		104		111		116		121		128		134		139	
Mean piston velocity			[m.s ⁻¹]	0,53		0,55		0,59		0,62		0,65		0,68		0,71		0,74	
Description of pump	No. Of plungers [-]	Plunger diameter [mm]	Max. press. [bar]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]
PAX-3-160-40	3	40	1050	60,3	106	62,7	110	67,0	117	70,0	122	73,0	128	77,2	135	80,8	141	83,8	147
PAX-3-160-45	3	45	820	76,3	104	79,4	109	84,7	116	88,6	121	92,4	126	97,7	134	102	140	106	145
PAX-3-160-50	3	50	660	94,2	104	98,0	108	105	115	109	120	114	125	121	133	126	139	131	144
PAX-3-160-55	3	55	560	114	106	119	111	127	118	132	123	138	129	146	136	153	143	159	148
PAX-3-160-60	3	60	470	136	106	141	111	151	118	157	123	164	129	174	136	182	142	189	148
PAX-3-160-65	3	65	400	159	106	166	110	177	118	185	123	193	128	204	136	213	142	221	148
PAX-3-160-70	3	70	340	185	105	192	109	205	116	214	121	224	127	236	134	248	140	257	146
PAX-3-160-75	3	75	300	212	106	221	110	235	118	246	123	257	128	271	136	284	142	295	147
PAX-3-160-80	3	80	260	241	105	251	109	268	116	280	121	292	127	309	134	323	140	335	145
PAX-3-160-90	3	90	200	305	102	318	106	339	113	354	118	369	123	391	130	409	136	424	141
PAX-3-160-100	3	100	160	377	101	392	105	418	112	437	117	456	122	483	129	505	135	524	140
PAX-3-160-110	3	110	140	456	106	474	111	506	118	529	123	552	129	584	136	611	143	634	148
Gear ratio			i	5,47		5,27		4,94		4,75		4,53		4,28		4,11		3,95	

Technical data

input revolutions 985

Crank shaft revolutions			R.P.M.	180		188		199		208		218		230		238		249	
Mean piston velocity			[m.s ⁻¹]	0,96		1,00		1,06		1,11		1,16		1,23		1,27		1,33	
Description of pump	No. of plungers [-]	Plunger diameter [mm]	Max. press. [bar]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]
PAX-3-160-40	3	40	1050	109	190	113	198	120	210	125	220	131	230	139	243	144	251	150	263
PAX-3-160-45	3	45	820	137	188	144	196	152	208	159	217	166	227	176	240	182	248	190	260
PAX-3-160-50	3	50	660	170	187	177	195	188	206	196	216	205	226	217	238	224	247	235	258
PAX-3-160-55	3	55	560	205	192	214	200	227	212	237	221	249	232	262	245	271	253	284	265
PAX-3-160-60	3	60	470	244	191	255	200	270	212	282	221	296	232	312	245	323	253	338	265
PAX-3-160-65	3	65	400	287	191	299	200	317	211	331	221	347	231	366	244	379	253	397	264
PAX-3-160-70	3	70	340	333	188	347	197	368	208	384	218	403	228	425	241	440	249	460	261
PAX-3-160-75	3	75	300	382	191	399	199	422	211	441	221	462	231	488	244	505	252	528	264
PAX-3-160-80	3	80	260	434	188	454	197	480	208	502	217	526	228	555	240	574	249	601	260
PAX-3-160-90	3	90	200	550	183	574	191	608	203	635	212	666	222	702	234	727	242	760	253
PAX-3-160-100	3	100	160	679	181	709	189	750	200	784	209	822	219	867	231	897	239	939	250
PAX-3-160-110	3	110	140	821	192	858	200	908	212	949	221	994	232	1 049	245	1 086	253	1 136	265
Gear ratio			i	5,47		5,27		4,94		4,75		4,53		4,28		4,11		3,95	

Technical data

input revolutions 1485

Crank shaft revolutions			R.P.M.	271		282		301		313		329		347		361		376	
Mean piston velocity			[m.s ⁻¹]	1,45		1,50		1,61		1,67		1,75		1,85		1,93		2,01	
Description of pump	No. of plungers [-]	Plunger diameter [mm]	Max. press. [bar]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]	Qt [l.min ⁻¹]	Nt [kW]
PAX-3-160-40	3	40	1050	163	286	170	298	182	318	189	330	198	347	209	366	218	381	227	397
PAX-3-160-45	3	45	820	207	283	215	294	230	314	239	327	251	343	265	362	276	377	287	392
PAX-3-160-50	3	50	660	255	281	266	292	284	312	295	324	310	341	327	360	340	374	354	390
PAX-3-160-55	3	55	560	309	288	322	300	343	320	357	333	375	350	396	369	412	384	429	400
PAX-3-160-60	3	60	470	368	288	383	300	409	320	425	333	447	350	471	369	490	384	510	400
PAX-3-160-65	3	65	400	432	288	449	299	479	320	499	332	524	349	553	368	575	383	599	399
PAX-3-160-70	3	70	340	501	284	521	295	556	315	578	328	608	344	641	363	667	378	695	394
PAX-3-160-75	3	75	300	575	287	598	299	638	319	664	332	698	349	736	368	766	383	797	399
PAX-3-160-80	3	80	260	654	283	680	295	726	315	755	327	794	344	837	363	871	377	907	393
PAX-3-160-90	3	90	200	828	276	861	287	919	306	956	319	1 005	335	1 060	353	1 102	367	1 148	383
PAX-3-160-100	3	100	160	1 022	272	1 063	283	1 135	303	1 180	315	1 240	331	1 308	349	1 361	363	1 417	378
PAX-3-160-110	3	110	140	1 236	288	1 286	300	1 373	320	1 428	333	1 501	350	1 583	369	1 647	384	1 715	400
Gear ratio			i	5,47		5,27		4,94		4,75		4,53		4,28		4,11		3,95	

Qt.....Theoretical flow capacity calculated from geometric characteristics and revolutions.Influende of noneffective space has not been taken in mind.

Nt.....Theoretical hydraulic output uf pump calculated from maximum pressure and theoretical flow capacity

High Pressure Horizontal Triplex Plunger Pump type PAX-3-160

Informative pump performance chart

