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28. WARRANTY CONDITIONS

- 1- Warranty period starts with the delivery of goods and it is for 2(two) years.
- 2- Complete of good including all parts under the warranty of our company.
- 3- In case that good had a failure within warranty period, duration which passes through warranty is added to warranty period. Repair time for good can not exceed 20 days. In case that there is not service station related to failure of good, this duration starts with informing the seller, distributor, agency, importer, exporter or producer. It is possible for consumers to make failure notification by telephone, fax, e-mail, certified mail, and similar ways. However, proof liability belongs to consumers in dispute cases. If the failure of good can not be eliminated within 10 days; manufacturer, produces or importer is liable to deliver a similar product until a repair has been completed.
- 4- In case that product has failure because of labor or material failure, its repair will be performed without charging any amount regardless with labor costs or replaced part prices.
- 5- Although the repair right of product is used by consumer;
 - Provided that remaining in defined warranty period after the date of delivery to consumer; in case that maximum four times in a year or more than six times in warranty period defined by manufacturer-producer and/or importer it has a failure, and besides this, if that failure prevents usage.
 - exceeding the maximum time which is determined for repair;
 - Provided that there is not any service station, by means of a report issued by the seller, distributor, agency, representation, importer, or manufacturer or produced indicating that repair is impossible; the consumer may request the replacement free of charge, refunding or price deduction with the same amount.
- 6- Warranties that are caused by the contrary unsafe of products with user manual are not covered by warranty.
- 7- Consumers may apply to CUSTOMS AND COMMERCE MINISTRY PROTECTION OF CONSUMER AND MARKET SUPERVISION GENERAL DIRECTORATE for the problems which may be related with the warranty certificate.

26. PART NUMBER AND PART NAME LIST

Part No	Part Number
010	Volute Casing
080	Bearing Housing
030	Impeller
040	Shaft
090	Bearing Cover-Inside
091	Bearing Cover-Outside
081	Interconnection Part
459	Shaft Sleeve
390	Flat Washer
164	Mech. Seal Setting Sleeve
165	Mechanical Seal
160	Bearing
181	Piston Ring
128	Safety Sheet

Part	Part Number
130	Puller Nut
099	Oil seal
403	Throw Protection
170	Key
125	Distance Ring
395	Spring washer
127	Nut
150	Stud
409	Drain Plug
109	Air Bleed Plug
320	Supporting Feet
406	Full-pass Bolt-Key head
220	O-ring
280	Seal Box

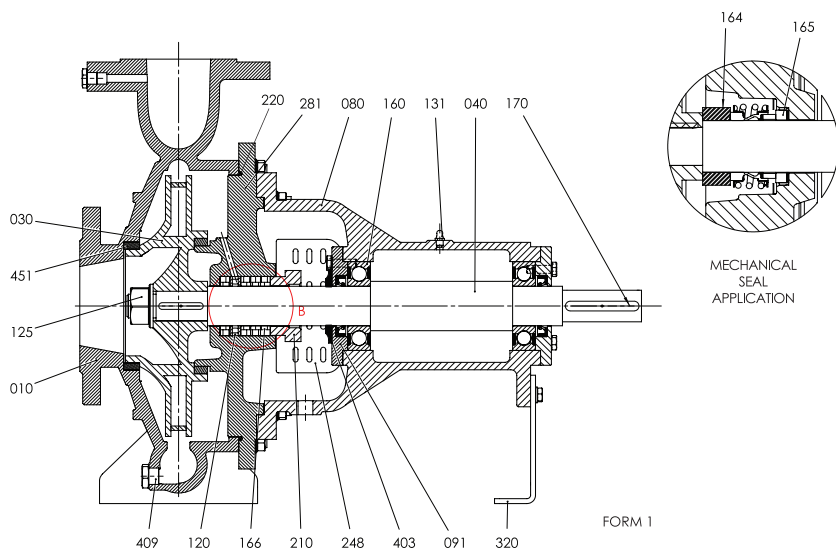
27. NOISE LEVEL

Motor Power PN (kW)	Noise Pressure Level (DbA)	
	Pump-Motor Group	
	1450 rpm	2900 rpm
<0,55	61	65
0,75	61	66
1,1	63	66
1,5	64	68
2,2	65	70
3	66	71
4	68	72
5,5	68	75
7,5	69	75
11	70	76
15	72	77
18,5	72	78
22	74	78
30	74	81
37	75	82
45	76	82
55	76	84
75	77	85
90	79	85
110	80	86
132	80	86
160	80	86

- It is the value measured in the free field of the reflecting surface, at a distance of 1 m without a sound protection curtain.



25. PUMP SECTIONAL VIEW

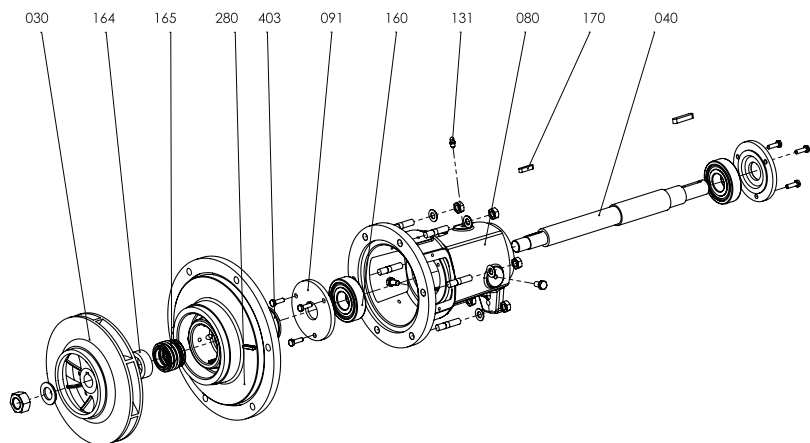
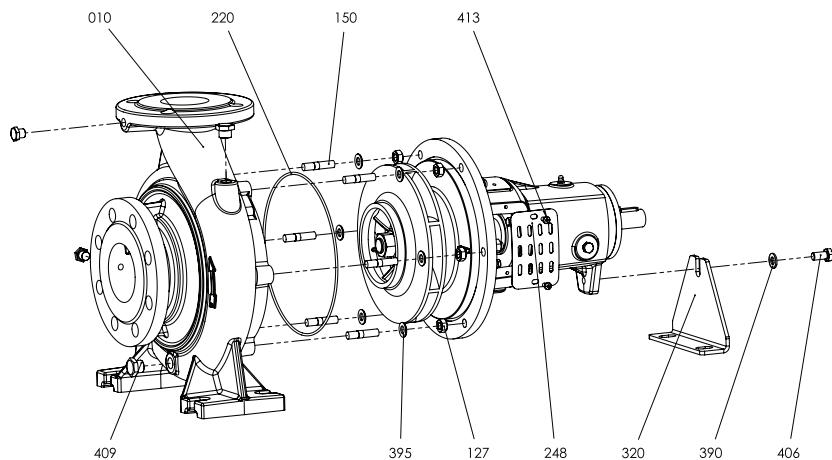


No	Part Number
010	Volute Casing
030	Impeller
040	Shaft
080	Bearing Housing
091	Bearing Cover
120	Flushing Ring
125	Nut
131	Grease Nipple
160	Bearing
164	Mechanical Seal Setting Sleeve
165	Mechanical Seal

No	Part Number
166	Soft Packing
170	Key
210	Connection Support
220	O-Ring
248	Protection Sheet
281	Seal Box
320	Supporting Feet
403	Throw Protection
409	Drain Plug
451	Wear Ring



24. PUMP SIZE TYPES AND WEIGHTS





24. PUMP SIZE TYPES AND WEIGHTS

Pump Type	Pump Size Type	Shaft Diameter and Shaft Length (mm)	Weight (Kg)
32-160	A1	Ø24-385	50
50-160	A1	Ø24-385	52
32-200	A1	Ø24-385	50
40-200	A1	Ø24-385	60
50-200	A1	Ø24-385	60
65-160	A2	Ø32-500	55
65-200	A2	Ø32-500	64
80-200	A2	Ø32-500	76
100-200	A2	Ø32-500	110
125-200	A2	Ø32-500	140
40-250	A2	Ø32-500	95
50-250	A2	Ø32-500	100
65-250	A2	Ø32-500	100
80-250	A2	Ø32-500	125
50-315	A2	Ø32-500	130
150-200	A3	Ø42-545	180
100-250	A3	Ø42-530	140
125-250	A3	Ø42-530	150
150-250	A3	Ø42-530	180
65-315	A3	Ø42-530	145
80-315	A3	Ø42-530	145
100-315	A3	Ø42-530	160
125-315	A3	Ø42-530	180
80-400	A3	Ø42-530	175
100-400	A3	Ø42-530	180
125-400	A3	Ø42-530	205
150-315	A4	Ø48-670	250
150-400	A4	Ø48-670	280
200-260	A4	Ø48-684	310
200-315	A4	Ø48-684	330
150-500	A5	Ø55-730	480
200-400	A5	Ø55-725	360
250-315	A5	Ø55-730	400
250-400	A5	Ø55-750	460
200-500	A6	Ø70-925	650
250-500	A6	Ø70-940	660



23. FAULTS AND FAILURE CAUSES

Reason For Failure	Fault	The pump does not suction	Pump does not deliver label flow rate	Pump does not deliver label pressure	Pump loses suction after first run	Motor overloads	There is noise or vibration	Seal box overheats	The seal box overheat and deform	Irregularity and turmoil in the flow
Wrong oil selection									X	
Water or dirt in the beds									X	
Lubrication system does not work									X	
The beds are very tightly mounted									X	
There is excessive axial load									X	
Insufficient lubrication									X	
Bearing assembly incorrect									X	
Excessive bed cooling									X	
Excessive grease in the bearings									X	
Plumbing puts an excessive load on the pump						X	X	X	X	
Foreign matter in the pump		X	X			X	X			
Impeller installed upside down		X								
Suction valve fully closed		X								
Suction valve partially closed			X							
The flange gaskets are installed without cutting the middle		X								

Reason For Failure	Fault	The pump does not suction	Pump does not deliver label flow rate	Pump does not deliver label pressure	Pump loses suction after first run	Motor overloads	There is noise or vibration	Seal box overheats	The seal box overheat and deform	Irregularity and turmoil in the flow
Impeller completely clogged		X								
Mechanical fault						X	X			
Impeller rubbing against the body						X				
Wrong pump selection			X	X						
Impeller diameter small				X						
Coupling is deformed							X			
Impeller balancing holes clogged									X	
Pump body seals worn			X	X	X					
Balancing disc does not work							X		X	



23. FAULTS AND FAILURE CAUSES

Reason For Failure \ Fault	The pump does not suction	Pump does not deliver label flow rate	Pump does not deliver label pressure	Pump does suction after first run	Motor overloads	There is noise or vibration	Seal box overheats	The seal box overheat and deform	Irregularity and turmoil in the flow
Reverse direction	X		X						
Suction line not fully filled with water	X			X					
Air in suction pipe	X	X		X		X			X
Suction pipe not filled with enough water	X	X		X		X			X
ENPY (present) too small	X	X		X		X			X
Low speed	X	X	X						
System pressure is greater than pump label rating	X	X							
Suction pipe sucks air		X	X	X		X			X
Dip flap is too small		X							
Bottom flap is blocked	X	X							
The viscosity of the liquid is higher than the design value		X	X		X	X			
Wear rings worn		X	X		X				
Impeller deformed		X	X		X				
Suction depth too high	X	X		X					
Excessive vapor, gas, or air in liquid			X	X		X			X

Reason For Failure \ Fault	The pump does not suction	Pump does not deliver label flow rate	Pump does not deliver label pressure	Pump does suction after first run	Motor overloads	There is noise or vibration	Seal box overheats	The seal box overheat and deform	Irregularity and turmoil in the flow
Irrigation ring not placed correctly				X					
Quick turn									
Liquid density higher than design value					X				
Coupling unadjusted					X				
The seal box are deformed					X	X		X	
Impeller not balanced						X			
Impeller section blocked		X				X		X	
Curvature of the shaft					X	X		X	
Pump outlet valve position is not correct						X		X	
Chassis foundation is broken						X			
Seal tightly mounted					X		X		
No water comes into the packing or the air is sucking in the packing	X	X		X			X		
Packing selection wrong							X		
Cooling insufficient							X	X	
Low or high oil level								X	

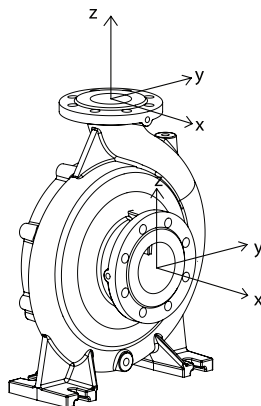


22. LOADS AND TORQUES ON THE PUMP FLANGE

			Suction Flange								Discharge Flange							
			Forces (N)				Moments (N.m)				Forces (N)				Moments (N.m)			
Pump Type	Dne	Dnb	Fx	Fy	Fz	Fb	Mx	My	Mz	Mb	Fx	Fy	Fz	Fb	Mx	My	Mz	Mb
100-160	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
100-200	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
100-250	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
100-315	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
100-400	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
125-200	150	125	1750	1575	1410	2750	875	610	720	1280	1240	1120	1380	2170	735	525	665	1070
125-250	150	125	1750	1575	1410	2750	875	610	720	1280	1240	1120	1380	2170	735	525	665	1070
125-315	150	125	1750	1575	1410	2750	875	610	720	1280	1240	1120	1380	2170	735	525	665	1070
125-400	150	125	1750	1575	1410	2750	875	610	720	1280	1240	1120	1380	2170	735	525	665	1070
150-200	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
150-250	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
150-315	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
150-400	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
150-500	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
200-270	250	200	2920	2607	2360	4570	1550	1100	1280	2290	2100	1890	2345	3660	1140	805	930	1680
200-315	250	200	2920	2607	2360	4570	1550	1100	1280	2290	2100	1890	2345	3660	1140	805	930	1680
200-400	250	200	2920	2607	2360	4570	1550	1100	1280	2290	2100	1890	2345	3660	1140	805	930	1680
200-500	250	200	2920	2607	2360	4570	1550	1100	1280	2290	2100	1890	2345	3660	1140	805	930	1680
250-350	300	250	3500	3130	2810	5480	2110	1505	1730	3115	2610	2360	2920	4570	1560	1100	1280	2300
250-400	300	250	3500	3130	2810	5480	2110	1505	1730	3115	2610	2360	2920	4570	1560	1100	1280	2300
250-500	300	250	3500	3130	2810	5480	2110	1505	1730	3115	2610	2360	2920	4570	1560	1100	1280	2300



22. LOADS AND TORQUES ON THE PUMP FLANGE



Pump Type			Suction Flange								Discharge Flange							
			Forces (N)				Moments (N.m)				Forces (N)				Moments (N.m)			
			Fx	Fy	Fz	Fb	Mx	My	Mz	Mb	Fx	Fy	Fz	Fb	Mx	My	Mz	Mb
32-125	50	32	580	520	520	910	490	350	400	720	315	300	370	580	385	260	300	560
32-160	50	32	580	520	520	910	490	350	400	720	315	300	370	580	385	260	300	560
32-200	50	32	580	520	520	910	490	350	400	720	315	300	370	580	385	260	300	560
32-250	50	32	580	520	520	910	490	350	400	720	315	300	370	580	385	260	300	560
40-125	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
40-160	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
40-200	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
40-250	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
40-315	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
50-125	65	50	600	650	595	1150	525	385	420	770	525	470	580	910	490	350	400	720
50-160	65	50	600	650	595	1150	525	385	420	770	525	470	580	910	490	350	400	720
50-200	65	50	600	650	595	1150	525	385	420	770	525	470	580	910	490	350	400	720
50-250	65	50	600	650	595	1150	525	385	420	770	525	470	580	910	490	350	400	720
50-315	80	50	875	790	720	1380	560	400	455	820	525	470	580	910	490	350	400	720
65-125	80	65	875	790	720	1380	560	400	455	820	650	595	735	1155	525	385	420	770
65-160	80	65	875	790	720	1380	560	400	455	820	650	595	735	1155	525	385	420	770
65-200	80	65	875	790	720	1380	560	400	455	820	650	595	735	1155	525	385	420	770
65-250	80	65	875	790	720	1380	560	400	455	820	650	595	735	1155	525	385	420	770
65-315	80	65	875	790	720	1380	560	400	455	820	650	595	735	1155	525	385	420	770
65-400	100	65	1170	1050	945	1840	610	440	510	910	650	595	735	1155	525	385	420	770
80-125	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-160	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-200	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-250	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-315	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-400	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770



21. TIGHTENING MOMENT

Metric Bolt	Tightening torques according to quality classes Nxm (Newton x Meter)					
	4,6	5,6	6,9	8,8	10,9	12,9
M 2	0,15	0,2	0,3	0,4	0,5	0,6
M 2,2	0,2	0,3	0,5	0,6	0,8	1
M 2,5	0,3	0,4	0,8	0,9	1,2	1,5
M 3	0,5	0,6	1,2	1,4	1,9	2,3
M 3,5	0,7	0,9	1,8	2,1	2,9	3,5
M 4	1	1,5	2,6	3	4,3	5,2
M 5	2	3	5	6	9	11
M 6	4	5	9	11	15	18
M 7	6	8	15	18	25	29
M 8	9	11	22	26	36	43
M 10	17	22	43	51	71	86
M 12	30	40	74	88	123	148
M 14	46	61	117	140	195	236
M 16	70	94	180	210	300	360
M 18	97	128	246	290	412	491
M 20	136	181	385	412	580	697
M 22	183	246	471	560	785	942
M 24	231	310	600	711	1000	1196
M 27	344	461	887	1049	1481	1775
M 30	466	623	1206	1422	2010	2403
M 33	633	850	1628	1932	2716	3266
M 36	814	1089	2099	2481	3491	4197
M 39	1059	1412	2716	3226	4531	5443
M 42	304	1746	3364	3991	5609	6727
M 45	1638	2177	2177	4992	7012	8414
M 48	1981	2638	2638	6021	8473	10150

19. SEALS

19.1 - Soft Packing

- Before replacing the soft seal, the seal ap in the bearing box and gland must be cleaned thoroughly. If there is a wearing seal sleeve or shaft, it should be replaced with a spare part.
- The soft packing should be cut at 90° the cut out of the first seal to be installed is at the top, the second one at the bottom revers asseby should be done. If there is a lantern ring put into place too.
- Place the gland and tighten the pump mest be started. The first run shouldn't be intervenerd for 5- 10 minutes and then the gland's nuts should be tightened evenly. This should be done every 5- 10 minutes until the leak reaches the desired value. This dripping shouldn't be less than 10 cm³/min. and more than 20 cm³/min.

19.2 - Mechanical Seal

- Mechanical seals do not leak like soft seals so there is no need for mechanical seal maintenance.
- You can learn the some information such as the required dimensions. instructions for use for mechanical seals from the mechanical seal manufacturers.
- When changing the mechanical seal, the surfaces should be cleaned well and foreign materials such as welding residue shouldn't come to the mechanical seal.
- Water should be used instead of such as oil to aid the assembly.

20. SPARE PARTS

- **ERDURO PUMP** is obliged to supply spare parts for all its pumps for 10 (ten) years from the time of manufacture. For the spare part orders, it will be sufficient to send the information on the label to the factory.

Recommended Two-Year Spare Parts Stock - According to (DIN 24296)

		Total Pump Quantity						
Part Number	Part Name	2	3	4	5	6 and 7	8 and 9	10 and 10+
210	Seal Suport	1	1	2	2	2	3	%20
040	Shaft	1	1	2	2	2	3	%20
459	Shaft Sleeve	2	2	2	3	3	4	%50
165	Mechanical Seal	1	1	2	2	2	3	%25
166	Soft Packing	4	6	8	8	9	12	%150
160	Bearing Set	2	2	4	4	6	8	%100
030	Impeller	1	1	1	2	2	3	%20
080	Bearing Housing	-	-	-	-	-	1	2 qty
220-099	O-ringler-Seals	4	6	8	8	9	12	%150
451	Wear Ring	2	2	2	4	4	6	%50



17. DISMANTLING

- Sure that the valves in the Suction and Delivery lines are closed.
- The pump body should be cooled to ambient temperature, the liquid in it should be drained and the pressure should be reduced.
- The oil in the bearing housing must be drained.
- Auxiliary equipment and auxiliary lines must be removed.
- Dismantling to coupling guard.
- Suction and discharge line are separated from the pump.
- The motor is separated from the base plate by removing the bolts on the motor feet.
- The snail is disconnected and the pump is separated from the bearing body assembly. If this process is done in large pumps, it should be put with support.
- If fastening materials such as studs, bolts, nuts are not removed, rust solvent or solvent may be used.
- To remove the impeller, it will be sufficient to unscrew the impeller nut and remove the impeller wedge. After the impeller is removed, the mechanical seal is also removed by tin. If the sleeve with the packing is worn, it should be contacted with the authorized service and replaced with a new one.
- The seal box is removed from the interconnecting cage and separated from the bearing housing group.
- couplings on the pump must be removed with a puller.



18. ASSEMBLY

- Pump installation should be done in reverse order of dismantling.
- Damaged gaskets and o-rings must be replaced.
- Flange gaskets must be replaced.
- Make sure that the bearing caps rest on the shaft invoices.
- The assembly should be started from the group where bearing oil is connected. Bearings should be mounted on the shaft by press. Fit bearing caps. After installing the seal box with the interconnection cage, the packing is placed and the impeller is fixed with the impeller nut. The pump assembly is completed by connecting this sub-assembly to the snail.
- The pump is placed on the base plate. The system is prepared by connecting the motor group and coupling set. Coupling adjustment must be made again.
- Suction and discharge lines must be connected and auxiliary equipment-accessories are attached.
- Coupling guard must be attached by making the coupling adjustment one more time. The motor must be electrically connected and the pump assembly must be checked one more time.



16. IDENTIC PART LIST

Pump Size Type	Mechanical Seal				Soft Packing				
	Pump Type	Shaft End	Mechanical Seal	Shaft	Bearing		Soft Packing Support	Soft Packing Length	Supporting Feet
					Coupling Side	Impeller Side			
A1	32-125	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	1 No.
A1	32-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	2 No.
A1	32-200	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	3 No.
A1	32-250	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	4 No.
A1	40-125	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	1 No.
A1	40-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	2 No.
A1	40-200	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	3 No.
A1	40-250	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	4 No.
A2	40-315	32	MG1 40 mm	3 No.	2x6308		2 No.	10-500 mm	7 No.
A1	50-125	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	2 No.
A1	50-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	3 No.
A1	50-200	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	3 No.
A1	50-250	24	MG1 30 mm	2 No.	2x6308		1 No.	8-380 mm	4 No.
A2	50-315	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	8 No.
A1	65-125	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	3 No.
A1	65-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	3 No.
A1	65-200	24	MG1 30 mm	1 No.	2x6306		1 No.	8-380 mm	4 No.
A2	65-250	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	7 No.
A2	65-315	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	8 No.
A2	65-400	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	10 No.
A1	80-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	4 No.
A2	80-200	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	6 No.
A2	80-250	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	7 No.
A2	80-315	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	9A No.
A3	80-400	42	MG1 50 mm	4 No.	2x6310		1 No.	12-630 mm	9B No.
A1	100-160	24	MG1 30 mm	2 No.	2x6306		1 No.	8-380 mm	5 No.
A2	100-200	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	7 No.
A2	100-250	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	8 No.
A2	100-315	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	9A No.
A3	100-400	42	MG1 50 mm	4 No.	2x6310		1 No.	12-630 mm	9B No.
A2	125-200	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	9A No.
A2	125-250	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	9A No.
A3	125-315	42	MG1 50 mm	5 No.	2x6310		1 No.	12-630 mm	9B No.
A3	125-400	42	MG1 50 mm	4 No.	2x6310		1 No.	12-630 mm	12 No.
A2	150-200	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	11 No.
A2	150-250	32	MG1 40 mm	3 No.	2x6308		1 No.	10-500 mm	11 No.
A3	150-315	42	MG1 50 mm	5 No.	2x6310		1 No.	12-630 mm	9B No.
A3	150-400	42	MG1 50 mm	4 No.	2x6310		1 No.	12-630 mm	12 No.
A4	150-500	55	MG1 60 mm	6 No.	2x6312		1 No.	12-940 mm	14 No.
A3	200-270	42	MG1 50 mm	5 No.	2x6310		1 No.	12-630 mm	13 No.
A3	200-315	42	MG1 50 mm	5 No.	2x6310		1 No.	12-630 mm	13 No.
A4	200-400	55	MG1 60 mm	6 No.	2x6312		1 No.	12-940 mm	14 No.
A5	200-500	70	MG1 85 mm	7 No.	7315	NU 2315	1 No.	16-1335 mm	15 No.
A5	250-350	70	MG1 85 mm	7 No.	7315	NU 2315	1 No.	16-1335 mm	15A No.
A4	250-400	55	MG1 60 mm	6 No.	2x6312		1 No.	12-940 mm	14 No.
A5	250-500	70	MG1 85 mm	7 No.	7315	NU 2315	1 No.	16-1335 mm	15A No.



14. CHECK LIST DURING PUMP IS WORKING

- Pump should work without high vibration, low noise.
- Pump shouldnt work at closed valve to avoid medium over heated.
- Ambient temprature shouldnt exceed 45 °C . Bearing box temprature shouldnt exceed 90 °C.
- The pump should not be operated in a closed valve, ie at a valve where the flow rate is zero.
- If pump is working as stand by situation, should work minimum 1 times per week.
- Control box should consist ampermeter. If there is over current situation, probably there is friction inside the pump. Apply to authorized service.
- WARNING! Don't work the pump without medium.
- Mechanical seal doesnt need any maintenance. If pump is with gland packing type, there should be leakage from seal side. If there is no leakage from seal side, pump should stop and check the area. Seal box screws should be tihtgen time by time.
- Check the coupling rubbers per 6 months.



15. LUBRICATION AND OIL CHANGE

- ETKF series pump lubricate with oil.

These oil lubricated pumps oil should be change first 250 hours work. With normal operation, oil should change minimum 1 time in a year or after work 3000 hours. Oil quantity is mentioned as below.

Pump Size Type	Shaft End Diameter ϕ	Bearing Type	Oil Amount (lt)
A1	24	2x6308	0.80
A2	32	2x6308	1.70
A3	42	2x6310	1.80
A4	55	2x6312	2.30
A5	70	7315x1-NU 2315x1	3.30

- Checke the oil level from bearing box. If there is any low level, add oil.

12. START-UP PROCEDURE



- Be sure that valve is totally closed at discharge side before start-up. When pump reach to the nominal speed, valve will open slightly.
- Suction line pressure should not be lower than atmospheric pressure.
- Open or Close the valve to set the pressure on required points. Pump Shouldnt work our of curve.
- If you faces with below problems, please stop the pump and apply to service;
- When temprature of medium increse and leakage situation
- Coupling and bearing box side temprature increase
- Over pressure or low pressure
- Not pressuration situation
- Decreasing capacity
- High Vibration
- High noise situation

13. PUMP STOP PROCEDURE

- Close the discharge valve slightly.
- If system consist check valve at discharge line, pump can stop directly without closing discharge valve.
- Be sure that suction valve is totally open. And pump stop without high vibration and high noise.
- If system will not work long time, suction valve should be close. The medium inside the piping line and pump should be take out from system. It is very important especially cold weather application.



10. ELECTRICAL CONNECTION

- In three-phase motors, the direction of motor rotation should be in the clockwise direction when viewed from behind the motor in accordance with DIN VDE 0530. The direction of rotation of the pump should be counterclockwise when viewed from the suction flange. It must be connected as above to make sure it is correct.
- It is recommended to use PTC sensor in motors. This is according to the customer's request. If to be used, PTC sensor in accordance with DIN 44081/44082 should be used. The PTC sensor must be connected to the terminal box of the electric motor and from there they must be connected to the thermistor control device on the electric motor control panel.
- Electric motors should be protected by circuit breakers against overload.
- If the three-phase motor connected as a star/delta connection, the time period has to be short when the motor connection turns star connection to delta connection. If this period would longer than a normal period, it would damage the electric motor.
- If the electric motor power is 30 or less than 30 kW, the star connection time period must be less than 3 seconds. If the electric motor power is bigger than 30 kW, the time period must be less than 5 seconds. In cases where the motor rotation direction is reversed, both phases should be replaced.



11. CHECK LIST BEFORE START-UP

- Check once again to coupling alignment.
- Warning signs must be hung and will wear protective clothing.
- Be sure that pump shaft is turning slightly.
- Pump should work until it comes to system temprature, than set coupling alignment again.
- Be sure that pump is full fill with medium.
- Be sure that turning rotation is correct.
- Be sure that assisted equipments are working safely.
- Be sure that pump consist bearing lubrication for minimum 1 year work.
- Be sure that, medium sourche enough to work pumps safely
- If system consist suction valve, take-off the air from top of piping system than fill with medium.

WARNING! Don't work the pump without medium.

10. ELECTRICAL CONNECTION



- Electrical connections should be made by experts who has knowledge and experience in electricity. These electric connection operations should be be carried out in accordance with international standards and regulations.
- Electric motors must be produced in accordance with EN 60034-1 standard.
- Check the current main voltage according to the data on the motor label and be sure to make right connection. Motor protection unit is recommended.

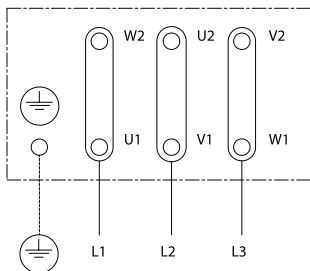


Figure 10.1.1 Delta Connection (Low Voltage)

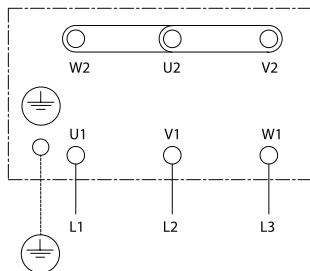


Figure 10.1.2 Star Connection (High Voltage)

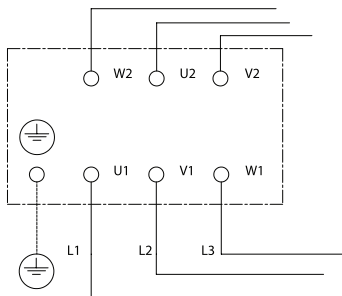
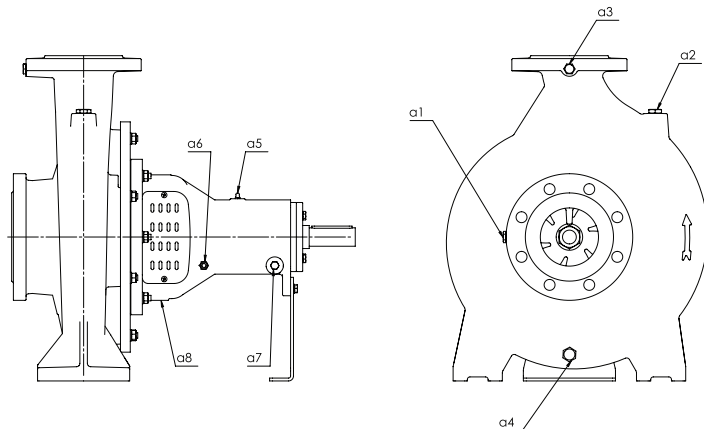


Figure 10.1.3 Y/Δ Connection



9. AUXILIARY ELEMENTS AND ACCESSORIES

- Depending on applications, auxiliary elements should be used to check vacuum, pressure, temperature etc. values also auxiliary should be used for seal washing, cooling, watering etc.
- Vacuum or pressure measurements should be made from the point where is closest to the pump flanges.
- Seal washing pipes should be installed properly and correctly.
- Each pump has drain holes in the body to drain water and to reduce water leakage from the seal box.



- a1: Suction Flange Pressure Gauge Connection
a2: Air relief and water filling plug
a3: Discharge Flange Pressure Gauge Connection
a4: Drain plug
a5: Oil filling and air relief plug
a6: Oil level indicator
a7: Oil relief plug
a8: Seal Leakage Drain Hole

8. CONNECTION OF PIPE INSTALLATION

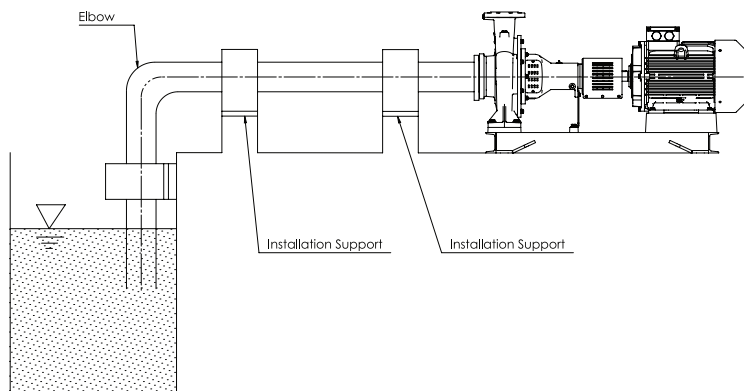


Figure 8.1.2. Negative Suction

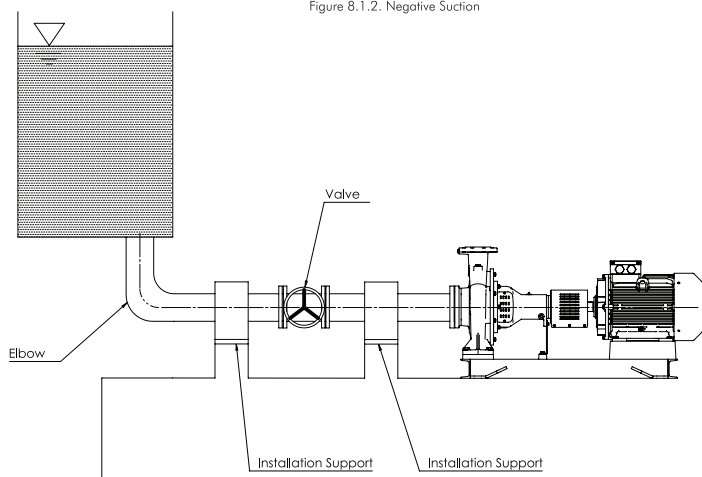


Figure 8.1.3. Positive Suction



8. CONNECTION OF PIPE INSTALLATION



ATTENTION!

- Never use the pump as a support or carrier point. The pump must never carry the weight of the pipes.
- Piping support points should be selected from points close to the pump and the pump should be mounted without any load.
- Eccentric reduction should be used to avoid creating cavitation in the pump suction line.
- Our recommendation is "Nominal diameters of suction and discharge pipes should be selected bigger than nominal diameters of suction and pressure of the pump."
- Depending on the pump and operating conditions, control element and closing element must be installed.

Control and protect elements should be installed to avoid the pump from mechanical loads and thermal expansion.

- The pump installation must be well cleaned for protect to pump from dirt, welding waste, or casting slags before the pump is put into operation. The pump installation has to include suction valves and filters.
- Gaskets placed between pipe and pump flanges should be properly centred and should not block flow.
- Flow in suction side should not exceed 2 m/s and the flow speed in discharge side should not exceed 3 m/s. The flow with high velocity cause pressure drop, cavitation on suction side and friction losses in the discharge pipe.

7. CLUTCHING ALIGNMENT

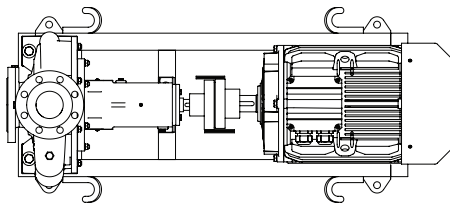


Figure 7.1.3. the Non-Coaxial State of the Coupling in the Horizontal Plane

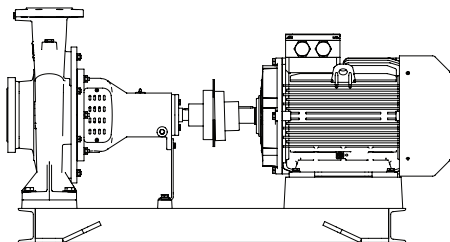


Figure 7.1.4. Angle Failure in the Horizontal Plane

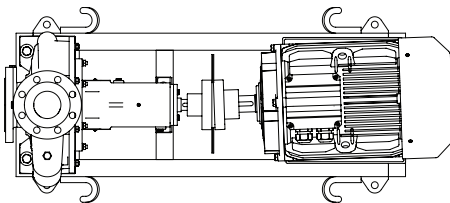


Figure 7.1.5. Angle Failure in the Vertical Plane

- To check the angular failure, the gap between the coupling halves must be the same at all points horizontally and vertically
- To control parallel sliding error, straight edged steel ruler is pressed down on one half of the coupling in parallel to the axis. It is checked against the other half. Straight edge must touch to the both half couplings completely same at all points in each vertical and horizontal planes.
- Alignment errors can be either on vertical plane or horizontal plane. On vertical plane alignment is corrected by inserting shims under the pump or motor foot, and on horizontal plane alignment is corrected by sliding the pump and/or motor horizontally sideways by using the gaps at mounting holes.

ATTENTION! Following any alternation, each alignment should be rechecked because any movement due to an adjustment in one direction may cause misalignment in another.

7. CLUTCHING ALIGNMENT

- Adjustment of the coupling is very important for the smooth operation of the pump system. for a trouble free service life of the pumping unit the most important factor is aligning the coupling properly. The main reason for noisy operation, vibration, warming bearings and overloading is an unaligned or misaligned coupling.
 - After baseplate installation and connection of the installation the coupling adjustment should be done properly. This is the buyer's responsibility. ETKF series pumps are dispatched from our factory after the coupling alignment is precisely secured if supplied with driver and baseplate, a certain amount of deformation of the baseplate is possible during transit, installation, handling.
 - Motor axis and pump axis must be in the same direction.
- After the axes are in the same direction, they are connected to the baseplate. Flat plates or wedges are placed under the motor feet until the pump axis and motor axis are the same.

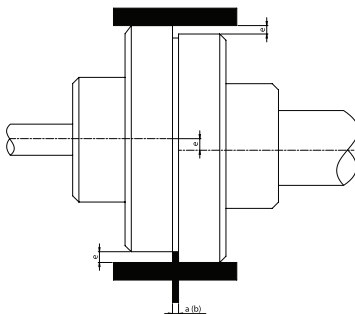


Figure 7.1.1. Aligning a Flexible Coupling

- A flexible coupling should never be expected to correct misalignment.
- It is used to normalize the expansions caused by temperature change, which are used to allow the movement of the shaft ends used to avoid friction in power transfer to pump from motor.
- A smooth - edged tool such as a steel ruler and a precise calliper are needed to align the coupling.

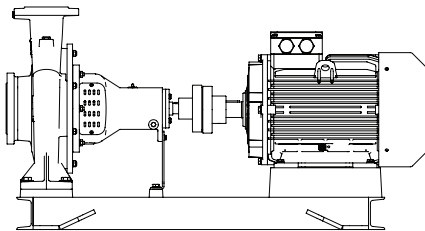


Figure 7.1.2. the Non-Coaxial State of the Coupling in the Vertical Plane



6. INSTALLATION

6.1 - Before Start to Pump Installation

- Protectors parts on suction and discharge flanges should be removed and cleaned thoroughly.
- The pump should be installed in a frost and dust-free, well-ventilated and non-explosive environment.
- In order for the pumps to be easily installed a comfortable working area must be available.
- The suction pipe should be kept as short as possible.

6.2 - Installation of the Pump

- Installation of pump group to ground by anchoring stud bolts;
- Pump group is placed to center the stud bolt slots which are opened in ground concrete. The anchor bolts are inserted in to their seats by passing through the connection holes on the pump base plate.
- Pump group is placed over base concrete. Water balance is placed over pump discharge flange and horizontality of pump is controlled. If there is a horizontal imbalance in pumps position, steel wedges are put under frame and balance of pump group is obtained.

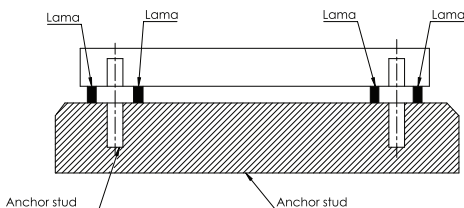


Figure 6.2.1. Foundation Concrete, lama and anchorage application

- Nuts of anchoring stud bolts are installed.
- Anchoring stud bolts holes are filled with concrete or special epoxy concrete mortar.
- Anchoring stud bolts are reciprocally tightened.
- Coupling setup is controlled again in this situation.
- Baseplate up to 400 mm width are resistant to bending. They do not need to be filled cement. After the connection in 400 mm wide baseplate, it should be filled with cement to the top of the baseplate.
- The anchor bolts are tightened thoroughly after making sure that the concrete is completely filled.
- Coupling adjustment is again checked with template. If there is any coupling misalignment, corrections should be made.
- Pump suction and discharge flange connections are checked. If there are unnecessary strains and cracks they are eliminated.
- The coupling guard put in place after the coupling adjustment.



5. STORAGE AND PROTECTION



ATTENTION!

- If the pump group is not to be installed soon after arrival, store the pump in a low moisture, dry and frost free place.
- If the pump has regreaseable bearings, pump extra grease on bearings to prevent moisture from entering around the shaft.
- The places where the pump will be mounted should be closed to protect it from dust, moisture, dirt and foreign materials.
- Pump shaft should be rotated a few turns for preventing pitting around pump bearing surfaces and jamming of shaft.



6. INSTALLATION

- Installation has to be carried out in accordance with EN 60204.
- The pump should only be installed, levelled up and aligned by skilled personnel. Incorrect installation or defective foundation could result in troubles. Erduro co. is not responsible for malfunctions that may occur due to faulty installation and pump floor. This would not be covered by the warranty.
- Concrete floor, DIN 1045/1 or similar standards to this standard should be made, the ground suitability should be ensured to be horizontal and flat.
- If the pump has been supplied with bare shaft end it is required to prepare a proper base plate on which to mount the pump and motor assembly, the base plate must be properly designed and manufactured for enough rigidity to prevent vibrations and distortions.
- If the pump has been supplied bare shaft and without electrical motor is necessary to select a proper motor before proceeding to the installation of the unit. The following considerations must be taken into account for selection of motor;
 - Maximum power absorbed by the pump (over the total operating range)
 - Pump operating speed (1450 rpm, 2900 rpm etc.)
 - Available power (frequency, voltage etc.)
 - Motor type (Tefc, Ex-Proof, Diesel etc.)
 - Motor mounting position (foot mounted, flange mounted, horizontal, vertical etc.)
- The coupling (clutch) adjustment should be coaxial with pump and motor shafts vibration consisting of non-adjustable coupling damages any part of the pump.



4. SHIPMENT PROCESS

4.2 - Lowering & Loading Process of Pump and Motor Assembly

- Determine the maximum weight, dimensions and sizes that will be carried.
- Determine the lifting points.
- During lifting, acceleration and braking operations should not be done in a dangerous way and must be handled with care.
- It should not be standing under and next to the removed product.
- The pump and pump unit should be transported as shown in the figure below. (It should not be lifted by the motor suspension bolt or shaft.)

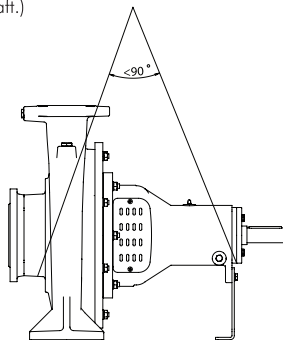


Figure 4.2.1. Transportation of the Pump

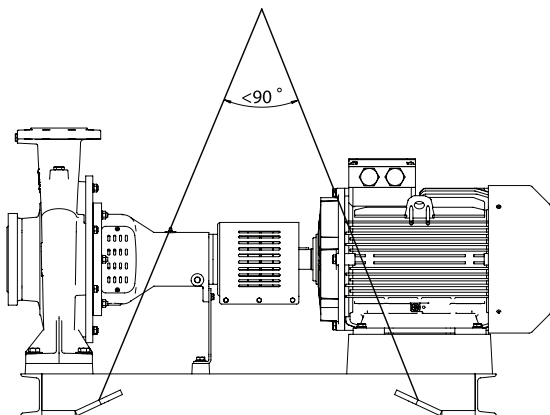


Figure 4.2.2. Transportation of the Pump Assembly

3. TECHNICAL SPECIFICATIONS

3.5 - Pump Label Information

Erduro		Centrifugal Pump www.erduro.com	
TP:		No:	
Y:		H:	M
Q:	m ³ /h	Ø:	mm
P:	kW	MEI ≥	
n:	rpm		
MS:			
Made In TURKEY		→	EN ISO 9905 TS EN 733

TP : Pump Type
Y : Production Year
No : Serial Number
Q : Flow Rate
H : Pump Head
Ø : Impeller Diameter
P : Motor Power
n : Rotation Speed
MEI : Energy Efficiency Index
MS : Montage Seal

4. SHIPMENT PROCESS

- The pump unit must always remain horizontal during the transportation process.
- Pumps must never be transported from shafts and motor shafts.
- Please inform ERDURO service department and the shipping company about the damaged product during transportation.
- Make sure that the products or parts listed in the packing slip are all complete. Otherwise, contact ERDURO service department.

4.1 - Transportation Process



General Warnings

- The facility must take the necessary measures during the transportation process.
- Depending on the weight, structure and volume, use appropriate cranes, forklifts and lifting devices to lower and load wooden crates, packaging, boxes and pallets.
- Use protective equipment during transportation. (Ex. Gloves, Safety Helmet... etc)



3. TECHNICAL SPECIFICATIONS

3.1 - Pump Description

- ETKF pump series are single stage, end suction centrifugal pumps with horizontal shaft, radial separable volute casing, closed impeller or open impeller, with base plate connection and removable from the back.

ETKF Pump dimensions are in accordance with TS EN 733 / DIN 24255

3.2 - Application Areas

- Chemical and Petrochemical Industry
- Heating and Cooling facilities
- Water Supply
- Fire Extinguishing Facilities
- Irrigation Systems
- Power Stations
- Paper and Pulp Industry
- Food Industry

3.3 - Description of the Pump Code



3.4 - Technical Information

- Speed: up to 3600 rpm
- Discharge Flange: DN32... DN250
- Suction and Discharge Flanges: TS EN 1092-2 / PN 16
- Operating Temperature: -25°C... 140°C cooled gland packing
- Ambient Temperature (Maximum): + 40°C
- Casing Pressure: 10 bar - 16 bar
- Insulation Class: F
- Protection Class: IP55
- Motor Connection: Single-Phase 220V-50Hz, Three-Phase 380 V-50 Hz
- Motor Options (Optional): Special Voltage, Frequency

* Pump materials may vary depending on operating fluid, operating temperature and pressure.



2. SAFETY INSTRUCTIONS



The following safety instructions must be strictly followed.

- The pump should not be operated in the opposite direction.
- Do not walk on the pump or the installation connected to it.
- Do not touch excessively hot or cold pumps and pipes that will cause danger. Take precautions for the user.
- Do not forget to put warning signs.
- Rotating mechanisms that will cause an accident should not be disassembled, such as couplings, never be removed when operating.
- The pumped liquids are explosive, hot, chemical, etc. In case of a leak, precautions should be taken against leaking and environmental laws should be applied.
- Before working on the pump, the motor must be disconnected from the power and make sure that it is disconnected.
- Necessary precautionary and warning markers should be placed and applied for electrical hazards.
- Work should not be performed without stopping the pump system.
- The pump system should be cooled at room temperature.
- Before the pump body is maintained and repaired, the system must be stopped, cooled, the pressure must be reduced and the liquid in it must be drained.
- Removed warnings should be placed back after working on the pump.
- Do not insert your hand or finger into the gaps or holes on the pump system.
- Stress, contraction and weights in the plumbing system should not be transferred to the pump.



1. GENERAL WARNINGS ABOUT THE USER GUIDE

The purpose of this manual is,

It is prepared to inform about the installation, maintenance, repair and use of the pump and to make your operations easier.

Responsible persons need to read, review, store this manual and be in a safe place, within easy reach.

For efficient, accurate and reliable operation of the pump, it is necessary to follow the instructions for use.

Responsible persons should have knowledge and experience on the subject, and have the command of security-related standards.

If the pump needs to be operated outside of the desired operating conditions (type of fluid pressed, flow rate, speed, density, pressure, temperature and motor power limits), contact ERDURO authorized service. ERDURO is not responsible for any damages caused by the ERDURO authorized service being operated without the written approval of the ERDURO authorized service.

If the delivered pump will not be installed immediately, the environmental conditions of the place to be stored (humidity, temperature, etc.) must be appropriate. Otherwise, too dry or humid, hot or cold ambient conditions may damage the pump.

This user manual does not cover the safety rules applicable at the place of use.

The usage life of the pumps determined and announced by the Ministry is 10 (ten) years.

1.1 - Meaning of Signs



General danger sign according to
ISO 7000-0434



Danger sign according to IEC 417-5036



Priority, importance

Technical support team is listening to you.

For your questions and opinions;

info@erduro.com



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ETKF SERIES

Horizontal Single Stage EN 733 Pumps

Operation and Maintenance Guide

