NOTE

NOTE

NOTE

27. WARRANTY CONDITIONS

1- The warranty period starts from the delivery date of the product and the period is for 2 (two) years.
2- All parts of the delivered product are under warranty of our company.
3- If the product fails during the warranty period due to material and workmanship or assembly faults, it will be repaired without any charge under the name of labor cost, replacement part price, or any other name.
4- Damages and malfunctions resulting from usage errors and using contrary to the usage and maintenance instructions in the product's user manual are not covered by the warranty.

- Regarding the product; If people other than the authorized service intervene in product promotion, assembly operations, technical controls, etc., the entire product is out of warranty. Malfunctions caused by parts not purchased from authorized services are not covered by the warranty.
- Malfunctions that may occur due to voltage drop or increase or faulty electrical installation are not covered by the warranty.
- The parts that wear out due to usage and consumables, that are worn out, that become calcified, that have lost their function due to contamination and the damage and malfunctions caused by the loss of these parts are not covered by the warranty.

5- In case of the product malfunctions within the scope of the warranty period, the time passed for repair is added to the warranty period . Repair cannot exceed 30 working days. This period starts from the date of acceptance of the notification to the service station (in case the service station is not available, to the seller, dealer, agency, representative office, importer or manufacturer) of the malfunction related to the product. Consumer's fault notification; It is possible to do by phone, fax, e-mail, registered mail or similar. However, in case of dispute, the burden of proof belongs to the consumer.
6- Repair cannot exceed 30 working days. If the fault of the product is not corrected within 10 working days, the manufacturer-producer or importer must allocate another industrial product with similar characteristics to the use of the consumer until the repair of the good is completed. If another good with similar features is not requested by the consumer, the manufacturer or importer is relieved of this obligation.
*Work day; working days other than national, official and religious holidays and New Year, May 1 and Sunday
7- Although the consumers use their right to repair;

- The product fails at least four times within a year within the warranty period from the date of delivery to the Consumer, and more than six times within the specified warranty period, as well as these failures make it permanent not to benefit from the product,
- Exceeding the maximum time required to repair the problem,
- In cases where it is determined that the repair of the defect is not possible, the service station of the company (if the service station is not available, respectively, the seller, dealer, agency, representative, importer or manufacturer), with a report,the consumer can demand free replacement of the product, a refund or a discount in proportion to the defect.

8- If it is found that the good is defective, the consumer can use one of the limited optional rights listed below:

- Canceling the contract by declaring that it is ready to return the sold product,
- Retaining the sold and asking for a discount from the sales price at the rate of defects,
- Requesting the seller to replace it with a similar one without any defects.

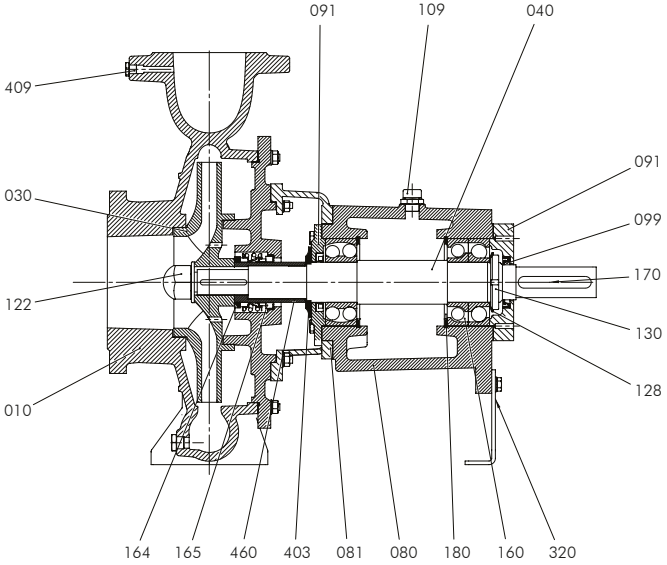
9- If the replacement of the product with a similar product without defects will bring disproportionate difficulties for the seller, the consumer can use one of the rights to withdraw from the contract and to discount the defect rate from the price.
10- The warranty period of the product replaced during the warranty application is limited to the remaining warranty period of the purchased product.
11- Invoices issued for sold goods do not replace warranty.
12- For problems that may arise regarding the warranty certificate, the Ministry of Customs and Trade, General Directorate of Consumer Protection and Market Surveillance can be applied.
13- Consumers can submit their complaints and appeals to consumer arbitration committees and consumer courts.

26. 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.

24. PUMP SECTIONAL VIEW

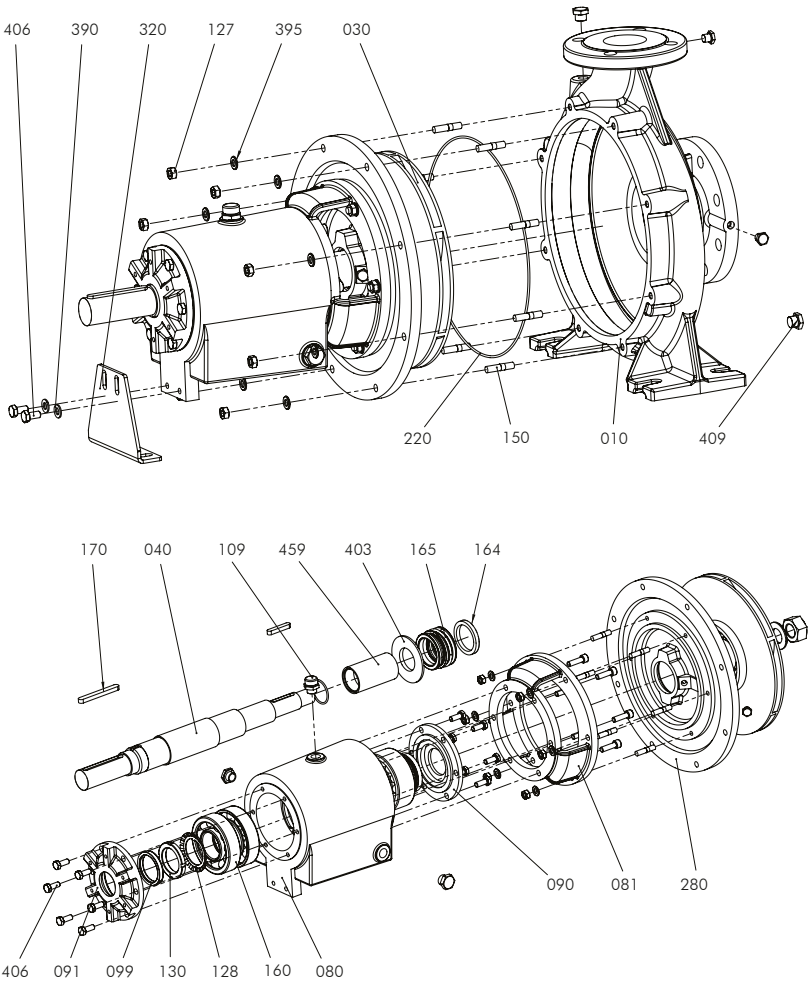


25. PART NUMBER AND PART NAME LIST

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 Plus
109	Air Bleed Plug
320	Destek Ayağı
406	Full-pass Bolt-Key head
220	O-ring
280	Seal Box

23. PUMP DISASSEMBLY VIEW



22. 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 housings								X	
Lubrication system does not work								X	
The housings are very tightly mounted								X	
There is excessive axial load								X	
Insufficient lubrication								X	
Bearing assembly incorrect								X	
Excessive housings 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								

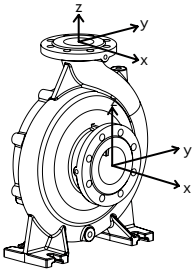
Reason For Failure \ Fault	The pump does not suction	Pump does not deliver label flow rate	Pump does not deliver label pressure	Pump does suction after first run	Motor overlands	There is noise or vibration	Seal box overheats	The seal box overheat and deform	Irregularity and turmoil in the flow
Impeller 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	

22. 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 overlands	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
NPSH (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
Foot valve is too small		X							
Foot valve 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 overlands	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	

21. LOADS AND TORQUES ON THE PUMP FLANGE



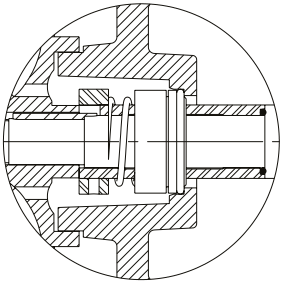
PumpType			Suction Flange								Discharge Flange							
			Forces (N)				Moments (N.m)				Forces (N)				Moments (N.m)			
	Dne	Dnb	Fx	Fy	Fz	Fb	Mx	My	Mz	Mb	Fx	Fy	Fz	Fb	Mx	My	Mz	Mb
32-125	50	32	580	520	520	910	490	350	400	720	315	300	370	580	385	260	300	560
32-160																		
32-200																		
32-250																		
40-200	65	40	600	650	595	1150	525	385	420	770	385	350	440	680	455	315	370	665
40-250																		
50-160		50									525	470	580	910	490	350	400	720
50-200																		
50-250																		
50-315	80	50	875	790	720	1380	560	400	455	820	525	470	580	910	490	350	400	720
65-160		65									650	595	735	1155	525	385	420	770
65-200																		
65-250																		
65-315																		
80-200	100	80	1170	1050	945	1840	610	440	510	910	790	720	875	1380	560	400	455	770
80-250																		
80-315																		
80-400																		
100-200	125	100	1380	1240	1120	2170	735	525	665	1070	1050	945	1170	1840	610	440	510	910
100-250																		
100-315																		
100-400																		
125-200	150	125	1750	1575	1410	2750	875	610	720	1280	1240	1120	1380	2170	735	525	665	1070
125-250																		
125-315																		
125-400																		
150-200	200	150	2345	2100	1890	3660	1140	805	930	1680	1575	1420	1750	2750	875	610	720	1280
150-250																		
150-315																		
150-400																		
150-500																		
200-270	250	200	2920	2607	2360	4570	1550	1100	1280	2290	2100	1890	2345	3660	1140	805	930	1680
200-315																		
200-400																		
200-500																		
250-350	300	250	3500	3130	2810	5480	2110	1505	1730	3115	2610	2360	2920	4570	1560	1100	1280	2300
250-400																		
250-500																		

20. TIGHTENING MOMENT

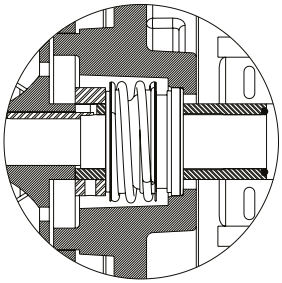
Metric Bold	Tightening torques according to quality classes Nxm (Newton x Meter)					
	4.6	5.6	6.9	8.8	10,9	12,9
M 2	0,15	0,2	0,3	0,4	0,5	0,6
M 2,2	0,2	0,3	0,5	0,6	0,8	1
M 2,5	0,3	0,4	0,8	0,9	1,2	1,5
M 3	0,5	0,6	1,2	1,4	1,9	2,3
M 3,5	0,7	0,9	1,8	2,1	2,9	3,5
M 4	1	1,5	2,6	3	4,3	5,2
M 5	2	3	5	6	9	11
M 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

18. SEALING

18.3 - Mechanical Seal Types



M32N Application



MG1 Application

Pump Size Type	Shaft End Diameter ø	Mechanical Seal Diameter
A1	24	35
A2	32	45
A3	42	55
A4	48	60
A5	55	65
A6	70	85

19. 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 Supoort	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

18. SEALING

18.1 - Soft Packing

• Before replacing the soft seal, the seal ap in the stuffing 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 assebly 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 should't be intervened 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.

18.2 - Mechanical Seal

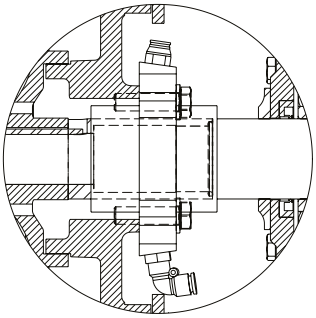
• Mechanical seals do not leak like soft seals so there is no need for mechanical seal maintenance.

• You can learn the some information such as the required dimensions. instructions for use for mechanical seals from the mechanical seal manufacturers.

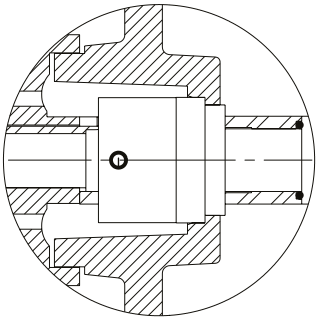
• When changing the mechanical seal, the surfaces should be cleaned well and foreign materials such as welding residue shouldn't come to the mechanical seal.

• Water should be used instead of such as oil to aid the assembly.

18.3 - Mechanical Seal Types



Cartex Application



M7N Application

16. DISASSEMBLY

- 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.

17. 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.

14. OBSERVATION THAT MUST BE MADE DURING OPERATION

- Pump should work without high vibration, low noise.
- Pump shouldnt work at closed valve to avoid medium over heated.
- Ambiant 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 value 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 tihgten time by time.
- Check the coupling rubbers 6 mounths.

15. LUBRICATION AND OIL CHANGE

- ETKF-AH series pump lubricate with oil.

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

Pompa Size Type	Shaft End Diameter ø	Bearing Type	Oil Amount (lt)
A1	24	1 x NU 2307 - 2 x 7307	0,80
A2	32	1 x NU 2309 - 2 x 7309	1,60
A3	42	1 x NU 2311 - 2 x 7311	1,80
A4	48	1 x NU 2313 - 2 x 7313	2,90
A5	55	1 x NU 2312 - 2 x 7312	2,20
A6	70	1 x NU 2315 - 2 x 7315	3,30

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

12. START-UP THE PUMP

ATTENTION!

• Be sure that valve is totaly 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. SHUT-OFF THE PUMP

• 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 totaly 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 the pump side. 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. FINAL CONTROL OF THE PUMP

- 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 liquid.

10. ELECTRICAL CONNECTION

ATTENTION!

• Electrical connections should be made by experts who has knowledge and experience in electricity. These electric connection operations should 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.

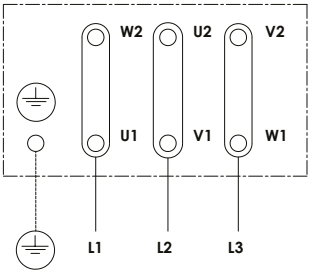


Figure x.x. Delta Connection (Low Voltage)

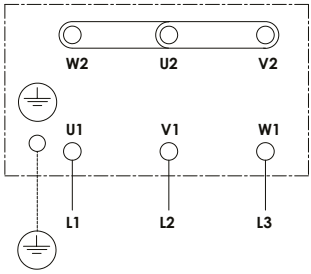


Figure x.x. Star Connection (High Voltage)

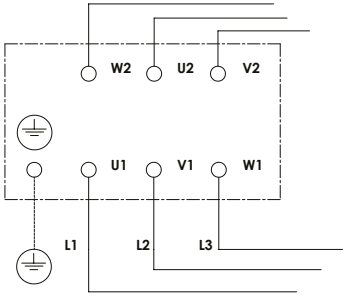
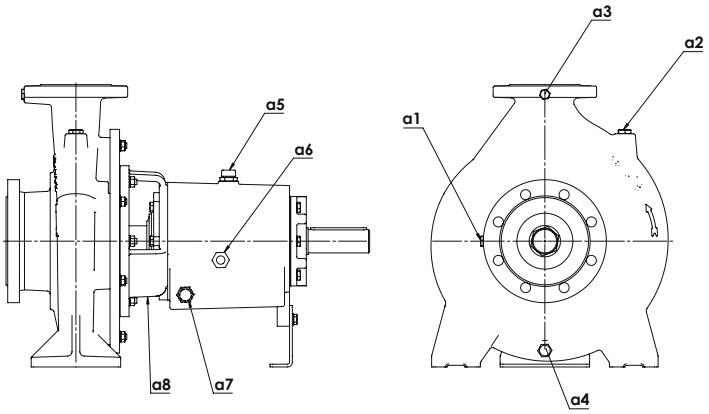


Figure x.x. Y/Δ Connection

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 flange.
• 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 releif plug
a6: Oil level indicator
a7: Oil relief plug
a8: Seal Leakage Drain Hole

8. CONNECTION OF PIPE INSTALLATION

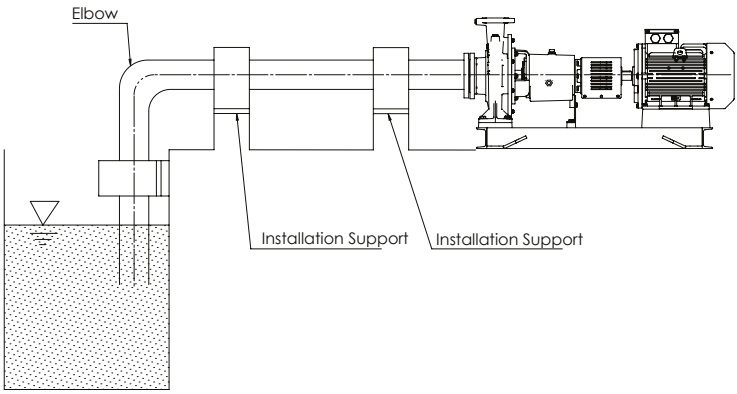


Figure 8.1.2. Negative Suction

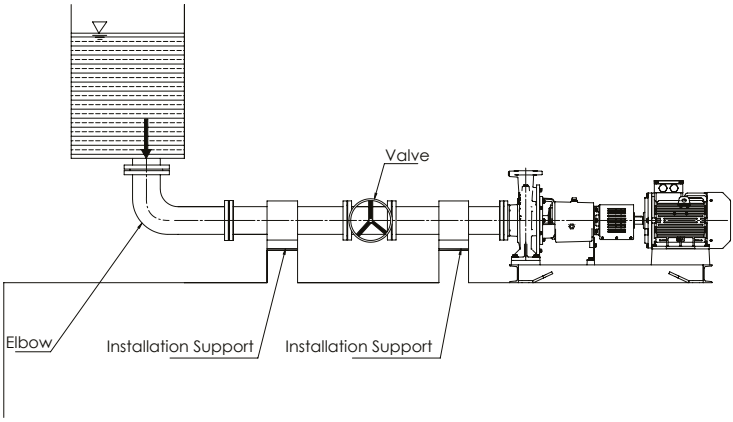


Figure 8.1.3. Positive Suction

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 dischare 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

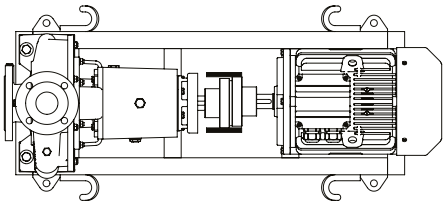


Figure 7.1.3. the Non-Coaxial State of the Coupling in the Horizontal Plane

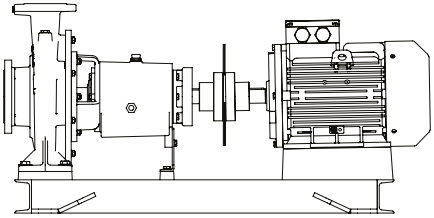


Figure 7.1.4. Angle Failure in the Vertical Plane

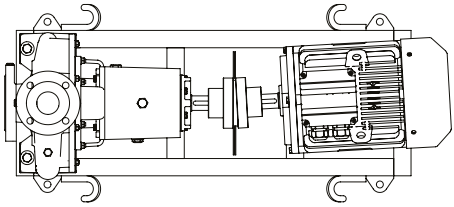


Figure 7.1.5. Angle Failure in the Horizontal Plane

• 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-AH 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 line.

After the axes are in the same line, 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.

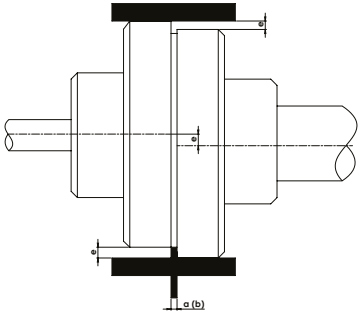


Figure 7.1.1. Aligning a Flexible Coupling

• A flexible coupling or rubber 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 calliper and a precise calliper are needed to align the coupling.

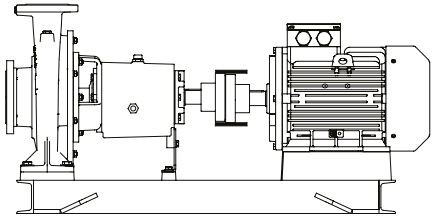


Figure 7.1.2. the Non-Coaxial State of the Coupling in the Vertical Plane

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.

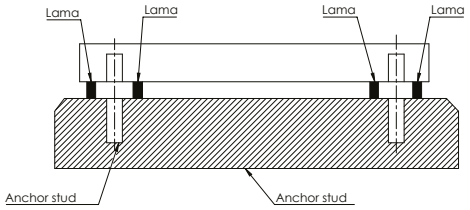


Figure 6.2.1. Foundation Concrete, lama and anchorage application

- Nuts of anchoring stud bolts are fastened.
- Anchoring stud bolts holes are filled with concrete or special epoxy concrete mortor.
- Anchoring stud bolts are reciprocally tightened.
- Coupling setup is controlled again in this situation.
- Baseplate up to 400 mm width are resistand to bending. They do not need to be filled cement. After the connection in 400 mm wide baseplate, it should be filled ith 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 misaligment, corrections should be made.
- Pump suction and discharge flange connections are checked. If there are unneccessary strains and cricks 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 Ltd. 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 assebly, 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 ranges)
- 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. TRANSPORT PROCEDURES

4.2 - Disloading / Loading Process Of Pump And Motor Group

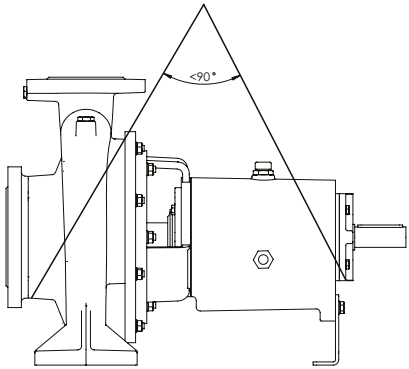


Figure 4.2.1. Transportation of the Pump

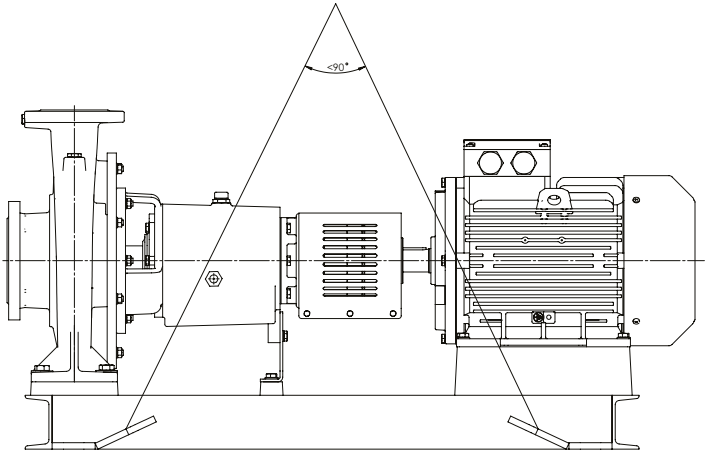


Figure 4.2.2. Transportation of the Pump Assembly

4. TRANSPORT PROCEDURES

• 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 - Transport Procedures

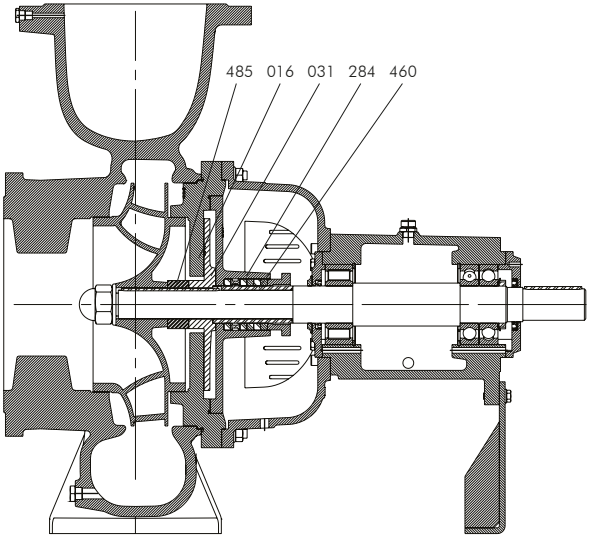
General Warnings

• 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)

4.2 - Disloading / Loading Process Of Pump And Motor Group

• 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.)

3.7 - Expeller Impeller Application



Part Number	Part Name
485	Impeller Setting Sleeve
031	Expeller Impeller
284	Seal Box

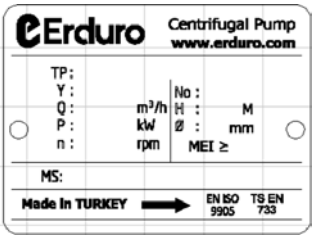
Part Number	Part Name
460	Sealing Setting Sleeve
016	Diffuser Cover

• This type of heavy-duty pump applications are used to transfer fluids such as clean and slightly contaminated liquids, viscous liquids, fibrous slurries, large solids containing liquids and chemical liquids.

• Its application areas are food and beverage industry, iron and steel industry, mining, power plants, paper industry, chemical industry, oil industry, sugar factories etc. It is used in gland packing and mechanical seal designs.

• As a working principle, the expeller impeller behind the pump impeller reduces the pressure coming to the seal sleeve area and prevents the seal from wearing out and deforming in a short time.

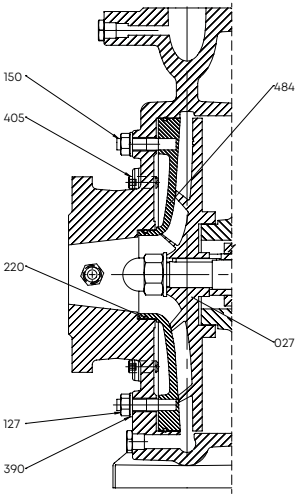
3.5 - Pump Label Information



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

3.6 - Semi-Open Impeller Application

150	Stud Bolt
405	Set Screw
220	O-ring
127	Nut
390	Washer
484	Wear Plate
027	Impeller



3. TECHNICAL SPECIFICATIONS

3.1 - Pump Description

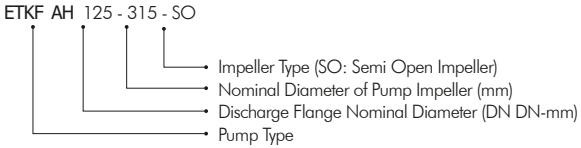
• ETKF AH pump series are single stage, end suction centrifugal pumps with horizontal shaft, radial separable volute casing, closed impeller or open impeller, with base plate connection and removable from the back.

ETKF-AH Pump dimensions are in accordance with TS EN 22858 / ISO 2858.

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 2900 rpm
- Discharge Flange: DN32-DN250
- Flow Rate: 1750m^3/h
- Pump Head: 160 m
- Suction and Discharge Flanges: TS EN 1092-2 / PN16
- Operating Temperature: -10°C… 140°C cooled gland packing
- Ambient Temperature (Maximum): + 40°C
- Casing Pressure: 16 Bar (25 Bar)*
- Motor Insulation Class: F
- Motor Protection Class: IP55
- Motor Connection: Single-Phase 220V-50Hz, Three-Phase380 V-50 Hz
- Motor Options (Optional): Special Voltage, Frequency

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

2. SAFETY INSTRUCTIONS

ATTENTION!

The following safety instructions must be strictly followed.

- The pump should not be run in the reverse direction.
- Do not put any load on the pump and do not walk on the installation connected to the pump.
- Do not touch the pumps and pipes that will cause danger. Take precautions for the user.
- Do not forget to put up warning signs.
- The protection parts of rotating mechanisms (such as couplings) that will cause accidents should not be disassembled and should never be removed during operation.
- The pumped liquids are explosive, hot, chemical, etc. measures should be taken against leakage that may pose a danger in case of occurrence and the provisions of the environmental law should be applied.
- Before working on the pump, the electrical connection of the motor must be disconnected and it must be made sure that it is.
- Necessary precautions and warning markers should be placed and applied for electrical hazards.
- No work should be done on the pump system without stopping it.
- Before the pump body is serviced and repaired, the system must be stopped, cooled, depressurized and drained of liquid.
- After work is done on the pump, the cautions that were removed must be put back in their places.
- Do not insert your hand or finger into the gaps or holes in the pump system.
- Tension, 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 user manual;

• It has been prepared to inform you about the installation, maintenance, repair and use of the pump and to make your operations easier.
• Persons responsible are required to read, examine, store and keep this manual in a safe place that is easily accessible.
• The operating instructions must be followed for efficient, correct and reliable operation of the pump.
• The responsible persons must have knowledge and experience on the subject, and must have a good command of safety-related standards.
• Contact ERDURO authorized service, if the pump needs to be operated outside the desired operating conditions (type of fluid, flow rate, speed, density, pressure, temperature and motor power.)
• ERDURO is not responsible for any damages that occur due to the operation of the ERDURO authorized service without the written consent of the specified working conditions.
• If the delivered pump will not be installed immediately, the environmental conditions (humidity, temperature, etc.) of the place to be stored must be suitable. Otherwise, excessively 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 service life of the pumps determined and announced by the Ministry is 10(ten) years.

1.1 - Meaning of Signs

General danger mark according to ISO 7000-0434.

General danger sign according to IEC 417-5036.

CAUTION

Priority, importance status.

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ENG

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Erduro Fluid Solutions

ETKF-AH SERIES

Horizontal Single Stage ISO 2858 Pumps

Operation and Maintenance Guide

ENG