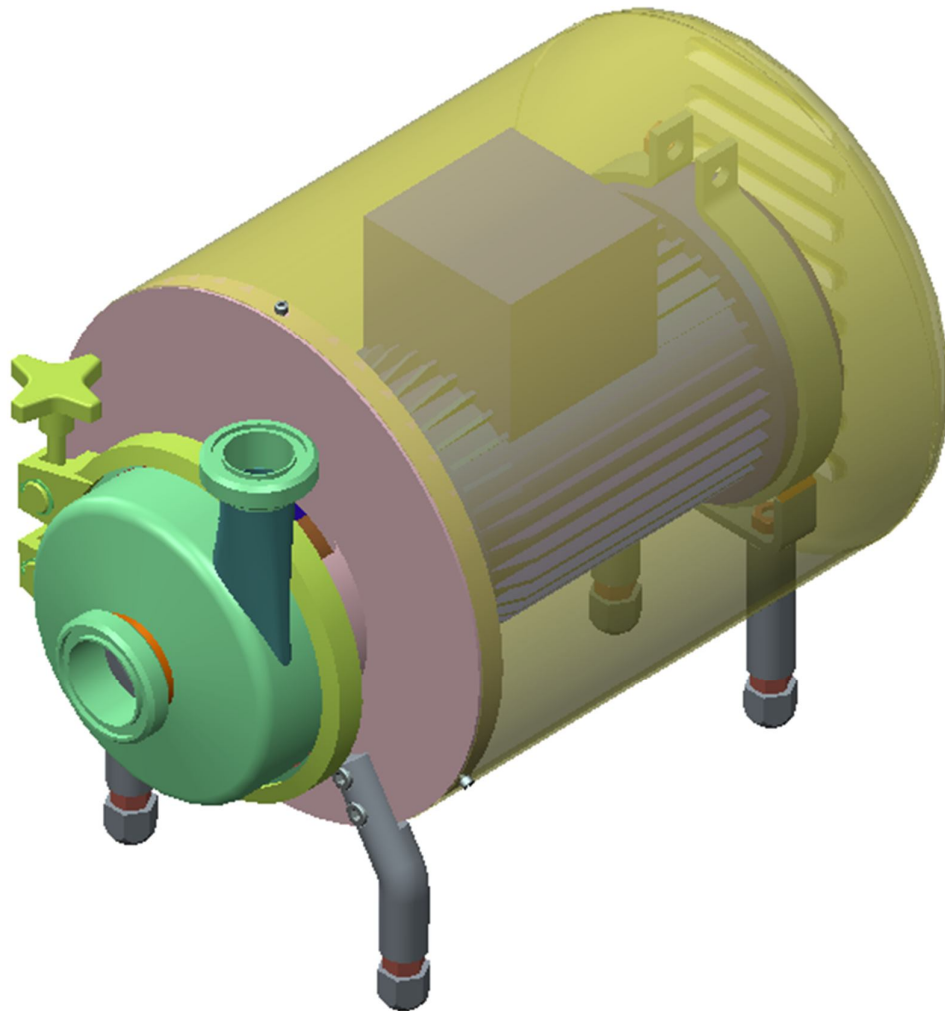


INSTALLATION, COMMISSIONING, OPERATION AND MAINTENANCE MANUAL CENTRIFUGAL PUMP (CL/CLC)



Manufactured by

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CIN : U29299GJ1992PLC01828

Foreword

Thank you for buying IDMC's Centrifugal Pump.

This manual will provide you assistance in the installation, operation, and maintenance of your Centrifugal pump.

Please read this manual carefully prior to operating the Centrifugal pump and keep it for future reference.

The information contained in the manual must not be copied, in whole or in part, nor used for manufacture or otherwise disclosed without the prior written consent of the company. IDMC reserves the right to change the specifications without any obligation to update the publications that are already published.

If you have a query, please call on the IDMC's 24x7 helpline no. + 91 18002335556.

WARNING !!

- Check for the direction of rotation of the machine as provided on the motor cover.
- Opposite direction rotation for a longer period in dry condition may damage the mechanical seal.
- Never start the pump before connecting it to the lines.
- Do not operate the pump if the pump casing is not fitted.
- Check for proper specifications of the motor, especially if its working conditions create an explosion hazard.
- During the installation, all the electric work should be carried out by authorized personnel
- Never touch the pump or the pipe work during operation if the pump is being used for transferring hot liquids or during cleaning.
- The pump contains moving parts. Never place your fingers inside the pump during operation.
- Never operate with the suction and discharge valves closed.
- Never spray water directly on the electrical motor. The standard motor protection is ip-55: protection against dust and water spray.



CENTRIFUGAL PUMP TEST REPORT

IDMC LTD

WARRANTY

- If not specified otherwise in the order confirmation, the terms and conditions of the warranty are as follows.

Warranty period

- The warranty period shall be 12 months from the date of commissioning or 18 months from the date of supply, whichever is the earlier. However, warranty validity is applicable to the timeframe of 8 hours/ day machine running or 3000 hours of production.
- The warranty shall not be extended for any of the components or the whole unit.

Scope of warranty

The warranty shall not apply to those parts whose failures or wear-tear are caused due to

- Failure to comply with the instructions for use and maintenance of the equipment.
- Failure to perform the maintenance measures.
- Improper maintenance.
- Use of inappropriate tools for maintenance.
- Any modifications, alterations or tampering carried out without any written authorization from IDMC specific to the action.

Exclusion

- The warranty shall not cover any such material and parts subjected to normal wear tear such as seals, gaskets and other rubber parts and to that of electrical and electronic components/ instruments.

Limits

- Warranty shall be limited to the repair or replacement of the defective material. IDMC shall be not responsible for any consequential loss or damage arising out of transportation/ installation or assembly.

Environment of machine installation should be

- Free from direct heat.
- Free from insects/rodents.
- Free from external oil splash and acid.
- Any damage to the machine/ parts of the same due to above mentioned reasons does not fall under the purview of warranty by IDMC.

Return of defective material

- Any claim under the warranty clause is to be made with IDMC, with details of defects and the circumstances that caused the problem. All claims are to be quoted with the machine model, machine serial number, and defective part name and item code.
- Before sending any material to IDMC for repair or replacement, an approval -in writing- is to be obtained from IDMC. All the materials shall be properly packed causing no damage during transit.
- The packing cost, freight and insurance for return of such material shall be borne by the customer.

- All the replaced parts under warranty shall be supplied at IDMC cost. We shall bear the ex-works cost of the parts, packing and forwarding, tax and duties, insurance and freight cost.
- Any defective part, that is being replaced, shall be the property of IDMC and hence shall not be returned to the customer.

IDMC may agree to send the replacement material before receiving the defective material. It shall be customer's responsibility to send back the replaced item to IDMC at his cost and risk, within a week's time; failing which IDMC shall raise an invoice for the replaced item.

1. General information:

CL/CLC is a range of monoblock type centrifugal pumps with hygienic design, suitable for use in the dairy, beverage, and food industry in general.

This single-stage horizontal pump has a casing with axial suction and tangential discharge. The main pump components are: casing, cover, impeller, motor, shroud, impeller nut, rear foot, front foot etc.

2. Application advantages of IDMC centrifugal pump

As a general rule, CL/CLC pumps in their standard version are used in the food industry mainly to transfer liquids.

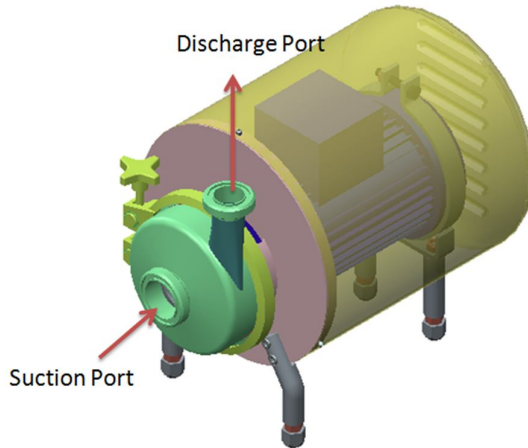
For each type of the pump, the hydraulic performance is given by the choice of impeller diameters and speeds. The characteristic curves also show the power and efficiency requirements. The intended use of the pump is defined by its characteristic curve.

3. Installation

A. Reception of the pump

Warnings !!!

- IDMC will not be liable for any deterioration of the material due to transport or unpacking. Visually check that the packaging has not been damaged.



The following documentation is included with the pump:

- Shipping documents.
- Instructions manual for the pump.
- Performance Report.

Unpack the pump and check the following:

- The suction and discharge connections on the pump, removing any remaining packaging material.
- Check that the pump and motor have not suffered any damage.
- If not in good material condition and/or if not all the parts are included, the shipping carrier should submit a report as soon as possible.

B. Identification of the pump

Each pump has a nameplate with the basic data required to identify the model.

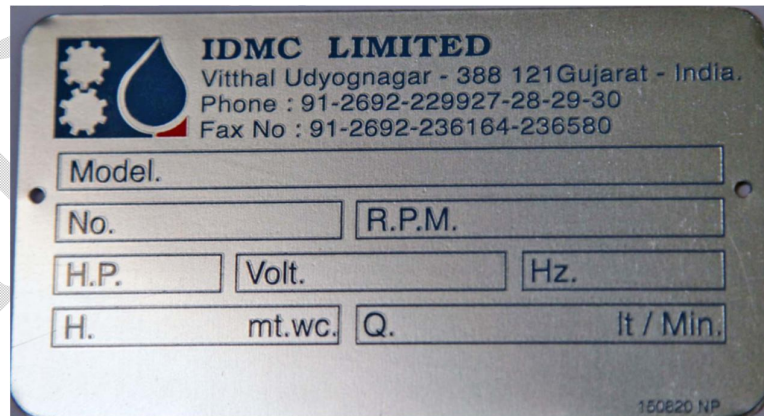
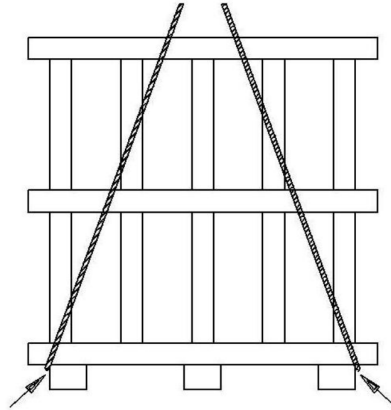


Fig 3.1 : Name Plate

4. HANDLING/ INSTALLATION

The machine is transported duly packed in wooden boxes that can be handled with a crane or a fork lift. Steel chain or cables are to be used on the marking indicated on the boxes. The upside marking, front side marking are also marked on the boxes.(see Fig. C)

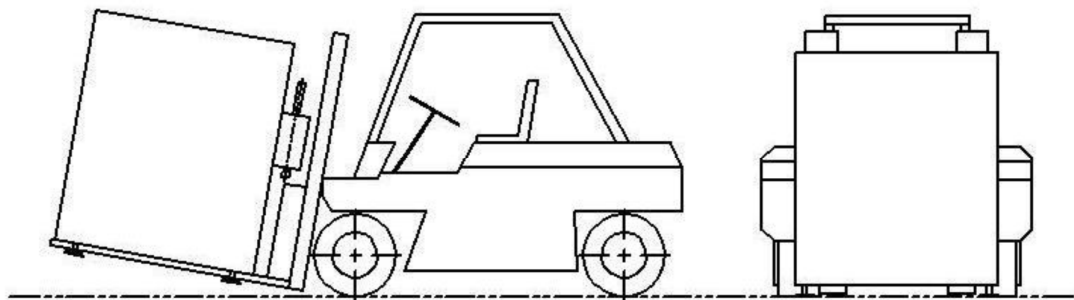


(Figure C)

In the case of handling the machine by a fork lift, insert the fork lift from the front side. Forks of the fork lift should be spaced as to cover the base of the wooden box packing as indicated below.(see Fig. D)

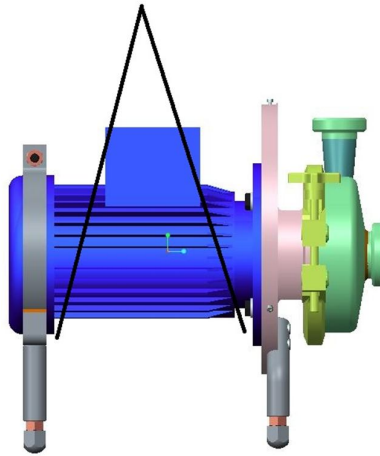


DANGER: During hoisting and transportation, suggested to operate with great caution in order to prevent damage to the item or people around.



(Figure D)

The machine should be unpacked at its location destined. Should you need to handle an unpacked Centrifugal pump unit, it should be done as per the Fig. E below.



(Figure E)

5. INSPECTION CHECK ON RECEIPT OF THE MACHINE

At IDMC, the machine has been packed and loaded safely on the carrier. Any damage during shipping is to be taken to the observation and charged to the transporter/customer's account. Hence, requested to inspect the machine on delivery without fail.

- Please check the assembly and number of packs as per the shipping document
- Please report any apparent damage on the packing observed while receiving the material to the transporter.

You are also requested to inspect and report the following.

- Content of the packing like tools, spares, manuals packed in secondary boxes
- It is advisable to unpack the machine at the place of installation.

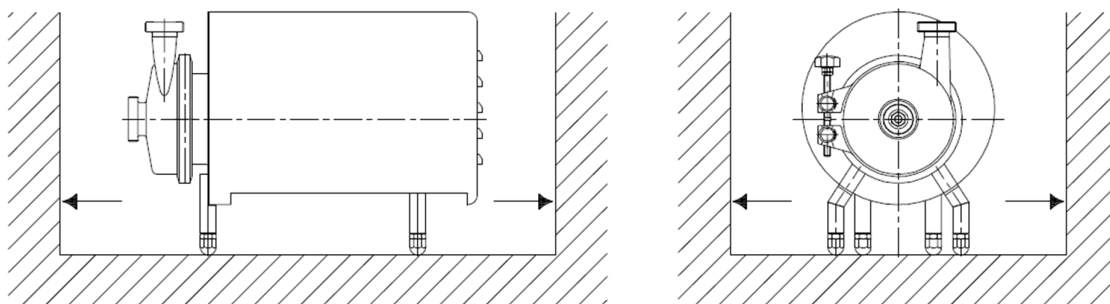
Unloading and installation of the Turbo Blender is not in IDMC scope, unless and otherwise specified in the purchase order.

Please follow handling instruction properly.

- Any damage occurred to the items during unloading or installation of the equipment shall be the responsibility of the customer.
- Please also check for motor pulley and belt drive prior to installation.
- It is also important to check any damage to the internal cabling & terminal of the unit prior to installation.

6. Installation and Positioning:

- The machine footprint drawing is attached. Sufficient space is to be kept around the machine for maintenance related activities.
- It is recommended that minimum 500 mm space should be kept all around the machine.
- Floor should have a proper slope and a masonry drain.
- The machine is designed for installation in well-ventilated area without any obstruction of the free air flow that is required for machine cooling.
- The machine is to be installed at a temperature of less than 45 °C and at an altitude less than 1000m above the sea level.



7. CLEANING

A. CIP (Clean-in-Place) cleaning

If the pump is installed in a system with a CIP process, its removal will not be required. If an automatic cleaning process is not available, disassemble the pump as indicated in the section exploded view of CLC pump.

To remove any traces of cleaning products, ALWAYS perform a final rinse with clean water at the end of the cleaning process.

Cleaning solutions for CIP processes.

Only use clear water (chlorine-free) to mix with the cleaning agents:

a) Alkaline solution: 1% by weight of caustic soda (NaOH) at 70°C (150°F)

1 kg NaOH + 100 Ltrs. of water = cleaning solution

or

2.2 Ltrs. of 33% NaOH + 100 Ltrs. of water = cleaning solution

b) Acid solution: 0.5% by weight of nitric acid (HNO₃) at 70°C (150°F)

0.7 Ltrs. of 53% HNO₃ + 100 Ltrs. of water = cleaning solution

Warnings !!!

- The use of aggressive cleaning products such as caustic soda and nitric acid may burn the skin. Use rubber gloves during the cleaning process.
- Check the concentration of the cleaning solutions; incorrect concentrations may lead to deterioration of the pump seals.

B. SIP (Sterilization-in-Place) cleaning

Sterilization with steam is applied to all equipment including the pump.

Maximum conditions during the SIP process with steam or overheated water

- a) Max. temperature: 140°C / 284°F
- b) Max. time: 30 min.
- c) Cooling: Sterile air or inert gas
- d) Materials: EPDM
FPM

Warnings !!!

- Do NOT use the equipment during the steam sterilization process.
- The parts/materials will not be damaged if the indications specified in this manual are observed.
- Make sure that no cold liquid enters the system until the temperature of the pump is lower than 60°C (140°F).
- The pump generates an important pressure loss through the sterilization process. We recommend the use of a branch circuit with a discharge valve to ensure that steam / superheated water sterilizes the integrity of the circuit.

8. Cross section of CLC pump :

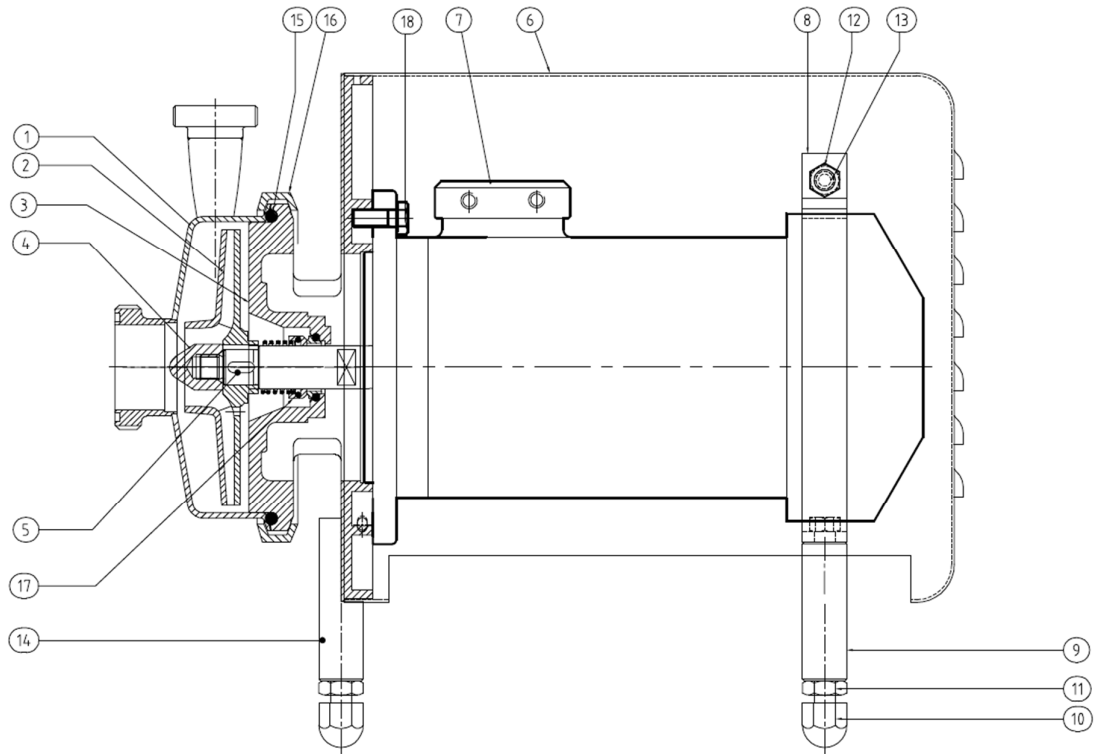


Fig 3.1 : T- Execution (Single Mechanical seal)

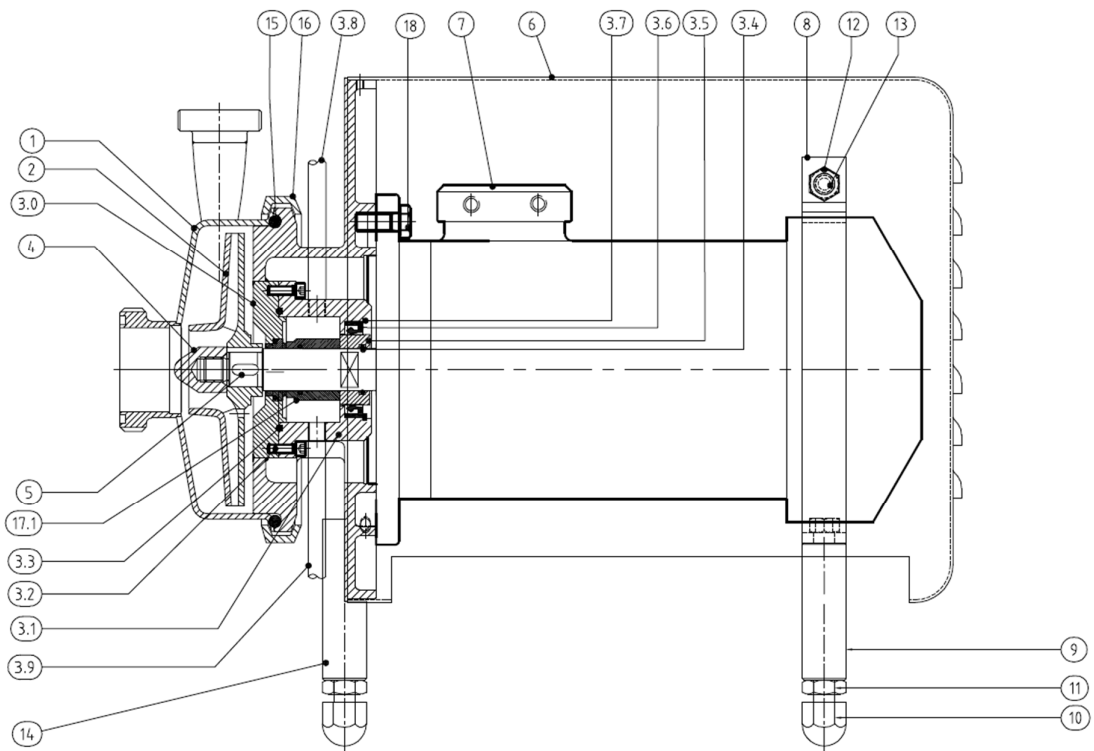


Fig 3.2 : U- Execution (External Mechanical seal)

Position	Description	Quantity	Material
1	Casing	1	AISI 316L
2	Impeller	1	AISI 316L
3	Cover (T-execution)	1	AISI 316L
3.0	Cover (U-execution)	1	AISI 316L
3.1	Mechanical Seal Box	1	AISI 316L
3.2	Hex headed cap screw	4	AISI 304
3.3	O-Ring	1	EPDM
3.4	O-Ring	1	EPDM
3.5	Ceramic harding bush	1	Ceramic
3.6	Rotary Shaft Seal	1	EPDM
3.7	Circlip	1	Carbon Steel
3.8	Pipe for Water flushing IN	1	AISI 304
3.9	Pipe for Water flushing OUT	1	AISI 304
4	Impeller Nut	1	AISI 316L
5	Key	1	AISI 316L
6	Shroud	1	AISI 304
7	Motor	1	STD.
8	Rear foot clamp	1	AISI 304
9	Rear foot	2	AISI 304
10	Level adjuster	4	AISI 304
11	Hex headed nut	4	AISI 304
12	Hex headed bolt	1	AISI 304
13	Hex headed nut	1	AISI 304
14	Front foot	2	AISI 304
15	O-Ring	1	EPDM/VITON
16	Clamp	1	AISI 304
17	Internal Mechanical seal	1	-
17.1	External Mechanical seal	1	-
18	Hex headed bolt	4	AISI 304

9. EXPLODED VIEW FOR ASSEMBLY AND DIS-ASSEMBLY

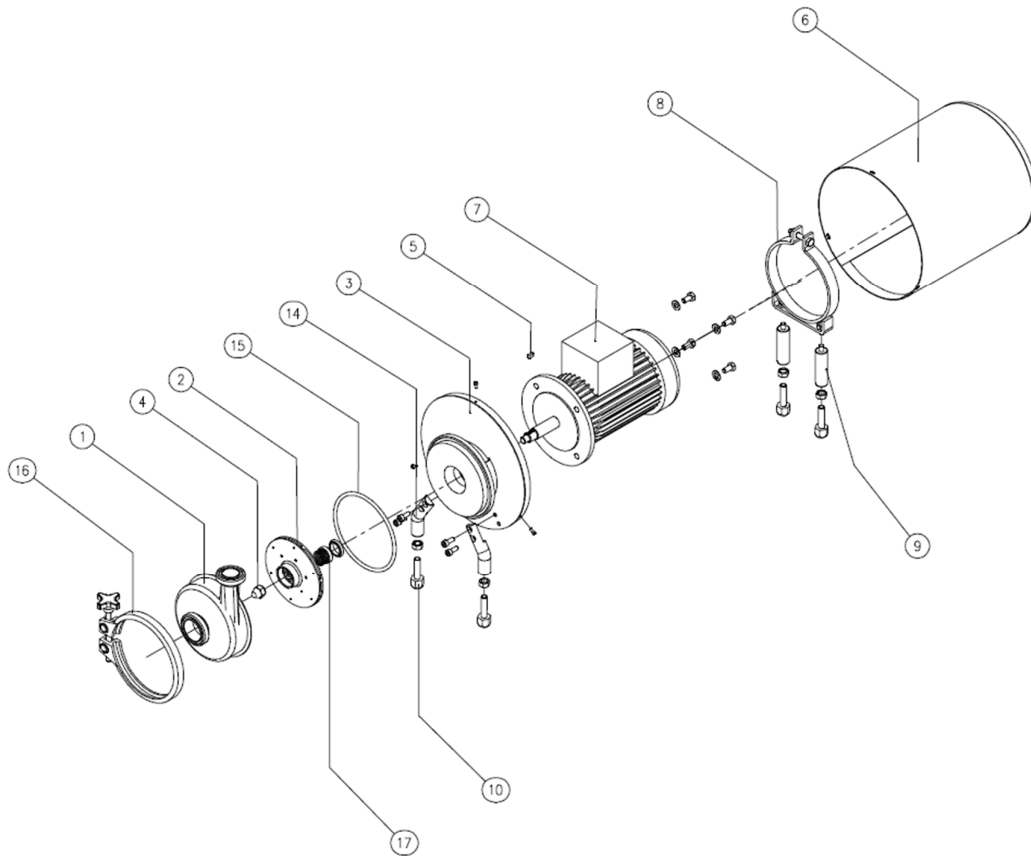


Fig 4.1 : Exploded view of T- Execution pump (Single Mechanical seal)

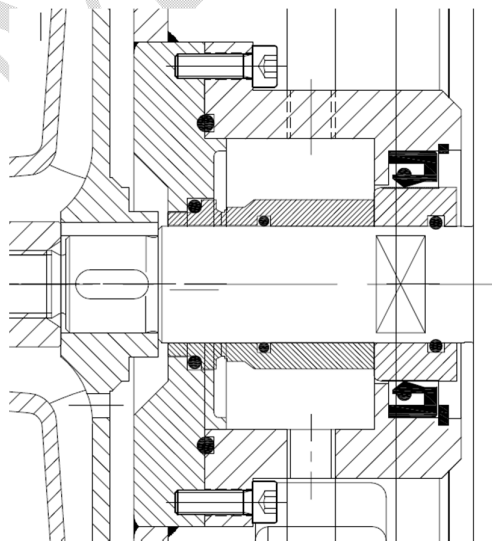


Fig 4.2 : Detail view of U- Execution pump (External Mechanical seal)

10. TECHNICAL SPECIFICATIONS

Maximum operating pressure	70 mWC (7 bar)
Temperature range	-10 to 120 °C (EPDM)
Maximum speed	2900 rpm (50 Hz)
Noise level	61 to 80 dB (A)

Materials

Parts in contact with the product	AISI 316L
Other steel parts	AISI 304 L
Gaskets in contact with the product	EPDM (standard) FPM (Viton)
Exterior surface finish	Matt
Interior surface finish	Polished Ra 0,8 µm

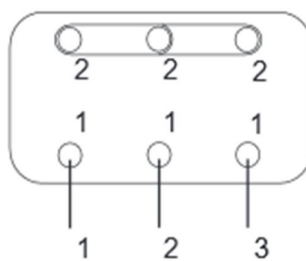
Mechanical seal

Type Internal single or External seal, balanced	
Material of rotating part	Silicon carbide (SiC) (standard) Carbon (standard)
Material stationary part	Silicon carbide (SiC) Cr-No-Mo Stainless Steel 316
Gasket material	EPDM (standard) FPM (Viton)
Other Parts	Cr-No-Mo Stainless Steel 316

Motor

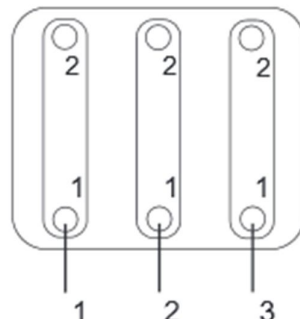
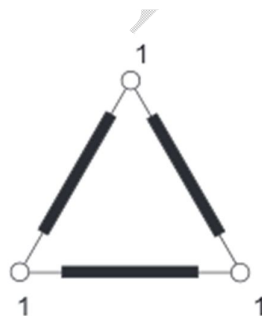
Type Three-phase asynchronous motor with AISI 316L Shaft extension
IEC B5/B14 type
4 poles, IP55 protection, Class-F insulation
Power 0.75 to 15 kW

220-240 V Δ / 420 V Y, ≤ 4 kW
420 V Δ ≥ 5.5 kW



Star connection

- Connect the motor in accordance with the order data and the data on the type plate



Delta connection

- Connect the motor in accordance with the order data and the data on the type plate

11. Operating Problems:

Sr No.	Problem	Cause	Remedies
1	Motor overload	Flow rate too high	<ul style="list-style-type: none"> a. Reduce the flow by means of a diaphragm. b. Partially close the discharge valve. c. Trim the impeller. d. Decrease speed
		Low outlet pressure (counter pressure)	<ul style="list-style-type: none"> a. Higher counter pressure (throttling)
		Pumping of viscous liquids	<ul style="list-style-type: none"> a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
		The impeller scrapes	<ul style="list-style-type: none"> a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
2	The pump flow or pressure is insufficient.	Wrong direction of rotation.	<ul style="list-style-type: none"> a. Check motor rotation.
		Insufficient NPSH	<ul style="list-style-type: none"> a. Raise the suction tank. b. Lower the pump. C. Reduce the vapor pressure. D. Widen the diameter of the suction pipe. e. Shorten and simplify the suction line.
		Cavitation.	<ul style="list-style-type: none"> a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		The pump sucks in air.	<ul style="list-style-type: none"> a. Check the suction line and all of its connections.
		Discharge pressure too high	<ul style="list-style-type: none"> a. If necessary, reduce the pressure losses, for example, by increasing the pipe diameter.
		Viscosity of the liquid too high.	<ul style="list-style-type: none"> a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
		Liquid temperature is too high	<ul style="list-style-type: none"> a. Decrease the temperature by cooling the liquid.
3	There is no pressure on the discharge side.	Insufficient NPSH	<ul style="list-style-type: none"> a. Raise the suction tank. b. Lower the pump. c. Reduce the vapor pressure. d. Widen the diameter of the suction pipe. e. Shorten and simplify the suction line.
		Pump not purged	<ul style="list-style-type: none"> a. Purge or fill.(Priming)

		Suction pipe obstructed	a. Check the suction line and the filters, if available.
4	Irregular discharge flow rate / pressure.	Wrong direction of rotation.	a. Check motor rotation.
		Insufficient NPSH	a. Raise the suction tank. b. Lower the pump. c. Reduce the vapor pressure. d. Widen the diameter of the suction pipe. e. Shorten and simplify the suction line.
		Cavitation.	a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		The pump sucks in air.	a. Check the suction line and all of its connections.
		Suction pipe obstructed	a. Check the suction line and the filters, if available.
		Viscosity of the liquid too high.	a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
5	Noise and vibrations.	Insufficient NPSH	a. Raise the suction tank. b. Lower the pump. c. Reduce the vapor pressure. d. Widen the diameter of the suction pipe. e. Shorten and simplify the suction line.
		Cavitation.	a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		The pump sucks in air.	a. Check the suction line and all of its connections.
		Suction pipe obstructed	a. Check the suction line and the filters, if available.
		Discharge pressure too high	a. If necessary, reduce the pressure losses, for example, by increasing the pipe diameter.
		Flow rate too high	a. Reduce the flow by means of a diaphragm. b. Partially close the discharge valve. c. Trim the impeller. d. Decrease speed

		Viscosity of the liquid too high.	a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
		Liquid temperature is too high	a. Decrease the temperature by cooling the liquid.
		The impeller scrapes	a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		Tension in the lines.	a. Connect the pipes to the pump without tension.
		Foreign matter in the liquid.	a. Install a filter in the suction pipe.
6	The pump gets clogged.	Viscosity of the liquid too high.	a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
		Liquid temperature is too high	a. Decrease the temperature by cooling the liquid.
		The impeller scrapes	a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		Tension in the lines.	a. Connect the pipes to the pump without tension.
		Foreign matter in the liquid.	a. Install a filter in the suction pipe.
7	Pump overheated.	Flow rate too high	a. Reduce the flow by means of a diaphragm. b. Partially close the discharge valve. c. Trim the impeller. d. Decrease speed
		Viscosity of the liquid too high.	a. Larger motor or smaller impeller b. Reduce the viscosity, for example, by heating the liquid.
		Liquid temperature is too high	a. Decrease the temperature by cooling the liquid.
		The impeller scrapes	a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		Tension in the lines.	a. Connect the pipes to the pump without tension.
		Foreign matter in the liquid.	a. Install a filter in the suction pipe.

8	Abnormal wear.	Cavitation.	<ul style="list-style-type: none"> a. Lower the temperature. b. Reduce the suction pressure. c. Adjust the impeller/cover play.
		The pump sucks in air.	a. Check the suction line and all of its connections.
		Liquid temperature is too high	a. Decrease the temperature by cooling the liquid.
		Tension in the lines.	a. Connect the pipes to the pump without tension.
		Foreign matter in the liquid.	a. Install a filter in the suction pipe.
9	Leak through the mechanical seal.	Mechanical seal worn or damaged.	a. Replace the seal.
		Running dry	a. Replace: All wearing parts
		Abrasive particles in the liquid	a. Select stationary and rotating seal ring in silicon carbide/silicon carbide
		Incorrect rubber grade	a. If necessary: Change rubber grade
		Inadequate O-rings for the liquid.	a. Install the correct O-rings after consulting the supplier.
		Mechanical seal spring tension is too low	a. Adjust as indicated in this manual.
10	Cavitation	Low inlet pressure	a. Increase the inlet pressure
		High liquid temperature	a. Reduce the liquid temperature
			<ul style="list-style-type: none"> b. Reduce the pressure drop before the pump c. Reduce speed
11	Leaking O-ring seals	Incorrect assembly	a. follow all Check point while assembly and use proper tools
		Incorrect rubber grade	a. Change rubber grade

IDMC LTD

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