

IOM manual

tapflo®

CTX Centrifugal Pumps

edition 2020 rev 1

Original instruction



Read this instruction manual carefully,
before you install and operate the pump.



CTX I

CTX I 40-165
CTX I 50-145
CTX I 50-200
CTX I 65-175
CTX I 65-230
CTX I 65-240
CTX I 80-205
CTX I 80-212

CTX H

CTX H 40-165
CTX H 50-145
CTX H 50-200
CTX H 65-175
CTX H 65-230
CTX H 65-240
CTX H 80-205
CTX H 80-212



» All about your flow

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EC DECLARATION OF CONFORMITY 01/EC/CTX/2020

Series:

CTX...

Serial numbers:

2020 - ... (from 2001 - ...)

Manufactured by:

Tapflo AB

Filaregatan 4

442 34 Kungälv, Sweden

This declaration of conformity is issued under the sole responsibility of the manufacturer.

Object of declaration: **SINGLE STAGE CENTRIFUGAL PUMPS**

The object of the declaration described above is in conformity with the relevant Union harmonisation legislation:

- Directive 2006/42/EC of European Parliament and of the Council of 17 May 2006 on machinery, amending Directive 95/16/EC;
- Directive 2014/35/UE of the European Parliament and of the Council of 14 February 2014 on harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;

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Signed for and on behalf of Tapflo AB:

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Managing director

Tapflo AB, 02.02.2020

0. GENERAL

0. GENERAL

0.1. Introduction

The CTX pumps are open impeller single stage centrifugal pumps. They are manufactured in high finish and mechanical strong material stainless steel AISI 304L/316L. The pump range meets the demands from a variety of today's industries.

The industrial series CTX I is designed with glass blasted pump casing. A variety of connection types, mechanical seal options and other executions are available to satisfy most type of industrial duties.

The hygienic series CTX H is supplied with electro polished internals. This series is specially dedicated for hygienic duties in food, beverage and pharmaceutical industries, where clean- and drain-ability are important factors.

With proper attention to maintenance, CTX pumps will give efficient and trouble free operation. This instruction manual will familiarise operators with detailed information about installing, operating and maintaining the pump.

0.2. Warning symbols

The following warning symbols are present in this instruction manual. This is what they say:



This symbol stands next to all safety instructions in this instruction manual where danger to life and limb may occur. Observe these instructions and proceed with utmost caution in these situations. Inform also other users of all safety instructions. In addition to the instructions in this instruction manual, the general safety and accident prevention regulations must be observed.



This signal stands at points in this instruction manual of particular importance for compliance with regulations and directives, for correct work flow and for the prevention of damage to and destruction of the pump.



This symbol signals possible danger caused by the presence of electric fields or live wires.

0.3. Qualification and training of personnel



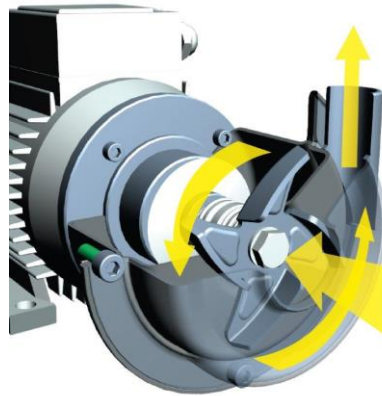
The personnel in charge of installation, operation and maintenance of the pumps we produce must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual.

1. INSTALLATION

1. INSTALLATION

1.1. Operation principle

In order to operate the pump, the casing has to be filled with liquid before start-up. The liquid enters the pump casing axially to the shaft. The rotating impeller generates a centrifugal force accelerating the liquid through the pump casing and into the discharge piping.



1.2. Receiving inspection

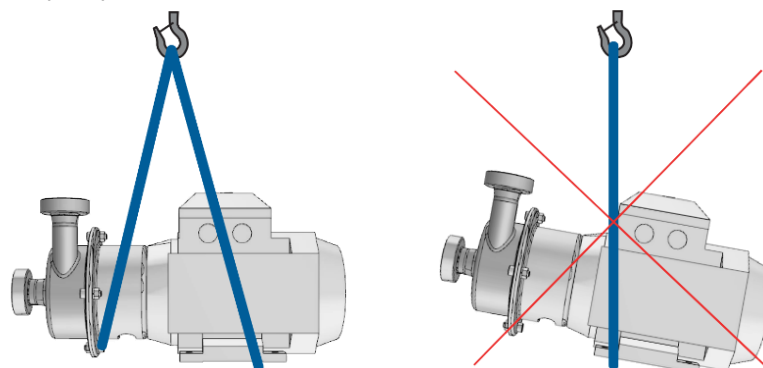
Although precaution is taken by us when packing and shipping, we urge you to carefully check the shipment on receipt. Make sure that all parts and accessories listed on the packing list are accounted for. Immediately report any damage or shortage to the transport company and to us.

1.3. Lifting and transportation

Before handling the pump check the weight of the pump (see chapter 6. Data). Refer to Your local standards on how to handle the pump. If the weight is excessive to transport by hand it must be lifted using slings and a suitable lifting device e.g. a crane or forklift.

Always use at least two slings and make sure they are secured in such a way to prevent the pump from slipping and that the pump unit is hanging straight.

Never lift the pump with only one sling. Incorrect lifting can cause serious injury and/or damage to the pump.



Never lift the pump under pressure.

Be careful that nobody passes under the pump when lifted.

Never try to lift the pump by the connections or hoses attached to the pump.

1. INSTALLATION

1.4. Storage



If the equipment is to be stored prior to installation, place it in a clean location. Do not remove the protective covers from the suction and discharge which have been fastened to keep pump internals free of debris. Clean the pump thoroughly before installation.

When in storage, turn the shaft by hand at least once per month. The pump-motor unit should always be stored indoor in dry, vibration and dust free conditions.

1.5. Foundation



The pump-motor unit must stand on and be fixed to a sufficiently rigid structure that can support the entire perimeter on which the unit stands. The foundation on a firm bottom is the most satisfactory. Once the pump is in position, adjust level with metal shims between the feet and the surface on which it stands. Check that the feet of the pump motor unit stand well on each of them. The surface on which the foundation stands must be flat and horizontal. If the unit is fitted on a steel structure, make sure that it is supported so that the feet do not warp. In any case, it is advisable to fit some anti-vibration rubber pieces between the pump and the brickwork. The motor needs an additional stand as its level is higher than that of the pump casing. As an option the pump can be ordered with feet for the motor. For close-coupled type, pump motor alignment is not required.

1.6. Environment



- There should be enough space in the vicinity of the pump in order to operate, maintain and repair it.
- The area in which the pump is operated, must be sufficiently ventilated. Excessive temperature, humidity or dirt may affect the pump operation.
- Behind the cooling fan of the motor there must be sufficient room for the hot air to escape the motor.

1.7. Suction and discharge piping



A pump is generally part of a piping system that can include a number of components such as valves, fittings, filters, expansion joints, instruments, etc. The way the piping is arranged and the positioning of the components has a great influence on the operation and the lifetime of the pump. The pump cannot be used as a support for the components connected to it.

The flow of liquid from the pump must be as even as possible. It is advisable to avoid any tight bends or drastic reductions of diameters that may cause flow resistance in the installation. In case of diameter reduction, it is advisable to use appropriate conical reductions (possibly eccentric on suction side and concentric on discharge side) at changes of diameter and at a minimum distance from pump connections of five diameters of the pipeline.

1.7.1. Connection of discharge pipe



A check-valve and a shut-off/regulation valve are normally fitted on the discharge side.

The check-valve protects the pump from any backflow. The shut-off/regulation valve cuts off the pump from the line and adjusts the output. Never adjust flow rate using the valve on the suction pipe.

1. INSTALLATION

1.7.2. Connection of suction pipe



The suction piping is very important for the correct operation of the pump assembly. It must be as short and as direct as possible. If a longer suction line is unavoidable, the diameter should be large enough, i.e. at least as the inlet connection on the pump, to ensure less flow resistance. In any case, suction must be carried out properly avoiding any air locks.

The CT pumps are single-stage centrifugal pumps, thus not self-priming. It will therefore always be necessary to install a bottom valve in all cases when the static height of the liquid is lower than the suction height of the pump. It is also crucial that the whole suction line is filled with liquid prior to starting the pump. The suction piping must be air tight. Critical points in these terms are also the seals between flanges and the seals of the valve stems. Even some small air let into the suction line cause serious operating problems that can make the pump stop. It is recommended to use check-valve in the suction line to avoid siphoning when the pump stops.

1.8. Health and safety

The pump must be installed according to local and national safety rules.



The pumps are constructed for particular applications. Do not use the pump on applications different from that for which it was sold without consulting us to ascertain its suitability.

1.8.1. Protection



In the interest of health and safety it is essential to wear protective clothing and safety goggles when operating, and/or working in the vicinity of Tapflo pumps.

1. INSTALLATION

1.8.2. Electrical safety



Do not carry out any maintenance or/and operation on the pump while it is running or before it has been disconnected from the power supply. Avoid any danger caused by electric power (for details see current regulations in force). Check that electrical specifications on the data plate are equivalent to the power supply to which it will be connected.

1.8.3. Chemical hazard



Whenever the pump is to be used for pumping a different liquid, it is essential to clean the pump beforehand in order to avoid any possible reaction between the two products.

1.8.4. Dry running



Do not start nor carry out running tests before filling the pump with liquid. Always avoid dry operation of the pump. Start the pump when it is completely filled and with the valve on the discharge side almost completely closed.

1.8.5. Noise level



CT pumps, including the motor, in normal operating conditions produce a sound level below 80 dB(A). The major sources of noise are: liquid turbulence in the installation, cavitation or any other abnormal operation that is independent from the pump construction nor the pump manufacturer. The user must provide suitable protective means if the sources of noise could produce a harmful noise level for operators and for the environment (in compliance with current local regulations).

1.8.6. Temperature hazards



Raised temperature can cause damage on the pump and/or piping and may also be hazardous for personnel in the vicinity of the pump/piping. The hot or cold parts of the machine must be protected to avoid accidental contacts.

1.8.7. Rotating parts



Do not tamper with the protection of the rotating parts, do not touch or approach rotating parts in movement.

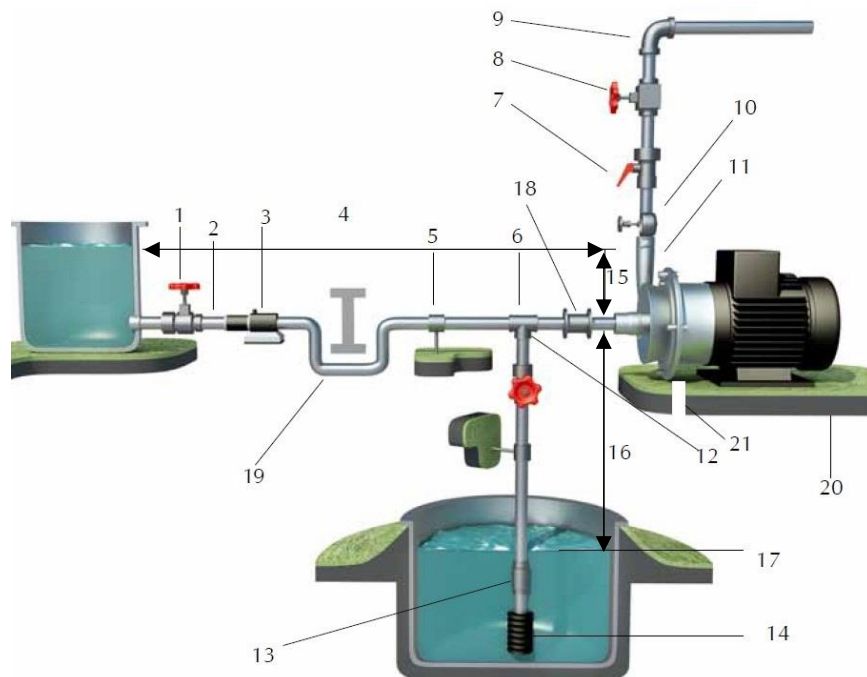
1.8.8. Cleaning and disinfection



Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food process installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product.

1. INSTALLATION

1.9. Example of installation



- 1) YES: Gate valve (may also be near pump in case of long piping)
- 2) With positive head: tilt of piping towards pump
- 3) YES: line strainer if particles are present
- 4) NO: air pockets – the circuit must be short and straight
- 5) YES: pipe fastening
- 6) Suction line as short and direct as possible
- 7) YES: attachment for gauge or safety pressure switch
- 8) YES: adjusting gate valve on outlet
- 9) Bends placed after valves and instruments not closer to the pump inlet than five times the piping diameter
- 10) YES: attachment for gauge or safety pressure switch
- 11) NO: elbow joints (and other parts) on the pump (discharge and suction lines)
- 12) With negative suction lift: tilt of piping towards suction tank
- 13) YES: check valve (with negative suction lift)
- 14) YES: strainer if particles are present
- 15) Suction head varies according to flow in order to prevent windage
- 16) Suction head
- 17) Immersion depth
- 18) YES: expansion joint (indispensable with long pipes or hot liquids) and/or anti-vibration facility during discharge and suction; anchored near to pump
- 19) YES: overcoming obstacles at lower depths
- 20) Fix the pump by the fixing holes provided: the supports must be level
- 21) YES: drainage channel around base

1.10. Instruments



In order to ensure a proper control of the performance and the conditions of the installed pump, we recommend using the following instruments:

- a pressure-vacuum gauge on the suction piping;
- a pressure gauge on the discharge piping.

1. INSTALLATION

The pressure intakes must be made of straight pieces of piping at a distance of minimum five diameters from the pump inlets. The pressure gauge on discharge must always be fitted between the pump and the shut-off / regulation valve. The output can be read on the pressure gauge, transformed into meters and then compared with the typical curves.

1.10.1. Electric power

The electric power absorbed by the motor can be measured by means of a wattmeter or an amp gauge.

1.10.2. Optional instruments

The optional instruments can indicate if pump is working in an abnormal way. The abnormal conditions can be caused by: accidentally closed valves, lack of pumped liquid, overloads, etc.

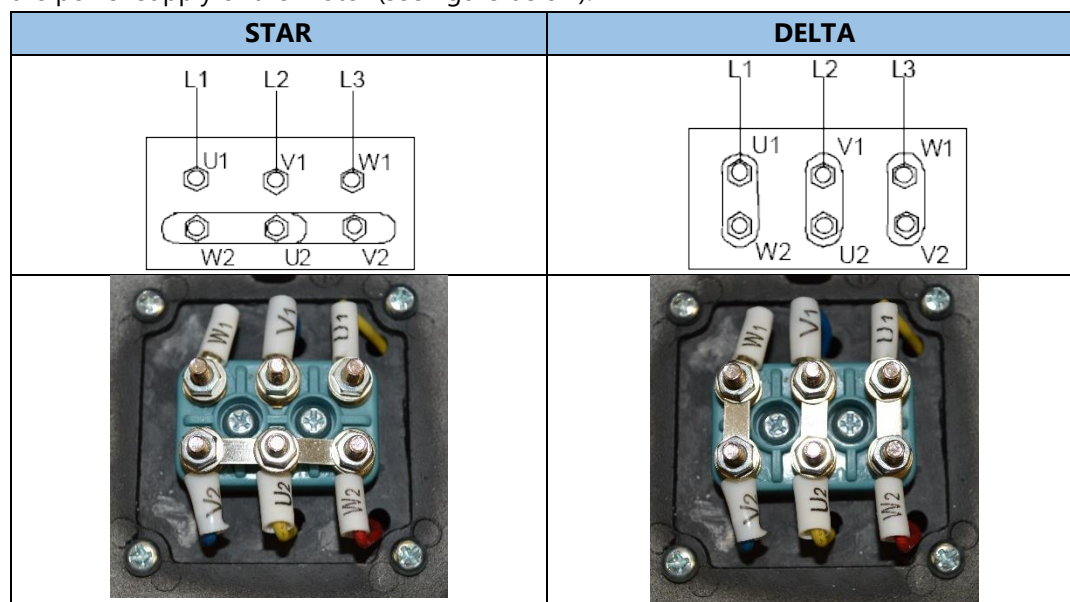
1.10.3. Thermometer

If the temperature of the pumped liquid is a critical parameter, provide the installation with a thermometer (preferably on the suction side).

1.11. Motor connection



An expert electrician must always carry out the electrical connection. Compare the power supply with the data plate specifications and then choose a suitable connection. The type of connection is stated on the motor data plate and can be Y (star) or D (Delta), according to the power supply of the motor (see figure below).



Follow the connection standard used in the plant. In no case connect the electrical motor directly to supply network but use a suitable electric switchboard equipped with a knife switch and suitable safety devices (e.g. motor breaker switches) in the power circuit. Safety devices against overloads must also protect the motors. Make sure that the motor has suitable grounding and that it has been connected properly.

1. INSTALLATION

1.12. Motor standard

As a standard Tapflo CT pump are equipped with motors of the following parameters:






- International Mounting Arrangement – **B35**
- Number of poles / Rotation speed [rpm] – **2**
- **Non ATEX**
- Protection grade – **IP55**
- Voltage – **3 phase**
- **PTC protection**

Motor power	IEC size	RPM	Voltage	Frequency
1.5 kW	90S	2920	Δ230 / Y400	50 Hz
		3500	Δ280 / Y480	60 Hz
2.2 kW	90L	2920	Δ230 / Y400	50 Hz
		3500	Δ280 / Y480	60 Hz
3.0 kW	100L	2910	Δ230 / Y400	50 Hz
		3500	Δ280 / Y480	60 Hz
4.0 kW	112M	2910	Δ400 / Y690	50 Hz
		3500	Δ480 / Y830	60 Hz
5.5 kW	132S	2930	Δ400 / Y690	50 Hz
		3500	Δ480 / Y830	60 Hz
7.5 kW	132S	2930	Δ400 / Y690	50 Hz
		3520	Δ480 / Y830	60 Hz
11 kW	160M	2950	Δ400 / Y690	50 Hz
		3540	Δ480 / Y830	60 Hz
15 kW	160M	2950	Δ400 / Y690	50 Hz
		3550	Δ480 / Y830	60 Hz
18.5 kW	160L	2960	Δ400 / Y690	50 Hz
		3550	Δ480 / Y830	60 Hz
22 kW	180M	2960	Δ400 / Y690	50 Hz
		3550	Δ480 / Y830	60 Hz
30 kW	200L	2970	Δ400 / Y690	50 Hz
		3550	Δ480 / Y830	60 Hz
37 kW	200L	2970	Δ400 / Y690	50 Hz
		3560	Δ480 / Y830	60 Hz

2. OPERATION

2. OPERATION

2.1. Start-up

- Check manually that the motor is free to turn, moving the motor cooling fan.
- Make sure that the piping is not clogged and is free from residues or foreign objects. Make sure that the liquid flows regularly into the pump.
-  ➤ The pump and piping connected to it, at least the suction pipe, must be full of liquid. Any air or gas must be carefully released. In case of suction with negative head, fill the suction piping and check how the bottom valve works. It must guarantee that the liquid must not flow back, therefore emptying the suction pipe with consequent disconnection of the pump.
-  ➤ The suction shut-off valve (if any) must be completely open.
-  ➤ The shut-off / regulation valve on the discharge side must be 75% closed.
-  ➤ The motor must turn in the same direction as the arrow shown on the pump. The direction of rotation is always clockwise looking at the pump from the motor side; check by starting briefly, then looking at the direction of rotation of the motor fan through the fan lid. If it is wrong, the motor must be stopped immediately. Change the connection to the terminals of the electric motor (chapter 1.11 "Motor connection") and repeat the procedure described above.
-  ➤ Any auxiliary connections must all be connected.

2.1.1. Starting the pump



Start the electric motor and open the discharge shut-off / regulation valve gradually until the desired output has been reached. The pump must not run two or three minutes with closed discharge. Longer operation in these conditions can seriously damage the pump.



If the pressure shown on the pressure gauge on the discharge piping does not increase, turn off the pump immediately and release pressure carefully. Repeat the connection procedure.



If there are changes of flow rate, head, density, temperature or viscosity of the liquid, stop the pump and get in touch with our technical service.

2.1.2. Restarting after power shut-off



In case of accidental stopping, make sure that the non-return valve has prevented backflow and check that the motor cooling fan has stopped. Start the pump again following the instructions of chapter 2.1.1 "Starting the pump".

If the pump intakes from a lower level than it is positioned, it can un-prime during the standstill and therefore you must check again before starting that the pump and the suction piping are full of liquid.

2. OPERATION

2.2. Stopping the pump



It is advisable to close the discharge shut-off / regulation valve gradually and stop the motor immediately after. The reverse sequence is not recommendable, especially with larger pumps or longer delivery piping. That is to avoid any problems due to water hammering. If a suction shutoff valve has been installed, it is advisable to close it completely after pump is fully stopped.

2.3. Cleaning and disinfection



Cleaning and disinfection of the pump system is of greatest importance when the pump is used in a food processing installation. Use of a pump system that is NOT cleaned or disinfected can cause contamination of the product. The cleaning cycles as well as chemicals to use for the cleaning vary depending on the pumped product and the process. The user is responsible to establish a suitable cleaning and / or disinfection program according to local and public health and safety regulations.

2.3.1. Cleaning procedure

The pump may be cleaned in two different ways:

CIP (Cleaning In Place)

without dismantling the pump, using steam, water or cleaning chemicals. Follow these safety instructions during the CIP procedure:



- Make sure that all cleaning line connections are properly tightened to avoid splashing of hot water or cleaning chemicals.
- When using an automatic process, a safety device should be installed to avoid unintentional automatic start-up of the pump.
- Before any disassembly of the pump, fittings or pipes, make sure that the cleaning cycle is finished.

Manual cleaning

by simply dismantling the pump casing, impeller and mechanical seal. Always follow these safety instructions:



- Switch off the electric power to the motor and disconnect the motor starting system if installed.
- The cleaning personnel shall wear suitable protective clothing, footwear and goggles.
- Use a suitable non-toxic and non-flammable cleaning solution.
- Always keep the area around the pump clean and dry.
- Never clean the pump by hand with pump running.

2. OPERATION

2.4. Residual risks

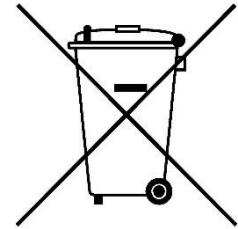
Even with proper application and observance of all points listed in this operating manual, there is still an estimable and unexpected residual risk when using the pumps. It may leak, fail due to wear, application-related causes or system-related circumstances.

2.5. Disposal after expiration of the expected lifetime

The metallic components like stainless steel can be recycled. Plastic parts are not recyclable and must be disposed of as residual waste. The pump must be disposed of properly, according to local regulations. It should be noted that potentially dangerous fluid residues may remain in the pump and can create a hazard to the operator or the environment, therefore the pump has to thoroughly cleaned before disposal.

2.6. Waste of electrical and electronic equipment (WEEE) directive

Users of electrical and electronic equipment (EEE) with the WEEE marking per Annex IV of the WEEE Directive must not dispose of end of life EEE as unsorted municipal waste, but use the collection framework available to them for the return, recycle, recovery of WEEE and minimize any potential effects of EEE on the environment and human health due to the presence of hazardous substances. The WEEE marking applies only to countries within the European Union (EU) and Norway. Appliances are labelled in accordance with European Directive 2002/96/EC. Contact your local waste recovery agency for a designated collection facility in your area.



2.7. Actions in emergency

In case of a leakage of an unknown fluid, respiratory protection should be worn and contact with the fluid avoided. During firefighting, no special hazards are to be expected from the pump itself. In addition, the currently handled fluid and the corresponding safety data sheet must be taken into account.

In the event of personal injury, the appropriate emergency number or 112 must be chosen.

3. MAINTENANCE

3. MAINTENANCE



Maintenance work on electrical installations must be performed by qualified personnel and only when the power supply has been shut off. Follow the local and national safety regulations.

3.1. Inspections

- Periodically check suction and discharge pressures.
- Inspect the motor according to the instructions from the motor manufacturer.
- In general, a mechanical seal does not require maintenance, but the pump should never run when empty (dry). If a leakage occurs, replace the mechanical seal.
- Establish a preventive maintenance schedule based on the pump's service history.

3.2. Location of faults

Overheating of motor	Insufficient flow rate or pressure in pump	No pressure on the discharge	Irregular discharge flow / pressure	Noise and vibrations	The pump gets clogged	Overheating of the pump	Abnormal wear	Leak in mechanical seal	Possible reason	Solution
	X		X						Wrong direction of rotation	Invert the direction of rotation
	X	X	X	X					Insufficient suction head (NPSH)	Increase available NPSH: ➤ Raise the suction reservoir ➤ Lower the pump ➤ Increase the pressure in the suction tank ➤ Reduce the vapour pressure ➤ Increase the diameter of the suction pipe ➤ Make suction pipe short and direct
		X							Pump is clogged	Clean the pump
	X		X	X				X	Cavitation	Increase suction pressure
	X		X	X				X	The pump sucks air	Make sure all connections are tight
		X	X	X					Suction pipe is blocked	Check pipes / valves and filters on the suction line
	X			X					Discharge pressure too high	Reduce the head by increasing pipe diameter and/or reduce number of valves and bends
X				X		X			Flow rate too high	Reduce the flow: ➤ Partially close the discharge valve ➤ Reduce the impeller diameter (contact us) ➤ Reduce the rotation speed
	X			X	X	X	X		Liquid temperature too high	Cool the liquid
								X	Broken or worn mechanical seal	Replace the seal
								X	Wrong material of O-rings for the liquid	Mount O-rings in other material (contact us)
X				X	X	X			The impeller scratches	Reduce the temperature and / or suction pressure. Adjust clearance between housing and impeller
				X			X		Loads on the pipes	Connect the pipes independent of the pump
				X	X	X	X		Foreign objects in the liquid	Use a filter on the suction side
								X	Spring tension too low on mechanical seal	Adjust as mentioned in this manual
		X							Shut-off valve closed on suction side	Check and open the valve
	X								Discharge pressure too low	Increase the pressure – install an impeller with a bigger diameter (contact us)
					X	X			Pump is not filled with liquid	Fill pump with liquid
X	X			X					Liquid parameters different than calculated	Check pumped liquid parameters

3. MAINTENANCE

3.3. Disassembly of the pump



The disassembly should be performed only by qualified personnel.



Each operation to be fulfilled with the machine must always be carried out once all the electrical contacts have been disconnected. The pump-motor unit must be placed in a position where it cannot be started unintentionally.



Before servicing in any way the parts that come in contact with the pumped liquid, make sure that the pump has been fully emptied and washed. When draining the liquid, make sure that there is no danger for people or the environment.

The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 5. "Spare parts".

3.3.1. Disassembly procedure

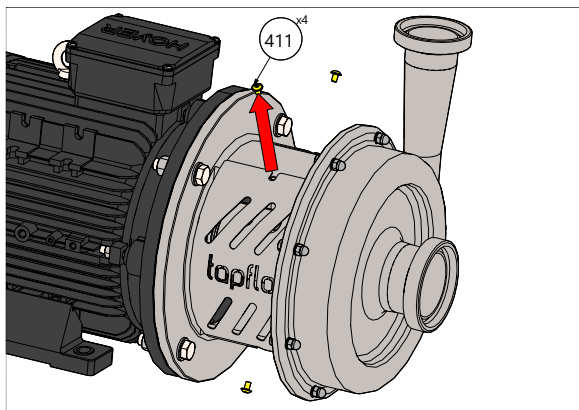


Fig. 3.3.1

Unscrew the shaft guard screws [411] fastening the shaft guards [41] to the lantern [11].

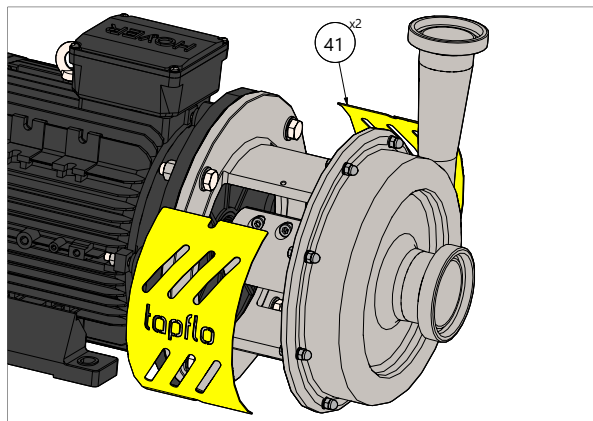


Fig. 3.3.2

Take off the shaft guards [41].

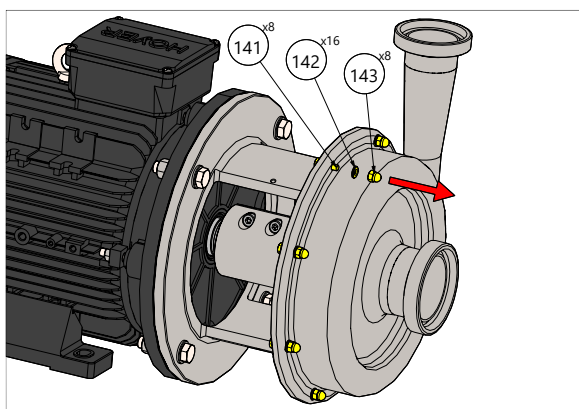


Fig. 3.3.3

Unscrew the casing mounting screws [141] and remove them with the nuts [143] and washers [142].

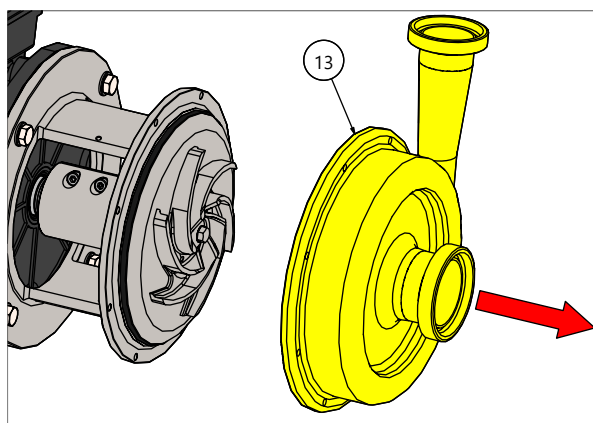


Fig. 3.3.4

Take off the pump casing [13].

3. MAINTENANCE

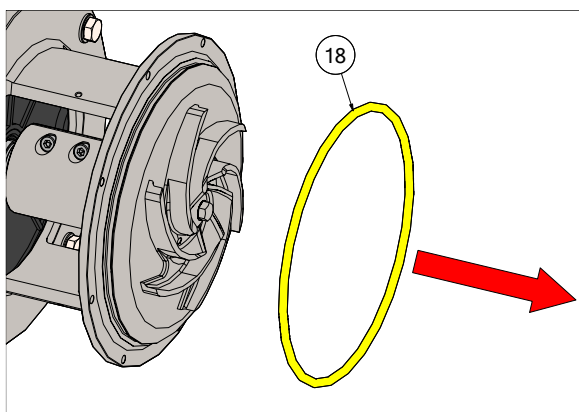


Fig 3.3.5

Remove the casing O-ring [18].

NOTE! After every disassembly the O-ring [18] should be replaced by a new one.

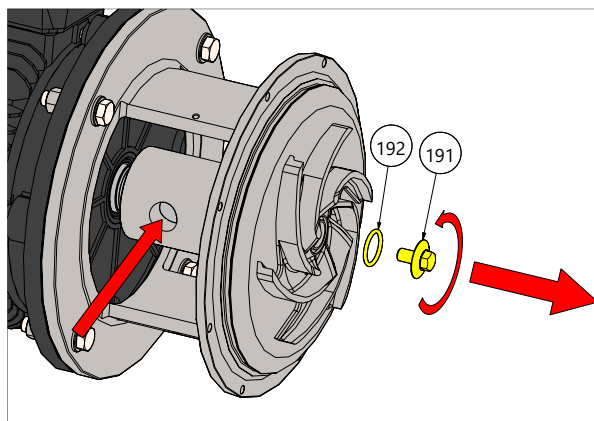


Fig 3.3.6

Use a bar to fix the shaft in place and unscrew the impeller nut [191] and remove the O-ring [192].

NOTE! Apply grease on the thread before re-assembly.

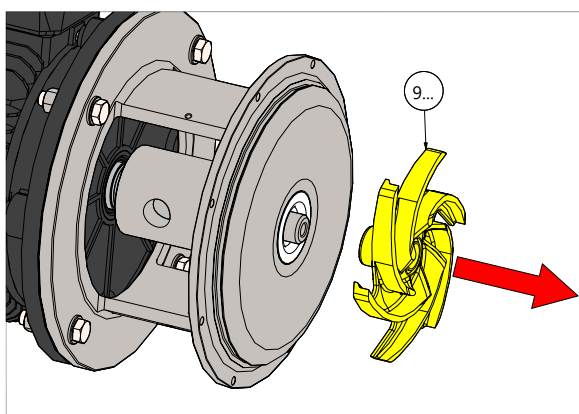


Fig 3.3.7

Unscrew the impeller [9...].

NOTE! Apply grease on the thread before re-assembly.

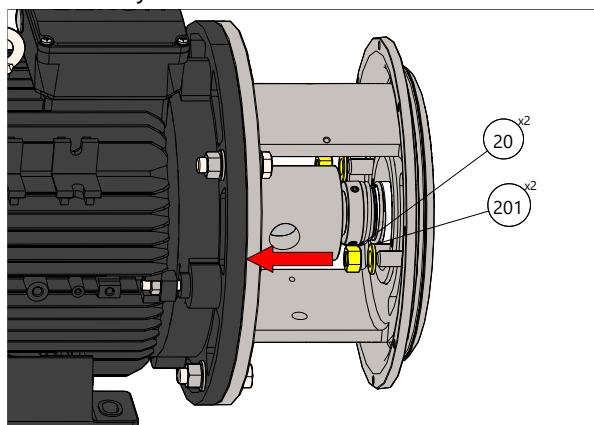


Fig 3.3.8

Remove the nuts [20] and washers [201] fastening the back casing [12] to the lantern [11].

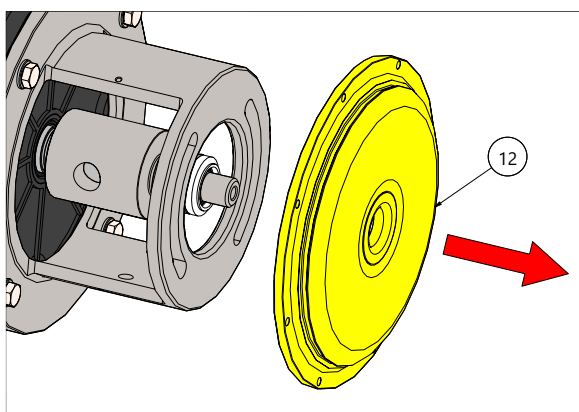


Fig 3.3.9

Carefully remove the back casing [12]. The static part of the mechanical seal will remain in the back casing.

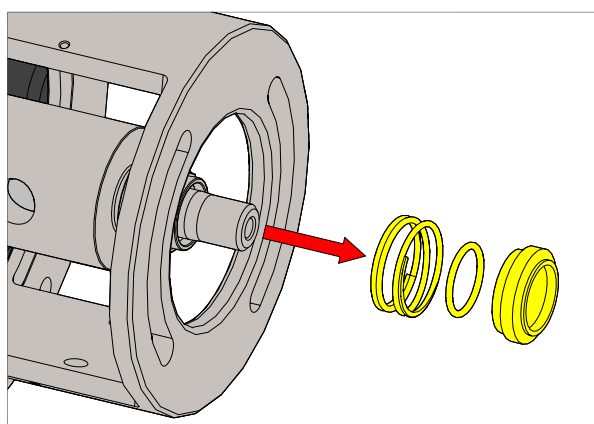


Fig 3.3.10

Remove the rotary parts of mechanical seal.

3. MAINTENANCE

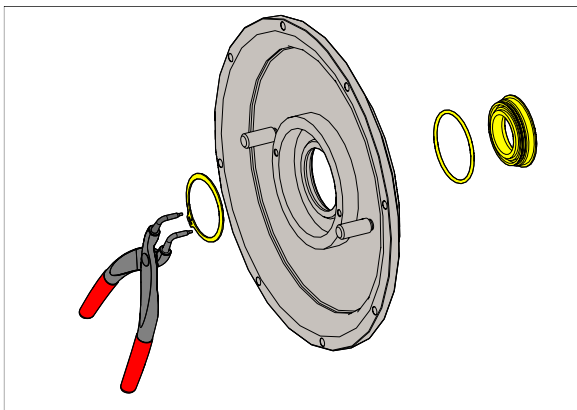


Fig 3.3.11

Remove the circlip by means of pliers and push out the static part of the mechanical seal.

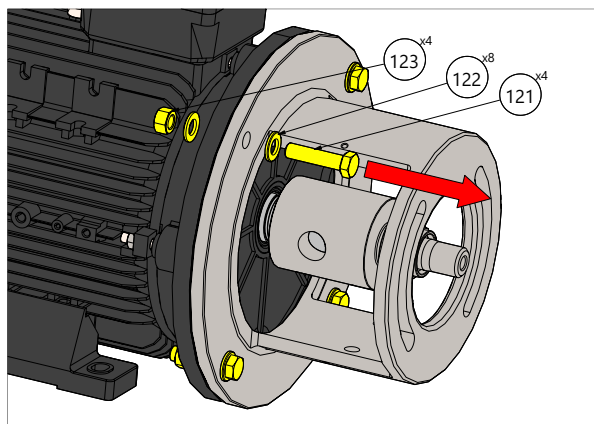


Fig 3.3.12

Remove the bolts [121], washers [122] and nuts [123] fastening the lantern [11] to the electric motor.

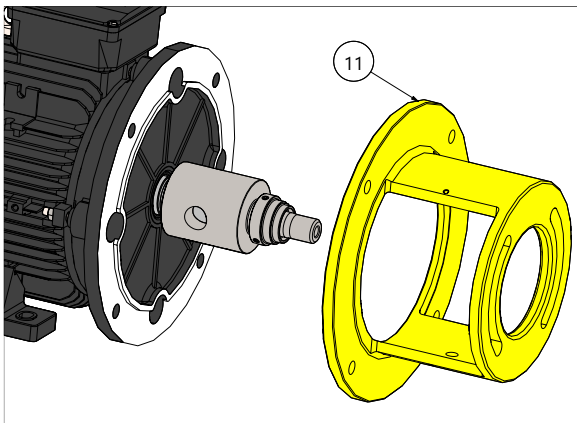


Fig 3.3.13

Remove the lantern [11].

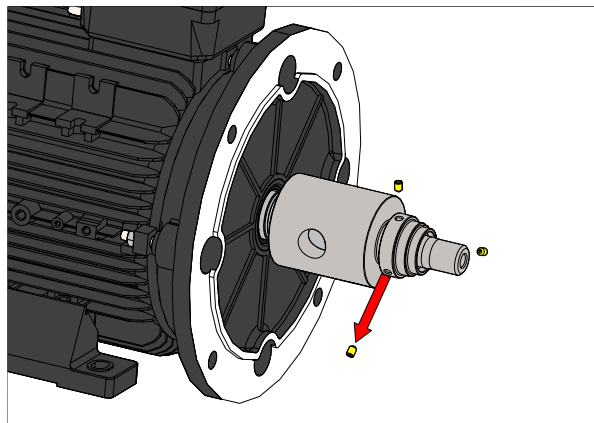


Fig 3.3.14

Remove the mechanical seal grub screws.

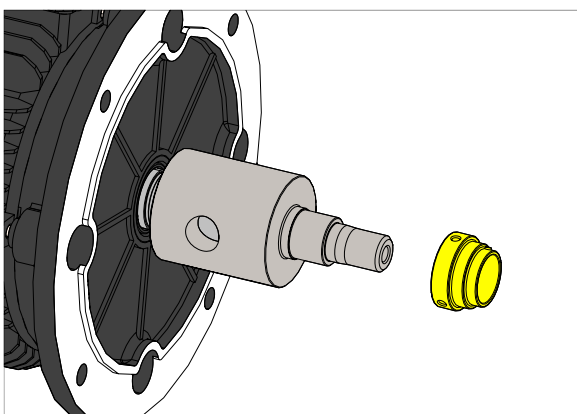


Fig 3.3.15

Remove the remaining part of mechanical seal.

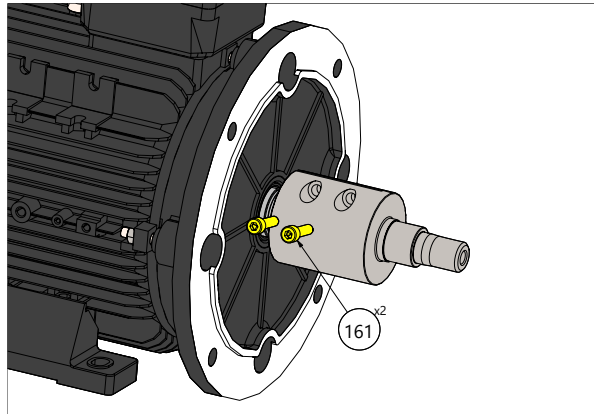


Fig 3.3.16

Remove the shaft screws [161].

3. MAINTENANCE

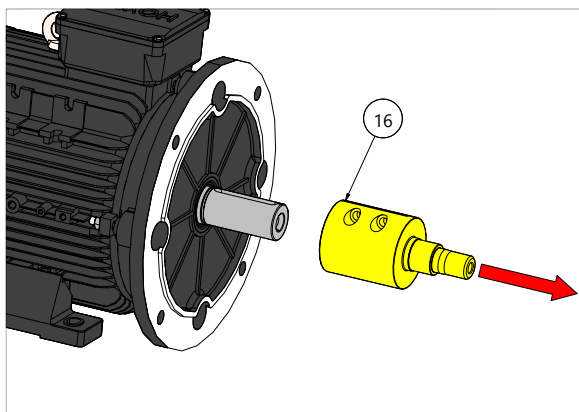


Fig 3.3.17

Remove the shaft [16].



The pump is now completely disassembled. Check all components, especially the mechanical seal, for wear or damage and replace if necessary. The casing O-ring should be replaced after every pump disassembly!

3.4. Assembly of the pump

The assembly procedure is done in the reverse order to the disassembly.

Nevertheless there are a few things that you have to remember in order to assemble the pump correctly.

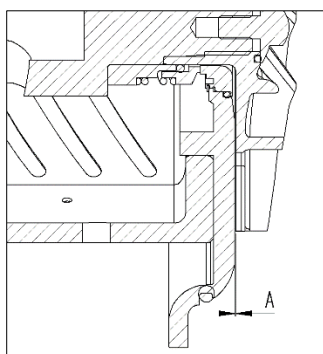


Fig. 3.4.1

After installation of the impeller, proper gap "A" between the impeller and the back casing has to be set. Loosen the shaft screws [161] and using a feeler (gap) gauge set the appropriate gap.

Pump type	A [mm]
CTX 40-165	0.5
CTX 50-145	
CTX 50-200	
CTX 65-175	1.0
CTX 65-240	
CTX 65-230	
CTX 80-205	
CTX 80-212	

3. MAINTENANCE

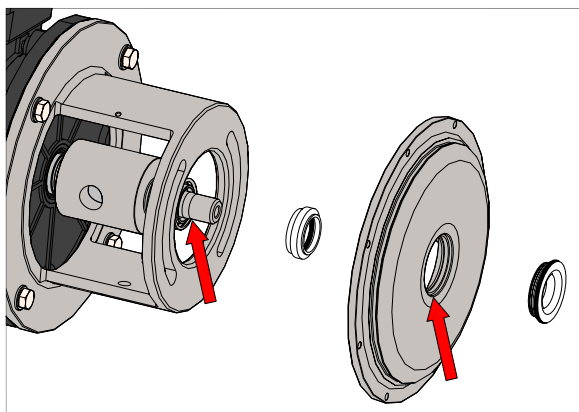


Fig. 3.4.2

Precisely clean and degrease with alcohol the internal rim of the back casing [12] as well as the shaft [16] surface. Check if the rim surface is smooth. If not it may cause mechanical seal leakage.

NOTE! For cleaning use dust-free material e.g. blue towel TORK 1230081.

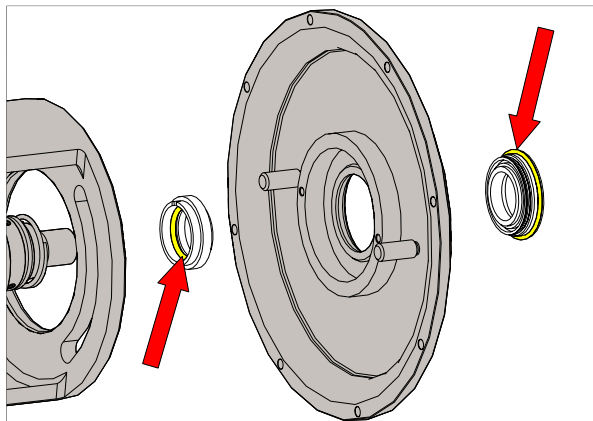


Fig. 3.4.3

Before assembly lubricate the mechanical seal O-rings to provide more accurate assembly as well as prevent the O-ring from curling.

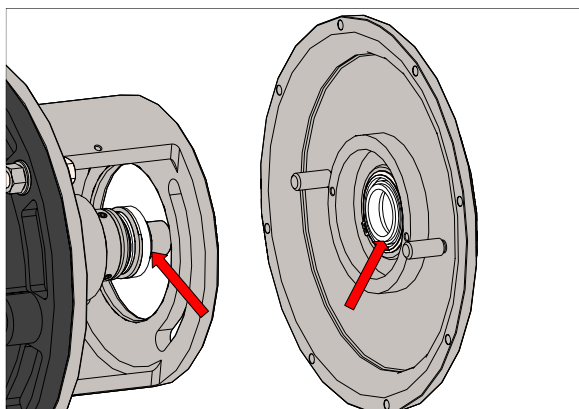


Fig. 3.4.4

Before final assembly, once again degrease the sliding faces of the mechanical seal.

3.4.1. Test run



We recommend you to conduct a test run of the pump before installing it in the system, so no liquid gets wasted if the pump leaks or perhaps does not start accordingly to wrong assembly of the pump.

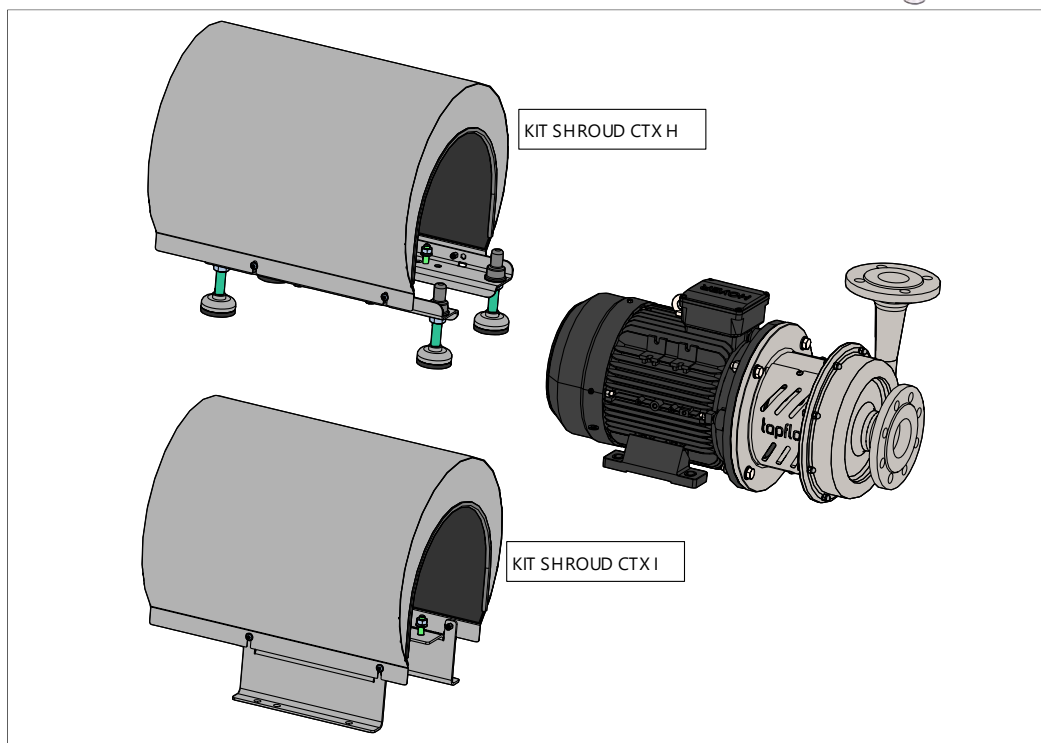
After a few weeks of operation retighten the screws with appropriate torque.

4. OPTIONS

4. OPTIONS

4.1. Motor shroud – M/N

An optional motor shroud is available. It is made of stainless steel and provides easy cleaning and splash protection for the electrical motor. As a standard, the pump with the shroud is equipped with feet (M) or bracket (N).



Available for all pump sizes

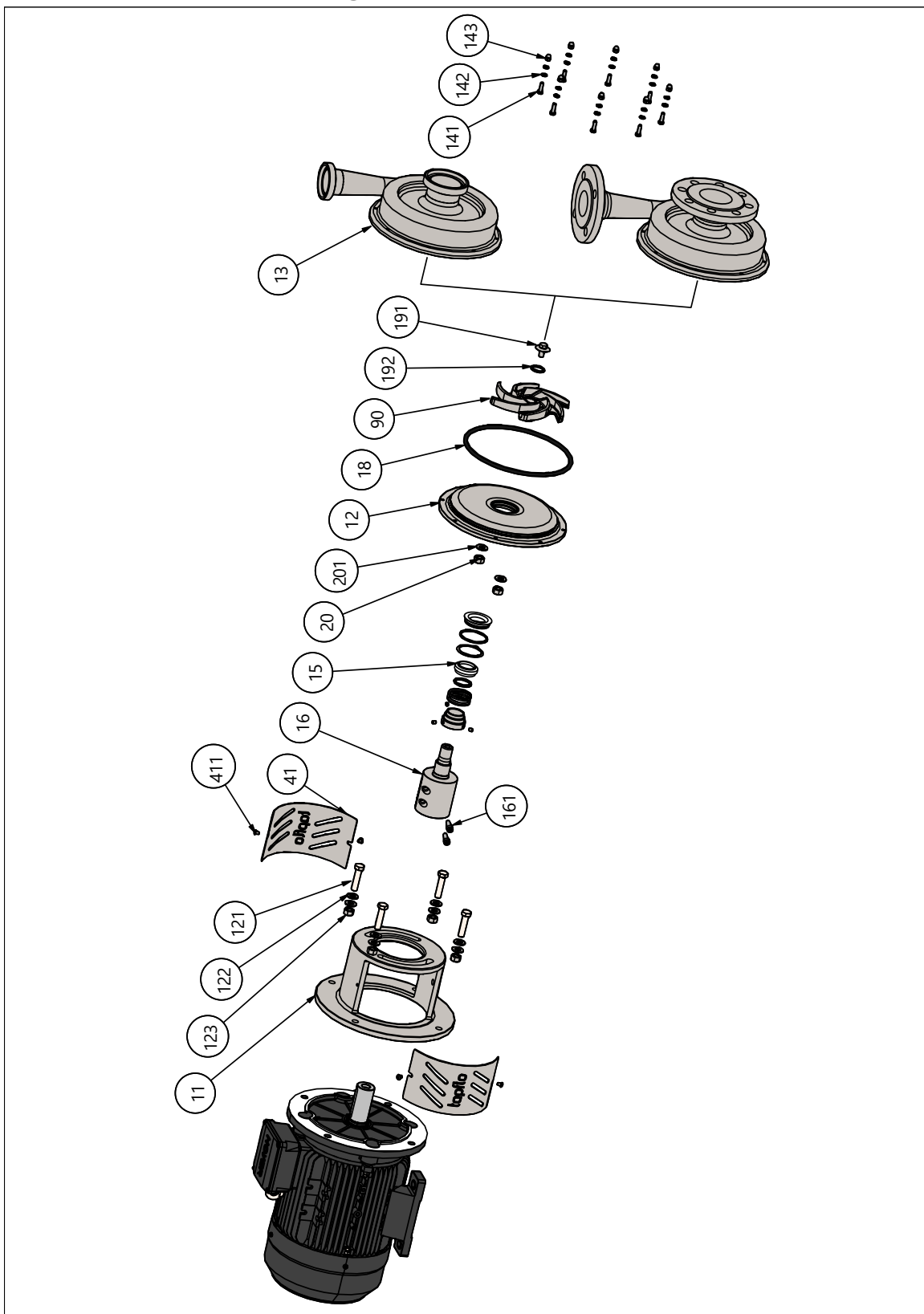
Pump size	Code
40-165	KIT SHROUD 165 X
50-145	KIT SHROUD 145 X
50-200	KIT SHROUD 200 X
65-175	KIT SHROUD 175 X
65-230	KIT SHROUD 230 X
65-240	KIT SHROUD 240 X
80-205	KIT SHROUD 205 X
80-212	KIT SHROUD 212 X

X – M for hygienic and N for industrial execution

5. SPARE PARTS

5. SPARE PARTS

5.1. Spare parts drawing



5. SPARE PARTS

5.2. Spare parts list

Pos.	Description	Q-ty	Material	
			CTX I	CTX H
11	Lantern	1	AISI 304L	
12	Back casing [H/N]***	1	AISI 316L Ra<3.2	AISI 316L Ra<0.8
121	Lantern assembly bolt	4	A4-70	
122	Lantern assembly washer	8	A4-70	
123	Lantern assembly nut	4	A4-70	
13	Pump casing [H/N]	1	AISI 316L Ra<3.2	AISI 316L Ra<0.8
141	Casing mounting screws	8/6*	A4-70	
142	Casing mounting washers	16/12*	A4-70	
143	Casing mounting nuts	8/6*	A4-70	
15	Mechanical seal (complete)	1	See 6.1	See 6.1
16	Shaft extension	1	AISI 304L	
161	Shaft screw	2/1*	A4-80	
18	Casing O-ring	1	EPDM (std), FKM, Silicone, NBR	
191	Impeller mounting nut [N/H]	1	AISI 316L Ra<3.2	AISI 316L Ra<0.8
192	Impeller nut O-ring	1	EPDM (std), FKM, Silicone, NBR	
21	Back casing nut	4/2**	A4-70	
201	Back casing washer	4/2**	A4-70	
41	Shaft guard	2	AISI 304L	
411	Shaft guard screw	4	A4-70	
9xxx	Impeller (xxx – diameter in mm)	1	AISI 316L Ra<3.2	AISI 316L Ra<0.8



* CTX 80-212, 80-205, 65-240, 65-230, 65-175, 50-200 / 50-145, 40-165

** CTX 80-212, 80-205, 65-240, 65-230 / 65-175, 50-200, 50-145, 40-165

*** Parts indicated as [H/N] have different execution for CTX I and CTX H pumps. When ordering spare parts please indicate if the part is for Industrial or Hygienic series e.g. 14-145**N**-11 or 14-145**H**-11.

5.3. Recommended spare parts

Normally the CTX pump is maintenance free. However, depending on the nature of the liquid and temperature etc. some parts of the pump are subject to wear and need to be replaced. We recommend having the following parts in stock:

Pos.	Description	Q-ty
15	Mechanical seal	1
18	Casing O-ring	1
192	Impeller nut O-ring	1

5.4. How to order parts

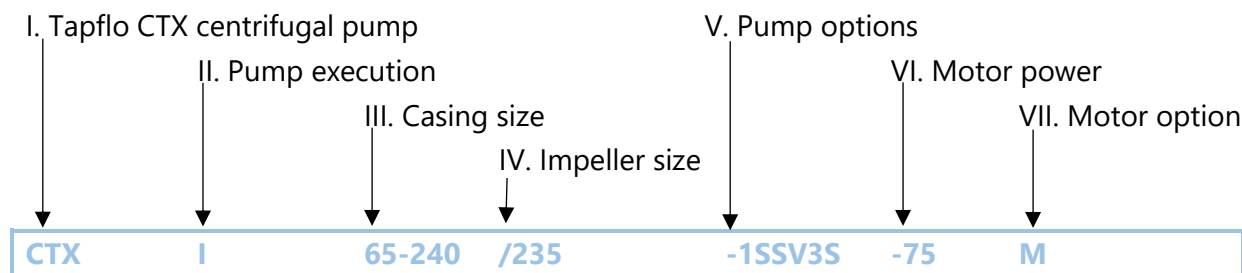
When ordering spare parts for Tapflo pumps. please let us know what is the **model number** and **serial number** from the pump's name plate. Then just indicate the part numbers from the spare parts list and quantity of each item.

6. DATA

6. DATA

6.1. Pump code

The model number on the pump and on the front page of this instruction manual tells the pump size and materials of the pump.



I. CTX = Tapflo CTX centrifugal pump

II. Pump execution:

- I = Industrial
- H = Hygienic

III. Pump size (inlet DN – max impeller diameter [mm]):

40-165
50-145
50-200
65-175
65-230
65-240
80-205
80-212

IV. Actual impeller diameter [mm] used in pump Trimming by 1 mm allowed

	Impeller diameter	
	Max.	Min.
80-212	212	160
80-205	205	155
65-240	240	190
65-230	230	170
65-175	175	130
50-200	200	160
50-145	145	115
40-165	165	120

V. Pump options:

1. Mechanical seal (FDA as standard):

- Blank* = SiC/carbon/EPDM
- SSS = SiC/SiC/Silicone
- SSE = SiC/SiC/EPDM
- SSV = SiC/SiC/FKM
- SSN = SiC/SiC/NBR
- SGV = SiC/graphite/FKM
- SGS = SiC/graphite/Silicone
- SGN = SiC/graphite/NBR

3. Connection options

- Blank* = EN 1092-1 flange on CTX I
- Thread DIN 11851 on CTX H
- A = ANSI flange (CTX I only)
- B = BSPT female thread (CTX I only)
- C = SMS 3017 clamp (CTX H only)
- T = Clamp DIN 32676 (CTX H only)
- S = Thread SMS 1145 (CTX H only)
- R = Thread RJT (CTX H only)
- P = ISO 1127 clamp (CTX H only)
- W = No connection – plain weld end
- Z = Camlock male connection (CTX I only)

4. Special executions

- P05 = Extra polishing to Ra<0.5 (CTH X only)

VI. Motor power / IEC motor size

2900 rpm motors (2-pole):

- 15 = 1.5 kW / 90S
- 22 = 2.2 kW / 90L
- 30 = 3.0 kW / 100L
- 40 = 4.0 kW / 112M
- 55 = 5.5 kW / 132S
- 75 = 7.5 kW / 132S
- 110 = 11 kW / 160M
- 150 = 15 kW / 160M
- 185 = 18.5 kW / 160L
- 220 = 22 kW / 180M
- 300 = 30 kW / 200L
- 370 = 37 kW / 200L

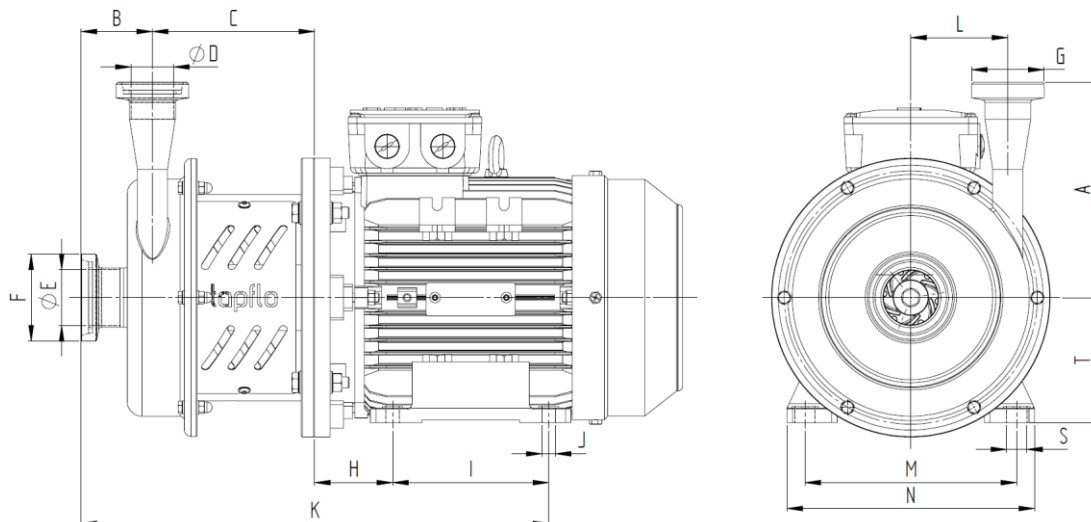
VII. Motor options

- M = Motor shroud with hygienic feet
- N = Motor shroud with mounting bracket
- V...F... = Motor for special voltage, frequency
- C = External cooling for motor
- UL = UL/CSA certified motor
- IP.. = IP class for motor
- D = Built on frequency inverter

* = standard execution

6. DATA

6.2. Dimensions



Dimensions in mm (where other is not indicated)

General dimensions only, ask us for detailed drawings. Changes reserved without notice.

MODEL	Power [kW]	IEC size	A	B	C	øD	øE	H*	I*	J*	K*	L	M*	N*	S*	T*				
40-165-15	1.5	90S	178	58.5	132	32	38	56	125	10	372	91	140	177	14	90				
40-165-22	2.2	90L			144			63	140	12	406		160	205	18	100				
40-165-30	3.0	100L						70			413		190	222		112				
40-165-40	4.0	112M						89			456		216	265		132				
40-165-55	5.5	132S			168											132				
40-165-75	7.5	132S																		
50-145-15	1.5	90S	193	64	133.5	38	50	56	125	10	378.5	87	140	177	14	90				
50-145-22	2.2	90L			145.5			63	140	12	412.5		160	205	18	100				
50-145-30	3.0	100L						70			119.5		190	222		112				
50-145-40	4.0	112M						89			462.5		216	265		132				
50-145-55	5.5	132S			169.5											132				
50-145-75	7.5	132S																		
50-200-30	3.0	100L	201	65.5	150	38	50	63	140	12	418	105	160	205	18	100				
50-200-40	4.0	112M			171			70			425		190	222		112				
50-200-55	5.5	132S						89			465		216	265		132				
50-200-75	7.5	132S			201			108	210	14.5	584		254	314	14.5	160				
50-200-110	11	160M									628					160				
50-200-150	15	160M														160				
50-200-185	18.5	160L							254		628									
65-175-30	3.0	100L	231	75.5	148	50	66	63	140	12	427	100	160	205	18	100				
65-175-40	4.0	112M			169			70			434		190	222		112				
65-175-55	5.5	132S						89			474		216	265		132				
65-175-75	7.5	132S			199			108	210	14.5	593		254	314	14.5	160				
65-175-110	11	160M									637					160				
65-175-150	15	160M														160				
65-175-185	18.5	160L							254		637									
65-240-55	5.5	132S	238	88	162.5	38	66	89	140	12	479.5	132	216	265	18	132				
65-240-75	7.5	132S			190.5			108			596.5		254	314	14.5	160				
65-240-110	11	160M									640.5		279	349		180				
65-240-150	15	160M						121	241	18.5	716.5		318	388	18.5	200				
65-240-185	18.5	160L														200				
65-240-220	22	180M																		
65-240-300	30	200L																		
65-240-370	37	200L																		

6. DATA

80-208-55	5.5	132S	240	96	171	50	81	89	140	12	496	130	216	265	18	132
80-208-75	7.5	132S														132
80-208-110	11	160M														160
80-208-150	15	160M														160
80-208-185	18.5	160L														160
80-208-220	22	180M														180
80-208-300	30	200L														200
80-208-370	37	200L														200
65-230-55	5.5	132S	240	87	170.5	50	66	89	140	12	399.5	130	216	265	18	132
65-230-75	7.5	132S														132
65-230-110	11	160M														160
65-230-150	15	160M														160
65-230-185	18.5	160L														160
65-230-220	22	180M														180
65-230-300	30	200L														200
65-230-370	37	200L														200
80-212-55	5.5	132S	272	99	171	66	81	40	140	12	399.5	130	216	265	18	132
80-212-75	7.5	132S														132
80-212-110	11	160M														160
80-212-150	15	160M														160
80-212-185	18.5	160L														160
80-212-220	22	180M														180
80-212-300	30	200L														200
80-212-370	37	200L														200

*Dimension may vary depending on motor brand

Connection dimensions						
Model	BSPT male thread		EN1092-1 flange (std.)		ANSI 150 flange	
	F	G	F	G	F	G
40-165	1.5"	1.25"	DN40	DN32	1.5"	1.25"
50-145	2"	1.5"	DN50	DN40	2"	1.5"
50-200	2"	1.5"	DN50	DN40	2"	1.5"
65-175	2.5"	2"	DN65	DN50	2.5"	2"
65-230	2.5"	2"	DN65	DN50	2.5"	2"
65-240	2.5"	1.5"	DN65	DN40	2.5"	1.5"
80-205	3"	2"	DN80	DN50	3"	2"
80-212	2"	2.5"	DN80	DN65	2"	2.5"




Connection dimensions										
Model	DIN 11851 thread (std.)		DIN 32676 clamp		SMS3017 clamp		SMS 1145 thread		RJT thread	
	F	G	F	G	F	G	F	G	F	G
40-165	DN40	DN32	DN40	DN32	38	33.7	38	32	1.5"	1.25"
50-145	DN50	DN40	DN50	DN40	51	38	51	38	2"	1.5"
50-200	DN50	DN40	DN50	DN40	51	38	51	38	2"	1.5"
65-175	DN65	DN50	DN65	DN50	63.5	51	63.5	51	2.5"	2"
65-230	DN65	DN50	DN65	DN50	63.5	51	63.5	51	2.5"	2"
65-240	DN65	DN40	DN65	DN40	63.5	38	63.5	38	2.5"	1.5"
80-205	DN80	DN50	DN80	DN50	76.1	51	76	51	3"	2"
80-212	DN80	DN65	DN80	DN65	76.1	63.5	76	63.5	2"	2.5"

6. DATA

6.3. Materials, data and limits

	CTX H ...	CTX I ...
Casing	Stainless steel AISI 316L electro polished Ra<0.8	Stainless steel AISI 316L glass blasted Ra<3.2
Open impeller	Stainless steel AISI 316L electro polished Ra<0.8	Stainless steel AISI 316L electro polished Ra<3.2
Mechanical seal	Single, SiC/carbon (std) or SiC/SiC, FDA approved	Single, SiC/carbon (std) or SiC/SiC, FDA approved
O-rings	EPDM, FKM, NBR (all FDA approved)	EPDM, FKM, NBR (all FDA approved)
Motor	IP55; IEC frame B35; PTC thermistor; IE3; 3-phase	
Pressure rating @ 20°C	PN10 – CTX 40-165, CTX 50-145, CTX 50-200, CTX 65-175 PN16 – CTX 65-230, CTX 65-240, CTX 80-205, CTX 80-212	
Liquid temp.	(-10)÷120 °C (140°C for short periods during SiP)	
Ambient temp.	(-20)÷40 °C	
Viscosity	Max ~150 cSt	
Particles	Max diameter is 6 mm (std open impeller); bigger if soft particles	

6.4. Mounting torques and dimensions of screws/nuts

Screw / nut type	Description	CTX 40-165	CTX 50-145	CTX 50-200	CTX 65-175	CTX 65-230	CTX 65-240	CTX 80-205	CTX 80-212
	Pos. 141. DIN 933 bolt								
	Mounting torque [Nm]	8	8	8	8	18	18	18	18
	Tool size "S" [mm]	10	10	10	10	13	13	13	13
	Thread	M6	M6	M6	M6	M8	M8	M8	M8
	Pos. 161. DIN 912 screw								
	Mounting torque [Nm]	25	25	25	25	25	25	25	25
	Tool size "S" [mm]	6	6	6	6	6	6	6	6
	Thread	M8	M8	M8	M8	M8	M8	M8	M8
	Pos. 121. DIN 933 bolt								
	Mounting torque [Nm]	35	35	60	60	140	140	140	140
	Tool size "S" [mm]	16	16	18	18	24	24	24	24
	Thread	M10	M10	M12	M12	M16	M16	M16	M16

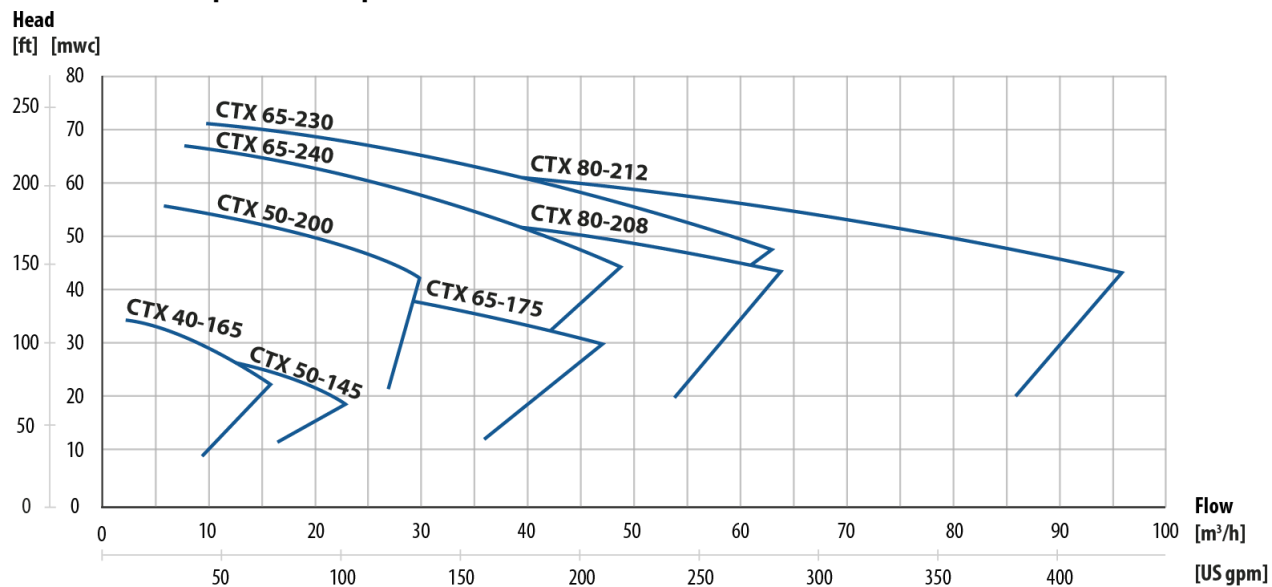
6. DATA

6.5. Performance curves

The performance curves are based on water at 20°C.

Contact us for detailed curves

Speed 2900 rpm



6. DATA

6.6. Permitted loads on inlet and outlet

We recommend not to exceed the following loads and forces reacting on the inlet and

CTI A		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	70	6
Y	100	6
Z	70	6

CTI B		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	80	8
Y	120	8
Z	80	8

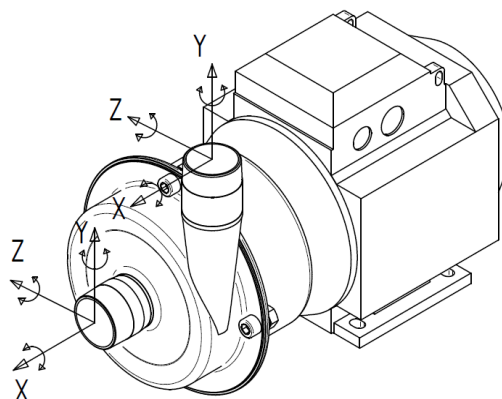
CT C		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	100	10
Y	150	10
Z	100	10

outlet.

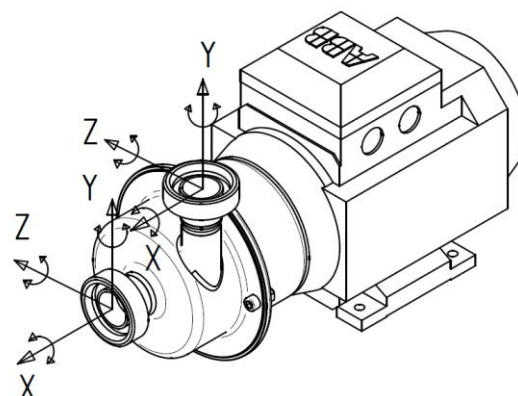
CT D / E		
Direction	Load [N] (inlet/outlet)	Moment of force (inlet/outlet) [Nm]
X	100/120*	12
Y	170	12
Z	120	12

*CTI / CTH

CTI pump



CTH pump



7. WARRANTY

7. WARRANTY

7.1. Returning parts

When returning parts to Tapflo please follow this procedure:

- Consult Tapflo for shipping instructions.
- Cleanse or neutralize and rinse the part/pump. Make sure the part/pump is completely empty from liquid.
- Pack the return articles carefully to prevent any damage during transportation.

Goods will not be accepted unless the above procedure has been complied with.

7.2. Warranty

Tapflo warrants products under conditions as stated below for a period of not more than 12 months from installation and not more than 24 months from date of manufacturing.

1. The following terms and conditions apply to the sale of machinery, components and related services and products, of Tapflo (hereinafter "the products").
2. Tapflo (the manufacturer) warrants that:
 - a. its products are free of defects in material, design and workmanship at the time of original purchase;
 - b. its products will function in accordance with Tapflo operative manuals; Tapflo does not guarantee that the product will meet the precise needs of the Customer except for those purposes set out in any invitation to render documents or other documents specifically made available to Tapflo before entering into this agreement;
 - c. high quality materials are used in the construction of the pumps and that machining and assembly are carried out to the highest standards.

Except as expressly stated above, Tapflo makes no warranties, express or implied, concerning the products, including all warranties of fitness for a particular purpose.

3. This warranty shall not be applicable in circumstances other than defects in material, design and workmanship. In particular warranty shall not cover the following:
 - a. Periodic checks, maintenance, repair and replacement of parts due to normal wear and tear (seals, O-rings, rubber items, bushings, etc.);
 - b. Damage to the product resulting from:
 - b.1. Tampering with, abuse or misuse, including but not limited to failure to use the product for its normal purposes as stated at the time of purchase or in accordance with Tapflo instructions for use and maintenance of the product, or the installation or improper ventilation or use of the product in a manner inconsistent with the technical or safety standard in force;
 - b.2. Repairs performed by non-skilled personnel or use of non-original Tapflo parts;

7. WARRANTY

b.3. Accidents or any cause beyond the control of Tapflo, including but not limited to lightning, water, fire, earthquake and public disturbances etc.;

4. The warrantee shall cover the replacement or repairing of any parts, which is documented faulty due to construction or assembling, with new or repaired parts free of charges delivered by Tapflo. Parts subjected to normal tear and wear shall not be covered by the warranty. Tapflo shall decide as to whether the defective or faulty part shall be replaced or repaired.
5. The warrantee of the products shall be valid for a period in accordance to the current law from the date of delivery, under the condition that notice of the alleged defect to the products or parts thereof be given to Tapflo in written within the mandatory term of 8 days from the discovery. Repair or replacement under the terms of this warranty shall not give a right to an extension to or a new commencement of the period of warranty.
6. Repair or replacement under the terms of this warranty shall not give a right to an extension to, or a new commencement of, the period of warranty. Repair or replacement under the terms of this warranty may be fulfilled with functionally equivalent reconditioned units. Tapflo qualified personnel shall be solely entitled to carry out repair or replacement of faulty parts after careful examination of the pump. Replaced faulty parts or components will become the property of Tapflo.
7. The products are built in accordance with standard CE normative and are tested (where applicable) by Tapflo. Approval and tests by other control authority are for the customer's account. The products shall not be considered defective in materials, design or workmanship if they need to be adapted, changed or adjusted to conform to national or local technical or safety standards in force in any country other than that for which the unit was originally designed and manufactured. This warranty shall not reimburse such adaptations, changes or adjustments, or attempt to do so, whether properly performed or not, nor any damage resulting from them, nor any adaptation change or adjustments to upgrade the products from their normal purpose as described in the products operative manual without the prior written consent of Tapflo.
8. Installation, including electric and other connections to utility mains according to Tapflo drawings, is for the cost and responsibility of the customer, unless otherwise agreed in writing.
9. Tapflo will not be liable on any claim, whether in contract, tort, or otherwise, for any indirect, special, incidental or consequential damages caused to the customer or to third parties, including loss of profits arising by any possible infringement of par. 3 above or by the customer or third parties being in the impossibility of using the products.

Steady the above, Tapflo liability to the customer or third parties from any claim, whether in contract, tort or otherwise, shall be limited to the total amount paid by the customer for the product that caused the damages.

7. WARRANTY

7.3. Warranty form

Company: _____	
Telephone: _____	Fax: _____
Address: _____	
Country: _____	Contact Name: _____
E-mail: _____	
Delivery Date: _____	Date of pump installation: _____
Pump type: _____	
Serial No (see name plate): _____	
Description of the fault: _____	

The installation:				
Liquid: _____				
Temperature [°C]: _____	Viscosity [cPs]: _____	Spec grav. [kg/m ³]: _____	pH-value: _____	
Content of particles: _____		%, of max size [mm]: _____		
Flow [l/min]: _____	Duty [h/day]: _____	No of starts per day: _____		
Discharge head [mWC]: _____		Suction head / lift [m]: _____		
Other: _____				

Place for sketch of installation:

Sweden

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Tel: +46 303 63390

Fax: +46 303 19916

E-mail addresses:

Commercial questions: sales@tapflo.com

Orders: order@tapflo.com

Tech support: support@tapflo.com

Tapflo products and services are available in 75 countries on 6 continents.

Tapflo is represented worldwide by own Tapflo Group Companies and carefully selected distributors assuring highest Tapflo service quality for our customers' convenience.

AUSTRALIA | AUSTRIA | AZERBAIJAN | BAHRAIN | BELARUS | BELGIUM | BOSNIA & HERZEGOVINA | BRAZIL | BULGARIA | CANADA | CHILE | CHINA | COLOMBIA | CROATIA | CZECH REPUBLIC | DENMARK | ECUADOR | EGYPT | ESTONIA | FINLAND | FRANCE | GREECE | GEORGIA | GERMANY | HONG-KONG | HUNGARY | ICELAND | INDIA | INDONESIA | IRAN | IRELAND | ISRAEL | ITALY | JAPAN | JORDAN | KAZAKHSTAN | KUWAIT | LATVIA | LIBYA | LITHUANIA | MACEDONIA | MALAYSIA | MEXICO | MONTENEGRO | MOROCCO | THE NETHERLANDS | NEW ZEALAND | NORWAY | POLAND | PORTUGAL | PHILIPPINES | QATAR | ROMANIA | RUSSIA | SAUDI ARABIA | SERBIA | SINGAPORE | SLOVAKIA | SLOVENIA | SOUTH AFRICA | SOUTH KOREA | SPAIN | SUDAN | SWEDEN | SWITZERLAND | SYRIA | TAIWAN | THAILAND | TURKEY | UKRAINE | UNITED ARAB EMIRATES | UNITED KINGDOM | USA | UZBEKISTAN | VIETNAM

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