

# CTS Self-priming Centrifugal Pumps

Original Instruction  
2025 | 1



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



## CTS I

With 2900 rpm motor:

CTS I CC-22  
CTS I CE-22  
CTS I DD-40  
CTS I DF-40  
CTS I EF-55  
CTS I EG-55  
CTS I EF-75  
CTS I EG-75

## CTS H

With 2900 rpm motor:

CTS H CC-22  
CTS H CE-22  
CTS H DD-40  
CTS H DF-40  
CTS H EF-55  
CTS H EG-55  
CTS H EF-75  
CTS H EG-75



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## EC DECLARATION OF CONFORMITY 01/EC/CTS/2016

Series:

**CTS...**

Serial numbers:

**2016 - ... (from 1604 - ...)**

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 SELF-PRIMING CENTRIFUGAL PUMPS**

The object of the declaration described above is in conformity with the relevant Union harmonization 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;

Mr Michał Śmigiel is authorized to compile the technical file.

Tapflo Sp. z o.o.

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83-110 Tczew

Signed for and on behalf of Tapflo AB:



Håkan Ekstrand

**Managing director**

Tapflo AB, 16.04.2016

## EU DECLARATION OF CONFORMITY XX/ATEX/CTS/2021

Series:

**CTS...**

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 VERTICAL CENTRIFUGAL SELF-PRIMING 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
- Directive **2014/34/EU** of the European parliament and of the council of 26 February 2014 on Equipment or Protective System intended for use in potentially explosive atmospheres

Applied harmonised standards:

- **EN ISO 80079-36:2016-07**

ATEX marking:

  **II 2G Ex h IIC T6...T3 Gb**  
**II 2D Ex h IIIC T69°C...T139°C Db**

Notified body **J.S. Hamilton Poland Sp. z o.o. (...)** performed **EU-type examination** and issued certificate **JSHP 21 ATEX XXXX**.

Signed for and on behalf of Tapflo AB



Håkan Ekstrand  
**Managing Director**  
Kungälv, 28.07.2021

# 0. GENERAL

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## 0. GENERAL

### 0.1. Introduction

CTS is an open impeller self-priming centrifugal pump, manufactured from stainless steel AISI 316L. CTS H with excellent electro polished surfaces, FDA approved seals, high finish and mechanical strength, meet the demands from food and sanitary applications, CTS I with AISI 316L chemical resistance and mechanical strength is a reliable choice.

The self-priming feature allows to use the pump in applications where standard CT pumps do not prove useful. The CTS pump is capable of creating up to 4,5 m of suction lift.

With proper attention to maintenance, CTS 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 complete dampener or its subassemblies.



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

### 0.3. Qualification and training of personnel



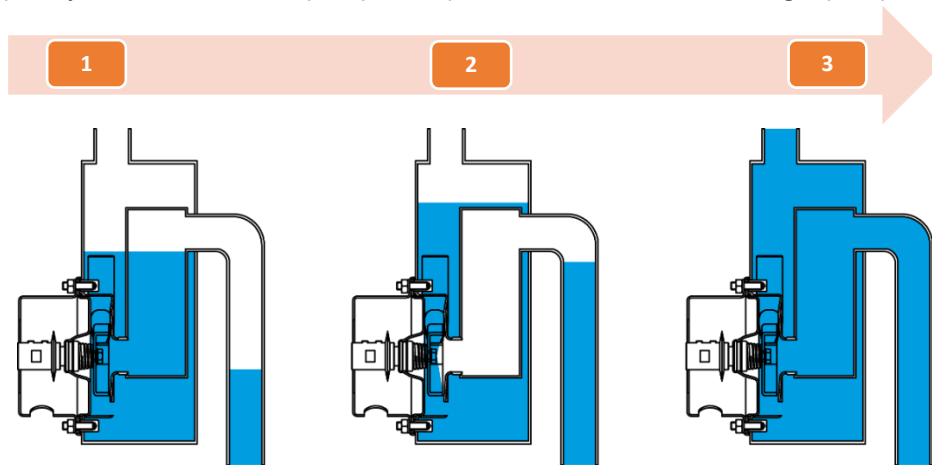
The personnel in charge of installation, operation and maintenance of the pumps we produce must be qualified to carry out the operations described in this manual. Tapflo shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual. In case any instructions in this manual are unclear or any information is lacking, please contact Tapflo before handling the pump.

# 1. INSTALLATION

## 1. INSTALLATION

### 1.1. Operation principle

In order for the priming action to be achieved, the pump casing has to be filled with liquid to a level above the impeller (1). When the pump starts its operation, it is slowly sucking out the air from the suction line thus creating negative pressure and lifting the product. The air is mixed with the liquid in the pump casing (2). In order to achieve the self-priming capability, the shut-off / regulation valve on the discharge side must be opened. The air escapes the casing through the discharge line while the liquid returns to the impeller as it has higher specific gravity than the liquid/air mixture. This process continues until the suction line is completely free of air and the pump can operate as a standard centrifugal pump (3).



### 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

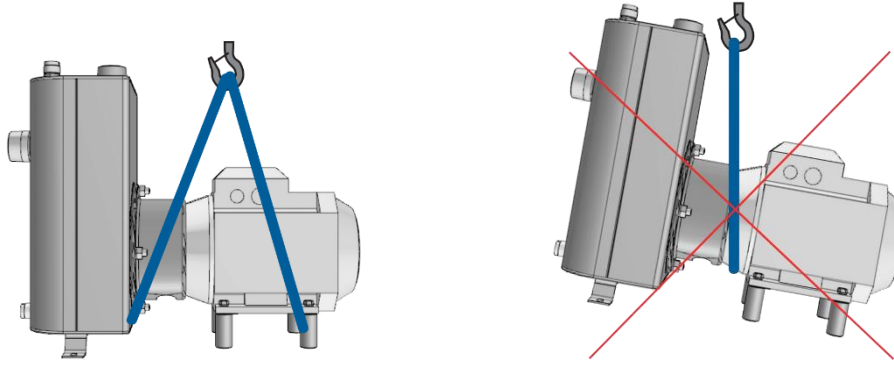
Before handling the pump check the weight of the pump (see 6.2. Technical data). Refer to Your local standards on how to handle the pump. If the weight is excessive to transport by hand it must be lifted using slings and a suitable lifting device e.g. a crane or forklift.

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.

# 1. INSTALLATION

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Never lift the pump under pressure.

Be careful that nobody passes under the pump when lifted.

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

As an option pumps can be equipped with lifting eyebolts connected with the pump.

## 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 twice per week.

## 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. INSTALLATION

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## 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.

**NOTE!** The pump casing is designed for maximal work pressure of 3 bar (for CTS C) and 4,5 bar (for CTS D,E), therefore exceeding these limits is prohibited.

### 1.7.1. Connection of discharge pipe



A shut-off / regulation valve is normally fitted on the discharge side. It cuts off the pump from the line and adjusts the output. Never adjust flow rate using the valve on the suction pipe.

**NOTE!** When starting the pump, the valve on the discharge side must be opened to allow the pump to self-prime.

### 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.

It is recommended to use check valve in the suction line to avoid siphoning when the pump stops. A foot valve on the suction side can prove useful when suction height is big. It allows to shorten the time of pump self-priming.

## 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 opened.

## 1.8.5. Explosion hazardous environments – ATEX

CTS series pumps are allowed to operate in environments, where is danger of explosion. However, they must be equipped with appropriate ATEX rated electrical motor. Follow below instructions and local/national rules for safe use.

### ATEX (directive 2014/34/EU) classification of Tapflo CTS pumps:

**II 2G Ex h IIC T6...T3 Gb**

**II 2D Ex h IIIC T69°C...T139°C Db**

Equipment group: **II** – all other explosive areas than mines;

Category group: **2** – high level of protection (can be used in zone 1);

Atmosphere: **G** – gas;

**D** – dust;

Explosion group: **IIC** – gas group (such as acetylene, hydrogen);

**IIIC** – dust group (conductive dusts);

Type of protection: **h** – control of ignition sources;

Temperature class: **T4, T6** – in the event of a malfunction, the maximum temperature of a surface that may be exposed to gas **T3** = 155°C, **T6** = 85°C;

EPL protection level: **Gb, Db** – high protection.

### Temperature classes and allowable temperatures

The temperature class of the pump depends on the temperature of the pumped medium.

Medium temperature	Pump max surface temperature
	$-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$
Up to 40°C	T6 / 69°C
Up to 60°C	T5 / 89°C
Up to 80°C	T4 / 109°C
Up to 110°C	T3 / 139°C

If ambient temperature exceeds the range  $-20^{\circ}\text{C} \leq T_a \leq +40^{\circ}\text{C}$ , contact Tapflo.

# 1. INSTALLATION

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## **Antistatic surface**

Pumps in ATEX execution should be cleaned in order to preserve antistatic properties. Layer of dust or other solid particles on the outer surfaces is unacceptable.

### **1.8.6. 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).

### **1.8.7. 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

### **1.8.8. Rotating parts**



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

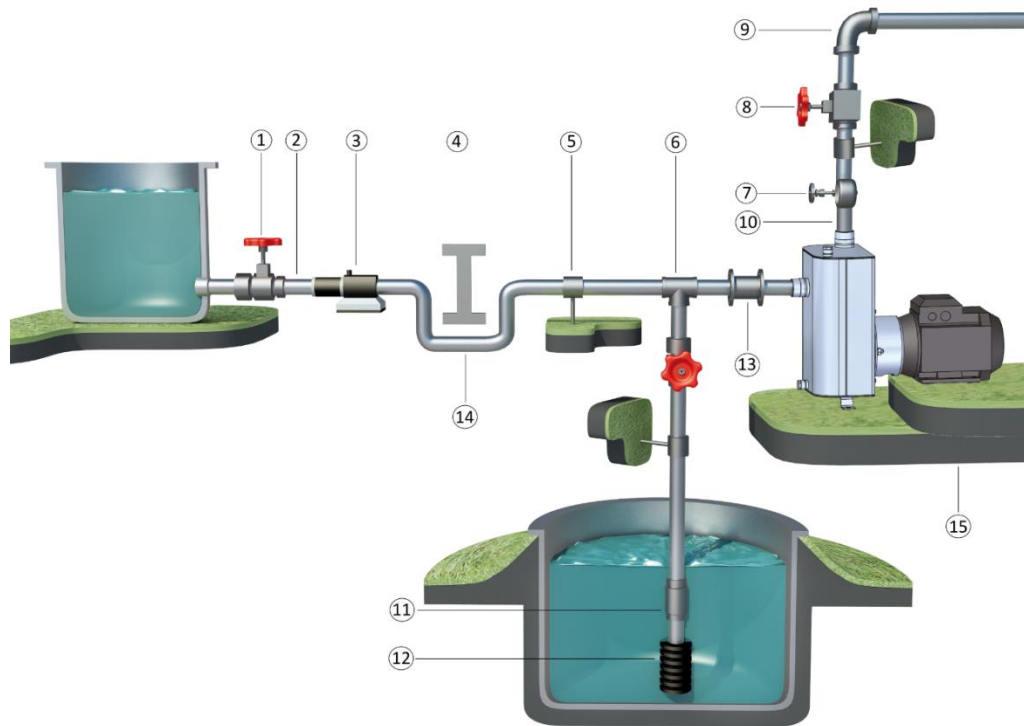
### **1.8.9. Cleaning and disinfection**



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) NO: elbow joints (and other bends) on the pump inlet and outlet
- 11) OPTIONAL: check valve
- 12) YES: strainer if particles are present
- 13) YES: expansion joint (necessary with long pipes or hot liquids) and/or anti-vibration facility during discharge and suction – anchored near the pump
- 14) YES: overcoming obstacles at lower depths
- 15) Fix the pump to the stand by means of holes in the motor feet. The stand must be level

# 1. INSTALLATION

## 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.

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.

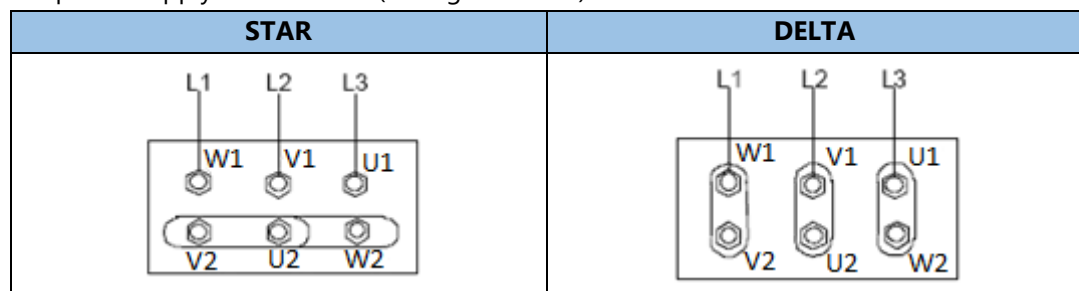
### 1.10.3. Thermometer

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

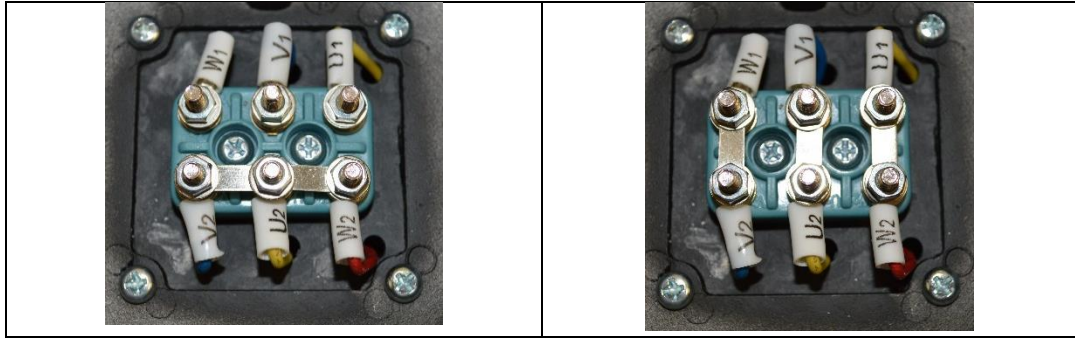
## 1.11. Motor connection



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).



# 1. INSTALLATION



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.

## 1.12. Motor standard

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

- International Mounting Arrangement – **B34**
- Number of poles / Rotation speed [rpm] – **2/4**
- **Non ATEX**
- Protection grade – **IP55**
- Voltage – **3 phase**

Motor power	RPM	Voltage	Frequency
<b>2,2 kW</b>	2900	$\Delta$ 230 / Y400	50 Hz
	3500	$\Delta$ 265 / Y460	60 Hz
<b>4,0 kW</b>	2900	$\Delta$ 400 / Y690	50 Hz
	3500	$\Delta$ 460	60 Hz
<b>5,5 kW</b>	2900	$\Delta$ 400 / Y690	50 Hz
	3500	$\Delta$ 460	60 Hz
<b>6,0 kW</b>	2900	$\Delta$ 400 / Y690	50 Hz
<b>7,5 kW</b>	2900	$\Delta$ 400 / Y690	50 Hz

## 2. OPERATION

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### 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 casing must be filled with liquid. The minimum water level is:
  - 240 mm ±5 (9,5 ± 0,2 inch) or 7 dm<sup>3</sup> (1,54 UK gal) for CTS C pumps
  - 300 mm ±5 (11,8 ± 0,2 inch) or 11,8 dm<sup>3</sup> (2,6 UK gal) for CTS D, E pumps

- The suction shut-off valve (if any) must be completely open.

- The shut-off / regulation valve on the discharge side must be opened.



- 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 1.8 "Motor connection") and repeat the procedure described above.



- Any auxiliary connections must all be connected.
- When restarting the pump, make sure to drain the discharge line. It is important that during self-priming there is no back pressure, so the air can easily escape the pump casing.
- If the pump is equipped with an oil reservoir, make sure to fill it before start-up.



#### 2.1.1. Starting the pump



Start the electric motor. **The discharge shut-off / regulation valve must be completely opened.**

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".

### 2.2. Stopping the pump

## 2. OPERATION

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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.

### 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.

### 2.4. 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 life expectancy



The metallic components like aluminium, stainless steel and carbon steel can be recycled. Plastic parts are not recyclable and must be disposed of as residual waste. The pump must



## 2. OPERATION

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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. Actions in an 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.

### 2.7. 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.



## 3. MAINTENANCE

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### 3. MAINTENANCE



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

**Wait five minutes for capacitor discharge before opening equipment.**

#### 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.

# 3. MAINTENANCE

## 3.2. Location of faults

Overheating of motor	Insufficient flow rate or pressure in pump	No pressure on the discharge side	Irregular discharge flow / pressure	Noise and vibrations	The pump gets clogged	Overheating of the pump	Abnormal wear	Leak in mechanical seal	The pump does not prime	Possible reason	Solution
X		X							X	Wrong direction of rotation	Invert the direction of rotation
	X	X	X	X					X	Insufficient suction head (NPSH)	Increase available NPSH: > Raise the suction reservoir > Lower the pump > 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	X	The pump sucks air	Make sure all connections are tight
		X	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								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			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 only be performed by qualified personnel.



Each operation carried out on 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.



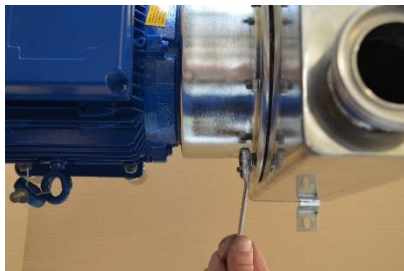
Before servicing in any way the parts that come in contact with the pumped liquid, make sure that the pump has been fully emptied and washed. When draining the liquid, make sure that there is no danger for people or the environment.



Wait five minutes for capacitor discharge before opening equipment.

The numbers put in brackets, refer to the part numbers in the spare part drawings and spare part lists in chapter 4 "Spare parts".

### 3.3.1. Disassembly procedure



**Fig. 3.3.1**

Unscrew the casing mounting nuts [143] and remove the washers [142].

Take off the pump casing [131S].



**Fig. 3.3.2**

Remove the O-ring [18].

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



**Fig. 3.3.3**

Remove the impeller mounting screw [191] and the washer [192], use a spanner key in the opening of the pump back cover [11] to hold the shaft [16] to lock the impeller. Remove the impeller.

### 3. MAINTENANCE

---



**Fig 3.3.4**

Carefully remove the back casing [12]. The static part [15B] of the mechanical seal will remain in the back casing.



**Fig 3.3.5**

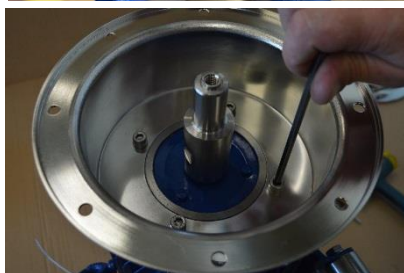
If necessary, push out the static part [15B] of the mechanical seal.

**NOTE!** Apply some alcohol or water before pushing out of the mechanical seal.



**Fig 3.3.6**

Remove the deflector [17].



**Fig 3.3.7**

Remove the screws [121] and washers [122] holding the back cover [11] to the motor [10].



**Fig 3.3.8**

Loosen the lock screws [161] and remove the shaft extension [16].

The pump is now completely disassembled. Check all components, especially the casing O-ring and mechanical seal, for wear or damage and replace if necessary.

#### 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.

### 3. MAINTENANCE



**Fig. 3.4.1**

When mounting the impeller [9...] on the shaft extension [16] make sure that it is locked in the proper position before tightening the mounting screw [191] with its washer [192].

**NOTE!** Take care not to damage the head surface of the shaft extension.



**Fig. 3.4.2**

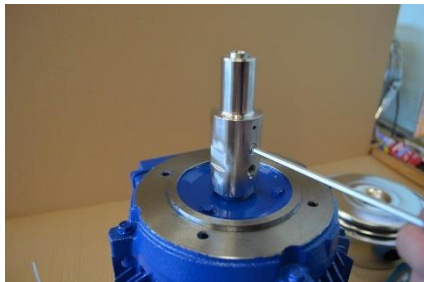
Before assembly of the mechanical seal [15] wet the O-rings with alcohol.



**Fig. 3.4.3**

After inserting the static part [15B] of the mechanical seal, fit the back casing [12] onto the back cover [11] and check the seal fitting dimension according to the table below. This ensures that correct pressure is applied on the mechanical seal by the impeller.

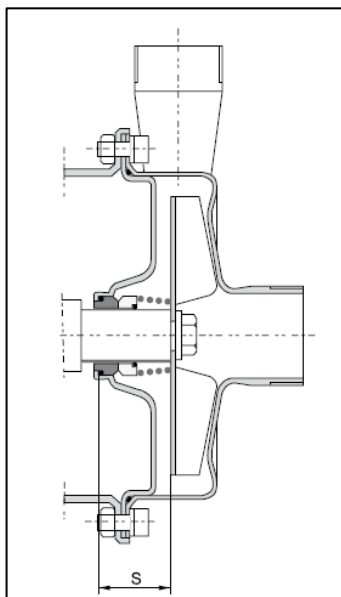
**NOTE!** This is a very important procedure when you have taken off the shaft extension.



**Fig. 3.4.4**

Using a calliper, adjust the "S" dimension.

It is achievable by loosening the lock screws [161] and moving the shaft extension [16] up or down.



Pump type	S [mm]
CTS C	35.5
CTS D	35.5
CTS E	35.5

## 3. MAINTENANCE

---



**Fig. 3.4.5**

When assembling the casing, make sure that the O-ring sealing surfaces on the casing [131S] and the back casing [12] are clean.



**Fig. 3.4.6**

To screw in the casing pin screws [141S] use two nuts tightened against each other.

### 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

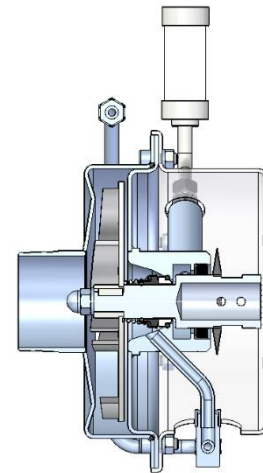
### 4.1. Lubricated seal – 4Z

A great option when there is a potential risk of dry running, or where the product tends to solidify or crystallize. An oil reservoir is connected to the mechanical seal chamber.



#### The pump is delivered without lube medium in oil reservoir!

- Before the first start fill up the oil reservoir with a proper medium (i.e. SAE 20 oil). In case if the pumped medium cannot be contaminated by oil, you should use a lubricating medium compatible with the pumped medium;
- Medium in the oil reservoir should be also compatible with materials that the pump is made of (when using oil as buffering liquid you should not use EPDM O-rings in mechanical seal);
- As a standard, an NBR lip seal is used (other materials are available upon request);
- Oil reservoir should be filled up to  $\frac{3}{4}$  of cup height;
- You should change liquid after 2000 hours of operation or once a year.
- For food applications it is recommended to use FDA approved liquid.



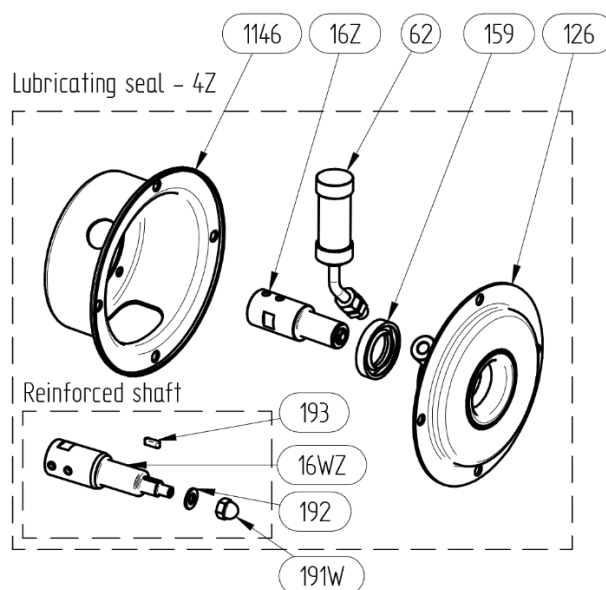
#### Important!

- If mechanical seal damage will occur, fluid level in the chamber will increase and then it will spill out of the oil reservoir. You must stop the pump immediately to replace mechanical seal!
- If liquid level in oil reservoir will start decreasing in short period of time, probably the lip seal is damaged. You should stop the pump and replace damaged lip seal.



## 4. OPTIONS

### Additional / different parts:



Art. no	Q-ty	Description
5-xxx-1146	1	Pump back cover for lubricated seal
5-xxx-126	1	Pump back casing with welded seal chamber
5-xxx-159	1	Lip seal
5-xxx-16Z	1	Shaft for pump with lubricated seal
5-xxx-16WZ*	1	Shaft – reinforced version
5-xxx-62	1	Oil reservoir
5-xxx-191W*	1	Domed nut for reinforced shaft
5-xxx-192*	1	Washer for reinforced shaft
5-xxx-193*	1	Key for reinforced shaft

\* Option

## 4. OPTIONS

### 4.2. Heating / cooling jacket – 4J

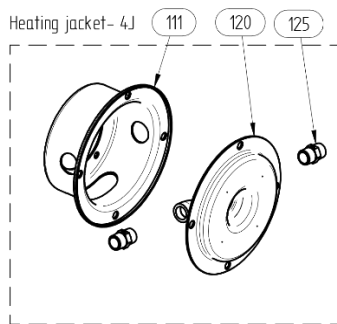
Great protection for the mechanical seal in cases where there is a risk of solidification of the product. The heating jacket is also used when the pumped product has to maintain a specific temperature, high or low. A heating or cooling medium is continuously circulated in the jacket.

Heating / cooling is operated by a jacket welded into the pump back casing (12). The jacket has two G 1/2" connections. To connect the jacket use flexible hoses to prevent any undue stress and strain on the heating jacket connectors.

For heating / cooling process use medium that is fully compatible with materials the pump is made of. Maximum temperature for heating medium is 60°C, maximum pressure is 2 bar. It's crucial to avoid sudden temperature changes that could cause excessive strain.

The pump can also be equipped with optional connections on the heating jacket (e.g. flanges).

#### Additional / different parts:



**Available for pump sizes: C, D and E**

Art. no	Q-ty	Description
5-xxx-111	1	Pump back cover for heating jacket
5-xxx-120	1	Pump back casing with heating jacket
5-xxx-125	2	Joint for pump with heating jacket

### 4.3. Hygienic shroud – M

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 is equipped with adjustable feet.



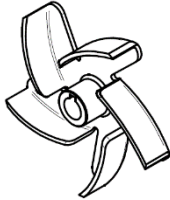
#### Additional / different parts:

Art. no	Motor power
SHR-CT-090-SF	1,5 kW; 2,2 kW
SHR-CT-100-SF	4 kW
SHR-CT-112-SF	6 kW
SHR-CT-132-SF	5,5 kW; 7,5 kW

## 4. OPTIONS

### 4.4. Semi-open impeller – 4H; Reinforced impeller – 4W

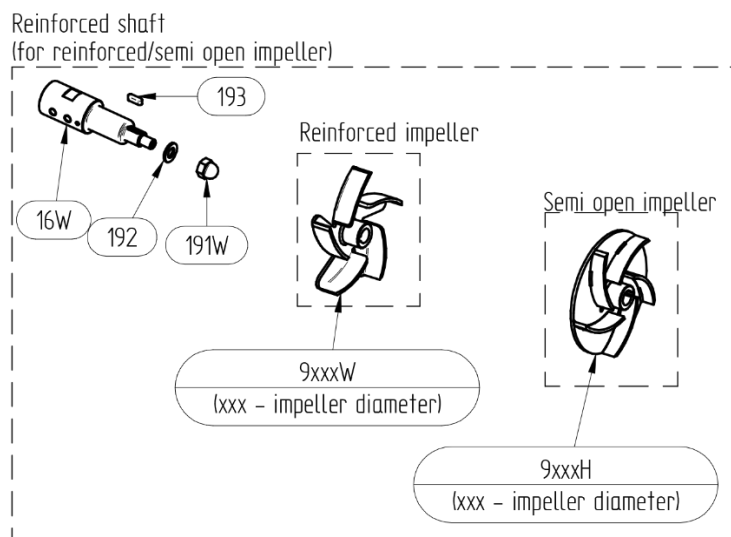
Tapflo CT pumps can be fitted with a semi-open impeller in comparison to its standard open impeller. This option ensures more stable operation, lower noise, lower vibrations and more robust construction. It is recommended to use the semi-open impeller when hard solids can be present in the pumped liquid. This impeller is always in reinforced execution.



The reinforced impeller is a great option when pumping high viscous liquids or ones containing solid particles. This design is much more robust and can withstand more tensions transferred from the liquid.

**NOTE!** The D, F and G size impellers are reinforced as standard.

#### Additional / different parts:



#### Available for all pump sizes

Art. no	Q-ty	Description
5-xxx-9xxxH	1	Semi-open impeller
5-xxx-16W	1	Reinforced shaft
5-xxx-191W	1	Domed nut for impeller
5-xxx-192	1	Washer
5-xxx-193	1	Mounting key

Art. no	Q-ty	Description
5-xxx-16W	1	Reinforced shaft
5-xxx-9xxxW	1	Reinforced impeller
5-xxx-191W	1	Domed nut for impeller
5-xxx-192	1	Washer
5-xxx-193	1	Mounting key

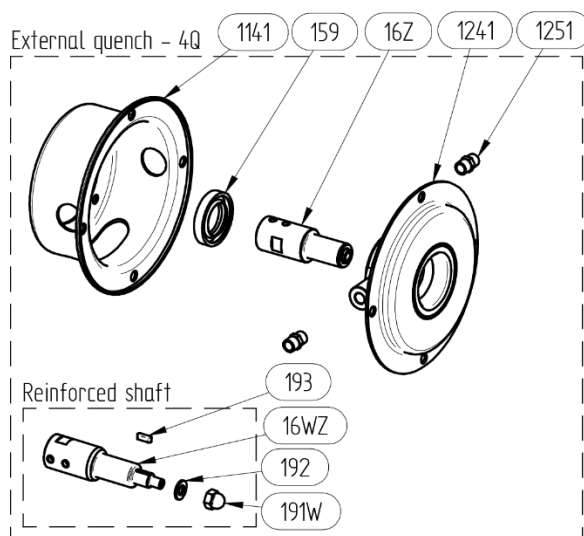
## 4. OPTIONS

### 4.5. External quench – 4Q

This option is similar to the lubricated seal option and is recommended when there is a potential risk of dry running, or where the product tends to solidify or crystallize when in contact with air. There is however an added value to this option, as circulating quench liquid removes heat from the mechanical seal. It is recommended to use a thermos-siphon circulation method in the quench circuit.

**NOTE!** Max pressure in the quench circuit is 0,5 bar.

**Additional / different parts:**



Art. no	Q-ty	Description
5-xxx-1141	1	Pump back cover for external quench
5-xxx-1241	1	Pump back casing for external quench
5-xxx-1251	2	Connection joint
5-xxx-159	1	Lip seal
5-xxx-16Z	1	Pump shaft for external quench

### 4.6. Mechanical seal options

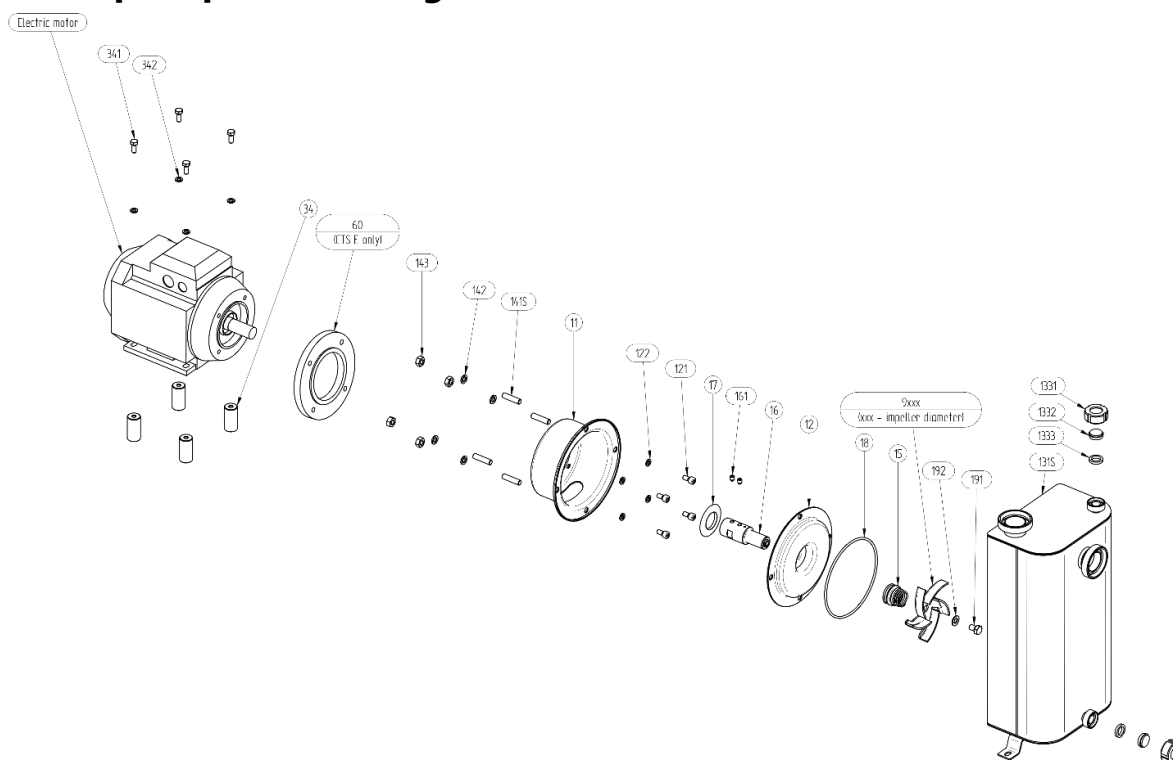
Apart from different materials that can be used for static and dynamic seal faces as well as elastomers (see 6.1 "**Błąd! Nie można odnaleźć źródła odwołania.**") we offer a range of different special execution mechanical seals:

- 2P – in this option the O-ring of the static part of the mechanical seal is replaced by an OP-ring (square O-ring). This increases friction between the O-ring and the back casing thus lowering chances of static part rotation when seal faces stick together.
- 2K – this option refers only to SiC/SiC mechanical seals. Standard seals have seal faces of the same hardness therefore there is potential risk of them sticking together due to adhesion phenomena. 2K offers seal faces of different hardness (J/D) thus eliminating this risk. Additionally seal is equipped with OP-ring.

# 5. SPARE PARTS

## 5. SPARE PARTS

### 5.1. Spare parts drawing



### 5.2. Spare parts list

Pos.	Description	Size			Material	
		CTS C	CTS D	CTS E	CTS I	CTS H
-	Electric motor	1	1	1		
11	Back cover [H/N]*	1	1	1	AISI 316L Glass blasted	AISI 316L Ra<0.8
12	Back casing [H/N]	1	1	1	AISI 316L	AISI 316L Ra<0.8
121	Back cover mounting screws	4	4	4	AISI 316L	AISI 316L
122	Back cover mounting washers	4	4	4	AISI 316L	AISI 316L
131S	Pump casing [H/N]	1	1	1	AISI 316L Glass blasted	AISI 316L Ra<0.8
1331	Drain plug screw cap	2	2	2	AISI 316L	AISI 316L
1332	Drain plug stopper	2	2	2	AISI 316L	AISI 316L
1333	Drain plug O-ring	2	2	2		
141S	Casing mounting screws	4	8	8	AISI 316L	AISI 316L
142	Casing mounting washers	4	8	8	AISI 316L	AISI 316L
143	Casing mounting nuts	4	8	8	AISI 316L	AISI 316L
15	Mechanical seal (complete) [H/N]	1	1	1	See 5.1	See 5.1
16	Shaft extension	1	1	1	AISI 316L	AISI 316L
161	Lock screw	1	2	2	AISI 316	AISI 316
17	Deflector	1	1	1	NBR	NBR
18	Casing O-ring [H/N]	1	1	1	EPDM (std), FKM, FEP/Silicone, NBR	EPDM FDA (std), FKM, FEP/Silicone FDA
191	Impeller mounting screw	1	1	1	AISI 316L	AISI 316L
192	Impeller mounting washer	1	1	1	AISI 316L	AISI 316L
34	Feet	4	4	4	AISI 316L	AISI 316L
341	Feet mounting screws	4	4	4	AISI 316L	AISI 316L
342	Feet mounting washers	4	4	4	AISI 316L	AISI 316L
60	Motor adaptive flange	-	-	1	Aluminium	Aluminium
9...	Impeller	1	1	1	AISI 316L Ra<0.8	AISI 316L Ra<0.8

## 5. SPARE PARTS

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Parts indicated as [H/N] have different execution for CTS I and CTS H pumps. When ordering spare parts please indicate if the part is for Industrial or Hygienic series e.g. 5-340**N**-11 or 5-340**H**-11.

### 5.3. Recommended spare parts

Normally the CTS 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 have to be replaced. We recommend having the following parts in stock:

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

### 5.4. How to order parts

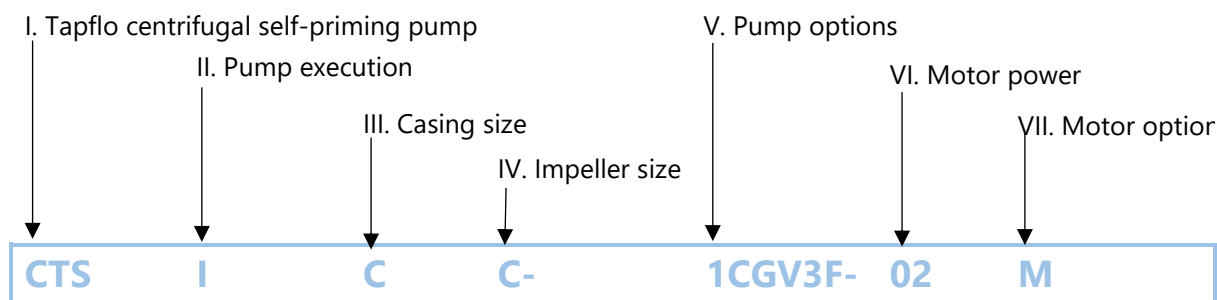
When ordering spare parts for Tapflo pumps, please let us know what is the **model number** and **serial number** from the pump's name plate. Then just indicate the part numbers from the spare parts list and quantity of each item.

# 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. CTS = Tapflo centrifugal self-priming pump

#### II. Pump execution:

I = Industrial      H = Hygenic

#### III. Casing size (motor flange diameter / IEC size):

C = 140 mm / 90  
D = 160 mm / 100 or 112  
E = 200 mm / 132

#### IV. Impeller size

C = 125 mm                      F = 155 mm  
D = 130 mm                      G = 180 mm  
E = 135 mm

#### V. Pump options:

##### 1. Mechanical seal:

Blank\* = ceramin/graphite/EPDM (FDA on CTS H)  
1CGV = ceramin/graphite/FKM (FDA on CTS H)  
1CGF = ceramin/graphite/FEP (FDA)  
1CGN = ceramin/graphite/NBR (CTS I only)  
1SSE = SiC/SiC/EPDM (FDA on CTS H)  
1SSV = SiC/SiC/FKM (FDA on CTS H)  
1SSF = SiC/SiC/FEP (FDA)  
1SSN = SiC/SiC/NBR (CTS I only)  
1SGE = SiC/graphite/EPDM (FDA on CTS H)  
1SGV = SiC/graphite/FKM (FDA on CTS H)  
1SGF = SiC/graphite/FEP (FDA)  
1SGN = SiC/graphite/NBR (CTS I only)

##### 3. Connection options

Blank\* = Thread BSP on CTS I  
          Thread DIN 11851 on CTS H

3B = BSPT thread (on CTS H)

3C = Clamp ISO 1852 (CTS H only)

3T = Clamp DIN 32676 (CTS H only)

3S = Thread SMS (CTS H only)

3R = Thread RJT (CTS H only)

3P = ISO 1127 clamp (CTS H only)

DA = DIN11866-1A thread (CTS H)

#### 4. Special executions

4H = Semi open heavy duty impeller

PX = Welds polishing (CTH S only)

W = Reinforced inmpeller (D and F sizes only)

#### VI. Motor power / IEC motor size

2900 rpm motors (2-pole):

22 = 2.2 kW / 90

40 = 4.0 kW / 112

55 = 5.5 kW / 132

75 = 7.5 kW / 132

#### VII. Motor options

M = Hygenic motor shroud (CTS H)

X2d = Eex d IIB T4 motor

X2e = Eex e IIB T3 motor

X2de = Eex de IIB T4 motor

X2nA = Eex nA IIB T4 motor

X3e = Ex II 3G T135C motor - tropic

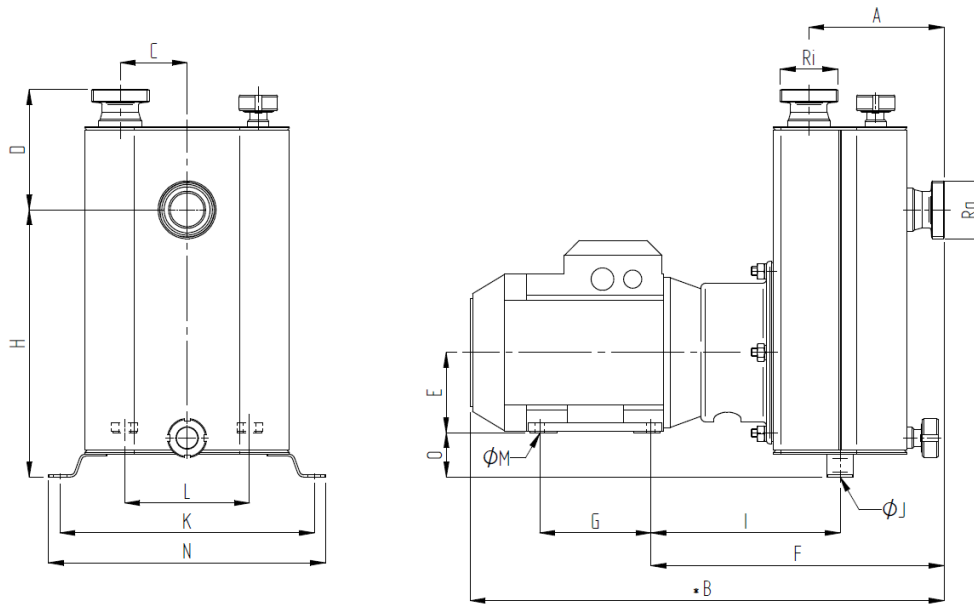
T = Motor with PTC thermistor

F60 = 60 Hz motor

\* = standard execution

# 6. DATA

## 6.2. Dimensions



Dimensions in mm (where other is not indicated)

Dimensions in inch (where other is not indicated)

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

MODEL	CTS CC-22	CTS CE-22	CTS DD-40	CTS DF-40	CTS EF-55	CTS EG-55	CTS EF-75	CTS EG-75
<b>Motor power</b>	2.2	2.2	4.0	4.0	5.5	5.5	7.5	7.5
<b>IEC motor size</b>	90	90	112	112	132	132	132	132
<b>Weight [kg]</b>	35.5	35.5	56	56	63	63	78	78
<b>A</b>	152 6	152 6	170 6.7	170 6.7	170 6.7	170 6.7	170 6.7	170 6.7
<b>*B</b>	532.5 21	532.5 21	641 25.2	641 25.2	692 27.2	692 27.2	692 27.2	692 27.2
<b>C</b>	75 3	75 3	90 3.5	90 3.5	90 3.5	90 3.5	90 3.5	90 3.5
<b>D</b>	135 5.3	135 5.3	120 4.7	120 4.7	120 4.7	120 4.7	120 4.7	120 4.7
<b>E</b>	90 3.5	90 3.5	112 4.4	112 4.4	132 5.2	132 5.2	132 5.2	132 5.2
<b>F</b>	329.5 13	329.5 13	378 14.9	378 14.9	414 16.3	414 16.3	414 16.3	414 16.3
<b>G</b>	125 4.9	125 4.9	140 5.5	140 5.5	178 7	178 7	178 7	178 7
<b>H</b>	300.5 11.8	300.5 11.8	377 14.8	377 14.8	377 14.8	377 14.8	377 14.8	377 14.8
<b>I</b>	212.5 8.4	212.5 8.4	243 9.6	243 9.6	279 11	279 11	279 11	279 11
<b>ØJ</b>	9 0.4	9 0.4	9 0.4	9 0.4	9 0.4	9 0.4	9 0.4	9 0.4
<b>K</b>	286 11.3	286 11.3	336 13.2	336 13.2	336 13.2	336 13.2	336 13.2	336 13.2
<b>L</b>	140 5.5	140 5.5	190 7.5	190 7.5	216 8.5	216 8.5	216 8.5	216 8.5
<b>ØM</b>	10 0.4	10 0.4	12 0.5	12 0.5	12 0.5	12 0.5	12 0.5	12 0.5
<b>N</b>	311 12.2	311 12.2	362 14.3	362 14.3	362 14.3	362 14.3	362 14.3	362 14.3
<b>O</b>	50 2	50 2	55 2.2	55 2.2	35 1.4	35 1.4	35 1.4	35 1.4



## 6. DATA

\*The dimension may vary depending on motor brand

Connection dimensions BSPT (male thread)		
Model	Ra	Ri
CTSI C	1 ½"	1 ½"
CTSI D	2 ½"	2"
CTSI E	2 ½"	2"
Connection dimensions EN1092-1 Flange		
Model	Ra	Ri
CTSI C	DN40	DN40
CTSI D	DN65	DN65
CTSI E	DN65	DN65


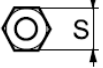


Connection dimensions DIN 11851 (male thread)		
Model	Ra	Ri
CTSH C	DN40	DN40
CTSH D	DN65	DN50
CTSH E	DN65	DN50

### 6.3. Materials, data and limits

	CTSH ...	CTSI ...
<b>Casing</b>	Stainless steel AISI 316L electro polished Ra<0.8	Stainless steel AISI 316L glass blasted
<b>Impeller</b>	Stainless steel AISI 316L electro polished Ra<0.8. open (std) or semi-open	Stainless steel AISI 316L glass blasted. open (std) or semi-open
<b>Mechanical seal</b>	Single ceramic/graphite (std), SiC/SiC or SiC/graphite, optional with oil lube	Single ceramic/graphite (std), SiC/SiC or SiC/graphite, optional with oil lube
<b>O-rings</b>	EPDM FDA approved (std), FEP/Silicone FDA approved, FKM FDA approved	EPDM (std). FKM, FEP/Silicone or NBR
<b>Motor</b>	IP55. IEC frame B34. Available with ATEX cat 2 or 3. Eex e or Eex d	
<b>Pressure rating</b>	PN 2,5 bar (CTS C) at 20°C; PN 4 bar (CTS D,E) at 20°C	
<b>Temperature</b>	Max 90°C	
<b>Viscosity</b>	Max ~200 cSt	
<b>Particles</b>	Max diameter is 6 mm (std open impeller). bigger if soft particles	

## 6. DATA

### 6.4. Mounting torques and dimensions of screws/nuts

Screw / nut type	Description	Pump model		
		CTS C ...	CTS D ...	CTS E ...
	<b>Pos. 121. allen screw</b> Mounting torque [Nm] Too size "S" [mm] Thread	15 5 M6	15 6 M8	15 6 M8
	<b>Pos. 143. hexagonal nut</b> Mounting torque [Nm] Too size "S" [mm] Thread	15 17 M10	15 13 M8	15 13 M8
	<b>Pos. 161. allen screw</b> Mounting torque [Nm] Too size "S" [mm] Thread	17 4 M8	17 4 M8	17 4 M8
	<b>Pos. 191. hexagonal screw</b> Mounting torque [Nm] Too size "S" [mm] Thread	17 17 M10	17 17 M10	17 17 M10



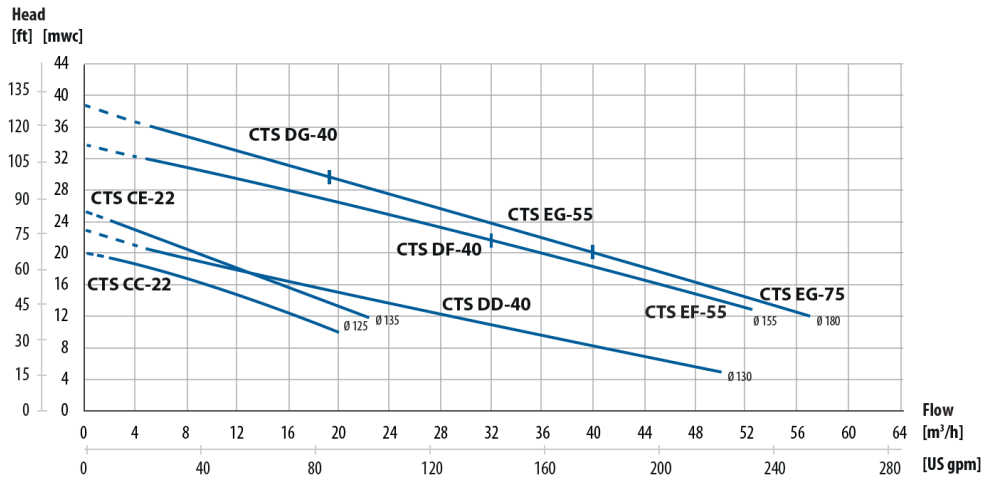
Checking of the tightening torques is necessary after periods of stoppage, when temperature variations are a factor or after transport and maintenance of the pump.

What is more for proper operation and safety the torque values should be checked frequently as part of preventive maintenance (please contact Tapflo for interval proposals). Although pump applications vary, a general guideline is to re-torque the pump every two weeks.

# 6. DATA

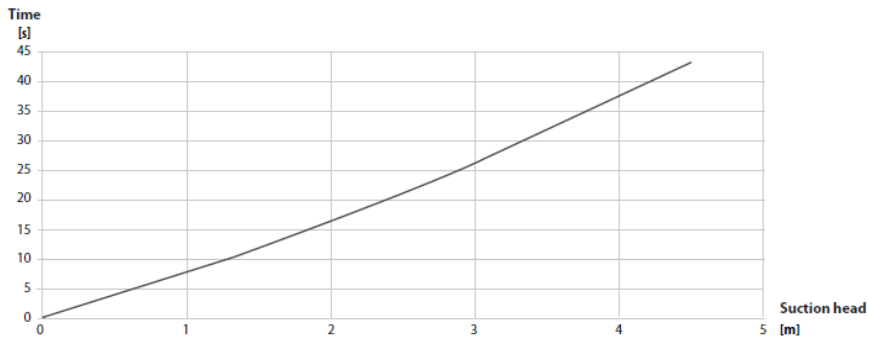
## 6.5. Performance curves

The performance curves are based on water at 20°C. Speed 2900 rpm.



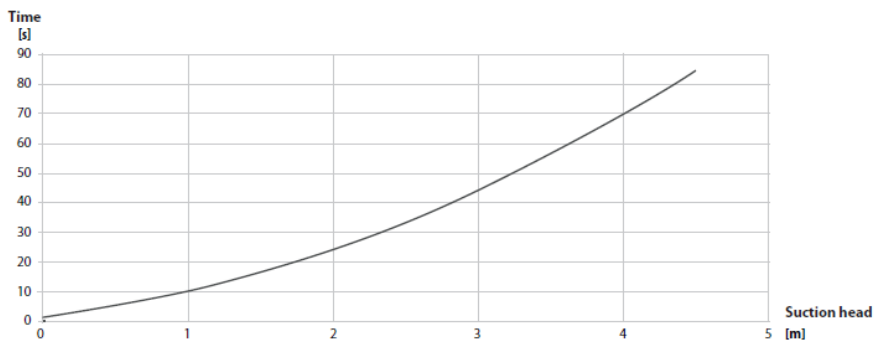
Suction installation - DN40, Open impeller  $\varnothing 135$

CTS CE-22



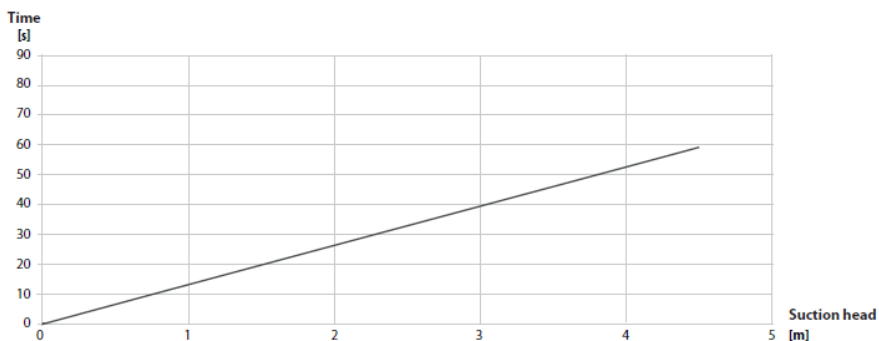
Suction installation - DN65, Open impeller  $\varnothing 155$

CTS DF/EF-40



Suction installation - DN65, Open impeller  $\varnothing 180$

CTS DG/EG-75



# 7. WARRANTY

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## 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 tender 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;

## 7. WARRANTY

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- b.2. Repairs performed by non-skilled personnel or use of non-original Tapflo parts;
  - 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.



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## Tapflo products and services are available worldwide.

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

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