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Instruction Manual

Toftejorg[™] SaniJet[™] 20 Electrically Driven

Versions included:

- Standard

TE91A794-EN7

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Original manual

Instruction Manual

Contents

Contents	1
Toftejorg SaniJet 20E, Product programme	3
Standard programme, Toftejorg SaniJet 20E	3
Standard Options, Toftejorg SaniJet 20E	3
Accessories	4
Introduction	5
Intended Use	6
Patents and trademarks	6
Quality System	6
General Description	7
Functioning	8
Machine with External Motor Drive	9
Self-cleaning	10
Cleaning Pattern, The Golden Section	11
Performance Data for Toftejorg SaniJet 20E Electrically Driven	12

Instruction Manual - Installation

General Installation Instructions	17
Installation of Electric Motor	19

Instruction Manual - Operation

Normal Operation	23
Safety Precautions	24

Instruction Manual - Maintenance

Preventive Maintenance	27
Reserved rights for design changes of Alfa Laval equipment used in validated processes	27
Part List Drawings	29
Toftejorg SaniJet 20E electrically Driven, complete	29
Cleaner Unit	30
Base Unit	31
Reference List of Parts	32
Toftejorg SaniJet 20E, Electrically Driven	32
Cleaner Unit	34
Base Unit	35

Rotacheck System.....	39
Trouble Shooting Guide	40
Service Kits and Tools.....	42
Service Intervals	42
Service Kit in EPDM for Toftejorg SaniJet 20 motor driven version (air/electrically)	42
Service Kit in Viton for Toftejorg SaniJet 20 motor driven version (air/electrically)	42
Tools	42
How to Order Spare Parts	43
How to contact Alfa Laval Tank Equipment	43
EU Declaration of Conformity	44
Toftejorg SaniJet 20E (Electrically Driven).....	44

Toftejorg SaniJet 20E, Product programme

This manual covers the product programme for Toftejorg SaniJet 20E Electrically Driven. For information on the Media Driven and Air Driven versions, please see Instruction Manual, please refer to Instruction Manual IM-TE91A793 for the Air Driven version and IM-TE91A792 for the Media Driven version.

Standard programme, Toftejorg SaniJet 20E

Length	2xø2mm	2xø3.8mm HS	2xø3.8mm LS	4xø4.2mm
500mm	TE20B200	TE20B220	TE20B240	TE20B260
350mm	TE20B201	TE20B221	TE20B241	TE20B261
700mm	TE20B202	TE20B222	TE20B242	TE20B262
1000mm	TE20B204	TE20B224	TE20B244	TE20B264
1200mm	TE20B206	TE20B226	TE20B246	TE20B266
1500mm	TE20B208	TE20B228	TE20B248	TE20B268

HS = High speed; LS = Low speed.

Standard Options, Toftejorg SaniJet 20E

Electric motor variants: Indicated by index-no.

Index.no.	Specification
none	1 phase 220-230V, 15W
-01	1 phase 200V, 15W
-02	1 phase 110-115V, 15W
-03	1 phase 100V, 15W

Machines with Viton seals

Index no. for electric motor variants:

Index.no.	Specification
-10	1 phase 220-230V, 15W
-11	1 phase 200V, 15W
-12	1 phase 110-115V, 15W
-13	1 phase 100V, 15W

Toftejorg SaniJet 20E, Product programme

Accessories

Clamp Coupling Parts

Reference no.	Description
TE51S101	Clamp welding liner 1"
TE5TS111	Gasket EPDM f. 1" Clamp coupling
TE51S121	Clamp ring 1"
TE51S107	Clamp welding liner 3"
TE51S117	Gasket EPDM f. 3" Clamp coupling
TE51S127	Clamp ring 3"
TE51S140	Clamp adaptor 3"/4"

Monitoring

An electronic system with rotation sensor to validate 360° coverage can be included:

TE52E067 Rotacheck Sensor ø27 mm

TE52E058 Rotacheck Relay

For further information see page 39.

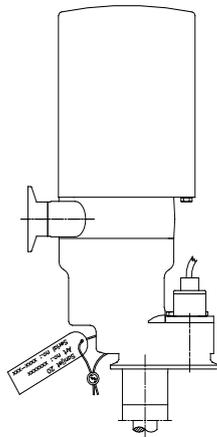
Introduction

This manual has been prepared as a guide for installation and for the persons who will be operating and maintaining your tank cleaning machine. The key to long life for your tank cleaning machine is a carefully planned system for preventive maintenance; you must appreciate that a tank cleaning machine which has a rough and dirty job Toftejorg SaniJet 20E, Product programme to do will need more frequent attention than one working under ideal conditions.

Note: Get the best and most economical performance from your tank cleaning machine. Insufficient preventive maintenance means poor performance, unscheduled stops, shorter lifetime and extra costs. Good preventive maintenance on the contrary means good performance, no unscheduled stops and superior total economy.

The information in this manual is simple to follow, but should you require further assistance, our Customer Service Department and world-wide net of Distributors will be pleased to help you. Please quote the type, article and serial number with all your enquiries; this will help us to help you. The type, article and serial number are placed on the tag attached to the Base house of the tank cleaning machine.

Note: Don't remove the TAG sign! To obtain traceability it is important to keep the TAG sign on.



Warning:



Before installing the machine and setting it into operation carefully read the General Installation Instructions (page 17) and the Safety Precautions (page 24) and take all necessary precautions according to your application and local regulations.

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Intended Use

It is to be verified by the end-user:

- that the tank cleaning machine is in conformity with respect to tank, vessel or container size in which it will be used.
- that the construction materials (both metallic and non-metallic) are compatibility with product, flushing media, cleaning media, temperatures and pressure under the intended use.

Patents and trademarks

This Instruction Manual is published by Alfa Laval Kolding A/S without any warranty. Improvements and changes to this Instruction Manual may at any time be made by Alfa Laval Kolding A/S without prior notice. Such changes will, however, be incorporated in new editions of this Instruction Manual.

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Quality System

The Toftejorg SaniJet 20 is designed in accordance with the EHEDG design guidelines for sanitary design of processing equipment and Biotechnological Institute in Kolding, Denmark, has tested the cleanability. It is produced according to Alfa Laval Tank Equipment's ISO 9002 International Standard certified quality system. All parts are made from certified material and all non-metal parts are made from FDA-approved materials.

General Description

The Toftejorg SaniJet 20 is a tank cleaning machine intended for industrial use in closed tanks for processing storage and transportation. There is a broad range of application areas within pharmaceutical, food and chemical industries.

The Toftejorg SaniJet 20 is a sanitary cleaning device of the rotary jet head type for permanent installation that provides a 360° indexed cleaning pattern. Provided it is installed in an upright position, the Toftejorg SaniJet 20 is completely self-cleaning and self-draining, and it has an integrated self-cleaning down pipe (patent pending). The drive mechanism is located outside the tank or process equipment, leaving a minimum of parts to be submerged into the product. All product contact surfaces are AISI 316/316L, duplex SAF 2205, Ti Grade 5 and USP Class VI and/or FDA approved polymer materials such as PEEK, E-CTFE, EPDM and Viton.

No threads or screws have been used in the product contact areas.

The cleaning device is lubricated by the cleaning media. No oil, grease or other lubricants are used.

The Toftejorg SaniJet 20 is available in media driven or motor driven (electrical/air) versions. The motor driven versions are equipped with a magnetic clutch providing a leakage-proof transmission. The motor driven versions provide an effective drive for low flow machines in rough environments. The air motor has variable speed in order to adjust cleaning intensity. The air driven version is covered by Instruction Manual IM-TE91A793 and the media driven version is covered by Instruction Manual IM-TE91A792.

The Toftejorg SaniJet 20 is designed for use in pharmaceutical, biotechnological, food and dairy processing applications. Tanks and vessels between 0.5-30 m³ (130-8,000 US gallons). The design makes the Toftejorg SaniJet 20 especially well suited when processing high viscous, foaming or thixotropic products and in chemical processing applications, where product cross contamination is unacceptable and must be avoided.

For use in explosive hazard zones the media driven and the air motor version can be used, provided it is installed according to safety instructions in local regulations.

The version with standard electrical motor must not be used in explosive hazard zones.

General Description (continued)

Functioning

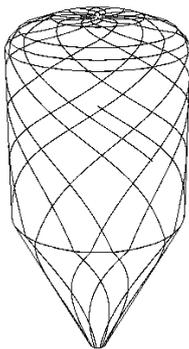
Toftejorg SaniJet 20 consists of 3 main parts: The Drive unit with flow inlet and the Base housing placed outside the tank, and inside the tank: the Down pipe with the rotating Outer tube and the Cleaner unit.



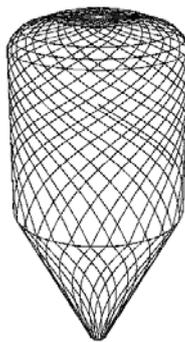
The flow of the cleaning fluid passes from the inlet through the Base housing, through the Down pipe, into the Cleaner head and out through the Nozzles. The Outer tube of the Down pipe is rotably suspended on a Stationary shaft with a Ball bearing inside the Outer tube. The Drive mechanism rotates the Outer tube with the Cleaner unit around the vertical axis. Via a set of Bevel gears on the Stationary shaft and the Cleaner head, the Cleaner head with the Nozzles is simultaneously rotated around the horizontal axis in a fixed relation thus moving the nozzles and the jets 360° around in the tank making a pre-set indexed cleaning pattern.

The Toftejorg SaniJet 20 utilises the patented “Golden Section” cleaning pattern. The distance between the tracks of the jets ensures an efficient removal of remaining product from the tank surface right from the beginning of the cleaning sequence, allowing for short cleaning time.

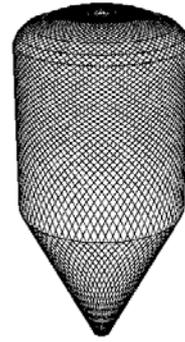
Example – 2 nozzle machine:



0.8 min.



2.3 min.



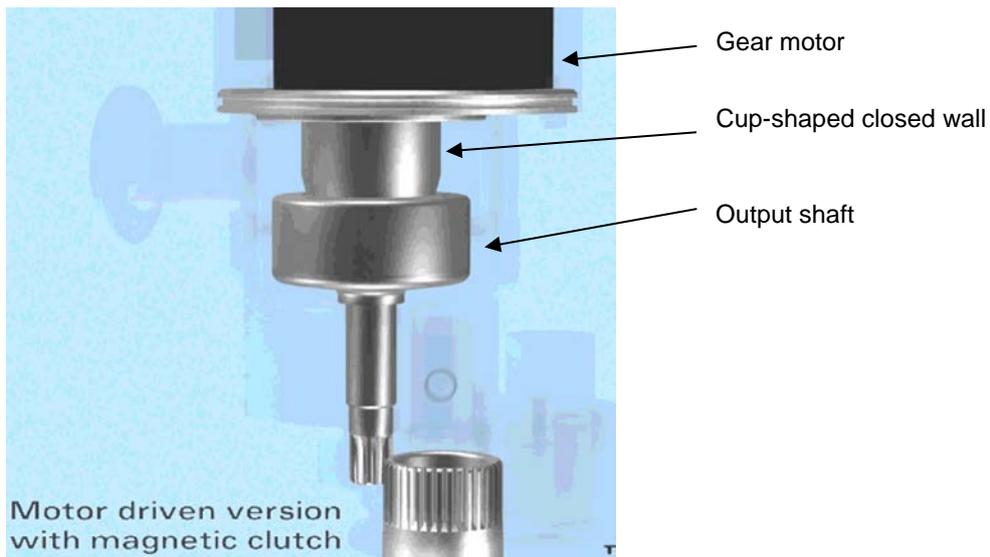
6 min.

The time needed to perform a proper cleaning depends on type of soilage, distance, cleaning procedure and agent. For substances that are easily mobilised, i.e. are easy to remove, less than 1 min. could be sufficient while in cases of more heavy soilage (high viscous, sticky substances, etc.) a more dense pattern/longer time will be needed.

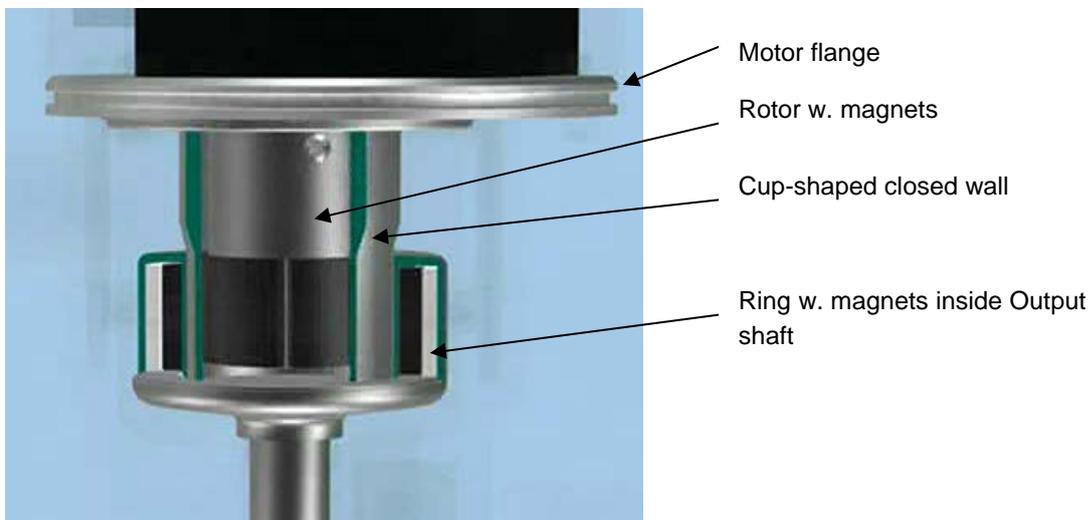
General Description (continued)

Machine with External Motor Drive

The machine is driven by a gear motor mounted on top of the Inlet housing. Via a Magnetic clutch the rotation of the gear motor is transmitted from the outside through a closed wall to the Output shaft placed inside the Inlet housing. The Output shaft is in mesh with the Down pipe and rotates the Down pipe in the same way as in the media driven version.



The output shaft of the gear motor is equipped with a Rotor with permanent magnets. The rotor is placed inside the cavity in the Motor flange, made by the cup protruding into the liquid chamber in the Inlet housing. The cup is welded to the motor flange as a hermetic sealed closed wall between the liquid chamber and the outside. The magnetic field from the permanent magnets is transferred through the wall, to a ring with permanent magnets inside the Output shaft, which is placed around the cup on the inside the liquid chamber.



General Description (continued)

The machine with Electrical gear motor (at frequency 50 Hz) is rotating at fixed speed: 14 RPM with 2xø2mm nozzles and 6.5 RPM with 4xø4.2mm nozzles. The machine with 2xø3.8mm nozzles is available in both a High Speed (14 RPM) and a Low Speed version (6.5 RPM).

Self-cleaning

Apart from the main flow flushing the inside of the Base housing and the Down pipe, and thereafter forming the jets through the Nozzles, fluid is flushed through all internal cavities, through Bevel gear, Ball bearings and gabs between moving parts and is finally also used for cleaning of the outside surfaces of the machine.

From the gab between the Base housing and the rotating Down pipe, a cleaning jet is directed against the Down pipe, thus loosening and removing product remains on the outside. A liquid film flushing all around the tube further assists by continuously transporting away loosened product remains. The front of the Cleaner head is flushed by a liquid flow from the gab between the Cleaner head and the Retaining ring.

In order to ensure a proper self-cleaning, the machine must be installed in an approx. upright position and the inlet pressure must be min. 3 bar.

In the bottom of the Cleaner head, in the Retaining ring, the machine is equipped with a hole to ensure self-draining. This self-draining is only ensured, if the machine is installed in an upright position.

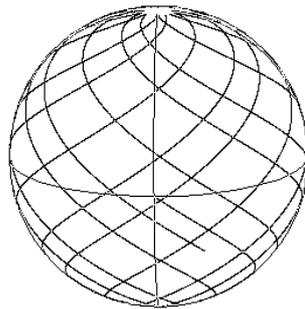
General Description (continued)

Cleaning Pattern, The Golden Section

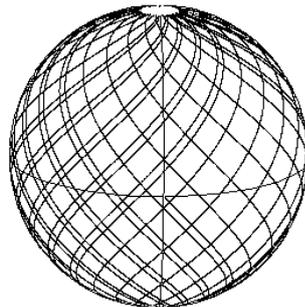
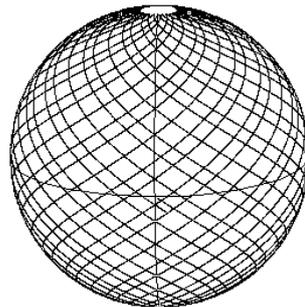
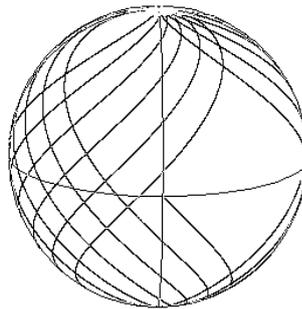
The patented Golden Section cleaning pattern (EP-Patent No.: 0495883. US-Patent No.: 5,279.675) is unique in building up the pattern in an ultimate uniform way. The pattern starts very coarse and refines itself in a step-less way by laying out the tracks approximately in the middle between the two most distant tracks already made. This means that the jets always clean the areas containing most remaining product, and thereby remove as much deposit as possible in the shortest possible way.

In case a complete cleaning pattern is not required, it will be possible to reach the same cleaning level within half the time and by using half the amount of cleaning fluid compared to a traditional step-wise cleaning pattern. Furthermore, due to the uniform cleaning pattern, the cleaning can be stopped at any time, whereas with traditional non-uniform cleaning pattern this would not be advantageous. However, after the complete cleaning pattern has been established, the difference between the Golden Section and the traditional stepwise cleaning pattern is negligible.

**Golden Section
Cleaning pattern**



**Traditional
Cleaning pattern**



Technical Data (continued)

Performance Data for Toftejorg SaniJet 20E Electrically Driven

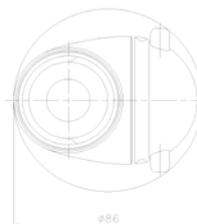
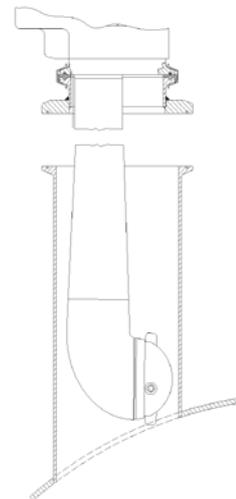
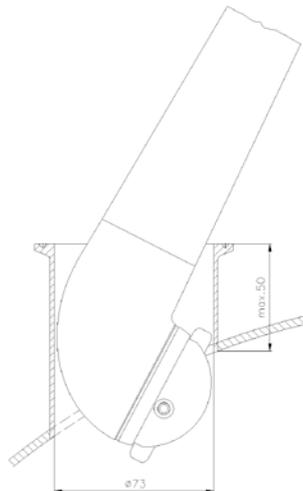
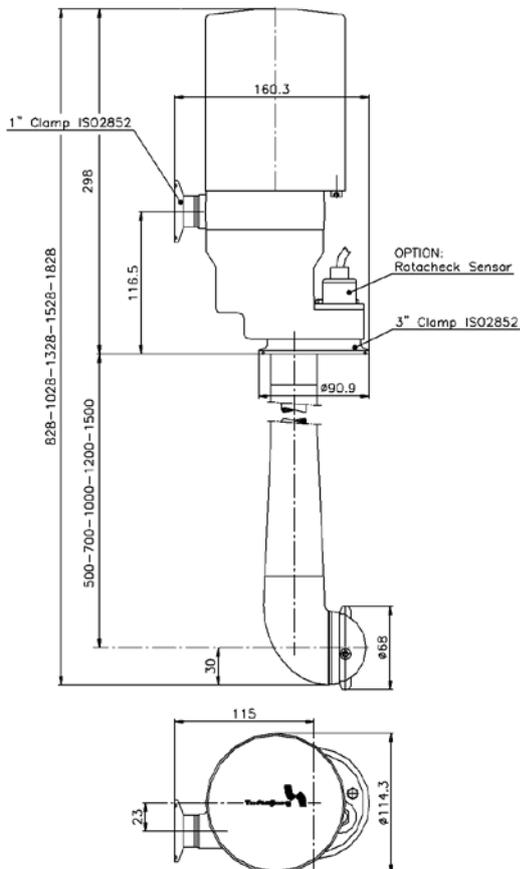
Weight of machine	Electrical driven	: 11.8 kg (26 lbs)
Working pressure	:	3-13 bar (45-185 psi)
Recommended pressure	:	5-8 bar (75-115 psi)
Max. working temperature	:	90°C (194°F)
Max. temperature inside tank	:	140°C (284°F)
Max. ambient temp. f. air motor	:	121°C (250°F)
Max. ambient temp. f. electr. motor	:	50°C (122°F)
Ambient humidity f. electr. motor	:	Max. 85% (no condensation)
Effective throw length	:	1.0-5 m (3-16 ft)
Materials	:	Stainless Steel: AISI 304/316/316L, SAF 2205, Ti Grade 5, MS-nickled
		Sealing: EPDM, FDA-approved 21 CFR §177 and USP Class VI
		Sealing: Viton, FDA-approved 21 CFR §177
		Polymers: PEEK, E-CTFE, FDA-approved 21 CFR §177 and USP Class VI
Surface finish	:	Product contact surfaces: Ra=0.8 µm – except weldings
Lubricant	:	Machine : Self-lubricant with the cleaning media

Principal Dimensions in mm, SaniJet 20 E Electrically driven

Inlet connection: 1" Clamp ISO2852
 Tank connection: 3" Clamp ISO2852

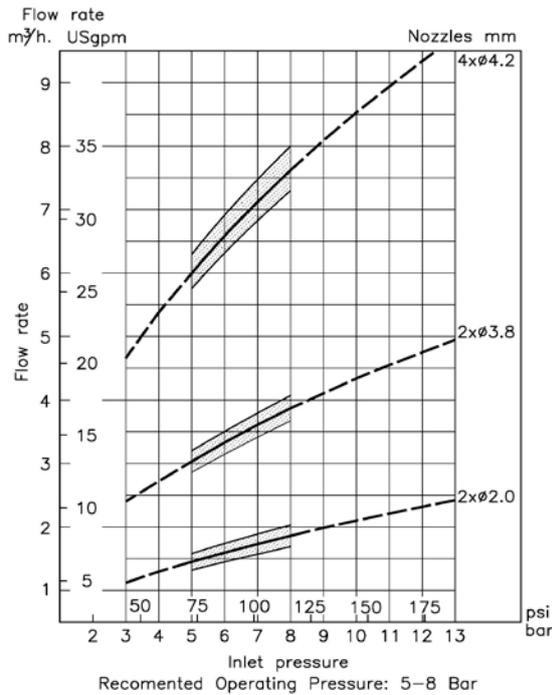
For permanent installation machine can pass through 3" clamp of max. length 50 mm:

For portable installation or installation through long "nozzles" 4" (100 mm) fittings are recommended. Adaptor to 4" ISO/ NW100DIN clamp fitting is available*:

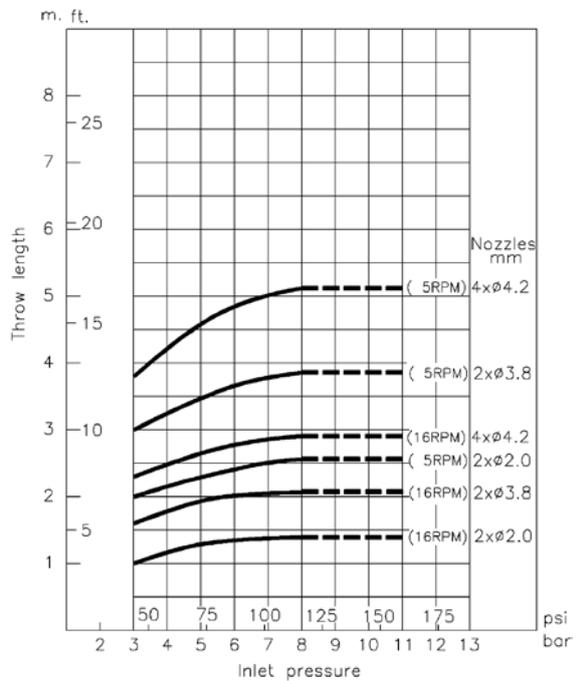


Technical Data (continued)

Performance Data for Toftejorg SaniJet 20E Electrically Driven



Flow rate



Effective throw length depending on rotation speed

Down pipe RPM	Time between vertical jet impingements		Cleaning time complete pattern
	2 Nozzles	4 Nozzles	
5	8.7 sec.	4.3 sec.	11.0 min
6	7.2 sec.	3.6 sec.	9.2 min
7	6.2 sec.	3.1 sec.	7.9 min
8	5.4 sec.	2.7 sec.	6.9 min
9	4.8 sec.	2.4 sec.	6.1 min
10	4.3 sec.	2.2 sec.	5.5 min
11	3.9 sec.	2.0 sec.	5.0 min
12	3.6 sec.	1.8 sec.	4.6 min
13	3.3 sec.	1.7 sec.	4.2 min
14	3.1 sec.	1.6 sec.	3.9 min
15	2.9 sec.	1.4 sec.	3.7 min
16	2.7 sec.	1.4 sec.	3.4 min

Note: Effective throw length varies depending on jet transverse speed over surface, substance to be removed, cleaning procedure and agent.

The inlet pressure has been taken immediately before the machine inlet. In order to achieve the performance indicated in the curves, the pressure drop in the supply lines between pump and machine must be taken into consideration.

Technical Data (continued)

Performance Data for Toftejorg SaniJet 20E Electrically Driven

Power supply options	:	1 phase 220-230V, 15W
		1 phase 220V, 15W
		1 phase 110-115V, 15W
		1 phase 100V, 15W
Cleaning time/rotation speed (at frequency 50 Hz)	:	2 x \varnothing 2.0 mm: 4.0 min./14 RPM
		2 x \varnothing 3.8 mm, HS: 4.0 min./14 RPM
		2 x \varnothing 3.8 mm, LS: 8.5 min./6.5 RPM
		4 x \varnothing 4.2 mm: 8.5 min./6.5 RPM

Instruction Manual, Installation

Contents

General Installation Instructions 17
Installation of Electric Motor 19

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Installation

General Installation Instructions

The Toftejorg SaniJet 20 is designed to be installed in a vertical upright position.

It is recommended to install a filter with mesh size 250 µm (0,01") in the supply line in order to avoid particles, scale etc. from clogging inside the machine. It is essential to avoid fine solid particles, such as fine sand, in the cleaning fluid as they will increase wear considerably. This is particular important in case of recirculation.

In order to prevent accidental leakage of cleaning fluid into the tank it is recommended to install a shut-off valve close to the machine inlet. This will also prevent back-flow of liquid from the tank through the machine in case the cleaner head is submerged and there is an over-pressure inside the tank. The installation and operation shall be made in such a way that the draining of the machine is ensured.

It is recommended that the fluid valve fitted is of a type that prevents hydraulic shocks, which may cause severe damage to the entire installation.

Before installation, all supply lines and valves must be thoroughly flushed to remove remains of welding electrodes, grinding dust, scale and other foreign matter.

During handling and installation handle the machine with care in order not to damage the fine surface finish of the machine.

The Toftejorg SaniJet 20 machine has been tested in a test tank according to ALTEQ test procedures at the factory before shipping.

Note: Do not try to turn Nozzle head by hand, since this may damage the Gear. Nozzle head can be turned by blowing air from an air pistol through the inlet connection of the media driven machine or the intake port of the air motor.

Note: The machine shall be installed in accordance with national regulations for safety and other relevant regulations and standards. In EU-countries the complete system must fulfil the EU-Machine Directive and depending of application, the EU-Pressure Equipment Directive and other relevant Directives and shall be **CE-marked** before it is set into operation.

Installation (continued)

General Installation Instructions

Warning: Precautions shall be made to prevent starting of the cleaning operation, while personnel are inside the tank or otherwise can be hit by jets from the nozzles.



Electrical equipment such as magnetic valves and electric actuators must not be installed in Ex-zones without type approval and marking, corresponding to the EX-class in question. The standard Toftejorg SaniJet electrical motor is not Ex-approved.

Installation (continued)

Installation of Electric Motor

Precautions for Installation

1. Do not use in a place where there is flammable gas and/or corrosive gas.
2. When installing the motor into your equipment, ensure that the motor lead wires are fixed and do not move. In addition, do not apply any pressure to these lead wires.
3. Motors for use only in equipment of protection class I.
4. The motor housing must be mounted with a screw and spring washer to the ground point of the equipment.
5. Installation must be performed by a qualified installer.

Installation Conditions

Install the motor and capacitor according to the following conditions:

1. Indoor (the product is designed and manufactured to be mounted in a machine).
2. Ambient temperature: -10 to +50°C (no freezing).
3. Ambient humidity: Less than 85% (no condensation).
4. No explosive, flammable, and/or corrosive gas.
5. Not exposed to direct sunlight.
6. Not exposed to dirt.
7. Not exposed to moisture or oil.
8. Well ventilated and allows heat radiation.
9. Does not receive continuous vibration or excessive shock.
10. 1,000 meters or less above seal level.

Warning: The motor housing must always be grounded and the Motor cover must always be mounted when the motor is connected to the power line.

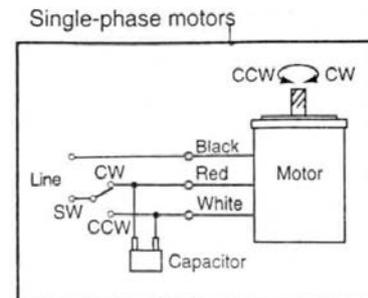
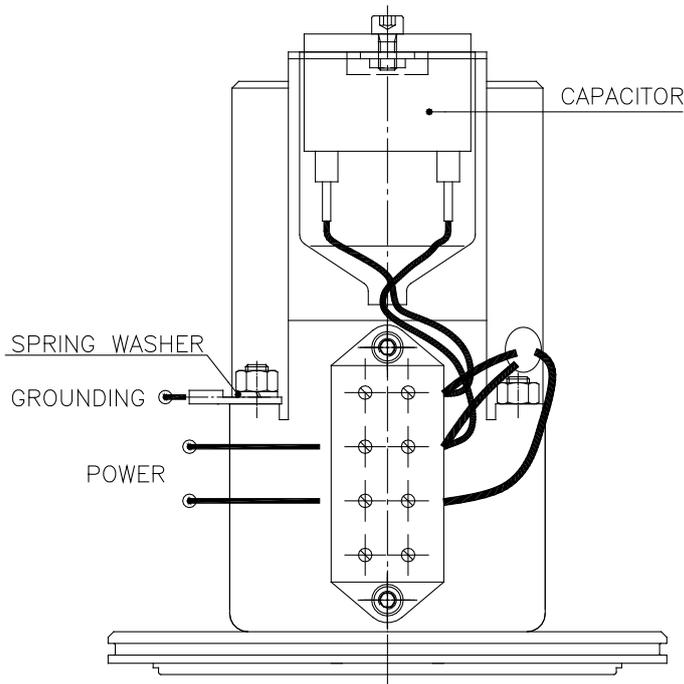


Installation (continued)

Connection

Wiring diagram

Note: The Down pipe shall rotate clockwise (CW) as viewed from above (from the motor), and accordingly the output shaft from the gear must rotate clockwise as viewed from the shaft side.



The directions of motor rotation is as viewed from motor output shaft side.

As the HS gear (1:36) reverses the rotation whereas the HS gear (1:75) does not, the internal wiring is connected differently from the factory in order to compensate for this. All you have to do is to connect the power to the two terminals in the middle on the terminal strip and mount grounding with a spring washer to the grounding point.

Note: Insulation class of this motor is B.

Make sure that the motor case temperature does not exceed 100°C during operation of the motor. Operation exceeding case temperature 100° may significantly deteriorate the coils and ball bearings of the motor and shorten motor's life span. Motor case temperature can be measured by fixing a thermometer on the motor surface. It can also be measured using thermo tape or thermocouple.

Note: Single-phase motors use a capacitor and keep it connected even after rotation of the motor has started.

Instruction Manual, Operation

Contents

Normal Operation 23
Safety Precautions 24

- Blank page -

Operation

Normal Operation

Pressure

In order to protect the machine, your pipe and valve installation, etc. against damage:

Avoid hydraulic shocks! Put on pressure gradually!

Recommended working pressure: 5 - 8 bar (75 - 115 psi). Too high pressure will increase consumption of wear parts.

The machine is designed to stand up to 13 bar working pressure. This is normally not recommended but may be used for special purposes, where high pressure at close distance is preferred.

Cleaning Media

Use only cleaning fluids, which are compatible with Stainless Steel AISI 316/316L, SAF2205, Titanium Grade 5, Hastelloy C22/C276, PEEK, E-CTFE, EPDM and Viton. Normal detergents, moderate solutions of acids and alkalis are acceptable as well as a number of solvents at ambient temperature during cleaning. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures as well as certain solvents and hydrochlorides should be avoided. If you are in doubt, contact your local Alfa Laval Tank Equipment sales office.

Temperature

The machine is designed to operate with cleaning media at temperatures up to 90°C (194 °F). However, it stands temperatures up to 140°C (284°F) inside the tank, and it is possible to steam the tank through the machines.

The machine is not designed to rotate during steaming. A slow rotation of the media driven machine might occur and is not harmful. The air or electric motor must not be running during steaming.

Warning:



Tanks with capacities greater than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam issuing from a nozzle could contain charged droplets.

Tanks smaller than this may be steam cleaned providing that: the steam nozzles and other metal parts of the system are reliably earthed and grounded to the tank structure.

Warning:



In potentially explosive atmospheres, the temperature must not exceed the maximum surface temperature according to the temperature class for the combustible gas or liquid.

Operation (continued)

After-Use Cleaning

After use flush the machine with fresh water. Cleaning media should never be allowed to dry or set-up in the system due to possible "salting out" or "scaling" of the cleaning media. If cleaning media contains volatile chloride solvents, it is recommended not to flush with water after use, as this might create hydrochloric acid.

Safety Precautions

The machine is intended for use inside a tank only. As peak velocity of main jets reaches 40 m/s, Toftejorg SaniJet 20 electrically driven must not be operated in open air or when tank is open.

Warning: Hot chemicals and steam under pressure may be used for cleaning and sterilising. Protect against scalding and burning. Never tamper with or try to open clamps or other connections while system is in operation. Make sure that system is de-pressurised and drained before disassembly.



The cleaning jets impinging the tank surface are a source of noise. Depending on pressure and distance to the tank walls, noise level may reach up to 85 dB.

Warning: In case potentially explosive liquids are used, precautions should be taken against incidental creation of an explosive mixture with oxygen in the tank atmosphere.



Warning: Tanks with capacities greater than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam issuing from a nozzle could contain charged droplets.



Tanks smaller than this may be steam cleaned providing that: the steam nozzles and other metal parts of the system are reliably earthed and grounded to the tank structure.

Warning: Tanks may contain poisonous/hazardous products or products which represent an environmental or safety risk. Never open tank and dismantle the machine without checking previous tank contents and necessary precautions.



Warning: Retaining screw on side of Base housing (Pos. 12.6) must never be loosened, when machine is mounted in tank unless down pipe is supported and Pressure line is disconnected, as otherwise the complete Down pipe assembly will fall down.



Instruction Manual, Maintenance

Contents

Preventive Maintenance	27
Reserved rights for design changes of Alfa Laval equipment used in validated processes	27
Part List Drawings	29
Toftejorg SaniJet 20E electrically Driven, complete	29
Cleaner Unit	30
Base Unit	31
Reference List of Parts	32
Toftejorg SaniJet 20E, Electrically Driven	32
Cleaner Unit	34
Base Unit	35
Rotacheck System.....	39
Trouble Shooting Guide	40
Service Kits and Tools.....	42
Service Intervals	42
Service Kit in EPDM for Toftejorg SaniJet 20 motor driven version (air/electrically)	42
Service Kit in Viton for Toftejorg SaniJet 20 motor driven version (air/electrically)	42
Tools	42
How to Order Spare Parts	43
How to contact Alfa Laval Tank Equipment	43
EU Declaration of Conformity	44
Toftejorg SaniJet 20E (Electrically Driven).....	44

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Maintenance

Preventive Maintenance

In order to keep your tank cleaning machine servicing you as an efficient tool in your tank cleaning operations, it is essential to maintain its high performance by following a simple preventive maintenance programme.

Good maintenance is careful and regular attention!

The following recommended preventive maintenance is based on tank cleaning machines working in average conditions. However, you will appreciate that a tank cleaning machine, which has a rough and dirty job to do, will need more frequent attention than one working in ideal conditions. We trust that you will adjust your maintenance programme to suit.

Handle machine with care. Take proper action to protect fine surfaces from being damaged.

Always use only proper tools. Use Toftejorg SaniJet 20 standard tool kit. Never force, hammer or pry components together or apart. Always perform all assembly/disassembly steps in the order described in this manual.

Never assemble components without previous cleaning. This is especially important at all mating surfaces. Work in a clear well-lighted work area.

Reserved rights for design changes of Alfa Laval equipment used in validated processes

Alfa Laval is continuously working on improving our equipment and services. In this improvement work Alfa Laval may for example change the design and material in our equipment. A change in the design will not necessarily entail a change of the specification and item no. for the equipment.

Alfa Laval reserves the right to change the design of Alfa Laval equipment without any notifications for improvements of our design.

If Equipment from Alfa Laval is used in connection with, for example, a validated plant, and an order for replacements is made, the design of the replacement may have been changed even if the specifications /item no. is the same as the existing installed and validated ones.

When ordering a replacement please contact Alfa Laval sales support in this matter before placing the order.

Maintenance (continued)

300 working hours

1. Disassemble machine as described on the following pages.
2. Clean material build-up and deposits from internal parts with water or suitable chemical cleaner, possibly Scotch-brite, S-Ultrafine.
3. Check Bearing bushes (Pos. 12.14 + 12.15) in Base housing by fitting Rotor outer (Pos. 31) and check sideways movement. Replace if necessary. If bushes are worn they will allow Rotor outer to tilt and eventually it may seize up.

Note: Timely replacement of bearings will prevent costly damage to the gear. However, all Bearing bushes, made from high performance plastic PEEK-material, are mounted with press-fit and should not be removed unless they need to be replaced.

4. Check unrestricted rotation of Ball bearings. Inspect for build-up of foreign material in Ball rings (Pos. 12.12 + 14.6) and Ball races. Balls must rotate freely in Ball rings.
5. Assemble machines as described in the following pages.
6. After fitting the Rotor outer (Pos. 31), before mounting Motor drive unit, rotate down pipe and check unrestricted rotation.
7. Also check unrestricted rotation of Motor drive unit before mounting on machine.

In order to ensure current good hygiene it is recommended to replace all rubber seals at each service inspection.

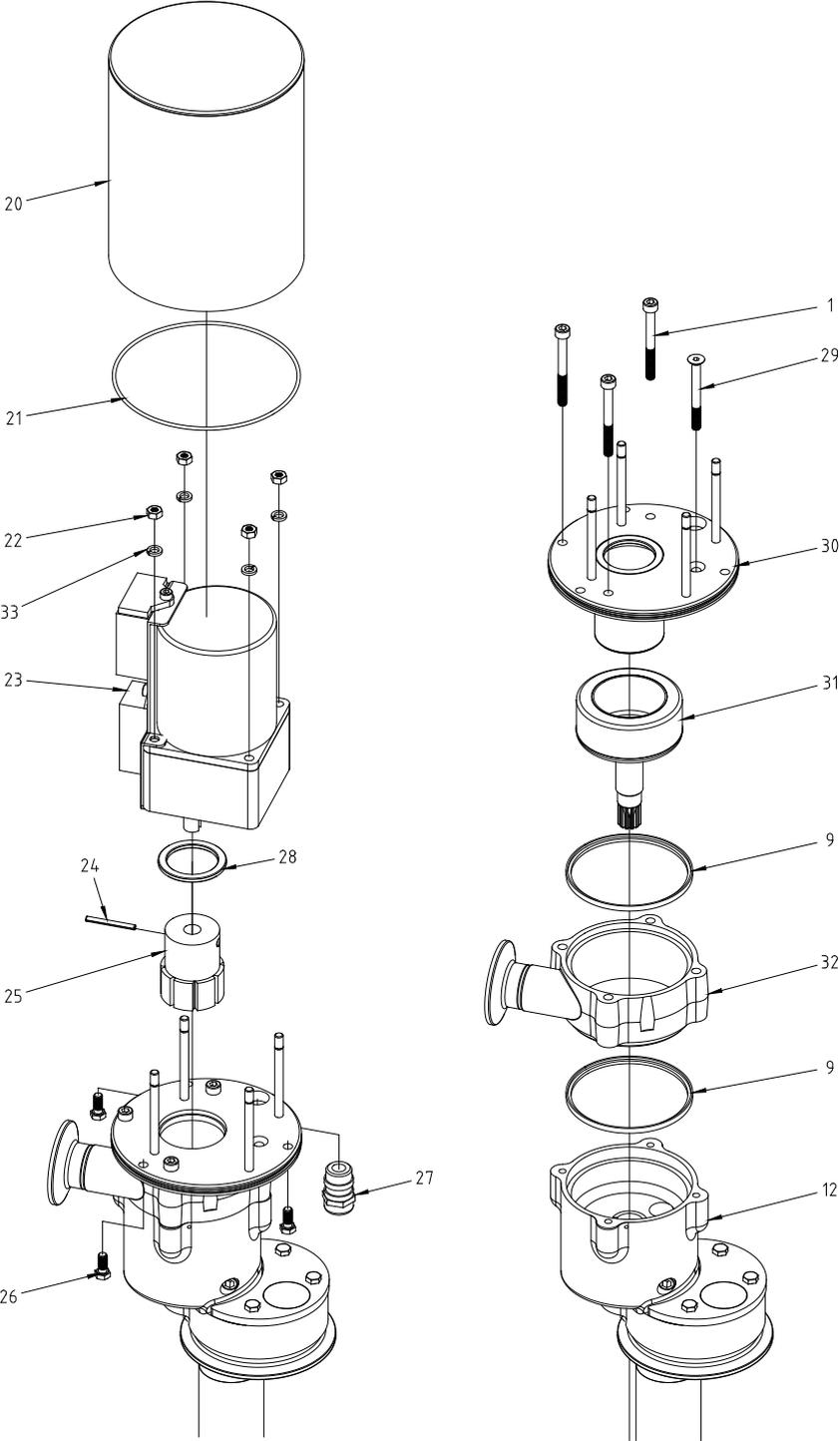
Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear. Wear parts are specified in the Reference List of Parts, page 32.

Preventive Maintenance of Electric Motor

The electric motor is maintenance free. The gear is life-time lubricated and need no maintenance.

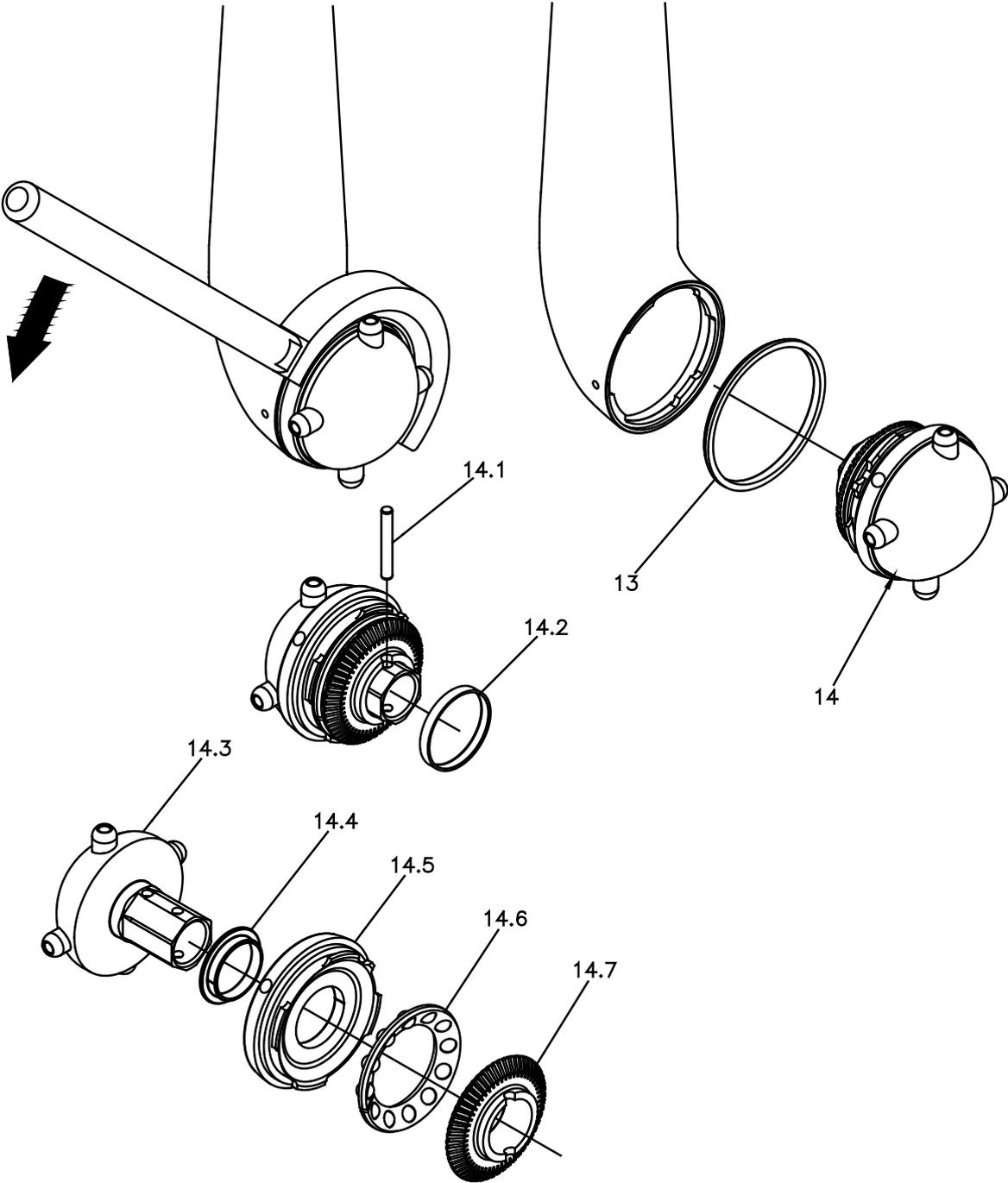
Part List Drawings

Toftejorg SaniJet 20E electrically Driven, complete



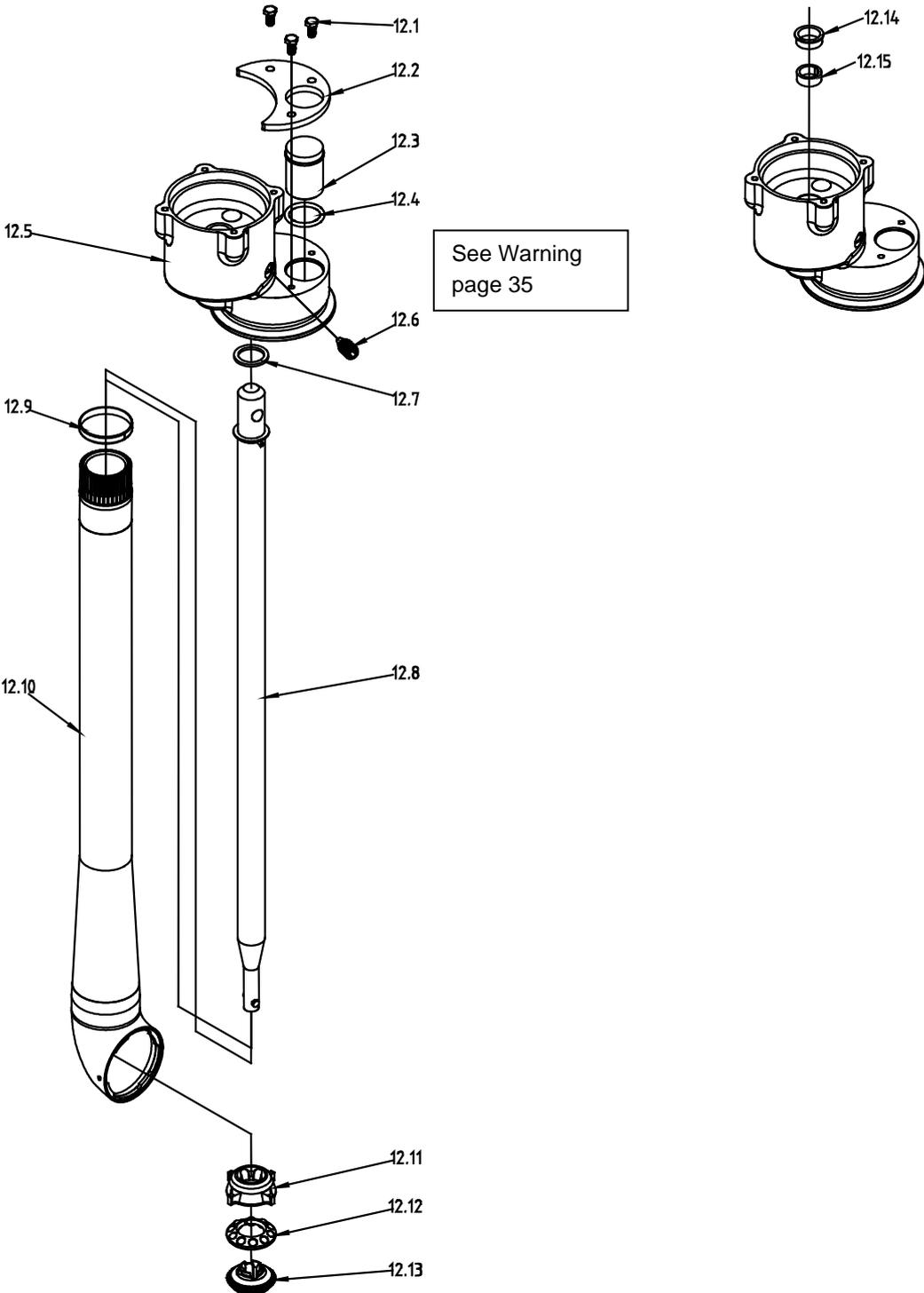
Part List Drawings (continued)

Cleaner Unit



Part List Drawings (continued)

Base Unit



Reference List of Parts

Toftejorg SaniJet 20E, Electrically Driven

Pos.		Ref. no.	No/ Unit	Description	Material	Remarks
1		TE51A146	3	Screw	Stainless steel	Spare part
9	<input type="checkbox"/>	TE20B516	2	Gasket	Elastomer	Wear part
	<input type="checkbox"/>	TE20B516-01	2	Gasket	Elastomer	Wear part
	<input type="checkbox"/>	TE20C516	2	Gasket	Elastomer	Wear part
12	<input type="checkbox"/>	TE20B309	1	Base unit, L = 350 mm	Assy	
	<input type="checkbox"/>	TE20B300	1	Base unit, L = 500 mm	Assy	
	<input type="checkbox"/>	TE20B301	1	Base unit, L = 700 mm	Assy	
	<input type="checkbox"/>	TE20B302	1	Base unit, L = 1000 mm	Assy	
	<input type="checkbox"/>	TE20B303	1	Base unit, L = 1200 mm	Assy	
	<input type="checkbox"/>	TE20B304	1	Base unit, L = 1500 mm	Assy	
	<input type="checkbox"/>	TE20B309-01	1	Base unit, L = 350 mm	Assy, Elastomer	
	<input type="checkbox"/>	TE20B300-01	1	Base unit, L = 500 mm	Assy, Elastomer	
	<input type="checkbox"/>	TE20B301-01	1	Base unit, L = 700 mm	Assy, Elastomer	
	<input type="checkbox"/>	TE20B302-01	1	Base unit, L = 1000 mm	Assy, Elastomer	
	<input type="checkbox"/>	TE20B303-01	1	Base unit, L = 1200 mm	Assy, Elastomer	
	<input type="checkbox"/>	TE20B304-01	1	Base unit, L = 1500 mm	Assy, Elastomer	
12.1		TE51A172	3	Screw	Stainless steel	Spare part
12.2		TE20B594	1	Bracket	Stainless steel	Spare part
12.3		TE20B642	1	Plug	Stainless steel	Spare part
12.4	<input type="checkbox"/>	TE51T127	1	O-ring	Elastomer	Wear part
	<input type="checkbox"/>	TE51T008	1	O-ring	Elastomer	Wear part
	<input type="checkbox"/>	TE51T129	1	O-ring	Elastomer	Wear part
12.5		TE20B500	1	Base housing	Stainless steel	Spare part
12.6		TE20B512	1	Retaining screw	Stainless steel	Spare part
12.7	<input type="checkbox"/>	TE20B511	1	Plain seal	Elastomer	Wear part
	<input type="checkbox"/>	TE20B511-01	1	Plain seal	Elastomer	Wear part
	<input type="checkbox"/>	TE20C511	1	Plain seal	Elastomer	Wear part
12.8	<input type="checkbox"/>	TE20B538	1	Inner shaft, L = 350 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B532	1	Inner shaft, L = 500 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B533	1	Inner shaft, L = 700 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B534	1	Inner shaft, L = 1000 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B535	1	Inner shaft, L = 1200 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B536	1	Inner shaft, L = 1500 mm	Stainless steel	Spare part
12.9		TE20B510	1	Bearing ring	Polymer	Wear part
12.10	<input type="checkbox"/>	TE20B310	1	Outer tube, L = 350 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B311	1	Outer tube, L = 500 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B312	1	Outer tube, L = 700 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B313	1	Outer tube, L = 1000 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B314	1	Outer tube, L = 1200 mm	Stainless steel	Spare part
	<input type="checkbox"/>	TE20B315	1	Outer tube, L = 1500 mm	Stainless steel	Spare part
12.11		TE20B539	1	Ball race	Stainless steel	Wear part
12.12		TE20B364	1	Ball ring	Polymer/Titanium	Wear part
12.13.		TE20B542	1	Bevel gear	Stainless steel	Wear part
12.14		TE20B513	1	Bearing bush	Polymer	Wear part
12.15		TE20B514	1	Bearing bush	Polymer	Wear part
13	<input type="checkbox"/>	TE20B553	1	Seal ring H	Elastomer	Wear part
	<input type="checkbox"/>	TE20B553-01	1	Seal ring H	Elastomer	Wear part
	<input type="checkbox"/>	TE20C553	1	Seal ring H	Elastomer	Wear part
14	<input type="checkbox"/>	TE20B324	1	Cleaner unit, 2xø2.0mm	Assy	
	<input type="checkbox"/>	TE20B325	1	Cleaner unit, 2xø3.8mm	Assy	
	<input type="checkbox"/>	TE20B326	1	Cleaner unit, 4xø4.2mm	Assy	
14.1		TE51C003	1	Pin	Stainless steel	Spare part

Reference List of Parts (continued)

Toftejorg SaniJet 20E, Electrically Driven

Pos.	Ref. no.	No/ Unit	Description	Material	Remarks
14.2	TE20B571	1	Clip ring	Stainless steel	Spare part
14.3	<input type="checkbox"/> TE20B334	1	Cleaner head 2xø2.0mm	Stainless steel	Spare part
	<input type="checkbox"/> TE20B335	1	Cleaner head 2xø3.8mm	Stainless steel	Spare part
	<input type="checkbox"/> TE20B336	1	Cleaner head 4xø4.2mm	Stainless steel	Spare part
14.4	TE20B554	1	Bearing bush	Polymer	Wear part
14.5	TE20B552	1	Retaining ring	Stainless steel	Wear part
14.6	TE20B365	1	Ball ring N	Polymer/Titanium	Wear part
14.7	TE20B550	1	Bevel gear	Stainless steel	Wear part
20	TE20B347	1	Motor cover	Stainless steel	Spare part
21	TE51T125	1	O-ring	Elastomer	Spare part
22	TE51A504	4	Nut	Stainless steel	Spare part
23	<input type="checkbox"/> TE20B380	1	El-gear motor (1:36) 220-230V	Assy	
	<input type="checkbox"/> TE20B380-01	1	El-gear motor (1:36) 200V	Assy	
	<input type="checkbox"/> TE20B380-02	1	El-gear motor (1:36) 110-115V	Assy.	
	<input type="checkbox"/> TE20B380-03	1	El-gear motor (1:36) 100V	Assy.	
	<input type="checkbox"/> TE20B381	1	El-gear motor (1:75) 220-230V	Assy.	
	<input type="checkbox"/> TE20B381-01	1	El-gear motor (1:75) 200V	Assy.	
	<input type="checkbox"/> TE20B381-02	1	El-gear motor (1:75) 110-115V	Assy.	
	<input type="checkbox"/> TE20B381-03	1	El-gear motor (1:75) 100V	Assy.	
24	TE51C052	1	Tubular rivet	Stainless steel	Spare part
25	TE20B343	1	Rotor inner w. magnets	Assy.	
26	TE51A189	3	Screw	Stainless steel	Spare part
27	TE51U310	1	Union joint	Steel, plated	Spare part
28	TE20B630	1	Guide ring	Stainless steel	Spare part
29	TE51A057	1	Screw	Stainless steel	Spare part
30	TE20B344	1	Motor flange welded E	Stainless steel	Spare part
31	TE20B340	1	Rotor outer w. magnets	Assy.	
32	TE20B351	1	Inlet housing, Tri-clamp	Stainless steel	Spare part
33	TE51B039	4	Washer	Stainless steel	Spare part

Configuration as delivered marked

Maintenance (continued)

Cleaner Unit

Dismantling

1. Loosen Cleaner unit (Pos. 14) with Hook spanner (tool no. TE20B701). Insert carefully into holes in Retaining ring (os. 14.5). Turn counter-clockwise and draw out Cleaner unit. Never use Pipe wrench or any other tool than the Toftejorg SaniJet 20 special Hook spanner, which is developed especially to protect the surface from being damaged.
2. Remove Seal ring (Pos. 13).
3. Pull off Clip ring (Pos. 14.2). Push out Pin (Pos. 14.1).
4. Draw off Bevel gear (Pos. 14.7) together with Ball ring (Pos. 14.6) and Retaining ring (Pos. 14.5).
5. If replacement is necessary, pull off Bearing bush (Pos. 14.4) from Cleaner head (Pos. 14.3). The Bearing bush should not be removed unless worn or damaged. Wear on this part will increase leakage flow around the front of the Cleaner head, and accordingly increase the total flow rate.

Reassembling

1. If necessary press new Bearing bush (Pos. 14.4) fully home onto Cleaner head (Pos. 14.3).
2. Mount Retaining ring (Pos. 14.5), Ball ring (Pos. 14.6) and Bevel gear (Pos. 14.7) on Cleaner head (Pos. 14.3).
3. Hold Cleaner head and turn Bevel gear to align the groove over the holes in the Cleaner head. Mount Pin (Pos. 14.1).
4. Secure with Clip ring (Pos. 14.2) over Pin (Pos. 14.1). Check that Pin with Clip ring can move axially.
5. Hold Retaining ring (Pos. 14.5) and check free rotation of Cleaner unit.
6. Insert Seal ring (Pos. 13) into Cleaner house on Outer tube. Make sure that it is fitted correctly into recess.
7. Insert Cleaner unit (Pos. 14) in Outer tube. Correct mounting is made foolproof: Drain hole in Retaining ring must be at the lowest point. Tighten with Hook spanner (tool no. TE20B701).

Caution:



It is important that Seal ring is fitted correctly and that Retaining ring is tightened fully home against "stop". Check that assembly is firmly held in position. If assembly feels loose, replace Seal ring.

Maintenance (continued)

Base Unit

Dismantling of Outer tube

In order to dismantle the parts in the Outer tube, it is necessary first to release the Inner shaft (Pos. 12.8).

Warning:



Retaining screw on side of Base housing (Pos. 12.6) must never be loosened, when machine is mounted in tank unless down pipe is supported and Pressure line is disconnected, as otherwise the complete Down pipe assembly will fall down.

1. Remove Retaining screw (Pos. 12.6). Loosen and unscrew with a M10 Hex key (Allen key). Pull out Outer tube (Pos. 12.10) together with Inner shaft (Pos. 12.8) from Base housing (Pos. 12.5).
2. Turn Outer tube upside down. Hold Bevel gear (Pos. 12.13) and push Inner shaft (Pos. 12.8) approx. 5 mm into Outer tube. Then rotate Inner shaft $\frac{1}{4}$ revolution, in order for pin in the shaft to pass through grooves in Bevel gear. Remove Bevel gear (Pos. 12.13) and Ball ring (Pos. 12.12).
3. Rotate Inner shaft to pass grooves in Ball race (Pos. 12.11) and pull it out. Tip out Ball race from Outer tube (Pos. 12.10).
4. If it is necessary to replace Bearing ring (Pos. 12.9) on Outer tube, pull it off. The Bearing ring should not be removed unless worn or damaged. Wear on this part will increase leakage around Down pipe and accordingly increase total flow rate. It is recommended to replace if diameter is below $\varnothing 38.7$ mm. Diameter must never be below $\varnothing 38.5$ mm.
5. Remove Plain seal (Pos. 12.7) from Inner shaft (Pos. 12.8).
6. If necessary, replace Bearing bush (Pos. 12.14 and 12.15) in Base housing (Pos. 12.5).

Reassembling of Outer Tube

1. Mount Plain seal (Pos. 12.7) on Inner shaft (Pos. 12.8).
2. Turn Outer tube (Pos. 12.10) upside down. Fit Ball race (Pos. 12.11) into Outer tube. Make sure that it is correctly placed in recess.
3. Mount Inner shaft (Pos. 12.8) from below into the Outer tube. Hold against Ball race (Pos. 12.11) and fit Inner shaft pin through axial grooves. Place Ball ring (Pos. 12.12) and Bevel gear (Pos. 12.13) over Inner shaft on top of the Ball race (Pos. 12.11). Hold Bevel gear, rotate Inner shaft and draw back to fit pin into groove in the end face of the Bevel gear.
4. Place Base housing (Pos. 12.5) upside down. Fit upper end of Inner shaft into Base housing. By pressing at the lower end of Inner shaft push the entire assembly into Base housing. Tighten with Retaining screw (Pos. 12.6).

Maintenance (continued)

Base Unit (continued)

Toftejorg SaniJet 20 is as a standard prepared for monitoring by a Rotacheck Sensor (see Rotacheck System). A Plug (Pos. 12.3) is fitted in the Base housing in the opening designed for the Rotacheck sensor.

Dismantling of Plug or Rotacheck Sensor

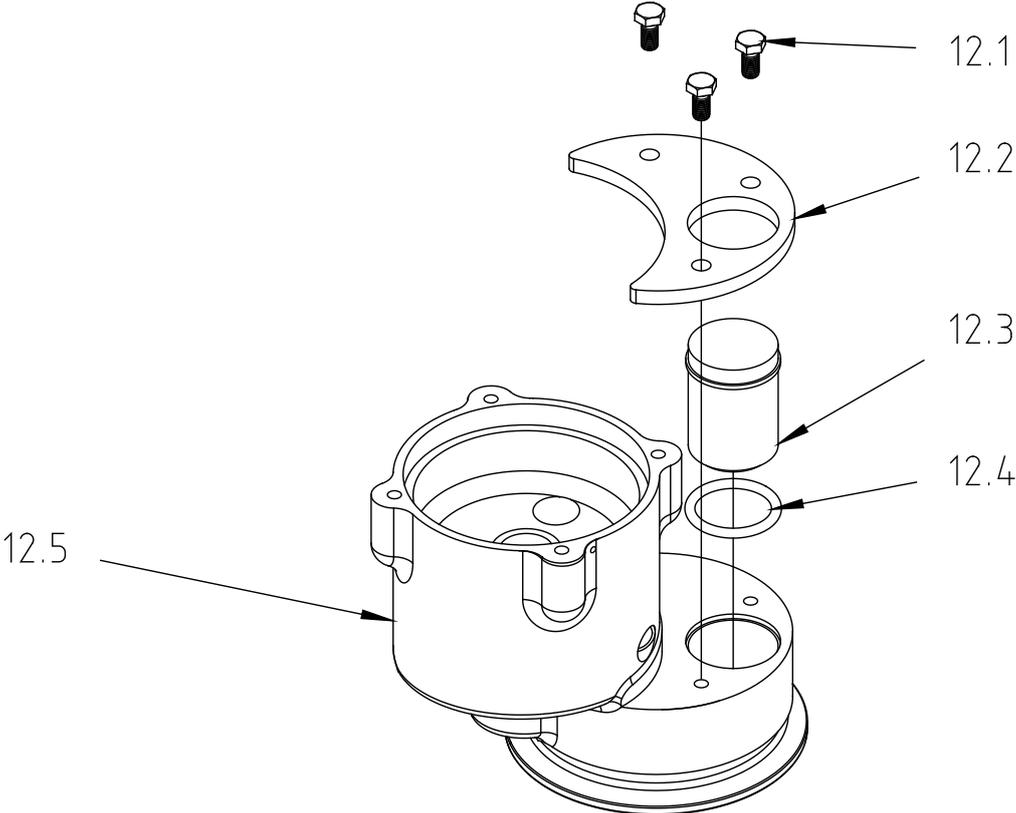
1. Remove Screws (Pos. 12.1). Loosen and unscrew with a Socket wrench (tool no. TE462A).
2. Remove Bracket (Pos. 12.2).
3. Press up Plug/Rotacheck (Pos. 12.3). Remove O-ring (Pos. 12.4).

Reassembling of Plug or Rotacheck Sensor

1. Insert O-ring (Pos. 12.4) in hole for Rotacheck on Base housing (Pos. 12.5). Make sure that it is fitted correctly into O-ring groove inside hole. Insert Plug/Rotacheck (Pos. 12.3).
2. Place Bracket (Pos. 12.2) over Plug/Rotacheck.
3. Mount and tighten Screws (Pos. 12.1) with Socket wrench (tool no. TE462A).

Maintenance (continued)

Base Unit (continued)



Maintenance (continued)

Further Dismantling

1. Remove M5 Screws (Pos. 26) and lift off the Motor cover (Pos. 20).
2. Remove M5 Screws (Pos. 1 and 29). Loosen and unscrew with a Hex key.
3. Lift off the Motor flange (Pos. 30).
4. Remove Gasket (Pos. 9) and lift off Inlet housing (Pos. 32).
5. Withdraw Rotor Outer (Pos. 31).
6. Remove Gasket (Pos. 9) from Base unit (Pos. 12).

Further Reassembling

Before reassembly make sure that all parts are clean without deposits or build-up of foreign matter.

1. Insert Gasket (Pos. 9) in top of Base unit (Pos. 12).
2. Insert the Rotor outer (Pos. 31). Check free rotation.
3. Replace Inlet housing (Pos. 32) on Gasket (Pos. 9) in Base unit (Pos. 12).
4. Mount Gaskets (Pos. 9) into Inlet housing (Pos. 32).
5. Mount the Motor flange (Pos. 30).
6. Mount and tighten Screws (Pos. 1 and 29) with Hex key. Tighten crosswise. Torque: 3-4 Nm.
7. Replace Motor cover (Pos. 20) and mount and tighten Screws (Pos. 26).

Rotacheck System

The Rotacheck System is an ex-proof system, designed for monitoring the operation of the tank cleaning machine. The Sensor is supplied from a special Relay. The Sensor will send a signal to the Relay each time it is hit by a jet from the rotating tank cleaning machine, thus providing verification that the machine is rotating, of the rotation speed, and that the nozzles are not blocked. To install Rotacheck Sensor simply replace Plug (Pos. 12.3) with Rotacheck Sensor TE52E067. For further information see Data sheet and operators manual for Rotacheck system.

Trouble Shooting Guide

Symptom: Slow rotation or failure of machine to rotate

Possible Causes	Fault finding
No or insufficient liquid flow	<ul style="list-style-type: none">a) Check if supply valve is fully open.b) Check if inlet pressure to machine is correctc) Check supply line/filter for restrictions/ cloggingd) Remove Motor flange including Motor and Motor cover (see page 38) and check for clogging in Rotor area.e) Remove Rotor and Rotor outer (Pos. 31, page 38) and check for clogging in Base housing.f) Remove Cleaner unit (see page 34-30) and check Nozzles and Cleaner unit for clogging. If blocked, carefully clean without damaging Nozzles vanes and Nozzle tip. Use air pistol.g) Inspect Bevel gear, Ball ring (page 34-30) and Bevel gear inside Outer tube (see page 35). If necessary, remove parts and clean. <p>If large particles repeatedly get jammed in the machine, install filter or reduce mesh size of installed filter in supply line.</p>

Trouble Shooting Guide (continued)

Symptom: Slow rotation or failure of machine to rotate

Possible Causes

Fault finding

Foreign material or material build-up

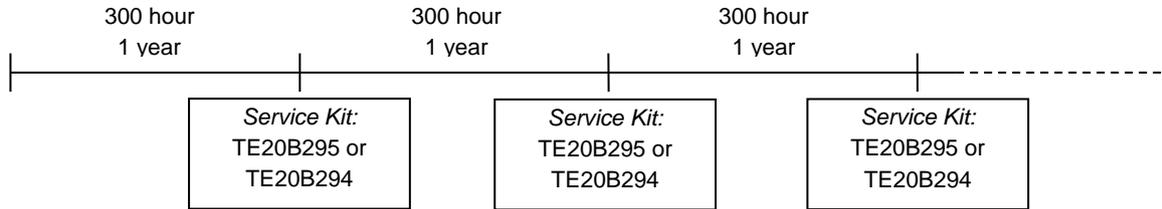
- | | |
|--|--|
| a) Cleaner unit or Bevel gears jammed/sluggish | Rotate again Down pipe. It must rotate freely without any restriction. If not, remove Cleaner unit (see page 34-30). Clean out any foreign material and material build-up inside Cleaner head in the bottom of the Outer tube. Hold Retaining ring and rotate Cleaner head. If any restriction is recognised, disassemble Cleaner unit and clean all parts. Balls in ball ring must rotate freely. |
| b) Down pipe jammed/sluggish | If Down pipe still does not rotate freely without any restriction, it must be disassembled. Clean opening in bottom of Base housing and Bearing ring on Outer tube. Remove Bevel gear, Ball ring and Ball race inside Outer tube and clean parts. Balls in Ball ring must rotate freely without any restriction. |
-

Mechanical defects

- | | |
|--------------------------------|--|
| a) Damaged teeth on Bevel gear | Inspect teeth on Bevel gear for deformation. Mount Cleaner Unit in Outer tube (See page 34-30). Remove Planet gear. Hold Base housing and rotate Down pipe to check that Bevel gears can work together. If damaged: Replace Bevel gears. |
|--------------------------------|--|
-

Service Kits and Tools

Service Intervals



Service Kit in EPDM for Toftejorg SaniJet 20 motor driven version (air/electrically)

Article no. TE20B295

Reference no.	No.	Description	Pos. no.
TE20B510	1	Bearing ring, top	12.9
TE20B513	1	Bearing bush D1	12.14
TE20B514	1	Bearing bush D2	12.15
TE20B511	1	Plain seal S	12.7
TE20B516	2	Gasket D	9
TE20B553	1	Seal ring H	13
TE51T127	1	O-ring	12.4

Service Kit in Viton for Toftejorg SaniJet 20 motor driven version (air/electrically)

Article no. TE20B294

Reference no.	No.	Description	Pos. no.
TE20B510	1	Bearing ring, top	12.9
TE20B513	1	Bearing bush D1	12.14
TE20B514	1	Bearing bush D2	12.15
TE20B511-01	1	Plain seal S	12.7
TE20B516-01	2	Gasket D	9
TE20B553-01	1	Seal ring H	13
TE51T008	1	O-ring	12.4

Tools

Reference no.	Description
TE462A	8mm Socket Wrench w. pin
TE20B701	Hook spanner

How to Order Spare Parts

On the Exploded View Drawing as well as on all instruction drawings, the individual parts have a position no., which is the same on all drawings. From the pos. no. the part is easily identified in the Reference List of Parts, page 32.

Individual parts should always be ordered from the Reference List of Parts, page 32. Ref. no. and Description should be clearly stated.

Please also quote the type of machine and serial no. This will help us to help you. The serial no. is stamped on the Connection Nipple on the top of the tank cleaning machine.

How to contact Alfa Laval Tank Equipment

For further information please feel free to contact:

Alfa Laval Tank Equipment

Alfa Laval Kolding A/S

31, Albuen - DK 6000 Kolding - Denmark

Registration number: 30938011

Tel switchboard: +45 79 32 22 00 - Fax switchboard: +45 79 32 25 80

www.toftejorg.com , www.alfalaval.dk - info.dk@alfalaval.com

Contact details for all countries are continually updated on our websites.

EU Declaration of Conformity

Toftejorg SaniJet 20E (Electrically Driven)

Only valid for EU countries

EC Declaration of Conformity

Revision of Declaration of Conformity: 2009-05-27

The designated company

Alfa Laval Kolding A/S
Company name

Albuen 31, 6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone no.

hereby declare that

Tank Cleaning Machine Toftejorg SaniJet 20 Electrically Driven
Designation Type

From serial numbers from 2015-00001 to 2030-99999

is in conformity with the following regulations and directives with amendments:

- The Machinery Directive 2006/42/EC
DS/EN ISO 12100:2010
- The Low Voltage Directive 73/23/EC
EN 60950
- The Pressure Directive 97/23/EC
According to its own volume and the rated pressure range the product is regarded an Article 3, paragraph 3 Equipment
- The Low Voltage Directive:
DIN VDE 0530-Teil 1:1993, IEC34-1:1994, IEC34-5:1991, IEC34-11:1978

The person authorised to compile the technical file is the signer of this document.

QHSE Manager, Quality, Health
and Safety & Environment
Title

Annie Dahl
Name


Signature

2015-01-01
Date

Kolding
Place



How to contact Alfa Laval

Contact details for all countries are continually updated on our website.

Please visit www.alfalaval.com to access the information directly.

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