## Instruction Manual

**Alfa Laval TJ40G Rotary Jet Head**

Covering: Standard Machines, Heavy duty (HD),
Q-doc - Equipment Doc (3.1 Inspection Certificate - EN 10204)
Machines delivered with ATEX/IECEx Certification in accordance with Directive 2014/34/EU
TE91A725, First published: 2017-01

<table>
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<tr>
<th>ESE03480-EN3</th>
<th>2017-03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original manual</td>
<td></td>
</tr>
</tbody>
</table>
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The Designated Company

Alfa Laval Kolding A/S

Company Name

Albuen 31, DK-6000 Kolding, Denmark

Address

+45 79 32 22 00

Phone No.

hereby declare that

Tank Cleaning Machine

Designation

Alfa Laval TJ40G & TJ40G-HD Rotary Jet Head

Type

From serial number 2016-0001 to 2030-99999

is in conformity with Machinery Directive 2006/42/EC and the following harmonized standard is used:

DS/EN ISO 12100:2011 Safety of Machinery - Risk Assessment

is in conformity with (Ex / ATEX) Directive 2014/34/EU and the following harmonized standards are used:


EC Type Examination Certificate no. Baseefa17ATEX0018X and IECEx BAS 17.0017X

Marking: II 1G Ex h IIC T85°C... T175°C Ga

II 1D Ex h IIC T85°C... T140°C Da

Baseefa Ltd., Certification body number 1180, Rockhead Business Park, Staden Lane, Buxton, Derbyshire SK17 9RZ, United Kingdom

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

Global Product Quality Manager

Pumps, Valves, Fittings and Tank Equipment

Lars Kruse Andersen

Title

Name

Signature

Kolding

2017-03-01

Place

Date

This Declaration of Conformity replaces Declaration of Conformity dated 2017-01-23
2 Safety

Unsafe practices and other important information are emphasized in this manual. Warnings are emphasized by means of special signs. Always read the manual before using the tank cleaning machine!

2.1 Important information

**WARNING**
Indicates that special procedures must be followed to avoid serious personal injury.

**CAUTION**
Indicates that special procedures must be followed to avoid damage to the tank cleaning machine.

**NOTE**
Indicates important information to simplify or clarify procedures.

2.2 Warning signs

General warning: 

![General warning symbol](image)

ATEX/IECEx warning 

![ATEX/IECEx symbol](image)
3 Introduction

3.1 Introduction

Based on more than 30 years’ experience from practical tank cleaning and production, the Alfa Laval Toftejorg TJ40G Rotary Jet Head has been developed to meet the highest demands for efficiency, reliability and hygiene within food and beverage, pharmaceutical and biochemical industry.

This manual has been prepared as a guide for installing, operating and maintaining your Alfa Laval Toftejorg tank cleaning machine. Should you require further assistance, our Technical Sales Support department and worldwide net of sales offices are pleased to help you. Please quote the type, article and serial numbers with all of your enquiries; this helps us to help you. The type and serial number are placed on the body of the tank cleaning machine.

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. On the contrary, good preventive maintenance on the contrary means good performance, no unscheduled stops and superior total economy.

If the Alfa Laval Toftejorg TJ40G stops rotating unintentionally within the warranty period, please return the machine to Alfa Laval. Please do not try to fix any mechanical problems before shipping.

Important information: Before installing the machine and setting it into operation, carefully read the General safety and installation instructions (page 13) and the specific conditions for safe use in accordance with ATEX/IECEx directive 2014/34/EU (page 14) and take all necessary precautions according to your application and local regulations.

NOTE

The illustrations and specifications contained in this manual were effective at the date of printing. However, as continuous improvements are our policy, we reserve the right to alter or modify any unit specification on any product without prior notice or any obligation.

The English version of the instruction manual is the original manual. We make reservations in regard to possible mistranslations in language versions of the instruction manual. In case of doubt, the English version of the instruction manual applies.

3.2 Intended use

The end-user should verify:

- that the tank cleaning machine is in conformity with respect to tank, vessel or container size in which it is 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.

The tank cleaning machine is intended for use in closed tank, vessel or container. If used in open environment see 4.3 General safety and installation instructions (page 13).
3 Introduction

3.3 Patents and trademarks

This Instruction Manual is published by Alfa Laval without any warranty. Improvements and changes to this Instruction Manual may at any time be made by Alfa Laval without prior notice. Such changes are incorporated in new editions of this Instruction Manual.

Alfa Laval Kolding A/S. All rights reserved.

The Alfa Laval logotype is a trademark or a registered trademark of Alfa Laval Corporate AB. "Toftejorg" is a trademark or registered trademark of Alfa Laval. The Alfa Laval Toftejorg™ TJ40G product has a pending patent in the EPO member states (EP 14199732.0), in the US and in other countries. Other products or company names mentioned herein may be the trademarks of their respective owners. Any rights not expressly granted herein are reserved.

3.4 Marking

Alfa Laval tank cleaning machines are marked to allow for recognition of type of machine, machine name, serial number and manufacturing address.

The marking is placed on the body of the tank cleaning machine.

![Rotary Jet Head TJ40G s/n.: yyyy-xxxxx](image)

Alfa Laval, DK-6000 Kolding, Albuen 31

Serial number explanation
Machines supplied with or without normal documentation:
yyyy-xxxxx: serial number
yyyy: year
xxxxx: 5 digit sequential number
3.5 ATEX/IECEx marking

The Alfa Laval Toftejorg TJ40G is certified as category I component. The certification is carried out by the notified body Baseefa, who has issued the certificate no. 17ATEX0018X and IECEx BAS 17.0017X.

Note
Explosion protection type is constructional safety “c”.

The marking on the ATEX/IECEx certified Alfa Laval Toftejorg TJ40G is as follows:

Rotary Jet Head
TJ40G
s/n.: yyyy-xxxxx
Alfa Laval, DK-6000 Kolding, Albuen 31
II 1G Ex h IIIC T85°C…T175°C Ga
II 1D Ex h IIIC T85°C…T140°C Da
1180 Baseefa 17ATEX0018X IECEx BAS 17.0017X

Serial number explanation:
Machines supplied with or without normal documentation:
yyyy-xxxxx: serial number
yyyy: year
xxxxx: 5 digit sequential number
3.6 ATEX/IECEx temperature class and code

The maximum surface temperature depends mainly on operating conditions which are the temperature of the process fluid and ambient temperature.

The dust temperature code depends on the process fluid temperature or the ambient temperature, whichever of the two is the highest.

<table>
<thead>
<tr>
<th>Dust temperature code</th>
<th>Process fluid temperature</th>
<th>Ambient temperature (T_{ambX})</th>
</tr>
</thead>
<tbody>
<tr>
<td>T85°C</td>
<td>0°C ≤ +85°C</td>
<td>0°C ≤ +85°C</td>
</tr>
<tr>
<td>T100°C</td>
<td>0°C ≤ +100°C</td>
<td>0°C ≤ +100°C</td>
</tr>
<tr>
<td>T135°C</td>
<td>0°C ≤ +135°C</td>
<td>0°C ≤ +135°C</td>
</tr>
<tr>
<td>T140°C</td>
<td>0°C ≤ +140°C</td>
<td>0°C ≤ +140°C</td>
</tr>
</tbody>
</table>

Category 1G

The gas temperature class is corrected with a safety margin of 80% due to a requirement for Group II EPL Ga equipment.

The gas temperature class depends on the process fluid temperature or the ambient temperature, whichever of the two is the highest.

<table>
<thead>
<tr>
<th>Gas Temperature Class</th>
<th>Process fluid temperature</th>
<th>Ambient temperature (T_{ambX})</th>
</tr>
</thead>
<tbody>
<tr>
<td>T85°C (T6)</td>
<td>0°C ≤ +68°C</td>
<td>0°C ≤ +68°C</td>
</tr>
<tr>
<td>T100°C (T5)</td>
<td>0°C ≤ +80°C</td>
<td>0°C ≤ +80°C</td>
</tr>
<tr>
<td>T135°C (T4)</td>
<td>0°C ≤ +108°C</td>
<td>0°C ≤ +108°C</td>
</tr>
<tr>
<td>T175°C</td>
<td>0°C ≤ +140°C</td>
<td>0°C ≤ +140°C</td>
</tr>
</tbody>
</table>

Example of gas class determination

Process fluid temperature is 67°C and ambient temperature is 75°C.

Gas class = T5

ATEX/IECEx marking on the equipment:

II 1G Ex h IIIC T85°C…T175°C Ga
II 1D Ex h IIIIC T85°C…T140°C Da

3.7 Quality system

The Alfa Laval Toftejorg TJ40G is designed to be best-in-class on hygienic design using recognised principles of hygienic design wherever feasible. It is produced according to Alfa Laval Kolding’s ISO-9001 international Standard certified quality system. All parts are made from certified material and all non-metal parts are made from FDA and EU 10/2011 complaint materials.
4.1 General description

The Alfa Laval Toftejorg TJ40G is a media driven and media lubricated tank cleaning machine. No lubricating substances such as oil, grease etc. are used. All materials are selected for contact with food, and the machine is self-cleaning i.e. all internal and external surfaces are cleaned during normal operation.

For use in explosive hazard zones the ATEX/IECEx version can be used, provided it is installed according to safety instructions in local regulations.

4.2 Functioning

The flow of cleaning fluid into the machine passes through a turbine, which accordingly is set into rotation. Through a gear set, the turbine rotation is transmitted to the cleaner head.

The combined motion of the machine body and the nozzles ensures a fully indexed tank cleaning coverage. After 5 5/8 revolutions of the hub cover with nozzles (5 3/8 revolutions of the machine body), one coarse cleaning pattern is laid out on the tank surface and the first cycle has been made. During the following cycles, this pattern is repeated 7 times, each of which is displaced, and the pattern gradually becomes more dense. Finally, after 8 cycles - a total of 45 revolutions of the hub cover with nozzles (43 revolutions of the machine body), a complete cleaning pattern has been laid out, and the first pattern is repeated (figure 1).

![Figure 1: Build up of pattern for cylindrical tank with the machine placed in the centre](image)

The number of cycles needed to perform a proper cleaning depends on type of soilage, position of the tank cleaning machine, cleaning procedure, cleaning temperature and cleaning agent.

For substances that are easily mobilised, i.e. are easy to remove, one cycle could be sufficient while in cases of more heavy soilage (high viscous, sticky substances, etc.) a more dense pattern (more cycles) are needed.

The rotation speed of the turbine depends on the flow rate through the machine. The higher the flow rate, the higher the speed of rotation. In order to control the RPM of the machine for a wide range of flow rates, the machine has different turbines according to the nozzle size.
Apart from the main flow flushing the gear and the hub, and thereafter forming the jets through the nozzles, fluid is flushed through all internal areas, through bevel gear, ball bearings and gaps between moving parts and finally also used for cleaning of the outside surfaces of the machine. In the bottom of the body, a drain hole is present to ensure self-draining. This self-draining is only ensured, if the machine is installed in upright position.

The cone is cleaned from the patent pending design of the hub; this is by impact and sheeting action.

The threaded connection between downpipe and machine is not a product contact surface as it is enclosed using two seals and the welding adaptor. If needed, a welding adaptor, depending on downpipe dimensions, must be ordered separately (see page 35ff).

For all versions:
For devices with tapered thread connections to the down pipe, it is recommended that you secure the connection in a manner appropriate for the application. Subject to the intended use environment and any inhouse user requirements or policies, an adhesive such as Loctite No. 2046 or equivalent could be used. Other methods could be acceptable and subject to customer preference.
4.3 General safety and installation instructions

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

Upon arrival check that the machine is in operating condition using an 8 mm socket wrench on the turbine shaft and easily turn the turbine shaft anti-clockwise. If resistance is recognized, disassembled the machine to localize the cause.

**NOTE**

Do not try to turn the hub with hub nozzles by hand, since this may damage the gear. The hub with nozzles can be turned by blowing compressed air through the inlet connection or using a socket wrench on top of the turbine shaft.

Before connecting the machine to the system, all supply lines and valves should be flushed for removal of foreign particles.

The tank cleaning machine should be installed in vertical position (upright or upside down). The installation and operation shall be made so that the self-draining of the machine is ensured.

The machine should be screwed tightly onto the supply line using a 65 mm flat jawed spanner (tool No. TE81B147) on the flats, machined on the inlet cone. Subject to the environment of intended use and any in-house user requirements or policies adhesives such as Loctite no. 2046 could be used to prevent the connection from loosening due to excessive vibration in the system.

In order to separate the CIP system from the process it is recommended to install a shutoff valve close to the machine inlet. This also prevents back-flow of liquid from the tank through the machine in case the machine is submerged and there is an over-pressure inside the tank.

It is recommended that the fluid valve fitted is of a type that prevents hydraulic shocks. Hydraulic shocks may cause severe damage to the machine and/or the entire installation. Ideally, use a frequency controlled pump with a ramp function for start-up to supply the cleaning liquid.

Larger particles may get trapped in the nozzles, while smaller particles may be get trapped in the smaller clearances of the machine and increase wear. Magnitude of the issues relies on the particle shape and properties (e.g. soft vs. hard). Experience shows that Alfa Laval tank cleaning machines may operate with strainer sizes larger than recommended below. Contact your local Alfa Laval office for support.

For low amounts of particles in the recirculating CIP liquid larger particles should be avoided and in this case a 3 mm strainer may be sufficient for a reliable operation.

For high amounts of particles in the recirculating CIP liquid it is recommended to install a strainer according to the smallest clearance in the machines. For the TJ40G a strainer of 0.1 mm is recommended and for the TJ40G-HD a strainer of 1 mm is recommended.

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

**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.

For information on use in potential explosive atmospheres see paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification page 14
4.4 Specific conditions for safe use in accordance with ATEX/IECEEx certification

Directive 2014/34/EU

NOTE
Explosion protection type is constructional safety “c”.

Warning: Temperature class and ambient temperature range
The temperature class and ambient temperature range are shown in paragraph 3.6 ATEX/IECEEx temperature class and code, page 10.

Warning: Surface temperature
The maximum surface temperature depends mainly on operations conditions which is the temperature of the process fluid and ambient temperature, see paragraph 3.6 ATEX/IECEEx temperature class and code, page 10.

Warning: Draining using compressed air
Draining using compressed air must not be done in ex classified zone.
Draining using compressed air is possible in non ex classified zones (see page 16).

Warning: Earthing
All metal and other conductive or dissipative material should be connected to earth with the exception of very small items.

Warning: Steaming tanks greater than 100 m³
Tanks with capacities greater than 100 m³ that could contain a flammable atmosphere should not be steam cleaned, as steam cleaning tanks produces an electrostatically charged mist. Tanks smaller than 100 m³ may be steam cleaned. For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 7.10 and 8.5.

Warning: Earthed when in use
The unit must be effectively earthed at all times when in use.

Warning: Process earthed electrostatic
The user must address the electrostatic hazards generated from the process of the equipment in accordance with guidance document IEC/TS 60079-32-1:2013.
4 Installation

**Warning:** Electrostatically charged liquid

Liquids can become electrostatically charged when they move relative to contacting solids or the spraying of liquids can also create a highly charged mist or spray. The cleaning solvent must be made electrically conductive by additives or otherwise.

For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance. With focus on clause 7.1.3, 7.1.4, 7.2.1, 7.2.4.

**NOTE**

The tank cleaning machine has been certified by accredited notified body and can operate in tanks having an enclosed volume up to 100 m³ as long as all ATEX warnings in the instruction manual are complied with.

**General guidelines for tanks larger than 100 m³:**

Tanks larger than 100 m³ must not be steam cleaned – See guide IEC/TS 60079-32-1:2013 clause 8.5.

To use the unit in tanks larger than 100 m³ is possible under certain conditions.

It is necessary to know the current factors such as tank size, cleaning solvent and product. Additives can be used in the cleaning solvent, or, for example, the tank can be filled with nitrogen. The basic guidelines are described in the guide IEC/TS 60079-32-1:2013.

It must be ensured that the equipotential bonding of all conductive metal objects is in accordance with national regulations for use.


- **High conductivity** > 10 000 pS/m
- **Medium conductivity** between 25 × εₚ pS/m and 10 000 pS/m
- **Low conductivity** < 25 × εₚ pS/m

For liquids with a dielectric constant of around 2, (e.g. hydrocarbons), these classifications reduce to:

- **High conductivity** > 10 000 pS/m
- **Medium conductivity** between 50 pS/m and 10 000 pS/m
- **Low conductivity** < 50 pS/m

Following a guidance document such as IEC/TS 60079-32-1:2013 to establish safe use of machinery and process is the users own responsibility and is not covered by the ATEX/IECEx certification for this unit except for tanks up to 100 m³. For further information see IEC/TS 60079-32-1:2013 Explosive atmospheres – Part 32-1: Electrostatic hazards, guidance with focus on clause 7.1.3, 7.1.4, 7.2.1, 7.2.4.

**Warning:** Appropriate cleaning fluid

The cleaning fluid should be appropriate for the application (e.g. so no chemical reaction can take place between the cleaning fluid and the residue of process fluid/compound which can generate heat).

**Warning:** Fluid pressure

The maximum permitted process fluid pressure is 12 bar.

In addition to the above mentioned precautions relating to Directive 2014/34/EU, the Safety Precautions on page 13 must be observed.
## 5 Operation

### 5.1 Normal operation

<table>
<thead>
<tr>
<th>Cleaning Media</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use only media compatible with Stainless Steel AISI 316, SAF 2205, PEEK, PFA HP and EPDM. Normal detergents, moderate solutions of acids and alkalics are acceptable. Aggressive chemicals, excessive concentrations of chemicals at elevated temperatures, as well as certain hypochlorids should be avoided. If in doubt, contact your local Alfa Laval sales office.</td>
</tr>
</tbody>
</table>

**NOTE**

Do not try to turn the hub with nozzles by hand, since this may damage the gear. The hub with nozzles can be turned by blowing compressed air through the inlet connection or by using a socket wrench on top of the turbine shaft.

PEEK is not resistant to concentrated sulphuric acid.

<table>
<thead>
<tr>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>In cases where the machine is submerged in, or in other ways exposed to, product the compatibility between stainless steel AISI 316, SAF 2205, PEEK, PFA HP and EPDM and the product must be considered carefully.</td>
</tr>
</tbody>
</table>

**NOTE**

EPDM swells significantly exposed to fatty materials.

<table>
<thead>
<tr>
<th>Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoid hydraulic shocks. Increase pressure gradually. Do not exceed 12 bar inlet pressure. Recommended inlet pressure: 5-7 bar. High pressure in combination with high flow rate increase consumption of wear parts. High pressure also reduces the cleaning effect.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Draining using compressed air</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the machine is drained using compressed air, then the compressed air pressure must not cause the machine body rotation to exceed 4.5 rpm (corresponding to appx. 13 sec pr. rev of the body) in order to avoid risk of machine breakdown. Draining should always be done inside the tank. See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 14).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Steam cleaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>If stream cleaning is done through the machine, the steam pressure must not cause the machine body rotation to exceed 10 rpm (corresponding to appx. 6 sec pr. rev of the body) in order to avoid risk of machine breakdown. See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 14).</td>
</tr>
</tbody>
</table>
5 Operation

### Temperature

The maximum recommended process liquid temperature is 95°C. The maximum recommended steam temperature is 140°C. The maximum ambient temperature is 140°C.

See paragraph 4.4 Specific conditions for safe use in accordance with ATEX/IECEx certification (page 14).

### After use cleaning

After use flush the machine with fresh water. Cleaning media should never allow to dry or settle 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.

5.2 Safety precautions

The machine is intended for use inside a tank only. As peak velocity of main jets reaches 40 m/s, The Alfa Laval Toftejorg TJ40G 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:** Tanks may contain poisonous/hazardous products or products which represent an environmental or safety risk. Never open tank and dismount the machine without checking previous tank contents and necessary precautions.

See also 3.6 ATEX/IECEx temperature class and code, page 10.
6 Maintenance

6.1 Preventive maintenance

Following the Alfa Laval Preventive Maintenance Guidelines and using the Alfa Laval Service Kits ensures the availability of your equipment at all times and enables you to plan your operating budget and your downtime. The risk of unscheduled breakdowns due to component failure is virtually eliminated and in the long term your operating costs are reduced.

Alfa Laval Tank Cleaning Equipment Service Kits contain all you need. They comprise genuine, traceable Alfa Laval spare parts, manufactured to the original specifications.

The recommended preventive maintenance program is based on tank cleaning machines working in average conditions. However, a tank cleaning machine, exposed to heavy soiling and recirculation CIP liquid containing abrasives and/or particulates (see section 4.3 General safety and installation instructions for strainer recommendations), needs more frequent attention than one exposed to light/no soiling and recirculation with ordinary CIP liquid. Alfa Laval Kolding A/S recommends that you adjust the maintenance program to suit the cleaning task in hand. Contact your local Alfa Laval sales office for discussion.

For further information regarding Alfa Laval Service Kits and service intervals, see paragraph 6.3 Maintenance Intervals and service Kits on page 19 of this manual or the Spare Parts Manual.

NOTE

Handle the Alfa Laval Toftejorg machine with care. Take proper action to protect surfaces from being damaged.

Always use only proper tools and the Alfa Laval Toftejorg TJ40G standard tool kit (page 20). Never use force, hammer or pry components together or apart. Always perform all assembly/disassembly steps in the order described in this manual.

Clean all surfaces prior to assembling. Especially take care of the mating surfaces. Work in a clear well-lighted work area.

According to “Regulation (EC) No 1935/2004 - Article 17” effective from 27th of October 2006, producers of food shall ensure traceability of the materials and articles intended to come into contact with foodstuffs. It is recommended that a traceability system is setup for replacement of wear parts and spare parts. This makes it possible to identify into which machine a given wear part or spare part has been inserted.

6.2 Service and repair of ATEX/IECEX certified machines

All service and repair of ATEX/IECEX certified machines can be performed by Alfa Laval Kolding A/S, Denmark, or by an Alfa Laval service center approved by Alfa Laval Kolding A/S.

Changes to the machine are not allowed without approval by the person responsible for the ATEX/IECEX certification at Alfa Laval. If changes are made – or spare parts other than Alfa Laval original spare parts are used - the EC Type Examination certification (the ATEX/IECEX Directive) is no longer valid.

Warning: In order to ensure compliance with the ATEX/IECEX regulations and keep the machine ATEX/IECEX certification valid the service or repair must be performed by an authorized person with knowledge of the ATEX/IECEX requirements and regulations. All spare parts must be original Alfa Laval spare parts and the repair or service must be done according to the instructions in the related manual. If a customer wishes to carry out service or repair himself, it is the responsibility of the repair shop to ensure that the ATEX/IECEX requirements are met in any way possible. After performing service or repair, the repair shop thus carries the full responsibility for traceability of all relevant documents in order to ensuring the retention of the ATEX/IECEX certification of the machine.
6.3 Maintenance Intervals and service Kits

It is recommended that the wear parts are checked every 500 working hours for machine working under normal conditions. There are Minor and Major service kits for the Alfa Laval Toftejorg TJ40G (see parts lists and drawings page 38 ff).

**Service intervals**

<table>
<thead>
<tr>
<th>500 hour</th>
<th>500 hour</th>
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<tr>
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<td>Minor Service Kit: 96900031XX or 96900031XX</td>
<td>Minor Service Kit: 96900031XX</td>
</tr>
</tbody>
</table>

**Every 500 working hours**

- (##) refers to position numbers on page 38.
- 1. Disassemble machine as described on the following pages.
- 2. Clean material build-up and deposits from internal parts with Scotch-brite, S-Ultra-fine, eventually chemical media and fine abrasive cloth.
- 3. Check bearing for body (9) for wear. If the hole is worn oval to a max. diameter of more than 10.4 mm, it should be replaced.
- 4. Check bearing for turbine shaft top (26) in cone. If hole is worn oval to a max. diameter of more than 10.4 mm, Bearing should be replaced. If the bearing is loose in a horizontal direction, the bearing should be replaced.
- 5. Check planet gear carrier bearing (17). If worn oval to a max. diameter of more than 15.3 mm, it should be replaced.

**Note:** Timely replacement of bearings prevents costly damage to the gearbox.

- 6. Check gear wheels (15 and 16). They must rotate easily on the shafts. If restriction or too much clearance on shafts is felt, planet wheels should be dismounted for inspection of bearing surfaces and shafts for planet wheel (14). Max diameter of holes: 6.8 mm. Check tooth wear. **If replacement is necessary, planet wheels must be replaced as a pair.**
- 7. Check unrestricted rotation of ball bearings. Inspect for build-up of foreign material on stem nut (12) and hub nut (6), in ball retainers (5) and ball races (4).
- 8. Inspect the nozzle vanes (28) for foreign objects (e.g. product pulp, threads, etc.) and if necessary clean with care – damaging nozzles (or fouled nozzles) decrease the throw length of the machine. Clean using compressed air or tweezers.
- 9. Replace gaskets if damaged.
- 10. Check if ball races (5) on stem and hub (3) as well as stem/hub nut w. ball race (12 and 6): If heavily worn, they should be replaced. Also the ball retainer w. balls (5) should be replaced if heavily worn.
- 11. Assemble machine as described in the following pages.
- 12. Check that the hub (3) is not stuck on hub nut - it should be possible to shift hub (3) a little both clockwise and anticlockwise.
- 13. Check that the machine is in operating condition by using a socket wrench (8 mm) on top of turbine shaft, and easily turn turbine shaft anticlockwise. If resistance is recognised, disassembled machine in order to localise the cause.

Apart from the parts specifically mentioned above, all the remaining wear parts should regularly be inspected for wear. Which parts that are wear parts appear from the Spare Part Manual, available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.
6 Maintenance

6.4 General assembly/disassembly recommendations

- Always read the instruction and maintenance manuals carefully before service.
- Always replace all parts included in the Service Kit.
- Prior to assembly/disassembly clean all tools and fixtures to ensure that scratches and marks and trace of soil/corrosion from tools are avoided.
- Do not scratch or damage the surfaces of the machine.
  - Always place components on soft material

Check surfaces for product residues and clean all parts before assembly. Assembly of the machine is described on the following pages.

6.5 Disassembly tools

**Disassembly tools needed for maintenance and repair**
(For toolkit see page 42).

- Caliper
- Fork key NV65
- Fork key NV24
- Pin punch ø8 mm
- Extended socket wrench ø8 mm
- Torque wrench
- Support ring (only for changing ball races) - e.g. a piece of pipe with an inner diameter of ø67 - ø80
- Bench vice (large enough to secure the body of the TJ40G)
- Rubber hammer

**Special tool needed for disassembly turbine assembly**
- Fixture for impeller

**Standard toolkit**
- Item no. TE81B149 (see page 42)
6.6 Disassembly instructions

Warning: During disassembly and assembly the threads can gall. If any resistance is felt when screwing/unscrewing parts, proceed with caution.

(#) refers to position numbers on page 38.

Step 1
Remove the four nozzles (27) using fork key NV24.
  a. If damaged remove O-rings (29) from nozzles (27).

Step 2
Fasten the machine in a bench vice using the surfaces where the nozzles (27) are attached to the machine.

Step 3
Using a socket wrench (ø8 mm) on the top of the turbine to rotate the turbine shaft until the machine is more-or-less in vertical position (by hand support the body (1) of the machine to aid the rotation).

Step 4
If damaged remove gasket (30) from inside the cone (24).

Step 5
Loosen and remove cone (24) using fork key NV65.

Step 6
Remove guide (25), turbine assembly and planet gear assembly. NB: guide maybe inside cone when removing the cone.
  a. If damaged remove O-ring (22) from the guide.
  b. If worn too much remove bearing (26) from guide using drift punch.
  c. If worn too much or if gear wheels (15 and 16) need to be inspected remove bushing (17) from planet gear frame (13).
     i. Remove gear wheels (15 and 16) from planet gear frame (13).
  d. If O-rings (20) on turbine assembly needs replacement disassemble it.
     i: Mount fixture (TE20J591) in bench vise.
     ii: Insert impeller shaft (18) end of assembly into fixture (TE20J591).
     iii: Loosen shaft end (21) of assembly using socket wrench (ø8 mm).
     iv: Remove impeller (19).
     v: Remove O-ring (20) from impeller (19).

Step 7
Remove O-ring (22) from stem (11).

Step 8
Remove O-ring (23) from stem (11).

Step 9
Loosen stem nut (12) using caliper. If needed use rubber hammer on caliper.
6 Maintenance

Step 10
Remove stem (11) along with ball retainer w. balls (5) and stem nut (12) from the machine.
   a. Remove stem nut (12) from stem (11).
   b. Remove ball retainer w. balls (5) from stem (11).
   c. If worn remove ball race (4) from stem (11) using pin punch to pry it loose.

Step 11
Loosen the 3 screws (10) attaching the gear ring (7) to the machine.

Step 12
Remove the gear ring (7).
   a. If worn too much remove bearing (9) from gear ring (7) using pin punch.

Step 13
Remove the machine from the bench vise.

Step 14
Hold body (1) against table and loosen hub nut (6) using caliper. If needed use rubber hammer on caliper.

   Note: Left-hand thread

   NB: Body (1) can also be fixed in bench vise, but care should be taken a) not to damage the outside surface roughness and b) not apply too much pressure from the jaws to the body (1) as this can deform the body.

Step 15
Remove hub (3) along with ball retainer w. balls (5) and hub nut (6) from the machine.
   a. Remove O-ring (2) from body (1).
   b. Remove hub nut (6) from hub (3).
   c. Remove ball retainer w. balls (5) from hub (3).
   d. If worn remove ball race (4) from hub (3) using pin punch to pry it loose.
6 Maintenance

6.7 Assembly instructions

**Warning:** During disassembly and assembly the threads can gall. If any resistance is felt when screwing/unscrewing parts, proceed with caution.

(##) refers to position numbers on page 38.

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

Inspect the nozzle vanes (28) for foreign objects (e.g. product pulp, threads, etc.) and if necessary clean with care - damaging nozzles (or fouled nozzles) decreases the throw length of the machine. Clean using compressed air or tweezers.

**Planet gear assembly (if it has been disassembled)**

**Step 1**
Put gear wheels (15 and 16) on each planet gear shaft (14).

**Note:** The two planet wheels are different: on gear wheel I (15), teeth of upper an lower gearing are aligned, while they are displaced ½ tooth on gear wheel II (16).

**Step 2**
Mount planet gear bushing (17) in top of planet gear frame (13) – eg. use impeller shaft (18) to apply pressure to the planet gear bushing (17).

**Turbine assembly (if it has been disassembled)**

**Step 3**
Insert an O-ring (20) on either side of the impeller (19).

**Step 4**
Mount the impeller with O-rings onto the impeller shaft (18).

**Step 5**
It is recommended to slightly grease the thread with food grade/FDA compliant grease. The grease reduces the risk of galling in threads. The grease is enclosed between O-rings and, therefore, it will no come into contact with the cleaning media.

**Step 6**
Screw the shaft end (21) into the impeller shaft (18). Tighten to metal-to-metal stop (10-12 Nm). Use tool TE20J591 to fixate the impeller shaft (18).

**Guide assembly (if it has been disassembled)**

**Step 7**
Insert bearing for turbine shaft top (26) into the guide (25) and press it in.

**Nozzle assembly (if it has been disassembled)**

**Step 8**
Mount O-ring (29) into O-ring groove just after the threads on the nozzle (27).
6 Maintenance

**Ball race (if replaced during maintenance)**

**Step 9**
Mount ball race (4) on hub (3) using support ring – press together in bench vise.

**Step 10**
Mount ball race (4) on stem (11) using support ring – press together in bench vise.

**Gear ring assembly (if it has been disassembled)**

**Step 11**
Mount seal ring (8) in gear ring (7).

**Step 12**
Mount bearing for body (9) on the gear ring (7). Use pin punch between bearing for body (9) and rubber hammer to apply pressure. NB: Ensure bottom of bearing for body (9) is flush with the bottom of the gear ring (7) after insertion.

**Machine assembly**

**Step 13**
Put ball retainer w. balls (5) around hub (3).

**Step 14**
Mount O-ring (2) over body (1).

**Step 15**
Put hub nut (6) around hub (3).

**Step 16**
Mount the hub (3) (with ball retainer and hub nut) into the hub part of the body (1). After screwing in the hub nut (6) almost all the way (left hand thread), move the O-ring (2) from around the body (1) into the O-ring groove on the body (1). Tighten the hub nut (6) to the body (1). NB: make sure O-ring (2) is in the O-ring groove. NB: Wet the surface of the O-ring (2) with water to ease the assembly. Tighten to metal-to-metal stop. **IMPORTANT:** No lubricants and lock tight to be used.

**Step 17**
Mount the hub (3) in bench vise and turn the body (1) so the stem part of the body (1) is upwards.

**Step 18**
Insert gear ring (7) into body (1) and fasten it using the 3 screws for body (10) with a torque of 4.5-5 Nm. **NB:** It may be necessary to rotate the gear ring (7) so the holes fits with the thread holes in the body (1).

**Step 19**
Insert stem (11) into the body (1).

**Step 20**
Place ball retainer w. balls (5) around stem (11).

**Step 21**
Place stem nut (12) around the stem (11) and tighten the stem nut (12) into the body (1) (right hand thread). **IMPORTANT:** No lubricants and lock tight to be used. (It may be necessary to lift the stem (11) a little while turning the stem nut (12).
Step 22
Place O-ring (23) around the stem (11).

Step 23
Insert planet gear assembly into stem (11) and into the gear ring (7). NB: it may be necessary to wiggle the machine a little to get the planet gear assembly to fall in place.

Step 24
Insert O-ring (22) into the O-ring groove on top of the stem (11).

Step 25
Insert impeller assembly into the planet gear assembly – rotate the impeller (19) by hand to ensure that it rotates freely. (By hand support the body (1) of the machine to aid the rotation).

Step 26

Step 27
Insert O-ring (22) into the O-ring groove on top of the guide (25) (right hand thread).

Step 28
It is recommended to slightly grease the thread with food grade/FDA compliant grease. The grease reduces the risk of galling in threads. The grease is enclosed between O-rings and, therefore, it will no come into contact with the cleaning media.

Step 29
Mount the cone (24) over the guide assembly and catch the thread on the stem (11) and tighten the cone (24) on to the stem (11). NB: make sure O-rings are in the O-ring grooves. NB: Wet the surface of the O-rings with water to ease the assembly. Tighten to metal-to-metal stop.

Step 30
Insert gasket (30) into top part of cone (24).

Step 31
Remove the assembly from the bench vise.

Step 32
Mount nozzle w. gaskets (27) into the hub (3). NB: Make sure O-rings are in the O-ring grooves. E.g. use a finger to push O-ring in guide back in place while fastening the cone. NB: Wet the surface of the O-rings with water to ease the assembly. Tighten to metal-to-metal stop – torque of 70 Nm. IMPORTANT: No lubricants and lock tight to be used.

After reassembly check if the turbine rotates freely using an 8 mm socket wrench at the top of the turbine and turn it anticlockwise, while holding the machine by the cone. The hub with nozzles should rotate very slowly.
### 7 Trouble shooting guide

#### Symptom: Slow rotation or failure of the machine to rotate:

<table>
<thead>
<tr>
<th>Possible Causes</th>
<th>Fault finding</th>
</tr>
</thead>
</table>
| **No or insufficient liquid flow**           | a). Check if supply valve is fully open.  
   b). Check if inlet pressure to machine is correct.  
   c). Check supply line/filter for restrictions/clogging.  
   d). Remove nozzles and check for clogging. If blocked, carefully clean nozzle without damaging nozzle vanes and nozzle tip.  
   e). Remove cone (see page 21) and check for clogging in guide and impeller area.  
   If large particles repeatedly get jammed in the machine, install filter or reduce mesh size of installed filter (1 mm) in supply line or contact Alfa Laval for other solutions.|

#### Foreign material or material build-up

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>a). Impeller jammed</td>
<td>Insert socket wrench on top of turbine shaft and easily turn turbine shaft anticlockwise. If any resistance is recognised, disassemble machine to localise cause.</td>
</tr>
<tr>
<td>b). Turbine shaft sluggish in bearing</td>
<td>Remove turbine shaft assembly and planet gear assembly (see page 21) and remove foreign material.</td>
</tr>
<tr>
<td>c). Planet gear jammed/sluggish</td>
<td>Remove foreign material from planet wheels and internal gears. Check rotation of planet wheels. If restriction is recognised, disassemble planet gear assembly (see page 21) and remove material build up, especially on shafts and bushes in planet wheels.</td>
</tr>
<tr>
<td>d). Stem or hub jammed/sluggish</td>
<td>Remove planet gear assembly (see page 21). Turn hub and check unrestricted rotation. Remove stem and hub (see page 21 ff). Remove foreign material/mate-rial build-up on stem, hub and inside nut. Clean Ball races and ball retainer with balls. Assemble stem/hub, ball retainer with balls and stem/hub nut.</td>
</tr>
<tr>
<td>e). Bevel gears jammed</td>
<td>Remove stem and hub (see page 21 ff). Clean teeth on stem and hub.</td>
</tr>
</tbody>
</table>

#### Wear

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>d). Shafts for planet wheels</td>
<td>Check clearance of planet wheels on shafts. Transverse movement should not exceed 0.3 mm.</td>
</tr>
<tr>
<td>e). Turbine shaft</td>
<td>Check clearance in planet gear bearing and bearing for turbine shaft. Transverse movement should not exceed 0.3 mm. Also inspect teeth for wear.</td>
</tr>
</tbody>
</table>

#### Mechanical defects

<table>
<thead>
<tr>
<th>Item</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>b). Planet wheel can not rotate on shafts/shafts bent</td>
<td>Replace planet gear frame.</td>
</tr>
<tr>
<td>c). Damaged teeth on bevel gear</td>
<td>Inspect teeth on stem and hub for deformation. Mount hub and stem in body (See page 23). Hold body in upside down position and rotate hub to check that bevel gears can work together. If damaged: Replace stem and/or hub.</td>
</tr>
<tr>
<td>d). Damage on stem and hub-nut</td>
<td>If hard particles get stuck between stem nut and stem or hub nut and hub, the particles will damage the parts. The damaged parts should be replaced.</td>
</tr>
</tbody>
</table>
Weight of machine: 6.3 kg (13.9 lb) 6.7 kg (14.8 lb) including welding adapter
Recommended inlet pressure: 5-7 bar (70-100 psi) 12 bar (174 psi)
Max. inlet pressure: 12 bar (174 psi)
Max. recommended working liquid temperature: 95°C (200°F) 140°C (284°F)
Max. recommended working steam temperature: 140°C (284°F) when not operated
Ambient temperature: 140°C (284°F) when not operated
Materials: Stainless Steel AISI 316, SAF 2205, PFA HP, PEEK, EPDM
Max. permitted process fluid pressure: 12 bar.

Minimum required passage: Tilted ~30°: Ø167 mm (6.6 inch). Otherwise Ø187 mm (7.4 inch).
8 Technical data

TJ40G

8.1 Performance data for TJ40G

Article numbers 96900003XX (TJ40G)
Article numbers 96900003XX (TJ40G)

**Note:** Throw lengths are measured as horizontal throw length at static condition. Vertical throw length upwards is approx. 1/3 less. Throw lengths are defined and measured as given in Alfa Laval Technical Specification 93P003. 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.
8 Technical data

TJ40G

Article numbers 96900003XX (TJ40G)

Cleaning time for complete pattern (= 8 cycles)

Cleaning time for complete pattern (= 8 cycles)

<table>
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<tr>
<th>Nozzles mm</th>
<th>psi</th>
<th>bar</th>
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</table>

Inlet pressure

0 1 2 3 4 5 6 7 8 9 10 11 12 bar
0 2.5 5 7.5 10 12.5 15 17.5 20 22.5 25 27.5 30 psi
8.2 Performance data for TJ40G-HD

Article numbers 96900002XX (TJ40G-HD)
Technical data

TJ40G

Article numbers 96900002XX (TJ40G-HD)

Note: Throw lengths are measured as horizontal throw length at static condition. Vertical throw length upwards is approx. 1/3 less. Throw lengths are defined and measured as given in Alfa Laval Technical Specification 93P003. 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.
Article numbers 96900002XX (TJ40G-HD)

Cleaning time for complete pattern (= 8 cycles)

Inlet pressure
# 9 Product programme

This manual covers the product program for Alfa Laval Toftejorg TJ40G tank cleaning machine

## 9.1 Standard Configurations

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<th>Standard Item number</th>
<th>Heavy Duty (HD) Item number</th>
<th>Documentation Q-Doc ATEX/IECEEx</th>
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## 9.2 Available Add-ons

**Explanation to Add-ons**

**Q-doc**

( Equipment Documentation)

**ATEX/IECEEx**

ATEX/IECEEx includes:

- ATEX/IECEEx certified machine for use in explosive atmospheres. Category 1 for installation in zone 0/20 in accordance with directive 2014/34/EU.
- II 1G Ex h IIC T85°C…T175°C Ga
- II 1D Ex h IIIC T85°C…T140°C Da

Equipment Documentation includes:

- EN 1935/2004 DoC
- EN 10204 type 3.1 inspection Certificate and DoC
- FDA DoC
- GMP EC 2023/2006 DoC
- EU 10/2011 DoC
- ADI DoC
- QC DoC
9.3 Available add-ons for spare parts

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-doc</td>
<td>Q-doc including</td>
</tr>
<tr>
<td>9690003102</td>
<td>- EN 1935/2004 DoC</td>
</tr>
<tr>
<td>or</td>
<td>- EN 10204 type 3.1 inspection Certificate and DoC</td>
</tr>
<tr>
<td>9690006202</td>
<td>- FDA DoC</td>
</tr>
<tr>
<td>or</td>
<td>- GMP EC 2023/2006 DoC</td>
</tr>
<tr>
<td>9690006502</td>
<td>- EU 10/2011 DoC</td>
</tr>
<tr>
<td></td>
<td>- ADI DoC</td>
</tr>
<tr>
<td></td>
<td>- QC DoC</td>
</tr>
</tbody>
</table>

9.4 Available welding and thread adaptors

Welding adapter (see right) with sealing assembly between down pipe, welding adapter and machine. Welding connections are ordered separately. For use with sanitary connection cones use cone with seal (seals are included for machines with sanitary cone).

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Down pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>9690006601</td>
<td>2&quot; ISO pipe</td>
</tr>
<tr>
<td>9690006602</td>
<td>DN50R2</td>
</tr>
<tr>
<td>9690006603</td>
<td>2½&quot; Dairy pipe</td>
</tr>
<tr>
<td>9690006604</td>
<td>2&quot; NPT (male)</td>
</tr>
<tr>
<td>9690006605</td>
<td>DN50R2</td>
</tr>
<tr>
<td>9690006606</td>
<td>DN40R1</td>
</tr>
<tr>
<td>9690006607</td>
<td>2&quot; Dairy pipe</td>
</tr>
<tr>
<td>9690006608</td>
<td>1½&quot; ISO pipe</td>
</tr>
<tr>
<td>9690006609</td>
<td>1½&quot; NPT (male)</td>
</tr>
<tr>
<td>9690006610</td>
<td>1½&quot; ISO (male)</td>
</tr>
<tr>
<td>9690006611</td>
<td>1½&quot; ISO (female)</td>
</tr>
<tr>
<td>9690006612</td>
<td>2&quot; ISO (female)</td>
</tr>
<tr>
<td>9690006613</td>
<td>1½&quot; NPT (female)</td>
</tr>
<tr>
<td>9690006614</td>
<td>2&quot; NPT (female)</td>
</tr>
</tbody>
</table>

* Includes gaskets for sanitary installation
** Either Dimension or existing thread on pipe
## 9 Product programme

This manual covers the product program for Alfa Laval Toftejorg TJ40G tank cleaning machine

### 9.5 Overview of guide and turbine combinations - all nozzle sizes

<table>
<thead>
<tr>
<th>Nozzle size</th>
<th>4x Ø6, fast</th>
<th>4x Ø6</th>
<th>4x Ø6.6</th>
<th>4x Ø7.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide</td>
<td><img src="image1" alt="Guide Image" /></td>
<td><img src="image2" alt="Guide Image" /></td>
<td><img src="image3" alt="Guide Image" /></td>
<td><img src="image4" alt="Guide Image" /></td>
</tr>
<tr>
<td></td>
<td>9690-0044-01</td>
<td>9690-0043-01</td>
<td>9690-0043-01</td>
<td>9690-0043-01</td>
</tr>
<tr>
<td></td>
<td>9690-0050-01</td>
<td>9690-0049-01</td>
<td>9690-0049-01</td>
<td>9690-0049-01</td>
</tr>
<tr>
<td>Turbine</td>
<td><img src="image5" alt="Turbine Image" /></td>
<td><img src="image6" alt="Turbine Image" /></td>
<td><img src="image7" alt="Turbine Image" /></td>
<td><img src="image8" alt="Turbine Image" /></td>
</tr>
<tr>
<td></td>
<td>9690-0028-01</td>
<td>9690-0030-01</td>
<td>9690-0028-01</td>
<td>9690-0026-01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nozzle size</th>
<th>4x Ø8.1</th>
<th>4x Ø9</th>
<th>4x Ø10</th>
<th>4x Ø11.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide</td>
<td><img src="image9" alt="Guide Image" /></td>
<td><img src="image10" alt="Guide Image" /></td>
<td><img src="image11" alt="Guide Image" /></td>
<td><img src="image12" alt="Guide Image" /></td>
</tr>
<tr>
<td></td>
<td>9690-0041-01</td>
<td>9690-0039-01</td>
<td>9690-0039-01</td>
<td>9690-0039-01</td>
</tr>
<tr>
<td></td>
<td>9690-0047-01</td>
<td>9690-0045-01</td>
<td>9690-0045-01</td>
<td>9690-0045-01</td>
</tr>
<tr>
<td>Turbine</td>
<td><img src="image13" alt="Turbine Image" /></td>
<td><img src="image14" alt="Turbine Image" /></td>
<td><img src="image15" alt="Turbine Image" /></td>
<td><img src="image16" alt="Turbine Image" /></td>
</tr>
<tr>
<td></td>
<td>9690-0028-01</td>
<td>9690-0028-01</td>
<td>9690-0027-01</td>
<td>9690-0026-01</td>
</tr>
</tbody>
</table>
# Product programme

This manual covers the product program for Alfa Laval Toftejorg TJ40G tank cleaning machine.

<table>
<thead>
<tr>
<th>Nozzle size</th>
<th>2x Ø6, fast</th>
<th>2x Ø6</th>
<th>2x Ø6.6</th>
<th>2x Ø7.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbine</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nozzle size</th>
<th>2x Ø8.1</th>
<th>2x Ø9</th>
<th>2x Ø10</th>
<th>2x Ø11.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guide</td>
<td></td>
<td></td>
<td>9690-0040-01</td>
<td>9690-0046-01</td>
</tr>
<tr>
<td>Turbine</td>
<td></td>
<td></td>
<td>9690-0027-01</td>
<td></td>
</tr>
</tbody>
</table>
10 Parts drawing, parts lists, service kits and tools

TJ40G

10.1 Alfa Laval Toftejorg TJ40G
## Parts list

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Body</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Hub</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Ball race</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Ball retainer w. balls</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Hub nut</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Gear ring</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>Seal ring</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Bearing f. body</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>Screw f. body</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Stem</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Stern nut</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>Gear frame</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>Shaft f. planet gear</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>Gear wheel I</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>Gear wheel II</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>Bushing f. planet gear</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>Impeller shaft</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>Impeller</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>O-ring</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>Shaft end</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>O-ring</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>Cone</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>Guide</td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>Bearing f. turbine top</td>
</tr>
<tr>
<td>27.1</td>
<td>4/2</td>
<td>Nozzle</td>
</tr>
<tr>
<td>27.2</td>
<td>0/2</td>
<td>Blind cap</td>
</tr>
<tr>
<td>28</td>
<td>20/10</td>
<td>Nozzle vane</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>O-ring</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>Gasket f. cone - inside</td>
</tr>
</tbody>
</table>

*Note: Position 1 is not sold as single spare part component. Only sold as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.*

Configuration according to delivery note/order.

Parts marked with ◆ are included in the Minor Service Kit for TJ40G: 96900031XX
Parts marked with ○ are included in the Major Service Kit for TJ40G: 96900062XX
Alfa Laval TJ40G/TJ40G-HD tool kit: Item no. TE81B149
See page 34 for more information on available add-ons.
10.2 Alfa Laval Toftejorg TJ40G-HD
## Parts list

<table>
<thead>
<tr>
<th>Pos.</th>
<th>Qty</th>
<th>Denomination</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>Body</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>Hub</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>Ball race</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>Ball retainer w. balls</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Hub nut - HD</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>Gear ring</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>Seal ring</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Bearing f. body</td>
</tr>
<tr>
<td>10</td>
<td>3</td>
<td>Screw f. body</td>
</tr>
<tr>
<td>11</td>
<td>1</td>
<td>Stem</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Stern nut - HD</td>
</tr>
<tr>
<td>13</td>
<td>1</td>
<td>Gear frame</td>
</tr>
<tr>
<td>14</td>
<td>2</td>
<td>Shaft f. planet gear</td>
</tr>
<tr>
<td>15</td>
<td>1</td>
<td>Gear wheel I</td>
</tr>
<tr>
<td>16</td>
<td>1</td>
<td>Gear wheel II</td>
</tr>
<tr>
<td>17</td>
<td>1</td>
<td>Bushing f. planet gear</td>
</tr>
<tr>
<td>18</td>
<td>1</td>
<td>Impeller shaft</td>
</tr>
<tr>
<td>19</td>
<td>1</td>
<td>Impeller</td>
</tr>
<tr>
<td>20</td>
<td>2</td>
<td>O-ring</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>Shaft end</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>O-ring</td>
</tr>
<tr>
<td>23</td>
<td>1</td>
<td>O-ring</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>Cone</td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>Guide</td>
</tr>
<tr>
<td>26</td>
<td>1</td>
<td>Bearing f. turbine top</td>
</tr>
<tr>
<td>27.1</td>
<td>4/2</td>
<td>Nozzle</td>
</tr>
<tr>
<td>27.2</td>
<td>0/2</td>
<td>Blind cap</td>
</tr>
<tr>
<td>28</td>
<td>20/10</td>
<td>Nozzle vane</td>
</tr>
<tr>
<td>29</td>
<td>4</td>
<td>O-ring</td>
</tr>
<tr>
<td>30</td>
<td>1</td>
<td>Gasket f. cone - inside</td>
</tr>
</tbody>
</table>

### Service kits

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Service kits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor service kit</td>
<td>TJ40G-HD ............................................. 9690003101</td>
</tr>
<tr>
<td>Minor service kit</td>
<td>TJ40G-HD - Q-Doc ..................................... 9690003102</td>
</tr>
<tr>
<td>Major service kit</td>
<td>TJ40G-HD ............................................. 9690006501</td>
</tr>
<tr>
<td>Major service kit</td>
<td>TJ40G-HD - Q-Doc ..................................... 9690006502</td>
</tr>
</tbody>
</table>

*Note: Position 1 is not sold as a single spare part component. Only sold as part of a machine maintenance/repair order. For further information please contact Alfa Laval Customer Support.

Configuration according to delivery note/order.

Parts marked with ☑ are included in the Minor Service Kit for TJ40G-HD: 96900031XX
Parts marked with ● are included in the Major Service Kit for TJ40G-HD: 96900065XX

Alfa Laval TJ40G/TJ40G-HD tool kit: Item no. TE81B149

See page 34 for more information on available add-ons.
10  Parts drawing, parts lists, service kits and tools

TJ40G

10.3  Tools

Alfa Laval Toftejorg TJ40G Tool kit
Article number TE81B149

<table>
<thead>
<tr>
<th>Denomination</th>
<th>Qty x tool item number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixture f. Impeller</td>
<td>1 x TE20J591</td>
</tr>
<tr>
<td>5 mm calipers</td>
<td>1 x TE369</td>
</tr>
<tr>
<td>Ring fork key NV24</td>
<td>1 x TE81B140</td>
</tr>
<tr>
<td>NV8 socket long</td>
<td>1 x TE81B157</td>
</tr>
<tr>
<td>Torque wrench 1/4&quot; 5 - 25 Nm</td>
<td>1 x TE81B156</td>
</tr>
<tr>
<td>Pin punch ø8</td>
<td>1 x TE81B148</td>
</tr>
<tr>
<td>Ring fork key NV65</td>
<td>1 x TE81B147</td>
</tr>
</tbody>
</table>
11 General information

11.1 Service and repair

Upon every return of a product, no matter if for modifications or repair, it is necessary to contact your local Alfa Laval office to guarantee a quick execution of your request.

You will receive instructions regarding the return procedure from your local Alfa Laval office. Be sure to follow the instructions closely.

11.2 How to order spare parts

On the parts drawings as well as on all instruction drawings, the individual parts have a position number, which is the same on all drawings. From the position number, the part is easily identified in the parts lists, page 38 ff.

Individual parts should always be ordered from the parts lists, page 38 ff. Item number and denomination should be clearly stated. Please refer to the Spare Part Manual for information on item numbers. The Spare Part manual is available from the on-line Alfa Laval product catalogue Anytime or the Close at hand spare part catalogue.

Please also quote the type of machine and serial number. This will help us to help you. The type and serial numbers are stamped on the body of the tank cleaning machine.

In cases where spare parts are ordered for machines originally delivered with 3.1 certificates, please state this information on your ordering form together with the machine type and serial number. This is to ensure full traceability henceforward.

11.3 How to contact Alfa Laval Kolding A/S

For further information please feel free to contact:

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
Declaration Of Conformity
with
EN 10204, Sub Clause 2.2 Test Report
Materials of Construction and Surface Finishes

Alfa Laval Kolding A/S (supplier)
declare, under our sole responsibility, that the following product:

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfa Laval Tøfähjorn TJ40G Rotary Jet Head</td>
</tr>
</tbody>
</table>

has been subjected to non-specific controls for product quality and are found to conform with the following standards and other normative documents:

**Metal Materials**

<table>
<thead>
<tr>
<th>Steel</th>
<th>Werkstoff No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>AISI 316</td>
<td>1.4401</td>
</tr>
<tr>
<td>AISI 316L</td>
<td>1.4404</td>
</tr>
<tr>
<td>SAP 2205</td>
<td>1.4462</td>
</tr>
</tbody>
</table>

1 of 2

This certificate is delivered in compliance with the latest valid design and construction. Alfa Laval Kolding A/S reserve the right to alter or modify any unit specification without notice or any obligation.

Rev. 1, 20170118
Non-Metal Materials

21 CFR §177.1550 (PTFE)
21 CFR §177.2600 (EPDM)
21 CFR §177.2415 (PEEK)

Surface Finish

All parts are finished with a nominal external roughness Ra = 0.8 μm (30 micro inch).

Non-Specific Controls on Product Quality “As-Supplied”

All metallic part material certifications are inspected upon receipt before assembly.

Parts inspections are completed according to the approved ISO 9001:2008 standard program. The Quality Control Department only accepts the product in component parts for assembly according to this program if the parts comply with the above material specification documentation.

Product welds are executed, inspected and finished (polished where accessible), according to written, approved procedures.

Parts produced from FDA approved polymers are only sourced from suppliers that have met “pre-qualification” standards established by Alfa Laval Kolding’s ISO 9001:2008 program. Materials of construction of component parts are controlled through clear and explicit specifications in purchase orders. These specifications include the materials of construction specified by the parts designers, making them subject to the contractual terms and conditions.

The following item numbers are covered by this certificate:

| 96900002xx |
| 96900003xx |

Copenhagen, Ishoej, on February 14, 2017
For Alfa Laval Kolding A/S

[Signature]

Annie Dahl
Quality Manager
12 Miscellaneous

12.2 Declaration of Complianc with 10/2011 – Food contact materials

Declaration of compliance for food contact materials

Article Nr: 9690-0001-xx
9690-0002-xx
9690-0003-xx
9690-0004-xx

Product TJ40G

We, Alfa Laval Kolding AS, hereby certify that the plastic articles intended to come into contact with products included in the article stated above comply with the Regulation (EC) No. 1935/2004 and the Regulation (EC) No. 10/2011 both in their relevant versions on materials and articles intended to come in contact with food.

Finished articles subject to an overall migration limit of 10 mg/dm² or 60 mg/kg.

The following substances subject to limitations are used in the above stated article.

<table>
<thead>
<tr>
<th>Substance</th>
<th>PEEK 450G</th>
<th>TECAPEEK TF 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diphenylsulfone</td>
<td>3 mg/kg food</td>
<td>-</td>
</tr>
<tr>
<td>1,4-Dihydroxybenzol</td>
<td>0.6 mg/kg food</td>
<td>0.6 mg/kg food</td>
</tr>
<tr>
<td>4,4'-Difluorobenzophenone</td>
<td>0.05 mg/kg food</td>
<td>0.05 mg/kg food</td>
</tr>
<tr>
<td>TFE</td>
<td>-</td>
<td>0.05 mg/kg food</td>
</tr>
<tr>
<td>Substance 3*</td>
<td>-</td>
<td>3 mg/kg food</td>
</tr>
<tr>
<td>Substance 4*</td>
<td>-</td>
<td>0.05 mg/kg food</td>
</tr>
</tbody>
</table>

*) This information is provided only under a non-disclosure agreement for the purpose of conformity testing.

Migration from the plastic articles has been investigated by calculations as laid down in paragraph (32) in Regulation (EC) No. 10/2011, to control that the migration limits and other requirements are fulfilled. The articles can be used within its application area, with all type of foods at batch size above 1,500 kg.

We also certify that the plastic articles intended to come into contact with products included in the article stated above are also entirely in accordance with the present US regulation FDA CFR 21 § 177.

Soborg, 08-11-2016

Henrik Falster-Hansen, R&D Manager
Alfa Laval Kolding A/S

*Based on worst case scenario i.e. all of the free monomer in the plastic migrates to one batch.

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