



Instruction Manual

Alfa Laval GJ 18



Covering:
Standard Machines
First published: 2019-April

Original manual

The information herein is correct at the time of issue but may be subject to change without prior notice.

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1 EC Declaration of Conformity

The designated company

Alfa Laval, Inc.
Company name

604 Jeffers Circle – Exton, PA – 19341, United States
Address

+1 610 408 9940
Phone no.

hereby declare that

Tank Cleaning Machine
Denomination

Alfa Laval GJ 18
Type

From serial numbers SF-0100 to SF-9999

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

- **The Machinery Directive 2006/42/EC**
DS/EN ISO 12100:2011
- **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 person authorised to compile the technical file is the signer of this document.

Executive VP Operations
Title

Andrew Delaney
Name


Signature

2019-04-04
Date

Exton, United States
Place



*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:



Dangerous electrical voltage:



Caustic agents:



2 Safety

All warnings in the manual are summarized on this page.

Pay special attention to the instructions below so that severe personal injury and/or damage to the tank cleaning machine are avoided.

2.3 Safety Precautions

Installation:

Always read the technical data thoroughly. (See chapter 7 Technical Data.)

Any tank cleaning machine can develop a static electric charge while in operation.

If the tank being cleaned contains a combustible liquid or vapor having a risk of ignition or explosion, it is imperative to have the Alfa Laval GJ properly grounded.



Operation:

Always read the technical data thoroughly. (See chapter 7 Technical Data.) Necessary precautions must be taken if leakage occurs as this can lead to hazardous situations.

Always handle lye and acid with great care. When an Alfa Laval GJ is operating, there should be covers over every tank opening.

These covers should be sealed well enough to withstand the full force of the jet striking the cover plate.

If the cleaning solution were hot, corrosive, or toxic, a leak would present a serious hazard to any personnel in the immediate vicinity or to any exposed electrical equipment.

Warning: Any tank-cleaning machine can develop a static electricity charge while in operation. If the tank being cleaned contains a combustible liquid or vapor having a risk of ignition or explosion, it is imperative to have the Alfa Laval GJ properly grounded.



Maintenance:

Always read the technical data thoroughly. (See chapter 7 Technical Data.)

Never service the tank cleaning machine when it is hot.

Always use Alfa Laval genuine spare parts.



Transportation of the tank cleaning machine:

Always drain the tank cleaning machine head and accessories of any liquid.

Always use original packaging or similar during transportation.

3.1 Description

The Alfa Laval GJ 18 is a fluid-driven (turbine-driven) 360° rotary nozzle machine designed for cleaning the interior surfaces of a wide variety of process vessels with a minimum opening of 7.0 inches (177.8 mm) in diameter. It is powered entirely by the cleaning solution and it requires no electricity, compressed air, or lubricant for operation. The Alfa Laval GJ 18 is designed for both portable and CIP (Clean-in-Place) applications. If the Alfa Laval GJ 18 is permanently mounted inside a tank, it is strongly recommended to inspect the unit every few hundred hours of operation. (See chapter 6 Maintenance for more information.)

Warning: In most conditions, the Alfa Laval GJ 18 should not be immersed while left in the tank. It is strongly recommended that you have prior approval from Alfa Laval to ensure that immersion will not harm the machine in any way. Failure to comply with this restriction may void the warranty!

In order to handle the broadest possible range of applications, the stainless steel Alfa Laval GJ 18 is available with an extensive selection of nozzle sizes, stators (non-rotating turbine), and o-ring materials. The nozzles are available in several interchangeable sizes that range from 3/8-inch to 5/8-inch (9.5 mm to 15.9 mm). The Alfa Laval GJ 18 wash cycle time can be adjusted for special applications by changing the guide and/or nozzle size. Interchangeable stators and nozzle sizes are available for either low or high pressures and/or flow rates. The guide performance capabilities of these options are detailed in chapter 7 Technical Data.

3.2 Intended Use

It is to be verified by the end-user:

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

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 will, however, be incorporated in new editions of this Instruction Manual.

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The Alfa Laval logotype is a trademark or the registered trademark of Alfa Laval Corporate AB. "Gamajet" is a trademark or registered trademark of Alfa Laval, Inc. The Alfa Laval Gamajet™ 18 product is patented in the US (US 8,814,061 and US 9,649,668). 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 GJ tank cleaning machines are all marked to allow recognition of machine type, machine name, serial number and manufacturing address. The marking is placed on the body of the tank cleaning machine.

Alfa Laval, Inc. - Exton, PA
Patent #: US 8,814,061; US 9,649,668



4 Installation

Read the instructions carefully and pay special attention to the warnings! Always check the tank cleaning machine before operation.

4.1 Unpacking/Delivery

Step 1

CAUTION

Alfa Laval cannot be held responsible for incorrect unpacking.

Check the delivery for:

1. Complete Cleaning Machine
 2. Delivery Note
-

Step 2

Remove any packing materials.

Step 3

Inspect the tank cleaning machine for visible transport damage.

Inspection!

Read the instructions carefully and pay special attention to the warnings! Always check the tank cleaning machine before operation.

4.2 Installation

Step 1

Always read the technical data thoroughly.
(See chapter 7 Technical Data)



Step 2

Assembly

Every Alfa Laval GJ is operationally tested before shipment and is ready to run after unpacking. No assembly is required prior to use. The Alfa Laval GJ 18 has been configured to meet the operating conditions (at the tank cleaning device, not at the pump) specified at the time of sale, e.g. pressure, flow, temperature, cycle time, chemical adders, etc.

Note: Any change to the original operating conditions will affect the Alfa Laval GJ 18 accordingly.

Warning: Do not manually force the Tee Housing (pos. 24.1) to rotate. Doing so may cause damage to the internal components.



Step 3

Inlet Connections

The standard inlet connection for the Alfa Laval GJ 18 is a 2 ½" NPT female adapter. It is recommended that when connecting the unit to the supply hose thread, the mating male thread should be wrapped with PTFE pipe joint tape prior to mounting. This will minimize any chance of leakage and will make subsequent removal much easier.

Step 4

Mounting

Before mounting the Alfa Laval GJ 18, make sure the supply line has been adequately flushed. It can be mounted on a rigid 2 ½" pipe using a pipe wrench. The Alfa Laval GJ 18 operates most reliably when mounted with the inlet connection pointing up; however, the unit can function in any orientation.

The Alfa Laval GJ 18 can be suspended from the top of the tank via a flexible hose. The machine is designed to have balanced forces in order to keep it centered even while hanging. A flexible hose should not be used, however, when using the machine in any other orientation since the non-rigid hose will not maintain the unit's position in the tank.

Warning: When attaching the Alfa Laval GJ 18 onto the supply pipe, **ALWAYS** apply the wrench to the Inlet Collar (pos. 1) at the top/inlet of the unit. Never use a wrench on the Stem (pos. 15.1), Tee Housing (pos. 24.1), or Tee Housing Base (pos. 30) to tighten the unit onto the pipe. Doing so risks internally damaging the machine. Refer to Step 1 in chapter 6.1 General Maintenance.

4 Installation

Read the instructions carefully and pay special attention to the warnings! Always check the tank cleaning machine before operation.

Step 5

Location inside Tank

Generally, a single Alfa Laval GJ 18 will be positioned in the approximate center of the vessel in order to equalize the cleaning radius in all directions. However, some vessels may have specific obstacles such as coils, or heavy deposits such as the liquid level line or “bathtub ring”, that present a challenge in terms of cleaning. In these situations, the Alfa Laval GJ 18 should be located closer to the difficult area for the best cleaning results.

Tanks with internal mechanisms or structures such as an agitator shaft, impellers or baffles will require careful positioning to minimize the “shadow” on areas that do not receive direct jet impact. Sometimes more than one machine, or varied placement of a single machine, may be necessary to avoid these “shadow areas” or striping.

Step 6

Entry Openings

When using the Alfa Laval GJ 18, the vessels being cleaned must provide entry openings large enough to avoid interference during insertion and removal. The minimum opening size required for the Alfa Laval GJ 18 is 7.0 inches (177.8 mm) for free-hand installation, and 9.7 inches (246.4 mm) for automated or fixed-centerline installation.

Step 7

Vessel Drainage

If it is necessary to clean the floor of a vessel, any standing liquid will diminish the effectiveness of the Alfa Laval GJ 18 by covering any soils underneath. Wherever possible, the tank floor should be pitched toward the drain and the drainage opening should be large enough to eliminate or reduce any liquid buildup or puddling. If gravity alone is insufficient, a scavenger pump or similar should be connected to the drain to suck out the excess wash fluid. In extreme cases, it may be necessary to use smaller nozzles on the unit, or even to operate it intermittently to allow time for draining.

Step 8

Filters and Strainers

All tank cleaning systems should be equipped with a filter or strainer that will trap solids 1/16” (4.23 mm) or larger, as these will not pass through the Alfa Laval GJ 18. These particles can become caught in one of the internal passages of the machine and cause it to stop turning or reduce its cleaning effectiveness due to a loss of flow. It will then be necessary to disassemble the Alfa Laval GJ and remove the blockage.

In recirculated (closed-loop) cleaning or any application where the cleaning solution may carry abrasive solids in suspension, adequate filtration is a must. These particles can be extremely destructive to the Alfa Laval GJ, pumps, valves, and other system components. Filters, properly installed and maintained, will more than pay for themselves with lower overall operating costs in these applications. Furthermore, to ensure that clogged filters or strainers are cleaned, we recommend using automatic self-cleaning models.

Read the instructions carefully and pay special attention to the warnings! Always check the tank cleaning machine before operation.

Step 9

Capacity of Supply Pump

The Alfa Laval GJ 18 can be used with a constant volume-style pump, e.g. a centrifugal or positive displacement (PD) pump. In most cases, if the unit is to be used with a centrifugal pump, it should be configured so that the pump will operate close to its best efficiency point. The end user must therefore consider all the plumbing, elevation, and cleaning unit pressure/flow rate requirements.

If a PD style pump (i.e. piston pump, plunger pump, or mechanical diaphragm pump, etc.) will be supplying the wash fluid to the Alfa Laval GJ 18, a different set of rules applies. PD pumps are fixed volume pumps whose flow rate is dependent upon the rotational speed of the pump; the pumps also have a pressure rating which is the maximum operating pressure. Note: Do not confuse the maximum operating pressure of a PD pump with the actual operating pressure, the actual operating pressure is dictated by the fixed flow rate of the pump and the Alfa Laval GJ 18 and plumbing system. If a PD pump is used, the Alfa Laval GJ 18 should be sized to first match the flow capability of the pump and, second, to not exceed the Alfa Laval GJ 18's or pump's maximum operating pressure (taking the pressure rating of the plumbing system into account, also).

Warning: For high-pressure applications (over 150 psig (10 bar)), the pressure of the system must "ramp up" to its operating pressure. If the system experiences a pressure spike or pressure increases at a rate of more than 150 psig per second (10 bar/sec), the machine may be damaged, and parts will wear out prematurely. Damage resulting from this water hammer affect is not covered by the warranty.



4.3 Recycling Information

• Unpacking

- Packing material consists of wood, plastics, cardboard boxes and in some cases metal straps.
- Wood and cardboard boxes can be reused, recycled or used for energy recovery.
- Plastics should be recycled or burnt at a licensed waste incineration plant.
- Metal straps should be sent for material recycling.

• Maintenance

- All metal parts should be sent for material recycling.

• Scrapping

- At end of use, the equipment must be recycled according to relevant local regulations. Beside the equipment itself, any hazardous residues from the process liquid must be considered and dealt with in an appropriate manner. When in doubt, or in the absence of local regulations, please contact your local Alfa Laval sales company.
-

5 Operation

Read the instruction carefully and pay special attention to the warnings!

5.1 Operation/Control

Step 1

Always read the technical data thoroughly. (See chapter 7 Technical Data.)

CAUTION

Alfa Laval cannot be held responsible for incorrect operation/control.



Step 2

Never touch the tank cleaning machine or the pipelines when pumping hot liquids.



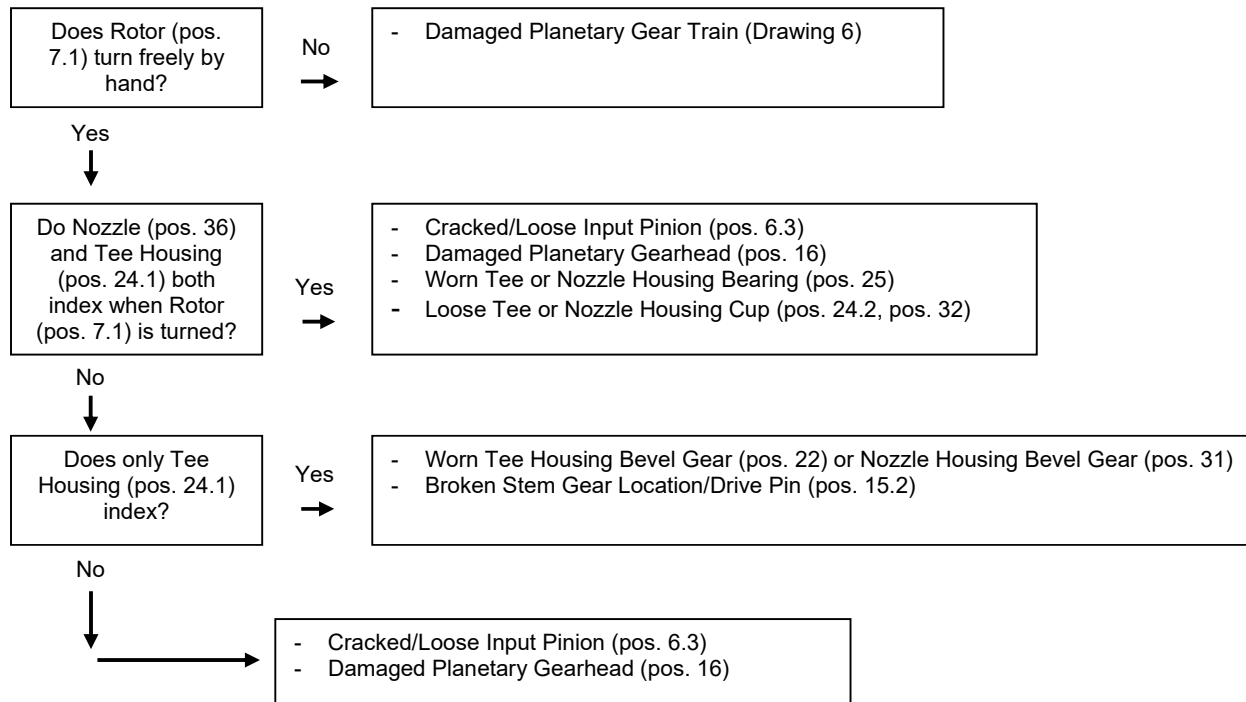
Step 3

Initial Startup

Every Alfa Laval GJ 18 shipped out is accompanied by a Birth Certificate. This document indicates how the unit performed in our testing tank before shipping, based on the operating conditions supplied to Alfa Laval. To ensure the longest possible life of the GJ 18, please verify the operating conditions and, most importantly, the machine's cycle time. The cycle time can be measured by, first, picking a fixed point inside of a vessel as a reference and, second, timing how long it takes the same nozzle to pass back over that point in the vessel. (This, naturally, will not be the exact same spot because the spray pattern is indexing.) The measured time in seconds directly corresponds to the machines full cycle time in minutes. In other words, a single 10-second rotation translates to a full cycle time taking 10 minutes.

Pay attention to possible faults. Read the instructions carefully.

5.2 Troubleshooting



Refer to Sections 6.3 (General Dismantling) and 6.4 (Inspection and Service of Components) for instructions on disassembly, examination of the part(s), and the location of the part(s) within the machine.

Potential Causes:

Insufficient Flow

Each Alfa Laval GJ 18 is configured to meet certain operating conditions outlined at the time of the initial sale, such as flow rate (GPM or m³/h), pressure (PSI or bar), temperature (°F or °C), chemical content of the wash fluid, cycle time, etc. If the Nozzles (pos. 36) are too small or the Stator (pos. 3) is not sized correctly, the Tee Housing (pos. 24.1) may not turn. Look for restrictions in the fluid supply such as a clogged filter, kinked hose, or deposits in the piping.

Tight Clearances

A recently overhauled Alfa Laval GJ 18 may fail to operate when first returned to service. If the machine seems otherwise fine, try running it with at least one Nozzle (pos. 36) removed. The reduction in pressure and additional flow should be enough to overcome the extra resistance of any new Bearings and Seals. Twenty minutes of operation should loosen the machine to run normally with the Nozzles reinstalled.

Clogged Unit

Loosen the Inlet Collar Screws (pos. 13) and remove the Inlet Collar (pos. 1). Look inside the Inlet Collar and remove any debris caught in the Stator (pos. 3). Check for debris in the vanes of the Rotor as well (pos. 7.1). Remove any material wound around the Rotor Shaft (pos. 6.1). In addition, check for any debris caught in the outlet holes of the Stem (pos. 15.1), the nose of the Tee Housing (pos. 24.1), the Nozzle Carrier (pos. 33.1), and the Nozzles (pos. 36).

5 Operation

Pay attention to possible faults. Read the instructions carefully.

5.3 Cleaning Solution Leakage

Cleaning Solution Leakage:

The Alfa Laval GJ 18 is a self-flushing machine and thus has 2-3% leakage designed into the machine. Excessive leakage may indicate a larger issue.

Worn Bearings & Seals

Excessive leakage from the Tee Housing (pos. 24.1) or Nozzle Carrier (pos. 33.1) usually indicates a damaged Tee Housing and/or Nozzle Housing Bearing (pos. 25). Inspect them for wear. Specifically, examine the condition of the external ring and internal O-ring.

Check the Output Shaft Bearing Housing (pos. 17.1) and Output Shaft (pos. 21). Examine the condition of the Output Shaft Lower Bearing (pos. 26) and the two Output Shaft Seals (pos. 19). There should still be some interference with the Output Shaft as it passes through the Bearing and Seals.

Worn Housing Cups

Inspect the Tee and Nozzle Housing Cups (pos. 24.2, pos. 32) for excessive wear (grooving or scoring). Replace any Cups that show distinct grooves.

Pay attention to possible faults. Read the instructions carefully.

5.4 Poor Cleaning Performance

- **Inadequate Flow and Pressure**

Check the pressure at the Alfa Laval GJ inlet under actual operating conditions. The supply piping and hoses must be large enough to handle the flow rate required for the nozzle size being used to ensure adequate pressure.

Insufficient pressure may also result from line losses when the machine is far from the pump. If this is the case, the line size must be increased accordingly for long runs. Although the Alfa Laval GJ will rotate at low flow rates, effective cleaning may require considerably more flow. Proper mechanical operation (the unit turns) is NOT the same thing as effective cleaning (the soils have been removed)! Contact Alfa Laval if assistance is required.

- **Chemical Concentration and Temperature**

Verify that the cleaning solution is using the correct compound at an appropriate concentration for the deposit being cleaned. If heating is necessary, also check that the solution is at the proper temperature.

- **Plugged Nozzles**

Unscrew the Nozzles (pos. 36) and inspect for any debris.

- **Slow or no Rotation of the Housings**

This will result in partial or erratic washing coverage. Refer to previous sections for more information.

- **Alfa Laval GJ Configuration**

Determine if the deposit being cleaned requires greater jet impact or longer jet dwell time (slower rotation) for more thorough scrubbing. Confirm that the nozzle size, turbine, and gearing are correct for the specific application. Refer to the machine's Birth Certificate for specific information regarding its configuration. Contact an Alfa Laval representative if assistance is required.

- **Inadequate Drainage**

Ensure that the vessel drains the effluent (used wash fluid) as fast as it's being sprayed in through the Alfa Laval GJ. The floor of the vessel should be sloped or pitched toward the drain and the drainage opening should be large enough to gravity-drain the effluent from the vessel. If you still have puddling (build-up of the wash fluid so it covers the floor and shields the residues underneath), use some form of pump to remove the effluent.

5 Operation

*The Tank Cleaning machine is designed for cleaning in place (CIP). CIP = Cleaning in Place.
Study the instructions carefully and pay special attention to the warnings!*

5.5 Recommended Cleaning

Step 1

Caustic danger!



Always handle lye and acid with great care.



Always use rubber gloves!



Always use protective goggles!

Step 2

Danger of burns!



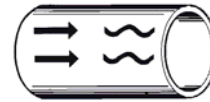
Never touch the pump or the pipelines when sterilizing.

Step 3



Always rinse well with clean water after using a cleaning agent.

Always rinse!



Clean Water

Cleaning agent

NOTE

Cleaning agents must be stored/disposed of in accordance with current regulations/directives.

Maintain the Tank Cleaning Machine with care. Read the instructions carefully and pay special attention to the warnings! Always keep Minor spare parts kit in stock.

6.1 General Maintenance

Step 1

Always read the technical data thoroughly. (See chapter 7 Technical Data)



Step 2

Recommended spare parts:

Order service kits from the service kits list
(See 8.8 Minor Service Kits & 8.9 Major Service Kits)

Ordering spare parts:

Contact your local Alfa Laval Sales company.

6 Maintenance

Maintain the Tank Cleaning Machine with care. Read the instructions carefully and pay special attention to the warnings! Always keep Minor spare parts kit in stock.

6.2 General Dismantling Setup

Step 1

NOTE

A rigorously implemented preventative maintenance program will significantly reduce repair costs over the life of the Alfa Laval GJ 18. The foundation of such a program is regularly scheduled inspections to discover and replace worn or damaged parts before they can cause the failure of other, more costly, components. The inspection intervals required will depend on the severity of the application, but a complete internal inspection at 100 hours of operation is recommended initially.

Step 2

STORAGE

The Alfa Laval GJ should be rinsed with clean water after each use to remove any foreign material or soft substances left in the machine that may harden during storage and cause the unit to seize or lock up. A clean water rinse through the Alfa Laval GJ 18 will also wash out any residues of chemical cleaners or recirculated wash water that could adversely affect the seals and O-rings during prolonged contact in storage. The best position to store the Alfa Laval GJ is to stand it up with the inlet connection facing down.

Step 3

EXTERNAL INSPECTION INTERVALS

Before every shift, the Stator (pos. 3) and the Nozzles (pos. 36) should be inspected for debris. Examine the Stator by looking down into the Inlet Collar (pos. 1). Look into each Nozzle for signs of debris or build-up.

Step 4

INTERNAL INSPECTION INTERVALS

An interval of 100 hours is recommended initially. If all the components are found to be in acceptable condition after the first 100 hours, the Alfa Laval GJ may then be inspected and routine preventative maintenance should be performed every 300 to 500 of operation, depending on the severity of use.

Step 5

TIPS

All the Bearings, Bushings, Seals and O-rings are “wear parts”. Ideally, they should all be replaced, as a group, every 300 to 500 hours of operation, depending on the severity of use. If just one Bearing or Seal is worn or damaged, replace both it and its mate, not just the worn or damaged part. Verify that the mating Bearing Cups (pos. 24.2, pos.32) are not scored. Replacing new bearings and seals in scored cups may prematurely wear the new bearings and may cause premature failure of the bearings and seals.

Read the instructions carefully. The items refer to the parts list and service kits section.

6.3 General Dismantling

Step 1

Inlet Collar Removal

Loosen and remove the Inlet Collar Cap Screws (pos. 13) and matching Split Lock Washers (pos. 14) from the top of the Inlet Collar (pos. 1) using a 3/16" Hex Key. Remove the Inlet Collar Assembly (Drawing 5) from the top of the unit.

Caution: Hold or turn on Stem (pos. 15.1). DO NOT hold or turn on Tee Housing (pos. 24.1) or Nozzle Carrier (pos. 33.1). Doing so will damage the gear train.



Step 2

Gear Train Removal

Pull the Gear Train Assembly (Drawing 6) up and out of the Stem (pos. 15.1).

Step 3

Nozzle Housing Assembly Removal

Remove the two Nameplate Screws (pos. 35) and Flat Lock Washers (pos. 5) from the front of the Nozzle Carrier (pos. 33.1) using a 7/16" socket wrench.

Remove the Nameplate (pos. 34).

Pull the Nozzle Housing Assembly (Drawing 18) and the outer Labyrinth Bearing (pos. 25) from the nose of the Tee Housing (pos. 24.1).

Gently remove the inner Labyrinth Bearing (pos. 25) from the nose of the Tee Housing.

Step 4

Body Assembly

Remove the Tee Housing Base Cap Screws (pos. 28) and matching Lock Washers (pos. 29) from the Tee Housing Base (pos. 30) using a 1/4" Hex Key.

Remove the Tee Housing Base from the bottom of the Tee Housing (pos. 24.1).

Unscrew the Stem Base Cap Screws (pos. 28) and matching Lock Washers (pos. 29) from the Stem Base (pos. 27) using a 1/4" Hex Key. Hold the Stem (pos. 15.1) to prevent the unit from spinning while removing the screws.

Remove the Stem Base from the Tee Housing.

Pull up on the Tee Housing Assembly (Drawing 19) while holding the Stem Assembly (Drawing 7) down to separate the parts. The upper Labyrinth Bearing (pos. 25) should come off the Stem along with the Tee Housing.

6 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

6.4 Inspection and Service of Components

Drawing 5

Inlet Collar and Stator

Inspect the vanes of the Stator (pos. 3) inside the Inlet Collar (pos. 1) to be sure that they are clear of debris. If closer inspection of the Stator is required, use duckbill pliers to remove the Stator Retaining Ring (pos. 2) from the Inlet Collar.

Warning: Use caution when installing and removing the Stator Retaining Ring (pos. 2), as it is an exceedingly stiff spring part. If improperly gripped, the Ring may slip out of the pliers and cause serious personal injury. Safety glasses are strongly recommended during the removal and installation of this part.



Drawing 6

Planetary Gear Train Assembly

Pull apart the Input Shaft Housing Assembly (Drawings 8-12), the Gear Box Assembly (Drawings 14-17), and the Output Housing Assembly (Drawing 13).

Drawing 7

Stem Assembly

Carefully remove the remaining Labyrinth Bearing (pos. 25) and the Tee Housing Bevel Gear (pos. 22) from the central shaft of the Stem (pos. 15.1). Insert a slotted screwdriver into the pin slot in the Bevel Gear for leverage if needed. Inspect the Bevel Gear for worn, sharp, or damaged teeth.

Caution: DO NOT force the screwdriver in under the Tee Housing Bevel Gear (pos. 22). The Clutch O-Ring (pos. 23) is directly underneath and will be damaged.



Inspect the Clutch O-Ring (pos. 23) for deterioration or damage. Remove only if replacement is necessary.

Caution: To reduce the likelihood of scratching any sealing surface, use a pick made from brass to remove o-rings.



Inspect the Output Shaft Lower Bearing (pos. 26) seated in the central shaft of the Stem (pos. 15.1) for excessive wear on its inside diameter. Remove only if replacement is necessary. If the unit is a pin drive machine, there will be a Bevel Gear Location Pin (pos. 15.2) in the corresponding hole in the Stem. If the unit is a clutch machine, the pin hole will be empty.

Note: If you are unsure whether the unit is intended to be a pin or clutch drive, contact Alfa Laval for assistance.



Drawing 8

Input Shaft Housing Assembly

Remove the Rotor Nut (pos. 4) and Lock Washer (pos. 5) from the top of the Input Pinion Shaft Assembly (Drawing 12) using a 7/16" socket wrench.

Caution: Gently hold the Input Pinion (pos. 6.3) while loosening the Rotor Nut (pos. 4), but DO NOT clamp down. Doing so may damage the gear teeth.



Remove the Rotor Assembly (Drawing 9) and the Input Shaft Housing Assemblies (Drawings 10-11) from the Rotor Shaft Assembly (Drawing 12).
Unthread the Seal Housing Assembly (Drawing 11) from the Bearing Housing Assembly (Drawing 10).

Caution: The Input Shaft Housings (Drawings 10 and 11) have left-hand threads. Take care when separating the parts.



Read the instructions carefully. The items refer to the parts list and service kits section.

Drawing 9

Rotor Assembly

Inspect the Rotor Shaft Central Bearing (pos. 7.2) that is installed in the Rotor (pos. 7.1) for chips, cracks, or excessive wear. The Bearing should protrude slightly from the bottom face of the Rotor.

Drawing 10

Input Shaft Bearing Housing Assembly

Inspect the Rotor Shaft Central Bearing (pos. 8.2) that is installed in the top of the Input Shaft Bearing Housing (pos. 8.1) for chips, cracks, or excessive wear. The Bearing should protrude slightly from the top face of the Housing. Ensure that the upper Gear Box Pin (pos. 8.3) is firmly pressed into the bottom of the Housing.

Drawing 11

Input Shaft Seal Housing Assembly

Inspect the Rotor Shaft Central Bearing (pos. 9.2) that is installed in the bottom of the Input Shaft Seal Housing (pos. 9.1) for chips, cracks, or excessive wear. The Bearing should be slightly recessed into the Housing. Remove the Input Seal Retaining Ring (pos. 10) from the Housing. Inspect the back-to-back Input Shaft Seals (pos. 11) for loss of spring tension, indicated by excessive dry deposits of dirty or abrasive cleaning solution on the spring. If the Seals require replacement, remove them from the Housing. Inspect the Gear Box O-Ring (pos. 12) around the Housing for deterioration or damage.

Caution: To reduce the likelihood of scratching any sealing surface, use a pick made from brass to remove o-rings and seals. Inspect the o-rings for deterioration or damage. Inspect the seals for loss of spring tension (indicated by excessive dry deposits of dirty or abrasive cleaning solution on the spring). Replace as required.



Drawing 12

Input Pinion Shaft Assembly

Inspect the Input Pinion (pos. 6.3) for hairline cracks on the end face and worn, damaged, or sharp/pointed teeth. The Pinion should be tight on the Rotor Shaft (pos. 6.1) and flush against the Rotor Shaft Carbide Thrust Washer (pos. 6.2). The Thrust Washer should not be able to spin on the Rotor Shaft. If the Input Pinion has slipped, press it back onto the Rotor Shaft, or replace it if it is cracked or worn. Inspect the Rotor Shaft for signs of scoring and wear, particularly along the regions with plasma coating. Replace the Rotor Shaft if any of the coating is chipped or cracked.

Drawing 13

Output Shaft Housing Assembly

Push the Transition Output Shaft (pos. 21) up and out of the Output Shaft Bearing Housing (pos. 17.1). Remove the Output Seal Retaining Ring (pos. 20) from the Housing. Inspect the Output Shaft Seals (pos. 19) for loss of spring tension, indicated by excessive dry deposits of dirty or abrasive cleaning solution on the spring. Remove them from the Housing for replacement if necessary. Inspect the Gear Box O-Ring (pos. 12) around the Housing for deterioration or damage. Remove and replace if necessary.

Caution: To reduce the likelihood of scratching any sealing surface, use a pick made from brass to remove o-rings and seals.



Inspect the Output Shaft Upper Bearing (pos. 18) inside the Housing for excessive wear on the inner diameter and on the upper surface that the flange of the Transition Output Shaft contacts. Remove and replace if necessary. Ensure that the lower Gear Box Pin (pos. 17.2) is firmly pressed into the hole in the top of the Housing.

6 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

Drawings 14-17

Gear Box Internal Assembly

Caution: If you suspect that the Gear Box requires service, proceed with caution. If at any time you do not feel completely comfortable servicing the Gear Box, contact Alfa Laval immediately.



Drawing 14: Begin by holding the Gear Box upright to keep the internal components from unexpectedly spilling out. Use a pick to remove the upper Gear Box Snap Ring (pos. 16.2) from the top of the Planetary Ring Gear (pos. 16.1). Hold the Top Planetary Washer (pos. 16.3) in place on top of the Gear Stack (Drawing 15) and flip the Ring Gear and its contents upside down.

Press down gently on the Planetary Output Shaft (pos. 16.8.1) so that the Gear Stack (Drawing 15) slides down and out of the Ring Gear.

Remove the lower Gear Box Snap Ring (pos. 16.2) from the bottom of the Ring Gear, then remove the Planetary Output Shaft Washer (pos. 16.9). Inspect the Washer for scoring or cupping and replace if necessary.

Drawing 15: Separate the four layers of the Gear Stack (Drawings 16 and 17) and place the layers on a flat surface.

At the top of the gear stack is the Top Planetary Large Washer (pos. 16.3). Inspect the Washer for scoring or cupping and replace if necessary.

Beneath each of the three upper Gear Stack layers (Drawing 16) is an Inter-Tier Planetary Washer (pos. 16.7). Inspect these washers for scoring or cupping and replace if necessary.

Drawing 16: The upper three layers of the Gear Stack are identical. Each layer includes four Planet Gears (pos. 16.4.1) with pressed-in Planet Gear Bushings (pos. 16.4.2); one Planet Carrier Plate (pos. 16.6.1) with a Planet Gear Pinion (pos. 16.6.2) pressed into the bottom and four Planet Gear Idler Shafts (pos. 16.6.3) pressed into the top. Four Planet Gear Washers (pos. 16.5) sit on the Idler Shafts underneath the Planet Gears.

Inspect the Gear Bushings for severe wear on the top or bottom; overly loose fit inside the Planet Gears; or overly loose fit on the Idler Shafts. The Bushings do not need to fit tightly into the Planet Gears for the Gear Train to run properly.

Inspect the Gear Pinion (pos. 16.6.2) for worn, damaged, or sharp/pointed teeth. Pay special attention to the Pinion in the lowermost layer, as it experiences the most torque. Ensure that the Pinion is fully pressed into the Carrier Plate and does not shift or rotate.

Inspect the teeth of the Planet Gears (pos. 16.4.1) for any worn, broken, or bent teeth.

Ensure that the Idler Shafts are tightly installed in the Carrier Plate and are pressed all the way into their respective holes.

Inspect the Gear Washers for scoring or cupping and replace if necessary.

Drawing 17: The lowermost layer of the Gear Stack is the same as the upper layers, with the exception that the Carrier Plate and Gear Pinion are replaced with the Planetary Output Shaft (pos. 16.8.1). Inspect the Gears (pos. 16.4.1), Gear Bushings (pos. 16.4.2), Gear Washers (pos. 16.5), and Idler Shafts (pos. 16.8.2) as described above.

Inspect the Planetary Output Shaft for wear or damage on the shaft.

Read the instructions carefully. The items refer to the parts list and service kits section.

Drawing 18

Nozzle Carrier Body Assembly

Remove the Nozzles (pos. 36) from the Nozzle Carrier (pos. 33.1). Inspect the Stream Straighteners (pos. 37) inside the Nozzles for debris or damage. If the Stream Straighteners are damaged or worn, remove from the Nozzles for replacement.

Inspect the Nozzle Housing Cups (pos. 32) that are pressed into the Nozzle Carrier (pos. 33.1) for severe scoring or wear. If either Cup is worn, they should be replaced as a pair.

Check whether the Nozzle Housing Bevel Gear (pos. 31) can be rotated and inspect it for worn, sharp, or damaged teeth.

If the Bevel Gear can be rotated but its teeth are not damaged AND the Bearing Cups are not significantly worn, an arbor press can be used to press the inner Bearing Cup back into the Nozzle Carrier until the Bevel Gear is held in place.

If the Bevel Gear requires replacement, the inner Bearing Cup will need to be removed, at which point both Bearing Cups should be removed and replaced together.

If the Bevel Gear is being replaced, the Bevel Gear Location Pin (pos. 33.2) can be inspected as well. Confirm that the Pin is firmly seated in its hole in the Nozzle Carrier and is not deformed or worn.

Drawing 19

Tee Housing Assembly

Inspect the Tee Housing Bearing Cups (pos. 24.2) inside the Tee Housing (pos. 24.1) for severe scoring or wear. If either Cup is worn, they should be replaced as a pair.

Inspect the nose of the Tee Housing (pos. 42) for any debris or blockages in the windows. Check that the nose is coming straight out from the main of the part and is not bent or deformed.

6 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

6.5 Reassembly

General Notes

All Parts must be cleaned thoroughly before reassembling. Any deposits remaining on the parts can cause difficult disassembly the next time the Alfa Laval GJ 18 needs to be serviced. Also, it may cause misalignment of parts and the potential for premature failure.

Unless otherwise stated, apply a dab of a Teflon-based anti-seize compound to all threads when reassembling; this will prevent galling of threads and ease any future disassembly.

To ease installation of all O-rings, they should be lubricated prior to reassembly. Lithium-based grease is acceptable, for Viton® O-rings, however, Silicon based lubricant must be used for EP O-rings.

Refer to the illustrations in Section 8 for clarification during reassembly.

Drawings 14-17

Gear Train

Replace the Planetary Output Shaft Washer (pos. 16.9) in the bottom of the Planetary Ring Gear (pos. 16.1), denoted by the chamfered outer edge of the Ring Gear. Insert one of the Gear Box Snap Rings (pos. 16.2) to retain the Washer.

Ensure that the Planet Gear Idler Shafts (pos. 16.6.3, pos. 16.8.2) are pressed firmly into the Planetary Output Shaft (pos. 16.8.1) and three Planet Carrier Plates (pos. 16.6.1). Confirm that the Planet Gear Pinions (pos. 16.6.2) are also pressed firmly into the Carrier Plates.

The Planet Gear Bushings (pos. 16.4.2) should be pressed into the Planet Gears (pos. 16.4.1). If reusing worn Bushings, sliding clearance inside the Gears is permissible, but the fit should not be sloppy.

Place one Planet Gear Washer (pos. 16.5) around each Idler Shaft (pos. 16.6.3, pos. 16.8.2) on every platform, then place one Planet Gear with its Gear Bushing onto each Idler Shaft.

Note: The sixteen Planet Gears (pos. 16.4.1) in the Gear Train are identical. They are interchangeable and can be safely installed on any of the Idler Posts in any Layer.



Hold the assembled Lower Gear Stack Layer (Drawing 17) with the output shaft facing down and the Gears facing upward. Place one Inter-Tier Planetary Washer (pos. 16.7) on top of the Gears, then put one of the Upper Gear Stack Layers on top of the Inter-Tier Washer.

Caution: During reassembly, the Gear Stack should be lightly repacked using food-grade grease. Please contact Alfa Laval for a specific grease recommendation.



Complete the Gear Stack (Drawing 15) with alternating Inter-Tier Washers (pos. 16.7) and Upper Gear Stacks (Drawing 16). Complete the Gear Stack with the Top Planetary Large Washer (pos. 16.3).

Firmly hold the Gear Stack (Drawing 15) and apply pressure with fingers to the Top Washer and the underside of the Planetary Output Shaft (pos. 16.8.1) to keep the parts assembled. Maintaining this hold on the Gear Stack, flip the Stack upside down so that the Output Shaft is facing up.

Take the Planetary Ring Gear (pos. 16.1), with the already-installed Output Shaft Washer (pos. 16.9) and Snap Ring (pos. 16.2) facing up and lower the Ring Gear onto the inverted Gear Stack. Rotate the Ring Gear back and forth slightly to get the Planet Gears (pos. 16.4.1) to mesh with the teeth of the Ring Gear. The Gear Stack is in place once the Top Washer is flush up against the teeth of the Ring Gear. Insert the remaining Gear Box Snap Ring (pos. 16.2) to secure the Top Washer.

Read the instructions carefully. The items refer to the parts list and service kits section.

Drawings 8-12

Input Shaft Housing Assembly

Drawing 12: Confirm that the Input Pinion Shaft Assembly is assembled, with no play between the parts.

Drawing 11: Gently press the two Input Shaft Seals (pos. 11) into the top of the Input Shaft Seal Housing (pos. 9.1), applying pressure evenly around the seals during installation to prevent damage.

Note: The Input Shaft Seals (pos. 11) are installed back-to-back, with the lips/springs facing away from each other.



Install the Input Shaft Seal Snap Ring (pos. 10) into the groove in the top of the Housing to retain the Seals.

The Gear Box O-Ring (pos. 12) should be seated in its groove on the outer diameter of the Housing.

Drawings 9-10: Confirm that the Central Bearings (pos. 7.2, pos. 8.2) are pressed into the Rotor (pos. 7.1) and Input Shaft Bearing Housing (pos. 8.1), respectively. Verify also that the Gear Box Pin (pos. 8.3) is pressed into the bottom of the Bearing Housing.

Drawing 8: Thread the Input Shaft Seal Housing Assembly (Drawing 11) into the Input Shaft Bearing Housing Assembly (Drawing 10).

Note: The Input Shaft Housings (Drawings 10 and 11) have left-hand threads.

Slide the threaded-together Housing Assemblies onto the Input Pinion Shaft Assembly (Drawing 12), with the Seal Housing Assembly (Drawing 11) facing towards the Input Pinion (pos. 6.3).

Slide the Rotor Assembly (Drawing 9) onto the Rotor Shaft (pos. 6.1) next, making sure the Central Bearing (pos. 7.2) in the Rotor (pos. 7.1) is facing down towards the Housings.

Place the Lock Washer (pos. 5) onto the Input Shaft on top of the Rotor, then thread on the Rotor Nut (pos. 4). Tighten the Nut using a 7/16" socket wrench.

Caution: Gently hold the Input Pinion (pos. 6.3) while tightening the Rotor Nut (pos. 4), but DO NOT clamp down. Doing so may damage the gear teeth.



Drawing 13

Output Shaft Housing Assembly

Ensure that the Output Shaft Upper Bearing (pos. 18) is pressed into the Output Shaft Bearing Housing (pos. 17.1). Its upper face should be flush with the ledge inside the Housing.

Gently press the two Output Shaft Seals (pos. 19) into the bottom of the Housing, applying pressure evenly around the seals during installation to prevent damage.

Note: The Output Shaft Seals (pos. 19) are installed back-to-back, with the lips/springs facing away from each other.



Install the Output Shaft Seal Snap Ring (pos. 20) into the groove in the bottom of the Housing to retain the Seals.

Confirm that the Gearbox Pin (pos. 17.2) is firmly installed in its hole in the Housing.

The Gear Box O-Ring (pos. 12) should be seated in its groove on the outer diameter of the Housing.

Holding the Housing with the Gear Box Pin facing up, insert the end of the Transition Output Shaft (pos. 21) with the flats through the Housing.

Note: There should be some resistance from the Bearing (pos. 18) and the Seals (pos. 19) when installing and rotating the Output Shaft (pos. 21). If the Output Shaft rotates freely and spins without direct force applied, the Seals and Bearing should be replaced.



6 Maintenance

Read the instructions carefully. The items refer to the parts list and service kits section.

Drawing 7

Stem Assembly

Confirm that the Clutch O-Ring (pos. 23) is seated in the groove of the Stem (pos. 15.1).

If the unit is a pin drive machine, there will be a Bevel Gear Location Pin (pos. 15.2) in the corresponding hole in the Stem.

If the unit is a clutch machine, the pin hole will be left empty.

Note: If you are unsure whether the unit is intended to be a pin or clutch drive, contact Alfa Laval for assistance.



The Output Shaft Lower Bearing (pos. 26) should be firmly pressed into the corresponding hole in the Stem.

Press the Tee Housing Bevel Gear (pos. 22) down over the Clutch O-Ring (pos. 23), aligning the Gear's pin notch with the Location Pin (pos. 15.2), if applicable.

Install the Labyrinth Bearing (pos. 25) down onto the Stem with the flange facing the Bevel Gear.

Drawing 19, 4

Tee Housing Assembly

Drawing 19: Confirm that the Tee Housing Cups (pos 24.2) are pressed securely into the Tee Housing (pos. 24.1).

Drawing 4: Orient the Stem Assembly (Drawing 7) with the Tee Housing Bevel Gear (pos. 22) facing upward. The lower Labyrinth Bearing (pos. 25) should already be installed with the flange facing the Bevel Gear.

Lower the Tee Housing Assembly (Drawing 19) onto the Stem (pos. 15.1), with the six holes for the Tee Housing Base Screws (pos. 28) facing upward. Install the second Labyrinth Bearing (pos. 25) so that it sits around the Stem (pos. 15.1).

Place the Stem Base (pos. 27) onto the end of the Stem (pos. 15.1). The indented side of the Stem Base should be up against the Stem. Align the screw holes of the two parts, install the four Stem Base Cap Screws (pos. 28) with the corresponding Lock Washers (pos. 29). Tighten the Screws using a ¼" Hex Key, proceeding in a star pattern to distribute shear stresses.

Place the Tee Housing Base (pos. 30) on the top surface of the Stem (pos. 15.1) with the stepped region of the Base facing up. Align the holes for the Tee Housing Base Cap Screws (pos. 28) and insert the Screws with their corresponding Lock Washers (pos. 29). Tighten the Screws using a ¼ Hex Key, again proceeding in a star pattern to distribute shear stresses.

Drawing 18, 3

Nozzle Carrier Body Assembly and Installation

Drawing 18: Ensure that the Nozzle Housing Bevel Gear (pos. 31) is held firmly in place by the inner Nozzle Housing Cup (pos. 32) and that the matching outer Cup is also pressed securely into the Nozzle Carrier (pos. 33.1).

Verify that the Stream Straighteners (pos. 37) are seated inside their respective Nozzles (pos. 36).

Thread the Nozzles into the Nozzle Carrier.

Drawing 3: Place one Labyrinth Bearing (pos. 25) with the flange facing inwards onto the nose of the Tee Housing (pos 24.1), followed by the Nozzle Carrier Assembly (Drawing 18) with the Bevel Gear (pos. 31) facing inwards.

Place the second Labyrinth Bearing (pos. 25) onto the nose of the Tee Housing (pos. 24.1) with the flange facing outwards. Position the Nameplate (pos. 34) at the outer face of the Tee Housing nose. Secure the Nameplate with the Nameplate Screws (pos. 35) and their corresponding Lock Washers (pos. 5) using a 7/16" socket wrench.

Read the instructions carefully. The items refer to the parts list and service kits section.

Drawing 6, 2

Gear Train Assembly and Installation

Drawing 6: Combine the subassemblies for the Input Shaft Housings (Drawings 8-12), the Gear Box (Drawings 14-17), and the Output Shaft Housing (Drawing 13).

Drawing 2: Lower the Gear Train Assembly (Drawing 6) into the Stem (pos. 15.1). The Transition Output Shaft (pos. 21) should seat in the hole in the Tee Housing Base (pos. 30) with the corresponding flats lining up. The Gear Train Assembly (Drawing 6) is properly installed when the Input Shaft Bearing Housing (pos. 8.1) is flush with the upper surface of the Stem.

Drawing 5, 1

Inlet Collar Assembly and Installation

Drawing 5: If the Stator (pos. 3) was taken out of the Inlet Collar (pos. 1) for inspection, insert it into the threaded side of the Collar with the fins facing down.

Use duckbill pliers to pinch the Stator Retaining Ring (pos. 2) and replace it inside the Collar (pos. 1). The Retaining Ring should seat evenly in the groove above the Stator and below the internal threads of the Collar.

Warning: Use caution when installing and removing the Stator Retaining Ring (pos. 2), as it is an exceedingly stiff spring part. If improperly gripped, the Ring may slip out of the pliers and cause serious personal injury.



Drawing 1: Lower the Inlet Collar Assembly (Drawing 5) down around the Rotor (pos. 7.1) so that it sits on the upper face of the Input Shaft Bearing Housing (pos. 8.1). Align the holes of the Collar flange with the holes through the Bearing Housing and the matching holes in the Stem (pos. 15.1).

Install the eight Inlet Collar Cap Screws (pos. 13) and corresponding Lock Washers (pos. 14) using a 3/16" Hex Key, tightening the screws evenly in a star pattern to distribute shear stresses.

7 Technical Data

*It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.*

7.1 Technical Data

The Alfa Laval GJ 18 Tank Cleaning Machine is a highly efficient machine at a range of pressures and flows. The instruction manual is part of the delivery. Read the instructions carefully.

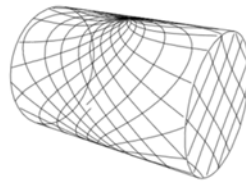
TECHNICAL DATA

Lubricant Food grade
Max. throw length 100 ft (30.5 m)

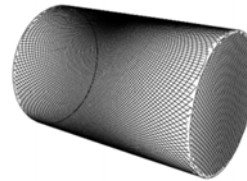
Pressure

Working pressure 45 - 300 PSI (3 – 21 bar)
Recommended pressure 50 - 200 PSI (3.5 – 14 bar)

Cleaning Pattern



First Cycle



Full Pattern

The above drawings show the cleaning pattern achieved on a horizontal cylindrical vessel. The difference between the first cycle and the full pattern represents the number of additional cycles available to increase the density of the cleaning.

Certificate

2.1 Material Certificate

PHYSICAL DATA

Materials

1.4404 (316L), PPS, FKM (FFKM available).

Temperature

Max. working temperature 203°F (95°C)
Max. ambient temperature 284°F (140°C)

Weight 26 lbs. (11.8 kg)

Connections

Standard thread 2.5-inch NPT, 2.5-inch BSP

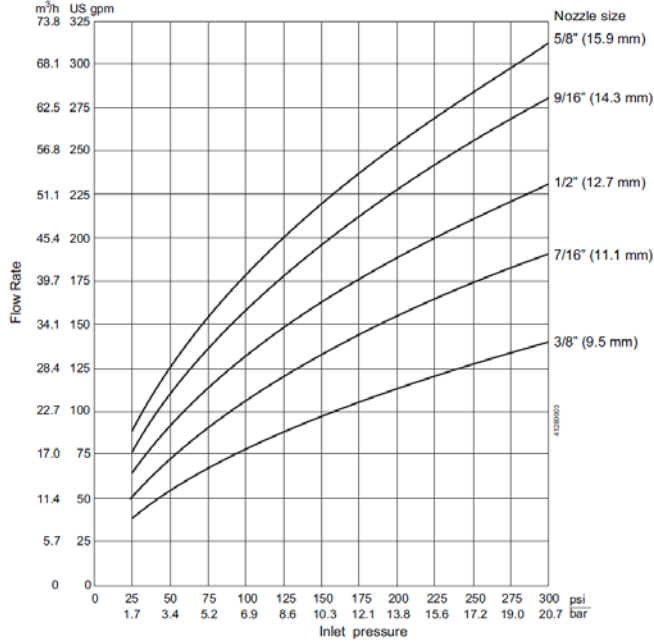
Caution

Do not use for gas evacuation or air dispersion.

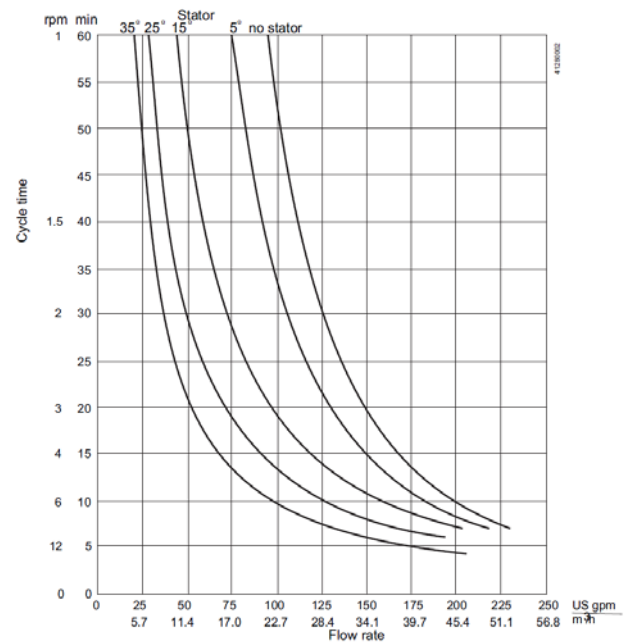
It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.

7.2 Performance Data

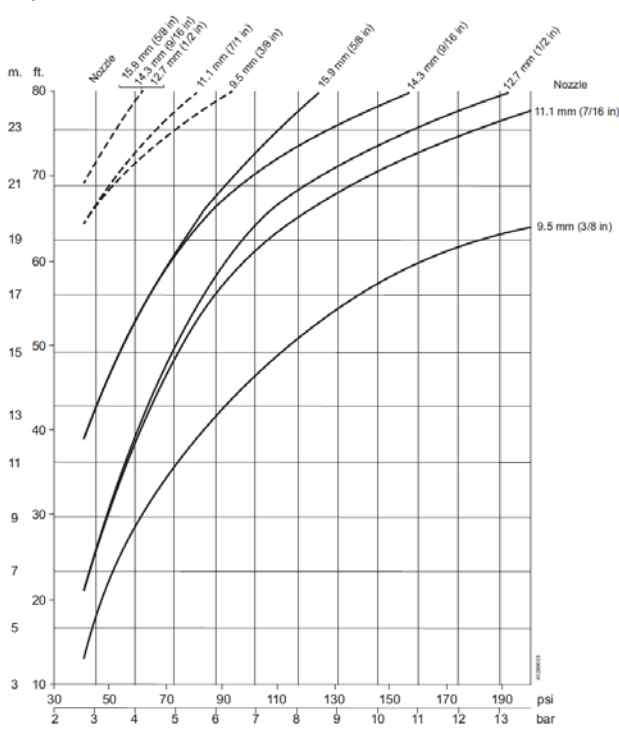
Pressure vs. Flow Rate



Flow Rate vs. Cycle Time



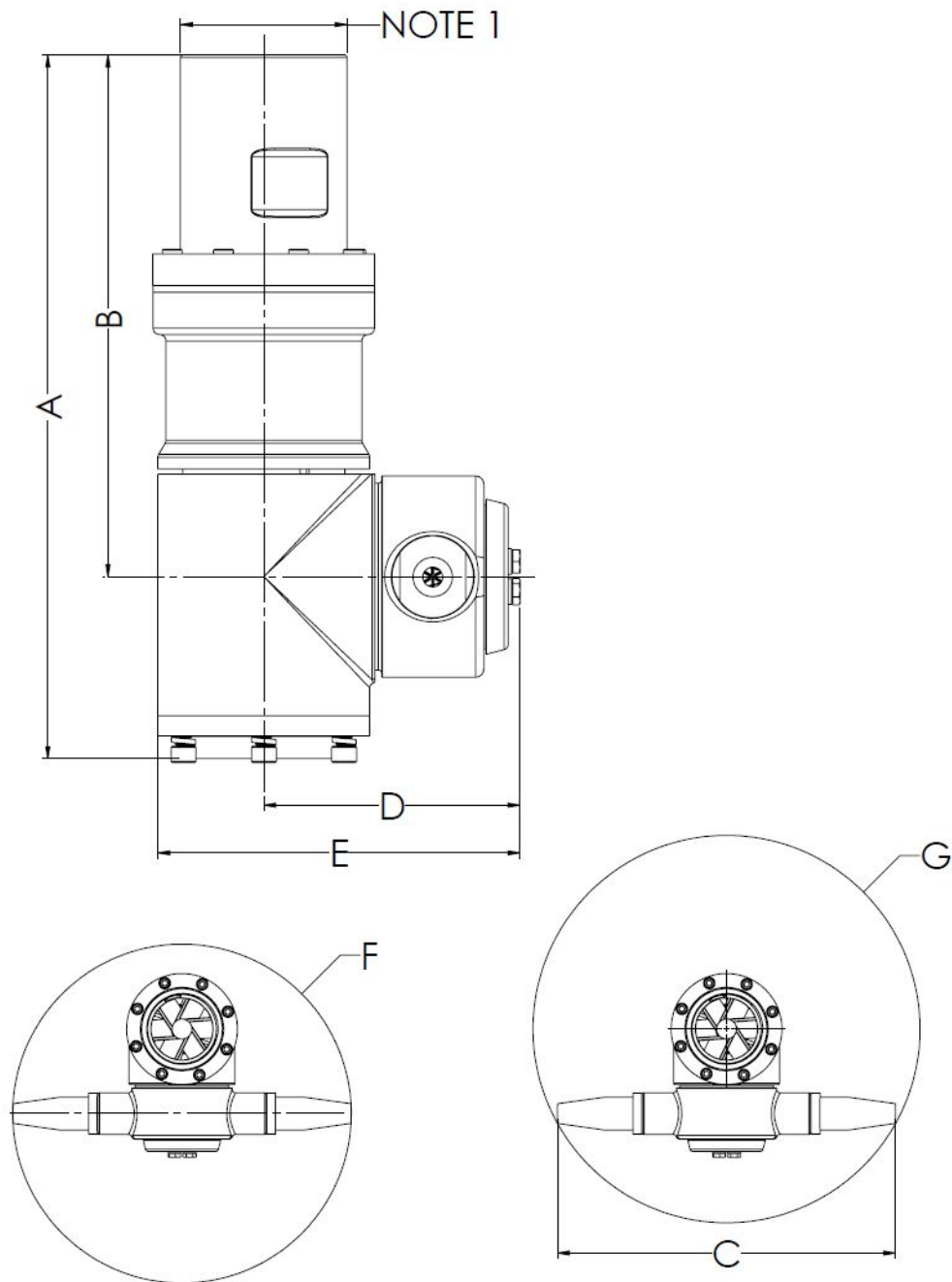
Impact Data and Flow



7 Technical Data

*It is important to observe the technical data during installation, operation and maintenance.
Inform personnel about the technical data.*

7.3 Dimensions



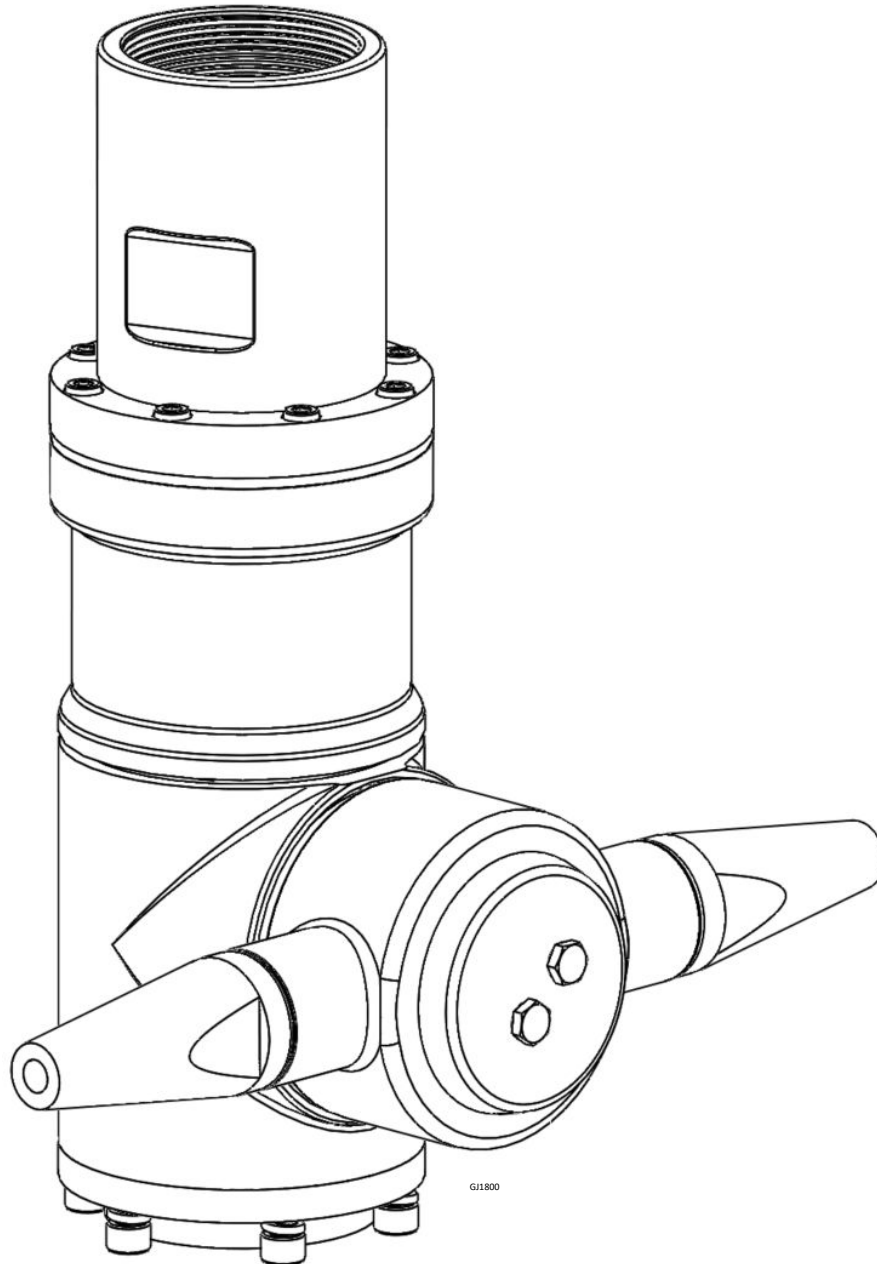
Dimensions

	A	B	C	D	E	F	G
in	13.27	9.84	12.76	4.84	6.84	12.78	14.61
mm	337	250	324	123	174	325	371

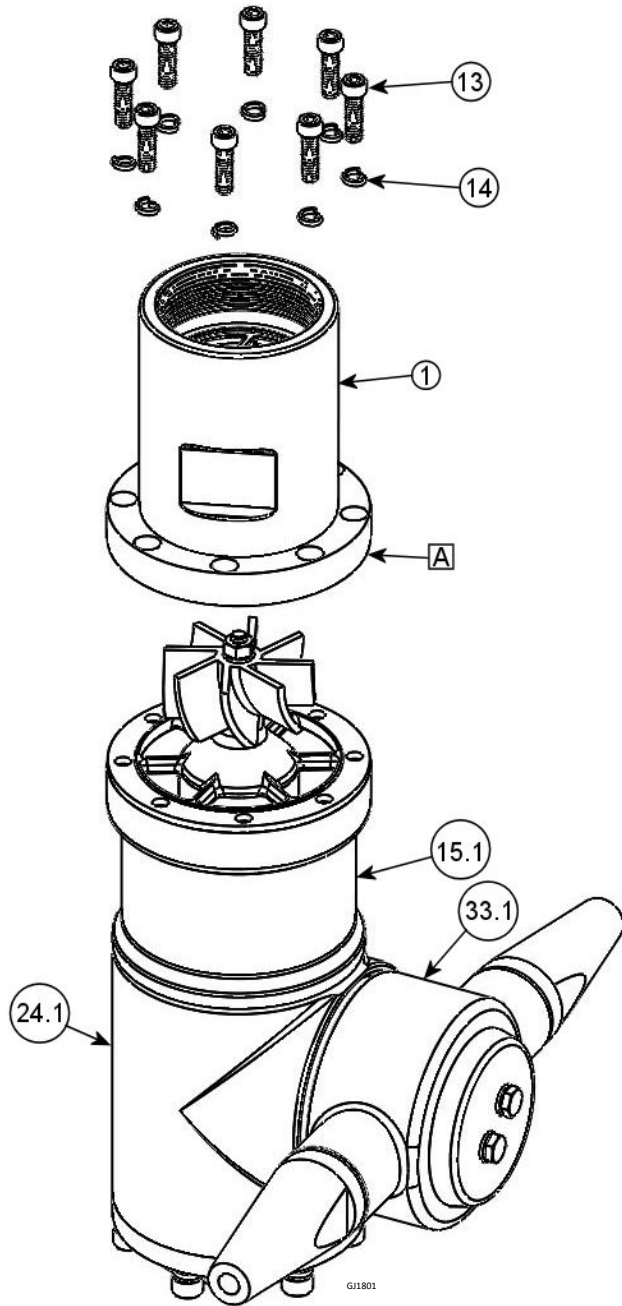
NOTE 1: 2 1/2" NPT or 2 1/2" BSP

The Drawing shows Alfa Laval GJ 18 Tank Cleaning Machine.

8.1 AL GJ 18 View

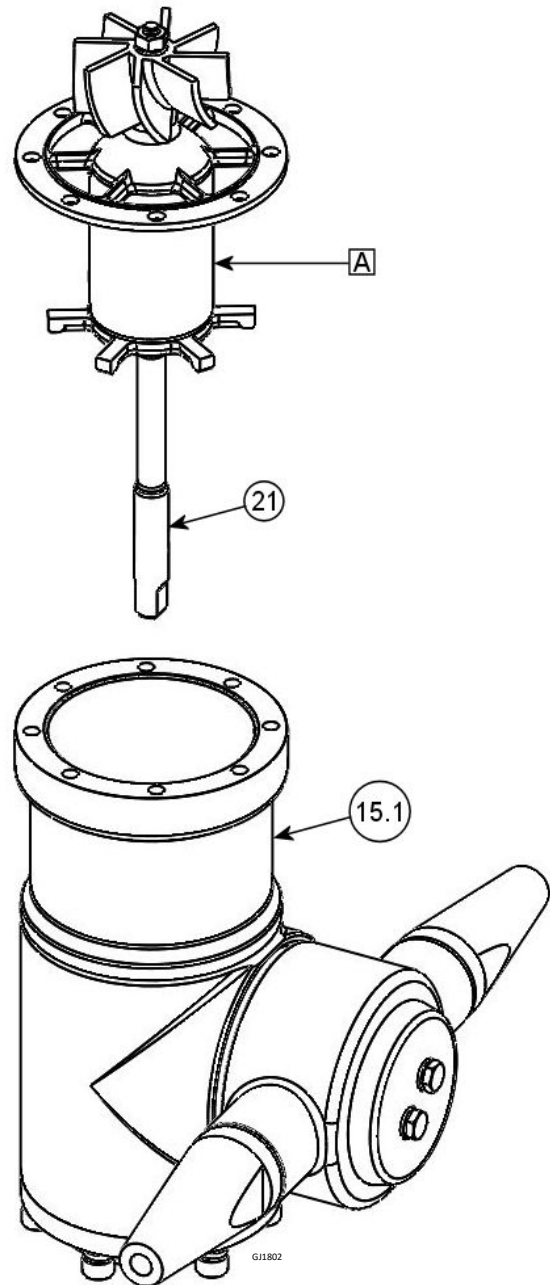


8.2 Assembly Drawings – 1 & 2



Drawing 1 – Inlet Collar Removal/Installation

A: Drawing 5

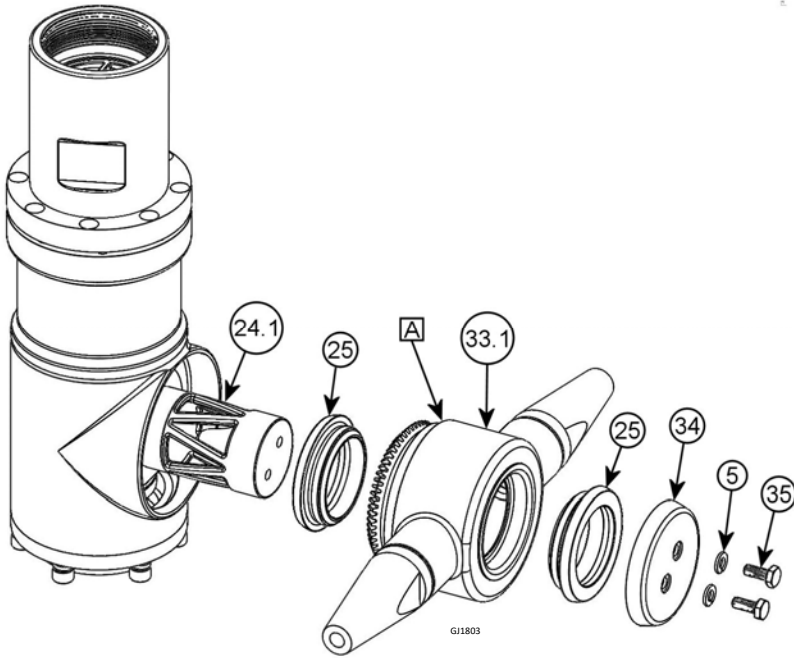


Drawing 2 – Gear Train Removal/Installation

A: Drawing 6

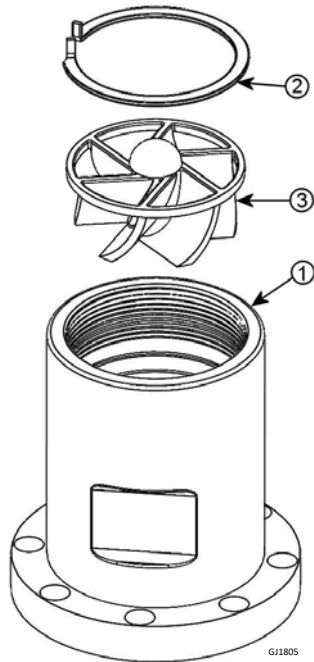
The Drawings show the Alfa Laval GJ 18 Tank Cleaning Machine.

8.3 Assembly Drawings – 3, 4 & 5

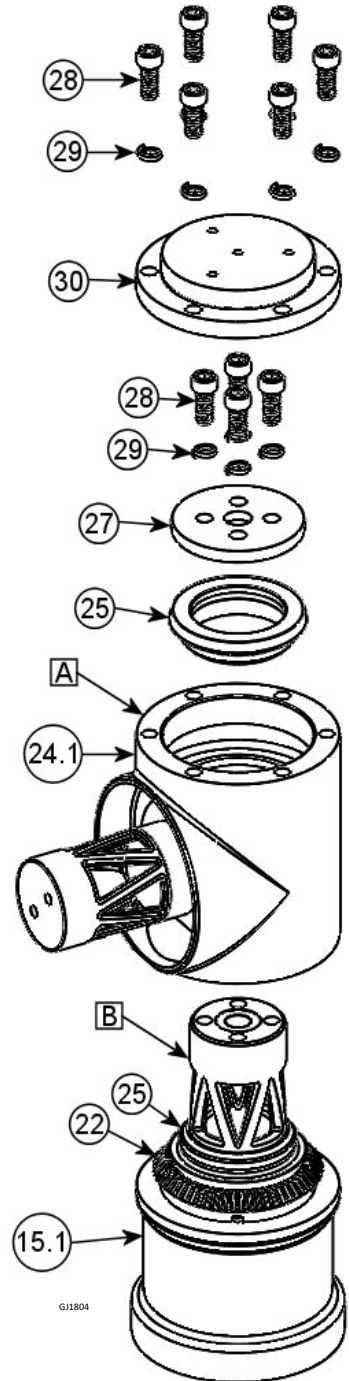


Drawing 3 – Nozzle Carrier Removal/Installation

A: Drawing 18



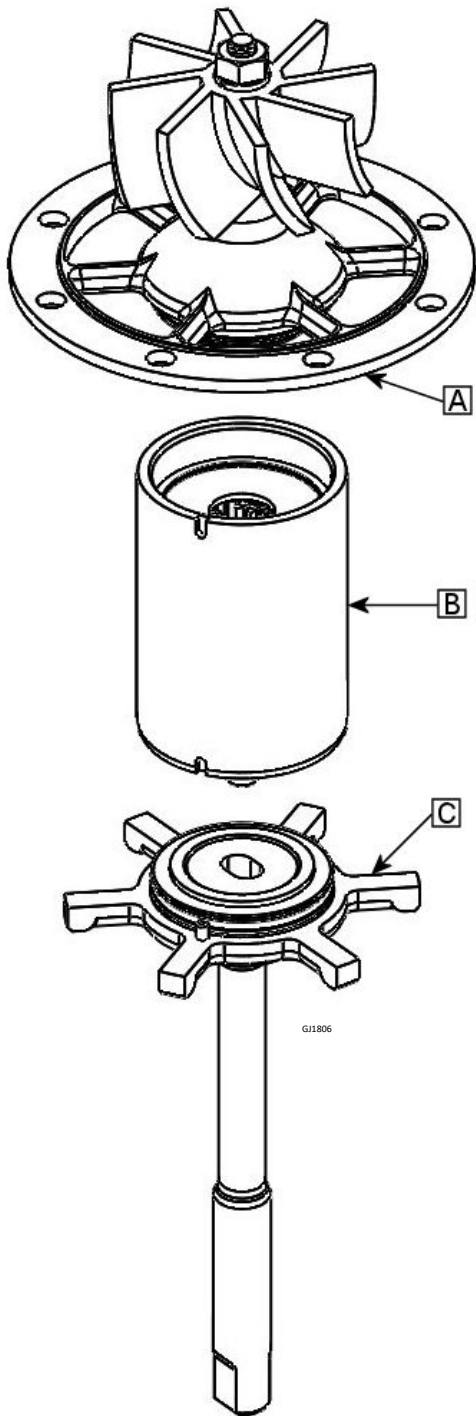
Drawing 5 – Inlet Collar Teardown/Assembly



Drawing 4 – Body Teardown/Assembly

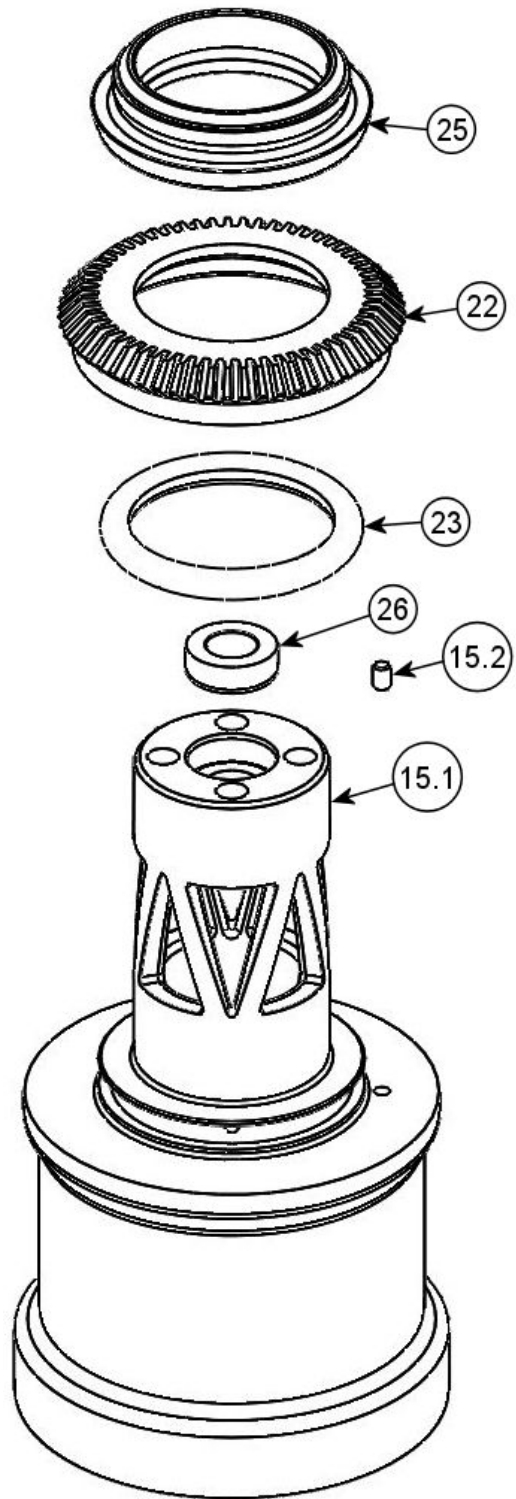
A: Drawing 7

8.4 Assembly Drawings – 6, 7, 8, 9, 10, 11, 12 & 13



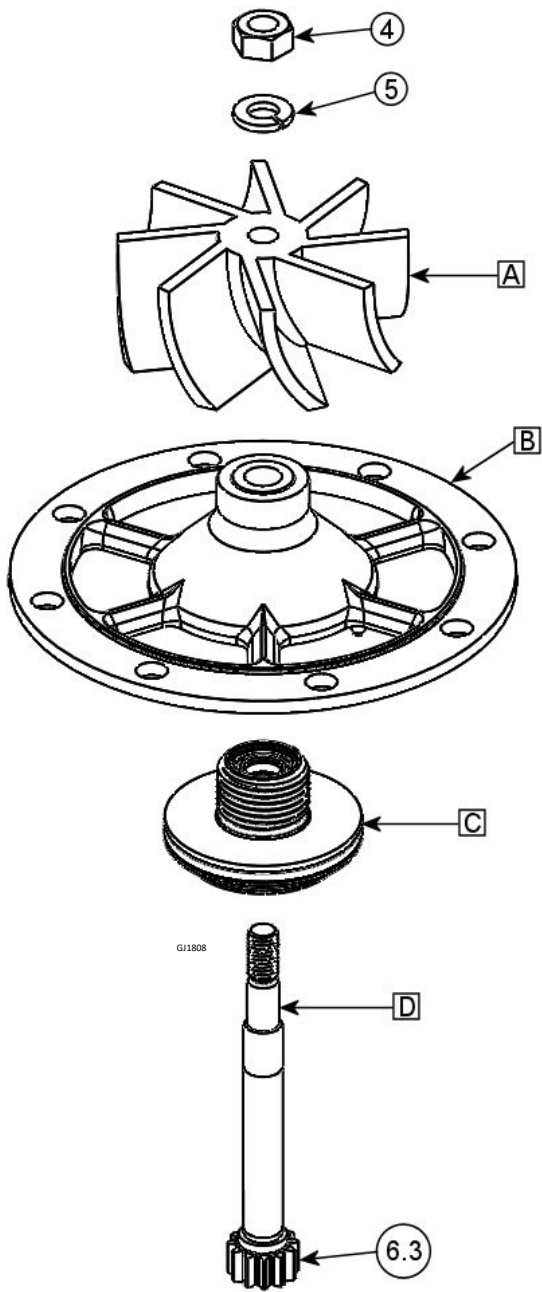
Drawing 6 – Gear Train Assembly

- A: Drawing 8
- B: Drawing 14
- C: Drawing 13



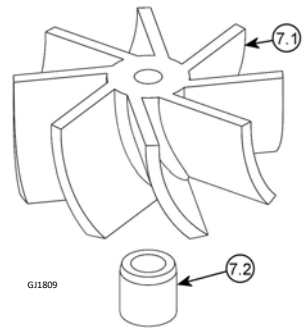
Drawing 7 – Stem Assembly

The Drawings show the Alfa Laval GJ 18 Tank Cleaning Machine.

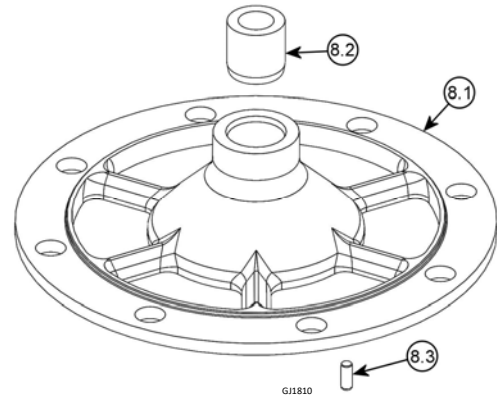


Drawing 8 – Input Shaft Housing Assembly

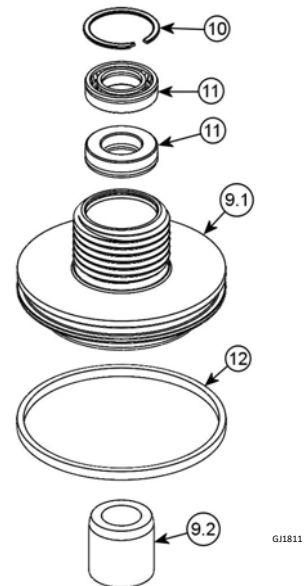
- A: Drawing 9
- B: Drawing 10
- C: Drawing 11
- D: Drawing 12



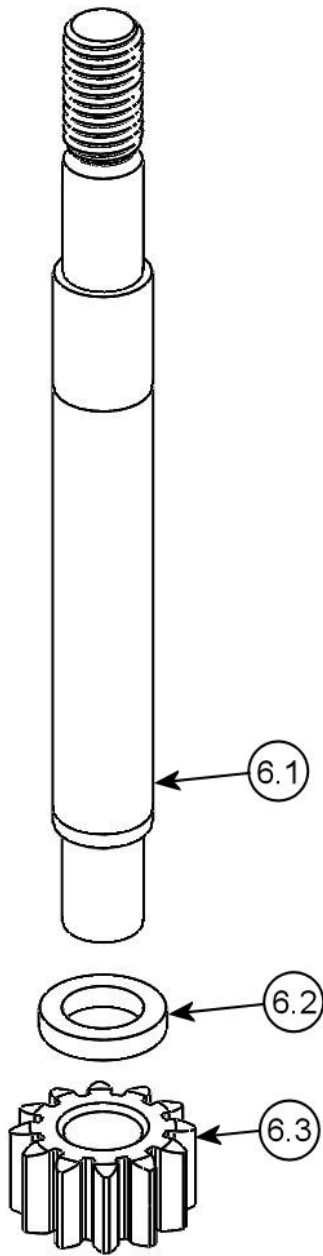
Drawing 9 – Rotor Assembly



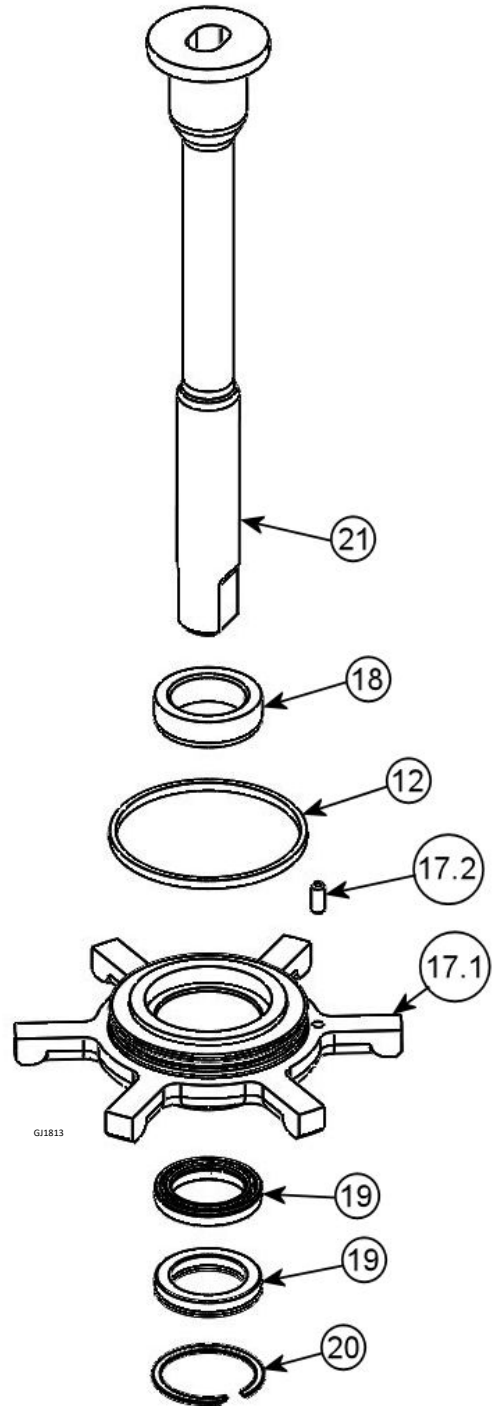
Drawing 10 – Input Shaft Bearing Housing Assembly



Drawing 11 – Input Shaft Seal Housing Assembly



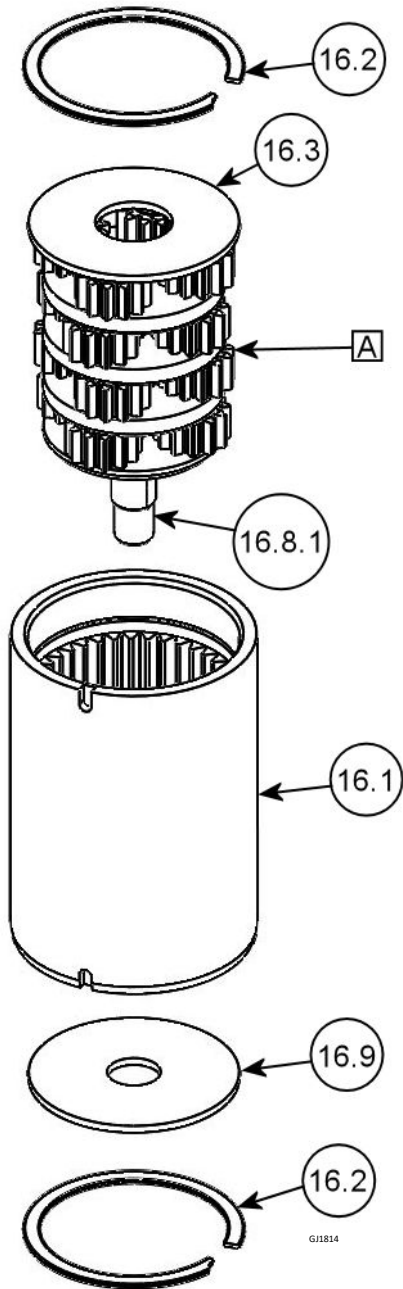
Drawing 12 – Input Pinion Shaft Assembly



Drawing 13 – Output Shaft Bearing Housing Assembly

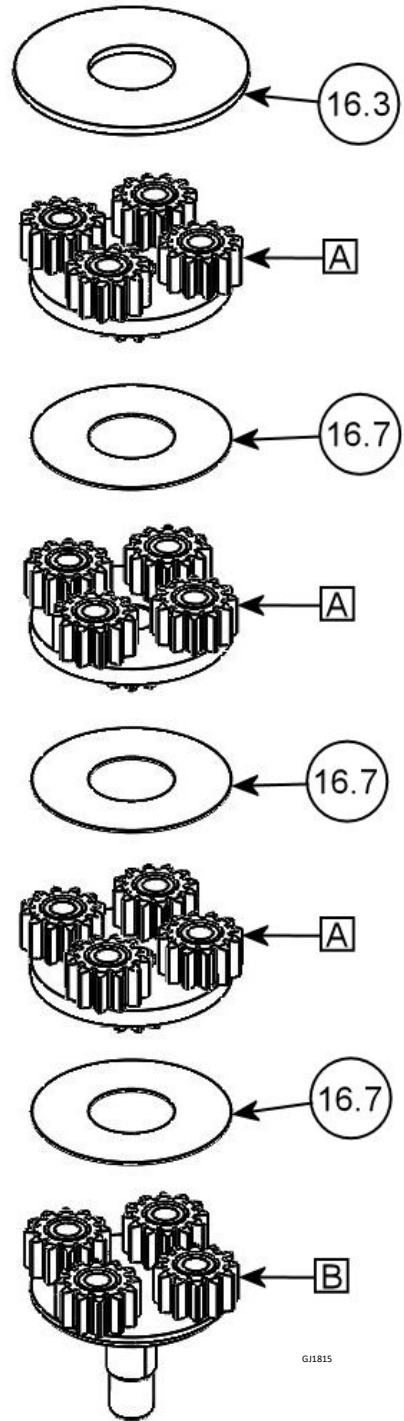
The Drawings show the Alfa Laval GJ 18 Tank Cleaning Machine.

8.5 Assembly Drawings – 14, 15, 16 & 17



Drawing 14 – Gear Box Assembly

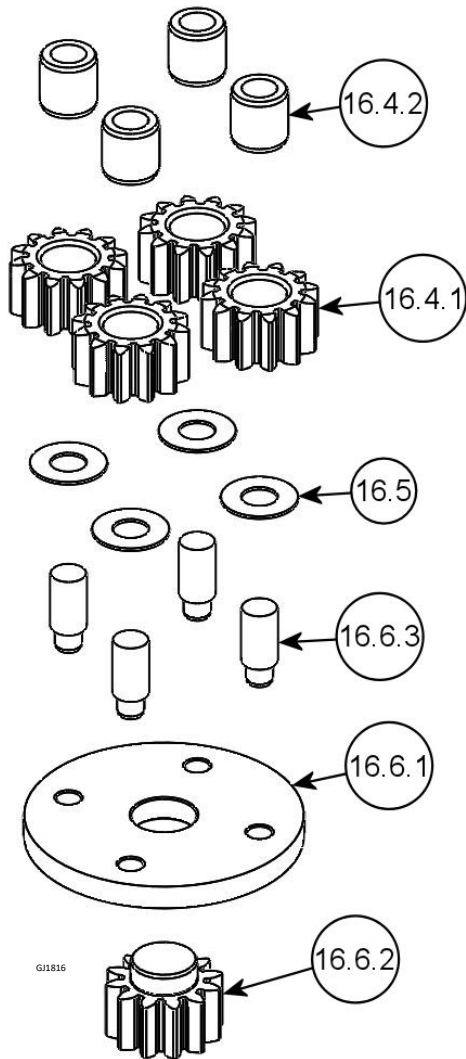
A: Drawing 15



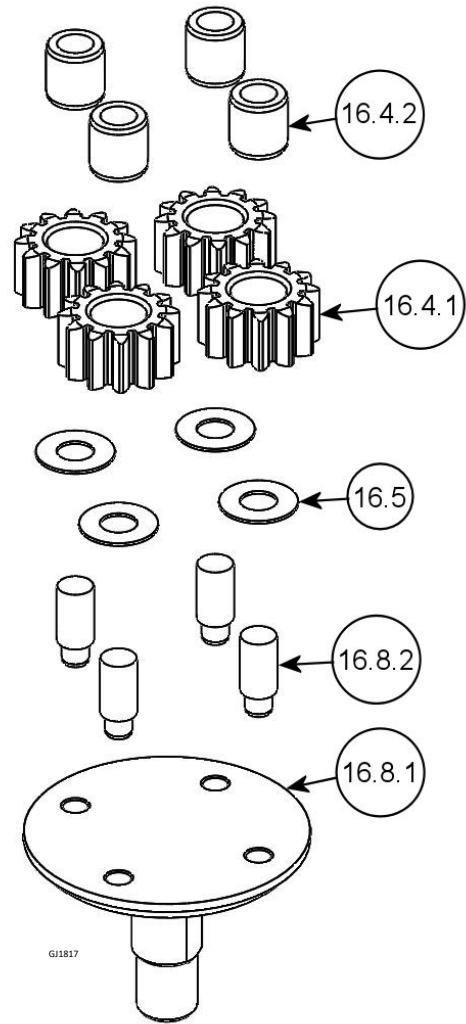
Drawing 15 – Gear Stack Assembly

A: Drawing 16

B: Drawing 17



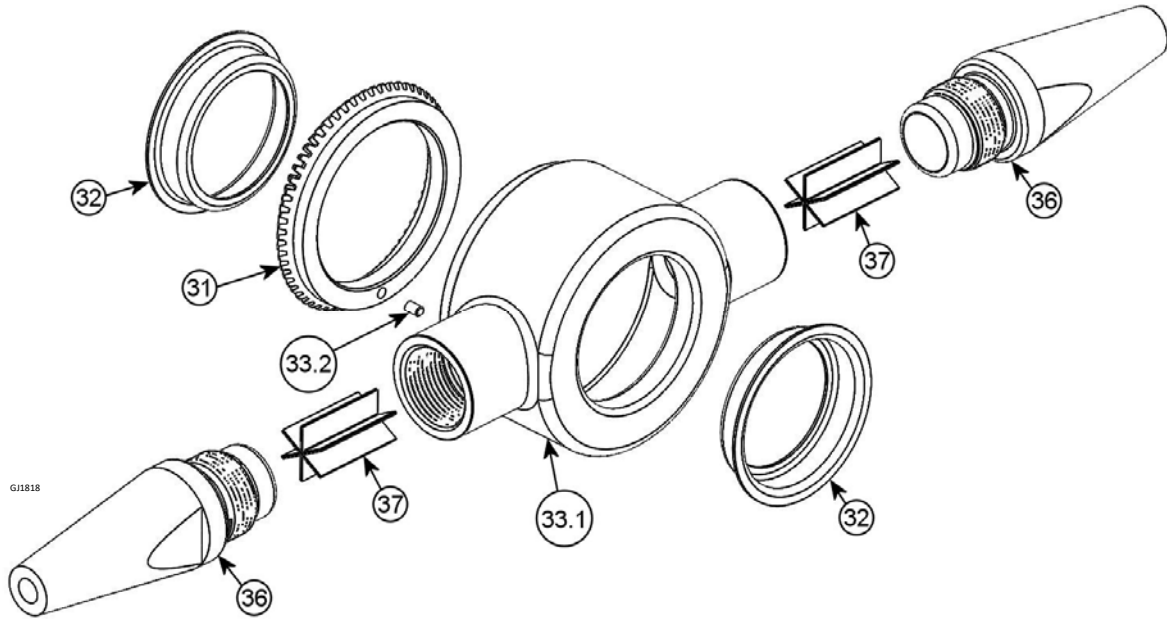
Drawing 16 – Upper Gear Stack Layer Assembly



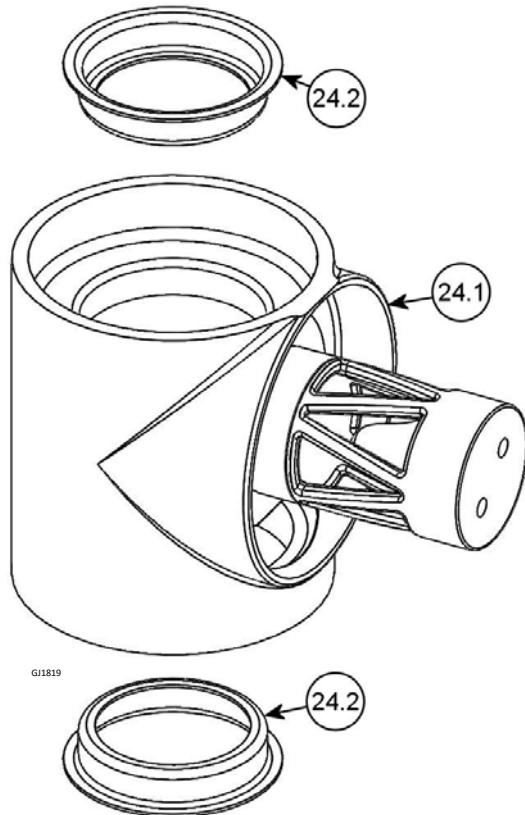
Drawing 17 – Lower Gear Stack Layer Assembly

The Drawings show the Alfa Laval GJ 18 Tank Cleaning Machine.

8.6 Assembly Drawings – 18 & 19



Drawing 18 – Nozzle Carrier Body Assembly



Drawing 19 – Tee Housing Assembly

All GJ 18 parts are listed below.

Quantities are given per machine, unless the part belongs to a subassembly.

Then, subassembly quantities are given per machine, and the parts of the subassembly are given per unit subassembly.

8.7 Parts List

Position Number	AL Part Number*	GJ Part Number	Description	Qty.
1	9614710700	18-108	INLET COLLAR	1
2	9614711200	18-115	STATOR RETAINING RING	1
3	9614710803	18-109-5	5 DEGREE STATOR	1
3	9614710802	18-109-15	15 DEGREE STATOR	1
3	9614710801	18-109-25	25 DEGREE STATOR	1
3	9614710800	18-109-35	35 DEGREE STATOR	1
4	9614663901	654-S	ROTOR NUT	1
5	9614662901	647-S	ROTOR/NAMEPLATE LOCK WASHER	3
6	9614711600	18-122-AS	ROTOR SHAFT ASSEMBLY	1
6.1		18-122	ROTOR SHAFT	(1)
6.2		18-124	ROTOR SHAFT CARBIDE THRUST WASHER	(1)
6.3		18-111	INPUT PINION	(1)
7	9614710900	18-110-AS	ROTOR ASSEMBLY	1
7.1		18-110	STANDARD ROTOR	(1)
7.2		18-113	ROTOR SHAFT CENTRAL BEARING	(1)
8	9614712100	18-128-AS	INPUT SHAFT BEARING HOUSING ASSEMBLY	1
8.1		18-128	INPUT SHAFT BEARING HOUSING	(1)
8.2		18-113	ROTOR SHAFT CENTRAL BEARING	(1)
8.3		6-166	GEARBOX PIN	(1)
9	9614714300	18-827-AS	INPUT SHAFT SEAL HOUSING ASSEMBLY	1
9.1		18-827	INPUT SHAFT SEAL HOUSING	(1)
9.2		18-113	ROTOR SHAFT CENTRAL BEARING	(1)
10	9614713700	18-164	INPUT SHAFT SEAL SNAP RING	1
11	9614713900	18-167	INPUT SHAFT SEAL	2
12	9614636701	18-143	GEAR BOX O-RING - VITON	2
12	9614636702	18-143-E	GEAR BOX O-RING - EPDM (7-457-E)	2
13	9614713300	18-150	INLET COLLAR CAP SCREW	8
14	9614713500	18-153	INLET COLLAR LOCK WASHER	8
15	9614710301	18-103-AS	STEM PIN ASSEMBLY	1
15.1	9614710300	18-103	STEM	(1)
15.2	9614713800	18-166	STEM BEVEL GEAR LOCATION PIN ** (PIN DRIVE ONLY)	(1**)
16	9614711801	18-125-AS	GEAR TRAIN CARTRIDGE ASSEMBLY	1
16.1	9614711800	18-125	PLANETARY RING GEAR	1
16.2	9614711500	18-121	GEAR BOX SNAP RING	2
16.3	9614714200	18-170	TOP PLANETARY LARGE WASHER	1
16.4	9614712600	18-139-AS	PLANET GEAR BUSHING ASSEMBLY	16
16.4.1		18-139	PLANET GEAR	(1)
16.4.2	9614712000	18-127	PLANET GEAR BUSHING	(1)
16.5	9614712900	18-144	PLANET GEAR WASHER	16
16.6	9614712500	18-137-AS	PLANET UPPER PLATFORM ASSEMBLY	3
16.6.1		18-137	PLANET CARRIER PLATE	(1)
16.6.2		18-138	PLANET GEAR PINION	(1)
16.6.3		18-130	PLANET GEAR IDLER SHAFT	(4)
16.7	9614711900	18-126	INTER-TIER PLANETARY WASHER	3
16.8	9614712800	18-141-AS	PLANET LOWER PLATFORM ASSEMBLY	1
16.8.1		18-141	PLANETARY OUTPUT SHAFT	(1)
16.8.2		18-130	PLANET GEAR IDLER SHAFT	(4)
16.9	9614712700	18-140	PLANETARY OUTPUT SHAFT WASHER	1

*Parts and assemblies are only assigned an Alfa Laval part number if they are available for individual sale. To purchase spare parts, or if you think you may need parts beyond those listed, please contact your local Alfa Laval sales company.

8 Parts List and Service Kits

Parts are listed below.

Quantities are given per machine, unless the part belongs to a subassembly.

Then, subassembly quantities are given per machine, and the parts of the subassembly are given per unit subassembly.

Pos.	AL Part Number*	GJ Part Number	Description	Qty.
17	9614712200	18-129-AS	OUTPUT SHAFT BEARING HOUSING ASSEMBLY	1
17.1		18-129	OUTPUT SHAFT BEARING HOUSING	(1)
17.2		6-166	GEARBOX PIN	(1)
18	9614713000	18-145	OUTPUT SHAFT UPPER CARBIDE BEARING	1
19	9614714000	18-168	OUTPUT SHAFT SEAL	2
20	9614711700	18-123	OUTPUT SHAFT SEAL SNAP RING	1
21	9614711000	18-112	TRANSITION OUTPUT SHAFT	1
22	9614711300	18-117	TEE HOUSING BEVEL GEAR	1
23	9614714100	18-169	CLUTCH O-RING – VITON	1
23	9614714101	18-169-E	CLUTCH O-RING – EPDM	1
24	9614710400	18-104-AS	TEE HOUSING CUP ASSEMBLY	1
24.1		18-104	TEE HOUSING	(1)
24.2	9614712400	18-132	TEE AND NOZZLE HOUSING CUP	(2)
25	9614712300	18-131	LABYRINTH BEARING	4
26	9614713200	18-147	OUTPUT SHAFT LOWER BEARING	1
27	9614713100	18-146	STEM BASE	1
28	9614713400	18-151	STEM/TEE HSG BASE CAP SCREW	10
29	9614713600	18-154	STEM/TEE HSG BASE LOCK WASHER	10
30	9614711100	18-114	TEE HOUSING BASE	1
31	9614711400	18-118	NOZZLE HOUSING BEVEL GEAR	1
32	9614712400	18-132	TEE AND NOZZLE HOUSING CUP	2
33	9614710500	18-105-AS	NOZZLE CARRIER PIN ASSEMBLY	1
33.1		18-105	NOZZLE CARRIER	(1)
33.2	9614713800	18-166	NOZZLE CARRIER BEVEL GEAR LOCATION PIN	(1)
34	9614710600	18-106	NAMEPLATE	1
35	9614663301	648-BS	NAME PLATE SCREW	2
36	9614655704	607-.375	GJ 4 NOZZLE - 3/8"	2
36	9614655705	607-.438	GJ 4 NOZZLE - 7/16"	2
36	9614655706	607-.500	GJ 4 NOZZLE - 1/2"	2
36	9614655707	607-.563	GJ 4 NOZZLE - 9/16"	2
36	9614655708	607-.625	GJ 4 NOZZLE - 5/8"	2
37	9614655801	608	GJ 4 STREAM STRAIGHTENER	2

*Parts and assemblies are only assigned an Alfa Laval part number if they are available for individual sale. To purchase spare parts, or if you think you may need parts beyond those listed, please contact your local Alfa Laval sales company.

8.8 Minor Service Kits

Article no: 9614714400 18EPDMKIT GJ 18 EPDM MINOR KIT				
Pos. no.	Part No.	Gamajet Part No.	Description	No.
25	9614712300	18131	LABYRINTH BEARING	4 pcs.
18	9614713000	18145	OUTPUT SHAFT UPPER BEARING	1 pcs.
26	9614713200	18147	OUTPUT SHAFT LOWER BEARING	1 pcs.
11	9614713900	18167	INPUT SHAFT SEAL	2 pcs.
19	9614714000	18168	OUTPUT SHAFT SEAL	2 pcs.
23	9614714101	18169E	CLUTCH O-RING – EPDM	1 pcs.
12	9614636702	18143E	GEAR BOX O-RING – EPDM (7457E)	2 pcs.
16.4.2	9614712000	18127	PLANET GEAR BUSHING	16 pcs.

Article no: 9614714500 18VITONKIT GJ 18 VITON MINOR KIT				
Pos. no.	Part No.	Gamajet Part No.	Description	No.
25	9614712300	18131	LABYRINTH BEARING	4 pcs.
18	9614713000	18145	OUTPUT SHAFT UPPER BEARING	1 pcs.
26	9614713200	18147	OUTPUT SHAFT LOWER BEARING	1 pcs.
11	9614713900	18167	INPUT SHAFT SEAL	2 pcs.
19	9614714000	18168	OUTPUT SHAFT SEAL	2 pcs.
23	9614714100	18169	CLUTCH O-RING – VITON	1 pcs.
12	9614636701	18143	GEAR BOX O-RING – VITON (7457)	2 pcs.
16.4.2	9614712000	18127	PLANET GEAR BUSHING	16 pcs.

8 Parts List and Service Kits

8.9 Major Service Kits

Article no: 9614714401 18EPDMMAJKIT GJ 18 EPDM MAJOR KIT				
Pos. no.	Part No.	Gamajet Part No.	Description	No.
25	9614712300	18131	LABYRINTH BEARING	4 pcs.
18	9614713000	18145	OUTPUT SHAFT UPPER BEARING	1 pcs.
26	9614713200	18147	OUTPUT SHAFT LOWER BEARING	1 pcs.
11	9614713900	18167	INPUT SHAFT SEAL	2 pcs.
19	9614714000	18168	OUTPUT SHAFT SEAL	2 pcs.
23	9614714101	18169E	CLUTCH O-RING – EPDM	1 pcs.
12	9614636702	18143E	GEAR BOX O-RING – EPDM (7457E)	2 pcs.
16.4.2	9614712000	18127	PLANET GEAR BUSHING	16 pcs.
22	9614711300	18117	TEE HOUSING BEVEL GEAR	1 pcs.
31	9614711400	18118	NOZZLE HOUSING BEVEL GEAR	1 pcs.
16.7	9614711900	18126	INTER-TIER PLANETARY WASHER	3 pcs.
24.2, 32.2	9614712400	18132	TEE AND NOZZLE HOUSING CUP	4 pcs.
16.5	9614712900	18144	PLANET GEAR WASHER	16 pcs.

Article no: 9614714501 18VITONMAJORKIT GJ 18 VITON MAJOR KIT				
Pos. no.	Part No.	Gamajet Part No.	Description	No.
25	9614712300	18131	LABYRINTH BEARING	4 pcs.
18	9614713000	18145	OUTPUT SHAFT UPPER BEARING	1 pcs.
26	9614713200	18147	OUTPUT SHAFT LOWER BEARING	1 pcs.
11	9614713900	18167	INPUT SHAFT SEAL	2 pcs.
19	9614714000	18168	OUTPUT SHAFT SEAL	2 pcs.
23	9614714100	18169	CLUTCH O-RING – VITON	1 pcs.
12	9614636701	18143	GEAR BOX O-RING – VITON (7457)	2 pcs.
16.4.2	9614712000	18127	PLANET GEAR BUSHING	16 pcs.
22	9614711300	18117	TEE HOUSING BEVEL GEAR	1 pcs.
31	9614711400	18118	NOZZLE HOUSING BEVEL GEAR	1 pcs.
16.7	9614711900	18126	INTER-TIER PLANETARY WASHER	3 pcs.
24.2, 32.2	9614712400	18132	TEE AND NOZZLE HOUSING CUP	4 pcs.
16.5	9614712900	18144	PLANET GEAR WASHER	16 pcs.

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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