Instruction Manual for Freshwater Generator Type JWSP-26-C100

Serial No.: NK-01053

Shipname/
Hull No.: H5119

Build at yard: Daewoo Heavy Industrie

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FWG Order Specification

Safety Instructions and Warnings

Should you need further clarification regarding this manual, do not hesitate to contact your local Alfa Laval representative - or call Alfa Laval Desalt directly.

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1.0.0 Safety Instructions and Warnings

The following symbols in this manual point out safety precautions. It means your attention is needed and your safety is involved.

WARNING

This symbol is used to indicate the presence of a hazard which can or will cause severe personal injury, if the warning is ignored.

CAUTION

Certain passages of the text will be marked with a caution mark. This mark indicates the presence of hazard which will or can cause property damage if the instructions are not observed.

NOTE

This type of instruction indicates a situation which, if not avoided, could result in damage to the equipment.

It is the owner's and operator's responsibility to see that any person involved with the use or operation of this equipment follow all safety instructions.

Read all safety instructions carefully and insist that they will be followed by those working with you and for you. Not following the instructions may cause severe personal injury or damage the equipment beyond repair.

Do not allow this equipment to be used if it is faulty or the operator does not understand the proper use.

WARNING

The freshwater generator is not to be operated in polluted water or within 20 miles from the coast

Freshwater must not be produced from polluted water, as the produced water can be unsuitable for human consumption.

If manuals are translated to local language the unit comply with the EEC Machinery Directive and EN 292-1/2 standards. For EEC land installations manuals MUST be available in local language before installing and operating the unit.

The unit also comply with EN 50081-2 and EN 50082-2 “Industry” with regards to the EMC directive from EEC.

WARNING

Noise hazards
- Use ear protection in noisy environments.

Crush hazards
- Use correct lifting tools.
- Do not work under hanging load.

Burn hazard
- Wear gloves to avoid burns by hot surfaces.

Cut hazards
- Wear gloves to avoid cuts by sharp edges when handling machined parts.
- Wear helmet to avoid cuts by sharp edges during maintenance of the equipment.

NOTE

- Max. ambient temperature for the equipment is 50°C (122°F).
- Min. ambient temperature for the equipment is 0°C (32°F).

System Description

1.0.0 Working Principle

The combined brine/air ejector driven by the ejector pump creates a vacuum in the system in order to lower the evaporation temperature of the feedwater.

The feedwater is introduced into the evaporator section through an orifice, and is distributed into every second plate channel (evaporation channels).

The hot water is distributed into the remaining channels, thus transferring its heat to the feedwater in the evaporation channels.

Having reached boiling temperature - which is lower than at atmospheric pressure - the feed water undergoes a partial evaporation, and the mixture of generated vapour and brine enters the separator vessel, where the brine is separated from the vapour and extracted by the combined brine/air ejector.

Having passed a demister the vapour enters every second plate channel in the condenser section.

The sea water supplied by the combined cooling/ejector water pump distributes itself into the remaining channels, thus absorbing the heat being transferred from the condensing vapour.

The produced freshwater is extracted by the freshwater pump and led to the freshwater tank.

1.1.0 Freshwater Quality

To continuously check the quality of the produced freshwater, a salinometer is provided together with an electrode unit fitted on the freshwater pump delivery side.

If the salinity of the produced freshwater exceeds the chosen maximum value, the dump valve and alarm are activated to automatically dump the produced freshwater to the bilge.

If there are no special requirements from the authorities, the produced freshwater can be used directly as drinking water.

1.2.0 Main Components

The freshwater generator consists of the following components:

1. **Evaporator section**
   The evaporator section consists of a plate heat exchanger and is enclosed in the separator vessel.

2. **Separator vessel**
   The separator separates the brine from the vapour.

3. **Condenser section**
   Just like the evaporator section the condenser section consists of a plate heat exchanger enclosed in the separator vessel.

4. **Combined brine/air ejector**
   The ejector extracts brine and in condensable gases from the separator vessel.

5. **Ejector pump**
   Normally, the ejector pump is delivered by Alfa Laval, and the ejector pump is a single-stage centrifugal pump. This pump supplies the condenser with sea water and the brine/air ejector with jet water as well as feed water for evaporation.

6. **Freshwater pump**
   The freshwater pump is a single-stage centrifugal pump. The freshwater pump extracts the produced freshwater from the condenser, and pumps the water to the freshwater tank.

7. **Salinometer**
   The salinometer continuously checks the salinity of the produced water. The alarm set point is adjustable.

8. **Control panel**
   Normally, the control panel is delivered by Alfa Laval. It contains motor starters, running lights, salinometer, contacts for remote alarm and is prepared for start/stop.

1.3.0 Alternative Steam

1. **Steam injector**
   Instead of jacket cooling water heating, saturated live steam can alternatively be used as heating medium for the freshwater generator. In the steam injector the steam transfers partly heat, partly kinetic energy to the circulating water.

   The condensate produced in this circuit is transferred to the condensate well through G3.

2. **Safety valve**
   If the pressure after the steam injector exceeds 1 bar g the safety valve will open to secure the vessel.

3. **Steam quality**
   The steam supplied to the steam injector must be saturated steam.

Operating Instructions

WARNING

DO NOT operate the plant in polluted water.

Freshwater must not be produced from polluted water, as the produced water will be unsuitable for human consumption.

1.0.0 Starting and Stopping Procedure

CAUTION

Before starting up please observe instructions for feedwater treatment, see “Chemical dosing of scale control chemicals”.

Please refer to PI-diagram (see “FWG Order Specification”).

1.1.0 Starting-up the Plant with Jacket Cooling Water Heating

1. Open valves on the suction and discharge side of the ejector pump PU-SC-01.
2. Open overboard valve for combined brine/air ejector.
3. Close **air screw VA-E1-01** on the separator.
4. Start **ejector pump PU-SC-01** to create a vacuum of min. 90%.

   Pressure at combined brine/air ejector inlet minimum 300 kPa (3.0 kp/cm²).

   Back pressure at combined brine/air ejector outlet maximum 60 kPa (0.6 kp/cm²).

1.1.1 Evaporation

When there is a minimum of 90% vacuum (after maximum 10 minutes),

CAUTION

To secure that the boiler water and the jacket water do not mix the two butterfly **valves** in the steam injector circuit must be closed.

5. Close the two butterfly **valves** in the steam injector circuit.

6. Open valve for feedwater treatment, if any.

7. Open hot water inlet and outlet valves.

8. Start hot water supply to distiller by adjusting bypass valve step-wise 10°C, until the desired jacket water temperature is reached.

   The boiling temperature now rises, while the obtained vacuum drops to approx. 85%.

   This indicates that evaporation has started.

1.1.2 Condensation

After approx. 3 minutes the boiling temperature will drop again, and normal vacuum is reestablished.

9. Open valve to freshwater tank.

10. Switch on salinometer.

11. Start **freshwater pump PU-FR-01/PU-FR-02**.

NOTE

The freshwater pump pressure must be between 120 and 160 kPa (1.2 - 1.6 kp/cm²).

1.2.0 Adjustment of Jacket Water Flow

Please refer to “FWG Order Specification” for specified hot water flow.

In order to obtain the specified flow of hot water, it is necessary to adjust the bypass

valve until desired flow is achieved.

The flow can be calculated as follows:

$$M_{JW} = \frac{K_{JW} \times \text{cap.m}^3/24\text{h}}{\Delta t_{JW}} = \text{m}^3/\text{h}$$

Where:

M_{JW} = Flow of hot water in one hour.

K_{JW} = Constant=26.67 for 1-stage freshwater generator
= Constant =15.52 for 2-stage freshwater generator

Δt = Difference in temperature of hot water in and out.

Cap.m³/24h = Freshwater production in 24 hours, i.e. production in 5 min.times 288.

Example: cap. m³/24h = 20m³
T_{SW} = 32°C

Δt_{JW} = 6°C

1-stage freshwater generator

$$M_{JW} = \frac{26.67 \times 20}{6} = 89 \text{ m}^3/\text{h}$$

1.3.0 Adjustment of Sea Cooling Water

The sea cooling water flow is correct, when the pressure at the inlet of the combined brine/air ejector is between 300 and 400 kPa (3.0 - 4.0 kp/cm².).

1.4.0 Stopping the Plant

1. Stop hot water supply to distiller.
2. Close valve for feedwater treatment, if any.
3. Stop **freshwater pump PU-FR-01/PU-FR-02.**
4. Switch off salinometer.
5. Stop **ejector pump PU-SC-01.**

6. Open **air screw VA-E1-01.**
7. Close inlet and outlet valves for ejector pump.
8. Close overboard valve for combined brine/air ejector.
9. Close the valve to fresh water tank.

> **CAUTION**
>
> All valves must be shut, while the generator is out of operation. Except air screw.

2.0.0 Before Starting Up the Plant with Steam Injection Equipment

> **WARNING**
>
> The steam arrangement must be filled with fresh water from hydrophone system, before steam is supplied to the system.

When changing from jacket water heating to steam injection heating

1. Close in- and outlet valves for jacket cooling water system (yard supply)
2. Empty the jacket cooling water by G4 to the bilge
3. Open the plug at G2.
4. When empty: close the outlet G4

To fill up the steam injection system with clean fresh water or steam condensate.

5. Open the two butterfly **valves** in the steam injector circuit
6. Fit a water hose into **G2**.
7. Fill up the system, with boiler feed water or clean fresh water until water escape from ball valve at the steam condensate outlet G3.
8. Then close this valve.
9. Dismantle the water hose.

10. Close the G2 with a plug.

WARNING

No valve at all must be fitted on the pipe from the safety valve (G16) as this pipe must be open to the atmospheric pressure.

2.1.0 Starting Up the Plant with Steam Injection Equipment (AS)

1. Open valves on the suction and discharge side of the combined **ejector/cooling water pump PU-SC-01.**

2. Open overboard valve for **combined brine/air ejector EW-ES-01.**

3. Close **air screw VA-E1-01** on the separator.

4. Start **combined ejector/cooling water pump PU-SC-01** to create a vacuum of min. 90%.

   Pressure at combined brine/air ejector inlet minimum 300 kPa (3.0 kp/cm²).

   Back pressure at combined brine/air ejector outlet maximum 60 kPa (0.6 kp/cm²).

2.1.1 Evaporation

5. Open the two butterfly valves in the steam injector circuit.

6. Open valve for feedwater treatment, if any.

7. Open the steam inlet valve (yard supply) slowly.

8. Wait a few minutes until the equipment will be noiseless.

9. Continue the supply of steam until the desired inlet pressure is reached. Steam pressure must be in accordance with pressure stated in “Technical specification”.

WARNING

Max. back pressure in condensate discharge line is 80 kPa (0.8 kp/cm²).

2.1.2 Condensation

10. Open valve to freshwater tank.
11. Switch on salinometer.
12. Start **freshwater extraction/transfer pump PU-FR-01/PU-FR-02.**
13. Readjust the steam supply to reach the freshwater production.

> **NOTE**
>
> The freshwater pump pressure must be between 120 and 160 kPa (1.2 - 1.6 kp/cm²).

2.2.0 Adjustment of the Freshwater Production

The freshwater production can be regulated by adjustment of the quantity of steam supplied to the steam injector.

The steam inlet pressure corresponding to the production of fresh water in question can be regulated either by means of a manually operated regulating valve (yard supply) or by an automatic reduction valve (yard supply).

Steam pressure must be in accordance with pressure stated in “FWG Order Specification”.

> **WARNING**
>
> Do not open steam inlet valve for the steam injector before the ejector pump PU-SC-01 has been started and serves feed water to the evaporator.

2.3.0 Stopping the Plant Working with Steam Injection Heating

1. Close steam inlet valve (yard supply).
2. Close valve for feedwater treatment, if any
3. Stop **freshwater pump PU-FR-01/PU-FR-02.**

4. Switch off salinometer.
5. Stop **ejector pump PU-SC-01.**
6. Open **air screw VA-E1-01.**
7. Close inlet and outlet valves for ejector pump.
8. Close overboard valve for combined brine/air ejector.
9. Close the valve to fresh water tank.

> **CAUTION**
>
> When stopping the plant always check that the steam inlet valve is completely closed.
>
> This to avoid high temperature in the evaporator, as this might cause:
>
> - Scale formation on the inside of the heat exchanger plates.
> - Damage the gaskets in the heat exchanger.

2.4.0 Changing from Steam Injection Heating to Jacket Cooling Water

1. Close the valve for steam supply (yard supply).
2. Close the two butterfly valves for **steam injection equipment.**
3. Open the ball valve at the steam condensate outlet G3.
4. Empty the boiler water by G4 to the bilge.
5. When empty: Close the outlet G4.
6. Close the ball valve mentioned above.
7. Open the valves for in- and outlet jacket cooling water to the evaporator (yard supply).
8. Start hot water supply to distiller by adjusting bypass valve step-wise until the desired jacket water temperature is reached.

2.5.0 Long Term Standstill

If the distiller is out of operation for periods longer than 14 days, please observe “Maintenance of separator vessel”.

Maintenance

1.0.0 Why you need to perform regular maintenance duties

Regular maintenance of the plant will improve performance and availability.

The maintenance schedule on the following pages will tell you how often service should be performed on the main components.

As the actual operating conditions of the plant are of major influence on the life time, the overhaul dates are not obligatory but only recommended intervals.

When the plant has been in operation for a longer period of time and experience has been established as to the actual performance, it will be possible to adapt the maintenance schedule.

For service on minor components please refer to component instructions.

1.1.0 Overhaul Intervals

Component	Operating Hours	Action
Evaporator section	As required	Clean in inhibited acid bath
Condenser action	As required	Clean with pure freshwater and brush
Separator vessel with anodes	2000 h	See separator instructions
Combined ejector/cooling water pump with motor	8000 h	Measure seal ring and impeller. Examine mechanical shaft seal, cooling water pipe passage. Megger-test electric motor. Clean pump thoroughly before reassembly.
Freshwater extraction pump with motor	8000 h	See above
Combined air/brine ejector	8000 h	Measure nozzles and diffuser and compare to measurements in technical specification. Max. wear 20% on diffuser cylindrical bore.

Component	Operating Hours	Action
MV-valves	4000 h	Disassembly and inspect for damage
Demister	8000 h	Clean in inhibited acid bath
Manometers	8000 h	Adjust with control manometer
Salinometer	See “Maintenance of salinometer type DS-20”	See “Maintenance of salinometer type DS-20”

1.2.0 Maintenance of Separator Vessel

The front cover and the pressure plates for the heat exchanger sections (evaporator and condenser) are made of stainless steel with a special chemical treatment. This treatment will reestablish normal surface oxidation after work- up at the factory. The preparation is a natural protection of the stainless steel.

CAUTION

To preserve this natural protection DO NOT scrape or scratch the inside surface of the front cover.

Whenever the separator vessel is opened,

- check that the anodes are functioning.

If the anodes are not functioning and/or scarified, replace them.

NOTE

If the unit is stopped for a longer period than 14 days.

- Open front covers and clean unit inside with freshwater.
- Let the unit dry out completely, before closing covers.

1.3.0 Maintenance of Evaporator Section

Clean evaporator as follows:

1. Remove bolts in front cover, and open.

2. Loosen the

   2 nuts for P-16 distiller
   4 nuts for P-26 distiller

   in plate stack gradually, so that no nut is carrying the entire load alone.

3. Remove plate stack.

> **NOTE**
>
> If some of the gaskets come loose on removing plate stack, please see section 1.5.2

4. Submerge plates completely in a hot, inhibited acid bath at maximum 50ºC. For further instructions see “Chemical dosing of scale control chemicals”.

> **WARNING**
>
> Always follow carefully the suppliers instructions when using inhibited acids.
>
> Remember to neutralize according to suppliers instructions.

5. Examine plates and gaskets for possible damage, and remove damaged plates and/or replace damaged gaskets.

6. If a defective plate is found, remove the plate together with one of the adjacent plates.

NOTE

The assembly measurements must be reduced with

2.8 mm for P-16 distiller
3.5 mm for P-26 distiller

per plate, if plates are removed from plate stack.

CAUTION

The ES and EE plate cannot be removed but must always be replaced with a corresponding plate.

7. Reassemble evaporator section in accordance with assembly scheme.

8. Tighten plate stack to measurements stated in technical specification.

9. Pressure test evaporator section before closing front cover.

   The evaporator section is pressure tested by letting hot water circulate through the section with bypass valve for hot water in normal running position.

10. When the evaporator section is found to be tight, close front cover and tighten bolts.

11. Retighten cover, when vacuum has been reestablished.

1.4.0 Maintenance of Condenser Section

Clean condenser as follows:

1. Remove bolts in front cover, and open.

2. Loosen the

   2 nuts for P-16 distiller
   6 nuts for P-26 distiller

   in plate stack gradually, so that no nut is carrying the entire load alone.

3. Remove plate stack.

NOTE

If some of the gaskets come loose on removing plate stack, please see section 1.5.2

4. Scrub plates with a soft brush and plain hot water at maximum 50ºC.

5. Examine plates and gaskets for possible damage, and remove damaged plates and/or replace damaged gaskets.

6. If a defective plate is found, remove the plate and one of the adjacent plates.

NOTE

The assembly measurements must be reduced with

2.8 mm for P-16 distiller
3.5 mm for P-26 distiller

per plate, if plates are removed from plate stack.

CAUTION

The KS and KE plate cannot be removed but must always be replaced with a corresponding plate.

7. Reassemble condenser section in accordance with assembly scheme.

8. Tighten plate stack to measurements stated in technical specification.

9. Pressure test condenser section before closing front cover.

   The condenser section is pressure tested by letting sea water from the combined cooling water/ejector pump circulate through the section.

CAUTION

Before starting the combined ejector/cooling water pump, the feed water must be sealed off.

10. When the condenser section is found to be tight, close front cover and tighten bolts.

11. Retighten, when vacuum has been reestablished.

12. Do not forget to remove the feed water sealing as mentioned above.

1.5.0 Renewal of Plate Heat Exchanger Gaskets

1.5.1 Removal of Old Gaskets

Pull the old gaskets out of groove.

If the gasket cannot come off directly, heat the back of the gasket groove with a hot-air blower or butane gas burner.

Pay attention not to overheat the plates.

You will obtain a suitable temperature, if the flame is held 10 to 15 cm behind the plate.

WARNING

DO NOT use *acetylene gas*.

1.5.2 Cleaning

Charred or loose glue and rubber remains must be removed, e.g. using a rotating stainless steel brush. The width should be adapted (Ø40-50 mm, width 8-10 mm). Thin layers of glue which are difficult to remove, may remain.

Clean the gasket groove with a clean cloth, dipped in a solvent (acetone, methyl ethyl ketone, trichlorethylene etc.).

WARNING

Be careful when handling these solvents, as they may be hazardous to your health.

Observe suppliers' instructions.

Gaskets, that have loosened, can be glued on. Clean gasket groove carefully with a sharp tool. Then clean the loose part of the gasket with emery cloth or sandpaper. Finally clean groove and gasket with a solvent, and glue.

1.5.3 Preparation of New Gaskets

Dry new gaskets with a clean cloth that has been slightly moistened with a solvent.

1.5.4 Fitting New Gaskets

1. Apply a thin layer of glue to both gasket and groove.
2. Let the glue dry for 10-15 minutes.
3. Fit new gasket into groove.

Gaskets may sometimes be slightly short or long.

Short gaskets should be stretched before being fitted into the groove.

Long gaskets should be fitted into the grooves at the plate ends first and then gradually be pushed into the groove towards the middle.

If necessary, tape gasket into groove.

Chemical Dosing of Scale Control Chemicals

2.0.0 Prevention of Scaling

During the evaporation of sea water there is always a risk of scaling on the heating surfaces. This will lead to a reduction of the K-values of the heating surface and decreasing freshwater production and reduction of plant efficiency.

In order to effectively prevent scaling the operators must be aware of the factors influencing the scale formation.

2.1.0 Feed Water Ratio

The feedwater ratio is an extremely important factor. It is defined by the relationship between the feedwater amount fed into the plant and the produced amount of freshwater.

If the feedwater ratio is reduced, the concentration will rise in the plant subsequently resulting in scale formations.

Two things may shift the feedwater ratio: first of all direct adjustment of the feedwater system, and secondly exceeding the maximum freshwater production laid out for the plant. The operators must observe the following rules at all times.

CAUTION

DO NOT adjust feedwater system. Feedwater pressure min. 3.0 max. 4.0 bar g.

2.2.0 Chemical Dosage

In order to control scale formations on the heating surfaces and continuously ensure long operation periods without acid cleaning the plant, it is absolutely necessary to dose scale control additives to the feedwater. The operators must follow the instructions for chemical dosing given by the chemical supplier carefully.

CAUTION

If the distiller is operated at boiling temperatures above 45°C without chemicals, frequent cleaning of the evaporator will be necessary.

We recommend that you do not operate the freshwater distiller without recommended chemical dosage at boiling temperatures above 45°C. Even at lower temperatures it can be recommended.

2.2.1 Scale Inhibitor Dosage Equipment for Feed Water

Please refer to drawing, see “FWG Order Specification”.

- When adding chemicals mix thoroughly to ensure a homogenous blend of chemicals and water.

Use a fully soluble scale inhibitor, e.g. on polymer basis. The following products can be recommended:

NALFLEET Evaporator treatment 9-913

AMEROYAL EVAPORATOR TREATMENT

HEXAMETHAPHOSPHATE

1. Mix the required quantity for 24 hours operation in the tank according to maker’s instructions.

2. Adjust flowmeter to cover the maximum freshwater output from the distiller.

3. Flush the dosage system regularly.

2.2.2 Safety Precautions with the use of Chemicals

WARNING

1 USE eye protection and gloves. Avoid direct skin contact, eye contact or contact with clothes.

2 CLEAN empty containers before disposal.

3 If chemicals are spilled on clothes, rinse with water and dispose off clothes.

4 If chemicals are spilled on the floor, rinse with water and suck remaining chemicals off with sand. Clean the spot immediately afterwards.

5 Scale inhibitor is hazardous, if consumed in a concentrated solution. If consumed by mistake.
IMMEDIATELY SEEK MEDICAL ATTENTION.

6 If eyes get in contact with the chemicals, rinse for at least 20 minutes.
IMMEDIATELY SEEK MEDICAL ATTENTION.

Trouble-Shooting

3.0.0 Test Sheet

Before taking any action, please fill in a test sheet to find possible causes of malfunctions.

Test sheets can be found in the back of this binder.

3.1.0 Trouble Shooting Table

Problem	Cause	Action
Drop in production.	Partially blocked feed water orifice and/or sludge deposits on hot water side.	Dismantle evaporator section, and clean evaporator and orifice.
	Sludge on the heat exchanger plates on the sea water side.	Dismantle condenser section, and clean.
	Inlet channel in evaporator/ condenser plate stack blocked, e.g. with rust scales, gasket fragments etc.	Dismantle evaporator/ condenser section, and clean.
	Too low ejector pump pressure.	See instructions for “Low Sea Cooling water/Ejector pump flow / pressure”, below.
	Leakages	Carry out a pressure test at max. 150 kPa (1.5 kp/cm²) (21.8 PSI).a
	Foreign bodies in ejector nozzles.	Inspect nozzles, and clean. Replace nozzles, if damaged.
	Too high back pressure on ejector outlet side. Max 60 kPa (0.6 kp/cm²) (8.7 PSI).	Check overboard pipe and valves for blocking / functionability.
	Non-return valve in air extraction pipe defect.	Replace non-return valve.
	Hot water temperature too high.	Reduce to specified temperature.
	Defective water clock.	Examine water clock. Let the produced water flow through water clock into a 10 l pail, and check production with a stop watch.

Problem	Cause	Action
Low Sea Cooling water/Ejector pump flow / pressure. Minimum pressure 300 kPa (3.0 kp/cm²) (43.5 PSI). At inlet side of ejector.	Too low ejector pump pressure.	Clean, or replace pressure gauge.
	Suction strainer blocked.	Clean suction strainer.
	Valves on suction or pressure pipe defect.	Examine and overhaul defective valves.
	Leakage from suction pipe to pump.	Repair.
	Impeller / seal ring defective.	Check pump maximum clearance See “Maintenance of Ejector Pump”
	Clocked up condenser plate stack.	Dismantle condenser plate stack and clean.
	Pump rotating in wrong direction.	Interchange phases.
Sight glass overflow. Normal back pressure for freshwater pump is 120 - 160 kPa (1.2 - 1.6 kp/cm²) (17.4 - 23.2 PSI). Except for JWP-16-C40 generator type, where the max. back pressure is 80 kPa (0.8 kp/cm²) (11.6 PSI).	Suction pipe leakage.	Check suction pipe especially unions and connections. Repair.
	Mechanical seal in freshwater pump defect.	Replace mechanical seal.
	Impeller / seal ring in freshwater extraction pipe defect.	Check pump maximum clearance See “Maintenance of Freshwater Pump”
	Pump rotating in wrong direction.	Interchange phases.
	Valves to freshwater tank closed.	Check all valves.
	Inlet filter for water clock blocked.	Clean filter.
Salinity too high (more than 2.0 ppm).	Demister not fitted correctly.	Check that demister is fitted against baffle and front cover.
	Front cover gasket defect or not fitted correctly.	Replace front cover gasket.
	Insufficient brine extraction.	See separate instructions for insufficient brine extraction, below.
	Electrode unit defective or dirty.	Examine electrode unit for cracks. Check that it is fitted correctly. Clean, if necessary.

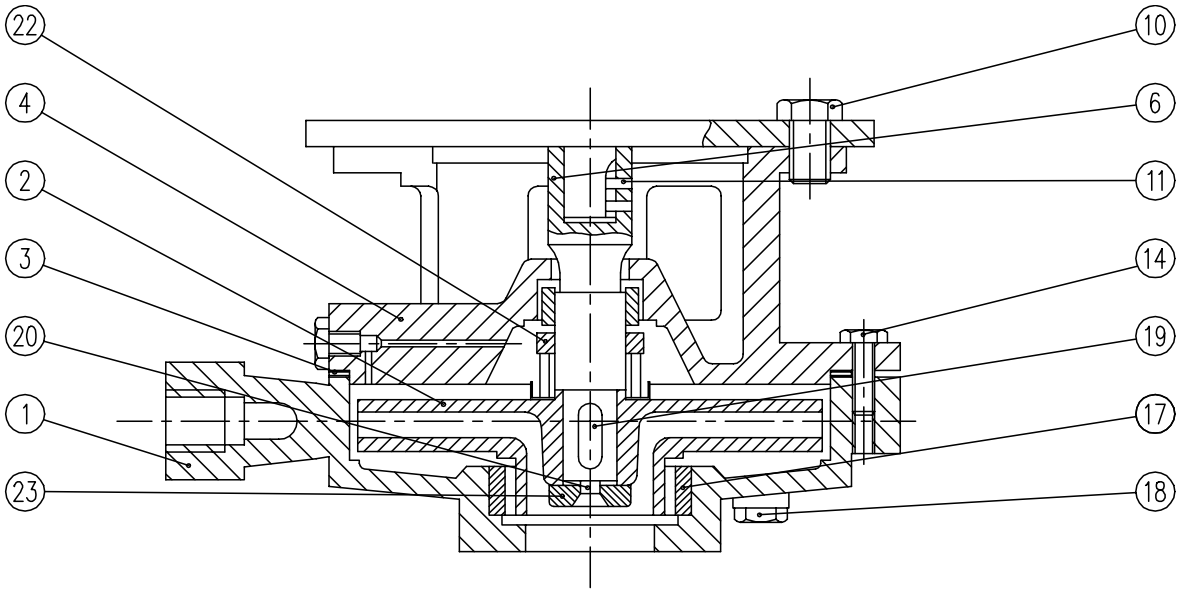
Problem	Cause	Action
	Leakage in condenser section.	Open distiller and pressure test condenser. Max. 600 kPa (6.0 kp/cm²) (87 PSI). If there is a defective plate, remove together with adjacent plate assemble plate stack according to new plate number with reduced assembly measurements. Check plate gaskets and replace, if necessary.
Insufficient brine extraction - brine level in sight glass higher than 20 mm.	Ejector pump pressure too low.	See special instructions for “Low Sea Cooling water/Ejector pump flow / pressure”, above.
	Foreign bodies in ejector nozzles.	Check nozzles, and clean. Replace damaged nozzles.
	Too high back pressure downstream of ejector.	Examine overboard pipe and valves.
	Wrong dimension of feedwater orifice.	Examine orifice dimension - check technical specification.
	Non-return valve in brine suction pipe of ejector defect.	Examine valve and repair, or replace.
Frequent refill of freshwater expansion tank due to loss of hot water.	Leakage in evaporator section.	Open distiller and pressure test condenser. Max. 600 kPa (6.0 kp/cm²) (87 PSI). If there is a defective plate, remove together with adjacent plates assemble plate stack according to new plate number with reduced assembly measurements. Check plate gaskets and replace, if necessary.
Abnormal amperage consumption of ejector pump motor.	Ejector nozzles defective.	Replace nozzles.
	Wrong dimension of feedwater inlet orifice.	Check dimensions on spare parts list, See List of spare part drawings”, and replace if necessary.
	Bearings in motor defective.	Examine with stetoscope, and replace bearings, if defective.
	Contactor defective.	Examine and replace contactor set, if defective.
	Breaking of phases.	Max. 5% difference in amperage between phases.

Maintenance of Freshwater Pump

4.0.0 Maintenance of Freshwater Pump Types PVVF 1525-1532-2040

The following instructions must be carefully observed whenever it becomes necessary to overhaul or repair the freshwater pump.

Please refer to drawing for item references in the text.



4.1.0 Overhaul of the Pump

1. Remove the **nuts 14** on the **pump casing 1.**
2. Lift motor with **pump cover 4** and **impeller 2** clear of **pump casing 1**.
3. Unscrew **countersunk screw 20** (right hand thread).
4. Remove impeller. Normally, it can be removed without using dismantling tools.
5. Remove **key 19.**
6. Remove the **mechanical shaft seal 22.**
7. Inspect the ceramic ring, the carbon ring and the spring.
8. Replace mechanical shaft seal, if necessary. It is recommended to grease the shaft and seat for the ceramic ring with glycerine in order to make it easier to assemble the mechanical shaft seal. Please also observe separate instructions for mechanical shaft seal delivered together with the seal.

9. Fit carbon ring, spring and spring holder on pump shaft.

10. Inspect impeller and the drilled sealing water channel for clogging, and clean.

11. **Remember to replace gasket 3.**

12. Reassemble in reverse order.

4.1.1 Clearance

In connection with the inspection be sure to measure the **impeller and wear ring 17** in order to secure that the clearance is no more than 0.5 mm on the diameter.

> **CAUTION**
>
> The **pump shaft 11** must only be dismantled, if pump shaft or electric motor bearing has to be replaced.
>
> In this case carefully observe “Dismantling pump shaft”.

4.1.2 Dismantling Pump Shaft

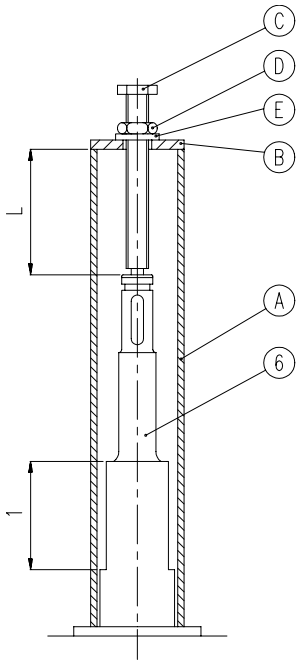
1. Dismantle the pump as described above.

2. Unscrew **pointed screws 11.**

3. Carefully insert two screw drivers behind the pump shaft, and loosen it.

   If the pump shaft does not come loose, use the special dismantling tools shown below.

   The tool is not Alfa Laval Desalt supply.



The tool consists of a pipe (A), a disc (B) with hole for the screw (C) and a nut (D), washer (E).

Please note that the length L must be longer than the length l.

Place pipe around the shaft. Fasten the screw with nut and washer into the threaded hole (M12) on the shaft end.

Loosen shaft by tightening the nut while holding on to the screw.

CAUTION

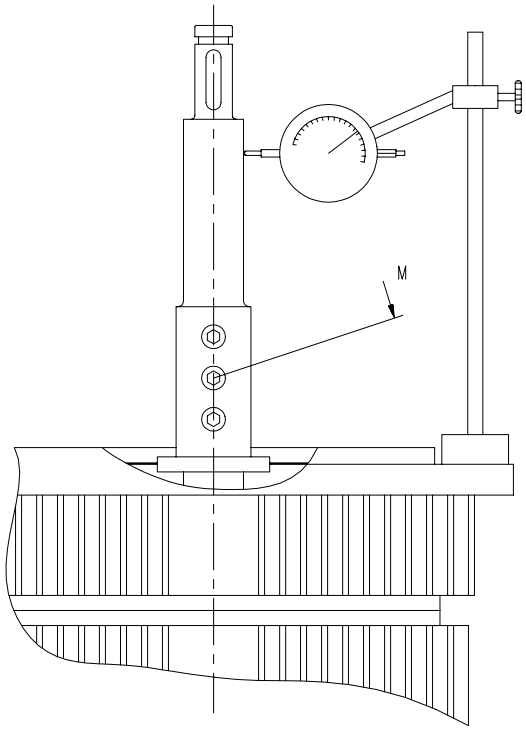
DO NOT grind the motor shaft.

4. Mount the new pump shaft on the motor shaft.

5. Make sure that the pump shaft fits the motor shaft without any obstructions, before final shaft fitting as follows:

   - Tap onto the end of the pump shaft slightly with a RUBBER hammer.

6. Tighten **pointed screws 11** as follows:



NOTE

The torque should be 5 Nm (0.5 kpm) and the maximum wobble 60 μ.m.

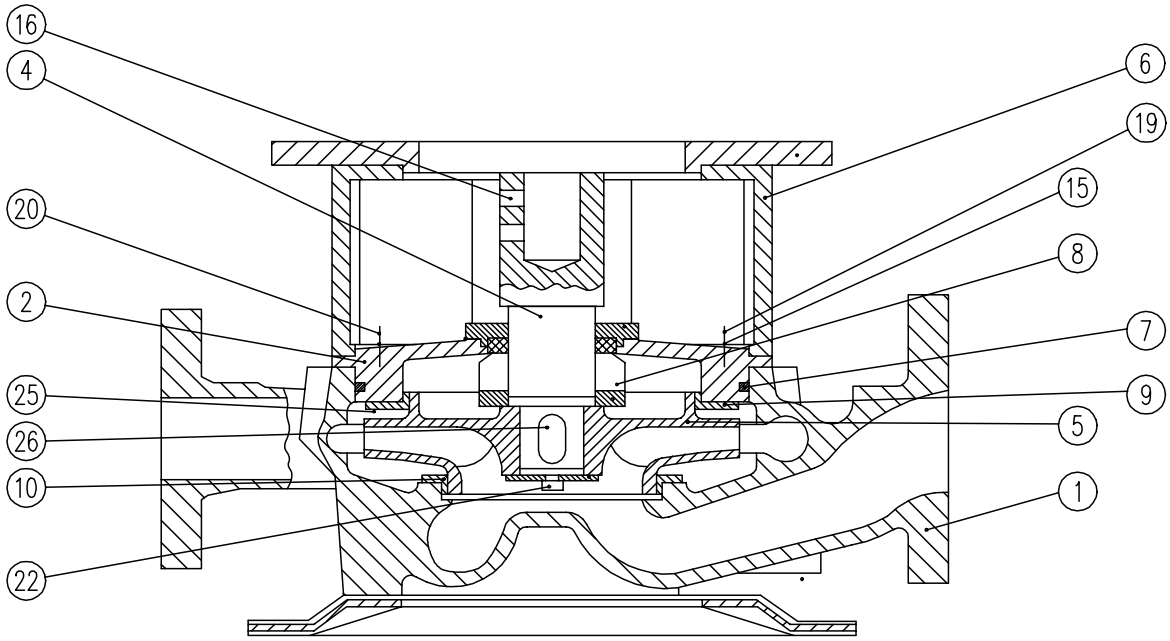
7. Check the wobble of the pump shaft with a dial indicator.
8. Assemble the pump as described above.

Maintenance of Ejector Pump

5.0.0 Maintenance of Ejector Pump

(If supplied from Alfa Laval)

The following instructions must be carefully observed whenever it becomes necessary to overhaul or repair the above mentioned pump. Please refer to drawing for item references in the text.



5.1.0 Overhaul of the Pump

1. Remove the **set screws 19** in **pump cover 2.**

   *Motor with motor bracket 6, pump cover 2, and impeller 5 can now be lifted clear of the **pump casing 1.***

2. Unscrew the **screw 22** (right-hand thread).

3. Remove impeller.

NOTE

Normally, the impeller can be removed without using dismantling tools.

If not, you can fit dismantling screws into the two threaded holes in the impeller.

4. Remove the key 26 and the mechanical seal 8 (including spring holder, spring and carbon ring).

5. Inspect the ceramic ring, the carbon ring and the spring. Replace, if necessary

   If mechanical seal has to be replaced, proceed as follows:

   - *Unscrew **set screw 20** to remove **pump cover 2** from **motor bracket 6** in order to gain access to ceramic ring.*

   In order to make it easier to assemble the mechanical seal, the shaft and ring seat may be greased with glycerine. Please also refer to separate instructions for mechanical seal delivered together with the seal.

   - *After fitting the ceramic ring, fit **pump cover 2** to **motor bracket 6.***

   - *Fit carbon ring, spring and spring holder.*

6. Clean drilled cooling water channel in **pump cover 2.**

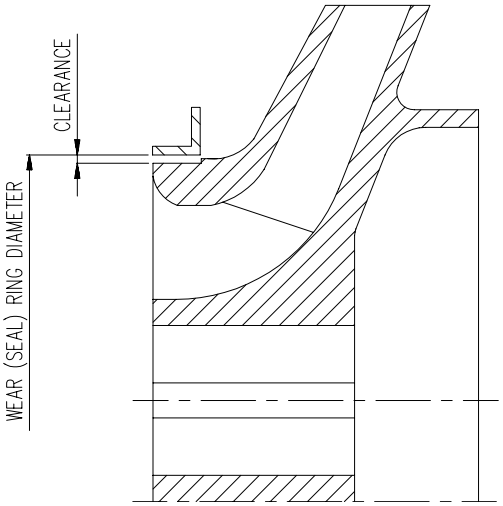
7. Inspect impeller and threaded holes for clogging.

8. **Remember to change the O-ring 7.**

9. Reassemble in reverse order.

5.1.1 Clearance

In connection with the inspection, the **impeller 5** and **wear rings 10** are measured in order to secure that the clearance is not larger than stated in the diagram below.



Wear ring Ø	Clearance maximum	Clearance minimum
100 mm	0.5 mm	0.15 mm
150 mm	0.6 mm	0.2 mm
200 mm	0.7 mm	0.25 mm
250 mm	0.8 mm	0.28 mm
300 mm	0.85 mm	0.3 mm
350 mm	0.9 mm	0.3 mm

If the clearance is too big, replace wear rings as follows:

1. Unscrew **countersunk screws 25.**
2. Pull out wear (seal) rings.
3. Fit new wear rings and tighten countersunk screws.

CAUTION

The pump shaft may only be dismantled, if pump shaft or bearings, in the electric motor have to be replaced.

Carefully observe instructions for “Dismantling pump shaft”.

5.1.2 Dismantling Pump Shaft

If the **shaft 4** has to be dismantled due to a defect or if electric motor bearing has to be replaced, proceed as follows:

1. Unscrew **pointed screws 16.**
2. Remove **shaft 4**. Normally this can be done without using dismantling tools.

> **CAUTION**
>
> DO NOT grind the motor shaft.

3. Fit **shaft 4.**
4. In order to make sure that the coupling is fitted correctly, tap slightly at the shaft end with a RUBBER hammer.
5. Tighten **pointed screws 16** with a torque of 35 Nm (3.5 kpm).

Salinometer

6.0.0 Salinometer Type DS-20

6.1.0 Technical Specification

Function	Measuring (Dot Bar) and supervising salinity of freshwater produced by seawater desalination.
Supply voltage	90-120 V or 200-240 V AC.
Frequency	50/60 Hz
Power consumption	Salinometer 10 VA.
Relay contacts	Max. load 100 VA.
Salinity display	0,5 - 20 ppm (Dot Bar).
Temperature correction	Automatic in the range 5 - 85°C.
Alarm level	Can be set to any value between 0,5 - 20 ppm.
Test	Can be checked by test switch, 10 ppm.
Output	4-20 mA Current Loop.
Max. ambient temperature	55°C.
Protection degree	IP 54.

6.2.0 Installation (for DS-20)

1. Open front cover.
2. Select correct voltage select according to the main supply voltage 115 V or 230 VAC.
3. Screw salinometer on to bulkhead with six nuts.
4. Connect necessary cables to the terminals.
5. Close front cover.
6. Test salinometer function (see instructions for use).

6.3.0 Instructions for use

1. Switch on mains.
2. Switch on sec. alarm.

   Green pilot LED should light up. Dot. Bar displays the measured salinity.

6.3.1 Testing the Instrument

WARNING

The salinometer must be tested at least once a month, and the electrode unit must be cleaned.

Push TEST switch on.

The Dot Bar should read 10 ppm.

If the alarm level is less than 10 ppm, the salinometer will give an alarm.

6.3.2 Adjustment of Alarm Level

1. Switch “MAINS” on.
2. Push sec. alarm off.
3. Adjust Alarm Set to desired alarm level by using the switches.
4. Switch “Sec. Alarm” on.

The salinometer is now ready for use.

If the salinity exceeds the alarm level,

- The two red alarm LEDS flash.
- Solenoid valve is activated.
- Buzzer (if fitted) and external alarm system is activated.

Cancel buzzer and external alarm system by switching “Sec. Alarm” off. Solenoid valve is not affected.

Switch “Sec. Alarm” on as soon as the salinity is normal again; i.e. when the two red LEDS are off.

6.3.3 Maintenance

CAUTION

Remove electrode unit and inspect/clean after every 1000 hours of operation. Use a clean and dry rag. Avoid touching the electrodes with the fingers.

Spare Parts

7.0.0 Ordering Spare Parts

When ordering spare parts please always state:

1. Serial number.
2. Capacity.
3. Designation.
4. Spare parts drawing number.
5. Position number.
6. Article number.

In order to identify article numbers, please refer to FWG Order Specification and other drawings.

When ordering parts for pumps proceed as follows:

1. Find article number in the list of drawings.
2. Check spare part drawing and item list with corresponding article number to identify the item to be ordered.

7.1.0 Alfa Laval Service

The **Alfa Laval** group is represented in all major ports of the world.

DO NOT hesitate to contact your **Alfa Laval** representative if you have any questions, problems or require spare parts.

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FWG Order Specification

FWG Order Specification

INI.:	*Date:*	*BPCS:*	*Serial no.:*
JSY	98.03.19	45757	NK-01053

Technical data

Type of generator:	JWSP-26-C100	Capacity [m3/24h]:	30	NE/NK:	100/100
Power supply, main/control		Main [Volt / Hz]:	3 x 440/60	Control [Volt]:	220
Jacket water temperature		Inlet [°C]:	80	Outlet [°C]:	68,1
Jacket water flow /pressure drop		Flow [m³/h]:	66	Pressure drop [bar]	0,43
Heat consumption from jacket water		[Mcal/h]:	778,3	or [kW]:	904,2
Seawater temperature		Inlet [°C]:	32	Outlet [°C]:	41,9
Seawater flow /pressure drop		Flow [m³/h]:	70	Pressure drop [bar]	0,49
Alternative heating: steam:		Capacity [m³/24h]:	30		
Steam flow /pressure:		Flow [kg/h]:	1490	Pressure [bar]:	6

Pump / motor data

	Fresh water	Ejector water	Brine water	Hot water
Nominel flow x pressure [m3/h x mwc]:	2,1 x 28	70 x 42	-	-
Marked output power [kW]:	0,75	21,4	-	-
Consumed electrical power [kW]:	0,75	16,5	-	-
Current [A]:	1,6	33,5	-	-
Rotating speed [rpm]:	3360	3515	-	-

Quality data

Certificate:	Workshop	Connections:	JIS

Extra / special equipment

Special painting : Alfa Blue C310 (Steam, ejector pump/motor, control panel, box for spare parts)
Control panel build-on.

Note:

Max. inlet temperature for evaporator section must NEVER exceed 100°C (212°F)

Max. inlet pressure for condenser section must not exceed 4 bar g (400 kPa)

Max. ambient temperature for freshwater generator is 45°C (113°F)

FWG Order Specification

INI:	Date:	BPCS no.:	Serial no.:	Page 2/2
JSY	98.03.19	45757	NK-01053	

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Dimension draw ing, freshw ater generator	9.2.2.5.8
Technical data, pump and motor	9.2.2.2.6
Dimension draw ing, ejector pump	9.2.5.2.3
Dimension draw ing, control panel	9.2.6.2.4-1
Dimension draw ing, salinometer	-
Dimension draw ing, feed w ater treatment	9.2.9.3.2
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Equipmtnt specification	9.2.2.4.2
Vertical plant positioning	9.2.8.1
Electric diagram	9.2.6.3.4-1
Assembly scheme	985 16610
Spare parts, generator	985 17909-81
Spare parts, steam arrangement	985 15594-81
Spare parts, steam injector	985 00026-50

Bill Of Material

Parent item no.:	Description:	Date:	
SPE-NK-01053 R: 00	SPECIFICATION PARTS LIST JWSP-26-C100 DRAWING NO. 985 15849	20051102	Page 1 of 1
Drawing no.:		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
8	1.000000	EA	MOTOR 71B-2 380/440V 50/60HZ 0.55/0,75KW 1.4/1.6A		984 20313-00		
9	1.000000	EA	COMBINED BRINE/AIR EJECTOR BRINE/AIR EJECTOR	984 12200-R05	984 12272-00		
35	1.000000	EA	SOLENOID VALVE 1/2" EV220B 15 220V 50/60 CS NO (EVSI 15)	984.23482.0	984 23486-00		
36	1.000000	EA	FRESHWATER PUMP PVVF-2040.2X-014	984.10230.00	984 10255-00		
42	1.000000	EA	ORIFICE D=13,0 (FEED WATER)	984 57863-R04	984 57863-27		
45	1.000000	EA	PLATE P-26 KS/ES TITAN 0,5	984 70192-R06	119291-2183		ASS.MEASURE = 350 MM
45	1.000000	EA	PLATE P-26 KE/EE TITAN 0,5	984 70192-R06	119281-4116	TITAN/NITRIL	
45	49.000000	EA	PLATE P-26 EV TITAN 0,5	984 70192-R06	119479-2103	TITAN/NITRIL	
45	49.000000	EA	PLATE P-26 ED TITAN 0,5		119281-3103	TITAN/NITRIL	
46	8.000000	EA	CLAMPING BOLT L=535 P-26	984 58083-R05	984 58083-05	Stainles Steel A4, min. tensile	
49	4.000000	EA	SUPPORTING SHAFT L=535	984 58182-R03	984 58182-05	ISO 683/13/74 ; TYPE 11	
52	1.000000	EA	PLATE P-26 KS/ES TITAN 0,5	984 70192-R06	119291-2183		ASS.MEASURE = 350 MM
52	1.000000	EA	PLATE P-26 KE/EE TITAN 0,5	984 70192-R06	119281-4116	TITAN/NITRIL	
52	49.000000	EA	PLATE P-26 KV TITAN 0,5	984 70192-R06	119281-4103	TITAN/NITRIL	
52	49.000000	EA	PLATE P-26 KD TITAN 0,5	984 70192-R06	119281-2103	TITAN/NITRIL	
500	.000000	EA	ACCESSORIES:		ACCESSORIES		
501	1.000000	EA	CONTROL PANEL - FWG - OPT. A (DIAGR: 985 16645-R01)	985 16646-R01	985 00034-85		ALFA BLUE C310
502	.000000	EA	MOTOR 160L-2 380/440V 50/60HZ 18,5/21KW IN 34A		985 00033-80		
502	1.000000	EA	SET OF MANOMETERS FOR PUMP TYPE CNL 65/80/100	984 58196-R08	984 58196-83		
502	1.000000	EA	NAME TAGS FOR MANOMETER SET MODEL 1 FRONTSIDE OF PUMP	985 18035-R02	985 18035-80	AISI 316	
502	.000000	EA	PUMP CNL 80-80/200 DIN/JIS CNL 80-80/200 DIN/JIS		NK-01053-01		
503	1.000000	EA	FEED WATER TREATMENT, SCALE INHIBITOR DOSAGE EQUIPMENT	985 14867-R08	985 14867-80		
504	1.000000	EA	STANDARD SPARE PARTS KIT JW(S)P-26-C80(B)/C100		985 00037-42		

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EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

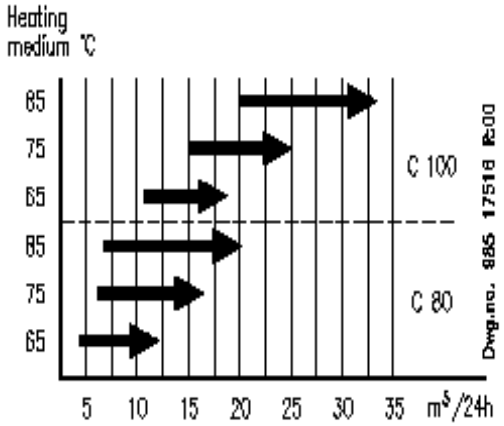
9.2.2.1 General description, JW(S)P-26-C80(B)/C100

Application

Conversion of seawater into fresh water by vacuum distillation, for drinking, process water, and domestic use on ships and rigs, and in small power stations. Max. salinity 2 ppm.

Capacity

The JW(S)P-26-C80(B)/C100 covers a capacity range from 4 to 35 m^3/24h, depending on the heating medium and seawater temperature. The capacities shown below are at a seawater temperature of 32°C.



Working principle

The seawater to be distilled evaporates at a temperature of about 40°C as it passes between the hot plates in the evaporator.
This evaporating temperature corresponds to a vacuum of approximately 93% which is maintained by the brine/air ejector.
The vapours generated pass through a demister where any drops of seawater entrained are removed and fall to the bottom of the distiller chamber.
The vapours continue to the condenser where they condense to fresh water as they pass between the cold plates.

Basic Equipment

Titanium plate heat exchanger in evaporator and condenser.
Red brass separator and stainless steel demister, front cover and pressure plates.
Seawater pipes in CuNi.
The freshwater generator is equipped for jacket water heating and with a combined condenser cooling and ejector water system. Furthermore the freshwater generator is equipped with dump valve, water clock, automatic feed water regulator, combined brine/air ejector, instruments, freshwater pump with electric motor, internal piping and bed frame.

Options

Flanges:	DIN, JIS or ANSI		
Power/control:	3 x 380 V	50 Hz	100/110/220 V
	3 x 440 V	60 Hz	100/110/220 V
	3 x 460 V	60 Hz	110 V (ul)

Additional equipment necessary for operation

- Ejector pump/electric motor.
- Control panel with motorstarters and salinometer.
- Feed water treatment.

Optional equipment/design

- Steam heating systems type JWSP.
- Hot Water Loop Module for steam boosting of jacket water.
- Salinometer.
- Manual motor starters and salinometer.
- Remote start/stop.
- Water clock by-pass.
- Return pipe to brine sump.
- Electric panel build-on the unit.
- Optional spares kit for 1, 2 or 5 years of operation.
- Steel box for spares kit.
- Class test certificate.
- Freshwater treatment equipment.

9.2.2.2-5 Technical data, JW(S)P-26-C100

Power consumption

Ejector and freshwater pump:

NE/NK	50 Hz	60 Hz
62/62-70/70:	12.8 kW	13.0 kW
72/72-80/80:	13.5 kW	13.6 kW
82/82-90/90:	16.6 kW	16.7 kW
92/92-100/100:	17.2 kW	17.3 kW

Pressure

	bar(g)	lbs/in^2
Max. jacket water pressure:	4.0	58
Max. back pressure to freshwater tank:	1.6	23
Max. seawater pressure to inlet condenser:	4.0	58
Min. seawater pressure to ejector:	3.0	43
Max. back pressure at ejector outlet:	0.6	8.7
Max. back pressure for safety valve on steam equipment:	1.0	14.5
Max. steam pressure for steam equipment:	7.0	101
Normal operation pressure for steam equipment:	2-4.5	29-65
Back pressure to condensate well for steam equipment:	0.6-0.8	8.7-11-6

Temperature

Seawater temperature: 0-32°C

Jacket water temperature: 55-95°C

Flow

Seawater flow: 49-70 m^3/h

Jacket water flow: 25-72 m^3/h

Materials

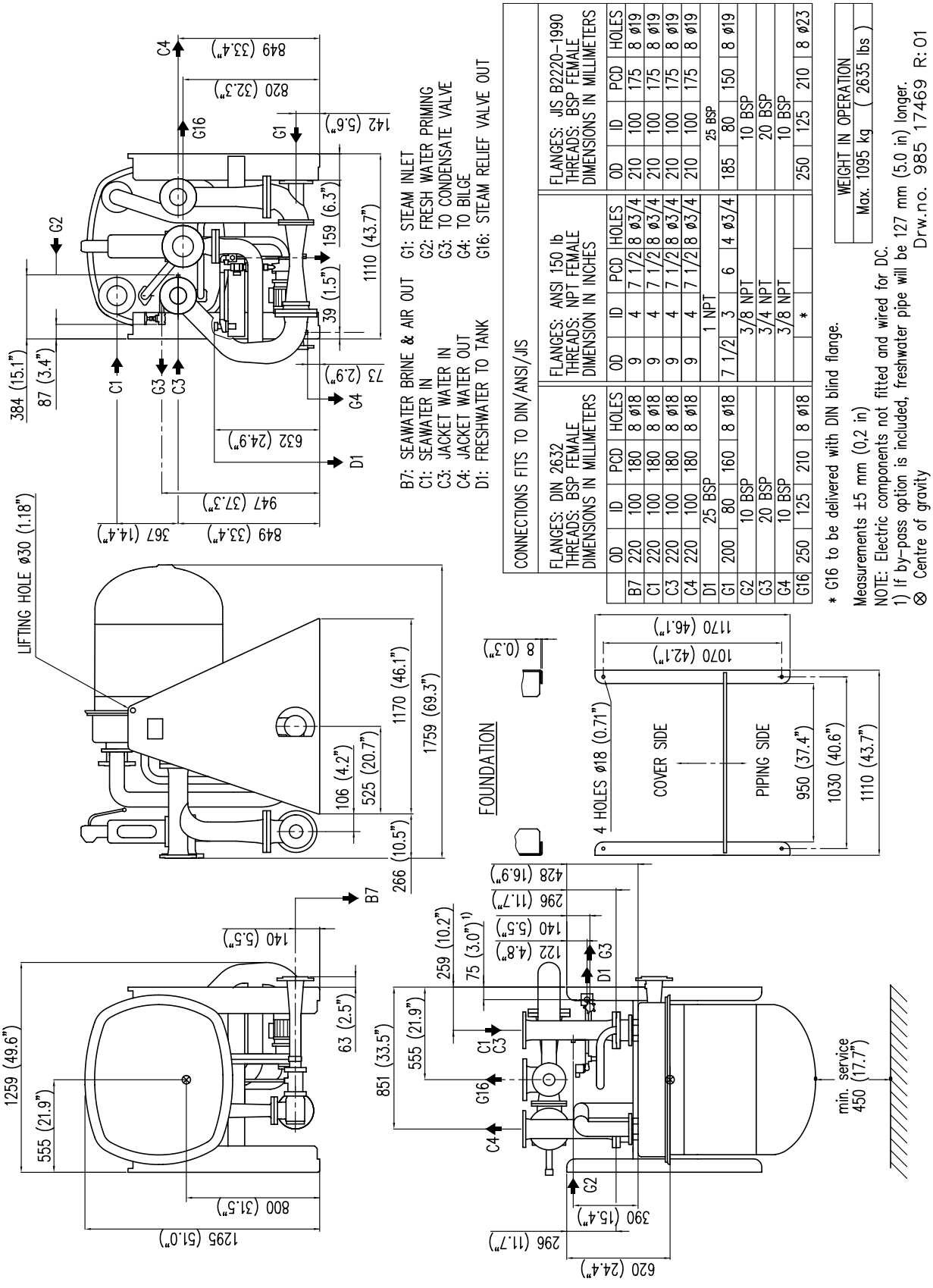
Separator:	Red brass
Front cover:	Stainless steel
Bed frame:	Steel (hot dip galvanized)
Pipe for brine discharge:	Red brass
Evaporator/condenser plates:	Titanium
Demister:	Stainless steel
Pipe for seawater:	CuNi 90/10
Pipe for fresh water:	CuNi 90/10
Combined brine/air ejector housing:	Red brass
Combined brine/air ejector nozzle:	Stainless steel
Flange for evaporator/condenser:	SG-iron (hot dip galvanized)
Steam equipment type JWSP and SP.	
Pipe:	Steel (hot dip galvanized)
Steam injector housing:	Cast iron (painted)
Steam injector nozzle:	Stainless steel

Shipping data

Freshwater generator, complete with ejector pump, electrical panel, dosing unit and standard spares.

Weight:	net: 930 kg, gross:1050 kg
Dimensions:	l x w x h: 2200 x 1300 x 1620 mm
Volume:	4.6 m^3

9.2.2.5-8 Dimensional drawing, JWSP-26-C100

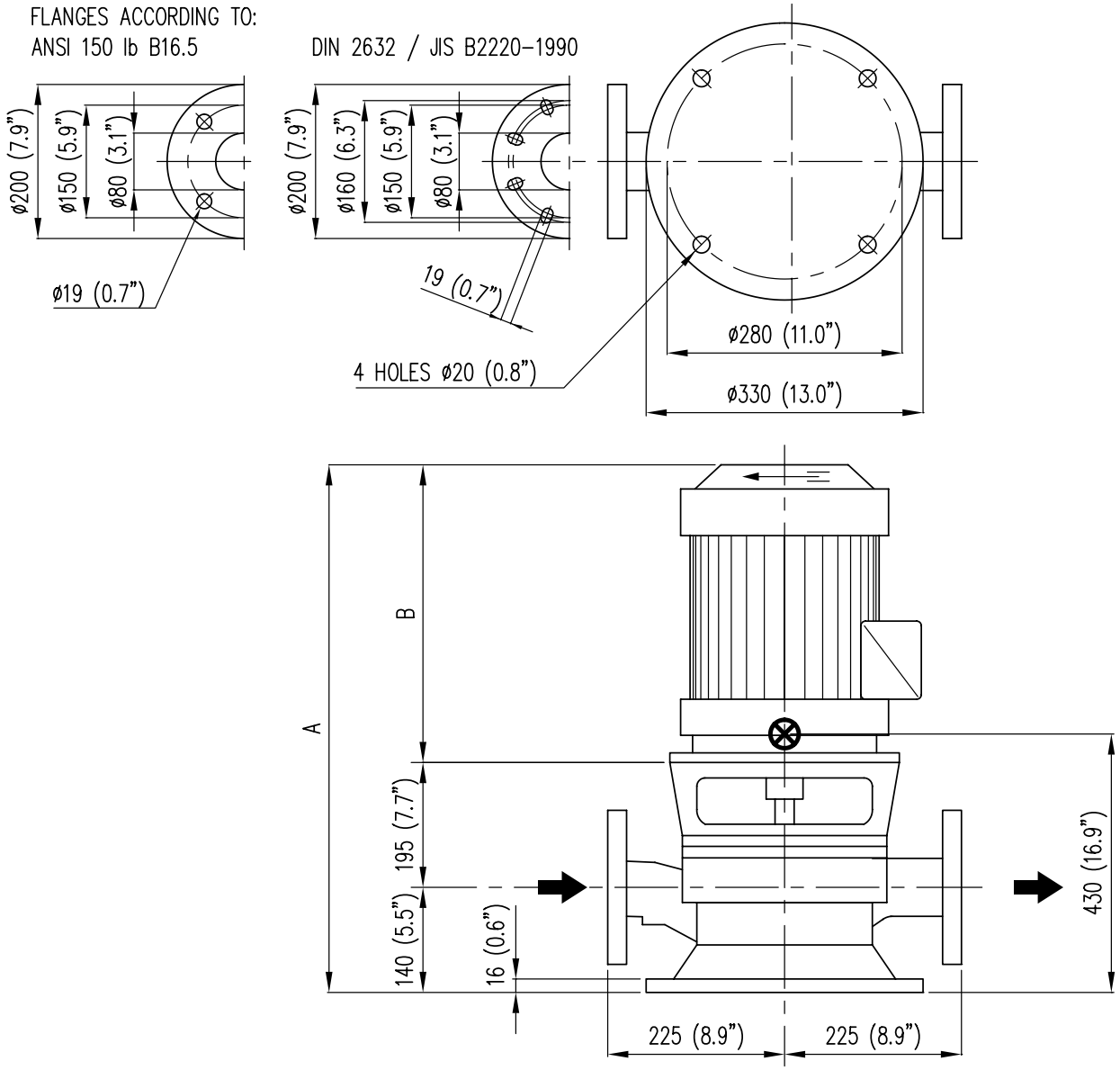


9.2.2.2-6 Technical data, Pump and Motor for JW(S)P-26-C100

No. of plates NE/NK:		62/62-70/70		72/72-80/80	
Pump function		**Freshwater**	**Ejector**	**Freshwater**	**Ejector**
Pump Type		PVVF-2040	CNL 80-80/200	PVVF-2040	CNL 80-80/200
Motor type		71 B	160 M	71 B	160 M
Nom. flow x pressure	m^3/h x mwc	2.1 x 28	49 x 42	2.1 x 28	56 x 42
Impeller size	50 Hz : mm	ø149	ø205	ø149	ø205
Impeller size	60 Hz : mm	ø128	ø172	ø128	ø172
Rotating speed	50 Hz : RPM	2820	2905	2820	2905
Rotating speed	60 Hz : RPM	3360	3505	3360	3505
3 x 380 V 50 Hz:					
Rated output power	kW	0.55	15.5	0.55	15.5
Consumed power	kW	0.67	12.1	0.67	12.8
Current (full load)	A	1.4	28.5	1.4	28.5
Current (start)	A	7	157	7	157
3 x 440 V 60 Hz:					
Rated output power	kW	0.75	17.8	0.75	17.8
Consumed power	kW	0.75	12.2	0.75	12.8
Current (full load)	A	1.6	28.5	1.6	28.5
Current (start)	A	7	157	7	157
3 x 460 V 60 Hz:					
Rated output power	kW	0.75	17.8	0.75	17.8
Consumed power	kW	0.75	12.2	0.75	12.8
Current (full load)	A	1.5	27.2	1.5	27.2
Current (start)	A	7	157	7	157

No. of plates NE/NK:		82/82-90/90		92/92-100/100	
Pump function		**Freshwater**	**Ejector**	**Freshwater**	**Ejector**
Pump Type		PVVF-2040	CNL 80-80/200	PVVF-2040	CNL 80-80/200
Motor type		71 B	160 L	71 B	160 L
Nom. flow x pressure	m^3/h x mwc	2.1 x 28	62 x 42	2.1 x 28	70 x 42
Impeller size	50 Hz : mm	ø149	ø192	ø149	ø192
Impeller size	60 Hz : mm	ø128	ø168	ø128	ø168
Rotating speed	50 Hz : RPM	2820	2915	2820	2915
Rotating speed	60 Hz : RPM	3360	3515	3360	3515
3 x 380 V 50 Hz:					
Rated output power	kW	0.55	18.6	0.55	18.6
Consumed power	kW	0.67	15.9	0.67	16.5
Current (full load)	A	1.4	33.5	1.4	33.5
Current (start)	A	7	211	7	211
3 x 440 V 60 Hz:					
Rated output power	kW	0.75	21.4	0.75	21.4
Consumed power	kW	0.75	15.9	0.75	16.5
Current (full load)	A	1.6	33.5	1.6	33.5
Current (start)	A	7	211	7	211
3 x 460 V 60 Hz:					
Rated output power	kW	0.75	21.4	0.75	21.4
Consumed power	kW	0.75	15.9	0.75	16.5
Current (full load)	A	1.5	32	1.5	32
Current (start)	A	7	211	7	211

9.2.5.2-3 Dimensional drawing, CNL 80-80/200



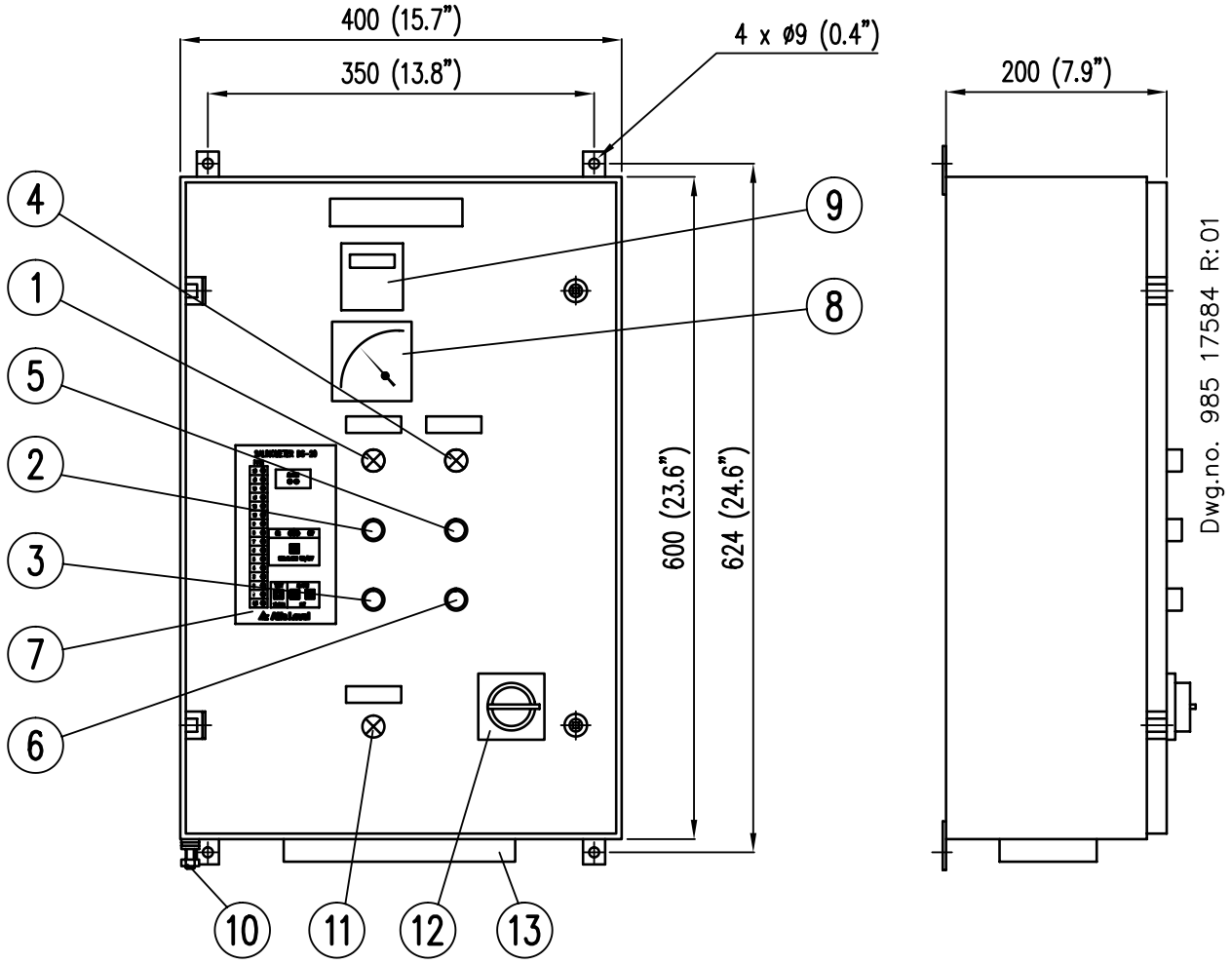
⊗ CENTRE OF GRAVITY

EJECTOR PUMP TYPE	MOTOR TYPE	FLANGE TYPE	A mm	B mm	WEIGHT (INCL. MOTOR) Kg	CABLE GLANDS KVM 36
CNL 80-80/200	160 M	DIN/JIS/ANSI	814 (30.05")	479 (18.9")	166 (366 lbs)	ø 22,5-24,5
CNL 80-80/200	160 L	DIN/JIS/ANSI	858 (33.8")	523 (20.6")	170 (375 lbs)	ø 22,5-24,5

MECHANICAL PROTECTION	INSULATION	COOLING SYSTEM	SHAFT SEAL	POLES FOR MOTOR
IP 55	CLASS F	FAN COOLED	MECH. SEAL	2 POLES

Dwg.no. 985 17500 R:02

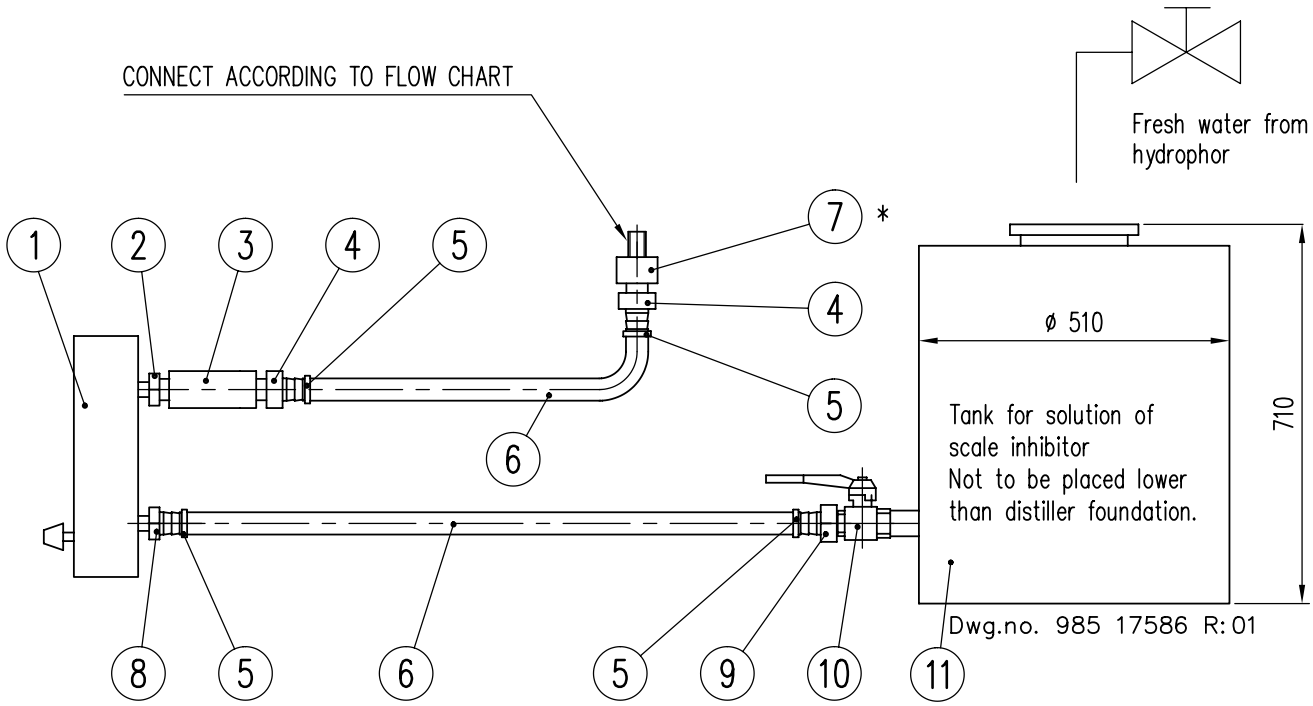
9.2.6.2-41 Dimensional drawing, Panel for Single-stage FWG (option A)



Legend

1 Running light, ejector pump
2 Start, ejector pump
3 Stop, ejector pump
4 Running light, freshwater pump 1
5 Start, freshwater pump 1
6 Stop, freshwater pump 1
7 Salinometer
8 Ammeter
9 Running hour meter
10 Earth connection point
11 Source on
12 Main switch
13 Connections: 1 PG29 (20–27 mm)
2 PG21 (14–20 mm)
2 PG16 (8–15 mm)
2 PG13,5 (7–13 mm)
Additional 6 PG16

9.2.9.3-2 Feed Water Treatment - 130 liter



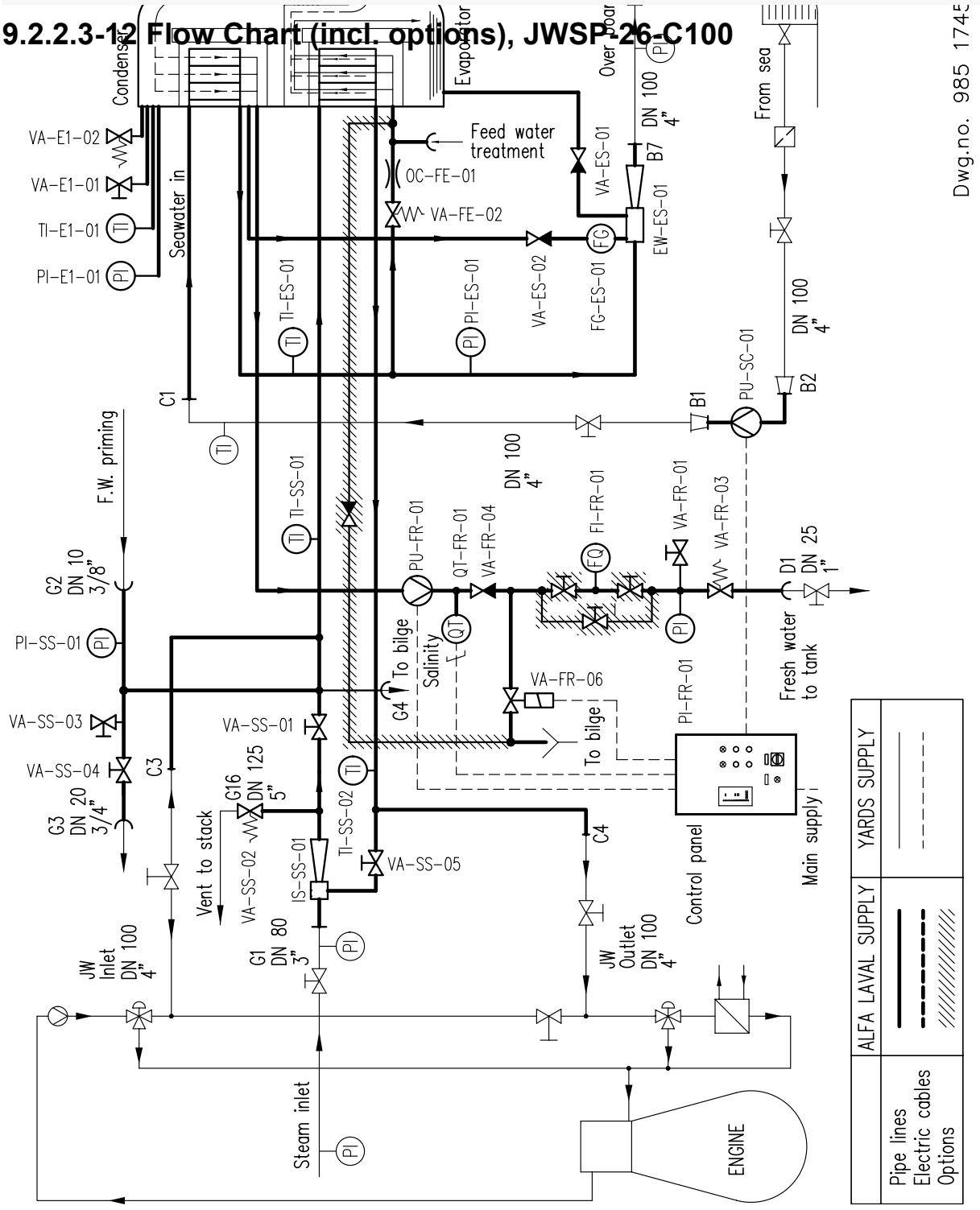
Recommendation

Use fully soluble scale inhibitor for instance on polymere basis.
Mix quantity required for 24 hours operation in tank according to maker's instruction and adjust dosage to cover max. freshwater output from distiller.
Flush regularly.

1 Flowmeter incl. reg. valve
2 Nipple 3/8" x 1/8"
3 Non return valve 3/8"
4 Hose connection 3/8" x 10
5 Hose clip
6 Hose 3/8" (4000 mm)
7 Connection 3/8" x 1/4" *
8 Connection 1/8" x 10
9 Connection 1/2" x 10
10 Ball Valve 1/2"
11 PE tank (130 l)

* Only for JWP-36-C

9.2.2.3-12 Flow Chart (incl. options), JWSP-26-C100



9.2.2.4-2 Equipment specification, JW(S)P-26-C100

Equipment supplied by Alfa Laval:

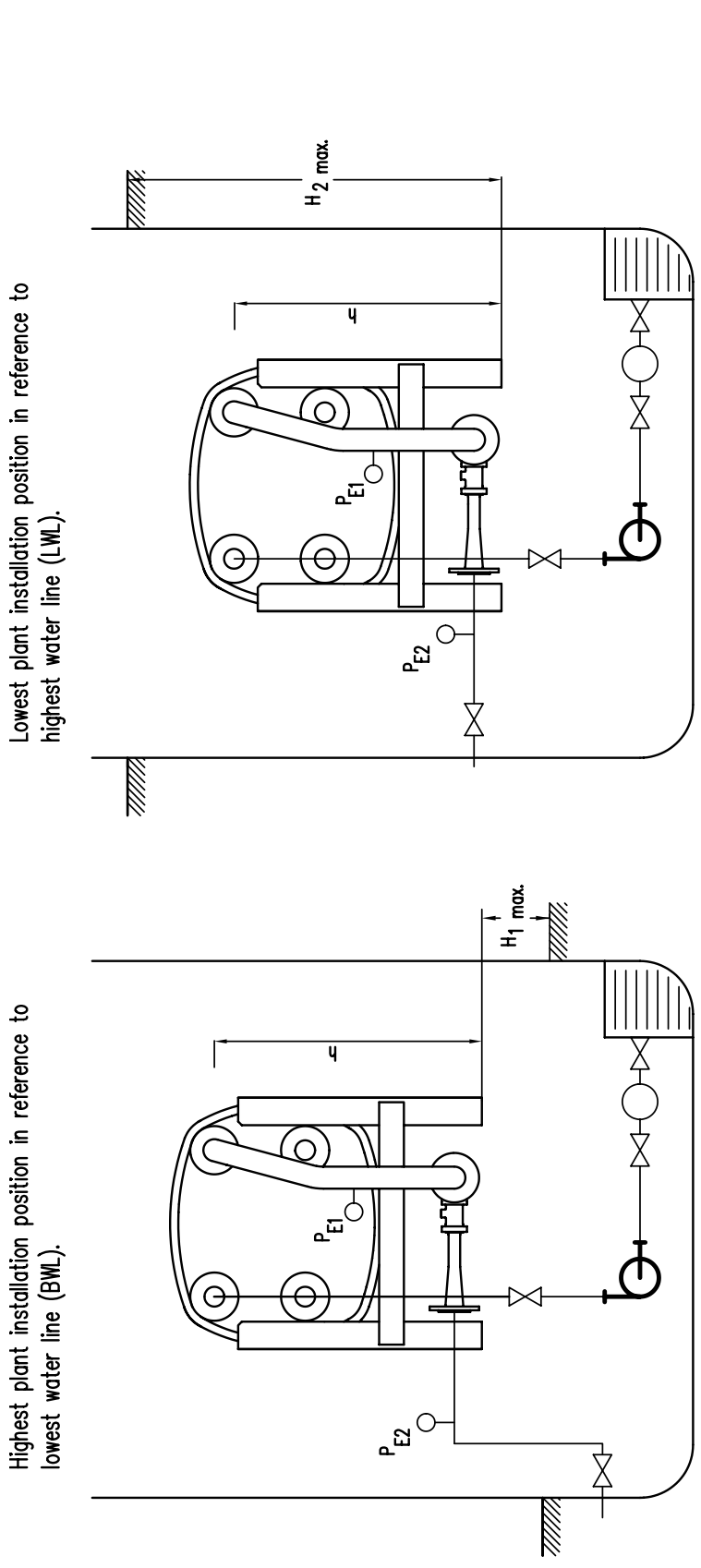
Tag No.	Description	Article No.	Connection
	Unit:		
EW-ES-01	Ejector	See specification	–
FG-ES-01	Flow sight glass	984 35686-00	1/2" BSP
FI-FR-01	Water meter	985 42600-04	3/4" BSP
OC-FE-01	Orifice	See specification	–
PI-ES-01	Pressure gauge	984 30297-00	1/4" BSP
PI-E1-01	Mano/vacuum gauge	984 30308-00	3/8" BSP
PI-FR-01	Pressure gauge	984 30298-00	1/4" BSP
PU-FR-01	Freshwater pump	See specification	–
PU-SC-01	Ejector pump	See specification	–
QT-FR-01	Electrode unit	984 22500-00	–
TI-ES-01	Thermometer	984 30366-00	1/2" BSP
TI-E1-01	Thermometer	984 30366-00	1/2" BSP
VA-ES-01	Non return valve	984 35501-01	DN 50
VA-ES-02	Non return valve	984 35686-00	1/2" BSP
VA-E1-01	Air screw	984 40939-03	1/4" BSP
VA-E1-02	Safety valve	984 35360-00	1" BSP
VA-FE-02	Spring loaded valve	984 35535-00	DN 40
VA-FR-01	Ball valve	984 35683-00	1/2" BSP
VA-FR-03	Spring loaded valve	984 35166-00	–
VA-FR-04	Non return valve	984 35672-00	1" BSP
VA-FR-06	Solenoid valve	See specification	–
	Control panel [1]	See specification	–
	Steam arrangement: [2]		
IS-SS-01	Steam injector	See specification	–
PI-SS-01	Mano/vacuum gauge	984 30285-00	3/8" BSP
TI-SS-01	Thermometer	984 30366-00	1/2" BSP
TI-SS-02	Thermometer	984 30366-00	1/2" BSP
VA-SS-01	Butterfly valve	984 35620-00	DN 100
VA-SS-02	Safety valve	See specification	–
VA-SS-03	Ball valve	984 35618-00	3/8" BSP
VA-SS-04	Seated valve	985 56110-04	3/4" BSP
VA-SS-05	Butterfly valve	984 35620-00	DN 100

Dwg.no. 985 17470 R:01

[1] Normally supplied by Alfa Laval

[2] Type JWSP

9.2.8.1 Vertical Plant Positioning, JWP-16/26 and D-PU-(2)-36



The stated installation heights are given under the conditions that the line pressure drop does not exceed 0.1 bar (1.5 lbs/in^2) which should account for all normal installations. If the 0.1 bar (1.5 lbs/in^2) is exceeded the heights must be diminished accordingly.

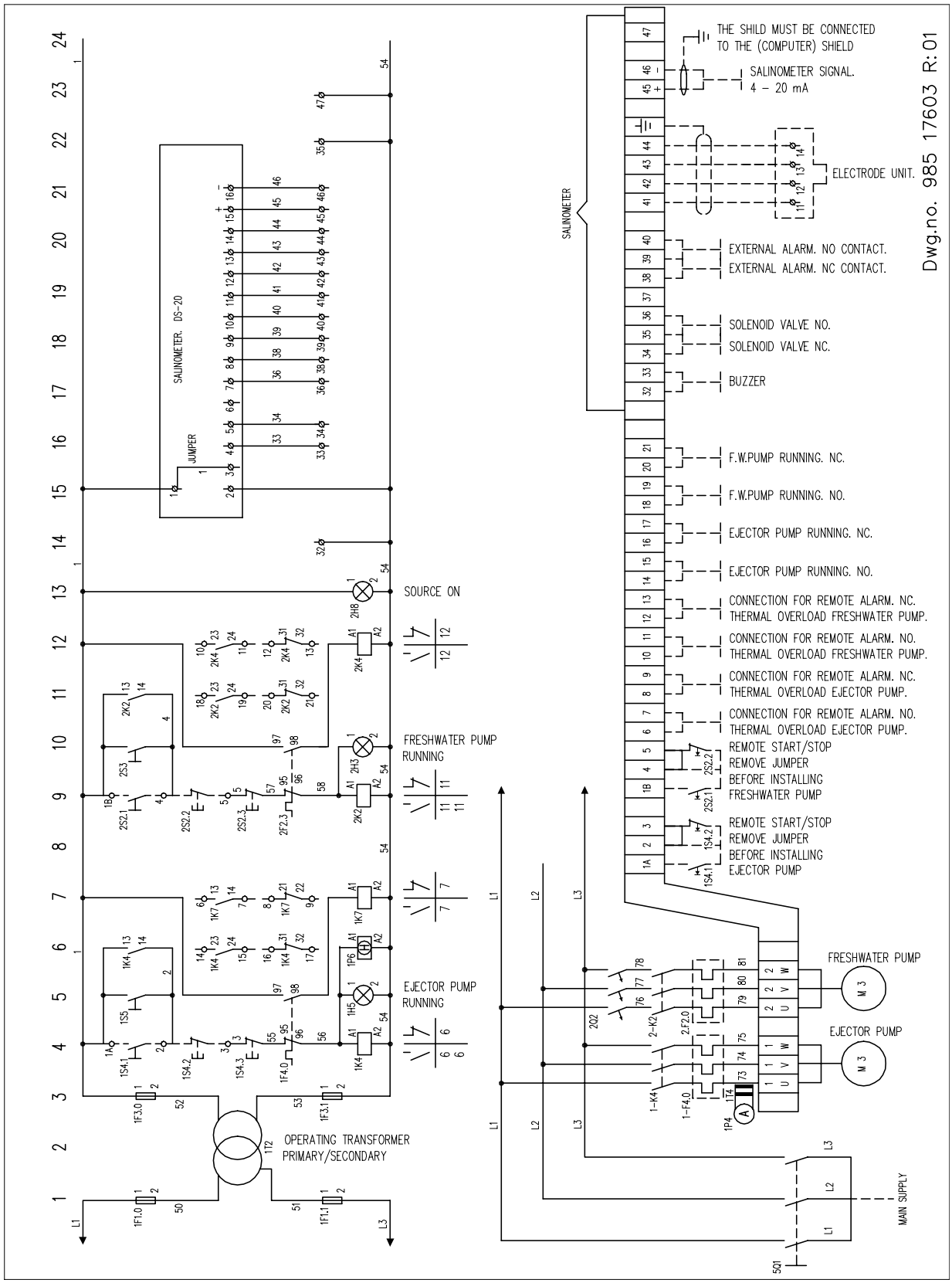
Freshwater Generator type	P_{E2} max. bar (lbs/in^2)	h mm	Highest vertical plant positioning		Lowest vertical plant positioning	
			P_{E1} min. bar (lbs/in^2)	H_1 max. mm	P_{E1} max. bar (lbs/in^2)	H_2 max. mm
P-16	0.5 (7.3)	913	3 (43.5)	3000	3.85 (55.8)	5000
P-26	0.6 (8.7)	1100		4000		6000
D-PU-36		1500				
D-PU-2-36						

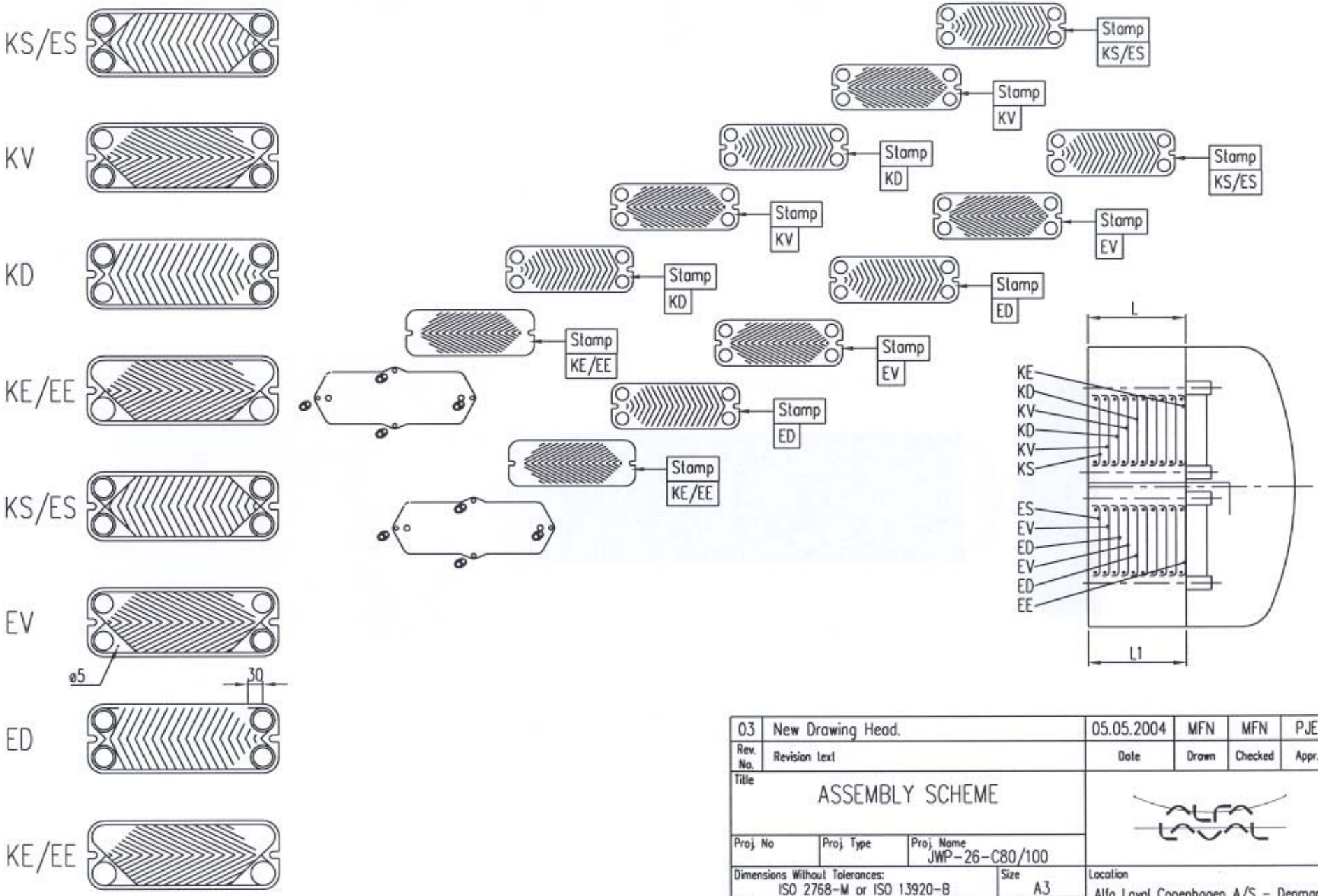
In order to minimize the pressure drop we recommend to avoid the use of seat valves in the system.

Ejector pump is not self priming.

Dwg.no. 985 17495 R:00

9.2.6.3-41 Electrical diagram, Control panel for Single-stage FWG (option A)





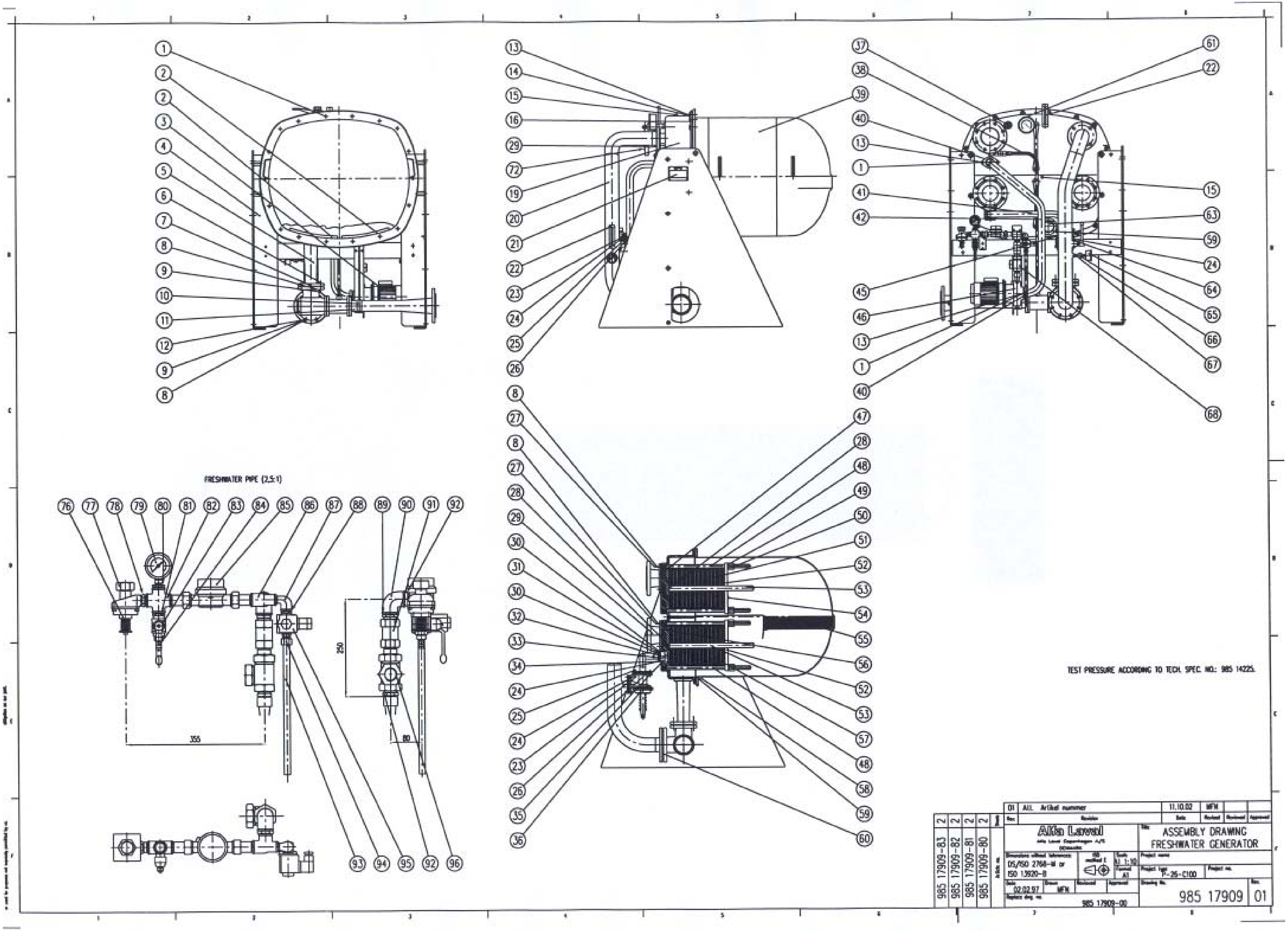
03	New Drawing Head.	05.05.2004	MFN	MFN	PJE
Rev. No.	Revision text	Date	Drawn	Checked	Appr.

Title: ASSEMBLY SCHEME

Proj. No	Proj. Type	Proj. Name JWP-26-C80/100		
Dimensions Without Tolerances: ISO 2768-M or ISO 13920-B			Size A3	
Date 26.06.2000	Drawn PGR	ISO Method E	Scale 1:20	
Checked HJO	Approved HJO		Sheet 2	

Location: Alfa Laval Copenhagen A/S - Denmark

Drawing No: 985 16610 | Rev. 03



FRESHWATER PIPE (2,5:1)
355
250
80
TEST PRESSURE ACCORDING TO TECH. SPEC. NO.: 985 14225.
01 All. Artikel nummer 11.10.02 MFN
985 17909-83 2
985 17909-82 2
985 17909-81 2
985 17909-80 2
Alfa Laval
Alfa Laval Copenhagen A/S
DENMARK
Dimensions without tolerances: DS/ISO 2768-M or ISO 13920-B
Scale 1:10
A1
ASSEMBLY DRAWING
FRESHWATER GENERATOR
Project type P-25-C100
Date 02.02.97
Drawn MFN
Replace drg. no. 985 17909-00
Drawing No. 985 17909
Rev. 01

Bill Of Material

Parent item no.:	Description:	Date:	
985 17909-81 R: 00	ASSEMBLY DRAWING NE/NK 92-100/92-100 P-26-C100 DIN / JIS	20040608	Page 1 of 4
Drawing no.:		Ini	
985 17909-R01		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
	.000000	EA	EJECTOR PUMP		SEE SPECIFIC.H		
	.000000	EA	MOTOR FOR EJECTOR PUMP		SEE SPECIFIC.I		
	.000000	EA	CONTROL PANEL		SEE SPECIFIC.P		
	1.000000	EA	CAUTION PLATE FOR EJECTOR PUMP		19.00000.01		
	1.000000	EA	LOGO FRONT COVER 380 X 102 MM JWP-26-C80/100		19.00000.11		
	.000000	EA	MANOMETER SET	985 58196	SEE SPECIFIC.MS		
1	22.000000	EA	SCREW M12 x 40 DIN 912		985 00002-15	QUALITY 8.8 ; DELTA-MAGNI	
2	2.000000	EA	ZINC ANODE P-26-C80/C100 DPU-36-C100/125	984 58033-R04	984 58033-80		
3	.000000	EA	MOTOR FOR FRESHWATER PUMP		SEE SPECIFIC.M		
4	1.000000	EA	BED FRAME	985 12564-R03	985 12564-80		
5	1.000000	EA	BRINE PIPE P-26-C100	984 58218-R04	984 58218-01		
6	4.000000	EA	SCREW M16 X 40 DIN 933		985 80011-38	QUALITY 8.8 ; DELTA-MAGNI	
7	1.000000	EA	NON RETURN FLAP Ø 50 MED TEXTILINDLÆG	984 57281-R03	985 00036-39		
8	28.000000	EA	WASHER M16 DIN 125 A		985 32512-20	A4	
9	12.000000	EA	NUT M16 DIN 934 HOT DIP GALVANIZED		984 40910-45	HOT DIP GALVANIZED	
10	1.000000	EA	CLAMP Ø 60	984 58229-R04	984 58229-80		
11	.000000	EA	COMBINED BRINE/AIR EJECTOR		SEE SPECIFIC.B		
12	8.000000	EA	SCREW M16 X 60 DIN 933		984 40910-43	QUALITY 8.8 ; DELTA-MAGNI	
13	18.000000	EA	WASHER M12 ISO 887/83		985 32512-16	ISO 683/13/86 ; TYPE 20A	
14	18.000000	EA	NUT M12 DIN 934		985 00001-71	QUALITY 8.8 ; DELTA-MAGNI	
15	2.000000	EA	AIR VALVE 1/4" BSP	VVS 40 5501 002	984 40939-03	BRASS	
16	1.000000	EA	GASKET FOR FRONT COVER P-26-C	984 58058-R02	984 58058-01		
19	1.000000	EA	SEPARATOR P-26	984 58215-R06	984 58215-01		

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BIC/SWIFT ESSEDKKK

Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

Bill Of Material

Parent item no.:	Description:	Date:	
985 17909-81 R: 00	ASSEMBLY DRAWING NE/NK 92-100/92-100 P-26-C100 DIN / JIS	20040608	Page 2 of 4
Drawing no.:		Ini	
985 17909-R01		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
20	1.000000	EA	SEAWATER PIPE FROM CONDENSER	985 16542-R00	985 16542-80	CuNi10Fe1,6Mn	
21	.000000	EA	NAME PLATE		SEE SPECIFIC.NP		
22	2.000000	EA	THERMOMETER W/POCKET - ANGLE 63 MM	984 30366-R01	984 30366-00	CuNi10Fe	
23	8.000000	EA	SCREW M10 X 40 DIN 933		984 40910-39	QUALITY 8.8 ; DELTA-MAGNI	
24	16.000000	EA	WASHER M10 DIN 125 A		985 32512-14	A4	
25	8.000000	EA	NUT M10 DIN 934		984 40900-27	QUALITY 8.8 ; DELTA-MAGNI	
26	2.000000	EA	GASKET Ø84/46 X 2	984 58335-R01	984 58335-01		
27	16.000000	EA	SCREW M16 x 40 DIN 912		985 00002-16	QUALITY 8.8 ; DELTA-MAGNI	
28	4.000000	EA	STUD BOLT M16 X 43	984 58183-R03	984 58183-01	S 235 JR	
29	3.000000	EA	FLANGE Ø 100 DIN/ANSI/JIS FOR JW/SW	984 58207-R06	984 58207-03		
30	2.000000	EA	GASKET Ø56/30 X 2	984 57843-R02	984 57843-01		
31	.000000	EA	ORIFICE FOR FEED WATER		SEE SPECIFIC.O		
32	1.000000	EA	RUBBER SLEEVE	984 58084-R02	984 58084-01		
33	1.000000	EA	CONNECTION Ø59/28 (FEED WATER) P-26-C	984 58065-R03	984 58065-01		
34	4.000000	EA	SCREW M10 x 55 DIN 933		985 00002-14	QUALITY 8.8 ; DELTA-MAGNI	
36	1.000000	EA	SPRING LOADED VALVE MVF-40-2.5	984 35535-02	984 35535-00	RG 5	
37	1.000000	EA	SAFETY VALVE 1" BSP	VVS 43 2240 108	984 35360-00	BRASS	
38	1.000000	EA	VACUUM PIPE P-26-C100	984 58296-R02	984 58296-80		
39	1.000000	EA	FRONT COVER P-26 0,35 M2	984 58226-R04	984 58226-80		
40	2.000000	EA	GASKET Ø75/43 X 2	984 58093-R02	984 58093-01		
41	1.000000	EA	PIPE FOR FEED WATER	984 58209-R04	984 58209-80	CuNi10Fe1,6Mn	
42	1.000000	EA	FRESHWATER PIPE TO PUMP	984 58213-R02	984 58213-80	CuNi10Fe1,6Mn	
45	1.000000	EA	GASKET Ø95/Ø70 X 2	984 58244-R02	984 58244-01		

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Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

Bill Of Material

Parent item no.:	Description:	Date:	
985 17909-81 R: 00	ASSEMBLY DRAWING NE/NK 92-100/92-100 P-26-C100 DIN / JIS	20040608	Page 3 of 4
Drawing no.:		Ini	
985 17909-R01		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
46	.000000	EA	FRESHWATER PUMP		SEE SPECIFIC.F		
47	2.000000	EA	RUBBER SLEEVE	984 58085-R02	984 58085-01		
48	.000000	EA	CLAMPING BOLT		SEE SPECIFIC.G		
49	8.000000	EA	WASHER M24 ISO 887/83 316L		985 32510-28	ISO 683/13/86 ; TYPE 20A Aisi 3	
50	8.000000	EA	NUT M24	984 57822-R01	984 57822-01	ISO 1338/77 ; CU PB5 SN5 ZN5	
51	.000000	EA	HEAT EXCHANGER-CONDENSER		SEE SPECIFIC.K		
52	2.000000	EA	PRESSURE PLATE	984 58024-R04	984 58024-01		
53	.000000	EA	SUPPORTING SHAFT		SEE SPECIFIC.A		
54	1.000000	EA	ASSEMBLY PLATE P-26-C	984.70140.00	19.00000.06		
55	1.000000	EA	DEMISTER 0,35 M2	984 58238-R05	984 58238-80		
56	2.000000	EA	GASKET Ø127/77 X 2	VVS 00 0662 076	984 40942-02	NITRIL	
57	.000000	EA	HEAT EXCHANGER-EVAPORATOR		SEE SPECIFIC.E		
58	3.000000	EA	NUT M6 ISO 4032/86		985 32010-07	AISI 316 L	
59	7.000000	EA	WASHER M6 ISO 887/83		985 32510-08	A4	
60	1.000000	EA	GASKET Ø 162 / Ø 90 X 2	985 15932-R00	985 15932-01		
61	1.000000	EA	COMPOUND GAUGE -100% - 2 BAR LB/IN2,BAR=KGF/CM2,Ø100,3/8"BN	984 30308-R01	984 30308-00		
63	1.000000	EA	SIGHT GLASS WITHOUT INNER PART	984 57862-R03	984 57862-82		
64	4.000000	EA	SCREW M10 x 30 DIN 912		985 00002-17	QUALITY 8.8 ; DELTA-MAGNI	
65	1.000000	EA	PRESSURE GAUGE 0-6 BAR LB/IN2,BAR=KGF/CM2.Ø63,1/4"BC	984 30297-R01	984 30297-00		
66	1.000000	EA	PRESSURE GAUGE COCK 1/4" BSP BRASS	EV 5100-8	984 35533-00	BRASS	
67	1.000000	EA	NIPPLE 1/4" BSP	EV 206 B	984 40941-29	ISO 426/2/83 ; CU ZN39 PB3	
68	1.000000	EA	ELECTRODE (FOR SL-3000,DS-20)		985 42985-05		
72	1.000000	EA	RUBBER SLEEVE Ø80/Ø100	985 17576-R00	985 17576-01		

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Bill Of Material

Parent item no.:	Description:	Date:	Page 4 of 4
985 17909-81 R: 00	ASSEMBLY DRAWING NE/NK 92-100/92-100 P-26-C100 DIN / JIS	20040608	
Drawing no.:		Ini	
985 17909-R01		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
76	1.000000	EA	SPRING LOADED VALVE MV-15-1.0	984.35166.00	984 35166-00	BRONZE	
77	1.000000	EA	RED. NIPPLE 1" BSP X 1/2" BSP	EV 120 B	984 40941-37	ISO 426/2/83 ; CU ZN39 PB3	
78	1.000000	EA	HEXAGON NIPPLE 3/4" X 1/2" BSP	B 3245	985 52722-03	ISO 1338/77 ; CU PB5 SN5 ZN5	
79	1.000000	EA	PRESSURE GAUGE 0-3 BAR LB/IN2,BAR=KGF/CM2,Ø63,1/4"N	984 30298-R01	984 30298-00	AISI 316	
80	1.000000	EA	BUSHING 3/4" X 1/4" BSP	B 3241	985 52720-04	ISO 1338/77 ; CU PB5 SN5 ZN5	
81	1.000000	EA	BUSHING 3/4" X 1/2" BSP	B 3241	985 52720-06	ISO 1338/77 ; CU PB5 SN5 ZN5	
82	1.000000	EA	CROSS 3/4" BSP	B 3180	984 40943-27	ISO 1338/77 ; CU PB5 SN5 ZN5	
83	1.000000	EA	BALL VALVE 1/2" BSP BRASS		984 35683-00	BRASS	
84	1.000000	EA	HOSE CONNECTION 1/2" BSP X 15	VVS 74 4700 104	984 40939-01	ISO 426/2/83 ; CU ZN39 PB3	
85	1.000000	EA	WATER METER B&R TYPE EVW-DD 3/4" BPS CONNECTION		985 42600-04		
86	1.000000	EA	TEE 3/4" x 3/4" x 1/2" BSP	B 3130	985 52710-12	ISO 1338/77 ; CU PB5 SN5 ZN5	
87	1.000000	EA	ELBOW 1/2" BSP	B 3092	985 52700-03	ISO 1338/77 ; CU PB5 SN5 ZN5	
88	1.000000	EA	HEXAGON NIPPLE 1/2" BSP	B 3280	985 52721-03	ISO 1338/77 ; CU PB5 SN5 ZN5	
89	1.000000	EA	HEXAGON NIPPLE 1" BSP	B 3280	985 52721-05	ISO 1338/77 ; CU PB5 SN5 ZN5	
90	1.000000	EA	ELBOW 1" BSP	B 3090	985 52690-05	ISO 1338/77 ; CU PB5 SN5 ZN5	
91	1.000000	EA	NON RETURN VALVE 1" BSP	985 13952	984 35672-00	BRASS	
92	2.000000	EA	HEXAGON NIPPLE 1" X 3/4" BSP	B 3245	985 52722-04	ISO 1338/77 ; CU PB5 SN5 ZN5	
93	350.000000	MM	PIPE Ø 16/12,7		984 40938-29	COPPER DIN 1754/1787/17671	
94	1.000000	EA	CONNECTION 1/2" BSP X 16	EV 68 F	984 40941-39	ISO 426/2/83 ; CU ZN39 PB3	
95	.000000	EA	SOLENOID VALVE		SEE SPECIFIC.S		
96	1.000000	EA	HOUSING FOR ELECTRODE 1" BSP	984 57672-R04	984 22211-02		
99	.000000	EA	PAINTED PARTS FOR BED FRAME		SEE SPECIFIC.PP		

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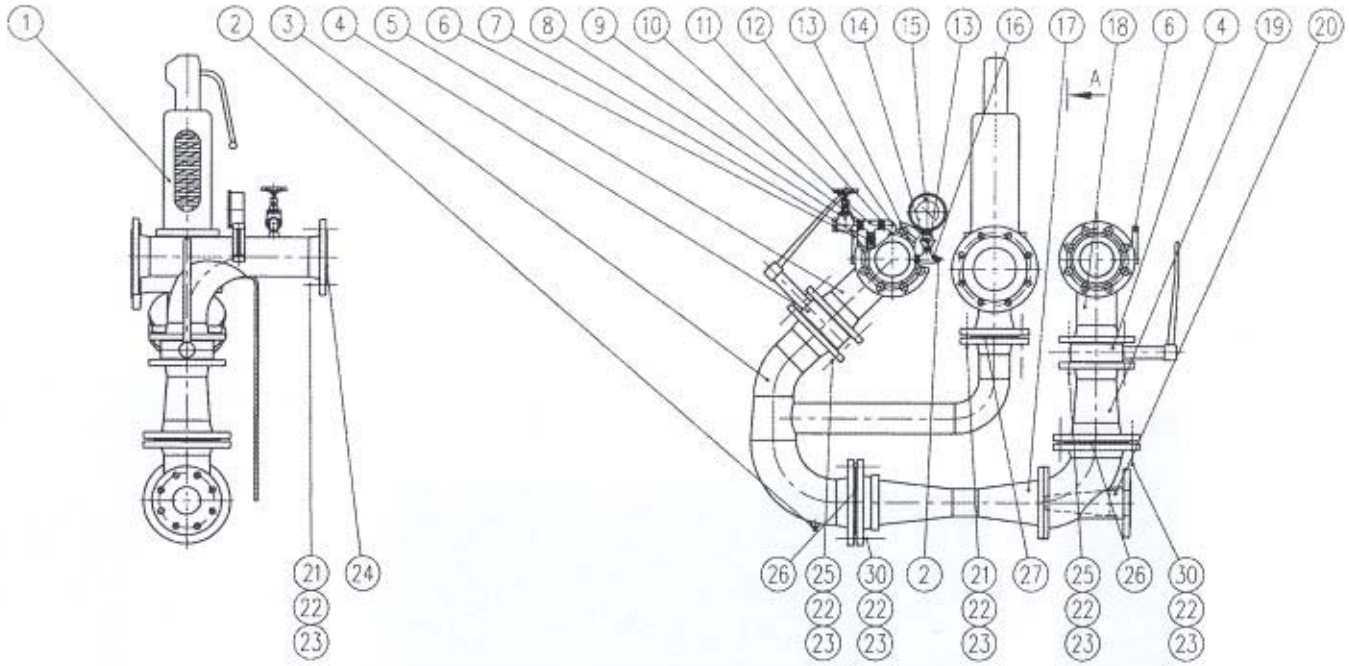
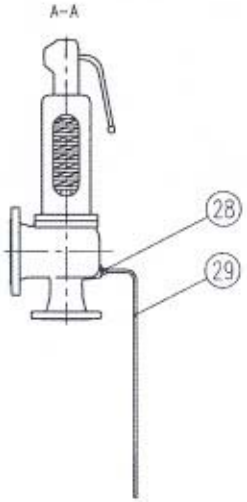
USD IBAN Acc. DK4252950015000929





Rev	Revision	Date	Reviewed	Reviewed	Approved
4	Pos. 2 Add 1 stk.	03.07.03	MFN		
3	Pos. 28+29+30 add Pos. 21 chg.	02.10.95	JOK		
2	Part list added	27.04.95	CSM		
1	D/A/J added in part list	11.04.94	AJE		

Alfa Laval
Alfa Laval Copenhagen A/S
DENMARK

Title: MOUNTING DRAWING STEAM ARRANGEMENT

Dimensions without tolerances: DS/ISO 2768-M or ISO 1302-B
ISO method E
Scale: 1:10
Format: A2
Project name: JWSP-26-C100/N2
Project type:
Project no.

Date: 13.11.93
Drawn: AJE
Reviewed:
Approved:
Replace dwg. no:

Drawing No.: 985 15594
Rev.: 04

Sheets: 2 2
Article no.: 985 15594-81 985 15594-80

Bill Of Material

Parent item no.:	Description:	Date:	
985 15594-81 R: 04	MOUNTING DRAWING STEAM ARRANGEMENT JIS JWSP-26-C100/N2	20040727	Page 1 of 2
Drawing no.:		Ini	
985 15594-R04		MFN	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
	.000000	EA	PIPE PARTS FOR STEAM ARR.		SEE SPECIFIC.PS		
1	1.000000	EA	SAFETY VALVE DN80/125 JIS TYPE SV603-7 PRES 1.0 BAR		985 00023-95		
2	2.000000	EA	PLUG 3/8".	B 3291	985 52730-02	ISO 1338/77 ; CU PB5 SN5 ZN5	
3	.000000	EA	CONNECTION FOR SAFETY VALVE		PIPING PART.A		
4	2.000000	EA	BUTTERFLY VALVE DN100	984 35620-R00	984 35620-00	GG 22	
5	.000000	EA	STEAM ARRANGEMENT INLET		PIPING PART.B		
6	2.000000	EA	THERMOMETER W/POCKET - ANGLE 63 MM	984 30366-R01	984 30366-00	CuNi10Fe	
7	1.000000	EA	BALL VALVE 3/8" BSP		984 35618-00	BRASS	
8	1.000000	EA	VALVE 3/4". GLOBE		985 56110-04	CU PB5 SN5 ZN5 ISO 1338	
9	1.000000	EA	HEXAGON NIPPLE 3/4" X 1/2" BSP	B 3245	985 52722-03	ISO 1338/77 ; CU PB5 SN5 ZN5	
10	1.000000	EA	TEE 1/2" X 3/8" X 1/2" BSP	B 3130	985 00010-58	ISO 1338/77 ; CU PB5 SN5 ZN5	
11	1.000000	EA	NIPPLE PIPE 1/2" BSP X 60	B 3530	984 40943-11	ISO 1338/77 ; CU PB5 SN5 ZN5	
12	1.000000	EA	ELBOW 1/2" BSP	B 3092	985 52700-03	ISO 1338/77 ; CU PB5 SN5 ZN5	
13	2.000000	EA	HEXAGON NIPPLE 3/8" BSP	B 3280	985 52721-02	ISO 1338/77 ; CU PB5 SN5 ZN5	
14	1.000000	EA	PRESSURE GAUGE COCK 3/8" BSP		984 35538-00	BRASS	
15	1.000000	EA	COMPOUND GAUGE -100% - 2 BAR LB/IN2,BAR=KGF/CM2,Ø100,3/8"N	984 30285-R01	984 30285-00		
16	1.000000	EA	TEE 3/8" BSP	B 3130	985 52710-02	ISO 1338/77 ; CU PB5 SN5 ZN5	
17	.000000	EA	STEAM INJECTOR		SEE SPECIFIC.J		
18	.000000	EA	STEAM ARRANGEMENT OUTLET		PIPING PART.C		
19	.000000	EA	REDUCTION		PIPING PART.D		
20	.000000	EA	NOZZLE FOR STEAM INJECTOR		SEE SPECIFIC.N		
21	24.000000	EA	SCREW M16 X 65 DIN 933		984 40910-44	QUALITY 8.8 ; DELTA-MAGNI	
22	112.000000	EA	WASHER M16 DIN 125 A		985 32512-20	A4	

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BIC/SWIFT ESSEDKKK

Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

Bill Of Material

Parent item no.:	Description:	Date:	
985 15594-81 R: 04	MOUNTING DRAWING STEAM ARRANGEMENT JIS JWSP-26-C100/N2	20040727	Page 2 of 2
Drawing no.:		Ini	
985 15594-R04		MFN	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
23	56.000000	EA	NUT M16 DIN 934 HOT DIP GALVANIZED		984 40910-45	HOT DIP GALVANIZED	
24	2.000000	EA	GASKET DN100 Ø162/115 X 1,5 MM DIN 2690 PN10		985 80009-19	FERJOSEAL 2639	
25	16.000000	EA	SCREW M16 X 110 DIN 931		985 00012-43	QUALITY 8.8 ; DELTA-MAGNI	
26	2.000000	EA	GASKET DN125 Ø192/141 X 1,5 MM DIN 2690 PN10		985 80009-20	FERJOSEAL 2639	
27	1.000000	EA	GASKET DN80 Ø142/90 X 1,5 MM DIN 2690 PN10		985 80009-18	FERJOSEAL 2639	
28	1.000000	EA	CONNECTION 1/2" BSP X 8		985 00067-98	ISO 426/2/83 ; CU ZN39 PB3	
29	850.000000	MM	COPPER PIPE Ø 6/8	VVS 04 0104 008	984 40938-03	COPPER	
30	16.000000	EA	SCREW M16 X 70 DIN 933 HOT DIP GALVANIZED		985 80011-31	HOT DIP GALVANIZED	

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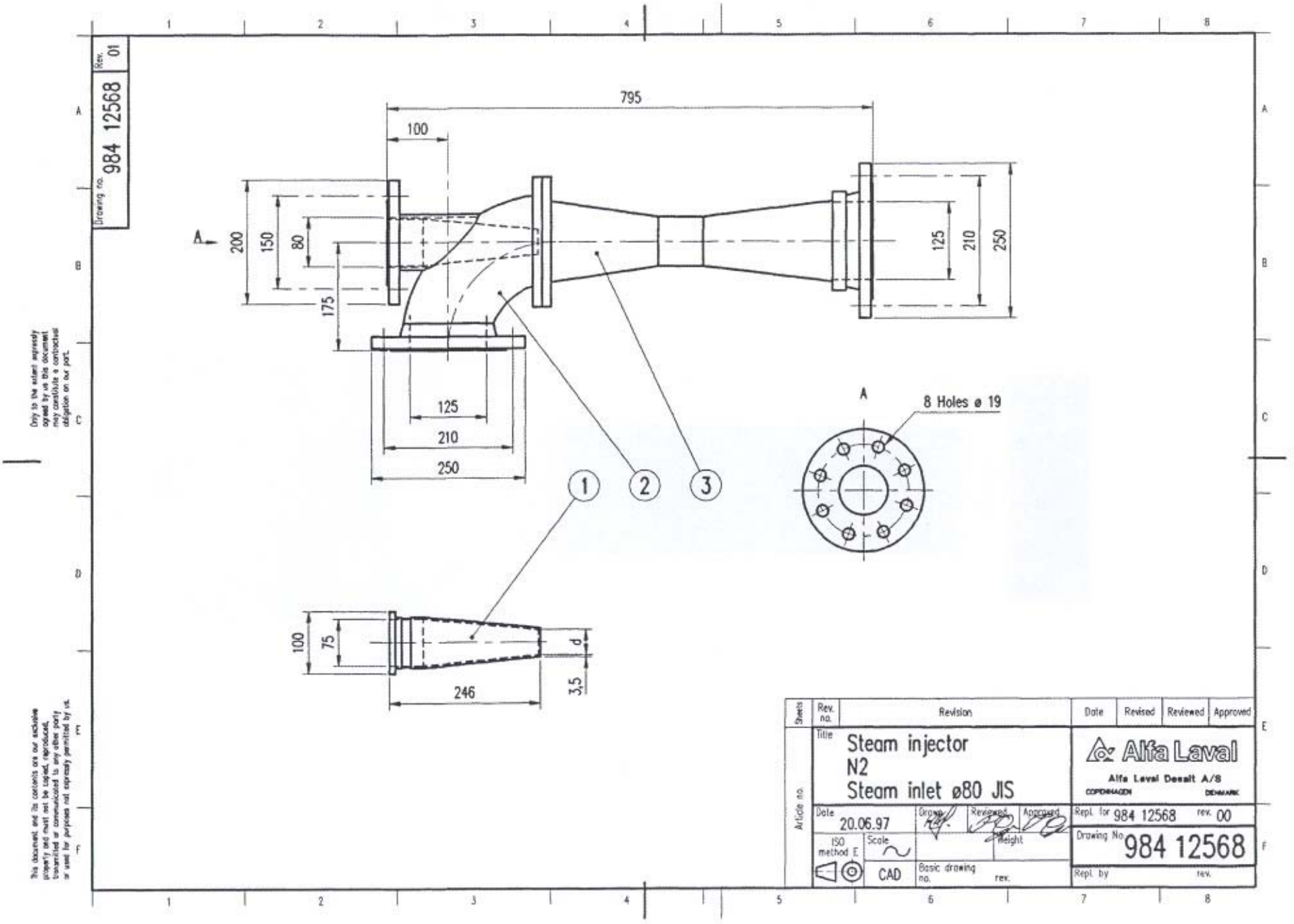
Drawing no. 984 12568
Rev. 01
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8 Holes ø 19
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d
3,5
246
Sheets
Rev. no.
Revision
Date
Revised
Reviewed
Approved
Article no.
Title
Steam injector
N2
Steam inlet ø80 JIS
Alfa Laval
Alfa Laval Denmark A/S
COPENHAGEN
DENMARK
Date
20.06.97
Drawn
Reviewed
Approved
Weight
Repl. for 984 12568 rev. 00
ISO method E
Scale
CAD
Basic drawing no.
rev.
Drawing No. 984 12568
Repl. by
rev.
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Bill Of Material

Parent item no.:	Description:	Date:	
985 00026-50 R: 00	STEAM INJECTOR N2 GG20/RG5 25/40 MM SPECIFIED COLOUR	20051102	Page 1 of 1
Drawing no.: 984.12568.0		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	EJECTOR NOZZLE Ø 25		984 12500-01	RG 5	
2	1.000000	EA	INJECTOR HOUSING JIS N2 FL A JIS B2222-1977 FL B DIN		984 12568-01	GG 20	
3	1.000000	EA	DIFFUSOR Ø 40.0 MM DIN 2632		984 12500-03	GG 20	
4	1.000000	EA	GASKET Ø120/105 X 1,5	FJ 650	984 40942-06	NON-ASBESTOS	

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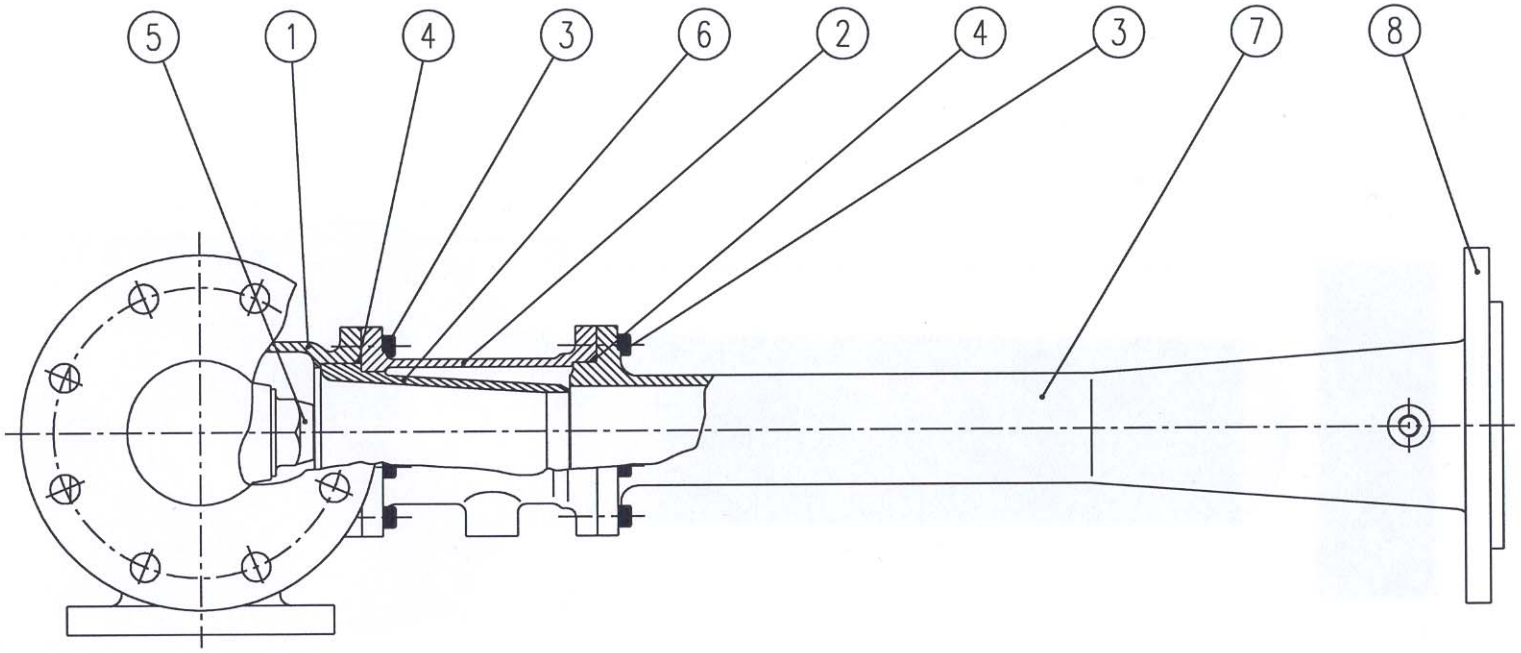
Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

984.12200.00 04



04	Art. no. 985 00027-14 added	18.07.95	RKS	X	X
03	Art. no. 985 00004-63 added	16.09.93	AJE	HJO	JBN
02	Art. no. 985 00008-36 added	16.02.93	ANO	KIM	HPA
01	New drawing in CAD	10.02.92	AJE	HJO	EWA

985 00027-14	2	984 12229-00	2
985 00008-36	2	984 12228-00	2
985 00004-63	2	984 12227-00	2
984 12288-00	2	984 12226-00	2
984 12285-00	2	984 12225-00	2
984 12272-00	2	984 12224-00	2
984 12271-00	2	984 12223-00	2
984 12270-00	2	984 12222-00	2
984 12269-00	2	984 12221-00	2
984 12268-00	2	984 12220-00	2
984 12267-00	2	984 12219-00	2
984 12266-00	2	984 12218-00	2
984 12265-00	2	984 12217-00	2
984 12264-00	2	984 12216-00	2
984 12263-00	2	984 12215-00	2
984 12262-00	2	984 12214-00	2
984 12261-00	2	984 12213-00	2

COMBINED
BRINE / AIR EJECTOR
X

11.11.85	AJ	AP	EWA
Scale			X
	X	X	

984.12200.00 03

984.12200.00

X X

Bill Of Material

Parent item no.:	Description:	Date:	
984 12272-00 R: 04	COMBINED BRINE/AIR EJECTOR BRINE/AIR EJECTOR 27,5/41,5/48,6 JIS	20040608	Page 1 of 1
Drawing no.: 984.12200.00		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	EJECTOR HOUSING		984 12215-10	RG 5	
2	1.000000	EA	EJECTOR INTERMEDIATE HOUSING		984 12215-20	RG 5	
3	16.000000	EA	SCREW M8 X 30 DIN 912	HFC 1790	984 40908-08	ISO 683/13/86 ; TYPE 20A	
4	2.000000	EA	O-RING 85.32 X 3.53		984 40999-02	NITRIL	
5	1.000000	EA	EJECTOR NOZZLE Ø 27.5	985 16716	984 12264-40	AISI 329	
6	1.000000	EA	EJECTOR NOZZLE Ø 41.5		984 12264-50	RG 5	
7	1.000000	EA	DIFFUSOR Ø 48.6 MM		984 12264-70	RG 5	
8	1.000000	EA	+FLANGE JIS		984 12225-80	ST.00	

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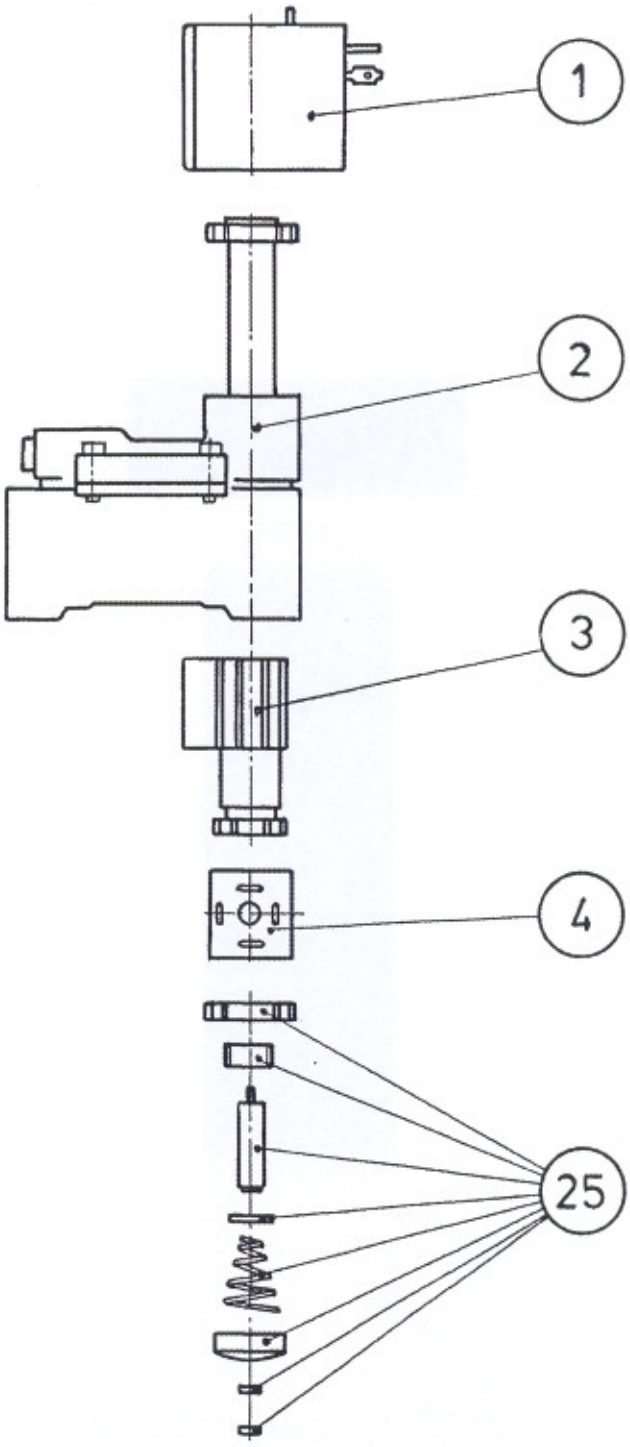
USD IBAN Acc. DK4252950015000929



ALFA-LAVAL
NIREX ENGINEERING
COPENHAGEN DENMARK

Scale		
	construct	
	drawn	14.11.86 AJ
	checked	14.11.86 JKP
	revised	

SOLENOID VALVE
DANFOSS

Replacement for:

Drawing No:
984.23482.00

Replaced by:

1765 Tuxen & Koch 01-13 36 30

Bill Of Material

Parent item no.:	Description:	Date:	
984 23486-00 R: 01	SOLENOID VALVE 1/2" EV220B 15 220V 50/60 CS NO (EVSI 15)	20040608	Page 1 of 1
Drawing no.:		Ini	
984.23482.0		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	COIL FOR SOLENOID VALVE 230V 50/60 CS		984 23480-01		
2	1.000000	EA	SOLENOID VALVE NO EV220B 15 (EVSI 15)		985 58810-18		
3	1.000000	EA	SEAL KIT N.O. FOR SOLENOID VALVE N.O.		985 00062-05		
25	.000000	EA	SPARE PART SET 1/2" NO		984 23486-25		

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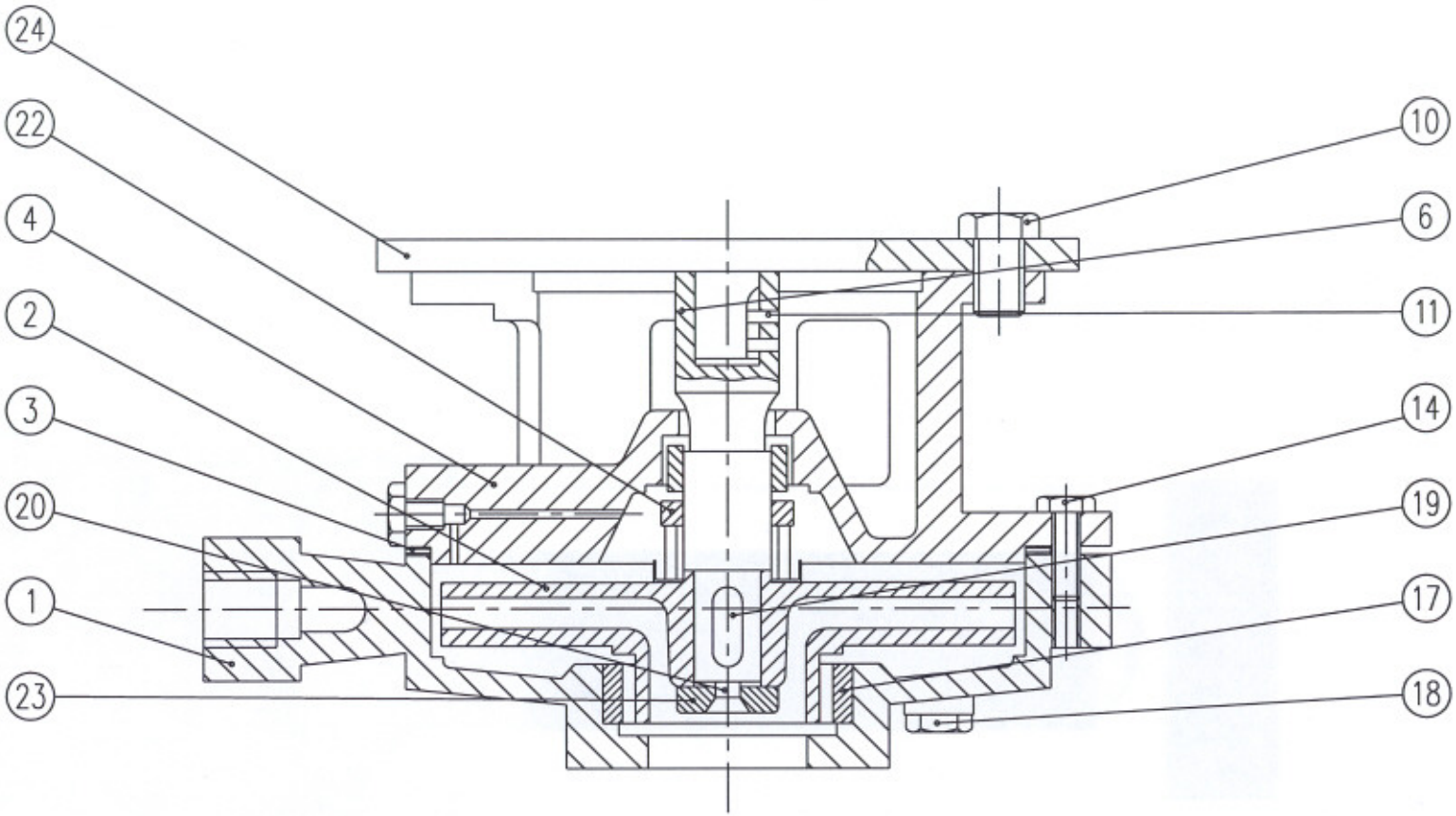
Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929

984.10230.00 02



02	ART.NO.985 00025-83&0027-60 AD	281195	BGU	X	X
01	New drawing in CAD	29.02.92	AJE	HJO	EWA

985 00027-60	2
985 00025-83	2
984.10270.00	2
984.10262.00	2
984.10255.00	2
984.10254.00	2
984.10253.00	2
984.10252.00	2
984.10241.00	2
984.10240.00	2
984.10231.00	2
984.10230.00	2

FRESHWATER PUMP
PVVF-1532
PVVF-2040

27.06.84	AJ	X	
			X
	X	X	

984.10230.00 01

984.10230.00

X X

Bill Of Material

Parent item no.:	Description:	Date:	
984 10255-00 R: 02	FRESHWATER PUMP PVVF-2040.2X-014 35 L/MIN, 39 MWC, 3360 R	20040608	Page 1 of 1
Drawing no.:		Ini	
984.10230.00		DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	HOUSING INCL. ITEM 3+17		984 10252-01	ISO 1338/77 ; CuPb5Sn5Zn5	
2	1.000000	EA	IMPELLER Ø 149		984 10252-02	RG 9	
3	1.000000	EA	GASKET PVVF 2040	985 13382-R01	984 10252-03	NON-ASBESTOS	
4	1.000000	EA	COVER INCL. ITEM 3		984 10252-04	ISO 1338/77 ; CuPb5Sn5Zn5	
6	1.000000	EA	SHAFT COMPLETE		984 10230-05	AISI 316	
10	4.000000	EA	SCREW M8 X 16 DIN 933 KVAL. 8.8	HFC 473	984 40908-11	HARDENED STEEL ; EL. ZINCED	
11	2.000000	EA	SCREW M5 X 8 DIN 916	HFC 710	984 40905-03	STEEL ; KVAL. 45 H	
14	4.000000	EA	*SCREW M10 X 25 (SET) KVAL. 8.8	HFC 473	984 40910-03	HARDENED STEEL ; EL. ZINCED	
17	1.000000	EA	SEAL RING		984 10252-06	ISO 1338/77 ; CuPb5Sn5Zn5	
18	2.000000	EA	+*PLUG 1/8" BSP UDGÅET. ERST. AF 984 10030-87	EV 109 B	984 40941-15	ISO 426/2/83 ; CU ZN39 PB3	
19	1.000000	EA	KEY 4 X 4 X 15		984 10230-07	ISO 683/13/86 ; TYPE 20A	
20	1.000000	EA	SCREW M5 X 16 DIN 7991	HFC 1795	984 40905-04	ISO 683/13/86 ; TYPE 20A	
22	1.000000	EA	MECH. SEAL Ø 16		984 10230-08	316 C/CE	
23	1.000000	EA	WASHER	984 57763	984 10230-09	ISO 683/13/86 ; TYPE 20A	

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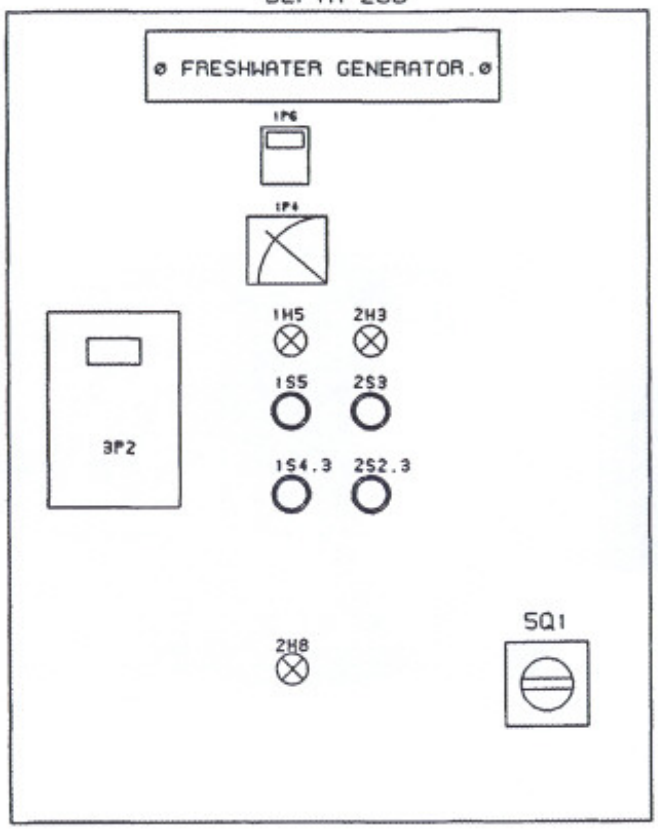
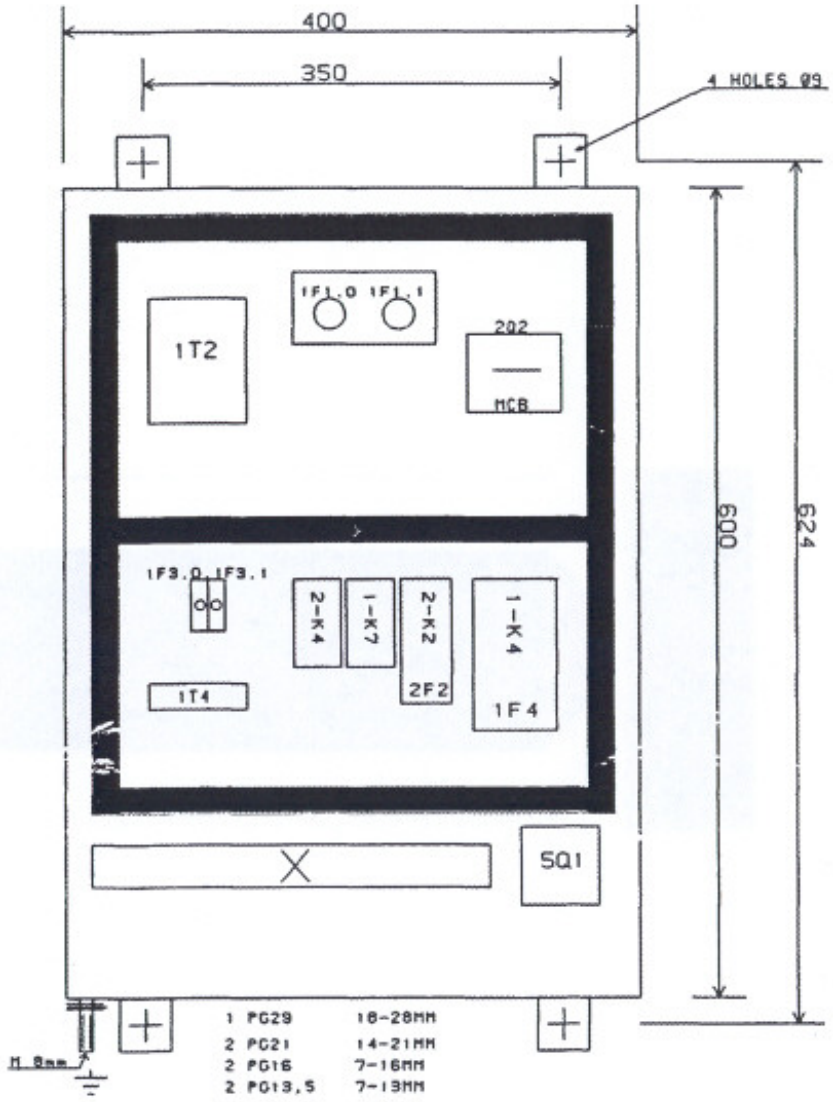
USD IBAN Acc. DK4252950015000929





TYPE. FRESHWATER GENERATOR. ARRANGEMENT DRAWING.	Alfa Laval Alfa Laval Denett A/S COPENHAGEN DENMARK	DATO 07/03-95 SIGN. OZA	DRAWING NO. 985 16646 R:01

Bill Of Material

Parent item no.:	Description:	Date:	
985 00034-85 R: 02	CONTROL PANEL - FWG - OPT. A (DIAGR: 985 16645-R01) 220/380/440V - 220V	20040608	Page 1 of 2
Drawing no.: 985 16646-R01		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
10	1.000000	EA	BOX 400 X 600 X 200		984 21625-20	2490	
20	1.000000	EA	MAIN SWITCH OETL 63 K3		984 21622-82	6289	5Q1
30	1.000000	EA	HANDLE OETL ZX104/150		984 21622-83		5Q1
40	3.000000	EA	AUX. CONTACT CA5-10 HJÆLPEKONTAKT FOR A9-A110-N		984 21621-80	5096	1K4,2K2
50	2.000000	EA	AUX. CONTACT CA5-01 HJÆLPEKONTAKT FOR A9-A110-N		984 21621-81	5095	1K4,2K2
60	1.000000	EA	CONTACTOR A9 220V/50-60CS A9 220-230/230-240 50/60CS		984 21620-02	362	2K2
70	1.000000	EA	CONTACTOR.		SEE SPECIFIC.CO		1K4
80	1.000000	EA	THERMAL RELAY TA25 (1.3-1.8A) TA25		984 21621-01	5252	2F2.0
90	1.000000	EA	THERMAL RELAY.		SEE SPECIFIC.TR		1K4
120	2.000000	EA	FUSE CAP KII 5SH 112		984 21624-61	121	1F1.0,1F1.1
130	2.000000	EA	FUSE 6A DZ II 6A DZ II		984 21624-44	182	1F1.0,1F1.1
141	1.000000	EA	NO FUSE BREAKER C60H/C 6A 3PO C60H/C 6A 3POL ' MERLIN GERIN		985 00022-80	24998	2Q2
160	1.000000	EA	*UNIVERSAL TRANSFORMER		985 00013-47		1T2
170	3.000000	EA	BULB FOR PILOT LAMP 240V 220-240V		984 21622-01	4494	1H5,2H3,2H8
180	2.000000	EA	GLASS FOR PILOT LAMP (GREEN)		984 21622-02	4621	1H5,2H3
190	1.000000	EA	GLASS FOR PILOT LAMP (WHITE)		984 21622-03	5232	2H8
200	2.000000	EA	PUSH BUTTON (ON)		984 21622-30	4489	1S5,2S3
210	2.000000	EA	PUSH BUTTON (OFF)		984 21622-31	4490	1S4.3,2S2.3
220	2.000000	EA	PLATE FOR PUSH BUTTON (GREEN)		984 21622-40	4618	1S5,2S3
230	2.000000	EA	PLATE FOR PUSH BUTTON (RED)		984 21622-41	4617	1S4.3,2S2.3
240	2.000000	EA	FUSE 1A 143-241 5X20MM 143-241 RUDOLPH SCHMIDT		985 00016-25		1F3.0,1F3.1
276	2.000000	EA	AUX.RELAY N22E 220-240V50/60CS N22E 220-230V/230-240V 50/60CS		984 21620-92	3538	1K7,2K4
390	1.000000	EA	SALINOMETER DS-20 MUNSELL 7.5		984 22510-00	7443	3P2

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Bill Of Material

Parent item no.:	Description:	Date:	Page 2 of 2
985 00034-85 R: 02	CONTROL PANEL - FWG - OPT. A (DIAGR: 985 16645-R01) 220/380/440V - 220V	20040608	
Drawing no.: 985 16646-R01		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
411	1.000000	EA	A-METER EQ72 0-50/5-250A		984 21623-21	6197	1P4
412	1.000000	EA	CURRENT TRANSFORMER. 50/5A CELSA IBA ACL 9000018		985 00014-90		1T4
413	1.000000	EA	HOUR COUNTER 230V-50/60HZ UL BAUSER 633 UL.		984 21623-43	6494	1P6

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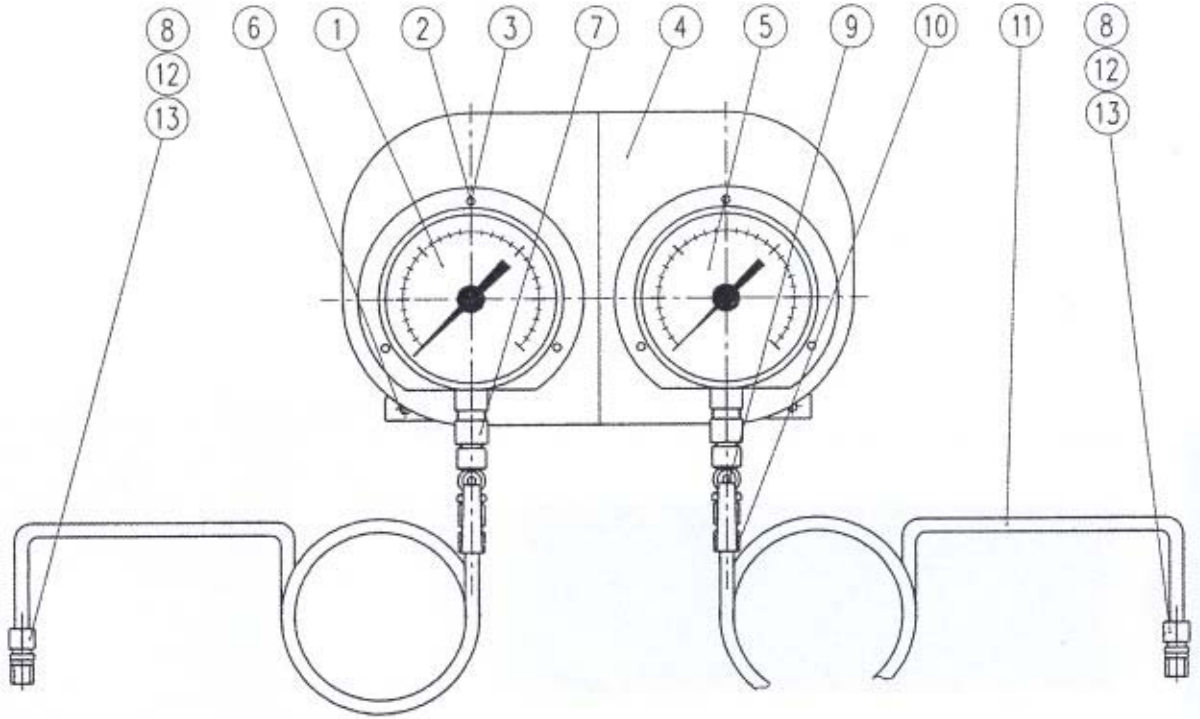
USD IBAN Acc. DK4252950015000929



Article no.	Sheets
984 58196-84	2
984 58196-83	2
984 58196-82	2
984 58196-81	2
984 58196-80	2

Rev. No.	Revision text	Date	Drawn	Checked	Appr.
08	New Drawing Head. Che. Rev. 07	01.06.04	MFN	MFN	PJE

Title: SET OF MANOMETERS FOR PUMP.

Proj. No | Proj. Type | Proj. Name: Production Drawing

Dimensions Without Tolerances: ISO 2768-M or ISO 13920-B

Size: A2

Date: 17.08.98 | Drawn: AJ | Checked: AJ | Approved: AC

ISO Method E

Scale: 1:2

Sheet: 2

Location: Alfa Laval Copenhagen A/S - Denmark

Drawing No: 984 58196 Rev: 08

Bill Of Material

Parent item no.:	Description:	Date:	
984 58196-83 R: 06	SET OF MANOMETERS FOR PUMP TYPE CNL 65/80/100	20040630	Page 1 of 1
Drawing no.: 984 58196-R08		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	COMPOUND GAUGE -100% - 2 BAR LB/IN2,BAR=KGF/CM2,Ø100F,3/8"N		984 30284-00		
2	6.000000	EA	SCREW M4 X 10 DIN 84		985 30470-16	ISO 683/13/86 ; TYPE 20A	
3	6.000000	EA	NUT M4 DIN 934		985 32010-03	QUALITY 8.8; DELTA MAGNI	
4	1.000000	EA	ATTACHMENT FOR MANOMETERS	984 58195-R02	984 58195-80		
5	1.000000	EA	PRESSURE GAUGE 0-6 BAR LB/IN2,BAR=KGF/CM2,Ø100F,3/8"N		984 30318-00		
6	2.000000	EA	SCREW M6 X 10 DIN 84	HFC 9033	984 40906-01	STEEL ; EL. ZINCED KVAL. 4.8	
7	2.000000	EA	CONNECTION 3/8" BSP X 1/4" BSP	EV 120 B	984 40941-35	ISO 426/2/83 ; CU ZN39 PB3	
9	2.000000	EA	MANOMETER COCK 1/4"BSP		984 35661-00	BRASS	
10	2.000000	EA	CONNECTION 1/4" BSP X Ø 8	EV 66 F	984 40941-33	ISO 426/2/83 ; CU ZN39 PB3	
11	2000.000000	MM	COPPER PIPE Ø 6/8	VVS 04 0104 008	984 40938-03	COPPER	
12	2.000000	EA	CONNECTION 1/4" BSP X 8	EV 68 F	984 40941-05	ISO 426/2/83 ; CU ZN39 PB3	

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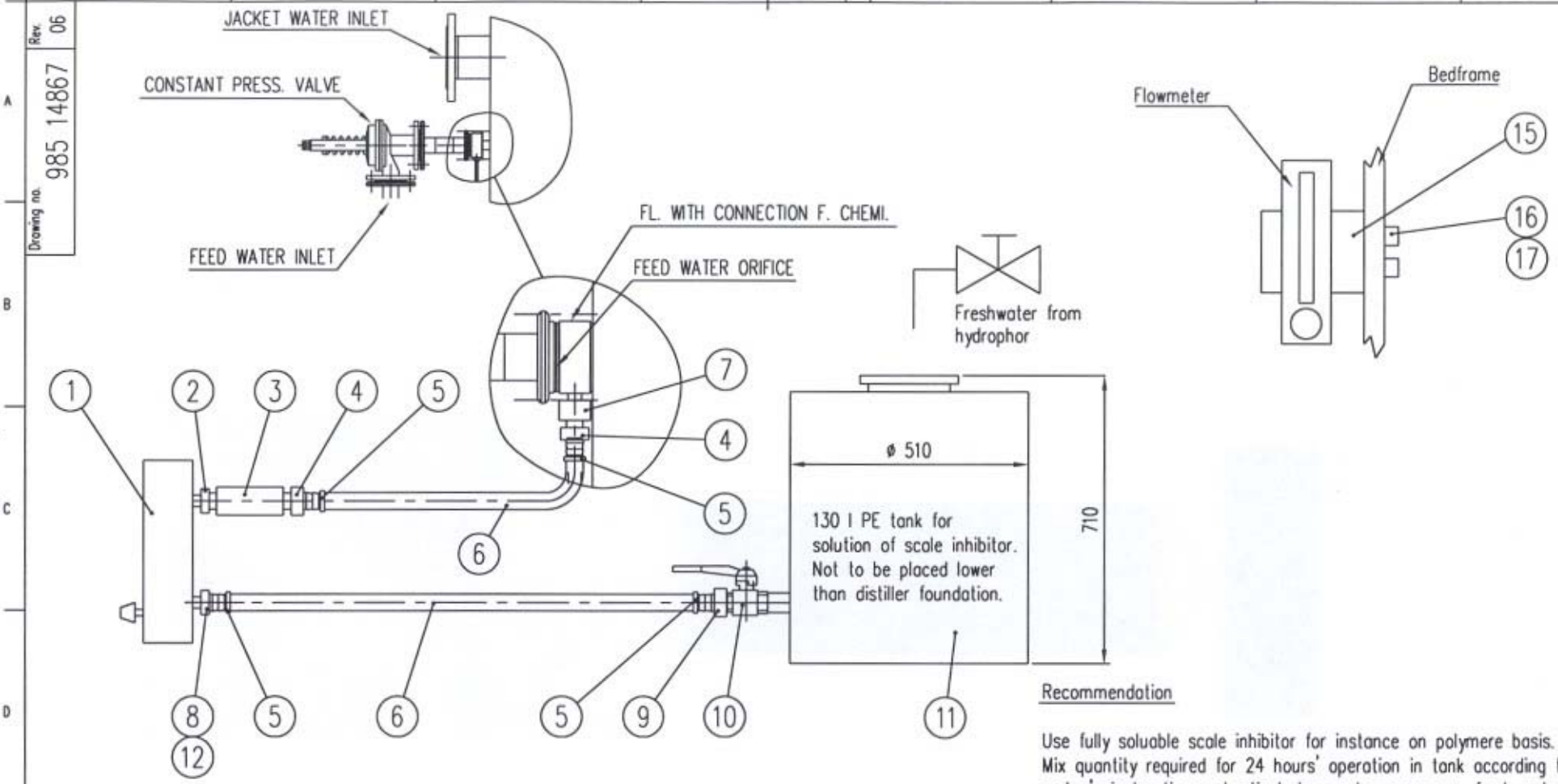
BIC/SWIFT ESSEDKKK

Accounts: DKK IBAN Acc. DK5752950010008069
EUR IBAN Acc. DK4552950013000735
USD IBAN Acc. DK4252950015000929



Rev. 06

Drawing no. 985 14867

Recommendation

Use fully soluable scale inhibitor for instance on polymere basis. Mix quantity required for 24 hours' operation in tank according to maker's instruction and adjust dosage to cover max. fresh water output from distiller.
Flush regulary.

Rev. no.	Revision	Date	Revised	Reviewed	Approved
6	Att. pos 15. 16. 17.	291001	MFN	HJO	HJO
5	PARTS LIST -83 ADDED	961106	LSI	PGR	PGR
4	PART LIST ADDED	180895	CSM	JBN	JBN
3	NEW PRINT; REV. 02- DISAPPERED	110895	LGR	HPA	HPA
2	MATR. FOR TANK: PVC TO PE	141094	FBJ	HJO	HJO
1	CORRECTION CONCERNING ORIFICE	300694	FBJ	HJO	HJO

Article no.	Sheets	Rev. no.
985 14867-83	2	2
985 14867-82	2	2
985 14867-81	2	2
985 14867-80	2	2

Title: FEED WATER TREATMENT SCALE INHIBITOR DOSAGE EQUIPMENT

Date 14.01.93. | Drawn OAN | Reviewed AJE | Approved AMS

ISO method E | Scale 1:10 | Weight X | CAD | Basic drawing no. | rev.

Alfa Laval
Alfa Laval Desalt A/S
COPENHAGEN DENMARK

Repl. for 985 14867 rev. 05

Drawing No. 985 14867

Repl. by X rev. X

Bill Of Material

Parent item no.:	Description:	Date:	
985 14867-80 R: 07	FEED WATER TREATMENT, SCALE INHIBITOR DOSAGE EQUIPMENT P-26-C/D-PU-36-C 130 L	20040623	Page 1 of 1
Drawing no.: 985 14867-R07		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	FLOWMETER INCL. REG. VALVE TILSLUTNING 1/8 NPT	985 20164-R00	985 00037-66	ACRYL	MOUNTED ON FWG
2	1.000000	EA	NIPPLE 3/8" BSP X 1/8" BSP	EV 206 B	984 40941-40	ISO 426/2/83 ; CU ZN39 PB3	MOUNTED ON FWG
3	1.000000	EA	NON RETURN VALVE 3/8" BSP		984 35623-00	BRASS	MOUNTED ON FWG
4	2.000000	EA	HOSE CONNECTION 3/8" BSP X 12	EV 265-2	984 40941-28	ISO 426/2/83 ; CU ZN39 PB3	MOUNTED ON FWG
5	4.000000	EA	HOSE CLIP		984 35543-00	ST.37	2PCS MOUNTED ON FWG
6	4.000000	ME	HOSE 3/8"		984 09607-01	Reinforced PVC-materiale	1PCS = 2ME
7	1.000000	EA	VALVE 1/2" BSP	VVS 744004 204	984 35542-00	RG 5	
8	1.000000	EA	HOSE CONNECTION 1/8" BSP X 12	EV 265-1	984 40941-26	ISO 426/2/83 ; CU ZN39 PB3	MOUNTED ON UNIT
9	1.000000	EA	HOSE CONNECTION 1/2" BSP X 12	EV 265-3	984 40941-27	ISO 426/2/83 ; CU ZN39 PB3	
10	1.000000	EA	TANK 130 L		985 00004-51	PE	
11	1.000000	EA	SUPPORT FOR FLOWMETER	985 18092-R01	985 18092-01	AISI 304	
12	2.000000	EA	SCREW M6 X 16 DIN 933 ISO 4017/88		985 30010-43	ISO 683/13/86 ; TYPE 20A	
13	2.000000	EA	WASHER M6 ISO 887/83		985 32510-08	A4	

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Bill Of Material

Parent item no.:	Description:	Date:	
985 00037-42 R: 01	STANDARD SPARE PARTS KIT JW(S)P-26-C80(B)/C100	20040608	Page 1 of 1
Drawing no.:		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
	1.000000	EA	MECH. SEAL Ø 35		984 10724-11	316 C/CE	FOR EJECTOR PUMP
1	1.000000	EA	MECH. SEAL Ø 16		984 10230-08	316 C/CE	FOR F.W. PUMP
2	1.000000	EA	BALL BEARING 6210 Z C3		985 00037-49		FOR EJECTOR PUMP
2	1.000000	EA	BALL BEARING 6203-2Z-C3		984 20645-00		FOR F.W. PUMP MOTOR
3	1.000000	EA	GASKET FOR FRONT COVER P-26-C	984 58058-R02	984 58058-01		FOR GENERATOR
4	1.000000	EA	GLUE		984 40002-00		

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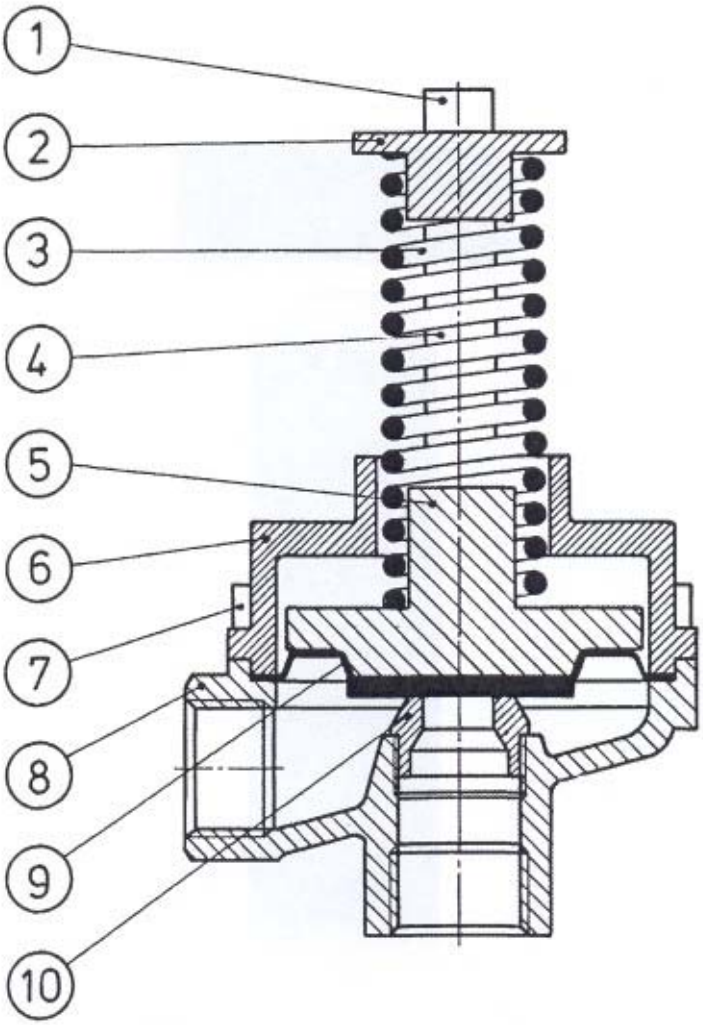

ALFA-LAVAL
NIREX ENGINEERING
COPENHAGEN DENMARK

Scale	construct	
	drawn	28.9.88 AJE
	checked	
	revised	

SPRING LOADED VALVE
MV-15

Replacement for:

Drawing No:
984.35166.00

Replaced by:

1765 Tuxen & Koch 01-13 36 30

Bill Of Material

Parent item no.:	Description:	Date:	
984 35166-00 R: 01	SPRING LOADED VALVE MV-15-1.0	20040608	Page 1 of 1
Drawing no.: 984.35166.00		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	2.000000	EA	SCREW M6 X 50 DIN 912	HFC 1790	984 40906-26	ISO 683/13/86 ; TYPE 20A	
2	1.000000	EA	SPRING GUIDE		984 35685-02	RG 5	
3	1.000000	EA	SPRING		984 35685-03	AISI 304	
4	1.000000	EA	DISTANCE BUSHING L=38 MM		984 35172-01	AISI 304	
5	1.000000	EA	DIAPHGRAM DISC.		984 35615-07	DELRIN	
6	1.000000	EA	+SPRING HOUSING		984 35166-02	BRASS	
7	4.000000	EA	SCREW M6 X 12 DIN 912	HFC 1790	984 40906-14	ISO 683/13/86 ; TYPE 20A	
8	1.000000	EA	VALVE HOUSING		984 35166-03	RG 5	
9	1.000000	EA	DIAPHRAGM TYPE MVF 25	984 58197	984 35615-09		
10	1.000000	EA	VALVE SEAT		984 35166-04	DELRIN	

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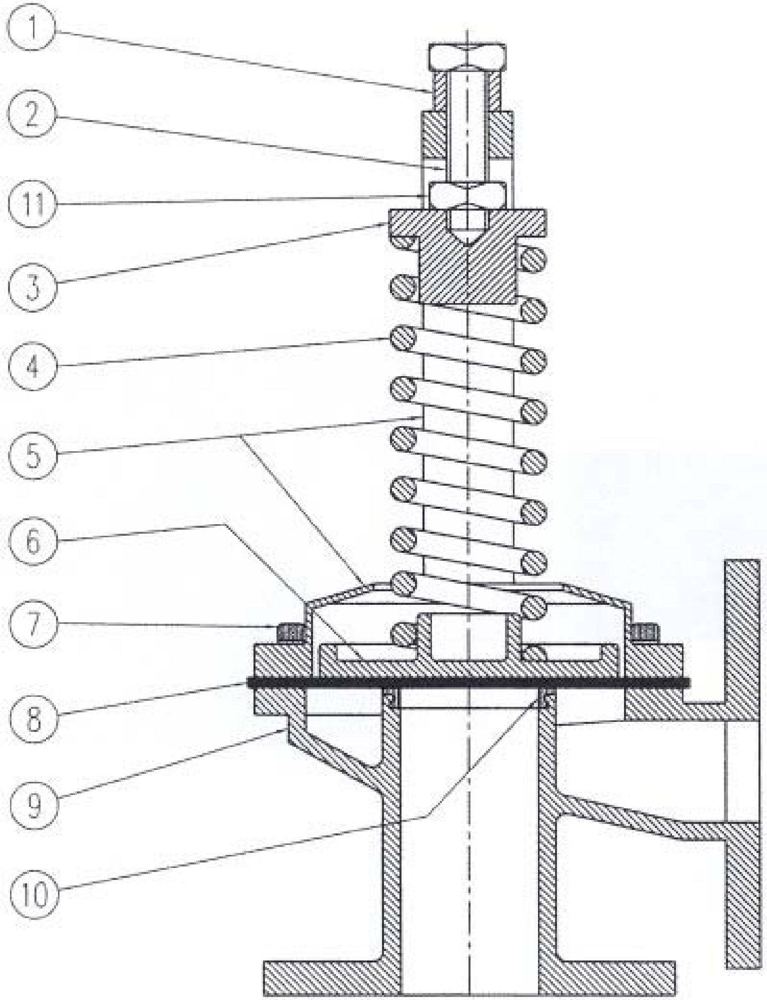

SPRING LOADED VALVE	
984 35535-00	MVF-40-2.5
984 35536-00	MVF-50-3.0

Rev	Revision	Date	Revised	Reviewed	Approved
2	New drawing in CAD	26.06.03	MFN		

Alfa Laval
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DENMARK

Title: Spring loaded valve
MVF-40-2.5 50-3.0

Dimensions without tolerances: DS/ISO 2768-M or ISO 13920-B
ISO method E
Scale 1:1
Format A2
Project name
Project type
Project no.
Date 26.06.03
Drawn MFN
Reviewed
Approved
Replace dwg. no.
Drawing No. 984 35535
Rev 02

Bill Of Material

Parent item no.:	Description:	Date:	
984 35535-00 R: 01	SPRING LOADED VALVE MVF-40-2.	20040608	Page 1 of 1
Drawing no.: 984 35535-02		Ini DKSOABK	

BUBL	QTY	U/M	DESCRIPTION	DRAWING NO.	ARTICLE NO.	MATERIAL	REMARKS
1	1.000000	EA	ADJUSTING RING		984 35516-01	AISI304	
2	1.000000	EA	ADJUSTING SCREW		984 35516-02	AISI304	
3	1.000000	EA	SPRING RETAINER		984 35516-03	DELRIN	
4	1.000000	EA	SPRING		984 35504-04	SPRING STEEL	
5	1.000000	EA	SPRING GUIDE		984 35516-05	ALU/RILSAN	
6	1.000000	EA	DIAPHRAGM WASHER		984 35516-06	ALU/RILSAN	
7	6.000000	EA	SCREW M8 X 20 DIN 912	HFC 1790	984 40908-06	ISO 683/13/86 ; TYPE 20A	
8	1.000000	EA	DIAPHRAGM		984 35504-08	EPDM	
9	1.000000	EA	VALVE HOUSING		984 35535-01	RG 5	
10	1.000000	EA	VALVE SEAT		984 35535-02	DELRIN	
11	1.000000	EA	NUT M12 DIN 934		985 00001-71	QUALITY 8.8 ; DELTA-MAGNI	

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TEST SHEET for Single-stage Freshwater Generator

Vessel/Rig:		Date:		Location:			
Distiller No.:		Type:		Capacity: m^3/24H			
No. of plates in evaporator:		Date for latest cleaning:					
No. of plates in condenser:		Date for latest cleaning:					
TEST							
Date							
Time from							
To							
Difference min.							
Water clock to m^3							
From m^3							
Difference m^3							
Total output m^3/24h							
Evaporator Section:							
Hot water inlet °C							
Hot water outlet °C							
Difference °C							
Hot water flow m^3/h							
Feed water temp. °C							
Separator Vessel:							
Boiling temp. °C							
Vacuum %							
Hot Water Pump:							
Suction pressure Bar							
Discharge pressure Bar							
Brine / Air Ejector:							
Inlet pressure Bar							
Discharge pressure Bar							

Condenser Section:							
Seawater inlet	**°C**						
Seawater outlet	**°C**						
Difference	**°C**						
Flow	**m^3/h**						
Ejector Pump:							
Suction pressure	**Bar**						
Discharge pressure	**Bar**						
Freshwater Pump:							
Discharge pressure	**Bar**						
Salinometer:							
Salinity	**ppm**						
Diesel Engine Load:							
Eng. No.: 1	**kW**						
Eng. No.: 2	**kW**						
Eng. No.: 3	**kW**						
Eng. No.: 4	**kW**						
Eng. No.: 5	**kW**						

Comments:

Sign.