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Section 1: Reference drawings.

- + Piping diagram
- + Specification of flake ice machine
- + Mounting instruction for Iceflaker
type SD, SE, SF, AD, AE and AF.

Applications:

The instructions are used to get the right operation and maintenance of the ice-machines.

If the operation conditions are changed, or if the refrigerant is changed, the supplier of the machines has to be notified since the opportunity for breakdowns and accidents is present.

The ice-machines type SD, SE AND SF are flake-ice machines operated after the principle of a rotating Evaporator. This principle is used in the food-industries or elsewhere where ice of high quality is wanted.

Calculations and project-plans:

The calculations of ice-flakers are done by means of the updated technical leaflets, where capacities, dimensions etc. are informed.

These leaflets are ordered by Buus Refrigeration A/S.

Service:

Maintenance and repair-work, which demands skilled labour has to take place due to instructions, and must only be done by skilled engineers.

Avoid liquid in the compressor:

To avoid liquid coming back to the compressor the suction gas has to be superheated. The superheat normally is 3-5°C, the suction valve on the compressor is just icing a little.

Legislation:

Installation and operation has to take place in order of the legislation present, this is deviating from country to country. The components has to be approved and adjusted in accordance to the legislation.

See also the scheme with guided values.

Additional instructions:

If You have questions referring to installation, service, operation etc, please call the local dealer/agent.

Identification:

At the delivery the machines are supplied with a labelling informing about year of fabrication, serial number, type of refrigerant etc.

Ordering of spareparts:

By ordering of spareparts please indicate type, serial number of the machine and the sparepart number according to the sparepart list.

HORIZONTAL FLAKE ICE MACHINE

Description

The horizontal iceflaker model SD, SE & SF is made of corrosion resistant material (aluminium, stainless steel and plastic).

The iceflaker is very effective, e.g. high K-value on the surface of the freezing drum. This means high drum speed, which again means quick freezing and large capacity compared to the size of the drum.

Base unit and cabinet is made of stainless steel.

Drum dimensions and capacities:

Type	Length mm	Cylinder diam. mm	T/24h Fresh/Sea Water
SD 1000	565	262	1.0
SD 1500	565	262	1.5
SD 2000	565	262	2.0
SD 2500	565	262	2.5
SE 3000	765	262	3.0
SE 4000	765	262	4.0
SE 4500	765	262	4.5
SF 5000	1130	262	5.0
SF 6000	1130	262	6.0
SF 7000	1130	262	7.0
SF 8000	1130	262	8.0
SF 10000	1130	262	9.5

The flakeice machines are constructed for use of Freon and ammonia NH₃ (R-717) as refrigerants. The machine has a horizontal rotating freezing drum. The inside of the drum is cooled by the evaporated refrigerant, whereas the outside surface is lowered/sprinkled with water from two distributing pipes, depending upon the type of machine.

On the cold surface of the drum some of the water is frozen to ice. The surplus water returns to the water tank. From here the water pump draws water and presses it to the distributing pipes (marine versions). The water level in the water tank is controlled by a floater through which the inlet water is supplied. If the ice machine is equipped with water pre-cooler the water is cooled down to approx. 8°C before it is led to the water tank. The water pre-cooler is mounted inside the cabinet.

A possible water pre-cooler can also be mounted externally and be common to more machines or it can be left out if the temperature of the supplied water does not exceed 8°C.

The ice layer on the surface of the drum is removed with an ice cutter fixed on a horizontal holder on the front edge of the bearing of the ice machine. The ice slides out through the ice spout on the front of the ice machine.

The iceflaker is producing dry cold ice, it is however possible to regulate the quality of the ice by adjusting the water level in the tank by means of the floater.

On the marine-versions it is possible to control the waterflow to the distribution-pipe through the valve.

The drum is operated by an electric motor over a V-belt to a worm-gear, which through a gear transmission leads the power to the drum. The water pump is mounted on the primary shaft.

The transmission is protected against overload by a safety wedge, placed under the gear-wheel on the secondary shaft of the worm reduction gear.

The drum is controlled in both ends by a slide bearing. The bearing housing has built-in stuffing boxes, both at the refrigerant and at the water side.

Slide bearing and gear transmission are of a lubrication free construction and requires a minimum of service.

Freon:

The supply of refrigerant is done through an automatically expansion valve. The expansion valve is operating

As a constant pressure-regulator, which is obtaining the set-pressure given by the spring.

NH₃ (Ammonia):

1): Direct expansion:

The regulation of the ammonia supply takes place automatically by means of a level control valve TEVA.

2): Pump circulation:

In the inlet the ammonia is pumped through an adjustable manual valve, and in the outlet there is an automatic constant evaporation valve.

The ice machine is protected against freeze-up by a freezing thermostat and a thermostat-controlled heating element in the water tank. If the water temperature in the water tank becomes too low, the heating element will be operated.

If this is not enough to keep the temperature above freezing point, the supply of refrigerant to the drum is stopped by means of the freezing thermostat, which closes a solenoid valve in the refrigerant pipe. At the same time the water supply to the tank is turned off by means of a solenoid valve in the water pipe. If the water supply to the water tank fails, a pressure control in the water pipe will stop the refrigerant supply by closing the solenoid valve in the refrigerant pipe.

The ice machine is constructed to produce ice of slightly salted water. If only surface water or fresh water with low or no calcium contents is used, it will be necessary to add a salt solution to the water.

If water with low calcium content is supplied to the machine, the ice will freeze disproportionately hard on the drum and will break in very small flakes on the ice cutter. The ice will therefore be less suitable.

If supply of salt is necessary, a salt dosing device must be connected to the watersupply. The salt dosing device is described in a separate instruction, see section 9.

Important!

It is important that the operation period of the ice machine is as long as possible, since start/stop is always critical for ice machines.

Buus says max. 4-5 start/stop pr. 24h.

This also applies in cases where the normal running of the ice machine is interrupted by eg. too low water pressure or too low temperature in the water tank.

Security precautions and environment

In general

Eye protectors

When doing bodywork at the compressor one has to use eye protectors due to the risk of liquid refrigerant.

Closed stopvalve at the discharge side

Never operate the compressor when the discharge stopvalve is closed.

V-belt baffle

Never run v-belt operated compressors without having the v-belt baffle mounted.

Coupling baffle

Never start direct operated compressors without having the coupling baffle mounted.

Compressors with closed valves

A compressor with closed valves which is not evacuated is under pressure. The pressure is measured at the gauges, and the compressor must never be heated up.

Fire precautions

(H)CFC-refrigerants, contains CL, and must not be in the near of fire due to the poisonous compounds being produced, which under certain conditions can cause death. At dangerous concentrations a warning smell occurs. Avoid smoking if there is (H)CFC present in the room.

Ammonia

R717, NH₃ may not be in the near of fire since an explosion can occur at certain concentrations with the air. (ratio of components 108-201 g/m³) Also see Iar bulletin no. 110.

Fixing points

Now and then the fixing points of the compressor and motor must be checked and tightened

Breathing protection

At the entrance of the engineroom the security masks must be placed so they are easily found.

Emergency stop

The compressor must always be equipped with an easy to reach and visible emergency stop.

Common laws

The plant must be constructed due to national laws and conventions.

Refrigerant leakage

Working in a room where a large amount of refrigerant is present in gas or liquid is dangerous.

Refrigerant containers

Containers with refrigerant is to be opened carefully. Never expose the bottles for shocks, and see to they are secured against tumble and heating up.

Leakage of refrigerant

The engineroom has to be ventilated since the refrigerants will crowd out the air and in this way cause lack of oxygen which can cause death. This is in particular for the (H)CFC-refrigerants since one cannot smell these refrigerants. If there is any doubt of leakage security-masks must be used.

First Aid by R717, Ammonia

Rinse with water immediately. Call a doctor and ambulance with oxygen mask.

Breathing in of Ammonia may cause difficulty in breathing

Until the ambulance arrives the patient must be transferred to a heated room and be placed lying with the head and shoulders raised a little.

If anything happens to the eyes

Refrigerantgasses will normally not damage the eyes.
If however liquids enter the eye the injured person must as fast as possible to a doctor or at the hospital.

The breathing and coughing of the patient can be relieved by loosen up the cloth.

Persons who has inhaled larger amounts of Ammoniagas must have oxygen as fast as possible and lay still

Avoid rubbing the eyes

As temporary first aid we can recommend

Unconscious persons may not have water or other liquids.

Drip the eyes with sterile mineraloil (compressor- or paraffinoil) and rinse with water.

If the injured person is not unconscious it may help him with some water or orange juice with sugar or glyucose.

Cauterization of the eyes

Lift the eyelids and rinse with lots of water for minimum 15 min.

Cauterization of the body

Rinse with lots of water for minimum 15 min., if needed before the clothing is removed.

Cauterized spots is not to be covered with cloth, bandage, oil or unguent.

Fainting

At larger leakages of refrigerant in pour ventilated rooms suffocation is a risk due to the missing oxygen.

The injured person must as fast as possible be brought Outside and the cloth must be loosened up.

Attempt at resusciation by means of mouth to nose methode must take place immediately and continue untill skilled personnel is present and oxygen can be used.

Transfer the injured person to a doctor or hospital as fast as possible.

Swallowing of liquid Ammonia

The injured person must drink lost of water, added with some vinegar mixed 1:5. Milk mixed with raw egg will also neutralize.

Enviroment

Refrigerantion oil

When handling oil the rules of the authorities must be taken into consideration. Used oils has to be disposed and treated in consideration of the rules e.g. delivered to the supplier of the oil.

First aid at (H)CFC refrigerants, R12 R22 R502 R134

Frost injuries

Direct contact with refrigerant liquid can cause frostbite due to the evaporation of the liquid. Cover the spot with cloth or a blanket and call an ambulance.

Heat up the frozen area with lukewarm water.

Refrigeration leakage

It is prohibited leaking refrigerants out into the air. Used refrigerants must be collected in containers and Delivered to the supplier, or treated due to the rules.

The refrigerants are normally not corrosive.

W A R N I N G

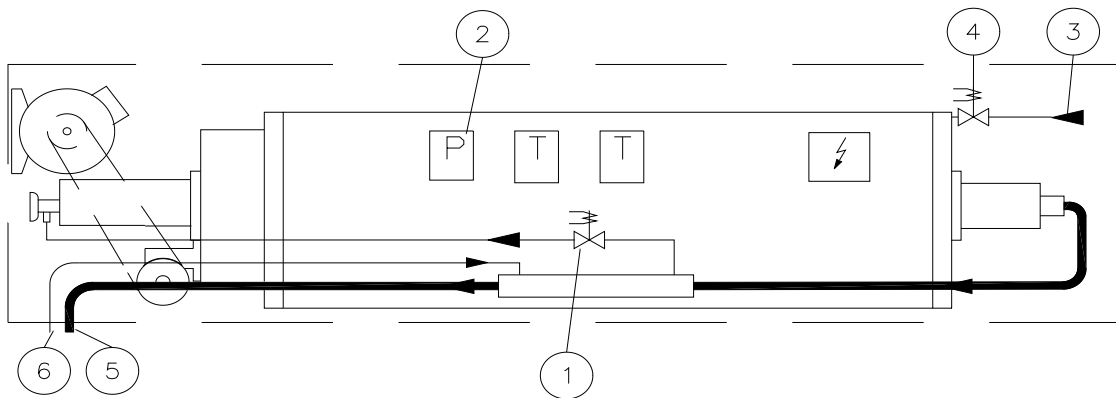
If combustion engines are to be installed in the same room as refrigeration plant or pipes containing refrigerant, it is imperative that combustion air for the motor is taken from a point where refrigeration gas is never likely to be present – even if the gas accidentally escapes from the system.

If this warning is ignored, the lubricating oil from the combustion engine may mix with the refrigerant – resulting in corrosion or perhaps severely damaging the motor.

Mounting instructions

Connection of the iceflaker is done in accordance to the drawings/instructions in section , 5, 7 and 10.

On the drawing one is able to see the main connections on the iceflaker, the pos. numbers are as follows:



Pos.	Description
1.	Solenoid valve for refrigerant inlet.
2.	Waterpressure switch.
3.	1/2" pipe for water inlet for ice flaker.
4.	Main valve.
5.	Refrigerant outlet.
6.	Refrigerant inlet.

Eventually a BUUS saltmixer is connected to the watersupply, also BUUS pre-cooler on Trope-versions.

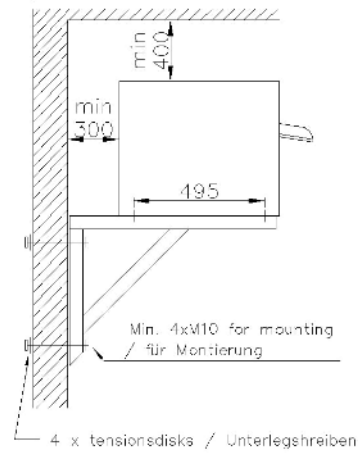
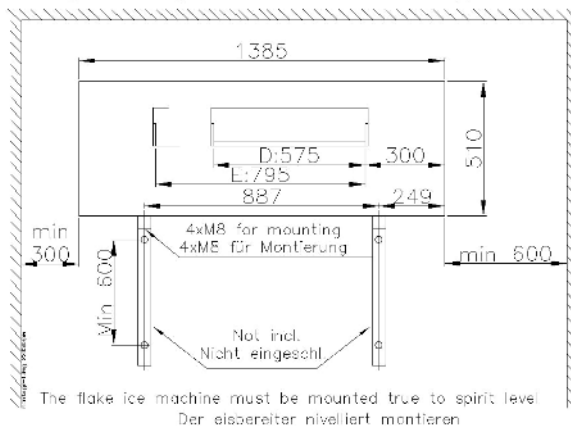
Max. water pressure in inlet: 3 bar.

Refrigerant connection:

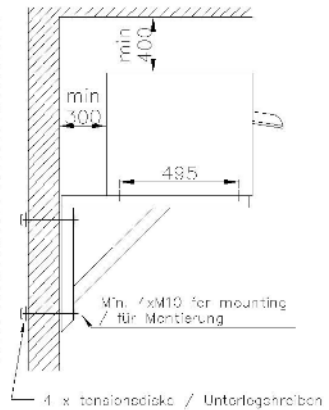
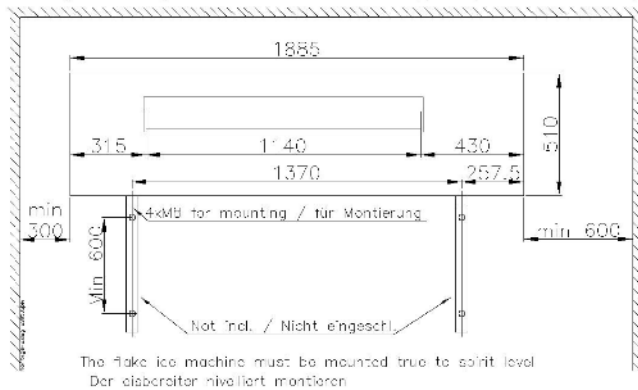
Connection of the flakeice machine is like an ordinary evaporator (pos. 6 and 7).
The iceflaker must only be operating with the refrigerant specified on the labelling

Section 3 page 2.

Mounting instructions for flake ice machines type D & E (1000 to 4500)
 Montageanleitung für Scherbereisbereiter Typ D & E (1000 bis 4500)

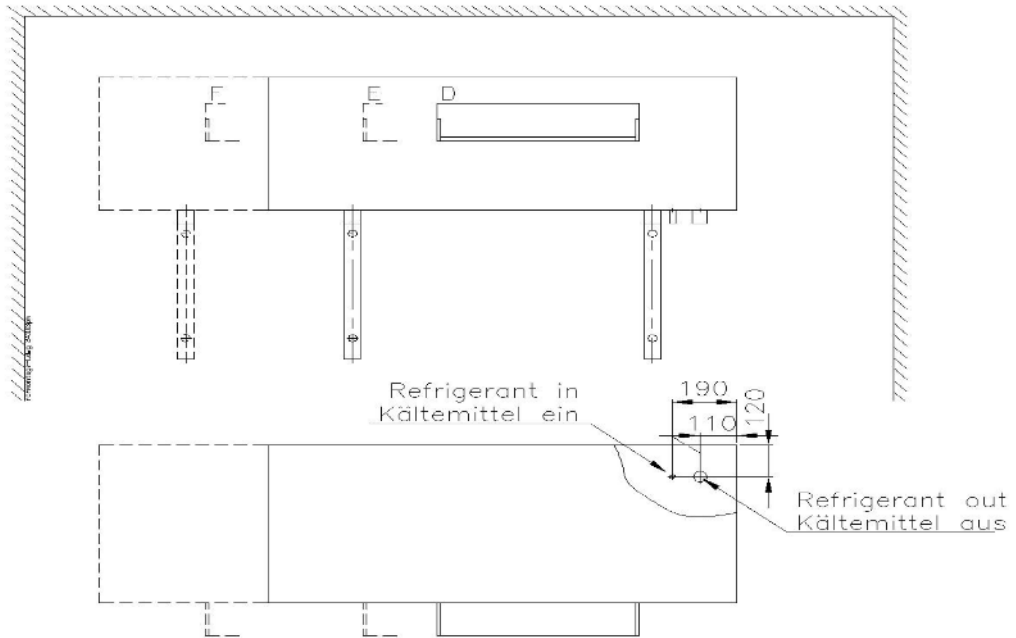


Mounting instructions for flake ice machines type F (5000 to 10000)
 Montageanleitung für Scherbereisbereiter Typ F (5000 bis 10000)

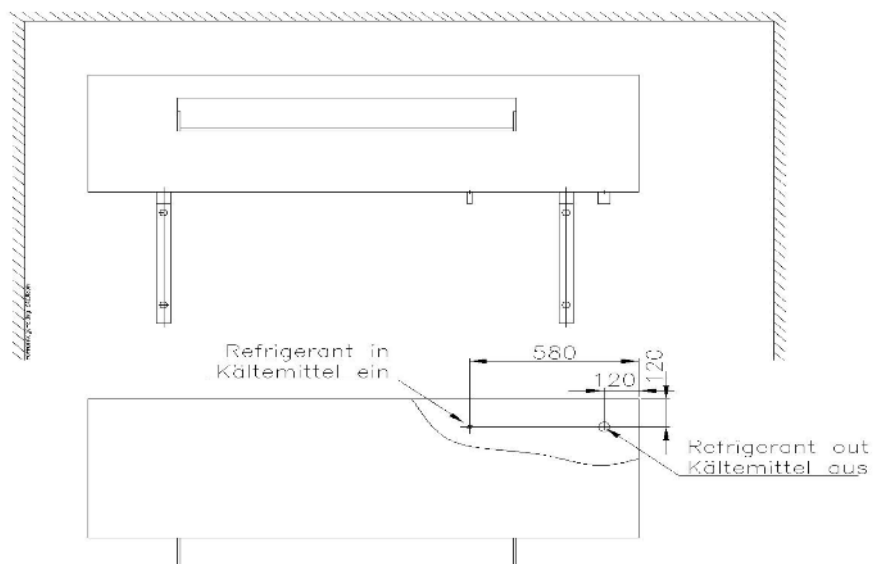


Section 3 page 2-b.

Tubing instructions for flake ice machines type: SD, SE, AD, AE & AF
Rohreinleitung für Scherbeneisbereiter Typ SD, SE, AD, AE & AF



Tubing instructions for flake ice machines type: SF
Rohreinleitung für Scherbeneisbereiter Typ SF



Starting up the plant:

- * Fill the watertank with water before starting up.
- 1. Open stop valve for water inlet.
- 2. The main switch should be switched on at least 2 hours before start-up, at the same time the suction pressure stop-/pressure stop- and receiver stopvalves should be opened.
- 3. Check oil level in compressor (must be visible in sight glass).
- 4. **Freon:**

Start the ice flaker with control switch.

When the flaker has been running for some minutes, the automatic expansion valve must be adjusted as follows:

- a: Remove plastic protective cap.
- b: Turn adjusting screw until suction pressure pipe is frosted all the way back to the compressor suction valve.
- c: One turn of the adjusting screw on the automatic expansion valve equals a pressure change of 0.8 bar.
- d: Adjustment clockwise = higher evaporation temperature.
- e: Adjustment counterclockwise = lower evaporation temperature.

NB: It may be necessary in very hot periods to adjust the automatic expansion valve at air cooled plants because of the pressure change in the condenser. Remember to re-adjust when normal temperature has become re-established.

R-717, Ammonia, NH₃:

Start ice flaker with control switch.

When the flaker has been running for some minutes, the TEVA valve should be adjusted as follows:

Direct expansion:

- a: Remove protective cap on the TEVA valve (340).
- b: Turn adjusting screw until suction pressure pipe is frosted all the way back to the compressor suction valve.

- c: Don't turn the adjusting screw on the TEVA valve more than one turn at the time.
- d: Adjustment clockwise = higher superheat.
- e: Adjustment counter clockwise = lower superheat.

On machines with pump-circulation the PM-valve is adjusted to the wanted pressure.

5. If banging noises or oil boiling occurs, throttle the suction stop valve immediately and then open slowly.
6. Check amount of refrigerant on the plant.
7. Check condenser pressure:

Recommended pressure: min 12-14 bar.

8. Check suction pressures, at freshwater production:

Recommended pressures:

Ammoniak:

HCFC/CFC:

Type	°C	Type	°C
AD 1000	-18	SD 1000	-13
AD 1500	-20	SD 1500	-14
AD 2000	-22	SD2000	-17
AD 2500	-24	SD2500	-19
AE 3000	-21	SE 3000	-17
AE 4000	-23	SE 4000	-20
AE 4500	-24	SE 4500	-23
AF 5000	-20	SF 5000	-17
AF 6000	-22	SF 6000	-19
AF 7000	-24	SF 7000	-22
AF 8000	-26	SF 8000	-23
AF10000	-31	SF10000	-29

At saltwater-ice the temperature must always be min. -27°c.

9. Do not leave the ice flaker before it is balanced.

Water-level at machines without sprinkler:

When adjusting the water level in tank, the following must be observed:

1. For wet ice adjust to high water level, by means of the floater.

The water level must not exceed the level of the ice cutter. Higher adjustment makes the water overflow at standstill.

2. For dry ice, lower the water level.
3. Adjustments are made by sliding the weight on the floating valve.

Marine equipment:

1. Adjust the sprinkler valve to an appropriate water spread over the freezing cylinder (adjustment based on experience).
2. The quality of the ice is interchangeable between dry and wet ice by turning the sprinkler pipe in order to make the water spray up over the drum.
3. Watch the adjustment of the ice flaker at suitable intervals. Re-adjust if changes are recorded.
4. To avoid accumulation of salt in the water tank, mount a 3/8" hose on the valve see pos. 46 on spareparts drawing, and connect it to a drain. When the valve is half open (pos. 46), the water will be replaced with app. 5 ltr./hr.

Iceflaker with water-precooler:

A water precooler is recommended when the temperature of the applied water (unfiltered water) exceeds 20° C.

Adjust the water temperature to 8° C. by means of the evaporating pressure valve KVP (equal pressure valve).

Please note: The evaporating pressure valve is preset by the factory.
See section 9.

Surplus water and drainage:

The ice machine is provided with a 1/2" drainage connection at the bottom of the cabinet, which must be connected to a drain (bilge) by means of a hose or pipe.

At the side of the water tank a small drainage valve (pos. 46 sparepart drawing) is mounted. This valve must be a little open in order to let 5 litres of water run out per hour.

This is done for two reasons:

1. To prevent the salt concentration in the tank from increasing.
2. To empty the water tank when the ice machine is out of operation and the water supply is turned off.

Refrigeration connections:

The connection for refrigerant to the ice machine is made according to pipe diagram section 3 page 1. Also see the safety prescriptions for handling of refrigerants.

Ice-cutter:

The ice-cutter is out of stainless steel.

Adjustment 1-10 ton: 0.15 mm from ice cutter to the drum, measured at the highest point of the drum.

The measurements are at 20°C.

The bolts must be tightened with 50 Nm.

Safety systems:

Each machine is provided with two thermostats and one safety pressure switch.

One of the thermostats is intended for protection against freezing up the water in the tank and it will turn off the refrigerant and water supply respectively. (Set point: 0-1° C.).

The other thermostat, for control of the water temperature in the tank, cuts in and cuts out the heating in the water tank. (Set point 8° C.).

See section 4, sparepartsdrawing.

The water pressure switch with auto reset is mounted in the water inlet pipe for protection against failing water supply. If the water supply fails, the switch cuts out the refrigerant supply and the compressor will “pump down” and stop. (Set point: 2 bar) (Built-in difference 0.6 bar).

Automatically operation:

It is assumed the control board is wired referring to the instructions given by Buus , or delivered by **Buus Refrigeration A/S**.

Warning:

The plant can start and stop automatically, because of the icestop (if supplied), waterpressure switch and high- and lowpressure switch.

The wired ”pump-down” automatic sees to the compressor is able to start if the pressure is exceeding the setting at the LP-safety switch.

Cleaning/maintenance of the machine:

It is always a good idea to keep the iceflaker in good condition and to keep it cleaned, due to the fact that this is offering the most reliable operation of the machine.

The iceflaker is made out of corrosion free materials, stainlesssteel and PET, which can be cleaned with water without damaging the parts.

Water is **not** to be sprinkled directly into the cabinet or directly at the electrical components since this can cause problems.

The inside of the machine is cleaned with a brush which gives the best result.
The watertank is drained and cleaned with poor acetic acid due to the bacteria.
After cleaning everything is rinsed with lots of water.

The machine can be oiled now and then, since this keeps the stainlesssteel surfaces in a nice condition.
The oil could be of the type: OILIT, or any stainlesssteel treatment.

The water in the tank should be drained if the machine is at standstill for more than 2-3 days. The watertank and the drum is now rinsed with freshwater and cleaned/dried.
It is important to seal up the surface of the drum with acid free oil, if the ice is used for provisions, use an approved oil.

This is to prevent corrosion of the drum.

Spareparts for **compressor:** Please refer to section 8.

Spareparts for **water pump:** Please refer to section 9.

Spareparts for **electrical switchboard:** Please refer to section 5.

Electrical connections:

The ice flaker is directly attachable according to the switch board diagram overleaf. Certain conditions explained in the manual must however be observed.

As frost/heat safety thermostats, two pcs. Of the type RT 14, Danfoss is used.

Settings: Frost-thermostat, SP = 0-1°C

Heating thermostat, SP = 8°C

Switch difference is pre-set
by the factory at 1° C.

Important: The thermostats are set and sealed by the factory and the guarantee no longer applies if the seal is broken!

Main switch:

1. The main switch is placed on the control box (control box is optional). On units the board is mounted as standard.
2. If the ice flaker is stopped for a longer time-period, the water tank must be completely emptied.
3. The compressor crankcase heating is automatically disconnected if the main switch is turned off.
4. The main switch must be connected for at least 2 hours before start-up to secure the heating of the compressor crankcase.
5. The water tank must be full before the main switch is connected.

Control switch:

1. The control switch must be placed near by the ice flaker (can be mounted on the control box).
2. The iceflaker is operated by the control switch.
3. If the control switch is turned off, the freezing cylinder will continue for 5 min. (post running). Also se section 3 page 6, automatically operation.

The supplied demo-wiring will indicate how to construct the wiring.

The wiring only to be done by skilled labour.

Buus Refrigeration A/S can deliver the complete switchboard which will offer the optimum operation and reliability.

Mounting instruction of equalizer connection on iceflakers :

To minimize galvanic corrosion of the iceflakers any electrical connections between the drum and other parts of the machine should be avoided, attached diagram for connection of equalizer connections is to be followed closely.

If an electrical connection is made it can lead to galvanic corrosion and damage of the drum.

The drawing shows the iceflaker from the end.

ONE MUST UNDER NO CIRCUMSTANCES MOUNT FURTHER EQUALIZER CONNECTIONS THAN SHOWN ON THE DRAWING.

Dismantling at the suction side:

See drawing section 7.

1. Evacuate the plant.
2. Remove the suction-pipe.
3. Remove the bolts in the inlet flange , pull cautiously the flange pipe out of the shaft boring horizontally.
4. The gasket(s) (140) and the stationary part of the stuffing box (135) will follow.
5. Dismount the bolts in the bearing (105) and draw the bearing out. The gasket for water (165) is now exchangeable.
6. The rotating part of the stuffing box (133) can now be exchanged. Stuffing box and shaft end must be handled very cautiously. Avoid touching the wearing surfaces and clean with non-fluffy material. The wearing surfaces must be completely free of dirt when mounted. Apply neutral oil when mounting.
Also see "Mounting instruction for shaftseals", section 7 page 3.
7. Dismount the gasket (165) by passing a screwdriver behind it and cautiously rocking it out. Mount the gasket by pressing them against your chest.

Note that the spring must not face the water side.

8. Assembling is performed in reverse order.

Dismantling at the inlet side.

(see drawing section 7)

1. The plant is evacuated..
2. The expansionvalve (340) is removed.
3. Dismount the bolts (105), the flange is now removed carefully in horizontal direction.
4. The gasket (140), the steady part of the seal (135) is removed between with this part.
5. The bolts in the bearing is removed and the bearinghousing is dismantled from the gearhousing. The gasket (165) can now be removed/replaced.
6. The rotating part of the seal (133) is now to be removed. See mounting instruction for Shaftseals section 7 page 3.
7. The bolts in the gearinghousing is removed and the housing can be dismantled.
8. The screw at the toothwheel (320) is removed so the dismantling of the gearwheel is easily done. When using a puller the edge has to be protected.
9. The gaskets at the endplates (165) is removed by pressing a screwdriver in between the gasket and the endplate. The gasket is to be renewed and mounted carefully without damaging the surface.

The spring is to be against the water.
10. The gasket in the bearinghousing (165) is removed and replaced as above.

The spring has to face against the bearinghousing.
11. The mounting is in reverse order.

Mounting instruction for shaftseals:

The mounting has to be done in the following way:

1. All surfaces are to be clean and free of any dirt or particles.
2. The silicium-surface of the rotating part of the seal has to be lubricated with an acid-free oil before mounting, due to the oil to enter the material.
3. The stationary ring is lubricated with oil on the surface before mounting.
It is very important that the ring is pressed to the bottom of the flange, and secured against rotating
By the split-pin at the bottom of the flange.
4. The stationary part of the seal is to be fixed in the right position with a constant pressure dispersed on the whole surface of the ring. The rotating part is fixed with the two screws, and one has to be careful that the two surfaces are adjusted mutually correct.
5. The ice-drum is centred in the watertank, and the measurement at the drawing is now to be between 28-29mm where 28,5 mm is ideal. The measurement is done by a gauge when the flange is dis-mounted and no gaskets appears.
A standard gasket is always needed to separate the flange from the bearing housing. The distance is adjusted by intermediary layers if the measured value is less the 28,5 mm, remember gaskets at both sides of the layers.

An example:

The measurement is 27,5mm this means intermediary layer of 1mm, and the standard gasket which is always mounted.

This adjustment is already done at the factory and the layers must be re-mounted as they were removed.

6. The stop-ring (PVC) (143) is mounted in the flange so that the horizontally movement of the seal is limited.
7. The system is evacuated and the drum has to be rotated a few revolutions before starting the refrigeration plant.
8. The seal is pressure tested by the supplier, and is ready to be put into operation.

Replacement of safety wedge:

(see drawing section 7)

1. Dismount V-belt.
2. Remove the bolts in the gear flange (4 x M8) and remove the gear.
3. Dismount bolt (350) and washer (355), draw out the gear (360), the safety wedge (365) is now exchangeable.
4. When mounting the gear, check that the two gears (320 + 360) are in proper mesh before the gear bolts are tightened.
5. Assemble is performed in reverse order.

Dismantling/mantling of the knife and knife bracket:

It is very important that the insulating layer between the water tank and the knife bracket is mounted correctly, so no electrical connection between knife bracket and water tank occurs.
This is done to prevent galvanic corrosion.

When mounting the stainlesssteel knife insulating washers should be used together with insulating pasta, since the knife is to be electrical insulated from the knife bracket.

After mounting is has to be measured that no electrical connection between the mentioned parts occurs.

Also see section 5 for further details regarding equalizer connections on the machine.

Instructions for ice flaker:

1. BUUS Ice Flaker model SD, SE and SF is made of corrosion resistant material (aluminum-plastic). The ice flaker is very effective, e.g. high K-value on the cooling surface.
2. This means high cylinder speed, which again means quick freezing and large capacity compared to the size of the cylinder.
3. Base unit and cabinet are made of stainless steel.
4. Drum capacities and dimensions:

TYPE	LENGTH MM	DIAM. CYLINDER MM	SPEED	T/24 HRS
1000	565	262	1.9 rpm	1.0
1500	565	262	2.6 rpm	1.5
2000	565	262	3.0 rpm	2.0
2500	565	262	4.0 rpm	2.5
3000	765	262	3.4 rpm	3.0
4000	765	262	3.4 rpm	4.0
4500	765	262	4.0 rpm	4.5
5000	1130	262	5.4 rpm	5.0
6000	1130	262	6.3 rpm	6.0
7000	1130	262	6.3 rpm	7.0
8000	1130	262	6.7 rpm	8.0
10000	1130	262	7.5 rpm	9.5

General maintenance:

It is essential in order to avoid operating problems that intervention in the circuit of the ice flaker must be performed according to the following instructions. If incorrectly performed, the following may occur:

- a. Moisture
- b. Air
- c. Metal shavings and dirt
- d. Ferric oxide
- e. Cupric oxide

Furthermore, lacking refrigerant adding and incorrect management of liquid supply to the evaporator frequently cause operating problems.

Evacuationg the plant:

1. Close the receiver stop valve of the receiver. Evacuate the evaporator, not more than about a little below 0 ato.
2. Stop the compressor for some minutes, the pressure and temperature in evaporator will then increase, now repeat evacuating the plant as above.
3. Stop compressor and close suction/pressure stop valve.
4. Switch off the power supply.
5. All refrigerant is now in the receiver/condenser.

Disassembling of plant

1. The above procedure leaves a small excess of pressure in the plant. Remember the following security items when opening the plant: Airing, avoid open fire, and use a gas mask if possible.
2. Do not open the plant more than absolute necessary and only in one section at a time.
3. The open areas are sealed after assembling to avoid dirt to enter into the plant..

4. After minor repairs the plant should be evacuated, see “EVACUATION OF PLANT”. After major repairs it is recommended to perform a leak test before evacuation, see “LEAK TESTING”.
5. Next: Start-up, see section D: “STARTING THE PLANT”.
6. NB.: Remember to change drying filter at disassembling.

Minimizing corrosion of the iceflakers:

Since the construction of the iceflaker gives that different materials is lowered into same watertank galvanic corrosion can occur if the following is not kept in mind.

No electrical connections between the drum and other parts of the iceflaker must occur, this means no connection between the piping and the stainlesssteel watertank.

If this occurs the galvanic corrosion will speed up and the surface of the drum could be damaged.

In general the following precautions should be beared in mind :

During operation:

- 1) Minimize the dosing of salt if used, see section 9, ssaltdosing equipment.
- 2) Drainage of the water tank so the concentration is not becoming too high.
- 3) The knife must never touch the drum directly.

At standby:

- 1) Drainage of the water tank.
- 2) Wiping/blowing off the drum, so that no water film between the drum and the knife is left.
- 3) Rinsing with freshwater.
- 4) Rubbing the drum with oil.

At standby during more than 2 days the above mentioned precautions **MUST** be followed.

Leak testing:

1. Before start-up after major repairs, leak testing with nitrogen (not oxygen) should be performed. Dry air which equals the operating pressure of the plant is also applicable. All assemblings and connections are then examined with soap suds.
2. After refrigerant charging, all assemblings and connections should be examined with a gas detector.

Evacuating the plant:

1. In order to remove moisture/water from a plant, it is necessary to evacuate it, as moisture/water will boil out at a decreasing pressure. 0.001 ata. is the boiling point for water at app. + 6°C.
2. A vacuum pump is mounted on the suction pipe and the water will boil out at a constant pressure equal to the temperature. When evaporation has stopped, the pressure will fall again. Continue to min. 0.001 ata = 7,6 mm HG.
3. Repeat this procedure by pressure equalizing with refrigerant. Evacuate again till 0.001 ata.

Lubricating oil requirements

The lubricationoil must offer a satisfactory lubrication of the compressor. Furthermore, it must be able to resist the relatively high temperatures in the cylinder during compression. This means no coking at high temperatures and no ice or paraffin at low temperatures.

The oil must be non-corrosive.

General rules for use of refrigeration oil:

1. Use only clean oil from sealed containers of a recommended brand like Icematic 299.
2. Use the quality of oil originally delivered for the compressor or an oil of equal quality.

3. Avoid mixing of different oils. In the most cases no harm is done by mixing two similar oils of different brands, but mixed oil is normally of worse quality than the original ones, and the risk of sludge will increase.
4. Shifting from one oil brand to another should only be done in connection with a complete compressor oil change.
5. Refrigeration oil is normally purchased in tins of appropriate sizes which can be kept sealed until charged to the plant.
6. Avoid filling the same tins with old polluted oil due to the risk of reusing.
7. If in doubt of oil brand, contact BUUS Refrigeration rather than adding an unsuitable oil. BUUS Refrigeration recommends Castrol Icematic 299.

Adding oil on ice flaker: **ONLY MODELS WITH SEALED HOUSING**
(see drawing “INLET”)

1. Remove the yellow plug at the top of each glass of the bearing in the inlet end and suction end.
2. Add oil of type Icematic 299 , or the oil used in the system to the marking.
3. Replace the plugs.

Adding oil to the compressor:

1. Evacuate the compressor, see “EVACUATING OF PLANT”
2. The adding of oil is performed with an oil pump which is connected to the compressor crankcase. Oil can now be added immediately.

Oil at piston-compressors.

Oil in the refrigeration system.

In a system the oil is to ensure the compressor at all types of refrigerants, and at every operation condition.

Today the following oils are used for refrigeration plants:

- ◆ Mineral oil.
- ◆ Synthetic oil.
- ◆ Mixture of the two types.

R717 (NH-3)

Oil is only miscible with R717 in very small quantities, and due to the high density the oil will be separated lower than the NH-3 level. The oil being transported to and drained from the system is normally not to be used again, and it is therefore very important that the compressor is equipped with an effective oil separator and automatic oil return. At piston-compressor plants with high gas-pressures it is important to choose an oil with high oxidation constancy.

R22

The refrigerant is, depending of the condition, completely or nearly miscible with the oil.

The system will contain oil, and this oil will be transported through the piping and return to the compressor, why it is important that the oil is not damaged at low temperatures, low floc-point is a must.

At the crankcase of the piston compressor the oil will be mixed with the refrigerant typically from 5-30%. This means the characteristics of the oil is not always as stated by the supplier.

Alternatively refrigerants

R134a is not miscible with the normally used refrigeration oils. For this type of plants two types of oil can be used, either oil based upon polyalkylenglycol (PAG), or synthetic ester oil.

In the HC/HCT compressors normally the ester oil is used. Due to the speed of development the suppliers must always approve the oil for compressors used by R134a and other refrigerants, this is to obtain the normal guarantee given for the compressors.

Oil quality

The oil must always be of the best quality, e.g. after DIN 51503. At piston compressors the viscosity has to be minimum 20 Cst, also if the quantity of refrigerant present in the oil is high.

Oil from different suppliers and of different quality must not be mixed, change from one branch to another should not take place before consulting the oil-supplier.

Mineral oil

Mineral oil is indicated by the letter M, and is produced by crudeoil of good quality. The oil exists of hydrocarbon in different sizes and structure. The most important is paraffin, naftalin and flavour. By means of modern refinery process the refrigeration oil can be produced, so that a high level of paraffin and naftalin is obtained. The un wanted level of flavours is kept as low as possible.

MN

MN is based on naftalin, and is an good oil for R22-plants.

MP

MP is oil based on paraffin and is used for R717-plants.

Synthetic oil

Synthetic oil is present in many forms.

A

A is a refrigeration oil based on alcybenzol and alcyaromat, and is characterized by the way it behaves together with R22 at low temperatures. The flow characteristic is however pour at low temperatures which can give a decreased evaporator effect and demands mounting of suction heatexchanger. The oil is more stabil and is able to operate at high temperatures without oxydation.

MA

MA is a miscible of synthetic A-oil and mineral-oil. MA is present in some variations, but in general the MA-oils are as the best mineral-oils.

PAO

PAO are synthetic oils based on polyalfa-olifin and is characterized by a high chemical and thermal stability together with a high viscosity index. The oil is useful where the oil- and pressuretemperatures are high, eg in heat pump systems.

The oil has a low floatpoint, which makes it suitable for R717 plants at low evaporation temperatures. The miscibility with CFC and HCFC is pour and the plants are to be designed with oil separators and effective return of the oil from the evaporators.

The oil is expensive but is not to be changed often. The drained oil can normally be used again after filtration.

A change of the oil is done after analyzes done by the supplier of the oil.

AP

AP is a mix from A-oils and PAO-oils and has a medium miscibility with R22, which makes it more suitable for those applications than PAO. The oil is also to be used in R717-plants.

G

G is a synthetic oil based on polyclycol, which can be used in eg R290 (propan), R600 (butan) and other chemical plants. The oil is not to be used for R22 and R717.

The charateristic of the oil.

The kinematic viscosity is measured in cst (centistoke) and is classified at ISO VG, which means the test is made at an oil temperature at 40°C. The ISO VG 68 means that the viscosity is 68 cst at 40°C.

At R22-compressors where a mix of oil and refrigerant takes place in the crankcase an mixing viscosity will occure. The exact viscosity can be found by means of a diagram showing the viscosity together with the temperature and the pressures.

Viscosity index ISO 2909

The index express how the viscosity variates with the temperature. A high viscosity index means a very low change of viscosity in the area 40-100°C. An oli with high viscosity index is suitable in refrigeration plants.

Other charateristics

The oil supplier is talking about many more charateristics for the refrigeration oil eg. Flash point, pour point, floc point, aniline point, colour, acid etc. Those informations is listed in the technical datasheet and can be obtained from the supplier.

Permissible temperatures

Depending on the viscosity the following max temperatures for piston compressors are given:

ISO VG NR.	OIL TEMPERATURE	MAX COMPRESSION TEMP.
46	50°C	120°C
68	60°C	130°C
100	65°C	130°C

In cases of doubt please contact the supplier.

Operating log

It is possible to correct erratic operation before it causes problems by entering the plant's operation in a log.

The operating log should provide current entries for:

<u>Motor:</u>	Gauge ampere consumption	
<u>Compressor:</u>	Check suction pressure and pressure pipe pressure	ato.
	Check suction temperature and pressure pipe temperature	°C
	Check oil level	
<u>Water cooled condenser:</u>	Water supply inlet	°C
	Water supply outlet	°C
	Water supply	l/hr
<u>Air cooled condenser:</u>	Check ventilators and cooling surface for dirt etc.	
<u>Air temperature:</u>		°C
<u>Engineroom ambient temperature:</u>		°C

Service schedule

In order to avoid operation stops, the intervals in the schedule should be obeyed.

	Check	Interval	Activity
Compressor	Suction and pressure, valves with valve springs	Exchange after abt. 10.000 working hours	Check for leaky pressure valve by stopping compressor, close pressure stop valve and read on pressure gauge that pressure is quickly equalized
	Stuffing box	Periodically	Stop compressor. Check stuffing box for leaks with leak lamp or leak spray
Motor	Lubrication of motor	Periodically	Clean and lubricate
	Clutch, V-belts and transmissions	Periodically	Check clutch, V-belts and transmissions. Tighten or replace slack V-belts
Air cooled condenser	Failing condenser cooling	Periodically	Clean cooling surface with cold water. Wash only parallel to the air direction of the cooling fins
Water cooled condenser	Failing condenser cooling	Periodically	Adjust condenser cooling. Drain water and check all water-contacted parts for dirt, furring or overgrowing.
	Corrosion	Periodically - Usually quarterly - Normally 4 times/year	Marine condensers are protected against galvanic corrosion by plugs mounted on condenser lid. Metallic contact between plug and lid is essential to profitable functioning
Oil	Oil level in crankcase	Weekly	
	Oil filter in crankcase	Clean at oil change	Change filter screen at major repairs on compressor
	Oil change		Change oil if discoloured in compressor

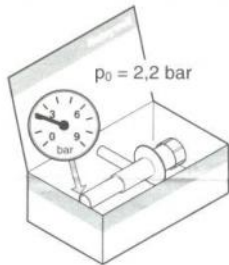
	Check	Interval	Activity
Strainers	Strainers in liquid pipe - expansion valve - suction pipe	Clean when needed	Dirt causes reduced refrigerant supply to evaporator. If strainer has warm inlet and cold outlet, the component is most likely clogged
	Drying out of moisture in sight-glass	Periodically	Some plants have sightglasses with moisture indicator, whose colour will change from green to yellow at lack of moisture in refrigerant
Refrigerant	Amount of refrigerant		Lack of refrigerant means reduced plant capacity, which causes liquid to foam in sight-glass
	Leak testing	Periodically	Plant should be frequently tested for leaks
Automatics	Safety pressure switches - operation automatics - alarms	Periodically	Check function

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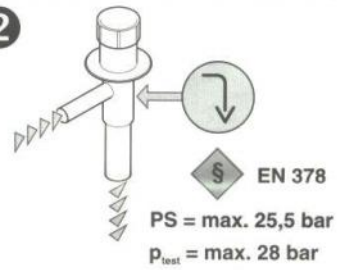
AEL
Einbau-Anleitung • Installation instructions
Instructions de montage



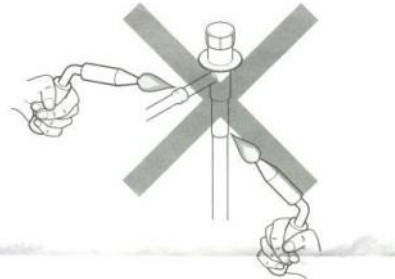
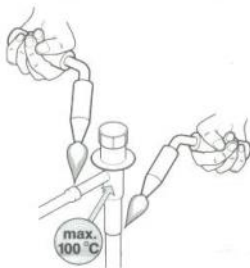
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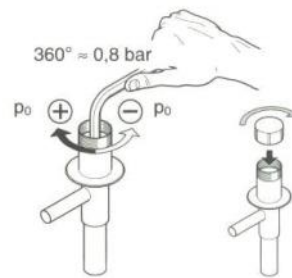
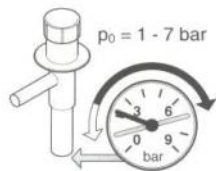


3



4

$p_0 \neq 2,2 \text{ bar}$



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Waterquality:

Under certain conditions it may be necessary to add brine to the water. If only surface water or any other kind of water containing no or little lime is used in the production, it is necessary to add to the water a brine of abt. 20 per thousand.

Surface water will, because of the low content of lime, cause the ice to freeze disproportional hard on the cylinder, and consequently to break into very small flakes (crumble) on the ice cutter. This will make the ice less suitable.

The PH-value of the water is important to the surface of the drum, and it must be within the range of neutral

To avoid corroding the surface of the drum, this means $6.5 < PH < 7.5$.

If the values are deviating from this the guarantee is lost.

Summarized it is recommended:

1. To apply BUUS Salt Mixer if the lime content of the water is below 15° of hardness.
2. Baltic water may be used directly.
3. North Sea water should be mixed with abt. 50% fresh water.
4. In any other cases - contact BUUS Refrigeration A/S.

The values of the conductance of water is as follows:

Conductivity in μS

Rain water	0,05 – 0,1
Salt/seawater	18 – 20
City water (DK)	0,7 – 0,9
Optimal for ice production	1,3 – 1,5

Instruction for:

BUUS saltmixer, SALT-02:

The salt mixer is necessary if a precision instrument with a high rate of accuracy (95%). It is equally suited for different mixtures. It can mix up to 1500 l/hr and down to 30 l/hr. The mixer can operate in both warm and cold water (Max. 40°C.).

SALT-02 is mainly for stand alone iceflakers, when more machines are connected to the same water supply and running independently, the SALT-01 must be used instead.

Mounting:

The mixer is supplied for installation directly on the supplied watertank, by means of the furnishing however

the installation of the pump can be made inside the icemachine casing.

Watersupply is made to the tank through the floater, and the delivered hoses are mounted as shown at the drawing.

The discharge of the pump can be connected either directly to the iceflaker, or to the water supply to the iceflaker, max. Back-pressure is 5 bar.

Connection to the mainsupply:

It is important the water direction is correct, as stated by the arrows at the mixer.

The mixer is connected to the supplies as shown at the drawing/electrical-wiring.

Every BUUS saltmixer is tested before leaving the factory and a content of water can occur.

NOTE: The mixtures must be 100% soluble in water. There must be no crystals or lumps in the mixture. It is recommended to use a 100% soluble regeneration salt for fully automatic operation as salt addition.

It is highly recommended to place a dirt strainer before the mixer, as dirt may damage the pump cylinder.

Mixture proportions:

Since there always has to be a 100% dissolution of salt in the tank, one adjustment of the pump should be enough, however it can occur that the pot-meter on the pump must be adjusted now and then to obtain the correct salt concentration to the iceflaker.

The quality of the flakes will show this.

Mixture proportions: The salt mixer is normally adjusted to app. 1%, it is however difficult to obtain this mixture correctly since there is no display of the dissolution. The best way is to adjust the pot-meter until the wanted quality of the ice is obtained,.

At mixers delivered together with the iceflaker, Buus Refrigeration has already adjusted the mixer.

Warning:

The salt mixer must be operated with sludge-free water. The salt mixer has to be protected against frost and must not be placed close to a heat source such as boilers etc. **Do not disassemble the sealed part (the guarantee will be annulled).** Foreign objects must never fall into the salt container, keep the container opening covered.

Maintenance:

At the end of an operation period or between two periods of operation, the salt mixer should be running with clean water in the container for abt. 15 minutes. This will avoid mixture residue to stick to the mixer.

After a period of app. 3 months a check of the pumping hoses has to be done, since this part of the mixer is very important for a reliable operation.

At the same time a leak- and function test must take place.

Guarantee:

BUUS Refrigeration guarantees that all new BUUS Salt Mixers are faultless with regards to material and production. This guarantee will be lost if the mixer has been exposed to frost or disassembling of the sealed part.

Instruction for:

BUUS –saltmixer, SALT-01:

The salt mixer is necessary if a precision instrument with a high rate of accuracy (95%). It is equally suited for different mixtures. It can handle up to 1500 l/hr and down to 30 l/hr at a water pressure at **_0.2 to 3.5 atm**. The mixer can operate in both warm and cold water (Max. 65°C.).

Mounting:

The mixer is delivered with furnishing for mounting on wall. Spread the arms of the furnishing a little and lock the 4 pins on the outside of the mixer in the matching holes.

Mount the enclosed suction hose on the suction opening after having removed its protective cap.

Connection to main pipe:

Check that the water is flowing in the correct direction as pointed out with arrows on the mixer.

Connect the mixer to the main pipe with a 3/4" hose, and tighten with hose clips. Mounting to the main pipe is performed with two 3/4" hose unions with valves (see drawing). One union is for inlet of water to the mixer, the other for outlet of water from the mixer. A valve is mounted between the two unions to force the water through the mixer.

When the salt mixer is not in use, close the valves on both unions and open the valve between the unions.

To start the salt mixer, open the taps for water inlet.

All BUUS Salt Mixers are factory tested and may therefore contain some water. To avoid damaging the wrapping, the openings of the salt mixer are closed with plastic plugs. **Take care to remove the protective plugs before connection to water supply.**

Note: The mixtures must be 100% soluble in water. There must be no crystals or lumps in the mixture. It is recommended to use a 100% soluble regeneration salt for fully automatic operation as salt addition.

It is highly recommended to place a dirt strainer before the mixer, as dirt may damage the pump cylinder.

Mixture proportions:

This new salt mixer has 3 adjustments possible - 0.5%, 0.8% and 1%. Adjustment is made by moving the pump rod pin to another hole as shown in the drawing of the pump housing (unscrew the black pipe of the pump housing for access to the pump rod).

Mixture proportion: 0.5% equals 5 l saturated salt solution per 1000 l water - 0.8% equals 8 l and 1% equals 10 l per 1000 l water. The salt mixer is on receipt in factory setting: 1%.

Warning: The salt mixer must be operated with sludge-free water. The salt mixer has to be protected against frost and must not be placed close to a heat source such as boilers etc. **Do not disassemble the sealed part (the guarantee will be annulled).** Foreign objects must never fall into the salt container, keep the container opening covered.

Maintenance: At the end of an operation period or between two periods of operation, the salt mixer should be running with clean water in the container for approx. 15 minutes. This will avoid mixture residue to stick to the mixer.

Guarantee: BUUS Refrigeration guarantees that all new BUUS Salt Mixers are faultless with regards to material and production. This guarantee will be lost if the mixer has been exposed to frost or disassembling of the sealed part.

DO-IT-YOURSELF REMEDIES IF THE SALT MIXER DOES NOT WORK

The mixer does not suck: The large packing round the big pump rod in the hole to the pump housing may be too "slack" where the black pipe is connected.

The mixer returns the solution to the container: The small packing lowest on the black pipe in the union, where the suction pipe is connected, may have become too large in the hole.

The mixer does not click: One or both springs in the mixer may be broken.

The mixer is filled up with lime: Disassemble the mixer and immerse it in a mixture of 1/3 acetic acid and 2/3 water for 1-2 hrs.

There is no risk in disassembling the mixer. All internal components are secured to the inside of the cylinder.

Machines supplied with pre-cooler:

Machines to be operated where the watersupply exceeds +20°C, must be installed with a pre-cooler cooling down the water to the iceflaker.

This pre-cooler can be a combined one supplying more machines, or it can be build-in and delivered with the iceflaker.

BUUS pre-cooler PRE-01 is a specially constructed pre-cooled in acid-proof stainless steel, so it is able to operated also with warm saltwater.

The water is connected and will enter the cooler through the strainer and the valve.

Inlet of refrigerantis done through the innerpipe, and the build-in solenoidvalve, whereafter the suction pressure is controlled with the regulator pos.8. The regulator is adjusted to minimum-2°C, this is to avoid freezing up the pre-cooler and damaging the pipes.

The automatic expansionvalve pos.7 will ensure correct operation of the pre-cooler.

The build-in security thermostat ensure the pre-cooler from freezing up if the pressure regulator is out of operation due to a fault. The preset has to be minimum +5°C.

**ADJUSTMENT OF THE THERMOSTAT IS DONE BY THE FACTORY,
IF THE ADJUSTMENT IS CHANGED THE GUARANTEE WILL BE LOST.**

The control of the pre-cooler is done so the solenoid valve will open when the compressor starts and be closed when closing down the system.

See also the wiring-diagram at section 5.

The principle of the pre-cooler is to see from the drawing.

Ordering spareparts

When ordering spareparts the following must be enlightened:

1. position number.
2. Ordering number.
3. Spareparts number.
4. Number of the iceflaker, e.g order-number.

This will ensure that the right spareparts to be dispatched without delays.

EC Declaration of conformity

Fabrikant: Buus Køleteknik A/S
Manufacturer: Elsøvej 217-219, Frøslev
 DK-7900 Nykøbing Mors

Hereby ensures and declares that:

Evaporator/cylinder for Flake Ice Machine: Type D, E, F Fluida 2 D, E Fluida 1

Description of the pressure equipment:		Evaporator/vessel for flake icemachine with max. P at 22 bar
Serial No.:		1808
Year of manufacture:		2010
Drawing(s) No.:		svejs02-2002
Minimum/maximum allowable pressure:	PS	-1+22 bar overtryk.
Minimum/maximum allowable temperature:	TS	-50 til 43°C
Volumen Nominal:	V	F1 max. 9 ltr. , F2 max. 16 ltr.
Fluida group:		1 & 2
Fluids:		R717, R22, , R134a, R404a, R507
Conformity assessment procedure followed:		modul A1
Other technical standards and specifications used:		prEN 13445 part 3 & 5 AD-Merkblätter
Notified body used / identification number:		Force / 0200
Approval no.:		DK-0200-4.2547/06
References of the other Community Directives applied:		Rådets Direktiv 89/392/EF

Is manufactured in accordance with the DIRECTIVE 97/23/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment and the other Community Directives stated above.

Name, title and signature of the signatory authorized to sign the legally binding declaration for the manufacturer:



09.02.10

Director

Frank Olesen.

Dato/date

Titel/ title

Navn/name

EC Declaration of conformity

Fabrikant: Buus Køleteknik A/S
Manufacturer: Elsøvej 217-219, Frøslev
DK-7900 Nykøbing Mors

Hereby ensures and declares that:

Evaporator/cylinder for Flake Ice Machine: Type D, E, F Fluida 2

Description of the pressure equipment:		Evaporator/vessel for flake icemachine with max. P at 30 bar
Serial No.:		
Year of manufacture:		2010
Drawing(s) No.:		svejs02-2002
Minimum/maximum allowable pressure:	PS	-1+30 bar overtryk.
Minimum/maximum allowable temperature:	TS	-50 til 43°C
Volumen Nominal:	V	F2 max. 6,5 ltr.
Fluida group:		2
Fluids:		R744
Conformity assessment procedure followed:		modul A1
Other technical standards and specifications used:		prEN 13445 part 3 & 5 AD-Merkblätter
Notified body used / identification number:		Force / 0200
Approval no.:		DK-0200-4.2547/06
References of the other Community Directives applied:		Rådets Direktiv 89/392/EF

Is manufactured in accordance with the DIRECTIVE 97/23/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment and the other Community Directives stated above.

Name, title and signature of the signatory authorized to sign the legally binding declaration for the manufacturer:



09.02.10

Director

Frank Olesen.

Dato/date

Titel/ title

Navn/name

EC Declaration of conformity

Fabrikant: Buus Køleteknik A/S
Manufacturer: Elsøvej 217-219, Frøslev
DK-7900 Nykøbing Mors

Hereby ensures and declares that:

Evaporator/cylinder for Flake Ice Machine: Type F Fluida 1

Description of the pressure equipment:		Evaporator/vessel for flake icemachine with max. P at 22 bar
Serial No.:		
Year of manufacture:		2010
Drawing(s) No.:		svejs02-2002
Minimum/maximum allowable pressure:	PS	-1+22 bar overtryk.
Minimum/maximum allowable temperature:	TS	-50 til 43°C
Volumen Nominal:	V	Max. 16 ltr.
Fluida group:		1 & 2
Fluids:		R717
Conformity assessment procedure followed:		modul B1+F
Other technical standards and specifications used:		prEN 13445 part 3 & 5 AD-Merkblätter
Notified body used / identification number:		Force / 0200
Approval no.:		DK-0200-4.2547/06
References of the other Community Directives applied:		Rådets Direktiv 89/392/EF

Is manufactured in accordance with the DIRECTIVE 97/23/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 May 1997 on the approximation of the laws of the Member States concerning pressure equipment and the other Community Directives stated above.

Name, title and signature of the signatory authorized to sign the legally binding declaration for the manufacturer:



09.02.10

Director

Frank Olesen.

Dato/date

Titel/ title

Navn/name

**EC-declaration of conformity for machinery 2010.
Directive, 89/392/EEC, annex 2, sub. A.**

Date: 09-02-10	Page no. 1.	
Delivered Iceflaker Type SD, SE, SF and AD, AE, AF.		
Possible health- and security- risks estimated for the machines delivered.	Potential Risks YES/NO	Solutions and references to documentation in the “ BUUS reference manual”
Starting up, operation and maintenance of the complete plant	YES	Only to be operated by the precent engineer, skilled Assistant or skilled refrigeration engineer. Electrical- and control-automatics only to be operated by Licensed engineer.
Complete BUUS-operation and maintenance instruction book. To be read before putting the machine in operation.	YES	Supplied in1 copy.