

# Operation and maintenance manual

Industrial chillers for liquids




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## 1. INTRODUCTION

This manual contains the installation, use and maintenance procedures for industrial liquid chillers. This manual has been specifically designed to ensure safe and efficient operation by qualified personnel.

All rights reserved.

 The manufacturer assumes no responsibility for any improper use of the machinery, modifications to it or failure to comply with the regulations in this manual or any other accompanying documents. Each piece of machinery comes with a technical manual and a thermostat operation manual to support proper use. All manuals should be stored in a safe place and accessible to personnel responsible for operating and maintaining the chiller.

**The CE marking certifies that the appliances comply with the safety requirements of the European Machinery Directive.**


English language: Instructions.


The manufacturer accepts no responsibility for inaccuracies contained herein due to printing or data entry errors.


The manufacturer reserves the right to make modifications to its products as it deems necessary or useful without prior notice provided that their fundamental characteristics remain the same.

### 1.1 Symbols

Symbols in this manual:

 **DANGER:** Indicates immediate danger. Ignoring this symbol may result in serious accident or injury.

 **CAUTION:** Indicates a possible hazardous situation. Ignoring this symbol may result in an accident or injury.

 **INFORMATION:** Indicates an important piece of information or guidance on how to use the machinery.

## 2. EUROPEAN DIRECTIVES

The following directives were considered in the design and development of the chiller family:

### European Community Directives:

2006/42/EC Machinery Directive

2014/30/EU Electromagnetic Compatibility Directive

2014/35/EU Low Voltage Directive

### Applicable Regulations:



- EN ISO 12100
- EN 60204-1
- EN 61439-1
- EN 60529
- EN 378-1\_4
- EN ISO 3746
- EN ISO 13732-1
- EN ISO 13732-3
- EN ISO 13857
- EN 14511-1\_4
- EN 12464
- EN ISO 7010


## 3. SAFETY MEASURES

These safety instructions describe the actions that must be observed at all times during the commissioning, operation and servicing of the product.

**These instructions must be provided and made available at all times to the personnel responsible for installing, operating and maintaining the product.**

The chiller must be used in accordance with the following basic guidelines:

- Operation and maintenance must only be carried out by qualified personnel and in accordance with the instructions in this manual.
- A copy of the manuals must be kept near the machinery (Operation and Maintenance Manual, Technical Manual, Electronic Thermostat Manual); the utmost care must be taken during all routine maintenance operations.
- Worn or damaged parts should be replaced by qualified personnel and only original parts or parts recommended by the manufacturer should be used.
- For the proper operation of the unit and the safety of the operator, all panels must be kept closed when the unit is in operation.
- The electrical components and pressure in the circuits can create hazardous situations during installation or maintenance work. Qualified personnel performing routine and non-routine maintenance are responsible for determining the appropriate tools and personal protective equipment for the task, while also taking into account the manuals supplied with the machine.
- Do not operate the machine if the safety guards have been modified or removed.
- Do not operate the machine if the electrical panel door is open.
- Do not operate the machine unless it is properly installed and anchored to the ground or suitable supports.
- Do not operate the machine without a proper electrical connection. The electrical supply system must comply with all current sizing and electrical safety regulations.
- Do not operate the machine without a proper hydraulic connection. The hydraulic system must comply with all current sizing and safety regulations. It is recommended to install safety components and a cut-off valve to ensure electrical isolation during maintenance.
- Do not start air cooled chillers without first reviewing the dimensional diagram attached to the machine. Ensure the installation environment offers adequate ventilation and air exchange.
- Before installing the machine, ensure the operation data on the machine plate (usually attached to the front of the machine or on the fixed wooden structure) are compliant with the application.
- Before performing any work on the unit, ensure the parts involved are electrically and mechanically isolated.
- Do not install the machine on inclined surfaces. The machine must only be installed on flat surfaces suitable for this purpose;
-  Routine and non-routine maintenance must only be performed by qualified personnel with adequate personal protective equipment;
-  Do not install the machinery in places with a risk of explosion or fire;

 The manufacturer accepts no liability for damage to persons or property resulting from installation not following the indicated guidelines or from the reuse of individual machine parts. Do not replace or modify any part of the machine without authorization.



### 3.1 General rules

The machinery is designed and built to minimize hazards to operators and their surroundings. In addition to improper use of the machine, residual risk may arise from:

- Risk due to loss of machine stability.
- Risk due to machine failure (refer to Chapter 7 – Maintenance, and Chapter 8 – Malfunctions/Troubleshooting).
- Risk due to lifting and/or handling the machine.
- Risk due to refrigerant gas leakage.
- Risk due to oil leakage from the cooling circuit.
- Leakage of pressurized water or oil from the hydraulic circuit.
- Risk due to operating noise exceeding the permitted limits or due to installation in unsuitable environments.
- Risk of abrasion due to sharp-edged sheet metal, high-temperature internal surfaces or low-temperature surfaces.

### 3.2 Preventing mechanical risk


The machine is composed of moving and rotating parts, sharp surfaces and components at low or high temperatures. All these elements may pose a danger to the operator. To minimize these sources of danger, follow these guidelines:

- Turn off the power to the machine before removing any panels.
- Do not operate the machine with the paneling removed.
- Always check that the surfaces of the circuit components (heat exchangers, copper piping, compressors, condensed batteries, etc.) are at room temperature. High or low surface temperatures can cause burns.
- Pay attention to components where the high-temperature symbol is present.
-  Always put on personal protective equipment before performing work on the cooling or hydraulic circuit.
- The additives present in the hydraulic circuit are corrosive and can burn eyes and skin. Always wear safety goggles and gloves.
- Any refrigerant gas leakage from the cooling circuit is a source of danger due to high temperatures and/or pressure;
-  Wear protective gloves when accessing the machine for routine or nonroutine maintenance operations.

### 3.3 Preventing electrical risk



Electrical machinery creates a hazard, especially if safety regulations are not observed. To minimize sources of danger, the following basic guidelines must be followed:

- Follow the relevant EN or applicable standards when making electrical connections on the cooling unit. Follow the technical conditions for connection established by electricity distribution companies.
- Before performing any work on the unit, turn off the power supply using the main disconnect switch.
- Work on the unit must be performed only by qualified personnel.
- Always replace components that are worn out or damaged.
- Before working on the electrical system, always refer to the machine's technical manual, which contains the specific technical diagram.
- Always verify there is no electrical voltage present in the system.
- Check the grounding continuity before operating the machine.



- Check all electrical connections, cables and, in particular, the condition of the cable insulation. Replace any cables that are worn out or damaged.
- For the power supply, use cables with a suitable cross-sectional area as required by IEC EN ISO 60204-1 and the applicable regulations in the country of operation, following the more restrictive conditions.
- If the switch is in the OFF position, only the user-supplied line for servicing the machine remains powered.
-  If the yellow triangle with black thunderbolt is present on the electrical panel and/or junction boxes, exercise caution as voltage may be present even if the isolating switch is in the OFF position.

### 3.4 Preventing other risks

The refrigerated circuit contains HFC coolant (R134a/R410A/R404A/R407C/R449A/R513A/R452A), which is environmentally friendly and must be handled with care, in accordance to applicable legal regulations and guidelines. Only qualified personnel may perform this work. If it leaks from the circuit, the coolant poses a very low health hazard for the operator. In high concentrations, it may cause skin irritation or light-headedness. Importantly, it may also cause low-temperature burns. If the coolant leaks onto hot surfaces or open flames, it can decompose into toxic substances. The coolant evaporates immediately in the environment, so it is important to ventilate the area quickly. Do not install the machinery on floors above or below ground level without adequate emergency exits. The machinery cannot be used in environments where there is risk of explosion or fire. The operator is responsible for disposing of the coolant and all parts that make up the machine.

-  Wear protective gloves when performing routine or non-routine maintenance.
-  Install the machine in accordance with the regulations in effect in the country of installation.

When lifting the machine, please refer to the following symbols:

-  Lifting by crane: use all lift points indicated by the symbols.
-  Lifting using at least two forks.

If lifting a machine with a tank, it must be emptied before lifting.

## 4. INTENDED USE OF THE CHILLER

The chillers are designed and intended exclusively for cooling water-based hydraulic circuits, glycol solutions (water + ethylene glycol) or oil-based solutions. These machines are suitable for operation in industrial environments where the air temperature is between a minimum of 15°C and a maximum of 45°C. For operation outside this temperature range, please contact the manufacturer's trade office.

**Water chillers:** set point determined according to application

#### STANDARD

Working fluid	Water or glycol solutions (water + ethylene glycol)
---------------	-----------------------------------------------------

Ambient temperature operating range	+15°C to +45°C
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#### POSITIVE COLD

(Cooled fluid temperatures above +5°C)

Ethylene glycol range	0% to 30% ±2%
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Operating range for machines with tank	+8°C to +25°C
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Operating range for machines without tank	+13°C to +30°C
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## NEGATIVE COLD

(Cooled fluid temperatures below +5°C)

Ethylene glycol range	30% to 50% ±2%
Operating range for machines with tank	–30°C to –5°C
Operating range for machines without tank	–25°C to +0°C

**Oil chillers:** set point determined according to application

Working fluid	Oil ISO VG 32 range 5 cSt to 60 cSt
Ambient temperature operating range	+15°C to +45°C
Operating range for machines with tank	+20°C to +35°C
Operating range for machines without tank	+25°C to +40°C

**The WARRANTY will automatically become void in cases of unit failure caused by operation outside the above limits or failure to comply with this manual.**

### 4.1 Unintended uses

Do not use the machine in environments not stipulated by the manufacturer, such as:

- In a potentially explosive atmosphere.
- In a flammable atmosphere.
- In particularly dusty environments.

In addition, do not use the machine for unauthorized purposes, including:

- In a manner other than as specified by the applicable law.
- Installed in a manner other than as outlined in this manual.
- Installed outside the operational ranges.

**⚠ Do not use the machine for cooling flammable or explosive substances.**

### 4.2 Recommended fluids

#### Water Chillers:

The water to be used in the cooling hydraulic circuit must comply with the values set in the drinking water regulations. If deionized water is used, the appropriate design changes must be made and requested from the manufacturer's technical department.

The water in the hydraulic circuit must not cause limestone scale or precipitation that might circulate throughout the system.

The liquid must be treated in an appropriate manner depending on the impurity of the liquid to be cooled and the size and structure of the recirculating cooling system.

In accordance with the drinking water regulation, the recommended limit values are:

Electrical conductivity at 25°C	80 to 750 µS/cm
Total hardness	6° to 20° dH
Appearance	Clear, without sediment
Color	Colorless
Bacterial load	<10,000 cfu/ml
pH value	4.5 to 8.5

**⚠ CAUTION:** The water quality in the hydraulic circuit must be checked periodically. Due to the continuous evaporation of water, the concentration of the substances it contains may increase.

Contact the manufacturer for the compatibility of the materials within the hydraulic circuit with substances other than those indicated.

**⚠ CAUTION:** Do not use any liquids other than those specified. **Do not use propylene glycol in the hydraulic circuit.**

#### Antifreeze

The percentage of glycol required depends on the minimum achievable fluid temperature. The table gives the required amount of glycol as a volume percentage in relation to the minimum achievable fluid temperature.

Minimum fluid temperature [°C]	Amount of glycol needed [Vol-%]
> +5°C	No antifreeze required
–15°C	<b>30 Vol-% TEXA Fluid 903-TX</b>
–20°C	35 Vol-%
–25°C	40 Vol-%
–30°C	45 Vol-%
–35°C	50 Vol-%

**i** The concentration of ethylene glycol in the water affects the cooling power of the machine. As the concentration of glycol increases, the cooling power decreases. Circuit load loss also increases as glycol concentration increases.

The use of the following product is recommended:

#### TEXA Fluid 903-TX

**TEXA Fluid 903-TX** is a product specifically designed for use in closed industrial circuits (indoor or outdoor), with limited water replenishment. It is compatible with all common metals (iron, steel, copper and its alloys, aluminum and its alloys), as well as with plastics and rubber.

**TEXA Fluid 903-TX** has been developed to protect hydraulic circuits in industrial machines and machine tools, as well as any systems requiring cold or hot water recirculation.

Its formula is composed of substances that allow for three fundamental actions to protect the system:

**ANTI-FREEZE ACTION:** prevents ice formation at temperatures around zero and lower;

**ANTI-CORROSIVE ACTION:** prevents corrosion by forming a protective film on metal walls;

**BIOCIDE ACTION:** prevents the growth of fungi, molds and bacteria by limiting the formation of biofilms.

**C15001209** – Inhibited ethylene glycol, 25 kg canister,  
**To be mixed with water**



**C15001218** – Water mixture + TEXA fluid 903-TX (concentration 30%), 25 kg canister,  
**READY-TO-USE product for temperatures down to –15°C**



**TEXA Fluid 903-TX** must be mixed with pure water, not suitable for use with water with any material in suspension or brackish water. NOT RECOMMENDED for use with demineralized water or water treated by reverse osmosis. The concentration of **TEXA fluid 903-TX should be checked every six months** and the solution should be clear.

**Every 18 months, the water in the circuit must be completely replaced to ensure the optimum concentration of anti-corrosives and inhibitors, which degrade over time.**

#### Oil Chillers:

It is recommended to use mineral oil-based fluids specifically for liquid circuits, with good anti-wear, anti-foam, fast de-aeration, anti-oxidizant, anti-corrosive and lubricating properties.

The kinematic fluid viscosity values must be within the following range:

**5 cSt to 60 cSt**

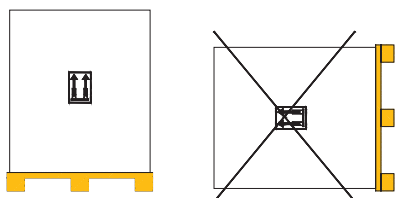
If liquids other than those mentioned above are used, the manufacturer's Technical Office must be informed of the type used and the operating conditions so it can assess any compatibility or durability problems that could affect the hydraulic circuit components.

## 5. HANDLING AND STORAGE

### 5.1 Checks on arrival

Upon receipt of the machine, carefully check the physical condition of the packaging. When unpacking, check that the machine has not been damaged during transit and that oil is not leaking from the circuit. Check that the machine has been transported in the correct position, as indicated by the symbol on the packaging, as shown in the figure. Do not accept the goods if they arrive damaged — notify the manufacturer immediately.

**DO NOT accept the machinery** if it has been damaged in transit.



### 5.2 Specifications for transportation and handling

The machinery must be transported upright, as indicated on the packaging, and without water. The machine is built to be handled using a forklift, pallet truck or crane.

The machine must be handled in such a way as to avoid any risk of damage.

Do not use unsuitable or undersized lifting equipment for the total weight of the machine.

Before lifting the machine, carefully check that all removable panels are securely attached to the unit to prevent them from falling during lifting.

**CAUTION:** If the machine has not been transported in an upright position, the machine must be returned to an upright position and allowed up to three hours for the oil in the cooling system to drain into the compressor sump before starting.

**CAUTION:** The machine must be transported without liquid in the tank.

Important transport information:

Weight	(see "Technical data")
Dimensions	(see "Technical data")
Ambient temperature range	min -20°C to max +65°C

If the machine is being transported in environments with a temperature below 0°C, ensure the water circuit is completely drained. For machines with a water condenser, ensure that the condensing hydraulic circuit is emptied.

### 5.3 Handling with a forklift

To transport the machine with a forklift, place the two forks under the unit at the front or rear (on larger models, use the longer side). The base is designed to be carried by a forklift. Insert the two forks symmetrically to the machine's center of gravity along its entire length. The machine can then be lifted.



**Use a very low speed when handling.**

Move the machine with the tank completely emptied of water.

### 5.4 Handling with a pallet truck

#### A. Transport on front of the machine:

- The machine may only be transported from the front or rear by pallet truck if the following symbol is present:
- If the symbol is not present, only lift the machine using hooks and lift trucks and/or cranes. The crane forks must be longer than the length of the machine. **Use a very low speed when handling the machinery.**

#### B. Transport from the side of machine:

- The forks of the pallet truck must only be inserted into the designated lifting holes on the side, horizontal to the machine, if the following symbol is present:
- If the symbol is not present, only lift the machine using hooks and lift trucks and/or cranes. The forks must protrude from the opposite side. Once this condition has been met, you are ready to lift the machine, taking into account the center of gravity. **Use a very low speed when handling the machinery.**

### 5.5 Handling with a crane

The machine can be lifted and transported by crane using all of the lifting points indicated by the following symbol.

**Lifting equipment:** suitable chains or rope slings can be used. Both means of transport are suitable for lifting, and ropes or chains must be of equal length to meet lifting requirements. Check that the lifting equipment plates are compatible with the weight of the machine.

**Use a very low speed when handling the machinery.**

### 5.6 Storage

The machine must be stored in its original packaging. Before storing the unit, carefully check the following characteristics:

Weight	(see "Technical data")
Dimensions	(see "Technical data")
Ambient temperature range	min -20°C to max +65°C

If the machine is stored in environments with a temperature below 0°C, carefully ensure that the hydraulic circuit is completely drained of water. For machines with a water condenser, also ensure that the condensing hydraulic circuit is emptied.



## 6. INSTALLATION

When installing the machine, follow the safety instructions in Chapter 3.


Before starting up the system, follow these simple precautions:

### 6.1 Positioning


Before installing the chiller, attention should be paid to the following points to determine the best location:


- A. Choose an installation site that provides easy access at all times to ensure all maintenance and service operations can be performed.
- B. For maximum efficiency, always install the machine as close to the user system as possible.
- C. **To prevent the unit from malfunctioning, ensure that the clearance distances shown in the diagram included with this manual are followed;**
  - a. **Distance for maintenance work:**  
At least 0.8 m on the inspection and connection side.
  - b. **Distance on the air inlet side:**  
See attached dimension drawing.
  - c. **Side-by-side units on battery side:**  
Maintain three times the space indicated in the diagram for a single machine.  
N.B.: The distances are indicative but should be followed and assessed depending on specific positions and very narrow environments. The specific diagrams in the manual for each machine should be taken into consideration.
- D. Comply with the operating limits set by the manufacturer.
- E. Install the machine on a flat horizontal surface with a capacity greater than the weight of the machine itself.
- F. The installation environment must be frost-free.
- G. The chillers are designed to be installed indoors. If installed outdoors, suitable accessories must be provided and the machinery must be protected from direct exposure to weather conditions.
- H. If the machine is installed outside, avoid positioning the unit in such a way that strong winds cause air recirculation to the condensing battery.
- I. Provide a fluid drain point for accidental leaks from the machine or system to which it is connected.

### 6.2 Electrical connection

 Check the machine's electrical plate carefully before making the electrical connection. **Make sure the supply voltage is compatible with the voltage on the machine plate.** All installation operations must be performed by qualified personnel.

Refer to the machine wiring diagram before connecting.

 **CAUTION:** Follow applicable regulations when connecting the cooling unit electrically. In addition, follow the technical conditions for connection established by electricity distribution companies. Upstream of the chiller, install protection with a capacity appropriate to the consumption specified on the machine plate.

 Specific transformer protection is recommended for machines with on-board transformers.

Connect the power cables to the dedicated terminals in the electrical panel. In addition, attach the ground cable.

The section of the electric power cables must be sized according to the maximum power consumption specified on the machine plate. The maximum voltage drop on the line should not exceed 10%.

The supply voltage must comply with the voltage specified on the machine plate. The supply voltage must correspond to the nominal value by  $\pm 5\%$ , with a maximum phase imbalance of 3%.

For electrical connection:

- Remove the side panels.
- Use the appropriate channels on the back, front or side of the machine for the power supply.
- Enter the electrical panel from the bottom through the appropriate clearance holes.
- Connect the legally required ground cable.
- Attach the power cables to the appropriate terminals.

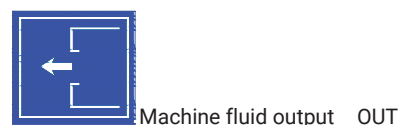
 **CAUTION: Do not override the machine protections.**

**Remote machine ignition:** It is possible to switch on the machine from a remote switch using the two terminals provided on the terminal board inside the electrical panel. **CAUTION:** This type of connection **is not** voltage-free. **Note:** These terminals cut off power to the secondary circuit while the primary circuit remains powered. For single-phase versions, this switch must be sized according to the electrical diagram.


### 6.3 Hydraulic system connection

When connecting the hydraulic system, it is important to carefully follow the guidelines below and the current regulations of the country where the machine is installed.

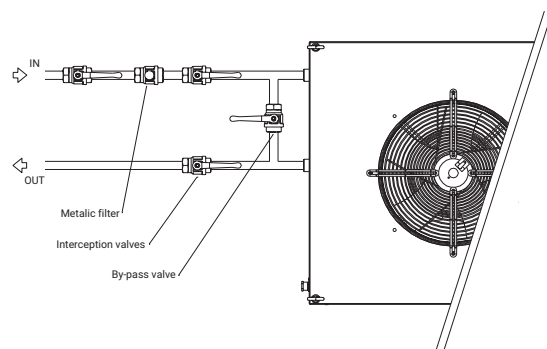
Connect the hydraulic piping with isolating valves to the threaded sleeves at the rear of the machine, respecting the fluid inlet and outlet symbols:



#### A. HYDRAULIC WATER CIRCUIT:

 **CAUTION:** The hydraulic piping must be appropriately sized for the nominal flow rate of the liquid and must be bracket-mounted to avoid putting weight on the chiller. The piping used must be flexible. Rigid piping must have flexible joints to balance the thermal expansion and absorb any vibration by the machine. The piping must be able to withstand the maximum hydraulic pressure of the machine.

- Provide two shut-off valves (sluices) to isolate the machine from the hydraulic circuit.
- Provide a metal mesh filter with a filtration rate of no more than 1 mm to protect the plate exchanger from debris or impurities in the pipes.
- Provide a hydraulic bypass valve for flow control.



**CAUTION:** While the electric pump is operating, do not close the delivery branch completely (with closed bypass), otherwise the electric pump on the machine may become damaged.

Using the on-board pressure gauge in conjunction with the delivery valve, it is possible to adjust the appropriate head for the hydraulic circuit. **CAUTION: Check the maximum pump head before operating the shut-off valve.**

#### B. HYDRAULIC OIL CIRCUIT:

Before starting the system, follow these simple precautions:

**CAUTION:** The hydraulic oil piping must be appropriately sized for the nominal flow rate of the liquid and must also be bracket-mounted to avoid putting weight on the chiller. The piping used must be flexible. Rigid piping must have flexible joints to balance the thermal expansion and absorb any vibration by the machine. The piping must be able to withstand the machine's maximum oil pressure.

The gear pumps of standard oil units are sized for a **maximum pressure of 10 bar**.

- During the first startup, calibrate the pressure relief valve to the required value, if necessary. Calibration range 0–10 bar.
- If the unit is not equipped with a pressure relief valve, provide a pressure relief system external to the unit (see water hydraulic circuit diagram, section 6.3).
- Avoid under-load starts in low temperatures or after extended periods of inactivity (avoiding or at least limiting under-load starts helps ensure longer pump life).
- Start the system for a few moments by activating all components; then vent the circuit to check it is correctly filled.
- If there is a collection tank, check the fluid level after the first load and ensure it is regularly monitored.

### 6.4 Commissioning the machine

Before starting the machine, some **preliminary checks** are necessary:

- Check that all panels are in place and secured by the appropriate fastening screws;
- Check that the electrical connections have been made correctly and all terminals have been tightened;
- Check that the fuses, if present, are in their housings (fuse holders);
- Check that the IN and OUT hydraulic pipes are connected correctly;
- Check that the door(s) on the electrical panel is/are closed.

**Commissioning a machine with a standard hydraulic circuit:**

**A. FILLING AND EMPTYING THE COLLECTION TANK:** The first operation to be performed before commissioning is to fill the collection tank (where applicable) via the filler cap, which is located on the roof of the machine for smaller versions and inside the tank for larger versions. The visual level, located on the front of the machine, will help filling up to the maximum level.

Filling and emptying are marked with the following symbols:



Tank filling.



Tank emptying. **For some versions of the machine, or if purchased as an add-on, a tap can be fitted at the drain to facilitate draining operations.**

#### B. COMMISSIONING THE MACHINE – HYDRAULIC WATER CIRCUIT:

**The first time the machine is commissioned, check to ensure the motors ROTATE correctly (only for three-phase versions).**

There is an arrow indicating the direction of rotation on each motor. You can verify that the fan is rotating correctly by checking that air is being expelled from the condensing battery. If the air leaving the machine is above the ambient temperature, the compressor is rotating in the correct direction. If pressure is present on the water pressure gage, the pump is rotating correctly. **IMPORTANT: The motors are tested and phase-sequenced at the factory.**

#### COMMISSIONING THE MACHINE – OIL HYDRAULIC CIRCUIT:

Before commissioning the machine, regularly check the cleanliness of the oil used during startup and perform regular maintenance during use. Preventive actions include cleaning the system thoroughly during installation, removing any liquid residues and, above all, continually filtering the oil during operation. There are two parameters that determine a proper filter choice: absolute rating and  $\beta$  ratio. Low absolute ratings combined with high  $\beta$  ratios indicate good filtering properties. It is therefore very important to limit the size of the largest particles and the number of smaller particles that pass through the filter.

Recommended level of filtration	25 $\mu\text{m}$
Recommended $\beta$ ratio	>75

For machines in the TCU (Temperature Control Unit) range, i.e. machines used for cooling "dirty" oils, a maximum degree of impurity of 150  $\mu\text{m}$  is considered.

In this case, there is an air vent point on the evaporator area to be used when setting up the machine (the positioning is highlighted on the SCI hydraulic diagrams of the relevant technical manual supplied with the machine).

#### C. WATER CIRCUIT PUMP VENT:

When starting up, if there is no pressure in the hydraulic system even after checking that the motors are rotating correctly, the pump may not be primed properly. The pump must be vented from any air bubbles trapped between the volute and impeller. Loosen the bleed screw (see figure 1) on the pump body and, if necessary, fill the pump volute with water to facilitate priming.

If it is not possible to access the bleed screw, proceed as follows (with the pump switched off):

- Fill the tank to the maximum permitted level.

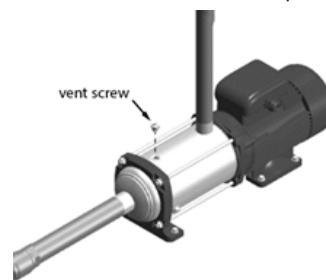


Figure 1

- Disconnect the pressure gage connection pipe from the pressure gage quick coupling.
- Bring the end of the tube below the level of the fluid in the tank and wait for the liquid to drain from the tube.
- Insert the end of the pressure gage connection pipe into the pressure gage quick coupling.

**D. TOPPING UP THE COLLECTION TANK:** When first starting up, the liquid inside the tank will fill the entire hydraulic circuit and the level will drop. It is important to top up the collection tank with the same fluid (or mixture), up to the maximum level.



- E. ADJUSTING THE "BA" BYPASS VALVE:** By default, the "BA" automatic bypass is adjusted according to the maximum curve that the installed pump can reach; if a lower working pressure is required, the bypass must be adjusted using the adjusting screw.
- F. ADJUSTING THE "BM" BYPASS VALVE:** By default, the "BM" manual bypass is adjusted slightly open to allow a minimal amount of fluid to draw through; if a lower working pressure is required, the bypass should be opened until the desired working pressure is reached.

#### Commissioning a machine with an internal recirculation hydraulic circuit:

Units with an internal recirculation hydraulic circuit must be set up using the same procedure for filling the collection tank.

### 6.5 Extended periods of inactivity

If the system has to be stopped for an extended period during its service life, it is essential to **fully drain the liquid**, from the collection tank, pipes and electric pump.

When restarting, it is important to start the pump carefully to avoid straining the electric motor in the event of a blockage. In this case, remove the cover located at the rear of the pump and use a tool on the impeller shaft.

### 6.6 Decommissioning and disposal



Decommissioning and non-routine maintenance of the refrigeration circuit must comply with environmental regulations regarding the recovery, use and disposal of liquids, supplies and components. The unit must be dismantled by a service provider specializing in the removal of obsolete machinery.

The machine is made of materials that can be treated as secondary raw materials. The following guidelines must be observed:

- the oil in the compressor sump must be removed, recovered and delivered to a specialized waste disposal service provider;
- any antifreeze glycol must be recovered and delivered to a specialized waste disposal service provider;
- refrigerant must not be discharged into the atmosphere. It must be recovered and delivered to a specialized waste disposal service provider;
- dehydrator filters and electronic components must be recovered and delivered to a specialized waste disposal service provider;
- insulation material must be removed and treated as municipal waste.

Legislation regulating the use of ozone-depleting substances prohibits the release of refrigerant gases into the atmosphere, and requires them to be recovered and delivered to specialized disposal centers.



Special care should be taken during all maintenance operations on the refrigeration system to minimize leakage of coolant gas into the atmosphere.

## 7. MAINTENANCE



Before performing any activity on the unit or accessing internal parts, ensure that the power supply is shut off.

Before working on the unit, carefully observe the safety instructions in Chapter 3.

Regular inspection of the machine is recommended to ensure it is working correctly. Routine maintenance does not require any

special conditions in terms of refrigeration engineering. It can therefore be carried out by trained and skilled personnel.

Maintenance operations are essential to keep the refrigeration unit in optimal working order, both functionally and in terms of energy efficiency.

### 7.1 Routine maintenance

Routine maintenance		
Units/ components	Operation	Frequency
Cooling air circuit/ framework	AIR FILTER — Clean or replace air filter (if present).	Monthly
	CONDENSING BATTERY — Clean with compressed air and appropriate solvents, taking care not to damage the aluminum fins.	When needed
	STRUCTURE — Visually inspect the condition of the woodwork (points of corrosion or dents) and the fasteners.	Monthly
Cooler In general	VISUAL SYSTEM INSPECTION — Visually inspect machine operation using the digital thermostat (presence of alarms) and any fluid leaks in the hydraulic system.	Daily
	ELECTRICAL PARAMETERS — Check the current draw and that the electric motor terminals are properly connected.	Annually
	DOCUMENTATION — Check for documentation on the machine.	Annually
	COMPONENTS — Visually inspect the condition of the components on the machine.	Annually

Routine maintenance		
Units/ components	Operation	Frequency
Hydraulic circuit	LINES – Visually check that the hydraulic circuit is properly sealed.	Daily
	FLUID LEVEL – Check the level of liquid in the collection tank and top it up, if necessary, with the same mixture originally used.	Daily
	FLUID – Check the quality of the fluid in the tank, its cleanliness and the concentration of any glycol.	Monthly
	PRESSURE – Check the circuit pressure through the water pressure gauge. This pressure must be compatible with the characteristics of the installed pump.	Monthly
Electrical circuit	VISUAL INSPECTION – Visually check that the components in the electrical panel are intact and check the continuity of the grounding conductors on the metal structures. Check the condition of the woodwork, door seals, direct contact protection structures, interlocks and locks. Visually inspect for dust or dirt.	Annually
	CLEANING – Clean the electrical panel as thoroughly as possible, removing all dust and dirt from cables, connections, components and woodwork. Avoid using compressed air. We <b>strongly recommend</b> performing cleaning without voltage present.	Annually
	CHECK CONNECTIONS – Check the condition of the power and auxiliary connections, and tighten all connections. If there are signs of overheating on the connections and/or cables, such as burns or blackening, remove the damaged part and restore it to its original condition. Ensure the cables on the terminal block are not moving excessively and have not come loose.	Annually

## 7.2 Extraordinary maintenance



Non-routine maintenance must only be performed by trained personnel who are qualified to work on refrigeration systems.

**Non-routine upgrade operations** will be necessary during the life

cycle of the machine.

If there are no specific regulations in the country where the machine is installed, please refer to the requirements in EN378-2 "Appendix C – Inspection While In Service."

Intervention Type	Inspection	Control/Check		
	Visual inspection	Pressure test	Coolant leaks	HP pressure switch Max pressure valve
A	x	x	x	x
B	x		x	x
C	x		x	
D	x			x

Inspection and monitoring operations are to be performed by qualified personnel.

### Description of intervention criteria:

- A. Upgrades must be performed after working on the coolant circuit in the event of repair or service (e.g., components changes, leak repairs, dehydrator filter changes, etc.).
- B. Upgrades must be performed before putting a machine back into operation after it has been inactive for more than approximately two years.

- C. Upgrades must be performed during site visits to the end customer after the machine is first commissioned.
- D. Regular upgrades must be performed annually.

The visual inspection includes all operations listed in paragraph 7.1 on routine maintenance.

## 7.3 After-sales service

For any problems concerning machine malfunctions, technical information or installation advice, contact our Service Department at:

TEXA INDUSTRIES S.r.l.

AFTER-SALES SERVICE:

Strada Cà Bruciata 5

46020 – Pegognaga (MN) – ITALY

Tel: +39 0376-554511

Email: [texa.service@nVent.com](mailto:texa.service@nVent.com)

Website: [www.nVent.com](http://www.nVent.com)

**Before contacting the manufacturer's Service Department, ensure that you have the following available:**

- A. The complete machine code.
- B. The machine serial number.

All repair requests must be sent to the manufacturer in writing via email.



**CAUTION:** Machines may only be returned to the manufacturer following a written request and acceptance of the return by the manufacturer.

## 8. MALFUNCTIONS/TROUBLESHOOTING

Keep the specific accompanying documentation available for troubleshooting:

- Wiring diagram
- Hydraulic diagram

- Digital thermostat manual
- List of digital thermostat parameters

Refer to the attached digital thermostat manual for the warning lights on the digital thermostat.



### FAULTS – TROUBLESHOOTING TABLE

Fault	Potential cause	Comments
<b>THE SYSTEM IS NOT WORKING –</b> No device is functioning	<ul style="list-style-type: none"> <li>• Check the power supply</li> <li>• Check the connection of the dedicated ignition terminals/remote shutdown</li> <li>• Faulty electromechanical protections</li> </ul>	<ul style="list-style-type: none"> <li>• Check the operation of the electrical line and the electrical panel provided for powering the machine</li> </ul>
<b>LOW PRESSURE ALARM/INSUFFICIENT COOLING POWER</b> The air leaving the condenser is at a low temperature. Lack of coolant gas in the circuit.	<ul style="list-style-type: none"> <li>• The lack of coolant gas causes a sharp drop in the cooling potential of the machine. There is a leak in the gas circuit.</li> </ul>	<ul style="list-style-type: none"> <li>• Qualified personnel (refrigeration technician) must take action.</li> <li>• Contact the Service Department.</li> </ul>
<b>HIGH PRESSURE ALARM/PRESSURE INCREASE</b> in coolant circuit – If the maximum pressure of the cooling circuit is exceeded, the high pressure switch is triggered and switches off the cooling function of the machine.  An alarm will appear on the electrical panel display.	<ul style="list-style-type: none"> <li>• Failure to observe minimum separation distances (check diagram).</li> <li>• Ambient temperature too high (check environmental limits in technical data).</li> <li>• The temperature of the water on the hydraulic return line is too high (check limits in technical data).</li> <li>• Water outlet temperature outside the permitted limits (check technical data).</li> <li>• Insufficient water supply to condenser in water-cooled versions (check technical data).</li> <li>• The digital thermostat that manages the machine is faulty.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact the Service Department to restore the unit to normal operating conditions.</li> </ul>
<b>COMPRESSOR TURNING ON TOO OFTEN</b>	<ul style="list-style-type: none"> <li>• Cooling power of the machine is too high compared to the level necessary.</li> <li>• Lack of thermal flywheel in the system suitable for operation.</li> <li>• Start/stop differential of compressor too small (standard value <math>\pm 2^{\circ}\text{C}</math>).</li> </ul>	<ul style="list-style-type: none"> <li>• Check the digital thermostat parameter settings.</li> </ul>
<b>COMPRESSOR NOT WORKING –</b> Fault signal on the digital thermostat	<ul style="list-style-type: none"> <li>• Compressor thermal protection activated.</li> </ul>	<ul style="list-style-type: none"> <li>• Cooling circuit working pressure too high. Check the efficiency of the air filter (if fitted) – Check that the minimum operating distances are followed, and that there is no recirculation of expelled hot air.</li> <li>• Ambient temperature too high.</li> </ul>
<b>FAN NOT WORKING –</b> Fault signal on the digital thermostat	<ul style="list-style-type: none"> <li>• Fan thermal protection activated.</li> </ul>	<ul style="list-style-type: none"> <li>• High pressure loss of ventilator, caused by obstructions to air flow. Fan damaged or blocked.</li> <li>• Damaged electric in-rush capacitor (for single-phase versions).</li> </ul>
<b>ELECTRIC PUMP NOT WORKING –</b> Fault signal on the digital thermostat	<ul style="list-style-type: none"> <li>• Activation of electric pump thermal protection.</li> </ul>	<ul style="list-style-type: none"> <li>• Pump is faulty.</li> <li>• Check the pump pressure against the technical data provided on the label.</li> </ul>



## FAULTS – TROUBLESHOOTING TABLE

Fault	Potential cause	Comments
<b>MACHINE RUNNING BUT LIMITED COOLING POWER</b> – Compressor, fan and pump(s) are running but machine cannot cool down.	<ul style="list-style-type: none"><li>• Condensation air flow short circuited.</li><li>• Obstructions to the intake or outlet of condensation air.</li><li>• Clogged or dirty air condenser or air filter.</li></ul>	<ul style="list-style-type: none"><li>• Remove any obstructions from the regular air flow.</li><li>• Position the machine within the minimum installation distances.</li><li>• Clean the condensing battery, clean or replace the dirty air filter.</li></ul>
<b>LIMITED COOLING POWER AND CONDENSATION ON THE COMPRESSOR</b> – With risk of ice formation	<ul style="list-style-type: none"><li>• Insufficient water flow over the evaporator.</li></ul>	<ul style="list-style-type: none"><li>• Check the operation of the electric pump and the pressure of the hydraulic circuit.</li></ul>

### North America

service@nVent.com  
Tel +1 763 422 2211

Follow the instructions for option 1, then for option 2 and option 3.

### All other locations

texa.service@nVent.com  
Tel +39 0376 554511



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