



TAEvo Tech MINI

WATER CHILLERS



TAEvo Tech MINI 10 UL



OPERATING AND MAINTENANCE MANUAL

USER'S QUICK GUIDE

ATTENTION

MODIFICATION OF AN UL LISTED PRODUCT

MTA chillers feature an electrical cabinet designed and wired in compliance with the UL508A standard for electrical enclosures. The UL compliance allows this MTA equipment to meet local code requirements in most locations in the US and Canada. When a UL Listed product is modified, retrofitted or altered in any way after it leaves the factory, it is necessary to verify if the product continues to meet the applicable certification safety requirements.

If a modification made to the product in the field (outside of the MTA factory) does NOT affect the electrical characteristics of the panel installed on the machine, then the UL Listing is not affected and the UL label that was placed on the product at the factory can remain. Some examples include:

- Making the remote ON / OFF connection (to terminals provided in the panel)
- Making the alarm relay connection (to terminals provided in the panel)
- Making remote terminal connection (to terminals provided in the panel)
- Replacement of panel components with equal components

If a modification made in the field DOES affect the electrical characteristics of the panel installed on the machine, it is not possible for UL to confirm that the product continues to meet the applicable certification safety requirements. In this case the field modifications must be specifically inspected and recertified by the appropriate UL agency. Some examples include:

- Replacement of panel components with components that are different than those originally supplied
- Replacement of motors (or other current-drawing devices) that involve the change of components inside the panel
- Addition of devices not provided for by MTA
- Addition of electrical loads not foreseen by MTA

In this case it is the responsibility of the AUTHORITY HAVING JURISDICTION to assess the acceptability of modifications and/or to determine if modifications are significant enough to require a member of the UL field engineering services staff to evaluate and/or recertify the modified product. Anyone directly involved with a product (including manufacturers, owners, contractors, and regulatory authorities) can request a Field Evaluation.

For further clarification, contact MTA USA or visit the UL's Web site at www.ul.com/field.

ATTENTION

 At the first start-up, check the correct operation of all electrical connections.


ATTENTION

 Before starting units of this type, ensure that all personnel involved have read and understood Chapter 2 "Safety" and follow the procedures set down in Chapter 6 "Start up".

NOTE

The pump must never run dry.

ATTENTION

 The pressure limiting valve is factory set, according to the pump nominal flow.
Before using the unit it is necessary to set the limiting valve according to the plant nominal flow.

0.1 Switching the unit on/off

The unit is switched on and off:


- from the keypad
- from the digital input (remote ON/OFF)

NOTE

In the event of a power supply blackout, when the power is restored the unit will restart operation in its pre-blackout status.

0.1.1 Switch-on from the keypad

Power up the unit.

With the unit in standby (OFF) mode press the  key. If the unit is on, the display shows the regulator probe value. If the unit is in standby mode, the display shows **OFF**.



0.1.2 Switch-on from digital input

NOTE

Refer to the wiring diagram for connection of the digital input.


Power up the unit by closing the digital input contact; the unit switches on; it switches to standby (OFF) if it is opened. The off command (from keypad or digital input) always overrides the on command. If the unit is switched off from the keypad, it must be switched back on from the keypad.

When the unit is switched off using the digital input, the display shows **OFF**.



0.2 Setpoint

0.2.1 Displaying the setpoint

Press the  key to display the setpoint.

0.2.2 Modifying the setpoint

Hold down the  key for 3 seconds to activate modification.

Use the  and  keys to edit the value.

Press the  key to confirm or wait for the time-out.

TABLE OF CONTENTS

USER'S QUICK GUIDE.....	1
0.1 Switching the unit on/off.....	1
0.1.1 Switch-on from the keypad	2
0.1.2 Switch-on from digital input	2
0.2 Setpoint	2
0.2.1 Displaying the setpoint	2
0.2.2 Modifying the setpoint	2
TABLE OF CONTENTS	3
	Chapter 1
GENERAL INFORMATION.....	5
1.1 How to interpret the model.....	7
1.2 How to interpret the alphanumeric string.....	7
	Chapter 2
SAFETY	9
2.1 General	9
2.2 Liquids to be cooled	9
2.3 Lifting and transport precautions	10
2.4 Precautions to be adopted during installation	10
2.5 Precautions to be adopted during operation	10
2.6 Disposal, disassembly and recycling.....	11
2.7 Maintenance precautions.....	11
2.8 Refrigerant gases	12
2.8.1 Refrigerants safety datasheet	12
	Chapter 3
TECHNICAL DATA	14
3.1 Data for standard units	14
3.1.1 Dimensions	14
3.1.2 Characteristics of pump and fan	14
3.1.3 Sound level measurements	15
	Chapter 4
DESCRIPTION	16
4.1 Operating principle.....	16
4.1.1 Refrigeration compressor	16
4.1.2 Casing	16
4.1.3 Materials in contact with the liquid to be cooled	16
4.1.4 Condenser	16
4.1.5 Evaporator	16
4.1.6 Pump	16
4.1.7 Accumulation tank	16
4.1.8 Fans	16
4.2 Overall dimensions.....	16
4.3 Minimum distances from walls.....	16
4.4 Water and refrigerant circuits.....	16
4.4.1 Water circuit	16
4.4.2 Refrigerant circuit	17
4.5 Electrical circuit	17
	Chapter 5
INSTALLATION	18
5.1 Inspection	18
5.2 Location.....	18
5.3 Freeze protection.....	19
5.4 Limit operating conditions	19
5.5 Plumbing connections	19
5.5.1 Evaporator water limit features	20
5.6 Electrical connections	20

Chapter 6	
START UP	23
Chapter 7	
ELECTRONIC CONTROL UNIT.....	24
7.1 LEDs	24
7.2 Keys	24
7.2.1 Key combinations	25
7.3 Switching the unit on/off	25
7.3.1 Switch-on from the keypad	25
7.3.2 Switch-on from digital input	25
7.4 Setpoint	25
7.4.1 Displaying the setpoint	25
7.4.2 Modifying the setpoint	26
7.5 Dynamic setpoint	26
7.6 Maximum and minimum temperature	27
7.7 Modifying the value of a parameter.....	27
7.8 Keypad lock	28
7.9 Pump	28
7.10 Displaying the "real setpoint"	28
7.11 Compressor control	28
7.12 Alarms.....	28
7.12.1 Alarm messages	28
7.12.2 Alarm relay	29
7.13 Parameter list	29
Chapter 8	
OTHER COMPONENTS.....	31
8.1 High pressure switch (HP).....	31
Chapter 9	
OPERATION AND MAINTENANCE	32
9.1 Operation	32
9.2 Maintenance.....	32
9.2.1 Unit access	32
9.3 Pressure limiting valve.....	32
9.3.1 Maintenance schedule	33
Chapter 10	
TROUBLE SHOOTING	34
Chapter 11	
RISK ANALYSIS: RESIDUAL RISK.....	37
APPENDIX.....	41

CHAPTER 1

GENERAL INFORMATION

The units described in this manual may be referred to below as “WATER CHILLERS”.

This manual is addressed to personnel responsible for installing, using and servicing the unit.

The units were constructed using components made by premium quality manufacturers and the entire design, production and control process was carried out in compliance with standard ISO 9001.











In the majority of applications the liquid in the user circuit is water so henceforth the term “WATER” will be utilised, even if the liquid in the user service is different (for example mixtures of water and ethylene or propylene glycol).

Hereinafter the expression “PRESSURE” is used to indicate relative pressure.



The electrical panel has been designed following UL508A standard rule (Industrial Control Panels).





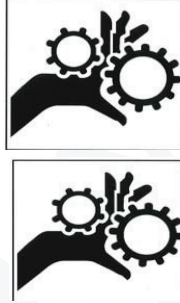



The compressors, fans, pump, condensing and evaporating coils carry the cURus marking.



The following symbols are to be found on the decals affixed to the unit and also in the dimensional drawings and refrigerant circuit diagrams. The meaning of each symbol is indicated below:

	Process water inlet		Process water outlet
	Drain point to empty the unit of water		Overflow
	Electric shock hazard		Risk of burns from contact with high-temperature surfaces
	Direction of flow of refrigerant fluid and water circuit		Indication of the axis of reference for lifting operations
	Water filling point		Risk of injury due to sharp edges

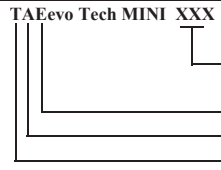
The following warning symbols are shown on the stickers on the unit. If requested, the same stickers are available also in French. Their meaning is the following:

WARNING SYMBOL	DESCRIPTION
 <p>WARNING</p> <p>To maintain overcurrent, short-circuit, and ground-fault protection, the manufacturer's instructions for selection of overload and short circuit protection must be followed to reduce the risk of fire or electric shock.</p> <p>If an overload or a fault current interruption occurs, circuits must be checked to determine the cause of the interruption.</p> <p>If a fault condition exists, the current-carrying components should be examined and replaced if damaged, and the integral current sensors must be replaced to reduce the risk of fire or electric shock.</p>	 <p>AVERTISSEMENT</p> <p>Pour maintenir la protection de surintensité, de court-circuit et de défaut de la terre, les instructions du fabricant sur le choix de la protection de surcharge et de court-circuit devraient être suivies pour réduire le risque du feu et de décharge électrique.</p> <p>Si une surcharge ou une interruption de courant de défaut se produit, des circuits doivent être vérifiés pour déterminer la cause de l'interruption.</p> <p>Si une condition de panne existe, les composants portant le courant de défaut devraient être examinés et remplacés si endommagés, et les dispositifs de mesure de courant intégrales doivent être remplacés pour réduire le risque du feu ou de décharge électrique.</p> <p>To maintain overcurrent, short-circuit, and ground-fault protection, the manufacturer's instructions for selection of overload and short circuit protection must be followed to reduce the risk of fire or electric shock.</p> <p>In an overload or a fault current interruption occurs, circuits must be checked to determine the cause of the interruption.</p> <p>If a fault condition exists, the current-carrying components should be examined and replaced if damaged, and the integral current sensors must be replaced to reduce the risk of fire or electric shock.</p>

WARNING SYMBOL		DESCRIPTION
 <p>WARNING Hazardous voltage. All doors must be closed before energizing the panel.</p>	 <p>AVERTISSEMENT Tension dangereuse. Toutes les portes devraient être fermées avant d'alimenter le panneau.</p>	Hazardous voltage. All doors must be closed before energizing the panel.
 <p>WARNING Read and understand operator's manual before using this machine. Failure to follow operating instructions could result in death or serious injury.</p>	 <p>AVERTISSEMENT Lisez attentivement le manuel de l'utilisateur avant d'utiliser la machine. Le non respect des consignes d'utilisation peut provoquer la mort ou des blessures graves.</p>	Read and understand operator's manual before using this machine. Failure to follow operating instructions could result in death or serious injury.
 <p>WARNING Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing.</p>	 <p>ATTENTION Pièces en mouvement susceptibles d'arracher et couper. Ne pas utiliser sans la protection. Suivre la procédure de verrouillage avant toute opération.</p>	Moving parts can crush and cut. Do not operate with guard removed. Follow lockout procedure before servicing.
 <p>DANGER Hazardous voltage. Disconnect power before servicing or cleaning.</p>	 <p>DANGER Tension dangereuse. Appliquez les consignes de mise hors tension avant de travailler sur la machine.</p>	Hazardous voltage. Disconnect power before servicing or cleaning.

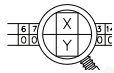
WARNING SYMBOL	DESCRIPTION
 <div> WARNING Ensure casters are locked before operating. </div>	Ensure casters are locked before operating.
 <div> DANGER Risk of electric shock. Orange wires inside the panel remain energized when the main switch is in the off positions. To service these circuits, shut off the equipment at the main service disconnect. </div>	Risk of electric shock. Orange wires inside the panel remain energized when the main switch is in the off positions. To service these circuits, shut off the equipment at the main service disconnect.

1.1 How to interpret the model

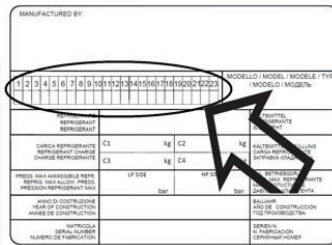
MODEL	DESCRIPTION
TAEvo Tech MINI XXX 	Guideline power of compressor expressed in HP E = hermetic compressor A = air-cooled condenser T = tank; chiller with storage tank.

1.2 How to interpret the alphanumeric string

The alphanumeric string is shown on the metal data plate on the last page of this manual.



This symbol shown alongside appears in some refrigerant circuit diagrams and electrical diagrams. This symbol refers to the alphanumeric string reported in the manual. The upper box (X) identifies the position of the string, the lower box (Y) identifies the assigned value.



The empty alphanumeric string is circled in the adjacent figure; each position in the upper row is associated with an alphanumeric value in the lower row (0, 1, 2, A, B, etc.) and each character is associated with a specific feature of the unit.

	POS.	VALUE	DESCRIPTION
MATERIAL CABINET	1	0	STANDARD
		1	STAINLESS STEEL
REFRIGERANT	2	2	R134a
		3	R410A
VOLTAGE	3	2	230/1/50
		C	230/1/50-60
		P	230/2/60
LASER	4	A	YES
		B	NO
PUMP	5	I	P3
		L	P5

	POS.	VALUE	DESCRIPTION
WESTEC CONNECTORS	6	0	NO
		1	YES
LEVEL SENSOR	7	0	NO
		1	YES
KIT TYPE	8	A	NO KIT
		H	SECTIONING HYDRAULIC KIT
PRODUCT TYPE	9	0	STANDARD
		X	SPECIAL

ATTENTION



This manual, which is addressed to users, installers, and service personnel, supplies all the technical information required to install and work with the unit and to perform the routine maintenance operations required to maximise its working life.

Use only genuine parts when carrying out routine maintenance or repairs.

Requests for SPARE PARTS and any INFORMATION concerning the unit must be made to your dealer or nearest service centre, specifying the MODEL and SERIAL NUMBER shown on the unit's dataplate and on the last page of this manual.

CHAPTER 2

SAFETY

This unit is designed to ensure the best guarantees of safety and efficiency in its intended use, on the condition that it is installed, commissioned, and serviced in compliance with the instructions given in this manual.

The manual must therefore be studied by all those who want to install, use or maintain the unit.

The unit contains electrical components that operate at mains voltage and also moving parts.


All work on the unit must be carried out only after disconnecting the electrical supply. Maintenance operations involving work inside the unit must be performed by skilled and adequately qualified personnel equipped with suitable protection means (active and passive, e.g. work gloves) to ensure maximum safety.

Keep unauthorized persons (e.g. children) away from the place of installation of the unit.

2.1 General

When handling or maintaining the unit and all auxiliary equipment, personnel must operate with care observing all instructions concerning health and safety at the installation site.

ATTENTION

 Numerous accidents that occur during operation and maintenance of the units are caused by failure to comply with basic safety rules and precautions.

An accident can often be avoided by recognising a situation that is potentially hazardous.

The user must ensure that all personnel involved in operating and servicing the unit have read and understood all the warnings, precautions, prohibitions and notes given in this manual and affixed to the unit. Improper operation or maintenance of the unit and auxiliary equipment can be dangerous and can cause serious or fatal accidents.

We cannot anticipate every possible circumstance which might constitute a potential hazard.


The warnings in this manual are therefore not all-inclusive.

If the user adopts operational procedures or uses tools or working procedures that are not specifically recommended, he must take care to ensure that the unit and the auxiliary equipment are not damaged or made unsafe and that no risks emerge in relation to persons or property. Any improper use of the unit will relieve the manufacturer from any liability for possible personal injury or property damage.

Arbitrary modifications made to the unit will automatically invalidate all forms of guarantee provided by the manufacturer.

ATTENTION



 The hot / chilled water produced by units cannot be used for hygiene/sanitary or food applications. If it is used for the above purposes, the installer must install an intermediate exchanger. If the intermediate exchanger is not present, the installer must affix a warning notice to the effect "non potable water".

2.2 Liquids to be cooled


The liquids to be cooled must be compatible with the materials used.

These can be water or mixtures of water and glycol, for example. In case of distilled or demineralised water, check the compatibility with materials.

It is advisable to work with pH between 7 and 8. If using chemical additives consult your supplier for more information concerning compatibility with materials in contact with the process fluid of the chiller.

The liquids to be cooled must not be flammable.

ATTENTION

 If the liquids to be cooled contains dangerous substances (e.g. ethylene glycol) it is very important to collect any liquid which leaks because it could cause damages to the ambient. Furthermore, when the chiller is no longer used, dangerous liquids must be disposed of by firms specialised and authorised for treating them.

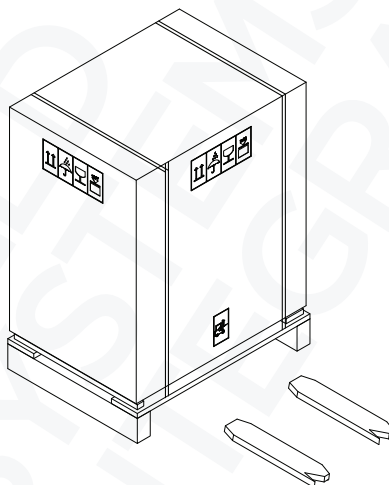
2.3 Lifting and transport precautions

Avoid injury by using a hoist to lift heavy loads.
Check all chains, hooks, shackles and slings are in good condition and are of the correct capacity.
They must be tested and approved according to local safety regulations.
Cables, chains or ropes must never be attached directly to lifting eyes.
Always use an appropriate shackle or hook properly positioned. Arrange lifting cables so that there are no sharp bends.
Use a spreader bar to avoid lateral loading of hooks and eyebolts.
When a load is lifted from the ground keep well clear of the area beneath the load and the immediately surrounding area.
Keep lifting acceleration and speed well within safety limits and never leave a suspended load attached to a hoist any longer than strictly necessary.
The weight values shown in the table below were obtained with the unit empty and with P3 pump.
The manufacturer does not supply load spreaders, lifting straps or hooks with the unit.

Model TAEvo Tech MINI	10
Weight (lb)	275

NOTE

Weight values are guideline, with the water circuit empty. The values may vary in relation to the configuration of the unit. Refer to the overwrap and the data plate.



NOTE

The unit is complete with eyebolts for lifting, which can be used once the packaging has been removed.

2.4 Precautions to be adopted during installation

The connections to be prearranged concern the process water circuit. For connection to the mains electrical supply consult the technical documentation attached to the unit..

2.5 Precautions to be adopted during operation

The unit must be operated by competent personnel under the guidance of a qualified supervisor.
All water pipelines must be painted or clearly marked in compliance with local safety prescriptions in force in the place of installation.

ATTENTION

! Do not remove or tamper with safety devices, protections, or the insulating materials installed in the unit and in the auxiliary equipment.

All electrical connections must comply with local codes.
The unit and its auxiliary equipment must be connected to earth and protected against short circuits and overloads.

When mains power is switched on, lethal voltages are present in the electrical circuits and extreme caution must be exercised if any work must be carried out on the electrical system.

Do not open the electrical equipment guard panels while the circuit is energized. Operations that require intervention with the electrical circuit energized must be performed only by qualified personnel using appropriate equipment and wearing apparel and devices designed to protect against electrical hazards.

2.6 Disposal, disassembly and recycling

The product was designed and built with recyclable materials.

The correct waste sorting for the subsequent start-up of the equipment disposed of for recycling, treatment and for compatible environmental disposal, contributes to prevent possible negative consequences on the environment and health. It also favours the recycling of the materials the equipment is made up with.

The unit may include all or some of the materials listed below:

- Refrigerant fluid R410A
- Copper parts
- Aluminium parts
- Carbon Steel parts
- Stainless Steel parts
- PVC parts
- CFC-free synthetic insulating material
- polystyrene parts
- Polyester oil
- Brass


During dismantling, the compressor, pumps, fans, exchangers (if working) can be recovered for possible re-use thanks to specialised centres. All materials must be recycled or disposed of in compliance with the corresponding national regulations. Refrigerant, oil and possible anti-freeze solutions recycling must be done by specialised companies in compliance with the corresponding local and national legislation.

Electrical and electronic materials cannot not be disposed of together with domestic general waste. They must be disposed of in special collection centres.

Units must be treated at a centre specialised in re-conditioning, recycling and recovery of materials.

2.7 Maintenance precautions

ATTENTION

 *When it is necessary to discharge waste material do not pollute water pipelines, groundwater or watercourses. Avoid the combustion of materials that could produce fumes that are toxic and harmful when released into the atmosphere. Protect the environment by using only approved methods of disposal.*


Keep a written record of all work carried out on the unit and the auxiliary equipment. The frequency and the nature of the work required over a period can reveal adverse operating conditions that should be corrected.

ATTENTION

 *Use only the refrigerant specified on the data plate of the unit.*

Make sure that all instructions concerning operation and maintenance are strictly followed and that the complete unit, with all accessories and safety devices, is kept in good working order. The accuracy of pressure and temperature gauges must be regularly checked. If values are discovered that exceed the permissible tolerances, the gauges must be replaced.

ATTENTION

 *Do not perform welding procedures or other operations that can produce heat in the vicinity of elements containing oil or flammable liquids. Systems which may contain oil or flammable liquids must be completely purged and cleaned, e.g. with steam, before carrying out such operations.*

Components in the vicinity must be protected with non-inflammable material and, if the operation is to be performed close to parts of the lubrication system or in the vicinity of components that may contain oil or inflammable liquids, the system must first be purged.

Never use an open flame as a light source to inspect parts of the unit.

For all units establish a suitable time interval for cleaning procedures.

ATTENTION

⚠ If replacement parts are needed use only original spares.

Take care not to damage pressure limiting devices.

All guards must be refitted after carrying out repair or maintenance work.

Do not use flammable liquids to clean the unit when it is running. If chlorinated hydrocarbon non-flammable fluids are used for cleaning, safety precautions must be taken against any toxic vapours that may be released.

ATTENTION

⚠ Before removing any panels or dismantling any part of the unit, carry out the following operations:

- Isolate the unit from the electrical power supply by disconnecting the supply upstream of the power feeding line.
- Lock out the disconnect switch in the "OFF" position by fitting a padlock.
- Affix a tag to the disconnect switch handle stating "WORK IN PROGRESS - DO NOT SWITCH ON".
- Do not set the electrical power switch to ON or attempt to start the unit if it has been tagged out with a warning sign.

Coloured tracers can be used in service-maintenance operations.

Inspect all refrigerant circuit unions including connectors, flanges, and more generally all critical points (open unions) in order to prevent possible leakage of refrigerant gas.

2.8 Refrigerant gases

The units are charged with R410A refrigerant.

Do not replace or mix one gas with another because different gases are not mutually compatible.

To clean out a very heavily contaminated refrigerant system, e.g. after a refrigerant compressor burnout, a qualified refrigeration engineer must be consulted to carry out the task.

The manufacturer's instructions and local safety regulations should always be observed when handling and storing high pressure gas cylinders.

2.8.1 Refrigerants safety datasheet

Denomination:	R410A (50% Difluoromethane (R32); 50% Pentafluoroethane).
INDICATION OF HAZARDS	
Major hazards:	Suffocation.
Specific hazards:	Rapid evaporation can cause frostbite.
FIRST AID MEASURES	
General information:	Do not attempt to administer liquids or solids to persons who have lost consciousness.
Inhalation:	Move victims to the open air. Use oxygen or artificial respiration if necessary. Do not administer adrenaline or similar substances.
Contact with the eyes:	Wash thoroughly with plenty of clean water for at least 15 minutes and seek medical assistance.
Contact with the skin:	Wash immediately in plenty of clean water. Remove contaminated clothing immediately.
FIRE-FIGHTING MEASURES	
Means of extinction:	Any.
Specific hazards:	Pressure rise.
Specific methods:	Cool containers with water spray.
MEASURES IN THE EVENT OF ACCIDENTAL LEAKAGE	
Individual precautions:	Evacuate personnel to safe muster points. Provide adequate ventilation. Use personal protective equipment.
Environmental precautions:	Evaporates.
Cleaning methods:	Evaporates.
HANDLING AND STORAGE	
Handling	
Technical measures/ precautions:	Ensure the presence of sufficient ventilation and/or air extraction means in the workplace.
Recommendations for safe use:	Do not breath fumes or aerosol.
Storage:	Close hermetically and store in a cool, dry and well-ventilated place. Store in its original containers. Incompatible products: explosives, flammable materials, organic peroxide

CONTROL OF EXPOSURE/INDIVIDUAL PROTECTION

Control parameters:	AEL (8-h and 12-h TWA) = 1000 ml/m ³ for each of the two components.
Respiratory protection:	For rescue and maintenance work in tanks use autonomous breathing apparatus. The vapours are heavier than air and can cause suffocation, by reducing the oxygen available for breathing.
Protection of the eyes:	Safety spectacles.
Protection of the hands:	Rubber gloves.
Hygiene measures:	Do not smoke.

PHYSICAL AND CHEMICAL PROPERTIES

Colour:	Colourless.
Odour:	Ethereal.
Boiling point:	-60.8°F at atmospheric pressure.
Flash point:	Non-flammable.
Relative density:	1.08 kg/l at 77°F.
Solubility in water:	Negligible.

STABILITY AND REACTIVITY

Stability:	No reactivity if used in compliance with instructions.
Materials to avoid:	Highly oxidising materials. Incompatible with magnesium, zinc, sodium, potassium and aluminium. Incompatibility is more critical if the metal is present in the form of powder or if surfaces have been recently unprotected.
Hazardous decomposition products:	These products are halogen compounds, hydrofluoric acid, carbon monoxides (CO, CO ₂), carbonyl halides.

TOXICOLOGICAL INFORMATION

Acute toxicity:	(R32) LC50/inhalation/4 hours/lab. rats 760 ml/l (Pentafluoroethane) LC50/inhalation/4 hours/lab. rats 3480 mg/l
Local effects:	Concentrations significantly above the TLV can cause narcotic effects. Inhalation of products in decomposition can lead to respiratory difficulty (pulmonary oedema).
Long-term toxicity:	No carcinogenic, teratogenic, or mutagenic effects observed in laboratory animals.

ECOLOGICAL INFORMATION

Global warming potential GWP (EU n° 517/2014):	2088
Ozone depletion potential ODP (R11=1):	0
Considerations on disposal:	Usable with reconditioning.

CHAPTER 3

TECHNICAL DATA

The data plate affixed to the unit bears the following technical data:

MODEL and CODE	The model number and the code identify the size of the unit and the type of construction.
MANUAL	Code number of the manual.
SERIAL NUMBER	Construction number of the unit.
MONTH YEAR OF CONSTRUCTION	Year and month of unit's final testing.
VOLTAGE/PHASES/FREQUENCY	Electrical power supply characteristics.
FLA COMPRESSOR	Motor rating FLA (compressor).
FLA FAN	Motor rating FLA (fan).
FLA PUMP	Motor rating FLA (pump).
MCA	Minimum circuit ampacity.
MOP	Maximum rating of overcurrent protective device.
MAX. ABSORPTION	Unit current draw in limit operating conditions.
INSTALLED POWER	Unit power input in limit operating conditions
PROTECTION RATING	According to European standard EN 60529.
FIELD WIRING DIAGRAM	Identifies the electrical diagram number.
COOLING CIRCUIT	
REFRIGERANT	Refrigerant fluid in the unit.
REFRIGERANT CHARGE	Quantity of refrigerant fluid contained in the unit.
REFRIG. MAX. WORKING PRESS.	Refrigerant circuit design pressure
MAX. TEMPERATURE	Refrigerant circuit design temperature
UTILIZATION CIRCUIT FLUID	Type of user fluid utilised by the unit (normally water)
MAX WORKING PRESSURE	Max. design pressure of the user circuit.
MAX. TEMPERATURE	Maximum design temperature of the user circuit; this should not be confused with the maximum working temperature which is established when the offer is made.
SOUND PRESSURE LEVEL	Free field sound pressure level in hemispherical radiation conditions (open field) at a distance of 3,2 FT from the condenser side of the unit and a height of 5,2 FT from the ground.
AMBIENT TEMPERATURE	Minimum and maximum values of ambient air temperature.
WEIGHT	Weight of the unit before packing.
PRODUCTION LOCATION	Location of unit's production.

3.1 Data for standard units

3.1.1 Dimensions

See attached drawings.

3.1.2 Characteristics of pump and fan

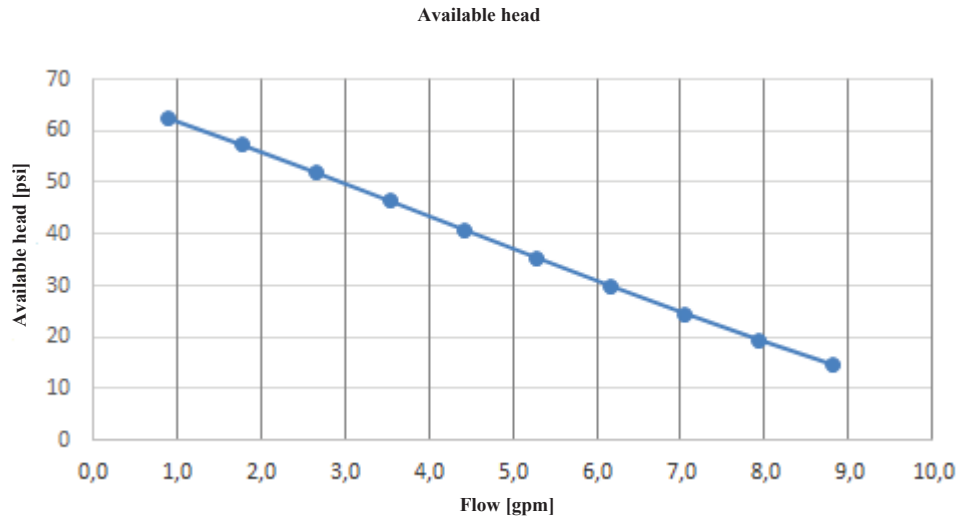
Model TAEvo Tech MINI			10
Tank capacity	water volume	(gal)	5.8
Pump P3	rated power	(kW)	0.52
Axial flow fan	total airflow	(gpm)	26.3

NOTE

The values in the table may vary in relation to the unit model and configuration. In this case refer to the offer data.

NOTE

The pressure head is the pressure head available in the user's premises. The installed pump may differ with respect to the standard pump.

**NOTE**

The pump must never run dry.

3.1.3 Sound level measurements

	Lp dB(A) *	Lw dB(A) **
TAEvo Tech MINI 10	68	81

* at distance of 3,2 FT

** global

Test conditions

Noise levels refer to operation of the unit at full load in nominal conditions.

Sound pressure level in hemispherical irradiation conditions at a distance of 3,2 FT from the condensers side of the unit and height of 5,2 FT from the ground. Values with tolerance of ± 2 dB.

Sound pressure level: according to ISO 3744.

CHAPTER 4

DESCRIPTION

4.1 Operating principle

All the chillers described in this manual work on the basis of the same principle. A refrigerant circuit cools the exchange surface of an evaporator through which the liquid to be cooled passes.

The evaporator finds inside the tank.

The refrigerant compressor is controlled by an electronic control unit.

The electronic control unit controls the temperature of the water in the tank to maintain it within preset limits.

4.1.1 Refrigeration compressor

Of rotary hermetic type, cooled by the aspirated refrigerant and equipped with thermal cutout protection.

The compressor is mounted on anti-vibration supports.

4.1.2 Casing

The entire plinth, the uprights, and the outer panels are made of galvanized carbon steel sheet and are assembled by means of screws and/or rivets. All panels undergo phosphor degreasing treatment followed by epoxy polyester power coating.

The base and all structure, except for the internal elements, can be in stainless steel AISI 304.

The frame is designed to allow easy access to all components of the unit.

4.1.3 Materials in contact with the liquid to be cooled

Stainless steel, copper, brass, plastics, aluminium.

4.1.4 Condenser

Condensation occurs in finned core coils composed of copper tubes and headers, corrugated aluminium fins, and galvanized sheet metal shoulders.

4.1.5 Evaporator

The evaporator is of the finned core type; water flows in contact with the finned surface at velocities such as to ensure low pressure drops, while the refrigerant flows through the tubes.

In these models the exchanger is protected from the risk of ice formation caused by low evaporation temperatures, with anti-freeze strategies handled by the electronic controller. The evaporator water outlet temperature is controlled by a probe. If room/water temperatures lower than 41°F are required, a mixture of water and glycol must be used.

To drain the circuit use the appropriate discharge.

4.1.6 Pump

Body in brass, base in brass, impeller in anti-corrosion brass, shaft in AISI420, key in AISI316, seeger in AISI420.

NOTE

The pump must never run dry.

4.1.7 Accumulation tank

Plastic accumulation tanks are used.

These units are furnished with a tank, finding in vertical position over the unit's base.

The tanks contain the evaporator.

The hydraulic circuit is of atmospherical type and by a plug, positioned on the top of the unit, it is possible to fill the unit.

A water level gauge is provided.

4.1.8 Fans

The fans are of axial type with ON/OFF operation.

4.2 Overall dimensions

See attached drawings.

4.3 Minimum distances from walls

See attached drawings.

4.4 Water and refrigerant circuits

See attached drawings.


4.4.1 Water circuit

The water flowing through the evaporator pipes cools and flows into the tank.

Then the water is sucked by a peripheric pump which sends it directly to the user.

A pressure gauge is connected to the pump output. It indicates the outlet water pressure of the plant.

ATTENTION

 *The pressure limiting valve is factory set, according to the pump nominal flow.
Before using the unit it is necessary to set the limiting valve according to the plant nominal flow.*

4.4.2 Refrigerant circuit

The refrigerant is pumped by the refrigerant compressor to the condenser. The condenser is a heat exchanger and is cooled by an air flow produced by a fan.

After the condenser, the refrigerant liquid passes through a drying filter and a thermostatic valves.

The refrigerant then enters the evaporator's circuit in which it flows in counter-current with respect to the water to be cooled.

When it exits the evaporator, the refrigerant is again sucked by the compressor and the cycle repeats itself.

The refrigerant circuit is also furnished with a high pressure switch (HP) of automatic reset type.

The refrigerant circuit, is equipped with the following components:

- refrigerant fluid utilised R410A;
- hermetic rotary compressor;
- high refrigerant pressure switch;
- thermostatic lamination valve complete with external pressure equalizer;
- filter dryer;
- liquid sight-glass;
- schrader service valves;
- by-pass solenoid valve for equalising the pressure at compressor switch-off.

For more information consult the attached diagrams.

4.5 Electrical circuit

See the enclosed electrical diagrams.

CHAPTER 5

INSTALLATION

ATTENTION

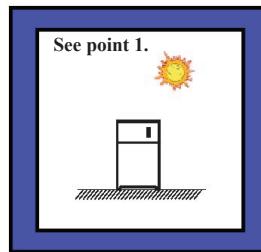
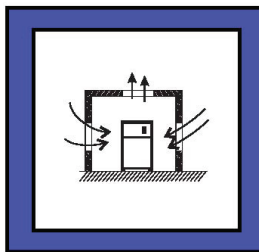
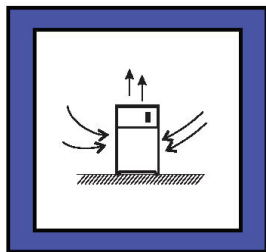
! Before installing or operating these units, ensure that all personnel involved have read and understood Chapter 2 "Safety". The unit must be installed in accordance with current national legislation in the country of use.

5.1 Inspection

As soon as the unit has been unpacked check it carefully for damage.

5.2 Location

1. The unit can be installed either outdoors or in an enclosed environment, depending on the degree of IP protection of the electrical panel and the unit itself.
2. If the unit is installed indoors the place of installation must be well ventilated. In certain cases it may be necessary to install ventilation fans or extractor fans in order to reduce room temperature.
3. The ambient air must be clean, avoid sea ambients (brackish air), and not contain flammable gas or corrosive solvents.
4. The minimum and maximum working ambient temperature are specified on the unit data plate. Ensure that the unit is not installed in flows of hot air emitted by other equipment. In extreme temperature conditions, the protection devices may trip.
5. Do not obstruct or interfere with the air flow produced by the unit; comply strictly with the minimum spaces/distances specified in the installation drawings.
6. The machine must be installed on a perfectly horizontal flat surface, built and calculated to withstand the machine's operating weight, especially in the contact points highlighted in the installation drawing. **In the event of installations which fail to comply with the above requirements, the manufacturer's warranty cover will immediately become null and void and the unit could malfunction or even lock out.**
7. Leave free space around the unit for access during service interventions (see Attachments).
8. Do not install the plant in sites exposed to strong winds; if unavoidable, install suitable windscreens.



5.3 Freeze protection

Even if the minimum operating temperature is higher than 32°F, during shutdown periods in the cold season the unit may be subject to temperatures that are lower than 32°F.

In such cases if the water is not drained out of the unit ethylene or propylene glycol antifreeze should be added to the water in the following percentages:

Ambient T up to °F	Ethylene Glycol [% by weight]	Propylene Glycol [% by weight]
32	0	0
23	15	18
14	25	27

In accordance with the chilled water outlet temperature, to avoid the formation of ice ethylene or propylene glycol antifreeze should be added to the water in the following percentages:

Water outlet T up to °F	Ethylene Glycol [% by weight]	Propylene Glycol [% by weight]
45	0	0
37	20	20
32	20	25
27	25	30
23	30	30

NOTE

The water flow rate must correspond to the value stated in the technical specifications or in the selection software. The conditions specified in the table do not guarantee anti-freeze protection with the machine operating in bypass mode between water delivery and return, and with the machine water inlet and outlet fittings shut off.

ATTENTION

⚠ For uses with setpoints below 41°F reduce the **LS** parameter and adjust the **ALL** parameter as appropriate. For water outlet temperatures lower than 42.8°F you must add a suitable quantity of antifreeze solution.

5.4 Limit operating conditions

		Minimum	Maximum
Ambient air temperature	°F	41	107
Evaporator water inlet temperature	°F	32 ⁽¹⁾	95
Evaporator water outlet temperature	°F	23 ⁽¹⁾	86

(1) For temperatures below 41°F use antifreeze solutions (see 5.3 "Freeze protection").

5.5 Plumbing connections



It is recommended to insert a filter of "Y" (with mesh 0.019 to 0.031 in) type on the water inlet connection, in order to stop eventual impurities of water which could cause big damages to the pump.

1. Connect the chiller to the water piping. See the overall dimension drawings for the size and type of connections.
2. Provide two cocks (inlet and outlet) to by-pass the machine for maintenance purposes without having to empty the water circuit of the user.
3. Fill the water receptacle by unscrewing the plug of the receptacle and filling the circuit with water (for example using a hose connected to the cock) until the level in the receptacle is about half-way between the min. e max. indicated levels. The filling of tank before starting-up the unit is very important as the pump can not operate without water.

The receptacle used for filling the circuit acts as an open expansion tank. It is therefore necessary to pay attention to the volumes and dimensions in play.

ATTENTION

⚠ Before starting the pump, ensure that the circuit is full of water.

Evaporator water connections sizes:

Unit model	TAEvo Tech MINI 10
Evaporator IN/OUT water connections	Rp 1/2"

ATTENTION

⚠ The pump must never run dry.

5.5.1 Evaporator water limit features

Water component for corrosion limit on Copper

pH	7.5 ÷ 9.0	
SO ₄ ²⁻	< 100	ppm
HCO ₃ ⁻ / SO ₄ ²⁻	> 1.0	
Total hardness	4.5 ÷ 8.5	dH
Cl ⁻	< 50	ppm
PO ₄ ³⁻	< 2.0	ppm
NH ₃	< 0.5	ppm
Free Chlorine	< 0.5	ppm
Fe ³⁺	< 0.5	ppm
Mn ⁺⁺	< 0.05	ppm
CO ₂	< 50	ppm
H ₂ S	< 50	ppb
Temperature	< 65	°C
Oxygen content	< 0.1	ppm

5.6 Electrical connections








The machine must be connected to the main power supply in accordance with the laws and regulations in force in the country of installation, after verifying the wiring diagram annexed to the unit.

OPERATING AND MAINTENANCE MANUAL






Chapter 5 - Installation

Voltage, frequency and the number of phases must comply with the values indicated on the machine data plate.


Main distribution systems in United States:

System	Nominal Voltage	Utilization Voltage	
	120	115	110
	240/120	230/115	220/110
	600 480 240	575 460 230	550 440 220
	480	460	440
	480/277 208/120	460/266 200/115	440/254 190/110
	240/120	230/115	220/110
	240/120	230/115	220/110


Main distribution systems in Canada:

System	Nominal Voltage	Utilization Voltage	
	240 480 600	230 460 575	220 440 550
	240/120	230/115	220/110
	600 480 240	575 460 230	550 440 220
	600 480 240	575 460 230	550 440 220
	600/347 480/277 416*/240 208/120	575/332 460/266 400*/230 200/115	550/318 440/254 380*/220 190/110

For mains power input:

1. Connect the machine (terminal  in the electrical panel) to the earth system of the building;
2. Provide protection against direct contact of at least NEMA Type 1 upline from the power cable;
3. Fit a device protecting the power cable from overcurrent (short-circuit) (see indication in the electrical diagram) upline from the power cable. For this purpose, all protection devices must be homologated ("listed").
4. Use conductors which can carry the maximum current required at the maximum ambient operating temperature, according to the type of installation chosen (see indication in the electrical diagram). Use only UL marked copper cables, in conformity with NEC (NATIONAL ELECTRICAL CODE) and CEC (CANADIAN ELECTRICAL CODE).
5. After the connection to the circuit breaker/switch (as indicated in the wiring diagram), the unit's power cable must exit the unit by the appropriate hole positioned on the back panel and identified by a label with the indication of the power supply.


ATTENTION

 *If the SUPPLY CORD is damaged, it must be replaced by the manufacturer, its service agent or similarly qualified persons in order to avoid a hazard.*

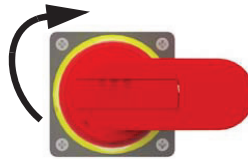
CHAPTER 6

START UP

ATTENTION

 Before starting any lifting procedure, ensure that the "Safety" section has been read and understood.

1. Check that the machine's on/off valves are open.
2. Check that the level of the liquid in the receptacle is at about the middle of the graduated scale.
3. Check that the ambient temperature is within the limits indicated on the machine data plate.
4. Check that the main switch is in the OFF position.
5. Check that the power supply voltage is correct.
6. Turn the machine main switch ON.



7. The Electronic Control Unit switches on.
8. The unit is ready to start.

If with the first start-up, there is a high ambient temperature and the temperature of the water in the hydraulic circuit is much higher than the working value this means that the chiller starts up overloaded with the consequence of **possible tripping of the compressor protection devices. To reduce this overload, a chiller outlet valve can be gradually** (but not totally!) **closed to reduce the flow of water passing through it.** Open the valve as the water temperature in the hydraulic circuit reaches the working value.

If the thermal load is lower than that produced by the chiller, the water temperature drops until it reaches the set point. After the pump start-up, if the unit operates regularly, make sure that the water level in the canister is approximately halfway through the graded scale of the level gauge.

CHAPTER 7

ELECTRONIC CONTROL UNIT



7.1 LEDs

LED	MODE	MEANING
°C	On	°C
	Flashing	Parameter menu
	Off	°F
n	On	Compressor running
	Flashing	Minimum OFF time active
⚠	Flashing	Alarm active
🔧	Flashing	Pump running
Led by the top left	Flashing	By-pass valve active. Flashing when the valve is operating. Not flashing when the valve is not operating.
Led by the top right	Flashing	Funzione Set Dinamico abilitato







Led by the top right
Led by the top left



7.2 Keys

Key	Function
SET	Displays or modifies (held down for 3") the setpoint. During programming selects a parameter or confirms a value.
▲	During programming scrolls the parameters / increases a value.
▼	During programming scrolls the parameters / decreases a value.
⏻	Switches the unit on/off.

7.2.1 Key combinations

Keys	Function
 + 	Keypad lock/unlock (held down for 3")
 + 	Access to programming mode (held down for 3")
 + 	Quit programming mode.

7.3 Switching the unit on/off

The unit is switched on and off:


- from the keypad
- from the digital input (remote ON/OFF)

NOTE

In the event of a power supply blackout, when the power is restored the unit will restart operation in its pre-blackout status.

7.3.1 Switch-on from the keypad

Power up the unit.

With the unit in standby (OFF) mode press the  key. If the unit is on, the display shows the regulator probe value. If the unit is in standby mode, the display shows **OFF**.



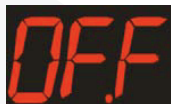
7.3.2 Switch-on from digital input

NOTE

Refer to the wiring diagram for connection of the digital input.


Power up the unit by closing the digital input contact; the unit switches on; it switches to standby (OFF) if it is opened. The off command (from keypad or digital input) always overrides the on command. If the unit is switched off from the keypad, it must be switched back on from the keypad.

When the unit is switched off using the digital input, the display shows **OFF**.



7.4 Setpoint

7.4.1 Displaying the setpoint

Press the  key to display the setpoint.

Depending on the functions enabled, the displayed setpoint is as follows.:

Dynamic Setpoint enablement "Sd1" (*)	SET button "pressed for the first time" Label SEt	SET button "Pressed the second time" Label SEtr
0	Chiller Setpoint	/
1	Chiller Setpoint	Real Chiller Setpoint

(*) see section "7.5 Dynamic setpoint" for Dynamic Setpoint.

7.4.2 Modifying the setpoint

Hold down the **SET** key for 3 seconds to activate modification.

Use the **▲** and **▼** keys to edit the value.

Press the **SET** key to confirm or wait for the time-out.

7.5 Dynamic setpoint

The regulator allows the operating setpoint to be modified by adding or subtracting a coefficient proportional to the external air temperature (**installation of the probe by the customer**).

For industrial applications, the purpose of this function is to prevent condensate from forming on the surface of the component cooled by the unit. This function allows to save energy or to operate the machine with particularly severe ambient temperatures.

The chiller re-start will take place at $SET + Hy$.

To enable the dynamic setpoint, it is necessary to configure the parameters of the Sd group.

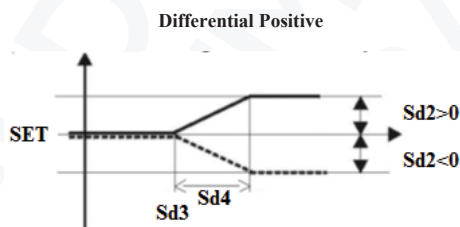
With dynamic setpoint enabled ($Sd1 = Y$), pressing the SET button twice allows the actual setpoint to be displayed.

If the dynamic setpoint is enabled with non-enabled environment probe ($P2P = n$), the parameter is forcibly disabled.

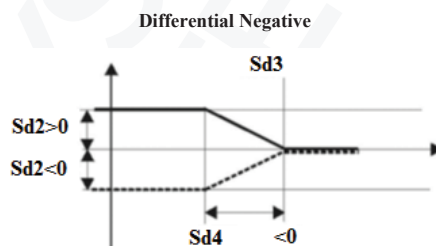
The dynamic setpoint is enabled if:

- the parameter **Sd1** = Y;
- the ambient probe is present $P2P = Y$

ES: $Sd1 = Y$, $P2P = Y$; $Sd4 > 0$



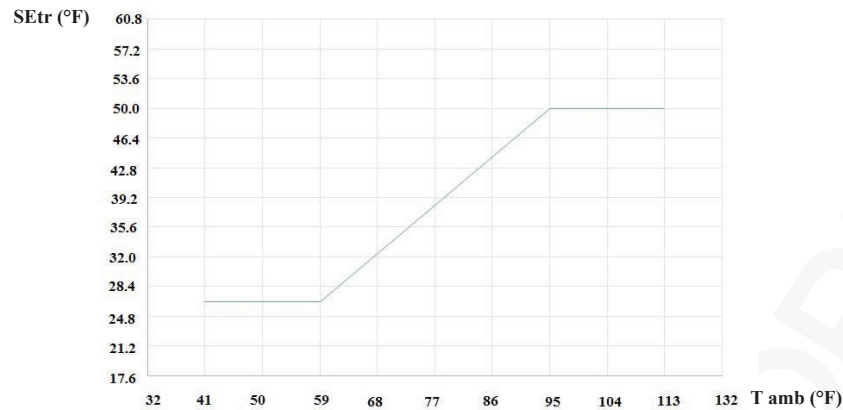
ES: $Sd1 = Y$, $P2P = Y$; $Sd4 < 0$



Following the temperature profile that it is possible to obtain with the programmed default parameters in the control.

Graphic UL:

SEt = 26.6, Sd2 = 55.4, Sd3 = 59, Sd4 = 68



7.6 Maximum and minimum temperature

The maximum and minimum temperature reached by the regulator probe can be displayed.

Minimum temperature:

1. Press the key.
2. The screen shows “Lo” and the minimum temperature reached.
3. Press the key to return to the current temperature.

Maximum temperature:

1. Press the key.
2. The screen shows “Hi” and the maximum temperature reached.
3. Press the key to return to the current temperature.

To delete the maximum or minimum temperature:

With the minimum or maximum temperature displayed, hold the button down for a few seconds to clear the value. “rSt” flashes on the screen and the current temperature value is recorded.

7.7 Modifying the value of a parameter

To edit parameter values:

1. Access programming mode by holding down keys + for 3 s (the °F LED flashes).
2. Hold down + for at least 7 s to display the protected parameters. “Pr2” appears on the screen.
3. Use the and keys to select the parameter required.
4. Press the key to edit the value (value and °F LED flash).
5. Edit it with the and keys.
6. Press to save the new value and move on to the next parameter.



To quit:

Press + with a parameter displayed or wait 15s.

NOTE

The new value is saved even if the user quits the menu without pressing the key.

7.8 Keypad lock

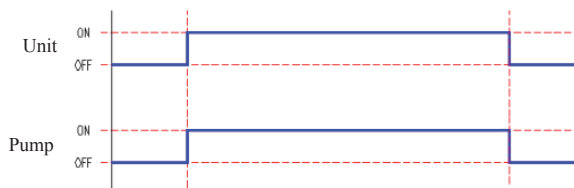
Hold down the  and  keys for a few seconds to lock/unlock the keypad. The screen shows “Pof” while the keypad is locked and “Pon” while it is unlocked.

Only display of the setpoint and maximum and minimum temperatures is possible with the keypad locked.

7.9 Pump




The water pump follows the status of the unit; the pump is on with the unit on and off with the unit off.

No chiller alarm detected by the ECU cuts out the pump.



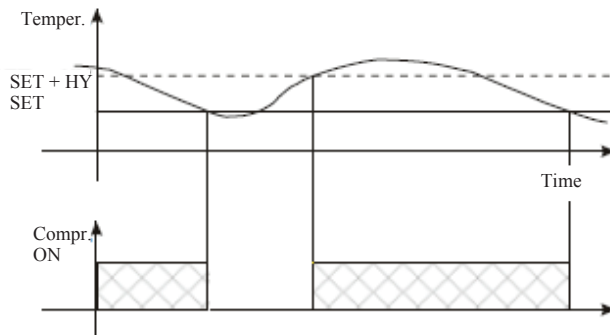
7.10 Displaying the "real setpoint"

With "Dynamic Setpoint" active:

1. Press and release the  key, the setpoint chiller will immediately appear.
2. Press and release for the second time  : the key in the lower row appears the SetR text.
3. To return to the temperature, wait 60s or press the  key again.

7.11 Compressor control

The compressor is activated to maintain the temperature set by the setpoint.



If the control temperature is higher than SET+HY, the compressor is on; if it is below SET, the compressor is shut down.

It is still true that, in case of stop, the re-start of the compressor takes place at the Chiller setpoint + Hy.

7.12 Alarms

7.12.1 Alarm messages

When the unit is on, an alarm icon flashes  and the alarm message appears. The possible alarm messages are listed below:

Message	Cause	Outputs	
		Compr.	Pump
P1	Thermostatic control probe failure	OFF	ON
P2	Room temperature probe failure	OFF	ON
HA	Thermostatic control probe high temperature alarm	ON	ON
LA	Thermostatic control probe low temperature alarm	ON	ON
PAL	High pressure switch alarm	OFF	ON

NOTE

The alarm relay switches status for all alarms.

7.12.2 Alarm relay

The Electronic Control Unit has an alarm signalling relay. Its contact is closed during normal operation and is opened in the case of an alarm or a power blackout.

Refer to the wiring diagram for the relative connections.

If an alarm occurs, the light turns red to indicate its presence.


7.13 Parameter list

Every parameter has a corresponding access level:

U= user level

S= service level (Pr2)

ATTENTION

 Changing the default parameters may prevent the unit from functioning correctly.

Parameter	Level	Description	Range	Default settings
SEt	U	Setpoint	LS - US	45
Hy	U	Compressor control hysteresis	0÷45°F	7
LS	U	Minimum setpoint	67°F÷SET	23
US	S	Maximum setpoint	SET÷302°F	59
ot	S	Thermostatic control probe calibration	-21÷21°F	0
P2P	U	Room temperature probe enabling	n - Y	n
oE	S	Room temperature probe	-21÷21°F	0
odS	S	Output activation delay at start-up	0÷255 (min.)	1
AC	S	Anti-oscillation delay	0÷50 (min.)	3
CF	S	Unit of measurement: Celsius, Fahrenheit	°C - °F	°F
rES	U	Resolution (°C): decimal, integer	dE - in	dE
Lod	S	Instrument display	P1; P2, SET, rSE, SEL	P1
LEn	S	Unit of measurement LED switch-on	n - Y	n
ALC	S	Alarm configuration: relative / absolute	rE - Ab	Ab
ALU	U	High temperature alarm	32.0÷122°F rel. or ALL÷302°F	104
ALL	U	Low temperature alarm	32.0÷122°F rel. or -67°F÷ALU;	21
AFH	S	Temperature alarm differential	1÷45°F	2
ALd	S	Temperature alarm delay	0÷255 (min.)	0
dAo	S	Temperature alarm exclusion at start-up	0÷24.0h	0
tbA	S	Alarm relay deactivation	n= no; y= yes	n
AoP	S	Alarm relay polarity	oP; cL	oP
iIP	S	Digital input 1 polarity	oP - CL	oP
iIF	S	Digital input 1 function	nU - EAL - bAL - PAL - oFF	bAL
did	S	Digital input 1 alarm delay	0÷255 (min.)	0

Parameter	Level	Description	Range	Default settings
i2P	S	Digital input 2 polarity	oP - CL	oP
i2F	S	Digital input 2 function	nU - EAL - bAL - PAL - oFF	oFF
nPS	S	Number of pressure switch alarm triggerings	0÷15	1
PbC	S	Probe type selection	PtC - ntC	ntc
onF	S	On/off key function	no, OFF	OFF
dP1	U	Thermostatic control probe display	read-only (probe value)	--
dP2	U	Room temperature display	read-only (probe value)	--
rSE	S	Real setpoint	read-only (setpoint value)	--
ESC	S	Serial communication enabling	n - Y	n
Sd1	U	Dynamic setpoint function enabling	(n= not enabled / Y= enabled)	n
Sd2	U	Max. increasing of dynamic setpoint	-22÷86°F	13
Sd3	U	External air temperature set of dynamic setpoint	-67÷302°F	15
Sd4	U	External air temperature differential of dynamic setpoint	-22÷86°F	20
rEL	S	Firmware release code	read-only	15.9
Ptb	S	EEPROM map code	read-only	2

CHAPTER 8

OTHER COMPONENTS

8.1 High pressure switch (HP)

TAEvo Tech MINI 10 models are furnished with a high pressure switch (HP).

It monitors the discharge pressure of the refrigerant compressor and prevents it from increasing to dangerous levels for the compressor and people within the immediate vicinity.

It is of "automatic reset" type.

It opens the power circuit of the compressor and of the fan (see wiring diagram).

In the event of an alarm, when the discharge pressure of the refrigerant compressor decreases and falls below the reset point, it automatically resets. To eliminate the alarm of the board it is necessary to power off and on the unit by means of the circuit breaker.

The setting values are fixed.

In the event of replacement, the pressure switch is screwed to a SCHRAEDER valve which prevents the refrigerant from leaking.

The TRIP and RESET values of the pressure switch are indicated in the following table:

Pressure switch	Refrigerant	TRIP		RESET	
		psi	°F	psi	°F
HP	R410A	595	147.4	479	130.1

CHAPTER 9

OPERATION AND MAINTENANCE

9.1 Operation

The machine operates in completely automatic mode.

There is no need to turn it off when there is no thermal load as it turns off automatically when the preset water temperature has been reached.

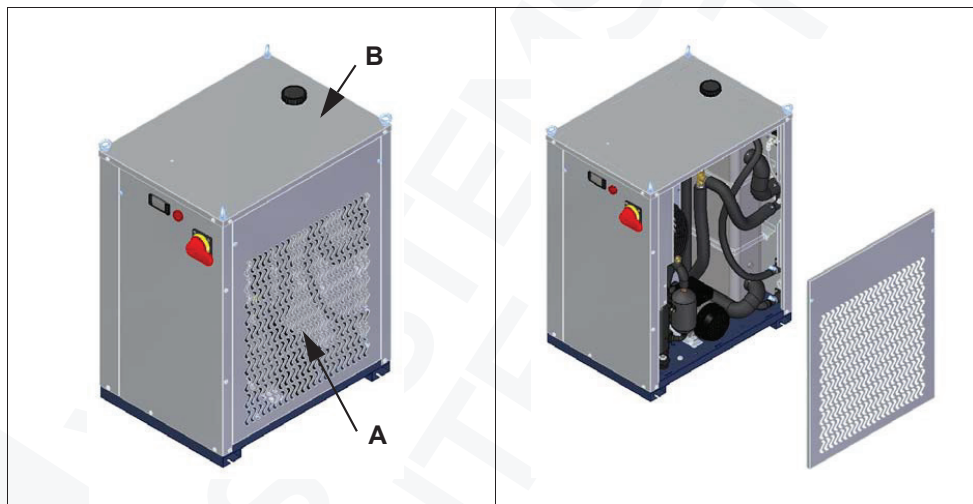
9.2 Maintenance

ATTENTION

! Before proceeding with the maintenance of these units be sure that all personnel concerned have read and understood the "Safety" section of this manual.

9.2.1 Unit access

To gain access to the refrigeration circuit components remove the front panel "A" and if necessary the top cover "B" of the unit. Removing the front panel "A" gives access to the electrical panel, the pump, the water circuit and the refrigeration circuit components.



9.3 Pressure limiting valve

The pressure limiting valve is factory set, according to the pump nominal flow operating. Before using the unit it is necessary to set the limiting valve according to the customer plant nominal flow.



9.3.1 Maintenance schedule

OPERATION	1 day	1 month	6 months	annually
Check control panel display for any alarm signals.	◇			
Check that the water output temperature is within the envisaged range.	◇			
Check that water inlet temperature is in compliance with the value utilised for selection of the unit. (*)		◇		
Check that the ambient temperature is lower than the value used for selecting the unit. Check that the environment is well ventilated.		◇		
Clean the water filter. The water filter should be cleaned one week after the first start-up of the unit.		◇		
Check the water level with the aid of the gauge provided.	◇			
Check that the unit current absorption is with the value on the data plate. (*)			◇	
Carry out visual inspection of refrigerant circuit, looking out for any deterioration of the piping or any traces of oil which might indicate a refrigerant leak.			◇	
Check the condition and security of piping connections.			◇	
Check the condition and security of wiring and electrical connections.			◇	
Check that fan operation is not noisy. Clean the filter on the condenser. Inspect the condenser fins and clean them if necessary with a soft sponge or a jet of clean compressed air. Check that the grilles of the unit are free from dirt and any other obstructions.			◇	

(*) For this purpose use specific test meters.

ATTENTION



The above maintenance schedule is based on average operating conditions.

In some installations it may be necessary to increase the frequency of maintenance.

CHAPTER 10

TROUBLE SHOOTING

PROBLEM	CAUSE	SYMPTOM	REMEDY
A Water temperature higher than the expected value.	A1 Thermal load too high.	A1.1 Water temperature higher than expected value.	Restore the thermal load to within the preset limits.
	A2 Ambient temperature too high.	A2.1 See A1.1	Restore the ambient temperature to within the preset limits.
	A3 Condenser fins dirty and/or filter blocked.	A3.1 See A1.1	Clean the condenser fins.
	A4 Front surface of the condenser obstructed.	A4.1 See A1.1	Free the front surface of the condenser.
	A5 No refrigerant fluid in the plant.	A5.1 • See A1.1; • low evaporation pressure.	Get a technician to check for leaks and eliminate them. Fill the plant.
B Probe (-BEWOT) faulty.	B1 Probe faulty or parameters out of range.	B1.1 Message P1 appears.	Check or renew the probe.
C Low water pressure at pump outlet.	C1 Clearance between the impeller and the pump casing too high. Wear parts.	C1.1 Low water pressure at pump outlet.	Verify and replace the pump impeller.
D The unit is obstructed and the water does not flow.	D1 Setpoint too low so that the water freezes.	D1.1 • Water does not pass; • intake pressure too low.	Choose between: • raise the set point; • add an appropriate % of ethylene glycol (antifreeze) (see Chapter 5 "Installation").
	D2 Evaporator obstructed by dirt carried by the water to be cooled.	D2.1 High water temperature difference between inlet and outlet.	Depending on the type of dirt: • clean the evaporator by running a detergent solution which is not aggressive for steel, aluminium and copper; • run a high water flow against the stream. Install a filter upstream from the chiller.

PROBLEM	CAUSE	SYMPTOM	REMEDY
E High pressure switch (HP) trips.	E1 Fan does not work.	E1.1 The refrigeration compressor and the fan stop.	Repair or replace the fan. Where fitted, check the thermal protection switch of the fan. Press the reset button on the cap of the pressure switch.
	E2 Ambient air temperature too high.	E2.1 • Air ambient temperature higher than maximum permitted value; • see E1.1.	Reduce ambient temperature within design limits, for example by increasing local ventilation. Press the reset button on the cap of the pressure switch.
	E3 Recirculation of warm air due to incorrect installation location.	E3.1 • Condenser cooling air temperature higher than the permitted value; • see E1.1.	Change the position of the unit or the position of any adjacent obstructions to avoid recirculation. Press the reset button on the cap of the pressure switch.
	E4 See A4.	E4.1 See E1.1.	Clean the condenser fins. Press the reset button on the cap of the pressure switch.
	E5 See A5.	E5.1 See E1.1.	Remove obstruction from condenser intake. Press the reset button on the cap of the pressure switch.
	E6 See A1.	E6.1 • Water outlet temperature too high; • refrigerant compressor stops.	Restore the thermal load to within the preset limits. Press the reset button on the cap of the pressure switch.
	E7 Lack of water in the tank	E7.1 Tank discharged	Make sure that there are no losses in the tank and bring the water level in the canister back to halfway the graded scale of the level gauge.
F Compressor protection tripped (hermetic compressors klixon).	F1 Thermal load too high in conjunction with high ambient temperature.	F1.1 • The head and body of the compressor are very hot; • the compressor stops and attempts to start after a brief period.	Stop the machine and restore the load within the preset limits. Wait a few minutes before restarting.
	F2 Thermal load too high in concomitance with a lack of refrigerant in the circuit (also see A5).	F2.1 See F1.1.	Get a engineer to check for leaks and eliminate them. Get the engineer to fill the circuit.
	F3 See points from E1 to E6.	F3.1 See F1.1.	See points from E1 to E6.
	F4 By-pass solenoid valve on the compressor not working correctly (remains closed).	F4.1 With compressor on, the solenoid valve remains closed (coil not energised).	Check operation of the solenoid valve. If necessary, renew the solenoid valve coil or the entire solenoid valve.

PROBLEM	CAUSE	SYMPTOM	REMEDY
G Fuse FC1 trips.	G1 Compressor motor overloading or short circuit, or short circuiting in the compressor power line.	G1.1 The compressor does not start even if the thermostat function so requires.	Using a tester, check the motor windings and the power cable. Replace the compressor or cable if necessary. Change the fuse.
H Fuse FF1 trips.	H1 Fan, pumps and electronic power overload or short circuit in the power line.	H1.1 The fan and electronic board do not work at the same time even if there is electric power.	Check the components and wiring with a tester. Replace the damaged component or wiring. Change the fuse.
I The compressor does not start (signalled by compressor LED flashing).	I1 Compressor delay on.	I1.1 The compressor does not start.	Verify parameters OdS, AC.
J The temperature is over the set limit but there is no alarm message and the buzzer, if present, does not sound.	J1 Alarm delay on.	J1.1 The temperature measured by the probe is higher than the set limit.	Verify parameters ALd, dAO.
K Low temperature alarm.	K1 The alarm delay is too short or the alarm threshold too low.	K1.1 “LA” low temperature alarm displayed (See Ch. 7.6 “Maximum and minimum temperature”).	Verify parameters ALL.
L High temperature alarm.	L1 The alarm delay is too short or the alarm threshold too low.	L1.1 “HA” high temperature alarm displayed (See Ch. 7.6 “Maximum and minimum temperature”).	Verify parameters ALU.
M After modifying a parameter the electronic control continues to operate with the old values.	M1 The instrument has not updated the old value or the parameter programming procedure was not concluded correctly, that is by pressing.	M1.1 After modifying a parameter the electronic control continues to operate with the old values.	Turn the instrument off and on again or re-program the parameters correctly.

CHAPTER 11

RISK ANALYSIS: RESIDUAL RISK

Description of risk:	Effect:	User instructions:
1. Risk of crushing	Falling of machine onto persons and/or crushing of limbs.	Use lifting equipment suited to the task in hand, to be performed by qualified personnel with reference to the labelling instructions and manual.
2. Risk of cutting and detachment caused by sheets or profiles in general.	Risk of cutting upper limbs on sharp edges caused by shearing of sheets or saw cutting of profiles.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance".
3. Risk of cutting or detachment due to the finned surface of air-cooled condensers.	Risk of cutting upper limbs.	Strictly observe all manual instructions. Chapter 1 "General information"; Chapter 2 "Safety" and Chapter 9 "Operation and maintenance".
4. Risk of cutting or detachment due to fan blades.	Risk of cutting or detachment.	Strictly observe all manual instructions. Chapter 1 "General information"; Chapter 2 "Safety" and Chapter 9 "Operation and maintenance".
5. Risk of high pressure fluid ejection from pipelines in cooling circuit due to accidental bursting.	Contact of body parts with refrigerant gas or parts of cooling circuit pipelines launched at high speed.	Strictly observe all manual instructions. Chapter 2 "Safety" and Chapter 5 "Installation"
6. Risk of high pressure fluid ejection from pipelines in cooling circuit due to design pressure values being exceeded.	Contatto di parti del corpo con gas frigorigeno o residui di tubazione del circuito frigo lanciati ad alta velocità.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance"
7. Risk of high pressure fluid ejection from pipelines in hydraulic circuit due to accidental bursting.	Contact of body parts with fluids or residual parts of hydraulic circuit pipelines launched at high speed.	Disconnect the machine from the electrical mains during interventions on the hydraulic circuit. Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance"
8. Risk of high pressure fluid ejection from pipelines in hydraulic circuit due to design pressure values being exceeded.	Contact of body parts with fluids or residual parts of circuit pipelines launched at high speed.	Depressurise the machine during interventions on the hydraulic circuit. Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance"
9. Electrical hazards due to direct contact with live parts.	Risk of electrocution and burns.	Strictly observe all manual instructions. Chapter 2 "Safety" and 5.6 "Electrical connections"
10. Electrical hazards due to indirect contact with parts that are live due to faults, in particular due to an insulation fault.	Risk of electrocution and burns.	Strictly observe all manual instructions. Chapter 2 "Safety" and 5.6 "Electrical connections"
11. Electrical hazards: electrostatic phenomena.	Uncontrolled movements by victim of electrostatic discharge due to contact	Strictly observe all manual instructions. 5.6 "Electrical connections"

Description of risk:	Effect:	User instructions:
12. Electrical hazard: heat radiations or other phenomena, such as projection of melted particles, and chemical effects deriving from short circuits, overloads.	Risk of electrocution with live parts due to short circuits, scalding on contact with hot components due to overload.	Strictly observe all manual instructions. Chapter 2 "Safety" and 5.6 "Electrical connections"
13. Heat-associated risk: burns and/or scalding	Scalding on contact with pipelines at temperatures over 149°F and/or freezing due to contact with surfaces at temperatures below 32°F.	Strictly observe all manual instructions. Chapter 2 "Safety"
14. Hazards generated by noise levels that may impair hearing capacity (deafness) and other physical disorders (such as loss of balance, consciousness).	Loss of hearing capacity by operator.	Secure all components correctly after interventions and maintenance.
15. Hazards generated by materials or substances handled, used, produced or offloaded from the machine and by materials used to construct the machine: inhalation of refrigerant gases.	Inhalation of refrigerant gas.	Strictly observe all manual instructions. Chapter 2 "Safety"
16. Hazards generated by materials or substances handled, used, produced or offloaded from the machine and materials used to construct the machine: fire or explosion.	Risk of fire or explosion.	Install the system in an environment fitted with adequate fire fighting equipment. Strictly observe all manual instructions. Chapter 5 "Installation"
17. Hazards generated by failure to use personal protective equipment.	Lacerations to upper limbs during maintenance or installation.	Use adequate personal protective equipment and observe all instructions in the manual. Chapter 1 "General information"; Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance"
18. Hazards generated by failure to observe principles of ergonomics during machine design, caused, for example, by: inadequate design, layout or identification of manual controls.	Hazards associated with failure to correctly identify manual controls.	Consult all sections of the manual.
19. Hazards generated by failure to observe principles of ergonomics during machine design, caused, for example, by: inadequate design, or layout/location of visual display units.	Hazards associated with failure to correctly understand visual display units.	Consult all sections of the manual.
20. Inadvertent start-up, overtravel/ unexpected excess speed (or any other similar malfunction) caused by: fault or malfunction of control system.	Electrical or mechanical hazard due to incorrect settings of operating parameters or settings.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation"; 5.6 "Electrical connections" and Chapter 9 "Operation and maintenance"

Description of risk:	Effect:	User instructions:
21. Inadvertent start-up, overtravel/ unexpected excess speed (or any other similar malfunction) caused by: fault or malfunction of control system with possibility of disabling safety devices.	Electrical hazard during interventions on machine with safety devices inhibited.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation"; 5.6 "Electrical connections" and Chapter 9 "Operation and maintenance"
22. Inadvertent start-up, overtravel/ unexpected excess speed (or any other similar malfunction) caused by: fault or malfunction of control system.	Electrical hazards associated with environmental work conditions.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 3 "Technical data" and 5.6 "Electrical connections"
23. Inadvertent start-up, overtravel/ unexpected excess speed (or any other similar malfunction) caused by: return of electric power supply after failure.	Hazards associated with inadvertent start-up of the machine when electric power supply is restored.	Strictly observe all manual instructions. Chapter 2 "Safety"; 5.6 "Electrical connections" and Chapter 6 "Start up"
24. Inadvertent start-up, overtravel/ unexpected excess speed (or any other similar malfunction) caused by external factors on the electrical equipment (EMC).	Electrical hazards associated with electric stress on internal machine components, short circuits and overloads.	Strictly observe all manual instructions. Chapter 2 "Safety"; 5.6 "Electrical connections" and Chapter 9 "Operation and maintenance"
25. Hazards caused by assembly errors.	Hazards associated with machine instability caused by vibrations. Hazards on contact with operating fluids, risk of pollution due to dispersion of fluids into the environment.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 6 "Start up"
26. Risk of falling or projection of objects or fluids.	Contact of body parts with metallic materials such as the fan blades or moving parts of the compressor.	Disconnect the machine from the electrical mains during interventions on the hydraulic circuit. Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation" and Chapter 9 "Operation and maintenance"
27. Loss of stability/upturning of machine.	Crushing of body parts.	Strictly observe all manual instructions. Chapter 5 "Installation" and instructions on packaging.
28. Loss of stability/upturning of machine due to installation on unstable ground and/or vibrations generated on connection pipelines.	Crushing of body parts due to upturning of the machine, contact of body parts with water due to failure of connections to the hydraulic circuit caused by excessive vibrations.	Strictly observe all manual instructions. Chapter 5 "Installation" and Chapter 6 "Start up"
29. Hazards generated by absence of and/or position of measures/ instruments influencing safety: all guards.	Hazard of contact, due to sudden ejections, with machine components and processed or used materials.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation"; Chapter 6 "Start up" and Chapter 9 "Operation and maintenance"
30. Hazards generated by absence of and/or position of measures/ instruments influencing safety: graphic safety signs.	Hazard associated with the lack of or inadequate graphic instruction and warning symbols related to dangers that could not be eliminated in design.	The operator must observe all graphic safety signs on the machine and replace when worn or illegible. Strictly observe all manual instructions. Chapter 1 "General information"
31. Hazards generated by absence of and/or position of measures/ instruments influencing safety: manual.	Hazards associated with incorrect preparation of the manual due to lack of and/or unclear information required to ensure operator safety and safe use of the machine.	Consult all sections of the manual.

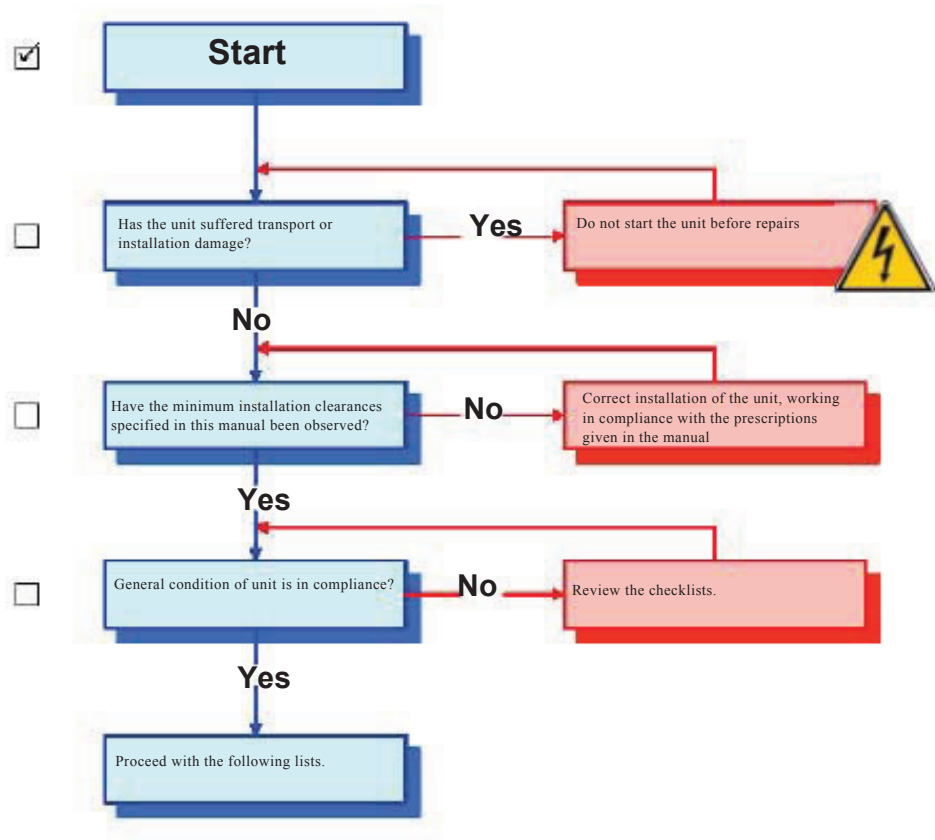
Description of risk:	Effect:	User instructions:
32. Hazards generated by absence of and/or position of measures/instruments influencing safety: disconnection of power sources.	Contact with live parts, contact with high pressure fluids or gas.	Strictly observe all manual instructions. Chapter 2 "Safety" and 5.6 "Electrical connections"
33. Hazards generated by absence of and/or position of measures/instruments influencing safety: instruments and accessories for adjustments and/or maintenance in safety conditions.	Hazard of cutting, ejection of fluids or gas at high pressure, scalding, or vibrations caused by incorrect maintenance.	Strictly observe all manual instructions. Chapter 2 "Safety"; Chapter 5 "Installation"; Chapter 9 "Operation and maintenance"

APPENDIX

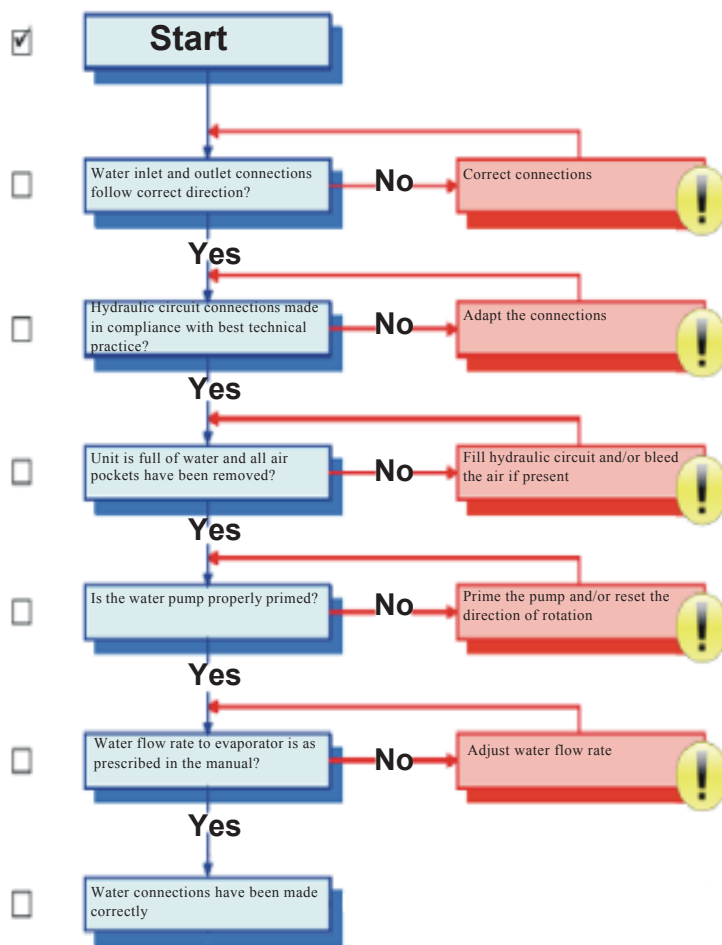
GENERAL CONDITIONS CHECKLIST

WARNING

 **DO NOT POWER ON THE UNIT!**



HYDRAULIC CIRCUIT CHECKLIST



The data in this manual are not binding and may be changed by the manufacturer without notice. **Reproduction of this manual is strictly prohibited**

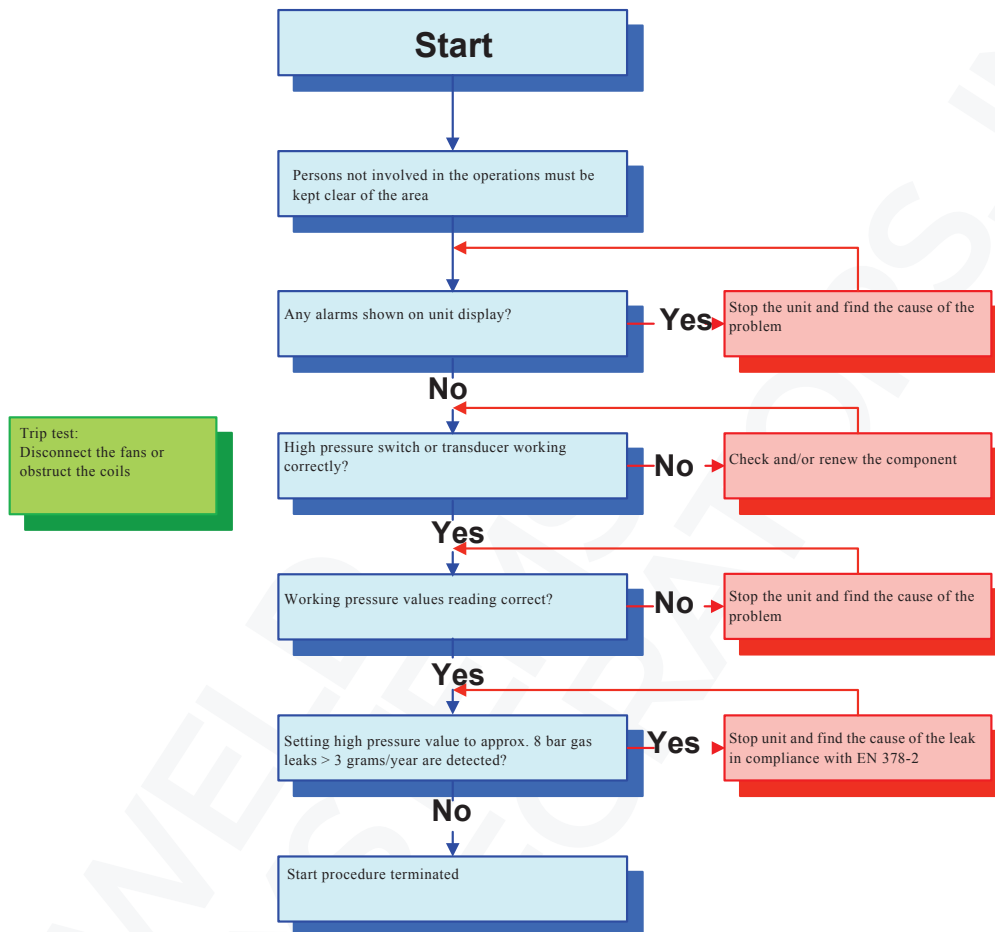
- Appendix

CONTROLLER CHECKLIST



The data in this manual are not binding and may be changed by the manufacturer without notice. **Reproduction of this manual is strictly prohibited**

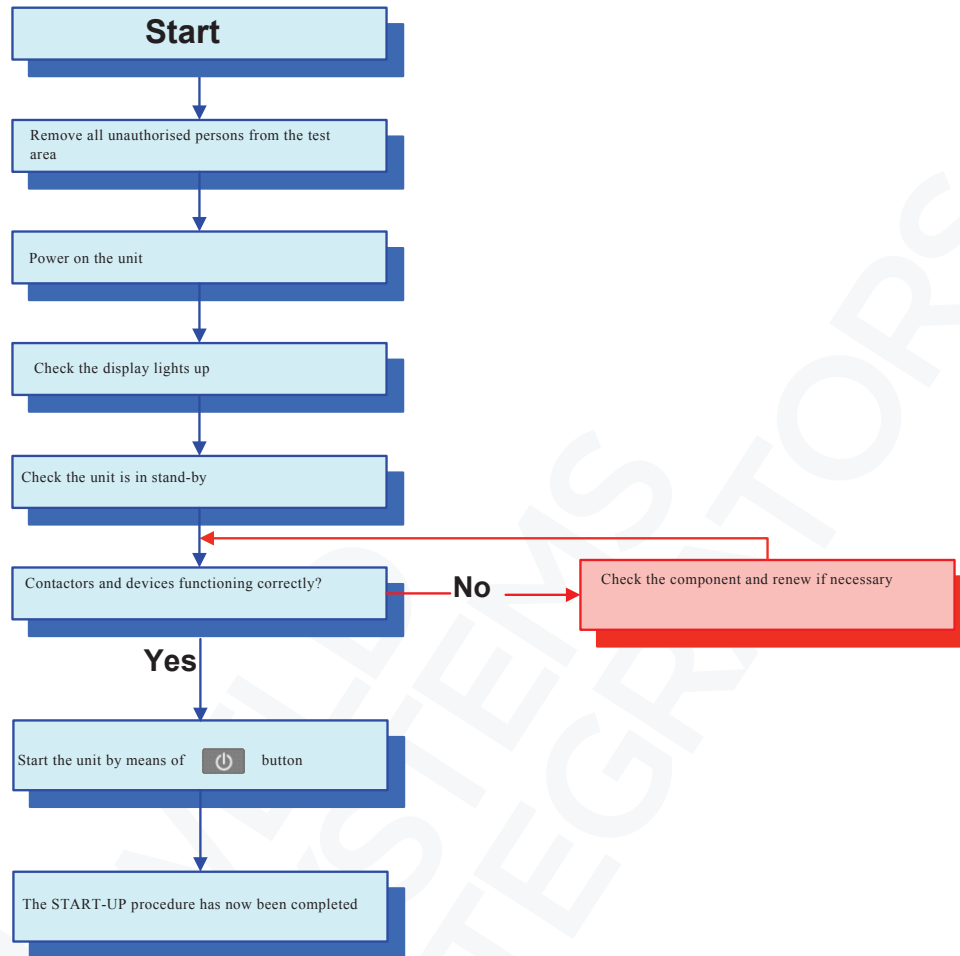
FIRST START CHECKLIST



The data in this manual are not binding and may be changed by the manufacturer without notice. **Reproduction of this manual is strictly prohibited**

- Appendix

UNIT RUNNING CHECKLIST



The data in this manual are not binding and may be changed by the manufacturer without notice. **Reproduction of this manual is strictly prohibited**