

E15, E16, E17, E17.5, E18
E18.5, E19, E20, E21, E22

Instruction book

Original instructions

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This instruction book is valid for CE as well as non-CE labelled machines. It meets the requirements for instructions specified by the applicable European directives as identified in the Declaration of Conformity.

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1 Safety precautions

1.1 Safety icons

Explanation

	Danger to life
	Warning
	Important note

1.2 Safety precautions, general

General precautions

1. The operator must employ safe working practices and observe all related work safety requirements and regulations.
2. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
3. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel.
4. The dryer is not considered capable of producing air of breathing quality. For air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
5. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the dryer, press the emergency stop button, switch off the voltage and depressurize the dryer. In addition, the power isolating switch must be opened and locked.
6. Never play with compressed air. Do not apply the air to your skin or direct an air stream at people. Never use the air to clean dirt from your clothes. When using the air to clean equipment, do so with extreme caution and wear eye protection.
7. The owner is responsible for maintaining the unit in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
8. It is not allowed to walk or stand on the roof of the dryer canopy.

1.3 Safety precautions during installation



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during installation

1. The machine must only be lifted using suitable equipment in accordance with the applicable safety regulations. Loose or pivoting parts must be securely fastened before lifting. It is strictly forbidden to dwell or stay in the risk zone under a lifted load. Lifting acceleration and deceleration must be kept within safe limits. Wear a safety helmet when working in the area of overhead or lifting equipment.
2. The unit is designed for indoor use. If the unit is installed outdoors, special precautions must be taken; consult the manufacturer.
3. Place the machine where the ambient air is as cool and clean as possible. If necessary, install a suction duct. Never obstruct the air inlet. Care must be taken to minimize the entry of moisture at the inlet air.
4. Any blanking flanges, plugs, caps and desiccant bags must be removed before connecting the pipes.
5. Air hoses must be of correct size and suitable for the working pressure. Never use frayed, damaged or worn hoses. Distribution pipes and connections must be of the correct size and suitable for the working pressure.
6. The aspirated air must be free of flammable fumes, vapors and particles, e.g. paint solvents, that can lead to internal fire or explosion.
7. Arrange the air intake so that loose clothing worn by people cannot be sucked in.
8. Ensure that the discharge pipe from the dryer to the air net is free to expand under heat and that it is not in contact with or close to flammable materials.
9. No external force may be exerted on the air outlet valve; the connected pipe must be free of strain.
10. If remote control is installed, the machine must bear a clear sign stating:
DANGER: This machine is remotely controlled and may start without warning.
 The operator has to make sure that the machine is stopped and that the isolating switch is open and locked before any maintenance or repair. As a further safeguard, persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the start equipment.
11. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted air does not recirculate to the air inlet or cooling air inlet.
12. The electrical connections must correspond to the applicable codes. The machines must be earthed and protected against short circuits by fuses in all phases. A lockable power isolating switch must be installed near the dryer.
13. On machines with automatic start-stop system or if the automatic restart function after voltage failure is activated, a sign stating "This machine may start without warning" must be affixed near the instrument panel.

14. Never remove or tamper with the safety devices, guards or insulation fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure must be protected by a pressure-relieving device or devices as required.
15. Pipework or other parts with a temperature in excess of 80°C (176°F) and which may be accidentally touched by personnel in normal operation must be guarded or insulated. Other high-temperature pipework must be clearly marked.
16. For water-cooled machines, the cooling water system installed outside the machine has to be protected by a safety device with set pressure according to the maximum cooling water inlet pressure.
If the ground is not level or can be subject to variable inclination, consult the manufacturer.



Also consult following safety precautions: [Safety precautions during operation](#) and [Safety precautions during maintenance](#).

These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.4 Safety precautions during operation



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during operation

1. Never touch any piping or components of the machine during operation.
2. Use only the correct type and size of hose end fittings and connections. When blowing through a hose or air line, ensure that the open end is held securely. A free end will whip and may cause injury. Make sure that a hose is fully depressurized before disconnecting it.
3. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
4. Never operate the machine when there is a possibility of taking in flammable or toxic fumes, vapors or particles.
5. Never operate the machine below or in excess of its limit ratings.
6. Keep all bodywork doors shut during operation. The doors may be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when opening a door.
7. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
8. Periodically check that:
 - All guards are in place and securely fastened
 - All hoses and/or pipes inside the machine are in good condition, secure and not rubbing
 - There are no leaks
 - All fasteners are tight
 - All electrical leads are secure and in good order
 - Safety valves and other pressure-relief devices are not obstructed by dirt or paint
 - Air outlet valve and air net, i.e. pipes, couplings, manifolds, valves, hoses, etc. are in good repair, free of wear or abuse
9. If warm cooling air from dryers is used in air heating systems, e.g. to warm up a workroom, take precautions against air pollution and possible contamination of the breathing air.
10. Do not remove any of, or tamper with, the sound-damping material.
11. Never remove or tamper with the safety devices, guards or insulations fitted on the machine. Every pressure vessel or auxiliary installed outside the machine to contain air above atmospheric pressure shall be protected by a pressure-relieving device or devices as required



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during maintenance](#).

These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

Safety precautions

It is important to follow all regulations regarding the use of radio equipment, in particular regarding the possibility of radio frequency (RF) interference. Please follow the safety advice given below carefully.

- Respect restrictions on the use of radio equipment in fuel depots, chemical plants or other explosive environments.
- Avoid operation close to inadequately protected personal medical devices such as hearing aids and pacemakers. Consult the manufacturers of the medical device to determine if it is adequately protected.
- Avoid operation close to other electronic equipment which may also cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturer recommendations.
- Respect a distance from the human body of at least 20 cm (8 inch) during operation.
- Do not operate the device in areas where cellular modems are not advised without proper device certifications. These areas include environments where cellular radio can interfere, such as explosive atmospheres, medical equipment, or any other equipment which may be susceptible to any form of radio interference. The modem can transmit signals that could interfere with this equipment.

1.5 Safety precautions during maintenance or repair



All responsibility for any damage or injury resulting from neglecting these precautions, or non-observance of the normal caution and care required for installation, operation, maintenance and repair, even if not expressly stated, will be disclaimed by the manufacturer.

Precautions during maintenance or repair

1. Always use the correct safety equipment (such as safety glasses, gloves, safety shoes, etc.).
2. Use only the correct tools for maintenance and repair work.
3. Use only genuine spare parts.
4. All maintenance work shall only be undertaken when the machine has cooled down.
5. A warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment.
6. Persons switching on remotely controlled machines shall take adequate precautions to ensure that there is no one checking or working on the machine. To this end, a suitable notice shall be affixed to the remote start equipment.
7. Close the dryer air outlet valve before connecting or disconnecting a pipe.
8. Before removing any pressurized component, effectively isolate the machine from all sources of pressure and relieve the entire system of pressure.
9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapors of cleaning liquids.
10. Scrupulously observe cleanliness during maintenance and repair. Keep dirt away by covering the parts and exposed openings with a clean cloth, paper or tape.
11. Never weld on, or in any way modify, pressure vessels.
12. Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of the oil vapor when air is admitted.
13. Never use a light source with open flame for inspecting the interior of a machine, pressure vessel, etc.
14. Make sure that no tools, loose parts or rags are left in or on the machine.
15. All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action.
16. Before clearing the machine for use after maintenance or overhaul, check that operating pressures, temperatures and time settings are correct. Check that all control and shut-down devices are fitted and that they function correctly.
17. Protect the motor, electrical and regulating components, etc. to prevent moisture from entering them.
18. Make sure that all sound-damping material and vibration dampers, e.g. damping material on the bodywork, is in good condition. If damaged, replace it by genuine material from the manufacturer to prevent the sound pressure level from increasing.
19. Never use caustic solvents which can damage materials of the air net, e.g. polycarbonate bowls.

20. The following safety precautions are stressed when handling refrigerant:

- Never inhale refrigerant vapours. Check that the working area is adequately ventilated; if required, use breathing protection.
- Always wear special gloves. In case of refrigerant contact with the skin, rinse the skin with water. If liquid refrigerant contacts the skin through clothing, never tear off or remove the latter; flush abundantly with fresh water over the clothing until all refrigerant is flushed away; then seek medical first aid.



Also consult following safety precautions: [Safety precautions during installation](#) and [Safety precautions during operation](#).

These precautions apply to machinery processing or consuming air or inert gas. Processing of any other gas requires additional safety precautions typical to the application which are not included herein.

Some precautions are general and cover several machine types and equipment; hence some statements may not apply to your machine.

1.6 Dismantling and disposal

Dismantling

Once the end of life of the machine is reached, please follow next steps:

1. Stop the machine.
2. Check all safety precautions mentioned in the previous chapters to secure safe handling (e.g. LOTO, cool-down, depressurize, discharge, ...).
3. Separate the harmful from the safe components (e.g. drain oil from oil containing parts).
4. Refer to the disposal topic mentioned below.

Disposal of electrical and electronic appliances (WEEE)

This equipment falls under the provisions of the European Directive 2012/19/EU on waste electrical and electronic appliances (WEEE) and may not be disposed as unsorted waste.



The equipment is labelled in accordance with the European Directive 2012/19/EU with the crossed-out wheeled bin symbol.

At the end of life-time of the electric and electronic equipment (EEE) it must be taken to separate collection.

For more information check with your local waste authority, customer center or distributor.

Disposal of other used material

Used filters or any other used material (e.g. desiccant, lubricants, cleaning rags, machine parts, etc.) must be disposed of in an environmentally friendly and safe manner, and in line with the local recommendations and environmental legislation.

2 General description

2.1 Introduction

General overview

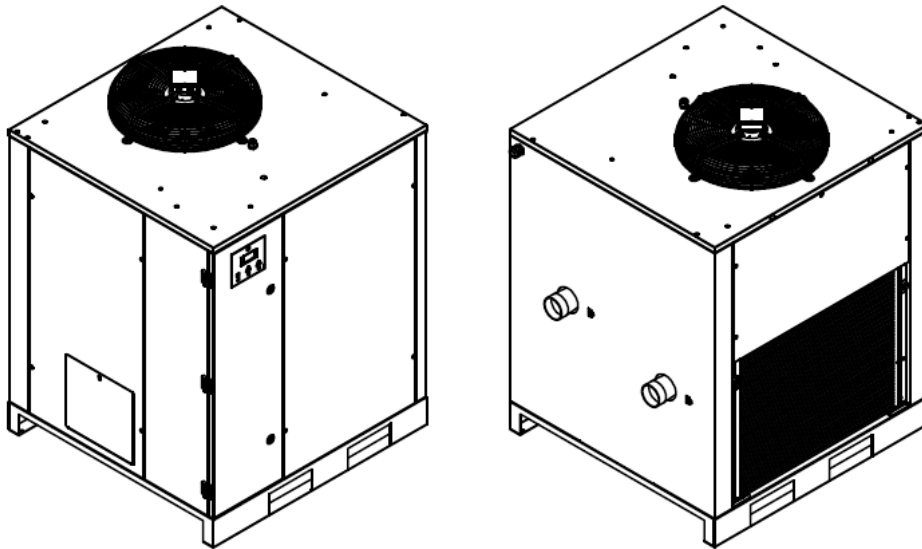


Fig.1a - E15

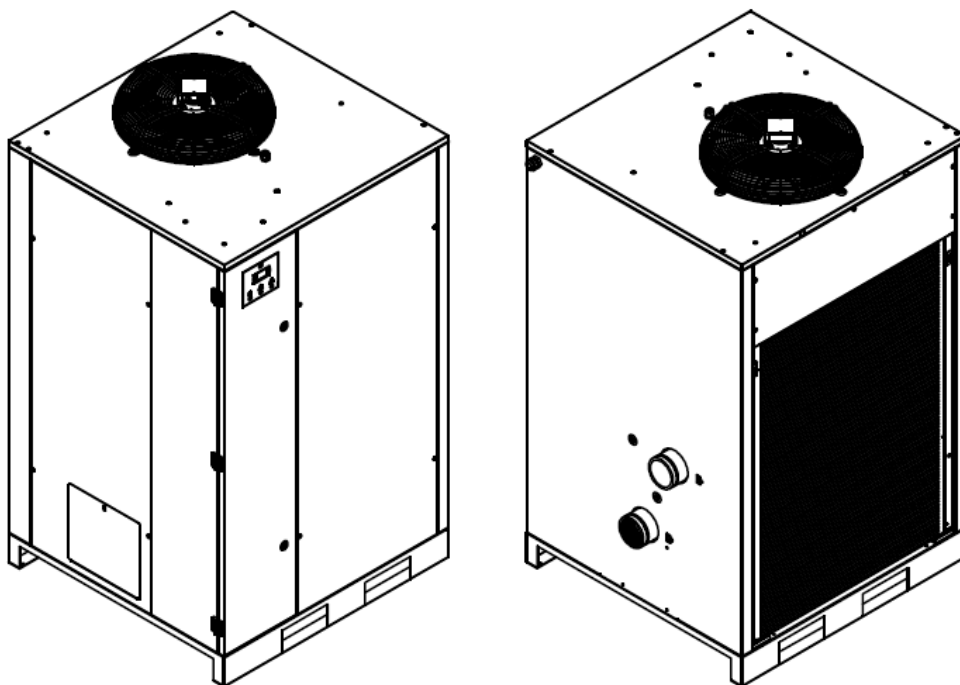


Fig.1b - E16-E17-E17.5

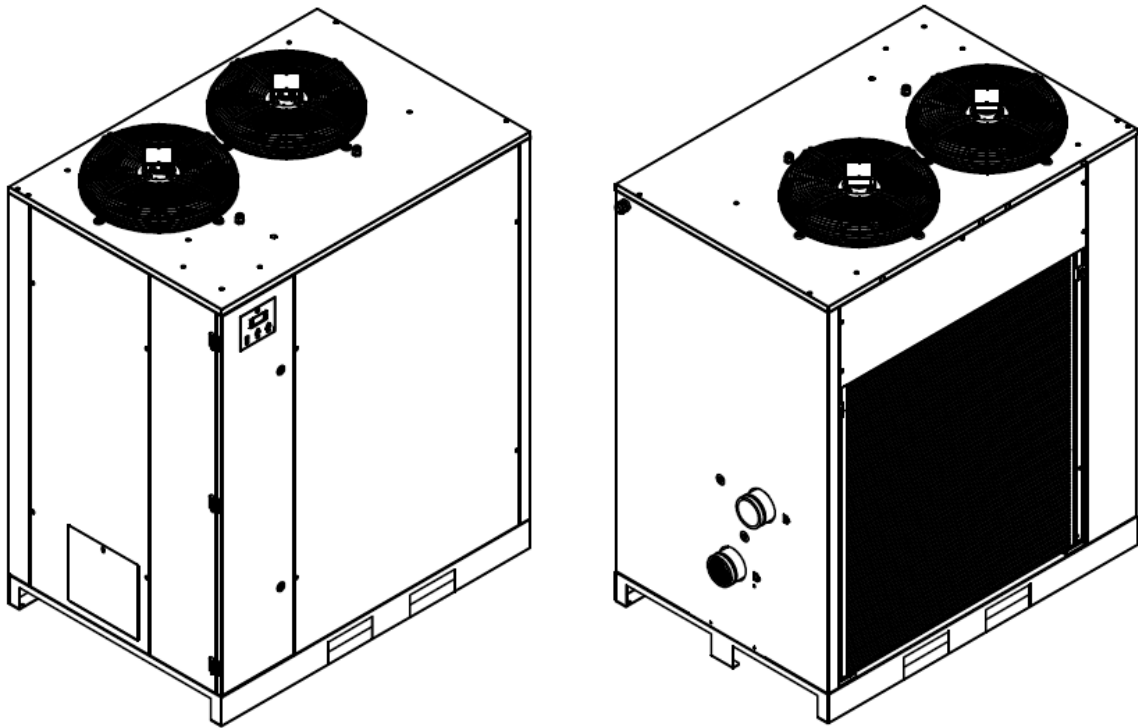


Fig.1c - E18-E18.5-E19

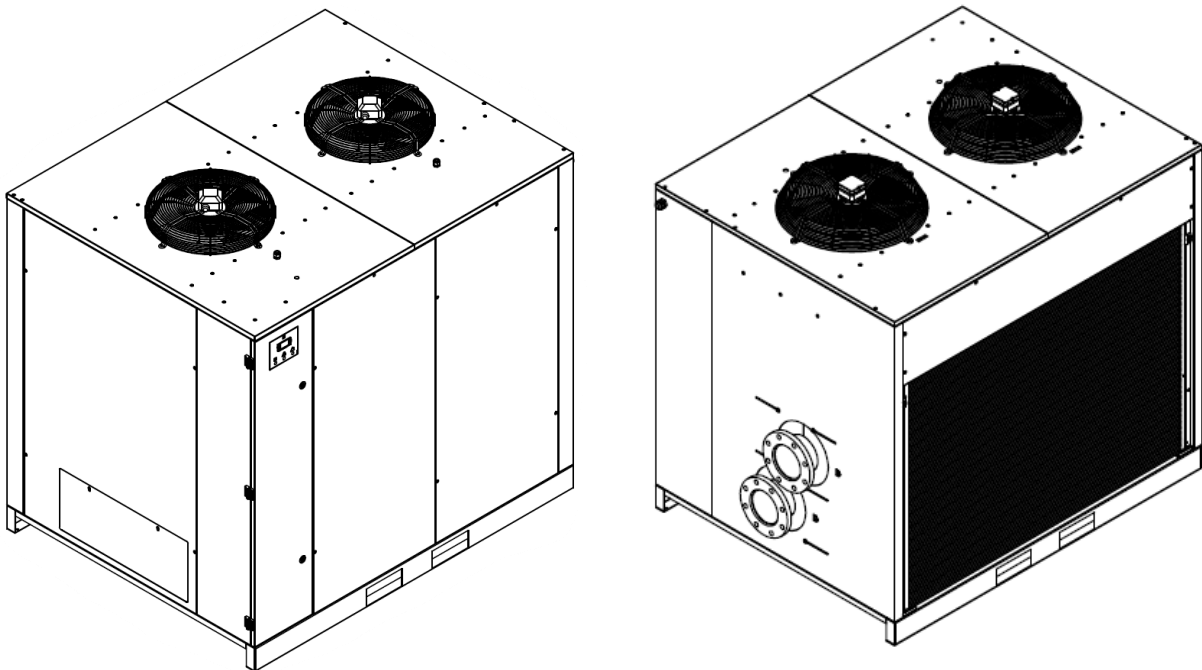


Fig.1d - E20-E21-E22

Description

The air dryer removes moisture from compressed air by cooling it near the freezing point. This causes water to condense. The condensate is automatically drained. The air is warmed up before leaving the dryer (approx. 5°C / 9°F below the incoming air temperature).

2.2 Intended use

The dryer is designed to dry the compressed air for industrial use. The dryer cannot be used in premises where there is a risk of fire or explosion or in which substances dangerous to safety can be released into the environment (for example: solvents, inflammable vapours, alcohol, etc.).

In particular the appliance cannot be used to produce breathable air by the humans or in applications in direct contact with food products. These uses are allowed only if the compressed air produced is filtered with the aid of an adequate filtering system (Consult the manufacturer for these special uses).

This appliance must be used only for the purpose for which it was specifically designed. All other uses are to be considered incorrect and therefore unreasonable. The Manufacturer cannot be considered responsible for any damage resulting from improper, incorrect or unreasonable use.

2.3 Operation

Compressed air

Compressed air enters the heat exchanger (10) and is pre-cooled by the outgoing cold and dry air. In this phase, part of the water contained in the incoming air starts to condense. The air then passes through the heat exchanger/evaporator (4) where it transfers heat to the refrigerant gas during its evaporation process: in this way, the air is further cooled down close to the temperature of the evaporating refrigerant. This results in an additional condensing process. The cold air then passes through the separator (5) where all the condensate is separated and is discharged through the automatic drain (15). The dry and cold air finally passes through the heat exchanger (10) where it is heated by the incoming air to about 5°C / 9°F below the inlet air temperature.

Refrigerant gas

The gaseous refrigerant coming from the evaporator (4) is sucked by the refrigerant compressor (1) after passing through a liquid separator (14) and is pumped into the condenser (2). The models from E17.5 are equipped with an oil separator (16) downstream the refrigerant compressor, which has the function of separating the gaseous refrigerant from the lubricating oil contained in the compressor. The collected oil is then injected upstream the liquid separator (14) to be recovered inside the compressor and thus ensure proper lubrication.

Gas condensation occurs in the condenser (2) with the possible help of one or two fans (3). The condensed refrigerant then passes through the dehydration filter (8) and a liquid sight glass (17). Finally, it is expanded through the thermostatic expansion valve (7) and injected into the evaporator, where it produces the desired refrigerating effect. Thanks to

the counter-current heat exchange with the compressed air, the refrigerant evaporates and returns to the compressor, where a new cycle begins.

The circuit is equipped with a bypass system for the refrigerant; this intervenes to adjust the available refrigerating capacity to the actual cooling load. This is achieved by injecting hot gas under the control of one or more valves (9) which keep the refrigerant pressure constant in the evaporator. Therefore, the dew point never drops below 0°C (32°F), thus preventing the condensate from freezing inside the evaporator. The dryer works fully automatically.

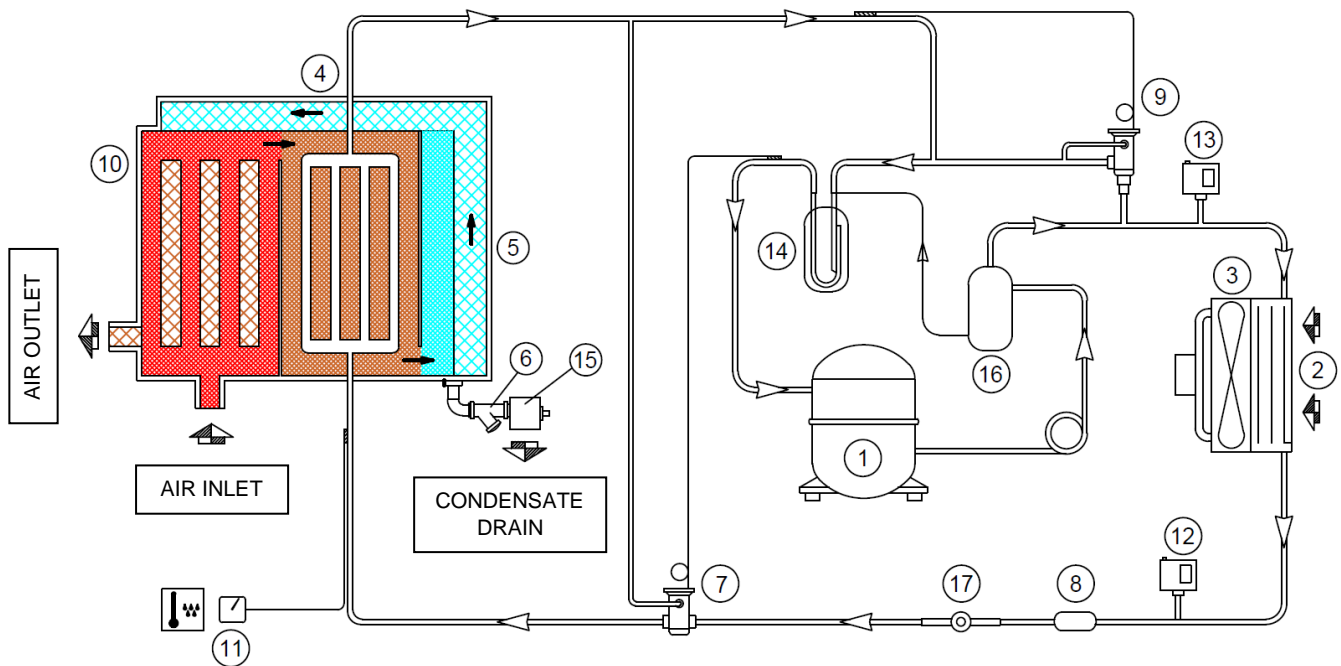


Fig.2

(1) Refrigerant compressor	(10) Air-air exchanger
(2) Refrigerant condenser	(11) Dew point indicator
(3) Fan motor(s)	(12) Fan pressure switch
(4) Evaporator	(13) High pressure switch
(5) Separator	(14) Liquid separator
(6) Impurity trap	(15) Condensate discharge drain(s)
(7) Thermostatic expansion valve(s)	(16) Oil separator
(8) Refrigerant filter	(17) Sight glass
(9) Hot gas by-pass valve(s)	

2.4 General Safety Standard








The appliance may be used only by specially trained and authorized personnel.

Any tampering with the machine or alterations not approved beforehand by the Manufacturer relieve the latter of responsibility for any damage resulting from the above actions.








The removal of or tampering with the safety devices constitutes a violation of the European Standards on safety.

ALL WORK ON THE ELECTRIC PLANT, HOWEVER SLIGHT, MUST BE CARRIED OUT BY PROFESSIONALLY SKILLED PERSONNEL.

2.5 Description of danger signals

					 
1) Dangerous electric voltage	2) Air not fit for breathing	3) High pressure	4) Fan rotating	5) Hot parts	6) Refrigerant gas

2.6 Danger zones

(1) 	(2) 	(3) 	(4) 	(5) 	(6)  
Risks present in the whole machine					

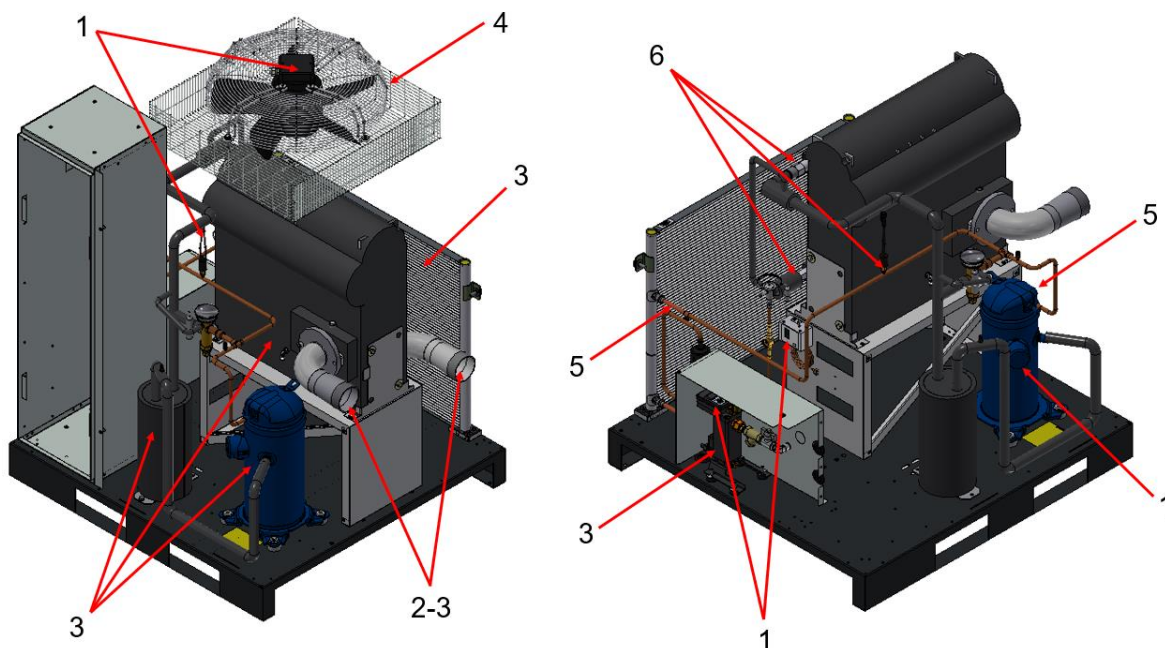


Fig.3a - E15

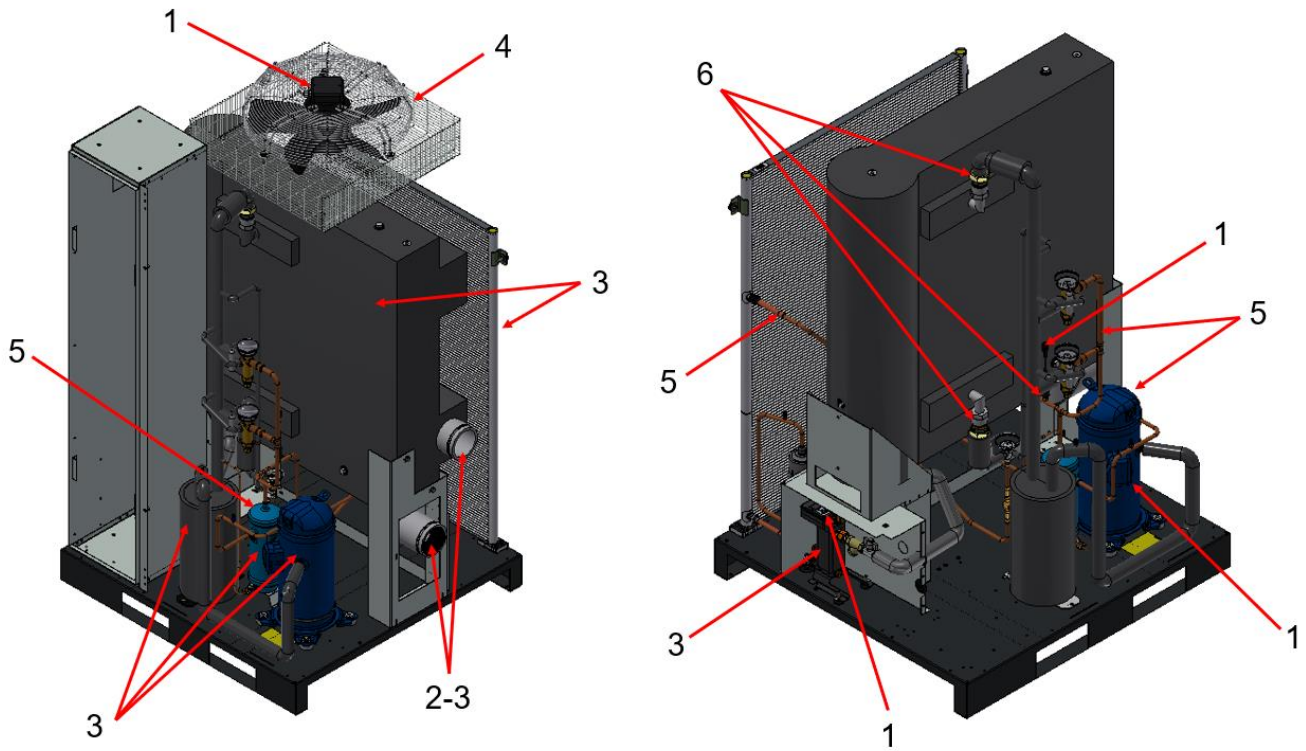


Fig.3b - E16-E17-E17.5

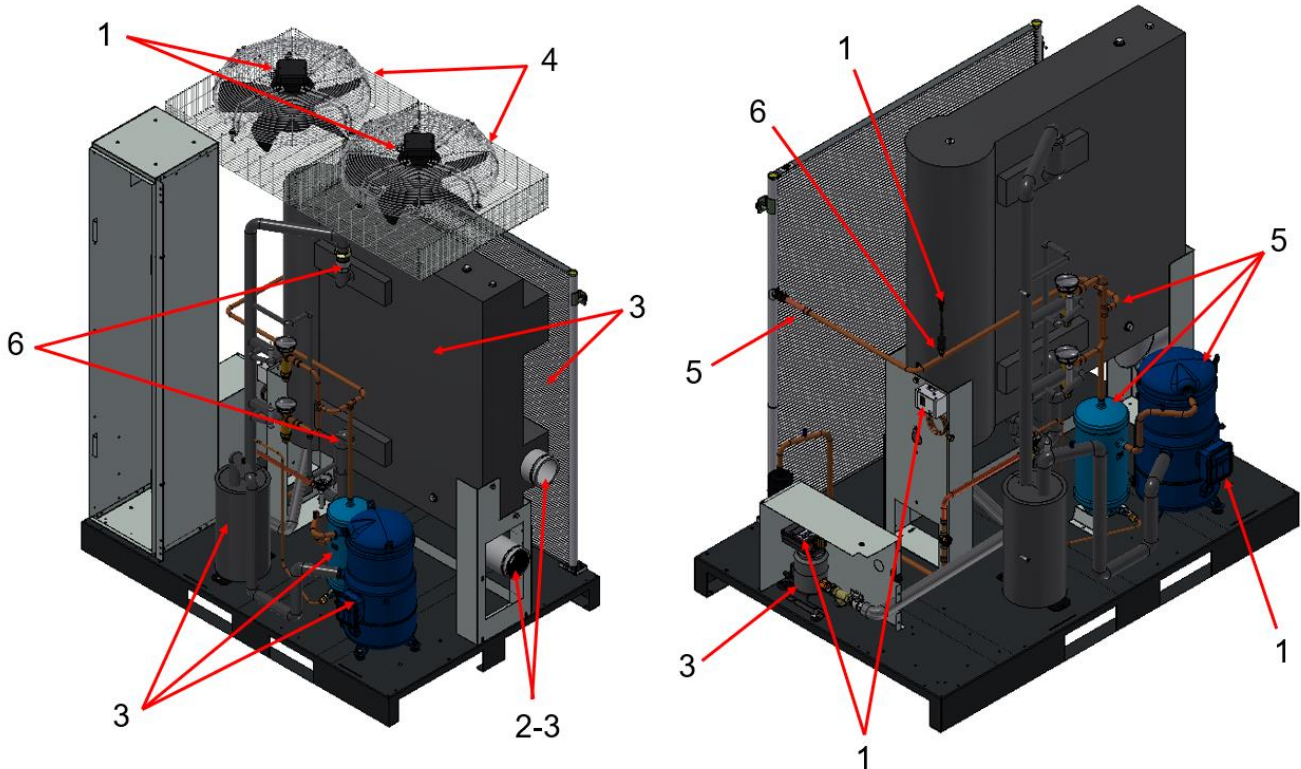


Fig.3c - E18-E18.5-E19

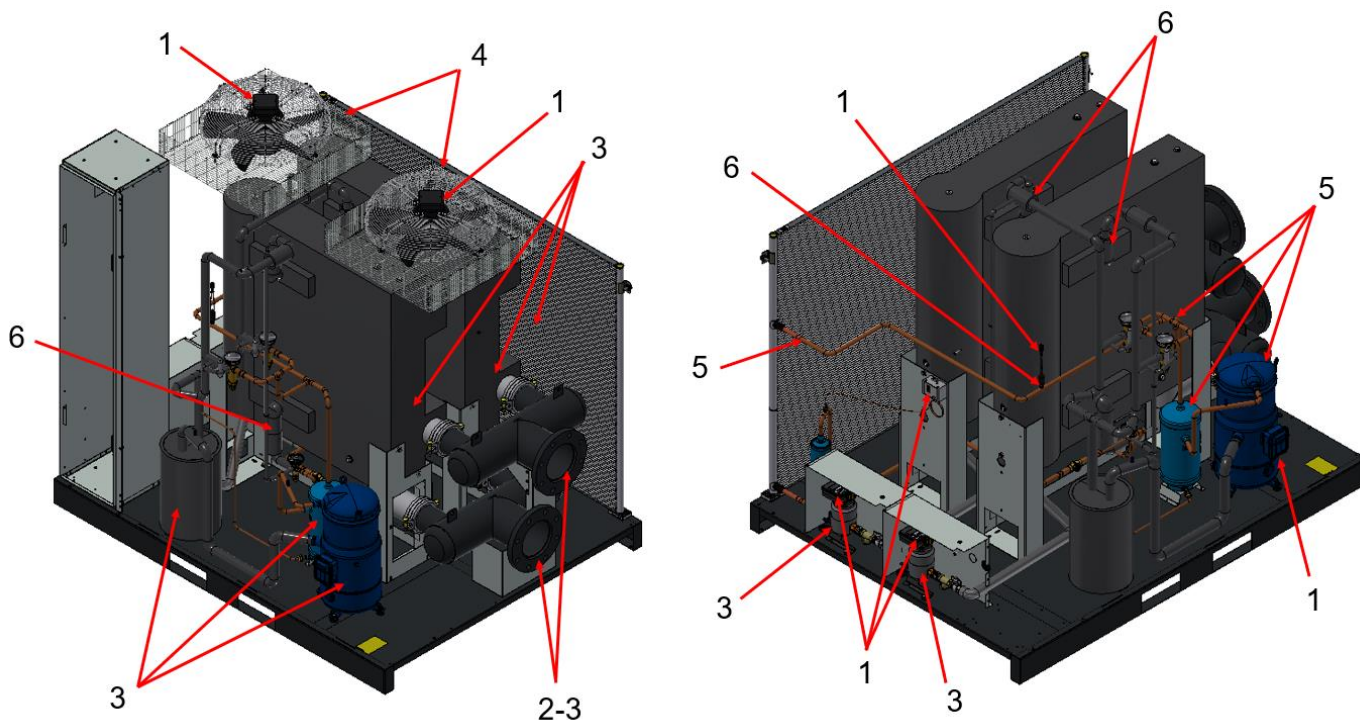



Fig.3d - E20-21-22


3 Installation

	Before proceeding with the installation, consult the following precautions: Safety precautions during installation
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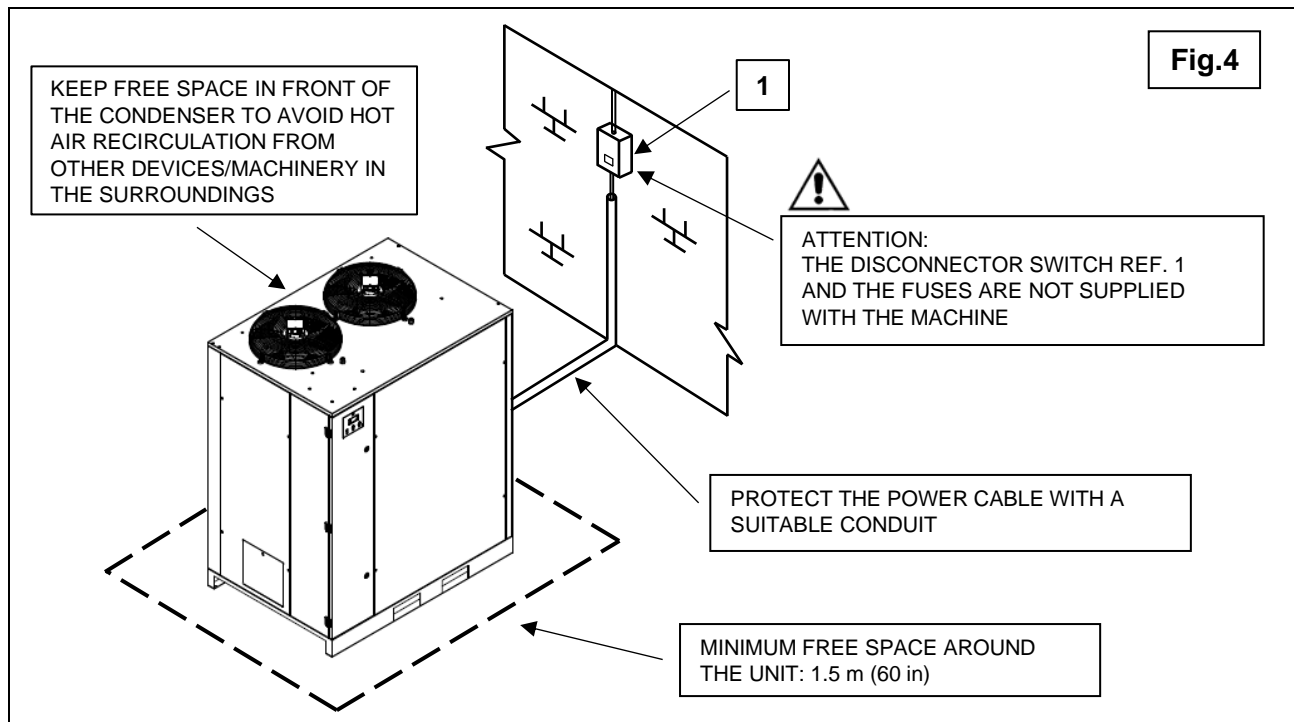
Positioning

The dryer must be installed on a horizontal floor suitable to support its weight (see section “Technical data”). After unpacking the unit and preparing the dryer room, position the machine ensuring that there is sufficient space to allow maintenance (see Fig.4).

	Use a forklift truck to move the dryer. Do not use chains or metal cables for lifting the unit. Move the dryer carefully: violent falls can damage parts of the machine and compromise its operation.
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	Ensure that the operator can see the whole machine from the control panel and check for any unauthorized personnel in the proximity of the machine.
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The packaging material (plastic bags, polystyrene foam, nails, screws, wood, metal straps, etc.) must not be left within the reach of children or abandoned in the environment, as they are a potential source of danger and pollution. Dispose of these materials in approved collection centers.



Ventilation

The choice of an appropriate installation room will extend the dryer lifetime:

- Keep ambient conditions (temperature and humidity) stable in the dryer room to avoid the refrigerant compressor overload and a reduced dryer/fan performance.
- Ensure the proper composition & quality of the air inside the dryer room:
 - Clean without dangerous pollutants (e.g. dust, fibers, fine sand);
 - Without explosive or chemically unstable gases or vapours;
 - Without acid / alkaline substances that may allow the formation of ammonia, chlorine or hydrogen sulphide.
- Avoid that the hot cooling air discharged by the dryer does not recirculate towards the condenser intake of the unit itself or other units nearby.

Connection to the compressed air network

All pipes should be installed stress-free to the dryer unit. All pipes should be installed so that there is no obstruction accessing the unit through the removable panels.

Use manual shut-off valves (Ref.1, Fig.5) between the machine and the compressed air network to isolate the dryer during maintenance operations.

All refrigerant dryers shall be equipped with proper pre-filter at closest position to dryer air inlet (to be replaced according to the service plan: once per year or even before in case of particular high humidity ambient conditions).



Any damage related to the noncompliance with the indications mentioned above will not be attributable to the manufacturer and may cause the expiration of the warranty conditions.

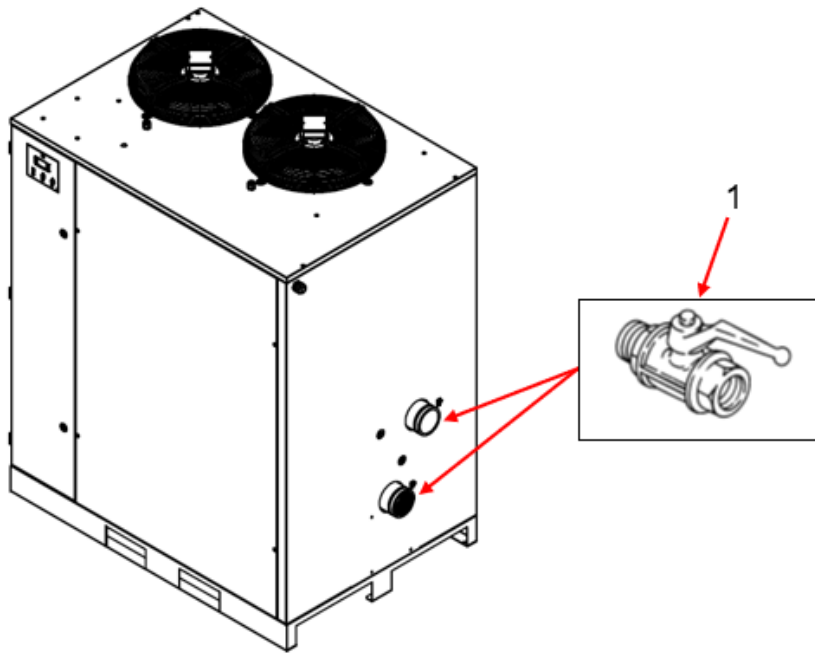


Fig.5

Air connections

The dryer models in the E16-E19 range are equipped with couplings (2) and threaded adapters (E16-E17) / flanged adapters (E17.5-E18-E18.5-E19) (3) supplied with the machine (Fig. 6).

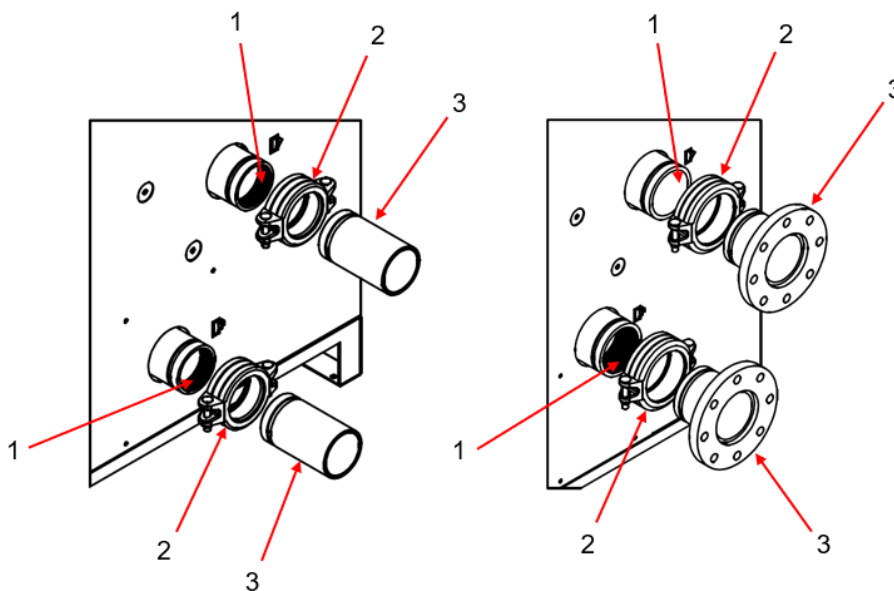



Fig.6



Before proceeding with the installation, consult the following precautions:
[Safety precautions, general](#) and [Safety precautions during installation](#)

Attention: do NOT use the female threads on the evaporator air connections (1) to connect the unit to the compressed air network.

The correct joint assembly (2) is achieved when the metal-to-metal contact occurs at the bolt pads of the two shells and the oval neck of each bolt seats proper in the bolt hole. DO NOT continue to tighten the nuts after the visual metal-to-metal bolt pad inspection requirement is achieved.

	<p>Improperly assembled joints shall be fixed before pressurizing the system. The manufacturer declines all responsibility for the consequences caused by the incorrect assembly of the couplings and adapters.</p>
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Condensate drain hose connection

The condensate drain must be led outside the machine through the opening provided in the base frame (Ref.2, Fig.7) by means of a flexible pipe that may be inspected if necessary.

Attention: the installation of the condensate drain pipe is responsibility of the end customer.

The condensate is discharged at the same pressure as the compressed air in the system: use a pipe suitable for the purpose, properly fixed to the drain, adequately sized for the working pressure and whose material is compatible with the condensate contact.

Attention: the condensate generated by the cooling of the compressed air may contain oil. Disposal and drainage must comply with all applicable regulations in the country of installation.

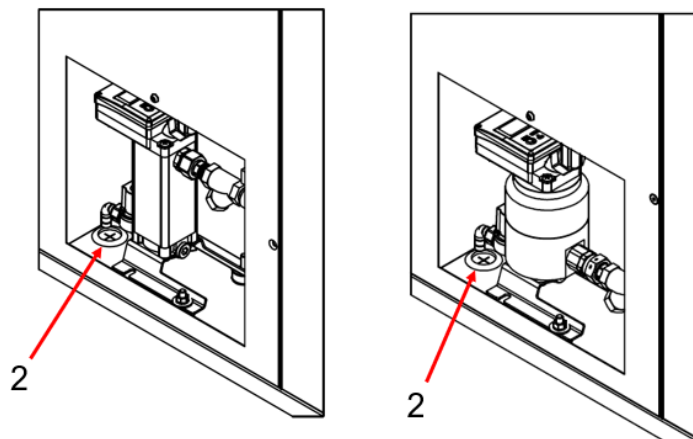
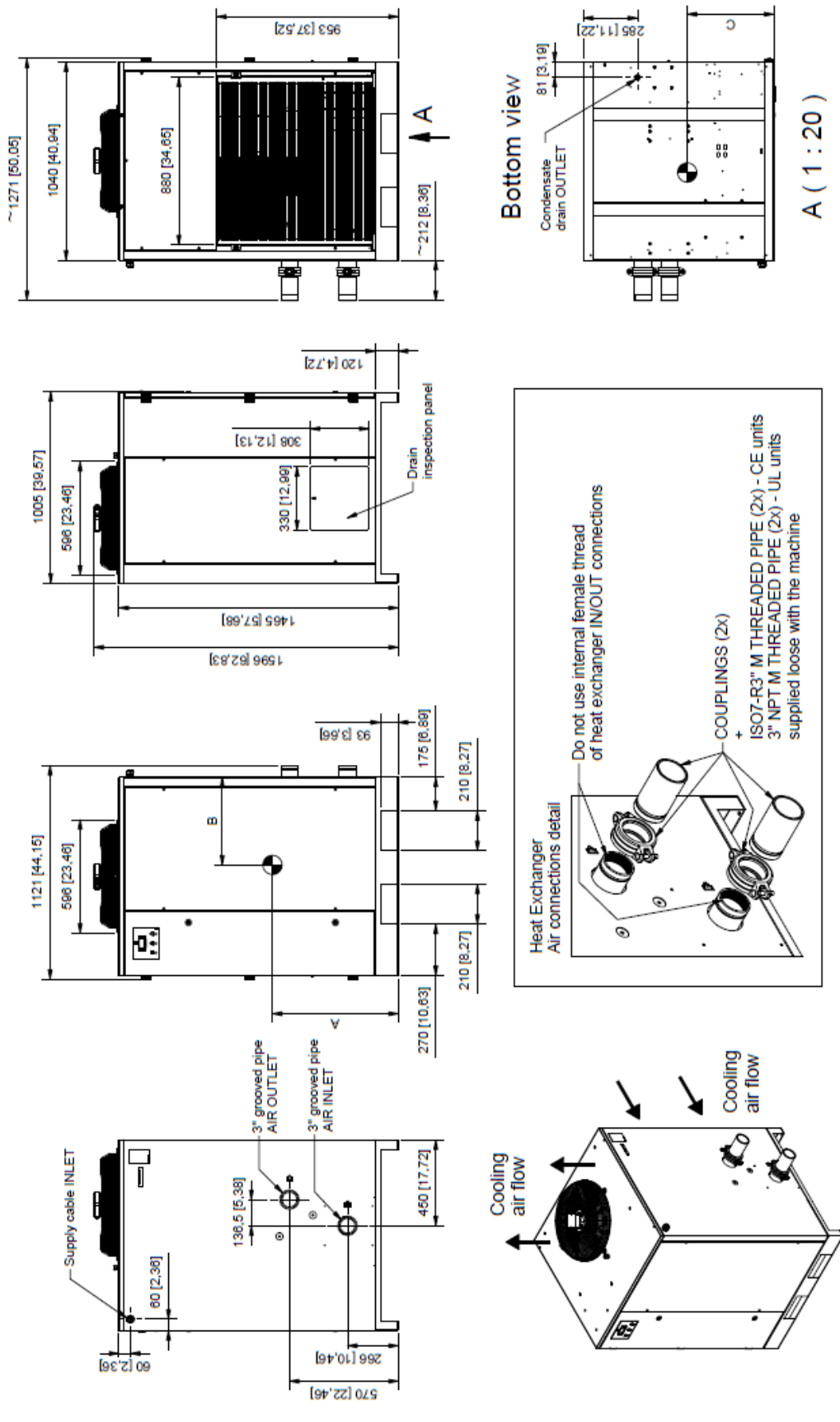


Fig.7

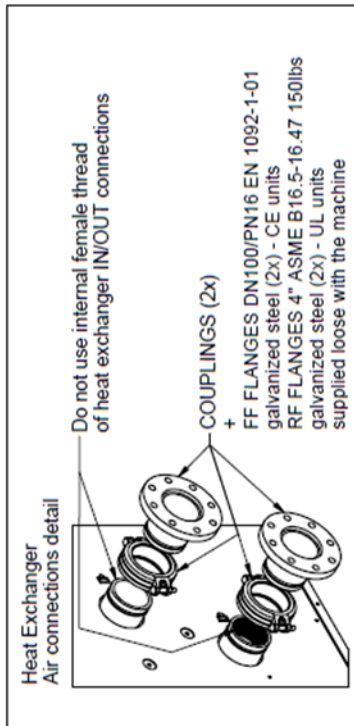
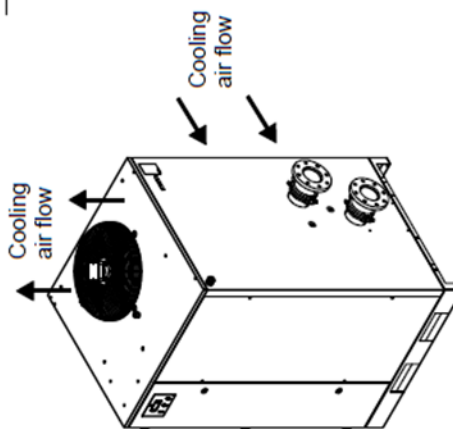
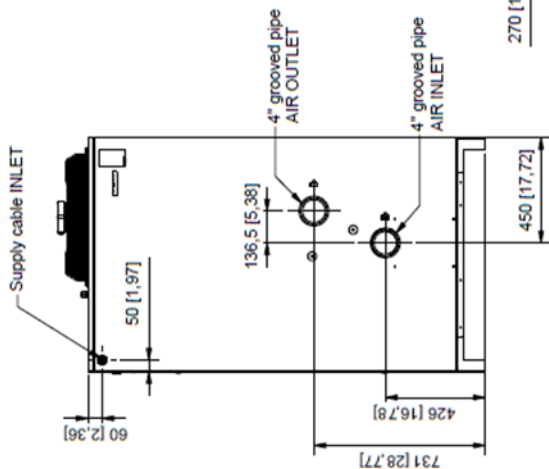
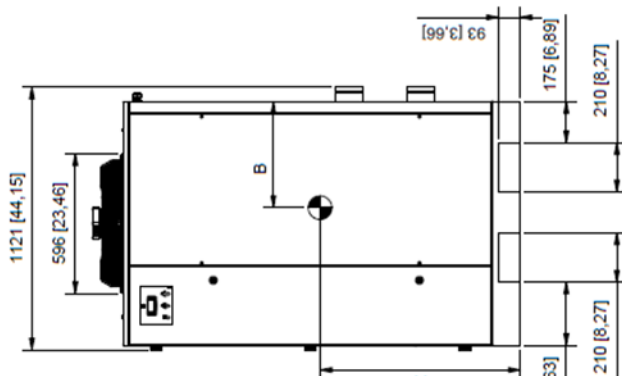
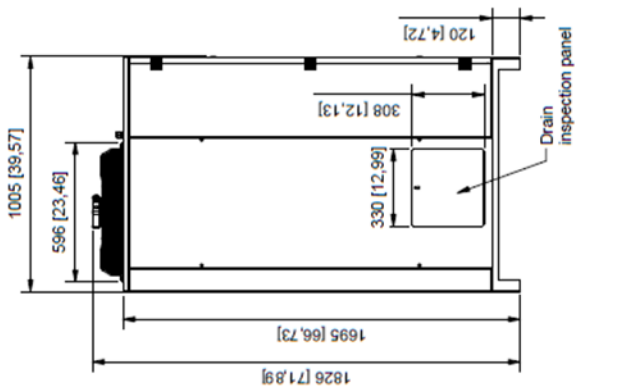
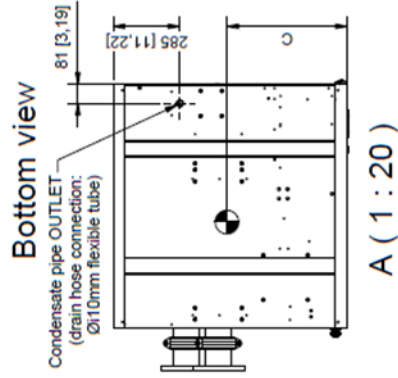
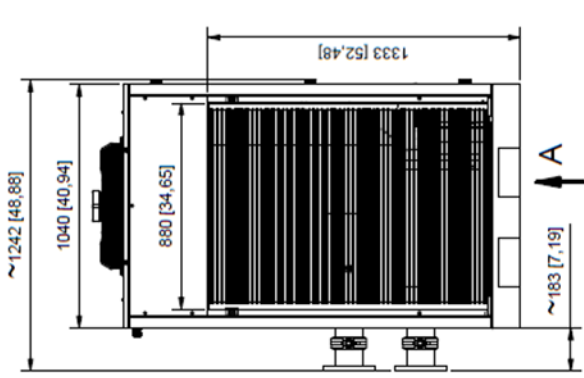


Weights and quotes (mm [inch]) - approx.

Dryer	Variant	A	B	C	Weight
E16	400V / 480V / 380V	668 [26.30]	448 [17.64]	467 [17.99]	325 kg / 717 lb
E16	575V	652 [25.67]	462 [18.19]	448 [17.64]	335 kg / 739 lb
E17	400V / 480V / 380V	874 [26.54]	466 [17.96]	460 [18.11]	338 kg / 745 lb
E17	575V	658 [25.91]	468 [18.43]	462 [17.90]	348 kg / 767 lb

● Centre of gravity
All dimensions: mm [inch]

Fig.8b - E16-E17



Centre of gravity
All dimensions: mm [inch]

Weights and quotes (mm [inch]) - approx.					
Dryer	Variant	A	B	C	Weight
E17.5	400V / 460V / 380V	797 [31,38]	491 [19,33]	465 [18,31]	390 kg / 860 lb
E17.5	575V	780 [30,71]	501 [19,72]	458 [18,03]	400 kg / 882 lb

Fig.8c - E17.5

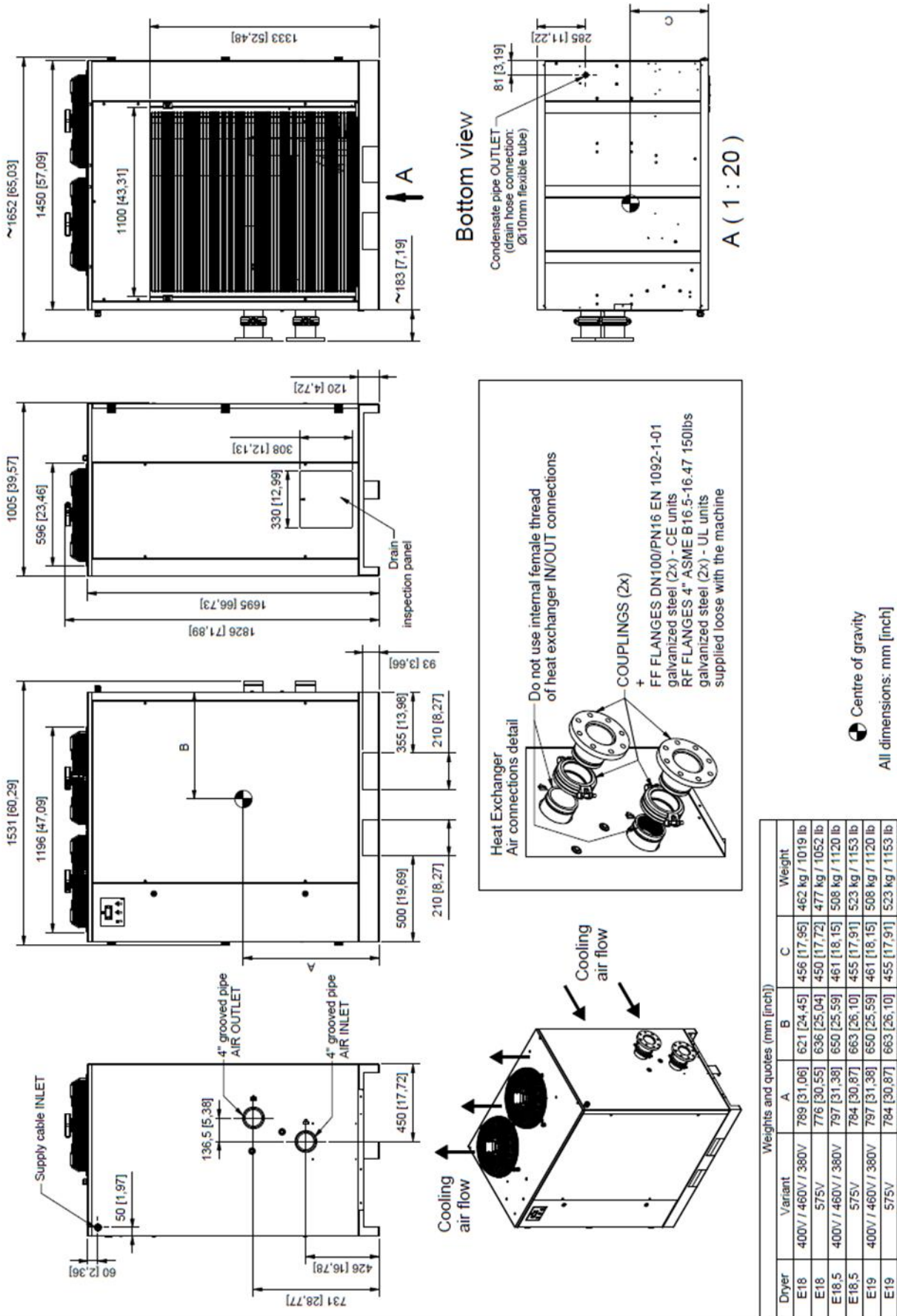
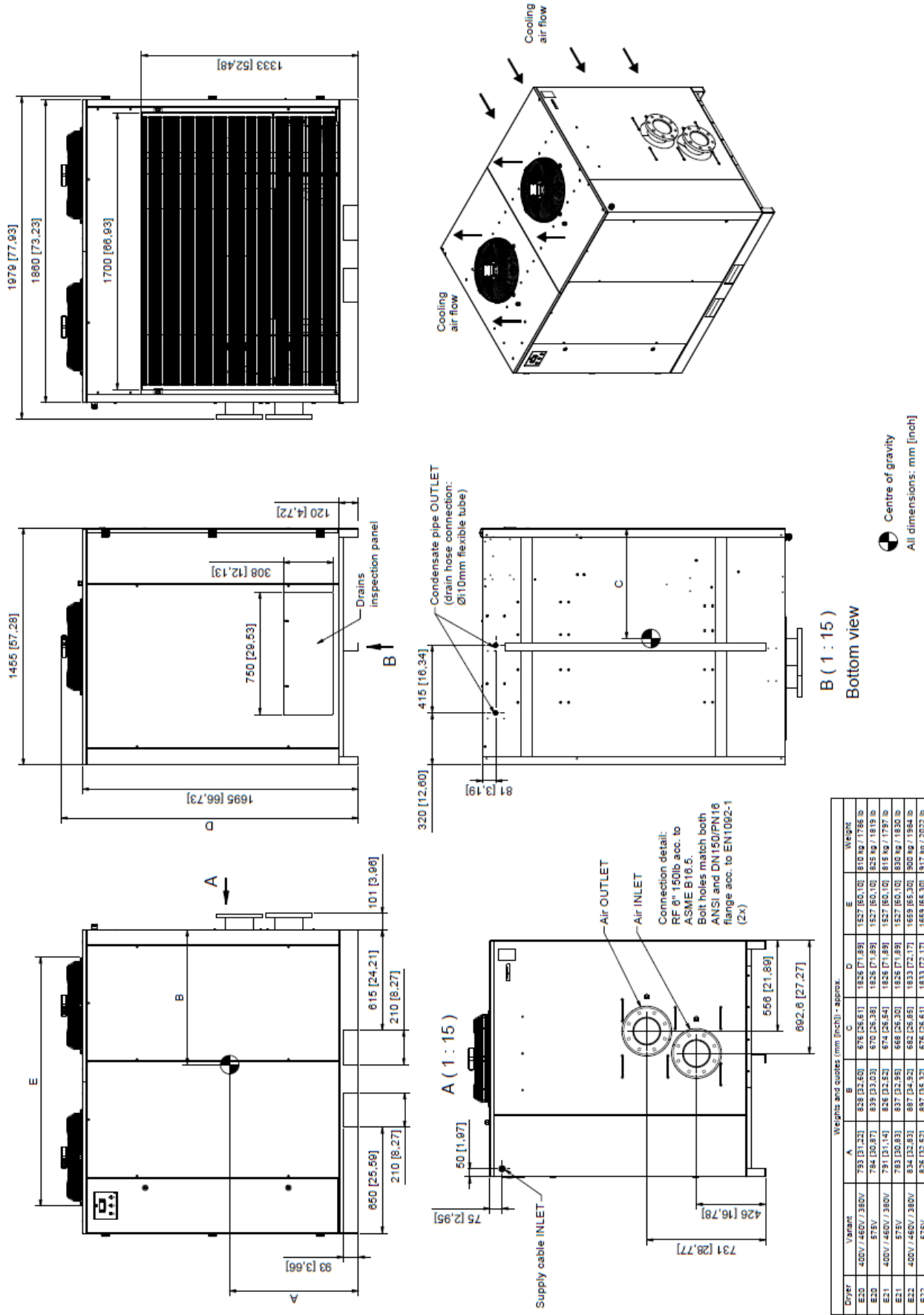


Fig.8d - E18-E18.5-E19



Weights and quotes (mm [inch]) - approx.

Dryer	Variant	A	B	C	D	E	Weight
E20	400V / 460V / 380V	759 [31.25]	828 [32.60]	876 [34.51]	1826 [71.89]	1527 [60.10]	810 kg / 1786 lb
E21	575V	784 [30.87]	839 [33.03]	876 [34.51]	1826 [71.89]	1527 [60.10]	825 kg / 1819 lb
E21	400V / 460V / 380V	791 [31.14]	826 [32.52]	876 [34.51]	1826 [71.89]	1527 [60.10]	815 kg / 1797 lb
E21	575V	783 [30.83]	837 [32.95]	868 [33.90]	1826 [71.89]	1527 [60.10]	830 kg / 1830 lb
E22	400V / 460V / 380V	834 [32.83]	887 [34.92]	882 [34.51]	1833 [72.17]	1659 [65.30]	900 kg / 1984 lb
E22	575V	826 [32.52]	887 [34.92]	876 [34.51]	1833 [72.17]	1659 [65.30]	817 kg / 2022 lb

Fig.8e - E20-E21-E22

3.2 Electrical connection



Access to the electrical panel is allowed only to professionally qualified personnel. Before opening the cubicle panel, disconnect the power supply.

- The power supply cable has to be sized and installed by a qualified electrician.
- Check the condition of the line conductors and ensure that there is an efficient ground connection.
- Check that the supply voltage is the same as the value indicated on the machine data plate.
- Check the correct installation of a disconnecter switch (Ref.1, Fig.4 paragraph 3) and fuses upstream the machine; for details, size and type see the service diagram.



Local regulations remain applicable if they are stricter than the values proposed. For calculations, an undervoltage of 10% is considered and according to EN60364-5-523, table 52-C11 with installation method E. Grouping: distance between cables is equal to the cable diameter. For IEC dryers, the settings of the main fuses below are according to Directive 2014/35/EU (low-voltage directive) EN60204-1. The cable size is valid for cable PVC 70 °C (158°F) at an ambient temperature of 40°C (104°F) / 46°C (114.8°F). For cULus dryers, the settings of the main fuses are according to CSA standards C22.1 and NFPA70. The cable size is valid for cable PVC 75°C (167°F) at an ambient temperature of 40°C (104°F) / 46°C (114.8°F).

Supply cable routing

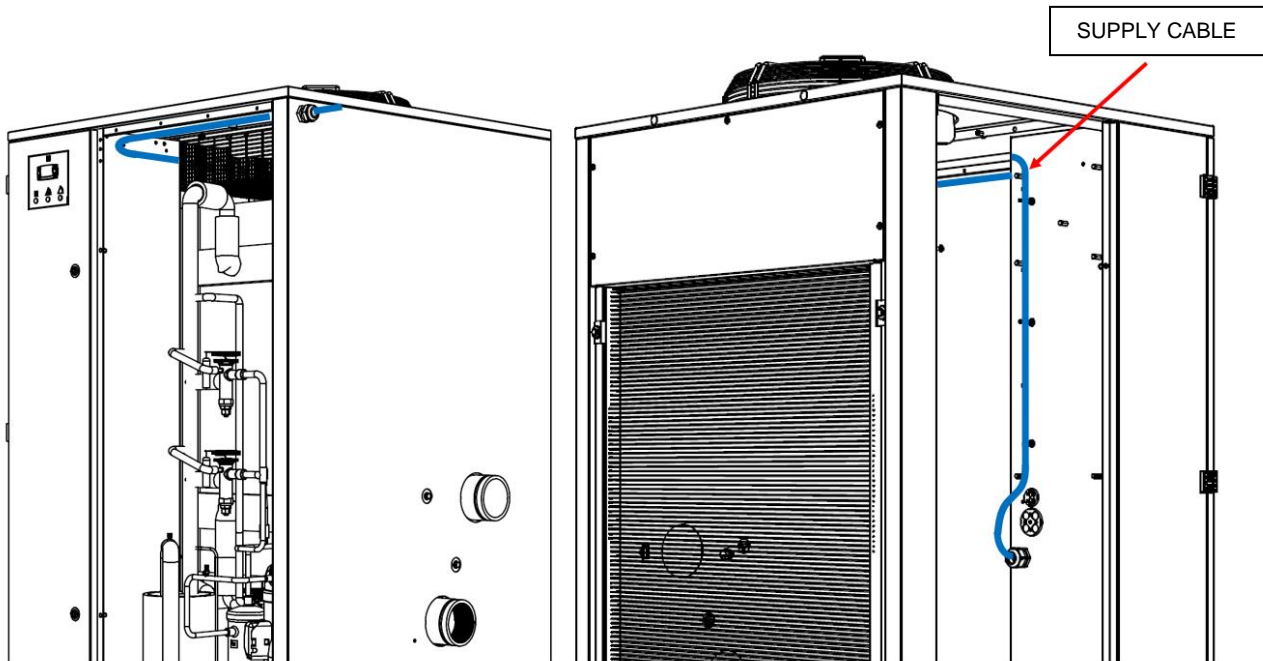


Fig.9

4 Operating instructions

4.1 Warnings

Safety precautions

The operator must apply all relevant safety precautions, including those mentioned in this manual.

Altitude operation

Consult your supplier if operating above 1000 m (3281 ft).

4.2 Control panel

Description

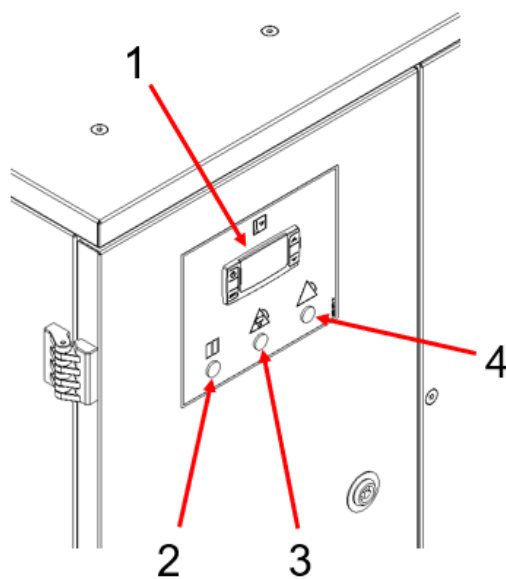


Fig.10

Reference	Name
1	Digital controller
2	Green indicator for presence of voltage and dryer in operation
3	Red indicator for condensate drain alarm
4	Red indicator for high pressure alarm or fan motor protection

Digital controller

Identification

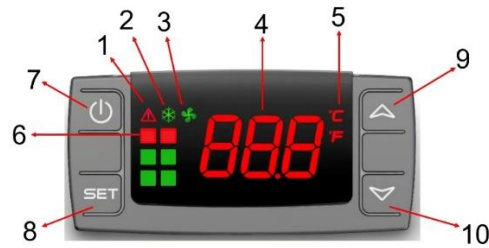


Fig.11a - Controller front view

Reference	Name
1	Alarm / Warning icon
2	Refrigerant compressor icon
3	Fan icon
4	PDP (dewpoint) temperature / dryer status
5	Unit (°C or °F)
6	Alarm LED
7	ON / OFF button
8	SET button
9	UP button
10	DOWN button
8+9	Back to previous screen
8+10	Menu

Icons

Icon	Name	Mode	Function
	Alarm / Warning	OFF	No active alarms
		ON	Probe failure alarm
		ON	High temperature or low temperature alarm
		ON	Service warning
	Refrigerant compressor	ON	Dryer on
		Flashing + SE	Maintenance warning
		Flashing + L2	Dewpoint too low Dryer is stopped
		Flashing + H3	Too high discharge temperature of the refrigerant compressor (see "H3" alarm below) Dryer is stopped
	Fan	OFF	Fan off
		ON	Fan on

Remote alarm function

The controller allows to remotely display a number of alarms. This is managed by means of a free NC (Normally Closed) contact. The contact opens in case of an alarm.

- **CD contact:** it's in series to all the alarms from the controller (see the section "fault messages"), to the fan motor breaker Q2-(Q3), to the phase sequency relay KPH and to the safety pressure switch AP. The contact opens when one of the faults happens.
- **EF contact:** it's in series to the alarms coming from the drain. The contact opens when one of the faults happens.

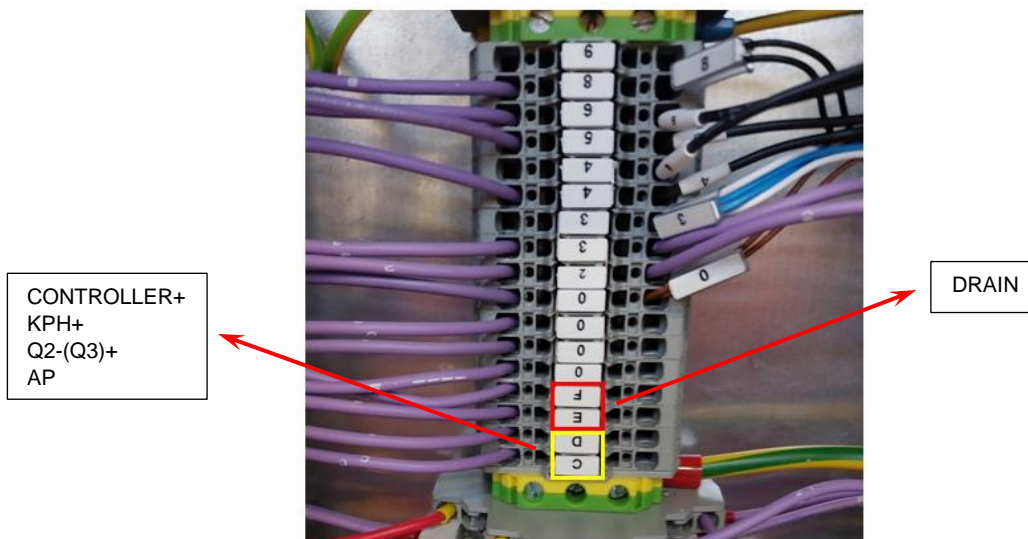









Fig.12 - Free contact location

Fault messages

Flashing fault message	Description	Remedy
	Dewpoint temperature probe failure	Replace the probe
	Refrigerant compressor discharge temperature probe failure	Replace the probe
	Pressure dewpoint too high	Refer to the "fault and remedies" section

Flashing fault message	Description	Remedy
	Pressure dewpoint too low	Refer to the "fault and remedies" section
	Refrigerant compressor discharge temperature too high; refrigerant compressor stopped.	Refer to the "fault and remedies" section"
	Internal EPROM error	Reset by pressing one of the four buttons. If the problem persists, replace the controller
	Maintenance required	Perform the maintenance and reset the alarm

Resetting the maintenance warning

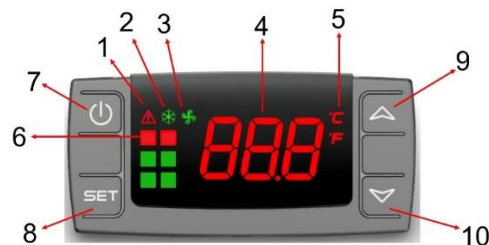


Fig.11b - Controller front view

To reset the maintenance warning, follow steps 1 to 12.

1. The display is flashing between standard view (dewpoint) and maintenance required (SE) alarm.
2. Push and hold buttons SET (8) and DOWN (10) to enter the menu.
3. Message "SE" appears on display.



4. Push and release the UP button (9).

5. Message "rS" appears on display.



6. Push and release the SET button (8).
7. Message "n" appears on display.



8. Push and release the UP button (9).
9. Message "y" appears on display.



10. Push and release SET (8) to reset service alarm.
11. Message "y" blinks for 3 seconds.



12. Then "rL" is fixed and "°C" blinks on display for about 10 seconds.



The service alarm is now reset.

Setting the service interval

To set the service interval, follow steps 1 to 9:

1. PDP is showing standard view.
2. Push and hold buttons SET (8) and DOWN (10) to enter the menu.
3. Message "SE" appears on display.



4. Push and release SET (8) to enter the "SE" menu.
5. Current service interval is displayed.
(“60” standard value or any other value between “0” and “99”)



6. Select desired service interval using the UP and DOWN button.
(40=4000h, 55=5500h, 80+8000h,...)
7. Push and release SET to confirm the new service interval.
8. The selected value blinks for 3 seconds.



9. Then "rS" is fixed and "°C" blinks on display for about 10 seconds.



The new service interval is now set.

Freeze protection function

Once the digital controller detects a dewpoint temperature below -2°C during more than 2 minutes, (L2 Alarms), it switches off the refrigerant compressor.

Resetting the dryer after a refrigerant compressor stop

Press button 7 to reset the alarm.

The dryer restarts when both the following conditions are true.

- The dewpoint temperature is higher than -2°C
- 30 second are passed from the refrigerant compressor stop (minimum balancing pressure stop time).
A countdown is available if the reset is made before the minimum stop time.

Silent alarm function

To snooze the alarm, press button 7.

Refrigerant compressor discharge temperature visualization function

To see the discharge refrigerant compressor temperature, follow steps 1 to 5:

1. PDP is showing standard view.
2. Push and hold buttons SET (8) and DOWN (10) to enter the menu.
3. Push and release the UP button (9) until message "S3" appear on display.



4. Push and release the SET button (8) to enter the "S3" parameter.
5. Current temperature of discharge refrigerant compressor is displayed.





Automatic restart after voltage failure (ARAVF)

The controller has a built-in function to automatically restart the unit when the voltage is restored after voltage failure. For units leaving the factory, this function is made inactive. If desired, the function can be activated. Consult your supplier.



If the function is activated and the regulator was in the automatic operation mode, the unit will automatically restart if the supply voltage to the module is restored.
The ARAVF label shall be glued near to the controller.

4.3 Start-up

	The operator must apply all relevant safety precautions.
	<p>Before switching-on the dryer verify:</p> <ul style="list-style-type: none"> • The correct connection to the compressed air network: remember to remove any plugs at the inlet and outlet of the dryer • The correct connection of the condensate drain pipe • The power supply is correct
	To ensure optimum operational efficiency, do not press the dryer ON/OFF button (7) repeatedly within a short time period. Wait at least 5 minutes to start the dryer again after shutdown to allow pressure compensation in the refrigerant circuit.
	To keep the compressed air net free of condensate, start the dryer before starting the air compressor and stop the air compressor before stopping the dryer.

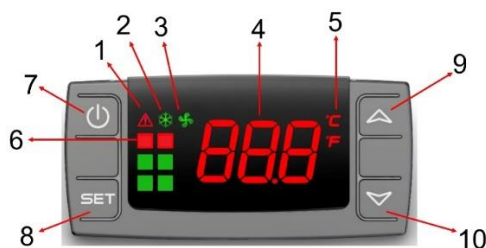


Fig.11c - Controller front view

Description

Step	Action
1	Check that all machine panels are assembled and the drain valve is in “open” position. Connect the power supply and start the dryer by pressing the ON button (7).
2	Open the dryer air inlet valve (installation at customer’s care).
3	Approx. 5 minutes later, open the dryer air outlet valve (installation at customer’s care).
4	Approx. 10 minutes later, the nominal dew-point will be reached.

The dryer is equipped with a belt resistance heater used for heating up the compressor crankcase during the off-cycle period. The heater prevents the refrigerant condensation in the compressor case and reduces the possible refrigerant and oil mixing during the stop phase.

Attention: the heater is energized when the electric power supply is connected to the machine and the refrigerant compressor is not running (dryer in stand-by mode). It is strongly recommended to energize the heater at least 6 hours before switching on the dryer.

4.4 During operation

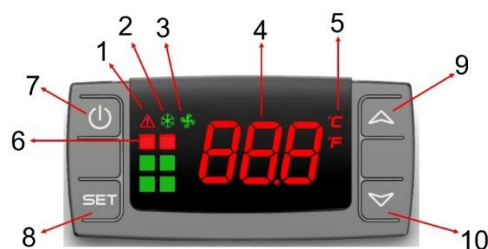


Fig. 11d - Controller front view

Description

Regularly check:

- The display of the digital controller. The pressure dewpoint will deviate from the nominal value if the air inlet conditions or volume flow differ from the reference values.
- That condensate is discharged. The amount depends on the operating conditions.

4.5 Stopping

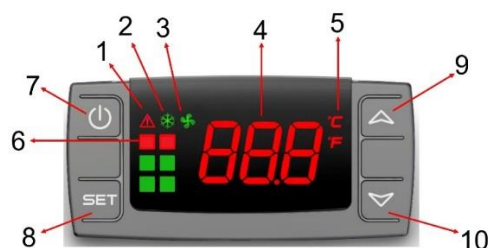


Fig. 11e - Controller front view

Description

Step	Action
1	Close the dryer inlet and outlet valves (installation at customer's care).
2	Press the OFF button for a few seconds (7). The "off" sign will be displayed in field (4). Keep the machine connected to the power supply if the dryer has to remain in stand-by mode (crankcase heater ON).

4.6 Pressure discharge procedure

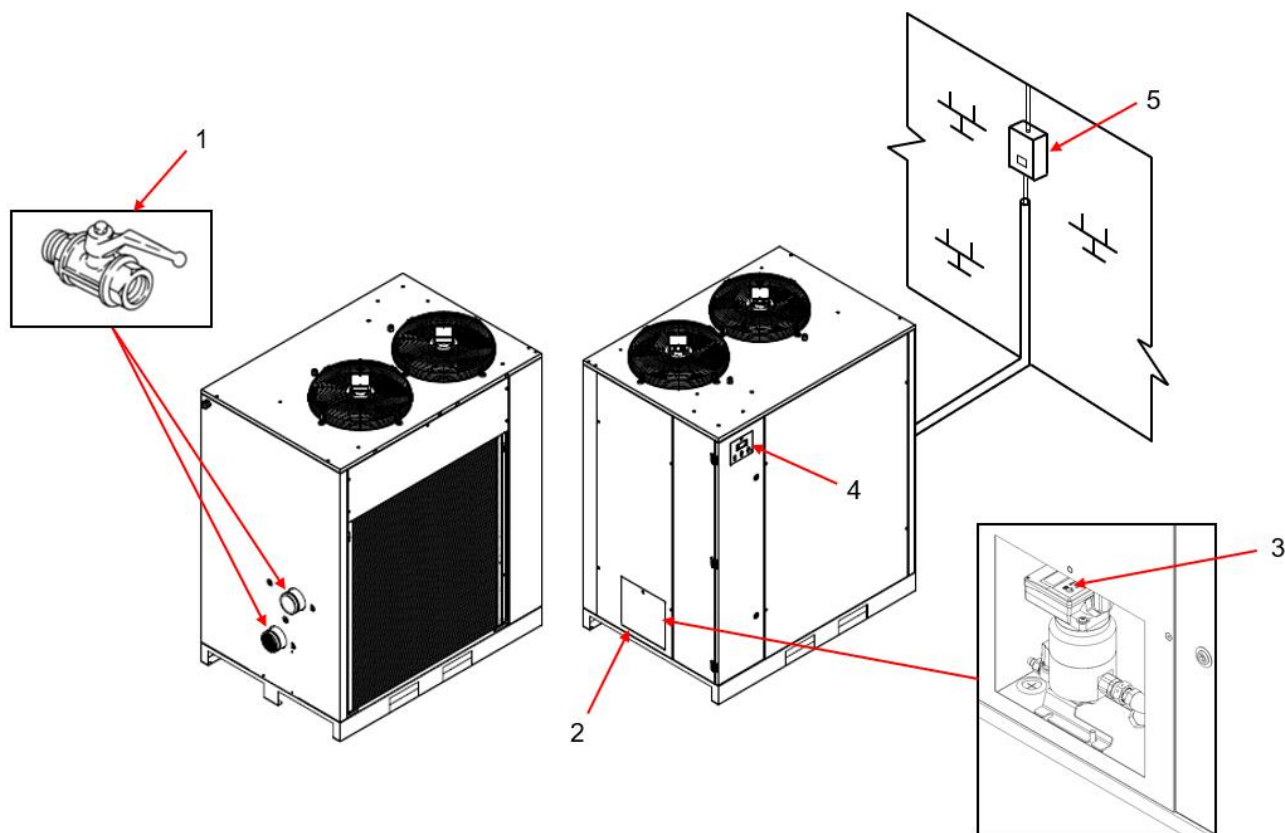


Fig.13

Follow below procedure to depressurize the dryer (Fig.13):

1. Close the inlet and outlet valves (1).
2. Remove the panel (2).
3. Depressurize the dryer by pressing and holding down the "TEST" button located on the top of the drain (3).
4. Switch off the machine (pushing the "OFF" button) (4).
5. Disconnect the power supply (5).
6. Close the panel (2).

5 Maintenance

5.1 Maintenance instructions

Important



Before starting any maintenance or repair operations, consult the following precautions: [Safety precautions during maintenance or repair](#).

Safety precautions

When handling refrigerant gas, all applicable safety precautions must be observed. The following points are stressed:

- Contact of refrigerant with the skin will cause frostbite. Wear special gloves and, in case of skin contact, rinse with water. For no reason the clothes should be removed.
- Refrigerant fluid can cause also freezing of the eyes; therefore, safety glasses must be worn.
- Refrigerant is poisonous. Do not inhale refrigerant vapours. Check that the working area is adequately ventilated.
- When the dryer is filled with refrigerant, it is forbidden to remove the refrigerant compressor inlet sensor.

When removing the side panels of the dryer, be aware that internal elements such as the pipes can reach a temperature of 120°C (248°F). Therefore, wait until the dryer has cooled down before removing the side panels.

Before starting any maintenance or repairs, switch off the voltage. Isolate the dryer from the air net and depressurize the unit following the pressure discharge procedure.

Local legislation

Local legislation may impose that:

- Operations on the refrigerant circuit of the cooling dryer or on any equipment that affects its function must be carried out by an authorized control body.
- The installation should be checked once a year by an authorized control body.

Warranty and product liability

Use only authorized genuine parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability.

Service agreements

Customer Centres have a range of service agreements to suit your needs:

- An Inspection Plan.
- A Preventive Maintenance Plan.
- A Total Responsibility Plan.

Contact your Customer Centre to arrange a tailor-made service agreement. This will ensure optimum operational efficiency, minimize downtime and reduce the total life cycle costs.

General

The following remarks should be kept in mind:

- Keep the dryer clean.
- Brush or blow off the finned surface of the condenser regularly.
- Inspect and clean the electronic water drain once a year.

Maintenance Plan

Maintenance intervals in chart below are suggested for clean (not dusty) and well-ventilated installation sites.

In case of dusty installation sites, frequency of controls should be doubled

Weekly	Clean the condenser surface with an air flow from the inside towards the outside
	Clean drain filter
Every 2000 hours / 1 year	Replace drain filter (0803501008)
Every 4000 hours / 2 years	Replace wear kit drain (2200902017)

Automatic condensate drain cleaning procedure (Fig.14)

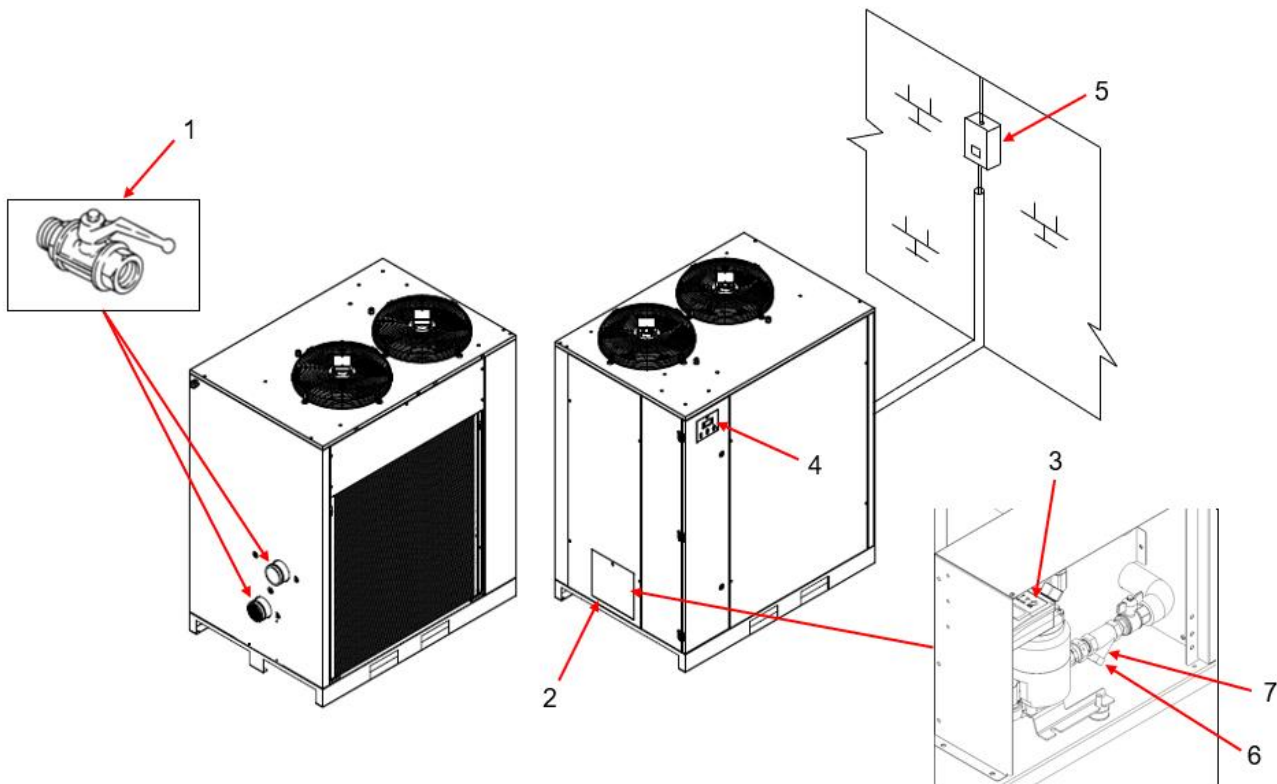


Fig.14


The condensate drain filter must be cleaned.

Proceed as follows:

1. Close the inlet and outlet valves (1)
2. Remove the panel (2) and depressurize the dryer by pressing and holding down the "TEST" button located on the top of the drain (3)
3. Switch off the machine (pushing the "OFF" button) (4)
4. Disconnect the power supply (5)
5. Remove the cap (6)
6. Remove the filter (7)
7. Clean the filter with an air flow from the inside toward the outside
8. Re-install the filter and tight the cap (7)/(6)

6 Problem solving

Attention

	Use only authorized parts. Any damage or malfunction caused by the use of unauthorized parts is not covered by Warranty or Product Liability. Apply all relevant Safety precautions .
	<p>Before carrying out any maintenance or repairs on the dryer:</p> <ul style="list-style-type: none"> • Close the air inlet and outlet valves of the dryer. • Press the “TEST” button on the electronic condensate drain for depressurize the dryer. • Switch off the dryer and disconnect the power supply. See section “Stopping” • Open the isolating switch to prevent an accidental start.
	Any action on dryer shall be performed by professionally qualified personnel

**IN CASE OF MALFUNCTIONING OR IN CASE OF OPERATING PROBLEMS,
CONTACT THE LOCAL DEALER**

6.1 Faults and remedies

	Condition	Fault	Remedy
1	Pressure dew point too high	Air inlet temperature too high	Check and correct. Also check the air compressor upstream the dryer; if necessary, install a pre-cooler
		Air inlet temperature too high	Check and correct; if necessary, draw cooling air through a duct from a cooler place or relocate the dryer
		Air inlet pressure too low	Increase inlet pressure Adjust the pressure switch
		Nominal flow rate of dryer exceeded	Reduce air flow
		Shortage of refrigerant	Have circuit checked for leaks and recharged
		Refrigerant compressor does not run	See 3
		Evaporating pressure too high	See 5
		Condensing pressure too high	See 2
		Automatic drain system clogged	Clean the system See 4

2	Condensing pressure too high or too low	Fan or fan motor out of order	Check fan/fan motor
		Fan pressure switch out of order	Check pressure switch electrical connections. If necessary, replace it
		Ambient temperature too high	Check and correct; if necessary, draw cooling air through a duct from a cooler place or relocate the dryer
		Condenser clogged externally	Clean the condenser (with compressed air from the inside towards the outside)
3	Compressor stops or does not start and controller is ON	Thermal protection of refrigerant compressor motor tripped	Wait for reset of thermostatic protection
		Overload fan motor protection tripped	Reset the overload motor protection
		Phase sequence relay indicate wrong rotation	Change sequence of two phases
		High pressure switch tripped	Reset the high-pressure switch
	Compressor stops or does not start and controller is OFF	Fuses of transformer tripped	Change fuses. In the event of a repetitive problem, perform an electrical check of the system
		Circuit breaker (installation at customer's care) tripped	Check the electrical causes
4	The condensate drain remains inoperative	Drain system clogged	Have system inspected
		Filter upstream of the solenoid valve clogged	Check filter
		Timer or solenoid exhaust valve out of order	Press the "TEST" button for 5 seconds to reset the drain; if necessary, contact a technician
5	Evaporating pressure is too high or too low in unload condition	Hot gas by-pass valve incorrectly set or out of order	Adjust the hot gas by-pass valve
		Condensing pressure too high or too low	See 2
		Shortage of refrigerant	Have circuit checked for leaks and recharged

7 Technical data

7.1 Reference conditions

Specification	Unit	Value
Compressed air inlet pressure	Bar(g) / psi(g)	7 (101,5)
Ambient temperature (50Hz variants)	°C (°F)	25 (77)
Ambient temperature (60Hz variants)	°C (°F)	38 (100)
Compressed air inlet temperature (50Hz variants)	°C (°F)	35 (95)
Compressed air inlet temperature (60Hz variants)	°C (°F)	38 (100)
Relative humidity at inlet	%	100
Pressure dewpoint (50Hz variants)	°C (°F)	3 (37,4)
Pressure dewpoint (60Hz variants)	°C (°F)	4 (39,2)

7.2 Limitations

Specification	Unit	Value
Maximum compressed air inlet pressure	Bar(g) / psi(g)	14 (203)
Minimum ambient temperature	°C (°F)	5 (41)
Maximum ambient temperature	°C (°F)	46 (115)
Maximum air inlet temperature	°C (°F)	60 (158)
Maximum storage temperature	°C (°F)	45 (113)
Minimum storage temperature	°C (°F)	5 (41)

7.3 Air dryer data

Refrigerant gas and global warming potential

The refrigerant gas for the dryer is **R410A** and the global warming potential (GWP) is 2088.

50Hz variants: 400V IEC

Type	Connections	Volume flow rate ¹	Weight	Refrigerant charge	Nominal power
		m ³ /min (cfm)	Kg (lb)	Kg (lb)	kW (HP)
E15	ISO7-R3" M Thread	24 (848)	230 (507)	1.65 (3.64)	3.50 (4.69)
E16	3" grooved pipe / ISO7-R3" M Thread	30 (1059)	325 (717)	3.00 (6.61)	3.69 (4.95)
E17	3" grooved pipe / ISO7-R3" M Thread	35 (1236)	338 (745)	3.40 (7.50)	4.55 (6.10)
E17.5	4" grooved pipe / EN1092-1 PN16 DN100 Flange	45 (1589)	390 (860)	4.80 (10.58)	6.10 (8.18)
E18	4" grooved pipe / EN1092-1 PN16 DN100 Flange	50 (1766)	462 (1019)	5.40 (11.91)	6.54 (8.77)
E18.5	4" grooved pipe / EN1092-1 PN16 DN100 Flange	62 (2200)	508 (1120)	5.80 (12.79)	7.10 (9.52)
E19	4" grooved pipe / EN1092-1 PN16 DN100 Flange	70 (2472)	508 (1120)	5.80 (12.79)	7.29 (9.78)
E20	EN1092-1 PN16 DN150 Flange	84 (2966)	810 (1786)	11.00 (24.25)	8.26 (11.08)
E21	EN1092-1 PN16 DN150 Flange	99 (3496)	815 (1797)	11.00 (24.25)	10.20 (13.68)
E22	EN1092-1 PN16 DN150 Flange	120 (4238)	900 (1984)	11.995 (26.44)	12.18 (16.33)

¹Referred to absolute pressure of 1 bar (14.5 psi) and temperature of 20°C (68°F) and measured according to ISO7183:2007.

60Hz variants: 460V / 380V IEC

Type	Connections	Volume flow rate ¹	Weight	Refrigerant charge	Nominal power	
		m ³ /min (cfm)	Kg (lb)	Kg (lb)	W (HP)	
					460V	380V
E15	ISO7-R3" M Thread	24 (848)	230 (507)	1.65 (3.64)	5.81 (7.79)	6.80 (9.12)
E16	3" grooved pipe / ISO7-R3" M Thread	30 (1059)	325 (717)	3.00 (6.61)	6.03 (8.09)	6.05 (8.11)
E17	3" grooved pipe / ISO7-R3" M Thread	35 (1236)	338 (745)	3.40 (7.50)	6.75 (9.05)	6.75 (9.05)
E17.5	4" grooved pipe / EN1092-1 PN16 DN100 Flange	45 (1589)	390 (860)	4.80 (10.58)	7.84 (10.51)	7.96 (10.67)
E18	4" grooved pipe / EN1092-1 PN16 DN100 Flange	50 (1766)	462 (1019)	5.10 (11.24)	9.43 (12.65)	9.58 (12.85)
E18.5	4" grooved pipe / EN1092-1 PN16 DN100 Flange	62 (2200)	508 (1120)	5.60 (12.35)	9.50 (12.74)	9.50 (12.74)
E19	4" grooved pipe / EN1092-1 PN16 DN100 Flange	70 (2472)	508 (1120)	5.60 (12.35)	9.71 (13.02)	9.71 (13.02)
E20	EN1092-1 PN16 DN150 Flange	84 (2966)	810 (1786)	11.00 (24.25)	11.39 (15.27)	11.39 (15.27)
E21	EN1092-1 PN16 DN150 Flange	99 (3496)	815 (1797)	11.00 (24.25)	12.81 (17,18)	12.81 (17,18)
E22	EN1092-1 PN16 DN150 Flange	120 (4238)	900 (1984)	11.995 (26.44)	17.15 (23.00)	17.15 (23.00)

¹Referred to absolute pressure of 1 bar (14.5 psi) and temperature of 20°C (68°F) and measured according to ISO7183:2007.

60Hz variants: 460V / 575V UL

Type	Connections	Volume flow rate ¹	Weight		Refrigerant charge	Nominal power	
		m ³ /min (cfm)	Kg (lb)		Kg (lb)	W (HP)	
			460V	575V		460V	575V
E15	NPT 3" M Thread	24 (848)	230 (507)	240 (529)	1.65 (3.64)	5.81 (7.79)	6.80 (9.12)
E16	3" grooved pipe / NPT 3" M Thread	30 (1059)	325 (717)	335 (739)	3.00 (6.61)	6.03 (8.09)	6.05 (8.11)
E17	3" grooved pipe / NPT 3" M Thread	35 (1236)	338 (745)	348 (767)	3.40 (7.50)	6.75 (9.05)	6.75 (9.05)
E17.5	4" grooved pipe / ASME 150 lb 4" Flange	45 (1589)	390 (860)	400 (882)	4.80 (10.58)	7.84 (10.51)	7.96 (10.67)
E18	4" grooved pipe / ASME 150 lb 4" Flange	50 (1766)	462 (1019)	477 (1052)	5.10 (11.24)	9.43 (12.65)	9.58 (12.85)
E18.5	4" grooved pipe / ASME 150 lb 4" Flange	62 (2200)	508 (1120)	523 (1153)	5.60 (12.35)	9.50 (12.74)	9.50 (12.74)
E19	4" grooved pipe / ASME 150 lb 4" Flange	70 (2472)	508 (1120)	523 (1153)	5.60 (12.35)	9.71 (13.02)	9.71 (13.02)
E20	ASME 150 lb 6" Flange	84 (2966)	810 (1786)	825 (1819)	11.00 (24.25)	11.39 (15.27)	11.39 (15.27)
E21	ASME 150 lb 6" Flange	99 (3496)	815 (1797)	830 (1830)	11.00 (24.25)	12.81 (17,18)	12.81 (17,18)
E22	ASME 150 lb 6" Flange	120 (4238)	900 (1984)	917 (2022)	11.995 (26.44)	17.15 (23.00)	17.15 (23.00)

¹Referred to absolute pressure of 1 bar (14.5 psi) and temperature of 20°C (68°F) and measured according to ISO7183:2007.

