PNEUMATECH

Breathable Air System

Pure protection Pure production Pure profitability



BA25 HE, BA35 HE, BA45 HE, BA75 HE, BA90 HE, BA110 HE, BA150 HE, BA220 HE, BA300 HE



Instruction Book





Pneumatech

Breathing air purifiers

BA25 HE, BA35 HE, BA45 HE, BA75 HE, BA90 HE, BA110 HE, BA150 HE, BA220 HE, BA300 HE

Instruction book

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1 Safety precautions

1.1 Safety icons

Explanation

\triangle	Danger for life
	Warning
Ø	Important note

1.2 Safety precautions, general

General precautions



- 1. The air purifier units are designed for normal indoor use.
- 2. Installation, operation, maintenance and repair work must only be performed by authorised, trained, specialised personnel.
- 3. Portable and mobile RF communications equipment can affect the unit. They should be used no closer to any part of the unit, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter (see EN 60601).
- 4. The operator must employ safe working practices and observe all related work safety requirements and regulations:
 - Wear ear protectors if applicable. People staying in environments or rooms where the sound pressure level reaches or exceeds 90 dB(A) shall wear ear protectors.
 - Never remove or tamper with the safety devices. 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.
 - Proper protective clothing (face mask, eye protection, overall, disposable gloves and apron) must be worn when installing, servicing or handling this equipment.
 - Danger to health during inspection, cleaning or replacement and danger to the environment: Contaminated filter elements, inlet screens, non-return valves or other components must be disposed of using the procedure for contaminated waste. Drain flasks must be sterilized. Any type of particles or liquid within a drain flask or inlet screen must be treated as potentially biologically contaminated. Any moisture drained from vessels or other drain points must be treated as biologically contaminated. Prior to transportation, items will be decontaminated as well as possible and the contamination status shall be stated in a "Declaration of Contamination" form (see annex).

- Immediately upon completion of work, remove any contaminated clothing and wash hands (and, if necessary, contaminated tools) in a 2% glutaraldehyde solution and rinse under running water.
- A checklist / logbook will be made wherein the installer will mark the adherence of the installation to the commissioning chapter of the instruction book.
- A validation of the quality of the air at the outlet should be carried out before the unit is put into operation.
- 5. If any of the following statements does not comply with the applicable legislation, the stricter of the two shall apply.
- 6. Installation, operation, maintenance and repair work must only be performed by authorized, trained, specialized personnel.
- 7. A compressor is not considered capable of producing air of breathing quality. To obtain air of breathing quality, the compressed air must be adequately purified according to the applicable legislation and standards.
- 8. Before any maintenance, repair work, adjustment or any other non-routine checks, stop the equipment, press the emergency stop button, switch off the voltage and depressurize the equipment. In addition, the power isolating switch must be opened and locked.
- 9. 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.
- 10. The owner is responsible for maintaining the dryer in safe operating condition. Parts and accessories shall be replaced if unsuitable for safe operation.
- 11. It is not allowed to walk or stand on the equipment or its components. Protect the equipment against falling objects.

1.3 Safety precautions during installation

- 1. The equipment must only be lifted using suitable equipment and 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.
- Install the equipment where the ambient air is as cool and clean as possible and within the limitations for operation. It shall be protected from rain, snow or other precipitation and the distances to walls shall be respected. Make sure that the environment is not potentially explosive.
 Make sure that the ambient condition limits specified in the limits for operation are not exceeded during the course of the plant lifetime and that they comply with the protection class of the unit. Care must be taken to minimize the entry of moisture or any other impurities (e.g. internal combustion engine exhaust, vehicle parking, access areas, hospital waste and disposal systems, vacuum system exhausts, vents from medical gas pipeline systems, anaesthetic gas scavenging systems, ventilation system discharges, chimney outlets and other sources of contamination) at the inlet of the compressor.
- 3. Any blanking flanges, plugs, caps or desiccant bags must be removed before connecting the pipes.
- 4. 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.
- 5. The air, aspirated by the compressor, must be free of flammable fumes, vapours and particles (e.g. paint solvents) that can lead to internal fire or explosion.
- 6. Portable and mobile RF communications equipment can affect the unit. They should be used no closer to any part of the unit, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter (See EN 60601).
- 7. No external force may be exerted on the inlet and outlet piping. The connections must be free of strain.

8. If remote control is installed, the machine must bear a clear sign stating <u>"Danger: This machine is remotely controlled and may start without warning"</u>.

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 starting equipment.

- 9. Air-cooled machines must be installed in such a way that an adequate flow of cooling air is available and that the exhausted cooling air does not recirculate to the inlet.
- 10. The electrical connections must be made in accordance with 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 equipment.
- 11. 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.
- 12. 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.
- 13. Piping or other parts with a temperature in excess of 80°C (176°F) and which may be accidentally touched by personnel during normal operation must be guarded or insulated. Other high-temperature piping must be clearly marked.
- 14. 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.
- 15. If no safety valve is present in the air net close to the desiccant dryer (e.g. safety valve of compressor), full flow safety valves must be installed on the dryer vessels.
- 16. If the maximum pressure of the compressor is higher than the design pressure of the dryer, a full flow safety valve must be installed between the compressor and the dryer in order to blow off the excessive pressure in case the safety valve of the dryer should be out of order or blocked.



1.4 Safety precautions during operation

- 1. Always be careful when touching any piping or components of the dryer 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 equipment in the presence of flammable or toxic fumes, vapours or particles.
- 5. Never operate the machine below or in excess of its limit ratings.
- 6. Keep all bodywork closed during operation. Bodywork should be opened for short periods only, e.g. to carry out routine checks. Wear ear protectors when removing a panel.

- 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 condition, free of wear or abuse
- 9. Do not remove any of, or tamper with, the sound-dampening material.
- 10. 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. All regulating and safety devices shall be maintained with due care to ensure that they function properly.
- 11. Make sure the breathable air is at a suitable temperature.
- 12. Breathing air can be extremely dry. Make sure adequate precautions are being taken when using breathing air during a long period (regularly drinking electrolytes, using humidifiers,...)

1	Also consult sections General safety precautions, Safety precautions during installation
~0	and Safety precautions during maintenance or repair
	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 equipment.

1.5 Safety 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. During use, it is possible that tools will become contaminated with oil or grease. It is therefore important that tools are cleaned and degreased following any maintenance operation, especially if the same tools are subsequently used with an Oxygen System. When the tools come into contact with possible bacteria contaminated parts (e.g. if the bacterial filters were ruptured), they must be sterilised after completion.
- 3. Use only genuine spare parts.
- 4. All maintenance work shall only be undertaken when the machine has cooled down and is depressurized.
- 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 starting 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. Before disconnecting any piping, pneumatically isolate the section and slowly bring the pressure to atmospheric pressure. Do not suddenly open any isolating valve that may cause rapid evacuation of any section that may be at high pressure. Open valves slowly and allow sufficient time for the pressure to stabilise.
- 9. Never use flammable solvents or carbon tetrachloride for cleaning parts. Take safety precautions against toxic vapours 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 equipment.
- 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, e.g. when steam-cleaning.
- 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 desiccant:
 - Take precautions not to inhale desiccant dust.
 - Check that the working area is adequately ventilated; if required, use breathing protection.
 - Do not overfill the dryer when replacing desiccant.

$\langle \! \langle \! \rangle \!$	Also consult sections General 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 equipment
	some statements may not apply to your equipment.

2 General description

2.1 Introduction

High quality air is of vital importance to many industries, but nowhere as literally as in the breathing air applications. The purity of the compressed air for breathing air is crucial to assure a safe working environment in a wide range of applications like asbestos removal, tank cleaning, sand blasting and others.

For this specific application, Pneumatech has designed the BA HE breathing air purifier range. The BA HE takes air from any regular compressor and treats it to become ultra clean. It consists of a number of components, which together, after proper commissioning, produce air with a quality matching the Pharmacopoeia and will comply with European Norm EN 12021 (Compressed air for breathing apparatus).

A BA HE offers following stages of cleaning:

- A water separator (WS) to eliminate free water from the compressed air, thus ensuring good operation of the desiccant dryer.
- Coalescing filters (C & G filters) to remove contaminating particles and oil droplets.
- A desiccant dryer (PD dryer) to lower the pressure dew point (PDP) to -40 °C (-40 °F), eliminating the risk of condensation and strongly reducing water-related problems like bacteria growth.
- The VT+ filter reduces hydrocarbons like oil vapour and smells to harmless levels and converts excessive concentrations of CO into CO2.
- A particle filter (MS filter) to eliminate particles that may have migrated out of the desiccant dryer.

General views



1	Air inlet valve	7	VT+ filter
2	Water separator (WS)	8	Dew point sensor
3	C filter	9	MS filter
4	G filter	10	Air outlet valve
5	BA HE controller	11	Outlet pressure sensor
6	PD dryer		



BA 220 HE, front view

1	Air inlet valve	7	VT+ filter
2	Water separator (WS)	8	Dew point sensor
3	C filter	9	MS filter
4	G filter	10	Air outlet valve
5	BA HE controller	11	Outlet pressure sensor
6	PD dryer		

Air flow 2.2

Flow diagram



Description

Compressed air enters water trap (WS), eliminating liquid water from the air. Next, the air flows through C and G filters, removing contaminating particles and oil mist. The air then enters the PD dryer, eliminating water damp and producing dry air with a pressure dew point of minimum -31 °C (-23.8 °F). Next is the VT+ filter where oil vapour and smells of the dried air are reduced (active carbon) and where the conversion of CO into CO₂ takes place. Finally the air flows through the MS filter, hereby eliminating remaining dust particles for absolute purity.

Specifications of the outlet air can be found in section Reference conditions and limitations.

2.3 Water separator and filters

Overview



Water separator with drain (WS) (1)

WS's are general-purpose water separators for free water removal from compressed air.

Centrifugal force created in the cyclone throws free water (droplets) to the wall, from where it flows down to the bottom of the bowl. The water is automatically discharged when a given level is reached. A drain valve is provided for manual draining of the bowl.

C filter (2)

The C filter combines two filtration steps into one, removing oil aerosols to 0.3 mg/m^3 (0.3 ppm) and particles down to 1 micron. The filter is equipped with a drain. Typical pressure drop over filter is 0.055 bar (0.8 psi) when dry and 0.125 bar (1.8 psi) when saturated.

The air flow is from inside to outside the filter element.

G filter (3)

The G filter combines two filtration steps into one, removing oil aerosols to 0.01 mg/m^3 (0.1 ppm) and particles down to 0.01 micron. The filter is equipped with a drain. Typical pressure drop over filter is 0.085 bar (1.2 psi) when dry and 0.125 bar (1.8 psi) when saturated.

The air flow is from inside to outside the filter element.

MS filter (6)

The MS is a high efficiency particle filter for dust protection, removing particles down to 0.01 micron. Pressure drop over filter is 0.1 bar (1.5 psi) when dry.

The air flow is from outside to inside the filter element.



2.4 PD dryer

Description

The construction of the air dryer is simple, reliable and easy to service. A dryer basically consists of two vertical cylinders (towers), containing the adsorption material (desiccant). This desiccant is a very porous grain material, able to adsorb large amounts of water vapour.



Operation principle

The operation cycle of the dryer is repetitive and is controlled by a factory-set timer in the BA HE controller.

While the desiccant in one tower dries the compressed air, the desiccant in the second tower is being regenerated. Regeneration of the desiccant is achieved by means of dried air (purge air) from the drying tower.

The compressed air entering the dryer is led to one of the towers by means of the inlet selector valve. The position of the selector valve depends on the condition (activated or not) of the solenoid valves. While the air flows upwards through the tower, the desiccant adsorbs the water vapor and the compressed air is dried.

The dried air leaves the dryer via the outlet selector valve.

A small portion of the dried air passes a purge orifice (7), expands to atmospheric pressure and flows downwards through the other tower, regenerating (drying) the desiccant.

When purchased as a stand-alone unit, a purge orifice for operation of the dryer at 10 bar is installed as standard. Alternative orifices for use at other operating pressures are included

The regeneration air is released via the solenoid valve and the silencer of the regenerating tower. The solenoid valves are controlled by the dryer controller.

After a pre-set time interval, the function of the towers is reversed. The fully regenerated tower will now dry the air, while the desiccant in the other tower will be regenerated.

By default, the regeneration timer will restart from the beginning of the cycle in case of a power failure during operation.

Purge control

The dryer is equipped with a dew point sensor, extending the drying time and saving compressed air. The regeneration time remains timer controlled.

Operation principle:

The sensor constantly measures the atmospheric dew point of the air leaving the drying tower. As long as the dew point is below the set point (-40 °C), the drying tower will remain drying, until the dew point exceeds the set point. On that moment the regenerated tower will start drying the compressed air and the other tower will be regenerated.

As long as the dew point is below the set point, regeneration of the non-drying tower is stopped after a preset time interval has elapsed. As a result, reduction of purge air is achieved.

2.5 VT+ filter

Air flow



Reference	Name
A	Air inlet
В	Air outlet
1	Activated carbon
2	Catalyst

Description

The dried compressed air enters the VT+ filter

A VT+ filter contains active carbon, reducing volatile organic compounds (VOC) and hydrocarbons (odours, oil vapours) to harmless levels, and as an option a catalyst material, converting excessive concentrations of CO into CO_2 .

Depending on the size of the unit, the VT+ filter consists of one, two or three cylinders.

2.6 Electrical diagrams

The service diagram can be found in the BA HE control box.

2.7 Optional equipment

Precautions

1. Make sure that all electrical wiring is installed in compliance with the applicable regulations.
2. Installation must always be performed by a qualified technician.
3. Installation must be carried out in compliance with the circuit diagrams and connection
drawings provided.
Some precautions are general and may not apply to your optional equipment.
All responsibility for any damage or injury resulting from neglecting these precautions, or
maintenance and repair, even if not expressly stated, will be disclaimed by the
manufacturer.
Experience Solo-San

Available options

• Electronic water drain (EWD)

The automatic drain is optional on the WS and the C and the G filters. The electronic drain is a zero-loss, electronically operated drain valve, specially designed to drain oil and water. A sensor detects the liquid level. If the level exceeds a preset value during a fixed programmed time, the condensate is discharged via drain outlet.

• CO sensor

The CO sensor is connected to the BA HE controller and will trigger an alarm when the CO level exceeds 5 ppm.

• CO₂ sensor

The CO₂ sensor is connected to the BA HE controller and will trigger an alarm when the CO₂ level exceeds 500 ppm.

• VT oil indicator

An oil indicator is available as an option to control the purity of the air. The oil indicator is a calibrated measuring instrument, used to detect aerosol-mist levels of oil entrainment that may be present in compressed air systems. Sensitivity of the indicator is limited only by the total number of hours it is allowed

to remain on the air supply system. The indicator is sensitive enough to measure a concentration of oil entrainment as low as 0.01 ppm. This sensor will indicate when the activated carbon is saturated and needs to be replaced. The oil indicator has a maximum pressure of 8.75 bar (127 psi).



3 Purelogic[™] controller

3.1 General

Controller



General description

The controller automatically controls and protects the dryer, i.e.:

- keeping the pressure dew-point stable
- monitoring pressures, temperatures and digital switches to ensure safe operation, and stopping the dryer
- whenever necessary
- restarting the dryer when required

In order to control the dryer and to read and modify programmable parameters, the regulator has a control panel provided with

- LEDs indicating the status of the dryer
- a display indicating the operating conditions or a fault
- keys to control the dryer and to access the data collected by the regulator
- buttons to manually start and stop the dryer

Automatic restart after voltage failure

The regulator has a built-in function to automatically restart the dryer if the voltage is restored after voltage failure.



Provided the regulator was in the automatic operation mode, the dryer will automatically restart if the supply voltage to the module is restored within a programmed time period. The power recovery time (the period within which the voltage must be restored to have an automatic restart) can be set between 15 and 3600 seconds or to 'Infinite'. If the power recovery time is set to 'Infinite', the dryer will always restart after a voltage failure, no matter how long it takes to restore the voltage. A restart delay can also be programmed, allowing for eGmple the dryer and the compressors to be restarted one after the other.

3.2 Control panel

Controller



Parts and functions

Reference	Designation	Function
1	Display	Shows the dryer operating condition and a number of icons to navigate through the menu.
2	Pictograph	Automatic operation
3	Pictograph	General alarm
4	General alarm LED	Flashes if a shut-down warning condition exists.
5	Pictograph	Service
6	Service LED	Lights up if service is needed
7	Automatic operation LED	Indicates that the regulator is automatically controlling the dryer.
8	Voltage on LED	Indicates that the voltage is switched on.
9	Pictograph	Voltage on
10	Enter key	Key to activate the selected menu or to modify the selected parameter.
11	Escape key	To go to previous screen or to end the current action
12	Scroll keys	Keys to scroll through the menu.
13	Stop button	Button to stop the dryer. LED (7) goes out.
14	Start button	Button to start the dryer. LED (7) lights up indicating that the Purelogic regulator is operative.

3.3 Icon used

Animation

Animation		Description	
59313D		ldle	
1 59314D)	Relief tower B	
59325	P	Blower heating tower B	
6 59326	D	Blower pre-cooling tower B	
59317	D	Purge heating tower B	













Status icons

Name	Icon	Description
Stopped/Running	57786F	When the dryer is stopped, the icon stands still. When the dryer is running, the icon is rotating.
Machine control mode	57790F	Local start/stop
	57791F	Remote start/stop
	5778F	Network control
Automatic restart after voltage failure	57793F	Automatic restart after voltage failure is active
Week timer	57794F	Week timer is active
	STOP 198225	Shutdown
	24797F	Warning Depend you Can 8300
Service	57798F	Service required
Main screen	59162F	Change main screen
	82196F	Main chart

Inputs Icons

lcon	Description
57789F	Pressure
57800F	Temperature



57801F	Digital input
57802F	Special protection

System Icons

lcon	Description
57804F	Dryer
57805F	Fan
57806F	Frequency converter
57807F	Drain
57808F	Filter
57809F	Motor
57810F	Failure expansion module
57782F	Network problem
57812F	General alarm

Menu icons

lcon	Description
57813F	Inputs
57814F	Outputs
57812F	Alarms (Warnings, shutdowns)
1 - 0 0 0 0 1 57815F	Counters
58499D	Test
57817F	Settings

	lcon	Description
	57798F	Service
	57818F	Event history (saved data)
	57819F	Access key/User password
	57792F	Network
	57820F	Set point
	57867F	Info
		General settings
	59807D	Rolding
Na	vigation arrows	Ropener On
	lcon	Description
	57821F	Up Experience 00-542-0
	57822F	Down

3.4 Main screen

Controller





(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Function

The Main screen shows the status of the dryer operation and is the gateway to all functions implemented in the controller.

The Main screen is shown automatically when the voltage is switched on and one of the keys is pushed. It is switched off automatically after a few minutes when no keys are pushed.

Six different main screens can be chosen:

- 1. Two value lines
- 2. Four value lines
- 3. Chart (High resolution)
- 4. Chart (Medium resolution)
- 5. Chart (Low resolution)
- 6. Dryer animation

Dryer animation, two and four value views







Two value lines



Four value lines

Text on figure

(1)	Pressure equalization
(2)	Menu

- **Section A** shows information regarding the dryer operation (e.g. the Pressure in vessels A and B, the Dryer Pressure Dewpoint, the Dryer Inlettemperature).
- Section B shows Status icons. Following icon types are shown in this field:
 - Fixed icons These icons are always shown in the main screen (e.g. Dryer stopped or running, Dryer status).
 - Optional icons These icons are only shown if their corresponding function is activated (e.g. week timer, automatic restart after voltage failure, etc.).
 - Pop up icons
 These icons pop up if an abnormal condition occurs (warnings, shutdowns, service).

To call up more information about the icons shown, select the icon using the scroll keys and press the enter key.

• Section C is called the Status bar.

This bar shows the text that corresponds to the selected icon. When the menu button is selected, this text shows the operational state of the dryer.

- Section D shows the Action buttons. These buttons are used:
 - to call-up or program settings.
 - to reset a service message.
 - to have access to all data collected by the regulator.

The function of the buttons depends on the displayed menu. The most common functions are:

Designation	Function
Menu	To go to the menu
Modify	To modify programmable settings
Reset	To reset a timer or message

To activate an action button, highlight the button by using the Scroll keys and press the Enter key. To go back to the previous menu, press the Escape key.

Chart views



When the Chart (High Resolution) is selected, a chart showing the value of a parameter selected in the Inputs menu per minute is shown on the main screen. Each point in the chart is 1 second. The screen shows 4 minutes.

The switch button (icon) for selecting other screens is changed into a small Chart and is highlighted (active).



When the Chart (Medium Resolution) is selected, a chart showing the parameter per hour is shown on the main screen. Each point is the average of 1 minute. The screen shows 4 hours.

The switch button (icon) for selecting other screens is changed into a small Chart and is highlighted (active).



When the Chart (Low Resolution) is selected, a chart showing the parameter per day is shown on the main screen. Each point is the average of 1 hour. The screen shows 10 days.

The switch button (icon) for selecting other screens is changed into a small Chart and is highlighted (active).

3.5 Calling up menus

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Description

When the voltage is switched on, the main screen is shown automatically (see section Main screen):



(1)	Pressure equalization
(2)	Menu

- To go to the Menu screen, highlight the Menu button (2), using the Scroll keys.
- Press the Enter key to select the menu. Following screen appears:



- The screen shows a number of icons. Each icon indicates a menu item. By default, the Inputs icon is selected. The status bar shows the name of the menu that corresponds with the selected icon.
- Use the Scroll keys to select an icon.
- Press the Enter key (2) to open the menu or press the Escape key (3) to return to the Main screen.

3.6 Inputs menu

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Inputs


Function

To call up information regarding the actually measured data and the status of some inputs such as the Vessel Pressure.

Procedure

Starting from the main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:





2. Press the Enter key. A screen similar to the one below appears:



Text on figure

(1)	Inputs
(2)	Pressure vessel A
(3)	Pressure vessel B
(4)	Blower pressure
(5)	Inlet dryer

3. The screen shows the first items of a list of all inputs with their corresponding icons and readings. Use the scroll button to see the other items in the list.

4. If an input is in warning or shutdown, the original icon is replaced by the warning or shutdown icon respectively.



3.7 **Outputs menu**

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Outputs

Function

To call up information regarding the actual status of some outputs, such as the Dryer motor, PDP 800-542-8 alarm, General shut-down, etc.

Procedure

perience Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



58536D

2. Move the cursor to the Outputs icon using the Scroll keys.



3. Press the Enter key. A screen similar to the one below appears:



Text on figure

(1)	Outputs
(2)	Dryer motor (means the dryer is operating)
(3)	PDP alarm
(4)	General shut-down
(5)	General warning
(6)	Yes
(7)	Not triggered
(8)	Triggered

800

4. The screen shows the first items of a list of all outputs with their corresponding icons and readings. Use the scroll button to see the other items in the list. perient

3.8 Counters

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Counters

0	9	5d	5
1	0	5	5
2	1	6	12
_	_	_	'in

Function

To call up:

- The running hours
- The number of dryer starts
- The number of hours that the regulator has been powered
- The operational state timers

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- 2. Using the Scroll keys, move the cursor to the Counters icon (see above, section Menu icon).
- 3. Press the Enter key. Following screen appears:

Counters (1)
Running Hours Dryer (2)	
	7 hours
Loaded Hours Dryer (3)	
	7 hours
Actual State Time (4)	
	07:21:45
Programmed State Time (5)	
	00:00:00
	(6)Reset
	58540D

Text on figure

(1)	Counters	
(2)	Running hours dryer	
(3)	Loaded hours dryer	
(4)	Actual state time	
(5)	Programmed state time	
(6)	Reset	



The screen shows a list of all counters with their actual readings. A number of counters keep track of the state of the dryer:

- Running hours: counts the operation hours of the dryer.
- **Loaded hours**: the same as running hours, but shows to which time interval the energy counters refer to; this counter is also reset when the energy counters are reset.
- Actual state time: shows how long the dryer's current state has been active.
- **Programmed state time**: shows how long (at most) the current state should be active.
- Actual half cycle time: shows how long the adsorbing vessel has been adsorbing (since last vessel shift).
- **Programmed half cycle time**: shows how long the half cycle should take; minimum value if PDP control is not active, maximum value if PDP is active.
- **Regeneration cycles vessel A**: integer that counts how many cycles vessel A has performed.
- **Regeneration cycles vessel B**: integer that counts how many cycles vessel B has performed.
- **Standby time**: shows how long the dryer has been in standby mode since the last reset of the energy counters. This counter will not be reset when the standby state has ended and a vessel switch is performed. The next time the dryer is in the standby state, it resumes at the previous value. The counter is automatically reset when the energy counters are reset.
- **Energy saving PDP sensor**: shows how much energy is saved (in %) by having the PDP sensor since the energy counters have been reset, so it equals StandbyTime/LoadedTime.
- Average heating power: shows the 24/24h average of heating power consumed since the last reset of the energy counters. This timer equals the (Heater Contactor Time x Heater Power)/(Loaded Time). The Heater Contactor Time is an internal timer and cannot be called up on the screen. The Heater Contactor Time is reset when the energy counters are reset.
- **Module hours**: shows how long the controller has been active. This timer cannot be reset, not even when downloading new controller software.

3.9 Event history menu

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Event History

	_	$\frac{\omega}{\omega}$
-	_	ì
	_	5
-	-	

Function

To call up the last shut-down and last emergency stop data.

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- 2. Using the Scroll keys, move the cursor to the Event History icon (see above, section Menuicon).
- 3. The list of last shut-down and emergency stop cases is shown.
- 4. Scroll through the items to select the desired shut-down or emergency stop event.
- 5. Press the Enter key to find the date, time and other data reflecting the status of the dryer when that shut- down or emergency stop occurred.

3.10 Test menu

Controller



Menu icon, Test

Function





The vessels can only be depressurized when the dryer is stopped (off state). The test procedure will be stopped as soon as another menu is selected on the regulator.

Procedure

Starting from the Main screen (see Main screen):

1. Move the cursor to the action button Menu and press the enter key (2); following screen appears:



- 2. Using the scroll keys (1), move the cursor to the test icon (see above, section Menu icon).
- 3. Press the enter key (2), following screen appears:



Text on figure

(1)	Test
(2)	Depressurize vessels

4. A red selection bar is covering the item Depressurize vessels; press the Enter key to depressurize the vessels.

3.11 Service menu

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Service



Function

- To reset the service plans which are carried out.
- To check when the next service plans are to be carried out.
- To find out which service plans were carried out in the past.
- To modify the programmed service intervals.

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- 2. Using the Scroll keys, move the cursor to the Service icon (see above, section Menu icon).
- 3. Press the Enter key. Following screen appears:



Text on figure

(1)	Service
(2)	Overview
(3)	Service plan
(4)	Next service
(5)	History

4. Scroll through the items to select the desired item and press the Enter key to see the details as explained below.



Overview



Text on figure

(1)	Overview
(2)	Running Hours (green)
(3)	Real Time hours (blue)

EGmple for service level (A):

The figures at the left are the programmed service intervals. For Service Interval A, the programmed number of running hours is 4000 hours (upper row, green) and the programmed number of real time hours is 4380 hours, which corresponds to six months (second row, blue). This means that the controller will launch a service warning when either 4000 running hours or 4380 real hours are reached, whichever comes first. Note that the real-time hours counter keeps counting, also when the controller is not powered.

The figures within the bars are the number of hours to go till the next service intervention. In the eGmple above, the dryer was just started up, which means it still has 4000 running hours or 4337 hours to go before the next Service intervention.

Service plans

A number of service operations are grouped (called Level A, Level B, etc). Each level stands for a number of service actions to be carried out at the time intervals programmed in the controller.

When a service plan interval is reached, a message will appear on the screen.

After carrying out the service actions related to the indicated levels, the timers must be reset. From the Service menu above, select Service plan (3) and press Enter. Following screen appears:

Service Plan (1)			
(2) Level	(3) Running	(4)Real	
	Hours	Time	
A	4000	4380	
В	8000	8760	
C	40000	43800	
D			
E			

58543D

Text on figure

(1)	Service plan
(2)	Level
(3)	Running hours
(4)	Real time

Next Service

	Next Service (1)
(2) Level	(3) Running
	Hours
A	(4) Actual 8 4000
	58544D

Text on figure

(1)	Next service
(2)	Level
(3)	Running hours
(4)	Actual

In the eGmple above, the A Service level is programmed at 4000 running hours, of which 8 hours have passed.

History

The History screen shows a list of all service actions done in the past, sorted by date. The date at the top is the most recent service action. To see the details of a completed service action (e.g. Service level, Running hours or Real time hours), use the Scroll keys to select the desired action and press the Enter key.

54

3.12 Protections menu

Controller



Menu icon, Protections



Function

To call-up the protections.



Before resetting a warning or shut down message, always remedy the problem. Frequently resetting these messages without remedying may damage the dryer.

Procedure

Starting from the Main screen (see Main screen):

1. Move the cursor to the action button Menu and press the enter key (2). Following screen appears:



- 2. Using the scroll keys (1), move the cursor to the protections icon (see above, section Menu icon).
- 3. Press the enter key (2). Following screen appears:



4. The screen shows a list of all shut-down and shut-down warning settings and the actual reading. Active alarms are highlighted in yellow. In case of shut-down, the protection can be reset after remedying.

3.13 Week timer menu

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Week timer



Function

- To program time-based start/stop commands for the dryer.
- To program time-based change-over commands for the net pressure band.
- Four different week schemes can be programmed.
- A week cycle can be programmed; a week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Use the Scroll buttons to select the Timer icon.



2. Press the Enter key on the controller. Following screen appears:



Text on figure

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week 1
(6)	Remaining Running Time

The first item in this list is highlighted in red. Select the item requested and press the Enter key on the controller to modify.

Programming week schemes

• Select Week action schemes and press Enter. A new window opens. The first item in the list is highlighted in red. Press the Enter key on the controller to modify Week Action Scheme 1.

Week Action Schemes(1)
Week Action Scheme 1 (2)
Week Action Scheme 2(3)
Week Action Scheme 3 (4)
Week Action Scheme 4 (5)
58498D

Text on figure

(1)	Week Action Schemes
(2)	Week Action Scheme 1
(3)	Week Action Scheme 2
(4)	Week Action Scheme 3
(5)	Week Action Scheme 4

• A weekly list is shown. Monday is automatically selected and highlighted in red. Press the Enter key on the controller to set an action for this day.

Tuesday	(3)	
Wednesda	(4)	
Thursday	(5)	
Friday	(6)	
Saturday	(7)	
Sunday	(8)	

Text on figure

(1)	Week Action Scheme 1
(2)	Monday
(3)	Tuesday
(4)	Wednesday
(5)	Thursday
(6)	Friday
(7)	Saturday
(8)	Sunday

• A new window opens. The Modify action button is selected. Press the Enter button on the controller to create an action.



Text on figure

(1)	Monday
(2)	Modify

• A new pop-up window opens. Select an action from this list by using the Scroll keys on the controller. When ready press the Enter key to confirm.



Text on figure

٠

(1)	Monday	
(2)	Actions	
(3)	Remove	
(4)	Start	
(5)	Stop	
(6)	Pressure Set point 1	
(7)	Modify	

A new window opens. The action is now visible in the first day of the week.



Text on figure

(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

• To adjust the time, use the Scroll keys on the controller and press the Enter key to confirm.



Text on figure

(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

• A pop-up window opens. Use the ↑ or ↓ key of Scroll keys to modify the values of the hours. Use the ← or → Scroll keys to modify the minutes.



Text on figure

(1)	Monday
(2)	Time
(3)	Save
(4)	Modify
L	104 0.83

Press the Escape key on the controller. The action button Modify is selected. Use the Scroll keys to select the action Save.



Text on figure

(1)	Monday
(2)	Start
(3)	Save
(4)	Modify

• A new pop-up window opens. Use the Scroll keys on the controller to select the correct actions. Press the Enter key to confirm.



Text on figure

(1)	Monday	
(3)	Are you sure?	
(4)	Νο	
(5)	Yes	
(6)	Save	
(7)	Modify	

Press the Escape key to leave this window.

• The action is shown below the day the action is planned.



Text on figure

(1)	Week Action Scheme 1	
(2)	Monday - Start	
(3)	Tuesday	
(4)	Wednesday	
(5)	Thursday	
(6)	Friday	
(7)	Saturday	
(8)	Sunday	

Press the Escape key on the controller to leave this screen.

Programming the week cycle

A week cycle is a sequence of 10 weeks. For each week in the cycle, one of the four programmed week schemes can be chosen.

• Select Week Cycle from the main Week Timer menu list.



81496D

Text on figure

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Week Timer Inactive
(6)	Remaining Running Time

• A list of 10 weeks is shown.



Text on figure

(1)	Week Cycle
(2)	Week 1
(3)	Week 2
(4)	Week 3
(5)	Week 4
(6)	Modify

Press twice the Enter key on the controller to modify the first week.

• A new window opens. Select the action, eGmple: Week Action Scheme 1





Text on figure

(1)	Week Cycle
(2)	Week 1
(3)	Week Action Scheme 1
(4)	Week Action Scheme 2
(5)	Week Action Scheme 3
(6)	Modify

• Check the status of the Week Timer

Use the Escape key on the controller to go back to the main Week Timer menu. Select the status of the Week Timer.



• A new window opens. Select Week 1 to set the Week Timer active.



Text on figure

(1)	Week Timer
(2)	Week
(3)	Week Timer Inactive
(4)	Week 1

• Press the Escape key on the controller to leave this window. The status shows that week 1 is active.



81503D

Text on figure

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

• Press the Escape key on the controller to go to the main Week Timer menu. Select Remaining Running Time from the list and press the Enter key on the controller to Modify.



Text on figure

(1)	Week Timer
(2)	Week Action Schemes
(3)	Week Cycle
(4)	Status
(5)	Remaining Running Time

• This timer is used when the week timer is set and for certain reasons the dryer must continue working. The remaining running time, for eGmple 1 hour, can be set in this screen. This timer is prior to the Week Timer action.





Text on figure

(1)	Week Timer
(2)	Week action schemes
(3)	Remaining Running Time

3.14 Info menu

Controller



(1)	Scroll keys
(2)	Enter key
(3)	Escape key

Menu icon, Info



Function

To show the Pneumatech internet address.

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- 2. Using the Scroll keys, move the cursor to the Info icon (see above, section Menu icon).
- 3. Press the Enter key. The Pneumatech internet address appears on the screen.

3.15 Modifying settings

Controller



(1)	Enter key
(2)	Escape key
(3)	Scroll keys

Menu icon, Settings



Function

To display and modify a number of settings (e.g. Time, Date, Date format, Language, units).

Procedure

Starting from the Main screen (see Main screen),

1. Move the cursor to the action button Menu and press the Enter key. Following screen appears:



- 2. Using the Scroll keys, move the cursor to the Settings icon (see above, section menu icon).
- 3. Press the Enter key. Following screen appears:



4. The screen shows a number of icons: 04

lcon	Function
57792F	Network settings
58470D	General settings
57820F	Regulation settings
21793F	Automatic restart after voltage failure settings
57819F	Access key
57819F	User password

5. Move the cursor to the icon of the function to be modified and press the Enter key.

Modifying network settings

1. Select the network settings icon as described above and press the Enter button (2). Following screen appears:



82089D

Text on figure

(1)	Network	
(2)	Ethernet	0
(3)	CAN	

2. A red selection bar is covering the first item (Ethernet). Use the ↓ key of the Scroll keys to select the setting to be modified and press the Enter key. Following screen appears:

Ethernet (1)	thernet (1)300
Experience	0-54 On
IP Address(2)	192.168,100.100
Subnet Mask (3)	255.265.255.0
Gateway IP (4)	192.168.100.1
	Modify (5)
	820900

Screen for Ethernet setting

Text on figure

(1)	Ethernet
(2)	IP Address
(3)	Subnet mask
(4)	Gateway IP
(5)	Modify







Text on figure

(1)	CAN
(2)	CAN Address
(3)	Communication profile
(4)	Modify

- 3. Press the Enter button; a red selection bar is covering the first item (Ethernet).
- 4. Using the Scroll keys, move the cursor to the setting to be modified (e.g. Ethernet) and press the Enter button (2).
- 5. A pop-up screen appears. Use the ↑ or ↓ key to select the required parameter and press the Enter key to confirm.

General settings

• Select the General settings icon as described above and press the Enter button (2). Following screen appears:

Gene	ral (1)
Language In Use (2)	1.1
	English
Time (3)	
	13:42:33
Date (4)	
	18/01/2010
Date Format (5)	
	DD/MM/YY
	Modify
	58467D

Text on figure

(1)	General
(2)	Language in use
(3)	Time
(4)	Date
(5)	Date format

- The screen shows the first items of a list of all settings. Use the scroll button to see the other items in the list.
- Press the Enter button (2); a red selection bar is covering the first item (Language in use).
- Use the \downarrow key of the Scroll keys to select the setting to be modified and press the Enterkey.
- A pop-up screen appears. Use the ↑ or ↓ key to select the required parameter and press the Enter key to confirm.

Regulation settings

Select the Regulation icon as described above and press the Enter button (2). Following screen appears:

	Regulation (1)
	PDP Extended Cycle (2)
	(3) Activated
	PDP Switching Temperature (4)
	-40 °C
	PDP Alarm Offset (5)
	5 °C
	Heatless Backup Mode (6)
	(7) Not Activated
	(8) Modify
	58547D
Text on figure	TLASSO (On
(1)	Regulation
(2)	PDP extended cycle
(3)	Activated
(4)	PDP switching temperature
(5)	PDP Alarm offset
(6)	Heatless Backup mode
(7)	Not activated
(8)	Modify

- The screen shows the list of all settings.
- Press the Enter button (2); a red selection bar is covering the first item (PDP extended cycle).
 - Use the \downarrow key of the Scroll keys to select the setting to be modified and press the Enter key.
- A pop-up screen appears. Use the ↑ or ↓ key to select the required parameter and press the Enter key to confirm.

Regulation settings:

- **PDP extended cycle:** the cycle is lengthened by putting the vessel in waiting mode (standby) if PDP is low enough after regeneration and cooling.
- **PDP switching temperature:** the PDP should not increase to this setting before the vessels are switched when the dryer is in standby mode.
- **PDP alarm offset:** the PDP alarm is active when: PDP > PDP_switching_temperature + PDP_alarm_offset. In that way, the alarm threshold can be set independently of the switching threshold.

Automatic restart

• Select the Automatic restart settings icon as described above and press the Enter button (2). Following screen appears:



Text on figure

(1)	Automatic restart	
(2)	Maximum power down time	
(3)	Restart delay	
(4)	Modify	

- The screen shows the list of all settings.
- Press the Enter button (2); a red selection bar is covering the first item (Automatic restart).
- Use the ↓ key of the Scroll keys to select the setting to be modified and press the Enterkey.
- A pop-up screen appears. Use the ↑ or ↓ key to select the required parameter and press the Enter key to confirm.

Access key

Different security levels are programmed in the regulator (e.g. user, service technician, etc). This menu item is used to change the security level. Scroll to the correct icon using the scroll key. Press the enter button. Press the enter button again to modify the security level. Press the enter button again; a pop-up menu appears. Use the scroll keys to enter the password of the new security level. Press the enter key to confirm the change.

User password

If the password option is activated, it is impossible for not authorized persons to modify any setting.

- Using the Scroll keys, move the cursor to the Password icon.
- Press the Enter key.
- Select the Modify button using the Scroll keys and press the Enter key. Next, modify the password as required.

3.16 Web server

The controllers have a built-in web server that allows direct connection to a PC via a local area network (LAN). This allows to consult certain data and settings via the PC instead of via the display of the controller.

Getting started

Make sure you are logged in as administrator.

• Use the internal network card from your computer or a USB to LAN adapter (see picture below).



USB to LAN adapter

• Use a UTP cable (CAT 5e) to connect to the controller (see picture below).



Configuration of the network card

• Go to My Network places (1).

	/	_1
Microsoft Excel	My Network Places	nation about, folders and files on other computers.
	Set Program Access and Defaults Printers and Faxes W Help and Support Search	
All Programs 🕨	7 Run	
	🖉 Log Off 🛛 💽 Shut Down	

81509D

• Click on View Network connections (1).



• Select the Local Area connection (1), which is connected to the controller.



• Click with the right button and select properties (1).





• Use the checkbox Internet Protocol (TCP/IP) (1) (see picture). To avoid conflicts, de-select other properties if they are selected. After selecting TCP/IP, click on the Properties button (2) to change the settings.



- Use the following settings:
 - IP Address 192.168.100.200
 - Subnetmask 255.255.255.0

Click OK and close network connections.

Configuration of the web server

Configure the web interface



The internal web server is designed and tested for Microsoft® Internet Explorer 6, 7 and 8. Other web browsers like Opera and Firefox do not support this internal web server. When using Opera or Firefox, a redirect page opens. Click on the hyperlink to connect to the download server from Microsoft® to download the latest version of Internet Explorer, and install this software.

• When using Internet Explorer; Open Internet Explorer and click on Tools - Internet options (2).



• Click on the Connections tab (1) and then click on the LAN settings button (2).



• In the Exceptions Group box, enter the IP address of your controller. Multiple IP addresses can be given but they must be separated with semicolons (;).

EGmple: Suppose that you already added two IP addresses (192.168.100.1 and 192.168.100.2). Now you add 192.168.100.100 and separate the 3 IP addresses by putting semicolons between them (1) (see picture).

Click OK (2) to close the window.

	Do not use proxy server for addresses beginning with:	
₩.Ξ	192.168.100.1; <mark>192.168.100.100</mark> ;192.168.100.2	
	Use semicolons (;) to separate entries.	
	OK Cancel	1

Viewing the controller data

• Open your browser and type the IP address of the controller you want to view in your browser (in this eGmple http://192.168.100.100). The interface opens and shows the dryer data.

Navigation and options

• The banner shows the compressor type and the language selector. In this eGmple, three languages are installed on the controller.

Languages	English
	English
	Nederlands (Dutch)
	Francais (French)

- On the left side of the interface the navigation menu can be found. If a license for ESi is foreseen, the menu contains 3 buttons.
 - o Dryer: shows all dryer settings.
 - Es: shows the ESi status (if a license is provided).
 - Preferences: allows to change temperature and pressure unit.



Dryer settings

All dryer settings can be hidden or shown. Put a mark for each setting. Only the machine status is fixed and cannot be removed from the main screen.

- Analog inputs (the units of measure can be changed in the preference button from the navigation menu).
- Counters: give an overview of all actual counters from controller and dryer.
- Info status: the machine status is always shown on the web interface.
- Digital inputs: gives an overview of all digital inputs and their status.
- Digital outputs: shows a list of all digital outputs and their status.
- Special protections: give an overview of all special protections of the compressor.
- Service plan: shows all levels of the service plan and status. This screen only shows the running hours. It is also possible to show the actual status of the service interval.
- ES screen controller: if an ESi license is provided, the button ES is shown in the navigation menu. At the left all compressors in the ES and at the right the ES status is shown.

3.17 Programmable settings

Description

The regulation and safety devices are factory-adjusted to obtain optimum performance of the dryer. No adjustments are required.



4 Installation

4.1 Dimension drawings



4.2 Installation proposal



Reference [Description	
(1)	Minimum free area to be reserved for the medical air unit installation	

- Install the equipment on a level floor, suitable for taking its weight. Provide enough space (approximately 800 mm (31.5 in)) around the air treatment unit (1) for installation and maintenance operations.
- Make sure that only clean parts come in contact with the outlet of the air treatment unit. If this is not the case, this may have an effect on the quality of the air delivered by the unit. This is also applicable for piping and other parts installed after the unit.
 Details about the special requirements concerning the degree of cleanliness can be found in EN 7396-1 and the herein mentioned standards and regulations.
- Make sure that the air delivered to the air treatment unit is within the allowed limitations. See section Reference conditions and limitations.
- The water separator (4) is followed by a general purpose C filter (5) and a high efficiency G filter (6). Install a drain tube (8) on the water separator and the C and G filters. The drain pipes (8) to the drain
collector must not dip into the water.

- •
- If the drain pipes are connected to a drain system, it is advised to place a non-return valve after the filters and the water separator to prevent liquid from being pushed into the dryer.
- For draining of pure condense water, install an oil/water separator. Consult your Customer Centre.

General recommendations

\triangle	The installation of the BA HE unit can only be done by trained and certified Atlas Copco service personnel.
	The preferred and recommended installation sequence is compressor(s) (3), vessel (2) and BA HE unit (1). It may be required to install an additional dew point sensor downstream the unit. Consult Atlas Copco before operating the unit. The BA HE does not require extra ventilation.
	The power cable must be connected by a qualified electrician. Check that the electrical installation corresponds to the applicable codes. Before switching on the main power supply, check the voltage requirements in the technical specifications or on the data plate of the unit. The BA HE unit must be earthed and protected against short circuits using fuses of the inert type. An isolating switch must be installed near the unit.
	Follow the correct start-up procedure. See section Operating instructions.
	In almost all cases the BA HE will be put in parallel with another similar unit. Ensure that the air flow cannot go from one pipeline to the other lines and put the proper pressure reducing valves after the entire BA HE unit before delivering the air to the user.
	Positioning: Place the unit at a location where the temperature and the concentration of certain gases, which are present in the ambient air, never exceed the limits. See also section Reference conditions and limitations.
	 Piping: All valves, couplings and pipes used/installed after the unit must be free from oil and grease (hydrocarbon contamination below 550 mg/m²) and dust (particles size below 50 micrometer). All connections to the unit must be mounted stress-free. Pay extra attention when connecting the compressed air lines to the unit's inlet and outlet.
	Verification: Before the installation is going to be used, a validation of the air quality according pharmacopoeia must be done. These records must be kept by the user at all times.

4.3 Electrical connections

General



The electrical wiring must comply with the local regulations. The air treatment unit must be earthed and protected by fuses against short-circuiting. Consult the electric diagram delivered with the unit.

Before switching on the main power supply, check the voltage requirements in the technical specifications or on the unit's data plate.

Installation

The air treatment unit can be connected to a supply voltage of 115 V AC as well as to 230 V AC. The transformer in the upper left corner of the control cubicle is standard wired for a supply voltage of 230 V AC.

In case of a supply voltage of 115 V AC, the L-phase wire should be reconnected at the primary side of the transformer as stated in the image below.



4.4 Pressure setting

The purge nozzle diameter and the timer settings are specific for the size and the operating pressure of the dryer of the air treatment unit.

In case the unit is bought as a package in combination with an ES-Medical and compressors, this matching is already performed by Atlas Copco.

If the operating pressure is different from the pressure for which the dryer was ordered, the nozzle (and in some cases also the timer settings) may have to be adapted. Contact Atlas Copco.

4.5 Pictographs

Pictographs on the data plate



Reference	Name
1	Caution, consult accompanying documents
2	Consult instructions for use
3	Temperature limitation
4	Manufacturer
5	Date of manufacture

MHRH 550 MHRH 550 Depend 1000 Can Depend



5 Operating instructions

Safety



Always observe all relevant safety instructions.

Initial startup

To start up the air treatment unit for the first time or after a long period of standstill, proceed as follows:

- 1. Close the air supply towards the purge control sensor.
- 2. Close the air supply from the compressor towards the unit by closing the inlet valve.
- 3. Close the outlet valve.
- 4. Remove the silencers of the dryer to prevent them from getting clogged by dust from the new desiccant. Wear a dust mask, safety glasses and ear protection. (This is only required at initial startup or after the desiccant was replaced).
- 5. Start the compressors or (in case the dryer is connected to an ES-Medical) start the compressors by starting the ES-Medical. Wait for pressure.
- 6. <u>Slowly</u> open the inlet valve of the air treatment unit.
- 7. Check all connections for air leaks and remedy if necessary.
- 8. Let the unit operate for several hours with the external outlet valve closed.
- 9. In case the silencers were removed, refit the silencers.
- 10. Check the dew point downstream the BA HE unit. When the atmospheric dew point has reached -40 °C to -45 °C (-40 °F to -49 °F), open the external outlet valve and set the flow according the specification of the unit (see section Technical data).

Make sure that the air flow does not exceed the specified flow and check what is the highest temperature the ambient air will have. **This flow must not be directed into the air net but needs to be blown off via another way!** The initial dew point of the air leaving the unit will be higher than normal after starting. Since the air needs to be according to Pharmacopoeia regulations, it is necessary to run the dryer for minimum 24 hours with the outlet air blown off to make sure that the pipes are not contaminated.

- When the atmospheric dew point has reached -48 °C (-54 °F), it is necessary to perform a validation of the air quality according Pharmacopoeia.
 When the quality of the air is confirmed, change over from blow off circuit to the air system by switching
- these valves. The records of these tests must be kept by the user at all times.12. Gradually open the external outlet valve.
- 12. On an the air supply towards the purge control (
- 13. Open the air supply towards the purge control sensor.

At initial startup, and specially when the dryer is loaded from the beginning, it can take a long time before the dew point is reached.
It is therefore recommended to operate the dryer for a number of days with the outlet valve closed.

 Before starting the unit make sure that all pipes are connected and that items in drains or pipes for protection during transport are removed.
--



Normal start

If the dryer has not been used for more than 3 months, refer to section Initial startup. In all other cases, proceed as follows:

- 1. Cut off the air supply from the compressor towards the dryer by closing the inlet valve.
- 2. Close the air supply towards the purge control sensor.
- 3. Close the outlet valve between the dryer and the air consumer.
- 4. Start the compressors and slowly open the inlet valve.
- 5. Ensure the dryer is powered on.
- 6. Gradually open the air outlet valve.
- 7. If applicable, close the bypass valves of the dryer.
- 8. Open the air supply towards the purge control sensor.

	Close the external inlet valve in case the compressor needs to be restarted. The high air speed in the startup phase of the compressor may damage the desiccant.
--	--

\triangleleft	 All valves, couplings and pipes used/installed after the unit must be free from oil and grease (hydrocarbon contamination below 550 mg/m²) and dust (particles size below 50 micrometer). For the location of the external inlet valve and external outlet valve(customer's installation), see section Installation proposal.
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During operation

- At regular intervals, check the status of the dryer on the dryer controller display. If the warning/alarm LED is alight, consult section Problem solving.
- Check the dew point regularly. If the dew point is too high, consult section Problem solving.
- Regularly check the differential pressure indicator of the filters. Replace the filter cartridge if the pressure drop is red.



• Regularly check that water is discharged via the drain outlet of the water separator.

Stopping

To stop the air treatment unit, proceed as follows:

- 1. Close the <u>inlet</u> valve (between the air receiver and the BA HE) and the <u>outlet</u> valve (between the BA HE and the air net).
- 2. Let the unit operate for a period without consumption, to depressurize the vessels.
- 3. Stop the air treatment unit.



If the air treatment unit is stopped for a longer period, keep the external inlet and outlet valve closed to avoid moisture from entering the unit. Under no circumstances must compressed air be allowed to flow through the unit when the electrical power is switched off. This will result in terminal failure of the desiccant material, causing regeneration will no longer be possible.

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6 Maintenance

6.1 Service agreements

Description

Since all service and maintenance has to be done by properly certified and trained service personnel, it is strongly advised to consider a service agreement. Pneumatech Customer Centers 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 set up a tailor-made service agreement. It will ensure optimum operational efficiency, minimize downtime and reduce the total life cycle costs.

6.2 Maintenance instructions

General

The PD dryer and the VT filter do not need any specific maintenance except for the desiccant and activated carbon, and catalyst replacement.

However, the scheduled performance and service life may decrease if liquid water or particles enter the unit. Therefore, correct maintenance of the water separator and the filters is crucial.

Safety precautions



Maintenance must be done by trained and certified service personnel. Use only authorized genuine parts. Check the correct operation after maintenance.

Before carrying out any maintenance or corrective activity, apply the following recommendations and safety precautions:

- Stop the unit and switch off the power.
- Disconnect all pressure sources and vent the internal pressure of the system before dismantling any pressurized component.
- Use genuine spare parts only. Consult the Spare Parts List for part numbers. For preventive maintenance, dedicated Service kits are available.
- Check for correct operation after maintenance.

Warranty-Product Liability

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

Any damage or malfunction caused by bad maintenance is not covered by Warranty or Product Liability.

Service kits

For overhauling or carrying out preventive maintenance, service kits are available for the desiccant and the filters (see section Service kits).

Preventive maintenance schedule

\triangleleft	Carry out following operations at the interval (period or running hours) which comes first. The longer interval checks must also include the shorter interval checks.
	The local Customer Centre may overrule the maintenance schedule depending on the environmental and working conditions of the unit.

Period (1)	Running hours (1)	Operation
Daily		 Check that the compressed air temperature does not exceed the limits. Check for alarms on the displays. Check working state of the unit. If options are installed, check their operation. On filters with automatic drain valve, check the sight glass at regular intervals. A liquid level indicates malfunction of the automatic drain valve. Replace the part if cleaning does not correct the problem. Filter elements need to be replaced when the pressure drop reaches 0.35 bar (5.08 psi).
Weekly	P	 Check for water or air leaks. Check for abnormal noise. If a pressure dew point (PDP) sensor is installed, check the filter of the pressure dew point sensor for dust and clean ifnecessary. Check the pressure drop over the filters. Check if all drains are working properly.
Monthly		Verify air quality delivered by the unit at regular intervals to guarantee correct usage in correspondence to the applicable legislation. Records of these measurements must be kept by the user.
Every 6 months	4000	 Check for air leaks. Service the automatic drain assembly of the water separator (WS). Check the elements of the filters. Replace if necessary. Check for damaged wiring or loose connections. VT+ filter: replace the active carbon and the catalyst CO gas sensors (option) need to be calibrated. Service silencer
Yearly	8000	 Exchange the dew point sensor. The certificate is valid only one year. Contact the supplier of your equipment for re-calibration of the PDP sensor. CO2 gas sensors (option) need to be calibrated. EWD (optional): replace the set of wearing parts
Every 2 years	16000	 Replace the PD service kit, desiccant, shuttle kits, seal kits, purge orifice kits, service inlet solenoid valve, diaphragm kits

(1) whichever comes first

The lifetime of the desiccant is related to the operating conditions. The scheduled lifetime
is only valid when operating in reference working conditions. If the desiccant becomes
contaminated due to more severe operating conditions, it will have to be replaced earlier.
It is recommended to have the desiccant replaced by a gualified service technician.

Check periodically that:

- All safety equipment is in good working order
- All hoses, cables, wiring, pipes 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
- Air outlet valves and manifold, hoses, couplings, ... are in good shape and free of wear or abuse

6.3 Service kits

Service kits

Service kits are available, offering the benefits of genuine parts while keeping the maintenance budget low. The kits comprise all parts needed for servicing.

A complete survey of available service kits is given in the Spare Parts Book.

Warning



6.4 Storage after installation

Procedure

When the desiccant is in good shape, stop the unit and keep all valves closed to avoid moisture from entering the unit.

\triangleleft	Keep the BA unit and its spare parts away from materials which easily oxidise (e.g. peroxides, chlorates, acids,). Spare parts must be stored in dry, cool and closed containers.
	Although the unit does not contain hazardous substances, it must be handled with care under any condition.

6.5 Disposal of 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.

7 Adjustments and servicing procedures

7.1 Servicing the water separator drain

Water separator drain (WS)



Procedure

Once every six months, service the automatic drain assembly:

- 1. Isolate the water separator from the air net by closing the external inlet and outlet valve of the unit (customer's installation).
- 2. Depressurize the separator by opening the manual drain valve on connection (3).



- 3. Unscrew the bowl (2). A whistling noise will warn you if the bowl is not fully depressurized. If this occurs, the bowl should be screwed back and the venting should be repeated.
- 4. Drain valve maintenance.



- 5. Screw the bowl completely on the separator head (1).
- 6. Repressurize and check for leaks.

Note.

For electronic water drain please follow instruction supplied with wear kit 2200 9020 17.

7.2 C, G and MED filter change

Filter



Procedure

Replace the filter elements yearly or every 4000 hours (whichever comes first), or if the pressure drop indicator is red.

Following procedure is valid for the C, G & MS filters:

- 1. Isolate the filter from the air net by closing the external inlet and outlet valve of the unit (customer's installation).
- 2. Depressurize the filter (3)



- 3. Unscrew the bowl (2). A whistling noise will warn you if the bowl is not fully depressurized. If this occurs, the bowl should be screwed back and the venting should be repeated.
- 4. Remove the filter element, and discard.
- 5. Fit the new filter element.
- 6. Screw bowl (2) back onto filter head (1).
- 7. Reset drain (3).



8. Open external inlet and out let valves.



7.3 Dryer unit desiccant cartridge change

Ensure shutdown and start up procedures are followed prior to carrying out any maintenance work on the dryer

Desiccant cartridge for BA HE 25 & BA HE 35 dryer

- 1. Remove prefiltration and hoses.
- 2. Unscrew four bolts ³/₄ turn on the opposite tower to aid desiccant changeout process.
- 3. Unscrew the four pressure housing retaining bolts and slide out the pressure housing.
- 4. Remove banjo fixing bolt using hex key.
- 5. Extract end cap and banjo assembly from pressure housing.
- 6. Using banjo fixing bolt, retract the cartridge from pressure housing.
- 7. Replace with new cartridge supplied as part of the cartridge service kit.
- 8. Ensure O-ring seals are in place when installing cartridge and assembly in pressure housing.
- 9. Follow above steps in reverse to finish installing new cartridge into the dryer.
- 10. Repeat steps 1 10 for the second pressure housing.
- 11. Ensure the dryer is leak-free before operating pressure is applied to the dryer.
- 12. Follow start up procedure as stated on page 24 of this manual.
- 13. Reset the controller.
 - After following the start-up procedure it is necessary to reset the controller. This is done by using the re-set disc (supplied with cartridge service kit) then:
 - Hold the disc against the blue pad on the front display of the dryer panel for 5 seconds.
 - During the five second period the power indicator will flash green. When the reset has been successful indicator X will flash green once to confirm that it has been completed successfully.

Desiccant cartridge for BA HE 45 – BA HE 300 dryer

Maintenance information leaflet is provided with each desiccant cartridge replacement kit showing how to carry out the change out.

Warning

To ensure that the unit always produces pharmacopoeia compliant air, only dedicated and genuine spare parts must be used.
The installation and maintenance must be done by trained and certified personnel.







When replacing desiccant, make sure that the desiccant is disposed of according to the local regulations. Consult the parts list for part numbers.

Pharmacopoeia compliance



7.4 VT filter maintenance

Service



Change the VT filter element 6M or every 4000 hours, whichever comes first. Its pressure drop will not increase during its useful life. Nevertheless, the adsorption element must be changed earlier at the first signs of oil vapour and odour.

When the filter has to process air with a temperature higher than the reference temperature, the filter's lifetime will shorten considerably. It is then advisable to oversize the filter.

The air flow of the filter is from the bottom to the top of the filter. Due to the composition of the activated carbon element, the bag must be placed with the knot at the top of the bag. Observe the correct order of the bags (activated carbon first, than catalyst)!

If an oil indicator is mounted, the purity of the air is measured. When the indicator shows a fast increase of oil content in the air, the VT filter element and the indicator tube have to be replaced.

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Procedure

- 1. Isolate the filters from the air net.
- 2. Depressurize the VT+ filter by means of the UD+ filter drain.
- 3. Uncouple the pipe at the inlet with the flange.
- 4. Unscrew the head.
- 5. Remove the spring and the perforated plate.
- 6. Remove the filter bag(s).
- 7. Clean the extrusion and heads with a dry clean cloth.
- 8. Place a new filter bag inside the extrusion. The label "This side up" must be at the top of the bag.
- 9. Replace the o-ring in the head (and between the heads).
- 10. Reposition the perforated plate and spring.
- 11. Screw the head completely on the extrusion.
- 12. Torque the bolts with 40 Nm.
- 13. Connect the head and flange at the inlet of the filter. Replace the o-ring between the flange and the head.
- 14. Slowly pressurize the filters.
- 15. Check for leaks.

A small amount of water based lubricant (supplied in the cleaning kit) may be applied to screw threads and

o-rings to facilitate the assembly.

Traceability

The catalyst and activated carbon bags are labeled with production date, batch number and part number.

Warning

To ensure that the unit always produces pharmacopoeia compliant air, only dedicated and genuine spare parts must be used.
The installation and maintenance must be done by trained and certified personnel.

Note

\triangleleft	When replacing the activated carbon and catalyst, make sure that the activated carbon and catalyst are disposed of according to the local regulations.
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Purge plug identification/changeout BA HE 25 & 35 7.5



Ensure shutdown and start up procedures are followed prior to carrying out any purge plug changeout

Purge Plug Identification

Model	Operating F	Operating Pressure (barg)											
	4	5	6	7	8	9	10	11	12	13	14	15	16
BA 25	PPK020	PPK018	PPK016	PPK015	PPK014	PPK014	PPK013	PPK013	PPK013	PPK012	PPK012	PPK012	PPK012
BA 35	PPK028	PPK023	PPK021	PPK020	PPK018	PPK018	PPK016	PPK015	PPK015	PPK014	PPK014	PPK014	PPK014



- Remove dryer front panel.
- Remove purge plug securing screw from the upper valve block.
- Remove purge plug. Replace with appropriate purge plug according to inlet pressure.
- Refer to table above.

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Grease purge plug O-ring to ensure ease of fit



- 1. Securing screw
- 2. Purge plug



7.6 Purge orifice identification/changeout BA HE 45 - 300

- Reference figure page 84 and the Purge Plug Identification Table.
- The lettering (A through S), located on the purge valve body, indicates the orifice size selected to suit the operating pressure of the dryer per the chart below.
- If the inlet pressure to the dryer will be different than the pre-set orifice size, the purge valve can be adjusted.
- Most dryers use a single orifice purge valve represented by the Blue and Green single letter references in the table below.
- Larger dryers may require a two or three hole purge valve as represented by the Red and Yellow two and three letter references.
- To select the correct orifice size, locate the appropriate dryer model at the left side of the table and then the operating pressure at the top.
- Make sure that the correct valve body (1, 2 or 3 hole) and orifice disc (01, 02, 03 or 04) has been supplied with the dryer. The discs have the number (01, 02, 03 or 04) stamped out at the top.

	ALCOK ALCOK									
Purge Plug	Identifica	tion		R	RES	Depend On				
Operating pressure	4	5	6	Z	you gan	39	10	11	12	13
Dryer				anjence	594					
MED/BAP 21	М	K	1 3	2 BAL B	G	F	E	Е	Е	D
MED/BAP 35	В	S	Р	М	L	L	K	l I	l I	Н
MED/BAP 42	С	А	Р	Р	N	L	K	J	1	Н
MED/BAP 52	1	Е	С	А	Р	М	K	K	J	1
MED/BAP 71	СК	М	G	F	С	В	A	S	S	P
MED/BAP 104	AFK	FN	DL	Р	К	Н	F	E	D	С
MED/BAP 142	DIN	СНМ	AFK	GP	DL	СК	BJ	М	l I	Н

HYG-BLEED	1.5	1.25	1.25	1	1	0.75	0.75	0.75	0.75	0.5
Disc										
01										
02										
03										
04										

Instruction book



- Reference figure above and the Purge Plug Identification Table on page 83.
- Once the correct purge body (1, 2 or 3 hole) and orifice disc (01, 02, 03 or 04) has been selected per the instructions on Page 78, the purge valve may be assembled.
- The index letters located on the purge valve body correspond with the selected orifice sizes per the Table on Page 78.
- Place the appropriate orifice disc onto the valve body, taking care to align the notches. The disc will only fit in one position. Place the valve stem O-ring(s) into their corresponding recesses on the back of the valve stem.
- Align the holes in the purge sealing gasket with the corresponding holes in the valve stem.
- Rotate the valve stem assembly so that the correct orifice letters align with the notches corresponding to the holes (1, 2 or 3) in the valve stem.
- Press the assembly together and fasten with the M4 screw.
- Double check to make sure that the open orifice holes correspond with the correct orifice selection as identified earlier.

8 **Problem solving**

Use only authorised genuine parts. Any damage or malfunction caused by the use of unauthorised parts is not covered by Warranty or Product Liability. Apply all relevant Safety precautions during maintenance or repair.
All valves, couplings and pipes used/installed after the unit must be free from oil and grease (hydrocarbon contamination < 550 mg/m^2) and dust (particles size < 50 micrometer).
Before carrying out any maintenance or repair work on the BA HE unit: make sure that the tower or unit is not active or under pressure and switch off the voltage. Open the isolating switch to prevent an accidental start. Close air inlet and outlet valve (2) of the unit.

Faults and remedies, PD dryer

Condition	Fault	Remedy
Too high dew point	The dryer has not had the time to regenerate completely	Close the valve installed between the unit and the application (if permitted) and have the desiccant regenerated
	The silencers are clogged	Replace the silencers
	A drain is not working correctly	Check the drain valve of the WS and filter
	The air flow through the dryer is too high	Check for correct application
	The outlet pressure is too low	Check whether the compressor provides enough air for the application
4	The inlet temperature is too	Check the compressor aftercooler
The dryer produces a lot of noise	Check the silencers and their fiGtion	Replace the silencers if necessary or correct its fiGtion
Insufficient air leaves the dryer	Too much purge air escapes	Check the condition of the solenoid valve and replace it if necessary Check if the correct purge orifice is installed
LED Service warning/ Service alarm is alight	Both LED's are timer controlled and will light up after a certain time (orange LED (warning) after 7750 hours, red LED (alarm) after 8000 hours).	Contact your service centre for maintenance. Reset the timer after maintenance
Connection hoses	Hoses obstructed, ruptured or leaking	Check/clean piping and connections, replace worn parts
Instruction book missing or unreadable		Replace (contact your supplier)
Data label	Not present or unreadable	Clean or replace (contact your supplier)

Faults and remedies, water separator (WS)

For all references below, consult section Servicing the water separator drain.

Condition	Fault	Remedy
Condensate is not discharged from the separator	Discharge pipe clogged	Check and correct as necessary
	Drain valve of separator malfunctioning	Remove drain valve assembly, clean and check

Faults and remedies, filters

For all references below, consult section C, G and MS filter change.

Condition	Fault	Remedy
The filter produces a whistling noise	Filter bowl not correctly mounted	Refit the filter bowl correctly
Bad filtration	Filter element damaged	Replace
Insufficient air leaves the filter	Filter clogged	Clean the filter bowl and replace the filter element

VT filter

Condition	Fault	Remedy
Bad filtration	Activated carbon lifetime exceeded	Replace the activated carbon at the indicated intervals
	Wet air from dryer in activated carbon	Check proper functioning of the dryer
	Activated carbon not compressed	Check if spring is (properly) fitted
Too high CO concentration at outlet	Wet air from the dryer	Check proper functioning of the dryer Replace the desiccant at indicated intervals
	Too much CO at inlet	Check proper working conditions

Faults and remedies, ancillaries

Condition	Fault	Remedy
Inlet solenoid completely or partially closed/opened	Electrical faultMechanical fault	Check wiringReplace defective parts
Pressure sensors: malfunctioning	Mechanical defect (e.g. diaphragm ruptured)	Replace defective parts
Pressure sensors: error signal (no measurement)	 Electric connection interrupted Mechanical damage (e.g. too high mounting torque) Connection plugs not connected Crack due to incorrect mounting Internal defect No supply voltage 	Check connectionsCheck sensors
Pressure sensors: too high or too low indication	 Condense on connection plugs Faulty supply signal Clogging or contamination Sensor internally defect Deviation due to ageing Deviation due to incorrect production 	 Check sensors Replace defective parts
Pressure regulator: wrong outlet pressure	Wrong setting	Check gauge of pressure regulatorAdjust pressure

Condition	Fault	Remedy
Dew point sensor malfunctioning	No direct feedback of dew point	Replace defective parts
Dew point sensor: no measurement (error signal)	No direct feedback of dew point	Check connectionsCheck sensors
Dew point sensor: incorrect measurement	Dew point alarm generated too early or too late	Check sensorsReplace defective parts

Faults and remedies, controller

Condition	Fault	Remedy
Doesn't read in pressure or dew point	Software fault	Reprogram the controllerCheck wiring
Doesn't issue alarm(s) when it should	 Software fault Connection fault between the controller and the control room display 	Reprogram the controllerCheck wiring
Doesn't issue service warnings when it should	Software fault	Reprogram the controller
Keeps exhaust valves closed (for purge of dryer)	 Software fault Communication fault 	 Reprogram the controller Check wiring Check solenoid
	СОЛОВИ Цом Сан Дерени Ехреніенсе Уом Сан Дерени Ехреніенсе Уом Сан Дерени Ехреніенсе Уом Сан Дерени	

9 Technical data

9.1 Fuse values

Attention



The indicated fuse value is the maximum value. The cable size used may specify fuses of a lower value.

Values

	Frequency	Voltage	Fuse specification	Maximum fuse value
IEC	50 Hz	230 V	gL/gG	16 A
CSA/UL	60 Hz	115 V	CSA HRC/UL RK5	16 A
CSA/UL	60 Hz	230 V	CSA HRC/UL RK5	16 A

9.2 Electric cable size

Attention

\wedge	Local regulations remain applicable if they are stricter than the values proposed below.
	The voltage drop must not exceed 5% of the nominal voltage. It may be necessary to use
	cables of a larger size than those stated to comply with this requirement.

	Frequency	Voltage	Minimum cable size
IEC	50 Hz	230 V	3 x 2.5 mm²
CSA/UL	60 Hz	115 V	3 x AWG14
CSA/UL	60 Hz	230 V	3 x AWG14

9.3 Device settings

Regulating and safety devices

The regulating and safety devices are factory-adjusted to obtain optimum performance of the dryer. Do not alter the setting of any of the devices.

9.4 Reference conditions and limitations

Reference conditions

	Units	
Compressed air inlet pressure	bar(e)	See Technical data
Compressed air inlet pressure	psig	See Technical data
Compressed air inlet temperature	°C	35
Compressed air inlet temperature	°F	95
Ambient temperature	°C	5 to 40
Ambient temperature	°F	41 to 104
Inlet relative air humidity	%	95
Pressure dew point	°C	-40
Pressure dew point	°F	-40

Limitations

	Units	
Maximum compressed air inlet pressure	bar(e)	13
Maximum compressed air inlet pressure	psig	188
Minimum compressed air inlet pressure	bar(e)	4
Minimum compressed air inlet pressure	psig	58
Maximum concentration of contaminants: 1,000		
O ₂ concentration	%	20.4 < x < 21.4
CO ₂ concentration	ppm	700
SO ₂ concentration	ppm	5
NO _x concentration	ppm	5
Water vapour amount	%	100
Oil vapour amount	mg/m ³	3

9.5 Technical data

Data at 7 bar inlet pressure

	Unit	BA 25	BA 35	BA 45	BA 75	BA90
Volume flow at dryer inlet	l/s	12	17	21	35	42
Volume flow at dryer inlet	cfm	25.5	36	44.5	74.2	89
Pressure drop over dryer	mbar	900	1400	1100	1000	900
Pressure drop over dryer	psi	13,05	20,3	15,95	14,5	13,05
Time of half a cycle	s	154	154	154	154	154
Regeneration time	s	120	120	120	120	120

	Unit	BA 25	BA 35	BA 45	BA 75	BA 90
Pressurization time	s	34	34	34	34	34
Installed power	W	240	240	240	240	240
Net mass	kg	77	87	102	108	130
Net mass	lb	170	192	225	238	286
Air quality (Pharmacopeia)						
O ₂ concentration	%			20 <x< 22</x< 		
CO ₂ concentration	ppm			700		
CO concentration	ppm			50		
SO ₂ concentration	ppm			5		
NO _x concentration	ppm			5		
Pressure dew point	°C			-40		
Pressure dew point	°F			-23.8		
Oil vapour	mg/m³			0.1		
Taste and odour				free		

SD.							
	Unit	BA 110	BA 150	BA 220	BA 300		
Volume flow at dryer inlet	I/s	O ^M 52	71	104	142		
Volume flow at dryer inlet	cfm)eper	137.7	169.5	211.9	307.2		
Pressure drop over dryer	mbar	900	900	1000	1400		
Pressure drop over dryer	psi	13,05	13,05	14,5	20,3		
Time of half a cycle	S	154	154	154	154		
Regeneration time	s	120	120	120	120		
Pressurization time	s	34	34	34	34		
Installed power	W	240	240	240	240		
Net mass	kg	184	184	261	309		
Net mass	lb	465	465	639	745		
Air quality (Pharmacopeia)							
O ₂ concentration	%			20 <x<22< td=""><td></td></x<22<>			
CO ₂ concentration	ppm			500			
CO concentration	ppm			5			
SO ₂ concentration	ppm			1			
NO _x concentration	ppm			2			
Pressure dew point	°C			-31			
Pressure dew point	°F			-23.8			
Oil vapour	mg/m³			0.1			
Taste and odour				free			

Data at 10 bar inlet pressure

	Unit	BA 25	BA 35	BA 45	BA 75	BA 90
Volume flow at dryer inlet	l/s	16	23	29	49	58
Volume flow at dryer inlet	cfm	33.9	48.7	61.4	103.8	122.9
Pressure drop over dryer	mbar	1000	1600	1200	1100	1000
Pressure drop over dryer	psi	14,5	23,2	17,4	15,95	14,5
Time of half a cycle	S	154	154	154	154	154
Regeneration time	s	120	120	120	120	120
Pressurization time	S	34	34	34	34	34
Installed power	W	240	240	240	240	240
Net mass	kg	77	87	102	108	130
Net mass	lb	170	192	225	238	286
Air quality (Pharmacopeia)						
O ₂ concentration	%			20 <x< 21</x< 		
CO ₂ concentration	ppm			500		
CO concentration	ppm			5		
SO ₂ concentration	ppm			1		
NO _x concentration	ppm	SV		2		
Pressure dew point	°C	- OK	•	-31		
Pressure dew point	°F	Jan Bar	On	-23.8		
Oil vapour	mg/m ³	Depen		≤ 0.1		
Taste and odour	you	2.830		free		
	mience 50	2	1	I		1

Experigo0-	Unit	BA 110	BA 150	BA 220	BA 300
Volume flow at dryer inlet	l/s	71	91	142	194
Volume flow at dryer inlet	cfm	150.4	192.8	300.8	411
Pressure drop over dryer	mbar	1000	1000	1200	1700
Pressure drop over dryer	psi	14,5	14,5	17,4	24,65
Time of half a cycle	s	85	85	85	85
Regeneration time	s	65	65	65	65
Pressurization time	s	20	20	20	20
Regeneration air consumption (average)	%	15.4	15.4	15.4	15.4
Installed power	W	240	240	240	240
Net mass	kg	184	184	261	309
Net mass	lb	405	405	575	681
Air quality (Pharmacopeia)					
O ₂ concentration	%			20 <x< 22</x< 	
CO ₂ concentration	ppm			500	
CO concentration	ppm			5	
SO ₂ concentration	ppm			1	
NO _x concentration	ppm			2	
Pressure dew point	°C			-31	

Instruction book

•	Pressure dew point	°F		-23.8	
•	Oil vapour	mg/m³		0.1	
•	Taste and odour			free	

Data at 13 bar inlet pressure

	Unit	BA 25	BA 35	BA 45	BA 75	BA 90
Volume flow at dryer inlet	l/s	21	29	37	62	75
Volume flow at dryer inlet	cfm	44.5	61.4	78.4	131.4	159
Pressure drop over dryer	mbar	1200	2000	1300	1200	1100
Pressure drop over dryer	psi	17,4	29	18,85	17,4	15,95
Time of half a cycle	S	154	154	154	154	154
Regeneration time	S	120	120	120	120	120
Pressurization time	S	34	34	34	34	34
Installed power	V	240	240	240	240	240
Net mass	kg	77	87	102	108	130
Net mass	lb	170	192	225	238	286
Air quality (Pharmacopeia)						
O ₂ concentration	%	Spend	On	20 <x< 22</x< 		
CO ₂ concentration	ppm	an Depa		500		
CO concentration	ppmyou	0.83		5		
SO ₂ concentration	ppm 50	t for		1		
NO _x concentration	ppm			2		
Pressure dew point	°C			-31		
Pressure dew point	°F			-23.8		
Oil vapour	mg/m³			0.1		
Taste and odour				free		

	Unit	BA 110	BA 150	BA 220	BA 300
Volume flow at dryer inlet	l/s	91	124	182	248
Volume flow at dryer inlet	cfm	192.8	262.7	385.6	525.5
Pressure drop over dryer	mbar	1100	1100	1300	2000
Pressure drop over dryer	psi	15,95	15,95	18,85	29
Time of half a cycle	s	154	154	154	154
Regeneration time	s	120	120	120	120
Pressurization time	s	34	34	34	34
Installed power	W	240	240	240	240
Net mass	kg	184	184	261	309
Net mass	lb	405	405	575	681

Instruction book		pneumatech Pure air - Pure gas
Air quality (Pharmacopeia)		
O ₂ concentration	%	20 <x< 22</x<
CO ₂ concentration	ppm	500
CO concentration	ppm	5
SO ₂ concentration	ppm	1
NO _x concentration	ppm	2
Pressure dew point	°C	≤ -31
Pressure dew point	°F	≤ -23.8
Oil vapour	mg/m³	≤ 0.1
Taste and odour		free

Remark

When the actual inlet pressure or inlet temperature differs from the reference condition, the volume flow will be different. Consult your supplier.

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10 European Directives

10.1 Instructions for Use

Instructions

	Description
1	The dryers can contain pressurized air. This can be potentially dangerous if the equipment is misused.
2	The towers of the dryer consist of an extruded profile, which must only be used as a compressed air vessel and must be operated within the limits specified. See section Pressure equipment directives, table A.
3	No alterations must be made to the vessels by welding, drilling or other mechanical methods without the written permission of the manufacturer.
4	The design pressure and temperature of this pressure bearing part must be clearly indicated on the data label.
5	If installed, the safety valve must correspond with pressure surges of 1.1 times the maximum allowable operating pressure. This should guarantee that the pressure will not permanently exceed the maximum allowable operating pressure of the vessel.
6	Original bolts have to be used after opening for inspection. The maximum torque has to be taken into consideration (see table below).

Maximum bolt torque

Thread size	Tightening torque (Nm)	Allowed deviation (Nm)		
M3	1	0.3		
M4	2.4	0.6		
M5	5	1.2		
M6	8	2.1		
M8	20	5		
M10	41	10		
M12	73	18		
M14	115	29		
M16	185	46		
M18	238	60		
M20	335	84		

10.2 Pressure equipment directives

Components are subject to Pressure Equipment Directive 2014/68/EU.

Parts of article 4.3 of 2014/68/EU are subject to Sound Engineering Practice (SEP).

Parts of category I according to 2014/68/EU are integrated into the machine and fall under the exclusion of article I, section 2-(f)-(i).

Below table contain the necessary information for the inspection of all pressure equipment of category I according Pressure Equipment Directive 2014/68/EU.

DRYER TYPE	DESIGN PRESSURE (BARG)	DESIGN TEMPERATURE (°C)	PED CATEGORY	MODULE	EXTRUSION WALL THICKNESS (mm)	EXTRUSION INTERNAL DIAMETER (mm)	VOLUME (Litres)
PD025	16	5 to 50°C	CAT I	А	3	86	11
PD035	16	5 to 50°C	CAT II	D1	3	86	15.8
PD0046	13	5 to 50°C	CAT II	D1	7	149	22.2
PD0056	13	5 to 50°C	CAT II	D1	7	149	25.2
PD0075	13	5 to 50°C	CAT II	D1	7	149	31.4
PD0090	13	5 to 50°C	CAT II	D1	7	149	35.9
PD0110	13	5 to 50°C	CATII	D1	in 7	149	44.6
PD0150	13	5 to 50°C	CATI	Dieper	7	149	56.8
PD0180	13	5 to 50°C	CATII	CANDI	0 7	149	66
PD0220	13	5 to 50°C	CATI	B1+D	7	149	88.6
PD0300	13	5 to 50°C	CATI	B1+D	7	149	113
PD0360	13	5 to 50°C	CATIII	B1+D	7	149	131.5

Recommendation of the manufacturer for the re-inspection time

Following actions are to be executed by authorized service personnel, unless stated differently in the applicable legislation. The stated time interval has as reference the day of start-up of the unit.

- Every 6 months: visual check of the vessel material on the outside (exposed) for traces of strong corrosion. Consult the service department of your supplier if necessary.
- Every 5 years: when replacing the desiccant, following inspections are to be carried out:
 - Inspection of outside and inside of the material for excessive and local corrosion,
 - Inspection of outside and inside of the material for fissures, leaks, damage.
 - Consult the service department of your supplier if necessary.
- Every 10 years: hydrostatic test according to the Pressure Equipment Directive 2014/68/EU. Consult the service department of your supplier if necessary.





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