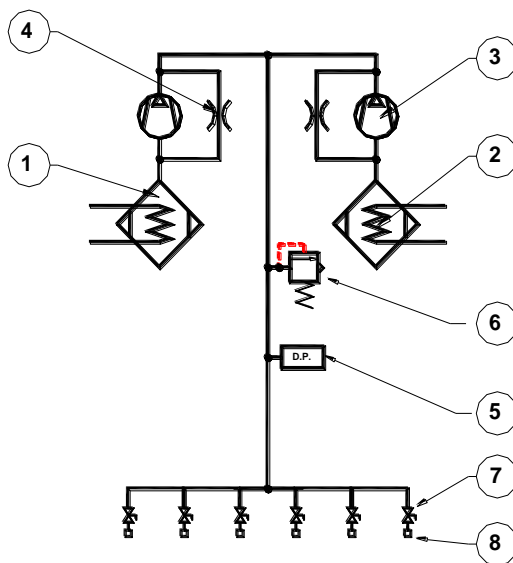


**MINILAB DEHYDRATOR**

**USER MANUAL**



- 1 DRYING TOWER
- 2 HEATER
- 3 PUMP
- 4 AIR BACKWASHING HOLE
- 5 HUMIDITY DETECTOR
- 6 SAFETY VALVE
- 7 SHUTOFF VALVE
- 8 DRY AIR OUTLET

C14336.011-E.MUG

## 1. SAFETY PRECAUTIONS










This is the safety alert symbol. It is used to alert you to personal injury hazards. Obey all safety instructions that follow this symbol to reduce the risk of possible injury or death as well as property damage.








### WARNING

**READ CAREFULLY THE PRODUCT INSTALLATION, OPERATING AND MAINTENANCE MANUAL. THIS PRODUCT MUST BE INSTALLED ONLY BY QUALIFIED TECHNICIANS. FOLLOW ALL APPLICABLE LOCAL AND STATE CODES AND REGULATIONS.**






### GENERAL SAFETY INFORMATIONS

|   |   |
|---|---|
|  | <ul style="list-style-type: none"> <li>Do not apply any modification or adjustment to the machine.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>The machine must be installed only following the instructions provided by the user manual.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li><b>IMPORTANT:</b> improper installation and operation of the machine will result in unsatisfactory performance or failure of the system and will also void your warranty.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>Make sure that the installation place has a good ambient ventilation.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>Air must not be discharged in the same fuel exhaust discharge outlet of other gas machines.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>Ventilation grid must not be choked.</li> </ul>  |
|  | <ul style="list-style-type: none"> <li>If the power supply cable is damaged it must be replaced <b>only</b> by the manufacturer or authorized and qualified personnel to avoid dangerous situations.</li> </ul>             |





## SAFETY INSTRUCTIONS

|   |   |
|---|---|
|  | <ul style="list-style-type: none"> <li>• Follow the instructions provided together with the machine.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• <b>DANGER:</b> make attention during machine displacement or movement. Electrocutation, burst and burn hazard. Use always qualified gloves.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>• Do not install or use the machine if it is damaged.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• Check the correct in-plane position after the installation with a bubble level.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• Make sure of the correct air ventilation inside the machine.</li> </ul>  |

## ELECTRICAL INSTALLATION

|   |  |
|---|--|
|  | <ul style="list-style-type: none"> <li>• <b>WARNING:</b> burn and electrocution hazard.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• The machine must be electrically grounded. Check for the correct ground connection.</li> </ul>          |
|  | <ul style="list-style-type: none"> <li>• Do not use extension cables.</li> </ul>   |
|  | <ul style="list-style-type: none"> <li>• <b>DANGER:</b> do not touch any power supply cable or power supply connector with wet hands.</li> </ul> |
|  | <ul style="list-style-type: none"> <li>• This machine respects the CEE directive.</li> </ul>   |

## OPERATION SAFETY PRECAUTIONS

|   |   |
|---|---|
|  | <ul style="list-style-type: none"><li>• <b>DANGER:</b> risk of death, burn, injuries or property damage.</li></ul>  |
|  | <ul style="list-style-type: none"><li>• Do not apply any modification or adjustment to the machine technical specifications.</li></ul>                                      |
|  | <ul style="list-style-type: none"><li>• <b>WARNING:</b> do not place or keep any inflammable liquid, material or object near, over or inside the machine.</li></ul>         |
|  | <ul style="list-style-type: none"><li>• Before any work or maintenance is performed on the machine, turn off the power supply and release pressure in the system.</li></ul> |



## 2. FEATURES

Output pressure : factory set at 2 kPa, on request from 1 kPa to 6 kPa  
(pressure is indicated on the rear label)

Maximum flow rate : 150 liters per hour

Safety valve : built in, set at 7 kPa  $\pm$  15%

Output air dew point : better than  $-45^{\circ}\text{C}$ , @  $20^{\circ}\text{C}$  ambient temperature, 80%  
Relative Humidity

Desiccant regeneration : automatic by heating

Local alarms : power and system failures, low/high pressure, high  
humidity

Remote alarms : the summary alarm is remotely signaled by a SPDT  
relay

Optional remote monitoring interface : 10/100 BaseT Ethernet, auto-sensing with the  
following protocols HTTP, TCP/IP, SNMP, TFTP,  
FTP, Telnet, DHCP

Led indications : power on, alarm codes

Acoustic noise :  $\leq 50$  dBA at 1 m far and 1,5 m high

Enclosure degree of protection : IP20 according to IEC529

Operating temperature :  $-10^{\circ}\text{C} \div + 50^{\circ}\text{C}$

Storage temperature :  $-40^{\circ}\text{C} \div + 70^{\circ}\text{C}$

Power supply std : • 48/60 Vdc (from 36 to 72 Vdc)

- 100 – 240 Vac (from 90 to 264 Vac) 50/60 Hz,  
with apposite power supply kit code K14524

Power consumption :  $< 2,5$  W (at steady state without system leakage)  
 $< 55$  W (max during regeneration phase)

- Dimensions :
- 19" rack mounting:  
L= 482; H= 88 (2U); D= 190 mm
  - wall and floor mounting:  
L= 482; H= 88; D= 216 mm
  - frame N3 mounting:  
L= 533; H= 88; D= 190 mm

Weight : about 4,2 kg

Standard outlets : 6 outlets, each with shut off valve

Outlets fitting : 7 mm diameter, others on request



|   |  |
|---|--|
| Shock and vibration                     |  |
| Transportation                          | : conform to ETSI EN 300 019-1-2, Class 2.3  |
| Stationary use                          | : conform to ETSI EN 300 019-1-3, Class 3.1E |
| Low Voltage Directive                   | : 2014/35/EU                                 |
| Electromagnetic Compatibility Directive | : 2014/30/EU                                 |
| Safety Normative                        | : IEC/EN 60950-1                             |
|   | Certified to CB, test ref. n° SE-64590A1     |
| Electromagnetic Compatibility Normative | : EN 55022 class A and B                     |
|   | EN 61000                                     |
|   | ETSI EN 301 489-1                            |
|   | ANSI CFR 47 part 15                          |
| Environmental compliance                | : 2011/65/EU (RoHS2)                         |
|   | 1907/2006 (REACH)                            |
| Marks                                   | : CE   |
|   | CB   |
|   | UKCA   |

### 3. DESCRIPTION

The MINILAB dehydrator is designed for continuous operation and automatic duty. It supplies dry air up to 150 l/h with dew point better than -45 °C.

The standard output pressure is 2 kPa, other pressures in the range from 1 to 6 kPa are available on request.

Dry air is vented by six independent air outlets with hose-tail fittings accessible from the back side of the equipment. Each outlet has an independent shutoff valve.

The air is dried through absorption by granular substances in two drying towers. While a tower dries (incoming air releases most of its molecules of water by adsorption) the other one is regenerated by heating and backwashing with a reverse dry air flow. The electronic microprocessor board controls drying cycles and adjusts cycles duration according to plant air needs.

Air is compressed by two diaphragm pumps. A fundamental feature of the MINILAB dehydrator is the continuous tracking of output pressure. The PWM (Pulse Width Modulation) technique is used to control the pumps speed to optimize pumps duty, power consumption, acoustic noise, and to improve reliability. Pumps speed control avoids mechanical pressure regulators that introduce undesirable pressure losses and a worst response to flow needs.

The equipment is designed for wall, floor, 19" and ETSI N3 standard racks mountings with 2 U modular height.

The MINILAB dehydrator does not need pre-settings nor warm up time before startup. It does not need preventive maintenance along its lifetime.

No radioactive or chemically hazardous components are used.

## 4. INSTALLATION

The MINILAB dehydrator is designed for wall mounting, floor mounting and for both 19" standard rack and N3 standard frame mountings.

The equipment is factory assembled for 19" rack mounting.

ETSI-N3 mounting brackets and the relevant screws are supplied in the ancillary kit.

### 4.1 Rack mounting

The dehydrator must be placed in the upper part of the rack without any other equipment on top.



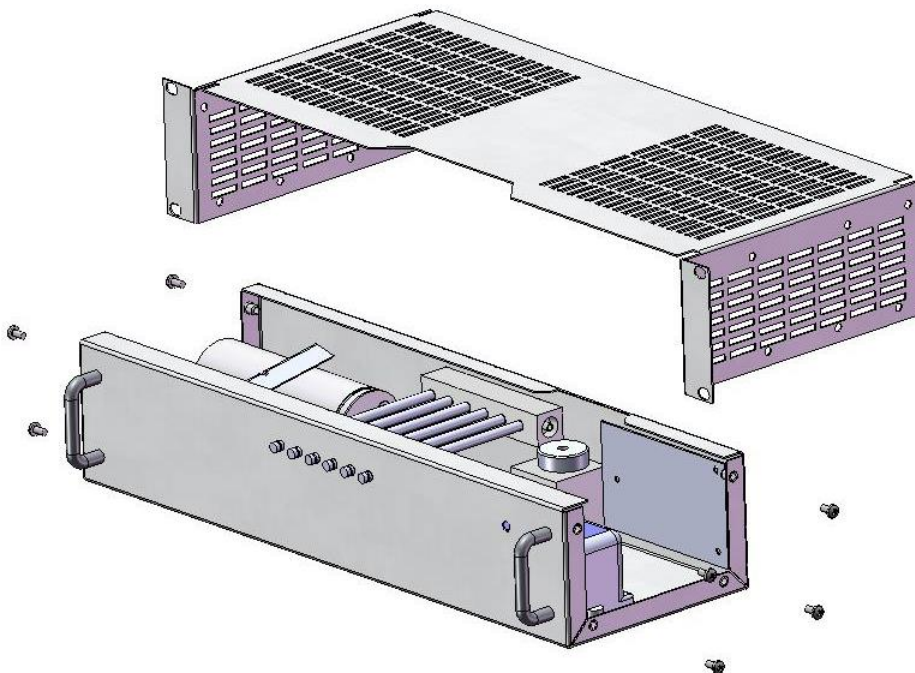
**It is mandatory to leave at least one unit of free space from the top of the dehydrator to the closest equipment, in order to dissipate generated heat.**

If the dehydrator has to be mounted on N3 rack, tighten the ETSI-N3 brackets with the same screws used for 19" rack mounting. Put the dehydrator into the frame and lock it with the screws supplied in the ancillary kit.

### 4.2 Wall and floor mounting

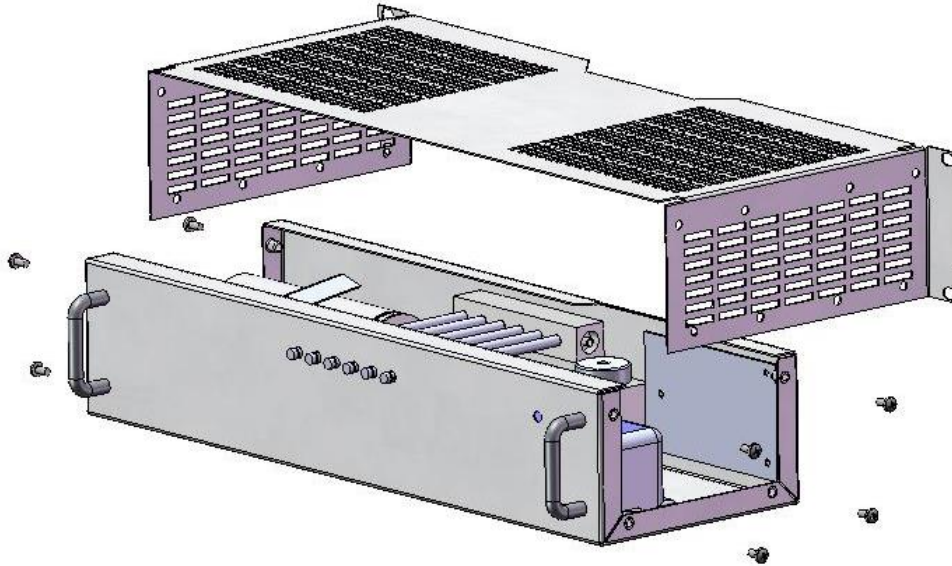
MINILAB dehydrator comes in 19" rack mount configuration. If wall mount configuration is desired, follow these steps:

- 1) Unscrew four pan-head screws on each lateral side of the box.
- 2) Pull the top cover out of the bottom case (as shown in the figure)





- 3) Turn the top cover around (with lateral wings facing backwards).



- 4) Slide the top cover into the bottom case; make sure that the top face of the cover is below the bend of the bottom case.
- 5) Fix the top cover to the case with screws.
- 6) Refer to chapter 6 for dimensions of fixing holes in the wall or in the floor.

### 4.3 Pneumatic connections

The MINILAB has six air outlets. Each outlet is equipped with an independent shutoff valve on front side.

Open, by pulling relevant knob, only valves corresponding to used outlets, keep all the others closed by pushing relevant knob.

### 4.4 Electrical connections

Two male connectors are placed on the rear side:

- **J1**, 3 pin D-sub-3W3-C, for DC power connection;
- **J2**, 9 pin IEC48B D series, for remote alarm output.





4.4.1 Power connection

An appropriate disconnect device shall be provided as part of the building installation. Disconnect the dehydrator from the supply for servicing.

Protection for short-circuit and earth failures of power conductors is a function assigned to installation area system.



The dehydrator requires a protective and functional earthing.

The earthing terminal is available in the power supply connector and it is marked with the symbol

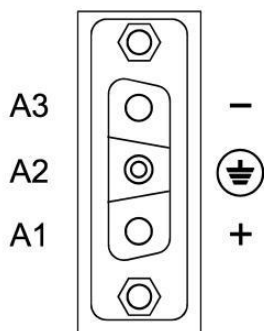
Note: protective earthing is mandatory only for power supply above 60Vdc. Functional earthing is always necessary.

Never connect the MINILAB dehydrator to power supply before having checked for correct type and rated voltage. See Power rating marking on the rear side of the dehydrator.

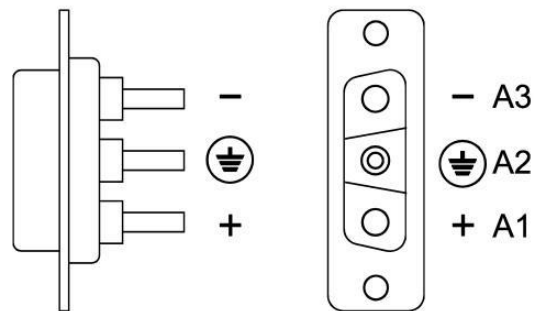
Connect power cable wires to the J1 connector according to the following pinout. It is recommended to use at least 0,5 mm<sup>2</sup> wires.

| J1 - power terminal board pinout |       |                             |
|----------------------------------|-------|-----------------------------|
| Pin number                       | Label | Function                    |
| A1                               | +     | positive power supply input |
| A2                               |       | Protective earthing         |
| A3                               | -     | negative supply input       |

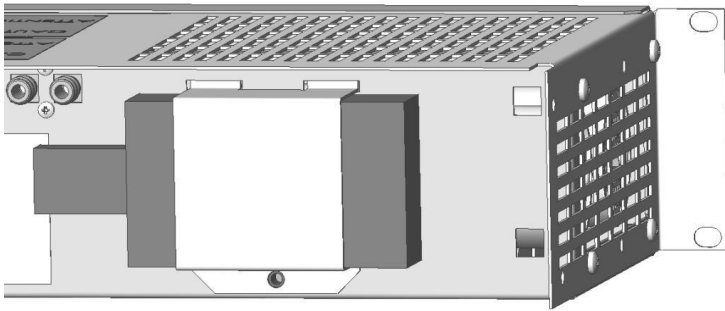
Solder the supply cables on the solder cup sockets and the earthing cable on the solder cup plug; put pins in the connectors as shows the following pictures respecting the right polarity (earthing pin is the central one). Insert the connector in the protective shell.



Fixed connector



Matching mating connector



An apposite power supply adapter kit can be provided (PN K14524) if MINILAB is intended to be used with AC power supply (100-240 Vac, 50/60 Hz).

The adapter can be fixed on the MINILAB back side using the bracket and the screw provided in the kit.

Note: when using adapter kit protective and functional earthing is not necessary

#### 4.4.2 Remote alarm output connection

A summary (OR) alarm is provided by an internal SPDT (Single Pole Double Throw) relay contacts.

The maximum switching current is 0,5 A dc/ac.

The maximum switching voltage is 60 Vdc or 42 Vac.

Note: in case of power failure the relay switches to alarm position.

Remote alarm connector, 9 pin IEC48B D series, is located on the rear panel. Connect the alarm transmission wires according to the following pinout:

| J2 - alarm connector pinout |                 |
|-----------------------------|-----------------|
| Pin number                  | Function        |
| 1                           | Common          |
| 5                           | Closed on alarm |
| 9                           | Open on alarm   |

#### 4.5 Operation

**Important note:** if the equipment has been left not working or stored for a long period, both the drying towers will be wet. The MINILAB must be left switched on for not less than 48 hours continuously to let both the drying towers be regenerated: meanwhile all air outlets must be closed. During this period the High Humidity Alarm must be ignored.

Open the valves corresponding to the used air outlets before proceeding with first start up.

Once the dehydrator is powered, after a few seconds, dry air starts flowing out of the outlets and LED turns solid green.

Depending on the volume of user system to be pressurized, it may take some time for the output pressure to achieve factory set value. Dehydrator pressure alarms are enabled after 20 sec. from power on; then low pressure alarm is hold until the target pressure is met.



At the very first startup, it is recommended to purge the transmission line with dry air by keeping open the opposite side of the pressurized line for a period of time given by following formula: **purging time (hours) = (3 x V) / 100**

Where V is the pressurized plant volume in liters.

**Close the opposite side of the pressurized plant after purging time. Alarms must be ignored during the purging phase.**

#### 4.6 Alarm LED indicator

Front LED is solid green during normal operation.

When LED turns red one or more alarms occurred. Type of alarm depends on whether LED is solid red or blinking red, also it depends on number of blinking:

| Blinkings | Alarm          |
|-----------|----------------|
| Solid red | System failure |
| 1         | High humidity  |
| 2         | Low pressure   |
| 3         | High pressure  |

Each blinking lasts 0.2 sec, repetition time is about 2 sec.

In case of two or more simultaneous alarms, first alarm blinking is followed by others in a continuous sequence.

Example: High Humidity Alarm + Low Pressure Alarm

☀ .... 2 sec. .... ☀☀ .... 2 sec. .... ☀ .... 2 sec. .... ☀☀ ...

#### 4.7 Alarms description

- **SYSTEM FAILURE** means a failure of the electronic control logic. The dehydrator is not working properly and must be replaced.
- **LOW PRESSURE** means that pressure is lower than the pressure threshold value (see §1 - Features). Possible cause is excessive output air leakages.

The standard low pressure alarm threshold is 1,0 kPa.

For MINILAB with target pressure < 2 kPa, the low pressure alarm is 0,5 kPa below target pressure.

Low pressure alarm is enabled 20 second after power on.

- **HIGH PRESSURE** means that pressure is higher than the high pressure alarm threshold value (see §1 - Features). In case of leakageless user system, possible cause of this alarm is the air thermal expansion.

The standard pressure threshold is 6,0 kPa.



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For MINILAB with target pressure  $> 4$  kPa the high pressure alarm is 0,5 kPa over target pressure.

High pressure alarm is enabled 20 second after power on.

- **HIGH HUMIDITY** means that the output air flow has a Relative Humidity higher than 10%. This alarm can turn on at first start-up if the dehydrator has been stocked for weeks in humid place; in this case the alarm must disappear within 24 hours after start-up.

During normal operation, this alarm indicates a dehydrator failure.

High humidity alarm is enabled 30 minutes after power on.



## 5. ETHERNET INTERFACE (OPTIONAL)

The dehydrator provides a 10BASE-T/100BASE-TX Ethernet connectivity as option. The RJ45 Ethernet connector is located on the rear panel.

An embedded web server is used for real-time remote control and monitoring of the dehydrator.

Every TCP connection is defined by a destination IP address. The dehydrator must have assigned a unique IP address for a correct network operation.

The default IP address is showed on a label near the RJ45 Ethernet connector. Different IP address and port can be assigned, see par. 5.1.

By default, the Dynamic Host Configuration Protocol (DHCP) client is disabled; you must properly configure the network settings of the device to be on the same subnet with the dehydrator.

Launch a web browser on your device that is connected to the dehydrator and enter the dehydrator IP address in the address field of the browser.

For example, if the IP address is 192.168.0.120 (factory default), the web page displays:

The screenshot shows a web browser window titled "RFS - Dehydrator" with the address bar set to "192.168.0.120/". The page content is divided into two main sections: a left sidebar menu and a main content area.

**Left Sidebar:**

- Menu**
  - [Status](#)
  - [Settings](#)
    - [Target pressure](#)
    - [LP alarm threshold](#)
    - [HP alarm threshold](#)
  - [Network](#)
  - [System](#)
  - [SNMP](#)
  - [Password](#)
- Documentation**
  - [MINILAB User Manual](#)

**Main Content Area:**

**RFS**

**MINILAB Dehydrator**

**Status**

| Current status | Value | Unit |
|----------------|-------|------|
| Pressure       | 20    | hPa  |
|                | 0.3   | psi  |
| Hour meter     | 1     | h    |
| Alarm(s)       | none  |      |

| Current settings   | Value | Unit |
|--------------------|-------|------|
| Target pressure    | 20    | hPa  |
|                    | 0.3   | psi  |
| LP Alarm threshold | 10    | hPa  |
|                    | 0.1   | psi  |
| HP Alarm threshold | 60    | hPa  |
|                    | 0.9   | psi  |

Alarm legend:  
 LP= Low Pressure  
 HP= High Pressure  
 HH= High Humidity

The menu is shown on the left side of the web page.



Select “**Status**” to see:

### Current Status

- the current (real-time) air output pressure
- the air flow (if available)
- the hour meter
- the current alarm(s)

### Current Settings

- the target pressure
- low pressure alarm threshold
- high pressure alarm threshold

Select “**Target pressure**” to enter a new working pressure

Select “**LP alarm threshold**” to enter a new low pressure alarm threshold

Select “**HP alarm threshold**” to enter a new high pressure alarm threshold

Select “**Network**” to change the IP address

Select “**System**” to reboot the device

Select “**SNMP**” to set Contact, Description, Location and Name for this dehydrator

Select “**Password**” to set the username and password, if required to login, or to get a free access (default, no username and password required).

To get a free access (default) to the web page, select “**Password**” on the menu.

The screenshot shows a web browser window titled "RFS - Dehydrator" with the address bar displaying "192.168.0.120/". The page features the RFS logo and the text "MINILAB Dehydrator". A navigation menu is visible on the left, including links for Status, Settings (with sub-links for Target pressure, LP alarm threshold, and HP alarm threshold), Network, System, SNMP, and Password. Below the menu is a "Documentation" section with a link to the "MINILAB User Manual". The main content area is titled "Password" and contains a "Password Setup" form. The form includes a "Login:" dropdown menu set to "Disable", a "Username:" field containing "admin", and two "Password (32 bytes max):" fields. A "Submit" button is located at the bottom of the form.



Select **Disable** as option for Login and then click on Submit.

If user wants to **set a password** to login, select “**Password**” on the menu.

The screenshot shows a web browser window titled "RFS - Dehydrator" with the address bar displaying "192.168.0.120/". The page features the RFS logo and the text "MINILAB Dehydrator". A left-hand menu includes links for Status, Settings (with sub-links for Target pressure, LP alarm threshold, and HP alarm threshold), Network, System, SNMP, and Password. Under Documentation, there is a link for the MINILAB User Manual. The main content area is titled "Password" and contains a "Password Setup" form. The form has a "Login:" dropdown menu set to "Enable", a "Username:" field containing "admin", a "Password (32 bytes max):" field with six dots, and a "Confirm Password (32 bytes max):" field with six dots. A "Submit" button is located at the bottom of the form.

Select **Enable**

as option for Login, type the password, confirm password and click on Submit.

In a few seconds the following request appears on the screen; user must type username and password.

The screenshot shows a Windows Security dialog box titled "Sicurezza di Windows" with a close button (X). The dialog is for "Microsoft Edge" and contains the following text: "Il server 192.168.0.120 sta richiedendo nome utente e password. Il server segnala che la richiesta proviene da config." Below the text are two input fields: the first contains "admin" and the second contains six dots. There is a checkbox labeled "Memorizza credenziali" which is currently unchecked. At the bottom, there are two buttons: "OK" and "Annulla".

Username is fixed and cannot be changed. User must type “**admin**” (lower case) in the first field of the above screen.

The second field is reserved to the password. **User must type the password to get the access.**





## 5.1 LAN configuration

Select “**Network**” to access the LAN configuration page and to set the new IP address, the subnet mask and the gateway.

| Network Setup                         |               |
|---------------------------------------|---------------|
| DHCP Client:                          | Disable       |
| IP Address:                           | 192.168.0.120 |
| Network Mask:                         | 255.255.255.0 |
| Gateway:                              | 192.168.0.1   |
| <input type="button" value="Submit"/> |               |

Select “**Network**” in the menu:

- **DHCP Client:** is always disable
- **IP Address:** the IP address of your dehydrator. To change it, enter an unused IP address from the address range used on your LAN.
- **Network Mask:** type the subnet mask based on the IP address that you assign.
- **Gateway:** the IP address of the gateway of your LAN. For more complex networks, enter the address of the router for the network segment to which the dehydrator is connected.

Click the **Submit** button and your settings are saved.

**Note:** If you change the LAN IP address while connected through the browser, you will be disconnected. To reconnect, open a new connection using the new IP address.

**Remind to update the new IP address on the label placed on the rear side of the dehydrator (close to the RJ45 connector).**



## 5.2 Simple Network Management Protocol (SNMP)

The dehydrator supports SNMP protocol version 1 (SNMPv1).

The relevant OID numbers are the following:

- 1) **Current Pressure Reading:** 1.3.6.1.4.1.48157.1.1.0  
returns the current reading of the output pressure. The unit of measure is hPa.
- 2) **Pressure Target Reading:** 1.3.6.1.4.1.48157.1.2.0  
returns the pressure target. The unit of measure is hPa (1 kPa = 10 hPa).
- 3) **Low Pressure Alarm threshold Reading:** 1.3.6.1.4.1.48157.1.3.0  
returns the low-pressure alarm threshold. The unit of measure is hPa
- 4) **High Pressure threshold Reading:** 1.3.6.1.4.1.48157.1.4.0  
returns the high-pressure alarm threshold. The unit of measure is hPa.
- 5) **Hour Meter Reading:** 1.3.6.1.4.1.48157.1.6.0  
returns the dehydrator overall working time. The unit of measure is hour.
- 6) **Alarm Code Reading:** 1.3.6.1.4.1.48157.1.7.0  
returns a code containing all the active alarms. The code legend is the following:

|   |   |                                 |
|---|---|---------------------------------|
| 0 | = | no alarm                        |
| 1 | = | Low Pressure                    |
| 2 | = | High Pressure                   |
| 3 | = | High Humidity                   |
| 4 | = | Low Pressure and High Humidity  |
| 5 | = | High Pressure and High Humidity |



## 6. CORRECTIVE MAINTENANCE AND SPARE PART

The dehydrator does not require any preventive maintenance.

In case of dehydrator failure please contact Radio Frequency Systems Customer Service.

In case of servicing made by the user itself, Radio Frequency Systems will supply with the necessary spare parts and support.

Servicing does not require specialized personnel. No setting-up or calibration is needed.

In case of servicing, it is mandatory to keep the following in mind:



**CAUTION: an appropriate disconnect device shall be provided as part of the building installation. Disconnect the dehydrator from the supply for servicing.**



**CAUTION: due to the high temperature of some parts inside the dehydrator, it is mandatory to wait for at least one hour after the switch-off, before servicing inside.**

A list of spare parts available at service stock is given in the following table:

(Note: always mention the equipment P/N or S/N on orders)

| Description                 | Cibred Sud Code |
|-----------------------------|-----------------|
| Electronic board 48-60 Vdc  | C14630.002      |
| Diaphragm pump              | 2PPBA737016S    |
| Drying tower                | C14350.002      |
| Safety valve                | C10843          |
| Humidity detector           | C5472.001       |
| Optional Ethernet board kit | K15401.102      |

### Optional add-on

| Description            | Cibred Sud Code |
|------------------------|-----------------|
| AC/DC power supply kit | K14524          |

**Note:** K14524 power supply kit allows AC Power Supply from 90 to 264 Vac 50/60 Hz.



## 7. OUTLINE

