HIGH PRESSURE PROPORTIONAL HUMIDIFIER

CENTRAL UNITS AND SOLENOIDS CARDS

USER, INSTALLATION AND MAINTENANCE GUIDE

Ver. 13.01.UK

Index

Please before using your equipment read this guide carefully, by noting all the precautions and safety instructions reported in it. Keep your equipment in good operative conditions.

Familiarize with the working and security instructions related to the operation of your apparatus before trying to make it function. Keep this guide and any other booklet provided with your apparatus to be able to refer to them later.

1 Package content

The High Pressure Humidifier package is composed of:

- ◊ The high pressure humidifier central unit
- ◊ This user guide
- ◊ The high pressure pump user manual
- ◊ The inverter user manual
- ◊ A yellow cap for the pump oil to replace the red one (to be used only for transport)

2 Security measures

- ➢ People who are not familiar with this type of apparatus or which did not read attentively this guide do not have to be authorized to use the humidifier.
- ➢ The humidifier is designed to be used on alternative 220Vac 50/60 Hz only. Do not try to connect it to a different type of supply. Check that the sector supply voltage corresponds to that of the apparatus.
- ➢ Your humidifier must always be switched-off before any maintenance operations.
- ➢ All operations of maintenance and repairs must be carried out by the manufacturer, his technical service or any other qualified personnel to avoid any problem.
- ➢ Do not cover any opening of the humidifier and do not insert objects in the openings

3 Working principle

The high pressure humidifier performs an adiabatic humidification by atomization of softened water or standard water at high pressure.

The system is composed of a central unit, comprising a high-pressure pump with associated control system of the pressure in the network, a card for proportional control of the distribution network and by a series of atomizing nozzles arranged in the environment to be humidified or inside the AHU.

The basic system includes a “Solenoid Card” used to control solenoids installed on the distribution network to have proportional opening of nozzles based on the control system request.

The system can include a (optional) “Zone Card” used to control different areas with ON/OFF control system using a single central unit.

4 Manufacturer

Manufacturer
Elsteam S.r.l.

Sede legale – amministrativa
Via ENRICO FERMI 496, 21042 CARONNO PERTUSELLA (VA) - ITALY

Contatti
Tel.: (0039) 029659890
Fax: (0039) 0296457007
Email: infocomm@elsteam.com
Web: www.elsteam.com

5 Conformity declaration

IL COSTRUTTORE

ELSTEAM S.r.l.
Azienda

Via Enrico Fermi, 496	**210142**	**VA**
Indirizzo	*Cap*	*Provincia*

Caronno Pertusella	**Italy**
Città	*Stato*

DICHIARA CHE LA MACCHINA

High Pressure Proportional Humidifier	**HPN**
Descrizione	*Modello*

hpn	**2008**
Serie/Matricola	*Anno costr.*

High Pressure Proportional Humidifier
Denominazione commerciale

Room and AHU Humidifying
Uso previsto

E' conforme alle direttive comunitarie

- 2006/95/CEE "Direttiva Bassa Tensione" del Consiglio 27 Dicembre 2006
- 89/336/CEE "Compatibilità Elettromagnetica EMC" modificata da:
  - Direttiva 91/263/CEE del Consiglio del 29 aprile 1991
  - Direttiva 92/31/CEE del Consiglio del 28 aprile 1992
  - Direttiva 93/68/CEE del Consiglio del 22 luglio 1993
  - Direttiva 04/108/CEE del Consiglio del 15 dicembre 2004

Claudio Cattaneo	**Dirigente**
Responsabile	*Funzione*

ELSTEAM S.r.l.- Via E. Fermi 496 – 21042 – Caronno Pertusella (VA) - ITALY
Società

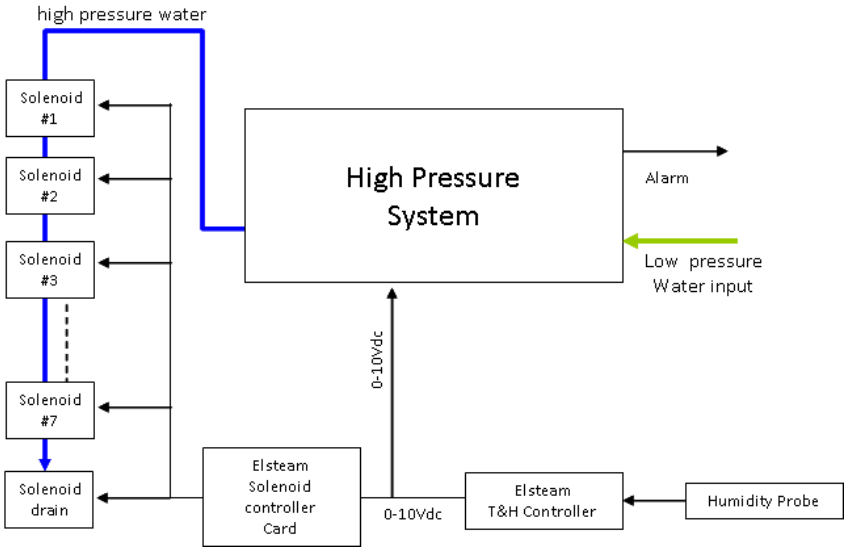
2008
Anno

6 Characteristics

Technical Data						
	HPN2	HPN4	HPN8	HPNDEMI3	HPNDEMI5	HPNDEMI7
Output Pressure	80 bar					
Min.Input Pressure	1 bar					
Nozzles						
Output Capacity						
Max. Capacity [l/h]	120	240	480	150	300	420
Max. Nozzles	11	24	47	16	26	37
Electrical Connection						
Power [kW]	0.6	1.1	2.2	1.0	1.5	2.2
Current [A]	4	6	10	5	7	10
Voltage	220V, 50/60 Hz, Single Phase					
Mechanical Characteristics						
Dimensions (LxHxP)	560mmx430mmx330mm					
Width (kg)						

7 Installation Principles

The figure below shows the basic working principle of the proportional humidifier. The output signal of



the humidistat (0-10V) controls the solenoids controlled card (for proportional working mode) as well as the activation (threshold set at 1V) of the high pressure system.

8 Installation

The cabinet of the humidification system must be installed in a ventilated and protected place. It must be placed on a flat and stable surface. For a correct use and operation, as well as for an easy maintenance, leave enough free space around the machine. To enable the correct ventilation of the unit is necessary to ensure a free space of at least 20 cm in the vicinity of the perforated panel for ventilation, which is located on the right wall of the machine.
Do not place the machine in dangerous and/or explosive/inflammable places.

After installation the red cap of the oil tank, used for the transport, must be replaced by the yellow one, used for normal working operation, provided with the system.
The access internal parts of the cabinet remove screws that secure the top and side panels.

During the first installation and all the operations of maintenance please take care of the temperature sensor installed at the exit of high pressure pump.
Its damage may cause the breakage of the high pressure system.

Before first switch-On replace the RED transport cap with the cap with a built-in dipstick provided.

8.1 Hydraulics connections

The connection between the pump and distribution network must be realized using pipes which supports nominal pressure of 100bar (minimum), due to the high pressure (80 bar) in the network. It is preferable to use stainless steel material to limit as much as possible deposits that can clog the filters nozzles.
Hydraulic connections are positioned on side panels of the cabinet. Input water connection is 3/4" and is on the right side of the cabinet, output is 3/8" and is on the left side.

Before installing the nozzles, it is mandatory to carry out a cleaning phase of the pipes installed to remove all deposits in the pipes. This will avoid clogging the nozzles filters.

The High Pressure Humidifier can work with standard or dematerialized water. Different pumps materials (STAINLESS STEEL for dematerialized water, BRASS for standard water) are used in the two versions. Two filters (5μm and 1μm) are installed on the input water circuit of the humidifier to remove deposits present in the pipes that can clog filters and damage the pump.
The water pressure at the input must not be lower than 1bar.

8.2 Electrical Connections

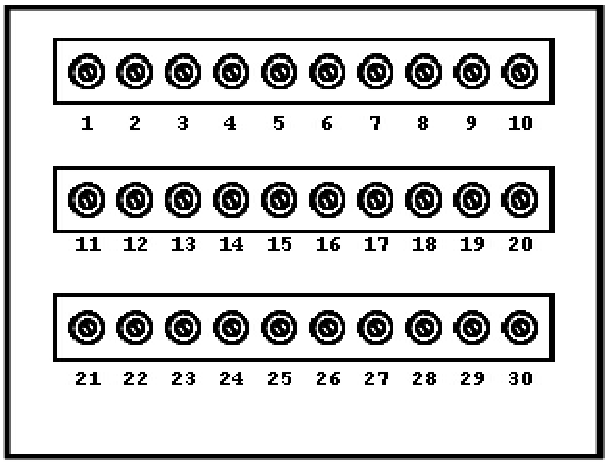
Prior to carrying out any inspection or service on the machine, it is necessary to disconnect it from the main electrical supply. Make sure, that nobody can reconnect it during the technical service.
Every installed electrical and electronic equipment or basic structure must be earthed.

All operations of electrical installation MUST be performed by qualified personnel (eg electrician or staff with appropriate training) only.
The customer is responsible for the use of qualified personnel.

Before starting installation:

- ◊ Check that the supply voltage and the frequency correspond to those indicated on the rating plate.
- ◊ The dimensions of the supply cable must suit the machine absorption and comply with the current regulations.
- ◊ Put the cable in the relevant cable passage hole and then tighten.

Power connections and control signals terminals are located inside the top of the cabinet (to access it is necessary to remove the top panel of the cabinet). It is recommended to isolate the machine from the mains before any and every case in the absence of protective panels.
The power lines must be connected the circuit breaker.



Controller Terminal Block

N°	Name	Description
3	ALARM	Alarm Normally opened contact. (Max. 2A, 230V).
4	ALARM	
5	REQ	NOT USED
6	REQ	
7	0 V	Ground reference voltage (0V)
8	REG	Input Control Signal (0-10V)
9	V+	Positive Reference Voltage (12V)
10	RTH	NOT USED
11	ACOUT	Draining solenoid driving signal (connect to solenoids board pin.3)

All connections between the controller and the solenoid card are made at the factory. The user must connect the output signal of the humidistat to the terminals 7 (-) and 8 (+) taking care of polarities.

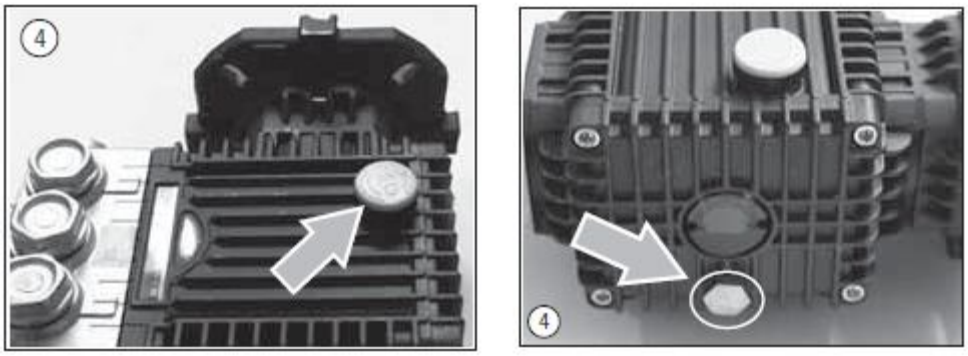
8.3 Setting of the bypass control valve

The high-pressure system has a bypass valve for regulating the output pressure. At first power on is necessary to control the adjustment of this valve.
In the case of a successful installation, you can adjust the maximum pressure (turning clockwise the valve). **It is advisable to adjust the output pressure up to a pressure of about 80 bar**.
It's also possible to reduce the output pressure in case "**Etb**" message is displayed on the inverter display.

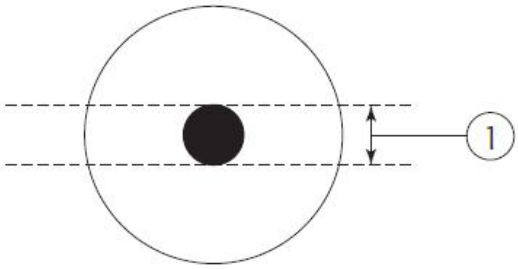
9 Maintenance

A high pressure humidification system requires some periodic maintenance operations for its proper operation:

- Change the oil pump every 500 hours, as indicated on the attached manual pump, closing the inlet water and removing the top caps and bottom as shown in figure



- Periodically clean the filter of the nozzles and check that the nozzles are not clogged. A signal that can indicate the clogging of the nozzles is the increasing noise of the pump.
- Periodically check the wear of the nozzles. The nozzles worn may cause the blocking of the machine due to an excessive reduction of output pressure
- Check periodically pump oil level:



If oil level is not within ① zone, add or remove oil in the tank. Check for oil leaks.

NOTE
The high pressure humidifier presents a thermal protection for the pump system. Be extremely careful not to damage the temperature sensor mounted on the pump.

10 Electronic Controller

All operation of the high pressure humidifier are managed by a micro controller based board. All information is provided through a 16 characters by 2 lines display. Its main functions are:

- Switch On/Off of the system
- Check the real working time of the system
- Provide information about replacement of spare parts and pump oil.
- Display information about parameters
- Provide different alarms

10.1 Normal operation DISPLAY

During normal operation the electronic controller display show on the first line main parameters of the system:

H	P	N			❶		T	❷				❸		W	i
P	o	u	t	=	x	x	.	x			b	a	r		

❶ : System State:
- "u" : indicates proper operation of the system
- "!" : indicates temperature protection intervention
- "x" : indicates that no request is present

❷ : Pump temperature indication bar

❸ : Minimum operating time of the pump. At startup/shutdown of the pump "t" character is displayed. During the inhibit time (factory setting: 60 s). During this period system shutdown or startup is inhibited.

"W" character indicates that input water solenoid is opened

"i" character indicates that input water flow is sufficient for system operation. If "i" is not shown, there is a problem in input water flow or pressure.

The second line indicates the pressure value in the nozzles network.

10.2 Electronic controller basic programming

During the first programming of the controller is advisable to disconnect the control signals (Pin 8 of the terminal) to avoid that the humidifier is put into operation.

To enter the basic programming mode press the **SET** button for 2 seconds, until the following message is displayed:

```
Humidify System
-- Enabled --
```

To modify the value of a field or to move between fields use **+** and **-** buttons. During value changing, the value of the field blinks.

To end the programming of a field press the **OK** button to set the new value, **CANC** button to cancel modification or **OK** , **SET** or **CANC** for more than 3 seconds to exit programming phase.

Programming phase automatically ends without current parameter update if no button is pressed for 3 seconds.

Note: To save updated values do not abandon programming pressing **CANC** button.

Basic menu programming fields are:

Display	Description
Humidify System	**Enable or disable the humidifier** "**Enabled**", System on "**Disabled**", System off
Life Time	**Display the effective working time of the system** This field is read only. Cannot be modified by the user
Change Oil Timer	**Display the remaining time before pump oil change** This field is read only. Cannot be modified by the user

10.2.1 Counter of the remaining time before pump oil change

The high pressure pump requires changing the oil every 500 hours of operation (the first oil change should be made after 50 hours of operation). Use SAE 15W40 mineral oil. The quantity of oil needed depends on the pump flow. Please refer to the pump system manual for details.
The controller counts the time remaining for the next oil change. At the end of that period the message "**ChangeOil xxxxxh**" is displayed to inform user that oil must be changed. After this message there is still a period of 50 hours before the controller BLOCKS the system.

If oil is changed before scheduled time (before the controller blocks the system), the oil counter must be reset by pressing **SET** and **OK** buttons. When the message "Pump Oil has been changed" is displayed, press **OK** button to confirm and reset the counter. By pressing CANC button the counter is not reset and the system will stop at counter expiration.
At expiration of extended period the system will stop working and following message will be displayed "**System Failure - Change the Oil of the Pump**".
Once the oil is changed do not forget to reset the oil counter by pressing **OK** button. When the message "Pump Oil has been changed" is displayed, press **OK** button to confirm and reset the counter. By pressing CANC button the counter is not reset and the system will remain blocked.

10.2.2 Display of the remaining time

During normal working operation the user can display remaining time before oil change pressing **-** button.

10.2.3 LCD Contrast change

If necessary the user can modify the value of the display contrast pressing **CANC** button and one of **+** or **-** button.

10.2.4 Display of Firmware version

User can display the installed firmware version pressing **+** and **-** buttons.

10.3 Electronic controller advanced programming (only for maintenance/fitter)

Advanced programming mode allows maintenance people and fitters to modify additional parameters depending on the working conditions of the HPN system.
To enter the advanced programming mode press **SET** and **+** buttons for 2 seconds, until the following message is displayed:

```
Humidify System
-- Enabled --
```

Advanced menu programming fields are:

Display	Description
Humidify System	**Enable or disable the humidifier** "**Enabled**", System on "**Disabled**", System off
Life Time	**Display the effective working time of the system** This field is read only. Cannot be modified by the user
Change Oil Timer	**Display the remaining time before pump oil change** This field is read only. Cannot be modified by the user
Pump Rate	**Set the system flow rate** Indicates the nozzle system flow rate, not the pump one. In the current version must be set to minimum value. Will be used to provide information about real water consumption.
Minimum External Signal xxx/100%	**Minimum value of external controller signal (only proportional controller)** This value is expressed in percentage of 10V. In case of noise on the external signal line, parameter value can be increased. (*Default value 10%*)
Output Pressure Timeout= xxx sec	**Max time to reach standard pressure in the nozzles network** If within this period from system start, pressure in the nozzles pipe has not reached the default value, the embedded controller stops the system providing the following error message "**Low Output Pressure**". To restart the system after failure solution, press **OK**. (*Default value 60 sec*)
Minimum On/Off Time = 000 sec	**Minimum System On/Off time** To avoid frequent stop and start of the pump (that can damage it) a minimum period is set by electronic controller. During this period switch on and off of the system is inhibited unless the circuit breaker is used (NOT RECOMMENDED). In cases of frequent starting and stopping of the pump, increase the value. (*Default Value : 60 sec*)

Std Pressure xxx bar	**Standard value of pressure** This parameter allows the fitter to modify the default value of the pressure in the nozzles network. (*Default Value: 80bar)*
4..20mA Coeff. P P= xx.xbar)yyyyy	**Pressure transducer Coefficient** On the second line of the LCD display the pressure value and probe coefficient are showed. (*Default Value: 8850)*

To confirm the changes made to a field, use SET or OK. To exit the advanced programming mode, press SET or OK. To store the changes in the FLASH memory of the microcontroller press SET or OK for more than 3 seconds. Using the CANC key changes to a field will not be stored in FLASH and new values will be valid until the next switch off the humidifier (using circuit breaker).

11 Alarm Messages

To remove alarm conditio0n and restart the system press **OK** key.

Message	**Insufficient Water**
Cause	Lack of input water Clogged filter nozzles Defective input flow meter Inverter security error
Possible Solution	Check input water flow. Check inverter display for error messages. If "**Etb**" message is displayed the output pressure security pressure switch stopped the system. Check the output bypass valve. Turn it counterclockwise to reduce output pressure. Remove one nozzle from the network and try the system. Press **OK** key to remove alarm condition and restart the system. If the alarm condition stops: • Replace nozzle filters and restart the system If the system is still in alarm: • Check input water filters If the system is still in alarm, please contact ELSTEAM or your distributor for input flow meter replacement part.

Message	**Check Load Valve Driver**
Cause	Driving of input water solenoid failure
Possible Solution	If "W" character is displayed in the first line, check solenoid connections and voltage (12V). Press **OK** key to remove alarm condition and restart the system. If the system is still in alarm, please contact ELSTEAM or your distributor for part replacement.

Message	**NTC failure**
Cause	The pump temperature probe is damaged.
Possible Solution	Contact ELSTEAM or your distributor for part replacement.

Message	**Low Output Pressure**
Cause	The pressure in the nozze pipe cannot reach the default value within the set period.
Possible Solution	Check distribution network and output connection pipe for draining. Check the output bypass valve. To increase the output pressure turn clockwise the valve.

Message	**Pump Overheating, check atomisers**
Cause	Pump temperature high.
Possible Solution	Check nozzle filters Check the output bypass valve. Turn it counterclockwise to reduce output pressure.