EWHT 600 NT

User Guide

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SAFETY INFORMATION

Important information

Read these instructions carefully and visually inspect the equipment to familiarise yourself with the device before attempting to install it, put it into operation, overhaul or service it. The following warning messages may appear anywhere in this documentation or on the equipment to warn of potential dangers or to call attention to information that can clarify or simplify a procedure.

The addition of this symbol to a 'Danger' or 'Warning' safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety warning symbol. It is used to warn the user of the potential dangers of personal injury. Observe all the safety warnings that follow this symbol to avoid the risk of serious injury or death.

⚠ DANGER

DANGER indicates a dangerous situation that, unless avoided, **will result** in death or serious injury**.**

⚠ WARNING

WARNING indicates a potentially dangerous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially dangerous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE used in reference to procedures not associated with physical injuries.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel.
No responsibility is assumed by Schneider Electric and Eliwell for any consequences arising out of the use of this material.
A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Personnel qualification

Only personnel with suitable training and an in-depth knowledge and understanding of the contents of this manual and any other documentation relevant to the product are authorized to work on and with this product. Qualified personnel must be capable of identifying any dangers which may arise from the parameterization or changing of parameter values, and from the use of mechanical, electric and electronic equipment in general.
Plus, they must be familiar with the personal safety laws, provisions and regulations which must be observed during system

Permitted use

The device must be installed and used in accordance with the instructions provided. In particular, parts carrying dangerous voltages must not be accessible under normal conditions.
It must be adequately protected from water and dust with regard to the application, and must only be accessible using tools or a keyed locking mechanism (with the exception of the front panel).
The device is suitable for use in household refrigeration appliances and/or similar equipment and has been tested in accordance with the harmonized European reference standards.

Prohibited use

Any use other than that expressly permitted is prohibited.
The relay contacts provided are mechanical and subject to failure; any protection devices required by product standards, or suggested by good practice in view of obvious safety requirements, must be installed externally of the device.

Liability and residual risks

The liability of Schneider Electric and Eliwell is limited to the correct and professional use of the product according to the directives referred to herein and in the other supporting documents, and does not cover any damage (including but not limited to) the following causes:

- unspecified installation/use and, in particular, in contravention of the safety requirements of the legislation in force in the country of installation and/or specified in this document;
- use on equipment which does not provide adequate protection against electrocution, water and dust in the actual installation conditions;
- use on devices which allow access to dangerous parts without the aid of a keyed or tooled locking mechanism;
- tampering with and/or modification of the product;
- installation/use on equipment that does not comply with the regulations in force in the country of installation.

Disposal

The equipment (or product) must be subjected to separate waste collection in compliance with the local legislation on waste disposal.

Date of production

The date of production is shown on the device label, indicating the week and year of production (WW-YY).

ABOUT THE DOCUMENT

Document Scope

The document describes the **EWHT 600 NT** controller, outlining its architecture, technical characteristics, and configurable functions for managing temperature and humidity in cold rooms, with optional refrigerant leak monitoring. It details hardware capabilities, including multiple relays, analog and digital inputs, and communication interfaces for integration with supervisory systems. The guide explains parameter configuration for compressors, fans, defrost cycles, humidity regulation, alarms, and display behavior, supported by calibration and firmware tools. It highlights flexible operating modes, remote communication via Modbus and proprietary systems, and emphasizes that correct configuration and parameter management help ensure optimal and adaptable performance across refrigeration applications.

NOTE: Read and understand this document and all related documents, before installing, operating, or maintaining your device.

Validity Note

The characteristics of the products described in this document are intended to match the characteristics that are available on www.eliwell.com. As part of our corporate strategy for constant improvement, we may revise the content over time to enhance clarity and accuracy. If you see a difference between the characteristics in this document and the characteristics on www.eliwell.com, consider www.eliwell.com to contain the latest information.

Product related information

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables or wires.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Before powering the device back up, fit back and fix all the covers, hardware components and wiring.
- Check the earthing connections on all earthed devices.
- Use only the specified voltage when operating this equipment and any associated products.
- Comply with all standards regarding accident protection and local applicable safety directives.

Failure to follow these instructions will result in death or serious injury.

⚠⚠ DANGER

HAZARD OF OVERHEATING AND/OR FIRE

- Do not use with loads other than those indicated in the technical specification.
- Do not exceed the maximum permitted current; for higher loads, use a meter with sufficient power capacity.

Failure to follow these instructions will result in death or serious injury.

This equipment is designed to operate outside all hazardous locations.
Install this equipment only in areas known to be free from dangerous atmospheres at all times.

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install this equipment only in locations where flammable refrigerants cannot accumulate, even in the event of a leak.

Failure to follow these instructions will result in death or serious injury.

For information regarding the use of control equipment in applications capable of generating dangerous atmospheres , contact the relevant national regulatory bodies or certifying authorities.

⚠ WARNING

HAZARD OF OVERHEATING AND/OR FIRE

Verify that your application has not been designed with device outputs connected directly to devices generating a frequently operated capacitive load [(1)].

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[(1)] Even if your application does not apply a frequently operated capacitive load on the relay, capacitive loads will reduce the life of any electromechanical relay, and installation of a contactor or an external relay, that is sized and maintained according to the dimensions and characteristics of the capacitive load, will help minimize the consequence of relay degradation.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Route communication and I/O cables separately from power cables.
- Every end application of this device must be tested individually and completely in order to check its proper operation before putting it in service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

HACCP Module

NOTICE

INOPERABLE EQUIPMENT

For TTL serial line connection, use cables no longer than 1 m (3.28 ft).

Failure to follow these instructions can result in equipment damage.

NOTE: For information on the cables to be used with the HACCP Module, contact your local Eliwell representative.

General Cybersecurity Information

In recent years, the growing number of networked machines and production plants has seen a corresponding increase in the potential for cyber threats, such as unauthorized access, data breaches, and operational disruptions. You must, therefore, consider all possible cybersecurity measures to help protect assets and systems against such threats.
To help keep your Schneider Electric products secure and protected, it is in your best interest to implement the cybersecurity best practices as described in the Recommended Cybersecurity Best Practices document.

Schneider Electric provides additional information and assistance:

- Subscribe to the Schneider Electric security newsletter.
- Visit the Cybersecurity Support Portal to:
  - Find Security Notifications
  - Report vulnerabilities and incidents
- Visit the Schneider Electric Cybersecurity and Data Protection Posture to:
  - Access the cybersecurity posture
  - Learn more about cybersecurity in the cybersecurity academy
  - Explore the cybersecurity services from Schneider Electric

Environmental Data

For product compliance and environmental information refer to the Schneider Electric Environmental Data Program.

Languages available for this document

This document is available in the following languages:

- Italian (9MA00323)
- English (9MA10323)
- Spanish (9MA30323)
- German (9MA50323)
- French (9MA20323)
- Turkish (9MAL0323)

Related Documents

Title of documentation	Reference number
Cybersecurity Best Practices	Refer to Recommended Cybersecurity Best Practices
EWHT 600 NT Quick Start Guide	9IS54964

To find documents online, visit the Eliwell website (www.eliwell.com).

Terminology Derived from Standards

The technical terms, terminology, symbols and the corresponding descriptions in this User Guide, or that appear in or on the products themselves, are generally derived from the terms or definitions of international standards.
In the area of functional safety systems, drives and general automation, this may include, but is not limited to, terms such as *safety, safety function, safe state, fault, fault reset, malfunction, failure, error, error message, dangerous*, etc.

Information on Non-Inclusive Terminology

As part of a group of responsible, inclusive companies, we are updating our communications and products that contain non-inclusive terminology. Until we complete this process, however, our content may still contain standardized industry terms that may be deemed inappropriate by our customers.

1. INTRODUCTION

1.1. GENERAL DESCRIPTION

The **EWHT 600 NT** is a compact controller for temperature and humidity regulation in static or ventilated cold rooms.
In the default configuration, it supports combined temperature and relative humidity (RH) control, coordinating cooling and humidity functions.
Alternatively, the controller can be configured for temperature control with refrigerant gas leak alarm management when combined with an LKDNext Leak Detector. In this mode, humidity functions are disabled and the device manages gas concentration display and Warning / Danger alarm signalling via dedicated relay outputs.
EWHT 600 NT has 6 configurable relays, 2 configurable digital inputs for door switches or other devices and 4 analog inputs (3 x NTC and 1 x 4...20 mA). Models are available with a clock, yearly calendar, and HACCP event logging.
The instrument can be connected to Televis**System** / Modbus, via the RS-485 plug-in module (optional) and is compatible with Eliwell AIR Silent Guardian service, powered by AIR Edge (Wi-Fi), via TTL.
The box lets you install one or more electromechanical devices, depending on the model.

1.2. MODELS

- **EWHT 600 NT HACCP** - Versions with 6 configurable relays for controlling all the accessory loads in the room, HACCP function with clock and yearly calendar.
- **EWHT 600 NT 4DIN HACCP** - Versions with 6 configurable relays for controlling all the accessory loads in the room, HACCP function with clock and yearly calendar, plus door for installation of magnetothermal switch or accessories on a DIN rail.

2. TECHNICAL SPECIFICATIONS

2.1. TECHNICAL DATA

The product complies with the following harmonized Standards	EN 60730-1 / EN 60730-2-9
Construction of control	Electronic automatic Independently mounted Control
Purpose of control	Operating control (not safety related)
Type of action	1.C
Degree of protection by enclosure	IP65
Pollution degree	2
Overvoltage category	II
Rated impulse voltage	2500 V
Ambient operating conditions	Temperature: -5...50 °C (23...122 °F) Humidity: 10…90 % RH (non-condensing)
Transportation and storage conditions	Temperature: -20...85 °C (-4...185 °F) Humidity: 10…90 % RH (non-condensing)
Power supply	SMPS 100...240 Vac (±10%) 50/60 Hz
Power draw (maximum)	7 W
Software class	A
Temperature for ball pressure test	100 °C (212 °F)
Clock backup	Up to four days in the absence of an external power supply

2.2. FURTHER INFORMATION

2.2.1. INPUT CHARACTERISTICS

Measurement range:	NTC: -50.0...110°C (-58°F...230°F); PTC: -55.0...150°C (-67°F...302°F); on 2 displays: (top display) 3 digit + sign/ (bottom display) 4 digit
Accuracy:	better than 0.5% full scale + 1 digit
Resolution:	0.1°C (0.1°F)
Buzzer:	Yes
Analog inputs:	**3** configurable NTC/PTC inputs, **1** 4...20 mA
Digital inputs:	2 multi-function, voltage-free digital inputs (DI)

2.2.2. OUTPUT CHARACTERISTICS

RELAY OUTPUTS		
MODEL	**EWHT 600 NT**	
CODE	**HTNS••••••••••** **4 DIN models HTNA••••••••••**	
STANDARD	**EN60730** **max 250 Vac**	**UL60730** **max 240 Vac**
OUT1	12(8) A	12FLA - 72LRA
OUT2	10(6) A	10 A resistive 10FLA - 60LRA
OUT3	8(4) A	4.9FLA - 29.4LRA
OUT4	10(6) A	10 A resistive 10FLA - 60LRA
OUT5	NO 8(4) A, NC 6(3) A	NO 8 A resistive, NC 6 A resistive NO 4.9FLA - 29.4LRA
OUT6	10(6) A	10 A resistive 10FLA - 60LRA
NOTE	Maximum current on common pole: 18 A	

2.2.3. MECHANICAL CHARACTERISTICS

Casing:	PC+ABS
Dimensions:	EWHT 600 HT: front panel 213 x 318 mm (8.38 x 12.51 in.), depth 102 mm (4.01 in.) EWHT 600 HT 4DIN: front panel 221 x 318 mm (8.70 x 12.51 in.), depth 107 mm (4.21 in.)
Terminals:	screw-on terminals (see wiring diagram)
Connectors:	TTL port for connection to AIR Edge (Wi-Fi) / HACCP Module / UNICARD / Copy Card / TelevisSystem)

NOTE: The technical specifications stated in this document regarding the measurement (range, accuracy, resolution, etc.) refer strictly to the instrument and not to any accessories provided, such as the probes.

3. SERIAL COMMUNICATION AND PASSWORD CHANGE

3.1. SERIAL COMMUNICATION

By default, serial communication is disabled.
To enable serial communication:

1. Press and hold the SET button for 3 seconds until USr appears on the display.
2. Using the UP and DOWN buttons, select the inS parameter section.
3. Enter Password **PA2** set by default to **15**
4. Press and release the SET button.
5. Using the UP and DOWN buttons, select the Add folder.
6. Press and release the SET button and select the SEE parameter.
7. Set the value to y and confirm by pressing the SET button.

Display	description
4.0 85.0	Press SET for 3 seconds
USr PA1	Label USr appears Use ‘UP’ and ‘DOWN’ to search for InS
InS PA2	Press SET
PA2 0	Use UP and DOWN keys to enter the password
PA2 15	NOTE: Password **PA2** is set by default to **15** Press SET
CPr ----	Installer menu accessed the first CPr folder appears If the value entered is incorrect, label **PA2** will be shown again and the procedure must be repeated

Display	description
Add ----	Press SET to enter Add folder
SEE n	Use ‘UP’ and ‘DOWN’ to search for SEE
SEE y	Press SET. Label SEE will flash Use UP and DOWN keys to set “y” and activate serial communication Press ESC or wait 15 seconds to confirm the value

3.1.1. Password Change

After enabling serial communication, the device requires the PA1 and PA2 passwords to be both changed.
Serial communication becomes active only after this procedure has been completed.

Display	description
PA1 1000	Use UP and DOWN keys to change PA1 password NOTE. 1000 value is not allowed. Allowed values are in the 0...999 range Confirm with SET
PA2 1000	Use UP and DOWN keys to change PA2 password NOTE. 1000 value is not allowed. Allowed values are in the 0...999 range Confirm with SET

3.1.2. Serial Communication Access Level

The E2E parameter, located in the Add folder, defines the access level available through the serial communication interface.

E2E = 0 → Read-only access.
E2E = 1 → Read/write access.

E2E = 0 – Read-only access
Connected devices can read parameters, measurements, and status information. Writing parameters, storing values in EEPROM, and sending control commands through the serial communication interface are not allowed.

E2E = 1 – Read/write access
Connected devices can read and modify parameters, store values in EEPROM, and send commands through the serial communication interface. This setting should only be enabled when write access is required by the application.

NOTE: For improved cybersecurity, use E2E = 0 whenever write access through the serial communication interface is not required.

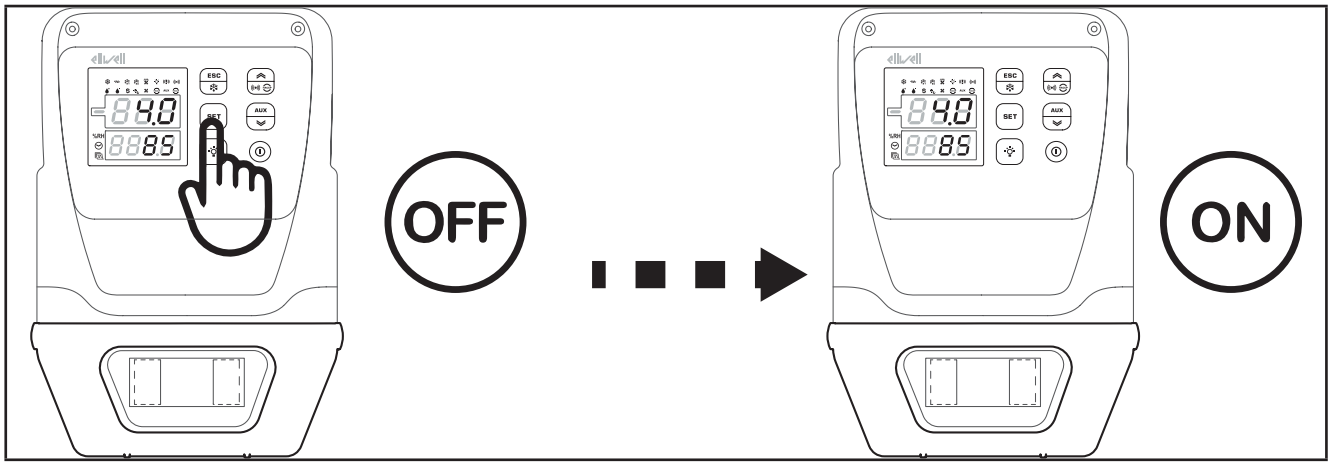
3.2. PASSWORD RECOVERY

If PA1 and/or PA2 are forgotten, follow the procedure below:

1. Turn OFF the device.
2. Press and hold the SET button. While keeping the SET button pressed, switch the instrument ON and continue holding the button until the Lamp Test is completed.
3. The PA / rECO label is displayed. Press and hold the SET button for 3 seconds.
4. The rsP / n label is displayed. Use the UP and DOWN buttons to select y or n to confirm password recovery.
   If no selection is made within 15 seconds, the device returns to the normal display.
5. Press SET to confirm your choice.
   NOTE. This action cannot be canceled and cannot be repeated without restarting the procedure.

1. If n is selected, or if no selection is made, repeat the procedure from step 1 to recover the password values.
2. If y is selected, the PA / CHnG label is displayed and a password change is required.
3. Press SET to edit PA1.
4. An initial invalid password value (1000) is displayed by default.
5. Use the UP and DOWN buttons to select a new PA1 value.
6. Press SET to confirm.
7. An initial invalid password value (1000) is displayed by default.
8. Use the UP and DOWN buttons to select a new PA2 value.
9. Press SET to confirm.

NOTE: Both PA1 and PA2 passwords must be configured. The password value 1000 is not allowed.
Allowed values are in the 0...999 range.



Display	description
PA rECO	Press SET for 3 seconds
rSP n	Label rsP appears Use ‘UP’ and ‘DOWN’ to select y
PA CHn9	Press SET
PA1 1000	Use UP and DOWN keys to change PA1 password NOTE. 1000 value is not allowed. Allowed values are in the 0...999 range Confirm with SET
PA2 1000	Use UP and DOWN keys to change PA1 password NOTE. 1000 value is not allowed. Allowed values are in the 0...999 range Confirm with SET

4. CYBERSECURITY

4.1. OVERVIEW

This Eliwell product includes functions that enable information security.
These functions are enabled by default and can be configured according to your own installation requirements.

NOTE: deactivating or changing the settings for these individual functions can have a positive or negative effect on the overall posture of the device security.

It is also necessary to observe best practices in order to help ensure robust system protection and help ensure the security of the system as a whole.
For more information, please refer to: **“Cybersecurity Best Practices” page 11** (English language only).

Eliwell adheres to industry best practices in the development and implementation of control systems. This includes a Defense-in-Depth approach which protects the controller by limiting access exclusively to authorized personnel and protocols.

⚠ WARNING

UNAUTHORIZED ACCESS AND SUBSEQUENT NETWORK INTRUSION

- Assess whether the room or the machines are connected to a critical infrastructure and, if so, take suitable preventative measures, based on ‘Defense-In-Depth’ strategy, before connecting the automation system to any network.
- Monitor activity within the systems.
- Help prevent direct access or direct connection to the devices by unauthorized individuals or unauthorized actions.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

4.2. VENDOR CONTACT INFORMATION

Vendor Name

Eliwell Control srl

Primary Business Address

Via dell’Industria 15 32016 Alpago (BL) Italy.

Website

www.eliwell.com

4.3. DEFENSE IN DEPTH

The protection levels of the device are:

1. User Guide
2. Physical
3. UNICARD (Custom Hardware)
4. Signed firmware
5. Device password

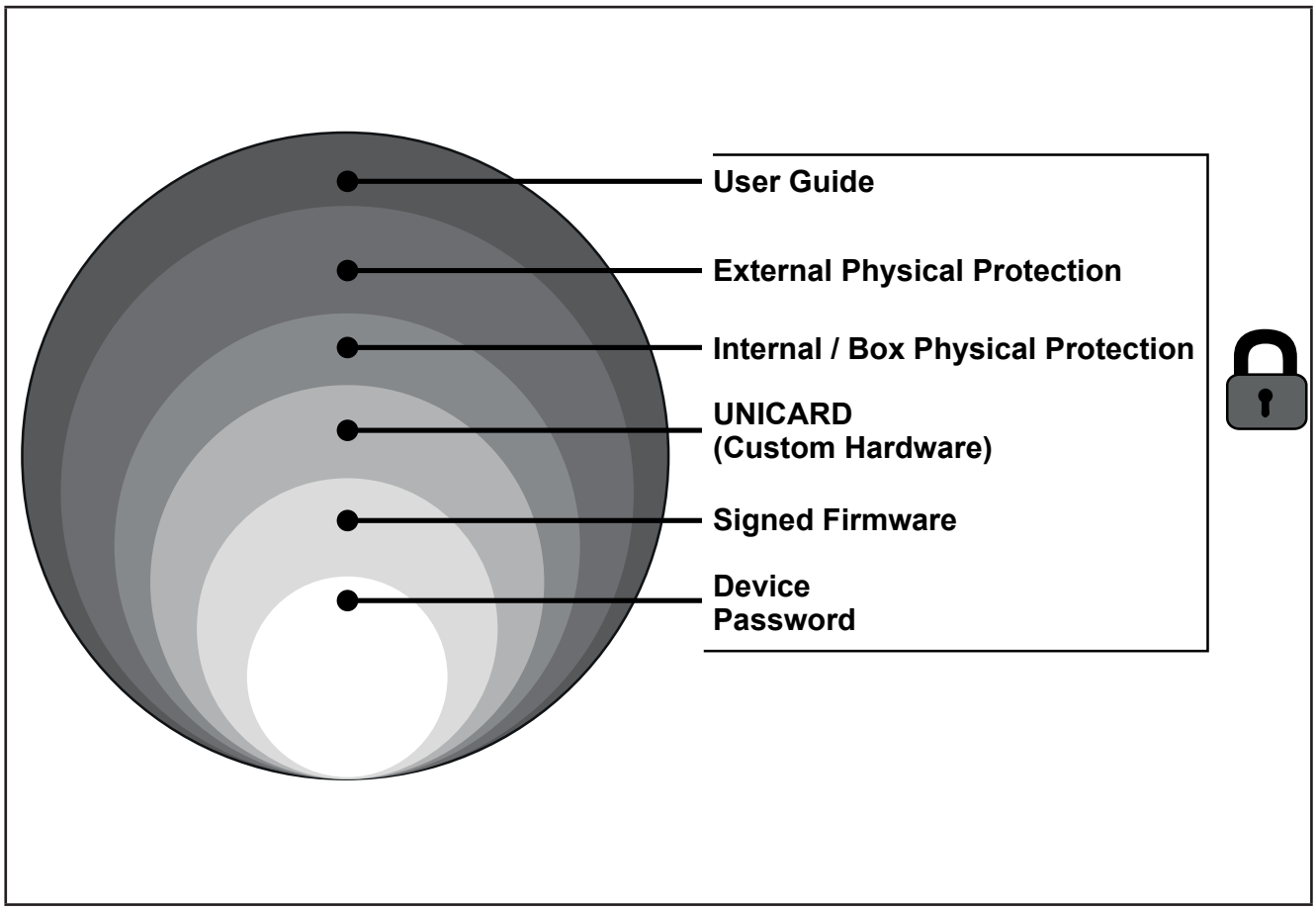


Fig. 1. Defense in Depth Design

4.3.1. User Guide

This document with its Safety Messages, Recommendations, etc.

4.3.2. Physical

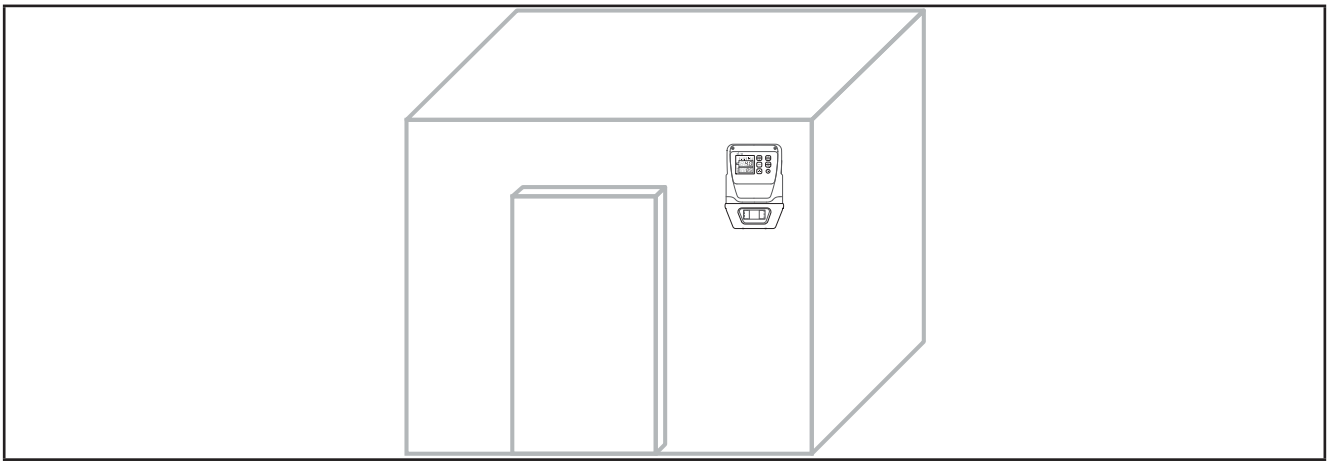
Make sure to install the device in a box accessible only by authorized personnel and protect the access to the communication ports.
To help prevent unauthorized access Physical protection is implemented at two levels:

External Physical Protection

Install the device in an area with controlled access, accessible only to authorized and qualified personnel, for example a technical room or machine area protected by a PIN keypad, smart card, key lock, or equivalent access-control mechanism.

The protection may be further reinforced by the typical installation position of the device, which is often mounted at a height that cannot be reached without suitable equipment, such as a ladder.

These measures help prevent unauthorized direct access to the device front panel and to the installation area.



Internal Box Physical Protection

Access to the communication ports shall be protected by the enclosure. The device shall be installed so that only the front panel is accessible during normal operation, while internal wiring and serial communication ports are accessible only after opening the box.

The TTL serial port, used for AIR Edge (Wi-Fi), HACCP Module, UNICARD, Copy Card, or TelevisSystem connection, is located inside the enclosure. If the optional RS-485 plug-in module is installed, access to it is also protected by the enclosure.

Opening the box shall be restricted to authorized and qualified personnel only. Before opening the enclosure or accessing internal parts, disconnect all power from the equipment and connected devices, and verify that power is off using a properly rated voltage sensing device.

4.3.3. UNICARD (Custom proprietary hardware)

The UNICARD (a custom proprietary hardware) is the only one that can be connected to the TTL port for Firmware upgrade.

4.3.4. Signed firmware

The device can only be updated using Schneider Electric or Eliwell signed firmware (see ‘Security hardening guidelines’ section).

4.3.5. Device password

The device provides two passwords (PA1 and PA2) to access User and Installer parameters (see ‘Password’ section).

4.3.6. Use Cases

EWHT 600 NT may be used either as a stand-alone unit or as part of a supervised software.

Stand-alone mode

Stand-alone mode is intended for local and autonomous operation of a single EWHT unit, while Supervisor mode is designed for more complex installations where multiple units or devices need to be monitored and managed from a central supervision software.

In stand-alone applications, local communication may be performed through the TTL interface, where available. This interface is intended for local service, configuration, or diagnostic activities and should be accessible only to authorised personnel.

Supervisor mode

In supervised applications, EWHT may be connected through the RS485 interface to an external controller, gateway, PLC, BMS, or supervision software. This configuration enables remote monitoring and, where supported, parameter management or control functions.
Serial port shall be considered local OT communication interface. This interface may not provide native authentication or encryption; therefore, access shall be protected through physical security, controlled wiring, trusted connected devices, and appropriate network segmentation when gateways or supervisors are used.
If write commands, parameter changes, or reset functions are supported, the system integrator shall ensure that only authorised software and personnel can access these functions.

Serial communication security

By default, serial communication is disabled. When serial communication is enabled, the controller requires the default PA1 and PA2 passwords (both) must be changed before the communication interface becomes operational. This behavior is implemented by design and helps prevent the use of default credentials when remote or supervised access is enabled.

The system integrator shall assign appropriate password values and ensure that only authorized personnel are allowed to access the communication functions. When write access is not required, parameter E2E should be configured for read-only access.

1. Stand-alone mode

In stand-alone mode, EWHT 600 NT operates as an independent system on a single machine, unit, or local installation.

In this configuration, the operator interacts directly with EWHT 600 NT to configure, monitor, and manage the available functions locally, without relying on a central supervision software.

This mode is suitable when the required control and monitoring activities are limited to a single device, machine, or operating environment.

Typical use case:

An operator uses EWHT 600 NT directly on the local machine to check the operating status, adjust parameters, view messages, and manage alarms or notifications related to that specific unit.

2. Supervisor mode

In supervisor mode, EWHT 600 NT is integrated into a wider supervision environment, where a central system collects, displays, and manages information from one or more connected units.

In this configuration, EWHT 600 NT acts as part of a centralized monitoring and control architecture. The goal is to provide a broader overview of the software status, supporting operational supervision, diagnostics, alarm management, and coordinated control.

Typical use case:

A supervisor monitors several EWHT 600 NT units from a central workstation, checks their operating conditions, receives alarm notifications, and intervenes when anomalies or abnormal operating states are detected.

4.4. SECURITY HARDENING GUIDELINES

4.4.1. Recommendations

- Install the device inside the machine with only the front panel accessible.
- Permit access to the device only to authorized and Qualified personnel (see ‘Personnel qualification’ section)

4.5. SECURE DISPOSAL GUIDELINES

4.5.1. Procedure

The guidelines for removing the device and preventing potential data disclosure are:

1. Restore default values (see ‘Restore default values’ section)
2. Remove the device (component/system) from its intended environment
3. Recycle the device properly (see ‘Disposal’ section)

4.5.2. Restore default values

When necessary, and in any case before disposal of the product, you can restore the parameters to their default values.

The H60 parameter can be used to load one of the predefined application vectors. Loading an H60 application restores a predefined subset of factory-default parameters associated with the selected application. Parameters not included in the selected application vector retain their previous values and shall therefore be reviewed before the device is returned to service or disposed of.

The procedure to load one of the predefined application vectors restores the respective default values, with the exception of the parameters which are not specific for the application that retain the previously set value. These values, left unaltered, may not be correct and may therefore need to be changed.

NOTICE

INOPERABLE EQUIPMENT

Verify the parameters after loading a predefined application vector.

Failure to follow these instructions can result in equipment damage.

Before decommissioning or transferring the device, restore the default application values and remove any customized credentials. Since the H60 application restore only resets a predefined subset of parameters, verify the remaining configuration parameters and manually restore password values to their factory defaults:

PA1 = 0
PA2 = 15

This helps prevent the disclosure of customized credentials and installation-specific configuration data.

4.5.3. Disposal

For security reasons, we recommend resetting the controller to its default values prior to decommissioning (see ‘Restore default values’ section).

NOTICE
DISCLOSURE OF APPLICATION DATA Reset the controller to the default values to help prevent data disclosure. **Failure to follow these instructions can result in equipment damage.**

The equipment (or product) must be subjected to separate waste collection in compliance with the local legislation on waste disposal.

4.6. SECURE OPERATION GUIDELINES

4.6.1. Device upgrade

The controller can be upgraded only with authenticated Schneider Electric or Eliwell files. In case the authenticity check fails the controller stays idle, without any capacity for regulation until the Unicard is removed and the controller is power cycled (after that the former application restart).

NOTICE
UNINTENDED EQUIPMENT OPERATION Use authenticated Schneider Electric or Eliwell files only. **Failure to follow these instructions can result in equipment damage.**

4.6.2. Personnel qualification

Only personnel with suitable training and an in-depth knowledge and understanding of the contents of this User Guide and any other documentation relevant to the product are authorized to work on and with this product.
Qualified personnel must be capable of identifying any dangers which may arise from the configuration or changing of parameter values, and from the use of mechanical, electric and electronic equipment in general. Plus, they must be familiar with the personal safety laws, provisions and regulations which must be observed during system planning and implementation.

4.7. ACCOUNT MANAGEMENT GUIDELINES

4.7.1. Recommendations

Protect the device access by changing the PA1 and PA2 passwords.

4.7.2. Password

The PA1 and PA2 passwords are required to access the device parameters:

- PA1: access the “User” (level 1) parameters (default: PA1 = 0 - disabled)
- PA2: access the “Installer” (level 2) parameters (default: PA2 = 15 - enabled)

To change the password value:

1. Press and hold SET key for at least 3 seconds
2. Scroll through the parameters with and until you find the label “PA2”
3. Press and release SET key
4. Set the “PA2” value using UP and DOWN keys
5. Confirm the value by pressing SET key
6. Scroll through the folders with UP and DOWN keys until you find the label “diS”
7. Press and release SET key
8. Scroll through the parameters with and until you find the label “PA1” or “PA2”, depending on whether you want to change access password PA1 or PA2

Note: If PA1=0, the User parameters will not be protected and displayed before PA2 label.
Note: If the value entered is incorrect, the PA1 or PA2 label will be shown again. Repeat the procedure.

For security reasons, on first access we recommend to change the PA1 and PA2 passwords. Carefully consider the implications of giving access to other people.

⚠ WARNING

UNAUTHORIZED ACCESS

- Change the default passwords PA1 and PA2 immediately.
- Do not share the password with unauthorized individuals or non-qualified personnel.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: For instructions on recovering forgotten passwords, refer to **“3.2. PASSWORD RECOVERY” page 17.**

5. MECHANICAL INSTALLATION

5.1. BEFORE STARTING

Read and understand this chapter before beginning the installation of your system.
Pay particular attention in conforming to any safety information, different electrical requirements, and normative standards that would apply to your machine or process in the use of this equipment.
The use and application of the information contained herein require expertise in the design and programming of automated control systems. Only you, the user, machine builder or integrator, can be aware of all the conditions and factors present during installation and setup, operation, and maintenance of the machine or process, and can therefore determine the automation and associated equipment and the related safeties and interlocks which can be effectively and properly used.
When selecting automation and control equipment, and any other related equipment or software, for a particular application, you must also consider any applicable local, regional or national standards and/or regulations.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Make sure that all equipment used and the systems designed comply with all applicable local, regional and national laws.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

5.2. DISCONNECTING POWER

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables or wires.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Before restoring the power supply, replace and secure all covers, hardware components and cables.
- Use only the specified voltage when operating this equipment and any associated products.
- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and use this equipment in an enclosure appropriately rated for its intended environment.
- Do not use this equipment for safety-critical functions.
- Do not disassemble, repair, or modify this equipment.
- Do not connect wires to unused terminals and/or terminals indicated as “Reserved”.

Failure to follow these instructions will result in death or serious injury.

5.3. OPERATING ENVIRONMENT

This equipment is designed to operate outside all hazardous locations.
Install this equipment only in areas known to be free from dangerous atmospheres at all times.

⚠⚠ DANGER

POTENTIAL FOR EXPLOSION

Install this equipment only in locations where flammable refrigerants cannot accumulate, even in the event of a leak.

Failure to follow these instructions will result in death or serious injury.

For information regarding the use of control equipment in applications capable of generating dangerous atmospheres , contact the relevant national regulatory bodies or certifying authorities.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Install and use the equipment in compliance with the conditions described in the Technical Specifications chapter.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

5.4. INSTALLATION CONSIDERATIONS

⚠⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables or wires.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Before restoring the power supply, replace and secure all covers, hardware components and cables.
- Use only the specified voltage when operating this equipment and any associated products.
- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and use this equipment in an enclosure appropriately rated for its intended environment.
- Do not use this equipment for safety-critical functions.
- Do not disassemble, repair, or modify this equipment.
- Do not connect wires to unused terminals and/or terminals indicated as “Reserved”.

Failure to follow these instructions will result in death or serious injury.

The devices are designed for wall mounting.

When handling the equipment, use caution to avoid damage caused by electrostatic discharge. In particular, the unshielded connectors and in certain cases the open circuit boards are vulnerable to electrostatic discharge.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO ELECTROSTATIC DISCHARGE

- Keep the equipment in the protective packaging until ready for installation.
- The equipment must only be installed in type-approved casing and/or in points that prevent unauthorised access and provide protection from electrostatic discharge.
- When handling sensitive equipment, use an antistatic bracelet or equivalent earthed protective device against electrostatic discharge.
- Before handling the equipment, always discharge the static electricity from the body by touching an earthed surface or type-approved antistatic mat.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

⚠ WARNING

HAZARD OF OVERHEATING AND/OR FIRE

Verify that your application has not been designed with device outputs connected directly to devices generating a frequently operated capacitive load [1].

Failure to follow these instructions can result in death, serious injury, or equipment damage.

[1] Even if your application does not apply a frequently operated capacitive load on the relay, capacitive loads will reduce the life of any electromechanical relay, and installation of a contactor or an external relay, that is sized and maintained according the dimensions and characteristics of the capacitive load, will help minimize the consequence of relay degradation.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Route communication and I/O cables separately from power cables.
- Every end application of this device must be tested individually and completely in order to check its proper operation before putting it in service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

HACCP Module

NOTICE

INOPERABLE EQUIPMENT

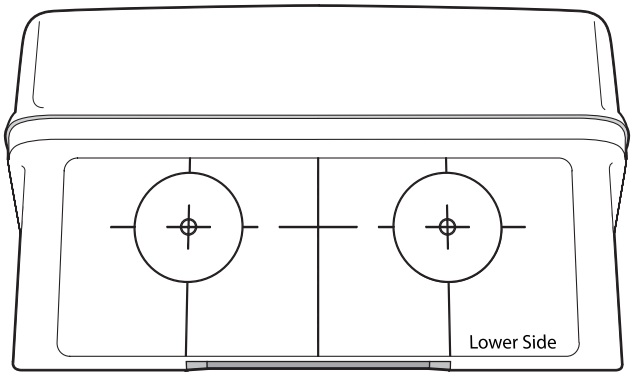
For TTL serial line connection, use cables no longer than 1 m (3.28 ft).

Failure to follow these instructions can result in equipment damage.

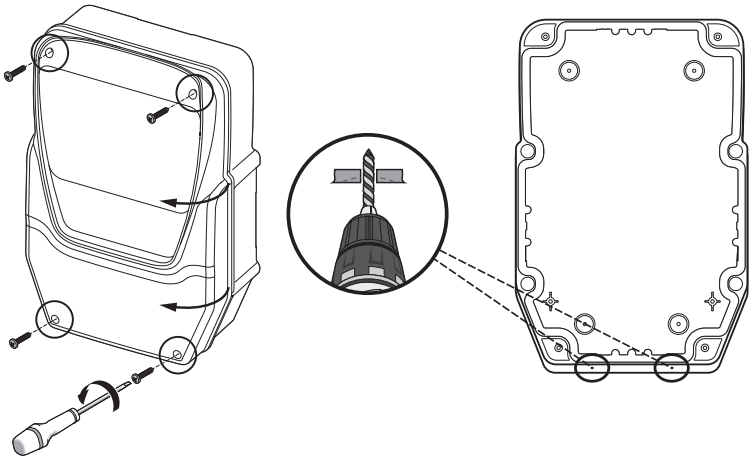
NOTE: For information on the cables to be used with the HACCP Module, contact your local Eliwell representative.

5.5. INSTALLATION PROCEDURE

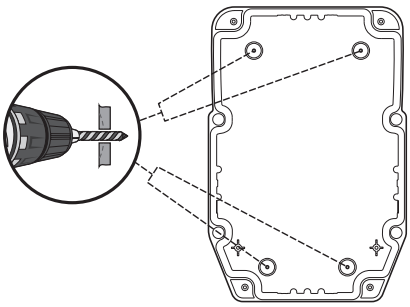
5.5.1. Preparing the panel



1) Remove the cover and drill the holes for the cable clamps (at least one for power cables and one for signalling cables) on the bottom of the panel.
NOTE: Use the drilling template provided.



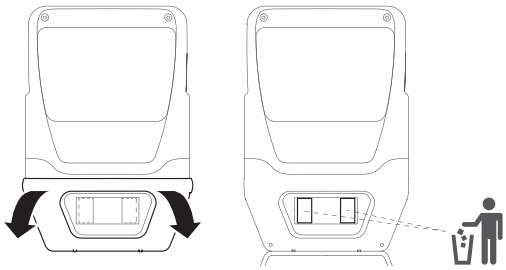
2) Drill the wall fixing holes on the back of the panel, in the areas marked on the back.



Hinges are available for mounting on special compartments for opening the cover both right and left.
Screw on the respective anchoring screws taking care that the hinges are fitted well and lie flush so that they do not interfere with the compression of the seal.

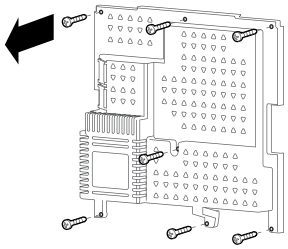
3) Optional. Set-up the panel.

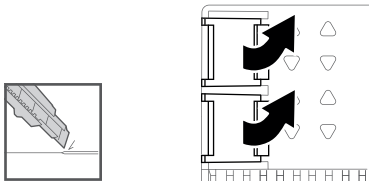
NOTE: on 4 DIN models two more DIN spaces can be created: open the door with both hands as shown in the figure, then remove the factory-fitted push-through tabs.

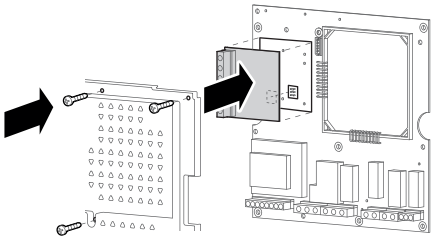


4) Optional. Install the plug-in RS-485 module for communication with the supervisor.

1) Remove the seven screws securing the plastic protecting the board.
2) Remove the protective element, then use a box cutter to remove the two terminal covers.
3) Connect the RS-485 plug-in module (optional) using the specific spacers, then replace the cover and secure it using the screws.



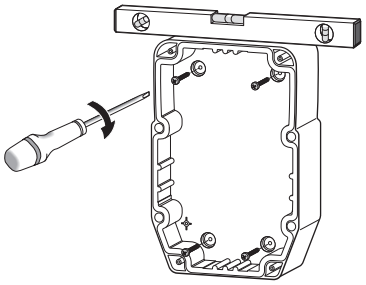


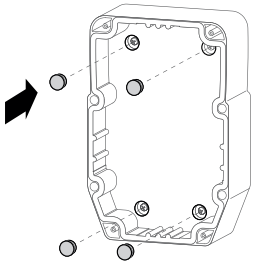


NOTICE
INOPERABLE DEVICE Fit the plug-in RS-485 module in the plug-in connector aligning the four posts with the holes in the control board. **Failure to follow these instructions can result in equipment damage.**

5.5.2. Wall-Mounting the panel

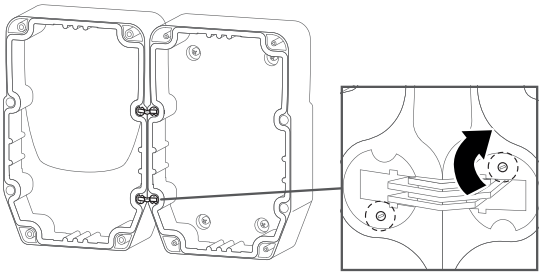
5) Fix the back of the panel to the wall using four screws (not supplied) suited to the wall thickness.
NOTE: TDI20 screw caps (not provided) can be fitted at the wall mounting points so that the IP rating is not altered.





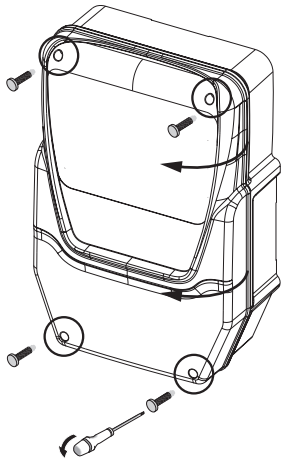
6) Hinges are available for mounting on special compartments for opening the cover both right and left.
Screw on the respective anchoring screws taking care that the hinges are fitted well and lie flush so that they do not interfere with the compression of the seal. Fit the hinges to secure the cover.

Fit the hinges provided into their housings on the right or left side of the panel and tighten the corresponding screws to secure them.



5.5.3. Close the panel

7) Close the cover and secure it with the screws provided.



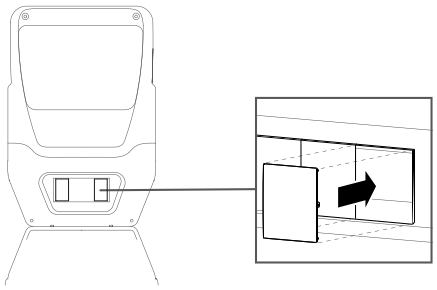
⚠⚠ DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR EXPOSURE TO ACCESSIBLE PARTS

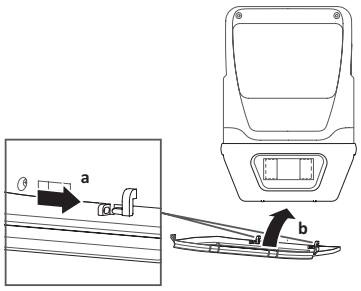
The final application must disallow access to parts at hazardous voltage, as the instrument offers no intrinsic protection against this risk.

Failure to follow these instructions will result in death or serious injury.

8) DIN rail-mounted models with window only. Close access to inside the panel from the front window using the dedicated DIN plugs.
The end user is responsible for ensuring that the open parts of the box are not accessible.



9) Close the door



⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Place the devices dissipating the most heat in the top of the cabinet and ensure suitable ventilation.
- Do not place this equipment near or above any devices which could cause overheating.
- Install the device in a point that guarantees the minimum distances from all structures and adjacent equipment as indicated in this document.
- Install all equipment in conformity with the technical specifications given in the respective documentation.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

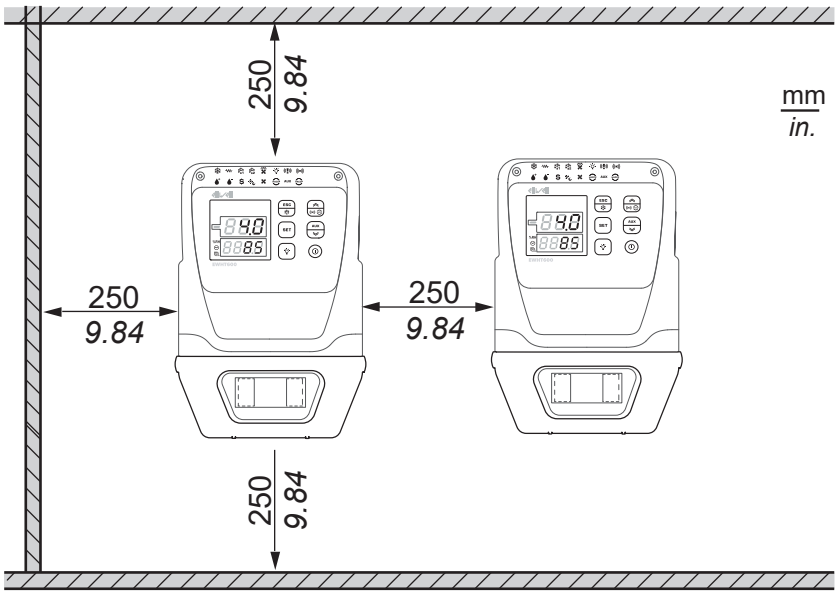


Fig. 2. Minimum Distance

6. ELECTRICAL CONNECTIONS

6.1. WIRING BEST PRACTICES

The following information describes the guidelines for wiring and the associated best practices to follow when using the device.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables or wires.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Before restoring the power supply, replace and secure all covers, hardware components and cables.
- Use only the specified voltage when operating this equipment and any associated products.
- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and use this equipment in an enclosure appropriately rated for its intended environment.
- Do not use this equipment for safety-critical functions.
- Do not disassemble, repair, or modify this equipment.
- Do not connect wires to unused terminals and/or terminals indicated as “Reserved”.

Failure to follow these instructions will result in death or serious injury.

⚠ DANGER

HAZARD OF OVERHEATING AND/OR FIRE

- Do not use with loads other than those indicated in the technical specification.
- Do not exceed the maximum permitted current; for higher loads, use a meter with sufficient power capacity.

Failure to follow these instructions will result in death or serious injury.

This equipment is designed to operate outside all hazardous locations.
Install this equipment only in areas known to be free from dangerous atmospheres at all times.

⚠ DANGER

POTENTIAL FOR EXPLOSION

Install this equipment only in locations where flammable refrigerants cannot accumulate, even in the event of a leak.

Failure to follow these instructions will result in death or serious injury.

For information regarding the use of control equipment in applications capable of generating dangerous atmospheres , contact the relevant national regulatory bodies or certifying authorities.

6.1.1. Wiring guidelines

⚠ ⚠ DANGER

LOOSE WIRING CAN RESULT IN ELECTRIC SHOCK

- Tighten connections in conformance with the torque specifications.
- Do not insert more than one wire per connector of the terminal block unless using the cable ends (ferrules) specified below.

Failure to follow these instructions will result in death or serious injury.

Use copper conductors only.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Route communication and I/O cables separately from power cables.
- Every end application of this device must be tested individually and completely in order to check its proper operation before putting it in service.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTICE

INOPERABLE EQUIPMENT

- For the connection of probes and digital inputs, use cables shorter than 10 m (32.80 ft).
- For TTL serial line connection, use cables shorter than 1 m (3.28 ft).

Failure to follow these instructions can result in equipment damage.

HACCP Module

NOTICE

INOPERABLE EQUIPMENT

For TTL serial line connection, use cables no longer than 1 m (3.28 ft).

Failure to follow these instructions can result in equipment damage.

NOTE: For information on the cables to be used with the HACCP Module, contact your local Eliwell representative.

The temperature (NTC) probes have no specified connection polarity; the connections can be extended using a normal bipolar cable. Extending the probe wiring influences the electromagnetic compatibility (EMC) of the controller.

Screw-type terminals

Types of cables and wire sections for a screw-type terminal board with **5.08 mm (0.197 in.)** spacing:

mm / in. 7 / 0.28								
mm²	0.2…2.5	0.2…2.5	0.25…2.5	0.25…2.5	2 x 0.2…0.75	2 x 0.2…0.75	2 x 0.25…0.75	2 x 0.5...1.5
AWG	*24…14*	*24…14*	*22...14*	*22...14*	*2 x 24…18*	*2 x 24…16*	*2 x 22…18*	*2 x 20...16*

Ø 3,5 mm (*0.14 in.*)	C	N•m	0.5...0.6
		lb-in	*4.42...5.31*

Fig. 3. Spacing 5.08 mm (0.197 in.)

Power Supply terminals

Types of cables and wire sections for a screw-type terminal board with **7.62 mm (0.30 in.)** spacing:

mm / in. 7 / 0.28								
mm²	0.2…4	0.2…2.5	0.25…2.5	0.25…2.5	2 x 0.2…1.5	2 x 0.2…1.5	2 x 0.25…0.75	2 x 0.5...1.5
AWG	*24…12*	*24…14*	*22...14*	*22...14*	*2 x 24…16*	*2 x 24…16*	*2 x 22…18*	*2 x 20...16*

Ø 3,5 mm (*0.14 in.*)	C	N•m	0.5...0.6
		lb-in	*4.42...5.31*

Fig. 4. Spacing 7.62 mm (0.3 in.)

6.1.2. Serial connections

The controller can be connected to Televis**System** / Modbus remote control systems by a direct RS-485 connection using the RS-485 optional plug-in module.

6.1.3. RS-485 serial port connection

When you connect a device with a non-isolated RS485 serial port to the network, please consider:

- Start connecting only the '+' and '-' terminals of the device
- If the functioning is not good or is not stable, also connect the GND terminal to the network. Verify that the connection does not create an earth loop on the serial port to help prevent equipment damage.
- Use a "**twisted pair**" shielded cable with two conductors with cross-section 0.5 mm^2 (AWG 20), plus sheath, such as, for example, a Belden cable version 3105A (typical impedance 120 Ω) with PVC sheath, rated capacity between conductors 36 pF/m, rated capacity between conductor and sheath 68 pF/m. Alternatively, use a "**twisted pair**" shielded cable with two conductors with cross-section 0.5 mm^2 (AWG 20), plus sheath, such as, for example, a Belden cable version 8762 with PVC sheath, rated capacity between conductors 89 pF/m, rated capacity between conductor and sheath 161 pF/m. For laying wires, comply with the indications given in standard EN 50174 on information technology wiring.
- Follow the applicable regulations for laying and connecting the cables. Extra care must be taken in separating data transmission circuits from power lines.
- The length of the RS-485 network which can be connected directly to the controller is 1200 m. This length can be extended and the number of devices for each channel increased using appropriate repeater modules.
- Input impedance: 1/8 unit load.
- Single terminal board with 3 conductors: use all 3 conductors ("+" and "-" for the signal and "GND" for the braiding).
- Attach the 120 Ω 1/4W resistors between the "+" and "-" terminals on the interface and the last controller in each branch of the network.
- The RS-485 physical level can be used for Modbus SL communication
  Concurrent communication of different protocols on the same serial port is **NOT** permitted.

Pay special attention when connecting serial lines. Incorrect wiring may cause the equipment to stop working.

NOTICE

INOPERABLE EQUIPMENT

- The load equivalent to all the bus RS-485 bus should not exceed 8 Unit Load (For the definition of Unit Load refer to standard TIA/EIA-485-A).
- Do not fit the termination resistors inside the RS485 network.
- For the connection with the supervision system, use a shielded "twisted pair" cable specific (for example: BELDEN cable model 8762).
- The length of an RS485 network is directly related to the baudrate used. At a baud rate of 9600 baud, the maximum cable length is approximately 800 meters (2,625 feet). At 19200 baud, the maximum length is reduced to approximately 400 meters (1,312 feet).

Failure to follow these instructions can result in equipment damage.

NOTICE

INOPERABLE EQUIPMENT

Do not communicate simultaneously via Modbus and Televis protocols on the same serial port.

Failure to follow these instructions can result in equipment damage.

6.1.4. TTL connection

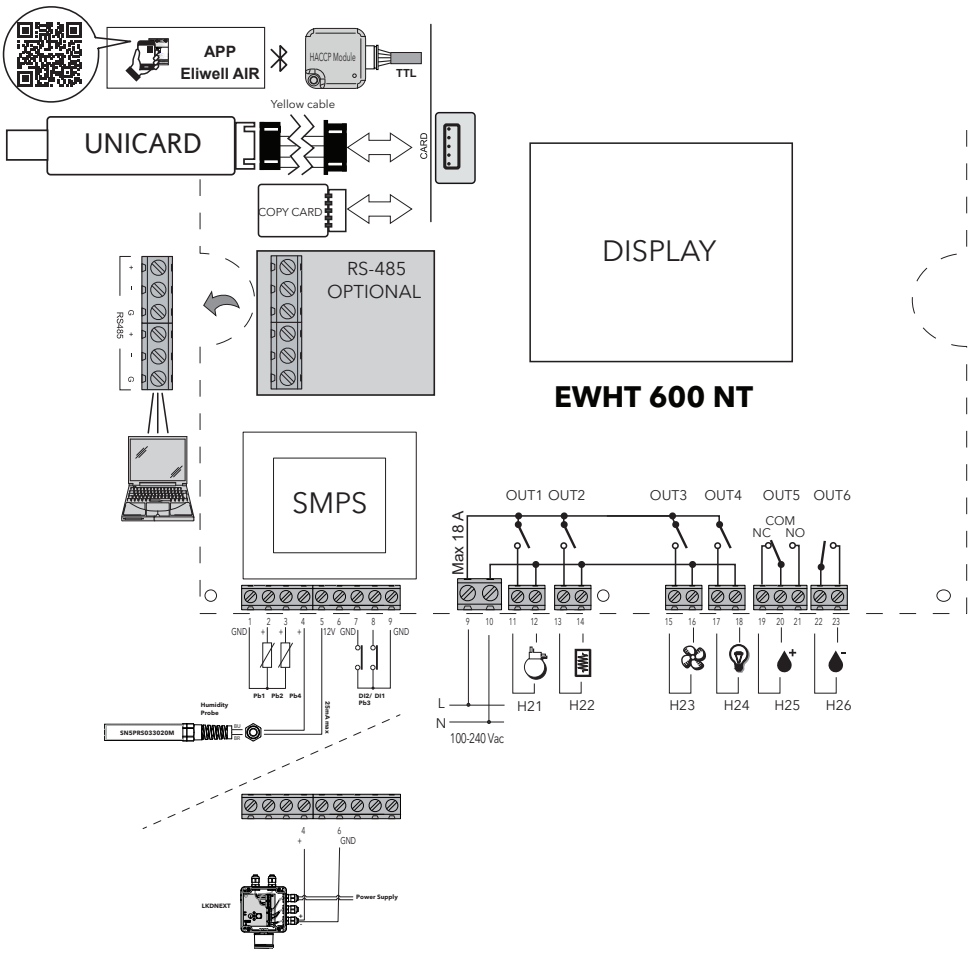
Use a 5-wire TTL cable up to 3 m (118 in.) in length.
An Eliwell-supplied TTL cable is recommended. Contact Eliwell Sales Office for item availability.

HACCP Module

NOTICE
INOPERABLE EQUIPMENT For TTL serial line connection, use cables no longer than 1 m (3.28 ft). **Failure to follow these instructions can result in equipment damage.**

NOTE: For information on the cables to be used with the HACCP Module, contact your local Eliwell representative.

6.2. WIRING DIAGRAM



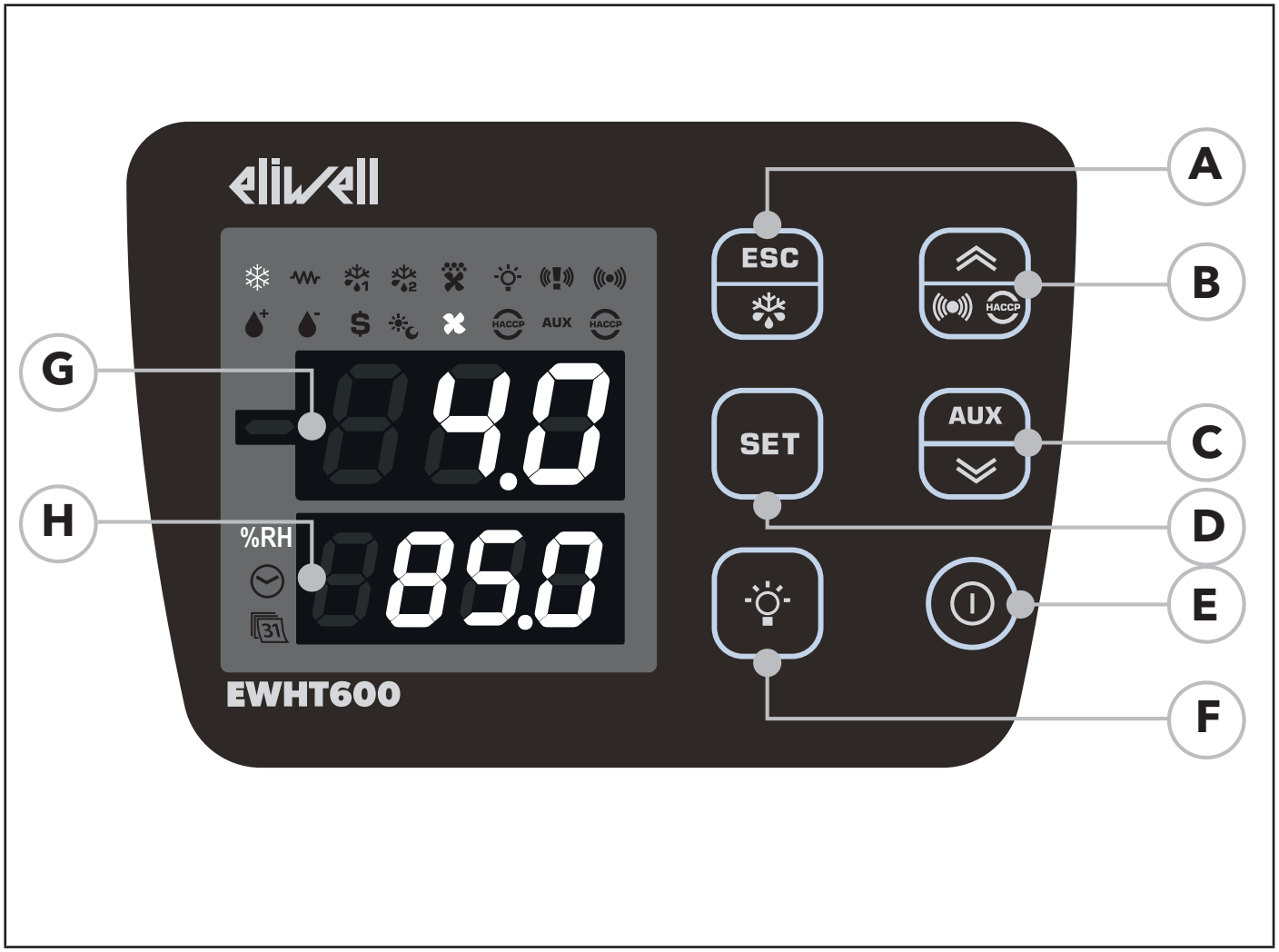
6.2.1. TERMINALS

TERMINALS				
1, 6, 9	GND		**9, 10**	LINE/NEUTRAL. Power supply
2	Analog input Pb1		**11**	NO OUT1
3	Analog input Pb2		**12**	NEUTRAL
4	Analog input Pb4		**13**	NO OUT2
5	12V		**14**	NEUTRAL
7	Digital input DI2 / Analog input Pb3		**15**	NO OUT3
8	Digital input DI1		**16**	NEUTRAL
CARD	TTL port for connection to AIR Edge (Wi-Fi) / HACCP Module / UNICARD / Copy Card / TelevisSystem		**17**	NO OUT4
RS-485	Plug-in module for connection to TelevisSystem / Modbus (optional)		**18**	NEUTRAL
			19	NC OUT5
			20	OUT5 Common terminal
			21	NO OUT5
			22	NO OUT6
			23	NC OUT6

7. USER AND START-UP INTERFACE

7.1. DISPLAY

7.1.1. KEYS



No.	KEY	press and release	press and hold for about 3 seconds	NAVIGATION MENU	Notes
A	ESC Defrost	• Functions Menu	• Manual defrost • Return to Main Menu	• Output	Configurable - see parameter H33
B	▲ UP Alarms	• Alarms Menu (always visible)	/	• Scroll • Increase values	HACCP alarms only on foreseen models and if present
C	▼ DOWN AUX	system INFO See Technical Support	Activate auxiliary function	• Scroll • Decrease values	Configurable - see parameter H32
C	SET	• Display setpoint / probe values / time (Models with clock only) • Confirm values • Access value edit mode (top display flashing)	Access Parameters menu	• Confirm values • Move right	Time only visible on models with clock
E	ON/OFF	/	Switch On/Off device	/	Configurable - see parameter H34
F	LIGHT	Switch light On/Off	Switch light On/Off	/	Configurable - see parameter H35

7.1.2. DISPLAY MEANING

G	H
3-DIGIT TOP DISPLAY plus the - sign	**4-DIGIT BOTTOM DISPLAY**
Display: • operating value • parameters label • alarms, functions	Display: • Temperature setpoint • Humidity (%RH), when humidity control is enabled • Gas concentration (ppm), when used with an LKDNext Leak Detector. (1) • Time
if TOP display is **flashing** it means that the value of the BOTTOM Display can be modified	(1) The value is shown only when it exceeds the configured thresholds; otherwise, “SAFE” is displayed

The display provides quick access to the main operating values:
- Temperature setpoint
- Measured temperature
- Humidity (%RH), when humidity control is enabled
- Gas concentration (ppm), when used with an LKDNext Leak Detector
- Time, on models equipped with RTC

In the factory configuration, the display is preset to show the room temperature and humidity.
The information shown on the second 4-digit display depends on the application configuration and is defined by parameter dd2.
According to the value set for dd2, the display can display:
- dd2 = 0 ➜ the temperature setpoint
- dd2 = 1 ➜ the time
- dd2 = 2 ➜ the values read by Pb4 **(default),** 4...20 mA probe (either %RH or ppm).

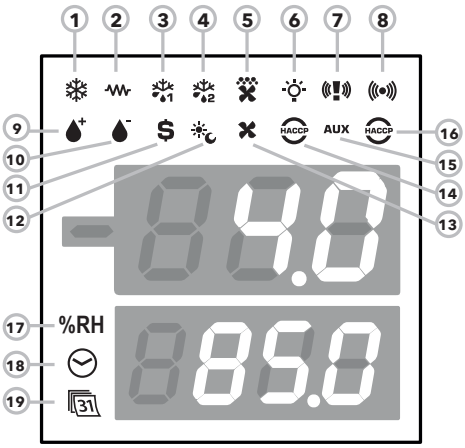
7.1.3. CONNECTION TO HACCP Module

When EWHT 600 NT is connected to the Eliwell AIR app via the HACCP Module or AIR Edge (Wi-Fi), the btL label is shown on the TOP display, while icons are disabled.
Press any button to display the temperature and humidity values.

7.1.4. CONNECTION TO LKDNEXT Module

The **SAFE** message is shown on the display when the controller is connected to LKDNext and the measured gas concentration is below the warning threshold.
If the measured gas concentration exceeds the warning threshold, the display shows the ppm value scaled by a factor of 10 (ppm/10).

7.1.5. ICONS



No.	ICON	colour	description
17	%RH	white	ON in case of displaying Relative Humidity RH %
18	TIME	white	ON in case of time display or editing
19	DATE	white	ON in case of date display or editing

Alarms	ICON 7	ICON 8	Colour	Buzzer	OFF	
					Icon	Buzzer
Alarm			Red	See “10.2. ALARM CAUSE/EFFECT TABLE” page 125		
PANIC			Red		---	---
Warning Leak Detector			Red		...	---
PANIC + Danger Leak Detector			Red		---	(1)

(1) = As long as the Panic alarm persists it will not be possible to mute the buzzer from the keypad.

No.	Icon	colour	ON	FLASHING	OFF
1	COMPRESSOR	white	Compressor ON	Delay	Compressor OFF
2	RESISTOR	white	Heating ON	/	Heating OFF
3	DEFROST 1	white	Defrost	Dripping	No defrost
4	DEFROST 2	white	Defrost	Dripping	No defrost
5	CONDENSER FANS	white	Fans ON	/	Fans OFF
6	LIGHT	white	Light ON	/	Light OFF
7	PANIC	red	Alarm	Not displayed	No alarm
8	ALARM	red	Alarm	Not displayed	No alarm
9	HUMIDITY +	white	Humidity + ON	/	Humidity + OFF
10	HUMIDITY -	white	Humidity - ON	/	Humidity - OFF
11	ENERGY SAVING	white	Energy saving ON	/	Energy saving OFF
12	NIGHT & DAY	white	Night & Day ON	/	Night & Day OFF
13	FANS	white	Fans ON	/	Fans OFF
14	HACCP	white	HACCP menu	/	/
15	AUXILIARY (AUX)	white	AUX ON	/	AUX OFF
16	HACCP ALARM	red	HACCP alarm	Not displayed	No alarm
ON: function/alarm ON; OFF: function/alarm OFF					

7.2. PRELIMINARY CONFIGURATIONS

After making the electrical connections, simply power up the device to start operation.
At first start-up, Eliwell recommends that you:

1. make sure the instrument is powered (green POWER SUPPLY icon on).
2. make sure the display is working: when the controller is powered up it performs a lamp test, during which time the display and icons will flash for several seconds to ensure that they all function correctly.
3. make sure there are no active alarms (ALARM / HACCP ALARM icon off and labels **E1**, **E2**, **E3** not displayed).
4. configure the main parameters listed in the USER menu to suit your requirements.

7.3. OPERATION WITH FACTORY DEFAULT CONFIGURATION

7.3.1. Parameters

Parameter	Folder	Description	UM	Range
CHC	inS/CPr	Dehumidify control type 0 = Dehumidification independent from Cooling 1 = Cooling priority over Dehumidification (factory setting)	flag	0/1
SEH	USr/CPr	Humidity setpoint	%RH	0…100
PbH	inS/CPr	Humidity control probe selection 0 = disabled 1 = enabled	flag	0/1
CHt	inS/CPr	Humidity-temperature control type	num	0/1/2/3
dEH	inS/CPr	Humidity regulation during defrost. 0 = disabled during defrost 1 = enabled during defrost	flag	0/1
dbH	USr/CPr	Humidity intervention semi-band	%RH	0...50
dFH	USr/CPr	Humidification differential	%RH	0...50
CHd	USr/CPr	Humidity control enable differential	%RH	0…30
CHL	USr/CPr	Minimum temperature to enable humidity control	°C / °F	-58.0…302.0
CHH	USr/CPr	Maximum temperature to enable humidity control	°C / °F	-58.0…302.0
CHF	USr/CPr	Humidify-dehumidify out off time	s	0…250
CHn	USr/CPr	Humidify-dehumidify out on time	s	0…250
HuL	USr/FAn	Humidity level selection. 0 = disabled, 1 = Level 1, 2 = Level 2, 3 = Level 3	num	0...3
Hu1	USr/FAn	Evaporator fans on time humidity level 1	min	0…250
Hu2	USr/FAn	Evaporator fans off time humidity level 1	min	0…250
Hu3	USr/FAn	Evaporator fans on time humidity level 2	min	0…250
Hu4	USr/FAn	Evaporator fans off time humidity level 2	min	0…250
Hu5	USr/FAn	Evaporator fans on time humidity level 3	min	0…250
Hu6	USr/FAn	Evaporator fans off time humidity level 3	min	0…250
H2x	USr/CnF	Configuration of digital output x (OUT x). 14 = Humidify, 15 = Dehumidify, 16 = Resistor Dehumidify For the other values, refer to Parameters table	min	0…19

With the factory default configuration, EWHT 600 NT manages **combined temperature and humidity control** using predefined inputs and outputs.
Temperature control is performed via the output configured as **Cooling**.

7.3.2. Humidification

Humidity control is performed via the output configured as **Humidification** (parameter **H25 = 14**).
The humidification control operates **independently** from temperature control.

7.3.3. Dehumidification

Dehumidification control is performed via the output configured as Dehumidification (parameter **H26 = 15**).
With the factory setting (**CHC = 1**), **Cooling has priority over Dehumidification**.
When cooling is required, the **cooling relay is activated**, while the **dehumidification relay remains OFF**. Once the temperature setpoint has been reached, if dehumidification is still required, the **cooling relay is deactivated** and the **dehumidification relay is activated**.

7.3.4. Alternative Operating Mode: LKDNext

In the factory configuration, **EWHT 600 NT does not manage the LKDNext leak detector.**
To configure EWHT 600 NT for **LKDNext management as an alternative to combined temperature and humidity control**, refer to the section **"LKDNext Leak Detector Configuration (Step-by-Step)"**.

7.3.5. Alternative Dehumidification Control Logic

EWHT 600 NT allows the configuration of alternative dehumidification control logics, different from the factory default setting.
Dehumidification Independent from Cooling
By setting parameter **CHC = 0** and help ensuring that at least one relay output is configured as **Dehumidification** (parameter **H2x = 15**), dehumidification operates **independently from the Cooling regulator.**
In this configuration, the dehumidification output is controlled exclusively by the humidity regulation logic and does not require the activation of the Cooling output.
Dehumidification with Priority over Temperature Control
By configuring one output as **Cooling** (parameter **H2x = 1**) and one output as **Resistor Dehumidify** (parameter **H2x = 16**), dehumidification is given **priority over temperature control.** When dehumidification is required, the Dehumidification relay keeps the Cooling output active until the humidity setpoint is reached, regardless of the temperature regulation status.
In this operating mode, parameter **CHC is not applied.**

7.4. LEAK DETECTOR CONFIGURATION (STEP-BY-STEP)

As an alternative to the combined temperature and humidity management, the controller can be configured for temperature control with refrigerant gas leak alarm management when connected to an LKDNext Leak Detector.
In this operating mode, humidity regulation is disabled and the EWHT 600 NT provides gas concentration display as well as Warning and Danger alarm signalling via dedicated relay outputs.

Step 1 – Enter Parameter Menu

1. Power on the EWHT 600 NT
2. Access the parameter menu according to the standard procedure

Step 2 – Configure Leak Detector Input and Display scaling

Assign the appropriate input channel to the Leak Detector signal
Enable ppm value visualization
Confirm that the displayed value represents ppm / 10

Parameter	Value	Folder	
04U	**1**	inS/CnF	1 = ppm
04P	**1**	inS/CnF	Display shows ppm x 10
H1x [1]	**±21**	inS/CnF	Select the digital input actually wired to the Leak Detector. Sign meaning: +21 → input active when contact is closed -21 → input active when contact is open

[1] As an optional configuration, the alarm relay of the LKDNext Leak Detector can be connected to one of the EWHT 600 NT digital inputs, by setting parameter H1x = ±21.
When the LKDNext Leak Detector is connected to the EWHT 600 NT, refrigerant concentration (ppm) management and visualization are handled via parameters 04U and 04P. These parameters define the unit and scaling of the displayed value. The configuration of the digital input for the LKDNext alarm relay is therefore optional and should be considered as an additional function only. It is not mandatory, since the digital input does not provide ppm value visualization, but only a binary alarm status.

Step 3 – Configure Relay Outputs

Assign one relay to LKDNext Warning / Assign one relay to LKDNext Danger

Relay Configuration for Leak Detector Alarms

Parameter	Value	Folder	Function	Example
H21...26	**17**	inS/CnF	LKDNext Warning	H24 = 17 (Warning)
H21...26	**18**	inS/CnF	LKDNext Danger	H25 = 18 (Danger)

Alarm Thresholds

Parameter	Folder	Meaning
ALL	InS/diS	Leak Warning threshold
ALH	InS/diS	Leak Danger threshold
AL1	InS/diS	Warning delay
AL2	InS/diS	Danger delay
04d	InS/diS	Common differential

Step 4 – Changing between temperature/humidity control and temperature + leak detection control

After switching between temperature/humidity control and temperature + leak detection control (or vice versa), power cycle the device (OFF → ON) to apply the new configuration.

Step 5 – Verify Operation

Simulate warning and danger conditions / Verify display update and relay activation

- Simulate Warning level → relay assigned as LKDNext Warning must activate
- Simulate Danger level → relay assigned as LKDNext Danger must activate
- Confirm displayed value is ppm / 10
- Verify Leak Detector / Panic alarm icons

7.4.1. Leak Detector Value Display

The second display row supports 4 digits
Refrigerant concentration is displayed as ppm / 10

Refrigerant Threshold Examples

Refrigerant	Actual Threshold (ppm)	Displayed Value
CO_2	10,000	1,000
NH_3	20,000	2,000

7.4.2. Relay Configuration for Leak Detector Alarms

Relay outputs can be configured as follows:

Relay Function	Description	Notes
LKDNext Warning	Activated at warning threshold	
LKDNext Danger	Activated at danger threshold	

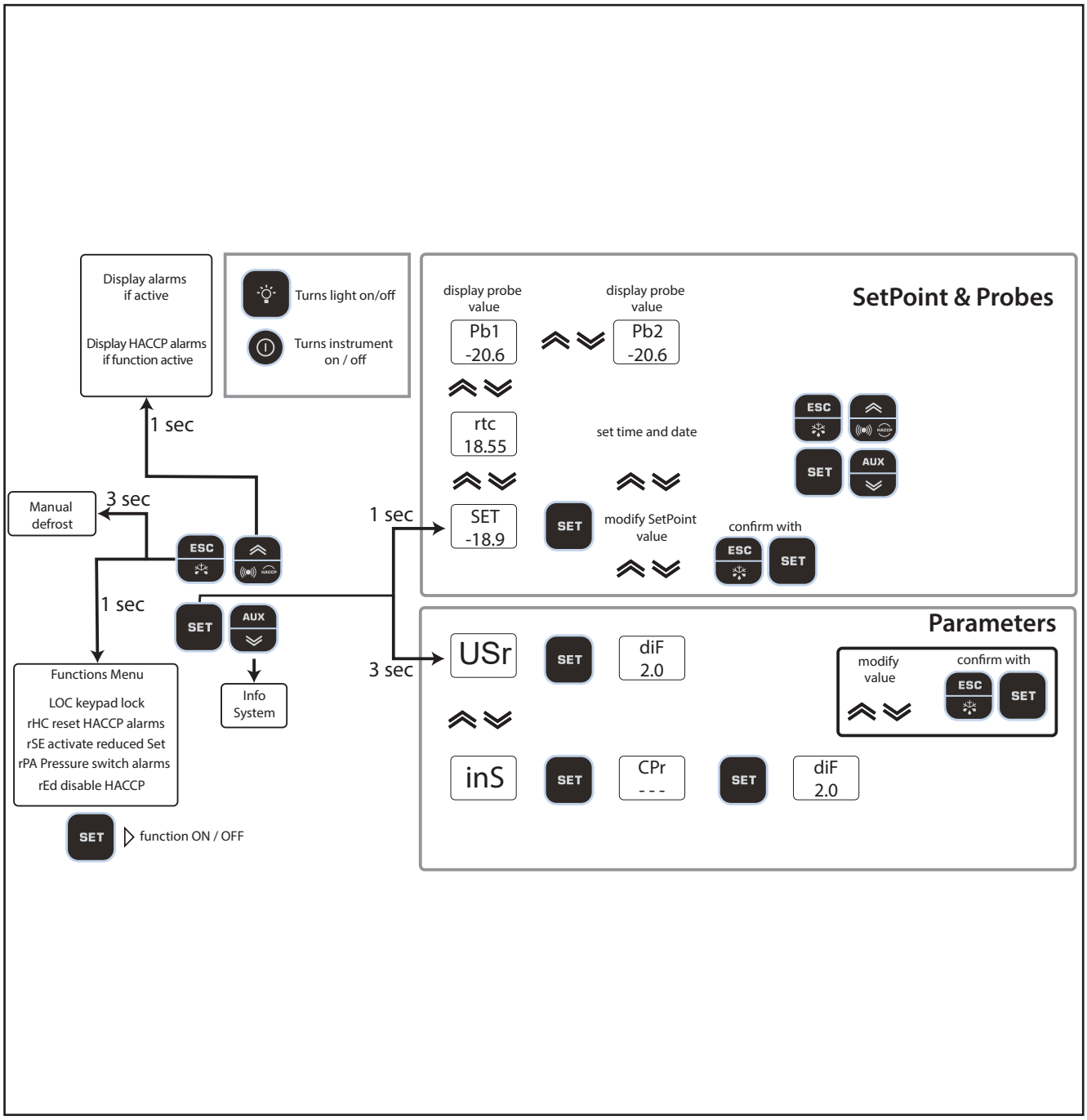
These outputs can be connected to external:
- Acoustic alarms
- Visual indicators
- Supervisory systems

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION
- The EWHT 600 NT is not a safety device and does not replace the LKDNext's built-in LED safety indications or any mandatory safety functions.
- Always rely on the LKDNext detector as the primary safety device for refrigerant leak detection.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

7.4.3. NAVIGATION



7.4.4. FUNCTIONS MENU AND KEY-ENABLED FUNCTIONS

The Functions menu is used to perform a number of manual functions such as putting the device into stand-by, clearing pressure switch interventions and clearing HACCP alarms, etc.

Access the Functions menu by pressing the ESC key.

The following table lists the functions, which are all OFF by default.

Display	Function	description
LOC OFF	Keypad lock	The UP/ESC/ON-OFF/LIGHT keys and the functions programmed via keys are locked The DOWN key may be used to display the Setpoint only; the value cannot be modified Only function visible if keypad locked (On)
rCF OFF	Disable condenser filter cleaning	Disable condenser filter cleaning
rEd OFF	Disables HACCP alarm recording	Disables HACCP alarm recording
FrH OFF	Frame Heater	Enable/Disable Frame Heater function
rPA OFF	Reset pressure switch alarm	Clears pressure switch alarm NOTE: the function reverts to OFF status when you exit the Functions Menu
AU OFF	Auxiliary function	Enable/Disable auxiliary function
rSE OFF	Reduced set	Reduced set
dEF OFF	Defrost Request	Enable defrost manually dEF label flashes if it is not possible to activate the defrost cycle
rHC OFF	Reset HACCP alarms	Clears HACCP alarms May be protected by Password PA3

All models have the **UP** key set to display the Alarms Menu.
All models also allow the setting of other keys to activate a specific function as identified by the client.
The parameters for configuring the two keys are:

- **H32** = DOWN key configuration
- **H33** = ESC key configuration
- **H34** = ON/OFF key configuration
- **H35** = LIGHT key configuration

The values that can be set apply to these keys and the functions that can be activated are:

Value of H32/H33/H34/H35	
0 = disabled	10 = Activate / disable Frame Heater relay
1 = defrost	11 = Enable/disable Night And Day functions
2 = Auxiliary	12 = deep cooling cycle
3 = Activate reduced set	13 = Clear voltage drop errors (Reset Power Outage)
4 = Reset HACCP alarms	14 = Service stoppage
5 = Disable HACCP alarms	15 = Activate economy set + Night And Day
6 = Light	
7 = Stand-by	
8 = NOT USED	
9 = Evaporator fans ON	

7.4.5. PASSWORDS

Password PA1 is disabled by default.

Password "**PA1**": allows access to **User** parameters.

To enable (**PA1≠0**): press and hold **SET** for more than 3 seconds. The label **USr** appears. Press **SET** again.
Scroll through the parameters using **UP** and **DOWN** until you find label **PA1**, press **SET** to display its value, change it using **UP** and **DOWN** and save by pressing **SET** or **ESC.**

Example with password enabled (**PA1≠0**): it will be requested before access to the User parameters is granted.

Display	description
4.0 85.0	Press SET for 3 seconds
USr PA1	Label PA1 appears
PA1 0	Press SET Use UP and DOWN keys to enter the password
PA1 12	In the example the password is 12 Press SET
d. F 2.0	User menu accessed The first User parameter appears If the value entered is incorrect, label **PA1** will be shown again and the procedure must be repeated

Password "**PA2**": allows access to **Installer** parameters.

The example is the same. NOTE: Password **PA2** is set by default to **15**

Display	description
4.0 85.0	Press SET for 3 seconds
USr PA1	Label USr appears Use 'UP' and 'DOWN' to search for InS

Display	description
nS PA2	Press SET
PA2 0	Use UP and DOWN keys to enter the password
PA2 15	In the example the password is 15 Press SET
CPr ----	Installer menu accessed the first CPr folder appears If the value entered is incorrect, label **PA2** will be shown again and the procedure must be repeated

7.4.6. SETPOINT PROGRAMMING

By way of example, we will change the Setpoint value from 0 °C 4 °C.

Display	description
4.0 85.0	Press and release the SET key
SEt 0.0	The top display will show SEt, the bottom display will indicate the current setpoint value Press and release the SET key once more
SEt 4.0	The top display will show SEt flashing Press and release the DOWN key to display the setpoint value
4.0 4.0	Press the ESC key several times to return to the normal display (or press the SET key to confirm, followed by ESC to exit) The new Setpoint value is saved and appears on the bottom display

7.4.7. RH SETPOINT PROGRAMMING

By way of example, we will change the Setpoint value from 85 RH % to 90 RH %.

Display	description
4.0 85.0	Press and release the SET key
SEt 0.0	The top display will show SEt, the bottom display will indicate the current setpoint value Press and release the DOWN key to display SEH
SEH 85.0	The top display will show SEH, the bottom display will indicate the current RH setpoint value Press and release the SET key once more
SEH 90.0	The top display will show SEH flashing Press and release the DOWN key to display the setpoint value
4.0 90.0	Press the ESC key several times to return to the normal display (or press the SET key to confirm, followed by ESC to exit) The new RH Setpoint value is saved and appears on the bottom display

7.4.8. VIEWING PROBE VALUES

Display	description
4.0 85.0	Press and release the SET key
SEt -20.0	The top display will show SEt, the bottom display will indicate the current setpoint value Press the DOWN key to display the value of probe Pb1
rtc 5.28	The time is displayed in HACCP models

Display	description
Pb1 7.5	Press the DOWN key again to display the value of probe Pb1
Pb2 3.4	Press the DOWN key again to display the value of probe Pb2
Pb4 61	Press the DOWN key again to display the value of probe Pb4
Pb3 61	If H43 is not 0 (probe 3 present) Press the DOWN key again to display the value of probe Pb3
4.0 85.0	Press the ESC key to return to the normal display Normal display

7.4.9. How to modify the date and time

Display	description
4.0 85	Press and release the SET key
SEt -20.0	The top display will show SEt, the bottom display will indicate the current setpoint value Press the DOWN key to display the time
rtc 5.28	**The CLOCK icon will be on** Press and release the SET key.
rtc 5.28	**The CLOCK icon will be on** <u>The hour value will begin to flash</u> Press and release the DOWN key to display the hour value
rtc 17.28	**The CLOCK icon will be on** Press and release the SET key
rtc 17.28	**The CLOCK icon will be on** The hour value has been changed <u>The minute value begins to flash</u> Press and release the DOWN key to display the minute value
rtc 31.05 rtc 2026	Repeat this procedure to adjust the date value (DAY.MONTH) and YEAR In this case the DATE icon (31) is on Press the ESC key several times to return to the normal display

7.4.10. Displaying Alarms

Display	description
4.0 85	Press and release the UP key. The top display will show ALr.
ALr nOnE ALr SYSt	The bottom display will show a. nOnE if no alarms active b. SYSt if system alarms present
ALr HACP	The top display will show ALr. The bottom display will show HACP if HACCP alarms are present NOTE: parameter H50 must = 1

7.4.11. System Alarms example

Let us suppose two alarms have occurred,

- one HIGH TEMPERATURE on the cold room probe
- one HIGH TEMPERATURE on probe 3 (parameter H43 different from 0)

Display	description
4.0 85	Press and release the UP key.
ALr SYSt	The top display will show ALr. The bottom display will indicate SYSt Press and release the SET key.
ALr HA1	The top display will show ALr. The bottom display will show HA1 HIGH TEMPERATURE alarm on the cold room probe Press and release the DOWN key to display other alarms, if present
ALr HA3	In the example, the bottom display will indicate HA3 HIGH TEMPERATURE alarm on probe 3 (see para. H43) Press the ESC key several times to return to the normal display

7.4.12. Modifying a parameter

The User parameters **USr** are not divided into subfolders.
They are always visible by default (access password PA1 is not enabled by default).
The same parameters are also visible in the respective folders ‘Compressor’, ‘Fans’, etc. within the Installer parameters menu **InS**. The password is enabled (PA2=15) by default.

NOTE: It is advisable to switch the device off and on again each time the configuration parameters is changed.

How to modify a user parameter

Instructions are provided in this section on how to modify a User parameter
The same procedure applies to Installer (**inS**) level parameters.
Let us take the **dit** parameter as our example.
There are no sub-folders at User level. At Installer level the parameter is in the folder containing **dEF** defrost parameters.
We will now show how to change the value from 6 hours to 8 hours.

Display	description
4.0 85.0	Press and hold the SET key for approx. 3 seconds
USr	The folder for USr parameters will appear Press and release the SET key. Press and release the SET key to access the first parameter
d.F 2.0	The first User parameter appears Press and release the DOWN key to display to find the parameter that you wish to modify
d.t 6	Press and release the SET key. The dit label will flash Press and release the DOWN key to display its value
d.t 8	Press and release the SET key to confirm the modification.

How to modify an Installer parameter

Instructions are provided in this section on how to modify the same User parameter but via the Installer menu
Let us take the **dit** parameter as our example.
At Installer level the parameter is in the folder containing **dEF** defrost parameters.
We will now show how to change the value from **8 h to 6 h.**

Display	description
4.0 85.0	Press and hold the SET key for approx. 3 seconds
USr inS	The folder for USr parameters will appear Press and release the DOWN key to display to search for the inS folder Press and release the SET key. Press and release the SET key to access the first parameter
CPr ---- dEF ----	The first folder appears Press and release the DOWN key to display to search for the dEF folder
dit 8	Press and release the SET key. The first parameter in the dEF folder will appear Press and release the DOWN key to display to find the parameter you want to change
dit 6	Press and release the SET key. The dit label will flash Press and release the DOWN key to display its value Press and release the SET key to confirm the modification.

8. FUNCTIONS AND REGULATORS

This chapter describes the various functions of the devices.

8.1. SETTINGS

8.1.1. PROBE SETTING AND CALIBRATION

EWHT 600 NT has 3 configurable NTC/PTC inputs (Pb1...Pb3).

The temperature probes (Pb1...Pb3) must all be the same type and should be configured via parameter **H00,** visible at User level (**USr**) or inside folder **CnF**, Installer level (**inS**)

- **H00** = 0 if using PTC probes
- **H00** = 1 if using NTC probes (Default)

After installation, the values read by the probes can be corrected/calibrated using the following parameters:

- **CA1**: probe 1 offset. Positive or negative value to be added to the value read by Pb1 (Range: **-30.0...30.0**)
- **CA2**: probe 2 offset. Positive or negative value to be added to the value read by Pb2 (Range: **-30.0...30.0**)
- **CA3**: probe 3 offset. Positive or negative value to be added to the value read by Pb3 (Range: **-30.0...30.0**)
- **CA4**: probe 4 offset. Positive or negative value to be added to the value read by Pb4 (Range: **-30.0...30.0**)

8.1.2. DISPLAY SETTINGS

At User level (**Usr**) or inside the **diS** folder at Installer level (**inS**) you will find the parameters used to set the temperature readout, decimal point usage, unit of measure and display during defrost.

- **ndt**: (**USr/inS**) enables/disables decimal point display
  (with resolution of one-tenth of a degree; for example: 10.0°C)
  Display with decimal point is only possible within the range of values from -99.9°C to 99.9°C
  - ndt = y ➔ displays read values with decimal point **(default)**;
  - ndt = n ➔ displays read values without decimal point

  NOTE: enabling/disabling the decimal point only affects the on-screen display of values. The controller will continue to perform calculations with decimal point.

- **ddL**: (**USr/inS**) sets the type of display during and up to the end of defrost
  - ddL = 0 ➔ displays the probe value **(default)**
  - ddL = 1 ➔ continues to display the value read by the probe at the start of defrosting
  - ddL = 2 ➔ displays the fixed label **dEF**

- **dro**: (**inS**) sets temperature display to °C or °F.
  - dro = 0 ➔ display in °C **(default)**
  - dro = 1 ➔ display in °F

  NOTE: switching between °C and °F DOES NOT modify the values of temperature parameters (for example setpoint=10°C becomes 10°F).
  This means that the maximum and minimum limits of parameters as absolute values are the same for both units of measure and hence the ranges are different.

- **ddd**: (**inS**) establishes the value to be shown on the top display.
  All other display and adjustment modes are the same.
  - ddd = Set ➔ displays the Setpoint value
  - ddd = Pb1 ➔ displays the values read by Pb1 **(default)**
  - ddd = Pb2 ➔ displays the values read by Pb2
  - ddd = Pb3 ➔ displays the values read by Pb3
  - ddd = Pb4 ➔ displays the values read by Pb4

- **dd2**: (**inS**) establishes the value to be shown on the bottom display (display 2).
  All other display and adjustment modes are the same.
  - dd2 = 0 ➔ displays the temperature setpoint
  - dd2 = 1 ➔ displays the time
  - dd2 = 2 ➔ displays the values read by Pb4 (4...20 mA Probe), either %RH or ppm depending on configuration

8.2. FUNCTIONS

8.2.1. UPLOAD, DOWNLOAD, FORMAT

Description

The UNICARD / Copy Card must be connected to the TTL serial port and allows the rapid programming of instrument parameters.

DOWNLOAD from reset operating mode: at power-on, if the UNICARD / Copy Card is inserted in the device, the controller automatically downloads parameters.

After connecting the UNICARD / Copy Card with the instrument switched off and on completion of the lamp test, one of the following labels will be displayed:

- **dLY** if the operation was successful
- **dLn** if the operation was not successful

After about 5 seconds, the display will show the probe or set point value, depending on the default settings.

NOTE: once the download has been completed successfully, the controller will start to work with the new map loaded.

Operating mode: access “Installer” parameters by entering the password “**PA2**” if enabled (PA2≠0), scroll through the folders using **UP & DOWN** until the folder “**FPr**” appears. Select it using **SET**, scroll through the parameters using **UP & DOWN** and then select one of the functions by pressing **SET**:

- **UL** (Upload): With this function, the programming parameters are uploaded from the instrument to the card. If the operation is successful, the display will show “**y**”, otherwise it will show “**n**”.
- **Fr** (Format): This command is used to format the copy card (which is necessary when using the card for the first time).
  NOTE: the use of the **Fr** parameter deletes all data present and this operation cannot be reversed.
- **Download**: Connect the UNICARD / Copy Card when the instrument is switched off. At power-on, data will automatically start downloading from the UNICARD / Copy Card to the instrument. At the end of the lamp test, the display will show “**dLy**” if the operation was successful and “**dLn**” if not.

NOTE: before Uploading or Downloading a map, make sure that communication
with the supervisor (PC with Televis, TelevisGo system, etc.) has been cut off.
This means you should make sure that the RS-485 is disconnected from the instrument or that Supervision system acquisitions have been stopped.

Parameters

The parameters that control this function are:

Label	Description
UL	Transfer of programming parameters from device to UNICARD / Copy Card **EWHT 600 NT ➔ UNICARD / Copy Card**
dL	Transfer of programming parameters from UNICARD / Copy Card to device **UNICARD / Copy Card ➔ EWHT 600 NT**
Fr	UNICARD / Copy Card formatting. Erases all data on the UNICARD / Copy Card

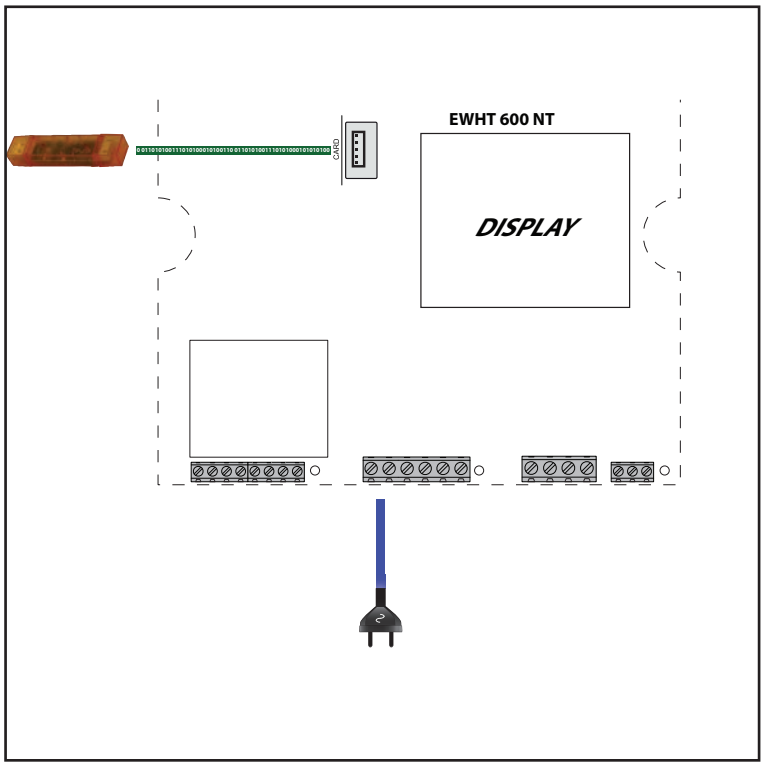
8.2.2. UNICARD

The Unicard lets you download/upload a parameter map from/to a controller, in the same way as the UNICARD / Copy Card. It is a versatile tool that also allows you to quickly and easily customise devices.
It differs from the UNICARD / Copy Card in the following ways:

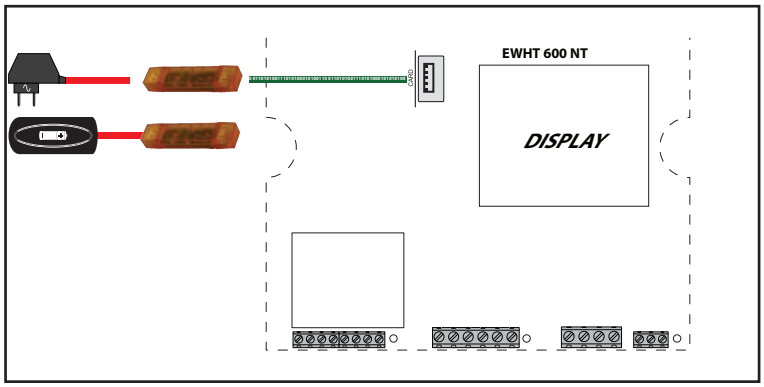
1) it can be connected to a computer via USB
2) it can be plugged into a USB socket or USB battery, to power the device directly during upload/download.

The UNICARD can be powered in the following ways:

A) Cabinet powered



B) Site powered



8.3. BOOT LOADER FIRMWARE

The device is equipped with a Boot Loader, so it is possible to update the Firmware directly on site.
Updating may be carried out using UNICARD / Copy Card.

Updating procedure:

- Connect the UNICARD / Copy Card equipped with the application;
- Power the device if it is off, otherwise switch it off and on again

  NOTE: the UNICARD / Copy Card can be connected even with the instrument powered.

- Wait until the LED for the UNICARD / Copy Card is flashing (operation in progress);
- The operation will be concluded when the LED for the UNICARD / Copy Card is:
  - **ON**: operation concluded correctly;
  - **OFF**: operation not performed (application not compatible...)

NOTE: the LED display is only provided for UNICARDS produced from week 18-12 onwards.

8.4. COMPRESSOR

The compressor is controlled by the device's relay. It will be switched on or off depending on:

- the temperature status readings from the cold room probe
- the temperature control functions set
- the defrost/dripping functions (see Defrost chapter)

8.4.1. Compressor configuration

Relay polarity is fixed.

NOTE: you MUST check the Compressor ➔ digital output (relay) association by setting parameter **H2x** accordingly.
NOTE: By default **H21 = 1 (compressor)**

8.4.2. Second compressor configuration

EWHT 600 NT offers the option of using a second compressor
NOTE: you MUST check the Compressor 2 ➔ digital output (relay) association by setting parameter **H2x** accordingly.
Example **H25 = 10 (compressor 2).**
NOTE: to prevent the two compressors from starting up with an insufficient interval in between, an activation delay can be set for the second compressor using **dSC**.

8.4.3. Compressor operating conditions

Compressor operation
The regulator is active when:

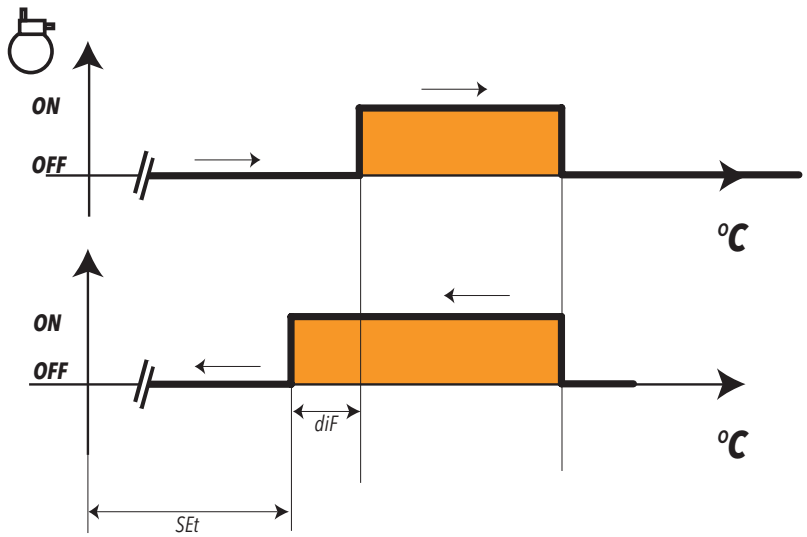
- the device is ON
- there is not an alarm **E1** indicating control probe fault
- the time set in parameter **OdO** has elapsed
- a defrost cycle is not underway (except in FREE mode)

(There is a fixed interval of one second between the request and activation of the relay)

The parameters that control this regulator are:

- the setpoint (SEt) that can be set via the keypad
- the differential (diF)

The following diagram indicates the compressor activation mode for cooling based on parameters **SEt** and **diF** > 0.



8.5. COMPRESSOR/GENERAL PROTECTIONS

Description

If the cold room probe is in error **E1** the output relay configured as compressor/general regulates in accordance with the times set in parameters **Ont** and **OFt**.

The first time to consider is **Ont**.
If **Ont >0** the protection programmed in parameters
dOn-dOF-dbi (see safety compressor times).

NOTE: remember that parameter **OdO** inhibits the activation of all outputs commanding a relay for its entire duration (compressor/general, defrost, fans), excluding buzzers or alarm relays.

Operating conditions

The following table lists the ways the compressor relay output can be managed:

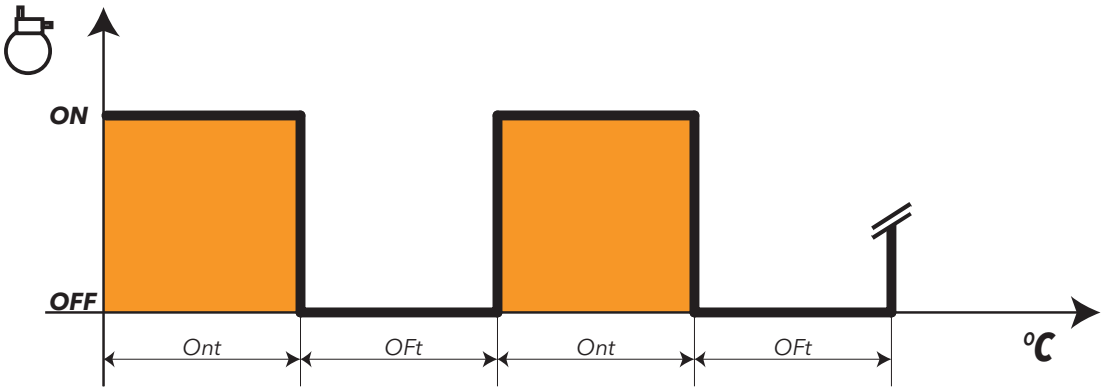
Ont	OFt	Compressor OUT
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	Duty-cycle

If **Ont** > 0 and **OFt** = 0 the compressor regulator entrusts relay deactivation to the safety protection **CAt**.

If **Ont** > 0 and **OFt** > 0: the compressor regulator activates in operating cycle mode irrespective of the values read by the probes (cold room probe failure) and of requests from other loads (**Duty-cycle** mode).

If the cold room probe is working properly, Duty-cycle mode does **NOT** activate as it does not have priority over normal compressor regulator settings.

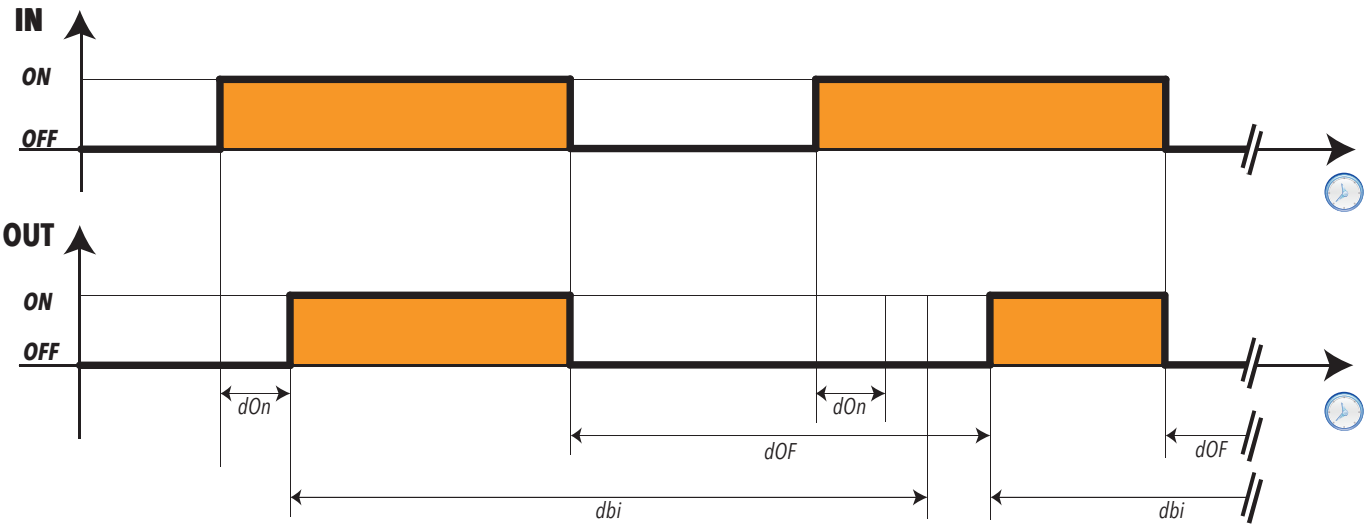
The following diagram shows the **Duty-cycle** operating mode, based on parameters **Ont** and **OFt > 0**:



8.5.1. Compressor safety timings

Compressor on-off operations must respect the safety times that you can set using the special parameters as described in the following section.
The compressor icon will flash to indicate when a compressor activation request has been received but a safety protection exists.
A safety time (compressor On... Off safety time) regulated by the parameter **dOF** must be respected between a switch-off and switch-on of the same compressor. This waiting time also occurs at switch-on of the device.
A safety time regulated by the parameter **dbi**must be respected between one switch-on and the next.
The safety time set in parameter **dOn** must elapse between a compressor start-up request and actual start-up.
Times set with parameters **dOn**, **dOF** and **dbi**, if active, are not accumulative but parallel.
The following diagram illustrates the operation of the compressor protection with parameters **dOn**, **dOF**, **dbi** set where:

IN	Input status for compressor regulator.
OUT	Output status for compressor regulator.



NOTE: See the chapter entitled Compressor Function During Defrost for other safety measures and compressor timings.

Maximum timer period
The maximum compressor activation time before its deactivation can be set via the parameter **CAt**.
Minimum timer period
The minimum compressor activation time before its deactivation can be set via the parameter **Cit**.

User parameters

The parameters that manage this regulator are:

Label	Description
Ont	Compressor output ON time in the event of a faulty Pb1 probe
OFt	Compressor output OFF time in the event of a faulty Pb1 probe
dOn	Compressor output activation delay from request
dOF	Compressor output activation delay from shutdown
dbi	Delay between two consecutive starts of the compressor output
OdO	Output activation delay from power-on
Cit	Minimum compressor output activation time
CAt	Maximum compressor output activation time

8.6. DEFROST/DRIPPING

8.6.1. Defrost type and activation

Defrost is used to stop ice from forming on the surface of the evaporator.
Its **activation** can be:

- automatic, in one of the following modes selected via **dCt**:
  - compressor hours (Digifrost);
  - device hours;
  - compressor stop;
  - via clock (see corresponding paragraph under RTC);
- via digital input (DI);
- via key;
- remotely.

The **type** of defrost can be selected via the parameter **dty** and can be:

1. defrost with electric heaters;
2. inverse;
3. FREE

Dripping

On completion of defrost, given that there will be water on the evaporator, it is better not to start “cooling” right away as this would ruin the effect of the defrost by creating ice immediately.
The dripping interval is regulated via parameter **dt**.

Defrost conditions and operation

Defrosting is enabled if:

- the evaporator temperature, read by probe 2, is lower than the defrost end setpoint configured via parameter **dSt**
- manual defrosting has not already been activated, in which case the request for automatic defrost will be cancelled.

Defrost requests can be made in the following ways:

Controller power-on	if parameter **dPO** (defrost at power-on) is programmed accordingly.
Time intervals	if **dit** > 0 whenever the defrost time interval set in parameter **dit** elapses.
Manually (via key)	by pressing the **UP** key The cycle will not start if **OdO≠0**; the request will be refused and the display will flash three times to indicate that defrost is impossible.
External request via digital input (DI)	If the digital input (DI) is suitably configured. Activation via digital input (DI) respects the protections of the automatic cycle. The cycle will not start if **OdO≠0**; the request will be refused and the display will flash three times to indicate that defrost is impossible.

HACCP models also offer the following mode:

Time	if **dit = 0** and **dCt=3** with rtc function (real time clock). At the times set in parameters dE1...dE8 (dd folder)

8.6.2. Automatic defrosting

The defrost cycle is programmed to start at intervals.

NOTE: To disable the automatic cycle, set **dit**=0.

If **dit>0**, the defrost cycles will be run at fixed intervals, as indicated in parameter **dit** and the interval time is counted as follows:

Par.	Value	U.M.	Description	Notes
dCt	**0**	num	Hours of compressor compressor (DIGIFROST method®)	In this case, the counter runs only if the compressor is on. A new count starts when the defrost interval elapses and a new defrost cycle starts if conditions permit. **NOTE**: compressor running time is counted separately from the evaporator temperature. If the evaporator probe is missing or faulty, the count continues for the time the compressor is on.
	1	num	Device running time	The defrosting interval is counted continuously when the device is on and starts at each power-on. A defrost cycle starts when the defrosting interval elapses (indicated by dit) if conditions permit and the controller immediately starts counting a new defrosting interval.
	2	num	Compressor stop	Each time the compressor stops, a defrost cycle is run according to the mode set in parameter **dty**.
	3	num	RTC (clock)	The clock can be used to set: • defrost times (**6** bands for weekdays and **6** bands for weekends/holidays), • regular defrosts (every **n** days) • daily events (**1** event for weekdays and **1** event for weekends/holidays) Time band defrosts and periodic defrost are mutually exclusive functions (they cannot be activated simultaneously). If defrost by RTC has been enabled and the clock has failed, the defrost will run according to the mode set in **dit** (provided the value is **≠ 0**).

NOTE: regardless of how the interval is counted, the following conditions apply:

If parameter **OdO** is underway or the temperature read by the evaporator probe is higher than **dSt**, then defrost will not be permitted: a new interval will be counted and only at the end of this subsequent count will conditions be tested for the start of a defrost cycle.

8.6.3. Manual defrost

Press and hold the manual defrost key **ESC** (or from digital input (DI) if appropriately configured **H11...H12 = 1**), the device enters defrost. Procedures for the activation of this defrost cycle are the same as for external defrost.

The defrosting interval will now be counted as described for Automatic Defrost (time **dEt** is not cleared, it continues).

If the conditions for defrost activation are not present, i.e.:

- the time set in parameter **OdO** has not elapsed
- the evaporator temperature is higher than the value set in parameter **dSt**

this will be indicated on the display (screen flashes three times) and the defrost will stop.

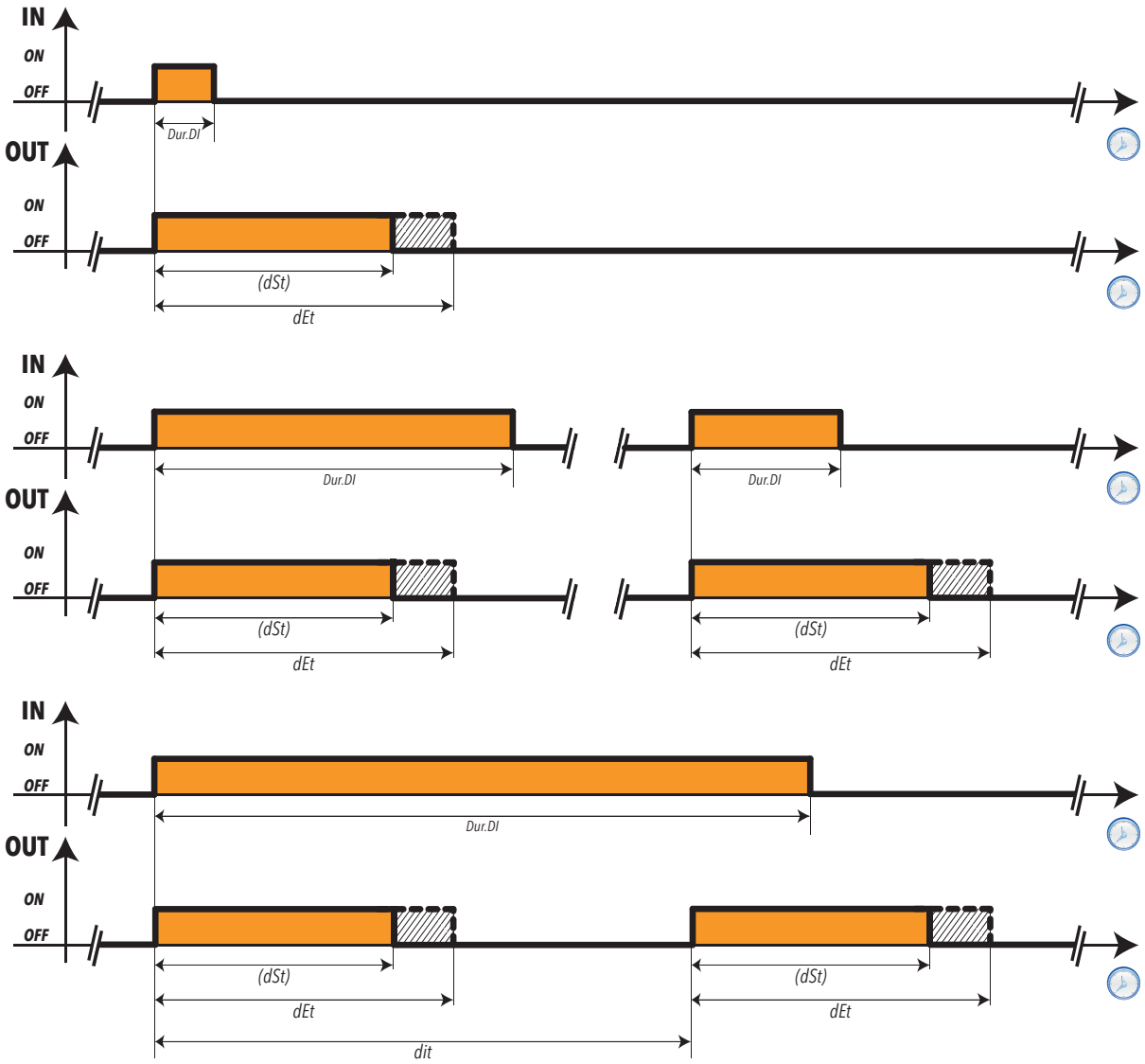
Manual defrost is always enabled except when **dit** = 0.

8.6.4. External defrost

If the Digital Input is configured for this function (if **H11...H12 = 1**) and if conditions permit, defrost can be requested and the corresponding regulator activated.
Time graphs for signals in each of the various function modes are presented in the following section .

NOTE: Defrost activation occurs when the signal is toggled and the polarity can be selected.
Hence you can only activate a defrost, NOT stop one that is underway.
Defrost or dripping currently underway and the defrost or dripping interval count cannot be suspended.

IN (Digital Input)	Input status for defrost regulator, with activation from Digital Input.
OUT (Defrost)	Output status for defrost regulator.
DurDI	Digital Input duration.
NOTE:	**dSt** indicates end defrost time when Setpoint temperature reached and **dEt** indicates end of defrost due to timeout.



8.6.5. Defrost WITH REMOTE START/STOP

If the Digital Input is configured for this function (if **H11...H12 = ±22**) defrost with start/stop is activated from remote.
The defrost is switched on when the digital input becomes active. Vice versa, when the digital input is disabled, the defrost ends.

If the automatic defrost is also active, the two functions will proceed in parallel. In this case, the defrost interval set in the parameter dit will be reset when the remote defrost is activated (digital input).
Having ended the remote defrost, the dripping function will be activated if **dt** > 0.

The conditions for activation are:
- Defrost probe present and temperature lower than **dSt**;
- Defrost not inhibited by an alarm.

The defrost will not be activated if the following conditions are present:
1. Defrost end probe present and temperature higher than **dSt**;
2. Alarm condition inhibiting the defrost,

The defrost may end before the defrost is disabled from the digital input (DI) if:
- **dEt** ends the count;
- Defrost probe present and temperature higher than **dSt**;
- Alarm condition ending the defrost early.

To manage the activation delays of the digital inputs DI1 and DI2 separately:
- Set **dAd** = 0;
- Add a delay using parameters **O1i** (to delay the activation of digital input DI1) and **O2i** (to delay the activation of digital input DI2), the delay of the digital input DI3 can be set using parameter **di3**.

NOTE: If **dAd** ≠ 0, any delays set in **O1i** and **O2i** will not be considered by the instrument.

User parameters

Label	Description
dAd	Delay activating digital input DI1 and digital input DI2.
O1i	Delay activating digital input DI1
O2i	Delay activating digital input DI2
di3	Delay activating digital input DI3

8.7. DEFROST MODE

8.7.1. Defrost with electric heaters

Defrost with electric heaters is configured via parameter **dty = 0**.

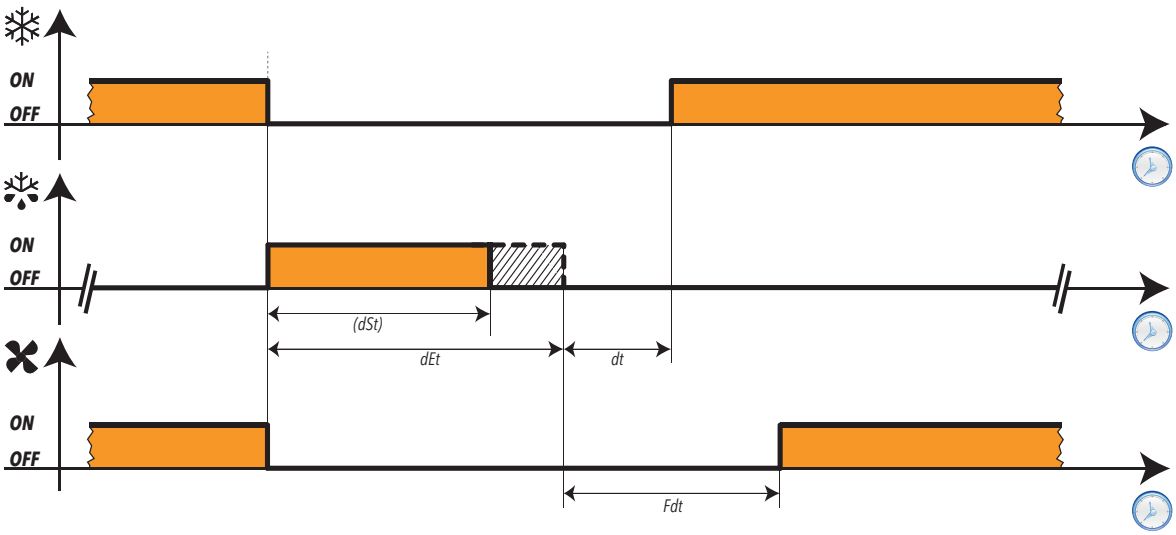
The compressor remains stopped for the duration of the defrost cycle and the relay configured as defrost regulator output, to which the electric heaters are connected, activates. On completion of defrost, the electric heaters are switched off and the compressor remains off for the dripping time set in parameter **dt**, if it is not equal to zero.

Defrost ends due to:

Evaporator Probe	End of defrost description
Evaporator Probe ABSENT	Due to timeout set in parameter **dEt** (defrost timeout)
Evaporator Probe PRESENT	Temperature setpoint for the end of defrost set in parameter **dSt** reached. If this setpoint is not reached within the time set in parameter **dEt** (defrost timeout), the defrost will end due to timeout.

NOTES:
- If **dSt** intervenes before **dEt**, dripping (**dt** and **Fdt**) aligns with **dSt**.
- If **Fdt** < **dt** then **Fdt** = **dt**.
- During defrost, fans are OFF if parameter **dFd** is set accordingly, otherwise they will behave as set for the fan regulator.

The operating diagram is as follows:



Key:

	Output status for **Compressor regulator**
	Output status for **Defrost regulator**
	Output status for **Evaporator Fan regulator**

8.7.2. Inverse defrost

Hot gas defrost is configured by setting parameter **dty = 1**.

The compressor stays on for the entire duration of the defrost cycle and the relay configured as defrost regulator output, and that the solenoid valve is connected to, activates.
On completion of the defrost cycle, the valve relay is de-energised and the dripping phase set in parameter **dt** (if not equal to zero) is interrupted. The compressor relay is once again controlled by the compressor regulator.

Defrost ends due to:

Evaporator Probe	End of defrost description
Evaporator Probe ABSENT	Due to timeout set in parameter **dEt** (defrost timeout)
Evaporator Probe PRESENT	Temperature setpoint for the end of defrost set in parameter **dSt** reached. If this setpoint is not reached within the time set in parameter **dEt** (defrost timeout), the defrost will end due to timeout.

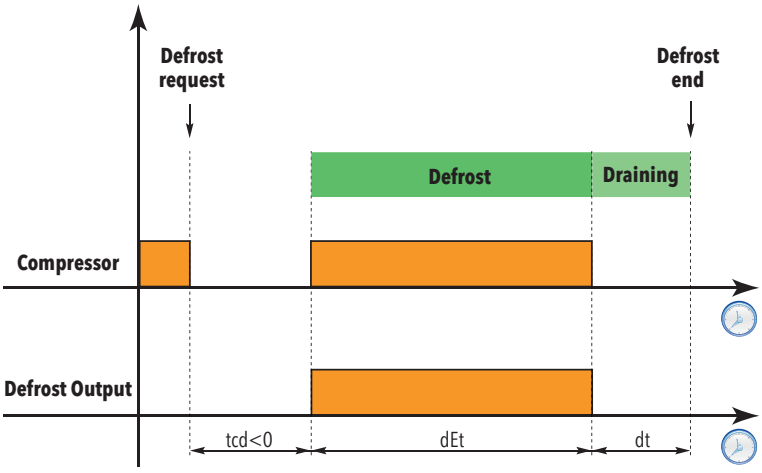
NOTE: Parameters **dOn**, **dOF** and **dbi** still have priority.

NOTES:
- If **dSt** intervenes before **dEt**, dripping (**dt** and **Fdt**) aligns with **dSt**.
- If **Fdt** < **dt** then **Fdt** = **dt**.
- During defrost, fans are OFF if parameter **dFd** is set accordingly, otherwise they will behave as set for the fan regulator.

The operating diagram is as follows:

Example tcd>0

Defrost Request	= Start defrost request
Defrost	= Defrost time
Dripping	= Dripping time
Defrost end	= End of defrost
Compressor	= Compressor
Defrost Output	= Defrost output



Example tcd<0

Defrost Request	= Start defrost request
Defrost	= Defrost time
Dripping	= Dripping time
Defrost end	= End of defrost
Compressor	= Compressor
Defrost Output	= Defrost output

8.7.3. Double evaporator defrost

The defrost for a second evaporator can be controlled via the probe configured as second evaporator.

Configure a relay output (see configuration parameters **H21…H25**) as a defrost relay for evaporator 2.

To enable this function, you need to:

- set probe Pb3 to control defrost evaporator 2 mode (parameter **H43**).
- configure a relay output (see configuration parameters **H21…H25**) as a defrost relay for evaporator 2.
- Define defrost mode by setting parameter **H45**.

Input mode

A double evaporator defrost can take place in three different ways on the basis of parameter **H45**, as described in the following section:

- **H45**=0: Defrost is enabled only when the temperature of evaporator 1 is lower than the value set in parameter **dSt**.
- **H45**=1: Defrost is enabled when the readings from at least one of the two probes is below its defrosting end temperature (**dSt** for evaporator 1 and **dS2** for evaporator 2)
- **H45**=2: Defrost is enabled when both probe values are below the corresponding end of defrost setpoints (**dSt** for evaporator 1 and **dS2** for evaporator 2)

The probe error condition is considered as a probe calling for defrost.

The defrost for every single evaporator ends when the following conditions have been met:

- the **dEt**/**dE2** timeout period has elapsed
- the **dSt**/**dS2** temperature has been reached

Ending mode

Defrost in the case of a double evaporator takes place when both probe values have reached or exceeded the relative end of defrost setpoints (**dSt** for evaporator 1 and **dS2** for evaporator 2)

If one or both probes are in error, the end of defrost will take place due to timeout.

In any case

If there are no conditions for performing the defrost the request will be cancelled.

The defrost for a single evaporator will end when the corresponding probe reaches or exceeds the defrosting end temperature or when the timeout period elapses.

Dripping begins when both defrosts have ended.

If one or both probes are in error, the defrost for the corresponding evaporator will end due to timeout. Onset is allowed as if the corresponding temperature is lower than the corresponding setpoint **(dSt or dS2)**.

If the probe is not configured to be the probe for the second evaporator (**H43** ≠2), the defrost for the second evaporator may take place if a digital output is configured to control defrost on the second evaporator (**H21...H25** = 9). In this case consent for defrost will be granted, as if the probe temperature (evaporator 2) < **dS2** and the output takes place due to timeout. The fan regulator is not affected.

User parameters

The parameters that manage this regulator are:

Label	Description
dty	Selects defrost type
dit	Time interval between 2 consecutive defrost cycles
dCt	Selects the count mode for the defrost interval
dOH	Defrost cycle activation delay after request
dEt	Defrost timeout evaporator 1. Determines the maximum defrost duration
dE2	Defrost timeout evaporator 2. Determines the maximum defrost duration
dSt	Defrost 1 end temperature - determined by evaporator probe 1
dS2	Defrost 2 end temperature - determined by evaporator probe 2
dPO	Determines whether the instrument must enter defrost mode at power-on
Fdt	Fan activation delay after a defrost cycle
dt	Dripping time
dFd	Allows exclusion of the evaporator fans to be selected or not selected during defrosting.
dAO	Temperature alarm disabling time after defrost cycle
dAt	Alarm signalling end of defrost due to timeout
ddL	Display mode during defrost cycle (lock display.)
Ldd	Timeout value for display unlock - label **dEF**

Summary table

Defrost on evaporator 1

<table>
<tr><th colspan="2">Defrost START</th><th>Defrost END</th></tr>
<tr><td>If H45=0</td><td>Probe Pb2 (evaporator 1) temperature < dSt</td><td rowspan="3">Probe Pb2 (evaporator 1) temperature > dSt
or if
Probe Pb2 (evaporator 1) temperature <dSt due to time-out
or if probe Pb2 in error due to timeout</td></tr>
<tr><td>If H45=1</td><td>Probe Pb2 (evaporator 1) temperature < dSt</td></tr>
<tr><td>If H45=2</td><td>Probe Pb2 (evaporator 1) temperature < dSt and
Probe Pb3 (evaporator 2) temperature < dS2</td></tr>
<tr><td colspan="3">NOTE: if the probe is in error or H43 ≠2 and a digital output is configured as a regulator for the second evaporator, the following condition applies: Probe temperature (evaporator 2) < dS2</td></tr>
</table>

Defrost on evaporator 2

<table>
<tr><th colspan="2">Defrost START</th><th>Defrost END</th></tr>
<tr><td>If H45=0</td><td>Probe Pb2 (evaporator 1) temperature < dSt
and Probe Pb3 (evaporator 2) temperature < dS2</td><td rowspan="3">Probe Pb3 temperature (evaporator 2) > dS2
or if
Probe Pb3 temperature (evaporator 2) < dS2 due to timeout
or if probe in error due to timeout.</td></tr>
<tr><td>If H45=1</td><td>Probe Pb3 (evaporator 2) temperature < dS2</td></tr>
<tr><td>If H45=2</td><td>Probe Pb2 (evaporator 1) temperature < dSt
and Probe Pb3 (evaporator 2) temperature < dS2</td></tr>
<tr><td colspan="3">NOTE: if the probe is in error or H43 ≠2 and a digital output is configured as a regulator for the second evaporator, the following condition applies: Probe temperature (evaporator 2) < dS2</td></tr>
</table>

Dripping

Drip cooling START	Drip cooling END
End of defrost for both evaporators if defrosting takes place for both evaporators, otherwise end of the only defrost in progress	Unchanged

8.8. EVAPORATOR FANS

8.8.1. Evaporator fan operating conditions

The regulator is active when:

- the time set in parameter **OdO** has elapsed.
- the temperature of the evaporator probe, if present, is between the values of parameters **Fot** and **FSt**
- during defrost it is not excluded by the parameter **dFd** (**dFd = y**).
- dripping is not active (**dt**).
- the fan delay is not active after defrost (**Fdt**).

The request to switch fans on or off can be generated in the following ways:

- by the compressor regulator to help in the "cooling" process (temperature control mode.)
- by the defrost regulator to check and/or limit the diffusion of hot air.

	FCO	Compressor ON	Compressor OFF
Probe present and working	0	THERMOSTAT CONTROLLED	OFF
	1	THERMOSTAT CONTROLLED	THERMOSTAT CONTROLLED
	2	THERMOSTAT CONTROLLED	THERMOSTAT CONTROLLED
	3	THERMOSTAT CONTROLLED	DUTY-CYCLE (1)
	4	THERMOSTAT CONTROLLED	DUTY-CYCLE(1) (2)
Probe present but in error	0	DUTY-CYCLE	OFF
	1	ON	OFF
	2	DUTY-CYCLE	DUTY-CYCLE
	3	DUTY-CYCLE	DUTY-CYCLE
	4	DUTY-CYCLE	DUTY-CYCLE
Probe absent	0	ON	OFF
	1	ON	ON
	2	DUTY-CYCLE*	DUTY-CYCLE(1)
	3	ON	DUTY-CYCLE(1)
	4	ON	DUTY-CYCLE(1) (2)

(1) see paragraph "Fan operation with probe Pb2 absent" (H42 ≠ 0).
(2) Normal Duty-Cycle operation reversed (OFF cycle - ON cycle)

Heating operation

When the controller operates in Heating mode (HC = H), evaporator fan operation continues to follow the logic defined by parameter FCO, in the same way as during Cooling operation.

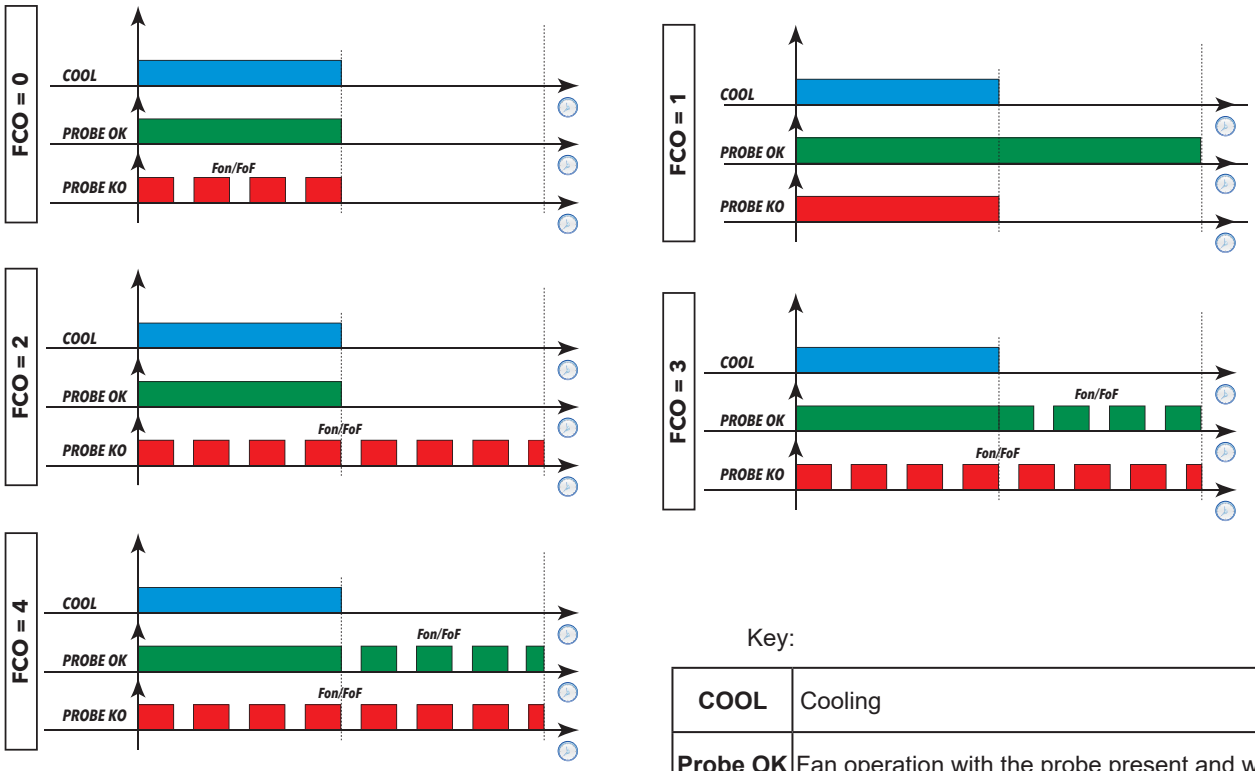
Evaporator Fan Operation with FCH = 1

When FCH = 1, the evaporator fan control follows the same logic defined by parameter FCO. However, the references to Compressor ON and Compressor OFF in the FCO table are replaced by the status of the **climate control demand.**
A climate control demand is considered ON whenever at least one of the following outputs is ON:
Climate Control Demand =

- Compressor (H2x = 1)
- OR Humidifier (H2x = 14)
- OR Dehumidifier (H2x = 15)
- OR Dehumidification heater (H2x = 16)

If all these outputs are OFF, the fan controller applies the operating mode specified in the "Compressor OFF" column of the FCO table.
This allows fan operation to be coordinated with any active climate-control function, not only with compressor operation.

The following diagram illustrates fan operation on the basis of the **FCO** value.



Key:

COOL	Cooling
Probe OK	Fan operation with the probe present and working
Probe KO	Fan operation with the probe present but in error

8.8.2. Fan operation in temperature control mode

During “cooling”, the fans operate as shown in this diagram:

Thermostat control of fans takes place at the values set in parameters

- **FSt** (fan disabling temperature) and **FAd** (fan differential).
- **Fot** (fan start temperature) and **FAd** but with the sign inverted.

By default, the fan disabling temperature, set by parameters **FSt** (fan disabling temperature) and **FAd** (fan differential), is an absolute value, as **FPt = 0** (actual temperature value).

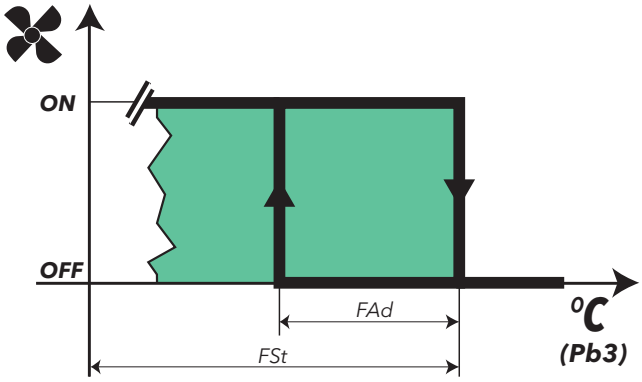
Depending on the parameter **FPt**, the fan disabling temperature set at parameter **FSt** can be absolute (actual temperature value) or relative (value to add to the Setpoint SEt).

Depending on the parameter **FPt**, the fan start temperature set at parameter **Fot** can be absolute (actual temperature value) or relative (value to add to the Setpoint SEt).

NOTE: if as an absolute value the parameter **Fot** is greater than **FSt** the fans will be excluded

Around the fan start temperature (-50°C by default) the differential will always take account of the differential parameter **FAd** but with the sign inverted (negative side). Fan stop in **Fot**, and activation at value (**Fot** + **FAd**).

The fan regulator operates as indicated in the following diagram:



8.8.3. Fan operation in Duty-Cycle mode

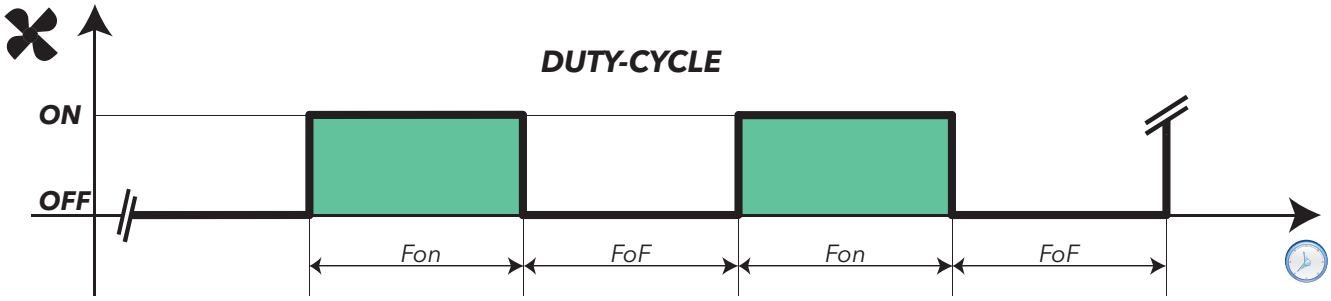
For Duty-cycle operation, parameters **Fon** and **FoF** must be set accordingly;

The fans operate as follows:

DUTY-CYCLE

Fon	FoF	Fan operation
0	0	OFF
0	≠0	OFF
≠0	0	ON
≠0	≠0	DUTY-CYCLE

The fan regulator will operate in Duty-cycle mode as illustrated in the following diagram:



8.8.4. Fan operation in defrost

During defrost, the fans operate as shown in this diagram

dFd = n:	the fans are not excluded during defrost (see parameters **FCO**, **Fon**, **FoF**)	TEMPERATURE CONTROL / DUTY-CYCLE
dFd = y:	exclusion of fans during defrost	OFF

Thermostat control of fans takes place at the values set in parameters:

- **FSt** (fan disabling temperature) and **FAd** (fan differential).

NOTE: during defrost with electric heaters, the compressor is OFF but the fans work as if the compressor was still ON, unless they have been disabled during defrost (see parameter **dFd**).

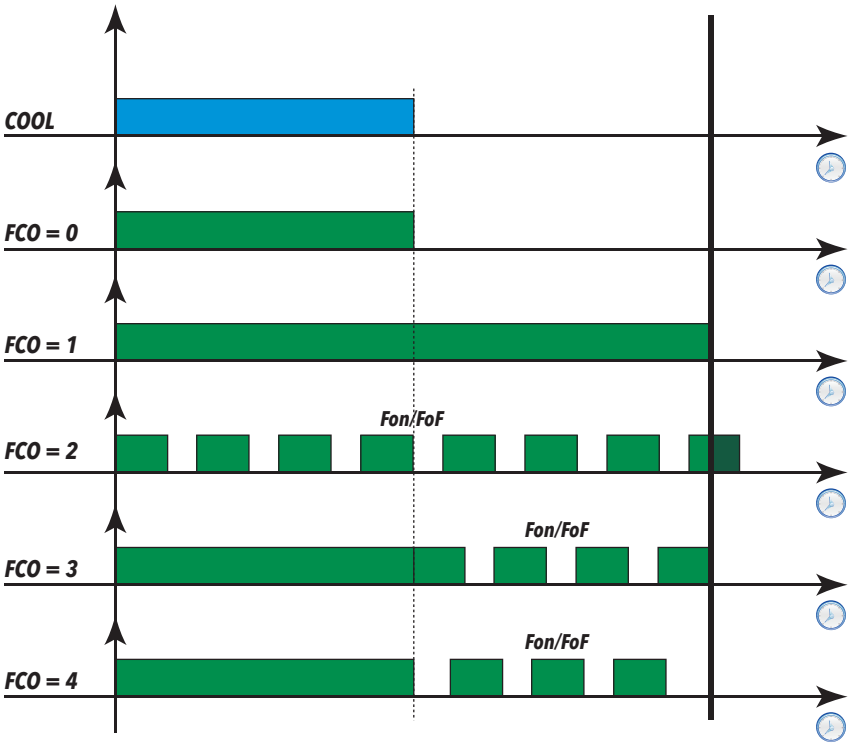
When the evaporator fans are enabled in defrost (**dFd = n**) and regulate the evaporator probe Pb2 in thermostat controlled mode, when the latter enters error “E2” during defrost, the fans must always be ON, regardless of the values set via the Duty-cycle.

Fan operation without probe

If parameter **H42** = **n** (probe Pb2 absent), depending on the FCO value and the status of the compressor, the fans may assume the status “On”, “Off”, “Duty-cycle”.

The parameter **FCO** will determine the operating mode of the evaporator fans during the DAY phase and the NIGHT phase.

The following is an example of fan operation on the basis of the value set for **FCO**.



8.8.5. Fan function during dripping

If parameter **dt ≠ 0** (dripping time), the fans will stay OFF for the time set in this parameter.
See "***Defrost with electric heaters***".
Note that if **Fdt** (fan delay time) is greater than **dt** (dripping time) the fans stay OFF for the time set in **Fdt** rather than **dt** (for example whichever timing is longer will be applied).

8.8.6. Post-ventilation

Parameter **FdC** delays the switching off of the fans after the compressor has stopped (increasing efficiency of the system by making better use of inertia). Post-ventilation must be active with any FCO value and without a configured probe.
If **FdC = 0** the function is disabled.

NOTE: Post-ventilation does not have priority over the delay set by parameter **dcd**.

User parameters

The parameters that manage the fan regulator are:

Label	Description
FPt	Characterises parameter "FSt" which can be expressed either as an absolute value or relative to the setpoint
FSt	Evaporator fan disabling temperature
Fdt	Evaporator fans delay after defrost cycle
dFd	Evaporator fans disabling during defrost time
FCO	Evaporator fans operating mode
FAd	Evaporator fans activation differential
dt	Dripping time
FdC	Evaporator fans switch-off delay after compressor deactivation
Fon	Evaporator fans ON time in duty-cycle mode
FoF	Evaporator fans OFF time in duty-cycle mode

8.9. DEEP COOLING CYCLE - DCC

Description

This regulator helps ensure that the compressor regulates the setpoint **dCS**, with differential equal to the value set via parameter **diF**.
When the Deep Cooling Cycle (**DCC**) activates, the interval between defrost cycles is cleared and defrosts are disabled.
DCC is activated, by setting the parameter **tdc>0**, and **H01=1**
Ending of the **DCC** is time-based, by setting the parameter **tdc≠0**, or when the setpoint **dCS** if **tdc = 0**.

When a **DCC** has ended and once the time set in parameter **dcc** has elapsed, a defrost cycle is forced and the counters restart for the interval between defrost cycles (value set via parameter **dit**). If **dcc=0** defrost begins at the end of the **DCC**.
During the **DCC** the temperature alarms are disabled.
Normal temperature alarm management is restored at the end of the **DCC**, when the temperature value read by probe **Pb1** reaches the regulation setpoint value **SEt**.

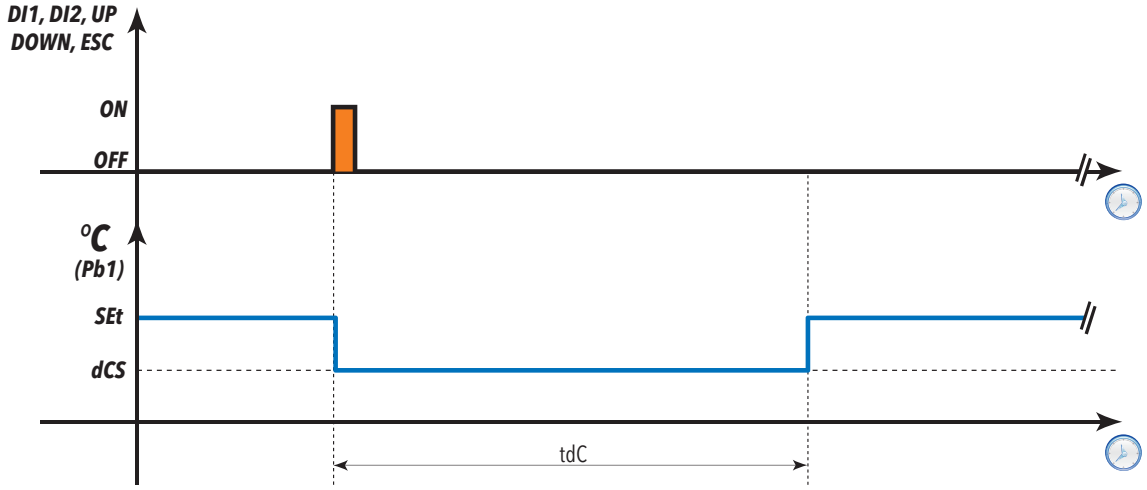
Operating conditions

The Deep Cooling Cycle will be activated via Digital Input or via a suitably configured key.

In the event of a probe error and/or power failure, the Deep Cooling Cycle is stopped and standard controller function restored.

If the **dCS** parameters are changed, **tdc** and **dcc** the functioning of the Deep Cooling Cycle is recalculated with new set values.

NOTE: After a Deep Cooling Cycle, the **dcc** time must elapse before a new cycle can begin.



User parameters

The parameters that manage the fan regulator are:

Label	Description
dCS	Deep Cooling set point
tdc	Deep Cooling Time
dcc	Delay Defrost after Deep Cooling

8.10. PREHEAT

The preheating phase is linked to a suitably configured digital input (**H11... H12 = ±12**).

In the period when the preheat output is active:

- the compressor output will be forced OFF;
- the compressor icon will flash.

The Preheat only affects defrosting in applications that require the use of the compressor (**dty**= 1 and **dty**= 2).

8.11. PRESSURE SWITCH

This regulator performs diagnostic procedures on an activated digital input by assigning the value **±11** (General pressure switch), **±09** (Minimum pressure switch) or **±10** (Maximum pressure switch) to one of the parameters **H11**...**H12**.

If a pressure switch input is activated, power to the compressor loads is immediately cut off, the corresponding alarm icon lights up to provide a visual warning and the alarms folder **ALr** is also displayed. The folder contains labels with the number of pressure switch activations (up to the maximum value set in parameter **PEn**):

- **P01, P02, ...P0n**... for general pressure switch
- **H01, H02, ...H0n**... for maximum pressure switch
- **L01, L02, ...L0n**... for minimum pressure switch

If the number of activations exceeds the maximum number defined by parameter **PEn** within a time less than the value of **PEi**, the following conditions occur:

- The compressor, fan and defrost outputs are disabled
- in the alarms folder **ALr** label **PA**, **LPA** or **HPA** are displayed (general, minimum or maximum pressure switch respectively).
- The alarm relay comes on (if configured).

NOTE: 1) if the number of activations exceeds the number set in **PEn** in the **PEI** time, the alarm is automatically reset.
2) the input must be:
- closed on itself if unused and the input is active when normally closed;
- open if unused and active when normally open;
- deactivated via digital input configuration parameter.

NOTES: 1) Once it has entered alarm status, the device must be switched off and on again, or reset using the **rPA** key in the functions menu.
2) If parameter **PEn = 0**, the function is disabled and alarms and counters are also disabled.
3) The pressure switch alarm is not stored in EEPROM
4) During the pressure switch activation period the defrost interval count runs as normal.

Operating conditions

The number of pressure switch errors is counted using a FIFO method. The time interval **PEi** is divided into 32 parts; the counter is incremented by one unit if there are one or more activations during one part of the entire interval **PEi**.
Two operating examples are given in the following section: In both cases, suppose that **PEi** = 32' (equal to 32'/32 = 1 minute) and **PEn** = 7.

Example 1: ***ALARM SIGNALLED***. The interval for storing activations is 1 minute: all activations within that minute are counted as a single activation and the alarm is activated when the sampling interval has elapsed. In this example the pressure switch alarm is signalled because there have been 7 activations during the 32' time window.

Example 2: ***ALARM NOT SIGNALLED*** In this example the alarm is not activated because during the 32' time window the number of activations set in parameter **PEn** was not reached. In practice the time window is a rolling window and all activations that are outside of it are deleted: the reference point is the last activation and the time **PEi** is subtracted from that point to establish how many activations are included in the count.

The parameters that manage the pressure switch regulator are:

Label	Description
PEn	Number of errors allowed per general/maximum/minimum pressure switch input
PEI	General/minimum/maximum pressure switch error count interval (in 32 parts)

8.12. AUXILIARY OUTPUT (AUX/LIGHT)

Description

If one of the parameters **H21...H25** is set to the value **H2x=5**, it anticipates the relay control as AUX and, by pressing the associated key **H32...H35** which must be set to the value **H3x=2**, the relay is activated if it was off previously and vice-versa.

The on/off status is saved in non-volatile memory hence when power returns after a blackout, the device will restart in the status that was active prior to the blackout.

If one of the parameters **H11**...**H12** is set to the value**H11...H12=±3**, it anticipates the AUX relay control by the digital input; in this case the relay will mirror the status of the input. In this case, on/off status is not saved in non-volatile memory.

NOTE: the meaning of the digital input (DI) must always remain the same: for example, if the relay is activated by digital input (DI) and switched off by key, when the digital input (DI) is reset to the starting position, the relay does not change status (since it was already de-energised by key).
With the instrument OFF, if set accordingly, only the digital input (DI) and the associated key can change the status of the output.

Operating conditions

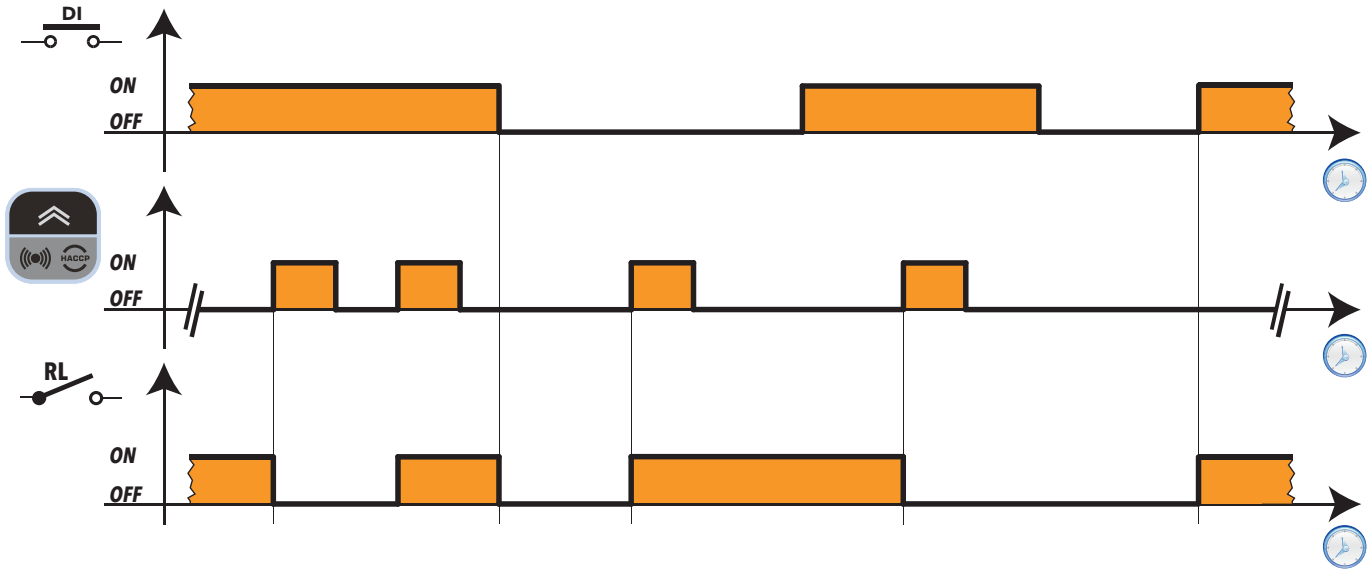
The regulator is activated by:

- Key
- Function
- Digital Input

if configured accordingly.

The regulator is not active when:

Condition	AUX output status
during start-up	OFF
during stand-by	status depending on parameters H06 and H08



User parameters

The parameters that manage the auxiliary (AUX) output regulator are:

Label	Description
H11...H12	Configuration of digital input 1...3 / Polarity
H21...H25	Configuration of digital output 1...5
H32...H35	Configuration of DOWN, ESC, ON/OFF, LIGHT key

8.13. DOOR/EXTERNAL ALARM MANAGEMENT

The door switch input is associated to an appropriately configured digital input (**H1x = ±4**).
By controlling the opening of the door, it is possible to disable the compressor output and/or the fans.

It is also possible to associate a deactivation delay with the compressor output by means of parameter **dCO**.
If the door is opened during a defrost cycle, the cycle is not shut down.

The values that can be set for the parameters involved are:

dod: Door switch switches off loads on digital input (DI) command

- **0** = function disabled
- **1** = disables fans (FAN)
- **2** = disables the compressor (COMP)
- **3** = disables the compressor (COMP) and fans (FAN)

Any protective timers (for example compressor start delay, etc.) will still be observed.

rLO: Locks compressor, defrost and fan regulators if the digital input (configured as external alarm) is activated.

- **0** = no resource locked
- **1** = Compressor and Defrost locked
- **2** = compressor, defrost and fans locked

dOA: Establishes what should be enabled/disabled on enabling/disabling of the Digital input. Only applies if **PEA** ≠ 0.

- **0** = activates the compressor (COMP)
- **1** = activates fans (FAN)
- **2** = activates the compressor (COMP) and fans (FAN)
- **3** = deactivates the compressor (COMP)
- **4** = deactivates fans (FAN)
- **5** = deactivates the compressor (COMP) and fans (FAN)

PEA: Establishes which of the door switch and alarm should be linked to the parameter **dOA** in the following way:

- **0** = function deactivated
- **1** = function linked to door switch
- **2** = function linked to external alarm
- **3** = function linked to door switch and external alarm

dCO: Compressor resource activation/power off delay (0 ...255 min).

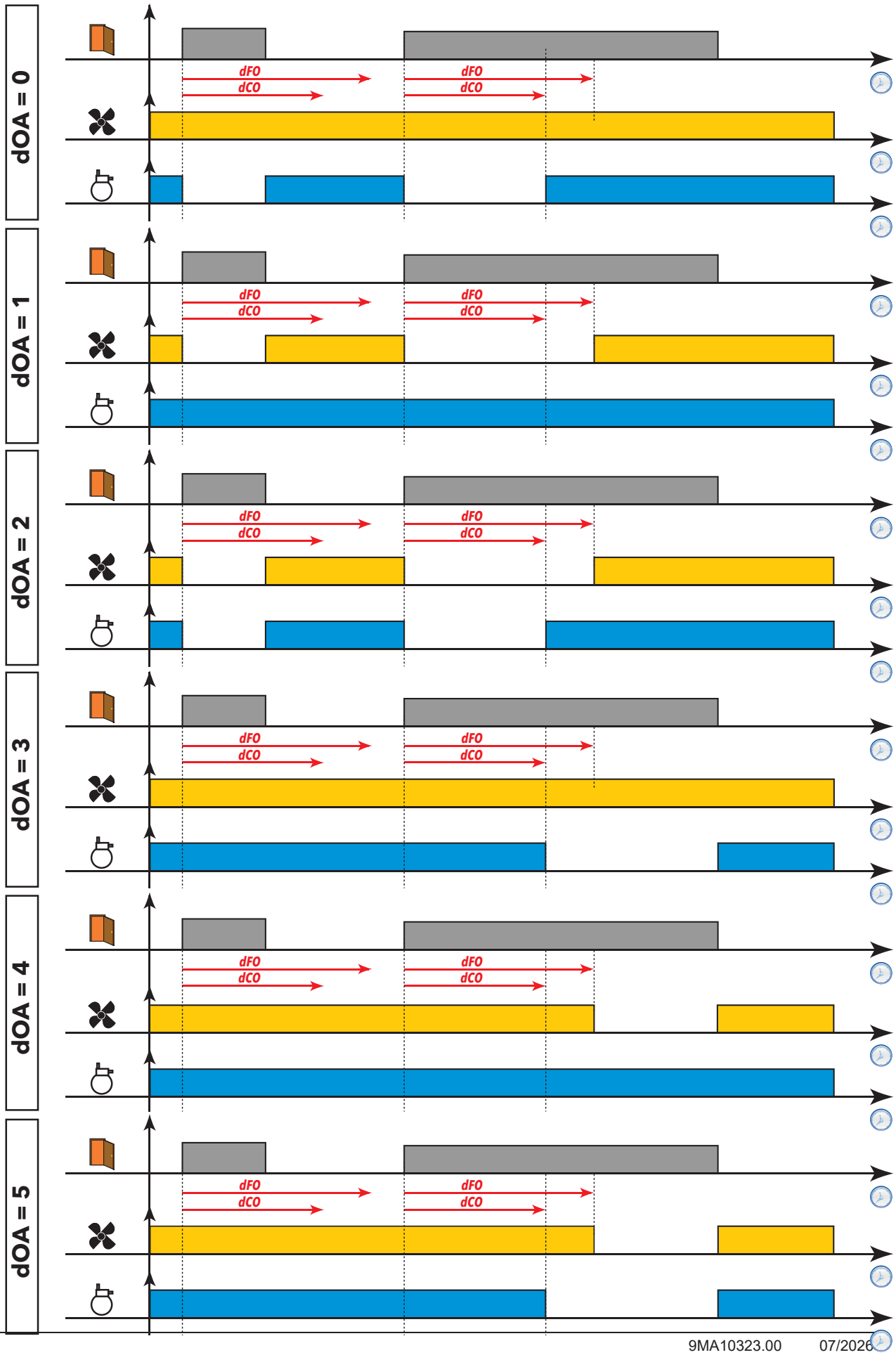
dFO: Evaporator fan resource activation/power off delay (0 ...255 min).

tdO: Door open alarm exclusion time (0...255 min). The door open alarm will be activated if the door remains open for a time period greater than the setting for this parameter.

The way in which parameters **dCO** and **dFO** act depends on how parameter **dOA** is configured.

In the following diagram fan operation is illustrated, on the basis of the **dOA** value. In the graphs, we can see that:

	Door
	Evaporator fans
	Compressor


dOA = 0
dOA = 1
dOA = 2
dOA = 3
dOA = 4
dOA = 5
dFO
dCO

8.14. DEMISTING HEATERS (FRAME HEATERS)

The controller is equipped with a regulator for the demisting heaters.

Operating conditions

The following table lists the ways the relay output can be managed:

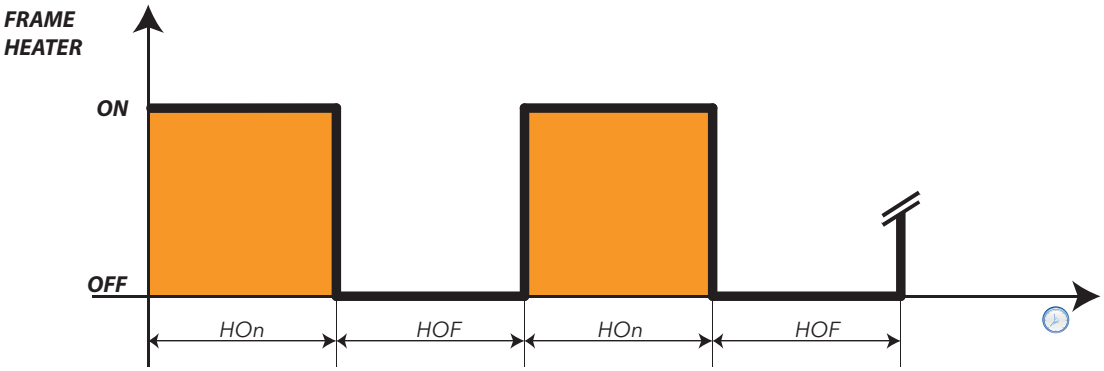
HOn	HOF	FRAME HEATER OUT
0	0	OFF
0	>0	OFF
>0	0	ON
>0	>0	Duty-cycle

Where **HOn** = 0 the regulator is always off, while if **HOn** > 0 and **HOF** = 0 the regulator is always on.

If **HOn** > 0 and **HOF** > 0: the regulator activates in operating cycle mode irrespective of the values read by the probes (cold room probe failure) and of requests from other loads (**Duty-cycle** mode).

If the cold room probe is working properly, the Duty-cycle mode does **NOT** activate as it does not have priority over normal regulator settings.

The following diagram shows the **Duty-cycle** operating mode based on the parameters **HOn** and **HOF > 0**:



User parameters

The parameters that manage the frame heater regulator are:

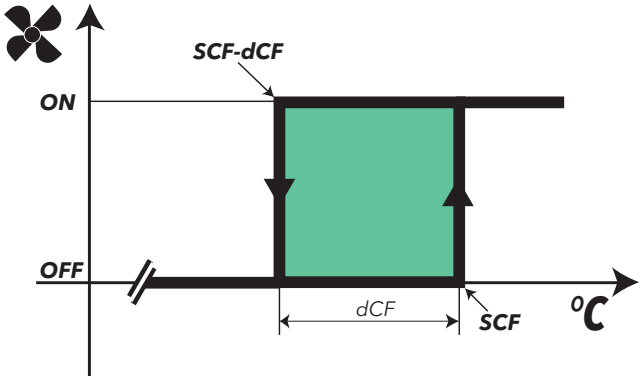
Label	Description
HOn	Frame Heater regulator output ON time
HOF	Frame Heater regulator output OFF time
dt3	Frame Heater regulator time standard unit of measurement: **0** = hours; **1** = minutes; **2** = seconds

8.15. CONDENSER FANS

This regulator is associated with probe Pb3 (see specific section) and features:

- intervention setpoint **SCF**
- operating differential **dCF**
- exclusion of fans during defrost **dCd**
- activation delay after end of defrost **tCF**

If a digital output is set as condenser fans (**H21...H25**=12), this output will behave as follows:



If probe Pb3 is not present and if alarm E3 is active, the regulator will always be active except during the defrost cycle. Probe 3 can be excluded and, in this case, its lack of connection to the instrument will not cause any error signalling to occur.
NOTE: During the dripping time the output is OFF.
NOTE: If a digital output is programmed as “condenser fans” (**H21...H25**=12), parameter **SA3** is always an absolute value, regardless of the value assumed by the parameter Att.

User parameters

The parameters that manage the condenser fan regulator are:

Label	Description
SCF	Condenser fans activation Setpoint
dCF	Condenser fans activation differential
tCF	Condenser fans switch-on delay after defrost
dCd	Exclusion of condenser fans during defrost
dt	Dripping time.

8.16. ANTI-STRATIFICATION FANS

Inside the cold room, warmer air tends to rise while colder air remains near the bottom (stratification).
To prevent this phenomenon, “anti-stratification” fans are activated according to the following modes:
This regulator is associated with probe Pb3 (see specific section) and features:

- intervention setpoint **SCF**
- operating differential **dCF**
- exclusion of fans during defrost **dCd**
- activation delay after end of defrost **tCF**

Operating conditions:
If a digital output is set as condenser fans (**H21...H25**=19), this output will behave as follows:

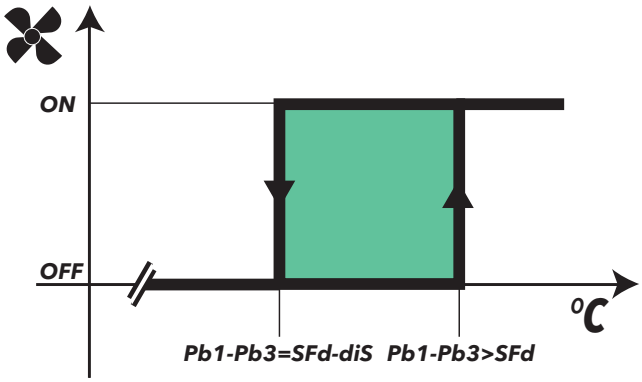
Stratification Fan Status	Condition
Stratification probe absent (H43 and H44 ≠ 4)	ON for SOn, OFF for SOf
Stratification probe inoperable (out of range) (H43 or H44 = 4)	ON for SOn, OFF for SOf
Stratification probe present (H43 or H44 = 4) and SFd ≠ 0	ON when Pb1 – Pb3 | > SFd OFF when | Pb1 – Pb3 | = SFd – diS

Note
The temperature difference between Pb1 and Pb3 is always evaluated in absolute value.
This accounts for systems where the room probe may be installed at the top and the stratification probe at the bottom, or vice versa.

Operation during defrost and drip phases:

- Defrost cycle: anti-stratification fans operate normally
- Drip time (post-defrost): anti-stratification fans operate normally

There is no forced shutdown during these phases.



User parameters
The parameters that manage the condenser fan regulator are:

Label	Description
SFd	Temperature delta (°C/°F) that triggers fan activation based on stratification
diS	Temperature differential used to deactivate fans, adding hysteresis to prevent rapid cycling
SOn	Fan ON time (seconds) in timed mode
SOf	Fan OFF time (seconds) in timed mode

8.17. STAND-BY

Operating conditions

The stand-by regulator can be activated by digital input (if configured) or by key (if programmed).

With the device OFF the display shows “OFF” and all regulators are blocked including alarms.

When the device is switched on via a key or an appropriately configured digital input, regular operation commences, the same as from power-on. After power-on, the temperature alarm is excluded for a time set in parameter **PAO**, and the delay set by parameter **OdO** is activated.
Each time that the device is switched off, all cycle times are reset.
The on/off status is saved in non-volatile memory hence when power returns after a blackout, the device will restart in the status that was active prior to the blackout.
The output from stand-by is linked to the delay set in parameter **OdO**.

NOTE: With the controller off, all relays are de-energized except for Aux: button/aux input-light-door switch are active.

User parameters

The parameters that manage the stand-by regulator are:

Label	Description
PAO	Alarm disabling after power-on
OdO	Output activation delay from power-on
OAO	High/low temperature alarm exclusion time after door closing

8.18. PUMP DOWN

In pump-down mode, the cooling output and the pump-down output perform two separate functions.
The cooling output is controlled by the thermostat. It opens and closes the solenoid valve to manage the refrigerant flow according to the cold room temperature.
The pump-down output controls the compressor only.
The compressor is switched on and off according to the signal from the low-pressure switch connected to a properly configured EWHT 600 NT digital input.
With this logic, the thermostat controls the refrigeration request through the solenoid valve, while compressor operation depends exclusively on the low-pressure switch status.

8.18.1. Service stoppage

Service stoppage switches the cold room OFF, and this status is indicated on the display. It also allows compressor activation every time the pressure on the suction line rises until the minimum pressure switch starts running (pump-down).

8.19. HEAT/COOL

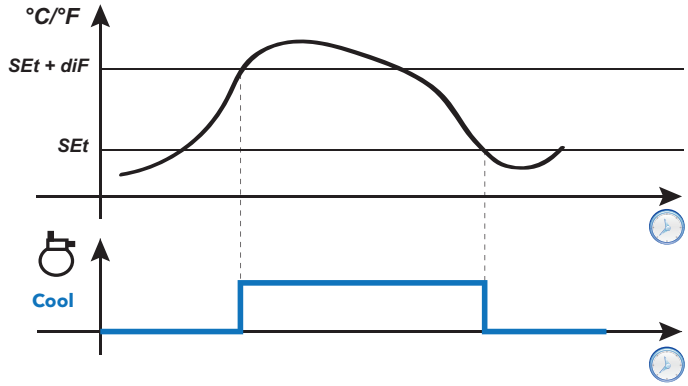
Overview

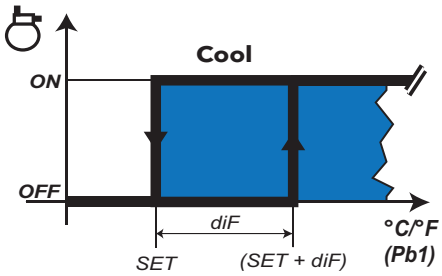
The regulator can work with an absolute or relative differential, both in Heat and Cool modes, and is controlled by the value of Regulation 1 probe.
Before activating the compressor, the regulator makes sure of the following conditions:

- The controller is on or in stand-by (in the latter case, only applies if H08 = 0)
- Regulation probe is not in error
- From power-on the time set using parameter odo has elapsed (only if odo≠0)
- There are no active defrosts (depending on the defrost type)

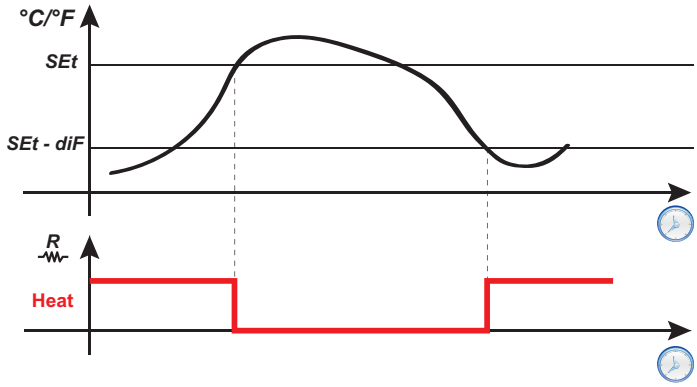
Parameters	Description
SEt	Regulation set point
diF	Differential of set point
HC	Operating mode (Heating/Cooling)
OSP	Offset on set point

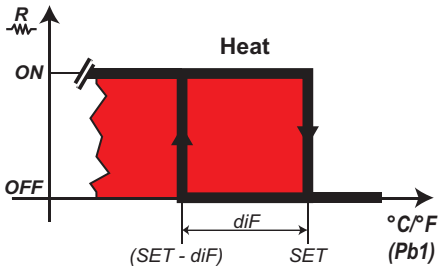
Cooling Regulation





Heating Regulation

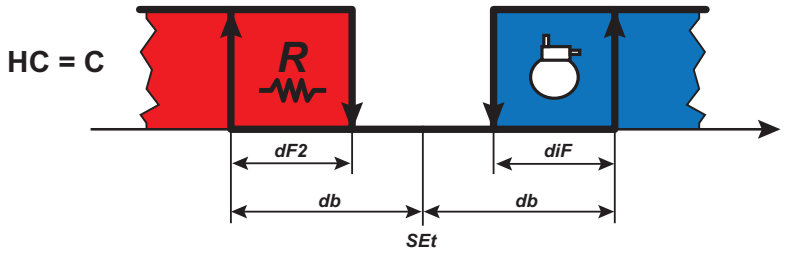


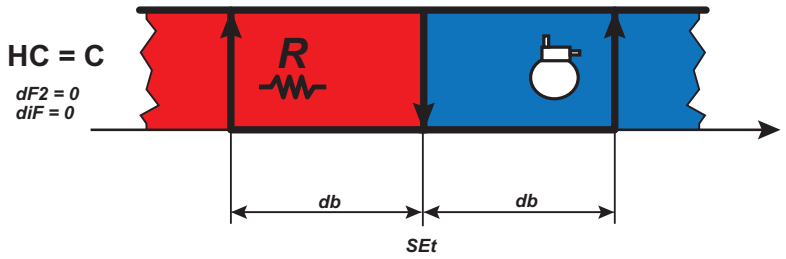


The heating control is disabled during defrost.

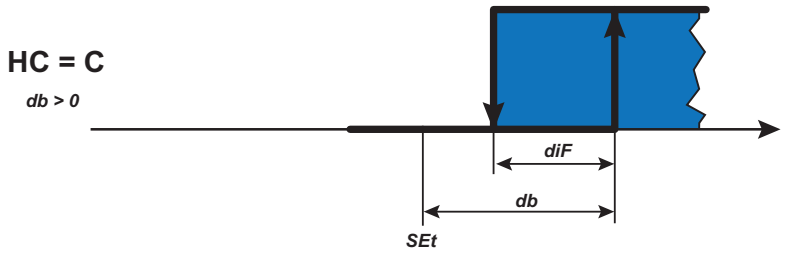
Parameters	Cooling Control	Heating Control	Description
rE	x	x	Type of regulation
SEt	x	-	Regulation set point
SP2	-	x	Regulation set point 2
diF	x	-	Differential of set point
dF2	-	x	Differential of set point 2
HC	HC = C	HC = H	Operating mode (Heating/Cooling)
OSP	x	x	Offset on set point

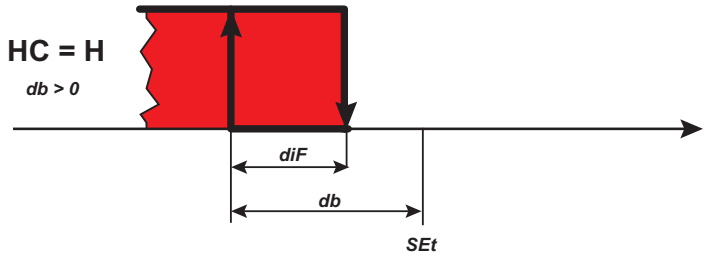
Neutral Zone (rE=1)



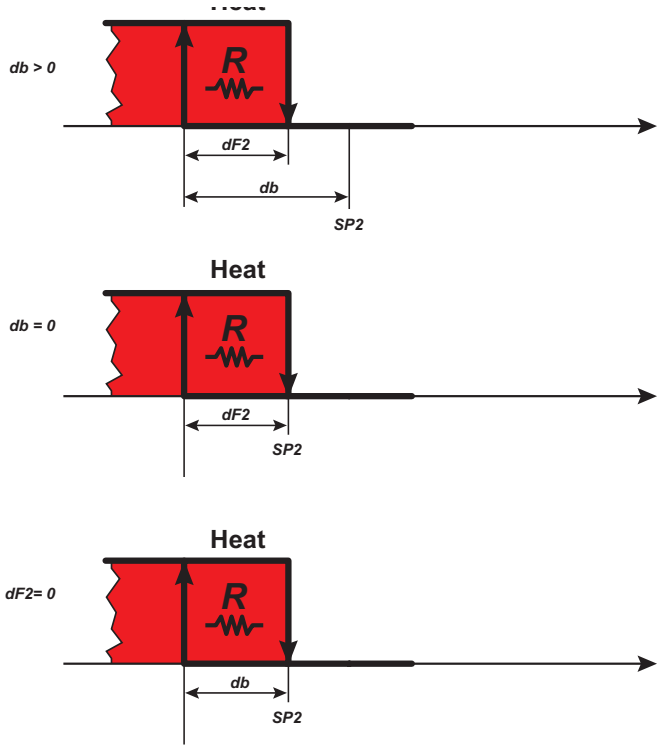


Cooling Regulation (rE=0)





Heating Regulation (rE=2)



Heating / Cooling Regulation with Digital Input (rE=3)

The controller is enabled by properly setting a digital input (H1x = heat/cool).
In heating mode, manual defrost is disabled.

Input inactive: cooling control (compressor) with parameters SEt, diF, db
Input active: heating control (heater) with parameters SP2, dF2, db

8.20. HUMIDITY CONTROL

Overview

The humidity control function can operate with a humidity probe (PbH > 0) or, where supported, without a humidity probe by using timed evaporator fan operation (PbH = 0). Depending on the selected configuration, humidity regulation may operate independently from temperature control or be coordinated with the cooling output. Unless otherwise specified, humidity regulation does not interact with other control loops. During defrost, humidity control can remain active or be disabled (relay OFF) according to parameter dEH.

Note
Humidity control is disabled when an alarm occurs that requires an immediate compressor shutdown.

If the humidity probe is in error:
- Humidify and dehumidify outputs switch to duty-cycle mode.
- ON and OFF times are defined by CHN and CHF.
- If both outputs are configured (neutral zone configuration), they remain OFF.

8.20.1. Parameters

Parameters involved:

Parameter	Description	Notes
CHC	Dehumidify control type	
CHF	Humidify-dehumidify out off time	
CHn	Humidify-dehumidify out on time	
CHt	Humidity-temperature control type	
dEH	Humidity regulation during defrost	
HUL	Humidity level selection	Humidity level “1”/”2”/”3”
HU1	Evaporator fans on time humidity level 1	Duty Cycle level “1”
HU2	Evaporator fans off time humidity level 1	
HU3	Evaporator fans on time humidity level 2	Duty Cycle level “2”
HU4	Evaporator fans off time humidity level 2	
HU5	Evaporator fans on time humidity level 3	Duty Cycle level “3”
HU6	Evaporator fans off time humidity level 3	
CHd	Humidity control enable differential	
CHL	Minimum temperature to enable humidity control	
CHH	Maximum temperature to enable humidity control	
dbH	Humidity intervention semi-band	
dFH	Differential of humidity set point	
SEH	Humidity setpoint	
PbH	Humidity control probe selection	Always Probe 4
FCH	Fans behavior in case of humidity control	
FCO	Evaporator fans status with OFF compressor output	
CA4	Analog input 4 calibration	
04P	Analog input prescaler 4	×10 scaling factor
04U	Analog input unit of measure 4	

Dehumidification Control Modes

Dehumidification Using Dedicated Relay (Independent from Temperature Control)

Activation
This mode is enabled by setting parameter CHC = 0 and configuring a digital output as Dehumidification Relay (H2x = 15).
With this configuration, humidity control is completely independent from temperature control.
Application
Suitable for applications where humidity control must not influence temperature regulation.

Dehumidification Using Dehumidify Relay + Compressor (CHC = 1)

Activation
Set CHC = 1 and configure a digital output as Dehumidification Relay (H2x = 15).
Application
Suitable for systems where humidity is reduced through cooling.

Dehumidification Using Dehumidify-Resistor Relay (Priority over Cooling)

Activation
Configure a digital output as Dehumidify-Resistor (H2x = 16).
This dehumidification mode does not depend on parameter CHC.
Application
Suitable for applications where dehumidification is prioritized over temperature control.

Value	Description
CHC = 0	Dehumidification independent from Cooling
CHC = 1	Cooling priority over Dehumidification (factory setting)

Value	CHC parameter	Relay
Dehumidification Using Dedicated Relay (Independent from Temperature Control)	**CHC = 0**	**H2x = 15 Dehumidity**
Dehumidification Using Dehumidify Relay + Compressor	**CHC = 1**	**H2x = 15 Dehumidity**
Dehumidification Using Dehumidify-Resistor Relay (Priority over Cooling)	**NA**	**H2x = 16 Dehumidity Resistor**

Evaporator Fan Management

Parameter FCH defines how the evaporator fan is managed when humidity control is active. Depending on the value of FCH, the fan control logic can consider only the compressor output status or both the compressor and humidity-related output status. This allows the evaporator fan behavior to be adapted to the humidity control strategy configured for the application.

The evaporator fan may be forced ON when a humidity-related relay is active, based on FCH:

Value	Description
FCH = 0	Fan controlled by FCO considering compressor output only
FCH = 1	Fan controlled by FCO considering compressor and humidity outputs

For a detailed description of the **Climate Control Demand** logic and its effect on evaporator fan operation, refer to
"8.8.1. Evaporator fan operating conditions" page 75"

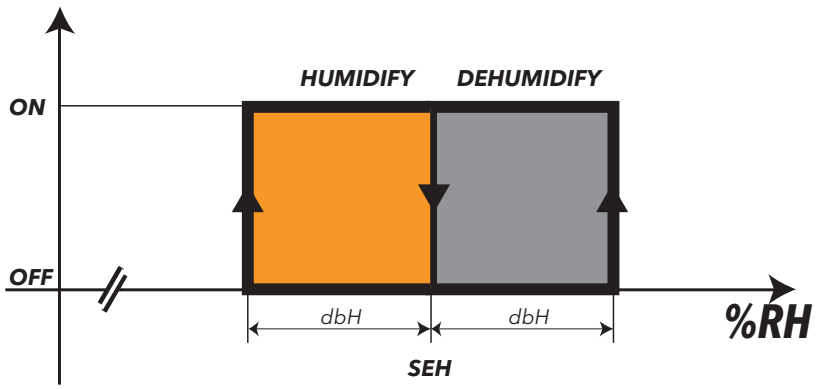
8.20.2. Neutral Zone Humidity Regulation

Neutral zone control requires configuration of DFH, DBH, and the relevant relay output.

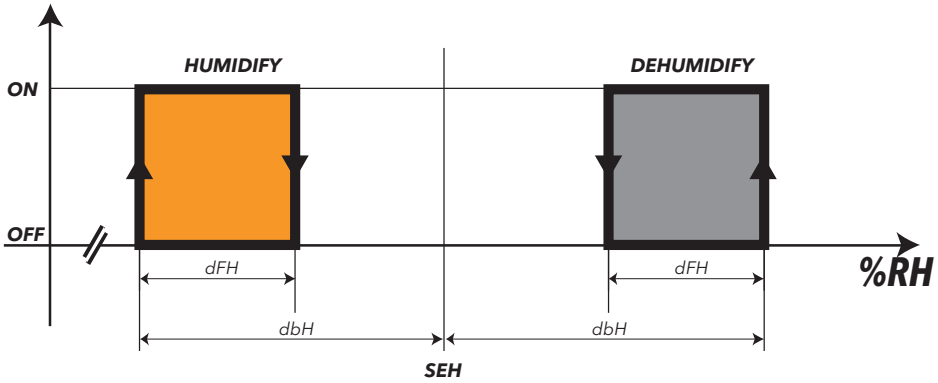
Note: Independent controller; no interactions with other functions.

Parameters	Description
SEH	Humidity Setpoint
dBH	Humidity intervention semi-band
dFH	Differential of humidity set point

dFH = 0



dFH > 0

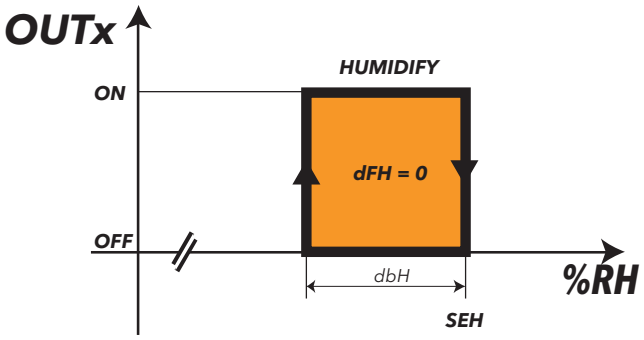


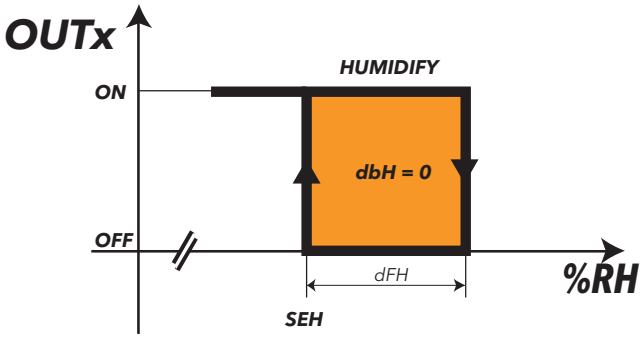
8.20.3. Humidification

The humidify is available only with a dedicated relay
Humidity control can operate with a configured humidity probe or, where supported, by using timed evaporator fan operation. Depending on the configuration, humidity regulation can be managed independently from temperature control or coordinated with the cooling output.

Parameters	Description
SEH	Humidity Setpoint
dBH	Humidity intervention semi-band
dFH	Differential of humidity set point

Note: Independent controller.





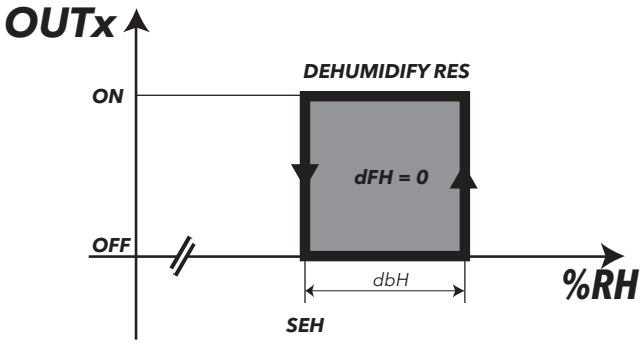
8.20.4. Dehumidification

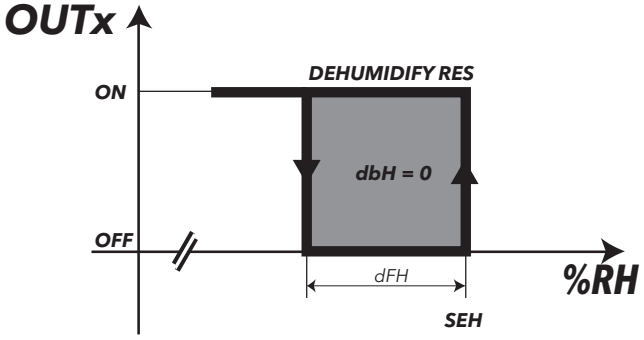
Dehumidification Using Dehumidify-Resistor Relay (Priority over Cooling)

This mode is enabled by configuring:
- an output as Cooling (H2x = 1)
- an output as Dehumidify-Resistor (H2x = 16).

Dehumidification is performed using both outputs and operates independently of parameter CHC and the standard humidity control mode selection.

Behavior
Parameters: SEH, dBH, dFH
By configuring one output as **Cooling** (parameter **H2x = 1**) and one output as **Resistor Dehumidify** (parameter **H2x = 16**), dehumidification is given **priority over temperature control.** When dehumidification is required, the Dehumidification relay keeps the Cooling output active until the humidity setpoint is reached, regardless of the temperature regulation status.
In this operating mode, parameter **CHC is not applied.**





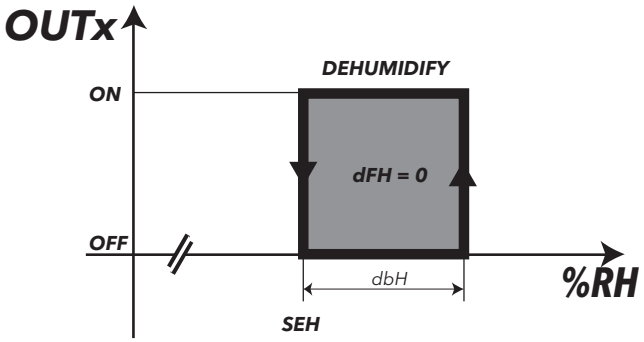
Dehumidification Using Dedicated Relay (Independent from Temperature Control)

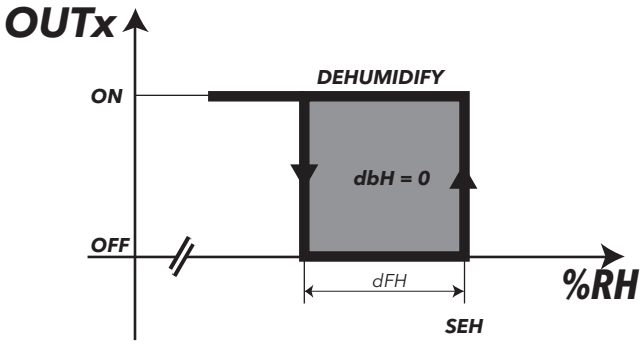
This mode allows the controller to manage dehumidification independently from temperature control.

NOTE:
To enable this function, set parameter CHC = 0 and configure a digital output as Dehumidification Relay (H2x = 15).

Behavior
Parameters: SEH, dBH, dFH

In this configuration, the dehumidification output is activated according to the humidity setpoint and differential only. The cooling output is not forced by the dehumidification request, and temperature regulation continues according to its own control logic.





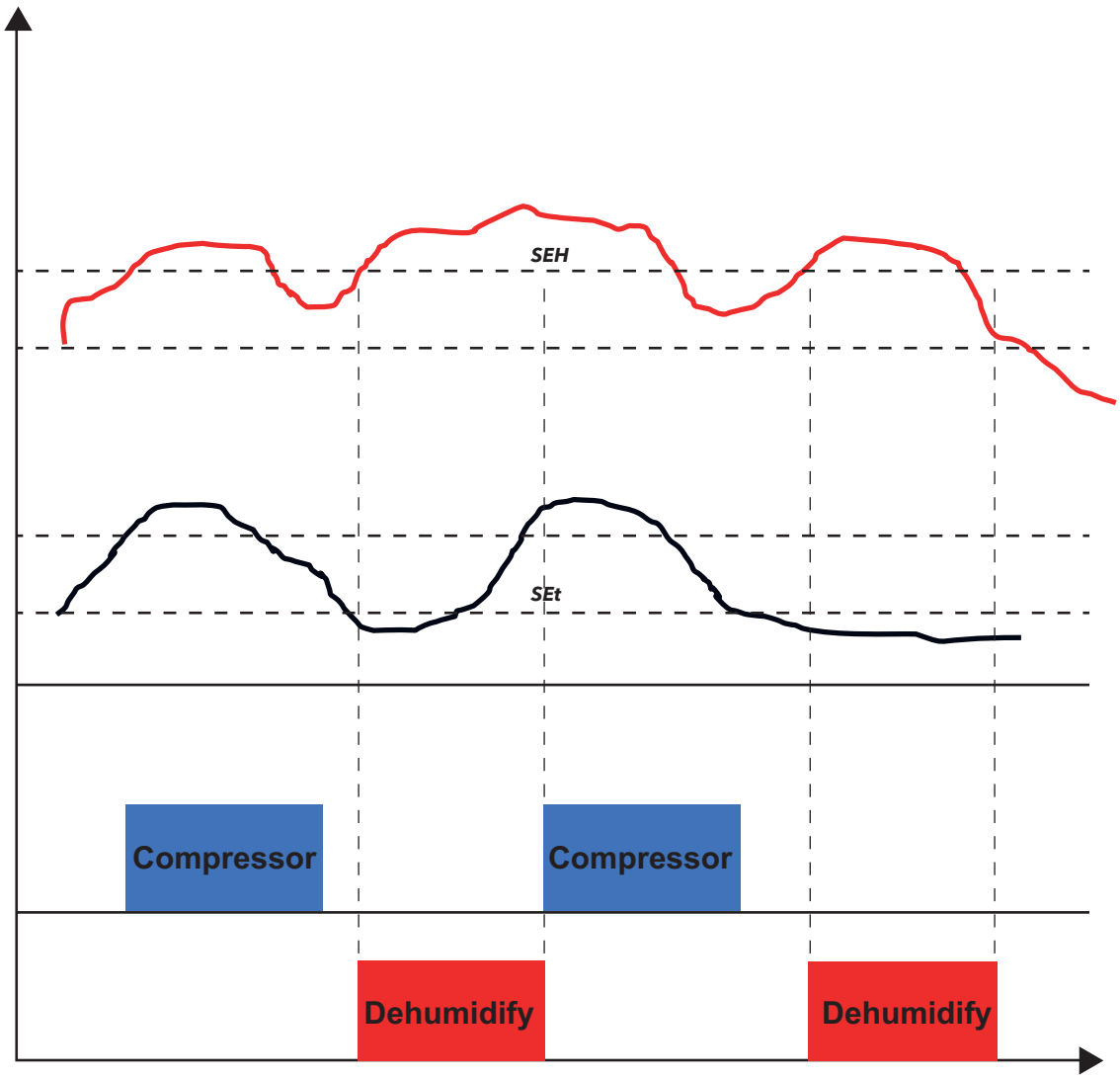
Dehumidification Using Dehumidify Relay + Compressor (CHC = 1)

This mode uses separate relays for:

- Dehumidify
- Compressor

Behavior
Parameters: SEH, DBH, DFH
When both cooling and dehumidification are requested, **Cooling has priority over Dehumidification**. The **Cooling relay is activated**, while the **Dehumidification relay remains OFF**. Once the temperature setpoint is reached, the **Cooling relay is deactivated**. If a dehumidification demand is still present, the **Dehumidification relay is activated** and remains active according to the humidity control logic.
If heating (HC = H) and dehumidification are both active, the heating and dehumidification outputs operate according to their respective control logic.

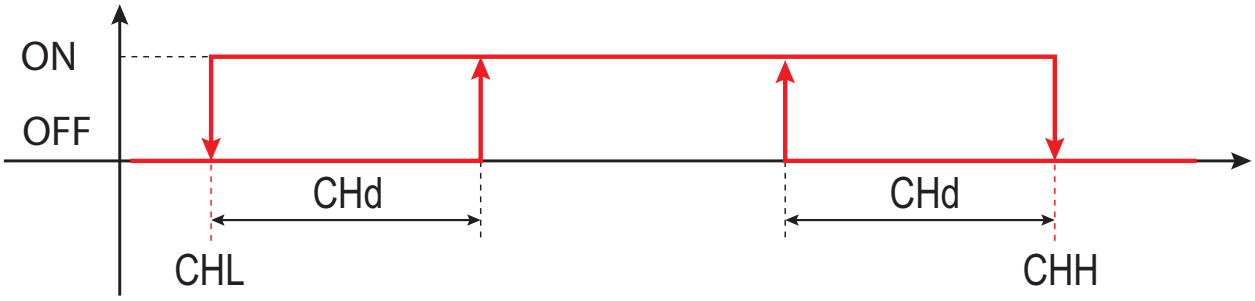
Diagram



8.20.5. Combined Humidity–Temperature Control

The CHt parameter defines the temperature range in which humidity control is enabled during combined temperature/humidity regulation.
This function allows the installer to limit humidification or dehumidification to specific temperature conditions. If the measured temperature is outside the range defined by CHL and/or CHH, humidity control is disabled and the controller gives priority to temperature regulation only.
This prevents humidity control from operating when the temperature is too low or too high for the application, installation requirements, or safety conditions.

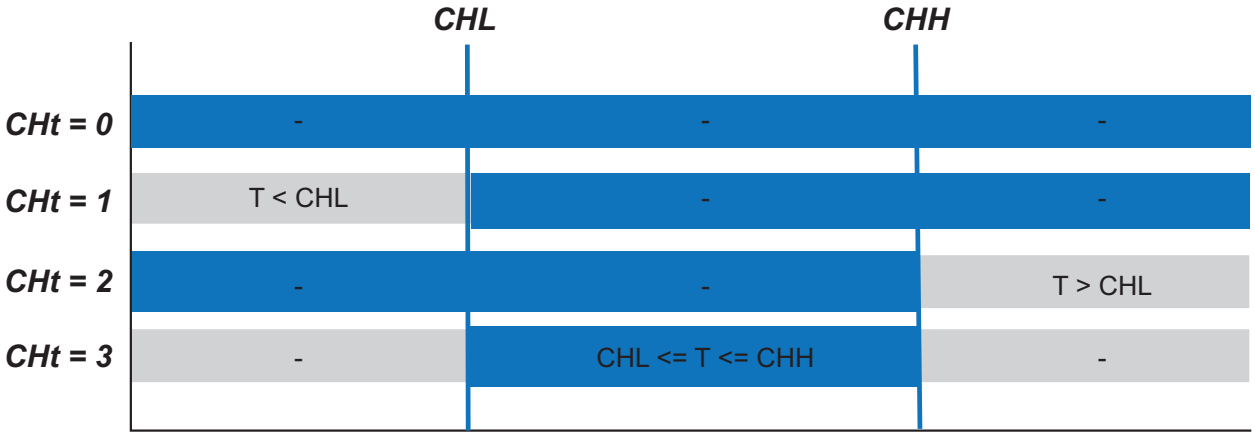
CHt	Description
0	No temperature control
1	Control minimum temperature
2	Control maximum temperature
3	Control both minimum and maximum temperature



Temperature-Based Inhibition of Humidification and Dehumidification (CHt)

Parameter **CHt** enables temperature-dependent inhibition of the humidification and dehumidification functions.

- CHt = 0 No temperature inhibition
- CHt = 1 Humidify/Dehumidify inhibited when Temperature T < CHL
- CHt = 2 Humidify/Dehumidify inhibited when Temperature T > CHH
- CHt = 3 Humidify/Dehumidify inhibited when Temperature T < CHL or Temperature T > CHH



8.20.6. Humidity Control with Evaporator Fan (PbH = 0)

When humidity control is performed using evaporator fans (PBH = 0), the operation depends on a combination of configuration conditions.

Operation Conditions
The humidity control function using evaporator fans is active only when all the following conditions are met:

1. Compressor OFF condition
The regulator operates only when the compressor is OFF.

2. Evaporator fan configuration (FCO)
Parameter FCO must be set so that the evaporator fans are OFF when the compressor is OFF (for example, FCO = 0).
This ensures that the controller can actively manage fan operation for humidity control.

3. Humidity level enable (HUL)

Parameter HUL must be greater than 0

Operating Principle
When all the conditions above are satisfied, the controller activates the evaporator fans according to the configured humidity control logic (timed ON/OFF cycles or regulation parameters).
In this mode, fan operation is no longer determined only by temperature regulation, but is directly controlled by the humidity regulation function.

IMPORTANT
If any of the conditions above are not satisfied:
humidity control using evaporator fans is disabled;
evaporator fans operate only according to standard fan control logic (FCO and temperature-related behavior).

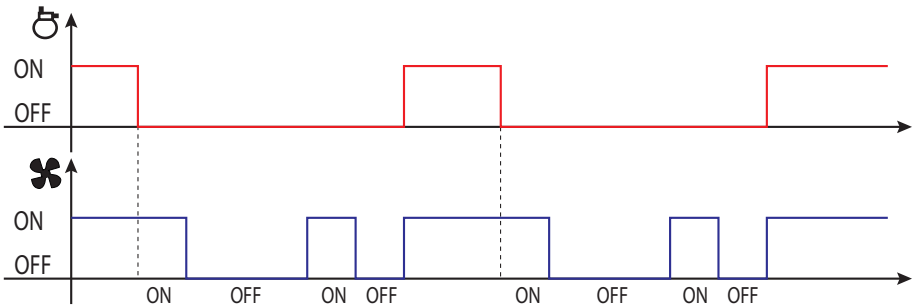
The HUL parameter selects the humidity level with parameters that select the duty cycle of the evaporator fan.

Humidity Level Selection

HuL	Description
0	Disabled
1	Humidity level “1”
2	Humidity level “2”
3	Humidity level “3”

Duty Cycle Parameters

Hux	Description
Hu1	Evaporator fans on time humidity level 1
Hu2	Evaporator fans off time humidity level 1
Hu3	Evaporator fans on time humidity level 2
Hu4	Evaporator fans off time humidity level 2
Hu5	Evaporator fans on time humidity level 3
Hu6	Evaporator fans off time humidity level 3



8.21. LEAK DETECTOR INTERFACE

Overview

As an alternative to the combined temperature and humidity management, the controller can be configured for temperature control with refrigerant gas leak alarm management when connected to an LKDNext Leak Detector.
In this operating mode, humidity regulation is disabled and the EWHT 600 NT provides gas concentration display as well as Warning and Danger alarm signalling via dedicated relay outputs.

Leak Detector Configuration (Step-by-Step)

Step 1 – Enter Parameter Menu

1. Power on the EWHT 600 NT
2. Access the parameter menu according to the standard procedure

Step 2 – Configure Leak Detector Input and Display scaling

Assign the appropriate input channel to the Leak Detector signal
Enable ppm value visualization
Confirm that the displayed value represents ppm / 10

Parameter	Value	Folder	
04U	**1**	inS/CnF	1 = ppm
04P	**1**	inS/CnF	Display shows ppm x 10
H1x [1]	**±21**	inS/CnF	Select the digital input actually wired to the Leak Detector. Sign meaning: +21 → input active when contact is closed -21 → input active when contact is open

[1] As an optional configuration, the alarm relay of the LKDNext Leak Detector can be connected to one of the EWHT 600 NT digital inputs, by setting parameter H1x = ±21.
When the LKDNext Leak Detector is connected to the EWHT 600 NT, refrigerant concentration (ppm) management and visualization are handled via parameters 04U and 04P. These parameters define the unit and scaling of the displayed value. The configuration of the digital input for the LKDNext alarm relay is therefore optional and should be considered as an additional function only. It is not mandatory, since the digital input does not provide ppm value visualization, but only a binary alarm status.

Step 3 – Configure Relay Outputs

Assign one relay to LKDNext Warning / Assign one relay to LKDNext Danger

Relay Configuration for Leak Detector Alarms

Parameter	Value	Folder	Function	Example
H21...26	**17**	inS/CnF	LKDNext Warning	H24 = 17 (Warning)
H21...26	**18**	inS/CnF	LKDNext Danger	H25 = 18 (Danger)

Alarm Thresholds

Parameter	Folder	Meaning
ALL	InS/diS	Leak Warning threshold
ALH	InS/diS	Leak Danger threshold
AL1	InS/diS	Warning delay
AL2	InS/diS	Danger delay
04d	InS/diS	Common differential

Step 4 – Changing between temperature/humidity control and temperature + leak detection control

After switching between temperature/humidity control and temperature + leak detection control (or vice versa), power cycle the device (OFF → ON) to apply the new configuration.

NOTICE
INOPERABLE EQUIPMENT Power cycle the device (OFF → ON) to apply the new configuration. **Failure to follow these instructions can result in equipment damage.**

Step 5 – Verify Operation

Simulate warning and danger conditions / Verify display update and relay activation

- Simulate Warning level → relay assigned as LKDNext Warning must activate
- Simulate Danger level → relay assigned as LKDNext Danger must activate
- Confirm displayed value is ppm / 10
- Verify Leak Detector / Panic alarm icons

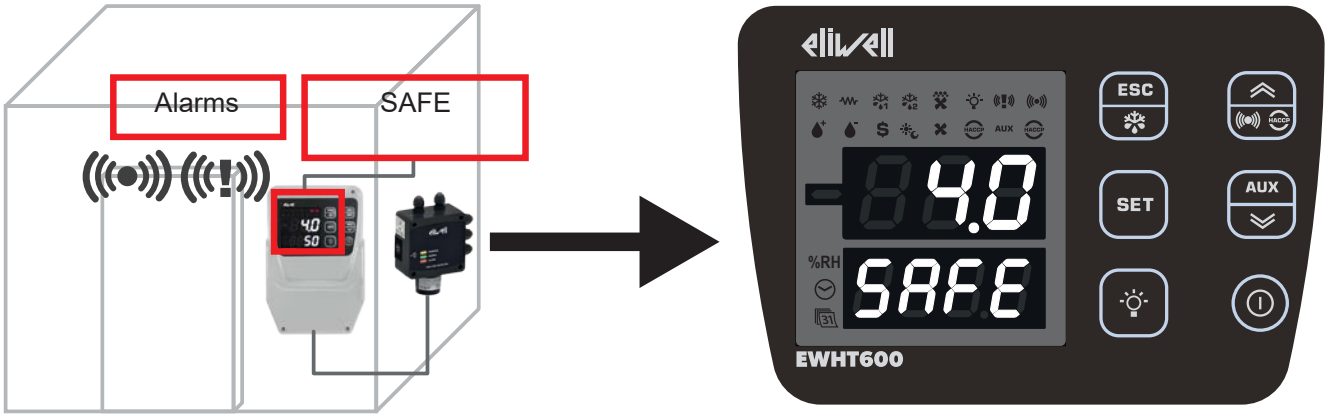
⚠ WARNING
UNINTENDED EQUIPMENT OPERATION • The EWHT 600 NT is not a safety device and does not replace the LKDNext's built-in LED safety indications or any mandatory safety functions. • Always rely on the LKDNext detector as the primary safety device for refrigerant leak detection. **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

8.21.1. Display

Display behavior
If the measured ppm value is below the configurable warning threshold, the display shows SAFE.
If the measured value is above the warning threshold or the danger threshold, the display shows the scaled ppm value.

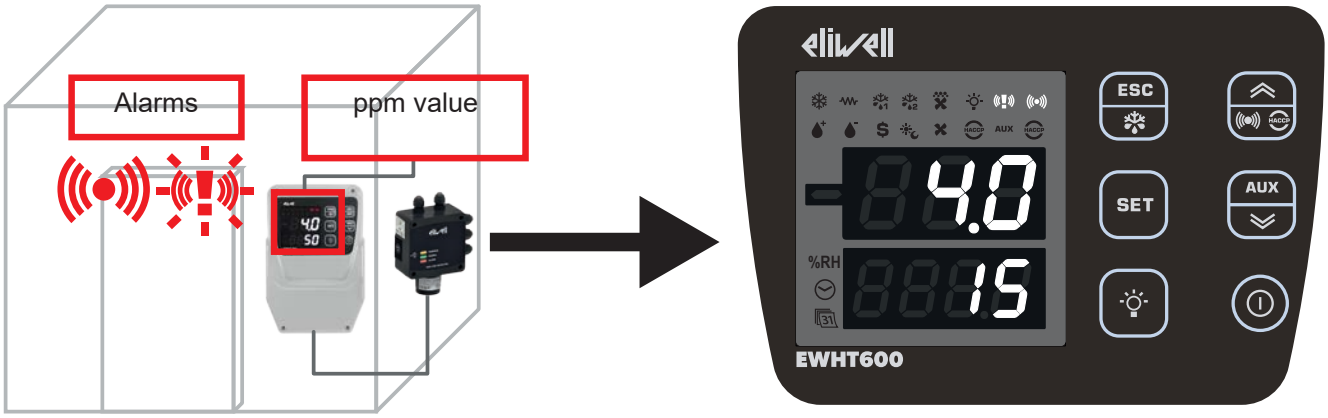
Display Examples
The following examples show the three basic display conditions: SAFE, WARNING, and DANGER. The same examples also clarify the state of the alarm-related elements shown by the numbered callouts in each figure.

SAFE condition: ppm below the warning threshold
Measured refrigerant concentration is below the configurable warning threshold.
The controller displays the SAFE label instead of ppm value



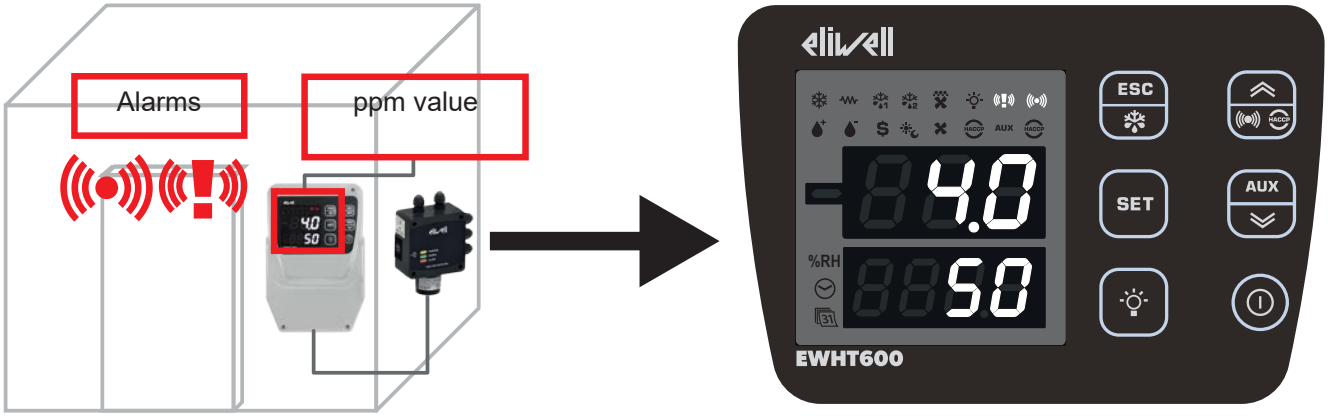
4..20 mA Leak Detector Output

WARNING condition: ppm above the warning threshold
Measured refrigerant concentation is above the configurable warning threshold.
The controller displays the scaled ppm value and the warning alarm logic becomes active after the configured delay



4..20 mA Leak Detector Output

DANGER condition: ppm above the danger threshold
Measured refrigerant concentation is above the configurable danger threshold.
The controller displays the scaled ppm value and the danger alarm logic becomes active after the configured delay



4..20 mA Leak Detector Output

The EWHT 600 NT can display refrigerant concentration from a leak detector input. Values are scaled for display (for example, 10,000 ppm displayed as 1,000). Relay outputs can signal warning and danger thresholds. The controller is not a safety device and does not replace the leak detector.

Important Safety Information

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- The EWHT 600 NT is not a safety device and does not replace the LKDNext's built-in LED safety indications or any mandatory safety functions.
- Always rely on the LKDNext detector as the primary safety device for refrigerant leak detection.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

When the measured refrigerant concentration is below the configured warning threshold, the display shows SAFE. When the measured concentration exceeds the warning or danger threshold, the EWHT 600 NT displays the scaled ppm value and activates the configured alarm logic according to the related threshold, differential, and delay parameters. Warning and danger conditions can be associated with dedicated relay outputs, display icons, buzzer activation, and alarm labels.

Refrigerant PPM Display and Alarm Indication

The system allows the user and installer to monitor the refrigerant concentration (ppm) and the associated warning and danger alarms without entering the cold room, where the LKDNext detector is normally installed.
All information is displayed remotely via the EWHT 600 NT controller.

8.21.2. Leak Detector Value Display

The second display row of the EWHT 600 NT supports a maximum of four digits.
For this reason, the refrigerant concentration is shown as follows:

Refrigerant concentration is displayed as ppm / 10

Refrigerant Threshold Examples

Refrigerant	Actual Threshold (ppm)	Displayed Value
CO_2	10,000	1,000
NH_3	20,000	2,000

Example:
- Actual concentration: 10,000 ppm
- Displayed value: 1,000

This applies for example to the following danger thresholds:
- CO_2: 10,000 ppm
- NH_3: 20,000 ppm

8.21.3. Configuration for Leak Detector Alarms

Relay outputs can be configured as follows:

Relay Function	Description	Notes
LKDNext Warning	Activated at warning threshold	
LKDNext Danger	Activated at danger threshold	

These outputs can be connected to external:
- Acoustic alarms
- Visual indicators
- Supervisory systems

Alarm Configuration

The EWHT 600 NT relays can be configured to signal:
- LKDNext Warning Alarm
- LKDNext Danger Alarm

These relay outputs allow external devices (for example alarms or indicators) to alert the user when warning or danger thresholds are reached.

Alarm-Related State Table

Condition	Display	Warning output	Danger output	Alarm indicator	Buzzer
SAFE	SAFE	OFF	OFF	OFF	OFF
WARNING	ppm value	ON	OFF	ON	ON (can be silenced)
DANGER	ppm value	ON	ON	ON	ON (can be silenced)

8.21.4. Parameters

Involved parameters.

Function	Parameter	Description	Diagram
Scaling and unit	**04U**	Analog input unit of measure 4 Measurement unit selection either "%RH" or "ppm" 0 = %RH 1 = ppm	**-**
	04P	Analog input prescaler 4 ×10 scaling factor The parameter values are multiplied x1 or x10 0 = The parameter values are multiplied x1 1 = The parameter values are multiplied x10	**-**
Differential	**04d**	Leak alarm differential The Leak Alarm Differential is common to both the Warning and Danger alarm thresholds. Due to the limitation of the display to four digits, when the maximum expected probe value exceeds 9999, the configured parameter values must be interpreted with a ×10 scaling factor. To enable this scaling, parameter 04P shall be set to “1”. **Note** When ×10 scaling is active, all displayed values represent ten times the actual numerical value shown. **Example** A displayed value of 1,000 corresponds to an actual concentration of 10,000 ppm.	**Differential**
Threshold	**ALL**	Leak alarm low threshold WARNING Threshold for Leak Detection	**WARNING Set**
	ALH	Leak alarm high threshold DANGER Threshold for Leak Detection	**DANGER Set**
Delays	**AL1**	Probe remains above the low threshold for leak alarm activation WARNING alarm delay for Leak Detection (in seconds)	**WARNING Time Out**
	AL2	Probe remains above the high threshold for leak alarm activation DANGER alarm delay for Leak Detection (in seconds)	**DANGER Time Out**

8.21.5. LKDNext Management Logic with EWHT 600 NT

The logic must include all the managed elements: ppm display, alarm outputs, display icons, buzzer and buzzer acknowledgement, differential on the thresholds, alarm delays, and indication of the parameters used to configure thresholds, differential, and delays.

- The input value is scaled according to parameter 04P and displayed in ppm according to parameter 04U.
- The measured value is compared with the configurable Warning threshold (ALL) and Danger threshold (ALH).
- Differential / hysteresis (04d) is applied so that the condition is not reset until the measured value falls below the threshold by the configured amount.
- Warning and Danger delays (AL1 and AL2) determine how long the threshold must remain exceeded before the corresponding alarm logic becomes active.
- When ppm is below the warning threshold, the display shows SAFE.
- When ppm is above the warning threshold, the display shows the scaled ppm value and the warning output can become active.
- When ppm is above the danger threshold, the display shows the scaled ppm value, the danger output can become active, and the buzzer can sound.
- The buzzer can be silenced from the keypad, while the visual alarm indication remains active until the condition is cleared.

4...20 mA Input from LKDNext
Analog input configured for leak detector management

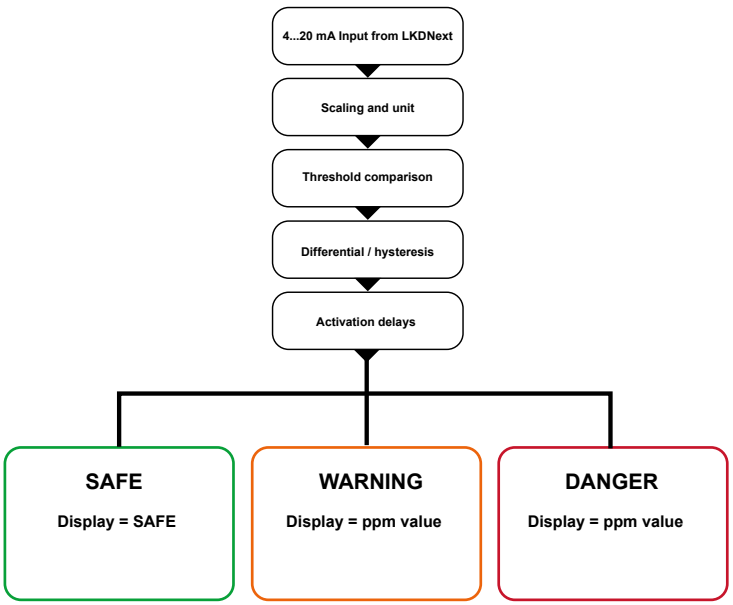
Scaling and unit
04P = Scaling factor
04U = Measurement unit

Threshold comparison
ALL = Warning Threshold
ALH = Danger Threshold

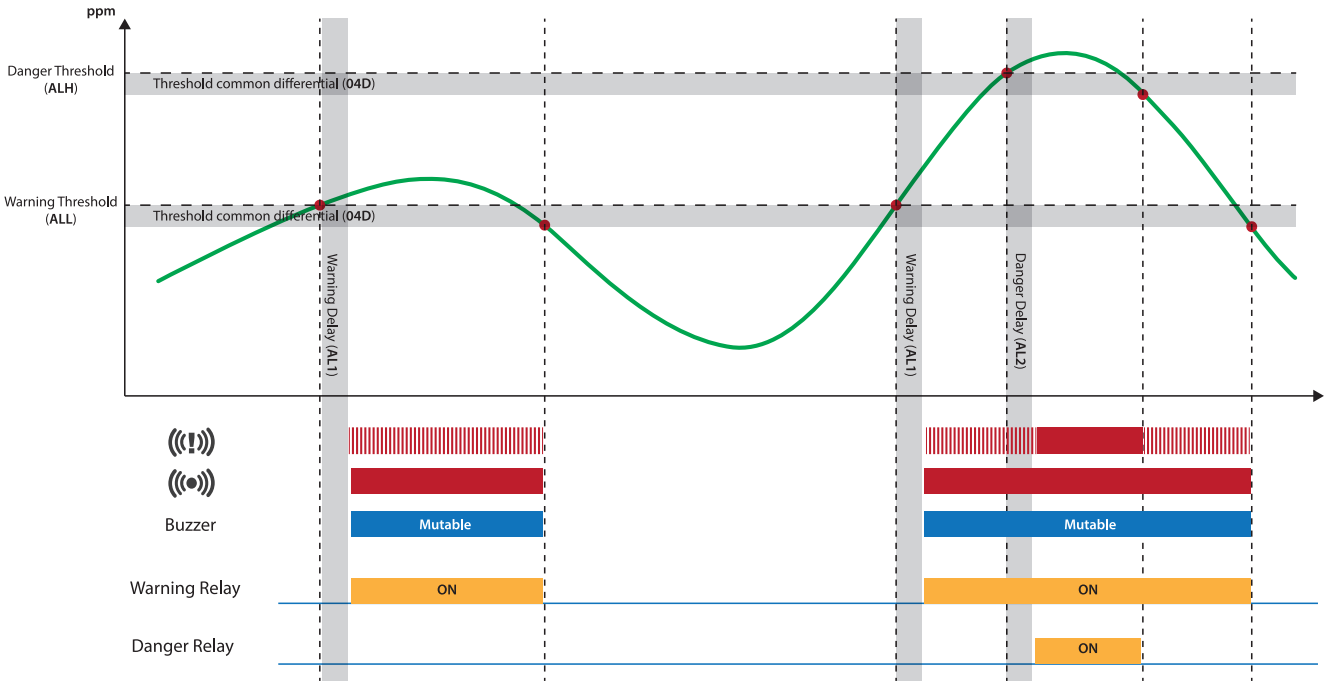
Differential / Hysteresis
04d = Differential used to reset the condition below the threshold

Activation delays
AL1 = Warning delay
AL2 = Danger delay

Diagram



Diagram


ppm
Danger Threshold
(ALH)
Threshold common differential (04D)
Warning Threshold
(ALL)
Threshold common differential (04D)
Warning Delay (AL1)
Warning Delay (AL1)
Danger Delay (AL2)
Buzzer
Mutable
Mutable
Warning Relay
ON
ON
Danger Relay
ON

9. PARAMETERS

9.1. HOW TO EDIT THE USER PARAMETERS

The 'User' parameters are the most useful ones. This document describes them in the Parameter Table section.
1) Press and hold the SET button for at least 3 seconds, until the display shows USr
2) Press and release the SET key. The top display will show the first parameter, the bottom display will indicate the current parameter value
3) Using the UP & DOWN keys, find the parameter that you wish to modify
4) Press and release the SET key again. The top display will show the name of the flashing parameter
5) Press and release the DOWN key to display the parameter value
6) Press and release SET to save the parameter value
7) Return to step 3) or press ESC several times to return to the normal display.

IT IS POSSIBLE TO EDIT OTHER INSTALLER PARAMETERS (inS) ON THE INSTRUMENT

9.2. HOW TO EDIT THE INSTALLER PARAMETERS

1) Press and hold the SET key for 3 seconds until the display shows USr
2) Press and release the DOWN key to display to select the **inS** parameter section
3) Press and release the SET key again. The display will show the first folder
4) Press and release the SET key again. The top display will show the first parameter in the folder, the bottom display will indicate the current parameter value
5) Press and release the DOWN key to display to find the parameter that you want to change

The procedure progresses in a similar manner to that described for the User parameters (steps 4-7).

9.3. PARAMETER TABLE

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
SEt	-	Temperature control SEtpoint	°C/°F	-58.0...302	0.0
SEH	USr/inS	Humidity SEtpoint	%RH	0...100	50.0
		COMPRESSOR parameters (CPr)			
rE	inS	Type of regulation 0= standard 1=neutral zone 2=heating with resistor 3=heating/cooling with digital input	num	0/1/2/3	0
diF	USr/inS	Activation differential	°C/°F	0...30.0	2.0
SP2	inS	Regulation set point 2	°C/°F	LSE...HSE	0.0
dF2	inS	Differential of set point 2	°C/°F	0...50.0	0.0
db	inS	Band	°C/°F	0...50.0	0.0
HSE	inS	Maximum value that can be assigned to the setpoint. NOTE: The two setpoints are interdependent: HSE cannot be less than LSE and vice versa.	°C/°F	LSE...HdL	50.0
LSE	inS	Minimum value that can be assigned to the setpoint. NOTE: The two setpoints are interdependent: LSE cannot be greater than HSE and vice versa.	°C/°F	LdL...HSE	-50.0
OSP	inS	Temperature value to be added algebraically to the setpoint if reduced set enabled (Economy function). Enabling can take place via key, function or digital input configured specifically for this purpose.	°C/°F	-30.0...30.0	0.0
HC	inS	Operating mode (Heating/Cooling) C(0) = Cooling H(1) = Heating	flag	C/H	C
Cit	inS	Minimum activation time of compressor before possible deactivation. If Cit = 0 it is not active.	min	0...255	0
CAt	inS	Maximum activation time of compressor before possible deactivation. If CAt = 0 it is not active.	min	0...255	0
Ont	inS	Controller switch-on time in the event of probe error. - if Ont = 1 and OFt = 0, the compressor stays on permanently (ON), - if Ont > 0 and OFt > 0, it operates in duty-cycle mode.	min	0...255	10
OFt	inS	Controller switch-off time in the event of probe error. - if OFt = 1 and Ont = 0, the compressor stays OFF permanently, - if Ont > 0 and OFt > 0, it operates in duty-cycle mode	min	0...255	10
dOn	inS	Delayed start. The parameter indicates that a protection is active on the general compressor relay actuations. At least the indicated time must elapse between the request and the actual activation of the compressor relay.	s	0...255	2
dOF	inS	Delay time after power-off: the delay time indicated must elapse between deactivation of the compressor relay and the next power-on.	min	0...255	0
dbi	inS	Delay between switch-ons; the delay time indicated must elapse between two consecutive compressor power-ons.	min	0...255	2
OdO	inS	Delay in activating outputs after the instrument is switched on or after a power outage. 0 = not active	min	0...255	0
dSC	inS	Compressor 2 activation delay. Indicates the time after which the relay configured as compressor 2 will be activated in relation to the first compressor. If compressor 1 is disabled during this time, the call for compressor 2 will be cancelled.	s	0...255	0
dCS	inS	Deep cooling Set Point	°C/°F	-58,0 ... 302,0	0.0
tdC	inS	Deep cooling Duration	min	0 ... 600	10
dCC	inS	Defrost delay after deep cooling	min	0 ... 255	0
CCi	inS	Condenser Filter Cleaning Interval	month	0 ... 24	0
CCb	inS	Enable Buzzer with Condenser Filter Cleaning Alarm n = disabled y = enabled	flag	n/y	n

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
CHC	inS	Dehumidify control type 0 = Dehumidification independent from Cooling 1 = Cooling priority over Dehumidification (factory setting)	flag	0 ... 1	0
CHF	USr/inS	Humidify-dehumidify out off time	s	0 ... 250	0
CHn	USr/inS	Humidify-dehumidify out on time	s	0 ... 250	0
CHt	inS	Humidity-temperature control type 0 = no temperature control (disabled) 1 = control minimum temperature 2 = control maximum temperature 3 = control both minimum temperature and maximum temperature	num	0 ... 3	0
dEH	inS	Humidity regulation during defrost 0 = disabled 1 = enabled	flag	0 ... 1	0
CHd	USr/inS	Humidity control enable differential	°C/°F	0 ... 30,0	0
CHL	USr/inS	Minimum temperature to enable humidity control	°C/°F	-58,0 ... 302,0	-58.0
CHH	USr/inS	Maximum temperature to enable humidity control	°C/°F	-58,0 ... 302,0	302.0
dbH	USr/inS	Humidity intervention semi-band	%RH	0 ... 50	50
dFH	USr/inS	Differential of humidity set point	%RH	0 ... 50	10
SEH	USr/inS	Humidity setpoint	%RH	0 ... 100	50.0
PbH	inS	Humidity control probe selection 0 = Probe disabled 1 = Probe enabled	num	0 ... 1	1
FCH	inS	Fans behavior in case of humidity control 0 = Evaporator fan ON/OFF according to FCO parameter considering only compressor output 1 = Evaporator fan ON/OFF according to FCO parameter considering compressor, humidify, dehumidify, dehumidify with resistor out	num	0 ... 1	0
		DEFROST parameters (dEF)			
dty	USr/inS	Defrost mode 0 = electric defrost (defrost cycle OFF), or compressor not running during defrost. NOTE: electric defrost + air defrost, in the case of fans connected in parallel to the defrost output relay 1 = cycle inversion defrost (hot gas, or compressor on during defrost;) 2 = “free” mode defrost (independent of compressor)	num	0...2	0
dit	USr/inS	Interval between defrost cycles Time interval between the start of two consecutive defrost cycles. 0 = function disabled (defrost is NEVER activated). See dt1 for UM.	hrs/ min/s	0...255	6 hours
dt1	inS	Unit of measure for defrost intervals (parameter dit). 0 = parameter dit in hours 1 = parameter dit in minutes 2 = parameter dit in seconds	num	0...2	0
dt2	inS	Unit of measure for duration of defrost (parameter dEt/dE2). 0 = parameter dEt/dE2 in hours 1 = parameter dEt/dE2 in minutes 2 = parameter dEt/dE2 in seconds.	num	0...2	1
dCt	USr/inS	Defrost interval count mode 0 = compressor running time (DIGIFROST® method); defrost active ONLY when compressor is on. N.B.: compressor running time is counted separately from the evaporator probe (count active even if the evaporator probe absent or error). 1 = device running hours; defrost count is always active when machine is on and starts at each power-up. 2 = compressor stop. Every time the compressor stops, a defrost cycle is run depending on parameter dty; 3 = RTC. Defrost at specific times set by parameters dE1...dE8, F1...F8	num	0...3	1

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
dOH	USr/inS	Defrost cycle enabling delay from request Delay preceding start of first defrost after call.	min	0...59	0
dEt	USr/inS	Defrost timeout Determines the maximum defrost time on Evaporator 1. See dt2 for UM.	hrs/ min/s	1...255	30
dSt	USr/inS	Defrost end temperature Defrost 1 end temperature (determined by evaporator probe 1).	°C/°F	-58.0...302.0	6.0
dS2	inS	Evaporator 2 defrost end temperature Determines the maximum defrost time on Evaporator 2	°C/°F	-58.0...302.0	8.0
dE2	inS	Evaporator 2 maximum defrost duration Determines the maximum defrost time on Evaporator 2. See dt2 for UM.	hrs/ min/s	1...255	30
dPO	inS	Defrost enabling request from power-on Determines whether the instrument must enter defrost mode at power-on (provided that the temperature measured at the evaporator will allow defrost). n = no, does not start defrosting at power-on; y = yes, starts defrost at power-on	flag	n/y	n
tcd	inS	Compressor output activation/deactivation time before a defrost Minimum time that must elapse with the compressor ON or OFF before defrost is activated.	min	-31...31	0
Cod	inS	Time preceding a defrost, during which the compressor output is not activated	min	0...60	0
Parameters dE1...dE8 / F1...F8 **NOTE: do not confuse parameters dE1...dE8 with values d0 …d7 in folder nAd, used for the Day/Night regulator.**					
dE1...dE8 F1...F8		Parameters for setting the time of single defrosts • daily (dE1…dE8) • daily “weekends/public holidays” (F1...F8), used by the Day/Night regulator. The parameters will only be displayed if: • dit = 0 • dCt = 3 (Real time clock) • H48 = y (rtc option declared present) • the device has been switched off and on again after the above parameters have been set.			
dE1...dE8		Setting the time for defrosts on weekdays If parameter dit (defrosting interval) = 0, dCt = 3 and the rtC option is (declared) present, then parameters dE1...dE8 allow you to set the hours and minutes. Only on the basis of these values will a defrost cycle begin. If you do not wish to use some of the defrost times (dE1...dE8), exclude them as explained below: Select the parameter (dE1...dE8) that you want to exclude, then increase the value until 24 appears on the display, indicating that the parameter has been excluded. Bear in mind that the times do not have to be set in exact chronological order, for example: dE1 = h 12.25 dE2 = h 06.05 dE3 = h 18.30 …	hours/ mins	The parameter is then split into dEn_H (hours), dEn_m (minutes), n=1…8	
F1...F8		Setting the time for defrosts on weekends/public holidays If parameter dit (defrosting interval) is dit = 0, dCt = 3 and the RTC option is declared present, then parameters F1...F8 allow you to set the hours and minutes. Only on the basis of these values will a defrost cycle begin. If you do not wish to use some of the defrost times (F1...F8), exclude them as explained below: Select the parameter (F1...F8) that you want to exclude, then increase the value until 59 appears on the display, indicating that the parameter has been excluded. Bear in mind that the times do not have to be set in exact chronological order, for example: • F1 = h 12.25 • F2 = h 06.05 • F3 = h 18.30	hours/ mins	The parameter is then split into Fn_H (hours), Fn_m (minutes), n=1…8	
dE1H	USr/inS	Start time weekday defrost 1. 0...23 = start hour; 24 = disabled.	hours	0...24	0

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
dE1m	USr/inS	Start time minutes weekday defrost 1.	min	0...59	0
dE2H	USr/inS	2nd workday defrost start hour. d1H...23 = start hour; 24 = disabled.	hours	0...24	0
dE2m	USr/inS	2nd workday defrost start minutes.	min	0...59	0
dE3H	USr/inS	3rd workday defrost start hour. d2H...23 = start hour; 24 = disabled.	hours	0...24	0
dE3m	USr/inS	3rd workday defrost start minutes.	min	0...59	0
dE4H	USr/inS	4th workday defrost start hour. d3H...23 = start hour; 24 = disabled.	hours	0...24	0
dE4m	USr/inS	4th workday defrost start minutes.	min	0...59	0
dE5H	USr/inS	5th workday defrost start hour. d4H...23 = start hour; 24 = disabled.	hours	0...24	0
dE5m	USr/inS	5th workday defrost start minutes.	min	0...59	0
dE6H	USr/inS	6th workday defrost start hour. d5H...23 = start hour; 24 = disabled.	hours	0...24	0
dE6m	USr/inS	6th workday defrost start minutes.	min	0...59	0
dE7H	USr/inS	7th workday defrost start hour. d4H...23 = start hour; 24 = disabled.	hours	0...24	0
dE7m	USr/inS	7th workday defrost start minutes.	min	0...59	0
dE8H	USr/inS	8th workday defrost start hours. d5H...23 = start hour; 24 = disabled.	hours	0...24	0
dE8m	USr/inS	8th workday defrost start minutes.	min	0...59	0
F1H	USr/inS	1st weekend/public holiday defrost start hour. 0...23 = start hour; 24 = disabled.	hours	0...24	0
F1m	USr/inS	1st weekend/public holiday defrost start minutes.	min	0...59	0
F2H	USr/inS	2nd weekend/public holiday defrost start hour. F1H...23 = start hour; 24 = disabled.	hours	0...24	0
F2m	USr/inS	2nd weekend/public holiday defrost start minutes.	min	0...59	0
F3H	USr/inS	3rd weekend/public holiday defrost start hour. F2H...23 = start hour; 24 = disabled.	hours	0...24	0
F3m	USr/inS	3rd weekend/public holiday defrost start minutes.	min	0...59	0
F4H	USr/inS	4th weekend/public holiday defrost start hour. F3H...23 = start hour; 24 = disabled.	hours	0...24	0
F4m	USr/inS	4th weekend/public holiday defrost start minutes.	min	0...59	0
F5H	USr/inS	5th weekend/public holiday defrost start hour. F4H...23 = start hour; 24 = disabled.	hours	0...24	0
F5m	USr/inS	5th weekend/public holiday defrost start minutes.	min	0...59	0
F6H	USr/inS	6th weekend/public holiday defrost start hour. F5H...23 = start hour; 24 = disabled.	hours	0...24	0
F6m	USr/inS	6th weekend/public holiday defrost start minutes.	min	0...59	0
F7H	USr/inS	7th weekend/public holiday defrost start hour. F5H...23 = start hour; 24 = disabled.	hours	0...24	0
F7m	USr/inS	7th weekend/public holiday defrost start minutes.	min	0...59	0
F8H	USr/inS	8th weekend/public holiday defrost start hour. F5H...23 = start hour; 24 = disabled.	hours	0...24	0
F8m	USr/inS	8th weekend/public holiday defrost start minutes.	min	0...59	0
FAN parameters (FAn)					
FPt	inS	FSt parameter management mode. 0 = absolute value; 1 = relative value	flag	0/1	0
FSt	USr/inS	Fans lockout temperature; if the value read is greater than FSt, the fans will be stopped. The value may be positive or negative	°C/°F	-58.0...302	6.0
Fot	inS	Fan start temperature. If the temperature read by the evaporator probe is lower than the set value, the fans remain off.	°C/°F	-58.0...302	-50.0
FAd	inS	Fans activation differential	°C/°F	0.1...25.0	1.0
Fdt	inS	Fans activation delay after a defrost cycle	min	0...255	0
dt	USr/inS	dripping time. Dripping time.	min	0...255	0
dFd	USr/inS	Operating mode of evaporator fans during defrost. n (0) = no (depending on the FCO parameter); y (1) = yes (fan off).	flag	n/y	y

<table>
<tr><th>PAR.</th><th>LEV.</th><th>DESCRIPTION</th><th>U.M.</th><th>RANGE</th><th>DEFAULT</th></tr>
<tr><td>FCO</td><td>inS</td><td>Evaporator fans operating mode. The status of the fans will be:
<table>
<tr><th>FCO</th><th>COMPRESSOR ON</th><th>COMPRESSOR OFF</th><th>Notes</th></tr>
<tr><td>0</td><td>Thermostat controlled</td><td>OFF</td><td>-</td></tr>
<tr><td>1</td><td>Thermostat controlled</td><td>Thermostat controlled</td><td>-</td></tr>
<tr><td>2</td><td>Thermostat controlled</td><td>Thermostat controlled</td><td>-</td></tr>
<tr><td>3</td><td>Thermostat controlled</td><td>duty-cycle</td><td>controlled via parameters FOn and FOF</td></tr>
<tr><td>4</td><td>Thermostat controlled</td><td>duty-cycle</td><td>controlled via parameters FOn and FOF</td></tr>
</table></td><td>num</td><td>0...4</td><td>1</td></tr>
<tr><td>FdC</td><td>inS</td><td>Evaporator fans switch-off delay after compressor deactivation.</td><td>min</td><td>0...255</td><td>0</td></tr>
<tr><td>FOn</td><td>inS</td><td>Time fans remain ON during daytime duty-cycle. Fans used in duty-cycle mode; applies to FCO = 3,4 (duty-cycle)</td><td>min</td><td>0...255</td><td>0</td></tr>
<tr><td>FOF</td><td>inS</td><td>Time fans remain OFF during daytime duty-cycle. Fans used in duty-cycle mode; applies to FCO = dc</td><td>min</td><td>0...255</td><td>0</td></tr>
<tr><td>SCF</td><td>inS</td><td>Condenser Fans
Condenser fans activation Setpoint</td><td>°C/°F</td><td>-50.0…150.0</td><td>10.0</td></tr>
<tr><td>dCF</td><td>inS</td><td>Condenser fans activation differential</td><td>°C/°F</td><td>-30.0…30.0</td><td>2.0</td></tr>
<tr><td>tCF</td><td>inS</td><td>Condenser fans switch-on delay after defrost</td><td>min</td><td>0...59</td><td>0</td></tr>
<tr><td>dCd</td><td>inS</td><td>Exclusion of condenser fans during defrost
n (0)= fans running during defrost; y (1) = fans excluded;</td><td>flag</td><td>n/y</td><td>n</td></tr>
<tr><td></td><td></td><td colspan="4">FAN parameters (FAn) - HUMIDITY parameters</td></tr>
<tr><td>HuL</td><td>USr/inS</td><td>Humidity level selection
0 = disabled
1 = Humidity level “1”
2 = Humidity level “2”
3 = Humidity level “3”</td><td>num</td><td>0 ... 3</td><td>0</td></tr>
<tr><td>Hu1</td><td>USr/inS</td><td>Evaporator fans on time humidity level 1</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>Hu2</td><td>USr/inS</td><td>Evaporator fans off time humidity level 1</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>Hu3</td><td>USr/inS</td><td>Evaporator fans on time humidity level 2</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>Hu4</td><td>USr/inS</td><td>Evaporator fans off time humidity level 2</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>Hu5</td><td>USr/inS</td><td>Evaporator fans on time humidity level 3</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>Hu6</td><td>USr/inS</td><td>Evaporator fans off time humidity level 3</td><td>s</td><td>0 ... 250</td><td>0</td></tr>
<tr><td>SFd</td><td>inS</td><td>Temperature delta for fan stratification</td><td>num</td><td>0 ... 3200</td><td>0</td></tr>
<tr><td>diS</td><td>inS</td><td>Temperature differential for fan stratification</td><td>num</td><td>0 ... 3200</td><td>0</td></tr>
<tr><td>SOn</td><td>inS</td><td>ON time for fan stratification regulator output</td><td>num</td><td>0 ... 65535</td><td>0</td></tr>
<tr><td>SOF</td><td>inS</td><td>OFF time for fan stratification regulator output</td><td>num</td><td>0 ... 65535</td><td>0</td></tr>
<tr><td>CA4</td><td>inS</td><td>Analog input 4 calibration</td><td>°C/°F</td><td>-30,0 ... 30,0</td><td>0</td></tr>
<tr><td></td><td></td><td colspan="4">ALARMS parameters (ALr)</td></tr>
<tr><td>Att</td><td>inS</td><td>Parameters HAL and LAL mode intended as the absolute temperature value or differential in relation to the Setpoint.
(0) = absolute value
(1) = relative value
NOTE: In case of relative values (par. Att=1), the HAL parameter should be set to positive values, while the LAL parameter should be set to negative values (-LAL).</td><td>flag</td><td>0/1</td><td>0</td></tr>
<tr><td>AFd</td><td>inS</td><td>Alarms cut-in differential.</td><td>°C/°F</td><td>0.1...25.0</td><td>1.0</td></tr>
<tr><td>HAL</td><td>USr/inS</td><td>Probe 1 maximum alarm. Temperature value (intended either as distance from setpoint or as an absolute value based on Att) above which the probe will trigger activation of the alarm signal.</td><td>°C/°F</td><td>LA1...302</td><td>50.0</td></tr>
<tr><td>LAL</td><td>USr/inS</td><td>Probe 1 minimum alarm. Temperature value (intended as distance from setpoint or as an absolute value based on Att) under which the probe will trigger activation of the alarm signal.</td><td>°C/°F</td><td>-58.0...HA1</td><td>-50.0</td></tr>
<tr><td>PAO</td><td>USr/inS</td><td>Alarm exclusion time after device is switched on following a power failure.
This parameter refers to high/low temperature alarms LAL and HAL only</td><td>hours</td><td>0...10</td><td>3</td></tr>
<tr><td>dAO</td><td>USr/inS</td><td>Temperature alarm exclusion time after defrost.</td><td>min</td><td>0...255</td><td>60</td></tr>
</table>

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
OAO	inS	Alarm indication delay (high and low temperature) following deactivation of digital input (port closed).	hours	0...10	1
tdO	inS	Door open alarm activation delay.	min	0...255	10
tAO	USr/inS	Delay preceding temperature alarm signal. This parameter refers to high/low temperature alarms LAL and HAL only	min	0...255	0
dAt	inS	Alarm indicating end of defrost as a result of timeout. n (0) = alarm is not triggered y (1) = triggers the alarm.	flag	n/y	n
rLO	inS	Regulators inhibited by external alarm. 0 = does not inhibit any resource 1 = compressor and defrost blocked 2 = compressor, defrost and fans blocked	num	0/1/2	0
AOP	inS	Alarm output polarity: 0 = alarm active and output disabled 1 = alarm active and output enabled	flag	0...1	1
PbA	inS	Configuration of temperature alarm on probe 1 and/or 3: 0 = on probe 1 (cold room) 1 = on probe 3 (display) 2 = on probes 1 and 3 (cold room and display) 3 = on probes 1 and 3 (cold room and display) with external threshold	num	0...3	0
SA3	inS	Probe 3 alarm set point	°C/°F	-58.0...302.0	0.0
dA3	inS	Probe 3 alarm differential	°C/°F	-300...300	2.0
tA3	inS	Delay time for alarm signal on probe 3	min	0...59	0
ArE	inS	Enables alarm relay in the event of probe 3-related alarms: 0 = does not enable alarms in the event of alarms/errors on probe 3 1 = enables the alarm relay in the event of alarms/errors on all probes 2 = enables the alarm relay ONLY in the event of alarms/errors on probe 3	num	0...2	0
Art	inS	Regulator alarm type. 0 = regulation of temperature alarms disabled with door open; 1 = temperature alarms enabled with door open.	num	0...1	0
ALL	inS	Leak alarm low threshold WARNING Threshold	num	0 ... 65000	0
ALh	inS	Leak alarm high threshold DANGER Threshold	num	0 ... 65000	0
AL1	inS	Probe remains above the low threshold for leak alarm activation WARNING alarm delay for Leak Detection	s	0 ... 65000	0
AL2	inS	Probe remains above the high threshold for leak alarm activation DANGER alarm delay for Leak Detection	s	0 ... 65000	0
		LIGHTS & DIGITAL INPUTS parameters (Lit)			
dSd	inS	Light relay / door switch interlock. dd2 n (0) = door opening does not switch on the light; y (1) = door opening switches on the light (if it was off).	flag	n/y	y
dLt	inS	Delay preceding deactivation (switch-off) of light relay (interior light). The interior light remains on for dLt minutes when the door is closed if parameter dSd is set to 'yes'.	min	0...31	0
OFL	inS	Light relay always deactivated by light key. Enables switching off with cold room light switch even if the delay after closing the door set by dLt is enabled. n (0) = no y (1) = yes.	flag	n/y	y
dOd	inS	Enable utility switch-off on activation of door switch. 0 = disabled 1 = disable fans 2 = disable compressor 3 = disable fans and compressor	num	0...3	1
dAd	inS	Activation delay for digital inputs DI1, DI2	min	0...255	0
di3	inS	Activation delay for digital inputs DI3	min	0...255	0

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
dOA	inS	Forced action of digital input (if PEA ≠ 0): 0 = activate compressor 1 = activate fans 2 = activate compressor and fans 3 = disable compressor 4 = disable fans 5 = disable compressor and fans	num	0...5	0
PEA	inS	Selection of digital input configured to inhibit/enable resources. 0 = function disabled 1 = associated with door switch 2 = associated with external alarm 3 = associated with external alarm and door switch	num	0...3	0
dCO	inS	Compressor activation/deactivation delay when enabled.	min	0...255	0
dOC	inS	Compressor switch-off delay from acknowledgement.	min	0...255	0
dFO	inS	Fan activation/deactivation delay when enabled.	min	0...255	0
PEn	inS	Number of errors allowed per pressure switch input. 0= disabled.	num	0...15	15
PEi	inS	Pressure switch error count interval.	min	1...99	99
O1i	inS	Activation delay for digital inputs DI1. Only if dAd = 0.	min	0...250	0
O2i	inS	Activation delay for digital inputs DI2. Only if dAd = 0.	min	0...250	0
NIGHT AND DAY (nAd) parameters					
If the Night & Day regulator is enabled (via key or DI), both weekday and weekend defrost management is active (see parameters dE1…dE8, F1…F8): parameter E3 can be used for every day to establish which defrosts to activate. If the Night & Day regulator has not been enabled, only weekday defrosts dE1...dE8 will be run Folder consisting of 7 sub-folders: d0, d1, d2, d3, d4, d5, d6 and d7(°), each of which contain the following parameters. (°) NOTE: it is advisable to consider the first day d0 as SUNDAY. 'd7' can be used to program daily events which are valid for all days					
E0		Functions enabled during events. 0 = events management disabled 1 = enable reduced setpoint 2 = enable reduced set+light 3 = enable reduced set+light+aux 4 = enable stand-by 5 = enable reduced setpoint*. 6 = enable reduced set+light*. 7 = enable reduced set+light+aux*. 8 = enable stand-by*. * disables the buzzer; the alarms and alarm relay continue to run as per the programming			
E1		Start of event hours/minutes. Sets event start time based on the value of E0. The "NIGHT" mode begins at this time. The duration is determined by parameter E2 In hours and minutes (in the parameter table, the parameter is split into E1_h (hours), E1_min (minutes))			
E2		Duration of event. Sets the duration of the event starting as programmed in E1, based on the value of E0 In hours			
E3		Enable defrost weekdays or weekends: 0 = "weekdays" defrost sequence defined by parameters dE1...dE8. 1 = "weekends/holidays" defrost sequence defined by parameters F1…F8. NOTE: This regulator can be enabled by key (see para. H32...H37=11) or by Digital Input (see para. ...H11...H12=16) Note: for the daily event 'd7', this parameter is ignored (it is not possible to manage defrosts)			
d0_E0	inS	Enable functions during events day 1 (SUNDAY)	num	0...8	0
d0_E1_h	inS	Event start time (hours) day 1	hours	0...23	0
d0_E1_min	inS	Event start time (minutes) day 1	min	0...59	0
d0_E2	inS	Event duration day 1	hours	0...72	0
d0_E3	inS	Enable defrost weekdays or weekends day 1	flag	0...1	0
d1_E0	inS	Enable functions during events day 2	num	0...8	0
d1_E1_h	inS	Event start time (hours) day 2	hours	0...23	0
d1_E1_min	inS	Event start time (minutes) day 2	min	0...59	0
d1_E2	inS	Event duration day 2	hours	0...72	0
d1_E3	inS	Enable defrost weekdays or weekends day 2	flag	0...1	0
d2_E0	inS	Enable functions during events day 3	num	0...8	0
d2_E1_h	inS	Event start time (hours) day 3	hours	0...23	0
d2_E1_min	inS	Event start time (minutes) day 3	min	0...59	0
d2_E2	inS	Event duration day 3	hours	0...72	0

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
d2_E3	inS	Enable defrost weekdays or weekends day 3	flag	0...1	0
d3_E0	inS	Enable functions during events day 4	num	0...8	0
d3_E1_h	inS	Event start time (hours) day 4	hours	0...23	0
d3_E1_min	inS	Event start time (minutes) day 4	min	0...59	0
d3_E2	inS	Event duration day 4	hours	0...72	0
d3_E3	inS	Enable defrost weekdays or weekends day 4	flag	0...1	0
d4_E0	inS	Enable functions during events day 5	num	0...8	0
d4_E1_h	inS	Event start time (hours) day 5	hours	0...23	0
d4_E1_min	inS	Event start time (minutes) day 5	min	0...59	0
d4_E2	inS	Event duration day 5	hours	0...72	0
d4_E3	inS	Enable defrost weekdays or weekends day 5	flag	0...1	0
d5_E0	inS	Enable functions during events day 6	num	0...8	0
d5_E1_h	inS	Event start time (hours) day 6	hours	0...23	0
d5_E1_min	inS	Event start time (minutes) day 6	min	0...59	0
d5_E2	inS	Event duration day 6	hours	0...72	0
d5_E3	inS	Enable defrost weekdays or weekends day 6	flag	0...1	0
d6_E0	inS	Enable functions during events day 7 (SATURDAY)	num	0...8	0
d6_E1_h	inS	Event start time (hours) day 7	hours	0...23	0
d6_E1_min	inS	Event start time (minutes) day 7	min	0...59	0
d6_E2	inS	Event duration day 7	hours	0...72	0
d6_E3	inS	Enable defrost weekdays or weekends day 7	flag	0...1	0
d7_E0	inS	Enable functions during daily event (EVERY DAY)	num	0...8	0
d7_E1_h	inS	Daily event start time (EVERY DAY)	hours	0...23	0
d7_E1_min	inS	Daily event start time (minutes) (EVERY DAY)	min	0...59	0
d7_E2	inS	Daily event duration (EVERY DAY)	hours	0...72	0
d7_E3	inS	Enable daily defrost weekdays or weekends (EVERY DAY)	flag	0...1	0
		COMMUNICATION parameters (Add)			
PtS	inS	Protocol selection. t (0) = Televis d (1) = ModBUS	flag	t d	d (msk 888)
dEA	inS	Device address: indicates the device address to the management protocol.	num	0...14	0
FAA	inS	Family address: indicates the device family to the management protocol.	num	0...14	0
Adr	inS	ModBUS protocol controller address (only if PtS = d).	num	1...250	1
Pty	inS	Set the ModBUS parity bit (only if PtS = d). n (0) = none E (1) = parity o (2) = disparity	num	n E o	E (msk 888)
StP	inS	ModBUS stop bit: 1b=1 bit; 2b=2 bit	num	1b - 2b	1b
bAU	inS	Baudrate selection. 96 (0) = 9600 192 (1) = 19200 384 (2) = 38400	num	96 192 384	96
E2E	inS	Serial 1 write enable E2E = n → Read-only access. E2E = y → Read/write access.	flag	n/y	y
SEE	inS	Serial 1 enable SEE = n → Serial port disabled. SEE = y → Serial port enabled. Refer to “3.1. Serial Communication” page 15	flag	n/y	n
		DISPLAY parameters (diS)			
LOC	USr/inS	LOCk. Setpoint edit lock. The parameter programming menu can still be accessed, and the settings changed, which means also that the status of this parameter can be changed so as to unlock the keypad. n (0) = no y (1) = yes.	flag	n/y	n

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
PA1	USr/inS	PAssword 1. When enabled (PA1 ≠ 0) this password provides access to level1 parameters (User).	num	0...255	0
PA2	inS	PAssword 2. When enabled (PA2 ≠ 0), this password provides access to level2 parameters (Installer).	num	0...255	15
PA3	inS	PAssword 3. When enabled (PA3 ≠ 0), this is the access key used to clear HACCP alarms in the Functions menu.	num	0...255	0
ndt	USr/inS	Display values with decimal point. n (0) = no (integers only) y (1) = yes (display with decimal point).	flag	n/y	y
CA1	inS	Calibration of probe Pb1. Positive or negative temperature value added to the value read by Pb1. This sum is used for both temperature display and temperature regulation purposes.	°C/°F	-30.0...30.0	0.0
CA2	inS	Calibration of probe Pb2. Positive or negative temperature value added to the value read by Pb2. This sum is used for both temperature display and temperature regulation purposes.	°C/°F	-30.0...30.0	0.0
CA3	inS	Calibration of probe Pb3. Positive or negative temperature value added to the value read by Pb3. This sum is used for both temperature display and temperature regulation purposes.	°C/°F	-30.0...30.0	0.0
CA	inS	Offset activation on display, thermoregulation or both: 0 = only the temperature shown is modified 1 = only the temperature used by the regulators is modified; the display remains unchanged. 2 = temperature displayed is modified, which is also the one used by the regulators.	num	0/1/2	2
LdL	inS	Minimum value that can be displayed by the device.	°C/°F	-58.0...HdL	-50.0
HdL	inS	Maximum value that can be displayed by the device.	°C/°F	LdL...302	140.0
ddL	inS	Display mode during defrost. 0 = displays the temperature read by probe 1 = locks the reading at the temperature value registering via the probe when the defrost cycle starts and until the next time the SEt is reached 2 = displays label dEF during defrosts and until the SEt is reached (or until Ldd elapses)	num	0/1/2	1
Ldd	inS	Timeout value for display unlock - label dEF.	min	0...255	0
dro	inS	Selection of °C or °F to display the probe value. 0= °C, 1= °F. NOTE: switching between °C and °F or vice-versa DOES NOT modify the setpoint, differential, etc. (for example setpoint = 10°C becomes 10°F).	flag	0/1	0
ddd	inS	Selects the type of value to show in the display. 0 = Setpoint 1 = probe Pb1 will be used 2 = probe Pb2 will be used 3 = probe Pb3 will be used	num	0...3	1
dd2	inS	Selects the type of value to show in the display 2 0 = Setpoint 1 = RTC 2 = 4...20 mA Probe (either %RH or ppm)	num	0/1/2	1
HACCP ALARM parameters (HAC)					
SHi	inS	“Instant” maximum HACCP alarm indication threshold: when the temperature value read by the temperature control probe goes beyond the range set in “SHi”, an HACCP alarm is immediately triggered, with the icon/(alarm relay) coming on according to parameter H50 (see specific section).	°C/°F	SHH...150.0	35.0
SLi	inS	The differential when returning from the alarm condition is fixed at 0.1°C/°F. “Instant” minimum HACCP alarm indication threshold: when the temperature value read by the temperature control probe goes beyond the range set in “SLi”, an HACCP alarm is immediately triggered, with the icon/(alarm relay) coming on according to parameter H50 (see specific section). The differential when returning from the alarm condition is fixed at 0.1°C/°F.	°C/°F	-50.0...SLH	-35.0

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
SHH	inS	Maximum HACCP alarm indication threshold: when the temperature value displayed by the temperature control probe is outside the range set by the value of “SHH” for longer than the time set in parameter “drA”, an HACCP alarm is triggered, with the icon/(alarm relay) coming on according to parameter H50 (see specific section). The differential when returning from the alarm condition is fixed at 0.1°C/°F.	°C/°F	SLH...150.0	30.0
SLH	inS	Minimum HACCP alarm indication threshold: when the displayed temperature value of the temperature control probe is outside the range set by the value of “SLH” for longer than the time set in parameter “drA”, an HACCP alarm is triggered, with the icon/(alarm relay) coming on according to parameter H50 (see specific section). The differential when returning from the alarm condition is fixed at 0.1°C/°F.	°C/°F	-50.0...SHH	-30.0
drA	inS	Minimum dwelling time in critical area for the event to be recorded: one this time has elapsed it is saved and an HACCP alarm generated.	min	0...99	10
drH	inS	HACCP alarm reset time from last reset: this is the time that must pass once the instrument has been switched on before any recorded alarms are cleared automatically. If the parameter is set to 0, automatic reset is inhibited and only manual reset is enabled.	hours	0...255	0
H50	inS	Enable HACCP alarms storage with or without alarm relay enabling: NOTE: SWITCH THE INSTRUMENT OFF AND ON AGAIN AFTER MODIFYING PARAMETER H50 • 0 = HACCP alarms disabled • 1 = HACCP alarms enabled and alarm relay NOT enabled • 2 = HACCP alarms enabled and alarm relay enabled	num	0...2	0
H51	inS	HACCP alarms storage disabling time (key or DI) In minutes	min	0...255	0
H52	inS	Probe enabled to signal HACCP alarms: 1=probe 1; 3=probe 3;	flag	1/3	1
CONFIGURATION parameters (CnF) **If one or more parameters in the directory are changed, the controller MUST be turned off and then back on.**					
H00	inS	Selection of type of probe used (Pb1...Pb3). (0) = PTC (1) = NTC	num	0/1	1
H01	inS	Enable deep cooling function n (0) = not enabled; y (1) =enabled.	flag	n/y	n
H02	inS	Activation time for keypad functions	s	0...15	3
H06	inS	Key or digital input configured as AUX/LIGHT on with device in stand-by n (0)=not active; y (1)=active;	flag	n/y	y
H08	inS	Stand-by operating mode. 0 = the display is off and the regulators on, the device signals any alarms by reactivating the display. 1 = the display is on, plus all regulators including alarms 2 = the display is off, plus all regulators are locked including alarms 3 = the top display shows the label “OFF”, plus all regulators are locked including alarms	num	0/1/2/3	3

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
H11	inS	Configuration of digital input 1/polarity. NOTE: - The "+" sign indicates that the input is active when the contact is closed - The "−" sign indicates that the input is active when the contact is open 0 = disabled ± 1 = defrost ± 2 = Reduced set ± 3 = Auxiliary AUX ± 4 = Door microswitch ± 5 = external alarm ± 6 = Disable HACCP alarm logging ± 7 = Stand-by ± 8 = NOT USED ± 9 = Minimum pressure switch ±10 = Maximum pressure switch ±11 = General pressure switch ±12 = Preheat ±13 = Force evaporator fans ±14 = Activate light relay ±15 = Activate Frame Heater relay ±16 = Enable/disable Night And Day functions ±17 = Deep cooling cycle ±18 = Panic alarm ±19 = Reset HACCP alarms ±20 = Pressure switch Pump Down ±21 = Leak Detector ±22 = Start/Stop remote defrost	num	-22...+22	4
H12	inS	Configuration of 2/polarity digital input. Same as H11.	num	-22...+22	0
H21	inS	Configuration of digital output 1 (OUT 1) 0 = disabled 1 = Compressor (cooling) 2 = Defrost 3 = Fans 4 = Alarm 5 = AUX 6 = Stand-by 7 = Light 8 = Buzzer output 9 = Evaporator 2 10 = Compressor 2 11 = Frame Heater 12 = Condenser fans 13 = Compressor Pump Down 14 = Humidify 15 = Dehumidify 16 = Resistor Dehumidify 17 = LKDNext Warning 18 = LKDNext Danger 19 = Stratification Fan	num	0...19	1
H22	inS	Configuration of digital output 2 (OUT 2). Same as H21	num	0...19	2
H23	inS	Configuration of digital output 3 (OUT 3). Same as H21	num	0...19	3
H24	inS	Configuration of digital output 4 (OUT 4). Same as H21	num	0...19	7
H25	inS	Configuration of digital output 5 (OUT 5). Same as H21	num	0...19	14
H26	inS	Configuration of digital output 6 (OUT 6). Same as H21	num	0...19	15
H28	inS	Enable buzzer. (0) = output disabled (8) = output enabled	num	0...19	8
H32	inS	Configuration of DOWN key 0 = disabled 1 = defrost 2 = Auxiliary 3 = Activate reduced set 4 = Reset HACCP alarms 5 = Disable HACCP alarms 6 = Light 7 = Stand-by 8 = NOT USED 9 = Evaporator fans ON 10 = Activate / disable Frame Heater relay 11 = Enable/disable Night And Day functions 12 = deep cooling cycle 13 = Clear voltage drop errors (Reset Power Outage) 14 = Service stoppage 15 = Activate economy set + Night And Day	num	0...15	2
H33	inS	ESC key configuration. Same as H32.	num	0...15	1
H34	inS	ON/OFF key configuration. Same as H33.	num	0...15	7
H35	inS	LIGHT key configuration. Same as H34.	num	0...15	6
H41	inS	Presence of Cold Room probe Pb1 n= not present; y= present.	flag	n/y	y
H42	inS	Presence of Evaporator probe Pb2 n= not present; y= present.	flag	n/y	y

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
H43	inS	Presence of probe Pb3 n= not present; y= present; 2EP= second evaporator; 3-1= regulation on Pb1 or on Pb3-Pb1 differential	num	n/y/2EP/3-1	n
H44	inS	Setpoint for Pb3-Pb1 temperature differential. Sets the Pb3-Pb1 differential If H43=3-1, regulation of the temperature differential between probes Pb3 and Pb1, in addition to regulation of probe Pb1, is enabled. In this way, to activate compressor regulation, one or both of the two conditions must be met (on Pb1 or Pb3-Pb1 differential). The differential is defined by H44. To disable the compressor, both conditions must be met, so: • Output enabled if: Pb1>SET+diF, or (Pb3-Pb1) > H44+diF • Output not enabled if: Pb1<SET and (Pb3-Pb1) < H44	°C/°F	0...255	0.0
H45	inS	Start defrost mode for applications with double evaporator: 0 = Defrost is enabled by checking only that the temperature of evaporator 1 is lower than the value set in parameter dSt. 1 = Defrost is enabled, checking that the readings from at least one of the two probes is below its defrosting end temperature (dST for evaporator 1 and dS2 for evaporator 2) 2 = Defrost is enabled, checking that both probe values are below the corresponding defrost end setpoints (dSt for evaporator 1 and dS2 for evaporator 2).	num	0/1/2	0
H48	inS	Clock presence. (0) = no clock (1) = clock present.	flag	n/y	y
04P	inS	Analogue input prescaler 4 0 = The parameter values are multiplied x 1 1 = The parameter values are multiplied x 10	num	0 ... 1	1
04U	inS	Probe 4 measurement unit 0 = %RH 1 = ppm	num	0 ... 1	0
04d	inS	Leak alarm differential The Leak Alarm Differential is common to both the Warning and Danger alarm thresholds. Due to the limitation of the display to four digits, when the maximum expected probe value exceeds 9999, the configured parameter values must be interpreted with a ×10 scaling factor. To enable this scaling, parameter 04P shall be set to “1”. **Note** When ×10 scaling is active, all displayed values represent ten times the actual numerical value shown. **Example** A displayed value of 1000 corresponds to an actual concentration of 10’000 ppm.	num	0 ... 65000	0
04L	inS	Lower limit of analogue input	num	-999 ... 9999	0
04H	inS	Upper limit of analogue input	num	-999 ... 9999	1000
H60	inS	Display of selected application. 0 = no vector selected; 1 = vector 1, …, 6 = vector 6. It has a subset of parameters which can be programmed in line with the type of configuration required for the installation. By setting H60, the user can also select one of the six ‘sets’ of pre-programmed parameters. If you do not want to enable any of the available setpoints, but prefer to use the programming menu values, simply set parameter H60 to 0. The parameters corresponding to the different programs are described at the bottom of the table	num	0...6	0
rEL	inS	Firmware version release (for example 1,2,...). Read only. See Technical Support.	/	/	/
tAb	inS	Map code. Read only. See Technical Support.	/	/	/
FRAME HEATER parameters (FrH)					

PAR.	LEV.	DESCRIPTION	U.M.	RANGE	DEFAULT
		The Frame Heater function can be selected by key or by Digital Input This function can be associated to all relay outputs (by setting parameters H21...H25 = 11) and can be used to actuate “Duty-cycle” regulation with the intervals set by parameters HOn and HOF.			
HOn	inS	Frame Heater regulator output ON time	min	0...255	0
HOF	inS	Frame Heater regulator output OFF time	min	0...255	0
dt3	inS	Frame Heater regulator time standard unit of measurement: 0=hours; 1=minutes; 2=seconds	num	0...2	0
COPY CARD parameters (FPr)					
UL	-	Upload. To transfer programming parameters from instrument to UNICARD / Copy Card.	/	/	/
dL	-	Download. To transfer programming parameters from UNICARD / Copy Card to instrument.	/	/	/
Fr	-	Formatting. Deletes data on UNICARD / Copy Card. NOTE: If parameter “Fr” is used, the data entered will be permanently lost. This operation cannot be reversed.	/	/	/

9.3.1. Parameter H60

Display of selected application.
0=no vector selected; **1**= application 1, …, **6**= application 6.
It has a subset of parameters which can be programmed in line with the type of configuration required for the installation. By setting **H60**, the user can also select one of the six 'sets' of pre-programmed parameters. If you do not want to enable any of the available setpoints, but prefer to use the programming menu values, simply set parameter **H60** to 0.

The parameters corresponding to the different programs are described at the bottom of the table

	parameter H60	=1	=2	=3	=4	=5	=6
SEt	Regulation set point	0.0	2.0	-18.0	2.0	-18.0	5.0
diF	Differential of set point	2.0	2.0	2.0	2.0	2.0	2.0
LSE	Minimum value settable for set point	-50.0	-5.0	-25.0	-5.0	-25.0	2.0
HSE	Maximum value settable for set point	50.0	5.0	-15.0	5.0	-15.0	10.0
dSt	Defrost end temperature evaporator 1	6.0	10.0	15.0	10.0	15.0	10.0
FSt	Evaporator fans disabling temperature	6.0	8.0	-5.0	8.0	-5.0	50.0
dty	Type of defrost	0	1	1	0	0	0
dit	Interval between defrosts	6	6	6	6	6	6
dCt	Counting mode for defrost interval	1	1	1	1	1	1
dOH	Defrost cycle enabling delay from request	0	0	0	0	0	0
dEt	Max. duration defrost evaporator 1	30	15	15	30	30	15
Fdt	Evaporator fans delay after defrost cycle	3	1	2	1	2	0
dt	Dripping time	0	2	2	2	2	0
dPO	Defrost enabling request from Power On	0	0	0	0	0	0
ddL	Display blocking mode during defrost	1	0	0	0	0	0
dFd	Evaporator fans disabling during defrost time	1	1	1	1	1	1

10. ALARMS

10.1. ALARMS AND SIGNALS TABLE

When an alarm condition is detected, the ALARM icon will come on
If present and enabled, the buzzer and alarm relay will also activate.
To silence the buzzer, press and release any key, the relative icon will continue to flash.
All alarms are reset automatically (i.e. they disappear when the issue that caused them is removed).

The alarm codes are as follows:

Code	Description	Alarm relay	Reset	Parameters used to ENABLE ALARM
E1	Pb1 probe error	**active**	Automatic	Ont, OFt
E2	Pb2 probe error	**active**	Automatic	Ont, OFt
E3	Pb3 probe error	**active**	Automatic	Ont, OFt
E4	Pb4 probe error	**active**	Automatic	Ont, OFt
HA1	HIGH temperature alarm	**active**	Automatic	SP1, Att, AFd, HAL, LAL, PAO, dAO, OAO, tAO
LA1	LOW temperature alarm	**active**	Automatic	SP1, Att, AFd, HAL, LAL, PAO, dAO, OAO, tAO
EAL	External alarm	**active**	Automatic	PEA, rLO
OPd	Door open alarm	not active	Automatic	PEA, tdO
Ad2	Defrost end due to timeout	not active	Automatic	dEt, dE2, dAt
PAn	Panic alarm	not active	Automatic	
ALd	Leak detector alarm	not active	Automatic	
Prr	Preheat alarm	not active	Automatic	
E10	Clock alarm	not active	Automatic	
PA	General pressure switch alarm	not active	**Manual**	PEn, PEi
LPA	Low pressure switch alarm	not active	**Manual**	PEn, PEi
HPA	High pressure switch alarm	not active	**Manual**	PEn, PEi
ALL	Leak Warning Threshold	**active**	Automatic	ALL, AL1, 04d, 04U
ALH	Leak Danger Threshold	**active**	Automatic	ALH, AL2, 04d, 04U

NOTES:
1. If alarm exclusion times have been set (see “ALr” folder in the Parameters table) the alarm will not be indicated.
2. With the exception of faulty probe alarms, all other alarms will record the corresponding label in the ALr folder (press UP key)
3. Inoperable probe alarms will be indicated on the display by means of label E1, E2, E3, E4 depending on whether the fault relates to probe Pb1, Pb2, Pb3, Pb4 respectively
4. In the event of an overlap between the “Panic” alarm and the “Refrigerant leakage” alarm, priority is given to the “Panic Alarm” with its operating modes. Both alarm codes can in any case be viewed in the alarms folder.

10.2. ALARM CAUSE/EFFECT TABLE

EWHT 600 NT can run integral diagnostics on the installation, signalling any operating faults with specific alarms found, and record and signal any user-defined unusual events to have greater control over the system as a whole.

Label	Description	Cause	Effects	Remedy
E1	Probe Pb1 in error	• Measured values are outside operating range • probe errors/short-circuited/open	• Label E1 displayed • Alarm icon permanently alight	• Check probe type (H00) • Check probe wiring • Replace probe
E2	Probe Pb2 in error	• Measured values are outside operating range • probe errors/short-circuited/open	• Label E2 displayed • Alarm icon permanently alight	• Check probe type (H00) • Check probe wiring • Replace probe
E3	Probe Pb3 in error	• Measured values are outside operating range • probe errors/short-circuited/open	• Label E3 displayed • Alarm icon permanently alight	• Check probe type (H00) • Check probe wiring • Replace probe
E4	Probe Pb4 in error	• Measured values are outside operating range • probe errors/short-circuited/open	• Label E4 displayed • Alarm icon permanently alight	• Check probe type (H00) • Check probe wiring • Replace probe
HA1	HIGH temperature Temperature 1	value read by probe 1 > HA1 after time equal to tAO. (see "MAX/MIN TEMP. MAX/MIN)	• Label HA1 recorded in folder ALr • No effect on regulation	Wait until value read by the probe returns below HA1-AFd.
LA1	LOW temperature Temperature 1	Value read by probe 1 < LA1 after time equal to tAO. (see "MAX/MIN TEMP. MAX/MIN)	• Label LA1 recorded in folder ALr • No effect on regulation	Wait until value read by the probe returns above LA1+AFd.
HA3	HIGH temperature Temperature 3	with PbA = 1 or 2 Value read by probe Pb3> HAL after time equal to tAO. with PbA = 3 and dA3> 0 Value of probe Pb3> SA3 plus tA3 time	• Recording of label HA3 in folder ALr • No effect on regulation	Wait for value read by probe to return with PbA = 1 or 2 below threshold of HAL-AFd. with PbA = 3 and dA3> 0 below threshold of SA3-dA3.
LA3	LOW temperature Temperature 3	with PbA = 1 or 2 Value read by probe Pb3< LAL after time equal to tAO. with PbA = 3 and dA3< 0 Value of probe Pb3< SA3 plus tA3 time	• Recording of label LA3 in folder ALr • No effect on regulation	Wait for value read by probe to return with PbA = 1 or 2 above threshold of LAL-AFd. with PbA = 3 and dA3< 0 above threshold of SA3-dA3.
EAL	Alarm External	Digital input activated	• Label EAL recorded in folder ALr • Alarm icon permanently alight • Lockout of regulation as requested by rLO	Check and remove external cause of alarm on DI
OPd	Alarm Door Open	Digital input activated (for a time greater than tdO)	• Recording of label OPd in folder ALr • Alarm icon permanently alight • Lockout of regulation as requested by dOd	• Close the door • Delay preceding defined alarm signal by OAO.
Ad2	End Defrost due to timeout	end of defrost cycle due to timeout rather than due to defrost end temperature being read by Pb2.	• Recording of label Ad2 in folder ALr • Alarm icon permanently alight	Await next defrost cycle for automatic return to normal
Prr	Alarm Preheat	Alarm for preheat input regulator ON	• Label Prr recorded in folder ALr • Compressor icon flashing • Regulation inhibited (Compressor and Fans) NOTE: defrost will also be inhibited if it is hot gas defrost.	Preheat input regulator off
E10	Alarm Clock	• Clock faulty • Extended period without power	• Recording of label E10 in folder ALr • Functions associated with clock not managed	Connect the instrument to the power supply.

Label	Description	Cause	Effects	Remedy
P01 ... P99	Alarm general pressure switch	Pressure switch alarm activation by general pressure switch regulator.	If the number n of pressure switch activations is n<PEn: • Number of pressure switch activations recorded • Regulation inhibited (Compressor and Fans)	Check and remove external cause of alarm on DI (Automatic Reset).
PA	Alarm general pressure switch	Pressure switch alarm activation by general pressure switch regulator.	If the number n of pressure switch activations is n=PEn: • Label PA displayed • Recording of label PA in folder ALr • Alarm icon permanently alight • Regulation inhibited (Compressor and Fans)	• Switch the device off and back on again • Reset alarms using the rPA key (Manual Reset)
L01 ... L99	Alarm low pressure switch	Activation of pressure switch alarm by minimum pressure switch regulator.	If the number n of pressure switch activations is n<PEn: • Number of pressure switch activations recorded • Regulation inhibited (Compressor and Fans)	Check and remove external cause of alarm on DI (Automatic Reset).
LPA	Alarm minimum pressure switch	Activation of pressure switch alarm by minimum pressure switch regulator.	If the number n of pressure switch activations is n=PEn: • Label LPA displayed • Recording of label LPA in folder ALr • Alarm icon permanently alight • Regulation inhibited (Compressor and Fans)	• Switch the device off and back on again • Reset alarms using the rPA key (Manual Reset)
H01 ... H99	Alarm high pressure switch	Activation of pressure switch alarm by maximum pressure switch regulator.	If the number n of pressure switch activations is n<PEn: • Number of pressure switch activations recorded • Regulation inhibited (Compressor and Fans)	Check and remove external cause of alarm on DI (Automatic Reset).
HPA	Alarm maximum pressure switch	Activation of pressure switch alarm by maximum pressure switch regulator.	If the number n of pressure switch activations is n=PEn: • Label PHPA displayed • Recording of label HPA in folder ALr • Alarm icon permanently alight • Regulation inhibited (Compressor and Fans)	• Switch the device off and back on again • Reset alarms using the rPA key (Manual Reset)
PAn	Panic alarm	Activation of appropriately configured digital input	• Recording of PAn label in ALr folder • PANIC Alarm icon steadily on • Alarm icon steadily on • Temperature control is NOT inhibited when the alarm is active	Check and remove external cause of alarm on DI (Automatic Reset).
ALd	Alarm Refrigerant Leak	Activation of appropriately configured digital input	• Recording of ALd label in ALr folder • Panic Alarm icon flashing • Alarm icon steadily on • Intermittent buzzer sounding • Temperature control is NOT inhibited when the alarm is active	Check and remove external cause of alarm on DI (Automatic Reset).
ALL ALARMS • Alarm icon permanently alight • Buzzer (if present) and alarm relay (OUT5) activated, except Ad2 • Press any key to mute the alarm. The icon changes from steady to flashing. NOTE: the buzzer is deactivated while the alarm relay remains active *E1 - E2: If simultaneous they will be shown alternately on the display at a frequency of 2 seconds			REFRIGERANT LEAK ALARM (LEAK DETECTOR) • Flashing alarm icon and Alarm icon steadily on • Intermittent sounding of buzzer (if present) and alarm relay (OUT5) • Press any key to mute the alarm. In this case the Panic icon switches from flashing to steady while the alarm icon will flash.	

10.3. DESCRIPTION OF ALARMS

10.3.1. PROBE alarm

OPERATING CONDITIONS

When one of the probes is out of the nominal operating range or in the case of an open probe or a probe in short circuit, an alarm is generated if this condition persists for longer than 10 seconds.
The alarm condition is indicated on the display by means of the following error codes:

- **E1** = Pb1 probe error
- **E2** = Pb2 probe error
- **E3** = Pb3 probe error
- **E4** = Pb4 probe error

The alarm icon and alarm relay are activated. Codes **E1**, **E2**, **E3**, **E4** when occurring at the same time,are shown in the following sequence: E1 x 2 seconds, E2 x 2 seconds, E3 x 2 seconds, etc.

ACTIONS ON CURRENT REGULATION

For all probes, the probe error condition causes the following actions:

- the display shows code E**x** (where **x** = 1, 2, 3, 4)
- activation and permanent display of alarm icon and activation of alarm relay (if present)

When the faulty probe condition ceases, regulation resumes as normal.
During the probe error, the defrost interval count continues as normal.

SIGNALLING

Code	Meaning
E1	Probe Pb1 error
E2	Probe Pb2 error
E3	Probe Pb3 error
E4	Probe Pb4 error

ALARM ACKNOWLEDGEMENT

In the alarm condition, it is possible to acknowledge the alarm and/or relay configured as an alarm, even if the alarm condition persists, by pressing any key or using the corresponding function in the menu. The alarm icon will start to flash.
Eliminating the cause of the alarm disarms the acknowledgement.
The probe alarm error is not stored by the controller.

USER PARAMETERS

Label	Description
Ont	ON time for compressor output with control probe error
OFt	OFF time for compressor output with control probe error

10.3.2. MINIMUM AND MAXIMUM TEMPERATURE alarm

OPERATING CONDITIONS

The alarm regulation is carried out on probe 1. The temperature limits defined in parameters **HAL** and **LAL** are determined by parameter **Att** which specifies if they represent the absolute temperature value or a setpoint differential (in the case of offset on the entered setpoint, the high and low alarms will refer to this new control set point).

- If **Att**=0 **Ab(solute)** , the temperature limits for probe 1/3 are absolute.
- If **Att**=1 **rE(lative)** , the temperature limits for probe 1/3 refer to the Setpoint **SEt**

NOTE: to obtain the minimum alarm below the setpoint in the case of **Att**=1 (relative) set **LAL** < 0

ALARM CONDITIONS

A maximum/minimum alarm is generated when the Pb1 temperature is:

- Maximum alarm: ≥ **HAL** if **Att=Ab(solute)** and ≥ (**SEt + HAL**) if **Att=rE(lative)**
- Minimum alarm: ≤ **LAL** if **Att=Ab(solute)** and ≤ (**SEt + LAL**) if **Att=rE(lative)**

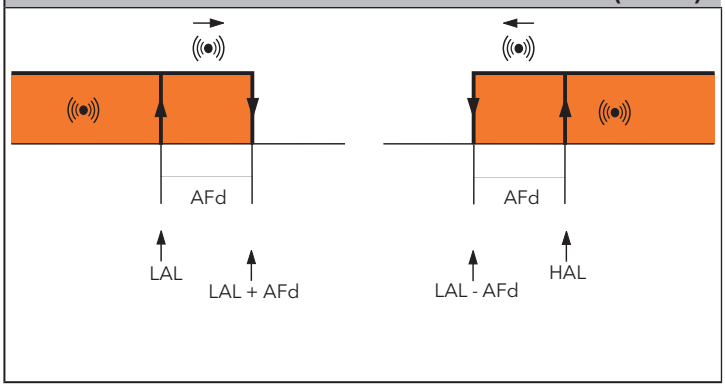
If**Att=Ab(solute)** the values of **HAL and LAL** must be with sign, if **Att=rE(lative)** it is necessary that **HAL > 0 and LAL < 0**.

When one of the two aforementioned conditions occurs, if no alarm override times apply (see alarm override parameters), the alarm icon lights up and the relay configured as alarm activates (if present).

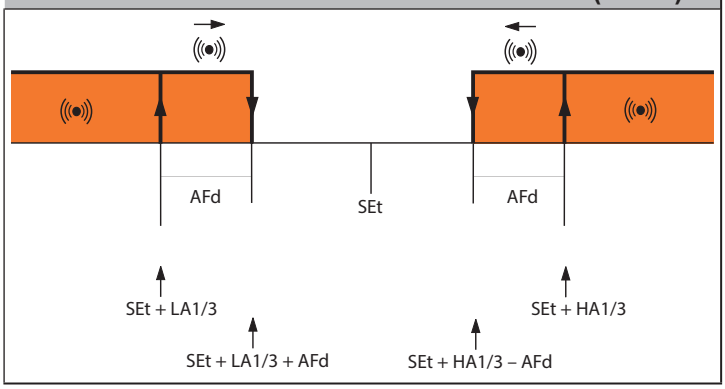
The maximum/minimum alarm will be reset when the temperature of probe 1/2 is:

- Reset from maximum alarm: ≤ (**HAL - AFd**) if **Att=Ab(solute)** and ≤ (**SEt + HAL - AFd**) if **Att=rE(lative)**
- Reset from minimum alarm: ≥ (**LAL + AFd**) if **Att=Ab(solute)** and ≥ (**SEt + LAL + AFd**) if **Att=rE(lative)**

TEMPERATURE AS AN ABSOLUTE VALUE (Att=0)



TEMPERATURE AS A RELATIVE VALUE (Att=1)



NOTES:

- During a defrost cycle, high and low temperature alarms are overridden.
- Occurrence of this alarm does not effect any regulation in progress.

SIGNALLING

Code	Meaning
HA1	HIGH temperature alarm, refers to probe
LA1	LOW temperature alarm, refers to probe

ALARM ACKNOWLEDGEMENT

In the alarm condition, it is possible to acknowledge the relay configured as an alarm (if present), even if the alarm condition persists, by pressing any key or using the corresponding function in the menu. The alarm icon will start to flash.
Eliminating the cause of the alarm disarms the acknowledgement.
The probe alarm error is not stored by the controller.

HIGH AND LOW TEMPERATURE ALARM OPERATION WITH DOOR OPEN

• If **Art = 0** (regulation of temperature alarms disabled with door open)

1. If the door is open and there is no temperature alarm, the alarms are inhibited and cannot be activated;
2. If the door is opened, the temperature alarm must continue;
3. If the temperature alarm is triggered and the door is open, the temperature alarm will cease when the reset conditions return.

• If **Art = 1** (temperature alarms enabled with door open)

1. If the door is open, the temperature alarms are not inhibited and can be activated if the required conditions are in place. The delay **OAO**, referred to the previous closing of the door, is not counted.
2. If a temperature alarm is triggered with the door closed, on opening the door the temperature alarm must continue.
3. If the temperature alarm is present with the door open, the temperature alarm will cease when the reset conditions return.

USER PARAMETERS

Label	Description
Att	HAL and LAL parameter mode (absolute or relative)
AFd	Alarm activation differential
HAL	Probe maximum alarm threshold
LAL	Probe minimum alarm threshold
PAO	Temperature alarm exclusion time from power-on
dAO	Temperature alarm disabling time after defrost cycle
OAO	High/low temperature alarm exclusion time after door closing
tAO	Temperature alarms delay time
Art	Regulator alarm type

10.3.3. END OF DEFROST DUE TO TIMEOUT alarm

OPERATING CONDITIONS

The regulator is activated without any delay in the case of end of defrost due to timeout, instead of probe 2 reaching the defrost end temperature.
The action consists of:

- alarm icon steadily on
- recording of Label **Ad2** in the alarms menu.

Automatic reset occurs with the start of the next defrost cycle.
The alarm icon can be switched off using the normal acknowledgement procedure, although the alarm signal is only actually cancelled at the start of the next defrost cycle.

SIGNALLING

Code	Meaning
Ad2	Defrost alarm on Pb2

USER PARAMETERS

Label	Description
dEt	Evaporator 1 defrost timeout
dE2	Defrost timeout evaporator 2
dAt	Alarm signalling end of defrost due to timeout

10.3.4. EXTERNAL alarm

OPERATING CONDITIONS

In the case of activation of the digital input, the alarm regulator is activated with the delay set by parameter **dAd**, and this alarm persists until the next time the digital input is deactivated.
The action consists of:

- alarm icon steadily on
- recording of Label **EAL** in the alarms menu.
- Activation of the relay configured as alarm (if enabled)
- deactivation of regulation if parameter **rLO** requires it.

It is possible to mute the alarm relay but the regulators still remain locked until the next time the digital input is deactivated.

The values that **rLO** can be assigned to parameter:

- **rLO = 0**: an external alarm has not locked any resource;
- **rLO = 1**: an external alarm has locked the compressor and defrost;
- **rLO = 2**: an external alarm has locked the compressor, defrost and the fans.

SIGNALLING

Code	Meaning
EAL	External alarm

USER PARAMETERS

Label	Description
rLO	An external alarm blocks the regulators

10.3.5. DOOR OPEN alarm

OPERATING CONDITIONS

The door switch alarm is associated to a specially configured digital input:

- **H11, H12 = ± 4**

On activation of the digital input (door open) and after delay **tdO** has elapsed, the door open alarm must be signalled in the alarms folder and the icon and alarm relay should come on. The label **OPd** is displayed.
The action consists of:

- alarm icon steadily on
- recording of Label **OPd** in the alarms menu.
- Activation of the relay configured as alarm

As in the case of the other alarms, the relay may be disabled by pressing an acknowledgement key, the alarm icon will flash and label **OPd** will remain in the alarms menu until the door is closed.
If the door is opened, the regulator will operate on the basis of the value of parameter **dOd**. The values that can be assigned to it are:

- **dOd = 0**: no resource is locked;
- **dOd = 1**: fans are locked (FAN);
- **dOd = 2**: the compressor is locked (COMPR);
- **dOd = 3**: both the fans (FAN) and compressor (COMPR) are locked

If the door open alarm locks the compressor, it can still be reactivated even if the door remains open, by setting the parameter **dCO**.

SIGNALLING

Code	Meaning
OPd	Door open alarm

USER PARAMETERS

Label	Description
dOd	Digital input for switching off loads: **0** = disabled; **1** = disables the fans; **2** = disables the compressor; **3** = disables fans and compressor.
dCO	Compressor activation delay from acknowledgement
tdO	Open door disabling time

10.3.6. PRESSURE SWITCH INPUT alarm

OPERATING CONDITIONS

The pressure switch is associated with a suitably configured Digital Input and can be general, minimum or maximum.

NOTE: behaviour and configuration parameters are the same for all three types.

Every time pressure switch input activation causes the compressor/fans to be disabled instantly, with only visual indication of the activation (WARNING) provided via illumination of the alarm icon and recording of the number of pressure switch activations that have taken place.

If the pressure switch Digital Input is deactivated, the compressor starts up again and the alarm icon switches off, but the alarm folder still contains the number of activations recorded in the previous counting interval (defined using parameter PEi). Once the number of activations set in parameter **PEn** has been reached **PA** (general), **LPA** (minimum) or **HPA** (maximum) will appear on the display.

Compressor, fans and defrosts are deactivated, the alarm icon lights up and the alarm relay comes on if configured.
Once the device has entered alarm mode, it must be switched off and on again, or a key-activated reset performed using the function **rPA** (reset pressure switch alarm) on the functions menu.

NOTA: **PEn** represents the number of pressure switch activations within the interval defined in parameter PEI, which determines activation of alarm mode and deactivation of the compressor, fan and defrost outputs
If **PEn = 0** the function is excluded and the pressure switch alarm is ignored.

SIGNALLING

Code	Meaning
PA	General pressure switch alarm
LPA	Minimum pressure switch alarm
HPA	Maximum pressure switch alarm

USER PARAMETERS

Label	Description
PEn	Number of errors allowed per pressure switch input. **0** = disabled.
PEi	Pressure switch error count interval.

10.3.7. PANIC alarm

OPERATING CONDITIONS

The panic alarm is associated to a specially configured digital input:

- **H11, H12 = ± 18**

After the delay set in parameter dAd, this alarm is activated and persists until the next digital input deactivation.
The action consists of:

- Panic alarm icon steadily on
- Alarm icon steadily on
- recording of label PAn in the alarms menu.
- activation of the relay configured as alarm (if enabled)

SIGNALLING

Code	Meaning
PAn	Panic alarm

USER PARAMETERS

Label	Description
dAd	Activation delay DI1, DI2
di3	Activation delay DI3

11. MODBUS MSK 888 FUNCTIONS AND RESOURCES

11.1. INTRODUCTION

Modbus is a Primary/Secondary protocol for communication between devices connected in a network. Modbus devices communicate using a Primary-Secondary technique in which only one device (Primary) can send request messages. The other devices in the network (Secondary) respond, returning the data requested by the Primary or executing the action contained in the message sent by the Primary. A Secondary is a device connected to a network that processes information and sends the results to the Primary using the Modbus protocol.
The Primary device can send messages to individual Secondaries.
The Modbus standard used by Eliwell employs the RTU code for data transmission.

11.1.1. Data Format (RTU)

The coding type used defines the structure of messages transmitted on the network and the way in which this information is deciphered. The coding type is usually chosen according to specific parameters (baudrate, parity, stop), plus certain devices only support specific coding types. Use the same coding type for all devices connected to a Modbus network.
The protocol uses the RTU binary method with the serial frame configured as follows:

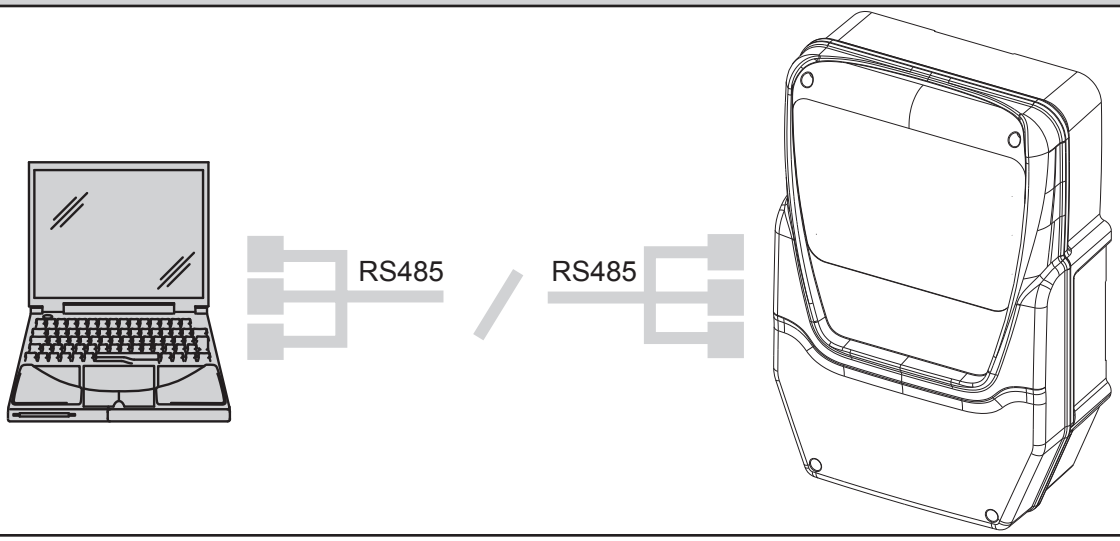
baudrate 9600
8 bits for data (non-configurable),
parity bit none
1 stop BIT

Parameter setting allows the integral configuration of the device
Changes can be made via:

- Device keypad
- UNICARD / Copy Card
- data via Modbus protocol directly to an individual controller or broadcasting it, using the address 0 (broadcast)

11.1.2. Network

ModBUS connection via RS-485



11.1.3. Modbus commands available and data areas

The following commands are implemented:

ModBUS command	Command description
03 (hex 0x03)	Read 16 consecutive registers for Client side.
04 (hex 0x04)	Read 1 single register for parameters.
16 (hex 0x10)	Write 15 consecutive registers for Client side
22 (hex 0x16)	Write 1 register for the parameters
43 (hex 0x2B)	Read device ID. It is possible to read the following 3 fields: **Field code** — **Field description** **0** — Manufacturer ID **1** — Model ID **2** — Family ID (MSK 888) / device version

11.1.4. ADDRESS CONFIGURATION

The serial TTL - which we will call COM1 – can be used to configure the device, parameters, states, and variables with ModBUS via the ModBUS protocol.

The address of a device within a ModBUS message is set using the parameter **Adr**.

The address 0 is used for broadcast messages that all slaves recognise. Slaves don't respond to broadcast messages.
The parameters for configuring the device are:

Parameter	Description	Values	Range
PtS	Select COM1 (TTL) protocol	d (msk 888)	t = Televis d = ModBUS
Adr	ModBUS protocol controller address	1	1...250
Pty	ModBUS protocol parity bit	E (msk 888)	• n= NONE • E = EVEN (parity) • o = ODD (disparity)
bAU	Baudrate selection.	96	• 96 = 9600 baud • 192 = 19200 baud • 384 = 38400 baud

NOTE: for correct operation, the controller must be switched off and switched on again after modification

11.2. PARAMETER VALUES AND VISIBILITY

In the following section several notes relating to the value and visibility of the parameters are described

NOTE:

- Unless otherwise indicated, the parameter should be considered as visible and able to be changed unless the user applies custom settings via the serial port.
- If the visibility of the folder is changed all the parameters in that folder will assume the new setting.

11.2.1. Modbus table contents

Introduction

The following tables list all information required to read, write and decode all accessible resources in the device.
There are the following tables:

- **Parameter/Visibility Table**: contains device configuration parameters stored in the controller's non-volatile memory, including visibility
- **Parameter / Visibility H60 Table**: contains H60 vector device configuration parameters stored in the controller's non-volatile memory, including visibility
- **Folder Visibility Table**: indicates the visibility of the folders containing the parameters
- **Resources Table**: includes all I/O and alarm status resources available in the volatile memory of the instrument.

Description of the columns

FOLDER

Indicates the label of the folder containing the parameter in question

LABEL

Indicates the label used to display the parameters in the menu.

DESCRIPTION

This is the description of the meaning of **parameters**.

PAR. VALUE ADDRESS

Represents the Modbus register address which contains the read or write value of the resource in the device.

The value after the decimal point indicates the position of the most significant data bit inside the register; if not indicated it is taken to be zero. This information is always provided when the register contains more than one information item, and it is necessary to distinguish which bits actually represent the data (the working size of the data indicated in the column DATA SIZE is also taken into consideration).
Given that the ModBUS registers have the size of one WORD (16 bit), the index number after the point can vary from 0 (least significant bit -LSb-) to 15 (most significant bit -MSb-).
Examples (in binary form the least significant bit is the first on the right):

PAR. VALUE ADDRESS	DATA SIZE	Value	Content of register	
8806	WORD	1350	1350	(0000010101000110)
8806	BYTE	70	1350	(00000101**01000110**)
8806.8	BYTE	5	1350	(**00000101**01000110)
8806.14	1 BIT	0	1350	(0**0**000010101000110)
8806.7	4 BIT	10	1350	(00000**1010**1000110)

IMPORTANT: when the register contains more than one piece of data, the writing procedure is as follows:

- Read current value of register
- Modify bits for the resource concerned
- Write register

VIS PAR. ADDRESS

Contains the Modbus register address which contains the visibility value of the resource to read or write in the device.

FILTER

Mask representing the position of the data inside the register (it has BITs set to 1 in correspondence with the register BITs effectively associated with the resource). It assumes values from 0 to 65535.
Note: in binary representation the least significant is furthest to the right.
Note: the size of the piece of visibility data is 2 BIT.
Visibility values:

Value 0 = parameter or folder NOT visible
Value 1 = parameter or folder visible at 'User' level only
Value 2 = parameter or folder visible at 'Installer' level only
Value 3 = parameter or folder visible both 'User' and 'Installer' level

1. Parameters and/or folders with a level of visibility =**1,2** (password-protected) will be visible only if the correct password is entered (installer or user) following this procedure:
2. Parameters and/or folders with a level of visibility =3 are always visible even without a password: in this case, the following procedure is not necessary.

Examples (in binary form the least significant bit is the first on the right):

Default visibility

PAR. VALUE ADDRESS	DATA SIZE	Value	Content of register	
49336.6	2 BIT	3	65535	----------(00000000**11**11111111111111)
49337	2 BIT	3	65535	(0000000011111**11**11111111)
49337.2	2 BIT	3	65535	(000000001111**11**1111111111)
49337.4	2 BIT	3	65535	(00000000111**11**111111111111)
49337.6	2 BIT	3	65535	(00000000**11**11111111111111)

R/W
Indicates the option of reading or writing the resource

R The resource is read-only
W The resource is write-only
RW The resource can be both read and written

DATA SIZE
Indicates the size of the data in bits.

WORD = 16 bit
Byte = 8 bit
“n” bit = 0...15 bit based on the value of “n”

CPL
When the field indicates “Y”, the value read by the register needs to be converted because the value represents a number with a sign. In the other cases the value is always positive or null.
To carry out conversion, proceed as follows:

If the register value falls between...	Then the result is...
0 and 32767	the same value (zero and positive values).
32768 and 65535	the register value, from which to subtract 65536 (negative values).

EXP
WHEN UTILISING MODBUS PROTOCOL ONLY
If = -1 the value read by the register is divided by 10 (value/10) to convert it to the values indicated in the RANGE and DEFAULT columns using the unit of measure indicated in the column U.M.

Example: parameter HSE = 50.0. Column EXP = -1:
- The value read by the device /DeviceManager is 50.0
- The value read by the register is 500 --> 500/10 = 50.0

RANGE
Describes the interval of values that can be assigned to the parameter. It can be correlated with other parameters in the instrument (indicated with the parameter label).

U.M.
Unit of measure for values converted according to the rules indicated in the CPL and EXP columns.

11.2.2. PARAMETER/VISIBILITY table

NOTE: ModBUS read command: 04 (0x04) and ModBUS write command: 22 (0x16)

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
/	SEt	16386	49493	3	RW	Setpoint	WORD	Y		°C/°F	LSE...HSE
CPr	rE	49325	49539	192	RW	Type of regulation	BTYTE		-1	num	0/1/2/3
CPr	diF	16388	49493	12	RW	Setpoint differential	WORD		-1	°C/°F	0...30.0
CPr	SP2	16922	49539	3	RW	Regulation set point 2	WORD		-1	°C/°F	LSE...HSE
CPr	dF2	16924	49539	12	RW	Differential of set point 2	WORD		-1	°C/°F	0...50.0
CPr	db	16926	49539	48	RW	Band	WORD		-1	°C/°F	0...50.0
CPr	HSE	16390	49493	48	RW	Maximum setpoint value that can be set	WORD	Y	-1	°C/°F	LSE...HdL
CPr	LSE	16392	49493	192	RW	Minimum setpoint value that can be set	WORD	Y	-1	°C/°F	LdL...HSE
CPr	OSP	16394	49494	3	RW	Offset on setpoint	WORD	Y	-1	°C/°F	-30.0...30.0
CPr	HC	49234	49494	12	RW	Operating mode (Heating/Cooling)	BYTE			flag	0/1
CPr	Cit	49235	49494	48	RW	Minimum compressor output activation time	BYTE			min	0...255
CPr	CAt	49236	49494	192	RW	Maximum compressor output activation time	BYTE			min	0...255
CPr	Ont	49237	49495	3	RW	ON time for compressor output with control probe error	BYTE			min	0...255
CPr	OFt	49238	49495	12	RW	OFF time for compressor output with control probe error	BYTE			min	0...255
CPr	dOn	49239	49495	48	RW	Compressor output activation delay from request	BYTE			s	0...255
CPr	dOF	49240	49495	192	RW	Compressor output activation delay from shutdown	BYTE			min	0...255
CPr	dbi	49241	49496	3	RW	Delay between two consecutive starts of the compressor output	BYTE			min	0...255
CPr	OdO	49242	49496	12	RW	Output activation delay from power-on	BYTE			min	0...255
CPr	dSC	49243	49496	48	RW	Compressor 2 activation delay	BYTE			s	0...255
CPr	dCS	16396	49496	192	RW	Deep Cooling setpoint	WORD	Y	-1	°C/°F	-58.0...302.0
CPr	tdc	16398	49497	3	RW	Deep Cooling Duration	WORD			min	0...600
CPr	dcc	49244	49497	12	RW	Delay defrost after Deep Cooling	BYTE			min	0...255
CPr	CCi	49428	49529	192	RW	Condenser filter cleaning interval	BYTE			month	0 ... 24
CPr	CCb	49429	49530	3	RW	Enable buzzer with condenser filter cleaning alarm	BYTE			flag	0 ... 1
CPr	CHC	49432	49535	12	RW	Dehumidify control type	BYTE			flag	0 ... 1
CPr	CHF	49433	49535	48	RW	Humidify-dehumidify out off time	BYTE			s	0 ... 250
CPr	CHn	49434	49535	192	RW	Humidify-dehumidify out on time	BYTE			s	0 ... 250
CPr	CHt	49435	49536	3	RW	Humidity-temperature control type	BYTE			num	0 ... 3
CPr	dEH	49436	49536	12	RW	Humidity regulation during defrost	BYTE			flag	0 ... 1
dEF	dty	49245	49497	48	RW	Defrost mode	BYTE			num	0...2
dEF	dit	49246	49497	192	RW	Interval between defrost cycles	BYTE			hrs/min/s	0...255
dEF	dt1	49247	49498	3	RW	Unit of measure for defrost interval	BYTE			num	0/1/2
dEF	dt2	49248	49498	12	RW	Unit of measurement for defrost duration	BYTE			num	0/1/2
dEF	dCt	49249	49498	48	RW	Defrost interval count mode	BYTE			num	0...3
dEF	dOH	49250	49498	192	RW	Defrost interval count mode	BYTE			min	0...59
dEF	dEt	49251	49499	3	RW	Evaporator 1 defrost timeout	BYTE			hrs/min/s	1...255
dEF	dSt	16400	49499	12	RW	Probe 1 defrost end temperature	WORD	Y	-1	°C/°F	-58.0...302.0
dEF	dS2	16402	49499	48	RW	Probe 2 defrost end temperature	WORD	Y	-1	°C/°F	-58.0...302.0
dEF	dE2	49252	49499	192	RW	Defrost timeout evaporator 2	BYTE			hrs/min/s	1...250
dEF	dPO	49253	49500	3	RW	Defrost activation request from power-on	BYTE			flag	0/1
dEF	tcd	16404	49500	12	RW	Minimum compressor ON or OFF time in mins. before defrost	WORD	Y		min	-31...31

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
dEF	Cod	49254	49500	48	RW	Time preceding a defrost, during which the compressor output is not activated	BYTE			min	0...60
dEF	dE1_h	49341	-	-	RW	Defrost start time (minutes) no. 1 weekday	BYTE			hours	0...24
dEF	dE1_min	49340	-	-	RW	Defrost start time (hours) no. 2 weekday	BYTE			min	0...59
dEF	dE2_h	49343	-	-	RW	Defrost start time (minutes) no. 2 weekday	BYTE			hours	0...24
dEF	dE2_min	49342	-	-	RW	Defrost start time (hours) no. 3 weekday	BYTE			min	0...59
dEF	dE3_h	49345	-	-	RW	Defrost start time (minutes) no. 3 weekday	BYTE			hours	0...24
dEF	dE3_min	49344	-	-	RW	Defrost start time (hours) no. 4 weekday	BYTE			min	0...59
dEF	dE4_h	49347	-	-	RW	Defrost start time (minutes) no. 4 weekday	BYTE			hours	0...24
dEF	dE4_min	49346	-	-	RW	Defrost start time (hours) no. 5 weekday	BYTE			min	0...59
dEF	dE5_h	49349	-	-	RW	Defrost start time (minutes) no. 5 weekday	BYTE			hours	0...24
dEF	dE5_min	49348	-	-	RW	Defrost start time (hours) no. 6 weekday	BYTE			min	0...59
dEF	dE6_h	49351	-	-	RW	Defrost start time (minutes) no. 6 weekday	BYTE			hours	0...24
dEF	dE6_min	49350	-	-	RW	Defrost start time (hours) no. 7 weekday	BYTE			min	0...59
dEF	dE7_h	49353	-	-	RW	Defrost start time (minutes) no. 7 weekday	BYTE			hours	0...24
dEF	dE7_min	49352	-	-	RW	Defrost start time (hours) no. 8 weekday	BYTE			min	0...59
dEF	dE8_h	49355	-	-	RW	Defrost start time (minutes) no. 8 weekday	BYTE			hours	0...24
dEF	dE8_min	49354	-	-	RW	Weekday defrost 3 duration	BYTE			min	0...59
dEF	F1_h	49357	-	-	RW	Defrost start time (hours) no. 1 weekend	BYTE			hours	0...24
dEF	F1_min	49356	-	-	RW	Defrost start time (minutes) no. 1 weekend	BYTE			min	0...59
dEF	F2_h	49359	-	-	RW	Defrost start time (hours) no. 2 weekend	BYTE			hours	0...24
dEF	F2_min	49358	-	-	RW	Defrost start time (minutes) no. 2 weekend	BYTE			min	0...59
dEF	F3_h	49361	-	-	RW	Defrost start time (hours) no. 3 weekend	BYTE			hours	0...24
dEF	F3_min	49360	-	-	RW	Defrost start time (minutes) no. 3 weekend	BYTE			min	0...59
dEF	F4_h	49363	-	-	RW	Defrost start time (hours) no. 4 weekend	BYTE			hours	0...24
dEF	F4_min	49362	-	-	RW	Defrost start time (minutes) no. 4 weekend	BYTE			min	0...59
dEF	F5_h	49365	-	-	RW	Defrost start time (hours) no. 5 weekend	BYTE			hours	0...24
dEF	F5_min	49364	-	-	RW	Defrost start time (minutes) no. 5 weekend	BYTE			min	0...59
dEF	F6_h	49367	-	-	RW	Defrost start time (hours) no. 6 weekend	BYTE			hours	0...24
dEF	F6_min	49366	-	-	RW	Defrost start time (minutes) no. 6 weekend	BYTE			min	0...59
dEF	F7_h	49369	-	-	RW	Defrost start time (hours) no. 7 weekend	BYTE			hours	0...24
dEF	F7_min	49368	-	-	RW	Defrost start time (minutes) no. 7 weekend	BYTE			min	0...59
dEF	F8_h	49371	-	-	RW	Defrost start time (hours) no. 8 weekend	BYTE			hours	0...24
dEF	F8_min	49370	-	-	RW	Defrost start time (minutes) no. 8 weekend	BYTE			min	0...59
FAn	FPt	49255	49501	3	RW	FSt parameter mode	BYTE			flag	0/1
FAn	FSt	16406	49501	12	RW	Fan disabling temperature	WORD	Y	-1	°C/°F	-58.0...302.0
FAn	Fot	16408	49501	48	RW	Evaporator fans start temperature	WORD	Y	-1	°C/°F	-58.0...302.0
FAn	FAd	16410	49501	192	RW	Fans differential	WORD		-1	°C/°F	0.1...25.0
FAn	Fdt	49256	49502	3	RW	Fan activation delay from compressor start	BYTE			min	0...255
FAn	dt	49257	49502	12	RW	Dripping time	BYTE			min	0...255
FAn	dFd	49258	49502	48	RW	Evaporator fans mode in defrost	BYTE			flag	0/1
FAn	FCO	49259	49502	192	RW	Evaporator fans mode	BYTE			num	0...4
FAn	FdC	49261	49503	12	RW	Fan switch-off delay from compressor stoppage	BYTE			min	0...255
FAn	FOn	49262	49503	48	RW	Fans ON time in duty-cycle	BYTE			min	0...255
FAn	FOF	49263	49503	192	RW	Fans OFF time in duty-cycle	BYTE			min	0...255
FAn	SCF	16412	49504	3	RW	Condenser fans activation Setpoint	WORD	Y	-1	°C/°F	-50.0…150.0
FAn	dCF	16414	49504	12	RW	Condenser fans activation differential	WORD	Y	-1	°C/°F	-30.0…30.0

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
FAn	tCF	49264	49504	48	RW	Condenser fans switch-on delay after defrost	BYTE			min	0...59
FAn	dCd	49265	49504	192	RW	Condenser fans exclusion during defrost	BYTE			flag	0/1
FAn	HuL	49437	49530	192	RW	Humidity level selection	BYTE			num	0 ... 3
FAn	Hu1	49438	49531	3	RW	Evaporator fans on time humidity level 1	BYTE			min/s	0 ... 250
FAn	Hu2	49439	49531	12	RW	Evaporator fans off time humidity level 1	BYTE			min/s	0 ... 250
FAn	Hu3	49440	49531	48	RW	Evaporator fans on time humidity level 2	BYTE			min/s	0 ... 250
FAn	Hu4	49441	49531	192	RW	Evaporator fans off time humidity level 2	BYTE			min/s	0 ... 250
FAn	Hu5	49442	49532	3	RW	Evaporator fans on time humidity level 3	BYTE			min/s	0 ... 250
FAn	Hu6	49443	49532	12	RW	Evaporator fans off time humidity level 3	BYTE			min/s	0 ... 250
FAn	CHd	16676	49536	48	RW	Humidity control enable differential	WORD		-1	°C/°F	0 ... 30,0
FAn	CHL	16678	49536	192	RW	Minimum temperature to enable humidity control	WORD	Y	-1	°C/°F	-199.9 ... 1999.0
FAn	CHH	16680	49537	3	RW	Maximum temperature to enable humidity control	WORD	Y	-1	°C/°F	-199.9 ... 1999.0
FAn	dbH	16682	49537	12	RW	Humidity intervention semi-band	WORD			%RH	0 ... 50
FAn	dFH	16684	49537	48	RW	Differential of humidity set point	WORD			%RH	0 ... 50
FAn	SEH	16686	49537	192	RW	Humidity setpoint	WORD			%RH	0 ... 100
FAn	PbH	49456	49538	3	RW	Humidity control probe selection	BYTE			num	0 ... 1
FAn	FCH	49457	49538	12	RW	Fan behavior during humidity control	BYTE			num	0 ... 1
FAn	CA4	49458	49538	48	RW	Analog input 4 calibration	WORD	Y		°C/°F	-30,0 ... 30,0
FAn	SFd	49480	49534	12	RW	Temperature delta for fan stratification	WORD			num	0 ... 3200
FAn	diS	49482	49534	48	RW	Temperature differential for fan stratification	WORD			num	0 ... 3200
FAn	SOn	49484	49534	192	RW	ON time for fan stratification regulator output	WORD			num	0 ... 65535
FAn	SOF	49486	49535	3	RW	ON time for fan stratification regulator output	WORD			num	0 ... 65535
AL	Att	49266	49505	3	RW	HAL and LAL parameter mode	BYTE			flag	0/1
AL	AFd	16416	49505	12	RW	Alarm setpoint differential	WORD		-1	°C/°F	0.1...50.0
AL	HAL	16418	49505	48	RW	Maximum alarm	WORD	Y	-1	°C/°F	LA1...302.0
AL	LAL	16420	49505	192	RW	Minimum alarm	WORD	Y	-1	°C/°F	-58.0...HA1
AL	PAO	49267	49506	3	RW	Alarm exclusion at power-on	BYTE			hours	0...10
AL	dAO	16422	49506	12	RW	Alarm exclusion after defrost	WORD			min	0...255
AL	OAO	49268	49506	48	RW	Alarm signalling delay from door closure	BYTE			hours	0...10
AL	tdO	49269	49506	192	RW	Open door disabling time	BYTE			min	0...255
AL	tAO	49270	49507	3	RW	Temperature alarms signalling delay	BYTE			min	0...255
AL	dAt	49271	49507	12	RW	Enable alarm at end of defrost	BYTE			flag	0/1
AL	rLO	49272	49507	48	RW	External alarm switches off loads	BYTE			num	0/1/2
AL	AOP	49273	49507	192	RW	Alarm output polarity	BYTE			flag	0 /1
AL	PbA	49275	49508	12	RW	Probe enabled to signal temperature alarms (probe 1 and/or 3)	BYTE			num	0...3
AL	SA3	16424	49508	48	RW	Alarm set point related to probe 3	WORD	Y	-1	°C/°F	-50.0...150.0
AL	dA3	16426	49508	192	RW	Probe 3 alarm tripping differential	WORD	Y	-1	°C/°F	-30.0...30.0
AL	tA3	49276	49509	3	RW	Alarm 3 signalling delay time	BYTE			min	0...59
AL	ArE	49277	49509	12	RW	Enables alarm relay in the event of probe 3-related alarms	BYTE			num	0/1/2
AL	Art	16655	49529	48	RW	Regulator alarm type	BYTE			num	0/1
Lit	dSd	49278	49509	48	RW	Enable light relay from door switch	BYTE			flag	0/1
Lit	dLt	49279	49509	192	RW	Light relay deactivation delay	BYTE			min	0...31
Lit	OFL	49280	49510	3	RW	Light key always disables light relay	BYTE			flag	0/1
Lit	dOd	49281	49510	12	RW	Door switch switches off loads	BYTE			num	0...3
Lit	dAd	49282	49510	48	RW	Delay activating digital inputs DI1, DI2	BYTE			min	0...255
Lit	di3	49283	49510	192	RW	Delay to activate digital input DI3	BYTE			min	0...255

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
Lit	dOA	49285	49511	12	RW	Action forced by digital input	BYTE			num	0...5
Lit	PEA	49286	49511	48	RW	Select DI for lock/unlock resources function	BYTE			num	0...3
Lit	dCO	49287	49511	192	RW	Evaporator fan compressor activation/switch-off delay	BYTE			min	0...255
Lit	dOC	49260	49503	3	RW	Compressor switch-off delay from acknowledgement	BYTE			min	0...255
Lit	dFO	49288	49512	3	RW	Evaporator fan activation/switch-off delay	BYTE			min	0...255
Lit	PEn	49334	49512	12	RW	Number of errors permitted	BYTE			num	0...15
Lit	PEi	49335	49512	48	RW	Error count interval	BYTE			min	1...99
Lit	01i	16658	49525	48	RW	Delay activating digital input DI1	BYTE			min	0...250
Lit	02i	16659	49525	192	RW	Delay to activate digital input DI2	BYTE			min	0...250
nAd	d0_E0	49372	-	-	RW	Enable functions during events day 1 (SUNDAY)	BYTE			num	0...8
nAd	d0_E1_h	49397	-	-	RW	Event start time (hours) day 1	BYTE			hours	0...23
nAd	d0_E1_m	49396	-	-	RW	Event start time (minutes) day 1	BYTE			min	0...59
nAd	d0_E2	49380	-	-	RW	Event duration day 1	BYTE			hours	0...72
nAd	d0_E3	49388	-	-	RW	Enable defrost weekdays or weekends day 1	BYTE			flag	0...1
nAd	d1_E0	49373	-	-	RW	Enable functions during events day 2	BYTE			num	0...8
nAd	d1_E1_h	49399	-	-	RW	Event start time (hours) day 2	BYTE			hours	0...23
nAd	d1_E1_m	49398	-	-	RW	Event start time (minutes) day 2	BYTE			min	0...59
nAd	d1_E2	49381	-	-	RW	Event duration day 2	BYTE			hours	0...72
nAd	d1_E3	49389	-	-	RW	Enable defrost weekdays or weekends day 2	BYTE			flag	0...1
nAd	d2_E0	49374	-	-	RW	Enable functions during events day 3	BYTE			num	0...8
nAd	d2_E1_h	49401	-	-	RW	Event start time (hours) day 3	BYTE			hours	0...23
nAd	d2_E1_m	49400	-	-	RW	Event start time (minutes) day 3	BYTE			min	0...59
nAd	d2_E2	49382	-	-	RW	Event duration day 3	BYTE			hours	0...72
nAd	d3_E3	49390	-	-	RW	Enable defrost weekdays or weekends day 3	BYTE			flag	0...1
nAd	d3_E0	49375	-	-	RW	Enable functions during events day 4	BYTE			num	0...8
nAd	d3_E1_h	49403	-	-	RW	Event start time (hours) day 4	BYTE			hours	0...23
nAd	d3_E1_m	49402	-	-	RW	Event start time (minutes) day 4	BYTE			min	0...59
nAd	d3_E2	49383	-	-	RW	Event duration day 4	BYTE			hours	0...72
nAd	d3_E3	49391	-	-	RW	Enable defrost weekdays or weekends day 4	BYTE			flag	0...1
nAd	d4_E0	49376	-	-	RW	Enable functions during events day 5	BYTE			num	0...8
nAd	d4_E1_h	49405	-	-	RW	Event start time (hours) day 5	BYTE			hours	0...23
nAd	d4_E1_m	49404	-	-	RW	Event start time (minutes) day 5	BYTE			min	0...59
nAd	d4_E2	49384	-	-	RW	Event duration day 5	BYTE			hours	0...72
nAd	d4_E3	49392	-	-	RW	Enable defrost weekdays or weekends day 5	BYTE			flag	0...1
nAd	d5_E0	49377	-	-	RW	Enable functions during events day 6	BYTE			num	0...8
nAd	d5_E1_h	49407	-	-	RW	Event start time (hours) day 6	BYTE			hours	0...23
nAd	d5_E1_m	49406	-	-	RW	Event start time (minutes) day 6	BYTE			min	0...59
nAd	d5_E2	49385	-	-	RW	Event duration day 6	BYTE			hours	0...72
nAd	d5_E3	49393	-	-	RW	Enable defrost weekdays or weekends day 6	BYTE			flag	0...1
nAd	d6_E0	49378	-	-	RW	Enable functions during events day 7 (SATURDAY)	BYTE			num	0...8
nAd	d6_E1_h	49409	-	-	RW	Event start time (hours) day 7	BYTE			hours	0...23
nAd	d6_E1_m	49408	-	-	RW	Event start time (minutes) day 7	BYTE			min	0...59
nAd	d6_E2	49386	-	-	RW	Event duration day 7	BYTE			hours	0...72
nAd	d6_E3	49394	-	-	RW	Enable defrost weekdays or weekends day 7	BYTE			flag	0...1
nAd	d7_E0	49379	-	-	RW	Enable functions during daily event (EVERY DAY)	BYTE			num	0...8
nAd	d7_E1_h	49411	-	-	RW	Daily event start time	BYTE			hours	0...23

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
nAd	d7_E1_m	49410	-	-	RW	Daily event start time (minutes)	BYTE			min	0...59
nAd	d7_E2	49387	-	-	RW	Duration of daily event	BYTE			hours	0...72
nAd	d7_E3	49395	-	-	RW	Enable defrost weekdays or weekends daily event	BYTE			flag	0...1
Add	PtS	49289	49512	192	RW	Protocol selection (0: Televis; 1: ModBUS)	BYTE			flag	0/1
Add	dEA	49290	49513	3	RW	Device address, Micronet	BYTE			num	0...14
Add	FAA	49291	49513	12	RW	Family address, Micronet	BYTE			num	0...14
Add	Adr	49422	49491	192	RW	ModBUS address	BYTE			num	1...255
Add	Pty	49292	49513	48	RW	Parity bit (ModBUS protocol)	BYTE			num	0/1/2
Add	Pty	49293	49513	192	RW	ModBUS stop bit	BYTE			num	0/1
Add	bAU	49421	49492	3	RW	BaudRate	BYTE			num	0/1/2
Add	E2E	49431	49540	3	RW	Serial 1 write enable	BYTE			flag	0/1
Add	SEE	49324	49538	192	RW	Serial 1 enable	BYTE			flag	0/1
diS	LOC	49294	49514	3	RW	Keypad lock	BYTE			flag	0/1
diS	PA1	16428	49514	12	RW	Password 1	WORD			num	0...999
diS	PA2	16430	49514	48	RW	Password 2	WORD			num	0...999
diS	PS3	16432	49514	192	RW	Password 3	WORD			num	0...999
diS	ndt	49295	49515	3	RW	Display with decimal point	BYTE			flag	0/1
diS	CA1	16434	49515	12	RW	Calibration Pb1	WORD	Y	-1	°C/°F	-30.0...30.0
diS	CA2	16436	49515	48	RW	Calibration Pb2	WORD	Y	-1	°C/°F	-30.0...30.0
diS	CA3	16438	49515	192	RW	Calibration Pb3	WORD	Y	-1	°C/°F	-30.0...30.0
diS	CA4	49458	49538	48	RW	Calibration Pb4	WORD	Y	-1	°C/°F	-30.0...30.0
diS	CA	49296	49516	3	RW	Calibration operation	BYTE			num	0/1/2
diS	LdL	16440	49516	12	RW	Minimum possible value	WORD	Y	-1	°C/°F	-58.0...HdL
diS	HdL	16442	49516	48	RW	Maximum possible value	WORD	Y	-1	°C/°F	LdL...302
diS	ddL	49297	49516	192	RW	Lock display during defrost	BYTE			num	0/1/2
diS	Ldd	49298	49517	3	RW	Unlock timeout “ddL”	BYTE			minutes	0...255
diS	dro	49299	49517	12	RW	°C/°F selection. (0=°C, 1=°F)	BYTE			flag	0/1
diS	ddd	49300	49517	48	RW	Selection of main display value 1	BYTE			num	0/1/2
diS	dd2	49420	49529	12	RW	Selection of main display value 2	BYTE			flag	0/1
diS	ALL	16700	49533	12	RW	Leak alarm low threshold	WORD			num	0 ... 65000
diS	ALh	16702	49533	48	RW	Leak alarm high threshold	WORD			num	0 ... 65000
diS	AL1	16704	49533	192	RW	Probe remains above the low threshold for leak alarm activation	WORD			num	0 ... 65000
diS	AL2	16706	49534	3	RW	Probe remains above the high threshold for leak alarm activation	WORD			num	0 ... 65000
HAC	SHi	16444	49517	192	RW	Maximum HACCP alarm threshold, no delay	WORD	Y	-1	°C/°F	SHH...150.0
HAC	SLi	16446	49518	3	RW	Minimum HACCP alarm threshold, no delay	WORD	Y	-1	°C/°F	-50.0...SLH
HAC	SHH	16448	49518	12	RW	Maximum HACCP alarm threshold	WORD	Y	-1	°C/°F	SLH...150.0
HAC	SLH	16450	49518	48	RW	Minimum HACCP alarm threshold	WORD	Y	-1	°C/°F	50.0...SHH
HAC	drA	49301	49518	192	RW	Minimum dwelling time in critical area before alarm signalling	BYTE			min	0...99
HAC	drH	49302	49519	3	RW	HACCP alarm reset time from last manual reset	BYTE			hours	0...255
HAC	H50	49303	49519	12	RW	Enable HACCP alarms storage with/without alarm relay enabling	BYTE			num	0/1/2
HAC	H51	49304	49519	48	RW	HACCP alarms storage disabling time (key or digital input)	BYTE			min	0...255
HAC	H52	49305	49519	192	RW	Probe enabled to signal HACCP alarms	BYTE			flag	1/3
CnF	H00	49306	49520	3	RW	Probe type Pb1-Pb2-Pb3 (1=NTC, 0=PTC)	BYTE			flag	0/1

FOLDER	LABEL	VAL. PAR. ADDRESS	Vis. PAR.ADDRESS	Filter	R/W	DESCRIPTION	DATA SIZE	CPL	EXP	UM	RANGE
CnF	H01	49307	49520	12	RW	Enable deep cooling	BYTE			flag	0/1
CnF	H02	49308	49520	48	RW	Key activation time	BYTE			s	0...15
CnF	H06	49309	49520	192	RW	Key or auxiliary digital input/light on with device Off	BYTE			flag	0/1
CnF	H08	49310	49521	3	RW	Stand-by mode	BYTE			num	0...3
CnF	H11	16452	49521	12	RW	DI1 input configuration	BYTE	Y		num	-22...22
CnF	H12	16454	49521	48	RW	DI2 input configuration	BYTE	Y		num	-22...22
CnF	H21	49311	49522	12	RW	Configuration Relay 1	BYTE			num	0...13
CnF	H22	49312	49522	48	RW	Configuration Relay 2	BYTE			num	0...13
CnF	H23	49313	49522	192	RW	Configuration Relay 3	BYTE			num	0...13
CnF	H24	49314	49523	3	RW	Configuration Relay 4	BYTE			num	0...13
CnF	H25	49315	49523	12	RW	Configuration Relay 5	BYTE			num	0...13
CnF	H26	49315	49523	48	RW	Configuration Relay 6	BYTE			num	0...13
CnF	H28	49318	49524	3	RW	Enable buzzer	BYTE			flag	0/1
CnF	H32	49320	49524	48	RW	Configuration of DOWN key	BYTE			num	0...15
CnF	H33	49321	49524	192	RW	ESC key configuration	BYTE			num	0...15
CnF	H34	49322	49525	3	RW	ON/OFF key configuration	BYTE			num	0...15
CnF	H35	49323	49525	12	RW	LIGHT key configuration	BYTE			num	0...15
CnF	H41	49327	49526	12	RW	Pb1 input configuration	WORD			flag	0/1
CnF	H42	49328	49526	48	RW	Pb2 input configuration	WORD			flag	0/1
CnF	H43	49329	49526	192	RW	Pb3 input configuration	WORD			num	n, y , 2EP, 3-1
CnF	H44	49330	49527	3	RW	Setpoint for Pb3-Pb1 temperature differential	WORD			num	0...255
CnF	H45	49331	49527	12	RW	Start defrost mode for applications with double evaporator	WORD			num	0...2
CnF	H48	49332	49527	48	RW	Clock presence	WORD			flag	0/1
CnF	04P	49460	49532	48	RW	Analogue input prescaler 4	BYTE			num	0 ... 1
CnF	04U	49461	49532	192	RW	Analog input unit of measure 4	BYTE			num	0 ... 1
CnF	04d	16698	49533	3	RW	Leak alarm differential	WORD			num	0 ... 65000
CnF	04L	16708	49530	12	RW	Lower limit of analogue input	WORD	Y		num	-999 ... 9999
CnF	04H	16710	49530	48	RW	Upper limit of analogue input	WORD	Y		num	-999 ... 9999
CnF	H60	49333	49527	192	R	Preset selection (Parameters vector selector)	WORD			num	0...6
CnF	rEL	-	49528	12	R	Device version	WORD			num	0...3
CnF	tAb	-	49528	12	R	Map code	WORD			num	0...3
FrH	HOn	49336	49528	48	RW	Frame Heater regulator output On time	BYTE			min	0...255
FrH	HOF	49337	49528	192	RW	Frame Heater regulator output Off time	BYTE			min	0...255
FrH	dt3	49338	49529	3	RW	Frame Heater regulator time standard unit of measurement	BYTE			num	0/1/2
FPr	UL	-	-	-	-	Parameter transfer function visibility (Controller -> UNICARD / Copy Card)	2 BIT			num	0...3
FPr	dL	-	-	-	-	Parameter transfer function visibility (UNICARD / Copy Card -> Controller)	2 BIT			num	0...3
FPr	Fr	-	-	-	-	UNICARD / Copy Card formatting function visibility	2 BIT			num	0...3

11.2.3. PARAMETER/VISIBILITY H60 table

LABEL	PAR. Value ADDRESS	Vis. PAR.ADDRESS	R/W	DESCRIPTION	DATA SIZE	UM	RANGE
V1-SEt	16790	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V1-diF	16792	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V1-LSE	16794	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V1-HSE	16796	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V1-dSt	16798	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V1-FSt	16800	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V1-dtY	49570	-	RW	Type of defrost	BYTE	num	0/1/2
V1-dit	49571	-	RW	Interval between defrosts	BYTE	min	0...255
V1-dCt	49572	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V1-dOH	49573	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V1-dEt	49574	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V1-Fdt	49575	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255
V1-dt	49576	-	RW	Dripping time	BYTE	min	0...255
V1-dPO	49577	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V1-ddL	49578	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V1-dFd	49579	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1
V2-SEt	16812	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V2-diF	16814	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V2-LSE	16816	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V2-HSE	16818	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V2-dSt	16820	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V2-FSt	16822	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V2-dtY	49592	-	RW	Type of defrost	BYTE	num	0/1/2
V2-dit	49593	-	RW	Interval between defrosts	BYTE	min	0...255
V2-dCt	49594	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V2-dOH	49595	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V2-dEt	49596	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V2-Fdt	49597	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255
V2-dt	49598	-	RW	Dripping time	BYTE	min	0...255
V2-dPO	49599	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V2-ddL	49600	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V2-dFd	49601	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1
V3-SEt	16834	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V3-diF	16836	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V3-LSE	16838	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V3-HSE	16840	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V3-dSt	16842	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V3-FSt	16844	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V3-dtY	49614	-	RW	Type of defrost	BYTE	num	0/1/2
V3-dit	49615	-	RW	Interval between defrosts	BYTE	min	0...255
V3-dCt	49616	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V3-dOH	49617	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V3-dEt	49618	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V3-Fdt	49619	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255
V3-dt	49620	-	RW	Dripping time	BYTE	min	0...255

LABEL	PAR. Value ADDRESS	Vis. PAR.ADDRESS	R/W	DESCRIPTION	DATA SIZE	UM	RANGE
V3-dPO	49621	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V3-ddL	49622	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V3-dFd	49623	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1
V4-SEt	16856	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V4-diF	16858	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V4-LSE	16860	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V4-HSE	16862	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V4-dSt	16864	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V4-FSt	16866	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V4-dtY	49636	-	RW	Type of defrost	BYTE	num	0/1/2
V4-dit	49637	-	RW	Interval between defrosts	BYTE	min	0...255
V4-dCt	49638	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V4-dOH	49639	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V4-dEt	49640	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V4-Fdt	49641	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255
V4-dt	49642	-	RW	Dripping time	BYTE	min	0...255
V4-dPO	49643	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V4-ddL	49644	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V4-dFd	49645	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1
V5-SEt	16878	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V5-diF	16880	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V5-LSE	16882	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V5-HSE	16884	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V5-dSt	16886	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V5-FSt	16888	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V5-dtY	49658	-	RW	Type of defrost	BYTE	num	0/1/2
V5-dit	49659	-	RW	Interval between defrosts	BYTE	min	0...255
V5-dCt	49660	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V5-dOH	49661	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V5-dEt	49662	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V5-Fdt	49663	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255
V5-dt	49664	-	RW	Dripping time	BYTE	min	0...255
V5-dPO	49665	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V5-ddL	49666	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V5-dFd	49667	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1
V6-SEt	16900	-	RW	Regulation set point	WORD	°C/°F	LSE...HSE
V6-diF	16902	-	RW	Differential of set point	WORD	°C/°F	0.1...30.0
V6-LSE	16904	-	RW	Minimum value settable for set point	WORD	°C/°F	LSE...HdL
V6-HSE	16906	-	RW	Maximum value settable for set point	WORD	°C/°F	LdL...HSE
V6-dSt	16908	-	RW	Defrost end temperature evaporator 1	WORD	°C/°F	-58.0...302.0
V6-FSt	16910	-	RW	Evaporator fans disabling temperature	WORD	°C/°F	-50.0...150.0
V6-dtY	49680	-	RW	Type of defrost	BYTE	num	0/1/2
V6-dit	49681	-	RW	Interval between defrosts	BYTE	min	0...255
V6-dCt	49682	-	RW	Counting mode for defrost interval	BYTE	num	0...3
V6-dOH	49683	-	RW	Defrost cycle enabling delay from request	BYTE	min	0...59
V6-dEt	49684	-	RW	Max. duration defrost evaporator 1	BYTE	hrs/min/s	1...255
V6-Fdt	49685	-	RW	Evaporator fans delay after defrost cycle	BYTE	min	0...255

LABEL	PAR. Value ADDRESS	Vis. PAR.ADDRESS	R/W	DESCRIPTION	DATA SIZE	UM	RANGE
V6-dt	49686	-	RW	Dripping time	BYTE	min	0...255
V6-dPO	49687	-	RW	Defrost enabling request from Power On	BYTE	flag	0/1
V6-ddL	49688	-	RW	Display blocking mode during defrost	BYTE	num	0/1/2
V6-dFd	49689	-	RW	Evaporator fans disabling during defrost time	BYTE	flag	0/1

11.2.4. FOLDER VISIBILITY TABLE

LABEL	ModBUS ADDRESS	R/W	DESCRIPTION	DATA SIZE	RANGE	UM
vis_CPr	49488	RW	Folder visibility	2 bit	0...3	num
vis_dEF	49488,2	RW	Folder visibility	2 bit	0...3	num
vis_FAn	49488,6	RW	Folder visibility	2 bit	0...3	num
vis_HUL	49530,6	RW	Folder visibility	2 bit	0...3	num
vis_ALr	49489	RW	Folder visibility	2 bit	0...3	num
vis_Lit	49489,2	RW	Folder visibility	2 bit	0...3	num
vis_nAd	49488,4	RW	Folder visibility	2 bit	0...3	num
vis_Add	49489,4	RW	Folder visibility	2 bit	0...3	num
vis_diS	49489,6	RW	Folder visibility	2 bit	0...3	num
vis_HAC	49490	RW	Folder visibility	2 bit	0...3	num
vis_CnF	49490,2	RW	Folder visibility	2 bit	0...3	num
vis_FrH	49490,4	RW	Folder visibility	2 bit	0...3	num
vis_FPr	49490,6	RW	Folder visibility	2 bit	0...3	num

11.2.5. RESOURCES Table

⚠ WARNING

HAZARD OF EXPLOSION, OVERHEATING AND/OR FIRE

Do not write read-only resources.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

NOTE: ModBUS read command: 03 (0x03) and ModBUS write command: 16 (0x10)

LABEL	ADDRESS	FILTER	R/W	DESCRIPTION	DATASIZE	RANGE	UM
AI1	337		R	Analogue input (display) 1	WORD	-58,0 ... 302,0	°C/°F
AI2	339		R	Analogue input (display) 2	WORD	-58,0 ... 302,0	°C/°F
AI3	341		R	Analogue input (display) 3	WORD	-58,0 ... 302,0	°C/°F
AI4	343		R	Analogue input (display) 4	WORD	-99,9 ... 999,9	%
AI4_LKD	343		R	Analogue input (display) 4	WORD	0 ... 65535	ppm
AR1	345		R	Analogue input (control) 1	WORD	-58,0 ... 302,0	°C/°F
AR2	347		R	Analogue input (control) 2	WORD	-58,0 ... 302,0	°C/°F
AR3	349		R	Analogue input (control) 3	WORD	-58,0 ... 302,0	°C/°F
AR4	351		R	Analogue input (control) 4	WORD	-99,9 ... 999,9	%
AR4_LKD	351		R	Analogue input (control) 4	WORD	0 ... 65535	ppm
DI1	33130	16	R	Digital input 1	1 bit	0...1	flag
DI2	33130	8	R	Digital input 2	1 bit	0...1	flag
DI3	33130	4	R	Digital input 3	1 bit	0...1	flag
DI4	33130	2	R	Digital input 4	1 bit	0...1	flag
HA1	33085	32	R	High analogue input threshold exceeded 1	1 bit	0...1	flag
LA1	33085	64	R	Low analogue input threshold exceeded 1	1 bit	0...1	flag
HA3	33085	1	R	High analogue input threshold exceeded 3	1 bit	0...1	flag
LA3	33085	8	R	Low analogue input threshold exceeded 3	1 bit	0...1	flag
EAL	33085	16	R	External	1 bit	0...1	flag
PA	33084	128	R	Pressure switch	1 bit	0...1	flag
OPd	33085	128	R	Door open	1 bit	0...1	flag
Pan	33084	2	R	Men in the room alarm	1 bit	0...1	flag
LPA	33084	4	R	Minimum pressure switch	1 bit	0...1	flag
HPA	33084	8	R	Maximum pressure switch	1 bit	0...1	flag
E10	33084	64	R	Faulty clock alarm	1 bit	0...1	flag
Ad2	33160	1	R	Defrost timeout	1 bit	0...1	flag
Prr	33099	4	R	Preheating input controller	1 bit	0...1	flag
E1	33085	2	R	Analog input 1 failure	1 bit	0...1	flag
E2	33085	4	R	Analog input 2 failure	1 bit	0...1	flag
ALd	33084	16	R	Refrigerant leakage	2 bit	0...1	flag
E3	33084	32	R	Analog input 3 failure	2 bit	0...1	flag
HACCP	33163	4	R	HACCP Alarm	1 bit	0...1	flag
ECC	33164	1	R	Dirty filters (manual reset)	1 bit	0...1	flag
LKD_WARNING	33162	16	R	LKD Warning Threshold Exceeded	1 bit	0...1	flag
LKD_ALARM	33162	4	R	LKD Danger Threshold Exceeded	1 bit	0...1	flag
E4	33162	2	R	Analog input 4 failure	1 bit	0...1	flag
OnOff	33089	2	R	On	1 bit	0...1	flag
STD-BY	33089	2	R	Stand-by mode	1 bit	0...1	flag
DF1	33092	48	R	Defrost 1	1 bit	0...1	flag
DF2	33100	12	R	Defrost 2	1 bit	0...1	flag
ECO	33089	1	R	Economy function	1 bit	0...1	flag
AUX	33089	16	R	Auxiliary	1 bit	0...1	flag
FRH	33101	64	R	Frame heaters	1 bit	0...1	flag
LIGHT	33089	4	W	Light	1 bit	0...1	flag
CP1	33092	8	W	Compressor 1	1 bit	0...1	num
CP2	33099	16	W	Compressor 2	1 bit	0...1	num
FAN_E	33094	128	W	Fan 1	1 bit	0...1	num
FAN_C	33102	128	W	Cond. Fan 1	1 bit	0...1	num
DOOR	33096	8	W	Door	1 bit	0...1	num

LABEL	ADDRESS	FILTER	R/W	DESCRIPTION	DATASIZE	RANGE	UM
ALM	33097	32	W	Alarm	1 bit	0...1	num
DEEP	33102	32	W	Deep Cooling	1 bit	0...1	num
PD	33102	16	W	Pumpdown	1 bit	0...1	num
HUM	33095	4	W	Humidification	1 bit	0...1	num
DE-HUM	33095	8	W	Dehumidification	1 bit	0...1	num
DE-HUM_RES	33096	64	W	Heater	1 bit	0...1	num
STRAT_FAN	33096	128	W	Stratification fan relay	1 bit	0...1	num
LIGHT_ON	33057	1	W	Lights On	1 bit	0...1	num
LIGHT_OFF	33057	2	W	Lights Off	1 bit	0...1	num
OSP_ON	33057	4	W	Economy Mode On	1 bit	0...1	num
OSP_OFF	33057	8	W	Economy Mode Off	1 bit	0...1	num
AUX_ON	33057	16	W	Auxiliary output On	1 bit	0...1	num
AUX_OFF	33057	32	W	Auxiliary output Off	1 bit	0...1	num
ON	33057	64	W	Instrument On	1 bit	0...1	num
OFF	33057	128	W	Instrument Off	1 bit	0...1	num
SILENT	33058	1	W	Alarm silencing	1 bit	0...1	num
DEF	33058	2	W	Manual defrost activation	1 bit	0...1	num
NIGHTDAY_OFF	33058	32	W	Disable Night & Day functions	1 bit	0...1	num
NIGHTDAY_ON	33058	64	W	Enable Night & Day functions	1 bit	0...1	num
LOCK_KBD	33059	1	W	Keyboard Locked	1 bit	0...1	num
UNLOCK_KBD	33059	2	W	Keyboard Unlocked	1 bit	0...1	num
RST_HACCP	33059	4	W	Reset HACCP alarms	1 bit	0...1	num
RST_PRESS	33059	8	W	Reset pressure switch alarms	1 bit	0...1	num
FRAMEHEATER_ON	33059	16	W	Activation Frame Heater	1 bit	0...1	num
FRAMEHEATER_OFF	33059	32	W	Deactivation Frame Heater	1 bit	0...1	num
HACCP_OFF	33059	64	W	Disable HACCP alarm recording	1 bit	0...1	num
HACCP_ON	33059	128	W	Enable HACCP alarm recording	1 bit	0...1	num
DEEP_COOL	33060	1	W	Enable Deep Cooling regulator	1 bit	0...1	num
ClkUp	33058	4	W	Update clock	1 bit	0...1	flag

12. ADVANCED FUNCTIONS - NIGHT AND DAY

Events and cycles can be programmed at set times during the week using the Night&Day regulator algorithm. The parameters concerned are contained in folder **nAd** / subfolders **d0…d6, Ed**

NOTE: do not confuse labels **E0 … E3** with probe error messages **E1 … E2…**
NOTE: be careful as to how **E0 = 3** (stand-by regulator) is used. You may not have access to the device for the duration of the event set in **E2.**

12.1. DAY/NIGHT REGULATOR OPERATION

Different events for days of the week
For each day of the week, indicated by parameters/(sub-folders) **d0 … d6**, you can set:
- a time for the start of the event (**E1, in format HH:mm**)
- the duration (**E2**)
- which functions to enable (E0) for the event
- which defrost group to enable (parameters **dE1...dE8 weekdays** or **F1…F8 weekends/holidays**) (**E3**).

Parameters **E0 … E3**, can be different for each day.
According to the time set, E1 is the start time, usually set for the Reduced set (Economy) function (“NIGHT” mode). The duration is determined by parameter E2. In this mode, parameter E0 allows you to:
- Activate the reduced set functions.
- Activate the light regulator.
- Activate the aux regulator.
- Activate the stand-by regulator.

You can also decide whether to enable defrost during weekdays (E3 = 0) and weekends/public holidays (E3 = 1).

NOTE that parameter **E3** has no effect on the daily event settings.

Daily event
Using the same parameters, E0 … E3 in the (sub-)folder Ed, you can also program a daily event, i.e. one that runs every day. Defrosts cannot be managed with this function. Hence parameter E3 in (sub-) folder d7 is not listed.

Daily or weekly events all have the same priority.

Days of the week correspond to these parameters:

Par.	Day of week	Day #
d0	Sunday	day 1
d1	Monday	day 2
d2	Tuesday	day 3
d3	Wednesday	day 4
d4	Thursday	day 5
d5	Friday	day 6
d6	Saturday	day 7
d7	Daily event (Every Day)	Daily event (Every Day)

12.2. OPERATION WITH DEFROST GROUP

If E0 is not equal to 0, the meaning of weekday parameters dE1…dE8 shifts from:
Defrost group valid EVERY day (see Automatic defrost with Real Time Clock.)
to:
Defrost group applicable only to weekdays.

The weekday parameters dE1…dE8 are supplemented with the management of weekend/public holiday parameters F1…F8.
Both folders still make use of the conditions for defrost at a pre-established time.

Hence for each day d0…d6 we can determine whether:
- E3 = 0, so that defrosts run at the times set in dE1…dE8.
- E3 = 1, so that defrosts run at the times set in F1…F8.

Example
Supposing you set these time configurations:
- 3 “weekend” defrosts (when the refrigerated cabinet is not being intensively used)
  - 2 am (F1=> h02 ‘00)
  - 10 am (F2=> h10 ‘00)
  - 6 pm (F3=> h18 ‘00)
- 4 defrosts on “weekdays” (or days when the refrigerated cabinet is used intensively)
  - 5 am (dE1=> h05 ‘00)
  - 11 am (dE2=> h11 ‘00)
  - 5 pm (dE3=> h17 ‘00)
  - 11 pm (dE4=> h23 ‘00)

if the days considered as weekends/holidays are Sunday and Monday, this means the day settings will be:
- d0 / E3 = 1 (Sunday = “weekend” day)
- d1 / E3 = 1 (Monday = “weekend” day)
- d2 / E3 = 0 (Tuesday = “weekday”)
- d3 / E3 = 0 (Wednesday = “weekday”)
- d4 / E3 = 0 (Thursday = “weekday”)
- d5 / E3 = 0 (Friday = “weekday”)
- d6 / E3 = 0 (Saturday = “weekday”)

12.3. DAY/NIGHT REGULATOR DURING A BLACKOUT

- If a blackout occurs during day/night status activation (i.e. caused by a day/night event), and power is restored:
  - during this event, the instrument will return to the status implemented at the time of the blackout, before disabling the event at the programmed time.
  - If it occurs after this event but before the next day/night event, the device starts up as if it has disabled the day/night event during which the blackout occurred.
  - If it occurs after this event but during the next day/night event, the device starts up as if it has disabled the day/night event during which the blackout occurred, before switching to the status requested by the day/night event underway when power was restored.
- Manual events (key or digital input) have priority over the day/night status until the next day/night event (event that either disables the current status or activates the next one) if the power supply is uninterrupted.
- If a manual event inverts the status set by the day/night function within the day/night status activation period and this is followed by a blackout, and power is restored:
  - During the same day/night status activation, the controller will return to the status set by the manual event before disabling the event at the programmed time.
  - If it occurs after this event, the device starts in the status set by the manual event.
  - It if occurs after this event but during the status activation of the next day/night event, the controller switches to the status requested by the day/night event concerned before disabling the event at the programmed time.

12.4. OPENING FOLDER NAD - DAY/NIGHT

Display	description
4.0 85.0	Press SET for 3 seconds
USr ---	Folder USr appears Press and release the DOWN key to display to search for the InS folder Press and release the SET key
CPr ---	Press and release the DOWN key to display to search for the nAd folder
nAd ---	Press and release the SET key. Press and release the SET key to open the folder
nAd d0	The first day, d0, appears Scroll using ‘UP’ and ‘DOWN’ to access the other days d1...d6 and Every Day d7 Press and release the SET key
E0 0	The first parameter E0 appears Press and release the SEt key to modify it The E0 label will flash Press and release the DOWN key to display its value
E0 1	The first parameter E0 appears Press and release the SEt key to modify it The E0 label will flash Press and release the DOWN key to display its value
E1 0.00	Press the ESC key several times to return to the normal display, or repeat the procedure to modify another parameter NOTE: in the case of parameter E1, the clock icon will appear. Modification takes place in the same way as the time setting procedure (see User Interface)

13. ADVANCED FUNCTIONS - HACCP

To meet the minimum requirements prescribed in HACCP regulations, there is a set of dedicated parameters. These parameters can be viewed and configured in folder:

HACCP (folder with label “HAC”)

The recording of HACCP alarms can be enabled in parameter H50≠0
NOTE: SWITCH THE INSTRUMENT OFF AND ON AGAIN AFTER MODIFYING PARAMETER H50

HACCP alarm START and storing begins every time the alarms are cleared - see paragraph Deleting HACCP alarms

These parameters record and file the high and low temperature alarms for cold room probe Pb1 or display probe Pb3, as well as any instrument power failures.

In addition to alarms, these parameters also record any controller blackouts, saving the number of blackouts that have occurred since the last time the machine was stopped.
Alarms for the HACCP function are managed independently from the rest of the regulators.

Each HACCP alarm consists of a folder containing the following information:
- alarm number: up to 40 alarms can be saved: 20 for high/low temperature and 20 for power failure
- type of alarm: Ht (high temperature), Lt (low temperature) and PF (Power failure)
- time/date and duration of all alarms
- maximum or minimum temperature, with corresponding time/date, reached during the event

SLi, SHi parameters Instant HACCP alarm
When a temperature value exceeds the range defined by parameters SLi and SHi, an HACCP alarm is signalled and recorded.
This threshold indicates the limit beyond which the food concerned would deteriorate irreparably, even for brief periods of time.

SLL, SHH parameters HACCP alarm
When a temperature value exceeds the range defined by parameters SLL and SHH for a time greater than the drA parameter, an HACCP alarm is signalled and displayed

13.1. DISPLAYING HACCP ALARMS

Display	description
ALr HACP	The red HACCP icon will remain permanently on to indicate an HACCP alarm has occurred Press and release the UP key The top display will show ALr If HACP alarms have occurred the bottom display will show HACP Press and release the SET key
AHC 01.Ht	To access the information contained within each AHC folder, press the ‘set’ key
StA 02.07	The clock icon will be steadily on In fact, label StA will be shown on the top display, while the alarm start time will appear on the bottom display Press the DOWN key to scroll through the other alarm data
StA 31.07	The date icon will be steadily on In fact, label StA will be shown on the top display, while the alarm activation date will appear on the bottom display Press the DOWN key to scroll through the other alarm data
dUr -.--	Label dur will be shown on the top display, while the alarm duration will appear on the bottom display In HH:mm If --.— appears the alarm is still active Press the DOWN key to scroll through the other alarm data
-12.7 02.06	The clock icon will be steadily on …and the maximum temperature measured by the probe during the alarm (on the top display) will be displayed along with the relative time (on the bottom display). Press the DOWN key to scroll through the other alarm data
-12.7 31.07	The clock icon will be steadily on …and the maximum temperature measured by the probe during the alarm (on the top display) will be displayed along with the relative date (bottom display.) Press the DOWN key to scroll through the other alarm data
AHC 01.Ht	To return to the alarm display screen (label AHC) press the ESC key once Press the ESC key several times to return to the normal display

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