EWNext Performance Dispenser -HC

Electronic controllers compatible with flammable refrigerant gases

User Manual

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EWNXD-01EN

www.eliwell.com

eliwell
by Schneider Electric

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Index

Safety information **5**
Important information 5
About the book **7**
Introduction **11**
Introduction 12
Models 13
Accessories 14
Preliminary configurations **15**
Introduction 16
EWNext 971 P/CD (115 Vac - 230 Vac) 19
Mechanical installation **20**
Before starting 21
Power supply disconnection 21
Operating environment 22
Comments concerning installation 23
Installation 24
Electrical connections **25**
Best wiring practices 26
Connections 27
EWNext 971 P/CD (115 Vac - 230 Vac) 28
Technical characteristics **29**
Technical data 30
Power supply and power draw 30
Output characteristics 30
Input characteristics 30
Further Information 31
User interface and operation **32**
User interface 33
Using the controller 35
Setting the probes 39
Setting the displayed values 40
Defrost **42**
Introduction 43
Display and alarm operation 44
Manual defrost 45
Modulating Defrost 47
Standard defrost 53
Functions **58**
Door switch 59
Stand-by 60
Copy parameters (UNICARD) 61
Boot loader firmware 62
Reset TelevisAir diagnostic counters 63
Regulators **64**

Cool regulator 65
Regulation with probe Pb1 66
Regulation with single ice sensor 68
Regulation with dual ice sensor 69
Ice sensor threshold and differential setting 70
Low ambient temperature protection 71
Compressor 72
Managing the compressor with the probe in error (only if H50=0) 75
Deep cooling cycle (only if H50=0) 76
Pump 78
Pressure switch 79
Auxiliary output 81
Light output 83
Night/Day 85
Energy saving - Reduced set (only if H50=0) 87
Pull-down regulator (only if H50=0) 88
Diagnostics 90
Alarms and indications 91
Minimum and maximum temperature alarm 93
Parameters EWNext Performance Dispenser -HC 95
Parameters EWNext 971 P/CD 96
Modbus MSK 779 functions and resources 108
Setting parameters via Modbus 109
Modbus table content 110
Table of Modbus Parameters 112
Visibility table for folders relating to applications 126
Table of Modbus Resources 129

Safety information

Important information

Notices

Read these instructions carefully and visually inspect the equipment to familiarize yourself with the controller before attempting to install it and/or put it into operation, or before servicing 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 which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a 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 must only be installed, used and repaired by qualified technicians. Schneider Electric and Eliwell do not accept any liability for any consequences arising from the use of this material.

An authorized person is someone in possession of the skills and knowledge applicable to the structure, to the operation of the electrical equipment and to its installation, and who has received safety training in order to recognize and avoid the risks 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 planning and implementation.

Permitted use

This product is used to control refrigerated units.

The controller must be installed and used in accordance with the provided instructions and in particular, in normal conditions, dangerous energized parts must not be accessible.

The controller should be suitably protected from water and dust. Access to the various product parts from the front should involve the use of a keyed or tooled locking mechanism.

The controller is suitable for integration into equipment for controlling refrigerated units, and has been checked on the basis of the harmonized European standards of reference.

Only use the product with the specified cables and accessories. Only use genuine accessories and spare parts.

Prohibited use

Any use other than that indicated in the above paragraph "Permitted use" is strictly prohibited.

The relay contacts supplied are electromechanical and are subject to wear. The functional safety protection devices, specified by international or local laws, must be installed outside this 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 tools and/or which do not have a keyed locking mechanism;
- product tampering and/or alteration;
- 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 local legislation regarding waste disposal.

About the book

Document Scope

This document describes the **EWNext Performance Dispenser -HC** controllers and corresponding accessories, including information regarding installation and wiring.

Note: read this document and all related documents carefully before installing, operating or servicing the controller.

Validity Note

The technical characteristics of the devices described in this manual are also available online, through the Eliwell website (**www.eliwell.com**).

The characteristics illustrated in this manual should be identical to those which can be found online. In accordance with our policy of continuous improvement, the content of the documentation may be revised from time to time in order to improve its clarity and accuracy. If there are any discrepancies between the manual and the information available online, use the latter as your point of reference.

Related documents

Publication title	Reference document code
Instruction Sheet EWNext Performance Dispenser -HC	9IS54787 (7L)

All available technical documentation and other technical information is available to download from the website: **www.eliwell.com**

Product related information

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, FIRE 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 device 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.

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

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK AND/OR FIRE

- Do not expose the equipment to liquids.
- Do not exceed the temperature and humidity ranges specified in the technical data and keep the area surrounding the cooling slits aerated.
- Do not apply dangerous voltages to the SELV connection terminals (see "Connections" chapter).
- Only connect compatible accessories - as specified in the section "Accessories" - to the device.
- Only use cables with a suitable cross-section (see “Best wiring practices”).
- Only use recommended disconnectable terminals (see “Best wiring practices”)

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

⚠ ⚠ DANGER

LOOSE WIRING CAN RESULT IN ELECTRIC SHOCK AND/OR FIRE

Tighten the connections in compliance with the technical specifications for torque values and make sure the wiring is correct.

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

⚠ WARNING

HAZARD OF OVERHEATING AND/OR FIRE

- Do not use with loads other than those indicated in the technical data.
- Do not exceed the maximum permitted current; in the case of higher loads, use a contactor with suitable power.
- Make sure the application has not been designed with the controller outputs connected directly to instruments that generate a frequently activated capacitive load (1).
- Power lines and output connections must be suitably wired and protected by means of fuses when required by national and local regulations.
- Connect the relay output, including the shared pole, using cables with a cross-section of 2.5 mm^2 (14 AWG) and a length of at least 200 mm (7.87 in.).

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

(1) Even if the application does not apply a frequently activated capacitive load to the relay, capacitive loads reduce the life of any electromechanical relay and the installation of a contactor or external relay, sized and maintained according to the ratings and characteristics of the capacitive load, helps to minimize the consequences of relay degradation.

When handling the equipment, take care to avoid damage caused by electrostatic discharge. In particular, the unshielded connectors are extremely vulnerable to electrostatic discharge.

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO 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.

NOTICE

UNINTENDED EQUIPMENT OPERATION

- Prevent subject devices from direct access or direct link by unauthorized parties or unauthenticated actions.
- You must have a complete understanding of the application and the machine before attempting to control the application remotely.
- Isolate your industrial network from other networks inside your company.
- Take the precautions necessary to assure that you are operating remotely on the intended machine by having clear, identifying documentation within the application and its remote connection.

Failure to follow these instructions can result in equipment damage.

NOTICE

INOPERABLE DEVICE

- For the connection of probes and the digital input, use cables shorter than 10 m (32.80 ft).
- 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.

The controller can be upgraded only with authenticated Schneider Electric or Eliwell files. In case the authenticity check fails the controller stay idle, without any capacity for regulation.

NOTICE

UNINTENDED EQUIPMENT OPERATION

Use authenticated Schneider Electric or Eliwell files only.

Failure to follow these instructions can result in equipment damage.

To restore the normal operation of the controller, upload an authenticated file.

NOTICE

UNINTENDED EQUIPMENT OPERATION

The SELV wiring must be kept separate from all the other wiring (see "Connections" chapter).

Failure to follow these instructions can result in equipment damage.

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.

Flammable refrigerant gases

The use of flammable gas refrigerants is dependent on may factors, including local, regional and/or national regulations.

The devices and corresponding accessories described in the documentation accompanying the product use components and, more specifically, electromechanical relays tested in accordance with IEC standard 60079-15 and classed as nC components (non-sparking ‘n’ electrical apparatus).
This condition complies to Annex BB of EN/IEC 60335-2-89.

Conformance to Annex BB EN/IEC 60335-2-89 is considered sufficient, and thereby suitable, for commercial refrigeration applications applying flammable gas refrigerants, such as R290. However, other limitations, equipment, locations and/or type of machine (refrigerators, vending machines and dispensers, bottle coolers, ice machines, Reach-Ins, etc.) may also be implicated, restricted and/or required in so doing.

The use and application of the information contained herein require expertise in the design and parameterizing/programming of refrigeration control systems. Only you—the original equipment manufacturer, installer or user—can be aware of all the conditions and factors present, and the regulations applicable, during the design, installation and setup, operation, and maintenance of the machine or related processes. Therefore, only you can determine the suitability of automation and associated equipment, and the related safeties and interlocks, which can be effectively and properly used in the locations for which the equipment is to be put into service. When selecting automation and control equipment, and any other related equipment or software for an application, you must also consider any applicable local, regional or national standards and/or regulations.

You must verify, while incorporating this controller and related equipment, the final compliance of the machine to regulations and standards when using flammable gas refrigerants. Although all statements and information contained herein are believed to be accurate and reliable, they are presented without warranty of any kind. Information provided herein does not relieve you from the responsibility of carrying out your own tests and validations of conformance to any applicable regulations.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

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

Introduction

Contents

This section includes the following topics:

Introduction 12
Models 13
Accessories 14

Introduction

General Description

EWNext Performance Dispenser -HC is a family of electronic controllers for managing refrigerated units.

Every controller has 3 preset applications: **AP1**, **AP2** and **AP3**, that pre-configure the controller to work with 3 real usage situations, reducing installation time and only requiring precision changes to parameters.

Main regulators

The main regulators for the controller are as follows:

- heat/cool
- single or double ice sensor
- compressor
- deep cooling cycle
- dual compressor
- Modulating defrost
- Standard defrost
- door switch
- AUX output (Auxiliary/Light)
- pressure switch
- day/night
- energy saving

In this manual, the photographs and diagrams are provided to illustrate the controller (and other Eliwell devices) and are purely illustrative. The corresponding dimensions and proportions may not correspond to actual dimensions in terms of life-size or scale. Furthermore, all the wiring or electrical diagrams should be considered as simplified representations which may not accurately represent the reality.

Models

The following is a list of **EWNext Performance Dispenser -HC** models:

Product	Description
EWNext 971 P/CD	EWNext 971 P NTC 1Hp/8 115 Vac disp. RTC AIR -HC
	EWNext 971 P NTC 1Hp/8 115 Vac disp. RTC PH AIR -HC
	EWNext 971 P NTC 2Hp/8 230 Vac disp. RTC AIR -HC
	EWNext 971 P NTC 2Hp/8 230 Vac disp. RTC PH AIR -HC

Abbreviations

The following is a list of abbreviations used in the descriptions:

- **AIR** = controller compatible with the BTLE Dongle
- **PH** = controller with disconnectable terminals
- **RTC** (/**C**) = controller with RTC
- **disp.** (/**D**) = the controller is a Dispenser model

Accessories

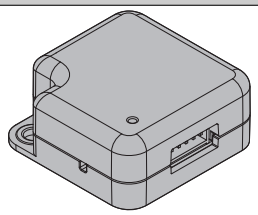
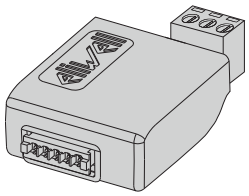
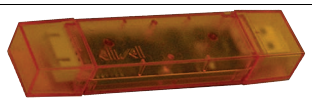
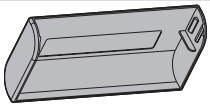
⚠ ⚠ DANGER

RISK OF ELECTRIC SHOCK, FIRE OR ARC FLASH

Only connect compatible accessories to the instrument.

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

Contact a Eliwell representative for further information regarding the accessories that can be used.

Accessory	Description
	**BTLE Dongle**: TTL/Bluetooth communication interface
	**BusAdapter 150 Dongle**: Non-opto-isolated TTL/RS485 communication interface
	**BusAdapter**: Opto-isolated TTL/RS485 communication interface
	**UNICARD**: Programming key
	**DMI**: Programming interface
	**Probes**: NTC
	**Protection**: Dripping protection for connections

Preliminary configurations

Contents

This section includes the following topics:

Introduction 16
EWNext 971 P/CD (115 Vac - 230 Vac) 19

Introduction

Overview

EWNext Performance Dispenser -HC is a family of electronic controllers for managing refrigerated units.

Every controller has 3 preset applications: **AP1**, **AP2** and **AP3**, that pre-configure the controller to work with 3 real usage situations, reducing installation time and only requiring precision changes to parameters.

Applications

Changing the controller operating parameters does not affect the preset application values.

The first time the instrument is switched on, the operating parameters are the same (for value and visibility) as those for application **AP1**.

Applications **AP1**, **AP2** and **AP3** cannot be edited from the instrument.

Applications **AP2** and **AP3** can only be edited via Device Manager, an Eliwell proprietary software.

Application **AP1** can never be edited (not even using Device Manager) so that the controller can be restored with a reliably working application.

Switching on for the first time

Once the electrical connections have been completed, simply power up the device for it to start working.

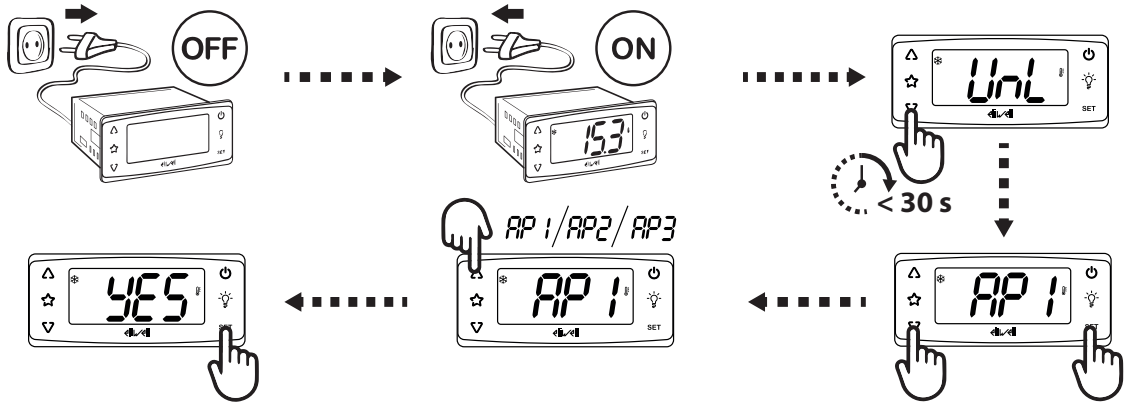
At the first startup:

1. Select and load the preset application - **AP1**, **AP2** or **AP3** - that best reflects the usage requirements.
2. Verify and, if necessary, adjust the value of the main controller parameters to adapt the selected application to your system.
3. Make sure there are no active alarms.

Loading Preset Applications

The procedure to load one of the preset applications is:

1. If the device is on, switch it off
2. Switch on the device
3. Press and hold ∇ for at least 3 seconds, until the keypad unlock label “UnL” appears
4. Within 30 seconds since the device power-on, press and hold (**SET** + ∇) for at least 5 seconds, until the label “AP1” appears
5. Scroll through applications **AP1**, **AP2** and **AP3** using ∆ and ∇
6. Confirm the selected preset application using **SET**.
   Note: The process can be canceled by pressing ⏻ or letting a timeout occur (15 seconds)
7. If the procedure completes successfully, the display will show "**yES**"; otherwise it will show "**no**"
8. The regulator will restart



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

NOTICE
INOPERABLE DEVICE Verify the parameters after loading a preset application. **Failure to follow these instructions can result in equipment damage.**

Restore default values

When necessary, you can restore the parameters to their default values, by loading one of the preset applications **AP1**, **AP2** or **AP3**.

View Preset applications

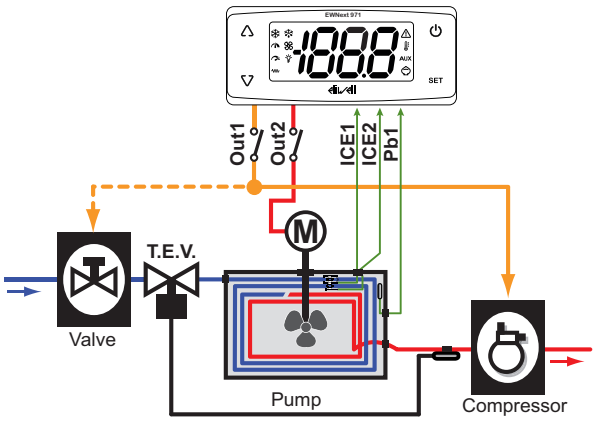
Click on the controller model purchased to access the corresponding Preset applications:

- **EWNext 971 P/CD**

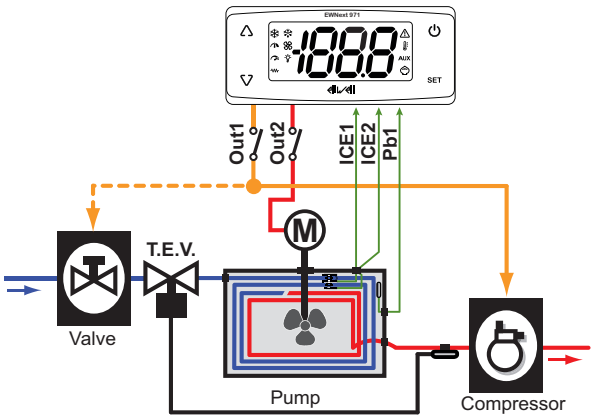
EWNext 971 P/CD (115 Vac - 230 Vac)

Application overview

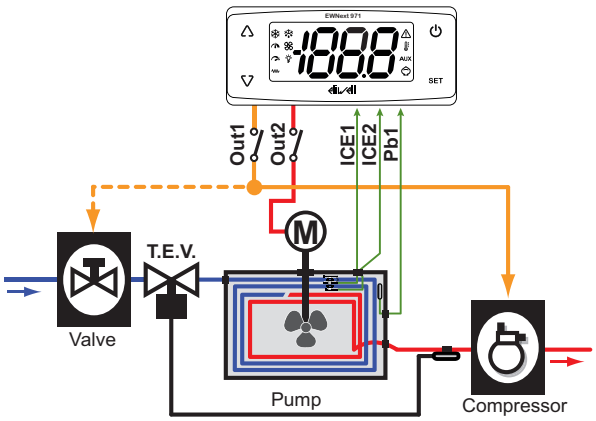
AP1: AT refrigerated units



AP2: NT refrigerated units



AP3: LT refrigerated units



Legend:

- **Valve** = Valve
- **T.E.V.** = Expansion valve
- **Pump** = Pump
- **Compressor** = Compressor
- **M** = Motor

Application details

Setpoint SEt	-20.0°C (-4.0°F)
Setpoint SES (summer)	2.0°C (28.4°F)
Analog inputs	1 NTC inputs (**Pb1**) + 2 ice sensors (**ICE1** and **ICE2**)
Digital inputs	1 digital input **DI** on TTL not set (**H12**=0)
Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Pump)
Buzzer	NO
RTC	SI
Type of defrost	Defrost due to compressor stop
End of defrost	Due to compressor stop
Active alarms	Pb1 maximum / minimum temperature (**HAL** and **LAL**)
Key configuration	△: manual defrost ▽: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

Mechanical installation

Contents

This section includes the following topics:

Before starting 21
Power supply disconnection 21
Operating environment 22
Comments concerning installation 23
Installation 24

Before starting

Read this manual carefully before installing the controller and its accessories.

In particular, ensure conformity with all safety indications, electrical requirements and current legislation for the machine or the process used with this equipment.

The use and application of information contained herein requires experience in the design and programming of automated control systems. Only the machine user, integrator or manufacturer will be aware of all the conditions and factors affecting installation, configuration, operation and maintenance of the machine or process and can therefore identify the associated equipment and corresponding safety interlocks and systems that can be used appropriately and efficiently. When selecting automation and control equipment, other equipment and connected software for a particular application, all local, regional and national standards and/or legislation must be taken into account.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

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

Power supply disconnection

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, FIRE 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 device 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.

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

Operating environment

The use of flammable gas refrigerants is dependent on may factors, including local, regional and/or national regulations.

The devices and corresponding accessories described in the documentation accompanying the product use components and, more specifically, electromechanical relays tested in accordance with IEC standard 60079-15 and classed as nC components (non-sparking 'n' electrical apparatus).
This condition complies to Annex BB of EN/IEC 60335-2-89.

Conformance to Annex BB EN/IEC 60335-2-89 is considered sufficient, and thereby suitable, for commercial refrigeration applications applying flammable gas refrigerants, such as R290. However, other limitations, equipment, locations and/or type of machine (refrigerators, vending machines and dispensers, bottle coolers, ice machines, Reach-Ins, etc.) may also be implicated, restricted and/or required in so doing.

The use and application of the information contained herein require expertise in the design and parameterizing/programming of refrigeration control systems. Only you—the original equipment manufacturer, installer or user—can be aware of all the conditions and factors present, and the regulations applicable, during the design, installation and setup, operation, and maintenance of the machine or related processes. Therefore, only you can determine the suitability of automation and associated equipment, and the related safeties and interlocks, which can be effectively and properly used in the locations for which the equipment is to be put into service. When selecting automation and control equipment, and any other related equipment or software for an application, you must also consider any applicable local, regional or national standards and/or regulations.

You must verify, while incorporating this controller and related equipment, the final compliance of the machine to regulations and standards when using flammable gas refrigerants. Although all statements and information contained herein are believed to be accurate and reliable, they are presented without warranty of any kind. Information provided herein does not relieve you from the responsibility of carrying out your own tests and validations of conformance to any applicable regulations.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

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

Comments concerning installation

Important information

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, FIRE 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 device 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.

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

When handling the equipment, take care to avoid damage caused by electrostatic discharge. In particular, the unshielded connectors are extremely vulnerable to electrostatic discharge.

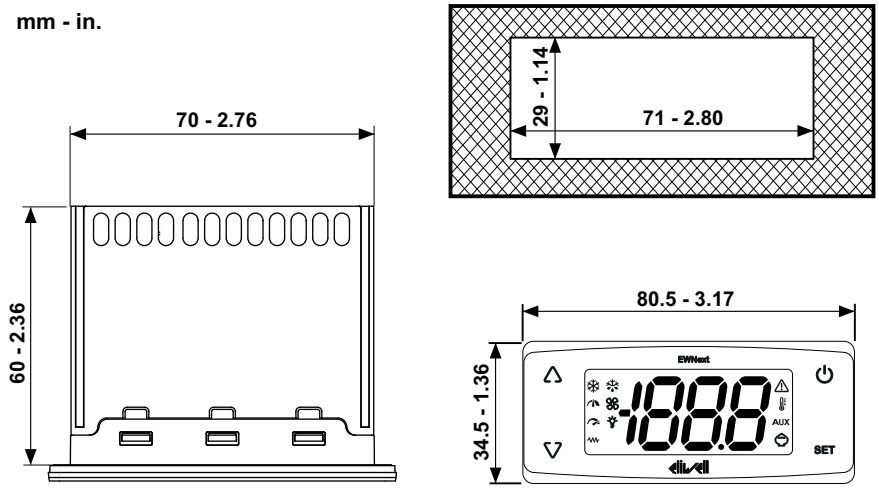
⚠ WARNING

UNINTENDED EQUIPMENT OPERATION DUE TO 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.

Mechanical dimensions



Installation

Installing/uninstalling the controller

Mount the controller horizontally.
To install, proceed as follows:

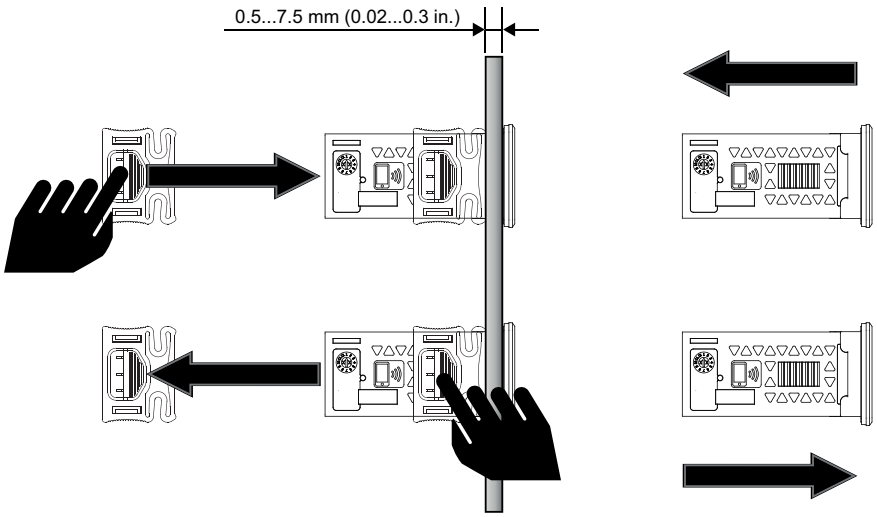
1. Make a hole measuring 71 x 29 mm (2.80 x 1.14 in.)
2. Introducing the controller
3. Secure it by inserting the brackets in the relevant rails at the 2 sides of the controller, until it clicks into place

To uninstall it, proceed as follows:

1. Press the brackets on the 2 sides of the device until you hear a click and take them out
2. Removing the controller

Note: Leave the area around the slits clear to allow air to circulate, keeping the controller cool.

Note: The panel thickness must be between 0.5 mm (0.02 in.) and 7.5 mm (0.3 in.) inclusive.



Electrical connections

Contents

This section includes the following topics:

Best wiring practices 26
Connections 27
EWNext 971 P/CD (115 Vac - 230 Vac) 28

Best wiring practices

Warnings

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, FIRE 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 device 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.

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

⚠ ⚠ DANGER

HAZARD OF ELECTRIC SHOCK AND/OR FIRE

- Do not expose the equipment to liquids.
- Do not exceed the temperature and humidity ranges specified in the technical data and keep the area surrounding the cooling slits aerated.
- Do not apply dangerous voltages to the SELV connection terminals (see "Connections" chapter).
- Only connect compatible accessories - as specified in the section "Accessories" - to the device.
- Only use cables with a suitable cross-section (see “Best wiring practices”).
- Only use recommended disconnectable terminals (see “Best wiring practices”)

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

⚠ WARNING

HAZARD OF OVERHEATING AND/OR FIRE

- Do not use with loads other than those indicated in the technical data.
- Do not exceed the maximum permitted current; in the case of higher loads, use a contactor with suitable power.
- Make sure the application has not been designed with the controller outputs connected directly to instruments that generate a frequently activated capacitive load (1).
- Power lines and output connections must be suitably wired and protected by means of fuses when required by national and local regulations.
- Connect the relay output, including the shared pole, using cables with a cross-section of 2.5 mm^2 (14 AWG) and a length of at least 200 mm (7.87 in.).

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

(1) Even if the application does not apply a frequently activated capacitive load to the relay, capacitive loads reduce the life of any electromechanical relay and the installation of a contactor or external relay, sized and maintained according to the ratings and characteristics of the capacitive load, helps to minimize the consequences of relay degradation.

⚠ WARNING

REGULATORY INCOMPATIBILITY

Be sure that all equipment applied and systems designed comply with all applicable local, regional and national regulations and standards.

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

Wiring guidelines

⚠ ⚠ DANGER

LOOSE WIRING CAN RESULT IN ELECTRIC SHOCK AND/OR FIRE

Tighten the connections in compliance with the technical specifications for torque values and make sure the wiring is correct.

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

Use copper wires (obligatory)

The table below shows the type and size of permitted cables for screw terminals and the torque values:

mm / in. 6.5 / 0.26								
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*	*24...14*	*24...14*	*2 x 24…18*	*2 x 24…18*	*2 x 24…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*

The table below shows the type and size of permitted cables for MSTB 2.5/x-ST-5.00 disconnectable terminals and the torque values.

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...1	2 x 0.2…1.5	2 x 0.25...1	2 x 0.5...1.5
AWG	*24…14*	*24…14*	*24...14*	*24...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*

Only use the removable screw terminal blocks provided (in some models) or bought directly from Eliwell. Otherwise, make sure you are using suitable terminals to jointly operate with the Eliwell device in the condition of the specific application.

NOTICE

UNINTENDED EQUIPMENT OPERATION

The SELV wiring must be kept separate from all the other wiring (see "Connections" chapter).

Failure to follow these instructions can result in equipment damage.

NOTICE

INOPERABLE DEVICE

- For the connection of probes and the digital input, use cables shorter than 10 m (32.80 ft).
- 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.

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.

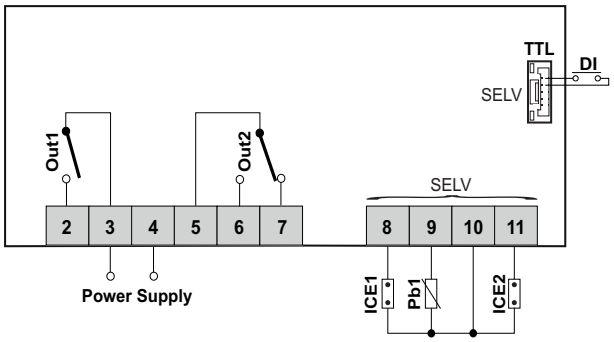
Connections

Wiring diagrams

Click on the controller model to access the corresponding wiring diagram:

- **EWNext 971 P/CD**

EWNext 971 P/CD (115 Vac - 230 Vac)



Terminals	Description
2-3	Compressor relay (**Out1**)
3-4	Power supply input 115 Vac or 230 Vac (depending on the model)
5-6-7	Pump relay (**Out2**)
8-10	Sensor ICE1 (Ice bank - Minimum level)
9-10	Probe Pb1 (NTC)
11-10	Sensor ICE2 (Ice bank - Maximum level)
SELV	SELV terminals
TTL	TTL serial port or DI (if **H12**≠0)

Technical characteristics

Contents

This section includes the following topics:

Technical data 30
Power supply and power draw 30
Output characteristics 30
Input characteristics 30
Further Information 31

Technical data

The product complies with the following harmonized Standards: EN 60730-1 and EN 60730-2-9	
Device construction:	Electronic automatic incorporated Control
Device purpos:	Operating control (non-safety related) device
Type of action:	1.C
Degree of protection by enclosure:	IP00 for models with removable screw terminal blocks IP20 for models with screw terminal blocks IP65 front panel only (Tested in accordance with EN 60529 with a steel sheet 2 mm (0.08 in.) thick ±10 %)
Pollution degree:	2
Overvoltage category:	II
Nominal pulse voltage:	2500 V
Power supply:	see table below
Power draw:	see table below
Environmental operating conditions:	Temperature: -5...55°C (23...131°F) Humidity: 10…90% RH (non-condensing)
Transportation and storage conditions:	Temperature: -30...85°C (-22...185°F) Humidity: 10…90% RH (non-condensing)
Software class:	A
Front panel protection type:	Type 1
Temperature for the ball pressure test:	Front and Rear cover: 128 °C (262,4 °F) Terminal blocks: 107 °C (224,6 °F) PWB (Printed Wiring Board): 125 °C (257 °F)

Power supply and power draw

Model	Power supply	Power draw (maximum)
EWNext 971 P/CD	115 Vac or 230 Vac (±10%) 50/60 Hz (depending on the model)	5.5 VA

Note: Verify the power supply specified on the controller label.

Output characteristics

230 Vac models	Output	EU (230 Vac)	USA (230 Vac)
EWNext 971 P/CD	**Out1**	12(8) A	12FLA 72LRA
	Out2	NO 8(4) A - NC 6(3) A - CO 6 A resistive	NO 8 A - NC 6 A - CO 6 A resistive NO 3.6FLA 21.6LRA

115 Vac models	Output	EU (115 Vac)	USA (115 Vac)
EWNext 971 P/CD	**Out1**	12(8) A	V*: 16FLA 96LRA - S**: 12FLA 72LRA
	Out2	NO 8(4) A - NC 6(3) A - CO 6 A resistive	NO 8 A - NC 6 A - CO 6 A resistive NO 3.6FLA 21.6LRA

V* = models with screw terminals - **S**** = models with disconnectable terminals.

Input characteristics

Analog inputs	• **EWNext 971 P/CD**: 1 NTC input (Pb1) + 2 ice sensors (ICE1 and ICE2)
Digital inputs	• **EWNext 971 P/CD**: 1 voltage free digital inputs (DI*).

(*) digital input **DI**, if enabled, should be connected to the TTL connector (if **H12**≠0)

Further Information

Probe values

Display ranges	-99.9…99.9 or -999…999
Measurement range	**NTC**: -50...110°C (-58...230°F) - on display with 3 digits + sign
Accuracy	**NTC**: -50...-30 °C (-58...-22 °F): better than ±2.4 °C (±4.3 °F) ±1 digit. -30...110 °C (-22...230 °F): better than ±1.6 °C (±2.9 °F) ±1 digit.
Resolution	1°C/°F or 0.1°C/°F (depending on the display range setting)

Mechanical characteristics

Connectors	TTL serial port for connection of compatible accessories
Dimensions	Front panel 80.5 x 34.5 mm (3.17 x 1.36 in.), depth 60 mm (2.36 in.)
Mounting panel thickness	0.5...7.5 mm (0.02...0.3 in.)
Terminals	Screw terminal blocks / removable screw terminal blocks

Note: the technical characteristics provided in this document concerning measurement (range, accuracy, resolution, etc.) refer only to the device itself and not to any accessories supplied, such as the probes.

User interface and operation

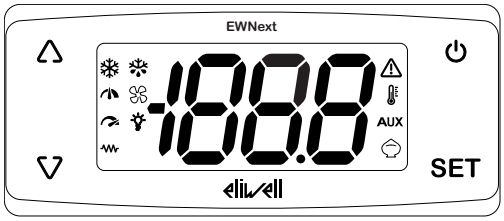
Contents

This section includes the following topics:

User interface 33
Using the controller 35
Setting the probes 39
Setting the displayed values 40

User interface

Interface



Keys

Keys	press and release	press for at least 5 seconds
∧	• Scroll through the menu options. • Increase the values.	Activates manual defrost. From outside the menus only.
∨	• Scroll through the menu options. • Decrease the values.	• From outside the menus only. Can be configured by the user (parameter **H32**) • Unlock keypad (press and hold for at least 3 seconds)
⏻	• Go back (up one level) in the menu. • Confirm the parameter value.	From outside the menus only. Can be configured by the user (parameter **H33**) Default: Activate stand-by.
SET	• Access the "Machine Status" menu. • Display alarms (if present). • During device power-on, access selection mode for the application to be loaded.	• Access the "Programming" menu. • Confirm commands.
∨ + SET	Press both simultaneously for at least 5 seconds at device power-on to load the preset applications (only after unlocking the keypad).	

Note: At device power-on or after 30 seconds since last action on the user interface, the device keypad locks automatically. If it is locked and any key is pressed, the text ‘LoC’ will appear. To unlock the keypad, press and hold ∨ for at least 3 seconds until the text "UnL" appears.

Icons

Icon	Function	Description
	Compressor	On steadily: compressor active Flashing: delay, protection or activation inhibited Off: compressor off
	Defrost	On steadily: defrost active Flashing: defrost activated manually or via digital input Off: defrost inactive
	Pump	On steadily: pump active Off: pump off
	/	Reserved
	/	Reserved
	Light	On steadily: light on Off: light off
	Heating	On steadily: Heating regulator active Off: Heating regulator off
	Alarm	On steadily: alarm present Flashing: alarm silenced Off: No alarm active
	Temperature	On steadily: a temperature is displayed (**°C** or **°F**) Off: a value not relating to temperature or a label is displayed
AUX	AUX	On steadily: AUX output active (depending on model) Flashing: Deep cooling active Off: AUX output off
	Energy saving	On steadily: Energy saving active Flashing: reduced set active

Note: Some icons may be associated with unavailable functions, depending on the model.

Note: If the value of the parameter **CuS**≠0, when the instrument is switched on it shows the label **CuS** and the value of the parameter for approximately 2 seconds.

Using the controller

Switching on for the first time

Once the electrical connections have been completed, simply power up the device for it to start working.

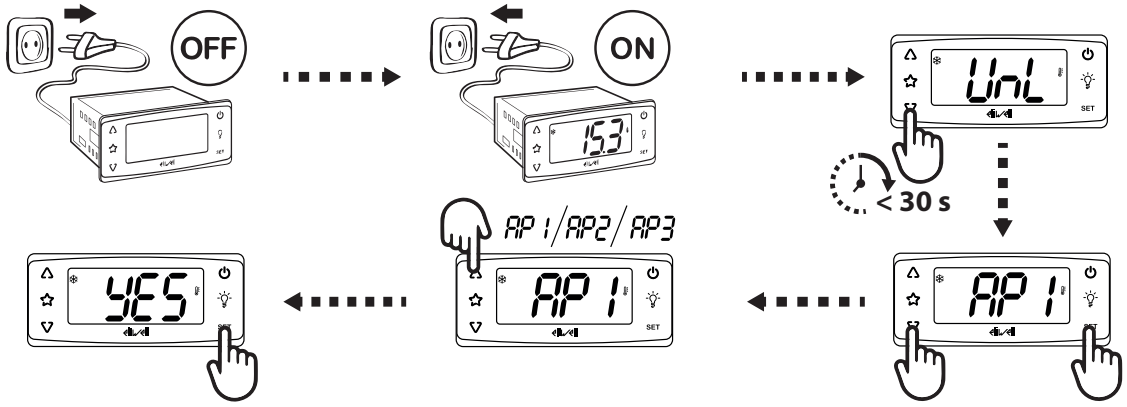
At the first startup:

1. Select and load the preset application - **AP1**, **AP2** or **AP3** - that best reflects the usage requirements.
2. Verify and, if necessary, adjust the value of the main controller parameters to adapt the selected application to your system.
3. Make sure there are no active alarms.

Loading Preset Applications

The procedure to load one of the preset applications is:

1. If the device is on, switch it off
2. Switch on the device
3. Press and hold ∇ for at least 3 seconds, until the keypad unlock label “UnL” appears
4. Within 30 seconds since the device power-on, press and hold (**SET** + ∇) for at least 5 seconds, until the label “AP1” appears
5. Scroll through applications **AP1**, **AP2** and **AP3** using ∆ and ∇
6. Confirm the selected preset application using **SET**.
   Note: The process can be canceled by pressing ⏻ or letting a timeout occur (15 seconds)
7. If the procedure completes successfully, the display will show "**yES**"; otherwise it will show "**no**"
8. The regulator will restart



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

NOTICE
INOPERABLE DEVICE Verify the parameters after loading a preset application. **Failure to follow these instructions can result in equipment damage.**

Password

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

- **PA1**: access the User parameters (default: **PA1** = 0 - disabled)
- **PA2**: access the Installer parameters (default: **PA2** = 15 - enabled)

To change the password value:

1. To unlock the keypad, press and hold ▽ for at least 3 seconds, until the label "**UnL**" appears
2. Press and hold for at least 5 seconds **SET**
3. Scroll through the parameters with △ and ▽ until you find the label "PA2"
4. Press and release **SET**
5. Set the value "15" using the keys △ and ▽
6. Confirm the value by pressing **SET** (the first folder will be displayed)
7. Scroll through the folders with △ and ▽ until you find the label "diS"
8. Press and release **SET**
9. Scroll through the parameters with △ and ▽ until you find the label "PS1" or "PS2", depending on whether you want to change access password **PA1** or **PA2**
10. To confirm the value press **SET** or ⏻, or let a timeout occur (15 seconds).

Note: If **PA1**=0, the User parameters will be not protected and displayed before **PA2** label.

Note: If the value entered is incorrect, the label **PA1**/**PA2** will be shown again. Repeat the procedure.

Machine Status Menu

To enter the Machine Status menu:

1. To unlock the keypad, press and hold ▽ for at least 3 seconds, until the label "**UnL**" appears
2. Press and release **SET**
3. Scroll through the folders with keys △ and ▽ until you find the label for the desired folder
4. Press and release **SET**
5. View the value reading
6. To exit press **SET** or ⏻, or let a timeout occur (15 seconds).

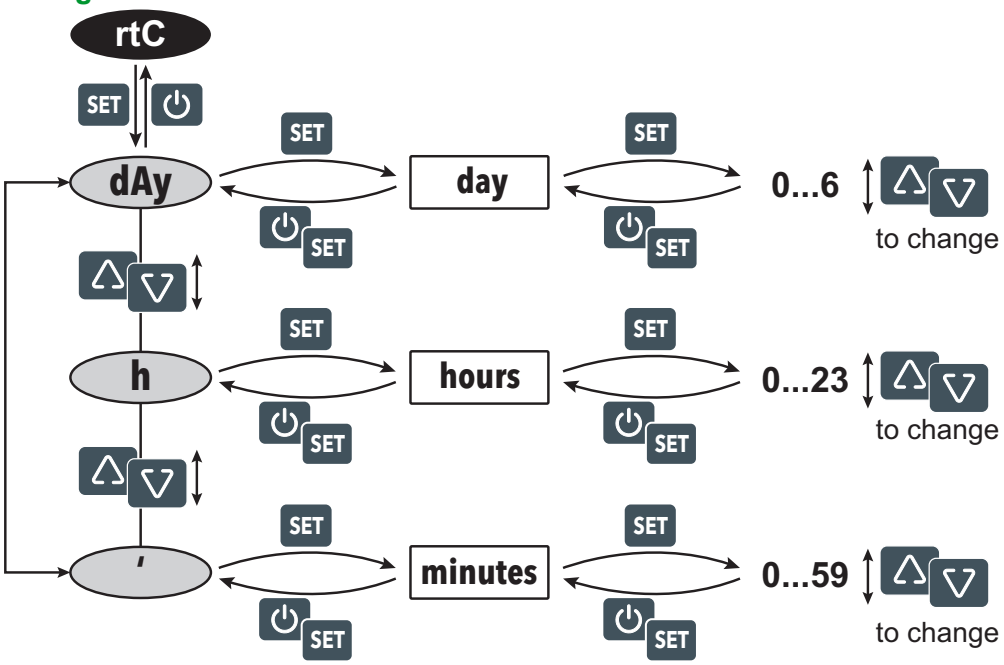
List of folders:

The folders shown are as follows:

- **SEt**: setpoint setting folder
- **ALr**: alarms folder (only visible if there are active alarms)
- **rtC**: clock parameters folder
  - **dAy**: day
  - **h**: hour
  - **'**: minutes
- **Pb1**: Pb1 probe value folder
- **Pb2**: ICE1 sensor value folder (Ice bank - Minimum level)
- **rP2**: raw points/100 value folder for sensor ICE1
- **Pb3**: ICE2 sensor value folder (Ice bank - Maximum level)
- **rP3**: raw points/100 value folder for sensor ICE2
- **idF**: firmware mask value folder
- **rEL**: firmware release value folder
- **nAM**: product name folder

Note: some folders may not be present, depending on the model

RTC setting



Programming Menu

To enter the Programming menu:

a. To unlock the keypad, press and hold ▽ for at least 3 seconds, until the label "**UnL**" appears
b. Press and hold for at least 5 seconds **SET**

If required, an access PASSWORD **PA1** will be requested for User parameters and **PA2** for Installer (Inst) parameters (see **Password** section).

User parameters (User):

Upon access the first parameter (**SEt**) will be shown.

1. Scroll through the parameters with keys △ and ▽ until you find the label for the parameter you want to change
2. Press and release **SET**
3. Set the desired value using the keys △ and ▽
4. To confirm the value press **SET** or ⏻, or let a timeout occur (15 seconds).

Installer parameters (Inst):

Upon access the first folder (**CP**) will be shown.

1. Scroll through the folders with keys △ and ▽ until you find the label for the desired folder
2. Press and release **SET**
3. Scroll through the parameters with keys △ and ▽ until you find the label for the parameter you want to change
4. Press and release **SET**
5. Set the desired value using the keys △ and ▽
6. To confirm the value press **SET** or ⏻, or let a timeout occur (15 seconds).

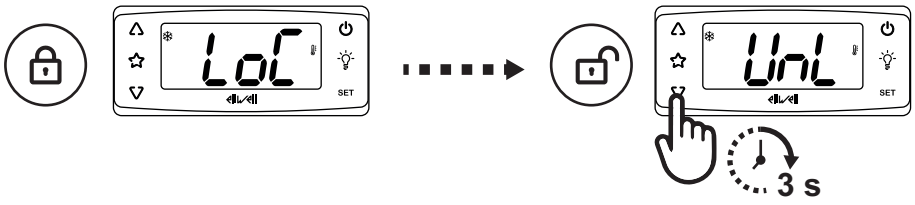
Note: Switch the device off and on again every time you change the parameter configuration.

Locking/unlocking the keypad

The keypad locks automatically in the following situations:

- at device power-on
- after 30 seconds of inactivity

To unlock the keypad, press and hold ▽ for at least 3 seconds, until the label 'UnL' appears.



Viewing the probe values

1. Unlock the keypad by pressing and holding ▽ for at least 3 seconds, until the label “**UnL**” appears
2. Press and release **SET** to access the 'Machine status' menu
3. Scroll through the folders with △ and ▽ until you find the folder **Pb1** or **Pb2** or **Pb3**
4. Press **SET** to view the value measured by the corresponding probe.

Notes:
- the displayed value cannot be changed.
- folder **Pb2** can only be viewed on models that manage probe Pb2.
- folder **Pb3** can only be viewed on models that manage probe Pb3.

Setting the setpoint

1. To unlock the keypad, press and hold ▽ for at least 3 seconds, until the label “**UnL**” appears
2. Press and release **SET** to access the “Machine status” menu
3. Scroll through the folders with △ and ▽ until you find the folder **SEt**
4. Press **SET** to view the current setpoint value.
5. Change the setpoint value using △ and ▽ within 15 seconds.
6. To confirm the value press **SET** or ⏻, or let a timeout occur (15 seconds).

Setting frequently used functions

Some frequently used functions may be paired with the keys by suitably configuring the corresponding parameters; they can then be activated by pressing and holding the paired key.

Note: Some keys may not be present or settable, depending on the model.

Key	Parameter
▽	**H32**
⏻	**H33**

Value H32/H33	Description
0	Disabled
1	Defrost
2	AUX
3	Reduced set
4	Stand-by
5	Reserved
6	Reserved
7	Deep cooling
8	Light
9	Energy saving
10	Reserved
11	Summer mode

Setting the main parameters

See "User" menu in the parameters table for the various models.

Setting the probes

Probe inputs

The controller has the following inputs:

- one analog input (**Pb1**)
- two ice sensors (**ICE1**= **Pb2** and **ICE2** = **Pb3**)

Probe calibration

The **diS** folder, within the “Installer” menu, contains the parameters:

- **CA1** (probe Pb1)

to force an additional value (with sign) on reading the corresponding probe (if managed by the specific model).

Setting the displayed values

Introduction

The following settings refer to the parameters in folder **diS**.

Display with decimal point

You need to set parameter **ndt**:

ndt value	Description
y	Display with decimal point and resolution to tenths of a degree
n	Display with no decimal point

Note: this setting only influences the displaying of data, not the resolution of the measurement or the accuracy of the controller's calculations.

Default display

You need to set parameter **ddd**:

ddd value	Description
0	Display setpoint
1	Display the value read by Pb1
2	Display the value read by ICE1 (Pb2)
3	Display the value read by ICE2 (Pb3)

Note: If the selected probe is not present, the displayed value cannot be considered reliable.

Default ECPlus module display (via Modbus)

The controller can manage a **ECPlus** module (via Modbus) connected to the TTL serial port. **Note**: the controller always acts as a Master.

To enable viewing, set parameter **ddE**:

ddE value	Description
0	**ECPlus** module not connected
1	View the value read by Pb1. If Pb1 is in error, "**E1**" will appear.
2	View the value read by ICE1 (Pb2)
3	View the value read by ICE2 (Pb3)
4	View the setpoint value.

Note: If the selected probe is not present, the displayed value cannot be considered reliable.

Display during defrost

You need to set parameter **ddL**:

ddL value	Description
0	Display the values read by Pb1
1	Display the value read by Pb1 at the start of defrost
2	Display the label **dEF**

Filter displayed value

Filtering of the value shown on the display depends on parameters **FiS** and **Fit**.

FIS parameter:

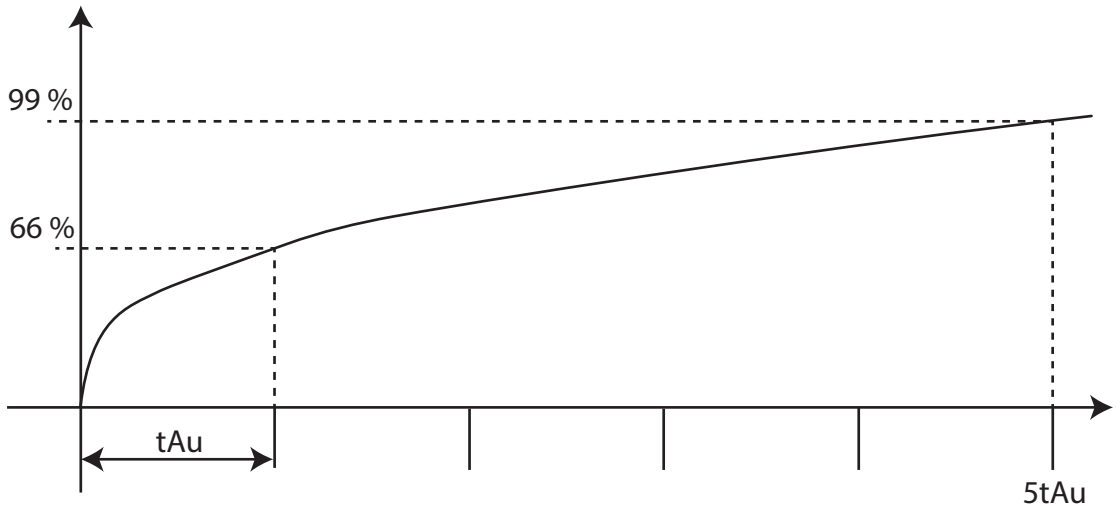
- **FiS**=0: the filter is disabled
- **FiS**=1: the filter is set based on time values **tAu** and **5tAu**, and is applied to the displayed information according to the value of parameter **Fit**.
- **FiS**=2: the temperature value shown changes by 1°C/°F every **tAu** minutes

Note: **tAu** and **5tAu** are, respectively:

- **tAu** = the time taken by the temperature shown to reach 66% of the final value
- **5tAu** = the time taken by the temperature shown to reach 99% of the final value

FIt parameter:

- **Fit**=0: the filter is only enabled when the temperature increases
- **Fit**=1: the filter is always enabled (both when the temperature increases and when it decreases)



Set the unit of measure for the temperatures

You need to set parameter **dro**:

dro value	Description
0	Display the temperature in °C
1	Display the temperature in °F

Note: this setting only influences how the temperature read by the probe is displayed. After changing the unit of measure from °C to °F, the value of parameters **SEt/SES**, **diF/diS**, etc, remains the same and they will take on a different meaning, since they are expressed in a new unit of measure (**SEt/SES** = 10°C becomes **SEt/SES** = 10°F).

Defrost

Contents

This section includes the following topics:

Introduction 43
Display and alarm operation 44
Manual defrost 45
Modulating Defrost 47
Standard defrost 53

Introduction

In addition to Standard defrosts, a Modulating defrost has been developed with the aim of activating the defrost function "when necessary", on the basis of conditions defined previously.

List of defrost types

Click on the desired defrost type to access the relevant section:

- Modulating Defrost
- Standard defrost

Functioning conditions

Defrosting removes ice from the surface of the evaporator.

Defrost is triggered automatically if:

- the defrost activation timer has elapsed.

Defrost is NOT triggered automatically if:

- a manual defrost is already underway.
- the defrost activation timer has elapsed, in which case a new timer count will begin.

Display and alarm operation

Alarm operation during defrost

You can activate an alarm for defrost ending due to timeout, by setting parameter **dAt** = y (see alarm **Ad2** in the section "Alarms and indications" on page 91).

In the event of a regulation probe (Pb1) error, defrosts will still take place and during defrost the temperature alarm associated with the probe error will be excluded.

Displayed values

By setting parameter **ddL**, you can choose the values displayed during the defrost phase until the end of dripping time.

The value shown on the display may be configured in one of the following ways:

- **ddL** = 0: display the temperature read by the regulation probe (Pb1)
- **ddL** = 1: display the temperature read by the regulation probe (Pb1) at the start of defrost
- **ddL** = 2: display (steadily) the label **dEF** (defrost)

Restore standard displaying

The standard displaying is restored on the display:

- on reaching the setpoint and after dripping
- on reaching the timeout value, defined by parameter **Ldd**

Parameters

Parameter	Description
dAt	Defrost ended due to timeout alarm indication.
ddL	Display mode during defrosting.
Ldd	Display unlock timeout value - label **dEF**.

Manual defrost

Introduction

The Manual Defrost function can be activated in one of the following ways:

- press and hold a key (configured with **H3x** = 1)
- via digital input (configured with **H12** = ±1)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)

Note: if the **odo** count is in progress, the defrost cycle does not begin, the request is not carried out and the display will flash three times to indicate that defrosting is not possible.

Functioning conditions

If manual defrost is activated, depending on the value of parameter **dMr**, the defrost interval count (**dit** time):

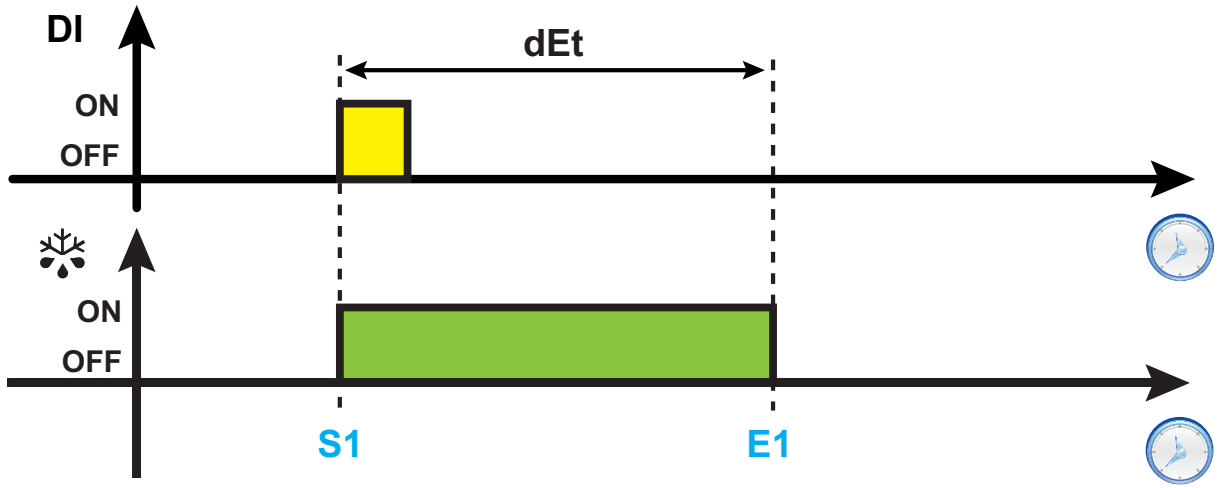
- if **dMr** (0) = **n** the count is not reset.
- if **dMr** (1) = **y** the count is reset

If the **odo** count is in progress, the defrost will not be activated and the display will flash three times.

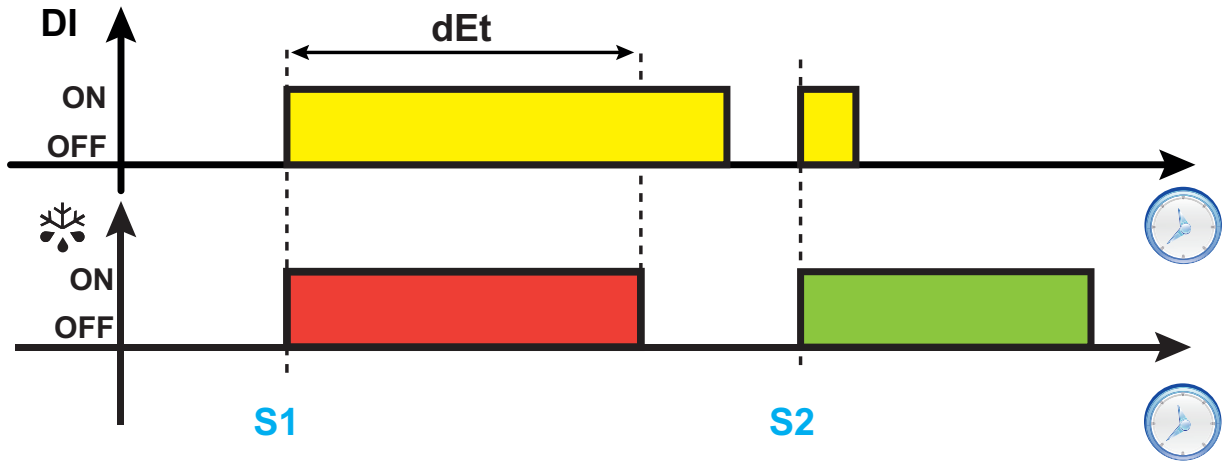
Note: defrost activation takes place upon closure (**H12**=1) or opening (**H12**=-1) of the digital input DI (if activated). You can only activate a defrost, not end an active one. Any defrost or dripping cycle in progress and the defrost or dripping time cannot be suspended.

Regulation examples

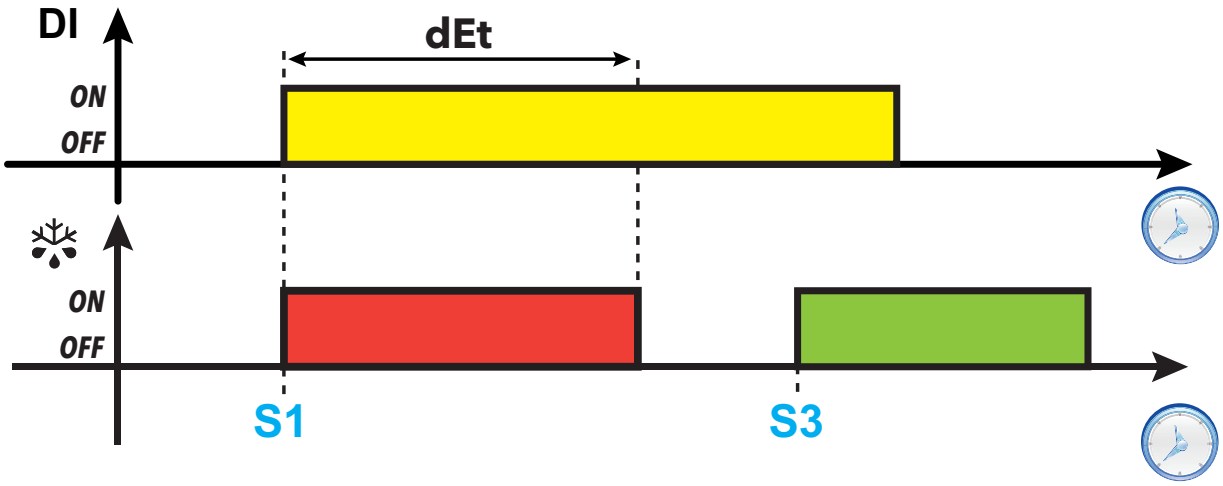
Example 1:



Example 2:



Example 3:



Legend: **S1** = Defrost 1 start; **S2** = Defrost 2 start; **S3** = Regular defrost start with fixed expiration; **E1** = End of defrost due to timeout.

Parameters

Parameter	Description
dit	Time interval between one defrost and the next.
odo	Output activation delay time from switching on the controller or after a power failure.
dEt	Defrost timeout. Determines the maximum duration of the defrost.
H12	DI digital input/polarity configuration (on TTL port).
H32	▽ key configuration.
H33	⏻ key configuration.

Modulating Defrost

The Modulating defrost methods that can be activated simultaneously are as follows:

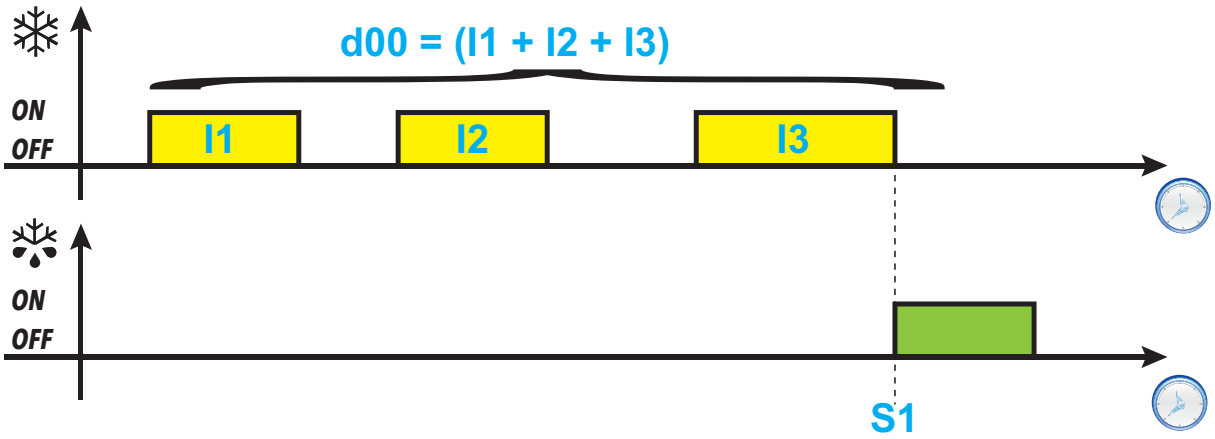
Activation method	Parameters
Compressor running time The defrost is activated when the sum of compressor operating period durations reaches the value **d00**.	**d00/d01**
Instrument running time The defrost is activated when the instrument operating period duration reaches the value **dit**.	**dit/d11**
Compressor stop The defrost is activated when the compressor switches off (only if **d20** = 1).	**d20**
RTC (Real Time Clock) The defrost will be activated at preset intervals and on specified days (RTC with fixed or regular intervals)	**d90...d94**

Compressor running time

This defrost can be configured via the following parameters:

Parameter	Description
d00	Compressor running time before defrost is activated. When the compressor on time is equal to **d00**, defrost is active. The value of **d00** is calculated as the sum of all the compressor on times.
d01	**d00** unit of measure: • **0** = hours • **1** = minutes • **2** = seconds

Regulation diagram



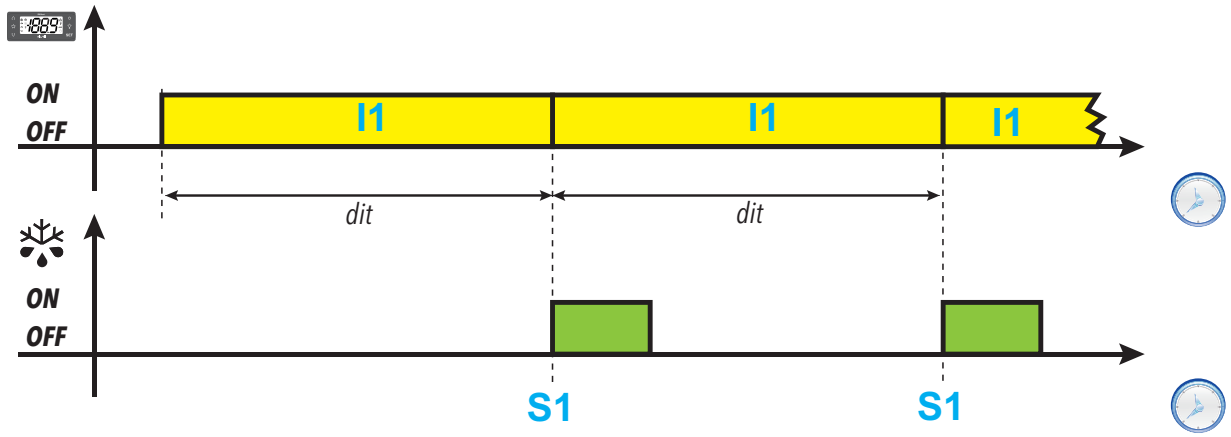
Legend: **I1, I2, I3** = Compressor on times; **S1** = Defrost start.

Instrument running time

This defrost can be configured via the following parameters:

Parameter	Description
dit	Time interval between one defrost and the next. After the instrument is switched on, a meter is activated and remains on, regardless of the compressor status. When the time period **dit** has elapsed, defrost will be activated and the meter will start a new count until the next defrost is activated.
d11	**dit** unit of measure: • **0** = hours • **1** = minutes • **2** = seconds

Regulation diagram



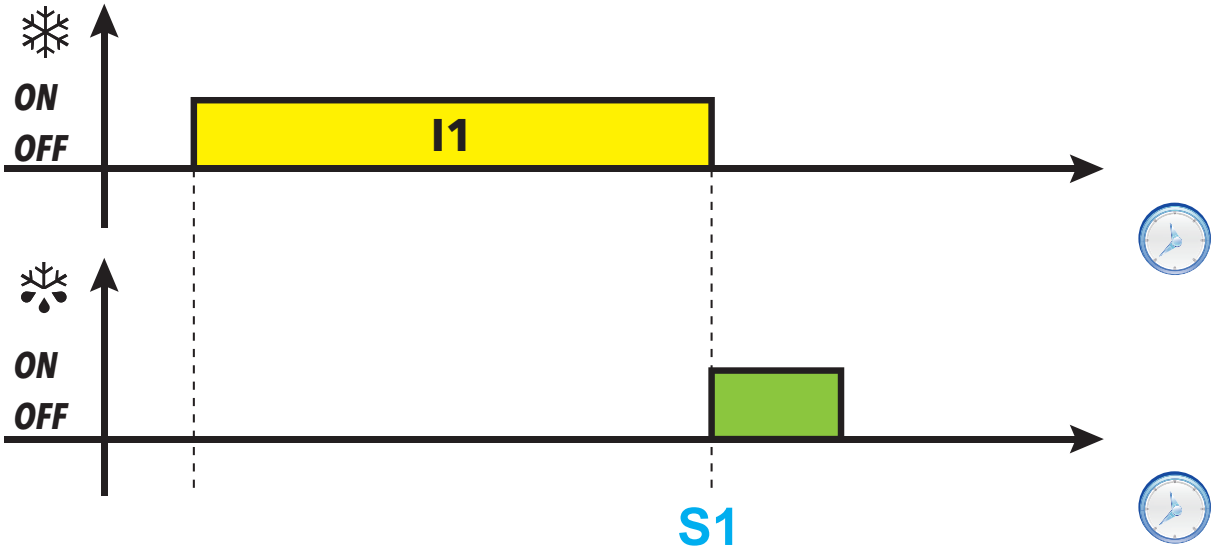
Legend: **I1** = Controller on time (equal to **dit**); **S1** = Defrost start.

Compressor stop

This defrost can be configured via the following parameters:

Parameter	Description
d20	Can be used to activate the defrost when the compressor switches off. • **0** = mode disabled. • **1** = enabled. Defrost is activated when the compressor switches off.

Regulation diagram



Legend: **I1** = Compressor on time; **S1** = Defrost start

RTC (Real Time Clock)

This defrost can be configured via the following parameters:

Parameter	Description
d90	Sets the defrost mode with RTC. • **0** = Mode disabled • **1** = RTC at time intervals (maximum 6 different intervals) • **2** = RTC at fixed intervals (**d91**) • **3** = Regular RTC
d91	Sets the number of daily defrosts (only if **d90**=2).
d92	Sets the first weekend/holiday defrost (only if **d90**≠3) • **0** = Sunday • **1** = Monday • **2** = Tuesday • **3** = Wednesday • **4** = Thursday • **5** = Friday • **6** = Saturday • **7** = Disabled
d93	Sets the second weekend/holiday day. Same as **d92**.
d94	Sets the interval (duration) of the regular defrost expressed in days.

Note: this function can only be activated in models with RTC.

RTC operation at time intervals

If RTC at time intervals mode is selected (**d90**=1), up to 6 different defrost intervals can be programmed. The intervals can be customized to different schedules for weekdays (**dxH**, **dxn**) or weekends/holidays (**FxH**, **Fxn**).

Note: it is not possible to set the maximum duration or the defrost end temperature for a single defrost event.

RTC operation at fixed intervals

If RTC at fixed intervals mode is selected (**d90**=2), the first defrost starts with the first programmed defrost time (holiday / weekday). The next defrost begins at fixed intervals: the time between two defrosts (expressed in hours) is calculated with the formula 24 h/**d91** (example: if **d91**=6, defrost begins every 4 hours after the first).

The defrost events are described via parameters:

- **d1H** (weekday start hour)
- **d1n** (weekday start minute)
- **F1H** (weekend/holiday start hour)
- **F1n** (weekend/holiday start minute).

Regular RTC operation

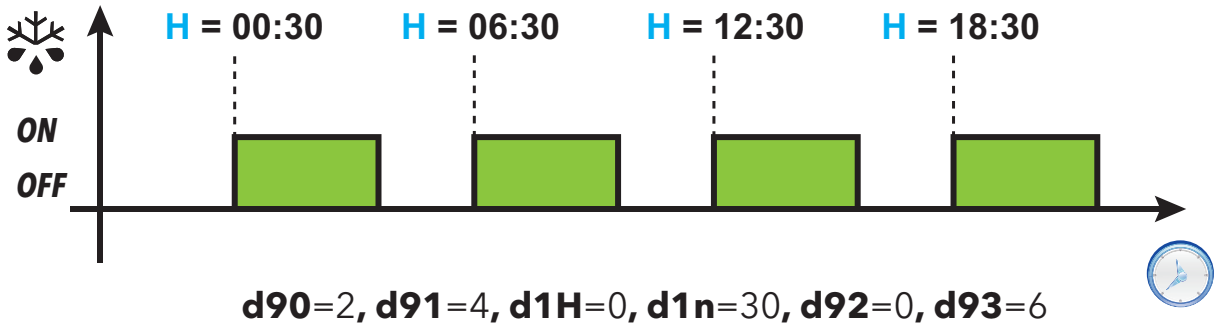
If regular interval RTC is selected (**d90**=3), the first defrost begins at the time programmed using parameters **d1H**, **d1n** (**F1H** and **F1n** are not taken into account).

After **d94** days from the first defrost, at the time **d1H** & **d1n**, a new defrost begins. After **d94** days from the second defrost, at the time **d1H** & **d1n**, a new defrost begins and so on.

Note: No distinction is made between weekdays and weekends/holidays. The value of parameter **d92** is not important.

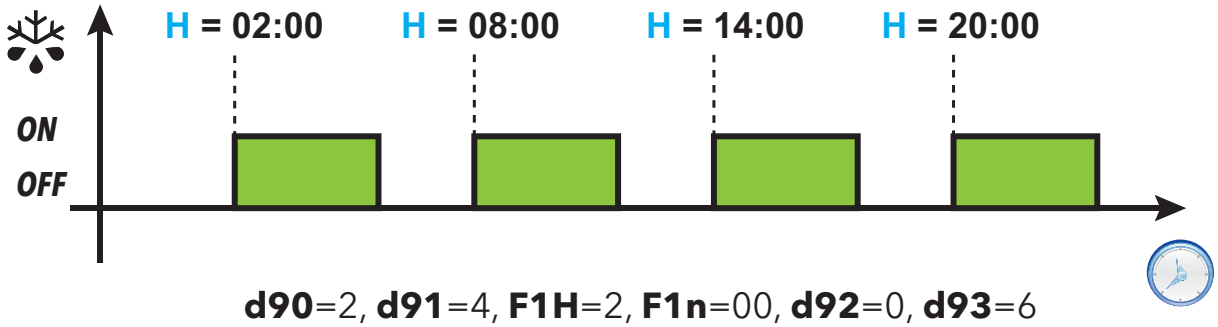
Regulation diagrams

a) Example of defrost at fixed intervals during the week (Monday...Friday)



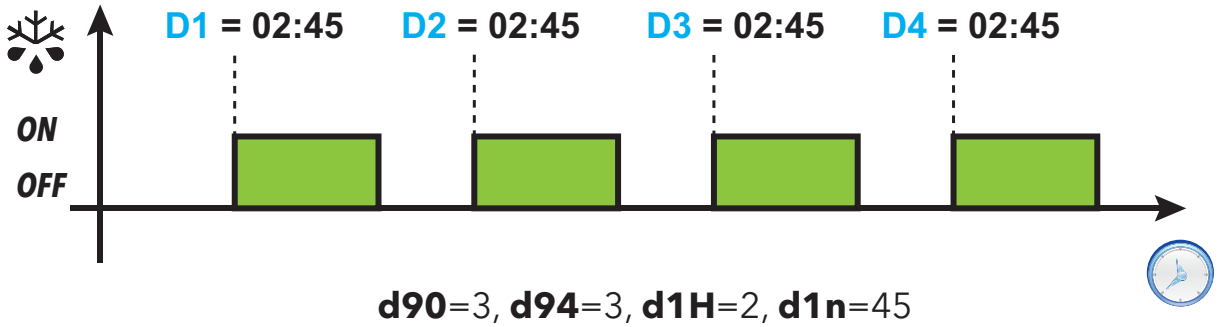
d90=2, **d91**=4, **d1H**=0, **d1n**=30, **d92**=0, **d93**=6

b) Example of defrost at fixed intervals on weekends/holiday (Saturday/Sunday)



d90=2, **d91**=4, **F1H**=2, **F1n**=00, **d92**=0, **d93**=6

c) Example of defrost at regular intervals (start day: Sunday)



d90=3, **d94**=3, **d1H**=2, **d1n**=45

Legend:

- **H** = Defrost start time;
- **Dx** = day of the week (Start day **D1** = Sunday. **d94**=3 days on which consecutive defrosts will start with **D2**=Wednesday, **D3**=Saturday and **D4**=Tuesday).

Standard defrost

To select this defrost mode, set parameter **dty** (defrost type).

Defrost takes place due to the evaporator heating up, in one of the following ways:

dty value	Defrost mode
0	Electric heater defrost
	Defrost due to compressor stoppage
1	Cycle inversion (hot gas) defrost
2	Free defrost

Electric heater defrost

When defrost is activated (**dty** = 0):

- The compressor stops
- the relay to which the electric heaters are connected, configured as defrost regulator output, is activated

At the end of defrost, regulation begins again as normal.

End of defrost

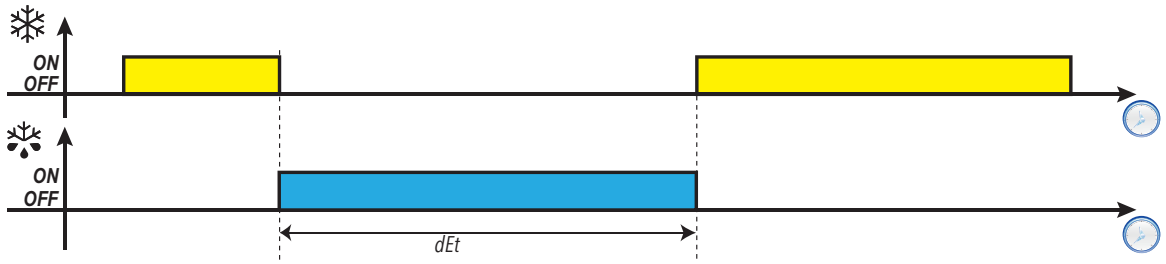
Defrost ends for end of timeout period set using parameter **dEt**.

Notes:

- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- The programmed defrost is carried out independently of the Pb1 status
- Defrost is carried out independently of the door switch activation or not

Regulation diagram

End of electric heater defrost due to timeout



Parameters

Parameter	Description
don	Compressor relay activation delay time from call.
doF	Delay time after compressor relay switch-off and the next switch-on.
dbi	Delay time between two compressor switch-ons.
dty	Type of defrost.
dEt	Defrost timeout. Determines the maximum duration of the defrost.

Defrost due to compressor stoppage

When electric defrost is activated (**dty** = 0),

- The compressor stops
- No relay is configured as defrost regulator output

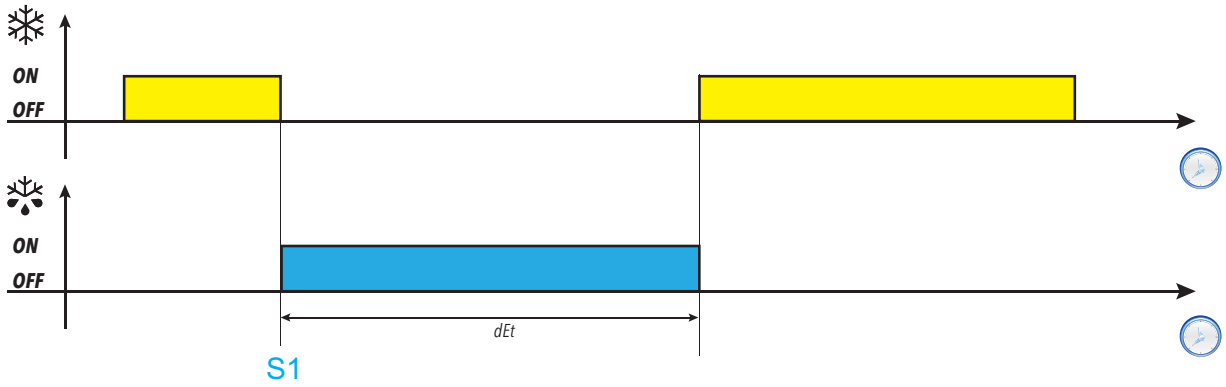
End of defrost

Defrost ends for end of timeout period set using parameter **dEt**.

Notes:

- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- The programmed defrost is carried out independently of the Pb1 status
- Defrost is carried out independently of the door switch activation or not

Regulation diagram



Legend: **S1** = Start of defrost

Parameters

Parameter	Description
dty	Type of defrost.
dEt	Defrost timeout. Determines the maximum duration of the defrost.

Cycle inversion (hot gas) defrost

When defrost is activated (**dty** = 1):

- The compressor remains active for the entire duration of the defrost
- the relay to which the solenoid valve is connected, configured as defrost regulator output, is activated

End of defrost

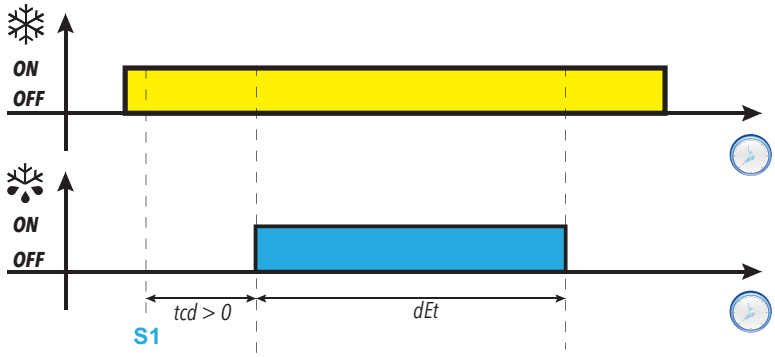
Defrost ends for end of timeout period set using parameter **dEt**.

Notes:

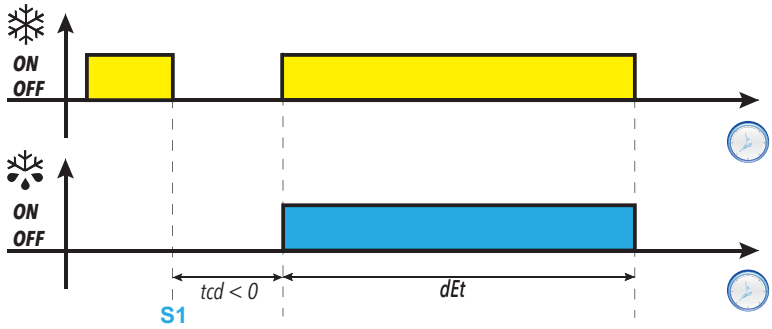
- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- The compressor safety timings (managed by parameters **don**, **doF** and **dbi**) take priority over defrost
- The programmed defrost is carried out independently of the Pb1 status
- Defrost is carried out independently of the door switch activation or not

Regulation diagrams

End of hot gas defrost due to timeout, with tcd > 0



End of hot gas defrost due to timeout, with tcd < 0



Legend: **S1** = Defrost request

Parameters

Parameter	Description
don	Compressor relay activation delay time from call.
doF	Delay time after compressor relay switch-off and the next switch-on.
dbi	Delay time between two compressor switch-ons.
tcd	Minimum compressor on or off time which must elapse before defrost is activated.
dty	Type of defrost.
dEt	Defrost timeout. Determines the maximum duration of the defrost.

Free defrost

When defrost is activated (**dty** = 2):

- The compressor remains under control of the compressor regulator for the duration of the defrost
- the relay to which the electric heaters are connected, configured as defrost regulator output, is activated

At the end of the defrost the heaters switch off.

End of defrost

Defrost ends for end of timeout period set using parameter **dEt**.

Notes:

- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- The programmed defrost is carried out independently of the Pb1 status
- Defrost is carried out independently of the door switch activation or not

Parameters

Parameter	Description
dty	Type of defrost.
dEt	Defrost timeout. Determines the maximum duration of the defrost.

Functions

Contents

This section includes the following topics:

Door switch 59
Stand-by 60
Copy parameters (UNICARD) 61
Boot loader firmware 62
Reset TelevisAir diagnostic counters 63

Door switch

Description

By setting **H12** = ±4 it is possible to connect a door switch to the digital input. When it is activated, the compressor is deactivated instantly or after a time period set with parameter **dCo**.

By setting **H2x** = 5, an AUX relay output can be associated with the door switch regulator output.

Operating mode

Controller operation on opening of the door switch depends on parameters **dod** and **dCo**:

dod	dCo	Compressor
0 = function disabled	NA	On
1 = reserved	NA	NA
2 = compressor disabled	0	Off
	> 0	Off after **dCo** time
3 = reserved	NA	NA

Note: If the door is opened during a defrost cycle, the defrost continues normally.

Parameters

Parameter	Description
dod	Utilities switched off upon activation of the digital input set for the door switch.
dCo	Compressor switch-off delay from door switch.
oAo	Alarm signaling delay after deactivation of the digital input (door closure).
tdo	Delay time due to door open alarm.
AuP	Association of an AUX output when the door is open.
H12	**DI** digital input/polarity configuration (on TTL port).
H21	Configuration of digital output **Out1**
H22	Configuration of digital output **Out2**

Stand-by

Description

The stand-by function maintains the controller power supply and, depending on the value of parameter **H08**:

- switches off the display or shows **oFF**
- deactivates all regulators (or not)
- excludes alarms (or not)

Activation

The stand-by function can be activated in one of the following ways:

- press and hold a key (configured with **H3x** = 4)
- via digital input (configured with **H12** = ±6)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)

Note: the digital input takes priority over the key. If both are configured, the key command will be excluded.

Operation

When the stand-by function is activated, depending on the setting for **H08**, the following will occur:

- **H08** = **0**: display off, the regulators remain active and the instrument can activate the alarm icon ⚠ when an alarm occurs
- **H08** = **1**: display off, all relays are de-energized and the alarms deactivated
- **H08** = **2**: the display shows the text **oFF**, all relays are de-energized and the alarms deactivated

On exiting stand-by function, the temperature alarm is excluded for the time period set with parameter **PAo**; the outputs are deactivated for the time period set with parameter **odo**. These timing are reset every time the controller is switched off.

If stand-by had been active when the controller was switched off (as the result of a blackout, to the opening of the general switch, etc.), it will also remain active the next time it is switched on.

Parameters

Parameter	Description
PAo	Alarm exclusion time when switching on the controller, after a power failure
odo	Output activation delay after startup
H08	Stand-by operating mode
H12	**DI**digital input/polarity configuration (on TTL port).
H32	▽ key configuration.
H33	⏻ key configuration.

Copy parameters (UNICARD)

Introduction

The UNICARD connects to the TTL serial port and allows uploading/downloading of a parameters map.

Note: Format the UNICARD the first time it is used.

The UNICARD:

- Can be connected directly to a computer by means of a USB port.
- If powered by a USB power supply device, it can power **EWNext Performance Dispenser -HC** during the upload/download phases.

Formatting the UNICARD

1. Access the installer parameters, entering the **PA2** password if enabled
2. Scroll through the folders with ∧ and ∨ until you find the folder **FPr**
3. Press **SET** to confirm
4. Scroll through the parameters using ∧ and ∨ until you see parameter **Fr**
5. Press **SET** to confirm.

This command is used to format the UNICARD (necessary when using the card for the first time).
Note: the **Fr** parameter deletes all data present. It's not possible to stop and/or undo this task.

Uploading parameters from the controller to the UNICARD

1. Access the installer parameters, entering the **PA2** password if enabled
2. Scroll through the folders with ∧ and ∨ until you find the folder **FPr**
3. Press **SET** to confirm
4. Scroll through the parameters using ∧ and ∨ until you see parameter **UL**
5. Press **SET** to confirm
6. If the operation is completed, the display will show **yES**, otherwise it will show **no**.

Downloading parameters from the UNICARD to the controller

Connect the UNICARD when the controller is switched off. When the controller is switched on, the data is downloaded automatically from the UNICARD to the controller. On the display shows **dLy** if the operation was successful, otherwise it will show **dLn**.

Note: after downloading the data, the instrument will work with the settings for the loaded map straight away.

Boot loader firmware

Description

The device comes with Boot Loader, which makes it possible to update the firmware directly on site. Updating takes place via UNICARD.

Operating mode

To carry out the update:

1. Connect the UNICARD with the authentic application loaded onto it
2. Restore the device power, if it is off; otherwise, switch it off and on again
3. Wait for the UNICARD LED to flash (operation in progress)
4. The operation is complete when the UNICARD LED is:
   - **ON**: operation completed successfully
   - **OFF**: operation not completed (application incompatible …)
5. At the end of the download, if the operation was successful, firmware is started automatically with the new release. Otherwise, if the applicative is authentic, a feedback is given on display and the applicative does not start.

The controller can be upgraded only with authenticated Schneider Electric or Eliwell files. In case the authenticity check fails the controller stay idle, without any capacity for regulation.

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

To restore the normal operation of the controller, upload an authenticated file.

Diagnostics

During application update the display shows:

- **Pump icon on** ( ): UNICARD connected
- **Alarm icon on** ( ): binaries file non authentic
- **Alarm and reduced set icons on** (+): error during firmware updating
- **Temperature icon flashing** ( ): firmware updating running

Reset TelevisAir diagnostic counters

Description

The controller provides via Televis**Air** a set of counters that can be used for diagnostic or maintenance functions.

Counters list

Label	Counter	Counter presence	RS	RD
tC1	Compressor 1 working hours	Always	10 h	100 h
nC1	Compressor 1 activations	Always	1	10
tC2	Compressor 2 working hours	If configured	10 h	100 h
nC2	Compressor 2 activations	If configured	1	10
td1	Defrost 1 working hours	If configured	1 m	1 h
nd1	Defrost 1 activations	If configured	1	10
tdo	Door opening time	If configured	1 m	1 h
ndo	Door opening count	If configured	1	10
nP0	Power ON counter	Always	1	1
rSt	Reset all the counters			

Legend:

- **RS** = Multiplier factor to be applied to the counter when the value is read via the serial port.
- **RD** = Multiplier factor to be applied to the counter when the value is read on display.

Operating mode

To reset one or more counters, proceed as follows:

1. Access the Installer parameters entering the **PA2** password if enabled
2. Scroll through the folders with ∧ and ∨ until you find the folder **FnC**
3. Press **SET** to confirm
4. Scroll through the menu options with ∧ and ∨ until you find the label **Cnt** and press **SET**
5. Scroll through the parameters with ∧ and ∨ until you find the counter to reset
6. Press and hold **SET** for at least 5 seconds to confirm.

Note: Parameter **rSt** allows you to reset all the counters simultaneously.

Regulators

Contents

This section includes the following topics:

Cool regulator 65
Regulation with probe Pb1 66
Regulation with single ice sensor 68
Regulation with dual ice sensor 69
Ice sensor threshold and differential setting 70
Low ambient temperature protection 71
Compressor 72
Managing the compressor with the probe in error (only if H50=0) 75
Deep cooling cycle (only if H50=0) 76
Pump 78
Pressure switch 79
Auxiliary output 81
Light output 83
Night/Day 85
Energy saving - Reduced set (only if H50=0) 87
Pull-down regulator (only if H50=0) 88

Cool regulator

The regulator can work with an absolute or relative differential and it is controlled by the value of probe Pb1, by one ice sensor or by two ice sensors in accordance with the value of parameter **H50**.

When regulating by means of one or two ice sensors, you need to set the threshold and differential values (consult the section "Ice sensor threshold and differential setting").

Functioning	Condition
Regulation with probe Pb1	**H50=0**
Regulation with single ice sensor (ICE1)	**H50=1**
Regulation with dual ice sensor (ICE1 and ICE2)	**H50=2**

Regulation with probe Pb1

Functioning conditions

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 Pb1 is not in error (alarm **E1** is not present)(only if **H50**=0)
- 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)

Standard mode

In standard mode, it uses:

- **SEt** as setpoint
- **diF** as differential

If an offset is activated on the setpoint (**oSP**) and on the differential (**odF**), then:

- **SEt** will be replaced by the value (**SEt + oSP**)
- **diF** will be replaced by the value (**diF+ odF**)

Note: **oSP** can assume both positive and negative values.

Summer mode

In summer mode, it uses:

- **SES** as setpoint
- **diS** as differential

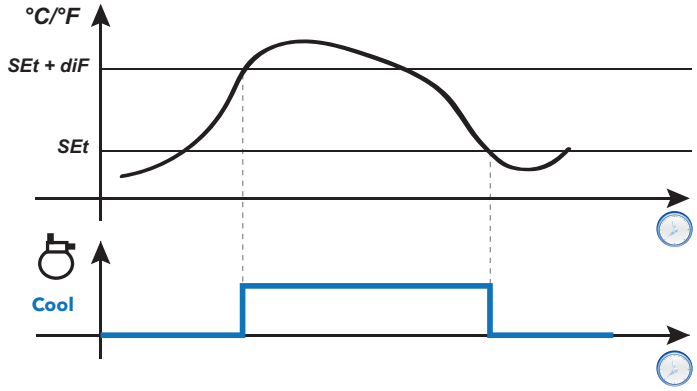
If an offset is activated on the setpoint (**oSP**) and on the differential (**odF**), then:

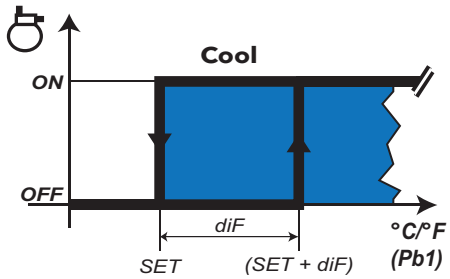
- **SES** will be replaced by the value (**SES + oSP**)
- **diS** will be replaced by the value (**diS+ odF**)

Note: **oSP** can assume both positive and negative values.

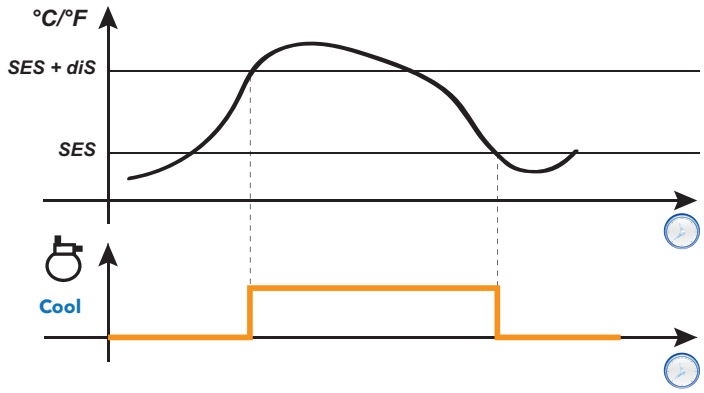
Regulation diagrams

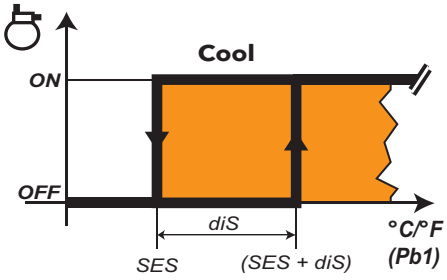
Cooling Regulation in standard mode





Cooling Regulation in summer mode





Legend: **Cool** = Cooling.

Parameters

Parameter	Description
SEt	Regulation setpoint
SES	Regulation setpoint in summer mode
diF	Regulator activation differential
diS	Regulator activation differential in summer mode
oSP	Offset on setpoint
odF	Offset on differential in energy saving mode
odo	Output activation delay after startup

Regulation with single ice sensor

The regulator is active if the parameter **H50** = 1.

In this configuration the ice sensor is connected to the input ICE1 (Pb2).

The Compressor:

- is activated when the sensor detects the presence of water
- is switched off when the sensor detects the presence of ice (or air)

Legend: **ICE1 (Pb2)** = Ice sensor 1; **COMP** = Compressor output.

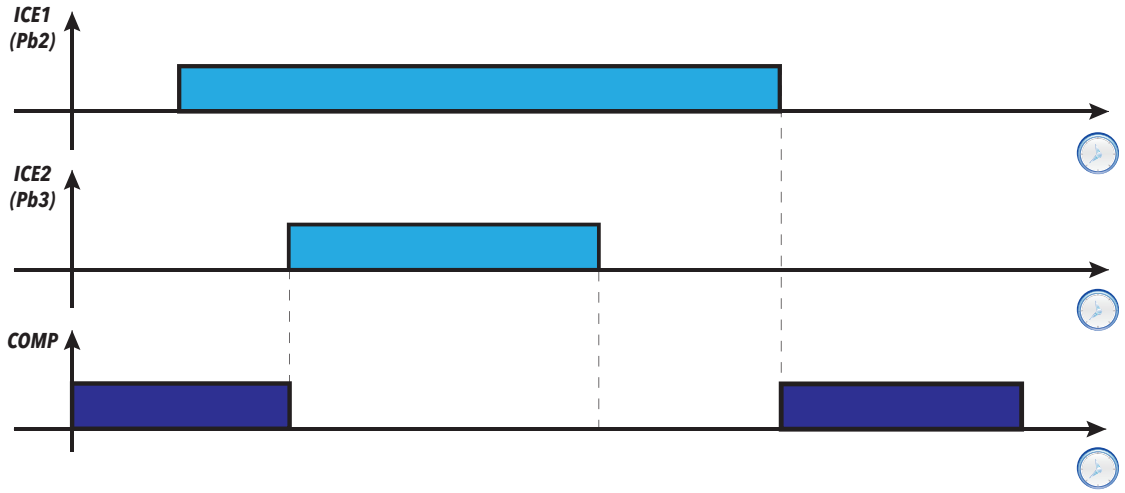
Regulation with dual ice sensor

The regulator is active if the parameter **H50** = 2.

In this configuration the two ice sensors are connected to the inputs ICE1 (Pb2) and ICE2 (Pb3).

The Compressor:

- is activated when both sensors detect the presence of water
- is switched off when both sensors detect the presence of ice (or air)
- remains in the same condition in all other cases



Legend: **ICE1 (Pb2)** = Ice sensor 1; **ICE2 (Pb3)** = Ice sensor 2; **COMP** = Compressor output.

Note: In situations where a dual sensor is used, the shared electrode is typically located between the two electrodes, where the electrode specifically corresponding to sensor ICE1 (Pb2) is associated with the minimum ice thickness position and the electrode specifically corresponding to sensor ICE2 (Pb3) is associated with the maximum ice thickness position.

Ice sensor threshold and differential setting

To calculate the value of the threshold (**H51**) and differential (**H52**) for the ice sensors, proceed according to the refrigerant used, as follows:

Refrigerant = water

Regulation with single or dual ice sensor (ICE1 or ICE1+ICE2)

1. Set **H51** = 0 (so that the machine continues to produce ice)
2. On startup, when the refrigerant is completely liquid, access the "Machine status" menu, read the value of variable **RP2** (raw points/100 for sensor ICE1) and make a note of it as the RP2max value. The machine will continue to produce ice
3. When the ice reaches the maximum permitted value (all electrodes, two in the case of a single sensor and three in the case of a dual sensor, are completely immersed in the ice), access the "Machine status" menu, read the new value of variable **RP2** (raw points/100 for sensor ICE1) and make a note of it as the RP2min value
4. Set the threshold to: **H51** = (RP2max+RP2min)/2
5. Set the differential to: **H52** = (RP2max-RP2min)/3

Refrigerant = glycol solution

Regulation with single ice sensor (ICE1)

1. Set **H51** = 0 (so that the machine continues to produce ice)
2. When the ice reaches the minimum permitted value, access the "Machine status" menu, read the value of variable **RP2** (raw points/100 for sensor ICE1) and make a note of it as the RP2max value. The machine will continue to produce ice
3. When the ice reaches the maximum permitted value, access the "Machine status" menu, read the new value of variable **RP2** (raw points/100 for sensor ICE1) and make a note of it as the RP2min value
4. Set the threshold to: **H51** = (RP2max+RP2min)/2
5. Set the differential to: **H52** = (RP2max-RP2min)/3

Regulation with dual ice sensor (ICE1+ICE2)

1. Set **H51** = 0 (so that the machine continues to produce ice)
2. When the ice reaches the minimum permitted value, access the "Machine status" menu, read the value of variable **RP2** (raw points/100 for sensor ICE1) and make a note of it as the RP2 value. The machine will continue to produce ice
3. When the ice reaches the maximum permitted value, access the "Machine status" menu, read the value of variable **RP3** (raw points/100 for sensor ICE2) and make a note of it as the RP3 value
4. Set the threshold to: **H51** = (RP2+RP3)/2
5. Set the differential to: **H52** = (RP2-RP3)/3

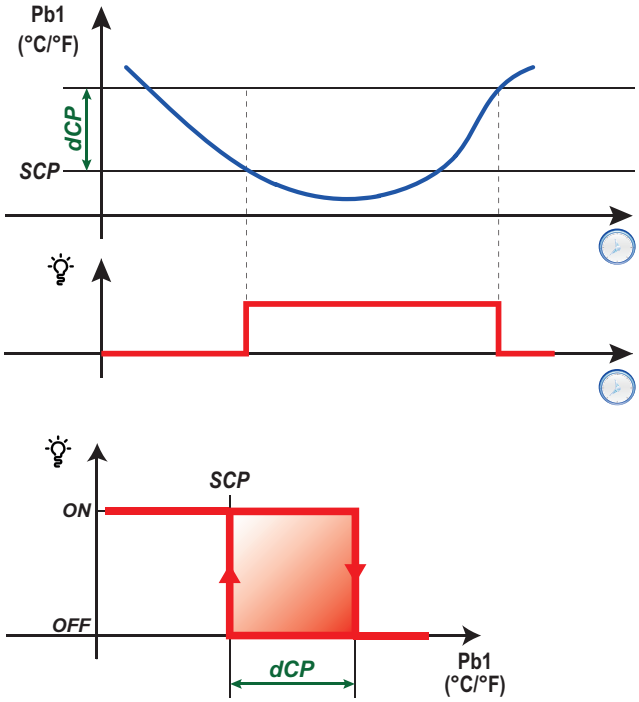
Low ambient temperature protection

Description

Regulator activations takes place when the temperature measured by **Pb1** drops below the temperature **SCP** for a time period **tCP**.

This protection attempts to heat the machine by switching on the lights until the temperature (**SCP**+**dCP**) is reached. If **tCP** = 0, the function is disabled.

Regulation diagram



Parameters

Parameter	Description
SCP	Excessive cold protection setpoint
dCP	Excessive cold protection differential
tCP	Amount of time the temperature remains below setpoint **SCP**.

Compressor

Description

The compressor is controlled by a relay and switches on/off according to the following elements:

- A COOL regulator request
- the defrost functions

For compressor-controller wiring diagrams, refer to the "Electrical Connections" section.

Note: digital output **Out1** is set as "Compressor" by default.

Functioning conditions

The regulator is activated if the following conditions occur:

- The controller is on or in stand-by (in the latter case, only applies if **H08** = 0)
- Regulation probe Pb1 is not in error (alarm **E1** is not present) (only if **H50**=0)
- 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)

The Compressor activation request at startup can be delayed by setting parameter **odo**.

During this period, the compressor remains off and, if an activation request is made, the compressor icon ❄ flashes.

Regulator activations is possible also near a defrost cycle.

There is a fixed interval of one second between the request and the actuation of the linked relay.

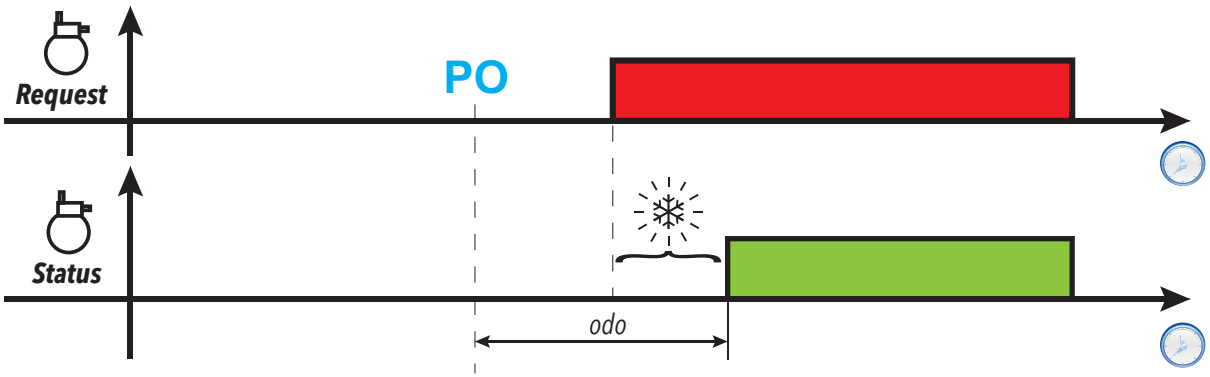
Compressor protections

To avoid damaging the compressor, the following protections can be set up:

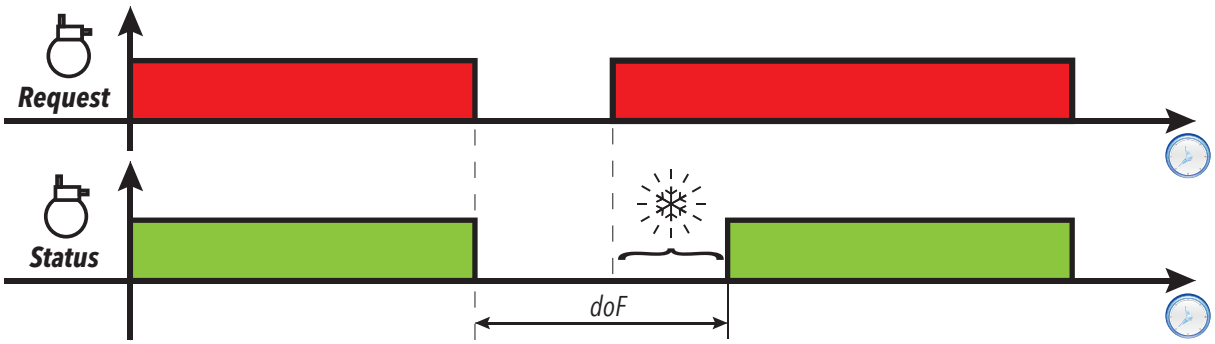
- a delay **doF** between compressor relay switch-off and the next switch-on. If a new activation request arises during the delay **doF**, the compressor icon will flash on the display.
- a delay **dbi** between one compressor startup and the next. The delay **dbi** is calculated from the previous compressor startup. If a request arises during the delay **dbi**, the compressor icon will flash on the display.
- a delay **don** for compressor startup after the request. During the delay **don**, the compressor icon will flash on the display.
- Minimum compressor output activation time **Cit** .
- a maximum compressor running time **CAt**, even if the activation request has not ended and is normally associated with the delay **doF**. During the time period **doF** in which the compressor remains off, the compressor icon will flash on the display.

Regulation diagrams

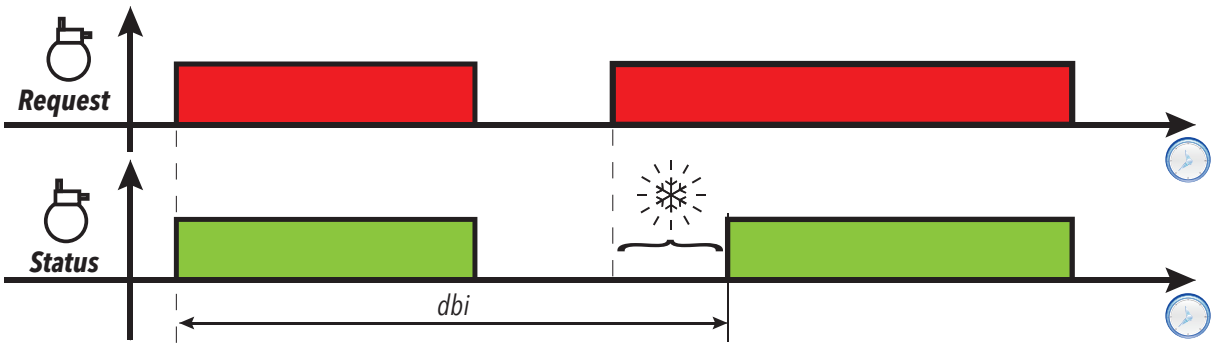
Compressor activation delay from controller power-on



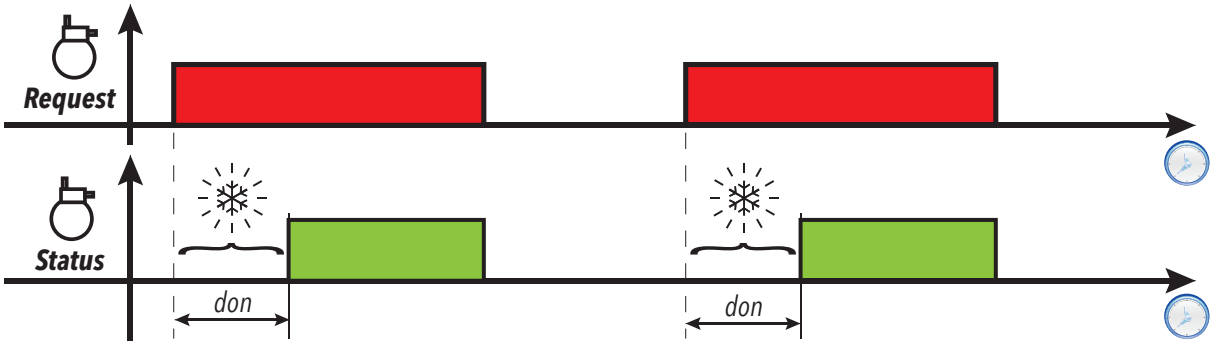
Compressor output activation delay from switch-off



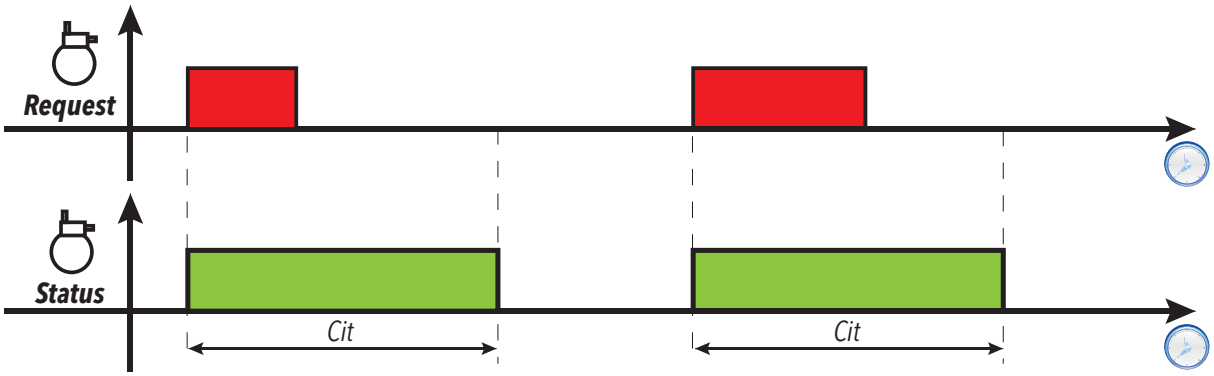
Delay between two consecutive compressor output activations



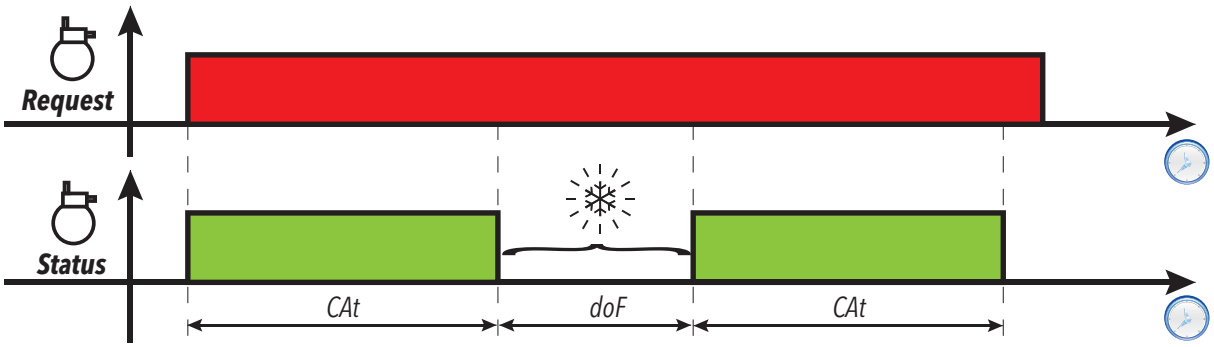
Compressor activation delay from request



Minimum compressor output activation time



Maximum compressor output activation time



Legend: **PO** = Controller switch-on; ❄ = Compressor icon flashing; **Request** = Compressor activation request; **Status** = Compressor status (ON/OFF).

Parameters

Parameter	Description
don	Compressor relay activation delay from call
doF	Delay between compressor relay switch-off and the next switch-on
dbi	Delay between two subsequent compressor starts
Cit	Minimum compressor activation time
CAt	Maximum compressor activation time
odo	Output activation delay from startup

Managing the compressor with the probe in error (only if H50=0)

Description

The compressor relay operates in Duty cycle mode (according to parameters **ont** and **oft**) if:

- probe Pb1 is in error and the display shows **E1** (see alarms list)

The first time to consider is always **ont**. If **ont** >0 the compressor protections set using **don**, **doF**, **dbi**, **Cit** and **CAt** still apply.

Note: parameter **odo** inhibits activation of the relay outputs for its duration, with the exception of the alarm relay (if present).

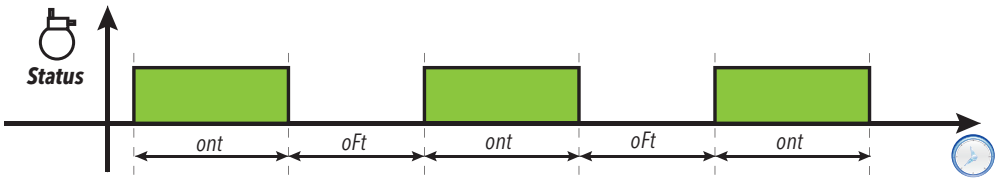
Functioning conditions

Ont	OFt	Compressor output
0	0	off
0	>0	off
>0	0	active
>0	>0	Duty cycle, regardless of the probe values (probe Pb1 not working) and requests from other utilities

Note: if probe Pb1 is functioning, Duty cycle mode is not active and conventional regulation is activated (see compressor section).

Note: when the probe is restored (connected/replaced), normal regulation starts up again.

Regulation diagram



Parameters

Parameter	Description
ont	Compressor output ON time if probe Pb1 is not functioning
oFt	Compressor output OFF time if probe Pb1 is not functioning
don	Compressor relay activation delay from call
doF	Delay between compressor relay switch-off and the next switch-on
dbi	Delay between two subsequent compressor starts
Cit	Minimum compressor activation time
CAt	Maximum compressor activation time
odo	Output activation delay after startup

Deep cooling cycle (only if H50=0)

Description

The Deep Cooling Cycle (DCC) type can be set using parameter **dCA**.

After deep cooling cycle activation, the interval between 2 programmed defrosts is reset and the defrost disabled.

Operating condition

A deep cooling cycle can be activated based on the value of **dCA**:

- **dCA** = **dis**: Deep cooling cycle disabled
- **dCA** = **Std**: Manual deep cooling cycle
- **dCA** = **Aut**: Automatic deep cooling cycle

When the **dCC** meter runs out (Defrost activation delay after a "Deep cooling cycle"):

- a defrost is forced
- the defrost meters are restarted.

Note: If **dCC**=0, automatic defrost after a deep cooling cycle is disabled.

If regulation is not based on ice sensors but on the temperature probe value and this is in error, the deep cooling cycle is inhibited and standard regulation takes place (with management of the probe in error).

Alarm operation during the deep cooling cycle

During the deep cooling cycle, the temperature alarms are disabled with the exception of the low temperature alarm LAL. Normal management is restored at the end of the cycle, when the regulation setpoint is reached.

Manual deep cooling cycle

The regulator can be activated manually in one of the following ways:

- press and hold a key (configured with **H3x** = 8)
- digital input (only if **H12** = ±3)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)

During manual deep cooling cycle the regulation will work:

- using the value **dCS** as a setpoint
- using the value **diF** as a differential
- using the value **tdC** as the maximum regulation duration

If the cycle ends due to timeout (**tdC**), the controller will resume normal regulation according to the status of the machine.

Automatic Deep cooling cycle

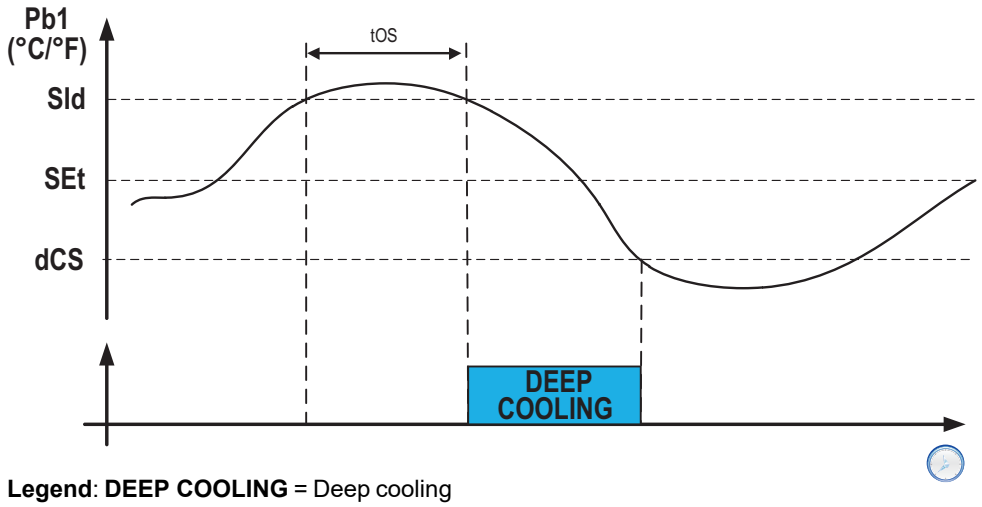
The regulator is activated if the value read by regulation probe **Pb1** remains above the temperature **SId** for a period of time **toS**.

During automatic deep cooling cycle the regulation will work:

- using the value **dCS** as a setpoint
- using the value **diF** as a differential

The cycle will end based on the value **tdC**:

- if **tdC** = 0: it will end when the temperature read by Pb1 drops below the value **dCS**
- if **tdC** > 0: it will end when the time period **tdC** elapses



Legend: **DEEP COOLING** = Deep cooling

Pump

Description

To set a relay as a pump output, set the corresponding parameter **H2x** = 3.

Functioning conditions

The behavior of pump output is:

H54 value	Description
0	If **H54**=0, pump regulates based on the compressor operation: • if the compressor is active, pump output is active • If the compressor is off, pump output regulated in duty cycle mode (See parameters **H57** and **H56**)
1	The algorithm activates the pump output when water temperature rises, regardless of the compressor status. In case of probe failure, pump output remains always on.

Pump output is always enabled when the temperature value read by Pb1 > **H58**.

When the temperature value read by Pb1 < **H58**, the current value and the previous one are continuously compared.

If the temperature value continues to go down, the pump output start to operate in duty cycle mode (on for a time **H57** and off for a time **H56**).

Parameters

Parameter	Description
H54	Pump regulation probe selection.
H56	Duty cycle: time with pump regulation on.
H57	Duty cycle: time with pump regulation off.
H58	Pump regulation setpoint.
H21	Digital output Out1 configuration
H22	Digital output Out2 configuration

Pressure switch

Introduction

A pressure switch can be connected to a digital input on the controller.

Setting a digital input as a pressure switch

To set a digital input as a pressure switch:

- Set the digital input as a pressure switch (**H12** = ±7)
- Set the number of errors permitted per pressure switch, parameter **PEn**

  Note: if **PEn** = 0, the function is disabled.

Pressure switch activation effects

When the pressure switch is activated, the controller carries out the following operations:

- It inhibits the compressor
- It adds the **nPA** alarm to the alarms folder **AL** with an indication of the number of pressure switch activations

The compressor can only be reactivated if the time set using parameter **PEt** has elapsed since the pressure switch was deactivated.

The alarm status is reset automatically when the pressure returns to a normal level.

Effects of reaching the maximum number of pressure switch activations

If the number of pressure switch activations reachs the maximum number set using parameter **PEn** in a time period shorter than the value of parameter **PEI**, the controller performs the following operations:

- It inhibits the compressor and defrost.
- The alarm icon ⚠ appears on the display.
- The label **PAL** is shown on the display.
- It replaces label **nPA** with alarm label **PA** in alarms folder **AL**.
- It activates the alarm relay, if configured.

To reset this alarm status, execute the **rAP** function in folder **FPr** or switch the controller off and on again.

Operating mode

The interval **PEI** is divided into 32 sub-intervals. If one or more activations are recorded within a sub-interval, the meter is increased by one unit.

The reference instant to calculate the **PEI** interval is the last recorded activation. The number of activations recorded in the 32 sub-intervals preceding the most recent activation are counted.

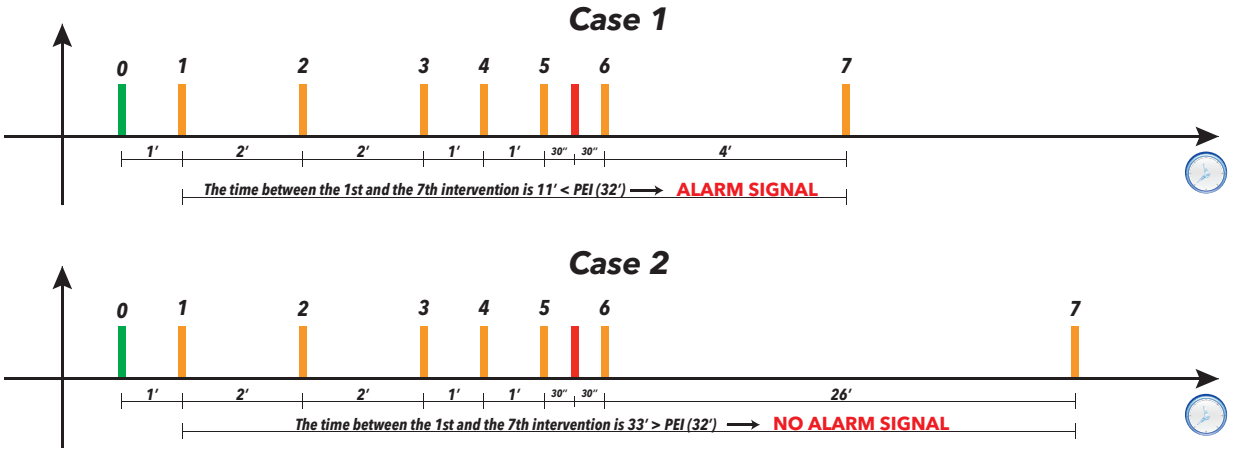
Note: The defrost interval count is independent of any pressure switch alarms.

Regulation diagrams

Examples

PEI = 32 minutes (sub-interval = 32/32 = 1 minute)

PEn = 7



In case 1 the pressure switch alarm is triggered because in the 32 minutes preceding the most recent activation 7 pressure switch activations were counted (including the last one, to which the expiration of the 32-minute window refers).

In case 2 the alarm is not triggered because in the 32 minutes preceding the most recent activation at least 7 pressure switch activations were not counted (including the last one).

Parameters

Parameter	Description
PEn	Number of activations permitted per minimum/maximum pressure switch input
PEI	Minimum/maximum pressure switch activation count interval (in minutes)
PEt	Compressor activation delay after pressure switch deactivation

Auxiliary output

Description

To set a relay as an auxiliary output **AUX**, set the corresponding parameter **H2x**= 5.

Note: The outputs may not be present, depending on the model.

During stand-by the regulator operates in accordance with parameter **H08**.

Activation

The regulator can be activated in one of the following ways:

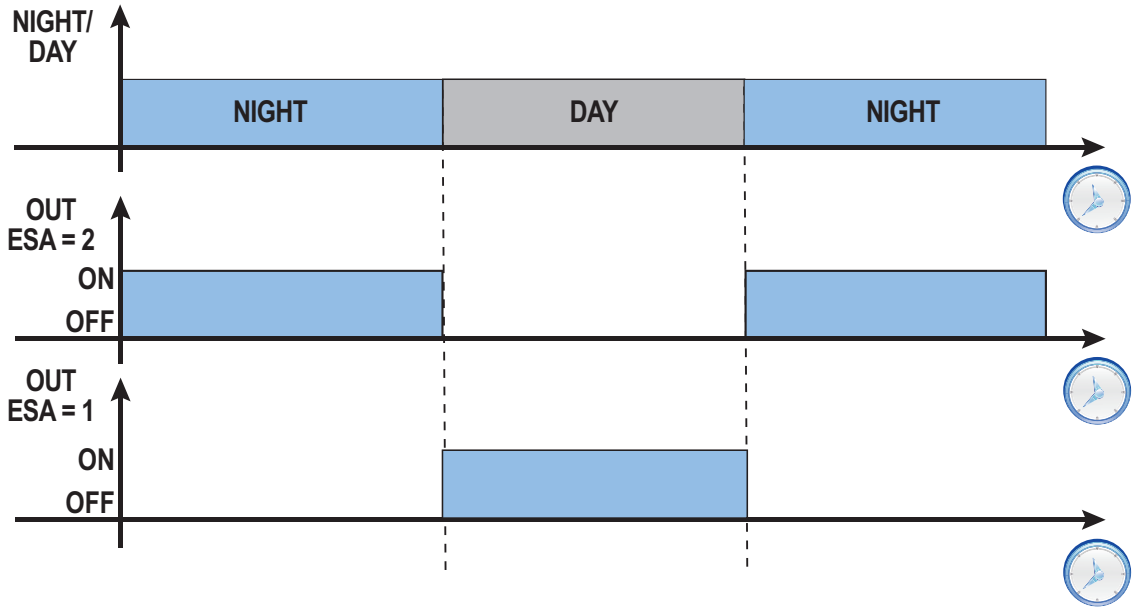
- press and hold a key (configured with **H3x** = 2)
- digital input (only if **H12** = ±3)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)
- RTC activation (models with RTC only)

Note: every time a key associated to the AUX function is pressed the output changes (inverts) status; the digital input, if associated to the AUX function, changes the status of the output in correspondence with its variations.

Regulation during Energy Saving

The status of the **AUX** output during Energy Saving is managed by parameter **ESA**:

- **ESA** = 0: No effect on the status of the AUX output
- **ESA** = 1: Output disabled
- **ESA** = 2: Output enabled



Legend: **OUT** = AUX output; **NIGHT/DAY** = Night/Day; **NIGHT** = Night; **DAY** = Day.

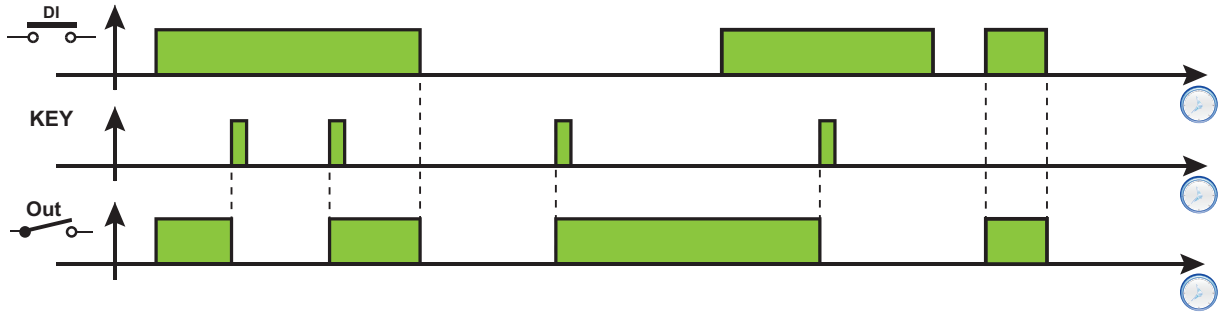
Controlling the auxiliary output via key

To control the output (relay opening/closing) via key, set **H3x** = 2.

Note: depending on the model, some keys may not be present.

Note: the relay status is restored after a blackout.

Regulation diagram



Legend: **DI** = Digital input; **KEY** = Key; **Out** = Digital output.

Parameters

Parameter	Description
ESA	AUX/Light operation during Energy saving
H08	Stand-by operating mode
H12	Digital input **DI**/Polarity configuration
H21	Digital output Out1 configuration
H22	Digital output Out2 configuration
H32	▽ key configuration.
H33	⏻ key configuration.

Light output

Description

To set a relay as an auxiliary **Light**, set the corresponding parameter **H2x**= 7.

Note: The outputs may not be present, depending on the model.

During stand-by the regulator operates in accordance with parameter **H08**.

Activation

The regulator can be activated in one of the following ways:

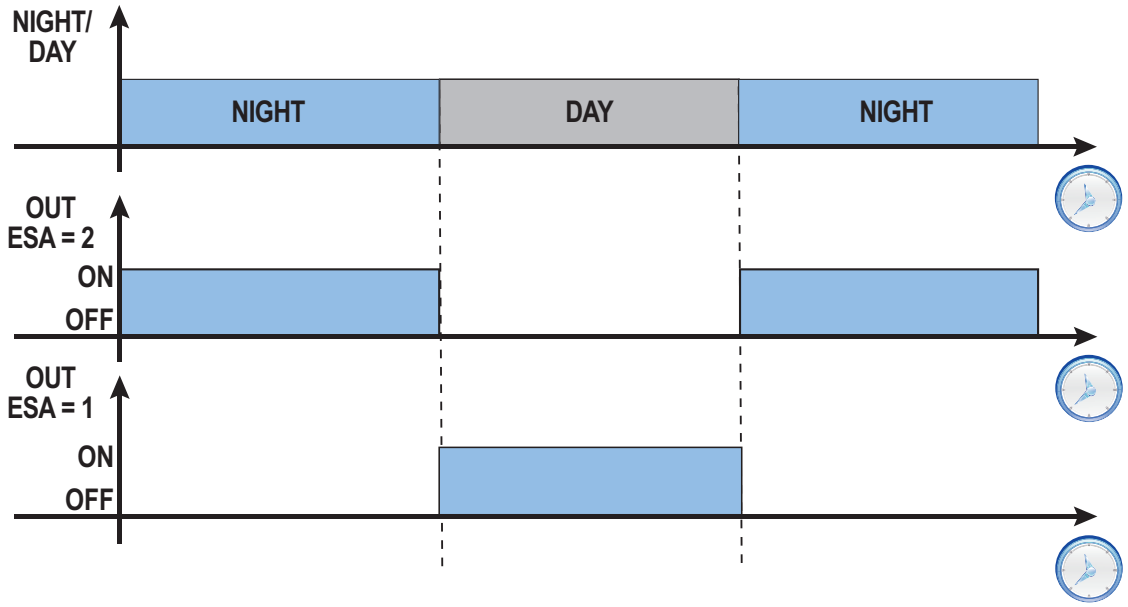
- press and hold a key (configured with **H3x** = 8)
- digital input (only if **H12** = ±3)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)
- RTC activation (models with RTC only)

Note: every time a key associated to the Light function is pressed the output changes (inverts) status; the digital input, if associated to the Light function, changes the status of the output in correspondence with its variations.

Regulation during Energy Saving

The status of the **Light** output during Energy Saving is managed by parameter **ESA**:

- **ESA** = 0: No effect on the status of the Light output
- **ESA** = 1: Output disabled
- **ESA** = 2: Output enabled



Legend: **OUT** = AUX output; **NIGHT/DAY** = Night/Day; **NIGHT** = Night; **DAY** = Day.

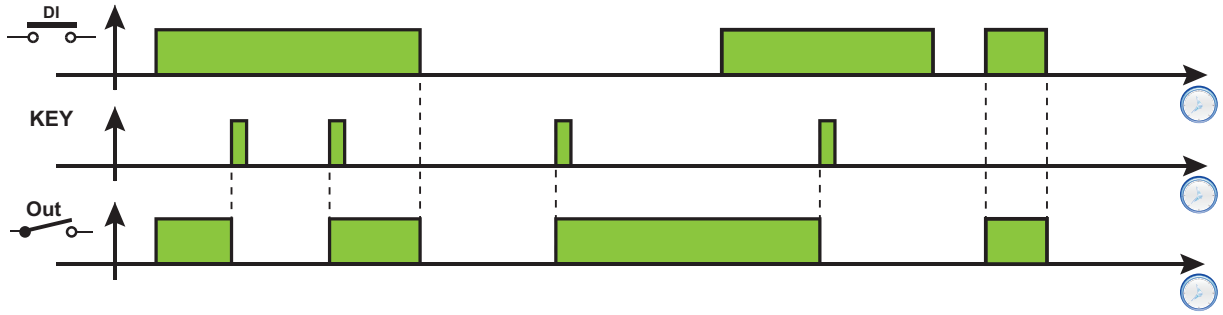
Controlling the light output via key

To control the output (relay opening/closing) via key, set **H3x** = 8.

Note: depending on the model, some keys may not be present.

Note: the relay status is restored after a blackout.

Regulation diagram



Legend: **DI** = Digital input; **KEY** = Key; **Out** = Digital output.

Parameters

Parameter	Description
ESA	AUX/Light operation during Energy saving
H08	Stand-by operating mode
H12	Digital input **DI**/Polarity configuration
H21	Digital output Out1 configuration
H22	Digital output Out2 configuration
H32	▽ key configuration.
H33	⏻ key configuration.

Night/Day

Description

The Night&Day regulator (Energy Saving) can be used to program 2 events.

Functioning conditions

An occurrence can be linked to each of the two events by setting parameters **E10** (Event 1) and **E20** (Event 2):

- **0** = disabled
- **1** = event only active on Mondays
- **2** = event only active on Tuesdays
- **3** = event only active on Wednesdays
- **4** = event only active on Thursdays
- **5** = event only active on Fridays
- **6** = event only active on Saturdays
- **7** = event only active on Sundays
- **8** = event active from Monday to Friday
- **9** = event active from Monday to Saturday
- **10** = event only active on Saturdays and Sundays
- **11** = event active every day

The start and end time can be set for each event:

- START: **E11**, **E12** (Event 1) and **E21**, **E22** (Event 2)
- END: **E13**, **E14** (Event 1) and **E23**, **E24** (Event 2).

If the event end time follows the start time, the event will end on the same day, otherwise it will start on one day and end the next day.

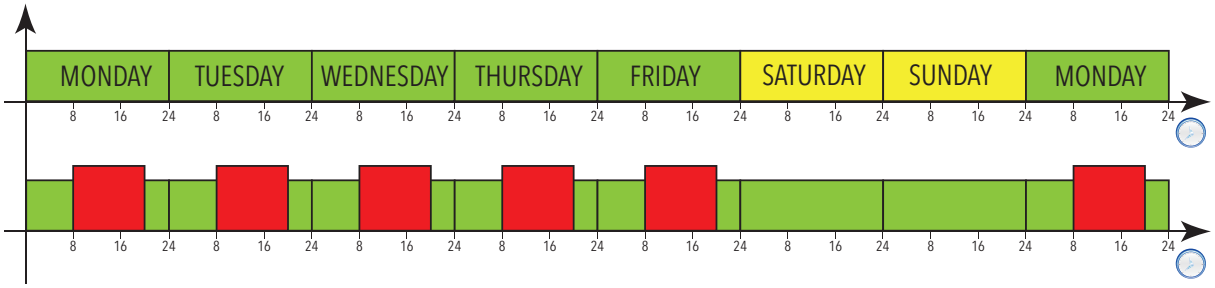
You can set the type of each of the two events using parameters **E15** (Event 1) and **E25** (Event 2):

- **0** = Energy saving (only if **H50**=0)
- **1** = AUX deactivated
- **2** = AUX activated
- **3** = Stand-by
- **4** = Light on
- **5** = Light off.

Regulation diagrams

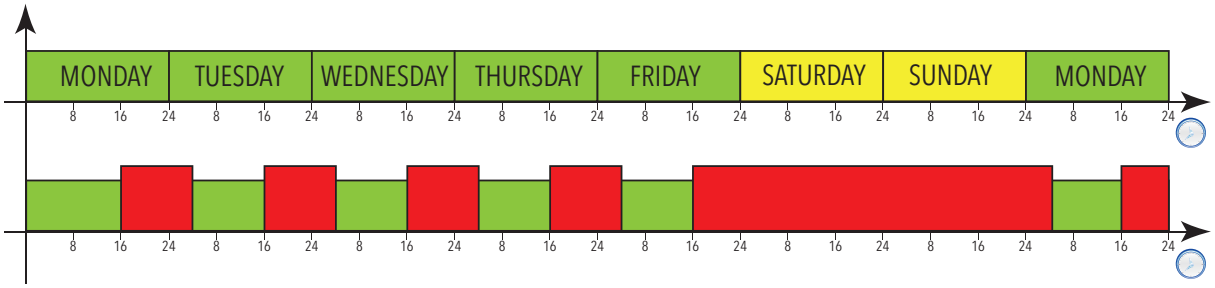
Example 1: The event starts and ends on the same day (E11/E12 < E13/E14)

Settings: **E10** = 8; **E11** = 8; **E12** = 0; **E13** = 20; **E14** = 0 and **E15** = 4.



Example 2: The event starts on one day and ends the next day (E11/E12 > E13/E14)

Settings: **E10** = 8; **E11** = 16; **E12** = 0; **E13** = 4; **E14** = 0 and **E15** = 0.



Legend: **Monday** = Monday; **Tuesday** = Tuesday; **Wednesday** = Wednesday; **Thursday** = Thursday; **Friday** = Friday; **Saturday** = Saturday; **Sunday** = Sunday.

Regulation during a blackout

If a blackout occurs during a Night&Day (NaD), then:

- if a **NaD** event was active and the power supply is restored within the same period of activity as the event, the controller will restart with the same status set by the event
- if a **NaD** event was active and the power supply is restored after the end of the same period but before the next event, the controller will restart, ending the event
- if a **NaD** event was active and the power supply is restored not only after the end of the same period but after the start of one of the next events, the controller will restart, setting the status associated with the new event
- external events (key press, activation of a digital input, serial command) always have priority over the status set by the **NaD** event until the next **NaD** event (activation or deactivation). These events are only acknowledged if the power supply is present
- If an external event inverts the status set by the **NaD** event during a status activation, and then there is a blackout and the power supply is restored within the same period, the controller will restart with the status set by the external event. At the end of the **NaD** event, the status of the controller will be restored to its initial condition
- If an external event inverts the status set by the **NaD** event during a status activation, and then there is a blackout and the power supply is restored after the end of the same period but during one of the next events, the controller will restart with the status forced by the external event
- If an external event inverts the status set by a **NaD** event outside a **NaD** event status activation, and then there is a blackout and the power supply is restored with no **NaD** event active, the controller will restart with the status forced by the external event
- If an external event inverts the status set by a **NaD** event outside a **NaD** event status activation, and then there is a blackout and the power supply is restored during a new **NaD** event, the controller will restart with the status requested by the external **NaD** event

Parameters

Parameter	Description
E10	Select Event 1 activation method
E11	Event 1 start hour
E12	Event 1 start minute
E13	Event 1 end hour
E14	Event 1 end minute
E15	Set Event 1 type
E20	Select Event 2 activation method
E21	Event 2 start hour
E22	Event 2 start minute
E23	Event 2 end hour
E24	Event 2 end minute
E25	Set Event 2 type

Energy saving - Reduced set (only if H50=0)

Reduced set operating conditions

The reduced set function can be activated:

- by pressing and holding a key (configured with **H3x** = 3)
- by activating the digital input (configured with **H12** = ±2)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)
- via functions menu (label **SP**)

When the "reduced set" is activated:

- the icon comes on
- **SEt** will be replaced by the value (**SEt + oSP**)
- **diF** will be replaced by the value (**diF+ odF**)

In summer mode:

- the icon comes on
- **SES** will be replaced by the value (**SES + oSP**)
- **diS** will be replaced by the value (**diS+ odF**)

Note: for further details, see: "Cool regulator".

Energy Saving operating conditions

The energy saving function can be activated:

- by pressing and holding a key (configured with **H3x** = 9)
- by activating the digital input (configured with **H12** = ±10)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)

Parameters **ESt** and **ESA** manage device behavior during the energy saving phase.

When energy saving is enabled, the icon is on.

Parameter **ESt** sets the type of controller operation:

- **ESt**=0: function disabled
- **ESt**=1: An offset is applied to the setpoint (Setpoint = **SEt + oSP**)
- **ESt**=2: An offset is applied to the differential (Differential = **diF+ odF**)
- **ESt**=3: An offset is applied to the setpoint and differential
- **ESt**=4: Reserved
- **ESt**=5: Reserved

Parameter **ESA** sets the AUX/Lights status during energy saving:

- **ESA**=0: No effect on the status of the AUX/Lights output
- **ESA**=1: Output disabled
- **ESA**=2: Output enabled

Pull-down regulator (only if H50=0)

Description

The pull-down sequence anticipates bringing the end of a “Night” cycle forward by **tPd** minutes, by activating cooling with a setpoint lower than the one used for regulation to overcome thermal inertia of the machine, ensuring the temperature will be close to the regulation temperature when the store reopens.

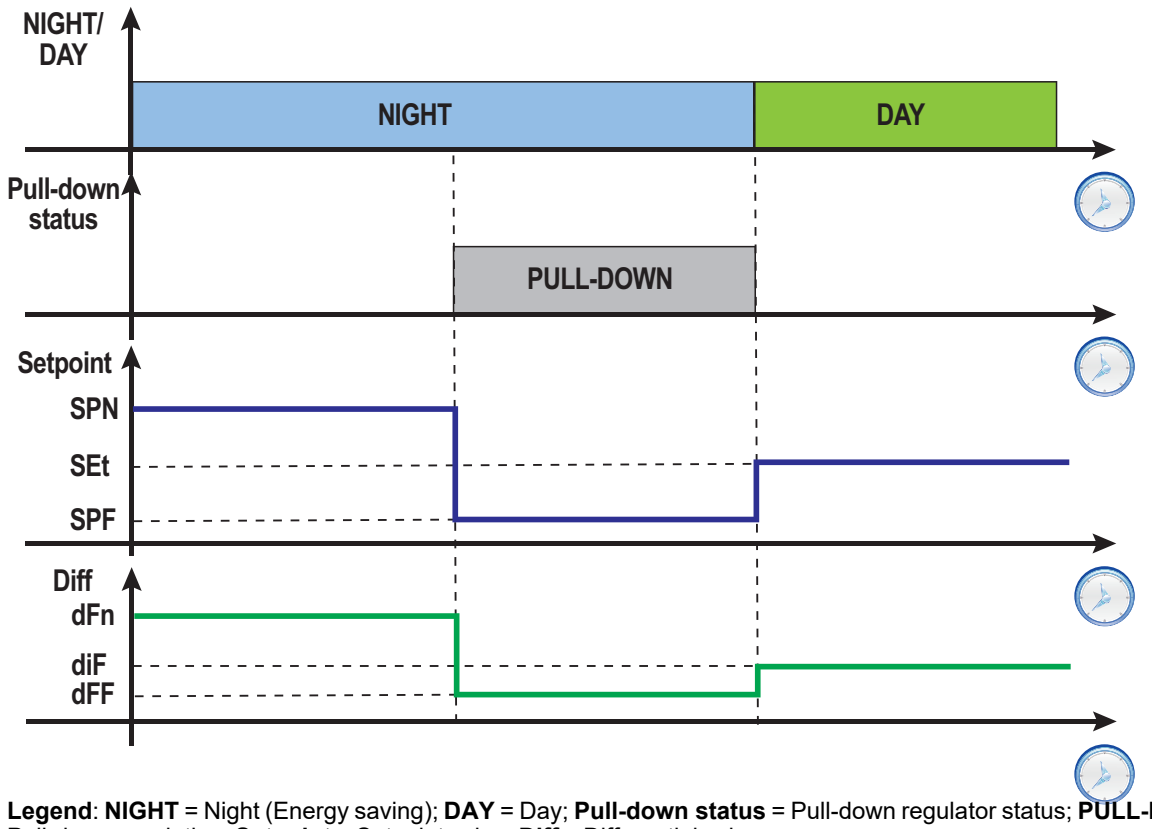
Parameter **PdC** can be used to select the pull-down type:

- **PdC** = **diS**: regulator disabled
- **PdC** = **FI**: pull-down with fixed setpoint
- **PdC** = **Aut**: automatic pull-down

Pull-down with fixed setpoint

If the pull-down with fixed setpoint (**PdC** = FI), regulation will use the following values:

- **SPF** = regulation setpoint in pull-down
- **dFF** = regulation differential in pull-down



Legend: **NIGHT** = Night (Energy saving); **DAY** = Day; **Pull-down status** = Pull-down regulator status; **PULL-DOWN** = Pull-down regulation; **Setpoint** = Setpoint value; **Diff** = Differential value;

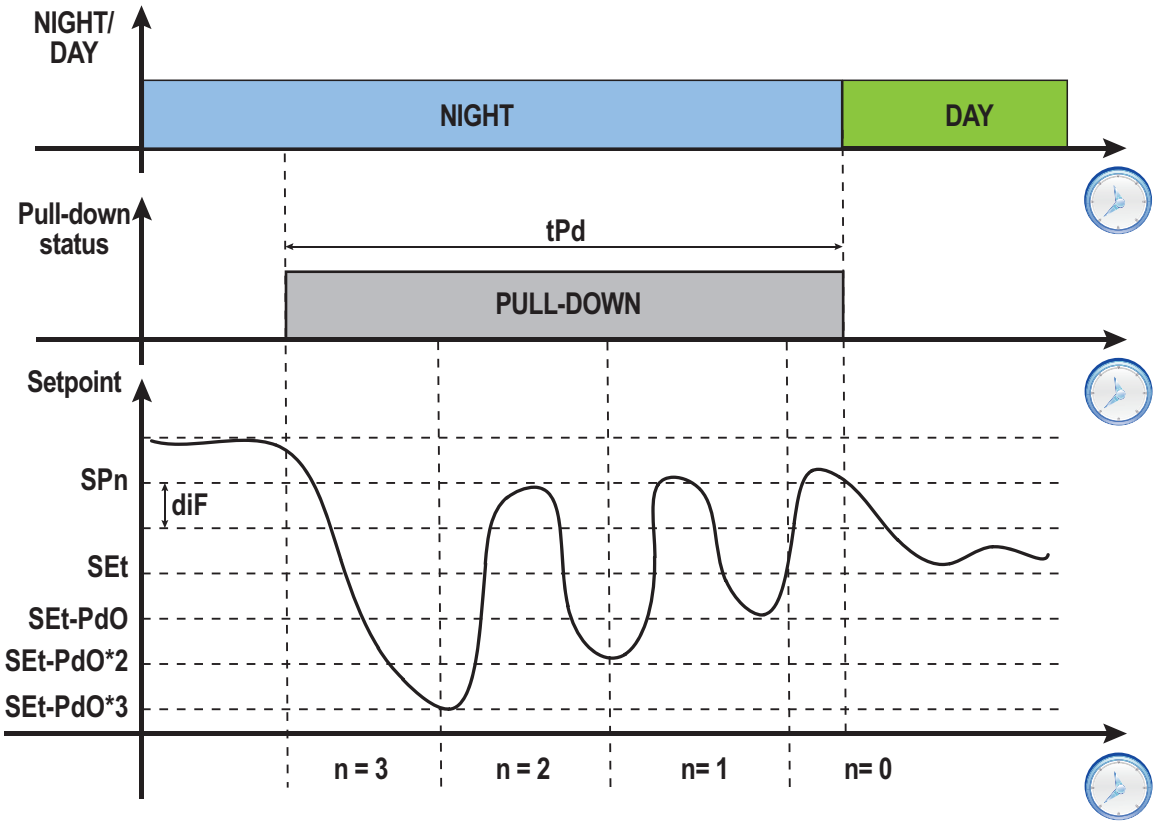
Automatic Pull-down

If automatic pull-down is enabled (**PdC** = Aut), the setpoint and differential values will be:

- **Setpoint** = **SEt** - **Pdo*n**
- **Differental** = **diF** + **Pdo*n**

When regulation begins, **n** = 3 (value set using parameter **Pdn**) and decreases by one every time the calculated setpoint is reached. This system helps to reduce energy consumption during pull-down.

If pull-down regulation does not end before the time period **tPd**, regulation will be stopped and the controller will begin regulating with the “day” regulator settings.



Legend: **NIGHT/DAY** = Night/Day (Energy saving/Normal operation); **NIGHT** = Night; **DAY** = Day; **Pull-down status** = Pull-down regulator status; **PULL-DOWN** = Pull-down regulation; **Setpoint** = Setpoint.

Diagnostics

Contents

This section includes the following topics:

Alarms and indications 91
Minimum and maximum temperature alarm 93

Alarms and indications

Introduction

All alarms are deactivated automatically when their cause is removed, except the pressure switch alarm **PA**, which can be deactivated via the **rAP** function.

Detecting an alarm condition

If there is an alarm condition, the alarm icon ⚠ comes on steadily. If present and enabled, the alarm relay is also activated.

Note: If alarm exclusion timings are in progress, the alarm is not signaled.

All active alarms, except those relating to probe error, are listed in the **AL** folder within the "Machine status" menu.

Silencing an alarm

Press any key or use the menu function: the alarm icon ⚠ flashes and the alarm relay is de-energized.

Alarms legend

Code	Description	Alarm relay	Cause	Effects	Solutions
E1	Probe Pb1 error	Active	• Reading of values outside the operating interval • Probe or corresponding wiring in short-circuit or open circuit	• **E1** shown • Steady alarm icon ⚠ • Maximum/minimum alarm regulator disabled • Compressor operation based on parameters **Ont** and **OFt**	• Verify the type of probe (default NTC) • Verify the probe wiring • Replace probe.
AH1	Alarm due to Pb1 HIGH Temperature	Active	Value read by Pb1 > **HAL** for longer than time **tAo** (see section "Minimum and maximum temperature alarm" on page 93)	• Alarm **AH1** added to folder **AL** • No effect on regulation	Wait for the temperature read by Pb1 to drop below the alarm threshold (**HAL-AFd**)
AL1	Alarm due to Pb1 LOW Temperature	Active	Value read by Pb1 < **LAL** for longer than time **tAo** (see section "Minimum and maximum temperature alarm" on page 93)	• Alarm **AL1** added to folder **AL** • No effect on regulation	Wait for the temperature read by Pb1 to rise above the alarm threshold (**LAL+AFd**)
EA	External alarm	Active	Activation of the digital input (**H12** = ±5)	• Alarm **EA** added to folder **AL** • Steady alarm icon ⚠ • Regulation inhibited if **EAL** = y	Verify and remove the external cause that caused the alarm on the digital input.
oPd	Open door alarm	Active	Digital input activation (**H12** = ±4) for a time greater than **tdo**	• Alarm **oPd** added to folder **AL** • Steady alarm icon ⚠ • Regulator inhibited, on the basis of parameter **dod**	• Close the door • Increase the value of parameter **oAo**
Ad2	Defrost due to timeout	Not active	End of defrost due to timeout	• Alarm **Ad2** added to folder **AL** • Steady alarm icon ⚠	Wait for the next defrost for automatic deactivation.
E10	Clock alarm	Not active	Clock alarm or battery low	• Alarm **E10** added to folder **AL** • Functions related to the clock not present or not synchronized with the real time	Set the correct time. If the error persists, replace the instrument (RTC battery low)
rFA	Low refrigerant alarm	Not active	Even with the compressor on, the temperature trend does not fall within the interval set by **rFt**.	• Alarm **rFA** added to folder **AL** • Steady alarm icon ⚠	Switch the instrument off and on again (alarm deactivated if **rFt** = 0)

Code	Description	Alarm relay	Cause	Effects	Solutions
nPA	Pressure switch alarm	Not active	Pressure switch alarm activation caused by the external pressure switch.	If the number **n** of pressure switch activations is lower than **PEn**: • **nPA** alarm is added to the folder **AL** with the number of pressure switch activations • Compressor regulation inhibited	Verify and remove the cause that triggered the alarm on the digital input (automatic reset) (see Pressure switch)
PAL	Pressure switch alarm	Active	Pressure switch alarm activation caused by the external pressure switch.	If the number **N** of pressure switch activations is **N** = **PEn** in a time period < **PEi**: • **PAL** is shown • Alarm **PA** is added to the folder **AL** and alarm **nPA** is removed from the folder **AL** • Steady alarm icon ⚠ • Compressor regulation and defrost are inhibited	• Switch the controller off and on again • Select **rAP** (manual reset) in the functions folder to reset the alarms.

Minimum and maximum temperature alarm

Description

The alarms operate according to the temperature read by regulation probe Pb1. The accepted temperature interval limits are set using parameters **HAL** and **LAL**.

Alarm codes

Code	Description
AH1	High temperature alarm
AL1	Low temperature alarm

High and low temperature alarms are excluded during a defrost. The triggering of these alarms does not have any effect on the regulation in progress.

Absolute or relative temperature values

Depending on the value of parameter **Att**, the temperature is expressed as an absolute or relative value (differential in respect to the setpoint):

Att value	Label	Description
0	**Ab**	Absolute values. The **HAL** and **LAL** values must have a sign.
1	**rE**	Relative values. **HAL** > 0 and **LAL** < 0.

Alarm conditions

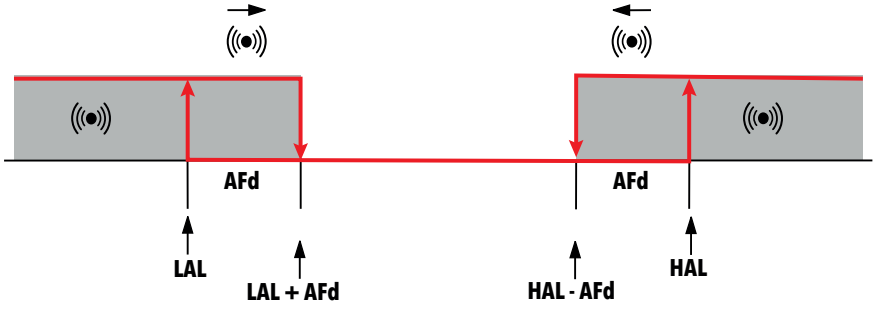
Att value	Temperature read by Pb1	Alarm generated
0	≥ **HAL**	Maximum temperature
	≤ **LAL**	Minimum temperature
1	≥ (**SEt** + **HAL**)	Maximum temperature
	≤ (**SEt** + **LAL**)	Minimum temperature

Conditions for alarm deactivation

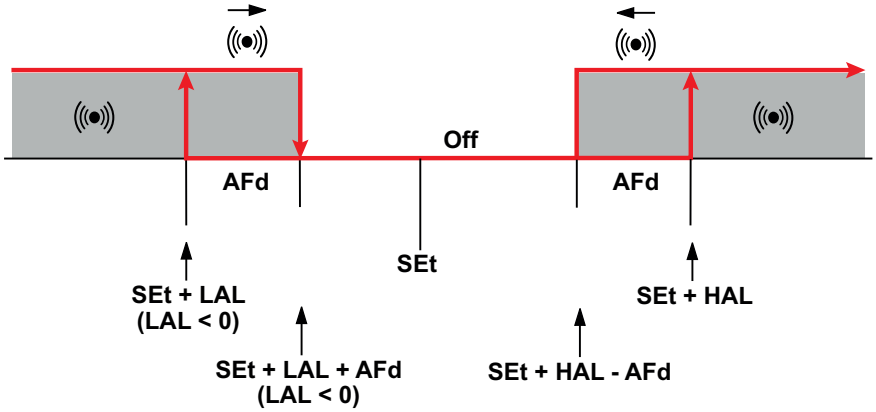
Att value	Temperature read by Pb1	Alarm generated
0	≤ (**HAL** - **AFd**)	Maximum temperature
	≥ (**LAL** + **AFd**)	Minimum temperature
1	≤ (**SEt** + **HAL** - **AFd**)	Maximum temperature
	≥ (**SEt** + **LAL** + **AFd**)	Minimum temperature

Operating diagrams

Operation with Att=0 (absolute values)



Operationwith Att=1 (relative values)



Parameters

Parameter	Description
Att	Expression mode for **HAL** and **LAL** values (absolute or relative)
AFd	Alarm activation differential
HAL	Maximum temperature limit
LAL	Minimum temperature limit
PAo	Alarm exclusion time when switching on the controller, after a power failure
dAo	Exclusion time for temperature alarms after a defrost cycle
oAo	Exclusion time for temperature alarms after closing the door
tAo	Temperature alarm signaling delay time

Parameters EWNext Performance Dispenser -HC

Contents

This section includes the following topics:

Parameters EWNext 971 P/CD 96

Parameters EWNext 971 P/CD

User parameters EWNext 971 P/CD

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
SEt	Regulation setpoint with range between the minimum setpoint **LSE** and the maximum setpoint **HSE**. The setpoint value is set in the "Machine status" menu.	**LSE**...**HSE**	°C/°F	-2.0	-2.0	-2.0	-2.0
SES	Regulation setpoint in summer mode with range between the minimum setpoint **LSE** and the maximum setpoint **HSE**. The setpoint value is set in the "Machine status" menu.	**LSE**...**HSE**	°C/°F	0.2	0.2	0.2	0.2
diF	Compressor relay activation differential; the compressor stops when reaching the entered setpoint (upon indication of the regulation probe) and restarts at a temperature value equal to the setpoint plus the value of the differential.	0.1...30.0	°C/°F	2.5	2.5	2.5	2.5
diS	Compressor relay activation differential in summer mode; the compressor stops when reaching the entered setpoint (upon indication of the regulation probe) and restarts at a temperature value equal to the setpoint plus the value of the differential.	0.1...30.0	°C/°F	0.1	0.1	0.1	0.1
LSE	Minimum setpoint value.	-67.0...**HSE**	°C/°F	-50.0	-50.0	-50.0	-50.0
HSE	Maximum setpoint value.	**LSE**...302	°C/°F	99.0	99.0	99.0	99.0
dty	Type of defrost. • **0** = electric defrost or due to stoppage - compressor OFF during defrost • **1** = cycle inversion (hot gas) defrost; compressor on during defrost • **2** = defrost with “Free” mode; defrost independent of compressor.	0/1/2	num	0	0	0	0
dEt	Defrost timeout. Determines the maximum duration of the defrost	1...250	min	30	30	30	30
dit	Time interval between one defrost and the next	0...250	hours	24	24	24	24
d1H	1st weekday defrost start hour. • **0...23** = start hour • **24** = disabled	0...24	hours	24 (not in applications)			
d1n	1st weekday defrost start minutes.	0...59	min	0 (not in applications)			
d2H	2nd weekday defrost start hour. • **d1H...23** = start hour • **24** = disabled	d1H...24	hours	24 (not in applications)			
d2n	2nd weekday defrost start minutes.	0...59	min	0 (not in applications)			
d3H	3rd weekday defrost start hour. • **d2H...23** = start hour • **24** = disabled	d2H...24	hours	24 (not in applications)			
d3n	3rd weekday defrost start minutes.	0...59	min	0 (not in applications)			
d4H	4th weekday defrost start hour. • **d3H...23** = start hour • **24** = disabled	d3H...24	hours	24 (not in applications)			
d4n	4th weekday defrost start minutes.	0...59	min	0 (not in applications)			
d5H	5th weekday defrost start hour. • **d4H...23** = start hour • **24** = disabled	d4H...24	hours	24 (not in applications)			
d5n	5th weekday defrost start minutes.	0...59	min	0 (not in applications)			

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
d6H	6th weekday defrost start hour. • **d5H...23** = start hour • **24** = disabled	d5H...24	hours	24 (not in applications)			
d6n	6th weekday defrost start minutes.	0...59	min	0 (not in applications)			
F1H	1st weekend/holiday defrost start hour. • **0...23** = start hour • **24** = disabled	0...24	hours	24 (not in applications)			
F1n	1st weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F2H	2nd weekend/holiday defrost start hour. • **F1H...23** = start hour • **24** = disabled	F1H...24	hours	24 (not in applications)			
F2n	2nd weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F3H	3rd weekend/holiday defrost start hour. • **F2H...23** = start hour • **24** = disabled	F2H...24	hours	24 (not in applications)			
F3n	3rd weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F4H	4th weekend/holiday defrost start hour. • **F3H...23** = start hour • **24** = disabled	F3H...24	hours	24 (not in applications)			
F4n	4th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F5H	5th weekend/holiday defrost start hour. • **F4H...23** = start hour • **24** = disabled	F4H...24	hours	24 (not in applications)			
F5n	5th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F6H	6th weekend/holiday defrost start hour. • **F5H...23** = start hour • **24** = disabled	F5H...24	hours	24 (not in applications)			
F6n	6th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
HAL	Maximum temperature alarm. Temperature value (in an absolute or relative value - see **Att**) which, when exceeded, will lead to the activation of alarm signaling.	**LAL**...302	°C/°F	50.0	50.0	50.0	50.0
LAL	Minimum temperature alarm. Temperature value (in an absolute or relative value - see **Att**) which, when not reached, will lead to the activation of alarm signaling.	-67.0...**HAL**	°C/°F	-50.0	-50.0	-50.0	-50.0
tAo	Temperature alarm signaling delay time.	0...250	min	0	0	0	0
SPn	Night mode Setpoint.	-67.0...302	°C/°F	7.0	7.0	7.0	7.0
dFn	Night mode differential.	0.1...30.0	°C/°F	4.0	4.0	4.0	4.0
oSP	Temperature value to be added to the setpoint in the case of an enabled reduced set (Economy function).	-30.0...30.0	°C/°F	0.0	0.0	0.0	0.0
odF	Differential offset during an energy saving cycle or reduced set.	0.1...30.0	°C/°F	4.0	4.0	4.0	4.0
dnt	Night mode duration.	0...24	hours	11	11	11	11
SPF	Regulation setpoint during the pull-down phase.	-67.0...302	°C/°F	0.0	0.0	0.0	0.0
dFF	Regulation offset during the pull-down phase.	0.1...30.0	°C/°F	0.1	0.1	0.1	0.1
CA1 (!)	Positive or negative temperature value to be added to the value of Pb1.	-30.0...30.0	°C/°F	0.0	0.0	0.0	0.0
LoC	Keypad lock. • **n**(0) = Keypad lock disabled • **y**(1) = Keypad lock enabled (on startup or when 30 seconds have passed since the last action carried out on the user interface)	n/y	flag	y	y	y	y

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
ddL	Display mode during defrosting. • **0** = display the temperature read by Pb1 • **1** = inhibits reading on the value of Pb1 at the start of defrost and until the setpoint is reached • **2** = displays label **dEF** during defrost until the setpoint is reached.	0/1/2	num	1	1	1	1
Ldd	Display unlock timeout value - label **dEF**	0...250	min	30	30	30	30
PS1	When enabled (**PS1**≠0) this is the access key for the user parameters.	0...250	num	0	0	0	0
tAb	Reserved: read-only parameter.	/	/	/ (not in applications)			
dCS	"Deep cooling cycle" setpoint	-67.0...302	°C/°F	-2.0	-2.0	-2.0	-2.0
tdC	"Deep cooling cycle" duration	0...250	min	0	0	0	0

Note: if one or more parameters in folder **CnF** or marked with **(!)** are changed, the controller must be switched off and then on again to make sure it works properly.
Note: the “User” menu parameters also include **PA2**, which allows access to the "Installer" menu.
Note: for the full list of parameters, see the section "**Installer parameters**".

Installer parameters EWNext 971 P/CD

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
SEt	Regulation setpoint with range between the minimum setpoint **LSE** and the maximum setpoint **HSE**. The setpoint value is set in the "Machine status" menu.	**LSE**...**HSE**	°C/°F	-2.0	-2.0	-2.0	-2.0
SES	Regulation setpoint in summer mode with range between the minimum setpoint **LSE** and the maximum setpoint **HSE**. The setpoint value is set in the "Machine status" menu.	**LSE**...**HSE**	°C/°F	0.2	0.2	0.2	0.2
CP (Compressor)							
diF	Compressor relay activation differential; the compressor stops when reaching the entered setpoint (upon indication of the regulation probe) and restarts at a temperature value equal to the setpoint plus the value of the differential.	0.1...30.0	°C/°F	2.5	2.5	2.5	2.5
diS	Compressor relay activation differential in summer mode; the compressor stops when reaching the entered setpoint (upon indication of the regulation probe) and restarts at a temperature value equal to the setpoint plus the value of the differential.	0.1...30.0	°C/°F	0.1	0.1	0.1	0.1
LSE	Minimum setpoint value.	-67.0...**HSE**	°C/°F	-50.0	-50.0	-50.0	-50.0
HSE	Maximum setpoint value.	**LSE**...302	°C/°F	99.0	99.0	99.0	99.0
ont	Regulator switch-on time for faulty probe: • if **Ont** = 1 and **OFt** = 0 compressor always on • if **Ont** = 1 and **OFt** > 0 compressor in duty cycle	0...250	min	0	0	0	0
oFt	Regulator switch-off time for faulty probe: • if **OFt** = 1 and **Ont** = 0 compressor always off • if **OFt** = 1 and **Ont** > 0 compressor in duty cycle	0...250	min	1	1	1	1
don	Compressor relay activation delay time from call	0...250	s	0	0	0	0
doF	Delay time after switch-off; the indicated time must elapse between compressor relay switch-off and a subsequent switch-on.	0...250	min	0	0	0	0
dbi	Delay time between switch-ons; the indicated time must elapse between two consecutive compressor switch-ons.	0...250	min	0	0	0	0
Cit	Minimum compressor activation time before it can be deactivated. If **Cit** = 0 it is not active.	0...250	min	0	0	0	0
CAt	Maximum compressor activation time before it can be deactivated. If **CAt** = 0 it is not active.	0...250	min	0	0	0	0
odo	Output activation delay time from switching on the controller or after a power failure. **0** = not active	0...250	min	0	0	0	0
CP2	Compressor 2 activation delay.	0...250	min	0	0	0	0
H50	Sets the type of regulation. • **0** = Regulation on Pb1 probe • **1** = Regulation on single ice sensor (ICE1) • **2** = Regulation on double ice sensors (ICE1 and ICE2).	0/1/2	num	2	2	2	2
H51	Threshold (Setpoint) for ice sensor.	0...650	num	208	208	208	208
H52	Ice sensor differential.	0...250	num	117	117	117	117
dEF (Defrost)							

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
dty	Type of defrost. • **0** = electric defrost or due to stoppage - compressor OFF during defrost • **1** = cycle inversion (hot gas) defrost; compressor on during defrost • **2** = defrost with “Free” mode; defrost independent of compressor.	0/1/2	num	0	0	0	0
doH	Defrost cycle activation delay from the call	0...250	min	0	0	0	0
dEt	Defrost timeout. Determines the maximum duration of the defrost	1...250	min	30	30	30	30
dPo	Defrost activation request at power-on. • **n**(0) = no • **y**(1) = yes.	n/y	flag	n	n	n	n
dMr	Enables the defrost count reset in the case of manual defrosting. • **n** (0) = count reset does not take place • **y** (1) = count reset takes place	n/y	flag	n	n	n	n
d00	Compressor running time before defrost is activated	0...250	hours	0	0	0	0
d01	**d00** unit of measure. • **0** = hours • **1** = minutes • **2** = seconds.	0/1/2	num	0	0	0	0
dit	Time interval between one defrost and the next	0...250	hours	24	24	24	24
d11	**dit** unit of measure. • **0** = hours • **1** = minutes • **2** = seconds.	0/1/2	num	0	0	0	0
d20	Can be used to activate the defrost when the compressor is off. • **0** = disabled. Defrost is not activated. • **1** = enabled. Defrost is activated when the compressor is off.	0/1	flag	0	0	0	0
d90	Sets the defrost mode with RTC. • **0** = RTC disabled • **1** = Reserved • **2** = RTC at fixed intervals (**d91**) • **3** = Regular RTC (**d94**)	0...3	num	0	0	0	0
d91	Sets the number of daily defrosts (only if **d90**=2)	0...255	num	0	0	0	0
d92	Sets the first weekend/holiday day. • **0** = Sunday • **1** = Monday • **2** = Tuesday • **3** = Wednesday • **4** = Thursday • **5** = Friday • **6** = Saturday • **7** = Disabled	0...7	num	0	0	0	0
d93	Sets the second weekend/holiday day. Same as **d92**.	0...7	num	0	0	0	0
d94	Sets the duration of the regular defrost in days (only if **d90**=3).	1...7	num	1	1	1	1
d1H	1st weekday defrost start hour. • **0...23** = start hour • **24** = disabled	0...24	hours	24 (not in applications)			
d1n	1st weekday defrost start minutes.	0...59	min	0 (not in applications)			

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
d2H	2nd weekday defrost start hour. • **d1H...23** = start hour • **24** = disabled	d1H...24	hours	24 (not in applications)			
d2n	2nd weekday defrost start minutes.	0...59	min	0 (not in applications)			
d3H	3rd weekday defrost start hour. • **d2H...23** = start hour • **24** = disabled	d2H...24	hours	24 (not in applications)			
d3n	3rd weekday defrost start minutes.	0...59	min	0 (not in applications)			
d4H	4th weekday defrost start hour. • **d3H...23** = start hour • **24** = disabled	d3H...24	hours	24 (not in applications)			
d4n	4th weekday defrost start minutes.	0...59	min	0 (not in applications)			
d5H	5th weekday defrost start hour. • **d4H...23** = start hour • **24** = disabled	d4H...24	hours	24 (not in applications)			
d5n	5th weekday defrost start minutes.	0...59	min	0 (not in applications)			
d6H	6th weekday defrost start hour. • **d5H...23** = start hour • **24** = disabled	d5H...24	hours	24 (not in applications)			
d6n	6th weekday defrost start minutes.	0...59	min	0 (not in applications)			
F1H	1st weekend/holiday defrost start hour. • **0...23** = start hour • **24** = disabled	0...24	hours	24 (not in applications)			
F1n	1st weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F2H	2nd weekend/holiday defrost start hour. • **F1H...23** = start hour • **24** = disabled	F1H...24	hours	24 (not in applications)			
F2n	2nd weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F3H	3rd weekend/holiday defrost start hour. • **F2H...23** = start hour • **24** = disabled	F2H...24	hours	24 (not in applications)			
F3n	3rd weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F4H	4th weekend/holiday defrost start hour. • **F3H...23** = start hour • **24** = disabled	F3H...24	hours	24 (not in applications)			
F4n	4th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F5H	5th weekend/holiday defrost start hour. • **F4H...23** = start hour • **24** = disabled	F4H...24	hours	24 (not in applications)			
F5n	5th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
F6H	6th weekend/holiday defrost start hour. • **F5H...23** = start hour • **24** = disabled	F5H...24	hours	24 (not in applications)			
F6n	6th weekend/holiday defrost start minutes.	0...59	min	0 (not in applications)			
PUP (Pump)							
H54	Pump regulation probe selection. • **0** = Probe not present; Duty cycle regulation • **1** = Probe Pb1.	0/1	flag	0	0	0	0
H56	Duty cycle: time with pump regulation on.	0...999	s	3	3	3	3
H57	Duty cycle: time with pump regulation off.	0...999	s	27	27	27	27
H58	Pump regulation setpoint.	**LSE**...**HSE**	°C/°F	0.0	0.0	0.0	0.0
AL (Alarms)							

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
Att	Sets the absolute or relative value for parameters **HAL** and **LAL**. • **0** = absolute value • **1** = relative value	0/1	flag	0	0	0	0
AFd	Alarm differential.	0.1...25.0	°C/°F	2.0	2.0	2.0	2.0
HAL	Maximum temperature alarm. Temperature value (in an absolute or relative value - see **Att**) which, when exceeded, will lead to the activation of alarm signaling.	**LAL**...302	°C/°F	50.0	50.0	50.0	50.0
LAL	Minimum temperature alarm. Temperature value (in an absolute or relative value - see **Att**) which, when not reached, will lead to the activation of alarm signaling.	-67.0...**HAL**	°C/°F	-50.0	-50.0	-50.0	-50.0
PAo	Alarm exclusion time when switching on the controller, after a power failure.	0...10	min*10	0	0	0	0
dAo	Temperature alarm exclusion time after defrosting.	0...999	min	0	0	0	0
oAo	Alarm signaling delay after deactivation of the digital input (door closure). Alarm refers to high and low temperature alarms.	0...10	hours	0	0	0	0
tdo	Door open alarm activation delay time.	0...250	min	0	0	0	0
tAo	Temperature alarm signaling delay time.	0...250	min	0	0	0	0
dAt	Defrost ended due to timeout alarm indication. • **n**(0) = alarm not activated • **y**(1) = alarm activated.	n/y	flag	n	n	n	n
EAL	An external alarm inhibits the regulators. • **0** = does not inhibit the regulators • **1** = compressor and defrost inhibited • **2** = fans, compressor and defrost inhibited;	0/1/2	flag	0	0	0	0
AoP	Alarm output polarity. • **0** = NC (Normally closed) • **1** = NO (Normally open).	0/1	flag	1	1	1	1
rFt	Low refrigerant alarm signaling delay.	0...250	min	0 (not in applications)			
Lit (Lights and digital inputs)							
ESA	AUX/Lights status during energy saving. • **0** = No effect on the status of the AUX/Light output • **1** = Output disabled • **2** = Output enabled	0/1/2	flag	1	1	1	1
dOr (Door switch)							
dOd	Digital input shuts off utilities. • **0** = disabled • **1** = reserved • **2** = disables compressor • **3** = reserved.	0...3	num	1	1	1	1
dCo	Compressor switch-off delay from door opening.	0...250	min	0	0	0	0
PrE (Pressure switch)							
PEn	Number of errors permitted per minimum/maximum pressure switch input	0...15	num	5	5	5	5
PEi	Minimum/maximum pressure switch error count interval	1...99	min	1	1	1	1
PEt	Compressor activation delay after pressure switch deactivation	0...250	min	0	0	0	0
EnS (Energy Saving)							
SPn	Night mode Setpoint.	-67.0...302	°C/°F	7.0	7.0	7.0	7.0
dFn	Night mode differential.	0.1...30.0	°C/°F	4.0	4.0	4.0	4.0

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
oSP	Temperature value to be added to the setpoint in the case of an enabled reduced set (Economy function).	-30.0...30.0	°C/°F	0.0	0.0	0.0	0.0
odF	Differential offset during an energy saving cycle or reduced set.	0.1...30.0	°C/°F	4.0	4.0	4.0	4.0
ESt	Energy Saving mode. • **0** = disabled • **1** = offset on setpoint • **2** = offset on differential • **3** = offset on setpoint and differential • **4** = reserved • **5** = reserved.	0...5	num	0	0	0	0
dnt	Night mode duration.	0...24	hours	11	11	11	11
Cdt	Door closure time due to dynamic setpoint activation.	0...250	min*10	6	6	6	6
PLd (Pull-down)							
PdC	Enable pull-down. • **diS** (0) = disabled • **FI** (1) = with fixed setpoint • **AUt** (2) = automatic	diS/ FI/ AUt	num	diS	diS	diS	diS
tPd	Pull-down phase duration.	1...250	min	30	30	30	30
SPF	Regulation setpoint during the pull-down phase.	-67.0...302	°C/°F	0.0	0.0	0.0	0.0
dFF	Regulation offset during the pull-down phase.	0.1...30.0	°C/°F	0.1	0.1	0.1	0.1
Pdo	Temperature step in operation with automatic pull-down.	0.1...30.0	°C/°F	0.2	0.2	0.2	0.2
Pdn	Number of steps in operation with automatic pull-down.	1...10	num	3	3	3	3
Add (Communication)							
Adr	Modbus protocol controller address.	1...247	num	1 (not in applications)			
bAU	Modbus Baudrate selection. • **96** (0) = 9600 baud • **192** (1) = 19200 baud • **384** (2) = 38400 baud	96/192/384	num	96 (not in applications)			
Pty	Modbus parity bit. • **n**(0) = none • **E**(1) = even • **o**(2) = odd.	n/E/o	num	E (not in applications)			
diS (Display)							
dro	Selects the unit of measure used when displaying the temperature read by the probes. (**0** = °C, **1** = °F). **Note**: changing from °C to °F or vice-versa does NOT change the **SEt**, **diF** values, etc. (example: **SEt** = 10°C becomes 10°F).	0/1	flag	0	0	0	0
CA1 (!)	Positive or negative temperature value to be added to the value of Pb1.	-30.0...30.0	°C/°F	0.0	0.0	0.0	0.0
LoC	Keypad lock. • **n**(0) = Keypad lock disabled • **y**(1) = Keypad lock enabled (on startup or when 30 seconds have passed since the last action carried out on the user interface)	n/y	flag	y	y	y	y
ddd	Selects the type of value to show on the display. • **0** = setpoint • **1** = Pb1 probe • **2** = reserved • **3** = reserved	0...3	num	1	1	1	1

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
ddE	Selects the type of value to show on the module **ECPlus**. • **0** = module not connected • **1** = Pb1 probe • **2** = reserved • **3** = reserved • **4** = setpoint.	0...4	num	0	0	0	0
ddL	Display mode during defrosting. • **0** = display the temperature read by Pb1 • **1** = inhibits reading on the value of Pb1 at the start of defrost and until the setpoint is reached • **2** = displays label **dEF** during defrost until the setpoint is reached.	0/1/2	num	1	1	1	1
Ldd	Display unlock timeout value - label **dEF**	0...250	min	30	30	30	30
ndt	Display with decimal point. • **n**(0) = no • **y**(1) = yes.	n/y	flag	y	y	y	y
FiS	Selects display filter. • **0** = disabled • **1** = the filter is set based on time values **tAu** and **5tAu**, and is applied to the displayed information according to the value of parameter **Fit** • **2** = the temperature value shown changes by 1°C/°F every **tAu** minutes.	0/1/2	num	0 (not in applications)			
tAU	Display filter time constant.	0...250	min	0 (not in applications)			
Fit	Display filter mode. • **0** = the filter is only enabled when the temperature increases • **1** = the filter is always enabled (both when the temperature increases and when it decreases)	0/1	flag	0 (not in applications)			
PS1	When enabled (**PS1**≠0) this is the access key for the user parameters.	0...250	num	0	0	0	0
PS2	When enabled (**PS2**≠0) this is the access key for the installer parameters.	0...250	num	15	15	15	15
CnF (Configuration)							
H08	Stand-by operating mode. • **0** = display off; the regulators are active and the device signals possible alarms by reactivating the display • **1** = display off; the regulators and the alarms are blocked • **2** = the display shows the label “OFF”; the regulators and alarms are inhibited.	0/1/2	num	2	2	2	2

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
H12	Configuration of digital input (**DI**)/ polarity. • **0** = disabled • **±1** = defrost • **±2** = reduced set • **±3** = auxiliary • **±4** = door switch • **±5** = external alarm • **±6** = stand-by • **±7** = pressure switch • **±8** = deep cooling • **±9** = light • **±10** = energy saving • **±11** = reserved • **±12** = reserved • **±13** = summer mode **Nota**: • segno “+” indica che l’ingresso è attivo se il contatto è chiuso. • segno “-” indica che l’ingresso è attivo se il contatto è aperto.	-13...+13	num	0	0	0	0
H21	Configuration of digital output 1 (**Out1**). • **0** = disabled • **1** = compressor • **2** = defrost • **3** = pump • **4** = alarm • **5** = auxiliary • **6** = stand-by • **7** = light • **8** = reserved • **9** = compressor 2 • **10** = reserved • **11** = reserved	0...11	num	1	1	1	1
H22	Configuration of digital output 2 (**Out2**). • **0** = disabled • **1** = compressor • **2** = defrost • **3** = pump • **4** = alarm • **5** = auxiliary • **6** = stand-by • **7** = light • **8** = reserved • **9** = compressor 2 • **10** = reserved	0...10	num	3	3	3	3
H32	Configuration of ▽ key. • **0** = disabled • **1** = defrost • **2** = auxiliary • **3** = reduced set • **4** = stand-by • **5** = reserved • **6** = reserved • **7** = deep cooling • **8** = light • **9** = energy saving • **10** = reserved • **11** = summer mode	0...11	num	0	0	0	0
H33	Configuration of ⏻ key. Same as **H32**.	0...11	num	4	4	4	4
H60	Display selected application. • **0** = disabled • **1** = AP1 • **2** = AP2 • **3** = AP3.	0...3	num	1 (not in applications)			

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
tAb	Reserved: read-only parameter.	/	/	/ (not in applications)			
CuS	Customer model reference.	0...999	num	0 (not in applications)			
FPr (UNICARD)							
UL	Transfer of the programming parameters from the controller to the UNICARD.	/	/	/ (not in applications)			
Fr	UNICARD formatting. Deletes all data on the UNICARD. **Note**: the use of parameter **Fr** results in the loss of all data entered. This operation cannot be reversed.	/	/	/ (not in applications)			
FnC (Functions)							
oSP	Reduced set activation. The labels displayed will be: • **SP** = Reduced set active • **oSP** = Reduced set NOT active	/	/	/ (not in applications)			
dEF	Activate defrost	/	/	/ (not in applications)			
AUX	AUX output activation / deactivation. The labels displayed will be: • **Aon** = AUX output active • **AoF** = AUX output not active	/	/	/ (not in applications)			
rAP	Reset pressure switch alarms	/	/	/ (not in applications)			
Cnt	Reset TelevisAir diagnostic counters (see Reset TelevisAir diagnostic counters)	/	/	/ (not in applications)			
nAd (Night and Day)							
E10	Selects Event 1 activation mode. **0** = disabled; **1** = Monday; **2** = Tuesday; **3** = Wednesday; **4** = Thursday; **5** = Friday; **6** = Saturday; **7** = Sunday; **8** = Monday to Friday; **9** = Monday to Saturday; **10** = Saturday and Sunday; **11** = every day.	0...11	num	0 (not in applications)			
E11	Event 1 start hour.	0...23	hours	0 (not in applications)			
E12	Event 1 start minute.	0...59	min	0 (not in applications)			
E13	Event 1 end hour.	0...23	hours	0 (not in applications)			
E14	Event 1 end minute.	0...59	min	0 (not in applications)			
E15	Sets Event 1 type. **0** = Energy Saving; **1** = AUX deactivated; **2** = AUX activated; **3** = Stand-by; **4** = Light on; **5** = Light off.	0...5	num	0 (not in applications)			
E20	Selects Event 2 activation mode. Same as **E10**.	0...11	num	0 (not in applications)			
E21	Event 2 start hour.	0...23	hours	0 (not in applications)			
E22	Event 2 start minute.	0...59	min	0 (not in applications)			
E23	Event 2 end hour.	0...23	hours	0 (not in applications)			
E24	Event 2 end minute.	0...59	min	0 (not in applications)			
E25	Sets Event 2 type. Same as **E15**.	0...5	num	0 (not in applications)			
CPr (Low ambient temperature protection)							
tCP	Time temperature remains below low ambient temperature protection Setpoint (CPS).	0...250	min	0	0	0	0
SCP	Low ambient temperature protection setpoint.	-67.0...302	°C/°F	-10.0	-10.0	-10.0	-10.0
dCP	Low ambient temperature protection differential.	0.1...30.0	°C/°F	1.0	1.0	1.0	1.0
dEC (Deep Cooling Cycle)							
dCA	Enable "Deep cooling cycle". • **diS**(0) = disabled • **Std**(1) = manual • **AUt**(2) = automatic	diS/ Std/ AUt	num	diS	diS	diS	diS
dCS	"Deep cooling cycle" setpoint	-67.0...302	°C/°F	-2.0	-2.0	-2.0	-2.0

Parameter	Description	Range	MU	Default	AP1	AP2	AP3
tdC	"Deep cooling cycle" duration	0...250	min	0	0	0	0
dCC	Defrost activation delay after a "Deep cooling cycle"	0...250	min	0	0	0	0
Sid	Threshold for entering a “Deep Cooling Cycle”.	-67.0...302	°C/°F	4.0	4.0	4.0	4.0
toS	“Deep Cooling Cycle” activation time.	0...250	min	5	5	5	5

Note: if one or more parameters in folder **CnF** or marked with **(!)** are changed, the controller must be switched off and then on again to make sure it works properly.

Modbus MSK 779 functions and resources

Contents

This section includes the following topics:

Setting parameters via Modbus 109
Modbus table content 110
Table of Modbus Parameters 112
Visibility table for folders relating to applications 126
Table of Modbus Resources 129

Setting parameters via Modbus

Introduction

Modbus is a client/server protocol for communication between devices connected in a network. Modbus devices communicate using a master-slave technique in which only one device (master) can send request messages. The other devices in the network (slave) respond, returning the data requested by the master or executing the action contained in the message sent by the master. A slave is a device connected to a network that processes information and sends the results to the master using the Modbus protocol.

The master device can send messages to individual slaves, or to all devices connected to the network (broadcast), whilst slave devices can only respond to messages individually and to the master device. The Modbus standard used by Eliwell employs the RTU code for data transmission.

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:

- 8 bits for data
- parity bits NONE (configurable)
- 2 stop BITS

Parameters can be changed via:

- Device keypad
- UNICARD / DMI
- Send data via Modbus protocol directly to an individual device or in a broadcast using the address 0 (broadcast)

Modbus commands available and data areas

The following commands are implemented:

Modbus command	Description
03 (hex 0x03)	Read resources
16 (hex 0x10)	Write resources
43 (hex 0x2B)	Read device ID. The following 3 fields can be read: • 0 = Manufacturer ID • 1 = Model ID • 2 = Family ID (MSK 779) / device version

Note: Maximum length of transmitted/received messages equal to 50 bytes.

Configuration

The **TTL** serial port may be used to configure the device, parameters, statuses, variables using the Modbus protocol.

The address of a device within a Modbus message is set via parameter **Adr**.

The address **0** is used for broadcast messages that all slaves recognize. Slaves do not respond to a broadcast type request.

The device configuration parameters are as follows:

Parameter	Description
Adr	Modbus protocol controller address
bAU	Baudrate selection
Pty	Sets the Modbus protocol parity BIT and the number of stop BITs: • **n** = NONE parity bit + 2 stop BITS • **E** = EVEN parity bit + 1 stop BIT • **o** = ODD parity bit + 1 stop BIT

Note: Switch the controller off and on again after changing **Pty**.

Parameter values and visibility

Below are several notes relating to the value and visibility of the parameters.

Notes:

- 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.

Modbus table content

Introduction

The tables below contain the information required to access the resources properly.

There are 3 tables:

- **Modbus Parameters Table**: contains all the device configuration parameters including visibility
- **Folder Visibility Table**: contains the visibility of the folders containing the parameters
- **Modbus Resource Table**: contains all status (I/O) and alarm resources available in the volatile memory of the device.

Description of the columns

FOLDER
Indicates the name of the folder containing the parameter in question.

LABEL
Indicates the name with which the parameter appears in the menu.

DESCRIPTION
Description of the parameter's meaning.

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

FILTER VAL.
Represents the position of the most significant data bit inside the register. This information is always provided when the register contains more than one piece of information and it is necessary to distinguish which bits actually represent the data (the useful size of the data, indicated in the DATA SIZE column, should also be taken into account).

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

FILTER VIS.
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

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

- R = the resource is read-only
- W = the resource is write-only
- R/W = the resource can be both read and written

DATA SIZE
Indicates the size of the piece of data (in bit):

- 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 convert it, 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).

RANGE
Describes the interval of values that can be assigned to the parameter. This range can be correlated to the value of other parameters.

MU
Unit of measure for the values.

Table of Modbus Parameters

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
-	**SEt**	Regulation setpoint	32769	0	32931	49152	R/W	Word	Y	**LSE**...**HSE**	°C/°F
-	**SES**	Summer mode regulation setpoint	32777	0	32930	48	R/W	Word	Y	**LSE**...**HSE**	°C/°F
CP	**diF**	Setpoint differential	32770	0	32928	768	R/W	Word	-	0.1...30.0	°C/°F
CP	**diS**	Summer mode setpoint differential	32778	0	32930	3072	R/W	Word	-	0.1...30.0	°C/°F
CP	**LSE**	Minimum setpoint value that can be set	32771	0	32928	3072	R/W	Word	Y	-67.0...**HSE**	°C/°F
CP	**HSE**	Maximum setpoint value that can be set	32773	0	32928	12288	R/W	Word	Y	**LSE**...302	°C/°F
CP	**ont**	Compressor output ON time if regulation probe is faulty	32768	0	32929	3	R/W	Byte	-	0...250	min
CP	**oFt**	Compressor output OFF time if regulation probe is faulty	32772	0	32929	12	R/W	Byte	-	0...250	min
CP	**don**	Compressor output activation delay from call	32776	0	32929	48	R/W	Byte	-	0...250	s
CP	**doF**	Compressor output activation delay from switch-off	32780	0	32929	192	R/W	Byte	-	0...250	min
CP	**dbi**	Delay between two consecutive compressor output power-ons	32784	0	32929	768	R/W	Byte	-	0...250	min
CP	**Cit**	Minimum compressor output activation time	32800	0	32930	3	R/W	Byte	-	0...250	min
CP	**CAt**	Maximum compressor output activation time	32804	0	32930	12	R/W	Byte	-	0...250	min
CP	**odo**	Output activation delay at startup	32788	0	32929	3072	R/W	Byte	-	0...250	min
CP	**H50**	Sets the type of regulation	32917	61440	32932	3072	R/W	Byte	-	0/1/2	num
CP	**H51**	Threshold (Setpoint) for ice sensor	32850	0	32932	12288	R/W	Byte	-	0...650	num
CP	**H52**	Ice sensor differential	32851	0	32932	49152	R/W	Byte	-	0...250	num
dEF	**dty**	Type of defrost	32908	61440	32930	768	R/W	Byte	-	0/1/2	num
dEF	**doH**	Defrost cycle activation delay from the call	32820	0	32931	3	R/W	Byte	-	0...250	min
dEF	**dEt**	Defrost timeout	32816	0	32930	12288	R/W	Byte	-	1...250	min
dEF	**dPo**	Defrost activation request at power-on	32968	1024	32931	768	R/W	Byte	-	0/1	flag
dEF	**dMr**	Enable defrost timer reset with manual defrost	32969	2048	32961	12	R/W	Byte	-	0/1	flag
dEF	**d00**	Cumulative time for defrost activation	32889	0	32949	12	R/W	Byte	-	0...250	hours
dEF	**d01**	Parameter d00 unit of measure	32925	12	32951	12	R/W	Byte	-	0/1/2	num
dEF	**dit**	Device time for defrost activation	32812	0	32949	49152	R/W	Byte	-	0...250	hours
dEF	**d11**	Parameter dit unit of measure	32925	48	32951	48	R/W	Byte	-	0/1/2	num
dEF	**d20**	Enable defrost at compressor stop	32969	256	32951	768	R/W	Byte	-	0/1	flag
dEF	**d90**	Clock defrost mode	32914	3840	32950	3072	R/W	Byte	-	0...3	num
dEF	**d91**	Number of daily defrosts	32890	255	32949	48	R/W	Byte	-	0...255	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
dEF	**d92**	1st weekend/holiday day	32914	15	32950	192	R/W	Byte	-	0...7	num
dEF	**d93**	2nd weekend/holiday day	32914	240	32950	768	R/W	Byte	-	0...7	num
dEF	**d94**	Regular defrost interval duration	32914	61440	32950	12288	R/W	Byte	-	1...7	num
dEF	**d1H**	Weekday defrost no. 1 start hour	32972	0	32993	3	R/W	Byte	-	0...24	hours
dEF	**d1n**	Weekday defrost no. 1 start minute	32976	0	32993	12	R/W	Byte	-	0...59	min
dEF	**d2H**	Weekday defrost no. 2 start hour	32980	0	32993	48	R/W	Byte	-	d1H...24	hours
dEF	**d2n**	Weekday defrost no. 2 start minute	32996	0	32993	192	R/W	Byte	-	0...59	min
dEF	**d3H**	Weekday defrost no. 3 start hour	33028	0	32993	768	R/W	Byte	-	d2H...24	hours
dEF	**d3n**	Weekday defrost no. 3 start minute	33029	255	32993	3072	R/W	Byte	-	0...59	min
dEF	**d4H**	Weekday defrost no. 4 start hour	33029	0	32993	12288	R/W	Byte	-	d3H...24	hours
dEF	**d4n**	Weekday defrost no. 4 start minute	33030	255	32993	49152	R/W	Byte	-	0...59	min
dEF	**d5H**	Weekday defrost no. 5 start hour	33030	0	32994	3	R/W	Byte	-	d4H...24	hours
dEF	**d5n**	Weekday defrost no. 5 start minute	33031	255	32994	12	R/W	Byte	-	0...59	min
dEF	**d6H**	Weekday defrost no. 6 start hour	33031	0	32994	48	R/W	Byte	-	d5H...24	hours
dEF	**d6n**	Weekday defrost no. 6 start minute	33032	0	32994	192	R/W	Byte	-	0...59	min
dEF	**F1H**	Weekend/holiday defrost no. 1 start hour	33033	255	32994	768	R/W	Byte	-	0...24	hours
dEF	**F1n**	Weekend/holiday defrost no. 1 start minute	33033	0	32994	3072	R/W	Byte	-	0...59	min
dEF	**F2H**	Weekend/holiday defrost no. 2 start hour	33034	255	32994	12288	R/W	Byte	-	F1H...24	hours
dEF	**F2n**	Weekend/holiday defrost no. 2 start minute	33034	0	32994	49152	R/W	Byte	-	0...59	min
dEF	**F3H**	Weekend/holiday defrost no. 3 start hour	33035	255	32995	3	R/W	Byte	-	F2H...24	hours
dEF	**F3n**	Weekend/holiday defrost no. 3 start minute	33035	0	32995	12	R/W	Byte	-	0...59	min
dEF	**F4H**	Weekend/holiday defrost no. 4 start hour	33036	0	32995	48	R/W	Byte	-	F3H...24	hours
dEF	**F4n**	Weekend/holiday defrost no. 4 start minute	33037	255	32995	192	R/W	Byte	-	0...59	min
dEF	**F5H**	Weekend/holiday defrost no. 5 start hour	33037	0	32995	768	R/W	Byte	-	F4H...24	hours
dEF	**F5n**	Weekend/holiday defrost no. 5 start minute	33038	255	32995	3072	R/W	Byte	-	0...59	min
dEF	**F6H**	Weekend/holiday defrost no. 6 start hour	33038	0	32995	12288	R/W	Byte	-	F5H...24	hours
dEF	**F6n**	Weekend/holiday defrost no. 6 start minute	33039	255	32995	49152	R/W	Byte	-	0...59	min
PUP	**H54**	Pump regulation probe selection	32970	1	32933	12	R/W	Byte	-	0/1	flag
PUP	**H56**	Duty cycle: time with pump regulation on	32858	0	32933	48	R/W	Word	Y	-67.0...302	°C/°F
PUP	**H57**	Duty cycle: time with pump regulation off	32859	0	32933	192	R/W	Word	Y	-67.0...302	°C/°F

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
PUP	**H58**	Pump regulation setpoint	32861	0	32933	768	R/W	Word	-	1.0...25.0	°C/°F
AL	**Att**	Alarm mode (absolute or relative)	32968	32768	32934	12	R/W	Byte	-	0/1	flag
AL	**AFd**	Alarm activation differential	32872	0	32934	48	R/W	Word	-	0.1...25.0	°C/°F
AL	**HAL**	Maximum alarm threshold	32779	0	32934	192	R/W	Word	Y	**LAL**...302	°C/°F
AL	**LAL**	Minimum alarm threshold	32781	0	32934	768	R/W	Word	Y	-67.0...**HAL**	°C/°F
AL	**PAo**	Temperature alarm exclusion time from power-on	32873	255	32934	3072	R/W	Byte	-	0...10	min*10
AL	**dAo**	Exclusion time for temperature alarms after a defrost cycle	32841	0	32934	12288	R/W	Word	-	0...250	min
AL	**oAo**	High and low temperature alarms exclusion time after closing the door	32874	255	32934	49152	R/W	Byte	-	0...10	hours
AL	**tdo**	Door open alarm exclusion time	32875	255	32935	49152	R/W	Byte	-	0...250	min
AL	**tAo**	Temperature alarm signaling delay time	32874	0	32935	3	R/W	Byte	-	0...250	min
AL	**dAt**	Defrost ended due to timeout alarm signaling	32782	0	32935	12	R/W	Byte	-	0/1	flag
AL	**EAL**	Regulators inhibited by external alarm	32915	3840	32935	48	R/W	Byte	-	0/1/2	num
AL	**AoP**	Alarm output polarity	32969	1	32935	768	R/W	Byte	-	0/1	flag
AL	**rFt**	Refrigerant level alarm bypass	33051	0	32985	12288	R/W	Byte	-	0...250	min
Lit	**ESA**	AUX status during Energy Saving	32925	768	32959	3072	R/W	Byte	-	0/1/2	num
dOr	**dod**	Enable utility shutoff upon door switch activation	32909	3840	32935	12288	R/W	Byte	-	0...3	num
dOr	**dAd**	D.I. activation indication delay time 1/2	32882	255	32940	3072	R/W	Byte	-	0...250	min
dOr	**dCo**	Compressor activation delay from acknowledgment	32840	0	32931	3072	R/W	Byte	-	0...250	min
PrE	**PEn**	Number of errors permitted per minimum/maximum pressure switch input	32894	255	32946	12288	R/W	Byte	-	0...15	num
PrE	**PEi**	Minimum/maximum pressure switch error calculation interval	32894	0	32946	49152	R/W	Byte	-	1...99	min
PrE	**PEt**	Compressor activation delay after pressure switch deactivation	32895	255	32947	3	R/W	Byte	-	0...255	min
EnS	**SPn**	Night mode setpoint	32854	0	32953	49152	R/W	Word	Y	-67.0...302	°C/°F
EnS	**dFn**	Night mode offset	32855	0	32954	3	R/W	Word	-	0.1...30.0	°C/°F
EnS	**oSP**	Offset on setpoint	32783	0	32936	49152	R/W	Word	Y	-30.0...30.0	°C/°F
EnS	**odF**	Trigger differential correction	32785	0	32937	48	R/W	Word	-	0.1...30.0	°C/°F
EnS	**dnt**	Night mode duration	32877	255	32937	3	R/W	Byte	-	0...24	hours
EnS	**Cdt**	Door closing time	32877	0	32937	12	R/W	Byte	-	0...250	min*10
PLd	**PdC**	Pull-Down mode	32915	61440	32963	3	R/W	Byte	-	0/1/2	num
PLd	**tPd**	Fast cooling mode duration	32836	0	32962	768	R/W	Byte	-	0...250	min

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
PLd	**SPF**	Fast cooling setpoint	32845	0	32952	12288	R/W	Word	Y	-67.0...302	°C/°F
PLd	**dFF**	Fast cooling offset	32842	0	32951	49152	R/W	Word	-	0.1...30.0	°C/°F
PLd	**Pdo**	Step value for fast cooling setpoint	32843	0	32952	768	R/W	Word	-	0.1...30.0	°C/°F
PLd	**Pdn**	Step number for fast cooling setpoint	32916	3840	32957	49152	R/W	Byte	-	1...10	num
Add	**Adr**	Modbus protocol controller address	33048	0	32984	768	R/W	Byte	-	0...247	num
Add	**bAU**	Baudrate selection	33051	255	32984	3072	R/W	Byte	-	0/1/2	num
Add	**PtY**	MODBUS parity bit	33049	255	32984	12288	R/W	Byte	-	0/1/2	num
diS	**dro**	Select °C / °F	32969	8	32937	192	R/W	Byte	-	0/1	flag
diS	**CA1**	Analog input 1 calibration	32786	0	32937	768	R/W	Word	Y	-30.0...30.0	°C/°F
diS	**LoC**	Disable keypad	32969	16	32938	48	R/W	Byte	-	0/1	flag
diS	**ddd**	Select main display value	32909	61440	32938	192	R/W	Byte	-	0...3	num
diS	**ddE**	Display on eco device	32918	240	32958	12288	R/W	Byte	-	0...4	num
diS	**ddL**	Display lock mode during a defrost	32910	15	32938	768	R/W	Byte	-	0/1/2	num
diS	**Ldd**	Display lock timeout from end of defrost	32878	255	32938	3072	R/W	Byte	-	0...250	min
diS	**ndt**	Display with decimal point	32969	32	32938	12288	R/W	Byte	-	0/1	flag
diS	**FiS**	Select display filter	33053	255	32990	3	R/W	Byte	-	0/1/2	num
diS	**tAu**	Display filter time constant	33053		32990	12	R/W	Byte	-	0...250	min
diS	**Fit**	Display filter mode	33054	255	32990	48	R/W	Byte	-	0/1	flag
diS	**PS1**	Password 1 value	32879		32939	192	R/W	Byte	-	0...250	num
diS	**PS2**	Password 2 value	32880		32939	768	R/W	Byte	-	0...250	num
CnF	**H08**	Stand-by operating mode	32925	3	32939	12288	R/W	Byte	-	0/1/2	num
CnF	**H12**	Configurability of digital input 2	32881	0	32940	768	R/W	Word	Y	-13...13	num
CnF	**H21**	Configurability of digital output Out1	32884	0	32940	12288	R/W	Byte	-	0...11	num
CnF	**H22**	Configurability of digital output Out2	32885	255	32940	49152	R/W	Byte	-	0...10	num
CnF	**H32**	Key configuration ▽	32911	15	32941	192	R/W	Byte	-	0...11	num
CnF	**H33**	Key configuration ⏻	32911	240	32941	768	R/W	Byte	-	0...11	num
CnF	**H60**	Parameter vector selector	33043	0	32987	192	R	Byte	-	0...3	num
CnF	**tAb**	Map code	32997	0	32985	12	R	Word	-	0...999	num
CnF	**CuS**	Customer model reference	33689	0	32990	192	RW	Word	-	0...999	num
FPr	**UL**	Visibility of the function transferring the programming parameters from the controller to the UNICARD	-	-	32985	48	R/W	2 bit	-	0...3	num
FPr	**Fr**	UNICARD formatting function visibility	-	-	32985	768	R/W	2 bit	-	0...3	num
FnC	**oSP**	Reduced set activation	-	-	32988	768	R/W	2 bit	-	0...3	num
FnC	**dEF**	Activate defrost	-	-	32987	768	R/W	2 bit	-	0...3	num
FnC	**AUX**	AUX output activation / deactivation	-	-	32987	49152	R/W	2 bit	-	0...3	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
FnC	**rAP**	Pressure switch alarm reset visibility	-	-	32985	3072	R/W	2 bit	-	0...3	num
nAd	**E10**	Event 1 profile	33040	0	32985	49152	R/W	Byte	-	0...11	num
nAd	**E11**	Event 1 start hour	33041	0	32986	3	R/W	Byte	-	0...23	hours
nAd	**E12**	Event 1 start minute	33042	255	32986	12	R/W	Byte	-	0...59	min
nAd	**E13**	Event 1 end hour	33042	0	32986	48	R/W	Byte	-	0...23	hours
nAd	**E14**	Event 1 end minute	33043	255	32986	192	R/W	Byte	-	0...59	min
nAd	**E15**	Enable functions during event 1	33041	255	32986	768	R/W	Byte	-	0...5	num
nAd	**E20**	Event 2 profile	33044	0	32986	3072	R/W	Byte	-	0...11	num
nAd	**E21**	Event 2 start hour	33045	0	32986	12288	R/W	Byte	-	0...23	hours
nAd	**E22**	Event 2 start minute	33046	255	32986	49152	R/W	Byte	-	0...59	min
nAd	**E23**	Event 2 end hour	33046	0	32987	3	R/W	Byte	-	0...23	hours
nAd	**E24**	Event 2 end minute	33047	255	32987	12	R/W	Byte	-	0...59	min
nAd	**E25**	Enable functions during event 2	33045	255	32987	48	R/W	Byte	-	0...5	num
CPr	**tCP**	Time temperature remains below the cool protection setpoint	32844	0	32952	3072	R/W	Byte	-	0...250	min
CPr	**SCP**	Cool protection setpoint	32846	0	32952	49152	R/W	Word	Y	-67.0...302	°C/°F
CPr	**dCP**	Cool protection differential	32847	0	32953	3	R/W	Word	-	0.1...30.0	°C/°F
dEC	**dCA**	Enable deep cooling	32925	3072	32959	12288	R/W	Byte	-	0/1/2	num
dEC	**dCS**	Deep cooling setpoint	32834	0	32947	768	R/W	Word	Y	-67.0...302	°C/°F
dEC	**tdC**	Deep cooling duration	32886	0	32948	12288	R/W	Byte	-	0...250	min
dEC	**dCC**	Defrost delay after deep cooling	32883	0	32948	3072	R/W	Byte	-	0...250	min
dEC	**Sid**	Deep cooling start threshold	32857	0	32962	48	R/W	Word	Y	-67.0...302	°C/°F
dEC	**toS**	Time above the threshold for deep cooling start	32867	255	32957	3	R/W	Byte	-	0...250	min
Application 1 parameters											
V1	**V1-SEt**	Regulation setpoint	33073	0	33235	49152	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V1	**V1-SES**	Summer mode regulation setpoint	33081	0	33234	48	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V1	**V1-diF**	Setpoint differential	33074	0	33232	768	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-diS**	Summer mode setpoint differential	33082	0	33234	3072	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-LSE**	Minimum setpoint value that can be set	33075	0	33232	3072	R/W	Word	Y	-67.0...**HSE**	°C/°F
V1	**V1-HSE**	Maximum setpoint value that can be set	33077	0	33232	12288	R/W	Word	Y	**LSE**...302	°C/°F
V1	**V1-ont**	Compressor output ON time if regulation probe is faulty	33072	0	33233	3	R/W	Byte	-	0...250	min
V1	**V1-oFt**	Compressor output OFF time if regulation probe is faulty	33076	0	33233	12	R/W	Byte	-	0...250	min
V1	**V1-don**	Compressor output activation delay from call	33080	0	33233	48	R/W	Byte	-	0...250	s
V1	**V1-doF**	Compressor output activation delay from switch-off	33084	0	33233	192	R/W	Byte	-	0...250	min

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V1	**V1-dbi**	Delay between two consecutive compressor output power-ons	33088	0	33233	768	R/W	Byte	-	0...250	min
V1	**V1-Cit**	Minimum compressor output activation time	33104	0	33234	3	R/W	Byte	-	0...250	min
V1	**V1-CAt**	Maximum compressor output activation time	33108	0	33234	12	R/W	Byte	-	0...250	min
V1	**V1-odo**	Output activation delay at startup	33092	0	33233	3072	R/W	Byte	-	0...250	min
V1	**V1-H50**	Sets the type of regulation	33221	61440	33236	3072	R/W	Byte	-	0/1/2	num
V1	**V1-H51**	Threshold (Setpoint) for ice sensor	33154	0	33236	12288	R/W	Byte	-	0...650	num
V1	**V1-H52**	Ice sensor differential	33155	0	33236	49152	R/W	Byte	-	0...250	num
V1	**V1-dty**	Type of defrost	33212	61440	33234	768	R/W	Byte	-	0/1/2	num
V1	**V1-doH**	Defrost cycle activation delay from the call	33124	0	33235	3	R/W	Byte	-	0...250	min
V1	**V1-dEt**	Defrost timeout	33120	0	33234	12288	R/W	Byte	-	1...250	min
V1	**V1-dPo**	Defrost activation request at power-on	33272	1024	33235	768	R/W	Byte	-	0/1	flag
V1	**V1-dMr**	Enable defrost timer reset with manual defrost	33273	2048	33265	12	R/W	Byte	-	0/1	flag
V1	**V1-d00**	Cumulative time for defrost activation	33193	0	33253	12	R/W	Byte	-	0...250	hours
V1	**V1-d01**	Parameter d00 unit of measure	33229	12	33255	12	R/W	Byte	-	0/1/2	num
V1	**V1-dit**	Device time for defrost activation	33116	0	33253	49152	R/W	Byte	-	0...250	hours
V1	**V1-d11**	Parameter dit unit of measure	33229	48	33255	48	R/W	Byte	-	0/1/2	num
V1	**V1-d20**	Enable defrost at compressor stop	33273	256	33255	768	R/W	Byte	-	0/1	flag
V1	**V1-d90**	Clock defrost mode	33218	3840	33254	3072	R/W	Byte	-	0...3	num
V1	**V1-d91**	Number of daily defrosts	33194	255	33253	48	R/W	Byte	-	0...255	num
V1	**V1-d92**	1st weekend/holiday day	33218	15	33254	192	R/W	Byte	-	0...7	num
V1	**V1-d93**	2nd weekend/holiday day	33218	240	33254	768	R/W	Byte	-	0...7	num
V1	**V1-d94**	Regular defrost interval duration	33218	61440	33254	12288	R/W	Byte	-	1...7	num
V1	**V1-H54**	Pump regulation probe selection	33274	1	33237	12	R/W	Byte	-	0/1	flag
V1	**V1-H56**	Duty cycle: time with pump regulation on	33162	0	33237	48	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-H57**	Duty cycle: time with pump regulation off	33163	0	33237	192	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-H58**	Pump regulation setpoint	33165	0	33237	768	R/W	Word	-	1.0...25.0	°C/°F
V1	**V1-Att**	Alarm mode (absolute or relative)	33272	32768	33238	12	R/W	Byte	-	0/1	flag

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V1	**V1-AFd**	Alarm activation differential	33176	0	33238	48	R/W	Word	-	0.1...25.0	°C/°F
V1	**V1-HAL**	Maximum alarm threshold	33083	0	33238	192	R/W	Word	Y	**LAL**...302	°C/°F
V1	**V1-LAL**	Minimum alarm threshold	33085	0	33238	768	R/W	Word	Y	-67.0...**HAL**	°C/°F
V1	**V1-PAo**	Temperature alarm exclusion time from power-on	33177	255	33238	3072	R/W	Byte	-	0...10	min*10
V1	**V1-dAo**	Exclusion time for temperature alarms after a defrost cycle	33145	0	33238	12288	R/W	Word	-	0...250	min
V1	**V1-oAo**	High and low temperature alarms exclusion time after closing the door	33178	255	33238	49152	R/W	Byte	-	0...10	hours
V1	**V1-tdo**	Door open alarm exclusion time	33179	255	33239	49152	R/W	Byte	-	0...250	min
V1	**V1-tAo**	Temperature alarm signaling delay time	33178	0	33239	3	R/W	Byte	-	0...250	min
V1	**V1-dAt**	Defrost ended due to timeout alarm signaling	33086	0	33239	12	R/W	Byte	-	0/1	flag
V1	**V1-EAL**	Regulators inhibited by external alarm	33219	3840	33239	48	R/W	Byte	-	0/1/2	num
V1	**V1-AoP**	Alarm output polarity	33273	1	33239	768	R/W	Byte	-	0/1	flag
V1	**V1-ESA**	AUX status during Energy Saving	33229	768	33263	3072	R/W	Byte	-	0/1/2	num
V1	**V1-dod**	Enable utility shutoff upon door switch activation	33213	3840	33239	12288	R/W	Byte	-	0...3	num
V1	**V1-dCo**	Compressor activation delay from acknowledgment	33144	0	33235	3072	R/W	Byte	-	0...250	min
V1	**V1-PEn**	Number of errors permitted per minimum/maximum pressure switch input	33198	255	33250	12288	R/W	Byte	-	0...15	num
V1	**V1-PEi**	Minimum/maximum pressure switch error calculation interval	33198	0	33250	49152	R/W	Byte	-	1...99	min
V1	**V1-PEt**	Compressor activation delay after pressure switch deactivation	33199	255	33251	3	R/W	Byte	-	0...255	min
V1	**V1-SPn**	Night mode setpoint	33158	0	33257	49152	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-dFn**	Night mode offset	33159	0	33258	3	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-oSP**	Offset on setpoint	33087	0	33240	49152	R/W	Word	Y	-30.0...30.0	°C/°F
V1	**V1-odF**	Trigger differential correction	33089	0	33241	48	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-dnt**	Night mode duration	33181	255	33241	3	R/W	Byte	-	0...24	hours
V1	**V1-Cdt**	Door closing time	33181	0	33241	12	R/W	Byte	-	0...250	min*10
V1	**V1-PdC**	Pull-Down mode	33219	61440	33267	3	R/W	Byte	-	0/1/2	num
V1	**V1-tPd**	Fast cooling mode duration	33140	0	33266	768	R/W	Byte	-	0...250	min

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V1	**V1-SPF**	Fast cooling setpoint	33149	0	33256	12288	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-dFF**	Fast cooling offset	33146	0	33255	49152	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-Pdo**	Step value for fast cooling setpoint	33147	0	33256	768	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-Pdn**	Step number for fast cooling setpoint	33220	3840	33261	49152	R/W	Byte	-	1...10	num
V1	**V1-dro**	Select °C / °F	33273	8	33241	192	R/W	Byte	-	0/1	flag
V1	**V1-CA1**	Probe Pb1 calibration	33090	0	33241	768	R/W	Word	Y	-30.0...30.0	°C/°F
V1	**V1-LoC**	Enable keypad lock	33273	16	33242	48	R/W	Byte	-	0/1	flag
V1	**V1-ddd**	Select main display value	33213	61440	33242	192	R/W	Byte	-	0...3	num
V1	**V1-ddE**	Display on eco device	33222	240	33262	12288	R/W	Byte	-	0...4	num
V1	**V1-ddL**	Inhibit resources at the end of defrost	33214	15	33242	768	R/W	Byte	-	0/1/2	num
V1	**V1-Ldd**	Display lock timeout from end of defrost	33182	255	33242	3072	R/W	Byte	-	0...250	min
V1	**V1-ndt**	Display with decimal point	33273	32	33242	12288	R/W	Byte	-	0/1	flag
V1	**V1-PS1**	Password 1 value	33183	0	33243	192	R/W	Byte	-	0...250	num
V1	**V1-PS2**	Password 2 value	33184	0	33243	768	R/W	Byte	-	0...250	num
V1	**V1-H08**	Stand-by operating mode	33229	3	33243	12288	R/W	Byte	-	0/1/2	num
V1	**V1-H12**	Configurability of digital input 2	33185	0	33244	768	R/W	Word	Y	-13...13	num
V1	**V1-H21**	Configurability of digital output Out1	33188	0	33244	12288	R/W	Byte	-	0...11	num
V1	**V1-H22**	Configurability of digital output Out2	33189	255	33244	49152	R/W	Byte	-	0...10	num
V1	**V1-H32**	Key configuration ▽	33215	15	33245	192	R/W	Byte	-	0...11	num
V1	**V1-H33**	Key configuration ⏻	33215	240	33245	768	R/W	Byte	-	0...11	num
V1	**V1-tCP**	Time temperature remains below the cool protection setpoint	33148	0	33256	3072	R/W	Byte	-	0...250	min
V1	**V1-SCP**	Cool protection setpoint	33150	0	33256	49152	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-dCP**	Cool protection differential	33151	0	33257	3	R/W	Word	-	0.1...30.0	°C/°F
V1	**V1-dCA**	Enable deep cooling	33229	3072	33263	12288	R/W	Byte	-	0/1/2	num
V1	**V1-dCS**	Deep cooling setpoint	33138	0	33251	768	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-tdC**	Deep cooling duration	33190	0	33252	12288	R/W	Byte	-	0...250	min
V1	**V1-dCC**	Defrost delay after deep cooling	33187	0	33252	3072	R/W	Byte	-	0...250	min
V1	**V1-Sid**	Deep cooling start threshold	33161	0	33266	48	R/W	Word	Y	-67.0...302	°C/°F
V1	**V1-toS**	Time above the threshold for deep cooling start	33171	255	33261	3	R/W	Byte	-	0...250	min

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
Application 2 parameters											
V2	**V2-SEt**	Regulation setpoint	33281	0	33443	49152	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V2	**V2-SES**	Summer mode regulation setpoint	33289	0	33442	48	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V2	**V2-diF**	Setpoint differential	33282	0	33440	768	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-diS**	Summer mode setpoint differential	33290	0	33442	3072	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-LSE**	Minimum setpoint value that can be set	33283	0	33440	3072	R/W	Word	Y	-67.0...**HSE**	°C/°F
V2	**V2-HSE**	Maximum setpoint value that can be set	33285	0	33440	12288	R/W	Word	Y	**LSE**...302	°C/°F
V2	**V2-ont**	Compressor output ON time if regulation probe is faulty	33280	0	33441	3	R/W	Byte	-	0...250	min
V2	**V2-oFt**	Compressor output OFF time if regulation probe is faulty	33284	0	33441	12	R/W	Byte	-	0...250	min
V2	**V2-don**	Compressor output activation delay from call	33288	0	33441	48	R/W	Byte	-	0...250	s
V2	**V2-doF**	Compressor output activation delay from switch-off	33292	0	33441	192	R/W	Byte	-	0...250	min
V2	**V2-dbi**	Delay between two consecutive compressor output power-ons	33296	0	33441	768	R/W	Byte	-	0...250	min
V2	**V2-Cit**	Minimum compressor output activation time	33312	0	33442	3	R/W	Byte	-	0...250	min
V2	**V2-CAt**	Maximum compressor output activation time	33316	0	33442	12	R/W	Byte	-	0...250	min
V2	**V2-odo**	Output activation delay at startup	33300	0	33441	3072	R/W	Byte	-	0...250	min
V2	**V2-H50**	Sets the type of regulation	33429	61440	33444	3072	R/W	Byte	-	0/1/2	num
V2	**V2-H51**	Threshold (Setpoint) for ice sensor	33362	0	33444	12288	R/W	Byte	-	0...650	num
V2	**V2-H52**	Ice sensor differential	33363	0	33444	49152	R/W	Byte	-	0...250	num
V2	**V2-dty**	Type of defrost	33420	61440	33442	768	R/W	Byte	-	0/1/2	num
V2	**V2-doH**	Defrost cycle activation delay from the call	33332	0	33443	3	R/W	Byte	-	0...250	min
V2	**V2-dEt**	Defrost timeout	33328	0	33442	12288	R/W	Byte	-	1...250	min
V2	**V2-dPo**	Defrost activation request at power-on	33480	1024	33443	768	R/W	Byte	-	0/1	flag
V2	**V2-dMr**	Enable defrost timer reset with manual defrost	33481	2048	33473	12	R/W	Byte	-	0/1	flag
V2	**V2-d00**	Cumulative time for defrost activation	33401	0	33461	12	R/W	Byte	-	0...250	hours
V2	**V2-d01**	Parameter d00 unit of measure	33437	12	33463	12	R/W	Byte	-	0/1/2	num
V2	**V2-dit**	Device time for defrost activation	33324	0	33461	49152	R/W	Byte	-	0...250	hours
V2	**V2-d11**	Parameter dit unit of measure	33437	48	33463	48	R/W	Byte	-	0/1/2	num
V2	**V2-d20**	Enable defrost at compressor stop	33481	256	33463	768	R/W	Byte	-	0/1	flag

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V2	**V2-d90**	Clock defrost mode	33426	3840	33462	3072	R/W	Byte	-	0...3	num
V2	**V2-d91**	Number of daily defrosts	33402	255	33461	48	R/W	Byte	-	0...255	num
V2	**V2-d92**	1st weekend/holiday day	33426	15	33462	192	R/W	Byte	-	0...7	num
V2	**V2-d93**	2nd weekend/holiday day	33426	240	33462	768	R/W	Byte	-	0...7	num
V2	**V2-d94**	Regular defrost interval duration	33426	61440	33462	12288	R/W	Byte	-	1...7	num
V2	**V2-H54**	Pump regulation probe selection	33482	1	33445	12	R/W	Byte	-	0/1	flag
V2	**V2-H56**	Duty cycle: time with pump regulation on	33370	0	33445	48	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-H57**	Duty cycle: time with pump regulation off	33371	0	33445	192	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-H58**	Pump regulation setpoint	33373	0	33445	768	R/W	Word	-	1.0...25.0	°C/°F
V2	**V2-Att**	Alarm mode (absolute or relative)	33480	32768	33446	12	R/W	Byte	-	0/1	flag
V2	**V2-AFd**	Alarm activation differential	33384	0	33446	48	R/W	Word	-	0.1...25.0	°C/°F
V2	**V2-HAL**	Maximum alarm threshold	33291	0	33446	192	R/W	Word	Y	**LAL**...302	°C/°F
V2	**V2-LAL**	Minimum alarm threshold	33293	0	33446	768	R/W	Word	Y	-67.0...**HAL**	°C/°F
V2	**V2-PAo**	Temperature alarm exclusion time from power-on	33385	255	33446	3072	R/W	Byte	-	0...10	min*10
V2	**V2-dAo**	Exclusion time for temperature alarms after a defrost cycle	33353	0	33446	12288	R/W	Word	-	0...250	min
V2	**V2-oAo**	High and low temperature alarms exclusion time after closing the door	33386	255	33446	49152	R/W	Byte	-	0...10	hours
V2	**V2-tdo**	Door open alarm exclusion time	33387	255	33447	49152	R/W	Byte	-	0...250	min
V2	**V2-tAo**	Temperature alarm signaling delay time	33386	0	33447	3	R/W	Byte	-	0...250	min
V2	**V2-dAt**	Defrost ended due to timeout alarm signaling	33294	0	33447	12	R/W	Byte	-	0/1	flag
V2	**V2-EAL**	Regulators inhibited by external alarm	33427	3840	33447	48	R/W	Byte	-	0/1/2	num
V2	**V2-AoP**	Alarm output polarity	33481	1	33447	768	R/W	Byte	-	0/1	flag
V2	**V2-ESA**	AUX status during Energy Saving	33437	768	33471	3072	R/W	Byte	-	0/1/2	num
V2	**V2-dod**	Enable utility shutoff upon door switch activation	33421	3840	33447	12288	R/W	Byte	-	0...3	num
V2	**V2-dCo**	Compressor activation delay from acknowledgment	33352	0	33443	3072	R/W	Byte	-	0...250	min
V2	**V2-PEn**	Number of errors permitted per minimum/maximum pressure switch input	33406	255	33458	12288	R/W	Byte	-	0...15	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V2	**V2-PEi**	Minimum/maximum pressure switch error calculation interval	33406	0	33458	49152	R/W	Byte	-	1...99	min
V2	**V2-PEt**	Compressor activation delay after pressure switch deactivation	33407	255	33459	3	R/W	Byte	-	0...255	min
V2	**V2-SPn**	Night mode setpoint	33366	0	33465	49152	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-dFn**	Night mode offset	33367	0	33466	3	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-oSP**	Offset on setpoint	33295	0	33448	49152	R/W	Word	Y	-30.0...30.0	°C/°F
V2	**V2-odF**	Trigger differential correction	33297	0	33449	48	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-dnt**	Night mode duration	33389	255	33449	3	R/W	Byte	-	0...24	hours
V2	**V2-Cdt**	Door closing time	33389	0	33449	12	R/W	Byte	-	0...250	min*10
V2	**V2-PdC**	Pull-Down mode	33427	61440	33475	3	R/W	Byte	-	0/1/2	num
V2	**V2-tPd**	Fast cooling mode duration	33348	0	33474	768	R/W	Byte	-	0...250	min
V2	**V2-SPF**	Fast cooling setpoint	33357	0	33464	12288	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-dFF**	Fast cooling offset	33354	0	33463	49152	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-Pdo**	Step value for fast cooling setpoint	33355	0	33464	768	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-Pdn**	Step number for fast cooling setpoint	33428	3840	33469	49152	R/W	Byte	-	1...10	num
V2	**V2-dro**	Select °C / °F	33481	8	33449	192	R/W	Byte	-	0/1	flag
V2	**V2-CA1**	Probe Pb1 calibration	33298	0	33449	768	R/W	Word	Y	-30.0...30.0	°C/°F
V2	**V2-LoC**	Enable keypad lock	33481	16	33450	48	R/W	Byte	-	0/1	flag
V2	**V2-ddd**	Select main display value	33421	61440	33450	192	R/W	Byte	-	0...3	num
V2	**V2-ddE**	Display on eco device	33430	240	33470	12288	R/W	Byte	-	0...4	num
V2	**V2-ddL**	Inhibit resources at the end of defrost	33422	15	33450	768	R/W	Byte	-	0/1/2	num
V2	**V2-Ldd**	Display lock timeout from end of defrost	33390	255	33450	3072	R/W	Byte	-	0...250	min
V2	**V2-ndt**	Display with decimal point	33481	32	33450	12288	R/W	Byte	-	0/1	flag
V2	**V2-PS1**	Password 1 value	33391	0	33451	192	R/W	Byte	-	0...250	num
V2	**V2-PS2**	Password 2 value	33392	0	33451	768	R/W	Byte	-	0...250	num
V2	**V2-H08**	Stand-by operating mode	33437	3	33451	12288	R/W	Byte	-	0/1/2	num
V2	**V2-H12**	Configurability of digital input 2	33393	0	33452	768	R/W	Word	Y	-13...13	num
V2	**V2-H21**	Configurability of digital output Out1	33396	0	33452	12288	R/W	Byte	-	0...11	num
V2	**V2-H22**	Configurability of digital output Out2	33397	255	33452	49152	R/W	Byte	-	0...10	num
V2	**V2-H32**	Key configuration ▽	33423	15	33453	192	R/W	Byte	-	0...11	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V2	**V2-H33**	Key configuration ⏻	33423	240	33453	768	R/W	Byte	-	0...11	num
V2	**V2-tCP**	Time temperature remains below the cool protection setpoint	33356	0	33464	3072	R/W	Byte	-	0...250	min
V2	**V2-SCP**	Cool protection setpoint	33358	0	33464	49152	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-dCP**	Cool protection differential	33359	0	33465	3	R/W	Word	-	0.1...30.0	°C/°F
V2	**V2-dCA**	Enable deep cooling	33437	3072	33471	12288	R/W	Byte	-	0/1/2	num
V2	**V2-dCS**	Deep cooling setpoint	33346	0	33459	768	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-tdC**	Deep cooling duration	33398	0	33460	12288	R/W	Byte	-	0...250	min
V2	**V2-dCC**	Defrost delay after deep cooling	33395	0	33460	3072	R/W	Byte	-	0...250	min
V2	**V2-Sid**	Deep cooling start threshold	33369	0	33474	48	R/W	Word	Y	-67.0...302	°C/°F
V2	**V2-toS**	Time above the threshold for deep cooling start	33379	255	33469	3	R/W	Byte	-	0...250	min
Application 3 parameters											
V3	**V3-SEt**	Regulation setpoint	33485	0	33647	49152	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V3	**V3-SES**	Summer mode regulation setpoint	33493	0	33646	48	R/W	Word	Y	**LSE**...**HSE**	°C/°F
V3	**V3-diF**	Setpoint differential	33486	0	33644	768	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-diS**	Summer mode setpoint differential	33494	0	33646	3072	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-LSE**	Minimum setpoint value that can be set	33487	0	33644	3072	R/W	Word	Y	-67.0...**HSE**	°C/°F
V3	**V3-HSE**	Maximum setpoint value that can be set	33489	0	33644	12288	R/W	Word	Y	**LSE**...302	°C/°F
V3	**V3-ont**	Compressor output ON time if regulation probe is faulty	33484	0	33645	3	R/W	Byte	-	0...250	min
V3	**V3-oFt**	Compressor output OFF time if regulation probe is faulty	33488	0	33645	12	R/W	Byte	-	0...250	min
V3	**V3-don**	Compressor output activation delay from call	33492	0	33645	48	R/W	Byte	-	0...250	s
V3	**V3-doF**	Compressor output activation delay from switch-off	33496	0	33645	192	R/W	Byte	-	0...250	min
V3	**V3-dbi**	Delay between two consecutive compressor output power-ons	33500	0	33645	768	R/W	Byte	-	0...250	min
V3	**V3-Cit**	Minimum compressor output activation time	33516	0	33646	3	R/W	Byte	-	0...250	min
V3	**V3-CAt**	Maximum compressor output activation time	33520	0	33646	12	R/W	Byte	-	0...250	min
V3	**V3-odo**	Output activation delay at startup	33504	0	33645	3072	R/W	Byte	-	0...250	min
V3	**V3-H50**	Sets the type of regulation	33633	61440	33648	3072	R/W	Byte	-	0/1/2	num
V3	**V3-H51**	Threshold (Setpoint) for ice sensor	33566	0	33648	12288	R/W	Byte	-	0...650	num
V3	**V3-H52**	Ice sensor differential	33567	0	33648	49152	R/W	Byte	-	0...250	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V3	**V3-dty**	Type of defrost	33624	61440	33646	768	R/W	Byte	-	0/1/2	num
V3	**V3-doH**	Defrost cycle activation delay from the call	33536	0	33647	3	R/W	Byte	-	0...250	min
V3	**V3-dEt**	Defrost timeout	33532	0	33646	12288	R/W	Byte	-	1...250	min
V3	**V3-dPo**	Defrost activation request at power-on	33684	1024	33647	768	R/W	Byte	-	0/1	flag
V3	**V3-dMr**	Enable defrost timer reset with manual defrost	33685	2048	33677	12	R/W	Byte	-	0/1	flag
V3	**V3-d00**	Cumulative time for defrost activation	33605	0	33665	12	R/W	Byte	-	0...250	hours
V3	**V3-d01**	Parameter d00 unit of measure	33641	12	33667	12	R/W	Byte	-	0/1/2	num
V3	**V3-dit**	Device time for defrost activation	33528	0	33665	49152	R/W	Byte	-	0...250	hours
V3	**V3-d11**	Parameter dit unit of measure	33641	48	33667	48	R/W	Byte	-	0/1/2	num
V3	**V3-d20**	Enable defrost at compressor stop	33685	256	33667	768	R/W	Byte	-	0/1	flag
V3	**V3-d90**	Clock defrost mode	33630	3840	33666	3072	R/W	Byte	-	0...3	num
V3	**V3-d91**	Number of daily defrosts	33606	255	33665	48	R/W	Byte	-	0...255	num
V3	**V3-d92**	1st weekend/holiday day	33630	15	33666	192	R/W	Byte	-	0...7	num
V3	**V3-d93**	2nd weekend/holiday day	33630	240	33666	768	R/W	Byte	-	0...7	num
V3	**V3-d94**	Regular defrost interval duration	33630	61440	33666	12288	R/W	Byte	-	1...7	num
V3	**V3-H54**	Pump regulation probe selection	33686	1	33649	12	R/W	Byte	-	0/1	flag
V3	**V3-H56**	Duty cycle: time with pump regulation on	33574	0	33649	48	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-H57**	Duty cycle: time with pump regulation off	33575	0	33649	192	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-H58**	Pump regulation setpoint	33577	0	33649	768	R/W	Word	-	1.0...25.0	°C/°F
V3	**V3-Att**	Alarm mode (absolute or relative)	33684	32768	33650	12	R/W	Byte	-	0/1	flag
V3	**V3-AFd**	Alarm activation differential	33588	0	33650	48	R/W	Word	-	0.1...25.0	°C/°F
V3	**V3-HAL**	Maximum alarm threshold	33495	0	33650	192	R/W	Word	Y	**LAL**...302	°C/°F
V3	**V3-LAL**	Minimum alarm threshold	33497	0	33650	768	R/W	Word	Y	-67.0...**HAL**	°C/°F
V3	**V3-PAo**	Temperature alarm exclusion time from power-on	33589	255	33650	3072	R/W	Byte	-	0...10	min*10
V3	**V3-dAo**	Exclusion time for temperature alarms after a defrost cycle	33557	0	33650	12288	R/W	Word	-	0...250	min
V3	**V3-oAo**	High and low temperature alarms exclusion time after closing the door	33590	255	33650	49152	R/W	Byte	-	0...10	hours
V3	**V3-tdo**	Door open alarm exclusion time	33591	255	33651	49152	R/W	Byte	-	0...250	min

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V3	**V3-tAo**	Temperature alarm signaling delay time	33590	0	33651	3	R/W	Byte	-	0...250	min
V3	**V3-dAt**	Defrost ended due to timeout alarm signaling	33498	0	33651	12	R/W	Byte	-	0/1	flag
V3	**V3-EAL**	Regulators inhibited by external alarm	33631	3840	33651	48	R/W	Byte	-	0/1/2	num
V3	**V3-AoP**	Alarm output polarity	33685	1	33651	768	R/W	Byte	-	0/1	flag
V3	**V3-ESA**	AUX status during Energy Saving	33641	768	33675	3072	R/W	Byte	-	0/1/2	num
V3	**V3-dod**	Enable utility shutoff upon door switch activation	33625	3840	33651	12288	R/W	Byte	-	0...3	num
V3	**V3-dCo**	Compressor activation delay from acknowledgment	33556	0	33647	3072	R/W	Byte	-	0...250	min
V3	**V3-PEn**	Number of errors permitted per minimum/maximum pressure switch input	33610	255	33662	12288	R/W	Byte	-	0...15	num
V3	**V3-PEi**	Minimum/maximum pressure switch error calculation interval	33610	0	33662	49152	R/W	Byte	-	1...99	min
V3	**V3-PEt**	Compressor activation delay after pressure switch deactivation	33611	255	33663	3	R/W	Byte	-	0...255	min
V3	**V3-SPn**	Night mode setpoint	33570	0	33669	49152	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-dFn**	Night mode offset	33571	0	33670	3	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-oSP**	Offset on setpoint	33499	0	33652	49152	R/W	Word	Y	-30.0...30.0	°C/°F
V3	**V3-odF**	Trigger differential correction	33501	0	33653	48	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-dnt**	Night mode duration	33593	255	33653	3	R/W	Byte	-	0...24	hours
V3	**V3-Cdt**	Door closing time	33593	0	33653	12	R/W	Byte	-	0...250	min*10
V3	**V3-PdC**	Pull-Down mode	33631	61440	33679	3	R/W	Byte	-	0/1/2	num
V3	**V3-tPd**	Fast cooling mode duration	33552	0	33678	768	R/W	Byte	-	0...250	min
V3	**V3-SPF**	Fast cooling setpoint	33561	0	33668	12288	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-dFF**	Fast cooling offset	33558	0	33667	49152	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-Pdo**	Step value for fast cooling setpoint	33559	0	33668	768	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-Pdn**	Step number for fast cooling setpoint	33632	3840	33673	49152	R/W	Byte	-	1...10	num
V3	**V3-dro**	Select °C / °F	33685	8	33653	192	R/W	Byte	-	0/1	flag
V3	**V3-CA1**	Probe Pb1 calibration	33502	0	33653	768	R/W	Word	Y	-30.0...30.0	°C/°F
V3	**V3-LoC**	Enable keypad lock	33685	16	33654	48	R/W	Byte	-	0/1	flag
V3	**V3-ddd**	Select main display value	33625	61440	33654	192	R/W	Byte	-	0...3	num
V3	**V3-ddE**	Display on eco device	33634	240	33674	12288	R/W	Byte	-	0...4	num

Folders	Label	Description	Val. Par. Address	Filter Val.	Vis. Par. Address	Filter Vis.	R/W	Data Size	CPL	Range	MU
V3	**V3-ddL**	Inhibit resources at the end of defrost	33626	15	33654	768	R/W	Byte	-	0/1/2	num
V3	**V3-Ldd**	Display lock timeout from end of defrost	33594	255	33654	3072	R/W	Byte	-	0...250	min
V3	**V3-ndt**	Display with decimal point	33685	32	33654	12288	R/W	Byte	-	0/1	flag
V3	**V3-PS1**	Password 1 value	33595	0	33655	192	R/W	Byte	-	0...250	num
V3	**V3-PS2**	Password 2 value	33596	0	33655	768	R/W	Byte	-	0...250	num
V3	**V3-H08**	Stand-by operating mode	33641	3	33655	12288	R/W	Byte	-	0/1/2	num
V3	**V3-H12**	Configurability of digital input 2	33597	0	33656	768	R/W	Word	Y	-13...13	num
V3	**V3-H21**	Configurability of digital output Out1	33600	0	33656	12288	R/W	Byte	-	0...11	num
V3	**V3-H22**	Configurability of digital output Out2	33601	255	33656	49152	R/W	Byte	-	0...10	num
V3	**V3-H32**	Key configuration	33627	15	33657	192	R/W	Byte	-	0...11	num
V3	**V3-H33**	Key configuration	33627	240	33657	768	R/W	Byte	-	0...11	num
V3	**V3-tCP**	Time temperature remains below the cool protection setpoint	33560	0	33668	3072	R/W	Byte	-	0...250	min
V3	**V3-SCP**	Cool protection setpoint	33562	0	33668	49152	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-dCP**	Cool protection differential	33563	0	33669	3	R/W	Word	-	0.1...30.0	°C/°F
V3	**V3-dCA**	Enable deep cooling	33641	3072	33675	12288	R/W	Byte	-	0/1/2	num
V3	**V3-dCS**	Deep cooling setpoint	33550	0	33663	768	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-tdC**	Deep cooling duration	33602	0	33664	12288	R/W	Byte	-	0...250	min
V3	**V3-dCC**	Defrost delay after deep cooling	33599	0	33664	3072	R/W	Byte	-	0...250	min
V3	**V3-Sid**	Deep cooling start threshold	33573	0	33678	48	R/W	Word	Y	-67.0...302	°C/°F
V3	**V3-toS**	Time above the threshold for deep cooling start	33583	255	33673	3	R/W	Byte	-	0...250	min

Visibility table for folders relating to applications

Label	Description	Address	Filter	Data size	Range	MU
Visibility of folders for loaded application						
vis_CP	Visibility of folder **CP** (compressor)	32954	192	2 bit	0...3	num
vis_dEF	Visibility of folder **dEF** (defrost)	32954	768	2 bit	0...3	num
vis_PUP	Visibility of folder **PUP** (pump)	32954	3072	2 bit	0...3	num
vis_AL	Visibility of folder **AL** (alarms)	32954	12288	2 bit	0...3	num
vis_Lit	Visibility of folder **Lit** (lights and digital inputs)	32954	49152	2 bit	0...3	num
vis_dor	Visibility of folder **dor** (door switch)	32962	3072	2 bit	0...3	num
vis_PrE	Visibility of folder **PrE** (pressure switch)	32955	3	2 bit	0...3	num
vis_ENS	Visibility of folder **EnS** (energy saving)	32955	12	2 bit	0...3	num

Label	Description	Address	Filter	Data size	Range	MU
vis_PLd	Visibility of folder **PLd** (pull-down)	32962	49152	2 bit	0...3	num
vis_Add	Visibility of folder **Add** (communication)	32955	48	2 bit	0...3	num
vis_diS	Visibility of folder **diS** (display)	32955	192	2 bit	0...3	num
vis_CnF	Visibility of folder **CnF** (configuration)	32955	3072	2 bit	0...3	num
vis_FPr	Visibility of folder **FPr** (UNICARD)	32955	12288	2 bit	0...3	num
vis_FnC	Visibility of folder **FnC** (functions)	32955	49152	2 bit	0...3	num
vis_nAd	Visibility of folder **nAd** (night/day)	32954	48	2 bit	0...3	num
vis_CPr	Visibility of folder **CPr** (low ambient temperature protection)	32954	12	2 bit	0...3	num
vis_dEC	Visibility of folder **dEC** (Deep Cooling cycle)	32962	12	2 bit	0...3	num
Visibility of folders for AP1 application						
V1-vis_CP	Visibility of folder **CP** (compressor)	33258	192	2 bit	0...3	num
V1-vis_dEF	Visibility of folder **dEF** (defrost)	33258	768	2 bit	0...3	num
V1-vis_PUP	Visibility of folder **PUP** (pump)	33258	3072	2 bit	0...3	num
V1-vis_AL	Visibility of folder **AL** (alarms)	33258	12288	2 bit	0...3	num
V1-vis_Lit	Visibility of folder **Lit** (lights and digital inputs)	33258	49152	2 bit	0...3	num
V1-vis_dor	Visibility of folder **dor** (door switch)	33266	3072	2 bit	0...3	num
V1-vis_PrE	Visibility of folder **PrE** (pressure switch)	33259	3	2 bit	0...3	num
V1-vis_ENS	Visibility of folder **EnS** (energy saving)	33259	12	2 bit	0...3	num
V1-vis_PLd	Visibility of folder **PLd** (pull-down)	33266	49152	2 bit	0...3	num
V1-vis_Add	Visibility of folder **Add** (communication)	33259	48	2 bit	0...3	num
V1-vis_diS	Visibility of folder **diS** (display)	33259	192	2 bit	0...3	num
V1-vis_CnF	Visibility of folder **CnF** (configuration)	33259	3072	2 bit	0...3	num
V1-vis_FPr	Visibility of folder **FPr** (UNICARD)	33259	12288	2 bit	0...3	num
V1-vis_FnC	Visibility of folder **FnC** (functions)	33259	49152	2 bit	0...3	num
V1-vis_nAd	Visibility of folder **nAd** (night/day)	33258	48	2 bit	0...3	num
V1-vis_CPr	Visibility of folder **CPr** (low ambient temperature protection)	33258	12	2 bit	0...3	num
V1-vis_dEC	Visibility of folder **dEC** (Deep Cooling cycle)	33266	12	2 bit	0...3	num
Visibility of folders for AP2 application						
V2-vis_CP	Visibility of folder **CP** (compressor)	33466	192	2 bit	0...3	num
V2-vis_dEF	Visibility of folder **dEF** (defrost)	33466	768	2 bit	0...3	num
V2-vis_PUP	Visibility of folder **PUP** (pump)	33466	3072	2 bit	0...3	num
V2-vis_AL	Visibility of folder **AL** (alarms)	33466	12288	2 bit	0...3	num
V2-vis_Lit	Visibility of folder **Lit** (lights and digital inputs)	33466	49152	2 bit	0...3	num
V2-vis_dor	Visibility of folder **dor** (door switch)	33474	3072	2 bit	0...3	num
V2-vis_PrE	Visibility of folder **PrE** (pressure switch)	33467	3	2 bit	0...3	num
V2-vis_ENS	Visibility of folder **EnS** (energy saving)	33467	12	2 bit	0...3	num
V2-vis_PLd	Visibility of folder **PLd** (pull-down)	33474	49152	2 bit	0...3	num
V2-vis_Add	Visibility of folder **Add** (communication)	33467	48	2 bit	0...3	num
V2-vis_diS	Visibility of folder **diS** (display)	33467	192	2 bit	0...3	num
V2-vis_CnF	Visibility of folder **CnF** (configuration)	33467	3072	2 bit	0...3	num
V2-vis_FPr	Visibility of folder **FPr** (UNICARD)	33467	12288	2 bit	0...3	num
V2-vis_FnC	Visibility of folder **FnC** (functions)	33467	49152	2 bit	0...3	num
V2-vis_nAd	Visibility of folder **nAd** (night/day)	33466	48	2 bit	0...3	num
V2-vis_CPr	Visibility of folder **CPr** (low ambient temperature protection)	33466	12	2 bit	0...3	num
V2-vis_dEC	Visibility of folder **dEC** (Deep Cooling cycle)	33474	12	2 bit	0...3	num
Visibility of folders for AP3 application						
V3-vis_CP	Visibility of folder **CP** (compressor)	33670	192	2 bit	0...3	num
V3-vis_dEF	Visibility of folder **dEF** (defrost)	33670	768	2 bit	0...3	num
V3-vis_PUP	Visibility of folder **PUP** (pump)	33670	3072	2 bit	0...3	num
V3-vis_AL	Visibility of folder **AL** (alarms)	33670	12288	2 bit	0...3	num

Label	Description	Address	Filter	Data size	Range	MU
V3-vis_Lit	Visibility of folder **Lit** (lights and digital inputs)	33670	49152	2 bit	0...3	num
V3-vis_dor	Visibility of folder **dor** (door switch)	33678	3072	2 bit	0...3	num
V3-vis_PrE	Visibility of folder **PrE** (pressure switch)	33671	3	2 bit	0...3	num
V3-vis_ENS	Visibility of folder **EnS** (energy saving)	33671	12	2 bit	0...3	num
V3-vis_PLd	Visibility of folder **PLd** (pull-down)	33678	49152	2 bit	0...3	num
V3-vis_Add	Visibility of folder **Add** (communication)	33671	48	2 bit	0...3	num
V3-vis_diS	Visibility of folder **diS** (display)	33671	192	2 bit	0...3	num
V3-vis_CnF	Visibility of folder **CnF** (configuration)	33671	3072	2 bit	0...3	num
V3-vis_FPr	Visibility of folder **FPr** (UNICARD)	33671	12288	2 bit	0...3	num
V3-vis_FnC	Visibility of folder **FnC** (functions)	33671	49152	2 bit	0...3	num
V3-vis_nAd	Visibility of folder **nAd** (night/day)	33670	48	2 bit	0...3	num
V3-vis_CPr	Visibility of folder **CPr** (low ambient temperature protection)	33670	12	2 bit	0...3	num
V3-vis_dEC	Visibility of folder **dEC** (Deep Cooling cycle)	33678	12	2 bit	0...3	num

Table of Modbus Resources

Label	Description	Address	Filter	Type	Data_Size	CPL	Range	MU
AI1	Regulation probe 1	4109	0	R	Word	Y	-67.0...302	°C/°F
AI2	Ice sensor 1 status	4110	0	R	Word	Y	-67.0...302	°C/°F
AI3	Ice sensor 2 status	4111	0	R	Word	Y	-67.0...302	°C/°F
SET	Regulation setpoint 1 value	4114	0	R	Word	Y	-67.0...302	°C/°F
DI	Digital input	4118	2	R	1 bit	-	0...1	flag
E1	Analog input 1 fault	4121	1	R	1 bit	-	0...1	flag
oPd	Door open	4121	8	R	1 bit	-	0...1	flag
EA	External	4121	16	R	1 bit	-	0...1	flag
AL1	Analog input 1 lower limit exceeded	4121	32	R	1 bit	-	0...1	flag
AH1	Analog input 1 higher limit exceeded	4121	64	R	1 bit	-	0...1	flag
E10	RTC error	4121	256	R	1 bit	-	0...1	flag
rCA	Low liquid refrigerant level	4121	1024	R	1 bit	-	0...1	flag
nPA	Pressure switch	4121	2048	R	1 bit	-	0...1	flag
PA	Critical pressure	4121	4096	R	1 bit	-	0...1	flag
ALM	Alarm	4115	256	R	1 bit	-	0...1	flag
RL1	Control output 1	4120	1	R	1 bit	-	0...1	flag
RL2	Control output 2	4120	2	R	1 bit	-	0...1	flag
RL3	Control output 3	4120	4	R	1 bit	-	0...1	flag
RL4	Control output 4	4120	8	R	1 bit	-	0...1	flag
CP1	Compressor 1	4115	2	R	1 bit	-	0...1	flag
CP2	Compressor 2	4115	4	R	1 bit	-	0...1	flag
DEF1	Defrost 1	4115	16	R	1 bit	-	0...3	flag
PUMP	Pump 1	4115	64	R	1 bit	-	0...1	flag
LIGHT	Light	4115	1024	R	1 bit	-	0...1	flag
AUX	Auxiliary	4115	512	R	1 bit	-	0...1	flag
STD-BY	Stand-by	4115	1	R	1 bit	-	0...1	flag
ENS	Energy saving	4115	16384	R	1 bit	-	0...1	flag
ECo	Reduced set	4115	8192	R	1 bit	-	0...1	flag
DEEP	Deep Cooling	4115	2048	R	1 bit	-	0...1	flag
Do	Door status	4115	32768	R	1 bit	-	0...1	flag
RonAux	Activates auxiliary output	4123	1	W	1 bit	-	0...1	flag
RoFFAux	Deactivates auxiliary output	4123	2	W	1 bit	-	0...1	flag
Ronon	Device on	4123	4	W	1 bit	-	0...1	flag
RoFFoFF	Device off	4123	8	W	1 bit	-	0...1	flag
AttEnSav	Activates energy saving function	4123	16	W	1 bit	-	0...1	flag
DisattEnSav	Deactivates energy saving function	4123	32	W	1 bit	-	0...1	flag
Att_SetR	Activates economy mode	4123	64	W	1 bit	-	0...1	flag
Disatt_SetR	Deactivates economy mode	4123	128	W	1 bit	-	0...1	flag
RonLoC	Keyboard lock	4123	1024	W	1 bit	-	0...1	flag
RoFFLoC	Keyboard unlock	4123	2048	W	1 bit	-	0...1	flag
RonLight	Switches lights on	4123	256	W	1 bit	-	0...1	flag
RoFFLight	Switches lights off	4123	512	W	1 bit	-	0...1	flag
Att_Sbr	Manual Defrost activation	4123	4096	W	1 bit	-	0...1	flag
DCon	Deep Cooling regulator activation	4124	2	W	1 bit	-	0...1	flag
RTCUp	Updates clock	4124	4	W	1 bit	-	0...1	flag
Teston	Enables autotest	0	2	W	1 bit	-	0...1	flag
TestoFF	Resets test request	0	2	W	1 bit	-	0...1	flag
oFFRL1	Disables output 1	206	1	W	1 bit	-	0...1	flag
onRL2	Enables output 2	206	2	W	1 bit	-	0...1	flag
oFFRL2	Disables output 2	206	2	W	1 bit	-	0...1	flag

Label	Description	Address	Filter	Type	Data_Size	CPL	Range	MU
onRL3	Enables output 3	206	4	W	1 bit	-	0...1	flag
oFFRL3	Disables output 3	206	4	W	1 bit	-	0...1	flag
onRL4	Enables output 4	206	8	W	1 bit	-	0...1	flag
oFFRL4	Disables output 4	206	8	W	1 bit	-	0...1	flag
onAllRL	Enables output	206	15	W	Word	-	0...255	num
oFFAllRL	Disables output	206	15	W	Word	-	0...255	num
tim_CP1	Compressor 1 running time	4171	0	R	Word	-	0...65535	hours*10
cnt_CP1	Compressor 1 number of activations	4172	0	R	Word	-	0...65535	num
tim_DEF1	Defrost 1 activation time	4173	0	R	Word	-	0...65535	min
cnt_DEF1	Defrost 1 number of activations	4175	0	R	Word	-	0...65535	num
tim_Door	Door opening time	4176	0	R	Word	-	0...65535	min
cnt_Door	Door opening count	4177	0	R	Word	-	0...65535	num
cnt_PoWEr	Number of instrument power-ons	4181	0	R	Word	-	0...65535	num
tim_CP2	Compressor 2 run time	4183	0	R	Word	-	0...65535	hours*10
cnt_CP2	Compressor 2 number of activations	4184	0	R	Word	-	0...65535	num

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