EWNext Optimized -HC

Electronic controllers compatible with flammable refrigerant gases

User Manual

12/2024

www.eliwell.com

eliwell
by Schneider Electric

Legal Information

The information provided in this document contains general descriptions, technical characteristics and/or recommendations related to products/solutions.

This document is not intended as a substitute for a detailed study or operational and site-specific development or schematic plan. It is not to be used for determining suitability or reliability of the products/solutions for specific user applications. It is the duty of any such user to perform or have any professional expert of its choice (integrator, specifier or the like) perform the appropriate and comprehensive risk analysis, evaluation and testing of the products/solutions with respect to the relevant specific application or use thereof.

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Safety information

Important information

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 should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric and Eliwell for any consequences arising out of the use of this material. 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 cabinets, display units and 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 cabinets, display units and 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** devices 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

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

General Cybersecurity Information

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

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

Available Languages of this Document

This document is available in the following languages:

- Italian (EWNXO_04IT)
- English (EWNXO_04EN)
- Spanish (EWNXO_04ES)

Related Documents

Publication title	Reference document code
Instruction Sheet EWNext Optimized -HC	9IS54797 (7L)

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

Information on Non-Inclusive or Insensitive Terminology

As part of a group of responsible, inclusive companies, Schneider Electric constantly updates its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms considered inappropriate by some customers.

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 defrost synchronization line connection, use cables no longer 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 Standard is considered essential for commercial refrigeration and HVAC systems using flammable refrigerants such as R290. However, other limitations, equipment, locations, and/or types of equipment (refrigerators, vending machines, bottle coolers, ice machines, self-service refrigerated display cabinets, etc.) may also be affected, subject to additional restrictions and/or requirements related to the construction of controls, valves, sensors, and accessories described in this document.
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

General Description

EWNext is a family of electronic devices for managing refrigerated cabinets, display units and refrigerated units.

Main regulators

The main regulators for the controller are as follows:

- heat/cool
- compressor
- evaporator fans
- Modulating defrost
- Standard defrost
- door switch
- 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 Optimized -HC** models:

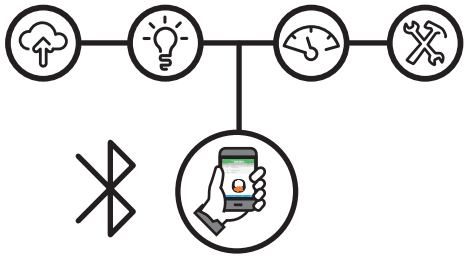
Product	Description
EWNext 961 O	EWNext 961 O NTC 2Hp 230 Vac AIR -HC
EWNext 961 O/B	EWNext 961 O NTC 1Hp 115 Vac BUZ AIR -HC
	EWNext 961 O NTC 1Hp 115 Vac BUZ PH AIR -HC
	EWNext 961 O NTC 2Hp 230 Vac BUZ AIR -HC
	EWNext 961 O NTC 2Hp 230 Vac BUZ PH AIR -HC
EWNext 971 O	EWNext 971 O NTC 1Hp/8 230 Vac AIR -HC
EWNext 971 O/B	EWNext 971 O NTC 1Hp/8 115 Vac BUZ AIR -HC
	EWNext 971 O NTC 1Hp/8 115 Vac BUZ PH AIR -HC
	EWNext 971 O NTC 2Hp/8 230 Vac BUZ AIR -HC
	EWNext 971 O NTC 2Hp/8 230 Vac BUZ PH AIR -HC
EWNext 974 O	EWNext 974 O NTC 2Hp/8/5 230 Vac AIR -HC
EWNext 974 O/B	EWNext 974 O NTC 1Hp/8/5 115 Vac BUZ AIR -HC
	EWNext 974 O NTC 1Hp/8/5 115 Vac BUZ PH AIR -HC
	EWNext 974 O NTC 2Hp/8/5 230 Vac BUZ AIR -HC
	EWNext 974 O NTC 2Hp/8/5 230 Vac BUZ PH AIR -HC
EWNext 974 O/Y	EWNext 974 O NTC 2Hp/8/5 230 Vac SYN 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
- **BUZ** (/**B**) = controller with Buzzer
- **SYN** (/**Y**) = controller with defrosts synchronized via digital input.

AIR - Applicazione mobile per Dongle BTLE



'Eliwell AIR' App, available on Google Play and Apple Store, is used to connect via Bluetooth to EWNext controllers compatible with Dongle Bluetooth. 'Eliwell AIR' App:

- a smart user interface to customize resources, read/write the configuration parameters, enable datalogging on specific resources and viewing in the form of table or chart the saved values
- real time controller management
- simplified settings and maintenance

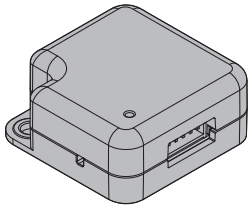
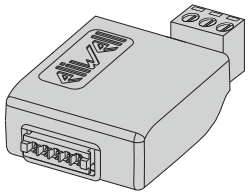
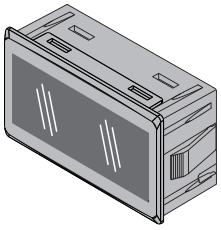
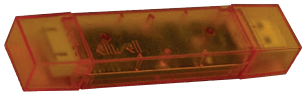
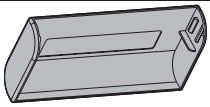
For further information, refer to controller and 'Eliwell AIR' App user manual on the Eliwell website: www.eliwell.com

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
	**ECNext 5 Vdc per EWNext**: Display for remote display purposes
	**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

Overview

EWNext is a family of electronic controllers for managing refrigerated cabinets, display units and refrigerated units.

Switching on for the first time

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

View Preset applications

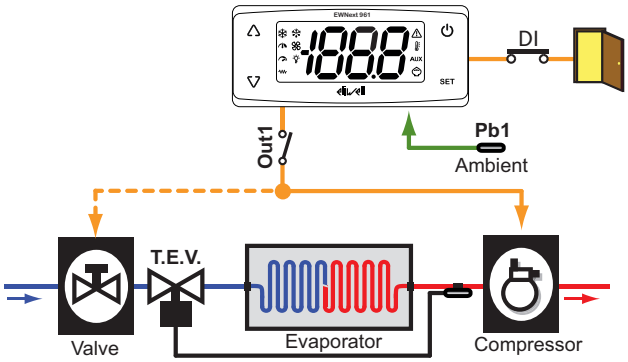
Click on the controller model purchased to access the corresponding Preset application:

- **EWNext 961 O**
- **EWNext 961 O/B**
- **EWNext 971 O**
- **EWNext 971 O/B**
- **EWNext 974 O**
- **EWNext 974 O/B**
- **EWNext 974 O/Y**

Note:
There is no automatic mechanism to restore controller parameters to default values.
If the user changes the values of the parameters associated with the preset application, the restore of the default values of each of the changed parameters is manual.

EWNext 961 O (230 Vac)

Default application overview



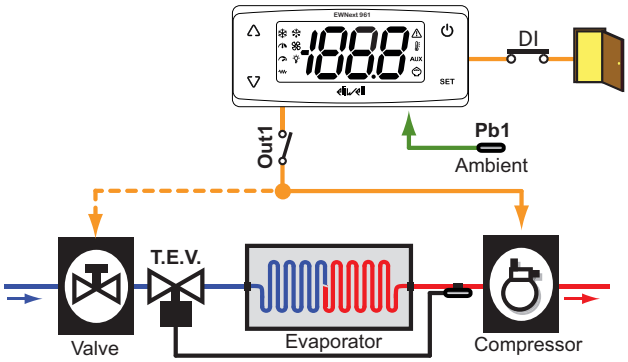
Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor.

Application details

Setpoint	3.5 °C (38.3 °F)
Analog inputs	1 NTC input (**Pb1**)
Digital inputs	1 digital input **DI** set for energy saving with port (**H11**=11)
Digital outputs	**Out1** relay (default: Compressor)
Buzzer	NO
SYN	NO
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 (**H31** = 1) ∇: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 961 O/B (115 Vac - 230 Vac)

Default application overview



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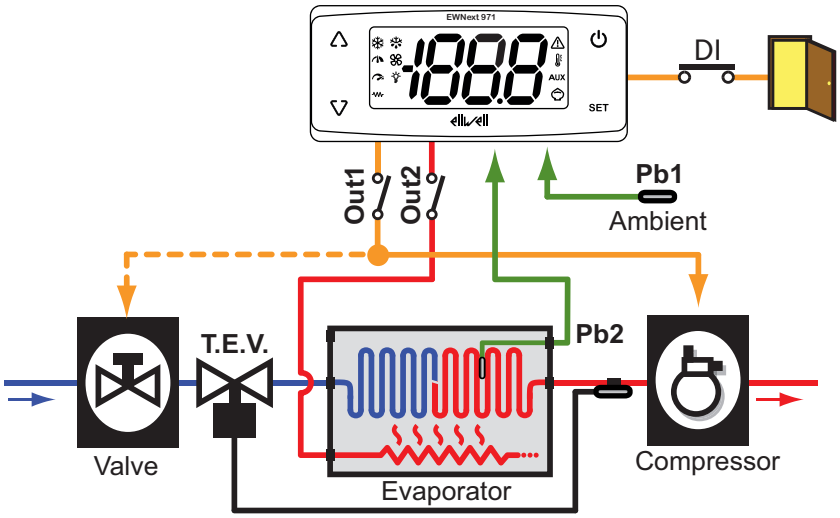
Analog inputs	1 NTC input (**Pb1**)
Digital inputs	1 digital input **DI** set for energy saving with port (**H11**=11)
Digital outputs	**Out1** relay (default: Compressor)
Buzzer	YES
SYN	NO
Type of defrost	Defrost due to compressor stop
End of defrost	Due to compressor stop
Active alarms	Pb1 maximum / minimum temperature (**HAL** and **LAL**)
Key configuration	∆: manual defrost (**H31** = 1) ∇: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 971 O (230 Vac)

Default application overview



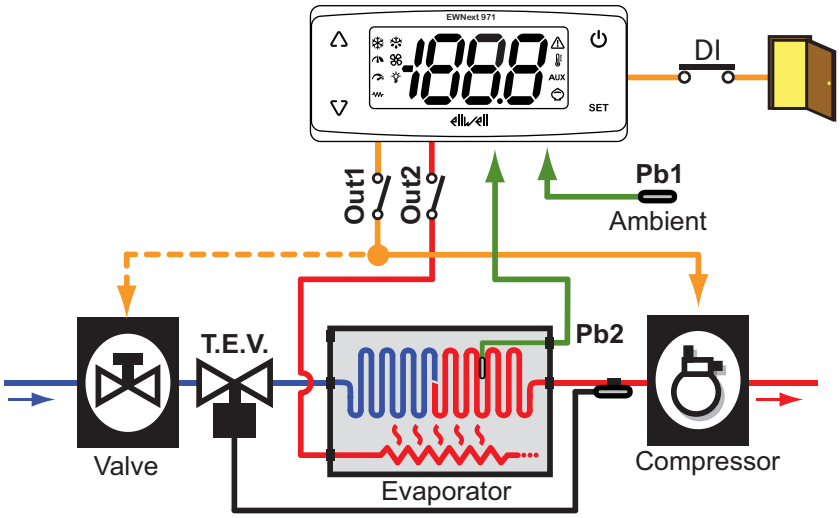
Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor.

Application details

Setpoint	3.5 °C (38.3 °F)
Analog inputs	2 NTC inputs (**Pb1**, **Pb2**)
Digital inputs	1 digital input **DI** set for energy saving with port (**H11**=11)
Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Defrost)
Buzzer	NO
SYN	NO
Type of defrost	Electric heater defrost
End of defrost	Due to temperature **dS1** = 8.0 °C (46.4 °F)
Active alarms	Pb1 maximum / minimum temperature (**HAL** and **LAL**)
Key configuration	⏶: manual defrost (**H31** = 1) ⏷: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 971 O/B (115 Vac - 230 Vac)

Default application overview



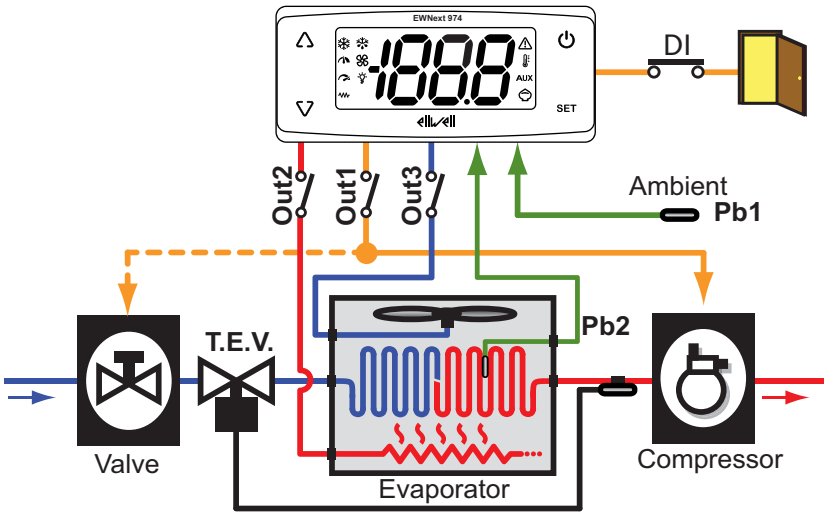
Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor.

Application details

Setpoint	3.5 °C (38.3 °F)
Analog inputs	2 NTC inputs (**Pb1**, **Pb2**)
Digital inputs	1 digital input **DI** set for energy saving with port (**H11**=11)
Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Defrost)
Buzzer	YES
SYN	NO
Type of defrost	Electric heater defrost
End of defrost	Due to temperature **dS1** = 8.0 °C (46.4 °F)
Active alarms	Pb1 maximum / minimum temperature (**HAL** and **LAL**)
Key configuration	⏶: manual defrost (**H31** = 1) ⏷: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 974 O (230 Vac)

Default application overview



Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor.

Application details

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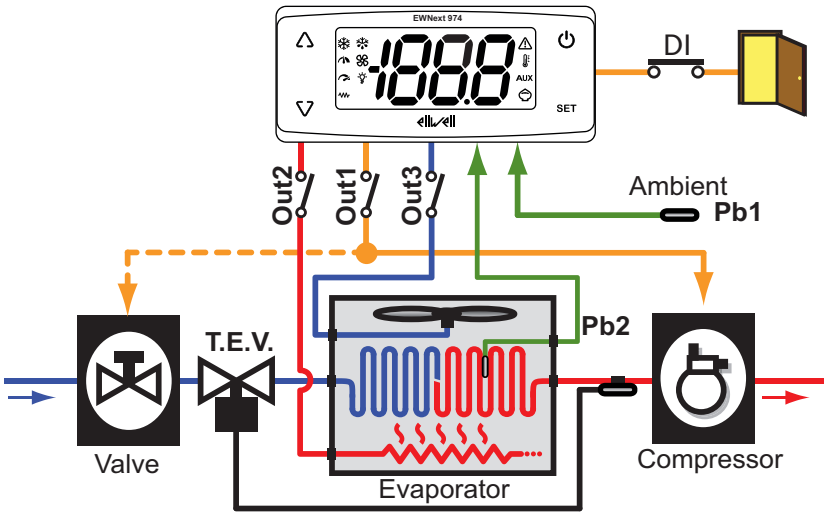
Digital inputs	1 digital input **DI** set for energy saving with port (**H11** = 11)
Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Defrost) **Out3** relay (default: Evaporator fans)
Buzzer	NO
SYN	NO
Type of defrost	Electric heater defrost
End of defrost	Due to temperature **dS1** = 8.0 °C (46.4 °F)
Active alarms	Pb1 maximum/minimum temperature (**HAL** and **LAL**)
Key configuration	⏃: manual defrost (**H31** = 1) ⏄: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 974 O/B (115 Vac - 230 Vac)

Default application overview



Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor.

Application details

Setpoint	3.5 °C (38.3 °F)
Analog inputs	2 NTC inputs (**Pb1**, **Pb2**)
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Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Defrost) **Out3** relay (default: Evaporator fans)
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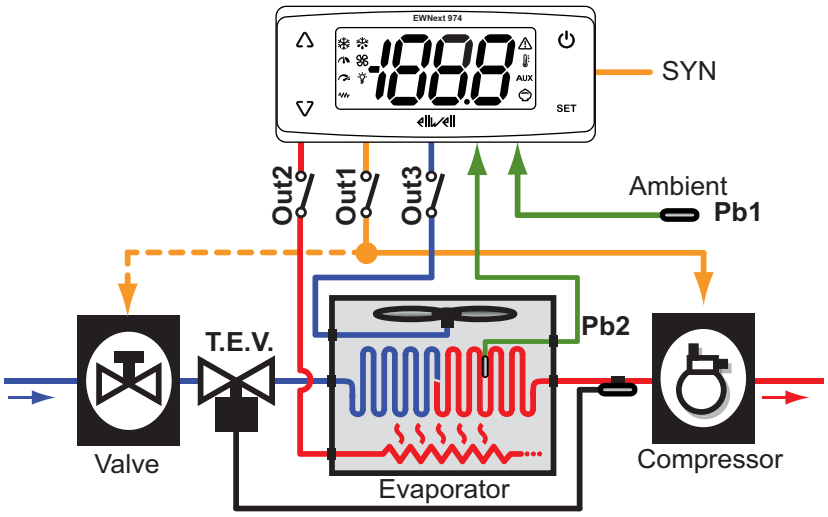
SYN	NO
Type of defrost	Electric heater defrost
End of defrost	Due to temperature **dS1** = 8.0 °C (46.4 °F)
Active alarms	Pb1 maximum/minimum temperature (**HAL** and **LAL**)
Key configuration	⏃: manual defrost (**H31** = 1) ⏃: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

EWNext 974 O/Y (230 Vac)

Default application overview



Legend: **Ambient** = Ambient; **Valve** = Valve; **T.E.V.** = Expansion valve; **Evaporator** = Evaporator; **Compressor** = Compressor; **SYN** = Synchronism connection.

Application details

Setpoint	3.5 °C (38.3 °F)
Analog inputs	2 NTC inputs (**Pb1**, **Pb2**)
Digital inputs	No Digital Input
Digital outputs	**Out1** relay (default: Compressor) **Out2** relay (default: Defrost) **Out3** relay (default: Evaporator fans)
Buzzer	NO
SYN	YES (11 = "**+**"; 10 = "**-**")
Type of defrost	Electric heater defrost
End of defrost	Due to temperature **dS1** = 8.0 °C (46.4 °F)
Active alarms	Pb1 maximum/minimum temperature (**HAL** and **LAL**)
Key configuration	⏃: manual defrost (**H31** = 1) ⏛: not set (**H32** = 0) ⏻: stand-by (**H33** = 4)

Mechanical installation

Contents

This section includes the following topics:

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 Standard is considered essential for commercial refrigeration and HVAC systems using flammable refrigerants such as R290. However, other limitations, equipment, locations, and/or types of equipment (refrigerators, vending machines, bottle coolers, ice machines, self-service refrigerated display cabinets, etc.) may also be affected, subject to additional restrictions and/or requirements related to the construction of controls, valves, sensors, and accessories described in this document.
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.

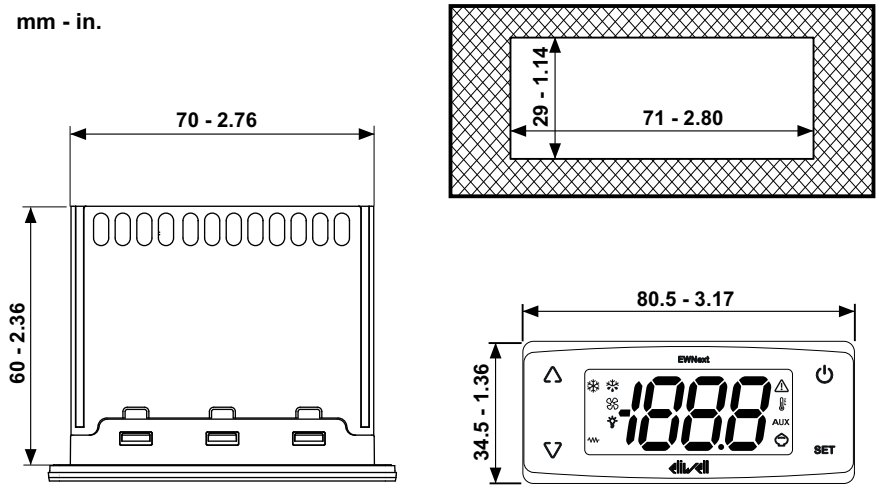
⚠ WARNING

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:

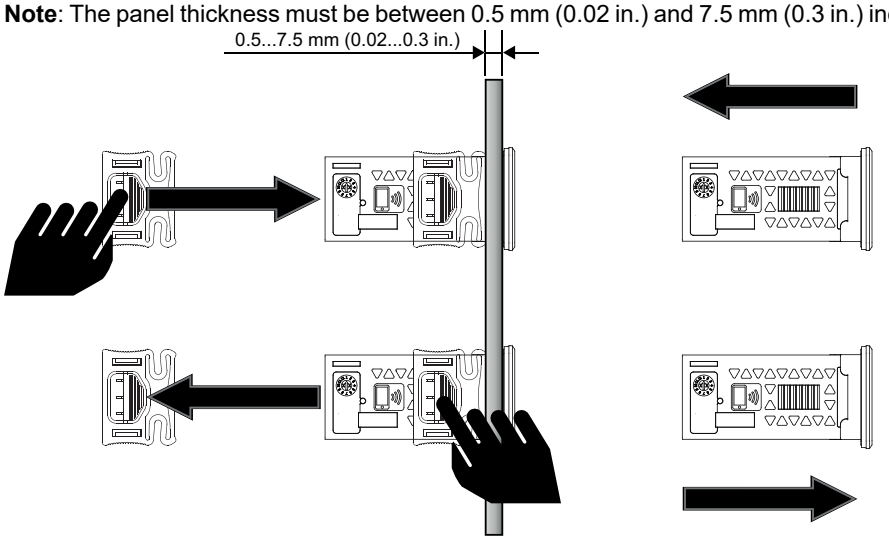
1. Make a hole measuring 71 x 29 mm (2.80 x 1.14 in.)
2. Introducing the controller
3. Secure it by inserting the brackets in the relevant rails at the 2 sides of the controller, until it clicks into place

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

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 conductors only.

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 defrost synchronization line connection, use cables no longer 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.

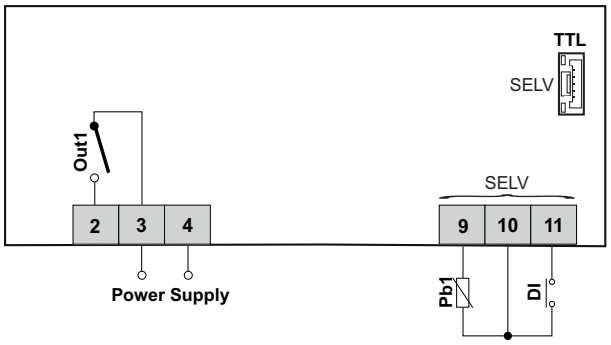
Connections

Wiring diagrams

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

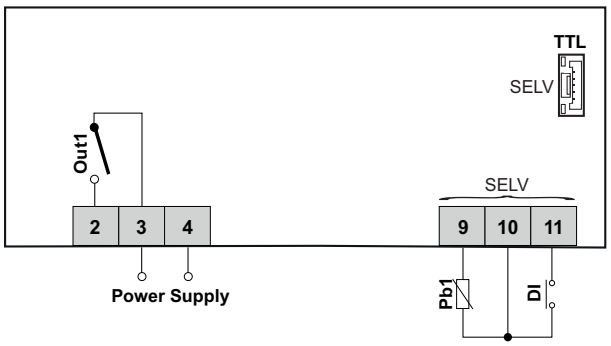
- **EWNext 961 O**
- **EWNext 961 O/B**
- **EWNext 971 O**
- **EWNext 971 O/B**
- **EWNext 974 O**
- **EWNext 974 O/B**
- **EWNext 974 O/Y**

EWNext 961 O (230 Vac)



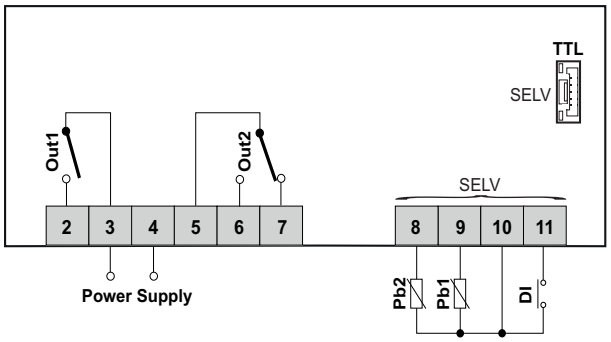
Terminals	Description
2-3	Compressor relay (**Out1**)
4-3	Power supply input 230 Vac
9-10	Probe Pb1
11-10	Digital input DI
SELV	SELV terminals
TTL	TTL serial port

EWNext 961 O/B (115 Vac - 230 Vac)



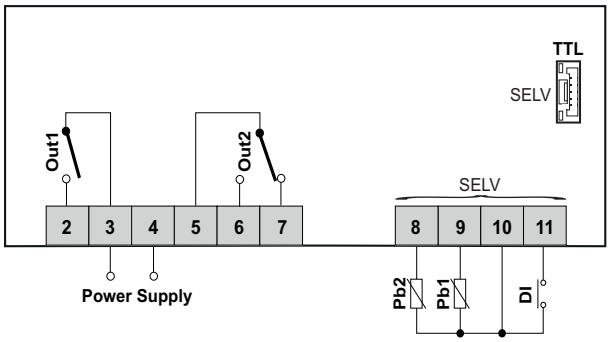
Terminals	Description
2-3	Compressor relay (**Out1**)
4-3	Power supply input 115 Vac or 230 Vac (depending on the model)
9-10	Probe Pb1
11-10	Digital input DI
SELV	SELV terminals
TTL	TTL serial port

EWNext 971 O (230 Vac)



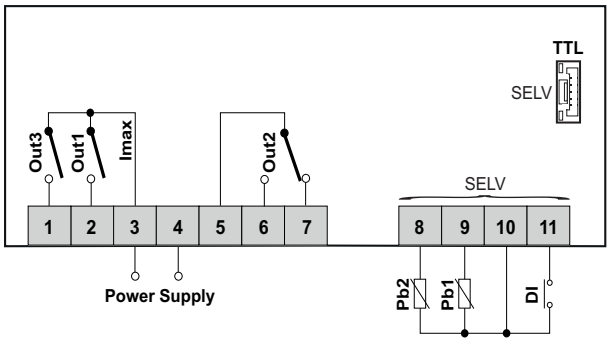
Terminals	Description
2-3	Compressor relay (**Out1**)
4-3	Power supply input 230 Vac
5-6-7	Defrost relay (**Out2**)
8-10	Probe Pb2
9-10	Probe Pb1
11-10	Digital input DI
SELV	SELV terminals
TTL	TTL serial port

EWNext 971 O/B (115 Vac - 230 Vac)



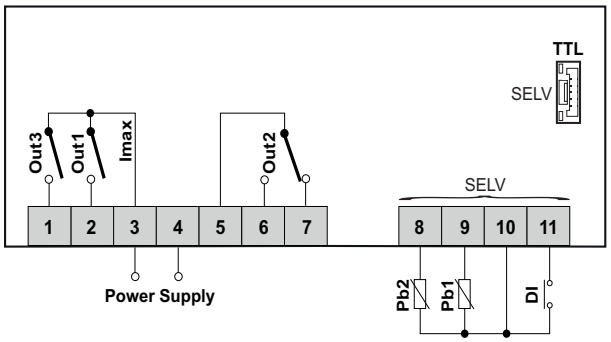
Terminals	Description
2-3	Compressor relay (**Out1**)
4-3	Power supply input 115 Vac or 230 Vac (depending on the model)
5-6-7	Defrost relay (**Out2**)
8-10	Probe Pb2
9-10	Probe Pb1
11-10	Digital input DI
SELV	SELV terminals
TTL	TTL serial port

EWNext 974 O (230 Vac)



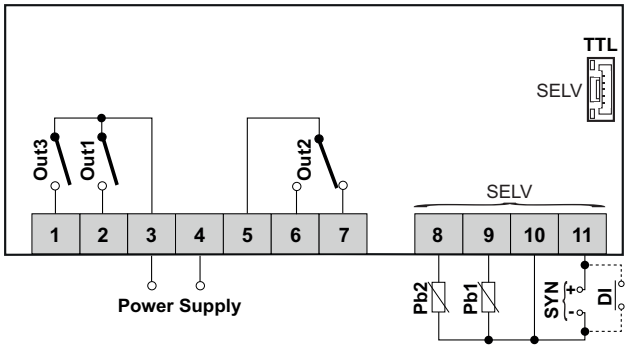
Terminals	Description
1-3	Evaporator fans relay (**Out3**)
2-3	Compressor relay (**Out1**)
4-3	Power supply input 230 Vac
5-6-7	Defrost relay (**Out2**)
8-10	Probe Pb2
9-10	Probe Pb1
11-10	Digital input DI
Imax	Screw terminals: 17 A maximum Disconnectable terminals: 12 A maximum
SELV	SELV terminals
TTL	TTL serial port

EWNext 974 O/B (115 Vac - 230 Vac)



Terminals	Description
1-3	Evaporator fans relay (**Out3**)
2-3	Compressor relay (**Out1**)
4-3	Power supply input 115 Vac or 230 Vac (depending on the model)
5-6-7	Defrost relay (**Out2**)
8-10	Probe Pb2
9-10	Probe Pb1
11-10	Digital input DI
Imax	Screw terminals: 17 A maximum Disconnectable terminals: 12 A maximum
SELV	SELV terminals
TTL	TTL serial port

EWNext 974 O/Y (230 Vac)



Terminals	Description
1-3	Evaporator fans relay (**Out3**)
2-3	Compressor relay (**Out1**)
4-3	Power supply input 230 Vac
5-6-7	Defrost relay (**Out2**)
8-10	Probe Pb2
9-10	Probe Pb1
11-10	SYN (11 = "**+**"; 10 = "**-**") for synchronized defrosts (if **H11**=±13) or DI (if **H11**≠±13)
SELV	SELV terminals
TTL	TTL serial port

Technical characteristics

Contents

This section includes the following topics:

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 961 O	230 Vac (±10%) 50/60 Hz	5,5 VA
EWNext 961 O/B	115 Vac or 230 Vac (±10%) 50/60 Hz (depending on the model)	5.5 VA
EWNext 971 O	230 Vac (±10%) 50/60 Hz	5,5 VA
EWNext 971 O/B	115 Vac or 230 Vac (±10%) 50/60 Hz (depending on the model)	5.5 VA
EWNext 974 O	230 Vac (±10%) 50/60 Hz	5.5 VA
EWNext 974 O/B	115 Vac or 230 Vac (±10%) 50/60 Hz (depending on the model)	5.5 VA
EWNext 974 O/Y	230 Vac (±10%) 50/60 Hz	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 961 O **EWNext 961 O/B**	**Out1**	12(8) A	12FLA 72LRA
EWNext 971 O **EWNext 971 O/B**	**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
EWNext 974 O **EWNext 974 O/B**	**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
	Out3	5(2) A	5 A resistive - 2FLA 12LRA
	Imax = Maximum current on common pole (**Out1 + Out3**) - V*: Imax = 17 A - S**: Imax = 12 A.		
EWNext 974 O/Y	**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
	Out3	5(2) A	5 A resistive - 2FLA 12LRA

115 Vac models	Output	EU (115 Vac)	USA (115 Vac)
EWNext 961 O/B	**Out1**	12(8) A	V*: 16FLA 96LRA - S**: 12FLA 72LRA
EWNext 971 O/B	**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
EWNext 974 O/B	**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
	Out3	5(2) A	5 A resistive - 2FLA 12LRA
	Imax = Maximum current on common pole (**Out1 + Out3**) - V*: Imax = 17 A - S**: Imax = 12 A.		

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

Input characteristics

Analog inputs	• **EWNext 961 O**: 1 NTC input (Pb1) • **EWNext 961 O/B**: 1 NTC input (Pb1) • **EWNext 971 O**: 2 NTC inputs (Pb1 and Pb2) • **EWNext 971 O/B**: 2 NTC inputs (Pb1 and Pb2) • **EWNext 974 O**: 2 NTC inputs (Pb1 and Pb2) • **EWNext 974 O/B**: 2 NTC inputs (Pb1 and Pb2) • **EWNext 974 O/Y**: 2 NTC inputs (Pb1 and Pb2)
Digital inputs	• **EWNext 961 O**: 1 voltage free digital input (DI). • **EWNext 961 O/B**: 1 voltage free digital input (DI). • **EWNext 971 O**: 1 voltage free digital input (DI). • **EWNext 971 O/B**: 1 voltage free digital input (DI). • **EWNext 974 O**: 1 voltage free digital input (DI). • **EWNext 974 O/B**: 1 voltage free digital input (DI). • **EWNext 974 O/Y**: 1 voltage free digital input (DI) or SYN connection for defrost synchronization.

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.

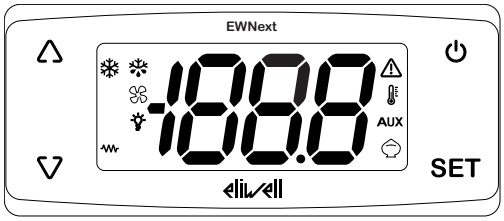
User interface and operation

Contents

This section includes the following topics:

User interface

Interface



Keys

Keys	press and release	press for at least 5 seconds
∧	• Scroll through the menu options. • Increase the values.	From outside the menus only. Can be configured by the user (parameter **H31**) Default: Activate manual defrost.
∨	• 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).	• Access the "Programming" menu. • Confirm commands.

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
	Evaporator fans	On steadily: fans active Off: fans off
	/	Reserved
	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	/	Reserved
	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.

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)
- **Pb1**: Pb1 probe value folder
- **Pb2**: Pb2 probe value folder
- **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

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).

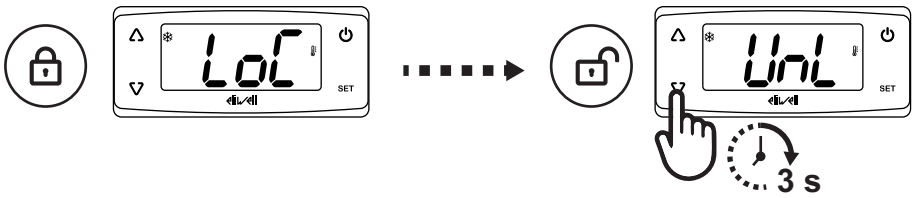
Note: Switch the device off and on again every time you change the parameter configuration.

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**
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.

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: if the functions set are 'AUX' (**H3x**=2) or 'Light' (**H3x**=8) , press and release the key to activate the function. In all other cases, press the key for at least 5 seconds.

Key	Parameter
△	**H31**
▽	**H32**
⏻	**H33**

Value H31/H32/H33	Description
0	Disabled
1	Defrost
2	Reserved
3	Reduced set
4	Stand-by
5	Reserved
6	Reserved
7	Reserved
8	Reserved
9	Energy saving
10	Reserved

Setting the main parameters

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

Setting the probes

Introduction

Only connect probes of the same type to the device (all NTC).

Probe inputs

Depending on the model, the controller has the following inputs:

- one or two analog inputs (**Pb1** and **Pb2**)

Probe calibration

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

- **CA1** (probe Pb1)
- **CA2** (probe Pb2)

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 Pb2
3	Reserved

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

Default ECNext module display (via Modbus)

The controller can manage a **ECNext** 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	**ECNext** module not connected
1	View the value read by Pb1. If Pb1 is in error, "**E1**" will appear.
2	View the value read by Pb2. If Pb2 is in error, "**E2**" will appear.
3	Reserved
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**

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 temperatures read by the probes are displayed. After changing the unit of measure from °C to °F, the value of parameters **SEt**, **diF**, etc, remains the same and they will take on a different meaning, since they are expressed in a new unit of measure (**SEt** = 10°C becomes **SEt** = 10°F).

Defrost

Contents

This section includes the following topics:

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
- Synchronized Defrost

Functioning conditions

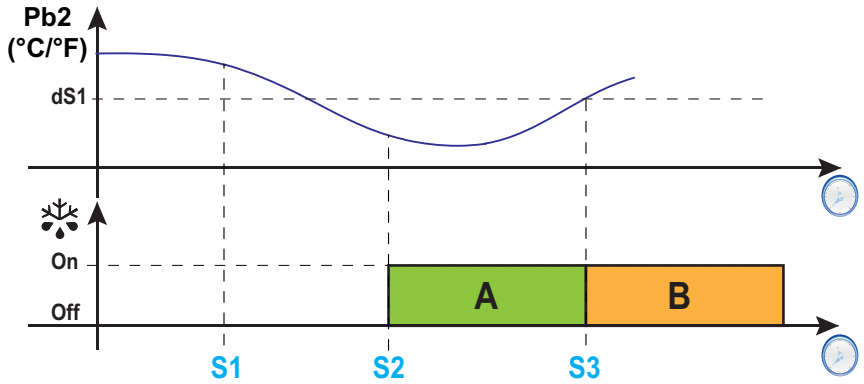
Defrosting removes ice from the surface of the evaporator.
If **dt** ≠ 0, once defrost is complete, a dripping cycle takes place to prevent the water left on the evaporator from freezing again.
Defrost is triggered automatically if:

- the temperature of the evaporator is lower than the defrost end setpoint **dS1***.
- the defrost activation timer has elapsed and the temperature of the evaporator 1 is lower than the defrost end setpoint **dS1***.

Defrost is NOT triggered automatically if:

- a manual defrost is already underway.
- the defrost activation timer has elapsed and the temperature of the evaporator 1 is higher than the defrost end setpoint **dS1***, in which case a new timer count will begin.

(*) models that manage probe Pb2.



Legend: **A** = Defrost; **B** = Dripping; **S1** = Defrost not performed; **S2** = Defrost start; **S3** = End of defrost and start of dripping cycle.

Setting the dripping interval

To activate dripping at the end of the defrost cycle, set parameter **dt** ≠ 0. During dripping, the fans are switched off even if **Fdt** < **dt**.

Note: parameter **dt** is only present in models that manage probe Pb2 and that can control the evaporator fans.

Parameters

Parameter	Description
dS1	Temperature value set for the end of defrost on evaporator 1.
Fdt	Fan activation delay after a defrost.
dt	Dripping duration.

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 94).

Note: this function can only be activated on models that manage probe Pb2.

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 **H11** = ±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

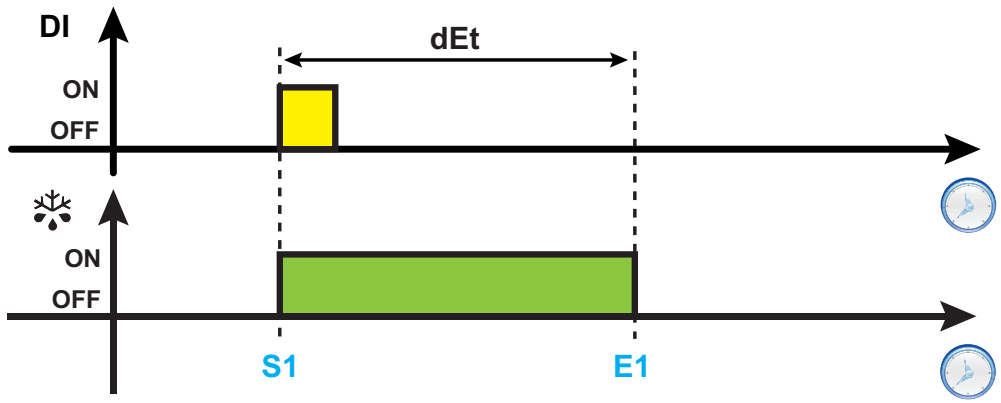
If manual defrost is activated, depending on the value of parameter **dMr**, the defrost interval count (**dit** time):

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

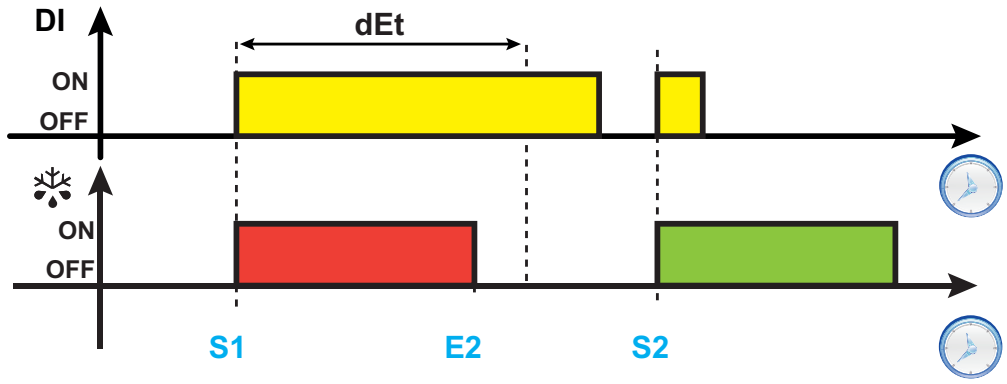
If the **odo** count is in progress and the evaporator temperature is greater than the value of parameter **dS1*** (evaporator 1), the defrost will not be activated and the display will flash three times.
(*): only models that manage probe Pb2.
Note: defrost activation takes place upon closure (**H11**=1) or opening (**H11**=-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

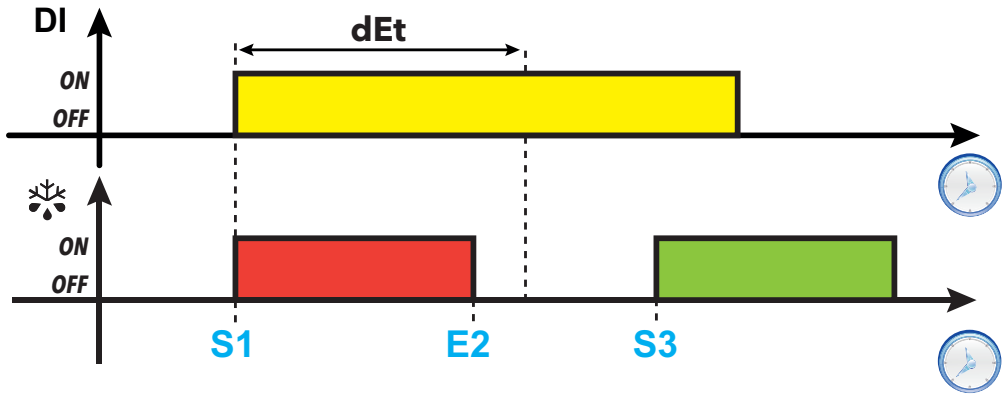
Example 1:



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; **E2** = End of defrost due to temperature.

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 outage.
dEt	Defrost timeout. Determines the maximum duration of the defrost.
dS1	Evaporator 1 defrost end temperature.
H11	**DI** digital input/polarity configuration.
H31	∧ key configuration.
H32	∨ key configuration.
H33	⏻ key configuration.

Modulating Defrost

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

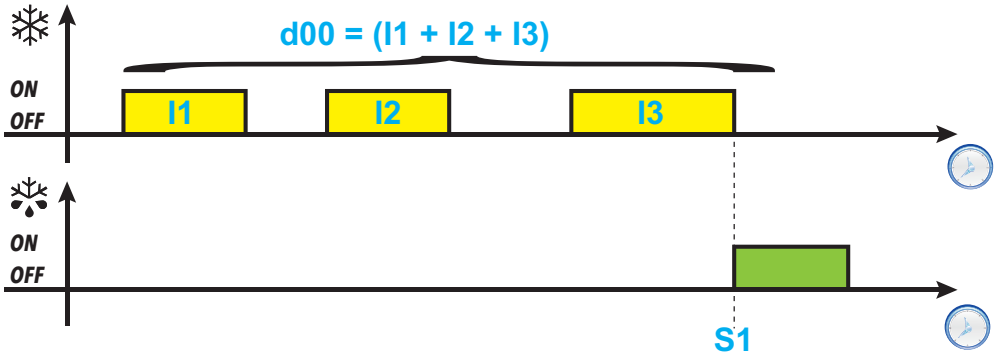
Activation method	Parameters
Compressor running time The defrost is activated when the sum of compressor operating period durations reaches the value **d00**.	**d00/d01**
Instrument running time The defrost is activated when the instrument operating period duration reaches the value **dit**.	**dit/d11**
Compressor stop The defrost is activated when the compressor switches off (only if **d20** = 1).	**d20**
Evaporator temperature The defrost is activated when the Evaporator temperature drops below the set threshold **d41**.	**d40...d44**
Temperature differential The defrost is activated on the basis of the value (**Pb2**-**Pb1**), considered in absolute or relative mode, and on the basis of the defrost activation threshold **d52**.	**d50...d55**

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



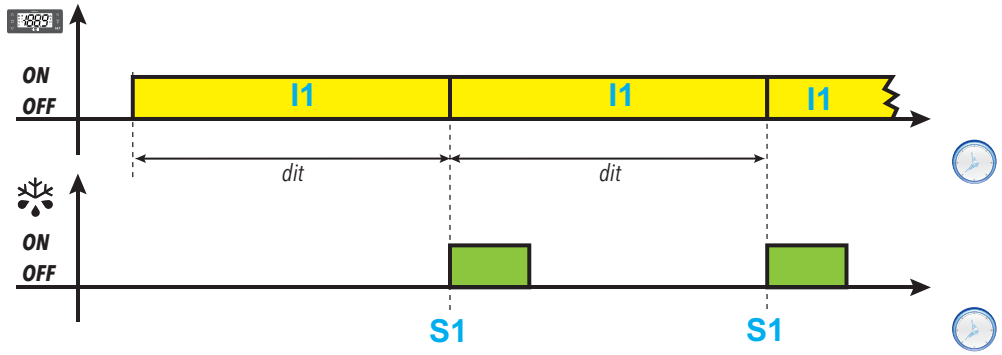
Legend: **I1, I2, I3** = Compressor on times; **S1** = Defrost start.

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



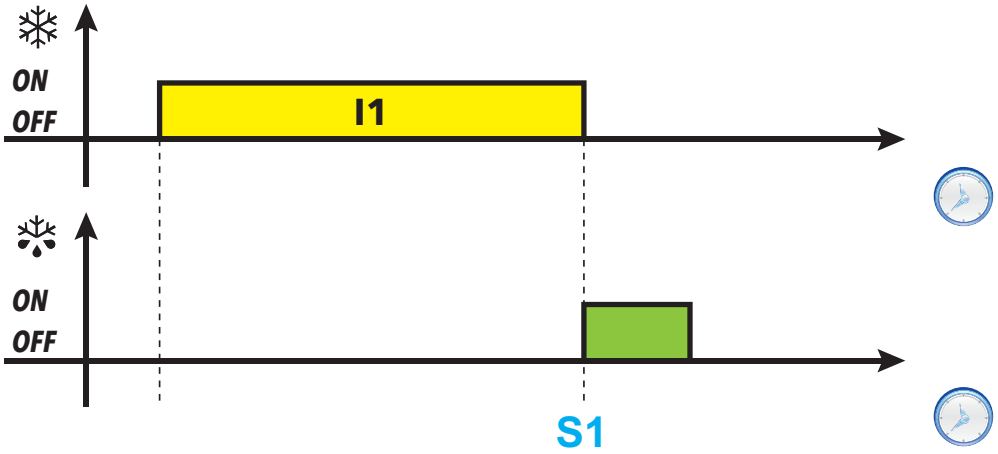
Legend: **I1** = Controller on time (equal to **dit**); **S1** = Defrost start.

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

Evaporator temperature

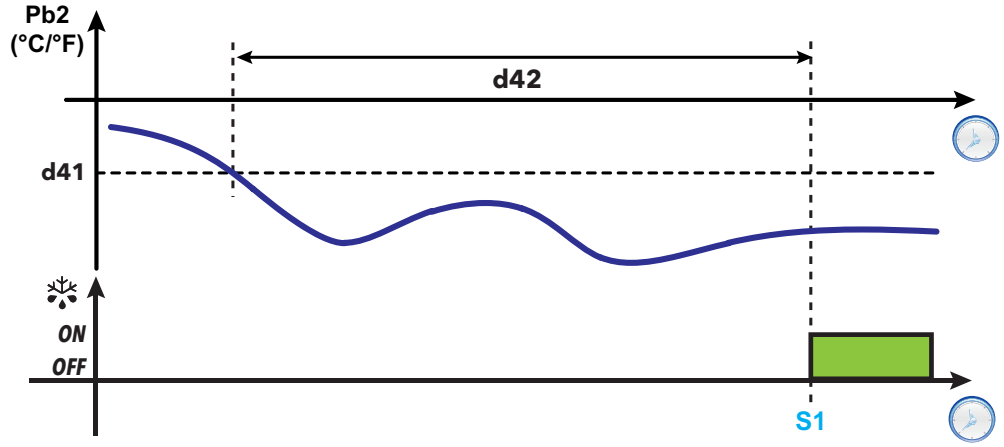
This defrost can be configured via the following parameters:

Parameter	Description
d40	Enables/disables use of probe Pb2. • **0** = mode disabled • **1** = enabled. Defrost runs according to the value read by Pb2 (only refers to defrost with threshold)
d41	Sets the defrost activation threshold (on the value read by probe Pb2)
d42	Sets the maximum time for which the evaporator can remain under the threshold **d41**
d43	Sets the type of incremental time count in which the evaporator temperature remains under the threshold value. • **0** = incremental count independent of the compressor status • **1** = incremental count with compressor on (when the compressor is off the incremental count is reset) • **2** = incremental count independent of the compressor status. The incremental count stops when the temperature rises above the threshold **d41** • **3** = incremental count with compressor on and until the temperature rises above the threshold **d41**
d44	Sets the threshold management mode. • **0** = absolute value (for example: **d41** = -25°C means that the threshold temperature is exactly -25°C) • **1** = relative value (negative offset, relative to the value measured by the defrost probe Pb2 (if **d40** = 1) at the end of the first cooling cycle or on startup). Set the threshold to a value equal to the value measured by probe Pb2 at the end of the first cooling cycle or at startup (if **d40** = 1) reduced by the amount set in parameter **d41**.

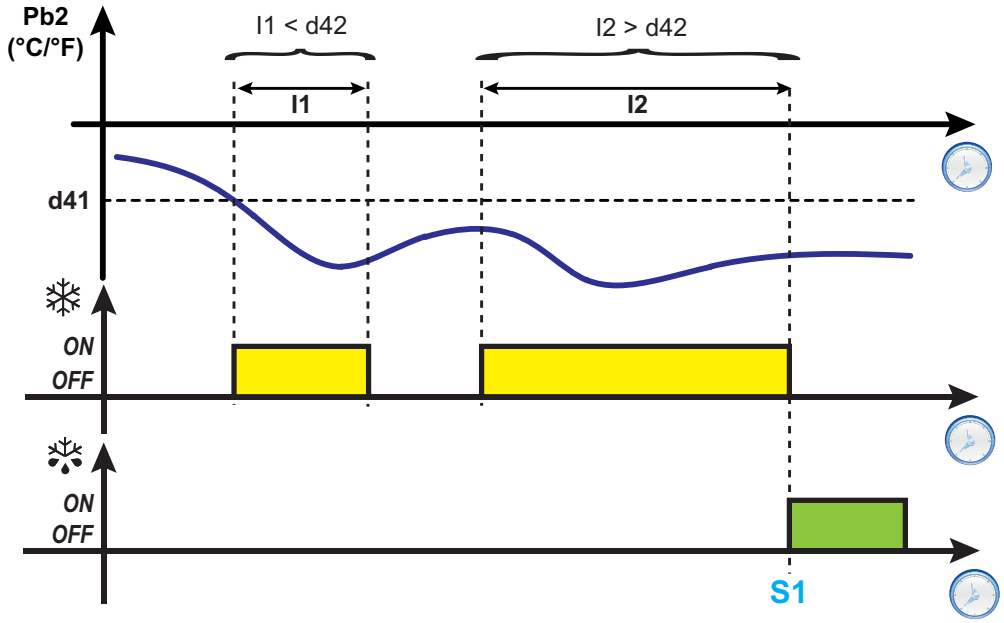
Note: this function can only be activated in models which manage probe Pb2 (as long as the conditions are correct to do so).

Regulation diagrams

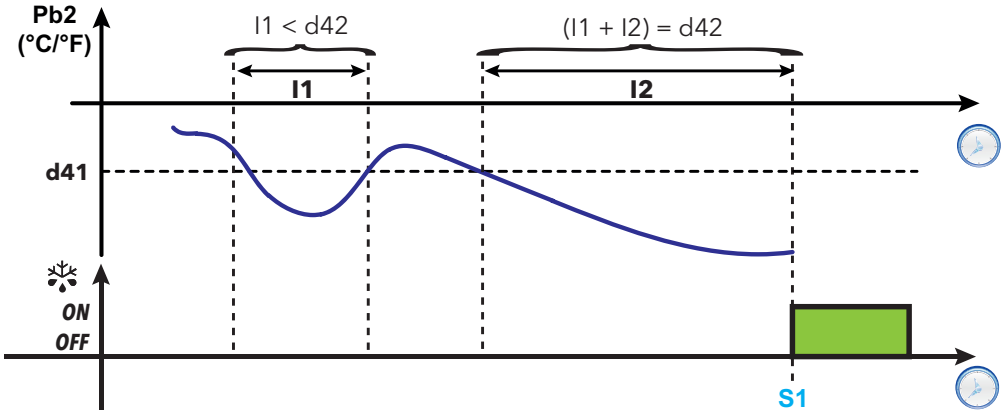
d43 = 0: count independent of the compressor status



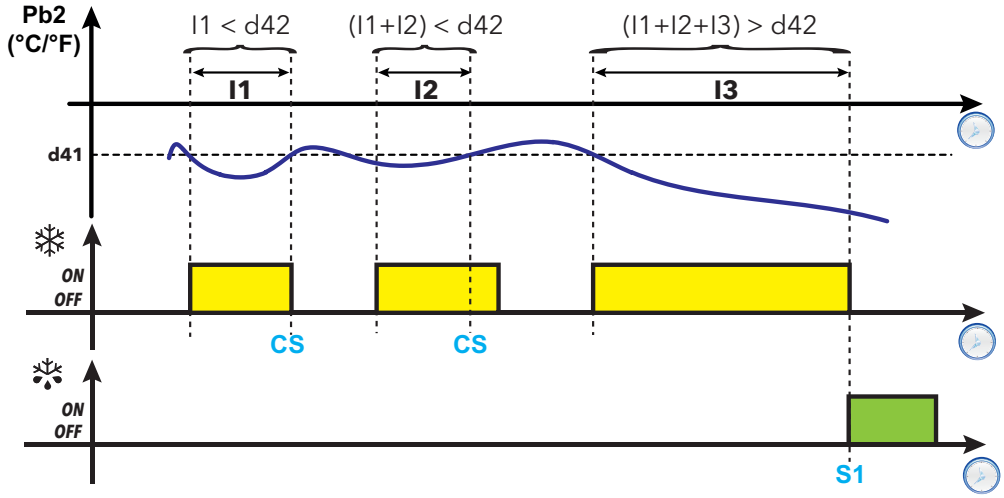
d43 = 1: count with compressor on



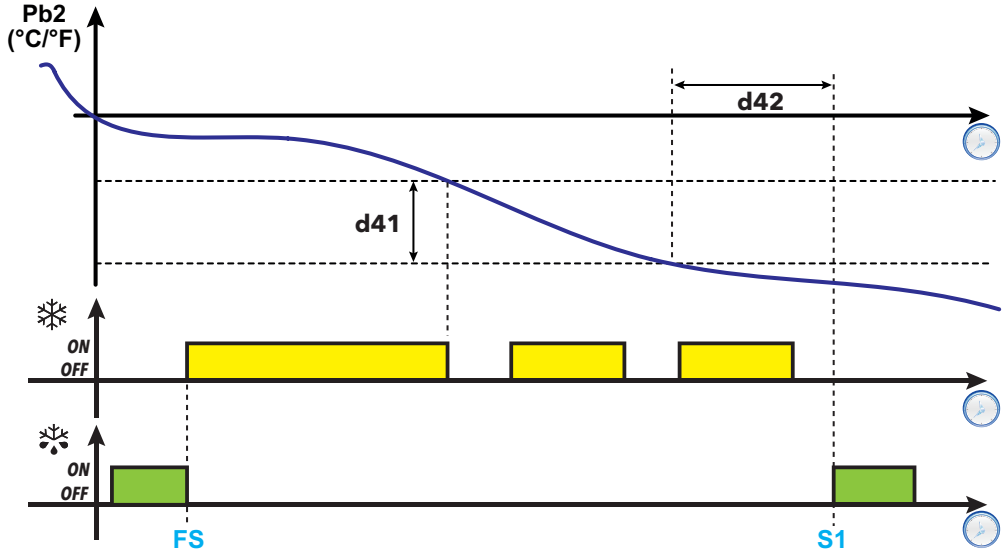
d43 = 2 : count independent of compressor status, count active for Pb2 values below threshold d41



d43 = 3 : count with compressor on, count active for Pb2 values below threshold d41



d44 = 1: Threshold in relative value



Legend: **I1, I2, I3** = Times with count active; **FS** = End of defrost; **S1** = Defrost start; **CS** = Count stop (Pb2 > **d41**).

Temperature differential

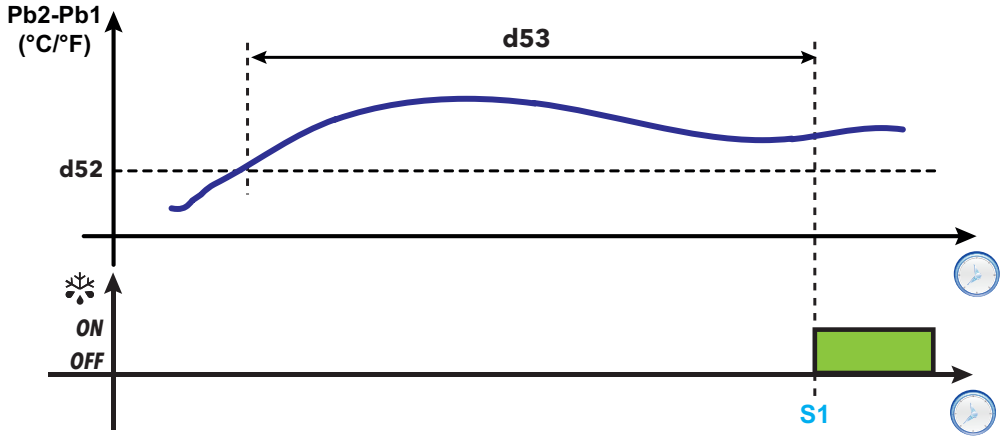
This defrost can be configured via the following parameters:

Parameter	Description
d50	Enables/disables use of probe Pb2. • **0** = disabled • **1** = enabled. Defrost runs according to the value read by Pb2 (only refers to defrost with threshold)
d51	Enables/disables use of probe Pb1. • **0** = disabled • **1** = enabled. Defrost runs according to the value read by Pb1 (only refers to defrost with threshold)
d52	Sets the defrost activation threshold (absolute differential **Pb2-Pb1**)
d53	Sets the maximum time for which the temperature difference (**Pb2-Pb1**) can remain above the threshold **d52**
d54	Sets the type of incremental time count in which the evaporator temperature remains above the threshold value **d52**. • **0** = incremental count independent of the compressor status • **1** = incremental count with compressor on (when the compressor is off the incremental count is reset) • **2** = incremental count independent of the compressor status. The incremental count stops when the temperature difference (**Pb2-Pb1**) falls below the threshold **d52** • **3** = incremental count with compressor on and until the temperature drops below the threshold **d52**
d55	Sets the threshold management mode. • **0** = absolute value • **1** = relative value (negative offset, relative to the differential of the temperatures measured by probes Pb1 and Pb2 (**Pb2-Pb1**) at the end of the first cooling cycle or on startup).

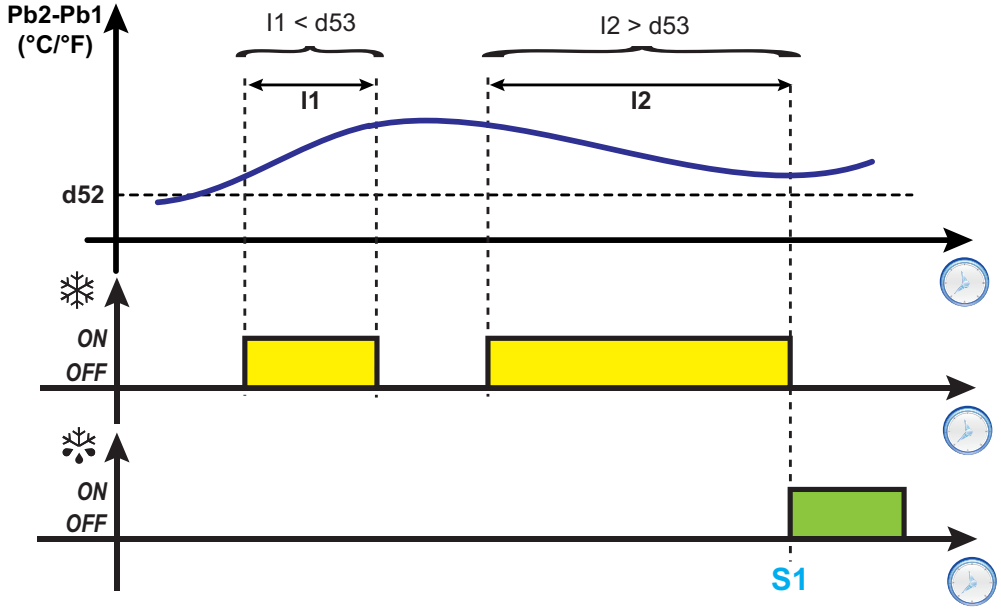
Note: this function can only be activated in models which manage probe Pb2 (as long as the conditions are correct to do so).

Regulation diagrams

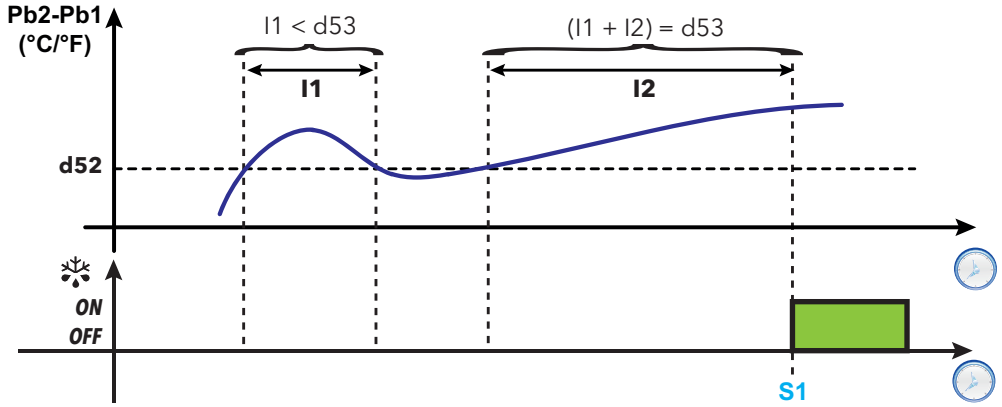
d54 = 0: count independent of the compressor status



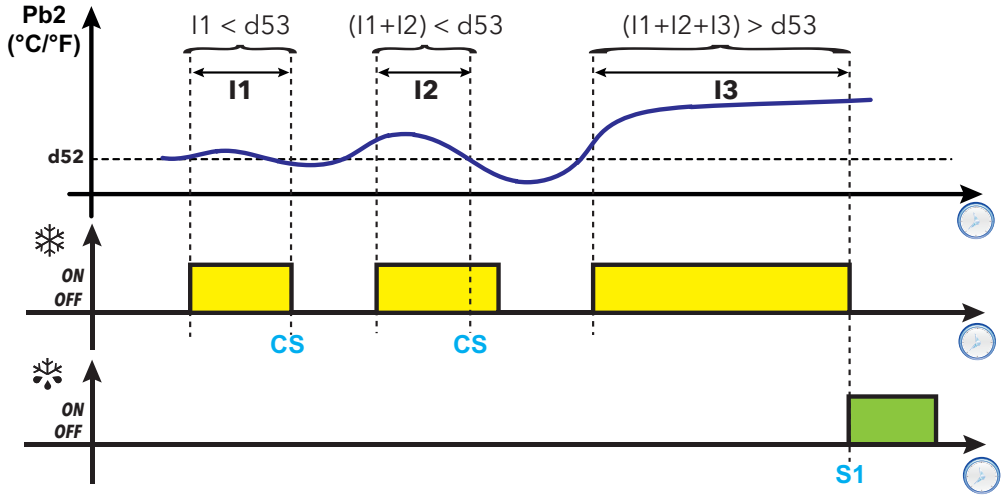
d54 = 1: count with compressor on



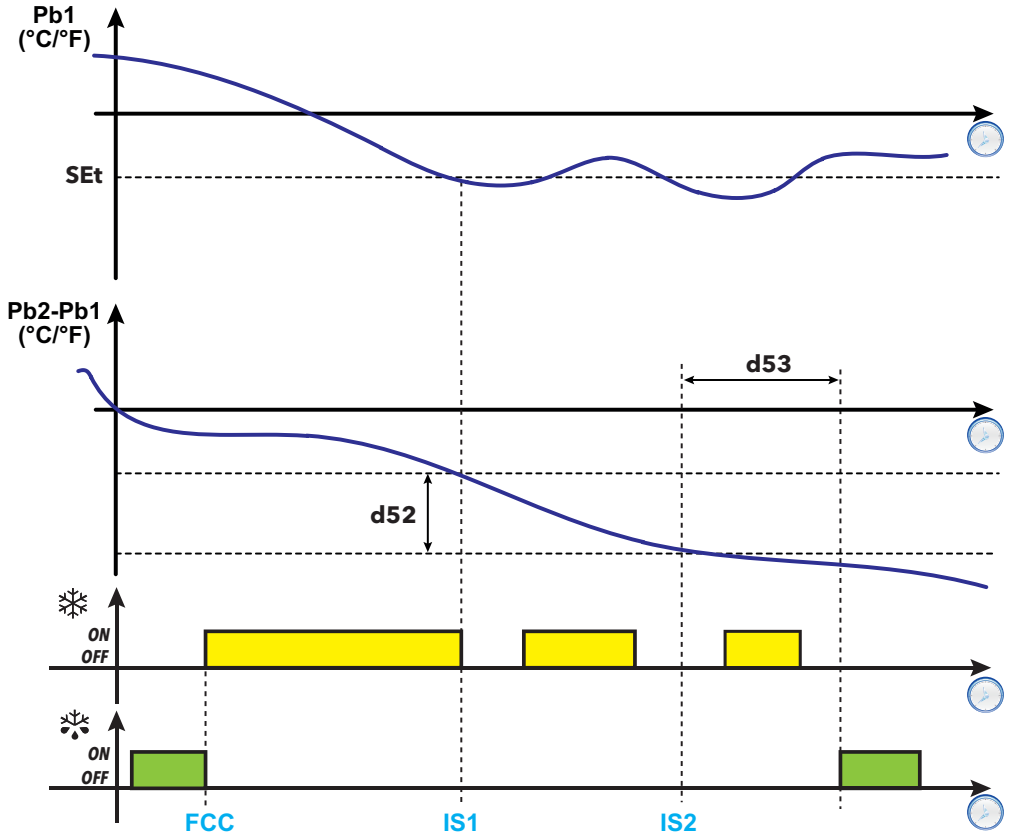
d54 = 2: count independent of the compressor status, count stop below the threshold



d54 = 3: count with compressor on, count stop below the threshold



d55 = 1: Threshold in relative value



Legend: **I1, I2, I3** = Times with count active; **S1** = Defrost request; **CS** = Count stop (Pb2 > **d52**); **FCC** = Start first cooling cycle; **IS1** = Moment in correspondence with the first cooling cycle in which the cut-in threshold is calculated (Threshold = Pb2-Pb1+Offset); **IS2** = Activation threshold crossing moment calculated at the **IS1** time.

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*

(*): only models that manage probe Pb2.

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, if **dt**≠0 the controller will move on to the dripping phase and the compressor, fans and heaters will remain inactive. At the end of the dripping cycle, regulation begins again as normal.

End of defrost

Defrost ends in the following conditions:

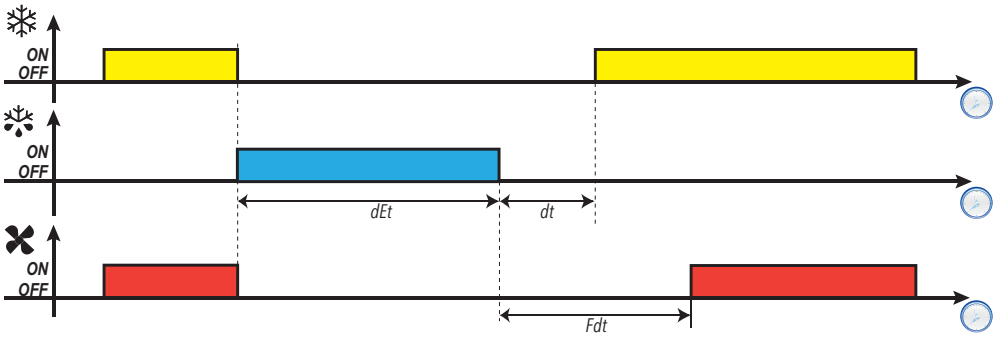
Condition	H42 value	Evaporator probe (Pb2)
End of timeout period set using parameter **dEt**.	0	Not managed
Defrost end setpoint set using parameter **dS1** reached or due to timeout if the setpoint is not reached within the time period **dEt**.	1	Managed

Notes:

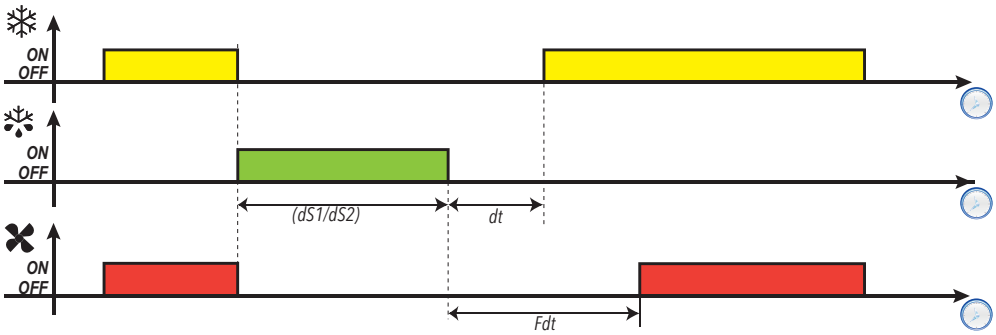
- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- If **dS1** intervenes before **dEt**, dripping (managed by parameters **dt** and **Fdt**) is activated in correspondence with **dS1** intervention
- If **Fdt** < **dt** **Fdt** = **dt** is set
- During the defrost the fans are off if **dFd** = y, otherwise they follow the other settings for the fan regulator
- The programmed defrost is carried out independently of the Pb1 status
- Defrost and dripping are carried out independently of the door switch activation or not

Regulation diagram

End of electric heater defrost due to timeout



End of electric heater defrost due to temperature



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.
dS1	Evaporator 1 defrost end temperature.
d40	Enables/disables use of probe Pb2.
Fdt	Fan activation delay after a defrost.
dFd	Evaporator fan exclusion during defrost.
dt	Dripping duration.

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

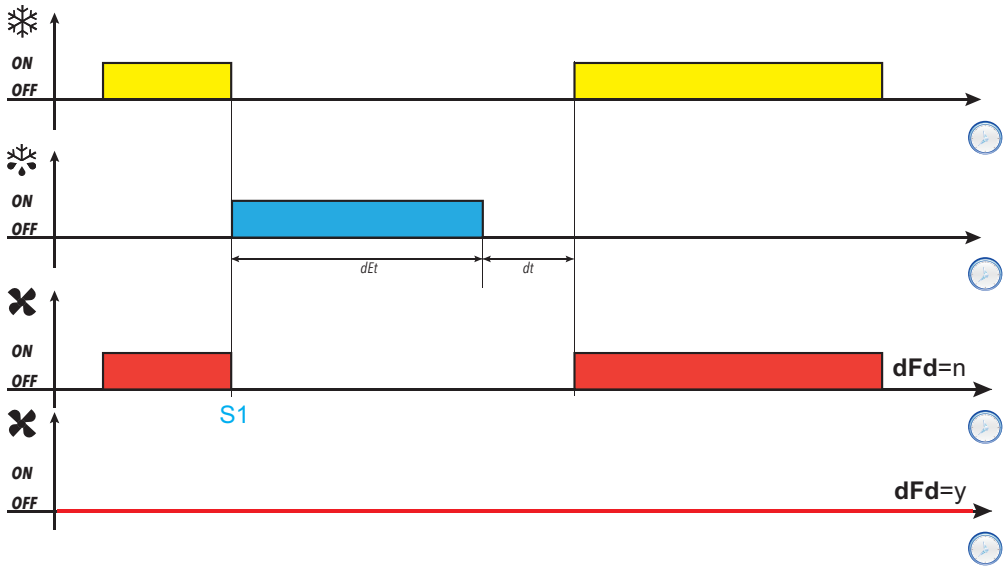
Defrost ends in the following conditions:

Condition	H42 value	Evaporator probe (Pb2)
End of timeout period set using parameter **dEt**.	0	Not managed
Defrost end setpoint set using parameter **dS1** reached or due to timeout if the setpoint is not reached within the time period **dEt**.	1	Managed

Notes:

- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- If **dt** ≠ 0, at the end of defrost the compressor and fans remain off for the time period **dt** (dripping time)
- During the defrost the fans are off if **dFd** = y, otherwise they follow the other settings for the fan regulator
- The programmed defrost is carried out independently of the Pb1 status
- Defrost and dripping are 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.
dFd	Evaporator fan exclusion during defrost.
dt	Dripping duration.

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

At the end of defrost the valve relay and the compressor relay are deactivated. The compressor relay is stopped for the entire duration of the dripping cycle, set via parameter **dt** (if a value other than zero). At the end of the dripping cycle regulation begins again as normal.

End of defrost

Defrost ends in the following conditions:

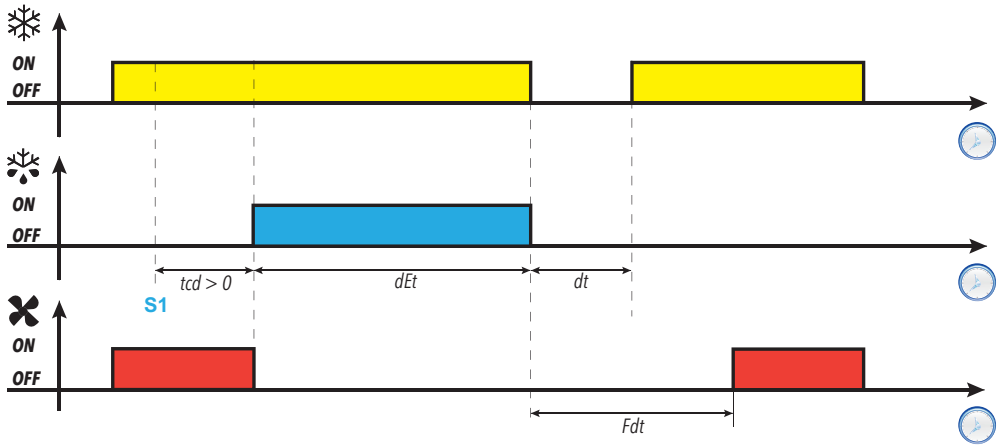
Condition	H42 value	Evaporator probe (Pb2)
End of timeout period set using parameter **dEt**	0	Not managed
Defrost end setpoint set using parameter **dS1** reached or due to timeout if the setpoint is not reached within the time period **dEt**.	1	Managed

Notes:

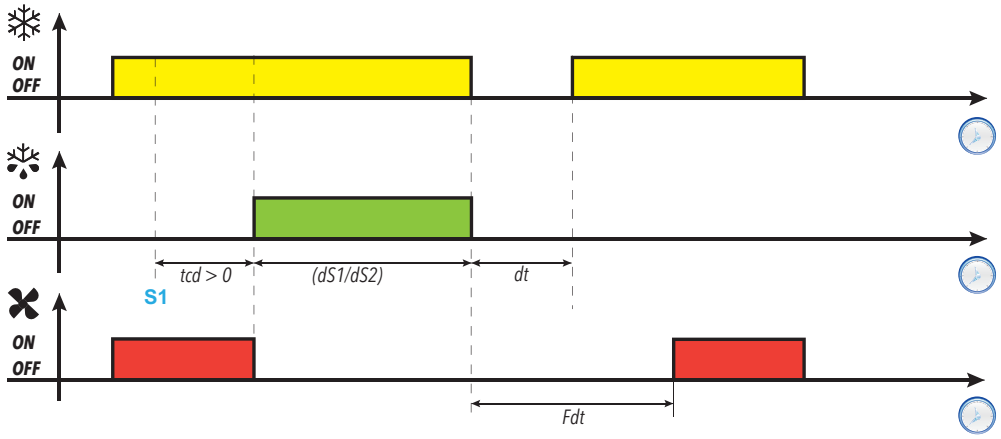
- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- The compressor safety timings (managed by parameters **don**, **doF** and **dbi**) take priority over defrost
- If **dS1** intervenes before **dEt**, dripping (managed by parameters **dt** and **Fdt**) is activated in correspondence with **dS1** intervention
- If **Fdt** < **dt**, **Fdt** = **dt** is set
- During the defrost the fans are off if **dFd** = y, otherwise they follow the other settings for the fan regulator
- The programmed defrost is carried out independently of the Pb1 status
- Defrost and dripping are carried out independently of the door switch activation or not

Regulation diagrams

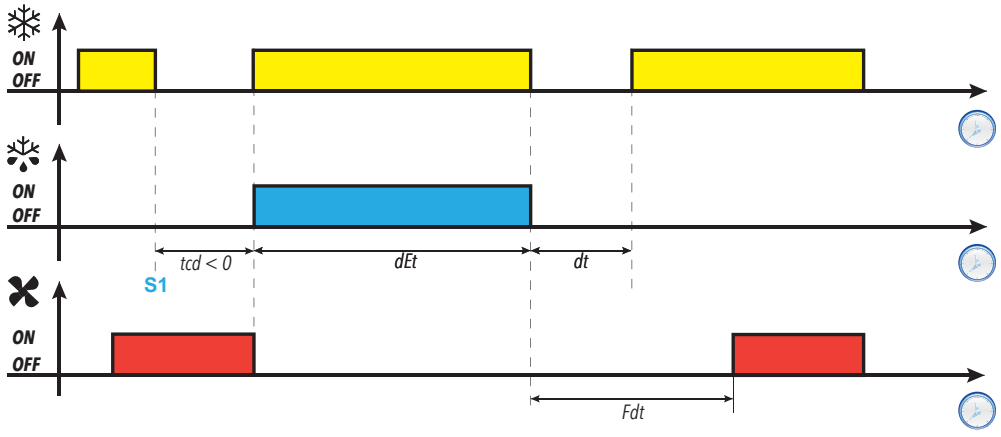
End of hot gas defrost due to timeout, with tcd > 0



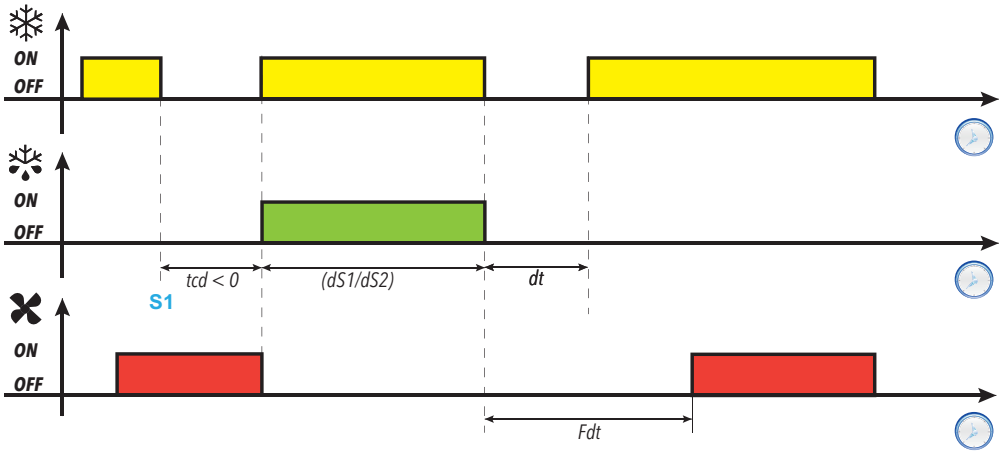
End of hot gas defrost due to temperature, with tcd > 0



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



End of hot gas defrost due to temperature, 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.
dS1	Evaporator 1 defrost end temperature.
Fdt	Fan activation delay after a defrost.
dt	Dripping duration.

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.
During the dripping cycle the compressor continues to run.

End of defrost

Defrost ends in the following conditions:

Condition	H42 value	Evaporator probe (Pb2)
End of timeout period set using parameter **dEt**	0	Not managed
End of defrost temperature setpoint, set using parameter **dS1**, reached. **Note**: (only models that manage probe Pb2) If the setpoint is not reached within the time set using parameter **dEt** (defrost timeout), the defrost ends in any case due to timeout.	1	Managed

Notes:

- To end defrost manually, switch the controller off and on again or use Stand-by function
- Temperature alarms are excluded during defrost
- If **dS1** intervenes before **dEt**, dripping (managed by parameters **dt** and **Fdt**) is nevertheless activated in correspondence with the end of interval **dEt**
- The programmed defrost is carried out independently of the Pb1 status
- Defrost and dripping are 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.
dS1	Evaporator 1 defrost end temperature.
Fdt	Fan activation delay after a defrost.
dt	Dripping duration.

Synchronized Defrost from Digital Input

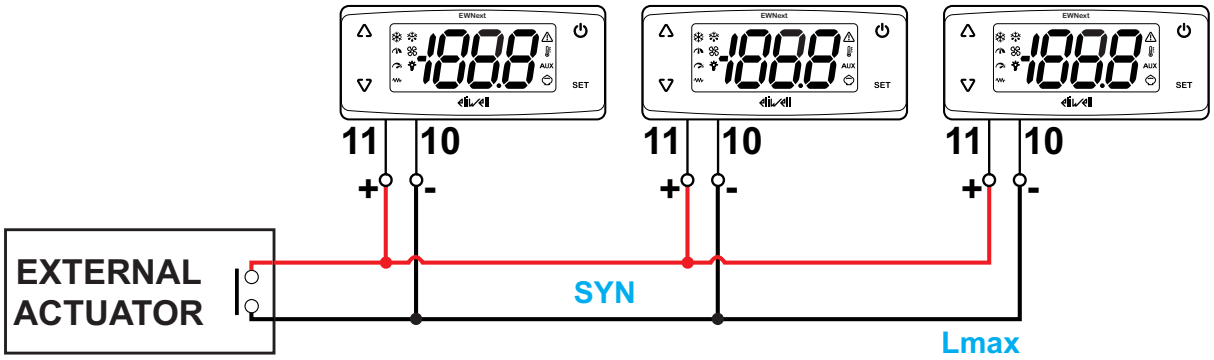
Functioning conditions

The function can be activated by setting:

- **H11** = ±13 (Synchronized defrost)

The start of a synchronized defrost can be enabled by means of an external actuator or via one of the EWNext devices that share the synchronism connection.

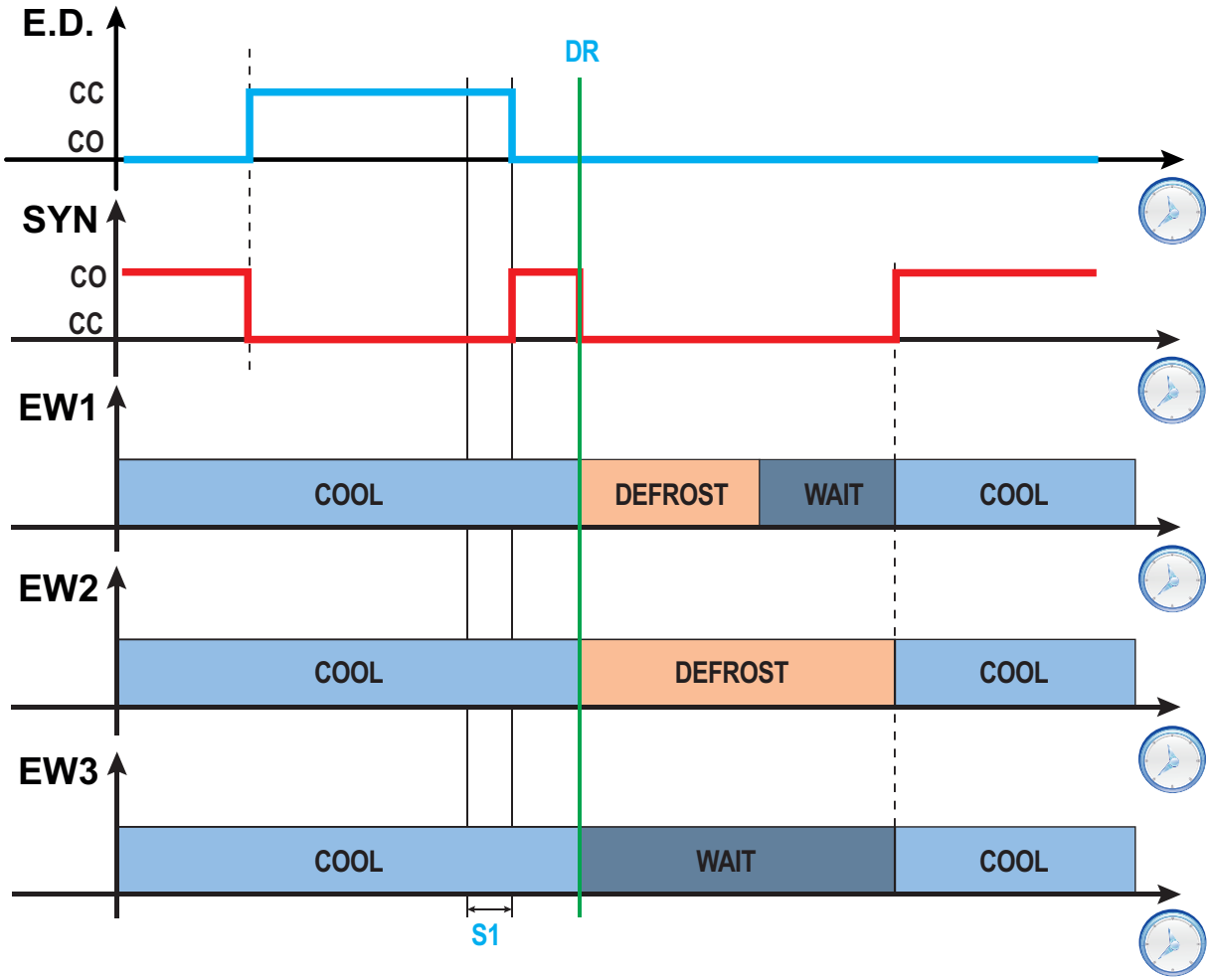
NOTICE
INOPERABLE DEVICE • The external actuator should be voltage free. • Use a maximum of 8 EWNext devices in the network. • For defrost synchronization line connection, use cables no longer than 10 m (32.80 ft). **Failure to follow these instructions can result in equipment damage.**



Legend: **External Actuator** = External actuator; **SYN** = Defrost synchronization line; **Lmax** = Maximum connection length (must be under 10 m - 32.8 ft).

CASE 1: at least one controller can start a defrost

If at least one controller is capable of starting a defrost, the other controllers - that do not possess the conditions for starting it - inhibit normal regulation. When all syncronized controllers have completed the defrost sequence, they will begin regulating normally again.



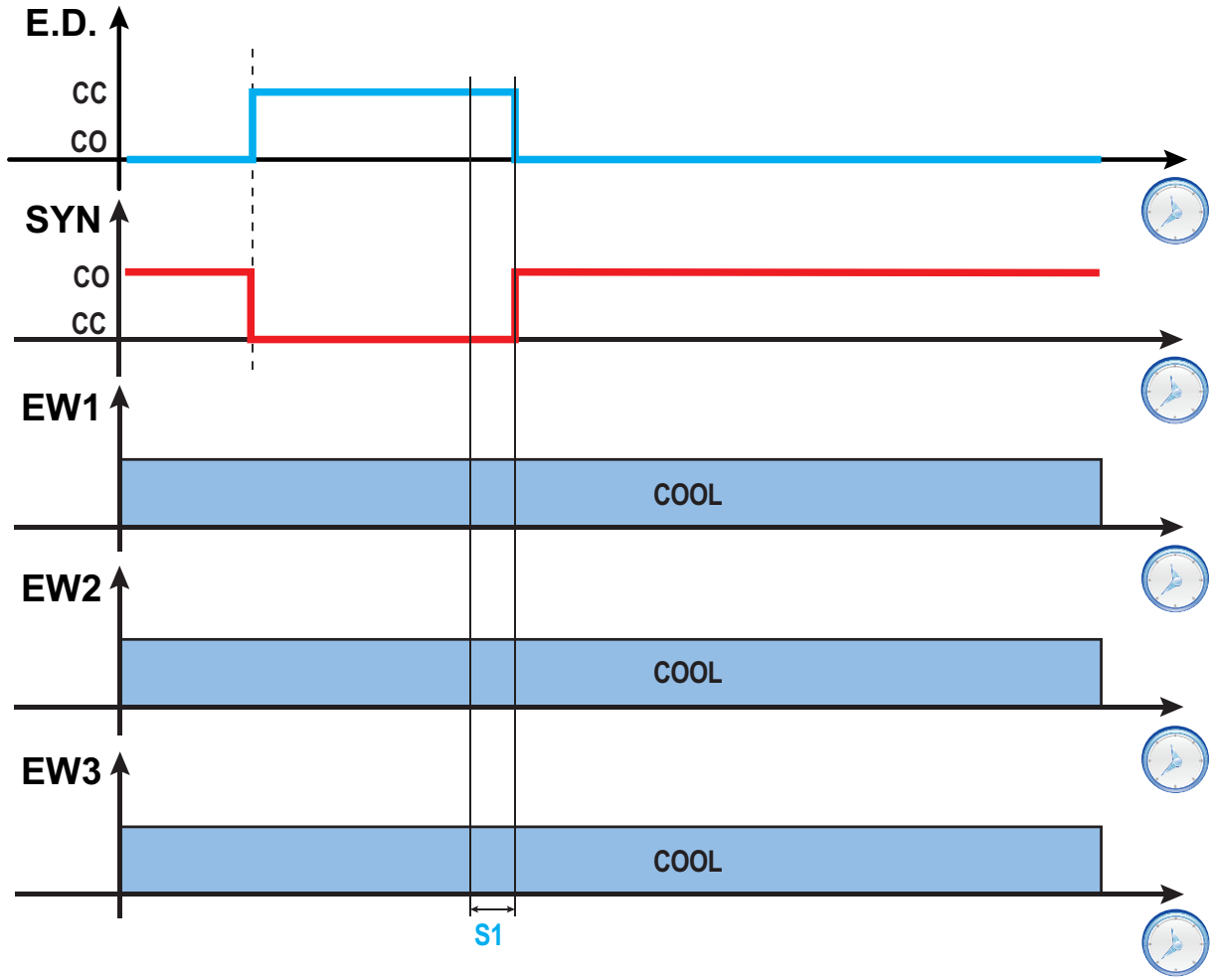
Legend: **E.D.** = External device; **SYN** = Synchronization line; **CC** = Closed contact; **CO** = Open contact; **EW1...EW3** = Synchronization network tools; **DR** = Defrost request; **S1** = Time period of 0.5 seconds; **COOL** = Normal regulation; **WAIT** = Command wait time; **DEFROST** = Defrost.

The defrost sequence will be:

1. The external device activates the synchronization line, closing the circuiti for a time period of at least 0.5 seconds (**S1**). During this period all the shared controllers continue to regulate normally.
2. The external device deactivates the synchronization line.
   The controllers that possess the conditions for starting a defrost start it activating the synchronization line.

If none of the controllers are in a condition to start a defrost, they will continue to regulate normally.

CASE 2: none of the controllers can start a defrost



Legend: **E.D.** = External device; **SYN** = Synchronization line; **CC** = Contact closed; **CO** = Contact open; **EW1...EW3** = Synchronization network tools; **DR** = Defrost request; **S1** = Time period of 0.5 seconds; **COOL** = Normal regulation.

Functions

Contents

This section includes the following topics:

Door switch

Description

By setting **H11** = ±4 it is possible to connect a door switch to the digital input. When it is activated, the compressor and/or fans are deactivated instantly or after a time period set with parameter **dCo**.

Operating mode

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

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

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.
dAd	Digital input activation delay.
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.
H11	**DI** digital input/polarity configuration.
H21	Configuration of digital output **Out1**
H22	Configuration of digital output **Out2**
H23	Configuration of digital output **Out3**

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 **H11** = ±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
H11	**DI** digital input/polarity configuration.
H31	∧ key configuration.
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** 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:

- **Fans 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
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:

Heat/Cool

Description

The regulator can work with an absolute or relative differential, both in Heat and Cool modes, and is controlled by the value of 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)
- 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)

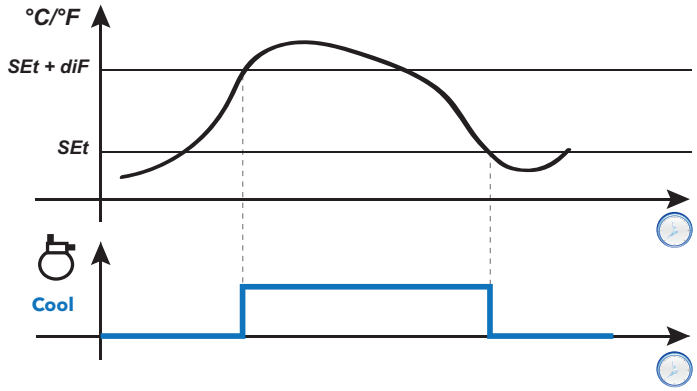
If an offset is activated on the setpoint (**oSP**) and on the differential (**odF**), then:

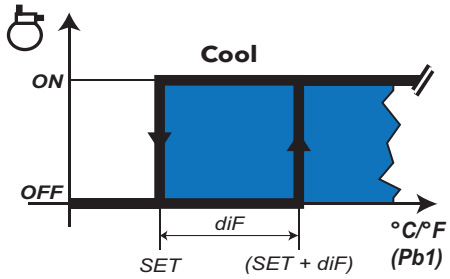
- **SEt** will be replaced by the value (**SEt + oSP**)
- **diF** will be replaced by the value (**diF+ odF**)

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

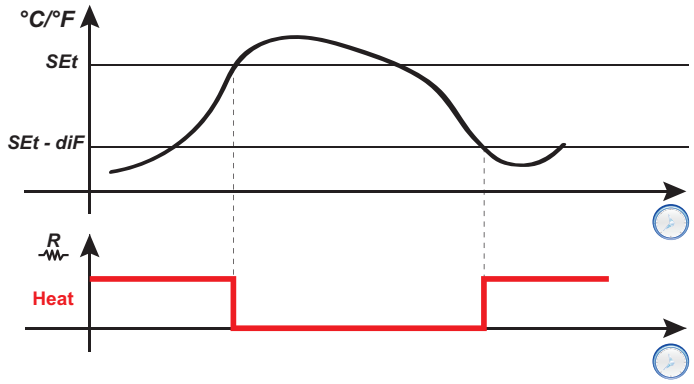
Regulation diagrams

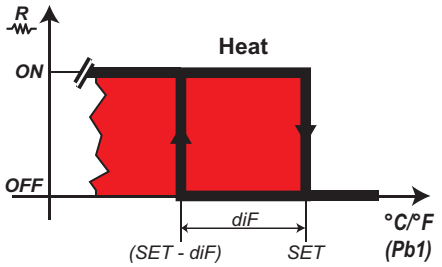
Cooling Regulation (**HC** = C)





Heating Regulation (**HC** = H)





Legend: **Heat** = Heating; **Cool** = Cooling.

Parameters

Parameter	Description
SEt	Regulation setpoint
diF	Regulator activation differential
HC	Select regulation mode (**H** = Heat / **C** = Cool)
oSP	Offset on setpoint
odF	Offset on differential in energy saving mode
odo	Output activation delay after startup

Compressor

Description

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

- the temperature value measured by probe Pb1
- the temperature control functions set
- the defrost/dripping 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)
- 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.

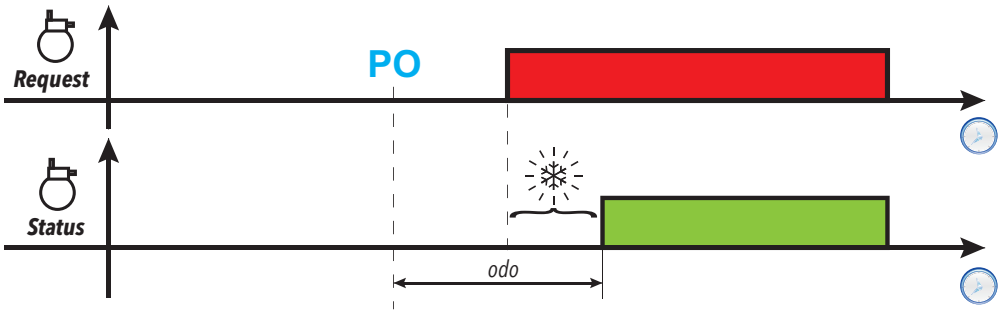
Compressor protections

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

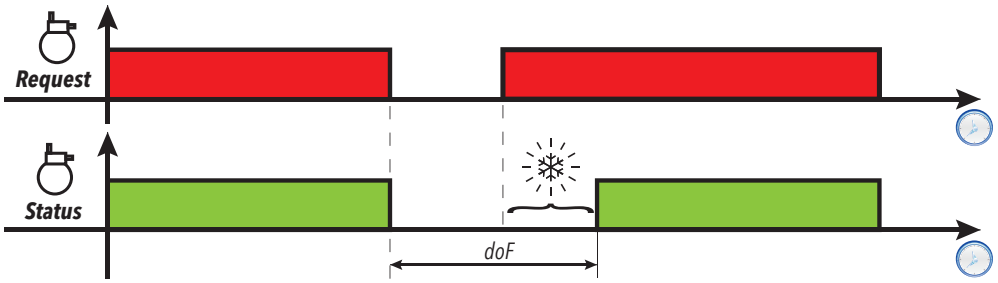
- a delay **doF** between compressor relay switch-off and the next switch-on. If a new activation request arises during the delay **doF**, the compressor icon will flash on the display.
- a delay **dbi** between one compressor startup and the next. The delay **dbi** is calculated from the previous compressor 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

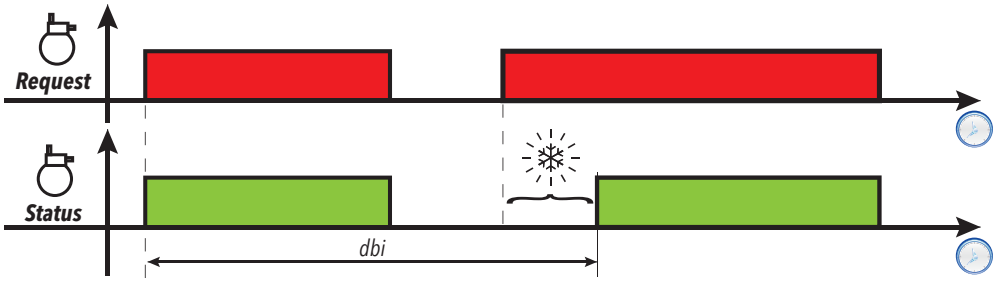
Compressor activation delay from controller power-on



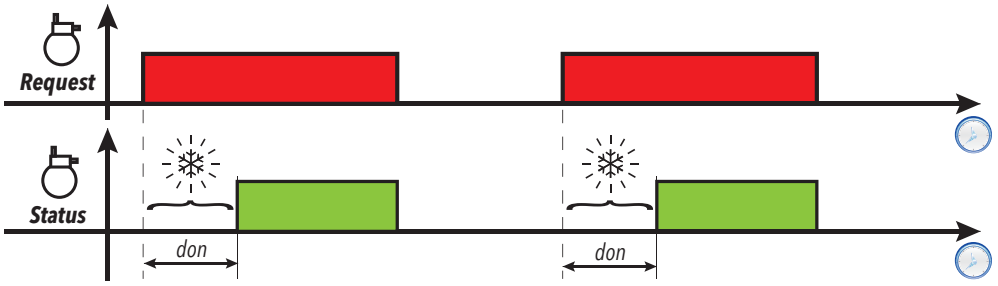
Compressor output activation delay from switch-off



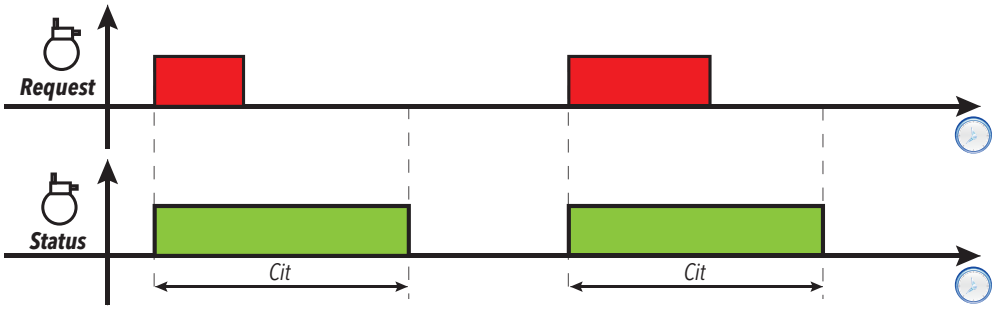
Delay between two consecutive compressor output activations



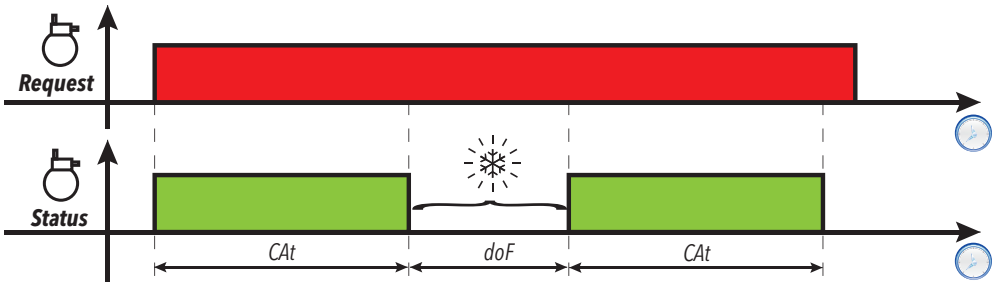
Compressor activation delay from request



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

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 and the buzzer (if present).

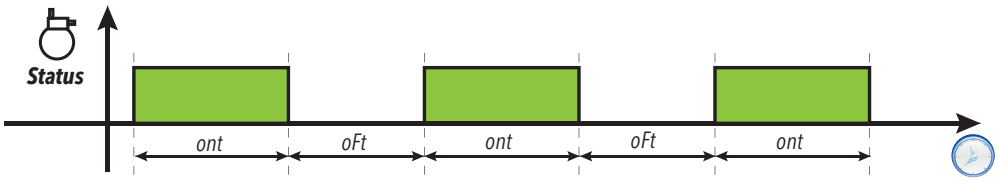
Functioning conditions

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

Evaporator fans

Functioning conditions

The evaporator fan regulator is activated if the following conditions occur:

- From power-on the time set using parameter **OdO** has elapsed (only if **OdO**≠0).
- The temperature read by the evaporator probe (Pb2) is lower than the value of parameter **FSt**.
- The fans regulator is not deactivated from parameter **dFd** during the defrost (**dFd** = y).
- Dripping is not active (**dt**).
- Fan delay after defrost is not active (**Fdt**).

Regulator activation

The request for fan activation or deactivation can come:

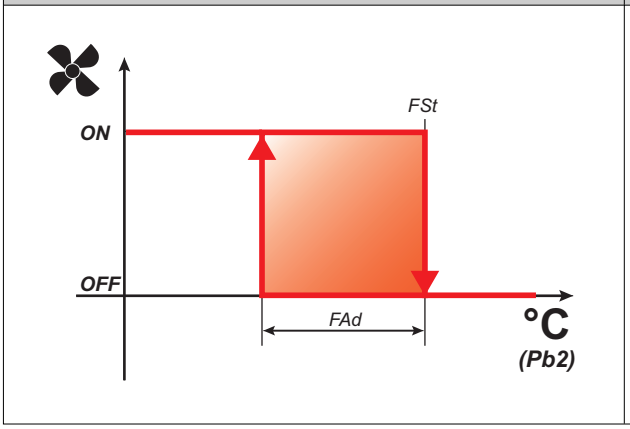
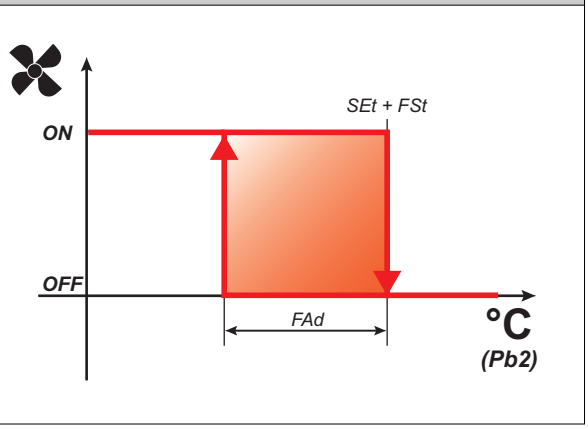
- from the compressor regulator (temperature control mode)
- from the defrost regulator, to control and/or limit the circulation of warm air.

Fan operating modes

			Day (normal operation)		Night (energy saving)	
Probe Pb2	**H42**	**FCo**	**Compressor ON**	**Compressor OFF**	**Compressor ON**	**Compressor OFF**
Present	y	0	Thermostat controlled	Off	Thermostat controlled	Off
		1	Thermostat controlled	Thermostat controlled	Thermostat controlled	Thermostat controlled
		2	Thermostat controlled	Day duty cycle	Thermostat controlled	Night duty cycle
		3	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
		4	Thermostat controlled	Off	Thermostat controlled	Off
		5	Thermostat controlled	Thermostat controlled	Thermostat controlled	Thermostat controlled
		6	Thermostat controlled	Thermostat controlled	Thermostat controlled	Thermostat controlled
In error **E2**	y	0	Day duty cycle	Off	Night duty cycle	Off
		1	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
		2	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
		3	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
		4	On	Off	On	Off
		5	On	Off	On	Off
		6	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
Absent	n	0	On	Off	On	Off
		1	On	Day duty cycle	On	Night duty cycle
		2	On	Day duty cycle	On	Night duty cycle
		3	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle
		4	On	Off	On	Off
		5	On	Off	On	Off
		6	Day duty cycle	Day duty cycle	Night duty cycle	Night duty cycle

Fan operation in regulation mode

During cooling, fan regulation is carried out based on values **FSt** (fan disabling temperature) and **FAd** (fan differential). Parameter **FPt** can be used to select whether the set temperature values are absolute or relative to the setpoint.
Note: around the fan start temperature **Fot**, the differential will always be specified by **FAd** but with the sign inverted.
Regulation diagrams based on whether the values are absolute or relative are shown below:

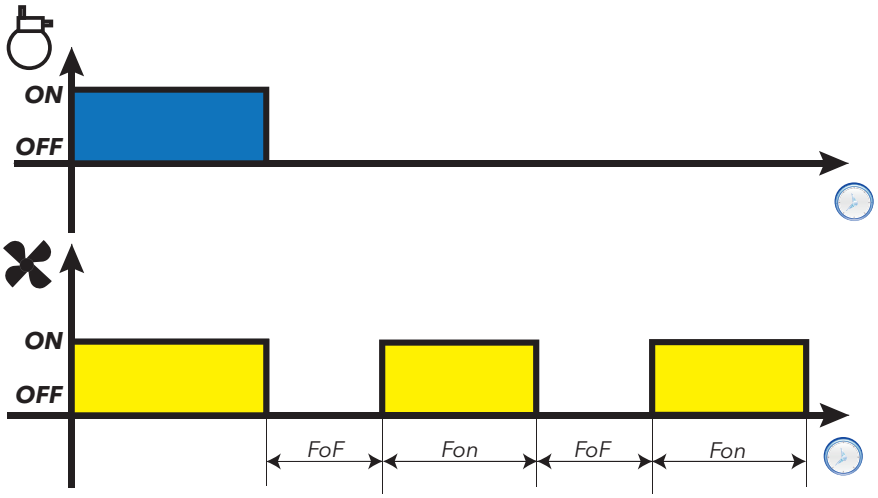
FPt = 0 (absolute values)	**FPt** = 1 (relative values)
	

Fan operation in duty cycle

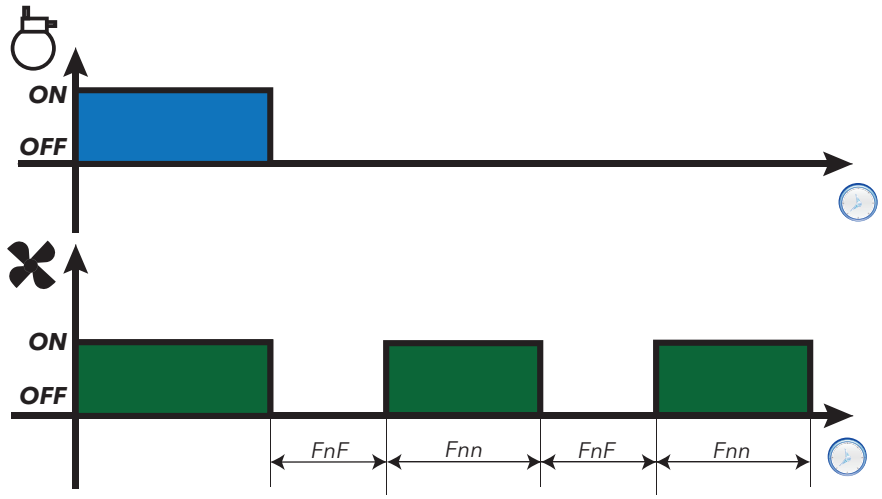
The fans run in duty cycle mode when the compressor is off and this mode is specified by parameter **FCo**.
Depending on whether the controller is in day (normal operation) or night (energy saving) mode, fan operation is based on parameters **Fon** and **FoF** (day) or **Fnn** and **FnF** (night):

Fon / Fnn	FoF / FnF	Fans
0	0	Off
0	≠0	Off
≠0	0	On
≠0	≠0	Duty cycle

Regulation diagram for Day duty cycle with compressor off



Regulation diagram for Night duty cycle with compressor off



Fan operation in defrost mode

Operation depends on parameter **dFd**:

dFd	Fans
y	Off
n	Regulation or duty cycle

Note: to exclude the fans during a defrost, you must set **dFd** = y.
Otherwise the compressor is stopped during defrost but the fans run normally.

Fan operation in dripping mode

During dripping the fans remain stopped for the time set using parameter **dt**.
Note: if **Fdt** is greater than **dt** the fans remain off for the time set in **Fdt**.

Post-ventilation

Parameter **FdC** delays fan deactivation after the compressor has stopped. If **FdC** = 0 the function is excluded.

Parameters

Parameter	Description
odo	Output activation delay from startup
FPt	Sets whether parameter **FSt** is expressed as an absolute value or as a value relative to the Setpoint
FSt	Evaporator fan disabling temperature
Fot	Evaporator fan activation temperature
Fdt	Evaporator fan activation delay time after a defrosting cycle
dFd	Evaporator fan exclusion during a defrost cycle
FCo	Evaporator fan operating mode
FdC	Evaporator fan shutoff delay after compressor deactivation
FAd	Evaporator fan trigger differential
dt	Dripping time
Fon	Evaporator fan ON time in day duty cycle mode
FoF	Evaporator fan OFF time in day duty cycle mode
Fnn	Evaporator fan ON time in night duty cycle mode
FnF	Evaporator fan OFF time in night duty cycle mode
ESF	Night (energy saving) mode activation
dCd	Fans activation delay after door closed.

Energy saving (night mode) - Reduced set

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 **H11** = ±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**)

Note: for further details, see: "Heat/Cool".

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 **H11** = ±10 or ±11)
- using a Supervisor, via Modbus command (serial)
- via APP (if the BTLE Dongle is present. See accessories section)

Parameter **ESt** manages 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

Diagnostics

Contents

This section includes the following topics:

Alarms and indications

Introduction

All alarms are deactivated automatically when their cause is removed.

Detecting an alarm condition

If there is an alarm condition, the alarm icon ⚠ comes on steadily. If present and enabled, the buzzer and the alarm relay are 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 buzzer is silenced, the alarm icon ⚠ flashes and the alarm relay is de-energized.

Alarms legend

Code	Description	Buzzer and alarm relay	Reset	Cause	Effects	Solutions
E1	Probe Pb1 error	Active	Automatic Reset	• 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.
E2	Probe Pb2 error **Note**: only models that manage probe Pb2	Active	Automatic Reset	• Reading of values outside the operating interval • Probe or corresponding wiring in short-circuit or open circuit	• **E2** shown • Steady alarm icon ⚠ • Defrost ends due to timeout (**dEt**) • The evaporator fans are: on (compressor ON), or run according to parameter **FCo**, (compressor OFF).	• Verify the type of probe (default NTC) • Verify the probe wiring • Replace probe.
AH1	Alarm due to Pb1 HIGH Temperature	Active	Automatic Reset	Value read by Pb1 > **HAL** for longer than time **tAo** (see section "Minimum and maximum temperature alarm" on page 96)	• 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	Automatic Reset	Value read by Pb1 < **LAL** for longer than time **tAo** (see section "Minimum and maximum temperature alarm" on page 96)	• 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	Automatic Reset	Activation of the digital input (**H11** = ±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	Automatic Reset	Digital input activation (**H11** = ±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**

Code	Description	Buzzer and alarm relay	Reset	Cause	Effects	Solutions
Ad2	Defrost due to timeout **Note**: only models that manage probe Pb2	Not active	Automatic Reset	End of defrost due to timeout, instead of the defrost end temperature being detected by Pb2	• Alarm **Ad2** added to folder **AL** • Steady alarm icon ⚠	Wait for the next defrost for automatic deactivation.
rFA	Low refrigerant alarm	Not active	Automatic Reset	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)

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

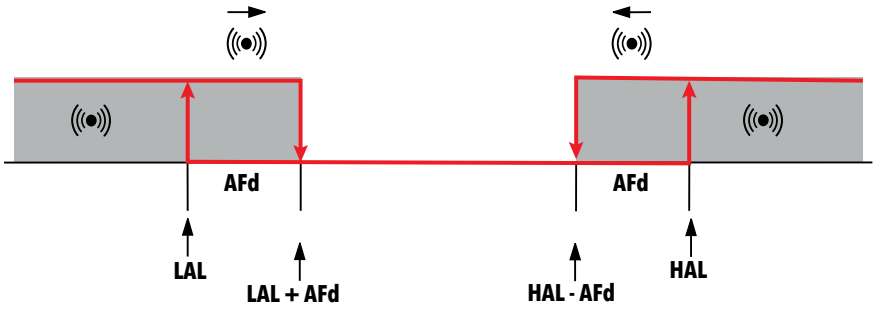
Att value	Temperature read by Pb1	Alarm generated
0	≥ **HAL**	Maximum temperature
	≤ **LAL**	Minimum temperature
1	≥ (**SEt** + **HAL**)	Maximum temperature
	≤ (**SEt** + **LAL**)	Minimum temperature

Conditions for alarm deactivation

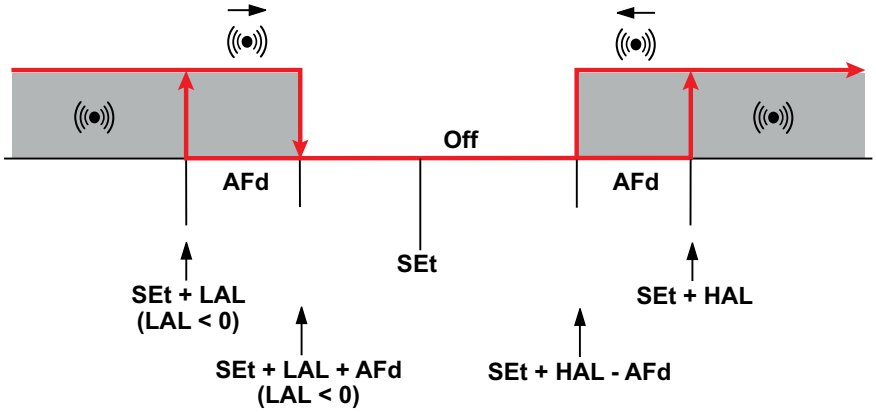
Att value	Temperature read by Pb1	Alarm generated
0	≤ (**HAL** - **AFd**)	Maximum temperature
	≥ (**LAL** + **AFd**)	Minimum temperature
1	≤ (**SEt** + **HAL** - **AFd**)	Maximum temperature
	≥ (**SEt** + **LAL** + **AFd**)	Minimum temperature

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

Low refrigerant alarm

Description

When the compressor is running, the trend of the regulation probe temperature is monitored.

f the trend of the temperature probe does not decrease within an interval given by **rFt**, the alarm icon turns on steady and the alarm **rFA** is added to folder **AL**.

You can silence the alarm with the normal alarm silence procedure.

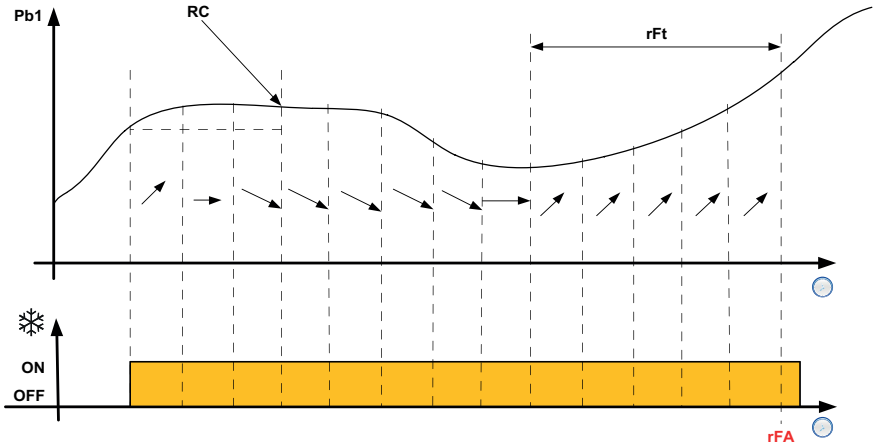
Once this alarm has been detected, the device have to be switched off and on again to cancel it.

The diagnostic is disabled if **rFt = 0**.

Alarm codes

Code	Description
rFA	Low refrigerant alarm

Operating diagrams



Legend: **RC** = reset counter; **rFt** = monitored time interval; **rFA** = alarm activation.

Parameters

Parameter	Description
rFT	Low refrigerant alarm signaling delay.

Parameters EWNext Optimized -HC

Contents

This section includes the following topics:

Parameters EWNext Optimized -HC

User parameters EWNext Optimized -HC

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
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	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	2.0	2.0	2.0	2.0	2.0	2.0	2.0
LSE	Minimum setpoint value.	-67.0...**HSE**	°C/°F	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
HSE	Maximum setpoint value.	**LSE**...302	°C/°F	99.0	99.0	99.0	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	0
dEt	Defrost timeout. Determines the maximum duration of the defrost	1...250	min	30	30	30	30	30	30	30
dS1	Evaporator 1 defrost end temperature (measured by probe Pb2)	-67.0...302	°C/°F	-	-	8.0	8.0	8.0	8.0	8.0
dit	Time interval between one defrost and the next	0...250	hours	24	24	24	24	24	24	24
FSt	Fan disabling temperature; a value, read by the evaporator probe.	-67.0...302	°C/°F	-	-	50.0	50.0	50.0	50.0	50.0
dt	Dripping time.	0...250	min	-	-	0	0	0	0	0
dFd	Used to select or deselect the exclusion of the evaporator fans during defrosting. • **no**(0) = no • **yES**(1) = yes (fan excluded - off).	no/yES	flag	-	-	yES	yES	yES	yES	yES

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
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	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	-50.0	-50.0	-50.0
tAo	Temperature alarm signaling delay time.	0...250	min	0	0	0	0	0	0	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	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	4.0	4.0	4.0
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	0.0	0.0	0.0
CA2	Positive or negative temperature value to be added to the value of Pb2.	-30.0...30.0	°C/°F	-	-	0.0	0.0	0.0	0.0	0.0
LoC	Keypad lock. • **no**(0) = Keypad lock disabled • **yES**(1) = Keypad lock enabled (on startup or when 30 seconds have passed since the last action carried out on the user interface)	no/yES	flag	yES	yES	yES	yES	yES	yES	yES
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	1	1	1
Ldd	Display unlock timeout value - label **dEF**	0...250	min	30	30	30	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	0	0	0
tAb	Reserved: read-only parameter.	/	/	/	/	/	/	/	/	/

Note: if one or more parameters in folder **CnF** 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 Optimized -HC

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
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	3.5	3.5	3.5	3.5	3.5	3.5	3.5
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	2.0	2.0	2.0	2.0	2.0	2.0	2.0
LSE	Minimum setpoint value.	-67.0...**HSE**	°C/°F	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0	-50.0
HSE	Maximum setpoint value.	**LSE**...302	°C/°F	99.0	99.0	99.0	99.0	99.0	99.0	99.0
HC	The regulator will execute operation for cooling (set "**C**(0)") or heating (set "**H**(1)")	C/H	flag	C	C	-	-	-	-	-
ont	Regulator switch-on time for probe in error: • 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	0	0	0
oFt	Regulator switch-off time for probe in error: • 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	1	1	1
don	Compressor relay activation delay time from call	0...250	s	0	0	0	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	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	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	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	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	0	0	0
dEF (Defrost)										
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	0
doH	Defrost cycle activation delay from the call	0...250	min	0	0	0	0	0	0	0
dEt	Defrost timeout. Determines the maximum duration of the defrost	1...250	min	30	30	30	30	30	30	30

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
dS1	Evaporator 1 defrost end temperature (measured by probe Pb2)	-67.0...302	°C/°F	-	-	8.0	8.0	8.0	8.0	8.0
dPo	Defrost activation request at power-on. • **no**(0) = no • **yES**(1) = yes.	no/yES	flag	no	no	no	no	no	no	no
dMr	Enables the defrost count reset in the case of manual defrosting. • **no** (0) = count reset does not take place • **yES** (1) = count reset takes place	no/yES	flag	no	no	no	no	no	no	no
d00	Compressor running time before defrost is activated	0...250	hours	0	0	0	0	0	0	0
d01	**d00** unit of measure. • **0** = hours • **1** = minutes • **2** = seconds.	0/1/2	num	0	0	0	0	0	0	0
dit	Time interval between one defrost and the next	0...250	hours	24	24	24	24	24	24	24
d11	**dit** unit of measure. • **0** = hours • **1** = minutes • **2** = seconds.	0/1/2	num	0	0	0	0	0	0	0
d20	Can be used to activate the defrost when the compressor is off. • **no** (0) = disabled. Defrost is not activated. • **yES** (1) = enabled. Defrost is activated when the compressor is off.	no/yES	flag	no	no	no	no	no	no	no
d40	Enables/disables use of probe Pb2. • **0** (0) = disabled. Defrost does not take Pb2 into account • **Pb2** (1) = enabled. Defrost runs according to the value read by Pb2 (only refers to defrost with threshold)	0/Pb2	flag	-	-	0	0	0	0	0
d41	Sets the defrost activation threshold	-67.0...302	°C/°F	-	-	0.0	0.0	0.0	0.0	0.0
d42	Sets the maximum time for which the evaporator can remain under the threshold **d41**	0...250	min	-	-	0	0	0	0	0
d43	Sets the type of time count in which the evaporator temperature remains under the threshold value. • **0** = count independent of the compressor status • **1** = count with compressor on (when the compressor is off the count begins again) • **2** = count independent of the compressor status. The count stops when the temperature rises above the threshold **d41** • **3** = count with compressor on and until the temperature rises above the threshold **d41**	0...3	num	-	-	0	0	0	0	0
d44	Sets the threshold management mode. • **AbS** (0) = absolute value (for example: **d41** = -25°C means that the threshold temperature is exactly -25°C) • **rEL** (1) = relative value (negative offset, relative to the value measured by the defrost probe Pb2 (if **d40** = 1) at the end of the first cooling cycle or on power-on)	AbS/rEL	flag	-	-	AbS	AbS	AbS	AbS	AbS

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
d50	Enables/disables use of probe Pb2 ('differential' mode). • **0** (0) = disabled • **Pb2** (1) = enabled. Defrost runs according to the value read by Pb2 (only refers to defrost with threshold)	0/Pb2	flag	-	-	0	0	0	0	0
d51	Enables/disables use of probe Pb1. • **0** (0) = disabled • **Pb1** (1) = enabled. Defrost runs according to the value read by Pb1 (only refers to defrost with threshold)	0/Pb1	flag	-	-	0	0	0	0	0
d52	Sets the defrost activation threshold (absolute differential **d50**-**d51**)	0.0...302	°C/°F	-	-	0.0	0.0	0.0	0.0	0.0
d53	Sets the maximum time for which the evaporator can remain above the threshold **d52**	0...999	min	-	-	0	0	0	0	0
d54	Sets the type of incremental time count in which the evaporator temperature remains above the threshold value **d52**. • **0** = incremental count independent of the compressor status • **1** = incremental count with compressor on (when the compressor is off the incremental count is reset) • **2** = incremental count independent of the compressor status. The incremental count stops when the temperature drops below the threshold **d52** • **3** = incremental count with compressor on and until the temperature drops below the threshold **d52**	0...3	num	-	-	0	0	0	0	0
d55	Sets the threshold management mode. • **0** = absolute value (for example: **d52** = **d50**-**d51**) • **1** = relative value (negative offset, relative to the differential of the temperatures measured by probes Pb1 and Pb2 (**d50**-**d51**) at the end of the first cooling cycle or on power-on).	0/1	flag	-	-	0	0	0	0	0
Fan (Fans)										
FPt	Sets whether parameter **FSt** is expressed as an absolute temperature value or as a value relative to the Setpoint. • **AbS** (0) = absolute • **rEL** (1) = relative.	AbS/rEL	flag	-	-	AbS	AbS	AbS	AbS	AbS
FSt	Fan disabling temperature; a value, read by the evaporator probe.	-67.0...302	°C/°F	-	-	50.0	50.0	50.0	50.0	50.0
Fot	Evaporator fan activation temperature.	-67.0...302	°C/°F	-	-	-50.0	-50.0	-50.0	-50.0	-50.0
FAd	Evaporator fan trigger differential.	0.1...25.0	°C/°F	-	-	2.0	2.0	2.0	2.0	2.0
Fdt	Fan activation delay time after a defrost.	0...250	min	-	-	0	0	0	0	0
dt	Dripping time.	0...250	min	-	-	0	0	0	0	0
dFd	Used to select or deselect the exclusion of the evaporator fans during defrosting. • **no**(0) = no • **yES**(1) = yes (fan excluded - off).	no/yES	flag	-	-	yES	yES	yES	yES	yES

<table>
<tr><th>PAR</th><th>Description</th><th>Range</th><th>MU</th><th>EWNext 961 O</th><th>EWNext 961 O/B</th><th>EWNext 971 O</th><th>EWNext 971 O/B</th><th>EWNext 974 O</th><th>EWNext 974 O/B</th><th>EWNext 974 O/Y</th></tr>
<tr><td>FCo</td><td>Evaporator fan operating mode.
<table>
<tr><th rowspan="2">Pb2</th><th rowspan="2">H42</th><th rowspan="2">FCo</th><th colspan="2">day</th><th colspan="2">night</th></tr>
<tr><th>Cn</th><th>Cf</th><th>Cn</th><th>Cf</th></tr>
<tr><td rowspan="7">ok</td><td rowspan="7">y</td><td>0</td><td>T</td><td>Off</td><td>T</td><td>Off</td></tr>
<tr><td>1</td><td>T</td><td>T</td><td>T</td><td>T</td></tr>
<tr><td>2</td><td>T</td><td>DC</td><td>T</td><td>DC</td></tr>
<tr><td>3</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td>4</td><td>T</td><td>Off</td><td>T</td><td>Off</td></tr>
<tr><td>5</td><td>T</td><td>T</td><td>T</td><td>T</td></tr>
<tr><td>6</td><td>T</td><td>T</td><td>T</td><td>T</td></tr>
<tr><td rowspan="7">ko</td><td rowspan="7">y</td><td>0</td><td>DC</td><td>Off</td><td>DC</td><td>Off</td></tr>
<tr><td>1</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td>2</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td>3</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td>4</td><td>On</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>5</td><td>On</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>6</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td rowspan="7">no</td><td rowspan="7">n</td><td>0</td><td>On</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>1</td><td>On</td><td>DC</td><td>On</td><td>DC</td></tr>
<tr><td>2</td><td>On</td><td>DC</td><td>On</td><td>DC</td></tr>
<tr><td>3</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
<tr><td>4</td><td>On</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>5</td><td>On</td><td>Off</td><td>On</td><td>Off</td></tr>
<tr><td>6</td><td>DC</td><td>DC</td><td>DC</td><td>DC</td></tr>
</table>
Headings legend:
Pb2 = probe Pb2 status (ok = present; ko = in E2 error and no = absent; day = day mode; night = night mode; Cn = compressor on; Cf = compressor off.
Status legend:
T = thermostat controlled fans; On = fans on; Off= fans off; DC = Duty cycle.</td><td>0...6</td><td>num</td><td>-</td><td>-</td><td>5</td><td>5</td><td>5</td><td>5</td><td>5</td></tr>
<tr><td>FdC</td><td>Evaporator fan shutoff delay after compressor deactivation.</td><td>0...250</td><td>min</td><td>-</td><td>-</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>Fon</td><td>Day duty cycle: time with fans on.</td><td>0...250</td><td>min</td><td>-</td><td>-</td><td>12</td><td>12</td><td>12</td><td>12</td><td>12</td></tr>
<tr><td>FoF</td><td>Day duty cycle: time with fans off.</td><td>0...250</td><td>min</td><td>-</td><td>-</td><td>6</td><td>6</td><td>6</td><td>6</td><td>6</td></tr>
<tr><td>Fnn</td><td>Night duty cycle: time with fans on.</td><td>0...250</td><td>min</td><td>-</td><td>-</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>FnF</td><td>Night duty cycle: time with fans off.</td><td>0...250</td><td>min</td><td>-</td><td>-</td><td>12</td><td>12</td><td>12</td><td>12</td><td>12</td></tr>
<tr><td>ESF</td><td>"Night" mode activation.
• no(0) = no
• yES(1) = yes.</td><td>no/yES</td><td>flag</td><td>-</td><td>-</td><td>no</td><td>no</td><td>no</td><td>no</td><td>no</td></tr>
<tr><td colspan="11">AL (Alarms)</td></tr>
<tr><td>Att</td><td>Sets the absolute or relative value for parameters HAL and LAL.
• AbS (0) = absolute value
• rEL (1) = relative value</td><td>AbS/rEL</td><td>flag</td><td>AbS</td><td>AbS</td><td>AbS</td><td>AbS</td><td>AbS</td><td>AbS</td><td>AbS</td></tr>
<tr><td>AFd</td><td>Alarm differential.</td><td>0.1...25.0</td><td>°C/°F</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td></tr>
<tr><td>HAL</td><td>Maximum temperature alarm. Temperature value (in an absolute or relative value - see Att) which, when exceeded, will lead to the activation of alarm signaling.</td><td>LAL...302</td><td>°C/°F</td><td>50.0</td><td>50.0</td><td>50.0</td><td>50.0</td><td>50.0</td><td>50.0</td><td>50.0</td></tr>
</table>

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
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	-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	0	0	0
dAo	Temperature alarm exclusion time after defrosting.	0...999	min	0	0	0	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	0	0	0
tdo	Door open alarm activation delay time.	0...250	min	0	0	0	0	0	0	0
tAo	Temperature alarm signaling delay time.	0...250	min	0	0	0	0	0	0	0
dAt	Defrost ended due to timeout alarm indication. • **no**(0) = alarm not activated • **yES**(1) = alarm activated.	no/yES	flag	-	-	no	no	no	no	no
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	num	0	0	0	0	0	0	0
AoP	Alarm output polarity. • **nC** (0) = NC (Normally closed) • **nO** (1) = NO (Normally open).	nC/nO	flag	-	-	nO	nO	nO	nO	nO
rFt	Low refrigerant alarm signaling delay.	0...250	min	0	0	0	0	0	0	0
dOr (Door switch)										
dOd	Digital input shuts off utilities. • **0** = disabled • **1** = disables fans • **2** = disables compressor • **3** = disables fans and compressor.	0...3	num	1	1	1	1	1	1	1
dAd	Digital input activation delay	0...250	min	0	0	0	0	0	0	0
dCo	Compressor switch-off delay from door opening.	0...250	min	0	0	0	0	0	0	0
EnS (Energy Saving)										
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	0.5	0.5	0.5	0.5	0.5	0.5	0.5
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	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	0	0	0
Add (Communication)										
Adr	Modbus protocol controller address.	1...247	num	1	1	1	1	1	1	1
bAU	Modbus Baudrate selection. • **96** (0) = 9600 baud • **192** (1) = 19200 baud • **384** (2) = 38400 baud	96/192/384	num	96	96	96	96	96	96	96
Pty	Modbus parity bit. • **n**(0) = none • **E**(1) = even • **o**(2) = odd.	n/E/o	num	E	E	E	E	E	E	E

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
diS (Display)										
dro	Selects the unit of measure used when displaying the temperature read by the probes. • **C**(0) = °C • **F**(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).	C/F	flag	C	C	C	C	C	C	C
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	0.0	0.0	0.0
CA2	Positive or negative temperature value to be added to the value of Pb2.	-30.0...30.0	°C/°F	-	-	0.0	0.0	0.0	0.0	0.0
LoC	Keypad lock. • **no**(0) = Keypad lock disabled • **yES**(1) = Keypad lock enabled (on startup or when 30 seconds have passed since the last action carried out on the user interface)	no/yES	flag	yES	yES	yES	yES	yES	yES	yES
ddd	Selects the type of value to show on the display. • **0** = setpoint • **1** = Pb1 probe • **2** = Pb2 probe • **3** = reserved	0...3	num	1	1	1	1	1	1	1
ddE	Selects the type of value to show on the module **ECNext**. • **0** = module not connected • **1** = Pb1 probe • **2** = Pb2 probe • **3** = reserved • **4** = setpoint.	0...4	num	0	0	0	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	1	1	1
Ldd	Display unlock timeout value - label **dEF**	0...250	min	30	30	30	30	30	30	30
ndt	Display with decimal point. • **no**(0) = no • **yES**(1) = yes.	no/yES	flag	yES	yES	yES	yES	yES	yES	yES
PS1	When enabled (**PS1**≠0) this is the access key for the user parameters.	0...250	num	0	0	0	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	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	2	2	2

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
H11	Configuration of digital input 1 (**DI**)/ polarity. • **0** = disabled • **±1** = defrost • **±2** = reduced set • **±3** = reserved • **±4** = door switch • **±5** = external alarm • **±6** = stand-by • **±7** = reserved • **±8** = reserved • **±9** = reserved • **±10** = energy saving • **±11** = reserved • **±12** = reserved • **±13** = synchronized defrost ((only models with SYN input, reserved for the other models). **Note**: • the "+" sign indicates that the input is active if the contact is closed. • the "-" sign indicates that the input is active if the contact is open.	-13...+13	num	0	0	0	0	0	0	13
H21	Configuration of digital output 1 (**Out1**). • **0** = disabled • **1** = compressor • **2** = defrost • **3** = evaporator fans • **4** = alarm • **5** = reserved • **6** = stand-by • **7** = reserved • **8** = buzzer • **9** = reserved • **10** = reserved • **11** = reserved • **12** = reserved • **13** = reserved	0...13	num	1	1	1	1	1	1	1
H22	Configuration of digital output 2 (**Out2**). • **0** = disabled • **1** = compressor • **2** = defrost • **3** = evaporator fans • **4** = alarm • **5** = reserved • **6** = stand-by • **7** = reserved • **8** = buzzer • **9** = reserved • **10** = reserved • **11** = reserved • **12** = reserved	0...12	num	-	-	2	2	2	2	2
H23	Configuration of digital output 3 (**Out3**). Same as **H22**.	0...12	num	-	-	-	-	3	3	3
H25	Enables/disables the buzzer. • **no** (0) = disabled • **yES** (1) = enabled.	no/yES	flag	-	yES	-	yES	-	yES	-

PAR	Description	Range	MU	EWNext 961 O	EWNext 961 O/B	EWNext 971 O	EWNext 971 O/B	EWNext 974 O	EWNext 974 O/B	EWNext 974 O/Y
H31	Configuration of ⚠ key. • **0** = disabled • **1** = defrost • **2** = reserved • **3** = reduced set • **4** = stand-by • **5** = reserved • **6** = reserved • **7** = reserved • **8** = reserved • **9** = energy saving • **10** = reserved	0...10	num	1	1	1	1	1	1	1
H32	Configuration of ▽ key. Same as **H31**.	0...10	num	0	0	0	0	0	0	0
H33	Configuration of ⏻ key. Same as **H31**.	0...10	num	4	4	4	4	4	4	4
H42	Probe Pb2 present. • **no**(0) = not present • **yES**(1) = present.	no/yES	flag	-	-	yES	yES	yES	yES	yES
tAb	Reserved: read-only parameter.	/	/	/	/	/	/	/	/	/
CuS	Customer model reference.	0...999	num	0	0	0	0	0	0	0
FPr (UNICARD)										
UL	Transfer of the programming parameters from the controller to the UNICARD.	/	/	/	/	/	/	/	/	/
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.	/	/	/	/	/	/	/	/	/
FnC (Functions)										
oSP	Reduced set activation. The labels displayed will be: • **SP** = Activates the reduced set • **oSP** = Deactivates the reduced set	/	/	/	/	/	/	/	/	/
dEF	Activate defrost	/	/	/	/	/	/	/	/	/
Cnt	Reset TelevisAir diagnostic counters (see Reset TelevisAir diagnostic counters)	/	/	/	/	/	/	/	/	/

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

Modbus MSK 791 functions and resources

Contents

This section includes the following topics:

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' (see **Pty**)

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 791) / 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: • **n** = NONE parity bit (with 2 stop BITS) • **E** = EVEN parity bit (with 1 stop BIT) • **o** = ODD parity bit (with 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

Label	Description	Folder	Val. Par. Address	Val. Filter	Vis. Par. Address	Vis. Filter	R/W	Data Size	CPL	Range	MU
SEt	Regulation setpoint	**-**	32769	0	32931	49152	R/W	Word	Y	**LSE**...**HSE**	°C/°F
diF	Setpoint differential	**CP**	32770	0	32928	768	R/W	Word	-	0,1...30,0	°C/°F
LSE	Minimum setpoint value that can be set	**CP**	32771	0	32928	3072	R/W	Word	Y	-67,0...**HSE**	°C/°F
HSE	Maximum setpoint value that can be set	**CP**	32773	0	32928	12288	R/W	Word	Y	**LSE**...302	°C/°F
HC	Operating mode (Heating/Cooling)	**CP**	32968	256	32928	49152	R/W	Byte	-	0/1	flag
ont	Compressor output ON time if regulation probe is faulty	**CP**	32768	0	32929	3	R/W	Byte	-	0...250	min
oFt	Compressor output OFF time if regulation probe is faulty	**CP**	32772	0	32929	12	R/W	Byte	-	0...250	min
don	Compressor output activation delay from call	**CP**	32776	0	32929	48	R/W	Byte	-	0...250	s
doF	Compressor output activation delay from switch-off	**CP**	32780	0	32929	192	R/W	Byte	-	0...250	min
dbi	Delay between two consecutive compressor output power-ons	**CP**	32784	0	32929	768	R/W	Byte	-	0...250	min
Cit	Minimum compressor output activation time	**CP**	32800	0	32930	3	R/W	Byte	-	0...250	min
CAt	Maximum compressor output activation time	**CP**	32804	0	32930	12	R/W	Byte	-	0...250	min
odo	Output activation delay at startup	**CP**	32788	0	32929	3072	R/W	Byte	-	0...250	min
dty	Compressor 2 activation delay.	**dEF**	32908	61440	32930	768	R/W	Byte	-	0/1/2	num
doH	Sets the type of regulation	**dEF**	32820	0	32931	3	R/W	Byte	-	0...250	min
dEt	Ice sensor differential	**dEF**	32816	0	32930	12288	R/W	Byte	-	1...250	min
dS1	Compressor 1 start-up mode	**dEF**	32774	0	32931	12	R/W	Word	Y	-67,0...302	°C/°F
dPo	Sets the type of regulation	**dEF**	32968	1024	32931	768	R/W	Byte	-	0/1	flag
dMr	Compressor 1 start-up mode	**dEF**	32969	2048	32961	12	R/W	Byte	-	0/1	flag
d00	Compressor 2 activation delay.	**dEF**	32889	0	32949	12	R/W	Byte	-	0...250	hours
d01	Sets the type of regulation	**dEF**	32925	12	32951	12	R/W	Byte	-	0/1/2	num
dit	Threshold (Setpoint) for ice sensor	**dEF**	32812	0	32949	49152	R/W	Byte	-	0...250	hours
d11	Ice sensor differential	**dEF**	32925	48	32951	48	R/W	Byte	-	0/1/2	num
d20	Compressor 1 start-up mode	**dEF**	32969	256	32951	768	R/W	Byte	-	0/1	flag
d40	Compressor 2 activation delay.	**dEF**	32913	240	32950	3	R/W	Byte	-	0/1	flag
d41	Sets the type of regulation	**dEF**	32837	0	32947	49152	R/W	Word	Y	-67,0...302	°C/°F
d42	Threshold (Setpoint) for ice sensor	**dEF**	32839	0	32947	12288	R/W	Byte	-	0...250	min
d43	Ice sensor differential	**dEF**	32913	3840	32950	12	R/W	Byte	-	0...3	num
d44	Compressor 1 start-up mode	**dEF**	32913	61440	32950	48	R/W	Byte	-	0/1	flag
d50	Sets the type of regulation	**dEF**	32916	61440	32958	3	R/W	Byte	-	0/1	flag
d51	Threshold (Setpoint) for ice sensor	**dEF**	32917	15	32958	12	R/W	Byte	-	0/1	flag

Label	Description	Folder	Val. Par. Address	Val. Filter	Vis. Par. Address	Vis. Filter	R/W	Data Size	CPL	Range	MU
d52	Ice sensor differential	**dEF**	32849	0	32953	48	R/W	Byte	-	0,0...302	°C/°F
d53	Compressor 1 start-up mode	**dEF**	32853	0	32953	12288	R/W	Byte	-	0...999	min
d54	Compressor 2 activation delay.	**dEF**	32917	240	32958	48	R/W	Byte	-	0...3	num
d55	Sets the type of regulation	**dEF**	32917	3840	32958	192	R/W	Byte	-	0/1	flag
FPt	FSt parameter mode (absolute or relative)	**FAn**	32968	4096	32933	3	R/W	Byte	-	0/1	flag
FSt	Evaporator fan disabling temperature	**FAn**	32778	0	32933	12	R/W	Word	Y	-67,0...302	°C/°F
Fot	Evaporator fan activation temperature	**FAn**	32838	0	32948	768	R/W	Word	Y	-67,0...302	°C/°F
FAd	Evaporator fan trigger differential	**FAn**	32869	0	32933	48	R/W	Word	-	0,1...25,0	°C/°F
Fdt	Evaporator fan activation delay time after a defrost cycle	**FAn**	32832	0	32947	48	R/W	Byte	-	0...250	min
dt	Dripping time	**FAn**	32870	255	32933	192	R/W	Byte	-	0...250	min
dFd	Evaporator fan cut-out during defrost	**FAn**	32968	8192	32933	768	R/W	Byte	-	0/1	flag
FCo	Evaporator fan status with compressor output Off	**FAn**	32909	15	32932	49152	R/W	Byte	-	0...3	num
FdC	Evaporator fan shutoff delay after compressor deactivation	**FAn**	32870	0	32933	3072	R/W	Byte	-	0...250	min
Fon	Evaporator fan On time in cyclical regulator mode	**FAn**	32871	255	32933	12288	R/W	Byte	-	0...250	min
FoF	Evaporator fan Off time in cyclical regulator mode	**FAn**	32871	0	32933	49152	R/W	Byte	-	0...250	min
Fnn	Evaporator fan ON time in night mode (duty cycle)	**FAn**	32868	0	32932	3072	R/W	Byte	-	0...250	num
FnF	Evaporator fan OFF time in night mode (duty cycle)	**FAn**	32869	255	32932	12288	R/W	Byte	-	0...250	num
ESF	Night mode activation (Energy Saving)	**FAn**	32969	512	32951	3072	R/W	Byte	-	0/1	flag
Att	Alarm mode (absolute or relative)	**AL**	32968	32768	32934	12	R/W	Byte	-	0/1	flag
AFd	Alarm activation differential	**AL**	32872	0	32934	48	R/W	Word	-	0,1...25,0	°C/°F
HAL	Maximum alarm threshold	**AL**	32779	0	32934	192	R/W	Word	Y	**LAL**...302	°C/°F
LAL	Minimum alarm threshold	**AL**	32781	0	32934	768	R/W	Word	Y	-67,0...**HAL**	°C/°F
PAo	Temperature alarm exclusion time from power-on	**AL**	32873	255	32934	3072	R/W	Byte	-	0...10	min*10
dAo	Exclusion time for temperature alarms after a defrost cycle	**AL**	32841	0	32934	12288	R/W	Word	-	0...250	min
oAo	High and low temperature alarms exclusion time after closing the door	**AL**	32874	255	32934	49152	R/W	Byte	-	0...10	hours
tdo	Door open alarm exclusion time	**AL**	32875	255	32935	49152	R/W	Byte	-	0...250	min
tAo	Temperature alarm signaling delay time	**AL**	32874	0	32935	3	R/W	Byte	-	0...250	min
dAt	Defrost ended due to timeout alarm signaling	**AL**	32782	0	32935	12	R/W	Byte	-	0/1	flag
EAL	Regulators inhibited by external alarm	**AL**	32915	3840	32935	48	R/W	Byte	-	0/1/2	num
AoP	Alarm output polarity	**AL**	32969	1	32935	768	R/W	Byte	-	0/1	flag

Label	Description	Folder	Val. Par. Address	Val. Filter	Vis. Par. Address	Vis. Filter	R/W	Data Size	CPL	Range	MU
rFt	Refrigerant level alarm bypass	**AL**	33051	0	32985	12288	R/W	Byte	-	0...250	min
dod	Enable utility shutoff upon door switch activation	**dOr**	32909	3840	32935	12288	R/W	Byte	-	0...3	num
dAd	D.I. activation indication delay time 1/2	**dOr**	32882	255	32940	3072	R/W	Byte	-	0...250	min
dCo	Compressor activation delay from acknowledgment	**dOr**	32840	0	32931	3072	R/W	Byte	-	0...250	min
oSP	Offset on setpoint	**EnS**	32783	0	32936	49152	R/W	Word	Y	-30,0...30,0	°C/°F
odF	Trigger differential correction	**EnS**	32785	0	32937	48	R/W	Word	-	0,1...30,0	°C/°F
ESt	Type of action for the Energy Saving function	**EnS**	32918	3840	32958	49152	R/W	Byte	-	0...5	num
Adr	Modbus protocol controller address	**Add**	33048	0	32984	768	R/W	Byte	-	0...247	num
bAU	Baudrate selection	**Add**	33051	255	32984	3072	R/W	Byte	-	0/1/2	num
PtY	MODBUS parity bit	**Add**	33049	255	32984	12288	R/W	Byte	-	0/1/2	num
dro	Select °C / °F	**diS**	32969	8	32937	192	R/W	Byte	-	0/1	flag
CA1	Analog input 1 calibration	**diS**	32786	0	32937	768	R/W	Word	Y	-30,0...30,0	°C/°F
CA2	Analog input 2 calibration	**diS**	32787	0	32937	3072	R/W	Word	Y	-30,0...30,0	°C/°F
LoC	Disable keypad	**diS**	32969	16	32938	48	R/W	Byte	-	0/1	flag
ddd	Select main display value	**diS**	32909	61440	32938	192	R/W	Byte	-	0...3	num
ddE	Display on eco device	**diS**	32918	240	32958	12288	R/W	Byte	-	0...4	num
ddL	Display lock mode during a defrost	**diS**	32910	15	32938	768	R/W	Byte	-	0/1/2	num
Ldd	Display lock timeout from end of defrost	**diS**	32878	255	32938	3072	R/W	Byte	-	0...250	min
ndt	Display with decimal point	**diS**	32969	32	32938	12288	R/W	Byte	-	0/1	flag
PS1	Password 1 value	**diS**	32879	0	32939	192	R/W	Byte	-	0...250	num
PS2	Password 2 value	**diS**	32880	0	32939	768	R/W	Byte	-	0...250	num
H08	Stand-by operating mode	**CnF**	32925	3	32939	12288	R/W	Byte	-	0/1/2	num
H11	Configurability of digital input 1	**CnF**	32881	255	32939	49152	R/W	Word	Y	-13...13	num
H21	Configurability of digital output Out1	**CnF**	32884	0	32940	12288	R/W	Byte	-	0...13	num
H22	Configurability of digital output Out2	**CnF**	32885	255	32940	49152	R/W	Byte	-	0...12	num
H23	Configurability of digital output Out3	**CnF**	32885	0	32941	3	R/W	Byte	-	0...12	num
H25	Configurability of digital output 5 (buzzer)	**CnF**	32897	255	32931	12288	R/W	Byte	-	0/1	num
H31	Key configuration	**CnF**	32910	61440	32941	48	R/W	Byte	-	0...10	num
H32	Key configuration	**CnF**	32911	15	32941	192	R/W	Byte	-	0...10	num
H33	Key configuration	**CnF**	32911	240	32941	768	R/W	Byte	-	0...10	num
H42	Configuration of analog input Pb2	**CnF**	32912	61440	32942	3	R/W	Byte	-	0/1	flag
tAb	Map code	**CnF**	32997	0	32985	12	R	Word	-	0...999	num
CuS	Customer model reference	**CnF**	33689	0	32990	192	RW	Word	-	0...999	num
UL	Visibility of the function transferring the programming parameters from the controller to the UNICARD	**FPr**	-	-	32985	48	R/W	2 bit	-	0...3	num
Fr	UNICARD formatting function visibility	**FPr**	-	-	32985	768	R/W	2 bit	-	0...3	num

Label	Description	Folder	Val. Par. Address	Val. Filter	Vis. Par. Address	Vis. Filter	R/W	Data Size	CPL	Range	MU
oSP	Reduced set activation	**FnC**	-	-	32988	768	R/W	2 bit	-	0...3	num
dEF	Activate defrost	**FnC**	-	-	32987	768	R/W	2 bit	-	0...3	num

Visibility table for folders relating to applications

Label	Description	Address	Filter	Data size	Range	MU
Visibility of folders for loaded application						
CP	Visibility of folder **CP** (compressor)	32954	192	2 bit	0...3	num
dEF	Visibility of folder **dEF** (defrost)	32954	768	2 bit	0...3	num
FAn	Visibility of folder **FAn** (fans)	32954	3072	2 bit	0...3	num
AL	Visibility of folder **AL** (alarms)	32954	12288	2 bit	0...3	num
dor	Visibility of folder **dor** (door switch)	32962	3072	2 bit	0...3	num
ENS	Visibility of folder **EnS** (energy saving)	32955	12	2 bit	0...3	num
Add	Visibility of folder **Add** (communication)	32955	48	2 bit	0...3	num
diS	Visibility of folder **diS** (display)	32955	192	2 bit	0...3	num
CnF	Visibility of folder **CnF** (configuration)	32955	3072	2 bit	0...3	num
FPr	Visibility of folder **FPr** (UNICARD)	32955	12288	2 bit	0...3	num
FnC	Visibility of folder **FnC** (functions)	32955	49152	2 bit	0...3	num

Table of Modbus Resources

Label	Description	Address	Filter	R/W	Data_Size	CPL	Range	MU
AI1	Regulation probe	4109	0	R	Word	Y	-67,0...302	°C/°F
AI2	Defrost probe	4110	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 1	4118	1	R	1 bit	-	0...1	flag
E1	Analog input 1 fault	4121	1	R	1 bit	-	0...1	flag
E2	Analog input 2 fault	4121	2	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
Ad2	Defrost end due to timeout	4121	128	R	1 bit	-	0...1	flag
rCA	Low liquid refrigerant level	4121	1024	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
BUZ	Buzzer	4120	256	R	1 bit	-	0...1	flag
CP1	Compressor 1	4115	2	R	1 bit	-	0...1	flag
DEF1	Defrost 1	4115	16	R	1 bit	-	0...3	flag
FAN	Evaporator fans	4115	64	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
Do	Door status	4115	32768	R	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
Att_Sbr	Manual Defrost activation	4123	4096	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
onRL3	Enables output 3	206	4	W	1 bit	-	0...1	flag
oFFRL3	Disables output 3	206	4	W	1 bit	-	0...1	flag
onBuzz	Enables output 5	0	64	W	1 bit	-	0...1	flag
oFFBuzz	Disables output 5	0	64	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

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