G.I. INDUSTRIAL HOLDING SPA

generic manual

Sequencer

KTK KLIMATECHNIK

SOMMARIO

1 INTRODUCTION

This document describes the operation of the sequencer.

The sequencer is an accessory and is identified by the abbreviation SQC.

In this document you can find information about:

- The types of units that can use the sequencer.
- The possible plant configurations.
- The parameters to be changed according to the type and number of units.

The document is structured in two sections:

- A descriptive section valid for all units that can be combined with the SQC accessory.
- An operational section dedicated to the modification of parameters for units that do not use R454C refrigerant.

Supplement the information contained in this document with the information in the manual of the units operating with the sequencer.

1.1 Glossary of function

The following functions are supported by the sequencer:

Supported function	Description
Wired logic	Wired logic refers to the set of electrodynamic devices placed within a panel that controls the unit. Examples of electrodynamic devices are relays and timer relays.
Step regulation	The thermal power is expressed as a number of steps/units that are switched on and off depending on the distance from the set point.
Single pump PS	The unit has only one integrated pump.
Double pump PD	The unit has two integrated pumps.
	CAUTION: This function is not supported for units using R454C refrigerant.
Equal units	Equal units have the same model, type, power, number of compressors and accessories.

The following functions are not supported by the sequencer:

Not supported function	Description
Master/Slave or Redundancy	All units contribute to meet system's requirements except for the backup units.
Master Unit	This is the only unit in the network that has thermoregulation control. The master unit calls the slave units.
Slave Unit	This is a unit subordinate to the decisions of the Master unit.
Backup unit	This is a special, optional slave unit that is active under specific conditions.
Unit field bus	This is the communication system which interconnects the units.
Customised system management	Functions not validated during the quotation or order phase are not supported.
VPF variable flow	Particular management of the pump under Inverter.
HYM hybrid system management function	The HYM function calls an external heat generator to supplement or replace the heat pump. Normally, a boiler is installed in parallel with the heat pump.
DHW function for domestic hot water management	The DHW function regulates the temperature of hot water for domestic use.
Multifunctional units	Multifunctional units are machines that simultaneously manage heating and cooling modes.
Different units	Units are considered different when they differ in model, type, power, number of compressors and accessories.
FC Free Cooling function	The FC function uses water at winter ambient temperature for thermoregulation in cooling mode.
Priority for a unit	Slave units are called by checking the status of the unit and the operating hours. The unit statuses considered by the master unit are: unit on, unit off and unit in alarm.

1.2 Definition of "unit network"

A unit network is a set of at least 2 and at most 4 units connected to the same system, activated by an external device called Sequencer.

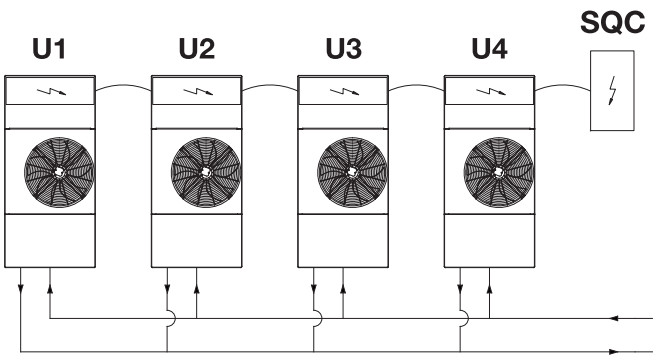
The installed units must:

- Have the same cooling capacity.
- Be identical to each other (same model).
- Have a common hydronic section.
- Share some electrical connections with wired logic.

The installed units do not support the following features:

- They do not include the FC (Free Cooling) set-up.
- They do not include the HYM accessory.
- They do not include the DHW accessory.
- Field bus is not provided.

Installed units must not be multifunctional units.



U1 Unit 1
U2 Unit 2
U3 Unit 3
U4 Unit 4
SQC Sequencer

1.3 Sequencer description

1.3.1 What is a sequencer

The sequencer is the device in a network of units that determines the number of units required to meet the set point.

The sequencer logics are based on the following principles:

- The sequencer and the units are connected on the same hydraulic system.
- The number of units installed on the system corresponds to the number of units configured on the sequencer.
- The sequencer can manage a plant pump.
- The sequencer activates all installed and configured units.
- The sequencer manages a maximum of 4 units.
- Units with fewer working hours are activated first.
- The sequencer activates the units with a step regulation defined by a directly proportional control.
- Units in alarm are not activated.

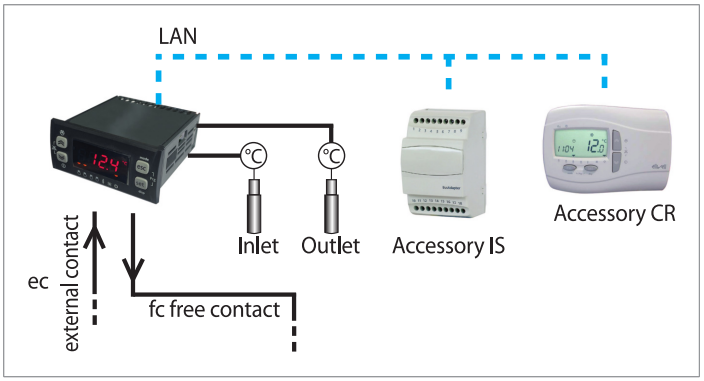
1.3.2 What is not a sequencer

The sequencer:

- It is not a backup unit manager: the units have equal activation priority.
- It is not integrated on the units: in fact, the controller is installed in an external box separate from the units.
- It is not networked with the units: in fact, commands to and from the units are hard-wired and follow electromechanical logic.
- It is not an information centraliser and visualiser: the sequencer controller and display are in fact disconnected from the other units.
- Does not handle master units and slave units: The sequencer controller evaluates all configured units as equal and without any kind of priority.
- It does not communicate with the units and is therefore unable to check, read and reset alarms on the units: each unit checks its own operation, ensuring that alarms are triggered and reset, where required, either independently or following a manual reset.

1.4 Sequencer hardware

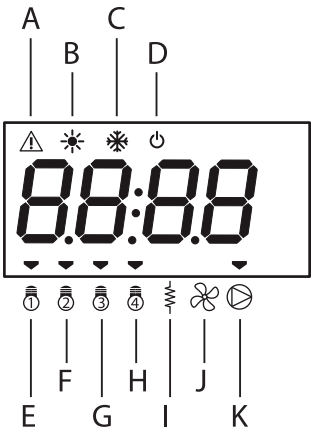
The main hardware features of the sequencer are listed below:



Feature/Component	Value/Model
Main controller	SBA 655 /C board
IS accessory	Serial interface for Modbus RTU communication on RS485 serial
CR Accessory	Remote control panel
Power supply	230 VAC
Absorbed current	Max 2 A
Connection	1 Phase + N + PE (1.5 mm^2)
Protection	Automatic circuit braker class C 4

1.5 Sequencer display

The sequencer display is shown below:



A Alarm notification
B Winter operation
C Summer operation
D Standby
E First step call
F Second step call
G Third step call
H Fourth step call
I Unused icon
J Unused icon
K Pump

1.6 I/O Map

Analogue inputs – 16-bit integer type – read only
Main controller SBA

Name	Address	Cfg	Description	Support relay	CODE	Terminals	Reference
AIL 1	708	1	Water temperature on the common inlet [°C]	-	sq_SL1	X1 103-104	-
AIL 2	710	2	Water temperature on the common outlet [°C]	-	sq_SA1	X1 101 -102	-
AIL 3	712	0	-	-	-	-	-
AIL 4	714	DI -3	Summer/Winter [DI]	-	sq_ecHC	X2 5-6	RHC
AIL 5	716	DI -1	Remote standby	-	sq_ecRC	X2 1-2	RC
			Call from the plant [DI]				

Digital inputs - Boolean type - read only
Main controller SBA

Name	Address	Cfg	Description	Support relay	CODE	Terminals	Reference
diL1	33454_0	-43	Unit 1 alarm	-	sq_ecGA1	X1 11-12	AC1
diL2	33454_1	-44	Unit 2 alarm	-	sq_ecGA2	X1 17-18	AC2
diL3	33454_2	-45	Unit 3 alarm	-	sq_ecGA3	X1 23-24	AC3
diL4	33454_3	-46	Unit 4 alarm	-	sq_ecGA4	X1 29-30	AC4
diL5	33454_4	-47	Pump thermal contact	-	sq_ecTP	X2 93-94	AP1
diL6	33454_5	-55	Water flow alarm	-	sq_ecFL	X2 49-50	FL1

Digital output - Boolean type - read only
Main controller SBA

Name	Address	Cfg	Description	Support relay	CODE	Terminals	Reference
dOL1	33455_2	1	Calling unit 1	KA1 – 11-14	sq_fcRC1	X1 09-10	-
dOL2	33455_3	2	Calling unit 2	KA2 – 11-14	sq_fcRC2	X1 15-16	-
dOL3	33455_4	-5	Summer/winter allocation unit 1	KA3 – 11-14	sq_fcHC	X1 13-14	-
			Summer/winter allocation unit 2	KA3 – 21-24	sq_fcHC	X1 19-20	-
			Summer/winter allocation unit 3	KA3 – 31-34	sq_fcHC	X1 25-26	-
			Summer/winter allocation unit 4	KA3 – 41-44	sq_fcHC	X1 31-32	-
dOL4	33455_0	31	SQC General Alarm	-	sq_fcGA	X2 03-04	ALM
dOL5	33455_1	-	-	-	-	-	-
DOL6	33455_5	14	Common pump call on the plant	KAP	sq_fcPC	X2 95-96	95-96
			Call of integrated pump on unit 1	KAP – 11-14	sq_fcPS	X1 95_1 - 96_1	-
			Call of integrated pump on unit 2	KAP – 21-24	sq_fcPS	X1 95_2 - 96_2	-
			Call of integrated pump on unit 3	KAP – 31-34	sq_fcPS	X1 95_3 - 96_3	-
			Call of integrated pump on unit 4	KAP – 41-44	sq_fcPS	X1 95_4 - 96_4	-

Analog output - integer type 16 bit - read only
Main controller SBA

Name	Address	Cfg	Description	Support relay	CODE	Terminals	Reference
AOL1	33521	3	Calling unit 3	KAO1– 11-14	sq_fcRC3	X1 21-22	-
AOL2	33522	4	Calling unit 4	KAO2– 11-14	sq_fcRC4	X1 27-28	-
AOL3	762	-	-	-	-	-	-
AOL4	764	-	-	-	-	-	-
AOL5	766	-	-	-	-	-	-
tCL1	33520	-	-	-	-	-	-

2 SYSTEM CONFIGURATIONS

You can configure a system in the following modes:
- plant pump mode: the pump is installed on a common manifold.
- integrated pump mode: a pump is integrated in each unit.

2.1 System with plant pump

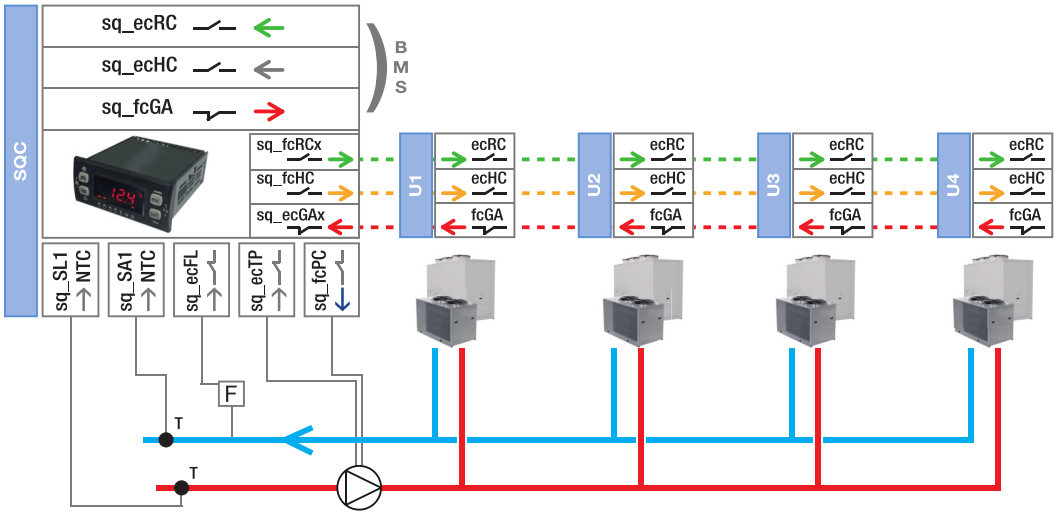
It is possible to configure a system where the pump is installed on the common manifold.
The system with the plant pump has the following features:
- Water circulation is provided by the system pump, which will also be called the common pump hereafter.
- The system pump is installed on the common manifold.
- The plant pump control is electrically connected to the sequencer.
- Plant pump activations and shutdowns are managed by the sequencer.

See the sub-sections with diagrams for further details.

Connect to the system with system pump only units without built-in pump.

2.1.1 Plant pump diagram with circuit breaker

The diagram shows a system with a common pump protected by a circuit breaker where:
- The sq_fcPC control turns the pump on and off.
- The sq_ecFL contact is connected and signals the flow switch alarm.
- The sq_ecTP contact is connected and signals the pump alarm.

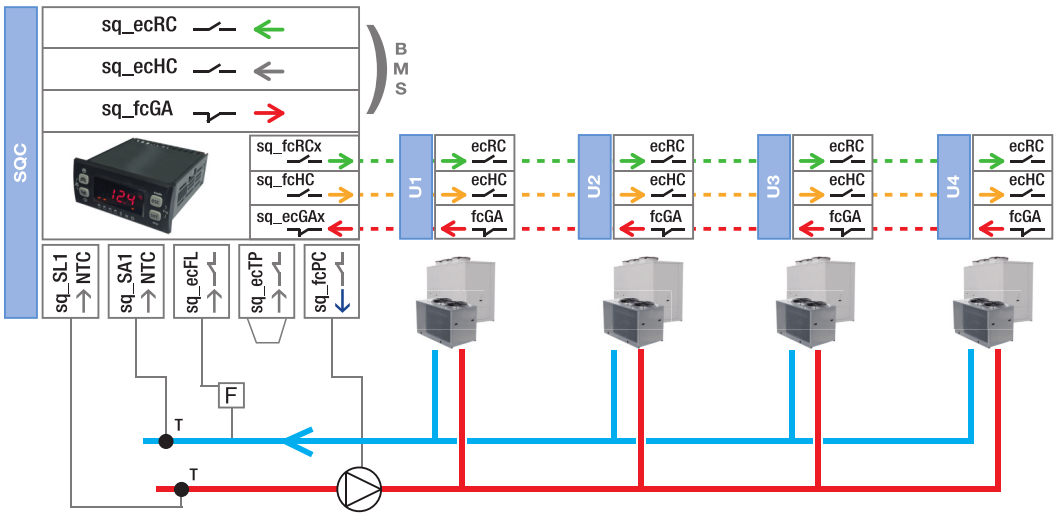


Connect voltage-free cables to the sq_ecFL and sq_ecTP terminal heads.

The system is switched off if the sq_ecTP thermal protection is activated or following activation of the sq_ecFL flow switch.

2.1.2 Plant pump diagram with fuses

The diagram shows a system with a common pump protected by fuses, where:
- The sq_fcPC control turns the pump on and off.
- The sq_ecFL contact is connected and signals the flow switch alarm.
- The sq_ecTP contact must be jumpered.



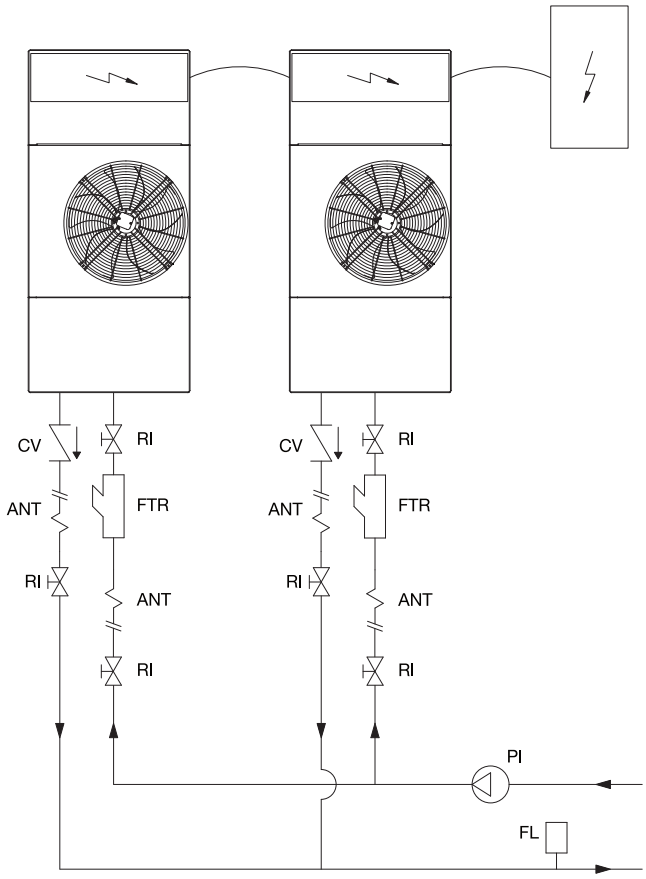
Connect voltage-free cables to the sq_ecFL and sq_ecTP terminal heads.

The system is only switched off if the sq_ecFL flow switch is activated.

2.1.3 Example of installation diagram with system pump

As an example, below is a non-exhaustive and non-binding installation diagram for the system pump layout in the case of two units.
For more detailed installation diagrams, refer to the technical documentation for the specific units (refrigerant circuit diagram, hydraulic circuit diagram, technical bulletin, installation, use and maintenance manual).

The diameters, characteristics of the pipes and related components must be calculated and validated by the installer.
All components external to the units are the responsibility of the installer.



ANT Anti-vibrating joint (not supplied)
CV Check valve (not supplied)
FTR Mesh filter (not supplied)
RI Shut-off valve (not supplied)
Pi System pump (not supplied)
FL Flow switch (not supplied)

2.1.4 Pump operation for system pump configuration

The operation described in this paragraph applies only to systems with a system pump.

The pump connected to the sequencer is always on when the sequencer is in the ON state.

These are the pump states for each individual unit state:
- Sequencer OFF: the pump is turned off.
- Sequencer STANDBY: the pump is turned off.
- Sequencer ON: the pump is always on.

These are the behaviours of the pump during state transitions and start-ups:
- Switching on the first unit: 'PI20 – Interval between switching on the system pump and the first unit.'
- System pump shutdown: The pump is switched off after the time specified in 'PI21 – Interval between shutdown of last unit and system pump.'

i Periodic water recirculation (Sniffer): Disabled and not configurable.

2.2 System with integrated pump

It is possible to configure a system where the pumps are integrated on the single units.
The features of a system with integrated pumps are:
- Water circulation is ensured by the operation of pumps integrated on the units.
- The integrated pumps are managed by the controller installed on the units.
- Water temperature is checked by the installed probes.

Refer to the paragraphs with diagrams for further details.

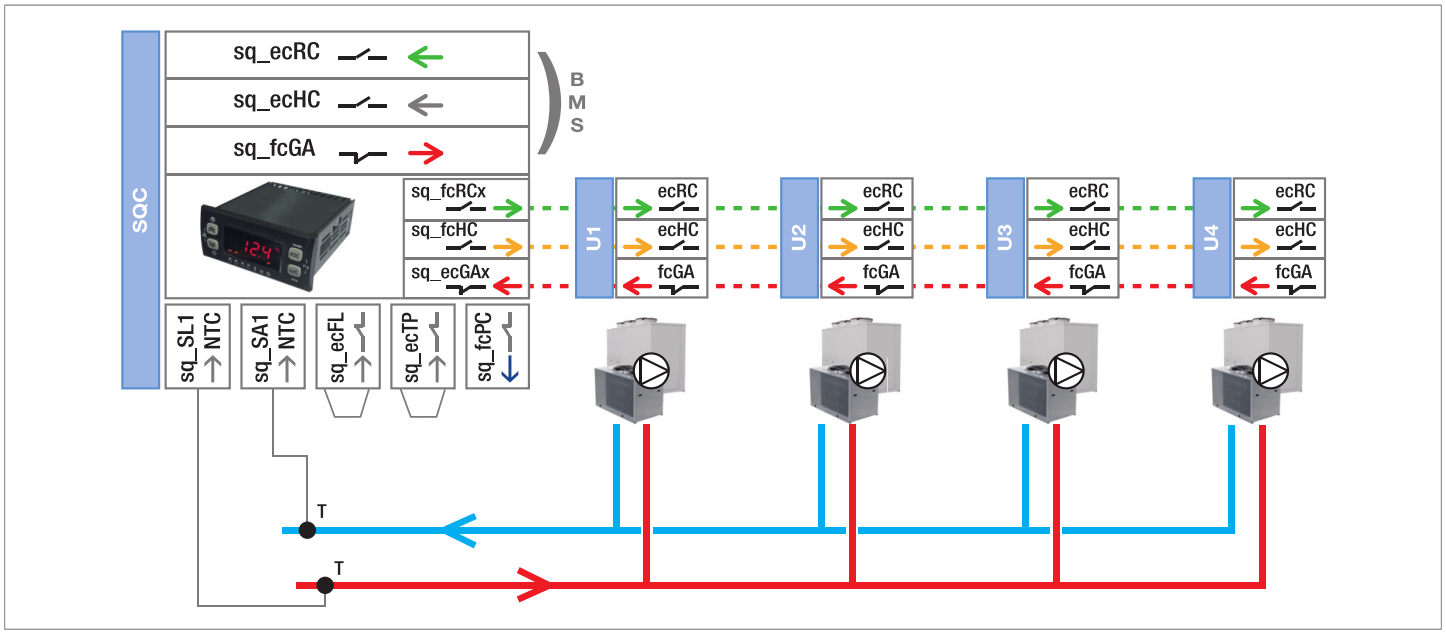
The integrated pump layout differs between units that do not use R454C refrigerant and units that do, as described in the following sub-sections.

2.2.1 Integrated pump scheme on units not using R454C refrigerant

The diagram shows a system with pumps integrated into the units where:
- The sq_fcPC control is disconnected.
- The sq_ecFL contact must be jumpered.
- The sq_ecTP contact must be jumpered.

Connect only units with integrated pump that do not use R454C refrigerant.

Do not connect the common pump.



2.2.2 Diagram for units using R454C refrigerant with integrated pumps

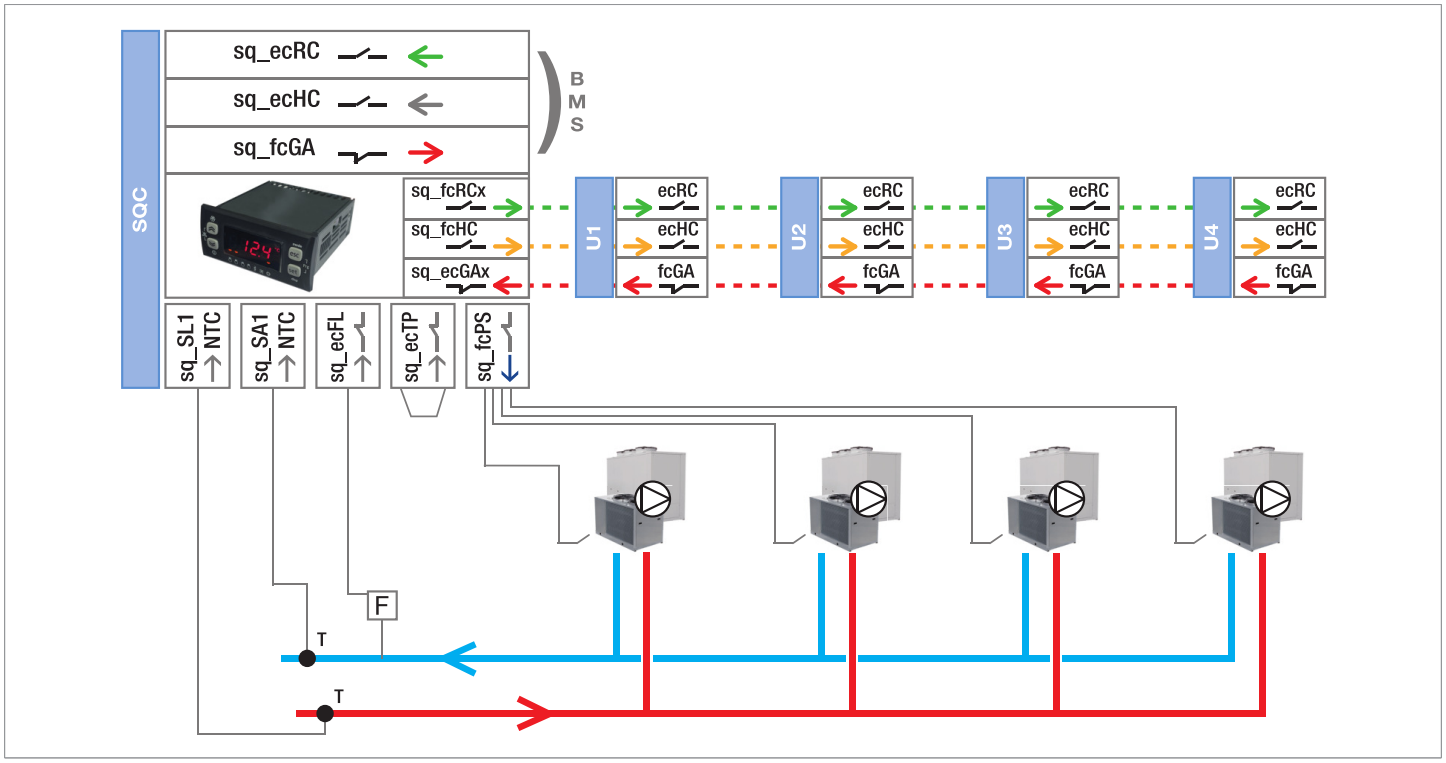
For units using R454C refrigerant, the SQP accessory (designed for operation with SQC) is required. One SQP is required for each unit in the network.

The diagram shows a system with pumps integrated into the units where:
- The sq_fcPS control is connected in parallel on all pumps in the system.
- The sq_ecFL contact is connected and signals the flow switch alarm.
- The sq_ecTP contact must be jumpered.

Follow the wiring diagram provided.

Do not connect the common pump.

Only connect units with an integrated pump that use R454C refrigerant.



Connect voltage-free cables to the sq_ecFL and sq_ecTP terminal heads.

The system is only switched off if the sq_ecFL flow switch is activated.

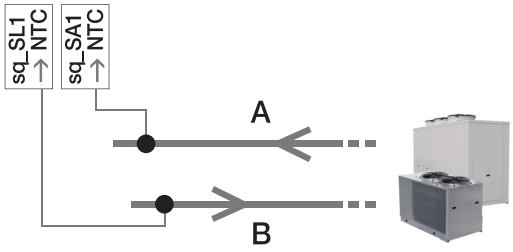
3 SEQUENCER OPERATION

3.1 Thermoregulation water probes

The sequencer is connected to two water temperature probes that measure:
- The temperature of the return water from the system.
- The temperature of the water entering the system.

The sq_SL1 return probe:
- is the work probe.
- It is installed on the common manifold and reads the temperature flowing from the system to the units.
- is the thermoregulation probe in both summer and winter operation.

The sq_SA1 supply probe:
- is the antifreeze probe.
- It is installed on the common manifold and reads the temperature of the flow from the units to the system.



A Delivery pipe
B Return pipe

3.2 Thermoregulation

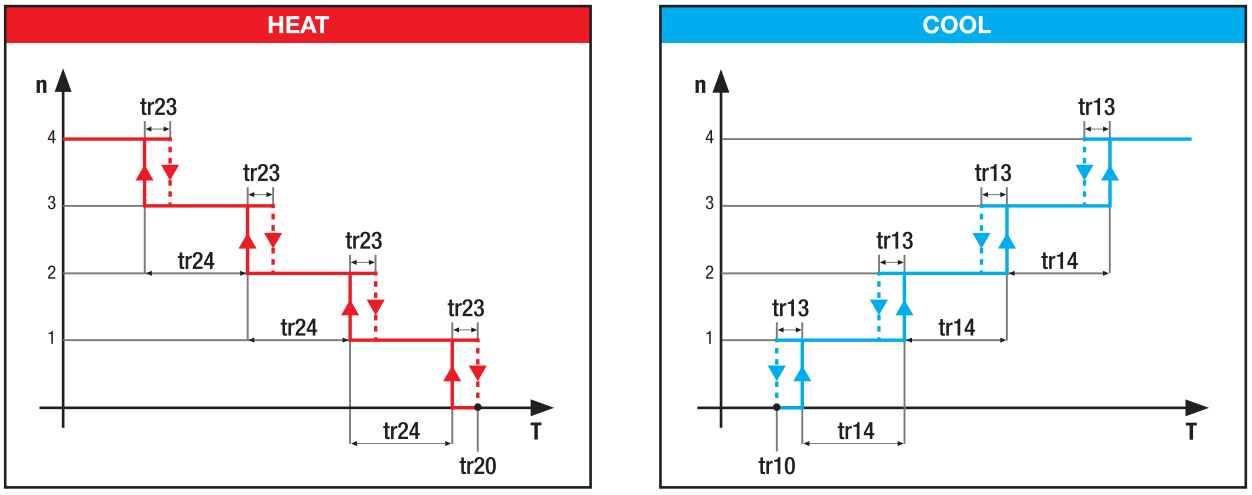
The thermoregulator calculates the thermal power to be supplied.
The thermal power is expressed as the number of steps/units that are switched on and off depending on the distance from the set point.
The calculation of the power to be supplied is performed in the same way in both summer and winter operation.

During SUMMER operation:
- tr10 = Set point in summer operation.
- tr13 = Step/unit switch-off hysteresis.
- tr14 = Step/unit insertion differential.

During WINTER operation:
- tr20 = Set point in winter operation.
- tr23 = Step/unit switch-off hysteresis.
- tr24 = Step/unit insertion differential.

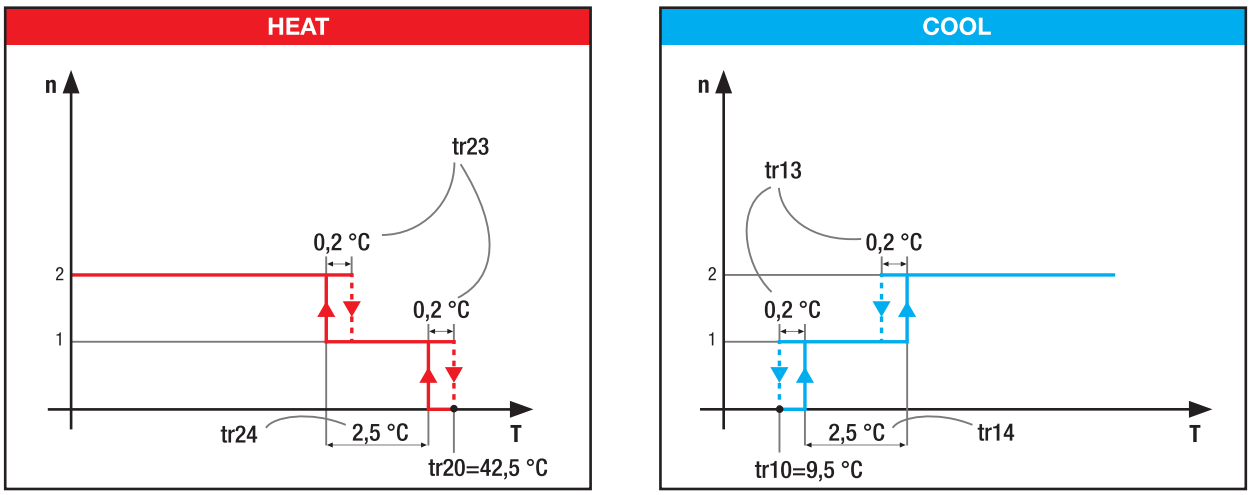
The parameters relating to the thermoregulator can be viewed and set in the tr parameter group.

The following diagram illustrates how thermoregulation is managed:



T Thermoregulation probe temperature
n Number of steps

The following diagram shows the thermoregulation management on a system with two units with default values:



T Thermoregulation probe temperature
n Number of steps

The thermoregulation of the sequencer is 5°C from the setpoint.

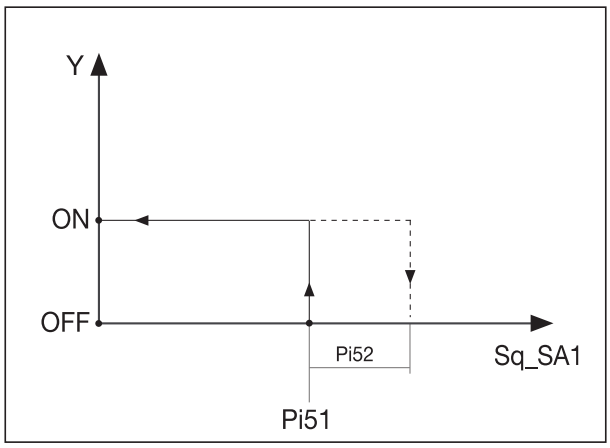
Each unit is enabled assuming a temperature difference of 2.5°C defined by parameter tr24 and parameter tr14.

3.3 Antifreeze function

3.3.1 Preventive antifreeze measure

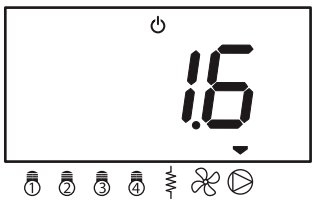
Preventive anti-freeze measures are guaranteed by reading the sq_SA1 probe installed on the common output.

- Pump activation is guaranteed below the Pi51 threshold.
- The pump is switched off when the temperature reaches values higher than Pi51 + Pi52.
- The action described is active during the ON and STANDBY states of the sequencer.



sq_SA1 Supply probe temperature sq_SA1

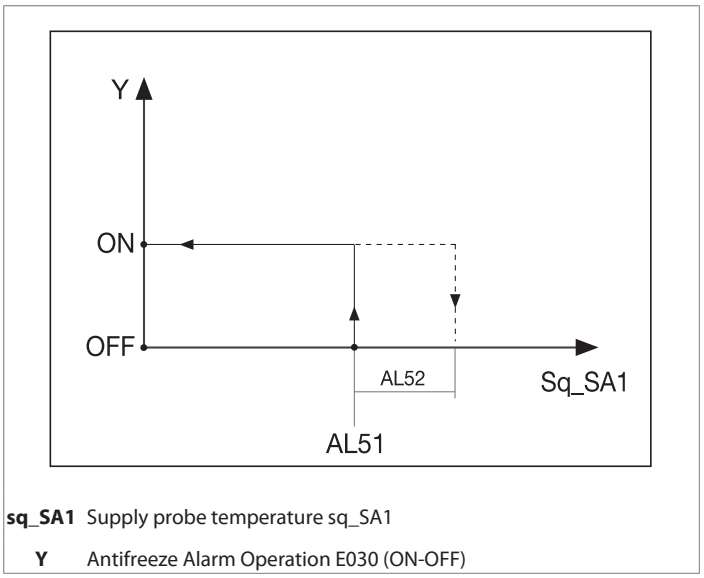
Y Pump operation (ON-OFF)



3.3.2 Antifreeze alarm

Anti-freeze actions are guaranteed by reading the sq_SA1 probe installed on the common output.

- Activation of alarm E030 is guaranteed below the limit threshold AL51.
- The alarm can be reset manually when the temperature reaches values higher than AL51 + AL52.
- The action described is active during the ON and STANDBY states of the sequencer.



sq_SA1 Supply probe temperature sq_SA1

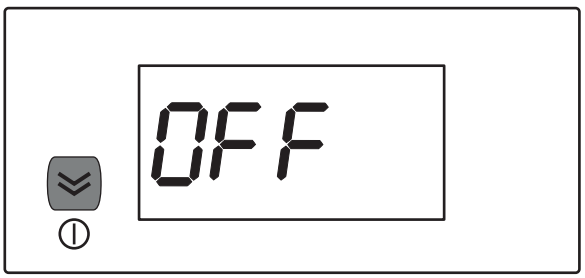
Y Antifreeze Alarm Operation E030 (ON-OFF)

3.4 Sequencer status

3.4.1 Status OFF

This is how the sequencer behaves in the OFF status:

- Turns off thermoregulation.
- It immediately turns off the pump.
- Turn off the alarm.
- Neutralise timing.



3.4.2 OFF/ON control on display

The unit can be switched on and off from the control panel.

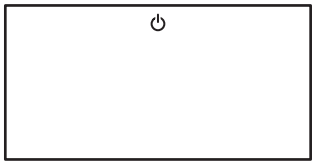
From the OFF state, sequencer off, it is possible to switch to the ON state by pressing and holding the DOWN button. In the same way, you can switch from the ON state to the OFF state.

3.4.3 The STANDBY state

During the STANDBY state, the sequencer turns off the units and terminates thermoregulation.

The compressors of each unit are only switched off after the active times have been counted.

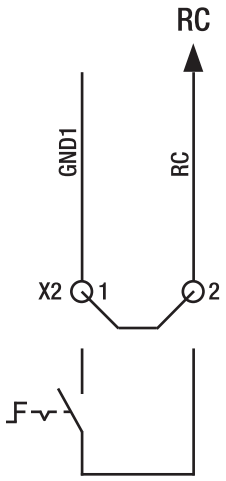
The antifreeze alarm and sequencer antifreeze preventions are active throughout the STANDBY phase.



- The STANDBY contact is identified by the abbreviation sq_ecRC and is connected to terminals X2 1-2.
- STANDBY control from digital input is enabled by default.
- The sequencer is in STANDBY with the contact closed (jumpered).
- The STANDBY icon on the display is flashing.

By opening the sq_ecRC contact, the unit returns to the previous mode.

The ON/OFF control is shown below in the sequencer wiring diagram:



The enabled STANDBY digital input inhibits the control while leaving the display option available if necessary.

3.4.4 The STANDBY control on display

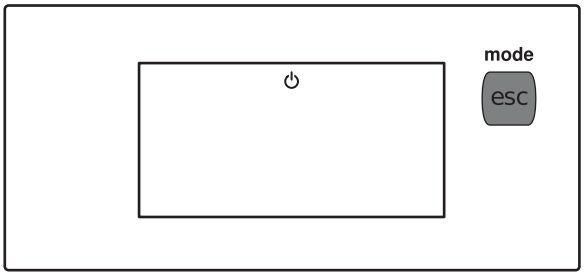
Disable the STANDBY control from the digital input by modifying the following parameters:

PARAMETER	Default value	Value to be set
CL04	1	0
CL54	1	0

Use the following procedure on the display to switch to Standby mode:

1. Access the menu by pressing and holding the “ESC” key.
2. Navigate the menu using the up and down arrows.
3. Identify the STANDBY control written as “Stby”.
4. Confirm your selection with the “set” key.

When the unit is in STANDBY mode, the icon on the display remains fixed.



The parameters can be modified at USER level.

The controller must be restarted after any modifications have been made.

The STANDBY control on the display is always available, but is disabled when the digital input is enabled.

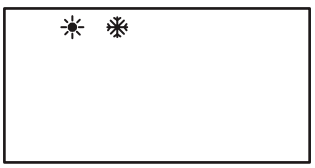
3.5 Winter and summer mode

The SUMMER/WINTER control is used to select the operating mode of the sequencer.

You can choose between summer mode and winter mode on heat pump units.

On cooling-only units, the parameterisation must be modified (see the dedicated section).

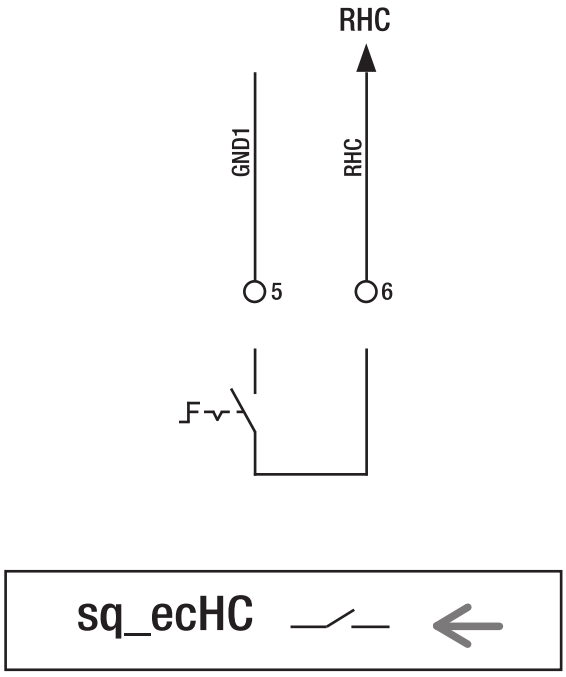
- The SUMMER/WINTER contact is identified by the code sq_ecHC and is connected to terminals X2 5-6.
- The SUMMER/WINTER control from digital input is enabled by factory.
- The sequencer is in WINTER MODE with the contact closed (jumpered).
- The icon on the display is flashing.



The SUMMER/WINTER control from digital input can be disabled by modifying the following parameters:

PARAMETER	Default value	Value to be set
CL03	1	0
CL53	3	0

The summer/winter control in the sequencer wiring diagram is shown below:



The parameters can be modified at USER level.

The controller must be restarted after any modifications have been made.

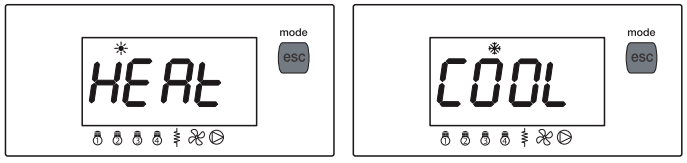
The enabled SUMMER/WINTER digital input inhibits the display controls while leaving the display selection available if necessary.

3.5.1 The SUMMER/WINTER control on the display

Disable the SUMMER/WINTER control from the digital input by changing the above parameters and follow the procedure below:

1. Access the menu by pressing and holding the “ESC” key.
2. Navigate the menu using the up and down arrows.
3. Identify the WINTER - HEAT or SUMMER - COOL control.
4. Confirm your selection with the “set” key.

The SUMMER/WINTER icons are now fixed.



Notes:

- The HEAT and COOL controls on the display are always available.

3.6 Alarms

In the event of an alarm, the ‘general alarm’ contact signals the alarm status of the sequencer or of one or more units.

The sequencer is in alarm status when:

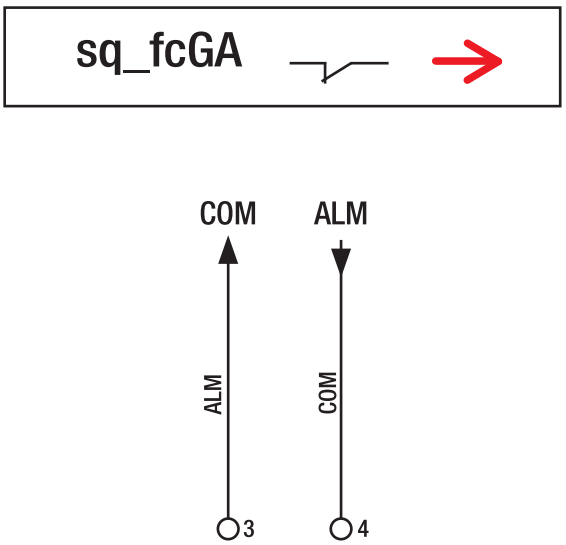
- One of the units is in alarm.
- The sequencer is in alarm.

To identify the specific alarm, refer to the alarm table in this chapter.

When an alarm is triggered, the fcGA contact (general alarm) is enabled:

- The ‘general alarm’ contact is identified by the code sq_fcGA and is connected to terminals X2 3-4.
- The sq_fcGA contact acts as a signal to external devices.
- The sq_fcGA contact is always factory configured.
- The sequencer is in alarm when the sq_fcGA contact is closed.
- The sq_fcGA contact is restored by resetting the alarm or by simply pressing a button on the control panel.
- The polarity of the contact can be changed using parameter CL93. To change the polarity of the contact, change the value of parameter CL93 from (31) to (-31).

The general alarm contact is shown below in the sequencer wiring diagram:



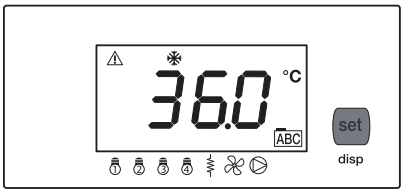
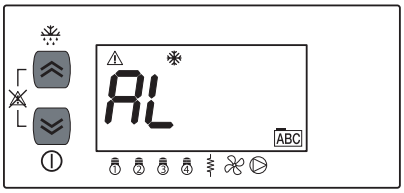
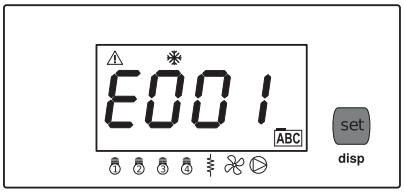
The indicated parameters are always visible.

Restart the controller after modifications.

3.6.1 GENERAL ALARM Icon

When the ALARM icon is displayed, you can access the ALARMS menu.

Procedure to access the ALARMS menu and view the ALARM.

Screen and keys	Procedure	
	1	Press the SET key to access to the menu.
	2	Use the UP and DOWN keys to move to the AL submenu (only present if alarms have been triggered).
	3	Press the SET key to enter the AL menu and display the alarm.

Once the problem that caused the alarm has been resolved, the alarm must be reset.

» To reset the alarm, press both arrow buttons simultaneously from the main menu.

3.6.2 Alarms table

The alarm codes and their descriptions are listed below:

Alarms	Description
E010	Unit 1 alarm
E011	Unit 2 alarm
E012	Unit 3 alarm
E013	Unit 4 alarm
E020	Common flow switch alarm
E021	Common pump thermal contact alarm
E030	Common circuit antifreeze alarm
E046	Clock needs adjusting error
E060	Common inlet water temperature probe error
E061	Common outlet water temperature probe error

4 CHANGING PARAMETERS

4.1 Changing parameters on unit and sequencer

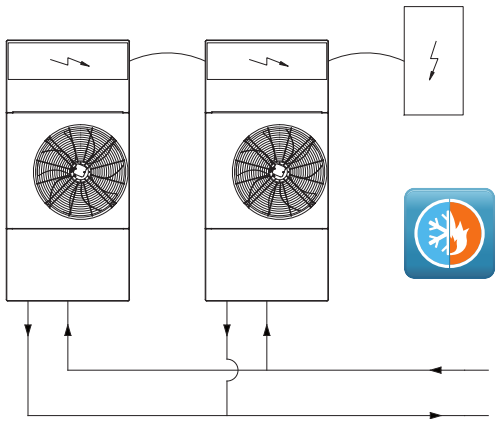
For proper installation of the sequencer:
- It is necessary to change some parameters on the units.
- It may be necessary to change some sequencer parameters.

The modification of parameters on the units depends on the type of unit used.
The following groups are distinguished for modifying the parameters on the units:

» Water/water units with 1 compressor and remote condensing unit with 1 compressor.
» Units with 1 inverter compressor.
» Units with 2 compressors and units with 3 compressors.
» Units with 4 compressors.

Furthermore, the modification of the parameters on the units differs between heat pump units and cooling-only units.

Any modification of the sequencer parameters depends on the type and number of units used.
The factory setting of the sequencer is designed to manage a network of units with the following features:
- There are 2 connected units.
- The connected units are all heat pump units.



During installation, it is necessary to modify some sequencer parameters when:

» The sequencer is connected to 3 units.
» The sequencer is connected to 4 units.
» The sequencer is connected to units for cooling only.

The parameters must be changed with the units switched off and the sequencer in OFF mode.

The indicated parameters are always visible.

The sequencer must be restarted after parameter changes (by removing power and re-powering the board).

4.2 Units - Change parameters

This section on modifying parameters is only valid for units that do not use R454C refrigerant.

To ensure proper operation, it is necessary to change some parameters on the units connected to the sequencer.
The modification of parameters depends on the type of unit used.
The following type of units are distinguished:
- Water/water units with 1 compressor and remote condensing unit with 1 compressor.
- Units with 1 inverter compressor.
- Units with 2 compressors and units with 3 compressors.
- Units with 4 compressors.

In the following tables are the parameters to be changed according to unit type.

Unit type	Configuration of I/O involved	Corresponding parameter	Parameter meaning	Value to be set
Units that do not use R454C refrigerant: - water/water unit with 1 compressor - remote condensing unit with 1 compressor	diL3	Cl42 (*)	Summer/Winter (*)	-3 (*)
	diL6	CL45	ON/OFF	-1
	dOL4	cl93	alarm contact	-31
	pump operation	pi00	pump operation selection	2
	pump operation	pi01	standby pump idle time (minutes)	15
	pump operation	pi03	stand-by pump operation time (10 x seconds)	60
	changing mode menu	ui21	enables menu	0

(*) modify on heat pump units only

Unit type	Configuration of I/O involved	Corresponding parameter	Parameter meaning	Value to be set
Units that do not use R454C refrigerant: Units with 1 inverter compressor.	diL3	Cl42 (*)	Summer/Winter (*)	-3 (*)
	diL6	CL45	ON/OFF	-1
	dOL4	cl93	alarm contact	-31
	pump operation	pi00	pump operation selection	2
	pump operation	pi01	standby pump idle time (minutes)	15
	pump operation	pi03	stand-by pump operation time (10 x seconds)	60
	changing mode menu	ui21	enables menu	0

(*) modify on heat pump units only

Unit type	Configuration of I/O involved	Corresponding parameter	Parameter meaning	Value to be set
Units that do not use R454C refrigerant: - units with 2 compressors - units with 3 compressors	DIE2	Ce41 (*)	Summer/Winter (*)	-3 (*)
	DIE1	Ce40	ON/OFF	-1
	dOL4	cl93	alarm contact	-31
	pump operation	pi00	pump operation selection	2
	pump operation	pi01	standby pump idle time (minutes)	15
	pump operation	pi03	stand-by pump operation time (10 x seconds)	60
	changing mode menu	ui21	enables menu	0

(*) modify on heat pump units only

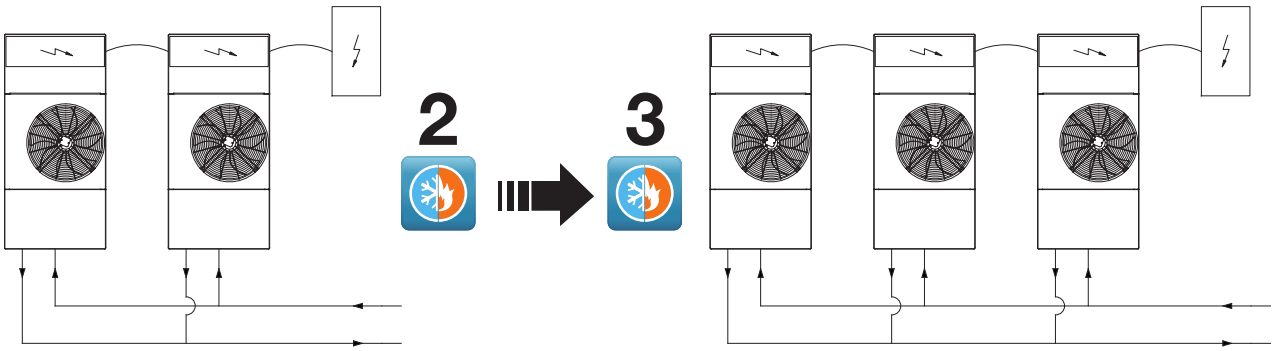
Unit type	Configuration of I/O involved	Corresponding parameter	Parameter meaning	Value to be set
Units that do not use R454C refrigerant: Units with 4 compressors.	DIE2	Ce41 (*)	Summer/Winter (*)	-3 (*)
	DIE1	Ce40	ON/OFF	-1
	Doe4	ce93	alarm contact	-31
	pump operation	pi00	pump operation selection	2
	pump operation	pi01	standby pump idle time (minutes)	15
	pump operation	pi03	stand-by pump operation time (10 x seconds)	60
	changing mode menu	ui21	enables menu	0

(*) modify on heat pump units only

i The indicated parameters are always visible.

i Restart the controller after modifications.

4.3 Sequencer - Changing parameters for 3 heat pump units



Change the parameters given in the following table to use the sequencer with 3 heat pump units.

PARAMETER	Description	Default value	Value for 3 units
CL42	DIL3 digital input configuration.	0	-45
CL43	DIL4 digital input configuration.	0	0
CL96	AOL1 digital output configuration.	0	0
CL97	AOL2 digital output configuration.	0	3
CP02	Number of compressors per circuit.	2	3

PARAMETER	Description	Default value	Value for 3 units
tr10	Thermoregulation set point in Cool.	9,5 °C	8,7 °C
tr14	Differential insertion steps/compressors in Cool.	2,5 °C	1,7 °C
tr20	Thermoregulation set point in Heat.	42,5 °C	43,3 °C
tr24	Differential insertion steps/compressors in Heat.	2,5 °C	1,7 °C

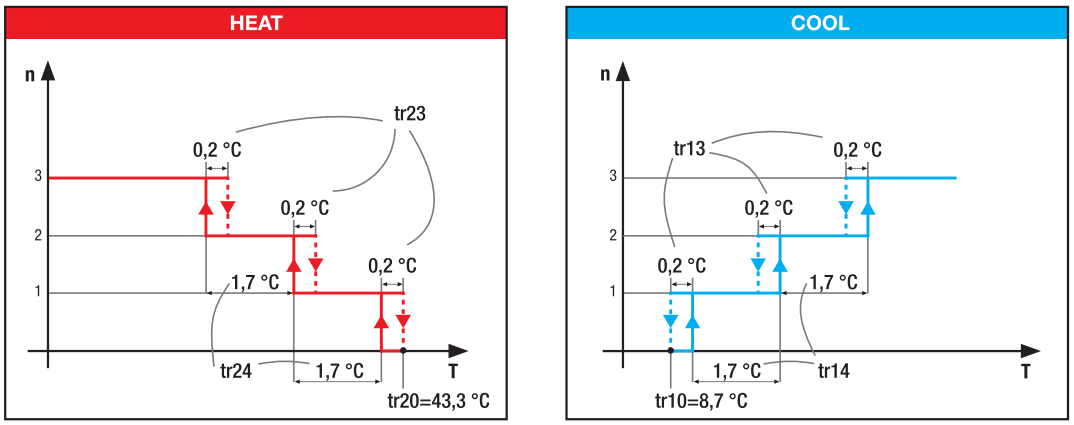
The parameters must be changed with the units switched off and the sequencer in OFF mode.

The indicated parameters are always visible.

The sequencer must be restarted after changing parameters by removing power and re-powering the board.

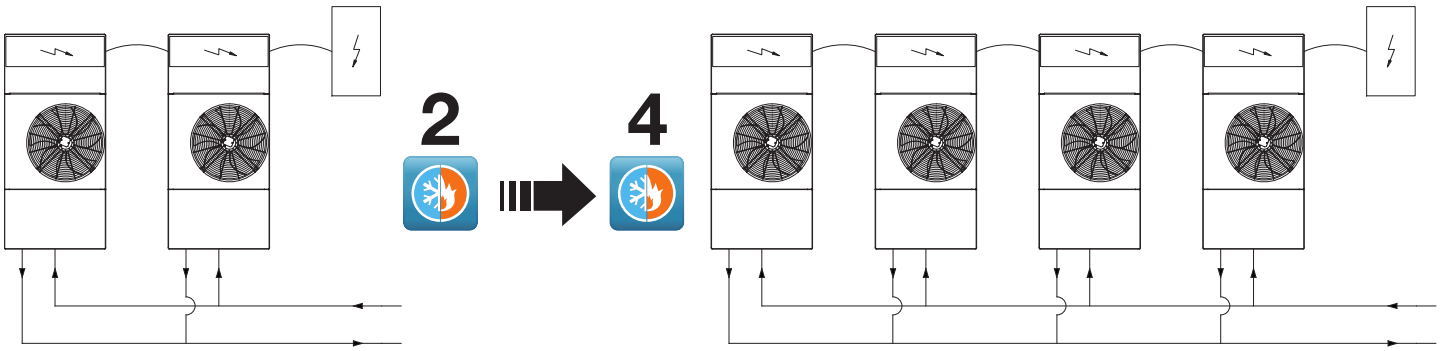
For using 3 units for cooling only, integrate the changes with those indicated in the dedicated section in this chapter.

The graphic below schematizes the management of thermoregulation on a system with 3 units:



T Thermoregulation probe temperature
n Number of steps

4.4 Sequencer - Changing parameters for 4 heat pump units



Change the parameters given in the following table to use the sequencer with 4 heat pump units.

PARAMETER	Description	Default value	Values for 4 units
CL42	DIL3 digital input configuration.	0	-45
CL43	DIL4 digital input configuration.	0	-46
CL96	AOL1 digital output configuration.	0	4
CL97	AOL2 digital output configuration.	0	3
CP02	Number of compressors per circuit.	2	4

PARAMETER	Description	Default value	Values for 4 units
tr10	Thermoregulation set point in Cool.	9,5 °C	8,3 °C
tr14	Differential insertion steps/compressors in Cool.	2,5 °C	1,3 °C
tr20	Thermoregulation set point in Heat.	42,5 °C	43,7 °C
tr24	Differential insertion steps/compressors in Heat.	2,5 °C	1,3 °C

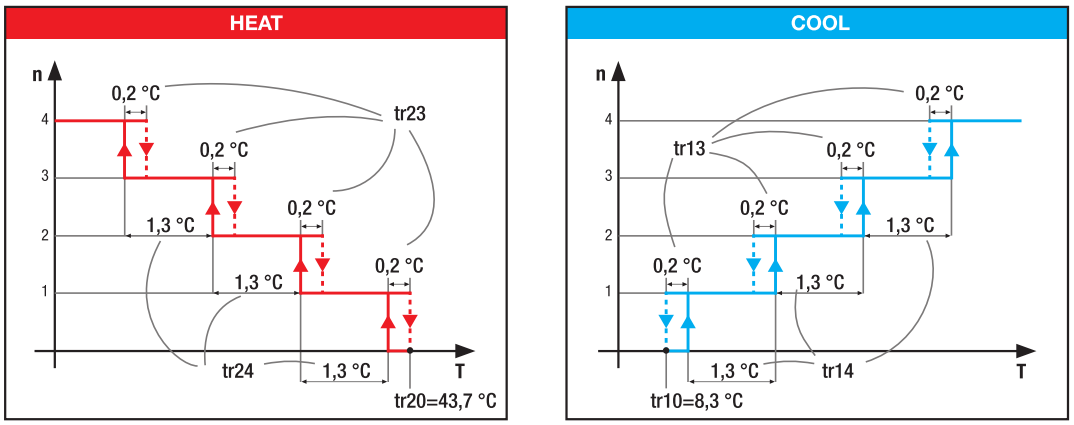
The parameters must be changed with the units switched off and the sequencer in OFF mode.

The indicated parameters are always visible.

The sequencer must be restarted after changing parameters by removing power and re-powering the board.

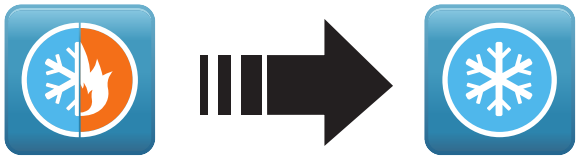
For the use of 4 units for cooling only, integrate the changes with those indicated in the dedicated section in this chapter.

The graphic below schematizes the management of thermoregulation on a system with 4 units:



T Thermoregulation probe temperature
n Number of steps

4.5 Sequencer - Changing parameters for cooling-only units



Change the parameters given in the following table to use the sequencer with units for cooling only.

PARAMETER	Description	Default value	Values for units for cooling only
CL03	AIL4 analog input type.	1	0
CL53	AIL4 analog input configuration if configured as a digital input.	3	0
CL92	DOL3 digital output configuration.	5	0
St00	Mode selection.	2	0
tr01	Disabling heat pump.	1	0

The given parameters do not configure the number of connected units.

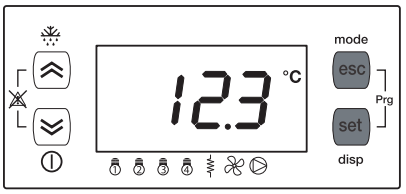
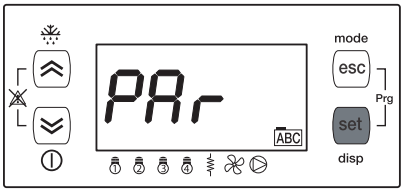
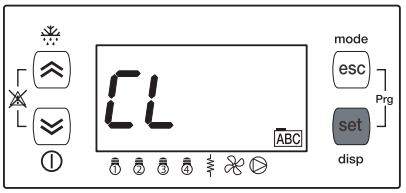
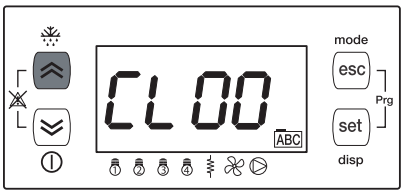
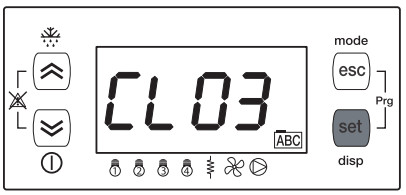
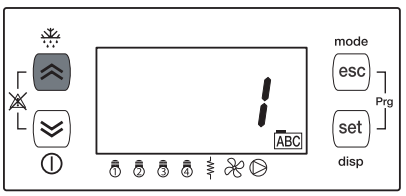
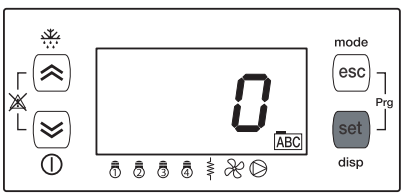
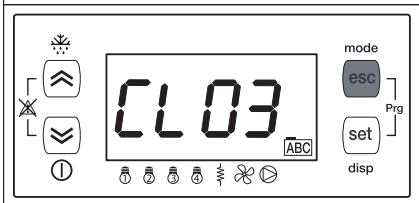
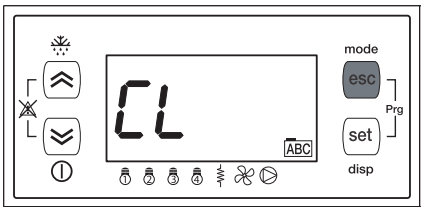
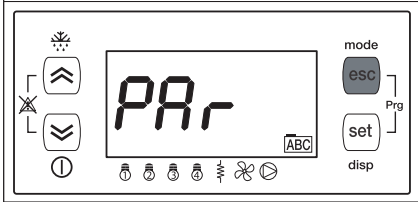
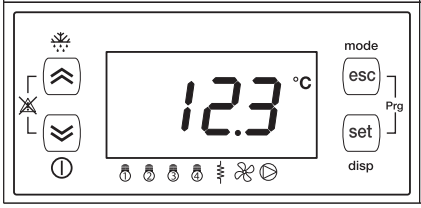
The parameters must be changed with the units switched off and the sequencer in OFF mode.

The indicated parameters are always visible.

The sequencer must be restarted after changing parameters by removing power and re-powering the board.

4.6 Procedure for changing sequencer parameters

The procedure for changing the parameters is shown below.

Screen and keys	Procedure	
	1	Access programming by pressing the esc key and the set key simultaneously.
	2	Display the word Par and enter the Parameters menu by pressing the set button.
	3	Display the word CL and enter the CL submenu by pressing the set key.
	4	Using the arrow keys, identify the parameter to be changed.
	5	Display the parameter to be changed and press the set key to access the change of the parameter value.
	6	Use the arrow keys to change the parameter value.
	7	Press the set key to confirm the value entered.
	8	Press the esc key to exit the parameter display.
	9	Press the esc key to return to the submenu level to exit the programming step.
	10	Press the esc key to return to the menu level to exit the programming phase.
	11	Now the main screen can be displayed.

The data indicated in this manual is purely indicative. The manufacturer reserves the right to modify the data whenever it is considered necessary.