e-drofan

electronic controller

CAREL

ENG User manual

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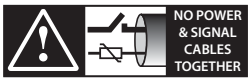

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WARNING: separate as much as possible the probe and digital input signal cables from the cables carrying inductive loads and power cables to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel wiring) and signal cables in the same conduits.

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5. in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

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1. INTRODUCTION

Features of the e-drofan family:

- Remote terminal with elegant appearance and diversified access to the various functions (set point modification on front buttons, change operating mode etc. on side buttons). NTC probe on board;
- Built-in LCD terminal with on-board probe;
- Remote control with LCD on board;
- Dipswitch for simple configuration by the installer;
- Control board with high number of I/O (5 digital inputs, 3 probes, 5 relay outputs);
- Possibility to create local broadcast networks (up to 5 slaves, max 30 m);
- Possibility to create extended networks (up to 1 km) using optional CANbus serial card. Flexible space management;
- Implementation of hydronic systems with synergy between the chiller controller-e-drofan using optional CANbus serial card;
- Customisable supervisory system thanks to the numerous protocols supported (Modbus, CANbus, PlantVisor);
- Parameter programming key;
- Options for the control of modulating valves (3 point, 0/10 Vdc input).

drofan is an electronic controller for fan coil units that optimises the performance of the cooling/heating system in order to achieve maximum comfort and considerable energy savings. It is easy to install and use, and allows the rapid re-configuration of the unit in the event where there are changes to the spaces being air-conditioned.
The network connection simplifies the operations if the installation has a high number of fan coils, as well as offering advanced supervision and automation functions (time bands, energy savings etc.), thanks to the integration with the chiller (pCO)/heat pump or boiler controller.
The information provided below has been divided based on the area of interest: user, installation, and advanced settings (typically reserved for the manufacturer of the air-conditioning system).

2. USER

The user interface is the acqua remote terminal, the built-in terminal or the remote control; all the devices have a liquid crystal display for simple and user-friendly operation.

2.1 Remote acqua terminal

Fig. 2.a

In summary:
- NTC probe on board to control the room temperature;
- LCD with clear symbols;
- Selection of the value displayed (temperature, set point, offset from common set point);
- Selective keypad lock (limited functions for offices, hotels.);
- Manual or automatic operation;
- timer ON, OFF functions;
- SLEEP function.

Below is the description of the terminal and the symbols on the liquid crystal display:

Button	Meaning
	Fan coil ON/OFF. If the remote ON/OFF digital input or the hydronic network is present, the function of the button may be disabled.
MODE	Used to select the desired mode: cooling, heating, dehumidify, fan, automatic operation. If the remote cooling/heating digital input or hydronic network is present, the function of the button may be disabled.
	Pressing this more than once sets the fan speed (min, med, max, automatic).
clear	Pressing this once activates the SLEEP function, pressing it again selects the number of hours the sleep function lasts (if more than three seconds have passed since the button was last pressed the function is deactivated). After pressing 9 consecutive times the function is deactivated.
TIMER	Pressing this once selects the fan coil on time (UP and DOWN buttons), a second time selects the off time, and the third time exits the timer programming mode. Hold the button to set the current time.
	Increases the currently selected value. Used to modify the value of the temperature set point.
	Decreased the currently selected value. Used to modify the value of the temperature set point.
MODE + clear	Advanced functions: After entering a password, the parameters can be modified.
set	Confirms the modifications made to the parameters.

Table 2.a

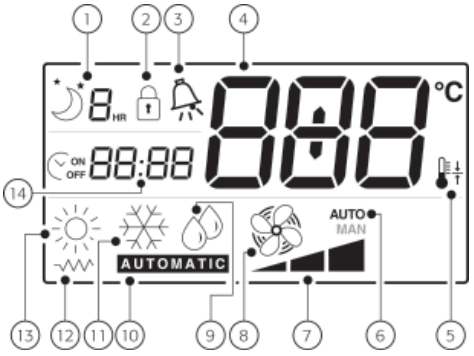


Fig. 2.b

Legenda

1	SLEEP function
2	limited keypad functions
3	active alarm
4	display temperature probe, set point or active alarm
5	indication of hydronic network connection
6	automatic fan speed
7	fan speed set (min/med/max)
8	fan and operating modes
9	dehumidify
10	automatic operation
11	cooling
12	heating with heater
13	heating

The following section shows all the default functions available on the e-drofan; the device can in any case be reconfigured by the manufacturer of the cooling/heating system or by the installer (according to the features of the installation), and therefore some functions may not be available; in particular, if a series of e-drofan are connected in a hydronic network (highlighted by the special symbol on the display), some settings are fixed by the manager of the installation and cannot be modified.

Important: in the event of power failures, the clock setting will be lost and needs to be reset (the time flashes). Modify the time using the UP and DOWN buttons, and confirm by pressing the SET button, after which the terminal can be used.

2.1.1 Manual operation: cooling

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly until the cooling symbol comes on.
- Setting the set point (desired temperature) using the UP and DOWN buttons.
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The fan only starts if the temperature of the coil is low enough, so as to avoid undesired flows of hot air. If this condition is not satisfied the cooling symbol flashes.

Fig. 2.c

2.1.2 Manual operation: heating

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly until the heating symbol only or heating with heater symbol (if installed) comes on. In the latter case the electric heater is also used as a source of heat.
- Setting the set point (desired temperature) using the UP and DOWN buttons.
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The fan only starts if the temperature of the coil is high enough, so as to avoid undesired flows of cold air. If this condition is not satisfied the heating symbol flashes.

If the electric heater is installed (highlighted by the special symbol on the display) the fan continues operating for 20 s even after it has been stopped. This time must also elapse even if the unit is switched off using the ON/OFF button.

Fig. 2.d.a
with heater

Fig. 2.d.b
without heater

2.1.3 Manual operation: dehumidification (DRY

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly until the dehumidification symbol comes on;
- Setting the set point (desired temperature) using the UP and DOWN buttons;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the fan operates at minimum speed.

The fan only starts if the temperature of the coil is low enough, so as to avoid unwanted flows of hot and humid air. If this condition is not satisfied, the dehumidification symbol flashes.

The e-drofan starts in cooling mode so as to bring the room temperature near to the set point (set point + 3 °C) using the set speed, then performs fan on/off cycles at minimum speed to remove the humidity.

Fig. 2.e

2.1.4 Manual operation: fan

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly so that only the fan symbol (at the bottom of the display) and the corresponding bar are on.
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is set to medium.

The fan only starts if the ambient temperature is within the range of temperature 15 to 35 °C, so as to avoid undesired flows of hot or cold air.

Fig. 2.f

2.1.5 Automatic operation

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly until the automatic symbol comes on;
- Setting the set point (desired temperature) using the UP and DOWN buttons;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The mode (heating or cooling) is decided by the electronic controller based on the deviation from the set point; if the room temperature is higher than the set point the control performs the cooling function while if it is lower it performs the heating function.

The fan only starts if the temperature of the coil is suitable to perform the heating or cooling functions.

2.1.6 Comfort control

In some installations only automatic mode is available, and the set point is decided by the manager of the installation; in these cases the user can increase or decrease the set point up to 2 °C to compensate for the different perception of the room temperature.
The value is modified by pressing the UP and DOWN buttons and is displayed for 5 seconds, after which the display returns to the previous situation.

Fig. 2.g.a
automatic mode

Fig. 2.g.b
automatic mode with automatic comfort

Fig. 2.g.c.
comfort variation mode

2.1.7 Setting the clock and On/Off timer

e-drofan offers the possibility to perform programmed starts and stops if the room only needs to be air-conditioned at certain times of the day. To be able to use these functions, the internal clock needs to be set with the correct time, as shown below:
- Hold the timer button for 5 seconds (Fig. 2.11);
- Set the time using the UP and DOWN buttons (the time flashes, Fig. 2.12);
- Confirm by pressing the SET button (the time is on steady, see Fig. 2.13).

Fig. 2.h.a

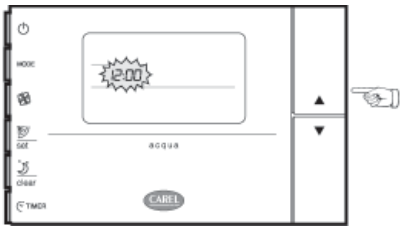


Fig. 2.h.b

Fig. 2.h.c

Fig. 2.h.d
timer ON display

Fig. 2.h.e
timer OFF display

Important:
In the event of power failures, the clock setting will be lost and needs to be reset, as does the On/Off timer. In this case, the time flashes and starts from 12:00. The clock can be hidden by suitably configuring the parameters (see section "constructor").

The timer ON (start) is set by:
- Pressing the TIMER button once;
- Setting the required start time with the UP and DOWN buttons (the time flashes);
- Confirming the time with the SET button (the symbol is on steady and the current time is displayed).

The timer OFF (stop) is set as for the timer ON, with the difference that the TIMER button must be pressed twice.

The timer ON/OFF functions remain active even after the corresponding ON/OFF event has occurred; to disable these functions proceed as follows:
- Press the timer button: once to disable the timer ON or twice to disable the timer OFF (the time flashes);
- Press the clear button (the special symbol disappears).

2.1.8 Sleep operation

The SLEEP function is especially useful during the night-time, when the decrease in body temperature (due to sleep) changes the perception of the room temperature.
In cooling mode the set point is increased by P18 for the number of hours set, after which the e-drofan returns to the previous situation (the SLEEP function is cancelled).
In heating mode the set point is decreased by the value of P19.

Fig. 2.i

To set the sleep function, proceed as follows:
- Switch the device on using the ON/OFF button and select the operating mode;
- Press the SLEEP button repeatedly until setting the required number of hours for the function.

To cancel this function, proceed by pressing the SLEEP button again, after having waited 3 s since the button was last pressed, or pressing the button more than once until exceeding the maximum number of hours, that is 9.

The SLEEP function can be combined with the timer OFF (see Fig. 2.i).

2.1.9 Remote off

When the remote off symbol is present the operating mode is set to automatic (with heater, if installed) and the user can: switch the unit on/off, modify the set point and set the fan speed; the other functions are not available.

Fig. 2.j

2.1.10 Alarms

The "acqua" terminal displays any alarms relating to the malfunctions of the device, shown in the summary table below. In the event of alarms, contact the relevant personnel (manager of the installation or installer/maintenance engineer) and make note of the signal to assist the response.

signal	alarm
A01	EEPROM fault
A02	offline in CAN network (no communication between e-drofan and CAN board)
A03	control probe fault
A04	probe B2 or B3 fault
A05	window alarm
A06	circulating pump alarm
A07	stop from digital input
Cn	serial communication fault with HYFC*

Table 2.b

2.2 e-droset terminal

In summary:

- NTC probe on board to control the room temperature;
- LCD with intuitive symbols;
- selection of the value displayed (temperature, set point, offset from common set point);
- selective keypad lock (limited functions for offices, hotels..);
- manual or automatic operation;
- sleep and occupancy functions;
- wall mounting using the most commonly available 3 gang switch boxes.

Below is the description of the terminal and the symbols shown on the liquid crystal display:

button	meaning
⏻	Fan coil On/Off. If the remote ON/OFF digital input or the hydronic network is present, the function of the button may be disabled.
M	Used to select the desired mode: Cooling, heating, dry (dehumidification), fan, automatic operation. If the remote ON/OFF digital input or the hydronic network is present, the function of the button may be disabled.
	Pressing this button repeatedly sets the fan speed (min, med, max, automatic).
	Pressing the button once activates the sleep function, pressing it again selects the duration of the sleep function, in hours (if more than three seconds elapse from when the button was last pressed, the function is deactivated). After 9 consecutive presses the function is deactivated. WITH THE OCCUPANCY FUNCTION ACTIVE: Pressing this button switches the e-drofan to occupancy mode, that is, it controls the temperature according to the set point rather than based on energy savings.
	Increases the currently selected value. Used to set the desired temperature.
	Decreases the currently selected value. Used to set the desired temperature.

Table 2.c

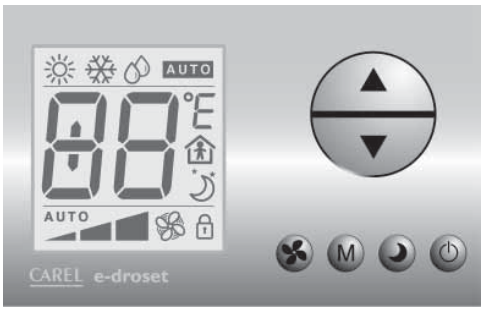


Fig. 2.k

Key

1	heating
2	cooling
3	dry
4	automatic operation
5	occupancy function= enabled
6	on steady= occupied on flashing= temporarily occupied
7	sleep function
8	limited keypad function
9	fan and operating modes
10	set fan speed (min/med/max)
11	automatic fan speed
12	display temperature probe or set point or active alarm code

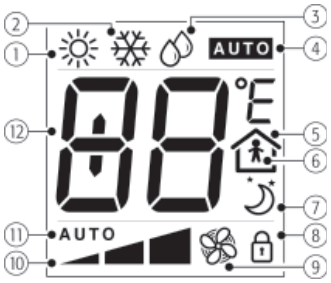


Fig. 2.l

Below are all the functions available by default on the e-drofan; the device may however be reconfigured by the manufacturer of the cooling/heating system or by the installer (according to the characteristics of the installation), and therefore some functions may not be available; in particular, when using a hydronic network connection between multiple e-drofan units, some settings are defined by the manager of the installation and cannot be modified.

Fig. 2.m.a

2.2.1 Manual operation: Cooling

Once the device has been switched on using the ON/OFF button, proceed as follows:
- press the MODE button repeatedly until the cooling symbol comes on;
- set the set point (required temperature) using the UP and DOWN buttons;
- press the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected, the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the greater the speed).

The fan only starts if the coil temperature is low enough, so as to avoid unwanted flows of hot air. If this condition is not satisfied, the cooling symbol flashes.

Fig. 2.m.b

2.2.2 Manual operation: Heating with or without heater

Once the device has been switched on using the ON/OFF button, proceed as follows:
- press the MODE button repeatedly until the heating symbol comes on. If the heater is installed it is always used;
- set the set point (required temperature) using the UP and DOWN buttons;
- press the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected, the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the greater the speed).

The fan only starts if the coil temperature is high enough, so as to avoid unwanted flows of cold air. If this condition is not satisfied, the heating symbol flashes.

If the electric heater is installed, the fan continues operating for 20 seconds after deactivation. This is also valid when the unit is switched off from the ON/OFF button.

Fig. 2.m.c

2.2.3 Manual operation: Dry (dehumidification)

Once the device has been switched on using the ON/OFF button, proceed as follows:
- press the MODE button repeatedly until the dehumidification symbol comes on.
- setting the set point (desired temperature) using the buttons UP and DOWN.
- press the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected, the fan operates at minimum speed.

The fan only starts if the coil temperature is low enough, so as to avoid unwanted flows of hot air. If this condition is not satisfied, the cooling symbol flashes.

The e-drofan starts in cooling mode so as to bring the room temperature to near the set point (set point + 3°C) using the set fan speed, and then performs fan on/off cycles at minimum speed to remove the humidity.

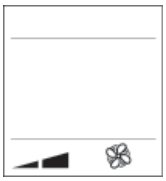


Fig. 2.m.d

2.2.4 Manual operation: Fan

Once the device has been switched on using the ON/OFF button, proceed as follows:
- press the MODE button repeatedly until only the fan symbol (at the bottom of the display) and the corresponding bar are on;
- press the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected, the fan speed is fixed at medium.

The fan only starts if the room temperature is in the range of temperatures from 15 to 35°C , so as to avoid unwanted flows of hot or cold air.

Fig. 2.m.e

2.2.5 Automatic operation

Once the device has been switched on using the ON/OFF button, proceed as follows:
- press the MODE button repeatedly until the automatic symbol comes on;
- set the set point (required temperature) using the UP and DOWN buttons;
- press the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected, the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the greater the speed).

The mode (heating or cooling) is decided by the electronic controller based on the deviation from the set point; if the room temperature is above the set point, the controller switches to cooling mode, while if it is below the set point, heating mode is activated.

The fan only starts if the coil temperature is sufficient to perform the heating or cooling functions.

2.2.6 Comfort control

In some installations, the set point is decided by the manager of the installation; in these cases, the user may increase or decrease the set point by 3°C to compensate for the different perception of the room temperature.
The set point is changed by pressing the UP and DOWN buttons, and is displayed for 5 seconds, after which the previous display resumes.

Automatic mode with comfort active (Fig. 2.m.f).
Comfort setting in automatic (Fig. 2.m.g).

Fig. 2.m.f

Fig. 2.m.g

2.2.7 Sleep function

The sleep function is especially useful at night, when the decrease in body temperature (due to sleep) changes people's perception of the room temperature.
In cooling mode, the set point is increased by P18 for the number of hours specified on the panel, after which the e-drofan returns to the previous operation (the sleep function is cancelled).

SLEEP display active (Fig. 2.m.h).

In heating mode, the set point is decreased by the value of P19.

To set the sleep function, proceed as follows:
- switch on the device using the ON/OFF button and select the operating mode;
- press the SLEEP button repeatedly until setting the desired duration of the function in hours (exceeding the maximum number of 9 hours disables the function).

To see the remaining time for the sleep function, press the sleep button once (after having waited 3 seconds since last pressed), and press it again to leave the function.

The sleep function is always cancelled after a power failure.

Fig. 2.m.h

2.2.8 Remote lock

When the remote lock symbol is present, the operating mode is fixed on automatic (with heater, if installed) and the user can: switch the unit on/off, change the set point and set the fan speed; the other functions are not available.

Remote lock display (Fig. 2.m.i).

Fig. 2.m.i

2.2.9 Alarms

The e-droset terminal can display any alarms relating to malfunctions of the device; below is a table summarising the signals. In the event of alarms, contact the relevant personnel (manager of the installation or installer/maintenance technician) and advise the signal so as to assist the response.

signal	alarm
A1	EEPROM fault
A2	offline in CAN network (no communication between e-drofan and CAN board)
A3	Room probe fault
A4	Probe B2 or B3 fault
A5	Window alarm
A6	Circulating pump alarm
A7	Local stop
Cn	serial communication fault with HYFC*

Table 2.d

2.2.10 Occupancy function

The system will air-condition the environment to the set temperature only when this is occupied; to activate the system, simply press any button, or wait for the sensor (if installed) to detect occupancy (this is shown by the symbol of the man coming on or flashing on the terminal). If the environment is not occupied, air-conditioning is activated with a set point aimed at saving energy (in this case, the terminal only shows the house symbol).

Environment empty, press any button to set occupancy (Fig. 2.m.l).
Environment temporarily occupied (Fig. 2.m.m).

Fig. 2.m.l

Fig. 2.m.m

2.3 Remote control and IR receiver board

In summary:
- Remote control of the unit (7 m);
- Lock keypad (limited user functions: offices, hotels ..);
- LCD on board;
- IR receiver board with 3 LEDs, 1 buzzer for the signals and 1 button (in the event of flat batteries);
- Manual or automatic operation;
- ON, timer OFF functions;
- SLEEP function.

Below is the description of the remote control and the symbols present on the liquid crystal display:

button	meaning
⏻	ON/OFF: Fan coil ON/OFF. If the remote ON/OFF digital input or hydronic network is present the function of the button may be disabled
MODE	MODE: used to select the desired mode: cooling, dehumidify, fan, heating, automatic operation. If the remote ON/OFF digital input or hydronic network is present the function of the button may be disabled
▲	UP set point: used to increase the desired temperature value
▼	DOWN set point: used to decrease the desired temperature value
FAN	FAN: press this more than once to set the fan speed (min, med, max, auto)
SLEEP	SLEEP: press once to activate the SLEEP function, press again to select the number of hours for the sleep function. After pressing 9 times the function is cancelled
ON	TIMER ON: used to set the fan coil on time
OFF	TIMER OFF: used to set the fan coil off time
▲	UP timer: increases the setting of the timer
▼	DOWN timer: decreases the setting of the timer
set	SET: confirms the modifications made to the timer settings
clear	CLEAR: pressed after the timer ON or timer OFF buttons cancels the action of the selected timer. If pressed for 5 seconds activates the keypad lock, the only function enabled is ON/OFF
▲ + ▼	pressed for 5 seconds sets the time

Table 2.3

Fig. 2.n

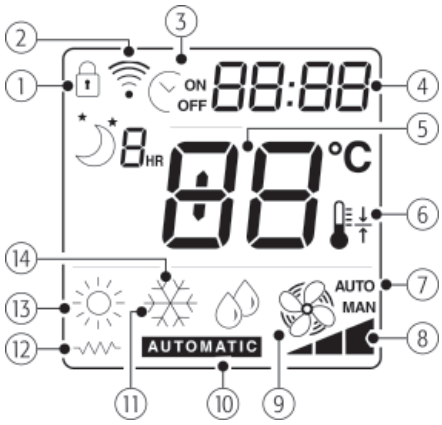


Fig. 2.o

Legenda:

1	lock keypad functions
2	data transmission in progress
3	timer ON/OFF
4	timer/clock
5	display of temperature probe or set point or active alarm
6	indication of hydronic network connection
7	automatic fan speed
8	set fan speed (min/med/max)
9	fan and operating modes
10	automatic operation
11	cooling
12	heating with heater
13	heating
14	Dehumidify

The following section shows all the default functions available on the e-drofan; the device can in any case be reconfigured by the manufacturer of the cooling/heating system or by the installer (according to the features of the installation), and therefore some functions may not be available; in particular, if a series of e-drofan are connected in a hydronic network (highlighted by the special symbol on the display), some settings are fixed by the manager of the installation and cannot be modified.
The correct reception of the functions is signalled by the sounding of the buzzer.

2.3.1 Manual operation: cooling

Once the device has been switched on using the ON/OFF button, proceed by:
- Pressing the MODE button repeatedly until the cooling symbol comes on;
- Setting the set point (desired temperature) using the UP set point and DOWN set point buttons;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The fan only starts if the temperature of the coil is low enough, so as to avoid undesired flows of hot air.

Fig. 2.p.a

2.3.2 Manual operation: heating

Once the device has been switched on using the ON/OFF button, proceed by:

- Pressing the MODE button repeatedly until the heating symbol only or heating with heater symbol (if installed) comes on. In the latter case the electric heater is also used as a source of heat;
- Setting the set point (desired temperature) using the UP set point and DOWN set point buttons;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The fan only starts if the temperature of the coil is high enough, so as to avoid undesired flows of cold air.

If the electric heater is installed the fan continues operating for 20 s even after it has been stopped. This time must also elapse even if the unit is switched off using the ON/OFF button.

Heating with heater (Fig. 2.p.b)
Heating without heater (Fig. 2.p.c)

Fig. 2.p.b

Fig. 2.p.c

2.3.3 Manual operation: dehumidification (DRY)

Once the device has been switched on using the ON/OFF button, proceed by:

- Pressing the MODE button repeatedly until the dehumidification symbol comes on;
- Setting the set point (desired temperature) using the UP set point and DOWN set point buttons;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the fan operates at minimum speed.

The fan only starts if the temperature of the coil is low enough, so as to avoid unwanted flows of hot and humid air.

The e-drofan starts in cooling mode so as to bring the room temperature near to the set point (set point + 3 °C) using the set speed, then performs fan on/off cycles at minimum speed to remove the humidity.

Fig. 2.p.d

2.3.4 Manual operation: fan

Once the device has been switched on using the ON/OFF button, proceed by:

- Pressing the MODE button repeatedly so that only the fan symbol (at the bottom of the display) and the corresponding bar are on;
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is set to medium.

The fan only starts if the ambient temperature is within the range of temperature 15 to 35 °C, so as to avoid undesired flows of hot or cold air.

Fig. 2.p.e

2.3.5 Automatic operation

Once the device has been switched on using the ON/OFF button, proceed by:

- Pressing the MODE button repeatedly until the automatic symbol comes on;
- Setting the offset (from -2 to +2 °C) from the set point in automatic mode (25 °C, the final set point thus ranges from 23 to 27 °C), using the UP set point and DOWN set point button
- Pressing the FAN button repeatedly to select the desired fan speed; if AUTO mode is selected the speed is decided by the electronic controller based on the deviation from the set point (the greater the deviation, the higher the speed).

The mode (heating or cooling) is decided by the electronic controller based on the deviation from the set point; if the room temperature is higher than the set point the control performs the cooling function while if it is lower it performs the heating function.

The fan only starts if the temperature of the coil is suitable to perform the heating or cooling functions.

If the network connection is present, the set point is decided by the manager of the installation; in these cases, the user can only increase or decrease the set point by 2°C to compensate for the different perception of the room temperature.

Fig. 2.p.f

2.3.6 Setting the clock and ON/OFF timer

e-drofan offers the possibility to perform programmed starts and stops if the room only needs to be air-conditioned at certain times of the day. To be able to use these functions, the internal clock needs to be set with the correct time, as shown below:

- Press the TIMER UP and DOWN buttons at the same time for 5 s (Fig. 2.p.g);
- Set the time using the TIMER UP and DOWN buttons (Fig. 2.p.h);
- Confirm by pressing the SET button (see Fig. 2.p.i).

Important:
In the event of power failures, the clock setting will be lost and needs to be reset (the time is displayed correctly on the remote control), as does the ON/OFF timer. To reset the clock, clock send any command to the e-drofan.

Fig. 2.p.g

Fig. 2.p.h

Fig. 2.p.i

Fig. 2.p.l

Fig. 2.p.m

The timer ON (start, Fig. 2.p.l) is set by:

- Pressing the TIMER ON button once;
- Setting the required start time with the TIMER UP and DOWN buttons;
- Confirming the time with the SET button (the symbol is on steady and the current time is displayed).

The timer OFF (stop, Fig. 2.p.m) is set as for the timer ON, with the difference that the TIMER OFF button must be pressed.

The timer ON/OFF functions remain active even after the corresponding ON/OFF event has occurred; to disable these functions proceed as follows:

- Press the TIMER ON/OFF button;
- Press the clear button (the special symbol disappears).

2.3.7 Sleep operation

The SLEEP function is especially useful during the night-time, when the decrease in body temperature (due to sleep) changes the perception of the room temperature.
In cooling mode the set point is increased by P18 for the number of hours set, after which the e-drofan returns to the previous situation (the SLEEP function is cancelled).
In heating mode the set point is decreased by the value of P19.

To set the sleep function, proceed as follows:

- Switch the device on using the ON/OFF button and select the operating mode;
- Press the SLEEP button repeatedly until setting the required number of hours for the function.

To cancel this function, proceed by pressing the SLEEP button again, after having waited 3 s since the button was last pressed, or pressing the button more than once until exceeding the maximum number of hours, that is, 9.

The SLEEP function can be combined with the timer OFF (see Fig. 2.p.n).
When the SLEEP function is active the brightness of the LED on the IR receiver board decreases.

Fig. 2.p.n

2.3.8 Keypad lock

When the keypad lock symbol is present, only the ON/OFF function is enabled. To activate the lock, press the CLEAR button for 5 seconds, and to deactivate the function repeat the operation.

Fig. 2.p.o

2.3.9 Button and signal LED

The IR receiver board features a button for setting the operation if the remote control is not available (e.g. flat batteries); pressing the button repeatedly changes the mode, in the following sequence: automatic, cooling, dehumidify, fan, heating, off. When setting the mode on the button the fan operates at minimum speed and the set point is equal to the value of parameter P01 (automatic mode set point, default= 25 °C).
Below is a list of the signals on the IR board:

Mode	Green LED	Yellow LED	Red LED
OFF	OFF	OFF	OFF
COOL/DRY	ON	ON	OFF
HEAT	OFF	ON	OFF
FAN	ON	OFF	OFF
AUTOMATIC OFF	ON	OFF	OFF
EXTRA FLUSH	ON	OFF	OFF

Table 2.f

2.3.10 Replacing the batteries

When the batteries are discharged or removed, all the settings are lost, and consequently the remote control needs to be reset according to the type of installation (heater fitted, hydronic networks, flap fitted, etc.).

In this case, proceed as follows:
- With the unit OFF, press the "Mode" and "clear" buttons at the same time for 5 seconds;
- A number of messages are displayed that correspond to the questions on the installation. Respond YES or NO by pressing the ▲ or ▼ button and confirming with the button set.

The settings are saved once the sequence of messages has been completed; if the procedure is not completed, all the modifications made are ignored.
If the information is not available, contact the relevant personnel (manager of the installation, installer..).

message	01	0H	0F	00	0A	EE
meaning	e-drofan model: for e-drofan HYFC****** respond NO.	Heater: Yes: Present No: Absent	Flap: Yes: Present No: Absent	Valve: Yes: Present No: Absent	Hydronic network: Yes: Present No: Absent	Fan tile unit respond NO

Table 2.g

2.3.11 Alarms

The IR receiver board uses the LED to signal the internal status, including any alarms (see the table below). Notify the maintenance personnel of the signal shown.

alarm	Green LED	Yellow LED	Red LED	priority
none	OFF	OFF	OFF	
EEPROM fault	BLINK	BLINK	BLINK	1
offline in CAN network	ON	OFF	ON	2
room probe fault	BLINK	OFF	ON	3
probe B2 or B3 fault	OFF	BLINK	ON	4
window alarm	BLINK	ON	ON	5
circulating pump	ON	BLINK	ON	6
stop from digital input	OFF	ON	ON	7

Table 2.h

2.4 Additional functions

Air-conditioned rooms are normally subject to the phenomenon of air stratification, due to the fact that the hot air moves upwards while the cold air moves downwards. To overcome this, the e-drofan runs fan on/off cycles (at minimum speed) once the temperature set point has been reached, so as to create a uniform room temperature. To ensure the correct measurement of the room temperature, the e-drofan runs a fan cycle for 30 s on power-up and whenever the mode is changed.
In automatic mode, this cycle is used to decide whether to heat or cool the environment.
If control is performed using the probe on the acqua terminal, these fan cycles are not performed.

2.5 Troubleshooting

Problem	Solution
The fan on one slave doesn't start	The temperature of the coil may not be hot or cold enough, or alternatively the room temperature has already reached the set point. Wait; if the fan remains off for an extended period contact the relevant personnel.
The fan does not work at the set speed	The temperature of the coil may not be hot or cold enough, the initial fan cycle at minimum speed may be in progress, or alternatively the fan is operating so as to ensure a uniform temperature in the environment.
The e-drofan does not switch on/off at the set time	A power failure may have occurred. Acqua terminal: reset the time and the TIMER ON/OFF or SLEEP function. ~~Remote control~~: press any button to reset the clock and the ON/OFF timer, SLEEP functions.

Table 2.7

3. INSTALLATION

In summary:
- Easy configuration by dipswitch;
- Creation of local networks (up to 5 slaves) without setting parameters or addresses (max 30 m);
- Possibility of control using the probe on board or the probe on the acqua terminal;
- Creation of extended networks (up to 1 km) with simple re-configuration if the layout of the spaces is changed.

3.1 Introduction: e-drofan and accessories

The following section lists the family of devices made up of the e-drofan and its accessories:

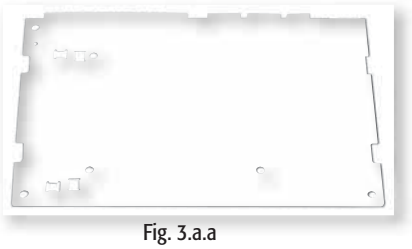


Fig. 3.a.a

e-drofan control board HYFC00000*
Manages the fan on the fan coil and controls the temperature. Allows the connection of digital inputs for the remote control of functions such as ON/OFF, cooling/heating, economy etc. Fitted with a serial port for the network connection of a series of units.

Fig. 3.a.b

Expansion card for e-drofan, HYVC000R0*
Allows the e-drofan to control additional loads to the fan, such as: bleed valves in the hot and cold water loops, circulating pump, power supply to the external relay for the heater and the hot and cold water requirement signal to the chiller/heat pump and boiler.

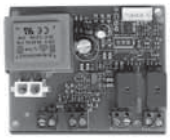


Fig. 3.a.c

Analogue/relay output expansion board for e-drofan, HYVC000V*
Allows the e-drofan to control two actuators with 0 to 10 Vdc input (e.g. modulating valves… etc.) and control any additional loads using the two multifunction relays.

Fig. 3.a.d

4 triac expansion board for e-drofan, HYVC000T*
Allows the e-drofan to control loads with a high number of operations (e.g. two modulating 3 point valves… etc.) using the 4 TRIAC outputs with voltage signal (230 Vac).

Fig. 3.a.e

Triac/relay output expansion board for e-drofan, HYVC000M*
Allows the e-drofan to control loads with a high number of operations (e.g. a modulating 3 point valve… etc.) using the 2 TRIAC outputs with voltage signal (230 Vac) and directly control a 2 kW heater. A second multifunction relay is available for any additional loads.

Fig. 3.a.f

IR receiver board for e-drofan HYIR00000*
Allows the e-drofan to receive the settings from the remote control, and displays, using 3 LEDs, the status of the unit and any alarms.
Fitted with a button for setting operation if the batteries are discharged.

Fig. 3.a.g

Remote control for e-drofan HYHS00100*
Allows the user to control the operation of the e-drofan, including any slaves connected in the network. The LCD ensures straightforward and user-friendly operation.

CANbus serial board for e-drofan HYSC00F0C0
Fitted on the e-drofan, this is used to create CANbus networks for centralised management and the application of advanced comfort and energy savings algorithms (integration with the chiller/heat pump or boiler).

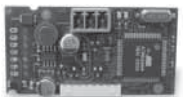


Fig. 3.a.h

Acqua" LCD terminal for e-drofan controller HYPA00100*
Allows the user to set the operation of the e-drofan (and any slaves connected in the network) and displays the alarms. The LCD ensures straightforward and user-friendly operation. In addition, it is fitted with a probe that can be used for room temperature control.

Fig. 3.a.i

Built-in "e-droset" LCD terminal for controlling the e-drofan, HYPA00300*
Ideal for wall mounting in the more commonly-used 3 gang switch boxes (Biticino, AVE, Vimar ... see the list in the corresponding paragraph). This allows the user to set the operation of the e-drofan (and any slaves connected in the network), display the alarms and air-condition the environment only if occupied (occupancy function). The LCD ensures simple and user-friendly operation. The terminal also includes a probe that can be used to control the room temperature.

Fig. 3.a.j

RS485 serial board HYSC00F0P0
Used to create customised (PlantVisor) or open (Modbus) supervisory systems.

Fig. 3.a.k

Programming key PSOPZKEY00
Used to simply export the configuration of the parameters from one e-drofan to another. Useful in systems with a large number of fan coils.
Programming key PSOPZKEYA0
Version with power supply.

Fig. 3.a.l

Adapter for e-drofan programming key HYKA00000*
To be used together with the programming key PSOPZKEY*.

Fig. 3.a.m

3.2 Type of fan coil and installation

The e-drofan electronic controller can control units featuring three fixed fan speeds (motors with three windings), main and secondary heat exchangers. The expansion card can be used to manage the additional loads, such as: bleed valves in the hot and cold water loops, circulating pump, power supply to the external relay for the heater and the hot and cold water requirement signal to the chiller/heat pump and boiler. Consequently the e-drofan can be used in all types of installation (for home or similar use): 2 pipe, 4 pipe and 4 pipe with local 2 pipe loop.
For the thermodynamic features and the installation/maintenance of the fan coil, refer to the manual provided by the manufacturer.

3.3 Installation and basic settings

3.3.1 Mounting

The controller is mounted to the fan coil using 4 plastic turrets (manufactured by RICHCO, code SP1-12-01) that slot into the holes on the four corners of the board, or alternatively using the special plastic supports on the specially prepared fan coils:

- dimensions (Fig. 7.a).

e-drofan dimension (Fig. 3.b.a).
e-drofan high accessories included (Fig. 3.b.b).

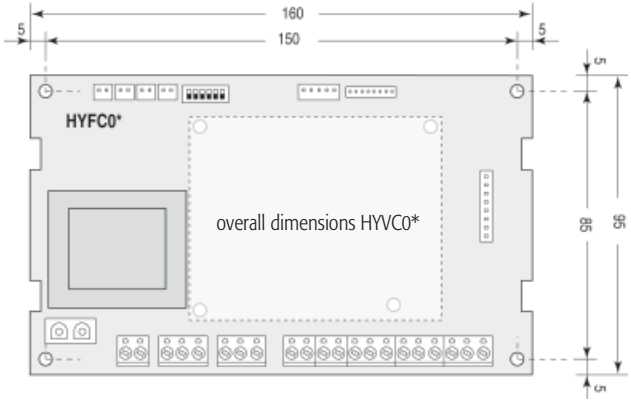


Fig. 3.b.a

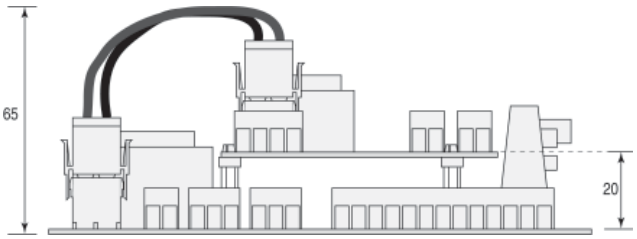


Fig. 3.b.b

3.3.2 Connections

In summary:

- 5 digital inputs (3 can be configured);
- Voltage outputs for the fan;
- Optional outputs: 2 voltage outputs, 2 voltage-free contacts. Operation can be configured (heater, valves, circulating pump, contacts for hot/cold water request signal);
- 3 NTC probes;
- tLAN serial connection (max 5 slave, max 30 m);
- Optional CANbus serial connection (max 1 km);
- tLAN connection for remote acqua terminal (max 30 m, power supplied by e-drofan).

The user interface is represented by the remote control or the terminal (both cannot be used), in particular the latter contains a probe that can be used to control the room temperature; see the notes provided below the table of connections for the positioning of the terminal.
Some especially useful functions in certain installations (e.g. remote ON/OFF inside hotels etc.) are also available by digital inputs or via serial communication, as well as from the terminal or remote control.

Below is a diagram of the connections:

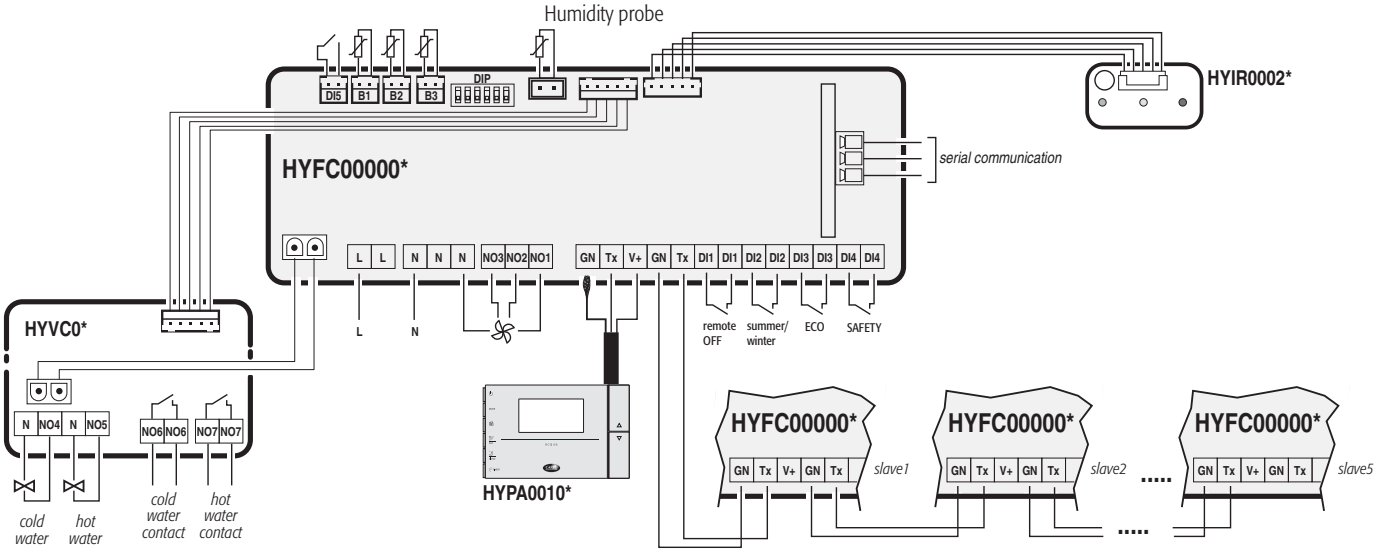


Fig. 3.b.c

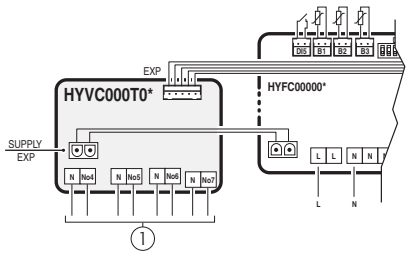


Fig. 3.b.d

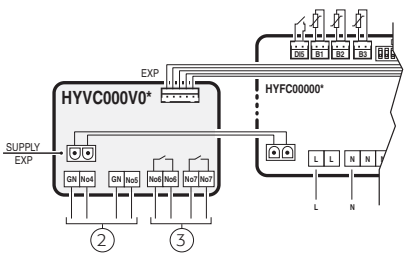


Fig. 3.b.e

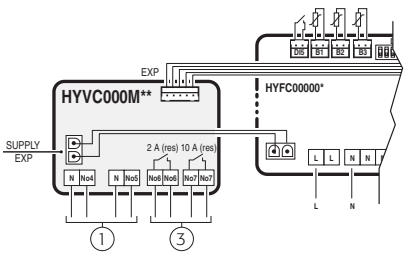


Fig. 3.b.f

Key:

1	multifunction voltage output (triac)
2	multifunction 0 to 10 Vdc output
3	multifunction relay output

terminal	meaning	note
e-drofan		
L	Phase	Power supply to the e-drofan and all the loads connected to the voltage outputs. Max length: 5 m. Cross-section: 14 to 22 AWG
N	Neutral	Power supply to the e-drofan and all the loads connected to the voltage outputs. Max length: 5 m. Cross-section: 14 to 22 AWG
NO1	Minimum fan speed (normally open).	Max length: 5 m. Voltage output (L) Cross-section: 14 to 22 AWG
NO2	Medium fan (speed normally open).	Max length: 5 m. Voltage output (L) Cross-section: 14 to 22 AWG
NO3	Maximum fan speed (normally open).	Max length: 5 m. Voltage output (L) Cross-section: 14 to 22 AWG
GN, Tx, V+	tLAN: Connection to LCD terminal	Shielded cable: 3-wire + shield. Max length 30 m. Cross-section: 14 to 22 AWG
GN, Tx	tLAN: Terminals for local network serial connection (master + 5 slave).	Shielded cable: 3-wire + shield. Max length of the entire tLAN network: 30 m. Cross-section: 14 to 22 AWG
DI1, DI2, DI3, DI4, DI5	Digital inputs (voltage-free contacts). 1= remote ON/OFF 2= remote cooling/heating 3= multifunction: not used 4= multifunction: not used 5= multifunction: not used	Max length 30 m. Inputs DI3, DI4, DI5 can be configured by parameters P43, P44, P45 (see section "constructor"). Polarity of DI2 can be configured by parameter P56. Cross-section: 14 to 22 AWG
B1	Air intake probe (room)	Max length 10 m. Control probe (if terminal or network connection absent, see dipswitch).
B2	Main indoor exchanger probe	Max length 10 m
B3	Secondary indoor exchanger probe	Max length 10 m
DIP	Configuration dipswitch: see paragraph "basic settings and functions available".	
EXP	Connector for the expansion card (5-wire cable)	
FLAP	Connector for flap power supply (where present).	Maximum flap power supply cable length: 50 cm
SUPPLY EXP	Connector for e-drofan expansion power supply (connect using 2 wire cable).	
IR	Connector for the infrared receiver interface (5-wire cable). To be connected when using the remote control.	
JS3	Connector for inserting optional power supply for compatibility with PCO serial cards.	Future uses
SERIAL	Connector for inserting serial cards (connection to supervisory systems or local networks).	
e-drofan expansion		
SUPPLY EXP	Connector for e-drofan expansion power supply (connect using 2 wire cable).	
EXP	Connector for the expansion card (5-wire cable)	
N	Neutral	Cross-section: 14 to 22 AWG
NO4	Multifunction: Cold water solenoid valve power supply (when DIP4= ON, 4 pipe).	Voltage output (L). Max length 5 m. Cross-section: 14. to 22 AWG
	Multifunction: Local hot/cold water solenoid valve power supply (when DIP4= OFF, 2 pipe).	
	Multifunction: Hot water solenoid valve power supply.	
NO5	Multifunction: Hot water solenoid valve power supply (when DIP4= ON, 4 pipe).	Voltage output (L). Max length 5 m. Cross-section: 14 to 22 AWG Can be configured by parameter P40 if DIP4= OFF and DIP5= OFF.
	Multifunction: Water solenoid valve power supply, not used (when DIP4= OFF and DIP5= OFF, 2 pipe).	
	Multifunction: heater (when DIP4= OFF and DIP5= ON).	
NO6	Cold water free contact.	Max length 30 m. If used to supply a load: max length 5m. Can be configured by parameter P41.
No7	Hot water free contact.	Max length 30 m. If used for alimentary a load: max length 5m. Cross-section: 14 to 22 AWG Can be configured by parameter P42.

Table 3.a

4 triac expansion board for e-drofan, HYVC000T*

terminal	meaning	notes
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable)	
EXP	E-drofan signal input connector (use 5 wire cable)	Cross-section: 14 to 22 AWG
N	Neutral	
No4	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P39)	Cross-section: 14 to 22 AWG Max. length 5 m
No5	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P40)	Cross-section: 14 to 22 AWG Max. length 5 m
No6	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P41)	Cross-section: 14 to 22 AWG Max. length 5 m
No7	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P42)	Cross-section: 14 to 22 AWG Max. length 5 m

Analogue/relay output expansion board for e-drofan, HYVC000V*

terminal	meaning	notes
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable)	
EXP	E-drofan signal input connector (use 5 wire cable)	
GN	Signal reference terminal	Cross-section: 14 to 22 AWG
No4	Multifunction 0 to 10 Vdc output: see the manufacturer section (configurable by parameter P39)	Cross-section: 14 to 22 AWG Max. length 5 m Keep separate from the power cable
No5	Multifunction 0 to 10 Vdc output: see the manufacturer section (configurable by parameter P40)	Cross-section: 14 to 22 AWG Max. length 5 m Keep separate from the power cable
No6	Multifunction relay output: see the manufacturer section (configurable by parameter P41). Voltage-free contact	Cross-section: 14 to 22 AWG Voltage-free contact: 30 m Load power supply: 5 m
No7	Multifunction relay output: see the manufacturer section (configurable by parameter P42). Voltage-free contact	Cross-section: 14 to 22 AWG Voltage-free contact: 30 m Load power supply: 5 m

Triac/relay output expansion board for e-drofan, HYVC000M*

terminal	meaning	notes
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable)	
EXP	E-drofan signal input connector (use 5 wire cable)	
N	Neutral	Cross-section: 14 to 22 AWG
No4	TRIAC output with voltage signal, multifunction: see the manufacturer section (configurable by parameter P39)	Cross-section: 14 to 22 AWG Max. length 5 m
No5	TRIAC output with voltage signal, multifunction: see the manufacturer section (configurable by parameter P40)	Cross-section: 14 to 22 AWG Max. length 5 m
No6	Multifunction relay output, 10 A resistive: see the manufacturer section (configurable by parameter P41). Voltage-free contact	Cross-section: 14 to 22 AWG Voltage-free contact: 30 m Load power supply: 5 m
No7	Multifunction relay output: see the manufacturer section (configurable by parameter P42). Voltage-free contact	Cross-section: 14 to 22 AWG Voltage-free contact: 30 m Load power supply: 5 m

Size the power and connection cables to the voltage output loads based on the current input (the maximum current input of the network must not exceed 6 A).
Maximum serial board communication cable length: see the section on “technical info” or the corresponding instruction sheet.
If a local network (tLAN) is created and the remote control is used (the LCD terminal must not be fitted), on the master (between terminals GN and V+) insert the 1.3 kOhm resistor, supplied. This operation assigns the corresponding e-drofan the role of master, and the receivers on the other e-drofans connected to the master tLAN will automatically be deactivated.

Warnings: All installation and maintenance operations must be carried out with the unit off;

Serial connections: do not use star connections (use chain connections, see the paragraph “tLAN and Broadcast networks”). Connect the shield to terminal GN;
Avoid short-circuits between pins GN and V+ (power supply to the LCD terminal);
Adopt precautions against electrostatic discharges when handling the boards;
Do not earth terminal GN, as this may damage the instruments in the event of network connection.

3.3.3 Basic settings and functions available (dip-switch)

The dipswitches on the fan coil board can be used to select the predefined settings relating to the type of fan coil and installation. Each input/output can nonetheless be reconfigured so as to guarantee greater flexibility; in this case (as for the advanced functions) the terminal needs to be used to modify the parameters. To perform this operation, enter the special password (refer to section "constructor").

Set the dipswitches as follows:

1 ON=	Enable heat/cool functions (probe B2 on coil). Probe B3 enabled only when DIP1= ON and DIP4= ON;
2 ON=	Enable remote cooling/heating digital input (DI2);
3 ON=	Enable remote off (some functions are disabled: timer ON, timer OFF, sleep. The operating mode is forced to "auto");
4 ON=	For 4-pipe fan coils (OFF=2 pipe);
5 ON=	Electric heater present (when DIP 4=ON the setting is ignored and the heater is not enabled);
6 ON=	Control performed using the probe inside the terminal, if OFF probe B1 is used.

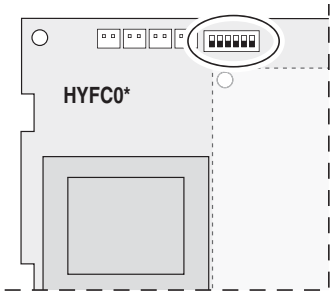


Fig. 3.d

3.3.4 Programming key (copy the configuration)

Once having set the parameters, the configuration can be quickly copied to other e-drofan controllers using the programming key. Proceed as follows:

1. Switch off the previously programmed e-drofan (source);
2. Set the dipswitches inside the programming key (underneath the battery cover) to reading mode (dip 1= OFF, dip2= OFF);
3. Insert the key in the special 4 pin connector on the adapter, and connect the 8-wire cable supplied (see Fig. 3.18);
4. Disconnect the 8-wire cable on the IR receiver board (if present) from the e-drofan;
5. Insert the 8-wire cable from the programming key adapter to the IR connector on the e-drofan board (source), see Fig. 3.19;
6. Press the button. The red LED and then the green LED come on in succession, if the operation has been completed with success. Other signals indicate problems (refer to the corresponding instruction sheet);
7. Remove the key and the adapter; set the dipswitch to write mode (dip 1= OFF, dip2= ON) and repeat steps 3, 4, 5, 6 to write the data to the target e-drofan;
8. Once having completed the sequence reconnect the IR receiver board on the source and target e-drofan.

Important: To avoid of excessively draining the batteries in the programming key, disconnect the normally closed digital inputs on the e-drofan. If this is not possible, use the key with the power supply. The e-drofan parameters (source) can be copied to devices with the same software version or lower.

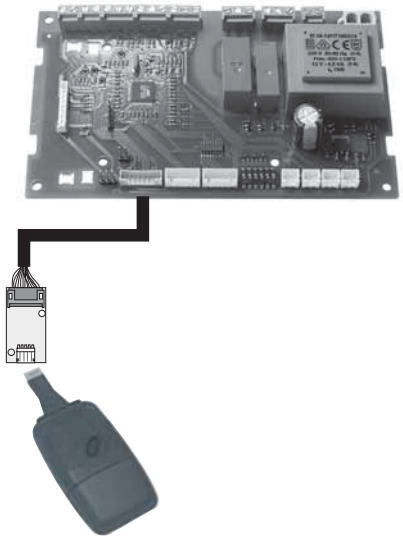


Fig. 3.e

3.3.5 LCD terminal

Avoid installing the terminal in places where the ambient temperature measurement may be altered: outside walls, near doors leading to the outside, exposed to the sun, etc. (the terminal should be fastened to the wall in a horizontal position so as to allow the recirculation of air through the slits on the rear cover fastened to the wall). The terminal is fitted inside the plastic case and is only accessible by removing the front cover (see the following figure).

Mounting the terminal

1. bottom view opening tab;
2. fastening holes.

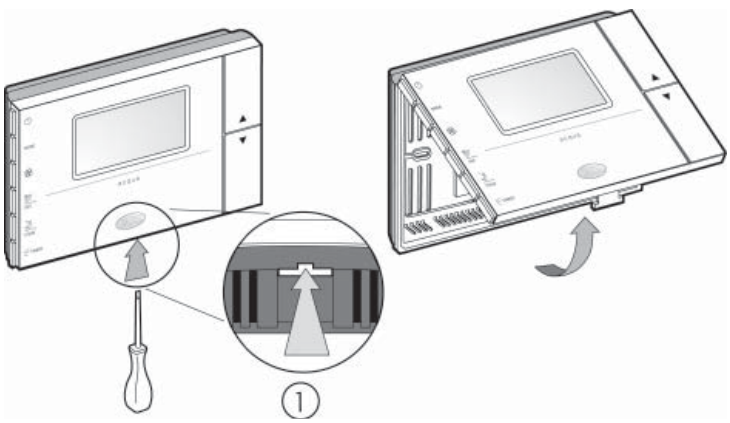


Fig. 3.f

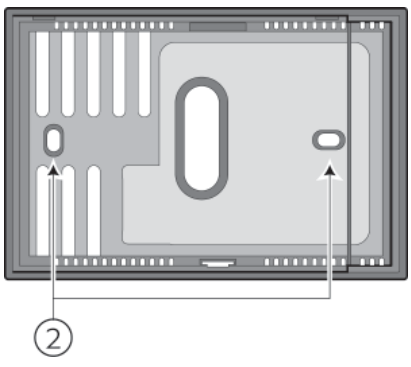


Fig. 3.g

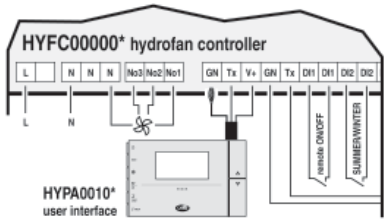


Fig. 3.h

Connect the terminal and the e-drofan as shown in the figure on the side.

If the temperature measured by the internal probe needs to be corrected (e.g. due to installation in a less than optimum position), a set number of degrees centigrade can be added or subtracted. For these settings see section "constructor", under the paragraph on "probes".

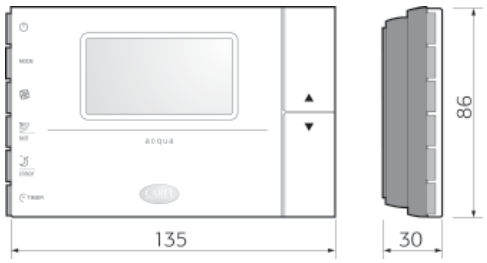


Fig. 3.i

Dimensions

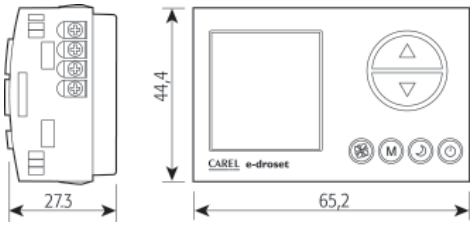


Fig. 3.j

3.3.6 e-droset

Avoid placing the terminal in places where the room temperature measurement may be altered: outside walls, near doors leading outside, exposed to the sun, near the fan coil etc. The terminal is located inside the plastic case and is accessible using a screwdriver.

Below is the sequence of operations for wall mounting:
- fasten the 3 gang support to the box for built-in installation using two screws;
- make the connections between the terminal and the wires in the shielded cable from the e-drofan.

terminal	meaning
GN (3)	use for connection to terminal GN on the e-drofan and the shield in the shielded cable
Tx (2)	use for connection to terminal Tx on the e-drofan
V+ (1)	use for connection to terminal V+ on the e-drofan

Maximum length of the shielded connection cable: 30 m from the e-drofan;
- insert the terminal in the plastic support;
- insert the fastening "shoulders";
- position the wallplate on the support.

The following wallplates can be used: BTicino Living International; Light; Light Tech; Matix VIMAR Idea; Idea Rondò; Plana.

The Living International - Light Tech - Matrix brands are the property of BTicino SpA. The Idea - Idea Rondò - Plana brands are the property of VIMAR SpA.

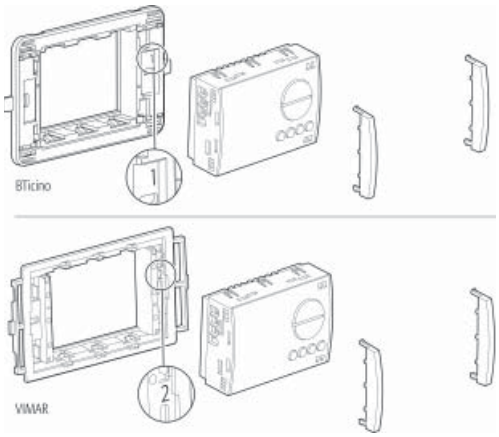


Fig. 3.k

If the local network (tLAN) is used, the terminal assigns the role of master to the fan coil connected.

Warnings:
- all installation and maintenance operations must be carried out with the unit off;
- adopt precautions against electrostatic discharges when handling the board.

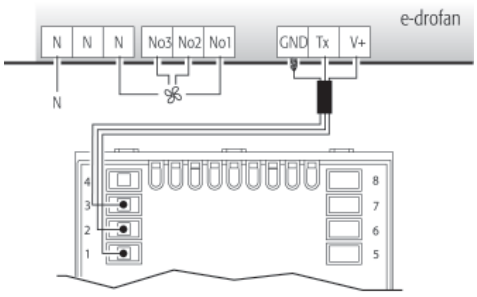


Fig. 3.l

The diagram in Fig. 3.k describes the connections to be made to the e-drofan board.

If the temperature measured by the internal probe needs to be corrected (e.g. due to installation in a less than optimum position), a set number of degrees centigrade can be added or subtracted. For these settings see section "constructor", under the paragraph on "probes".

3.3.7 Installing the modulating valves (3 point and 0-10V, with thermal actuator)

The e-drofan can control modulating valves using a P+I algorithm, see the "manufacturer" section for the appropriate configuration of the parameters.

3.3.8 Protection against electric shock and maintenance warnings

Important:

The system made up of the control board (HYFC0*****) and the other optional cards (HYVC000R0*, HYPA******, HYIR******, HYSC00F0C*, pCO serial cards etc.) represents a control device to be incorporated in class I or II appliances.

The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.

Disconnect the power supply before working on the board during assembly, maintenance, replacement and configuration. The protection against short-circuits must be guaranteed by the manufacturer of the appliance that the control device in integrated into or by the final installer.

3.3.9 Broadcast networks

In summary:

- Basic broadcast networks (max 5 slaves, max 30 m);
- Extended broadcast networks (up to 1 km, max 100 units) using the CANbus board;
- Simple reconfiguration from extended broadcast to hydronic system.

The network connection is used to simplify the operation of installations with multiple fan coils. For smaller environments, the tLAN can be used to create a small local network (basic broadcast) made up of a master and a maximum of 5 slaves (maximum total length: 30 m). In this case, the information is sent in one direction only: from the master to the slaves; all the settings on the master (the only unit fitted with the terminal) are applied to the slaves. By setting DIPSWITCH 6 on the master to ON, all the fan coils perform the control functions using the probe on the terminal, while if set to OFF, each fan coil performs the control functions using its own internal probe B1.

tLAN networks can also be created using the remote control as the user interface; in this case, the e-drofan master must be fitted with the IR receiver board and the resistor supplied must be connected between pins GN and V+.

Notes:

- A slave unit, disconnected from the network for at least 8 seconds, is automatically switched off;
- The panel only displays the status of the master;
- The slave alarms are managed locally and independently;
- If using the remote control, each fan coil performs the control functions using its own probe;
- The settings of the dipswitches present on the slave are ignored;
- The digital inputs on the slaves are disabled, with the exception of the ON/OFF and window alarm input;
- The parameters on a slave can be modified by disconnecting the network and connecting the terminal. Once the network is restored, the slave maintains the modifications (unless these concern the settings overwritten by the network);
- The following settings are sent by the master to the slaves: ON/OFF, mode (e.g. heating ..etc.), fan speed, SLEEP function, On/Off timer, set point, control probe (if DIP 6 on the master is ON).

Example of basic broadcast network

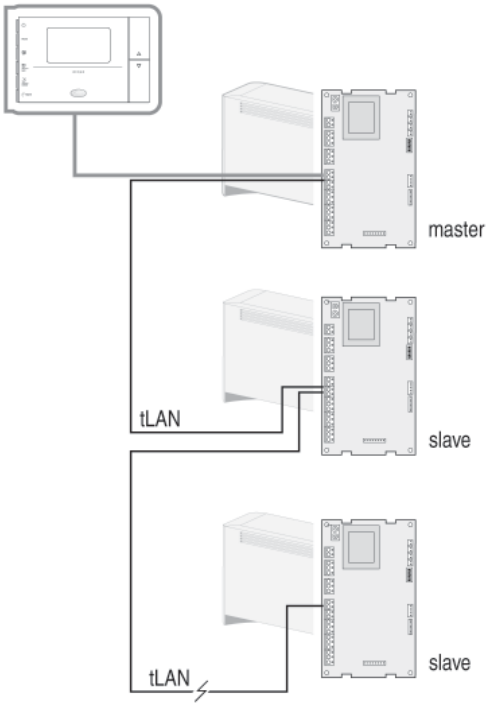


Fig. 3.m

To cover distances greater than the 30 m (up to 1 km in total) or connect more slaves, CANbus communication is required, using the serial board code HYSC****** (on each controller).

The following figure shows an example of an extended/multi-zone broadcast connection.

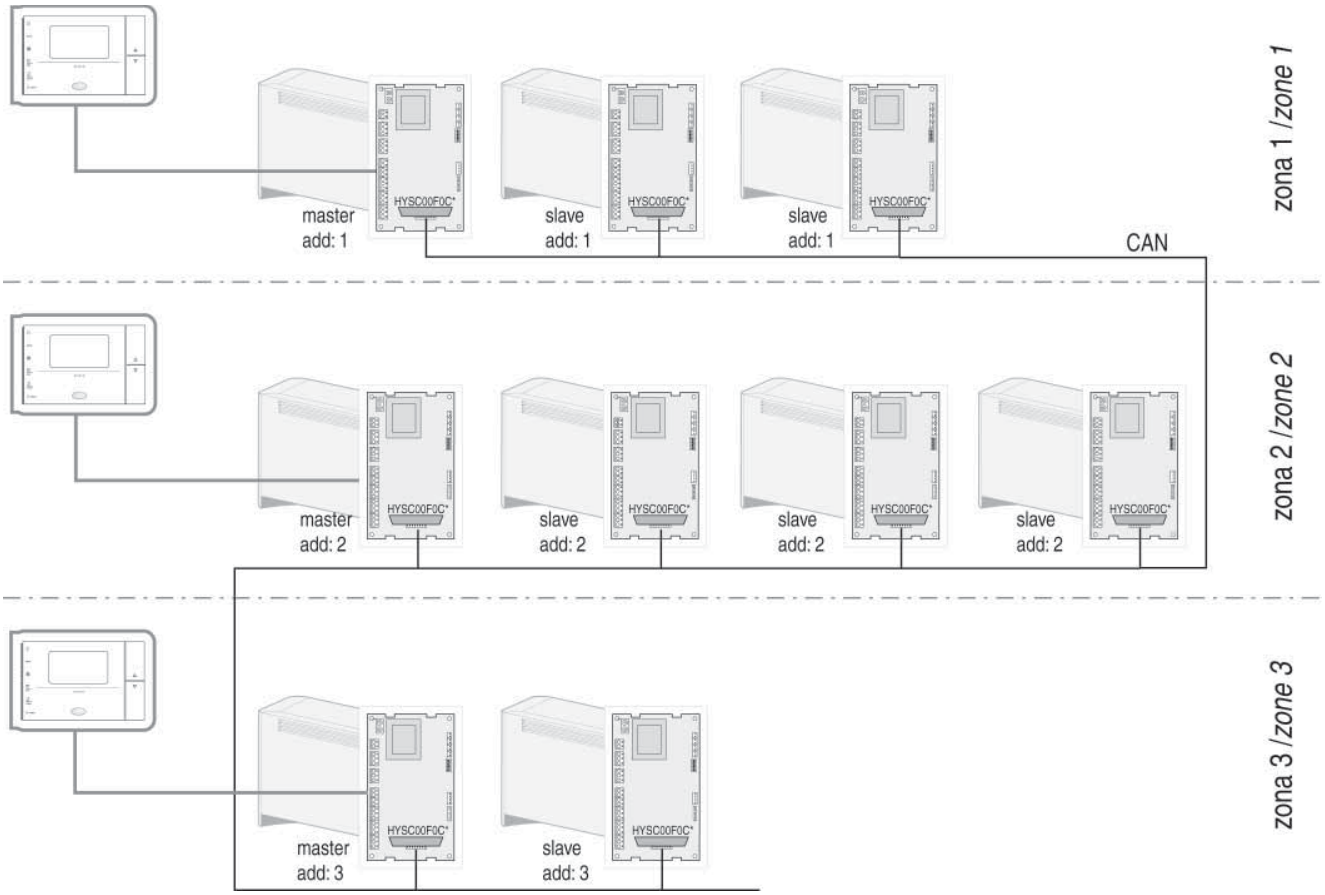


Fig. 3.n

The features of the CANbus connection are the following:
- Maximum number of units connected: 100;
- Maximum number of masters: 15;
- Maximum number of slaves: subtract the number of masters from 100;
- Maximum number of slaves for each master: all slaves available;
- Maximum length of the CANbus (total): 1 km with low communication speed (65 kbit); 500 m with high communication speed (125 kbit);
- Connection cable: Shielded cable, 2 wire + shield;
- Connect the two 120 ohm resistors to the ends of the CANbus (between terminals H+ and H-).

The behaviour is the same as in the case of the tLAN. The master has the control panel and sends all the slaves the status to be repeated.
Each controller must be fitted with a serial board and each slave must have the same address as the master it serves.

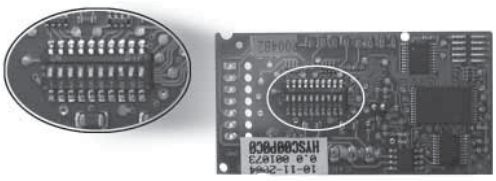


Fig. 3.o

The serial address is set on the group of 10 dipswitches located on the serial board (dips 1 to 7), see the following figure (Fig. 3.n).

In the extended broadcast, the available addresses range from 1 to 15; setting 0 allows the address to be entered from the acqua terminal (see the section on "advanced settings"), in this way the system can be reconfigured by simply connecting the terminal.

An extended broadcast installation can be easily converted to a hydronic system by modifying the serial addresses and setting a few parameters (see the section on "advanced settings" and "hydronic systems").

The following table shows the settings required to configure the corresponding addresses (binary notation):

Dipswitch setting	Address associated
	Default=1 (serial address set from the acqua terminal)
	1
	2
	3
	4
	5
	6
	7
	8
	9
	10
	11
	12
	13
	14
	15

Table 3.b

Dipswitches 9 and 10 are used to set the communication speed on the CANbus and must be both set in the same position.

dip 9 and 10 ON= 125 kbit/s
dip 9 and 10 OFF= 62.5 kbit/s
dip 8= must always remain ON for the use of the serial board on the e-drofan.

After each variation made to the position of the dipswitches, the e-drofan must be switched off and on again to make the changes operational.

The serial board is fitted with three LEDs to display the operating status. The green LED indicates that the serial board is on (power from the e-drofan) while the yellow and red LEDs indicate the serial communication status. When starting, the two LEDs (red and yellow) come on together, in normal communication first the red LED goes off, then the yellow LED, and finally the yellow LED (data reception in progress) or red LED (data transmission in progress) starts flashing. If both the LEDs are off steady communication is interrupted (the red LED continues flashing on the master).

Yellow LED	Red LED	meaning
ON	ON	starting sequence in progress
ON	OFF	starting sequence in progress
OFF	OFF	communication interrupted
flashing	OFF	data reception in progress (slave)
OFF	flashing	data transmission in progress (master)

Table 3.c

3.3.10 Procedure for testing the installation and alarms

Once the installation has been completed, the test procedure can be run to check the devices. The terminal is required for these functions. To enter test mode press the UP and DOWN buttons for 10 seconds with the unit connected to the power supply and in off status; the event is signalled by the buzzer, which emits a beep.
The test proceeds in steps, indicated on the terminal by the message "L" followed by an incremental number; pressing the UP button proceeds to the next step (signalled by the BEEPING of the buzzer). After the last step, the procedure ends and the controller returns to normal operation.

step	part in question	message flashing	message not flashing
"L01"	probe B1	probe error	probe Ok
"L02"	probe B2	probe error	probe Ok
"L03"	probe B3	probe error	probe Ok
"L04"	digital input 1	input open	input closed
"L05"	digital input 2	input open	input closed
"L06"	digital input 3	input open	input closed
"L07"	digital input 4	input open	input closed
"L08"	digital input 5	input open	input closed
"L09"	fan		on at minimum speed, no internal check
"L10"	fan		on at medium speed, no internal check
"L11"	fan		on at maximum speed, no internal check
"L12"	expansion output NO4		output activated, voltage present (L). No internal check
"L13"	expansion output NO5		output activated, voltage present (L). No internal check
"L14"	expansion output NO6		output activated, contact closed. No internal check
"L15"	expansion output NO7		output activated, contact closed. No internal check

Table 3.d

During operation (as well as during the test procedure), the device may generate alarm signals displayed on both the IR receiver board and on the terminal.
The alarms are shown in section "constructor".

4. ADVANCED SETTINGS

In summary:
- General functions: inlet water temperature control;
- Algorithm to overcome the phenomenon of air stratification;
- Manual operation: cooling, heating (heater management, if present), dehumidify, fan;
- Automatic operation (heater management, if present);
- Set point compensation based on the outside temperature;
- occupancy: possibility to use a second set point if the environment is not occupied (energy savings);
- control of modulating valves: three point or with 0 to 10 Vdc input.

The e-drofan provides a number of additional functions compared to traditional controllers: 5 digital inputs that can be configured, 3 probes, 1 dipswitch for rapid customisation on site, possibility of tLAN network connection and advanced control algorithms.
The e-drofan comes with a family of accessories (see the description in section "installer") including: the acqua terminal (with NTC probe on board) or the remote control with corresponding receiver board, the expansion card with 4 relay outputs and the CANbus serial board for creating hydronic systems; as an alternative to the latter accessory, the 485 serial board can be installed to create customised (PlantVisor) or open (Modbus) connectivity solutions.
The following section shows, in sequence, the description of the parameters, from the configuration of the I/O to the setting of the control algorithms. The list of parameters is shown at the end of the section.

Important: avoid parameter settings that create situations of conflict (for example, do no not configure 2 digital inputs on the same e-drofan for economy operation).

4.1 Configuration of the I/O and installer custom settings

The inputs and the outputs can be configured by parameter, thus giving the manufacturer complete freedom in choosing the available functions, while at the same time the installer can simply make the custom settings relating to the installation in progress (2 pipe, 4 pipe, etc.) using the dipswitches (see section "installer").
The parameters may be set from: the acqua terminal, the programming key and the serial connection.
The following section shows some examples that help describe the controllable loads (fan, valves, heater etc.) and the corresponding configuration of the parameters.

Example of fan coil installation in two pipe system:

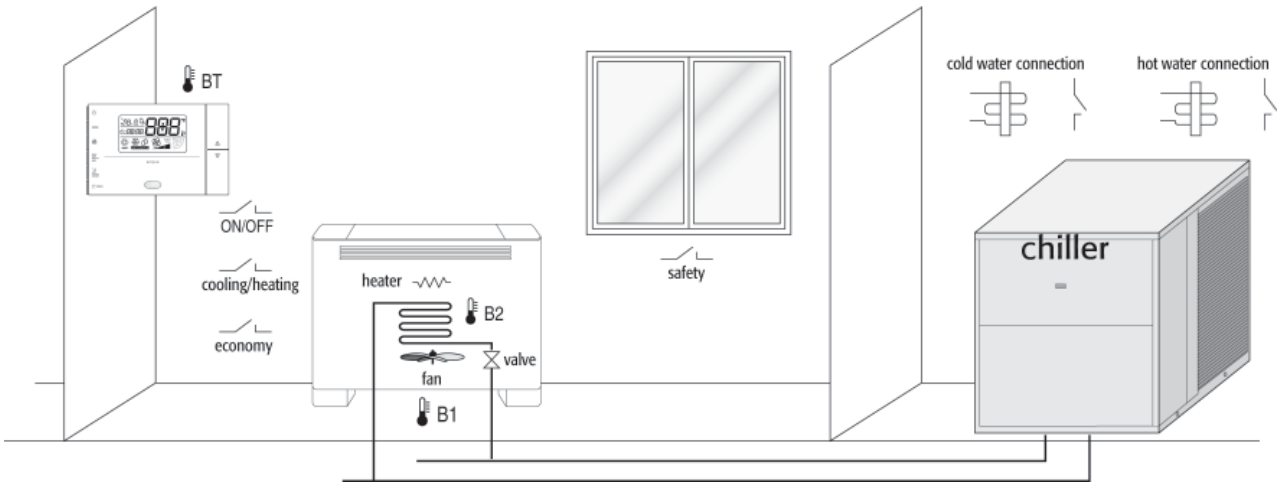


Fig. 4.a

4.1.1. Modifying parameters

To display and modify the parameters, enter editing mode by pressing, with the device OFF, the mode and clear buttons for 5 seconds (password 22) and then entering the second password for parameter P92 (password 66). To restore the default values, set parameter P91 to the value 44 (with the device OFF).

Fig. 4.b.a

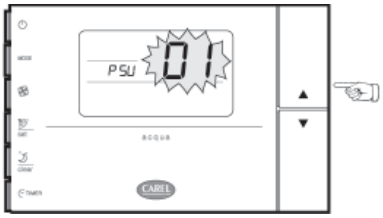


Fig. 4.b.b

Fig. 4.b.c

ENGLISH

4.1.2 Probes

The probe readings are affected by the position of the fan coil (on the wall or the floor), due to the phenomenon of air stratification. To overcome this problem, different offsets can be specified, depending on the operating mode (heating or cooling). Faults with the control probe or one of the probes on the two exchangers will stop the fan and close the valve. By default the use of the probes must be set by dipswitch, nonetheless for the use of modulating valves and the P+I function, the probes can be set directly by parameter (the parameters must be set for all the probes and P95=1).

probe	description	related parameters	notes
B1	Air intake probe/Outside air probe (compensation)	P22, P58, P59, P60, P61	When DIP6 is OFF and P22=0: room control probe.
B2	Main indoor exchanger probe	P62, P63	Enabled when DIP1= ON
B3	Secondary indoor exchanger probe/Outside air probe (compensation)	P22, P64, P65	Enabled when DIP1= ON and DIP4= ON
BT	Probe inside the terminal		When DIP6 is ON = Room control probe.

Table 4.a.a

par	unit of measure	def	min	max	setting	function
P15		0	0	5	Use probe B1 0= Use defined by dipswitch and P22 1= probe disabled 2= Cold/hot water coil probe 3= Cold water coil probe 4= Hot water coil probe 5= Control probe (WITH DIP6=OFF)	
P16		0	0	5	Use probe B2 See P15	
P17		0	0	5	Use probe B3 See P15	
P22		0	0	2	0= compensation disabled 1= B1 outside air probe (compensation enabled) 2= B3 outside air probe (compensation enabled) When P15, P16, P17 is other than 0, compensation disabled	compensation (see corresponding paragraph)
P58	°C/10	0	-99	127	probe B1 offset in cooling/dehumidify	
P59	°C/10	0	-99	127	probe B1 offset in heating	
P60	°C/10	0	-99	127	probe B1 offset in automatic	
P61	°C/10	3	-99	127	probe BT offset as room control probe	
P62	°C/10	0	-99	127	probe B2 offset in cooling/dehumidify	
P63	°C/10	0	-99	127	probe B2 offset in heating	
P64	°C/10	0	-99	127	probe B3 offset in heating	
P65	°C/10	0	-99	127	probe B3 offset in cooling/dehumidify	

Table 4.a.b

4.1.3 Digital inputs

Digital inputs DI1 and DI2 have a fixed configuration, while the remaining inputs can be configured by parameter. The off status of the digital input has priority over the signals received via the serial communication, so as to allow the user (directly affected by the flow of cold or hot air) to switch the fan coil units off.

input	description	related parameters	notes
DI1	ON/OFF input		when the input is closed the unit is off (even in the event of network connection). In the transition from OFF->ON the e-drofan is started, but may subsequently be switched off from the terminal or via serial connection. In the off status, the valve is closed and the fan is stopped (after any post-ventilation phase required for the heater).
DI2	cooling/heating		Enabled when DIP2= ON
DI3	multifunction	P43	
DI4	multifunction	P44	
DI5	multifunction	P45	

Table 4.b.a

par	def	setting	function
P43	0	0= input disabled	
		1= economy (normally open)	vary the set point (cooling= increase, heating= decrease)
		2= window alarm (normally open)	stop fan and close the valve
		3= occupancy (normally open)	keep the fan coil ON for half an hour
		4= circulating pump alarm (normally open)	stop fan and close the valve
		5= local stop (generic alarm, normally open)	stop fan and close the valve
		6= economy (normally closed)	
		7= window alarm (normally closed)	
		8= occupancy (normally closed)	
		9= circulating pump alarm (normally closed)	
		10= local stop (normally closed)	
P44	0	see P43	-
P45	0	see P43	-

Table 4.b.c

The management of the occupancy input is described in the paragraph on the occupancy function.
The Economy function is the same as the sleep function, with the difference that it is activated/deactivated by digital input.

4.1.4 Outputs

output	description	related parameters	note
No1	Voltage output (L) for minimum fan speed winding.	-	-
No2	Voltage output (L) for medium fan speed winding	-	-
No3	Voltage output (L) for maximum fan speed winding.	-	-
No4	Multifunction voltage (see DIP4)	P39	e-drofan expansion
No5	Multifunction voltage (see DIP4 and DIP5)	P40	e-drofan expansion
No6	Multifunction voltage	P41	e-drofan expansion
No7	Multifunction voltage	P42	e-drofan expansion

Table 4.c.a

par.	def.	setting
P39	5	When P95=0 the output is set by dipswitch (with dip 4 OFF the parameter is forced to 5, dip 4 ON the parameter is forced to 1). If P95=1 the output is settable by P39, the traditional heater can only be used when dipswitch= 1 0= Output disabled; 1= Cold water valve (normally open); 2= Hot water valve (normally open); 3= Chiller trigger, cold water request (normally open). Contact closed with cold/hot water valve or cold water only active (open with valve deactivated); 4= Boiler trigger, hot water request (normally open). Contact closed with cold/hot water or hot water valve only active (open with valve deactivated); 5= Cold/hot water valve (normally open). Activated with the cooling/heating request from the controller. Off when both are deactivated; 6= Heater (normally open) (set parameters P46 and P13); 7= Alarm (normally open); 8= Circulating pump (normally open). Activated when one of two valves, hot or cold water, opens. Off when are both deactivated. 9= 3-point valve + (clockwise) for cold water (hot/cold water if dip4= OFF). * 10= 3-point valve - (anticlockwise) for cold water (hot/cold water if dip4= OFF). * 11= 3-point valve + (clockwise) for hot water (deactivated if dip4= OFF). * 12= 3-point valve - (anticlockwise) for hot water (deactivated if dip4= OFF). * 13= Valve with 0 to 10 Vdc input for cold water (hot/cold water if dip4= OFF). * 14= Valve with 0 to 10 Vdc input for hot water (deactivated if dip4 = OFF). * 15= Reserved for future use 16= Reserved for future use 17= Output 0 to 10 Vdc for modulating heater control (by external module). Set parameters P111, P116. * 18= Output (triac or relay) for ON/OFF heater management (with hysteresis) on P+I. Set parameters P111, P112. *
P40	0	If P95=0 the output is set by dipswitch (if dip 4 is OFF the parameter is set to 0, dip 4 ON the parameter is set to 2). When dip 4 is OFF and dip 5 is ON the parameter is set to 6, that is, heater output. If P95=1 the output can be set by P40, in any case the heater cannot be used when dip4= ON. For the other settings see P39
P41	3	Vedere P39
P42	4	Vedere P39
P95	0	0=outputs No4 and No5 set by dipswitch 4 1=outputs No4 and No5 can be set by parameter P39 and P40 (settare a 1 per abilitare le uscite modulanti, algoritmo P+I)

Table 4.c.b

* The P+I parameters need to be set, see chap. 4.2.10.

summary table of the e-drofan options

	4 relay exp. HYVC000R0*				4 relay exp. HYVC000T0*				0 to 10 Vdc exp. HYVC000V0*				Triac/relay exp. HYVC000M0*			
	No4 (rel. volt)	No5 (rel. volt)	No6 (rel)	No7 (rel)	No4 (triac volt)	No5 (triac volt)	No6 (triac volt)	No7 (triac volt)	No4 (0 to 10 V)	No5 (0 to 10 V)	No6 (rel)	No7 (rel)	No4 (triac volt)	No5 (triac volt)	No6 (rel 10 A)	No7 (rel)
Set P39, P40, P41, P42	P39	P40	P41	P42	P39	P40	P41	P42	P39	P40	P41	P42	P39	P40	P41	P42
With P95=0 the output is set by dipswitch (with dip 4 OFF the parameter is forced to 5, dip 4 ON the parameter is forced to 1). If P95=1 the output is settable using P39																
0= Output disabled																
1= Cold water valve (normally open)	√	√	√	√	√	√	√	√			√	√	√	√	√	√
2= Hot water valve (normally open)	√	√	√	√	√	√	√	√			√	√	√	√	√	√
3= Chiller activation signal, cold water request (normally open). Contact closed with cold/hot water valve or cold water only active (open with valve deactivated)	√	√	√	√	√	√	√	√			√	√	√	√	√	√
4= Boiler activation signal, hot water request (normally open). Contact closed with cold/hot water valve or hot water only (open with valve deactivated)	√	√	√	√	√	√	√	√			√	√	√	√	√	√
5= Cold/hot water valve (normally open). Activated with the cold or hot water request from the controller. Off when are both deactivated	√	√	√	√	√	√	√	√			√	√	√	√	√	√
6= Heater (normally open); Select e-drofan option based on the current request on the relay: 2 Aac or 10 Aac	√	√	√	√	√	√	√	√			√	√	√	√	√	√
7= Alarm (normally open)	√	√	√	√	√	√	√	√			√	√	√	√	√	√
8= Circulating pump (normally open). Activated when either the hot or cold water valve opens. Off when are both deactivated	√	√	√	√	√	√	√	√			√	√	√	√	√	√
9= 3-point valve + (clockwise) for cold water (hot/cold water if dip4=OFF). Use e-drofan 4 triac or triac/relay (triac outputs only) option*					√	√	√	√					√	√		
10= 3-point valve - (anticlockwise) for cold valve (hot/cold water if dip4=OFF). Use e-drofan 4 triac or triac/relay (triac outputs only) option*					√	√	√	√					√	√		
11= 3-point valve + (clockwise) for hot water (deactivated if dip4 =OFF). Use e-drofan 4 triac or triac/relay (triac outputs only) option*					√	√	√	√					√	√		
12= 3-point valve - (anticlockwise) for hot water (deactivated if dip4 =OFF). Use e-drofan 4 triac or triac/relay (triac outputs only) option*					√	√	√	√					√	√		

13= Valve with 0 to 10 Vdc input for cold water (hot/cold water if dip4=OFF). Use e-drofan 0 to 10 V/relay option*									√	√						
14= Valve with 0 to 10 Vdc input for hot water (deactivated if dip4 =OFF). Use e-drofan 0 to 10V/relay option*									√	√						
15= Reserved for future use																
16= Reserved for future use																
17= 0 to 10 Vdc output for control of modulating heaters (by external module). Set parameters P111, P116*									√	√						
18= Output (triac or relay) for management of ON/OFF heaters (with hysteresis) on P+I. Set parameters P111, P112*	√	√	√	√	√	√	√	√			√	√	√	√	√	√

Below is a possible example for 0/10V modulating actuators on 4 pipe fan coils with heating/cooling request:

Analogue output option HYVC000V**:
- output No4: P39= 13 modulating 0 to 10 V cold water valve output;
- output No5: P40= 14 modulating 0 to 10 V hot water valve output;
- output No6: P41= 3 cooling request;
- output No7: P42= 4 heating request.

Do not set modulating and non-modulating outputs at the same time (e.g. P39=1, P40=16 or P39=6 and P40=17 etc.), as with modulating actuators control is P+I (when suitably configured); in any case, the following outputs can still be used: chiller activation signal, boiler activation signal and alarm. Only one output can be set as a heater.

4.1.5 Dipswitches and type of installation

	main coil	secondary coil	dipswitches
2 pipe (active probe: B2)	Functions available: cooling / heating (local hot/cold water valve)		DIP4= OFF DIP1= ON
4 pipe (active probes: B2,B3)	Functions available: cooling (cold water valve)	Functions available: heating (hot water valve)	DIP4= ON DIP1= ON

Tab. 4.d

In the case of 4 pipe installations, the main and secondary coil valves are never open at the same time, and the heater is disabled.

par	unit of measure	def	min	max	setting
P12	°C	37	0	255	Temperature to enable the fan in heating, automatic heating
P13	°C/10	10	0	255	Hysteresis to enable the fan in heating/automatic heating, cooling, automatic cooling
P14	°C	21	0	255	Temperature to enable the fan in cooling/automatic cooling
P51	min	0	0	255	Local valve, hot/cold water valve opening time
P52	min	0	0	255	Local valve, hot/cold water valve closing time

Table 4.8

In case of installations where the fan coils are used in stand-alone mode, the controller cannot know in advance the value of the temperature of the water contained in the loop, the probes being in the coil therefore afterwards the valves. After a series of attempts at fixed time intervals, it is possible to detect the temperature through the parameter P51 setting, minimum opening time, and P52, preset waiting time.

A series of attempts are performed to activate the hot/cold water valve until the exchanger reaches the temperature required to activate the fan (cool/heat enable), in which case the cycle of attempts is reset. The hot/cold water valve is activated for the time equal to P51 and remains off respectively for the time P52 after the first attempt, for P52-5 minutes after the second attempt, for P52-10 minutes after the third attempt, off for P52 x 2 after the fourth attempt; following the four attempts the cycle restarts from point 2 (valve OFF for P52 - 5 minutes).

4.1.6 Method for testing the installation

See section “installer”.

4.2 Control algorithms

In summary:
- General functions: Heat enable, Cool enable, Flush, Extra flush, autofan, continuous ventilation;
- Manual operation: cooling, heating (heater management, if present), dehumidify, fan;
- Automatic operation (heater management, if present);
- Set point compensation according to the outside temperature;
- Timer ON/OFF and SLEEP function;
- P+I control algorithm for modulating valves.

Below is a description of the operation of the e-drofan, divided into general functions, manual and automatic functions.

4.2.1 General functions: heat enable (heating/automatic heating)

In order to avoid undesired flows of cold air, the fan is only operated if the temperature of the main coil (probe B2) is high enough. If this condition is not satisfied the heating symbol flashes. DIP1 must be set to ON. The fan speed allowed (limiting the request by the control algorithm) is described in the following graph.

par.	def.	min.	max.	unit of measure	setting
P10	29	0	255	°C	Temperature to enable minimum fan speed in heating/automatic heating
P11	33	0	255	°C	Temperature to enable medium fan speed in heating/automatic heating
P12	37	0	255	°C	Temperature to enable maximum fan speed in heating/automatic heating
P13	10	0	255	°C/10	Fan activation hysteresis (heat enable/cool enable)
P55	0	0	1		0 = Display heating or cooling symbols in automatic mode: deactivated 1 = Display heating or cooling symbols in automatic mode: activated

Table 4.e

If the fan is disabled by the heat enable function, the heating symbol flashes (the heater remains on) as a signal to the user. After the hot/cold water valve or hot water valve only is closed, the fan is stopped. The heat enable function must be disabled when using modulating actuators (3 way valves … etc).

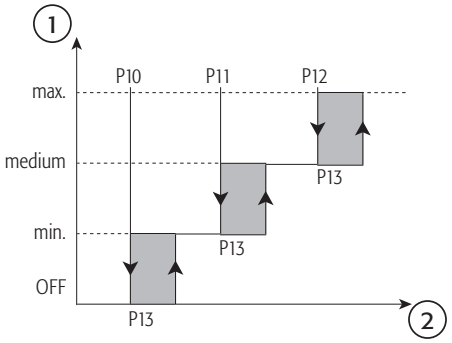


Fig. 4.c

Key:
1. speed allowed;
2. OFF main exchanger temperature (probe B2).

4.2.2 General functions: cool enable (cooling/ automatic cooling, dehumidify

In order to avoid undesired flows of hot air, the fan is operated only if the temperature of the coil is low enough. If this condition is not satisfied the cooling symbol flashes. The DIP1 must be set to ON. The fan speed is managed by the control algorithms or set manually.

par.	def.	min.	max.	unit of measure	setting
P13	10	0	255	°C/10	Fan activation hysteresis (heat enable/cool enable)
P14	21	0	255	°C	Temperature to enable fan in cooling, automatic cooling and dehumidify
P55	0	0	1		0= Display heating or cooling symbols in automatic mode: deactivated 1= Display heating or cooling symbols in automatic mode: activated

Table 4.f

If the fan is disabled by the cool enable function, the cooling symbol flashes as a signal to the user. After the hot/cold water valve or cold water valve only is closed, the fan is stopped. The cool enable function must be disabled when using modulating actuators (3 way valves … etc).

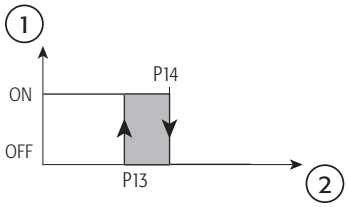


Fig. 4.d

Key:
1. fan status;
2. main exchanger temperature (probe B2).

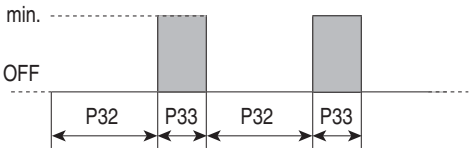


Fig. 4.e

4.2.3 General functions: Flush (fan on/off cycles)

To overcome the phenomenon of air stratification, the e-drofan operates fan on/off cycles at minimum speed, even when the room temperature has reached the set point (the local/hot/cold valve remains closed). This helps ensure the correct measurement of the room temperature if the probe on the acqua terminal is not used (control probe B1). If control is performed by probe BT, the flush function is disabled.
The behaviour can be modified depending on the operating mode: heating, cooling, dehumidify or automatic. The fan is started after a period of inactivity (due to the set point having been reached or the heat enable or cool enable functions), equal to the value of parameter P32.

The local/hot/cold valve should be installed to use the flush function.

par.	def.	min.	max.	unit of measure	setting
P34	0	0	3		0= Function disabled; 1= Flush function active in cooling, dehumidify and automatic OFF. 2= Flush function active in heating and automatic OFF. 3= Flush function active in heating, cooling, dehumidify and automatic OFF.
P32	2	0	255	min	0= Flush disabled >0: Period of fan inactivity (due to the control or flush function)
P33	90	0	255	s	0= Flush disabled >0: Fan duration

Table 4.g

4.2.4 General functions: Extra Flush

This function ensures correct operation when the acqua terminal is not fitted (control probe B1), overcoming the phenomenon of air stratification.
Whenever switching from OFF->ON or changing operating mode, the e-drofan runs a fan cycle at minimum speed (for the time P35) to make sure the room temperature is uniform.
At the end of this interval, normal operation resumes. This is especially useful in the event of automatic operation. It is deactivated if probe BT on the terminal is used for the control functions.
The local/hot/cold valve should be installed to use this function.

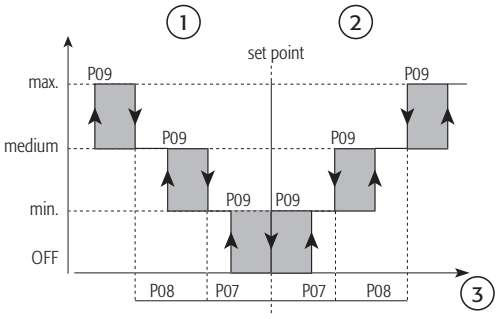


Fig. 4.f

Key:
1. heating (winter);
2. cooling (summer)
3. room temperature.

4.2.5 General functions: Autofan (fan speed selection based on the room temperature)

The Autofan function establishes the fan speed when this is not set manually by the user.
In cooling and heating mode the speed is higher the more the room temperature deviated from the set point (including automatic cooling, automatic heating). In fan mode the speed is fixed at the medium value for the range set by parameters P30, P31, P06 (see the paragraph below). In dehumidify mode the speed is fixed at the minimum value.

par.	def.	min.	max.	unit of measure	setting
P07	7	0	255	°C/10	Deviation of the room temperature from the set point above which the fan is activated at medium speed
P08	7	0	255	°C/10	Deviation of the room temperature from the set point above which the fan is activated at maximum speed
P09	5	0	255	°C/10	Hysteresis of the room temperature-set point deviation

Table 4.h

4.2.6 General functions: Continuous ventilation

If required, the fan can be activated in permanent mode; the fan speed is set by the user even when the room temperature has reached the set point (in AUTOFAN the speed is set to the minimum value). The heat cool enable functions have no effect.

parameter	setting
P29	0= Continuous ventilation deactivated. 1= Continuous ventilation activated.

Table 4.i

The local/hot/cold valve should be installed to use this function.

4.2.7 General functions: Comfort

This function, if activated by P36, disables the modification of the set point, allowing only an offset of +/- 3°C from the set value (in heat, cool, dry and automatic modes).
On the e-drofan master, the set point can be set via a serial connection (see the corresponding paragraph), while the slaves receive the set point from the related master and apply any offset (set from the terminal).
The master automatically loads the set point saved for parameter p01 when starting; this is subsequently modifiable via a serial connection. Set the logic and dependence parameters suitably.
E.g. In a hydronic system, the set point can be set on the e-drofan master and the slaves only allow modifications of +/- 3 C.
E.g.. In a centralised system (hotel), the room set point can be set via serial, allowing the guest the possibility to change it by +/- 3 C.

4.2.8 General functions: Occupancy

This function is used to set a second set point applied if the environment is not occupied, allowing the air-conditioning system to consume less energy and thus achieve cost savings.
The set point is increased by the value set for parameter P18 in cooling/dry mode, or decreased by the value set for P19 in heating mode.
Three typical situations have been identified, represented by parameter P93 "occupancy type"; each type can be optimised using time bands (set via a supervisory system) and occupancy sensors.

status of the installation	occupancy type	room status	e-drofan operation	event activating control at the set point	symbol on master terminal
OFF (command sent only once from supervisory system)	0	Unoccupied/ occupied	OFF		
	1= meeting room				
	2= corridor				
	3= office				
ON+ECO (command sent only once from supervisory system)	0	Unoccupied/ occupied	set point= economy		
	1= meeting room	Unoccupied	set point= economy		
		Occupied	set point=set value. When the occupancy timer has elapsed, e-drofan will return to set point = economy.	The occupancy timer is set as follows: 1. Pressing any button (except the ON/OFF button); 2. Pressing the sleep button or activation of the occupancy digital input.	
	2= corridor	Unoccupied/ occupied	set point= economy		
	3= office	Unoccupied	set point= economy		
		Occupied	set point= set value. When the occupancy timer has elapsed, e-drofan will return to set point = economy.	The occupancy timer is set as follows: 1. Pressing any button (except the ON/OFF button) or activation on the occupancy digital input; 2. Occupancy timer reset when pressing the sleep button or activation of the occupancy digital input.	
ON (command sent only once from supervisory system)	0	Unoccupied/ occupied	ON		
	1= meeting room	Unoccupied	set point= economy		
		Occupied	set point= set value. When the occupancy timer has elapsed, e-drofan will return to set point = economy.	The occupancy timer is set as follows: 1. Pressing any button (except the ON/OFF button); 2. Pressing the sleep button or activation of the occupancy digital input.	
	2= corridor	Unoccupied	set point= economy		
		Occupied	set point= set value. When the occupancy timer has elapsed, e-drofan will return to set point = economy	The occupancy timer is set upon activation of the occupancy digital input.	
	3= office	Unoccupied/ occupied	set point= set value	• No digital input: Set point always = set value. Pressing the sleep button for 5 s. activates the * symbol and the set point= economy. • With digital input: 1. Pressing any button (except the ON/OFF button) or activation on the occupancy digital input; 2. Occupancy timer reset when pressing the sleep button or activation of the occupancy digital input.	

Table 4.j.a

- In all modes the change ON+ECO->ON or OFF->ON sets the "occupancy timer", that is, on power-up the e-drofan starts with set point equal to the set value.
- In all modes (except corridor), holding the sleep button for 5 seconds the e-drofan takes set point= set value without time limits until receiving the OFF command; the set point may return to economy by pressing the sleep button again or switching the unit OFF or alternatively by disconnecting and reconnecting power to the e-drofan.

In a hydronic network the occupancy function shares the same variables as the economy/sleep functions, meaning the slaves can be forced to follow the status of the master (simply set the function on the master). In any case, the occupancy on a slave can be managed locally (obviously this must be fitted with a terminal) by activating the function using the corresponding parameter; in this case the activation request (following the detection of occupancy on the master) is ignored.

N.B.: do not use the ECONOMY digital input with the occupancy function enabled.

With the remote lock function active (dipswitch 3= ON) pressing the sleep button for 5 seconds does not switch to occupied mode without time limits.

Below is an example of occupancy management in a centralised system for offices:

time band	installation status	description	rooms
00.00 06.00	Installation OFF	The installation remains off and ignores the requests from the fan coil	All types
06.00 08.00	ON+ECO	The installation starts air-conditioning the rooms, preparing them for the arrival of the personnel. The fan coils start from unoccupied (set point= economy, e.g. 16°C in heating) and if necessary switch to occupied according to the types shown above.	• office • meeting room
08.00 12.00	Installation ON	The installation controls the temperature of the rooms to ensure the comfort of the personnel. At 8:00 all fan coils are activated at the set point= set value (e.g. 20°C in heating) for a time equal to the occupancy timer; upon expiry of the timer, the fan coils return to the management depending on the type.	All types
12.00 14.00	ON+ECO	The installation returns to unoccupied during the lunch break (set point= economy, e.g. 16°C in heating), maintaining comfort only where required.	• office • meeting room
14.00 18.00	Installation ON	The installation starts air-conditioning the rooms again to ensure the comfort of the personnel (e.g. 20°C in heating). At 14:00 all the fan coils are activated at set point =set value (e.g. 20°C in heating) for a time equal to the occupancy timer; upon expiry of the timer, the fan coils return to the management depending on the type.	All types
18.00 20.00	ON+ECO	The installation returns to unoccupied due to the absence of personnel (set point= economy, e.g. 16°C in heating), maintaining comfort only where required.	• office • meeting room
20.00 24.00	Installation OFF	The installation remains off and ignores the requests from the fan coil	All types

Table 4.j.b

4.2.9 General functions: P+I algorithm (cooling/heating/automatic)

The e-drofan features a P+I algorithm that is used to control modulating valves with 0 to 10 Vdc input and 3 point valves.
Control can be performed on the BT probe on the terminal (room temperature, enabled by dipswitch 6) or on one of the three probes on the e-drofan (e.g. air intake temperature), by setting the corresponding parameter.
The P+I algorithm is activated by enabling one of the modulating valve outputs and setting the proportional band and integral time parameters.
Below is a diagram showing the use of the modulating valves in heating mode.

Key:

1	P+I output
2	control probe (°C)
3	heater activation
4	open valve
5	close valve
6	P109 dead band
7	P112 ON/OFF heater hysteresis
8	P115 valve proportional band
9	P111 heater proportional band
10	set point

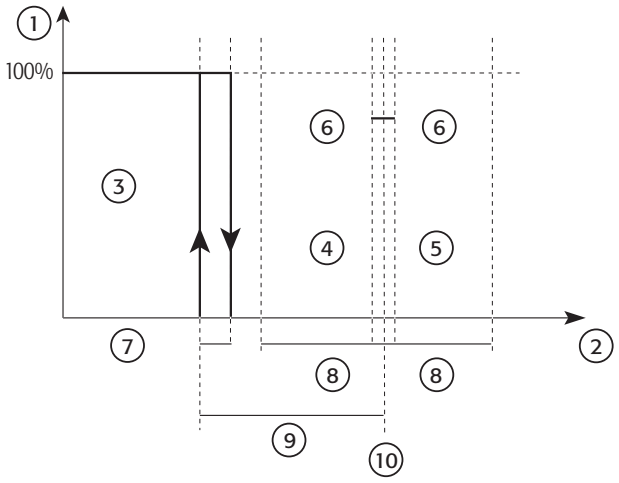


Fig. 4.h.b

The proportional band determines the temperature range within which the actuator moves from closed to maximum opening with control by the proportional term only. The extent of opening depends on the proportional and integral factors; the proportional factor opens the valve further the more temperature is below the set point, while the integral factor increases the opening of the valve if the device takes a long time to reach the set point (with the temperature above the set point the behaviour is symmetrical, that is, the valve is closed).
Low values of the proportional band cause a fast and intense response but cause system instability (swings between opening and closing of the valve); setting low values for the integral factor offers a fast response but, in this case too, the risk of the system becoming instable remains. The integral factor compensates for any misalignments between the theoretical position and the actual position of the valve (this is phenomenon typical of 3 point valves after a large number of operations).
To correctly set the proportional band and the integral time, run some tests on the fan coil system in the environment being air-conditioned, simulating high load and low load conditions and the typical variations in load. One example of the values that can be initially used is: valve proportional band P115= 30 (3°), P114= 30 (3°) and integral time P108= 60 (that is, 600 s).

A parameter is featured that limits the movements of the valve so as to reduce wear and adapt the P+I output to the effective resolution in the position of the actuator; in fact, a minimum variation in the P+I

output can be established before effectively switching the output (parameter P99).
Parameter P109 is the dead band (to the sides of the set point); within this zone the algorithm accepts minimum variations of the control temperature without performing any action, the purpose is to avoid instability and limit the number of operations of the actuator in steady operation (the integral factor remains constant, while the proportional factor is equal to 0). In cooling mode, the behaviour is symmetrical.
For the effective use of the actuators, the fan is activated when the P+I output is other than zero, the fan speed can be set manually or determined by the autofan function (in this case, at least the minimum speed is guaranteed).
The position of the valve can be displayed on the Acqua terminal in the place of the set point (see parameter P37).
If a series of actuators are used with overlapping set points and proportional bands, the activation is performed in sequence, starting from the resource with the lowest cost (e.g. valve) and ending with the resource with the highest cost (e.g. heater).

The "bumpless transfer" parameter is featured that, in response to modifications of the P+I algorithm control parameters during the normal operation of the unit, is used to dampen any swings or over-corrections of the system, especially if the algorithm interacts with a series of devices or actuators.

The P+I parameters are shown in the following table (for the settings corresponding to the various types of valves, see the following paragraphs).

par.	description	def	min	max	UOM
P99	Minimum P+I output variation for valve movement (0 to 10 V and 3 point valve) and heater increase. Expressed as a % of the total P+I output.	5%	0	100	%
P107	Bumpless transfer 0= no management of the transients for a change in actuator, variation in P+I parameters and variation in the set point. 1= gradual activation when changing actuator 2= gradual activation when changing actuator and gradual response to variations in P+I parameters 3= gradual activation when changing actuator, gradual response to variations in P+I parameters and set point	1	0	3	
P108	Integral time 0= Integral factor disabled	0	0	255	s *10
P109	Dead band	2	0	255	°C/10
P111	Heater control set point, expressed as an offset from the set point (ON/OFF management with hysteresis)	30	0	255	°C/10
P112	Heater control set point heater hysteresis with ON/OFF management	5	0	255	°C/10
P114	Cold valve proportional band 0=actuator disabled	0	0	255	°C/10
P115	Hot valve proportional band 0=actuator disabled	0	0	255	°C/10
P116	Modulating heater proportional band	0	0	255	°C/10

When the P+I output is other than zero, the heating/cooling request bits (depending on the mode) are set.
The P+I times for the 3 point valves or thermal valves have a resolution of 1 sec. With P+I active, the heat/cool enable functions are ignored. Set an integral time that considers the travel speed of the modulating valve used.

4.2.10 General functions: modulating valve management

The management of modulating valves requires the algorithm P+I to be enabled.
For the correct use of 3 point valves, the time taken by the valve to completely open or close needs to be entered.

par.	description	def	min	max	UOM
P97	Maximum valve travel time (or 2 windings)	0	0	600	s

Synchronisation

When the e-drofan is shutdown (switched from ON ->OFF), powered up, or when total closing is requested (in this case, the minimum time between two synchronisation cycles is 6 hours), a complete closing cycle is performed to ensure correct alignment between the position determined by the P+I algorithm and the real position, as there may in fact be misalignments due to mechanical wear after a significant number of operations. The synchronisation procedure is only performed on the 3 point valves, while for the valves with 0 to 10 V input, the function is managed by the electronics on the actuator.
The return to normal operating conditions after a synchronisation cycle is managed according to the normal dynamics of the P+I algorithm, given that the extent of the error at the moment of synchronisation cannot be known.
Small deviations between the theoretical and the actual position are automatically compensated for by the integral factor.

Antistick

To prevent the valves from blocking (due to impurities or the entrainment of solid residues in the water circuit), set movements of the valve are performed periodically. These operations are effected only after a certain period in which the valve is inactive (for example, when the set point has been reached or when the device is off). For the valves with 0 to 10 V input, this function is managed by the electronics on the actuator.

par.	description	def.	min	max	UOM
P100	Maximum valve inactivity time after which the antistick function is activated. If= 0 the antistick function is disabled	4	0	255	hours
P101	Forced movement due to antistick function. Considered as a % of the maximum travel set	20	0	100	% max travel

4.2.11 General functions: fan speed limit

In some applications, the fan speed needs to be limited; this is done by setting parameter P117.

par.	description	def.	min	max	UOM
P117	Speed enabled: 0= all speeds enabled. 1= Only minimum speed (autofan displayed on LCD terminal, not modifiable). The fan stops only when P+I output =0.	0	0	1	

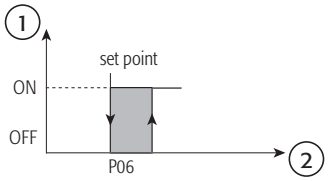


Fig. 4.g

Key:
1. status of the valve;
2. room temperature.

4.2.12 Manual operation: Cooling - (Management of the hot/cold water valve or cold water valve only)

The activation of the hot/cold water or local/cold water valve is based on the set point set by the user (see the following figure), while the fan starts according to the cool enable function (at the speed selected by the user or decided by the autofan function).
When the room temperature (the value read by the control probe) reaches the set point, the hot/cold water or local/cold water valve is closed and the fan is stopped.

par.	def.	min.	max.	unit of measure	setting
P06	5	0	255	°C/10	Thermostat hysteresis

Table 4.k

Below is an example of the sequence for the activation of the loads on the e-drofan; the device is fitted with a hot/cold water valve and is in cooling mode, with the fan speed established by the autofan function (control probe B1).

Key:
1. room temperature (B1);
2. exchanger temperature;
3. valve status;
4. fan status;
5. change mode by user;
6. extra flush cycle;
7. speed selected by autofan;
8. fan started by cool enable;
9. change speed by autofan;
10. valve and fan deactivated due to set point reached;
11. flush cycle.

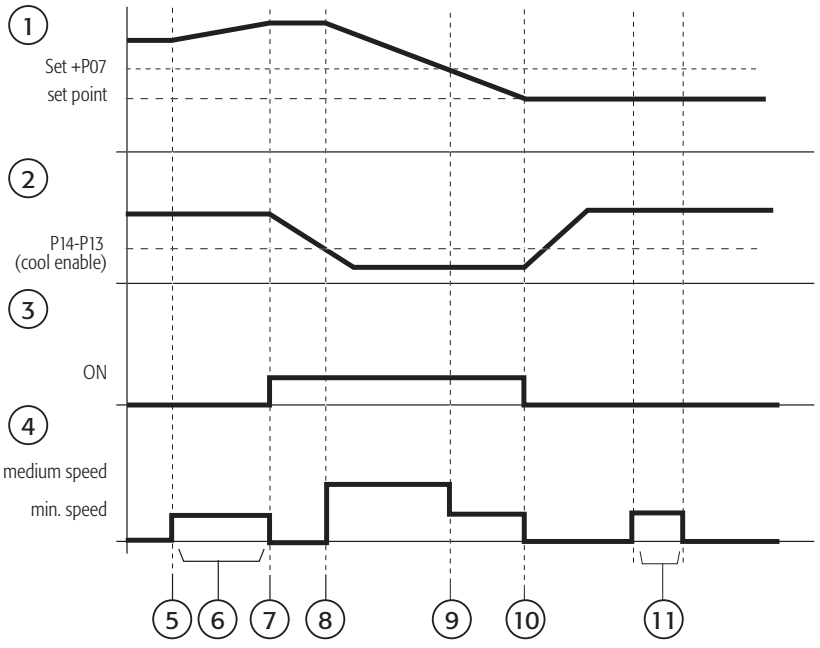


Fig. 4.h.a

4.2.13 Manual operation: heating - (management of the hot/cold water valve or cold water valve only)

The activation of the hot/cold water or local/hot water valve is based on the set point set by the user (see the following figure), while the fan starts according to the heat enable function (at the speed selected by the user or decided by the autofan function).
When the room temperature (the value read by the control probe) reaches the set point, the local/hot water valve is closed and the fan is stopped.

par.	def.	min.	max.	unit of measure	setting
P06	5	0	255	°C/10	thermostat hysteresis

Table 4.l.a

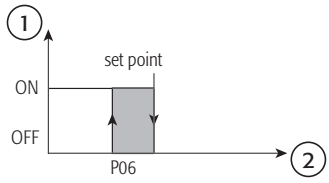


Fig. 4.g

Key:
1. valve status;
2. room temperature.

A heater can be used (when dip 5= ON) to improve the heating capacity, with a different hysteresis used according to whether the heat enable function is active. To avoid possible overheating, the fan is activated at the same time as the heater, and remains on for a time equal to P48 after it is deactivated. As a further protection, the heater is deactivated if the temperature of the coil exceeds the temperature set for parameter P47.

par	def	min	max	unit of measure	setting
P13	10	0	255	°C/10	Hysteresis for heater with heat enable active
P46	30	0	255	°C/10	Hysteresis for heater with heat enable not active
P47	40	0	255	°C	Maximum exchanger temperature for heater off
P48	20	0	255	s	Post-ventilation for heater

Table 4.l.b

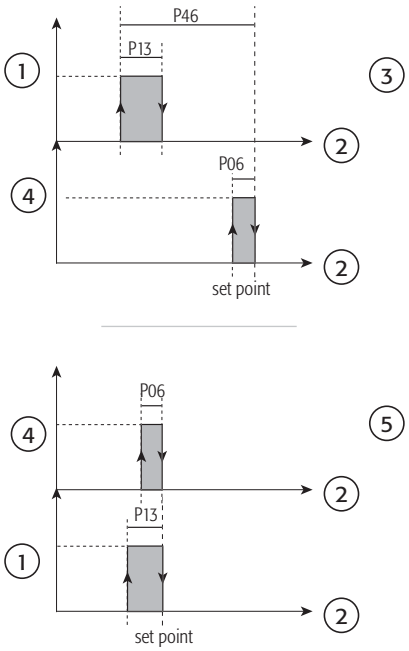


Fig. 4.h

Key:
1. heater ON;
2. room temperature;
3. heat enable not active (with hot water);
4. valve ON;
5. heat enable active (without hot water).

Below is an example of the sequence for the activation of the loads on the e-drofan in heating mode; the device is fitted with a hot/cold water or local/hot water valve and is in heating mode, with the fan speed established by the autofan function.

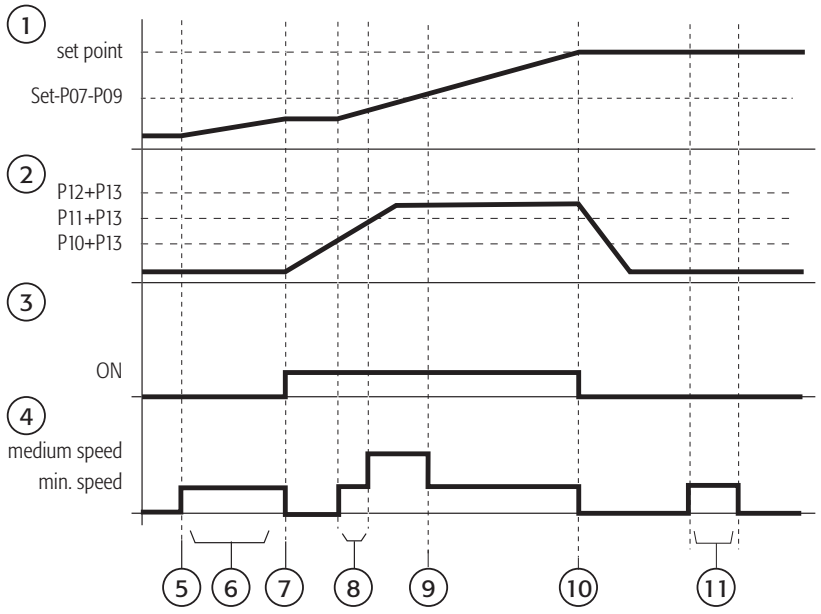


Fig. 4.i

Key:
1. room temperature (B1);
2. exchanger temperature (heat enable);
3. valve status;
4. fan status;
5. change mode by user;
6. extra flush cycle;
7. speed selected by autofan;
8. fan started by heat enable and change speed;
9. change speed by autofan;
10. valve and fan deactivated due to set point reached;
11. flush cycle.

Key:
1. room temperature (B1);
2. exchan ger temperature;
3. valve status;
4. heater status
5. fan status;
6. change mode by user;
7. extra flush cycle;
8. valve and heater enabling after extra flush;
9. heater enabling for threshold exceeded with non-active heat enable;
10. speed by autofan;
11. valve deactivated due to set point reached;
12. heater post-ventilation;
13. flush cycle.

P+I ALGORITHM: with the P+I algorithm, the heater output parameter must be set appropriately
- ON/OFF management with hysteresis: P39= 18 (or either P40, P41 or P42), in which case parameters P111 (heater activation delta from set point) and P112 (hysteresis) need to be set;
- modulating heater with 0 to 10 V input: P39 or P40= 17, in which case the P+I parameters need to be set (proportional band P116 etc).

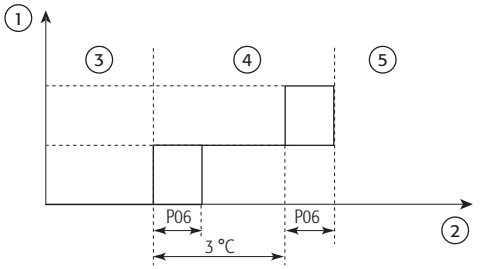


Fig. 4.k

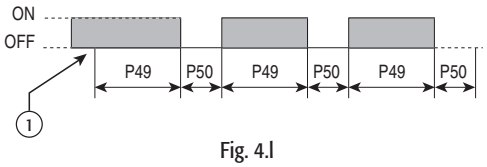


Fig. 4.l

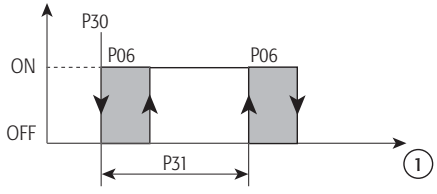


Fig. 4.m

Key:
1. room temperature (B1).

Below is a further example of a device fitted with hot/cold water or local/hot water valve and heater; it is in heating mode, with the fan speed established by autofan.

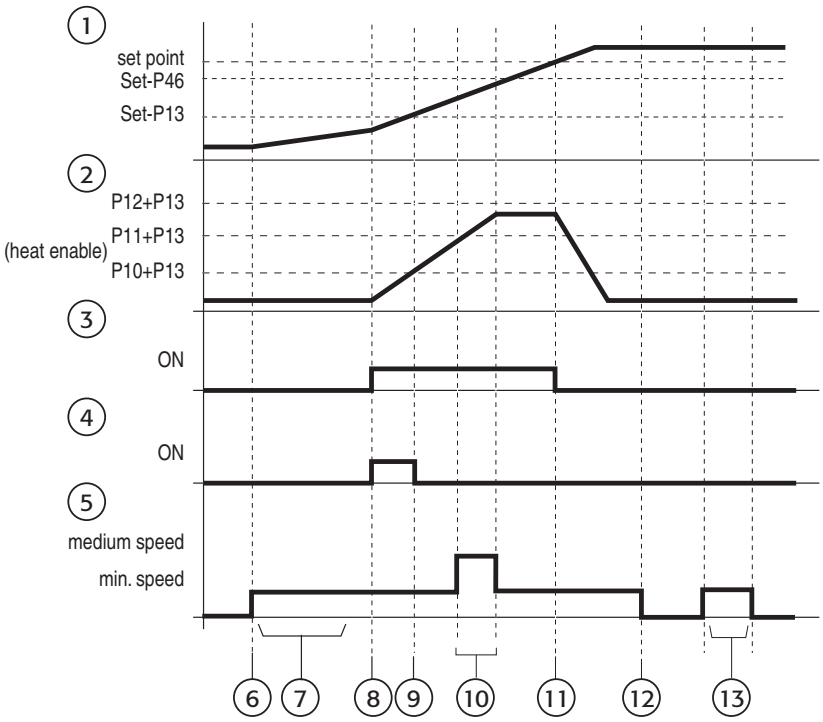


Fig. 4.j

4.2.14 Manual operation: dehumidify

Based on the set point set by the user, first the room temperature is controlled, by cooling if necessary, and then the dehumidification function starts.
In dehumidification mode, the hot/cold water or only local/cold water valve is always open and fan on/off cycles are performed at minimum speed.
The cool enable function is always active to ensure that the temperature of the exchanger is low enough to ensure the condensation of the water vapour.
When the room temperature reaches the set point the dehumidification function stops, the fan stops and the hot/cold water or only local/cold water valve is closed.

For modulating actuators, the valve is controlled as completely open or completely closed.

Key to Fig. 4.k "Management of the loads":
1. mode;
2. room temperature;
3. fan= OFF; valve= closed;
4. dehumidify: fan= cycles at min. speed; valve= open;
5. cooling: fan= user selection; valve= open.

Key to Fig. 4.l "Local/cold water valve management":
1. mode;
2. room temperature;
3. fan= OFF; valve= closed;
4. dehumidify: fan= cycles at min. speed; valve= open;
5. cooling: fan= user selection; valve= open.

par	def	min	max	unit of measure	setting
P06	5	0	255	°C/10	Thermostat hysteresis
P49	3	0	255	min	Fan operating time in dehumidify
P50	15	0	255	min	Fan operating time in dehumidify

Table 4.m

4.2.15 Manual operation: fan

In this mode, the hot or cold water valve is always closed and the fan operates at the speed selected by the user (in autofan, it works at medium speed). The fan only starts if the room temperature is within the range of temperatures specified by parameters P31 and P30, so as to avoid undesired flows of hot or cold air.

par	def	min	max	unit of measure	setting
P06	5	0	255	°C/10	Thermostat hysteresis
P30	15	0	255	°C	Fan enable temperature
P31	20	0	255	°C	Fan enable interval

Table 4.n

4.2.16 Automatic operation

In automatic mode, the e-drofan measures the room temperature and decides which mode to activate (cooling or heating) based on the set point defined by the user, the criterion is described in the graph on the side.
The fan and local/cold/hot water valve are managed as in heating/cooling mode (the flush function is not active). The heater is also managed as in heating mode. In automatic OFF the local/cold/hot water valve is closed and the flush function is active. If when entering automatic mode the room temperature falls within the hysteresis, priority is given to heating mode.
COMFORT: This function, when activated, does not allow the set point to be changed (fixed or sent via serial connection) but only the setting of an offset of +/- 2°C around the set point.
When cooling mode is activated, the control set point is equal to the set point + P02, while in heating mode, the control set point is equal to the set point - P03.

P+I ALGORITHM: Heating or cooling mode is determined according to the graph shown on the side, subsequently the P+I algorithm is activated to manage the outputs. The mode is changed only after the deactivation of all the actuators, as a consequence the internal parameters are reset each time. It should be noted that P02, P03, P04 and P05 ensure a further activation hysteresis (in addition to the P+I dead band) and consequently the parameters need to be set appropriately. The values of parameters P04 and P05 should be set lower than the dead band.

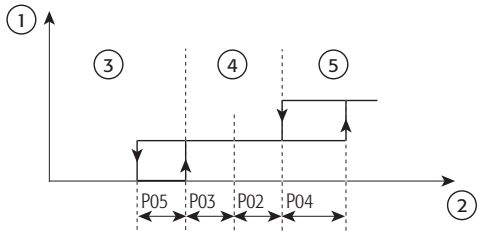


Fig. 4.n

Key:
1. mode;
2. room temperature;
3. heating;
4. OFF;
5. cooling.

par.	def.	min.	max.	unit of measure	setting
P01	22	0	255	°C	Set point in automatic mode
P02	5	0	255	°C/10	Differential in automatic OFF-cooling zone
P03	5	0	255	°C/10	Differential in automatic OFF-heating zone
P04	10	0	255	°C/10	Cooling hysteresis in automatic
P05	3	0	255	°C/10	Heating hysteresis in automatic
P36	0	0	1		0= Comfort function disabled 1= Enable Comfort

Table 4.o

4.2.17 Compensation using the outside temperature probe

The set point can be changed in relation to the outside temperature, so as to avoid considerable temperature differences when entering/exiting the environment or to compensate for the heat loss of the environment. The parameters differ between cooling and heating modes, and the coefficient applied may be positive or negative, depending on the desired effect.

Fig. 4.o

par.	def.	min.	max.	unit of measure	setting
P22	0	0	2		0= Compensation disabled 1= outside air probe B1 (Compensation enabled) 2= outside air probe B3 (Compensation enabled)
P23	0	-99	127	°C/10	Difference for compensation in cooling; 0= Compensation disabled
P24	0	-20	+20	/10	Coefficient for compensation in cooling; 0= Compensation disabled (tenths)
P25	0	-99	127	°C/10	Difference for compensation in heating; 0= Compensation disabled
P26	0	-20	+20	/10	Coefficient for compensation in heating; 0= Compensation disabled (tenths)

Table 4.p

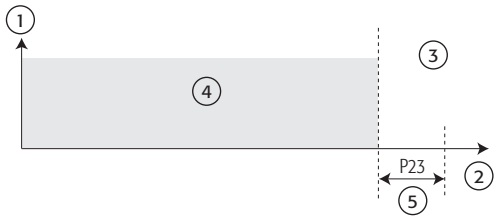


Fig. 4.p

Key:

1.	cooling mode
2.	room temperature
3.	compensation not active (room set pojnt unvaried)
4.	compensation active set = set + [(t.out - set - P23*P24] (cooling mode) set = set - [(set - P25) - t.out] * P26 (heating mode)
5.	room temperature set point

4.3 Notes on the serial connection settings

A serial connection (PlantVisor or Modbus) can be used to check all the e-drofan parameters and set those that are not write protected. Below is a short description of the most significant variables (for the settings see the parameter summary table).

Variable	Meaning	Type	SV add	Modbus add	R/W
Control probe	This variable contains the reading of the probe used to control the e-drofan (B1 or BT). The value considers any offsets, hysteresis values, control algorithms, etc.c.	A	74	74	Read only
Set point setting	Used to read and where required overwrite the value of the set point that has been set on the panel. Especially useful if the e-drofan is operating with the comfort function active (e.g. centralised systems, such as hotels, offices, etc.)	I	83	211	Read/write
Control set point	his variable is used to read the value of the set point used to control the e-drofan. The value considers the hysteresis settings, compensation factors, offsets (e.g. SLEEP function), algorithms, etc.	A	76	76	Read only
Digital inputs and heat/cool request	Heat/cool request: the bits are set when the unit is in ON and the set point has not been reached. Especially useful for energy saving functions.	I	81	209	Read only
Lock keypad from panel	Used to disable the buttons on the terminal to prevent accidental settings. Useful for centralised systems (hotels, offices etc).	I	78	206	Read/write (CANbus only)

Tab. 4.q

4.4 User interface (remote acqua terminal)

A number of parameters can be set to determine the information displayed on the remote acqua terminal.

par.	def.	min.	max.	setting
P36	0	0	1	Comfort: 0= Comfort function disabled 1= Enable Comfort
P37	0	0	4	Display: 0= Display set point 1= Display control probe (BT or B1) 2= Display probe B2 3= Display probe B3 4= Display modulating valve position (only use for testing or service and only with ACQUA terminal)
P38	0	0	255	Disable functions. Used to reduce the number of functions available on the panel (keypad). The settings are obtained by adding the values shown below: 1= automatic 2= cooling 4= dehumidification 8= fan 16= heating 32= autofan 64= sleep 128= ON/OFF timer and display clock e.g. activation of automatic mode only: 2+4+8+16=30
P55	0	0	1	Abilitazione simboli raffreddamento e riscaldamento in automatic: 0= simboli spenti 1= simboli accesi quando richiesto

Table 4.r

The hydronic network, if suitably configured, can disable some buttons on the terminal (see section "hydronic systems").
Enabling the TIMER ON and TIMER OFF functions (on the parameter P38) also enables the clock and the corresponding display (otherwise this is not visible).

4.4.1 Programming the events: timer ON, OFF and sleep

See the information in section "user" and the corresponding settings for the parameter P38. When the sleep function is active, in cooling mode, the set point is increased by the value set for parameter P18; in heating mode, the set point is decreased by the value contained in P19.

4.5 User interface (remote control and IR receiver)

The IR receiver board displays the status of the unit when the remote control is used. It also features a button for setting operation if the remote control is not available (e.g. flat batteries); pressing the button repeatedly changes the mode, in the following sequence: automatic, cooling, dehumidify, fan, heating, off. When setting the mode on the button the fan operates at minimum speed and the set point is equal to the value of parameter P01 (automatic mode set point).
Below is a list of the signals on the IR board:

mode	Green LED	Yellow LED	Red LED
OFF	OFF	OFF	OFF
COOL/DRY	ON	ON	OFF
HEAT	OFF	ON	OFF
FAN	ON	OFF	OFF
AUTOMATIC OFF	ON	OFF	OFF
OFF EXTRA FLUSH	ON	OFF	OFF

Table 4.s.a

If any alarms are active the display of the mode is replaced by the alarm signal.
If more than one alarm is active, the alarm with the highest priority is shown.

alarm	DL1 (green)	DL2 (yellow)	DL3 (red)	priority
None	OFF	OFF	OFF	
EEPROM fault	BLINK	BLINK	BLINK	1
Slave offline in CAN network	ON	OFF	ON	2
Room probe fault	BLINK	OFF	ON	3
Fault on probe B2 or B3 (B1 if P15 to 17 other than 0 and P95=1)	OFF	BLINK	ON	4
Window alarm	BLINK	ON	ON	5
Circulating pump	ON	BLINK	ON	6
Local stop from digital input	OFF	ON	ON	7

Table 4.s.b

The IR receiver board also features a buzzer that signals the correct reception of the commands sent from the remote control, as well as signalling special situations; the signals are made up of a sequence of intervals lasting 100 m/s in which the buzzer is on or off:

signal	sequence	sound				
Power ON (power supply)	ON	ON	ON	ON	OFF	OFF
Correct command reception	ON	OFF	OFF	OFF	OFF	OFF
Start	ON	OFF	ON	OFF	OFF	OFF
Stop	ON	ON	OFF	OFF	ON	ON
Loading default values	ON	OFF	ON	ON	ON	OFF

Table 4.s.c

4.6 Alarms

If alarms occur, the e-drofan performs certain actions to limit any possible problems; when more than one alarm is active at the same time, only the one with the highest priority is displayed:

alarm	signal (terminal)	effect	notes	priority
EEPROM fault at power on	A01	Fan off (with post-ventilation for heater)	Load the default values or reset from key	1
Offline in Can network (no communication between e-drofan and CAN board)	A02	Close local/hot/cold water valves Heater off	Communication lost between e-drofan and Can	2
Room probe fault	A03			3
Probe B2 or B3 (B1 if P15..17 div. 0 eP95=1) fault	A04			4
Window alarm	A05			5
Circulating pump alarm	A06			6
Local stop	A07			7

Tab. 4.t

4.7 List of parameters

P	Parameter	def.	min.	max.	unit	SPV type	Carel SPV	Modbus SPV	access	note
0	Software version		0	255		I	1	129	U	E.g. v3.5 = 35.
1	Set point in automatic mode	22	0	255	°C	A	1	1	U	
2	Differential in automatic OFF-cooling zone	5	0	255	°C/10	A	2	2	U	
3	Differential in automatic OFF-heating zone	5	0	255	°C/10	A	3	3	U	
4	Hysteresis for cooling in automatic	10	0	255	°C/10	A	4	4	U	
5	Hysteresis for heating in automatic	3	0	255	°C/10	A	5	5	U	
6	Thermostat hysteresis (not automatic mode)	5	0	255	°C/10	A	6	6	U	
7	Medium speed delta in Auto Fan	7	0	255	°C/10	A	7	7	U	
8	Maximum speed delta in Auto Fan	7	0	255	°C/10	A	8	8	U	
9	Fan speed hysteresis in Auto Fan	5	0	255	°C/10	A	9	9	U	
10	Minimum speed set in HEAT ENABLE	29	0	255	°C	A	10	10	U	
11	Medium speed set in HEAT ENABLE	33	0	255	°C	A	11	11	U	
12	Maximum speed set in HEAT ENABLE	37	0	255	°C	A	12	12	U	
13	HEAT ENABLE/COOL ENABLE hysteresis	10	0	255	°C/10	A	13	13	U	
14	COOL ENABLE set point	21	0	255	°C	A	14	14	U	
15	Use of probe B1	0	0	6		I	105	233	U	
16	Use of probe B2	0	0	6		I	106	234	U	
17	Use of probe St3	0	0	6		I	107	235	U	
18	Increase COOL/DRY set in sleep	10	0	255	°C/10	A	18	18	U	
19	Decrease HEAT set in sleep	10	0	255	°C/10	A	19	19	U	
20	Limit ADC coefficient	6	0	15		I	2	130	U	
21	Average ADC coefficient	6	0	15		I	3	131	U	
22	Select outside compensation probe	0	0	2		I	4	132	U	
23	Set point delta for compensation in cooling	0	-99	127	°C/10	A	20	20	U	
24	Compensation factor in cooling	0	-20	20		A	21	21	U	
25	Set point delta for compensation in heating	0	-99	127	°C/10	A	22	22	U	
26	Compensation factor in heating	0	-20	20		A	23	23	U	
27	Reserved use	0	0	2		I	5	133	U	
28	Display modulating outputs	0	0	3		I	6	134	U	
29	Enable continuous fan operation	0	0	1		I	7	135	U	
30	Ventilation set point in fan mode (local & AUTO)	15	0	255	°C	A	24	24	U	
31	Ventilation diff. in fan mode (local & automatic)	20	0	255	°C	A	25	25	U	
32	FLUSH fan off time	2	0	255	min	I	8	136	U	
33	FLUSH fan on time	90	0	255	s	I	9	137	U	
34	FLUSH mode	0	0	3		I	10	138	U	
35	Extra flush ventilation time	30	0	255	s	I	11	139	U	
36	Automatic/Comfort Set point	0	0	1		I	12	140	U	
37	Select probe to be displayed	0	0	4		I	13	141	U	
38	Skip Panel functions	0	0	255		I	14	142	U	
39	Set output 4 (see P95 and dipswitch)	5	0	18		I	15	143	U	
40	Set output 5 (see P95 and dipswitch)	0	0	18		I	16	144	U	
41	Set output 6	3	0	18		I	17	145	U	
42	Set output 7	4	0	18		I	18	146	U	
43	Select multifunction input DI3	0	0	10		I	19	147	U	
44	Select multifunction input DI4	0	0	10		I	20	148	U	
45	Select multifunction input DI5	0	0	10		I	21	149	U	
46	Heater activation delta with heat enable not active	30	0	255	°C/10	A	26	26	U	
47	Max B2 temperature to switch off heaters	40	0	255	°C	A	27	27	U	
48	Flush time with heaters	20	0	255	s	I	22	150	U	
49	Fan ON time in DRY	3	0	255	min	I	23	151	U	
50	Fan OFF time in DRY	15	0	255	min	I	24	152	U	
51	Valve On time during cycles	0	0	255	min	I	25	153	U	
52	Max valve Off time during cycles	0	0	255	min	I	26	154	U	
53	Minimum valve Off time	0	0	255	min	I	27	155	U	
54	Serial communication mode (0=CAREL, 1=Modbus, 2=LON, use with LON serial card)	0	0	2		I	28	156	F	
55	Enable cool & heat symbols in AUTOMATIC	0	0	1		I	29	157	U	
56	Polarity of cooling/heating digital input	1	0	1		I	30	158	U	
57	Mains frequency (0= 50 Hz; 1= 60 Hz)	0	0	1		I	31	159	U	
58	Offset for probe B1 in COOL/DRY	0	-99	127	°C/10	A	28	28	U	
59	Offset for probe B1 in HEAT	0	-99	127	°C/10	A	29	29	U	
60	Offset for probe B1 in AUTOMATIC	0	-99	127	°C/10	A	30	30	U	
61	Offset for probe B1 (terminal probe)	-30	-99	127	°C/10	A	31	31	U	

P	Parameter	def.	min.	max.	unit	SPV type	Carel SPV	Modbus SPV	access	note
62	Offset for probe B2 in COOL/DRY	0	-99	127	°C/10	A	32	32	U	
63	Offset for probe B2 in HEAT	0	-99	127	°C/10	A	33	33	U	
64	Offset for probe St3 in COOL/DRY	0	-99	127	°C/10	A	34	34	U	
65	Offset for probe St3 in HEAT	0	-99	127	°C/10	A	35	35	U	
66	CAN Master/Slave	0	0	1		I	32	160 *	F	
67	CANbus serial address	1	1	125		I	33	161 *	F	
68	Hydronic algorithm logic	0	0	7		I	34	162 *	F	
69	Local network address	1	0	207		I	35	163	F	
70	Dependency of hydronic algorithms (on Slaves)	0	0	7		I	36	164 *	F	
71	Serial address of Slave 1	0	0	207		I	37	165 *	F	
72	Serial address of Slave 2	0	0	207		I	38	166 *	F	
73	Serial address of Slave 3	0	0	207		I	39	167 *	F	
74	Serial address of Slave 4	0	0	207		I	40	168 *	F	
75	Serial address of Slave 5	0	0	207		I	41	169 *	F	
76	Serial address of Slave 6	0	0	207		I	42	170 *	F	
77	Serial address of Slave 7	0	0	207		I	43	171 *	F	
78	Serial address of Slave 8	0	0	207		I	44	172 *	F	
79	Serial address of Slave 9	0	0	207		I	45	173 *	F	
80	Serial address of Slave 10	0	0	207		I	46	174 *	F	
81	Dependency of hydronic algorithms on Slave 1	0	0	7		I	47	175 *	F	
82	Dependency of hydronic algorithms on Slave 2	0	0	7		I	48	176 *	F	
83	Dependency of hydronic algorithms on Slave 3	0	0	7		I	49	177 *	F	
84	Dependency of hydronic algorithms on Slave 4	0	0	7		I	50	178 *	F	
85	Dependency of hydronic algorithms on Slave 5	0	0	7		I	51	179 *	F	
86	Dependency of hydronic algorithms on Slave 6	0	0	7		I	52	180 *	F	
87	Dependency of hydronic algorithms on Slave 7	0	0	7		I	53	181 *	F	
88	Dependency of hydronic algorithms on Slave 8	0	0	7		I	54	182 *	F	
89	Dependency of hydronic algorithms on Slave 9	0	0	7		I	55	183 *	F	
90	Dependency of hydronic algorithms on Slave 10	0	0	7		I	56	184 *	F	
91	Load defaults	0	0	255		I	57	185	F	value= 44
92	Factory password	0	0	255		I	58	186	U	value= 66
93	Occupancy mode	0	0	3		I	59	187	U	
94	Occupancy time	15	1	255	min	I	60	188	U	
95	Disable output setting from dipswitch	0	0	1		I	61	189	U	
96	Reserved use						62			
97	Maximum valve travel time (2 windings)	120	1	255	s	I	63	191	U	
98	Reserved use					I	64	192	U	
99	Minimum P+I output variation for valve movement	5%	0	100	%	I	65	193	U	
100	Maximum valve inactivity time (for unblocking)	4	0	255	hours	I	66	194	U	
101	Forced movement for antistick function	20	0	100	% max travel	I	67	195	U	
102	Reserved use					I	68	196		
103	Reserved use					I	69	197		
104	Reserved use				°C/10	A	36	36		
105	Reserved use				°C/10	A	37	37		
106	Reserved use				°C	A	38	38		
107	Bumpless transfer	1	0	3		I	104	232	U	
108	Integral time	0	0	255	s *10	I	99	227	U	
109	Dead band	2	0	255	°C/10	A	42	42	U	
110	Reserved use				°C/10	A	43	43		
111	ON/OFF heater control offset from set point (ON/OFF management with hysteresis)	30	0	255	°C/10	A	44	44	U	
112	Heating set point hysteresis for heater control	5	0	255	°C/10	A	45	45	U	
113	Reserved use				°C/10	A	46	46		
114	Cold valve proportional band	0	0	255	°C/10	A	39	39	U	
115	Hot valve proportional band	0	0	255	°C/10	A	40	40	U	
116	Modulating heater proportional band	0	0	255	°C/10	A	41	41	U	
117	Fan speed enabled	0	0	1		I	100	228	U	
118	Reserved use					I	101	229	U	
119	Reserved use					I	102	230		
120	Reserved use				°C	A	47	47		
121	Reserved use				°C	A	48	48		
122	Reserved use				min	I	103	231		
123	Reserved use					I	108	236		
124	Presence of humidity-temperature probe sch_th	0	0	1		I	109	237		
125	Reserved use				°C/10	A	49	49		

Tab. 4.u

* Only for CANbus hydronic systems, not use for Modbus® or Plantvisor systems.

variables only accessible from serial link	def.	min.	max.	unit	SPV type	Carel SPV	Modbus SPV	notes
probe B1	0			°C/10	A	70	70	read-only
probe BT	0			°C/10	A	71	71	read-only
Probe B2	0			°C/10	A	72	72	read-only
probe B3	0			°C/10	A	73	73	read-only
control probe	0			°C/10	A	74	74	read-only
virtual probe (probe set by CANbus/supervisor)	0			°C/10	A	75	75	do not use with Plant-Visor and Modbus®
control set point				°C/10	A	76	76	read-only
mode (see Table 4.z)	0	0	6		I	70	198	see Table 4.z
fan (see Table 4.z)	0	0	3		I	71	199	see Table 4.z
Reserved use					I	72	200	
ON/OFF	0	0	1		I	73	201	
Ind /zone (control probe (1=B1; 0= BT)	1	0	1		I	74	202	internal use do not modify from supervisor
continuous fan operation	0	0	1		I	75	203	read/write
master alarms	0				I	76	204	read-only
slave alarms	0				I	77	205	read-only
lock panel keypad	0				I	78	206	for CANbus hydronic systems only, do not use with Modbus® and PlantVisor
general flags 1 (see Table 4.z)					I	79	207	see Table 4.z
general flags 2 (see Table 4.z)					I	80	208	read-only see Table 4.z
digital inputs (see Table 4.z) and heating/cooling request					I	81	209	read-only see Table 4.z
sleep/econ	0	0	1		I	82	210	
set point set	22	8	32	°C	I	83	211	
comfort control	0	-3	3	°C	I	84	212	
general flags 3 (see Table 4.z)					I	85	213	read-only
Reserved use					I	86	214	
enable control virtual probe when=1	0	0	1		I	87	215	for CANbus hydronic systems only, do not use with Modbus® and PlantVisor
general flags 6					I	88	216	
reserved use					I	89	217	
reserved use					I	90	218	
reserved use					I	91	219	
global alarm	0	0	1		D	1	-	read-only
reserved use					I	92	220	
reserved use				%	A	77	77	
modulating valve				%	A	78	78	read-only
modulating heater				%	A	79	79	read-only
humidity probe H				% rH	A	80	80	read-only
temperature probe H				°C/10	A	81	81	read-only
reserved use					I	93	221	
reserved use					I	94	222	

Tab. 4.v

mode

0	automatic
1	automatic + heater
2	cooling
3	dry
4	fan
5	heating
6	heating + heater

fan

0	auto
1	minimum
2	medium
3	maximum

general flags 1

1	heater available
2	reserved use
4	reserved use
8	remote control
16	broadcasting active
32	reserved use
64	lock function
128	hydronic active

general flags 2

1	enable cooling active
2	enable heating active
4	comfort function activated
8	economy
16	reserved use
32	reserved use
64	reserved use
128	reserved use

general flags 3

1	reserved use
2	reserved use
4	reserved use
8	display set/probe

flag generali 6

1	User present (see occupancy, used by Easy Way system)

digital inputs

1	value of input 1 (remote ON/OFF)
2	value of input 2 (heating/cooling)
4	value of input 3 (multifunction)
8	value of input 4 (multifunction)
16	value of input 5 (multifunction)
32	heating request
64	cooling request
128	occupied status (see occupancy)

5. HYDRONIC SYSTEMS

In summary:
- Synergy between chiller controller (pCO) and e-drofan;
- Algorithms focused on energy savings;
- Algorithms focused on comfort;
- Building automation functions;
- Flexible space management;
- Reduced times for the propagation of the commands;
- Type of networks: hydro bus (dedicated area controller or built into the chiller controller), integrated hybrid (area controller built into the chiller controller);
- Possibility to install the terminal on the slaves;
- Feedback on the alarms relating to the slaves (on chiller controller/area controller and e-drofan master);
- Control of all units by the supervisory system or area controller.

The use of the CAN serial board on the e-drofan allows the creation of hydronic systems with the purpose of creating synergy between the chiller controller (pCO) and the fan coil. This interaction gives the chance to apply advanced energy savings and comfort algorithms (resident on the chiller controller), as well as implement useful building automation functions.
The CAN board has been designed to minimise the activation of the operators in the event of variations in the spaces to be air-conditioned (quite common in some installations, e.g. offices); in this case, simply redefine the roles of the master and slave on the acqua terminal or pCO controller (if present).

5.1 Structure

The single node structure is used in the hydronic systems, in which the flow of data is bi-directional (unlike the broadcast structure, in which it is mono-directional); there are many consequent advantages: display the slave alarms on the master, acquire useful values for the management of the system, fit the acqua terminal on the slaves... etc.

	single node
Maximum number of units connected	100
Maximum number of masters	64
Maximum number of slaves	100 minus no. of masters
Maximum number of slaves for each master	10
Maximum length of the CANbus (total)	1 km (62.5 kbit); 500 m (125 kbit)

Table 5.a

The address set using the group of 10 dipswitches on the CAN board defines the operating mode:

address (binary), dip 1-7	mode	note
0	Can be configured: Broadcast or single node	The address can be set on the acqua terminal, parameter P67 (switch off and on again to make the new setting operational); consequently, the mode can be configured. Without these settings P67=1 and the e-drofan fitted with the terminal becomes the master.
1-15	Broadcast	Master and slave must have the same address
16	Reserved	
21-125	Single node	Each unit (master or slave) must have different addresses
126-128	Reserved	

Table 5.b

Dipswitches 9 and 10 are used to set the CANbus communication speed and must be set both in the same position.
dip 9 and 10 ON= 125 kbit/s
dip 9 and 10 OFF= 62.5 kbit/s
dip 8= must be set to ON to use the serial board on the e-drofan
After each variation made to the position of the dipswitches, the e-drofan must be switched off and on again for the changes to become operational.

5.1.1 Single node

In this mode, the information that the master must send to all the slaves (LOGIC parameter) can be set, as well as the information accepted by each individual slave (DEPENDENCE). The set of a master and its slaves is a "zone". All the settings are performed on the master from the panel.

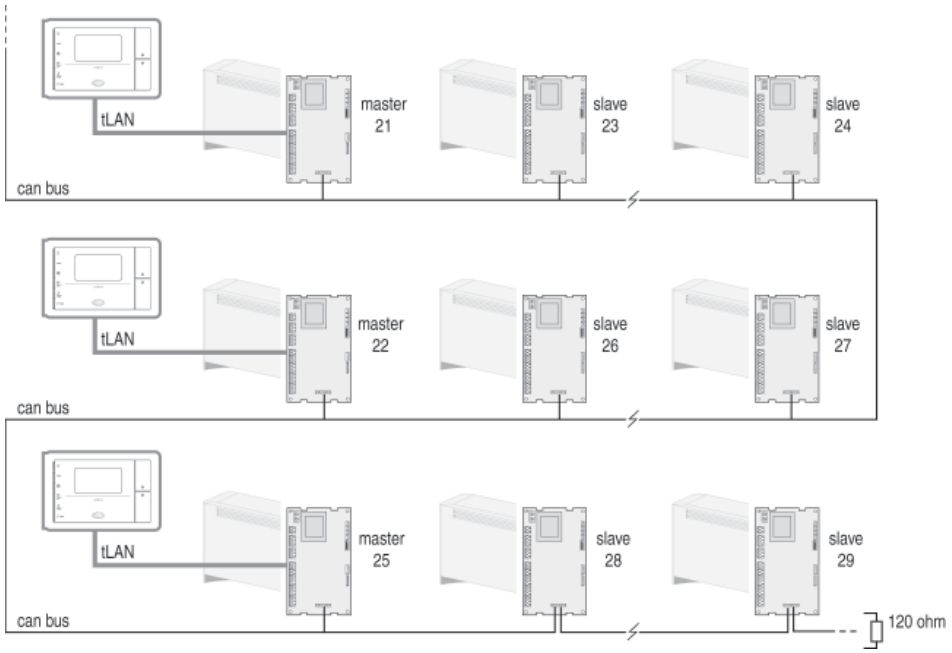


Fig. 5.a

par.	def.	min.	max.	setting	
P66	0	0	1	e-drofan master or slave; 0= slave; 1= master	
P67	1	1	125	Serial address on CANbus. Can be set on the acqua terminal if the serial address specified on the CAN board dipswitches is 0	
P68	0	0	7	Master LOGIC (see the table below)	
P69	1	1	207	485 networks serial address (used only with 485 serial board)	
P70	0	0	7	DEPENDENCE of the controller on its master (e-drofan or pCO):	0= the control ignores any data from its master 1= the controller accepts: ON/OFF, ECONOMY/ SLEEP 2= the controller accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort 3= the controller accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort, set point 4= the controller accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort, set point, fan speed 5= the controller accepts: mode, comfort, set point 6= the controller accepts: mode, comfort, set point, fan speed 7= the controller accepts: all the data from its master.
P71-P80	0	0	207	CANbus addresses of the slave	
P81-P90	0	0	7	Dependence of the slave:	0= the slave ignores all data from the master 1= the slave accepts: ON/OFF, ECONOMY/ SLEEP 2= the slave accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort 3= the slave accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort, set point 4= the slave accepts: ON/OFF, ECONOMY/ SLEEP, mode, comfort, set point, fan speed 5= the slave accepts: mode, comfort, set point 6= the slave accepts: mode, comfort, set point, fan speed 7= the slave accepts: all the data from the master.

Table 5.c

The occupancy function uses the economy/sleep variables to manage the network.

Data propagated according to the LOGIC parameter	LOG.=1	LOG.=2	LOG.=3	LOG.=4	LOG.=5	LOG.=6	LOG.=7 **
ON/OFF	√	√	√	√	√	√	√
ECONOMY/SLEEP	√	√	√	√	√	√	√
Mute ALARM (future use)	√	√	√	√	√	√	√
Control performed with probe value sent from the zone master (if DIP 6= ON on the master)	√						
Control performed with probe value sent from the chiller controller (PCO)		√					
Set point propagated by zone master	√	√		√		√*	√
Operating mode and comfort function propagated by zone master	√	√		√	√		
Fan speed propagated by zone master	√	√		√	√	√	
Flap position propagated by zone master (future use)							
Mode, comfort, set point, fan speed and flap position at switch OFF->ON only propagated by zone master (a only time).			√				
Use by zone master and slaves of the control probe value calculated as average of all the control probes in the zone (including slaves)				√			
Different set points propagated for the various slaves in the zone. The set points are specified for the related dependence parameters (the dependence is set to 7 for all the slaves in the zone) (e.g. P81= e-drofan slave1 set point etc.)					√		
Different offsets (from zone master set point) propagated for the various slaves in the zone. The offsets are specified in the related dependence parameters (the dependence is set to 7 for all the slaves in the zone) (e.g. P81= e-drofan slave1 offset); e-drofan slave1 set point= e-drofan master set point + P81 etc.)						√	

Table 5.4

* the master sends the final set point to the slave, performing the sum with the offset internally.
** Logic 7 reserved for future uses.
With logic = 0 no data are spread

IMPORTANT:
Before modifying a parameter on the master (related to the configuration of the network), the e-drofan must be set as a slave (P66= 0); once the operation has been completed, the e-drofan can be configured as the master.

The pCO chiller controller can deactivate some buttons on the e-drofan terminals via the hydronic network.
Following the setting of the DEPENDENCE parameter, a number of buttons on the e-drofan slave terminals are deactivated. These restrictions are required to avoid conflicts between the operation set by the master and any settings made by the user on the e-drofan slaves (using the acqua terminal).

Buttons locked on the terminal by the KEYLEVEL parameter	key level=1	key level=2	key level=3	key level=4	key level=5	key level=6	key level=7	key level= 8	key level= 9
ON/OFF button		√	√	√	√				√
MODE button				√	√		√	√	√
FAN speed button									√
SET button	√	√	√	√	√	√	√	√	√
CLEAR/SLEEP button (ECON. from digital input)			√			√			√
TIMER button	√	√	√	√	√	√	√	√	√
UP button					√			√	√
DOWN button					√			√	√

Table 5.d

* Reserved for future uses.

Description of the LOGIC parameter:
- LOGIC 1: The same as the broadcast, with the addition of displaying the alarms relating to the slaves on the master terminal.
- LOGIC 2: Operation as per broadcast, with the addition of displaying the alarms relating to the slaves on the master terminal; all the e-drofans in the zone are controlled based on the probe value sent by the chiller controller (pCO). Useful for algorithms resident on the pCO.
- LOGIC 3: Operation as per broadcast (with slave alarms displayed on the master terminal) but data sent only at power-up of the master. Modifications can be made to operation by the user controlling the slave (e.g. change fan speed to reduce noise). Useful for aligning the status of the slaves in a zone with the corresponding master (e.g. Start-up in the morning).
- LOGIC 4: The master propagates ON/OFF, ECONOMY/SLEEP and control probe; all the remaining functions can be modified on the slaves. The control probe reading is the average of the probes (B1 or BT) on all the slaves in the zone. Useful for giving priority to control of the average temperature in an environment rather than single point control (see Fig. 5.2).
- LOGIC 5: Operation as per broadcast (with slave alarms displayed on the master terminal). The master propagates different set points for each slave (these can be set on the master terminal). Useful in zones featuring slaves without terminals.
- LOGIC 6: Operation as per broadcast (with slave alarms displayed on the master terminal). The master propagates different set points for each slave (these can be set on the master terminal as offsets from the set point). Useful in zones featuring slaves without terminals.
- LOGIC 7: Reserved for future uses.

Key:
1. Average of BT on unit 1, BT unit 2, BT unit 3
   Bcontrol= (21+22+23)/3= 22°C
2. Set: 23 °C
   BT: 21 °C;
3. Set: 23 °C
   BT: 22 °C
4. Set: 23 °C
   BT: 23 °C.

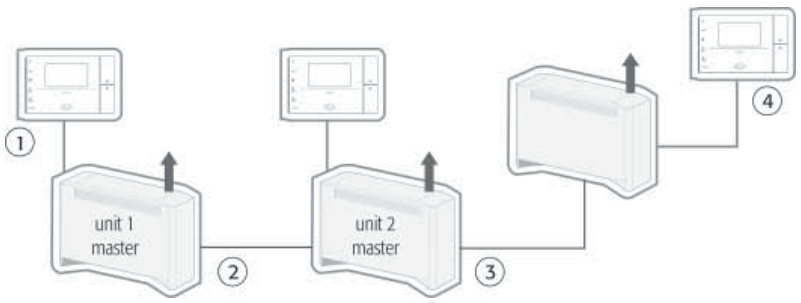


Fig. 5.b

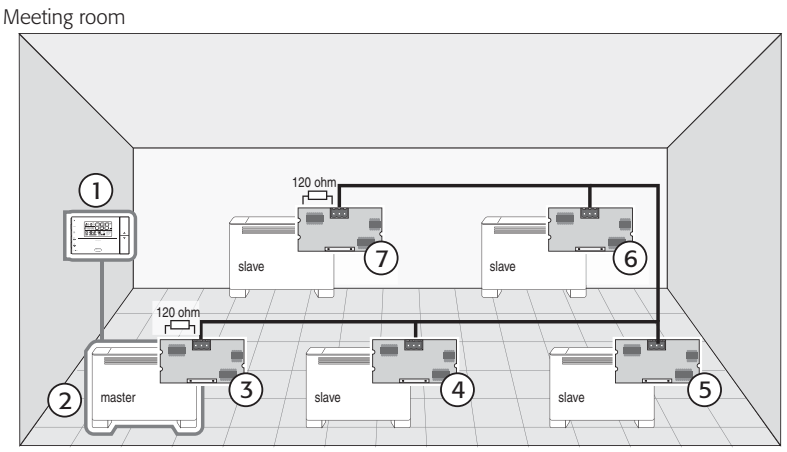
The off status, determined by ON/OFF digital input, has priority over the command sent by the master; this operation is required to allow the user to turn off the fan coil to stop the flow of cold air.

The area controller/chiller controller can nonetheless force the settings on the e-drofan irrespective of the dependence setting (useful in some extreme situations) and can acquire some useful information (status of digital inputs, heating/cooling request...etc.); for this information and for the further algorithms (comfort, energy savings.. that reside on the chiller controller (pCO)), refer to the corresponding user manual.

IMPORTANT:
If communication is interrupted between a slave e-drofan and its master (e.g. disconnection ...etc.) the slave stops automatically, nonetheless, it can be re-activated if fitted with the acqua terminal or remote control (in this case, the device has full control over all the functions).

Below is an example of the possible reconfiguration of the e-drofans if the spaces are reorganised.

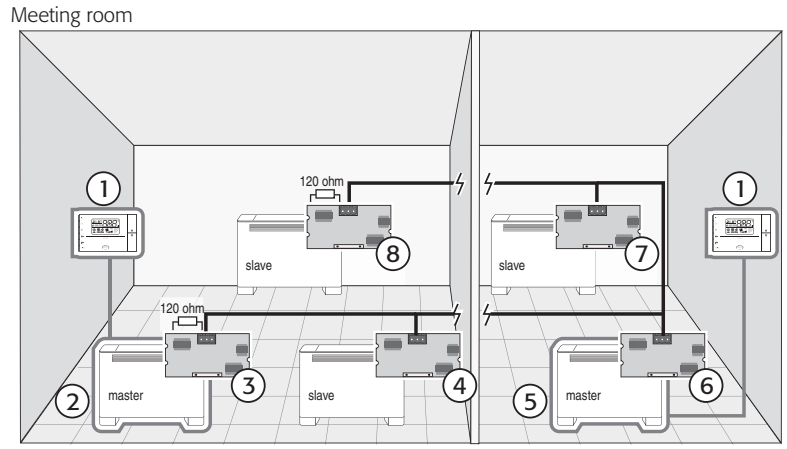
Initial configuration of a zone:



Key:
1. acqua terminal;
2. P66= 1;
   P71= 22;
   P72= 23
   P73= 24
   P74= 25;
3. serial card, ID= 21
4. serial card, ID= 22;
5. serial card, ID= 23;
6. serial card, ID= 24;
7. serial card, ID= 25

Fig. 5.c.a

Configuration after the division of the zone into two parts:



Key:
1. acqua terminal;
2. P66= 1;
   P71= 22;
   P72= 25;
3. serial card, ID= 21
4. serial card, ID= 22;
5. P66= 1
   P71= 24
6. ID= 23;
7. serial card, ID= 24;
8. serial card, ID= 25

Fig. 5.c.b

5.1.2 Integrated hybrid systems

Integrated hybrid networks can be created, that is, single node structures with the chiller controller and only the e-drofan master (where the slaves are connected in the tLAN and without the acqua terminal).

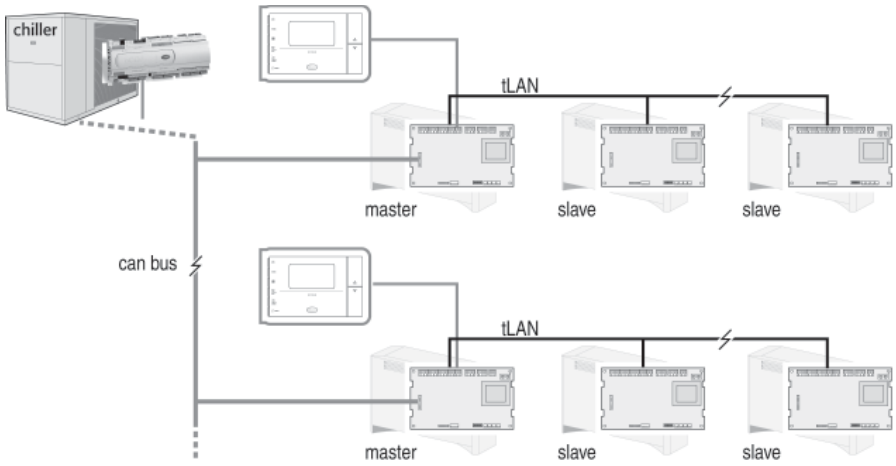


Fig. 5.d

In these applications (typical in single homes) the chiller controller (pCO) carries out the functions of both chiller management and area controller (that is, sends the commands required for the management of the units connected in the network and monitors the status). A maximum of 16 e-drofan masters can be managed by the chiller controller.

5.1.3 e-drobus

If only the CANbus connection is used, there is still the possibility to create networks in which the pCO acts as both chiller controller and area controller (that is, manages the 16 masters connected in the network).
To exceed the limit of 16 master units (necessary for multi-storey buildings), systems must be adopted in which one pCO only acts as area controller, while the chiller is controlled by a dedicated device (connected to the area controller, e.g.: pCO, µCH2).
In this case, a maximum of 64 e-drofan masters can be connected to the area controller, and the remaining units (up to a maximum of 100) can be assigned as slaves to the e-drofan masters. The area controller has complete control over the masters directly connected, while as regards the slaves assigned to the master, it can only act on the related logic and dependence parameters (resident on the master).

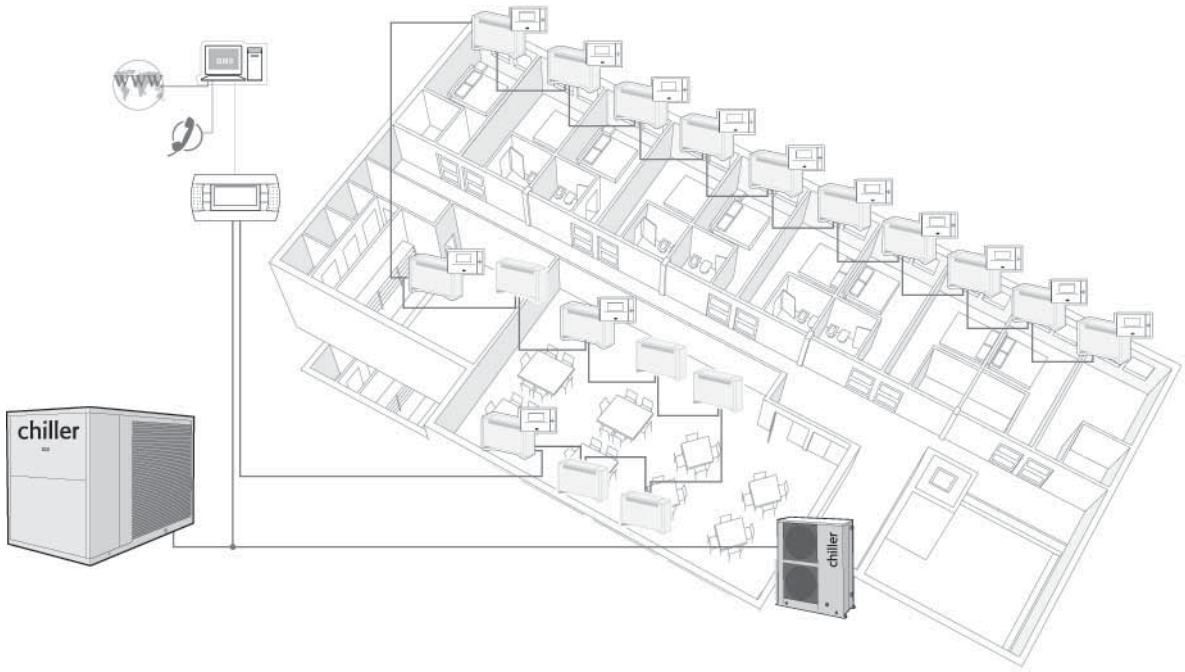


Fig. 5.e

5.2 Signals and diagnostics

The CANbus serial board has three LEDs to display the serial communication status relating to the device it is installed on.
The green LED is always on when power is connected.
When the board is initialising, the red and yellow LEDs flash in specific sequences. After around 20s, when initialisation is complete, the following situations may occur:

green LED	yellow LED	red LED	meaning	actions
ON	ON steady	OFF	ON line (master or slave)	OK
ON	OFF	ON steady	OFF line (slave only)	- check configuration of master - check address P67 - check wiring
ON	ON steady	flashing	Comnunication problems between e-drofan and CANbus serial board	- check P69=1 - check correct connection
ON	ON steady	ON steady	Serious error	Contact CAREL S.p.A.
ON	OFF	OFF	Serious errorgrave	Contact CAREL S.p.A.
OFF	any	any	No power	- check power supply - check correct connection

Table 5.e

5.2.1 Alarms

The acqua terminal displays the alarms on the e-drofan it is connected to, as well as those on the corresponding slaves. When it displays the alarms on its own e-drofan, the signal starts with "A" (e.g. A04), while when displaying those relating to the slaves in the zone, the signal starts with "S" (the second number indicates which slave it refers to (from 0 to 9), while the third number indicates the alarm code).
The codes for the slave alarms (third number) are the same as described in section "constructor", with Sn0 add: (n = Slave address): Slave not present.
The alarms on the master have priority over the slaves (see section "constructor"), the alarms on the different slaves are displayed in sequence (for each slave, the alarm with the highest priority is displayed).
The e-droset terminal only displays the index of the slave with the alarm.

Fig. 5.f

Key:
1. slave alarm;
2. slave;
3. room probe fault.

5.2.2 Notes on configuring hydronic networks

During the configuration of the hydronic networks, the following instructions should be observed:

IMPORTANT:
Avoid settings that create situations of conflict.

note	description	related events
1	If configuring a series of e-drofans, first configure the slaves and then the corresponding master, or alternatively perform the settings with the CANbus disconnected.	If this sequence is not observed, some buttons on the terminal connected to the slave may be locked due to of the dependence set on the master, thus preventing the correct configuration of the slave/slaves.
2	With logic 5 and 6 do not connect the acqua terminals on the slaves.	The information propagated via the CANbus may be lost.
3	The logic must be set on the master before the dependence on the slaves.	The related parameters (dependence P81-P90) may have different meanings (see logic 5 and 6) when the logic changes. When logic is 5 (different set points) the limits are 7 to 35°C, when logic is 6 (offset from the set point on the master) the limits are -5 to +5.
4	Some functions can be activated both locally (digital inputs) and remotely (via serial connection). To avoid conflicts, install the ON/OFF, ECONOMY and PRESENCE digital inputs only on the e-drofan master. The slaves can only be connected to the inputs relating to the alarms (window alarm, circulating pump alarm and local stop).	The status of an e-drofan slave is continuously controlled by its master. The master is set by the area controller/chiller controller just once, which allows the subsequent modification of its status (e.g. from the presence or ON/OFF inputs etc.). The continuous or periodical control of the master must be included in the area controller/chiller controller application.
5	So as to avoid conflicts, the cooling/heating function (to be installed on the master only) must be set only by digital input or via serial communication. The same must be applied to the remote off (settable by dipswitch). In this regard, the dependence is set to 0 when DIP 2 or 3 is ON (only when starting), while there is still the possibility to change the dependence from the area controller/chiller controller.	In the event of conflicts between the digital input and the area controller/chiller controller, operation is not affected, however there will be intense traffic in the serial communication, causing a decline in performance.
6	The specifications provided for the acqua terminal are also valid when using the remote control, with the exception of the keypad lock. In fact, if a function is locked, the remote control still sends the data, which are however ignored by the e-drofan; consequently, there may be discrepancies between the information shown on the display of the remote control and the operation of the device.	
7	The slaves should be fitted ON/OFF digital inputs (without acqua terminal or remote control, or if ON/OFF is disabled). In this way, the user can switch the unit off to stop the flow of hot/cold air.	

Table 5.f

5.2.3 Notes on the serial address settings

The serial address in a CAREL or Modbus® network is assigned by the e-drofan board using parameter P69 "local network address".
In a CANbus network, on the other hand, the device network address is assigned by parameter P67 "CANbus serial address". For correct communication between the CANbus serial board and the e-drofan, parameter P69 must be set to 1 (this is the default setting).

6. NON-HYDRONIC SUPERVISORY SYSTEMS

6.1 Introduction

The 485 serial board can be used to create customised supervisory systems, for example PlantVisor.
The same accessory can be used to integrate the e-drofan into ModBus systems (enable Modbus with parameter P54= 1).

6.2 Easy way Acqua (wireless network)

The "Easy Way Acqua" system is an evolution of the e-dronic system. Exploiting ZigBee wireless technology, this system ensures communication between e-drofan devices without a wired network. The e-drofan interfaces to the wireless system by fitting a router board that acts a gateway on the supervisor serial connection.
The logic implemented in the Easy Way Acqua system is similar to tLAN and CANbus broadcast mode, as the different e-drofan devices in the same hydronic zone have identical behaviour.
In the Easy Way Acqua system, the main hydronic zone operating parameters are always accessible to the supervisor.

For details on operation of this system, see the corresponding manual.

7. TECHNICAL SPECIFICATIONS AND PRODUCT CODES

7.1 e-drofan

Assembly and installation instructions

Terminal	Meaning
L	Phase
N	Neutral
No1	Minimum fan speed (normally open). Voltage output (L)
No2	Medium fan speed (normally open). Voltage output (L)
No3	Maximum fan speed (normally open). Voltage output (L)
GN, Tx, V+	LCD panel connection
GN, Tx	Terminals for local network serial connection (master + 5 slave)
DI1, DI2, DI3, DI4, DI5	Digital inputs, voltage-free contacts: 1=remote ON/OFF 2= remote cooling/heating 3= not used 4= not used 5= not used
B1	Ambient air probe (intake)
B2	Main exchanger probe
B3	Secondary exchanger probe
DIP	Configuration dipswitches: 1 ON= Enable heat/cool enable (probe B2) 2 ON= Enable remote cooling/heating 3 ON= Limited functions 4 ON= 4 pipe fan coil (OFF=2 pipe) 5 ON= Heater present 6 ON = Control on terminal probe
EXP	Connector for the expansion card (5-wire cable)
FLAP	Not used
SUPPLY EXP	Connector for expansion card power supply (2-wire cable)
IR	Connector for the infrared receiver interface (8-wire cable).
JS3	Connector for inserting optional power supply for compatibility with pCO serial cards (future use)
SERIAL	Connector for inserting serial optional cards

Table 7.a

Power supply	230 Vac, range -15 to 10%; 50/60 Hz; Maximum power input (excluding relay loads): 4 VA
Screw terminals (external unit power supply	Max voltage: 230 V
	Cable cross-section: 14-22 AWG
	The current input of the network (sum of the current input of the loads plus the external module) must not exceed 6 A.
Relay outputs No1, No2, No3	Maximum current: VDE0631: 6 (2) A, 250 Vac
	Minimum interval between switching cycles (each relay): 12 s (the of the manufacturer of the unit that the device will be integrated into must guarantee the correct configuration to respond to this specification)
	Type of relay microswitching: 1C
	Insulation between low (relay outputs) and very low voltage parts: reinforced
Digital inputs	Electrical standard: voltage-free contact
	Closing current referred to earth: 5 mA
	Maximum closing resistance: 50 W
Analogue inputs	B1, B2, B3: NTC temperature probes CAREL (10 kW at 25°C).
Index of protection	IP00
Storage conditions	-20T80°C, humidity 80% RH non-condensing
Operating conditions	**0T60°C, humidity <90% RH non-condensing**
Degree of pollution	**Normal**
Cat. of resistance to heat and fire	D
PTI of insulating materials	all the materials have PTI≥250
Class and structure of the software	A
Period of stress across the insulating parts	long

Table 7.b

Max. cable lengths:

probes:	10 m
digital inputs:	30 m (AWG 14-22)
LCD panel/ tLAN networks:	30 m (AWG 14-22)
serial communication cards:	refer to corresponding instruction sheet
boiler control:	30 m (AWG 14-22)
power supply:	5 m (AWG 14-22)
power outputs (relay):	30 m (AWG 14-22)

Warnings:
- All installation and maintenance operations must be carried out with the unit off;
- Use shielded cables for the serial connections: 3-wire + shield for tLAN, 2-wire + shield for networks made with optional serial cards. Do not make star connections (use chain connections). Connect the shield to terminal GN;
- Avoid short-circuits between pins GN and V+ (LCD panel power supply);
- Adopt precautions against electrostatic discharges when handling the board;
- Do not earth terminal GN.

Protection against electric shock and maintenance warnings

The system made up of the control board (HYFC0*) and the other optional cards (HYVC000R0*, HYPA*, HYIR*, HYSC00F0C*, pCO serial cards etc.) represents a control device to be incorporated in class I or II appliances.
The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect the power supply before working on the board during assembly, maintenance, replacement and configuration.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

Technical specifications

Functional characteristics

Resolution of analogue inputs:	Temperature probes: interval -40 to 80°C, 0.1°C
Measurement error by temperature:	Interval -20 to 25°C, ±0.5°C (excluding probe) Interval 25 to 30°C, ±1°C (excluding probe) Interval 30 to 90°C, ±1.5°C (excluding probe)

Table 7.c

Connections

See Fig. 3.c.

7.2 e-drofan expansion card

Assembly and installation instructions

Terminal	Meaning
SUPPLY EXP	e-drofan expansion power supply connector (connect by 2 wire cable)
EXP	Connector for e-drofan expansion using 5-wire cable
N	Neutral
No4	Multifunction Voltage output (L)
No5	Multifunction Voltage output (L)
No6	Cold water free contact
No7	Hot water free contact

Table 7.d

Maximum cable length, voltage outputs No4 and No5: 5 m
Maximum cable length, outputs No6 and No7: 30 m (voltage-free contact), 5 m (power supply to any load).

Warnings:
- All installation and maintenance operations must be carried out with the unit off;
- Keep the power cable (relay outputs) separate from the probe cables, digital inputs, flap power supply, IR receiver board, flat connection cable to expansion and serial connections (LCD panel, tLAN networks, hydronic networks etc.);
- Adopt precautions against electrostatic discharges when handling the board (e.g. antistatic bracelet);
- If using serial communication boards, the use of output No7 may be limited to very low voltage only.

Protection against electric shock and maintenance warnings
The system made up of the control board (HYFC0*) and the other optional cards (HYVC000R0*, HYPA*, HYIR*, HYSC00F0C*, pCO serial cards etc.) represents a control device to be incorporated in class I or II appliances.
The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect power before working on the board during assembly, maintenance and replacement.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

Technical specifications

Power supply	230 Vac, range –15 to 10%; 50/60 Hz (supplied by e-drofan board); Maximum power input (excluding relay loads): 1.5 VA
Screw terminals	Max voltage: 230 V
	Cable cross-section: 14-22 AWG
	The current input of the network (sum of the current input of the loads, the e-drofan, the expansion and the external module) must not exceed 6 A.
Uscite relè No4, No5, No6, No7	Maximum current at 250 Vac: EN60730: Resistive 2 A, Inductive: 2 A cos(φ)=0.4 60000 cycles
	For voltage outputs No4 and No5, respect the maximum limits described under "Screw terminals.
	Minimum interval between switching cycles (each relay): 12 s (the of the manufacturer of the unit that the device will be integrated into must guarantee the correct configuration to respond to this specification)
	Type of relay microswitching: 1C
Insulation	Insulation between low (relay outputs) and very low voltage parts: reinforced
	Insulation between voltage outputs No4, No5 and outputs No6, No7: reinforced
	Insulation between outputs No6 and No7: reinforced. If using serial cards, the use of output No7 may be limited to very low voltage only. See the user manual.
Index of protection	IP00
Storage conditions	-20T80°C, humidity 80% RH non-condensing
Operating conditions	0T60°C, humidity <90% RH non-condensing
Degree of pollution	Normal
Category of resistance to heat and fire:	D
PTI of insulating materials:	all the materials have PTI≥250
Period of stress across the insulating parts:	long

Table 7.e

7.3 E-drofan 4 triac expansion board

7.3.1 Assembly and maintenance instructions

terminal	meaning
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable).
EXP	E-drofan signal input connector (use 5 wire cable).
N	Neutral
No4	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P39)
No5	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P40)
No6	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P41)
No7	Multifunction TRIAC output with voltage signal: see the manufacturer section (configurable by parameter P42)

Maximum cable length for voltage outputs No4, No5, N06, N07: 5 m.

WARNINGS
- All installation and maintenance operations must be carried out with the unit off.
- Adopt precautions against electrostatic discharges when handling the board (e.g. antistatic bracelet).

7.2.2 Protection against electric shock and maintenance warnings
The system made up of the control board (HYFC0*****) and the other optional boards (HYVC000T0*, HYPA******, HYIR******, HYSC00F0C*, pCO serial boards etc.) represents a control device to be integrated into class I or class II appliances. The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect power before working on the board during assembly, maintenance and replacement.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

7.3.3 Technical specifications

Power supply	230 Vac, range –15% +10%; 50/60 Hz
	Maximum power input (excluding triac loads): 1.5 VA
Screw terminals	Max voltage: 250 V
	Cable cross-section: 14-22 AWG
	Max current: see outputs No4-7
Voltage outputs No4, No5, No6, No7	Maximum current at 250Vac (per individual voltage output): 0.3 A.
	Type of action of the triac: electronic disconnection
Insulation	Insulation between low (triac outputs) and very low voltage parts: Reinforced
	Insulation between triac outputs with voltage signal No4,No5, No6,No7: Functional
Index of protection	IP00
Storage conditions	-20T80 °C, humidity 80% RH non-condensing
Operating conditions	0T60 °C, humidity <90% RH non-condensing
Degree of pollution	Normal
Cat. of resistance to heat and fire:	D
PTI of insulating materials:	all the materials have PTI≥250
Period of stress across the insulating parts:	long

7.4 e-drofan triac/relay expansion board

7.4.1 Assembly and maintenance instructions

terminal	meaning
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable)
EXP	E-drofan signal input connector (use 5 wire cable)
N	Neutral
No4	TRIAC output with voltage signal, multifunction: see the manufacturer section (configurable by parameter P39)
No5	TRIAC output with voltage signal, multifunction: see the manufacturer section (configurable by parameter P40)
No6	Multifunction relay output 10 A resistive: see the manufacturer section (configurable by parameter P41). Voltage-free contact
No7	Multifunction relay output: see the manufacturer section (configurable by parameter P42). Voltage-free contact

Maximum cable length for voltage outputs No4, No5: 5 m
Maximum cable length for relay outputs N06, N07: 5 m

WARNINGS
- All installation and maintenance operations must be carried out with the unit off.
- Adopt precautions against electrostatic discharges when handling the board (e.g. antistatic bracelet).

7.4.2 Protection against electric shock and maintenance warnings

The system made up of the control board (HYFC0*****) and the other optional boards (HYVC000M**, HYPA******, HYIR******, HYSC00F0C*, pCO serial boards etc.) represents a control device to be integrated into class I or class II appliances. The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect power before working on the board during assembly, maintenance and replacement.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

7.4.3 Technical specifications

Power supply	230 Vac, range –15% +10%; 50/60 Hz
	Maximum power input (excluding triac loads): 1.5 VA
Screw terminals	Max voltage: 250 V
	Cable cross-section: 14-22 AWG
	Max current: see outputs No4-7
Voltage outputs No4, No5	Maximum current at 250Vac (per individual voltage output): 0.3 A
	Type of action of the triac: electronic disconnection
Relay output No6	Maximum current at 250 Vac: EN60730: Resistive 2 A, Inductive: 2 A cos( )=0.4 60000 cycles
Relay output No7	Maximum current at 250 Vac: EN60730: Resistive 10 to 100000 cycles
	Type of action/microswitching of the relay: 1C
Insulation	Insulation between low (triac outputs) and very low voltage parts: Reinforced Insulation between triac outputs with voltage signal No4,No5: Functional Insulation between triac outputs with voltage signal No4,No5 and relay outputs No6, No7: Reinforced Insulation between the two relay outputs No6, No7: Reinforced
Index of protection	IP00
Storage conditions	-20T80 °C, humidity 80% RH non-condensing
Operating conditions	0T60 °C, humidity <90% RH non-condensing
Degree of pollution	Normal
Cat. of resistance to heat and fire	D
PTI of insulating materials	all the materials have PTI≥250
Period of stress across the insulating parts	long

7.5.1 Assembly and maintenance instructions

terminal	meaning
SUPPLY EXP	Power supply connector (connect to e-drofan via 2 wire cable)
EXP	E-drofan signal input connector (use 5 wire cable)
GN	Signal reference terminal
No4	Multifunction 0 to 10 Vdc output: see the manufacturer section (configurable by parameter P39)
No5	Multifunction 0 to 10 Vdc output: see the manufacturer section (configurable by parameter P40)
No6	Multifunction relay output: see the manufacturer section (configurable by parameter P41).Voltage-free contact
No7	Multifunction relay output: see the manufacturer section (configurable by parameter P42). Voltage-free contact

Maximum cable length for 0 to 10Vdc outputs No4, No5: 5 m.
Maximum cable length for relay outputs (voltage-free contacts) N06, N07: 5 m.

WARNINGS
- all installation and maintenance operations must be carried out with the unit off.
- adopt precautions against electrostatic discharges when handling the board (e.g. antistatic bracelet).
- avoid short-circuits between terminals No4, No5 and the GN terminals.
- keep the power cable (relay outputs) separate from the cables to the 0 to 10 Vdc outputs. 7.5.2 Protection against electric shock and maintenance warnings

The system made up of the control board (HYFC0*****) and the other optional boards (HYVC000V**, HYPA******, HYIR******, HYSC00F0C*, serial boards pCO etc.) represents a control device to be integrated into class I or class II appliances. The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect power before working on the board during assembly, maintenance and replacement.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

7.5.3 Technical specifications

Power supply	230 Vac, range –15...+10%; 50/60 Hz
	Maximum power input: 1.5 VA
Screw terminals	Max voltage: 250 V
	Cable cross-section: 14-22 AWG
	Max current: see outputs No4-7
0 to 10 Vdc outputs No4, No5	Minimum impedance of the 0-10 Vdc actuator input stage (damper, valve...): 10 kOhm
Relay outputs No6, No7 (voltage-free contacts)	Maximum current at 250 Vac: - EN60730: Resistive 2 A, Inductive: 2 A cos( )=0.4 60000 cycles
	Type of action/microswitching of the relay: 1C
Insulation	Insulation between relay outputs No6 and No7: Reinforced Insulation between relay outputs No6, No7 and very low voltage parts: Reinforced Insulation between 0-10Vdc outputs and relay outputs No6,No7: Reinforced
Index of protection	IP00
Storage conditions	-20T80 °C, humidity 80% RH non-condensing
Operating conditions	0T60 °C, humidity <90% RH non-condensing
Degree of pollution	Normal
Category of resistance to heat and fire	D
PTI of insulating materials	all the materials have PTI≥250
Period of stress across the insulating parts	long

7.6 Remote acqua terminal

Assembly and installation instructions
To access the connection terminal remove the rear cover by levering the tab.

terminal	meaning
GN	use for connection to terminal GN on the fan coil and the shield on the shielded cable
Tx	use for connection to terminal Tx on the fan coil
V+	use for connection to terminal V+ on the fan coil

Table 7.f

Maximum length of shielded connection cable: 30 m from the fan coil.

If the local network (tLAN) is used, assign the role of master to the fan coil connected.
Avoid installing the terminal in places where the ambient temperature measurement may be altered: outside walls, near doors leading to the outside, exposed to the sun, etc.
Fasten the terminal as shown in the figure (the terminal should be fastened to the wall in a horizontal position so as to allow the recirculation of air through the slits on the rear cover).

Warnings:
- All installation and maintenance operations must be carried out with the unit off;
- Keep the power cables (relay outputs, live cables, etc.) separate from the shielded connection cable to the fan coil;
- Adopt precautions against electrostatic discharges when handling the board.

Technical specifications

Power supply	8 to 25 Vdc (supplied by the e-drofan board)
Insulation	Insulation between low (relay outputs) and very low voltage parts: reinforced (guaranteed by fan coil board and shielded connection cable).
Index of protection	IP30
Storage conditions	-20T80°C, humidity 80% RH non-condensing
Operating conditions	0T60°C, humidity <90% RH non-condensing
Degree of pollution	Normal
Category of resistance to heat and fire:	D
PTI of insulating materials:	all the materials have PTI≥250
Period of stress across the insulating parts:	long

Table 7.g7.7 e-droset remote terminal

Assembly and installation instructions

Below is the sequence of operations for wall mounting:
- fasten the 3 gang support to the box for built-in installation using two screws;
- make the connections between the terminal and the wires in the shielded cable from the e-drofan.

terminal	meaning
GN	use for connection to terminal GN on the e-drofan and the shield in the shielded cable.
Tx	use for connection to terminal Tx on the e-drofan.
V+	use for connection to terminal V+ on the e-drofan.

Table 7.h

Maximum length of the shielded connection cable: 30 m from the e-drofan;
- insert the terminal in the plastic support;
- insert the fastening "shoulders";
- position the wallplate on the support.
- The following wallplates can be used:

Biticino	Living International; Light; Light Tech; Matix
Vimar	Idea; Idea Rondò; Plana

The Living International - Light Tech - Matrix brands are the property of BTicino SpA. The Idea - Idea Rondò - Plana brands are the property of VIMAR SpA.

If the local network (tLAN) is used, the terminal assigns the role of master to the fan coil connected. Avoid placing the terminal in places where the room temperature measurement may be altered: outside walls, near doors leading outside, exposed to the sun, near the fan coil or radiators etc.

Warnings:
- all installation and maintenance operations must be carried out with the unit off;
- keep the power cables (relay outputs, live cables, etc.) separate from the shielded connection cable to the e-drofan;
- adopt precautions against electrostatic discharges when handling the board.

TECHNICAL SPECIFICATIONS

Power supply	8-25 Vdc (supplied by the fan coil board)
Insulation	Insulation between low (e-drofan relay outputs) and very low voltage parts: reinforced (guaranteed by the e-drofan board and the shielded connection cable).
Index of protection of the front panel	IP30
Storage conditions	-20T80°C, humidity 80% RH non-condensing
Operating conditions	0T60°C, humidity <90% RH non-condensing
Degree of pollution	Normal
Category of resistance to heat and fire:	D

Table 7.i

7.8 CANbus serial board

Assembly and installation instructions

terminal	meaning
GND, H+, H-	CANbus connection
Connettore 8 Vie	Power and communication jack with electronic controller to be inserted in the CANbus (fan coil, pCO...).
Connettore 7 vie (ove presente)	Power and communication jack with electronic controller to be inserted in the CANbus (fan coil, pCO...).
Dip switch 10 vie	Used to make the following settings (refer to the corresponding user manual): DIP 1-7: Serial address of the unit that hosts the CAN board (binary notation). From 1 to 15 for broadcast networks and the remaining for the single node mode. DIP8: ON= For use on pCO (OFF= For use on fan coil) DIP9: CANbus speed (ON= 125 Kbit/s OFF= 62.5 Kbit/s) DIP10: ON= Enable maximum CANbus distance (1 km). In this case the speed must be 62.5 Kbit/s

Table 7.j

Maximum cable length: 1 km at 62.5 Kbit/s, 500 m at 125 Kbit/s.

Warnings:
All installation and maintenance operations must be carried out with the unit off.
- Use shielded cables for serial connections, 2 wires plus shield, typical impedance 120 Ohm, parasitic capacitance 40 pf/m and signal propagation time 5 ns/m;
- Adopt precautions against electrostatic discharges when handling the board;
- The serial board is not optically-isolated, do not earth.

Below is a table showing the recommended shielded cables, depending on the various installations. The codes shown comply with the required specifications; cables supplied by other manufacturers can be used, as long as they comply with the above requirements.

EXAMPLES	Wire resistance (Ohm/km)	Max. cable length (km)	Belden code
AWG 16	13.7	1.173	9860
AWG 18	22.6	0.711	3074F
AWG 22	48.2	0.333	3105A
AWG 24	78.7	0.204	9841
AWG 24	78.7	0.204	8103

Table 7.k

Depending on the assumed length of the network, cables with a smaller cross-section may be used. For example, if expecting a maximum length of 300 m, AWG22 cable is sufficient.

Protection against electric shock and maintenance warnings
The system made up of the control board (including any optional cards) and the and the CAN serial board represents a control device to be incorporated in class I or II appliances. The class of protection against electric shock depends on how the control device is integrated into the unit built by the manufacturer.
Disconnect power before working on the board during assembly, maintenance and replacement.
The protection against short circuits must be guaranteed by the manufacturer of the appliance that the controller will be fitted on, or by the installer.

Technical specifications

Power supply	8-38 Vdc. Maximum power input: 900 mW
Screw terminals	Cable cross-section: 28-16 AWG
Insulation	The board is not optically-isolated. Refer to the user manual of the control it is installed on
Index of protection	IP00
Storage conditions	-20T80°C, humidity 80% RH non-condensing
Operating conditions	0T60°C, humidity <90% RH non-condensing
Degree of pollution	Normal
Cat. of resistance to heat and fire:	D
PTI of insulating materials:	all the materials have PT≥250
Class and structure of the software:	A
Period of stress across the insulating parts:	long

Table 7.l

7.9 Remote control

Assembly and installation instructions
If using this with a master fan coil, make sure that the resistor has been inserted between terminals GN and V+ (on the fan coil) and that the receiver board HYIR****** has been connected.

Warnings:
Disconnect the power supply before performing any installation and maintenance operations on the fan coil.
Adopt precautions against electrostatic discharges when handling the fan coil board.

Technical specifications

Power supply	Two "AAA" 1.5V batteries.
Storage conditions	-20T80°C, 80% RH non-condensing
Operating conditions	0T60°C, <90% RH non-condensing
Degree of pollution	Normal. The batteries should be disposed of according to the standards in force
Type of communication	Infrared

Table 7.m

7.10 Dimensions

Also see Figs. 3.b.a, 3.b.b e 3.e.

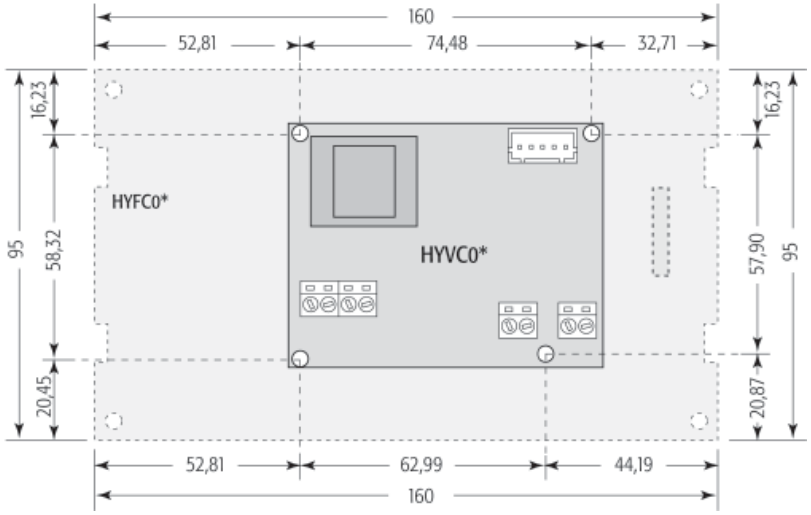


Fig. 7.a

7.11 Codes

For the description of the family of e-drofan products, see section "installer".

description	quantity	code
Main board		
e-drofan: Electronic controller for fan coils, single package	1 pc	HYFC000000
e-drofan: Electronic controller for fan coils, multiple package	25 pcs	HYFC000001
Terminal		
Remote ACQUA terminal for e-drofan, single package	1 pc	HYPA001000
Remote ACQUA terminal for e-drofan, multiple package	25 pcs	HYPA001001
Built-in e-droset terminal for e-drofan, single package	1 pc	HYPA003000
Accessories		
Programming key	1 pc	PSOPZKEY00
Programming key with power supply	1 pc	PSOPZKEYA0
Adapter for e-drofan programming key	1pc	HYKA000000
e-drofan relay expansion card, single package	1 pc	HYVC000R00
e-drofan relay expansion card, multiple package	50 pcs	HYVC000R01
E-drofan TRIAC expansion board, single package	1 pc	HYVC000T00
E-drofan TRIAC expansion board, multiple package	50 pcs	HYVC000T01
E-drofan relay/analogue output expansion board, single package	1 pc	HYVC000V00
E-drofan relay/analogue output expansion board, multiple package	50 pcs	HYVC000V01
E-drofan TRIAC/relay expansion board, single package	1 pc	HYVC000M00
E-drofan TRIAC/relay expansion board, multiple package	50 pcs	HYVC000M01
Serial option		
CAN bus serial board for e-drofan single package	1 pc	HYSC00F0C0
RS485 serial card for e-drofan single package	1 pc	HYSC00F0P0
Remote control options		
IR receiver board 24 cm cable multiple package 25 pcs	25 pcs	HYCB000201
IR receiver board 50 cm cable multiple package 25 pcs	25 pcs	HYCB000501
IR receiver board multiple package	50 pcs	HYIR000001
IR receiver board + 50 cm cable multiple package	50 pcs	HYIR000501
Remote control, single package	1 pc	HYHS001000
Remote control, multiple package	50 pcs	HYHS001001
Probes		
HP NTC probes 40 cm	50 pcs	NTC004HP0R
HP NTC probes 60 cm	50 pcs	NTC006HP0R
HP NTC probes 100 cm	50 pcs	NTC010HP0R
HP NTC probes 160 cm	50 pcs	NTC016HP0R

Table 7.n

7.12 Notes on the software release and compatibility

Compatibility of the system accessories based on the main functions

Main functions	e-drofan FW	acqua FW	CAN board FW	e-droset FW	Remote control FW
Occupancy. Comfort in all modes	1.9	1.3 (except occupancy)	4.6	1.0	-
modulating valves	2.1	1.3	4.6	1.0	

Table 7.o

Functions added/modified

	e-drofan 2.1
1	Added management of modulating actuators (3 point valves and valves with 0 to 10 Vdc input)

	e-drofan 1.9
1	Modified default values P06, P07, P08, P09, P13, P14, P39, P46, P53, P61
2	Added setting of outputs No4, No5 from dipswitch 4 if enabled by P95
3	Comfort settable in all modes
4	Enable Heat/Cool from dipswitch 1 and enabling of corresponding probe on coil
5	Added occupancy function
6	Modified management of the heater with or without heat enable
7	Added digital variable to enable alarm log on PlantVisor
8	Added management of e-droset built-in terminal
9	Extended parameter copy (by programming key) from e-drofan with previous version software (copy only the parameters in common)
10	Enabled use of the Modbus protocol

	ACQUA 1.3
1	Modified clock display and setting when starting
2	Parameter editing with index greater than 100
3	Comfort settable in all modes and extended to ±3°C

	CAN board 4.6
1	Lock keypad on the e-drofan slave terminals from PCO (released from dependence)
2	Comfort settable in all modes

Table 7.p

Note:

Note:

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CAREL INDUSTRIES HQs
Via dell'Industria, 11 - 35020 Brugine - Padova (Italy)
Tel. (+39) 049.9716611 - Fax (+39) 049.9716600
e-mail: CAREL @ CAREL. com - www .CAREL. com

Agenzia / *Agency*:

+030221266 rel. 3.5 - 14.07.2009