INSTALLATION AND OPERATION MANUAL

Advanced plus electronic controller

Manuale d'installazione e d'uso
FWEC3 COMANDO LCD PER TERMINALI — **Italiano**

Installation and operation manual
FWEC3 LCD CONTROLLER FOR INDOOR UNITS — **English**

Manuel d'installation et d'utilisation
FWEC3 CONTRÔLEUR LCD POUR UNITÉS TERMINALES — **Français**

Installations- und Bedienungsanleitung
FWEC3 LCD-STEUERUNG FÜR TERMINALS — **Deutsch**

Manual de instalación y de uso
FWEC3 MANDO LCD PARA TERMINALES — **Español**

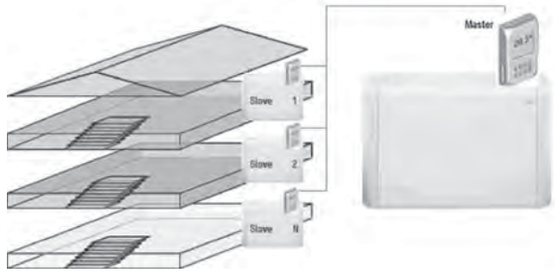
Manual de instalação e de uso
FWEC3 COMANDO LCD PARA TERMINAIS — **Portugues**

Handleiding voor gebruik en onderhoud
FWEC3 LCD BEDIENING VOOR TERMINALS — **Nederlands**

BESZERELÉSI ÉS FELHASZNÁLÓI KÉZIKÖNYV
FWEC3 LCD VEZÉRLŐ TERMINÁLOKHOZ — **Hungarian**

РУКОВОДСТВО ПО УСТАНОВКЕ И ЭКСПЛУАТАЦИИ
FWEC3 Ж (LCD) ПАНЕЛЬ УПРАВЛЕНИЯ ДЛЯ ТЕРМИНАЛОВ — **русский**

Εγχειρίδιο εγκατάστασης και χρήσης
FWEC3 ΠΙΝΑΚΑΣ ΕΝΤΟΛΩΝ ΜΓΔ ΓΙΑ ΤΕΡΜΑΤΙΚΑ — **Ελληνικά**


Master
Slave 1
Slave 2
Slave N

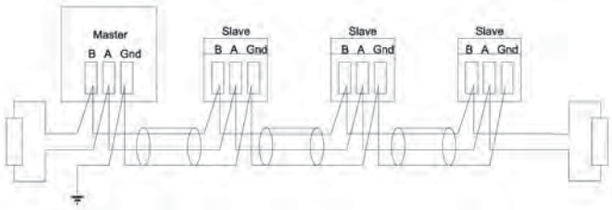
1


①
②
③
°C
ON
OFF
AUTO
% RH
SET

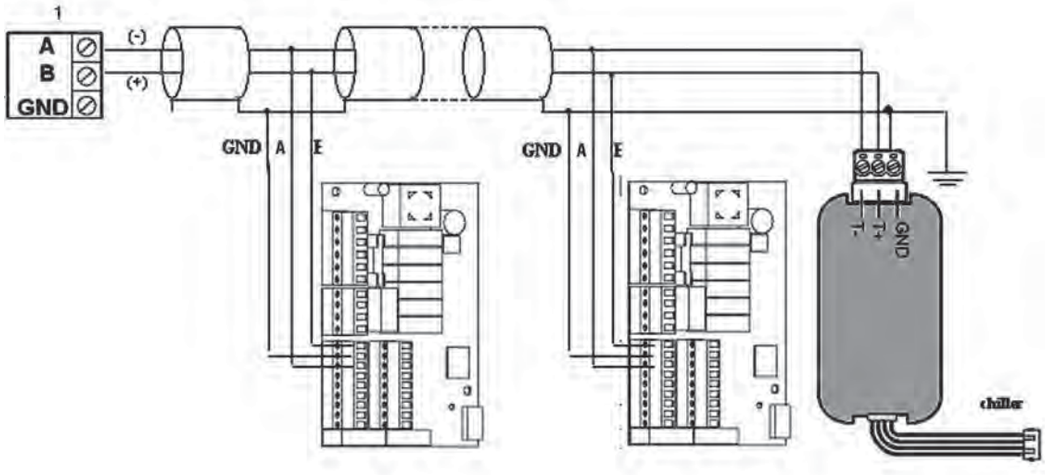
2


SEL
MODE

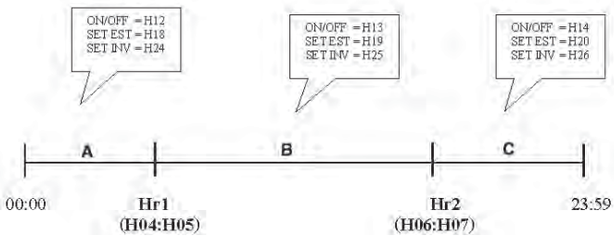
3

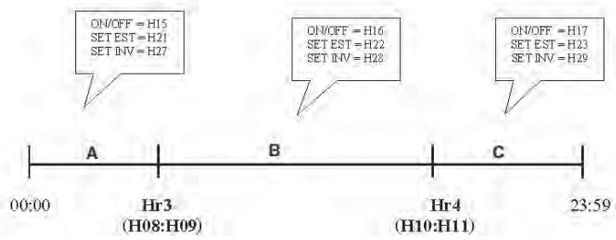

Master
B A Gnd
Slave
B A Gnd
Slave
B A Gnd
Slave
B A Gnd

4

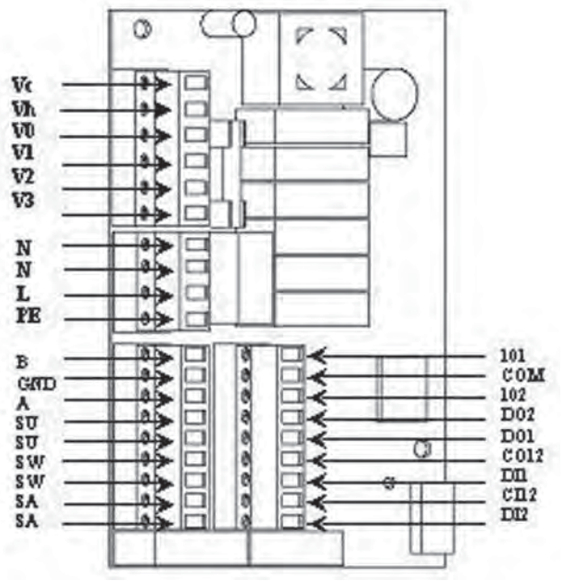

1
A
B
GND
(-)
(+)
GND A E
GND A E
T-
T+
GND
chiller

5

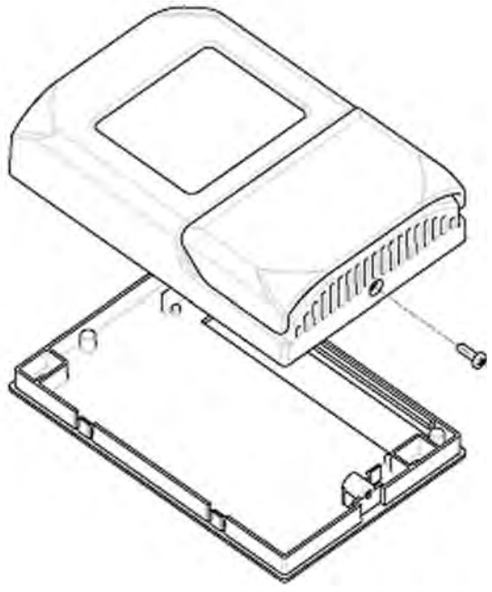

ON/OFF = H12
SET EST = H18
SET INV = H24
ON/OFF = H13
SET EST = H19
SET INV = H25
ON/OFF = H14
SET EST = H20
SET INV = H26
A
B
C
00:00
Hr1
(H04:H05)
Hr2
(H06:H07)
23:59


ON/OFF = H15
SET EST = H21
SET INV = H27
ON/OFF = H16
SET EST = H22
SET INV = H28
ON/OFF = H17
SET EST = H23
SET INV = H29
A
B
C
00:00
Hr3
(H08:H09)
Hr4
(H10:H11)
23:59

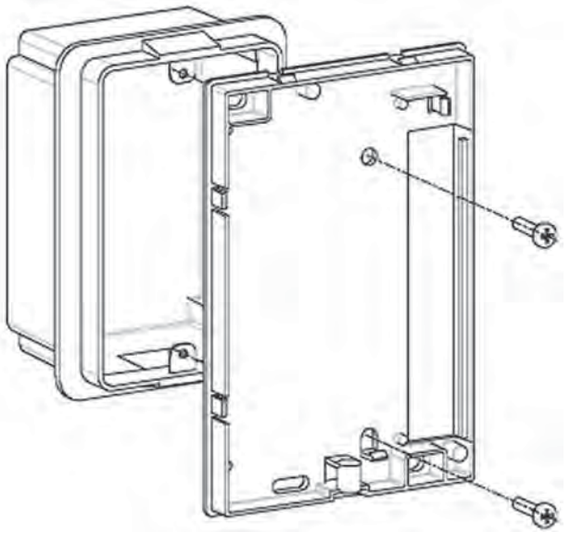
6


Vc
Vh
V0
V1
V2
V3
N
N
L
PE
B
GND
A
SU
SU
SW
SW
SA
SA
101
COM
102
DO2
DO1
CO12
DI1
CI12
DI2

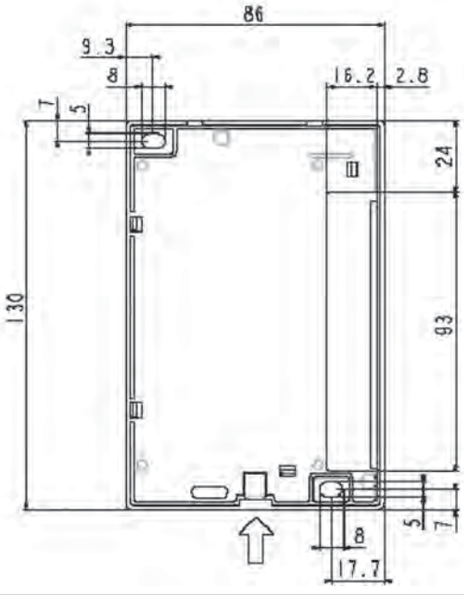
7



8



9


86
9.3
8
16.2
2.8
7
5
24
130
93
5
7
8
17.7

10

11

NOTES

GENERAL CHARACTERISTICS

The ADVANCED PLUS version of LCD controller has been designed to manage the operation of indoor units with single-phase multispeed asynchronous motor. As for the ADVANCED version it has the added features of advanced humidity control and MASTER/SLAVE with ADVANCED controls only.

MASTER-SLAVE SOLUTION (SEE FIGURE 1)

The Master-Slave solution sets up a Master-Slave system (up to 247 slave terminals), in which one of the LCD Microprocessor controllers plays the role of Master and controls all of the other slave elements.
In this case as well the connection is made via an RS485 bus, consisting of a simple shielded 2-conductor cable.
The MASTER controller (identified by the address 255), sends the following information to the SLAVE controllers:

1. Operation mode (Cooling or Heating)
2. Limits for adjusting the room temperature SETPOINT (in both SUMMER and WINTER modes): from each SLAVE controller the SETPOINT programmed on the MASTER controller can be adjusted by ± 2°C
3. ON/OFF status of the controller: all SLAVE controllers will conform to the ON/OFF status of the MASTER controller
4. Enabling the controller minimum room temperature
   With ON thermostat: display of current water temperature

MAIN FUNCTIONS

- Air temperature adjustment through automatic step regulation of fan speed or by modulating the fan speed.
- regulation of air temperature via fan on-off control (fan runs at a fixed speed),
- control of On-Off or modulating valves for two or four-pipe systems,
- control of electrical heater for auxiliary heating,
- cooling/heating switching in the following modes:
  - local manual switching
  - remote, manual (centralised);
  - automatic, depending on water temperature
  - automatic, depending on air temperature
- Dehumidify Function
- serial Communication
- timer-programmed operating mode.

ADDITIONAL FEATURES INCLUDE:

- no-voltage contact for external activation (e.g. window contact, remote ON/OFF, occupancy sensor, etc.) which may enable or disable unit operation (contact logic: see circuit board configuration parameters).
- no-voltage contact for centralised remote Cooling/Heating changeover (contact logic: see circuit board configuration parameters).
- no-voltage contact for remote enabling of the economy mode (contact logic: see circuit board configuration parameters).
- remote water temperature probe (FWTSKA accessory)
- internal temperature sensor
- internal humidity probe
- remote air temperature probe (FWTSKA accessory) (this probe, if present, is used in place of the internal one for the measurement of room temperature).
- remote humidity probe (FWHSKA accessory - to be used in combination with the remote temperature probe)
- two configurable digital outputs (no-voltage contacts) (see "Configuration parameters of board")

CONTROL PANEL

The control panel is composed of:

- LCD display - back lit
- keyboard with 7 keys

LCD DISPLAY - BACK LIT (SEE FIGURE 2)

(1) room temperature

(2) room humidity

(3) set temperature

ON fan status. When flashing it indicates that fans are off standing for a call from the thermostat. If the symbol is steadily lit it means that the fans are running

OFF fan status. Fans are off as speed is set to Off or the control is off.

AUTO automatic ventilation logic

fan speed

operation mode: Cooling. When flashing it indicates that water circuit is not enabled to fan ventilation.

operation mode: Heating. When flashing it indicates that water circuit is not enabled to fan ventilation.

Dehumidification. When flashing it indicates that the circuit is not enabled to dehumidification. If the symbol is steadily lit it means that the function is active

Economy option enabled

Alarm triggered

Minimum Temperature Control

valve open

electrical heater: If the symbol flashes it means that the electrical heater is on; if steadily lit it means only that the electrical heater has been selected

serial communication active. The flashing symbol indicates that the controller is the master of a network

The backlight switches on every time a button is pressed and automatically switches off about 2 minutes after the last button was pressed.

KEY BOARD (SEE FIGURE 3)

On/Off key: Thermostat On/Off. During the procedure of parameter modification, it permits to return to normal operating conditions

Up and **Down** keys: changing of thermostat setting temperature (Heating: [5.0-30.0°C], Cooling: [10.0-35.0°C]). During the procedure of parameter modification, they are used to select the parameters or to change their value

SEL key: in the heating mode, the electric electrical heater can be selected as auxiliary function

Mode key: selection of Heating/Cooling operating mode

Fan key: selection of operating speed

EC key: selection of Economy mode

ACTIVE KEY COMBINATIONS

- with OFF thermostat: access to circuit board configuration parameters (password=10)
- with thermostat ON: display of current water temperature (if air sensor is present and correctly configured through parameter *P04*) and hour set on the internal clock

- selection of Minimum temperature function

- selection of dehumidify option

- keypad locking/unlocking (password=99);

- access to time programming parameters (password=5)

In any display mode other than the normal one, about 2 minutes after the last button was pressed the controller will go back into the standard display mode.

BOARD CONFIGURATION

The board can be configured according to the type of unit/system to be governed by changing some parameters.

PARAMETER LIST

- *P00* = controller configuration (see "Available configurations") to select the type of unit to be managed.
- *P01* = type of controller installation
  -000: on the unit
  -001: wall mounted
- *P02* = Modbus address. In order for the change in this parameter to become active (excepting in the case of internal transfer between slave values) it is necessary to switch the power off and back on again at the end of programming):
  -0: serial communication disabled
  -1-247: Slave
  -255: Master
- *P03* = neutral zone [20-50°C/10]; parameter used in case of configurations with automatic cooling/heating changeover according to air temperature.
- *P04* = water sensor
  -0: not available
  -1: available
  Based on the set value, the sensor alarm and the electrical heater functions will be controlled
- *P05* = use configuration DIN 1/2
  - *0*: DIN1 = - DIN2 = -
  - *1*: DIN1 = - DIN2 = OnOff
  - *2*: DIN1 = Sum/Win DIN2 = -
  - *3*: DIN1 = Eco DIN2 = -
  - *4*: DIN1 = Sum/Win DIN2 = On/Off
  - *5*: DIN1 = Eco DIN2 = On/Off
  - *6*: DIN1 = Sum/Win DIN2 = Eco
- *P06* = DIN1 logic:
  - *0*: [open/closed] = [Cooling/Heating] = [-/ECO]
  - *1*: [open/closed] = [Heating/Cooling] = [ECO/-]
- *P07* = DIN2 logic:
  - *0*: [open/closed] = [OFF/ON] = [-/ECO]
  - *1*: [open/closed] = [On/Off] = [ECO/-]
- *P08* = Remote humidity sensor
  - *0* : not available
  - *1* : available

  Based on the set value, the associated probe alarm will be triggered accordingly.
- *P09* = DOUT1 configuration:
  - *0* : not used
  - *1* : indicating operation mode
  - *2* : indicating unit cooling/heating mode
  - *3* : indicating unit cooling mode
  - *4* : indicating unit heating mode
  - *5* : indicating ON/OFF
  - *6* : indicating sensor alarm triggered
  - *7* : external dehumidification active
  - *8* : external humidification active
  - *9* : indicating high room temperature
  - *10* : indicating low room temperature
  - *11* : not used
  - *12* : indicating low water temperature

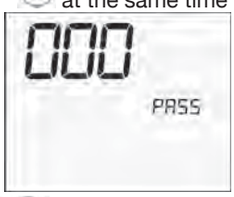
  (see "Configuration of digital outputs")
- *P10* = DOUT1 logic:
  - *0* : not used
  - *1* : indicating operation mode

  (see "Configuration of digital outputs")
- *P11* = DOUT2 configuration: same as parameter P09 but for digital output 2.
  (see "Configuration of digital outputs")
- *P12* = DOUT2 logic: same as parameter P10 but for digital output 2.
  (see "Configuration of digital outputs")
- *P13* = room relative humidity SETPOINT (see "Configuration of digital outputs)
- *P14* = AOUT1/2 configuration: configuration of the two analog outputs 0-10V depending on the type of fan (non-modulating or modulating) and the type of valve(s) (ON/OFF or modulating). For further details see "Configuration of analog outputs".

ACCESS TO PARAMETER CONFIGURATION PROCEDURE

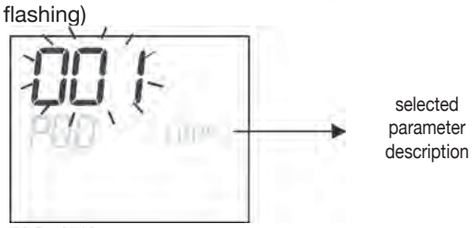
- switch the thermostat off

- push the SEL MODE at the same time



- Use keys △ ▽ to modify the display value up to the password value “10”, and press SEL.
  If it is correct, you will have access to the parameters

- Use keys △ ▽ to scroll the various parameters (see “Parameter list” described above)
- press SEL to confirm the parameter change (the value will start flashing)



- use keys △ ▽ to change the value
- press SEL to save the new value setting or ↺ to cancel the modification
- after completing the modification of the parameters concerned press key ⏻ to exit the procedure

N.B.: the parameter configuration phase is of limited duration. Once a certain time has elapsed (around 2 minutes) the thermostat will switch back into the Off status and only the saved changes will be retained.

AVAILABLE CONFIGURATIONS (PARAMETER P00)

The LCD controller can be configured in various ways according to the type of system. Various configurations can be obtained through the *P00* parameter (see configuration procedure of controller parameters).

001
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

002
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

003
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **WATER**

004
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

005
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

006
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **WATER**

007
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

008
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

AVAILABLE CONFIGURATIONS (PARAMETER P00)

009
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **AIR**

010
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

011
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

012
- System pipes: **2**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **AIR**

013
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

014
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

015
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **WATER**

016
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

017
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

018
- System pipes: **2**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **WATER**

019
- System pipes: **2**
- Valve: **3 WAYS**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

020
- System pipes: **2**
- Valve: **3 WAYS**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

021
- System pipes: **2**
- Valve: **3 WAYS**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **AIR**

022
- System pipes: **2**
- Valve: **3 ways**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

023
- System pipes: **2**
- Valve: **3 WAYS**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

024
- System pipes: **2**
- Valve: **3 WAYS**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **AIR**

025
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

026
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

AVAILABLE CONFIGURATIONS (PARAMETER P00)

027
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **AIR**

028
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

029
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

030
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **AIR**

031
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

032
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **REMOTE**

033
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **3**
- Summer/winter switching logic: **AIR**

034
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

035
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **REMOTE**

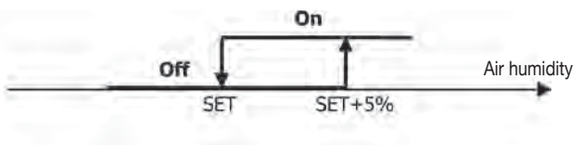
036
- System pipes: **4**
- Valve: **2-3 WAYS**
- Electrical heater: **NO**
- Speeds: **4**
- Summer/winter switching logic: **AIR**

037
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **3**
- Summer/winter switching logic: **LOCAL**

038
- System pipes: **4**
- Valve: **NO**
- Electrical heater: **YES**
- Speeds: **4**
- Summer/winter switching logic: **LOCAL**

CONFIGURATION OF DIGITAL OUTPUTS (PARAMETERS *P09,P10,P11,P12*)

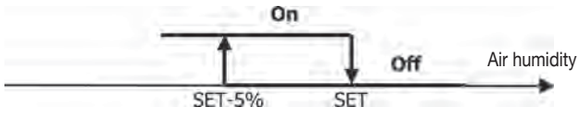
P09,P11 = **0**
The digital output is not governed by the controller; the contact is always open.
P09,P11 = **1**
The contact status reflects the current operating mode (summer or winter) of the unit.
P09,P11 = **2**
The contact status indicates the operation mode of the unit: cooling (summer) or heating (winter).
P09,P11 = **3**
The contact status indicates that the unit is in cooling mode.
P09,P11 = **4**
The contact status indicates that the unit is in heating mode.
P09,P11 = **5**
The contact status indicates if the control in ON or OFF
P09,P11 = **6**
The contact status indicates if an alarm is triggered (serious or non-serious, see “Alarms”)
P09,P11 = **7**
The contact is used to switch ON/OFF any external device for dehumidifying the air (cooling mode only). The ON/OFF logic is based on a reading of the humidity in the room and the SETPOINT selected with parameter P13. It follows the diagram shown:



CONFIGURATION OF DIGITAL OUTPUTS (PARAMETERS *P09,P10,P11,P12*)

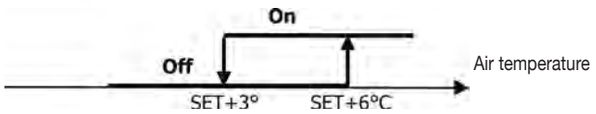
P09,P11 **= 8**

The contact is used to switch ON/OFF any external device for humidifying the air (heating mode only). The ON/OFF logic is based on a reading of the humidity in the room and the SETPOINT selected with parameter P13. It follows the diagram shown:



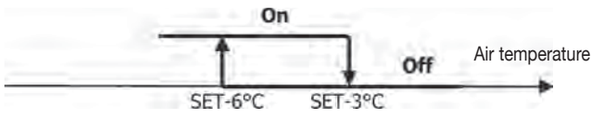
P09,P11 **= 9**

The status of the contact indicates whether the air temperature is too high compared to the temperature SETPOINT (only in the "summer" mode); the ON/OFF logic is thus tied to the value of the temperature SETPOINT, according to the following step:



P09,P11 **= 10**

The status of the contact indicates whether the air temperature is too low compared to the temperature SETPOINT (only in the "winter" mode); the ON/OFF logic is thus tied to the value of the temperature SETPOINT, according to the following step:

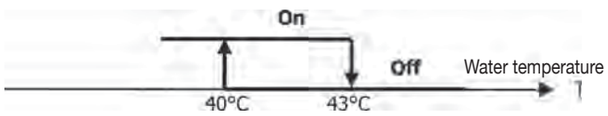


P09,P11 **= 11**

The digital output is not governed by the controller; the contact is always open.

P09,P11 **= 12**

The contact status indicates that water temperature is low. The activation/deactivation logic follows the step:



The two tables below provide a detailed explanation of the meaning of the contact associated with each digital output:

DIGITAL 1 OUTPUT					
P09		P10 = 0 (NO CONTACT)		P10 = 1 (NC CONTACT)	
		OPEN CONTACT	CLOSED CONTACT	OPEN CONTACT	CLOSED CONTACT
0	NOT USED	--	--	--	--
1	OPERATING MODE	SUMMER	WINTER	WINTER	SUMMER
2	UNIT IN COOLING OR HEATING MODE	NO	YES	YES	NO
3	UNIT IN COOLING MODE	NO	YES	YES	NO
4	UNIT IN HEATING MODE	NO	YES	YES	NO
5	CONTROLLER STATUS	OFF	ON	ON	OFF
6	ALARM TRIGGERED	NO	YES	YES	NO
7	EXTERNAL DEHUMIDIFICATION CALL	NO	YES	YES	NO
8	EXTERNAL HUMIDIFICATION CALL	NO	YES	YES	NO
9	HIGH ROOM TEMPERATURE	NO	YES	YES	NO
10	LOW ROOM TEMPERATURE	NO	YES	YES	NO
11	NOT USED	--	--	--	--
12	LOW WATER TEMPERATURE	YES	NO	NO	YES

DIGITAL 2 OUTPUT					
P11		P12 = 0 (NO CONTACT)		P12 = 1 (NC CONTACT)	
		OPEN CONTACT	CLOSED CONTACT	OPEN CONTACT	CLOSED CONTACT
0		--	--	--	--
1	OPERATING MODE	SUMMER	WINTER	WINTER	SUMMER
2	UNIT IN COOLING OR HEATING MODE	NO	YES	YES	NO
3	UNIT IN COOLING MODE	NO	YES	YES	NO
4	UNIT IN HEATING MODE	NO	YES	YES	NO
5	CONTROLLER STATUS	OFF	ON	ON	OFF
6	ALARM TRIGGERED	NO	YES	YES	NO
7	EXTERNAL DEHUMIDIFICATION CALL	NO	YES	YES	NO
8	EXTERNAL HUMIDIFICATION CALL	NO	YES	YES	NO
9	HIGH ROOM TEMPERATURE	NO	YES	YES	NO
10	LOW ROOM TEMPERATURE	NO	YES	YES	NO
11	WATER CIRCUIT ENABLED FOR COOLING	YES	NO	NO	YES
12	WATER CIRCUIT ENABLED FOR HEATING	YES	NO	NO	YES

CONFIGURATION OF 0-10V ANALOG OUTPUTS (PARAMETER P14)

The table below is a guide to setting parameter P14 correctly based on the type of valve(s) and fan the unit is equipped with. For each type of unit an indication is given of which value should be assigned to parameter P14 and the consequent use mode of the two analogue outputs.

TYPE OF UNIT	P14	AOUT1	AOUT2
2 OR 4 PIPES UNIT WITH ON/OFF VALVE AND NON-MODULATING FAN	0	NOT USED	NOT USED
2 PIPES UNIT WITH MODULATING VALVE AND NON-MODULATING FAN	1	VALVE MODULATION	--
2 PIPES UNIT WITH MODULATING VALVE AND MODULATING FAN	2	VALVE MODULATION	FAN MODULATION
4 PIPES UNIT WITH MODULATING VALVES (MODULATING FAN NOT ALLOWED)	3	COLD WATER VALVE MODULATION	HOT WATER VALVE MODULATION
2 OR 4 PIPES UNIT WITH ON/OFF VALVE(S) AND MODULATING FAN	4	--	FAN MODULATION

SERIAL COMMUNICATION

Connection to the RS485 communication network
The communication network (bus type) relies on a simple shielded 2-conductor cable, directly connected to the RS485 serial ports of the controllers (terminals A, B and GND).
For the network use a cable AWG 24 (diam. 0.511 mm)

The communication network must have the following general structure (figure 4):
In the case of the "MASTER-SLAVE" solution a termination resistor will have to be installed on both controllers at the furthest ends of the network.

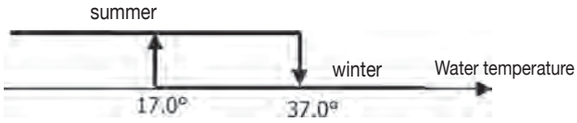
N.B.: (1) Comply with the polarity of the connection: indicated with A(-) and B(+)
(2) Avoid ground loops (ground shield at one end only)

LOGICS

COOLING/HEATING SWITCHING

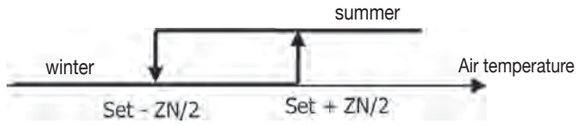
Four logics are present to select the thermostat operating modes according to the controller configuration setting parameter P00):

1 **Local**: user choice made through the key MODE
2 **Distance**: depending on the Digital Input DI1 status (contact logic: see configuration parameters of board)
3 Depending on water temperature



N.B.: in case of water sensor alarm, the controller returns to the Local mode temporarily.

4 depending on air temperature



Dove:
- **Set** is the temperature setting made by the arrows
- **ZN** is the neutral zone (parameter P03)

The thermostat operating mode is indicated on the display by the symbols ❄ (cooling) and ☼ (heating)

VENTILATION

GENERAL ASPECTS

The controller can perform two types of fan control:
- step control, with a fixed number of selectable speeds (3 or 4);
- modulating control, with speeds ranging from 0% to 100%

Which type of control will be used clearly depends on the type of fan (modulating or non modulating) installed in the unit; the controller makes the selection based on the value set for configuration parameter P14. Step control in turn follows two different logics depending on the type of valve(s) (**ON/OFF** or modulating); this information, like the fan type, is deduced by the controller based on the value taken on by configuration parameter P14. Consequently, configuration parameter P14 must be carefully set in order to ensure that the unit functions correctly.

Important: in the case of modulating fan control, in order to achieve a correct adjustment the controller takes into account the number of speeds implicitly indicated by the value assigned to configuration parameter P00. Though it may seem contradictory to talk about "number of speeds" in the case of modulating fan control, this information is essential for indicating to the control system whether the unit is designed to work in the natural convection mode or not. Based on this information, the modulating fan control will follow different logics.

Summing up, the automatic control logics implemented by the controller (and described in detail below) are the following:
- step fan control with **ON/OFF** valve (or valve absent) and 3 speeds, in the cooling and heating modes (specular logics);
- step fan control with **ON/OFF** valve (or valve absent) and 4 speeds, in the cooling and heating modes (specular logics);
- step fan control with modulating valve and 3 speeds, in the summer and winter modes (specular logics);
- step fan control with modulating valve and 4 speeds, in the summer and winter modes (non-specular logics);
- modulating fan control with **ON/OFF** valve, in the summer and winter modes (specular logics);
- modulating fan control with modulating valve

STEP FAN CONTROL

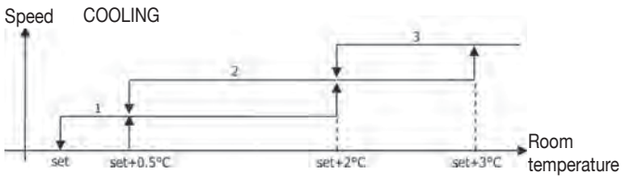
Operating speed selection

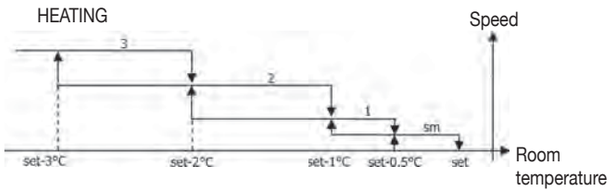
Using Fan key it is possible to select the following speeds:

- **AUTO Automatic ventilation**: depending on the set temperature and the room air temperature

WITH 3-SPEED CONFIGURATIONS AND **ON/OFF** VALVE(S) OR W/O VALVE(S):

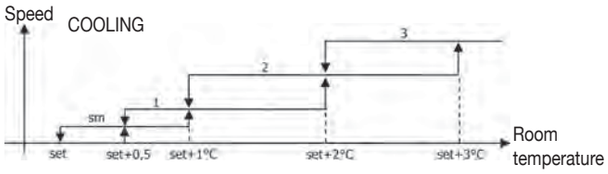
Speed
3: maximum
2: medium
1: minimum

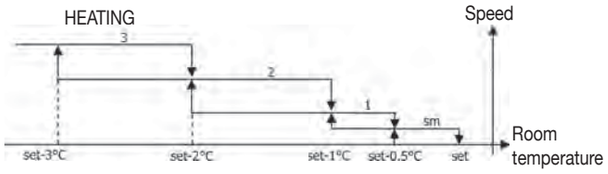




WITH 4-SPEED CONFIGURATIONS AND **ON/OFF** VALVE(S) OR W/O VALVE(S):

Speed
3: maximum
2: medium
1: minimum
sm: Extra-low

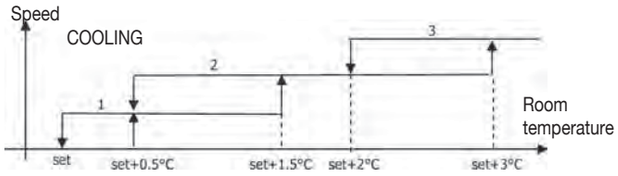


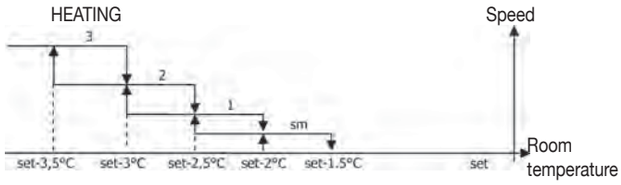


N.B.: in case of 4-speed configuration and valve, ventilation in heating mode is shifted by 0.5°C to permit a natural convection phase

WITH 3-SPEED CONFIGURATIONS AND MODULATING VALVE(S):

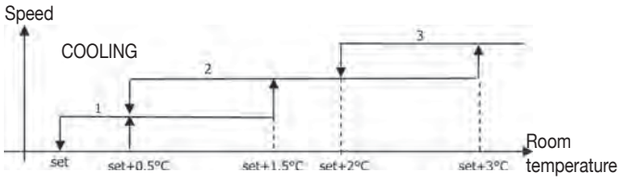
Speed
3: maximum
2: medium
1: minimum

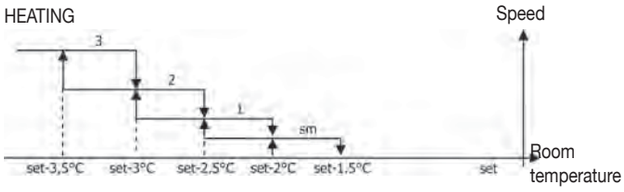




WITH 4-SPEED CONFIGURATIONS AND MODULATING VALVE(S):

Speed
3: maximum
2: medium
1: minimum
sm: Extra-low





- **Speed disabled:** Can be selected only in heating mode and with 4-speed configuration only. The indoor unit operates by natural convection only.
- **Extra low speed**: can be selected only with 4-speed configuration. It works at extra low speed only.
- **Minimum Speed**
- **Medium Speed**
- **Maximum Speed**

N.B.: In the case of fixed speed, the fan on/off logic will be equivalent to the automatic logic.

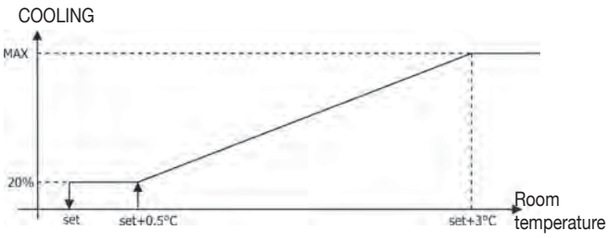
MODULATING FAN

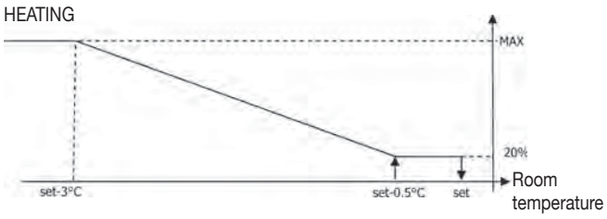
As in the case of step control, the modulating fan control logic provides for two possible operating modes:
- automatic operation
- fixed speed operation

The operating mode is selected by pressing the button, which switches between the automatic mode (the word **AUTO** appears) and the display of the percentage value of the fixed speed (which flashes in place of the temperature **SETPOINT**). While this display mode (the word "**FAN**" will also flash below the room temperature value) is active it is possible to change the speed percentage value using the **UP** and **DOWN** buttons (within any limits set by the manufacturer) and confirm fixed-speed operation by pressing the SEL button.

AUTOMATIC OPERATION LOGIC (AUTO):

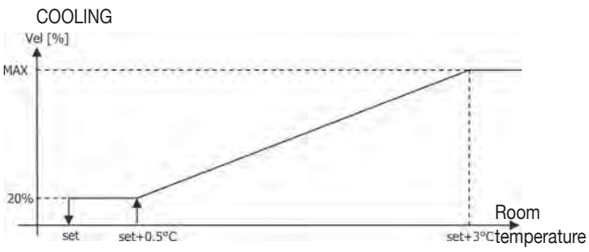
WITH 3 OR 4-SPEED CONFIGURATIONS AND **ON/OFF** VALVE(S) OR W/O VALVE(S):



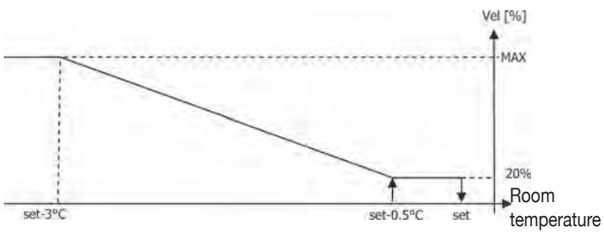


N.B.: in case of 4-speed configuration and valve, ventilation in heating mode is shifted by 0.5°C to permit a natural convection phase

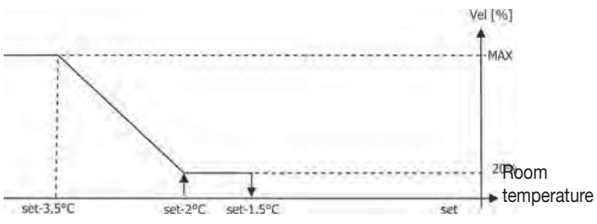
WITH 3 OR 4-SPEED CONFIGURATIONS AND MODULATING VALVE(S):



HEATING WITH 3-SPEED CONFIGURATIONS

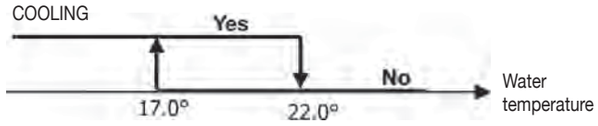


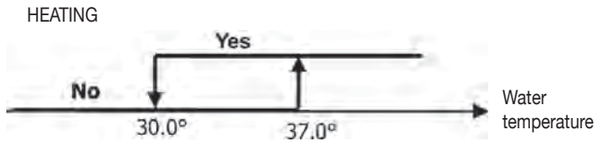
HEATING WITH 4-SPEED CONFIGURATIONS



WATER CONTROL

Irrespective of the type of fan present (modulating or non-modulating), fan operation will be constrained by the system water temperature control. Based on the operation mode, different heating or cooling thresholds will be enabled.





Upon a call of the thermostat, the absence of the enabling signal will be indicated on the display by the flashing of the symbol representing the active mode (or)

The enabling signal is ignored:

- if the water sensor is not included (*P04* = 0) or in alarm status because disconnected
- in the cooling mode with 4-pipe configurations

FORCED OVERRIDES

The normal fan operating logic (modulating or non-modulating) will be ignored in particular override situations that may be necessary to ensure correct control of the temperature or the unit operation. This may occur:

in the cooling mode:

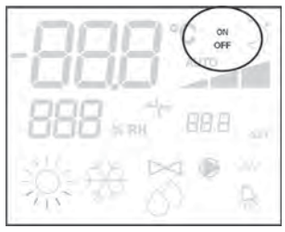
- on-board controller (*P01* = 0) and configurations with valve: the minimum speed available will be maintained even once the temperature has been reached.
- on-board controller and valveless configurations: after every 10 minutes in which the fan remains idle a 2 minute cleaning is carried out at medium speed to enable the air sensor to read the room temperature more correctly.

in the heating mode:

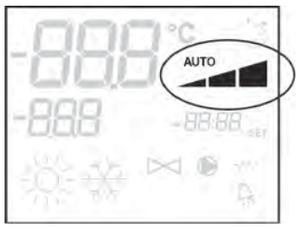
- While the electrical heater is on: the fan is forced to run at medium speed
- once the electrical heater has gone off: a 2 minute post-ventilation cycle will be run at medium speed. (N.B.: this cycle will be completed even if the thermostat is switched off or in the event of a changeover to the cooling mode)

DISPLAY

The display shows the fan status



- **On flashing**: fan in standby mode
- **On steadily lit**: fan on
- **OFF**: fan disabled to operate by natural convection only and fan speed (with indication of “automatic” logic if proper) enabled or selected (in case of stand-by fan)



- **Extra low speed**
- **Minimum Speed**
- **Medium Speed**
- **Maximum Speed**

N.B.: in the case of modulating fans, the four symbols mentioned above indicate the interval (extra-low, low, medium and high) in which the operating speed falls.

N.B.: if the active speed is different from the one selected by the user (in the case of a forced override), pressing the button Fan once will cause the latter to be displayed; pressing again will change this setting.

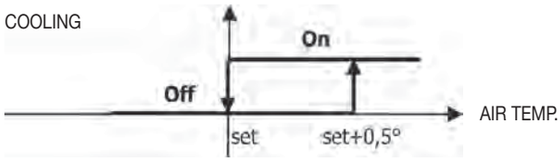
VALVE

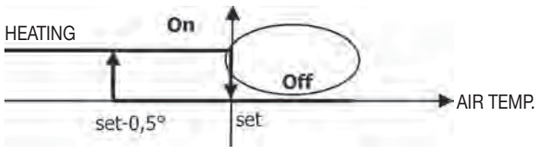
The controller can manage 2- or 3-way valves of the ON/OFF type (i.e. completely open or completely closed) or modulating valves (the degree of valve opening may range between 0% and 100%). As in the case of fans, parameter *P14* (configuration of analog outputs) must be carefully set based on the type of valves actually present in the unit, so that the controller will implement the correct control logic.

1. AIR CONTROL

A. OPENING

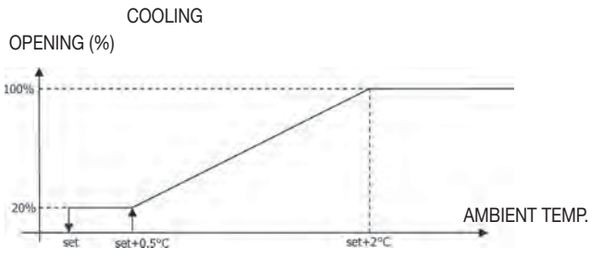
The valve opening is controlled according to the operating setpoint and air temperature setpoint



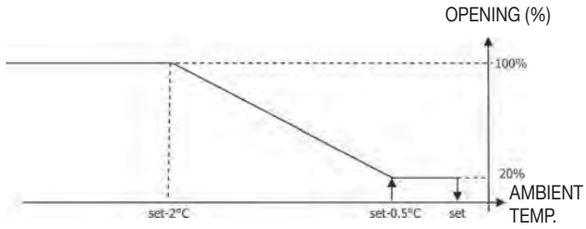


B. MODULATING VALVE

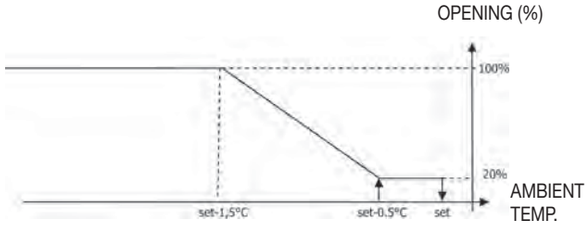
The valve opening is controlled according to the operating setpoint and air temperature setpoint The regulation logic for opening conforms to the diagrams below.



HEATING WITH 3-SPEED CONFIGURATIONS



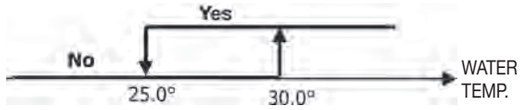
HEATING WITH 4-SPEED CONFIGURATIONS



2. WATER CONTROL

The checking of water temperature to enable valve opening is a function that concerns only configurations with 3-way valves and electrical heater. In such configurations the water temperature will be checked in the following cases:

- Heating with heat element: operation of the electrical heater will force the fan to switch on; it is therefore necessary to prevent excessively cold water from passing through the unit.



- Post-ventilation due to switching off of the electrical heater: this function will be maintained until the set time has elapsed, even if the operating mode is changed. During post-ventilation the water temperature enabling signal will coincide with the one seen for fan operation.

DISPLAY

The active valve indication on the display will be shown by the symbol

ELECTRICAL HEATER

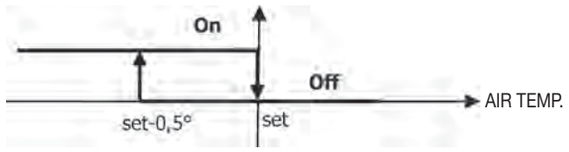
The electrical electrical heater is a device used to provide support where necessary in the heating mode.

SELECTION

If provided for in the configuration, the electrical heater can be selected in the heating mode by pressing the Sel key

ACTIVATION

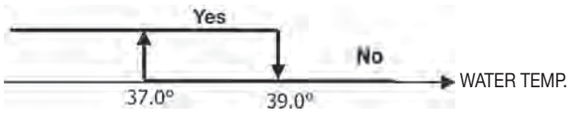
If use of the electrical heater is selected by the user, it will be activated on a call from the thermostat based on the room temperature



N.B.: switching it on will force the fan on as well

WATER CONTROL

Enabling of the electrical heater is tied to the water temperature. The related enabling logic is described below



The enabling signal will not be given if the water sensor is either not present or disconnected

DISPLAY

IThe display shows the following information

- electrical heater selected by the user: steadily lit symbol
- active electrical heater : flashing symbol

ECONOMY

The Economy function corrects the setpoint by 2.5°C and forces the fan to run at the minimum available speed to reduce unit operation.

- Cooling: setpoint + 2.5°C
- Heating: setpoint - 2.5°C

ACTIVATION

This function can be activated by pressing the key

DISPLAY

The Economy function is shown on the display by the symbol

MINIMUM TEMPERATURE CONTROL

This logic makes it possible to keep the room temperature from falling too far when the thermostat is off by forcing the unit into the heating mode if necessary and for the time required.
If the electrical heater is present, it will be used only if it was previously selected as a resource in the heating mode.

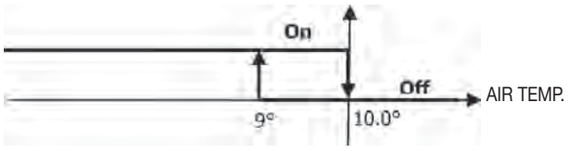
SELECTION

When the thermostat is off, you can select the minimum temperature control by pressing at the same time the keys .

The same key combination disables this function.

ACTIVATION

If this control is selected, the unit will switch on when the room temperature falls below 9°C.



When temperature exceeds 10°C the thermostat will resume the Off status.

N.B.: Any **Off** command from digital input will disable this logic

DISPLAY

The display shows the following information

- Minimum temperature control selected: symbol (displayed only when the thermostat is switched off)

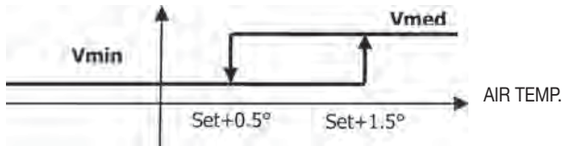
- Minimum temperature control enabled: *DEFR* indication

DEHUMIDIFICATION

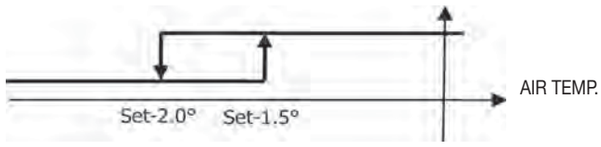
The dehumidification function, enabled only in the Cooling mode, activates operation of the indoor unit in order to achieve a 10% reduction in the level of humidity present in the room at the time the function itself was selected.

SELECTION

Dehumidification can be selected/unselected in the Cooling mode by simultaneously pressing the buttons.
If the water probe (*P04*=0) or the remote humidity probe is not available, in cases where the controller is installed directly on the unit (*P08*=0), selection will not be enabled. If selected, the dead band for automatic switching on the air side will be brought to 5°
Once selected, the dehumidification logic sets the target humidity level as the humidity present at the time the function was selected minus 10%. Where the room humidity is less than 40% the target level will be set at 30%.
The fan will be forced to run at low speed or, if the temperature is much higher than the setpoint, at medium speed.

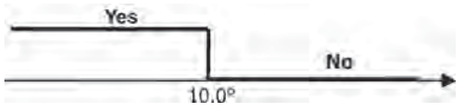


In order to bring the humidity to the set value, the fan (and valve, if present) will be activated even if the room temperature has already reached the programmed setpoint (indicated on the display). Should the room temperature fall too far below this threshold, the logic will be temporarily inhibited



WATER CONTROL

Enabling of the dehumidification function is tied to the water temperature. The related enabling logic is described below



If enabling conditions do not exist, the dehumidification function will be temporarily inhibited. The same will occur in the event that the sensor is disconnected.

N.B.: once the target level of humidity is reached or the controller is switched off, the dehumidify option will be unselected

DISPLAY

The display shows the following information

- Dehumidify ON: symbol lit

- Dehumidification temporarily inhibited: flashing symbol

PROGRAMMING OF TIME SCHEDULES

GENERAL FUNCTIONING

Time schedules are programmed by setting the dedicated parameters (H parameters) in a suitable manner and in the correct sequence. The procedure for accessing parameters and the meaning of each parameter are thoroughly described in the paragraphs below. It is possible to set two different types of time schedules:

- ON/OFF time programming: each time slot can be associated with a controller ON or OFF status, so that the controller will automatically switch on or off according to the time of day.
- temperature SETPOINT programming according to time of day: each time slot can be associated with a SUMMER temperature SETPOINT (for cooling) and a WINTER temperature SETPOINT (for heating), which will be automatically used by the controller as the temperature SETPOINT (adjustable by the user within a range of ±2°C) according to the time of day and current operating mode.

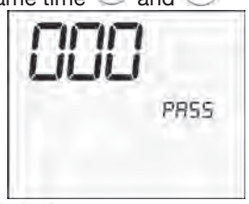
Two daily profiles can be defined, each of which divided into three time slots. Each day of the week can be associated with one profile or the other.

DAILY PROFILE 1 (FIGURE 6):
WHERE
A SLOT 1
B SLOT 2
C SLOT 3

DAILY PROFILE 2 (FIGURE 7):
A SLOT 1
B SLOT 2
C SLOT 3

ACCESS TO PARAMETER CONFIGURATION PROCEDURE

- Push at the same time SEL and



- Use keys to modify the display value up to the password value “5”, and press SEL. If it is correct, you will have access to the parameters.

- Use keys to scroll the various parameters (see “Parameter list”)
- Press SEL to confirm the parameter change (the value will start flashing)

- use keys to change the value
- Press SEL to save the new value setting or to cancel the modification
- after completing the modification of the parameters concerned press key to exit the procedure

PARAMETER LIST

Time schedules are programmed by setting the individual parameters encountered when scrolling with the arrow keys.

Warning: there are a total of 37 parameters, but not of all them are accessible. Whether certain parameters will be displayed or not depends on the value assigned to the first parameter (*H00*), i.e. the operating mode selected. More specifically:

- if *H00*=(ON/OFF mode), parameters H18 to H29 will not be displayed
- if *H00*=2 (operation based on temperature SETPOINT), parameters H12 to H17 will not be displayed
- if *H00*=0 the time programming function is disabled and therefore no parameter will be displayed except for H00

Below is a description of all 37 parameters, in sequence.

- *H00* ENABLING AND OPERATING MODES
  - *H00*=0: scheduling disabled
  - *H00*=1: ON/OFF time schedules
  - *H00*=2: time schedules based on temperature SETPOINT

CLO:
- *H01* = HOUR of controller clock
- *H02* = MINUTES of controller clock

DAY:
- *H03* = DAY OF THE WEEK

Hr1:
- *H04* = OUR (0-23) of SCHEDULE 1
- *H05* = MINUTES (0-59) of SCHEDULE 1

Hr2:
- *H06* = HOUR (0-23) of SCHEDULE 2
- *H07* = MINUTES (0-59) of SCHEDULE 2

Hr3:
- *H08* = OUR (0-23) of SCHEDULE 3
- *H09* = MINUTES (0-59) of SCHEDULE 3

Hr4:
- *H10* = HOUR (0-23) of SCHEDULE 4
- *H11* = MINUTES (0-59) of SCHEDULE 4
- *H12* = STATUS (ON or OFF) of TIME SLOT 1
- *H13* = STATUS (ON or OFF) of TIME SLOT 2
- *H14* = STATUS (ON or OFF) of TIME SLOT 3
- *H15* = STATUS (ON or OFF) of TIME SLOT 4
- *H16* = STATUS (ON or OFF) of TIME SLOT 5
- *H17* = STATUS (ON or OFF) of TIME SLOT 6

SP1:
- *H18* = SUMMER temperature SETPOINT of TIME SLOT 1

SP2:
- *H19* = SUMMER temperature SETPOINT of TIME SLOT 2

SP3:
- *H20* = SUMMER temperature SETPOINT of TIME SLOT 3

SP4:
- *H21* = SUMMER temperature SETPOINT of TIME SLOT 4

SP5:
- *H22* = SUMMER temperature SETPOINT of TIME SLOT 5

SP6:
- *H23* = SUMMER temperature SETPOINT of TIME SLOT 6

SP1:
- *H24* = WINTER temperature SETPOINT of TIME SLOT 1

SP2:
- *H25* = WINTER temperature SETPOINT of TIME SLOT 2

SP3:
- *H26* = WINTER temperature SETPOINT of TIME SLOT 3

SP4:
- *H27* = WINTER temperature SETPOINT of TIME SLOT 4

SP5:
- *H28* = WINTER temperature SETPOINT of TIME SLOT 5

SP6:
- *H29* = WINTER temperature SETPOINT of TIME SLOT 6

Mon:
- *H30* = daily profile (1 or 2) for MONDAY

Tue:
- *H31* = daily profile (1 or 2) for TUESDAY

Wed:
- *H32* = daily profile (1 or 2) for WEDNESDAY

Thu:
- *H33* = daily profile (1 or 2) for THURSDAY

Fri:
- *H34* = daily profile (1 or 2) for FRIDAY

Sat:
- *H35* = daily profile (1 or 2) for SATURDAY

Sun:
- *H36* = daily profile (1 or 2) for SUNDAY
- *H37* = 24H or 12H display

DEFAULT VALUES OF PARAMETERS

- *H00* = 0 (scheduling disabled)
- *H01* = 06:00
- *H02* = 22:00
- *H03* = 08:00
- *H04* = 20:00
- *H12* = OFF
- *H13* = ON
- *H14* = OFF
- *H15* = OFF
- *H16* = ON
- *H17* = OFF
- *H18-H23* = 25°C
- *H24-H29* = 22°C
- *H30-H34* = 1
- *H35-H36* = 2
- *H37* = 24H

If the 12H display mode has been set (parameter *H37*), for configuration parameters *H01* to *H11* (except *H03*) the display will not show the sequential number of the parameter but rather the hourly situation expressed in AM/PM.

DISPLAY

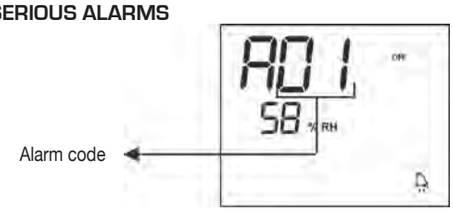
If the time programming function is enabled, when the thermostat is on the clock symbol will always appear and it will be possible to check whether the time settings are correct (only for a few instants) by simultaneously pressing the SEL+MODE buttons. When the thermostat is off, the clock symbol and current hour will appear constantly on the display only if the ON/OFF time programming mode is enabled.

ALARMS

This control governs two types of alarms:

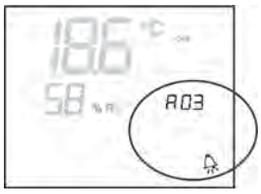
- Serious Alarms cause the forced switching off of the thermostat
- Non-serious Alarms do not cause the forced switching off of the thermostat, but disable possible critical functions

SERIOUS ALARMS



- Code *A01* = error of external air temperature sensor (in case of on-board thermostat)
- Code *A02* = error of internal air temperature sensor (in case of wall mounted thermostat and disconnected external air temperature sensor)

NON-SERIOUS ALARMS



THERMOSTAT OFF

THERMOSTAT ON

- Code *A03* = water sensor error
- Code *A04* = external humidity probe error (only if a remote temperature sensor is installed)
- Code *A05* = internal humidity probe error

N.B.: the alarm code is displayed only when the thermostat is switched off

MODBUS

The protocol implemented in the controller is Modbus RTU (9600, N, 8, 2) on RS485

FUNCTIONS IMPLEMENTED

- 0x03 : Read Holding Registers
- 0x04 : Read Input Registers
- 0x10 : Write Multiple registers

EXCEPTIONS IMPLEMENTED

Exception Code *02*: Invalidate data address

LIST OF SUPERVISION PARAMETERS

ADDRESS	REGISTER	TYPE	U.O.M.
0	Status	**R**	**-**
1	Speed	**R**	**-**
2	Air temperature	**R**	**[°C/10]**
3	Humidity	**R**	**%**
4	Water temperature	**R**	**[°C/10]**
5	P00: Configuration	**R**	**-**
6	P05: DIN Config.	**R**	**-**
7	T. Active setpoint	**R**	**[°C/10]**
8	T. User setpoint	**R**	**[°C/10]**
9	LCD version	**R**	**-**
10	P09: DOUT1 Config.	**R**	
11	P10: DOUT1 Logic	**R**	
12	P11: DOUT2 Config.	**R**	
13	P12: DOUT2 Logic	**R**	
14	P14: AOUT1/2 Config.	**R**	
15	Analog output 1	**R**	**[%]**
16	Analog output 2	**R**	**[%]**
50	Digital 1	**R/W**	**-**
51	Hourly programming	**R/W**	**-**
52	Setpoint - Cooling	**R/W**	**[°C/10]**
53	Setpoint - Heating	**R/W**	**[°C/10]**
54	Minimum Setpoint – Cool.	**R/W**	**[°C/10]**
55	Maximum Setpoint – Cool.	**R/W**	**[°C/10]**
56	Minimum Setpoint – Heat.	**R/W**	**[°C/10]**
57	Maximum Setpoint – Heat.	**R/W**	**[°C/10]**
58	Speed	**R/W**	**-**
59	Economy Correction	**R/W**	**[°C/10]**
60	Modulating fan mode	**R/W**	**-**

DESCRIPTION OF READ-ONLY REGISTERS [R]

■ **"Status"** Register

H							
Bit 15	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**
DOUT2	DOUT1	P04	Deum	P07	P06	DI2	DI1
L							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
Vh	Vc	Alarm	MinT	Eco	P01	S/W	On/Off

- **On/Off**: unit status (0: Off, 1=On)
- **S/W**: operation mode (0: S=cooling, 1:W=heating);
- **P01**: "on unit/wall-mounted" parameter
- **Eco**: Economy logic active
- **Min.T**: Minimum Temperature logic selected
- **Alarm**: general alarm indication (activated when any of the managed alarms is triggered)
- **Vc** status of digital output Vc
- **Vh**: status of digital output Vh
- **DI1**: logical value of dig. input 1 (the physical status of the input depends on the associated logic)
- **DI2**: logical value of dig. input 2 (the physical status of the input depends on the associated logic)
- **P07**: "DIN 2 Logic" parameter
- **P06**: "DIN 1 Logic" parameter
- **Dehum**: dehumidification ON (0:no, 1:yes)
- **P04**: "water probe present" parameter
- **DOUT1**: Digital Input 1 status
- **DOUT2**: Digital Input 2 status

■ **"Speed"** Register**:** current operating speed of the indoor unit
  - 0: fan off
  - 1: extra-low speed
  - 2: low speed
  - 3: medium speed
  - 4: high speed

■ "**Air Temperature**" register: room temperature read by the controller and shown on the display (N.B.: this temperature corresponds to the reading of the remote probe if the controller is located on the unit, or the reading of the internal probe in the case of a wall-mounted controller and remote probe disconnected)

■ "**Humidity**" Register: room humidity read by the controller via the probe associated with the temperature probe used

■ "**Water Temperature**" register: value read by the water probe (SW)

■ "**P00**" Register: "Controller configuration" parameter

■ "**T. Active setpoint**" Register: setpoint used for temperature control

■ "**T. User setpoint**" Register: setpoint programmed by the user (it may differ from the active setpoint due to corrections based on economy logics,…or use of the setpoint imposed by the supervision software)

■ "**LCD version**" Register: defines the controller type and software version installed (0xHHSS: HH: ASCII character, SS:sw version)

■ "**P09**" Register: "Digital output 1 Configuration" parameter

■ "**P10**" Register: "Digital output 1 Logic" parameter

■ "**P11**" Register: "Digital output 2 Configuration" parameter

■ "**P12**" Register: "Digital output 1 Logic" parameter

■ "**P14**" Register: "Configuration of analog outputs" parameter

■ "**Analog output 1**" register: value of analogue output 1 expressed as a % of the full scale 0-10V

■ "**Analog output 2**" register: value of analogue output 1 expressed as a % of the full scale 0-10V

DESCRIPTION OF READ/WRITE REGISTERS [R/W]

■ **"Digital 1"** Register**:**

H							
Bit 15	**Bit 14**	**Bit 13**	**Bit 12**	**Bit 11**	**Bit 10**	**Bit 9**	**Bit 8**
En.Vel	En.Min/ Max	En.Set	En.MinT	En.ECO	En.RE	En.S/W	En.On/ Off
L							
Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
-	-	Lock	MinT	Eco	RE	S/W	On/Off

- **On/Off**: On/Off via supervision system
- **S/W**: selection of operating mode via supervision system (0: Cooling, 1: Heating); N.B.: if the unit configuration (parameter *P00*) provides for summer/winter changeover based on water or air temperature, the resulting mode selection will override the command from the supervision system (which is thus substantially ignored))
- **RE**: selection of Electrical heater via supervision system
- **Eco**: Economy mode ON via supervision system
- **MinT**.: enabling of Minimum Temperature control via supervision system; N.B.: actual activation remains at the local discretion of each fan-coil unit based on the air temperature probe reading
- **Lock**: keypad lock (0: unlocked, 1: locked)
- **En.On/Off**: enabling of On/Off control via supervision system
- **En.S/W**: enabling of mode control via supervision system
- **En.RE**: enabling of selection of electrical heater function via supervision system
- **En.ECO**: enabling of economy mode activation via supervision system
- **En.MinT**: enabling of selection of Minimum Temperature logic via supervision system
- **En.Set**: enabling of forced override of setpoint via supervision system
- **En.Min/Max**: enabling of setpoint thresholds via supervision system
- **En.Vel**: enabling of selection of fan speed via supervision system

■ "**Scheduling**" register: ON/OFF time programming via supervision system
  - 0: scheduling disabled
  - 1: scheduling enabled for ON/OFF
  - 2: scheduling enabled with SETPOINT

■ "**Cooling - Setpoint**" Register: setpoint imposed by supervision system for the Cooling mode

■ "**Heating - Setpoint**" Register: setpoint imposed by supervision system for the Heating mode

■ "**Minimum Setpoint – Cool.**" Register: lower limit for setpoint in cooling mode

■ "**Maximum Setpoint – Cool.**" Register: upper limit for setpoint in cooling mode

■ "**Minimum Setpoint – Heat.**" Register: lower limit for setpoint in heating mode

■ "**Maximum Setpoint – Heat.**" Register: upper limit for setpoint in heating mode

■ "**Speed**" Register: selection of fan speed via supervision system; in the case of modulating fan control, it expresses the percentage of speed used in the manual mode

■ "**Economy Correction**" Register: correction of setpoint in the case of economy mode imposed by supervisor (this correction is an amount subtracted from or added to the setpoint, based on the operating mode)

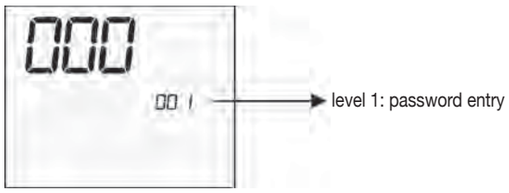
■ "**Modulating fan mode**" Register: selection of the mode in the case of modulating fan control: 0 = fan OFF; 1=manually forced fan operation ; 2=automatic fan operation

SELF-DIAGNOSIS PROCEDURE

This procedure allows you to check whether the individual outputs of the controller function correctly.
To run the procedure, follow the directions below:

- switch the thermostat **off**

- push the SEL MODE at the same time



- use the △ ▽ keys to change the value on the display until arriving at the password for self-diagnosis (*030*) and press SEL. The following screen will be displayed:

- press the button to switch on the various thermostat outputs in sequence.

Symbol	Actuation	Terminals
	Extra low speed	N-V0
	Minimum speed	N-V1
	Medium speed	N-V2
	Maximum speed	N-V3
	Valve	N-Vc
	Heater / Second valve	N-Vh
CO1	Digital 1 output	C012-C01
CO2	Digital 2 output	C012-C02
AO1	Analog output 1 = 10V	COM-101
AO2	Analog output 2 = 10V	COM-102

The electronic controller outputs can be checked one by one either by observing the respective component (valve, fan..) or verifying whether a voltage of 230 V is present at the corresponding terminals.

- to exit the self-diagnosis procedure press (after a few minutes the thermostat will automatically exit in any case).

ELECTRONIC BOARD (FIGURE 6)

Where

Vc	Valve
Vh	Heat valve/heater
V0	Extra low speed
V1	Minimum Speed
V2	Medium Speed
V3	Maximum Speed
N	Neutral
L	Phase
PE	Ground
A-B-GND	RS 485
SU	Remote humidity probe
SW	Water sensor
SA	Remote air sensor
101	0-10V 1 Output
COM	0-10V Output Common
102	0-10V 2 Output
DO2	Digital 2 output
DO1	Digital 1 output
CO12	Digital output Common
DI1	Dig.1 input
CI12	DI1-2 Common
DI2	Dig. 2 input

N.B.:

- For power connections use cable w/ cross section size of 1 mm2
- For digital inputs used AWG 24 cable
- For sensor extensions and RS485 use AWG 24 shielded cable

WIRING DIAGRAMS

CONFIG. (P00)	UNIT	DIAGRAM
01-02-03	FWL-M-V	FC66002554L (1)
	FWD	UT66000889L (7)
		UT66000888L (6)
04-05-06	FWB	UT66000887L (5)
	FWE	UT66001416 (13)
07-08-09	FWL-M-V	FC66002555L (2)
	FWD	UT66000892L (10)
		UT66000894L (12)
		UT66000891L (9)
		UT66000893L (11)
10-11-12	FWB	UT66000890L (8)
13-14-15	FWL-M-V	FC66002554L (1)
	FWD	UT66000889L (7)
		UT66000888L (6)
16-17-18	FWB	UT66000887L (5)
	FWE	UT66001416 (13)
19-20-21	FWL-M-V	FC66002555L (2)
	FWD	UT66000892L (10)
		UT66000894L (12)
		UT66000891L (9)
		UT66000893L (11)
22-23-24	FWB	UT66000890L (8)
25-26-27	FWL-M-V	FC66002554L (1)
	FWD	UT66000889L (7)
		UT66000888L (6)
28-29-30	FWB	UT66000887L (5)
	FWE	UT66001416 (13)
31-32-33	FWL-M-V	FC66002554L (1)
	FWD	UT66000889L (7)
		UT66000888L (6)
34-35-36	FWB	UT66000887L (5)
	FWE	UT66001416 (13)
37	FWL-M-V	FC66002555L (2)
	FWD	UT66000892L (10)
		UT66000894L (12)
		UT66000891L (9)
		UT66000893L (11)
38	FWB	UT66000890L (8)

WARNING: If 0-10V modulating valves are present (and thus configuration parameter *P14* is set on 1, 2 or 3), refer to the electrical connection shown in diagram FC66002678.

UNITS/ DIAGRAMS

UNIT	TYPE	CONFIGURATION (P00)	DIAGRAM
FWL-M-V	-	1-2-3-13-14-15-25-26-27-31-32-33	FC66002554L (1)
		7-8-9-19-20-21-37	FC66002555L (2)
FWB	-	4-5-6-16-17-18-28-29-30-34-35-36	UT66000887L (5)
		10-11-12-22-23-24-38	UT66000890L (8)
-	04/12	1-2-3-13-14-15-25-26-27-31-32-33	UT66000889L (7)
		7-8-9-19-20-21-37	UT66000892L (10)
	06/12 3PH	7-8-9-19-20-21-37	UT66000894L (12)
	16/18	1-2-3-13-14-15-25-26-27-31-32-33	UT66000888L (6)
		7-8-9-19-20-21-37	UT66000891L (9)
	16/18 3PH	7-8-9-19-20-21-37	UT66000893L (11)
EPIMSB6	FWL-M-V	-	FC66002557L (3)
	FWD	-	
	FWB	-	
FWE		4-5-6-16-17-18-28-29-30-34-35-36	UT66001416 (13)

WARNING: If 0-10V modulating valves are present (and thus configuration parameter *P14* is set on 1, 2 or 3), refer to the electrical connection shown in diagram FC66002678.

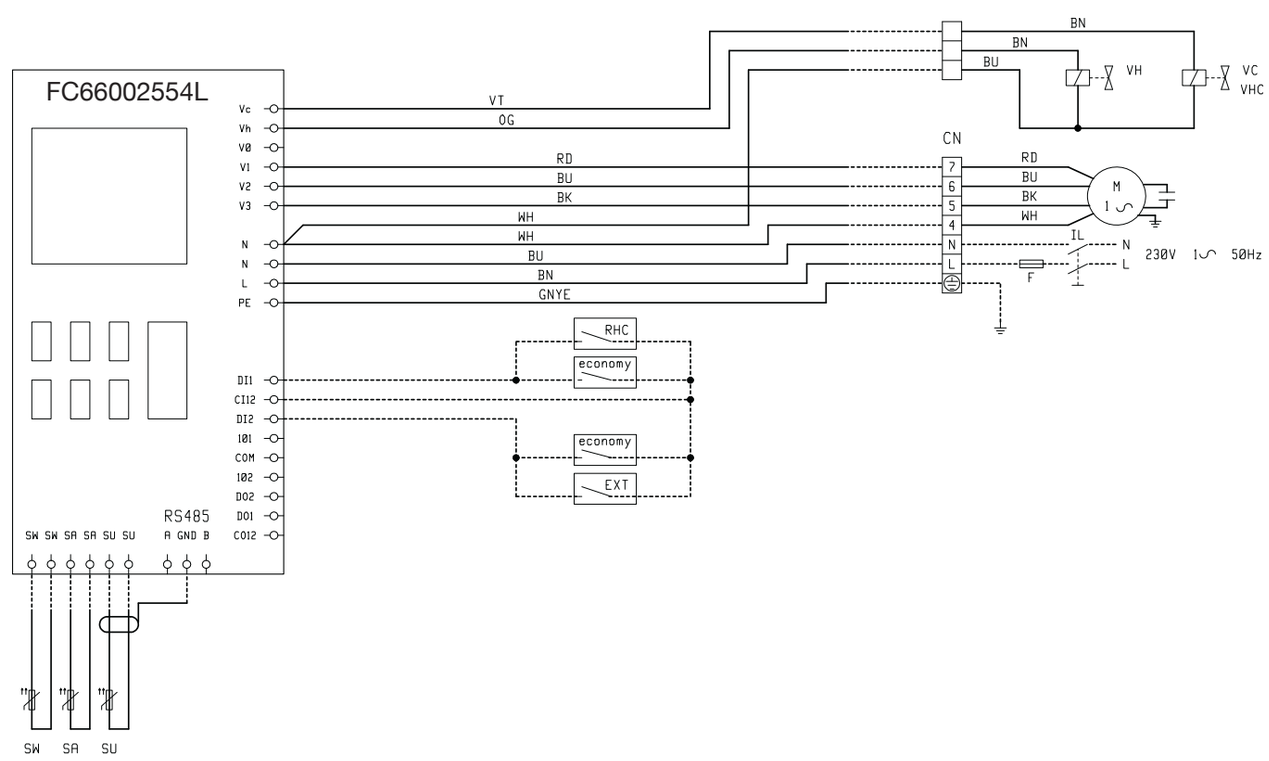
KEY TO SYMBOLS USED IN WIRING DIAGRAMS

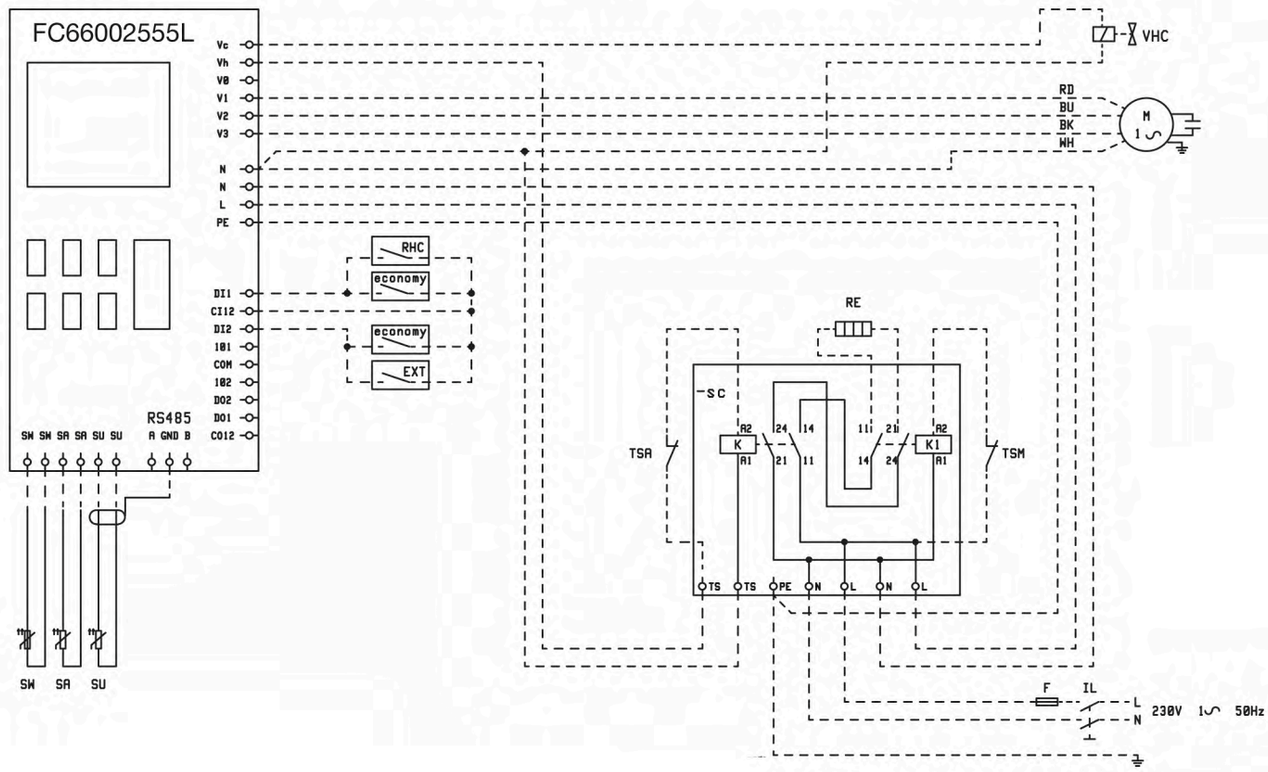
Vo	Extra-low speed
V1	Minimum speed
V2	Medium speed
V3	Maximum speed
L	Phase
PE	Ground
N	Neutral
RE	Electrical heater
SW	Water sensor
SA	Air sensor
SU	Humidity Probe
BK	Black (Max. speed)
BU	Blue (Med. speed)
RD	Red (Extra low speed)
WH	White (common)
GY	Grey
BN	Brown (Min. speed)
GN	Green
YE	Yellow
MS	Flap microswitch
DI1	Digital 1 input
DI2	Digital 2 input
CI12	Digital input common
A-B-GND	RS 485
F	Fuse (not supplied)
IL	Circuit breaker (not supplied)
CN	Terminal board
RHC	Heating/Cooling remote selecting switch
EXT	External auxiliary contact
EPIMSB6	Circuit board to control 4 indoor units
EPIB6	Circuit board for FWD units
M	Fan motor
VHC	Solenoid valve –Cool/Heat.
VC	Solenoid valve - Cooling
VH	Solenoid valve - Heating
TSA	Automatic safety thermostat
TSM	Safety fuse
SC	Wiring box
.....	Electrical connections to be made by installer

TECHNICAL DATA

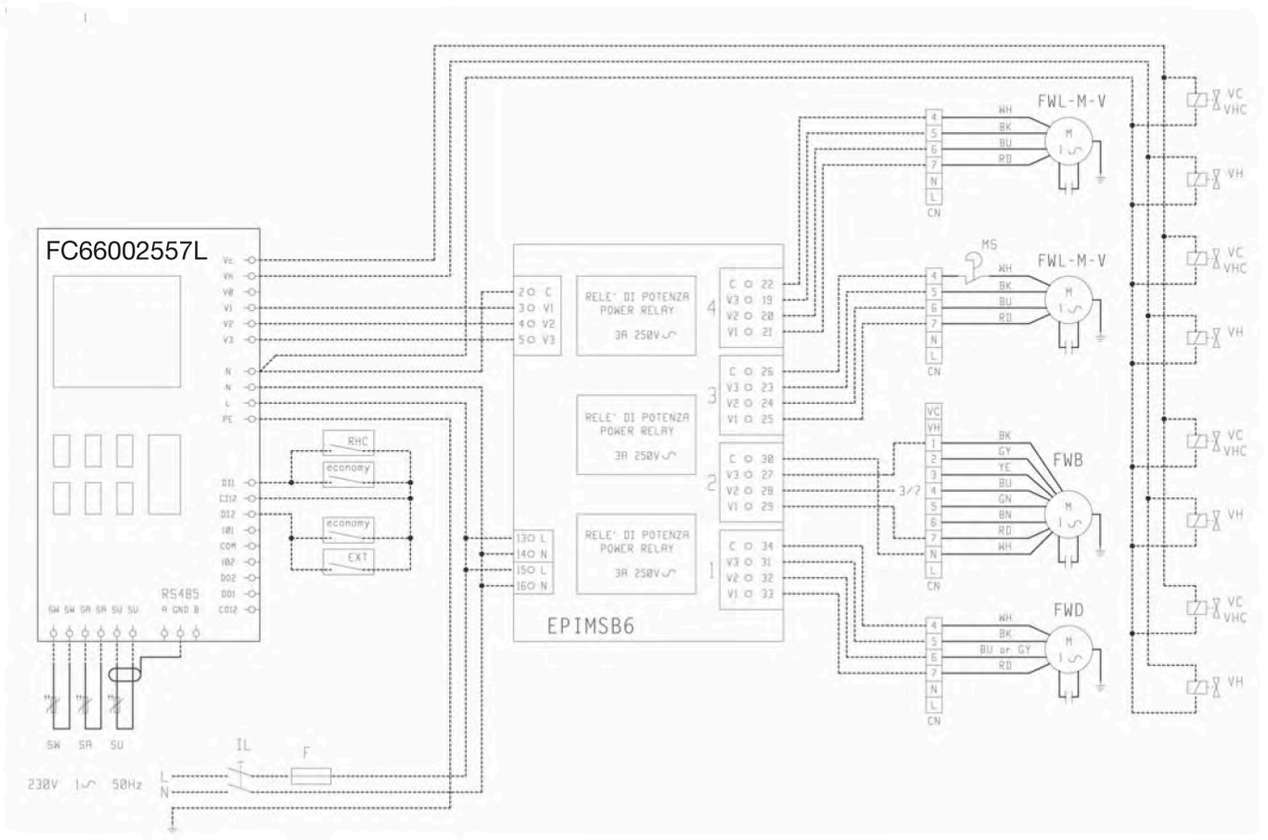
Power supply	90-250Vac 50/60Hz
	Electrical input 8W
	Protection fuse 500mA delayed
Operating temp.	Range 0-50°C
Storage temp.	Range 10-60°C
Protection rating	IP30
Control relay (Power outputs)	NO 5A @ 240V (Resistive)
	insulation: coil-contact distance 8 mm
	4000V coil-relay dielectric
	Max ambient temperature 105°C
Connectors	250V 10°
Digital inputs	NO-voltage contact
	Closing current 2mA
	Max. closing resistance 50 Ohm
Analog inputs	Temperature and relative humidity probes
Temperature sensors	NTC sensors 10K Ohm @25°C
	Range 25-100°C
Humidity probe	Resistive-type probe
	Range 20-90%RH
Configurable digital outputs (no-voltage contacts)	5A @ 240Vac (Resistive)
	3A @ 30Vdc (Resistive)
	Max ambient temperature: 85°C

NOTES

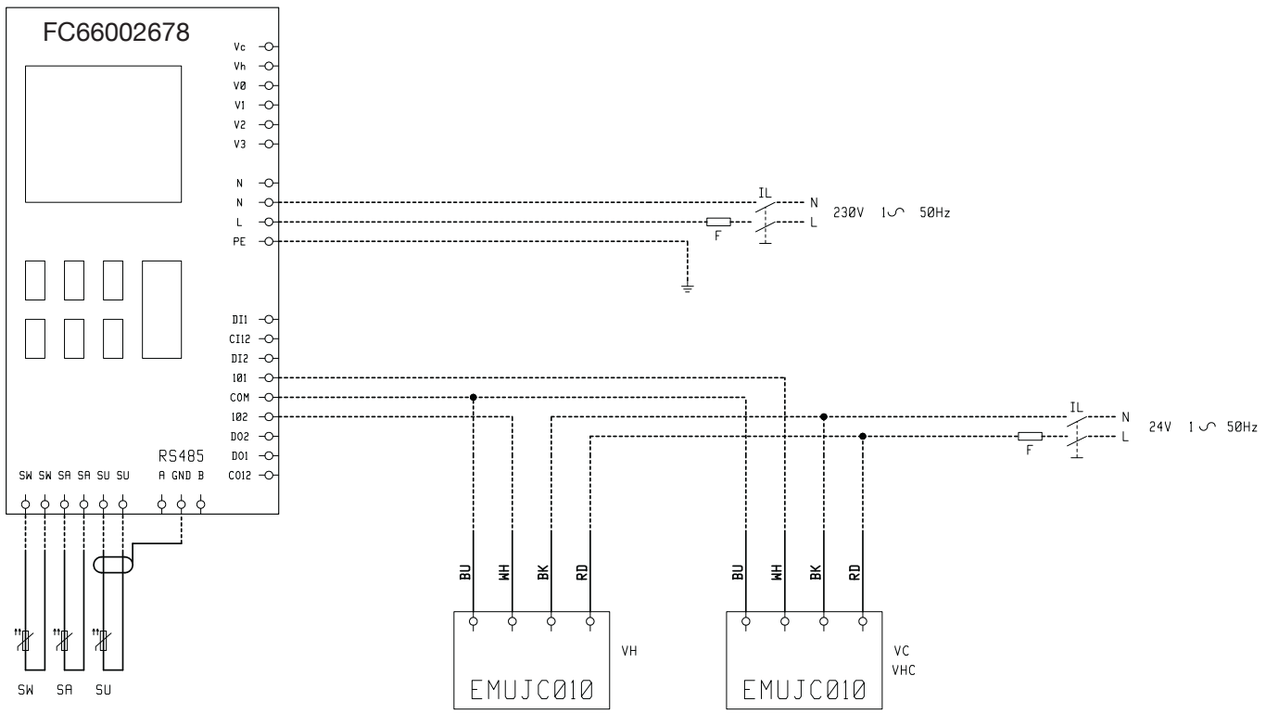

FC66002554L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW
SA
SU
VT
OG
RD
BU
BK
WH
WH
BU
BN
GNYE
BN
BN
BU
VH
VC
VHC
CN
7
6
5
4
N
L
RD
BU
BK
WH
M
1~
IL
F
N
L
230V 1~ 50Hz
RHC
economy
economy
EXT


FC66002555L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
A GND B
SW SW SA SA SU SU
RHC
economy
economy
EXT
VHC
RD
BU
BK
WH
M
RE
SC
TSA
TSM
K
K1
A2
A1
TS TS PE N L N L
F
IL
L
N
230V 1~ 50Hz
SW SA SU

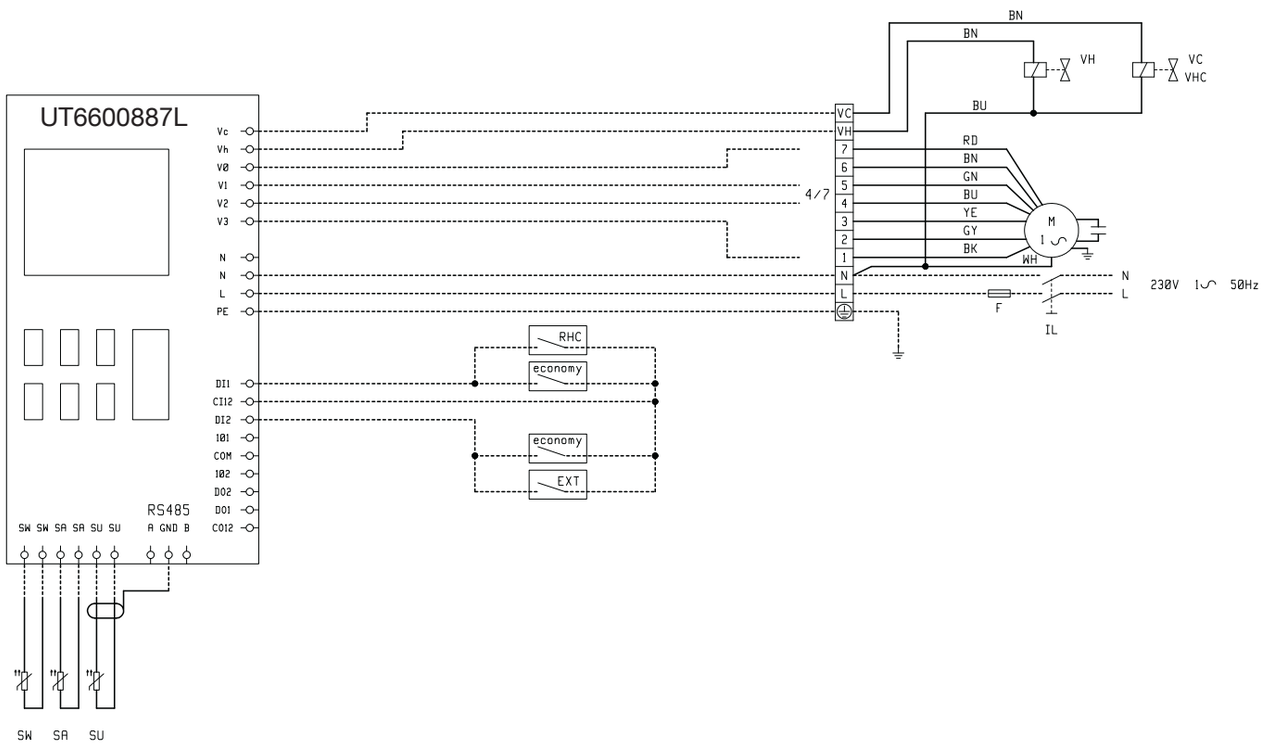
2


FC66002557L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
A GND B
SW SW SA SA SU SU
RHC
economy
economy
EXT
SW SA SU
IL
F
230V 1~ 50Hz
L
N
EPIMSB6
RELE' DI POTENZA
POWER RELAY
3A 250V~
FWL-M-V
FWB
FWD
MS
VC
VH
CN
WH
BK
BU
RD
GY
YE
GN
BN
BU or GY

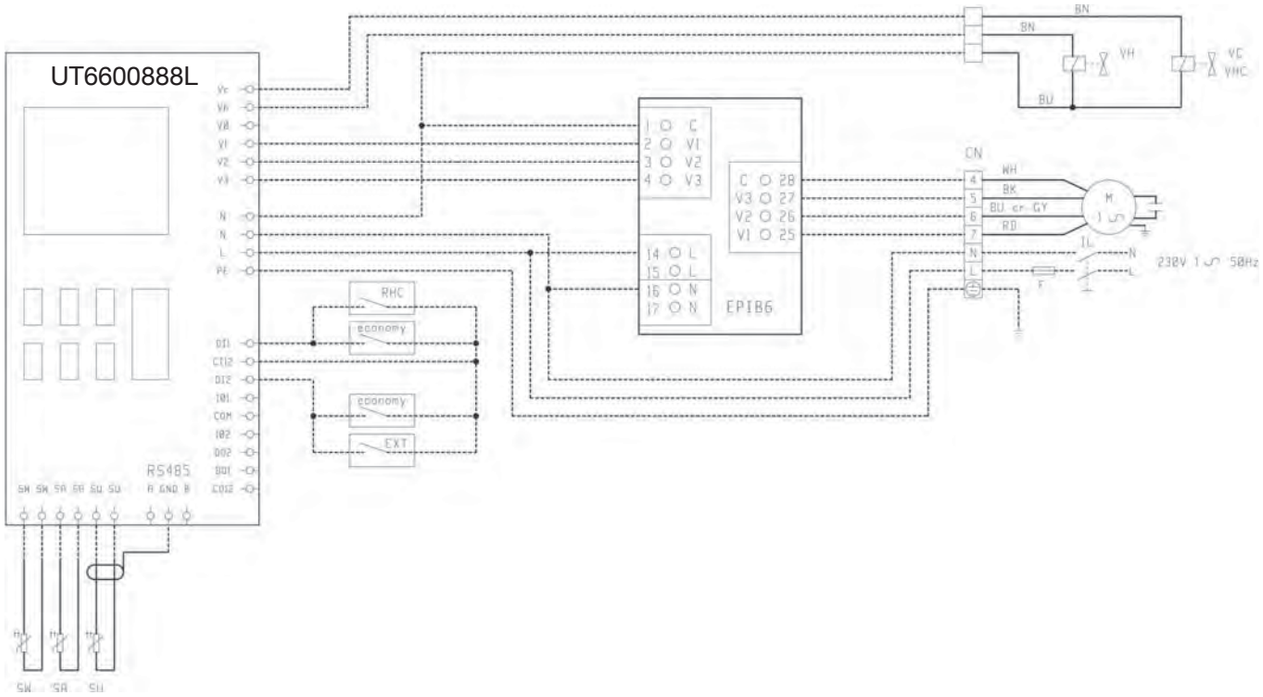
3


FC66002678
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW
SA
SU
IL
F
N
L
230V 1~ 50Hz
24V 1~ 50Hz
BU
WH
BK
RD
VH
VC
VHC
EMUJC010
EMUJC010

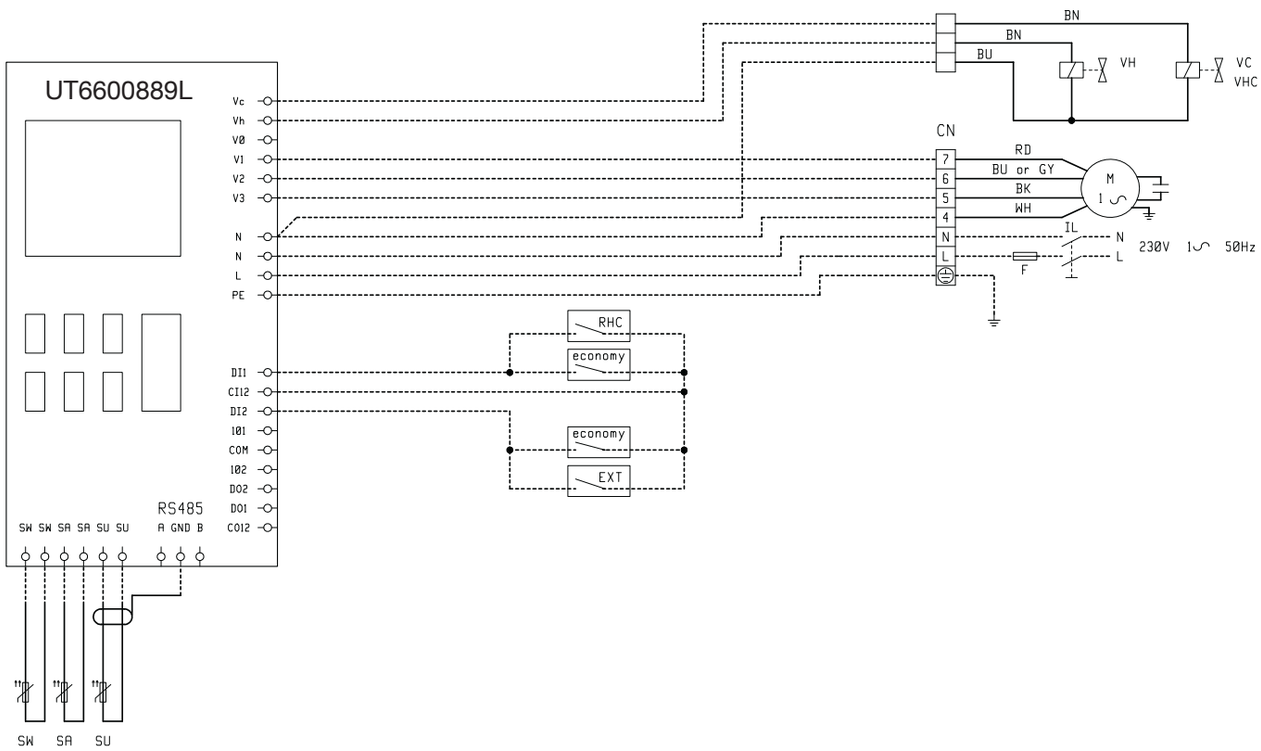
4


UT6600887L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW
SA
SU
BN
BN
VH
VC
VHC
BU
RD
BN
GN
BU
YE
GY
BK
WH
4/7
VC
VH
7
6
5
4
3
2
1
N
L
M
1~
N
L
230V 1~ 50Hz
F
IL
RHC
economy
economy
EXT

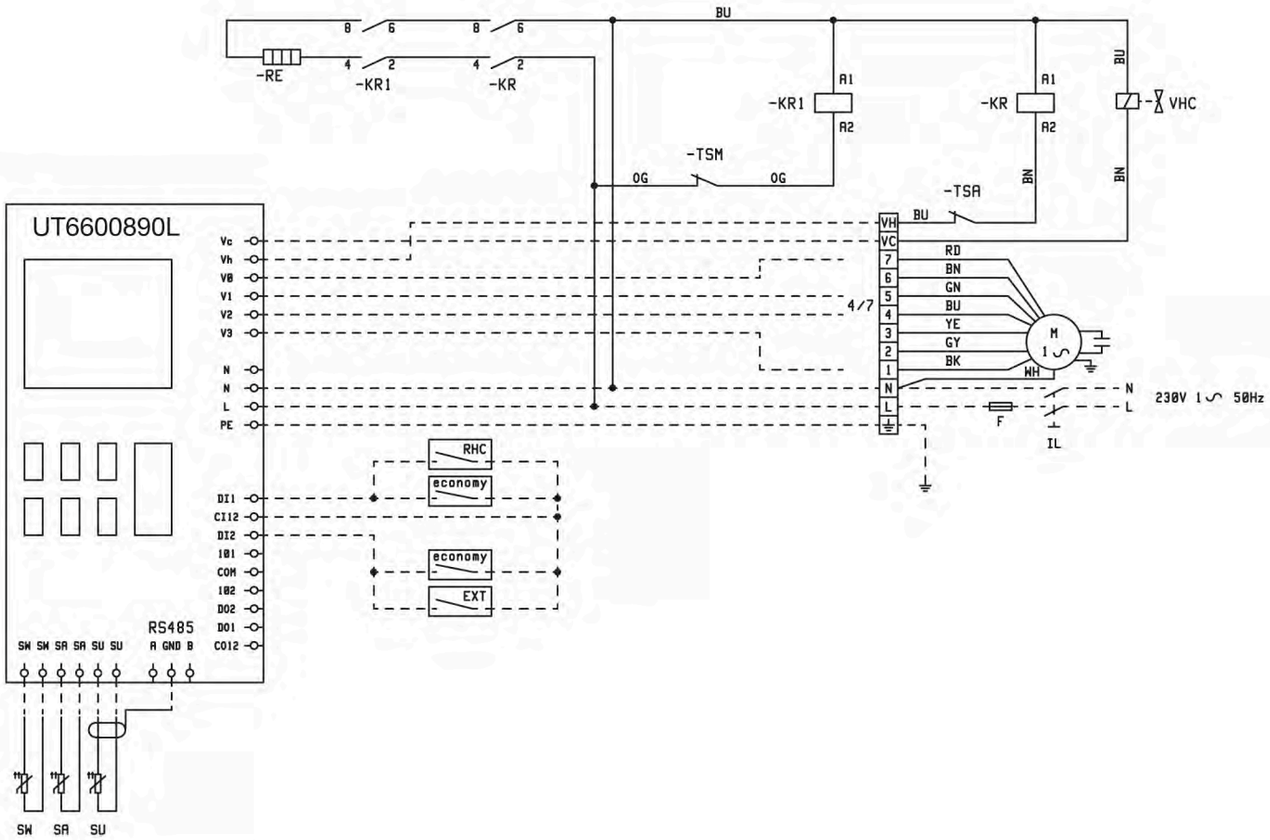
5


UT6600888L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW
SA
SU
RHC
economy
economy
EXT
EPIB6
BN
BN
BU
VH
VC
VHC
CN
WH
BK
BU or GY
RD
M
IL
F
230V 1~ 50Hz

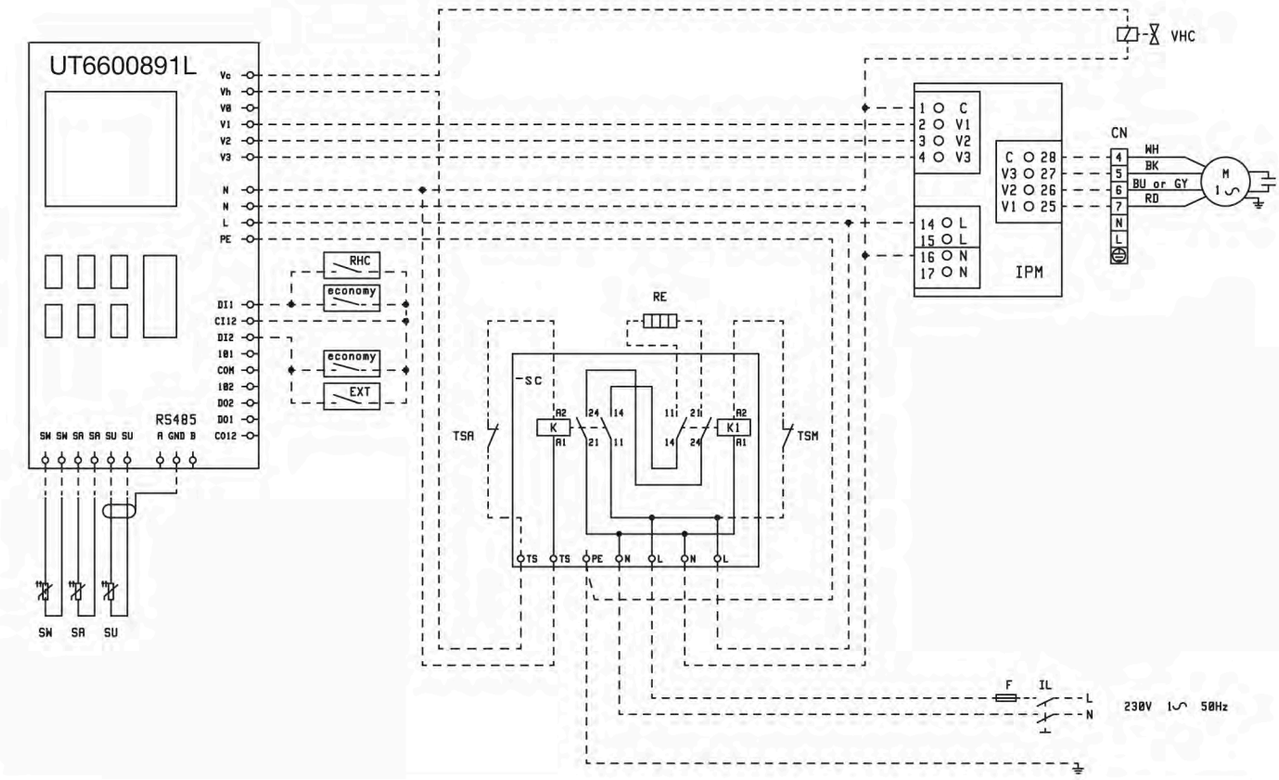
6


UT6600889L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW
SA
SU
RHC
economy
economy
EXT
BN
BN
BU
VH
VC
VHC
CN
RD
BU or GY
BK
WH
M
IL
F
230V 1~ 50Hz

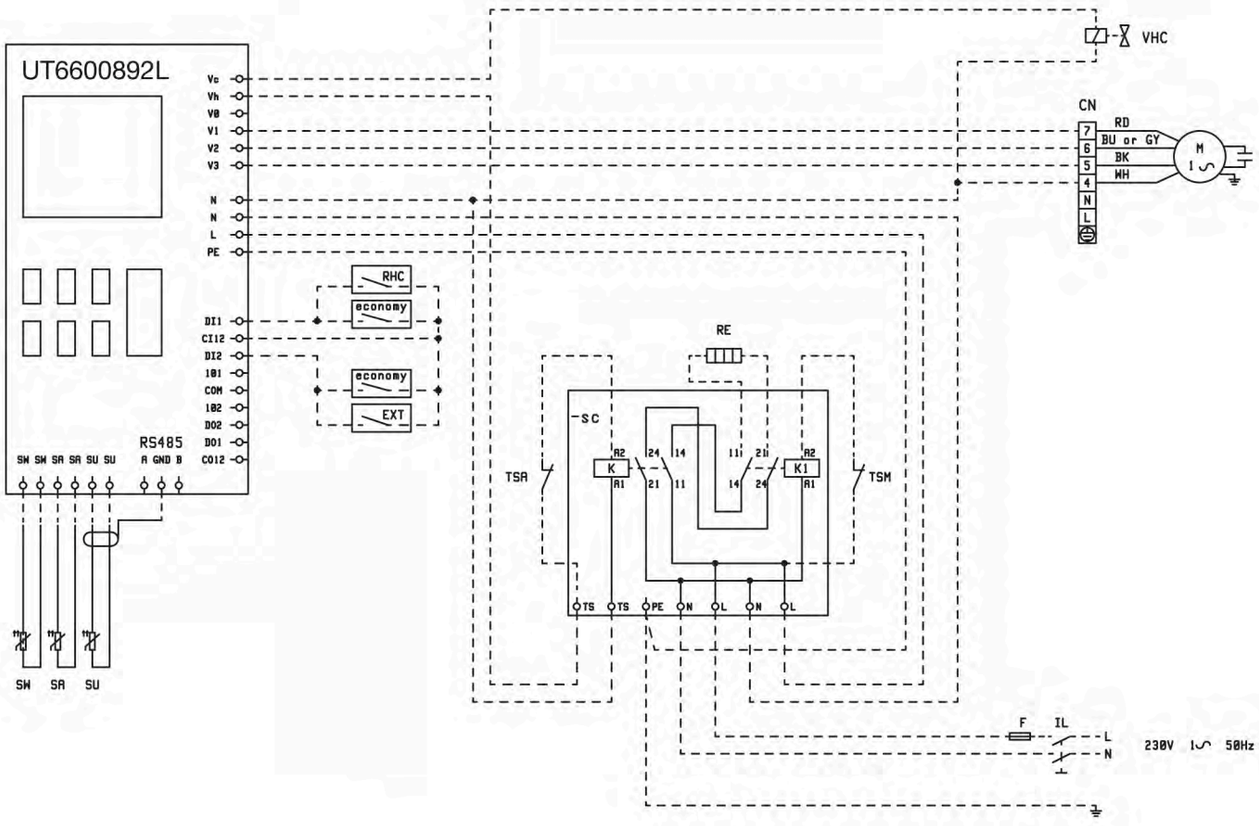
7


UT6600890L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW SA SU
RHC
economy
economy
EXT
-RE
-KR1
-KR
-TSM
-TSA
-KR1
-KR
A1
A2
VHC
BU
OG
BN
VH
VC
7
6
5
4
3
2
1
N
L
RD
BN
GN
BU
YE
GY
BK
WH
M
4/7
230V 50Hz
F
IL

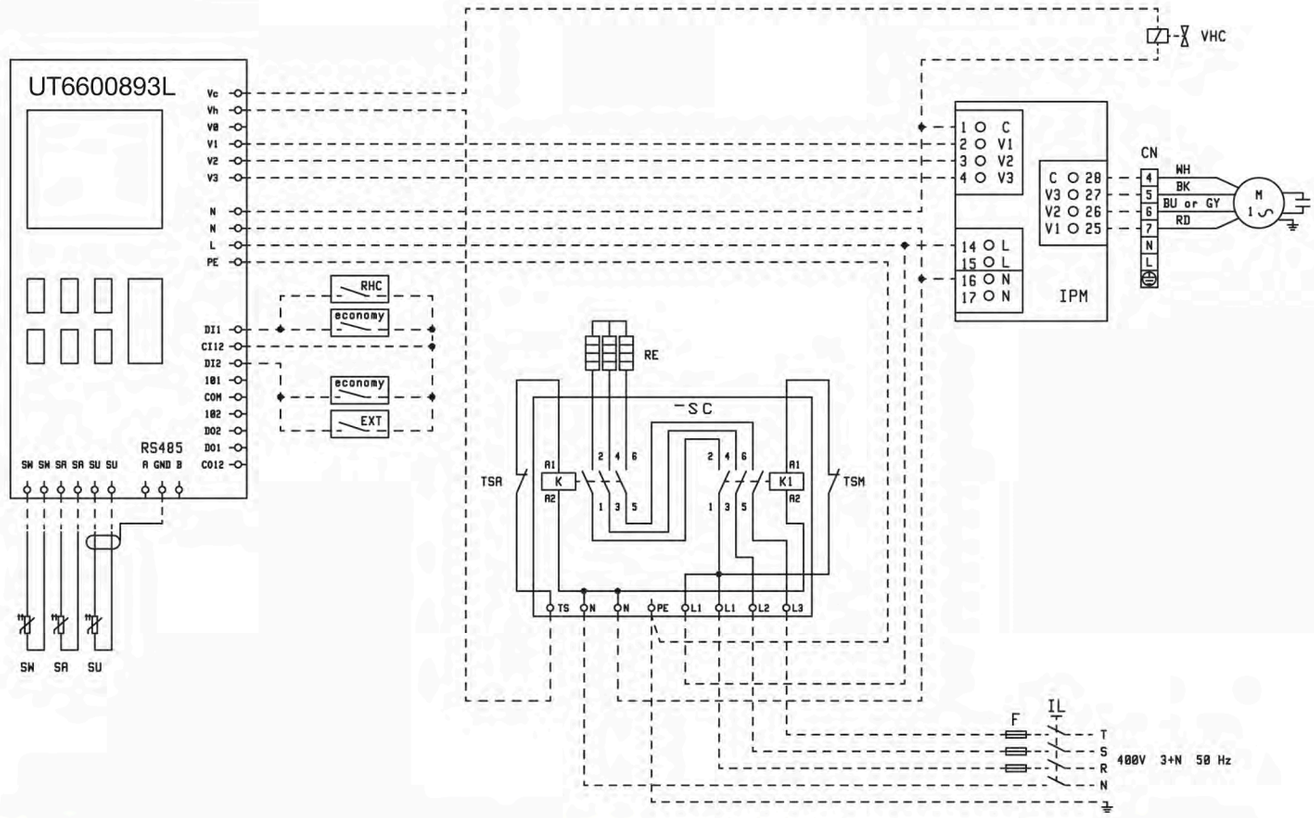
8


UT6600891L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
I01
COM
I02
DO2
DO1
CO12
RS485
SW SW SA SA SU SU
A GND B
SW SA SU
RHC
economy
economy
EXT
VHC
1 C
2 V1
3 V2
4 V3
14 L
15 L
16 N
17 N
IPM
CN
C 28
V3 27
V2 26
V1 25
4
5
6
7
N
L
WH
BK
BU or GY
RD
M
RE
-SC
TSA
TSM
K
K1
A2
A1
TS TS PE N L N L
F
IL
230V 50Hz

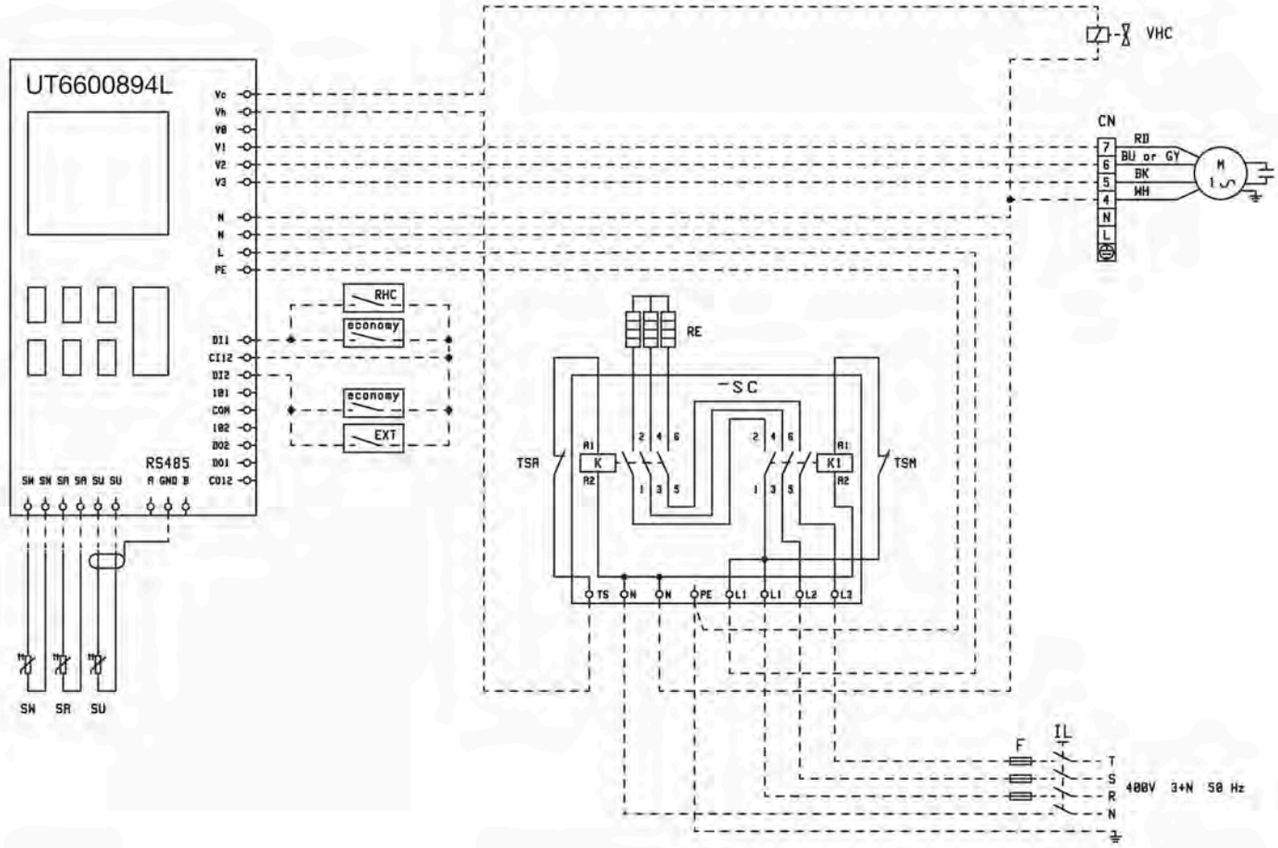
9


UT6600892L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
10I
COM
10Z
DO2
DO1
CO12
RS485
SW SW SR SR SU SU
A GND B
SW SR SU
RHC
economy
economy
EXT
VHC
CN
RD
BU or GY
BK
WH
M
1~
RE
SC
TSA
TSM
K
K1
A2
A1
TS TS PE N L N L
F
IL
230V 1~ 50Hz

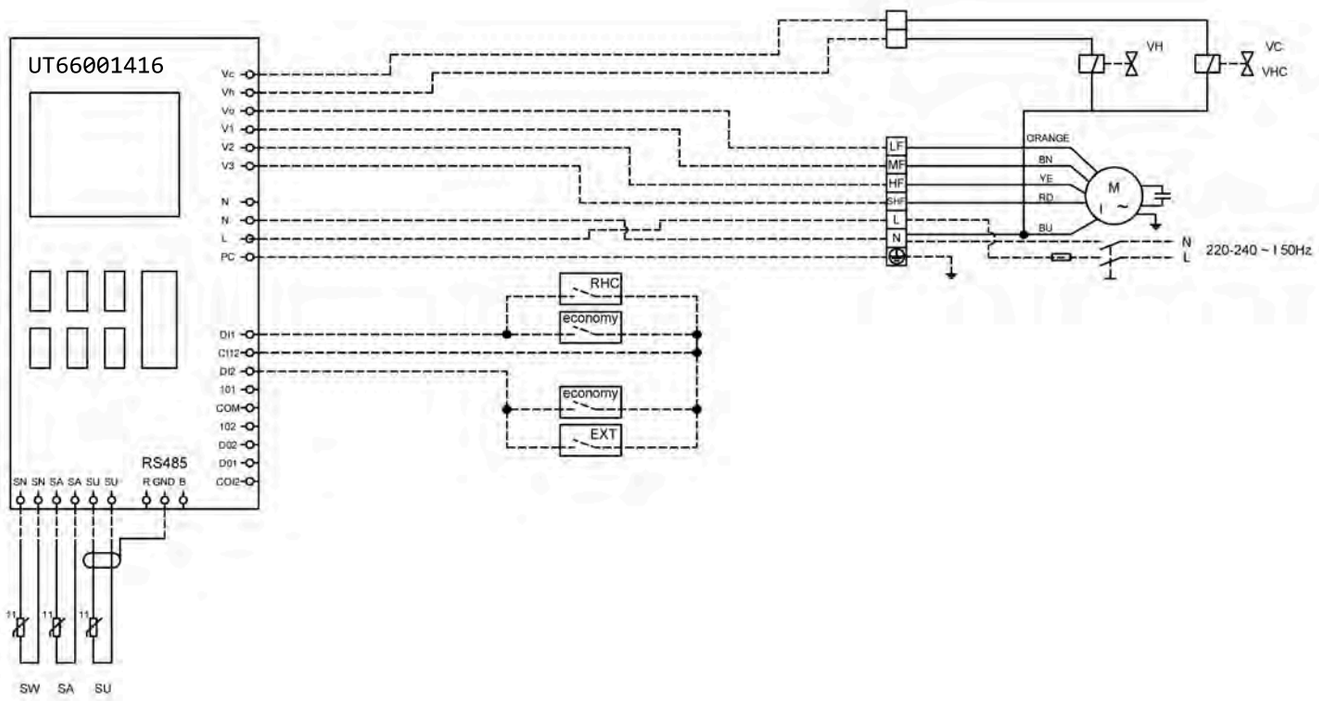
10


UT6600893L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
10I
COM
10Z
DO2
DO1
CO12
RS485
SW SW SR SR SU SU
A GND B
SW SR SU
RHC
economy
economy
EXT
VHC
1 C
2 V1
3 V2
4 V3
14 L
15 L
16 N
17 N
IPM
C 28
V3 27
V2 26
V1 25
CN
WH
BK
BU or GY
RD
M
1~
RE
SC
TSA
TSM
K
K1
A1
A2
TS N N PE L1 L1 L2 L3
F
IL
T
S
R
N
400V 3+N 50 Hz

11


UT6600894L
Vc
Vh
V0
V1
V2
V3
N
N
L
PE
DI1
CI12
DI2
IO1
COM
IO2
DO2
DO1
CO12
RS485
SW SN SA SA SU SU
A GND B
RHC
economy
economy
EXT
SW
SA
SU
VHC
CN
7
6
5
4
N
L
RD
BU or GY
BK
WH
M
1~
RE
SC
TSA
TSM
A1
K
A2
2 4 6
1 3 5
K1
TS N N PE L1 L1 L2 L3
F
IL
T
S
R
N
400V 3+N 50 Hz

12


UT66001416
Vc
Vh
Vo
V1
V2
V3
N
N
L
PC
DI1
CI12
DI2
IO1
COM
IO2
DO2
DO1
CO2
RS485
SW SN SA SA SU SU
R GND B
RHC
economy
economy
EXT
SW
SA
SU
VH
VC
VHC
LF
MF
HF
SHF
L
N
ORANGE
BN
VE
RD
BU
M
1~
N
L
220-240 ~ 50Hz

13

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