



# **CLEVER CONTROL - Version: V6.0**

INSTALLATION AND FUNCTIONING MANUAL USER AND BASIC VERSION

Please, read these instructions carefully before attempting installation



Using a wrong tailor made RJ45 or RJ11 cable, the PCB or TFT can be damaged. If so, the components are out of guarantee. If you wish to lengthen one of both cables you must use a twisted pair shielded cable.

SECURITY ADVISE SIMBOLS



Attention, Danger, Safety Advice!



Danger from electric current or high voltage!

Important information.

Injuries risk!

AIRDOM07100-R4 (13-04-18)



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# **CLEVER CONTROL CHARACTERISTICS**

**CLEVER**, the new advanced total control, leads the new generation in air curtains management: Maximum control + maximum energy saving.

Clever automatically adapts the functioning of the air curtain to the entrance climatic conditions in order to keep the comfort and energy saving.

Simple Installation Plug & Play. Factory adjusted to just switch on and run.

#### Main Advantages:

#### INTELLIGENT REGULATION

Depending on door state, on how often the door is open/closed, the internal/outside temperature or discharge temperature, Clever optimizes the ventilation and heating to create an efficient barrier for an optimal and effective climate separation. With manual or automatic functioning, it works with many different programs depending on heating type (water, electrical, heat pump or unheated) and installed temperature sensors. Clever Control has lots of extra functions to fulfil all client needs.

#### **USER FRIENDLY**

Multilanguage and easy icons for fully understanding. Main state screen indicates of the most important settings including: Ventilation speed, heating, temperatures, door state, working mode and program, filter state, day/hour, timer, etc.

Different menu configurations depending on who is managing the equipment:

- "User" simplified mode
- "Basic", with main parameters
- "Advanced" for professionals.

#### **ENERGY SAVING**

Clever Control has 3 grades of comfort and energy efficiency which can be adjusted in all manual and automatic programs. **"Eco"** mode uses the less energy possible without compromising too much the comfort, while **"Comfort"** spends more ventilation/heating to maintain or achieve quicker the set temperature. As indicates, **"Medium"** it's in between both modes.

#### ADAPTIVE DOOR DELAY

When the door closes, the air curtain remains working at door open conditions for certain time to be ready if it's open again. The power of the unit during this delay time is divided in two strength stages, where the first is stronger than the second one in order to save energy. There are two types: "**Fixed**" where you can select the duration of the delay, or "**Flexible**" which adapts automatically the time depending on how often the door is opened.

#### **FILTER ALARM**

Indicates when filter needs replacing/cleaning. Clever offers 2 options: By "Timer" of functioning hours or by "Pressure Sensor" switch. Filter sign will change colour depending on the state from green to orange and finally red combined with a flashing message on the screen.

#### **MULTI-EQUIPMENT**

Clever PCB can manage different types of units: Air curtains, fan heater, AHU, etc. Once programmed, it can work alone without any TFT control. Clever controller display shows the functioning and is used to program each device. One TFT can manage up to 255 different units, each one with its own program. The system detects and shows automatically how many units are connected. End user can customize the name of each equipment.





# TIMER / CALENDAR

Once programmed, the air curtain starts and turns off according to the client needs. Calendar function to turn ON/OFF automatically the unit depending on each different day of the week or predefined groups of days. User can select between Day or Night modes with 2 different Set temperatures in order to save energy.

# **BMS CONNECTION**

Clever uses Modbus RTU protocol to communicate between the PCB and TFT control and it can be connected directly to a Modbus RTU BMS system. Available in the future Modbus Ethernet with extra module. The Clever PCB has several digital IN/OUT and analogical IN/OUT (0-10V) to control/monitory directly the unit (ON/OFF, fan speed, heating, temperature set, alarms, etc.).

## PC / ANDROID APP

Any Windows PC or Android (IOS in the future) device can manage the air curtain with the same functions as the Clever TFT control. If an IP is assigned, the unit can be externally fully controlled thought internet. Extra Wi-Fi module required for Android.

## FULLY PROGRAMABLE

In Advanced configuration mode, user can set the minimum/maximum of many parameters, like ventilation speed or heating when door is open/closed, set the temperatures for day/night and air outlet, the door delay, etc.

#### Advanced functions:

- Intelligent proactive regulation
- Manual / Automatic Functioning
- Energy saving modes: Eco, Medium and Comfort
- Different programs depending on installed temperature sensors
- Lots of functions to fulfil the client needs
- Fixed / Flexible door delay (progressive / adaptive)
- Calendar (Timer ON day/ON night/OFF)
- Alarms: general, filter, anti-freezing, overheating,
- Fans overheating, airflow, fire, external, heating locked, etc.
- Day / Night Temperatures
- Multi-Equipment management
- Multilanguage
- User / Basic / Advanced configurations
- Control lock option
- 3 Temperature sensors: inside, outside and air jet
- Unheated, electrical or water heated, heat pump (also combined)
- Modulating valve for water heated (includes 24VDC power supply)
- AC and EC fans

#### **External communication:**

- 2 independent Modbus RTU BMS
- Configurable IN/OUT Digital/Analogical BMS
- Modbus TCP Ethernet BMS (optional, available soon)
- PC program (RS485)
- Wi-Fi (optional). Bluetooth (optional, available soon)
- Android application. IOS application (available soon). Both require Wi-Fi module.
- External monitoring (IP, available soon)



# **CLEVER KIT INCLUDES**



#### **Clever Control**

- Colour TFT screen 2.8 inch
- 114 (h) x 85 (w) x 14 (d) mm
- Prepared for flush-mount installation

#### Intelligent PCB Box

- Electronic PCB Regulation
- 218 (h) x 140 (w) x 64 (d) mm
- Varnish Protection



#### PCB Power Supply

- Input:100-240Vx1 50/60Hz (AC)
- Output: 24V 2A (DC)
- EU 2 pins / BS 3 pins plugs







#### RJ11 Cable

 Easy Plug & Play installation
 RJ11 (4 Pins), 7m length (RJ45 (8 Pins) 7/10 m length cable is included together with the air curtain/fan heater (not in clever kit)

#### **Door Contact**

- Monitoring Door Status
- Magnetic contact

#### **Outdoor Temperature Sensor**

- Real-time temperature values
- IP65 Protection



If more than one PCB connected in serial using Modbus protocol, you should turn ON the 3 switches inside the Clever Control and use 3 jumpers at CN3, CN6 and CN7 according to the wiring diagram. All Digital and Analogical IN/OUT are defined by default as indicated in the wiring diagram. Installer can modify

and select different functions depending on their needs.

The first time you connect the Clever, the equipment will check how many temperature sensors are connected in order to select the program automatically.

The Clever Control TFT has an inbuilt temperature sensor used as inside temperature. If you want an external inside temperature sensor (different place than the controller) you should install it at TS3 (once done, TS3 has priority to the Clever Control TFT).





Connection Diagram – TEMPERATURE SENSOR SHIELDED CABLE



(\*) Other optional TS2 and TS3 can be connected to any GND inside the PCB



(\*) If there are communication issues (interferences), use shielded cable connected to GND



#### Connection Diagram – AIR CURTAIN - 1 Clever Control managing multiple units (+1 PCB)



Please consult the operating manual of the air curtain for multiple units' connection.



(\*) If there are communication issues (interferences), use shielded cable connected to GND



#### Connection Diagram – BASIC FAN HEATER - 1 Clever Control managing multiple units (+1 PCB)



Connection Diagram – HORIZONTAL FAN HEATER - 1 Clever Control managing multiple units (+1 PCB)

![](_page_7_Figure_5.jpeg)

Please consult the instruction manual of the fan heater for multiple units' connection.

![](_page_8_Picture_0.jpeg)

# Wiring Diagram – 1 Clever Control with 1 Intelligent PCB

![](_page_8_Picture_2.jpeg)

![](_page_8_Figure_3.jpeg)

![](_page_9_Picture_0.jpeg)

![](_page_9_Picture_1.jpeg)

#### Wiring Diagram – 1 Clever Control with 2 Intelligent PCB

![](_page_9_Figure_3.jpeg)

#### 10

![](_page_10_Picture_0.jpeg)

## MODIFY MODBUS ADDRESS

By default the Modbus address of Clever PCB is 1.

If more than one PCB is connected in serial using Modbus protocol, you should give different Modbus addresses to each PCB board (you can choose from 1 to 255). The Modbus addresses should be introduced using a binary code to the switch SW1 as examples shown in this table:

PCB number (decimal)	Binary code	PCB switch position
1	0000001	1000000
2	0000010	0100000
3	00000011	11000000
4	00000100	00100000
5	00000101	10100000
6	00000110	01100000
7	00000111	11100000
8	00001000	00010000
9	00001001	10010000
10	00001010	01010000
34	00100010	01000100
58	00111010	01011100
100	01100100	00100110

After choosing an address, you should open the board and turn ON and OFF the correct switches of SW1 for the desired Modbus address. For example:

![](_page_10_Figure_7.jpeg)

After modifing the new Modbus address, you should:

- Remove the power supply or click the reset button 2 seconds
- Go to initial configuration (Basic Configuration) and press "Scan" to update all Modbus addresses.

![](_page_11_Picture_0.jpeg)

![](_page_11_Picture_1.jpeg)

### **CLEVER CONTROL TFT**

![](_page_11_Figure_3.jpeg)

**MAIN STATE SCREEN** 

Main state screen indicates of the most important settings, including: ventilation speed, heating, temperatures, door state, working mode and program, filter state, day/hour, timer, etc.

![](_page_11_Picture_6.jpeg)

![](_page_12_Picture_0.jpeg)

# MAIN STATE SCREEN FUNCTIONS

*=	FAN SPEED	Indicates the fan speed (stages or proportional)
	HEATING TYPE / STAGES	Indicates the heating type (electrical, water, heat pump) and state (heating stage, ON/OFF or proportional, heating/cooling) The last sign on the right is the anti-freezing protection at water heated units (safety program to protect the water coil)
	DOOR STATE	Indicates if the door is open or closed
5,50	AUTO / MANUAL	Indicates if unit works manually or automatic
	FILTER STATE	Indicates the state of the filter (green = clean, orange = getting dirty, red = dirty)
	ENERGY MODE	Indicates the energy saving mode: Eco, Medium or Comfort (Eco prioritizes saving energy against the comfort)
⊡ DAY	TIMER	Indicates that timer is activated. It has 3 states: ON Day, ON Night or OFF.
<u>×</u> (	DAY / NIGHT	Indicates that is activated the Day or Night Function to have two different set temperatures (in order to save energy)
EXT / BMS	EXTERNAL BMS	Indicates that something is interfering to the device externally or by the BMS
6	UNIT LOCKED	Indicates that the unit is locked. Unit does not work until you unlock it by code.
X	CONTROL LOCKED	Indicates that the control is locked. Unit works but user needs a code to manage the controller.
((=))	ALARM	The flashing red sign indicates that there is an alarm. If affects any parameter, it will also flash. A second screen with a message will indicate: - Name of device that have the alarm - Which alarm is - Explain or ask you to do something
SET 24°C INSIDE 21°C OUTSIDE 15°C AIR JET 32°C	TEMPERATURES	Indicates the set temperature (desired). Shows the current temperatures according to the installed sensors: Ambient, outside and discharge (air jet).
P1	PROGRAM	Indicates the selected functioning program
09:29 WED	TIME AND DATE	Indicates time and date
€*	WIFI / BLUETOOTH	Indicates that is connected with Wi-Fi or Bluetooth
\$	UNIT SELECTION	When there are arrows, indicates that there is more than one device connected to the TFT (pressing " < " it will change to blue colour and with the arrows you can change between other units)
<b>♦   / :   UNIT</b> 1	DEVICE TYPE AND NAME	Indicates the type of device: Air curtain, fan heater, etc. Name: Unit + Modbus address by default, but can be changed to identify with its own name

![](_page_13_Picture_0.jpeg)

![](_page_13_Picture_1.jpeg)

# **BUTTONS NAVIGATION**

When you are managing Control Clever, text in blue colour or flashing sign indicates where you currently are.

	01	Turn ON /	OFF the equipment
C	OFF	When mul	ti equipment (more than 1 unit) it will ask if you want to turn ON/OFF
		the curren	t unit or all
		State	Go to User Menu
		Screen	
_	MENU	Menus	- Exit Menu (if you are in first level)
_	EXIT		- Go back to previous menu screen (if you are in level 2 or higher)
			- When editing the name, time and hour, etc. it goes back to the
			previous value
		State	Manual: Modifies the ventilation (fan icon will flash). Once
		Screen	ventilation is chosen, button " $\checkmark$ " must be pressed, and then arrows
	SCROLL UP/DOWN		buttons will modify the heating. If you press " $\checkmark$ " again then arrows
	GO NEXT/BACK		modify the temperature set.
			Auto: Modifies only the Set temperature
		Menus	Scroll through option (left) or editing value (between arrows)
		State	Turn the device name into blue and then using arrows you can
		Screen	change between devices (different units and Modbus number) (Only
SELECT DEVICE		multi-equipment)	
(SET)	CONFIRM	Menus	Go from left side to the right side (in order to edit the values)
(011)			Confirm the selected value (between arrows) and go back to left
			Enter to edit an option with " 🗸 "sign

#### MENUS

There are different menus depending on who is managing the equipment:

- "User" very easy for final user
- "Basic" with main parameters to configure the unit. Suitable for people with technical knowledge.
- "Advanced" only for professionals

![](_page_13_Picture_10.jpeg)

➔ Access User Menu by pressing <u>"Menu"</u> button

![](_page_14_Picture_0.jpeg)

![](_page_14_Picture_1.jpeg)

# **USER MENU**

≡	MENU BACK	Exit Menu (if you are in first level) Go back to previous menu screen (if you are in level 2 or higher) When editing the name, time, hour, etc. it goes back to the previous value
▲ ▼	SCROLL UP/DOWN GO NEXT/BACK	Scroll through option (left) or editing value (between arrows)
(SET)	ENTER OPTION CONFIRM	Go from left side to the right side (in order to edit the values) Confirm the selected value (between arrows) and go back to left With "✓" sign you can edit an option.

![](_page_14_Figure_4.jpeg)

#### **USER MENU - SCREEN 1**

- Select Operation Mode
   Automatic or Manual Functioning
- Select Energy Saving Mode
  - Eco: Uses the less energy possible
  - Medium: In between Eco / Comfort modes.
  - Comfort: Spends more ventilation/heating to
  - maintain or achieve quicker the set temperature
- Adjust Time Programmer
   Automatic ON/OFF (see below)
- Adjust Time and Date (see below)

![](_page_14_Figure_14.jpeg)

# **USER MENU - SCREEN 2**

- Adjust Day / Night Temperature
   2 Different Set temperatures
- Enter into Basic Configuration Menu:
   Code required to access to technical parameters
- Enter into Advanced Configuration Menu:
   Code required to access to professional area
- Force Reset
   Restart the Clever Control

![](_page_15_Picture_0.jpeg)

# User Menu / TIME PROGRAMMER

- Time Programmer		
State	▼ Disable ▲	

By default it's OFF, showed as "Disable"

To activate to turn it into "Enable" and press "  $\checkmark$  " button to activate it and show all the options

E Time Programmer		
State	▼ Enable ▲	
Day Type	▼ Custom ▲	
Day/s	▼ Monday ▲	
Action 1	✓ New	
Action 2	✓ New	
Action 3	✓ New	
Action 4	✓ New	
Action 5	✓ New	

Time Programmer		
Action 6	✓ New	
Action 7	✓ New	
Action 8	✓ New	
Action 9	✓ New	
Action 10	✓ New	
Erase	▼ 🛍 Monday▲	

# TIME PROGRAMMER MENU - SCREENS 1 y 2

- ➡ Enable / Disable Time Programmer.
- Select "Day Type" group.
- Create from 1 to 10 different Timer Actions
- Erase selected action.

![](_page_16_Picture_0.jpeg)

![](_page_16_Picture_1.jpeg)

# User Menu / TIME PROGRAMMER

# Day Type:

## - Custom (default):

To make the choice of groups easier you can choose among predefined groups of days that will have the same program.

Groups are:

- **Custom (by default):** Customize each day with a different schedule, it must be programmed daily with desired schedule.
- Mon-Fri: Monday to Friday
- Mon-Sat: Monday to Saturday
- Mon-Sun: Monday to Sunday
- Mon-Fri Sat: Monday to Friday and separately Saturday
- Mon Fri-Sat-Sun: Monday to Friday and separately Saturday to Sunday

![](_page_16_Figure_13.jpeg)

Day Type (Monday)

C Time Programmer		
State	▼ Enable ▲	
Day Type Day/s	▼ Mon/Sun ▲	
Action 1	✓ New	
Action 2	✓ New	
Action 3	✓ New	
Action 4	✓ New	
Action 5	✓ New	

Group Day Type (Mon-Sun)

# 

Use <u>Scroll Up/Down</u> button to select an Action, and press "✓" button to create a new one or edit an existing one.

E Time Programmer		
State	▼ Enable ▲	
Day Type	▼ Custom ▲	
Day/s	▼ Tuesday ▲	
Action 1	✓ New	
Action 2	✓ New	
Action 3	✓ New	
Action 4	✓ New	
Action 5	✓ New	

Create New Timer Action (1)

E Time Programmer		
State	▼ Enable ▲	
Day Type	▼ Custom ▲	
Day/s	▼ Tuesday ▲	
Action 1	✓ 8:30 Day	
Action 2	✓ 23:00 Night	
Action 3	✓ New	
Action 4	✓ New	
Action 5	✓ New	

Edit Existing Timer Action (1 or 2)

![](_page_17_Picture_0.jpeg)

![](_page_17_Picture_1.jpeg)

# User Menu / Time Programmer / ACTIONS

# New Action / Edit Action:

T 🖸	imer \ Actions
Mon	day - Action 1
Action	▼ 🔆 Day 🔺
Time	Hour Minute
Confirm	✓ Yes
Erase	▼ 🕮 Yes 🔺

## **TIMER ACTIONS - SCREEN 1**

Action: (by default "NO")
Day: Turn ON the unit using "Day Temperature" (set in Day/Night Temperature Menu)
Night: Turn ON the unit using "Night Temperature" (set in Day/Night Temperature Menu)
ON: Turn ON the unit using "Set" temperature
OFF: Turn OFF the unit
V1,V2,V3,V4,V5: Turn ON the unit with ventilation speed 1, 2, 3, 4 or 5.

Time:

- Hour: Select from 0 to 23 h
- Minute: Select from 0 to 59 min

**Confirm:** Should press to confirm your selection and go back to <u>Timer</u> general menu

**Erase:** If you want to delete the editing action, select <u>Yes</u> and press " $\checkmark$ ".

# User Menu / ADJUST TIME

This function adjusts the general time and date of the Control.

Adjust Time
Hour Minute 15:03 Day Month Year 09 / 02 / 17

- Use <u>Scroll Up/Down</u> buttons to select a number, which will represent the hour time (from 0 to 23h). Press "✓" button to accept time and move to next value.
- 2. Repeat the same process until adjusting *Hour, Minute, Day, Month and Year* values.
- Press "✓" button to accept and go back to general User Menu.

![](_page_18_Picture_0.jpeg)

# User Menu / DAY - NIGHT TEMPERATURE

This function adjusts the Day/Night Set Temperatures. User can select between Day or Night modes with 2 different Set temperatures in order to save energy.

Day / Night Temperature		
Day		
Night		

- 1. Use <u>Scroll Up/Down</u> buttons to select *Day* or *Night*, value.
- 2. Press "✓" button to enter into selected option.
- 3. Use <u>Scroll Up/Down</u> buttons to enter temperature values. Press "✓" button when finished.

# User Menu / BASIC CONFIGURATION (MENU)

In Basic Configuration mode the technician can configure the main parameters of the clever control.

Basic Configuration		
Working Program	▼P1▲	
Configuration	✓ Edit	
Water Heating	▼ ON/OFF▲	
Parameters	✓ Edit	
General alarm	✓ Edit	
Filter: Hours to next revisior	▼ 300▲	
Counters	✓ Edit	
Lock Control	✓ Edit	
Change Basic code	✓ Edit	

# **BASIC CONFIGURATION - SCREEN MENU**

- Select Working Program (see below)
- **Calculation Equipment Configuration** (see below)
- Adjust Water Heating Mode

Only water heated and heat pump units: ON/OFF or Proportional (0-10V)

- Parameters (see below)
- General Alarm

Define which alarms activate the general alarm (digital OUT)

- **Ciliter Revision:** Define hours to next revision
- Counters

Consult Working/Heating/Filter hours

Lock Control

Unit in OFF and protected by a code

Change Basic Code

![](_page_19_Picture_0.jpeg)

## Enter Code

When entering Basic Configuration Menu, a security code must be introduced to access. *Consult section "Codes: Access and change".* 

Basic Configuration
Enter Code

- 1. Use <u>Scroll Up/Down</u> buttons to enter first digit's value.
- 2. Press "✓" button to move to next digit.
- 3. Repeat the same process until the code is fully entered.

## User Menu / Basic Configuration / WORKING PROGRAM – AIR CURTAINS

Clever has different operating programs depending on:

- Type of functioning: Manual or Automatic
- Type of heating: unheated, electrical heated, water heated, heat pump
- Energy saving mode: Eco, Medium or Comfort

#### Manual:

- P1: Manually you can select ventilation speed and heating stage (also with heat pump units you can select cooling or heating mode)
- **P2:** Manually you can select ventilation speed and heating stage depending on door state (also with heat pump units you can select cooling or heating mode):
  - When the door is open, you select the door open ventilation speed and heating stage.
  - When the door is <u>closed</u>, you select the door closed ventilation speed and heating stage.

At all programs, if ambient temperature >= set temperature, depending on energy saving mode it will:

- Comfort: nothing is modified
- Medium: heating is stopped
- Eco: stops the air curtain

![](_page_20_Picture_0.jpeg)

# User Menu / Basic Configuration / WORKING PROGRAM – AIR CURTAINS

#### Automatic:

Depending on door state, Clever will regulate itself the ventilation and heating thanks to its temperature sensors and energy saving mode, to achieve the maximum efficiency according to selected parameters.

- **P1:** Functioning according to:
  - Set and inside temperature
  - o Door state
  - o Energy saving mode
- P2: Functioning according to:
  - Set and external temperature
  - o Door state
  - Energy saving mode
- **P3/4:** Functioning according to:
  - o Door opened: Set Temperature and External Temperature
  - Door closed: Set Temperature and Inside Temperature
  - P3/4: Energy saving mode (P3 with door opened always in Comfort Mode)

![](_page_21_Picture_0.jpeg)

# User Menu / Basic Configuration / WORKING PROGRAM – FAN HEATERS

Clever has different operating programs depending on:

- Type of functioning: Manual or Automatic
- Type of heating: electrical heated, water heated or heat pump
- Energy saving mode: Eco, Medium or Comfort

#### Manual:

- P1: Manually you can select ventilation speed and heating stage
- **P2:** Manually you can select ventilation speed and heating stage depending on door state:
  - When the door is <u>open</u>, you select the door open ventilation speed and heating stage.

- When the door is <u>closed</u>, you select the door closed ventilation speed and heating stage. (Minimum required sensors: door contact)

At all programs, if ambient temperature >= set temperature, depending on energy saving mode it will:

- Comfort: nothing is modified
- Medium: heating is stopped
- Eco: stops the air curtain

#### Automatic:

Depending on program, Clever will regulate itself the ventilation and heating thanks to its temperature sensors, door stated and energy saving mode, to achieve the desired temperature.

- **P1/2:** Functioning according to:
  - Set and inside temperature P1 or outside temperature P2
  - Energy saving mode

P2 stops the unit if ambient temperature > set temperature (while P1 runs at minimum programmed speed)

(Minimum required sensors: P1 door contact, P2 outside temperature sensor. Recommended: door contact)

- **P3/4:** Functioning according to:
  - Door opened: depending on temperature difference between ambient and set and energy saving mode it will work at maximum programmed speed and heating for door open or will work as door closed.
  - Door closed: Works like P1 (P3) and P2 (P4)

(Minimum required sensors: outside temperature sensors. Recommended: door contact)

![](_page_22_Picture_0.jpeg)

![](_page_22_Picture_1.jpeg)

# User Menu / Basic Configuration / CONFIGURATION (INITIAL)

Configuration			
	Language	▼ English ▲	
	Port Baud 1	▼ 115200 ▲	
	Port Baud 2	▼ 115200 ▲	

![](_page_22_Figure_4.jpeg)

#### CONFIGURATION MENU – FIRST SCREEN

- Select the language: English, Spanish, Catalan, Swedish, Danish, Polish, French, Italian, Finish, German, Dutch, Turkish, Latvian, and Norwegian.
- Select Port Baud speed (this one must not be changed)
- Select Port Baud 2 speed

### CONFIGURATION MENU – MIDDLE SCREEN/S

It will appear 1 screen for each different device

- Select the type of unit: air curtain, fan heater, etc.
- Select the name of the unit
   (by default "Unit + Modbus address")
- Select the fan speed
   Air Curtains: 2 or 5
- Select the heating

Air (unheated), Electrical (heated), Water (heated) or Heat Pump

New questions/options can appear if required.

#### CONFIGURATION MENU – LAST SCREEN

- Confirm: "Yes" to accept all changes, "No" to go back without saving
- Scan (1-12): quick search

Scan Config: search within a Modbus set range Search connected equipment to the TFT

End address 🛛 🔻 1	12

"Searching Equipment" screen will appear

Searching temperature sensors

Search again or update new temperature sensors.

It will also change the program to the best option according

to the new sensors

![](_page_22_Figure_27.jpeg)

![](_page_23_Picture_0.jpeg)

![](_page_23_Picture_1.jpeg)

# User Menu / Basic Configuration / Configuration / NAME

In this option, you can edit or rename the unit denomination, to identify it easily.

There is a maximum length of 12 digits available, including **letters** (either in **lowercase** or **uppercase**), **numbers**, **space** and other common alphanumerical **symbols**.

When entering to the Edit's Name screen, scroll up or down through the first digit to start creating the name.

#### Menu Navigation

![](_page_23_Picture_7.jpeg)

	Name	
a v		
	Confirm √Yes	

#### Enter name (less than 12 digits)

![](_page_23_Figure_10.jpeg)

#### Enter name (using 12 digits)

![](_page_23_Figure_12.jpeg)

- Use <u>Scroll Up/Down</u> buttons to move through all characters available. Press "✓" button to select and move to next character.
- If the name is completed before reaching the total digits, go to "✓" sign to indicate that the edition is finished and confirm
- 3. Once in *Confirm* option, press "✓" button to accept and go back to general menu.
- 1. Use <u>Scroll Up/Down</u> buttons to move through all characters available. Press "✓" button to select and move to next character.
- 2. If the total 12 digits length is completed, at the 12<sup>th</sup> character you only have to *Confirm* to finish the edition
- 3. Once in *Confirm* option, press "✓" button to accept and go back to general menu.

![](_page_24_Picture_0.jpeg)

# User Menu / Basic Configuration / GENERAL ALARM

Clever control has a General Alarm (digital OUT) that will be activated depending on the selected alarms.

The technician can indicate "Yes" or "No" to all alarms that will activate the General Alarm. If only 1 of those alarms is activated, the general alarm will be also activated.

General Alarm	
Overheating Alarm	▼ Yes ▲
Autocooling Alarm	▼No 🔺
Dirty Filter Alarm	▼ Yes 🔺
Fan Overheating Alarm	▼ Yes 🔺
Heating Lock Alarm	▼ Yes 🔺
Air Flow Alarm	▼ Yes 🔺
Fire Alarm	▼ Yes 🔺
Temperature Sensor Alarm	▼ Yes 🔺
RPM Fan Alarm	▼ Yes 🔺

General Alarm	
External Stop Alarm	▼ Yes ▲
External Alarm	▼ Yes ▲
Anti Freeze Alarm	▼ Yes ▲
EC Fan Alarm	▼ Yes ▲
	General Alarm External Stop Alarm External Alarm Anti Freeze Alarm EC Fan Alarm

# **GENERAL ALARM MENU - SCREEN 1**

- Overheating Alarm
- Autocooling Alarm
- Dirty Filter Alarm
- Fan Overheating alarm
- Heating Lock Alarm
- ➔ Air Flow alarm
- Fire Alarm
- Temperature Sensor Alarm
- RPM Fan Alarm

#### **GENERAL ALARM MENU - SCREEN 2**

- External Stop Alarm
- External Alarm
- Anti Freeze Alarm
- EC Fan Alarm

![](_page_25_Picture_0.jpeg)

# User Menu / Basic Configuration / GENERAL ALARM

# Overheating

Indicates that inside the unit there is an overheating. Security program to protect the unit will automatically activate.

# Autocooling Alarm

If we turn the unit off and it has been working with heating (electrical heating), the self-cooling safety program activates automatically to protect the internal components of the equipment. It starts ventilation temporarily to reduce the effects of thermal inertia.

# Dirty Filter Alarm

It indicates that the filter is dirty. It's activated by hours timer or external pressure switch.

## **C** Fan Overheating Alarm

It indicates that there is an overheating inside the fans of the unit.

# Heating Lock Alarm

It indicates that the heating has been blocked.

## 

It indicates that the airflow is too low or 0.

## Fire Alarm

It indicates fire alarm.

#### **C** Temperature Sensor Alarm

It indicates a temperature sensor error.

# RPM Fan Alarm

It indicates that RPM of the fan are wrong.

# External Stop Alarm

It indicates that external alarm has switched OFF the unit.

#### External Alarm

It indicates an external alarm.

# Anti Freeze Alarm

It indicates that anti-freezing sensor is below the set temperature. It activates the safety program to protect the water coil.

# EC Fan Alarm

It indicates an error of the EC fan.

![](_page_26_Picture_0.jpeg)

# User Menu / Basic Configuration / PARAMETERS

Parameters		
Speed	✓ Edit	
Heating	✓ Edit	
Temperature	✓ Edit	
Disable	✓ Edit	
Door	✓ Edit	
Timeout Screen Menu	▼20 ▲	
Time to screen off	▼ 30 ▲	
Min Damper	▼ 100 ▲	

# BASIC PARAMETERS MENU

- Unit's Ventilation <u>Speed</u> (when Door Open/Closed)
- Unit's <u>Heating</u> (when Door Open/Closed)
- <u>Temperature</u> (Set Point Limits, calibration, Discharge Temperature, Antifreeze)
- <u>Disable</u> (Manual/Auto Heating /Cooling due to Ext Temperature)
- Door (Temporized, Delay Type, Delay Stages)
- <u>Timeout Screen Menu</u> (seconds to turn back to the previous menu automatically)
- <u>Time To Screen Off</u> (seconds to turn off TFT automatically)
- Din Damper (minimum opening of the Damper)

Use <u>Scroll Up/Down</u> buttons to move and select an option. When option is highlighted in blue, press "✓" button to enter and edit.

# User Menu / Basic Configuration / Parameters / SPEED

Speed	
Min Speed Door Open	▼0▲
Max Speed Door Open	▼5▲
Min Speed Door Closed	▼0▲
Max Speed Door Closed	▼3▲
Max Speed Cool Signal	▼5▲
Min Voltage AOVen1	▼ 1.5 ▲
Proportional Fan	🔻 No 🔺
QuickStart	V No 🔺
Quick Start Time	▼ 10 ▲
Stratification Step	▼2▲

- Min / Max Speed when Door Open
- Min / Max Speed when Door Closed
- Max Speed Cool Signal Only in cooling mode units, when the outdoor unit is in cooling mode you can limit the speed of the unit in order to control the condensation.
- Min Voltage AOVent1: Defines the minimum voltage at analogic out AOVent1 to start the fan.
- Proportional fan: Changes ventilation from speeds (2 or 5) to proportional 0-100%
- QuickStart: Fans starts at maximum speed during QST time
- QuickStartTime: Time that QuickStart remains at maximum speed.
- Stratification Step: Temperature difference (between ceiling and room) that starts antistratification

![](_page_27_Picture_0.jpeg)

# User Menu / Basic Configuration / Parameters / HEATING

Heating	
Min Heating Door Open	▼0▲
Max Heating Door Open	▼3▲
Min Heating Door Closed	▼0▲
Max Heating Door Closed	▼3▲
% Min Heating Door Open	<b>▼</b> 0 ▲
% Max Heating Door Open	▼100 ▲
% Min Heating Door Closed	<b>▼</b> 0 ▲
% Max Heating Door Closed	▼ 100 ▲
Stop HP Door Closed	<b>▼</b> 10 ▲

![](_page_27_Figure_4.jpeg)

- S Min / Max Heating when Door Open
- Min / Max Heating when Door Closed
- Solution ⇒ % Min / Max Heating when Door Open
- S % Min / Max Heating when Door Closed
- Stop Heat Pump when Door is Closed Only for heat pump units, it limits the OFF time of the heat pump when door closes, waiting the selected minutes. If door is opened again before this time elapses, heat pump will not be turned OFF.
- Heating Min % Open: defines minimum water flow at any situation to prevent freezing of pipes (Proportional).

### User Menu / Basic Configuration / Parameters / TEMPERATURE

Temperature	
Set Point Limits	✓ Edit
Calibration	✓ Edit
Discharge Temperature	✓ Edit
Enable Antifreeze	▼10 ▲
Temperature Units	▼ °C ▲
Cooling ON	▼No ▲
Set cold pipe	▼10 ▲
Set heating pipe	▼ 40 🔺

- Set Point Limits See below
- Calibration
- Discharge Temperature See below
- Enable Antifreeze
   Uses external temperature sensor as anti-freezing
   sensor
- Temperature Units
   To choose between °Celsius or °Fahrenheit.
- Cooling ON (by default NO) For water or heat pump coils working in cooling mode.
- Set cold pipe

Uses cold/heat temperature sensor. If it's below the set temperature, Clever will start cold mode.

- Set heating pipe
  - It is used in two different kind of sensors:
    - a) Uses cold/heat temperature sensor. If it's over the set temperature, Clever will start heating mode.
    - b) Uses return temperature sensor. It does not allow to return the water to more degrees of the set temperature.

![](_page_28_Picture_0.jpeg)

# User Menu / Basic Configuration / Parameters / Temperature / SET POINT LIMITS

Set Point Limi	its
Min Setpoint Day	▼5▲
Max Setpoint Day	▼ 30 ▲
Min Setpoint Night	▼5▲
Max Setpoint Night	▼ 20 ▲

#### Min / Max Setpoint Day Limit the minimum and maximum Day temperature that the user can set

Min / Max Setpoint Night Limit the minimum and maximum Night temperature that the user can set

# User Menu / Basic Configuration / Parameters / Temperature / CALIBRATION

Calibration	
Sensor Calibration1	▼ 0▲ 31.0
Sensor Calibration2	▼ 0 ▲ 27.1
Sensor Calibration3	▼ 0 ▲ 26.0
Sensor Calibration Int	▼ 0▲ 23.7

## Sensors Calibration

These parameters allow to calibrate each temperature sensor with +/- X °C (plus or minus degrees)

# User Menu / Basic Configuration / Parameters / Temperature / DISCHARGE TEMP (Available soon)

	Discharge Temperature		
$\bigcap$	Comfort Mode	▼ 50 ▲	
	Medium Mode	▼ 40 ▲	
	Eco Mode	▼ 30 ▲	
$\bigcup$			

#### Comfort Mode

Set maximum discharge temperature in Comfort mode.

#### Medium Mode

Set maximum discharge temperature in Medium mode.

# ➡ Eco Mode

Set maximum discharge temperature in Eco mode.

![](_page_29_Picture_0.jpeg)

# User Menu / Basic Configuration / Parameters / DISABLE DUE EXT TEMP

Disable Due Ext Temp	
Heat Due Ext Temp Man	▼No▲
Cool Due Ext Temp Man	▼No▲
Heat Due Ext Temp Aut	▼21 ▲
Cool Due Ext Temp Aut	▼No ▲
Stop Due Ext Temp	▼No ▲
Range to Stop Due Ext Temp	
Upper limit	▼No ▲
Lower limit	▼No ▲

- Heating Due Ext Temp Man In Manual operating, stops heating if external temperature is over to selected degrees.
- Cooling Due Ext Temp Man In Manual operating, stops cooling if external temperature is over to selected degrees.
- Heating Due Ext Temp Auto In Auto operating, stops heating if external temperature is over to selected degrees.
- Cooling Due Ext Temp Auto In Auto operating, stops cooling if external temperature is over to selected degrees.
- Stop Due Ext Temp Stops the unit if external temperature is over to selected degrees.
- Range to Stop Due Ext Temp Stops the unit if external temperature is between Lower and Upper limit degrees.

If you select "NO" it does not stop anything

# User Menu / Basic Configuration / Parameters / DOOR

Door Temporized Door OUT V A Delay Close Door V Flexible A

# Temporized Door OUT

If the air curtains should be working at nominal speed or heating when you open the door, you can program at "temporized door out signal" how many seconds the door should remain closed while the air curtain is preparing itself.

Once this time is finish, it will give the signal open to the door.

If time is different than 0 (activated) remember to select the function at one of the available digital outlets.

![](_page_30_Picture_0.jpeg)

![](_page_30_Picture_1.jpeg)

# Delay Close Door

When the door closes, the air curtain remains working at door open conditions for certain time to be ready if it's open again.

The regulation of the unit during this delay time is divided in two strength stages. During the first stage, the unit works according to Open Door parameters (ventilation and heating). During the second stage, ventilation and heating are reduced in order to save energy.

There are two types: **"Fixed"** where you can select the duration of the delay, or **"Flexible"** which adapts automatically the time depending on how often the door is open.

	Door	
$\bigcap$	Temporized Door OUT	▼ 0 ▲
	Delay Close Door	▼ Flexible ▲

# Flexible = Proactive

It adapts the delay functioning according to the traffic of people that crosses the door.

It detects how many times the door is open for the last minutes and adapts the door delay times and strengths to those conditions in order to save energy.

Door	
Temporized Door OUT	▼ 0 ▲
Delay Close Door	▼ Fixed ▲
Step 1	▼20▲
Step 2	▼10▲

# Fixed:

You can set how many seconds will stay at step 1 and then how many seconds will last with step 2.

The functioning is progressive as Step 1 is stronger than Step 2.

![](_page_31_Picture_0.jpeg)

# User Menu / Basic Configuration / FILTER: HOURS TO NEXT REVISION

Basic Configuratio	n
Working Program	▼P3▲
Configuration	✓ Edit
Water Heating	▼ ON/OFF▲
Parameters	✓ Edit
General alarm	✓ Edit
Filter: Hours to next revision	▼ 450 ▲
Counters	✓ Edit
Lock Control	✓ Edit
Change Basic code	✓ Edit
$\cup$	

# User Menu / Basic Configuration / COUNTERS

# Counters Filter: Hours To 0 / 300 Next Revision 0 Working Hours 19 Heating Working 0 Hours 0

# ➡ Filter: Hours To Next Revision

By default, the filter alarm by hours is activated. It will give us a message that the filter is dirty and ask if we have cleaned it. If so, it will restart the filter counter.

Here we can modify the hours to next filter revision.

- Filter: Hours To Next Revision
   It displays the hours without changing the filter / total hours before filter alarm
   50/300 = working 50h since last filter alarm and
   remains 250h to next filter alarm
- Working Hours
   Counter of all working hours
- Heating Working Hours
   Counter of only heating working hours

# User Menu / Basic Configuration / LOCK CONTROL TO USERS

Lock Control to Users	
Enable Lock Control	▼No ▲
Change Lock Code	✓ Edit

Enable Lock Control It will lock the control and the user will have to enter a code to access.

#### Change Lock Code

The user can modify the lock code

![](_page_32_Picture_0.jpeg)

![](_page_32_Picture_1.jpeg)

# **CODES – ACCESS AND CHANGE**

Clever control has different access levels protected by different codes.

#### Access levels:

- User menu: Access without code.
- Basic configuration: Code 1234 (by default).
- Advanced configuration: Only for professionals, please consult

If you want to protect the control from end users, you can lock the control or the unit.

#### User protections:

- Control Locked: Code 1234 by default (unit will remain working)
- Unit Locked: Code 1234 by default (unit will stop)

**Change the codes:** you will have to enter twice the new code. IMPORTANT: code 0000 is not allowed.

![](_page_32_Figure_13.jpeg)

![](_page_33_Picture_0.jpeg)

![](_page_33_Picture_1.jpeg)

### User Menu / ADVANCED CONFIGURATION

	Advanced Configuration	
$\square$	Lock Device	▼ No ▲
	Parameters	✓ Edit
	IN / OUT	✓ Edit
	Change Adv. Code	✓ Edit
	Recovery to defaults	✓ Edit

#### Lock Device

Lock the unit with code. The unit will be OFF while locked.

- Parameters
   Configure Advanced parameters
- - Configure the functions at:
  - Digital IN
  - Digital OUT
  - Analog IN
  - Analog OUT Configure temperature sensors Configure connections
- Change Advanced Code You can modify the password
- Recovery to defaults
  It turns all parameters to default
  - It turns all parameters to default except the selection made in initial configuration

## User Menu / Advanced Configuration / ADVANCED PARAMETERS

Intervals	✓ Edit
Fan Overheating	✓ Edit
Fan RPM	✓ Edit
Int Modulation P5 0-10V sec	▼ 20 ▲

# Intervals

Intervals are used at automatic programs to modify the ventilation and heating in order to have the most efficient separation. Set/Ambient Temp: 2°C default Set/External Temp: 2°C default Hysteresis: 1°C default

- Fans Overheating Determines the time the fan stops if there is a fan overheating. If it happens more than "X" times in "Y" interval, the heating will be blocked. Time of initial stop: 120seg by default Detection number: 2 times by default Time interval: 30 min by default
- Fan RPM

Under construction

Int Modulation P5 0-10V sec At program 5, establishes the interval of modulation in seconds.

![](_page_34_Picture_0.jpeg)

![](_page_34_Picture_1.jpeg)

# User Menu / Advanced Configuration / IN-OUT

	IN / OUT		
Digital Inputs	✓ Edit		
<b>Digital Outputs</b>	✓ Edit		
Analog Inputs	✓ Edit		
Analog Outputs	✓ Edit		
Temperature Sensors	✓ Edit		
Communications	✓ Edit		

![](_page_34_Figure_4.jpeg)

![](_page_34_Figure_5.jpeg)

![](_page_34_Figure_6.jpeg)

- Digital Inputs Modify the functions of Digital Inputs
- Digital Outputs Modify the functions of Digital Outputs
   Analog Inputs
- Modify the functions of Analog Inputs
- Analog Outputs Modify the functions of Analog Outputs
- Temperature Sensors Modify the functions of temperature sensors
- Configure the communications

You can select a function to each Digital IN

Each entrance can be configured to N/O or N/C (normally open/close)

You can select a function to each Digital OUT

All Analog IN are 0-10V

You can select a function to each Analog IN

Each entrance can be enabled or disabled

![](_page_35_Picture_0.jpeg)

# User Menu / Advanced Configuration / IN-OUT

Analog Outputs						
	ut1	▼ Heating 1				
0	ut2	▼ Fan Speed 1				
o	ut3	▼ 10V Power Supply				
o	ut4	Not Assigned				
$\cup$						

Temperature Sensors					
Sensor 1	▼ Outdoor				
Sensor 2	▼ Not Assigned				
Sensor 3	▼ Not Assigned				
Enable Cor	ntroller Ves	<b>A</b>			

All Analog OUT are 0-10V

You can select a function to each Analog OUT

By default:

Sensor 1 = Outdoor Sensor 2 = Air Discharge Sensor 3 = Inside Controller Enabled = Yes

Inside sensor has priority to the controller's one. If it's not connected, automatically uses the TFT control.

When you connect and configure the unit the first time, it detects automatically the sensors and selects the best available program.

![](_page_36_Picture_0.jpeg)

# Connections and Functions: IN/OUT of Digital/Analogic and Temperature Sensors

	ANALOG IN							
Only Air	Electrical	Water	DX		Observations			
				Electrical Heated Un	its:			
				0 - 0,2V : Do not modi	fy the control setting			
				0,3 – 3,2V : Heating S	Stage 1			
				3,3 – 6,2V : Heating S	Stage 2			
				6,3 – 10,2V: Heating \$	Stage 3			
				Water Heated Open/	Close:			
-		Heating		0 - 0,2V : Do not mod	fy the control setting			
	Treating			0,3 – 10,2V : 100%				
				Water Heated or Heat Pump Proportional:				
				0 - 0,2V : Do not mod	ty the control setting			
				0,3 - 1,2V = 10%	1,3 - 2,2V = 20%	2,3 - 3,2 V = 30%		
				3,3 - 4,2V = 40%	4,3 - 5,2V = 50%	5,3 - 6,2 V = 60%		
				6,3 - 7,2V = 70%	7,3 – 8,2V = 80%	8,3 – 9,2 V = 90%		
				9,3 - 10,2V = 100%	for the second section of			
				0 - 0,2V : Do not mod	ity the control setting			
	Ventilation	n Speed		2,3 - 4,2V : Fan Speed 2				
				4,3 - 6,20: Fan Speed 3 (2a a 2V)				
			6,3 - 6,2V: Fan Speed 4 (2a a 2V) 8.3 - 10 2V: Fan Speed 5 (2a a 2V)					
			0.5 = 10.2V · Do not mod	ify the control setting				
				$0.3 - 1.2V = 19^{\circ}C$	$1.3 - 2.2V = 20^{\circ}C$	$23 - 32 V = 21^{\circ}C$		
Set Temperature		$3.3 - 4.2V = 22^{\circ}C$	$4.3 - 5.2V = 23^{\circ}C$	5.3 - 6.2 V = 24°C				
				6.3 – 7.2V = 25°C	$7.3 - 8.2V = 26^{\circ}C$	8.3 – 9.2 V = 27°C		
				9,3 – 10,2V = 28°C	,, -,	-,,		

	ANALOG OUT					
Only Air	Electrical	Water	DX	Observations		
	Damper 1			Modulates a damper during stratification function		
	Power Supply 10V			Convert analogical entrance to digital (pending)		
-		Heating 3		Idem Heating 1		
-		Heating 2		Idem Heating 1		
-	Heating 2 Heating 1			Idem Heating 1Voltage between 0-10V according to the functioning:Electrical Heated Units: $0 - 0.2V$ : Heating OFF $0.3 - 3.2V$ : Heating Stage 1 $3.3 - 6.2V$ : Heating Stage 2 $6.3 - 10.2V$ : Heating Stage 3Water Heated Open/Close: $0 - 0.2V$ : Heating OFF = Closed $0.3 - 10.2V$ : Heating ON = OpenWater Heated or Heat Pump Proportional: $0 - 0.2V$ : OFF $0.3 - 1.2V = 10\%$ $1.3 - 2.2V = 20\%$ $2.3 - 3.2V = 30\%$ $3.3 - 4.2V = 40\%$ $4.3 - 5.2V = 50\%$ $5.3 - 6.2V = 60\%$ $6.3 - 7.2V = 70\%$ $7.3 - 8.2V = 80\%$ $8.3 - 9.2V = 90\%$		
	Ventilat	ion 3		Idem Ventilation 1		
	Ventilat	ion 2		Idem Ventilation 1		
Ventilation 1				Voltage between 0-10V according to the functioning: 0 - 0,2V : Ventilation OFF 0,3 - 2,2V : Fan Speed 1 2,3 - 4,2V : Fan Speed 2 4,3 - 6,2V : Fan Speed 3 (Speed 2 for air curtain with 2 speed) 6,3 - 8,2V : Speed 4 (Speed 2 for air curtain with 2 speed) 8,3 - 10,2V : Speed 5 (Speed 2 for air curtain with 2 speed)		

![](_page_37_Picture_0.jpeg)

![](_page_37_Picture_1.jpeg)

DIGITAL OUT					
Only Air	Electrical	Water	DX	Observations	
-	-	Exc water T Out		Indicates that the valve is modulated to regulate the water return temperature. Not used in heat pump	
-	-	Cooling mode	Cooling mode	Indicates that cooling mode is active	
-	-	Heating Mode	Heating Mode	Indicates that heating mode is active	
	D	o ext		Indicate/activate an extract fan on the roof if required by stratification function. (extracts air from the inside the building to outside)	
	D	o est		function (blows air from the ceiling to the floor inside the building)	
	Alarm	- EC fan		Indicate alarm of EC fan	
	Tempo	rized door		Indicate/activate door signal (When the air curtain starts working, it counts X seconds and then give the signal open to the door. Air curtain is working at nominal speed)	
-	-	-	Damper 3	Not used	
-	-	-	Damper 2	Not used	
-	-	-	Damper 1	Not used	
-	-	-	Fan Stop Alarm	Not used	
-	-	Antif	reezing	Indicates alarm of antifreezing (to avoid damages in the water coil due to low temperatures. Stops ventilation and turns on heating) Not used in heat pump	
-	-	-	Exc Water Temp	Not used	
-	-	-	Exc Water Temp	Not used	
-	-	Boil	ler ON	Indicate/turns on the boiler Not used in heat pump	
-	-	-	Lock Heat Pump	Not used	
-	-	-	Heat Pump On	Not used	
-	-	Drain p	oump ON	Indicate/turns on the drain pump (when cooling)	
-	-	Co	ol ON	Indicates or changes to Cooling mode	
-		Heating stage 2		Indicates or turns on heating stage 2 of electrical heating element	
-		Heating stage 1		Indicates or turns on heating stage 1 of electrical heating element	
-	-	-	Fan Speed Low	Not used	
-	-	-	Fan Speed High	Not used	
	Alar	m - Fire		Indicates fire alarm	
	Alarm	- Airflow		Indicates airflow alarm	
-	Heating Lock	-	Heating Lock	Indicates or blocks the electrical heating	
	Alarm - Fans	Overheating (TK)		Indicates fans overheating alarm	
	Alarn	n - Filter		Indicates filter alarm	
- Autocooling - Autocooling		Indicates autocooling (When you stop the unit, if there is an internal overheating it cools itself to protect internal components. It works only in OFF) Not used in heat pump			
-	Α	larm - Overheatin	Indicates internal overheating when unit is ON (safety program should run to protect internal components)		
	Alarm	- General		Indicates general alarm. Its a group of predefined alarms. If only 1 of those alarms is activated, activates the general alarm. User can select the alarms of the group.	
•		Heating ON		Indicates or turns on heating	
Run signal				Indicates that ventilation is working	

![](_page_38_Picture_0.jpeg)

![](_page_38_Picture_1.jpeg)

DIGITAL IN						
Only Air	Electrical	Water	DX	Observations		
	Alarm	- EC fan		Activates EC fan alarm, stops the air curtain and blocks heating		
-	- Alarm - Overheating			Activates overheating alarm. Unit ON: modifies ventilation and heating to decrease internal temperature. At electrical heated units if alarm persists it can block the electrical heater element. Unit OFF: maximum ventilation Not used in heat pump.		
	ON	Night		Turns on the unit at night temperature. User can't stop the unit and timer won't work.		
	ON	Day		Turns on the unit at day temperature. User can't stop the unit and timer won't work.		
	(	ЛС		Turns on the unit as it was when working.		
-	-	Co	ool	Changes heating mode to Cool		
	Forc	e Night		Changes to Night temperature		
	For	e Day		Changes to Day temperature		
	Alarm -	Fire OFF		Activates fire OFF alarm and stops the air curtain		
	Alarm	- Fire ON		Activates fire ON alarm and turns on the air curtain		
	Alarm	- Airflow		Activates airflow alarm when is activated more than 30 seconds and stops the heating		
	Alarm - Fan o	verheating (TK)		Activates fan overheating alarm and stops the air curtain. If persist it can block the air curtain		
	Alarm	External		Activates external alarm (nothing else)		
	Alarm - E	xternal OFF		Active l'alarme externe OFF et arrête l'appareil.		
	Force Aut	omatic Mode		Changes to Automatic mode		
	Force Ma	nual Mode		Changes to Manual mode		
	Contr	ol Lock		Locks the control and a code is required to use the controller		
-	Heating Lock	-	Heating Lock	Stops and blocks the electrical element Not used in heat pump.		
	Alarm - Filter	pressure switch		Activates filter alarm when is activated more than 30 seconds.		
-	-	Alarm Antifreezing	-	It stops ventilation and turns on heating. It works always (unit ON and OFF),		
-		Heating OFF		Stops the heating		
	(	)FF		Stops the unit		
	Door	Contact		Change state of the door and modify functionig according to the programs		

TEMPERATURE SENSORS						
Only Air Electrical Water DX Observations				Observations		
	F	Roof		Air sensor at the ceiling (inside the building) to detect stratification		
Return Pipe				Tube sensor to limit the water return temperature		
Pipe Cool/Heat				Tube sensor to detect the mode cool/heating depending on temperature		
	Discharge			Air sensor at discharge		
	Outdoor			Air sensor outside the building		
Indoor				Air sensor inside, room temperature (ambience)		

![](_page_39_Picture_0.jpeg)

![](_page_39_Picture_1.jpeg)

#### **PROGRAMS FUNCTIONING**

#### MANUAL FUNCTIONING

When Room Temperature exceeds Set Temperature, concerning Energy Saving mode:

- ECO: The air curtain stops itself
- MEDIUM: Stops Heating.
- COMFORT: Doesn't stop anything.

#### Program 1

Desired ventilation and heating are manually selected.

#### Program 2

Different ventilation speeds and heating can be manually selected according to the door state (Opened or Closed):

- While door is opened, we select or modify Fan speed or heating of Door Opened
- While door is closed, we select or modify Fan speed or heating of Door Closed

![](_page_40_Picture_0.jpeg)

#### AUTOMATIC FUNCTIONING

# Program 1

Function Set Temperature/Room Temperature (1 Room Temperature Sensor) In addition to the Control, it's necessary:

- Control's Room Sensor included or Room Temperature Sensor connected to TS3
- Door Contact
- Door Opened:

Always working according to speed value defined by VMaxPO parameter "Max Speed Door Opened" Heating works as defined in the following table (Diferential Set Temperature and Room Temperature): (Example: Set 23 – Room 18 = 5, Water Proportional in 8V)

Diferential		Heating	
Set Temp Room Temp.		Water	Electrical
°C	ON/OFF	Proportional 0-10V	Stage
		(AO Cal1)	_
-1,-2 or less	OFF	OFF	OFF
0,1	CMinPO	Cmin0/10PO	CMinPO
2,3	ON	6V	1
4,5	ON	8V	2
6 or more	ON	10V	3

CMinPO: Works according to the heating defined in "Min Heating Door Opened" parameter.

- Water Heating: 0 = OFF,1=ON
- Electrical Heating Stage: 0=OFF,1,2,3 (3 only for 5 speed air curtains)
- CMin0/10PO: Works according to the heating defined in "Min Proportional Heating Door Opened" parameter.
  - Water Heating: 0-10V defines a proportional valve opening from 0 to 100% (0 closed, 10 fully opened)

#### o Door Closed

Works according to Diferential/Room/Set Temperatures and energy saving mode Eco/Medium/Comfort:

• ECO: Air Curtain stops.

#### MEDIUM:

While Inside Temperature remains lower or equal to Set Temperature

- Works at ventilation speed defined by VminPT parameter "Min Fan Speed Door Closed"
- Works at heating defined by CminPT parameter "Min Heating Door Closed"

When Inside Temperature exceeds Set Temperature, the air curtain stops itself.

#### COMFORT:

Ventilation and heating work according to the following table of Diferential Set Temperature and Room Temperature ((Fan Speed with VMinPT, heating will work if Set Temperature interval isn't reached))

Diferential	Ventilation	Heating				
Set Temp Room Temp.			Water	Electrical		
°C		ON/OFF	Proportional 0-10V (AO Cal1)	Stage		
-1,-2 or less	VMinPT	OFF	OFF	OFF		
0,1	VMinPT	CMinPT	CMin0-10PT	CMinPT		
2,3	2	ON	6V	1		
4,5	3	ON	8V	2		
6,7	4	ON	10V	3		
8 or more	5	ON	10V	3		

VMinPT: Works at Fan Speed defined by "Min Speed Door Closed" parameter.

![](_page_41_Picture_0.jpeg)

#### AUTOMATIC FUNCTIONING

#### Program 2

Function Set Temperature/ Outside Temperature (1 Outside Temperature Sensor) In addition to the Control, it is necessary:

- Temperature sensor installed outdoors and connected to TS1
- Door Contact
- Door Opened

Works according to Diferential Set / Outside Temperatures/ and energy saving modes Eco/Medium/Comfort (example: Set 23 – Room 18= 5, Water Proportional in Eco/Medium=6V, Comfort=8V)

Set Temp Outside Temp.			Ventilation	Heating		
Comfort	Medium	Eco		Wa	ater	Electrical
°C				ON/OFF	Proportional 0-10V (AO Cal1)	Stage
-5,-6	-7,-8,-9	-9,-10,-11,-12	5	OFF	OFF	OFF
or less	or less	or less				
-3,-4	-4,-5,-6	-5,-6,-7,-8	4	OFF	OFF	OFF
-1,-2	-1,-2,-3	-1,-2,-3,-4	3	OFF	OFF	OFF
0,1	0,1,2	0,1,2,3	VMinPO	CMinPO	CMin0-10PO	CMinPO
2,3	3,4,5	4,5,6,7	3	ON	6V	2
4,5	6,7,8	8,9,10,11	4	ON	8V	3
6,7	9,10,11	12,13,14,15	5	ON	10V	3
or more	or more	or more				

VMinPO: Works at fan speed defined by "Min Speed Door Opened" parameter.

CMinPO: Works at heating defined by "Min Heating Door Opened" parameter.

- Water Heating: 0 = OFF,1=ON
- Electrical Heating Stage: 0=OFF, 1, 2, 3 (3 only for 5 speed air curtains)

CMin0/10PO: Works at heating defined by "Min Proportional Heating Door Opened" parameter.

 Water Heating: 0-10V defines a proportional valve opening from 0 to 100% (0 closed, 10 fully opened)

#### o Door Closed

Works according to Energy Saving Mode:

- ECO: Air curtain stops.
- MEDIUM:

Works at speed defined by VminPT parameter "Min Fan Speed Door Closed" and heating stopped while outside temperature remains lower than Set Temperature, otherwise air curtain will stop itself.

#### COMFORT:

Works always at fan speed defined by VminPT parameter "Min Fan Speed Door Closed" and without heating.

![](_page_42_Picture_0.jpeg)

#### AUTOMATIC FUNCTIONING

**CLEVER** 

#### Programs 3,4

Door Opened: Function Set Temperature / Outside Temperature Door Closed: Function Set Temperature / Room Temperature (2 Sensors: Room Temp., Outside Temp.)

In addition to the Control, it's necessary:

- Control's Room Sensor included or Room Temperature Sensor connected to TS3
- Temperature sensor installed outdoors and connected to TS1
- Door Contact

#### • Door Opened:

Works according to Diferential Set Temp. / Outside Temp. and energy saving mode Eco/Medium/Comfort (example: Set 23 – Room 18= 5, Water proportional in Eco/Medium=6V, Comfort=8V) Program 3 always works in Comfort Mode. Program 4 changes its functioning according to energy saving Eco/Medium/Comfort

Set Temp Outside Temp.			Ventilation		Heating			
Comfort	Medium	Eco		l I	Water	Electrical		
°C				ON/OFF	Proportional 0-10V (AO Cal1)	Stage		
-7,-8	-10,-11,-12	-13,-14,-15,-16	5	OFF	OFF	OFF		
or less	or less	or less						
-5,-6	-7,-8,-9	-9,-10,-11,-12	4	OFF	OFF	OFF		
-3,-4	-4,-5,-6	-5,-6,-7,-8	3	OFF	OFF	OFF		
-1,-2	-1,-2,-3	-1,-2,-3,-4	2	OFF	OFF	OFF		
0,1	0,1,2	0,1,2,3	VMinPO	CMinPO (*)	CMin0/10PO (**)	CMinPO (*)		
2,3	3,4,5	4,5,6,7	2	ON (*)	6V (**)	1 (*)		
4,5	6,7,8	8,9,10,11	3	ON (*)	8V (**)	2 (**)		
6,7	9,10,11	12,13,14,15	4	ON (*)	10V (**)	3 (**)		
8,9	12,13,14	16,17,18,19	5	ON (*)	10V (**)	3 (**)		
or more	or more	or more						

VMinPO: Works at ventilation speed defined by "Min Speed Door Open" parameter.

CMinPO: Works at heating defined by "Min Heating Door Open" parameter.

- Water Heating: 0 = OFF,1=ON
- Electrical Heating Stage: 0=OFF, 1, 2, 3 (3 only for 5 speed air curtains)

CMin0/10PO: Works at heating defined by "Min Proportional Heating Door Open" parameter.

 Water Heating: 0-10V defines a proportional valve opening from 0 to 100% (0 closed, 10 fully opened)

(\*) If Room Temperature exceeds 2 degrees the Set Temperature, heating will stop.

(\*\*) If Room Temperature approaches to Set Temperature, the heating gradually goes down until it exceeds 4 degrees the Set Temperature, and then heating stops.

![](_page_43_Picture_0.jpeg)

![](_page_43_Picture_1.jpeg)

#### $\circ \quad \text{Door Closed}$

It works according to Energy Saving mode:

• ECO: Air curtain stops.

#### • MEDIUM:

It works at:

- o Speed defined by parameter VminPT "Min Ventilation Door Closed"
- Heating defined by parameters CminPT "Min Heating Door Closed" or Cmin0-10PT "Min Proportional Heating Door Closed".

If Room Temperature or Outside Temperature exceed Set Temperature, the air curtain stops itself.

COMFORT:

Ventilation and heating work according to the following table of Diferential Set Temperature and Room Temperature (\*)

(example: Set 23 - Room 18= 5, Water Proportional 8V)

Diferential	Ventilation	Heating				
Set Temp Room Temp.		Aigi	Ja	Elèctrica		
°C		ON/OFF	Proportional 0-10V	Stage		
			(AO Cal1)			
-1,-2 or less	VminPT	OFF	OFF	OFF		
0,1	1	CminPT	Cmin0-10PT	CminPT		
2,3	2	ON	6V	1		
4,5	3	ON	8V	2		
6,7	4	ON	10V	3		
8 or more	5	ON	10V	3		

VMinPT: Works at Fan Speed defined by "Min Speed Door Closed" parameter.

CMinPT: Works at Heating defined by "Min Heating Door Closed" parameter.

- Water Heating: 0 = OFF,1=ON
- Electrical Heating Stage: 0=OFF, 1, 2, 3 (3 only for 5 speed air curtains)
- CMin0/10PT: Works at Heating defined by "Min Proportional Heating Door Closed" parameter
  - Water Heating: 0-10V defines a proportional valve opening from 0 to 100% (0 closed, 10 fully opened)

(\*) If Outside Temperature exceeds Set Temperature, ventilation changes into VminPT and heating stops.

![](_page_44_Picture_0.jpeg)

### **BMS CONTROL**

Clever can be managed externally using:

- Digital/Analogic entrances
- Or by via Modbus RTU

Although you send wrong orders to the equipment, the unit will not allow combinations that can damage the internal components. The internal PCB has instructions to run the unit safety. For example, if you order to electrical heated air curtain go to 3<sup>rd</sup> heating stage and 1<sup>st</sup> ventilation speed, it will allow go to air speed 1 but heating will work at 1<sup>st</sup> stage only (maximum allowed heating stage for first ventilation).

If you stop the ventilation, the heating will also stop except:

- Anti-freezing sensor signal
- Minimum voltage for 0-10V proportional valves (avoid freezing)

The minimum and maximum parameters (door open and door close) will be also respected. For instance, you define that maximum speed when the door is closed should be the 2<sup>nd</sup>. Then if you order the 3<sup>rd</sup> ventilation speed and door closes, it will change from 3<sup>rd</sup> to 2<sup>nd</sup>. If you open again the door it will go to the 3<sup>rd</sup>.

# Digital/Analogic entrances:

Clever has several digital IN and analogic IN to modify the functioning of the unit.

At the wiring diagrams (beginning of this manual) you can see the default functions of each entrance. There are more functions than entrances, so you can select the most appropriate to cover your needs (advanced menu).

All digital IN are NO (Normally Open), but you can change to NC (Normally Closed) at advanced menu. For example, here some default functions for air curtains:

- OFF Unit: Digital IN DIN2 (free voltage, dry contact)
- OFF Heating: Digital IN DIN3 (free voltage, dry contact)
- Temperature SET: Analog IN 0-10V (IN1) 0V 0-0,2V Do not modify the control setting 1V 0,3-1,2V = 19°C 2V 1,3-2,2V = 20°C 3V 2,3-3,2V = 21°C 4V 3,3-4,2V = 22°C 5V 4,3-5,2V = 23°C 6V 5,3-6,2V = 24°C 7V 6,3-7,2V = 25°C 8V 7,3-8,2V = 26°C
   9V 8,3-9,2V = 27°C 10V 9,3-10,2V = 28°C
   Ventilation Speed: Analog IN 0-10V (IN2)
- Ventilation Speed: Analog IN 0-10V (IN2) If 5 speed air curtain, then: 0V 0-0,2V Do not modifies the control setting 4V 2,3-4,2V = Fan Speed 2 8V 6,3-8,2V = Fan Speed 4
   Use time Steere Analog IN 0-10V (IN2) 10V 8,3-2,2V = Fan Speed 1 6V 4,3-6,2V = Fan Speed 3 10V 8,3-10,2V = Fan Speed 5
- Heating Stage: Analog IN 0-10V By default there is no entrance, but you can assign an entrance at advanced menu.

All those orders given by digital/analogic inputs have priority to the programs functioning.

For instance, if the program is running at maximum speed but you send 6V to (IN2), the unit will change to fan speed 3. It doesn't matter if the program conditions would change.

At this solution there is only 1 manager because all orders from BMS goes to the TFT and then to the Clever PCB.

![](_page_45_Picture_0.jpeg)

# Modbus RTU:

Modbus system only allows 1 manager. So we should only send orders to the unit by BMS or TFT Clever (if both together there will be problems).

To avoid communication troubles, you should use two different ports: TFT trough Modbus RTU1 and BMS at Modbus RTU2 (shielded cable 0,5mm<sup>2</sup> x2). See following diagram:

![](_page_45_Figure_5.jpeg)

Using the TFT you can select different baud rate at RTU2 port (by default is 115.200). Do not change baud rate of RTU1. Before starting, be sure that port RTU2 has the same speed as BMS.

If you want to send orders via Modbus you should:

- 1. Lock the TFT to avoid that nobody is sending also orders to the Clever (only 1 manager). You can lock using the same code of TFT or another different (then people won't be able to unlock from TFT as they won't know the code).
- 2. Stop the timer to avoid undesired ON Day/Night or OFF
- 3. Manage the unit:
  - ON/OFF unit
  - Select Energy Saving Mode (Comfort/Medium/Eco)
  - Select the functioning mode:
    - If MANUAL, you can select:
      - Fan speed
      - Heating stages
      - Temperature SET
    - If AUTOMATIC, you only can change the temperature SET

If you want to stop managing the equipment from BMS and activate the Clever TFT to allow the people manage the unit, then you only have to unlock the TFT (and stop giving Modbus orders). If you have locked the controller using a different code than TFT, you have to unlock with the old TFT code (known by people that uses TFT).

![](_page_46_Picture_0.jpeg)

![](_page_46_Picture_1.jpeg)

Following there are all the needed Modbus orders to manage the units.

All changes will not be saved if the power supply stops. To avoid it, after any order you have to save the configuration.

Modbus characteristics: Databits (8), Parity (None), Stop Bits (1), Flow Control (None) Assembled and Send Command in Binary Return data in Hexadecimal (from 0 to 9 is 0001 to 0009, then you need a converter)

Modbus Command		Observations	Digits
Node	хх	Modbus address, ex: 02	2
Function	03 or 04	To read parameters	2
	06	06 To write 1 parameter	
	10	To write multiple parameters or functions with bits	2
Starting Address (Hexa)	XX	First point we read/write	4
Number of points	XX	When reading = quantity of parameters	4
Data xx When writing = paramet		When writing = parameter value	4

Reading					
Node	Function	Starting Address	Number of points	Concept	Answer (Hexadecimal)
01	03	300C	0001	ON/OFF	ON=1, OFF=0
01	03	1016	0001	Fan Speed	0,1,2,3,4,5
01	02	4047	0001	Electrical Heating	Stage 0 (OFF),1,2,3
UI	03	1017		Water Heating ON/OFF	ON=1, OFF=0
01	03	3077	0001	Proportional Water Heating %	0-10000 Hundredth Volts in Decimal converted to Hexadecimal
01	03	300D	0001	Set Point Temperature	Hexadecimal
01	03	1007	0001	Inside Temperature (TFT by default)	Hexadecimal
01	03	1008	0001	Outside Temperature (default)	Hexadecimal
01	03	1009	0001	Discharge Temperature (If TS2 connected)	Hexadecimal
01	03	100A	0001	Inside Temperature (If TS3 connected)	Hexadecimal
01	03	200C	0012	Device Name	Hexadecimal 0000 if default (Unit xx)
01	03	2035	0001	Energy Saving Mode	0=Comfort, 1=Medium, 2=Eco
01	03	2153	0001	Water Heating Type	ON/OFF=0, Proportional=1
01	03	1016	0002	Fan + Heating	See Above
01	03	2000	0002	Product	Air Curtain =1

![](_page_47_Picture_0.jpeg)

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![](_page_47_Picture_1.jpeg)

Reading					
Node	Function	Starting Address	Number of points	Concept	Answer (Hexadecimal)
01	03	2001	0002	Model	1=AC_2S_AIR 2=AC_2S_WAT 3=AC_2S_ELE 4=AC_5S_AIR 5=AC_5S_WAT 6=AC_5S_ELE 7=AC_5S_HPU_2C 8=AC_5S_HPU_1C
01	03	3000	0002	Door State	BIT 3,4 00= Door Closed 01= Closing Door 10= Opening Door 11= Door Open
01	03	3000	0002	Filter State	BIT 21,22 00= Filter Clean 01= Filter Getting Dirty 10= Filter Dirty
01	03	3000	0002	Heating Bloqued (by program)	BIT 16 = 1
01	03	3000	0002	Ventilation Bloqued (by program)	BIT 17 = 1
01	03	3002	0002	Alarm: General	BIT 0 = 1
01	03	3002	0002	Alarm: Overheating	BIT 1 = 1
01	03	3002	0002	Alarm: Autocooling	BIT 2 = 1
01	03	3002	0002	Alarm: Dirty Filter	BIT 3 = 1
01	03	3002	0002	Alarm: TK fan (thermocontact)	BIT 4 = 1
01	03	3002	0002	Alarm: Electrical Heating Blocked	BIT 5 = 1
01	03	3002	0002	Alarm: Insufficient Air Flow	BIT 6 = 1
01	03	3002	0002	Alarm: Fire ON	BIT 7 = 1
01	03	3002	0002	Alarm: Fire OFF	BIT 8 = 1
01	03	3002	0002	Alarm: Temperature Sensor	BIT 9 = 1
01	03	3002	0002	Alarm: Fan RPM	BIT 10 = 1
01	03	3002	0002	Alarm: External Stop	BIT 11 = 1
01	03	3002	0002	Alarm: External	BIT 12 = 1
01	03	3002	0002	Alarm: Anti Freezing	BIT 15 = 1
01	03	3002	0002	Alarm: Heat Pump	BIT 16 = 1
01	03	3002	0002	Alarm: TK fan blocked	BIT 17 = 1
01	03	3002	0002	Alarm: EC fan	BIT 18 = 1

![](_page_48_Picture_0.jpeg)

Writing						
Node	Function	Starting Address	Number of points	Concept	Parameter Value (Hex)	
01	06	0014	0001	Lock TFT Control	0001 to 9999 Locked with code 0001-9999	
01	06	0014	0001	Unlock TFT Control	-0001 to - 9999 Unlocked with code 0001-9999	
01	06	207D	0001	Timer	ON=1, OFF=0	
01	06	300C	0001	ON/OFF	ON=1, OFF=0	
01	06	3015	0001	Fan Speed	0,1,2,3,4,5	
01	06	3016	0001	Heating	Electrical 0,1,2,3 Water ON/OFF 0,1 Water Proportional 0- 10000 Hundredth Volts in Decimal (30% is 3000 so 0BB8)	
01	06	203B	0001	Set Point Temperature	Hundredth of °C in Decimal (22°C is 2200 so 0898)	
01	06	2035	0001	Energy Saving Mode	0=Comfort, 1=Medium, 2=Eco	
01	06	2034	0001	Manual / Automatic	0=Manual, 1=Automatic	
01	06	2153	0001	Water Heating Type	ON/OFF=0, Proportional=1	
01	10	F030	0001	Save Changes (power supply stops)	0	

![](_page_49_Picture_0.jpeg)

![](_page_49_Picture_1.jpeg)

#### CLEVER CONTROL – WALL MOUNTING INSTRUCTIONS

![](_page_49_Figure_3.jpeg)

![](_page_50_Picture_0.jpeg)

#### HOW TO MANUFACTURE THE CABLES

#### Twisted Pair Cable RJ11 between Clever TFT and Clever PCB

The connection between the Clever controller and Clever PCB is made by **4 wires, which conforms a twisted pair cable RJ11.** 

The Modbus communication produces a very reliable connection without information loss even at long distances. Also the controls have RJ11 connectors for an easy quick connection, free of mistakes.

#### STANDARD CABLE

The standard cable served with Clever Kit is 7m length twisted pair, but there are more options available: 20, 50 and 100 meters length. Or any other length by request.

#### HOW TO MAKE A CABLE

If you produce or manipulate by yourself the cable, you must do it according the following drawings:

![](_page_50_Figure_10.jpeg)

If you catch both connectors same position with your hands, the colours of the wires have to be like a mirror.

If you use a different cable the unit won't work properly.

#### **COMMUNICATION PROBLEMS?**

A wrong cable can damage the electronics. If the connector is joined wrong side, you can solve the problem just by turning it.

If you have problems with the communication, you must do a Shielded Twisted Pair cable, following the same and connect the GND to the Clever PCB Earth Point.

Be careful with high density of electromagnetic fields created by closed electrical wiring, transformers, motors or relays, because it might create interferences. If the communication wire goes in

![](_page_50_Figure_17.jpeg)

parallel with power supply wiring, especially when there is a big amount of wiring it may create interferences, even though a shielded twisted pair cable can reduce almost all interferences. If the communication cable and the power supply wiring go at the same cable tray, it is recommended to use special separators to create a physical border between the two wiring types.

![](_page_51_Picture_0.jpeg)

![](_page_51_Picture_1.jpeg)

#### Twisted Pair Cable RJ45 between air curtain and controller

The connection between the air curtain and controller is made by 8 wires, which conforms a Twisted Pair cable RJ45.

The digital communication produces a very reliable connection without information loss even at long distances. Also the controls have RJ45 connectors for an easy quick connection, free of mistakes.

#### STANDARD CABLE

The standard cable for commercial air curtains range is 7m length and 10m for industrial air curtains range. Also there are available the following length: 20 and 50 meters, or any other length by request.

#### HOW TO MAKE A CABLE

If you produce or manipulate by yourself the cable, you must verify according the following drawing:

![](_page_51_Figure_9.jpeg)

If you catch both connectors same position with your hands, the colours of the wires have to be like a mirror.

If you use a different cable the unit won't work properly.

#### COMMUNICATION PROBLEMS?

A wrong cable can damage the electronics. If the connector is joined wrong side, you can solve the problem just by turning it.

If the problems persists, you must make a new Shielded Twisted Pair Cable, following the same instructions. But this time, connect the Shielded to the Earth Point into the air curtain connections box.

![](_page_51_Figure_15.jpeg)

Be careful with the electromagnetic fields created by closed electrical wiring, transformers, motors or relays, because it might create interferences.

If the communication cable goes in parallel with power supply wiring, especially when there is a big amount of wiring it may create interferences. If the communication cable and the power supply wiring go at the same cable tray, it is recommended to use special separators to create a physical border between the two wiring types.

![](_page_52_Picture_0.jpeg)

![](_page_52_Picture_1.jpeg)

#### TROUBLESHOOTING

#### **CLEVER – Communication Issues**

List of the most common troubles and solutions:

- 1. Cut and connect again the power supply? To see if it works again.
- 2. Search unit again? Basic Menu – Configuration – Scan.
- 3. Connections? To check if any mistake.

![](_page_52_Figure_8.jpeg)

(\*) If there are communication issues (interferences), use shielded cable connected to GND

#### 4. RJ11 cable is original?

Clever Kit comes with 7m cable.

If longer (and not ordered special) it's made by installer, then check pins and twisted pair. To be sure use shielded cable and connect it to the GND.

Many times, the cable is also manipulated to pass the cable thought pipes, then again check it.

#### 5. Interferences: RJ11 cable closer to power cables?

Power cables create interferences to the Modbus communication. Test spare twisted cable RJ11 from Clever TFT directly to the Clever PCB. To solve it, separate the cables from power and use RJ11 twisted pair and shielded connected to GND.

#### 6. Modbus cable polarity?

Do not mix + and -, it won't work. Check all line from the beginning till the end.

![](_page_53_Picture_0.jpeg)

![](_page_53_Picture_1.jpeg)

#### 7. RTU1 port of Clever TFT?

RTU1 is dedicated exclusively Modbus port of Clever TFT to the first Clever PCB and between other Clever PCBs.

All other connections (BMS, PLC, PC) will create communication errors.

![](_page_53_Figure_5.jpeg)

#### 8. BMS Modbus at RTU2?

RTU2 is dedicated exclusively to communicate to BMS, PLC, PC systems. If you mix RTU1 and RTU2 you will have communication errors.

BMS Modbus by default is 115200, if doesn't work please check BMS has the same speed. If not change it at Basic Menu – Configuration.

**9. End line resistances?** (switch and jumpers act as resistances) Clever TFT should have always 3 switches in ON.

Clever Modbus RTU1 requires the jumper **CN6** at the last Clever PCB of the line. If only 1 unit already done by default. If Clever TFT is in the middle of the line, then you need jumpers at the beginning and at the end.

If more than one PCB, then it should be done and checked by installer. BMS Modbus RTU2 requires the same but using Jumper **CN5**.

![](_page_53_Picture_12.jpeg)

![](_page_54_Picture_0.jpeg)

#### End line resistances -RTU1 - 1 PCB (CLEVER CONTROL AT THE BEGINNING OF THE LINE)

![](_page_54_Figure_3.jpeg)

End line resistances –RTU1 – MULTIPLE PCB (CLEVER CONTROL AT THE BEGINNING OF THE LINE)

![](_page_54_Figure_5.jpeg)

![](_page_55_Picture_0.jpeg)

![](_page_55_Picture_1.jpeg)

#### 10. Only 1 Clever TFT at RTU1?

Each group of PCBs connected by RTU1 can have maximum 1 Clever TFT.

#### 11. Replace Clever TFT?

All TFTs and PCBs should have same firmware version. If replace Clever TFT you should scan devices and sensors at Basic Menu – Configuration.

#### 12. Red LED Clever PCB is OFF?

If 24V at "OUT 24V 1A" then replace PCB. If 0V at "OUT 24V 1A" check power supply and transformer.

#### 13. Repeated Modbus address?

All devices should have different number. Never use address 0. If change number, scan again (Basic Menu – Configuration).

#### 14. Modbus address over 12?

By default Clever only search from 1 to 12. If over go to Basic Menu – Configuration and modify this search.

#### 15. RTU1 Baud rate?

Firmware below 5.13: Baud rate of RTU1 at 115200.

#### 16. BMS, PLC, PC Baud rate?

At Basic Menu - Configuration you can change Baud rate for BMS, PLC, PC.

![](_page_56_Picture_0.jpeg)

# CLEVER – Other Issues

CLEVER CONTROL					
ERROR	CHECK	CAUSE / CONSEQUENCE			
	Red LED inside Clever PCB OFF	Check 24V power supply at terminal block "OUT 24V 1A" inside Clever PCB			
IFI lights are OFF	Red LED inside Clever PCB ON	Check RJ11 cable (faulty or made on site wrongly) according to instructions			
Air curtain starts alone or does nothing or wrong order of ventilation speeds	RJ45 cable from the Clever is connected to AUX instead of CONTROL RJ45 cable is faulty or made on site wrongly. Then please check instructions how to do it properly				
Temperature unstable	Use and connect shielded cable to GND of the Clever PCB according to Clever manual to avoid interferences				
Temperature difference	Calibrate temperature sensors at: Basic Menu	- Parameters - Temperature – Calibration			
Control inside cabinet	If Clever is inside a room with different temperature that air curtain, use an external extra room temperature				
TFT buttons don't work	Remove and reconnect power supply	You can remove the RJ11 of the controller or cut Clever power supply			
	Manual or Automatic	Manual: user can modify ventilation, heating and temperature (depending on program) Automatic: user can only change temperature (no fan, no heating)			
	Door Contact	When door contact is not installed, then it works always like open door			
Configuration Main questions during installation	Programs and Temperature Sensors	Programs are available depending on installed temperature sensors - By default Clever is configured at Auto P3 Comfort to work with: - Room temperature sensor of Clever TFT - Outside external temperature sensor If outside temperature sensor is not installed, then it will change automatically to basic program Auto P1 and give temperature sensor error message You can connect the required sensor or go to Basic Menu - Configuration - Search temperature sensors and validate to update them - If no temperature sensors, then Manual P1 Comfort by default (on option P2) - If only room temperature sensor, then Auto P1 by default (on option Manual P1,P2) An extra room temperature connected to TS3 has priority against Clever TFT, but can be modified at Advanced Menu - IN/OUT At some programs information not needed/used is not displayed			

![](_page_57_Picture_0.jpeg)

![](_page_57_Picture_1.jpeg)

CLEVER CONTROL					
ERROR	CHECK	CAUSE / CONSEQUENCE			
	lcons	"EXT" means something external is modifying the functioning using analogical or digital IN Crossed heating sign: by default if outdoor temperature is over 21°C, heating is disabled To disconnect, go to Basic Menu - Parameters - Disable - Heat due to ext temp = NO			
Configuration Main questions during installation	Ventilation speed and heating stage	Ventilation/heating with door open/closed can be limited at Basic Menu - Parameters (by default are not limited) 3rd heating stage only with 4th and 5th ventilation speed / 2nd heating stage only with 2nd/3rd/4th/5th ventilation speed / 1st heating stage, all speeds			
	Energy saving mode	When the air curtain reach the Set temperature, the functioning changes depending on energy saving mode. In some programs at Eco mode the air curtain stops but in Medium mode stops only the heating			
	External connections	Check that connections are the right ones according to set functions Example: at heat pump units, the mode should be connected to DOUT3, but at many installations it's connected at DOUT2 (second relay)			
Filter alarm	Filter alarm ask you to clean the filter. When cleaned say YES to restart counter By default, hour counter is set at 300 hours but can be modified at Basic Menu - Filter hours If you say YES and alarm persist, update firmware to version 6 or higher If you can't update firmware, do the following steps: 1- TFT Advanced Menu: Factory reset values 2- Immediately make a reset by pressing the button of the PCB 3- Change hours filter at 0 Old versions has an error and can't work with hours filtre				
BMS only have Modbus RTU	Use gateway to convert to other protocols: Scada, KNX, Bagnet, etc.				