Electronic Climate System

HDL Climate
V02.55.508
FUNCTIONAL SPECIFICATION

1. HDL Climate Controller

The Half DIN Dimension Line (HDL) climate controller has been designed and developed for the control of the temperature inside the vehicle.

It controls the cooling and heating systems in accordance with the selected temperature and the internal temperature.

Also HDL controls the ventilation system and the AC compressor.

The control unit use an internal (in car) temperature sensor and an external temperature sensor.

Another sensor is also used for measuring the evaporator (anti icing) temperature.

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On the display is visualized the selected temperature (set-point temperature).

The temperature values are displayed in Celsius degrees (°C).

2. Set point temperature

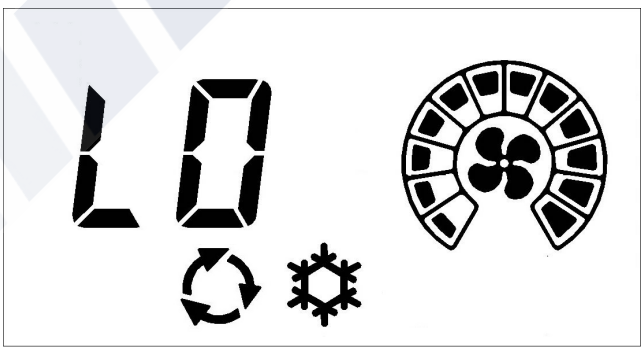
The set point temperature (or selected temperature) represents the value of the desired temperature inside of the vehicle.

This value can be changed pressing the  push buttons from 16°C to 28°C (step 1°C) and also it is possible to select the **LO** mode (maximum cold) and the **HI** mode (maximum heat).

When is select the **LO** mode the control init realize the following functions:

- AC compressor enable
- Maximum blower speed
- Water valve fully close
- Recirculation air

On display appear:



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When is select the **HI** mode the control init realize the following functions:

- AC compressor disable
- Maximum blower speed
- Water valve fully open
- Fresh air

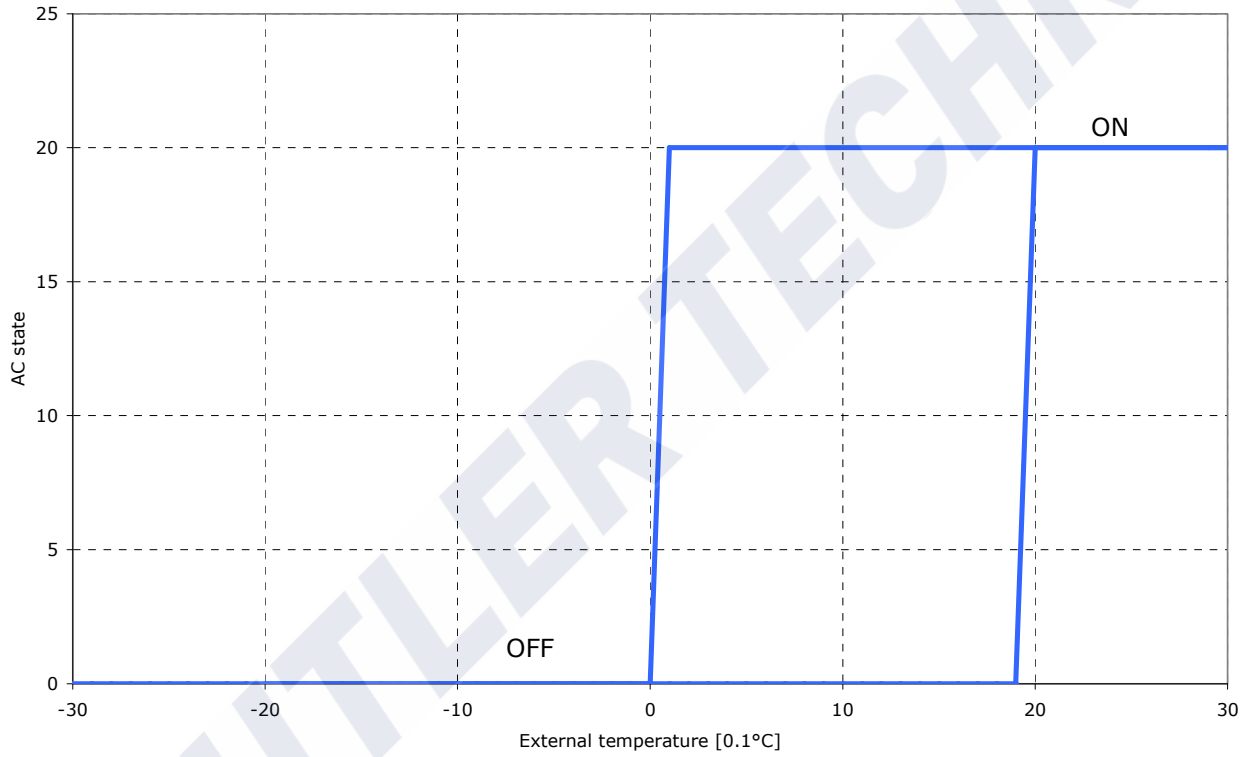
On display appear:

3. AC compressor control

The HDL manages one relay output for the AC compressor.

In automatic mode (symbol **AUTO** on) the AC compressor is always enable (❄ symbol on).

The status of the AC relay output depend of the external temperature value and the evaporator temperature value.



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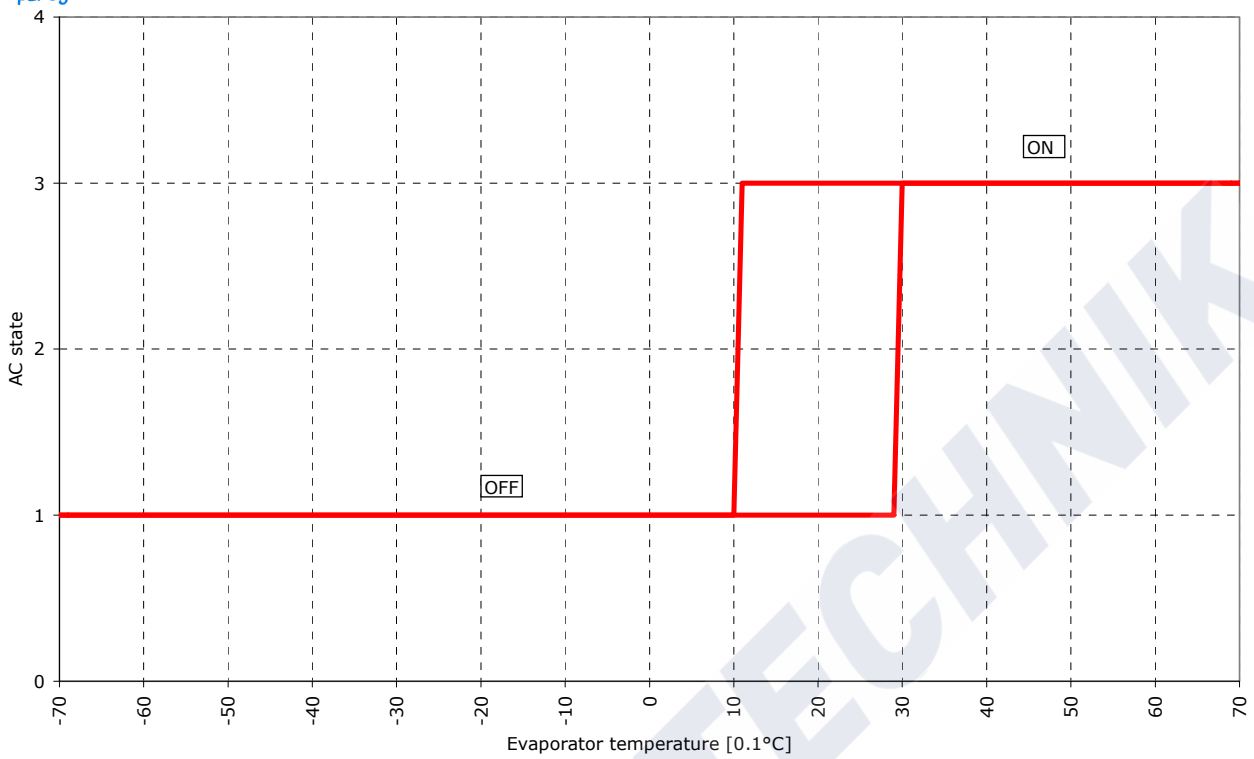

The user can modify manually the AC output by pressing the 

push button.

The symbol **AUTO** is switched off (semi automatic mode).

When the AC output is enable the  symbol is switch on, while the AC output is disable the  symbol is switch off.

4. Recirculation actuator control

The HDL manages an actuator that realize the recirculation function.

The user can modify manually the state if the recirculation actuator by pressing the  push button.

The symbol **AUTO** is switched off (semi automatic mode).

When the actuator is in recirculation air position the  symbol is switch on, while the actuator is in fresh air position the  symbol is switch off.

5. Blower speed control

The HDL manages an outputs for the blower speed controller.

In automatic mode (symbol **AUTO** on) the blower speed is select in according with the selected temperature, the internal temperature and the external temperature.

The user can modify manually the blower speed by pressing the  push buttons.

The symbol **AUTO** is switched off (semi automatic mode).

The selected blower speed is shown by the bar number lit:

from  1st speed to  12th speed

When the user manually selects a null blower speed, the AC compressor is switched off and the control unit goes into OFF mode.

6. Internal temperature sensor

In case of malfunction of the internal temperature sensor, the HDL displays the error code and enters in the manual mode.

In case of anomaly of this sensor, an error code appears instead of the selected temperature value:

E3 when the internal temperature sensor is open

E4 when the internal temperature sensor is short circuited.

7. External temperature sensor

In case of malfunction of the external temperature sensor, the HDL displays the error code and enters in the manual mode.

In case of anomaly of this sensor, an error code appears instead of the selected temperature value:

E1 when the external temperature sensor is open

E2 when the external temperature sensor is short circuited.

8. Evaporator temperature sensor

The HDL uses an evaporator temperature sensor.

The  symbol is blinking when the AC compressor is enable and there is a fault of the evaporator temperature sensor.

9. Operating mode

The HCC works in the following operating modes:

- Automatic mode
- Defrost mode
- Manual mode
- Off mode
- Pre-heating function
- Diagnostic mode
- Programming mode

9.1 Automatic mode

This represents the normal operating mode.

The functions associated at the push buttons are the following:

goes in fully automatic mode

increments the selected temperature value of 1°C

decrements the selected temperature value of 1°C

decrements the blower speed value

increments the blower speed value

changes the state of the recirculation actuator

changes the AC status (enable / disable)

goes in defrost mode (pressing for less than 1 second) or display the external temperature value (pressing for more than 1 second)

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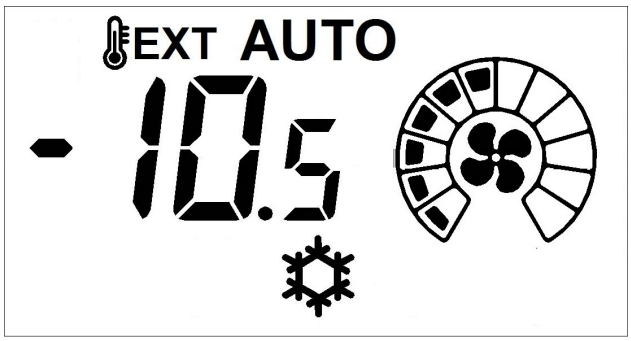
In automatic mode it is possible display the external temperature value by pressing for more than 1 second the  push button.



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9.2 Defrost mode

When the  push button is pressed for less than 1 second the is activated the defrost mode realizing the following functions:

- AC compressor enable (independent of the external temperature value)
- Maximum blower speed
- Water valve fully open
- Fresh air

On display appear:

The exit from the defrost mode can be as follows:

- Automatically after a predetermined interval time (60 seconds).
  The previous functions are restored.

- Pressing the 

push button.
  The control unit goes in fully automatic mode.

If the control unit is switched off during the defrost mode, at the next switched on the defrost mode is reset.

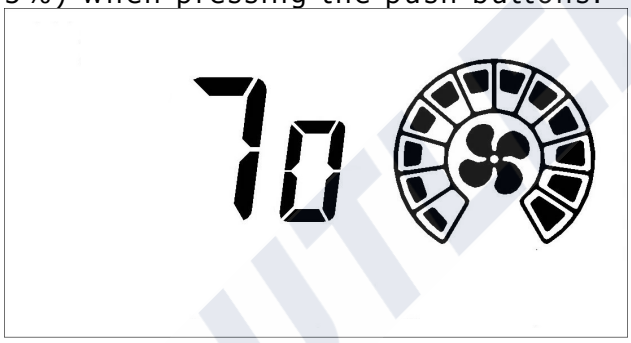
9.3 Manual mode

When the internal or external temperature sensor is wrong (open circuit or short circuited), on the display appears an error code (**E1** to **E4**) and the control unit operates in manual mode.

The symbol **AUTO** is switched off.

The position of the water valve is controlled directly by pressing the  push buttons.

On display appears the percentage opening rate of the water valve (step 5%) when pressing the push buttons.



9.4 OFF mode

By pressing the  push button when the blower speed is null, the control unit goes in off mode.

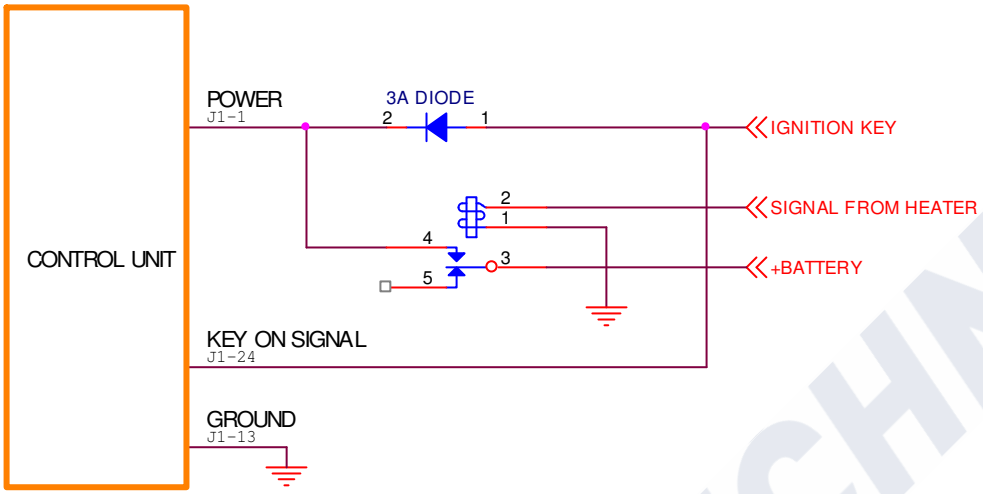
All the functions are disable and on the display no symbols appears.

For return at the normally operating mode it is sufficient press the 

or  push buttons.

In off mode it is possible display the external temperature value by pressing for more than 1 second the  push button.

9.5 Pre-heating function



When the heater is activated (high voltage) the control unit is powered on and the key on signal is low.

The control unit recognizes that heater is on and force the following conditions:

- water valve fully opened
- set a predefined blower speed (2nd speed)
- AC compressor off
- external air
- display

- None push button are enable.

In the case of simultaneous key on and heater on, the ignition key function is priority and the unit control the water valve position and the blower speed in according with the previously operating mode.

9.6 Diagnostic mode

The diagnostic mode is activated by pressing the 

push button during the first 2 seconds of the control unit power on.

On the display appear some information relative at the version of the control unit (for example Hd, 03, etc) and then the evaporator temperature value is displayed.

In case of anomaly of this sensor, an error code appears instead of the selected temperature value:

E7 when the evaporator temperature sensor is open

E8 when the evaporator temperature sensor is short circuited.

The symbol **AUTO** is switched off.

9.6.1 Water valve control

The position of the water valve is controlled directly by pressing the 
push buttons.

On display appears the percentage opening rate of the water valve (step 5%) when pressing the push buttons.

9.6.2 AC output control

By pressing the 

push button the status of the AC output will change (enable / disable).

The status of the AC relay output depend of the external temperature value and the evaporator temperature value.

On the display is lit the symbol  when the output is enabled.

9.6.3 Recirculation actuator control

By pressing the  push button it is possible modify the state if the recirculation actuator.

When the actuator is in recirculation air position the  symbol is switch on, while the actuator is in fresh air position the  symbol is switch off

9.6.4 Blower speed control

By pressing the  push buttons the status of the blower outputs will change.

The selected blower speed is shown by the bar number lit.

When the user manually selects a null blower speed, the AC compressor is deactivated.

9.6.5 Internal air temperature sensor control

By pressing the  push button for less than 1 second, the internal temperature sensor value is display for about 6 seconds.

The value displayed is blinking to highlight that you are viewing the internal temperature.

In case of malfunction of this sensor, an error code will be visualized instead of the temperature value:

E3 when the internal temperature sensor is open

E4 when the internal temperature sensor is short circuited.

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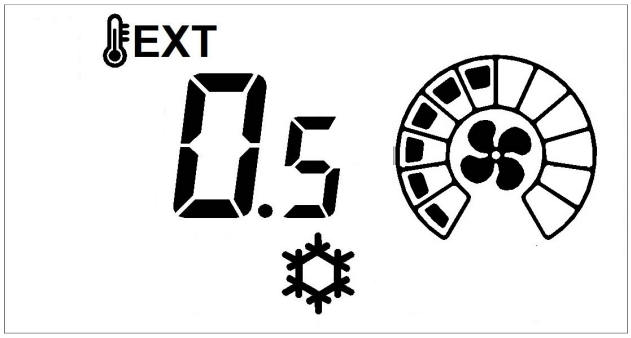
9.6.6 External air temperature sensor control

By pressing the  push button for more than 1 second, the external temperature sensor value is display for about 6 seconds.



The symbol  is on and the value displayed is not blinking to highlight that you are viewing the external temperature.

In case of anomaly of this sensor, an error code appears instead of the selected temperature value:

E1 when the external temperature sensor is open

E2 when the external temperature sensor is short circuited.

9.6.7 Diagnostic mode exit

To exit from diagnostic mode press the 

push buttons.

9.7 Programming mode

They are two programming parameters. In the first you enter by pressing, while in the second you enter by pressing

They are two modes of the parameters programming.

In the first (programming mode named **HL)** it is possible to enter by pressing the  push buttons, while in the second (programming mode named **HA)** it is possible to enter by pressing the  push buttons.

By pressing contemporaneously the push buttons  and  during the first 2 seconds of the control unit power on, the HDL enters in the parameter programming mode.

On the display appears the message " **Pr**", **"HL"** for about 2 seconds and successively **00** with the symbol  lit.

By pressing contemporaneously the push buttons  and  during the first 2 seconds of the control unit power on, the HDL enters in the parameter programming mode.

On the display appears the message " **Pr**", **"HA"** for about 2 seconds and successively **00** with the symbol  lit.

In this operating mode is possible to modify and memorize the programmable parameter values.

By repressing contemporaneously the same push buttons the control unit goes out from the programming mode.

It is advisable to switch off and switch on again the control unit after have modified the parameters, because the modification for some of these are acquired by the power on.

The values displayed are in hexadecimal format.

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The functions associated at the push buttons (for both programming mode) are the following:

push button

Memorize the set value by associating this at the selected parameter.

For confirming that the memorizing has happened, the symbol AUTO will lit for a few seconds.

push button

Changes the visualized data (parameter identifier or parameter value).

The symbol is lit when the parameter identifier is visualized, while

when the parameter value is visualized the symbol is lit.


push button

The visualized datum increases by 1 (parameter identifier or parameter value).


push button

The visualized datum decreases by 1 (parameter identifier or parameter value).


push button

Store the default value.

For confirming that the memorizing has happened, the symbol EXT will lit for a few seconds.

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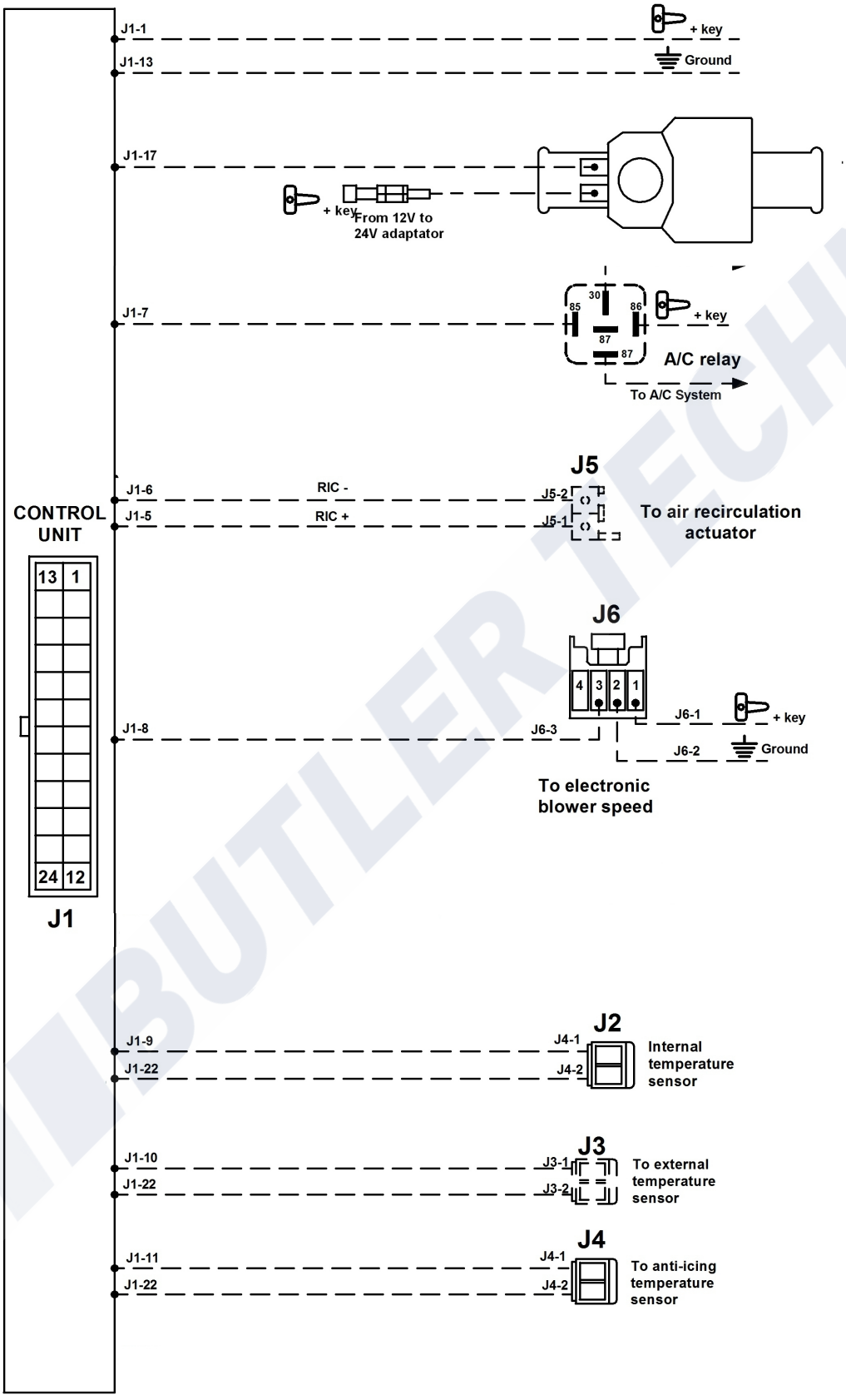
10.Electric diagram



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