

**HDL<sup>®</sup>**

**Air-Condition controller  
HDL-MAC01.431**



## Description

The HDL-MAC01.431 is designed to control centralized HVAC systems. Capable of accepting environmental temperature input data, the module can optimize fan speed, mode, and temperature settings. The module can be used in a master-slave mode, so that a single panel can control several HVAC modules.

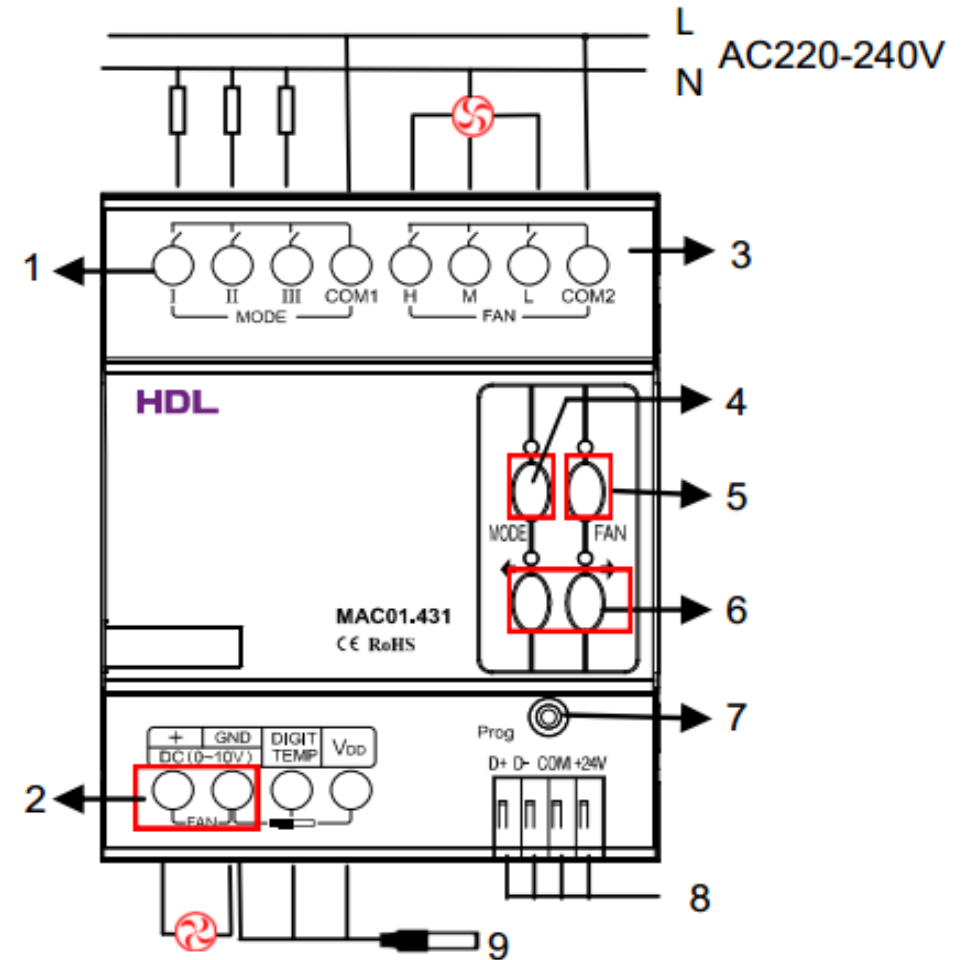


## Main functions

- ◆ It has three relays to control modes ( cooling, heating and dehumidification)
- ◆ Three relays to control fan speed ( low, medium and high)
- ◆ Built-in controlling algorithm which can control the air-conditioner smartly.
- ◆ Can be connected up to 4 PCS of DS18B20( Digital Temperature Sensor, supplied by HDL)
- ◆ One master module can control about 8 slave modules.
- ◆ Support online upgrading
- ◆ Support DC 0-10V fan speed control.

# Wiring

1. Relays I, II and III are used to control air conditioner work mode.
2. Additional fan control via a DC0-10V output
3. Fan motor connection
4. Mode button
5. Fan speed button
6. Previous/next button
7. LED indicator button
8. HDL Buspro interface
9. Temperature sensor input



HDL-MAC01.431 Features

# Basic Information Page

The main tab for setting main configurations

The screenshot displays the 'Basic information' tab of the HVAC control software. The interface is organized into several sections:

- Air-condition delay:**
  - Fan startup protect delay: 1 (S)
  - Fan switch off delay: 1 (S)
  - Compressor startup delay:  Minute  Second, 3 (S)
  - Compressor switch off delay: 1 (S)
  - Compressor startup protect delay: 3 (S)
- VAV fan voltage setting:**
  - High: 9 (V)
  - Medium: 5 (V)
  - Low: 1 (V)
  - Auto wind: 3 steps (V)
- Relay test:**
  - Mode of test relay enable
  - Mode: Mode I, Mode II, Mode III (each with a power button icon)
  - FAN speed: High, Medium, Low (each with a power button icon)
- Test and control:**
  - AC No.: 1
  - Temperature type: C
  - Current temperature: 25 C
  - AC Power: OFF
  - Cooling: 24C
  - Heating: 26C
  - Auto: 23C
  - Dry: 23C
  - Fan speed: Medium
  - Mode: Cooling
  - Buttons: Read, Save
- DS18B20 status:**
  - Button: Read

At the bottom of the window, there are three buttons: a refresh icon, a save icon, and a 'Save & Close' button. The status bar at the very bottom shows 'Current device: | 42-6\HVAC'.

## Basic Information Page

### ✓ VAV fan voltage output settings

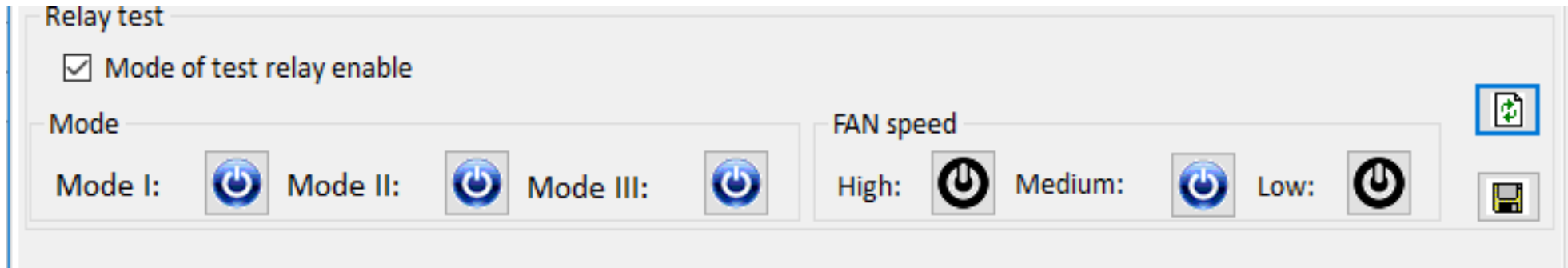
If the fan of FCU is controlled by DC 0-10V, then connected the fan to the DC 0-10V port of HVAC module, and set the fan speed controlling voltage in 'VAV Fan voltage Setting'. (the voltage of fan speed, you can refer to the manual of FCU)

VAV fan valtage setting			
High:	9	▼	(V)
Medium:	5	▼	(V)
Low:	2	▼	(V)
Auto wind:	3 steps	▼	(V)

# Basic Information Page

## ✓ Test settings:

The wiring test ensures that every relay has been wired correctly and that the system can operate safely, so before programming the end-user panel, the relay wiring can be tested here.





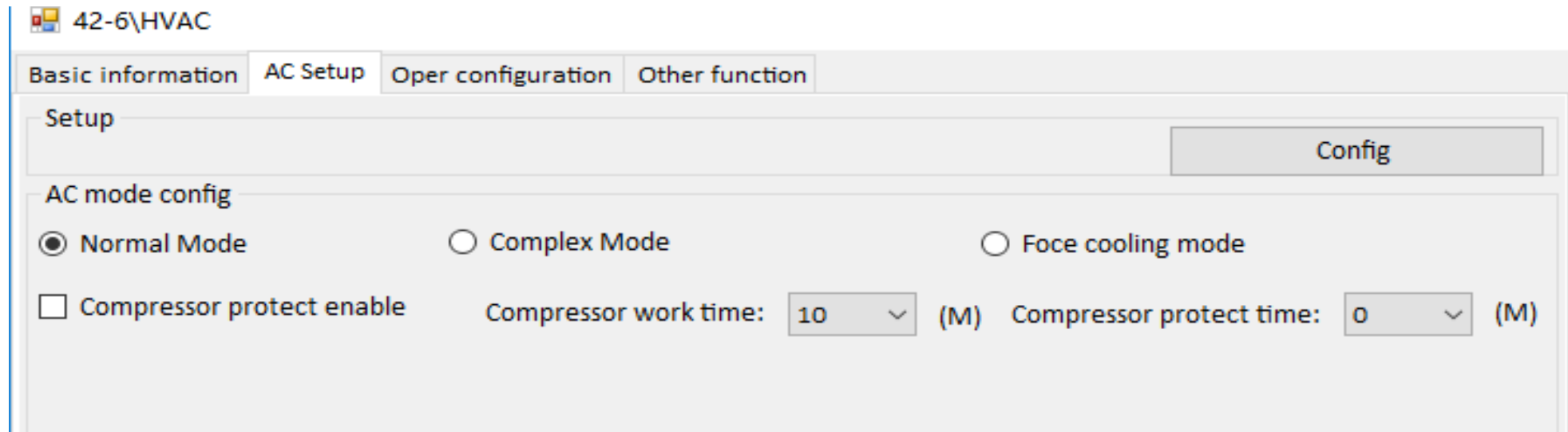
## AC Setup Page

### ✓ AC model settings:

There three different modes for the AC model settings regarding the wiring diagram

a) Normal mode:

the wiring should be like this: relay1=cooling; relay2=heating; relay3=humidity.



The screenshot shows a software interface for configuring an AC unit. The window title is "42-6\HVAC". There are four tabs: "Basic information", "AC Setup" (which is selected), "Oper configuration", and "Other function". Below the tabs is a "Setup" section with a "Config" button. Underneath is the "AC mode config" section, which includes three radio buttons: "Normal Mode" (selected), "Complex Mode", and "Face cooling mode". There is also a checkbox for "Compressor protect enable" which is unchecked. Below these are two dropdown menus: "Compressor work time" set to "10" (M) and "Compressor protect time" set to "0" (M).

# AC Setup page

✓ **AC model settings:**

b) Example for complex mode: cooling=relay1 on; heating=relay1 & relay2 on.

Attention: Enable simple mode means disable this function

The screenshot shows the 'AC Setup' page in the HDL software. It features several configuration tabs: 'Basic information', 'AC Setup', 'Oper configuration', and 'Other function'. The 'AC Setup' tab is active, showing 'Normal Mode', 'Complex Mode' (selected), and 'Face cooling mode' options. Below these are settings for 'Compressor protect enable', 'Compressor work time' (10 M), and 'Compressor protect time' (0 M). The 'Mode type and restore' section includes dropdowns for Mode I, II, and III types (all set to HVAC) and their restore settings (all set to 'Not Restore').

The 'HVAC setting' table is as follows:

	MODE I switch	MODE I delay(S)	MODE II switch	MODE II delay(S)	MODE III switch	MODE III delay(S)
Cooling	ON	0.0	OFF	0.0	OFF	0.0
Heating	ON	0.0	ON	0.0	OFF	0.0
Dehumidfy	OFF	0.0	OFF	0.0	OFF	0.0
FAN	OFF	0.0	OFF	0.0	OFF	0.0
Close	OFF	0.0	OFF	0.0	OFF	0.0

On the right side, the 'Test and control' panel shows 'AC No.: 1', 'Temperature type: C', 'Current temperature: 25 C', 'AC Power: ON', and sliders for 'Cooling', 'Heating', 'Auto', and 'Dry'. It also includes a 'Fan speed' dropdown set to 'Medium', a 'Mode' dropdown set to 'Cooling', and 'Read' and 'Save' buttons. At the bottom, there is a 'DS18B20' sensor section with a 'Read' button.

## AC Setup page

### ✓ AC model settings:

c) Force cooling mode:

the wiring should be like this: Mode I =Normal cooling; Mode II =Force cooling channel; Mode III=Normal relay.

Tip: when it is more than 2degree difference between setpoint and current temp, would open the force cooling channel.

42-6\HVAC

The screenshot shows a software interface for configuring an HVAC system. The title bar indicates the device is '42-6\HVAC'. The interface has four tabs: 'Basic information', 'AC Setup' (which is selected), 'Oper configuration', and 'Other function'. Below the tabs, there is a 'Setup' section with a 'Config' button. Underneath, the 'AC mode config' section contains three radio buttons: 'Normal Mode', 'Complex Mode', and 'Face cooling mode' (which is selected). Below the radio buttons, there is a checkbox for 'Compressor protect enable' which is unchecked. To the right of the checkbox, there are two dropdown menus: 'Compressor work time' set to '10 (M)' and 'Compressor protect time' set to '0 (M)'.

# Operation configuration page

## ✓ Operation way:

There are two different operation ways.

a) Fully control: the module has ability to control itself, and can be controlled directly from iLife app. the time for compressor, you can refer to the manual of FCU.

42-6\HVAC

Basic information AC Setup Oper configuration Other function

Please check the temperature sensor mode

Oper type: Slave Control Temperature type: C Current temperature: 25C

Temperature adjust: < 0 >

Refer to inside sensor(DS18B20,maxcount:4)  Refer to bus sensor

<input type="checkbox"/> Sensor 1 No.:	<input type="text" value="1"/>	<input type="checkbox"/> Sensor 2 No.:	<input type="text" value="2"/>
<input type="checkbox"/> Sensor 3 No.:	<input type="text" value="3"/>	<input type="checkbox"/> Sensor 4 No.:	<input type="text" value="4"/>

# Operation configuration page

The temperature can refer to inside sensor or bus sensor, you can select from the it.

## 1. Refer to inside sensor

Refer to inside sensor(DS18B20,maxcount:4)
  Refer to bus sensor

Sensor 1 No.: 
 Sensor 2 No.:

Sensor 3 No.: 
 Sensor 4 No.:

**Fill in the sensor number**

## 2. Refer to bus sensor

Read temperature interval:  s (S)

Temperature sensor1
  Temperature sensor2
  Temperature sensor3
  Temperature sensor4

Subnet ID	Device ID	Channel
<input type="text" value="1"/>	<input type="text" value="5"/>	<input type="text" value="1"/>
<input type="text" value="255"/>	<input type="text" value="255"/>	<input type="text" value="1"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="1"/>
<input type="text"/>	<input type="text"/>	<input type="text" value="1"/>

**Fill in the Subnet ID, Device ID and channel number.**

# Operation configuration page

✓ **Operation way:**

b) Slave control: the module can only be controlled via a DLP, other device (e.g. iLife) can only control HVAC through the DLP.

42-6\HVAC

Basic information AC Setup Oper configuration Other function

Please check the temperature sensor mode

Oper type: **Slave Control** ✓ Temperature type: C Current temperature: 25C

Temperature adjust: < 0 >

Refer to inside sensor(DS18B20,maxcount:4)  Refer to bus sensor

Sensor 1 No.: 12  Sensor 2 No.: 2

Sensor 3 No.: 3  Sensor 4 No.: 4

## Other function page

### ✓ Host settings

one master HVAC module can control up to 8 slave HVAC modules synchronously.

e.g. below screen shot control the slave HVAC (42-19) synchronously.

42-6\HVAC

Basic information AC Setup Oper configuration **Other function**

Host function

Host enable

The properties of each slave in host mode

Slave No.:	1	Status:	<input checked="" type="checkbox"/> Enable
Subnet ID:	42	Device ID:	19

Check the box to enable host function

Fill in the information of the slave module

# Application 1

- ✓ HVAC in Slave control mode, DLP in Fully control mode.

HVAC setting:

42-6\HVAC

Basic information AC Setup Oper configuration Other function

Please check the temperature sensor mode

Oper type: **Slave Control** Temperature type: C Current temperature: 25C

Temperature adjust: < 0 >

Refer to inside sensor(DS18B20,maxcount:4)  Refer to bus sensor

Sensor 1 No.:  Sensor 2 No.:

Sensor 3 No.:   Sensor 4 No.:

**Select Slave Control**



# Application 1

- ✓ HVAC in Slave control mode, DLP in Fully control mode.

DLP AC page setting:

The screenshot displays the 'AC' configuration page in a software interface. The 'Basic information of AC' section is highlighted with a red box and contains the following settings:

- Enable
- Status when power on: Last status
- Subnet ID: 42
- HVAC No.: 1
- Device ID: 6
- Type: New
- Adjust: 0

Below this section, the 'Test' area shows various controls for the AC unit, including ON/OFF (checked ON), Fan speed (High), Mode (Cooling), and temperature settings (Cooling: 20C, Heating: 26C, Auto: 26C, Now: 32C, Cooling, High, Dry: 23C). A red box highlights the 'Control AC running' checkbox in the 'Slave & sync' section, with an arrow pointing to it from the text 'Check this option'.

Enable AC function, fill in the ID of HVAC, select the type of AC.  
If HVAC has two control modes, it would be old type;  
If it has three control modes, it would be new type.

# Application 2

- ✓ HVAC in Fully control mode, DLP in Slave control mode.

HVAC setting:

42-6\HVAC

Basic information AC Setup Oper configuration Other function

Please check the temperature sensor mode

Oper type: **Fully Control** **Select full control** C Current temperature: 25C

Temperature adjust: < [ ] > 0

Refer to inside sensor(DS18B20,maxcount:4)  Refer to bus sensor

<input checked="" type="checkbox"/> Sensor 1 No.:	<input type="text" value="12"/>	<input type="checkbox"/> Sensor 2 No.:	<input type="text" value="2"/>
<input type="checkbox"/> Sensor 3 No.:	<input type="text" value="3"/>	<input type="checkbox"/> Sensor 4 No.:	<input type="text" value="4"/>

# Application 2

- ✓ HVAC in Fully control mode, DLP in Slave control mode.

DLP AC page setting:

The screenshot shows the 'AC' configuration page in a software interface. The 'Basic information of AC' section is highlighted with a red box and contains the following fields:

- Enable
- Status when power on: Last status
- Subnet ID: 42
- HVAC No.: 1
- Device ID: 6
- Type: New
- Adjust: 0

Annotations in red text provide instructions:

- Enable AC function, fill in the ID of HVAC, select the type of AC.
- If HVAC has two control modes, it would be old type; If it has three control modes, it would be new type.
- Uncheck this function (pointing to the 'Control AC running' checkbox).

The 'Slave & sync' section on the right contains the following options:

- Control AC running
- Enable/disable IR
- Send IR code when power ON
- IR automatic control

The 'Test' section at the bottom shows various controls for the AC, including ON/OFF (checked ON), Fan speed (Auto), Mode (Cooling), and temperature settings (Cooling: 24C, Dry: 23C).

PS: more information, please refer to the user manuals of HVAC and DLP.

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