ALTEC®

Humidity Controller

TH136

INSTRUCTION MANUAL

Contents

Specifications

Accuracy	±3% RH
Sample Rate	125ms
Input	HM1500 Humidity Sensor
Resolution	0.1% RH
Range	0.0~99.9% RH
Outputs	Relay, NO., max.250VAC, 3A Logic, 20V/10mA, drive SSR Triac, drive SCR Analog, 0~10mA, 4~20mA, 0~20mA, 0~5V, 1~5V, 0~10V
Alarms	Relay, NO., max.250VAC, 3A Upper and lower limit alarm, deviation alarm
Control Algorithm	ON/OFF PID with PID Auto-Tune
Communications	RS-485, RS-232
Power Supply	85~264VAC, 45/60Hz
Environmental	Temp: 0~50°C, Rel. Humidity: ⩽100%
Dimensions	96mm×96mm×100mm(W×H×D) 72mm×72mm×100mm(W×H×D)

1 Introduction

The TH136 humidity controller using the HM1500 humidity sensor(Range: 0~100% RH, long lifetime) to measure the humidity directly.

The controller has high control precision and friendly interface (easy to operate), the wiring is simple to configure too. With the humidifier and dehumidifier equipments, TH135 can be used to form a closed-loop humidity control system.

Idea for ventilation systems in grain stores, environmental protection, pharmaceuticals, paper making, food processing, incubation, etc.

2 Coding

TH136□/□/□/□/□/□

Optional

Option	Transmission of Measurement Value

COMMS

0	None
232	RS232(3 wires), optical isolation, distance: 12m
485	RS485(2 wires), optical isolation, distance: 1.2Km

Alarm 1

0	None
R	Relay, NO., 3A/250VAC

Output 1 / Output 2

0	None
R	Relay, NO., 3A/250VAC
L	Logic, 20V/10mA, drive SSR
T	Triac, drive SCR
D	Analog, 0~10mA, 4~20mA, 0~20mA, 0~5V, 1~5V, 0~10V

Dimensions

NONE	96*96*100mm
M	72*72*100mm

e.g.

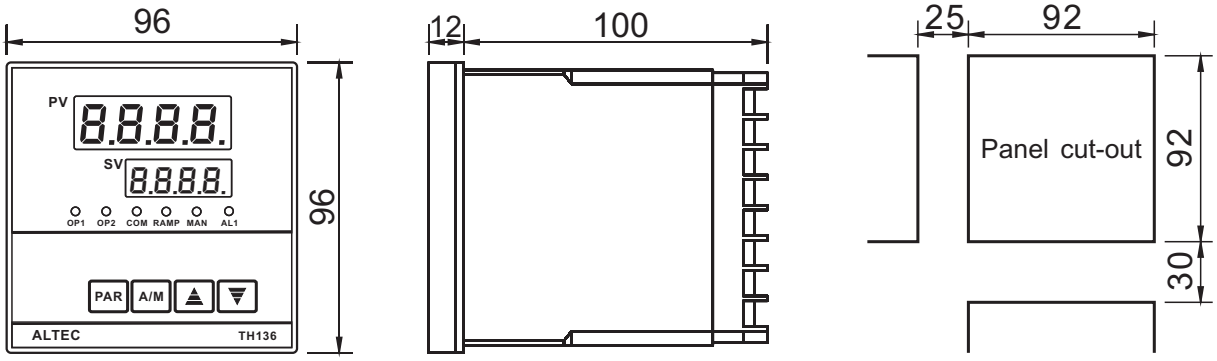
TH136/R/R/0/485: Represent the controller with relay for output1 and output2, without alarm1, with RS485 communication option, the outline dimension is 96mm(W)*96mm(H)*100mm(D).

3 Mounting

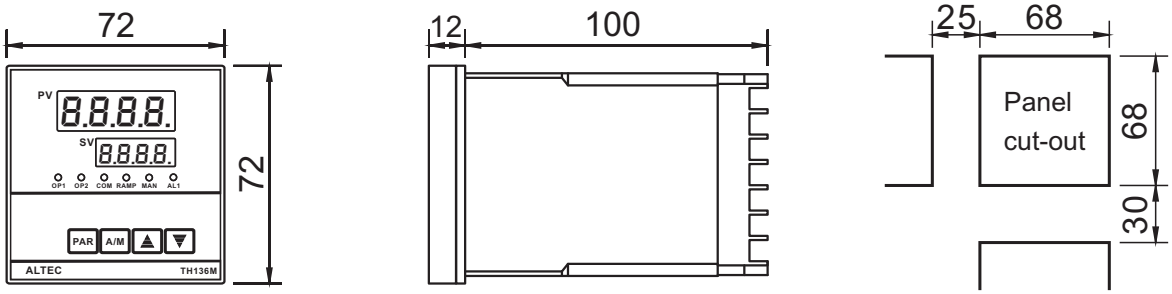
1) Prepare a square cut-out in the mounting panel to the size shown below.
   If a number of controllers are to be mounted in the same panel they should be spaced as shown.
2) Insert the controller through the cut-out.
3) From behind of the panel, catch the mounting bracket to the holes top and bottom of the case, and screw to fix.

Dimensions

TH136



TH136M

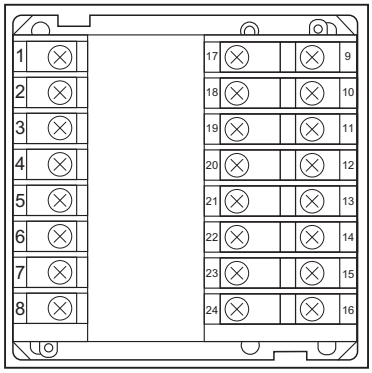


Note:

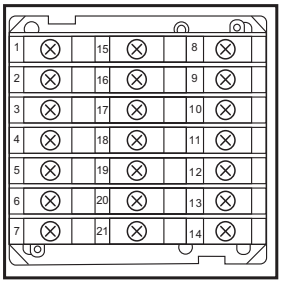
If a number of controllers are to be mounted in the same panel they should be spaced as shown above.

4 Electrical Connection

4.1 Rear Terminal Layout



TH136

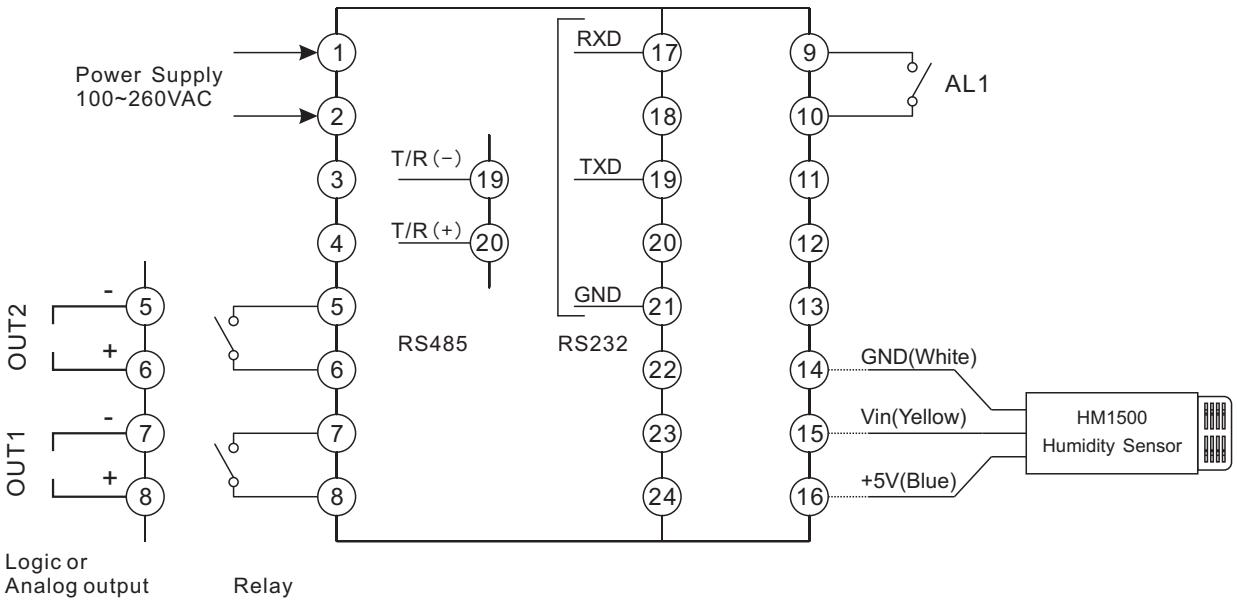


TH136M

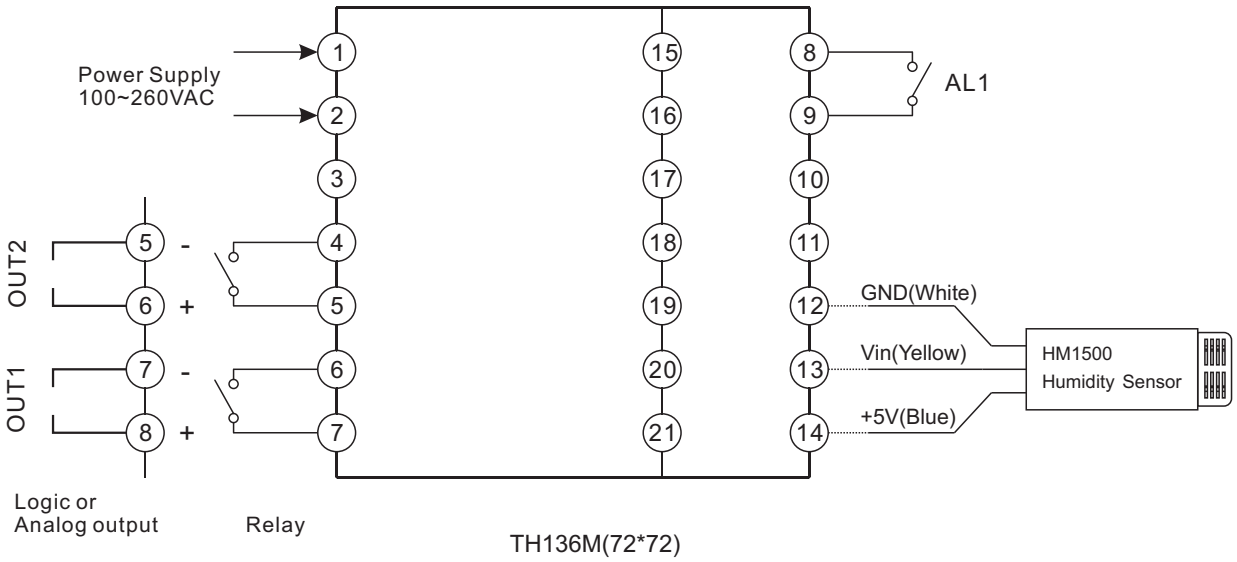
Note:

In order to avoid the electrical noise to the input signal, the signal line should be separated from the power line.

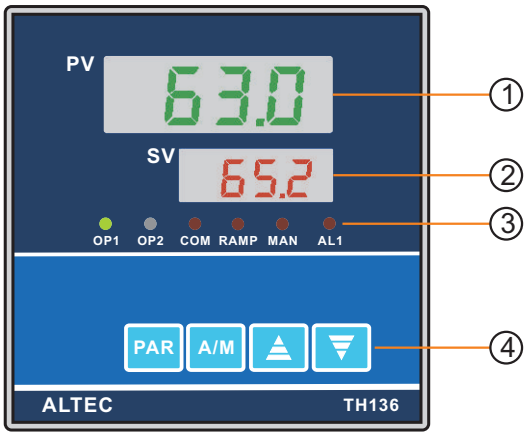
4.2 Connection Diagram



TH136(96*96)



5 Panel Layout



S.N.	Items	Description
①	PV Display	Indicates Process Value and Parameters
②	SV Display	Indicates Setpoint and Parameter Values
③	OP1	Output 1 indicator
	OP2	Output 2 indicator
	COM	Communication indicator
	RAMP	Program running indicator
	MAN	Manual operating mode indicator
	AL1	Alarms1 indicator
④	PAR	Parameter key
	A/M	Auto/Manual key
	▲	Up key
	▼	Down key

6 Operation

6.1 Panel Overview

When the controller is powered on, the upper display indicates the model code of the controller, and the lower display indicates the software version. 3 seconds later, the upper display will indicate measured values (PV), on selecting a parameter, the appropriate parameter abbreviation appears.

The lower display indicates setting values (SV), or on selecting a parameter, the appropriate parameter value appears here. When the controller is running in manual operating mode, the lower display indicates the output power.

There are 6 LED indicators on the panel. The LED indicators indicate the current status of the controller.
Both the LED indicator '**OP1**' & '**OP2**' indicates the state of the relevant output. The LED is lit when the output is 'ON'.
The indicator '**COM**' flashes when the controller is in active communication with a host computer. (only if option 'communication' has been installed)

The indicator '**RAMP**' is lit when the set point is ramping towards the target setpoint (only if ramp-to-setpint ha been configured).

The indicator '**MAN**' indicates **manual** operating mode. The indicator '**AL1**' is lit when **alarm** is active.

6.2 Setpoint Adjusting

During the basic functioning, press keys ▲ or ▼ to increase or decrease setpoint. Keeping it pressed results in a progressively faster variation. Setpoint adjustable range: SP L ~ SP H.

6.3 Operating Parameter List

When the controller is in the PV/SV displaying status, depress PAR key for 3 seconds, the first parameter will appear in the upper display, the lower display will show the value of the parameter. At this time, use keys ▲ or ▼ to modify the value of the parameter. After modification, press PAR key, the controller will display the next parameter, at the same time, the modified data will be saved in the memory.

If the last parameter is displayed or there is no key operation within 16 seconds, the controller will return to the PV/SV displaying status.

Operating Parameter List

S.N.	Mnemonic	Parameter	Adjustable Range	Comments
1	tunE	PID Auto-Tune	OFF on	Stop PID auto-tuning Start PID auto-tuning
2	AL1	Alarm 1	0.1~100.0% RH	
3	AL2	Alarm 2	0.1~100.0% RH	
4	HYS1	AL 1 Hysteresis	0.1~10.00% RH	Optional
5	HYS2	AL 2 Hysteresis	0.1~10.00% RH	
6	ProP	Proportional band	0.1~100.0% RH	
7	Int.t	Integral time	OFF, 1~8000 sec.	Appears only if CtrL = P, d
8	dEr.t	Derivative time	OFF, 1~999 sec.	
9	H.ct	Humidification cycle time	0.1~240.0 sec.	
10	Loc	Parameter Lock	0~9999	Set as 808 to enter the next level menu

6. 4 Parameter description

1). Control parameters (PropP, Int.t, dEr.t)

These three parameters directly affect the precision of control. The PID auto-tuning function could automatically measure, compute, and set these three constants. If the controller is configured as an ON/OFF controller, the proportional band(PROP) becomes the output hysteresis.

Proportional band(PropP) is the band of error within which the power output is proportional to the error. Error values outside this band give 100% or 0% power output. If the proportional band is too narrow it will give control resembling on/off control with continuous oscillation. Wide proportional bands give stable but sluggish control with an offset in the steady-state condition.

Parameter Int.t provides automatic compensation for long term control offsets. It is the time taken for the output to change by one proportional band width for a constant error equal to the proportional band. Typically this must be set to a value longer than the response time of the process being controlled.

The parameter dEr.t provides anticipation and fast recovery from disturbances. It can be taken as the 'look ahead' period of the controller. It is typically set to a time approximately one sixth of the integral time.

2). Humidification cycle time (H.ct)

The cycle time of the switching outputs(H.ct) should be set to high values(e.g. 20 seconds) if contactors are used, and to low values(e.g. 1 second for logic output) if thyristors are used.

7 PID Auto-Tuning

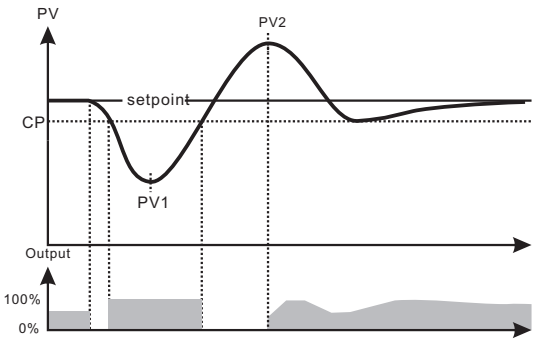
In order to achieve a good control performance, the PID control parameters(PropP, Int.t, dEr.t) must be optimized first. The PID auto-tuning function could automatically measure, compute, and set PID constants.

Auto-tuning can be activated under the following conditions:
●Automatic operating(closed loop)
●PID control algorithm

Before activating the auto-tuning, the actual value should be broadly stable. By setting the parameter tunE to on, the auto-tunging will start. During auto-tuning execution, code 'tunE' flashes in the lower display. The tuning operation is finished when the code 'tunE' no longer flashes. The user can abort PID auto-tuning at any time by setting the parameter tunE to OFF.

During auto-tuning, the controller will execute ON/OFF regulation, PV will oscillate, 1.5 period later, auto-tuning finished. According to the period and amplitude of the oscillation, the controller will calculate the optimum PID parameters and stored them in the memory automatically.

During auto-tuning, do not change any of the parameters, because each modification of setpoint will restart the auto-tuning.



Auto-tuning from setpoint - heating process

8 Configuration

The controller should be configured correctly before put it into use, such as the control algorithm, alarm mode, etc.

When the controller is in the PV/SV displaying status, depress PAR key for 3 seconds, the 1st parameter will appear in the upper display, the lower display will show the value of the parameter. At this time, use ▲ or ▼ key to modify the value of the parameter. After modification, press PAR key, the controller will display the next parameter, at the same time, the modified data will be saved in the memory. If the last parameter is displayed or there is no key operation within 16 seconds, the controller will return to the PV/SV displaying status.

After configuration, set the **Parameter Lock (Loc)** to a new value to protect the parameters' safety.

Configuration Parameter List

S.N.	Mnemonic	Parameter	Adjustable Range	Comments
1	OFSt	Input/calibration offset	-9.99~10.00	
2	Addr	Instrument Address	00~99	
3	bAud	Baud rate	1200 2400 4800 9600 19.2	
4	CtrL	Control Algorithm	On.OF P, d	ON/OFF Control PID Control
5	AL01	Alarm 1 output mode (AL1)	OFF H, AL LoAL HdA LdA dAO ndAO	Alarm OFF Full-scale high alarm Full-scale low alarm High deviation alarm Low deviation alarm Outside deviation band alarm Inside deviation band alarm
6	AL02	Alarm 2 output mode (AL2)		
7	Act	Control Action	rEu dir	Direct Reverse

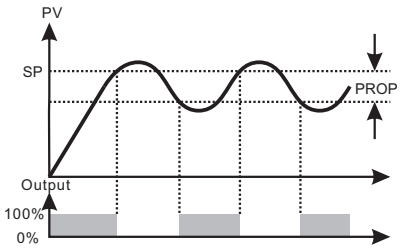
Parameter Description

1). Control algorithms - CtrL

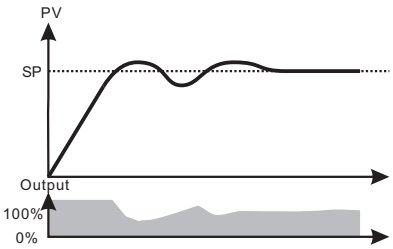
There are 2 different control algorithms can be selected: ON/OFF and PID.

If CtrL=On.OF, the controller is configured as an ON/OFF controller, the output hysteresis is set using the proportional band(ProP).

If CtrL=PID, the controller is configured as a PID controller, PID is intended for high precision control applications.



ON/OFF Control



PID Control

2). Alarms - AL01, AL02

Six different types of alarm can be configured with AL01 and AL02: HIAL, LoAL, HdAL, LdAL, dAo, ndAo as the following table shows.

The hysteresis is HYS1, HYS2. Hysteresis is used to provide a definite indication of the alarm condition and to prevent alarm relay chatter.

When AL01, AL02 are configured as HdAL, AL01, AL02 can be used as dehumidification output.

When AL01, AL02 are configured as LdAL, AL01, AL02 can be used as humidification output.