UT-5521-LCD

温湿度传感器说明书

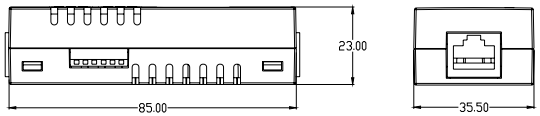
一、特点

壁挂或磁吸安装
RS485信号输出
线性响应，温湿度一体
LCD显示温度、湿度、地址和波特率
专用的敏感元件，测量范围宽、精度高
通讯协议采用标准的 Modbus RTU协议
提供 6 位的硬件地址拨码开关
提供通讯指示灯

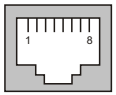
二、主要性能指标

	温度	湿度
测量范围	-10~70℃	0%RH~100%RH
测量精度	≤ ±0.5℃（-10～60℃）	≤3%RH(25℃,20%RH~80%RH)
信号输出	RS485	
通讯协议	MODBUS	
端口防护	浪涌200W（RS485）	
供电电源	5Vdc~30Vdc	
工作电流	<10mA	
工作温度	-10~70℃	
储存温度	-20~80℃（非凝结）	

三、外形尺寸（mm）

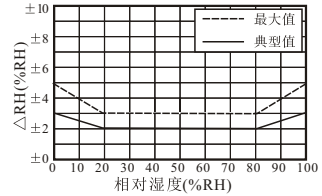


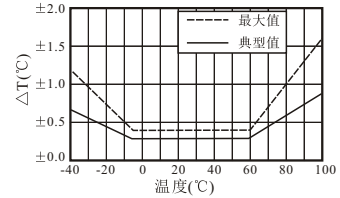
四、接线说明



引脚	1	2	3	4	5	6	7	8
定义	V+	V+	NC	485+	485-	SGND	GND	GND

五、精度与测量范围对应关系





六、LCD显示

传感器自带LCD显示，可以直观的显示温、湿度、地址和波特率。

全显示效果

温湿度显示

地址波特率显示

七、地址设定

6位拨码开关设置产品地址，地址范围：0～63，二进制格式，计算示例如下：

①  第1、2位拨到OFF，其它ON，地址为：1×1+1×2=3；

②  第5、6位拨到OFF，其它ON，地址为:1×16+1×32=48。

SW1	SW2	SW3	SW4	SW5	SW6	地址（HEX）
OFF	ON	ON	ON	ON	ON	01
ON	OFF	ON	ON	ON	ON	02
OFF	OFF	ON	ON	ON	ON	03
ON	ON	OFF	ON	ON	ON	04
…	…	…	…	…	…	…
OFF	OFF	OFF	OFF	OFF	OFF	3F

八、通讯协议

波特率：9600　8位数据位，1位停止位，无校验

主机读操作：

功能	地址	命令	起始地址	读取数量	校验
读温湿度	ADD/00	04	00 00	00 02	CRC (Li Hi)
读地址	ADD/00	03	00 00	00 01	CRC (Li Hi)
读波特率	ADD/00	03	00 01	00 01	CRC (Li Hi)
读温度修正值	ADD/00	03	00 02	00 01	CRC (Li Hi)
读湿度修正值	ADD/00	03	00 03	00 01	CRC (Li Hi)
读温度显示单位	ADD/00	03	00 04	00 01	CRC (Li Hi)

从机响应:

功能	地址	命令	字节长度	内容	校验
读温湿度	ADD/00	04	04	D0 D1 D2 D3①	CRC(Li Hi)
读地址	ADD/00	03	02	00 ADD	CRC(Li Hi)
读波特率	ADD/00	03	02	0000(9600)/0001(19200)	
读温度修正值	ADD/00	03	02	D0 D1②	CRC(Li Hi)
读湿度修正值	ADD/00	03	02	D0 D1③	CRC(Li Hi)
读温度显示单位	ADD/00	03	02	0000(℃)/0001(°F)	CRC(Li Hi)

主机写操作：

功能	地址	命令	起始地址	内容	校验
写地址	ADD/00	06	00 00	00 ADD	CRC(Li Hi)
写波特率	ADD/00	06	00 01	0000(9600)/0001(19200)	CRC(Li Hi)
写温度修正值	ADD/00	06	00 02	D0 D1②	CRC(Li Hi)
写湿度修正值	ADD/00	06	00 03	D0 D1③	CRC(Li Hi)
写温度显示单位	ADD/00	06	00 04	0000(℃)/0001(°F)	CRC(Li Hi)

从机响应：

功能	地址	命令	起始地址	内容	校验
写地址	ADD/00	06	00 00	00 ADD	CRC(Li Hi)
写波特率	ADD/00	03	00 01	0000(9600)/0001(19200)	CRC(Li Hi)
写温度修正值	ADD/00	06	00 02	D0 D1②	CRC(Li Hi)
写湿度修正值	ADD/00	06	00 03	D0 D1③	CRC(Li Hi)
写温度显示单位	ADD/00	06	00 04	0000(℃)/0001(°F)	CRC(Li Hi)

CRC校验生成多项式0xA001(1010 0000 0000 0001)

- 03命令可以一次读取多个参数。如：01 03 00 0005 85 C9一次读取5个参数。
- 修改温度显示单位只改变温度显示单位，不会影响通信数据格式。

注：

①D0D1温度值，无符号定点整型数据。实际温度=(D0D1-4000)/100
D2D3湿度值，无符号定点整型数据。实际湿度=D2D3/100

②无符号定点整型数据。D0D1为实际修正值的100倍。由于设备的自热效应，测量得到温度要比实际温度高，需要在测量结果中减去修正值。

③无符号定点整型数据。D0D1为实际修正值的100倍。受自热影响，测量得到湿度要比实际湿度低，需要在测量结果中加上修正值。

产品包装
牛皮盒包装；底面印“RECYCLABLE”标识；
包装尺寸：100×48×34mm。

包装清单：UT-5521-LCD×1　　合格证×1
有害物质成份表×1

UT-5521-LCD

Temperature and Humidity Sensor

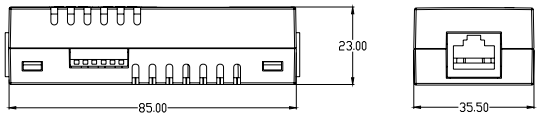
Ⅰ..Feature

☆ Wall hanging or magnetic attraction installation
☆ RS485 signal output
☆ Linear response and integration of temperature and humidity
☆ LCD displays the temperature, humidity, address and Baud rate
☆ Special sensitive element with wide measurement range and high precision
☆ Standard Modbus RTU protocol is used for the communication protocol.
☆ Provide 6-digit hardware address dial switch
☆ Provide the communication indicator light

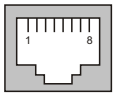
Ⅱ. Main Performance Indexes

	Temperature	Humidity
Measurement range	-10~70℃	0%RH~100%RH
Measurement precision	≤ ±0.5℃（-10～60℃）	≤3%RH(25℃,20%RH~80%RH)
Signal output	RS485	
Communication protocol	MODBUS	
Port protection	Surge 200W（RS485）	
Power supply	5Vdc~30Vdc	
Operating current	<10mA	
Operating temperature	-10~70℃	
Storage temperature	-20~80℃ (non-condensing)	

Ⅲ. Boundary dimension (mm)

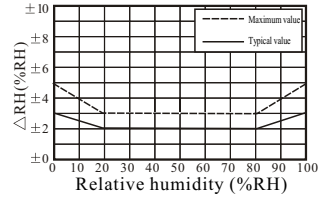


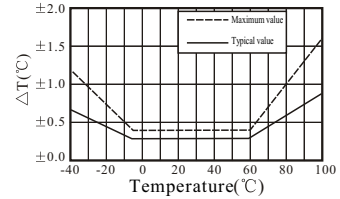
Ⅳ. Wiring Instruction



Pin	1	2	3	4	5	6	7	8
Definition	V+	V+	NC	485+	485-	SGND	GND	GND

Ⅴ. Relation between precision and measurement range





Ⅵ. LCD display

The sensor has the LCD display, which can visually display the temperature, humidity, address and Baud rate.

Full display effect

Temperature and humidity display

Address and Baud rate display

Ⅶ. Address setting

The 6-digit dial switch is used to set the product address, with the address range of 0~63 and a binary format. The calculation example is as follows:

① Switch 1 and 2 to OFF and others to ON, the address is 1×+1×2=3;

② Switch 5 and 6 to OFF and others to ON, the address is 1×16+1×2=48.

SW1	SW2	SW3	SW4	SW5	SW6	Address(HEX)
OFF	ON	ON	ON	ON	ON	01
ON	OFF	ON	ON	ON	ON	02
OFF	OFF	ON	ON	ON	ON	03
ON	ON	OFF	ON	ON	ON	04
…	…	…	…	…	…	…
OFF	OFF	OFF	OFF	OFF	OFF	3F

Ⅷ. Communication protocol

Baud rate: 9,600 8 data bits, 1 stop bit and no verification.
Read operation of mainframe:

Function	Address	Command	Initial address	Read value	Verification
Read temperature and humidity	ADD/00	04	00 00	00 02	CRC (Li Hi)
Read address	ADD/00	03	00 00	00 01	CRC (Li Hi)
Read Baud rate	ADD/00	03	00 01	00 01	CRC (Li Hi)
Read corrected temperature value	ADD/00	03	00 02	00 01	CRC (Li Hi)
Read corrected humidity value	ADD/00	03	00 03	00 01	CRC (Li Hi)
Read temperature display unit	ADD/00	03	00 04	00 01	CRC (Li Hi)

Write operation of mainframe:

Function	Address	Command	Byte length	Contents	Verification
Read temperature and humidity	ADD/00	04	04	D0 D1 D2 D3①	CRC (Li Hi)
Read address	ADD/00	03	02	00 ADD	CRC (Li Hi)
Read Baud rate	ADD/00	03	02	0000(9600)/0001(19200)	
Read corrected temperature value	ADD/00	03	02	D0 D1②	CRC (Li Hi)
Read corrected humidity value	ADD/00	03	02	D0 D1③	CRC (Li Hi)
Read temperature display unit	ADD/00	03	02	0000(℃)/0001(°F)	CRC (Li Hi)

Write operation of mainframe:

Function	Address	Command	Initial address	Contents	Verification
Write address	ADD/00	06	00 00	00 ADD	CRC (Li Hi)
Write Baud rate	ADD/00	06	00 01	0000(9600)/0001(19200)	CRC (Li Hi)
Write corrected temperature value	ADD/00	06	00 02	D0 D1②	CRC (Li Hi)
Write corrected humidity value	ADD/00	06	00 03	D0 D1③	CRC (Li Hi)
Write temperature display unit	ADD/00	06	00 04	0000(℃)/0001(°F)	CRC (Li Hi)

Slave response:

Function	Address	Command	Initial address	Contents	Verification
Write address	ADD/00	06	00 00	00 ADD	CRC (Li Hi)
Write Baud rate	ADD/00	03	00 01	0000(9600)/0001(19200)	CRC (Li Hi)
Write corrected temperature value	ADD/00	06	00 02	D0 D1②	CRC (Li Hi)
Write corrected humidity value	ADD/00	06	00 03	D0 D1③	CRC (Li Hi)
Write temperature display unit	ADD/00	06	00 04	0000(℃)/0001(°F)	CRC (Li Hi)

- CRC verification generates polynomial 0xA001 (10100000 0000 0001).
  03 command can read several parameters one time. For example,
  01 03 0000 05 85C9 reads 5 parameters one time.
- The temperature display unit modification only changes the temperature display unit, rather than influence the communication data format.

Notes:
① D0D1 temperature value, unsigned integer datum of fixed point.
Actual temperature is (D0D1-4000)/100.
D2D3 humidity value, unsigned integer datum of fixed point.
Actual humidity is D2D3/100
② Unsigned integer datum of fixed point. D0D1 is 100 times of the actual corrected value. Due to the self-heating effect of the equipment, the measured temperature is higher than the actual temperature and the corrected value should be deducted from the measured result.
③ Unsigned integer datum of fixed point. D0D1 is 100 times of the actual corrected value. Due to the self-heating effect, the measured humidity is lower than the actual humidity and the corrected value should be added to the measured result.

Product Packaging

Cattlehide box packaging: “ECYCLABLE” printed on the back surface and packaging dimension: 100×48×4mm.

Packing list: UT-5521-LCD *1 and certificate of quality *1
Ingredient list of hazardous substances*1