融智云
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RS485网络型空调红外控制器

RS485网络型空调红外控制器是专门针对普通空调实现远程监控而开发的，具有全球品牌空调遥控码库、空调状态监测、温湿度测量、红外自学习功能的"万能"遥控器。支持RS485通讯、开关机监测、高温重启、来电自启动等多种功能。无需繁琐的学习原空调遥控器各种控制命令，通过品牌进行遥控器一键配对，即可实现远程开关机、温度、运行模式、风速等设置调节功能，从而实现对普通空调的远程监测和控制。

产品特点

- 内置全球空调遥控码库，支持国内外246个品牌，支持超过1500种不同型号，兼容市面大多数品牌空调
- 空调遥控器一键配对，无需复杂繁琐的学习原空调遥控器各种控制命令，方便快捷
- 支持远程开关机、温度、运行模式、风速设置等操作
- 支持空调运行状态监测，可通过电流互感器测量运行电流或通过光电传感器检测空调运行指示灯进行开机和关机判断
- 支持温度和湿度测量功能，可实现高温空调重启
- 支持来电自启动功能，来电后使空调恢复断电前运行模式
- RS-485通讯，Modbus-RTU协议，双RJ-45接口，复合供电和信号，易于网线布线安装，方便手拉手多传感器串联组网。
- 防火ABS树脂外壳，可螺钉固定安装

配件

发红发射线　　电流互感器　　光电传感器

产品参数

产品型号	AC100	产品名称	RS485网络型空调红外控制器
温度测量	范围-20C°~70C°，精度±0.3C°@25C°	湿度测量	范围0~100%，精度±3%@25℃
红外载波	38KHz	遥控距离	5~10米
电流检测	支持，标配电流互感器	光电检测	支持，标配光电传感器
输入电压	DC9-15V	通讯接口	双RJ-45接口，复合供电和信号，防雷保护
工作功耗	小于100mW	外形尺寸	82x50x32mm

安装指导

结构说明

传感器接口为电流互感器　接至CT
传感器接口为光电传感器　接至PE

传感器接口　　　　红外发射线接口
传感器选择拨码开关
状态指示灯
红外接收头
RS485通讯端口，双RJ45接口，复合通讯和供电
温湿度传感器
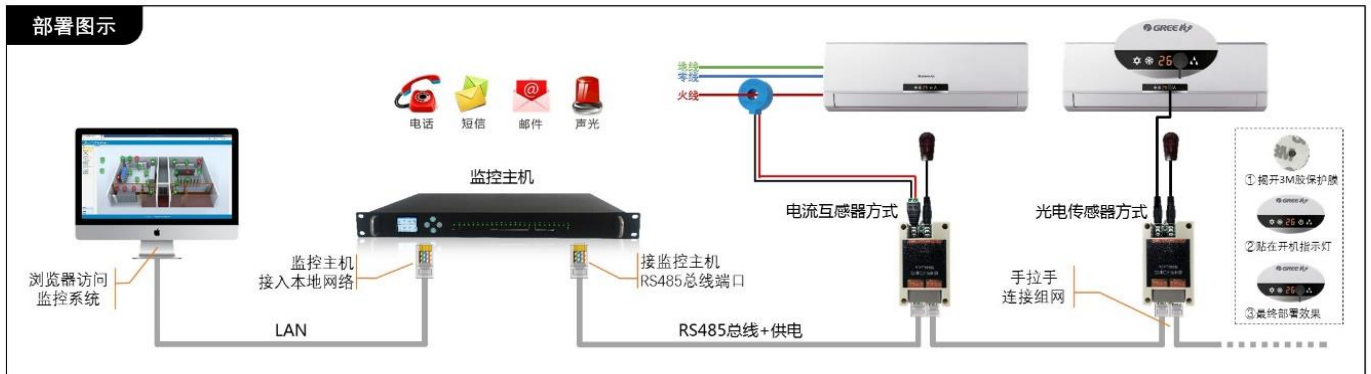状态指示灯　　　　数据接收指示灯
运行指示灯　　　　数据发送指示灯

PE　CT

拨码开关拨至CT　　或　　拨码开关拨至PE

接线规范

① 控制器与监控主机之间连接布线采用优质超五类网线。
② 控制器的供电和通讯信号采用网线传输，所以对网线的质量要求很高，必须为纯铜网线，电阻率越小越好。
③ 如果布线距离较远大于100米或环境存在很强电磁干扰，则必须选择带屏蔽超五或六类优质网线。
④ 多个RS-485通讯类设备，以手拉手方式安装接线，避免星型接线。
⑤ 控制器采用RJ-45接口，复合RS485通讯和供电，所有**水晶头以568B标准压接**，可参考下表的线序和线色对应顺序压接。
⑥ 为了方便接线，且防止传感设备接线出错，必须根据遵守下表网线线芯命名标准进行接线。

网口线序	1	2	3	4	5	6	7	8
网线色标	白橙	橙	白绿	蓝	白蓝	绿	白棕	棕
信号名称	12V	GND	A+	A+	B-	B-	12V	GND

部署图示

电话　短信　邮件　声光
监控主机

接线　零线　火线

浏览器访问监控系统

监控主机接入本地网络

接监控主机RS485总线端口

LAN

RS485总线+供电

电流互感器方式

光电传感器方式

手拉手连接组网

①揭开3M胶保护膜
②贴在开机指示灯
③最终部署效果

RS485 网络型万能空调控制器
通讯协议

一．通讯协议

通信协议采用标准 MODBUS-RTU 协议,本协议规定了应用系统中主机与万能型空调控制器之间在应用层的通信协议。

二．通信接口特性

接口类型：异步串行 RS485 通讯口。

通信波特率为：1200bps、2400bps、4800bps、9600bps、19200bps、38400bps、56000bps、57600bps、115200bps 可选，出厂默认为 9600bps。

数据传输格式：N,8,1

三．MODBU RTU 通信协议详述

1．读取多个寄存器命令格式，适用于功能码 03H、04H：

（1）主机发送命令

从机地址	功能码	起始寄存器地址高 8 位	起始寄存器地址低 8 位	读取寄存器个数高 8 位	读取寄存器个数低 8 位	CRC16 校验低 8 位	CRC16 校验高 8 位
1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节

（2）返回信息

从机地址	功能码	返回字节长度	数据 1 高 8 位	数据 1 低 8 位	数据 2 高 8 位	数据 2 低 8 位	...	CRC16 校验低 8 位	CRC16 校验高 8 位
1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节		1 字节	1 字节

2．写单个寄存器命令格式，适用于功能码 06H：

（1）主机发送命令

从机地址	功能码	写寄存器地址高 8 位	写寄存器地址低 8 位	写入数据高 8 位	写入数据低 8 位	CRC16 校验低 8 位	CRC16 校验高 8 位
1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节

（2）返回信息

从机地址	功能码	写寄存器地址高 8 位	写寄存器地址低 8 位	写入数据高 8 位	写入数据低 8 位	CRC16 校验低 8 位	CRC16 校验高 8 位
1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节	1 字节

3. 写多个寄存器命令格式，适用于功能码 10H：

（1）主机发送命令

地址	功能码	起始寄存器地址高8位	起始寄存器地址低8位	写入寄存器个数高8位	写入寄存器个数低8位	写入字节长度	数据1高8位	数据1低8位	数据2高8位	数据2低8位	…	CRC16校验低8位	CRC16校验高8位
1字节	1字节	1字节	1字节	1字节	1字节	1字节	1字节	1字节	1字节	1字节	…	1字节	1字节

（2）返回信息

地址	功能码	起始寄存器地址高8位	起始寄存器地址低8位	写入寄存器个数高8位	写入寄存器个数低8位	CRC16校验低8位	CRC16校验高8位
1字节	1字节	1字节	1字节	1字节	1字节	1字节	1字节

四．寄存器信息表

1. 04H 功能码寄存器表

功能码	寄存器内容	寄存器地址	数据类型	说明
04H	温度	0000H	short	有符号短整形，需乘0.01得到实际结果，单位：℃
	湿度	0001H	short	有符号短整形，需乘0.01得到实际结果，单位：%
	空调运行状态检测信号类型	0002H	unsigned short	0：电流互感器信号、1：光电传感器信号。信号类型取决于设备上信号选择拨码开关。
	空调运行状态检测信号值	0003H	unsigned short	传感器信号参考值，仅供空调开关机状态的判断
	空调运行状态	0004H	unsigned short	0：关机、1：开机
	红外状态	0005H	unsigned short	0：空闲、1和2：工作
	波特率	0006H	unsigned short	0：1200bps：1：2400bps：2：4800bps：3：9600bps：4：19200bps：5：38400bps：6：56000bps：7：57600bps：8：115200bps
	设备地址	0007H	unsigned short	范围1-254
	万能遥控器ID	0008H	unsigned int	万能遥控器ID，从"万能空调遥控器对应表"获取相应品牌遥控器ID。0008H为低16位，0009H为高16位
		0009H		
	遥控器工作模式	000AH	unsigned short	0：红外学习遥控器接收模式，1：红外学习遥控器发射模式，2：万能遥控器配对，>2：万能遥控器模式
	空调开关机设定	000BH	unsigned short	0：关机，1：开机
	空调模式设定	000CH	unsigned short	0：自动，1：制冷，2：制热，3：除湿，4送风
	空调温度设定	000DH	unsigned short	范围16-30
	空调风速设定	000EH	unsigned short	0：自动，1：低，2：中，3：高

	空调风向设定	000FH	unsigned short	0：扫风关闭，1：扫风开启
	空调运行状态信号阀值	0010H	unsigned short	开机信号阀值,用于开关机判断
	自动控制使能	0011H	unsigned short	0：禁用，1：启用
	设备扩展地址	0012H	unsigned short	设备硬件地址，不可修改类似 MAC 地址

2. 10H 功能码寄存器表

功能码	寄存器内容	寄存器地址	数据类型	说明
10H	波特率	0000H	unsigned short	0：1200bps:1：2400bps:2：4800bps:3：9600bps:4：19200bps:5：38400bps:6：56000bps:7：57600bps:8：115200bps
	设备地址	0001H	unsigned short	设备 MODBUS 地址，范围 1-254
	万能遥控器 ID	0002H 0003H	unsigned int	万能遥控器 ID,从"万能空调遥控器对应表"获取相应品牌遥控器 ID。0002H 为低 16 位，0003H 为高 16 位
	遥控器工作模式	0004H	unsigned short	0：红外学习遥控器接收模式，1：红外学习遥控器发射模式，2：万能遥控器配对，>2：万能遥控器模式
	空调开关机设定	0005H	unsigned short	0：关机，1：开机
	空调模式设定	0006H	unsigned short	0：自动，1：制冷，2：制热，3：除湿；4 送风
	空调温度设定	0007H	unsigned short	范围 16-30
	空调风速设定	0008H	unsigned short	0：自动，1：低，2：中，3：高
	空调风向设定	0009H	unsigned short	0：扫风关闭，1：扫风开启
	空调运行状态信号阀值	000AH	unsigned short	此阀值用于判断空调开关机状态，需要根据空调关机和开机两种状态下的"空调运行状态检测信号值"进行设定。当大于此值，空调控制器会判读"空调运行状态"为开机。
	自动控制使能	000BH	unsigned short	0：禁用，1：启用 启用后，当出现温度高于设定值、市电来电、检测到空调关机这几种情况，空调控制器会自动每隔 5 分钟发送一次当前空调设定指令（除空调控制器设定为关机状态），确保空调工作运行。

五．调试案例（地址 00H 为万能地址）

1. **读温湿度数据**
   - ➤ 主机下发命令：
     00 04 00 00 00 02 70 1A
   - ➤ 从机返回：
     00 04 04 温度 H 温度 L 湿度 H 湿度 L CRCL CRCH

2. **读空调运行状态**
   - ➤ 主机下发命令：
     00 04 00 04 00 01 71 DA
   - ➤ 从机返回：
     00 04 02 00 00 84 F0

3. **读当前遥控器设定**
   - ➤ 主机下发命令：
     00 04 00 0B 00 05 40 1A
   - ➤ 从机返回：
     00 04 0A 00 01 00 01 00 14 00 03 00 00 0E AF
     开机、制冷、20 度、风速高、扫风关闭

4. **设定空调控制器工作模式**
   - ➤ 主机下发命令：
     00 10 00 04 00 01 02 00 03 EA 45（万能遥控器模式）
   - ➤ 从机返回：
     00 10 00 04 00 01 41 D9

5. **远程空调设定：开机、制冷、20 度、风速高、扫风关闭**
   - ➤ 主机下发命令：
     00 10 00 05 00 05 0A 00 01 00 01 00 14 00 03 00 00 88 3E
   - ➤ 从机返回：
     00 10 00 05 00 05 11 DA

6. **远程空调关机**
   - ➤ 主机下发命令：
     00 10 00 05 00 01 02 00 00 AB 95
   - ➤ 从机返回：
     00 10 00 05 00 01 10 19

7. **远程空调温度调整为 21 度**
   - ➤ 主机下发命令：
     00 10 00 07 00 01 02 00 15 6B B8
   - ➤ 从机返回：
     00 10 00 07 00 01 B1 D9

8. 空调控制器进行遥控器配对操作，假如空调品牌为：格力

第一步：根据空调品牌查找"空调遥控器配对表"（见附件1），找到相应品牌遥控器 ID 数组（remoteId），如下图

[{
        "brand": "格力",
        "brandId": 0,
        "remoteId": [96739, 17890, 108150, 107943, 10654, 12592, 76169, 84920, 97196, 39619, 176181, 184354, 34427, 37277, 38383, 38623, 40936, 94351, 99994, 27453, 8867, 9401, 101266, 34034, 37511, 40200, 40452, 40696, 41412, 41908, 98193, 98983, 100194, 100385, 13885]
    }, {

第二步：尝试遥控器 ID 数组（remoteId）内每一个 ID，空调控制器工作模式设定为：万能遥控器配对。

遥控器 ID：96739->HEX 为 0001 79E3

➢ 主机下发命令：

00 10 00 02 00 03 06 79 E3 00 01 00 02 5B B5

➢ 从机返回：

00 10 00 02 00 03 20 19

遥控器 ID：17890-> HEX 为 0000 45E2

➢ 主机下发命令：

00 10 00 02 00 03 06 45 E2 00 00 00 02 32 89

➢ 从机返回：

00 10 00 02 00 03 20 19

遥控器 ID:XXXXX->HEX 为 AABB CCDD

➢ 主机下发命令：

00 10 00 02 00 03 06 CC DD AA BB 00 02 CRCL CRCH

➢ 从机返回：

00 10 00 02 00 03 20 19

第四步：当听到空调滴的一声，记录下此时的遥控器 ID。

第五步：将将空调控制器工作模式设定为：万能遥控器模式

➢ 主机下发命令：

00 10 00 04 00 01 02 00 03 EA 45

➢ 从机返回：

00 10 00 04 00 01 41 D9

第六步：参考调试案例 4，对空调各项控制测试，确保配对成功。如果存在控制不生效情况，则继续第二步尝试未匹配过的遥控器 ID。

附件 1
空调遥控器配对表

[{
    "brand": "格力",
    "brandId": 0,
    "remoteId": [96739, 17890, 108150, 107943, 10654, 12592, 76169, 84920, 97196, 39619, 176181, 184354, 34427, 37277, 38383, 38623, 40936, 94351, 99994, 27453, 8867, 9401, 101266, 34034, 37511, 40200, 40452, 40696, 41412, 41908, 98193, 98983, 100194, 100385, 13885]
  }, {
    "brand": "美的",
    "brandId": 144,
    "remoteId": [18339, 21998, 31239, 117353, 98386, 99170, 116842, 97502, 132864, 128371, 129183, 132078, 133179, 133473, 132336, 132566, 131561, 131009, 112968, 101266, 29500, 130158, 130717, 115713, 129465, 32831]
  }, {
    "brand": "海尔",
    "brandId": 252,
    "remoteId": [37748, 184151, 184561, 41176, 20684, 185408, 186726, 38867, 39242, 20372, 39885, 156130, 17212, 101266, 30321, 185705, 178679, 36819, 99786, 105886, 117121, 123246, 124610, 125586, 126129, 126672, 127235, 128098, 130432, 131819, 134365, 135559, 141674, 143294, 149546, 170563, 171517]
  }, {
    "brand": "海信",
    "brandId": 404,
    "remoteId": [17696, 28454, 125832, 185643, 23715, 169060, 160498, 126927, 137450, 135828, 138292, 139810, 160806, 101266, 117121, 161087, 161319, 23133, 26545, 31994]
  }, {
    "brand": "志高",
    "brandId": 488,
    "remoteId": [114792, 16956, 30527, 110261, 111102, 111407, 128371, 124809, 116842, 101266, 108599, 110572, 110864, 111702, 114251, 118455]
  }, {
    "brand": "大金",
    "brandId": 556,
    "remoteId": [185768, 15743, 16115, 161551, 161810, 116842, 163951, 101266, 28150, 162069]
  }, {
    "brand": "奥克斯",
    "brandId": 600,
    "remoteId": [186031, 29149, 101266, 110261, 134634, 133999, 72623, 21998, 134961, 133779, 117353, 116632, 134720]
  }, {
    "brand": "松下",
    "brandId": 656,

        "remoteId": [62249, 73147, 73489, 74502, 97196, 163951, 186364, 111916, 162373, 162899,
163425, 133179, 112442, 164377, 101266, 10258, 128882]
    }, {
        "brand": "TCL",
        "brandId": 728,
        "remoteId": [30004, 101266, 153781, 164903, 110261, 121748, 116842, 165190, 130096,
113450]
    }, {
        "brand": "格兰仕",
        "brandId": 772,
        "remoteId": [95692, 36362, 16752, 123815, 126361, 145282, 101266, 153781, 116842,
110261, 36149, 37068, 41699, 94142, 95999, 96236, 100632, 35425, 114489, 116241, 115402]
    }, {
        "brand": "三星",
        "brandId": 860,
        "remoteId": [8297, 84565, 101266, 178973, 115713, 30004]
    }, {
        "brand": "样例",
        "brandId": 888,
        "remoteId": [38142]
    }, {
        "brand": "长虹",
        "brandId": 896,
        "remoteId": [140605, 138909, 21998, 136862, 137156, 17470, 137731, 137982, 138292,
139810, 140335, 126927, 135305, 135828, 136089, 136343, 136601, 140079, 140843, 101266, 117353]
    }, {
        "brand": "春兰",
        "brandId": 984,
        "remoteId": [27239, 186490, 16548, 21753, 144580, 145889, 101266, 144087, 145075,
33797, 34246, 186428, 31723]
    }, {
        "brand": "康佳",
        "brandId": 1040,
        "remoteId": [101266, 143567, 121748, 116842, 110261]
    }, {
        "brand": "科龙",
        "brandId": 1064,
      "remoteId": [124403, 103048, 125119, 13243, 23715, 101266, 11309, 28454, 178504, 177896,
178188, 31994]
    }, {
        "brand": "澳柯玛",
        "brandId": 1116,
        "remoteId": [186031, 181556, 181786, 182059, 182353, 175179, 175497, 101266, 18907,
33395, 33596]

    }, {
        "brand": "东芝",
        "brandId": 1164,
        "remoteId": [21998, 117353, 176940, 177405, 101266, 30952, 113767]
    }, {
        "brand": "LG 乐金",
        "brandId": 1196,
        "remoteId": [93380, 119887, 120161, 22620, 120633, 120863, 101266, 101051, 102387, 102618, 102833, 103731]
    }, {
        "brand": "飞利浦",
        "brandId": 1248,
        "remoteId": [131244, 116842, 124809, 147876, 101266, 164903]
    }, {
        "brand": "夏普",
        "brandId": 1276,
        "remoteId": [30589, 101266, 101577, 101982, 106086, 106499, 118747, 103048, 103946, 104838, 105521, 106912]
    }, {
        "brand": "三菱",
        "brandId": 1328,
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