

Title: Modbus RTU Option Using XJ485CX

Department: Engineering

Objective: Provide Configuration Settings

Revision History:

Rev	Date	Owner	Description of Changes
1	01-06-11	G. Gonzalez	New Format Initial Release
2	01-19-11	G. Gonzalez	Added message structure setting for multiple devices
2.1	04-03-14	B. Slotnick	Update email address
2.2	02-05-16	B. Slotnick	Corrected cooling set point HEX address

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1.0 Scope

This manual provides the configuration settings for the Modbus RTU option. Refer to the data configuration settings section for a list of all available parameters.

2.0 Serial Configuration Settings

Physical Layer = RS485
Baud Rate = 9600 bps
Data Length = 8 bit
Parity = None
Stop Bit = 1

3.0 Modbus RTU Message Structure

- Read Holding Register: Function Code 03

Device Address	Function Code	Parameter Address	N. Register	CRC
Byte	Byte	Word	Word	Word

Example 1: Reading Cooling Set Point (0359 HEX)

TX: 01 03 03 59 00 01 CRC

Example 2: Reading Cooling Set Point (0359 HEX) from multiple devices

Air Conditioner Controller 1 with Address 01
Air Conditioner Controller 2 with Address 02
Air Conditioner Controller N with Address N

TX1: 01 03 03 59 00 01 CRC
TX2: 02 03 03 59 00 01 CRC
TXN: N 03 03 59 00 01 CRC

- Write Holding Register: Function Code 06

Device Address	Function Code	Parameter Address	N. Register	CRC
Byte	Byte	Word	Word	Word

Example 1: Write Cooling Set Point (0359 HEX)

TX: 01 06 03 59 00 01 CRC

Note: Define the CRC calculated for the frame data received. The CRC is used to verify integrity of the data.

Note: For multiple devices within the same gateway, the [Adr] parameter will need to be changed for each controller. The default [Adr] value is 1 and may range from 1 – 247. To access this setting press and hold the SET and DOWN buttons simultaneously on the Air Conditioner's Digital Controller for 3 seconds, release and using the up/down arrows navigate through the list of parameters. Locate [Adr], press SET, change the value using the up/down arrows and press SET to save changes.

Refer to the Air Conditioner User and Technical Manual for details on accessing the programming menu for the digital controller.

- Define CRC

The Modbus protocol requires the message with a byte pair in order to control the frame. The format of the frame is shown below. The CRC is calculated from the controller that transmits the frame and is stored in queue. The value of the CRC is sent in reverse order, first LSB followed by MSB.

Use the following C code for a CRC generator

```
#define MODBUS_GENERATOR 0xA001
Unsigned int CRC;
void ModbusCalcCRC(unsigned char* Frame,unsigned char LenFrame)
{
    unsigned char CntByte;
    unsigned char j;
    unsigned char bitVal;
    CRC = 0xFFFF;

    For (CntByte=0;CntByte<LenFrame;CntByte++)
    {
        CRC ^= Frame[CntByte];
        for(j=0;j<8;j++)
        {
            bitVal = CRC & 0x0001;
            CRC = CRC >> 1;
            if(bitVal == 1)
                CRC ^= MODBUS_GENERATOR;
        }
    }
}
```

4.0 Data Configuration Settings

Parameter	Description	Data Type	Modbus RTU Address (Hex)	Modbus RTU Address (Dec)	Current Rights	Data Range	Default	Controller Display
Set	Cooling Set Point	Integer	035F	864	Read / Write	Default 70 to 95 °F	90 °F	
Hy	Set Point Differential	Integer	0300	769	Read / Write	1 to 45 °F	5 °F	
LS	Minimum Set Point	Integer	0301	770	Read	-67 to 90 °F	70 °F	
US	Maximum Set Point	Integer	0302	771	Read	90 to 302 °F	95 °F	
Lod	Probe Displayed	Character	0315	790	Read / Write	P1 (Evaporator) = 0 P2 (Condenser) = 1		P1/P2
SAA	Set Point Aux (Dry Contact / Heater)	Integer	0330	817	Read / Write	-67 to 302 °F	55 °F	
SHy	Set Point Aux Differential (Dry Contact / Heater)	Integer	0331	818	Read / Write	1 to 45 °F	3 °F	
ALU	Maximum Temperature Alarm	Integer	033A	827	Read / Write	45 to 302 °F	105 °F	
ALL	Minimum Temperature Alarm	Integer	033B	828	Read / Write	-67 to 105 °F	45 °F	
rEL	Firmware Release	String	035D	862	Read			
N/A	Evaporator Probe 1 Temperature	Analog	108	265	Read	-67 to 302 °F		
N/A	Condenser Probe 2 Temperature	Analog	109	266	Read	-67 to 302 °F		
N/A	Probe # 1 Alarm Status (Evaporator Temperature)	Boolean	0208	521	Read	No Alarm = 0 Alarm = 1		P1
N/A	Probe # 2 Alarm Status (Condenser Temperature)	Boolean	0209	522	Read	No Alarm = 0 Alarm = 1		P2
N/A	High Room Temperature Alarm Status	Boolean	020C	525	Read	No Alarm = 0 Alarm = 1		HA
N/A	Low Room Temperature Alarm Status	Boolean	020D	526	Read	No Alarm = 0 Alarm = 1		LA
N/A	High Condenser Temperature Alarm Status	Boolean	020E	527	Read	No Alarm = 0 Alarm = 1		HA2
N/A	Low Condenser Temperature Alarm Status	Boolean	020F	528	Read	No Alarm = 0 Alarm = 1		LA2
N/A	Low Pressure Alarm Status	Boolean	0211	530	Read	No Alarm = 0 Alarm = 1		CA
N/A	Aux Relay Status	Boolean	021C	541	Read	Open = 0 Closed = 1		AUX
N/A	Relay Compressor Status	Boolean	021E	543	Read	Off = 0 On = 1		*
N/A	Keypad Lock	Boolean	0203	516	Read	Unlock = 0 Lock = 1		