WN90LP Modbus RTU protocol V1.0.1

CONTENTS

1. Communication Protocol

1.1 Basic Parameter

Code	8-bit binary
Data Bits	8 Bits
Parity Check Bits	None
Stop bit	1 bit
Error check	CRC(polynomial 0x8005)
Baud rate	Default:9600bit/s

1.2 Definition of data frame format

Host query frame structure：

Address code	Function code	Register start address	Register length	CRC LSB	CRC MSB
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave reply frame structure：

Address code	function code	Number of valid bytes	Data set 1	Data set 2	Data set N	CRC LSB	CRC MSB
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	1 byte	1 byte

1.3 Register address

Register address	Function	W/R	Description
0160 H	Device model	read only/RO	Device model code （90 H）
0161 H	Device Baud rate	Read write/RW	1 for 4800 2 for 9600 3 for 19200 4 for 115200
0162 H	Device address	Read write /RW	Range：1~252
0163 H	Device ID MSB	read only/RO	
0164 H	Device ID LSB	read only/RO	
0165 H	Light	read only/RO	value in hex Light=value*10 (Range: 0lux -> 300,000lux) If invalid fill with 0xFFFF

0166 H	UV index	read only/RO	value in hex UVI =UVI value/10 (Range: 0 -> 150) If invalid fill with 0xFFFF
0167 H	temperature	read only/RO	value in hex 10.5 C = 1F9h -10.5 C = 127h with 400 offset added (Range: -40.0C -> 60.0C) If invalid fill with 0x7ff
0168 H	Humidity	read only/RO	data in hex (Range: 1% - 99%) If invalid fill with 0xFFFF
0169 H	Wind speed	read only/RO	data in hex If invalid fill with 0xFFFF.Wind Speed = WIND value*0.1m/s(0~40m/s)
016A H	Gust Speed	read only/RO	data in hex If invalid fill with 0xFFFF.Gust Speed = GUST value*0.1m/s(0~40m/s)
016B H	Wind direction	read only/RO	value in hex (Range: 0°- 359°) If invalid fill with 0xFFFF
016C H	Rainfall	read only/RO	data in hex Rain = value*0.1mm 1.8mm=12H
016D H	ABS Pressure	read only/RO	Value in hex ABS = value*0.1hPa 1002.6hPa=272AH If invalid fill with 0xFFFF

1.4 Example for communication protocol

1.4.1 Example for normal command

Example 1： read light intensity

Inquiry frame：

Address code	function code	Start address	Payload size	CRC LSB	CRC MSB
0x90	0x03	0x01 0x65	0x00 0x01	0x89	0x68

Reply frame：

Address code	Function code	Payload size	light intensity	CRC LSB	CRC MSB
0x90	0x03	0x02	0x07 0xB0	0x46	0x1D

It means: the intensity is: 1968 (LUX)

Example 2: get data (light, UVI, Temperature, Humidity, Wind Speed, Gust speed, Wind direction, Rainfall)

Inquiry frame：

Address code	Function code	Start address	Payload size	CRC LSB	CRC MSB
0x90	0x03	0x01 0x65	0x00 0x08	0x49	0x6E

Reply frame：

Address code	function code	Payload size	Payload	CRC LSB	CRC MSB
0x90	0x03	0x10	0x06E7，0x000D 0x0296，0x003C 0x0000，0x0000 0x0096，0x0000	0xBD	0x2F

It means:

Light = 1767 Lux

UV index（UVI）= 13

Temperature = 26.2℃

Humidity = 60%

Wind speed = 0 m/s
Gust speed = 0 m/s
Wind direction = 150°
Rainfall = 0 mm

Example 3: modify Baud rate as 4800
Inquiry frame：

Address code	Function code	Register address	data	CRC LSB	CRC MSB
0x90	0x06	0x01 0x61	0x00 0x01	0x04	0xA9

Reply frame：

Address code	Function code	Payload size	Payload	CRC LSB	CRC MSB
0x90	0x06	0x02	0x00 0x01	0x84	0x95

Example 4: modify device address as 0x34
Inquiry frame：

Address code	Function code	Register address	data	CRC LSB	CRC MSB
0x90	0x06	0x01 0x62	0x00 0x34	0x34	0xBE

Reply frame：

Address code	Function code	Payload size	Payload	CRC LSB	CRC MSB
0x90	0x06	0x02	0x00 0x34	0x44	0x82

1.4.2 Special Command

If users modified device address and Baud rate, but forget the device address (modified) and baud rate(modified), then use this special command.

The structure of the host inquiry frame as following:

prefix	Read/write Baud rate	Read/Write device address	CRC LSB	CRC MSB
3 bytes Fix value 0xFDFDFD	1 byte 0：read Baud rate 1：set Baud rate4800 2：set Baud rate9600 3：set Baud rate19200 4: set Baud rate115200	1 byte 0：read device address 1~252：set device address	1 byte	1 byte

Structure of Slave Reply frame：

prefix	Baud rate	Device address	CRC LSB	CRC MSB
3 bytes Fix value 0xFDFDFD	1 byte 1：for Baud rate4800 2：for Baud rate9600 3：for Baud rate19200 4：for Baud rate115200	1 byte	1 byte	1 byte

Example 5：read Baud rate and slave address：

Inquiry frame：

prefix	Read Baud rate	Read device address	CRC LSB	CRC MSB
0xFDFDFD	0x00	0x00	0xE9	0x88

Reply frame：

prefix	Baud rate	Device address	CRC LSB	CRC MSB
0xFDFDFD	0x01	0x90	0xE8	0x74

It means: Baud rate is 4800，Slave device address is 0x90。

Example 6：set Baud rate as 9600：

Inquiry Frame：

prefix	Read Baud rate	Read device address	CRC LSB	CRC MSB
0xFDFDFD	0x02	0x00	0xE8	0xE8

Reply frame：

prefix	Baud rate	Device address	CRC LSB	CRC MSB
0xFDFDFD	0x02	0x90	0xE8	0x84

It means: set Baud rate as 9600 successfully, and read the slave device address 0x90.

Example 7: set device address as 0x01：

Inquiry frame：

prefix	Read Baud rate	Read device address	CRC LSB	CRC MSB
0xFDFDFD	0x00	0x01	0x28	0x48

Reply frame：

prefix	Baud rate	Device address	CRC LSB	CRC MSB
0xFDFDFD	0x02	0x01	0x29	0x28

It means: set device address as 0x01 successfully, and read Baud rate 9600

1.5 Error Code

Error Codes	Name	Description
01	illegal function	function code not 0x03、0x06
02	illegal data address	Register address not in the range
03	illegal data value	Data length cross the border/value wrong
08	CRC Verification failed	CRC Verification failed

Error code of Reply frame need add code 0x80， as example 8:

Example 8： Reply frame

Address code	Function code	Error code	CRC LSB	CRC MSB
0x90	0x83	0x08	0x11	0x1B

2. Wiring Connection

Wires	Description	Remark
Green	VCC	5~12V DC
Black	GND	GND
Red	485_A	485_A
Yellow	485_B	485_B