



MODBUS PROTOCOL LOTUS

ATTENZIONE - WARNING - ATTENTION

Impostare ID RS485 dello strumento a 1
Set RS485 controller's ID to 1
Définissez l'ID du contrôleur RS485 sur 1





NORME CE
EC RULES(STANDARD EC)
NORMAS DE LA CE

Direttiva Bassa Tensione
Low Voltage Directive
Directiva de baja tensión } 2014/35/UE

Direttiva EMC Compatibilità Elettromagnetica
EMC electromagnetic compatibility directive
EMC directiva de compatibilidad electromagnética } 2014/30/UE



GENERAL SAFETY GUIDELINES

Danger!

In emergencies the instrument should be switched off immediately! Disconnect the power cable from the power supply!

When installing always observe local regulations!

Manufacturer is not liable for any unauthorized use or misuse of this product that may cause injury, damage to persons and / or materials.

Caution!

Instrument must be accessible at all times for both operating and servicing. Access must not be obstructed in any way!

Feeder should be interlocked with a no-flow protection device to automatically shut-off the pumps when there is no flow!

Pumps and accessories must be serviced and repaired by qualified and authorized personnel only!

Always discharge the liquid end before servicing the instrument!

Empty and rinse the liquid end before work on a pump which has been used with hazardous or unknown chemicals!

Always read chemical safety datasheet!

Always wear protective clothing when handling hazardous or unknown chemicals!

Instrument must be operated / serviced by trained technicians only!

All connection operations must be performed while the instrument is not connected to main supply!

MODBUS

What is MODBUS?

It is a application--layer messaging protocol. It provides client/server communication between devices connected on networks.

Devices with MODBUS protocol use 8, N, 1 data format: 8 data bits, no parity, 1 stop bit. Communication speed rate (baud) can be set from devices communication menu directly.

MODBUS transactions are related always to the "master", that manage the line and a "slave" device per time (except for broadcast messages).

Each "slave" device is univoquely identified by an **address**.

First character of the message always contains the "slave" device's numeric address.

Permitted addresses are from 1 to 255. 0 is used only for broadcast messages, directed to all "slave" devices at the same time.

Second character of the message contains the master's request. The "slave" device replies with same character to mean the request has been executed.

Frequently used requests are

Function	Description
01	Read Coil Status
02	Read Input Status
03	Read Holding Registers
04	Read Input registers
05	Force Single Coil
06	Preset Single register
07	Read Status



Last two character of the message contains Cyclic Redundancy Check obtained by CRC16 algorithm.

MODBUS FUNCTIONS

Read Output Status (01)

The function asks the ON / OFF of binary logic variables.

Broadcast is not allowed.

Request

In addition to the "slave" address and the function code (01), message contains starting address on two bytes and the number of bits to be read also on two bytes. The address numbering starts from zero (bit1 = 0) for the MODBUS.

The time between one interrogation and another must be greater than or equal to: 500 ms (thousand seconds)

Example: Request to read from the slave 17 bit from 04 to 015.

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	CRC HI	CRC LO
11	01	00	03	00	0C	CE	9F

Reply

In addition to the “slave” address and the function code (01), message contains the number of data bytes and characters containing the data.

Data are packed so that a byte represent an 8 bit status, less significant bit of the first byte contains the bit corresponding to the starting Address and so on.

If the number of bits to be read is not multiple of 8, the last character is completed with zeros in the most significant bits.

Example: Reply to the previous request.

ADDR	FUNC	DATA byte count	DATA bit 04..11	DATA bit 12..15	CRC HI	CRC LO
11	01	02	CD	0B	6D	68

Read Output Registers (03)

This function allows to request value of 16-bit (word) registers containing numeric variables.

In addition to the “slave” address and the function code (03), the message contains the starting address on two bytes and the number of words to be read also on two bytes. The maximum number of words that can be read is 125.

Example: : Request to read from slave 25 of registers from 4069 to 40071.

ADDR	FUNC	DATA start Addr HI	DATA start Addr LO	DATA bit # HI	DATA bit # LO	CRC HI	CRC LO
19	03	00	44	00	03	46	06

Reply

In addition to the “slave” and the function code (03), message contains a character that contains the number of data bytes and characters containing the data.

The registers require two bytes each, the first of which contains the most significant part.

Example: Reply to the previous request.

ADDR	FUNC	DATA byte count	DATA byte 69 HI	DATA byte 69 LO	DATA byte 70 HI	DATA byte 70 LO	DATA byte 71 HI	DATA byte 71 LO	CRC HI	CRC LO
19	03	06	02	2B	00	00	00	64	AF	7A

Force Single Coil (05)

This function allows to force a single binary variable state ON or OFF.

In addition to the “slave” address and the function code (05), the message contains the address of the variable to force two bytes and two characters of which the first is set to FF hex (255) to force ON state and 00 hex to force OFF state, the second is set to zero in every case.

Example: Request to force ON on “slave” 47 bit 4.

ADDR	FUNC	DATA bit HI	DATA bit LO	DATA ON/OFF	DATA (Zero)	CRC HI	CRC LO
2F	05	00	03	FF	00	7A	74

Reply

Reply consists in reading setpoint status modification. **See Read Status (07)**

Preset Single Register (06)

This function allows to set a 16 bit single register value.

In addition to the “slave” address and the function code (06) the message contains the address of the variable on two byte and the value to be assigned to.

Example: Request to force 928 on “slave” 35 address 26.

ADDR	FUNC	DATA bit HI	DATA bit LO	DATA WORD HI	DATA WORD LO	CRC HI	CRC LO
23	06	00	19	03	A0	5E	07

Replay

Reply consists in reading setpoint status modification. **See Read Status (07)**

Read Status (07)

This function allows to read status an 8 bit message predetermined with a compact message.

Example: Request on “slave” 25 status.

ADDR	FUNC	CRC HI	CRC LO
19	07	5E	07

Replay

In addition to the “slave” address and the function code (07) the message contains a character with the status bits.

ADDR	FUNC	Status_send	CRC HI	CRC LO
2F	05	00	7A	74

status-send:

0 setpoint changed succesfully

1 wait setpoint changing

2 setpoint changing error

ERROR MANAGEMENT

ADDR	FUNC	DATA exept. code	CRC HI	CRC LO
0A	81	02	7A	74

Exceptional codes

CODE	NAME	DESCRIPTION
01	ILLEGAL FORMAT	Uncorrect format message
02	ILLEGAL DATA ADDRESS	Address referred is not allowed on the "slave"
03	ILLEGAL DATA VALUE	Uncorrect function
04	CRC ERROR	CRC checksum error

ADDRESS LIST VALUE:

Address	No. register	Format	Property	Function	Description
40002	2	Int16	R	03	Channel reading without flow point
40008	2	Int16	R	03	Divider factor for current: 1, 10 ,100, 1000
40052	2	Int16	R	03	Temperature
Alarms					
01	1Bit	Bit	R	01	Lev_Acid 0: No alarm 1: Alarm
02	1Bit	Bit	R	01	Lev_Full 0: No alarm 1: Alarm
03	1Bit	Bit	R	01	Lev_Chlorite 0: No alarm 1: Alarm
04	1Bit	Bit	R	01	Flow_Sefl_Water 0: No alarm 1: Alarm
05	1Bit	Bit	R	01	Sefl_Acid 0: No alarm 1: Alarm
06	1Bit	Bit	R	01	Sefl_Chlorine 0: No alarm 1: Alarm
07	1Bit	Bit	R	01	Leakage 0: No alarm 1: Alarm
08	1Bit	Bit	R	01	Overflow 0: No alarm 1: Alarm
09	1Bit	Bit	R	01	n/a
11	1Bit	Bit	R	01	Bypass alarm (LOTUS MAXI only) 0: No alarm 1: Alarm
11	1Bit	Bit	R	01	Pre-dilution line water (LOTUS ULTRA only) 0: No alarm 1: Alarm

Output					
40024	2	Int8	R	03	out is
40025	2	Int8	R	03	WORKING STATUS
Setpoint					
40068	2	Int16	R/W	03/06	Production 0008 0020 0080 0160 0240 0400 0600 0800 1000
40070	2	Int16	R/W	03/06	Mode 0 proportional WM 1 constant 2 Batch 4 Proportional and reading 5 Reading
40072	2	Int16	R/W	03/06	CAP1 (constant)
40074	2	Int16	R/W	03/06	CAP2 (constant)
40078	2	Int16	R/W	03/06	CAP proportional wm PROP & READ READING
40076	2	Int16	R/W	03/06	LIMIT proportional wm PROP & READ READING
40082	2	Int16	R/W	03/06	OUT // 0 -> 0/20mA 1->4/20mA
40084	2	Int16	R/W	03/06	OUTA [g/h]
40086	2	Int16	R/W	03/06	OUTB[g/h]
40088	2	Int16	R/W	03/06	IN // 0 -> 0/20mA 1->4/20mA
40092	2	Int16	R/W	03/06	INA reading
40090	2	Int16	R/W	03/06	INB reading
Clock Read					
40044	2	Int16	R/W		MOUNTH DAY
40046	2	Int16	R/W		HOUR YEAR
40048	2	Int16	R/W		00 MINUTES
47	1Bit	Bit	R/W	01/05	AM/PM
Parameter					
40522	2	Int16	R/W	03/06	Dos[strokes per alarm sefl]
40542	2	Int16	R/W	03/06	Password1
40520	2	Int16	R/W	03/06	Password2
40540	2	Int16	R/W	03/06	Language 0 English 2 USA
WMeter					
40528	2	Int16	R/W	03/06	0:Imp/Liters 1:Litri/Pulses 2:mA
40036	4	Int32	R/W	03/06	Value
40040	4	Int32	R/W	03/06	resolution

40536	2	Int16	R/W	03/06	0:0/20 1:4/20
40538	2	Int16	R/W	03/06	Timeout in seconds / Time Every Min
Flow					
40526	2	Int16	R/W	03/06	Mode0:Disable 1:Reverse 2: Direct
40524	2	Int16	R/W	03/06	Time in minutes
Log Setpoint					
48	1Bit	Bit	R/W	01/05	1: Enable 0: disable
40530	2	Int16	R/W	03/06	Time Hour = Value /100 Time Minute= Value%100
40532	2	Int16	R/W	03/06	Every Hour = Value /100 Every Minute= Value%100
54	1Bit	Bit	R/W	01/05	Time Am if =1
55	1Bit	Bit	R/W	01/05	Time Pm if =1
Service					
40058	2	Int16	R	03/06	Mv probe
LabelRead					
40844	2	Int16	R/W	03/06	Label "chr0-chr1"
40845	2	Int16	R/W	03/06	Label "chr2-chr3"
40846	2	Int16	R/W	03/06	Label "chr4-chr5"
40847	2	Int16	R/W	03/06	Label "chr6-chr7"
40848	2	Int16	R/W	03/06	Label "chr8-chr9"
40849	2	Int16	R/W	03/06	Label "chr10-chr11"
40850	2	Int16	R/W	03/06	Label "chr12-chr13"
40851	2	Int16	R/W	03/06	Label "chr14-chr15"
40852	2	Int16	R/W	03/06	Label "chr16-chr17"
40853	2	Int16	R/W	03/06	Label "chr18-chr19"
40854	2	Int16	R/W	03/06	Label "chr20-chr21"
40855	2	Int16	R/W	03/06	Label "chr22-chr23"
40856	2	Int16	R/W	03/06	Label "chr24-chr25"
40857	2	Int16	R/W	03/06	Label "chr26-chr27"



*When dismantling this instrument please separate material types and send them according to local recycling disposal requirements.
We appreciate your efforts in supporting your local Recycle Environmental Program.
Working together we'll form an active union to assure the world's invaluable resources are conserved.*