FOR CONTROLLERS FIRMWARE 419 R07 AND FOLLOWING / STANDARD VERSION

MODBUS MANUAL FOR LDS CONTROLLERS SERIES

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

WARNING: ENABLING MODBUS OPTION WILL DISABLE ERMES FUNCTIONALITIES

R6-02-24

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 INFORMATION

Danger! During an emergency of any nature within the environment where the pump group is installed, it is necessary to immediately turn off the power to the system and disconnect the instrument from the socket!

If particularly aggressive chemical materials are used, it is necessary to scrupulously follow the regulations regarding the use and storage of these substances!

If you install the instrument outside the European Community, comply with local safety regulations!

The manufacturer cannot be held responsible for damage to people or property caused by poor installation or incorrect use!

Attention! Install the instrument so that it is easily accessible whenever maintenance is required!
Never obstruct the place where the instrument is located!

The instrument must be slaved to an external control system. In case of lack of water, the dosing must be stopped.

The assistance and maintenance of the instrument and all its accessories must always be carried out by qualified personnel!

Always empty and carefully wash pipes that have been used with particularly aggressive chemical materials! Wear the most suitable safety devices for the maintenance procedure!

Always carefully read the chemical characteristics of the product to be dosed!

All operations must be carried out when the instrument is not connected to the power supply!

The MODBUS protocol

MODBUS is a serial communication protocol created in 1979 by MODICON (a company now part of the Schneider Electric group) to connect its programmable logic controllers (PLCs). AND
has become a *de facto* standard in industrial communication and is currently one of the most widespread connection protocols in the world among industrial electronic devices. The main reason for such a high use of MODBUS compared to other communication protocols is that this is an open and royalty-free protocol.

With the MODBUS protocol we define the format and mode of communication between a "master" that manages the system and one or more "slaves" that respond to queries from the master. Our device is a "slave".

The device address (ID), data format, and communication baud rate can be set directly from the MODBUS Communication menu from device menu.
MODBUS allows the connection of a master (e.g. a PC) and various “slaves” (e.g. measurement and control systems). Two versions are available: one for serial interface (RS-232 and RS-485) and one for ETHERNET.

The following operating modes can be distinguished for data transmission:

- MODBUS TCP: ETHERNET TCP/IP communication based on the client/server model
- MODBUS RTU: asynchronous serial transmission via RS-232 or RS-485
- MODBUS ASCII: similar to the RTU protocol except for a different data format used
  relatively rarely

In our case the **operating mode is RTU (asynchronous serial transmission via RS-485).**

MODBUS RTU

MODBUS RTU realizes a “master / slave” serial communication via RS-232 or RS-485. In order to address MODBUS RTU, the serial communication parameters must first be known and/or defined. These parameters include baud rate, parity, and stop bits. The “slave” addresses that must be also come into play here
directed by the "master".

Message format

The message format between the “master” and the “slave” includes:

- The address of the device with which the master established the transaction (address 0 corresponds to a broadcast message sent to all "slave" devices).
- The code of the function that is to be, or has been, executed.
- The data that needs to be exchanged.
- The error control composed according to the CRC16 algorithm.

If a device detects an error in the received message (format, parity or CRC16) or the address does not correspond to an online device, the message is considered invalid and discarded.
A “slave” that detects an error in the message will therefore not perform the action and will not respond to the request.

Data Format

Devices with MODBUS protocol use the following data formats for communication

8N1 format (default): 8 data bits, without any parity check (“No parity”) and with 1 stop bit. 8O1 format: 8 data bits, parity control on even bits (“Odd parity”) and with 1 stop bit.

8E1 format: 8 data bits, parity control on odd bits (“Even parity”) and with 1 stop bit. 8N2 format: 8 data bits, no parity check (“No parity”) and with 2 stop bits.

The polling speed must be equal to or greater than 500ms (milliseconds).

The address

MODBUS transactions always involve the master, which manages the line, and one "slave" at a time (except in the case of broadcast messages).

To identify the recipient of the message, a byte containing the numerical address of the selected device is transmitted as the first character.

Each of the "slaves" will therefore have been assigned a different numerical address that uniquely identifies it.

The eligible addresses are those from 1 to 255.

The address 0, which cannot be assigned to a "slave", placed at the head of the message transmitted by the master indicates that this is "broadcast", i.e. directed to all the "slaves" at the same time. Can only messages that do not require a response to carry out their function, therefore only assignments, can be transmitted as broadcasts.

The function code

The second character of the message transmitted by the master identifies the function that must be performed, to which the "slave" in turn responds with the same code to indicate that the function has been performed.

In our case, the only MODBUS functions that can be used are those shown below:

FUNCTION	DESCRIPTION
03	Reading registers
06	Single register setting
10	Setting up multiple registers

The last two characters of the message contain the cyclic redundancy code (Cyclic Redundancy Check) calculated according to the CRC16 algorithm.

MODBUS Data Addresses

Data Address	Offset	Associated number	GUY
0000- 270E Hex	40001	40001- 49999	R/W

THE MODBUS FUNCTIONS

Below is a detailed description of the MODBUS functions used.

Reading registers (03)

With this function, contiguous blocks of 16-bit internal registers are read from the "slave" device.

This function allows you to request the value of 16-bit registers (words) containing variables
numeric. Broadcast mode is not allowed.

Request

In addition to the address of the "slave" and the function code (03), the message contains the starting address ("Starting Address") expressed 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 the register with address 40001 (the first) from the "slave" with ID 01.

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	03	00	00	00	01	84	0A

Answer

In addition to the address of the "slave" and the function code (03), the response message includes the number of bytes read and the data contained in the read register.
Registers are made up of two bytes each, the first of which contains the most significant part.

Example: Response to the request above.

ID	FUNCTION	Number bytes read	DATE Address 0000 (HIGH)	DATE Address 0000 (LOW)	CRC (HIGH)	CRC (LOW)
01	03	02	00	00	B8	44

Request

Example: Read request from the "slave" with ID 1 of registers from 40001 to 40003.

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	03	00	00	00	03	05	CB

Answer

In addition to the address of the "slave" and the function code (03), the response message includes the number of bytes read and the data contained in the read registers.

Registers are made up of two bytes each, the first of which contains the most significant part.

Example: Response to the request above.

ID	FUNCTION	Number bytes read	DATE Address 0000 (HIGH)	DATE Address 0000 (LOW)	DATE Address 0001 (HIGH)	DATE Address 0001 (LOW)	DATE Address 0002 (HIGH)	DATE Address 0002 (LOW)	CRC (HIGH)	CRC (LOW)
01	03	06	00	00	00	00	00	00	21	75

Function Code (03) – Read pending registers

Request	Function Code	1 byte	0x03
	Starting address	2 bytes	From 0x0000 to 0xFFFF
	Number of registers	2 bytes	1 to 125 (0x01 to 0x7D)

Answer	Function Code	1 byte	0x03
	Number of bytes read	1 byte	2xN
	Register value	2N bytes	“N” is the number of registers

Single register setting (06)

This function allows you to set the value of a single 16-bit register. In addition to the address of the "slave" and the function code (06), the message contains the address of the variable expressed in two bytes and
the value that must be assigned. Broadcast mode is allowed. Example of Request (LEVEL
ALARM ENABLED and NC CONTACT): set the value 03 on the "slave" with ID 01 of register 40104.

ID	FUNCTION	Address (HIGH)	Address (LOW)	DATE WORD (HIGH)	DATE WORD (LOW)	CRC (HIGH)	CRC (LOW)
01	06	00	67	00	03	78	14

Answer

In addition to the address of the "slave" and the function code (06), the response message contains the address of the variable expressed in two bytes and the value assigned to it.

ID	FUNCTION	Address (HIGH)	Address (LOW)	DATE WORD (HIGH)	DATE WORD (LOW)	CRC (HIGH)	CRC (LOW)
01	06	00	67	00	03	78	14

Setting more than one register (10)

This function allows you to set the value of a consecutive block of 16-bit registers. Broadcast mode is allowed. In addition to the address of the "slave" and code 10, the message contains the starting address, the number of words to write, how many bytes the words are made up of and the value of the registers. In our case it is allowed to write only one word at a time and only words of 2 or 4 bytes.

Since we use the function with code 06 to write 2 bytes, we use this function to write words made up of four bytes.

Example: Set the pump having ID1 in CONSTANT mode (location 40140) at 80,000 L/h

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	Bytes for Words	DATE Word Address 008C (HIGH)	DATE Word Address 008C (LOW)	DATE Word Address 008B (HIGH)	DATE Word Address 008B (LOW)	CRC (HIGH)	CRC (LOW)
01	10	00	8B	00	01	04	00	01	38	80	F9	EF

Answer

In addition to the address of the "slave" and the function code (10), the message includes the starting address and the number of words written.

Example: Response to the request above.

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	10	00	8B	00	01	71	E3

ERROR MANAGEMENT

Two types of errors can occur during transmission, handled differently: errors
transmission and operational errors. Transmission errors are errors that occur if the message sent is compromised during sending and is therefore poorly received. In this case the error is detected by a possible bit parity check, if active in the serial transmission, or by a CRC check. The “slave”
that detects errors of this type in the message considers it invalid, discards the message without considering it and does not respond. However, if the message is correct in its form, without transmission errors, an error could occur in the content of the message itself, such as
a requested function, for any reason, is not executable, or the wrong content is addressed, an operational error occurs. The "slave" device responds to this error with an exception message.
This message consists of the address, the requested function delta code, an error code and the CRC. To indicate that the response is an error notification, the function code is returned with the most significant bit at "1".

The structure of the answer is as follows:

“SLAVE” ADDRESS	FUNCTION	ERROR CODE	CRC (HIGH)	CRC (LOW)

Request to a “slave” with wrong ID
Request

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
04	03	00	00	00	03	05	93

Answer

The message is considered invalid and there is no response.

Request

Request with wrong CRC

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	03	00	00	00	03	80	BB

Answer

The message is considered invalid and there is no response.

Request

Requests for content that does not exist in the “slave” Address 40566)

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	03	02	35	00	01	95	BC

Response (ILLEGAL DATA ADDRESS)

ID	FUNZ	Exception code	CRC (HI)	CRC (LO)
01	83	02	C0	F1

Request

Requests for content that does not exist in the "slave" (address 40014)

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	03	00	0D	00	03	94	08

Response (ILLEGAL DATA ADDRESS)

ID	Function	Exception queues	CRC (HIGH)	CRC (LOW)
01	83	02	C0	F1

Request (ILLEGAL DATA VALUE).

Attempt to write to a register (address 40100) a value that is not permitted for this address.

ID	FUNCTION	Address (HIGH)	Address (LOW)	DATE WORD (HIGH)	DATE WORD (LOW)	CRC (HIGH)	CRC (LOW)
01	06	00	63	00	04	78	17

Answer

ID	FUNCTION	Exception code	CRC (HIGH)	CRC (LOW)
01	86	03	02	61

Request

Function does not exist

ID	FUNCTION	Starting Address (HIGH)	Starting Address (LOW)	Number of Words (HIGH)	Number of Words (LOW)	CRC (HIGH)	CRC (LOW)
01	08	00	0D	00	01	21	CB

Answer

(ILLEGAL FUNCTION VALUE)

ID	FUNCTION	Exception	CRC (HIGH)	CRC (LOW)
01	80	01	80	00

Exception codes

CODE		DESCRIPTION
01	ILLEGAL FUNCTION VALUE	Non-existent function
02	ILLEGAL DATA ADDRESS	The address referenced by the data field is not a permitted address on the addressed “slave”. Attempt to write to a read-only register.
03	ILLEGAL DATA VALUE	The value to be assigned for the data field is not allowed for this address.
05	BUSY WRITING	n/a

Connect the RS485 wires on the mainboard to use the MODBUS protocol.
The native version does not require additional hardware to function.

REGISTER	ADDRESS	VALUES	PROPERTY'
VALUE 1 SETPOINT OUT IS	40010		R/W
VALUE 2 SETPOINT OUT IS	40011		R/W
VALUE 1 P/M OUT IS IN PROPORTIONAL MODE	40012		R/W
VALUE 2 P/M OUT IS IN PROPORTIONAL MODE	40013		R/W
MODE SETPOINT OUT IS	40014	0 ON/OFF 1 PROP2 Dis .	R/W
WAITING IN ON/OFF MODE	40016		R/W
VALUE 1 SETPOINT OUT RELAY	40037		R/W
VALUE 2 SETPOINT OUT RELAY	40038		R/W
VALUE 1 PERC/SEC OUT RELAY [PERC SEC-> PROP PWM MODE FIXED PWM]	40039		R/W
VALUE 2 PERC/SEC OUT RELAY [PERC SEC-> PROP PWM MODE FIXED PWM]	40040		R/W
MODE SETPOINT OUT RELAY	40041	0 PROP PWM 1 ON/OFF2 Fixed PWM 3 Dis	R/W
PARAMETER delay	40046	Time in minutes	R/W
PARAMETERS Tau	40047		R/W
PARAMETERS Pcode1	40048		R/W
PARAMETERS Pcode2	40049		R/W
PARAMETERS Pcode3	40050		R/W
PARAMETERS Pcode4	40051		R/W
PARAMETER TEMP_VIEW	40052	0 NO 1 YES	R/W
probe_failure mode	40054	1 STOP 0 DOSE	R/W
probe_failure time	40055	Time in minutes 0: OFF editable value from 100 to 250 min	R/W
dosing_alarm mode	40057	1 STOP 0 DOSE	R/W
dosing_alarm time	40058	Time in minutes 0: OFF editable value from 1 to 100 min	R/W
flow_setting mode	40060	0:Disable 1:Reverse 2:Direct	R/W
flow_setting time	40061	Time in minutes ALLOWED VALUES 0-99 min	R/W

ALARM MODE High	40063	0:disable 1 : Enable	R/W
ALARM MODE Low	40064	0:disable 1 : Enable	R/W
ALARM VALUE High	40065		R/W
ALARM VALUE Low	40066		R/W
ALARM VALUE Time	40067	Time in minutes editable value from 0 to 99 min	R/W
ALARM VALUE Mode	40068	1 STOP 0 DOSE	R/W
set_ clock.format //European time format (value 0) or American time format (value 1)	40070	European time format (value 0) or American time format (value 1)	W
set_clock.am_pm //AM -> 0, PM -> 1	40071	//AM -> 0, PM -> 1	W
set_clock.day	40072		W
set_clock.month	40073		W
set_ clock.year	40074		W
set_clock.hour	40075		W
set_ clock.minute	40076		W
MA_OUTPUT MAX value	40083		R/W
MA_OUTPUT MIN value	40084		R/W
MA_OUTPUTMode	40085	0: 0/ 20mA 1:4/20mA	R/W
MA_OUTPUT En_DIS_on_alarm	40086	0: Disable on Alarm 1 : Enable on Alarm	R/W
MA_OUTPUT_Temp.MAX	40088	°C value with 1 decimal point / °F no decimal points	R/W
MA_OUTPUT_Temp.MIN	40089	°C value with 1 decimal point / °F no decimal points	R/W
MA_OUTPUT_Temp.Mode	40090	0: 0/ 20mA 1:4/20mA	R/W
MA_OUTPUT_Temp.En_DIS_on_alarm	40091	0: Disable on Alarm 1 : Enable on Alarm	R/W
LOG Enable	40093	1: Enable 0: Disable	R/W
LOG Time Hour	40094		R/W

LOG Time Minute	40095		R/W
LOG.Time.Am	40096	1 YES 0 NO	R/W
LOG.Time.Pm	40097	1 YES 0 NO	R/W
LOG.Every.Hour	40098		R/W
LOG.Every.Minute	40099		R/W
LOG.Every.Am	40100	1 YES 0 NO	R/W
LOG.Every.Pm	40101	1 YES 0 NO	R/W
LOG.OUT_E	40102	1: LOGOUT Enable 0: LOG OUT disable	R/W
Alarm	40819	General alarm 0 : No alarm 1: alarm	R
LEV level alarm	40822	Alarm level 0 : No alarm 1 : Alarm	R
STBY	40824	STBY Alarm 0: No alarm 1: Alarm	R
SEPR	40825	SEPR Alarm 0: No alarm 1: Alarm	R
OUT IS dosage alarm	40827	0 No alarm 1 Dose alarm 2 Stop alarm	R
Dosing alarm OUT RELAY	40830	0 No alarm 1 Dose alarm 2 Stop alarm	R
Minimum maximum value alarm	40832	0 No alarm 1 Dose alarm 2 Stop alarm	R
reading channel (BASED ON THE PROBE)	40834	Current measurement division factor. Possible values 4 : div 1 , 3: div 10, 2: div 100, 2: div 1000	R
COMMA position temperature channel	40835	Current measurement division factor. Possible values 4 : div 1 , 3: div 10, 2: div 100, 2: div 1000	R
IS EXIT STATUS	40839	0 OFF 1 ON	R
RELAY OUTPUT STATUS	40840	0 OFF 1 ON	R
CHANNEL READING	40445		R

TEMPERATURE READING	40446		R
SERIAL PROBE FAILURE	40470	0 No alarm 1 Probe disconnected alarm	R
SERVICE READING IN mV	40472	for SCL probes it is a negative value	R
SERVICE TEMPERATURE IN mV	40473		R
DATE: DAY	40474		R
DATE: MONTH	40475		R
DATE: YEAR	40476		R
DATE: TIME	40477		R
DATE: MINUTES	40478		R
DATE: SECONDS	40479		R
& runtime_S.AM_PM	40480	2: EUROPEAN FORMAT 1: PM 0: AM	R

Disposal of end-of-life equipment by users

This symbol warns you not to dispose of the product with normal waste. Respect human health and the environment by taking discarded equipment to a designated collection center for the recycling of electronic and electrical equipment. For further information visit the online site.

All the materials used for the construction of the dosing pump and for this manual can be recycled and thus help maintain the incalculable environmental resources of our planet. Do not disperse harmful materials into the environment! Find out from the competent authority about the recycling programs for your area!

FOR CONTROLLERS FIRMWARE PRIOR TO 419 R07 / STANDARD & PLUS VERSION

MODBUS PROTOCOL
LDS SERIES

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

R5-12-24

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Direttiva EMC Compatibilità Elettromagnetica
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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

This device use MODBUS RTU protocol and it is a “slave”.

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 messagges, 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.

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

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.

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

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

ERROR CODES

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

Exception Codes

CODE	NAME	DESCRIPTION
01	ILLEGAL FORMAT	Received message format
02	ILLEGAL DATA ADDRESS	The address referenced by the data field is not a permitted on the addressed slave.
03	ILLEGAL DATA VALUE	Wrong Function
04	CRC ERROR	Checksum Error CRC

The time between one query and another must be greater than or equal to: 500 ms (milliseconds)

ADDRESS LIST PLUS ONLY

Address	Numero Registri	Format	Proprietà	Function	Description
40002	2	Int16	R	03	Channel reading Without decimal point
40004	2	Int16	R	03	Current measurement division factor. Possible values 1, 10, 100, 1000
40006	2	Int16	R	03	mA o mSec based on WM settings
40008	2	Int16	R	03	mA divisor factor (always 2)
40036	4	Int32	R	03	mch
40040	4	Int32	R	03	Litres totalizer
40052	2	Int16	R	03	Temperature
Allarmi					
01	1Bit	Bit	R	01	level Ch1 0: No alarm 1: alarm
02	1Bit	Bit	R	01	Flow 0: No alarm 1: alarm
03	1Bit	Bit	R	01	Out of Range 0: No alarm 1: alarm
04	1Bit	Bit	R	01	Dosing Alarm 0: No alarm 1: alarm
05	1Bit	Bit	R	01	Probe Malfunction 0: No alarm 1: alarm
06	1Bit	Bit	R	01	Level Ch2 0: No alarm 1: alarm
07	1Bit	Bit	R	01	Standby 0: No alarm 1: alarm

Output					
40024	2	Int16	R	03	CH1 Pulse: 0 ON/OFF 1 Proportional 2 Disable
40026	2	Int16	R	03	CH1 Relay 0 = Proportional 1 = ON/OFF 2 = FIXED 3 = DISABLE
40028	2	Int16	R	03	CH1 Pulse out IS 0:OFF| 1:ON
40030	2	Int16	R	03	CH2 Relay out Relay 0:OFF| 1:ON
Setpoint					
40068	2	Int16	R/W	03/06	xxxx Valore primo setpoint proporzionale
40070	2	Int16	R/W	03/06	xxxx Valore secondo setpoint proporzionale
40072	2	Int16	R/W	03/06	xxx P/m primo valore
40074	2	Int16	R/W	03/06	xxx P/m secondo valore
40076	2	Int16	R/W	03/06	xxxxx attesa in ON/OFF o mc/h in modalità prop+WM
40078	2	Int16	R/W	03/06	x modalità di lavoro 0 ON/OFF 1 PROP 2 Dis. 3 prop + WM 4 PID
40082	2	Int16	R/W	03/06	xxxx Valore primo setpoint relè
40084	2	Int16	R/W	03/06	xxxx Valore secondo setpoint relè
40086	2	Int16	R/W	03/06	xxx percentuale primo valore
40088	2	Int16	R/W	03/06	xxx percentuale secondo valore

40090	2	Int16	R/W	03/06	x modalità di lavoro 0 PROP PWM 1 ON/OFF 2 Fixed PWM 3 Dis 4 prop + WM 5 PID
40140	2	Int16	R/W	03/06	xxxx Valore primo setpoint proporzionale
40142	2	Int16	R/W	03/06	xxxx Valore secondo setpoint proporzionale
40144	2	Int16	R/W	03/06	xxx P/m primo valore
40146	2	Int16	R/W	03/06	xxx P/m secondo valore
40148	2	Int16	R/W	03/06	xxxxx attesa in ON/OFF o mc/h in modalità prop+WM
40150	2	Int16	R/W	03/06	x modalità di lavoro 0 ON/OFF 1 PROP 2 Dis. 3 prop + WM 4 PID
40154	2	Int16	R/W	03/06	xxxx Valore primo setpoint relè
40156	2	Int16	R/W	03/06	xxxx Valore secondo setpoint relè
40158	2	Int16	R/W	03/06	xxx percentuale primo valore
40160	2	Int16	R/W	03/06	xxx percentuale secondo valore
40222	2	Int16	R/W	03/06	x modalità di lavoro 0 PROP PWM 1 ON/OFF 2 Fixed PWM 3 Dis 4 prop + WM 5 PID
40284	2	Int16	R/W	03/06	percentuale a mc/h impostati in prop+WM Pulse 1
40286	2	Int16	R/W	03/06	percentuale a 0 mc/h in prop+WM Pulse 1
40288	2	Int16	R/W	03/06	mc/h in prop+WM uscita relè 1
40290	2	Int16	R/W	03/06	percentuale a mc/h impostati in prop+WM Relè 1
40294	2	Int16	R/W	03/06	percentuale a 0 mc/h in prop+WM Relè 1
40298	2	Int16	R/W	03/06	percentuale a mc/h impostati in prop+WM

					Pulse 2
40300	2	Int16	R/W	03/06	percentuale a 0 mc/h in prop+WM Pulse 2
40302	2	Int16	R/W	03/06	mc/h in prop+WM uscita relè 2
40304	2	Int16	R/W	03/06	percentuale a mc/h impostati in prop+WM Relè 2
40308	2	Int16	R/W	03/06	percentuale a 0 mc/h in prop+WM Relè 2
40312	2	Int16	R/W	03/06	PID mode 0: + 1: -
40314	2	Int16	R/W	03/06	Tempo Integrale
40316	2	Int16	R/W	03/06	Tempo Derivata
40318	2	Int16	R/W	03/06	Perturbativa 0:dis 1:ADD 2: Molt
40322	2	Int16	R/W	03/06	Perturbativa percentuale
40320	2	Int16	R/W	03/06	Perturbativa mc/h
40324	2	Int16	R/W	03/06	WM 0: L/P 1:P/L 2: 0-20mA 3: 4-20mA
40326	2	Int16	R/W	03/06	numero L/P o P/L o mc/h a 20mA in base a come è impostato il WM
40328	2	Int16	R/W	03/06	Timeout
Clock Read					
40044	2	Int16	R		MOUNTH|DAY
40046	2	Int16	R		HOUR | YEAR
40048	2	Int16	R		00|MINUTES
Parameter					
40520	2	Int16	R/W	03/06	Tau
40522	2	Int16	R/W	03/06	Delay
40542	2	Int16	R/W	03/06	Password
Dosing Alarm					
40428	2	Int16	R/W	03/06	Time for ch2 probe
44	1Bit	Bit	R/W	01/05	Mode 0: Dose 1 : Stop
Alarm Probe					
40444	2	Int16	R/W	03/06	Time for ch2
75	1Bit	Bit	R/W	01/05	Mode 0: Dose 1 : Stop
Flow					
40526	2	Int16	R/W	03/06	Mode0:Disable 1:Reverse 2: Direct
40524	2	Int16	R/W	03/06	Time in minutes
Clock Setpoint					
41624	2	Int16	R/W	03/06	MOUNTH|DAY
41626	2	Int16	R/W	03/06	HOUR | YEAR
41628	2	Int16	R/W	03/06	00|MINUTES
45	1Bit	Bit	R/W	01/05	Am 1: Yes 0: No
46	1Bit	Bit	R/W	01/05	Pm 1: Yes 0: No

47	1Bit	Bit	R/W	01/05	Format 0: Europe 1: USA
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
mA Setpoint					
50	1Bit	Bit	R/W	01/05	Mode ch1 0: 0/20 mA 1:4/20mA
40124	2	Int16	R/W	03/06	Max ch1
40126	2	Int16	R/W	03/06	Min ch1
51	1Bit	Bit	R/W	01/05	Mode temp 0: 0/20 mA 1:4/20mA
40128	2	Int16	R/W	03/06	Max temp
40130	2	Int16	R/W	03/06	Min temp
40134	2	Int16	R/W	03/06	1: 4/20 0: 0/20
40132	2	Int16	R/W	03/06	0 : nessun canale attivo 1: PID pulse 1 2: PID pulse 2 3: PID relè 1 4: PID relè 2
MinMax					
51	1Bit	Bit	R/W	01/05	Mode ch1 High 0:disable 1 : Enable
40438	2	Int16	R/W	03/06	Value ch1 High
52	1Bit	Bit	R/W	01/05	Mode ch1 Low 0:disable 1 : Enable
40442	2	Int16	R/W	03/06	Value ch1 Low
53	1Bit	Bit	R/W	01/05	Mode ch1 0: Dose 1 : Stop
40440	2	Int16	R/W	03/06	Time ch1
Service					
40056	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”
Circo Read					
56	1Bit	Bit	R/W	01/05	1:enabled 0:Disabled
Self Clean					

40536	2	Int16	R/W	03/06	Loop
40538	2	Int16	R/W	03/06	Clean Time
40540	2	Int16	R/W	03/06	Restore Time
57	1Bit	Bit	R/W	01/05	Clean On alarm 1: Clean on alarm NO

MODBUS EXTRA ADDRESSES FOR
LDSCD-D TIMER PLUS / LDSCDIND-D Timer PLUS

Functions for above controllers change as follows:

40140 Start Hour Timer Pulse
40142 Start Min Timer Pulse
40144 Stop Hour Timer Pulse
40146 Stop Min Timer Pulse

40154 Start Hour Timer Relay
40156 Start Min Timer Relay
40158 Stop Hour Timer Relay
40160 Start Min Timer Relay

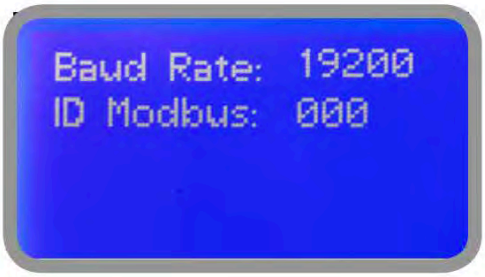
40300 DAYS ON/OFF timer pulse
// bit 7 : not used
// bit 6 : sunday 1ON | 0 OFF
// bit 5 : saturday 1 ON | 0 OFF
// bit 4 : friday 1 ON | 0 OFF
// bit 3 : thursday 1 ON | 0 OFF
// bit 2 : wednsday 1 ON | 0 OFF
// bit 1 : tuesday 1 ON | 0 OFF
// bit 0 : monday 1 ON | 0 OFF

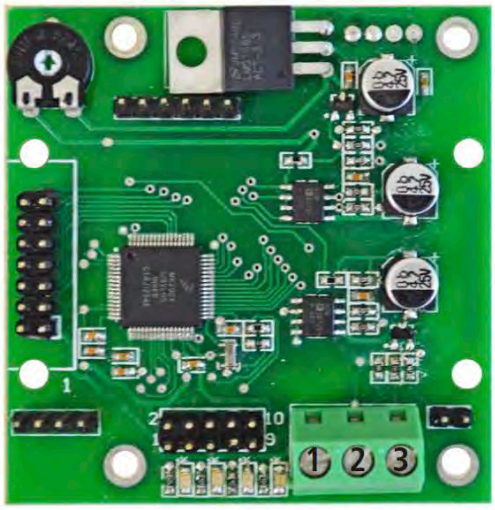
40304 DAYS ON/OFF timer relay
// bit 7 : not used
// bit 6 : sunday 1ON | 0 OFF
// bit 5 : saturday 1 ON | 0 OFF
// bit 4 : friday 1 ON | 0 OFF
// bit 3 : thursday 1 ON | 0 OFF
// bit 2 : wednsday 1 ON | 0 OFF
// bit 1 : tuesday 1 ON | 0 OFF
// bit 0 : monday 1 ON | 0 OFF

Appendix - MODBUS

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Simple and robust, it has since become a de facto standard communication protocol, and it is now a commonly available means of connecting industrial electronic devices.

From main menu select COMMUNICATION then MODBUS to access the options. Set the communication speed according to the PLC system available. Set the ID assigning an UNIQUE address to avoid conflicts.





1: GND
2: A-RS485 (+)
3: B-RS485 (-)

To access the module MODBUS open the instrument only after power is switched off!

Never make connections with the instrument powered!

WARNING

Disposal of end-of-life equipment by users

This symbol warns you not to dispose of the product with normal waste. Respect human health and the environment by taking discarded equipment to a designated collection center for the recycling of electronic and electrical equipment. For further information visit the online site.

All the materials used for the construction of the dosing pump and for this manual can be recycled and thus help maintain the incalculable environmental resources of our planet. Do not disperse harmful materials into the environment! Find out from the competent authority about the recycling programs for your area!