

# ND48-RS - MODBUS RTU protocol version M1.03

(Appendix for ND48-RS Display Operating Manual)

## MODBUS RTU Function 16 (0x10) Write Multiple Registers

### Frame format

**CAUTION!** Entire frame must be sent. Data field must contain 4 registers.

No	Name	Contents	Decimal value	Hex value
1	Start	silence interval <sup>1)</sup>		
2	SLAVE Address	8 bits		
3	Function Code	8 bits	16	10
4	Starting Address	16 bits	any	any
5	Quantity of registers	16 bits	4	4
6	Byte Count	8 bits	8	8
7	Data	4*16 bits( 8* 8bits)		
8	CRC 16-bit <sup>2)</sup>	16 bits		
9	End	silence interval <sup>1)</sup>		

### COMMENTS:

- 1) Start / End – silent interval on the line equal to at least 3,5 character times.
- 2) 16-bit values are sent in 2 bytes, higher byte first. CRC16 value is sent in opposite order: lower byte first!

### Data field format:

REGISTER	BYTE	DESCRIPTION
REGISTER 1	BYTE 1	reserved, irrelevant
	BYTE 2	Decimal points flags: b7:b0 - DP8:DP1 e.g.: "8888.8" : bit1=1, bit0=0 "88888." : bit1=0, bit0=1 "88888" : bit1=0, bit0=0 "8888.8." : bit1=1, bit0=1
REGISTER 2	BYTE 3	D0 - least significant digit on the display (ASCII code) e.g.: '1' = 0x31
	BYTE 4	D1
REGISTER 3	BYTE 5	D2
	BYTE 6	D3
REGISTER 4	BYTE 7	D4 - most significant digit on the display
	BYTE 8	irrelevant ( '0'=0x30 suggested)

### Programming

ND48-RS should be programmed before use. Serial transmission parameters have to correspond to transmitter settings.

Programming switches are placed on the rear wall of the housing. Programming menu messages are displayed on the main display in front.

At first, programming mode should be activated by putting the jumper on S3 pin strip. S1 and S2 push-buttons are used for menu scrolling and value changes. S1 push-button scrolls the menu and changes edited

values. S2 push-button is used to enter selected menu functions and accept edited values.

Programming procedure step by step:

1. Put the jumper on S3 pins - 'Edit' message appears.
2. Press S2 key - the first menu function symbol appears ('Fc01'...).
3. Choose function to be edited by pressing S1 key.
4. Press S2 key to enter chosen function.
5. Change function value or option with S1 key.
6. Accept change by pressing S2 key - function name reappears.
7. Edit other functions by repeating steps 3, 4, 5, 6.
8. Move to the end of function list until 'Edit' message reappears. Settings are stored in this moment.
9. Remove the jumper from S3. This way, settings memory is hardware protected.

**I** The jumper must be removed from S3 while 'Edit' message is displayed.

Resetting parameters to default settings.

1. Switch display power off.
2. Put the jumper on S3.
3. Keep S1 key depressed and turn display supply on - 'Eini' message should appear.
4. Press S2 key to accept the reset.
5. Remove the jumper from S3.

**I** If S2 key will be depressed erroneously in step 3, 'Fabr' message will appear. Turn display power off and repeat the procedure correctly.

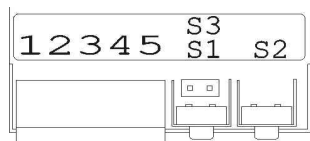


Fig.1. Programming switches on the back side.

**ND48-RS programming menu - MODBUS RTU version**

Function name	Description	Value range	Default value
Fc01	Address (slave)	1-247	1
Fc02	Transmission speed	1200, 2400, 4800, 9600, 19200 bps	9600
Fc03	Word format	8E1 - 8 data bits, parity bit (EVEN parity), 1 stop bit 8O1 - 8 data bits, odd parity bit (ODD parity), 1 stop bit 8N2 - 8 data bits, no parity bit, 2 stop bits	8E1
Fd01	Brightness	100%, 75%, 50%, 25%	100
Fd05	Display test	"8.8.8.8."	

ND48-RS ASCII table

20h 32d		30h 48d		40h 64d		50h 80d		60h 96d		70h 112d	
21h 33d		31h 49d		41h 65d		51h 81d		61h 97d		71h 113d	
22h 34d		32h 50d		42h 66d		52h 82d		62h 98d		72h 114d	
23h 35d		33h 51d		43h 67d		53h 83d		63h 99d		73h 115d	
24h 36d		34h 52d		44h 68d		54h 84d		64h 100d		74h 116d	
25h 37d		35h 53d		45h 69d		55h 85d		65h 101d		75h 117d	
26h 38d		36h 54d		46h 70d		56h 86d		66h 102d		76h 118d	
27h 39d		37h 55d		47h 71d		57h 87d		67h 103d		77h 119d	
28h 40d		38h 56d		48h 72d		58h 88d		68h 104d		78h 120d	
29h 41d		39h 57d		49h 73d		59h 89d		69h 105d		79h 121d	
2Ah 42d		3Ah 58d		4Ah 74d		5Ah 90d		6Ah 106d		7Ah 122d	
2Bh 43d		3Bh 59d		4Bh 75d		5Bh 91d		6Bh 107d		7Bh 123d	
2Ch 44d		3Ch 60d		4Ch 76d		5Ch 92d		6Ch 108d		7Ch 124d	
2Dh 45d		3Dh 61d		4Dh 77d		5Dh 93d		6Dh 109d		7Dh 125d	
2Eh 46d		3Eh 62d		4Eh 78d		5Eh 94d		6Eh 110d		7Eh 126d	
2Fh 47d		3Fh 63d		4Fh 79d		5Fh 95d		6Fh 111d		7Fh 127d	

Document version: ND48 RS MODBUS RTU M1.03 dtr02 ENG