

# Operating Manual UFR1002IP

updated: 2023-02-09 /Sc  
from Firmware: 20-00

## - Modbus TCP communication protocol

### Table of contents

1	Important Information .....	1
2	Interface Parameters .....	1
3	Supported Function Codes .....	2
4	Data Types .....	2
5	Telegram Structure.....	2
5.1	MODBUS Application Protocol header (MBAP) .....	2
5.1.1	Modbus function code 0x03 (Read Holding Registers) .....	2
6	Modbus Register Tables .....	3
6.1	Reading measured values, status values and min. / max.....	3
7	Function code 0x2B – Read device information.....	5
7.1	Function code 0x2B - Objects .....	5

## 1 Important Information



Please also read the general operating manual of the UFR1002IP carefully and observe the safety instructions.

## 2 Interface Parameters

TCP Port: 502

Max. TCP connections: 3

**The Modbus TCP protocol must be activated via the integrated web server of the UFR1002IP:**

- Enter the IP address of the device in the web browser (on computers in the same networks)
- Select the menu tab „network“
- Activate Modbus TCP



### 3 Supported Function Codes

Function code	Designation	Use
3 (03H)	Read Holding Registers	Read data from the registers

### 4 Data Types

The following data types are used in the Modbus registers:

Data type	Size	Range of numbers
signed int	16 Bit, register value	-32768 ... 32767
unsigned int	16 Bit, register value	0 ... 65535
signed long	32 Bit, divided over two registers	-2147483648 ... 2147483647
unsigned long	32 Bit, divided over two registers	0 ... 4294967296

### 5 Telegram Structure

According to Modbus TCP specification.

For details, refer to the Modbus original documentation, available at: <https://modbus.org>

#### 5.1 MODBUS Application Protocol header (MBAP)

Byte No.		Value (hex)	Designation	Description
0	Hi	00	Transaction Identifier	Identification number of a request (At multiple requests at the same time)
1	Lo	00		
2	Hi	00	Protocol Identifier	Always 0 (Modbus protocol)
3	Lo	00		
4	Hi	00	Length	Number of following bytes (High Byte is always 0)
5	Lo	06		
6		FF	Unit Identifier	Identification of a remote device (value meaningless)

#### 5.1.1 Modbus function code 0x03 (Read Holding Registers)

7		03	Function code	Modbus function code (0x03, Read Holding Registers)
8	Hi	00	Start address	Address of the first (read) register
9	Lo	00		
10	Hi	00	number of registers	High Byte always 0, Low Byte at Modbus: 1...125
11	Lo	06		

## 6 Modbus Register Tables

### 6.1 Reading measured values, status values and min. / max.

- Modbus function code 0x03 (Read Holding Registers)

Adr. hex	Data type	Register	Range of values / Description
0000	unsigned int 16	voltage L1-N	without VG1200: 0 ... 5200 [0,1 V]  with VG1200: 0 ... 1500 [V]
0001	unsigned int 16	voltage L2-N	
0002	unsigned int 16	voltage L3-N	
0003	unsigned int 16	voltage L1-L2	
0004	unsigned int 16	voltage L2-L3	
0005	unsigned int 16	voltage L3-L1	
0006	unsigned int 16	frequency	0 ... 5000 [0,01 Hz]
0007	unsigned int 16	vector shift L1	0 ... 900 [0,1 °]
0008	unsigned int 16	vector shift L2	
0009	unsigned int 16	vector shift L3	
000A	unsigned int 16	10-minutes mean value L1-N	without VG1200: 0 ... 5200 [0,1 V]  with VG1200: 0 ... 1500 [V]
000B	unsigned int 16	10 minutes mean value L2-N	
000C	unsigned int 16	10 minutes mean value L3-N	
000D	unsigned int 16	10 minutes mean value L1-L2	
000E	unsigned int 16	10 minutes mean value L2-L3	
000F	unsigned int 16	10 minutes mean value L3-L1	
0010	unsigned int 16	Rocof	[0,1 Hz/s]
0011	unsigned int 16	Relay status	bit 0 = K1, bit 1 = K2, bit 3 = K3
0012	unsigned int 16	status of digital inputs	bit 0 = Y1, bit 1 = Y2, bit 2 = E1E2, bit 3 = In1, bit 4 = In2, bit 5 = In3
0013	unsigned int 16	function of Relay K3 (channel 1)	<u>virtual state of function:</u> bit 0 = permanent on, bit 1 = impulse on, bit 2 = with K1/K2, bit 3 = on at error, bit 4 = life-contact, bit 5 = start signal, bit 6 = enable signal, bit 7 = status of Relay K3
0014	unsigned int 16	function of Relay K3 (channel 2)	
0015	unsigned int 16	Error state	<u>error on feedback contacts:</u> bit 6 = at switch on, bit 7 = at switch off, other bits = internal error
0016	unsigned int 16	device protection	bit 0 = status of code lock, bit 1 = status of sealing
0017	unsigned int 16	alarm status U>> von L1-N	0 = alarm off  1 = delay alarm on  2 = alarm on  3 = delay alarm off
0018	unsigned int 16	alarm status U>> von L2-N	
0019	unsigned int 16	alarm status U>> von L3-N	
001A	unsigned int 16	alarm status U>> von L1-L2	
001B	unsigned int 16	alarm status U>> von L1-L3	
001C	unsigned int 16	alarm status U>> von L2-L3	
001D	unsigned int 16	alarm status U> von L1-N	
001E	unsigned int 16	alarm status U> von L2-N	
001F	unsigned int 16	alarm status U> von L3-N	
0020	unsigned int 16	alarm status U> von L1-L2	
0021	unsigned int 16	alarm status U> von L1-L3	
0022	unsigned int 16	alarm status U> von L2-L3	
0023	unsigned int 16	alarm status U< von L1-N	
0024	unsigned int 16	alarm status U< von L2-N	
0025	unsigned int 16	alarm status U< von L3-N	

Adr. hex	Data type		Register	Range of values / Description
0026	unsigned int 16		alarm status U< von L1-L2	0 = alarm off 1 = delay alarm on 2 = alarm on 3 = delay alarm off
0027	unsigned int 16		alarm status U< von L1-L3	
0028	unsigned int 16		alarm status U< von L2-L3	
0029	unsigned int 16		alarm status U<< von L1-N	
002A	unsigned int 16		alarm status U<< von L2-N	
002B	unsigned int 16		alarm status U<< von L3-N	
002C	unsigned int 16		alarm status U<< von L1-L2	
002D	unsigned int 16		alarm status U<< von L1-L3	
002E	unsigned int 16		alarm status U<< von L2-L3	
002F	unsigned int 16		alarm status F>>	
0030	unsigned int 16		alarm status F>	
0031	unsigned int 16		alarm status F<	
0032	unsigned int 16		alarm status F<<	
0033	unsigned int 16		alarm status 10 minutes mean value L-N	
0034	unsigned int 16		alarm status 10 minutes mean value L-L	
0035	unsigned int 16		alarm status vector shift L1	
0036	unsigned int 16		alarm status vector shift L2	
0037	unsigned int 16		alarm status vector shift L3	
0038	unsigned int 16		alarm status Rocof	without VG1200: 0 ... 5200 [0,1 V]  with VG1200: 0 ... 1500 [V]
0039	unsigned int 16		min measured value from Voltage L1-N	
003A	unsigned int 16		max measured value from voltage L1-N	
003B	unsigned int 16		min measured value from Voltage L2-N	
003C	unsigned int 16		max measured value from voltage L2-N	
003D	unsigned int 16		min measured value from Voltage L3-N	
003E	unsigned int 16		max measured value from voltage L3-N	
003F	unsigned int 16		min measured value from Voltage L1-L2	
0040	unsigned int 16		max measured value from voltage L1-L2	
0041	unsigned int 16		min measured value from Voltage L2-L3	
0042	unsigned int 16		max measured value from voltage L2-L3	
0043	unsigned int 16		min measured value from Voltage L3-L1	0 ... 5000 [0,01 Hz]
0044	unsigned int 16		max measured value from voltage L3-L1	
0045	unsigned int 16		min measured value from frequency	[h]
0046	unsigned int 16		max measured value from frequency	
0047	unsigned int 32	<i>low</i>	Operating hours	
0048		<i>high</i>		
0049	unsigned int 32	<i>low</i>	Serial number	
004A		<i>high</i>		
004B	unsigned int 16		hardware version	0 ...
004C	unsigned int 16		firmware version	e. g. 0x07D2(hex) = 2002 (dez) Firmware -> 12690-1420-02
004D	unsigned int 16		bootloader version	

## 7 Function code 0x2B – Read device information

Byte No.		Value (hex)	Designation	Description
0	Hi	00	Transaction Identifier	Identification number of a request (At multiple requests at the same time)
1	Lo	00		
2	Hi	00	Protocol Identifier	Always 0 (Modbus protocol)
3	Lo	00		
4	Hi	00	Length	Number of following bytes (High Byte is always 0)
5	Lo	06		
6		FF	Unit Identifier	Identification of a remote device (value meaningless)
7		03	Function code	Modbus functions code (0x2B, Read device information)
8		0E	MEI Type	Always 0x0E *1
9		01	Read Device ID code *2	
10		00	Object ID	See function code 0x2B - Objects

\*1 MEI = MODBUS Encapsulated Interface (see Modbus documentation, <http://www.modbus.org>)

\*2  
 0x01: Query of “Basic” device information (stream access)  
 0x02: Query of “Regular” device information (stream access)  
 0x03: Query of “Extended” device information (stream access)  
 0x04: Querying individual device information (individual access)

### 7.1 Function code 0x2B - Objects

Object Id	Object-name / description	content	type	category
0x00	Manufacturer name	ZIEHL industrie-elektronik GmbH + Co KG	ASCII String	Basic
0x01	Product- (article-) number	S222301		
0x02	Revision Firmware	12690-1420-xx		
0x03	Manufacturer URL	www.ziehl.com	ASCII String	Regular
0x04	Product Name	Voltage and Frequency Relay		
0x05	Product designation	UFR1002IP		
0x80	Serial number	xxxxxxx	ASCII String	Extended
0x81	Revision Hardware	xx (e. g. “04”)		
0x82	Revision Bootloader	12750-1400-xx		