



NGRM700 - Modbus



NGR monitor Modbus registers

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1. Modbus: registers and communication

This annex provides a complete description of the Modbus registers (protocol version 6.0) to facilitate access to information.

The NGRM700 supports the following Modbus functions:

1. Holding register for reading values
(Read Holding Register; function code 0x03)
2. Register for device programming
(Preset Multiple Registers; function code 0x10)

For a complete Modbus protocol specification, visit <http://www.modbus.org>.

2. Abbreviations

Term	Represents	Register size	Explanation
RO	Read only	-	Register can only be read
RW	Read write	-	Register can be written
UINT16	Unsigned integer 16 bits	16 bits = 2 bytes	Unsigned integer (High byte, low byte)
u16Alarm	Unsigned integer (alarm)	16 bits = 2 bytes	Unsigned integer representing the alarm 0: no alarm; 1: prewarning; 2: fault
UINT32	Unsigned integer 32 bits	32 bits = 4 bytes	Unsigned integer (HiWord, LoWord)
Float		4 bytes	Float
String, xx		xx+1 bytes	String with xx characters

3. Measured values

Register	Property	Description	Format	Description/Unit
8192	RO	Status	Float	0: Trip relay not tripped 1: Trip relay tripped 2: Initial measurement 3: Field calibration is started 4: Restart 5: Test is started
8194	RO	R_{NGR}	Float	Ω
8196	RO	$R_{NGR\ rel}^{1)}$	Float	%
8198	RO	I_{RMS}	Float	A
8200	RO	$I_{RMS\ rel}^{1)}$	Float	%
8202	RO	I_{fund}	Float	A
8204	RO	$I_{fund\ rel}^{1)}$	Float	%
8206	RO	I_{harm}	Float	A
8208	RO	$I_{harm\ rel}^{1)}$	Float	%
8210	RO	U_{RMS}	Float	V
8212	RO	$U_{RMS\ rel}^{1)}$	Float	%
8214	RO	U_{fund}	Float	V
8216	RO	$U_{fund\ rel}^{1)}$	Float	%
8218	RO	U_{harm}	Float	V
8220	RO	$U_{harm\ rel}^{1)}$	Float	%
8222	RO	U_{L1L2}	Float	V
8224	RO	U_{L2L3}	Float	V
8226	RO	U_{L3L1}	Float	V
8228	RO	$U_{L1E\ rms}$	Float	V
8230	RO	$U_{L2E\ rms}$	Float	V

Register	Property	Description	Format	Description/Unit
8232	RO	$U_{L3E\ rms}$	Float	V
8234	RO	Frequency	Float	Hz
8236	RO	Temperature	Float	°C
8238	RO	Method	Float	1: active 2: passive
8240	RO	R_{Sense}	Float	20,000 100,000
8242...8446	Reserved			
8448	RO	DC component U_{NGR}	UINT16	%
8449	RO	H1 U_{NGR}	UINT16	%
8450...8511	RO	H... U_{NGR}	UINT16	%
8512	RO	H64 U_{NGR}	UINT16	%
8513...8703	Reserved			
8704	RO	DC component I_{NGR}	UINT16	%
8705	RO	H1 I_{NGR}	UINT16	%
8706...8767	RO	H... I_{NGR}	UINT16	%
8768	RO	H64 I_{NGR}	UINT16	%

Tab. 3.1: Measured values

- 1) The relative measured values always indicate the ratio of the measured value to the desired value.

Example:

$$\text{Set } R_{NGR\ nom} = 470\ \Omega$$

$$\text{Measured value } R_{NGR} = 480\ \Omega$$

$$R_{NGR\ rel} = 480\ \Omega / 470\ \Omega = 1.0213 = 102.13\ \%$$

4. Alarms

Register	Property	Description	Format	Description/Unit
9216	RO	Status	u16Alarm	0: no alarm 1: prewarning ¹⁾ 2: fault ²⁾
9217	RO	R_{NGR}	u16Alarm	
9218	RO	I_{RMS}	u16Alarm	
9219	RO	I_{fund}	u16Alarm	
9220	RO	I_{harm}	u16Alarm	
9221	RO	U_{RMS}	u16Alarm	
9222	RO	U_{fund}	u16Alarm	
9223	RO	U_{harm}	u16Alarm	
9224	RO	U_{L1L2}	u16Alarm	
9225	RO	U_{L2L3}	u16Alarm	
9226	RO	U_{L3L1}	u16Alarm	
9227	RO	$U_{L1E\ rms}$	u16Alarm	
9228	RO	$U_{L2E\ rms}$	u16Alarm	
9229	RO	$U_{L3E\ rms}$	u16Alarm	
9230	RO	Frequency	u16Alarm	
9231	RO	Temperature	u16Alarm	
9232	RO	Method	u16Alarm	
9233	RO	R_{Sense}	u16Alarm	

Tab. 4.1: Alarms

Description of alarms:

- | | | |
|----|------------|--|
| 1) | Prewarning | Response value violation and t_{trip} elapses. |
| 2) | Fault | Response value violation after t_{trip} has elapsed. |

5. Device parameters

Register	Property	Description	Format	Description/ Unit
12286	RO	Current IP address	UINT32	When DHCP = off, same as the IP address
12288	RW	DHCP on/off	UINT16	1: on 2: off
12289	RW	IP address	UINT32	
12291	RW	IP address standard gateway	UINT32	
12293	RW	Subnet mask	UINT16	
12294	RW	Modbus TCP (port 502) on/off	UINT16	1: on 2: off
12295	RW	Write access via communication ¹⁾	UINT16	1: allow 2: deny
12298	RW	BCOM system name	String, 16	
12306	RW	BCOM subsystem address	UINT16	
12307	RW	BCOM device address	UINT16	
12308	RW	BCOM messages timeout	Float	
12310	RW	BCOM TTL for subscription	UINT16	
12311	RW	BCOM for subscription percentage alteration	UINT32	
12313	RW	IP address DNS server	UINT32	
12315	RW	DNS domain name	String, 250	
12440	RW	Time (UTC)	UINT32	
12442	RW	UTC offset	Float	
12444	RW	Synchronisation via NTP server	UINT16	1: on 2: off
12445	RW	IP address NTP server	UINT32	
12447	RW	Format (date)	UINT16	1: dd.mm.yy 2: mm-dd-yy

Register	Property	Description	Format	Description/ Unit
12448	RW	Summertime	UINT16	1: off 2: DST 3: CEST
12449	RW	Format (time)	UINT16	1: 12 h 2: 24 h
12450	RW	Device display language	UINT16	0: German 1: English GB 2: French 4: Spanish 30: English US
12451	RW	Decimal separator	UINT16	0: Comma 1: Point
12452	RW	Modbus RTU (address)	UINT16	1...247
12453	RW	Modbus RTU (baud rate)	UINT16	1: 9600 baud 2: 19200 baud 3: 38400 baud 4: 57600 baud
12454	RW	Modbus RTU (parity)	UINT16	1: even 2: uneven 3: none
12455	RW	Modbus RTU (number of stop bits)	UINT16	1: 1 stop bit 2: 2 stop bits 3: automatic (Number of stop bits is set by means of the parity so that a data frame con- sists of 11 bits)

Tab. 5.1: Device parameters

Notes

- 1) "Allow" can only be set on the device.
If set to "Deny", no RW Modbus register can be written.

6. Measurement parameters

Register	Property	Description	Format	Description/ Unit
12544	RW	$U_{\text{sys (L-L)}}$	UINT32	V
12546	RW	Frequency	UINT16	1: 50 Hz 2: 60 Hz
12547	RW	I_{NGR}	Float	A
12549	RW	R_{NGR}	UINT32	Ω
12551	RW	CT primary	UINT32	A
12553	RW	CT secondary	UINT32	A
12555	RW	CT connection	UINT16	1: 5 A 2: 50 mA
12556	RW	Method	UINT16	1: auto 2: passive
12557	RW	PT primary	UINT32	V
12559	RW	PT secondary	UINT32	V
12561	RW	Phase monitor	UINT16	1: on 2: off
12562	RW	PT primary	UINT32	V
12564	RW	PT secondary	UINT32	V
12566	RW	$U_{\text{NGR trip}}$	UINT32	%
12568	RW	$I_{\text{NGR trip}}$	UINT32	%
12570	RW	$> R_{\text{NGR}}$	UINT32	%
12572	RW	$< R_{\text{NGR}}$	UINT32	%
12574	RW	t_{trip}	Float	s
12576	RW	System trip	UINT16	1: on 2: off
12577	RW	t_{restart}	Float	0.1...86400 s
12579	RW	Alarm stored	UINT16	1: on 2: off

Register	Property	Description	Format	Description/ Unit
12580	RW	Restart count	UINT32	1...5
12582	RW	Trip signal	UINT16	1: RMS 2: Fundamental 3: Harmonics
12583	RW	Upper limit harmonic	UINT16	0...32
12584	RW	Lower limit harmonic	UINT16	0...32
12585	RW	Ground-fault relay: mode	UINT16	1: Fail-safe 2: Non-fail-safe
12586	RW	Ground-fault relay: relay test	UINT16	1: on 2: off
12587	RW	NGR relay: mode	UINT16	1: Fail-safe 2: Non-fail-safe
12588	RW	NGR relay: relay test	UINT16	1: on 2: off
12589	RW	Trip relay: mode	UINT16	1: Fail-safe 2: Non-fail-safe
12590	RW	Trip relay: relay test	UINT16	1: on 2: off
12591	RW	Analogue mode	UINT16	1: 0...20 mA 2: 4...20 mA 3: 0...400 μ A 4: 0... 10 V 5: 2... 10 V
12592	RW	Analogue function	UINT16	1: I_{NGR} 2: R_{NGR}
12593	RW	System OUT	UINT16	1: Fail-safe 2: Non-fail-safe
12594	RW	Pulser OUT	UINT16	
12595	RW	Pulser IN	UINT16	1: Active high 2: Active low
12596	RW	RESET IN	UINT16	
12597	RW	TEST IN	UINT16	

Register	Property	Description	Format	Description/ Unit
12598	RW	Buzzer alarm	UINT16	1: on 2: off
12599	RW	Buzzer test	UINT16	1: on 2: off
12600	RW	Pulser	UINT16	1: active 2: external 3: auto 4: inactive
12601	RW	t_{pulse}	UINT32	1...10 s
12603	RW	Display R_{NGR}	UINT16	1: Display in Ω 2: Display in %
12604	RW	Display I_{NGR}	UINT16	1: Display in A 2: Display in %
12605	RW	t_{NGRtrip}	Float	0...60 s
12607	RW	CD-NGRM	UINT16	0: CD1000 1: CD5000 2: CD14400 3: CD25000

Tab. 6.1: Measurement parameters



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