Adress	Adress [hex]	Data type	Read/Write	Register Name	Note
				Commands type 16-bit Integer (measuring value + info)	
100	0x64	Word	R	DISTANCE	Measured level distance from the level meter - units see LEVEL UNIT (205)
101	0x65	Word	R	LEVEL	Height of the measured level from set lower level LEVEL MIN see Fig.1 - units see LEVEL UNIT (205)
102	0x66	Word	R	PERCENTAGE	Percentage level (between set low (0%) and set high (100%) level) - value x 100
103	0x67	Word	R	RESERVE	When reading returns 0
104	0x68	Word	R	STATUS1 ECHO – OK LEVEL HIGH LEVEL LOW TEACHING RUNNING [1] TEACHING ACTIVE [1] LOW POWER	Last measuring state bit 0 =1 ECHO captured in the last measurement bit 1 =1 The level is above measurement range or in the dead zone bit 2 =1 Level is below to measurement range bit 3 =1 TEACHING is currently running (creation of a curve for an empty storage tank) or electrode is changed NEW ELECTRODE (203) bit 4 =1 TEACHING is active (a newly created curve of an empty storage tank is being used) bit 5 =1 Low power voltage - necessary to check voltage on the level meter terminal clamps
105	0x69	Word	R	RANGE [2]	Maximum measuring range (bigger distance) – units see LEVEL UNIT (205)
106	0x6A	Word	R	DEAD ZONE [2]	Dead zone (minimum measuring range) – units see LEVEL UNIT (205)
107	0x6B	Word	R	ID (Sensor Type)	Identification number
108	0x6C	Word	R	Serial No. – MSB	Serial number – upper byte
109	0x6D	Word	R	Serial No. – LSB	Serial number – lower byte
110	0x6E	Word	R	Firmware No.	In the format xy, where x is the version number and y is the subversion number (e.g. 10 = 1.0)
111	0x6F	Word	R	ELECTRODE - TYPE [3]	Type electrode
112	0x70	Word	R	ELECTRODE - LENGTH [3]	Length electrode - units see LEVEL UNIT (205)
				16-bit Integer type commands (level meter setting)	
200	0xC8	Word	R/W	LEVEL MIN	Lower level measuring setting (Distance from level meter) - level farther away from the level meter see Fig.1 - units see LEVEL UNIT (205)
201	0xC9	Word	R/W	LEVEL MAX	Upper level measuring setting (Distance from level meter) - level closer to the level meter see Fig.1 - units see LEVEL UNIT (205)
202	0xCA	Word	R/W	DAMPING	Damping - response time setting in seconds (0-99)
203	0xCB	Word	R/W	STATUS2 RESERVE RESERVE FACTORY DEFAULT RESET RESERVE MATERIAL START TEACHING [1] NEW ELECTRODE [3]	Measurement settings bit 0 (When reading returns 0) bit 1 (When reading returns 0) bit 2 =1 Starts FACTORY DEFAULT (load all factory settings except for MODBUS communications settings) bit 3 =1 Performs RESET of the level meter (When read it returns 0) bit 4 (When reading returns 0) bit 5 (When reading returns 0) bit 6 =1 Starts TEACHING mode (detection of false reflections - storage tank must be emptied) bit 15 =1 Starts detection of new type or length of electrode with creation of an empty storage tank curve - storage tank must be emptied, (must be in the register before NEW ELECTRODE -TYPE (216) entered type of new electrode and in register NEW ELECTRODE - LENGTH (217 or 412) entered length of new electrode)
204	0xCC	Word	R/W	RESERVE	When reading returns 0
205	0xCD	Word	R/W	LEVEL UNIT	Level units - see table units
206	0xCE	Word	R/W	QUANTITY UNIT	Quantity units - see table units
207	0xCF	Word	R/W	RESERVE	When reading returns 0
208	0xD0	Word	R/W	RESERVE	When reading returns 0
209	0xD1	Word	R/W	MODBUS ADRESS	MODBUS address (1 – 247), DEFAULT=1 ; after registration the device responds with old address
210	0xD2	Word	R/W	MODBUS BAUDRATE	Baudrate (4800, 9600, 19200), DEFAULT=9600; after registration the device responds with new baudrate
211	0xD3	Word	R/W	MODBUS PARITY	Parity (0 = NONE+1STOPBIT, 1 = ODD, 2 = EVEN, 3 = NONE+2STOPBITS), DEFAULT=0 ; after registration the device responds with new parity
212	0xD4	Word	R/W	RESERVE	When reading returns 0
213	0xD5	Word	R/W	SENSITIVITY	Measurement sensitivity in steps 1 to 8, 1 - lowest (water and water solutions), 8 - highest (media with low permittivity)
214	0xD6	Word	R/W	DISPLAY DECIMAL POINT	Number of decimal places shown on the display (0- 4), DEFAULT = 0
215	0xD7	Word	R/W	RESERVE	When reading returns 0
216	0xD8	Word	R/W	NEW ELECTRODE - TYPE [3]	Type of new electrode (the electrode type may be changed on selected types, see manual)
217	0xD9	Word	R/W	NEW ELECTRODE - LENGTH [3]	Length of new electrode (the electrode length may be changed on selected types, see manual) - units, see LEVEL UNIT (205)

Adresa	Adresa [hex]	Typ dat	Read/ Write	Register Name	Note
32-bit Floating point type commands (measuring value)					
300	0x12C	DWord	R	DISTANCE IEEE754	Distance level from level meter – units see LEVEL UNIT (205)
302	0x12E	DWord	R	LEVEL IEEE754	Height of measured level from set lower level LEVEL MIN see Fig.1 – units see LEVEL UNIT (205)
304	0x130	DWord	R	QUANTITY IEEE754	Quantity of the medium in the tank (value 0 - 99999) – units see QUANTITY UNIT (206)
306	0x132	DWord	R	PERCENTAGE IEEE754	Percentage level (between set low and set high level)
308	0x134	DWord	R	RESERVE	When reading returns 0
310	0x136	DWord	R	RANGE IEEE754 [2]	Maximum measurement range of the level meter (greater distance) – units see LEVEL UNIT (205)
312	0x138	DWord	R	DEAD ZONE IEEE754 [2]	Dead zone [mm] (minimum measuring range) – units see LEVEL UNIT (205)
314	0x13A	DWord	R	RESERVE	When reading returns 0
32-bit Floating point type commands (level meter setting)					
400	0x190	DWord	R/W	LEVEL MIN IEEE754	Lower level measuring setting (Distance from level meter) - level farther away from the level meter see Fig.1 - units see LEVEL UNIT (205)
402	0x192	DWord	R/W	LEVEL MAX IEEE754	Upper level measuring setting (Distance from level meter) - level closer to the level meter see Fig.1 - units see LEVEL UNIT (205)
404	0x194	DWord	R/W	QUANTITY MIN IEEE754	Min. medium quantity set in tank (adequate LEVEL MIN see Fig.1) in value 0 - 99999 - number of decimal places see DISPLAY DECIMAL POINT (214), units see QUANTITY UNIT (206)
406	0x196	DWord	R/W	QUANTITY MAX IEEE754	Max. medium quantity set in tank (adequate LEVEL MAX see Fig.1) in value 0 - 99999 - number of decimal places see DISPLAY DECIMAL POINT (214), units see QUANTITY UNIT (206)
408	0x198	DWord	R/W	RESERVE	When reading returns 0
410	0x19A	DWord	R/W	RESERVE	When reading returns 0
412	0x19C	DWord	R/W	NEW ELECTRODE - LENGTH IEEE754 [3]	Length of new electrode (the electrode length may be changed on selected types, see manual) - units, see LEVEL UNIT (205)

1. The TEACHING mode is performed when it is necessary to suppress false reflections created by the reflection of a guided wave from the unevenness of storage tank walls, various partitions, mixing devices and other obstacles, or in the case, where the distance of the electrode of the level meter from the wall of the storage tank is less than 300 mm, or when the electrode of the level meter passes through a narrow neck. Before starting it, it is necessary to completely drain the storage tank. The mode can be started using the bit START TEACHING (address 203). The mode that is running is indicated by bit TEACHING RUNNING (address 104) and the level meter detects false reflections and saves them to memory. The saving of all reflections is indicated by bit TEACHING ACTIVE (address 104).

2. Depending on the level meter type – see technical specifications of the level meter.

3. NEW ELECTRODE function (electrode length and type settings) is used in the case where the length (e.g. electrode is shortened) or the type (replacement of a rod electrode with a cable electrode) of an electrode changes. Before starting it, it is necessary to completely drain the storage tank, enter the new type of electrode - see NEW ELECTRODE TYPE (address 216) and enter the length of the new electrode - see NEW ELECTRODE-LENGTH (address 217 or 412). The function can be started using the bit NEW ELECTRODE (address 203). The function that is running is indicated by bit TEACHING RUNNING (address 104). During this function, the level meter performs adaptation to the new type or new length of the electrode and also runs the TEACHING mode. The end of the function is indicated by the reset of bit TEACHING RUNNING (address 104) to zero.

More detailed description - see manual

Additional technical data GRLM–70 Modbus

Communication	Galvanically separated RS–485 without 120 Ω termination resistor, MODBUS RTU (Slave)
Specification	MODBUS over serial line specification and implementation guide v1.02; MODBUS application protocol specification v1.1b
Support commands	03 (0x03h), 06 (0x06h), 16 (0x10h)
Broadcast	YES
Data	Saved in holding registers
Data format	WORD (16- bit Integer, Transfer No.: HIGH byte, LOW byte) Signed Word (16- bit Integer with symbol, transmission order: HIGH byte, LOW byte) DWORD (32-bit Floating point IEEE754, Transfer No.: Sign+Exponent, Exponent+Mantisa(high), Mantisa, Mantisa(low)
Baud rate	4800, 9600, 19200 **(default = 9600)**
Data	8 bits
Parity	NONE+1STOPBIT, ODD, EVEN, NONE+2STOPBITY **(default = NONE+1STOPBIT)**
Address	1 – 247 **(default = 1)**

Units table GRLM–70 Modbus

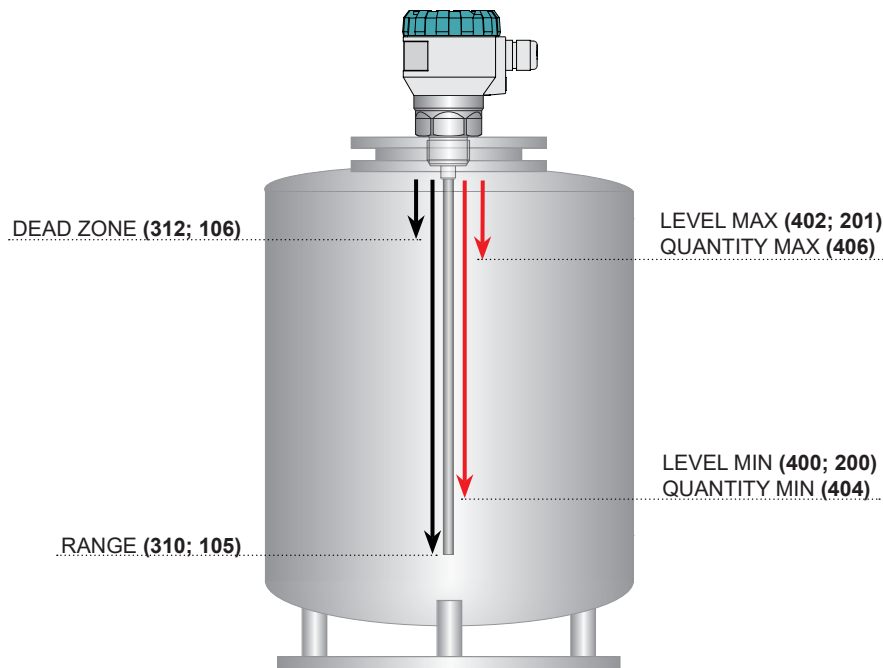|	
For LEVEL UNIT	44 (ft); 45 (m); 47 (in); 48 (cm); 49 (mm) The data contained in registers 100, 101, 105, 106, 200, 201 and 217 (variables Word) is for increasing resolution multiplied by these coefficients (according to the selected unit): mm: x1 cm: x10 m: x1000 in: x10 ft: x100
For QUANTITY UNIT	40 (gal); 41 (litr); 43 (m³); 44 (ft); 45 (m); 46 (bbl); 47 (in); 48 (cm); 49 (mm); 57 (%); 236 (hl)
For TEMPERATURE UNIT	32 (°C), 33 (°F)

Fig. 1: Basic level meter commands

The freeware **Basic Scada system** software for level meter settings and communications is available after purchasing.

Version for the Windows OS is available for download at www.dinel.cz.