List of ModBus-registers

Electromagnetic flow meter AFLOWT Modification Lite M (with realtime clock)

Holding cells

None

Holding registers

Logical MB address	Parameter name	Type	Access level	Limits	Comments
400001	Address	unsigned char	SERVICE, CALIBRATION	0-247	
400002	Baudrate index	unsigned char	SERVICE, CALIBRATION	0-7	see Attachment 1
400003	RTS delay, ms	unsigned char	SERVICE, CALIBRATION	0-255	
400004	Cutoff (falling), 0.1% Qmax	unsigned char	SERVICE, CALIBRATION	0-10	0.0% – 1.0%
400005	Cutoff (rising), 0.1% Qmax	unsigned char	SERVICE, CALIBRATION	0-10	0.0% – 1.0%

Logical MB address	Parameter name	Type	Access level	Limits	Comments
400006	Mask of indication parameters (low byte)	unsigned char	SERVICE, CALIBRATION	–	see Attachment 2
400007	Indication period, sec	unsigned char	SERVICE, CALIBRATION	1-100	
400008	Flow filter setting	unsigned char	SERVICE, CALIBRATION	0-7	0 – maximum filtering 7 – minimum reaction time
400009	Pulse period for output №1, ms	unsigned char	SERVICE, CALIBRATION	2-255	
400010	Reserv	unsigned char	–	–	
400011	Reserv	unsigned char	–	–	
400012	Reserv	unsigned char	–	–	
400012	Reserv	unsigned char	–	–	
400014	System commands	unsigned char	SERVICE, CALIBRATION	-	see Attachment 8
400015	Reserv	unsigned char	–	–	
400016	Reserv	unsigned char	CALIBRATION	–	
400017	Reserv	unsigned char	CALIBRATION	–	
400018	Pump frequency modulation	unsigned char	CALIBRATION	–	«0» – modulation off «1» – modulation on
400019	Pump current filter setting	unsigned char	CALIBRATION	0-7	0 – maximum filtering 7 – minimum reaction time
400020	Calibration by pump current	unsigned char	SERVICE, CALIBRATION	0-1	«0» – calibration off «1» – calibration on
400021	Maximum flow rate, 0.1 m/sec	unsigned char	CALIBRATION	10-100	1 – 10 m/sec
400022	Type of universal output №1	unsigned char	SERVICE, CALIBRATION	–	see Attachment 4
400023	Param of universal output №1	unsigned char	SERVICE, CALIBRATION	0-3	see Attachment 5
400024	Type of universal output №	unsigned char	SERVICE, CALIBRATION	–	see Attachment 4
400025	Param of universal output №2	unsigned char	SERVICE, CALIBRATION	0-3	see Attachment 5
400026	Reserv	unsigned char	–	–	
400027	Reserv	unsigned char	–	–	
400028	Reserv	unsigned char	–	–	
400029	Reserv	unsigned char	–	–	
400030	Reserv	unsigned char	–	–	

Logical MB address	Parameter name	Type	Access level	Limits	Comments
400031	Reserv	unsigned char	–	–	
400032	Reserv	unsigned char	–	–	
400033	Reserv	unsigned char	–	–	
400034	Test of frequency output	unsigned char	SERVICE, CALIBRATION	0-1	«0» – work mode «1» – test mode
400035	Reserv	unsigned char	–	–	
400036	Cutoff of flowrate for display, 0.1% Qmax	unsigned char	SERVICE, CALIBRATION	–	
4000037	Reserv	unsigned char	–	–	
4000038	Mask of indication parameters (low byte) (same as 400006)	unsigned char	SERVICE, CALIBRATION	–	see Attachment 2
4000039	Display's settings	unsigned char	SERVICE, CALIBRATION	–	see Attachment 3
400040	Display's contrast	unsigned char	SERVICE, CALIBRATION	8 – 40	
400041	UART mode	unsigned char	SERVICE, CALIBRATION	–	see Attachment 9
400042	Inertia time for switch flow direction to work with heat meters, min	unsigned char	SERVICE, CALIBRATION	0-60	
400043	Relative change of signal flow to run an adaptive algorithm, %	unsigned char	SERVICE, CALIBRATION	3-100	
400044	Minimum flow for start adaptive algorithm, 0.1% Qmax	unsigned char	SERVICE, CALIBRATION	–	
400045	Threshold for adaptive algorithm, % Qmax	unsigned char	SERVICE, CALIBRATION	1-24	
400046	On/off adaptive algorithm	unsigned char	SERVICE, CALIBRATION	0-1	«0» – switch off «1» – switch on
400047	Initialization	unsigned char	CALIBRATION	–	«1» – initialization start
400048	Reserv	unsigned char	–	–	
400049	Display language	unsigned char	SERVICE, CALIBRATION	0-1	«0» – Russian «1» – English
400050	Save of all parameters	unsigned char	SERVICE, CALIBRATION	–	«1» – save
400051	Empty pipe detection	unsigned char	SERVICE, CALIBRATION	0-1	«0» – switch off «1» – switch on
400052	Threshold of empty pipe detection, %	unsigned char	SERVICE, CALIBRATION	5-95	

Logical MB address	Parameter name	Type	Access level	Limits	Comments
400053	Empty pipe calibration	unsigned char	SERVICE, CALIBRATION	–	«1» – calibration start
400054	PFI signal	unsigned char	SERVICE, CALIBRATION	0-1	«0» – switch off «1» – switch on
400055	Device type	unsigned char	CALIBRATION	0-1	«0» – flange «1» – sandwich
400056	Daylight switch	unsigned char	SERVICE, CALIBRATION	0-2	«0» – no, «1» – standard, «2» – user
400057	Ground control	unsigned char	SERVICE, CALIBRATION	0-1	«0» – switch off «1» – switch on
400058	Threshold of ground control	unsigned char	SERVICE, CALIBRATION	–	
400059	Archive clear	unsigned char	SERVICE, CALIBRATION	0-1	«1» – clear of archive
400060	Command for storing reference values for an external magnet detection algorithm	unsigned char	CALIBRATION	0-1	«1» – save
400061	Mode of external magnet detection algorithm	unsigned char	SERVICE, CALIBRATION	0-2	Reaction: «0» – only accumulation of impact time, «1» – zero flow, «2» – zero flow and error frequency at frequency output
400062	Control of electrode contamination control algorithm	unsigned char	SERVICE, CALIBRATION	0-1	«0» – switch off «1» – switch on
400063	Low threshold of electrode contamination control algorithm, %	unsigned char	SERVICE, CALIBRATION	0-100	
400064	High threshold of electrode contamination control algorithm, %	unsigned char	SERVICE, CALIBRATION	0-100	
416385	DN, mm	unsigned int	CALIBRATION	5-500	
416386	Byte pause, ms	unsigned int	SERVICE, CALIBRATION	1- 5000	
416387	Reserv	unsigned int	–	–	
416388	Reserv	unsigned int	–	–	
416389	Full mask of indication parameters	unsigned int	SERVICE, CALIBRATION	–	see Attachment 2

Logical MB address	Parameter name	Type	Access level	Limits	Comments
416390	Lower limit of flow range, low flow, 0.01% Qmax	unsigned int	CALIBRATION	0-0	
416391	Upper limit of flow range, low flow, 0.01% Qmax	unsigned int	CALIBRATION	0-10000	
416392	Lower limit of flow range, medium flow, 0.01% Qmax	unsigned int	CALIBRATION	0-10000	
416393	Upper limit of flow range, medium flow, 0.01% Qmax	unsigned int	CALIBRATION	0-10000	
416394	Lower limit of flow range, high flow, 0.01% Qmax	unsigned int	CALIBRATION	0-10000	
416395	Upper limit of flow range, high flow, 0.01% Qmax	unsigned int	CALIBRATION	10000-10000	
416396	Reserv	unsigned int	–	–	
416397	Reserv	unsigned int	–	–	
416398	Reserv	unsigned int	–	–	
416399	Reserv	unsigned int	–	–	
416400	Number of measurements to be discarded when flowmeter turned on	unsigned int	CALIBRATION	450-13800	
416401	Pulse period for output №1, ms	unsigned int	SERVICE, CALIBRATION	2-1000	
416402	Fmax for output №1, Hz	unsigned int	SERVICE, CALIBRATION	0-500	
416403	Reserv	unsigned int	–	–	
416404	Pulse period for output №2, ms	unsigned int	SERVICE, CALIBRATION	2-1000	
416405	Fmax for output №2, Hz	unsigned int	SERVICE, CALIBRATION	0-500	
416406	Reserv	unsigned int	–	–	
416407	Ftest for output №1, 0.1Hz	unsigned int	SERVICE, CALIBRATION	0-10000	
416408	Ftest for output №2, 0.1Hz	unsigned int	SERVICE, CALIBRATION	0-10000	
416409-416414	Reserv	unsigned int	–	–	
416415-416430	Reserv	unsigned int	–	–	
432769	Flowmeter serial number	unsigned long	CALIBRATION	–	
432771	Reserv	unsigned long	–	–	
432773	Reserv	unsigned long	–	–	
432775	Reserv	unsigned long	–	–	

Logical MB address	Parameter name	Type	Access level	Limits	Comments
432777	Serial number of electronic module	unsigned long	CALIBRATION		
432779	Current date/time	unsigned long	WORK, SERVICE, CALIBRATION	–	In UNIX-format (seconds from 01.01.1970 00:00:00)
432781	Standard time switch	unsigned long	SERVICE, CALIBRATION	–	
432783	Daylight time switch	unsigned long	SERVICE, CALIBRATION	–	
449153	Coefficient KP, universal output №1, imp/l	float	SERVICE, CALIBRATION	0.0001-200000	
449155	Calibration coefficient K1+	float	CALIBRATION	-1000.0 –1000.0	
449157	Calibration coefficient P1+	float	CALIBRATION	-10000.0 – 10000.0	
449159	Calibration coefficient K1-	float	CALIBRATION	-1000.0 –1000.0	
449161	Calibration coefficient P1-	float	CALIBRATION	-10000.0 – 10000.0	
449163	Calibration coefficient K2+	float	CALIBRATION	-1000.0 –1000.0	
449165	Calibration coefficient P2+	float	CALIBRATION	-10000.0 – 10000.0	
449167	Calibration coefficient K2-	float	CALIBRATION	-1000.0 –1000.0	
449169	Calibration coefficient P2-	float	CALIBRATION	-10000.0 – 10000.0	
449171	Calibration coefficient K3+	float	CALIBRATION	-1000.0 –1000.0	
449173	Calibration coefficient P3+	float	CALIBRATION	-10000.0 – 10000.0	
449175	Calibration coefficient K3-	float	CALIBRATION	-1000.0 –1000.0	
449177	Calibration coefficient P3-	float	CALIBRATION	-10000.0 – 10000.0	
449179 – 449197	Reserv	float	–	–	
449199	Coefficient KP, universal output №1, imp/l (same as 449153)	float	SERVICE, CALIBRATION	0.0001-200000	Same as 449153
449201	Coefficient KP, universal output №2, imp/l	float	SERVICE, CALIBRATION	0.0001-200000	
449203 – 449223	Reserv	float	–	–	

Logical MB address	Parameter name	Type	Access level	Limits	Comments
449225	Reference level	float	CALIBRATION	–	
449227	Reference offset level	float	CALIBRATION	–	
449229	Reserv	float	–	–	
449231	Reserv	float	–	–	
449233	Reserv	float	–	–	
449235	Reserv	float	–	–	

Input cells

None

Input registers

Logical MB address	Parameter name	Type	Comments
300001	Network address when using an adapter with a preset address	unsigned char	Read zero if no adapter is installed.
300002	Errors	unsigned char	see Attachment 6
300003	Current consumption range	unsigned char	0 – range №1 (low) 1 – range №2 (medium) 2 – range №3 (high)
300004	Flow direction	unsigned char	0 – forward direction 1 – reverse direction
300005	Calibration by pump current	unsigned char	0 – off 1 – on
300006	Errors (same as 300002)	unsigned char	see Attachment 6
300007	Device state	unsigned char	see Attachment 7
300008	Work mode	unsigned char	0 – WORK 1 – SERVICE 2 – CALIBRATION
300009	Reserv	unsigned char	
300010	Reserv	unsigned char	
300011	Flow direction for heatmeters	unsigned char	0 – forward direction 1 – reverse direction
300012	Flow filter setting	unsigned char	
300013	Reference filter setting	unsigned char	
300014	Additional errors	unsigned char	see Attachment 10
316385	ADC signal code	signed int	
316386	ADC signal code	signed int	same as 316385
316387	ADC reference code	signed int	

Logical MB address	Parameter name	Type	Comments
316388	Reserv	signed int	
316389	Reserv	signed int	
316390	Reserv	signed int	
316391	Reserv	signed int	
316392	Reference ADC code for empty pipe	signed int	
316393	Current ADC code for empty pipe	signed int	
316394	Current ADC code for empty pipe (filtering)	signed int	
316395	Checksum of all parameters of the device	unsigned int	
316396	Checksum of software device (executable code)	unsigned int	
316397	Control information - the number of transitions in the "Service" mode	unsigned int	
316398	Control information - the number of transitions in the "Calibration" mode	unsigned int	
316399	Current record number in user action log	unsigned int	0-6999
316400	Reserv	unsigned int	
316401	Reserv	unsigned int	
316402	Errors (all)	unsigned int	United registers 300006 and 300014
316403	Reserv	unsigned int	
316404	Current ADC code for ground control	unsigned int	
316405	Current ADC code for ground control (filtering)	unsigned int	
332769	Device operation time, sec	unsigned long	
332771	Volume direct (integer part), m^3	signed long	Integer part
332773	Volume direct (fractional part), m^3	float	Fractional part
332775	Volume reverse (integer part), m^3	signed long	Integer part
332777	Volume reverse (fractional part), m^3	float	Fractional part
332779 – 332793	Reserv	unsigned long	
332797 – 332819	Reserv	unsigned long	
332821	Time last recorded time/date in the device	unsigned long	In UNIX-format (seconds from 01.01.1970 00:00:00)
332839	The time of external magnit detection, sec	unsigned long	

Logical MB address	Parameter name	Type	Comments
349153	Qmax, m^3/h	float	
349155	Current reference level	float	
349157	Current shift reference level	float	
349159	Frequency at output №1, Hz	float	
349161	Current flow, l/min	float	
349163	Reserv	float	
349165	Reserv	float	
349167	Reserv	float	
349169	Reserv	float	
349171	Frequency at output №1, Hz	float	same as 349159
349173	Frequency at output №2, Hz	float	
349175	Reserv	float	
349177	Reserv	float	
349179	Reserv	float	
349181	Reserv	float	
349183	Resistance coil sensor (initial), Ohm	float	
349185	Resistance coil sensor (initial), Ohm	float	

Attachment 1

Baudrate index

Value	Baudrate	Comments
0	1200	
1	2400	
2	4800	
3	9600	
4	19200	
5	38400	
6	57600	
7	115200	

Attachment 2

Mask of indication parameters

Bit	Parameter	Comments
High byte		
9-15	Reserv	
8	«1» – display current date and time	
Low byte		
7	«1» – display the checksums of the configuration database and the executable code	
6	«1» – display the conversion coefficients of the universal outputs KP1, KP2	
5	«1» – display calibration factors K, P	
4	«1» – display operation time	
3	«1» – display total volume	
2	«1» – display volume of the reverse flow direction	
1	«1» – display volume of direct flow direction	
0	«1» – display current flow	

Attachment 3

Additional indication parameters

Bit	Parameter	Comments
7	Reserv	
6	Reserv	
5	Reserv	
4	Reserv	
3	Reserv	
2	Autosrolling: «0» – off «1» – on	
1	Volume dimension: «0» – liter (l) «1» – m^3	
0	Flow dimesion: «0» – l/min «1» – m^3/h	

Attachment 4

Universal output configuration

Bit	Parameter	Comments
7	Activity level of universal output: «0» – «low» «1» – «high»	
6	Reserv	
5	Reserv	
4	Reserv	
3	Reserv	
2	Reserv	
1	Mode of universal output: «3» – Frequency mode «2» – Pulse mode «1» – Logical mode «0» – Off	If the universal output is turned off, it is in the passive level in accordance with the settings of bit 7 (passive level is inversely active)
0		

Attachment 5

Param of universal output

Value	Logical mode	Pulse mode	Frequency mode
0	Flow direction: “Passive level” - forward direction "Active level" - reverse direction	Modulo volume	Modulo flow
1	Error: Q > Qmax	Direct volume	Direct flow
2	Any error	Reverse volume	Reverse flow
3	Empty pipe	–	–
4	Flow direction for heatmeter: “Passive level” - forward direction "Active level" - reverse direction	–	–
5	The flag of the presence of the power supply	–	–

Attachment 6

Errors

Bit	Parameter	Comments
7	Working mode without initialization	
6	Device hardware failure (incorrect reference)	
5	Q > Qmax	
4	Input signal overflow	
3	Wrong KP for universal output №2	Exceeding the maximum frequency in frequency mode operation The number of pulses is greater than the maximum possible in pulsed mode
2	Wrong KP for universal output №1	Exceeding the maximum frequency in frequency mode operation The number of pulses is greater than the maximum possible in pulsed mode
1	Memory error	The memory chip (EEPROM) does not work, logging is impossible - changing the configuration parameters in any mode of operation is blocked
0	Empty pipe	Emptying or incomplete filling of the pipeline

Attachment 7

Device state

Bit	Parameter	Comments
7	«1» – Initialization done	
6	«1» – Calibration on	
5	«1» – Display is present	
4	«0» – Mode «SERVICE» or «CALIBRATION» «1» – Mode «WORK»	
3	«0» – Direct flow «1» – Reverse flow	
2	«0» – Frequency mode of the universal output №1 «1» – Pulse mode of the universal output №1	
1	«1» – There are errors	
0	«1» – External address is set	

Attachment 8

System command register

Bit	Parameter	Comments
7	«1» – Device reboot	Access: CALIBRATION
6	«1» – Enter programming mode	Access: CALIBRATION
5	–	
4	«1» – Save reference	Access: CALIBRATION
3	–	
2	–	
1		
0	–	

Attachment 9

UART mode

Bit	Parameter	Comments
7	«0» – ModBus RTU protocol «1» – ModBus ASCII protocol	
6	–	
5	«0» – Unidirectional flow control «1» – Bidirectional flow control	
4	–	
3		
2		
1		
0		

Attachment 10

Additional errors

Bit	Parameter	Comments
7	Reserv	
6	Reserv	
5	Reserv	
4	Reserv	
3	Electrode pollution	Sediment formation on electrodes
2	External magnet detection	The impact of an external magnet on the device
1	No ground contact	There is no galvanic contact between the "ground" of the flow meter and the pipeline
0	Supply voltage low	The supply voltage is lower than 20 V; incorrect operation of the pump current shaping driver is possible, and the flow is zeroed