

FLOWTI 702 MODBUS PROTOCOL
SPECIFICATION
Rev. 01.02

1	FLOWTI 702 modbus protocol.....	3
1.1	Current value	3
1.2	Archived data	3
1.3	Programmed value.....	3
1.4	Diagnostic code	3
2	Register map.....	4
2.1	16 bit integer registers	4
2.2	32 bit integer registers	7
2.3	32 bit floating point registers.....	9

1 FLOWTI 702 modbus protocol

Flowti 702 allow the user to access configuration and archived parameter through modbus protocol. Calculator support both, ASCII and RTU version, automatically. Default baud rate of COM1 and COM2 are 9600, 8 bit, no parity. Modbus registers are divided in three section:

- registers between 0001 and 3000 are 16 bit integer register,
- registers between 3001 and 7000 are 32 bit integer register,
- registers 7001 and greater are floating point.

1.1 Current value

Current value can be accessed directly reading the appropriate register as described in the register map.

1.2 Archived data

Flowti 702 archive 2 days of measure trace, and 2 month of daily value. To select the desiderate record the user must write the requested day in the day selection register, than the archived value can be read through the appropriate register (see register map).

1.3 Programmed value

Current value can be accessed directly reading the appropriate register as described in the register map.

1.4 Diagnostic code

Diagnostic code is a 32 bit binary code, If a bit is set to "1" the corresponding alarm is active, otherwise the alarm is not active. The follow is the diagnostic code description:

BIT	Description
0	Power failure
1	Battery low
2	Event buffer level at 90%
3	General alarm
4	Emitter fault
5	Event buffer full
6	Real time clock sincronization error
7	Converter alarm
8	Temperature out of limit
9	Pressure out of limit
10	Measured flow rate out of limit
11	Temperature out of range
12	Pressure out of range
13	Gas analyzer fault
14	<i>Not used</i>
15	<i>Not used</i>
16	<i>Not used</i>
17	<i>Not used</i>
18	<i>Not used</i>
19	<i>Not used</i>

BIT	Description
21	Not used
22	Power OFF
23	Printer fault
24	Measurement board fault
25	Calculation error
26	Temperature out of threshold
27	Pressure out of threshold
28	Flow rate out of threshold
29	User data checksum error
30	Program checksum error
31	Legal data checksum error

2 Register map

2.1 16 bit integer registers

	IND.	DIM.REG	RD/WR	TIPO	UM	DESCRIZIONE
	0001	16 bit	RD	16 Bit int	---	Line 1 modbus address
	0002	16 bit	RD	16 Bit int	---	Line 2 modbus address
CURRENT VALUES	0100-0101	16 bit	RD	32 Bit int	m3/h	Measured flow rate
	0102-0103	16 bit	RD	32 Bit Int	m3/h	Base flow rate
	0104-0105	16 bit	RD	32 Bit Int	m3/h	Conventional flow rate
	0106-0107	16 bit	RD	32 Bit Int	mJ/h	Energy flow rate
	0108-0109	16 bit	RD	32 Bit Int	bar * 1000	Measured pressure
	0110-0111	16 bit	RD	32 Bit Int	K * 100	Measured temperature
	0112-0113	16 bit	RD	32 Bit Int	* 100000	Conversion factor (C)
	0114-0115	16 bit	RD	32 Bit Int	* 100000	Zb/Z1 ration
	0116-0117	16 bit	RD	32 Bit Int	* 100000	Zb (Z at base condition)
	0118-0119	16 bit	RD	32 Bit Int	* 100000	Z1 (Z at measured condition)
	0120-0121	16 bit	RD	32 Bit Int	m3	Error volume counter in the last 15 minutes
	0122-0123	16 bit	RD	32 Bit Int	m3	Measured volume counter in the last 15 minutes
	0124-0125	16 bit	RD	32 Bit Int	m3	Base volume counter in the last 15 minute
	0126-0127	16 bit	RD	32 Bit Int	MJ	Energy counter in the last 15 minutes
	0128-0129	16 bit	RD	32 Bit Int	m3	Hourly measured volume
	0130-0131	16 bit	RD	32 Bit Int	m3	Hourly base volume
	0132-0133	16 bit	RD	32 bit Int	m3	Hourly error volume
	0134-0135	16 bit	RD	32 bit Int	MJ	Hourly Energy counter
	0136-0137	16 bit	RD	32 Bit Int	m3	Daily measured volume
	0138-0139	16 bit	RD	32 Bit Int	m3	Daily base volume
	0140-0141	16 bit	RD	32 Bit Int	m3	Daily error volume
	0142-0143	16 bit	RD	32 Bit Int	MJ	Daily Energy counter
	0144-0145	16 bit	RD	32 Bit Int	m3	Monthly measured volume
	0146-0147	16 bit	RD	32 Bit Int	m3	Monthly base volume
	0148-0149	16 bit	RD	32 Bit Int	m3	Monthly error volume
	0150-0151	16 bit	RD	32 Bit Int	MJ	Monthly Energy counter
	0152-0153	16 bit	RD	32 Bit Int	m3	Total measured volume
0154-0155	16 bit	RD	32 Bit Int	m3	Total base volume	
0156-0157	16 bit	RD	32 Bit Int	m3	Total error volume	
0158-0159	16 bit	RD	32 Bit Int	MJ	Total Energy counter	
0160-0161	16 bit	RD	32 Bit Int	---	Current diagnostic	
0162-0163	16 bit	RD	32 Bit Int	---	History diagnostic	
0164-0163	16 bit	RD	32 Bit Int	---	Current date (DDMMYY)	
0166-0163	16 bit	RD	32 Bit Int	---	Current hour (hhmmss)	

DAILY RECORD	199-200	16 bit	RD/WR	32 bit Int	---	Archive selection (DD/MM/YY)
	201-202	16 bit	RD	32 Bit Int	---	Daily diagnostic
	203-204	16 bit	RD	32 Bit Int	m3/D	Daily base volume
	205-206	16 bit	RD	32 Bit Int	m3/D	Daily measured volume
	207-208	16 bit	RD	32 Bit Int	---	Not used
	209-210	16 bit	RD	32 Bit Int	---	Not used
	211-212	16 bit	RD	32 Bit Int	---	Not used
	213-214	16 bit	RD	32 Bit Int	---	Not used
	301-302	16 bit	RD	32 Bit Int		
					bar x 1000	Hourly mean pressure (01->24)
	347-348	16 bit	RD	32 Bit Int		(hourly sample refered to gas hour)
	351-352	16 bit	RD	32 Bit Int		
					K x 100	Hourly mean temperature (01->24)
	397-398	16 bit	RD	32 Bit Int		(hourly sample refered to gas hour)
	401-402	16 bit	RD	32 Bit Int		
						Not uset
	447-448	16 bit	RD	32 Bit Int		
	501-502	16 bit	RD	32 Bit Int		
					m3/h	Hourly mean flow rate (1->96)
	691-692	16 bit	RD	32 Bit Int		(15 minute sample refered to gas hour)
	701-702	16 bit	RD	32 Bit Int		
						Not used
	891-892	16 bit	RD	32 Bit Int		
	901-902	16 bit	RD	32 Bit Int		
						Not used
	1091-1092	16 bit	RD	32 Bit Int		
1101-1102	16 bit	RD	32 Bit Int			
					Not used	
1291-1292	16 bit	RD	32 Bit Int			
1301-1302	16 bit	RD	32 Bit Int			
					Not used	
1491-1492	16 bit	RD	32 Bit Int			
1501-1502	16 bit	RD	32 Bit Int			
					Not used	
1691-1692	16 bit	RD	32 Bit Int			
1701-1702	16 bit	RD	32 Bit Int			
					Not used	
1891-1892	16 bit	RD	32 Bit Int			
1901-1902	16 bit	RD	32 Bit Int			
					Not used	
2091-2092	16 bit	RD	32 Bit Int			
PROGRAMMED DATA	2800-2801	16 bit	RD	32 Bit Int	1m3=p.*10000	Pulse weight
	2802-2803	16 bit	RD	32 Bit Int	m3/h	Max. conventional base flow rate
	2804-2805	16 bit	RD	32 Bit Int	m3/h	Max. measured flow rate
	2806-2807	16 bit	RD	32 Bit Int	m3/h	Min. measured flow rate
	2808-2809	16 bit	RD	32 Bit Int	---	P. trasducer type
	2810-2811	16 bit	RD	32 Bit Int	bar * 1000	Pressure trasducer at 4 mA
	2812-2813	16 bit	RD	32 Bit Int	bar * 1000	Pressure trasducer at 20 mA
	2814-2815	16 bit	RD	32 Bit Int	bar * 1000	Pressule low limit
	2816-2817	16 bit	RD	32 Bit Int	bar * 1000	Pressure high limit
	2818-2819	16 bit	RD	32 Bit Int	bar * 1000	Pressure low valid range
	2820-2821	16 bit	RD	32 Bit Int	bar * 1000	Pressure high valid range
	2822-2823	16 bit	RD	32 Bit Int	K * 1000	Temperature trasducer at 4 mA
	2824-2825	16 bit	RD	32 Bit Int	K * 1000	Temperature trasducer at 20 mA
	2826-2827	16 bit	RD	32 Bit Int	K * 1000	Temperature low limit
	2828-2829	16 bit	RD	32 Bit Int	K * 1000	Temperature high limit
2830-2831	16 bit	RD	32 Bit Int	K * 1000	Temperature low valid range	

2832-2833	16 bit	RD	32 Bit Int	K * 1000	Temperature high valid range

2900-2901	16 bit	RD	32 Bit Int	---	Print interval
2902-2903	16 bit	RD	32 Bit Int	---	End day hour
2904-2905	16 bit	RD	32 Bit Int	---	GMT
2906-2907	16 bit	RD	32 Bit Int	---	Daylight saving time begin
2908-2909	16 bit	RD	32 Bit Int	---	Daylight saving time end
2910-2911	16 bit	RD	32 Bit Int	bar * 100000	Base pressure
2912-2913	16 bit	RD	32 Bit Int	bar * 100	Base temperature
2914-2915	16 bit	RD	32 Bit Int	bar * 1000000	Rho air
2916-2917	16 bit	RD	32 Bit Int	bar * 10000	Barometrical pressure
2918-2919	16 bit	RD	32 Bit Int	bar * 1000	CO2
2920-2921	16 bit	RD	32 Bit Int	bar * 1000	H2
2922-2923	16 bit	RD	32 Bit Int	Kg/m3 * 100000	Base rho
2924-2925	16 bit	RD	32 Bit Int	MJ/M3 * 10000	PCS

2.2 32 bit integer registers

	IND.	DIM.REG	RD/WR	TIPO	UM	DESCRIZIONE
CURRENT VALUES	3101	32 bit	RD	32 Bit int	m3/h	Measured flow rate
	3102	32 bit	RD	32 Bit Int	m3/h	Base flow rate
	3103	32 bit	RD	32 Bit Int	m3/h	Conventional flow rate
	3104	32 bit	RD	32 Bit Int	mJ/h	Energy flow rate
	3105	32 bit	RD	32 Bit Int	bar * 1000	Measured pressure
	3106	32 bit	RD	32 Bit Int	K * 100	Measured temperature
	3107	32 bit	RD	32 Bit Int	* 100000	Conversion factor (C)
	3108	32 bit	RD	32 Bit Int	* 100000	Zb/Z1 ration
	3109	32 bit	RD	32 Bit Int	* 100000	Zb (Z at base condition)
	3110	32 bit	RD	32 Bit Int	* 100000	Z1 (Z at measured condition)
	3111	32 bit	RD	32 Bit Int	m3	Error volume counter in the last 15 minutes
	3112	32 bit	RD	32 Bit Int	m3	Measured volume counter in the last 15 minutes
	3113	32 bit	RD	32 Bit Int	m3	Base volume counter in the last 15 minutes
	3114	32 bit	RD	32 Bit Int	MJ	Energy counter in the last 15 minutes
	3115	32 bit	RD	32 Bit Int	m3	Hourly measured volume
	3116	32 bit	RD	32 Bit Int	m3	Hourly base volume
	3117	32 bit	RD	32 bit Int	m3	Hourly error volume
	3118	32 bit	RD	32 bit Int	MJ	Hourly Energy counter
	3119	32 bit	RD	32 bit Int	m3	Daily measured volume
	3120	32 bit	RD	32 bit Int	m3	Daily base volume
	3121	32 bit	RD	32 bit Int	m3	Daily error volume
	3122	32 bit	RD	32 bit Int	MJ	Daily Energy counter
	3123	32 bit	RD	32 bit Int	m3	Monthly measured volume
	3124	32 bit	RD	32 bit Int	m3	Monthly base volume
	3125	32 bit	RD	32 bit Int	m3	Monthly error volume
	3126	32 bit	RD	32 bit Int	MJ	Monthly Energy counter
	3127	32 bit	RD	32 bit Int	m3	Total measured volume
	3128	32 bit	RD	32 bit Int	m3	Total base volume
3129	32 bit	RD	32 bit Int	m3	Total error volume	
3130	32 bit	RD	32 bit Int	MJ	Total Energy counter	
3131	32 bit	RD	32 bit Int	---	Current diagnostic	
3132	32 bit	RD	32 bit Int	---	History diagnostic	
3133	32 bit	RD	32 bit Int	---	Current date (DDDMMYY)	
3134	32 bit	RD	32 bit Int	---	Current hour (hhmmss)	
	3199	32 bit	RD/WR	32 bit Int	---	Archive selection (DD/MM/YY)
DAILY RECORD	3201	32 bit	RD	32 Bit Int		Daily diagnostic
	3202	32 bit	RD	32 Bit Int	m3/D	Daily base volume
	3203	32 bit	RD	32 Bit Int	m3/D	Daily measured volume
	3204	32 bit	RD	32 Bit Int	---	Not used
	3205	32 bit	RD	32 Bit Int	---	Not used
	3206	32 bit	RD	32 Bit Int	---	Not used
	3207	32 bit	RD	32 Bit Int	---	Not used
	3301	32 bit	RD	32 Bit Int		
	3324	32 bit	RD	32 Bit Int	bar x 1000	Hourly mean pressure (01->24) (hourly sample refered to gas hour)
	3401	32 bit	RD	32 Bit Int		
	3424	32 bit	RD	32 Bit Int	K x 100	Hourly mean temperature (01->24) (hourly sample refered to gas hour)
	3501	32 bit	RD	32 Bit Int		
	3524	32 bit	RD	32 Bit Int		Not uset
	3601	32 bit	RD	32 Bit Int		
	3696	32 bit	RD	32 Bit Int	m3/h	Hourly mean flow rate (1->96) (15 minute sample refered to gas hour)

2.3 32 bit floating point registers

	IND.	DIM.REG	RD/WR	TIPO	UM	DESCRIZIONE
CURRENT VALUES	7101	32 bit	RD	32 bit float	m3/h	Measured flow rate
	7102	32 bit	RD	32 bit float	m3/h	Base flow rate
	7103	32 bit	RD	32 bit float	m3/h	Conventional flow rate
	7104	32 bit	RD	32 bit float	mJ/h	Energy flow rate
	7105	32 bit	RD	32 bit float	Bar	Measured pressure
	7106	32 bit	RD	32 bit float	K	Measured temperature
	7107	32 bit	RD	32 bit float	---	Conversion factor (C)
	7108	32 bit	RD	32 bit float	---	Zb/Z1 ration
	7109	32 bit	RD	32 bit float	---	Zb (Z at base condition)
	7110	32 bit	RD	32 bit float	---	Z1 (Z at measured condition)
	7111	32 bit	RD	32 bit float	m3	Error volume counter in the last 15 minutes
	7112	32 bit	RD	32 bit float	m3	Measured volume counter in the last 15 minutes
	7113	32 bit	RD	32 bit float	m3	Base volume counter in the last 15 minute
	7114	32 bit	RD	32 bit float	MJ	Energy counter in the last 15 minutes
	7115	32 bit	RD	32 bit float	m3	Hourly measured volume
	7116	32 bit	RD	32 bit float	m3	Hourly base volume
	7117	32 bit	RD	32 bit float	m3	Hourly error volume
	7118	32 bit	RD	32 bit float	MJ	Hourly Energy counter
	7119	32 bit	RD	32 bit float	m3	Daily measured volume
	7120	32 bit	RD	32 bit float	m3	Daily base volume
	7121	32 bit	RD	32 bit float	m3	Daily error volume
	7122	32 bit	RD	32 bit float	MJ	Daily Energy counter
	7123	32 bit	RD	32 bit float	m3	Monthly measured volume
	7124	32 bit	RD	32 bit float	m3	Monthly base volume
7125	32 bit	RD	32 bit float	m3	Monthly error volume	
7126	32 bit	RD	32 bit float	MJ	Monthly Energy counter	
7127	32 bit	RD	32 bit float	m3	Total measured volume	
7128	32 bit	RD	32 bit float	m3	Total base volume	
7129	32 bit	RD	32 bit float	m3	Total error volume	
7130	32 bit	RD	32 bit float	MJ	Total Energy counter	
7131	32 bit	RD	32 bit float	---	Current diagnostic	
7132	32 bit	RD	32 bit float	---	History diagnostic	
DAILY RECORD	7201	32 bit	RD	32 bit float		Daily diagnostic
	7202	32 bit	RD	32 bit float	M3/D	Daily base volume
	7203	32 bit	RD	32 bit float	M3/D	Daily measured volume
	7204					Not used
	7205					Not used
	7206					Not used
	7207					Not used
	7301	32 bit	RD	32 bit float		
		32 bit	RD	32 bit float	Bar	Hourly mean pressure (01->24)
	7324	32 bit	RD	32 bit float		(hourly sample refered to gas hour)
	7401	32 bit	RD	32 bit float		
		32 bit	RD	32 bit float	K	Hourly mean temperature (01->24)
	7424	32 bit	RD	32 bit float		(hourly sample refered to gas hour)
	7501	32 bit	RD	32 bit float		
		32 bit	RD	32 bit float		Not uset
	7524	32 bit	RD	32 bit float		
	7601	32 bit	RD	32 bit float		
	32 bit	RD	32 bit float	m3/h	Hourly mean flow rate (1->96)	
7696	32 bit	RD	32 bit float		(15 minute sample refered to gas hour)	
7701	32 bit	RD	32 bit float			
	32 bit	RD	32 bit float		Not used	

