Installation and operating manual

CI-module UNIGAS 300

Wigersma & Sikkema

Since 1921

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Preface

- This manual provides important information about the use of the CI-Module. Please read this manual carefully.
- Various remarks and warnings in this manual are marked with symbols. Read these carefully and take measures were necessary.

The symbols used have the following meaning.

	REMARK	Suggestions and recommendations to make tasks easier.
	NOTE	A note draws user's attention to potential problems.
	WARNING	If the procedure is not carried out correctly, a dangerous situation may develop, or data or settings may be lost.

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1 Introduction CI module UNIGAS 300

UNIGAS 300 communicates using the IEC 62056-21 protocol (previously 1107).

The CI module for UNIGAS 300 is a module to add one or more communication protocols to UNIGAS 300:

- IDOM
- FTP
- MODBUS

UNIGAS 300 is equipped with two communication ports; depending on the selected protocol, it will be available on communication port 1 (modem port) or communication port 2 (user port).

Protocol	Communication port	
	1	2
IDOM	V	-
FTP	V	-
MODBUS	V	V

If the service port of UNIGAS 300 is used during or in a 30 second period prior to the forwarding of an IDOM or FTP message, it is possible that forwarding the IDOM or FTP message fails.

The following must be taken into account when using both communication ports:

- When using MODBUS on either port, IEC 62056-21 cannot be communicated on the other port simultaneously. There should be at least 5 s space between the use of both ports.
- When using MODBUS on both ports, MODBUS cannot be communicated simultaneously. There should be at least 5 s space between the use of both ports.

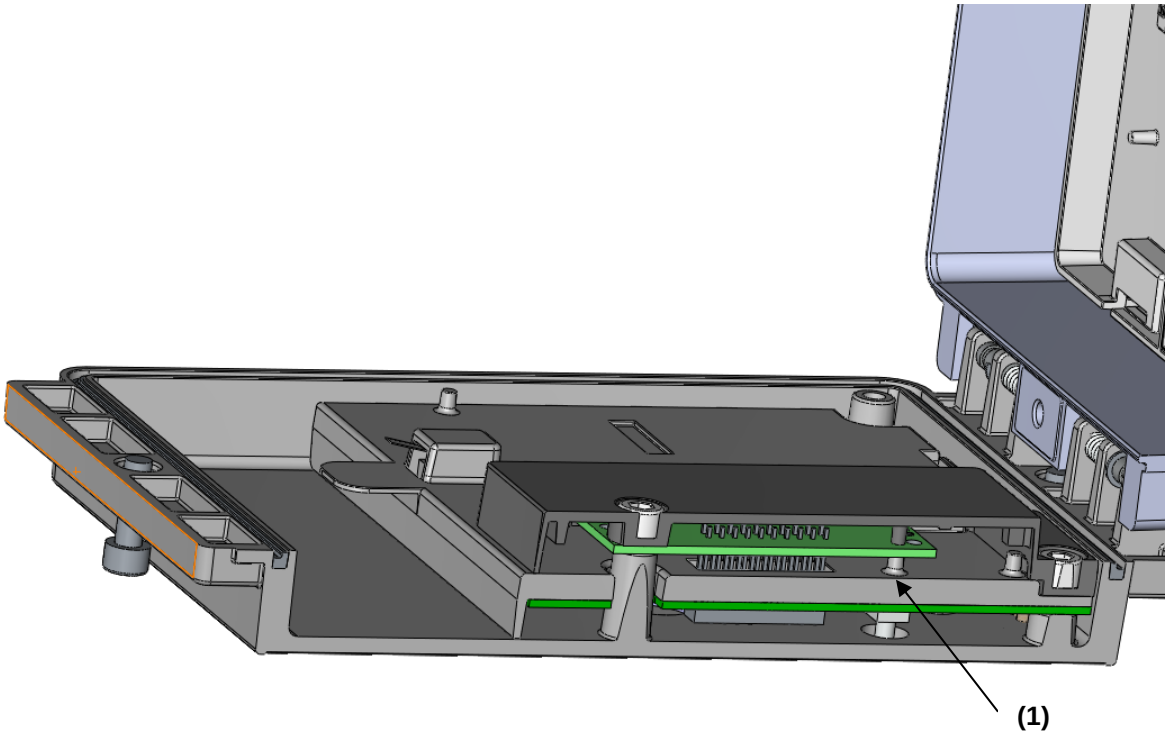
If it cannot be guaranteed that simultaneous communication will not occur when using both communication ports, the use of both ports is not recommended. This may lead to interference or blocking of communication for both ports.

- If no protocol is configured on the CI module, IEC 62056-21 can be communicated on both ports simultaneously.
- When using FTP or IDOM, while sending the FTP or IDOM message, on port 2 IEC 62056-21 can be communicated simultaneously.

2 Installing the CI-module

Mounting instruction *DDG6006MHML* describes installation of the CI-module in UNIGAS 300.

Installing the CI module in UNIGAS 300 will not affect the programmed settings of the CI module. Consequently, it is possible to exchange the CI module between several UNIGAS 300 units without any need to change the settings in the CI module.



CI module located in UNIGAS 300

Only place the CI module in UNIGAS 300 if the pillar (figure above (1)) is present.

When installing a CI module, as indicated at (3) in the installation manual *DDG6006MHML*, the ring must **not** be replaced!

3 IDOM

The IDOM protocol can be used as follows. UNIGAS 300 is connected to an RTU. The RTU will collect the data forwarded by the CI module in UNIGAS 300. Subsequently, the RTU will forward the data to a central system.
At a 5-min interval on the 5-min moment, UNIGAS 300 will forward the data over the users port (communications port 1). The RTU will receive these data and process into a load profile.

3.1 Data structure

The IDOM protocol will forward the following data.

Sequence	Description	Output/ format	Unit	Remarks
1	Non-converted volume	Va:########[CR]	m3	
2	Converted volume	Vr:######### [CR]	m3	
3	Pressure	P#.###[CR]	bar	
4	Temperature	T±##.##[CR]	Degrees Celsius	
5	Alarm	@[CR]		Only present in case of an alarm.

Example:

Va:01209188[CR]
Vr:01206764[CR]
P0.999[CR]
T+01.60[CR]

An alarm is set under the conditions specified in Chapter 6 of UNIGAS 300 manual *DDG6004MHGB*, table: "Status register 1; calibration relevant alarms" (97:97.1).

3.2 Data format

Baud rate: 4800
Parity: Even
Data bits: 7
Stop bits: 1

3.3 IDOM settings

The settings for IDOM in the CI module are made by means of UNITOOL.

The settings are

- System information; Protocol: *Off*, *FTP*, ***IDOM****, MODBUS*
- All the other settings are not relevant

Settings marked in bold shall be made to activate the IDOM mode.

Status	OBIS-code	Name	Value
Category:			
Manual	C.93.20	Protocol	IDOM
Category: Adress			
	C.90.1	Device communication number	00000002
Category: Components			
	C.91.5	Bottom PCB serial number	0120142600000153
Category: Meter data			
	7-0:0.2.0	Firmware bottom PCB	2000023
	C.1.1	Device type	MODULE1B
	C.1.0	Device serial number	0

4 FTP messages

For sending FTP messages a UNICOM 300 (or UNILOG GPRS/300)shall be connected to the modem port (communication port 1) of UNIGAS 300. FTP communication will send a file to the designated FTP server. The CI module will request UNICOM 300 (or UNILOG GPRS/300) to establish a FTP connection. It is therefore important that UNICOM 300 (or UNILOG GPRS/300) is provided with the correct settings of the FTP server which messages will be sent towards. The module reads and transfers the load profile P.01 of UNIGAS 300. The load profile P.01 can be set in UNIGAS 300 (5, 10, 15, 30, 60 min. or 24 hour).

The number of channels in the FTP file corresponds with the number of channels of the UNIGAS 300. More information on the load profile can be found in the UNIGAS 300 user manual.

Three different file formats of the FTP file are supported:

- XML
- IEC 62056-21
- CSV

When FTP is active, it will have priority communication on any other connections with UNIGAS 300. When a modem connection is active, UNICOM 300 (or UNILOG GPRS/300) will terminate the current connection and start a FTP session.

4.1 Start FTP

The FTP session will be activated depending on the programmed FTP interval. The FTP session starts 10 seconds after rogrammed interval. It is also possible to set up a additional delay (FTP offset) to the FTP session. The moment of starting the FTP is FTP interval + 10 Seconds + FTP offset, example given; FTP interval 5 minutes and FTP offset 25 seconds. The FTP session will commence on 5 min + 10 seconds + 25 second = xx:05:25. The next FTP message will be sent on xx:10:25, xx:15:25 and so forth.

4.2 First FTP message

The first FTP message the CI module sends, is a maximum of 7 days of data of the programmed interval of the load profile. In case of a five minuten interval, the FTP message will consist out of a maximum of 7 days * 24 hours * 12 (5 minutes interval) = 2016 entries.

Once every hour (5 minutes before the hour) the date of the last received load profile is saved. This prevents that when the CI module is reinstated in the same UNIGAS 300, the FTP message will contain 7 days of loggings. The FTP message will contain only last hours data.

When the CI modules is reinstated in a different UNIGAS 300 , the FTP message will contain a maximum of 7 days of data.

4.3 FTP file

The ftp filename consists of:

- Manufacturer ID
- Device serial number
- Date and Time
- Fixed text
- File extension depending on format.

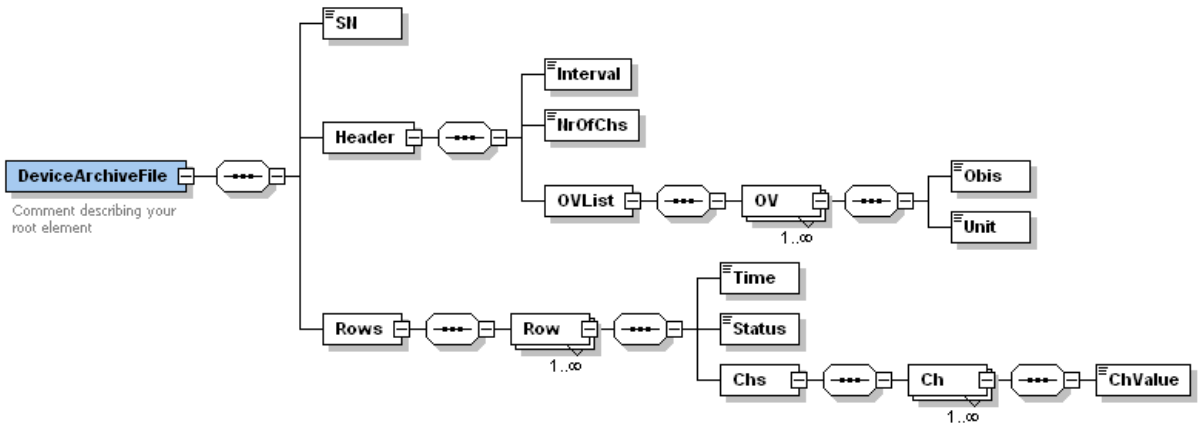
E.g.: *KAM[27000100][0091014161055]LP.txt*

4.4 XML file format

The XML file format has the extension *.xml*. *CR* and *LF* are not applied to show line breaks.

4.4.1 XSD

An XSD is available which defines XML message structure.



Channel 12 of the xml message (*ChValue*) has the same value as status.

Next examples contain 2 loggings of 5 minute interval.

Example:

<?xml version="1.0" encoding="UTF-8"?><DeviceArchiveFile xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"><SN>27000412</SN><Header><Interval>5</Interval><NrOfChs>12</NrOfChs><OVList><OV><Obis>7-1:11.2.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-1:12.1.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-1:13.0.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-1:11.1.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-2:13.0.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-3:13.0.0</Obis><Unit>m3</Unit></OV><OV><Obis>7-1:41.0.0</Obis><Unit>C</Unit></OV><OV><Obis>7-1:42.0.0</Obis><Unit>mbar</Unit></OV><OV><Obis>97:97.1</Obis><Unit></Unit></OV><OV><Obis>97:97.2</Obis><Unit></Unit></OV><OV><Obis>97:97.3</Obis><Unit></Unit></OV><OV><Obis>97:97.4</Obis><Unit></Unit></OV></OVList></Header><Rows><Row><Time>2010-03-22 00:45:00</Time><Status>0000</Status><Chs><Ch><ChValue>20631215</ChValue></Ch><Ch><ChValue>00006138</ChValue></Ch><Ch><ChValue>21992096</ChValue></Ch><Ch><ChValue>21992096</ChValue></Ch><Ch><ChValue>00000002</ChValue></Ch><Ch><ChValue>00000002</ChValue></Ch><Ch><ChValue>00001764</ChValue></Ch><Ch><ChValue>00102190</ChValue></Ch><Ch><ChValue>0010</ChValue></Ch><Ch><ChValue>0000</ChValue></Ch><Ch><ChValue>00FF</ChValue></Ch><Ch><ChValue>0000</ChValue></Ch></Chs></Row><Row><Time>2010-03-22 00:50:00</Time><Status>0000</Status><Chs><Ch><ChValue>20631499</ChValue></Ch><Ch><ChValue>00006138</ChValue></Ch><Ch><ChValue>21992396</ChValue></Ch><Ch><ChValue>21992396</ChValue></Ch><Ch><ChValue>00000002</ChValue></Ch><Ch><ChValue>00000002</ChValue></Ch><Ch><ChValue>00001763</ChValue></Ch><Ch><ChValue>00102187</ChValue></Ch><Ch><ChValue>0010</ChValue></Ch><Ch><ChValue>0000</ChValue></Ch><Ch><ChValue>00FF</ChValue></Ch><Ch><ChValue>0000</ChValue></Ch></Chs></Row></Rows></DeviceArchiveFile>

4.5 IEC 62056-21 file format

The FTP file has the extension *.txt*. The IEC 62056-21 file consists out of one or more data blocks with a max of 99 entries (loggings) bestaat uit één of meerdere datablokken met maximaal 99 entries (loggings) each. Each data block is provided of a data header, a BCC and characters [STX] and [EOT]. The file is terminated with marking of the character [ETX].

Example given:

[STX]P.52(0100215150000)(0000)(5)(11)(7-1:11.2.0)(m3)(7-1:12.1.0)(m3)(7-1:13.0.0)(m3)(7-1:11.1.0)(m3)(7-2:13.0.0)(m3)(7-3:13.0.0)(m3)(7-1:41.0.0)(C)(7-1:42.0.0)(mbar)(97:97.1)()(97:97.2)()(97:97.3)()[CR][LF]

(17772111)(00006138)(19019721)(19019721)(00000002)(00000002)(-00000176)(00100555)(0010)(0000)(00FF)[CR][LF]

(17772410)(00006138)(19020021)(19020021)(00000002)(00000002)(-00000141)(00100551)(0010)(0000)(0033)[CR][LF]

[ETX][ENQ]

4.6 CSV file format

The FTP file has the extension *.csv.* The CSV file has one more channel than the load profile of UNIGAS 300. The last channel is the VDEW status bit .

Example given:

0.9.2,0.9.1,7-1:11.2.0(m3),7-1:12.1.0(m3),7-1:13.0.0(m3),7-1:11.1.0(m3),7-2:13.0.0(m3),7-3:13.0.0(m3),7-1:41.0.0(C),7-1:42.0.0(mbar),97:97.1(),97:97.2(),97:97.3(),97:97.4()[CR][LF]

2010-02-15,15:20,17773309,00006138,19020921,19020921,00000002,00000002,-00000162,00100540,0010,0000,00FF ,0000[CR][LF]

2010-02-15,15:25,17773608,00006138,19021221,19021221,00000002,00000002,-00000136,00100547,0010,0000,00FF,0000[CR][LF]

4.7 FTP settings

FTP settings of the CI module can be programmed with UNITOOL. Connect with UNITOOL to MODULE1B, device address MODULE1B.

Open the menu *GPRS* for all settings regarding FTP.

Programmable settings are:

- Menu GPRS; FTP interval; off, ***5 minutes***, ***10 minutes***, ***15 minutes***, ***30 minutes, 60 minutes***, **1 day**
- Menu GPRS; FTP file format; ***IEC 62056-21***, ***CSV***, ***XML***
- Menu GPRS; FTP interval offset; **0** till **999** seconds.
- Menu System information; Protocol: Off, ***FTP***, *IDOM, MODBUS*

Bold marked settings must be set for FTP communication.

Status	OBIS-code	Name	Value	Unit
Category: FTP				
	C.92.63	FTP interval delay	30	s
	C.92.49	FTP interval	60 minutes	
	C.92.62	FTP file format	1107 (62056-21)	

5 Modbus

5.1 Introduction:

Modbus protocol can be read out easily by use of RS485 or RS232. Communication takes place through communication port 1 or communication port 2 of the UNIGAS 300.

Each Modbus message has the same structure, supporting the modes ASCII and RTU. The advantage of RTU is that fewer characters are sent.
Modbus supports mode RTU and ASCII with 300, 600, 1200, 2400, 4800 and 9600 baudrate.

Table: Modbus ASCII or RTU

	Modbus/ASCII	Modbus/RTU
Characters	ASCII **0**...**9** en **A**..**F**	Binary **0**...**255**
Checksum	**LRC** Longitudinal Redundancy Check	**CRC** Cyclic Redundancy Check
Frame start	character '**:**'	3,5 characters' silence
Frame end	characters **CR**/**LF**	3,5 characters' silence
Holes in message	1 sec	1,5 times character length
Start bit	**1**	**1**
Data bits	**7**	**8**
Parity	even	none
Stop bits	**1**	**1**

When the Modbus protocol is active on communication port 1, it is not possible to read out the CI module of the UNIGAS 300 by means of IEC 62056-21. For reading out with IEC 62056-21, a command must first be issued to temporarily deactivate Modbus.

The registers of Modbus are not configurable. The adressing of the Modbus register is defined in the mapping table (see 5.2 Modbus Registers). The mapping table also defines the Modbus format, the link with the correct OBIS parameter and the size of the OBIS parameter. The multipliers for read out of OBIS parameter Modbus are also defined in this table.

Example given:

Register address 1: OBIS parameter C.6.1 with OBIS multiplier 10.

When reading out the parameter from UNIGAS 300 the read out divided by the multiplier. Actual value 631 is the same as 63.1Ah. However, Modbus multiplies this value times 10

5.2 Modbus Registers

Register	Modbus format	Sca-ling	Ab.	Description	OBIS code	Unit
1	USHORT	10	Ah_used	Battery capacity	C.6.1	10^{-1} Ah
2	HEX2	1	Register 1	calibration relevant alarms	97:97.1	-
3	USHORT	1	Vm1	unconverted volume, total volume at measuring conditions, input 1 Post decimal places	7-1:13.0.0	10^{-3} m^3
4	USHORT	1	Vb1	converted volume, undisturbed volume at base conditions, input 1 Post decimal places	7-1:11.2.0	10^{-3} m^3
5*	HEX2	1	Register 2	Operational_status	97:97.2	-
6*	HEX2	1	Register 3	Alarm_reports	97:97.3	-
7*	HEX2	1	Register 4	VDEW status	97:97.4	-
101	ULONG	1	Vm1	unconverted volume, total volume at measuring conditions, input 1 Pre decimal places	7-1:13.0.0	m^3
103	ULONG	1	Vb1	converted volume, undisturbed volume at base conditions, input 1 Pre decimal places	7-1:11.2.0	m^3
301	IEEEFLOAT	1	pb	Reference pressure (base conditions)	7-1:42.2.0	mbar
303	IEEEFLOAT	1	tb	Reference temperature (base conditions)	7-1:41.2.0	°C
305	IEEEFLOAT	1	p	Pressure	7-1:42.0.0	mbar
307	IEEEFLOAT	1	p	Pressure	7-1:42.0.0	mbar
309	IEEEFLOAT	1	t	Temperature	7-1:41.0.0	°C
311	IEEEFLOAT	1	C	Calculated conversion factor	7-1:52.2.0	-
313	IEEEFLOAT	1	Z/Zbfix	Fixed value used for conversion	7-1:53.3.0	-
315	IEEEFLOAT	1	pfix	Fixed value for the pressure used for conversion	7-1:42.3.0	mbar
317	IEEEFLOAT	1	tfix	Fixed value for the temperature used for conversion	7-1:41.3.0	°C
319	IEEEFLOAT	1	N2	Nitrogen concentration N2	C.96.3	mol %
321	IEEEFLOAT	1	H2	Hydrogen concentration H2	C.96.2	mol %
323	IEEEFLOAT	1	CO2	Carbon dioxide concentration CO2	C.96.1	mol %
327	IEEEFLOAT	1	Qc1_5	Flow at measuring conditions based upon 5 minutes interval, total value	7-1:43.1.1	m3/h
329	IEEEFLOAT	1	Qb1_5	Flow at base conditions, undisturbed value based upon 5 minutes interval	7-1:43.2.1	m3/h
333	IEEEFLOAT	1	Hs	Calorific value of 1 m3 gas at 25 °C	7-1:54.11.0	MJ/m3
335	IEEEFLOAT	1	d	Relative density compared to air at 0 °C	7-1:45.11.0	-
337	IEEEFLOAT	1	pb	Reference pressure (base conditions)	7-1:42.2.0	mbar
339	IEEEFLOAT	1	tb	Reference temperature (base conditions)	7-1:41.2.0	°C
341*	IEEEFLOAT	1	Qc1_nx5	flow rate corrected operating volume on the basis of moving average of n x 5 min	7-1:43.1.2	m3/h
343*	IEEEFLOAT	1	Qc1_inst	flow rate corrected operating volume on the basis of increase ΔVc/t	7-1:43.1.0	m3/h
345*	IEEEFLOAT	1	Vc1_60	corrected operating volume (current clock hour consumption)	7-1:43.1.71	m3
347*	IEEEFLOAT	1	Qb1_nx5	flow rate converted volume on the basis of moving average of n x 5 min,	7-1:43.2.2	m3/h
349*	IEEEFLOAT	1	Qb1_inst	flow rate converted volume on the basis of Qc1_inst x C-factor	7-1:43.2.0	m3/h
351*	IEEEFLOAT	1	Vb1_60	converted volume (current hour)	7-1:43.2.71	m3

Register	Modbus format	Scaling	Ab.	Description	OBIS code	
501	COUNTER	1	Vm1	unconverted volume, total volume at measuring conditions, input 1	7-1:13.0.0	m3
504	COUNTER	1	Vb1	converted volume, undisturbed volume at base conditions, input 1	7-1:11.2.0	m3
507*	COUNTER	1	Vc1_err	unconverted volume, disturbed volume at measuring conditions, under circumstances of a calibration error condition and corrected for the gas meter measuring error p, t, Z, Zb or CRC error, input 1	7-1:12.0.0	m3
510*	COUNTER	1	Vb1_err	converted volume, disturbed volume at base conditions, under circumstances of a calibration error condition, input 1 p, t, Z, Zb or CRC error	7-1:12.1.0	m3
513*	COUNTER	1	Vm2	unconverted volume, total volume at measuring conditions, input 2	7-2:13.0.0	m3
516*	COUNTER	1	Vm3	unconverted volume, total volume at measuring conditions, input 3	7-3:13.0.0	m3
801	BCDNO4	1	Vm1	unconverted volume, total volume at measuring conditions, input 1	7-1:13.0.0	10-4 m3
805	BCDNO4	1	Vb1	converted volume, undisturbed volume at base conditions, input 1	7-1:11.2.0	10-4 m3
809*	BCDNO4	1	Vc1_err	unconverted volume, disturbed volume at measuring conditions, under circumstances of a calibration error condition and corrected for the gas meter measuring error p, t, Z, Zb or CRC error, input 1	7-1:12.0.0	m3
813	BCDTIME2	1	Time	Current time (Read/Write)	0.9.1	-
815	BCDDATE	1	Date	Current date (Read/Write)	0.9.2	-
817	BCDNO3	1	Serial number	Serial number UNIGAS 300	C.1.0	-
820	BCDNO	100	Gas day	Moment at which UNIGAS 300 closes and logs the day, as in day logger (end of gas day)	C.91.2	-
822*	BCDNO4	1	Vb1_err	converted volume, disturbed volume at base conditions, under circumstances of a calibration error condition, input 1 p, t, Z, Zb or CRC error	7-1:12.1.0	m3
826	BCDNO4	1	Vm2	unconverted volume, total volume at measuring conditions, input 2	7-2:13.0.0	m3
830	BCDNO4	1	Vm3	unconverted volume, total volume at measuring conditions, input 3	7-3:13.0.0	m3
60000	USHORT	1	Disable Modbus (**)	Deactivate modbus for IEC 62056-21 communication. Modbus is enabled if no communication during 40 seconds (protocol time-out)	N.A.	-

(*) Register added in firmware version 2.0.24 .

(**) This address is used to temporarily disable Modbus. This way, direct communication over IEC 62056-21 is possible with UNIGAS 300. Modbus will become active again after a protocol time-out of 40 seconds.

5.3 Data types

Type	Size in 16bit registers	Format
USHORT	1*16bit	Binary digit
ULONG	2*16bit	Binary digit
COUNTER	2*16bit + 1*16bit	Binary counter
BCDTIME	1*16bit	BCD
BCDTIME2	2*16bit	BCD
BCDDATE	2*16bit	BCD
BCDNO	1*16bit	BCD
BCDNO3	3*16bit	BCD
BCDNO4	4*16bit	BCD
IEEEFLOAT	2*16bit	Binary. Single precision floating point
HEX2	1*16bit	Hex formatted code

5.3.1 Ushort

Register	OBIS code	Ab.	Description	Unit	Scaling
1	C.6.1	Ah_used	Battery capacity	Ah	10^{-1}
3	7-1:13.0.0	Vm1	unconverted volume, total volume at measuring conditions, input 1 Post decimal places	m^3	10^{-3}
4	7-1:11.2.0	Vb1	converted volume, undisturbed volume at base conditions, input 1 Post decimal places	10^{-3} m^3	10^{-3}

Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 01 00 01 BC	3F 03 02 **00 04** B8	0,4 Ah

Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 03 00 01 BA	3F 03 02 **00 E7** D5	xxx**.231 m³** (post dec. Places)

Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 04 00 01 B9	3F 03 02 **00 49** 73	xxx**.730 m³** (post dec. Places)

5.3.2 ULONG

Register	OBIS code	Ab.	Description	Unit	Scaling
101	7-1:13.0.0	Vm1	unconverted volume, total volume at measuring conditions, input 1 Pre decimal places	m^3	-
103	7-1:11.2.0	Vb1	converted volume, undisturbed volume at base conditions, input 1 Pre decimal places	m^3	-

Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 65 00 02 57	3F 03 04 **01 8E C8 B5** AE	**26134709 m³**

Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 67 00 02 55	3F 03 04 **01 8E 9D 8E** 00	**26123662 m³**

5.3.3 Counter

Register	OBIS code	Ab.	Description	Unit	Scaling
501	7-1:13.0.0	Vm1	unconverted volume, total volume at measuring conditions, input 1	m^3	-
504	7-1:11.2.0	Vb1	converted volume, undisturbed volume at base conditions, input 1	m^3	-
507	7-1:12.0.0	Vc1_err	unconverted volume, disturbed volume at measuring conditions, under circumstances of a calibration error condition and corrected for the gas meter measuring error p, t, Z, Zb or CRC error, input 1	m^3	-
510	7-1:12.1.0	Vb1_err	converted volume, disturbed volume at base conditions, under circumstances of a calibration error condition, input 1 p, t, Z, Zb or CRC error	m^3	-
513	7-2:13.0.0	Vm2	unconverted volume, total volume at measuring conditions, input 2	m^3	-
516	7-3:13.0.0	Vm3	unconverted volume, total volume at measuring conditions, input 3	m^3	-

Function Code	Modbus Command	Answer	Meaning
03	3F 03 01 F5 00 03 C5	3F 03 06 **01 8E EE 24 00 E7** 30	➔ **01 8E EE 24 = 26144292 m3** ➔ **00 E7 = ,231 m3** ➔ **26144292,231 m3**

5.3.4 BCDDate

Register	OBIS code	Ab.	Description	Unit	Scaling
815	0.9.2	Date	Current date	-	-

Function Code	Modbus Command	Answer	Meaning
03	3F 03 03 2F 00 02 8A	3F 03 04 **20 14 02 13** 71	**13 februari 2014**
		71	

5.3.5 BCDNO

Register	OBIS code	Ab.	Description	Unit	Scaling
820	C.91.2	Gas day	Moment at which UNIGAS 300 closes and logs the day, as in day logger (end of gas day)	-	-

5.3.6 BCDNO3

Register	OBIS code	Ab.	Description	Unit	Scaling
817	C.1.0	Serial number	Serial number UNIGAS 300	-	-

5.3.7 BCDNO4

Register	OBIS code	Ab.	Description	Unit	Scaling
801	7-1:13.0.0	Vm1	unconverted volume, total volume at measuring conditions, input 1	10^{-4} m^3	-
805	7-1:11.2.0	Vb1	converted volume, undisturbed volume at base conditions, input 1	10^{-4} m^3	-
809	7-1:12.0.0	Vc1_err	unconverted volume, disturbed volume at measuring conditions, under circumstances of a calibration error condition and corrected for the gas meter measuring error p, t, Z, Zb or CRC error, input 1	10^{-4} m^3	
822	7-1:12.1.0	Vb1_err	converted volume, disturbed volume at base conditions, under circumstances of a calibration error condition, input 1 p, t, Z, Zb or CRC error	10^{-4} m^3	
826	7-2:13.0.0	Vm2	unconverted volume, total volume at measuring conditions, input 2	10^{-4} m^3	
830	7-3:13.0.0	Vm3	unconverted volume, total volume at measuring conditions, input 2	10^{-4} m^3	

Function Code	Modbus Command	Answer	Meaning
03	3F 03 03 21 00 04 96	3F 03 08 **00 00 26 14 53 27 23 10** CF	**000026145327,2310 m^3**
		53 27 23 10 CF	

5.3.8 IEEEFLOAT

Register	OBIS code	Ab.	Description	Unit	Scaling
301	7-1:42.2.0	pb	Reference pressure (base conditions)	mbar	-
303	7-1:41.2.0	tb	Reference temperature (base conditions)	°C	-
305	7-1:42.0.0	p	Pressure	mbar	-
307	7-1:42.0.0	p	Pressure	mbar	-
309	7-1:41.0.0	t	Temperature	°C	-
311	7-1:52.2.0	C	Calculated conversion factor	-	-
313	7-1:53.3.0	Z/Zbfix	Fixed value used for conversion	-	-
315	7-1:42.3.0	pfix	Fixed value for the pressure used for conversion	mbar	-
317	7-1:41.3.0	tfix	Fixed value for the temperature used for conversion	°C	-
319	C.96.3	N_2	Nitrogen concentration N_2	mol %	-
321	C.96.2	H_2	Hydrogen concentration H_2	mol %	-
323	C.96.1	CO_2	Carbon dioxide concentration CO_2	mol %	-
327	7-1:43.1.1	Qc1_5	Flow at measuring conditions based upon 5 minutes interval, total value	m^3/h	-
329	7-1:43.2.1	Qb1_5	Flow at base conditions, undisturbed value based upon 5 minutes interval	m^3/h	-
333	7-1:54.11.0	H_s	Calorific value of 1 m^3 gas at 25 °C	MJ/m^3	-
335	7-1:45.11.0	d	Relative density compared to air at 0 °C	-	-
337	7-1:42.2.0	pb	Reference pressure (base conditions)	mbar	-
339	7-1:41.2.0	tb	Reference temperature (base conditions)	°C	-
341	7-1:43.1.2	Qc1_nx5	flow rate corrected operating volume on the basis of moving average of n x 5 min	m^3/h	-

Register	OBIS code	Ab.	Description	Unit	Scaling
343	7-1:43.1.0	Qc1_inst	flow rate corrected operating volume on the basis of increase ΔVc/t	m^3/h	-
345	7-1:43.1.71	Vc1_60	corrected operating volume (current clock hour consumption)	m^3	-
347	7-1:43.2.2	Qb1_nx5	flow rate converted volume on the basis of moving average of n x 5 min,	m^3/h	-
349	7-1:43.2.0	Qb1_inst	flow rate converted volume on the basis of Qc1_inst x C-factor	m^3/h	-
351	7-1:43.2.71	Vb1_60	converted volume (current hour)	m^3	-

Function Code	Modbus Command	Answer	Meaning
03	3F 03 01 2D 00 02 8E	3F 03 04 **44 7D 50 00** A9	**1013,2500 mbar**

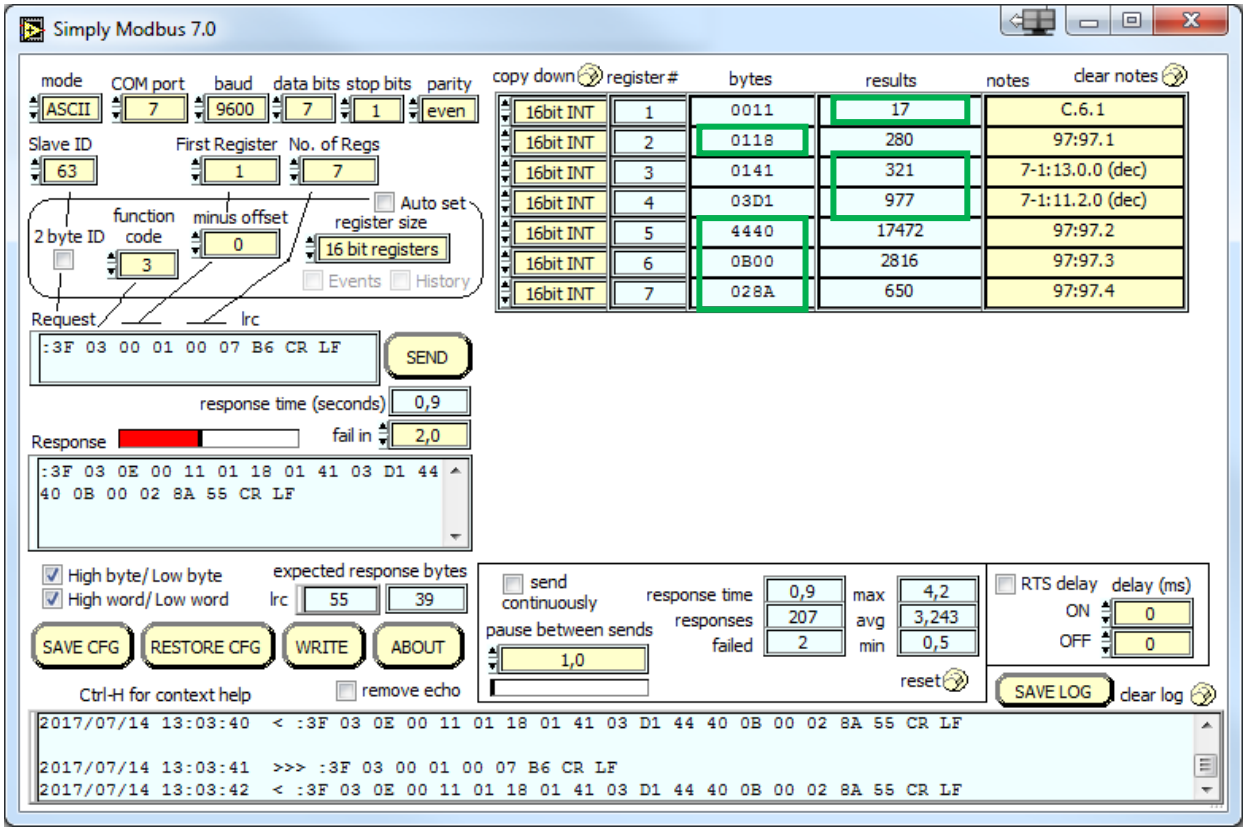
5.3.9 HEX2

Register	OBIS code	Ab.	Description	Unit	Scaling
2	97:97.1	Register 1	calibration relevant alarms	-	-
5	97:97.2	Register 2	Operational status	-	-
6	97:97.3	Register 3	Alarm reports	-	-
7	97:97.4	Register 4	VDEW status	-	-

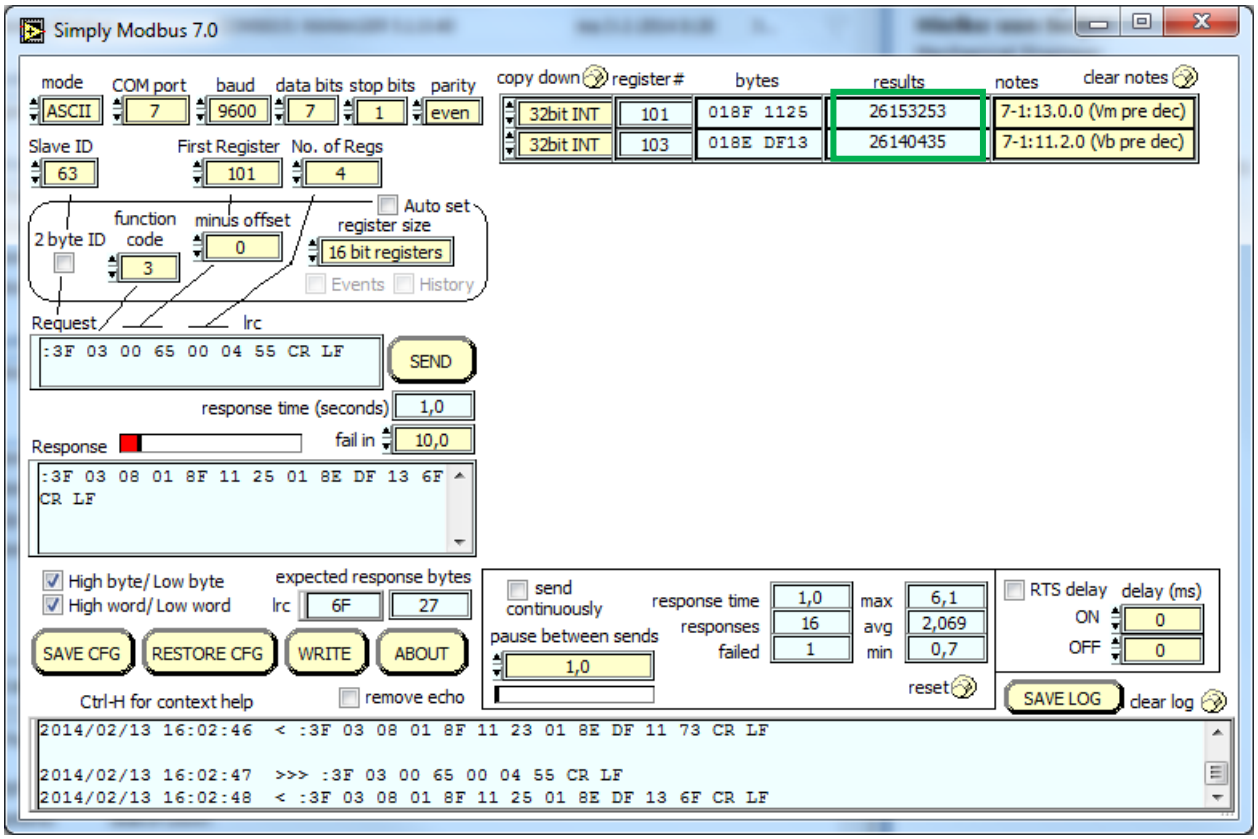
Function Code	Modbus Command	Answer	Meaning
03	3F 03 00 02 00 01 BB	3F 03 02 **00 0A** B2	**000A**

5.4 Read out examples

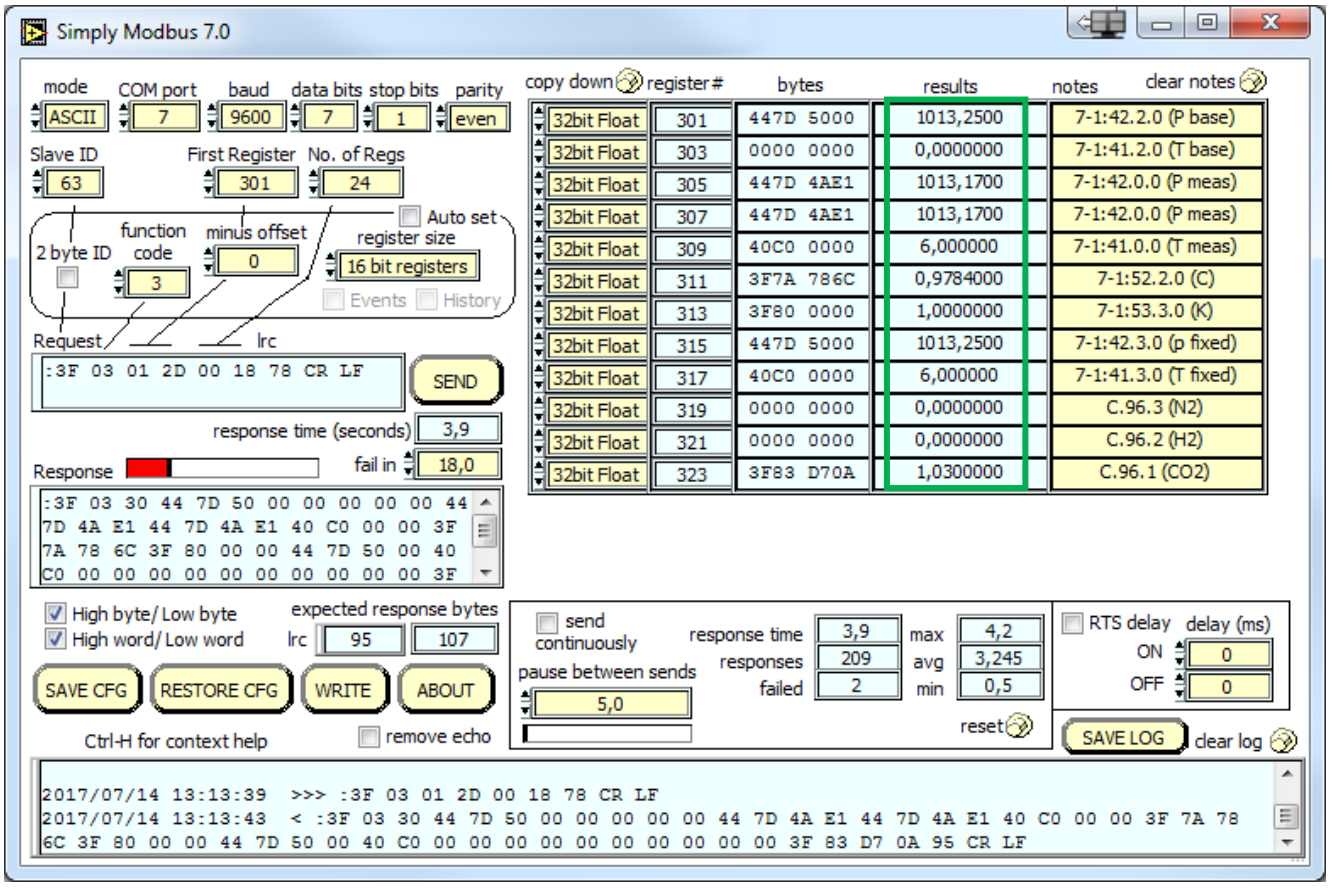
5.4.1 Register 1 -7



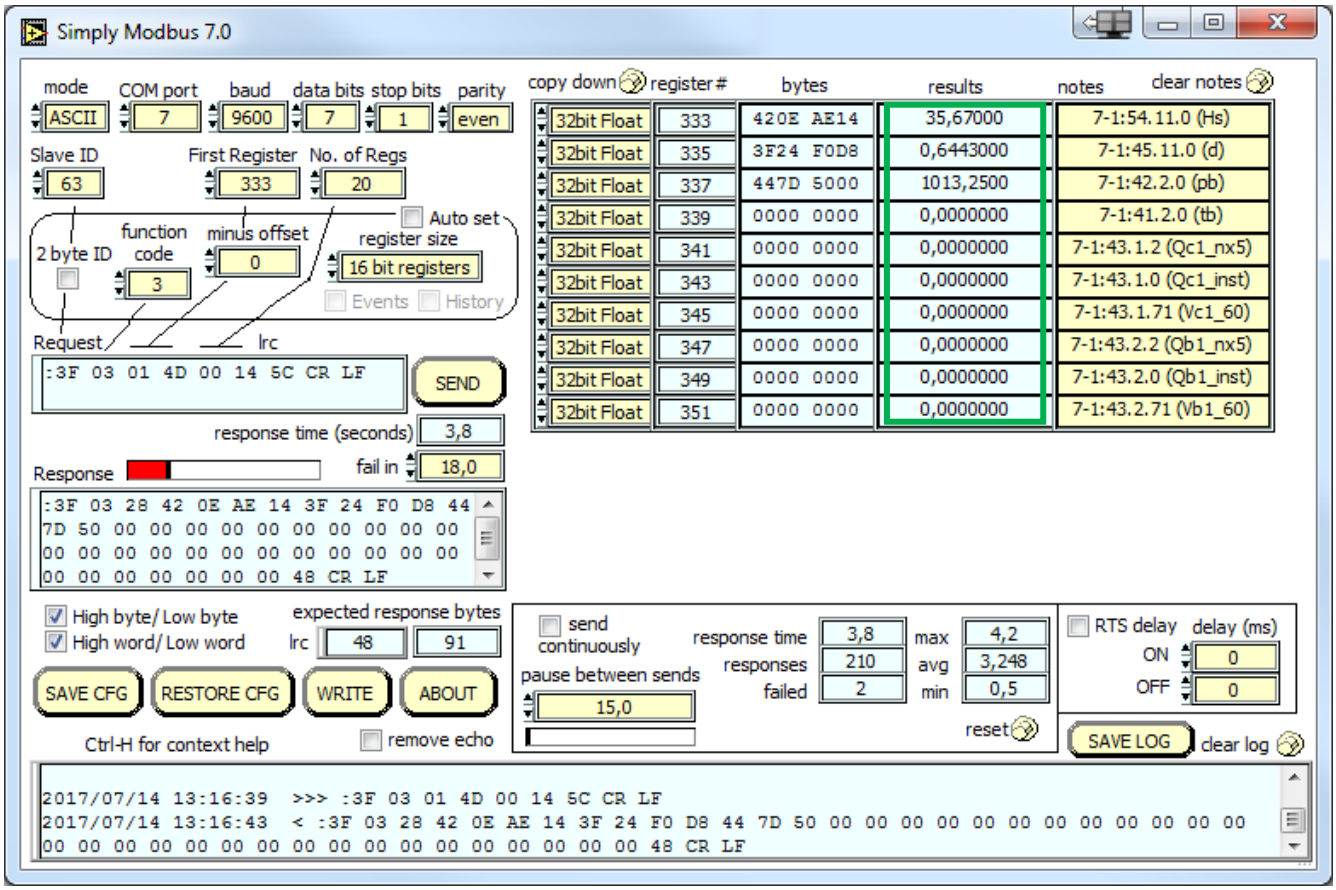
5.4.2 Register 101 -104



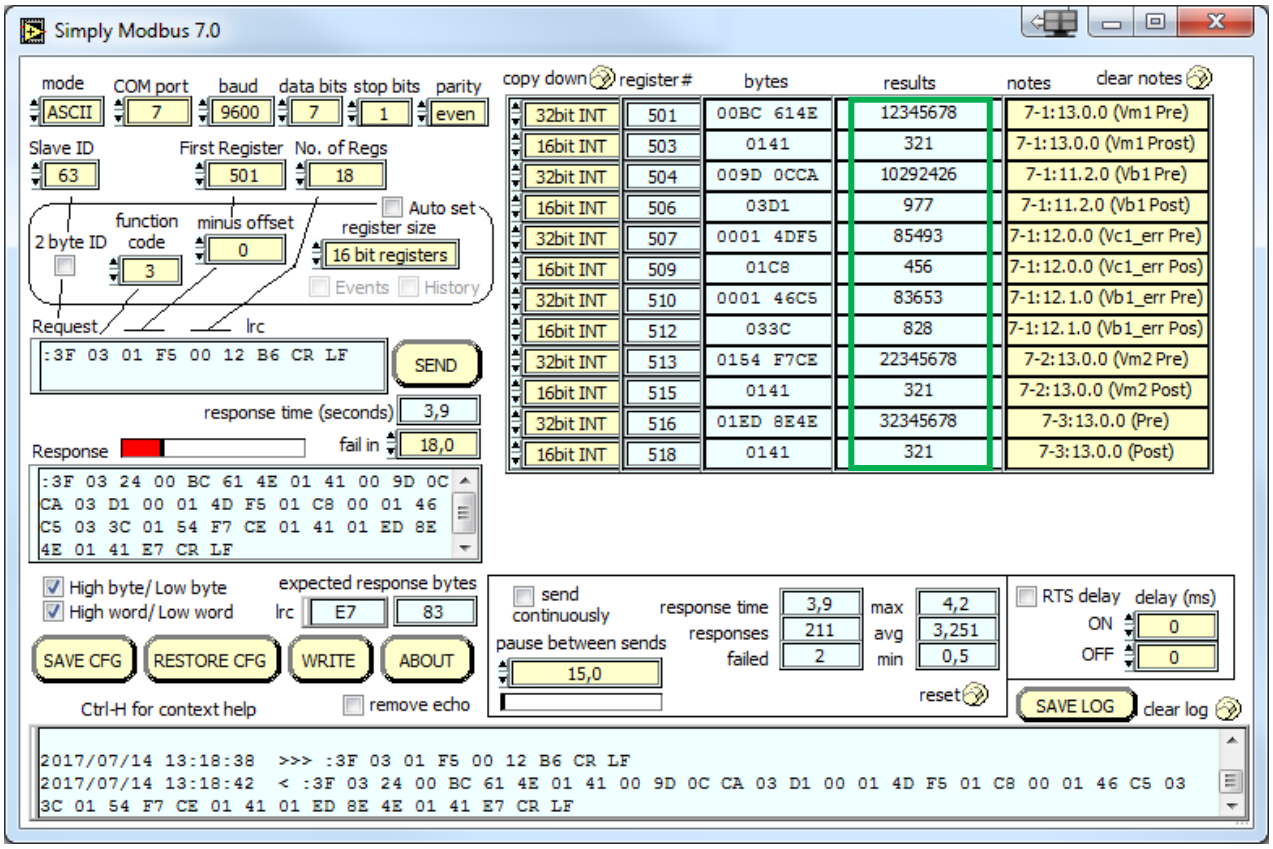
5.4.3 Register 301 – 324



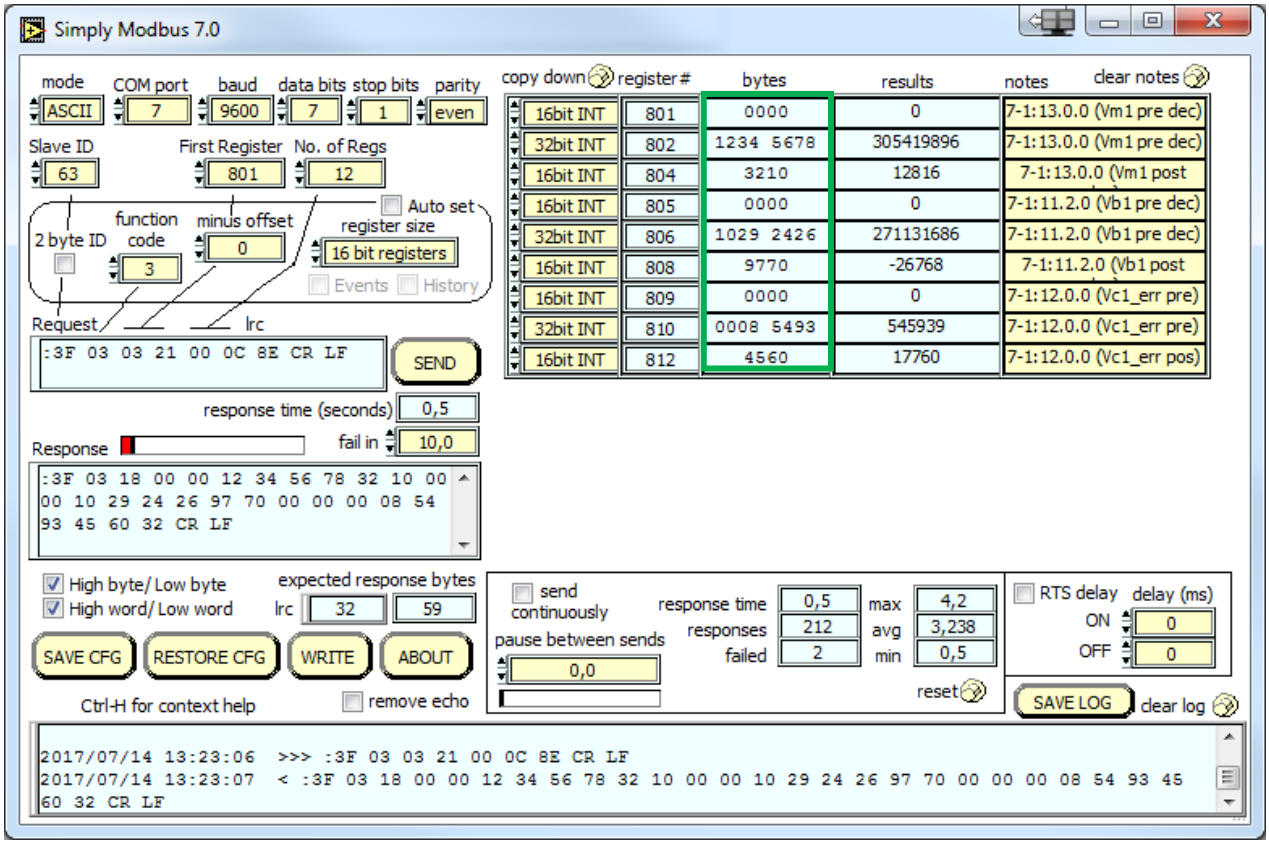
5.4.4 Register 327 – 351



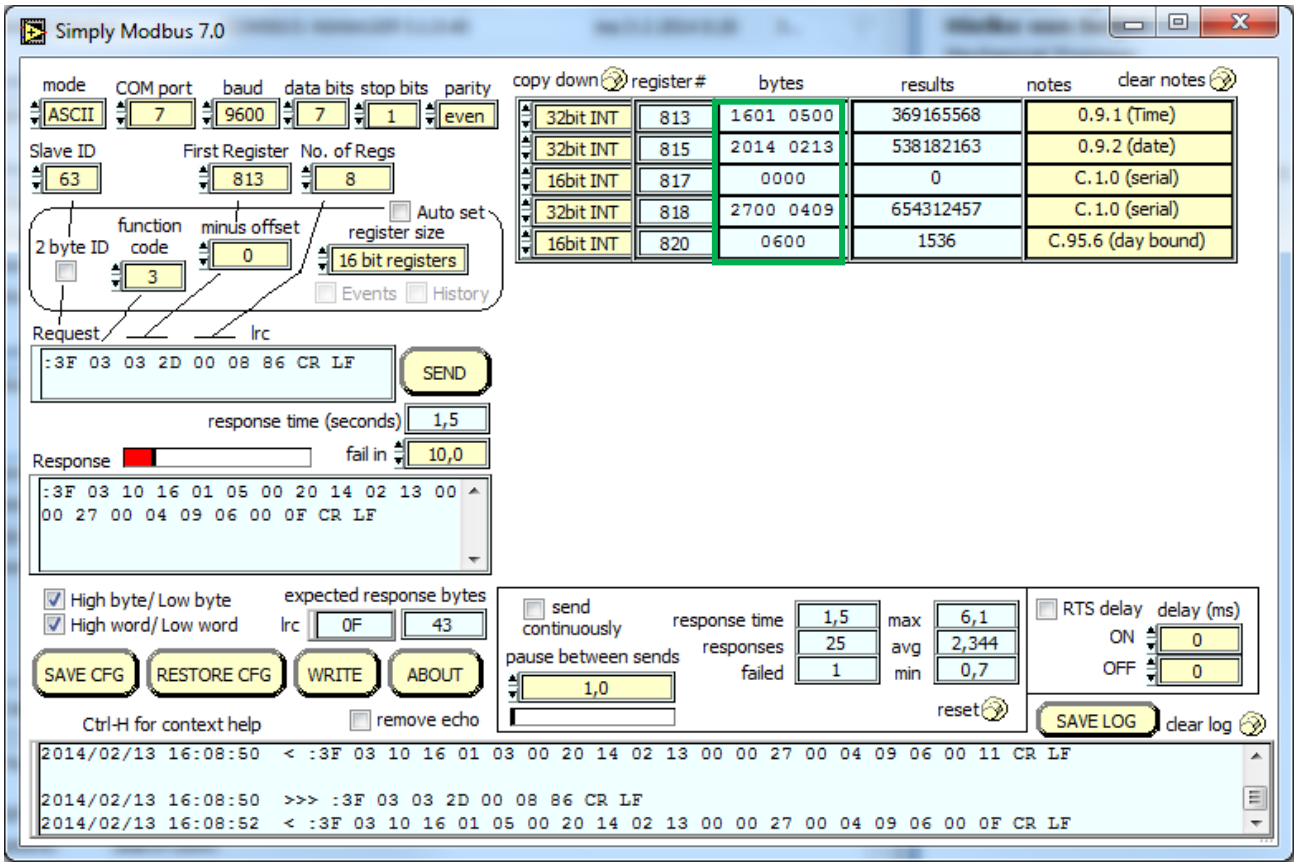
5.4.5 Register 501 – 506



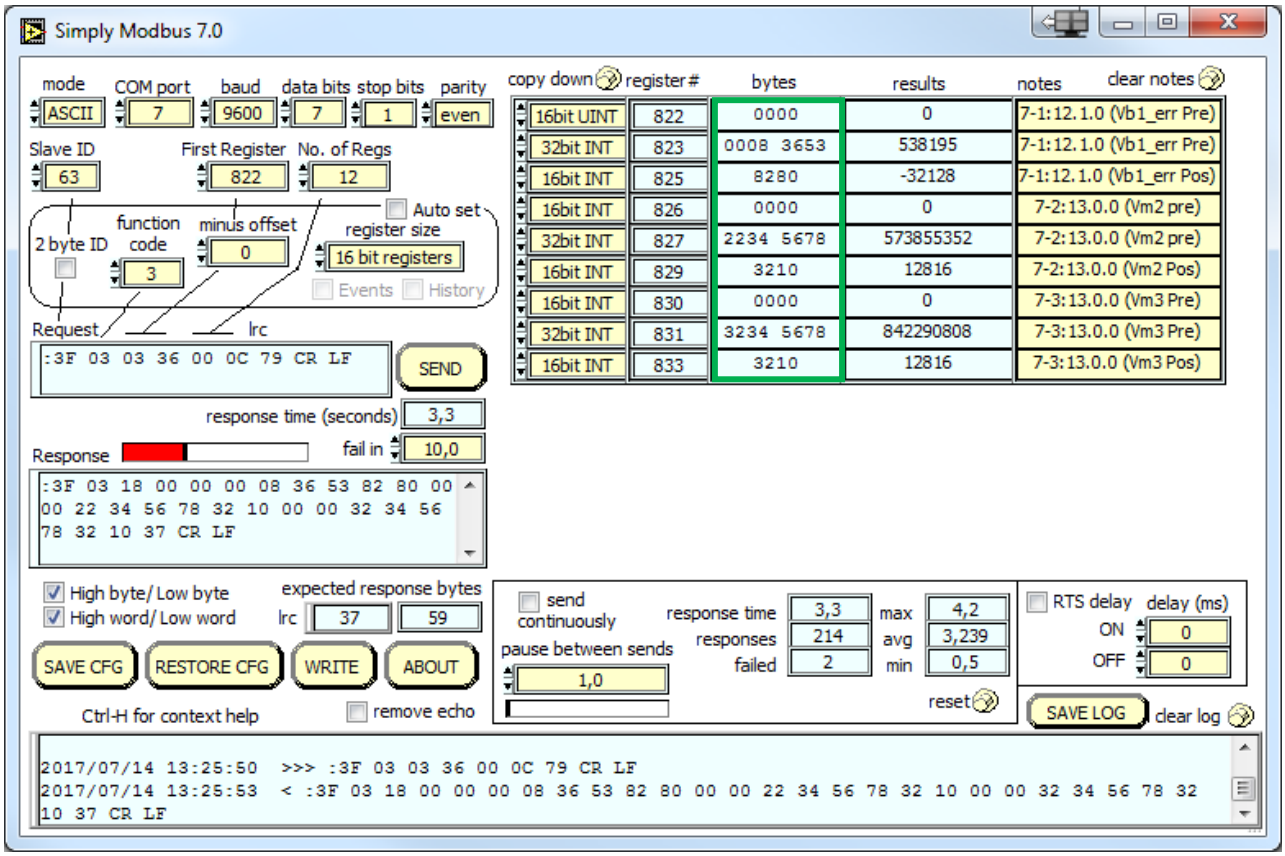
5.4.6 Register 801 -812



5.4.7 Register 813 – 820



5.4.8 Register 822 – 833



5.5 Device identification

It is possible to read out meter data through function code 0x2B and 0x0E. See following table for more information.

Table: CI module Modbus device identification objects

Object ID	Object Name	Type	Value	Category	
0x00	VendorName	ASCII string	“Wigersma & Sikkema.”	Basic	Fixed text
0x01	ProductCode	ASCII string	“27”		Fixed text
0x02	MajorMinorRevision	ASCII string	CI software version		CI OBIS 7-0:0.2.0
0x03	VendorUrl	ASCII string	“www.ws-gas.com”	Regular	Fixed text
0x04	ProductName	ASCII string	“UNIGAS 300”		Fixed text
0x05	ModelName	ASCII string	“UNIGAS 300”		Fixed text
0x06	UserApplicationName	ASCII string	“”		Fixed text

Table: Device identification message

Description	Size	Value
Function code	1 Byte	0x2B
MEI type	1 Byte	0x0E
Read Device ID code	1 Byte	0x01 / 0x02 / 0x04
Object ID	1 Byte	0x00 – 0x06

6 Parameters

Below, the parameters are shown that are available in the CI-module UNIGAS 300. For each parameter the name is given, together with the OBIS code, the protection level and a brief description. Where applicable, the names used are in accordance with standard EN 12405-1.

All parameters can be read out with the UNITOOL software (dependent on the rights assigned in UNITOOL).

All parameters can be provided with write protection.

The following protection levels have been provided for:

- Protection level 1: password 1 gives access to the programming mode in which counters and registers can be read and written to. Password 1 is protected by password 2a.
- Protection level 2a: password 2a allows writing to registers. Password 2a is assigned to the gassupplier and has the same function as the VDEW password. Password 2a is protected by password 2a.

Where no passwords have been programmed, the parameters can be written without using passwords or by means of any password.

Passwords are both read-protected and write-protected. This protection consists of the use of the password as indicated above.

General settings:
Protection level: Reading/writing

Name	OBIS	Unit	Format	Description
Device comm	C.90.1	-	S8	Module device addresse

Service parameters:
Protection level: Read only

Name	OBIS	Unit	Format	Description
Device serial number	C.1.0	-	I8	UNIGAS 300 serial number
Software version	7-0:0.2.0	-	I8	Software version of the embedded software
Device type	C.1.1	-	S8	Identification of the module. This value is a permanent value *MODULE1B*
PCB track and trace data	C.91.5	-	S16v	Track and trace data of the PCB

Protocol settings:
Protection level: Reading/writing; Protection level 2a

Name	OBIS	Unit	Range	Description
Protocol	C.93.20	-	-	Choice for selecting protocol type. Options: • Off • FTP • IDOM • Modbus
FTP interval	C.92.49	-	-	Interval for forwarding the FTP messages. Options: • 5 minuten • 10 minuten • 15 minuten • 30 minuten • 60 minuten • 24 hour
FTP file format	C.92.62	-	-	Setting on the file format of the FTP message. Options: • IEC 62056-21 • CSV • XML
FTP interval delay	C.92.63	-	-	Delay to be set for forwarding the FTP message.
Modbus slave address (User port)	C.90.27	I3	0 – 247	Address for Modbus communication
Modbus slave address (modem port)	C.90.29	I3	0 – 247	See parameter C.90.27
Modbus mapping version	C.91.13	I8	-	Version number of the modbus mapping file
L nibble: 300: 1 600: 2 1200: 3 2400: 4 4800: 5 9600: 6 H:nibble:No function	C.93.31			Baud rate of Modbus communication in bit/s Port 2 (user port)
L nibble: ASCII: 0 RTU: 1 H: nibble: No function	C.93.32			Modbus communication protocol mode Port 2 (user port)
See parameter C.93.31	C.93.34			See parameter C.93.31 Port 1 (modem port)
See parameter C.93.32	C.93.35			See parameter C.93.32 Port 1 (modem port)

Status	OBIS-code	Name	Value
Category: Communication port 1			
	C.93.35	Protocol mode	RTU
	C.93.34	Baudrate	9600
	C.90.29	Slave address	64
Category: Communication port 2			
	C.93.32	Protocol mode	RTU
	C.93.31	Baudrate	9600
	C.90.27	Slave address	64
Category: Meter data			
	C.91.13	Modbus Mapping version	10000004

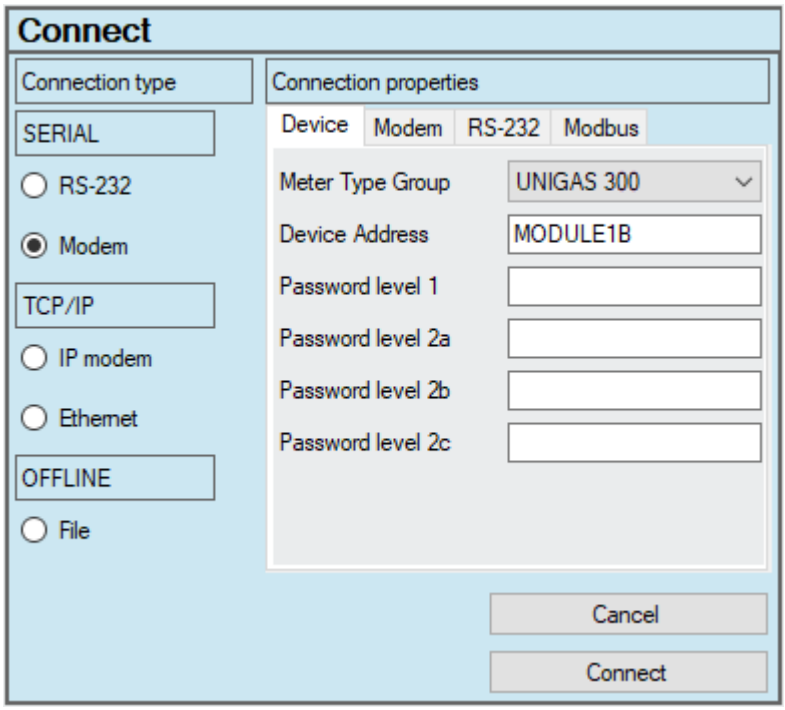
7 Recognition of modules installed in UNIGAS 300

When parameter C.91.7 is read out from UNIGAS 300 it is possible to recognize which module or modules are placed in UNIGAS 300. The final two characters in parameter C.91.7 contain the reference “1B” for the CI module UNIGAS 300.

8 UNITOOL and CI module

UNITOOL is used to read out or set the configuration and data of the CI module. The user must log in on UNITOOL. The CI module is only available under user *UNIGAS_300*.

UNITOOL has a Meter Type Group MODULE1. This means that entering the device address is no longer necessary.



9 Appendix 1; Specification

General

• Support device	UNIGAS 300; place in module slot
• Processor type	MSP430F2410T Rev. E
• Supply	From UNIGAS 300
• Weight	8,9 gram
• Dimensions	63 x 29 x 16 mm
• Operating temperature	- 40 °C to + 55 °C
• System	Dual UART low power microprocessor 64 kbyte Eeprom memory 56 kbyte Flash program memory
• Remote software update	Yes
• Internal reset	Once a day
• Watchdog	Implemented

Real time clock

• Internal POSIX clock	
• Synchronized with UNIGAS 300	- once a day at 00:30 or 01:30 (DST) - When clock of UNIGAS 300 is synchronized

Internal serial port for local read out and programming of functions

• Connection	Internal
• Signals	RS232 Rx, Tx (REQ, DATA)
• Baud-rates	9600, full duplex
• UNIGAS 300 communication port	Port 1 (modem port) and port 3 (service port)

Communication protocol

- IEC 62056-21 mode C, VDEW 2.0 protocol for acquisition systems
- IDOM
- FTP
- Modbus

IDOM

• Baud rate	4800
• Data format	7E1
• UNIGAS 300 communication port	Port number 1; Modem port

MODBUS

• Slave address	0x1 - 0x 63; 0x00 is supported for general broadcast address.
• Modes	RTU (8N1) or ASCI (7E1)
• Baud rates	300, 600, 1200, 2400, 4800 or 9600
• Supported function code	03, 04, 06, 16, 2B and 0E
• UNIGAS 300 communication port	Port number 1 or 2; Modem or user port

Scheduler for FTP client services

• initiation FTP transfer	Internal scheduler
• scheduler internal FTP	Off, every 5, 15, or 60 minutes programmable
• FTP file formats	XML, CSV, TXT
• Supported UNILOG types	UNILOG 300 (all versions), UNILOG GPRS (all versions)
• Supported UNICOM types	UNICOM 300 (all versions)
• UNIGAS 300 communication port	Port number 1; Modem port

Service software PC platform

• UNITOOL	Windows 7, 8, 10

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