

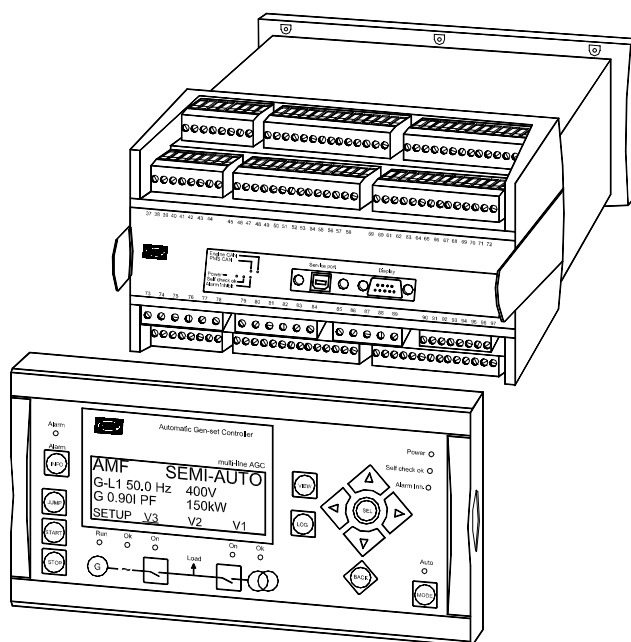
Description of options



Option N, WebARM Multi-line 2

4189340452A

SW version 3.0X.X



- *Hardware and software options*
 - Option N5: TCP/IP modbus communication
 - Option N6: Advanced login
- *General: SMS and e-mail alarms transfer*



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1. Warnings and legal information

This chapter includes important information about general legal issues relevant in the handling of DEIF products. Furthermore, some overall safety precautions will be introduced and recommended. Finally, the highlighted notes, which will be used throughout this document, are presented.

Legal information and responsibility

DEIF takes no responsibility for installation or operation of the generator set. If there is any doubt about how to install or operate the engine/generator controlled by the multi-line 2 unit, the company responsible for the installation or the operation of the set must be contacted.

The multi-line unit is not to be opened by unauthorised personnel. If opened anyway, the warranty will be lost.

Electrostatic discharge awareness

Sufficient care must be taken to protect the terminals against static discharges during the installation. Once the unit is installed and connected, these precautions are no longer necessary.

Safety issues

Installing the multi-line 2 unit may imply work with dangerous currents and voltages. Therefore, the installation should only be carried out by authorised personnel who understand the risks involved in working with live electrical equipment.

Programming

The multi-line 2 unit is delivered from factory with factory settings. These are based on an average value and do not necessarily represent values matching the engine/generator set in question. Precautions must be taken to check this before running the engine/generator set.

Notes

Throughout this document a number of notes will be presented. To ensure that these are noticed, they will be highlighted in order to separate them from the general text.



The notes provide general information which will be helpful for the reader to bear in mind.

2. Hardware

Options N5 and N6 use the Ethernet port of the webARM card in the multi-line 2 unit. As this connection uses a standard TCP/IP network media, no additional technical explanation is necessary in this chapter.

We recommend using CAT5 TCP/IP cable only, in order to avoid any cable quality trouble.

System requirements

- IBM PC 486DX4-100MHz CPU or higher, or compatible system
- TCP/IP port available
- Supports Windows se/me/2000/xp



With option Nx the specification of operating temperature is changed to:
CE: -25...70°C (-13...158°F) UL: -25...19°C (-13...66°F).

3. Configuration of the PC and multi-line 2 webARM card

The web Ethernet port of the multi-line 2 webARM card has to be configured with an IP address, subnet mask and gateway, fitting the network to which it will be connected. The factory IP address and subnet mask is:

	Factory setting
IP address	192.168.2.21
Subnet mask	255.255.255.0

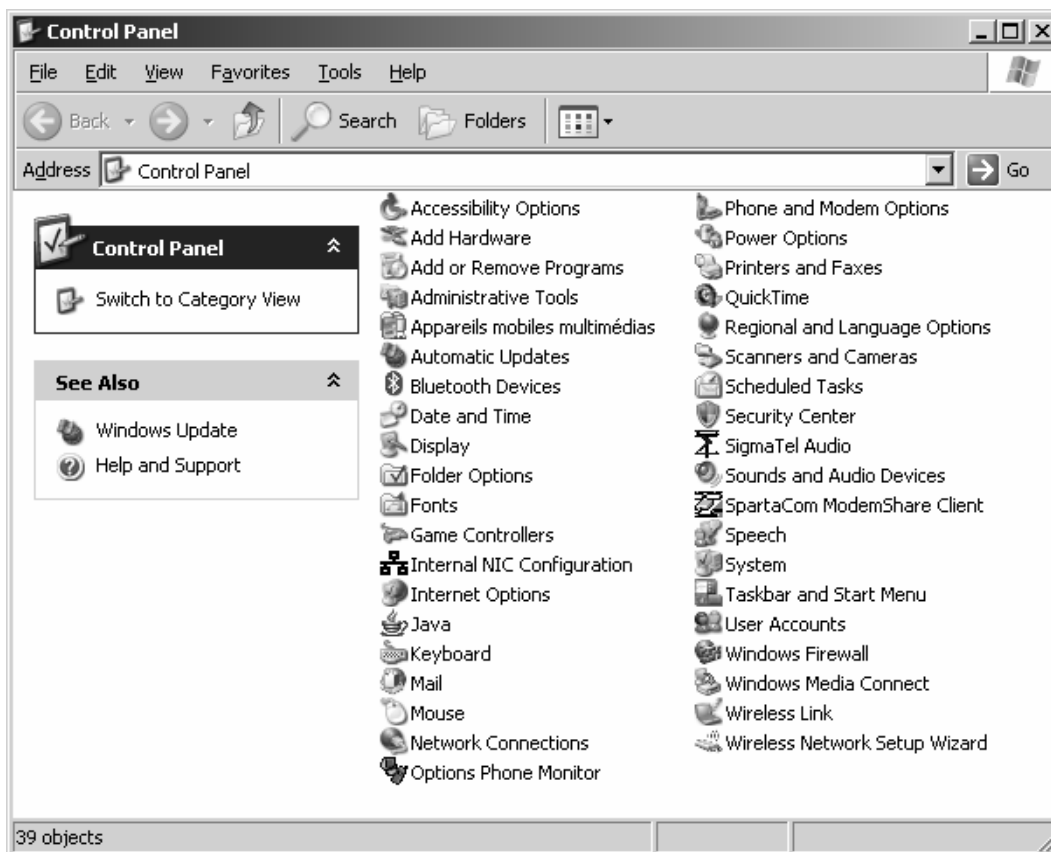
To change the IP address, a PC with a network card installed is needed. To make the PC communicate with the multi-line 2, the network settings of the PC have to be modified and disconnected from any other TCP/IP network. The PC and the multi-line 2 webARM card can now be connected by means of the crossed Ethernet cable (red TCP/IP cable provided by DEIF, or any other crossed TCP/IP CAT5 cable).

The IP address of the PC must be changed to match the IP address of the multi-line 2 webARM card.

Configuration of the PC that will set up the webARM card setup

The screen dumps below are based on a windows XP system, but it is quite similar when using other Windows systems.

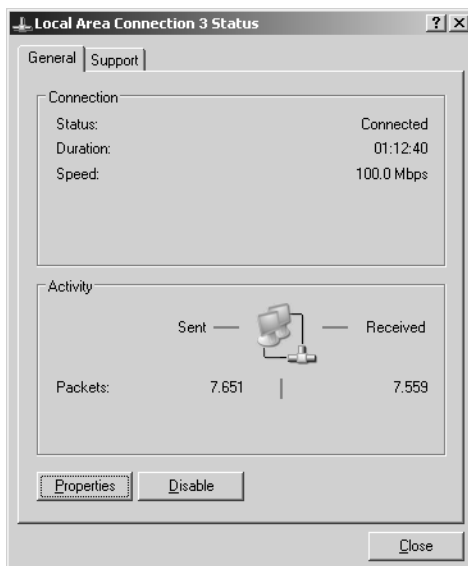
Click on 'Start' (lower left corner of the PC screen) and select 'Control Panel'.



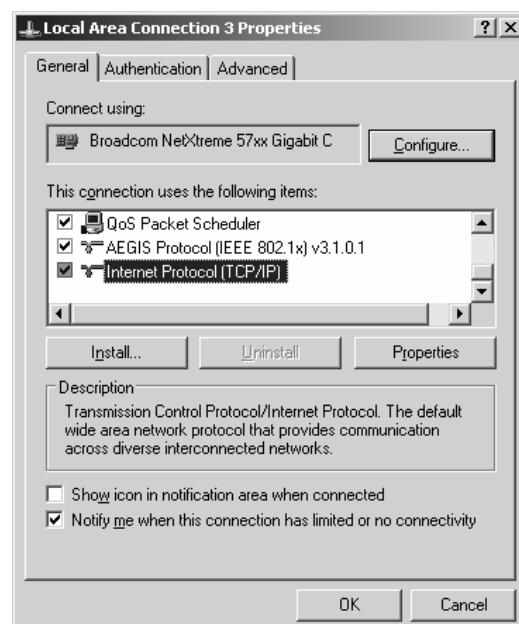
Double click on 'Network Connections'.



Double click on 'Local Area Connection'
(is used for connection to your usual network).

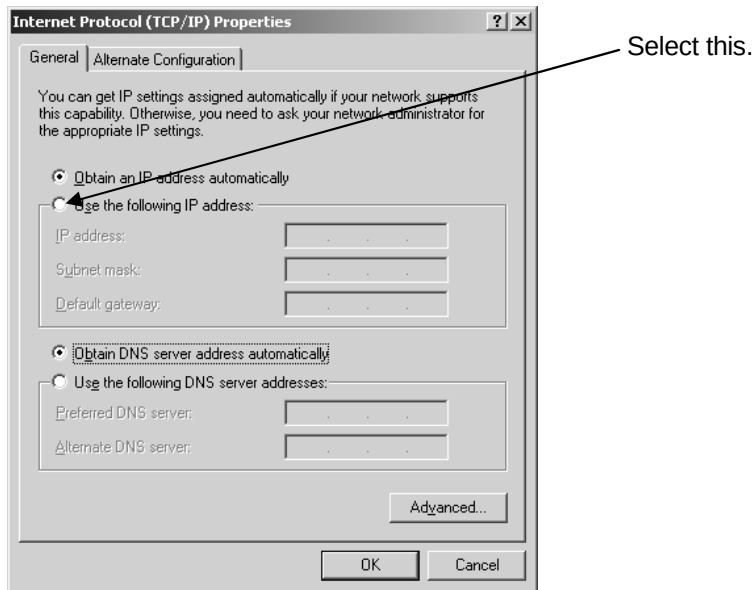


Click on 'Properties'.

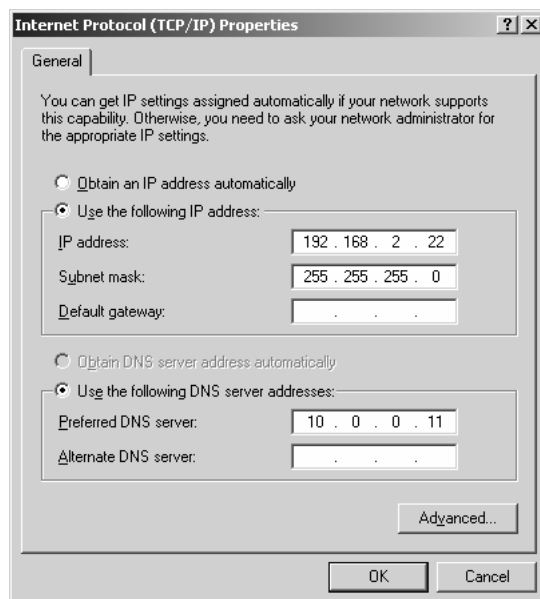


Select the last line 'Internet Protocol (TCP/IP)' and then click on the 'Properties' button.

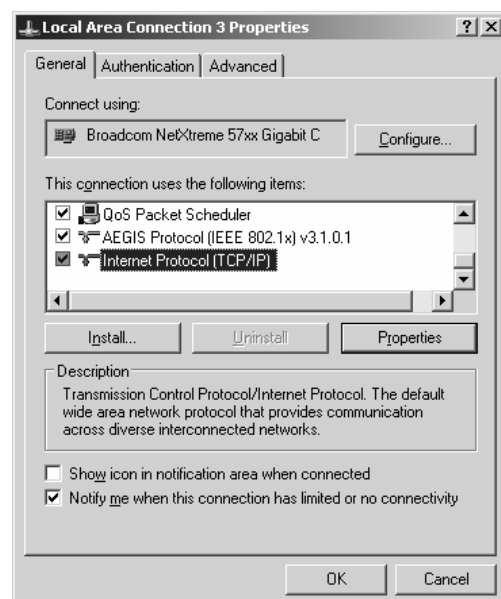
Mostly, it looks like this:



Write IP address = 192.168.2.22 (webARM card IP address + 1), and Subnet mask = 255.255.255.0 Do not write any default gateway address. It is not necessary to add anything to the DNS server fields, but if you already know the DNS IP address, you may add it (e.g.: 10.0.0.11).



Click on 'OK'.

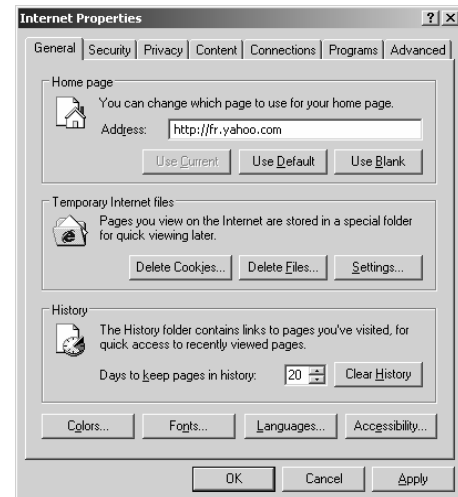
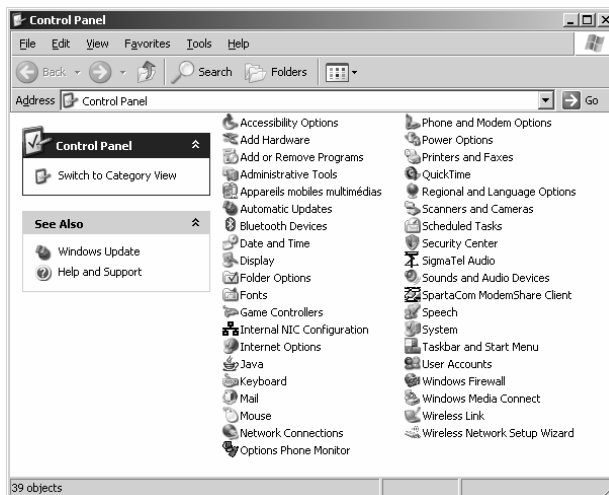


Click on 'OK'.

You can now close the 'Network Connections' window.

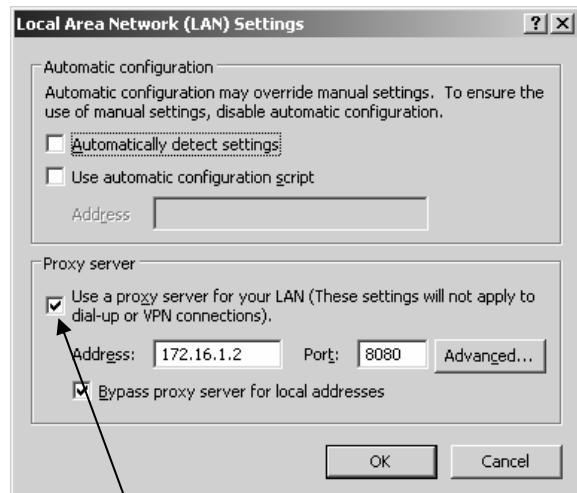
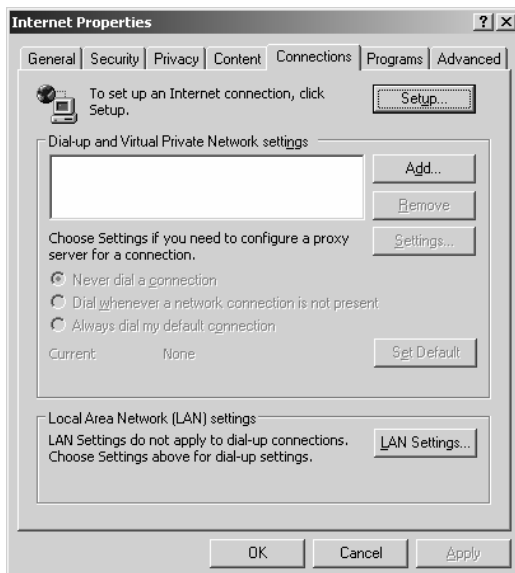


Double click on 'Internet Options'.



Select the 'Connections' tab.

Click on 'LAN Settings...'.



Deselect this and click on 'OK'.

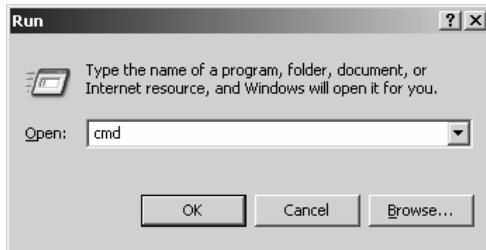
Close the 'Internet Options' window and close the 'Control Panel' window.

Connect the crossed TCP/IP red cable between your PC and the Ethernet socket of the multi-line 2 unit webARM card. Your PC is now ready to dialogue with this webARM card and has full access to it.

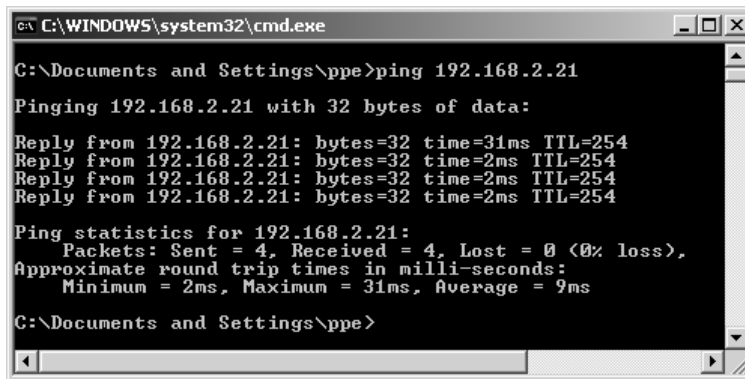
WebARM card setup

When your PC has been set up as described on the previous pages, and the PC is directly connected to the Ethernet socket of the multi-line 2 unit webARM card, you must now check if you have access to the webARM card from the internet connection by means of the ping utility program from your PC.

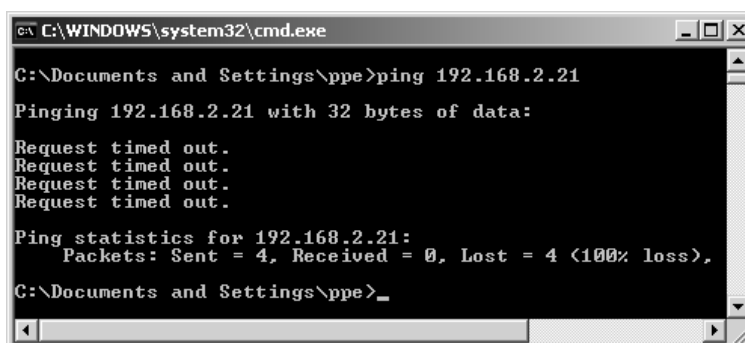
Click on 'Start' (lower left corner of the PC screen) and select 'Run...'. Type 'cmd' and press the 'Enter' key.



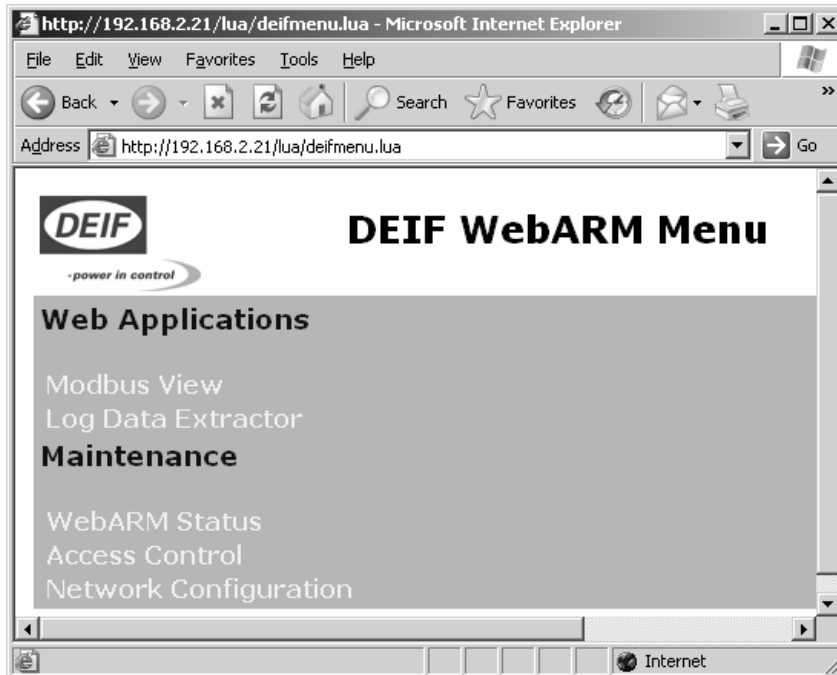
Type 'ping' + the IP address of the webARM card (standard is 192.168.2.21) and press the 'Enter' key (see below).



The above screen dump is displayed when this connection works as it should. Otherwise, it will look like this:

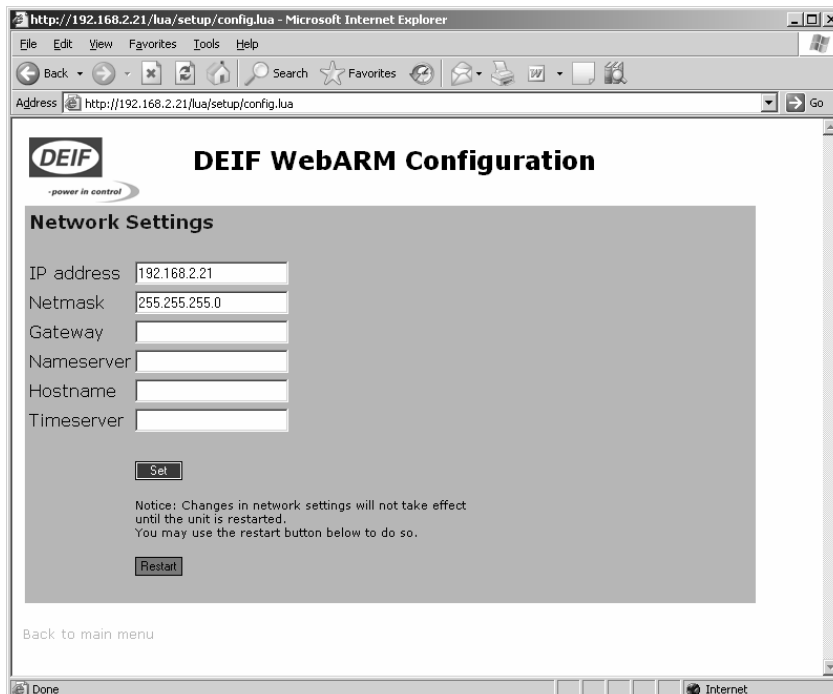


When the test has been carried out successfully, you can shut down this 'dos' window and open your internet browser (the one shown here is: Microsoft Internet Explorer), type the webARM card IP address in the internet address field and press the 'Enter' key.



Network configuration menu:

Click on the bottom link called 'Network Configuration' for changing the internet parameter of the webARM card (user name=admin, password=admin).



Access control menu:

Click on the bottom link called 'Access control' for changing the access control parameters of the webARM card (user name=admin, password=admin).

Access Control

Passwords

Page	Old password	New password	Retype new
Admin page (this) :			
Applications :			
FTP/admin :			

WWW IP Filtering

☐ Use same (Admin page) filter for everything

Admin page (this) :	
Applications :	
FTP/admin :	
Modbus/TCP/IP :	

About Filter Rules

An IP filter consists of a list of one or more patterns, each of which specifies a valid or excluded address. A pattern is an IP address, possibly with '*' replacing part of the end of the address. If the pattern starts with '!' the address is excluded instead of included. Patterns are separated with commas and/or whitespace. The list of patterns are evaluated from left to right, and evaluation continues until the IP address in question is either rejected or accepted. The filter rule examples to the right show 1) Access granted to one host only, 2) Access granted to the hosts on one class C network only, 3) Access denied for one host, granted to all others. 4) Access granted to all.

```
192.168.1.1
192.168.1.*
!192.168.1.2 , *
```

[Back to main menu](#)

Passwords: Used to modify the passwords of each web page type (admin, application or FTP).

www IP Filtering: Used you to select one or several IP addresses that will be allowed to access the webARM card for each webARM application type. If these fields are left blank, no IP address filter is applied and the webARM card is accessible by all IP addresses, without any restriction.

4. Option N4: XML OPC DA server

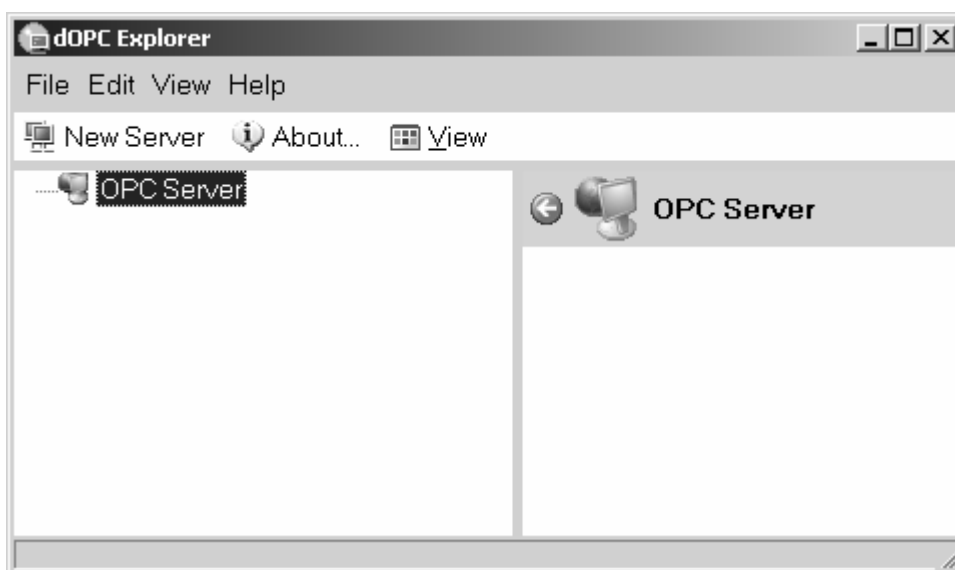
This special type of OPC server is defined by the OPC Foundation. You can download the OPC XML DA specifications and additional technical literature dealing with this subject directly from their web page at: www.opcfoundation.org.

DEIF has previously improved a light Scada system based on an OPC DA server called M-Vision. More information about M-Vision can be found on the DEIF web page at: www.deif.com.

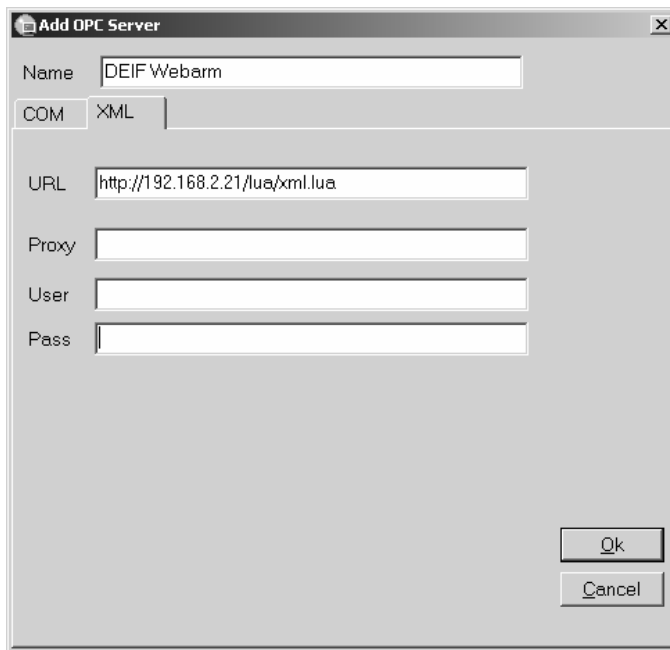
The data that can be extracted from the webARM card by means of this XML OPC DA server are most of the AGC data, and these data are the same as the TCP/IP modbus communication data, which will be described in the next chapter of this document (chapter 5, Option N5: TCP/IP modbus communication).

For exploiting all the possibilities of this XML OPC server (option N4), you must connect to this server as an XML OPC client. DEIF does not provide any XML OPC client software, but a lot of free software is downloadable from the internet, like those from Kassl GmbH (Germany) at this address: www.kassl.de. You can find some tool kits there for developing your own PC applications by means of several developing languages (Delphi, C++ or Kylix).

Another very useful PC software, which is also downloadable there, is called dOPC Explorer. Using this, you can display all the available data of the XML OPC server at once and explore their live values of each possible data (or tag). This software can be used for checking an XML OPC server, but also for any other standard and classic OPC server, like M-Vision for example. When this software is installed on your PC, it looks like this:



Click on 'New Server', select the XML window and fill in the fields as follows:



The 'Add OPC Server' dialog box is shown. It has a title bar with a close button. Inside, there are two tabs: 'COM' and 'XML'. The 'XML' tab is selected. The fields are as follows:

- Name: DEIF Webarm
- URL: http://192.168.2.21/lua/xml.lua
- Proxy: (empty)
- User: (empty)
- Pass: (empty)

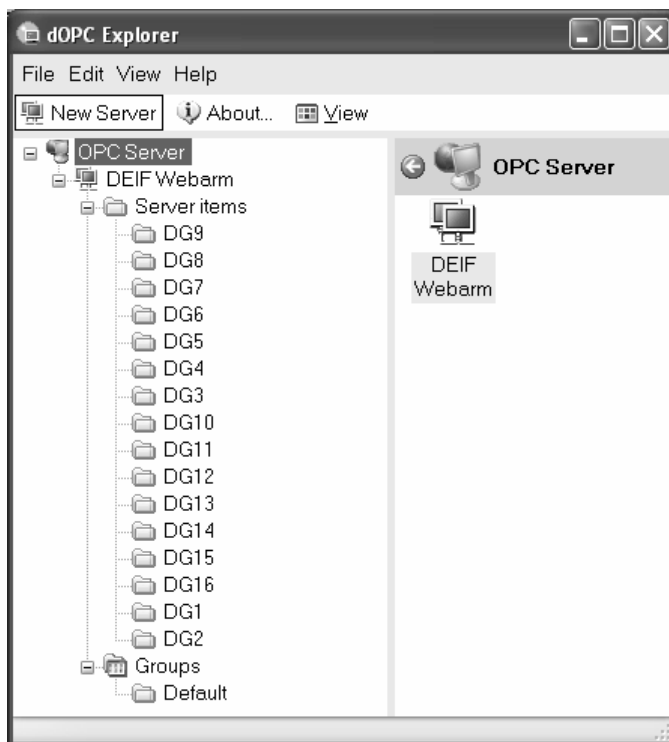
At the bottom right, there are 'Ok' and 'Cancel' buttons.

Name: You are free to choose the name you want for this server, e.g. DEIF webARM.

URL: http://192.168.2.21/lua/xml.lua, 192.168.2.21 is the factory setting IP address.

The **Proxy**, **User** and **Pass** fields must be filled in correctly, depending on your own network settings. When no password or proxy server is required for accessing this server, all these fields are left blank.

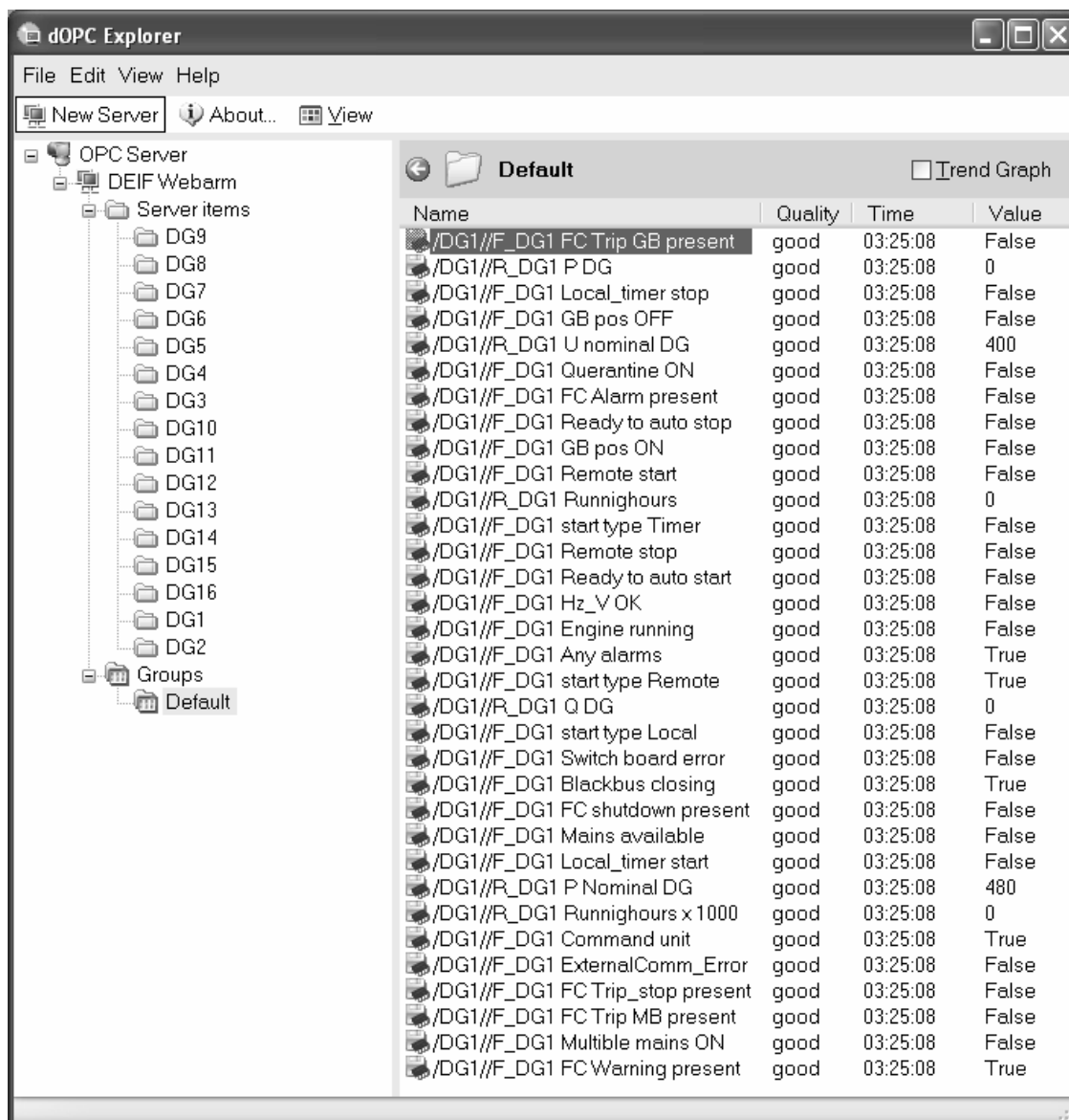
When this server is correctly created, it looks like this:



The **Server items** are all the possible data available on the webARM XML OPC DA server. As you see, it is not necessary to create any tags manually, as all the possible tags are automatically displayed here. It is then very quick and easy to display all the data.

Groups: If you want to display the on-line values of data, you must select them and move them from the 'Server items' to the 'Groups' directory. By creating several groups there, you can select different refresh times for each group by modifying their properties. Trending functions are also available when displaying data from these groups.

The screen dump below shows an example of what can be displayed from these groups.



Concerning the Time values: As the XML server is not sending data as long as the data value is unchanged, this time value is then corresponding to the last data transmission received.

5. Option N5: TCP/IP modbus communication

TCP/IP modbus is identical with the classical serial modbus communication, except that the media used for this communication is a TCP/IP communication. So the basic modbus functionalities will not be explained here, but more information can be found in the multi-line 2 option H2 (modbus option) documentation, which can be downloaded free of charge from the DEIF web page www.deif.com.

Modicon, today Schneider Electric, introduced the modbus protocol to the market in 1979. Modbus protocol is a messaging structure, and it is used to establish master-slave/client-server communication between intelligent devices. More information is available at www.modbus.org.

What is modbus TCP/IP protocol?



TCP/IP is the common transport protocol of the internet and is actually a set of layered protocols, providing a reliable data transport mechanism between machines. Ethernet has become the de facto standard of corporate enterprise systems, so it has also, not surprisingly, become the de facto standard for factory networking. Ethernet is not a new technology. It has matured to the point that the costs of implementing this network solution has dropped to where they are commensurate with those of today's field buses.

An open modbus TCP/IP specification was developed in 1999. The protocol specification and implementation guide are available for download (www.modbus-ida.org/specs.php).

The useful parameters required from the software you use for communicating with the webARM card by means of a TCP/IP modbus communication are:

- The **IP address** of the webARM to talk to
- The **port number** to be used

The previous chapters explain the way to set up the IP address parameter of the webARM card. The port number to be used is: **502**.

6. Data tables

Configurable area (read only) (function code 04h)

Address	Content	Type	
		ML-2	AGC mains
0	U_{L1-L2}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
1	U_{L2-L3}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
2	U_{L3-L1}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
3	U_{L1-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
4	U_{L2-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
5	U_{L3-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
6	f_{L1}	Generator freq. Measured in [Hz/100]	Mains freq. Measured in [Hz/100]
7	I_{L1}	Generator current. Measured in [A]	Mains current. Measured in [A]
8	I_{L2}	Generator current. Measured in [A]	Mains current. Measured in [A]
9	I_{L3}	Generator current. Measured in [A]	Mains current. Measured in [A]
10	P_{GEN}	Generator active power. Measured in [kW]. Negative value means reverse power	
11	Q_{GEN}	Generator reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power	
12	S_{GEN}	Generator apparent power. Measured in [kVA]	
13	Cos-phi	-99...0...100 generator cosinus-phi. Measured in cos-phi:100. Negative value means capacitive cos-phi	
14 [HI] 15 [LO]	R_{GEN}	Reactive energy counter. Measured in [kVArh]. Max. 300000 MVarh	
16 [HI] 17 [LO]	E_{GEN}	Energy counter. Measured in [kWh]. Max. 300000 MWh	
18	$U_{BBL1-L2}$	Busbar voltage. Measured in [V]	
19	$U_{BBL2-L3}$	Busbar voltage. Measured in [V]	
20	$U_{BBL3-L1}$	Busbar voltage. Measured in [V]	
21	U_{BBL1-N}	Busbar voltage. Measured in [V]	
22	U_{BBL2-N}	Busbar voltage. Measured in [V]	
23	U_{BBL3-N}	Busbar voltage. Measured in [V]	
24	F_{BB}	Busbar frequency L1. Measured in [Hz/100]	
25	$PHI_{BBL1-L2}$	+/-180 deg. Busbar phase angle. Measured in [deg.]	
26	$PHI_{BBL1-DGL1}$	+/-180 deg. Busbar/generator phase angle. Measured in [deg.]	
27	Alarms	Number of alarms	
28	Alarms	Number of unack. alarms	

Address	Content	Type			
29	Start attempts	Start attempts			
30 [HI] 31 [LO]	Abs. run. hours	Hour			
32	GB _{oper}	GB operations counter			
33	MB _{oper}	MB operations counter			
34	U _{SUPPLY}	Supply voltage. Measured in [V/10]			
35	U _{SUPPLY M4}	M4 supply voltage. Measured in [V/10]			
36	RPM	RPM			
37		Multi input 102, unscaled			
38		Multi input 105, unscaled			
39		Multi input 108, unscaled			
40		Control register table address 0			
41		Control register table address 1			
42		Control register table address 2			
43		Control register table address 3			
44		Control register table address 4			
45		Control register table address 5			
46		Control register table address 6			
47		Control register table address 7			
48	Protection alarms	Bit 0	1000	G -P> 1	
		Bit 1	1010	G -P> 2	
		Bit 2		Reserved	
		Bit 3	1030	G I> 1	
		Bit 4	1040	G I> 2	
		Bit 5	1050	G I> 3	
		Bit 6	1060	G I> 4	
		Bit 7		Reserved	
		Bit 8		Reserved	
		Bit 9	1130	G I>> 1	
		Bit 10	1140	G I>> 2	
		Bit 11	1150	G U> 1	M U> 1
		Bit 12	1160	G U> 2	M U> 2
		Bit 13	1170	G U< 1	M U< 1
		Bit 14	1180	G U< 2	M U< 2
		Bit 15	1190	G U< 3	M U< 3
49	Protection alarms	Bit 0	1210	G f> 1	M f> 1
		Bit 1	1220	G f> 2	M f> 2
		Bit 2	1230	G f> 3	M f> 3
		Bit 3	1240	G f< 1	M f< 1
		Bit 4	1250	G f< 2	M f< 2
		Bit 5	1260	G f< 3	M f< 3
		Bit 6	1270	BB U> 1	
		Bit 7	1280	BB U> 2	
		Bit 8	1290	BB U> 3	
		Bit 9	1300	BB U< 1	

Address	Content	Type		
		Bit 10	1310	BB U< 2
		Bit 11	1320	BB U< 3
		Bit 12	1330	BB U< 4
		Bit 13	1350	BB f> 1
		Bit 14	1360	BB f> 2
		Bit 15	1370	BB f> 3
50	Protection alarms	Bit 0	1380	BB f< 1
		Bit 1	1390	BB f< 2
		Bit 2	1400	BB f< 3
		Bit 3	1410	BB f< 4
		Bit 4	1420	df/dt (ROCOF)
		Bit 5	1430	Vector jump
		Bit 6	1440	BB Pos seq volt
		Bit 7	1450	G P> 1
		Bit 8	1460	G P> 2
		Bit 9	1470	G P> 3
		Bit 10	1480	G P> 4
		Bit 11	1490	G P> 5
		Bit 12	1500	Unbalance current
		Bit 13	1510	Unbalance voltage
		Bit 14	1520	G -Q>
		Bit 15	1530	G Q>
51	Synchronisation alarms	Bit 0	2120	Sync. window
		Bit 1	2130	GB sync failure
		Bit 2	2140	MB sync failure
		Bit 3	2150	Phase seq error
		Bit 4	2160	GB/TB open failure
		Bit 5	2170	GB/TB close failure
		Bit 6	2180	GB/TB pos failure
		Bit 7	2200	MB open failure
		Bit 8	2210	MB close failure
		Bit 9	2220	MB pos failure
		Bit 10	2270	Close before excitation failure
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
52	Digital inputs	Bit 0	3130	Dig. input 43
		Bit 1	3140	Dig. input 44
		Bit 2	3150	Dig. input 45
		Bit 3	3160	Dig. input 46
		Bit 4	3170	Dig. input 47
		Bit 5	3180	Dig. input 48
		Bit 6	3190	Dig. input 49

Address	Content	Type		
		Bit 7	3200	Dig. input 50
		Bit 8	3210	Dig. input 51
		Bit 9	3220	Dig. input 52
		Bit 10	3230	Dig. input 53
		Bit 11	3240	Dig. input 54
		Bit 12	3250	Dig. input 55
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
53	Digital inputs	Bit 0		NOT USED
		Bit 1		NOT USED
		Bit 2		NOT USED
		Bit 3		NOT USED
		Bit 4		NOT USED
		Bit 5		NOT USED
		Bit 6		NOT USED
		Bit 7	3330	Dig. input 91
		Bit 8	3340	Dig. input 92
		Bit 9	3350	Dig. input 93
		Bit 10	3360	Dig. input 94
		Bit 11	3370	Dig. input 95
		Bit 12	3380	Dig. input 96
		Bit 13	3390	Dig. input 97
		Bit 14		NOT USED
		Bit 15		NOT USED
54	Digital inputs	Bit 0	3400	Dig. multi input 102
		Bit 1	3410	Dig. multi input 105
		Bit 2	3420	Dig. multi input 108
		Bit 3	3401	W. failure, dig. multi input 102
		Bit 4	3411	W. failure, dig. multi input 105
		Bit 5	3421	W. failure, dig. multi input 108
		Bit 6	3430	Dig. input 112
		Bit 7	3440	Dig. input 113
		Bit 8	3450	Dig. input 114
		Bit 9	3460	Dig. input 115
		Bit 10	3470	Dig. input 116
		Bit 11	3480	Dig. input 117
		Bit 12	3490	Dig. input 118, emergency stop
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
55	Analogue inputs	Bit 0	3000	Dig. input 127
		Bit 1	3510	Dig. input 128
		Bit 2	3520	Dig. input 129
		Bit 3	3530	Dig. input 130

Address	Content	Type		
		Bit 4	3540	Dig. input 131
		Bit 5	3550	Dig. input 132
		Bit 6	3560	Dig. input 133
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
56	Analogue inputs	Bit 0	4000	4-20mA No91.1
		Bit 1	4010	4-20mA No91.2
		Bit 2	4020	W. fail ana 91
		Bit 3	4030	4-20mA No93.1
		Bit 4	4040	4-20mA No93.2
		Bit 5	4050	W. fail ana 93
		Bit 6	4060	4-20mA No95.1
		Bit 7	4070	4-20mA No95.2
		Bit 8	4080	W. fail ana 95
		Bit 9	4090	4-20mA No97.1
		Bit 10	4100	4-20mA No97.2
		Bit 11	4110	W. fail ana 97
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
57		Bit 0		Multi input 102.1
		Bit 1		Multi input 102.2
		Bit 2	4240	W. failure, multi input 102
		Bit 3		Multi input 105.1
		Bit 4		Multi input 105.2
		Bit 5	4370	W. failure, multi input 105
		Bit 6		Multi input 108.1
		Bit 7		Multi input 108.2
		Bit 8	4500	W. failure, multi input 108
		Bit 9	4510	Overspeed 1
		Bit 10	4520	Overspeed 2
		Bit 11	4530	Crank failure
		Bit 12	4540	Run feedb. fail
		Bit 13	4550	MPU wire failure
		Bit 14	4550	Generator Hz/V failure
		Bit 15	4570	Start failure
58		Bit 0	5000	Relay 5

Address	Content	Type		
		Bit 1	5010	MB OFF / relay 8
		Bit 2	5020	MB ON / relay 11
		Bit 3	5030	GB/TB OFF / relay 14
		Bit 4	5040	GB/TB ON / relay 17
		Bit 5	5050	Relay 20
		Bit 6	5060	Relay 21
		Bit 7	5070	Relay 29
		Bit 8	5080	Relay 31
		Bit 9	5900	Relay 33
		Bit 10	5100	Relay 35
		Bit 11	5110	Relay 57
		Bit 12	5120	Relay 59
		Bit 13	5130	Relay 61
		Bit 14	5140	Relay 63
		Bit 15		NOT USED
59		Bit 0		Block
		Bit 1		Manual
		Bit 2		Semi
		Bit 3		Auto
		Bit 4		Test
		Bit 5		Island
		Bit 6		AMF
		Bit 7		Peak shaving
		Bit 8		Fixed power
		Bit 9		Mains power export
		Bit 10		Load take over
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		AMF active
60	Communication	Bit 0	7570	EIC comm. error
		Bit 1	7580	EIC warning
		Bit 2	7590	EIC shutdown
		Bit 3	7600	EIC overspeed
		Bit 4	7610	EIC coolant temp. 1
		Bit 5	7620	EIC coolant temp. 2
		Bit 6	7630	EIC oil pressure 1
		Bit 7	7640	EIC oil pressure 2
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED

Address	Content	Type		
		Bit 14		NOT USED
		Bit 15		NOT USED
61- 199	Configurable	Reserved		

Measurement table (read only) (function code 04h)

Address	Content	Type	
		ML-2	AGC Mains
500		Application version	
501	U_{L1-L2}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
502	U_{L2-L3}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
503	U_{L3-L1}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
504	U_{L1-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
505	U_{L2-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
506	U_{L3-N}	Generator voltage. Measured in [V]	Mains voltage. Measured in [V]
507	f_{L1}	Generator freq. Measured in [Hz/100]	Mains freq. Measured in [Hz/100]
508	f_{L2}	Generator freq. Measured in [Hz/100]	Mains freq. Measured in [Hz/100]
509	f_{L3}	Generator freq. Measured in [Hz/100]	Mains freq. Measured in [Hz/100]
510	Φ_{L1-L2}	-180° to +180° Generator phase angle L1 – L2. Measured in [deg.]	
511	Φ_{L2-L3}	-180° to +180° Generator phase angle L2 – L3. Measured in [deg.]	
512	Φ_{L3-L1}	-180° to +180° Generator phase angle L3 – L1. Measured in [deg.]	
513	I_{L1}	Generator current. Measured in [A]	Mains current. Measured in [A]
514	I_{L2}	Generator current. Measured in [A]	Mains current. Measured in [A]
515	I_{L3}	Generator current. Measured in [A]	Mains current. Measured in [A]
516	P_{L1}	Generator active power. Measured in [kW]. Negative value means reverse power	
517	P_{L2}	Generator active power. Measured in [kW]. Negative value means reverse power	
518	P_{L3}	Generator active power. Measured in [kW]. Negative value means reverse power	
519	P_{GEN}	Generator total active power. Measured in [kW]. Negative value means reverse power.	
520	Q_{L1}	Generator reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power	
521	Q_{L2}	Generator reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power	
522	Q_{L3}	Generator reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power	
523	Q_{GEN}	Generator total reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power	
524	S_{L1}	Generator apparent power. Measured in [kVA]. Positive value means generated inductive reactive power	

Address	Content	Type	
		ML-2	AGC Mains
525	S_{L2}	Generator apparent power. Measured in [kVA]. Positive value means generated inductive reactive power	
526	S_{L3}	Generator apparent power. Measured in [kVA]. Positive value means generated inductive reactive power	
527	S_{GEN}	Generator total apparent power. Measured in [kVA]. Positive value means generated inductive reactive power	
528 [HI] 529 [LO]	R_{GEN}	Reactive total energy counter. Measured in [kVArh]. Max. 300000 MVarh	
530 [HI] 531 [LO]	Eday	Daily energy counter. Measured in [kWh]. Max. 300000MWh	
532 [HI] 533 [LO]	Eweek	Weekly energy counter. Measured in [kWh]. Max. 300000MWh	
534 [HI] 535 [LO]	Emonth	Monthly energy counter. Measured in [kWh]. Max. 300000MWh	
536 [HI] 537 [LO]	E_{GEN}	Total energy counter. Measured in [kWh]. Max. 300000MWh	
538	Cos ϕ	-99...0...100 Generator cos ϕ . Measured in cos ϕ x 100. Negative value means capacitive cos ϕ	
539	U_{L1-L2}	Mains/Bus voltage. Measured in [V]	
540	U_{L2-L3}	Mains/Bus voltage. Measured in [V]	
541	U_{L3-L1}	Mains/Bus voltage. Measured in [V]	
542	U_{L1-N}	Mains/Bus voltage. Measured in [V]	
543	U_{L2-N}	Mains/Bus voltage. Measured in [V]	
544	U_{L3-N}	Mains/Bus voltage. Measured in [V]	
545	f_{L1}	Mains/Bus freq. L1 Measured in [Hz/100]	
546	f_{L2}	Mains/Bus freq. L2 Measured in [Hz/100]	
547	f_{L3}	Mains/Bus freq. L3 Measured in [Hz/100]	
548	$\phi_{BBL1-L2}$	-180° to +180° Busbar phase angle. Measured in [deg.]	
549	$\phi_{BBL2-L3}$	-180° to +180° Busbar phase angle. Measured in [deg.]	
550	$\phi_{BBL3-L1}$	-180° to +180° Busbar phase angle. Measured in [deg.]	
551	$\phi_{BBL1-DGL1}$	-180° to +180° Busbar/generator phase angle. Measured in [deg.]	
552	$\phi_{BBL2-DGL2}$	-180° to +180° Busbar/generator phase angle. Measured in [deg.]	
553	$\phi_{BBL3-DGL3}$	-180° to +180° Busbar/generator phase angle. Measured in [deg.]	
554 [HI] 555 [LO]	Running time	Absolute running hour counter	
556 [HI] 557 [LO]		Relative running hour counter	
558		Number of alarms	
559		Number of unacknowledged alarms	
560		Number of acknowledged active alarms	
561		Running minute counter (shutdown override)	
562		Running hour counter (shutdown override)	
563	GB_{oper} / TB_{oper}	Generator/circuit breaker operations counter	Tie breaker operations counter
564	MB_{oper}	Mains breaker operation counter	

Address	Content	Type	
		ML-2	AGC Mains
566	Start attempts	Number of start attempts	
567	U _{SUPPLY}	Supply voltage. Measured in [V/10]	
568	U _{SUPPLY M4}	M4 supply voltage. Measured in [V/10]	
569	Service timer	Service timer 1 (running hours)	
570	Service timer	Service timer 1 (days)	
571	Service timer	Service timer 2 (running hours)	
572	Service timer	Service timer 2 (days)	
576	RPM	Running feedback RPM	
580	Multi input	Multi input 102, unscaled	
581	Multi input	Multi input 105, unscaled	
582	Multi input	Multi input 108, unscaled	
583	Multi input	Multi input 102, scaled	
584	Multi input	Multi input 105, scaled	
585	Multi input	Multi input 108, scaled	
586	4 -20mA	Analogue input no. 91, scaled	
587	4 -20mA	Analogue input no. 93, scaled	
588	4 -20mA	Analogue input no. 95, scaled	
589	4 -20mA	Analogue input no. 97, scaled	
592		Mains power, scaled value for multi input 102 or calculated power from the AGC Mains	
593	Engine communication	Refer to option H5/H7 manual	
594	Engine communication	Refer to option H5/H7 manual	
595	Engine communication	Refer to option H5/H7 manual	
596	Engine communication	Refer to option H5/H7 manual	
597	Engine communication	Refer to option H5/H7 manual	
598	Engine communication	Refer to option H5/H7 manual	
599	Engine communication	Refer to option H5/H7 manual	
600	Engine communication	Refer to option H5/H7 manual	
601	Engine communication	Refer to option H5/H7 manual	
602	Engine communication	Refer to option H5/H7 manual	
603	Engine communication	Refer to option H5/H7 manual	
604	Engine communication	Refer to option H5/H7 manual	
605	Engine communication	Refer to option H5/H7 manual	
606	Engine communication	Refer to option H5/H7 manual	
607	Engine communication	Refer to option H5/H7 manual	
608	Engine communication	Refer to option H5/H7 manual	
609	Engine communication	Refer to option H5/H7 manual	
610	Engine communication	Refer to option H5/H7 manual	
611	Engine communication	Refer to option H5/H7 manual	
612	Engine communication	Refer to option H5/H7 manual	
613	Engine communication	Refer to option H5/H7 manual	
614	Engine communication	Refer to option H5/H7 manual	
615	Engine communication	Refer to option H5/H7 manual	
616	Engine communication	Refer to option H5/H7 manual	

Address	Content	Type	
		ML-2	AGC Mains
617	Engine communication	Refer to option H5/H7 manual	
618	Engine communication	Refer to option H5/H7 manual	
642		Control register table address 0	
643		Control register table address 1	
644		Control register table address 2	
645		Control register table address 3	
646		Control register table address 4	
647		Control register table address 5	
648		Control register table address 6	
649		Control register table address 7	

Alarm and status table (read only) (function code 04h)

Address	Content	Type			
1000	Protection alarms	Bit 0	1000	G -P> 1	
		Bit 1	1010	G -P> 2	
		Bit 2	1020	Reserved	
		Bit 3	1030	G I> 1	
		Bit 4	1040	G I> 2	
		Bit 5	1050	G I> 3	
		Bit 6	1060	G I> 4	
		Bit 7	1090	Reserved	
		Bit 8	1120	Reserved	
		Bit 9	1130	G I>> 1	
		Bit 10	1140	G I>> 2	
		Bit 11	1150	G U> 1	M U> 1
		Bit 12	1160	G U> 2	M U> 2
		Bit 13	1170	G U< 1	M U< 1
		Bit 14	1180	G U< 2	M U< 2
		Bit 15	1190	G U< 3	M U< 3
1001	Protection alarms	Bit 0	1210	G f> 1	M f> 1
		Bit 1	1220	G f> 2	M f> 2
		Bit 2	1230	G f> 3	M f> 3
		Bit 3	1240	G f< 1	M f< 1
		Bit 4	1250	G f< 2	M f< 2
		Bit 5	1260	G f< 3	M f< 3
		Bit 6	1270	BB U> 1	
		Bit 7	1280	BB U> 2	
		Bit 8	1290	BB U> 3	
		Bit 9	1300	BB U< 1	
		Bit 10	1310	BB U< 2	
		Bit 11	1320	BB U< 3	
		Bit 12	1330	BB U< 4	
		Bit 13	1350	BB f> 1	
		Bit 14	1360	BB f> 2	
		Bit 15	1370	BB f> 3	
1002	Protection alarms	Bit 0	1380	BB f> 1	
		Bit 1	1390	BB f< 2	
		Bit 2	1400	BB f< 3	
		Bit 3	1410	BB f< 4	
		Bit 4	1420	df/dt (ROCOF)	
		Bit 5	1430	Vector jump	
		Bit 6	1440	BB Pos seq volt	
		Bit 7	1450	G P> 1	
		Bit 8	1460	G P> 2	
		Bit 9	1470	G P> 3	
		Bit 10	1480	G P> 4	
		Bit 11	1490	G P> 5	
		Bit 12	1500	Unbalance current	
		Bit 13	1510	Unbalance voltage	
		Bit 14	1520	G -Q>	
		Bit 15	1530	Q Q>	
1003	Protection alarms	Bit 0	1540	G neg. seq. I	
		Bit 1	1550	G neg. seq. U	

Address	Content	Type		
		Bit 2	1570	G zero seq. I
		Bit 3	1580	G zero seq. U
		Bit 4		NOT USED
		Bit 5		NOT USED
		Bit 6		NOT USED
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1004	Protection alarms			Reserved
1005	Synchronisation alarms	Bit 0	2120	Sync. window
		Bit 1	2130	GB sync failure
		Bit 2	2140	MB sync failure
		Bit 3	2150	Phase seq error
		Bit 4	2160	GB/TB open failure
		Bit 5	2170	GB/TB close failure
		Bit 6	2180	GB/TB pos failure
		Bit 7	2200	MB open failure
		Bit 8	2210	MB close failure
		Bit 9	2220	MB pos failure
		Bit 10	2270	Close before excitation failure
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1006	Regulation alarms	Bit 0	2560	GOV reg. fail
		Bit 1	2630	Deload error
		Bit 2	2680	AVR reg. fail
		Bit 3		NOT USED
		Bit 4		NOT USED
		Bit 5		NOT USED
		Bit 6		NOT USED
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1007	Digital inputs	Bit 0	3000	Dig. input 23
		Bit 1	3010	Dig. input 24
		Bit 2	3020	Dig. input 25
		Bit 3	3030	Dig. input 26
		Bit 4	3040	Dig. input 27

Address	Content	Type		
		Bit 5		Reserved
		Bit 6		Reserved
		Bit 7		Reserved
		Bit 8		Reserved
		Bit 9		Reserved
		Bit 10		Reserved
		Bit 11		Reserved
		Bit 12		Reserved
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1008	Digital inputs	Bit 0	3130	Dig. input 43
		Bit 1	3140	Dig. input 44
		Bit 2	3150	Dig. input 45
		Bit 3	3160	Dig. input 46
		Bit 4	3170	Dig. input 47
		Bit 5	3180	Dig. input 48
		Bit 6	3190	Dig. input 49
		Bit 7	3200	Dig. input 50
		Bit 8	3210	Dig. input 51
		Bit 9	3220	Dig. input 52
		Bit 10	3230	Dig. input 53
		Bit 11	3240	Dig. input 54
		Bit 12	3250	Dig. input 55
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1009	Digital inputs	Bit 0	3260	Dig. input 65
		Bit 1	3270	Dig. input 66
		Bit 2	3280	Dig. input 67
		Bit 3	3290	Dig. input 68
		Bit 4	3300	Dig. input 69
		Bit 5	3310	Dig. input 70
		Bit 6	3320	Dig. input 71
		Bit 7	3330	Dig. input 91
		Bit 8	3340	Dig. input 92
		Bit 9	3350	Dig. input 93
		Bit 10	3360	Dig. input 94
		Bit 11	3370	Dig. input 95
		Bit 12	3380	Dig. input 96
		Bit 13	3390	Dig. input 97
		Bit 14		NOT USED
		Bit 15		NOT USED
1010	Protection alarms	Bit 0	3400	Dig. multi input 102
		Bit 1	3410	Dig. multi input 105
		Bit 2	3420	Dig. multi input 108
		Bit 3	3401	Wire failure, dig. multi input 102
		Bit 4	3411	Wire failure, dig. multi input 105
		Bit 5	3421	Wire failure, dig. multi input 108
		Bit 6	3430	Dig. input 112
		Bit 7	3440	Dig. input 113
		Bit 8	3450	Dig. input 114
		Bit 9	3460	Dig. input 115

Address	Content	Type		
		Bit 10	3470	Dig. input 116
		Bit 11	3480	Dig. input 117
		Bit 12	3490	Dig. input 118 / Emergency STOP
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1011	Protection alarms	Bit 0	3500	Dig. input 127
		Bit 1	3510	Dig. input 128
		Bit 2	3520	Dig. input 129
		Bit 3	3530	Dig. input 130
		Bit 4	3540	Dig. input 131
		Bit 5	3550	Dig. input 132
		Bit 6	3560	Dig. input 133
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1012	Analogue inputs	Bit 0	4000	4-20mA No91.1
		Bit 1	4010	4-20mA No91.2
		Bit 2	4020	W. fail ana 91
		Bit 3	4030	4-20mA No93.1
		Bit 4	4040	4-20mA No93.2
		Bit 5	4050	W. fail ana 93
		Bit 6	4060	4-20mA No95.1
		Bit 7	4070	4-20mA No95.2
		Bit 8	4080	W. fail ana 95
		Bit 9	4090	4-20mA No97.1
		Bit 10	4100	4-20mA No97.2
		Bit 11	4110	W. fail ana 97
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1013	Analogue inputs	Bit 0		Multi input 102.1
		Bit 1		Multi input 102.2
		Bit 2	4240	W. failure, multi input 102
		Bit 3		Multi input 105.1
		Bit 4		Multi input 105.2
		Bit 5	4370	W. failure, multi input 105
		Bit 6		Multi input 108.1
		Bit 7		Multi input 108.2
		Bit 8	4500	W. failure, multi input 108
		Bit 9	4510	Overspeed 1
		Bit 10	4520	Overspeed 2
		Bit 11	4530	Crank failure
		Bit 12	4540	Run feedb. fail
		Bit 13	4550	MPU wirebreak
		Bit 14	6250	Generator Hz/V failure

Address	Content	Type		
1014	Analogue inputs	Bit 15	4570	Start failure
		Bit 0	4580	Stop failure
		Bit 1	4960	U< aux. supply term. 1
		Bit 2	4970	U> aux. supply term. 1
		Bit 3	4980	U< aux. supply term. 98
		Bit 4	4990	U> aux. supply term. 98
		Bit 5		NOT USED
		Bit 6		NOT USED
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1015	System/general alarms	Bit 0	6110	Service timer 1
		Bit 1	6120	Service timer 2
		Bit 2	6270	Stop coil failure
		Bit 3	6280	Int. comm. failure
		Bit 4	6330	Engine heater, alarm
		Bit 5	6410	Battery test
		Bit 6	6440	Battery asymmetry 1
		Bit 7	6450	Battery asymmetry 2
		Bit 8	6470	Max. ventilation 1
		Bit 9	6480	Max. ventilation 2
		Bit 10	6500	Swbd error, block
		Bit 11	6510	Swbd error, stop
		Bit 12	6540	Not in auto
		Bit 13	6550	Fuel fill check
		Bit 14		NOT USED
		Bit 15		NOT USED
1016	Relay outputs	Bit 0	5000	Relay 5
		Bit 1	5010	MB OFF / relay 8
		Bit 2	5020	MB ON / relay 11
		Bit 3	5030	GB/TB OFF / relay 14
		Bit 4	5040	GB/TB ON / relay 17
		Bit 5	5050	Relay 20
		Bit 6	5060	Relay 21
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11	5110	Relay 57
		Bit 12	5120	Relay 59
		Bit 13	5130	Relay 61
		Bit 14	5140	Relay 63
		Bit 15		NOT USED
1017	Relay outputs	Bit 0	5150	Relay 65
		Bit 1	5160	Relay 67
		Bit 2	5170	Relay 69
		Bit 3	5180	Relay 71

Address	Content	Type		
		Bit 4	5190	Relay 90
		Bit 5	5200	Relay 92
		Bit 6	5210	Relay 94
		Bit 7	5220	Relay 96
		Bit 8	5230	Relay 126
		Bit 9	5240	Relay 128
		Bit 10	5250	Relay 130
		Bit 11	5260	Relay 132
		Bit 12		Run coil
		Bit 13		Start prepare
		Bit 14		Start relay
		Bit 15		Stop coil
1018	Status	Bit 0		Mains failure
		Bit 1		MB pos ON
		Bit 2		DG ramp down
		Bit 3		Start regulation
		Bit 4		GB/TB pos ON
		Bit 5		GB/TB synchronising
		Bit 6		Engine running
		Bit 7		Running detection, timer expired
		Bit 8		DG Hz/V OK, timer expired
		Bit 9		Battery test
		Bit 10		Printing log
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1019		Bit 0		Block
		Bit 1		Manual
		Bit 2		Semi
		Bit 3		Auto
		Bit 4		Test
		Bit 5		Island
		Bit 6		AMF
		Bit 7		Peak shaving
		Bit 8		Fixed power
		Bit 9		Mains power export
		Bit 10		Load take over
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		AMF active
1020	Engine communication	Bit 0		EIC comm. error
		Bit 1		EIC warning
		Bit 2		EIC shutdown
		Bit 3		EIC overspeed
		Bit 4		EIC coolant temp. 1
		Bit 5		EIC coolant temp. 2
		Bit 6		EIC oil pressure 1
		Bit 7		EIC oil pressure 2
		Bit 8		NOT USED

Address	Content	Type		
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1021-1023	Engine communication			Reserved
1024	Engine communication	Bit 0		Refer to option H5/H7 manual for bit 0-13
		Bit 1		
		Bit 2		
		Bit 3		
		Bit 4		
		Bit 5		
		Bit 6		
		Bit 7		
		Bit 8		
		Bit 9		
		Bit 10		
		Bit 11		
		Bit 12		
		Bit 13		
		Bit 14		NOT USED
		Bit 15		NOT USED
1025		Bit 0		Reserved
1026	KW2000, Scania	Bit 0		Overrevring
		Bit 1		Speed sensor 1
		Bit 2		Speed sensor 2
		Bit 3		Water temp. sensor
		Bit 4		Charge air temp. sensor
		Bit 5		Charge air pressure sensor
		Bit 6		Oil temp. sensor
		Bit 7		Oil pressure sensor
		Bit 8		Fault in cor.
		Bit 9		Throttle pedal
		Bit 10		Emergency stop override
		Bit 11		Oil pressure prot.
		Bit 12		Wrong parameter
		Bit 13		Battery voltage
		Bit 14		Oil pressure prot.
		Bit 15		Emergency stop cor.
1027	KW2000, Scania	Bit 0		CAN cir. defect
		Bit 1		CAN mess. DLN1
		Bit 2		Wrong CAN version
		Bit 3		Un. inj. cyl. 1
		Bit 4		Un. inj. cyl. 2
		Bit 5		Un. inj. cyl. 3
		Bit 6		Un. inj. cyl. 4
		Bit 7		Un. inj. cyl. 5
		Bit 8		Un. inj. cyl. 6
		Bit 9		Un. inj. cyl. 7
		Bit 10		Un. inj. cyl. 8

Address	Content	Type		
		Bit 11		Extra ana. Inp.
		Bit 12		System shutdown
		Bit 13		Coola. L. prot.
		Bit 14		HW watchdog
		Bit 15		Fault in RAM
1028	KW2000, Scania	Bit 0		Seal
		Bit 1		Coola. shut OFF
		Bit 2		Overheat prot.
		Bit 3		Fault in TPU
		Bit 4		NOT USED
		Bit 5		NOT USED
		Bit 6		NOT USED
		Bit 7		NOT USED
		Bit 8		NOT USED
		Bit 9		NOT USED
		Bit 10		NOT USED
		Bit 11		NOT USED
		Bit 12		NOT USED
		Bit 13		NOT USED
		Bit 14		NOT USED
		Bit 15		NOT USED
1029-1030				Reserved for KW2000
1031	Int. communication	Bit 0		CAN 1 mains missing, single mains
		Bit 1		CAN 1 ID 1 missing
		Bit 2		CAN 1 ID 2 missing
		Bit 3		CAN 1 ID 3 missing
		Bit 4		CAN 1 ID 4 missing
		Bit 5		CAN 1 ID 5 missing
		Bit 6		CAN 1 ID 6 missing
		Bit 7		CAN 1 ID 7 missing
		Bit 8		CAN 1 ID 8 missing
		Bit 9		CAN 1 ID 9 missing
		Bit 10		CAN 1 ID 10 missing
		Bit 11		CAN 1 ID 11missing
		Bit 12		CAN 1 ID 12 missing
		Bit 13		CAN 1 ID 13 missing
		Bit 14		CAN 1 ID 14 missing
		Bit 15		CAN 1 ID 15 missing
1032	Int. communication	Bit 0		CAN 1 ID 16 missing
		Bit 1		CAN 2 mains missing, single mains
		Bit 2		CAN 2 ID 1 missing
		Bit 3		CAN 2 ID 2 missing
		Bit 4		CAN 2 ID 3 missing
		Bit 5		CAN 2 ID 4 missing
		Bit 6		CAN 2 ID 5 missing
		Bit 7		CAN 2 ID 6 missing
		Bit 8		CAN 2 ID 7 missing
		Bit 9		CAN 2 ID 8 missing
		Bit 10		CAN 2 ID 9 missing
		Bit 11		CAN 2 ID 10 missing
		Bit 12		CAN 2 ID 11 missing
		Bit 13		CAN 2 ID 12 missing
		Bit 14		CAN 2 ID 13 missing

Address	Content	Type	
1033	Int. communication	Bit 15	CAN 2 ID 14 missing
		Bit 0	CAN 2 ID 15 missing
		Bit 1	CAN 2 ID 16 missing
		Bit 2	Communication error ext
		Bit 3	NOT USED
		Bit 4	NOT USED
		Bit 5	NOT USED
		Bit 6	NOT USED
		Bit 7	NOT USED
		Bit 8	NOT USED
		Bit 9	NOT USED
		Bit 10	NOT USED
		Bit 11	NOT USED
		Bit 12	NOT USED
		Bit 13	NOT USED
		Bit 14	NOT USED
		Bit 15	NOT USED
1034	Int. communication	Bit 0	Ext. comm. error, single mains
		Bit 1	Ext. comm. error, ID 1
		Bit 2	Ext. comm. error, ID 2
		Bit 3	Ext. comm. error, ID 3
		Bit 4	Ext. comm. error, ID 4
		Bit 5	Ext. comm. error, ID 5
		Bit 6	Ext. comm. error, ID 6
		Bit 7	Ext. comm. error, ID 7
		Bit 8	Ext. comm. error, ID 8
		Bit 9	Ext. comm. error, ID 9
		Bit 10	Ext. comm. error, ID 10
		Bit 11	Ext. comm. error, ID 11
		Bit 12	Ext. comm. error, ID 12
		Bit 13	Ext. comm. error, ID 13
		Bit 14	Ext. comm. error, ID 14
		Bit 15	Ext. comm. error, ID 15
1035	Int. communication	Bit 0	Ext. comm. error, ID 16
		Bit 1	NOT USED
		Bit 2	NOT USED
		Bit 3	NOT USED
		Bit 4	NOT USED
		Bit 5	NOT USED
		Bit 6	NOT USED
		Bit 7	NOT USED
		Bit 8	NOT USED
		Bit 9	NOT USED
		Bit 10	NOT USED
		Bit 11	NOT USED
		Bit 12	NOT USED
		Bit 13	NOT USED
		Bit 14	NOT USED
		Bit 15	NOT USED

Power management measurement table (read only) (function code 04h)

Address	Content	Type
1500		Total power
1501		Available power
1502		Total nominal power
1503		Total gen-set power
1504		Total reactive power
1505		Number of gen-sets
1506		Mains selection
1507		Load dependent stop
1508		Load dependent start
1509		Stop gen-set calculation
1510		Nominal power gen-set 1
1511		Nominal power gen-set 2
1512		Nominal power gen-set 3
1513		Nominal power gen-set 4
1514		Nominal power gen-set 5
1515		Nominal power gen-set 6
1516		Nominal power gen-set 7
1517		Nominal power gen-set 8
1518		Nominal power gen-set 9
1519		Nominal power gen-set 10
1520		Nominal power gen-set 11
1521		Nominal power gen-set 12
1522		Nominal power gen-set 13
1523		Nominal power gen-set 14
1524		Nominal power gen-set 15
1525		Nominal power gen-set 16
1526		Power gen-set 1
1527		Power gen-set 2
1528		Power gen-set 3
1529		Power gen-set 4
1530		Power gen-set 5
1531		Power gen-set 6
1532		Power gen-set 7
1533		Power gen-set 8
1534		Power gen-set 9
1535		Power gen-set 10
1536		Power gen-set 11
1537		Power gen-set 12
1538		Power gen-set 13
1539		Power gen-set 14
1540		Power gen-set 15
1541		Power gen-set 16
1542		Reactive power gen-set 1

Address	Content	Type
1543		Reactive power gen-set 2
1544		Reactive power gen-set 3
1545		Reactive power gen-set 4
1546		Reactive power gen-set 5
1547		Reactive power gen-set 6
1548		Reactive power gen-set 7
1549		Reactive power gen-set 8
1550		Reactive power gen-set 9
1551		Reactive power gen-set 10
1552		Reactive power gen-set 11
1553		Reactive power gen-set 12
1554		Reactive power gen-set 13
1555		Reactive power gen-set 14
1556		Reactive power gen-set 15
1557		Reactive power gen-set 16
1558		Power, single mains
1559		Power, mains 1A
1560		Power, mains 1B
1561		Power, mains 2A
1562		Power, mains 2B
1563		Reactive power, single mains
1564		Reactive power, mains 1A
1565		Reactive power, mains 1B
1566		Reactive power, mains 2A
1567		Reactive power, mains 2B

Power management alarm and status table (read only) (function code 04h)

Address	Content	Type
1700	Power management	Bit 0 TB available
		Bit 1 Mains unit available
		Bit 2 Any MB pos ON
		Bit 3 All MB pos OFF
		Bit 4 TB pos ON
		Bit 5 TB pos OFF
		Bit 6 NOT USED
		Bit 7 NOT USED
		Bit 8 NOT USED
		Bit 9 NOT USED
		Bit 10 NOT USED
		Bit 11 NOT USED
		Bit 12 NOT USED
		Bit 13 NOT USED
		Bit 14 NOT USED
		Bit 15 NOT USED
1701		Bit 0 GB pos ON, ID 1
		Bit 1 GB pos ON, ID 2
		Bit 2 GB pos ON, ID 3
		Bit 3 GB pos ON, ID 4
		Bit 4 GB pos ON, ID 5
		Bit 5 GB pos ON, ID 6
		Bit 6 GB pos ON, ID 7
		Bit 7 GB pos ON, ID 8
		Bit 8 GB pos ON, ID 9
		Bit 9 GB pos ON, ID 10
		Bit 10 GB pos ON, ID 11
		Bit 11 GB pos ON, ID 12
		Bit 12 GB pos ON, ID 13
		Bit 13 GB pos ON, ID 14
		Bit 14 GB pos ON, ID 15
		Bit 15 GB pos ON, ID 16
1702		Bit 0 GB pos OFF, ID 1
		Bit 1 GB pos OFF, ID 2
		Bit 2 GB pos OFF, ID 3
		Bit 3 GB pos OFF, ID 4
		Bit 4 GB pos OFF, ID 5
		Bit 5 GB pos OFF, ID 6
		Bit 6 GB pos OFF, ID 7
		Bit 7 GB pos OFF, ID 8
		Bit 8 GB pos OFF, ID 9
		Bit 9 GB pos OFF, ID 10
		Bit 10 GB pos OFF, ID 11
		Bit 11 GB pos OFF, ID 12
		Bit 12 GB pos OFF, ID 13
		Bit 13 GB pos OFF, ID 14
		Bit 14 GB pos OFF, ID 15
		Bit 15 GB pos OFF, ID 16
1703		Bit 0 DG Hz/V OK, ID 1
		Bit 1 DG Hz/V OK, ID 2
		Bit 2 DG Hz/V OK, ID 3

Address	Content	Type
		Bit 3
		DG Hz/V OK, ID 4
		Bit 4
		DG Hz/V OK, ID 5
		Bit 5
		DG Hz/V OK, ID 6
		Bit 6
		DG Hz/V OK, ID 7
		Bit 7
		DG Hz/V OK, ID 8
		Bit 8
		DG Hz/V OK, ID 9
		Bit 9
		DG Hz/V OK, ID 10
		Bit 10
		DG Hz/V OK, ID 11
1704		Bit 11
		DG Hz/V OK, ID 12
		Bit 12
		DG Hz/V OK, ID 13
		Bit 13
		DG Hz/V OK, ID 14
		Bit 14
		DG Hz/V OK, ID 15
		Bit 15
		DG Hz/V OK, ID 16
		Bit 0
		Mains OK, single mains
		Bit 1
		Mains OK, mains 1A
		Bit 2
		Mains OK, mains 1B
1705		Bit 3
		Mains OK, mains 2A
		Bit 4
		Mains OK, mains 2B
		Bit 5
		NOT USED
		Bit 6
		NOT USED
		Bit 7
		NOT USED
		Bit 8
		NOT USED
		Bit 9
		NOT USED
		Bit 10
		NOT USED
1706		Bit 11
		NOT USED
		Bit 12
		NOT USED
		Bit 13
		NOT USED
		Bit 14
		NOT USED
		Bit 15
		NOT USED
		Bit 0
		Ready for auto start, ID 1
		Bit 1
		Ready for auto start, ID 2
		Bit 2
		Ready for auto start, ID 3
1707		Bit 3
		Ready for auto start, ID 4
		Bit 4
		Ready for auto start, ID 5
		Bit 5
		Ready for auto start, ID 6
		Bit 6
		Ready for auto start, ID 7
		Bit 7
		Ready for auto start, ID 8
		Bit 8
		Ready for auto start, ID 9
		Bit 9
		Ready for auto start, ID 10
		Bit 10
		Ready for auto start, ID 11
1708		Bit 11
		Ready for auto start, ID 12
		Bit 12
		Ready for auto start, ID 13
		Bit 13
		Ready for auto start, ID 14
		Bit 14
		Ready for auto start, ID 15
		Bit 15
		Ready for auto start, ID 16
		Bit 0
		Mains not in semi, single mains
		Bit 1
		Mains not in semi, mains 1A
		Bit 2
		Mains not in semi, mains 1B
1709		Bit 3
		Mains not in semi, mains 2A
		Bit 4
		Mains not in semi, mains 2B
		Bit 5
		NOT USED
		Bit 6
		NOT USED
		Bit 7
		NOT USED

Address	Content	Type	
		Bit 8	NOT USED
		Bit 9	NOT USED
		Bit 10	NOT USED
		Bit 11	NOT USED
		Bit 12	NOT USED
		Bit 13	NOT USED
		Bit 14	NOT USED
		Bit 15	NOT USED
1707		Bit 0	Any alarms, ID 1
		Bit 1	Any alarms, ID 2
		Bit 2	Any alarms, ID 3
		Bit 3	Any alarms, ID 4
		Bit 4	Any alarms, ID 5
		Bit 5	Any alarms, ID 6
		Bit 6	Any alarms, ID 7
		Bit 7	Any alarms, ID 8
		Bit 8	Any alarms, ID 9
		Bit 9	Any alarms, ID 10
		Bit 10	Any alarms, ID 11
		Bit 11	Any alarms, ID 12
		Bit 12	Any alarms, ID 13
		Bit 13	Any alarms, ID 14
		Bit 14	Any alarms, ID 15
		Bit 15	Any alarms, ID 16
1708		Bit 0	Any alarms, single mains
		Bit 1	Any alarms, mains 1A
		Bit 2	Any alarms, mains 1B
		Bit 3	Any alarms, mains 2A
		Bit 4	Any alarms, mains 2B
		Bit 5	NOT USED
		Bit 6	NOT USED
		Bit 7	NOT USED
		Bit 8	NOT USED
		Bit 9	NOT USED
		Bit 10	NOT USED
		Bit 11	NOT USED
		Bit 12	NOT USED
		Bit 13	NOT USED
		Bit 14	NOT USED
		Bit 15	NOT USED
1709		Bit 0	Engine running, ID 1
		Bit 1	Engine running, ID 2
		Bit 2	Engine running, ID 3
		Bit 3	Engine running, ID 4
		Bit 4	Engine running, ID 5
		Bit 5	Engine running, ID 6
		Bit 6	Engine running, ID 7
		Bit 7	Engine running, ID 8
		Bit 8	Engine running, ID 9
		Bit 9	Engine running, ID 10
		Bit 10	Engine running, ID 11
		Bit 11	Engine running, ID 12
		Bit 12	Engine running, ID 13

Address	Content	Type	
1710		Bit 13	Engine running, ID 14
		Bit 14	Engine running, ID 15
		Bit 15	Engine running, ID 16
		Bit 0	MB pos ON, single mains
		Bit 1	MB pos ON, mains 1A
		Bit 2	MB pos ON, mains 1B
		Bit 3	MB pos ON, mains 2A
		Bit 4	MB pos ON, mains 2B
		Bit 5	MB pos OFF, single mains
		Bit 6	MB pos OFF, mains 1A
		Bit 7	MB pos OFF, mains 1B
		Bit 8	MB pos OFF, mains 2A
		Bit 9	MB pos OFF, mains 2B
		Bit 10	NOT USED
		Bit 11	NOT USED
		Bit 12	NOT USED
		Bit 13	NOT USED
		Bit 14	NOT USED
		Bit 15	NOT USED

Control register table read(03h)/write(10h)

Address	Content	Description	Available in
0	Power regulator set point	0...100% of nominal power Activated in menu 7501	AGC
1	PF regulator set point	60...100 stated as PF value/100. The value 100 means PF = 1 Activated in menu 7504	AGC
2	Reactive power regulator set point	+/-100% of nominal power. A negative value means capacitive reactive power, and a positive value means inductive reactive power. Activated in menu 7505	AGC
3	Frequency regulator set point	+/-100% corresponding to +/-10.0% of nominal frequency. Activated in menu 7502	AGC
4	Voltage regulator set point	+/-100% corresponding to +/-10.0% of nominal voltage. Activated in menu 7503	AGC
5	Control command	Bit 0 This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored Bit 1 Start Bit 2 GB/TB ON Bit 3 GB/TB OFF Bit 4 Stop Bit 5 Reset analogue regulation outputs Bit 6 Bit 7 Alarm inhibit 1 Bit 8 Alarm inhibit 2 Bit 9 Alarm inhibit 3 Bit 10 Alarm ack. This bit is automatically reset. Bit 11 Nominal setting 1 Bit 12 Nominal setting 2 Bit 13 Nominal setting 3 Bit 14 Nominal setting 4 Bit 15	AGC
6	Control command	Bit 0 This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored Bit 1 Island Bit 2 Automatic mains failure (AMF) Bit 3 Peak shaving Bit 4 Fixed power Bit 5 Mains power export (MPE) Bit 6 Load take over (LTO) Bit 7 Bit 8 Bit 9 MB ON Bit 10 MB OFF Bit 11 Auto start/stop Bit 12 Manual mode Bit 13 Semi-auto mode Bit 14 Auto mode Bit 15 Test mode	AGC

Address	Content	Description	Available in
7		Bit 0 This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored Bit 1 External frequency control Bit 2 External voltage control Bit 3 External power control Bit 4 External reactive power control Bit 5 External power factor control Bit 6 Bit 7 Bit 8 Bit 9 Bit 10 Bit 11 Bit 12 Bit 13 Bit 14 Battery test Bit 15 Event printer	AGC
8-13		Not used	

Command flags table (write only) (function code 0Fh)

Address	Content	Description	Available in
0	NOT USED		AGC
1	Start	These bits are automatically reset in multi-line 2	
2	GB/TB ON		
3	GB/TB OFF		
4	Stop		
5	Reset analogue regulation outputs		
6	NOT USED		
7	Alarm inhibit 1		
8	Alarm inhibit 2		
9	Alarm inhibit 3		
10	Alarm ack.		
11	Nominal setting 1		
12	Nominal setting 2		
13	Nominal setting 3		
14	Nominal setting 4		
15	NOT USED		AGC
16	NOT USED		
17	Island		
18	Automatic mains failure (AMF)		
19	Peak shaving		
20	Fixed power		
21	Mains power export (MPE)		
22	Load take over (LTO)		
23	NOT USED		
24	NOT USED		
25	MB ON		
26	MB OFF		
27	Auto start/stop		
28	Manual mode		
29	Semi-auto mode		
30	Auto mode		
31	Test mode		
32	NOT USED		AGC
33	External frequency control		
34	External voltage control		
35	External power control		
36	External reactive power control		
37	External power factor control		
38	NOT USED		
39	NOT USED		
40	NOT USED		

Address	Content	Description	Available in
41	NOT USED		
42	NOT USED		
43	NOT USED		
44	NOT USED		
45	NOT USED		
46	Battery test		
47	Event printer		

Parameter table reading and writing

Function 02(02hex) read flag status

Reads the ON/OFF status of discrete flags in the slave unit.

Address area for reading of status flags

Multi-line 2 Data to request	Multi-line 2 Table	Address area
Alarm active	Parameter table	4000-4318



The maximum number of data query is limited by the length of the actual table.

Function 03(03hex)read/function 10(10h)write registers

Reads and writes the binary of registers in the slave unit.

Address area for reading of registers

Multi-line 2 Data to request	Multi-line 2 Table	Address area
Timers used	Parameter table	2000-3999
Values used	Parameter table	4000-4999
Values minimum	Parameter table	6000-7999
Values maximum	Parameter table	8000-9999
Output a	Parameter table	10000-11999
Output b	Parameter table	12000-13999
Fail class used	Parameter table	14000-15999



The maximum number of data query is limited by the length of the actual table.

Function 04(04hex) read registers

Reads the binary of registers in the slave unit.

Address area for reading of registers

Multi-line 2 Data to request	Multi-line 2 Table	Address area
Timers minimum	Parameter table	2000-3999
Timers maximum	Parameter table	4000-3999
Output a minimum	Parameter table	6000-7999
Output a maximum	Parameter table	8000-9999
Output b minimum	Parameter table	10000-11999
Output b maximum	Parameter table	12000-13999

Parameter table

Address and channel number overview

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
0	-	-		-	-
1	1000	G -P> 1	Standard	%/10	1/10s
2	1010	G -P> 2	Standard	%/10	1/10s
3	1020	Reserved			
4	1030	G l> 1	C1	%/10	1/10s
5	1040	G l> 2	C1	%/10	1/10s
6	1050	G l> 3	C1	%/10	1/10s
7	1060	G l> 4	C1	%/10	1/10s
8	1090	Reserved			
9	1120	Reserved			
10	1130	G l>> 1	Standard	%/10	1/10s
11	1140	G l>> 2	Standard	%/10	1/10s
12	1150	G U> 1	M U> 1	C1	%/10
13	1160	G U> 2	M U> 2	C1	%/10
14	1170	G U< 1	M U< 1	C1	%/10
15	1180	G U< 2	M U< 2	C1	%/10
16	1190	G U< 3	M U< 3	C1	%/10
17	1200	G voltage trip	0: Phase-phase, 1: Phase-neutral		
18	1210	G f> 1	M f> 1	C1	%/10
19	1220	G f> 2	M f> 2	C1	%/10
20	1230	G f> 3	M f> 3	C1	%/10
21	1240	G f< 1	M f< 1	C1	%/10
22	1250	G f> 2	M f> 2	C1	%/10
23	1260	G f> 3	M f> 3	C1	%/10
24	1270	BB U> 1	A/B	%/10	1/10s
25	1280	BB U> 2	A/B	%/10	1/10s
26	1290	BB U> 3	A/B	%/10	1/10s
27	1300	BB U< 1	A/B	%/10	1/10s
28	1310	BB U< 2	A/B	%/10	1/10s
29	1320	BB U< 3	A/B	%/10	1/10s
30	1330	BB U< 4	A/B	%/10	1/10s
31	1340	BB voltage trip	0: Phase-phase, 1: Phase-neutral		
32	1350	BB f> 1	A/B	%/10	1/10s
33	1360	BB f> 2	A/B	%/10	1/100s
34	1370	BB f> 3	A/B	%/10	1/100s
35	1380	BB f< 1	A/B	%/10	1/100s
36	1390	BB f< 2	A/B	%/10	1/100s
37	1400	BB f< 3	A/B	%/10	1/100s
38	1410	BB f< 4	A/B	%/10	1/100s
39	1421	df/dt (ROCOF)	A1+A2	Hz/10/s	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
40	1422	df/dt (ROCOF), delay	A1+A2	Periods	n
41	1430	Vector jump	A1+A3	Deg./10	n
42	1440	BB Pos. seq. volt low	A4	%/10	Periods
43	1450	G P> 1	C1	%/10	1/10s
44	1460	G P> 2	C1	%/10	1/10s
45	1470	G P> 3	C1	%/10	1/10s
46	1480	G P> 4	C1	%/10	1/10s
47	1490	G P> 5	C1	%/10	1/10s
48	1500	Unbalance current	C1	%/10	1/10s
49	1510	Unbalance voltage	C1	%/10	1/10s
50	1520	G -Q>	C1	%/10	1/10s
51	1530	G Q>	C1	%/10	1/10s
52	1540	G neg. seq. I	C2	%/10	1/10s
53	1550	G neg. seq. U	C2	%/10	1/10s
54	1560	Negative seq select	0: G measurement 1: BB measurement		
55	1570	G zero seq. I	C2	%/10	1/10s
56	1580	G zero seq. U	C2	%/10	1/10s
57	1590	Zero seq. selection	0: G measurement 1: BB measurement		
58		Reserved			
59		Reserved			
60		Reserved			
61		Reserved			
62		Reserved			
63	2000	Sync. type	0: Dynamic, 1: Static		
64		Reserved			
65	2021	Sync. df max.		Hz/10	n
66	2022	Sync. df min.		Hz/10	n
67	2023	Sync. dU max.		%	n
68	2024	Sync. t GB/TB		ms	n
69	2025	Sync. t MB		ms	n
70	2031	Static sync. df max.		Hz/10	n
71	2032	Static sync. dU max.		%	n
72	2033	Static sync. close window		Deg.	n
73	2034	Static sync. close delay		n	1/10s
74	2041	Dynamic f sync. ctrl, Kp	Analogue	1/100	n
75	2042	Dynamic f sync. ctrl, TI	Analogue	1/100s	n
76	2043	Dynamic f sync. ctrl, Td	Analogue	1/100s	n
77	2051	Dynamic f sync. ctrl, Kp	Relays	1/100	n
78	2061	Static sync. phase ctrl, Kp	Analogue	1/100	n
79	2062	Static sync. phase ctrl, TI	Analogue	1/100s	n
80	2063	Static sync. phase ctrl, Td	Analogue	1/100s	n
81	2071	Static sync. phase ctrl, Kp	Relays	1/100	n
82		Reserved			

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
83		Reserved			
84		Reserved			
85		Reserved			
86		Reserved			
87		Reserved			
88		Reserved			
89		Reserved			
90		Reserved			
91		Reserved			
92		Reserved			
93		Reserved			
94	2111	Sync. blackout, dfMax		Hz/10	n
95	2112	Sync. blackout, dUMax		%	n
96	2113	Reserved			
97	2120	Sync. window		%/10	1/10s
98	2130	Sync. failure, GB/TB		n	1/10s
99	2140	Sync. failure, MB		n	1/10s
100	2150	Phase seq. error		n	1/10s
101	2160	GB open failure		n	1/10s
102	2170	GB close failure		n	1/10s
103	2180	GB position failure		n	1/10s
104	2160	TB open failure		n	1/10s
105	2170	TB close failure		n	1/10s
106	2180	TB position failure		n	1/10s
107	2200	MB open failure		n	1/10s
108	2210	MB close failure		n	1/10s
109	2220	MB position failure		n	1/10s
110	2240	Separate sync.		n	1/10s
111	2251	Close before exc.		RPM	n
112	2252	Close before exc., delay		n	1/10s
113	2253	Close before exc., relay		n	n
114	2261	Close before exc., breaker seq.	0: GB 1: GB+TB		
115	2262	Close before exc., reg.		n	1/10s
116	2263	Close before exc., rpm OK		RPM	n
117	2270	Close before exc., failure		n	1/10s
118		Reserved			
119		Reserved			
120		Reserved			
121		Reserved			
122	2511	Freq. control Kp	Analogue	1/100	n
123	2512	Freq. control Ti	Analogue	1/100s	n
124	2513	Freq. control Td	Analogue	1/100s	n
125		Reserved			

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
126	2531	P control, Kp	Analogue	1/100	n
127	2532	P control, Ti	Analogue	1/100s	n
128	2533	P control, Td	Analogue	1/100s	n
129	2541	P load share, f Kp	Analogue	1/100	n
130	2542	P load share, f Ti	Analogue	1/100s	n
131	2543	P load share, f Td	Analogue	1/100s	n
132	2544	P load share, P weight	Analogue	%/10	n
133	2550	Analogue GOV offset		%	n
134	2560	GOV reg. fail		%/10	1/10s
135	2571	f control, DB	Relays	%/10	n
136	2572	f control, Kp	Relays	n	n
137	2581	P control, DB	Relays	%/10	n
138	2582	P control, Kp	Relays	n	n
139	2591	P load share ctrl, f DB	Relays	%/10	n
140	2592	P load share ctrl, f Kp	Relays	n	n
141	2593	P load share ctrl, P DB	Relays	%/10	n
142	2594	P load share ctrl, P weight	Relays	%/10	n
143	2601	GOV Min ON time		ms	n
144	2602	GOV Period time		ms	n
145		Reserved			
146	2611	Power ramp up, speed		%/10/s	n
147	2612	Power ramp up, delay point		%	1/10s
148	2621	Power ramp down, speed		%/10/s	n
149	2622	Power ramp down, open point		%	n
150	2630	Deload error		n	n
151	2641	U control, Kp	Analogue	1/100	n
152	2642	U control, Ti	Analogue	1/100s	n
153	2643	U control, Td	Analogue	1/100s	n
154	2651	Q control, Kp	Analogue	1/100	n
155	2652	Q control, Ti	Analogue	1/100s	n
156	2653	Q control, Td	Analogue	1/100s	n
157	2661	Q load share ctrl, U Kp	Analogue	1/100	n
158	2662	Q load share ctrl, U Ti	Analogue	1/100s	n
159	2663	Q load share ctrl, U Td	Analogue	1/100s	n
160	2664	Q load share ctrl, Q weight	Analogue	%/10	n
161	2670	Analogue AVR offset		%	n
162	2680	AVR reg. fail		%/10	1/10s
163	2691	U control, DB	Relays	%/10	n
164	2692	U control, Kp	Relays	n	n
165	2701	Q control, DB	Relays	%/10	n
166	2702	Q control, Kp	Relays	n	n
167	2711	Q load share ctrl, U DB	Relays	%/10	n
168	2712	Q load share ctrl, U Kp	Relays	n	n
169	2713	Q load share ctrl, Q DB	Relays	%/10	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
170	2714	Q load share ctrl, Q weight	Relays	%/10	n
171	2721	AVR Min ON time		ms	n
172	2722	AVR Period time		ms	n
173		Reserved			
174		Reserved			
175		Reserved			
176		Reserved			
177		Reserved			
178	2740	Delay regulation		n	s
179		Reserved			
180	2760	Overlap	0: OFF 1: ON		1/100s
181	2771	SCANIA control, droop		%/10	n
182	2772	SCANIA control, speed	0: User, 1: 1500RPM, 2: 1800RPM, 3: Low idle		
183	2781	Output GOV	0: Relay, 1: Analogue, 2: EIC		
184	2782	Output AVR	0: Relay, 1: Analogue		
185	3000	Dig. input 23		n	1/10s
186	3010	Dig. input 24		n	1/10s
187	3020	Dig. input 25		n	1/10s
188	3030	Dig. input 26		n	1/10s
189	3040	Dig. input 27		n	1/10s
190	3060	Dig. input 29		n	1/10s
191		Reserved			
192		Reserved			
193		Reserved			
194		Reserved			
195		Reserved			
196		Reserved			
197	3130	Dig. input 43	M12	n	1/10s
198	3140	Dig. input 44	M12	n	1/10s
199	3150	Dig. input 45	M12	n	1/10s
200	3160	Dig. input 46	M12	n	1/10s
201	3170	Dig. input 47	M12	n	1/10s
202	3180	Dig. input 48	M12	n	1/10s
203	3190	Dig. input 49	M12	n	1/10s
204	3200	Dig. input 50	M12	n	1/10s
205	3210	Dig. input 51	M12	n	1/10s
206	3220	Dig. input 52	M12	n	1/10s
207	3230	Dig. input 53	M12	n	1/10s
208	3240	Dig. input 54	M12	n	1/10s
209	3250	Dig. input 55	M12	n	1/10s
210		Reserved			
211		Reserved			
212		Reserved			

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
213		Reserved			
214		Reserved			
215		Reserved			
216		Reserved			
217	3330	Dig. input 91	M13.6	n	1/10s
218	3340	Dig. input 92	M13.6	n	1/10s
219	3350	Dig. input 93	M13.6	n	1/10s
220	3360	Dig. input 94	M13.6	n	1/10s
221	3370	Dig. input 95	M13.6	n	1/10s
222	3380	Dig. input 96	M13.6	n	1/10s
223	3390	Dig. input 97	M13.6	n	1/10s
224	3400	Dig. multi input 102		n	1/10s
225	3410	Dig. multi input 105		n	1/10s
226	3420	Dig. multi input 108		n	1/10s
227		Wire failure, dig. multi input 102		n	n
228		Wire failure, dig. multi input 105		n	n
229		Wire failure, dig. multi input 108		n	n
230	3430	Dig. input 112		n	1/10s
231	3440	Dig. input 113		n	1/10s
232	3450	Dig. input 114		n	1/10s
233	3460	Dig. input 115		n	1/10s
234	3470	Dig. input 116		n	1/10s
235	3480	Dig. input 117		n	1/10s
236	3490	Emergency stop		n	1/10s
237	3500	Dig. input 127	M13.8	n	1/10s
238	3510	Dig. input 128	M13.8	n	1/10s
239	3520	Dig. input 129	M13.8	n	1/10s
240	3530	Dig. input 130	M13.8	n	1/10s
241	3540	Dig. input 131	M13.8	n	1/10s
242	3550	Dig. input 132	M13.8	n	1/10s
243	3560	Dig. input 133	M13.8	n	1/10s
244		Reserved			
245		Reserved			
246		Reserved			
247		Reserved			
248		Reserved			
249		Reserved			
250		Reserved			
251		Reserved			
252		Reserved			
253		Reserved			
254		Reserved			

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
255		Reserved			
256	4000	4-20mA no. 91.1	M15	mA	1/10s
257	4010	4-20mA no. 91.2	M15	mA	1/10s
258	4030	4-20mA no. 93.1	M15	mA	1/10s
259	4040	4-20mA no. 93.2	M15	mA	1/10s
260	4060	4-20mA no. 95.1	M15	mA	1/10s
261	4070	4-20mA no. 95.2	M15	mA	1/10s
262	4090	4-20mA no. 97.1	M15	mA	1/10s
263	4100	4-20mA no. 97.2	M15	mA	1/10s
264	4020	Wire failure, ana 91	M15	n	n
265	4050	Wire failure, ana 93	M15	n	n
266	4080	Wire failure, ana 95	M15	n	n
267	4110	Wire failure, ana 97	M15	n	n
268	4120	4-20mA no.102.1		mA	1/10s
269	4140	0-40V DC no. 102.1		V/10	1/10s
270	4160	PT100/PT1000 input 102.1		Deg.	1/10s
271	4180	VDO Oil 102.1		Press.	1/10s
272	4200	VDO Water temp. 102.1		Deg.	1/10s
273	4220	VDO Fuel level 102.1		%	1/10s
274	4130	4-20mA no.102.2		mA	1/10s
275	4150	0-40V DC no. 102.2		V/10	1/10s
276	4170	PT100/PT1000 input 102.2		Deg.	1/10s
277	4190	VDO Oil 102.2		Press.	1/10s
278	4210	VDO Water temp. 102.2		Deg.	1/10s
279	4230	VDO Fuel level 102.2		%	1/10s
280	4250	4-20mA no. 105.1		mA	1/10s
281	4270	0-40V DC no. 105.1		V/10	1/10s
282	4290	PT100/PT1000 Input 105.1		Deg.	1/10s
283	4310	VDO Oil 105.1		Press.	1/10s
284	4330	VDO Water temp. 105.1		Deg.	1/10s
285	4350	VDO Fuel level 105.1		%	1/10s
286	4260	4-20mA no. 105.2		mA	1/10s
287	4280	0-40V DC no. 105.2		V/10	1/10s
288	4300	PT100/PT1000 input 105.2		Deg.	1/10s
289	4320	VDO Oil 105.2		Press.	1/10s
290	4340	VDO Water temp. 105.2		Deg.	1/10s
291	4360	VDO Fuel level 105.2		%	1/10s
292	4380	4-20mA no. 108.1		mA	1/10s
293	4400	0-40V DC no. 108.1		V/10	1/10s
294	4420	PT100/PT1000 input 108.1		Deg.	1/10s
295	4440	VDO Oil 108.1		Press.	1/10s
296	4460	VDO Water temp. 108.1		Deg.	1/10s
297	4480	VDO Fuel level 108.1		%	1/10s
298	4390	4-20mA no. 108.2		mA	1/10s

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
299	4410	0-40V DC no. 108.2		V/10	1/10s
300	4430	PT100/PT1000 input 108.2		Deg.	1/10s
301	4450	VDO Oil 108.2		Press.	1/10s
302	4470	VDO Water temp. 108.2		Deg.	1/10s
303	4490	VDO Fuel level 108.2		%	1/10s
304	4240	Wire failure 102		n	n
305	4370	Wire failure, 105		n	n
306	4500	Wire failure, 108		n	n
307	4510	Overspeed 1		%/10	1/10s
308	4520	Overspeed 2		%/10	1/10s
309	4530	Crank failure		RPM	1/10s
310	4540	Run feedb. fail		n	1/10s
311	4550	MPU wire fail		n	n
312	4550	Hz/V failure		n	1/10s
313	4570	Start failure		n	n
314	4580	Stop failure		n	1/10s
315	4960	U< aux. supply term. 1		V/10	1/10s
316	4970	U> aux. supply term. 1		V/10	1/10s
317	4980	U< aux. supply term. 98		V/10	1/10s
318	4990	U> aux. supply term. 98		V/10	1/10s
319	5000	Relay 05		0: Alarm 1: Limit 2: Horn	1/10s
320	5010	Relay 08			1/10s
321	5020	Relay 11			1/10s
322	5030	Relay 14			1/10s
323	5040	Relay 17			1/10s
324	5050	Relay 20			1/10s
325	5060	Relay 21			1/10s
326		Reserved			
327		Reserved			
328		Reserved			
329		Reserved			
330	5110	Relay 57	M12	0: Alarm 1: Limit 2: Horn	1/10s
331	5120	Relay 59	M12		1/10s
332	5130	Relay 61	M12		1/10s
333	5140	Relay 63	M12		1/10s
334	5150	Relay 65			1/10s
335	5160	Relay 67			1/10s
336	5170	Relay 69			1/10s
337	5180	Relay 71		0: Alarm 1: Limit 2: Horn	1/10s
338	5190	Relay 90	M14.6		1/10s
339	5200	Relay 92	M14.6		1/10s
340	5210	Relay 94	M14.6		1/10s
341	5220	Relay 96	M14.6		1/10s
342	5230	Relay 126	M14.8		1/10s

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
343	5240	Relay 128	M14.8		1/10s
344	5250	Relay 130	M14.8		1/10s
345	5260	Relay 132	M14.8		1/10s
346	5271	Transducer output 20	0: kWh pulse, 1: Relay		n
347	5272	Transducer output 21	0: kVArh pulse, 1: Relay		n
348	5781	AOut 66, min	E1/E2/EF2/EF4	mA	n
349	5782	AOut 66, max		mA	n
350	5791	AOut 70, min	E1/E2/EF2	mA	n
351	5792	AOut 70, max	E1/E2/EF2	mA	n
352	5801	AOut 91, min	F1	mA	n
353	5802	AOut 91, max	F1	mA	n
354	5811	AOut 95, min	F1	mA	n
355	5812	AOut 95, max	F1	mA	n
356	5823	Transducer, P output 1	E1/E2/F1/EF2/EF4	0: 0-20mA 4: 4-20mA	n
357	5833	Transducer, P output 2			n
358	5843	Transducer, P output 3			n
359	5853	Transducer, S output			n
360	5863	Transducer, Q output			n
361	5873	Transducer, PF output			n
362	5883	Transducer, f output			n
363	5893	Transducer, U output			n
364	5903	Transducer, I output			n
365	5913	Transducer, U BB output			n
366	5923	Transducer, f BB output			n
367	5933	Transducer, output (MI102)			n
368	5943	Transducer, output (MI105)			n
369	5953	Transducer, output (MI108)			n
370	5963	Transducer, P total consumed			n
371	5973	Transducer, P total available			n
372	5981	Governor output	0: Disabled, 1: AO66, 2: AO71, 3: AO91, 4: AO95		n
373	5991	AVR output			n
374	5825	Transducer, P output 1, min.	E1/E2/F1/EF2/EF4	kW	n
375	5835	Transducer, P output 2, min.		kW	n
376	5845	Transducer, P output 3, min.		kW	n
377	5855	Transducer, S output, min.		kVA	n
378	5865	Transducer, Q output, min.	E1/E2/F1/EF2/EF4	kVAr	n
379	5875	Transducer, PF output, min.		n	n
380	5885	Transducer, f output, min.		Hz	n
381	5895	Transducer, U output, min.		V	n
382	5905	Transducer, I output, min.		A	n
383	5915	Transducer, U BB output, min.		V	n
384	5925	Transducer, f BB output, min.		Hz	n
385	5935	Transducer, min. (MI102)		n	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
386	5945	Transducer, min. (MI105)		n	n
387	5955	Transducer, min. (MI108)		n	n
388	5965	Transducer, P total consumed, min.		kW	n
389	5975	Transducer, P total avail., min.		kW	n
390		Reserved			
391	5824	Transducer, P output 1, max.	E1/E2/F1/ EF2/EF4	kW	n
392	5834	Transducer, P output 2, max.		kW	n
393	5844	Transducer, P output 3, max.		kW	n
394	5854	Transducer, S output, max.		kVA	n
395	5864	Transducer, Q output, max.		kVAr	n
396	5874	Transducer, PF output, max.		n	n
397	5884	Transducer, f output, max.		Hz	n
398	5894	Transducer, U output, max.		V	n
399	5904	Transducer, I output, max.		A	n
400	5914	Transducer, U BB output, max.		V	n
401	5924	Transducer, f BB output, max.		Hz	n
402	5934	Transducer, max. (MI102)		n	n
403	5944	Transducer, max. (MI105)		n	n
404	5954	Transducer, max. (MI108)		n	n
405	5964	Transducer, P total consumed, max.		kW	n
406	5974	Transducer, P total avail., max.		kW	n
407	6001	Nom. frequency 1		Hz/10	n
408	6002	Nom. power 1		kW	n
409	6003	Nom. current 1		A	n
410	6004	Nom. voltage 1		V	n
411	6005	Nom. RPM 1		RPM	n
412	6006	Parameter set	0: Nom. set 1, 1: Nom. set 2, 2: Nom. set 3, 3: Nom. set 4		n
413	6011	Nom. frequency 2		Hz/10	n
414	6012	Nom. power 2		kW	n
415	6013	Nom. current 2		A	n
416	6014	Nom. voltage 2		V	n
417	6015	Nom. RPM 2		RPM	n
418	6021	Nom. frequency 3		Hz/10	n
419	6022	Nom. power 3		kW	n
420	6023	Nom. current 3		A	n
421	6024	Nom. voltage 3		V	n
422	6025	Nom. RPM 3		RPM	n
423	6031	Nom. frequency 4		Hz/10	n
424	6032	Nom. power 4		kW	n
425	6033	Nom. current 4		A	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
426	6034	Nom. voltage 4		V	n
427	6035	Nom. RPM 4		RPM	n
428	6041	G transformer, U primary		V	n
429	6042	G transformer, U secondary		V	n
430	6043	G transformer, I primary		A	n
431	6044	G transformer, I secondary		A	n
432	6051	BB transformer, U primary		V	n
433	6052	BB transformer, U secondary		V	n
434	6060	Engine type	0: Diesel		n
435	6070	Gen-set mode	0: Island, 1: AMF, 2: Peak shaving, 3: Fixed power, 4: Fixed power, 5: Load take over, 6: Power management		n
436	6080	Language		n	n
437	6103	GB/TB operations		n	n
438	6104	MB operations		n	n
439	6101	Running hours offset, 1hr		hrs	n
440	6102	Running hours offset, 1000hrs		1000hrs	n
441	6105	Reset kWh counter		n	n
442	6106	Start attempt counter		n	n
443	6112	Service timer 1, hours		Hrs	n
444	6113	Service timer 1, days		Days	n
445	6116	Service timer 1, reset		n	n
446	6122	Service timer 2, hours		Hrs	n
447	6123	Service timer 2, days		Days	n
448	6126	Service timer 2, reset		n	n
449	6130	Alarm horn		n	1/10s
450		Reserved			
451		Reserved			
452	6160	Run status		n	1/10s
453	6171	No. of teeth (flywheel)		n	n
454	6172	Running type	0: Digital, 1: MPU, 2: Frequency, 3: EIC		n
455	6173	Running detection		RPM	n
456	6174	Remove starter		RPM	n
457		Reserved			
458	6181	Start prepare		n	1/10s
459	6182	Start prepare, extended		n	1/10s
460	6183	Start ON time (crank)		n	1/10s
461	6184	Start OFF time (pause)		n	1/10s
462	6191	Start attempts		n	n
463		Reserved			
464		Reserved			
465		Reserved			
466	6211	Cooling down		n	1/10s

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
467	6212	Extended stop time		n	1/10s
468	6220	Hz/V OK		n	1/10s
469	6231	GB close delay		n	1/10s
470		Reserved			
471		Reserved			
472		Reserved			
473		Reserved			
474	6261	Power derate, input type	0: MI102, 1: MI105, 2: MI108, 3: EIC, 4: M-logic		n
475	6262	Derate start point		n	n
476	6263	Derate slope		%/10	n
477	6266	Derate limit		%/10	n
478	6270	Stop coil, wire failure		n	n
479	6280	Internal comm. failure		n	n
480	6291	Start idle run		n	Min/10
481	6292	Enable start idle		n	n
482	6293	Stop idle run		n	Min/10
483	6294	Enable stop idle		n	n
484	6296	Enable idle run		n	n
485		Reserved			
486		Reserved			
487		Reserved			
488		Reserved			
489	6380	Load share out		V/10	n
490	6390	Load share type	0: Adjustable, 1: Selco T4800		n
491	6321	Engine heater, set		Deg.	n
492	6322	Engine heater		n	n
493	6323	Engine heater, input type	0: MI102, 1: MI105, 2: MI108, 3: EIC		n
494	6324	Engine heater, hysteresis		Deg.	n
495	6330	Engine heater 1, alarm		Deg.	1/10s
496	6401	Master clock, Start hour		n	n
497	6402	Master clock, Stop hour		n	n
498	6403	Master clock, Difference		s	n
499	6404	Master clock, Compensation		Hz/10	n
500	6411	Battery test		V/10	n
501	6412	Battery test, delay		n	1/10s
502	6413	Battery test, input	0: Supply term. 1, 1: MI102, 2: MI105, 3: MI108		n
503	6422	Auto battery test, day	0: Mon, 1: Tue, 2: Wed, 3: Thu, 4: Fri, 5: Sat, 6: Sun		n
504	6423	Auto battery test, hours		n	n
505	6424	Auto battery test, weeks		n	n
506	6425	Auto battery test, relay		n	n
507	6431	Battery asymmetry 1, type	0: Supply term. 1, 1: MI102,		n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
508	6432	Battery asymmetry 1, ref	2: MI105, 3: MI108		n
509	6433	Battery asymmetry 2, type			n
510	6434	Battery asymmetry 2, ref			n
511	6440	Battery asymmetry 1, alarm		V/10	1/10s
512	6450	Battery asymmetry 2, alarm		V/10	1/10s
513	6461	Max. ventilation, set		Deg.	n
514	6462	Max. ventilation		n	n
515	6463	Max. ventilation, hysteresis		Deg.	n
516	6470	Max. ventilation, alarm 1		Deg.	1/10s
517	6480	Max. ventilation, alarm 2		Deg.	1/10s
518	6490	Summer/winter time		n	n
519	6500	Swbd error, block		n	1/10s
520	6502	Swbd error, block, parallel		n	n
521	6510	Swbd error, stop		n	1/10s
522	6540	Not in auto		n	1/10s
523	6551	Fuel pump, set point 1		%	1/10s
524	6552	Fuel pump, set point 2		%	1/10s
525	6553	Fuel pump, fill check		n	1/10s
526	6555	Fuel pump, input type	0: MI102, 1: MI105, 2: MI108		1/10s
527	7001	Mains power set point day		kW	n
528	7002	Mains power set point night		kW	n
529	7003	Mains power transducer max.		kW	n
530	7004	Mains power transducer min.		kW	n
531	7011	Daytime period start hour		n	n
532	7012	Daytime period start min.		n	n
533	7013	Daytime period stop hour		n	n
534	7014	Daytime period stop min.		n	n
535	7020	Start generator		%	1/10s
536	7023	Min. load		%	n
537	7030	Stop generator		%	1/10s
538	7040	Test		%	min/10
539	7043	Mode return after test	0: Semi, 1: Auto		n
540	7044	Test type	0: Simple, 1: Load, 2: Full		n
541	7051	Fixed power set point		%	n
542	7052	PF set point		1/100	n
543	7061	Mains fail. delay U		n	1/10s
544	7062	Mains OK delay U		n	1/10s
545	7063	Low voltage		%	n
546	7064	High voltage		%	n
547	7065	Mains fail ctrl	0: Start eng. + open MB 1: Start eng.		n
548	7071	Mains fail. delay freq		n	1/10s
549	7072	Mains OK delay freq		n	1/10s
550	7073	Low frequency		%	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
551	7074	High frequency		%	n
552	7081	Mode shift	0: Off, 1: On		n
553	7082	MB close delay		n	1/10s
554	7083	Back sync		n	n
555	7084	Sync to mains		n	n
556	7085	Breaker type	0: MB, 1: No breaker, 2: ATS		n
557	7501	P control via comm.		n	n
558	7502	Freq. control via comm.		n	n
559	7503	U control via comm.		n	n
560	7504	PF control via comm.		n	n
561	7505	VAr control via comm.		n	n
562	7511	Ext. comm. ID		n	n
563	7512	Baud rate 0=9600, 1=19200		n	n
564	7513	Comm. mode (ASCII, RTU)	0: RTU, 1: ASCII		n
565	7520	Ext. comm. error		n	1/10s
566	7531	Internal comm. ID		n	n
567	7532	CAN fail. mode	0: Manuel, 1: Semi, 2: No change		n
568	7533	Missing all units		n	n
569	7534	Fatal CAN error		n	n
570	7535	Any DG missing		n	n
571	7536	Any mains missing		n	n
572	7540	CAN interface 1	0: Off, 1: Power management, 2: EIC		n
573	7550	CAN interface 2	0: Off, 1: Power management		n
574		Reserved			
575	7560	EIC, J1939/MTU	0: Off, 1: DDEC, 2: EMR, 3: JDEC, 4: Iveco, 5: Perkins, 6: Caterpillar, 7: Volvo, 8: Volvo EMS2, 9: Scania, 10: Scania EMS2		n
576	7560	EIC, Cummins	0: Off, 1: QSK15, 2: QSK45/QSK60		n
577	7570	EI comm. error		n	1/10s
578	7580	EIC warning		n	1/10s
579	7590	EIC shutdown		n	1/10s
580	7600	EIC overspeed		RPM	1/10s
581	7610	EIC cooling w. temp. 1		Deg.	1/10s
582	7620	EIC cooling w. temp. 2		Deg.	1/10s
583	7630	EIC oil pressure 1		Press./10	1/10s
584	7640	EIC oil pressure 2		Press./10	1/10s
585		Reserved			
586		Reserved			
587		Reserved			
588		Reserved			

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
589		Reserved			
590		Reserved			
591		Reserved			
592		Reserved			
593		Reserved			
594		Reserved			
595		Reserved			
596		Reserved			
597		Reserved			
598		Reserved			
599		Reserved			
600		Reserved			
601		Reserved			
602		Reserved			
603		Reserved			
604		Reserved			
605		Reserved			
606	7991	Event printer, enable		n	n
607	7992	Event printer, additional data		n	n
608	7993	Event printer, print events		n	n
609	7994	Event printer, LOG type	0: Event, 1: Alarm, 2: Battery		n
610	7995	Event printer, auto stat. print	0 min. = Off	min.	n
611	8000	Load dep. start		kW	1/10s
612	8003	Minimum load		kW	n
613	8010	Load dep. stop		kW	1/10s
614	8021	DGs available		n	n
615	8022	Mains available	0: No, 1: Single, 2: Multiple		n
616	8023	Activate power management		n	n
617	8025	Command unit		n	n
618	8024	Plant start/stop type	0: Remote, 1: Local, 2: Timer		n
619	8031	Priority select	0: Manuel, 1: Running hours, 2: Fuel optimisation		n
620	8032	No. multi start		n	n
621	8033	Min. no. running		n	n
622	8034	Enable multi start		n	n
623	8071	Enable IM0		n	n
624	8041	Enable ID1		n	n
625	8042	Enable ID2		n	n
626	8043	Enable ID3		n	n
627	8044	Enable ID4		n	n
628	8045	Enable ID5		n	n
629	8046	Enable ID6		n	n
630	8051	Enable ID7		n	n
631	8052	Enable ID8		n	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
632	8053/8072	Enable ID9/IM9		n	n
633	8054/8073	Enable ID10/IM10		n	n
634	8055/8074	Enable ID11/IM11		n	n
635	8056/8075	Enable ID12/IM12		n	n
636	8061	Enable ID13		n	n
637	8062	Enable ID14		n	n
638	8063	Enable ID15		n	n
639	8064	Enable ID16		n	n
640	8081	Priority 1		n	n
641	8082	Priority 2		n	n
642	8083	Priority 3		n	n
643	8084	Priority 4		n	n
644	8085	Priority 5		n	n
645	8091	Priority 6		n	n
646	8092	Priority 7		n	n
647	8093	Priority 8		n	n
648	8094	Priority 9		n	n
649	8095	Priority 10		n	n
650	8096	Priority 11		n	n
651	8101	Priority 12		n	n
652	8102	Priority 13		n	n
653	8103	Priority 14		n	n
654	8104	Priority 15		n	n
655	8105	Priority 16		n	n
656	8086	Transmit		n	n
657	8111	Priority update, hours		n	n
658	8112	Run hours, type	0: Absolute, 1: Relative		n
659	8113	Reset relative counter		n	n
660	8120	Ground relay		n	n
661	8140	Stop noncon. DG		n	1/10s
662	8171	Fuel optimisation, set point		%	n
663	8172	Fuel optimisation, swap		kW	n
664	8173	Fuel optimisation, swap delay		n	1/10s
665	8174	Fuel optimisation, quarantine		n	n
666	8193	Power capacity		kW	n
667	8194	Power cap. overrule, delay		n	1/10s
668	8195	Power cap. overrule, enable		n	n
669	8191	Tie breaker enable		n	n
670	8192	Tie breaker open point		kW	n
671	8181	MB failure, start		n	n
672	8182	MB parallel		n	n
673	8183	MB no break transfer		n	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
674	8184	MB auto switch		n	n
675	8185	Mains command unit		n	n
676		Reserved			
677		Reserved			
678		Reserved			
679		Reserved			
680		Reserved			
681		Reserved			
682		Reserved			
683		Reserved			
684		Reserved			
685		Reserved			
686	8220	Available power 1		kW	1/10s
687	8230	Available power 2		kW	1/10s
688	8240	Available power 3		kW	1/10s
689	8250	Available power 4		kW	1/10s
690	8260	Available power 5		kW	1/10s
691		Reserved			
692		Reserved			
693		Reserved			
694	9100	Application		n	n
695	9116	Customer password		n	n
696	9117	Service password		n	n
697	9118	Master password		n	n
698	9140	Phase compensation		Deg./10	1/10s
699		Reserved			
700		Cmd timer function 1		n	n
701		Cmd timer day 1		n	n
702		Cmd timer hour 1		n	n
703		Cmd timer minute 1		n	n
704		Cmd timer function 2		n	n
705		Cmd timer day 2		n	n
706		Cmd timer hour 2		n	n
707		Cmd timer minute 2		n	n
708		Cmd timer function 3		n	n
709		Cmd timer day 3		n	n
710		Cmd timer hour 3		n	n
711		Cmd timer minute 3		n	n
712		Cmd timer function 4		n	n
713		Cmd timer day 4		n	n
714		Cmd timer hour 4		n	n
715		Cmd timer minute 4		n	n
716		Cmd timer function 5		n	n
717		Cmd timer day 5		n	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
718		Cmd timer hour 5		n	n
719		Cmd timer minute 5		n	n
720		Cmd timer function 6		n	n
721		Cmd timer day 6		n	n
722		Cmd timer hour 6		n	n
723		Cmd timer minute 6		n	n
724		Cmd timer function 7		n	n
725		Cmd timer day 7		n	n
726		Cmd timer hour 7		n	n
727		Cmd timer minute 7		n	n
728		Cmd timer function 8		n	n
729		Cmd timer day 8		n	n
730		Cmd timer hour 8		n	n
731		Cmd timer minute 8		n	n
732		Pin code GSM		n	n
733		SMS phone no. 1 GSM		n	n
734		SMS phone no. 2 GSM		n	n
735		SMS phone no. 3 GSM		n	n
736		SMS phone no. 4 GSM		n	n
737		SMS phone no. 5 GSM		n	n
738		Reserved			
739		Password language page	0: No, 1: Custom, 2: Service, 3: Master		n
740		Password log page			n
741		Password control page			n
742		Reserved			
743		Reserved			
744		Reserved			
745		Reserved			
746		VDO 102 type	0: Type 1, 1: Type 2, 2: Type 3: Config.		n
747		VDO 102 value 1		Ohm/10	n
748		VDO 102 value 2		Ohm/10	n
749		VDO 102 value 3		Ohm/10	n
750		VDO 102 value 4		Ohm/10	n
751		VDO 102 value 5		Ohm/10	n
752		VDO 102 value 6		Ohm/10	n
753		VDO 102 value 7		Ohm/10	n
754		VDO 102 value 8		Ohm/10	n
755		VDO 102 output 1		1/10	n
756		VDO 102 output 2		1/10	n
757		VDO 102 output 3		1/10	n
758		VDO 102 output 4		1/10	n
759		VDO 102 output 5		1/10	n
760		VDO 102 output 6		1/10	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
761		VDO 102 output 7		1/10	n
762		VDO 102 output 8		1/10	n
763		VDO 105 Type	0: Type 1, 1: Type 2, 2: Type 3: Config.		n
764		VDO 105 value 1		Ohm/10	n
765		VDO 105 value 2		Ohm/10	n
766		VDO 105 value 3		Ohm/10	n
767		VDO 105 value 4		Ohm/10	n
768		VDO 105 value 5		Ohm/10	n
769		VDO 105 value 6		Ohm/10	n
770		VDO 105 value 7		Ohm/10	n
771		VDO 105 value 8		Ohm/10	n
772		VDO 105 output 1		1/10	n
773		VDO 105 output 2		1/10	n
774		VDO 105 output 3		1/10	n
775		VDO 105 output 4		1/10	n
776		VDO 105 output 5		1/10	n
777		VDO 105 output 6		1/10	n
778		VDO 105 output 7		1/10	n
779		VDO 105 output 8		1/10	n
780		VDO 108 type	0: Type 1, 1: Type 2, 2: Type 3: Config.		n
781		VDO 108 value 1		Ohm/10	n
782		VDO 108 value 2		Ohm/10	n
783		VDO 108 value 3		Ohm/10	n
784		VDO 108 value 4		Ohm/10	n
785		VDO 108 value 5		Ohm/10	n
786		VDO 108 value 6		Ohm/10	n
787		VDO 108 value 7		Ohm/10	n
788		VDO 108 value 8		Ohm/10	n
789		VDO 108 output 1		1/10	n
790		VDO 108 output 2		1/10	n
791		VDO 108 output 3		1/10	n
792		VDO 108 output 4		1/10	n
793		VDO 108 output 5		1/10	n
794		VDO 108 output 6		1/10	n
795		VDO 108 output 7		1/10	n
796		VDO 108 output 8		1/10	n
797		Engineering units	0: Bar/Celsius, 1: Psi/Fahrenheit		n
798		Multi input 102, config.	0: mA, 1: VDC, 2: PT100, 3: PT1000, 4: VDO Oil, 5: VDO Water, 6: VDO Fuel, 7: Digital		n
799		Multi input 105, config.			n
800		Multi input 108, config.			n
801		Relay 0		n	n
802		Language download error		n	n

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
803		Relay alarm, ch. error		n	n
804		Function relay alarm		n	n
805		1 st priority alarm		n	n
806		Ext. MB trip		n	n
807		Can ID invalid		n	n
808		Duplicate CAN ID		n	n
809		CAN PM transmission failure		n	n
810		CAN ID 0 missing		n	n
811		CAN ID 1 missing		n	n
812		CAN ID 2 missing		n	n
813		CAN ID 3 missing		n	n
814		CAN ID 4 missing		n	n
815		CAN ID 5 missing		n	n
816		CAN ID 6 missing		n	n
817		CAN ID 7 missing		n	n
818		CAN ID 8 missing		n	n
819		CAN ID 9 missing		n	n
820		CAN ID 10 missing		n	n
821		CAN ID 11 missing		n	n
822		CAN ID 12 missing		n	n
823		CAN ID 13 missing		n	n
824		CAN ID 14 missing		n	n
825		CAN ID 15 missing		n	n
826		CAN ID 16 missing,2		n	n
827		CAN ID 0 missing,2		n	n
828		CAN ID 1 missing,2		n	n
829		CAN ID 2 missing,2		n	n
830		CAN ID 3 missing,2		n	n
831		CAN ID 4 missing,2		n	n
832		CAN ID 5 missing,2		n	n
833		CAN ID 6 missing,2		n	n
834		CAN ID 7 missing,2		n	n
835		CAN ID 8 missing,2		n	n
836		CAN ID 9 missing,2		n	n
837		CAN ID 10 missing,2		n	n
838		CAN ID 11 missing,2		n	n
839		CAN ID 12 missing,2		n	n
840		CAN ID 13 missing,2		n	n
841		CAN ID 14 missing,2		n	n
842		CAN ID 15 missing,2		n	n
843		CAN ID 16 missing,2		n	n
844		KeyWord 2000, alarm		n	n
845	7086	MB load time		n	1/10s
846	6232	GB/TB load time		n	1/10s

Offset address	Ch. no.	Content	Comment	Value unit	Delay unit
847		Number of new utility		n	n
848		CAN transmit failure		n	n
849		Gen. power too low		n	n
850		Max. parallel		n	1/100s
851		Trip+stop, start		n	1/10s
852		Trip+stop, stop		n	1/10s
853		Ext. U failure, delay		%	1/10s
854		Ext. f failure, delay		%	1/10s
855		CAN engine interface 0		n	n
856		CAN engine interface 1		n	n
857		CAN engine interface 2		n	n
858		CAN engine interface 3		n	n
859		CAN engine interface 4		n	n
860		CAN engine interface 5		n	n
861		CAN engine interface 6		n	n
862		CAN engine interface 7		n	n
863		CAN engine interface 8		n	n
864		CAN engine interface 9		n	n
865		CAN engine interface 10		n	n
866		CAN engine interface 11		n	n
867		CAN engine interface 12		n	n
868		CAN engine interface 13		n	n
869		Calibrate error		n	n
870		Number of VTA		n	n

CAN flags table used for advanced logging triggers

(Read only) (function code 01h)

Start address for reading of CAN flag status

CAN ID to request	Multi-line 2 table	Start address
ID0	CAN flags table	50000
ID1	CAN flags table	50072
ID2	CAN flags table	50144
ID3	CAN flags table	50216
ID4	CAN flags table	50288
ID5	CAN flags table	50360
ID6	CAN flags table	50432
ID7	CAN flags table	50504
ID8	CAN flags table	50576
ID9	CAN flags table	50648
ID10	CAN flags table	50720
ID11	CAN flags table	50792
ID12	CAN flags table	50864
ID13	CAN flags table	50936
ID14	CAN flags table	51008
ID15	CAN flags table	51080
ID16	CAN flags table	51152

Offset	Description
0	GB ON / Back sync. ON (mains unit)
1	GB OFF / First priority MB (mains unit)
2	Ready for Auto start / MB ON (mains unit)
3	Ready for Auto stop / MB OFF (mains unit)
4	Black BB closing / Semi (mains unit)
7	Hz/V OK / Ready for Auto MB ON (mains unit)
17	Local / Timer start activated
18	Local / Timer stop activated
19	Remote start activated
20	Remote stop activated
21	Start / stop type: Remote
22	Start / stop type: Local
23	Start / stop type: Timer
33	Quarantine ON / TB ON (mains unit)
34	Engine running / TB OFF (mains unit)
35	Any alarms / NOT USED (mains unit)
38	Command unit / TB failure (mains unit)
39	Mains available / AMF start of DG(mains unit)
45	Multiple mains ON
52	Ext. communication error
55	Switchboard error / Mains not in Semi (mains unit)
66	Warning
67	Alarm
68	Trip GB / Trip TB (mains unit)
69	Trip + stop / NOT USED (mains unit)
70	Shutdown / NOT USED (mains unit)
71	Trip MB

7. Option N6: Advanced logging

Overall description

A logging function is a values/data recorder function. The 'Advanced Logging' system consists of 3 advanced logging systems:

1. Operational logging
2. Error logging
3. Black box logging

Advanced operational logging

Logs (or records) the state of a selectable group of values by regular interval recording. The time between 2 records (interval time) is selectable. The number of logs recorded will be limited by the number of samples selected. As the number of recorded values is not infinite, when the amount of data recorded has reached the maximum number of samples selected, the next value to be recorded will overwrite the oldest recorded value (first-in/first-out principle).

Advanced error logging

Logs (or records) the state of a selectable group of values (same group of values as selected for the operational log) when an event (selectable group of modbus flags that change state) occurs. The number of logs recorded will be limited by the number of samples selected. As the number of recorded values is not infinite, when the amount of data recorded has reached the maximum number of samples selected, the next value to be recorded will overwrite the oldest recorded value (first-in/first-out principle).

Advanced black box logging

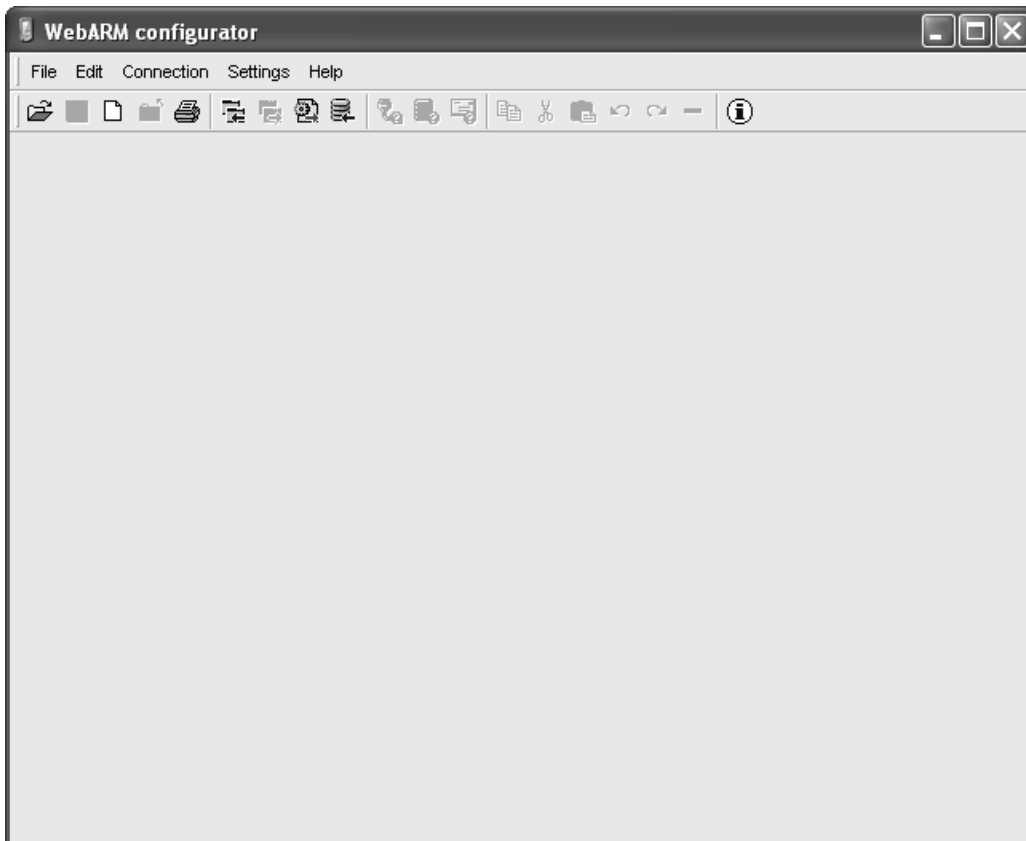
Logs (or records) the state of a selectable group of values before and after an event occurs (selectable group of modbus flags that change state) by regular interval recording. The time between 2 records (interval time) and the record time before and after the event occurrence are selectable. The number of logs recorded will be limited by the number of samples selected. As the number of recorded values is not infinite, when the amount of data recorded has reached the maximum number of samples selected, the next value to be recorded will overwrite the oldest recorded value (first-in/first-out principle).

Advanced logging configuration

The multi-line 2 unit which supports the webARM card must be powered and connected to a PC by means of a TCP/IP connection (see chapter 3).

The WebARM configuration software is a part of the PC Utility software and is started by pressing the WebARM icon: 

Once the webARM configuration software is executed, it looks like this:



Go to the menu 'Connection' and 'Get', or click on the 'Get' Icon () , or press the Ctrl+D keys. You must now inform the configuration software about the webARM parameters.



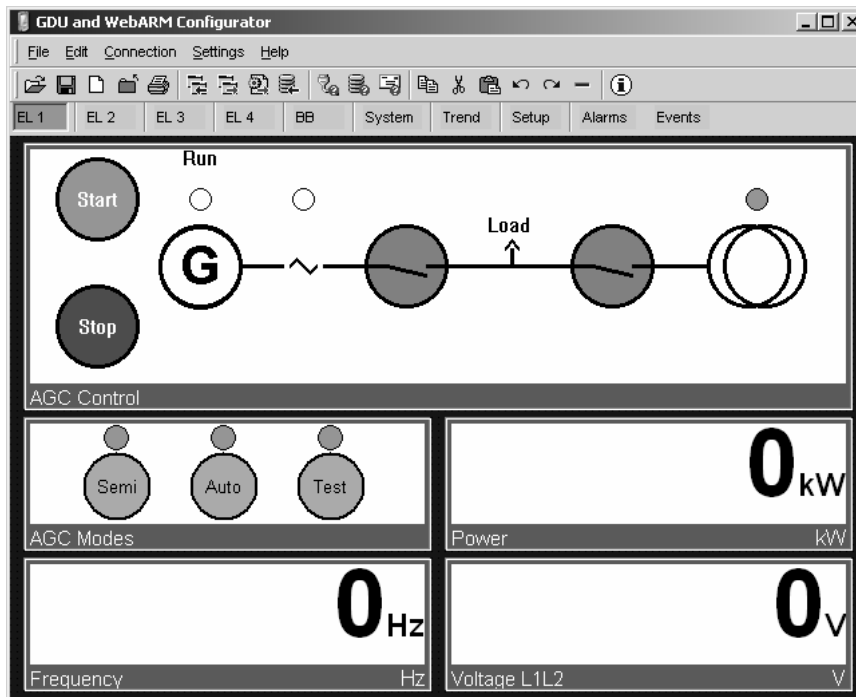
Host name or IP: Type the webARM IP address (the webARM factory address is: 192.168.2.21).

User name: Type the webARM FTP user name (the webARM factory user name is: admin).

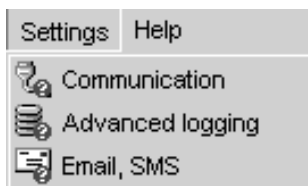
Password: Type the webARM FTP password (the webARM factory password is: admin).

Press the 'OK' button when ready.

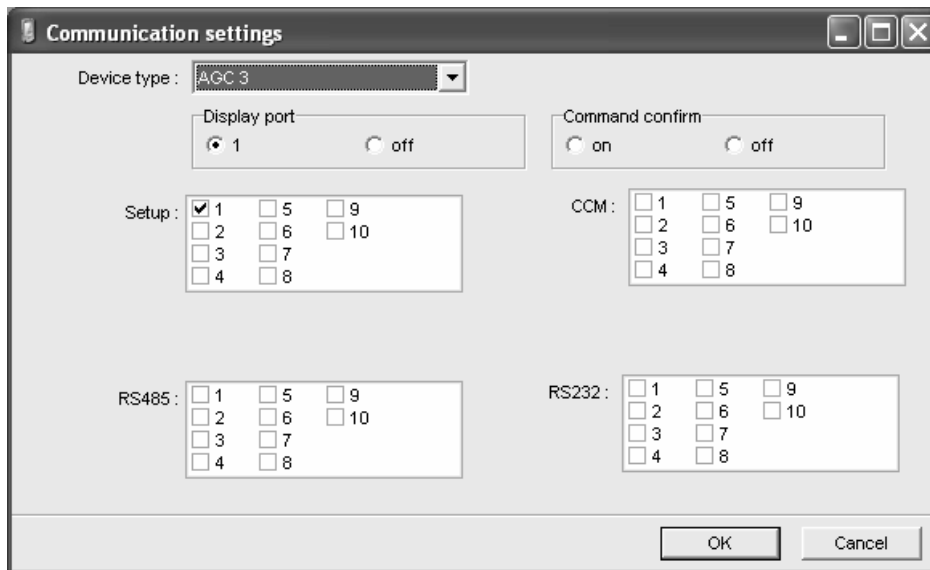
The advanced logging menus of the webARM configuration software are now accessible.



It is now very important to select the right type of device in the communication window. This must be done from the 'Settings' menu and 'Communication'.



Select 'AGC 3' as device type here and press the 'OK' button.



Communication settings

Device type: AGC 3

Display port: ☒ 1 ☐ off

Command confirm: ☐ on ☒ off

Setup:

☒ 1	☐ 5	☐ 9
☐ 2	☐ 6	☐ 10
☐ 3	☐ 7	
☐ 4	☐ 8	

CCM:

☐ 1	☐ 5	☐ 9
☐ 2	☐ 6	☐ 10
☐ 3	☐ 7	
☐ 4	☐ 8	

RS485:

☐ 1	☐ 5	☐ 9
☐ 2	☐ 6	☐ 10
☐ 3	☐ 7	
☐ 4	☐ 8	

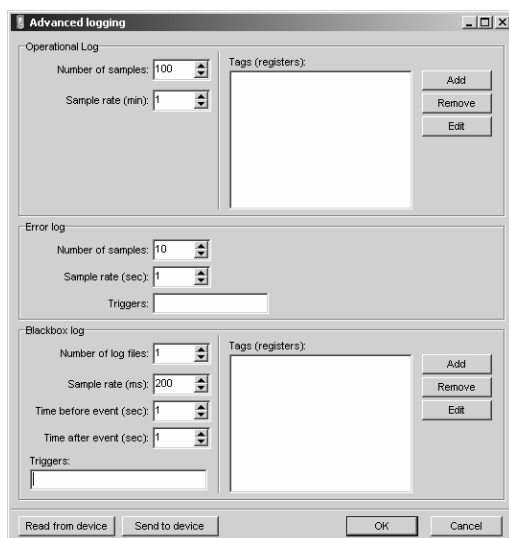
RS232:

☐ 1	☐ 5	☐ 9
☐ 2	☐ 6	☐ 10
☐ 3	☐ 7	
☐ 4	☐ 8	

OK Cancel



By pressing this icon (advanced logging settings), you will get access to the 'Advanced logging' configuration window.



Advanced logging

Operational Log

Number of samples: 100

Sample rate (min): 1

Tags (registers):

Add Remove Edit

Error log

Number of samples: 10

Sample rate (sec): 1

Triggers:

Blackbox log

Number of log files: 1

Sample rate (ms): 200

Time before event (sec): 1

Time after event (sec): 1

Triggers:

Add Remove Edit

Read from device Send to device OK Cancel

The 'Advanced logging' configuration window serves the purpose of configuration of the three advanced logging types (operation, error and black box logging) at once. The parameters of the 3 advanced logging types are then read ('Read from device' button) or saved ('Send to device' button) at once.

Pressing the 'Read from device' button will display the advanced logging parameters already present inside the webARM card.

Pressing the 'Send to device' button will transfer all the advanced logging parameters typed in this actually displayed window to the webARM card.

Advanced operational logging parameters

Number of samples: Min. value: 100, max. value: 4000.

It is the maximum size of the circular buffer where the recorded log items are stored. When this buffer is full, the oldest record is deleted to allow the next item record (first-in/first-out).

Sample rate (min): Min. value: 1, max. value: 30, unit: Minutes.

It is the interval of time between 2 logging items.

Tags (registers): Min. number of tags: 0, max. number of tags: 50.

The 'Add' button is for choosing and adding a log value (or tag).

(if a CAN value is selected, remember also to select the CAN ID number corresponding to the concerned unit).

The 'Remove' button is for removing a previously selected log value (or tag).

The 'Edit' button is for selecting another log value (or tag) than the previously selected one.

Advanced error logging parameters

Number of samples: Min. value: 10, max. value: 100.

It is the maximum size of the circular buffer where the recorded log items are stored. When this buffer is full, the oldest record is deleted to allow the next item record (first-in/first-out).

Sample rate (sec): Not used in this application.

Triggers: Modbus address of the flags value (see the CAN flags status table in the chapter 'Data tables') that will trigger the advanced error logging function. It triggers this function when the flag (or bit) value changes its binary state (from 0 to 1 or from 1 to 0). The list of the values that will be logged here is to be set up in the 'Tags' field of the advanced operational logging function. If several flags are used, they must be separated by comma and/or in intervals (e.g.: 2-5, 9-12, 1000-1020).

Advanced black box logging parameters

Number of log files: Min. value: 1, max. value: 100.

It is the maximum size of the circular buffer where the recorded log items are stored. When this buffer is full, the oldest record is deleted to allow the next item record (first-in/first-out).

Sample rate (ms): Min. value: 200, max. value: 1000 in steps of 100, unit: Milliseconds.

The system logs the values continuously and at a high sample rate. When an event happens, the samples are logged before and after. The sample rate time is the time between two logs.

Time before event (sec): Min. value: 1, max. value: 15, unit: Seconds.

Time after event (sec): Min. value: 1, max. value: 15, unit: Seconds.

Triggers: Modbus address of the flags value (see the CAN flags status table in the chapter 'Data tables') that will trigger the advanced error logging function. It triggers this function when the flag (or bit) value changes its binary state (from 0 to 1 or from 1 to 0). The list of the values that will be logged here is to be set up in the 'Tags' field of the advanced black box logging function. If several flags are used, they must be separated by comma and/or in intervals (e.g.: 2-5, 9-12, 1000-1020).

Tags (registers): Min. number of tags: 1, max. number of tags: 20.

The 'Add' button is for choosing and adding a log value (or tag).

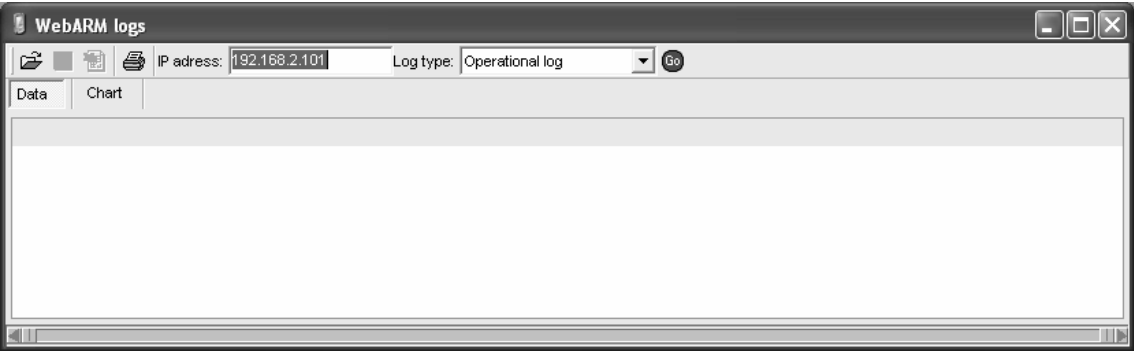
(If a CAN value is selected, remember to also select the CAN ID number corresponding to the concerned unit).

The 'Remove' button is for removing a previously selected log value (or tag).

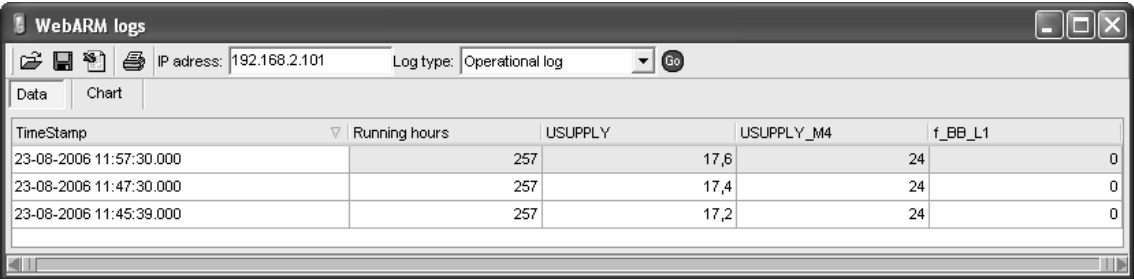
The 'Edit' button is for selecting another log value (or tag) than the previously selected one.

Advanced logging download and display

Click on the 'Log download' () icon of the webARM configuration software.

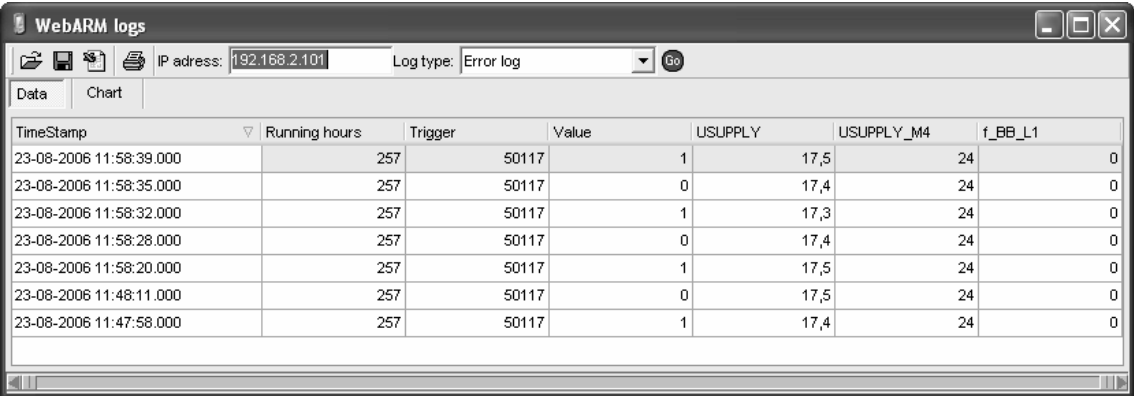


Select one of the three types of advanced logging functions in the Log type field and click on the 'Go' () icon. The window below is an example of advanced operational logging.

The screenshot shows the 'WebARM logs' window with the 'Log type' set to 'Operational log'. The 'Data' tab is selected, and a table of operational data is displayed.

TimeStamp	Running hours	USUPPLY	USUPPLY_M4	f_BB_L1
23-08-2006 11:57:30.000	257	17,6	24	0
23-08-2006 11:47:30.000	257	17,4	24	0
23-08-2006 11:45:39.000	257	17,2	24	0

The window below is an example of advanced error logging.

The screenshot shows the 'WebARM logs' window with the 'Log type' set to 'Error log'. The 'Data' tab is selected, and a table of error data is displayed.

TimeStamp	Running hours	Trigger	Value	USUPPLY	USUPPLY_M4	f_BB_L1
23-08-2006 11:58:39.000	257	50117	1	17,5	24	0
23-08-2006 11:58:35.000	257	50117	0	17,4	24	0
23-08-2006 11:58:32.000	257	50117	1	17,3	24	0
23-08-2006 11:58:28.000	257	50117	0	17,4	24	0
23-08-2006 11:58:20.000	257	50117	1	17,5	24	0
23-08-2006 11:48:11.000	257	50117	0	17,5	24	0
23-08-2006 11:47:58.000	257	50117	1	17,4	24	0

The window below is an example of advanced black box logging.

TimeStamp	USUPPLY	USUPPLY_M4	f_BB_L1	PL1
23-08-2006 11:58:43.800	17,1	24	0	0
23-08-2006 11:58:43.600	17,1	24	0	0
23-08-2006 11:58:43.400	17,1	24	0	0
23-08-2006 11:58:43.200	17,1	24	0	0
23-08-2006 11:58:43.000	17,1	24	0	0
23-08-2006 11:58:42.800	17,2	24	0	0
23-08-2006 11:58:42.600	17,2	24	0	0
23-08-2006 11:58:42.400	17,2	24	0	0
23-08-2006 11:58:42.200	17,2	24	0	0
23-08-2006 11:58:42.000	17,2	24	0	0
23-08-2006 11:58:41.800	17,4	24	0	0
23-08-2006 11:58:41.600	17,4	24	0	0

Please note that for the advanced black box logging function, the log number must be selected. The three above examples of advanced logging functions are based on the logging setup below.

Advanced logging

Operational Log

Number of samples: 100

Sample rate (min): 10

Tags (registers):

- USUPPLY
- USUPPLY_M4
- f_BB_L1

Add, Remove, Edit

Error log

Number of samples: 10

Sample rate (sec): 1

Triggers: 50117

Blackbox log

Number of log files: 1

Sample rate (ms): 200

Time before event (sec): 1

Time after event (sec): 1

Triggers: 50117

Tags (registers):

- USUPPLY
- USUPPLY_M4
- f_BB_L1
- PL1

Add, Remove, Edit

Read from device, Send to device, OK, Cancel

8. SMS or e-mail alarms transmission

When the webARM is connected to the internet (or TCP/IP network), sending an SMS alarm message (from internet to the GSM network/mobile phones) requires a service provided by an internet service provider, and for most of them, you will have to pay for this service. For example, the company Clickatell (<http://www.clickatel.com/>) is one of the possible service providers. More information is available from their web site (this service is what they call 'SMS gateway').

Sending an e-mail alarm message from a TCP/IP network or internet requires services from a SMTP server, which will not be described here, as it is one of the basic common services you are using when using the internet; sending e-mails. So the SMTP server is very well known and used worldwide, and it is described in numerous books.

This alarm application supervises a number of modbus flags. Should one or more of these alarm flags go up, a number of people will be notified via SMS and/or e-mail messages.

Each of the supervised alarm flags holds the state of a 'fail class', which is one of the following:

- Alarm
- Warning
- Trip GB
- Trip + stop
- Shutdown
- Trip MB

5 e-mail receivers and 5 SMS receivers can be defined, and for each, the fail classes to receive notifications about can be defined. For e-mails it can furthermore be specified, if the user should receive the mails as 'to:' receiver, or 'cc:' receiver.

The alarm flags are scanned every second and for each unit (from lowest to highest CAN ID number) each fail class (from highest to lowest priority) is evaluated, and e-mail/SMS messages are sent accordingly.

There is one special case, where an alarm is suppressed: When a warning alarm is detected at the same time as some higher priority alarm, the warning alarm is not sent.

SMS or e-mail alarms configuration

When the advanced logging menus of the webARM configuration software are accessible (after clicking the 'Get' (📡) icon, please refer to the chapter concerning advanced logging), go to the menu 'Settings' and select 'Email, SMS' or click on the 'Email and SMS settings' icon (📧).

Send to device >>> Write the above configuration to the webARM card.

Read from device >>> Read the configuration present inside the webARM card.

Email general:

This field gathers all the useful parameters for exporting the alarms by means of e-mail messages. This section is then connected to the e-mail section containing the 'Recipients Email' (right upper section of this window). If you do not require exporting the alarms by means of e-mail messages, do not fill in these fields.

Address of SMTP server:

Must contain the IP address of the SMTP server you want to use for exporting alarms by means of e-mail messages.

Sender address:

Must contain the sender e-mail address.

User name for mail server:

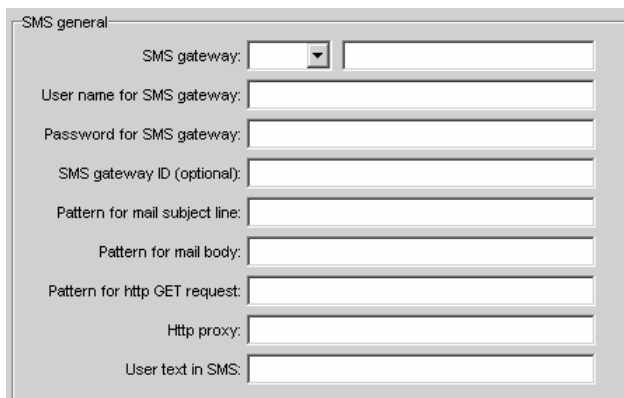
If required by the used SMTP server, you can type a user name here.

Password for mail server:

If required by the used SMTP server, you can type a password here.

User text in email:

The text you enter here will be placed in the subject line of the sent e-mail messages.

**SMS general:**

This field gathers all the useful parameters for exporting the alarms by means of SMS messages. This section is then connected to the section containing the 'Recipients tlf' (right lower section of this window).

SMS gateway:

Two different services can be used for exporting alarms by means of SMS messages when using the services from an SMS gateway provider (for example: Clickatell / www.Clickatell.com):

- http to SMS (see the Clickatell http post specification document [_SMS Gateway](#)).
- mail to SMS (see the Clickatell SMTP post specification document [_SMS Gateway](#)).

Visit their web site for getting all the details concerning these two different services.

The first field is for selecting the service type for alarms by means of SMS messages. Select 'http' or 'mail'. The contents of the next field (to the right) depends on the SMS gateway type ('http' or 'email'):

- http: The heading of the http command line (ex: <http://api.clickatell.com>).
- email: The e-mail address given by your SMS gateway provider (Example from Clickatell: sms@messaging.clickatell.com).

User name for SMS gateway:

Type the user name ID given by your SMS gateway provider.

Password for SMS gateway:

Type the password ID given by your SMS gateway provider.

SMS gateway ID (optional):

Type the application ID given by your SMS gateway provider, if it is necessary for using your provider services.

Pattern for mail subject line:

You must fill in this field, if 'mail' is selected in the SMS gateway field (see above). In this case, the text line you enter here will be the subject line of the e-mails that will be sent for exporting alarms by means of SMS messages.

Pattern for mail body:

You must fill in this field, if you select 'mail' in the SMS gateway field (see above). In this case, the text line you enter here will be the body text of the e-mails that will be sent for exporting alarms by means of SMS messages.

Pattern for http GET request:

You must fill in this field if you select 'http' in the SMS gateway field (see above). In this case, the text line you enter here will be the http line of the http message that will be used for exporting alarms by means of SMS messages.

The below symbols must be used for incorporating all the useful data from the other fields into this http GET request. The line to enter in here can then be as follows:

```
/http/sendmsg?api_id=%I&user=%U&password=%P&to=%N&text=%M
```

In these patterns, the substitution parameters to use in the above http command line are:

%U is replaced by the 'User name for SMS gateway' field content.

%P is replaced by the 'Password for SMS gateway' field content.

%I is replaced by the 'SMS gateway ID' field content.

%N is replaced by the 'Recipients tlf' field content.

%M is replaced by the 'User text in SMS' field content.

The final http command line that will be sent to the SMS gateway provider will then be:

'content of the field situated at the right side of the SMS gateway field'/http/sendmsg?api_id='SMS gateway ID' field content.

'&user='user name for SMS gateway field content'&password='password for SMS gateway field content'&to='Recipients tlf field content'&text='user text in SMS field content'.

Http proxy:

Must contain the proxy server IP address (and the port number) that is required for reaching the WEB (World Wide Web) from the multi-line 2 unit webARM card TCP/IP port. For example 192.168.1.1;8080. A semicolon must be used as separator between the proxy server IP address (192.168.1.1) and the port number (8080).

User text in SMS:

The text line you enter here will be used as SMS text when exporting alarms by means of SMS messages.

Recipients Email	Alarm list

The above table has to be filled in, if you require exporting the alarms by means of e-mail messages.

Recipients Email:

Must contain the e-mail addresses of the persons to contact by e-mail messages when an alarm is detected from the multi-line 2 unit.

Alarm list:

This field informs about which fail class alarm is interesting for the corresponding e-mail address (from the left side). Min. value: a, max. value: h, in steps of one letter. Example: a,b,d,h - in this case, the multi-line 2 unit will only export its alarms with a fail class type a, b, d or h.



Recipients tlf	Alarm list

The above table has to be filled in, if you require exporting the alarms by means of SMS messages.

Recipients tlf:

Must contain the GSM phone number of the persons to contact by SMS messages when an alarm is detected from the multi-line 2 unit.

Alarm list:

This field informs about which fail class alarm is interesting for the corresponding GSM phone number (from the left side). Min. value: a, max. value: f, in steps of one letter. Example; a,b,d,f. In this case, the multi-line 2 unit will only export its alarms with a fail class type a, b, d or f.

Alarm list	Fail class	
	Generator unit	Mains unit
a	Alarm	Alarm
b	Warning	Warning
c	Trip GB	Trip TB
d	Trip+stop	Trip MB
e	Shutdown	N/A
f	Trip MB	N/A

Examples for the SMS or e-mail alarms configuration

Example 1: Exporting the multi-line 2 alarms by e-mails.

Email and SMS

Email general

Address of SMTP server: 195.41.46.251

Sender address: noreply@deif.com

User name for mail server: smtp_user name

Password for mail server: smtp_password

User text in email: User defined text in email

SMS general

SMS gateway: http

User name for SMS gateway:

Password for SMS gateway:

SMS gateway ID (optional):

Pattern for mail subject line: ignored

Pattern for mail body:

Pattern for http GET request:

Http proxy:

User text in SMS:

Alarms

Email

Recipients Email	Alarm list
support@deif.com	a, b, c, d, e, f, g, h, to
info@deif.com	a, b, c, d, cc

SMS

Recipients tlf	Alarm list

Read from device Send to device OK Cancel

By adding 'to' or 'cc' at the end of each alarm list item, the concerned IP address will be used as 'To' or 'Cc' field inside the e-mail that will send the alarm.

Untitled - Message (HTML)

File Edit View Insert Format Tools Actions Help

Send Print Copy Paste Undo Redo Attach Detach Options... A+ a3

To...

Cc...

Bcc...

Subject:

Example 2: Exporting the multi-line 2 alarms by SMS (SMS gateway service type: http).

Email and SMS

Email general

Address of SMTP server:

Sender address:

User name for mail server:

Password for mail server:

User text in email:

SMS general

SMS gateway:

User name for SMS gateway:

Password for SMS gateway:

SMS gateway ID (optional):

Pattern for mail subject line:

Pattern for mail body:

Pattern for http GET request:

Http proxy:

User text in SMS:

Alarms

Email

Recipients Email	Alarm list

SMS

Recipients tlf	Alarm list
4540404040	a,b,c,d,e,f
4540404041	a
4540404042	b,d
4540404043	f

Read from device Send to device OK Cancel

Pattern for http GET request:

http://sendmsg?api_id=%l&user=%U&password=%P&to=%N&text=%M.

%l: Will insert what is already typed inside the 'SMS gateway ID' field (api_id).

%U: Will insert what is already typed inside the 'User name for SMS gateway' field (user name).

%P: Will insert what is already typed inside the 'Password for SMS gateway' field (password).

%N: Will insert what is already typed inside the 'Recipients tlf' field (mobile phone numbers).

%M: Will insert what is already typed inside the 'User text in SMS' field (user selectable text).

Example 3: Exporting the multi-line 2 alarms by SMS (SMS gateway service type: mail).

Email and SMS

Email general

Address of SMTP server: 195.41.46.251

Sender address: noreply@deif.com

User name for mail server: smtp_user name

Password for mail server: smtp_password

User text in email: User defined text in email

SMS general

SMS gateway: mail sms@messaging.clickatell.com

User name for SMS gateway: user name

Password for SMS gateway: password

SMS gateway ID (optional): 123456

Pattern for mail subject line:

Pattern for mail body: i_id:%l&user:%U&password:%P&to:%N&text:%M

Pattern for http GET request:

Http proxy: 192.168.1.1:8080

User text in SMS: User defined text in SMS

Alarms

Email

Recipients Email	Alarm list

SMS

Recipients tlf	Alarm list
4540404040	a,b,c,d,e,f
4540404041	a
4540404042	b,d
4540404043	f

Read from device Send to device OK Cancel

Pattern for mail body: api_id:%l&user:%U&password:%P&to:%N&text:%M.

%l: Will insert what is already typed inside the 'SMS gateway ID' field (api_id).

%U: Will insert what is already typed inside the 'User name for SMS gateway' field (user name).

%P: Will insert what is already typed inside the 'Password for SMS gateway' field (password).

%N: Will insert what is already typed inside the 'Recipients tlf' field (mobile phone numbers).

%M: Will insert what is already typed inside the 'User text in SMS' field (user selectable text).

Received message format

The content of the message sent is defined as:

'MsgNo._*n1*_IDNo._*n2*_t1_t2_t3'.

The variables in the message are as follows:

n1: Unique number of the alarm, incremented at each new alarm detection.

n2: CAN ID of the unit giving the alarm:

CAN ID	Comment
0	Single mains unit
1	Gen-set unit
2	Gen-set unit
3	Gen-set unit
4	Gen-set unit
5	Gen-set unit
6	Gen-set unit
7	Gen-set unit
8	Gen-set unit

CAN ID	Description
9	Gen-set/multiple mains unit
10	Gen-set/multiple mains unit
11	Gen-set/multiple mains unit
12	Gen-set/multiple mains unit
13	Gen-set unit
14	Gen-set unit
15	Gen-set unit
16	Gen-set unit

t1: User defined text.

t2: Name of the fail class.

t3: Specific alarm text:

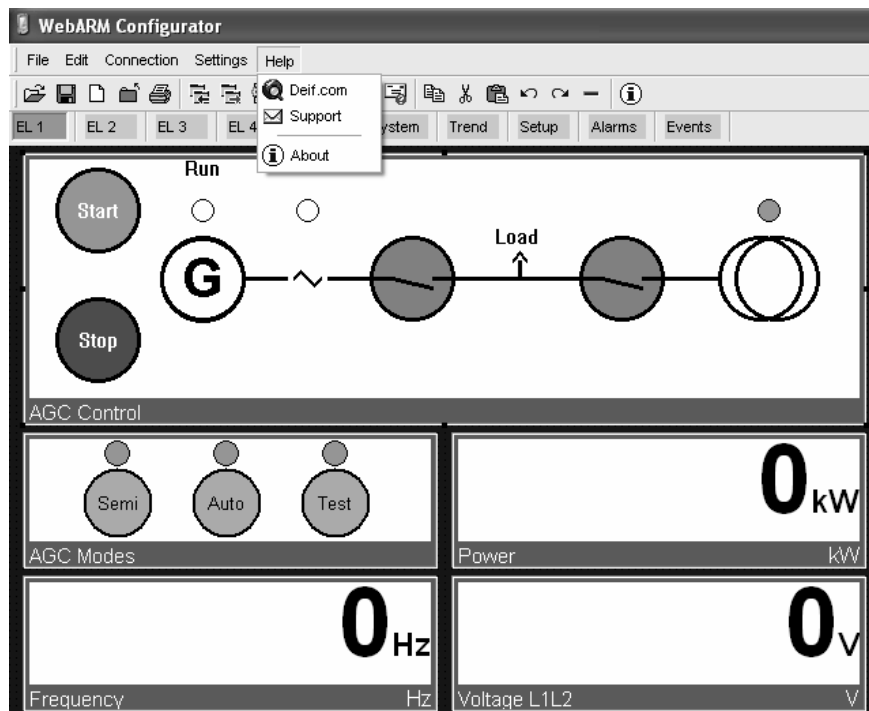
The alarm texts for the individual alarms will be used. Please refer to the parameter table address 1-117 and 185-318 in the chapter 'TCP/IP modbus'.

An example of a message could be:

'MsgNo._1_IDNo._3_User defined text_WARNING_Dig. input 23'

Getting help

Simply press the 'Help' menu of the webARM configuration software.



>>> Brings you to the DEIF web page.

>>> Contact the DEIF support department by e-mail.

or pressing the icon will display the window below:



The window displays the webARM configuration software version (here, software version 1.0.0.72). Press the 'OK' button to close the window.

DEIF A/S reserves the right to change any of the above