DEIF

-power in control

CE

Compact Genset Controller
DESCRIPTION OF OPTIONS



CGC 400
Option H2, Modbus communication

- Description of option
- Data tables
- Parameter table

DEIF A/S · Frisenborgvej 33 · DK-7800 Skive
Tel.: +45 9614 9614 · Fax: +45 9614 9615
info@deif.com · www.deif.com

Document no.: 4189340865A
SW version:

1. Delimitations

1.1 Scope of the Option

This description of options covers the following products:

Product	SW Version
CGC 412	SW version 1.00.0 or later
CGC 413	SW version 1.00.0 or later

2. General information

2.1 Warnings, legal information and safety

2.1.1 Warnings and notes

Throughout this document, a number of warnings and notes with helpful user information will be presented. To ensure that these are noticed, they will be highlighted as follows in order to separate them from the general text.

Warnings

Warnings indicate a potentially dangerous situation, which could result in death, personal injury or damaged equipment, if certain guidelines are not followed.

Notes

Notes provide general information, which will be helpful for the reader to bear in mind.

2.1.2 Legal information and disclaimer

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 unit, the company responsible for the installation or the operation of the set must be contacted.

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

Disclaimer

DEIF A/S reserves the right to change any of the contents of this document without prior notice.

2.1.3 Safety issues

Installing and operating the 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.

Be aware of the hazardous live currents and voltages. Do not touch any AC measurement inputs as this could lead to injury or death.

DEIF do not recommend to use the USB as the primary power supply for the unit.

2.1.4 Electrostatic discharge awareness

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

2.1.5 Factory settings

The unit is delivered from factory with certain factory settings. These are based on average values and are not necessarily the correct settings for matching the engine/generator set in question. Precautions must be taken to check the settings before running the engine/generator set.

3. Description of option

3.1 Option H2

The option H2 allows other systems to read all values in CGC 400 and to send different commands on Modbus RS485.

3.2 Wiring

See the chapter “Communication” in the Installation Instructions.

3.3 Terminal description

Terminal	Function	Description
49	DATA - (B)	Modbus RTU or Modbus ASCII RS485
50	GND	
51	DATA + (A)	

3.4 Communication settings

3.4.1 RS485 settings

These are the CGC 400 RS485 communication settings:

Parameter	Settings
Baud rate	9600 bps
Data bits	8 data bits
Parity	None parity
Stop bit	1 stop bit
Flow control	None

3.4.2 Parameter settings

The option H2 relates to the parameters 7510 and 7520.

For further information, please see the CGC 400 Parameter list, document number 4189340789.

3.5 Modbus

3.5.1 Supported function codes

Function code		Modbus name	Description
Decimal	**Hexadecimal (hex)**		
01	01	Read Coil status	Reads the ON/OFF status of discrete outputs (coils) in the slave.
02	02	Read Input status	Reads the ON/OFF status of discrete inputs in the slave.
03	03	Read Holding Registers	Reads the binary contents of holding registers in the slave.
04	04	Read Input Registers	Reads the binary contents of input registers in the slave.
05	05	Force Single Coil	Forces a single coil to either ON or OFF. When broadcast, the function forces the same coil reference in all attached slaves.
06	06	Preset Single Register	Presets a value into a single holding register. When broadcast, the function presets the same register reference in all attached slaves.
15	0F	Force Multiple Coils	Forces each coil in a sequence of coils to either ON or OFF. When broadcast, the function forces the same coil references in all attached slaves.
16	10	Preset Multiple Registers	Presets values into a sequence of holding registers. When broadcast, the function presets the same register references in all attached slaves.

Modbus function codes will hereafter in this document only be numbered with the decimal numbers.

3.5.2 Modbus references

For any further information concerning the Modbus protocol implementation, please consult the following documents and references:

Modbus application protocol specifications V 1.1b, at: http://www.modbus-IDA.org.

Modbus over serial line – Specification and implementation guide V. 1.02, at: http://www.modbus.org.

4. Data tables (read only, function code 04)

4.1 Configurable area

4.1.1 Analogue values

Columns:
• ”X” means included feature.
• Empty field means not available.

Value format: Signed integers

Address	Content		CGC 412	CGC 413
0	U_{L1-L2}	Generator voltage L1-L2 [V]	X	X
1	U_{L2-L3}	Generator voltage L2-L3 [V]	X	X
2	U_{L3-L1}	Generator voltage L3-L1 [V]	X	X
3	U_{L1-N}	Generator voltage L1-N [V]	X	X
4	U_{L2-N}	Generator voltage L2-N [V]	X	X
5	U_{L3-N}	Generator voltage L3-N [V]	X	X
6	f_{L1}	Generator f L1 [Hz/100]	X	X
7	I_{L1}	Generator current L1 [A]	X	X
8	I_{L2}	Generator current L2 [A]	X	X
9	I_{L3}	Generator current L3 [A]	X	X
10	P_{GEN}	Generator power [kW]	X	X
11	Q_{GEN}	Generator reactive power [kVAr]	X	X
12	S_{GEN}	Generator apparent power [kVA]	X	X
13	Cos-phi	Generator PF [cosPhi/100]	X	X
14	R_{GEN}	Reactive energy counter [kVArh] [Hi]	X	X
15	R_{GEN}	Reactive energy counter [kVArh] [Lo]	X	X
16	E_{GEN}	Active energy counter [kWh] [Hi]	X	X
17	E_{GEN}	Active energy counter [kWh] [Lo]	X	X
18	$U_{BBL1-L2}$	U BB L1-L2 [V]		X
19	$U_{BBL2-L3}$	U BB L2-L3 [V]		X
20	$U_{BBL3-L1}$	U BB L3-L1 [V]		X
21	U_{BBL1-N}	U BB L1-N [V]		X
22	U_{BBL2-N}	U BB L2-N [V]		X
23	U_{BBL3-N}	U BB L3-N [V]		X
24	F_{BB}	BB f L1 [Hz/100]		X

Address	Content		CGC 412	CGC 413
25	$PHI_{BBL1-L2}$	U BB phase angle L1-L2 [Deg/10]		X
26	$PHI_{BBL1-DGL1}$	U BB L1 - U GEN L1 phase angle [Deg/10]		X
27	Alarms	No. of alarms	X	X
28	Alarms	No. of unacknowledged alarms	X	X
29	Start attempts	Start attempts	X	X
30	Abs. run. hours	Absolute running hours [Hi]	X	X
31	Abs. run. hours	Absolute running hours [Lo]	X	X
32	GB_{oper}	No. of GB operations	X	X
33	MB_{oper}	No. of MB operations		X
34	U_{SUPPLY}	DC supply term. 1-2 [V/10]	X	X
35		Not used		
36	RPM	RPM	X	X
37		Multi-input 6 [mA/100 or Ohm/10]	X	X
38		Multi-input 7 [mA/100 or Ohm/10]	X	X
39		Multi-input 8 [mA/100 or Ohm/10]	X	X
40		Control register address 0	X	X
41		Control register address 1	X	X
42		Control register address 2	X	X
43		Control register address 3	X	X
44		Control register address 4	X	X
45		Control register address 5	X	X
46		Control register address 6	X	X
47		Control register address 7	X	X

4.1.2 Alarms

Address	Bit	Parameter	Content	CGC 412	CGC 413
48			**Generator**		
	0	1000	G -P> 1	X	X
	1	1010	G –P> 2	X	X
	2				
	3	1030	G I> 1	X	X
	4	1040	G I> 2	X	X
	5	1050	G I> 3	X	X
	6	1060	G I> 4	X	X
	7	1087	G I> inverse	X	X
	8				
	9	1130	G I>> 1	X	X
	10	1140	G I>> 2	X	X
	11	1150	G U> 1	X	X
	12	1160	G U> 2	X	X
	13	1170	G U< 1	X	X
	14	1180	G U< 2	X	X
	15	1190	G U< 3	X	X
49	0	1210	G f> 1	X	X
	1	1220	G f> 2	X	X
	2	1230	G f> 3	X	X
	3	1240	G f< 1	X	X
	4	1250	G f< 2	X	X
	5	1260	G f< 3	X	X
			Busbar/mains		
	6	1270	BB U> 1		X
	7	1280	BB U> 2		X
	8				
	9	1300	BB U< 1		X
	10	1310	BB U< 2		X
	11				
	12				
	13	1350	BB f> 1		X
	14	1360	BB f> 2		X
	15				
50	0	1380	BB f< 1		X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	1	1390	BB f< 2		X
	2				
	3				
	4				
	5				
	6				
			Generator		
	7	1450	G P> 1	X	X
	8	1460	G P> 2	X	X
	9	1470	G P> 3	X	X
	10	1480	G P> 4	X	X
	11	1490	G P> 5	X	X
	12				
	13				
	14				
	15				
51			**Breaker**		
	0				
	1				
	2				
	3	2150	Phase sequence failure	X	X
	4	2160	GB open failure	X	X
	5	2170	GB close failure	X	X
	6	2180	GB pos. failure	X	X
	7	2200	MB open failure		X
	8	2210	MB close failure		X
	9	2220	MB pos. failure		X
	10				
	11				
	12				
	13				
	14				
	15				
52-53			Not used		
54	0	3400	Multi-in. Alarm 6 (if conf. as Binary)	X	X
	1	3410	Multi-in. Alarm 7 (if conf. as Binary)	X	X
	2	3420	Multi-in. Alarm 8 (if conf. as Binary)	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	3	3401	Wire fail. 6 (if conf. as Binary)	X	X
	4	3411	Wire fail. 7 (if conf. as Binary)	X	X
	5	3421	Wire fail. 8 (if conf. as Binary)	X	X
	6				
	7				
	8				
	9				
	10				
	11				
	12	3490	Digital alarm input 20 (Emer. stop)	X	X
	13				
	14				
	15				
55	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7	3570	Mlogic alarm 01	X	X
	8	3580	Mlogic alarm 02	X	X
	9	3590	Mlogic alarm 03	X	X
	10	3600	Mlogic alarm 04	X	X
	11	3610	Mlogic alarm 05	X	X
	12				
	13				
	14				
	15				
56			Not used		
57			**Multi-functional input**		
	0	4120	4-20 mA 6.1	X	X
	1	4130	4-20 mA 6.2	X	X
	0	4160	PT 6.1	X	X
	1	4170	PT 6.2	X	X
	0	4180	RMI oil 6.1	X	X
	1	4190	RMI oil 6.2	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	0	4200	RMI water 6.1	X	X
	1	4210	RMI water 6.2	X	X
	0	4220	RMI fuel 6.1	X	X
	1	4230	RMI fuel 6.2	X	X
	0	3400	Digital 6	X	X
	2	4240	Wire fail 6	X	X
	3	4250	4-20 mA 7.1	X	X
	4	4260	4-20 mA 7.2	X	X
	3	4290	PT 7.1	X	X
	4	4300	PT 7.2	X	X
	3	4310	RMI oil 7.1	X	X
	4	4320	RMI oil 7.2	X	X
	3	4330	RMI water 7.1	X	X
	4	4340	RMI water 7.2	X	X
	3	4350	RMI fuel 7.1	X	X
	4	4360	RMI fuel 7.2	X	X
	3	3410	Digital 7	X	X
	5	4370	Wire fail 7	X	X
	6	4380	4-20 mA 8.1	X	X
	7	4390	4-20 mA 8.2	X	X
	6	4420	PT 8.1	X	X
	7	4430	PT 8.2	X	X
	6	4440	RMI oil 8.1	X	X
	7	4450	RMI oil 8.2	X	X
	6	4460	RMI water 8.1	X	X
	7	4470	RMI water 8.2	X	X
	6	4480	RMI fuel 8.1	X	X
	7	4490	RMI fuel 8.2	X	X
	6	3420	Digital 8	X	X
	8	4500	Wire fail 8	X	X
			Analogue input alarm		
	9	4510	Overspeed 1	X	X
	10	4520	Overspeed 2	X	X
	11	4530	Crank failure	X	X
	12	4540	Running feedback failure	X	X
	13				
	14	4560	Hz/V failure	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	15	4570	Start failure	X	X
58			**Output state**		
	0	5000	Relay 3	X	X
	1	5010	Relay 21	X	X
	2	5020	Relay 22	X	X
	3	5030	Relay 23	X	X
	4	5040	Relay 24	X	X
	5	5050	Relay 26	X	X
	6	5060	Relay 45	X	X
	7	5070	Relay 47	X	X
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
59			**General**		
	0		Block mode	X	X
	1		Manual mode	X	X
	2				
	3		Auto mode	X	X
	4		Test	X	X
	5		Island	X	X
	6		AMF		X
	7				
	8				
	9				
	10		Load takeover		X
	11				
	12				
	13				
	14				
	15		AMF active		X
60			**EIC alarm**		
	0	7570	Communication error	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	1	7580	Warning	X	X
	2	7590	Shutdown	X	X
	3	7600	Overspeed	X	X
	4	7610	Cool water temp. high 1	X	X
	5	7620	Cool water temp. high 2	X	X
	6	7630	Oil pressure low 1	X	X
	7	7640	Oil pressure low 2	X	X
	8	7650	Oil temp. 1	X	X
	9	7660	Oil temp. 2	X	X
	10	7670	Coolant level 1	X	X
	11	7680	Coolant level 2	X	X
	12				
	13				
	14				
	15				

4.2 Measurement table

Address	Content		CGC 412	CGC 413
501	U_{L1-L2}	Generator voltage L1-L2 [V]	X	X
502	U_{L2-L3}	Generator voltage L2-L3 [V]	X	X
503	U_{L3-L1}	Generator voltage L3-L1 [V]	X	X
504	U_{L1-N}	Generator voltage L1-N [V]	X	X
505	U_{L2-N}	Generator voltage L2-N [V]	X	X
506	U_{L3-N}	Generator voltage L3-N [V]	X	X
507	f_{L1}	Generator f L1 [Hz/100]	X	X
508	f_{L2}	Generator f L2 [Hz/100]	X	X
509	f_{L3}	Generator f L3 [Hz/100]	X	X
510	Phi	U gen. phase angle L1-L2 [Deg/10]	X	X
511	Phi	U gen. phase angle L2-L3 [Deg/10]	X	X
512	Phi	U gen. phase angle L3-L1 [Deg/10]	X	X
513	I_{L1}	Generator current L1 [A]	X	X
514	I_{L2}	Generator current L2 [A]	X	X
515	I_{L3}	Generator current L3 [A]	X	X
516	$P_{GEN\ L1}$	Generator power L1 [kW]	X	X
517	$P_{GEN\ L2}$	Generator power L2 [kW]	X	X
518	$P_{GEN\ L3}$	Generator power L3 [kW]	X	X
519	P_{GEN}	Generator power [kW]	X	X
520	$Q_{GEN\ L1}$	Generator reactive power L1 [kVAr]	X	X
521	$Q_{GEN\ L2}$	Generator reactive power L2 [kVAr]	X	X
522	$Q_{GEN\ L3}$	Generator reactive power L3 [kVAr]	X	X
523	Q_{GEN}	Generator reactive power [kVAr]	X	X
524	$S_{GEN\ L1}$	Generator apparent power L1 [kVA]	X	X
525	$S_{GEN\ L2}$	Generator apparent power L2 [kVA]	X	X
526	$S_{GEN\ L3}$	Generator apparent power L3 [kVA]	X	X
527	S_{GEN}	Generator apparent power [kVA]	X	X
528	$R_{GEN,\ EXP}$	Export, reactive energy counter [kVArh] [Hi]	X	X
529	$R_{GEN,\ EXP}$	Export, reactive energy counter [kVArh] [Lo]	X	X
530	$E_{GEN,\ EXP}$	Export, active energy counter, day [kWh] [Hi]	X	X
531	$E_{GEN,\ EXP}$	Export, active energy counter, day [kWh] [Lo]	X	X
532	$E_{GEN,\ EXP}$	Export, active energy counter, week [kWh] [Hi]	X	X

Address	Content		CGC 412	CGC 413
533	$E_{GEN, EXP}$	Export, active energy counter, week [kWh] [Lo]	X	X
534	$E_{GEN, EXP}$	Export, active energy counter, month [kWh] [Hi]	X	X
535	$E_{GEN, EXP}$	Export, active energy counter, month [kWh] [Lo]	X	X
536	$E_{GEN, EXP}$	Export, active energy counter, total [kWh] [Hi]	X	X
537	$E_{GEN, EXP}$	Export, active energy counter, total [kWh] [Lo]	X	X
538	Cos-phi	Generator PF [cosPhi/100]	X	X
539	$U_{BBL1-L2}$	U BB L1-L2 [V]		X
540	$U_{BBL2-L3}$	U BB L2-L3 [V]		X
541	$U_{BBL3-L1}$	U BB L3-L1 [V]		X
542	U_{BBL1-N}	U BB L1-N [V]		X
543	U_{BBL2-N}	U BB L2-N [V]		X
544	U_{BBL3-N}	U BB L3-N [V]		X
545	F_{BB}	BB f L1 [Hz/100]		X
546-547		Not used		
548	$PHI_{BBL1-L2}$	U BB phase angle L1-L2 [Deg/10]		X
549-550		Not used		
551	$PHI_{BBL1-DGL1}$	U BB L1 - U GEN L1 phase angle [Deg/10]		X
552	$PHI_{BBL2-DGL2}$	U BB L2 - U GEN L2 phase angle [Deg/10]		X
553	$PHI_{BBL3-DGL3}$	U BB L3 - U GEN L3 phase angle [Deg/10]		X
554	Abs. run. hours	Absolute running hours [Hi]	X	X
555	Abs. run. hours	Absolute running hours [Lo]	X	X
556	Rel. run. hours	Relative running hours [Hi]	X	X
557	Rel. run. hours	Relative running hours [Lo]	X	X
558	Alarms	No. of alarms	X	X
559	Alarms	No. of unacknowledged alarms	X	X
560	Alarms	No. of active acknowledged alarms	X	X
561	Run. min.	Running minute counter, shutdown override	X	X
562	Run. hours	Running hour counter, shutdown override	X	X
563	GB_{oper}	No. of GB operations	X	X
564	MB_{oper}	No. of MB operations		X
565		Not used		
566	Start attempts	Start attempts	X	X
567	U_{SUPPLY}	DC supply term. 1-2 [V/10]	X	X
568		Not used		
569	Service	Service timer 1 running hours	X	X

Address	Content		CGC 412	CGC 413
570	Service	Service timer 1 running days	X	X
571	Service	Service timer 2 running hours	X	X
572	Service	Service timer 2 running days	X	X
573	Cos-phi	Cos-phi [cosPhi/100]	X	X
574	Cos-phi	Cos-phi Inductive/Capacitive 0=Inductive, 1=Capacitive	X	X
575		Not used		
576	RPM	RPM	X	X
577-579		Not used		
580		Multi-input 6 [mA/100 or Ohm/10]	X	X
581		Multi-input 7 [mA/100 or Ohm/10]	X	X
582		Multi-input 8 [mA/100 or Ohm/10]	X	X
583		Multi-input 6 scaled according to configured function	X	X
584		Multi-input 7 scaled according to configured function	X	X
585		Multi-input 8 scaled according to configured function	X	X
586		Multi-input 58 [mA/100 or Ohm/10]		X
587		Multi-input 59 [mA/100 or Ohm/10]		X
588		Multi-input 58 scaled according to configured function		X
589		Multi-input 59 scaled according to configured function		X
590-594		Not used		
593-641		See H5/H7 manual	X	X
642	RegAddr.	Control register address 0	X	X
643	RegAddr.	Control register address 1	X	X
644	RegAddr.	Control register address 2	X	X
645	RegAddr.	Control register address 3	X	X
646	RegAddr.	Control register address 4	X	X
647	RegAddr.	Control register address 5	X	X
648	RegAddr.	Control register address 6	X	X
649	RegAddr.	Control register address 7	X	X
650	RegAddr	Control register address 8	X	X
651	RegAddr	Control register address 9	X	X
652	RegAddr	Control register address 10	X	X
653	RegAddr	Control register address 11	X	X
654	RegAddr	Control register address 12	X	X
655	RegAddr	Control register address 13	X	X
656-699		Not used		
700		Nominal power active (1-4)	X	X
701-789		Not used		

Address	Content		CGC 412	CGC 413
790	$R_{GEN, EXP}$	Export reactive energy counter, month [kWh] [Hi]	X	X
791	$R_{GEN, EXP}$	Export reactive energy counter, month [kWh] [Lo]	X	X
792	$R_{GEN, EXP}$	Export reactive energy counter, week [kWh] [Hi]	X	X
793	$R_{GEN, EXP}$	Export reactive energy counter, week [kWh] [Lo]	X	X
794	$R_{GEN, EXP}$	Export reactive energy counter, total [kWh] [Hi]	X	X
795	$R_{GEN, EXP}$	Export reactive energy counter, total [kWh] [Lo]	X	X
796	$E_{GEN, EXP}$	Import active energy counter, total [kWh] [Hi]	X	X
797	$E_{GEN, EXP}$	Import active energy counter, total [kWh] [Lo]	X	X
798	$E_{GEN, EXP}$	Import active energy counter, month [kWh] [Hi]	X	X
799	$E_{GEN, EXP}$	Import active energy counter, month [kWh] [Lo]	X	X
800	$E_{GEN, EXP}$	Import active energy counter, week [kWh] [Hi]	X	X
801	$E_{GEN, EXP}$	Import active energy counter, week [kWh] [Lo]	X	X
802	$E_{GEN, EXP}$	Import active energy counter, day [kWh] [Hi]	X	X
803	$E_{GEN, EXP}$	Import active energy counter, day [kWh] [Lo]	X	X
804	$R_{GEN, IMP}$	Import reactive energy counter, total [kWh] [Hi]	X	X
805	$R_{GEN, IMP}$	Import reactive energy counter, total [kWh] [Lo]	X	X
806	$R_{GEN, IMP}$	Import reactive energy counter, month [kWh] [Hi]	X	X
807	$R_{GEN, IMP}$	Import reactive energy counter, month [kWh] [Lo]	X	X
808	$R_{GEN, IMP}$	Import reactive energy counter, week [kWh] [Hi]	X	X
809	$R_{GEN, IMP}$	Import reactive energy counter, week [kWh] [Lo]	X	X
810	$R_{GEN, IMP}$	Import reactive energy counter, day [kWh] [Hi]	X	X
811	$R_{GEN, IMP}$	Import reactive energy counter, day [kWh] [Lo]	X	X
812-899		Not used		
900-999		See H5/H7 manual	X	X

4.3 Alarm and status table

Address	Bit	Parameter	Content	CGC 412	CGC 413
1000			**Generator**		
	0	1000	G -P> 1	X	X
	1	1010	G -P> 2	X	X
	2				
	3	1030	G I> 1	X	X
	4	1040	G I> 2	X	X
	5	1050	G I> 3	X	X
	6	1060	G I> 4	X	X
	7	1087	G I> inverse	X	X
	8				
	9	1130	G I>> 1	X	X
	10	1140	G I>> 2	X	X
	11	1150	G U> 1	X	X
	12	1160	G U> 2	X	X
	13	1170	G U< 1	X	X
	14	1180	G U< 2	X	X
	15	1190	G U< 3	X	X
1001	0	1210	G f> 1	X	X
	1	1220	G f> 2	X	X
	2	1230	G f> 3	X	X
	3	1240	G f< 1	X	X
	4	1250	G f< 2	X	X
	5	1260	G f< 3	X	X
			BB/mains		
	6	1270	BB U> 1		X
	7	1280	BB U> 2		X
	8				
	9	1300	BB U< 1		X
	10	1310	BB U< 2		X
	11				
	12				
	13	1350	BB f> 1		X
	14	1360	BB f> 2		X
	15	1370	BB f> 3		
1002	0	1380	BB f< 1		X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	1	1390	BB f< 2		X
	2				
	3				
	4				
	5				
	6				
			Generator		
	7	1450	G P> 1	X	X
	8	1460	G P> 2	X	X
	9	1470	G P> 3	X	X
	10	1480	G P> 4	X	X
	11	1490	G P> 5	X	X
	12				
	13				
	14				
	15				
1003			Not used		
1004	0				
	1				
	2				
	3				
	4				
	5				
	6	1960	Uq< 1	X	X
	7	1970	Uq< 2	X	X
	8	1980	GB ext. trip	X	X
	9	1980	MB ext. trip		X
	10				
	11				
	12				
	13				
	14				
	15				
1005			**Breaker**		
	0				
	1				
	2				

Address	Bit	Parameter	Content	CGC 412	CGC 413
	3	2150	Phase seq. failure	X	X
	4	2160	GB open failure	X	X
	5	2170	GB close failure	X	X
	6	2180	GB pos. failure	X	X
	7	2200	MB open failure		X
	8	2210	MB close failure		X
	9	2220	MB pos. failure		X
	10				
	11				
	12				
	13				
	14				
	15				
1006			Not used		
1007			**Digital alarms**		
	0	3000	Digital alarm input 10	X	X
	1	3010	Digital alarm input 11	X	X
	2	3020	Digital alarm input 12	X	X
	3	3030	Digital alarm input 13	X	X
	4	3040	Digital alarm input 14	X	X
	5	3050	Digital alarm input 15	X	X
	6	3060	Digital alarm input 56		X
	7	3070	Digital alarm input 57		X
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
1008-1009			Not used		
1010	0	3400	Multi-in. Binary alarm 6	X	X
	1	3410	Multi-in. Binary alarm 7	X	X
	2	3420	Multi-in. Binary alarm 8	X	X
	3	3401	Wire fail. 6	X	X
	4	3411	Wire fail. 7	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	5	3421	Wire fail. 8	X	X
	6				
	7				
	8				
	9				
	10				
	11				
	12	3490	Digital alarm input 20 (Emergency stop)	X	X
	13				
	14				
	15				
1011	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7	3570	M-Logic alarm 1	X	X
	8	3580	M-Logic alarm 2	X	X
	9	3590	M-Logic alarm 3	X	X
	10	3600	M-Logic alarm 4	X	X
	11	3610	M-Logic alarm 5	X	X
	12				
	13				
	14				
	15				
1012			Not used		
1013			**Multi-functional input**		
	0	4120	4-20 mA 6.1	X	X
	1	4130	4-20 mA 6.2	X	X
	0	4160	Pt 6.1	X	X
	1	4170	Pt 6.2	X	X
	0	4180	RMI oil 6.1	X	X
	1	4190	RMI oil 6.2	X	X
	0	4200	RMI water 6.1	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	1	4210	RMI water 6.2	X	X
	0	4220	RMI fuel 6.1	X	X
	1	4230	RMI fuel 6.2	X	X
	2	4240	Wire fail. 6	X	X
	3	4250	4-20 mA 7.1	X	X
	4	4260	4-20 mA 7.2	X	X
	3	4290	Pt 7.1	X	X
	4	4300	Pt 7.2	X	X
	3	4310	RMI oil 7.1	X	X
	4	4320	RMI oil 7.2	X	X
	3	4330	RMI water 7.1	X	X
	4	4340	RMI water 7.2	X	X
	3	4350	RMI fuel 7.1	X	X
	4	4360	RMI fuel 7.2	X	X
	5	4370	Wire fail. 7	X	X
	6	4380	4-20 mA 8.1	X	X
	7	4390	4-20 mA 8.2	X	X
	6	4420	Pt 8.1	X	X
	7	4430	Pt 8.2	X	X
	6	4440	RMI oil 8.1	X	X
	7	4450	RMI oil 8.2	X	X
	6	4460	RMI water 8.1	X	X
	7	4470	RMI water 8.2	X	X
	6	4480	RMI fuel 8.1	X	X
	7	4490	RMI fuel 8.2	X	X
	8	4500	Wire fail. 8	X	X
			Analogue input alarm		
	9	4510	Overspeed 1	X	X
	10	4520	Overspeed 2	X	X
	11	4530	Crank failure	X	X
	12	4540	Running feedback failure	X	X
	13				
	14	4560	Hz/V failure	X	X
	15	4570	Start failure	X	X
1014	0	4580	Stop failure	X	X
	1	4960	U< aux. term. 1	X	X
	2	4970	U> aux. term. 1	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	3				
	4				
	5	4590	Underspeed 1	X	X
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
1015	0	6110	Service timer 1	X	X
	1	6120	Service timer 2	X	X
	2	6270	Stop coil wire break		
	3	6280	Internal communication failure		
	4	6330	Engine heater 1	X	X
	5				
	6				
	7				
	8	6470	Max. ventilation 1	X	X
	9	6480	Max. ventilation 2	X	X
	10	6500	Blk. swbd. error	X	X
	11	6510	Stp. swbd. error	X	X
	12	6540	Unit not in auto	X	X
	13	6550	Fuel pump logic	X	X
	14				
	15				
1016			**Output state**		
	0	5000	Relay 3	X	X
	1	5010	Relay 21	X	X
	2	5020	Relay 22	X	X
	3	5030	Relay 23	X	X
	4	5040	Relay 24	X	X
	5	5050	Relay 26	X	X
	6	5060	Relay 45	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	7	5070	Relay 47	X	X
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
1017	0				
	1				
	2				
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12		Run. coil relay	X	X
	13		Start prepare	X	X
	14		Start relay	X	X
	15		Stop coil relay	X	X
1018			**Status**		
	0		Mains failure		X
	1		MB pos. ON		X
	2				
	3				
	4		GB pos. ON	X	X
	5				
	6		Engine running	X	X
	7	6173	Running detect. timer expired	X	X
	8	6220	DG Hz/V OK, timer expired	X	X
	9				
	10				

Address	Bit	Parameter	Content	CGC 412	CGC 413
	11		GB position OFF	X	X
	12		MB position OFF		X
	13		BB Hz/V OK		X
	14				
	15				
1019			**General/Modes**		
	0		Block mode	X	X
	1		Manual mode	X	X
	2				
	3		Auto mode	X	X
	4		Test	X	X
	5		Island	X	X
	6		AMF		X
	7				
	8				
	9				
	10		Load takeover		X
	11				
	12				
	13				
	14				
	15		AMF active		X
1020-1024			See H5/H7 manual	X	X
1025			Not used		
1026-1028			See H5/H7 manual	X	X
1029-1032			Not used		
1033	0				
	1				
	2	7520	Communication error ext.	X	X
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				

Address	Bit	Parameter	Content	CGC 412	CGC 413
	11				
	12				
	13				
	14				
	15				
1034-1049			Not used		
1050	0		Ready autostart	X	X
	1		DG U>30%*U nominal	X	X
	2		BB U>30%*U nominal		X
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
1051	0		Virtual event 1	X	X
	1		Virtual event 2	X	X
	2		Virtual event 3	X	X
	3		Virtual event 4	X	X
	4		Virtual event 5	X	X
	5		Virtual event 6	X	X
	6		Virtual event 7	X	X
	7		Virtual event 8	X	X
	8		Virtual event 9	X	X
	9		Virtual event 10	X	X
	10		Virtual event 11	X	X
	11		Virtual event 12	X	X
	12		Virtual event 13	X	X
	13		Virtual event 14	X	X
	14		Virtual event 15	X	X

Address	Bit	Parameter	Content	CGC 412	CGC 413
	15		Virtual event 16	X	X
1052	0		Virtual event 17	X	X
	1		Virtual event 18	X	X
	2		Virtual event 19	X	X
	3		Virtual event 20	X	X
	4		Virtual event 21	X	X
	5		Virtual event 22	X	X
	6		Virtual event 23	X	X
	7		Virtual event 24	X	X
	8		Virtual event 25	X	X
	9		Virtual event 26	X	X
	10		Virtual event 27	X	X
	11		Virtual event 28	X	X
	12		Virtual event 29	X	X
	13		Virtual event 30	X	X
	14		Virtual event 31	X	X
	15		Virtual event 32	X	X
1053	0				
	1				
	2				
	3				
	4	4610	Delta analogue 1 - fail 1	X	X
	5	4620	Delta analogue 1 - fail 2	X	X
	6	4630	Delta analogue 2 - fail 1	X	X
	7	4640	Delta analogue 2 - fail 2	X	X
	8	4650	Delta analogue 3 - fail 1	X	X
	9	4660	Delta analogue 3 - fail 2	X	X
	10				
	11				
	12				
	13				
	14				
	15				
1054	0				
	1				
	2				
	3				

Address	Bit	Parameter	Content	CGC 412	CGC 413
	4				
	5	7480	Avg U BB > 1		X
	6	7490	Avg U BB > 2		X
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
1055	0		LED 1 Red colour	X	X
	1		LED 1 Yellow colour	X	X
	2		LED 1 Green colour	X	X
	3		LED 1 Flash	X	X
	4		LED 2 Red colour	X	X
	5		LED 2 Yellow colour	X	X
	6		LED 2 Green colour	X	X
	7		LED 2 Flash	X	X
	8		LED 3 Red colour	X	X
	9		LED 3 Yellow colour	X	X
	10		LED 3 Green colour	X	X
	11		LED 3 Flash	X	X
	12		LED 4 Red colour	X	X
	13		LED 4 Yellow colour	X	X
	14		LED 4 Green colour	X	X
	15		LED 4 Flash	X	X
1056-1369			Not used		
1370-1499			See H5/H7 manual	X	X
1500-1999			Not used		

Address 1055: Bits 3, 7, 11 and 15 only have significance when one of the colour indication bits is high. When bit 3, 7, 11 or 15 is “0”, then the LED is on solid, and when bit 3, 7, 11 or 15 is “1”, the LED is flashing.

5. Data tables (write only, function code 16)

5.1 Control register table

The table below only shows control commands.

Control commands must only be used to send a command. They cannot be used to monitor bit status.

Address	Bit	Description	CGC 412	CGC 413
0-4		Not used		
5	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1	Remote start	X	X
	2	Remote GB ON	X	X
	3	Remote GB OFF	X	X
	4	Remote stop	X	X
	5			
	6			
	7	Alarm inhibit 1	X	X
	8	Alarm inhibit 2	X	X
	9	Alarm inhibit 3	X	X
	10	Alarm ack. This bit is automatically reset	X	X
	11	Nominal setting 1	X	X
	12	Nominal setting 2	X	X
	13	Nominal setting 3	X	X
	14	Nominal setting 4	X	X
	15	Deload (semi)		
6	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1	Island	X	X
	2	Automatic mains failure (AMF)		X
	3			
	4			
	5			
	6	Load takeover (LTO)		X
	7			
	8			
	9	MB ON		X

Address	Bit	Description	CGC 412	CGC 413
	10	MB OFF		X
	11	Auto start/stop	X	X
	12	Manual mode	X	X
	13	Auto mode	X	X
	14	Semi-auto mode		
	15	Test mode	X	X
7	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15	Synchronise clock to 4:00 AM	X	X
8	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored	X	X
	1	M-Logic: Virtual event 1	X	X
	2	M-Logic: Virtual event 2	X	X
	3	M-Logic: Virtual event 3	X	X
	4	M-Logic: Virtual event 4	X	X
	5	M-Logic: Virtual event 5	X	X
	6	M-Logic: Virtual event 6	X	X
	7	M-Logic: Virtual event 7	X	X
	8	M-Logic: Virtual event 8	X	X
	9	M-Logic: Virtual event 9	X	X
	10	M-Logic: Virtual event 10	X	X
	11	M-Logic: Virtual event 11	X	X
	12	M-Logic: Virtual event 12	X	X
	13	M-Logic: Virtual event 13	X	X

Address	Bit	Description	CGC 412	CGC 413
	14	M-Logic: Virtual event 14	X	X
	15	M-Logic: Virtual event 15	X	X
9	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1	M-Logic: Virtual event 16	X	X
	2	M-Logic: Virtual event 17	X	X
	3	M-Logic: Virtual event 18	X	X
	4	M-Logic: Virtual event 19	X	X
	5	M-Logic: Virtual event 20	X	X
	6	M-Logic: Virtual event 21	X	X
	7	M-Logic: Virtual event 22	X	X
	8	M-Logic: Virtual event 23	X	X
	9	M-Logic: Virtual event 24	X	X
	10	M-Logic: Virtual event 25	X	X
	11	M-Logic: Virtual event 26	X	X
	12	M-Logic: Virtual event 27	X	X
	13	M-Logic: Virtual event 28	X	X
	14	M-Logic: Virtual event 29	X	X
	15	M-Logic: Virtual event 30	X	X
10	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1	M-Logic: Virtual event 31	X	X
	2	M-Logic: Virtual event 32	X	X
	3			
	4	Clear log	X	X
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13			
	14			
	15			
11-12		Not used		

Address	Bit	Description	CGC 412	CGC 413
13	0	This bit must be 1 when writing the command word. If the bit is 0, the control command is ignored.	X	X
	1			
	2			
	3			
	4			
	5			
	6			
	7			
	8			
	9			
	10			
	11			
	12			
	13	Mute Horn	X	X
	14			
	15			

All control bits are automatically reset by the CGC 400 unit except for ”Auto start/stop” (address 6, bit 11).

5.2 Date & Clock register table

Control commands must only be used to send a command. They cannot be used to monitor bit status.

Address	Content	Description	CGC 412	CGC 413
58000	Year	2003-2099	X	X
58001	Month	01-12	X	X
58002	Date	01-31	X	X
58003	Day	1…7 (Monday…Sunday)	X	X
58004	Hour	0-23	X	X
58005	Min.	0-59	X	X
58006	Sec.	0-59	X	X

6. Data tables (write only, function code 15)

6.1 Command flags table

Address	Content	CGC 412	CGC 413
0	Remote start	X	X
1	Remote GB ON	X	X
2	Remote GB OFF	X	X
3	Remote stop	X	X
4	Alarm inhibit 1	X	X
5	Alarm inhibit 2	X	X
6	Alarm inhibit 3	X	X
9	Alarm ack.	X	X
10	Nominal setting 1	X	X
11	Nominal setting 2	X	X
12	Nominal setting 3	X	X
13	Nominal setting 4	X	X
14-15	Not used		
16	Island	X	X
17	Automatic mains failure (AMF)		X
18-20	Not used		
21	Load takeover (LTO)		X
22-23	Not used		
24	MB ON		X
25	MB OFF		X
26	Auto start/stop	X	X
27	Manual mode	X	X
28	Not used		
29	Auto mode	X	X
30	Test mode	X	X
31-45	Not used		
46	Synchronise clock to 4:00 a.m.	X	X
47	Not used		
48	Virtual event 1	X	X
49	Virtual event 2	X	X
50	Virtual event 3	X	X
51	Virtual event 4	X	X
52	Virtual event 5	X	X

Address	Content	CGC 412	CGC 413
53	Virtual event 6	X	X
54	Virtual event 7	X	X
55	Virtual event 8	X	X
56	Virtual event 9	X	X
57	Virtual event 10	X	X
58	Virtual event 11	X	X
59	Virtual event 12	X	X
60	Virtual event 13	X	X
61	Virtual event 14	X	X
62	Virtual event 15	X	X
63	Virtual event 16	X	X
64	Virtual event 17	X	X
65	Virtual event 18	X	X
66	Virtual event 19	X	X
67	Virtual event 20	X	X
68	Virtual event 21	X	X
69	Virtual event 22	X	X
70	Virtual event 23	X	X
71	Virtual event 24	X	X
72	Virtual event 25	X	X
73	Virtual event 26	X	X
74	Virtual event 27	X	X
75	Virtual event 28	X	X
76	Virtual event 29	X	X
77	Virtual event 30	X	X
78	Virtual event 31	X	X
79	Virtual event 32	X	X
80-120	Not used		
121	Clear log	X	X
122-134	Not used		
135	Mute Horn	X	X

All flags are automatically reset by the CGC 400 unit except for ”Auto start/stop” (address 26).

7. Data tables (read only, function code 02)

7.1 Status flags table

Address	Content	CGC 412	CGC 413
0	GB position ON	X	X
1	MB position ON		X
2	Not used		
3	Running	X	X
4	G Hz/V OK	X	X
5	Mains failure/main busbar failure		X
6	Block mode	X	X
7	Manual mode	X	X
8	Not used		
9	Auto mode	X	X
10	Test mode	X	X
11-12	Not used		
13	Island	X	X
14	Automatic mains failure (AMF)		X
15-17	Not used		
18	Load takeover (LTO)		X

7.2 Digital Input table

Address	Description	CGC 412	CGC 413
22500	Digital input 10	X	X
22501	Digital input 11	X	X
22502	Digital input 12	X	X
22503	Digital input 13	X	X
22504	Digital input 14	X	X
22505	Digital input 15	X	X
22506	Digital input 56		X
22507	Digital input 57		X
22508-22015	Not used		
22516	Emergency stop 20	X	X
22517-22580	Not used		
22581	Multi-func. Input, Binary state 59		X
22582	Multi-func. Input, Binary state 58		X
22583-22590	Not used		
22591	Multi-func. Input, Binary state 8	X	X
22592	Multi-func. Input, Binary state 7	X	X
22593	Multi-func. Input, Binary state 6	X	X

7.3 Digital Output table

Address	Description	CGC 412	CGC 413
23001	Relay 3	X	X
23002	Relay 21	X	X
23003	Relay 22	X	X
23004	Relay 23	X	X
23005	Relay 24	X	X
23006	Relay 26	X	X
23007	Relay 45	X	X
23008	Relay 47	X	X

8. Parameter table

8.1 Parameter table reading and writing

8.1.1 Function code 01 read/write flag status

The entire setting of parameters can be made using the Modbus. The combination of function and address areas used is described below:

Function code 01 read/write flag status
Reads the ON/OFF status of discrete flags in the slave unit.

Address area for reading of status flags:

Data to request	Table	Address area
Enable	Parameter table	2000-3999

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

8.1.2 Function code 02 read flag status

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

Address area for reading of status flags:

Data to request	Table	Address area
Alarm active	Parameter table	4000-5999
Alarm Status acknowledge	Parameter table	6000-7999
Timer output	Parameter table	8000-9999
Timer running	Parameter table	10000-11999

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

8.1.3 Function code 03 read/write registers

Reads the digital of registers in the slave unit.

Address area for reading of registers:

Data to request	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
Enable	Parameter table	16000-17999
Inhibit	Parameter table	18000-19999

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

8.1.4 Function code 04 read registers

Reads the digital of registers in the slave unit.

Address area for reading of registers:

Data to request	Table	Address area
Timers minimum	Parameter table	2000-3999
Timers maximum	Parameter table	4000-4999
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
Fail class minimum	Parameter table	14000-15999
Fail class maximum	Parameter table	16000-17999
Timers elapsed time	Parameter table	20000-21999

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

8.1.5 Function code 15 write multiple flags, function code 05 write single flag

Writes each flag (0 x reference) in a sequence of flags to either ON or OFF.

Address area for writing of status flags:

Data to request	Table	Address area
Enable	Parameter table	2000-3999
Ack. alarm	Parameter table	6000-7999

8.1.6 Function code 16 write multiple registers, function code 06 write single register

Writes values into a sequence of registers.

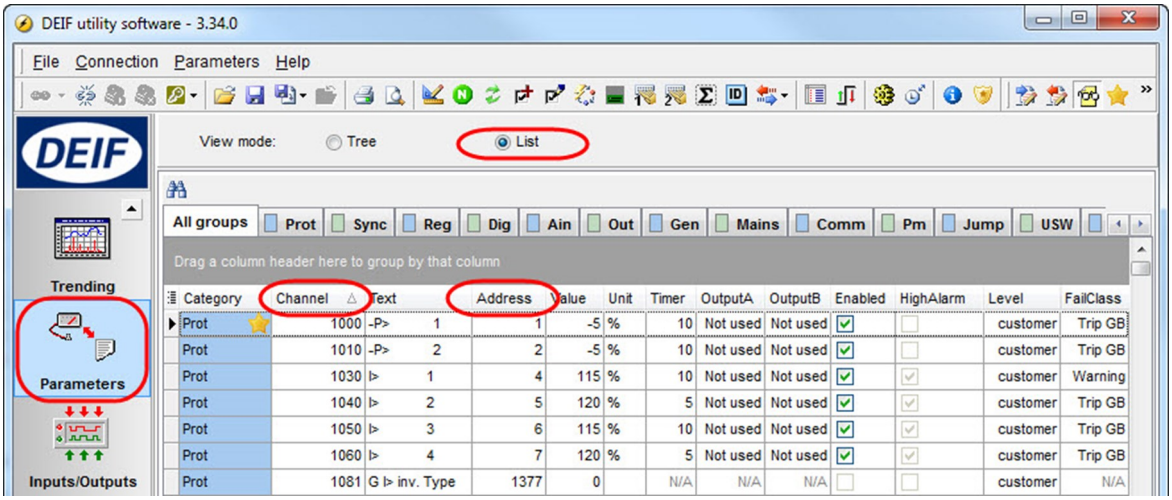
Address area for writing of registers:

Data to request	Table	Address area
Timers used	Parameter table	2000-3999
Values used	Parameter table	4000-4999
Output a	Parameter table	10000-11999
Output b	Parameter table	12000-13999
Fail class used	Parameter table	14000-15999
Enable	Parameter table	16000-17999
Inhibit	Parameter table	18000-19999

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

8.1.7 Parameter addresses

Parameters/channel and Modbus address numbers can be found in the utility software - Parameters.
View mode needs to be: List.



Adrdresses found in the utility software are the offset address, which are to be used in combination with the previous mentioned address areas.

Please refer to the CGC 400 Parameter list, document number 4189340789, about:
- **Availability of channels**
- **Min./max. settings**
- **Factory settings**

8.1.8 Examples

Write nominal frequency 2 (6011), offset 413, 60Hz
ID = 1, 60Hz = 600Hz/10 = 0258h
Address 4000 + 413 = 4413d = 113Dh
Tx: 01h 10h 11h 3Dh 00h 01h 02h 02h 58h A3h 26h
Rx: 01h 10h 11h 3Dh 00h 01h 95h 39h

Read nominal frequency 2 (6011) offset 413, 60Hz
Tx: 01h 03h 11h 3Dh 00h 01h 10h FAh
Rx: 01h 03h 02h 02h 58h B8h DEh
Read 0258h = 600d