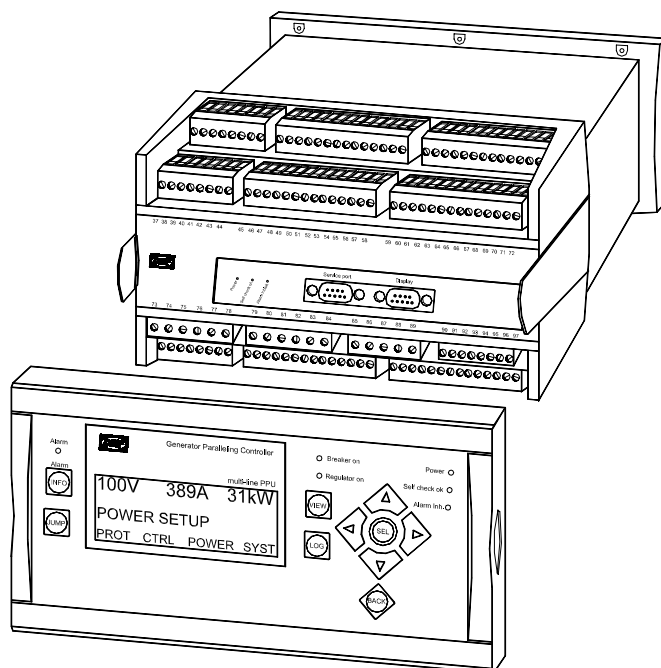


## Description of options

### Option H2 Serial communication – Modbus Multi-line 2 – version 2

4189340278N

SW version 2.42.X



- *Description of option*
- *Parameter list*
- *Data tables*
- *Parameter table*

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**This manual is valid for standard Multi-line 2 GPC/GPU/PPU units with firmware version 2.42.1 or later.**

## 1. Warnings and legal information

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### 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 generator set controlled by the unit, the company responsible for the installation or the operation of the set must be contacted.

**The units are 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 unit implies 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.**

### Definitions

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

### Notes



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

### Warnings



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

## 2. Description of options

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### Option H2

Option H2 is a hardware option, and therefore a separate PCB is installed in slot #2 in addition to the standard-installed hardware.

Function	ANSI no.
RS485 Modbus communication	-

### Terminal description

Term.	Function	Description
29	DATA + (A)	Modbus RTU, RS485
30	GND	
31	DATA - (B)	
32	Not used	
33	DATA + (A)	
34	Not used	
35	DATA - (B)	
36	Not used	



**Terminals 29 and 33 are internally connected.  
Terminals 31 and 35 are internally connected.**



**For wiring diagrams, please refer to the Installation Instructions.**

### Hardware settings

These are the ML-2 RS485 hardware settings:

- a. 9600 or 19200 bps
- b. 8 data bits
- c. None parity
- d. 1 stop bit

### 3. Parameter list

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The setup of parameters is done via the display or the PC utility software (USW).



For further information about menu structure, see the Designer's Reference Handbook.

#### Modbus setup

##### 4050 Communication control enable/disable control

No.	Setting		Min. setting	Max. setting	Factory setting
4051	Comm. control	Power	OFF	ON	OFF
4052	Comm. control	Frequency	OFF	ON	OFF
4053	Comm. control	Voltage	OFF	ON	OFF
4054	Comm. control	VAr	OFF	ON	OFF
4055	Comm. control	PF	OFF	ON	OFF



Selecting communication control ON will overrule external and internal settings.

##### 4060 External communication control

No.	Setting		Min. setting	Max. setting	Factory setting
4061	External comm.	ID	1	247	1
4062	External comm.	Baud rate	9600	19200	9600
4063	External comm.	Mode	RTU	ASCII	RTU



The mode ASCII is used for modem communication (ASCII: 7 data bit. RTU: 8 data bit).



The Baud rate can be changed for the Modbus communication. (To activate the change, switch the auxiliary supply off/on).

##### 4090 External communication error

No.	Setting		Min. setting	Max. setting	Factory setting
4091	External comm. error	Delay	1.0 s	100.0 s	10.0 s
4092	External comm. error	Relay output A	R0 (none)	Option-dependent	R0 (none)
4093	External comm. error	Relay output B	R0 (none)		R0 (none)
4094	External comm. error	Enable	OFF	ON	OFF

## 4. Data tables

**Measurement table (read only) (function code 03h)**

Address	Content	Type
0		Application version
1	$U_{L1-L2}$	Generator voltage. Measured in [V]
2	$U_{L2-L3}$	Generator voltage. Measured in [V]
3	$U_{L3-L1}$	Generator voltage. Measured in [V]
4	$U_{L1-N}$	Generator voltage. Measured in [V]
5	$U_{L2-N}$	Generator voltage. Measured in [V]
6	$U_{L3-N}$	Generator voltage. Measured in [V]
7	$F_{GEN}$	Generator frequency. Measured in [Hz/100]
8	$I_{L1}$	Generator current. Measured in [A]
9	$I_{L2}$	Generator current. Measured in [A]
10	$I_{L3}$	Generator current. Measured in [A]
11	Cos-phi	0...100 Generator cosinus-phi. Measured in [cos-phi/100] Unsigned value
12	$P_{GEN}$	Generator active power. Measured in [kW]. Negative value means reverse power
13	$Q_{GEN}$	Generator reactive power. Measured in [kVAr]. Positive value means generated inductive reactive power
14	$U_{BBL1-L2}$	Busbar. Measured in [V]
15	$F_{BB}$	Busbar frequency L1. Measured in [Hz/100]
16 [HI] 17 [LO]	$R_{GEN}$ Export	Reactive energy counter, exported reactive power. Measured in [kVArh]. Max. 300000 MVArh
18 [HI] 19 [LO]	$E_{GEN}$ Export	Energy counter, exported power. Measured in [kWh]. Max. 300000 MWh
20	Alarms	Bit 0      1010. Reverse power Bit 1      1020. Overcurrent step 1 Bit 2      1030. Overcurrent step 2 Bit 3      1060. Overcurrent inverse Bit 4      1070. Fast overcurrent Bit 5      1080. High overcurrent Bit 6      Reserved Bit 7      1100. U-DG High step 1 Bit 8      1110. U-DG High step 2 Bit 9      1120. U-DG Low step 1 Bit 10     1130. U-DG Low step 2 Bit 11     1140. f-DG High step 1 Bit 12     1150. f-DG High step 2 Bit 13     1160. f-DG Low step 1 Bit 14     1170. f-DG Low step 2 Bit 15     1180. U-BB High step 1

Address	Content	Type
21	Alarms	Bit 0 1190. U-BB High step 2 Bit 1 1200. U-BB Low step 1 Bit 2 1210. U-BB Low step 2 Bit 3 1220. f-BB High step 1 Bit 4 1230. f-BB High step 2 Bit 5 1240. f-BB Low step 1 Bit 6 1250. f-BB Low step 2 Bit 7 1260. Overload step 1 Bit 8 1270. Overload step 2 Bit 9 1280. Unbalance current Bit 10 1290. Unbalance voltage Bit 11 1300. Q import Bit 12 1310. Q export Bit 13 1320. Gen. neg. sequence current Bit 14 1330. Gen. neg. sequence voltage Bit 15 1390. Overload step 3
22	Alarms	Bit 0 1350. df/dt (ROCOF) Bit 1 1360. Vector jump Bit 2 3440. 4-20 mA input no. 1.1 Bit 3 3460. 4-20 mA input no. 2.1 Bit 4 3480. 4-20 mA input no. 3.1 Bit 5 3500. 4-20 mA input no. 4.1 Bit 6 3520. 4-20 mA input no. 5.1 Bit 7 3540. 4-20 mA input no. 6.1 Bit 8 3560. 4-20 mA input no. 7.1 Bit 9 3580. 4-20 mA input no. 8.1 Bit 10 3600. Pt100 no. 1.1 Bit 11 3620. Pt100 no. 2.1 Bit 12 3640. Overspeed (Tacho) 1 Bit 13 3120. Dig. input term. 23 Bit 14 3130. Dig. input term. 24 Bit 15 3140. Dig. input term. 25
23	Alarms	Bit 0 3150. Dig. input term. 26 Bit 1 3160. Dig. input term. 27 Bit 2 3170. Dig. input term. 43 Bit 3 3180. Dig. input term. 44 Bit 4 3190. Dig. input term. 45 Bit 5 3200. Dig. input term. 46 Bit 6 3210. Dig. input term. 47 Bit 7 3220. Dig. input term. 48 Bit 8 3230. Dig. input term. 49 Bit 9 3240. Dig. input term. 50 Bit 10 3250. Dig. input term. 51 Bit 11 3260. Dig. input term. 52 Bit 12 3270. Dig. input term. 53 Bit 13 3280. Dig. input term. 110 Bit 14 3290. Dig. input term. 111 Bit 15 3300. Dig. input term. 112

Address	Content	Type
24	Alarms	Bit 0 3310. Dig. input term. 113 Bit 1 3320. Dig. input term. 114 Bit 2 3330. Dig. input term. 115 Bit 3 3340. Dig. input term. 116 Bit 4 3350. Dig. input term. 117 Bit 5 3360. Dig. input term. 118 Bit 6 3370. Dig. input term. 127 Bit 7 3380. Dig. input term. 128 Bit 8 3390. Dig. input term. 129 Bit 9 3400. Dig. input term. 130 Bit 10 3410. Dig. input term. 131 Bit 11 3420. Dig. input term. 132 Bit 12 3430. Dig. input term. 133 Bit 13 3660. Oil pressure (VDO sensor 1) 1 Bit 14 3680. Water temperature (VDO sensor 2) 1 Bit 15 3700. Fuel level (VDO sensor 3) 1
25	System alarms/status	Bit 0 Sync. fail. alarm Bit 1 Generator breaker ON failure Bit 2 Generator breaker OFF failure Bit 3 Generator breaker position fail. alarm Bit 4 Phase sequence error alarm Bit 5 Governor regulator fail. alarm Bit 6 AVR regulator fail. alarm Bit 7 Battery voltage alarm Bit 8 Sync. window timer runout (menu 2052) * Bit 9 Reserved Bit 10 Reserved Bit 11 Start attempts
26	Alarm relay status	Bit 0 Relay 0 Bit 1 Relay 1 Bit 2 Relay 2 Bit 3 Relay 3 Bit 4 Relay 4 Bit 5 Relay 5 Bit 6 Relay 6 Bit 7 Relay 7 Bit 8 Relay 8 Bit 9 Relay 9 (Stop engine) Bit 10 Relay 10 Bit 11 Relay 11 Bit 12 Relay 12 Bit 13 Relay 13 Bit 14 Relay 14 Bit 15 Relay 15



**\*Address 25, bit 8: This bit is a status bit and is always high (1 value) as long as the unit is not synchronising. When synchronising, this bit is automatically reset to 0 and will remain 0 until synchronisation is achieved or the electrical measured values have been out of the synchronisation window for too long (longer than the programmed timer value of the synchronisation window parameter).**

Address	Content	Type
27	Status	Bit 0 Mode 1 Bit 1 Mode 2 Bit 2 Mode 3 Bit 3 Mode 4 Bit 4 Mode 5 Bit 5 Mode 6 Bit 6 Deload Bit 7 Start sync./control Bit 8 Alarm inhibit Bit 9 Breaker position ON Bit 10 Synchronising Bit 11 Relay 16
28		Bit 0 3450. 4-20 mA input no. 1.2 Bit 1 3470. 4-20 mA input no. 2.2 Bit 2 3490. 4-20 mA input no. 3.2 Bit 3 3510. 4-20 mA input no. 4.2 Bit 4 3530. 4-20 mA input no. 5.2 Bit 5 3550. 4-20 mA input no. 6.2 Bit 6 3570. 4-20 mA input no. 7.2 Bit 7 3590. 4-20 mA input no. 8.2 Bit 8 3610. Pt100 no. 1.2 Bit 9 3630. Pt100 no. 2.2 Bit 10 3650. Overspeed (Tacho) 2 Bit 11 3670. Oil pressure (VDO sensor 1) 2 Bit 12 3690. Water temperature (VDO sensor 2) 2 Bit 13 3710. Fuel level (VDO sensor 3) 2 Bit 14 1370. Zero sequence current Bit 15 1380. Zero sequence voltage
29	$U_{DG-max}$	Generator max. voltage. Measured in [V]
30	$U_{DG-min}$	Generator min. voltage. Measured in [V]
31	$U_{BBL2-L3}$	Busbar voltage. Measured in [V]
32	$U_{BBL3-L1}$	Busbar voltage. Measured in [V]
33	$U_{BB-max}$	Busbar max. voltage. Measured in [V]
34	$U_{BB-min}$	Busbar min. voltage. Measured in [V]
35	$U_{BBL1-N}$	Busbar voltage. Measured in [V]
36	$U_{BBL2-N}$	Busbar voltage. Measured in [V]
37	$U_{BBL3-N}$	Busbar voltage. Measured in [V]
38	Running time	Hour
39	RPM	RPM
40	$S_{GEN}$	Generator apparent power. Measured in [kVA]
41	VDO 1	Oil pressure in [bar]/10
42	VDO 2	Water temp. in [°C]
43	VDO 3	Fuel level in [%]
44	$PHI_{BBL1-L2}$	0...359 Busbar phase angle. Measured in [deg.]
45	$PHI_{BBL1-DGL1}$	0...359 Busbar/generator phase angle. Measured in [deg.]
46	$CB_{oper}$	Circuit breaker operations counter
47	$U_{SUPPLY}$	Supply voltage. Measured in [V/10]
48	Pt100 (1)	-40 – 250 temperature in deg. (engine interface)
49	Pt100 (2)	-40 – 250 temperature in deg. (engine interface)
50		Control register table address 0

Address	Content	Type
51		Control register table address 1
52		Control register table address 3
53		Control register table address 4
54		Control register table address 5
55		Analogue input no. 1 (scaled)
56		Analogue input no. 2 (scaled)
57		Analogue input no. 3 (scaled)
58		Analogue input no. 4 (scaled)
59		Analogue input no. 5 (scaled)
60		Analogue input no. 6 (scaled)
61		Analogue input no. 7 (scaled)
62		Analogue input no. 8 (scaled)
63		No. of alarms
64		No. of unacknowledged alarms
65	PF	-99...0...100 generator power factor. Measured in [PF/100] Negative value means capacitive power factor
66	Not used	
67	Not used	
68	Not used	
69	Not used	
70	Not used	
71	Not used	
72	Not used	
73	Not used	
74 Hi 75 Lo	R <sub>GEN</sub> Import	Reactive energy counter, imported reactive power. Measured in [kVARh]. Max. 300000 MVARh
76 Hi 77 Lo	E <sub>GEN</sub> Import	Energy counter, imported power. Measured in [kWh]. Max. 300000 MWh

**Control register table (write only) (function code 10h)**

Address	Content	Description
0	Power regulator setpoint	+/-100% of nominal power Activated in menu 4051
1	PF regulator setpoint	60...100 stated as PF value/100. The value 100 means PF = 1 Activated in menu 4055
2	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 Mode 1 Bit 2 Mode 2 Bit 3 Mode 3 Bit 4 Mode 4 Bit 5 Mode 5 Bit 6 Mode 6 Bit 7 Deload Bit 8 Start sync./reg. Bit 9 Alarm inhibit Bit 10 Alarm ack. This bit is automatically reset in Multi-line 2 Bit 11 Second setpoint (protection functions) Bit 12 Remote mode (option M1/M2)* Bit 13 Local mode (option M1/M2)*
3	Frequency regulator setpoint	-50...50 Hz/10 referring to nominal frequency Activated in menu 4052
4	Voltage regulator setpoint	-100...100%/10 of nominal voltage Activated in menu 4053
5	Reactive power regulator setpoint	-250...250% of produced power. A negative value means capacitive reactive power, and a positive value means inductive reactive power Activated in menu 4054
<b>Date and time setting</b>		
19000	Year setting	2003...2099
19001	Month setting	1...12
19002	Date setting	1...31
19003	Day setting	1...7 (1 = Monday, 7 = Sunday)
19004	Hour setting	0...23
19005	Minutes setting	0...59



If terminal 26 "Control via external communication" is activated, the regulators are controlled via the Modbus. The digital inputs "Alarm ack" and "Alarm inhibit" are always handled even if terminal 26 = ON. The date and time settings do not require terminal 26 to be ON.



In menu 4050 it is selected, if a setpoint is to be controlled by the control registers. (Bits representing mode 3 and/or mode 6 must be on). It is possible to write to the control registers also when terminal 26 = OFF, but the regulators will only respond if terminal 26 = ON. The content of the control registers is not lost in case of supply failure, so frequent updates are not necessary.



**\*Address 2 bits 12 and 13: The selection of remote/local mode must be made with a pulse. If the command is repeated, it will overrule the selection from the display.**

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

Address	Content	Description
0	Mode 1	
1	Mode 2	
2	Mode 3	
3	Mode 4	
4	Mode 5	
5	Mode 6	
6	Deload	
7	Start sync./reg.	
8	Alarm inhibit	
9	Alarm ack.	This bit is automatically reset in Multi-line 2
10	2 <sup>nd</sup> setpoint	Use second set of protection parameters
11	Remote*	Remote running mode (option M1/M2)
12	Local*	Local running mode (option M1/M2)

The command flag table has the same content as address 2 in the control register table.



**\*The selection of remote/local mode must be made with a pulse. If the command is repeated, it will overrule the selection from the display.**

### Status flags table (read only) (function code 01h)

Address	Content	Description
0	Mode 1	
1	Mode 2	
2	Mode 3	
3	Mode 4	
4	Mode 5	
5	Mode 6	
6	Deload	
7	Start sync./reg.	
8	Alarm inhibit	
9	Breaker pos. on	
10	Synchronising	
11	Remote	

## 5. Parameter table

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### Parameter table reading and writing

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

#### Function 01(01hex) 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
Status	Status table	0-499 (status address)
Alarm active	Parameter table	500-999 (status address + 500)
Alarm acknowledge	Parameter table	1000-1499 (status address + 1000)
Digital input	Digital input table	1500-1599 (status address + 1500)
Digital output	Digital output table	2000-2499 (status address + 2000)
Command flags	Parameter table	3500-4499 (command address + 3500)



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

#### Function 03(03hex) 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
Measuring values	Measuring values table	0-499 (data address)
Timers used	Parameter table	500-999 (data address + 500)
Timers minimum	Parameter table	1000-1499 (data address + 1000)
Timers maximum	Parameter table	1500-1599 (data address + 1500)
Values used	Parameter table	2000-2499 (data address + 2000)
Values minimum	Parameter table	2500-2999 (data address + 2500)
Values maximum	Parameter table	3000-3499 (data address + 3000)



The max. number of data query is limited of the length of the actual table or max. 100.

**Function 15(0Fhex) write multiple flags**

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

Address area for writing of status flags

Multi-line 2 Data to request	Multi-line 2 Table	Address area
Commands	Command table	0-499 (command address)
Alarm acknowledge	Parameter table	1000-1499 (command address + 1000)
Command flags	Parameter table	3500-4499 (command address + 3500)



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

**Function 16(10hex) write register**

Writes values into a sequence of registers.

Address area for writing of registers

Multi-line 2 Data to request	Multi-line 2 Table	Address area
Control	Control table setpoint	0-499 (control address)
Timers used	Parameter table	500-999 (control address + 500)
Values used	Parameter table	2000-2499 (control address + 2000)



The maximum number of data query is limited of the length of the actual table or max 100.

**Parameter table**

The table shows an overview of the addresses and menu numbers.

Offset address	Ch. no.	Content	Value unit	Delay unit
0	-	-	-	-
1	1010	Reverse power	%/10	1/10 s
2	1016	Reverse power inverse	%/10	1/10 s
3	1020	Overcurrent 1	%/10	1/10 s
4	1030	Overcurrent 2	%/10	1/10 s
5	1041	Overcurrent inverse 1 value	%/10	1/10 s
6	1042	Overcurrent inverse 2 values	%/10	1/10 s
7	1043	Overcurrent inverse 3 values	%/10	1/10 s
8	1051	Overcurrent inverse 4 values	%/10	1/10 s
9	1052	Overcurrent inverse 5 values	%/10	1/10 s

Offset address	Ch. no.	Content	Value unit	Delay unit
10	1053	Overcurrent inverse 6 values	%/10	1/10 s
11	1060	Overcurrent inv. relays and enable	-	-
12	1070	Fast overcurrent	%/10	1/10 s
13	1080	High overcurrent	%/10	1/10 s
14		Reserved		
15	1100	DG high volt 1	%/10	1/10 s
16	1110	DG high volt 2	%/10	1/10 s
17	1120	DG low volt 1	%/10	1/10 s
18	1130	DG low volt 2	%/10	1/10 s
19	1140	DG high freq 1	%/10	1/10 s
20	1150	DG high freq 2	%/10	1/10 s
21	1160	DG low freq 1	%/10	1/10 s
22	1170	DG low freq 2	%/10	1/10 s
23	1180	U-BB high step 1	%/10	1/100 s
24	1190	U-BB high step 2	%/10	1/100 s
25	1200	U-BB low step 1	%/10	1/100 s
26	1210	U-BB low step 2	%/10	1/100 s
27	1220	f-BB high step 1	%/10	1/100 s
28	1230	f-BB high step 2	%/10	1/100 s
29	1240	f-BB low step 1	%/10	1/100 s
30	1250	f-BB low step 2	%/10	1/100 s
31	1260	Overload 1	%/10	1/10 s
32	1270	Overload 2	%/10	1/10 s
33	1280	Unbalance current	%/10	1/10 s
34	1290	Unbalance volt.	%/10	1/10 s
35	1300	VAr import	%/10	1/10 s
36	1310	VAr export	%/10	1/10 s
37	1320	Gen. neg. sequence current	%/10	1/10 s
38	1330	Gen. neg. sequence voltage	%/10	1/10 s
39	1390	Overload 3	%/10	1/10 s
40	1350	df/dt (ROCOF)	Hz/10/s	n
41	1352	df/dt (ROCOF) measuring time	Periods	n
42	1360	Vector jump	Deg./10	n
43-44		Reserved		
45	1410	Reverse power S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
46	1420	Overcurrent 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
47	1430	Overcurrent 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
48	1440	DG high volt 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
49	1450	DG high volt 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
50	1460	DG low volt 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
51	1470	DG low volt 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
52	1480	DG high freq 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
53	1490	DG high freq 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
54	1500	DG low freq 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s

Offset address	Ch. no.	Content	Value unit	Delay unit
55	1510	DG low freq 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
56	1520	U-BB high step 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
57	1530	U-BB high step 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
58	1540	U-BB low step 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
59	1550	U-BB low step 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
60	1560	f-BB high step 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
61	1570	f-BB high step 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
62	1580	f-BB low step 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
63	1590	f-BB low step 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/100 s
64	1600	Overload 1 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
65	1610	Overload 2 S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
66	1620	Unbalance current S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
67	1630	Unbalance volt. S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
68	1640	VAr import S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
69	1650	VAr export S2 (2 <sup>nd</sup> param. set)	%/10	1/10 s
70	2011	Static sync. (enable/disable only)		
71	2021	Sync. df max.	Hz/10	n
72	2022	Sync. df min.	Hz/10	n
73	2023	Sync. DU max.	%	n
74	2024	Sync. t CB	ms	n
75	2031	Static sync. df max.	Hz/10	n
76	2032	Static sync. dU max.	%	n
77	2033	Static close window	Deg.	n
78	2034	Static phase controller Kp	None	n
79	2035	Static phase controller Ki	None	n
80	2041	Blackout df max.	Hz/10	n
81	2042	Blackout dU max.	%	n
82	2043	Blackout enable	n	n
83	2050	Sync. window	%	1/10 s
84	2060	Sync. failure	n	1/10 s
85	2070	General failure	n	1/10 s
86		Reserved		
87		Reserved		
88		Reserved		
89		Reserved		
90	2110	Modes active	n	n
91	2121	Freq. control DB	%/10	n
92	2122	Freq. control Kp	None	n
93	2123	Freq. control Ki	None	n
94	2124	Freq. control droop	%/10	n
95	2131	Power control DB	%/10	n
96	2132	Power control Kp	None	n
97	2133	Power control Ki	None	n
98	2141	Power ramp up speed	%/10/s	n

Offset address	Ch. no.	Content	Value unit	Delay unit
99	2142	Power ramp up point	%	n
100	2151	Power ramp down speed	%/10/s	n
101	2152	Power ramp down point	%	n
102	2160	Analogue governor offset	%	n
103		Reserved		
104		Reserved		
105		Reserved		
106	2180	Governor regulator failure	%	1/10 s
107	2191	Volt. control DB	%/10	n
108	2192	Volt. control Kp	None	n
109	2193	Volt. control Ki	None	n
110	2201	VAr control DB	%/10	n
111	2202	VAr control Kp	None	n
112	2203	VAr control Ki	None	n
113	2210	Analogue AVR offset	%	n
114		Reserved		
115		Reserved		
116		Reserved		
117	2230	AVR regulator fail.	n	1/10 s
118		Reserved		
119		Reserved		
120		Reserved		
121	2251	GOV min. ON time	ms	n
122	2252	GOV period time	ms	n
123	2253	AVR min. ON time	ms	n
124	2254	AVR period time	ms	n
125	2260	GOV/AVR setup (outputs)	None	n
126	2271	Minimum value (PWM)	%	n
127	2272	Initial value (PWM)	%	n
128	2273	Maximum value (PWM)	%	n
129	2274	Enable PWM	None	n
130	2281	Water control DB	%	n
131	2282	Water control Kp	None	n
132	2283	Water control Ki	None	n
133	3440	4-20 mA in no. 1 (alarm setting)	User	y
134	3460	4-20 mA in no. 2 (alarm setting)	User	y
135	3480	4-20 mA in no. 3 (alarm setting)	User	y
136	3500	4-20 mA in no. 4 (alarm setting)	User	y
137	3520	4-20 mA in no. 5 (alarm setting)	User	y
138	3540	4-20 mA in no. 6 (alarm setting)	User	y
139	3560	4-20 mA in no. 7 (alarm setting)	User	y
140	3580	4-20 mA in no. 8 (alarm setting)	User	y
141	3600	Pt100 no. 1	Deg.	y
142	3620	Pt100 no. 2	Deg.	y

Offset address	Ch. no.	Content	Value unit	Delay unit
143	3640	Overspeed (Tacho)	RPM	y
144	3120	Dig. input term. 23	None	y
145	3130	Dig. input term. 24	None	y
146	3140	Dig. input term. 25	None	y
147	3150	Dig. input term. 26	None	y
148	3160	Dig. input term. 27	None	y
149	3170	Dig. input term. 43	None	y
150	3180	Dig. input term. 44	None	y
151	3190	Dig. input term. 45	None	y
152	3200	Dig. input term. 46	None	y
153	3210	Dig. input term. 47	None	y
154	3220	Dig. input term. 48	None	y
155	3230	Dig. input term. 49	None	y
156	3240	Dig. input term. 50	None	y
157	3250	Dig. input term. 51	None	y
158	3260	Dig. input term. 52	None	y
159	3260	Dig. input term. 53	None	y
160	3270	Dig. input term. 110	None	y
161	3280	Dig. input term. 111	None	y
162	3290	Dig. input term. 112	None	y
163	3300	Dig. input term. 113	None	y
164	3310	Dig. input term. 114	None	y
165	3320	Dig. input term. 115	None	y
166	3330	Dig. input term. 116	None	y
167	3340	Dig. input term. 117	None	y
168	3350	Dig. input term. 118	None	y
169	3360	Dig. input term. 127	None	y
170	3370	Dig. input term. 128	None	y
171	3380	Dig. input term. 129	None	y
172	3390	Dig. input term. 130	None	y
173	3400	Dig. input term. 131	None	y
174	3410	Dig. input term. 132	None	y
175	3420	Dig. input term. 133	None	y
176	3660	Oil pressure (VDO 1)	%	1/10 s
177	3666	VDO 1 type	None	n
178	3680	Cool water temp. (VDO 2)	%	1/10 s
179	3686	VDO 2 type	None	n
180	3700	Fuel level (VDO 3)	%	1/10 s
181	3706	VDO 3 type	None	n
182	4011	Nom. frequency	Hz/10	n
183	4012	Nom. power	kW	n
184	4013	Nom. current	A	n
185	4014	Nom. voltage	V	n
186	4021	Volt prim. GEN	V	n

Offset address	Ch. no.	Content	Value unit	Delay unit
187	4022	Volt sec. GEN	V	n
188	4023	Current prim.	A	n
189	4024	Current sec.	A	n
190	4031	Volt prim. BUS	V	n
191	4032	Volt sec. BUS	V	n
192	4041	Control settings P	%	n
193	4042	Control settings VAr	%	n
194	4043	Control settings PF	None	n
195	4044	Control settings water level	%	n
196	4051	Comm. bus control P command	n0/1	n
197	4052	Comm. bus control f command	n0/1	n
198	4053	Comm. bus control U command	n0/1	n
199	4054	Comm. bus control Q command	n0/1	n
200	4055	Comm. bus control PF command	n0/1	n
201	4061	Ext. comm. ID	None	n
202	4062	Baud rate 0=9600, 1=19200	None	n
203	4092	Ext. comm. error	n1	1/10 s
204	4121	Running time	n0	n
205	4122	Circuit breaker operations	n0	n
206	4123	Reset kWh counter command	n0/1	n
207	4133	Water level control ON/OFF command	n0/1	n
208	4220	Battery low V	V/10	1/10 s
209	4231	Language	None	n
210	4240	Load share out	1/10 V	n
211	4250	Load share type	None	n
212	4260	Start next gen.	%	1/10 s
213	4270	Stop next gen.	%	1/10 s
214	4351	Running RPM	RPM	n
215	4352	No. of teeth (flywheel)	None	n
216	4361	Start prepare	n	1/10 s
217	4362	Start ON time (crank)	n	1/10 s
218	4363	Start OFF time (pause)	n	1/10 s
219	4371	Start attempts	None	n
220	4381	f/U OK	n	1/10 s
221	4391	f/U failure	n	1/10 s
222	4401	Cooldown time	n	1/10 s
223	4402	Extended stop time (stop coil)	n	1/10 s
224	4403	Coil type	None	n
225	4410	Stop failure	n	1/10 s
226	4420	Run status	b	1/10 s
227		Reserved		
228		Reserved		
229		Reserved		
230	4502	P output type	0 or 4	n

Offset address	Ch. no.	Content	Value unit	Delay unit
231	4512	S output type	0 or 4	n
232	4522	Q output type	0 or 4	n
233	4532	PF output type	0 or 4	n
234	4542	f output type	0 or 4	n
235	4552	U output type	0 or 4	n
236	4562	I output type	0 or 4	n
237	4503	P output max.	kW	n
238	4513	S output max.	kVA	n
239	4523	Q output max.	VA <sub>r</sub>	n
240	4533	PF output max.	None	n
241	4543	f output max.	Hz/10	n
242	4553	U output max.	V	n
243	4563	I output max.	A	n
244	4504	P output min.	kW	n
245	4514	S output min.	kVA	n
246	4524	Q output min.	kVA <sub>r</sub>	n
247	4534	PF output min.	None	n
248	4544	f output min.	Hz/10	n
249	4554	U output min.	V	n
250	4564	I output min.	A	n
251	4600	Relay 0 virtual	None	1/10 s
252	4610	Relay 1	None	1/10 s
253	4620	Relay 2	None	1/10 s
254	4630	Relay 3	None	1/10 s
255	4640	Relay 4	None	1/10 s
256	4650	Relay 5	None	1/10 s
257	4660	Relay 6	None	1/10 s
258	4670	Relay 7	None	1/10 s
259	4680	Relay 8	None	1/10 s
260	4690	Relay 9	None	1/10 s
261	4700	Relay 10	None	1/10 s
262	4710	Relay 11	None	1/10 s
263	4720	Relay 12	None	1/10 s
264	4730	Relay 13	None	1/10 s
265		Reserved		
266		Reserved		
267		Reserved		
268	4771	CCM Baud rate	None	n
269	4781	MID/UNIT number	None	n
270	4791	MID/UNIT number	None	n
271	4801	MID/UNIT number	None	n
272	4811	MID/UNIT number	None	n
273	4821	MID/UNIT number	None	n
274	4831	MID/UNIT number	None	n

Offset address	Ch. no.	Content	Value unit	Delay unit
275	4841	MID/UNIT number	None	n
276	4851	MID/UNIT number	None	n
277	4861	MID/UNIT number	None	n
278	4871	MID/UNIT number	None	n
279	4881	MID/UNIT number	None	n
280	4891	MID/UNIT number	None	n
281	4901	MID/UNIT number	None	n
282	4911	MID/UNIT number	None	n
283	4321	MID/UNIT number	None	n
284	4931	MID/UNIT number	None	n
285	4762	Enable list 1 command	n0/1	n
286	4772	Enable list 2 command	n0/1	n
287	4782	Enable list 3 command	n0/1	n
288	4792	Enable list 4 command	n0/1	n
289	4802	Enable list 5 command	n0/1	n
290	4812	Enable list 6 command	n0/1	n
291	4822	Enable list 7 command	n0/1	n
292	4832	Enable list 8 command	n0/1	n
293	4842	Enable list 9 command	n0/1	n
294	4852	Enable list 10 command	n0/1	n
295	4862	Enable list 11 command	n0/1	n
296	4872	Enable list 12 command	n0/1	n
297	4882	Enable list 13 command	n0/1	n
298	4892	Enable list 14 command	n0/1	n
299	4902	Enable list 15 command	n0/1	n
300	4912	Enable list 16 command	n0/1	n
301	4763	Update rate	1/10 s	n
302	4773	Update rate	1/10 s	n
303	4783	Update rate	1/10 s	n
304	4793	Update rate	1/10 s	n
305	4803	Update rate	1/10 s	n
306	4813	Update rate	1/10 s	n
307	4823	Update rate	1/10 s	n
308	4833	Update rate	1/10 s	n
309	4843	Update rate	1/10 s	n
310	4853	Update rate	1/10 s	n
311	4863	Update rate	1/10 s	n
312	4873	Update rate	1/10 s	n
313	4883	Update rate	1/10 s	n
314	4893	Update rate	1/10 s	n
315	4903	Update rate	1/10 s	n
316	4913	Update rate	1/10 s	n
317	4971	Password	None	n
318		Reserved		

Offset address	Ch. no.	Content	Value unit	Delay unit
319	5011	VDO 1 at 0.0 bar	Ohm/10	n
320	5012	VDO 1 at 2.5 bar	Ohm/10	n
321	5013	VDO 1 at 5.0 bar	Ohm/10	n
322	5014	VDO 1 at 6.0 bar	Ohm/10	n
323	5021	VDO 1 at 7.0 bar	Ohm/10	n
324	5022	VDO 1 at 8.0 bar	Ohm/10	n
325	5023	VDO 1 at 9.0 bar	Ohm/10	n
326	5024	VDO 1 at 10.0 bar	Ohm/10	n
327	5031	VDO 2 at 40°C	Ohm	n
328	5032	VDO 2 at 50°C	Ohm	n
329	5033	VDO 2 at 60°C	Ohm	n
330	5034	VDO 2 at 70°C	Ohm	n
331	5041	VDO 2 at 80°C	Ohm	n
332	5042	VDO 2 at 90°C	Ohm	n
333	5043	VDO 2 at 100°C	Ohm	n
334	5044	VDO 2 at 110°C	Ohm	n
335	5051	VDO 3 at 0%	Ohm/10	n
336	5052	VDO 3 at 40%	Ohm/10	n
337	5053	VDO 3 at 50%	Ohm/10	n
338	5054	VDO 3 at 60%	Ohm/10	n
339	5061	VDO 3 at 70%	Ohm/10	n
340	5062	VDO 3 at 80%	Ohm/10	n
341	5063	VDO 3 at 90%	Ohm/10	n
342	5064	VDO 3 at 100%	Ohm/10	n
343	4070	CANbus off	n	n
344	4080	CANbus transmit fail.	n	n
345	2275	PWM control droop	%/10	n
346	4941	Asynchronous synchronisation	n	n
347	4942	Slip frequency	%/10	n
348	4952	Inverted reg.	n	n
349	4951	No. of valves	None	n
350	4353	Nominal RPM	RPM	n
351	4045	Water minimum	%	n
352	4960	Voltage trip type	None	n
353		Reserved		
354	3450	4-20 mA input no. 1 (alarm setting 2)	User	n
355	3470	4-20 mA input no. 2 (alarm setting 2)	User	n
356	3490	4-20 mA input no. 3 (alarm setting 2)	User	n
357	3510	4-20 mA input no. 4 (alarm setting 2)	User	n
358	3530	4-20 mA input no. 5 (alarm setting 2)	User	n
359	3550	4-20 mA input no. 6 (alarm setting 2)	User	n
360	3570	4-20 mA input no. 7 (alarm setting 2)	User	n
361	3590	4-20 mA input no. 8 (alarm setting 2)	User	n
362	3610	Pt100 no. 1 (alarm setting 2)	Deg.	y

Offset address	Ch. no.	Content	Value unit	Delay unit
363	3630	Pt100 no. 2 (alarm setting 2)	Deg.	y
364	3650	Overspeed (tacho alarm setting 2)	RPM	y
365	3670	Oil pressure (VDO 1, alarm setting 2)	%	1/10 s
366	3690	Cool w. temp. (VDO 2, al. setting 2)	%	1/10 s
367	3710	Fuel level (VDO 3, alarm setting 2)	%	1/10 s
368	4063	Comm. mode (0: RTU, 1: ASCII)	None	n
369		Reserved		
370		Reserved		
371		Reserved		
372		Reserved		
373		Reserved		
374	5116	Pincode GSM	None	n
375	5201	MID/UNIT number, SPR 1	None	n
376	5211	MID/UNIT number, SPR 2	None	n
377	5221	MID/UNIT number, SPR 3	None	n
378	5231	MID/UNIT number, SPR 4	None	n
379	5241	MID/UNIT number, SPR 5	None	n
380	5251	MID/UNIT number, SPR 6	None	n
381	5261	MID/UNIT number, SPR 7	None	n
382	5271	MID/UNIT number, SPR 8	None	n
383	5281	MID/UNIT number, SPR 9	None	n
384	5291	MID/UNIT number, SPR 10	None	n
385	5202	Enable single parameter read 1	None	n
386	5212	Enable single parameter read 2	None	n
387	5222	Enable single parameter read 3	None	n
388	5223	Enable single parameter read 4	None	n
389	5242	Enable single parameter read 5	None	n
390	5252	Enable single parameter read 6	None	n
391	5262	Enable single parameter read 7	None	n
392	5272	Enable single parameter read 8	None	n
393	5282	Enable single parameter read 9	None	n
394	5292	Enable single parameter read 10	None	n
395	5203	Update rate SPR 1	1/10 s	n
396	5213	Update rate SPR 2	1/10 s	n
397	5223	Update rate SPR 3	1/10 s	n
398	5233	Update rate SPR 4	1/10 s	n
399	5243	Update rate SPR 5	1/10 s	n
400	5253	Update rate SPR 6	1/10 s	n
401	5263	Update rate SPR 7	1/10 s	n
402	5273	Update rate SPR 8	1/10 s	n
403	5283	Update rate SPR 9	1/10 s	n
404	5293	Update rate SPR 10	1/10 s	n
405	4771	CAN engine interface type	None	n
406	4771	Cummins engine interface type	None	n

Offset address	Ch. no.	Content	Value unit	Delay unit
407	4781	EIC unit	None	n
408	4790	EI communication error	n	1/10 s
409	4800	EIC warning	n	1/10 s
410	4810	EIC shutdown	n	1/10 s
411	4820	EIC overspeed	RPM	1/10 s
412	4830	EIC coolant temp. (alarm setting 1)	Deg.	1/10 s
413	4840	EIC coolant temp. (alarm setting 2)	Deg.	1/10 s
414	4850	EIC oil pressure (alarm setting 1)	1/10 bar	1/10 s
415	4860	EIC oil pressure (alarm setting 2)	1/10 bar	1/10 s

Please refer to the Designer's Reference Handbook for information about:



- Availability of channels
- Min./max. settings
- Factory settings

Note that several channels also depend on the options.

### Limitations

It is possible to write to channels, where the option is not activated. It is not possible to enable the channel. E.g. if an attempt is made to write a '1' to the enable flag, then the '1' will be discarded, and the enable flag remains '0'. It is not possible to write to offset address 0. These values are used for DEIF internal version control.

### Abbreviations

"y" means that the channel is writeable.

"n" means that a "0" can be written to the channel only.

"n10" means that only the value 10 can be written.

### Examples:

- Write nominal frequency (4011), offset 182, 60 Hz  
ID = 1, 60 Hz = 600 Hz/10 = 0258h  
Address 2000 + 182 = 2182d = 0886h  
Tx: 01h 10h 08h 86h 00h 01h 02h 58h 30h ACh  
Rx: 01h 10h 08h 86h 00h 01h E2h 40h
- Read nominal frequency (4011) offset 182, 60 Hz  
Tx: 01h 03h 08h 86h 00h 01h 67h 83h  
Rx: 01h 03h 02h 02h 58h B8h DEh  
Read 0258h = 600d

**Digital input table (read only 01h)**

Address	Terminal	Description
1500	-	Not used
1501	127	Binary input (option M13)
1502	128	Binary input (option M13)
1503	129	Binary input (option M13)
1504	130	Binary input (option M13)
1505	131	Binary input (option M13)
1506	132	Binary input (option M13)
1507	133	Binary input (option M13)
1508-1528	-	Reserved
1529	43	Deload
1530	44	Man. governor up
1531	45	Man. governor down
1532	46	Man. AVR up
1533	47	Man. AVR down
1534	48	Mode 1
1535	49	Mode 2
1536	50	Mode 3
1537	51	Mode 4
1538	52	Mode 5
1539	53	Mode 6
1540	54	Breaker position off
1541	55	Breaker position on
1542	23	Alarm inhibit
1543	24	Alarm acknowledge
1544	25	Sync. start
1545	26	Control via external communication
1546	27	Block loss of mains
1546-1574	Reserved	
1575	110	Binary input option M2
1576	111	Binary input option M2
1577	112	Binary input option M2
1578	113	Binary input option M2
1579	114	Binary input option M2
1580	115	Binary input option M2
1581	116	Binary input option M2
1582	117	Binary input option M2
1583	118	Binary input option M2

**Digital output table (read only 01h)**

<b>Address</b>	<b>Terminal</b>	<b>Description</b>
2000	69/70	AVR up
2001	71/72	AVR down
2002	65/66	Governor up
2003	67/68	Governor down
2004	126/127	Relay 10
2005	128/129	Relay 11
2006	130/131	Relay 12
2007	132/133	Relay 13
2008 - 2015	-	Not used
2016	57/58	Relay 5
2017	59/60	Relay 6
2018	61/62	Relay 7
2019	63/64	Relay 8
2020	-	Not used
2021	-	Not used
2022	-	Not used
2023	-	Not used
2024	-	Not used
2025	5/6	Relay 1
2026	8/9	Relay 2
2027	11/12	Relay 3
2028	14/15	Relay 4
2029	17/18	Sync. relay (on in short time)
2030-2043	Reserved	
2044	120/121	Start (engine)
2045	122/123	Stop (engine) (relay 9)
2046	124/125	Start prepare (engine)

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