UNIMA-KS

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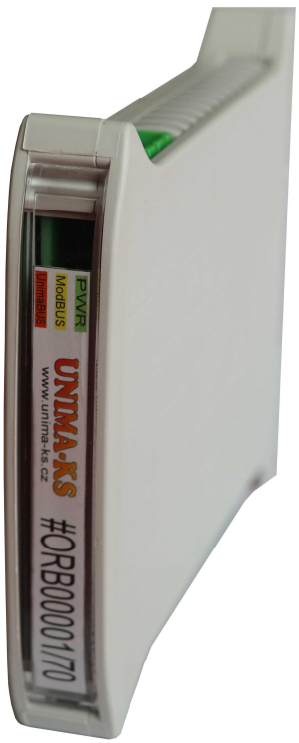
Specifications

Bridge ModBUS

UnimaBUS/ModBUS converter
for AP products



February 2022

1. Using

The described converter "Bridge ModBUS" (hereinafter Bridge) is used for two-way transmission of information from the AP device UNIMA-KS (on the RS485 UnimaBUS bus) to devices of other manufacturers (on the RS485 ModBUS RTU bus).

The converter can be configured as slave or master on the ModBUS bus. In slave mode, it can be used to send measured quantities and states from any device on UnimaBUS to the superior control system. In master mode, for example, any device on UnimaBUS can read measured quantities (sensors) from modules of other manufacturers with ModBUS RTU.

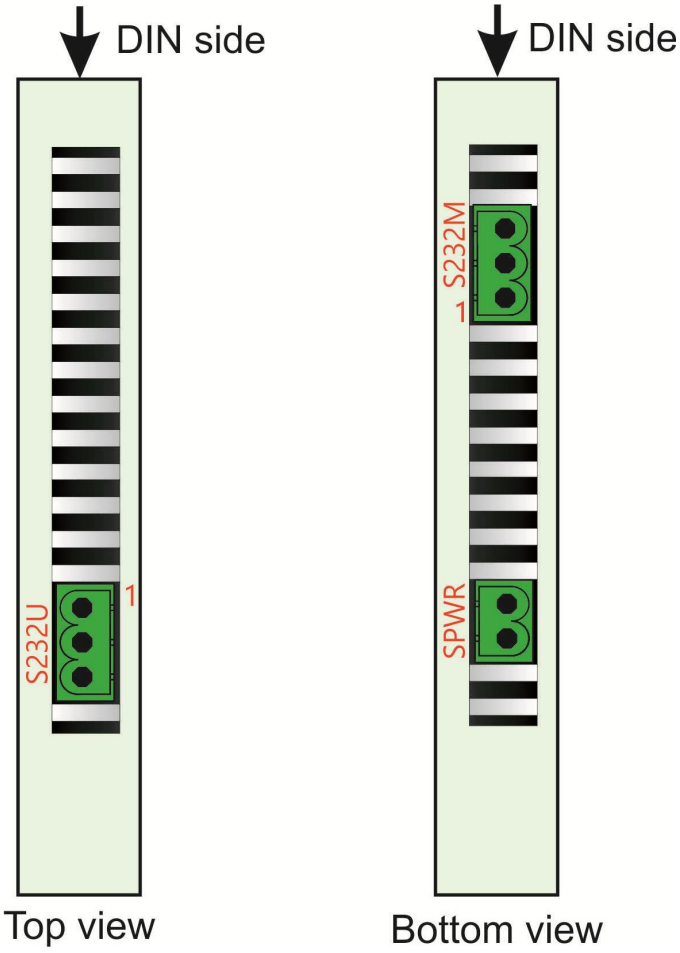
2. Mechanical design

The Bridge module is housed in a Railbox for DIN rail mounting. Module width (required space for DIN) is 18mm, height 100mm, depth 120mm. There are indicator LEDs on the front of the Bridge.

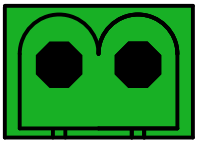
Indication LED on the front of the Bridge	
Power	Indicates the presence of supply voltage
ModBUS	Indicates outgoing communication on the ModBUS bus (sending a query in master mode, sending a response in slave mode) A flashing 100ms indicates that a response has been sent
UnimaBUS	Indicates incoming communication on the UnimaBUS bus 50ms flashing (permanent lighting) detects data reception via UnimaBUS

3. Electrical design

3.1 Signals connection



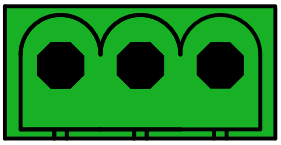
3.1.1 Connector SPWR



Pin	Name	Description
SPWR.1	POWER	Power supply 10÷33V DC or 8÷24V AC.
SPWR.2		

Connector span: 5,08mm

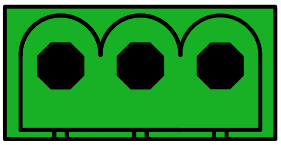
3.1.2 Connector S485U (RS-485 UnimaBUS communication)



Pin	Name	Description
S485U.1	485A	RS-485 for UnimaBUS connection
S485U.2	GND	
S485U.3	485B	

Connector span: 5,08mm
Max.conductor cross-sect: 2,5mm^2

3.1.3 Connector S485M (RS-485 ModBUS communication)



Pin	Name	Description
S485M.1	485A	RS-485 for ModBUS RTU communication
S485M.2	GND	
S485M.3	485B	

Connector span: 5,08mm
Max.conductor cross-sect: 2,5mm^2

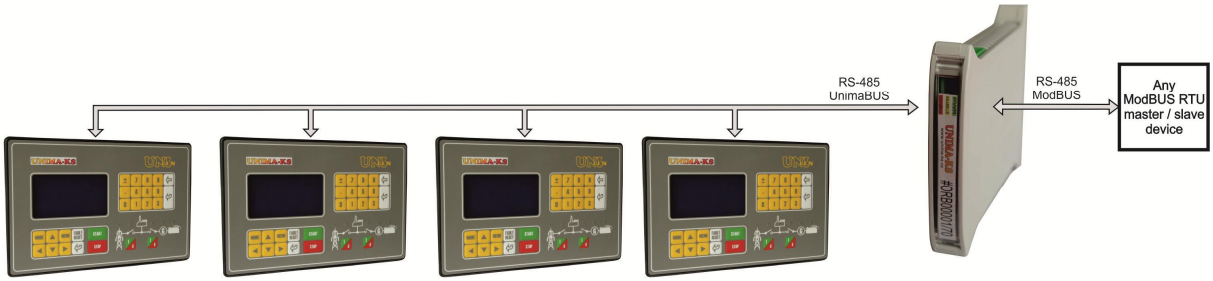
3.2 Bridge connection

3.2.1 Bridge connection to UnimaBUS

Connect the UnimaBUS communication bus with other UNIMA-KS devices to the S485U connector. The Bridge address on the UnimaBUS bus is defined by the "Addr" parameter (it can be different from the module address on the ModBUS bus, which is defined by another parameter).

The bridge can read information from various components of one unit (control system, speed controller, voltage controller, IO modules, etc.) connected to the UnimaBUS bus and then provide it to the ModBUS bus under one common ModBUS address. In this case, all components on the UnimaBUS bus (including the Bridge) must have the same UnimaBUS address set, the modules a different slot (the modules on slots 1-7 are "visible" to the Bridge automatically).

The bridge can read information from several control systems connected to the UnimaBUS bus and then provide it on the ModBUS bus under one common ModBUS address. In this case, all control systems must have a different UnimaBUS address set on the UnimaBUS.



3.2.2 Bridge connection to ModBUS

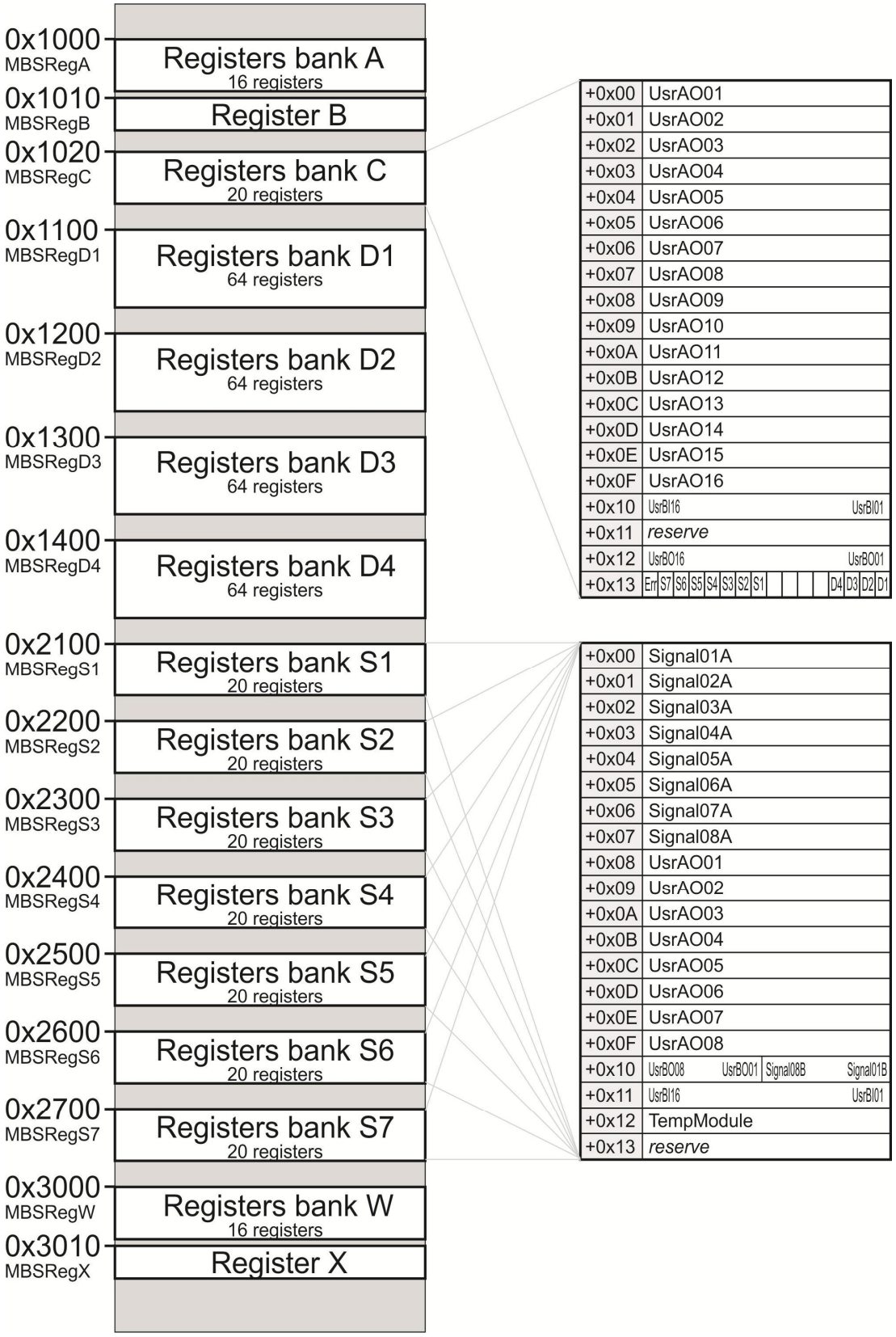
Connect the ModBUS communication bus to the S485M connector. The Bridge address on the ModBUS bus is defined by the "MBSAddr" parameter (it can be different from the module address on the UnimaBUS bus, which is defined by another parameter).

Communication parameters (speed, parity, number of stop bits) can be set in the Bridge parameters.

4. ModBUS registers

4.1 Register banks

Bridge memory is divided into several register banks. Bank addresses are defined in the Bridge parameters. The meaning of bank registers A and B is defined in the mapping. Bank C are the internal registers of Bridge itself. The meanings of the registers of banks D and S are fixed. Bank registers W and register X are used to write quantities from ModBUS in slave mode.



Registers bank	Default address	Description
BankA	0x1000÷0x100F	Bank of registers of analog quantities, individually defined in mapping (arbitrary analog quantities from various devices on UnimaBUS)
BankB	0x1010	Register of binary quantities, individually defined in the mapping (arbitrary binary quantities from various devices on UnimaBUS)
BankC	0x1020÷0x1033	Bridge Internal Registers. In addition to the user analog quantities, it is possible to read which devices or modules are online on UnimaBUS and whether there is a ModBUS error.
BankD1	0x1100÷0x113F	Fixed defined quantities from the device, which are given parameters "DevNSel" and address "DevNAddr", are automatically stored in the Banks D_N registers. Therefore, quantities from different devices at the same address as well as, for example, the same devices at different addresses can be stored in these registers
BankD2	0x1200÷0x123F	
BankD3	0x1300÷0x133F	
BankD4	0x1400÷0x143F	
BankS1	0x2100÷0x2113	The values from the IO modules on slot N are automatically stored in the S_N Bank Registers. The IO module must be at the same UnimaBUS address as the Bridge.
BankS2	0x2200÷0x2213	
BankS3	0x2300÷0x2313	
BankS4	0x2400÷0x2413	
BankS5	0x2500÷0x2513	
BankS6	0x2600÷0x2613	
BankS7	0x2700÷0x2713	
BankW	0x3000÷0x300F	Bank of registers for writing analog quantities from ModBUS. The values entered via ModBUS into this bank are visible to all devices on the UnimaBUS bus and can be used in the mapping of analog quantities.
BankX	0x3010	Register for writing binary quantities from ModBUS. The values written via the ModBUS bus to this register are visible to all devices on the UnimaBUS bus and can be used in the mapping of binary quantities.

When changing the default bank addresses, the address space must not overlap.

4.2 List of registers in banks

Below are the register offsets in the individual banks. The default bank address is listed as the default (factory default setting), the actual value may vary.

4.2.1 Bank A

Registers count : 16
Default address : 0x1000 (parameter „MBSRegA“)
The meaning of the registers of bank A is given by the mapping of the analog inputs Bridge.

Offset	Register content	Unit
+0x00	ModBUS[BankA+00]	0.1
+0x01	ModBUS[BankA+01]	0.1
+0x02	ModBUS[BankA+02]	0.1
+0x03	ModBUS[BankA+03]	0.1
+0x04	ModBUS[BankA+04]	0.1
+0x05	ModBUS[BankA+05]	0.1
+0x06	ModBUS[BankA+06]	0.1
+0x07	ModBUS[BankA+07]	0.1
+0x08	ModBUS[BankA+08]	0.1
+0x09	ModBUS[BankA+09]	0.1
+0x0A	ModBUS[BankA+0A]	0.1
+0x0B	ModBUS[BankA+0B]	0.1
+0x0C	ModBUS[BankA+0C]	0.1
+0x0D	ModBUS[BankA+0D]	0.1
+0x0E	ModBUS[BankA+0E]	0.1
+0x0F	ModBUS[BankA+0F]	0.1

4.2.2 Bank B

Registers count : 1
Default address : 0x1010 (parameter „MBSRegB“)
The meaning of the B bank registers is given by the mapping of the Bridge binary inputs.

Offset	Bit	Register content	Unit
+0x00	.0	ModBUS[BankB.0]	16x bit
	.1	ModBUS[BankB.1]	
	.2	ModBUS[BankB.2]	
	.3	ModBUS[BankB.3]	
	.4	ModBUS[BankB.4]	
	.5	ModBUS[BankB.5]	
	.6	ModBUS[BankB.6]	
	.7	ModBUS[BankB.7]	
	.8	ModBUS[BankB.8]	
	.9	ModBUS[BankB.9]	
	.10	ModBUS[BankB.10]	
	.11	ModBUS[BankB.11]	
	.12	ModBUS[BankB.12]	
	.13	ModBUS[BankB.13]	
	.14	ModBUS[BankB.14]	
	.15	ModBUS[BankB.15]	

4.2.3 Bank C

Registers count : 20
Default address : 0x1020 (parametr „MBSRegC“)
Internal registers of the Bridge

Offset	Bit	Register content	Unit
+0x00		User analog output 1	0.1
+0x01		User analog output 2	0.1
+0x02		User analog output 3	0.1
+0x03		User analog output 4	0.1
+0x04		User analog output 5	0.1
+0x05		User analog output 6	0.1
+0x06		User analog output 7	0.1
+0x07		User analog output 8	0.1
+0x08		User analog output 9	0.1
+0x09		User analog output 10	0.1
+0x0A		User analog output 11	0.1
+0x0B		User analog output 12	0.1
+0x0C		User analog output 13	0.1
+0x0D		User analog output 14	0.1
+0x0E		User analog output 15	0.1
+0x0F		User analog output 16	0.1
+0x10	.0	User binary input 1	16x bit
Binary inputs	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11		*Reserve*	
+0x12	.0	User binary output 1	16x bit
Binary outputs	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x13	.0	Device 1 on-line	16x bit

Binary outputs	.1	Devcie 2 on-line	
	.2	Device 3 on-line	
	.3	Device 4 on-line	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	*Reserve*	
	.8	IO modul [S1] on-line	
	.9	IO modul [S2] on-line	
	.10	IO modul [S3] on-line	
	.11	IO modul [S4] on-line	
	.12	IO modul [S5] on-line	
	.13	IO modul [S6] on-line	
	.14	IO modul [S7] on-line	
	.15	ModBUS communication error	

4.2.4 Banks D_N

Registers count : max.64
Default address : 0x1100+0x100*(N-1) (par. „MBSRegD_N“), where N=<1,4>
The meaning of the registers of bank D depends on the type of selected device for the given bank with the parameter "DevNSel". The order of registers in the bank is fixed (see the following chapters)

Chapter	Device
4.2.4.1	UniGEN-CHP, MicroGEN-CHP
4.2.4.2	UniGEN-TEM
4.2.4.3	UniGEN-MVE, MicroGEN-MVE
4.2.4.4	MicroGEN-SYNC
4.2.4.5	NSU2
4.2.4.6	UIS
4.2.4.7	UVR
4.2.4.8	USC
4.2.4.9	Bridge-TEM

Some of the registries listed below may not be available in later firmware versions of individual devices.

4.2.4.1UniGEN-CHP, MicroGEN-CHP

Offset	Bit	Register content	Unit
+0x00	.0-7	State	2x byte
	.8	Unit mode (0=OFF, 1=MAN, 2=SEM, 6=AUT)	
	.9		
	.10		
	.11	Power mode (0=MAN, 1=COPY)	
+0x01		Speed	$1min^{-1}$
+0x02		Motohours, low word	1s
+0x03		Motohours, high word	65536s
+0x04		Mains active power	0.1kW
+0x05		Mains reactive power	0.1kVAr
+0x06		Generator active power	0.1kW
+0x07		Generator reactive power	0.1kVAr
+0x08		Power requested value	0.1kW
+0x09		Power regulated value	0.1kW
+0x0A		Ganarator voltage requested value	0.1V
+0x0B		Voltage (power factor) control	0.1%
+0x0C		Speed request value	$1min^{-1}$
+0x0D		Speed (power) control	0.1%
+0x0E		Mixture control	0.1%
+0x0F		State word	16x bit
+0x10	.0	User binary input 1	16x bit
Binary inputs	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Blocking start by user	16x bit
Binary inputs	.1	External stop by user (key STOP)	
	.2	Blocking synchronization by user	
	.3	Control system mode 0	
	.4	Control system mode 1	
	.5	External asknowledge (key ACK)	
	.6	Fuel B/A	
	.7	Remote control	
	.8	Generator deion state	
	.9	Mains deion state	
	.10	Generator deion external control (key GCB) [1)]	
	.11	Full power request [1)]	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Generator overcurrent (external)	
	.15	Mains error	
+0x12	.0	Central stop	16x bit
	.1	Low gas pressure beetwen valves	

Binary inputs	.2	Low gas pressure on input	
	.3	Low oil pressure	
	.4	Low oil level	
	.5	Low water level in primary circuit	
	.6	Low water level in secondary circuit	
	.7	Chocked filter	
	.8	Gas escape level I	
	.9	Gas escape level II	
	.10	Smoke detector	
	.11	Oil refiling signalization	
	.12	Low clear oil level	
	.13	No clear oil	
	.14	High dirty oil level	
	.15	Step-motor closed [1)]	
+0x13 Binary inputs	.0	User binary input 17	16x bit
	.1	User binary input 18	
	.2	User binary input 19	
	.3	User binary input 20	
	.4	User binary input 21	
	.5	User binary input 22	
	.6	User binary input 23	
	.7	User binary input 24	
	.8	User binary input 25	
	.9	User binary input 26	
	.10	User binary input 27	
	.11	User binary input 28	
	.12	External start by user (key START) [1)]	
	.13	*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	Preheating	16x bit
	.1	Prestart	
	.2	Ready	
	.3	Run	
	.4	Error	
	.5	Varning	
	.6	Run request	
	.7	Manual run request	
	.8	Generator deion control	
	.9	Mains deion control	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	

	.13	*Reserve*	
	.14	Load decrease request	
	.15	Emergency mode	
+0x16 Binary outputs	.0	Starter	16x bit
	.1	Ignition	
	.2	Gas valve 1	
	.3	Gas valve 2	
	.4	Synchronization (back synchronization)	
	.5	Manual cool-down	
	.6	Idle run	
	.7	Acknowledge (signal is active 2s after acknowledge key pressed)	
	.8	Clear oil refiling pump	
	.9	Oil pre-lubrication pump	
	.10	Primary cooling circle pump	
	.11	Secondar cooling circle pump	
	.12	Primary 3-way valve open	
	.13	Primary 3-way valve close	
	.14	Secondary 3-way valve open	
	.15	Secondary 3-way valve close	
+0x17 Binary outputs	.0	Mode OFF	8x bit
	.1	Mode MAN	
	.2	Mode SEM	
	.3	Mode AUT	
	.4	Generator voltage down	
	.5	Generator voltage up	
	.6	Generator frequency down	
	.7	Generator frequency up	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Oil pressure	0.1kPa
+0x21		Oil temperature	0.1°C
+0x22		Oil level	0.1%
+0x23		Mixture pressure	0.1kPa
+0x24		Mixture temperature	0.1°C
+0x25		Gas pressure	0.1kPa
+0x26		Gas temperature	0.1°C
+0x27		Methane content	0.1%
+0x28		Air inside temperature	0.1°C
+0x29		Lambda	0.1mV
+0x2A		Exhaust temperature	0.1°C
+0x2B		Unit maximal power	0.1kW
+0x2C		External power request	0.1kW
+0x2D		Manual mixture correction <-20,20>	0.1%
+0x2E		*Reserve*	
+0x2F		Generator winding temperature L1	0.1°C
+0x30		Primary water temperature (input)	0.1°C
+0x31		Primary water temperature (output)	0.1°C
+0x32		Secondary water temperature (input)	0.1°C
+0x33		Secondary water temperature (output)	0.1°C
+0x34		Generator winding temperature L2	0.1°C

+0x35		Generator winding temperature L3	0.1°C
+0x36		Air intake temperature	0.1°C
+0x37		Controller temperature	0.1°C
+0x38		Average cylinder temperature	0.1°C
+0x39		Average value of active generator power (average value of register + 0x06)	0.1kW
+0x3A		Generator produced energy (low word)	0.1kWh
+0x3B		Generator produced energy (high word)	6553.5kWh
+0x3C		*Reserve*	
+0x3D		Time to service	1h
+0x3E		Time to oil change	1h
+0x3F Mains and gen. protect.	.0	Mains error in phase L1	16x bit
	.1	Mains error in phase L2	
	.2	Mains error in phase L3	
	.3	Mains voltage error	
	.4	Mains frequency error	
	.5	*Reserve*	
	.6	Network phase sequence error	
	.7	Vector jump	
	.8	Generator error in phase L1	
	.9	Generator error in phase L2	
	.10	Generator error in phase L3	
	.11	Generator voltage error	
	.12	Generator frequency error	
	.13	Generator overcurrent	
	.14	Generator phase sequence error	
	.15	*Reserve*	

[1)] UniGEN-CHP only

4.2.4.2UniGEN-TEM

Offset	Bit	Register content	Unit
+0x00	.0-7	State	2x byte
	.8	Unit mode (0=OFF, 1=MAN, 2=SEM, 6=AUT)	
	.9		
	.10		
	.11	Power mode (0=MAN, 1=COPY)	
+0x01		Speed	$1min^{-1}$
+0x02		Motohours (low word)	1s
+0x03		Motohours (high word)	65536s
+0x04		Mains active power	0.1kW
+0x05		Mains reactive power	0.1kVAr
+0x06		Generator active power	0.1kW
+0x07		Generator reactive power	0.1kVAr
+0x08		Requested power value	0.1kW
+0x09		Regulated power value	0.1kW
+0x0A		Generator requested voltage value	0.1V
+0x0B		Voltage (power-factor) control	0.1%
+0x0C		Requested speed value	$1min^{-1}$
+0x0D		Speed (power) control	0.1%
+0x0E		*Reserve*	
+0x0F		State word	16x bit
+0x10	.0	User binary input 1	16x bit
Binary inputs	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Blocking start by user	16x bit
Binary inputs	.1	CU TEM error	
	.2	CU TEM ready	
	.3	CU TEM ready to synchronization	
	.4	*Reserve*	
	.5	External acknowledge by user (key ACK)	
	.6	*Reserve*	
	.7	Remote control	
	.8	Generator deion state	
	.9	Mains deion state	
	.10	*Reserve*	
	.11	Full power request	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Generator overcurrent (externí)	
	.15	Mains error	
+0x12	.0	Central stop	16x bit

Binary inputs	.1	*Reserve*	
	.2	Low gas pressure	
	.3	*Reserve*	
	.4	Low oil level	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Chocked air filter	
	.8	Gas escape level I	
	.9	Gas escape level II	
	.10	Smoke detector	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	Step-motor closed	
+0x13 Binary inputs	.0	User binary input 17	16x bit
	.1	User binary input 18	
	.2	User binary input 19	
	.3	User binary input 20	
	.4	User binary input 21	
	.5	User binary input 22	
	.6	User binary input 23	
	.7	User binary input 24	
	.8	User binary input 25	
	.9	User binary input 26	
	.10	User binary input 27	
	.11	User binary input 28	
	.12	*Reserve*	
	.13	*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	*Reserve*	16x bit
	.1	Prestart	
	.2	Ready	
	.3	Run	
	.4	Error	
	.5	Warning	
	.6	Run request	
	.7	Manual run request	
	.8	Generator deion control	
	.9	Mains deion control	
	.10	*Reserve*	

	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Load decrease request	
	.15	Emergency mode	
+0x16 Binary outputs	.0	CU TEM Start/Stop	8x bit
	.1	*Reserve*	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	Idle run	
	.7	Acknowledge (signal is active 2s after acknowledge key pressed)	
+0x17 Binary outputs	.0	Mode OFF	8x bit
	.1	Mode MAN	
	.2	Mode SEM	
	.3	Mode AUT	
	.4	Generator voltage down	
	.5	Generator voltage up	
	.6	Generator frequency down	
	.7	Generator frequency up	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Oil pressure before filter	0.1kPa
+0x21		Oil temperature	0.1°C
+0x22		Oil level	0.1%
+0x23		Mixture pressure	0.1kPa
+0x24		Mixture temperature	0.1°C
+0x25		Gas pressure	0.1kPa
+0x26		Gas temperature	0.1°C
+0x27		Methane content	0.1%
+0x28		Inside air temperature	0.1°C
+0x29		*Reserve*	
+0x2A		Exhaust temperature	0.1°C
+0x2B		Unit maximal power	0.1kW
+0x2C		External power requesu	0.1kW
+0x2D		*Reserve*	0.1%
+0x2E		*Reserve*	
+0x2F		*Reserve*	0.1°C
+0x30		Primary water temperature (input)	0.1°C
+0x31		Primary water temperature (output)	0.1°C
+0x32		Secondary water temperature (input)	0.1°C
+0x33		Secondary water temperature (output)	0.1°C
+0x34		*Reserve*	
+0x35		*Reserve*	
+0x36		*Reserve*	
+0x37		Controller temperature	0.1°C
+0x38		*Reserve*	
+0x39		Average value of active generator power (average value of register + 0x06)	0.1kW

+0x3A		Generator produced energy (low word)	0.1kWh
+0x3B		Generator produced energy (high word)	6553.5kWh
+0x3C		*Reserve*	
+0x3D		Time to service	1h
+0x3E		Time to oil change	1h
+0x3F Mains and gen. protect.	.0	Mains error in phase L1	16x bit
	.1	Mains error in phase L2	
	.2	Mains error in phase L3	
	.3	Mains voltage error	
	.4	Mains frequency error	
	.5	*Reserve*	
	.6	Network phase sequence error	
	.7	Vector jump	
	.8	Generator error in phase L1	
	.9	Generator error in phase L2	
	.10	Generator error in phase L3	
	.11	Generator voltage error	
	.12	Generator frequency error	
	.13	Generator overcurrent	
	.14	Generator phase sequence error	
	.15	*Reserve*	

4.2.4.3UniGEN-MVE, MicroGEN-MVE

Offset	Bit	Register content	Unit
+0x00	.0-7	State	2x byte
	.8	Unit mode (0=OFF, 1=MAN, 2=SEM, 6=AUT)	
	.9		
	.10		
	.11	Power mode (0=MAN, 1=COPY)	
+0x01		Speed	1min^{-1}
+0x02		Motohours (low word)	1s
+0x03		Motohours (high word)	65536s
+0x04		Mains active power	0.1kW
+0x05		Mains reactive power	0.1kVAr
+0x06		Generator active power	0.1kW
+0x07		Generator reactive power	0.1kVAr
+0x08		Requested power value	0.1kW
+0x09		Regulated power value	0.1kW
+0x0A		Generator requested voltage value	0.1V
+0x0B		Voltage (power-factor) control	0.1%
+0x0C		Requested speed value	1min^{-1}
+0x0D		Speed (power) control	0.1%
+0x0E		*Reserve*	
+0x0F		State word	16x bit
+0x10	.0	User binary input 1	16x bit
Binary inputs	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Blocking start by user	16x bit
Binary inputs	.1	External stop by user (key STOP)	
	.2	*Reserve*	
	.3	Control system mode 0	
	.4	Control system mode 1	
	.5	External acknowledge by user (key ACK)	
	.6	*Reserve*	
	.7	Remote control	
	.8	Generator deion state	
	.9	Mains deion state	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Generator overcurrent (externí)	
	.15	Mains error	
+0x12	.0	Central stop	16x bit

Binary inputs	.1	*Reserve*	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	Idle gate closed	
	.5	Idle gate opened	
	.6	*Reserve*	
	.7	Step-motor closed [1)]	
	.8	Gate 1 closed	
	.9	Gate 1 opened	
	.10	Gate 2 closed	
	.11	Gate 2 opened	
	.12	Gate 3 closed	
	.13	Gate 3 opened	
	.14	Gate 4 closed	
	.15	Gate 4 opened	
+0x13 Binary inputs	.0	User binary input 17	16x bit
	.1	User binary input 18	
	.2	User binary input 19	
	.3	User binary input 20	
	.4	User binary input 21	
	.5	User binary input 22	
	.6	User binary input 23	
	.7	User binary input 24	
	.8	User binary input 25	
	.9	User binary input 26	
	.10	User binary input 27	
	.11	User binary input 28	
	.12	*Reserve*	
	.13	*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	*Reserve*	16x bit
	.1	Prestart	
	.2	Ready	
	.3	Run	
	.4	Error	
	.5	Warning	
	.6	Run request	
	.7	Manual run reguest	
	.8	Generator deion control	
	.9	Mains deion control	
	.10	*Reserve*	
	.11	*Reserve*	

	.12	*Reserve*	
	.13	*Reserve*	
	.14	Load decrease request	
	.15	Emergency mode	
+0x16 Binary outputs	.0	Pasting	16x bit
	.1	Raking	
	.2	Flush	
	.3	*Reserve*	
	.4	Close idle gate	
	.5	Open idle gate	
	.6	Idle run	
	.7	Acknowledge (signal is active 2s after acknowledge key pressed)	
	.8	Close gate 1	
	.9	Open gate 1	
	.10	Close gate 2	
	.11	Open gate 2	
	.12	Close gate 3	
	.13	Open gate 3	
	.14	Close gate 4	
	.15	Open gate 4	
+0x17 Binary outputs	.0	Mode OFF	8x bit
	.1	Mode MAN	
	.2	Mode SEM	
	.3	Mode AUT	
	.4	Generator voltage down	
	.5	Generator voltage up	
	.6	Generator frequency down	
	.7	Generator frequency up	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Distribution wheel position	0.1%
+0x21		Weir level	0.1mm
+0x22		The height of the sieve level	0.1mm
+0x23		The level of the fountain	0.1mm
+0x24		Turbine oil temperature	0.1°C
+0x25		Lower turbine bearing temperature	0.1°C
+0x26		Axial turbine bearing temperature	0.1°C
+0x27		Flywheel bearing temperature	0.1°C
+0x28		Generator bearing temperature 1	0.1°C
+0x29		Generator bearing temperature 2	0.1°C
+0x2A		Air temperature in the engine room	0.1°C
+0x2B		Maximal unit power	0.1kW
+0x2C		External power request	0.1kW
+0x2D		*Reserve*	
+0x2E		*Reserve*	
+0x2F		*Reserve*	
+0x30		The difference between the levels of the fountain and the sieve	0.1mm
+0x31		*Reserve*	
+0x32		*Reserve*	

+0x33		*Reserve*	
+0x34		Gate 1 position	0.1%
+0x35		Gate 2 position	0.1%
+0x36		Gate 3 position	0.1%
+0x37		Gate 4 position	0.1%
+0x38		*Reserve*	
+0x39		Average value of active generator power (average value of register + 0x06)	0.1kW
+0x3A		Generator produced energy (low word)	0.1kWh
+0x3B		Generator produced energy (high word)	6553.5kWh
+0x3C		*Reserve*	
+0x3D		Time to service	1h
+0x3E		*Reserve*	
+0x3F Mains and gen. protect.	.0	Mains error in phase L1	16x bit
	.1	Mains error in phase L2	
	.2	Mains error in phase L3	
	.3	Mains voltage error	
	.4	Mains frequency error	
	.5	*Reserve*	
	.6	Network phase sequence error	
	.7	Vector jump	
	.8	Generator error in phase L1	
	.9	Generator error in phase L2	
	.10	Generator error in phase L3	
	.11	Generator voltage error	
	.12	Generator frequency error	
	.13	Generator overcurrent	
	.14	Generator phase sequence error	
	.15	*Reserve*	

[1)] UniGEN-MVE only

4.2.4.4MicroGEN-SYNC

Offset	Bit	Register content	Unit
+0x00	.0-7	State	2x byte
	.8	Unit mode (0=OFF, 1=MAN, 2=SEM, 6=AUT)	
	.9		
	.10		
	.11	Power mode (0=MAN, 1=COPY)	
+0x01		Speed	1min^{-1}
+0x02		Motohours (low word)	1s
+0x03		Motohours (high word)	65536s
+0x04		Mains active power	0.1kW
+0x05		Mains reactive power	0.1kVAr
+0x06		Generator active power	0.1kW
+0x07		Generator reactive power	0.1kVAr
+0x08		Requested power value	0.1kW
+0x09		Regulated power value	0.1kW
+0x0A		Generator requested voltage value	0.1V
+0x0B		Voltage (power-factor) control	0.1%
+0x0C		Requested speed value	1min^{-1}
+0x0D		Speed (power) control	0.1%
+0x0E		*Reserve*	
+0x0F		State word	16x bit
+0x10	.0	User binary input 1	16x bit
Binary inputs	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Blocking start by user	16x bit
Binary inputs	.1	Activtion	
	.2	*Reserve*	
	.3	Control system mode 0	
	.4	Control system mode 1	
	.5	External acknowledge by user (key ACK)	
	.6	*Reserve*	
	.7	Remote control	
	.8	Geneator deion state	
	.9	Mains deion state	
	.10	Generator deion state request (synchronization start)	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Generator overcurrent (externí)	
	.15	Mains error	
+0x12	.0	Central stop	16x bit

Binary inputs	.1	*Reserve*	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	*Reserve*	
	.8	*Reserve*	
	.9	*Reserve*	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	*Reserve*	
+0x13 Binary inputs	.0	User binary input 17	16x bit
	.1	User binary input 18	
	.2	User binary input 19	
	.3	User binary input 20	
	.4	User binary input 21	
	.5	User binary input 22	
	.6	User binary input 23	
	.7	User binary input 24	
	.8	User binary input 25	
	.9	User binary input 26	
	.10	User binary input 27	
	.11	User binary input 28	
	.12	*Reserve*	
	.13	*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	*Reserve*	16x bit
	.1	*Reserve*	
	.2	Ready	
	.3	Run	
	.4	Error	
	.5	Warning	
	.6	Run request	
	.7	Manual run request	
	.8	Generator deion control	
	.9	Mains deion control	
	.10	*Reserve*	

	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Load decrease request	
	.15	Emergency mode	
+0x16		*Reserve*	
+0x17 Binary outputs	.0	Mode OFF	8x bit
	.1	Mode MAN	
	.2	Mode SEM	
	.3	Mode AUT	
	.4	Generator voltage down	
	.5	Generator voltage up	
	.6	Generator frequency down	
	.7	Generator frequency up	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		User analog output 17	0.1
+0x21		User analog output 18	0.1
+0x22		User analog output 19	0.1
+0x23		User analog output 20	0.1
+0x24		User analog output 21	0.1
+0x25		User analog output 22	0.1
+0x26		User analog output 23	0.1
+0x27		User analog output 24	0.1
+0x28		*Reserve*	
+0x29		*Reserve*	
+0x2A		*Reserve*	
+0x2B		*Reserve*	
+0x2C		External power request	0.1kW
+0x2D		*Reserve*	
+0x2E		*Reserve*	
+0x2F		*Reserve*	
+0x30		*Reserve*	
+0x31		*Reserve*	
+0x32		*Reserve*	
+0x33		*Reserve*	
+0x34		*Reserve*	
+0x35		*Reserve*	
+0x36		*Reserve*	
+0x37		*Reserve*	
+0x38		*Reserve*	
+0x39		Average value of active generator power (average value of register + 0x06)	0.1kW
+0x3A		Generator produced energy (low word)	0.1kWh
+0x3B		Generator produced energy (high word)	6553.5kWh
+0x3C		*Reserve*	
+0x3D		Time to service	1h
+0x3E		Time to oil change	1h
+0x3F	.0	Mains error in phase L1	16x bit
	.1	Mains error in phase L2	

Mains and gen. protect.	.2	Mains error in phase L3	
	.3	Mains voltage error	
	.4	Mains frequency error	
	.5	*Reserve*	
	.6	Network phase sequence error	
	.7	Vector jump	
	.8	Generator error in phase L1	
	.9	Generator error in phase L2	
	.10	Generator error in phase L3	
	.11	Generator voltage error	
	.12	Generator frequency error	
	.13	Generator overcurrent	
	.14	Generator phase sequence error	
	.15	*Reserve*	

4.2.4.5NSU2

Offset	Bit	Register content	Unit
+0x00	.0-7	State	1x byte
+0x01		*Reserve*	
+0x02		*Reserve*	
+0x03		*Reserve*	
+0x04		Mains active power	0.1kW
+0x05		Mains reactive power	0.1kVAr
+0x06		Generator active power	0.1kW
+0x07		Genertor reactive power	0.1kVAr
+0x08		*Reserve*	
+0x09		*Reserve*	
+0x0A		*Reserve*	
+0x0B		*Reserve*	
+0x0C		*Reserve*	
+0x0D		*Reserve*	
+0x0E		*Reserve*	
+0x0F		State word	16x bit
+0x10	.0	User binary input 1	16x bit
	.1	User binary input 2	
Binary inputs	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	*Reserve*	16x bit
	.1	*Reserve*	
Binary inputs	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	*Reserve*	
	.8	Generator deion state	
	.9	Mains deion state	
	.10	Generator deion state request (synchronization start)	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Generator overcurrent (external)	
	.15	Mains error	
+0x12	.0	Central stop	16x bit
	.1	*Reserve*	
Binary inputs	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	

	.5	*Reserve*	
	.6	*Reserve*	
	.7	*Reserve*	
	.8	*Reserve*	
	.9	*Reserve*	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	*Reserve*	
+0x13		*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	Mains voltage over 25V	16x bit
	.1	Generator voltage over 25V	
	.2	Ready	
	.3	Run	
	.4	Error	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Acknowledge (signal is active 2s after acknowledge key pressed)	
	.8	Generator deion control	
	.9	Mains deion control	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Synchronization	
	.15	*Reserve*	
+0x16 Mains and gen. protect.	.0	Mains error in phase L1	16x bit
	.1	Mains error in phase L2	
	.2	Mains error in phase L3	
	.3	Mains voltage error	
	.4	Mains frequency error	
	.5	*Reserve*	
	.6	Network phase sequence error	
	.7	Vector jump	
	.8	Generator error in phase L1	
	.9	Generator error in phase L2	
	.10	Generator error in phase L3	

	.11	Generator voltage error	
	.12	Generator frequency error	
	.13	Generator overcurrent	
	.14	Generator phase sequence error	
	.15	*Reserve*	
+0x17 Binary outputs	.0	*Reserve*	8x bit
	.1	*Reserve*	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	Generator voltage down	
	.5	Generator voltage up	
	.6	Generator frequency down	
	.7	Generator frequency up	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		User analog output 9	0.1kPa
+0x21		User analog output 10	0.1°C
+0x22		User analog output 11	0.1%
+0x23		User analog output 12	0.1kPa
+0x24		User analog output 13	0.1°C
+0x25		User analog output 14	0.1kPa
+0x26		User analog output 15	0.1°C
+0x27		User analog output 16	0.1%
+0x28	.0-7	Display, char 1 row 1	2x ASCII
	.8-15	Display, char 2 row 1	
+0x29	.0-7	Display, char 3 row 1	2x ASCII
	.8-15	Display, char 4 row 1	
+0x2A	.0-7	Display, char 5 row 1	2x ASCII
	.8-15	Display, char 6 row 1	
+0x2B	.0-7	Display, char 7 row 1	2x ASCII
	.8-15	Display, char 8 row 1	
+0x2C	.0-7	Display, char 9 row 1	2x ASCII
	.8-15	Display, char 10 row 1	
+0x2D	.0-7	Display, char 11 row 1	2x ASCII
	.8-15	Display, char 12 row 1	
+0x2E	.0-7	Display, char 13 row 1	2x ASCII
	.8-15	Display, char 14 row 1	
+0x2F	.0-7	Display, char 15 row 1	2x ASCII
	.8-15	Display, char 16 row 1	
+0x30	.0-7	Display, char 1 row 2	2x ASCII
	.8-15	Display, char 2 row 2	
+0x31	.0-7	Display, char 3 row 2	2x ASCII
	.8-15	Display, char 4 row 2	
+0x32	.0-7	Display, char 5 row 2	2x ASCII
	.8-15	Display, char 6 row 2	
+0x33	.0-7	Display, char 7 row 2	2x ASCII
	.8-15	Display, char 8 row 2	
+0x34	.0-7	Display, char 9 row 2	2x ASCII
	.8-15	Display, char 10 row 2	
+0x35	.0-7	Display, char 11 row 2	2x ASCII
	.8-15	Display, char 12 row 2	

+0x36	.0-7	Display, char 13 row 2	2x ASCII
	.8-15	Display, char 14 row 2	
+0x37	.0-7	Display, char 15 row 2	2x ASCII
	.8-15	Display, char 16 row 2	

4.2.4.6UIS

Offset	Bit	Register content	Unit
+0x00	.0-7	State	1 byte
+0x01		Speed	1min^{-1}
+0x02		Preignition	0.1°
+0x03		Ignition energy [234)]	0.1%
+0x04		External preignition correction	0.1°
+0x05		Extarnel energy correction	0.1%
+0x06		*Reserve*	
+0x07		Maximal knocking value [234)]	0.1%
+0x08	.0-7	The order of burning of the cylinder with the first highest level of detonation [3)]	0.78125%
	8-15	The first highest level of detonation [3)]	
+0x09	.0-7	The order of burning of the cylinder with the second highest level of detonation [3)]	0.78125%
	8-15	The second highest level of detonation [3)]	
+0x0A	.0-7	The order of burning wars with the third highest level of detonation [3)]	0.78125%
	8-15	The third highest level of detonation [3)]	
+0x0B		*Reserve*	
+0x0C	.0-7	Active cylinders mask [1)]	2x1 byte
	8-15	Switching cylinders mask [1)]	
+0x0D	.0-7	Current cylinders mask [1)]	2x1 byte
	8-15	Burning cylinders mask (not back energy) [1)]	
+0x0E		*Reserve*	
+0x0F		State word	16x bit
+0x10 Binary inputs	.0	User binary input 1	16x bit
	.1	User binary input 2	
	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11 Binary inputs	.0	Activtion	16x bit
	.1	*Reserve*	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Acknowledge	
	.8	*Reserve*	
	.9	*Reserve*	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	

	.13	*Reserve*	
	.14	*Reserve*	
	.15	*Reserve*	
+0x12		*Reserve*	
+0x13		*Reserve*	
+0x14 Binary outputs	.0	User binary output 1	16x bit
	.1	User binary output 2	
	.2	User binary output 3	
	.3	User binary output 4	
	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	*Reserve*	16x bit
	.1	Test mode is active	
	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Overheat [234)]	
	.8	Knocking [234)]	
	.9	Preignition decreased due to knocking [234)]	
	.10	Preignition decreased to minimal value	
	.11	Preignition increased to maximal value	
	.12	Sensors error	
	.13	Burning error	
	.14	Run	
	.15	Ready	
+0x16		*Reserve*	
+0x17		*Reserve*	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Teplota zapalování [234)]	0.1°C
+0x21		*Reserve*	
+0x22		Power (if there is info from CU)	0.1kW
+0x23		Methane level (if there is info from CU)	0.1%
+0x24		*Reserve*	
+0x25		*Reserve*	
+0x26		Motohours, low word	1s
+0x27		Motohours, high word	65536s
+0x28	.0-7	Success burning output 1 [234)]	2x1 byte

	8-15	Success burning output 2 [234)]	0.78125%
+0x29	.0-7	Success burning output 3 [234)]	2x1 byte
	8-15	Success burning output 4 [234)]	0.78125%
+0x2A	.0-7	Success burning output 5 [234)]	2x1 byte
	8-15	Success burning output 6 [234)]	0.78125%
+0x2B	.0-7	Success burning output 7 [234)]	2x1 byte
	8-15	Success burning output 8 [234)]	0.78125%
+0x2C	.0-7	Success burning output 9 [34)]	2x1 byte
	8-15	Success burning output 10 [34)]	0.78125%
+0x2D	.0-7	Success burning output 11 [34)]	2x1 byte
	8-15	Success burning output 12 [34)]	0.78125%
+0x2E	.0-7	Success burning output 13 [34)]	2x1 byte
	8-15	Success burning output 14 [34)]	0.78125%
+0x2F	.0-7	Success burning output 15 [34)]	2x1 byte
	8-15	Success burning output 16 [34)]	0.78125%
+0x30	.0-7	Success burning output 17 [4)]	2x1 byte
	8-15	Success burning output 18 [4)]	0.78125%
+0x31	.0-7	Success burning output 19 [4)]	2x1 byte
	8-15	Success burning output 20 [4)]	0.78125%
+0x32	.0-7	Success burning output 21 [4)]	2x1 byte
	8-15	Success burning output 22 [4)]	0.78125%
+0x33	.0-7	Success burning output 23 [4)]	2x1 byte
	8-15	Success burning output 24 [4)]	0.78125%
+0x34	.0-7	Knocking output 1 [234)]	2x1 byte
	8-15	Knocking output 2 [234)]	0.78125%
+0x35	.0-7	Knocking output 3 [234)]	2x1 byte
	8-15	Knocking output 4 [234)]	0.78125%
+0x36	.0-7	Knocking output 5 [234)]	2x1 byte
	8-15	Knocking output 6 [234)]	0.78125%
+0x37	.0-7	Knocking output 7 [234)]	2x1 byte
	8-15	Knocking output 8 [234)]	0.78125%
+0x38	.0-7	Knocking output 9 [34)]	2x1 byte
	8-15	Knocking output 10 [34)]	0.78125%
+0x39	.0-7	Knocking output 11 [34)]	2x1 byte
	8-15	Knocking output 12 [34)]	0.78125%
+0x3A	.0-7	Knocking output 13 [34)]	2x1 byte
	8-15	Knocking output 14 [34)]	0.78125%
+0x3B	.0-7	Knocking output 15 [34)]	2x1 byte
	8-15	Knocking output 16 [34)]	0.78125%
+0x3C	.0-7	Knocking output 17 [4)]	2x1 byte
	8-15	Knocking output 18 [4)]	0.78125%
+0x3D	.0-7	Knocking output 19 [4)]	2x1 byte
	8-15	Knocking output 20 [4)]	0.78125%
+0x3E	.0-7	Knocking output 21 [4)]	2x1 byte
	8-15	Knocking output 22 [4)]	0.78125%
+0x3F	.0-7	Knocking output 23 [4)]	2x1 byte
	8-15	Knocking output 24 [4)]	0.78125%

[1)] UIS1 only
[234)] UIS2,UIS3,UIS4 only
[34)] UIS3,UIS4 only
[3)] UIS3 only
[4)] UIS4 only
The value 255 in the individual bytes of the burning and detonation success registers means "NC" (not measured)

4.2.4.7UVR

Offset	Bit	Register content	Unit
+0x00	.0-7	State	1 byte
+0x01		Generator voltage	0.1V
+0x02		*Reserve*	
+0x03		Requested generator voltage	0.1V
+0x04		Regulated generator voltage	0.1V
+0x05		Requested exciting value	0.1%
+0x06		Rugulated exciting value	0.1%
+0x07		Requested power-factor	
+0x08		*Reserve*	
+0x09		*Reserve*	
+0x0A	.	*Reserve*	
+0x0B		*Reserve*	
+0x0C		*Reserve*	
+0x0D		*Reserve*	
+0x0E		*Reserve*	
+0x0F		*Reserve*	
+0x10	.0	User binary input 1	16x bit
	.1	User binary input 2	
Binary inputs	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Activstion	16x bit
	.1	Request exciting / voltage control	
Binary inputs	.2	*Reserve*	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Acknowledge	
	.8	*Reserve*	
	.9	*Reserve*	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	*Reserve*	
+0x12		*Reserve*	
+0x13		*Reserve*	
+0x14	.0	User binary output 1	16x bit
	.1	User binary output 2	
Binary outputs	.2	User binary output 3	
	.3	User binary output 4	

	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	*Reserve*	16x bit
	.1	Overheat error	
	.2	Underfrequency error	
	.3	*Reserve*	
	.4	Undervoltage error	
	.5	Overvoltage error	
	.6	Exciting winding short circuit error	
	.7	Exciting winding open circuit error	
	.8	Minimal exciting	
	.9	Maximal exciting	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	Ready	
+0x16		*Reserve*	
+0x17		*Reserve*	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Requested reactive power (when automatic control)	0.1kVAr
+0x21		*Reserve*	
+0x22		*Reserve*	
+0x23		*Reserve*	
+0x24		Exciting winding resistance	0.1Ω
+0x25		Power-factor	
+0x26		*Reserve*	
+0x27		*Reserve*	
+0x28		Voltage at the input to the output stage	0.1V
+0x29		Current to output stage input	0.001A
+0x2A		Output voltage	0.1V
+0x2B		Load current	0.001A
+0x2C		Output stage transistor heatsink temperature	0.1°C
+0x2D		Output stage cooler temperature	0.1°C
+0x2E		UVR supply current	0.001A
+0x2F		UVR supply voltage	0.1V
+0x30		Control voltage	0.00244V

4.2.4.8USC

Offset	Bit	Register content	Unit
+0x00	.0-7	State	1 byte
+0x01		Speed	$1min^{-1}$
+0x02		Flap position	0.1%
+0x03		Requested speed value	$1min^{-1}$
+0x04		Regulated speed value	$1min^{-1}$
+0x05		Requested flap position	0.1%
+0x06		Regulated flap position	0.1%
+0x07		*Reserve*	
+0x08		*Reserve*	
+0x09		*Reserve*	
+0x0A	.	*Reserve*	
+0x0B		*Reserve*	
+0x0C		*Reserve*	
+0x0D		*Reserve*	
+0x0E		*Reserve*	
+0x0F		*Reserve*	
+0x10	.0	User binary input 1	16x bit
	.1	User binary input 2	
Binary inputs	.2	User binary input 3	
	.3	User binary input 4	
	.4	User binary input 5	
	.5	User binary input 6	
	.6	User binary input 7	
	.7	User binary input 8	
	.8	User binary input 9	
	.9	User binary input 10	
	.10	User binary input 11	
	.11	User binary input 12	
	.12	User binary input 13	
	.13	User binary input 14	
	.14	User binary input 15	
	.15	User binary input 16	
+0x11	.0	Activation	16x bit
	.1	Request power / speed control	
Binary inputs	.2	Request idle / nominal speed	
	.3	*Reserve*	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	Acknowledge	
	.8	Fuel B/A	
	.9	PID set B/A	
	.10	*Reserve*	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	*Reserve*	
	.15	*Reserve*	
+0x12		*Reserve*	
+0x13		*Reserve*	
+0x14	.0	User binary output 1	16x bit
	.1	User binary output 2	
Binary outputs	.2	User binary output 3	
	.3	User binary output 4	

	.4	User binary output 5	
	.5	User binary output 6	
	.6	User binary output 7	
	.7	User binary output 8	
	.8	User binary output 9	
	.9	User binary output 10	
	.10	User binary output 11	
	.11	User binary output 12	
	.12	User binary output 13	
	.13	User binary output 14	
	.14	User binary output 15	
	.15	User binary output 16	
+0x15 Binary outputs	.0	Flap position feedback error	16x bit
	.1	Overheat error	
	.2	Underspeed error	
	.3	Overspeed error	
	.4	*Reserve*	
	.5	*Reserve*	
	.6	*Reserve*	
	.7	*Reserve*	
	.8	Minimal flap position	
	.9	Maximal flap position	
	.10	Flap current limit (did not get to the position)	
	.11	*Reserve*	
	.12	*Reserve*	
	.13	*Reserve*	
	.14	Run on idle / rated speed	
	.15	Ready	
+0x16		*Reserve*	
+0x17		*Reserve*	
+0x18		User analog output 1	0.1
+0x19		User analog output 2	0.1
+0x1A		User analog output 3	0.1
+0x1B		User analog output 4	0.1
+0x1C		User analog output 5	0.1
+0x1D		User analog output 6	0.1
+0x1E		User analog output 7	0.1
+0x1F		User analog output 8	0.1
+0x20		Flap exciting	0.097656%
+0x21		Bridge temperature	0.1°C
+0x22		*Reserve*	
+0x23		*Reserve*	
+0x24		*Reserve*	
+0x25		*Reserve*	
+0x26		*Reserve*	
+0x27		*Reserve*	

4.2.4.9 Bridge-TEM

Offset	Register content	Unit
+0x00	P196 Lube oil before filter	0.01Bar
+0x01	T208 Lube oil temperature	0.1°C
+0x02	L234 Lube oil level	0.1%
+0x03	T201 Receiver temperature	0.1°C
+0x04	G197 Throttle valve position	0.1%
+0x05	S200 Engine speed	0.1 min^{-1}
+0x06	Q311 CH4 value	0.1%
+0x07	T286 Exhaust after engine	0.1°C
+0x08	T287 Exhaust after CAT	0.1°C
+0x09	T288 Exhaust after AWT	0.1°C
+0x0A	T206 Jacket water engine outlet	0.1°C
+0x0B	T207 Jacket water engine inlet	0.1°C
+0x0C	P268 Boost pressure	0.1Bar
+0x0D	T202 Jacket water GK inlet	0.1°C
+0x0E	T405 GK-dry cooler outlet	0.1°C
+0x0F	T419 NK-dry cooler outlet	0.1°C
+0x10	T291 Heating water flow	0.1°C
+0x11	T289 Heating water return	0.1°C
+0x12	T404 Cabin air	0.1°C
+0x13	T209 Generator winding U	0.1°C
+0x14	T210 Generator winding V	0.1°C
+0x15	T211 Generator winding W	0.1°C
+0x16	T203 Intake air temperature	0.1°C
+0x17	T461 Combustion chamber A1 temperature	0.1°C
+0x18	T462 Combustion chamber A2 temperature	0.1°C
+0x19	T463 Combustion chamber A3 temperature	0.1°C
+0x1A	T464 Combustion chamber A4 temperature	0.1°C
+0x1B	T465 Combustion chamber A5 temperature	0.1°C
+0x1C	T466 Combustion chamber A6 temperature	0.1°C
+0x1D	T467 Combustion chamber A7 temperature	0.1°C
+0x1E	T468 Combustion chamber A8 temperature	0.1°C
+0x1F	T469 Combustion chamber A9 temperature	0.1°C
+0x20	T470 Combustion chamber A10 temperature	0.1°C
+0x21	T471 Combustion chamber B1 temperature	0.1°C
+0x22	T472 Combustion chamber B2 temperature	0.1°C
+0x23	T473 Combustion chamber B3 temperature	0.1°C
+0x24	T474 Combustion chamber B4 temperature	0.1°C
+0x25	T475 Combustion chamber B5 temperature	0.1°C
+0x26	T476 Combustion chamber B6 temperature	0.1°C
+0x27	T477 Combustion chamber B7 temperature	0.1°C
+0x28	T478 Combustion chamber B8 temperature	0.1°C
+0x29	T479 Combustion chamber B9 temperature	0.1°C
+0x2A	*Reserve*	
	Reserve	
+0x2F	*Reserve*	
+0x30	.0 4.1 Running	8xbit
	.1 20.5 Jacket water circuit pump	
	.2 20.6 Heating circuit pump	
	.3 20.7 Intercooler circuit pump	
	.4 21.0 Emergency cooling circuit pump	
	.5 34.0 P157 Exthoust back pres stoo high	
	.6 3.3 Collective alarm	
	.7 3.4 Collective fault	

4.2.5 Banky S_N

Registers count : max.20
Default address : 0x2100+0x100*(N-1) (par. „MBSRegS_N“), where N=<1,7>

Offset	Bit	Register content	Unit
+0x00		Signal01A	0.1
+0x01		Signal02A	0.1
+0x02		Signal03A	0.1
+0x03		Signal04A	0.1
+0x04		Signal05A	0.1
+0x05		Signal06A	0.1
+0x06		Signal07A	0.1
+0x07		Signal08A	0.1
+0x08		UsrAO01	0.1
+0x09		UsrAO02	0.1
+0x0A		UsrAO03	0.1
+0x0B		UsrAO04	0.1
+0x0C		UsrAO05	0.1
+0x0D		UsrAO06	0.1
+0x0E		UsrAO07	0.1
+0x0F		UsrAO08	0.1
+0x10	.0	Signal01B	16x bit
	.1	Signal02B	
Binary outputs	.2	Signal03B	
	.3	Signal04B	
	.4	Signal05B	
	.5	Signal06B	
	.6	Signal07B	
	.7	Signal08B	
	.8	UsrBO01	
	.9	UsrBO02	
	.10	UsrBO03	
	.11	UsrBO04	
	.12	UsrBO05	
	.13	UsrBO06	
	.14	UsrBO07	
	.15	UsrBO08	
+0x11	.0	UsrBI01	16x bit
	.1	UsrBI02	
Binary inputs	.2	UsrBI03	
	.3	UsrBI04	
	.4	UsrBI05	
	.5	UsrBI06	
	.6	UsrBI07	
	.7	UsrBI08	
	.8	UsrBI09	
	.9	UsrBI10	
	.10	UsrBI11	
	.11	UsrBI12	
	.12	UsrBI013	
	.13	UsrBI014	
	.14	UsrBI015	
	.15	UsrBI016	
+0x12		TempModule (module temperature, if measured)	0.1°C
+0x13		*Reserve*	

4.2.6 Banka W

Registers count : 16
Default address : 0x3000 (parameter „MBSRegW“)
Data is written to the bank W in slave mode with command 6. The entered data can be used by the surrounding devices on UnimaBUS in the mapping of their analog inputs.

Offset	Register content	Unit
+0x00	ModBUS[BankW+00]	0.1
+0x01	ModBUS[BankW+01]	0.1
+0x02	ModBUS[BankW+02]	0.1
+0x03	ModBUS[BankW+03]	0.1
+0x04	ModBUS[BankW+04]	0.1
+0x05	ModBUS[BankW+05]	0.1
+0x06	ModBUS[BankW+06]	0.1
+0x07	ModBUS[BankW+07]	0.1
+0x08	ModBUS[BankW+08]	0.1
+0x09	ModBUS[BankW+09]	0.1
+0x0A	ModBUS[BankW+0A]	0.1
+0x0B	ModBUS[BankW+0B]	0.1
+0x0C	ModBUS[BankW+0C]	0.1
+0x0D	ModBUS[BankW+0D]	0.1
+0x0E	ModBUS[BankW+0E]	0.1
+0x0F	ModBUS[BankW+0F]	0.1

4.2.7 Banka X

Registers count : 1
Default address : 0x3010 (parametr „MBSRegX“)
Data is written to bank X in slave mode with command 6. The entered data can be used by the surrounding devices on UnimaBUS in the mapping of their binary inputs.

Offset	Bit	Register content	Unit
+0x00	.0	ModBUS[BankX.0]	16x bit
	.1	ModBUS[BankX.1]	
	.2	ModBUS[BankX.2]	
	.3	ModBUS[BankX.3]	
	.4	ModBUS[BankX.4]	
	.5	ModBUS[BankX.5]	
	.6	ModBUS[BankX.6]	
	.7	ModBUS[BankX.7]	
	.8	ModBUS[BankX.8]	
	.9	ModBUS[BankX.9]	
	.10	ModBUS[BankX.10]	
	.11	ModBUS[BankX.11]	
	.12	ModBUS[BankX.12]	
	.13	ModBUS[BankX.13]	
	.14	ModBUS[BankX.14]	
	.15	ModBUS[BankX.15]	

5. Configuration

The bridge can be configured as a slave (only responds to incoming commands) as well as a master (actively sends commands). There must be only one master on the ModBUS.

In configuration slave mode, the bridge can also, among other things, capture the contents of registers intended for another device (written or read by the master to or from another slave device).

The "ModBUS register" parameters (register addresses) in the blocks listed in the following sections are displayed in hexadecimal format with the prefix "0x". When editing parameters, the register address can be entered not only in hexadecimal format (with the prefix "0x") but also in decimal (without the prefix "0x"). When you enter an address in decimal format, the value is automatically converted to hexadecimal format. So it doesn't matter if we write "0x0100" or "256" when entering the address.

The "ModBUS address" parameter (device address on the ModBUS bus) is always specified in decimal.

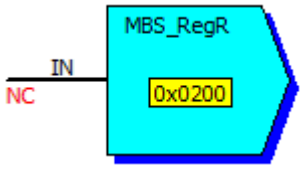
5.1 SLAVE mode

In slave mode, the contents of registers A and B can be read directly from Bridge. The contents of banks are determined by mapping (by assigning register values to the quantities of any devices in the mapping of analog and binary inputs).

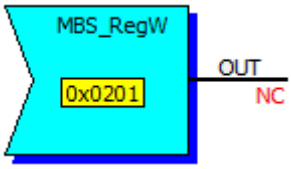
In slave mode, the contents of the C, DN and SN bank registers can also be read directly from Bridge without the need for any additional configuration in mapping or functions. The content of the DN banks is determined by the parameter settings (address and device type), the content of the SN bank is given by the I / O module slot.

In the slave mode, analog values can be written to the Bridge in bank W (or binary values in bank X). The values entered in this bank can then be used in mapping in any device on the UnimaBUS bus (connect to external signal / Bridge-ModBUS / Connect to input from ModBUS group / select bank register W or X)

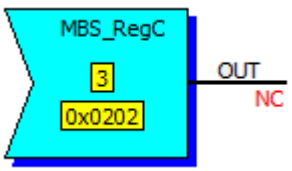
Addresses defined by banks can also be written to and read from. In this case, the read / write register must be defined in the functions by the following blocks:



Read registry,
at address 0x0200 the value mapped to the block input can be read from Bridge (function 4 in the master).



Write Registry,
a value (function 6 in the master) can be written to Bridge at address 0x0201, which is stored in a quantity mapped to the block output (User analog output). User analog outputs can then be used in mapping in any device on the UnimaBUS bus, similarly to banks W and X. In this way, a maximum of 16 analog values can be written (UsrBO01-UsrBO16)

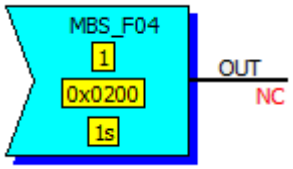


Capture Register,
at address 0x0202, the value that the master function 6 (4) has written (requested) to (from) a device other than Bridge (a device with address 3, different from the Bridge address) can be captured in Bridge. The value for this foreign device is stored in the quantity mapped to the block output. Unlike previous blocks, which respond to ModBUS communication with a response (by sending a setpoint or confirming a write), this block does not generate any response. It only eavesdrops on the transmitted data from the communication.

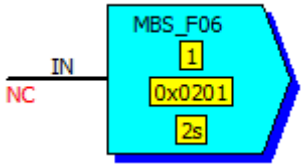
The register addresses in the MBS_RegR and MBS_RegW blocks must not overlap with the bank addresses.
The ModBUS address in the MBS_RegC block must have a different value than the slave address.
The MBS_RegR, MBS_RegW, and MBS_RegC blocks are ignored if Bridge mode is set to master.

5.2 MASTER mode

In master mode, Bridge generates read and write commands that are individually defined by the following blocks:



Command to read register 0x0200 from device at address 1, sent periodically every second. The read value is stored in the quantity connected to the block output (User analog output). The user analog outputs can then be used in mapping in any device on the UnimaBUS bus, similarly to banks W and X. In this way, a maximum of 16 analog values can be read (UsrBO01-UsrBO16).



Command for writing the value connected to the block input to the device register 0x0201 at address 1, sent periodically every two seconds.

If multiple read commands are defined from the same device and consecutive addresses, the read command is sent by a single command. In this case, the period of sending the read command is given by the value of the shortest period from these blocks (if they are different).
Blocks MBS_F04 and MBS_F06 are ignored if Bridge mode is set to slave.

6. ModBUS parameters

RS-485 ModBUS link parameters:

- Communication speed 4800-9600-14400-19200 bit/s (parameter „MBSbr“)
- 8 data-bits
- Parity none-odd-even (parameter „MBSpar“)
- 1-2 stop-bits (parameter „MBSsb“)
- ModBUS address 0x00÷0xFF (parameter „MBSAddr“)
- There must be a delay of 2.5 characters between the question and the answer

The control system supports the following functions from the ModBUS protocol

- 4 – Read input registers
- 6 – Write single register

6.1 Read input registers (function 4)

6.1.1 Query

Address	1 Byt	0x00 ÷ 0xFF (MBSaddr)
Function	1 Byt	0x04
First register address	2 Byty	0x0000 ÷ 0x00NN
Count of registers (N)	2 Byty	0x0001 ÷ 0x00NN
Check-sum	2 Byty	CRC16

6.1.2 Response

Address	1 Byte	0x00 ÷ 0xFF (MBSaddr)
Function	1 Byte	0x04
Count of bytes	1 Byte	2*N
Register values *)	2*N Bytes	
Check-sum	2 Bytes	CRC16

*) the values of the registers are two-byte, the higher byte of the contents of the register goes first.

The maximum response length must not exceed 256 bytes. This means that the maximum number of registers to read in one query is 125.

6.1.3 Error response

In the event of an error (wrong address, invalid data, etc.), the response of the device is as follows:

Address	1 Byte	0x00 ÷ 0xFF (MBSaddr)
Function +0x80	1 Byte	0x84
Error code	1 Byte	ERR
Check-sum	2 Bytes	CRC16

6.1.4 Example

Query to read 2 registers from address 17

0F	04	00	11	00	02	20	E0

Response
Reg1 = 0x0050 = 80 = 8,0
Reg2 = 0x7FFF = NC

0F	04	04	00	50	7F	FF	74	25

If Bridge returns the contents of register 0x7FFF during reading, the relevant quantity is not measured (in the mapping it is not assigned to any physical input but to "NC")

6.2 Write single register (function 6)

6.2.1 Query

Address	1 Byte	0x00 ÷ 0xFF (MBSaddr)
Function	1 Byte	0x06
Register address	2 Bytes	0x0100 ÷ 0x0103
Register value	2 Bytes	0x0000 ÷ 0xFFFF
Check-sum	2 Bytes	CRC16

6.2.2 Response

Address	1 Byte	0x00 ÷ 0xFF (MBSaddr)
Function	1 Byte	0x06
Register address	2 Bytes	0x0100 ÷ 0x0103
Register value	2 Bytes	0x0000 ÷ 0xFFFF
Check-sum	2 Bytes	CRC16

6.2.3 Error response

In the event of an error (wrong address, invalid data, etc.), the response of the device is as follows:

Address	1 Byte	0x00 ÷ 0xFF (MBSaddr)
Function +0x80	1 Byte	0x86
Error code	1 Byte	ERR
Check-sum	2 Bytes	CRC16

6.2.4 Example

Write value 0x929 = 234.5 to address 0x0101

01	06	01	01	09	29	1E	78

Response

01	06	01	01	09	29	1E	78

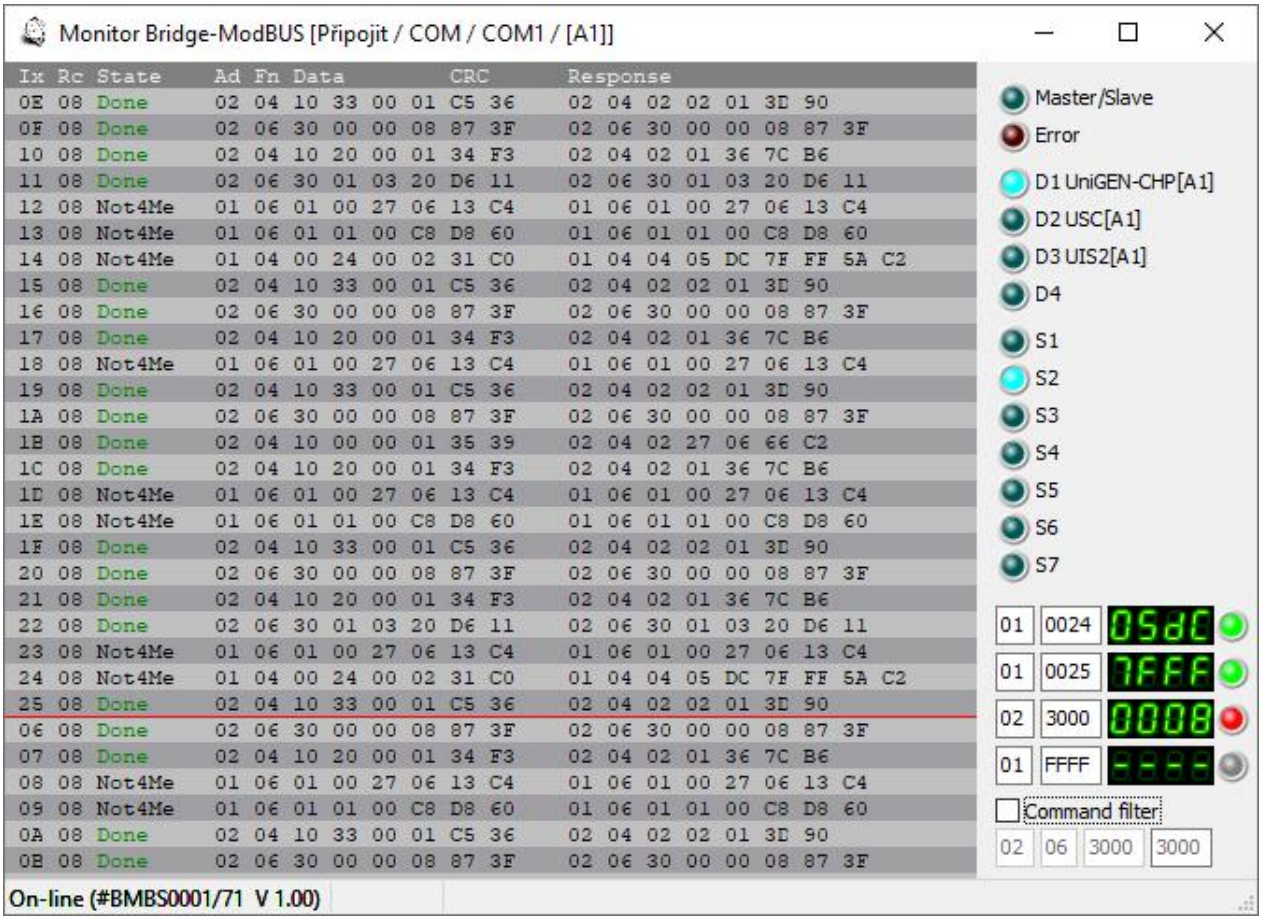
6.3 Error codes list

Error code (ERR)	Name	Description
01	Illegal function	Requested function is not suported
02	Illegal address	The entered address is out of the supported range [1)]
03	Illegal value	The transmitted data is not valid [2)]
04	Device failure	An error occurred while executing the request [3)]

[1)] Or the wrong number of registers to read
[2)] Invalid query length, CRC error
[3)] The response has less than 5 bytes, incorrect function code in the response

7. ModBUS monitoring

The progress of communication on ModBUS can be monitored in the Bridge monitor:



ModBUS communication (question and answer) is displayed in the monitor. In slave mode, queries for other devices on the ModBUS bus (devices with an address other than Bridge) are also displayed, including the answers of these devices (label "Not4Me"). In the event of a fault, a label with an error code is displayed.

Communication protocol header legend:

Ix	Communication sequence number (1 byte, overflows to 0 after reaching 255)
Rc	Number of query bytes (sent by master or received by slave)
State	Status (Done, foreign query, error…)
Ad	ModBUS address
Fn	Function
Data	Command data - register address, number (when reading), value (when writing)
CRC	Check-sum
Response	Slave answer to the question

LEDs on the right indicate:

- Master/Slave - Bridge mode
- Error – fault on ModBUS communication (goes out if there is no fault for more than 2 s)
- D_N – active LED detects that the selected device is connected to UnimaBUS (Bridge receives data from this device)

- S_N – active LED detects that an I / O module is connected on the given slot (Bridge receives data from this I / O module)

Below the indicator LEDs there are four indicators into which the contents of the registers can be captured from the communication. Just enter the address and register for the relevant ModBUS indicator. The LED next to the indicator flashes to detect the capture of the registry value (green flashing detects the capture of the content during the read function, red flashing detects the capture of the content during the write function). It is therefore possible to capture the contents of registers for devices on ModBUS other than Bridge. In this way, the contents of any registers can be captured during PC monitoring. Using the MBS_RegC (Capture) function, it is possible to capture the contents of registers intended for other devices and use them in any Unima device (see the configuration chapter in slave mode)

You can use "Command filter" to activate command filtering - only those commands that meet the given parameters (address, function, register from, register to) will remain displayed. The "xx" value of an address or function means any value.

The ability to display all communication on the monitor is limited by the transfer speed to the PC. In the case of a fast sequence of a large number of queries, the display of some packets may be lost (but not displaying the packet does not affect the sending of the correct response by Bridge).