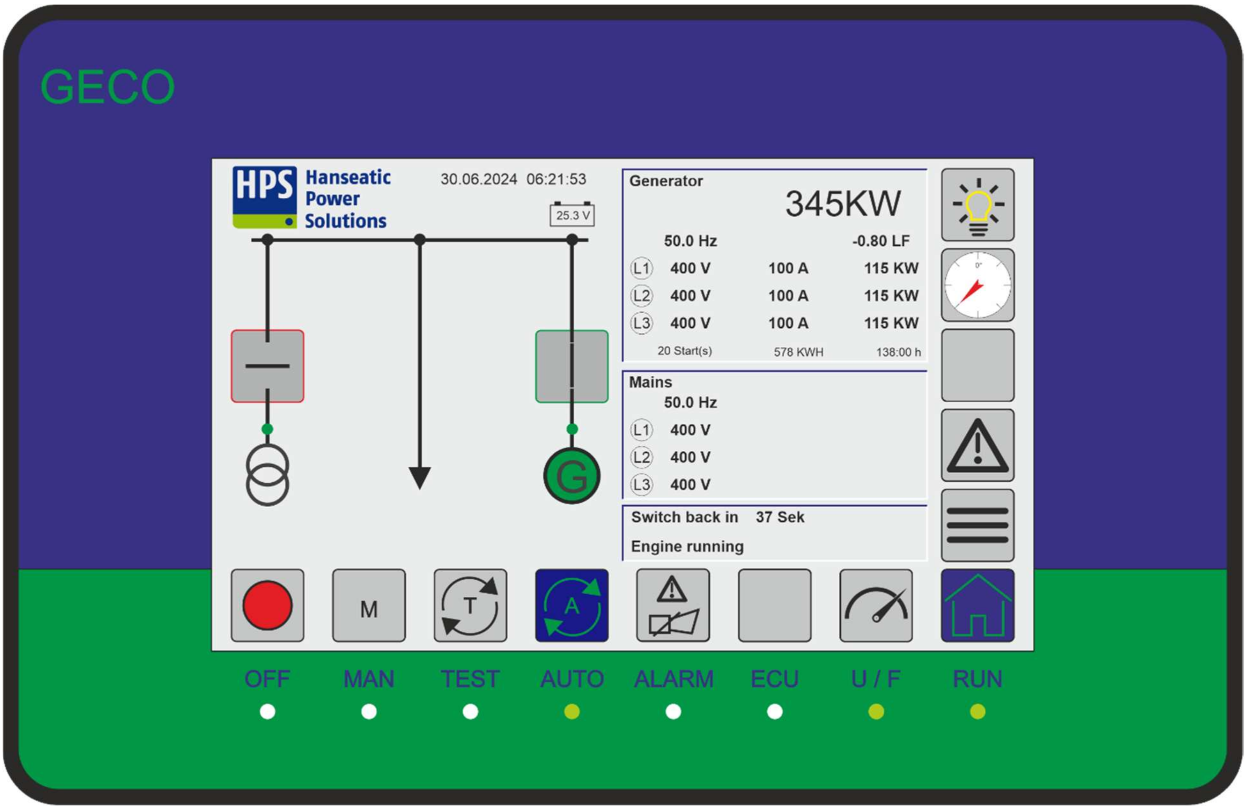
GECO20


GECO
Hanseatic
Power
Solutions
30.06.2024 06:21:53
25.3 V
Generator
345KW
50.0 Hz
-0.80 LF
L1 400 V 100 A 115 KW
L2 400 V 100 A 115 KW
L3 400 V 100 A 115 KW
20 Start(s)
578 KWH
138:00 h
Mains
50.0 Hz
L1 400 V
L2 400 V
L3 400 V
Switch back in 37 Sek
Engine running
OFF
MAN
TEST
AUTO
ALARM
ECU
U / F
RUN

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1 Data transmission

1.1 Profinet

If required, the GECO20 can be expanded with a Profinet module (PN20) for connection to a Profinet master. The corresponding module must then be configured within a project via the corresponding GSD file. The values to be transferred can be put together as desired. A maximum of 64 modules from a selection of 209 modules are possible. The maximum data length is 244 bytes.

The use of the universal module from the GSD file is not supported.

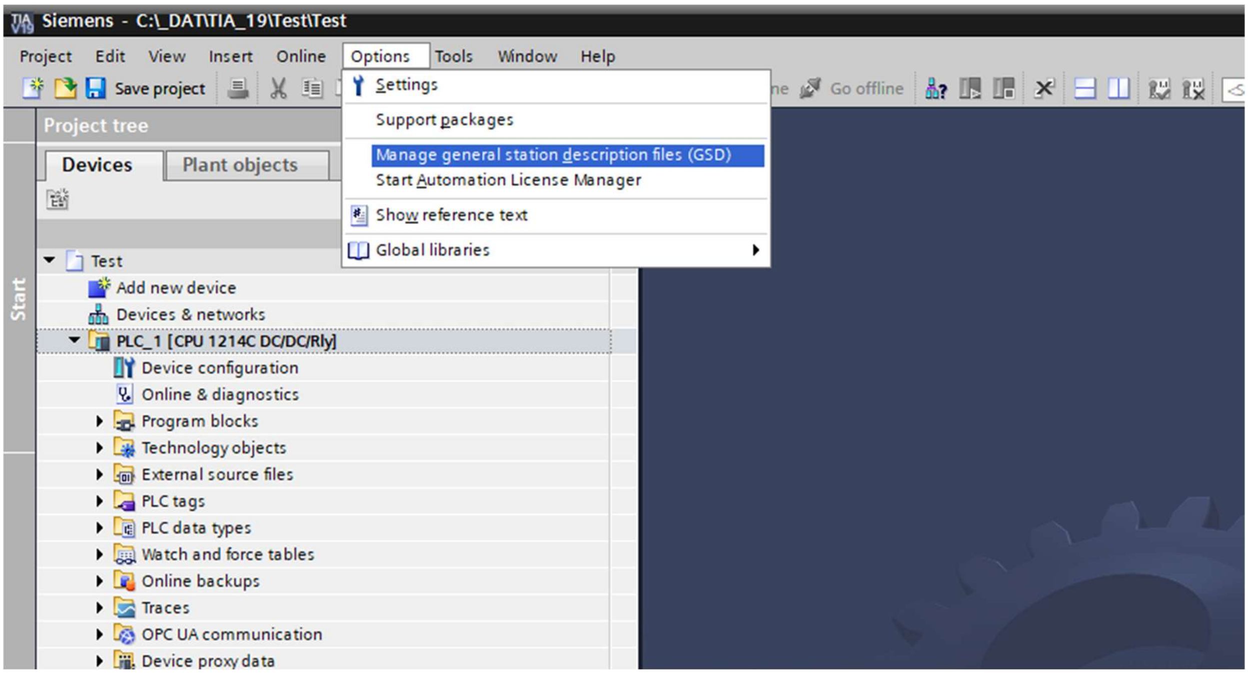
1.1.1 Device master file

The device master file for the GECO20 Profinet coupling via the PN20 has the file name:

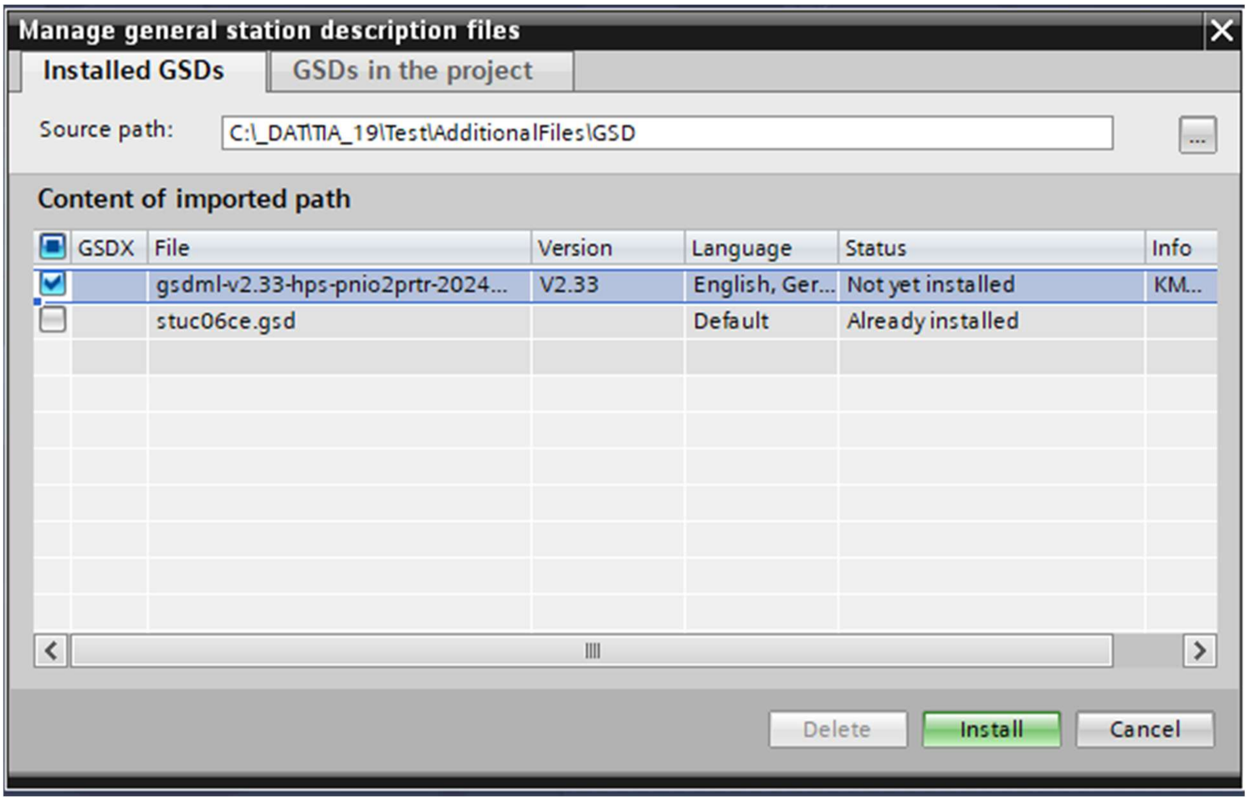
Profinet Redundancy Master M40 module: GSDML-V2.33-HPS-PNIO2PrtR-20240206.xml

1.1.2 Installation of the GSD file under SIMATIC TIA Portal

The installation of the GSD file under TIA Portal is done via Options > Manage general station description files (GSD).



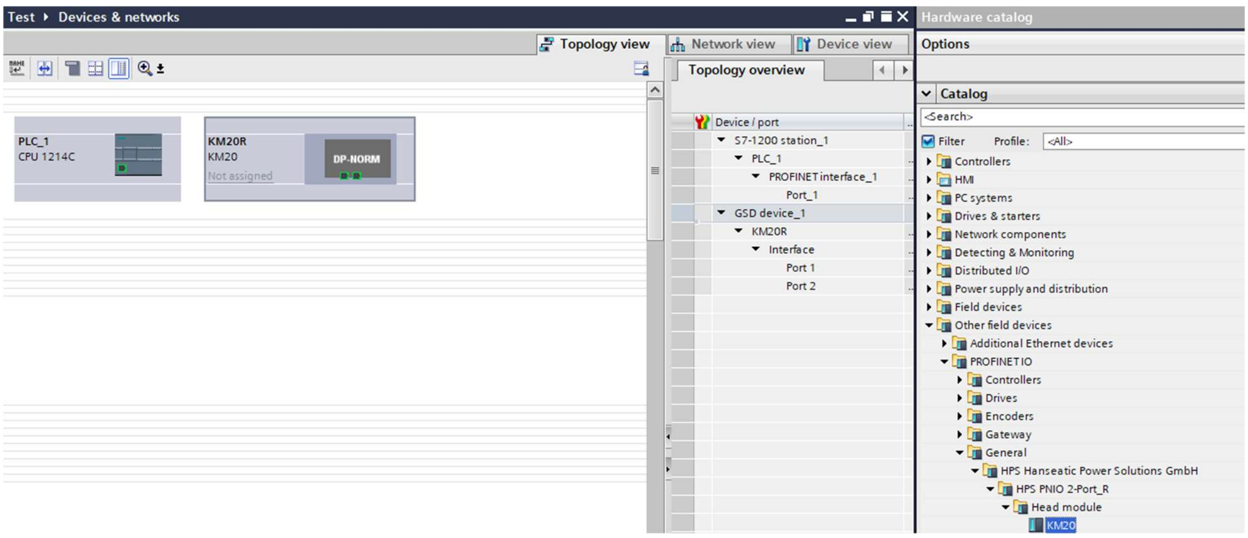
Selecting and installing the GSD file



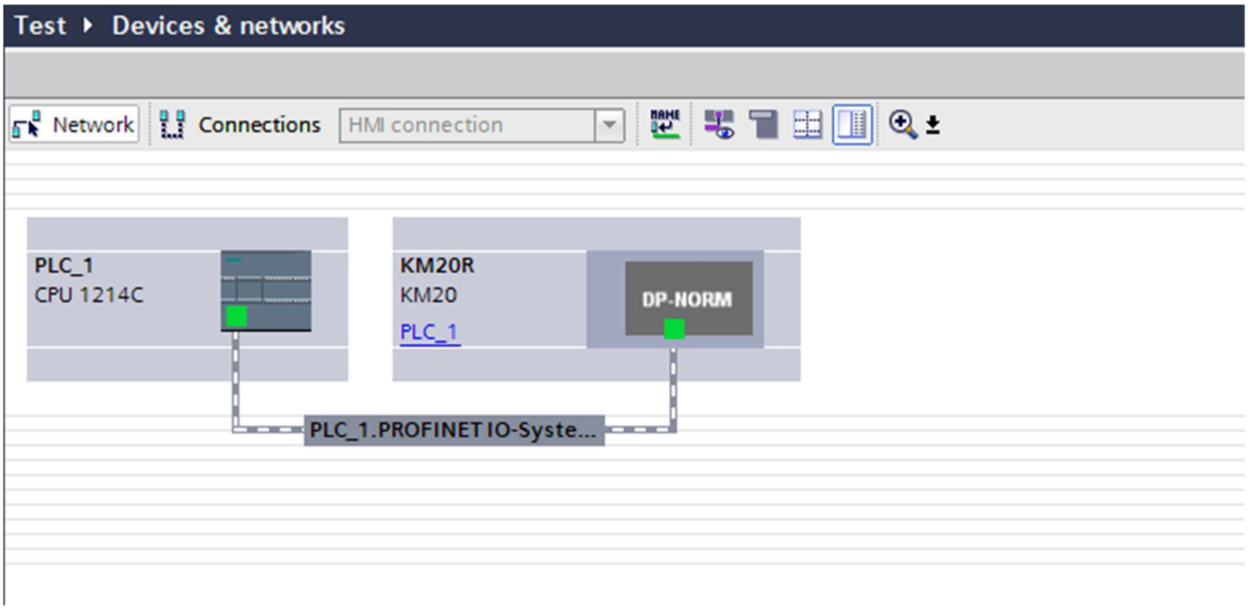
Application of the GSD file in the TIA project

After installation, the GSD file can be found in the Hardware Catalog under Other Field Devices/ General/ HPS Hanseatic Power Solutions GmbH/ HPS PNIO 2-Port_R and has the name KM20.

To integrate the Profinet I/O device into the configuration of the project, select the network view and select the KM20 module.

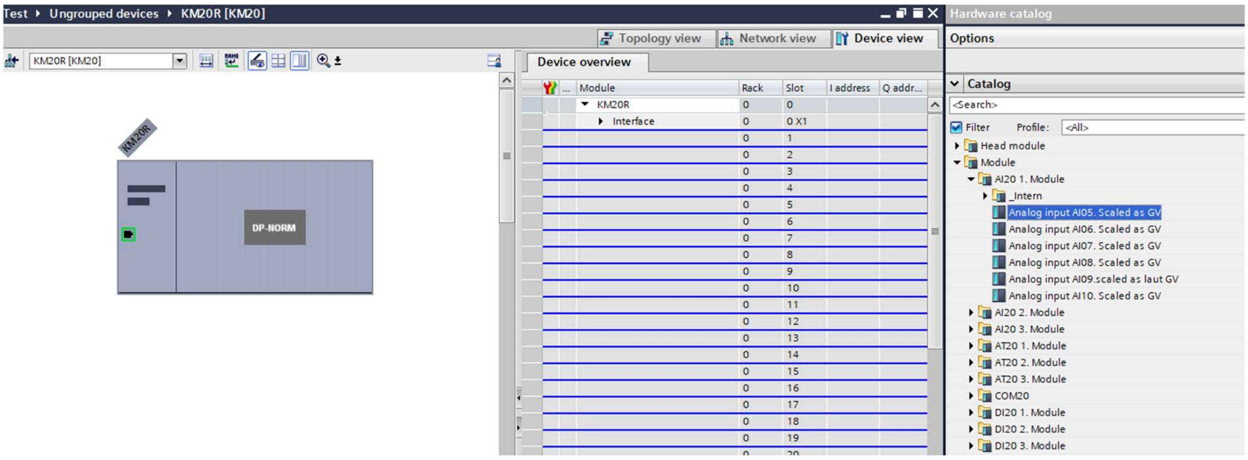


Now the KM20 module must be connected to the corresponding master.



It is then necessary to check the subscriber's address and to adjust, if necessary.

In the device view of the KM20 module it is now possible to select the required data from the corresponding modules.



Note: The Profinet configuration takes place in a similar way to the Profibus configuration.

1.2 Modbus Server/Slave

The GECO20 can be expanded with a Modbus TCP/IP module (MT20) or a Modbus RTU module (MR20) for connection to a Modbus client/master. For this purpose, 100 registers for reading and four registers for writing can be selected via the parameter software. The selection is made via a combo box for the respective register. The data length for each register is a "word". Some analogues require a double word (D-word). If a double word is selected, the next register cannot be used. Double words are indicated by the addition [DINT]. If binary values are selected, the send list lists the bit on which the messages are located. The addressing of the respective module is set in the parameter software depending on the type of communication.

Modbus functions

Modbus address	Modbus Function Code	HPS Parameter Software	Modbus Port Number	
30001 to 30064	04 – Read all registers	Register 01-64 Read	502	
40001 to 40008	06 – Write a register	Register 01-08 Writing	502	
40001 to 40008	16 – Write all registers	Register 01-08 Writing	502	

2 Data Transmission Modules Outputs

The Data Transmission Module Outputs must only be present once per device. If a remote control function is desired, the digital input for remote control can be set via PN20, MT20 or MR20.
Please observe the basic safety rules.
If the bit "power setpoint" is set, the value read in via the analogue setpoint isused as the setpoint.
Which bit is set over an impulse or continuous signal is marked as follows: [IMP]=pulse; [DS]=continuous signal. With the pulses, it should be noted that the impulse is pending until the command has been executed.

2.1 Profinet

Identifier	Designation	Bit	Length	Factor	PN20	Type
PN20 Control byte 1	[IMP] Selection the "OFF" operating mode	Bit 0	Byte		0x01AE	Bool
	[IMP] Selecting the "MAN" operating mode	Bit 1				
	[IMP] Selecting the "TEST" operating mode	Bit 2				
	[IMP] Selecting the "AUTO" operating mode	Bit 3				
	[DS] Engine start in the "MAN" operating mode	Bit 4				
	[DS] Power setpoint external (1) / internal (0)	Bit 5				
	[IMP] Buzzer off	Bit 6				
	[IMP] Reset of fault messages	Bit 7				
PN20 Control byte 2	[IMP] Generator switch on in "MAN" operating mode	Bit 0	Byte		0x01AF	Bool
	[IMP] Generator switch off in "MAN" operating mode	Bit 1				
	[IMP] Mains switch on in "MAN" operating mode	Bit 2				
	[IMP] Mains switch off in "MAN" operating mode	Bit 3				
	[DS] Power setpoint internal on (1) / off (0)	Bit 4				
	[DS] Remote start command in "AUTO"	Bit 5				
	[DS] CosPhi internal setpoint on (1) / off (0)	Bit 6				
	[DS] Lamp test	Bit 7				
PN20 Output control byte 1	Control bit 01	Bit 0	Byte		0x01B0	Bool
	Control bit 02	Bit 1				
	Control bit 03	Bit 2				
	Control bit 04	Bit 3				
	Control bit 05	Bit 4				
	Control bit 06	Bit 5				
	Control bit 07	Bit 6				
	Control bit 08	Bit 7				
PN20 Output control byte 2	Control bit 09	Bit 0	Byte		0x01B1	Bool
	Control bit 10	Bit 1				
	Control bit 11	Bit 2				
	Control bit 12	Bit 3				
	Control bit 13	Bit 4				
	Control bit 14	Bit 5				
	Control bit 15	Bit 6				
	Control bit 16	Bit 7				
PN20 Setpoint Power	in xxx.x %		2 bytes		0x01B2	INT
PN20 Setpoint CosPhi	in xxx.x %		2 bytes		0x01B3	INT

2.2 Modbus

Identifier	Designation	Bit	Length	Factor	MT20 MR20	Type
MT20 MR20 Control byte 1	[IMP] Selection the "OFF" operating mode	Bit 0	Byte		0x01C0	Bool
	[IMP] Selecting the "MAN" operating mode	Bit 1				
	[IMP] Selecting the "TEST" operating mode	Bit 2				
	[IMP] Selecting the "AUTO" operating mode	Bit 3				
	[DS] Engine start in the "MAN" operating mode	Bit 4				
	[DS] Power setpoint external (1) / internal (0)	Bit 5				
	[IMP] Buzzer off	Bit 6				
	[IMP] Reset of fault messages	Bit 7				
MT20 MR20 Control Byte 2	[IMP] Generator switch on in "MAN" operating mode	Bit 0	Byte		0x01C1	Bool
	[IMP] Generator switch off in "MAN" operating mode	Bit 1				
	[IMP] Mains switch on in "MAN" operating mode	Bit 2				
	[IMP] Mains switch off in "MAN" operating mode	Bit 3				
	[DS] Power setpoint internal on (1) / off (0)	Bit 4				
	[DS] Remote start command in "AUTO"	Bit 5				
	[DS] CosPhi internal setpoint on (1) / off (0)	Bit 6				
	[DS] Lamp test	Bit 7				
MT20 MR20 Output Control Byte 1	Control bit 01	Bit 0	Byte		0x01C2	Bool
	Control bit 02	Bit 1				
	Control bit 03	Bit 2				
	Control bit 04	Bit 3				
	Control bit 05	Bit 4				
	Control bit 06	Bit 5				
	Control bit 07	Bit 6				
	Control bit 08	Bit 7				
MT20 MR20 Output control byte 2	Control bit 09	Bit 0	Byte		0x01C3	Bool
	Control bit 10	Bit 1				
	Control bit 11	Bit 2				
	Control bit 12	Bit 3				
	Control bit 13	Bit 4				
	Control bit 14	Bit 5				
	Control bit 15	Bit 6				
	Control bit 16	Bit 7				
MT20 MR20 Setpoint power	in xxx.x %		2 bytes		0x01C4	INT
MT20 MR20 Setpoint CosPhi	in xxx.x %		2 bytes		0x01C5	INT

3 Data transmission modules inputs

3.1 COM20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Module status byte	xxxx xxxx xxxx 1111 -> flow counter from 0 to 15 xxx1 xxxx -> CCOM20 is ready for operation		Byte		0x0001	Bool
Bus status byte	Number of parameterized modules Bitwise encoded Bit 0 = 0 (Bus OK all modules present, 1 in case of error) Bit 1 = 1 GTP20 is missing Bit 2 = 1 PM20 is missing Bit 3 = 1 module ... missing (according to GV order) Bit 4 .... Bit 30 = 1 module ... missing (according to GV order) Bit 31 unused		4 bytes		0x0004	DUINT

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Operating messages Operating byte 1	Off	Bit 0	Byte		0x0011	Bool
	Hand	Bit 1				
	Test	Bit 2				
	Auto	Bit 3				
	Start	Bit 4				
	Power setpoint internal ON	Bit 5				
	Operation	Bit 6				
	Lamp test	Bit 7				
Operating messages Operating byte 2	GCB ON	Bit 0	Byte		0x0012	Bool
	MCB ON	Bit 1				
	Fault Release delay 1	Bit 2				
	Mains parallel operation	Bit 3				
	Island operation	Bit 4				
	DeltaF_release	Bit 5				
	Syn release	Bit 6				
	Load controller ON	Bit 7				
Operating messages Operating byte 3	Stopp	Bit 0	Byte		0x0013	Bool
	Warning	Bit 1				
	Mode select block	Bit 2				
	Sprinkler operation	Bit 3				
	Speed down	Bit 4				
	Speed up	Bit 5				
	Speed controller reset	Bit 6				
	Remote start	Bit 7				
Operating messages Operating byte 4	Generator voltage	Bit 0	Byte		0x0014	Bool
	Mains voltage	Bit 1				
	Starter break or start preparing / preglowing	Bit 2				
	GECO ready for operation / ramp-up completed	Bit 3				
	Idle test via DI	Bit 4				
	Net protection U	Bit 5				
	Net protection F	Bit 6				
	Sprinkler requirement	Bit 7				
Operating messages Operating byte 5	Buzzer	Bit 0	Byte		0x0015	Bool
	Collective fault	Bit 1				
	Mains protection release	Bit 2				
	CosPhi controller ON	Bit 3				
	Voltage down	Bit 4				
	Voltage up	Bit 5				
	Voltage controller reset	Bit 6				
	Lock Diff. protection (edge-controlled)	Bit 7				
Operating messages Operating byte 6	Deactivate C.B. interlocking	Bit 0	Byte		0x0016	Bool
	Standby switching	Bit 1				
	Stop solenoid on	Bit 2				
	Retransfer time runs	Bit 3				
	Pilot operation + GCB ON	Bit 4				
	Remote control or setpoint of PN20 / MT20 /MR20	Bit 5				
	BDEW Release U(t)	Bit 6				
	Start blocking active	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Operating messages Operating byte 7	Test function Omicron (AL150+154+197+198) blocked	Bit 0	Byte		0x0017	Bool
	Set time after DB	Bit 1				
	CAN BUS Droop active	Bit 2				
	Test operation CAN BUS error (AL364) blocked	Bit 3				
	CosPhi controller internal (1) / external (0)	Bit 4				
	LAAZA run-up skip	Bit 5				
	LAAZA aggregate not available	Bit 6				
	First closing / Pilot	Bit 7				
Operating messages Operating byte 8	CB trip (GLS is switched off due to error)	Bit 0	Byte		0x0018	Bool
	LAAZA pilot hand in if possible (GCB ready aux. marker)	Bit 1				
	LAAZA lock	Bit 2				
	CAN BUS Rapid Engine Start	Bit 3				
	No automatic start (DI set to automatic)	Bit 4				
	Standby connect mode VDE4105	Bit 5				
	Lock voltage control FE	Bit 6				
	Lock frequency control FE	Bit 7				
Operating messages Operating byte 9	PID controller - island operation	Bit 0	Byte		0x0019	Bool
	PID controller - syn. operation	Bit 1				
	PID controller - mains parallel operation	Bit 2				
	PID controller - gen. parallel operation	Bit 3				
	Toogle Bit 0.5s	Bit 4				
	Toogle Bit 1.0s	Bit 5				
	Toogle Bit 2.0s	Bit 6				
	CAN-BUS engine running	Bit 7				
Operating messages Operating byte 10	Analog output 05 switched to 0..20mA (PM20)	Bit 0	Byte		0x001A	Bool
	Analog output 08 switched to 0..20mA (GTP20)	Bit 1				
	Aggregate ready	Bit 2				
	Aggregate ready for control panel (no start blocking active)	Bit 3				
	CAN Bus Enabled	Bit 4				
	CAN Bus Communication OK	Bit 5				
	CAN BUS engine running	Bit 6				
	Aggregate loaded (P > X or FE)	Bit 7				
Operating messages Operating byte 11	MCB ON	Bit 0	Byte		0x001B	Bool
	MCB OFF	Bit 1				
	MCB READY	Bit 2				
	Free	Bit 3				
	GCB ON	Bit 4				
	GCB OFF	Bit 5				
	GCB READY	Bit 6				
	free	Bit 7				
Operating messages Operating byte 12	Function key 1 output	Bit 0	Byte		0x001C	Bool
	Function key 2 output	Bit 1				
	Function key 3 output	Bit 2				
	Function key 4 output	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
Operating messages Operating byte 13	Remote control of the remote panel GTP20R	Bit 0	Byte		0x001D	Bool
	Remote control from PN20	Bit 1				
	Remote control of the MT20 MR20	Bit 2				
	Remote control of the remote panel GTP20 PN20 MT20 MR20	Bit 3				
	Remote control or setpoint from PN20	Bit 4				
	Remote control or setpoint of MT20 MR20	Bit 5				
	Remote Control or Setpoint of PN20 MT20 MR20	Bit 6				
	free	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Logic Marker M01 .. M16	Marker01	Bit 0	Word		0x0022	Bool
	Marker02	Bit 1				
	Marker03	Bit 2				
	Marker04	Bit 3				
	Marker05	Bit 4				
	Marker06	Bit 5				
	Marker07	Bit 6				
	Marker08	Bit 7				
	Marker09	Bit 8				
	Marker10	Bit 9				
	Marker11	Bit 10				
	Marker12	Bit 11				
	Marker13	Bit 12				
	Marker14	Bit 13				
	Marker15	Bit 14				
	Marker16	Bit 15				
Logic Marker M17 .. M32	Marker17	Bit 0	Word		0x0023	Bool
	Marker18	Bit 1				
	Marker19	Bit 2				
	Marker20	Bit 3				
	Marker21	Bit 4				
	Marker22	Bit 5				
	Marker23	Bit 6				
	Marker24	Bit 7				
	Marker25	Bit 8				
	Marker26	Bit 9				
	Marker27	Bit 10				
	Marker28	Bit 11				
	Marker29	Bit 12				
	Marker30	Bit 13				
	Marker31	Bit 14				
	Marker32	Bit 15				
Logic Marker M33 .. M48	Marker33	Bit 0	Word		0x0024	Bool
	Marker34	Bit 1				
	Marker35	Bit 2				
	Marker36	Bit 3				
	Marker37	Bit 4				
	Marker38	Bit 5				
	Marker39	Bit 6				
	Marker40	Bit 7				
	Marker41	Bit 8				
	Marker42	Bit 9				
	Marker43	Bit 10				
	Marker44	Bit 11				
	Marker45	Bit 12				
	Marker46	Bit 13				
	Marker47	Bit 14				
	Marker48	Bit 15				
Logic Marker M49 .. M64	Marker49	Bit 0	Word		0x0025	Bool
	Marker50	Bit 1				
	Marker51	Bit 2				
	Marker52	Bit 3				
	Marker53	Bit 4				
	Marker54	Bit 5				
	Marker55	Bit 6				
	Marker56	Bit 7				
	Marker57	Bit 8				
	Marker58	Bit 9				
	Marker59	Bit 10				
	Marker60	Bit 11				
	Marker61	Bit 12				
	Marker62	Bit 13				
	Marker63	Bit 14				
	Marker64	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Logic Marker M65 .. M80	Marker65	Bit 0	Word		0x0026	Bool
	Marker66	Bit 1				
	Marker67	Bit 2				
	Marker68	Bit 3				
	Marker69	Bit 4				
	Marker70	Bit 5				
	Marker71	Bit 6				
	Marker72	Bit 7				
	Marker73	Bit 8				
	Marker74	Bit 9				
	Marker75	Bit 10				
	Marker76	Bit 11				
	Marker77	Bit 12				
	Marker78	Bit 13				
	Marker79	Bit 14				
	Marker80	Bit 15				
Logic Timer T01 .. T16	Timer01	Bit 0	Word		0x0027	Bool
	Timer02	Bit 1				
	Timer03	Bit 2				
	Timer04	Bit 3				
	Timer05	Bit 4				
	Timer06	Bit 5				
	Timer07	Bit 6				
	Timer08	Bit 7				
	Timer09	Bit 8				
	Timer10	Bit 9				
	Timer11	Bit 10				
	Timer12	Bit 11				
	Timer13	Bit 12				
	Timer14	Bit 13				
	Timer15	Bit 14				
	Timer16	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 001 .. 016	AL001 (free input*)	Bit 0	Word		0x0028	Bool
	AL002 (free input*)	Bit 1				
	AL003 (free input*)	Bit 2				
	AL004 (free input*)	Bit 3				
	AL005 (free input*)	Bit 4				
	AL006 (free input*)	Bit 5				
	AL007 (free input*)	Bit 6				
	AL008 (free input*)	Bit 7				
	AL009 (free input*)	Bit 8				
	AL010 (free input*)	Bit 9				
	AL011 (free input*)	Bit 10				
	AL012 (free input*)	Bit 11				
	AL013 (free input*)	Bit 12				
	AL014 (free input*)	Bit 13				
	AL015 (free input*)	Bit 14				
	AL016 (free input*)	Bit 15				
Alarms Alarm 017 .. 032	AL017 (free input*)	Bit 0	Word		0x0029	Bool
	AL018 (free input*)	Bit 1				
	AL019 (free input*)	Bit 2				
	AL020 (free input*)	Bit 3				
	AL021 (free input*)	Bit 4				
	AL022 (free input*)	Bit 5				
	AL023 (free input*)	Bit 6				
	AL024 (free input*)	Bit 7				
	AL025 (free input*)	Bit 8				
	AL026 (free input*)	Bit 9				
	AL027 (free input*)	Bit 10				
	AL028 (free input*)	Bit 11				
	AL029 (free input*)	Bit 12				
	AL030 (free input*)	Bit 13				
	AL031 (free input*)	Bit 14				
	AL032 (free input*)	Bit 15				
Alarms Alarm 033 .. 048	AL033 (free input*)	Bit 0	Word		0x002A	Bool
	AL034 (free input*)	Bit 1				
	AL035 (free input*)	Bit 2				
	AL036 (free input*)	Bit 3				
	AL037 (free input*)	Bit 4				
	AL038 (free input*)	Bit 5				
	AL039 (free input*)	Bit 6				
	AL040 (free input*)	Bit 7				
	AL041 (free input*)	Bit 8				
	AL042 (free input*)	Bit 9				
	AL043 (free input*)	Bit 10				
	AL044 (free input*)	Bit 11				
	AL045 (free input*)	Bit 12				
	AL046 (free input*)	Bit 13				
	AL047 (free input*)	Bit 14				
	AL048 (free input*)	Bit 15				
Alarms Alarm 049 .. 064	AL049 (free input*)	Bit 0	Word		0x002B	Bool
	AL050 (free input*)	Bit 1				
	AL051 (free input*)	Bit 2				
	AL052 (free input*)	Bit 3				
	AL053 (free input*)	Bit 4				
	AL054 (free input*)	Bit 5				
	AL055 (free input*)	Bit 6				
	AL056 (free input*)	Bit 7				
	AL057 (free input*)	Bit 8				
	AL058 (free input*)	Bit 9				
	AL059 (free input*)	Bit 10				
	AL060 (free input*)	Bit 11				
	AL061 (free input*)	Bit 12				
	AL062 (free input*)	Bit 13				
	AL063 (free input*)	Bit 14				
	AL064 (free input*)	Bit 15				

*See parameterization GECO20

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 097 .. 112	AL097 free	Bit 0	Word		0x002E	Bool
	AL098 free	Bit 1				
	AL099 free	Bit 2				
	AL100 free	Bit 3				
	AL101 Emergency stop	Bit 4				
	AL103 Start crank stop	Bit 5				
	AL103 Start crank stop	Bit 6				
	AL112 Starter battery 2 U>	Bit 7				
	AL112 Starter battery 2 U>	Bit 8				
	AL112 Starter battery 2 U>	Bit 9				
	AL112 Starter battery 2 U>	Bit 10				
	AL112 Starter battery 2 U>	Bit 11				
	AL112 Starter battery 2 U>	Bit 12				
	AL112 Starter battery 2 U>	Bit 13				
	AL112 Starter battery 2 U>	Bit 14				
	AL112 Starter battery 2 U>	Bit 15				
Alarms Alarm 113 .. 128	AL113 Gen CB fault	Bit 0	Word		0x002F	Bool
	AL114 Mains CB fault	Bit 1				
	AL115 Syn time too long	Bit 2				
	AL116 Watchdog	Bit 3				
	AL117 Maintenance counter	Bit 4				
	AL118 Fault remote tableau	Bit 5				
	AL119 Load/CosPhi Bus fault	Bit 6				
	AL120 Load/CosPhi Bus particip. missing	Bit 7				
	AL121 BDEW - U(t) Time is running	Bit 8				
	AL122 BDEW - U(t) Fault	Bit 9				
	AL123 VDE4105 Power reduction fault	Bit 10				
	AL124 AI03 UDC<	Bit 11				
	AL125 AI03 UDC>	Bit 12				
	AL126 free	Bit 13				
	AL127 free	Bit 14				
	AL128 free	Bit 15				
Alarms Alarm 129 .. 144	AL129 free	Bit 0	Word		0x0030	Bool
	AL130 free	Bit 1				
	AL131 free	Bit 2				
	AL132 free	Bit 3				
	AL133 Mains voltage <<	Bit 4				
	AL134 Mains voltage <	Bit 5				
	AL135 Mains voltage >	Bit 6				
	AL136 Mains voltage >>	Bit 7				
	AL137 Mains frequency <<	Bit 8				
	AL138 Mains frequency <	Bit 9				
	AL139 Mains frequency >	Bit 10				
	AL140 Mains frequency >>	Bit 11				
	AL141 Mains rotating field	Bit 12				
	AL142 Mains angle fault	Bit 13				
	AL143 Mains voltage asymmetry	Bit 14				
	AL144 MCB tripped	Bit 15				
Alarms Alarm 145 .. 160	AL145 free	Bit 0	Word		0x0031	Bool
	AL146 free	Bit 1				
	AL147 free	Bit 2				
	AL148 free	Bit 3				
	AL149 Generator voltage <<	Bit 4				
	AL150 Generator voltage <	Bit 5				
	AL151 Generator voltage >	Bit 6				
	AL152 Generator voltage >>	Bit 7				
	AL153 Generator frequency <<	Bit 8				
	AL154 Generator frequency <	Bit 9				
	AL155 Generator frequency >	Bit 10				
	AL156 Generator frequency >>	Bit 11				
	AL157 Generator rotating field	Bit 12				
	AL158 Generator angle fault	Bit 13				
	AL159 Generator voltage asymmetry	Bit 14				
	AL160 Cos Phi capacitive	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 161 .. 176	AL161 Cos Phi inductive	Bit 0	Word		0x0032	Bool
	AL162 GCB tripped	Bit 1				
	AL163 free	Bit 2				
	AL164 free	Bit 3				
	AL165 Mains protection collective fault	Bit 4				
	AL166 Mains protection U<<	Bit 5				
	AL167 Mains protection U<	Bit 6				
	AL168 Mains protection U>	Bit 7				
	AL169 Mains protection U>>	Bit 8				
	AL170 Mains protection F<<	Bit 9				
	AL171 Mains protection F<	Bit 10				
	AL172 Mains protection F>	Bit 11				
	AL173 Mains protection F>>	Bit 12				
	AL174 Mains protection vector >	Bit 13				
	AL175 Mains protection vector >>	Bit 14				
	AL176 Q-U protection <	Bit 15				
Alarms Alarm 177 .. 192	AL177 Q-U protection <<	Bit 0	Word		0x0033	Bool
	AL 178 free	Bit 1				
	AL 179 free	Bit 2				
	AL 180 free	Bit 3				
	AL181 VDE4105 - Collective fault	Bit 4				
	AL182 VDE4105 - U< (80%)	Bit 5				
	AL183 VDE4105 - U>> (115%)	Bit 6				
	AL184 VDE4105 - F< (47,5Hz)	Bit 7				
	AL185 VDE4105 - F> (51,5Hz)	Bit 8				
	AL186 VDE4105 - U> (Quality)	Bit 9				
	AL 187	Bit 10				
	AL 188	Bit 11				
	AL 189 Overcurrent >	Bit 12				
	AL 190 Overcurrent >>	Bit 13				
	AL 191 Overcurrent Time Protection	Bit 14				
	AL 192 Overcurrent VDE 0100-718	Bit 15				
Alarms Alarm 193 .. 208	AL193 Earth current >	Bit 0	Word		0x0034	Bool
	AL194 Earth current >>	Bit 1				
	AL195 free	Bit 2				
	AL196 free	Bit 3				
	AL197 Power >	Bit 4				
	AL198 Power >>	Bit 5				
	AL199 Reverse power >	Bit 6				
	AL200 Reverse power >>	Bit 7				
	AL201 Apparent power >	Bit 8				
	AL202 Apparent power >>	Bit 9				
	AL203 Reactive power >	Bit 10				
	AL204 Reactive power >>	Bit 11				
	AL205 Unbalanced load	Bit 12				
	AL206 free	Bit 13				
	AL207 Diff current >	Bit 14				
	AL208 Diff current >>	Bit 15				
Alarms Alarm 209 .. 224	AL209 Internal current >	Bit 0	Word		0x0035	Bool
	AL210 Internal current >>	Bit 1				
	AL211 External current >	Bit 2				
	AL212 External current >>	Bit 3				
	AL213 Stable current >	Bit 4				
	AL214 Stable current >>	Bit 5				
	AL215 Diff current rotating field int.	Bit 6				
	AL216 Diff current rotating field ext.	Bit 7				
	AL217 Diff current rate of change	Bit 8				
	AL218 free	Bit 9				
	AL219 Underspeed	Bit 10				
	AL220 Overspeed	Bit 11				
	AL221 AI5	Bit 12				
	AL222 AI6	Bit 13				
	AL223 AI7	Bit 14				
	AL224 AI8	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 225 .. 240	AL225 AI9	Bit 0	Word		0x0036	Bool
	AL226 AI10	Bit 1				
	AL227 free	Bit 2				
	AL228 free	Bit 3				
	AL229 AI11	Bit 4				
	AL230 AI12	Bit 5				
	AL231 AI13	Bit 6				
	AL232 AI14	Bit 7				
	AL233 AI15	Bit 8				
	AL234 AI16	Bit 9				
	AL235 free	Bit 10				
	AL236 free	Bit 11				
	AL237 AI17	Bit 12				
	AL238 AI18	Bit 13				
	AL239 AI19	Bit 14				
	AL240 AI20	Bit 15				
Alarms Alarm 241 .. 256	AL241 AI21	Bit 0	Word		0x0037	Bool
	AL242 AI22	Bit 1				
	AL243 free	Bit 2				
	AL244 free	Bit 3				
	AL245 PT1>	Bit 4				
	AL246 PT1>>	Bit 5				
	AL247 PT2>	Bit 6				
	AL248 PT2>>	Bit 7				
	AL249 PT3>	Bit 8				
	AL250 PT3>>	Bit 9				
	AL251 PT4>	Bit 10				
	AL252 PT4>>	Bit 11				
	AL253 PT5>	Bit 12				
	AL254 PT5>>	Bit 13				
	AL255 PT6>	Bit 14				
	AL256 PT6>>	Bit 15				
Alarms Alarm 257 .. 272	AL257 AI23>	Bit 0	Word		0x0038	Bool
	AL258 AI23>>	Bit 1				
	AL259 AI24>	Bit 2				
	AL260 AI24>>	Bit 3				
	AL261 PT7>	Bit 4				
	AL262 PT7>>	Bit 5				
	AL263 PT8>	Bit 6				
	AL264 PT8>>	Bit 7				
	AL265 PT9>	Bit 8				
	AL266 PT9>>	Bit 9				
	AL267 PT10>	Bit 10				
	AL268 PT10>>	Bit 11				
	AL269 PT11>	Bit 12				
	AL270 PT11>>	Bit 13				
	AL271 PT12>	Bit 14				
	AL272 PT12>>	Bit 15				
Alarms Alarm 273 .. 288	AL273 AI25>	Bit 0	Word		0x0039	Bool
	AL274 AI25>>	Bit 1				
	AL275 AI26>	Bit 2				
	AL276 AI26>>	Bit 3				
	AL277 free	Bit 4				
	AL278 free	Bit 5				
	AL279 free	Bit 6				
	AL280 free	Bit 7				
	AL281 free	Bit 8				
	AL282 free	Bit 9				
	AL283 free	Bit 10				
	AL284 free	Bit 11				
	AL285 free	Bit 12				
	AL286 free	Bit 13				
	AL287 free	Bit 14				
	AL288 free	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 289 .. 304	AL289 free	Bit 0	Word		0x003A	Bool
	AL290 free	Bit 1				
	AL291 free	Bit 2				
	AL292 free	Bit 3				
	AL293 Sensor error AT20/1	Bit 4				
	AL294 Sensor error AT20/2	Bit 5				
	AL295 free	Bit 6				
	AL296	Bit 7				
	AL297	Bit 8				
	AL298	Bit 9				
	AL299	Bit 10				
	AL300	Bit 11				
	AL301 Amber warning lamp	Bit 12				
	AL302 Red stop lamp	Bit 13				
	AL303 J1939 Coolant water pressure (20)	Bit 14				
	AL304 J1939 Percent accelerator pedal position (91)	Bit 15				
Alarms Alarm 305 .. 320	AL305 Fuel delivery pressure sensor (94)	Bit 0	Word		0x003B	Bool
	AL306 Water in fuel switch (97)	Bit 1				
	AL307 Engine oil level (98)	Bit 2				
	AL308 Engine oil filter differential pressure (99)	Bit 3				
	AL309 Engine oil pressure (100)	Bit 4				
	AL310 Boost pressure sensor (102)	Bit 5				
	AL311 Boost temperature sensor (105)	Bit 6				
	AL312 Boost pressure sensor (106)	Bit 7				
	AL313 Air filter differential pressure (107)	Bit 8				
	AL314 Ambient air pressure sensor (108)	Bit 9				
	AL315 Engine coolant pressure (109)	Bit 10				
	AL316 Engine coolant temperature (110)	Bit 11				
	AL317 Coolant level switch (111)	Bit 12				
	AL318 Crankcase pressure sensor (153)	Bit 13				
	AL319 Key switch battery potential (158)	Bit 14				
	AL320 Injection control pressure (164)	Bit 15				
Alarms Alarm 321 .. 336	AL321 Ambient air temperature sensor (172)	Bit 0	Word		0x003C	Bool
	AL322 Exhaust gas temperature sensor (173)	Bit 1				
	AL323 Oil temperature sensor (175)	Bit 2				
	AL324 Engine speed at idle (188)	Bit 3				
	AL325 Engine speed (190)	Bit 4				
	AL326 Start/stop redundancy (608)	Bit 5				
	AL327 +5V sensor supply (620)	Bit 6				
	AL328 Inlet air heater status (626)	Bit 7				
	AL329 Controller error (629)	Bit 8				
	AL330 EEPROM (630)	Bit 9				
	AL331 Speed sensor CAM (636)	Bit 10				
	AL332 Speed sensor flywheel (637)	Bit 11				
	AL333 J1939 Communication bus / Program (639)	Bit 12				
	AL334 Injector cylinder 1 (651)	Bit 13				
	AL335 Injector cylinder 2 (652)	Bit 14				
	AL336 Injector cylinder 3 (653)	Bit 15				
Alarms Alarm 337 .. 352	AL337 Injector cylinder 4 (654)	Bit 0	Word		0x003D	Bool
	AL338 Injector cylinder 5 (655)	Bit 1				
	AL339 Injector cylinder 6 (656)	Bit 2				
	AL340 Starter motor actuator (677)	Bit 3				
	AL341 Injection control pressure regulator (679)	Bit 4				
	AL342 Preheat sense (729)	Bit 5				
	AL343 Engine requested speed/speed limit (898)	Bit 6				
	AL344 Key off input sensor (stop request) (970)	Bit 7				
	AL345 +5V sensor supply (1079)	Bit 8				
	AL346 +5V sensor supply 2 (1080)	Bit 9				
	AL347 Engine ECU temperature (1136)	Bit 10				
	AL348 CAN Bus 2 (1231)	Bit 11				
	AL349 Rail pressure system (1239)	Bit 12				
	AL350 Main relay output (1485)	Bit 13				
	AL351 Engine starter motor relay (1675)	Bit 14				
	AL352 J1939 Communication bus (2017)	Bit 15				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Alarms Alarm 353 .. 368	AL353 Turbocharger 1 comp. out. temp. (2629)	Bit 0	Word		0x003E	Bool
	AL354 Internal EGR status (2791)	Bit 1				
	AL355 Piston cooling switch (520192)	Bit 2				
	AL356 Sea water pressure (520193)	Bit 3				
	AL357 Starter input sensor (start request) (520194)	Bit 4				
	AL358 Key off input sensor (stop request) (520195)	5 Bit				
	AL359 Starter speed(520837)	Bit 5				
	AL360 Run up speed(520838)	Bit 7				
	AL361 MTU Engine controller(522192)	Bit 8				
	AL362 MTU Engine protection	Bit 9				
	AL363 free	Bit 10				
	AL364 CAN BUS fault	Bit 11				
	AL365 free	Bit 12				
	AL366 Engine speed	Bit 13				
	AL367 Coolant temperature	Bit 14				
	AL368 Oil pressure	Bit 15				
Alarms Alarm 369 .. 384	AL369 Oil temperature	Bit 0	Word		0x003F	Bool
	AL370 Coolant level	Bit 1				
	AL371 free	Bit 2				
	AL372 free	Bit 3				
	AL373 free	Bit 4				
	AL374 free	Bit 5				
	AL375 free	Bit 6				
	AL376 free	Bit 7				
	AL377 free	Bit 8				
	AL378 free	Bit 9				
	AL379 free	Bit 10				
	AL380 free	Bit 11				
	AL381 free	Bit 12				
	AL382 free	Bit 13				
	AL383 free	Bit 14				
	AL384 free	Bit 15				
Analog Inputs – COM20	Speed pick-up in xxxx rpm		2 bytes		0x0048	UINT
Analog Inputs – COM20	Battery voltage 1 xx.x V		2 bytes	DIV10	0x0049	UINT
Analog Inputs – COM20	Battery voltage 2 xx.x V		2 bytes	DIV10	0x004A	UINT
Analog Inputs – COM20	Analog input AI01 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x004B	INT
Analog Inputs – COM20	Analog input AI02 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x004C	INT
Analog Outputs – COM20	Analog output AO01 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x004D	INT
Analog Outputs – COM20	Analog output AO02 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x004E	INT
Analog Outputs – COM20	Analog output AO03 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x004F	INT
Analog Outputs – COM20	Analog output AO04 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x0050	INT
Analog Outputs – PM20	Analog output AO05 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x0051	INT
Analog Outputs – PM20	Analog output AO06 +/- xx.xx V/mA (Scaled according to GV)		2 bytes	DIV100	0x0052	INT
Analog Outputs – GTP20	Analog output AO07 +/- xx.xx V (Scaled according to GV)		2 bytes	DIV100	0x0053	INT
Analog Outputs – GTP20	Analog output AO08 +/- xx.xx V/mA (Scaled according to GV)		2 bytes	DIV100	0x0054	INT
Digital outputs DO20-1 DO101 .. DO108	DO101	Bit 0	Byte		0x0058	Bool
	DO102	Bit 1				
	DO103	Bit 2				
	DO104	Bit 3				
	DO105	Bit 4				
	DO106	Bit 5				
	DO107	Bit 6				
	DO108	Bit 7				
Digital outputs DO20-1 DO109 .. DO111	DO109	Bit 0	Byte		0x0059	Bool
	DO110	Bit 1				
	DO111	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Digital Outputs DO20-2 DO201 .. DO208	DO201	Bit 0	Byte		0x005A	Bool
	DO202	Bit 1				
	DO203	Bit 2				
	DO204	Bit 3				
	DO205	Bit 4				
	DO206	Bit 5				
	DO207	Bit 6				
	DO208	Bit 7				
Digital Outputs DO20-2 DO209 .. DO211	DO209	Bit 0	Byte		0x005B	Bool
	DO210	Bit 1				
	DO211	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
Digital outputs DO20-3 DO301 .. DO308	DO301	Bit 0	Byte		0x005C	Bool
	DO302	Bit 1				
	DO303	Bit 2				
	DO304	Bit 3				
	DO305	Bit 4				
	DO306	Bit 5				
	DO307	Bit 6				
	DO308	Bit 7				
Digital outputs DO20-3 DO309 .. DO311	DO309	Bit 0	Byte		0x005D	Bool
	DO310	Bit 1				
	DO311	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
Digital outputs DO20-4 DO401 .. DO408	DO401	Bit 0	Byte		0x005E	Bool
	DO402	Bit 1				
	DO403	Bit 2				
	DO404	Bit 3				
	DO405	Bit 4				
	DO406	Bit 5				
	DO407	Bit 6				
	DO408	Bit 7				
Digital outputs DO20-4 DO409 .. DO411	DO409	Bit 0	Byte		0x005F	Bool
	DO410	Bit 1				
	DO411	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
ABYTEA09 Output Byte 9	free		Byte		0x0060	Bool
ABYTEA10 Output Byte 10	free		Byte		0x0061	Bool
Digital outputs PM20 DO601 .. DO608	DO601 MCB ready	Bit 0	Byte		0x0062	Bool
	DO602 MCB on	Bit 1				
	DO603 GCB ready	Bit 2				
	DO604 GCB on	Bit 3				
	DO605 Mains protection MCB (NO)	Bit 4				
	DO606 Mains protection GCB (NC)	Bit 5				
	DO607 Collective fault	Bit 6				
	DO608 Watchdog (NC)	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Digital outputs BUS modules DO707 .. DO708	free	Bit 0	Byte		0x0063	Bool
	free	Bit 1				
	free	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	DO707 MT20 o. MR20 Modbus	Bit 6				
	DO708 PN20 Profinet	Bit 7				
Digital outputs GTP20 DO801/901 .. DO802/902	DO801 GTP20	Bit 0	Byte		0x0064	Bool
	DO802 GTP20	Bit 1				
	free	Bit 2				
	DO901 GTP20 Remote Panel	Bit 3				
	DO902 GTP20 Remote Panel	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
CAN BUS Input byte	CAN Start	Bit 0	Byte		0x0071	Bool
	CAN Stop	Bit 1				
	CAN Droop	Bit 2				
	CAN Sprinkler	Bit 3				
	CAN Start blocking	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
CAN BUS CAN BIN 01 .. 08	BIN 01	Bit 0	Byte		0x0072	Bool
	BIN 02	Bit 1				
	BIN 03	Bit 2				
	BIN 04	Bit 3				
	BIN 05	Bit 4				
	BIN 06	Bit 5				
	BIN 07	Bit 6				
	BIN 08	Bit 7				
CAN BUS CAN BOUT 01 .. 05	BOUT 01	Bit 0	Byte		0x0073	Bool
	BOUT 02	Bit 1				
	BOUT 03	Bit 2				
	BOUT 04	Bit 3				
	BOUT 05	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
CAN BUS	CAN AIN 01		4 bytes		0x0074	DUINT
CAN BUS	CAN AIN 02		4 bytes		0x0075	DUINT
CAN BUS	CAN AIN 03		4 bytes		0x0076	DUINT
CAN BUS	CAN AIN 04		4 bytes		0x0077	DUINT
CAN BUS	CAN AIN 05		4 bytes		0x0078	DUINT
CAN BUS	CAN AIN 06		4 bytes		0x0079	DUINT
CAN BUS	CAN AIN 07		4 bytes		0x007A	DUINT
CAN BUS	CAN AIN 08		4 bytes		0x007B	DUINT
CAN BUS	CAN AIN 09		4 bytes		0x007C	DUINT
CAN BUS	CAN AIN 10		4 bytes		0x007D	DUINT
CAN BUS	CAN AIN 11		4 bytes		0x007E	DUINT
CAN BUS	CAN AIN 12		4 bytes		0x007F	DUINT
CAN BUS	CAN AIN 13		4 bytes		0x0080	DUINT
CAN BUS	CAN AIN 14		4 bytes		0x0081	DUINT
CAN BUS	CAN AIN 15		4 bytes		0x0082	DUINT
CAN BUS	CAN AIN 16		4 bytes		0x0083	DUINT
CAN BUS	CAN AIN 17		4 bytes		0x0084	DUINT
CAN BUS	CAN AIN 18		4 bytes		0x0085	DUINT
CAN BUS	CAN AIN 19		4 bytes		0x0086	DUINT
CAN BUS	CAN AIN 20		4 bytes		0x0087	DUINT

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
CAN BUS	CAN AIN 21		4 bytes		0x0088	DUINT
CAN BUS	CAN AIN 22		4 bytes		0x0089	DUINT
CAN BUS	CAN AIN 23		4 bytes		0x008A	DUINT
CAN BUS	CAN AIN 24		4 bytes		0x008B	DUINT
CAN BUS	CAN AIN 25		4 bytes		0x008C	DUINT
CAN BUS	CAN AIN 26		4 bytes		0x008D	DUINT
CAN BUS	CAN AIN 27		4 bytes		0x008E	DUINT
CAN BUS	CAN AIN 28		4 bytes		0x008F	DUINT
CAN BUS	CAN AIN 29		4 bytes		0x0090	DUINT
CAN BUS	CAN AIN 30		4 bytes		0x0091	DUINT
CAN BUS	CAN AIN 31		4 bytes		0x0092	DUINT
CAN BUS	CAN AIN 32		4 bytes		0x0093	DUINT
CAN BUS	CAN AOUT 01		2 bytes		0x0094	UINT
CAN BUS	CAN AOUT 02		2 bytes		0x0095	UINT
CAN BUS	CAN AOUT 03		2 bytes		0x0096	UINT
Setpoints	Setpoint power in xxx.x %		2 bytes	DIV10	0x0097	INT
Setpoints	Setpoint CosPhi in x.xxx PF		2 bytes	DIV1000	0x0098	INT
Setpoints	Setpoint speed CAN BUS in xxxx 1/8 rpm		2 bytes	DIV1	0x0099	UINT
Counter	Cooling down time in xxx.x sec.		2 bytes	DIV10	0x009B	UINT
Counter	Sprinkler cooling down time in xxx.x sec.		2 bytes	DIV10	0x009C	UINT
Counter	Stop time in xxx.x sec.		2 bytes	DIV10	0x009D	UINT
Counter	Retransfer time in xxx.x sec.		2 bytes	DIV10	0x009E	UINT
Counter	Unloading time in xxx.x sec.		2 bytes	DIV10	0x009F	UINT
LED GTP20	free	Bit 0	Word		0x00A0	Bool
	GTP LED [OFF]	Bit 1				
	GTP LED [MAN]	Bit 2				
	GTP LED [TEST]	Bit 3				
	GTP LED [AUTO]	Bit 4				
	GTP LED [ALARM]	Bit 5				
	GTP LED [ECU]	Bit 6				
	GTP LED [RUN]	Bit 7				
	GTP LED [U/F]	Bit 8				
	free	Bit 9				
	Main Window Message 1	Bit 10				
	Main Window Message 2	Bit 11				
	free	Bit 12				
	free	Bit 13				
	free	Bit 14				
	free	Bit 15				
LED Operating messages 01 .. 16	Operating messages 01	Bit 0	Word		0x00A1	Bool
	Operating messages 02	Bit 1				
	Operating messages 03	Bit 2				
	Operating messages 04	Bit 3				
	Operating messages 05	Bit 4				
	Operating messages 06	Bit 5				
	Operating messages 07	Bit 6				
	Operating messages 08	Bit 7				
	Operating messages 09	Bit 8				
	Operating messages 10	Bit 9				
	Operating messages 11	Bit 10				
	Operating messages 12	Bit 11				
	Operating messages 13	Bit 12				
	Operating messages 14	Bit 13				
	Operating messages 15	Bit 14				
	Operating messages 16	Bit 15				

3.2 GTP20

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Digital inputs DI 801/901 .. 804/904	DI801	Bit 0	Byte		0x0124	Bool
	DI802	Bit 1				
	DI803	Bit 2				
	DI804	Bit 3				
	DI901 (Remote Display)	Bit 4				
	DI902 (Remote Display)	Bit 5				
	DI903 (Remote Display)	Bit 6				
	DI904 (Remote Display)	Bit 7				
Counter	Start counter in xxxxxxx start(s)		4 bytes		0x0142	DUINT
Counter	KWH counter in xxxxxxx kWH		4 bytes		0x0143	DUINT
Counter	Working time in xxxxxxx h		4 bytes		0x0144	DUINT
Counter	Remaining time to maintenance in xxxxxxx s		4 bytes		0x0145	DUINT

3.3 PM20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Generator messages Gen. voltage byte	Voltage recognised L1	Bit 0	Byte		0x0149	Bool
	Voltage recognised L2	Bit 1				
	Voltage recognised L3	Bit 2				
	Rated voltage recognised L1+2+3	Bit 3				
	Voltage >	Bit 4				
	Voltage <	Bit 5				
	Voltage >>	Bit 6				
	Voltage <<	Bit 7				
Generator messages Gen. frequency byte	Frequency recognised L1	Bit 0	Byte		0x014A	Bool
	Frequency recognised L2	Bit 1				
	Frequency recognised L3	Bit 2				
	Nominal frequency recognised L1+2+3	Bit 3				
	Frequency >	Bit 4				
	Frequency <	Bit 5				
	Frequency >>	Bit 6				
	Frequency <<	Bit 7				
Generator messages Gen. protection byte 1	Mains protection Vector >	Bit 0	Byte		0x014B	Bool
	Mains protection Vector >>	Bit 1				
	Mains protection U>	Bit 2				
	Mains protection U<	Bit 3				
	Mains protection F>	Bit 4				
	Mains protection F<	Bit 5				
	Mains protection collective fault	Bit 6				
	Mains protection released	Bit 7				
Generator messages Gen. protection byte 2	Q-U protection <	Bit 0	Byte		0x014C	Bool
	Q-U protection <<	Bit 1				
	Mains protection U>>	Bit 2				
	Mains protection U<<	Bit 3				
	Mains protection F>>	Bit 4				
	Mains protection F<<	Bit 5				
	-	Bit 6				
	-	Bit 7				
Generator messages Gen. vector byte 1	Vector jump > L1 (plus)	Bit 0	Byte		0x014D	Bool
	Vector jump > L2 (plus)	Bit 1				
	Vector jump > L3 (plus)	Bit 2				
	Vector jump > L1 (minus)	Bit 3				
	Vector jump > L2 (minus)	Bit 4				
	Vector jump > L2 (minus)	Bit 5				
	Vector jump > L1 or L2 or L3 (plus)	Bit 6				
	Vector jump > L1 or L2 or L3 (minus)	Bit 7				
Generator messages Gen. vector byte 2	Vector jump >> L1 (plus)	Bit 0	Byte		0x014E	Bool
	Vector jump >> L2 (plus)	Bit 1				
	Vector jump >> L3 (plus)	Bit 2				
	Vector jump >> L1 (minus)	Bit 3				
	Vector jump >> L2 (minus)	Bit 4				
	Vector jump >> L2 (minus)	Bit 5				
	Vector jump >> L1 or L2 or L3 (plus)	Bit 6				
	Vector jump >> L1 or L2 or L3 (minus)	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Generator messages Gen. angle byte	Generator rotating field fault	Bit 0	Byte		0x014F	Bool
	Generator angle fault UL1	Bit 1				
	Generator angle fault UL2	Bit 2				
	Generator angle fault UL3	Bit 3				
	Generator voltage asymmetry	Bit 4				
	Slip in syn. operation Fg > Fn	Bit 5				
	Cos Phi capacitive (-)	Bit 6				
	Cos Phi inductive (+)	Bit 7				
Generator messages Gen. synchronisation byte	SYN pulse	Bit 0	Byte		0x0150	Bool
	Delta F OK	Bit 1				
	Delta U OK	Bit 2				
	Pulse voltage +	Bit 3				
	Pulse voltage -	Bit 4				
	Pulse frequency +	Bit 5				
	Pulse frequency -	Bit 6				
	free	Bit 7				
Gen. frequency	L1 in xx.xx Hz		2 bytes	DIV100	0x0151	UINT
Gen. frequency	L2 in xx.xx Hz		2 bytes	DIV100	0x0152	UINT
Gen. frequency	L3 in xx.xx Hz		2 bytes	DIV100	0x0153	UINT
Gen. angle	L1-L2 in xxx °		2 bytes		0x0154	INT
Gen. angle	L2-L3 in xxx °		2 bytes		0x0155	INT
Gen. angle	L3-L1 in xxx °		2 bytes		0x0156	INT
Gen. voltage	L1-N in xxxx V		2 bytes		0x0157	UINT
Gen. voltage	L2-N in xxxx V		2 bytes		0x0158	UINT
Gen. voltage	L3-N in xxxx V		2 bytes		0x0159	UINT
Gen. voltage	L1-2 in xxxx V		2 bytes		0x015A	UINT
Gen. voltage	L2-3 in xxxx V		2 bytes		0x015B	UINT
Gen. voltage	L3-1 in xxxx V		2 bytes		0x015C	UINT
Mains messages Mains voltage byte	Voltage recognised L1	Bit 0	Byte		0x015D	Bool
	Voltage recognised L2	Bit 1				
	Voltage recognised L3	Bit 2				
	Rated voltage recognised L1+2+3	Bit 3				
	Voltage >	Bit 4				
	Voltage <	Bit 5				
	Voltage >>	Bit 6				
	Voltage <<	Bit 7				
Mains messages Mains frequency byte	Frequency recognised L1	Bit 0	Byte		0x015E	Bool
	Frequency recognised L2	Bit 1				
	Frequency recognised L3	Bit 2				
	Nominal frequency recognised L1+2+3	Bit 3				
	Frequency >	Bit 4				
	Frequency <	Bit 5				
	Frequency >>	Bit 6				
	Frequency <<	Bit 7				
Mains messages Mains VDE byte	VDE4105 collective fault	Bit 0	Byte		0x015F	Bool
	VDE4105 U< (80%)	Bit 1				
	VDE4105 U> (115%)	Bit 2				
	VDE4105 F< (47.5Hz)	Bit 3				
	VDE4105 F> (51.5Hz)	Bit 4				
	VDE4105 U> (Quality)	Bit 5				
	free	Bit 6				
	VDE4105 Standby connect mode	Bit 7				
Mains messages Mains angle byte	Mains rotating field fault	Bit 0	Byte		0x0160	Bool
	Mains angle fault UL1	Bit 1				
	Mains angle fault UL2	Bit 2				
	Mains angle fault UL3	Bit 3				
	Mains voltage asymmetry	Bit 4				
	Slip in syn. operation Fn > Fg	Bit 5				
	BDEW U(t) Time is running	Bit 6				
	BDEW U(t) fault	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Mains frequency	L1 in xx.xx Hz		2 bytes	DIV100	0x0161	UINT
Mains frequency	L2 in xx.xx Hz		2 bytes	DIV100	0x0162	UINT
Mains frequency	L3 in xx.xx Hz		2 bytes	DIV100	0x0163	UINT
Mains angle	L1-L2 in xxx°		2 bytes		0x0164	INT
Mains angle	L2-L3 in xxx°		2 bytes		0x0165	INT
Mains angle	L3-L1 in xxx°		2 bytes		0x0166	INT
Mains voltage	L1-N in xxxx V		2 bytes		0x0167	UINT
Mains voltage	L2-N in xxxx V		2 bytes		0x0168	UINT
Mains voltage	L3-N in xxxx V		2 bytes		0x0169	UINT
Mains voltage	L1-2 in xxxx V		2 bytes		0x016A	UINT
Mains voltage	L2-3 in xxxx V		2 bytes		0x016B	UINT
Mains voltage	L3-1 in xxxx V		2 bytes		0x016C	UINT
Generator messages Gen. current byte 1	Generator current recognised I1	Bit 0	Byte		0x016D	Bool
	Generator current recognised I2	Bit 1				
	Generator current recognised I3	Bit 2				
	Nominal current recognised L1+2+3	Bit 3				
	Overcurrent >	Bit 4				
	Overcurrent >>	Bit 5				
	Overcurrent VDE100-718	Bit 6				
	Overcurrent time protection	Bit 7				
Generator messages Gen. current byte 2	Generator Power Rotary Field Right	Bit 0	Byte		0x016E	Bool
	Generator Power Rotary Field Left	Bit 1				
	Earth power >	Bit 2				
	Earth power >>	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	Current Rating 1A=0 / 5A=1	Bit 7				
Generator messages Gen. power byte 1	Loaded	Bit 0	Byte		0x016F	Bool
	Power >	Bit 1				
	Power >>	Bit 2				
	Reverse power >	Bit 3				
	Reverse power >>	Bit 4				
	Unbalanced load	Bit 5				
	KWH pulse	Bit 6				
	free	Bit 7				
Generator messages Gen. power byte 2	Apparent power >	Bit 0	Byte		0x0170	Bool
	Apparent power >>	Bit 1				
	Reactive power >	Bit 2				
	Reactive power >>	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
Digital inputs PM20 DI601 .. 603	DI601	Bit 0	Byte		0x0171	Bool
	DI602	Bit 1				
	DI603	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
Gen. current	I1 in xxx.xx A		4 bytes	DIV100	0x0173	DUINT
Gen. current	I2 in xxx.xx A		4 bytes	DIV100	0x0174	DUINT
Gen. current	I3 in xxx.xx A		4 bytes	DIV100	0x0175	DUINT
Gen. power	P1 in xxx.xx kW		4 bytes	DIV100	0x0176	DINT
Gen. power	P2 in xxx.xx kW		4 bytes	DIV100	0x0177	DINT
Gen. power	P3 in xxx.xx kW		4 bytes	DIV100	0x0178	DINT

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Gen. power	S1 in xxx.xx kVA		4 bytes	DIV100	0x0179	DUINT
Gen. power	S2 in xxx.xx kVA		4 bytes	DIV100	0x017A	DUINT
Gen. power	S3 in xxx.xx kVA		4 bytes	DIV100	0x017B	DUINT
Gen. power	Q1 in xxx.xx kVAR		4 bytes	DIV100	0x017C	DUINT
Gen. power	Q2 in xxx.xx kVAR		4 bytes	DIV100	0x017D	DUINT
Gen. power	Q3 in xxx.xx kVAR		4 bytes	DIV100	0x017E	DUINT
Gen. total power	P in xxx.xx kW		4 bytes	DIV100	0x017F	DINT
Gen. total power	Q in xxx.xx kVAR		4 bytes	DIV100	0x0180	DUINT
Gen. total power	S in xxx.xx kVA		4 bytes	DIV100	0x0181	DUINT
Mains voltage	L1 in xxx.x %		2 bytes	DIV10	0x0182	UINT
Mains voltage	L2 in xxx.x %		2 bytes	DIV10	0x0183	UINT
Mains voltage	L3 in xxx.x %		2 bytes	DIV10	0x0184	UINT
Gen. voltage	L1 in xxx.x %		2 bytes	DIV10	0x0185	UINT
Gen. voltage	L2 in xxx.x %		2 bytes	DIV10	0x0186	UINT
Gen. voltage	L3 in xxx.x %		2 bytes	DIV10	0x0187	UINT
Gen. Current	I1 in xxx.x %		2 bytes	DIV10	0x0188	UINT
Gen. Current	I2 in xxx.x %		2 bytes	DIV10	0x0189	UINT
Gen. Current	I3 in xxx.x %		2 bytes	DIV10	0x018A	UINT
Gen. power	P1 in xxx.x %		2 bytes	DIV10	0x018B	INT
Gen. power	P2 in xxx.x %		2 bytes	DIV10	0x018C	INT
Gen. power	P3 in xxx.x %		2 bytes	DIV10	0x018D	INT
Gen. power	S1 in xxx.x %		2 bytes	DIV10	0x018E	UINT
Gen. power	S2 in xxx.x %		2 bytes	DIV10	0x018F	UINT
Gen. power	S3 in xxx.x %		2 bytes	DIV10	0x0190	UINT
Gen. power	Q1 in xxx.x %		2 bytes	DIV10	0x0191	UINT
Gen. power	Q2 in xxx.x %		2 bytes	DIV10	0x0192	UINT
Gen. power	Q3 in xxx.x %		2 bytes	DIV10	0x0193	UINT
Gen. total power	S in xxx.x %		2 bytes	DIV10	0x0194	UINT
Gen. total power	Q in xxx.x %		2 bytes	DIV10	0x0195	UINT
Gen. total power	P in xxx.x %		2 bytes	DIV10	0x0196	INT
Gen. CosPhi	in xx.xxx LF		2 bytes	DIV1000	0x0197	INT
Earth current	in xxx.x %		2 bytes	DIV10	0x019D	UINT
Earth current	in xxxx A		2 bytes		0x019E	UINT

3.4 DM20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
DM20 - Differential protection Diff. current byte 1	Current internal recognised I1	Bit 0	Byte		0x01C9	Bool
	Current internal recognised I2	Bit 1				
	Current internal recognised I3	Bit 2				
	Nominal current recognised I1+I2+I3	Bit 3				
	Measurement 1A=0 / 5A=1	Bit 4				
	free	Bit 5				
	Internal current > (AL209)	Bit 6				
	Internal current >> (AL210)	Bit 7				
DM20 - Differential protection Diff current byte 2	Current external recognised I1	Bit 0	Byte		0x01CA	Bool
	Current external recognised I2	Bit 1				
	Current external recognised I3	Bit 2				
	Nominal current recognised I1+I2+I3	Bit 3				
	Measurement 1A=0 / 5A=1	Bit 4				
	free	Bit 5				
	External current > (AL211)	Bit 6				
	External current >> (AL212)	Bit 7				
DM20 - Differential protection Diff current byte 3	Trigger blocked via DE	Bit 0	Byte		0x01CB	Bool
	Trigger blocked via Delta ID	Bit 1				
	free	Bit 2				
	free	Bit 3				
	free	Bit 4				
	free	Bit 5				
	free	Bit 6				
	free	Bit 7				
DM20 - Differential protection Diff current byte 4	Stable current > (AL213)	Bit 0	Byte		0x01CC	Bool
	Stable Current >> (AL214)	Bit 1				
	Diff current > (AL207)	Bit 2				
	Diff current >> (AL208)	Bit 3				
	Diff current rotating field (AL215)	Bit 4				
	Diff current rate of rise	Bit 5				
	free	Bit 6				
	free	Bit 7				
Int. current frequency	I1 in xx.xx Hz		2 bytes	DIV100	0x01CF	UINT
Int. current frequency	I2 in xx.xx Hz		2 bytes	DIV100	0x01D0	UINT
Int. current angle	I1-I2 in xxx °		2 bytes		0x01D1	INT
Int. current angle	I2-I3 in xxx °		2 bytes		0x01D2	INT
Int. current angle	I3-I1 in xxx °		2 bytes		0x01D3	INT
Int./Ext. current angle	I1 in xxx °		2 bytes		0x01D4	INT
Stable current	I1 in xxx.xx A		4 bytes	DIV100	0x01D5	DUINT
Stable current	I2 in xxx.xx A		4 bytes	DIV100	0x01D6	DUINT
Stable current	I3 in xxx.xx A		4 bytes	DIV100	0x01D7	DUINT
Int. current	I1 in xxx.xx A		4 bytes	DIV100	0x01D8	DUINT
Int. current	I2 in xxx.xx A		4 bytes	DIV100	0x01D9	DUINT
Int. current	I3 in xxx.xx A		4 bytes	DIV100	0x01DA	DUINT
Ext. current frequency	I1 in xx.xx Hz		2 bytes	DIV100	0x01DB	UINT
Ext. current frequency	I2 in xx.xx Hz		2 bytes	DIV100	0x01DC	UINT
Ext. current angle	External current angle I1-I2 in xxx °		2 bytes		0x01DD	INT
Ext. current angle	External current angle I2-I3 in xxx °		2 bytes		0x01DE	INT
Ext. current angle	External current angle I3-I1 in xxx °		2 bytes		0x01DF	INT
Ext. current	I1 in xxx.xx A		4 bytes	DIV100	0x01E0	DUINT
Ext. current	I2 in xxx.xx A		4 bytes	DIV100	0x01E1	DUINT
Ext. current	I3 in xxx.xx A		4 bytes	DIV100	0x01E2	DUINT
Diff current	I1 in xxx.xx A		4 bytes	DIV100	0x01E3	DINT
Diff current	I2 in xxx.xx A		4 bytes	DIV100	0x01E4	DINT
Diff current	I3 in xxx.xx A		4 bytes	DIV100	0x01E5	DINT

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Stable current	I1 in xxx.x %		2 bytes	DIV10	0x01E6	UINT
Stable current	I2 in xxx.x %		2 bytes	DIV10	0x01E7	UINT
Stable current	I2 in xxx.x %		2 bytes	DIV10	0x01E8	UINT
Int. current	I1 in xxx.x %		2 bytes	DIV10	0x01E9	UINT
Int. current	I2 in xxx.x %		2 bytes	DIV10	0x01EA	UINT
Int. current	I3 in xxx.x %		2 bytes	DIV10	0x01EB	UINT
Ext. current	I1 in xxx.x %		2 bytes	DIV10	0x01EC	UINT
Ext. current	I2 in xxx.x %		2 bytes	DIV10	0x01ED	UINT
Ext. current	I3 in xxx.x %		2 bytes	DIV10	0x01EE	UINT
Diff current	I1 in xxx.x %		2 bytes	DIV10	0x01EF	INT
Diff current	I2 in xxx.x %		2 bytes	DIV10	0x01E0	INT
Diff current	I3 in xxx.x %		2 bytes	DIV10	0x01E1	INT

3.5 DI20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Digital inputs DI20-1 DI 101 .. 108	DI101	Bit 0	Byte		0x00A7	Bool
	DI102	Bit 1				
	DI103	Bit 2				
	DI104	Bit 3				
	DI105	Bit 4				
	DI106	Bit 5				
	DI107	Bit 6				
	DI108	Bit 7				
Digital inputs DI20-1 DI 109 .. 116	DI109	Bit 0	Byte		0x00A8	Bool
	DI110	Bit 1				
	DI111	Bit 2				
	DI112	Bit 3				
	DI113	Bit 4				
	DI114	Bit 5				
	DI115	Bit 6				
	DI116	Bit 7				
Digital inputs DI20-1 DI 117 .. 122	DI117	Bit 0	Byte		0x00A9	Bool
	DI118	Bit 1				
	DI119	Bit 2				
	DI120	Bit 3				
	DI121	Bit 4				
	DI122	Bit 5				
	free	Bit 6				
	free	Bit 7				
Digital inputs DI20-2 DI 101 .. 108	DI201	Bit 0	Byte		0x00AC	Bool
	DI202	Bit 1				
	DI203	Bit 2				
	DI204	Bit 3				
	DI205	Bit 4				
	DI206	Bit 5				
	DI207	Bit 6				
	DI208	Bit 7				
Digital inputs DI20-2 DI 109 .. 116	DI209	Bit 0	Byte		0x00AD	Bool
	DI210	Bit 1				
	DI211	Bit 2				
	DI212	Bit 3				
	DI213	Bit 4				
	DI214	Bit 5				
	DI215	Bit 6				
	DI216	Bit 7				

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
Digital inputs DI20-2 DI 117.. 122	DI217	Bit 0	Byte		0x00AE	Bool
	DI218	Bit 1				
	DI219	Bit 2				
	DI220	Bit 3				
	DI221	Bit 4				
	DI222	Bit 5				
	free	Bit 6				
	free	Bit 7				
Digital inputs DI20-3 DI 101 .. 108	DI301	Bit 0	Byte		0x00B1	Bool
	DI302	Bit 1				
	DI303	Bit 2				
	DI304	Bit 3				
	DI305	Bit 4				
	DI306	Bit 5				
	DI307	Bit 6				
	DI308	Bit 7				
Digital inputs DI20-3 DI 109 .. 116	DI309	Bit 0	Byte		0x00B2	Bool
	DI310	Bit 1				
	DI311	Bit 2				
	DI312	Bit 3				
	DI313	Bit 4				
	DI314	Bit 5				
	DI315	Bit 6				
	DI316	Bit 7				
Digital inputs DI20-3 DI 117 .. 122	DI317	Bit 0	Byte		0x00B3	Bool
	DI318	Bit 1				
	DI319	Bit 2				
	DI320	Bit 3				
	DI321	Bit 4				
	DI322	Bit 5				
	free	Bit 6				
	free	Bit 7				

3.6 AI20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
AI20-1 analog inputs	AI 05 V/mA - Scaling according to GV		2 bytes		0x00BB	INT
AI20-1 analog inputs	AI 06 V/mA - Scaling according to GV		2 bytes		0x00BC	INT
AI20-1 analog inputs	AI 07 V/mA - Scaling according to GV		2 bytes		0x00BD	INT
AI20-1 analog inputs	AI 08 V/mA - Scaling according to GV		2 bytes		0x00BE	INT
AI20-1 analog inputs	AI 09 V/mA - Scaling according to GV		2 bytes		0x00BF	INT
AI20-1 analog inputs	AI 10 V/mA - Scaling according to GV		2 bytes		0x00C0	INT
AI20-2 analog inputs	AI 11 V/mA - Scaling according to GV		2 bytes		0x00C4	INT
AI20-2 analog inputs	AI 12 V/mA - Scaling according to GV		2 bytes		0x00C5	INT
AI20-2 analog inputs	AI 13 V/mA - Scaling according to GV		2 bytes		0x00C6	INT
AI20-2 analog inputs	AI 14 V/mA - Scaling according to GV		2 bytes		0x00C7	INT
AI20-2 analog inputs	AI 15 V/mA - Scaling according to GV		2 bytes		0x00C8	INT
AI20-2 analog inputs	AI 16 V/mA - Scaling according to GV		2 bytes		0x00C9	INT
AI20-3 analog inputs	AI 17 V/mA - Scaling according to GV		2 bytes		0x00CD	INT
AI20-3 analog inputs	AI 18 V/mA - Scaling according to GV		2 bytes		0x00CE	INT
AI20-3 Analog Inputs	AI 19 V/mA - Scaling according to GV		2 bytes		0x00CF	INT
AI20- analog inputs	AI 20 V/mA - Scaling according to GV		2 bytes		0x00D0	INT
AI20-3 analog inputs	AI 21 V/mA - Scaling according to GV		2 bytes		0x00D1	INT
AI20-3 analog inputs	AI 22 V/mA - Scaling according to GV		2 bytes		0x00D2	INT

3.7 AT20 Module

Identifier	Designation	Bit	Length	Factor	PN20 MT20 MR20	Type
AT20-1 temperature measurem.	PT01 in xxxx °C		2 bytes	DIV10	0x00D6	INT
AT20-1 temperature measurem.	PT02 in xxxx °C		2 bytes	DIV10	0x00D7	INT
AT20-1 temperature measurem.	PT03 in xxxx °C		2 bytes	DIV10	0x00D8	INT
AT20-1 temperature measurem.	PT04 in xxxx °C		2 bytes	DIV10	0x00D9	INT
AT20-1 temperature measurem.	PT05 in xxxx °C		2 bytes	DIV10	0x00DA	INT
AT20-1 temperature measurem.	PT06 in xxxx °C		2 bytes	DIV10	0x00DB	INT
AT20-1 temperature measurem.	AI 23 V/mA - Scaling according to GV		2 bytes		0x00DC	INT
AT20-1 temperature measurem.	AI 24 V/mA - Scaling according to GV		2 bytes		0x00DD	INT
AT20-2 temperature measurem.	PT07 in xxxx °C		2 bytes	DIV10	0x00E3	INT
AT20-2 temperature measurem.	PT08 in xxxx °C		2 bytes	DIV10	0x00E4	INT
AT20-2 temperature measurem.	PT09 in xxxx °C		2 bytes	DIV10	0x00E5	INT
AT20-2 temperature measurem.	PT10 in xxxx °C		2 bytes	DIV10	0x00E6	INT
AT20-2 temperature measurem.	PT11 in xxxx °C		2 bytes	DIV10	0x00E7	INT
AT20-2 temperature measurem.	PT12 in xxxx °C		2 bytes	DIV10	0x00E8	INT
AT20-2 temperature measurem.	AI 25 V/mA - Scaling according to GV		2 bytes		0x00E9	INT
AT20-2 temperature measurem.	AI 26 V/mA - Scaling according to GV		2 bytes		0x00EA	INT

Subject to technical changes!