ANZ2 / KSS


HPS
Hanseatic
Power
Solutions
13:41:06 Uhr
0kW
G: 0V 0.0Hz -.--
N/S: 0V 0.0Hz
Schalter aus
Menü
330 kWh
HPS CPU
HPS PM1
HPS DM1
HPS DI1
HPS DO1
HPS PB1
PROFIBUS
2xDO

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1 General

The KSS compact protection system is used for detecting and monitoring the electrical values of a three-phase system and a connected generator. It can also manage the synchronization and regulation of the genset. Direct control of the mains and / or generator breaker is not possible. The device comes in different assembly variants; standard is a supply voltage of 24 V DC. 12 VDC versions may be supplied on request. The adaptation to different units / systems is carried out conveniently with a modern parameterization software (GV2) or directly on the display and operating unit ANZ2. All parameters are stored zero-voltage-safe in a flash memory.

Depending on expansion stage and variant assembly, analogue values can be connected as standardised signals or directly (mains, generator voltage and generator currents). This allows the integration of various protection and function units such as power control, power system protection, synchronization and differential protection. In addition, analog measured values such as winding temperatures can be read in. For the frequency and power control as well as the voltage and CosPhi control, individual settings can be made for the different operating situations.

The KSS has a CAN BUS interface which enables communication with engine control units.

External data communication can be implemented via various bus couplers (Profibus, Profinet or Modbus) for connection to a visualization system, for example in a building management system.

Extensive internal and external monitoring circles (inputs for error messages) guarantee a safe operation of the system, in which all electrical, mechanical operating equipment and system parts are monitored.

1.1 Functioning

The KSS is a microprocessor-controlled protection device for the collection of all measured values of the monitored system. The system is modular in design. All components are connected via a bus connector (T bus) on the DIN rail. Measurement of the relevant values is a real r.m.s. measurement, by means of simultaneous detection. The value collection includes phase currents, phase voltages, conductor currents, active power, apparent power, reactive power, CosPhi and frequency. Depending on the selected method measuring is performed with or without star point. When measuring without a star point it is not necessary to connect a neutral wire.

All measured values are shown on the graphic display. Limit values, resp. limit value messages can be set to the output relays. A total of 255 messages can be created. 16 freely configurable messages are available for the user.

Frequency measurement will only start at a measuring voltage above 45 V. Below this voltage the KAS works with a preset base frequency of 50 or 60 Hz.

The active power is calculated acc. to the formula:
Therefore the active power derives from the sum of the instantaneous power over a certain period.

$$P = \int_0^t u(t) * i(t) dt$$

The apparent power is calculated from:
It derives from the sum of the r.m.s-values of voltage and current.

$$U = \sqrt{\frac{1}{T}\int_0^T u^2 dt}; I = \sqrt{\frac{1}{T}\int_0^T i^2 dt}$$

The reactive power is calculated from:

$$Q = \sqrt{S^2 - P^2}$$

For integration the period is defined with a frequency measurement. One period means 16 scans. Scanning and evaluation are done with a resolution of 10 bit, appropriately signed.

1.2 Commissioning

Please connect the KSS acc. to the connecting diagram. After connection of the auxiliary voltage the operating LEDs are flashing and will switch to steady light as soon as all modules are correctly working. The display and operating device will then visualize the initialisation screen. As soon as the system is correctly working all current values will be displayed.

The device has been calibrated ex works, containing the relevant factory default settings. Monitoring starts at an input voltage of approx. 45 V Phase - N. For correct adaptation to each application parameter setting is necessary. The setpoint and trip values have to be checked and adapted to the system, if necessary.

Connection acc. to VDE 0160. Installation and commissioning should only be carried out by skilled and trained professionals.

2 Device assembly

The protection device KSS is a modular system. All modules are mounted on a DIN rail in random order, connected via bus connector (T-Bus). Power is supplied by the CPU module. Display and operating unit, as well as Profibus module include a separate power supply.

The following modules are available:

- ANZ2 - Display and operating module
- CPU - Central control
- PM2 - Power module
- DI1 - Digital input module
- DO1 - Digital output module

The following modules are available for system extension:

- Diff. protection module (additional module)
- PB1 - Profibus DP module (additional module)
- PN1 - Profinet module (additional module)
- MB1 - Modbus TCP/IP (Server) module (additional module)
- MB2 - Modbus RTU (Slave) module (additional module)
- AI1 - Analog input module (additional module)
- AT1 - PT100(0) measuring module (additional module)

2.1 Display and operating unit

The display unit is used for:

- visualization of the measured values
- parameterization via USB interface or the keys
- setting of the control parameters

It offers:

- a memory for up to 192 error messages
- its own galvanically isolated power supply
- the internal data bus interface (T bus)
- CAN-Bus J1939 (engine communication)
- and a real-time clock with a minimum of 72 hours for data retention

2.2 CPU Module

The CPU module includes:

- the power supply of the components
- 3 digital inputs, and a pick-up input
- 2 +/- 10 V analog inputs for external predetermined nominal values (common ground)
- 4 +/- 10 V analog outputs (of which 2 at a time share ground)
- internal data bus interface (T bus)
- external data bus interface for further components

2.3 Power Module PM2

The power module offers:

- 2 x 3-phase voltage and frequency measurements
- 3-phase current measurement
- 1-phase current measurement (earth / neutral current)
- 8 digital outputs and 3 digital inputs
- 1 analog output (+/- 20 mA or +/- 10 V)
- 1 analog output (+/- 10 V)
- internal data bus interface (T bus)

2.4 Digital Input Module DI1

The digital input module includes:

- 22 digital inputs
- internal data bus interface (T bus)

2.5 Digital Output Module DO1

The digital output module offers:

- 11 potential-free digital outputs (9 x NO and 2 x CO)
- internal data bus interface (T bus)

2.6 Diff. Protection Module DM1

The diff. Protection module contains:

- 2 x 3-phase current measurement
- 2 digital outputs
- internal data bus interface (T bus)

2.7 Profibus DP Module PB1

The Profibus DP module contains:

- galvanically isolated power supply
- Profibus DP interface (D-Sub 9)
- 2 potential-free digital outputs (NO)
- internal data bus interface (T bus)

2.8 Profinet Module PN1

The Profinet module contains:

- a galvanically isolated power supply
- 2 Profinet interfaces; RJ45 100Mbit/s full duplex
- 1 potential-free digital output (CO)
- internal data bus interface (T bus)
- integrated switch functionality

2.9 Modbus TCP/IP Module MB1 Server

The Modbus module contains:

- Galvanically isolated power supply
- 2 Modbus TCP/IP interfaces; RJ45 100Mbit/s full duplex
- 1 potential-free digital output (CO)
- internal data bus interface (T bus)
- integrated switch functionality

2.10 Modbus RTU Module MB2 Slave

The Modbus RTU module contains:

- Galvanically isolated power supply
- Modbus RTU interface (D-Sub 9); RS232/RS485
- 1 potential-free digital output (CO)
- internal data bus interface (T bus)

2.11 Analog Input Module AI1

The analog input module offers:

- 6 galvanically isolated measurement inputs (> 1 MOhm)
- Input range from -10V to +10V or from -20mA to +20mA
- 2 inputs for direct potentiometer connection (>=1 kOhm)

2.12 PT100(0) Measurement module AT1

The analog input module offers:

- 6 PT100(0) measurement inputs
- 2 measurement inputs -10V to +10V or -20mA to +20mA

3 Functions

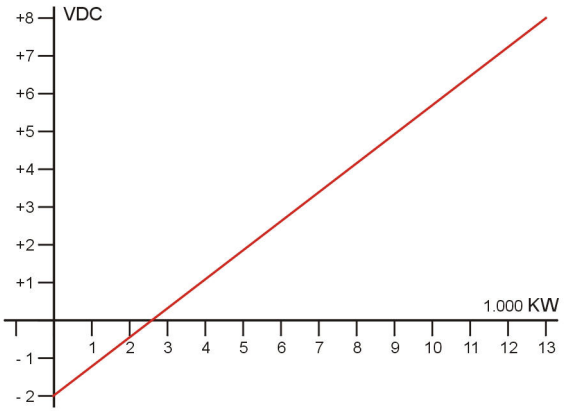
3.1 Analog inputs

The basic setup of the KSS offers two analog inputs, set by default from -10 to +10 V DC, and assigned fixed functions, for the supply of external setpoint values.

- The analog input 1 is used to capture the external setpoint specification of power in mains or generator parallel operation.
- The analog input 2 is used to capture the external setpoint specification for the power factor in mains or generator parallel operation. In case of a mains im-/export controller regulation during mains parallel operation this input is for capturing the actual mains output.

The applied voltage values can be scaled.

3.2 Analog outputs



The KSS has 6 analog outputs, set by default to +/- 10 V. One of the two analog outputs on the PM2 power module can be switched to +/- 20 mA.

Different functions can be assigned to the outputs.

The voltage/current range of the respective analog output can be scaled.

Example: The power values collected by the KSS within a range of 0 (start value) to 13.000 kW (final value) are visualized at the analog output via a voltage range between -2,00 (start value) and +8,00 V DC (final value) (*see Fig. to the left*).

3.3 Digital In- and Outputs

Depending on the version and setup of the compact automatic KSS a variable number of digital in- and outputs is available, partly with functions assigned ex works. More functions may be assigned to spare in- and outputs.

3.4 Limit values

Depending on expansion stage and variant assembly a number of minimum and maximum values are set by default from the operating and limit values for genset control. If one of the measured values turns out to be higher or lower than the respective preset limit value, an output relay – parameterized accordingly – can be energized, and the respective switching behaviour can be coded to closed or open circuit principle. As soon as the measured value returns within its preset limit, the switching step switches back to normal position with hysteresis.

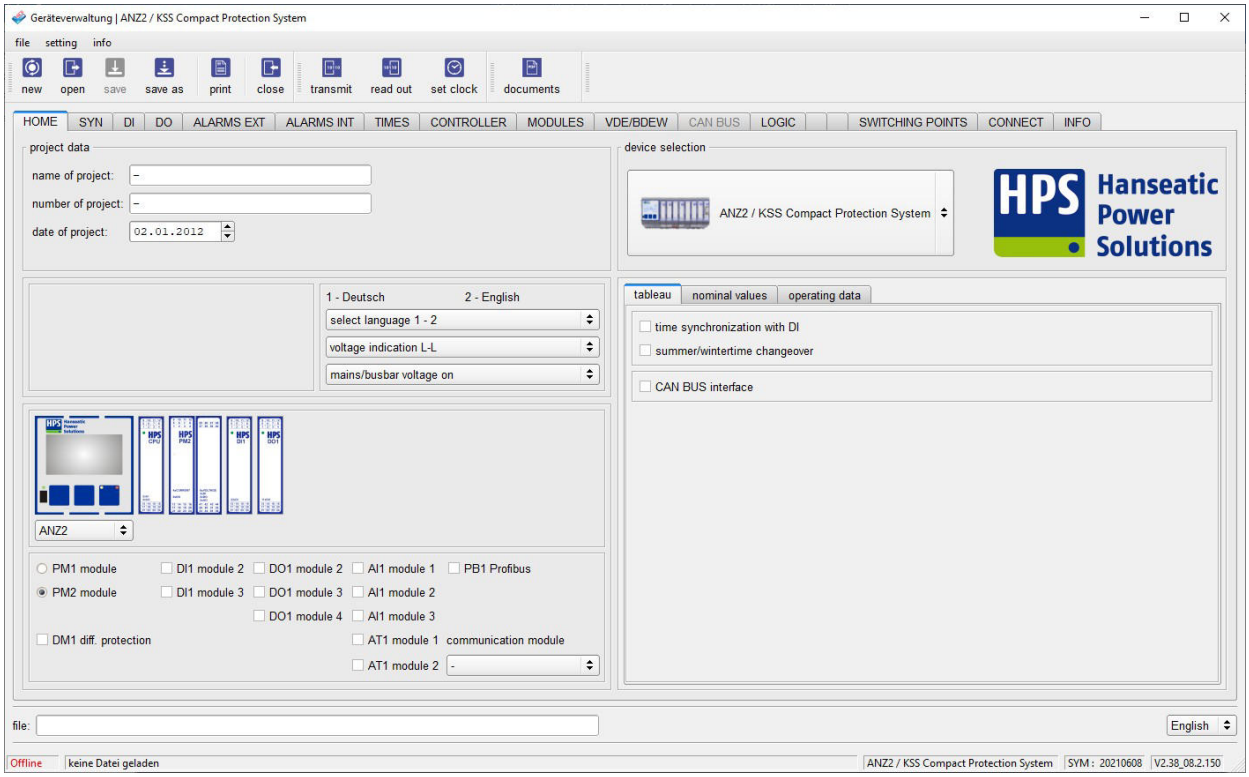
3.5 Alarms

Alarm parameterization activates the visualization of error messages in case of tripped limit values. In addition to the permanently assigned alarms there are 16 configurable alarms. The respective switching mode upon tripping can be coded acc. to the closed- or open-circuit principle.

Reset after an error message is automatically done, acc. to parameterization, via an input or the RESET key of the display and operating device ANZ2.

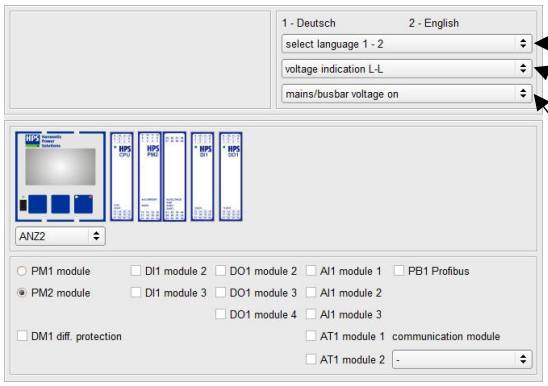
4 Setting device management

KSS parameter setting should be done with the supplied software (GV2). It is available for "download" on our homepage. For data transfer a data cable (USB A – Mini USB 5pol.) is required. Most of the parameters can also be adjusted directly at the panel ANZ2 (Setting→Parameter input). An overview of all parameters is listed under point 8.2.1.



4.1 Basic settings

4.1.1 Hardware configuration

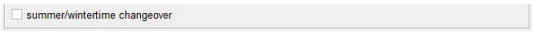


- Select display language
- Selection of voltage display for mains and generator measurement in the initial screen
- Fade out the mains / busbar voltage

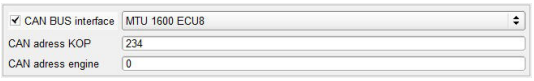
Selection of modules to be installed in addition to the basic configuration.

4.1.2 Tableau

It is possible to set panel time to preset synchronization time via an appropriately configured digital input.

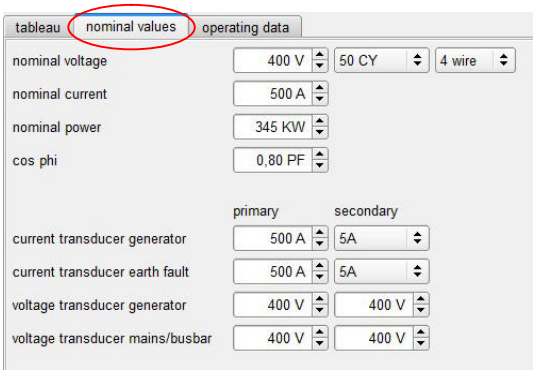


Automatic changeover from summer to winter time.



Activate the CAN BUS interface and selecting the motor type.

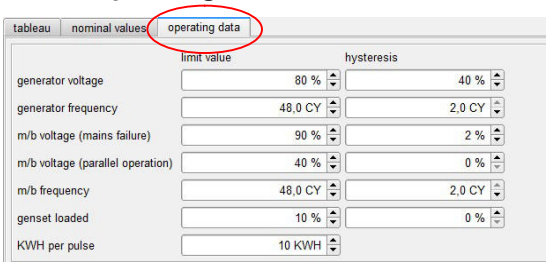
4.1.3 Nominal values



Input of nominal data for voltage, current, power and transducer values. All limit values derive by percentage from the nominal data. Frequency limit values are indicated in absolute values.

The Cos Phi is given for the correct display of the percentage values of apparent power and reactive power.

4.1.4 Operating data



When exceeding the operating values for voltage and frequency these values are declared as „Available“ and the corresponding internal operating procedures are activated.

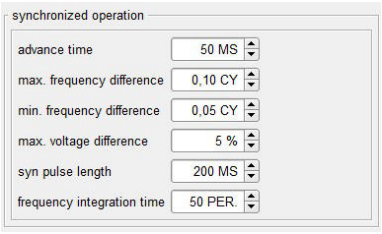
KWH value counting unit.

4.2 Synchronization

The KSS synchronizing function is used for the automatic parallel switching of three-phase current generators with each other or with another three-phase current system. Voltage and frequency will be adapted. In genset island operation mode it is possible to adjust to a preset basic frequency or voltage.

Voltage and frequency of two three-phase currents are monitored by differential amplifiers. Measurement for synchronization is done between L1 and L2. During operation all voltages and average frequencies are continuously displayed.

4.2.1 Synchronized operation

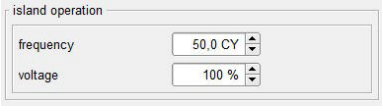


Synchronization is released via digital input 03 on the CPU module. When both three-phase current systems are within the preset limit values the SYN pulse will be output via digital output 04 on the PM1 module. Frequency and voltage adjustment can be done via analogue and digital signals. The corresponding outputs can be selected via the parameter software.

If synchronization is not done via the preset delay an error message “Synchronization delay too long” is output.

Synchronized operation	
Advance time	Serves to compensate delays caused by auxiliary switching elements. The synchronous pulse is emitted, corrected by the advance time, before the calculated synchronous moment has reached; typical delay of a breaker: 50ms.
Max. frequency difference	Max. permissible frequency deviation at which connection can take place.
Min. frequency difference	At synchronizing operation the generator is always regulated to a small frequency deviation to the mains frequency in order to keep the generator frequency in beat with the mains frequency, to make synchronizing possible at all.
Max. voltage difference	Max. permissible deviation of generator voltage against the synchronizing voltage, at which connection to the system can take place.
Syn pulse length	Time for control of the output relay.
Frequency integration time	The frequency, which is taken as the actual value for the frequency control, is averaged over several periods to steady the control circuit.

4.2.2 Island operation

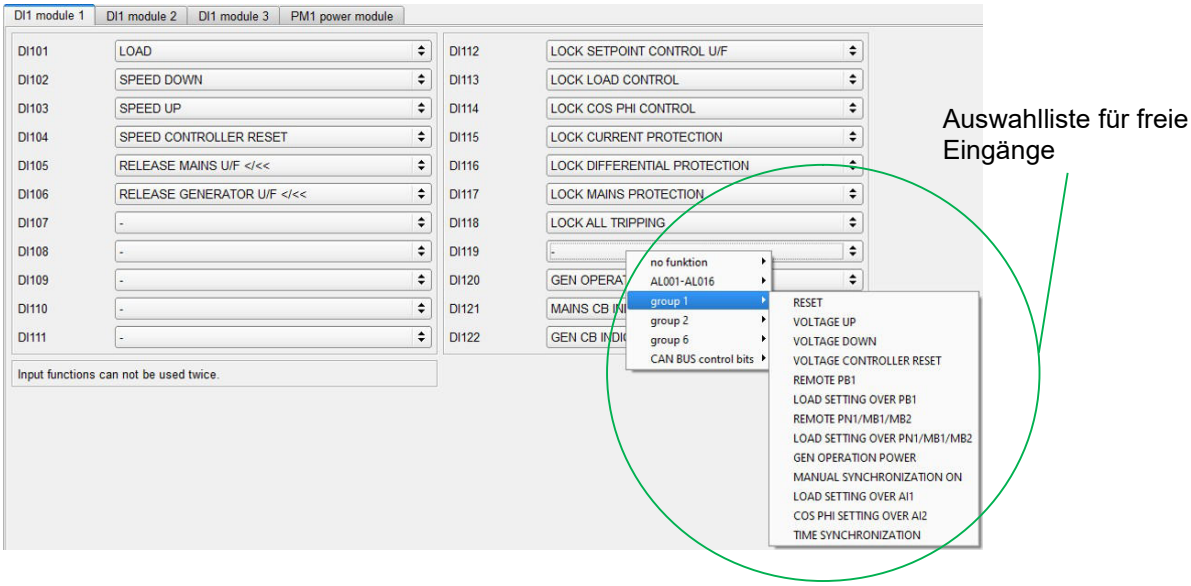


In island operation adjustment is done to the input voltage and frequency. This adjustment can be blocked via the digital input „Block setpoint control U/F“. If a setpoint value has been set to „0“ this control will be disabled.

Island operation	
Frequency	Set frequency value in island operation. If this value is set to „0“, the control will be disabled.
Voltage	Set voltage value in island operation. If this value is set to „0“, the control will be disabled.

4.3 Digital inputs

There are three modules with a total of 66 digital inputs available. There are also three further digital inputs on the PM2 module. The inputs DE101 to DE106, DE112 to DE118 and DE121 to DE122 on the first module DI1 are assigned to fixed functions. All other inputs can be assigned to functions according to the drop down lists. These function lists are separated into several sub-lists.



Below the first menu item (no function) there are two info texts which make visible that this input is used for another function.

Info texts	
Query via BUS	Indicates that this input is requested via an external data communication.
Logic function	Indicates that this input is used as an input variable in the logic.

Overview of all inputs with fixed functions.

Feste Eingangsfunktionen		
DE101	Unload	With active load control unloading is done with the input set.
	Load	With active load control unloading is done with the input NOT set.
DE102	Speed down	External adjustment pulses. The pulses affect the digital output (speed down) and the electr. potentiometer.
DE103	Speed up	External adjustment pulses. The pulses affect the digital output (speed up) and the electr. potentiometer.
DE104	Speed controller reset	Reset of frequency and power controller (edge-triggered). The reset affects the electr. potentiometer and the PID controller.
DE105	Release mains U/F </<<	Release of mains undervoltage/-frequency control.
DE106	Release generator U/F </<<	Release of generator undervoltage/-frequency control.
DE112	Lock setpoint control U/F	Lock island mode setpoint control.
DE113	Lock load control	Lock load control active in parallel operation.

DE114	Lock cos phi control	Lock CosPhi control active in parallel operation.
DE115	Lock current protection	Lock current protection trigger.
DE116	Lock differential protection	Lock differ. protection trigger.
DE117	Lock mains protection	Lock mains protection trigger.
DE118	Lock all tripping	Lock all tripping.
DE121	Mains CB indication on	The various operating states and functions are activated according to the wiring via these input functions. The following table shows when the controller, mains protection and setpoint functions are enabled.
	Generator parallel operation	
DE122	Gen CB indication on	

Display texts on ANZ2	DI Gen. Parallel operation	DI Mains CB indication on	DI Gen CB indication on	Controller	Mains protection	Setpoint
Breakers off	0	0	0	Frequency	No	
Gen. operation freq.	0	0	1	Frequency	No	
Mains operation	0	1	0	Frequency	No	
Mains parallel oper.	0	1	1	Load	Yes	Internal
Gen operation power	1	0	0	Load	No	External
Gen operation power	1	0	1	Load	No	External
Mains operation	1	1	0	Load	No	Internal
Mains parallel oper.	1	1	1	Load	Yes	Internal

These input assignments should be avoided.

Overview of all functions assigned to free inputs.

Function number

AL001-AL016		
01 to 16	AL001-AL016	16 free alarms. Text and alarm behaviour can be adjusted via the „Free alarms“ tab.

Group 1		
33	Reset	Reset of alarm messages.
62	Voltage up	External adjustment pulses. The pulses affect the digital output (voltage up) and the electr. potentiometer.
63	Voltage down	External adjustment pulses. The pulses affect the digital output (voltage down) and the electr. potentiometer.
64	Voltage controller reset	Reset of voltage and CosPhi controller (edge-triggered). The reset affects the electr. potentiometer and the PID controller.
57	Remote PB1	Remote control of KSS via bus coupling. (without load setting)
116	Load setting over PB1	Only the setpoint value for the power control comes over bus coupler PB1.
149	Remote PN1 / MB1 / MB2	Remote control of KSS via bus coupling. (without load setting)
150	Load setting over PN1 / MB1 / MB2	Only the setpoint value for the power control comes over bus coupler PN1 / MB1 / MB2.
60	Generator operation power	Switchboard in generator parallel operation.
50	Hand synchronisation on	Automatic adjustment signals for synchronisation will be disabled. Adjustment is done via the digital inputs.
164	Load setting over AE1	Change-over of the setpoint from ANZ2 to the analog input 1.
165	Cos Phi setting over AE2	Change-over of the setpoint from ANZ2 to the analog input 2.
151	Time synchronization	With the rising edge at the digital input, the time on the panel is set to the time set in the parameter software.

Group 2		
153	Lock setpoint control U	In island mode the setpoint control for voltage is locked.
154	Lock setpoint control F	In island mode the setpoint control for frequency is locked.
78	Diff. prot. ext. release lock	Lock diff. protection triggers. Locking time starts with the rising edge at the input and ends after the preset delay. Re-locking will only be possible after signal cancellation at the input (edge-triggered).
87	Block PID controller U/Phi	Block PID controller for voltage and Cos Phi adjustment.
88	Block PID controller F/P	Block PID controller for frequency and power adjustment.
152	Lock alarms Gen U/F	Lock the generator alarms for voltage and frequency so that only the mains protection alarms are active in parallel operation.
177	Testfunction for Omicron	Function to simplify the testing procedures. The following alarms are inhibited by this function: AL066, AL070, AL104 and AL105

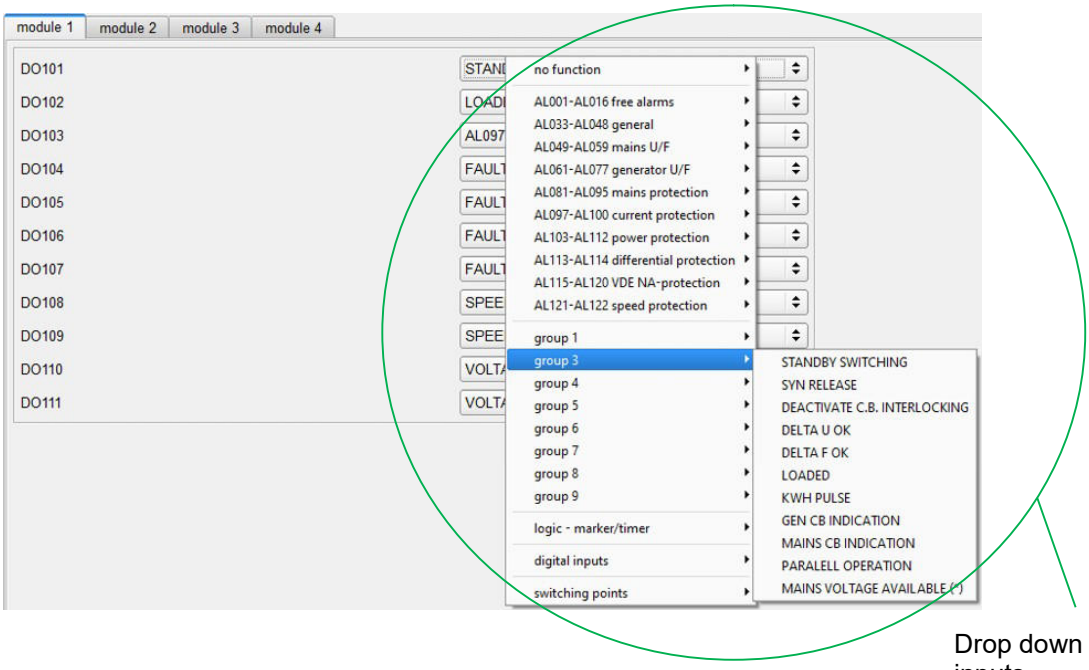
Group 6		
103	VDE4105 - Ext. setpoint reduct. 1 (pulse)	Limits the power setpoint to the value specified by parameterization.
104	VDE4105 - Ext. setpoint reduct. 2 (pulse)	Limits the power setpoint to the value specified by parameterization.
105	VDE4105 - Ext. setpoint reduct. 3 (pulse)	Limits the power setpoint to the value specified by parameterization.
108	VDE4105 - Ext. setpoint reduct. reset (pulse)	Reset of setpoint limit, set via pulse inputs.
109	VDE4105 - Ext. setpoint reduct. 1 (contin.)	Limits the power setpoint to the value specified by parameterization. If several levels are set at once, the lowest value will be taken for the limitation.
110	VDE4105 - Ext. setpoint reduct. 2 (contin.)	Limits the power setpoint to the value specified by parameterization. If several levels are set at once, the lowest value will be taken for the limitation.
111	VDE4105 - Ext. setpoint reduct. 3 (contin.)	Limits the power setpoint to the value specified by parameterization. If several levels are set at once, the lowest value will be taken for the limitation.
106	VDE4105 – Cos Phi contr. / power	Activates the performance-based CosPhi control.
107	BDEW - Dynamic mains support	Activates the dynamic mains support.
114	VDE4105 - Lock standby switching mains	Locks the function „VDE4105 Standby switching mains“.

CAN BUS Control Bits*		
166	Start command	Start command via CAN BUS
167	Stop command	Stop command via CAN BUS
168	Droop mode activ	Activation of the droop mode
169	Sprinkler protection override	Stopping alarms will be warning
178	Engine Rapid Start	Activates the rapid engine start function via the CAN BUS in case of an emergency start in the MTU ECU9 (4000 series).

(*) Not every controller can process these commands.

4.4 Digital outputs

There are four modules with a total of 44 digital outputs. All outputs can be assigned to functions according to the drop down lists. These function lists are separated into several sub-lists.



Drop down list for free inputs

Overview of all functions assigned to free outputs.

Function number		
AL001-AL016		
01 to 16	AL001-AL016	16 free alarms. Text and alarm behaviour can be adjusted via the „Free alarms“ tab.
AL033-AL048 General		
39	AL039 Supply UDC<	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
44	AL044 Syn time too long	
45	AL045 Watchdog (NO)	
46	AL046 Supply UDC>	
AL049-AL059 Mains U/F		
49	AL049 Mains voltage <<	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
50	AL050 Mains voltage <	
51	AL051 Mains voltage >	
52	AL052 Mains voltage >>	
53	AL053 Mains frequency <<	
54	AL054 Mains frequency <	
55	AL055 Mains frequency >	
56	AL056 Mains frequency >>	
57	AL057 Mains rotating field	
58	AL058 Mains angle fault	
59	AL059 Mains voltage asymmetry	

AL061-AL077 Generator U/F		
61	AL061 BDEW U(t) time runs	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
62	AL062 BDEW U(t) fault	
65	AL065 Generator voltage <<	
66	AL066 Generator voltage <	
67	AL067 Generator voltage >	
68	AL068 Generator voltage >>	
69	AL069 Generator frequency <<	
70	AL070 Generator frequency <	
71	AL071 Generator frequency >	
72	AL072 Generator frequency >>	
73	AL073 Generator rotating field	
74	AL074 Generator angel fault	
75	AL075 Generator voltage asym.	
76	AL076 Cos Phi capacitive	
77	AL077 Cos Phi inductive	

AL081-AL095 Mains protection		
81	AL081 Mains protect. col. fault	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
82	AL082 Mains protection U<<	
83	AL083 Mains protection U<	
84	AL084 Mains protection U>	
85	AL085 Mains protection U>>	
86	AL086 Mains protection F<<	
87	AL087 Mains protection F<	
88	AL088 Mains protection F>	
89	AL089 Mains protection F>>	
90	AL090 Mains protect. vector >	
91	AL091 Mains protect. vector >>	
92	AL092 Dif. vector surge >	
93	AL093 Dif. vector surge >>	
94	AL094 Q-U protection <	
95	AL095 Q-U protection <<	

AL097-AL100 Current protection		
97	AL097 Overcurrent >	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
98	AL098 Overcurrent >>	
99	AL099 Overcur. VDE0100-718	
100	AL100 Inv. Overcur. time prot.	

AL103-AL112 Power protection		
103	AL103 VDE4105 Ext. power reduct. fault	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
104	AL104 power >	
105	AL105 power >>	
106	AL106 Reverse power >	
107	AL107 Reverse power >>	
108	AL108 Apparent power >	
109	AL109 Apparent power >>	
110	AL110 Reactive power >	
111	AL111 Reactive power >>	
112	AL112 Unbalanced load	

AL113-AL114 Differential protection		
113	AL113 Diff current >	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
114	AL114 Diff current >>	

AL115-AL120 VDE NA-protection		
115	AL115 VDE4105- Coll. fault	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
116	AL116 VDE4105 - U< (80%)	
117	AL117 VDE4105 - U>> (115%)	
118	AL118 VDE4105 - F< (47,5Hz)	
119	AL119 VDE4105 - F> (51,5Hz)	
120	AL120 VDE4105 – U> (Quality)	

AL121-AL122 Speed protection		
121	AL121 Underspeed	If the value exceeds or falls below the previously input limit value, the released alarm can be output via a digital output.
122	AL122 Overspeed	

Group 1		
132	Fault group 1-3 (NO)	The digital output is set according to alarm coding. For some messages it is possible to select the output switching behaviour - NO or NC.
133	Fault group 4-6 (NO)	
136	Fault group 1 (NO)	
137	Fault group 2 (NO)	
138	Fault group 3 (NO)	
139	Fault group 4 (NO)	
140	Fault group 5 (NO)	
141	Fault group 6 (NO)	
142	Fault group 1 (NC)	
143	Fault group 2 (NC)	
144	Fault group 3 (NC)	
145	Fault group 4 (NC)	
146	Fault group 5 (NC)	
147	Fault group 6 (NC)	
148	Buzzer	The output is set and reset together with the internal buzzer.
164 165	Reset Acknowledge	Output for the control of external control circuits via „RESET“. The output is set as long as the key is pressed.

Group 3		
173	Standby switching	When exceeding the limit values for generator voltage and frequency, previously set in operating data, the output is set. If the Gen.CB is closed, only voltage will be monitored.
170	SYN release	The output is set if the SYN release is active during internal operation.
179	Deactivate C.B. interlocking	This output is used for deactivating the external key locking during synchronization. It is set with pending output „NLS or GLS Ready“ and will be switched off with key feedback.
191	Delta U OK	The output is set if the voltage is between the limits of „Max. diff. voltage“, previously adjusted for synchronization.
192	Delta F OK	The output is set if the frequency is between the limits of „Max. diff. frequency“, previously adjusted for synchronization.
166	Loaded	The output is set when the operating value „Genset loaded“ has been exceeded. When falling below this value the output will be deactivated again.
167	KWH pulse	When reaching the counter value previously input under operating data a pulse will be output. KWH counting starts again.
222	Gen C.B. indication	Output is set when feedback for Gen.CB is pending at the respective digital input.
221	Mains C.B. indication	Output is set when feedback for Mains CB is pending at the respective digital input.
206	Parallel operation	Feedbacks for Gen.CB and Mains CB are pending. Detection of parallel operation.
220	Mains voltage available	The output is set when reaching the operating value for mains voltage.

Group 4		
158	Speed down	Digital control signals for frequency and power control.
157	Speed up	Digital control signals for frequency and power control.
159	Speed controller reset	Output will be set for 1.5 secs., in compliance with one of the following requirements: Start command, Stop command, GenCB OFF or Reset in Manual Adjustment.
160	Speed controller on	The output is set with speed controller ON.
162	Voltage down	Digital control signals for voltage and Cos Phi control.
161	Voltage up	Digital control signals for voltage and Cos Phi control.
680	Voltage controller reset	Output will be set for 1.5 secs., in compliance with one of the following requirements: Start command, Stop command, GenCB OFF or Reset in Manual Adjustment.
216	VDE4105 – Mains standby switching (NC)	Output is set with mains within preset limit values. See Item 4.3.8.4
217	VDE4105 - Mains standby switching (NO)	Output is reset with mains within preset limit values. See Item 4.3.8.4
218	VDE4105 – Ext. setpoint reduct.select.	The output is set if setpoint reduction is selected via a digital input.
219	VDE4105 – Ext. setpoint reduct. active	The output is set if selected setpoint reduction is active.
305	VDE4105 – Ext. setpoint reduct. 1	The output is set if setpoint reduction 1 was activated by an input.
306	VDE4105 – Ext. setpoint reduct. 2	The output is set if setpoint reduction 2 was activated by an input.
307	VDE4105 – Ext. setpoint reduct. 3	The output is set if setpoint reduction 3 was activated by an input.

Group 5		
269 to 304	AE5 to AE22	Each analog input of modules AI1 has two limit values. The output is set when falling below (<x) or exceeding (>x) the respective limit value.

Group 6				
374	PT1<x	375	PT1>x	Each measurement input of modules AT1 has two limit values. The output is set when falling below (<x) or exceeding (>x) the respective limit value.
376	PT2<x	377	PT2>x	
378	PT3<x	379	PT3>x	
380	PT4<x	381	PT4>x	
382	PT5<x	383	PT5>x	
384	PT6<x	385	PT6>x	
386	AE23<x	387	AE23>x	
388	AE24<x	389	AE24>x	
390	PT7<x	391	PT7>x	
392	PT8<x	393	PT8>x	
394	PT9<x	395	PT9>x	
396	PT10<x	397	PT10>x	
398	PT11<x	399	PT11>x	
400	PT12<x	401	PT12><x	
402	AE25<x	403	AE25>x	
404	AE26<x	405	AE26>x	

Group 7		
556 to 563	PN1 / MB1 Control Bit 1- 8	There are 8 control bits available for the Profinet (PN1) or Modbus (MB1 / MB2) bus couplers, which can be connected directly to digital outputs. In addition, these control bits can be integrated into logic functions.
564 to 571	PB1 Control Bit 1 - 8	There are 8 control bits available for the Profibus coupler (PB1), which can be connected directly to digital outputs. In addition, these control bits can be integrated into logic functions.

Group 8		
599 to 608	CAN BUS AIN01 <x or >x to CAN BUS AIN05 <x oder >x	For the first 5 analog values coming from the engine (CAN BUS), two limit values are available. The output is set when falling below (<x) or exceeding (>x) the respective limit value.

Group 9		
668	Blink Bit 0,5s	The output is set and reset in a 2cy interval.
669	Blink Bit 1,0s	The output is set and reset in a 1cy interval.
670	Blink Bit 2,0s	The output is set and reset in a 0,5cy interval.

Logic – Marker/Timer		
438 to 485	Marker 01 to 40 Timer 01 to 08	40 logic blocks and 8 timer blocks can be configured. The respective outputs of the blocks can be assigned to digital outputs or used for other shortcuts.

Digital inputs		
486 to 554 665 to 667	DE001 to 003 DE101 to 122 DE201 to 222 DE301 to 322 DE501 to 503	The digital inputs can be linked directly to the digital outputs or used for controlling the logic blocks.

Switching points		
573 to 588	Switching point 1 to Switching point 16	For a certain selection of electrical quantities, e.g. the percentage active power, one limit value is available for each switching point. The output is set when falling below (<x) or exceeding (>x) the respective limit value.

4.5 External alarms

16 free alarms are available. The alarms can be set to free digital inputs. Text, alarm behaviour as well as delays can be selected separately for each alarm.

4.5.1 Alarm characteristics

Any alarm to be visualized has to be released before. Alarms not yet released are hidden.

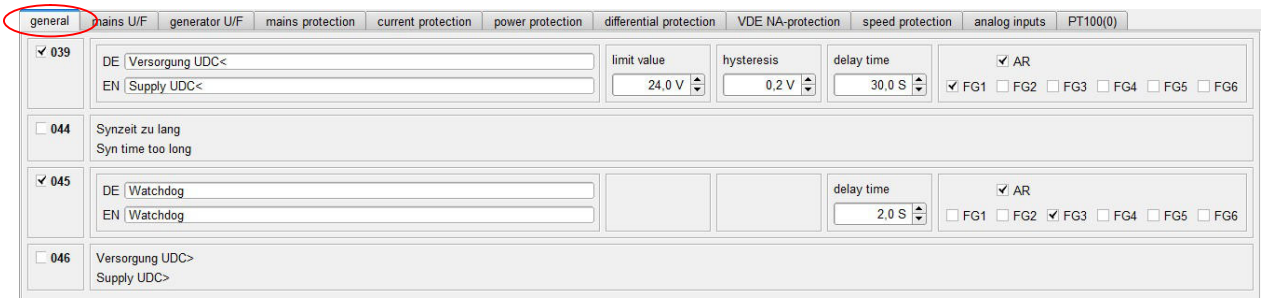
For internal alarms the alarm message is visualized acc. to the preset limit value and after expiration of the delay time.

With the coding the alarms can be customized to the corresponding applications.

INV	Inverted alarm behaviour.
AR	Auto reset – There will be an automatic reset when the alarm is not pending anymore, and the alarm reset delay has elapsed.
FG1 to FG6	Fault group 1 to 6 – The alarms can be grouped in six different groups. These groups can be adjusted to a digital output acc. to the function list.

4.6 Internal alarms

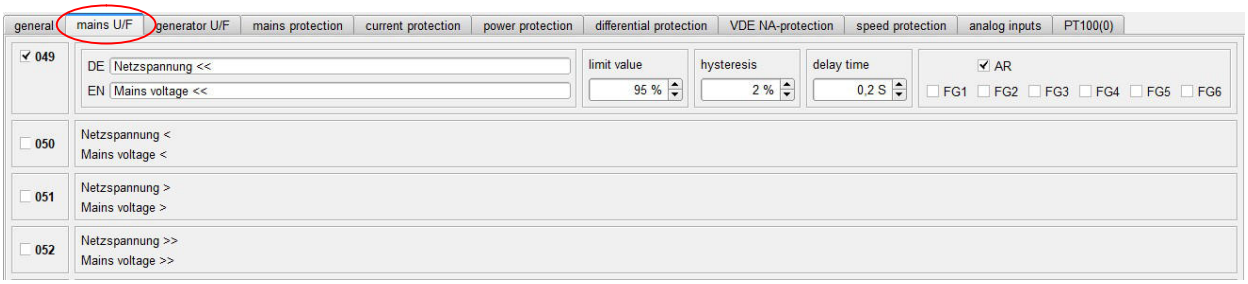
4.6.1 General



When exceeding or falling below the limit value the alarm is visualized acc. To the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

General	
AL039 Supply UDC<	Monitoring of KSS supply voltage for undervoltage.
AL044 Syn time too long	Synchronization has to be completed with the preset time.
AL045 Watchdog	Monitoring of active BUS modules.
AL046 Supply UDC>	Monitoring of KSS supply voltage for overvoltage.

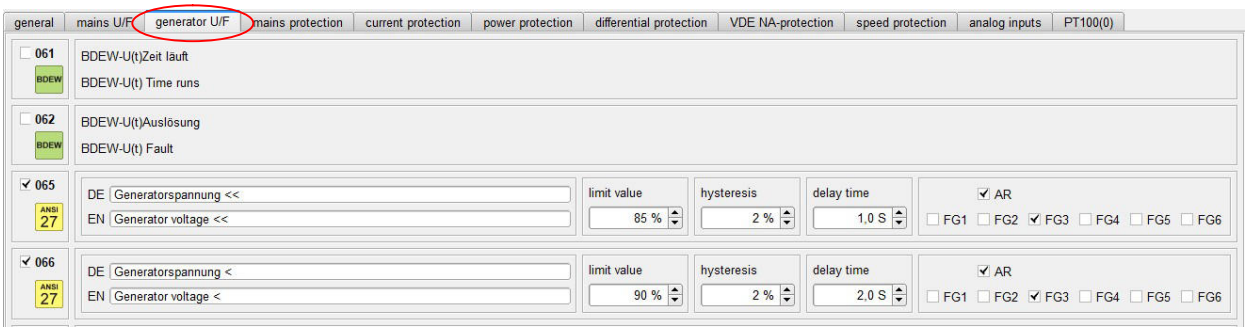
4.6.2 Mains U/F



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

Mains U/F	
AL049 Mains voltage << AL050 Mains voltage < AL051 Mains voltage > AL052 Mains voltage >> AL053 Mains frequency << AL054 Mains frequency < AL055 Mains frequency > AL056 Mains frequency >>	Monitoring of mains quality. Monitoring of under-/overvoltage and under-/overfrequency of mains voltage. Monitoring only starts when mains voltage has reached its operating value. If one of the alarm values exceeds or falls below the alarm limit values the respective alarm message will be visualized after expiration of the delay time. The LED for „Mains voltage available“ is flashing and the start sequence is initiated.
AL057 Mains rotating field	Monitoring of right or left rotating field.
AL058 Mains angle fault	Maximum deviation angle for external conductors.
AL059 Mains voltage asym.	The input limit value refers to the nominal voltage. Phase current deviations may not exceed this value.

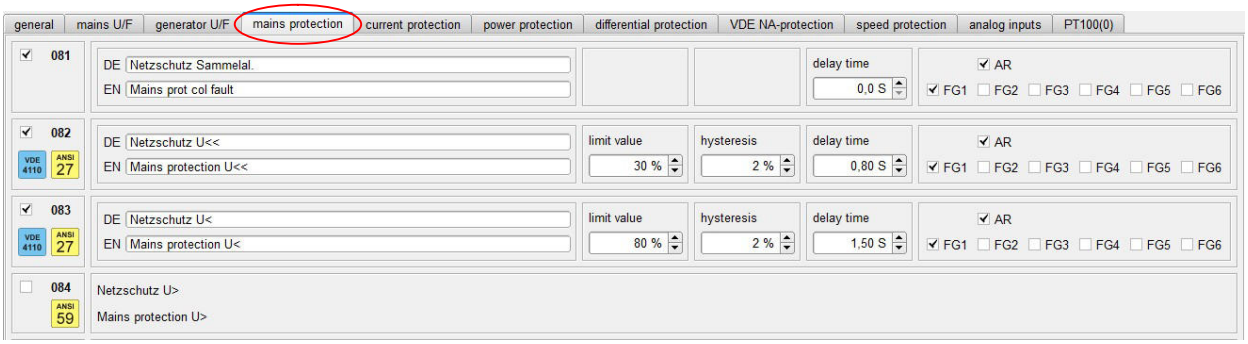
4.6.3 Generator U/F



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

Generator U/F	
AL061 BDEW–U(t) time runs	Dynamic mains support. Alarm is set while time for trigger curve is running. For control if there has been a voltage drop that has not led to tripping.
AL062 BDEW–U(t) fault	Dynamic mains support. Alarm is set if voltage has not been reestablished within the preset time or disconnected from mains.
AL065 Generator voltage << AL066 Generator voltage < AL067 Generator voltage > AL068 Generator voltage >> AL069 Gen. frequency << AL070 Gen. frequency < AL071 Gen. frequency > AL072 Gen. Frequency >>	Monitoring of generator voltage and frequency.
AL073 Gen. rotating field	Monitoring of right or left rotating field.
AL074 Gen. angle fault	Maximum deviation angle for external conductors.
AL075 Gen. voltage asym.	The input limit value refers to the nominal voltage. Phase current deviations may not exceed this value.
AL076 Cos Phi capacitive	Monitoring of power factor. Capacitive limit value.
AL077 Cos Phi inductive	Monitoring of power factor. Inductive limit value.

4.6.4 Mains protection

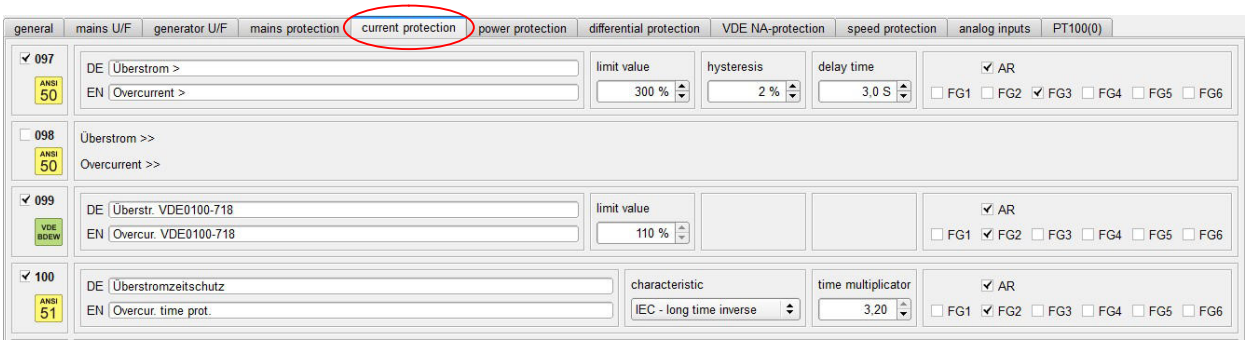


When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

The mains protection alarms are generated from the measured values at the generator voltage input.

Mains protection	
AL081 Mains protection collective fault	The mains protections collective fault is affected by all alarms activated in tab „Mains protection“. The collective fault is permanently assigned to two relays on the PM2 Module. Operation of both relays is based on the closed-circuit current principle. One relay has a normally-closed contact, the other one has a normally-open contact. Which relay is used depends on whether the mains protection has to affect the MCB or the GCB.
AL082 Mains protection U<< AL083 Mains protection U < AL084 Mains protection U > AL085 Mains protection U >> AL086 Mains protection F << AL087 Mains protection F < AL088 Mains protection F > AL089 Mains protection F >>	Monitoring of generator voltage and frequency.
AL090 Mains prot. vector > AL091 Mains prot. vector >>	Alarm is set with vector surge in one phase.
AL092 Dif. vector surge > AL093 Dif. vector surge >>	Alarm is set with a simultaneous vector surge in all three phases in the same direction.
AL094 Q-U protection < AL095 Q-U protection <<	If the voltage value falls below in all three phases and if the generating plant simultaneously **receives** inductive reactive power from the mains, the alarm is set. The limit value is set for the angle Phi is capacitive.

4.6.5 Current protection

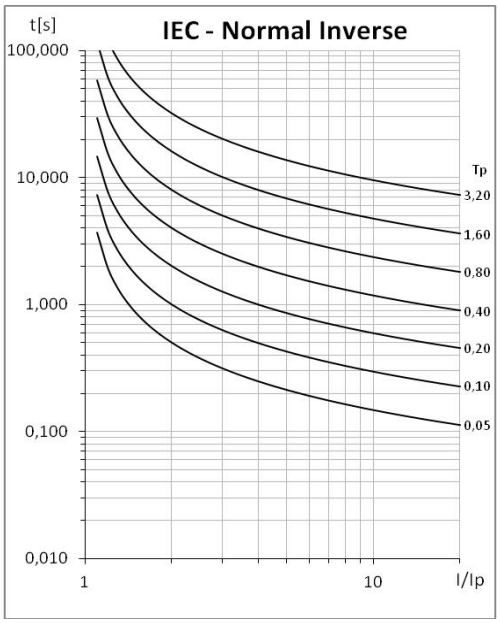


When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

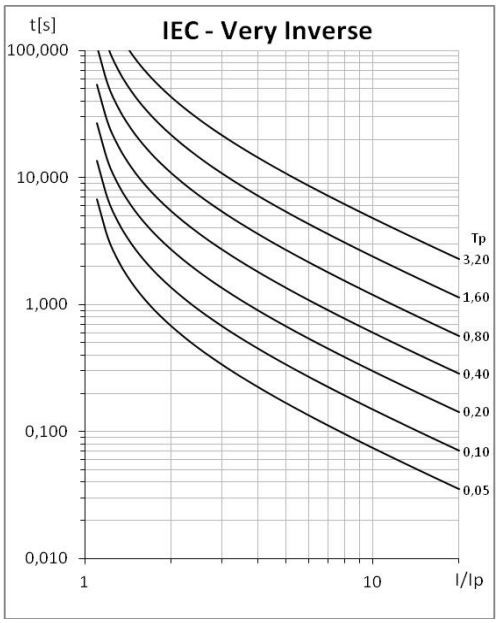
The current protection function of KSS monitors the current in three-phase networks. Current metering takes place as simultaneous 3-phase sampling and is a true effective value measuring. The current measuring circuits and supply voltage are galvanically-isolated (DC) among each other and against electronic measuring equipment. An influence e.g. by earth loop is excluded. For this reason direct current metering is possible even without current transformer in a nominal current range up to 5A.

Current protection	
AL097 Overcurrent > AL098 Overcurrent >>	If the current exceeds the limit value in one phase, the alarm will be set.
AL099 Overcur. VDE100-718	The KSS complies with the requirements of the DIN VDE 0108 and DIN VDE 0100-718 (Erection of low-voltage installations - Requirements for special installations or locations - Part 718: Installations for gathering of people), according to which only for up to 60 minutes 110 % of the rated current may be delivered within a 12 hour period.
AL100 Inv. t. overcur. prot.	According to the selected ANSI or IEC curves and the adjusted time multiplier tripping is delayed depending on the overcurrent.
AL079 Earth current >	If the earth current exceeds the limit value, the alarm will be set.
AL079 Earth current >>	

4.6.5.1 IEC Characteristics

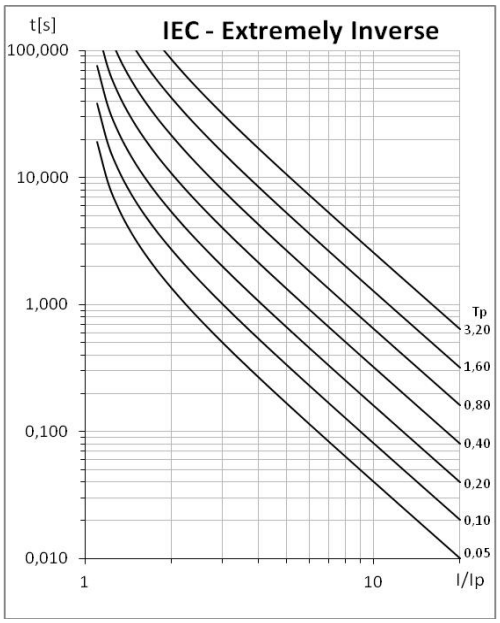


$$t = \frac{0{,}14}{\left(\frac{I}{Ip}\right)^{0{,}02} - 1} Tp$$

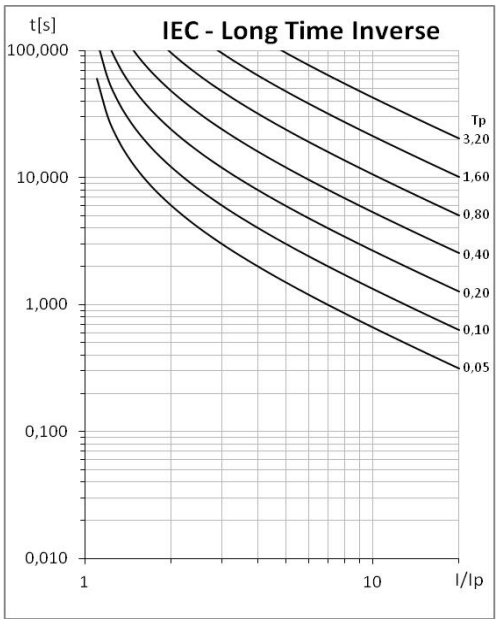


$$t = \frac{13{,}5}{\left(\frac{I}{Ip}\right)^{1} - 1} Tp$$

t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value



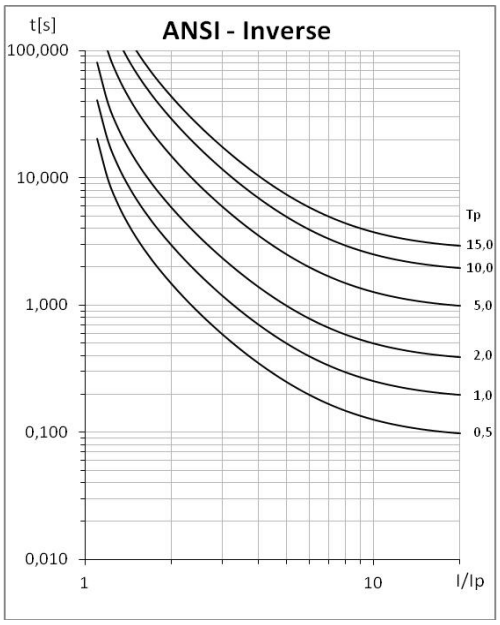
$$t = \frac{80}{\left(\frac{I}{Ip}\right)^{2} - 1} Tp$$



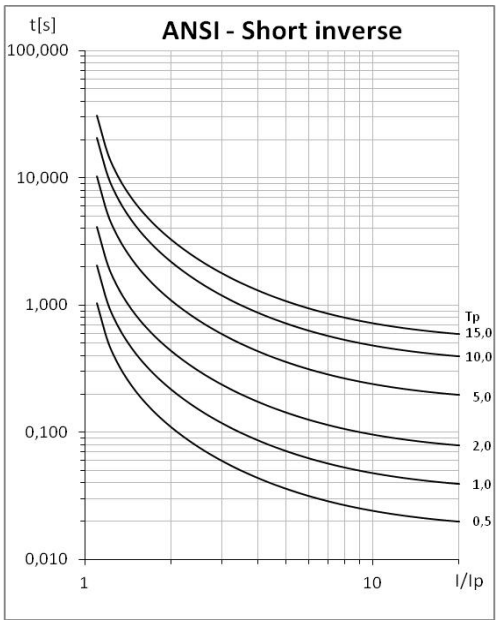
$$t = \frac{120}{\left(\frac{I}{I_P}\right) - 1} T_P$$

t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value

4.6.5.2 ANSI Characteristics

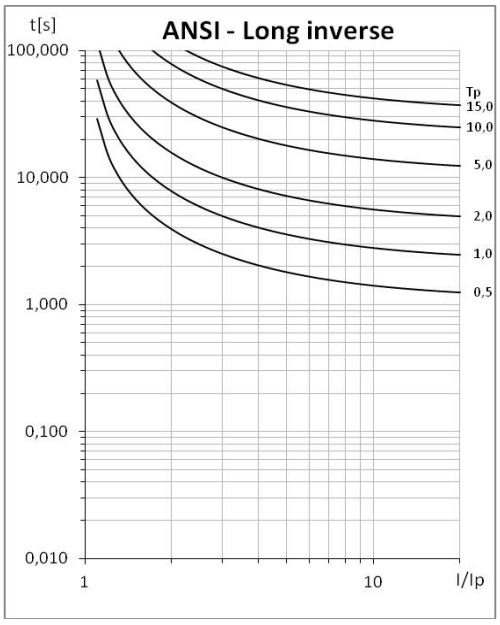


$$t = \left(\frac{8{,}9341}{\left(\frac{I}{Ip}\right)^{2{,}0938} - 1} + 0{,}17966 \right) Tp$$

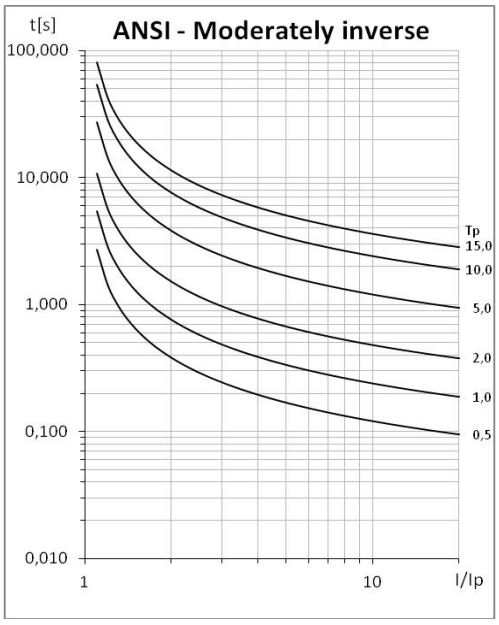


$$t = \left(\frac{0{,}2663}{\left(\frac{I}{Ip}\right)^{1{,}2969} - 1} + 0{,}03393 \right) Tp$$

t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value

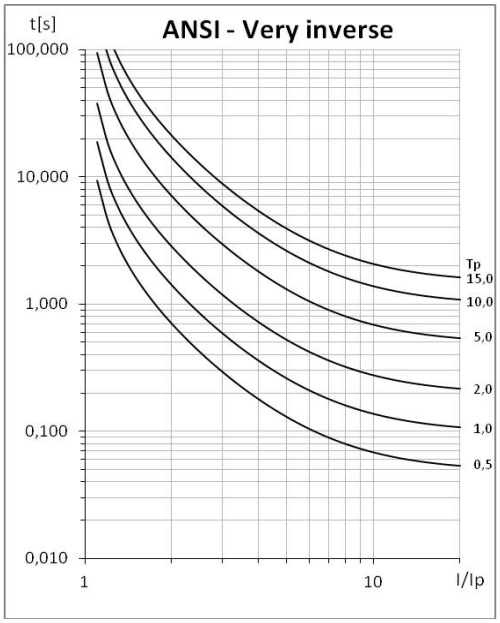


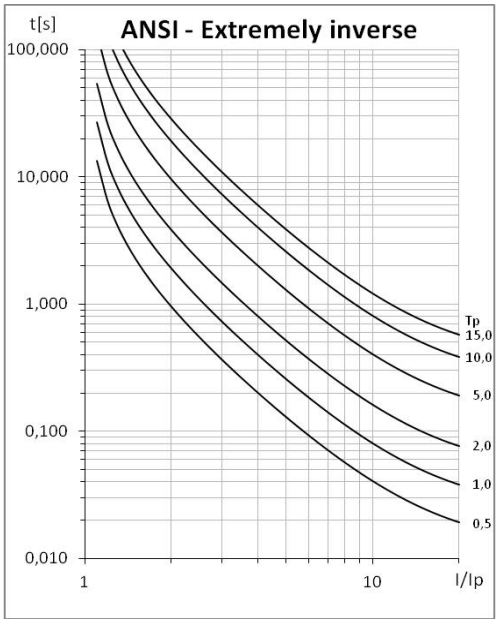
$$t = \left(\frac{5{,}6143}{\left(\frac{I}{Ip}\right)^{1} - 1} + 2{,}18592 \right) Tp$$



$$t = \left(\frac{0{,}0103}{\left(\frac{I}{Ip}\right)^{0{,}02} - 1} + 0{,}0228 \right) Tp$$

t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value

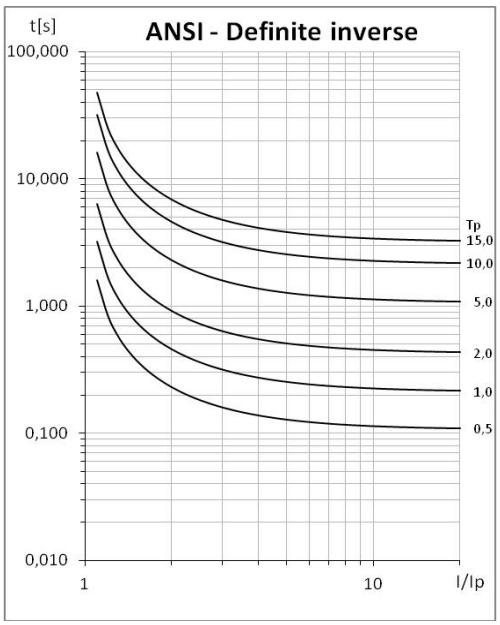




$$t = \left(\frac{3{,}922}{\left(\frac{I}{Ip}\right)^2 - 1} + 0{,}0982 \right) Tp$$

$$t = \left(\frac{5{,}64}{\left(\frac{I}{Ip}\right)^2 - 1} + 0{,}0243 \right) Tp$$

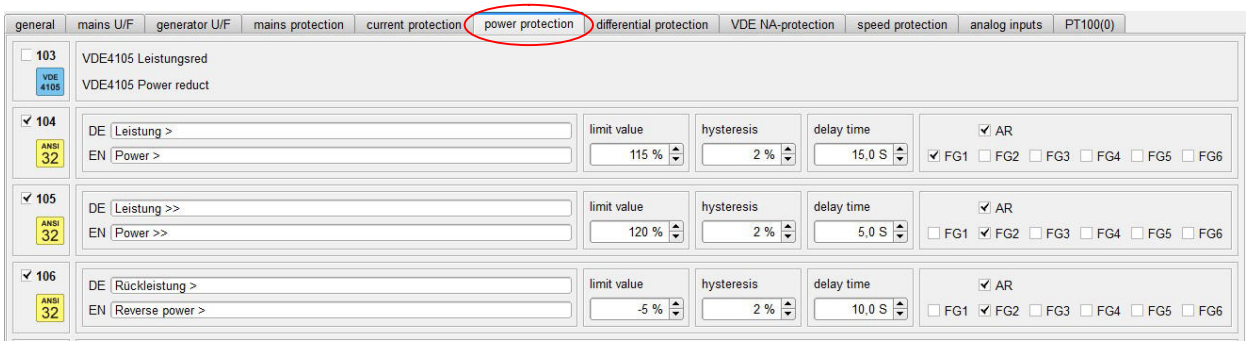
t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value



$$t = \left(\frac{0{,}4797}{\left(\frac{I}{Ip}\right)^{1{,}5625} - 1} + 0{,}21359 \right) Tp$$

t=delay time / Tp=time multiplier / I= act. current value / Ip=nom. value

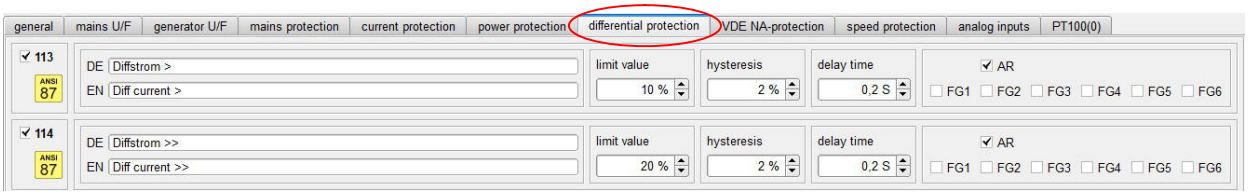
4.6.6 Power protection



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

Power protection	
AL103 Power reduct.	If the setpoint value given by the external power reduction is not reached within the adjusted delay, the alarm will be set.
AL104 Power > AL105 Power >> AL106 Reverse power > AL107 Reverse power >> AL108 Apparent power > AL109 Apparent power >> AL110 Reactive power > AL111 Reactive power >>	Monitoring of power data.
AL112 Unbalanced load	The input limit value refers to the nominal power. Phase power deviations may not exceed this value.

4.6.7 Differential protection



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

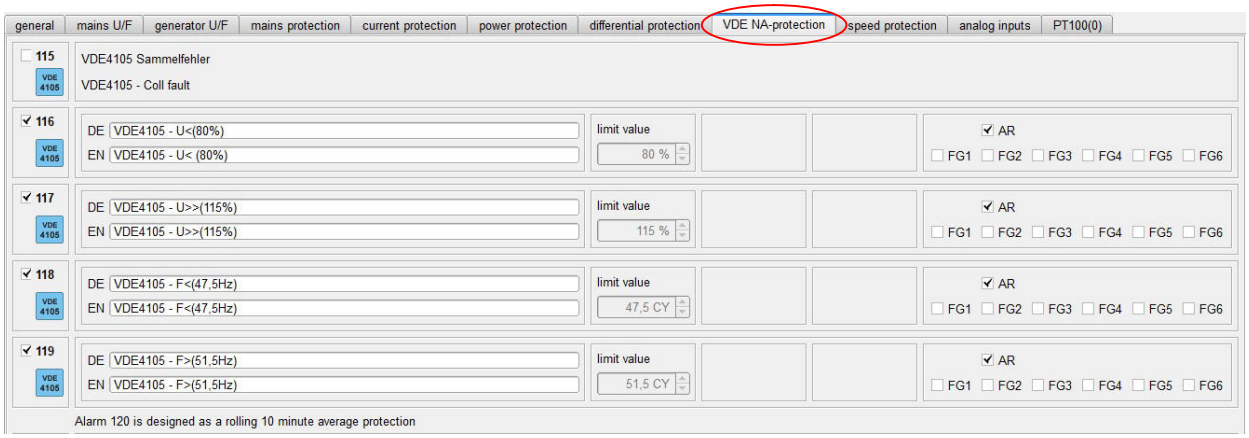
The diff.prot. alarms are visible when diff.prot. has been activated on tab „HOME“, and the DM1 Module has to be connected to the BUS. If the module is not yet connected the alarm „Watchdog“ will appear.

The differential protection function of the compact automatic KAS is to be used to protect three-phase rotary current generators or three-phase rotary current synchronous and asynchronous motors. It senses the residual currents within the protected zone, triggers when reaching the preset limit values and the corresponding error messages are displayed.

The differential protection measuring is the comparison of currents between generator star point and the outflow of generator or the supply in the switching gear. The sum of all currents must be zero.

Differential protection	
AL113 Diff current > AL114 Diff current >>	Differential currents are monitored within the protection range; tripped when preset limit values have been reached.

4.6.8 VDE-NA protection



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

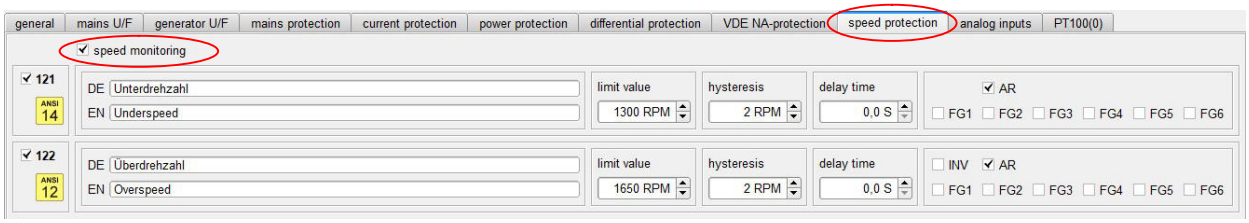
All active VDE NA-protection alarms affect the relays on the PM2, assigned to the function Mains protection. The relay operation is based on the closed-circuit current principle. One relay has a normally-closed contact, the other one has a normally-open contact. Which relay is used depends on whether the mains protection has to affect the MCB or the GCB.

In case of inadmissible voltage and frequency values NA protection, acc. to VDE4105, is for disconnecting the system from mains. NA protection is active after release of the corresponding alarms. The alarms have been set to fixed values. The only adjustable value is the 10 minutes average value protection, against exceeding the upper voltage limit. This value can be adjusted between 110% and 115%, and is generated Alarm 120.

The VDE NA protection alarms are generated from the values measured at the generator voltage input.

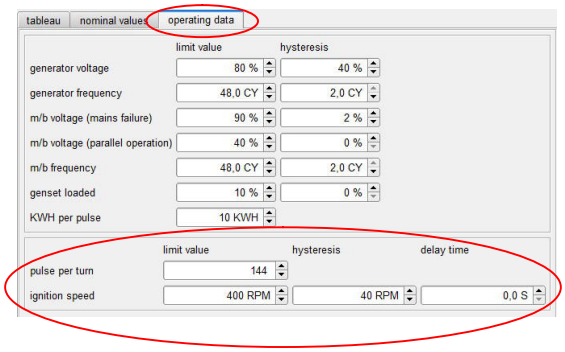
VDE NA-protection	
AL115 VDE4105 - Coll. fault	The coll. fault is affected by all alarms activated in tab „VDE NA-protection“.
AL116 VDE4105 - U< (80%) AL117 VDE4105 - U>> (115%) AL118 VDE4105 - F< (47,5Hz) AL119 VDE4105 - F> (51,5Hz)	Monitoring of voltage and frequency. It is not possible to modify the limit values.
AL120 VDE4105 - U> (Quality)	Monitoring of the 10-mins-average-voltage-value.

4.6.9 Speed protection



When the speed monitoring is activated the available alarms can be released.

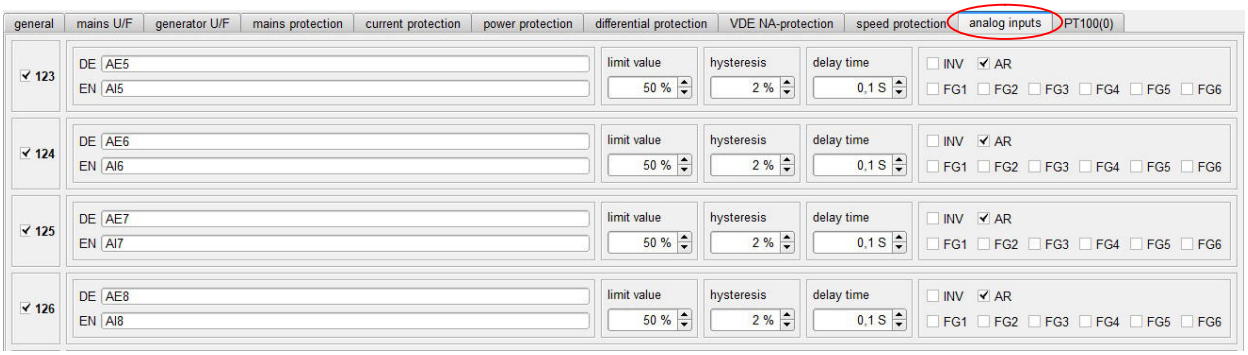
When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.



If the speed protection is enabled a Pick-Up has to be connected for speed measurement. In order to display the correct speed and to monitor the speed, the pulses per turn and the ignition speed have to be input under tab HOME→Operating data. Furthermore two alarms can be activated for speed monitoring for under- or overspeed.

Speed protection	
AL121 Underspeed AL122 Overspeed	Monitoring of motor speed.

4.6.10 Analog inputs



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

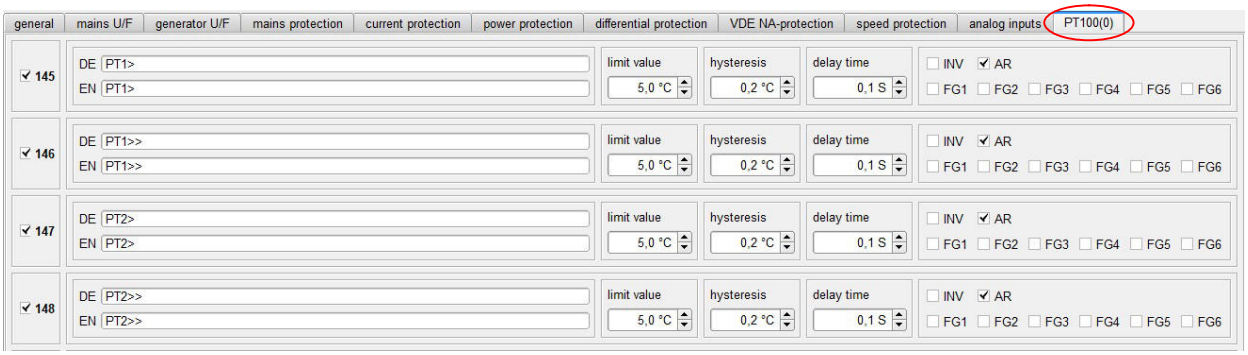
The alarms will only be displayed with the AI1 modules enabled under tab “HOME”.

Analog inputs	
AL123 Analog input 5 to AL128 Analog input 10	Module 1 – Each analog input on the additional modules is assigned to an alarm. The alarm is set if the value exceeds or falls below the limit value. It is possible to edit the alarm text.

Analog inputs	
AL129 Analog input 11 to AL134 Analog input 16	Module 2 – Each analog input on the additional modules is assigned to an alarm. The alarm is set if the value exceeds or falls below the limit value. It is possible to edit the alarm text.

Analog inputs	
AL135 Analog input 17 to AL140 Analog input 22	Module 3 – Each analog input on the additional modules is assigned to an alarm. The alarm is set if the value exceeds or falls below the limit value. It is possible to edit the alarm text.

4.6.11 PT100(0)



When exceeding or falling below the limit value the alarm is visualized acc. to the alarm behaviour (see Item 4.5.1) and after expiration of the delay time. All alarms can be parameterized to a digital output. It is not possible to modify the alarm message texts as the alarms are linked to internal functions.

The alarms will only be displayed with the AT1 modules enabled under tab “HOME”.

PT100(0)	
AL145 to AL156 PT1 to PT6 AL156 to AL160 AE23 to AE24	Module 1 – Each measurement input on the additional modules is assigned to two alarms. The alarm is set if the value exceeds or falls below the limit value. It is possible to edit the alarm text.

PT100(0)	
AL161 to AL172 PT7 to PT12 AL173 to AL176 AE25 to AE26	Module 2 – Each measurement input on the additional modules is assigned to two alarms. The alarm is set if the value exceeds or falls below the limit value. It is possible to edit the alarm text.

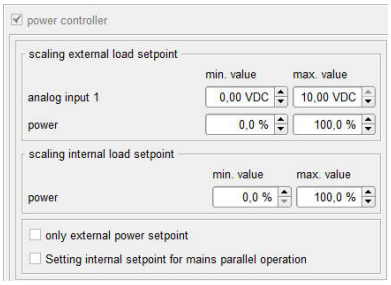
4.7 Times

Basic settings	
Ramp for unloading	The generator is relieved linearly in the set time window.

4.8 Controller

4.8.1 Setpoint

4.8.1.1 Power controller



Scaling of the load setpoint, given from analog input 1.

Furthermore the panel load setpoint input range can be defined.

If „Only external power setpoint“ has been selected, it is not possible anymore to modify the setpoint at the panel. Setpoint adjustment has always to be done via analog input.

„Setting internal setpoint for mains parallel operation“ activates the internal setpoint set at the ANZ2 in mains parallel operation.

Power control is active in mains or generator parallel operation mode of the compact automatic, for gen-set regulation to a preset power export value. The KSS will compare the actual power with the expected power. The output value is specified directly at the ANZ2 or by external control via a 0 ... 10 VDC input. The preset values are also kept if the 24V voltage supply fails.

By connecting the digital inputs for the breaker feedbacks and the DI "Gen. parallel operation", the corresponding controller for the respective operating mode is activated in the KSS. The setpoint is also switched over accordingly.

See the following matrix.

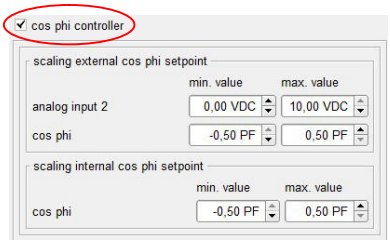
Display texts on ANZ2	DI Gen. Parallel operation	DI Mains CB indication on	DI Gen CB indication on	Controller	Setpoint
Breakers off	0	0	0	Frequency	
Gen. operation freq.	0	0	1	Frequency	
Mains operation	0	1	0	Frequency	
Mains parallel oper.	0	1	1	Power	Internal
Gen operation power	1	0	0	Power	External
Gen operation power	1	0	1	Power	External
Mains operation	1	1	0	Power	Internal
Mains parallel oper.	1	1	1	Power	Internal

These input assignments should be avoided.

4.8.1.1.1 Control of the power setpoint specification via a bus coupler

Preselection of the setpoint specification on the panel (ANZ2)		Input functions that can be set by connecting a digital inputs or creating a logic function.		Control byte 1 (TASTF01)		Active Setpoint		
Internal	External	Remote control via BUS	Load setting via BUS	Bit 5 External(1) / Internal(0)		SPS	Analog input 1	Tableau ANZ2
X								X
X				X				X
X			X			X		
X			X	X		X		
X		X					X	
X		X		X		X		
X		X	X			X		
X		X	X	X		X		
	X						X	
	X			X		X		
	X		X			X		
	X		X	X		X		
	X	X					X	
	X	X		X		X		
	X	X	X			X		
	X	X	X	X		X		

4.8.1.2 Cos Phi controller

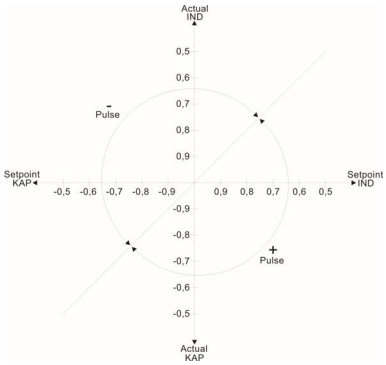


For adjustment of cos phi controller this must be enabled.

Scaling of cos phi setpoint, given via analog input 2.

Furthermore the panel scaling range for the cos phi setpoint can be limited.

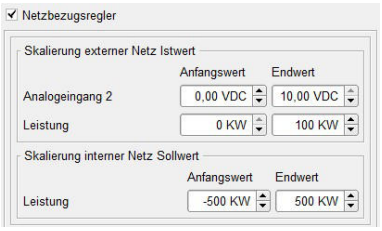
!!! If at the same time the mains im-/export controler is enabled, setpoint adjustment will only be possible at the panel !!!



In order to avoid transmission losses a power factor as high as possible is the aim. With its Cos Phi controller the protection device KSS meets the corresponding demands for power-factor-related system control.

The Cos Phi controller is only active in parallel operation mode. In island operation mode the voltage is adjusted. In order to deactivate the controller in parallel operation mode, a digital input, assigned with the function 'Lock Cos Phi controller', has to be accessed.

4.8.1.3 Mains im-/export controller



To be able to do adjustments on the mains im-/export controller it has to be enabled.

Scaling of mains actual value, provided by analog input 2.

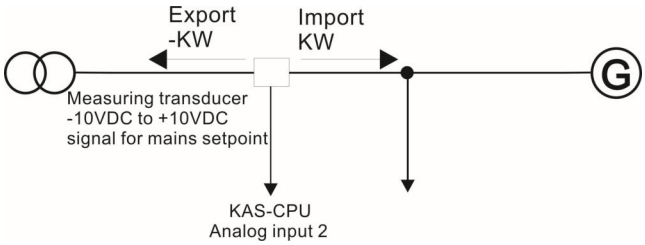
Furthermore the input range for the mains setpoint (panel input) can be limited here.

Scaling of power values in done in KW.

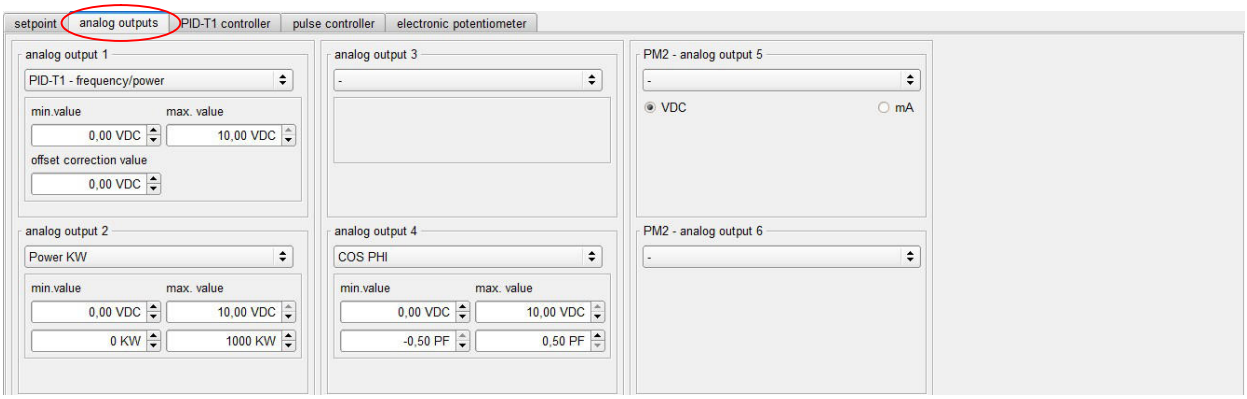
The Mains Im./Ex. Contr. controls the generator power in mains parallel operation up to reaching the preset mains setpoint value. Upon adjusting the setpoint value please consider if power is exported to mains or imported from mains. For export the setpoint has to be negative, for import positive.

A measuring transducer, connected to analogue input 2, monitors the actual mains value. The input range for the analogue input is from -10VDC to +10VDC. The analogue input can be scaled. All measuring values will be indicated in KW.

To activate the regulation during mains parallel operation a digital input with the function 'Mains Im./Ex. Contr.' has to be energized.



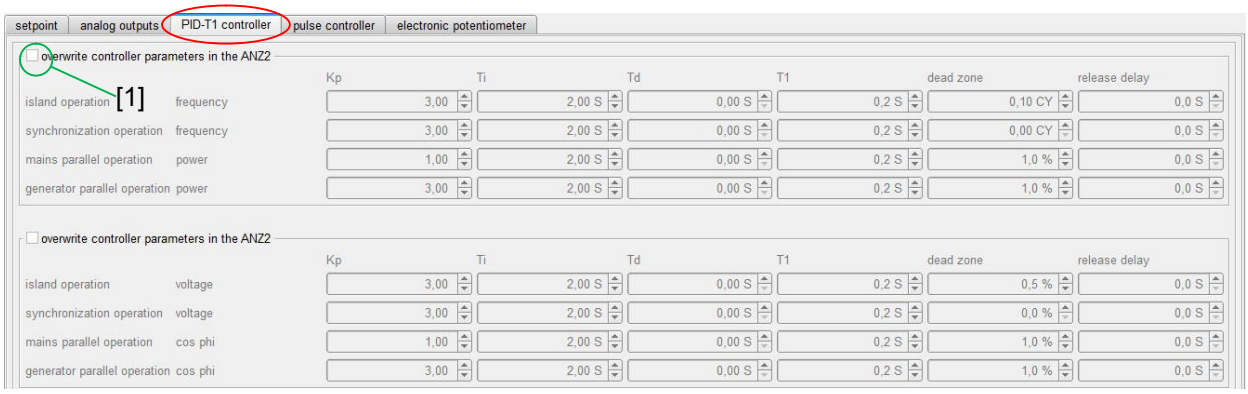
4.8.2 Analog outputs



A total of six analog outputs are available, four on the CPU module and two more on the PM2 module. Different functions can be assigned to these outputs. Depending on the functions the outputs can be scaled. The analog outputs 1+2 as well as 3+4 share a common potential. The four outputs on the CPU module are electrically isolated to the supply voltage. The two outputs on the PM2 module require an external auxiliary voltage and are galvanically separated from the internal electronics. Only the output of analog output 5 can be switched from V to mA.

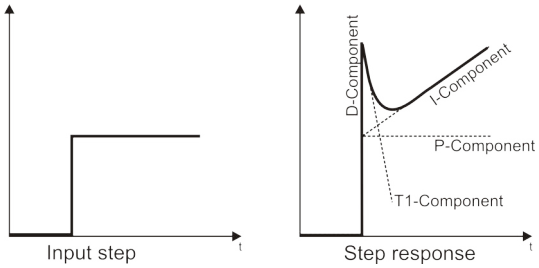
Analog outputs	
El.Poti 1 – frequency/power	Adjustment range will be entered at the ANZ2 under „Electr. Potentiometer“. The other regulation parameters are to be input via tab Controller→Pulse controller.
El.Poti 2 – voltage/cos phi	Adjustment range will be entered at the ANZ2 under „Electr. Potentiometer“. The other regulation parameters are to be input via tab Controller→Pulse controller.
PID-T1 – frequency/power	Input of adjustment range. Via „Offset“ the centre of the adjustment range can be moved. The other regulation parameters are to be input via tab Controller→PID-T1 controller.
PID-T1 – voltage/cos phi	Input of adjustment range. Via „Offset“ the centre of the adjustment range can be moved. The other regulation parameters are to be input via tab Controller→PID-T1 controller.
Power %	Scaling of output range. For power control in genset parallel operation.
Power KW	Scaling of output range. For connection of a measurement device.
Cos phi	Scaling of output range. For Cos Phi control in genset parallel operation.
Generator frequency	Scaling of output range.
Mains frequency	Scaling of output range.
Apparent power kVA	Scaling of output range.
Apparent power %	Scaling of output range.
Battery voltage	Scaling of output range.
CAN Bus – Engine speed	Scaling of output range.
CAN Bus – Coolant temp.	Scaling of output range.
CAN Bus – Oil pressure	Scaling of output range.
CAN Bus – Oil temperature	Scaling of output range.

4.8.3 PID-T1 controller



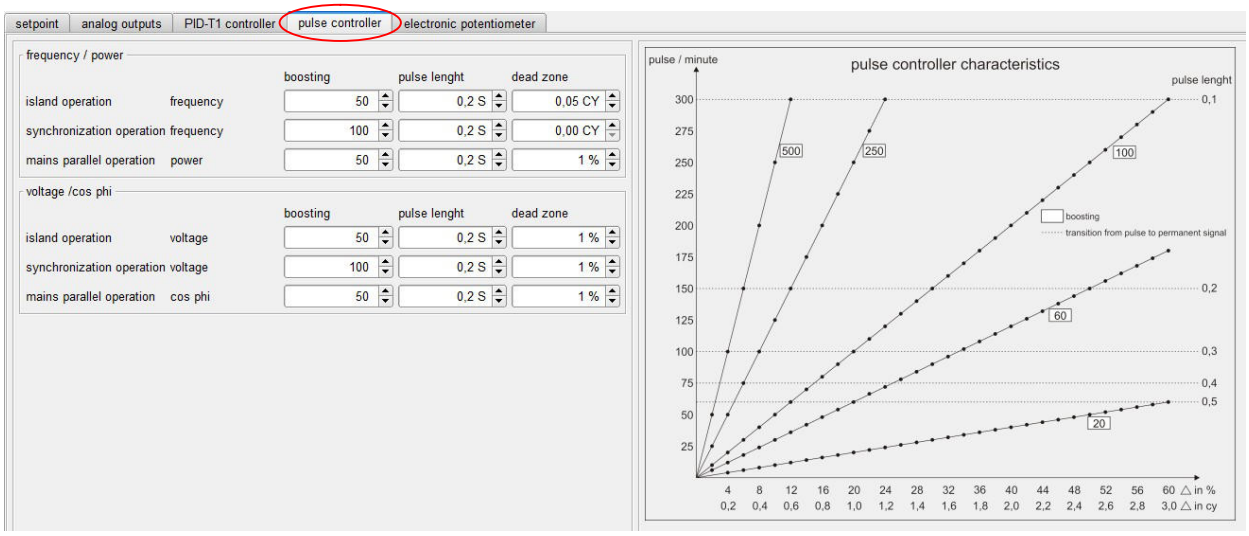
Settings for controller characteristics are made to the ANZ2 (see point 6.6.2). The set values can be read and stored with the parameter software. When transferring parameter data set on ANZ2 values are not overwritten. However, it is possible the stored values in the ANZ2 to overwrite with the parameter software. Here the function [1] must “overwrite controller parameters in the ANZ2” enabled. Each operation condition has its individual settings. They will only be displayed if PID-T1 controllers are set to an analog output.

The PID-T1 controller settings affect the KSS controller characteristics. Different parameters can be entered for the operation conditions island mode, synchronization, generator and mains parallel operation and acc. to the controlled variable the output is done via the analog outputs. Two controllers are available. One controller is for frequency / power control, the other for voltage / Cos Phi control.



PID-T1 controller	
Kp	Proportional coefficient – The step response is following the trend of the input signal. Only the amplitude changes.
Ti	Integration time – control time, required from the output to reach the height of the controlled variable step at the input.
Td	Derivative action time – An input step leads to an output pulse.
T1	Time to delay signal drop. Reduces oscillation.
Dead zone	Within dead zone only control with P part.
Release delay	The time that elapses after entering a new operating mode before the control begins.

4.8.4 Pulse controller



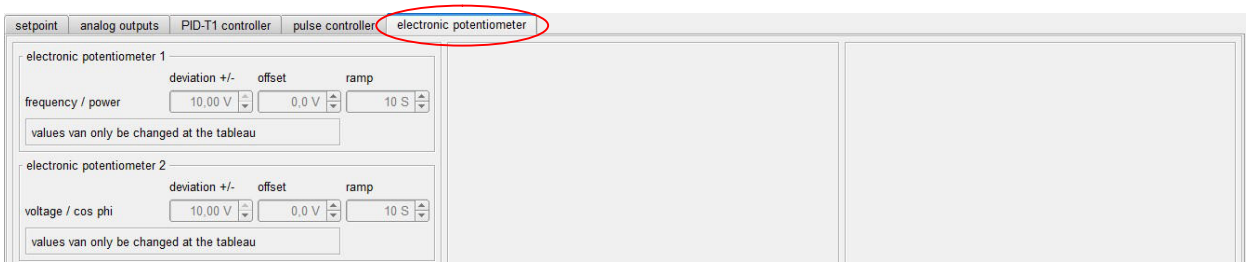
Settings for controller characteristics. Each operation condition has its individual settings. Controller settings affect the pulse controller (output via digital outputs), as well as the electr. potentiometer adjustments.

The pulse controller affects the KSS controller characteristics at the respective outputs. Different parameters can be entered for the operation conditions island mode, synchronization and parallel operation. The output is done acc. to the controlled variable via the digital outputs 'Decrease speed', 'Increase speed', 'Voltage lower' and 'Voltage higher'.

With the pulse controller characteristics various settings are shown for which deviation how many pulses have to be output, and when a continuous pulse occurs.

Pulse controller	
Boosting	Depending on the preset boosting value more pulses per minute will be output with increasing deviation. With the increasing number of pulses the pulse off time will be reduced. If the pulse off time is lower than the preset pulse length a permanent signal will be output.
Pulse length	Pulse length corresponds always to the preset value.
Death zone	Controller is disabled within dead zone.

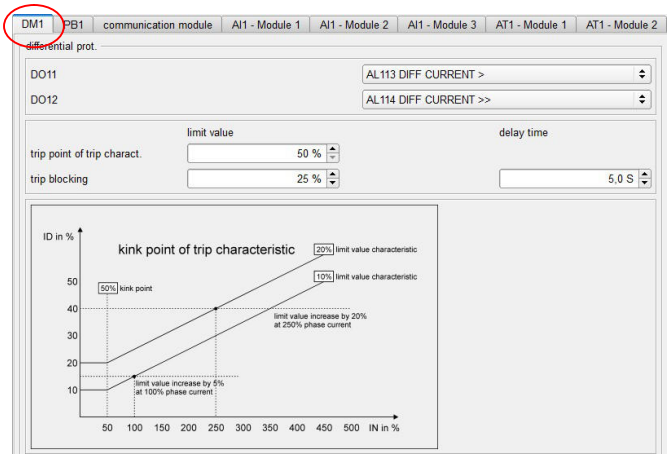
4.8.5 Electronic potentiometer



Input of electronic potentiometer values is only possible via panel ANZ2. When visualizing the parameter data only the values input via panel are displayed.

4.9 Additional Modules

4.9.1 DM1 module



For adjustment of differential protection settings the DM1 module has to be enabled via tab „HOME“. „Watchdog“ alarm will be tripped if the module is enabled but not connected to bus.

During operation, once the sampling interval is up, the measured values are compared with the preset limit values for pre-warning and cut-out. Upon reaching the limit values the corresponding error messages is displayed. If the phase current exceeds the infliction point, preset in a range from 50 to 500 %, the pre-warning and cut-out characteristics for the residual current are increased by 1 % per 10 % phase current above the kink-point.

If the limit is exceeded for trigger locked the trigger will be disabled for the duration of the delay time. The trigger lock can be also activated via a digital input (edge-triggered).

The differential protection function is to be used to protect three-phase rotary current generators or three-phase rotary current synchronous and asynchronous motors. It senses the residual currents within the protected zone, triggers when reaching the preset limit values and the corresponding error messages are displayed.

The differential protection measuring is the comparison of currents between generator star point and the outflow of generator or the supply in the switching gear. The sum of all currents must be zero.

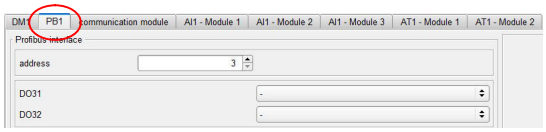
Three transformer circuits capture the current in the star point of the generator (internal electric circuit), three other transformer circuits are to be arranged by the customer and capture the consumer current (external electric circuit). The measuring in the six current paths in made as simultaneous sampling of all six measuring circuits with 16 samplings per cycle and path. For each current value the real effective value is calculated and evaluated once a cycle is up. The minimal disconnection delay amounts to approx. 130 ms.

The DM1 module offers two output relays permanently assigned to the alarms 113 and 114. To avoid accidental tripping, e.g. during start of large electrical drives, tripping can be suppressed for a set time.

If the residual current in one of the three phases is greater than the pre-selected limit value, the delay time starts to run. Once the delay time is up the appropriate error message is integrated into the KOP 2 display. In addition it is possible to link a digital output to the error message function. If the limit value falls below the preset hysteresis value, it automatically resets.

The difference between internal and external current is calculated from the instantaneous values of the currents, so that it is also possible to identify and evaluate a phase difference.

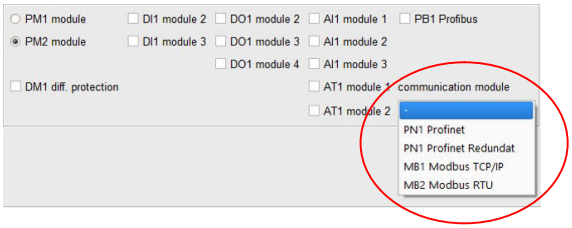
4.9.2 PB1 module



For adjustment of profibus coupling settings the PB1 module has to be enabled via tab „HOME“. „Watchdog“ alarm will be tripped if the module is enabled but not connected to bus.

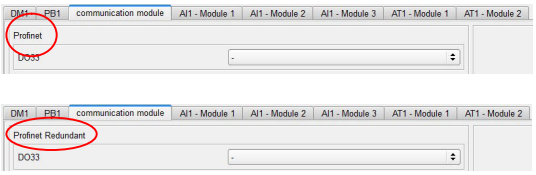
To connect with the PLC the correct address has to be set. Each PB1 module offers two output relays to be assigned to functions according to the dropdown lists.

4.9.3 Communication module



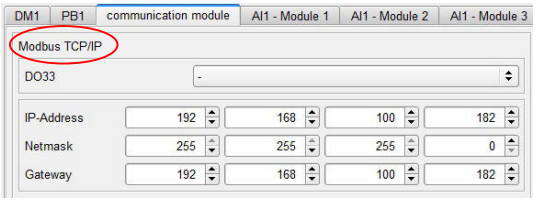
Four BUS modules are available for the communication module. In order to make the settings for the selected BUS connection, the corresponding module must be activated under the "HOME" tab. If the module is activated but not on the bus connector, the "watchdog" error occurs.

4.9.3.1 PN1 module



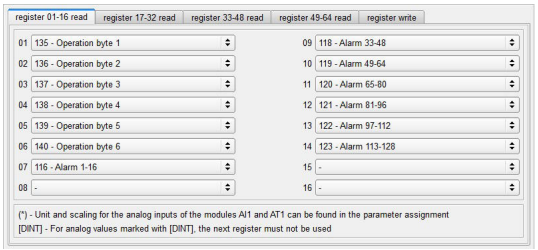
In order to establish a connection to the PLC, the PLC must assign an address to the PN1 module. An output relay is available to which functions can be assigned according to the selection list.

4.9.3.2 MB1 TCP/IP module

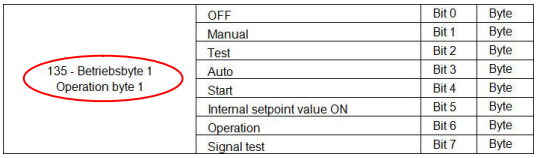


In order to establish a connection to the BUS module, an address must be set. The setting applies via IP address, netmask and gateway.

An output relay is available to which functions can be assigned according to the selection list.



There are 64 read and 4 write registers. It is selectable which data should be available in each address register, according to the pull-down selection list. The assignment of the address register can be found in the parameterization of the system (GV2). Which individual signals the byte / word contains is listed in the attached data point list. A secure assignment is made via the module number.



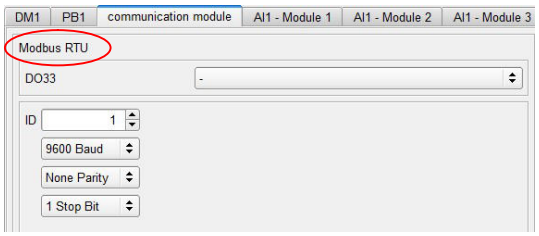
Addressing example:

Address register 01 = Modbus address 30001

Assignment example:

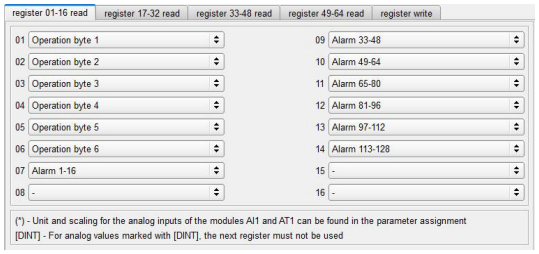
Module number 135 – Operation byte 1

4.9.3.3 MB2 RTU module

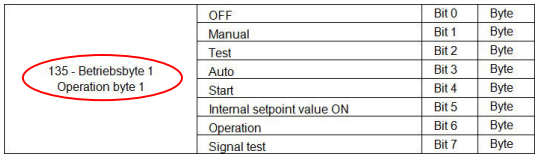


In order to establish a connection to the BUS module, some settings have to be done. The setting applies via baud rate, parity and stop bit.

An output relay is available to which functions can be assigned according to the selection list.



There are 64 read and 4 write registers. It is selectable which data should be available in each address register, according to the pull-down selection list. The assignment of the address register can be found in the parameterization of the system (GV2). Which individual signals the byte / word contains is listed in the attached data point list. A secure assignment is made via the module number.



Addressing example:

Address register 01 = Modbus address 30001

Assignment example:

Module number 135 – Operation byte 1

Pin connection at the Modbus RTU module MB2:

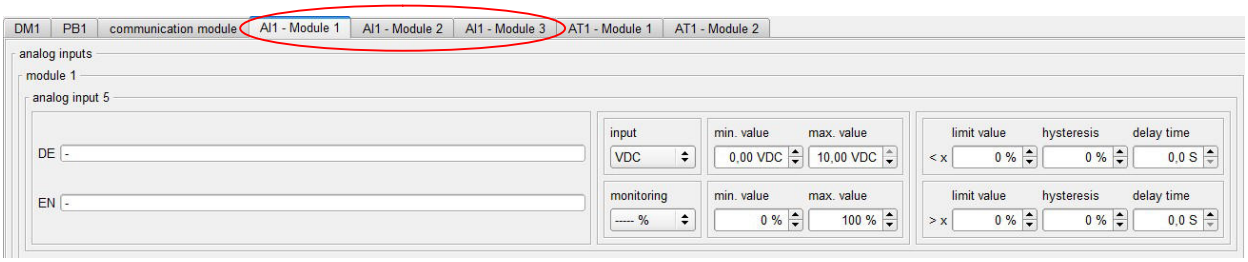
RS-232

Pin	Signal	Comment
1	GND	Bus polarization, ground (isolated)
2 - 3		Connect pin #2 to pin #3 (jumper)
7	Rx	RS-232 Data Receive
8	Tx	RS-232 Data Transmit

RS-485

Pin	Signal	Comment
5	B-Line	RS-485 B-Line (+)
9	A-Line	RS-485 A-Line (-)

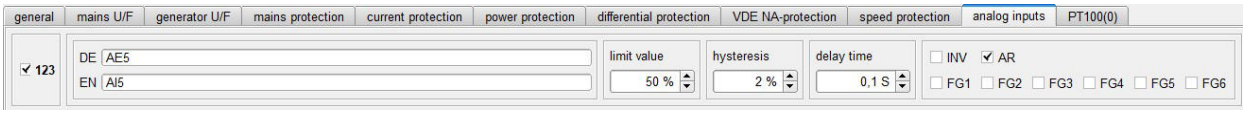
4.9.4 AI1 module



There are 3 analog modules with each 6 inputs available. The description is an example at the analog input 5 on the module 1.

For adjustment of analog input settings the AI1 module has to be enabled via tab „HOME“. „Watchdog“ alarm will be tripped if the module is enabled but not connected to bus.

Each input is assigned to an error message. For adjustment please refer to tab „ALARMS INT →Analog inputs“. The alarm has to be activated via a check box on the left side.



For each input or a current or a voltage signal can be selected. The input signal operating range is set via start and stop value.

Input	
VDC	Operating range from -10VDC to +10VDC.
mA	Operating range from -20mA to +20mA.

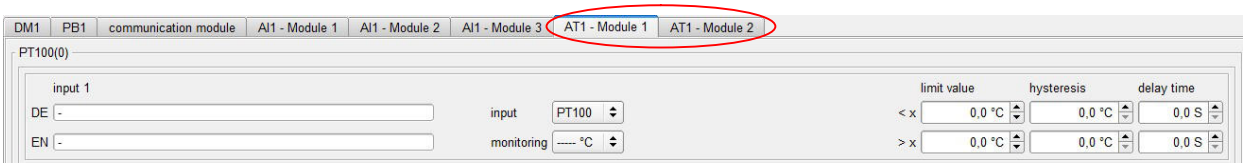
Depending on the selected display mode the analog values will be visualized on the panel via menu item „Analog values“. Depending on the input signal operating range the displayed values can be scaled with start and stop value. 7 different display units are available. If the panel analog value should not be displayed a „-“ character has to be input.

Monitoring	
----- % or ----,- %	5 digits in percent
----- Liter	5 digits in liter
----- bar or ---,- bar	5 digits in bar
----- C° or ----,- C°	5 digits in C°
----- rpm	5 digits in rpm
----- VDC or ----,- VDC	5 digits in VDC
----- ADC or ----,- ADC	5 digits in ADC

Furthermore there are two adjustable limit values available for selection for each input.

Limit value	
< x / > x	When falling below or exceeding the limit value and after expiration of the delay time the respective output relay will be activated.

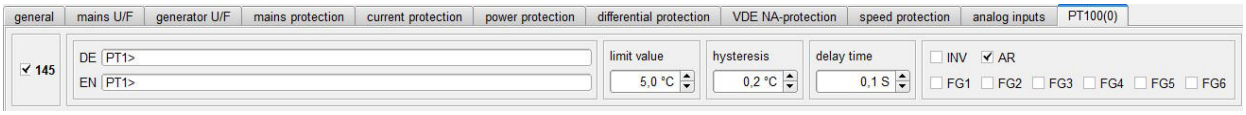
4.9.5 AT1 module



There are two measurement modules, each with 6 PT100(0) inputs and two analog inputs. The description is an example at the analog input 1 on the module 1.

For adjustment of the PT100 (0) measurement inputs the module has to be enabled via tab „HOME“. „Watchdog“ alarm will be tripped if the module is enabled but not connected to bus.

Two error messages are assigned to each input. For adjustment please refer to tab „ALARMS INT →PT100 (0)“.



For the PT100 (0) measuring inputs selection is possible between PT100 and PT1000.

For each input or a current or a voltage signal can be selected. The input signal operating range is set via start and stop value.

Input	
PT100	Working range -50°C to 220°C
PT1000	Working range -50°C to 220°C
VDC	Working range -10VDC to +10VDC
mA	Working range -20mA to +20mA

The display is always in °C.

Monitoring PT100(0)	
----- C° oder ----,- C°	4 digits in C°

Depending on the selected display mode the analog values will be visualized on the panel via menu item „Analog values“. Depending on the input signal operating range the displayed values can be scaled with start and stop value. 7 different display units are available. If the panel analog value should not be displayed a „-“ character has to be input.

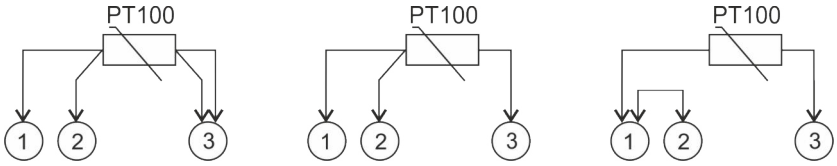
Monitoring analog input	
----- % or ----,- %	5 digits in percent
----- Liter	5 digits in liter
----- bar or ---,- bar	5 digits in bar
----- C° or ----,- C°	5 digits in C°
----- rpm	5 digits in rpm
----- VDC or ----,- VDC	5 digits in VDC
----- ADC or ----,- ADC	5 digits in ADC

Furthermore there are two adjustable limit values available for each input.

Limit value	
< x / > x	When falling below or exceeding the limit value and after expiration of the delay time the respective output relay will be activated.

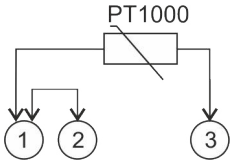
4.9.5.1 PT100(0) connection examples

Connection examples for the PT100 on measurement input 1.



4-wire 3-wire 2-wire

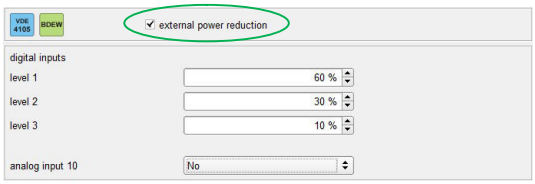
Connection example for the PT1000 on measurement input 1.



4.10 VDE/BDEW

A selection of functions required by VDE4105 (VDE=Association for Electrical, Electronic & Information Technologies) or BDEW (German Association of Energy and Water Industries).

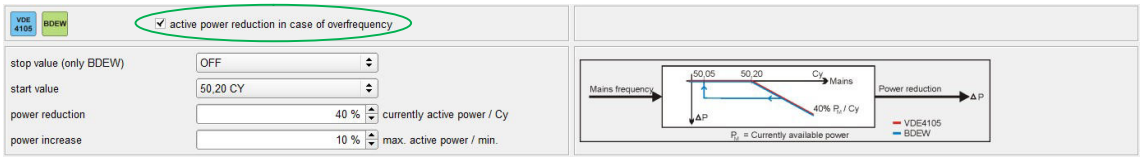
4.10.1 External power reduction



In mains parallel operation the system operator may require an external power reduction. This reduction is done with a setpoint value in steps or continuously. The steps are freely configurable via three digital inputs, or continuously limited via analogue input 10. The set percentage values indicate to which active power the output is reduced. Digital inputs are controlled with a continuous signal or via pulse. If the setpoint values are input via pulses Reset must be assigned to a fourth digital input. The system will be 100% ready for operation with Reset set, resp. no more continuous signal. If the power reduction is done with a continuous signal, always the lowest selected level is set. A -10 to +10VDC signal can be assigned to the analogue input. The input signal is freely configurable. If the preset setpoint value is not reached within five minutes, Alarm 103 will be displayed.

Note: The setpoint set internally on the panel (ANZ2) should be above the highest level if necessary.

4.10.2 Active power reduction in case of overfrequency

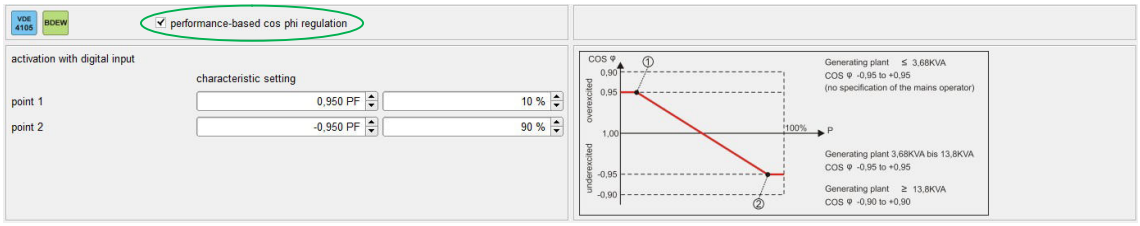


This function has to be enabled. Regarding operation, there are differences between VDE4105 and BDEW.

VDE4105 - In case of a mains frequency exceeding 50.2Cy, in mains parallel operation, the currently generated active power will be „frozen“. If the frequency continues to rise, 40% of this „frozen“ power will be decreased or increased per Hertz. In the frequency range between 50.2 Cy and 51.5 Cy, the active power moves permanently on the curve up and down ("driving on the curve"). If mains frequency falls again below the value of 50.2Cy (stop value setting is “OFF”), and the power setpoint value exceeds the „frozen“ active power, it will be adjusted in 10% steps to the maximum active power per minute. Active power reduction is limited to 0%.

BDEW - In case of a mains frequency exceeding 50.2Cy, in mains parallel operation, the currently generated active power will be „frozen“. If the frequency continues to rise, 40% of this „frozen“ power will be decreased per Hertz. The active power can be increased only when you return to a value of ≤ 50.05 Hz again (stop value setting is “50.05 Cy”). The gradient for the active power increase to the set point is adjustable. Active power reduction is limited to 0%.

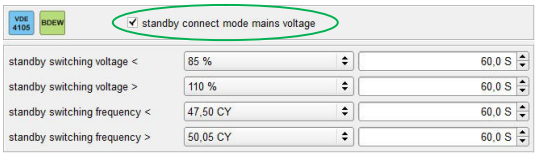
4.10.3 Performance-based Cos φ regulation



This function is activated via digital input.

Depending on the increasing active power the Cos Phi setpoint value changes from the inductive to the capacitive range. There are two configurable points to fix the characteristic curve. The settings of the regulation speed correspond to the settings of the Cos Phi controller.

4.10.4 Standby connect mode mains voltage



This function has to be activated. If this function should not be enabled permanently it is possible to lock it via a digital output parameterized accordingly.

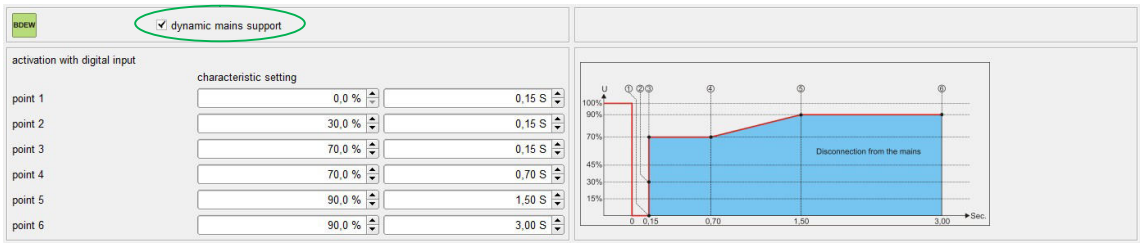
Mains connection is only established if mains voltage and mains frequency are in certain ranges of tolerance. These ranges differ in VDE4105 and BDEW.

VDE4105 – A connection or reconnection is allowed only if the mains voltage has to be between 85% and 110% of the rated voltage and the frequency between 47,5Hz and 50,05Hz. The mains voltage must be located over a period of at least 60 seconds within these tolerances.

BDEW – A connection or reconnection is allowed only if the mains voltage is at least 95% of the rated voltage and the frequency between 47,5Hz and 50,05Hz.

Additionally connection release can be output via a digital output. The contact can be used as NC or NO. If the ranges for voltage and/or frequency are left for up to three seconds, another connection is possible even if the tolerance ranges are kept for only five seconds without interruption. As long as standby connect mode has not been released the LED „Mains voltage available“ is flashing.

4.10.5 Dynamic mains support



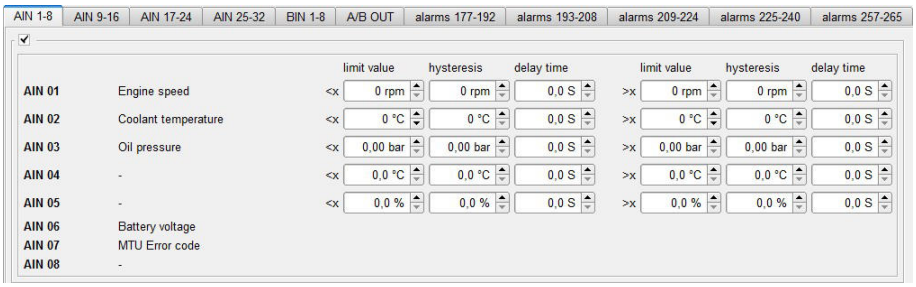
This function is enabled via a digital input parameterized accordingly.

The dynamic mains support has been designed for voltage continuity in case of mains voltage dips. For a certain period after mains breakdown it is made sure that connection to mains is not cut. Connection to mains will be cut if the voltage has not increased to the set value within the set time. The voltage time curve has to be set with six points. Alarm 61 and 62 are for the control of the characteristic setting.

4.11 CAN BUS

The CAN BUS interface is available as standard in the KSS. The connectors are located on the ANZ2. To unlock settings for the CAN BUS, the coupling must be activated under "HOME".

According to the ECU in use there are various analogue and digital signals for each motor, coming from or being sent to the motor. When changing the motor type selection, these values are automatically switched over and displayed on ANZ2. Error messages coming from the motor are displayed on the ANZ2 and processed according to the error message coding.

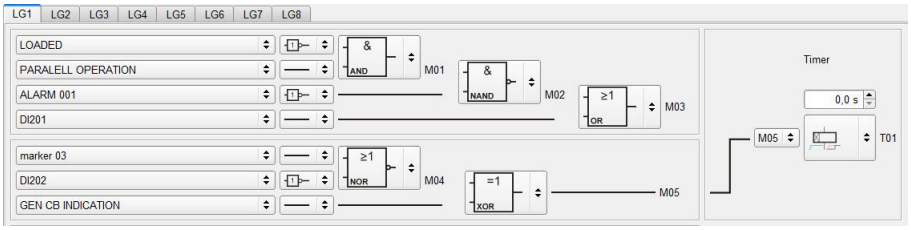


There are two adjustable limit values for the first five analog values, if available on the selected ECU.

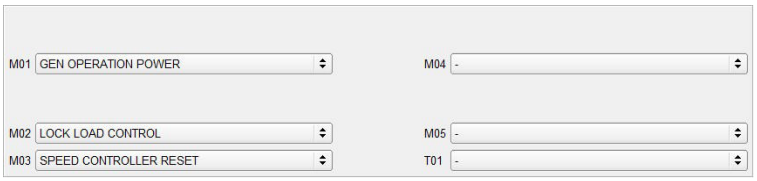
4.12 Logic

For the integration of logic functions in the control of the KAS are 40 logic blocks and 8 Timer blocks available. Each logic block can be assigned with functions according to the available list (NAND, OR, ...). For the timers 3 functions are available. Each input can be linked with a function from the selection list. In addition, each function that has been switched to a logic module can be negated. The outputs of the logic blocks can be assigned to digital outputs or linked to other logic blocks.

The logic blocks are divided into 8 groups of logic.



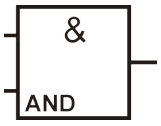
The markers of the logic functions can be linked to the internal functions can that also be controlled via the digital inputs. Inputs and markers with the same function are be "OR" linked.



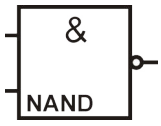
4.12.1 Logic blocks

The following functions for the logic blocks are available.

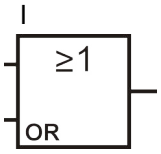
Via this icon the inputs can be negated.



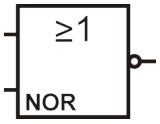
In1	In2	Out
0	0	0
0	1	0
1	0	0
1	1	1



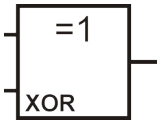
In1	In2	Out
0	0	1
0	1	1
1	0	1
1	1	0



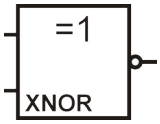
In1	In2	Out
0	0	0
0	1	1
1	0	1
1	1	1



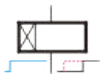
In1	In2	Out
0	0	1
0	1	0
1	0	0
1	1	0



In1	In2	Out
0	0	0
0	1	1
1	0	1
1	1	0



In1	In2	Out
0	0	1
0	1	0
1	0	0
1	1	1

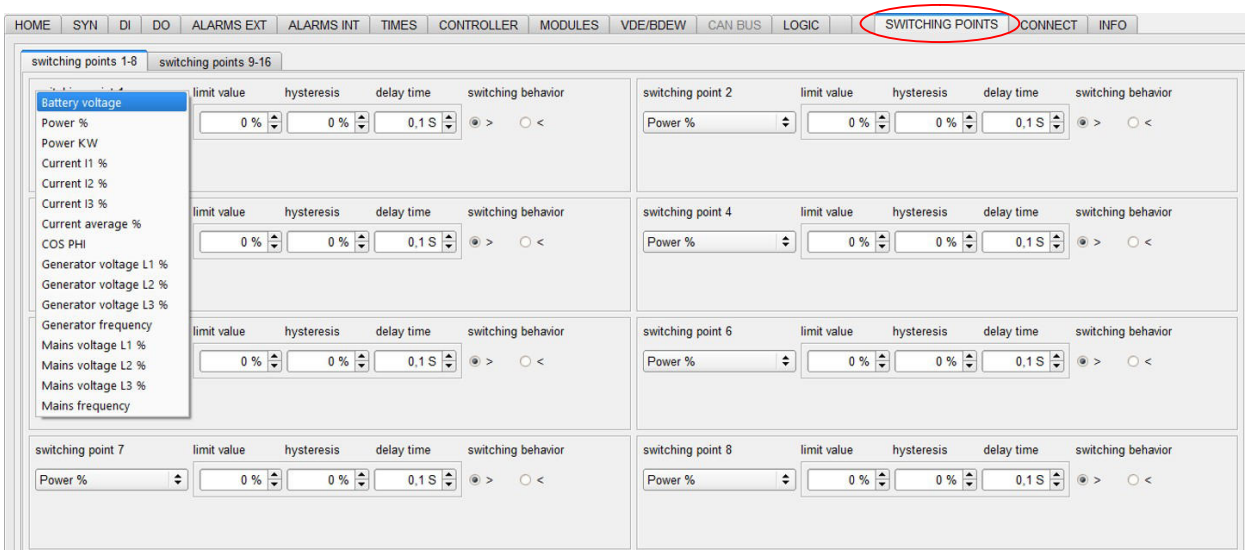


Timer on-delayed

Timer off-delayed

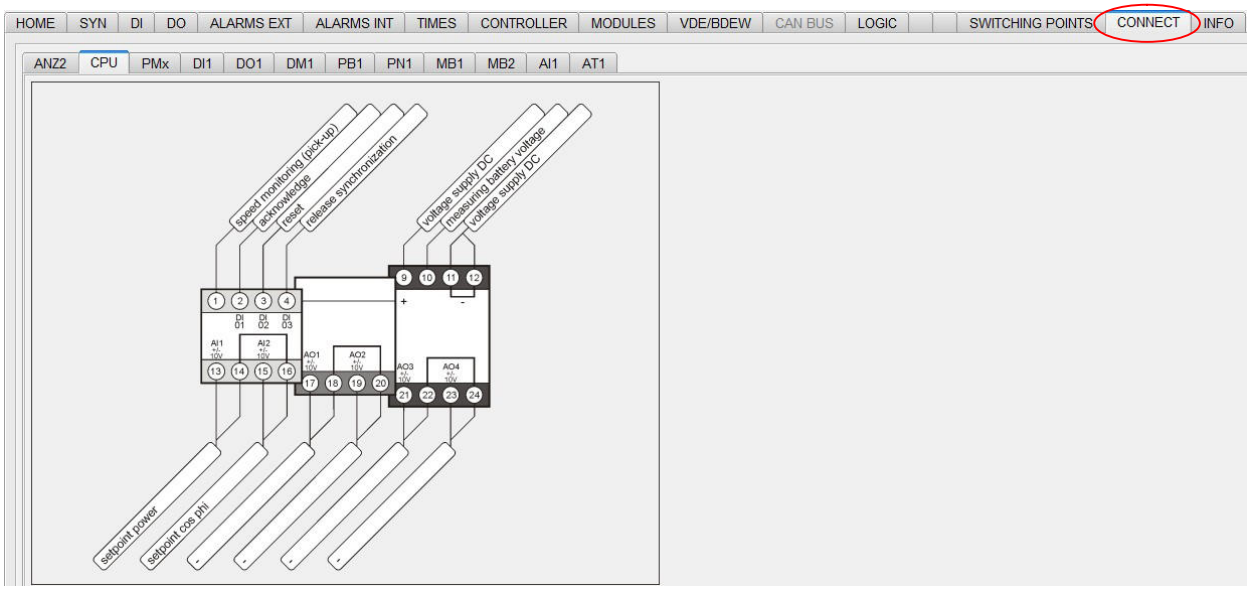
Timer Impulse

4.13 Switching points



A total of 16 switching points are available. With each, a selected electrical variable can be monitored for falling below or exceeding a set limit value. Each switching point can be assigned to a digital output and / or processed in logic functions.

4.14 Connect



Connection diagram for all available modules.

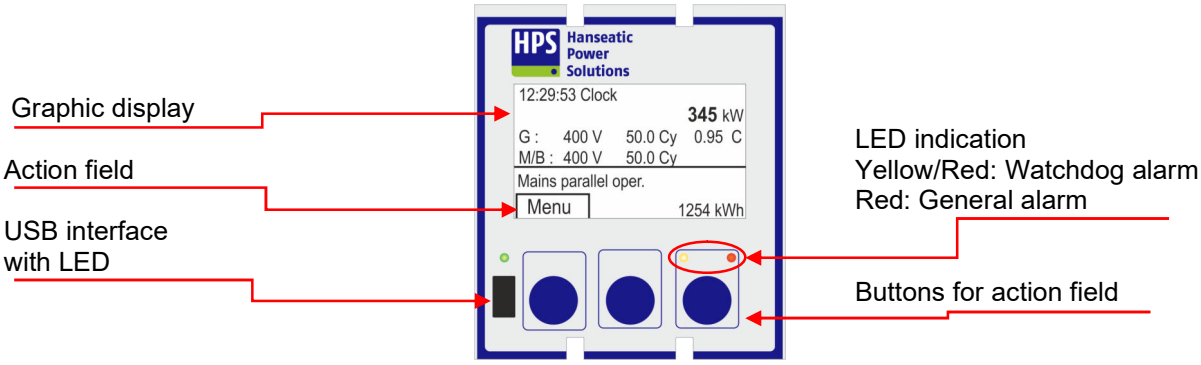
4.15 Info

There is an information window for free text input available. Input texts can be displayed via panel ANZ2 menu item „Info“.

5 ANZ2 operation

An overview of all available functions and displays is shown under the following points. The KSS protection device is operated directly using the ANZ2 display and control unit. For the parameterization of the device, which can also be done at the ANZ2, the use of the parameterization software 'Geräteverwaltung 2' is recommended.

5.1 Overview



5.2 Action fields

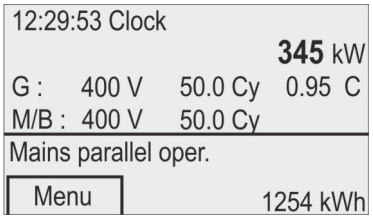
Menu	Selection of the menu level
↓	1. Scrolling through menus. 2. When entering numbers, the value will decrease.
↑	1. Scrolling through menus. 2. When entering numbers, the value will increase.
↵	1. Selection of a menu. 2. Open the input field. 3. Closing the input field with saving.
ESC	1. Go back one menu level (short press). 2. Back to the start screen (long press). 3. Closing the input field without saving.
Quitt	Acknowledging of fault messages. LED changes to steady light.
Reset	Fault messages that are no longer active are removed from the display with the "Reset button". Active fault messages are set again and must be acknowledged again.
AbsRel	Switching the measured values in the measurement menu from absolute to relative.

6 ANZ2 functions

The display and control unit ANZ2 has a graphic display that provides the user a quick overview of the device status and makes a user-friendly operation on the device possible.

The buttons below the display are used to control the display content and to navigate when entering parameters. The function assigned to the respective key is displayed in the action field above the key.

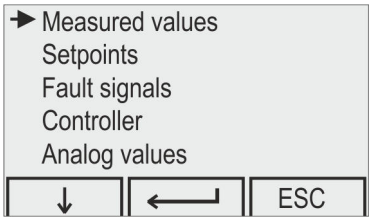
After switching on the protection device and the following initialisation the start screen will be displayed on the ANZ2. With the ESC key it is always possible to return to this start screen.

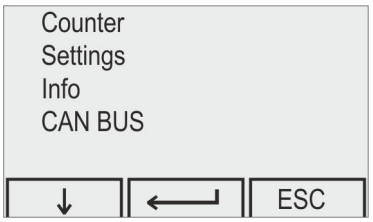


Start screen
Overview of the most important measured values.

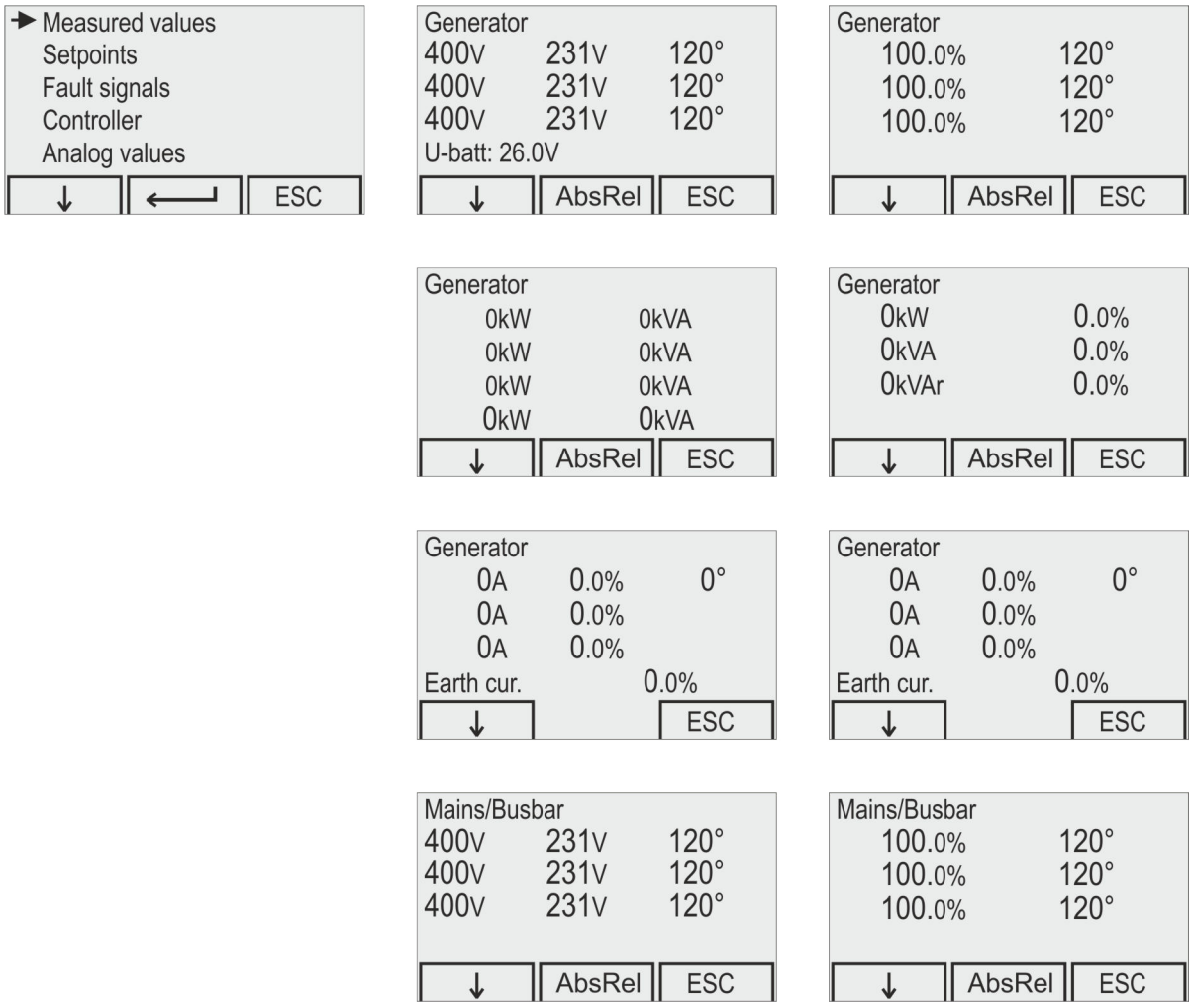
6.1 Menu selection

Menu selection is opened by the „Menu“ key. You can jump to the individual menu items with the arrow key. With the ↵ key the menu item will open. The same procedure is used for submenus. The ESC key switches back one level.



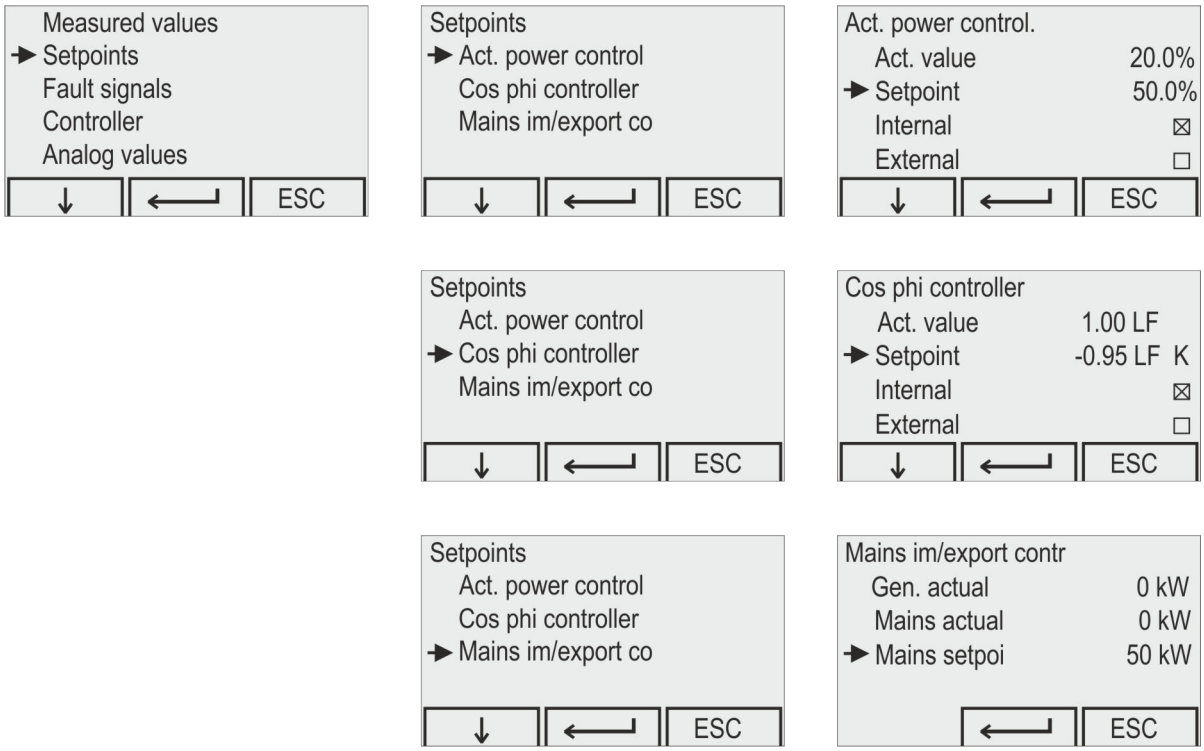


6.2 Measured values



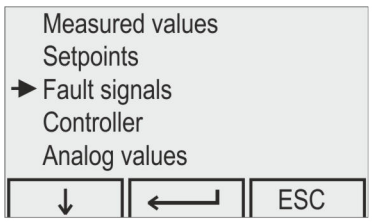
Four views are available. Scrolling through the measured values is done with the arrow keys. For each screen switching between absolute and relative values is possible.

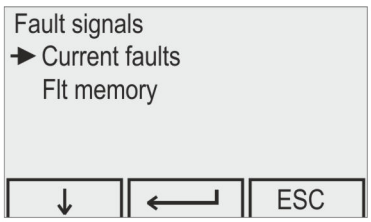
6.3 Setpoints

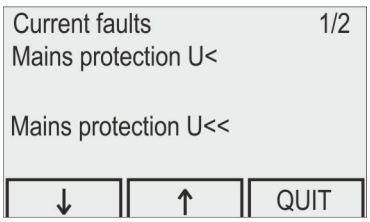


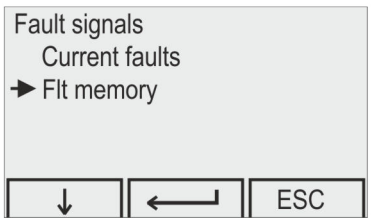
Setpoints can be set for three different regulators. For the setpoint specification selection is possible between the setpoint adjusted at the panel (internal) or the analog value (external). When not activated via parameterization the menus for these regulators are hidden and cannot be selected.

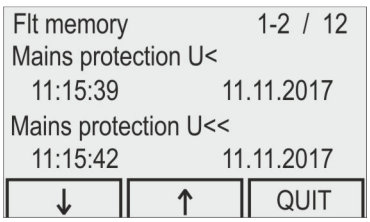
6.4 Fault signals





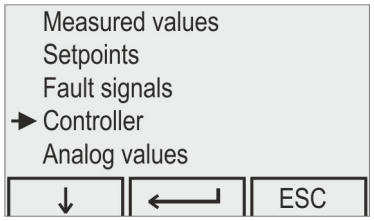




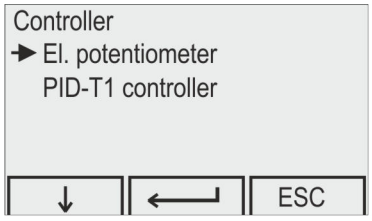


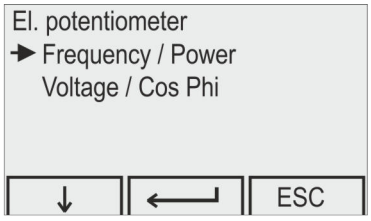
The submenus of this menu item display all currently pending alarm messages, as well as the contents of the alarm message memory. Two messages can be visualised at the same time. If there are more alarm messages available this list can be scrolled with the arrow keys. For a better overview in case of longer lists the upper status line shows the number of pending messages as well as the page where you currently are.

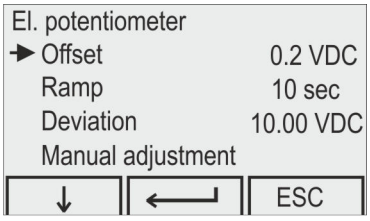
6.5 Controller

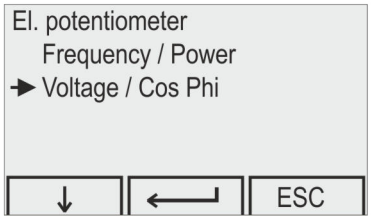


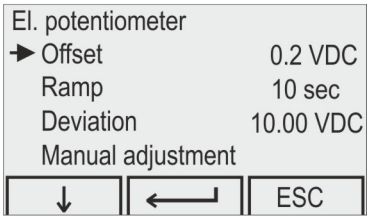
6.5.1 Electr. potentiometer











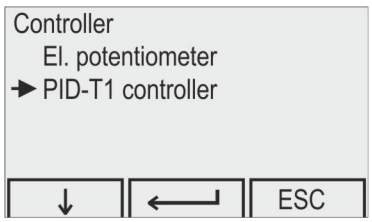
Two electronic potentiometers are available. The potentiometers have to be assigned to an analog output to be able to do adjustments via panel. The internal signals of the pulse controller influence the adjustment of the electr. potentiometers. Setting of the adjustment range of the electr. potentiometer is solely done via ANZ2. However the values can be read and displayed with the configuration software Geräteverwaltung 2 (GV2).

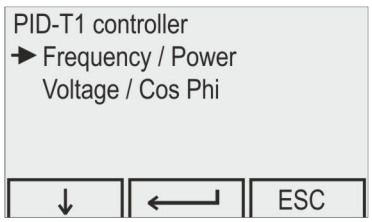
Offset	:	Basic voltage value at analogue output, the output will be reset to this value when the speed governor is reset (DI: Speed controller reset).
Ramp	:	Setting of the delay for voltage variation at analogue output;
Deviation	:	Input of adjustment range (+/-) with reference to the Offset value.

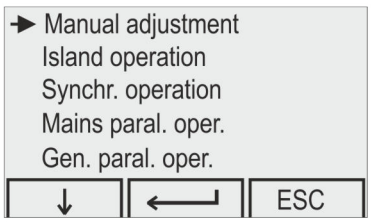
For test purposes manual adjustment can be activated. If manual adjustment is active the output can be set manually with the arrow keys.

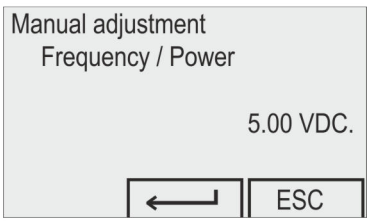
Attention: During manual adjustment the automatic control is disabled, regulation has to be done by the operator at the ANZ2. After leaving manual adjustment with the „ESC“ key the automatic adjustment is enabled again.

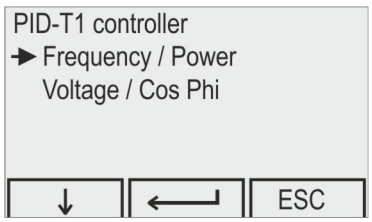
6.5.2 PID-T1

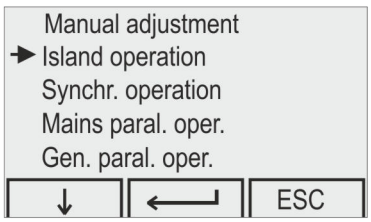


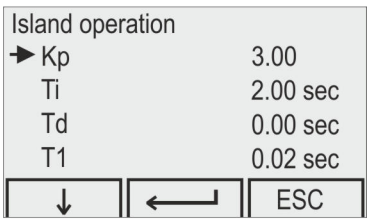


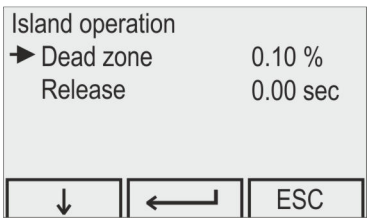












The two available PID-T1 controllers have to be assigned to an analog output. Setting of the adjustment range is solely done via the parameter software.

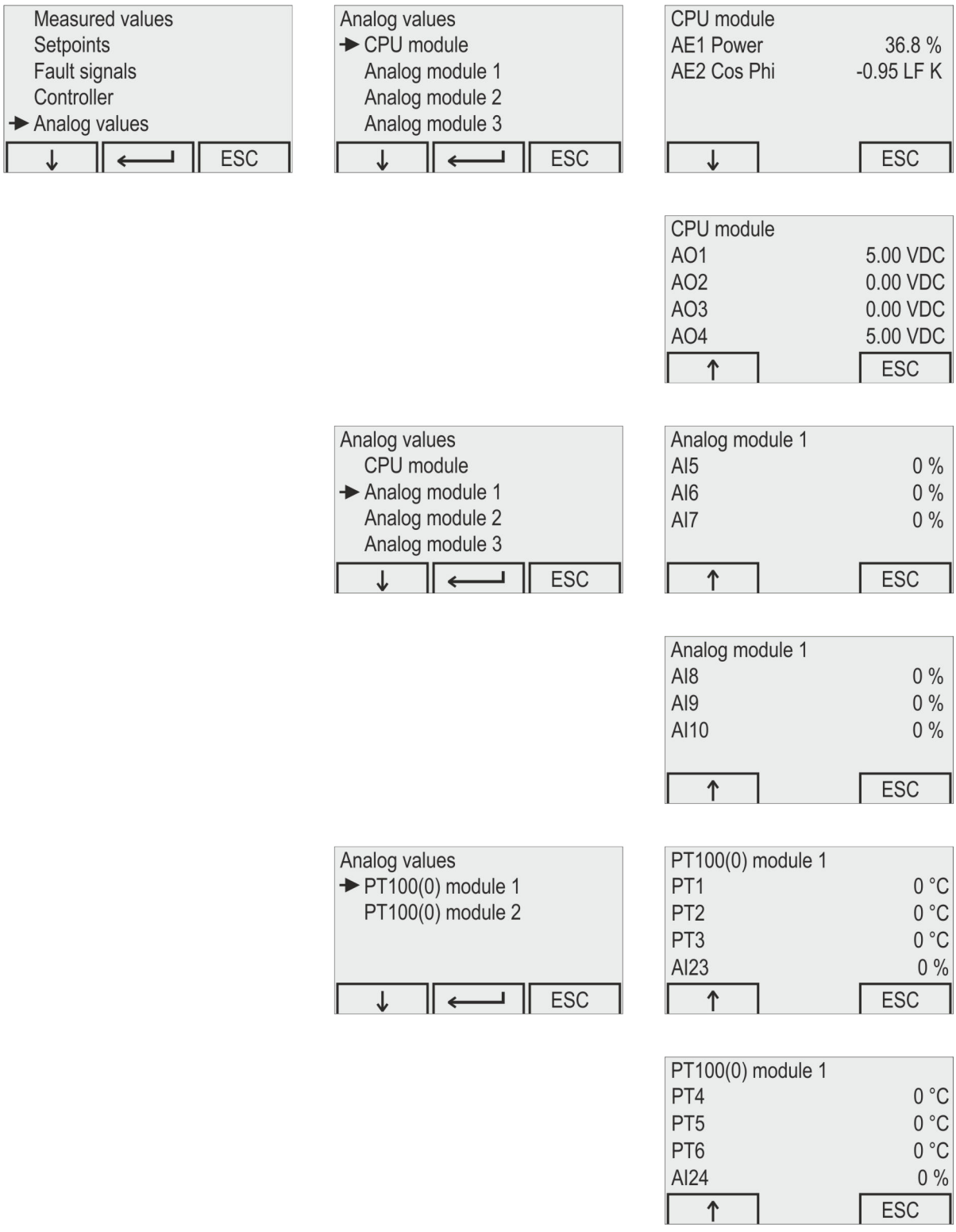
The controller parameters can be transmitted via the software parameters in the ANZ2, also a change of values during operation on the display is possible. There are four different operating modes for the separate controller parameters can be entered. The active mode is displayed in the menu selection for the PID-T1 controller underlined.

For test purposes manual adjustment can be activated. If manual adjustment is active the output can be set manually with the Plus / Minus keys.

Attention: During manual adjustment the automatic control is disabled, regulation has to be done by the operator at the ANZ2. After leaving manual adjustment with the „ESC“ key the automatic adjustment is enabled again.

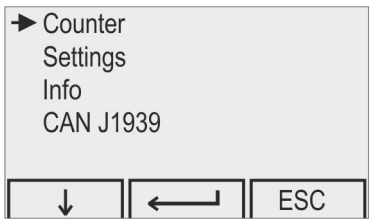
If the input "Lock setpoint control U / F" is set, the automatic control of the island and synchronization mode is disabled. The corresponding controller output can about the input functions "speed down", "speed up", "voltage down" and "voltage up" be changed.

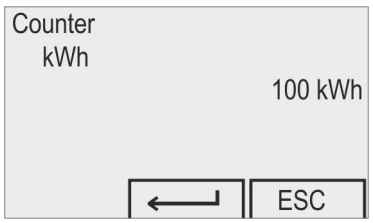
6.6 Analog values



The analog values of the CPU module are always available. The selection of analog input modules and the PT100(0) modules is only visible with the module activated. The windows show the measured values with the selected unit.

6.7 Counter



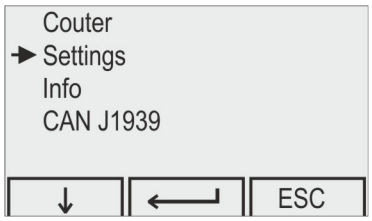


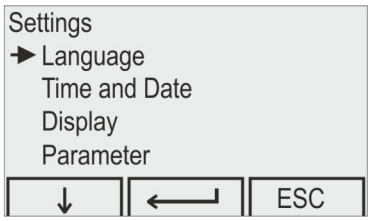
All counter values are also displayed on the start screen.

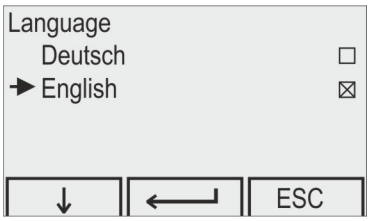
All values are saved in case of a power failure. For value reset/setting a PIN has to be entered.

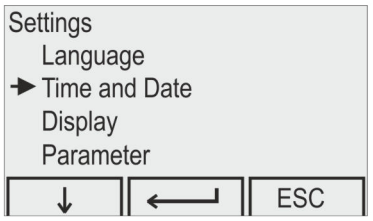
The maximum value that can be displayed is 999,999,999 kWh. The counter increments are dependent on the configured value set via configuration software under „HOME→operating data→KWH per pulse“.

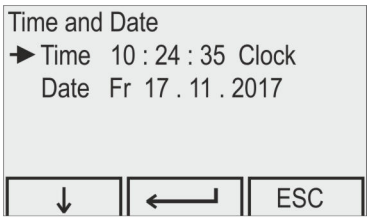
6.8 Settings

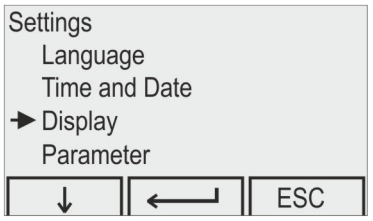


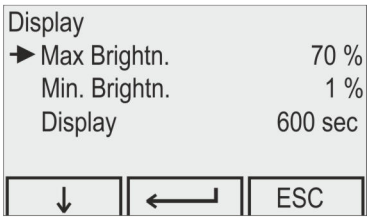


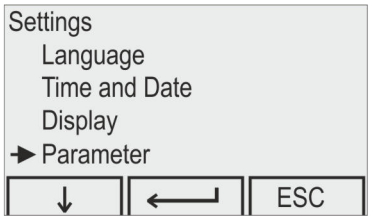


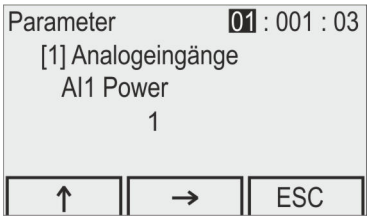












6.8.1 Language

Language selections for the displayed texts. Default languages are German and English.

6.8.2 Time and date

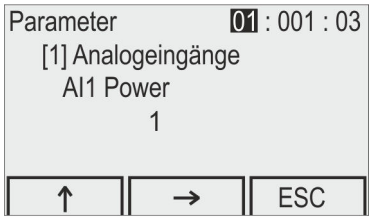
Setting of time and date in order to enable correct chronological recording of all locked entries in the fault message memory. If a data base is loaded to the SOP2 synchronization with PC date and time will be possible.

After a power failure, the date and time are saved for approx. 72 hours. The buffering takes place via a gold-cap capacitor as it is maintenance-free.

6.8.3 Display

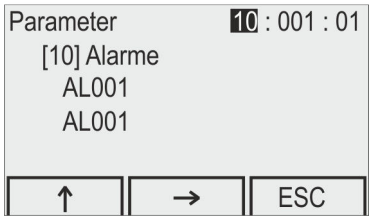
Settings for brightness and display time (min. 10 sec.), to dim or switch off the display when inactive. The display is reactivated via a keystroke or it as reactivated with incoming messages.

6.8.4 Parameter input



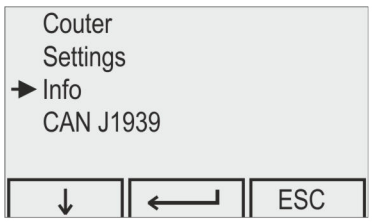
If there is no PC available all parameters can also be adjusted directly at the ANZ2. The input is protected by a PIN.

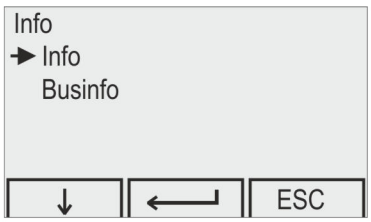
Acc. to the parameter list the 3-digit parameter number has to be input (xx:xxx:xx), to be able to modify the parameter.

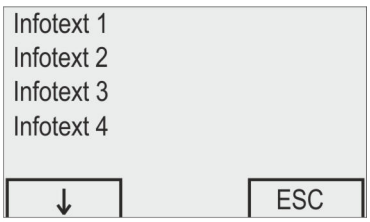


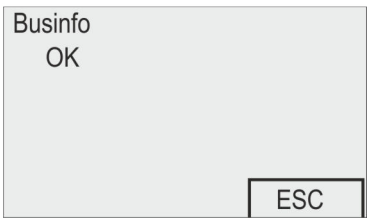
In parameters 10:xxx:01 and 10:xxx:02 the alarm texts for both languages can be edited.

6.9 Info





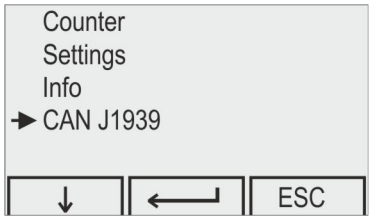


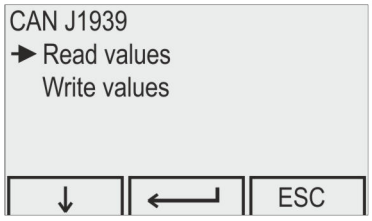


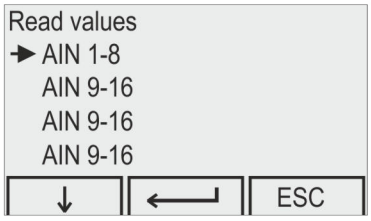
An information windows is available. All texts input via the device management „Info“ tab will be displayed.

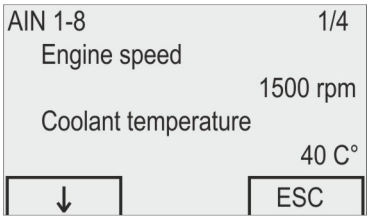
The modules set in the project will be monitored via menu item Businfo. If all modules are working without error the text message displays „OK“. If one of the modules doesn’t work anymore the name of this module will be visualized.

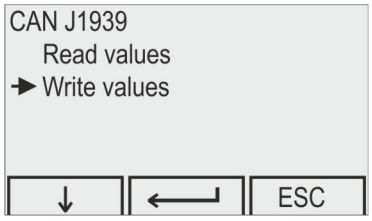
6.10 CAN J1939

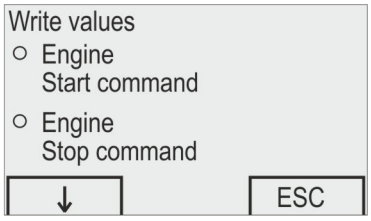












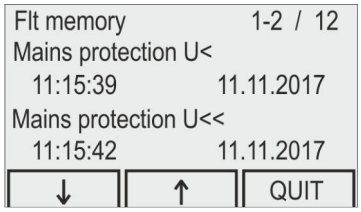
The menu item CAN J1939 is only visible and can be selected when the CAN BUS coupling has been activated.

Various images will be selected on which the values provided by the ECU can be displayed.

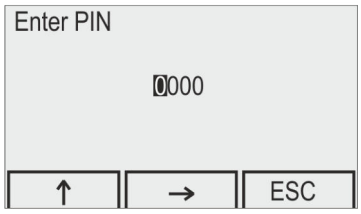
7 PIN protections

Several panel input modes are protected with a PIN number.
Modification of this PIN is only possible via panel.

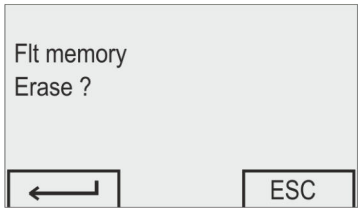
7.1 PIN Fault memory



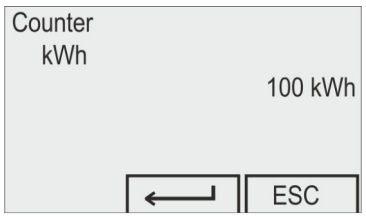
PIN number 1919
In order to delete the error message memory, both arrow keys must be pressed at the same time.



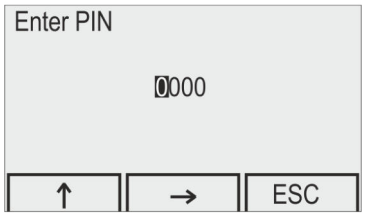
After entering and confirming the PIN number 1919, all stored fault messages are deleted immediately.



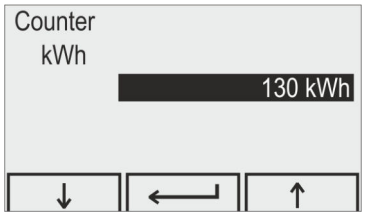
7.2 PIN Counter



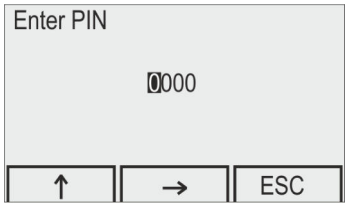
The KWH counter can be set to edit mode by pressing the Enter key.



After entering the PIN, the KWH counter can be changed with the arrow keys. Exiting the input with the Enter key.



7.3 PIN Edit mode

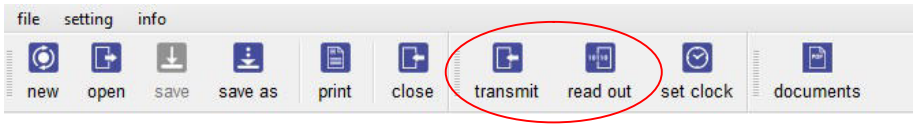


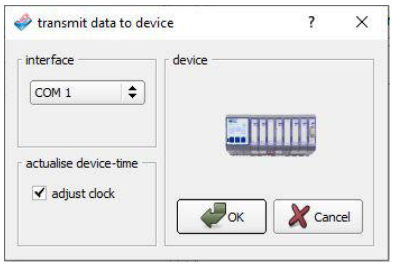
PIN number 9000
Settings for controllers or parameters can be activated by entering a PIN number.

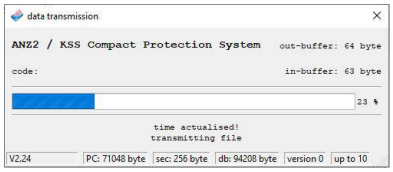
8 KSS configuration

In order to meet each possible application the respective parameterization is required. Before commissioning the nominal values have to be set, i.e. rated voltage, rated current and rated power, as well as the trip values for the alarm and protection settings. All settings are stored in a flash memory, and are also kept in case of power failure.

8.1 PC Konfiguration







For data transmission to the KSS the generator voltage must not be present.

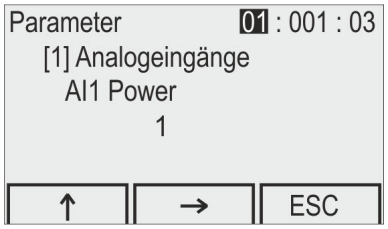
The PC has to be connected to the KSS via a USB cable (USB-A: USB-Mini-B 5-pin).

Transmission mode will be opened with the button „transmit“. After interface selection transmission will be started with the „OK“ button. During transmission the PC and the panel will show a progress bar.

After transmission the panel will do a reset and will then be in normal operating mode.

Panel project read out is done the same way.

8.2 Tableau configuration



To edit the parameters, the Parameters menu must be opened under Settings. To edit on ANZ2 using the arrow keys, first select the position of the value to be changed in the top line of the dialog shown.
Press the arrow keys again to select the value to be changed. The individual items are selected with the Enter and arrow keys and can be changed. The parameter input is exited with the "ESC" key. With the help of the parameter list it is possible to change all parameters on the panel.

8.2.1 Parameter list

[1] Analog inputs

	Description	:03	:04	:05	:06	:07	:08	:09
01:001:__	AI01 Power controller	1	0	1000	0	1000	0	0
01:002:__	AI02 Cos Phi controller	2	-50	50	0	1000	0	0
01:003:__	AI03 Mains im/export controller	3	0	100	0	1000	0	0
01:004:__	-	-	-	-	-	-	-	-
01:005:__	AI05 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:006:__	AI06 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:007:__	AI07 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:008:__	AI08 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:009:__	AI09 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:010:__	AI10 – AI1 Module (ADR0)	0	0	100	0	1000	0	83
01:011:__	AI11 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:012:__	AI12 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:013:__	AI13 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:014:__	AI14 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:015:__	AI15 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:016:__	AI16 – AI2 Module (ADR1)	0	0	100	0	1000	0	83
01:017:__	AI17 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:018:__	AI18 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:019:__	AI19 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:020:__	AI20 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:021:__	AI21 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:022:__	AI22 – AI3 Module (ADR2)	0	0	100	0	1000	0	83
01:023:__	PT1 – AT1 Module (ADR0)	0	0	100			0	88
01:024:__	PT2 – AT1 Module (ADR0)	0	0	100			0	88
01:025:__	PT3 – AT1 Module (ADR0)	0	0	100			0	88
01:026:__	PT4 – AT1 Module (ADR0)	0	0	100			0	88
01:027:__	PT5 – AT1 Module (ADR0)	0	0	100			0	88
01:028:__	PT6 – AT1 Module (ADR0)	0	0	100			0	88
01:029:__	AE23 – AT1 Module (ADR0)	0	0	100	0	1000	0	83
01:030:__	AE24 – AT1 Module (ADR0)	0	0	100	0	1000	0	83
01:031:__	PT7 – AT1 Module (ADR1)	0	0	100			0	88
01:032:__	PT8 – AT1 Module (ADR1)	0	0	100			0	88
01:033:__	PT9 – AT1 Module (ADR1)	0	0	100			0	88
01:034:__	PT10 – AT1 Module (ADR1)	0	0	100			0	88
01:035:__	PT11 – AT1 Module (ADR1)	0	0	100			0	88
01:036:__	PT12 – AT1 Module (ADR1)	0	0	100			0	88
01:037:__	AE25 – AT1 Module (ADR1)	0	0	100	0	1000	0	83
01:038:__	AE26 – AT1 Module (ADR1)	0	0	100	0	1000	0	83
01:039:__	-	0	0	0	0	0	0	0
01:040:__	-	0	0	0	0	0	0	0
01:041:__	-	0	0	0	0	0	0	0
01:042:__	-	0	0	0	0	0	0	0
01:043:__	-	0	0	0	0	0	0	0
01:044:__	-	0	0	0	0	0	0	0
01:045:__	-	0	0	0	0	0	0	0
01:046:__	-	0	0	0	0	0	0	0
01:047:__	Switching point 1	5	0	0	1	0	255	0
01:048:__	Switching point 2	5	0	0	1	0	255	0
01:049:__	Switching point 3	5	0	0	1	0	255	0
01:050:__	Switching point 4	5	0	0	1	0	255	0
01:051:__	Switching point 5	5	0	0	1	0	255	0
01:052:__	Switching point 6	5	0	0	1	0	255	0
01:053:__	Switching point 7	5	0	0	1	0	255	0
01:054:__	Switching point 8	5	0	0	1	0	255	0
01:055:__	Switching point 9	5	0	0	1	0	255	0
01:056:__	Switching point 10	5	0	0	1	0	255	0
01:057:__	Switching point 11	5	0	0	1	0	255	0
01:058:__	Switching point 12	5	0	0	1	0	255	0
01:059:__	Switching point 13	5	0	0	1	0	255	0
01:060:__	Switching point 14	5	0	0	1	0	255	0
01:061:__	Switching point 15	5	0	0	1	0	255	0
01:062:__	Switching point 16	5	0	0	1	0	255	0

	Do not modify input fields

:03	Function no.	Only for switching points: [5] Power % [6] Power kW [7] COS PHI [14] Generator frequency [15] Mains frequency
:04	Scaling of ANZ2 display	Start value Limit value (switching points)
:05	Scaling of ANZ2 display	Final value Hysteresis (switching points)
:06	Scaling of input signal	Start value Delay time (switching points)
:07	Scaling of input signal	Final value
:08	Selection of input signal	Analog inputs : VDC [0] / mA [1] PT100(0) : PT100 [0] / PT1000 [1] Switching behavior (Switching points) = > [255] / < [0]
:09	Selection of unit to be displayed	See parameterization KSS

[2] Analog outputs

	Description	:03	:04	:05	:06	:07	:08	
02:001:__	Analog output 1	9	0	1000	0	1000	0	
02:002:__	Analog output 2	6	0	1000	0	1000	0	
02:003:__	Analog output 3	0	0	1000	0	1000	0	
02:004:__	Analog output 4	7	-50	50	0	1000	0	
02:005:__	Analog output 5	0	0	1000	0	1000	0	
02:006:__	Analog output 6	0	0	1000	0	1000	0	

	Do not modify input fields

:03	Function no.	[0] without function [3] Electr. Poti 1 – frequency/power [4] Electr. Poti 2 – voltage/Cos Phi [5] power in % [6] power in KW [7] Cos Phi [8] PID-T1 – voltage/Cos Phi [9] PID-T1 – frequency/power
:04	Scaling of SOP display	Start value
:05	Scaling of SOP display	Final value
:06	Scaling of input signal	Start value
:07	Scaling of input signal	Final value
:08	Without function	

[3] Digital inputs

	Description	:03		
03:001:__	DI001	34	CPU-Module	Acknowledge
03:002:__	DI002	33	CPU-Module	Reset
03:003:__	DI003	72	CPU-Module	Release synchronization
03:004:__	DI101	76	DI1-Module (ADR0)	Load
03:005:__	DI102	53	DI1-Module (ADR0)	Speed down
03:006:__	DI103	52	DI1-Module (ADR0)	Speed up
03:007:__	DI104	71	DI1-Module (ADR0)	Speed controller reset
03:008:__	DI105	82	DI1-Module (ADR0)	Release mains U/f </<<
03:009:__	DI106	83	DI1-Module (ADR0)	Release generator U/f </<<
03:010:__ to 03:014:__	DI107 to DI111	0	DI1-Module (ADR0)	Free programmable
03:015:__	DI112	47	DI1-Module (ADR0)	Lock setpoint control U/f
03:016:__	DI113	49	DI1-Module (ADR0)	Lock load control
03:017:__	DI114	70	DI1-Module (ADR0)	Lock Cos Phi control
03:018:__	DI115	75	DI1-Module (ADR0)	Lock current protection
03:019:__	DI116	77	DI1-Module (ADR0)	Lock differential protection
03:020:__	DI117	79	DI1-Module (ADR0)	Lock mains protection
03:021:__	DI118	81	DI1-Module (ADR0)	Lock all tripping
03:022:__	DI119	0	DI1-Module (ADR0)	Free programmable
03:023:__	DI120	60	DI1-Module (ADR0)	Gen. operation power
03:024:__	DI121	73	DI1-Module (ADR0)	Mains C.B. indication
03:025:__	DI122	74	DI1-Module (ADR0)	Gen. C.B. indication

03:026:__ to 03:047:__	DI201 to DI222	0	DI1-Module (ADR1)	Free programmable
03:048:__ to 03:069:__	DI301 to DI322	0	DI1-Module (ADR2)	Free programmable
03:070:__	DI401	84	-	-
03:071:__	DI402	0	-	-
03:072:__	DI501	0	PM2-Module	Free programmable
03:073:__	DI502	0	PM2-Module	Free programmable
03:074:__	DI503	0	PM2-Module	Free programmable

	Do not modify input fields

:03	Selection of input functions acc. to function no.	see Item 4.3

[4] Digital outputs

	Description	:03		
04:001:__	DO001	168	PM2-Module	Mains / Busbar fault
04:002:__	DO002	169	PM2-Module	Generator voltage available
04:003:__	DO003	81	PM2-Module	Mains protection collective fault
04:004:__	DO004	171	PM2-Module	Syn-pulse
04:005:__	DO005	81	PM2-Module	Mains protection MCB - NO
04:006:__	DO006	81	PM2-Module	Mains protection GCB - NC
04:007:__	DO007	135	PM2-Module	Collective fault NC
04:008:__	DO008	184	PM2-Module	Watchdog (NC)
04:009:__	DO011	113	DM1-Module	Diff current >
04:010:__	DO012	114	DM1-Module	Diff current >>
04:011:__ bis 04:015:__	-	0	-	-
04:016:__	DO031	0	PB1-Module	Free programmable
04:017:__	DO032	0	PB1-Module	Free programmable
04:018:__	DO033	0	Communication module	Free programmable
04:019:__	-	0	-	-
04:020:__	DO101	173	DO1-Module (ADR0)	Standby switching
04:021:__	DO102	166	DO1-Module (ADR0)	Loaded
04:022:__	DO103	97	DO1-Module (ADR0)	AL097 Overcurrent >
04:023:__	DO104	136	DO1-Module (ADR0)	Fault group 1 (NO)
04:024:__	DO105	137	DO1-Module (ADR0)	Fault group 2 (NO)
04:025:__	DO106	138	DO1-Module (ADR0)	Fault group 3 (NO)
04:026:__	DO107	139	DO1-Module (ADR0)	Fault group 4 (NO)
04:027:__	DO108	158	DO1-Module (ADR0)	Speed down
04:028:__	DO109	157	DO1-Module (ADR0)	Speed up
04:029:__	DO110	162	DO1-Module (ADR0)	Voltage down
04:030:__	DO111	161	DO1-Module (ADR0)	Voltage up
04:031:__ to 04:041:__	DO201 to DO211	0	DO2-Module (ADR1)	Free programmable
04:042:__ to 04:052:__	DO301 to DO311	0	DO3-Module (ADR2)	Free programmable
04:053:__ to 04:063:__	DO401 to DO411	0	DO4-Module (ADR3)	Free programmable

	Do not modify input fields

:03	Selection of output functions acc. to function no.	see Item 4.4

[5] Transducer

	Description	:03	:04			to:03	to:04	
05:001:__	Voltage transducer mains	400	400			V	V	
05:002:__	Voltage transducer generator	400	400			V	V	
05:003:__	CT ratio	500	5			A	A	
05:004:__	CT ratio differential	500	5			A	A	
05:005:__	CT ratio earth current	500	5			A	A	

__:___:03	Transducer primary
__:___:04	Transducer secondary

[6] Configuration

	Description	:03	:04	zu:03	zu:04
06:003:__	Device identity	4	1		
06:004:__	Language	1	0	Tableau language – [1] A-B / [2] B-A	
06:005:__	Pulse factor	144	0	Pulse per turn	
06:006:__	Nominal voltage	400	0	in V	
06:007:__	Nominal current	500	0	in A	
06:008:__	Nominal power	345	80	in KW	Cos Phi
06:009:__	Nominal frequency	0	0	[0]=50Hz / [1]=60Hz	
06:010:__	Mains form	0	255	[0]=4-wire / [1]=3-wire	
06:011:__	PID parameter overwrite	0	0		
06:012:__	Color header/footer	0	0	0=blue 1=black	
06:013:__	VDE/BDEW pictures fade in	0	0		
06:014:__	Mains control active	0	1	[255]=Yes / [0]=No	
06:015:__	Synchronizing active	255	0	[255]=Yes / [0]=No	
06:016:__	Diff protection active	0	0	[255]=Yes / [0]=No	
06:018:__	Device identity	0	0		
06:019:__	Mains view	255	0	[255]=Yes / [0]=No	
06:020:__	DE / EN	0	0		
06:021:__	PIN Mains protection testing	xxxx	0		
06:022:__	PIN Counter reset	xxxx	0		
06:023:__	PIN Edit	xxxx	0		
06:024:__	AI/AT Modules	0	0		see 06:024:04
06:025:__	DI/DO Modules	255	0		see 06:025:04
06:026:__	Profibus module 1	0	3	[255]=Yes / [0]=No	see 06:026:04
06:027:__	Profibus module 2	0	0		
06:028:__	Profinet module 1	0	0	[255]=Yes / [0]=No	
06:029:__	Profinet module 2	0	0		
06:030:__	Type of plant	3	0		
06:031:__	CAN active	0	1	[255]=Yes / [0]=No	
06:032:__	CAN Baudrate [kBaud]	250	0		
06:033:__	CAN adress KOP	234	0		
06:034:__	CAN adress engine	0	0		
06:035:__	Type of engine	1	0		
06:036:__	CAN DROOP activate	255	0	[255]=Yes / [0]=No	
06:037:__	CAN Engine protection override	255	0	[255]=Yes / [0]=No	
06:038:__	Summer / Wintertime	0	0	[255]=Yes / [0]=No	
06:039:__	Time SYN with DI	0200	0	SYN time	[255]=Yes / [0]=No
06:042:__	Display brightness	70	1		
06:043:__	Screen saver	600	0		

	Do not modify input fields

06:024:04	Activate AI1 and AT1 modules	AI1 – Module 1 = 1 AI1 – Module 1 = 2 AI1 – Module 1 = 4	AT1 – Module 1 = 8 AT1 – Module 2 = 16
06:025:04	Activate DI1 and DO1 modules	DI1 – Module 1 = always active DI1 – Module 2 = 1 DO1 – Module 1 = always active DO1 – Module 2 = 4 DO1 – Module 3 = 8 DO1 – Module 4 = 16	
06:026:04	Address Profibus module	3 to 32	

[7] Options

	Description	:03				to:03		
07:001:__	Operation solenoid	255				[255]=Yes / [0]=No		
07:002:__	Speed monitoring	0				[255]=Yes / [0]=No		
07:003:__	Special synchronizing function	0				[255]=Yes / [0]=No		
07:004:__	Ext CB control	0				[255]=Yes / [0]=No		
07:005:__	Power reduction F>	0				[255]=Yes / [0]=No		
07:006:__	Standby switching mains voltage	0				[255]=Yes / [0]=No		
07:007:__	Isochron	255				[255]=Yes / [0]=No		
07:008:__	DI: First clothing / Pilot	0				[255]=Yes / [0]=No		
07:009:__	Cos phi controller	0				[255]=Yes / [0]=No		
07:010:__	Mains parallel possible	255				[255]=Yes / [0]=No		
07:011:__	Start speed max	0				[255]=Yes / [0]=No		
07:012:__	Only ext. load control	0				[255]=Yes / [0]=No		
07:013:__	Communication AS511	0				[255]=Yes / [0]=No		
07:014:__	Mains im-/export controller	0				[255]=Yes / [0]=No		
07:015:__	Monitoring mains quality	0				[255]=Yes / [0]=No		
07:016:__	Speed synchronization	0				[255]=Yes / [0]=No		
07:017:__	LAAZA	0				[255]=Ja / [0]=Nein		
07:018:__ to 07:136:__	BUS settings for Modbus	xxx						

	Do not modify input fields

[8] Operating data

	Description	:03	:04	:05		to:03	to:04	
08:001:__	Ignition speed	400	40	0		rpm	rpm	
08:002:__	CAN BUS Nominal speed	1500	50	0		rpm	rpm	
08:003:__	CAN BUS idle speed	500	10	0		rpm	rpm	
08:004:__	CAN BUS maximum speed	2000	10	0		rpm	rpm	
08:005:__	Gen. nominal voltage	80	40	0		%	%	
08:006:__	Gen. nominal frequency	480	20	0		1/10Hz	1/10Hz	
08:007:__	Mains nominal voltage	90	2	0		%	%	
08:008:__	Mains nominal frequency	480	20	0		1/10Hz	1/10Hz	
08:009:__	Min current AL076	10	1	0		%	%	
08:010:__	Min current AL077	10	1	0		%	%	
08:011:__	M/B voltage parallel operation	40	0	0		%	%	

	Do not modify input fields

__:___:03	Limit value	
__:___:04	Hysteresis	

[9] Limit values

	Description	:03	:04	:05		zu:03	zu:04	
09:001:__	Supply UDC<	240	2	0		1/10V	1/10V	
09:002:__	Battery 1 U<	240	2	0		1/10V	1/10V	
09:003:__	Battery 2 U<	240	2	0		1/10V	1/10V	
09:004:__	Speed <	1300	2	0		rpm	rpm	
09:005:__	Speed >	1650	2	0		rpm	rpm	
09:006:__	Generator voltage >	115	2	0		%	%	
09:007:__	Generator voltage <	90	2	0		%	%	
09:008:__	Generator frequency >	540	2	0		1/10Hz	1/10Hz	
09:009:__	Generator frequency <	480	2	0		1/10Hz	1/10Hz	
09:010:__	Generator voltage >>	120	2	0		%	%	
09:011:__	Generator voltage <<	85	2	0		%	%	
09:012:__	Generator frequency >>	560	2	0		1/10Hz	1/10Hz	
09:013:__	Generator frequency <<	470	2	0		1/10Hz	1/10Hz	
09:014:__	Mains voltage >	103	2	0		%	%	
09:015:__	Mains voltage <	97	2	0		%	%	
09:016:__	Mains frequency >	502	1	0		1/10Hz	1/10Hz	
09:017:__	Mains frequency <	498	1	0		1/10Hz	1/10Hz	
09:018:__	Mains voltage >>	105	2	0		%	%	
09:019:__	Mains voltage <<	95	2	0		%	%	
09:020:__	Mains frequency >>	530	2	0		1/10Hz	1/10Hz	
09:021:__	Mains frequency <<	470	2	0		1/10Hz	1/10Hz	

09:022:__	Supply UDC >	290	1	0		1/10V	1/10V	
09:023:__	Battery 1 U >	270	1	0		1/10V	1/10V	
09:024:__	Battery 2 U >	270	1	0		1/10V	1/10V	
09:025:__	Mains rotating field	1	2	0		[1]=Right / [2]=Left		
09:026:__	Gen rotating field	1	2	0		[1]=Right / [2]=Left		
09:027:__	Mains voltage asymmetry	30	2	0		%	%	
09:028:__	Gen voltage asymmetry	10	2	0		%	%	
09:029:__	Mains angle fault	10	2	0		Degree	Degree	
09:030:__	Gen angle fault	10	2	0		Degree	Degree	
09:031:__	Cos Phi capacitive	800	50	0		1/1000	1/1000	
09:032:__	Cos Phi inductive	800	50	0		1/1000	1/1000	
09:033:__	Start crank warning	1	0	0		Starts		
09:034:__	Start crank stop	3	0	0		Starts		
09:035:__	Start crank sprinkler	10	0	0		Starts		
09:036:__	Maintenance counter	0	0	0		Hours		
09:037:__ to 09:054:__	Analog input 5 to Analog input 22	50	2	0	Limit values for the alarms 123 to 140			
09:055:__ to 09:090:__	Analog input 5 to Analog input 22	50	2	0	Limit values for the relay outputs			
09:091:__ to 09:122:__	Analog input PT1 to PT12 Analog input 23 to 26	50	2	0	Limit values for the alarms 145 to 176			
09:123:__ to 09:154:__	Analog input PT1 to PT12 Analog input 23 to 26	50	2	0	Limit values for the relay outputs			
09:187:__ to 09:194:__	Can Bus limit value AIN 01 (alarm) to Can Bus limit value AIN 08 (alarm)	0	0	0	Limit values for the alarms 257 to 264			
09:195:__ to 09:210:__	Can Bus limit value AIN 01 to Can Bus limit value AIN 08	0	0	0	Limit values for the relay outputs			

	Do not modify input fields

__:___:03	Limit value	When entering the numerical values the selected unit has to be input with decimals
__:___:04	Hysteresis	

[10] Alarms

	Description	:01	:02	:03	:04			
10:001:__ to 10:016:__	AL001 to AL016	AL001 to AL016	AL001 to AL016	xxxxx…	10	External alarm		
10:017:__ to 10:032:__	-	-	-	-	-	-		
10:033:__	-	AL033	AL033	xxxxx…	0	Internal alarm		
10:034:__	-	AL034	AL034	xxxxx…	0	Internal alarm		
10:035:__	-	AL035	AL035	xxxxx…	0	Internal alarm		
10:036:__	-	AL036	AL036	xxxxx…	0	Internal alarm		
10:037:__	-	AL037	AL037	xxxxx…	20	Internal alarm		
10:038:__	-	AL038	AL038	xxxxx…	600	Internal alarm		
10:039:__	AL039 Supply UDC<	AL039	AL039	xxxxx…	300	Internal alarm		
10:040:__	-	AL040	AL040	xxxxx…	300	Internal alarm		
10:041:__	-	AL041	AL041	xxxxx…	300	Internal alarm		
10:042:__	-	AL042	AL042	xxxxx…	60	Internal alarm		
10:043:__	-	AL043	AL043	xxxxx…	30	Internal alarm		
10:044:__	AL044 Syn time too long	AL044	AL044	xxxxx…	1800	Internal alarm		
10:045:__	AL045 Watchdog	AL045	AL045	xxxxx…	20	Internal alarm		
10:046:__	AL046 Supply UDC>	AL046	AL046	xxxxx…	2	Internal alarm		
10:047:__		AL047	AL047	xxxxx…	2	Internal alarm		
10:048:__		AL048	AL048	xxxxx…	2	Internal alarm		
10:049:__	AL049 Mains voltage <<	AL049	AL049	xxxxx…	2	Internal alarm		
10:050:__	AL050 Mains voltage <	AL050	AL050	xxxxx…	20	Internal alarm		
10:051:__	AL051 Mains voltage >	AL051	AL051	xxxxx…	20	Internal alarm		
10:052:__	AL052 Mains voltage >>	AL052	AL052	xxxxx…	2	Internal alarm		
10:053:__	AL053 Mains frequency <<	AL053	AL053	xxxxx…	2	Internal alarm		
10:054:__	AL054 Mains frequency <	AL054	AL054	xxxxx…	20	Internal alarm		

10:055:__	AL055 Mains frequency >	AL055	AL055	xxxxx…	20	Internal alarm
10:056:__	AL056 Mains frequency >>	AL056	AL056	xxxxx…	2	Internal alarm
10:057:__	AL057 Mains rotating field	AL057	AL057	xxxxx…	10	Internal alarm
10:058:__	AL058 Mains angle fault	AL058	AL058	xxxxx…	10	Internal alarm
10:059:__	AL059 Mains voltage asymmetry	AL059	AL059	xxxxx…	10	Internal alarm
10:060:__	-	AL060	AL060	xxxxx…	2	Internal alarm
10:061:__	AL061 BDEW - U(t) time runs	AL061	AL061	xxxxx…	2	Internal alarm
10:062:__	AL62 BDEW - U(t) fault	AL062	AL062	xxxxx…	2	Internal alarm
10:063:__	-	AL063	AL063	xxxxx…	2	Internal alarm
10:064:__	-	AL064	AL064	xxxxx…	2	Internal alarm
10:065:__	AL065 Generator voltage <<	AL065	AL065	xxxxx…	10	Internal alarm
10:066:__	AL066 Generator voltage <	AL066	AL066	xxxxx…	20	Internal alarm
10:067:__	AL067 Generator voltage >	AL067	AL067	xxxxx…	20	Internal alarm
10:068:__	AL068 Generator voltage >>	AL068	AL068	xxxxx…	2	Internal alarm
10:069:__	AL069 Generator frequency <<	AL069	AL069	xxxxx…	10	Internal alarm
10:070:__	AL070 Generator frequency <	AL070	AL070	xxxxx…	30	Internal alarm
10:071:__	AL071 Generator frequency >	AL071	AL071	xxxxx…	20	Internal alarm
10:072:__	AL072 Generator frequency >>	AL072	AL072	xxxxx…	2	Internal alarm
10:073:__	AL073 Generator rotating field	AL073	AL073	xxxxx…	10	Internal alarm
10:074:__	AL074 Generator angle fault	AL074	AL074	xxxxx…	10	Internal alarm
10:075:__	AL075 Generator voltage asymmetry	AL075	AL075	xxxxx…	10	Internal alarm
10:076:__	AL076 Cos Phi capacitive	AL076	AL076	xxxxx…	10	Internal alarm
10:077:__	AL077 Cos Phi inductive	AL077	AL077	xxxxx…	10	Internal alarm
10:078:__	-	AL078	AL078	xxxxx…	2	Internal alarm
10:079:__	AL079 Earth current >	AL079	AL079	xxxxx…	2	Internal alarm
10:080:__	AL080 Earth current >>	AL080	AL080	xxxxx…	2	Internal alarm
10:081:__	AL081 Mains protection collective fault	AL081	AL081	xxxxx…	0	Internal alarm
10:082:__	AL082 Mains protection U<<	AL082	AL082	xxxxx…	0	Internal alarm
10:083:__	AL083 Mains protection U<	AL083	AL083	xxxxx…	0	Internal alarm
10:084:__	AL084 Mains protection U>	AL084	AL084	xxxxx…	0	Internal alarm
10:085:__	AL085 Mains protection U>>	AL085	AL085	xxxxx…	0	Internal alarm
10:086:__	AL086 Mains protection F<<	AL086	AL086	xxxxx…	0	Internal alarm
10:087:__	AL087 Mains protection F<	AL087	AL087	xxxxx…	0	Internal alarm
10:088:__	AL088 Mains protection F>	AL088	AL088	xxxxx…	0	Internal alarm
10:089:__	AL089 Mains protection F>>	AL089	AL089	xxxxx…	0	Internal alarm
10:090:__	AL090 Mains protection vector surge >	AL090	AL090	xxxxx…	0	Internal alarm
10:091:__	AL091 Mains protection vector surge>>	AL091	AL091	xxxxx…	0	Internal alarm
10:092:__	AL092 Dif. vector surge >	AL092	AL092	xxxxx…	0	Internal alarm
10:093:__	AL093 Dif. vector surge >>	AL093	AL093	xxxxx…	0	Internal alarm
10:094:__	AL094 Q-U protection >	AL094	AL094	xxxxx…	0	Internal alarm
10:095:__	AL095 Q-U protection >>	AL095	AL095	xxxxx…	0	Internal alarm
10:096:__	-	AL096	AL096	xxxxx…	0	Internal alarm
10:097:__	AL097 Overcurrent >	AL097	AL097	xxxxx…	30	Internal alarm
10:098:__	AL098 Overcurrent >>	AL098	AL098	xxxxx…	0	Internal alarm
10:099:__	AL099 Overcurrent VDE0100-718	AL099	AL099	xxxxx…	0	Internal alarm
10:100:__	AL100 Inv. time overcurrent prot.	AL100	AL100	xxxxx…	1	Internal alarm
10:103:__	AL103 VDE4105 Power reduction	AL103	AL103	xxxxx…	3000	Internal alarm
10:104:__	AL104 Power >	AL104	AL104	xxxxx…	150	Internal alarm
10:105:__	AL105 Power >>	AL105	AL105	xxxxx…	50	Internal alarm
10:106:__	AL106 Reverse power >	AL106	AL106	xxxxx…	100	Internal alarm
10:107:__	AL107 Reverse power >>	AL107	AL107	xxxxx…	2	Internal alarm
10:108:__	AL108 Apparent power >	AL108	AL108	xxxxx…	100	Internal alarm
10:109:__	AL109 Apparent power >>	AL109	AL109	xxxxx…	2	Internal alarm
10:110:__	AL110 Reactive power >	AL110	AL110	xxxxx…	100	Internal alarm
10:111:__	AL111 Reactive power >>	AL111	AL111	xxxxx…	2	Internal alarm
10:112:__	AL112 Unbalanced load	AL112	AL112	xxxxx…	100	Internal alarm
10:113:__	AL113Diff current >	AL113	AL113	xxxxx…	2	Internal alarm
10:114:__	AL114 Diff current >>	AL114	AL114	xxxxx…	2	Internal alarm
10:115:__	AL115 VDE4105 – Coll. Fault	AL115	AL115	xxxxx…	0	Internal alarm
10:116:__	AL116 VDE4105 – U< (80%)	AL116	AL116	xxxxx…	0	Internal alarm
10:117:__	AL117 VDE4105 – U>> (115%)	AL117	AL117	xxxxx…	0	Internal alarm
10:118:__	AL118 VDE4105 – F< (47,5Hz)	AL118	AL118	xxxxx…	0	Internal alarm
10:119:__	AL119 VDE4105 – F> (51,5Hz)	AL119	AL119	xxxxx…	0	Internal alarm
10:120:__	AL120 VDE4105 – U> (Quality)	AL120	AL120	xxxxx…	0	Internal alarm
10:121:__	AL121 Underspeed	AL121	AL121	xxxxx…	0	Internal alarm
10:122:__	AL122 Overspeed	AL122	AL122	xxxxx…	0	Internal alarm
10:123:__	AL123 Analog input 5	AL123	AL123	xxxxx…	1	Internal alarm
10:124:__	AL124 Analog input 6	AL124	AL124	xxxxx…	1	Internal alarm
10:125:__	AL125 Analog input 7	AL125	AL125	xxxxx…	1	Internal alarm
10:126:__	AL126 Analog input 8	AL126	AL126	xxxxx…	1	Internal alarm

10:127:__	AL127 Analog input 9	AL127	AL127	xxxxx…	1	Internal alarm
10:128:__	AL128 Analog input 10	AL128	AL128	xxxxx…	1	Internal alarm
10:129:__	AL129 Analog input 11	AL129	AL129	xxxxx…	1	Internal alarm
10:130:__	AL130 Analog input 12	AL130	AL130	xxxxx…	1	Internal alarm
10:131:__	AL131 Analog input 13	AL131	AL131	xxxxx…	1	Internal alarm
10:132:__	AL132 Analog input 14	AL132	AL132	xxxxx…	1	Internal alarm
10:133:__	AL133 Analog input 15	AL133	AL133	xxxxx…	1	Internal alarm
10:134:__	AL134 Analog input 16	AL134	AL134	xxxxx…	1	Internal alarm
10:135:__	AL135 Analog input 17	AL135	AL135	xxxxx…	1	Internal alarm
10:136:__	AL136 Analog input 18	AL136	AL136	xxxxx…	1	Internal alarm
10:137:__	AL137 Analog input 19	AL137	AL137	xxxxx…	1	Internal alarm
10:138:__	AL138 Analog input 20	AL138	AL138	xxxxx…	1	Internal alarm
10:139:__	AL139 Analog input 21	AL139	AL139	xxxxx…	1	Internal alarm
10:140:__	AL140 Analog input 22	AL140	AL140	xxxxx…	1	Internal alarm
10:141:__	-	AL141	AL141	xxxxx…	1	Internal alarm
10:142:__	-	AL142	AL142	xxxxx…	1	Internal alarm
10:143:__	-	AL143	AL143	xxxxx…	1	Internal alarm
10:144:__	-	AL144	AL144	xxxxx…	1	Internal alarm
10:145:__	AL145 PT1>	AL145	AL145	xxxxx…	1	Internal alarm
10:146:__	AL146 PT1>>	AL146	AL146	xxxxx…	1	Internal alarm
10:147:__	AL147 PT2>	AL147	AL147	xxxxx…	1	Internal alarm
10:148:__	AL148 PT2>>	AL148	AL148	xxxxx…	1	Internal alarm
10:149:__	AL149 PT3>	AL149	AL149	xxxxx…	1	Internal alarm
10:150:__	AL140 PT3>>	AL150	AL150	xxxxx…	1	Internal alarm
10:151:__	AL151 PT4>	AL151	AL151	xxxxx…	1	Internal alarm
10:152:__	AL152 PT4>>	AL152	AL152	xxxxx…	1	Internal alarm
10:153:__	AL153 PT5>	AL153	AL153	xxxxx…	1	Internal alarm
10:154:__	AL154 PT5>>	AL154	AL154	xxxxx…	1	Internal alarm
10:155:__	AL155 PT6>	AL155	AL155	xxxxx…	1	Internal alarm
10:156:__	AL156 PT6>>	AL156	AL156	xxxxx…	1	Internal alarm
10:157:__	AL157 AI23>	AL157	AL157	xxxxx…	1	Internal alarm
10:158:__	AL158 AI23>>	AL158	AL158	xxxxx…	1	Internal alarm
10:159:__	AL159 AI24>	AL159	AL159	xxxxx…	1	Internal alarm
10:160:__	AL160 AI24>>	AL160	AL160	xxxxx…	1	Internal alarm
10:161:__	AL161 PT7>	AL161	AL161	xxxxx…	1	Internal alarm
10:162:__	AL162 PT7>>	AL162	AL162	xxxxx…	1	Internal alarm
10:163:__	AL163 PT8>	AL163	AL163	xxxxx…	1	Internal alarm
10:164:__	AL164 PT8>>	AL164	AL164	xxxxx…	1	Internal alarm
10:165:__	AL165 PT9>	AL165	AL165	xxxxx…	1	Internal alarm
10:166:__	AL166 PT9>>	AL166	AL166	xxxxx…	1	Internal alarm
10:167:__	AL167 PT10>	AL167	AL167	xxxxx…	1	Internal alarm
10:168:__	AL168 PT10>>	AL168	AL168	xxxxx…	1	Internal alarm
10:169:__	AL169 PT11>	AL169	AL169	xxxxx…	1	Internal alarm
10:170:__	AL170 PT11>>	AL170	AL170	xxxxx…	1	Internal alarm
10:171:__	AL171 PT12>	AL171	AL171	xxxxx…	1	Internal alarm
10:172:__	AL172 PT12>>	AL172	AL172	xxxxx…	1	Internal alarm
10:173:__	AL173 AI25>	AL173	AL173	xxxxx…	1	Internal alarm
10:174:__	AL174 AI25>>	AL174	AL174	xxxxx…	1	Internal alarm
10:175:__	AL175 AI26>	AL175	AL175	xxxxx…	1	Internal alarm
10:176:__	AL176 AI27>>	AL176	AL176	xxxxx…	1	Internal alarm
10:177:__ to 10:240:__	AL177 to AL240 CAN BUS Alarms	AL177 to AL240	AL177 to AL240	xxxxx…	10	Internal alarm
10:241:__ to 10:255:__	AL241 to AL255	AL241 to AL255	AL241 to AL255	xxxxx…	1	Internal alarm
10:257:__ to 10:264:__	AL257 bis AL264 CAN BUS Alarms (limit values)	AL257 to AL264	AL257 to AL264	xxxxx…	1	Internal alarm

	Do not modify input fields

__:___:01	Text for language 1	
__:___:02	Text for language 2	
__:___:03	Numbers acc. to alarm coding	[0]=Disabled / [1]=Enabled
__:___:04	Delay in 1/10 secs.	

[11] Logic

Due to its complexity, the logic should only be set and changed via the parameterization surface of the GV2.

[12] Times

	Description	:03				to:03		
12:044:__	Ramp for unloading	50				1/10 Sec		

__:___:03	Times

[13] Diff protection

	Description	:03	:04	:05		to:03	to:04	to:05
13:001:__	Diff current >	10	2	0		%	%	
13:002:__	Diff current >>	20	2	0		%	%	
13:003:__	Trip point of trip charact.	50	2	0		%		
13:004:__	Trip blocking	25	2	50		%		1/10 Sec

	Do not modify input fields

__:___:03	Limit value in %
__:___:04	Hysteresis in %
__:___:05	Times in 1/10 secs.

[14] Current protection

	Description	:03	:04	:05		to:03	to:04	to:05
14:001:__	Overcurrent VDE 100-718	110	2	0				
14:002:__	Overcurrent >	300	2	0		%	%	
14:003:__	Overcurrent >>	350	2	0		%	%	
14:004:__	Overcurrent time protection	4	0	320		Fct.-No.		1/100

	Do not modify input fields

__:___:03	Limit value
__:___:04	Hysteresis
__:___:05	Time multiplicator

14:004:03	Select characteristic	[1] IEC-inverse [2] IEC-very inverse [3] IEC-extremely inverse [4] IEC-long inverse [5] ANSI-inverse [6] ANSI-short inverse [7] ANSI-long inverse [8] ANSI-moderately inverse [9] ANSI- very inverse [10] ANSI- extremely inverse [11] ANSI-definite inverse

[15] Mains protection

	Description	:03	:04	:05		to:03	to:04	to:05
15:001:__	Mains protection U<<	30	2	80		%	%	1/100 Sec
15:002:__	Mains protection U <	80	2	150		%	%	1/100 Sec
15:003:__	Mains protection U >	108	2	6000		%	%	1/100 Sec
15:004:__	Mains protection U >>	125	2	10		%	%	1/100 Sec
15:005:__	Mains protection F<<	475	2	4		1/10 Hz	1/10 Hz	1/100 Sec
15:006:__	Mains protection F<	475	2	10		1/10 Hz	1/10 Hz	1/100 Sec
15:007:__	Mains protection F>	515	2	300		1/10 Hz	1/10 Hz	1/100 Sec
15:008:__	Mains protection F>>	525	2	10		1/10 Hz	1/10 Hz	1/100 Sec
15:009:__	Mains prot vector >	6	0	0		degree		
15:010:__	Mains prot vector >>	12	0	0		degree		
15:011:__	Reset time	3	0	0				
15:012:__	Q-U protection U<	85	2	50		%		1/100 Sec
15:013:__	Q-U protection Q<	6	0	0		degree		
15:014:__	Q-U protection U<<	85	2	50		%		1/100 Sec
15:015:__	Q-U protection Q<<	3	0	0		degree		

	Do not modify input fields

__:___:03	Limit value	Voltage in % Frequency in 1/10 Hz Phi in degrees
__:___:04	Hysteresis	Voltage in % Frequency in 1/10 Hz Phi in degrees
__:___:05	Times in 1/100 Seconds	

[16] Power protection

	Description	:03	:04	:05		to:03	to:04	to:05
16:001:__	Active power loaded	10	0	0		%	%	
16:002:__	Active power >	115	2	0		%	%	
16:003:__	Active power >>	120	2	0		%	%	
16:004:__	Reverse power >>	-5	2	0		%	%	
16:005:__	Reverse power >>	-10	2	0		%	%	
16:006:__	Unbalanced load	30	2	0		%	%	
16:007:__	KWH Pulse	10	2	0		KW		
16:008:__	Apparent power >	115	2	0		%	%	
16:009:__	Apparent power >>	120	2	0		%	%	
16:010:__	Reactive power >	115	2	0		%	%	
16:011:__	Reactive power >>	120	2	0		%	%	

	Do not modify input fields

__:___:03	Limit value
__:___:04	Hysteresis
__:___:05	Times

[17] Synchronization

	Description	:03				to:03		
17:001:__	Advance time	50				msec		
17:002:__	Max. frequency diff.	10				1/100 Hz		
17:003:__	Min. frequency diff.	5				1/100 Hz		
17:004:__	Max. voltage diff.	5				%		
17:005:__	Syn pulse length	200				msec		
17:006:__	-	0						
17:007:__	-	0						
17:008:__	-	0						
17:009:__	-	0						
17:010:__	Frequency integration time	50				Periods		
17:011:__	Setpoint frequency	500				1/10 Hz		
17:012:__	Setpoint voltage	100				%		

	Do not modify input fields

__:___:03	Adjustment

[18] Controller

	Description	:03	:04	:05	:06	:07	:08	:10
18:001:__	PID U island	0	1000	200	0	2	10	0
18:002:__	PID U syn	0	1000	200	0	2	0	0
18:003:__	PID cos phi mains parallel	0	1000	200	0	2	10	0
18:004:__	PID cos phi gen parallel	0	1000	200	0	2	10	0
18:005:__	-	0	1000	200	0	2	5	0
18:006:__	PID F island	0	1000	200	0	2	5	0
18:007:__	PID F syn	0	1000	200	0	2	0	0
18:008:__	PID power mains parallel	0	1000	200	0	2	10	0
18:009:__	PID power gen parallel	0	1000	200	0	2	10	0
18:010:__	-	0	1000	100	0	2	5	0
18:011:__	PID CAN BUS frequency island	14	300	200	0	2	5	0

	Do not modify input fields

__:___:03	-	
__:___:04	P-part	Kp in 1/100
__:___:05	I-part	Ti in 1/100 Secs
__:___:06	D-part	Td in 1/100 Secs
__:___:07	T1-factor	T1 in 1/10 Secs
__:___:08	Neutral zone	Frequency in 1/100 Hz All other values in 1/10 %
__:___:09	-	
__:___:10	Delayed release	In 1/10 Secs

[19] Pulse controller

	Description	:03	:04	:05		to:03	to:04	to:05
19:001:__	Voltage island	50	2	1			1/10 Sec	%
19:002:__	Frequency island	50	2	5			1/10 Sec	1/100 Hz
19:003:__	Voltage syn	100	2	1			1/10 Sec	%
19:004:__	Frequency syn	100	2	0			1/10 Sec	1/100 Hz
19:005:__	Cos phi parallel	50	2	1			1/10 Sec	%
19:006:__	Power parallel	50	2	1			1/10 Sec	%

__:___:03	Boosting	
__:___:04	Pulse length	
__:___:05	Death zone	

[20] Motorpoti

	Description	:03	:04	:05				
20:001:__	El. Poti F/P	1000	0	10				
20:002:__	El. Poti U/PF	1000	0	10				

	Do not modify input fields

[21] Int. Setpoints

	Description	:03	:04			to:03	to:04	
21:001:__	Generator power	1000	0			1/10 %	1/10 %	
21:002:__	Mains im-/export	500	-500			KW	KW	
21:002:__	Cos Phi	50	-50			1/100 PF	1/100 PF	

__:___:03	Max value	
__:___:04	Min value	

[22] VDE table

	Description	:03	:04	:05		to:03	to:04	to:05
22:001:__	Standby switching U>	85	1	600		%		1/10 Sec.
22:002:__	Standby switching U<	110	1	600		%		1/10 Sec.
22:003:__	Standby switching F>	4750	1	600		1/100 Hz		1/10 Sec.
22:004:__	Standby switching F<	5005	1	600		1/100 Hz		1/10 Sec.
22:005:__	VDE NA-protection U<	80	1	0		%		
22:006:__	VDE NA-protection U>	115	1	0		%		
22:007:__	VDE NA-protection F<	475	1	0		1/10 Hz		
22:008:__	VDE NA-protection F>	515	1	0		1/10 Hz		
22:009:__	VDE NA-protection U>(Quality)	110	1	0		%		
22:010:__	Ext. power red. level 1	60	0	0		%		
22:011:__	Ext. power red. level 2	30	0	0		%		
22:012:__	Ext. power red. level 3	10	0	0		%		
22:013:__	VDE Power red. F>	5020	5150	0		1/100 Hz	1/100 Hz	
22:014:__	VDE Power red. - % / Hz	40	10	0				
22:015:__	Cos Phi in response of power - 1	950	10	0		1/1000	%	
22:016:__	Cos Phi in response of power - 2	-950	90	0		1/1000	%	
22:017:__	Dyn. Mains support - U(t) 1	0	0	15		%		1/100 Sec
22:018:__	Dyn. Mains support - U(t) 2	300	0	15		%		1/100 Sec
22:019:__	Dyn. Mains support - U(t) 3	700	0	15		%		1/100 Sec
22:020:__	Dyn. Mains support - U(t) 4	700	0	70		%		1/100 Sec
22:021:__	Dyn. Mains support - U(t) 5	900	0	150		%		1/100 Sec
22:022:__	Dyn. Mains support - U(t) 6	900	0	300		%		1/100 Sec

	Do not modify input fields

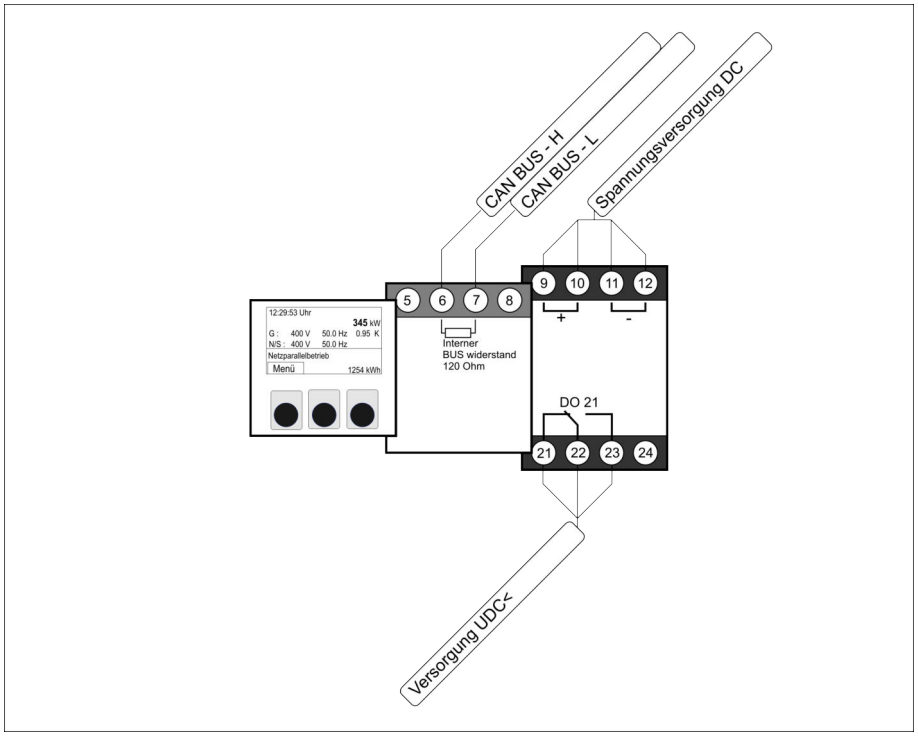
__:___:03	Limit value 1	
__:___:04	Limit value 2	
__:___:04	Times	

[23] CAN J1939

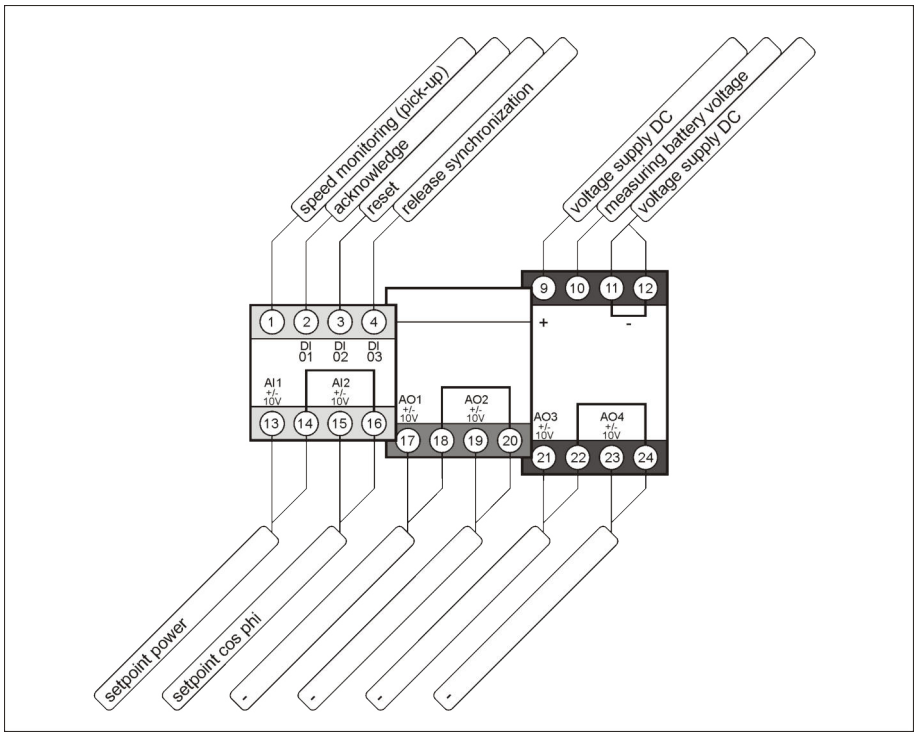
The assignment of the analogue and digital signals in this table are motor-dependent and can be found in the project-related parameterization at the CAN BUS tab.

9 Connection diagrams

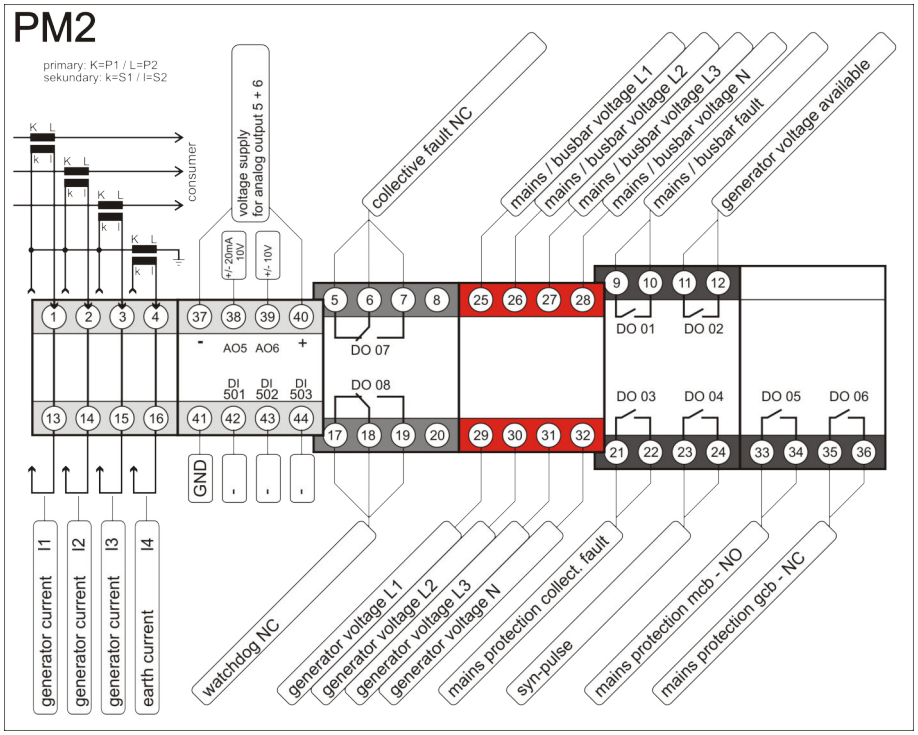
9.1 Display and operating device ANZ2



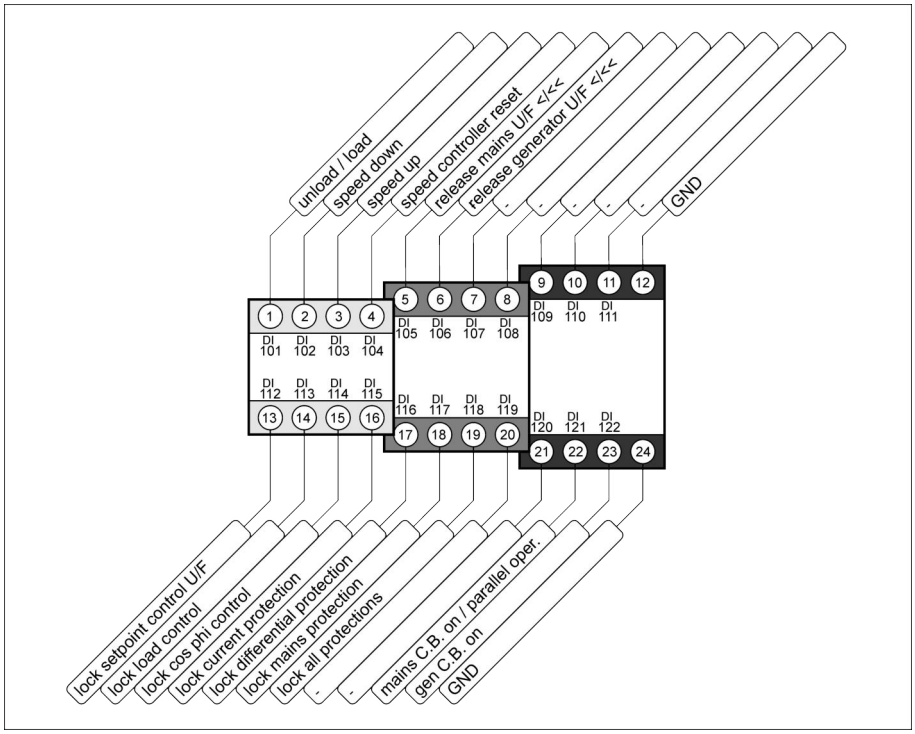
9.2 CPU module



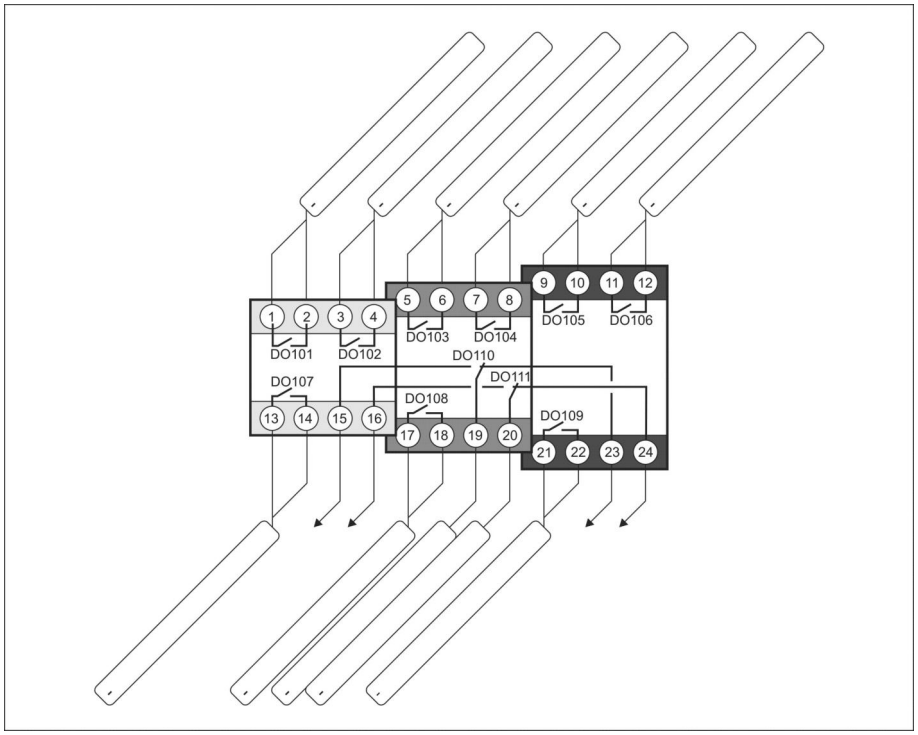
9.3 Power module PM2



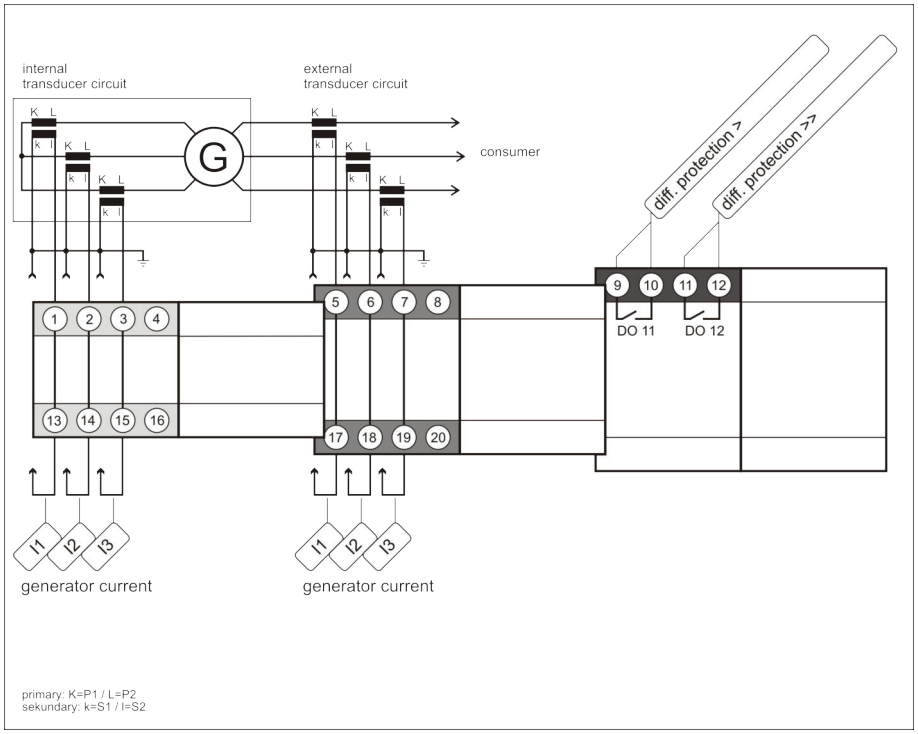
9.4 Input module DI1



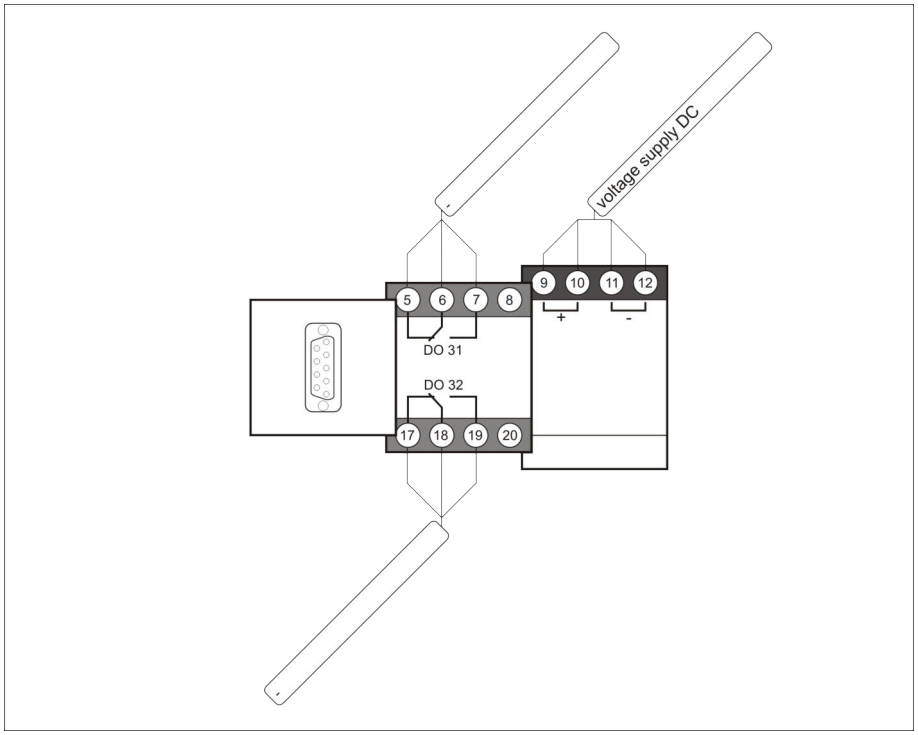
9.5 Output module DO1



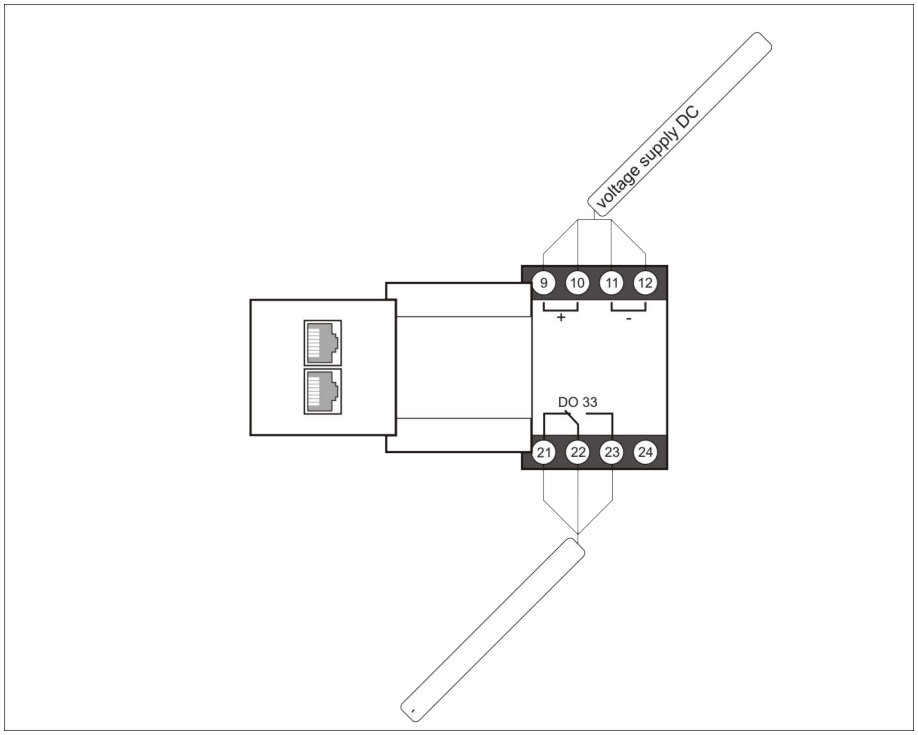
9.6 Diff. Protection module DM1



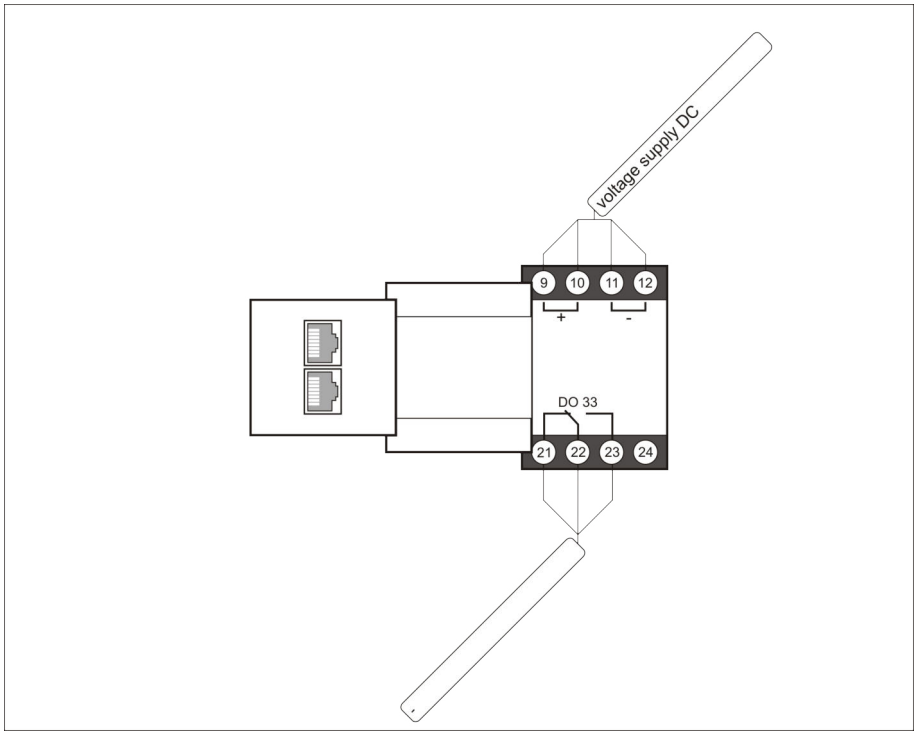
9.7 Profibus module PB1



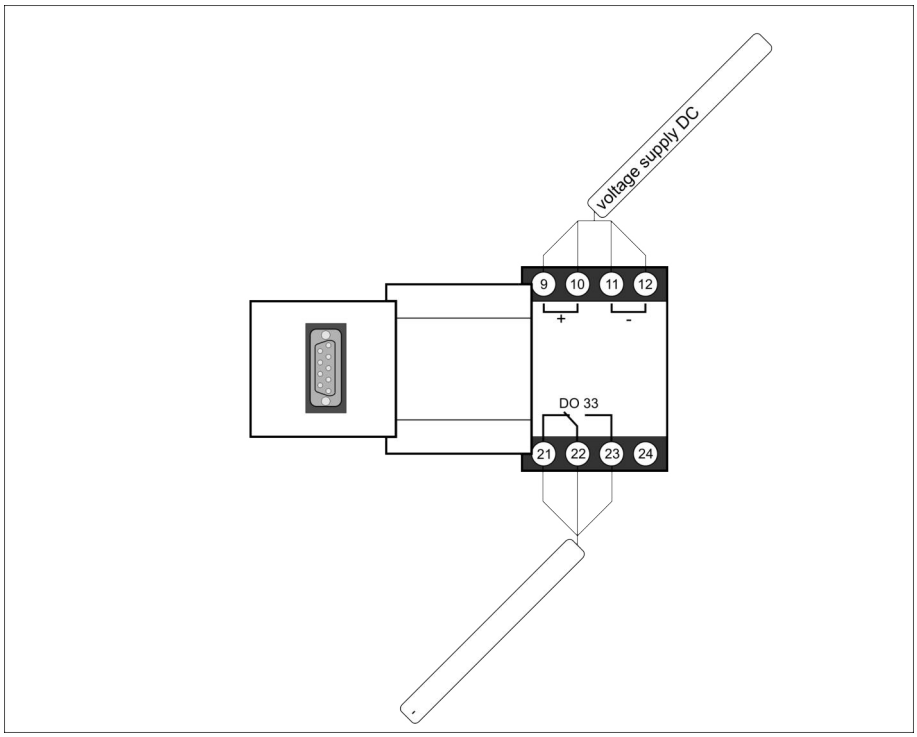
9.8 Profinet module PN1



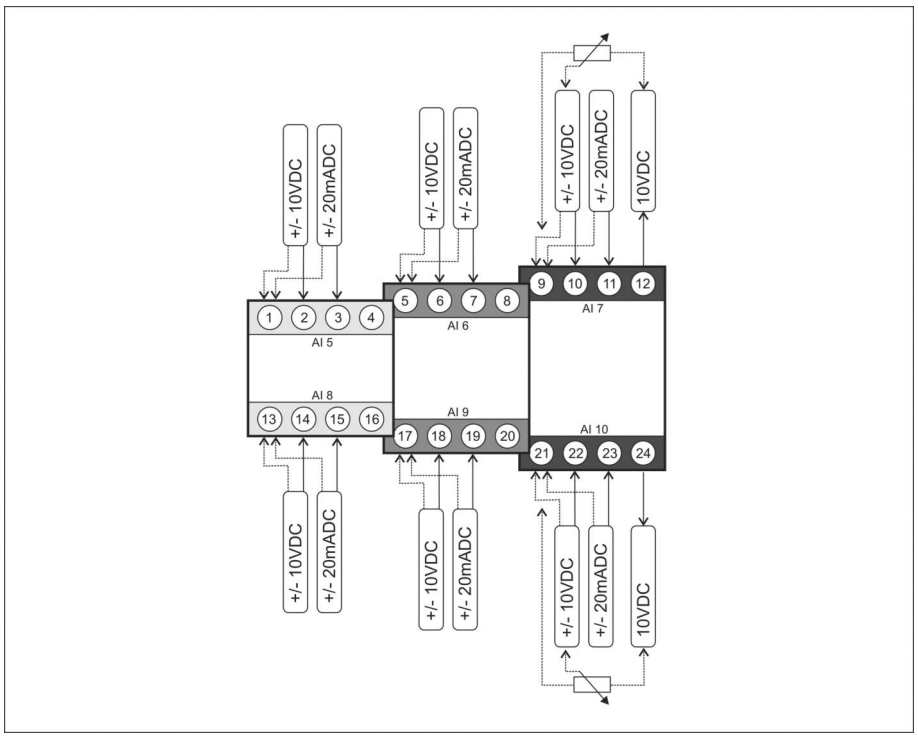
9.9 Modbus module TCP/IP MB1



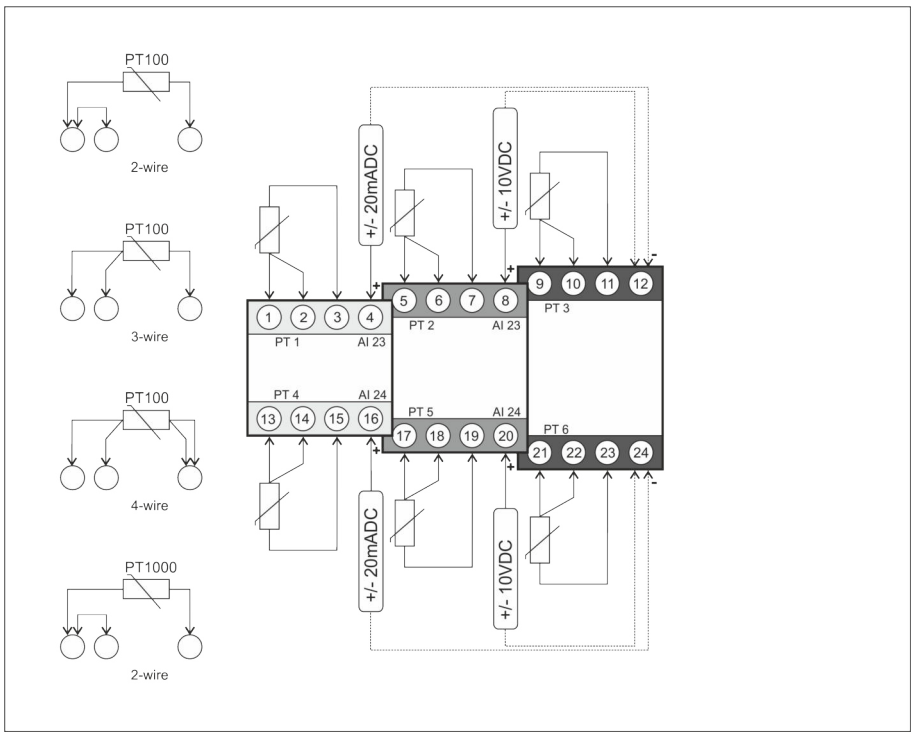
9.10 Modbus module RTU MB2



9.11 Analog input module AI1



9.12 PT100(0) module AT1



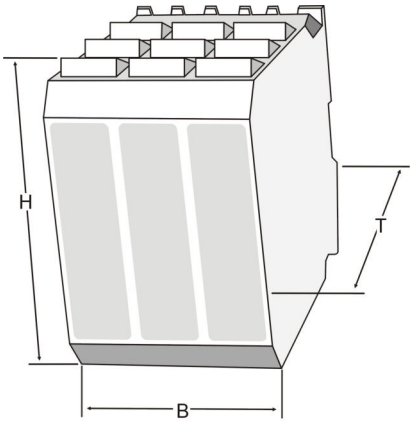
10 Casing variants and dimensions

10.1 Moduls

Variant	DIN – plastic casing (*Polyamide*)
Mounting	On DIN rail
Protection category	IP 40, terminal IP 20

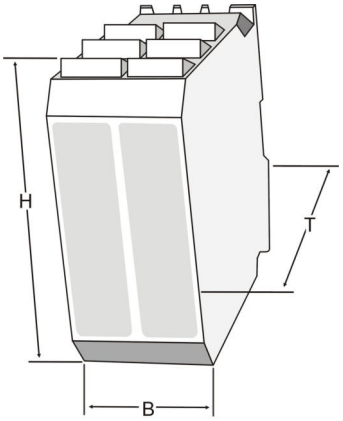
Module dimensions Modul ANZ2

Width(B)	67,5 mm
Height (H)	99,0 mm
Depth (T)	114,5 mm



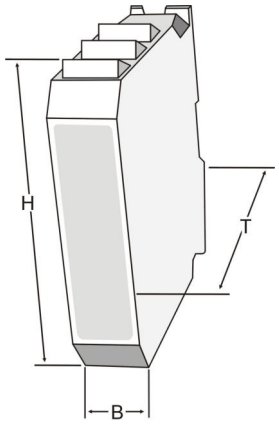
Module dimensions PM2 und DM1

Width (B)	45,0 mm
Height (H)	99,0 mm
Depth (T)	114,5 mm



Module dimensaions CPU, DI1, DO1, PB1, PN1, MB1, AI1 und AT1

Width (B)	22,5 mm
Height (H)	99,0 mm
Depth (T)	114,5 mm



11 Technical data

Installation and commissioning should only be carried out by skilled and trained professionals. Connection acc. to VDE 0160!

Auxiliary voltage	24 V (18 ... 34 V) DC
Power consumption	ANZ2 max. 3VA ; CPU max. 8VA ; PB1 / PN1 / MB1/2 max. 3VA
Digital inputs	24 V 8 mA (optically decoupled), input resistance > 3 kΩ, cable length should not exceed 2,5 m input OFF < 7V, input ON > 8V
Measuring voltage	40/70 …. 280/484 VAC, (isolation >4 MOhm) power consumption: max. 0,35VA/phase impulse-resistant up to 4 kV
Measuring current	nominal current: -/5 A (0,15 ... 18 A) AC; -/1 A (0,03 … 3,5 A)AC, (floating max. 500V) power consumption: max. 0,50VA/Phase 4 x $I_{nom.}$ continuous current 10 x $I_{nom.}$ 10 sec. 50 x $I_{nom.}$ 0,001 sec. apparent ohmic resistance <0,01 Ohm
Recommended transducer type	max. 4 * I_{Nenn}
Analogue inputs	+/-10 V (U_{max} ca. 11 V) DC, Ri > 1 MOhm isolation (>1 MOhm), max. 500V AI1 and AT1 module: see module data sheet
Analogue outputs	+/-10 V (U_{max} approx. 11 V) DC, 12 bit resolution minimum step width 5 mV / digit reproducibility +/- 5 mV, apparent ohmic resistance > 1 kΩ galvanic isolation max. 500V PM2 module (AI5): +/-20mA (I_{max} approx. 21 mA), load < 400Ω
Relay outputs	NO/CO 250 VAC, 2 A galvanically isolated
Nominal frequency	50 / 60 Hz (adjustable)
Frequency measurement	30 ... 70 Hz, +/- 0,05 Hz
Measurement accuracy (with nominal frequency 100 % sinus)	voltage measurement <= 0,5 % currency measurement <= 0,5 % power measurement <= 1 % CosPhi <= 1° frequency measurement <= 0,05 Hz
Protection category	casing: IP 40, terminal IP 20
Ambient air temperature	-20 ... +55 °C
Height above sea level	max. 1000 m
Humidity	max. 90 % without condensation
PC Software	Parameter software Geräteverwaltung 2 (GV_2.exe)
System requirements PC Software	IBM compatible PC, min. 1,2 GHz, 512 MB RAM Operating system MS Windows: Windows 7 or later
Type of cable for interfaces	CAN-Bus – Lappkabel Deutschland Unitronic Bus CAN FD P 1x2x0,5 mm² (Best-Nr 2170278)

11.1 Protection functions with ANSI-Code

ANSI 12	Overspeed	AL122 Overspeed
ANSI 14	Underspeed	AL121 Underspeed
ANSI 27	Undervoltage protection	AL065 Generator voltage << AL066 Generator voltage < AL082 Mains protection U<< AL083 Mains protection U<
ANSI 32	Active power protection	AL104 Power > AL105 Power >>
ANSI 32R	Reverse power protection	AL106 Reverse power > AL107 Reverse power >>
ANSI 32Q	Reactive power protection	AL110 Reactive power > AL111 Reactive power >>
ANSI 46	Phase balance current relay	AL112 Unbalanced load
ANSI 47	Phase sequence voltage relay	AL073 Generator rotating field
ANSI 50	Instantaneous overcurrent relay	AL097 Overcurrent > AL098 Overcurrent >>
ANSI 50N	Overcurrent protection (ground)	AL079 Erdstrom > AL080 Erdstrom >>
ANSI 51	AC Time overcurrent relay	AL100 Overcurrent time protection
ANSI 55	Power factor relay	AL076 Cos Phi capacitive AL077 Cos Phi inductive
ANSI 59	Overvoltage relay	AL068 Generator voltage > AL069 Generator voltage >> AL084 Mains protection U> AL085 Mains protection U>>
ANSI 78	Phase angel measuring „Out-of-Step“ relay	AL074 Generator angle fault AL090 Mains protection vector > AL091 Mains protection vector >>
ANSI 81	Frequency relay	AL069 Generator frequency << AL070 Generator frequency < AL071 Generator frequency > AL071 Generator frequency >> AL086 Mains protection F<< AL087 Mains protection F< AL088 Mains protection F> AL089 Mains protection F>>
ANSI 87	Differential protective relay	AL113 Diff current > AL114 Diff current >>

12 Data transfer

12.1 Profibus / Profinet

It is possible to upgrade the KSS with a Profibus DP Module PB1 or with a Profinet Module PN1 for the connection with a PLC. The corresponding module must be configured via the respective GSD file within a PLC project. A random combination of the values to be transmitted is possible. A maximum of 60 modules out of a selection of 209 modules is available. The maximum data length is 244 bytes. It is only supported the Profibus Master DPV0.

Profibus Master DPV1 is not supported.
The use of the universal module of the GSD file is not supported.

The **participant address** of the Profibus module can be configured. (*See Chap. 4.9.2)*

12.1.1 Device master file

The name of the device master file for the KAS Profibus connection via the PB1 has the file name: HPS0D97.gsd.

The name of the device master file for the KAS Profinet connection via the PN1 has the file names:
Profinet Standard M30 module: GSDML-V2.2-KORA-PNIO2Prt-20170911.xml
Profinet Redundancy-Master M40 module: GSDML-V2.33-KORA-PNIO2PrtR-20170911.xml

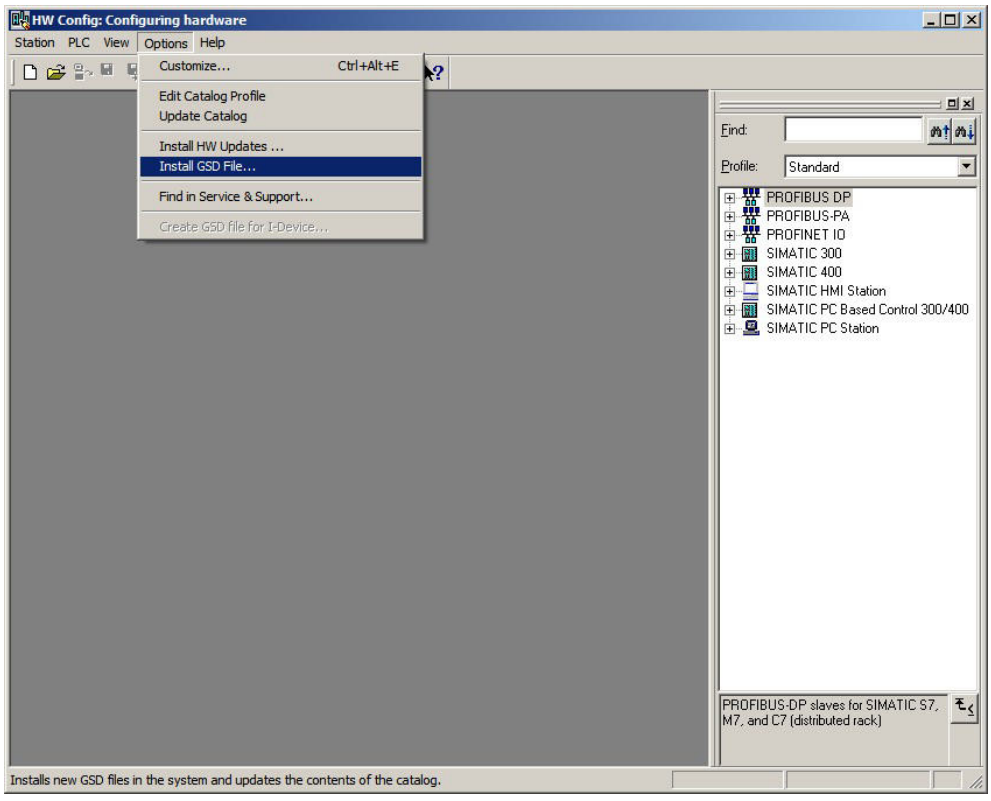
12.1.2 GSD file installation under SIMATIC STEP 7

The installation for Profibus DP is illustrated below as an example.

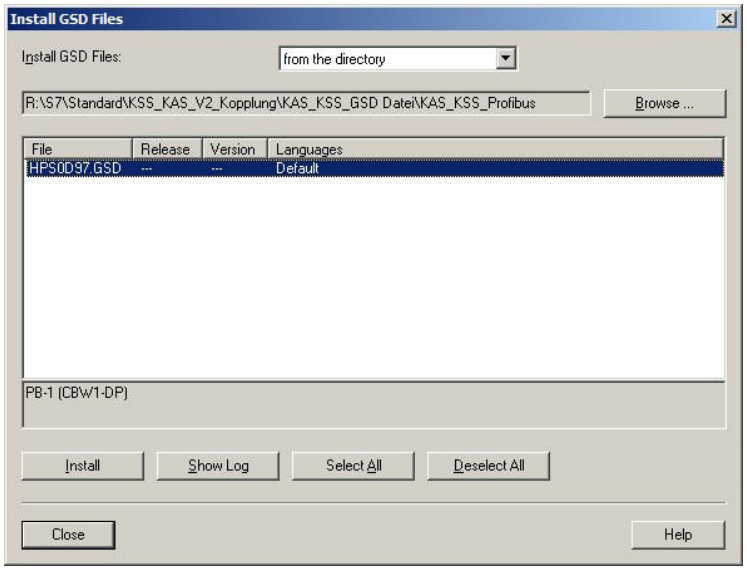
The hardware configuration of the SIMATIC manager has to be used for the installation of the GSD file under S7.

First open the hardware configuration.

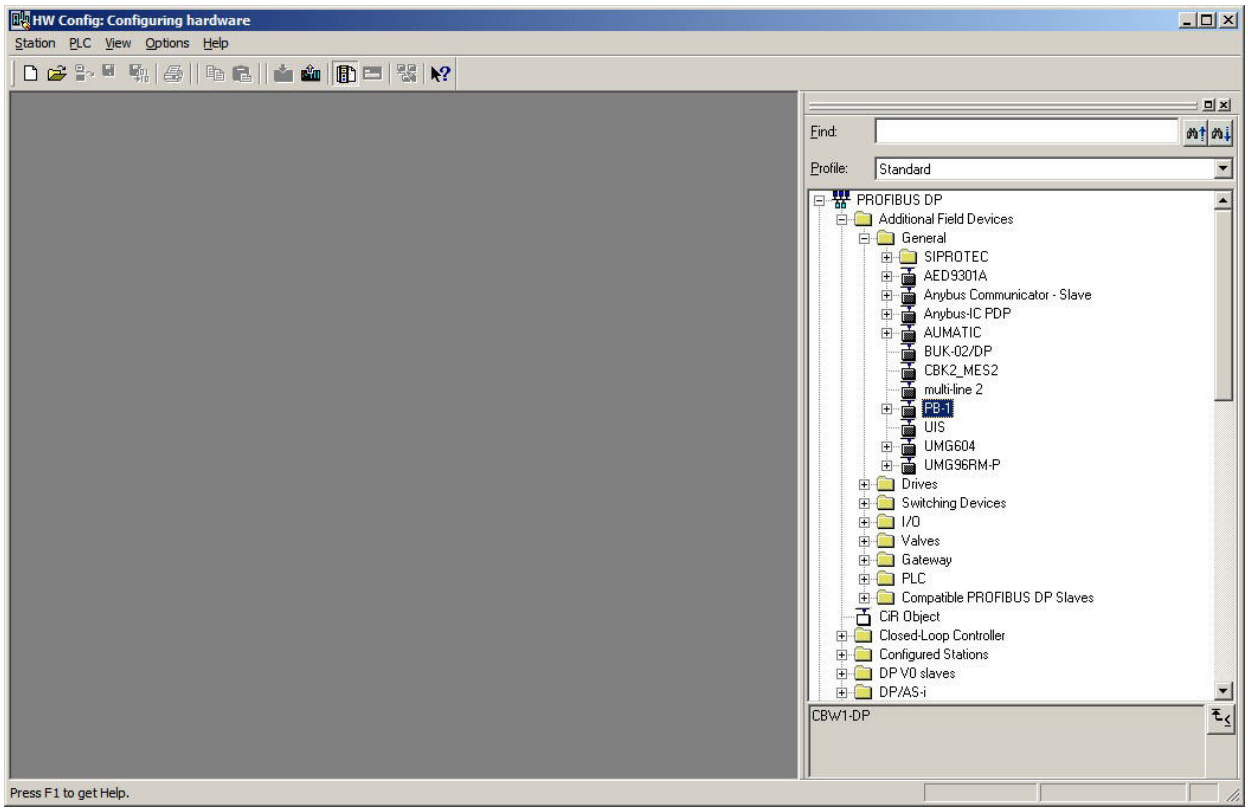
For installation please select Tools – Install GSD files.



GSD file selection

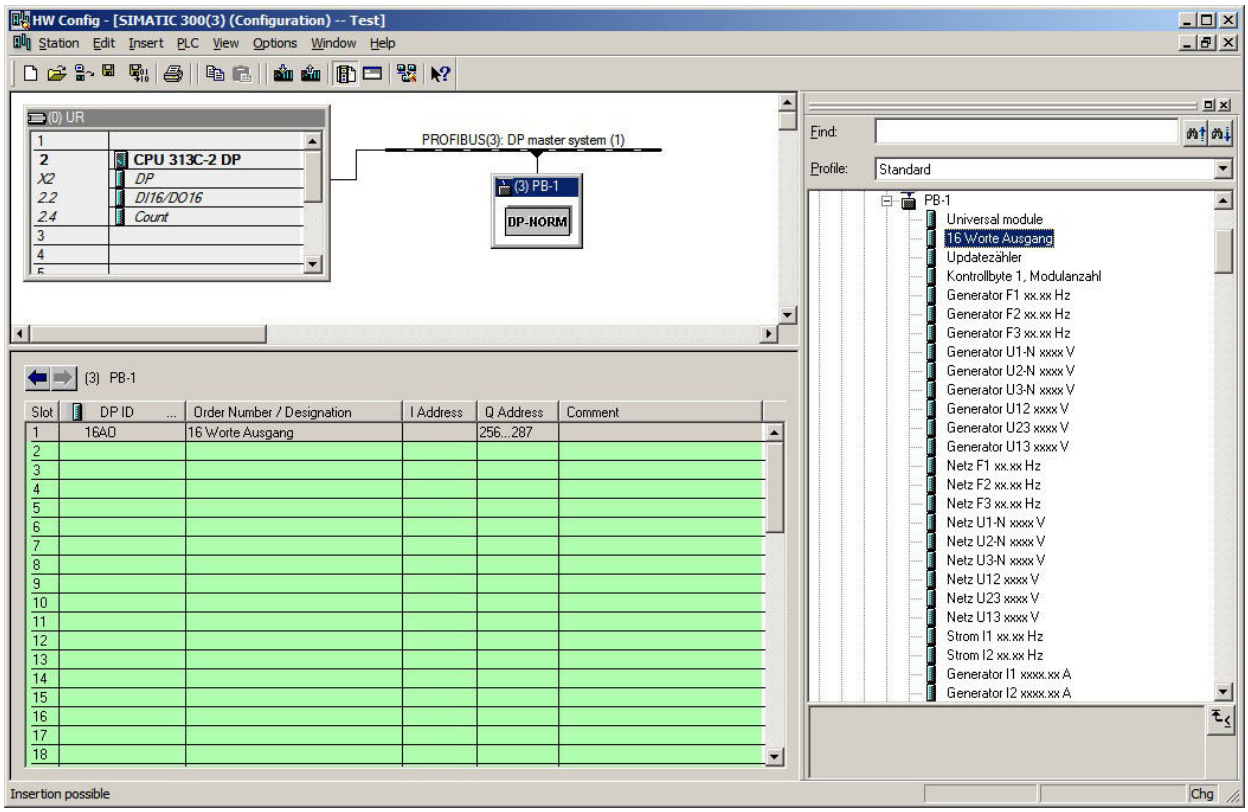


After installation the GSD file can be found in the directory ProfibusDP/ Further field devices/ General, and is named PB-1.



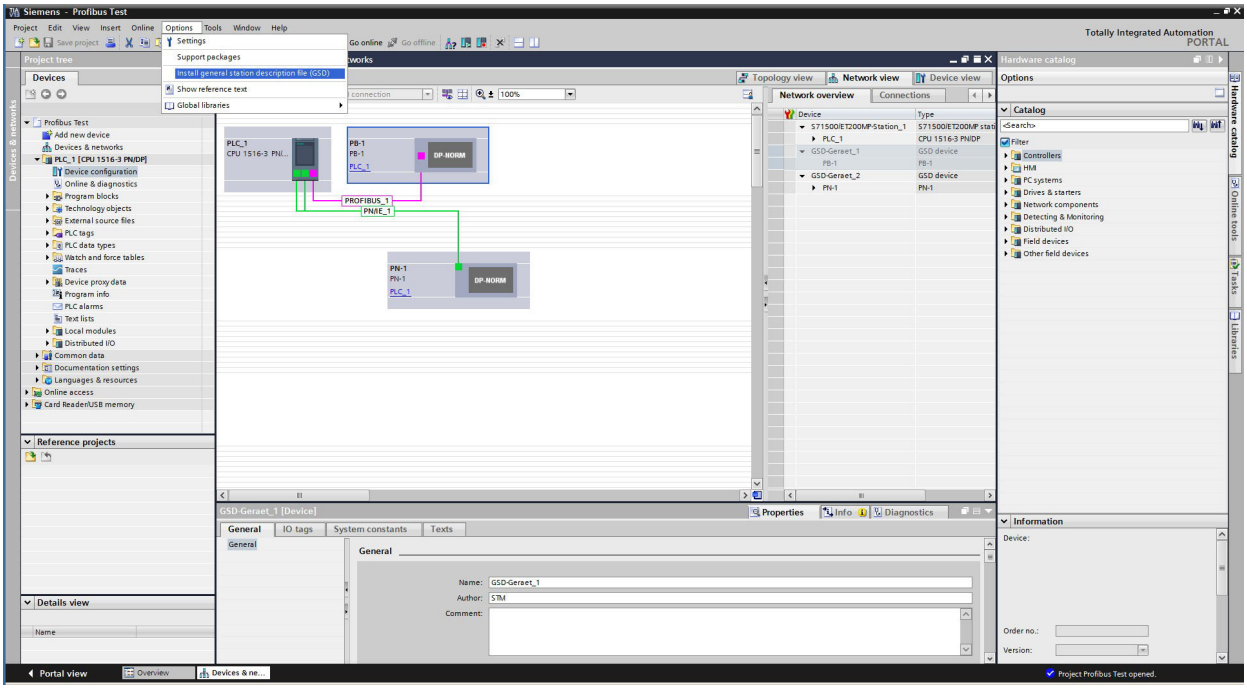
12.1.3 How to use the GSD file in the S7 project

After installation the Profibus DP participant will be integrated into the project configuration.
It is now possible to select the required data from the respective modules.

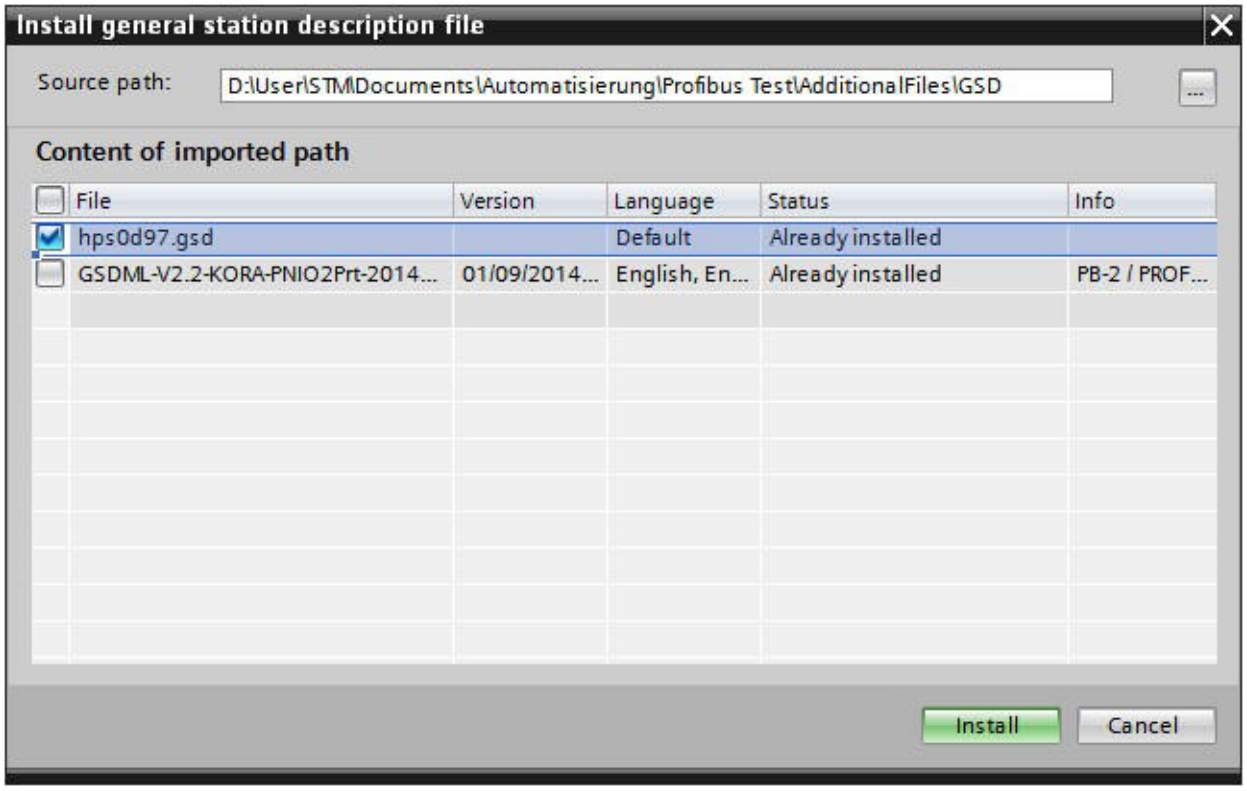


12.1.4 Installing the GSD file in SIMATIC TIA Portal

The installation of the GSD file under the TIA Portal via -> Install general station description.



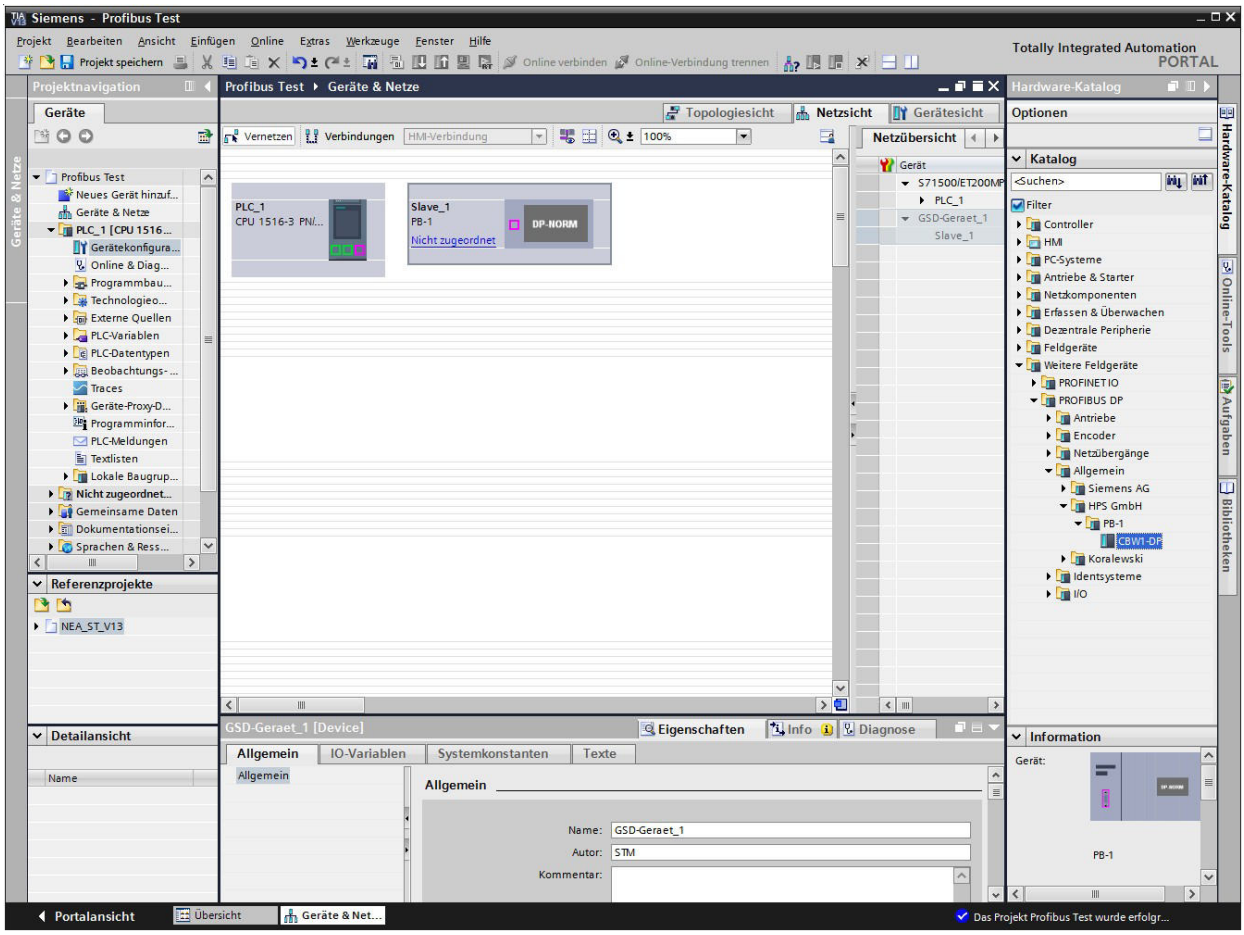
Auswahl der GSD Datei und Installation



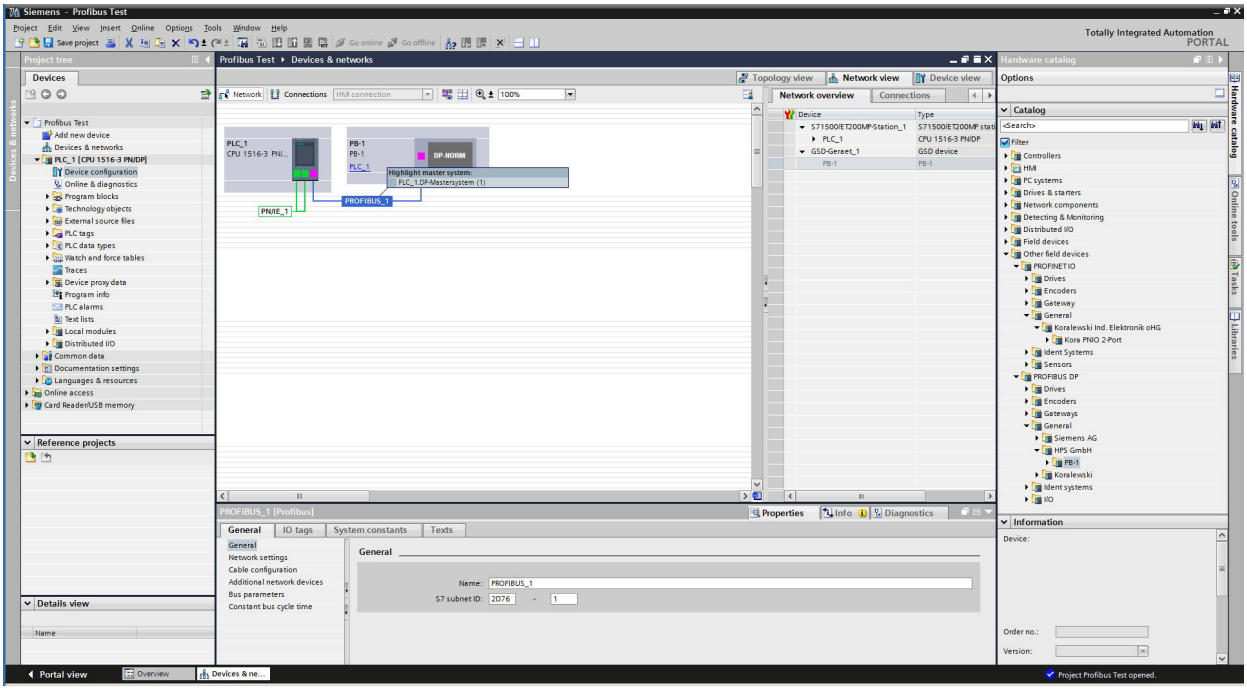
Application of the GSD file in the TIA Project

After the installation is the GSD file in the hardware catalogue under Other field devices/ Profibus DP/General/HPSGmbH and has the name PB-1.

To integrate the Profibus DP node in the configuration of the project, the network view is to choose and select the PB-1 module.

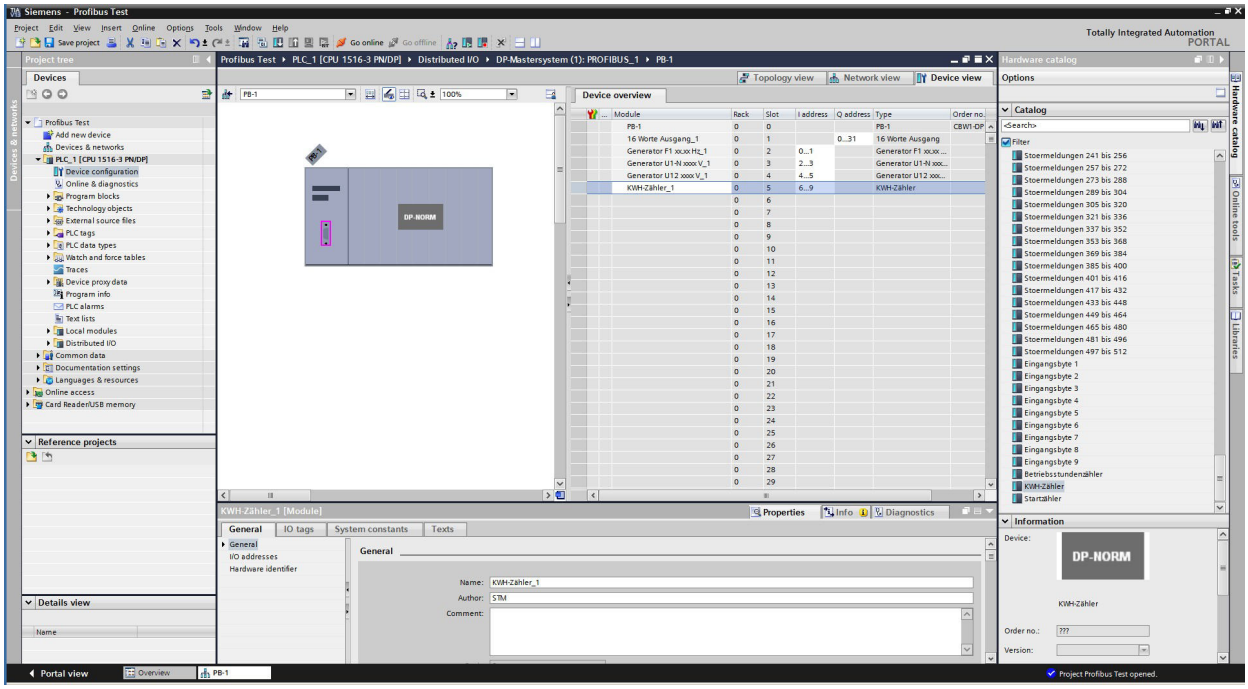


Now the PB-1 module with the corresponding master CPU must be connected.



Then a participant address must be set.

In the device view of the PB-1 module, it is now possible from the corresponding modules select the required data.



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

12.2 Modbus Server/Slave

If necessary, the KAS can be expanded with a Modbus TCP/IP module (MB1) or a Modbus RTU module (MB2) for connection to a Modbus client/master. For this purpose, 64 registers for reading and four registers for writing can be selected via the parameter software. The selection is made by a combo box for the respective register. The data length for each register is a "word". Some analog values require a double word (D word). If a double word is selected, the next register cannot be used. Double words are indicated by the suffix [DINT]. If binary values are selected, the transmission list shows which bit the messages are on. The addressing of the respective module is set in the parameter software depending on the type of communication (see *Chapter* ***Fehler! Verweisquelle konnte nicht gefunden werden.*** or *Chapter* ***Fehler! Verweisquelle konnte nicht gefunden werden.***).

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 to one register	register 01-08 write	502	
40001 to 40008	16 – Write to all registers	register 01-08 write	502	

13 Data transfer modules outputs

The data transfer module outputs may only be present once per device.
If a remote control function is required, the digital input for remote control via PB1, PN1, MB1 or MB2 has to be set.
Please note the basic safety regulations.
If the bit “Power setpoint” is set, then the input via the analog setpoint value is used as the setpoint.
Which bit is set via a pulse or continuous signal is indicated as follows: [IMP] = pulse; [DS] = continuous signal. Note that the pulse remains until the command has been executed.

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1/2	Type
TASTF01 Control Byte 1	[IMP] Select operation mode „OFF“	Bit 0	Byte	0x6F Byte0	0x00D0	Bool
	[IMP] Select operation mode „MAN“	Bit 1	Byte	0x6F Byte0	0x00D0	Bool
	[IMP] Select operation mode „TEST“	Bit 2	Byte	0x6F Byte0	0x00D0	Bool
	[IMP] Select operation mode „AUTO“	Bit 3	Byte	0x6F Byte0	0x00D0	Bool
	[DS] Motor start in operation mode „MAN“	Bit 4	Byte	0x6F Byte0	0x00D0	Bool
	[DS] Power setpoint extern(1) / intern(0)	Bit 5	Byte	0x6F Byte0	0x00D0	Bool
	[IMP] Switch off the buzzer	Bit 6	Byte	0x6F Byte0	0x00D0	Bool
	[IMP] Reset von Error messages	Bit 7	Byte	0x6F Byte0	0x00D0	Bool
TASTF02 Control Byte 2	[IMP] Switching on the GCB in „MAN” mode	Bit 0	Byte	0x6F Byte1	0x00D1	Bool
	[IMP] Switching off the GCB in „MAN” mode	Bit 1	Byte	0x6F Byte1	0x00D1	Bool
	[IMP] Switching on the MCB in „MAN” mode	Bit 2	Byte	0x6F Byte1	0x00D1	Bool
	[IMP] Switching off the MCB in „MAN” mode	Bit 3	Byte	0x6F Byte1	0x00D1	Bool
		Bit 4	Byte	0x6F Byte1	0x00D1	Bool
	[DS] Remote start command in „AUTO“	Bit 5	Byte	0x6F Byte1	0x00D1	Bool
		Bit 6	Byte	0x6F Byte1	0x00D1	Bool
	[DS] Signal test	Bit 7	Byte	0x6F Byte1	0x00D1	Bool
TASTF03 Free		Bit 0	Byte	0x6F Byte2	0x00D2	Bool
		Bit 1	Byte	0x6F Byte2	0x00D2	Bool
		Bit 2	Byte	0x6F Byte2	0x00D2	Bool
		Bit 3	Byte	0x6F Byte2	0x00D2	Bool
		Bit 4	Byte	0x6F Byte2	0x00D2	Bool
		Bit 5	Byte	0x6F Byte2	0x00D2	Bool
		Bit 6	Byte	0x6F Byte2	0x00D2	Bool
		Bit 7	Byte	0x6F Byte2	0x00D2	Bool
TASTF04 Control Byte 4	Control Bit 9	Bit 0	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 10	Bit 1	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 11	Bit 2	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 12	Bit 3	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 13	Bit 4	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 14	Bit 5	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 15	Bit 6	Byte	0x6F Byte3	0x00D3	Bool
	Control Bit 16	Bit 7	Byte	0x6F Byte3	0x00D3	Bool
TASTF05 Control Byte 5	Control Bit 1	Bit 0	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 2	Bit 1	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 3	Bit 2	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 4	Bit 3	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 5	Bit 4	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 6	Bit 5	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 7	Bit 6	Byte	0x6F Byte4	0x00D4	Bool
	Control Bit 8	Bit 7	Byte	0x6F Byte4	0x00D4	Bool
(only with PB1) Free		Bit 0	Byte	0x6F Byte5		Bool
		Bit 1	Byte	0x6F Byte5		Bool
		Bit 2	Byte	0x6F Byte5		Bool
		Bit 3	Byte	0x6F Byte5		Bool
		Bit 4	Byte	0x6F Byte5		Bool
		Bit 5	Byte	0x6F Byte5		Bool
		Bit 6	Byte	0x6F Byte5		Bool
		Bit 7	Byte	0x6F Byte5		Bool
1 - 16 Worte Ausgang (SOLLF01)	Setpoint power in xxx.x %		Word	0x6F Byte6 + 7	0x00D5	INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte8 + 9	0x00D6	INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte10+11	0x00D7	INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte12+13	0x00D8	INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte14+15		INT

1 - 16 Worte Ausgang	Free		Word	0x6F Byte16+17		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte18+19		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte20+21		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte22+23		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte24+25		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte26+27		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte28+29		INT
1 - 16 Worte Ausgang	Free		Word	0x6F Byte30+31		INT

14 Data transfer input modules

14.1 ProfibusDP (L2-Bus)

Modul - GSD-File	Description		Length	PB1		
2 - Update counter	xxxx xxxx xxxx 1111 -> Flow counter 1 to 15 1xxx xxxx -> Internal Bus OK(0 at fault)		Byte	0x0097		
3 – Control byte 1	Number of parameterized modules		Byte	0x0098		

14.2 CPU Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
114 - Speed xxxx U/min	Speed		Word	0x006E	0x0008	INT
115 - Supply voltage xx.x V	Supply voltage		Word	0x006F	0x0009	INT
116 - Error message 001 to 016	Error messages 001 (Free input*)	Bit 0	Word	0x0070	0x000A	Bool
	Error messages 002 (Free input*)	Bit 1	Word	0x0070	0x000A	Bool
	Error messages 003 (Free input*)	Bit 2	Word	0x0070	0x000A	Bool
	Error messages 004 (Free input*)	Bit 3	Word	0x0070	0x000A	Bool
	Error messages 005 (Free input*)	Bit 4	Word	0x0070	0x000A	Bool
	Error messages 006 (Free input*)	Bit 5	Word	0x0070	0x000A	Bool
	Error messages 007 (Free input*)	Bit 6	Word	0x0070	0x000A	Bool
	Error messages 008 (Free input*)	Bit 7	Word	0x0070	0x000A	Bool
	Error messages 009 (Free input*)	Bit 8	Word	0x0070	0x000A	Bool
	Error messages 010 (Free input*)	Bit 9	Word	0x0070	0x000A	Bool
	Error messages 011 (Free input*)	Bit 10	Word	0x0070	0x000A	Bool
	Error messages 012 (Free input*)	Bit 11	Word	0x0070	0x000A	Bool
	Error messages 013 (Free input*)	Bit 12	Word	0x0070	0x000A	Bool
	Error messages 014 (Free input*)	Bit 13	Word	0x0070	0x000A	Bool
	Error messages 015 (Free input*)	Bit 14	Word	0x0070	0x000A	Bool
	Error messages 016 (Free input*)	Bit 15	Word	0x0070	0x000A	Bool
117 - Error message 017 to 032	Error messages 017 (Free input*)	Bit 0	Word	0x0071	0x000B	Bool
	Error messages 018 (Free input*)	Bit 1	Word	0x0071	0x000B	Bool
	Error messages 019 (Free input*)	Bit 2	Word	0x0071	0x000B	Bool
	Error messages 020 (Free input*)	Bit 3	Word	0x0071	0x000B	Bool
	Error messages 021 (Free input*)	Bit 4	Word	0x0071	0x000B	Bool
	Error messages 022 (Free input*)	Bit 5	Word	0x0071	0x000B	Bool
	Error messages 023 (Free input*)	Bit 6	Word	0x0071	0x000B	Bool
	Error messages 024 (Free input*)	Bit 7	Word	0x0071	0x000B	Bool
	Error messages 025 (Free input*)	Bit 8	Word	0x0071	0x000B	Bool
	Error messages 026 (Free input*)	Bit 9	Word	0x0071	0x000B	Bool
	Error messages 027 (Free input*)	Bit 10	Word	0x0071	0x000B	Bool
	Error messages 028 (Free input*)	Bit 11	Word	0x0071	0x000B	Bool
	Error messages 029 (Free input*)	Bit 12	Word	0x0071	0x000B	Bool
	Error messages 030 (Free input*)	Bit 13	Word	0x0071	0x000B	Bool
	Error messages 031 (Free input*)	Bit 14	Word	0x0071	0x000B	Bool
	Error messages 032 (Free input*)	Bit 15	Word	0x0071	0x000B	Bool
118 - Error message 033 to 048	AL033 Emergency stop	Bit 0	Word	0x0072	0x000C	Bool
	AL034 Start crank warning	Bit 1	Word	0x0072	0x000C	Bool
	AL035 Start crank stop	Bit 2	Word	0x0072	0x000C	Bool
	AL036 Start crank sprinkler	Bit 3	Word	0x0072	0x000C	Bool
	AL037 Pick up fault	Bit 4	Word	0x0072	0x000C	Bool
	AL038 Stop fault	Bit 5	Word	0x0072	0x000C	Bool
	AL039 Supply UDC<	Bit 6	Word	0x0072	0x000C	Bool
	AL040 Battery 1<	Bit 7	Word	0x0072	0x000C	Bool
	AL041 Battery 2 <	Bit 8	Word	0x0072	0x000C	Bool
	AL042 Gen CB fault	Bit 9	Word	0x0072	0x000C	Bool
	AL043 Mains CB fault	Bit 10	Word	0x0072	0x000C	Bool
	AL044 Syn time too long	Bit 11	Word	0x0072	0x000C	Bool
	AL045 Watchdog	Bit 12	Word	0x0072	0x000C	Bool
	AL046 Supply UDC>	Bit 13	Word	0x0072	0x000C	Bool
	AL047 Maintenance counter	Bit 14	Word	0x0072	0x000C	Bool
	AL048 Fault remote tableau	Bit 15	Word	0x0072	0x000C	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
119 - Error message 049 to 064	AL049 Mains voltage <<	Bit 0	Word	0x0073	0x000D	Bool
	AL050 Mains voltage <	Bit 1	Word	0x0073	0x000D	Bool
	AL051 Mains voltage >	Bit 2	Word	0x0073	0x000D	Bool
	AL052 Mains voltage >>	Bit 3	Word	0x0073	0x000D	Bool
	AL053 Mains frequency <<	Bit 4	Word	0x0073	0x000D	Bool
	AL054 Mains frequency <	Bit 5	Word	0x0073	0x000D	Bool
	AL055 Mains frequency >	Bit 6	Word	0x0073	0x000D	Bool
	AL056 Mains frequency >>	Bit 7	Word	0x0073	0x000D	Bool
	AL057 Mains rotating field	Bit 8	Word	0x0073	0x000D	Bool
	AL058 Mains angle fault	Bit 9	Word	0x0073	0x000D	Bool
	AL059 Mains voltage asymmetry	Bit 10	Word	0x0073	0x000D	Bool
	Free	Bit 11	Word	0x0073	0x000D	Bool
	AL061 BDEW –U(t) Time is running	Bit 12	Word	0x0073	0x000D	Bool
	AL062 BDEW –U(t) Fault	Bit 13	Word	0x0073	0x000D	Bool
	Free	Bit 14	Word	0x0073	0x000D	Bool
	Free	Bit 15	Word	0x0073	0x000D	Bool
120 - Error message 065 to 080	AL065 Generator voltage <<	Bit 0	Word	0x0074	0x000E	Bool
	AL066 Generator voltage <	Bit 1	Word	0x0074	0x000E	Bool
	AL067 Generator voltage >	Bit 2	Word	0x0074	0x000E	Bool
	AL068 Generator voltage >>	Bit 3	Word	0x0074	0x000E	Bool
	AL069 Generator frequency <<	Bit 4	Word	0x0074	0x000E	Bool
	AL070 Generator frequency <	Bit 5	Word	0x0074	0x000E	Bool
	AL071 Generator frequency >	Bit 6	Word	0x0074	0x000E	Bool
	AL072 Generator frequency >>	Bit 7	Word	0x0074	0x000E	Bool
	AL073 Generator rotating field	Bit 8	Word	0x0074	0x000E	Bool
	AL074 Generator angle fault	Bit 9	Word	0x0074	0x000E	Bool
	AL075 Generator voltage asymmetry	Bit 10	Word	0x0074	0x000E	Bool
	AL076 Cos Phi capacitive	Bit 11	Word	0x0074	0x000E	Bool
	AL077 Cos Phi inductive	Bit 12	Word	0x0074	0x000E	Bool
	Free	Bit 13	Word	0x0074	0x000E	Bool
	Free	Bit 14	Word	0x0074	0x000E	Bool
	Free	Bit 15	Word	0x0074	0x000E	Bool
121 - Error message 081 to 096	AL081 Mains protection collective fault	Bit 0	Word	0x0075	0x000F	Bool
	AL082 Mains protection U<<	Bit 1	Word	0x0075	0x000F	Bool
	AL083 Mains protection U<	Bit 2	Word	0x0075	0x000F	Bool
	AL084 Mains protection U>	Bit 3	Word	0x0075	0x000F	Bool
	AL085 Mains protection U>>	Bit 4	Word	0x0075	0x000F	Bool
	AL086 Mains protection F<<	Bit 5	Word	0x0075	0x000F	Bool
	AL087 Mains protection F<	Bit 6	Word	0x0075	0x000F	Bool
	AL088 Mains protection F>	Bit 7	Word	0x0075	0x000F	Bool
	AL089 Mains protection F>>	Bit 8	Word	0x0075	0x000F	Bool
	AL090 Mains protection vector >	Bit 9	Word	0x0075	0x000F	Bool
	AL091 Mains protection vector >>	Bit 10	Word	0x0075	0x000F	Bool
	AL092 Dif vector surge >	Bit 11	Word	0x0075	0x000F	Bool
	AL093 Dif vector surge >>	Bit 12	Word	0x0075	0x000F	Bool
	AL094 Q-U protection <	Bit 13	Word	0x0075	0x000F	Bool
	AL095 Q-U protection <<	Bit 14	Word	0x0075	0x000F	Bool
	Free	Bit 15	Word	0x0075	0x000F	Bool
122 - Error message 097 to 112	AL097 Overcurrent I>	Bit 0	Word	0x0076	0x0010	Bool
	AL098 Overcurrent I>>	Bit 1	Word	0x0076	0x0010	Bool
	AL099 Overcurrent VDE0100-718	Bit 2	Word	0x0076	0x0010	Bool
	AL100 Overcurrent time protection	Bit 3	Word	0x0076	0x0010	Bool
	Free	Bit 4	Word	0x0076	0x0010	Bool
	Free	Bit 5	Word	0x0076	0x0010	Bool
	AL103 Power reduction fault	Bit 6	Word	0x0076	0x0010	Bool
	AL104 Power >>	Bit 7	Word	0x0076	0x0010	Bool
	AL105 Power >	Bit 8	Word	0x0076	0x0010	Bool
	AL106 Reverse power >	Bit 9	Word	0x0076	0x0010	Bool
	AL107 Reverse power >>	Bit 10	Word	0x0076	0x0010	Bool
	AL108 Apparent power >	Bit 11	Word	0x0076	0x0010	Bool
	AL109 Apparent power >>	Bit 12	Word	0x0076	0x0010	Bool
	AL110 Reactive power >	Bit 13	Word	0x0076	0x0010	Bool
	AL111 Reactive power >>	Bit 14	Word	0x0076	0x0010	Bool
	AL112 Unbalanced load	Bit 15	Word	0x0076	0x0010	Bool

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
123 - Error message 113 to 128	AL113 Diff current >	Bit 0	Word	0x0077	0x0012	Bool
	AL114 Diff current >>	Bit 1	Word	0x0077	0x0012	Bool
	AL115 VDE4105 Collective fault	Bit 2	Word	0x0077	0x0012	Bool
	AL116 VDE4105 U < (80%)	Bit 3	Word	0x0077	0x0012	Bool
	AL117 VDE4105 U > (115%)	Bit 4	Word	0x0077	0x0012	Bool
	AL118 VDE4105 F < (47,5Hz)	Bit 5	Word	0x0077	0x0012	Bool
	AL119 VDE4105 F > (51,5Hz)	Bit 6	Word	0x0077	0x0012	Bool
	AL120 VDE4105 U> (Quality)	Bit 7	Word	0x0077	0x0012	Bool
	AL121 Underspeed	Bit 8	Word	0x0077	0x0012	Bool
	AL122 Overspeed	Bit 9	Word	0x0077	0x0012	Bool
	AL123 AI1 Module 1 – AI05	Bit 10	Word	0x0077	0x0012	Bool
	AL124 AI1 Module 1 – AI06	Bit 11	Word	0x0077	0x0012	Bool
	AL125 AI1 Module 1 – AI07	Bit 12	Word	0x0077	0x0012	Bool
	AL126 AI1 Module 1 – AI08	Bit 13	Word	0x0077	0x0012	Bool
	AL127 AI1 Module 1 – AI09	Bit 14	Word	0x0077	0x0012	Bool
	AL128 AI1 Module 1 – AI10	Bit 15	Word	0x0077	0x0012	Bool
124 - Analog input 1 xxx.x %	Power setpoint value		Word	0x0078	0x002B	INT
125 - Analog input 2 x.xxx cos	Cos Phi setpoint value		Word	0x0079	0x002C	INT
126 - Analog output 1 xx.xx V	See project planning		Word	0x007A	0x002D	INT
127 - Analog output 2 xx.xx V	See project planning		Word	0x007B	00002E	INT
128 - Analog output 3 xx.xx V	See project planning		Word	0x007C	0x002F	INT
129 - Analog output 4 xx.xx V	See project planning		Word	0x007D	0x0030	INT
130 - Setpoint value 1 xxx.x %	Power setpoint value		Word	0x007E	0x003E	INT
131 - Setpoint value 2 x.xxx cos	Cos Phi setpoint value		Word	0x007F	0x003F	INT
132 - Setpoint value 3 xxx.x %	Speed setpoint CAN		Word	0x0080	0x0040	INT
133 - Setpoint value 4 xxx.x	Free		Word	0x0081	0x0041	INT
134 - Info word CPU	Depending on STEUBYTEA01		Word	0x0082	0x0043	INT
135 - Operation byte 1	OFF	Bit 0	Byte	0x0083	0x0001	Bool
	Manual	Bit 1	Byte	0x0083	0x0001	Bool
	Test	Bit 2	Byte	0x0083	0x0001	Bool
	Auto	Bit 3	Byte	0x0083	0x0001	Bool
	Start	Bit 4	Byte	0x0083	0x0001	Bool
	Internal setpoint value ON	Bit 5	Byte	0x0083	0x0001	Bool
	Operation	Bit 6	Byte	0x0083	0x0001	Bool
	Signal test	Bit 7	Byte	0x0083	0x0001	Bool
136 - Operation byte 2	Gen CB ON	Bit 0	Byte	0x0084	0x0002	Bool
	Mains CB ON	Bit 1	Byte	0x0084	0x0002	Bool
	Impurity release dir.1	Bit 2	Byte	0x0084	0x0002	Bool
	Mains parallel operation	Bit 3	Byte	0x0084	0x0002	Bool
	50Hz regulation	Bit 4	Byte	0x0084	0x0002	Bool
	DeltaF_release	Bit 5	Byte	0x0084	0x0002	Bool
	Syn release	Bit 6	Byte	0x0084	0x0002	Bool
	Load control ON	Bit 7	Byte	0x0084	0x0002	Bool
137 - Operation byte 3	Stopping	Bit 0	Byte	0x0085	0x0003	Bool
	Warning	Bit 1	Byte	0x0085	0x0003	Bool
	Operating modes selection block	Bit 2	Byte	0x0085	0x0003	Bool
	Sprinkler operation	Bit 3	Byte	0x0085	0x0003	Bool
	Speed down	Bit 4	Byte	0x0085	0x0003	Bool
	Speed up	Bit 5	Byte	0x0085	0x0003	Bool
	Speed governor reset	Bit 6	Byte	0x0085	0x0003	Bool
	Remote start	Bit 7	Byte	0x0085	0x0003	Bool
138 - Operation byte 4	Generator voltage	Bit 0	Byte	0x0086	0x0004	Bool
	Mains voltage	Bit 1	Byte	0x0086	0x0004	Bool
	Spare input Fct 1	Bit 2	Byte	0x0086	0x0004	Bool
	Spare input Fct 2	Bit 3	Byte	0x0086	0x0004	Bool
	Spare input Fct 3	Bit 4	Byte	0x0086	0x0004	Bool
	Mains protection U	Bit 5	Byte	0x0086	0x0004	Bool
	Mains protection F	Bit 6	Byte	0x0086	0x0004	Bool
	Sprinkler demand	Bit 7	Byte	0x0086	0x0004	Bool

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
139 - Operation byte 5	Horn (new error message)	Bit 0	Byte	0x0087	0x0005	Bool
	Collective fault	Bit 1	Byte	0x0087	0x0005	Bool
	Mains protection release	Bit 2	Byte	0x0087	0x0005	Bool
	CosPhi control ON	Bit 3	Byte	0x0087	0x0005	Bool
	Voltage down	Bit 4	Byte	0x0087	0x0005	Bool
	Voltage up	Bit 5	Byte	0x0087	0x0005	Bool
	Voltage control reset	Bit 6	Byte	0x0087	0x0005	Bool
	Diff protection blocking edge contr.	Bit 7	Byte	0x0087	0x0005	Bool
140 - Operation byte 6	Override interlocking	Bit 0	Byte	0x0088	0x0006	Bool
	Ready for operation	Bit 1	Byte	0x0088	0x0006	Bool
	Stop valve ON	Bit 2	Byte	0x0088	0x0006	Bool
	Speed reduction delay running	Bit 3	Byte	0x0088	0x0006	Bool
	Initial connection release Pilot_FE	Bit 4	Byte	0x0088	0x0006	Bool
	Remote control active (PB1)	Bit 5	Byte	0x0088	0x0006	Bool
	BDEW Release U(t)	Bit 6	Byte	0x0088	0x0006	Bool
	Start blocking active	Bit 7	Byte	0x0088	0x0006	Bool
141 - Input byte CPU	Ignition speed reached	Bit 0	Byte	0x0089	0x0007	Bool
	Remote start	Bit 1	Byte	0x0089	0x0007	Bool
	Emergency stop	Bit 2	Byte	0x0089	0x0007	Bool
	Speed monitoring (pick-up)	Bit 3	Byte	0x0089	0x0007	Bool
	Standby connect mode VDE4105	Bit 4	Byte	0x0089	0x0007	Bool
	Lock setpoint control U (DE153)	Bit 5	Byte	0x0089	0x0007	Bool
	Lock setpoint control F (DE154)	Bit 6	Byte	0x0089	0x0007	Bool
	Free	Bit 7	Byte	0x0089	0x0007	Bool
142 - Output byte 1	DO101*	Bit 0	Byte	0x008A	0x0031	Bool
	DO102*	Bit 1	Byte	0x008A	0x0031	Bool
	DO103*	Bit 2	Byte	0x008A	0x0031	Bool
	DO104*	Bit 3	Byte	0x008A	0x0031	Bool
	DO105*	Bit 4	Byte	0x008A	0x0031	Bool
	DO106*	Bit 5	Byte	0x008A	0x0031	Bool
	DO107*	Bit 6	Byte	0x008A	0x0031	Bool
	DO108*	Bit 7	Byte	0x008A	0x0031	Bool
143 - Output byte 2	DO109*	Bit 0	Byte	0x008B	0x0032	Bool
	DO110*	Bit 1	Byte	0x008B	0x0032	Bool
	DO111*	Bit 2	Byte	0x008B	0x0032	Bool
	Free	Bit 3	Byte	0x008B	0x0032	Bool
	Free	Bit 4	Byte	0x008B	0x0032	Bool
	Free	Bit 5	Byte	0x008B	0x0032	Bool
	Free	Bit 6	Byte	0x008B	0x0032	Bool
	Free	Bit 7	Byte	0x008B	0x0032	Bool
144 - Output byte 3	DO201*	Bit 0	Byte	0x008C	0x0033	Bool
	DO202*	Bit 1	Byte	0x008C	0x0033	Bool
	DO203*	Bit 2	Byte	0x008C	0x0033	Bool
	DO204*	Bit 3	Byte	0x008C	0x0033	Bool
	DO205*	Bit 4	Byte	0x008C	0x0033	Bool
	DO206*	Bit 5	Byte	0x008C	0x0033	Bool
	DO207*	Bit 6	Byte	0x008C	0x0033	Bool
	DO208*	Bit 7	Byte	0x008C	0x0033	Bool
145 - Output byte 4	DO209*	Bit 0	Byte	0x008D	0x0034	Bool
	DO210*	Bit 1	Byte	0x008D	0x0034	Bool
	DO211*	Bit 2	Byte	0x008D	0x0034	Bool
	Free	Bit 3	Byte	0x008D	0x0034	Bool
	Free	Bit 4	Byte	0x008D	0x0034	Bool
	Free	Bit 5	Byte	0x008D	0x0034	Bool
	Free	Bit 6	Byte	0x008D	0x0034	Bool
	Free	Bit 7	Byte	0x008D	0x0034	Bool
146 - Output byte 5	DO301*	Bit 0	Byte	0x008E	0x0035	Bool
	DO302*	Bit 1	Byte	0x008E	0x0035	Bool
	DO303*	Bit 2	Byte	0x008E	0x0035	Bool
	DO304*	Bit 3	Byte	0x008E	0x0035	Bool
	DO305*	Bit 4	Byte	0x008E	0x0035	Bool
	DO306*	Bit 5	Byte	0x008E	0x0035	Bool
	DO307*	Bit 6	Byte	0x008E	0x0035	Bool
	DO308*	Bit 7	Byte	0x008E	0x0035	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
147 - Output byte 6	DO309*	Bit 0	Byte	0x008F	0x0036	Bool
	DO310*	Bit 1	Byte	0x008F	0x0036	Bool
	DO311*	Bit 2	Byte	0x008F	0x0036	Bool
	Free	Bit 3	Byte	0x008F	0x0036	Bool
	Free	Bit 4	Byte	0x008F	0x0036	Bool
	Free	Bit 5	Byte	0x008F	0x0036	Bool
	Free	Bit 6	Byte	0x008F	0x0036	Bool
	Free	Bit 7	Byte	0x008F	0x0036	Bool
148 - Output byte 7	DO401*	Bit 0	Byte	0x0090	0x0037	Bool
	DO402*	Bit 1	Byte	0x0090	0x0037	Bool
	DO403*	Bit 2	Byte	0x0090	0x0037	Bool
	DO404*	Bit 3	Byte	0x0090	0x0037	Bool
	DO405*	Bit 4	Byte	0x0090	0x0037	Bool
	DO406*	Bit 5	Byte	0x0090	0x0037	Bool
	DO407*	Bit 6	Byte	0x0090	0x0037	Bool
	DO408*	Bit 7	Byte	0x0090	0x0037	Bool
149 - Output byte 8	DO409*	Bit 0	Byte	0x0091	0x0038	Bool
	DO410*	Bit 1	Byte	0x0091	0x0038	Bool
	DO411*	Bit 2	Byte	0x0091	0x0038	Bool
	Free	Bit 3	Byte	0x0091	0x0038	Bool
	Free	Bit 4	Byte	0x0091	0x0038	Bool
	Free	Bit 5	Byte	0x0091	0x0038	Bool
	Free	Bit 6	Byte	0x0091	0x0038	Bool
	Free	Bit 7	Byte	0x0091	0x0038	Bool
150 - Output byte 9	DO501*	Bit 0	Byte	0x0092	0x0039	Bool
	DO502*	Bit 1	Byte	0x0092	0x0039	Bool
	DO503*	Bit 2	Byte	0x0092	0x0039	Bool
	DO504*	Bit 3	Byte	0x0092	0x0039	Bool
	DO505*	Bit 4	Byte	0x0092	0x0039	Bool
	DO506*	Bit 5	Byte	0x0092	0x0039	Bool
	DO507*	Bit 6	Byte	0x0092	0x0039	Bool
	DO508*	Bit 7	Byte	0x0092	0x0039	Bool
151 - Output byte 10	DO509*	Bit 0	Byte	0x0093	0x003A	Bool
	DO510*	Bit 1	Byte	0x0093	0x003A	Bool
	DO511*	Bit 2	Byte	0x0093	0x003A	Bool
	Free	Bit 3	Byte	0x0093	0x003A	Bool
	Free	Bit 4	Byte	0x0093	0x003A	Bool
	Free	Bit 5	Byte	0x0093	0x003A	Bool
	Free	Bit 6	Byte	0x0093	0x003A	Bool
	Free	Bit 7	Byte	0x0093	0x003A	Bool
152 - Output byte 11	PM2 - DO01 – MCB ready (open)	Bit 0	Byte	0x0094	0x003B	Bool
	PM2 - DO02 – MCB on	Bit 1	Byte	0x0094	0x003B	Bool
	PM2 - DO03 – GCB ready (closed)	Bit 2	Byte	0x0094	0x003B	Bool
	PM2 - DO04 – GCB on	Bit 3	Byte	0x0094	0x003B	Bool
	PM2 - DO05 – Mains protection MCB (NO)	Bit 4	Byte	0x0094	0x003B	Bool
	PM2 - DO06 – Mains protection GCB (NC)	Bit 5	Byte	0x0094	0x003B	Bool
	PM2 - DO07 – Collective fault (NC)	Bit 6	Byte	0x0094	0x003B	Bool
	PM2 - DO08 – Watchdog (NC)	Bit 7	Byte	0x0094	0x003B	Bool
153 - Output byte 12	DM1 - DO11 – Diff current >	Bit 0	Byte	0x0095	0x003C	Bool
	DM1 - DO12 – Diff current >>	Bit 1	Byte	0x0095	0x003C	Bool
	Free	Bit 2	Byte	0x0095	0x003C	Bool
	LED1 on the tableau (DIG_LED1)*	Bit 3	Byte	0x0095	0x003C	Bool
	LED2 on the tableau (DIG_LED2)*	Bit 4	Byte	0x0095	0x003C	Bool
	LED3 on the tableau (DIG_LED3)*	Bit 5	Byte	0x0095	0x003C	Bool
	LED4 on the tableau (DIG_LED4)*	Bit 6	Byte	0x0095	0x003C	Bool
	LED5 on the tableau (DIG_LED5)*	Bit 7	Byte	0x0095	0x003C	Bool
154 - Output byte 13	Free	Bit 0	Byte	0x0096	0x003D	Bool
	Free	Bit 1	Byte	0x0096	0x003D	Bool
	Free	Bit 2	Byte	0x0096	0x003D	Bool
	Free	Bit 3	Byte	0x0096	0x003D	Bool
	PB1 – DO31*	Bit 4	Byte	0x0096	0x003D	Bool
	PB1 – DO32*	Bit 5	Byte	0x0096	0x003D	Bool
	PN1/MB1/MB2 – DO33*	Bit 6	Byte	0x0096	0x003D	Bool
	Free	Bit 7	Byte	0x0096	0x003D	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
174 - Error message 129 to 144	AL129 AI1 Modul2 – Input AI11	Bit 0	Word	0x00AC	0x0013	Bool
	AL130 AI1 Modul2 – Input AI12	Bit 1	Word	0x00AC	0x0013	Bool
	AL131 AI1 Modul2 – Input AI13	Bit 2	Word	0x00AC	0x0013	Bool
	AL132 AI1 Modul2 – Input AI14	Bit 3	Word	0x00AC	0x0013	Bool
	AL133 AI1 Modul2 – Input AI15	Bit 4	Word	0x00AC	0x0013	Bool
	AL134 AI1 Modul2 – Input AI16	Bit 5	Word	0x00AC	0x0013	Bool
	AL135 AI1 Modul3 – Input AI17	Bit 6	Word	0x00AC	0x0013	Bool
	AL136 AI1 Modul3 – Input AI18	Bit 7	Word	0x00AC	0x0013	Bool
	AL137 AI1 Modul3 – Input AI19	Bit 8	Word	0x00AC	0x0013	Bool
	AL138 AI1 Modul3 – Input AI20	Bit 9	Word	0x00AC	0x0013	Bool
	AL139 AI1 Modul3 – Input AI21	Bit 10	Word	0x00AC	0x0013	Bool
	AL140 AI1 Modul3 – Input AI22	Bit 11	Word	0x00AC	0x0013	Bool
	Free	Bit 12	Word	0x00AC	0x0013	Bool
	Free	Bit 13	Word	0x00AC	0x0013	Bool
	Free	Bit 14	Word	0x00AC	0x0013	Bool
	Free	Bit 15	Word	0x00AC	0x0013	Bool
175 - Error message 145 to 160	AL145 AT1 Modul1 – Input PT1 > *	Bit 0	Word	0x00AD	0x0014	Bool
	AL146 AT1 Modul1 – Input PT1 >> *	Bit 1	Word	0x00AD	0x0014	Bool
	AL147 AT1 Modul1 – Input PT2 > *	Bit 2	Word	0x00AD	0x0014	Bool
	AL148 AT1 Modul1 – Input PT2 >> *	Bit 3	Word	0x00AD	0x0014	Bool
	AL149 AT1 Modul1 – Input PT3 > *	Bit 4	Word	0x00AD	0x0014	Bool
	AL150 AT1 Modul1 – Input PT3 >> *	Bit 5	Word	0x00AD	0x0014	Bool
	AL151 AT1 Modul1 – Input PT4 > *	Bit 6	Word	0x00AD	0x0014	Bool
	AL152 AT1 Modul1 – Input PT4 >> *	Bit 7	Word	0x00AD	0x0014	Bool
	AL153 AT1 Modul1 – Input PT5 > *	Bit 8	Word	0x00AD	0x0014	Bool
	AL154 AT1 Modul1 – Input PT5 >> *	Bit 9	Word	0x00AD	0x0014	Bool
	AL155 AT1 Modul1 – Input PT6 > *	Bit 10	Word	0x00AD	0x0014	Bool
	AL156 AT1 Modul1 – Input PT6 >> *	Bit 11	Word	0x00AD	0x0014	Bool
	AL157 AT1 Modul1 – Input AI23 > *	Bit 12	Word	0x00AD	0x0014	Bool
	AL158 AT1 Modul1 – Input AI23 >> *	Bit 13	Word	0x00AD	0x0014	Bool
	AL159 AT1 Modul1 – Input AI24 > *	Bit 14	Word	0x00AD	0x0014	Bool
	AL160 AT1 Modul1 – Input AI24 >> *	Bit 15	Word	0x00AD	0x0014	Bool
176 - Error message 161 to 176	AL161 AT1 Modul2 – Input PT7 > *	Bit 0	Word	0x00AE	0x0015	Bool
	AL162 AT1 Modul2 – Input PT7 >> *	Bit 1	Word	0x00AE	0x0015	Bool
	AL163 AT1 Modul2 – Input PT8 > *	Bit 2	Word	0x00AE	0x0015	Bool
	AL164 AT1 Modul2 – Input PT8 >> *	Bit 3	Word	0x00AE	0x0015	Bool
	AL165 AT1 Modul2 – Input PT9 > *	Bit 4	Word	0x00AE	0x0015	Bool
	AL166 AT1 Modul2 – Input PT9 >> *	Bit 5	Word	0x00AE	0x0015	Bool
	AL167 AT1 Modul2 – Input PT10 > *	Bit 6	Word	0x00AE	0x0015	Bool
	AL168 AT1 Modul2 – Input PT10 >> *	Bit 7	Word	0x00AE	0x0015	Bool
	AL169 AT1 Modul2 – Input PT11 > *	Bit 8	Word	0x00AE	0x0015	Bool
	AL170 AT1 Modul2 – Input PT11 >> *	Bit 9	Word	0x00AE	0x0015	Bool
	AL171 AT1 Modul2 – Input PT12 > *	Bit 10	Word	0x00AE	0x0015	Bool
	AL172 AT1 Modul2 – Input PT12 >> *	Bit 11	Word	0x00AE	0x0015	Bool
	AL173 AT1 Modul2 – Input AI25 > *	Bit 12	Word	0x00AE	0x0015	Bool
	AL174 AT1 Modul2 – Input AI25 >> *	Bit 13	Word	0x00AE	0x0015	Bool
	AL175 AT1 Modul2 – Input AI26 > *	Bit 14	Word	0x00AE	0x0015	Bool
	AL176 AT1 Modul2 – Input AI26 >> *	Bit 15	Word	0x00AE	0x0015	Bool
177 - Error message 177 to 192	AL177 J1939 Amber warning lamp	Bit 0	Word	0x00AF	0x0016	Bool
	AL178 J1939 Red stop lamp	Bit 1	Word	0x00AF	0x0016	Bool
	AL179 J1939 Alarm - Motor type depend.	Bit 2	Word	0x00AF	0x0016	Bool
	AL180 J1939 Alarm - Motor type depend.	Bit 3	Word	0x00AF	0x0016	Bool
	AL181 J1939 Alarm - Motor type depend.	Bit 4	Word	0x00AF	0x0016	Bool
	AL182 J1939 Alarm - Motor type depend.	Bit 5	Word	0x00AF	0x0016	Bool
	AL183 J1939 Alarm - Motor type depend.	Bit 6	Word	0x00AF	0x0016	Bool
	AL184 J1939 Alarm - Motor type depend.	Bit 7	Word	0x00AF	0x0016	Bool
	AL185 J1939 Alarm - Motor type depend.	Bit 8	Word	0x00AF	0x0016	Bool
	AL186 J1939 Alarm - Motor type depend.	Bit 9	Word	0x00AF	0x0016	Bool
	AL187 J1939 Alarm - Motor type depend.	Bit 10	Word	0x00AF	0x0016	Bool
	AL188 J1939 Alarm - Motor type depend.	Bit 11	Word	0x00AF	0x0016	Bool
	AL189 J1939 Alarm - Motor type depend.	Bit 12	Word	0x00AF	0x0016	Bool
	AL190 J1939 Alarm - Motor type depend.	Bit 13	Word	0x00AF	0x0016	Bool
	AL191 J1939 Alarm - Motor type depend.	Bit 14	Word	0x00AF	0x0016	Bool
	AL192 J1939 Alarm - Motor type depend.	Bit 15	Word	0x00AF	0x0016	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
178 - Error message 193 to 208	AL193 J1939 Alarm - Motor type depend.	Bit 0	Word	0x00B0	0x0017	Bool
	AL194 J1939 Alarm - Motor type depend.	Bit 1	Word	0x00B0	0x0017	Bool
	AL195 J1939 Alarm - Motor type depend.	Bit 2	Word	0x00B0	0x0017	Bool
	AL196 J1939 Alarm - Motor type depend.	Bit 3	Word	0x00B0	0x0017	Bool
	AL197 J1939 Alarm - Motor type depend.	Bit 4	Word	0x00B0	0x0017	Bool
	AL198 J1939 Alarm - Motor type depend.	Bit 5	Word	0x00B0	0x0017	Bool
	AL199 J1939 Alarm - Motor type depend.	Bit 6	Word	0x00B0	0x0017	Bool
	AL200 J1939 Alarm - Motor type depend.	Bit 7	Word	0x00B0	0x0017	Bool
	AL201 J1939 Alarm - Motor type depend.	Bit 8	Word	0x00B0	0x0017	Bool
	AL202 J1939 Alarm - Motor type depend.	Bit 9	Word	0x00B0	0x0017	Bool
	AL203 J1939 Alarm - Motor type depend.	Bit 10	Word	0x00B0	0x0017	Bool
	AL204 J1939 Alarm - Motor type depend.	Bit 11	Word	0x00B0	0x0017	Bool
	AL205 J1939 Alarm - Motor type depend.	Bit 12	Word	0x00B0	0x0017	Bool
	AL206 J1939 Alarm - Motor type depend.	Bit 13	Word	0x00B0	0x0017	Bool
	AL207 J1939 Alarm - Motor type depend.	Bit 14	Word	0x00B0	0x0017	Bool
	AL208 J1939 Alarm - Motor type depend.	Bit 15	Word	0x00B0	0x0017	Bool
179 - Error message 209 to 224	AL209 J1939 Alarm - Motor type depend.	Bit 0	Word	0x00B1	0x0018	Bool
	AL210 J1939 Alarm - Motor type depend.	Bit 1	Word	0x00B1	0x0018	Bool
	AL211 J1939 Alarm - Motor type depend.	Bit 2	Word	0x00B1	0x0018	Bool
	AL212 J1939 Alarm - Motor type depend.	Bit 3	Word	0x00B1	0x0018	Bool
	AL213 J1939 Alarm - Motor type depend.	Bit 4	Word	0x00B1	0x0018	Bool
	AL214 J1939 Alarm - Motor type depend.	Bit 5	Word	0x00B1	0x0018	Bool
	AL215 J1939 Alarm - Motor type depend.	Bit 6	Word	0x00B1	0x0018	Bool
	AL216 J1939 Alarm - Motor type depend.	Bit 7	Word	0x00B1	0x0018	Bool
	AL217 J1939 Alarm - Motor type depend.	Bit 8	Word	0x00B1	0x0018	Bool
	AL218 J1939 Alarm - Motor type depend.	Bit 9	Word	0x00B1	0x0018	Bool
	AL219 J1939 Alarm - Motor type depend.	Bit 10	Word	0x00B1	0x0018	Bool
	AL220 J1939 Alarm - Motor type depend.	Bit 11	Word	0x00B1	0x0018	Bool
	AL221 J1939 Alarm - Motor type depend.	Bit 12	Word	0x00B1	0x0018	Bool
	AL222 J1939 Alarm - Motor type depend.	Bit 13	Word	0x00B1	0x0018	Bool
	AL223 J1939 Alarm - Motor type depend.	Bit 14	Word	0x00B1	0x0018	Bool
	AL224 J1939 Alarm - Motor type depend.	Bit 15	Word	0x00B1	0x0018	Bool
180 - Error message 225 to 240	AL225 J1939 Alarm - Motor type depend.	Bit 0	Word	0x00B2	0x0019	Bool
	AL226 J1939 Alarm - Motor type depend.	Bit 1	Word	0x00B2	0x0019	Bool
	AL227 J1939 Alarm - Motor type depend.	Bit 2	Word	0x00B2	0x0019	Bool
	AL228 J1939 Alarm - Motor type depend.	Bit 3	Word	0x00B2	0x0019	Bool
	AL229 J1939 Alarm - Motor type depend.	Bit 4	Word	0x00B2	0x0019	Bool
	AL230 J1939 Alarm - Motor type depend.	Bit 5	Word	0x00B2	0x0019	Bool
	AL231 J1939 Alarm - Motor type depend.	Bit 6	Word	0x00B2	0x0019	Bool
	AL232 J1939 Alarm - Motor type depend.	Bit 7	Word	0x00B2	0x0019	Bool
	AL233 J1939 Alarm - Motor type depend.	Bit 8	Word	0x00B2	0x0019	Bool
	AL234 J1939 Alarm - Motor type depend.	Bit 9	Word	0x00B2	0x0019	Bool
	AL235 J1939 Alarm - Motor type depend.	Bit 10	Word	0x00B2	0x0019	Bool
	AL236 J1939 Alarm - Motor type depend.	Bit 11	Word	0x00B2	0x0019	Bool
	AL237 J1939 Alarm - Motor type depend.	Bit 12	Word	0x00B2	0x0019	Bool
	AL238 J1939 Alarm - Motor type depend.	Bit 13	Word	0x00B2	0x0019	Bool
	AL239 J1939 Alarm - Motor type depend.	Bit 14	Word	0x00B2	0x0019	Bool
	AL240 J1939 Alarm - CAN BUS fault	Bit 15	Word	0x00B2	0x0019	Bool
181 - Error message 241 to 256	Error messages 241 (Free input*)	Bit 0	Word	0x00B3	0x001A	Bool
	Error messages 242 (Free input*)	Bit 1	Word	0x00B3	0x001A	Bool
	Error messages 243 (Free input*)	Bit 2	Word	0x00B3	0x001A	Bool
	Error messages 244 (Free input*)	Bit 3	Word	0x00B3	0x001A	Bool
	Error messages 245 (Free input*)	Bit 4	Word	0x00B3	0x001A	Bool
	Error messages 246 (Free input*)	Bit 5	Word	0x00B3	0x001A	Bool
	Error messages 247 (Free input*)	Bit 6	Word	0x00B3	0x001A	Bool
	Error messages 248 (Free input*)	Bit 7	Word	0x00B3	0x001A	Bool
	Error messages 249 (Free input*)	Bit 8	Word	0x00B3	0x001A	Bool
	Error messages 250 (Free input*)	Bit 9	Word	0x00B3	0x001A	Bool
	Error messages 251 (Free input*)	Bit 10	Word	0x00B3	0x001A	Bool
	Error messages 252 (Free input*)	Bit 11	Word	0x00B3	0x001A	Bool
	Error messages 253 (Free input*)	Bit 12	Word	0x00B3	0x001A	Bool
	Error messages 254 (Free input*)	Bit 13	Word	0x00B3	0x001A	Bool
	Error messages 255 (Free input*)	Bit 14	Word	0x00B3	0x001A	Bool
	Error message 256 - Blocked	Bit 15	Word	0x00B3	0x001A	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
182 - Error message 257 to 272	Error message 257-272 (Not released in the KSS)	Bit 0-15	Word	0x00B4	0x001B	Bool
183 - Error message 273 to 288	Error message 273-288 (Not released in the KSS)	Bit 0-15	Word	0x00B5	0x001C	Bool
184 - Error message 289 to 304	Error message 289-304 (Not released in the KSS)	Bit 0-15	Word	0x00B6	0x001D	Bool
185 - Error message 305 to 320	Error message 305-320 (Not released in the KSS)	Bit 0-15	Word	0x00B7	0x001E	Bool
186 - Error message 321 to 336	Error message 321-336 (Not released in the KSS)	Bit 0-15	Word	0x00B8	0x001F	Bool
187 - Error message 337 to 352	Error message 337-352 (Not released in the KSS)	Bit 0-15	Word	0x00B9	0x0020	Bool
188 - Error message 353 to 368	Error message 353-368 (Not released in the KSS)	Bit 0-15	Word	0x00BA	0x0021	Bool
189 - Error message 369 to 384	Error message 369-384 (Not released in the KSS)	Bit 0-15	Word	0x00BB	0x0022	Bool
190 - Error message 385 to 400	Error message 385-400 (Not released in the KSS)	Bit 0-15	Word	0x00BC	0x0023	Bool
191 - Error message 401 to 416	Error message 401-416 (Not released in the KSS)	Bit 0-15	Word	0x00BD	0x0024	Bool
192 - Error message 417 to 432	Error message 417-432 (Not released in the KSS)	Bit 0-15	Word	0x00BE	0x0025	Bool
193 - Error message 433 to 448	Error message 433-448 (Not released in the KSS)	Bit 0-15	Word	0x00BF	0x0026	Bool
194 - Error message 449 to 464	Error message 449-464 (Not released in the KSS)	Bit 0-15	Word	0x00C0	0x0027	Bool
195 - Error message 465 to 480	Error message 465-480 (Not released in the KSS)	Bit 0-15	Word	0x00C1	0x0028	Bool
196 - Error message 481 to 496	Error message 481-496 (Not released in the KSS)	Bit 0-15	Word	0x00C2	0x0029	Bool
197 - Error message 497 to 512	Error message 497-512 (Not released in the KSS)	Bit 0-15	Word	0x00C3	0x002A	Bool
207 - KWH- counter xxxxx kWh	KWH counter		D-Word	0x00CD	0x00D9	DINT
208 – Start counter xxxxx Start(s)	Start counter		D-Word	0x00CE	0x00DA	DINT
209 - Operation counter xxxxx h	Operation counter		D-Word	0x00CF	0x00DB	DINT
234 – CAN picture 1 / Word 1-8	8 Analog values read		8 x D-Word	0x00E8	0x00F4	DINT
235 – CAN picture 2 / Word 1-8	8 Analog values read		8 x D-Word	0x00E9	0x00F5	DINT
236 – CAN picture 3 / Word 1-8	8 Analog values read		8 x D-Word	0x00EA	0x00F6	DINT
237 – CAN picture 4 / Word 1-8	8 Analog values read		8 x D-Word	0x00EB	0x00F7	DINT
238 – CAN picture 5	8 Binär values read		8 x D-Word	0x00EC	0x00F8	DINT
239 – CAN picture 6	5 Binär values write		5 x D-Word	0x00ED	0x00F9	DINT
240 – CAN picture 6	3 Analog values write		3 x D-Word	0x00EE	0x00FA	DINT

* See parameterization KSS

14.3 PM2 Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1	Type
4 - Generator F1 xx.xx Hz	Generator frequency L1		Word	0x0000	0x0066	INT
5 - Generator F2 xx.xx Hz	Generator frequency L2		Word	0x0001	0x0067	INT
6 - Generator F3 xx.xx Hz	Generator frequency L3		Word	0x0002	0x0068	INT
7 - Generator U1-N xxxx V	Generator voltage L1-N		Word	0x0003	0x006C	INT
8 - Generator U2-N xxxx V	Generator voltage L2-N		Word	0x0004	0x006D	INT
9 - Generator U3-N xxxx V	Generator voltage L3-N		Word	0x0005	0x006E	INT
10 - Generator U1-U2 xxxx V	Generator voltage L1-2		Word	0x0006	0x006F	INT
11 - Generator U2-U3 xxxx V	Generator voltage L2-3		Word	0x0007	0x0070	INT
12 - Generator U3-U1 xxxx V	Generator voltage L3-1		Word	0x0008	0x0071	INT
13 - Mains F1 xx.xx Hz	Mains/Bus frequency L1		Word	0x0009	0x0079	INT
14 - Mains F2 xx.xx Hz	Mains/Bus frequency L2		Word	0x000A	0x007A	INT
15 - Mains F3 xx.xx Hz	Mains/Bus frequency L3		Word	0x000B	0x007B	INT
16 - Mains U1-N xxxx V	Mains/Bus voltage L1-N		Word	0x000C	0x007F	INT
17 - Mains U2-N xxxx V	Mains/Bus voltage L2-N		Word	0x000D	0x0080	INT
18 - Mains U3-N xxxx V	Mains/Bus voltage L3-N		Word	0x000E	0x0081	INT
19 - Mains U1-U2 xxxx V	Mains/Bus voltage L1-2		Word	0x000F	0x0082	INT
20 - Mains U2-U3 xxxx V	Mains/Bus voltage L2-3		Word	0x0010	0x0083	INT
21 - Mains U3-U1 xxxx V	Mains/Bus voltage L3-1		Word	0x0011	0x0084	INT
22 - Current I1 xx.xx Hz	Freq. generator current L1		Word	0x0012	0x008A	INT
23 - Current I2 xx.xx Hz	Freq. generator current L2		Word	0x0013	0x008B	INT
24 - Generator I1 xxxx.xx A	Generator current L1		D-Word	0x0014	0x008D	DINT

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
25 - Generator I2 xxxx.xx A	Generator current L2		D-Word	0x0015	0x008E	DINT
26 - Generator I2 xxxx.xx A	Generator current L3		D-Word	0x0016	0x008F	DINT
27 - Generator P1 xxxx.xx kW	Active power L1		D-Word	0x0017	0x0095	DINT
28 - Generator P2 xxxx.xx kW	Active power L2		D-Word	0x0018	0x0096	DINT
29 - Generator P3 xxxx.xx kW	Active power L3		D-Word	0x0019	0x0097	DINT
30 - Generator S1 xxxx.xx kVA	Apparent power L1		D-Word	0x001A	0x0098	DINT
31 - Generator S2 xxxx.xx kVA	Apparent power L2		D-Word	0x001B	0x0099	DINT
32 - Generator S3 xxxx.xx kVA	Apparent power L3		D-Word	0x001C	0x009A	DINT
33 - Gen. Wirkleistung xxxx.xx kW	Total active power		D-Word	0x001D	0x009B	DINT
34 - Gen. Blindleistung xxxx.xx kVAR	Total reactive power		D-Word	0x001E	0x009C	DINT
35 - Gen. Scheinleistung xxxx.xx kVA	Total apparent power		D-Word	0x001F	0x009D	DINT
36 - Generator CosPhi +/- 1.xxx	Generator Cos Phi		Word	0x0020	0x009E	INT
37 - Netz U1 xxx.x %	Mains/Bus voltage L1		Word	0x0021	0x0085	INT
38 - Netz U2 xxx.x %	Mains/Bus voltage L2		Word	0x0022	0x0086	INT
39 - Netz U3 xxx.x %	Mains/Bus voltage L3		Word	0x0023	0x0087	INT
40 - Generator U1 xxx.x %	Generator voltage L1		Word	0x0024	0x0072	INT
41 - Generator U2 xxx.x %	Generator voltage L2		Word	0x0025	0x0073	INT
42 - Generator U3 xxx.x %	Generator voltage L3		Word	0x0026	0x0074	INT
43 - Generator I1 xxx.x %	Generator current L1		Word	0x0027	0x0090	INT
44 - Generator I2 xxx.x %	Generator current L2		Word	0x0028	0x0091	INT
45 - Generator I3 xxx.x %	Generator current L3		Word	0x0029	0x0092	INT
46 - Generator P1 xxx.x %	Generator active power P1		Word	0x002A	0x009F	INT
47 - Generator P2 xxx.x %	Generator active power P2		Word	0x002B	0x00A0	INT
48 - Generator P3 xxx.x %	Generator active power P3		Word	0x002C	0x00A1	INT
49 - Generator S1 xxx.x %	Generator apparent power S1		Word	0x002D	0x00A2	INT
50 - Generator S2 xxx.x %	Generator apparent power S2		Word	0x002E	0x00A3	INT
51 - Generator S3 xxx.x %	Generator apparent power S3		Word	0x002F	0x00A4	INT
52 - Gen. Scheinleistung xxx.x %	Total apparent power		Word	0x0030	0x00A5	INT
53 - Gen. Blindleistung xxx.x %	Total reactive power		Word	0x0031	0x00A6	INT
54 - Gen. Gesamtleistung xxx.x %	Total active power		Word	0x0032	0x00A7	INT
PM2 Cotrol byte for info word	Frei	Bit 0	Byte	0x0033	0x00A8	Bool
	Angel for SYN	Bit 1	Byte	0x0033	0x00A8	Bool
	Earth current in xxx.x %	Bit 2	Byte	0x0033	0x00A8	Bool
	Earth current in xxxx.x A	Bit 3	Byte	0x0033	0x00A8	Bool
	Frei	Bit 4	Byte	0x0033	0x00A8	Bool
	Frei	Bit 5	Byte	0x0033	0x00A8	Bool
	Frei	Bit 6	Byte	0x0033	0x00A8	Bool
	Frei	Bit 7	Byte	0x0033	0x00A8	Bool
PM2 Info word	Show info word		Word	0x0034	0x00A9	INT
55 - Gen. Winkel L1-2 xxx°	Generator voltage angle L1-2		Word	0x0033	0x0069	INT
56 - Gen. Winkel L2-3 xxx°	Generator voltage angle L2-3		Word	0x0034	0x006A	INT
57 - Gen. Winkel L3-1 xxx°	Generator voltage angle L3-1		Word	0x0035	0x006B	INT
58 - Netz Winkel L1-2 xxx°	Mains voltage angle L1-2		Word	0x0036	0x007C	INT
59 - Netz Winkel L2-3 xxx°	Mains voltage angle L2-3		Word	0x0037	0x007D	INT
60 - Netz Winkel L3-1 xxx°	Mains voltage angle L3-1		Word	0x0038	0x007E	INT
61 - Strom Winkel L1-2 xxx°	Generator current angle L1-2		Word	0x0039	0x008C	INT
62 - Gen. Spannungsbyte Generator voltage byte	Generator voltage detected L1	Bit 0	Byte	0x003A	0x005F	Bool
	Generator voltage detected L2	Bit 1	Byte	0x003A	0x005F	Bool
	Generator voltage detected L3	Bit 2	Byte	0x003A	0x005F	Bool
	Nom. voltage detected L1+2+3	Bit 3	Byte	0x003A	0x005F	Bool
	Voltage >	Bit 4	Byte	0x003A	0x005F	Bool
	Voltage <	Bit 5	Byte	0x003A	0x005F	Bool
	Voltage >>	Bit 6	Byte	0x003A	0x005F	Bool
	Voltage <<	Bit 7	Byte	0x003A	0x005F	Bool

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
63 - Gen. Frequenzbyte Generator frequency byte	Generator frequency detected L1	Bit 0	Byte	0x003B	0x0060	Bool
	Generator frequency detected L2	Bit 1	Byte	0x003B	0x0060	Bool
	Generator frequency detected L3	Bit 2	Byte	0x003B	0x0060	Bool
	Nom frequency detected L1+2+3	Bit 3	Byte	0x003B	0x0060	Bool
	Frequency >	Bit 4	Byte	0x003B	0x0060	Bool
	Frequency <	Bit 5	Byte	0x003B	0x0060	Bool
	Frequency >>	Bit 6	Byte	0x003B	0x0060	Bool
	Frequency <<	Bit 7	Byte	0x003B	0x0060	Bool
64 - Gen. Netzschutzbyte Mains protection byte	Mains protection vector >	Bit 0	Byte	0x003C	0x0061	Bool
	Mains protection vector >>	Bit 1	Byte	0x003C	0x0061	Bool
	Mains protection U>	Bit 2	Byte	0x003C	0x0061	Bool
	Mains protection U<	Bit 3	Byte	0x003C	0x0061	Bool
	Mains protection F>	Bit 4	Byte	0x003C	0x0061	Bool
	Mains protection F<	Bit 5	Byte	0x003C	0x0061	Bool
	Mains protection collective fault	Bit 6	Byte	0x003C	0x0061	Bool
	Mains protection released	Bit 7	Byte	0x003C	0x0061	Bool
65 - Gen. Vektorbyte 1 Generator vector byte 1	Dif. vector surge L1 > (plus)	Bit 0	Byte	0x003D	0x0062	Bool
	Dif. vector surge L2 > (plus)	Bit 1	Byte	0x003D	0x0062	Bool
	Dif. vector surge L3 > (plus)	Bit 2	Byte	0x003D	0x0062	Bool
	Dif. vektor surge L1 > (minus)	Bit 3	Byte	0x003D	0x0062	Bool
	Dif. vektor surge L2 > (minus)	Bit 4	Byte	0x003D	0x0062	Bool
	Dif. vektor surge L2 > (minus)	Bit 5	Byte	0x003D	0x0062	Bool
	Mains protection U<<	Bit 6	Byte	0x003D	0x0062	Bool
	Mains protection U>>	Bit 7	Byte	0x003D	0x0062	Bool
66 - Gen. Vektorbyte 2 Generator vector byte 2	Dif. vector surge L1 >> (plus)	Bit 0	Byte	0x003E	0x0063	Bool
	Dif. vector surge L2 >> (plus)	Bit 1	Byte	0x003E	0x0063	Bool
	Dif. vector surge L3 >> (plus)	Bit 2	Byte	0x003E	0x0063	Bool
	Dif. vektor surge L1 >> (minus)	Bit 3	Byte	0x003E	0x0063	Bool
	Dif. vektor surge L2 >> (minus)	Bit 4	Byte	0x003E	0x0063	Bool
	Dif. vektor surge L2 >> (minus)	Bit 5	Byte	0x003E	0x0063	Bool
	Mains protection F<<	Bit 6	Byte	0x003E	0x0063	Bool
	Mains protection F>>	Bit 7	Byte	0x003E	0x0063	Bool
67 - Gen. Winkelbyte Generator angle byte	Generator rotating field error	Bit 0	Byte	0x003F	0x0064	Bool
	Voltage angle error L1	Bit 1	Byte	0x003F	0x0064	Bool
	Voltage angle error L2	Bit 2	Byte	0x003F	0x0064	Bool
	Voltage angle error L3	Bit 3	Byte	0x003F	0x0064	Bool
	Voltage asymmetry	Bit 4	Byte	0x003F	0x0064	Bool
	Q-U protection <	Bit 5	Byte	0x003F	0x0064	Bool
	Cos Phi capazitive	Bit 6	Byte	0x003F	0x0064	Bool
	Cos Phi inductive	Bit 7	Byte	0x003F	0x0064	Bool
68 - Gen. Synchronisationsbyte Synchronization byte	SYN-Pulse	Bit 0	Byte	0x0040	0x0065	Bool
	Delta F OK	Bit 1	Byte	0x0040	0x0065	Bool
	Delta U OK	Bit 2	Byte	0x0040	0x0065	Bool
	Pulse voltage +	Bit 3	Byte	0x0040	0x0065	Bool
	Pulse voltage -	Bit 4	Byte	0x0040	0x0065	Bool
	Pulse frequency +	Bit 5	Byte	0x0040	0x0065	Bool
	Pulse frequency -	Bit 6	Byte	0x0040	0x0065	Bool
	Q-U protection <<	Bit 7	Byte	0x0040	0x0065	Bool
69 - Netz Spannungsbyte Mains voltage byte	Mains voltage detected L1	Bit 0	Byte	0x0041	0x0075	Bool
	Mains voltage detected L2	Bit 1	Byte	0x0041	0x0075	Bool
	Mains voltage detected L3	Bit 2	Byte	0x0041	0x0075	Bool
	Nom. Voltage detected L1+2+3	Bit 3	Byte	0x0041	0x0075	Bool
	Voltage >	Bit 4	Byte	0x0041	0x0075	Bool
	Voltage <	Bit 5	Byte	0x0041	0x0075	Bool
	Voltage >>	Bit 6	Byte	0x0041	0x0075	Bool
	Voltage <<	Bit 7	Byte	0x0041	0x0075	Bool
70 - Netz Frequenzbyte Mains frequency byte	Mains frequency detected L1	Bit 0	Byte	0x0042	0x0076	Bool
	Mains frequency detected L2	Bit 1	Byte	0x0042	0x0076	Bool
	Mains frequency detected L3	Bit 2	Byte	0x0042	0x0076	Bool
	Nom frequency detected L1+2+3	Bit 3	Byte	0x0042	0x0076	Bool
	Frequency >	Bit 4	Byte	0x0042	0x0076	Bool
	Frequency <	Bit 5	Byte	0x0042	0x0076	Bool
	Frequency >>	Bit 6	Byte	0x0042	0x0076	Bool
	Frequency <<	Bit 7	Byte	0x0042	0x0076	Bool

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
71 - Netz Winkelbyte Mains angle byte	Mains rotating field error	Bit 0	Byte	0x0043	0x0078	Bool
	Voltage angle error L1	Bit 1	Byte	0x0043	0x0078	Bool
	Voltage angle error L2	Bit 2	Byte	0x0043	0x0078	Bool
	Voltage angle error L3	Bit 3	Byte	0x0043	0x0078	Bool
	Voltage asymmetry	Bit 4	Byte	0x0043	0x0078	Bool
	Free	Bit 5	Byte	0x0043	0x0078	Bool
	BDEW U(t) time is running	Bit 6	Byte	0x0043	0x0078	Bool
	BDEW U(t) fault	Bit 7	Byte	0x0043	0x0078	Bool
72 - Gen Strombyte Generator current byte 1	Generator current detected I1	Bit 0	Byte	0x0044	0x0088	Bool
	Generator current detected I2	Bit 1	Byte	0x0044	0x0088	Bool
	Generator current detected I3	Bit 2	Byte	0x0044	0x0088	Bool
	Nom. current detected L1+2+3	Bit 3	Byte	0x0044	0x0088	Bool
	Overcurrent >	Bit 4	Byte	0x0044	0x0088	Bool
	Overcurrent >>	Bit 5	Byte	0x0044	0x0088	Bool
	Overcurrent VDE100-718	Bit 6	Byte	0x0044	0x0088	Bool
	Overcurrent time protection	Bit 7	Byte	0x0044	0x0088	Bool
73 - Gen. Leistungsbyte Generator power byte 1	Loaded	Bit 0	Byte	0x0045	0x0093	Bool
	Power >	Bit 1	Byte	0x0045	0x0093	Bool
	Power >>	Bit 2	Byte	0x0045	0x0093	Bool
	Reverse power >	Bit 3	Byte	0x0045	0x0093	Bool
	Reverse power >>	Bit 4	Byte	0x0045	0x0093	Bool
	Unbalanced load	Bit 5	Byte	0x0045	0x0093	Bool
	KWH Pulse	Bit 6	Byte	0x0045	0x0093	Bool
	Free	Bit 7	Byte	0x0045	0x0093	Bool
74 - Gen. S/Q-byte Generator power byte 2	Apparent power >	Bit 0	Byte	0x0046	0x0094	Bool
	Apparent power >>	Bit 1	Byte	0x0046	0x0094	Bool
	Reactive power >	Bit 2	Byte	0x0046	0x0094	Bool
	Reactive >>	Bit 3	Byte	0x0046	0x0094	Bool
	Free	Bit 4	Byte	0x0046	0x0094	Bool
	Free	Bit 5	Byte	0x0046	0x0094	Bool
	Free	Bit 6	Byte	0x0046	0x0094	Bool
	Free	Bit 7	Byte	0x0046	0x0094	Bool
75 - Gen. Stromrichtungsbyte Generator current byte 2	Current rotating field right	Bit 0	Byte	0x0047	0x0089	Bool
	Current rotating field left	Bit 1	Byte	0x0047	0x0089	Bool
	Free	Bit 2	Byte	0x0047	0x0089	Bool
	Free	Bit 3	Byte	0x0047	0x0089	Bool
	Free	Bit 4	Byte	0x0047	0x0089	Bool
	Free	Bit 5	Byte	0x0047	0x0089	Bool
	Free	Bit 6	Byte	0x0047	0x0089	Bool
	Free	Bit 7	Byte	0x0047	0x0089	Bool
173 - VDE4105 Zustandsbyte VDE4105 NA-protection byte	VDE4105 Collective fault	Bit 0	Byte	0x00AB	0x0077	Bool
	VDE4105 U< (80%)	Bit 1	Byte	0x00AB	0x0077	Bool
	VDE4105 U> (115%)	Bit 2	Byte	0x00AB	0x0077	Bool
	VDE4105 F< (47,5Hz)	Bit 3	Byte	0x00AB	0x0077	Bool
	VDE4105 F> (51,5Hz)	Bit 4	Byte	0x00AB	0x0077	Bool
	VDE4105 U> (Quality)	Bit 5	Byte	0x00AB	0x0077	Bool
	Free	Bit 6	Byte	0x00AB	0x0077	Bool
	VDE4105 Standby switching	Bit 7	Byte	0x00AB	0x0077	Bool

14.4 DM1 Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1	Type
76 - F intern Strom L1 xx.xx Hz	Frequency int. current L1		Word	0x0048	0x00AD	INT
77 - F intern Strom L2 xx.xx Hz	Frequency int. current L2		Word	0x0049	0x00AE	INT
78 - F extern Strom L1 xx.xx Hz	Frequency ext. current L1		Word	0x0048	0x00AD	INT
79 - F extern Strom L2 xx.xx Hz	Frequency ext. current L2		Word	0x0049	0x00AE	INT
80 - stabiler Strom L1 xxx.xx A	Stable current L1		D-Word	0x004C	0x00C3	DINT
81 - stabiler Strom L2 xxx.xx A	Stable current L2		D-Word	0x004D	0x00C4	DINT
82 - stabiler Strom L3 xxx.xx A	Stable current L3		D-Word	0x004E	0x00C5	DINT
83 - interner Strom L1 xxx.xx A	Current internal L1		D-Word	0x004F	0x00B2	DINT
84 - interner Strom L2 xxx.xx A	Current internal L2		D-Word	0x0050	0x00B3	DINT
85 - interner Strom L3 xxx.xx A	Current internal L3		D-Word	0x0051	0x00B4	DINT

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
86 - externer Strom L1 xxx.xx A	Current external L1		D-Word	0x0052	0x00BD	DINT
87 - externer Strom L2 xxx.xx A	Current external L2		D-Word	0x0053	0x00BE	DINT
88 - externer Strom L3 xxx.xx A	Current external L3		D-Word	0x0054	0x00BF	DINT
89 - Differenz Strom L1 xxx.xx A	Diff. current L1		D-Word	0x0055	0x00C6	DINT
90 - Differenz Strom L2 xxx.xx A	Diff. current L2		D-Word	0x0056	0x00C7	DINT
91 - Differenz Strom L3 xxx.xx A	Diff. current L3		D-Word	0x0057	0x00C8	DINT
92 - stabiler Strom I1 xxx.x %	Stable current L1		Word	0x0058	0x00C9	INT
93 - stabiler Strom I2 xxx.x %	Stable current L2		Word	0x0059	0x00CA	INT
94 - stabiler Strom I3 xxx.x %	Stable current L3		Word	0x005A	0x00CB	INT
95 - interner Strom I1 xxx.x %	Current internal L1		Word	0x005B	0x00B5	INT
96 - interner Strom I2 xxx.x %	Current internal L2		Word	0x005C	0x00B6	INT
97 - interner Strom I3 xxx.x %	Current internal L3		Word	0x005D	0x00B7	INT
98 - externer Strom I1 xxx.x %	Current external L1		Word	0x005E	0x00C0	INT
99 - externer Strom I2 xxx.x %	Current external L2		Word	0x005F	0x00C1	INT
100 - externer Strom I3 xxx.x %	Current external L3		Word	0x0060	0x00C2	INT
101 - Differenz Strom I1 xxx.x %	Diff. current L1		Word	0x0061	0x00CC	INT
102 - Differenz Strom I2 xxx.x %	Diff. current L2		Word	0x0062	0x00CD	INT
103 - Differenz Strom I3 xxx.x %	Diff. current L3		Word	0x0063	0x00CE	INT
104 - Winkel intern I1-I2 xxx°	Angle internal L1-L2		Word	0x0064	0x00AF	INT
105 - Winkel intern I2-I3 xxx°	Angle internal L2-L3		Word	0x0065	0x00B0	INT
106 - Winkel intern I3-I1 xxx°	Angle internal L3-L1		Word	0x0066	0x00B1	INT
107 - Winkel extern I1-I2 xxx°	Angle external L1-L2		Word	0x0067	0x00BA	INT
108 - Winkel extern I2-I3 xxx°	Angle external L2-L3		Word	0x0068	0x00BB	INT
109 - Winkel extern I3-I1 xxx°	Angle external L3-L1		Word	0x0069	0x00BC	INT
110 - Winkel intern/extern L1 xxx°	Angle internal/external L1		Word	0x006A	0x00CF	INT
111 - Diff.byte Intern Diff. current byte internal	Current internal detected I1	Bit 0	Byte	0x006B	0x00AA	Bool
	Current internal detected I2	Bit 1	Byte	0x006B	0x00AA	Bool
	Current internal detected I3	Bit 2	Byte	0x006B	0x00AA	Bool
	Nom. current detected L1+2+3	Bit 3	Byte	0x006B	0x00AA	Bool
	Free	Bit 4	Byte	0x006B	0x00AA	Bool
	Free	Bit 5	Byte	0x006B	0x00AA	Bool
	Diff current >	Bit 6	Byte	0x006B	0x00AA	Bool
	Diff current >>	Bit 7	Byte	0x006B	0x00AA	Bool
112 - Diff.byte Extern Diff. current byte external	Current external detected I1	Bit 0	Byte	0x006C	0x00AB	Bool
	Current external detected I2	Bit 1	Byte	0x006C	0x00AB	Bool
	Current external detected I3	Bit 2	Byte	0x006C	0x00AB	Bool
	Nom. current detected L1+2+3	Bit 3	Byte	0x006C	0x00AB	Bool
	Free	Bit 4	Byte	0x006C	0x00AB	Bool
	Free	Bit 5	Byte	0x006C	0x00AB	Bool
	85% ID at 500% triggering off	Bit 6	Byte	0x006C	0x00AB	Bool
	100% ID triggering off	Bit 7	Byte	0x006C	0x00AB	Bool
113 - Diff. Sperrbyte Diff. lock byte	Triggering disabled via DI	Bit 0	Byte	0x006D	0x00AC	Bool
	Triggering disabled Delta ID	Bit 1	Byte	0x006D	0x00AC	Bool
	Free	Bit 2	Byte	0x006D	0x00AC	Bool
	Free	Bit 3	Byte	0x006D	0x00AC	Bool
	Free	Bit 4	Byte	0x006D	0x00AC	Bool
	Free	Bit 5	Byte	0x006D	0x00AC	Bool
	Free	Bit 6	Byte	0x006D	0x00AC	Bool
	Free	Bit 7	Byte	0x006D	0x00AC	Bool

14.5 DI1 Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1	Type
198 - Eingangsbyte 1 Input byte 1	DI101*	Bit 0	Byte	0x00C4	0x0056	Bool
	DI102*	Bit 1	Byte	0x00C4	0x0056	Bool
	DI103*	Bit 2	Byte	0x00C4	0x0056	Bool
	DI104*	Bit 3	Byte	0x00C4	0x0056	Bool
	DI105*	Bit 4	Byte	0x00C4	0x0056	Bool
	DI106*	Bit 5	Byte	0x00C4	0x0056	Bool
	DI107*	Bit 6	Byte	0x00C4	0x0056	Bool
	DI108*	Bit 7	Byte	0x00C4	0x0056	Bool
199- Eingangsbyte 2 Input byte 2	DI109*	Bit 0	Byte	0x00C5	0x0057	Bool
	DI110*	Bit 1	Byte	0x00C5	0x0057	Bool
	DI111*	Bit 2	Byte	0x00C5	0x0057	Bool
	DI112*	Bit 3	Byte	0x00C5	0x0057	Bool
	DI113*	Bit 4	Byte	0x00C5	0x0057	Bool
	DI114*	Bit 5	Byte	0x00C5	0x0057	Bool
	DI115*	Bit 6	Byte	0x00C5	0x0057	Bool
	DI116*	Bit 7	Byte	0x00C5	0x0057	Bool
200 - Eingangsbyte 3 Input byte 3	DI117*	Bit 0	Byte	0x00C6	0x0058	Bool
	DI118*	Bit 1	Byte	0x00C6	0x0058	Bool
	DI119*	Bit 2	Byte	0x00C6	0x0058	Bool
	DI120*	Bit 3	Byte	0x00C6	0x0058	Bool
	DI121*	Bit 4	Byte	0x00C6	0x0058	Bool
	DI122*	Bit 5	Byte	0x00C6	0x0058	Bool
	Free	Bit 6	Byte	0x00C6	0x0058	Bool
	Free	Bit 7	Byte	0x00C6	0x0058	Bool
201 - Eingangsbyte 4 Input byte 4	DI201*	Bit 0	Byte	0x00C7	0x0059	Bool
	DI202*	Bit 1	Byte	0x00C7	0x0059	Bool
	DI203*	Bit 2	Byte	0x00C7	0x0059	Bool
	DI204*	Bit 3	Byte	0x00C7	0x0059	Bool
	DI205*	Bit 4	Byte	0x00C7	0x0059	Bool
	DI206*	Bit 5	Byte	0x00C7	0x0059	Bool
	DI207*	Bit 6	Byte	0x00C7	0x0059	Bool
	DI208*	Bit 7	Byte	0x00C7	0x0059	Bool
202 - Eingangsbyte 5 Input byte 5	DI209*	Bit 0	Byte	0x00C8	0x005A	Bool
	DI210*	Bit 1	Byte	0x00C8	0x005A	Bool
	DI211*	Bit 2	Byte	0x00C8	0x005A	Bool
	DI212*	Bit 3	Byte	0x00C8	0x005A	Bool
	DI213*	Bit 4	Byte	0x00C8	0x005A	Bool
	DI214*	Bit 5	Byte	0x00C8	0x005A	Bool
	DI215*	Bit 6	Byte	0x00C8	0x005A	Bool
	DI216*	Bit 7	Byte	0x00C8	0x005A	Bool
203 - Eingangsbyte 6 Input byte 6	DI217*	Bit 0	Byte	0x00C9	0x005B	Bool
	DI218*	Bit 1	Byte	0x00C9	0x005B	Bool
	DI219*	Bit 2	Byte	0x00C9	0x005B	Bool
	DI220*	Bit 3	Byte	0x00C9	0x005B	Bool
	DI221*	Bit 4	Byte	0x00C9	0x005B	Bool
	DI222*	Bit 5	Byte	0x00C9	0x005B	Bool
	Free	Bit 6	Byte	0x00C9	0x005B	Bool
	Free	Bit 7	Byte	0x00C9	0x005B	Bool
204 - Eingangsbyte 7 Input byte 7	DI301*	Bit 0	Byte	0x00CA	0x005C	Bool
	DI302*	Bit 1	Byte	0x00CA	0x005C	Bool
	DI303*	Bit 2	Byte	0x00CA	0x005C	Bool
	DI304*	Bit 3	Byte	0x00CA	0x005C	Bool
	DI305*	Bit 4	Byte	0x00CA	0x005C	Bool
	DI306*	Bit 5	Byte	0x00CA	0x005C	Bool
	DI307*	Bit 6	Byte	0x00CA	0x005C	Bool
	DI308*	Bit 7	Byte	0x00CA	0x005C	Bool
205 - Eingangsbyte 8 Input byte 8	DI309*	Bit 0	Byte	0x00CB	0x005D	Bool
	DI310*	Bit 1	Byte	0x00CB	0x005D	Bool
	DI311*	Bit 2	Byte	0x00CB	0x005D	Bool
	DI312*	Bit 3	Byte	0x00CB	0x005D	Bool
	DI313*	Bit 4	Byte	0x00CB	0x005D	Bool
	DI314*	Bit 5	Byte	0x00CB	0x005D	Bool
	DI315*	Bit 6	Byte	0x00CB	0x005D	Bool
	DI316*	Bit 7	Byte	0x00CB	0x005D	Bool

* See parameterization KSS

Modul - GSD-File	Description	Bit	Length	PB1	PN1	Type
206 - Eingangsbyte 9 Input byte 9	DI317*	Bit 0	Byte	0x00CC	0x005E	Bool
	DI318*	Bit 1	Byte	0x00CC	0x005E	Bool
	DI319*	Bit 2	Byte	0x00CC	0x005E	Bool
	DI320*	Bit 3	Byte	0x00CC	0x005E	Bool
	DI321*	Bit 4	Byte	0x00CC	0x005E	Bool
	DI322*	Bit 5	Byte	0x00CC	0x005E	Bool
	Free	Bit 6	Byte	0x00CC	0x005E	Bool
	Free	Bit 7	Byte	0x00CC	0x005E	Bool

* See parameterization KSS

14.6 AI1 Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1	Type
155 - Analogeingangswort U101 +/- 32767 *	Analog input 5 (V/mA)		INT	0x0099	0x0044	INT
156 - Analogeingangswort U102 +/- 32767 *	Analog input 6 (V/mA)		INT	0x009A	0x0045	INT
157 - Analogeingangswort U103 +/- 32767 *	Analog input 7 (V/mA)		INT	0x009B	0x0046	INT
158 - Analogeingangswort U104 +/- 32767 *	Analog input 8 (V/mA)		INT	0x009C	0x0047	INT
159 - Analogeingangswort U105 +/- 32767 *	Analog input 9 (V/mA)		INT	0x009D	0x0048	INT
160 - Analogeingangswort U106 +/- 32767 *	Analog input 10 (V/mA)		INT	0x009E	0x0049	INT
161 - Analogeingangswort U201 +/- 32767 *	Analog input 11 (V/mA)		INT	0x009F	0x004A	INT
162 - Analogeingangswort U202 +/- 32767 *	Analog input 12 (V/mA)		INT	0x00A0	0x004B	INT
163 - Analogeingangswort U203 +/- 32767 *	Analog input 13 (V/mA)		INT	0x00A1	0x004C	INT
164 - Analogeingangswort U204 +/- 32767 *	Analog input 14 (V/mA)		INT	0x00A2	0x004D	INT
165 - Analogeingangswort U205 +/- 32767 *	Analog input 15 (V/mA)		INT	0x00A3	0x004E	INT
166 - Analogeingangswort U206 +/- 32767 *	Analog input 16 (V/mA)		INT	0x00A4	0x004F	INT
167 - Analogeingangswort U301 +/- 32767 *	Analog input 17 (V/mA)		INT	0x00A5	0x0050	INT
168 - Analogeingangswort U302 +/- 32767 *	Analog input 18 (V/mA)		INT	0x00A6	0x0051	INT
169 - Analogeingangswort U303 +/- 32767 *	Analog input 19 (V/mA)		INT	0x00A7	0x0052	INT
170 - Analogeingangswort U304 +/- 32767 *	Analog input 20 (V/mA)		INT	0x00A8	0x0053	INT
171 - Analogeingangswort U305 +/- 32767 *	Analog input 21 (V/mA)		INT	0x00A9	0x0054	INT
172 - Analogeingangswort U306 +/- 32767 *	Analog input 22 (V/mA)		INT	0x00AA	0x0055	INT

* Unit and scaling is the parameterization refer to

14.7 AT1 Module

Modul - GSD-File	Description	Bit	Length	PB1	PN1/MB1	Type
210 - AT-1 / 1 Temperatur 1 in xxx.x °	PT100(0) Measurement PT1		INT	0x00D0	0x00DC	INT
211 - AT-1 / 1 Temperatur 2 in xxx.x °	PT100(0) Measurement PT2		INT	0x00D1	0x00DD	INT
212 - AT-1 / 1 Temperatur 3 in xxx.x °	PT100(0) Measurement PT3		INT	0x00D2	0x00DE	INT
213 - AT-1 / 1 Temperatur 4 in xxx.x °	PT100(0) Measurement PT4		INT	0x00D3	0x00DF	INT
214 - AT-1 / 1 Temperatur 5 in xxx.x °	PT100(0) Measurement PT5		INT	0x00D4	0x00E0	INT
215 - AT-1 / 1 Temperatur 6 in xxx.x °	PT100(0) Measurement PT6		INT	0x00D5	0x00E1	INT
216 - AT-1 / 1 Analog 1 +/- 32767 *	Analog input 23 (V/mA)		INT	0x00D6	0x00E2	INT
217 - AT-1 / 1 Analog 2 +/- 32767 *	Analog input 24 (V/mA)		INT	0x00D7	0x00E3	INT
218 - AT-1 / 2 Temperatur 1 in xxx.x °	PT100(0) Measurement PT7		INT	0x00D8	0x00E4	INT
219 - AT-1 / 2 Temperatur 2 in xxx.x °	PT100(0) Measurement PT8		INT	0x00D9	0x00E5	INT
220 - AT-1 / 2 Temperatur 3 in xxx.x °	PT100(0) Measurement PT9		INT	0x00DA	0x00E6	INT
221 - AT-1 / 2 Temperatur 4 in xxx.x °	PT100(0) Measurement PT10		INT	0x00DB	0x00E7	INT
222 - AT-1 / 2 Temperatur 5 in xxx.x °*	PT100(0) Measurement PT11		INT	0x00DC	0x00E8	INT
223 - AT-1 / 2 Temperatur 6 in xxx.x °*	PT100(0) Measurement PT12		INT	0x00DD	0x00E9	INT
224 - AT-1 / 2 Analog 1 +/- 32767 *	Analog input 25 (V/mA)		INT	0x00DE	0x00EA	INT
225 - AT-1 / 2 Analog 2 +/- 32767 *	Analog input 26 (V/mA)		INT	0x00DF	0x00EB	INT

*Unit and scaling is the parameterization refer to

Subject to technical modifications!

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