DKG-507 CANBUS AND MPU VERSIONS

INPUTS AND OUTPUTS

Term	Function	Technical data	Description
1	**GENERATOR CONTACTOR**	Relay output, 16A-AC	This output provides energy to the generator contactor. If the generator phases do not have acceptable voltage or frequency values, the generator contactor will be de-energized. In order to provide extra security, the normally closed contact of the mains contactor should be serially connected to this output.
2	**GEN-L1**	Generator phase inputs, 0-300V-AC	Connect the generator phases to these inputs. The generator phase voltages upper and lower limits are programmable.
3	**GEN-L2**		
4	**GEN-L3**		
5	**GENERATOR NEUTRAL**	Input, 0-300V-AC	Neutral terminal for the generator phases.
6	**MAINS NEUTRAL**	Input, 0-300V-AC	Neutral terminal for the mains phases.
7	**MAINS-L3**	Mains phase inputs, 0-300V-AC	Connect the mains phases to these inputs. The mains voltages upper and lower limits are programmable.
8	**MAINS-L2**		
9	**MAINS-L1**		
10	**MAINS CONTACTOR**	Relay output, 16A-AC	This output provides energy to the mains contactor. If the mains phases do not have acceptable voltages, the mains contactor will be de-energized. In order to provide extra security, the normally closed contact of the generator contactor should be serially connected to this output.
11	**GROUND**	O VDC	Power supply negative connection.
12	**BATTERY POSITIVE**	+12 or 24VDC	The positive terminal of the DC Supply shall be connected to this terminal. The unit operates on both 12V and 24V battery systems.
13	**FUEL LEVEL SENDER**	Input, 0-5000 ohms	Analogue fuel level sender connection. Do not connect the sender to other devices. The input has programmable ohms for VDO senders.
14	**OIL PRESSURE SENDER**	Input, 0-5000 ohms	Analogue oil pressure sender connection. Do not connect the sender to other devices. The input has programmable characteristics and connects to any kind of sender.
15	**COOLANT TEMP. SENDER**	Input, 0-5000 ohms	Analogue high temperature sender connection. Do not connect the sender to other devices. The input has programmable characteristics and connects to any kind of sender.
16	**CHARGE**	Input and output	Connect the charge alternator's D+ terminal to this terminal. This terminal will supply the excitation current and measure the voltage of the charge alternator.
17	**RELAY-2 (HORN RELAY)**	Output 10A/28VDC	This relay has programmable function, selectable from a list.
18	**RELAY-1 (STOP RELAY)**	Output 10A/28VDC	This relay has programmable function, selectable from a list.
19	**START RELAY**	Output 10A/28VDC	This relay controls the engine cranking.
20	**FUEL RELAY**	Output 10A/28VDC	This relay is used for fuel solenoid control.

Term	Function	Technical data	Description
21	**EMERGENCY STOP**	Digital inputs	These inputs have programmable characteristics selected via the program menu. Each input may be driven by a 'normally closed' or 'normally open' contact, switching either battery+ or battery-. The effect of the switch is also selectable from a list. See PROGRAMMING section for more details.
22	**SPARE-2**		
23	**PROGRAM LOCK**		
24	**SPARE-1**		
25	**COOLANT LEVEL**		
26	**HIGH TEMP**		
27	**LOW OIL PRESSURE**		
28	**RECTIFIER FAIL**		
29	**CURR_1+**	Current transformer inputs, 5A-AC	Generator current transformer inputs. Do not connect the same current transformer to other instruments otherwise a unit fault will occur. Connect each terminal of the transformer to the unit's related terminal. Do not use common terminals. Do not use grounding. Correct polarity of connection is vital. If the measured power is negative, then change the polarity of each 3 current transformers. The rating of the transformers should be the same for each of the 3 phases. The secondary winding rating shall be 5 Amperes. (For ex. 200/5 Amps).
30	**CURR_1-**		
31	**CURR_2+**		
32	**CURR_2-**		
33	**CURR_3+**		
34	**CURR_3-**		
35	**OIL TEMP. SENDER**	Input, 0-5000 ohms	Analogue oil temperature sender connection. Do not connect the sender to other devices. The input has programmable characteristics and connects to any kind of sender.

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36	**CANBUS-L**	Digital communication port	Connect the J1939 port of an electronic engine to these terminals. The 120 ohm terminating resistors are inside the unit. Please do not connect external resistors. Use a twisted cable pair or coaxial cable for best results.
37	**CANBUS-H**		

MPU INPUT VERSIONS			
36	**MPU -**	Analog input, 0.5 to 30V-AC	Connect the MPU unit to these inputs Use a twisted cable pair or coaxial cable for best results.
37	**MPU +**		

PROGRAMMING

To **enter the program mode**, hold pressed the **MENU►** button for 5 seconds.

When the program mode is entered, the upper display will show "PRGM" and the mid display will indicate the program parameter number. The lower display will show the parameter value.

If the **PROGRAM LOCK** input is tied to **GROUND**, the program value modification will be disabled to prevent unauthorized intervention.

It is advised to keep the **PROGRAM LOCK** input tied to **GROUND**.

The program mode will not affect the operation of the unit. Thus programs may be modified anytime, even while the genset is running.

Navigation between program parameters is performed via the **MENU►** button. Holding the button pressed will cause the program parameter number to increase faster.

Parameter value may be increased and decreased with **▼** and **▲** buttons. If these keys are held pressed, the program value will be increased/decreased faster.

When a program parameter is modified, it is automatically saved in memory.

If **MENU►** button is pressed, next parameter will be displayed.

Program parameters are kept in a non-volatile memory and are not affected from power failures.

To **exit the program mode** press one of the mode selection keys. If no button is pressed during 1 minute the program mode will be cancelled automatically.
Program parameters are organized in 2 groups as low and high levels. Entering the program mode by pressing the **MENU►** button will allow access to only low level parameters.
In order to access all parameters please hold **OFF** and **MENU►** buttons pressed.

PGM	Parameter Definition	Unit	Fact.Set	Description
P_000	Current Transformer Ratio	A	500	This is the rated value of current transformers. All transformers must have the same rating. The secondary of the transformer will be 5 Amps.
P_001	Overcurrent Limit	A	0	If the current goes above this limit, during the period defined in **Overload Timeout** then a **Overcurrent Load Dump** alarm will be generated. If this parameter is 0 then Overcurrent check is disabled.
P_002	Excess Power Limit	KW	0	If the active power goes above this limit, during the period defined in Overload Timeout then an **Excess Power Load Dump** alarm will be generated. If this parameter is 0 then Excess Power check is disabled.
P_003	Mains Voltage Low Limit	V	170	If one of the mains phases goes under this limit, it means that the mains are off and it starts the transfer to the genset in **AUTO** mode.
P_004	Mains Voltage High Limit	V	270	If one of the mains phases goes over this limit, it means that the mains are off and it starts the transfer to the genset in **AUTO** mode.
P_005	Mains Frequency Low Limit	Hz	45	If the mains frequency goes under this limit, it means that the mains are off and it starts the transfer to the genset in **AUTO** mode.
P_006	Mains Frequency High Limit	Hz	55	If the mains frequency goes above this limit, it means that the mains are off and it starts the transfer to the genset in **AUTO** mode.
P_007	Genset Low Voltage Shutdown Limit	V	190	If one of the generator phase voltages goes under this limit when feeding the load, this will generate a **GENSET LOW VOLTAGE** shutdown alarm and the engine will stop.
P_008	Genset Low Voltage Warning Limit	V	200	If one of the generator phase voltages goes under this limit when feeding the load, this will generate a **GENSET LOW VOLTAGE** warning.
P_009	Genset High Voltage Warning Limit	V	250	If one of the generator phase voltages goes above this limit when feeding the load, this will generate a **GENSET HIGH VOLTAGE** warning.
P_010	Genset High Voltage Shutdown Limit	V	260	If one of the generator phase voltages goes over this limit when feeding the load, this will generate a **GENSET HIGH VOLTAGE** alarm and the engine will stop.
P_011	Low Frequency Shutdown	Hz	30	If the genset frequency goes under this limit, a **GENSET LOW SPEED** alarm is generated and the engine stops.
P_012	Low Frequency Warning	Hz	35	If the genset frequency goes under this limit, a **GENSET LOW SPEED** warning is generated.
P_013	High Frequency Warning	Hz	54	If the genset frequency goes over this limit, a **GENSET HIGH SPEED** warning is generated.
P_014	High Frequency Shutdown	Hz	55	If the genset frequency goes over this limit, a **GENSET HIGH SPEED** alarm is generated and the engine stops.
P_015	Low Battery Voltage Warning	V	9.0	If the battery voltage falls below this limit, this will generate a **LOW BATTERY** warning.
P_016	High Battery Voltage Warning	V	31.0	If the battery voltage goes over this limit, this will generate a **HIGH BATTERY** warning.

PGM	Parameter Definition	Unit	Fact.Set	Description
P_017	High Battery Voltage Shutdown	V	33.0	If the battery voltage goes over this limit, this will generate a **HIGH BATTERY** shutdown alarm and the engine will stop.
P_018	Low Oil Pressure Warning	bar	1.4	If the oil pressure measured from the analog input falls below this limit, this will generate a **LOW OIL PRESSURE SENDER** warning.
P_019	Low Oil Pressure Shutdown	bar	1.0	If the oil pressure measured from the analog input falls below this limit, this will generate a **LOW OIL PRESSURE SENDER** alarm is generated and the engine stops.
P_020	High Temperature Warning	°C	95	If the coolant temperature measured from the analog input goes over this limit, this will generate a **HIGH TEMPERATURE SENDER** warning.
P_021	High Temperature Shutdown	°C	98	f the coolant temperature measured from the analog input goes over this limit, this will generate a **HIGH TEMPERATURE SENDER** alarm and the engine will stop.
P_022	Low Fuel Warning	%	20	If the fuel level measured from the analog input falls below this limit, a **LOW FUEL LEVEL SENDER** warning is generated.
P_023	Low Fuel Shutdown	%	10	the fuel level measured from the analog input falls below this limit, a **LOW FUEL LEVEL SENDER** shutdown alarm is generated and the engine stops.
P_024	High Oil Temperature Warning	°C	100	If the oil temperature measured from the analog input goes over this limit, this will generate a HIGH OILTEMPERATURE SENDER warning.
P_025	High Oil Temperature Shutdown	°C	120	f the oil temperature measured from the analog input goes over this limit, this will generate a HIGH OIL TEMPERATURE SENDER alarm and the engine will stop.
P_026	Oil Pressure Sender type	-	1	This parameter selects the oil pressure sender type. **0:** Non standard sender. The sender characteristics are defined in **Sender Characteristics** table. **1:** VDO 0-7 bars (10-180 ohms) **2:** VDO 0-10 bars (10-180 ohms) **3:** DATCON 0-7 bars (240-33 ohms) **4:** DATCON 0-10 bars (240-33 ohms) **5:** DATCON 0-7 bars (0-90 ohms) **6:** DATCON 0-10 bars (0-90 ohms) **7:** DATCON 0-7 bars (75-10 ohms)
P_027	Coolant Temp. Sender Type	-	1	This parameter selects the temperature sender type: **0:** The sender characteristics are defined in **Sender Characteristics** table. **1:** VDO **2:** DATCON DAH type **3:** DATCON DAL type
P_028	Oil Temp. Sender Type	-	1	Temperature sender type selection: **0:** The sender characteristics are defined in **Sender Characteristics** table. **1:** VDO **2:** DATCON DAH type **3:** DATCON DAL type
P_029	Hysteresis Voltage	V	8	This parameter provides the mains and genset voltage limits with a hysteresis feature in order to prevent faulty decisions. For example, when the mains are present, the mains voltage low limit will be used as the programmed low limit. When the mains fail, the low limit will be incremented by this value. It is advised to set this value to 8 volts.

PGM	Parameter Definition	Unit	Fact.Set	Description
P_030	Engine Heating Temperature	°C	0	If it is requested that the engine runs without load until reaching a certain temperature, this parameter defines the temperature. If the coolant temperature falls below this parameter, an **Engine Low Temperature** warning will occur.
P_031	Fault Holdoff Timer	sec	12	This parameter defines the delay after the engine runs and before the fault monitoring is enabled.
P_032	Overload Timeout	sec	5	This is the period between the current or active power go over the limits and **OVERCURRENT** or **EXCESS POWER** Load Dump alarms occur. This is also the period between the frequency goes out of the limits and **OVERSPEED** or **UNDERSPEED** alarms occur. This is also the period between the genset voltage goes out of the limits and **HIGH VOLTAGE** or **LOW VOLTAGE** alarms occur.
P_033	Engine Start Delay	sec	0	This is the time between the mains fails and the fuel solenoid turns on before starting the genset. It prevents unwanted genset operation in battery backed-up loads.
P_034	Preheat Timer	sec	1	This is the time after the fuel solenoid is energized and before the genset is started. During this period the **PREHEAT** relay output is energized (if assigned by **Relay Definitions**)
P_035	Choke Timer	sec	5	This is the control delay of CHOKE output. The choke output is activated together with the crank output. It is released after this delay or when engine runs (whichever occurs first).
P_036	Gas Solenoid Delay	sec	5	The gas solenoid of the gas engine will be opened after this delay during cranking.
P_037	Crank Timer	sec	10	This is the maximum start period. Starting will be automatically cancelled if the genset fires before the timer.
P_038	Wait Between Starts	sec	10	This is the waiting period between two start attempts.
P_039	Idle Speed Timer	sec	0	When the engine runs, the Idle output relay function will be active during this timer.
P_040	Engine Heating Timer	sec	4	This is the period used for engine heating following the program parameter.
P_041	Mains Waiting Timer	min	0.5	This is the time between the mains voltages entered within the limits and the generator contactor is deactivated.
P_042	Cooldown Timer	min	1.0	This is the period that the generator runs for cooling purpose after the load is transferred to mains.
P_043	Genset Contactor Timer	sec	1	This is the period after the mains contactor has been deactivated and before the generator contactor has been activated.
P_044	Mains Contactor Timer	sec	1	This is the period after the generator contactor has been deactivated and before the mains contactor has been activated.
P_045	Stop Solenoid Timer	sec	10	This is the maximum time duration for the engine to stop. During this period the STOP relay output is energized (if assigned by **Relay Definitions**). If the genset has not stopped after this period, a **FAIL TO STOP** warning occurs.
P_046	Number of Starts	-	3	This is the maximum number of start attempts.
P_047	Mains Phase Order Enable	-	0	**0:** mains phase order checking disabled **1:** if mains phase order is faulty, then a warning is given and mains contactor deenergized.

PGM	Parameter Definition	Unit	Fact.Set	Description
P_048	Genset Phase Order Loaddump	-	0	**0:** genset phase order checking disabled **1:** if genset phase order is faulty, then a loaddump is generated and the genset stops after cooldown.
P_049	RPM from genset frequency	-	1	This parameter is used in the conversion of the genset frequency to engine rpm. 0: read rpm from the optional MPU input 1: convert frequency to rpm (using crank teeth count)
P_050	Crank Teeth Count	-	30	This is the number of pulses generated by the magnetic pickup sensing unit in one turn of the flywheel. This parameter is also used in the conversion of the genset frequency to engine rpm. The frequency in Hz is multiplied with this parameter during conversion to rpm.
P_051	Low rpm Shutdown	rpm	0	If the engine speed goes under this limit, a **GENSET LOW SPEED** alarm is generated and the engine stops.
P_052	Low rpm Warning	rpm	0	If the engine speed goes under this limit, a **GENSET LOW SPEED** warning is generated.
P_053	High rpm Warning	rpm	0	If the engine speed goes over this limit, a **GENSET HIGH SPEED** warning is generated.
P_054	High rpm Shutdown	rpm	0	If the engine speed goes over this limit, a **GENSET HIGH SPEED** alarm is generated and the engine stops.
P_055	Alarm Relay Timer	sec	60	This is the period during which the **ALARM** relay is active. If the period is set to 0, this will mean that the period is unlimited.
P_056	Intermittent Alarm Relay	-	0	**0:** continuous **1:** intermittent (turns on and off every second)
P_057	Service Engine Hours	hour	50	The **SERVICE REQUEST** led indicator will turn on after this quantity of engine hours from the last service. If the period is set to '0' no **SERVICE REQUEST** will be generated depending on engine hours.
P_058	Service Period	month	6	The **SERVICE REQUEST** led indicator will turn on after this amount of time from the last service. If the period is set to '0' no **SERVICE REQUEST** will be indicated depending on time.

TECHNICAL SPECIFICATIONS

Alternator voltage: 0 to 300 V-AC Ph-N
Alternator frequency: 0-100 Hz.
Mains voltage: 0 to 300 V-AC Ph-N
Mains frequency: 0-100 Hz.
DC Supply range: 9.0 VDC to 33.0 VDC
Cranking dropouts: survives 0 V for 100ms
Typical stand-by current: 100 mADC.
Maximum current consumption: 250 mADC.
Gen/mains contactor outputs: 16A@250 VAC.
DC outputs: 10A@28 VDC. relay outputs.
Charge alternator excitation: min 2W.
Magnetic pickup input:: 0.5 – 30 V-AC.
Magnetic pickup frequency: 10 KHz max.
Current inputs: from current transformers, .../5A. Max load 0.7VA per phase.
Digital inputs: 0 - 30 VDC. Internally connected to battery positive via 47'000 ohm resistor.
Analog inputs: 0 to 5000 ohms connected to the battery negative. Sources 5 mA when closed to battery negative.
Communication port: RS-232. 9600 bauds, no parity, 1 stop bit.
Operating temperature range: -40°C to +70°C (-40 ºF to +158 ºF)
Storage temperature range: -55°C to +80°C (-67ºF to +176ºF)
Maximum humidity: 95%, non-condensing
Dimensions: 200x148x46mm (WxHxD)
Panel Cut-out: 176 x 121mm minimum.
Weight: 400 g (approx.)
Case material: High temperature, self extinguishing ABS/PC (UL94-V0)
IP protection: IP65 from front panel, IP30 from the rear

TROUBLESHOOTING

The genset operates while AC mains are OK or continues to operate after AC mains are OK:

-Check engine body grounding.
-AC mains voltages may be outside programmed limits, measure the phase voltages.
-Check the AC voltage readings by pressing the MENU button.
-Upper and lower limits of the mains voltages may be too tight. Check the parameters **Mains Voltage Low Limit** and **Mains Voltage High Limit**. Standard values are 170/270 volts.
-The hysteresis voltage may be given to excessive. The standard value is 8 volts.

AC voltages or frequency displayed on the unit are not correct:

-Check engine body grounding, it is necessary.
-The error margin of the unit is +/- 3 volts.
-If there are faulty measurements only when the engine is running, there may be a faulty charging alternator or voltage regulator on the engine. Disconnect the charging alternator connection of the engine and check if the error is removed.
-If there are faulty measurements only when mains are present, then the battery charger may be failed. Turn off the rectifier fuse and check again.

kW and cosΦ readings are faulty although the Amp readings are correct:

-Current transformers are not connected to the correct inputs or some of the CTs are connected with reverse polarity. Determine the correct connections of each individual CT in order to obtain correct KW and cosΦ for the related phase, and then connect all CTs.

When the AC mains fails the unit energizes the fuel solenoid, but does not start and OIL PRESSURE led flashes:

The unit is not supplied with battery (-) voltage at the oil pressure input.
-Oil pressure switch not connected.
-Oil pressure switch connection wire cut.
-Oil pressure switch faulty.
-Oil pressure switch closes too lately. If oil pressure switch closes, the unit will start. Optionally oil pressure switch may be replaced.

The engine does not run after the first start attempt, then the unit does not start again and OIL PRESSURE led flashes:

-The oil pressure switch closes very lately. As the unit senses an oil pressure, it does not start. When oil pressure switch closes the unit will start. Optionally the oil pressure switch may be replaced.

When the AC mains fails, the engine starts to run but the unit gives START FAIL alarm and then the engine stops:

-The generator phase voltages are not connected to the unit. Measure the AC voltage between terminals **GEN L1** and **Generator Neutral** at the rear of the unit while the engine is running. A fuse protecting the generator phases may be failed. A misconnection may be occurred. If everything is OK, turn all the fuses off, and then turn all the fuses on, starting from the DC supply fuse. Then test the unit again.

The unit is late to remove engine cranking:

-The generator voltage rises lately. Also the generator remnant voltage is below 20 volts. The unit removes starting with the generator frequency, and needs at least 20 volts to measure the frequency. If this situation is to be avoided, please adjust program parameters in order to cut cranking with the charge alternator voltage.

The unit is inoperative:

Measure the DC-supply voltage between terminals 19 and 22 at the rear of the unit. If OK, turn all the fuses off, then turn all the fuses on, starting from the DC supply fuse. Then test the unit again.

Program parameters cannot be modified:

The program lock input disables parameter modificaiton. Disconnect the program lock input from battery negative before modification. Do not forget to make this connection again to prevent unauthorized program modifications.

Some program parameters are not displayed:

These parameters are reserved for factory setting and cannot be modified.

AUTO led flashes and the genset does not run when mains fail:

The unit is in Weekly Schedule **OFF** time. Please check date and time setting of the unit. Please check also Weekly Schedule program parameters.

CONNECTION DIAGRAM