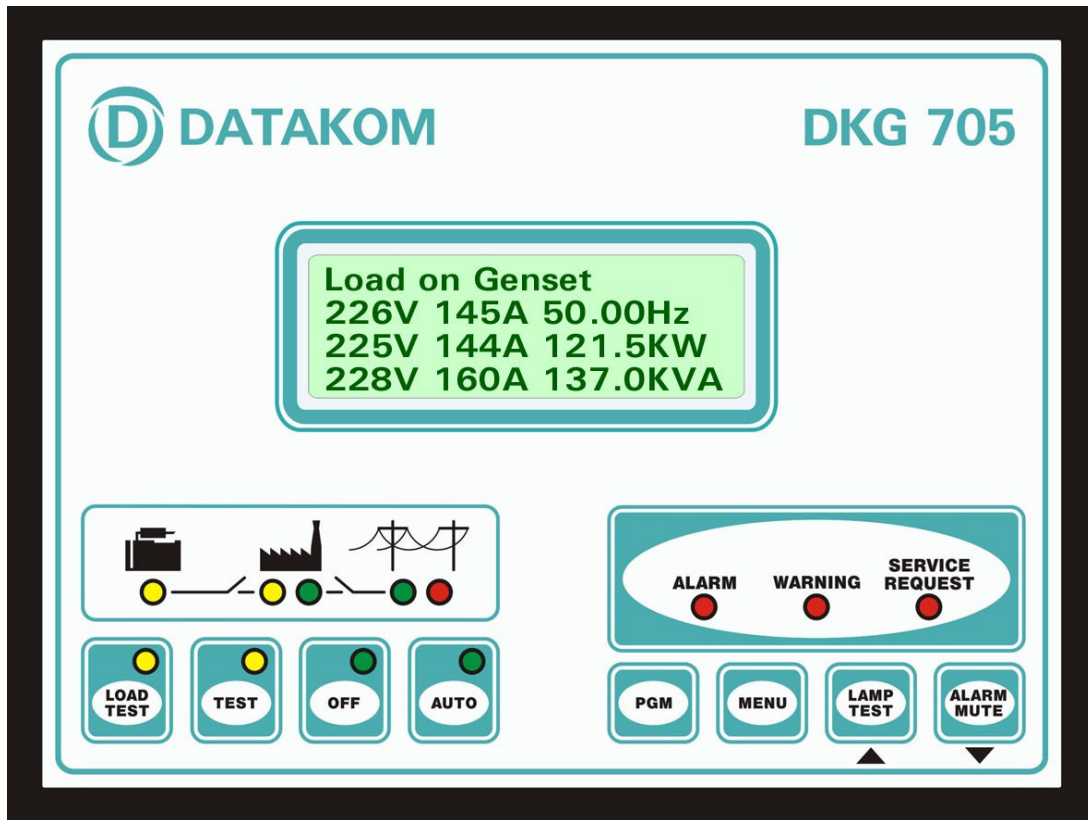


DKG-705 AMF, PARALLEL TO MAINS AND DUAL GENSET SYNCHRONIZATION UNIT



STANDARD FEATURES

Automatic mains failure
Engine control
Generator protection
Built in alarms and warnings
True RMS measurements
Complete genset power measurements
Synchronoscope
No break transfer
No break load test
Load shedding
Daily, weekly, monthly exerciser
Remote start operation capability
Periodic maintenance request indicator
Event logging with time stamp
Statistic counters
Weekly operation schedule programs
Field adjustable parameters
RS-232 serial port
Upgrade software downloadable from serial port
Free MS-Windows Remote monitoring SW:
 -local, LAN, IP and modem connection
 -monitoring, download of parameters
 -download of software updates
LCD display 4 lines by 20 characters

Configurable analogue inputs: 4
Configurable digital inputs: 8
Configurable relay outputs: 7
Survives cranking dropouts
Sealed front panel (IP65)
Plug-in connection system for easy replacement
Small dimensions (144x192x49mm)
Low cost

OPTIONAL FEATURES

Single set parallel with mains
Dual genset synchronization & parallel with mains
KW/KVAr load control
Soft transfer with ramp control
Peak lopping (peak shaving)
Complete mains power measurements
G-59 mains protections
Governor and AVR control interface
Battery backed-up real time clock
Output expansion capability

DESCRIPTION

The DKG-705 is a comprehensive AMF unit for single or dual generating set operating in **standby** or **parallel with mains** modes. The unit has two option levels, the standard version being for standby and the 'full' one for parallel with mains and dual genset synchronization applications.

In AUTOMATIC position, DKG-705 monitors mains phase voltages and controls the automatic starting, stopping and load transfer of the generating set in case of a mains failure and once the generator is running, it monitors internal protections and external fault inputs. The start/stop operation may also be controlled by an external Remote Start signal. If a fault condition occurs, the unit shuts down the engine automatically, indicates the failure source on the LCD display and turns on the red ALARM led.

The DKG-705 unit is able to transfer the load between mains and genset in 4 different ways:

-transfer with interruption: there will be a power interruption period during the transfer

-no break transfer without synchronization: transfer will be made without power interruption. The unit waits until mains and generator phases match and makes a quick transfer.

-no break transfer with synchronization (available only with 'full' version): transfer will be made without power interruption. The unit operates the governor and AVR control outputs to synchronize the generator voltages with the mains and makes a quick transfer.

-soft transfer (available only with 'full' version): transfer will be made without power interruption. The unit operates the governor and AVR control outputs to synchronize the generator voltages with the mains and makes a smooth ramped transfer.

The operation of the unit is controlled with front panel pushbuttons. The LOAD TEST, TEST, AUTO and OFF pushbuttons select the operating mode. Other buttons select the program mode entry/exit, display parameter scroll, alarm mute and lamp test functions.

The DKG-705 provides a comprehensive set of digitally adjustable timers, threshold levels, input and output configurations and operating sequences. The unauthorized access to program parameters is prevented by a 3 level password system. All programs may be modified via front panel pushbuttons, and do not require an external unit.

The fault conditions are considered in 3 categories as Warnings, Load-dumps and Alarms. Measured values have separate programmable limits for warning and alarm conditions.

The service request indicator lamp turns on at the expiration of either engine hours or time limits.

It is possible to monitor the operation of the system locally or remotely with the WINDOWS based PC utility program.

The unit is designed for front panel mounting. It is fitted into the cut-out with steel springs removed. Connections are made with 2 part plug and socket connectors.

STANDARD MEASUREMENTS

Generator Volts: U-N, V-N, W-N, U-V, V-W, W-U
Generator Amps: U, V, W
Generator KW: U, V, W, total
Generator KVA: U, V, W, total
Generator KVAr: U, V, W, total
Generator pf: U, V, W, average
Generator Frequency,
Mains Volts: R-N, S-N, T-N, R-S, S-T, T-R
Mains Frequency,
Synchronoscope Phase Angle
Synchronoscope Voltage Match U-R
Battery Voltage
Engine RPM
Engine Coolant Temperature
Engine Oil Pressure
Engine Oil Temperature
Engine Fuel Level

OPTIONAL MEASUREMENTS ('full' version only)

Mains Amps: R, S, T
Mains KW: R, S, T, total
Mains KVA: R, S, T, total
Mains KVAr: R, S, T, total
Mains pf: R, S, T, average

STATISTICS

Following incremental counters provide statistics about past performance of the generating set:

Generator KWh, KVAh, KVArh
Engine Hours Run
Engine Hours to Service
Time to Service
Number of Engine Cranks
Number of Genset Runs
Number of Genset on Load

DIGITAL INPUTS

The unit has 8 fully configurable digital inputs. Each input has following programmable parameters:

-input channel name: selectable from a list of 32,
-alarm type: shutdown / load-dump / warning / no alarm
-alarm polling: on engine running / always
-latching / non-latching operation,
-contact type: NO / NC
-switching: BAT+ / BAT-

ANALOG INPUTS

Engine analog inputs are provided for following functions:

-Coolant temperature
-Oil pressure
-Oil temperature
-Fuel level

The analog inputs connect to resistive sender units to provide precise and adjustable protection. The inputs have programmable sensor characteristics so that they are suitable for any type and any brand of sensors.

RELAY OUTPUTS

The unit provides 7 relay outputs with programmable functions, selectable from a list of 112 entries.

In addition to genset control signals any specific alarm information may be output as a relay contact.

Using two DKG-705 Relay Expansion Modules, the number of relays may be increased up to 23, 16 of them being volt-free contacts.

BUILT IN ALARMS

Under/Over Generator Volts
Under/Over Generator Frequency
Under/Over Engine RPM
High Battery Voltage
Low Fuel Level
High Oil Temperature
High Coolant Temperature
Low Oil Pressure
Fail to Stop
Fail to Start
Slave Unavailable
Generator Phase Sequence Fail
Communication Lost

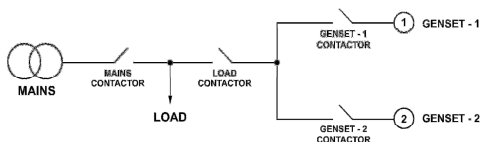
BUILT IN LOADDUMPS

Generator Reverse Power
Generator Excess Power
Overcurrent

BUILT IN WARNINGS

Under/Over Generator Frequency
Under/Over Engine RPM
Synchronization Fail
High Battery Voltage
Low Battery Voltage
Low Fuel Level
High Oil Temperature
High Coolant Temperature
Low Oil Pressure
Mains Phase Sequence Fail
Charge Fail
Low Battery Voltage
AVR Control Fail
Governor Control Fail
Parallel Mains Fail
Mains Reverse Power
Mains Frequency Fail
No Mains Frequency
ROCOF df/dt Fail
Vector Shift df/dt Fail
Communication Lost

DUAL GENSET SYNCHRONIZATION



The unit allows the synchronization scheme defined in the above picture. The application is made with standard units and standard software, no extra cost is needed. The same unit is used in both single and dual genset applications.

Basic features are below:

- automatic mains monitoring and load control,
- automatic starting, stopping and synchronization,
- both active and reactive load sharing,
- synchronization and soft transfer to and from mains,
- equal aging,
- selectable automatic/manual master-slave switching,
- automatic stop, restart and quick start of the slave,
- gensets do not need to be identical,

WEEKLY OPERATION SCHEDULE

In AUTO mode only, the unit offers the capability of defining a weekly operation schedule. Programmable parameters allow the genset to operate automatically only in defined time limits of each weekday. The standard unit increments the clock with the microprocessor crystal frequency. With a 'full' version unit, the internal battery backed-up real time clock will allow more precise switching times.

EVENT LOGGING

The DKG-705 records last 32 events with date and time stamp. Recorded events are:
-alarms, load-dumps and warnings
-generator on-load/off-load information

An example record may be as follows:

| | |
|------------------------------|-----------|
| EVENT LOGGING | 12 |
| 17-08-04 14:48.58 | |
| SHUTDOWN ALARM | |
| LOW OIL PRESS. SWITCH | |

TELEMETRY AND REMOTE PROGRAMMING

The DKG-705 module provides the user with large telemetry facilities via its standard RS-232 serial port. The unit can be either connected to a PC or a modem for remote communication.

The PC software offers local, Local Area Network (LAN), internet and modem operation capabilities. In **local mode**, the PC is directly connected to the DKG-705.

In **LAN mode**, additionally to the local connected PC, all PCs located in the same LAN may use the remote monitoring program.

In **internet mode**, the local PC should have an internet connection with its own IP address. Using a password system, the DKG-705 may be monitored anywhere in the world via internet.

In **modem mode**, both the PC and the DKG-705 will be connected to modems. The connection will be established over the telephone network. Note that the modem mode is also compatible with LAN and internet modes, so that the modem data may be served by PC for reuse in the LAN or internet.

The PC program is used for below purposes:

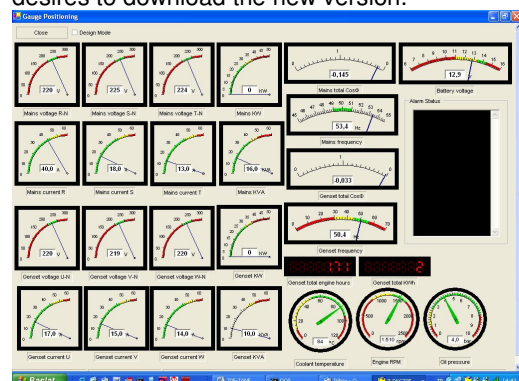
-software download: the DKG-705 unit's software is downloadable from serial port. This provides the user with field upgrading capability to new versions.

-parameter upload/download: program parameters may be saved to the PC or downloaded from PC. This provides the user with the capability of preparing standard configurations for different applications and taking backup copies of parameter values.

-remote monitoring: all measured values, statistics and event records may be visualized on the PC screen. The displays simulate analog meters with user selectable size, position, range and multiple zones with green, yellow and red colors. There are more than 60 possible displays and the user may design his own screen selecting between them. The values are also stored on disk for further analysis.

-diagnostics and analysis: the daily evolution of recorded values may be displayed or printed in a graphical form. This provides the service personnel with the capability of examining the history of an eventual fault condition.

The PC software detects automatically new versions over the internet. A menu system will guide user if he desires to download the new version.

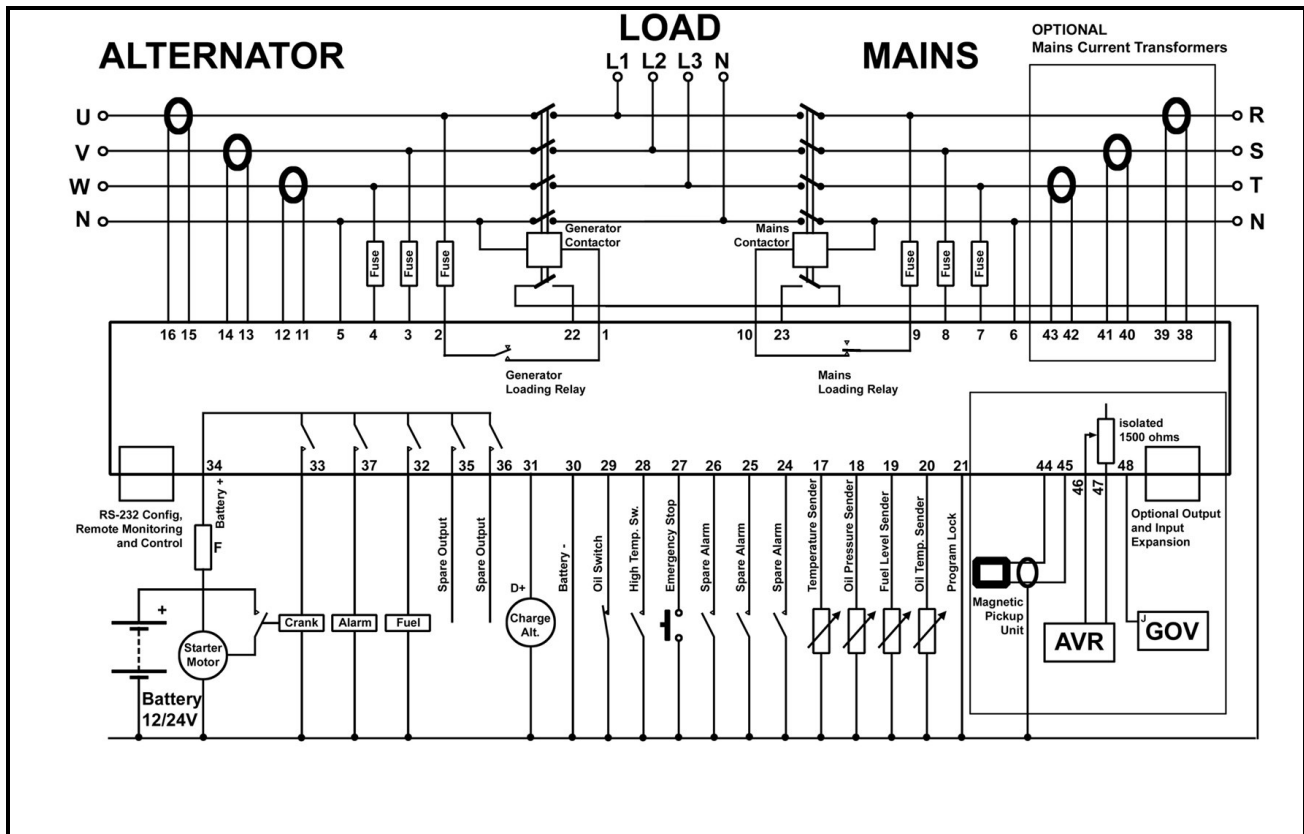


TECHNICAL SPECIFICATIONS

Alternator voltage: 300 V-AC (Ph-N)
Alternator frequency: 0-200 Hz.
Mains voltage: 300 V-AC (Ph-N)
Mains frequency: 0-200 Hz.
DC Supply Range:
 12V selection: 9.0 to 17.0 V-DC
 24V selection: 18.0 to 33.0 V-DC.
Cranking dropouts: survives 0 V for 100ms.
Typical Standby Current: 75 mA-DC
Maximum Operating Current: 400 mA-DC (Relay outputs open)
Generator Contactor Relay Output: 16 A / 250V
Mains Contactor Relay Output: 16 A / 250V
DC Relay Outputs: 10 A / 28V
Magnetic pick-up voltage: 0.5 to 70 Vpk.
Magnetic pick-up frequency: 20 KHz max.
Gov Control Output: 0 – 10 V-DC
AVR Control Output: adjustable for 1K to 200K trimpot inputs.
Charge excitation current: 36mA @ 12V-DC.

Analog input range: 0-5000 ohms.
Serial port: RS-232, 9600 bauds, no parity, 1 bit stop
Operating temp: -20°C to 70°C.
Storage temp: -40°C to 80°C.
Maximum humidity: 95% non-condensing.
IP Protection: IP65 from front panel, IP30 from the rear.
Dimensions: 192 x 144 x 49 mm (WxHxD)
Panel Cut-out Dimensions: 187x139 mm minimum.
Mounting: Front panel mounted with rear retaining steel spring.
Weight: 800 g (approx.)
Case Material: High Temperature ABS (UL94-V0, 110°C)
Conformity (EU directives)
 -73/23/EEC and 93/68/EEC
 -89/336/EEC, 92/31/EEC and 93/68/EEC
Norms of reference:
 -EN 61010 (safety requirements)
 -EN 50081-2 (EMC requirements)
 -EN 50082-2 (EMC requirements)

TYPICAL CONNECTIONS



DATAKOM Electronics Limited

Tel : +90-216-466 84 60

Fax : +90-216-364 65 65

e-mail : datakom@datakom.com.tr

http : www.datakom.com.tr