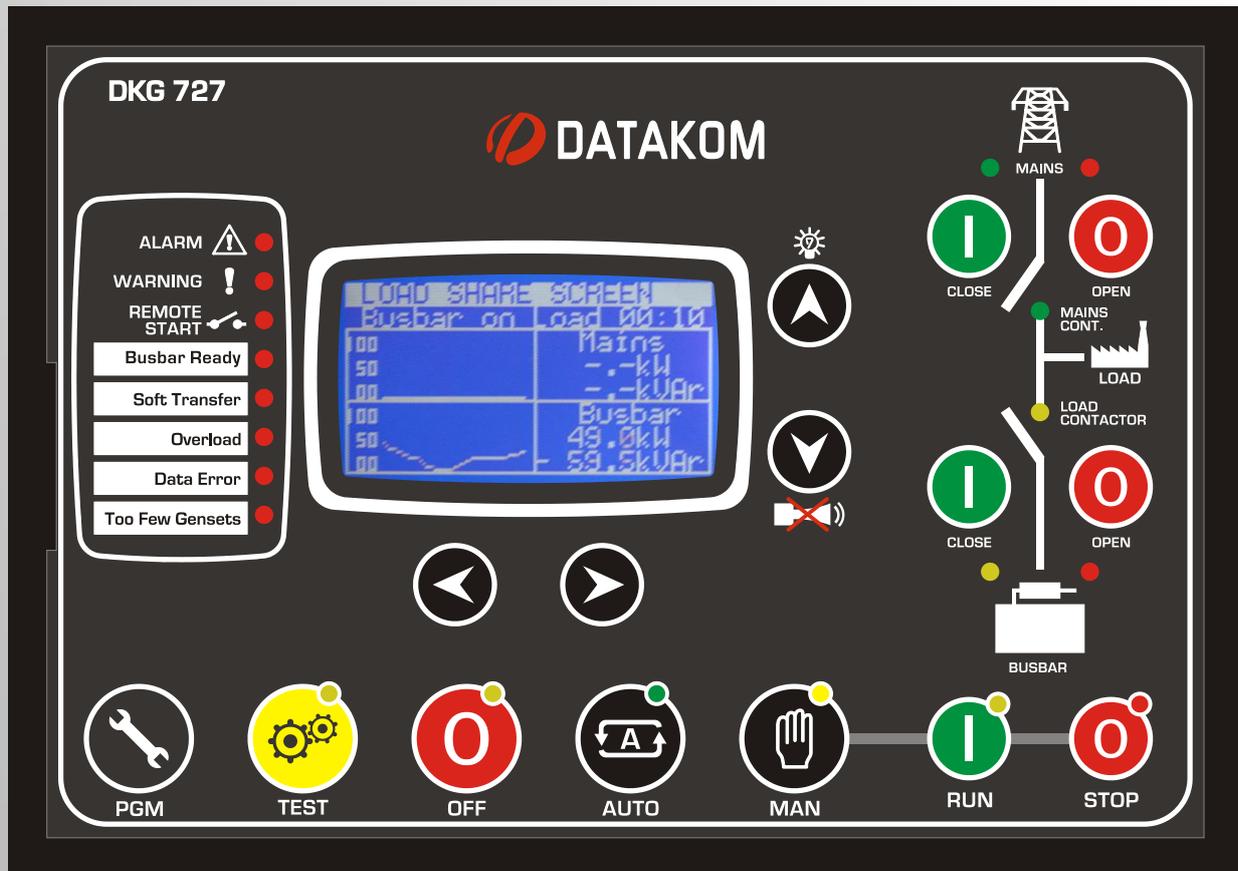


# DKG-727 MULTI GENSET PARALLELLING WITH MAINS UNIT



## STANDARD FEATURES

**Automatic mains failure**  
**Automatic and manual start**  
**Built in alarms and warnings**  
**True RMS measurements**  
**Complete mains power measurements**  
**Busbar voltages and frequency measurements**  
**Dead bus sensing**  
**Synchroscope**  
**No break transfer & no break load test**  
**Multi genset soft transfer to / from mains**  
**Multi genset power export to mains**  
**Multi genset peak lopping (peak shaving)**  
**G-59 mains protections**  
**External G59 protections applicable**  
**One Line Diagram monitoring on-line**  
**Load surge monitoring in programmed time scope**  
**Heavy Duty Feature**  
**Remote start operation capability**  
**Disable auto start capability**  
**Programmable Logic functions**  
**Fully isolated datalink communication port**  
**Voltage transformer ratio for MV applications**  
**Earth fault current monitoring**  
**Battery backed-up real time clock**

**Built-in daily, weekly, monthly exerciser**  
**500 event logs with time stamp and full snapshot**  
**Weekly operation schedule programs**  
**Field adjustable parameters**  
**Password protected front panel programming**  
**Upgrade software downloadable from PC (optional USB adapter needed)**  
**Free MS-Windows Remote monitoring SW:**  
     - monitoring, download of parameters  
     - download of software updates  
**High visibility, blue color 128x64 pixels graphic LCD**  
**User friendly graphic indicators and bar graphs**  
**Dual language support**  
**Customer logo display capability**  
**Protected semiconductor digital outputs**  
**Output expansion capability**  
**Configurable digital inputs: 12**  
**Configurable digital outputs: 8**  
**Configurable led indicators: 4**  
**Led/Relay output functions selectable from list**  
**Dimensions: 235 x 167 x 48mm (WxHxD)**  
**Sealed front panel (IP65)**  
**Plug-in connection system for easy replacement**

## DESCRIPTION

The DKG-727 is a comprehensive automatic paralleling with mains unit for multiple generating sets, featuring Manual and Automatic Load transfer between mains and multiple generating sets operating in parallel.

In automatic position, DKG-727 monitors mains phase voltages and controls the automatic starting, stopping and load transfer of the generating sets in case of a mains failure.

In case of mains failure DKG-727 energizes the remote system start output and waits until the sufficient number of generating sets to supply the programmed prime power are started, synchronized and closed to the busbar. Once the ready signal input is applied, the DKG-727 transfers the load to the busbar.

Once the busbar is alive and ready signal applied, It monitors internal protections and external fault inputs. If a fault condition occurs, the unit opens the load circuit breaker immediately and stops the multiple generating sets automatically, indicates the failure source on the LCD display and red ALARM led is illuminated.

Up to 7 generating sets may be paralleled with mains using DKG-727 units without the need for extra modules. The communication between modules is made with the Datalink connection.

The DKG-727 unit is able to transfer the load between mains and multiple generating sets in 3 various ways:

- 1. Transfer with interruption:** There will be a power interruption period during the transfer.
- 2. No break transfer:** Transfer will be made without power interruption. The unit starts to send command to multi generating sets to synchronize and waits until mains and common busbar phases within synchronization limits and makes a quick transfer.
- 3. Soft transfer:** Transfer will be made without power interruption. The unit starts to send command to multi generating sets to synchronize and waits until mains and common busbar phases within synchronization limits and closes the load circuit breaker and makes a smooth ramped transfer.

The DKG-727 units is able to run multiple generating sets in parallel with mains in 2 various ways

- 1. Peak Lopping:** If this feature is enabled, in auto mode when the mains active power reached to the programmed run limit DKG-727 runs the multiple generating sets then maximum mains active power is reached, DKG-727 synchronizes the multiple generating sets to the mains and multiple generating sets supply the remaining power amount of the mains active power programmed by user.
- 2. Power Export To Mains:** If this feature enabled, In auto mode the DKG-727 runs the multiple generating sets and synchronizes to mains and defined power with programmed power factor is exported to mains.

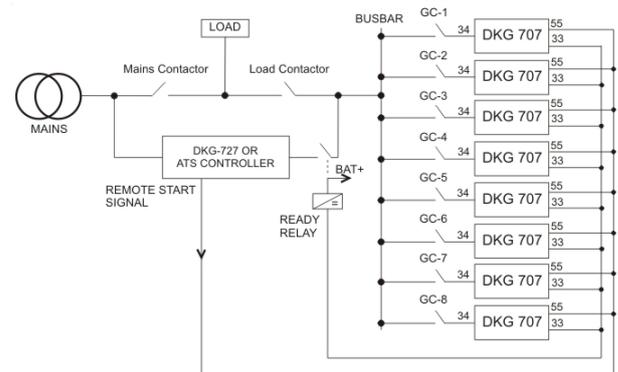
The operation of the unit is controlled with front panel pushbuttons. The Test, OFF, AUTO and MANUAL pushbuttons select the operating mode. Other buttons run and stop the generating sets manually, control the load circuit breaker, the mains circuit breaker, select the program mode entry/exit, scroll display parameters, provide alarm mute and lamp test functions. Also all main operations above may be done by programmed digital

inputs. The front panel pushbuttons may be locked by a programmed input against unauthorized interventions.

The DKG-727 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 modification of programs may be disabled also by the hard wired PROGRAM LOCK input.

The fault conditions are considered in 2 categories as Warnings, and Alarms. Measured values have separate programmable limits for warning and alarm conditions.

## MULTI-GENSET SYNCHRONIZATION



The unit allows the synchronization scheme defined in the above picture. The application is made with standard units and standard software, without extra cost. No additional parts are needed.

Basic features are below:

- Simple and cost effective application
- Automatic and manual start/stop, synchronization and load transfer between mains multiple generating sets.
- Parallel with mains operations (peak lopping, power export to mains etc)

## MEASUREMENTS

Mains Volts : L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1  
 Mains Amps: L1, L2, L3  
 Mains KW : L1, L2, L3, total  
 Mains KVA : L1, L2, L3, total  
 Mains KVAr : L1, L2, L3, total  
 Mains Pf : L1, L2, L3, average  
 Mains Frequency,  
 Busbar Volts: L1-N, L2-N, L3-N, L1-L2, L2-L3, L3-L1  
 Busbar Frequency,  
 Busbar total KW, total KVAr, total Pf (not measured)  
 Synchroscope Phase Angle  
 Voltage Match Mains-Busbar  
 Frequency match Mains-Busbar

## EVENT RECORDING

The DKG-727 records last 512 events with date and time stamp together with the complete snapshot of the busbar including all measured values.

Recorded events are:

- Alarms and warnings
- Date and time
- Operating mode change (AUTO, OFF, etc)
- DKG-727 status change (running, synchronizing etc)
- Mains and common busbar measurements.
- Digital input and output statuses
- Periodic recording

## DIGITAL INPUTS

The unit has 12 fully configurable digital inputs. Each input has following programmable parameters:

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

## DIGITAL OUTPUTS

The unit provides 8 semiconductor outputs with programmable functions, selectable from a list of 196 entries.

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

Using two DKG-725 Relay Expansion Modules, the number of relays may be increased up to 24, 16 of them being volt-free contacts.

## PROGRAMMABLE LOGIC FUNCTIONS

The DKG-727 unit offers to user usage of programmable logic functions. Function arguments can be selected from a list including 196 entries. OR, AND, XOR, NOT, NAND and NOR logical operations may be done and the result can be assigned to any of digital or led output by a programmable time delay.

## TELEMETRY AND REMOTE PROGRAMMING

The optional USB adapter module is necessary for PC connection. One module allows communication with all units connected on the same Datalink loop.

The DKG-727 module provides the user with large telemetry facilities via the optional USB interface module.

The PC program is used for below purposes:

- software download:** the DKG-727 unit's software is downloadable. 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 settings.
- remote monitoring:** The complete multiple generating sets system is displayed as a mimic diagram on the PC screen. Measured values are visualized as opening windows.
- logo downloading:** The customized company logo can be downloaded into device via PC software.

## BUILT IN ALARMS

Under/Over Busbar Volts  
Under/Over Busbar Frequency  
High Battery Voltage  
Minimum genset not available  
Insufficient Prime Power  
Busbar Phase Sequence Fail  
Earth Current Fault  
Mains Phase Sequence Fail  
Load CB Fail to Close  
Load CB Fail to Open  
Mains CB Fail to Close  
Mains CB Fail to Open  
Ready Signal Fail  
Address conflict  
Invalid address  
Data Link Error

## BUILT IN WARNINGS

Under/Over Busbar Frequency  
High/Low Battery Voltage  
Datalink Communication Lost  
Address not claimed  
Fail to Stop  
Mains Reverse Power  
Mains Frequency Fail  
No mains frequency  
Rocof Failure df/dt  
Vector Shift  
Synchronization Fail

## WEEKLY OPERATION SCHEDULE

In AUTO mode only, the unit offers the capability of defining a weekly operation schedule. Programmable parameters allow the unit to operate automatically only in defined time limits of each weekday. The internal battery backed-up real time clock will allow precise switching times.

## MODBUS COMMUNICATION

The optional DKG-727-MODBUS unit supports MODBUS protocol enabling communication with PLCs and building management systems. The MODBUS protocol is also supported through GSM and PSTN modems.

## TECHNICAL SPECIFICATIONS

**Busbar voltage:** 0 to 300 V-AC (Ph-N)  
**Busbar frequency:** 0-200 Hz.  
**Mains voltage:** 0 to 300 V-AC (Ph-N)  
**Mains frequency:** 0-200 Hz.  
**DC Supply Range:** 9.0 to 30.0 V-DC.  
**Current consumption:** 250 mA-DC max.  
**Current Inputs:** from current transformers. ..5A.  
**Digital inputs:** input voltage 0 to 35 V-DC.  
**Digital Outputs:** Protected semiconductor outputs, rated 1Amp@28V-DC  
**Measurement Category:** CAT II  
**Air Category:** Pollution degree II  
**Datalink Port:** Fully isolated, 115.2Kb, canbus levels.  
**Operating temperature:** -20°C to 70°C (-4 to +158 °F).  
**Storage temperature:** -40°C to 80°C (-40 to +176°F).  
**Maximum humidity:** 95% non-condensing.  
**IP Protection:** IP65 from front panel, IP30 from the rear.

**Dimensions:** 235 x 167 x 48mm (WxHxD)  
**Panel Cut-out Dimensions:** 219 x 151 mm minimum.  
**Weight:** 550 g (approx.)  
**Case Material:** High Temperature Self Extinguishing ABS/PC (UL94-V0)  
**Installation:** Flat surface mounting on a Type 1 Enclosure. Rear retaining plastic brackets.  
**EU Directives Conformity**  
 -2006/95/EC (low voltage)  
 -2004/108/EC (electro-magnetic compatibility)  
**Norms of reference:**  
 EN 61010 (safety requirements)  
 EN 61326 (EMC requirements)  
**UL Compatibility:** UL 508 – Industrial Control Equipment  
**CSA Compatibility:** CAN/CSA C22.2 No. 14-2005 - Industrial Control Equipment

## TYPICAL CONNECTION DIAGRAM

