Automatic synchronization and load sharing of two generating sets controlled by a single module

GENERAL POINTS
DUOGEN is a microprocessor based single module which gathers the control of two generators. DUOGEN carries out manual and auto synchronization, isochronous load sharing or droop load sharing. DUOGEN integrates the following features:
- 1 digital input for auto synchronization.
- 1 sync check relay is checking phase, frequency and voltage differences.
- 1 'Load shedding' output relay is calling for need of power, allowing a better power plant global efficiency.
- 2 Isochronous kW sharing controls.
- 2 Iso-voltage kVAR sharing controls.
- 2 Reverse power protections.

INPUTS/OUTPUTS FOR EACH GENSET
- 3 phases genset voltages (3 or 4 wires, 100 to 440 VAC).
- 3 phases genset currents (1A or 5A CTs).
- 1 digital input: feedback of the genset breaker position.
- 1 digital input: unload request (adjustable ramp time).
- 1 analogue input for speed control (± 5 VDC or potentiometer).
- 2 output relays: trip request and reverse power protection.
- 1 analogue output: active power monitor (0-5V or 0-1mA adjustable).
- Proportional and integral gain pot for synchronization.
- 1 analogue output for speed control adjustable with Gain pot and Offset pot, compatible with most electronic governors (Barber Colman, Woodward, GAC, Heinzmann, Ambac, DDEC, MDEC…).
- 1 analogue output for voltage control, adjustable with Gain pot and Offset pot, compatible with most AVR (Leroy Somer, Stamford, Basler…).

COMMON INPUTS/OUTPUTS
- ‘SYNC OK’ output relay: always active. Stays open in dead bus conditions.
  The coupling authorization safety relay is authorizing the coupling only when differences in frequency, voltage and phase meet the requirements of the installation.
- ‘LOAD SHEDDING’ output relay: active when application needs the power of the two gensets.
- 1 digital input: remote synchronization request.
- 1 digital input: droop mode.
- Stability and load sharing pot. for ILS.

APPLICATIONS
- **Two gensets in change over application:**
  Manual mode: potentiometer speed for synchronization and kW control.
  Auto mode: automatic synchronization and load sharing.
- **Two gensets in change over application + no break return to mains with soft load transfer:**
  Add a C2S-III (CRE module, reference A25W0) to synchronize the power plant to mains.
- **Gaz, fuel, and turbines:**
  Duogen can be installed regardless the type of prime mover and fuel.
**CHARACTERISTICS**

- **Weight - Size:** 1.5 kg - 200x275x26 mm
- **Measuring voltage and current input:**
<table>
<thead>
<tr>
<th>Reference</th>
<th>Switch</th>
<th>GE 1 &amp; 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>A40R0</td>
<td>pos. 1</td>
<td>110 VAC/5 A AC</td>
</tr>
<tr>
<td></td>
<td>pos. 2</td>
<td>240 VAC/5 A AC</td>
</tr>
<tr>
<td></td>
<td>pos. 3</td>
<td>440 VAC/5 A AC</td>
</tr>
</tbody>
</table>

  Frequency: 50 or 60 Hz.
- **Output relay contacts:**
  Volt free contacts, 5 A at voltage of 250 VAC, maximum cutting voltage 440 VAC. Switched power on resistive load, 1250 VA.

**ENVIRONMENT**

- **Power supply:**
  9 to 40VDC – 10 Watts
- **Operating temperature:**
  -20 to +85 °C.
- **Mounting:**
  can be mounted in all positions.
- **Humidity:**
  will operate normally in humid conditions (Tropic-proof circuits).
- **CE Mark:**
  Duogen is in conformity with European CE Mark requirements.

**WIRING DIAGRAM**

- **Breaker control**
  - G1
  - G2
  - G1 breaker IN
  - G2 breaker IN
  - Gen1 break out
  - Gen2 break out

- **Auto Mains Failure**
  - Load shedding
  - Battery
  - 5 A Amps

- **Power monitor**
  - 0-5V or 0-1mA

- **DUOGEN**
  - Gen1 AVR out -
  - Gen1 AVR out +
  - Gen1 Speed Ref
  - Gen1 Speed setpoint
  - Gen1 Rev. kW
  - Gen1 kW out +5V
  - Gen1 kW out 0
  - Gen1 kW out 1mA

- **DUOGEN**
  - Gen2 AVR out -
  - Gen2 AVR out +
  - Gen2 Speed Ref
  - Gen2 Speed setpoint
  - Gen2 Rev. kW
  - Gen2 kW out +5V
  - Gen2 kW out 0
  - Gen2 kW out 1mA

*CRE TECHNOLOGY*

Allée Charles Victor Naudin - Zone des Templiers - Sophia Antipolis - 06410 BIOT - FRANCE
Tél. : 04. 92. 38. 88. 20. - Fax : 04. 92. 38. 98. 89.