Combination Generator Control Module

Flexible and Robust Generator Control, Protection and System Supervision

Benefits

- Generator Protection
- Excitation Control
- Synchronization Control
- Full Featured Metering
- Integration with Allen-Bradley ControlLogix Family

Communication Ports

- Redundant ControlNet connector
- EtherNet/DLR communication
- RS-232 port for dedicated communication with a redundant CGCM

Synchronization Parameters

- Frequency
- Phase Rotation Match
- Phase Angle
- Voltage Magnitude

The Rockwell Automation Allen-Bradley® Combination Generator Control Module (CGCM) sets a new standard for generator control. The CGCM combines excitation control, generator protection, synchronization control, and full-featured metering in a single compact product. The CGCM, when used in conjunction with a ControlLogix® Automation Controller, provides a highly robust and flexible platform for generator control and system supervision.
Generator Regulation and Control Functions
- Four excitation control modes
- Automatic voltage regulation (AVR)
- Manual or field current regulation (FCR)
- Power factor (PF)
- Reactive power (VAR)
- Soft start voltage buildup with an adjustable ramp in AVR and FCR control modes
- Overexcitation (OEL) and underexcitation (UEL) limiting in AVR, VAR, and PF control modes
- Underfrequency compensation (Volts/Hertz)
- Line Drop Compensation
- Auto-tracking between operating modes and between redundant CGCM units
- Automatic transfer to a backup CGCM unit in redundant systems
- Generator paralleling with reactive droop compensation or crosscurrent (reactive differential) compensation
- Generator paralleling with real power load sharing
- Synchronizing for 1 or 2 circuit breakers

Generator Protection Functions
- Loss of excitation current (ANSI 40)
- Overexcitation voltage (ANSI 59F)
- Generator overvoltage (ANSI 59)
- Generator undervoltage (ANSI 27)
- Loss of sensing (ANSI 60FL)
- Loss of permanent magnet generator (PMG/Excitation power) (ANSI 27)
- Reverse VAR (ANSI 40Q)
- Overfrequency (ANSI 81O)
- Underfrequency (ANSI 81U)
- Reverse power (ANSI 32R)
- Rotating diode monitor (ANSI 58)
- Phase rotation error (ANSI 47)
- Generator overcurrent (ANSI 51/27F)
- Voltage Magnitude

Field Output
- Continuous Voltage 32, 63, 125 Vdc
- Continuous Current 15 A
- 10 Second Forcing Voltage 50, 100, or 200 Vdc
- 10 Second Forcing Current 30 A

Catalog Number Description
- 1407-CGCM Combination Generator Control Module with ControlNet
- 1407-CGCM-DLR Combination Generator Control Module with EtherNet/DLR

Generator Protection
- Loss of excitation current (ANSI 40)
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- Phase rotation error (ANSI 47)
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- Voltage Magnitude

Operating Power Requirements

<table>
<thead>
<tr>
<th>Source</th>
<th>Phases</th>
<th>Wiring Configuration</th>
<th>Voltage (min/max)</th>
<th>Frequency (min/max)</th>
<th>VA (max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Magnet Generator</td>
<td>1 Phase</td>
<td>PMG-A &amp; PMG-C</td>
<td>Min: 56 Vrms Max: 300 Vrms</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Permanent Magnet Generator</td>
<td>3 Phase</td>
<td>Floating wye</td>
<td>Min: 56 Vrms L-L Max: 300 Vrms L-L</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Separately Excited</td>
<td>1 Phase</td>
<td>PMG-A &amp; PMG-C</td>
<td>Min: 56 Vrms Max: 300 Vrms</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Separately Excited</td>
<td>3 Phase</td>
<td>Floating wye</td>
<td>Min: 56 Vrms L-L Max: 300 Vrms L-L</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Separately Excited</td>
<td>3 Phase</td>
<td>Grounded wye</td>
<td>Min: 56 Vrms L-L Max: 300 Vrms L-L</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Separately Excited</td>
<td>3 Phase</td>
<td>Floating delta</td>
<td>Min: 56 Vrms L-L Max: 300 Vrms L-L</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
<tr>
<td>Separately Excited</td>
<td>3 Phase</td>
<td>Open delta, floating</td>
<td>Min: 56 Vrms L-L Max: 300 Vrms L-L</td>
<td>Min: 50 Hz Max: 342 Hz</td>
<td>3070</td>
</tr>
</tbody>
</table>

Generator and Bus Voltage Sensing Values

<table>
<thead>
<tr>
<th>Phases</th>
<th>Wiring Configuration</th>
<th>Grounded Connection</th>
<th>Voltage (available)</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Phase</td>
<td>V A &amp; V C</td>
<td>No</td>
<td>Min: 57 Vrms Max: 150 Vrms</td>
<td>Min: 20 Hz Max: 90 Hz</td>
</tr>
<tr>
<td>3 Phase</td>
<td>Floating wye</td>
<td>No</td>
<td>Min: 99 Vrms L-L Max: 208 Vrms L-L</td>
<td>Min: 20 Hz Max: 90 Hz</td>
</tr>
<tr>
<td>3 Phase</td>
<td>Grounded wye</td>
<td>Yes</td>
<td>Min: 99 Vrms L-L Max: 208 Vrms L-L</td>
<td>Min: 20 Hz Max: 90 Hz</td>
</tr>
<tr>
<td>3 Phase</td>
<td>Open delta, grounded “B” phase</td>
<td>Yes</td>
<td>Min: 99 Vrms L-L Max: 208 Vrms L-L</td>
<td>Min: 20 Hz Max: 90 Hz</td>
</tr>
</tbody>
</table>

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