**THE SAMPLE SYSTEM**

A well-designed gas sampling system can eliminate unplanned measurement outages by removing oil, dust and water before they foul the instrument. Resident particulate and moisture filters, pressure regulators, flow meters and valves facilitate easy calibration, measurement isolation, and stable, repeatable gas sample conditions. Ask your sales representative for more information about the sample system, core monitor and gas dryer capability with our alliance partner —

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**Hydrogen Purging Standard Ranges**

<table>
<thead>
<tr>
<th>Range</th>
<th>H₂ in Air</th>
<th>H₂ in CO₂</th>
<th>Air in CO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 - 100</td>
<td>±1</td>
<td>±0.5</td>
<td>±0.5/month</td>
</tr>
<tr>
<td>0 - 100</td>
<td>±1</td>
<td>±0.5/month</td>
<td>±0.5/month</td>
</tr>
<tr>
<td>0 - 100</td>
<td>±0.5/month</td>
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</tr>
</tbody>
</table>

**Prevent catastrophic failures and lengthy downtime**

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**What does vigilance™ mean to Yokogawa?**

For starters, always, always making sure the products and solutions that leave our research and development labs are the best the world has seen — from day one throughout your business life cycle. Our innovative technologies and committed experts help design, install and manage your production systems efficiently and dynamically. In an ever-changing business environment, we help plan for the future to ensure continuity and flexibility in your automation strategies. Yokogawa goes the extra mile to do things right. Let us be vigilant about your business.
EXA GD402/GD40
Hydrogen Purity Monitor

The Yokogawa vibrating element type Hydrogen Purity Monitor has experienced worldwide acceptance as the new hydrogen purity measurement for electric power generators.

The GD402/GD40 hydrogen purity monitor’s low maintenance design, self-diagnostic capabilities, and easy-to-use YES/NO programming provide a broad range of control options to meet the demanding environments of power producers.

"The installations used the existing generator gas sample ports and the similarity to other Yokogawa equipment already within the plant made the operation nearly plug and play which greatly reduced installation and startup time."

Senior Instrument Mechanical Foreman, TVA Kingston power plant USA comments on the installation of 9 GD402 systems.

WHICH MONITOR TO CHOOSE?
The Yokogawa GD402/GD40 Hydrogen Purity Monitor (HPM) helps ensure that power generators are running with pure hydrogen. It is a fast, accurate and reliable process gas measurement and control device that is unaffected by ambient temperature or vibration, and does not require reference gases or a controlled temperature environment.

The heart of the GD40 is a unique, vibrating cylinder, sensor technology that measures hydrogen purity. Multi-frequency cylinder oscillation makes the GD40’s measurement highly resistant to errors caused by dust, oil, vibration, and temperature changes. The Yokogawa HPM maintains ±1%, FS accuracy and a response time (T90) of less than 5 seconds.

Simple operation, rock-solid performance, and low maintenance define the Yokogawa Hydrogen Purity Monitor.

Power generators use pure hydrogen to cool and insulate power generator electrical windings. Inexpensive and readily available, hydrogen is the choice insulator because its low density and high thermal conductivity provide the best environment for generator operation. Contaminated hydrogen reduces generator efficiency. Air is the most common contaminant, originating from leaking rotor shaft seals. Knowing the purity level of the generator hydrogen helps plant operators avoid conditions that place human life and expensive machinery at risk. Monitoring hydrogen purity with the EXA GD402 helps improve generator efficiency and reduce operational costs. (Fig 1)

Effects of Hydrogen Purity

EXA GD402 vs TEMPERATURE!

With typical hydrogen measurement technology, sudden process temperature swings can lead to large purity measurement errors. The EXA GD402/GD40 gas measurement remains stable in aggressive process conditions regardless of sharp changes in ambient or process gas temperature (Fig 2)

EXA GD402 AND CALIBRATION

Calibration is fast and simple. The HPM requires only two gases and usually requires less than 10 minutes to calibrate.

"It takes longer to gather tools and walk to the instrument than it does to calibrate!"

Georgia Power Plant Yates, Technician

TRI GAS ANALYZER

Hydrogen must be replaced with breathable air before generator maintenance. Since H₂ and air are a potentially explosive mixture, a third purge gas must be used as part of the generator outage process. CO₂ is used to buffer the H₂ from the air during generator maintenance. The Yokogawa HPM measures and outputs a separate 4-20mA signal for all phases of the generator purge sequence.
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<th>0 - 100</th>
<th>0 - 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Range</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response Time 90%</td>
<td>approximately 5 seconds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Linearity</td>
<td>±0.5</td>
<td>±0.5</td>
<td>±0.5</td>
</tr>
<tr>
<td>Repeatability</td>
<td>±0.5/month</td>
<td>±0.5/month</td>
<td>±0.5/month</td>
</tr>
<tr>
<td>Long-Term Stability</td>
<td>±0.5/month</td>
<td>±0.5/month</td>
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</tr>
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Density is the basic measurement, all other representations are derived from the basic density data.

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A Yokogawa Commitment to Industry