Generator Condition Monitor

Corrective action prompted by early warning of generator overheating can mean the difference between a brief shutdown for minor repairs and a major overhaul involving weeks or even months of costly downtime. E/One pioneered the development of the Generator Condition Monitor (GCM) and in more than 1,500 applications worldwide, operators are provided the opportunity of taking corrective action if and when a critical situation occurs.

Building on more than three decades of proven field experience, and incorporating international requirements for hazardous area locations, the Generator Condition Monitor – Explosion Proof Design (GCM-X) assures a new level in performance, reliability, and safety.

How the GCM-X Works.

High concentrations of submicron particles (pyrolytic products) are produced whenever any materials within the generator are heated sufficiently to produce thermal decomposition. These “hotspots” can lead to catastrophic failure if not detected in a timely manner. When they are present in hydrogen, pyrolytic products are quickly detected by the GCM-X’s sensitive ion chamber. In fact, the GCM-X warns of impending failure faster and more reliably than temperature sensors such as RTD’s and thermocouples.

Upon detection of hotspots, the GCM-X microprocessor initiates an alarm verification sequence by inserting the confirmation filter. If the alarm is validated, a verified alarm indication is given; alarm contacts are switched; and a fixed amount of the hydrogen flow automatically passes through the sampling system. Particles are then collected for laboratory analysis to determine their source.

Improvements Over Time

GCM’s have provided critical information to plant operators for three decades, but earlier designs did not earn the same level of confidence as today’s GCM-X. Here’s why:

- Early GCM’s didn’t give you a warning about inadequate hydrogen flow in the unit
- They didn’t automatically validate the alarm condition
- They didn’t monitor the integrity of system components

These shortcomings were addressed by introduction of the **Auto Alarm Remote Panel** (AARP) in the early 1980’s – a separate panel, remotely located in the control room, that provided warning of inadequate hydrogen flow, automatically verified the alarm condition, and validated the integrity of system components.

- The AARP represented the first major step in confidence building, but operators were still left with concerns – one of which was real time indication of hydrogen flow through the unit. The problem here was that if GCM output (4-20mA tied into the control room) began to drop, it could be due to overheating or inadequate flow. This issue was addressed in the GCM-X by incorporation of a differential pressure transmitter which provided real-time flow information (4-20mA) to the control room. Now, if the GCM-X’s output fell, and it accompanied a drop in hydrogen flow to the unit, operators could adjust the flow setting on the unit, or investigate other generator operating parameters that could lead to inadequate flow to the GCM.
- Two other aspects of the GCM-X design addressed issues of concern to operators. The first was increased system self-diagnostics. The GCM-X’s microprocessor afforded higher levels of “watch dog” features not found in earlier designs as well as data and trouble/alarm fault logging. The second issue was hazardous area safety concerns and the GCM-X earning third party certification to the internationally recognized ATEX standard, effectively put that issue to rest.

GCM-X from Environment One

Auto Alarm Remote Panel

Specifications

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