



DIGITALISATION TRANSFORMS REFINERY EMISSIONS MONITORING AND COMBUSTION CONTROL GAS ANALYSIS

An array of digital solutions combined with innovative service delivery and modern low-maintenance hardware are cutting the lifetime costs of gas analysers used in refineries and gas processing terminals. The results are reduced capital expenditure, simpler operations and a lower cost of ownership.

Additional or replacement gas analysers will often feature in the capex plan and when thinking on a 3 to 5-year timescale, upgrades can be a good investment. Investing wisely in new process control or emissions monitoring gas analysers can make a huge difference to the cost of ownership and bolting on Industry 4.0 services can result in increased simplicity and reduced operating costs.

Digital Solutions Deliver Value

Augmented reality, cloud computing and condition monitoring are at the heart of digitalisation. David Lincoln, Global Digital Lead at ABB's Measurement & Analytics Division explains how these digital solutions can make a transformational difference to refinery emissions monitoring and combustion control gas analysis: "the right combination of digital technology, service delivery and high-tech hardware offers unrivalled value for money to our gas-analyser users".

As an example of a digital solution, 'Remote Insights' (part of the ABB Ability™ suite of digital solutions) allows instrument technicians to communicate remotely with an ABB expert. It is a two-way augmented reality video and voice interaction enabled by a hand-held device such as a tablet computer or mixed reality headset. It means that the instrument technician can share what they are seeing with their counterpart at ABB and get instant feedback about the best course of action. Lincoln says that "in the past, training, start-up, maintenance, troubleshooting and repairs all meant a service call-out. With Remote Insights, operators will

get the fastest possible response. And with less travel time and support manhours, there is the potential for cost savings also".

Going further with another digitalisation service, 'Remote Assistance' is ABB's new collaborative cloud-enabled operations concept. It relies on Condition Monitoring health diagnostics in the gas analysers which can inform the operator's instrument engineer, or the service team at ABB about the status of the gas analyser. This data can be used to diagnose consumable materials replacement requirements or trouble shooting. The goal is to guide the local operations team towards a speedy resolution.

Closing out our examples here, 'Condition Monitoring' enables service teams to work with instrumentation engineers to review the health and status of their gas analysers. The concept means fixing little glitches in the gas analysers proactively before they escalate on the one hand and avoiding unnecessary maintenance if it is not required on the other. All in all, condition-based intervention saves time, reduces cost and can also contribute to improved safety.

Lincoln outlines a recent situation where low-maintenance emissions monitoring gas analysers and field service engineers teamed up to support a major multi-site operator in Italy. "Our customer was targeting immediate cost-savings and looking for a reliable service provider to support their installed CEM gas analyser base across 13 sites". To meet the cost-saving target, ABB offered a holistic approach built around the ABB Ability™ Condition Monitoring solution. That included a standardized maintenance strategy across their sites with rapid response and optimized routine services. "The condition-based monthly review of the CEM devices resulted in better emissions data reporting uptime and lower labour costs", concludes Lincoln.

Automated Calibration Pays Off

The Industry 4.0 dynamic is also at play in the gas analysers themselves. "We are on a mission to control our customer's costs, cut complexity and make their capex go further. That's why we continuously innovate our gas analysers". So says Stephen Gibbons, Head of Product Management for the Continuous Gas Analysers product range at ABB Measurement & Analytics.

"Take the example of combustion optimisation and emissions monitoring on an oil-fired process heater or



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refinery steam boiler. Our Advance Optima product range can bundle together all the gas analysers that a refinery would need for these applications with one controller. It means simplicity and cost-effectiveness".

Direct read IR gas analysers are ideal for measurement of the carbon dioxide (CO₂) and carbon monoxide (CO) for combustion control and CEM applications. Gibbons points out that "simultaneous measurement of these two components is right in the sweet spot for our Uras26 NDIR gas analyser". UV gas measurement technology is ideal for oxides of nitrogen (NOx) emissions measurement which is required for CEM and can also provide valuable process information for combustion optimisation.

IR and UV gas analysers are in common use for CO, CO₂ and NOx measurement. But the reason for considering the Industry 4.0 self-calibration features built into these ABB devices is to reduce operating costs. The gas analysers are fitted with cells which are filled with gas mixtures of known concentrations which enables automated calibration without the need for gas cylinders. It means the instruments can be maintained with minimum cost and complexity.



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