ABB MEASUREMENT & ANALYTICS | APPLICATION NOTE

VortexMaster and SwirlMaster

Online Meter Verification

Enhanced self-diagnosis without shutting down the system or removing devices

Measurement made easy

VortexMaster and SwirlMaster

Introduction

Quality-relevant and safety-relevant measuring points are becoming ever more important. These measuring points are increasingly subject to continual inspections which usually involves substantial costs.

For this reason, particular emphasis was placed on one important feature when designing the new VortexMaster vortex flowmeter and SwirlMaster swirl flowmeter devices – enhanced diagnosis in accordance with NAMUR, including ‘Online Meter Verification’.

VortexMaster and SwirlMaster

Online Meter Verification

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01 Namur Diagnosis Message HMI
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02 Namur Diagnosis Message HMI detailed view
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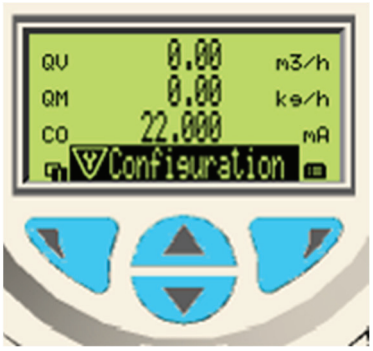
03 Namur Diagnosis Message HMI recommended action

Functionality
Using this functionality, the flowmeters in the system can be inspected while operating and do not have to be removed for repeated testing. The inspection routine is performed in the following sequence:

1. The user calls up the diagnosis function and the transmitter sends a test signal to the sensor without interrupting measured value acquisition.
2. The electronics system checks the sensor. If a sensor fault/electronics fault is detected, the electronics system sends a corresponding message to the display and to the diagnosis register.
3. All detected errors are saved in the sensor memory and can be viewed on the display if required or conveniently viewed using the DTM.



01

Advanced diagnostics
The new diagnosis technology consists of the following five elements:

1. Continuous self-monitoring of sensors and the electronics system; events reported to the display using clear text.
2. Sensor monitoring using a test signal inserted into the operating process without interrupting measured value acquisition.
3. Continuous inspection of the current output signal by reading the signal and comparing it with the nominal value.
4. Complete simulation of the measuring device from measured value acquisition and input circuits to all outputs, i.e. testing of the start-up of trigger points is eliminated.
5. All diagnosis parameters, calibration parameters or system parameters are stored in the sensor memory, thus providing accessibility to all data for the ABB analysis tool. As a result, the user does not need to be on site during the inspection, but can control everything from the control room.

02

The possibility of using Online Meter Verification while devices are installed allows intervals between inspections to be increased. The devices do not have to be removed for inspection and sent to the manufacturers' factory or must be removed for this purpose less often. This saves time and costs.

03

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04 Diagnosis overview FIM Tool without error
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05 Diagnosis overview FIM Tool with error
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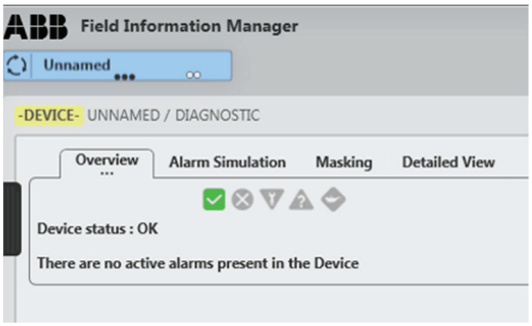
06 Diagnosis overview FIM Tool detailed view

The operator receives a clear statement concerning the condition of the device:
- passed or failed.



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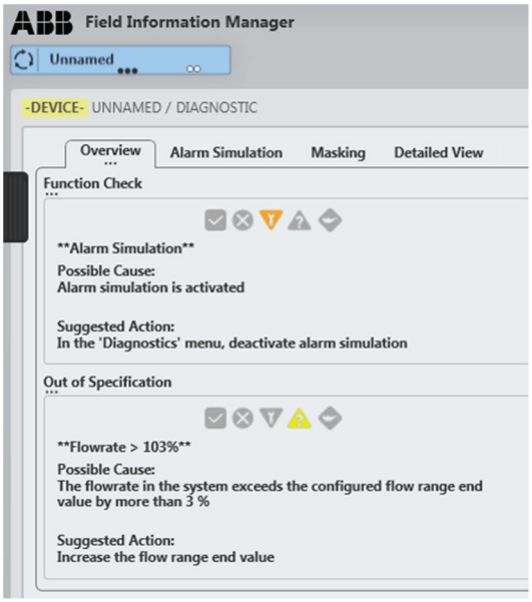

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Costs are significantly reduced:
- System shutdown is not required.

Retrofitting
When designing the devices, special attention was also paid to backward compatibility.
For ABB's customers, this means that these functions are not only integrated into new lines of devices, but are also available for previous versions. Operators can simply integrate Online Meter Verification into existing installed flowmeters by replacing the electronics unit; there is no requirement to purchase a complete new device.
This is, of course, particularly advantageous for larger nominal sizes.
Conversion kits are available for converting all device variants.
This allows trained technicians to perform the conversion themselves. Naturally, ABB Service can perform conversions on site at any time.

Conclusion
Due to legal requirements and strict quality standards, processes, auxiliary circuits and safety devices must be permanently monitored and the need for verifiable inspection options for measuring devices is growing.
The new diagnosis technology integrated in the VortexMaster and SwirlMaster guarantees fully comprehensive and continuous monitoring of device technology directly in the piping without removing the device.
- System shutdowns are avoided
- Reliable, quick and simple diagnosis technology
- Top quality online inspection with outstanding scope of testing
- Cost-optimized for users
- Backward compatible with users' existing installed equipment

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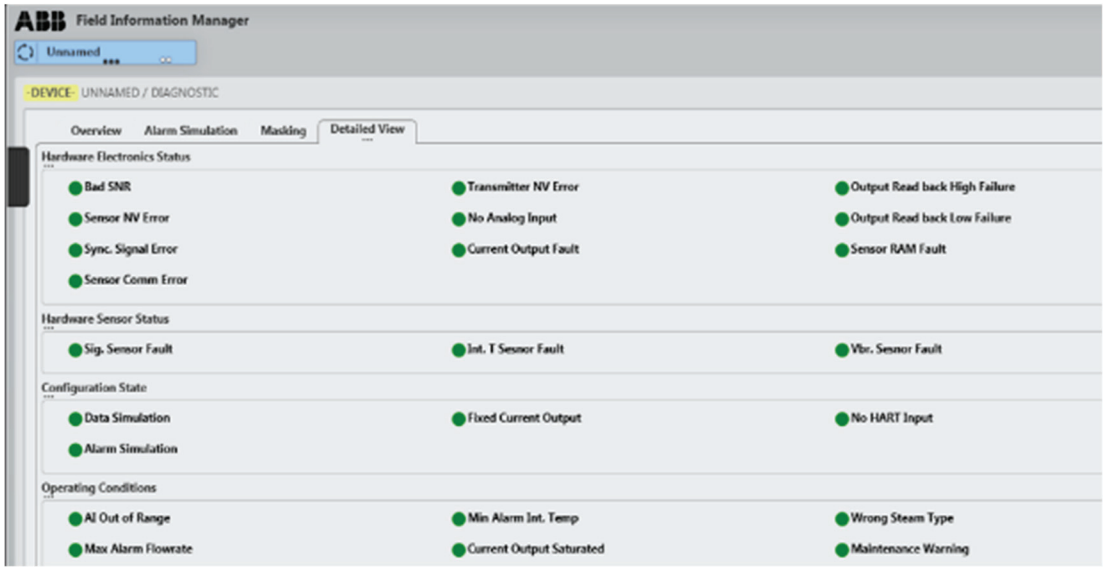

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