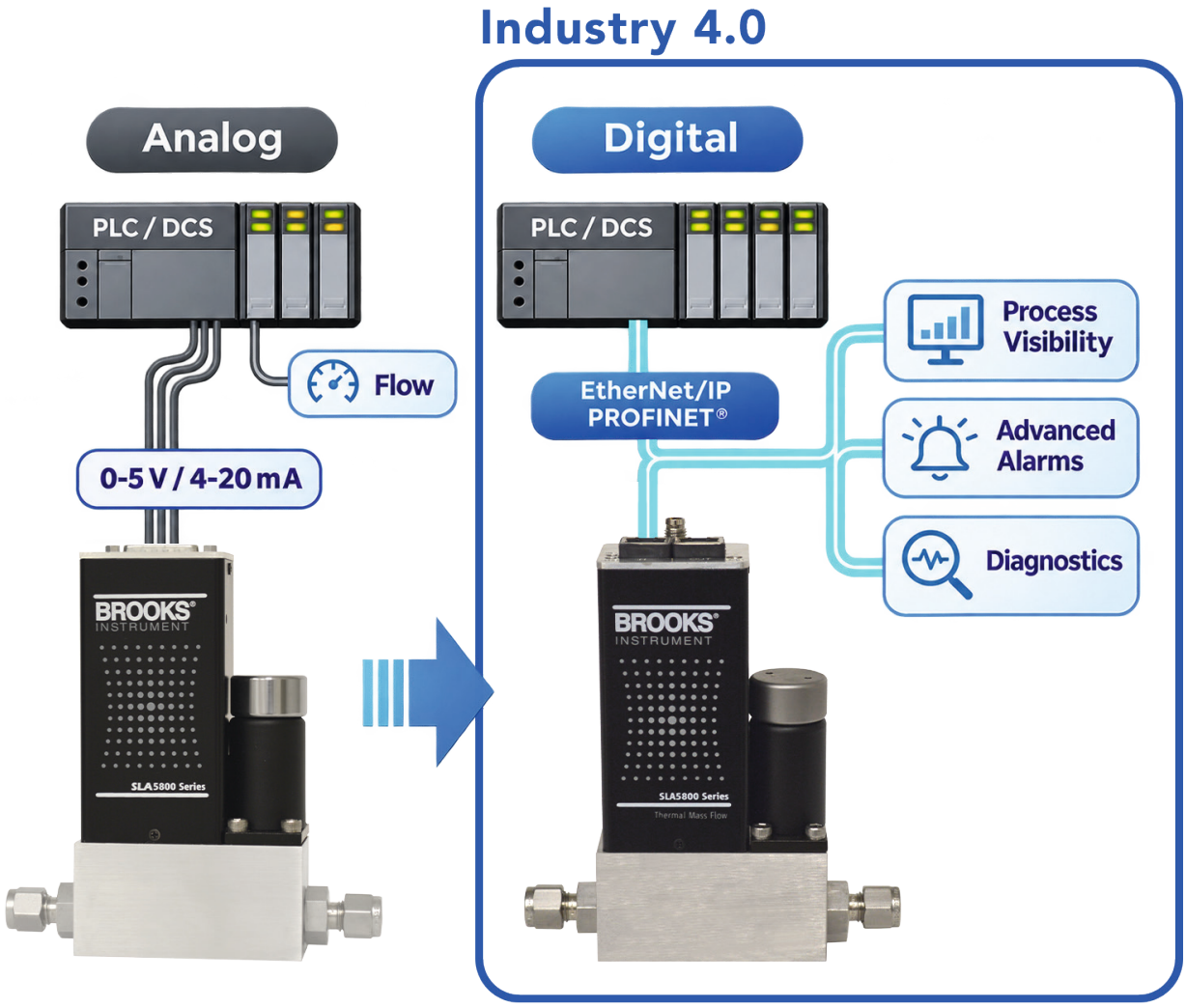
BROOKS® INSTRUMENT




White Paper

# Upgrade & Validation

## Fact or Fiction: Upgrading Mass Flow Controllers from Analog to Digital Communications Means Extra Headaches

## Introduction

# Fact or Fiction:
# Upgrading Mass Flow Controllers from Analog to Digital Communications Means Extra Headaches



**Joe Sipka**
Global Business Development



**Dan Woodbury**
Director of Industrial Sales

Maintaining process instrumentation and automation systems is critical to ensuring your processes are running smoothly. This decreases downtime and disruption that can be caused by process events or even cyber treats.

When it comes time to replace mass flow controllers (MFCs), many engineers face a critical choice: stick with analog units or take the leap towards Industry 4.0 utilizing digital platforms with advanced communication protocols like EtherNet/IP and PROFINET.

A common misconception is that upgrading to digital MFCs requires more validation, more system changes, and more time. In reality, that's a myth. Validation is required any time an instrument is replaced—analog or digital. In fact, your PLC/DCS control or automation system (PC hardware only lasts a certain amount of time, and all automation systems require regular software updates to maintain support) must be validated periodically even when you're not replacing instruments.

By choosing analog replacements during a full system upgrade, one customer missed out on advanced alarm features, richer diagnostics, and deeper process insights that EtherNet/IP-enabled MFCs would have delivered—without any significant additional validation burden.

This paper cuts through the confusion, separating fact from fiction, and serves as a practical guide to maximizing value when upgrading your MFCs.

# Myth #1: Digital MFCs require extra validation.

**Reality: Validation is always required—digital or analog. Upgrading to digital simply delivers more value for the effort you're already investing.**

## Fact 1: Recognize That Validation Happens Anyway

Validation is a given in any regulated or controlled process environment. Whether you replace an analog or digital MFC, validation is required to confirm proper installation, communication, and operation. Rather than viewing validation as a barrier, see it as a catalyst to modernize your infrastructure.

Hardware ages, software updates are inevitable, and system performance expectations continue to grow. Taking a lifecycle approach lets you make the most of the work you already have to do.

**Key Considerations:**

- **Verify** instrument setpoints and present values (SV vs. PV).
- **Replace** aging analog MFCs to reduce operational and contamination risk.
- **Use** validation to confirm system performance and update process documentation.

## Fact 2: Align Instrument Upgrades With System Refresh Cycles

Your control system is already on a maintenance schedule. PLC/DCS hardware eventually ages out, and automation software must be regularly updated. These updates are the perfect time to integrate digital MFCs—because the "hood is already open."

Digital MFCs use the same sensing principles as analog ones, but communicate directly over modern networks. When planned alongside system updates, the effort and downtime are nearly identical, while the benefits multiply.

**Key Benefits:**

- **Eliminate** analog I/O drift and DAC offset errors.
- **Reduce** wiring complexity and future maintenance.
- **Gain** access to new alarm and diagnostic capabilities.
- **Improve** long-term system reliability and utilization.

# Myth #2: Staying analog avoids costly system changes.

**Reality: You'll be updating hardware and software anyway—adding digital MFCs fits naturally into your existing system upgrade cycle, typically without the need for additional automation hardware.**

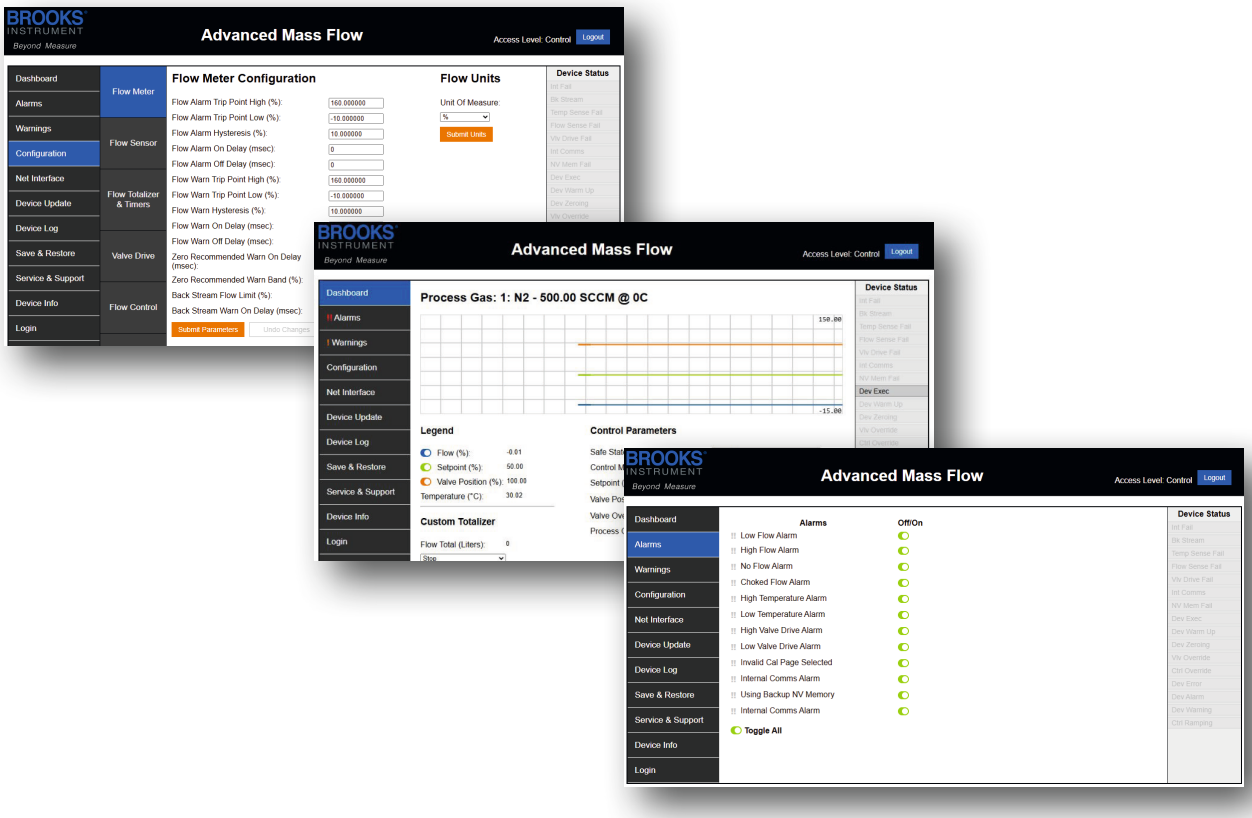
## Fact 3: Capture the Benefits of Digital Communications

EtherNet/IP and PROFINET MFCs don't just control gas flow—they add intelligence to your process.

**Digital Advantages:**

- **Advanced Alarms:** Early detection of flow or pressure deviations.
- **Embedded Diagnostics:** Quicker troubleshooting and recovery.
- **Data-Rich Insights:** Detailed visibility into performance trends and process health.
- **Standardized Integration:** Seamless connection to PLCs and distributed control systems.

An integrated web-based interface on MFCs with Ethernet/IP™ or PROFINET communication allow for easy configuration, monitoring, and integration into modern control systems.



# Myth #3: Analog is safer and simpler

**Reality: Analog limits visibility. Digital adds insight and control—without adding complexity.**

## Fact 4: Learn From Real-World Choices

In one real-world upgrade project, a customer opted for analog replacements to avoid perceived validation work. In the end, they performed the same validation activities—but missed out on a long list of benefits available through EtherNet/IP-enabled MFCs.

They could have upgraded using the same hardware footprint and even maintained serial number traceability. The validation requirements would not have changed, but the system's long-term capability and visibility would have improved dramatically, which improves the system performance and uptime.

## Fact 5: Apply a Risk-Based Validation Approach

Validation should be focused and proportional—targeting what changes and what doesn't. The key change when upgrading to digital MFCs is the communication interface, not the control logic or process behavior.

### What's Changing

- PLC communication configuration
- Data transfer protocol (wiring or Ethernet I/O)
- Device communication validation

### What's Not Changing

- Control logic and setpoints
- Process functionality or physical requirements

## Fact 6: Build Your Upgrade Plan

A smart upgrade strategy keeps effort and compliance aligned.

**Checklist for Success:**

- ☐ **Assess System Lifecycle:** Identify components nearing end-of-life or due for software updates.
- ☐ **Plan the Upgrade Window:** Combine MFC replacements with scheduled PLC/DCS updates.
- ☐ **Design the Network:** Prepare cabling and communication structure for EtherNet/IP or PROFINET.
- ☐ **Implement Risk-Based Validation:** Focus testing on changed components and communication loops.
- ☐ **Document Efficiently:** Use existing templates, change control, and vendor datasheets to streamline validation.

# Conclusion

Upgrading your MFCs doesn't mean extra work—it means getting more value from the work you already do. Validation is inevitable in any upgrade scenario, so make that effort count.

Digital MFCs with EtherNet/IP or PROFINET provide the alarms, diagnostics, and data visibility that turn replacement projects into opportunities for continuous improvement.

Don't just replace your MFCs—upgrade them. Your validation process is already on the clock; make it work harder for you.

## Your Next Step: Explore Your MFC Modernization Options



**Assess**
Existing MFCs

**Identify**
Digital Opportunities

**Plan**
Integration & Validation

**Optimize**
Process Performance

Brooks Instrument can help you evaluate your installed MFCs, identify opportunities for digital communications, and determine an appropriate upgrade path for your application.

**Talk with a Brooks Instrument Flow Specialist**
Learn what options may be available for your application.

Brooks Instrument, LLC | 407 West Vine Street, Hatfield, PA, 19440, USA | T: +1 (888) 534-FLOW | www.BrooksInstrument.com
© Copyright 2026 Brooks Instrument, LLC