FLUKE®
Calibration

Pressure Controller Modularity Done Correctly

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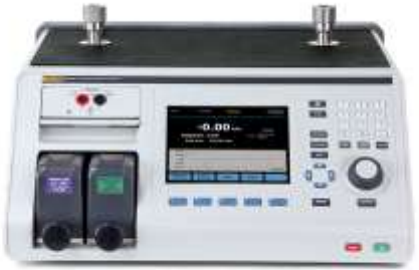
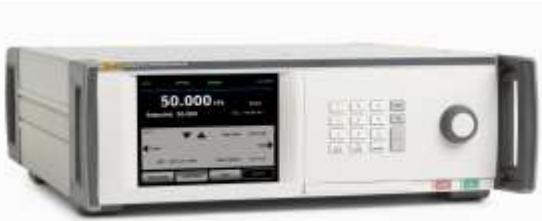
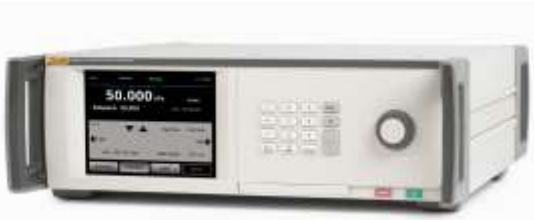
- The popular buzz word in pressure calibration today is “modularity.” But what does this really mean, and why is it such an important consideration in the design and construction of pressure calibration equipment?
- When designed correctly, modularity provides benefits over a traditional monolithic controller design but it can also present challenges in understanding the system’s overall measurement uncertainty and path of traceability. In this webinar we will review those benefits and challenges.

Pressure Controller Modularity Done Correctly

- In this presentation we discuss the Fluke Calibration modular pressure controller/calibrator range which includes the 2271A Industrial Pressure Calibrator and the 6270A, 8270A and 8370A Modular Pressure Controller/Calibrators. These products share many of our Measurement Modules and have similar functionality.

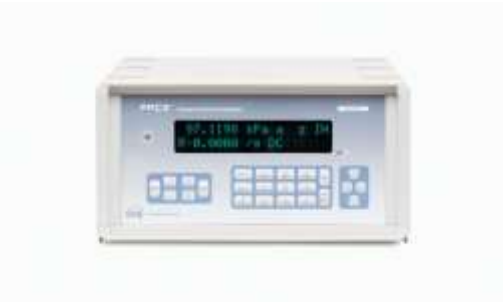






Concept of Modularity

- Every pressure controller/calibrator fulfils a set of tasks
  - Controls the pressure in the system
  - Measures the pressure



- In a truly modular system each of these tasks is encapsulated into its own module

Benefits of Modularity

- Rangeability
  - Calibrate more devices with one instrument
- Expandability
  - Your equipment grows with your needs
- Reduced Downtime
  - Modularity provides you the flexibility in the way you service and maintain your standard
- When done correctly….

Rangeability

A modular system provides rangeability when it:

- Accommodates multiple Pressure Measurement Modules (PMM's) simultaneously
- Accommodates PMM's with adequate measurement performance
- Allows for flexible PMM selection
- Allows for easy module removal and installation of PMM's to change pressure ranges

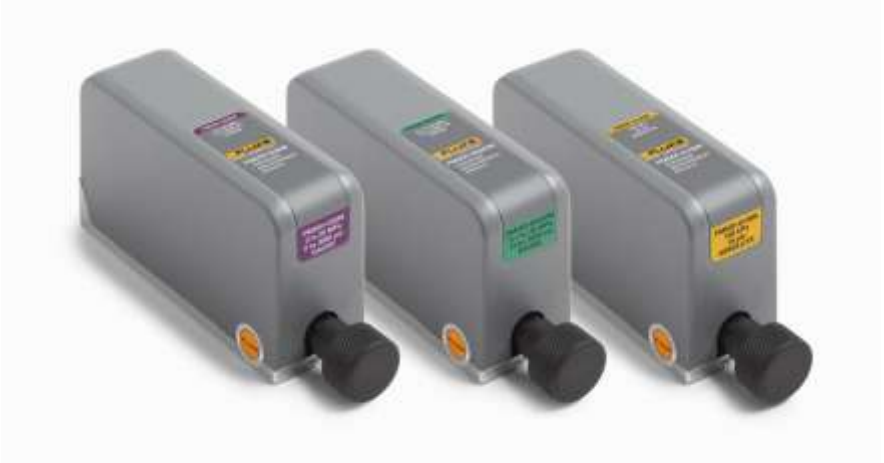
How We Provide Rangeability

- 6270/8270/8370[2] holds up to five PMM's
- 2271A holds up to two PMM's
- The PMM's are easily removed from the front of the controller
  - No tools required[1]
  - Hot Swapped – Power can be left turned on and supply pressure connected
  - 15 seconds and you are up and running

- [1] PM230/PM630 PMMs requires a 6 mm hex head wrench. Provided
- [2] PM230/PM630 PMMs need to be placed in right hand PMM slot in 8370A

How the 6270/8270/8370 Provide Rangeability

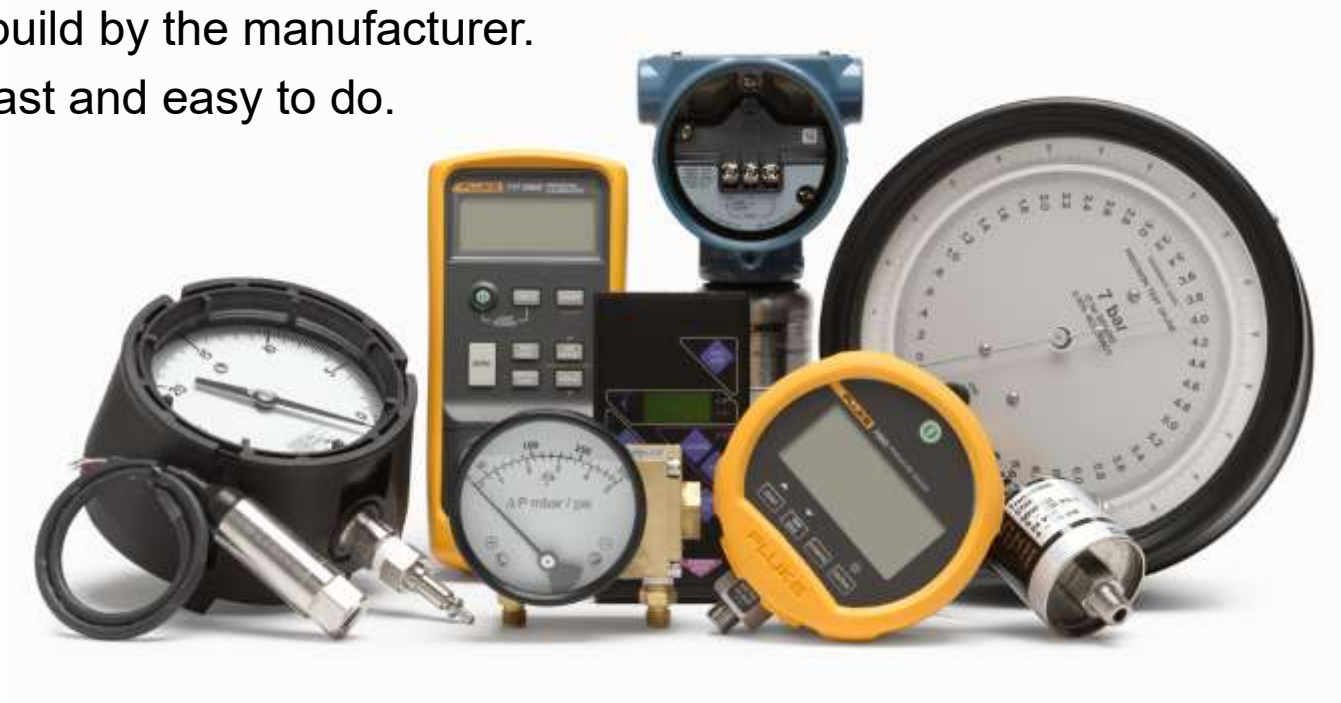
- Three Accuracy Classes
  - PM200 = 0.02% FS uncertainty for most ranges
  - PM500 = 0.01% reading from 50% to 100% of range
  - PM600* = 0.01% reading from 30% to 100% of span
- Mix and Match modules
- Combine any pressure range and accuracy class.



*Not supported in 2271A

Expandability

- A modular system provides expandability when:
  - Adding higher or lower range PMM's does not require purchasing a new instrument or a rebuild by the manufacturer.
  - Adding PMM's is fast and easy to do.



How We Provide Expandability

- The Pressure Control Module (PCM) is configured for use with all pressure ranges that the chassis being used is designed for.
  - 2271A* & 6270A -100 kPa to 20 MPa
  - 8270 -100 kPa to 40 MPa
  - 8370A ATM to 100 MPa
- PMM's can be added at any time without sending anything back to the factory
- PMM's are easily installed in the front of the controller

*PCM not modular in 2271A

Reduced Downtime

- A modular system provides reduced downtime when:
  - Calibration is proven to be fully at the modular level and calibration of the modules is easily supported
  - Overall system cost is split among the main system and modules
  - Replacing a module is quick and easy and will not introduce leaks or other issues

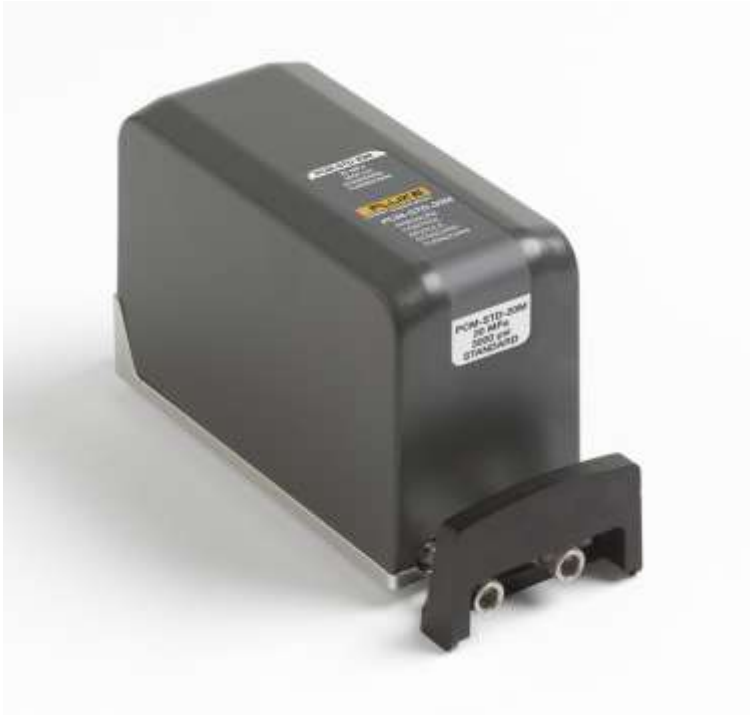
- Some products on the market that claim “modularity” need a tool set to remove or add measurement modules. Some even need to have their controller “optimised” if a measurement module is added or range changed using techniques that many users would be unable to perform.

How the PMM's Provide Reduced Downtime

- Unique torque limiting system provides feedback that the module is properly secured without accidental over-tightening the O-rings
- System cost is split between the chassis and modules so that spare modules can easily be purchased
- All items that are impacted by the calibration are on the modular level so PMM calibration can be phased over a time period meaning a calibration capability is always available – Some of our customers also have duplicate modules so they never lose any capability
- Calibration of modules can be easily supported and fully automated using COMPASS for Pressure Software for users with their own calibration capability.

Pressure Control Modules

- The PCM's* are also fully modular and can be removed with a hex head spanner within a minute to allow for servicing or maintenance. There is no tubing to disconnect.
- Like PMM's spare PCM's can be obtained to minimise down time. Specifically designed to support our manufacturing customers.



*Not modular in 2271A

Measurement Uncertainties

- A common question we receive is “How do I know which PMM is being used so I can calculate the total measurement uncertainty?”
- Default operation is “Auto” Module Selection
  - The Controller switches ranges and selects the PMM with the lowest uncertainty to measure the current selected pressure.
  - The Main Menu display shows the PMM being used and the controller uncertainty if “Show Uncertainty” option is active in the Instrument Settings Menu.

Controller Measurement Uncertainty

PMM Providing Measurement

Measurement Uncertainties

- “Fast” Module Selection
  - The Controller selects the PMM with the lowest pressure range that is sufficient to measure the Setpoint.
  - The Controller does not switch ranges during an upward pressure but switches immediately to the required range and stays on that range. Only PMM’s pressurised during the upward excursion are used during the downward excursion.
  - The Main Menu display shows the PMM being used and the controller uncertainty if “Show Uncertainty” option is active in the Instrument Settings Menu.

Measurement Uncertainties

- “Fixed” Module Selection
  - The Controller always keeps the user-selected range active. With this selection, a setpoint outside the measuring range of the selected module cannot be entered.
  - The Main Menu display shows the PMM being used and the controller uncertainty if “Show Uncertainty” option is active in the Instrument Settings Menu.
- We are not discussing the measurement uncertainty details in this presentation. Technical Note “Guide to determining pressure measurement uncertainty for 6270A Pressure Controller/Calibrator pressure modules” is available to download along with an On-Demand Webinar “Calculating Uncertainty When Using a Modular Pressure Controller” at www.flukecal.com
  - Direct Link to Webinar

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Thank you for your time and attention