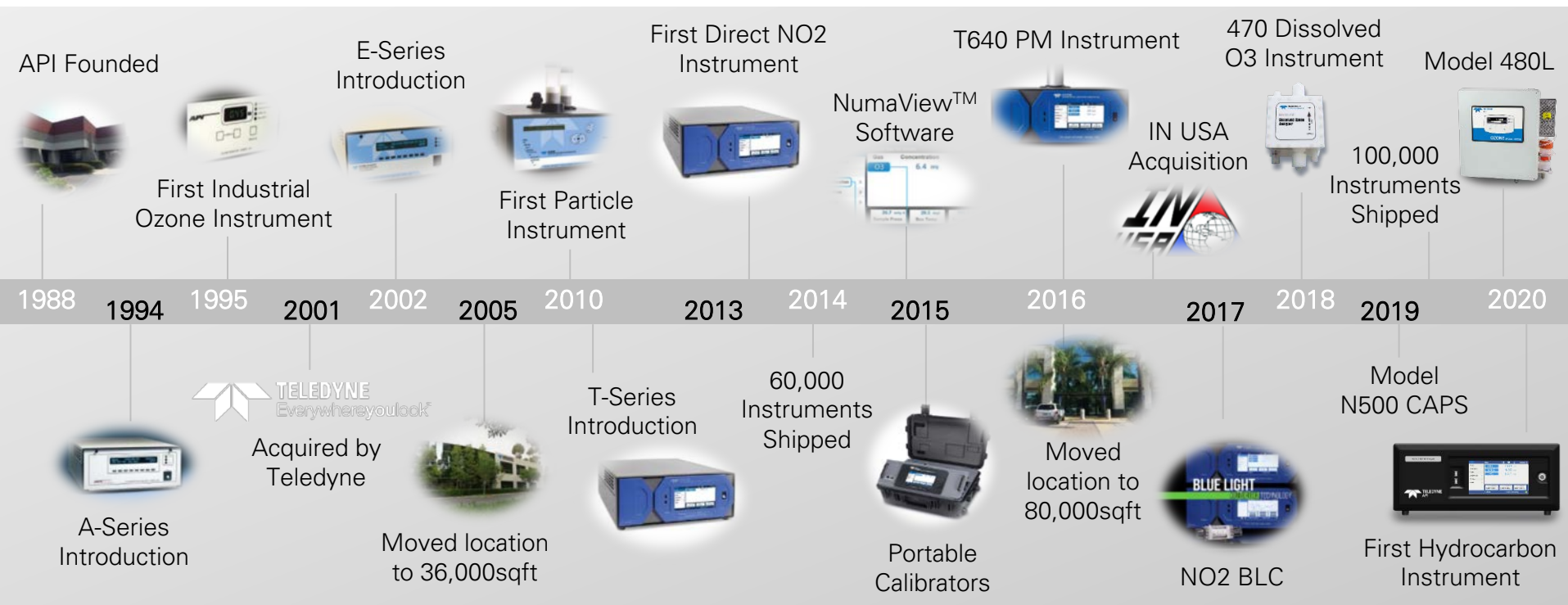


A History of Leading Innovation



N Series Gas Instruments for Continuous Emissions Monitoring (CEM) Systems



Designed for today, prepared for tomorrow

N Series Instrument Models (Released)

Gas	Model	Ranges (Min / Max)
SO ₂ (Sulfur Dioxide)	N100	0-50 ppb / 0-20,000 ppb
	N100H	0-10 ppm / 0-5,000 ppm
	N101	H2S: 0-50 ppb / 0-10,000 ppb SO2: up to 0-20,000 ppb
NO, NO ₂ , NO _x (Nitrogen Oxide, Nitrogen Dioxide)	N200	0-50 ppb / 0-20,000 ppb
	N200M	0-1 ppm / 0-200 ppm
	N200H	0-5 ppm / 0-5,000 ppm
CO (Carbon Monoxide)	N300	0-1 ppm / 0-1,000 ppm
	N300M	0-5 ppm / 0-5,000 ppm
CO ₂ (Carbon Dioxide)	N360	0-2 ppm / 0-2,000 ppm
	N360M	0-4 ppm / 0-4,000 ppm
O3 (Ozone)	N400	0-100 ppb / 0-10,000 ppb
True, Direct NO ₂ , NO _x , NO	N500	0-5 ppb / 0-1,000 ppb
Zero Air Generators	N701 N701H	18 SLPM at 30 psig 30 SLPM at 30 psig; 10 SLPM at 60 psig
O2 (Oxygen)	N802	0-1 % / 0-100%
CH ₄ (Methane), THC (Total Hydrocarbons)	N901	0-5 ppm / 0-1,000 ppm (Methane)
BTEX	N904	0-1 ppb / 0-200 ppb

N Series Highlights

- Smart Internal Hardware Modules
 - Easy field replacement with pre-calibrated and tested modules
- CAN Bus Communications Architecture
 - Simplified, common cabling increases reliability
- 24VDC Internal Power
 - Lower power consumption and unified power requirement
- Split Fold-down Rear Panel
 - Access to pneumatic connections inside bulkhead
- NumaView™ Software Interface
 - Familiar, mature, and customizable with real-time graphing, diagnostic alerts, and preventative maintenance capabilities
- Flow System Module with Pulse-width Modulation Control*
 - Reduces pump duty cycle for increased lifetime

* PWM is on internal pumps only for certain models

N Series Front Panel



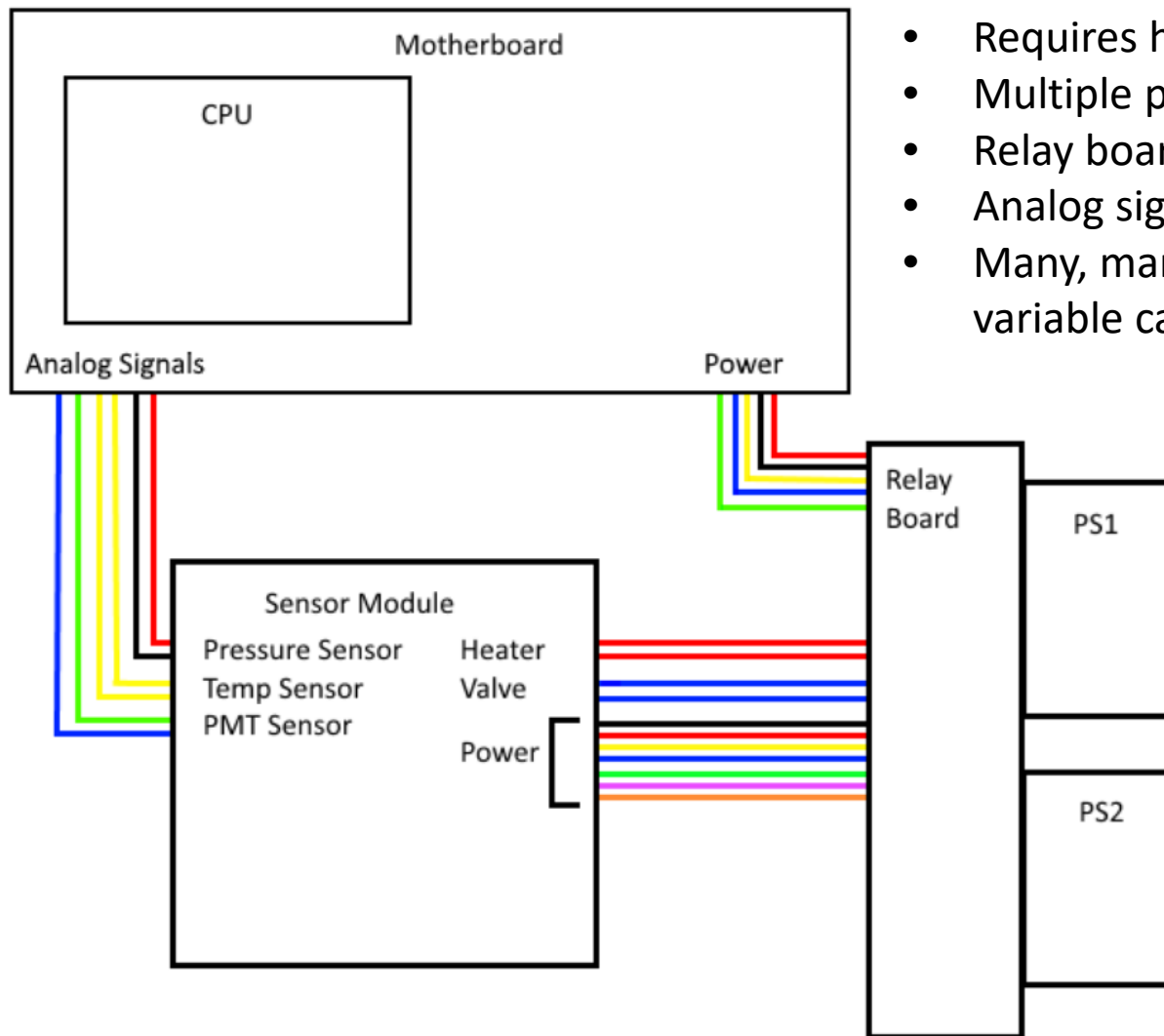
- Standard 19" rack mountable chassis
- Optional ears, handles, and/or slides
- Capacitive, color touch-screen display
- 2 front-panel USB ports
- Soft power switch

N Series Rear Panel



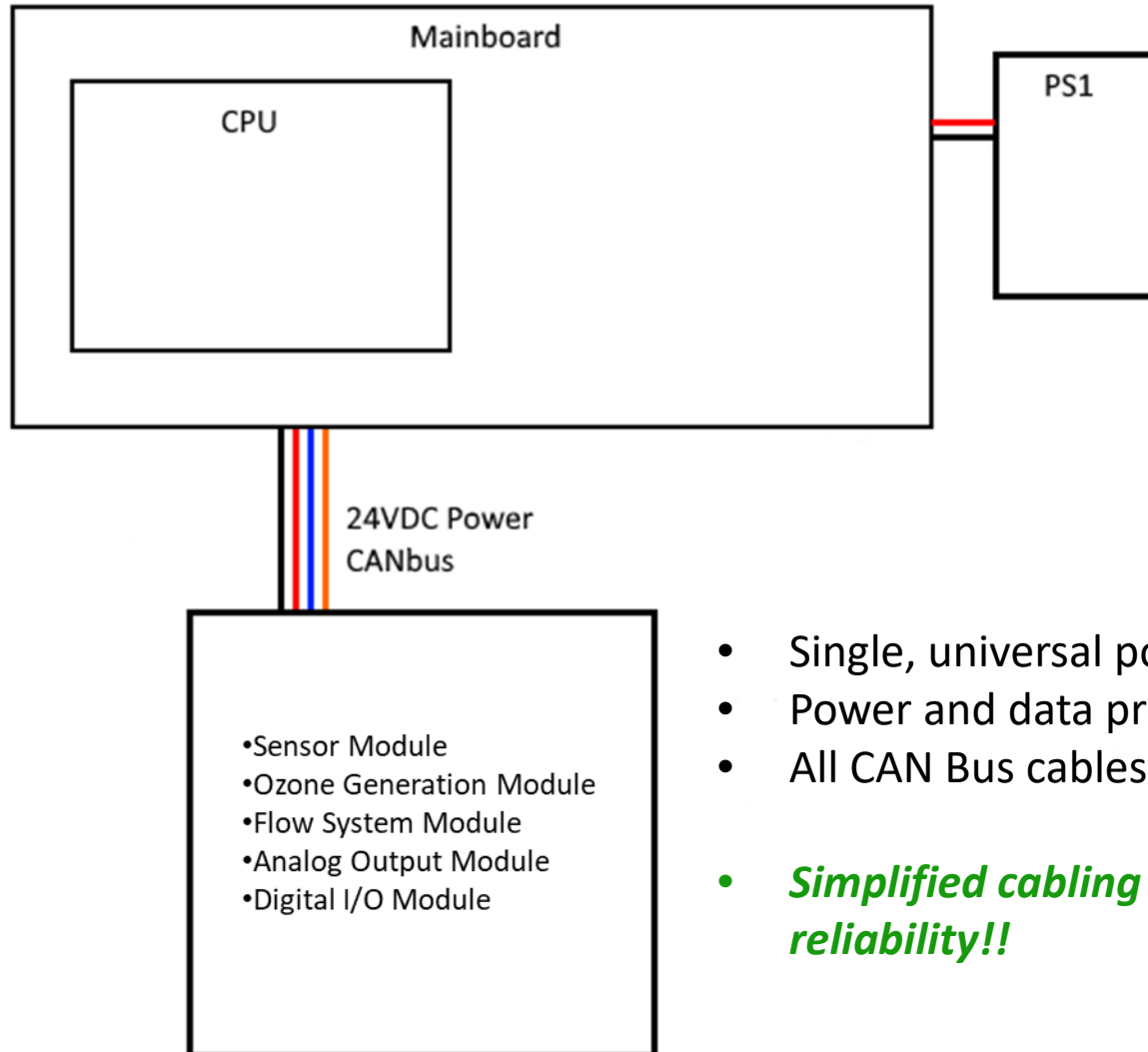
- Split fold-down rear panel
- Robust pneumatic bulkhead fittings
- Ethernet and serial communications with Modbus protocol
- Analog output and Digital expansion cards (optional)

Traditional Gas Instrument Wiring Architecture



- Requires host controller (motherboard)
- Multiple power supplies
- Relay board to transmit power
- Analog signals transmitted separately
- Many, many electrical connections and variable cable styles

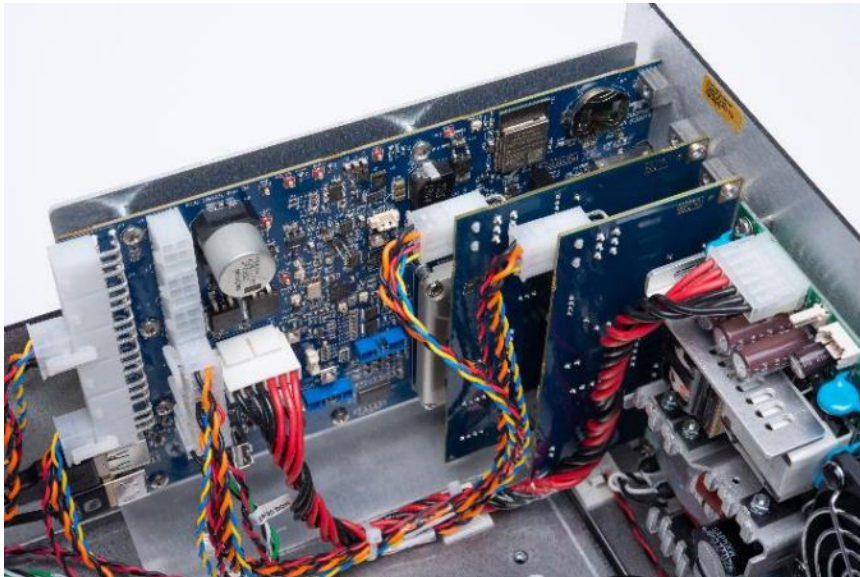
N Series Wiring Architecture



- Single, universal power supply
- Power and data provided in a single cable set
- All CAN Bus cables and connectors are common
- ***Simplified cabling and connections = improved reliability!!***

Common Smart Modules

- Mainboard Module
 - Serves as the “carrier board” for the CPU
 - Provides the core set of user-accessible I/O, including Ethernet and Serial ports
 - DC power distribution and CAN bus hub
 - Provides all power management including soft power switch

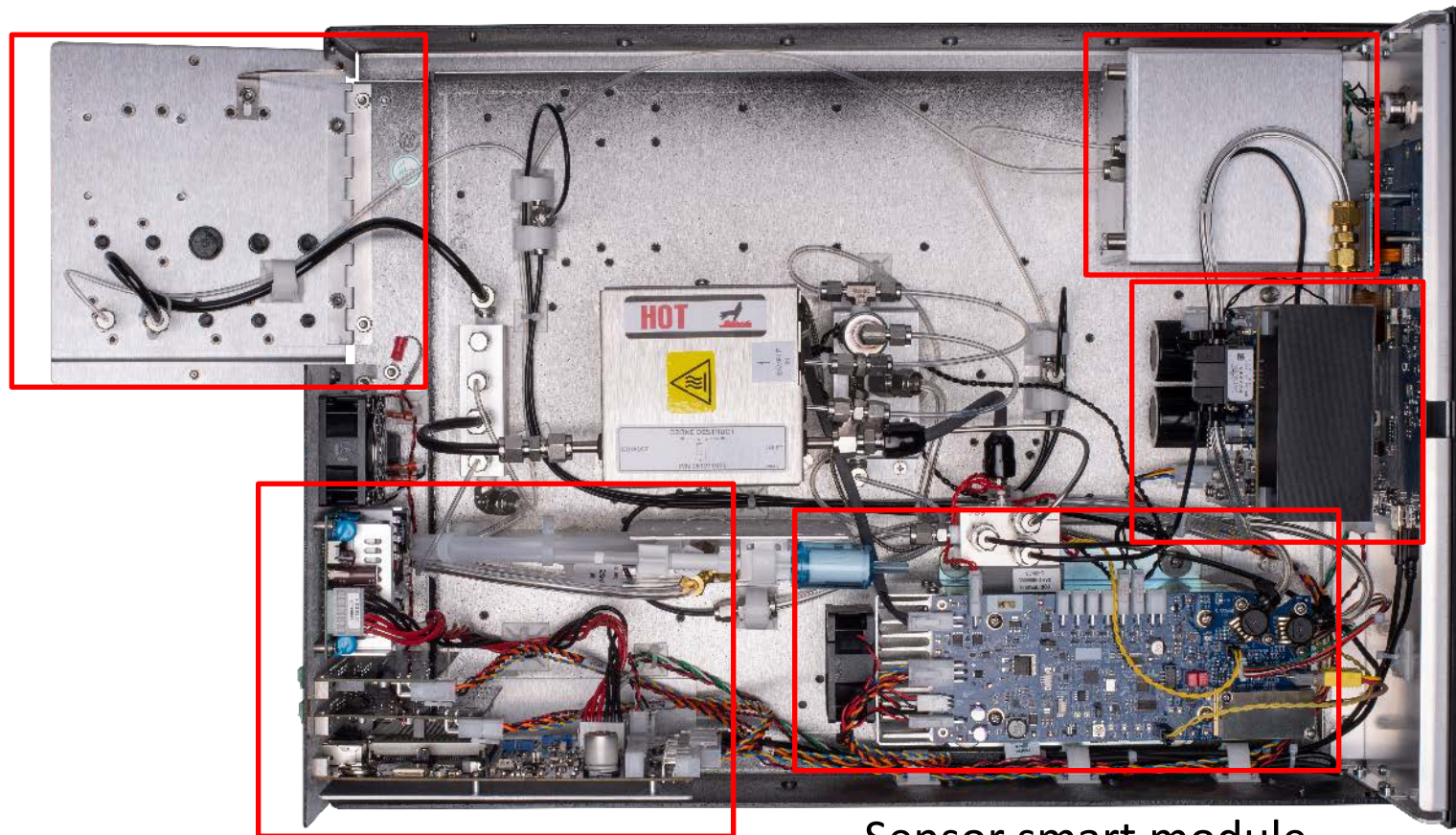


- Communication Modules
 - Digital I/O expansion
 - Status out, control in, alarm relays
 - Analog outputs
 - 3 x current (4-20 mA)
 - 4 x voltage (5 or 10V)

Internal Layout (N200M)

Split fold-down rear panel

Optional integrated paramagnetic O2 sensor



Ozone
generator
smart
module

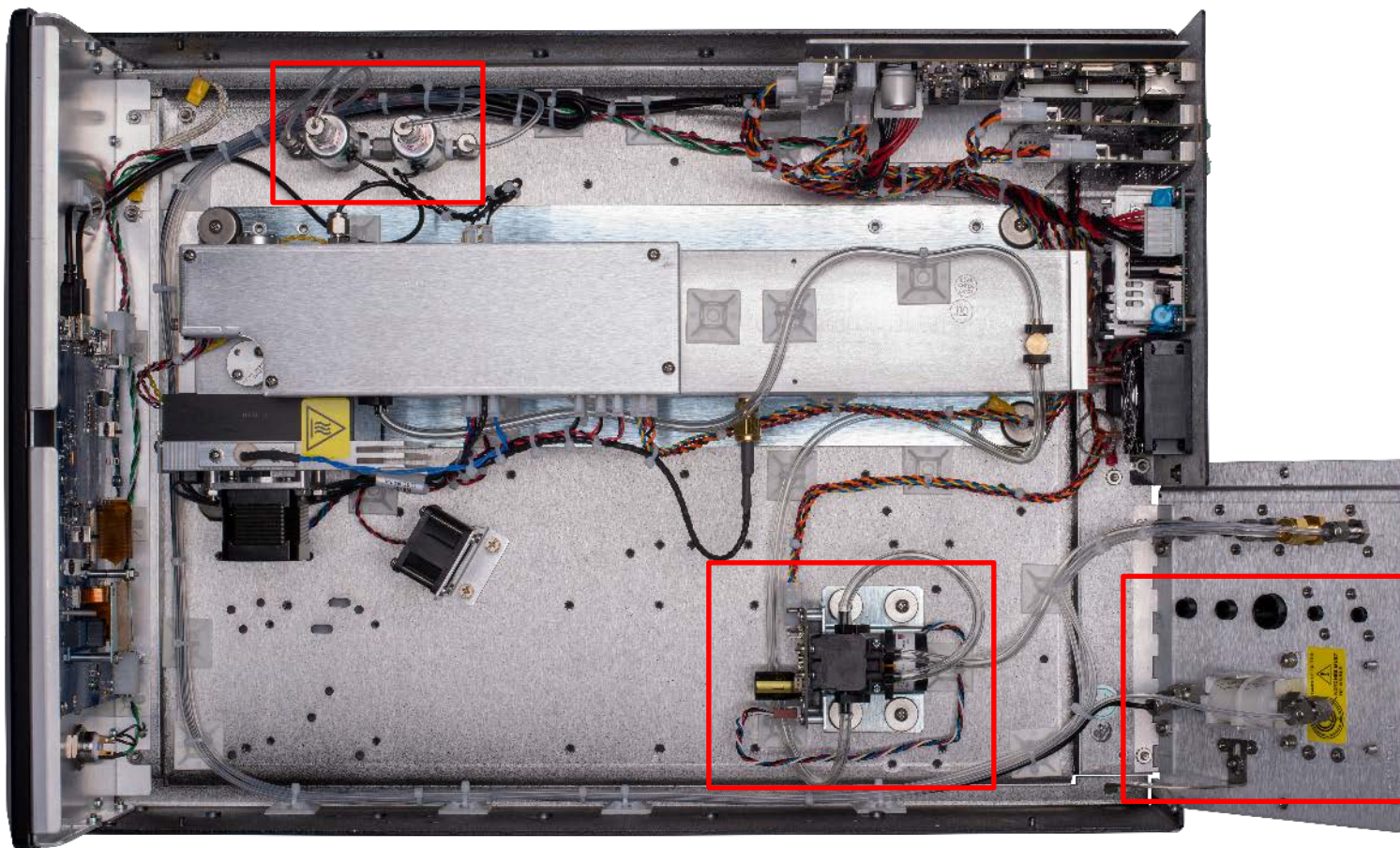
Sensor smart module

Common electronics with a single 24VDC power supply

Internal Layout (N300)

Internal Zero/Span Valve Assy*

*options available on ambient models

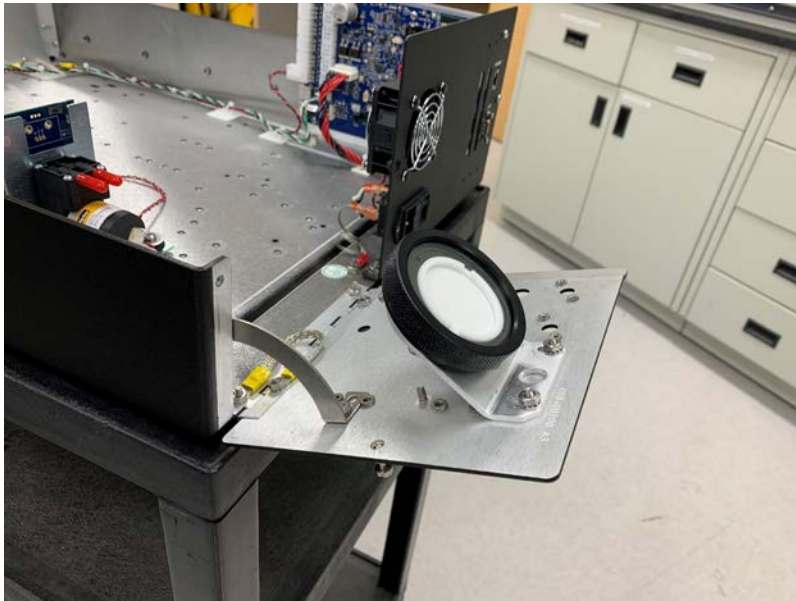


Flow system smart module with
Pulse-width modulated (PWM) control

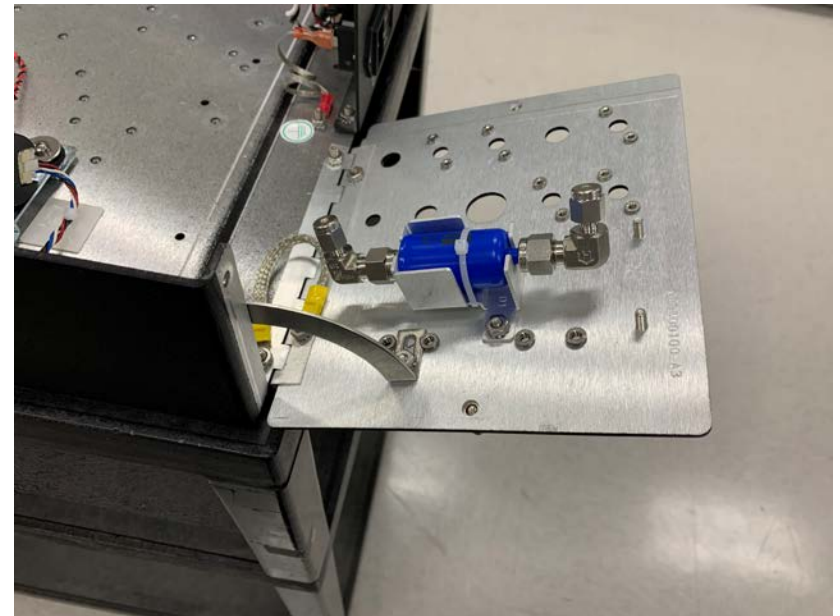
Long-life or 47mm sample
filter holders*

Sample Filter Options

Traditional 47mm

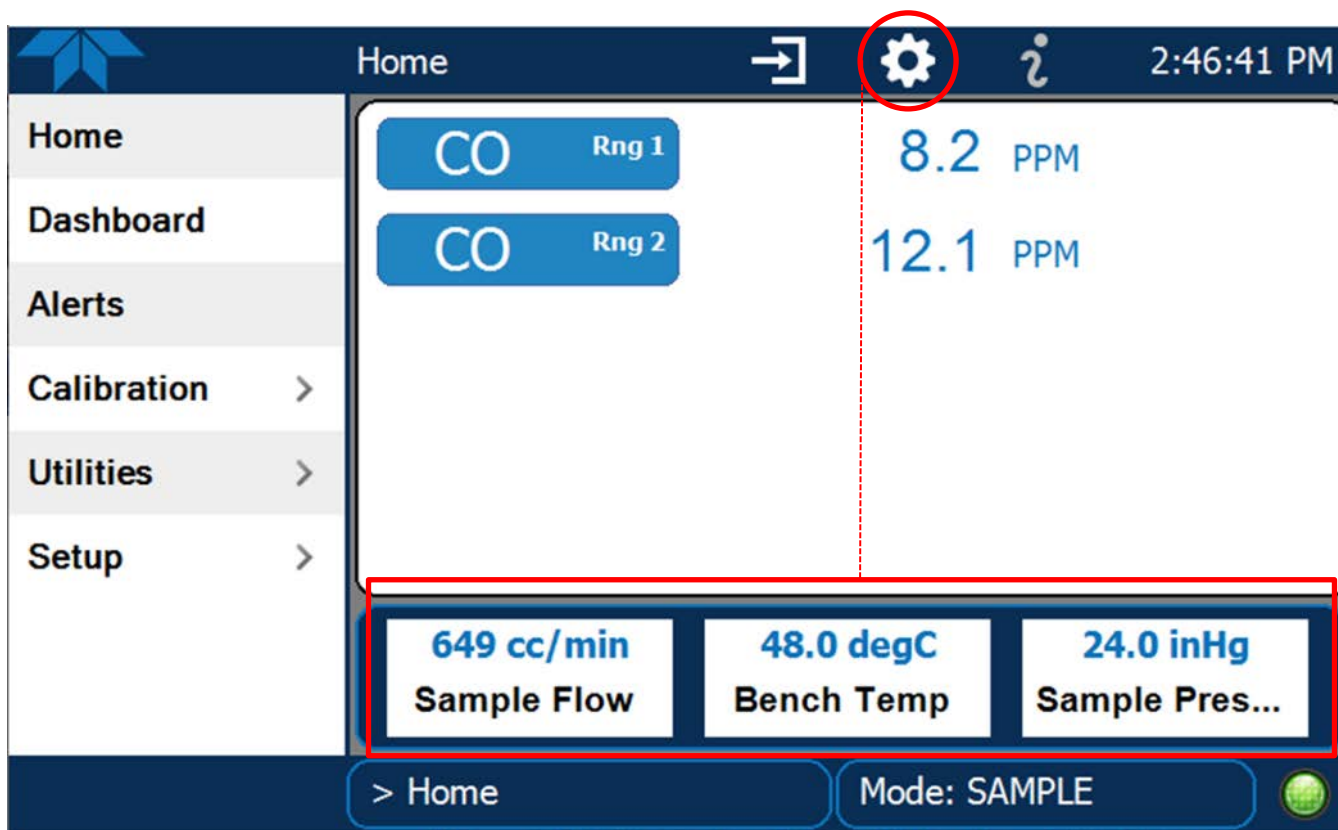


New Long-Life Filter (DFU)



NumaView™ Software Interface

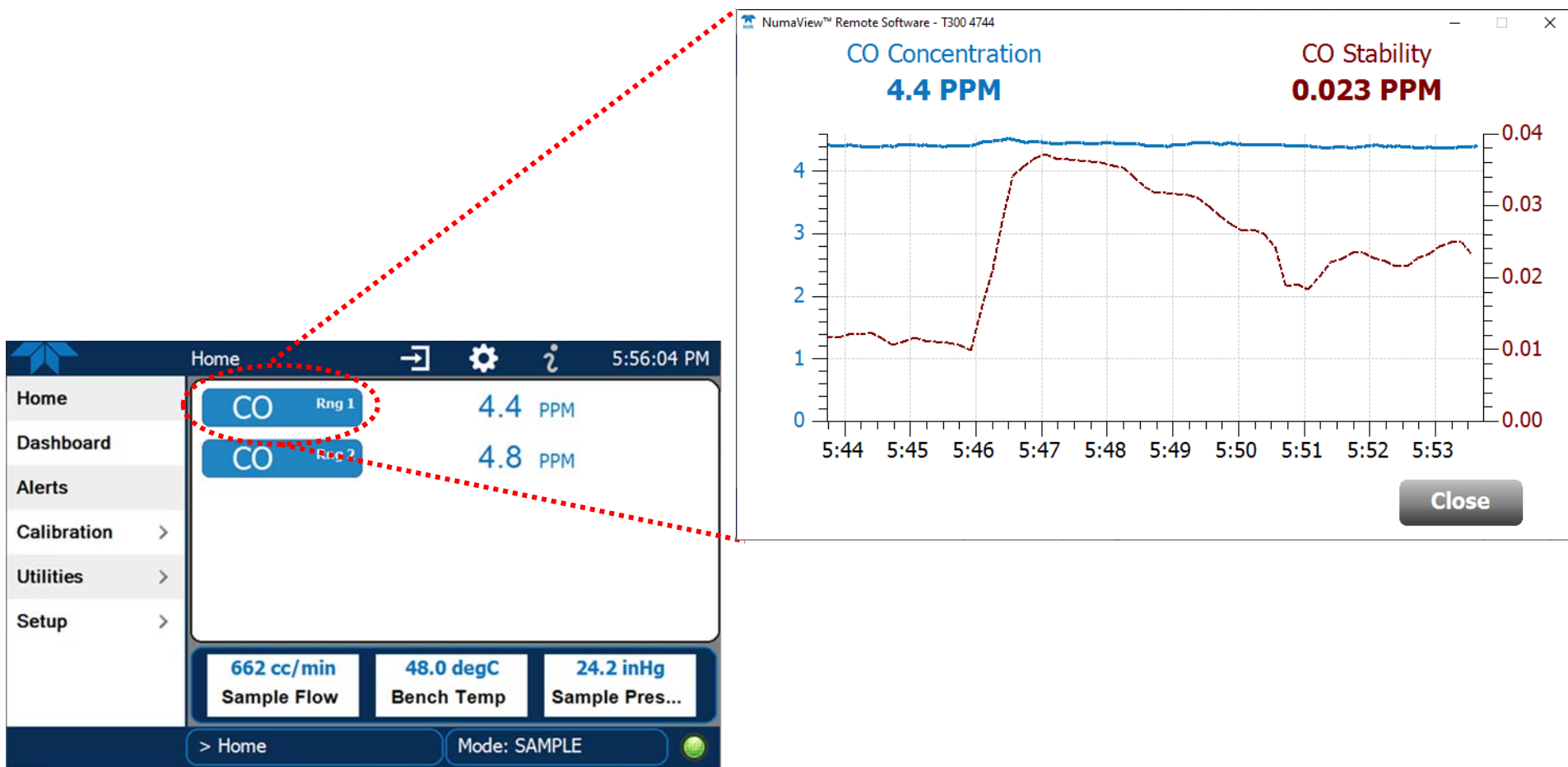
Customizable, content rich, and intuitive user interface



User-definable meter variables

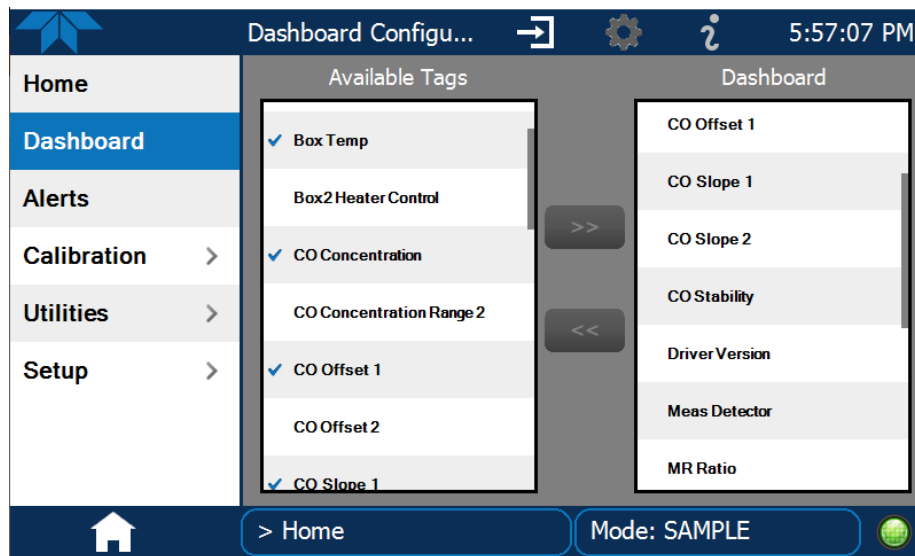
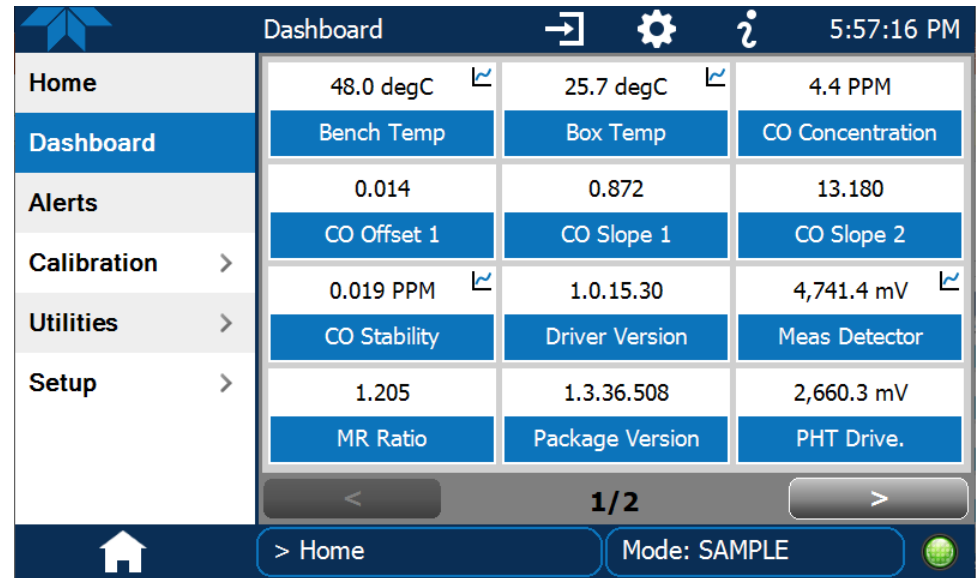
Intuitive User Interface

Real-time graphical representation of concentration and stability



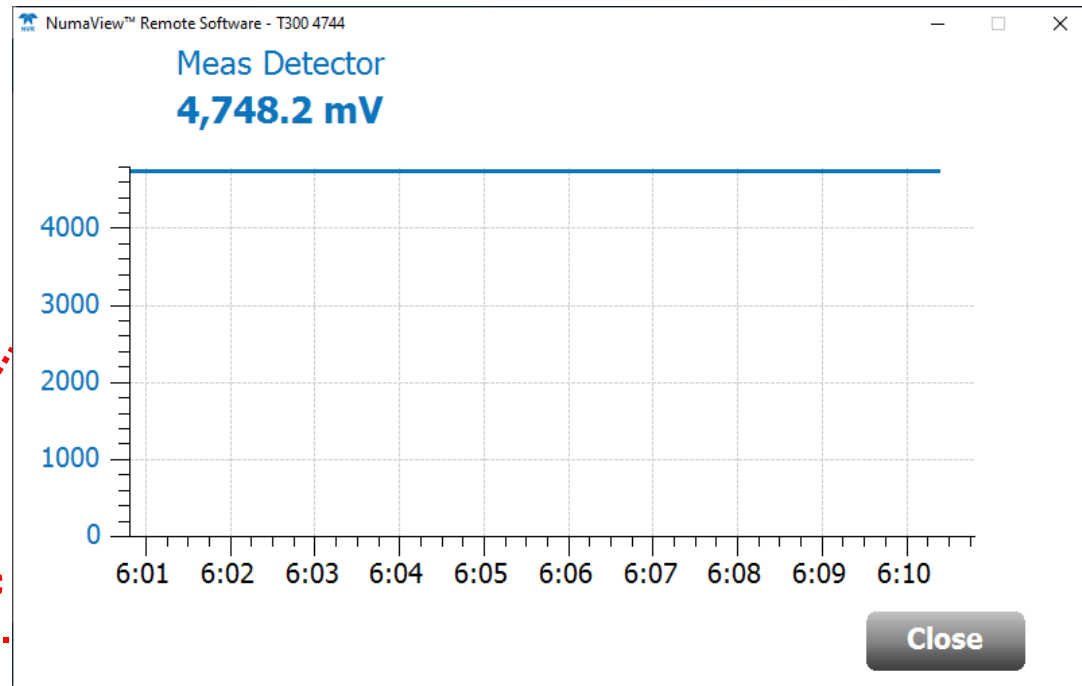
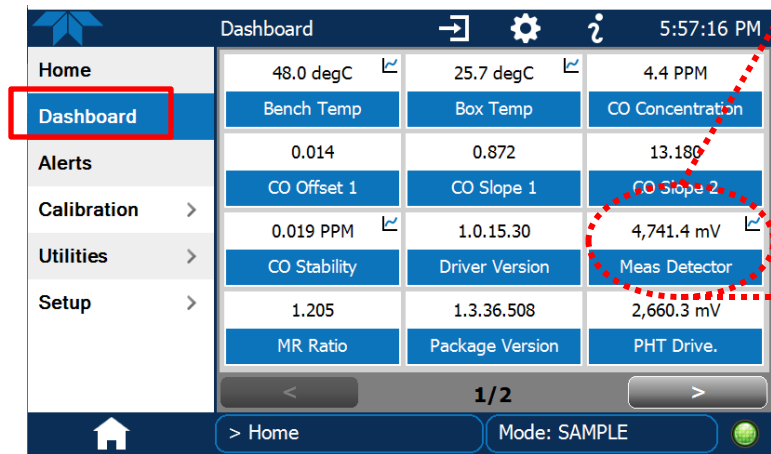
Intuitive User Interface

Fully configurable dashboard



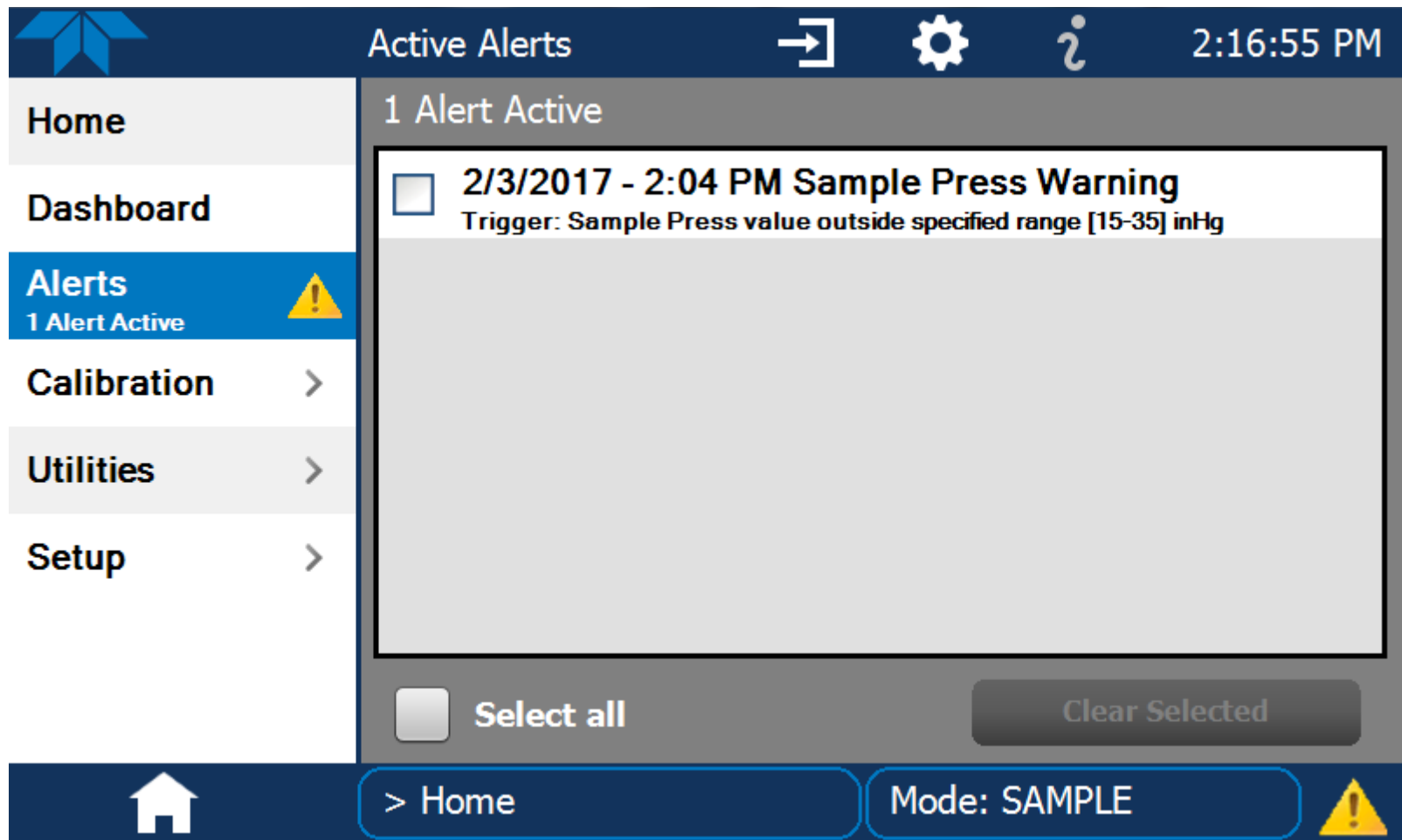
Intuitive User Interface

Real-time graphical representation of test functions



Intuitive User Interface

Simultaneous display of all active alerts with time stamp and cause



Intuitive User Interface

Custom events and warnings

Events Configuration

Name Sample Press Warning

Description Warning raised when the sample pressure is out of range

Enabled ☒ **Visible** ☒ **Latching** ☒

Trigger Tag Sample Press

Condition Out Of Range

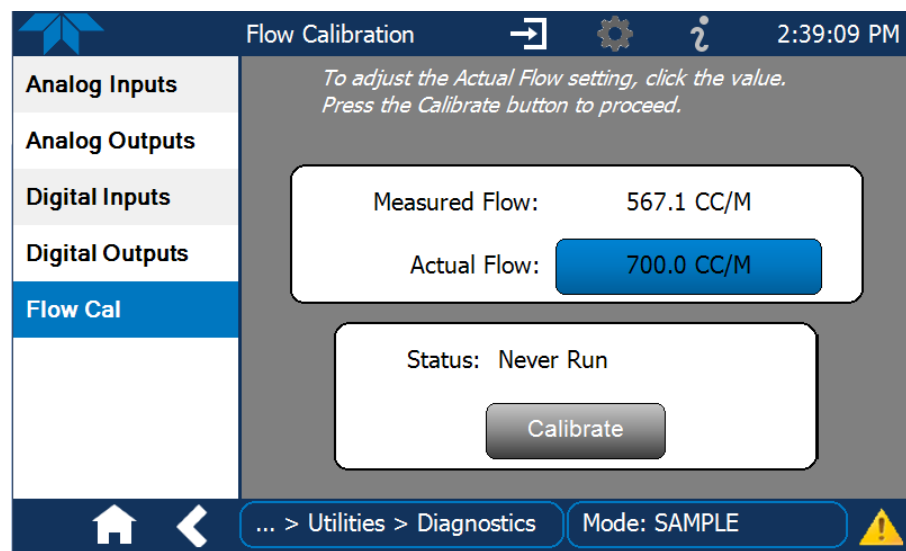
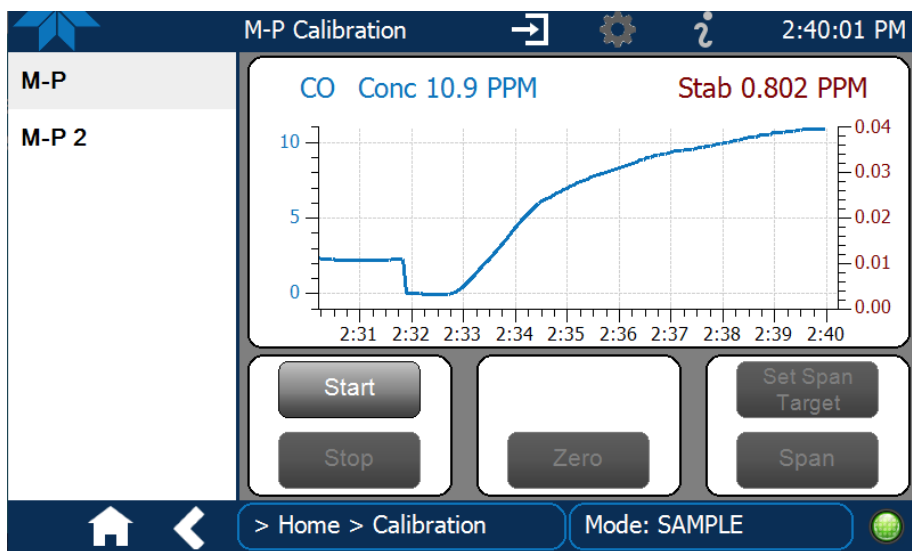
Low 15 inHg **High** 35 inHg

Done **Cancel**

> Home > Setup **Mode: SAMPLE**

Intuitive User Interface

Simple Calibrations



Data Acquisition and Logging

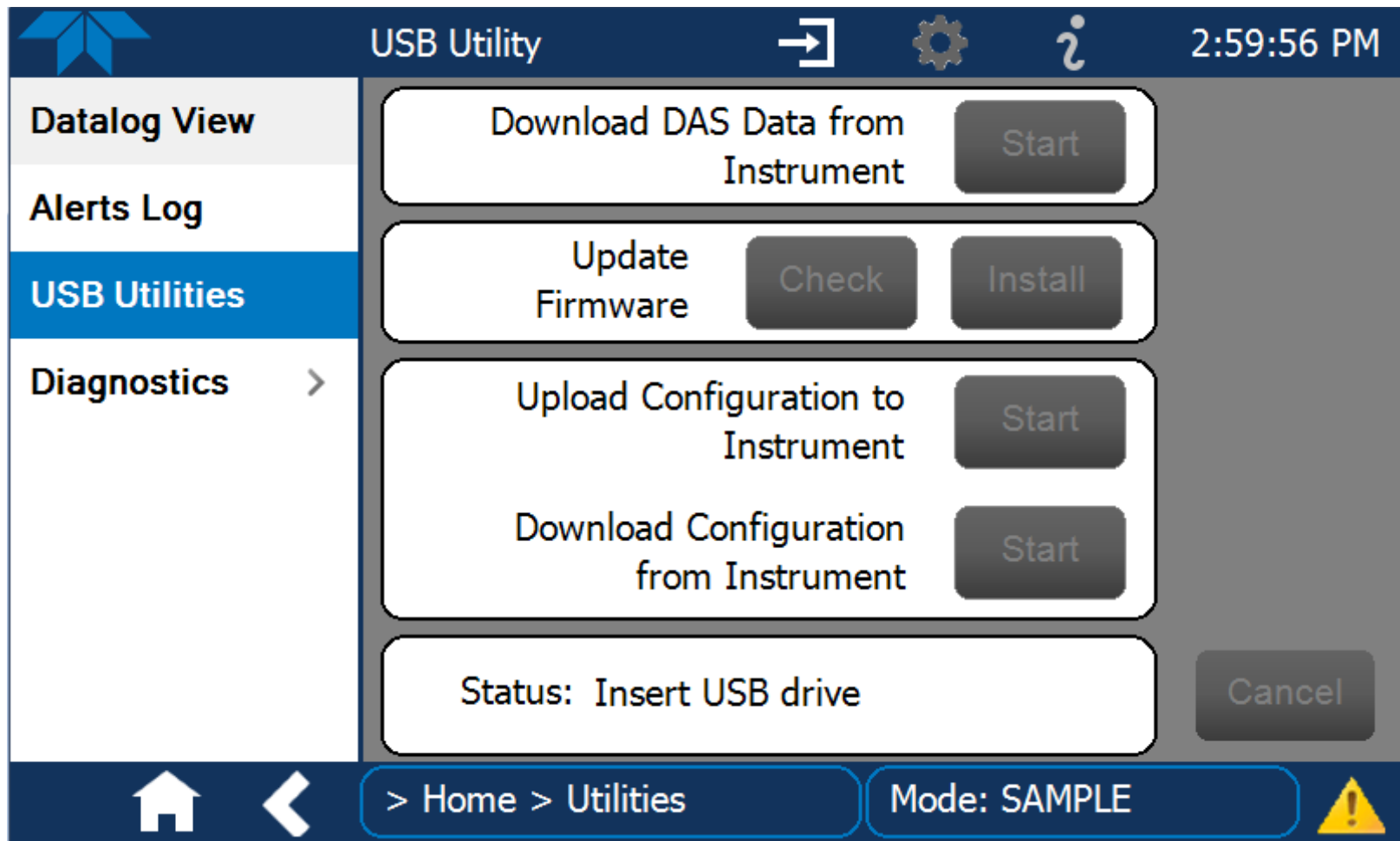
Triggers for data logging, including periodic and conditional

The screenshot shows the 'Datalog Configuration' screen. On the left is a navigation menu with options: Data Logging (selected), Events, Dashboard, Vars, Homescreen, Digital Outputs, Analog Outputs, and Instrument. The main area contains configuration fields for a log named 'HIRES'. The 'Description' field is empty. The 'Enabled' checkbox is checked. The 'Max Records' is set to 10000. The 'Log Tags' field contains 'Bench Temp, Box Temp, CO Concentration, Si'. The 'Trigger Type' is set to 'Periodic Trigger'. Below this, a grey box contains the 'Interval' set to 1 Minute and the 'Start Time' set to 08/21/2020 8:21:00 AM. At the bottom are buttons for 'Global Settings...', 'Done', and 'Cancel'. The bottom status bar shows a home icon, a back arrow, a breadcrumb '> Home > Setup', the 'Mode: SAMPLE', and a green status indicator.

Field	Value
Name	HIRES
Description	
Enabled	☒
Max Records	10000
Log Tags	Bench Temp, Box Temp, CO Concentration, Si
Trigger Type	Periodic Trigger
Interval	1 Minute
Start Time	08/21/2020 8:21:00 AM

Full USB Support

Data Upload and Download

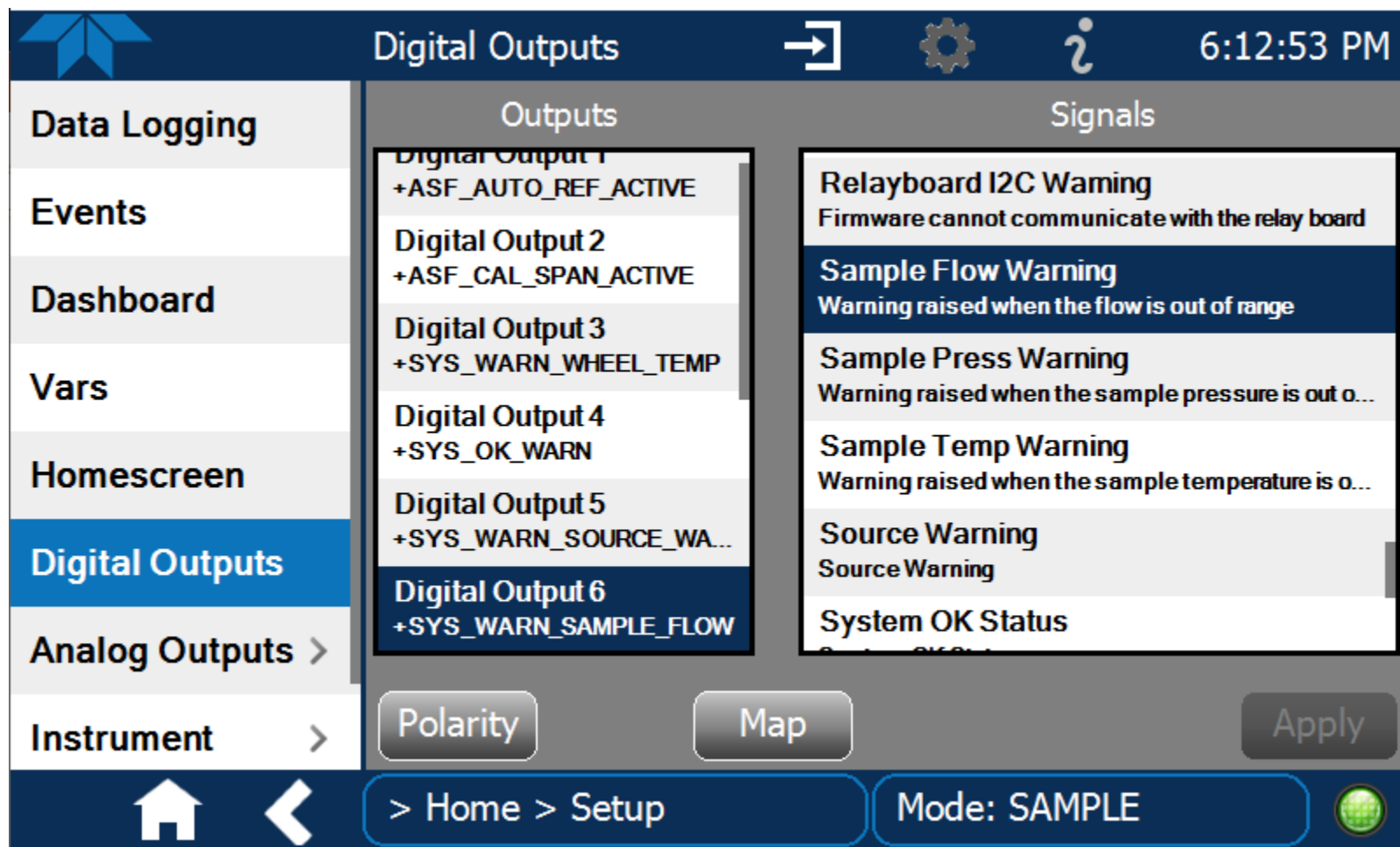


The screenshot displays the 'USB Utility' interface. On the left is a vertical menu with four items: 'Datalog View', 'Alerts Log', 'USB Utilities' (highlighted in blue), and 'Diagnostics' with a right-pointing arrow. The main area contains several functional blocks. The top block is 'Download DAS Data from Instrument' with a 'Start' button. The second block is 'Update Firmware' with 'Check' and 'Install' buttons. The third block contains 'Upload Configuration to Instrument' and 'Download Configuration from Instrument', each with a 'Start' button. The bottom block shows 'Status: Insert USB drive' and a 'Cancel' button. The top status bar includes a blue folder icon, the title 'USB Utility', navigation icons (back, forward, settings, info), and the time '2:59:56 PM'. The bottom status bar features a home icon, a back arrow, a breadcrumb '> Home > Utilities', a 'Mode: SAMPLE' indicator, and a yellow warning triangle.

Menu Item	Action	Button
USB Utilities	Download DAS Data from Instrument	Start
	Update Firmware	Check
		Install
	Upload Configuration to Instrument	Start
Download Configuration from Instrument		Start
Diagnostics	Status: Insert USB drive	Cancel

Digital Outputs

Easily map data 'tags' to any digital output channel



Analog Outputs

Easily map any data 'tags' to any analog output

The screenshot displays the 'Analog Outputs' configuration interface. On the left, a vertical list shows five output channels: 'Analog Output1', 'Analog Output2', 'Analog Output3', 'Analog Output4', and 'Analog Output Cal'. The 'Analog Output1' channel is selected, and its configuration is shown on the right. The configuration is organized into two columns. The left column contains 'Signal Out' (set to 'CO Concentration'), 'Min' (set to '0.0 PPM'), and 'Max' (set to '100.0 PPM'). The right column contains 'Calibration Type' (set to 'MANUAL'), 'Range' (set to 'Current'), 'Recorder Offset' (set to '0 mV'), and an 'Allow Overrange' checkbox which is checked. At the bottom right of the configuration area is an 'Apply' button. The bottom navigation bar includes a home icon, a back arrow, a breadcrumb path '... Setup > Analog Outputs', a 'Mode: SAMPLE' button, and a green globe icon. The top status bar shows the time '6:13:22 PM' and icons for settings and information.

Output Channel	Signal Out	Calibration Type	Min	Max	Range	Recorder Offset	Allow Overrange
Analog Output1	CO Concentration	MANUAL	0.0 PPM	100.0 PPM	Current	0 mV	☒
Analog Output2							
Analog Output3							
Analog Output4							
Analog Output Cal							

CEMS Application Settings

➤ **N300M models**

- Make sure you are using the latest firmware as the filter wheel speed has been reduced to 900rpm to improve on baseline noise
- Adaptive Delta: Set to 2.0 ppm
- Adaptive Percentage: set to 5.0%

➤ **N200H models**

- Adaptive Delta: Set to 2.0 ppm

➤ **Gas Delivery**

- Start high and work down: HighSpan – LowSpan – Zero. This helps trip the adaptive filters sooner, giving more time for the concentration to catch up to the actual Span value.
- Gas Delivery Dwell Times make a big difference as well. TAPI recommends a minimum of 7 minutes at each step.

T to N Spare Part Overlap

- Key Findings

- N100 vs. T100 → 51 % overlap
 - Optical filters, vacuum manifolds, LCD modules, filtration kits, reaction cell components, and pump rebuild kits.
- N200 vs. T200 → 59% overlap :
 - Filtration kits, reaction cell orifices, LCD touchscreen modules, scrubbers, pumps, and various electronic control components.
- N300 vs. T300 → 41 % overlap
 - Optical mirrors, CO scrubbers, LCD modules, filtration kits, key pneumatics, and interface components.
- N400 vs. T400 → 45% overlap
 - Stainless steel filters, charcoal filters, silica gel expansion kits, ozone generation lamps, LCD modules, flow control assemblies, and rebuild kits for KNF pumps.

- Key Benefits

- Easier transition, minimizing operational disruptions.
- Inventory optimization and maintain a leaner spare parts inventory
- Same Annual Maintenance Kits

Product Summary

Opacity / Dust Monitor

LightHawk 560

Opacity / Dust Compensation Monitor

- Used to measure visible emission from sources
- Green LED technology
- Dual-pass system
- Simple Calibrations
- Applies hard-coded PLCF
- Unit specific factory calibrated and logged by serial #



Product Summary

Particulate Matter Monitor

LaserHawk 360 Particulate Matter Monitor

- Measures the amount of light energy reflected off of the particulate in the stack
- Measurement is correlated to the particulate mass emissions emitted from the source



Product Summary

Flow Rate Monitors

UltraFlow 150 Ultrasonic Flow Monitor

- Measures velocity based on the time-of-flight-signals T1 and T2
- By determining T1 and T2, the monitor calculates velocity, volumetric flow and temperature
- Major components include a purge system, transducer interface enclosure (TIE), transducer assemblies and enhanced remote panel
- Uses Tone Burst (sound) to calculate velocity and temperature



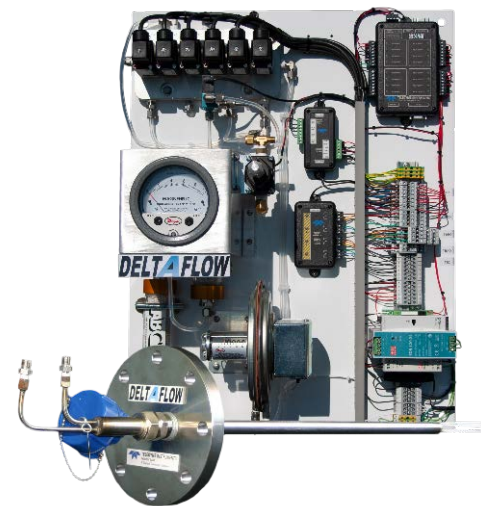
Product Summary

Flow Rate Monitors

DeltaFlow 180

Differential Pressure Flow Monitor

- Compliant with US EPA and international air quality regulations
- Available for Class 1, Division II and ATEX Zone 2 hazardous area installations
- Automated purge and interference check to ensure continuous operation
- Conversion to standard flow rates for temperature and pressure variations
- Browser based application for setup, data management, and system control
- 30-days of data stored locally when used with TML's RegPerfect® Software



Product Summary

Data Acquisition Software and Reporting

RegPerfect

Data Acquisition Software (DAS) Server

- Microsoft® Windows Server®
- Database - Microsoft® SQL Server
- Integrates email into reporting & alarming
- Microsoft® SQL Reports Standard for customized or user-configured reports
- Microsoft® Office Professional Standard
- RegPerfect® Applications.
- PLC, Data Logger, instrument interface drivers



Together, we are
Teledyne Air Quality

Thank you for your attention!

Questions?

Teledyne API N Series Gas Analyzers



Designed for today, prepared for tomorrow

Thank you for your attention!
Questions???