PGC5000 and PGC1000 Series

The replacement solution for ABB legacy GC's (PGC2000, 3100) and third-party analyzers

ABB

Process Gas Chromatographs have a typical lifespan between 10-15 years, but it is not rare to find end-users having their analyzers in operation beyond this period.

The key challenge for any organization is to implement an effective installed base strategy by having full visibility of the existing assets lifecycle and properly plan for their replacements in the future.

There are several risks associated with an obsolete installed base:
- High costs to reliably maintain the analyzers in operation
- Transfer of knowledge of an old technology
- Obsolescence of spare parts
- Process disruption due to an analyzer failure
- Lack of diagnostics

And the current ABB Process Gas Chromatograph portfolio, PGC5000 and PGC1000 Series, can help you to mitigate those impacts.

PGC5000
Process Gas Chromatograph

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01 PGC5000 Series

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02 PGC5000A

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01

The ABB PGC5000 Series process gas chromatograph is based on over 50 years of innovation in on-line process gas chromatographs. It simplifies gas chromatography and increases reliability. The PGC5000 Series has been designed for distributed control across multiple analytical Smart Ovens for limitless application approaches, offering a flexible platform for installation and a cost-effective alternative to traditional process gas chromatographs.

The PGC5000A Master Controller provides all analyzer system control functions for all the PGC5000 ovens. It offers a modern 10.4 inches Color Super VGA touch screen HMI that is highly graphical and logically laid out for ease of use. The exact same HMI design is offered on any networked PC.

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There are two oven models, PGC5000B and PGC5000C, with a complete line of detectors (TCD, FID, FPD and DBDID) and valves (vapor or liquid injection) to design and produce the best possible analytical measurement. Both analytical oven models have the options for airbath or airless design and Integrated Controller.

The PGC5000B oven has a smaller footprint and targets applications that require 1 or 2 detectors, with up to four analytical valves.

The PGC5000C oven is 28% larger than the PGC5000B oven, allowing application design flexibility. Targeting more complex applications, it can accommodate up to 3 detectors and 7 analytical valves.

PGC5000 benefits:
- Multiple Oven to Controller Configuration - The PGC5000 has the unique flexibility to connect up to 4 ovens to a single PGC5000A Master Controller, allow for a smaller shelter installation footprint and simplified application hardware configurations. Each oven is independently controlled allowing maintenance on one or more while the others continue to operate saving valuable technician time.
- Legacy Products and Backward Compatibility - The PGC5000 represents a modern electronics and communication backbone design for a long product life cycle. While it is a necessary departure from legacy products, the PGC5000 is fully backwardly compatible with the PGC2000 and PGC3100 as ABB has the capability of seamlessly connecting all three on the same network further enhanced by the STAR Data Management System (DMS). This provides for cost effective migration of legacy to state-of-the-art products.
- Obsolescence Management - The PGC5000 was designed with electronic component obsolescence management as a requirement and represents the most modern PGC design on the market. The CANopen communication protocol over CANbus is an industry standard, versus proprietary protocols such as I2C, widely used in the industries of aeronautical, naval, and automotive, meaning it will be supported for a very long time. The distributed PCB CANbus control design of the PGC5000 ensures the reality of electronic component obsolescence is easily and quickly managed guaranteeing a long life for the product.

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03 PGC5000
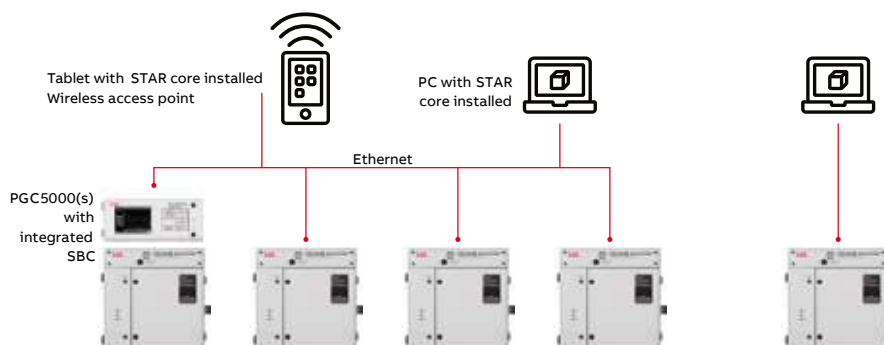Airless Oven

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04 PGC5000 Integrated
Controller

- System Diagnostics - The PGC5000 has a comprehensive Condition Monitoring System available through both the Local and Remote UIs. The CMS provides the user with a highly configurable, rich set of alarms and indicators that reach all the way down to the lowest component levels (PCBs, detectors, EPC etc.) enabling complete system diagnostics for rapid troubleshooting and maintenance.
- Digital Sample System - The PGC5000 connects over fiber optic via intrinsically safe CANbus communication to all digital SHS components, including stream switching valves and multivariate flow indicators. The PGC5000 locally and remotely displays on its UI critical SHS parameters including analyzer flow, bypass flow, bypass filter pressure drop and stream temperature. All these values are displayed on the PGC5000 and can be alarmed on with a Modbus signal to the DCS.
- Serviceability - All hardware component access points are from the front of the analyzer. The easily removed doors promote open access into the oven electronics.
- PGC5007 Total Sulfur GC - The PGC5007 employs a field proven combination of hardware and application experience, providing a simple, direct and robust measurement of Total Sulfur and hydrogen sulfide (H2S) in vapor or liquid process streams. The PGC5007B is based and built according to AS™ method D7041-04(2010), online analytical method with precision and bias data 2-5 times better than any analytical technique for total sulfur measurements.
- PGC5009 Fast Process GC - The PGC5009 represents the best in process analytics for simulated distillation analysis using fast temperature programmed process chromatography. With a patented design, the PGC5009 allows users to obtain a complete stream distillation profile in less than 5 minutes. The fast output of the technique allows the users to extract a much higher and accurate information from a stream compared to traditional technologies, enabling tight and effective process control.

The PGC5000 with Airless Oven option operates the same as the standard PGC5000 and it differs from other ovens in the means of heating the components within the oven. The Airless Oven blower circulates the ambient air inside the oven through the thermal exchange block. The heated air exits the back of the thermal exchange block at the rear of the oven, where a deflector plate directs the air flow toward the top of the oven. The blower pulls this air down the front of the oven and forces it back through the thermal exchange block. The Airless Oven option is a great cost savings solution due to non-consumption of instrument air.

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The Integrated Controller option offers a low initial investment solution by integrating the single board computer (SBC) directly into the PGC5000 oven. This not only eliminates the costs associated with one dedicated controller per oven architecture, but also helps to reduce the overall size of the analyzer shelter, due to a significant reduction in the space required to house traditional process gas chromatographs. For the replacement of existing analyzers, it can also help to optimize the shelter space. This product offering represents state of the art in process gas chromatograph architecture and offers user interface (UI) flexibility in three distinct options: (1) standard PC; (2) Industrial tablet or (3) PGC5000A master controller that can control and serve as the UI for all ovens in a single shelter.

Tablet with STAR core installed
Wireless access point

PC with STAR
core installed

Ethernet

PGC5000(s)
with
integrated
SBC

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PGC5000 specifications
- Enclosure: IP54 (NEMA 3 Equivalent)
- Area classification:
  CSA: PGC5000A
  - Class I, Division 1, Groups B, C and D, T4 – T2, with type X or Y-purge
  - Class I, Division 2, Groups B, C and D, T4
  CSA: PGC5000B and PGC5000C
  - Class I, Division 1, Groups B, C and D, T4 – T2, with type X or Y-purge
  - Class I, Division 2, Groups B, C and D, T4 – T2
  ATEX / IECEx: PGC5000A
  - Zone 1 Ex ib pyb IIB+H2 T4 Gb or Ex db ib pxb IIB+H2 T4 Gb
  - Zone 2 Ex nA IIB+H2 T4 Gc or Ex pzc IIB+H2 T4 Gc
  ATEX / IECEx: PGC5000B and PGC5000C
  - Zone 1 Ex db eb pyb IIB+H2 T4 Gb or Ex db eb ib pxb IIB+H2 T2, T3, T4 Gb
  - Zone 2 Ex db eb nA IIB+H2 T2, T3, T4 Gc or Ex db eb pzc IIB+H2 T2, T3, T4 Gc

- Carrier gas: Helium, Hydrogen, Nitrogen or Argon
- Repeatability: Typically ±1% of the measured value
- Ambient temperature range: 32°F to 122°F (0°C to 50°C)
- Supply voltage: 100 or 240 VAC
- Communication: Ethernet; dual redundant ports
- Protocols: Modbus TCP/IP; Modbus RTU
- Standard Inputs / Outputs: 8 Analog outputs (AO); 4 Digital outputs (DO)
- Additional I/O's available
- Historical data: SD card for 7 days of chromatogram and data storage
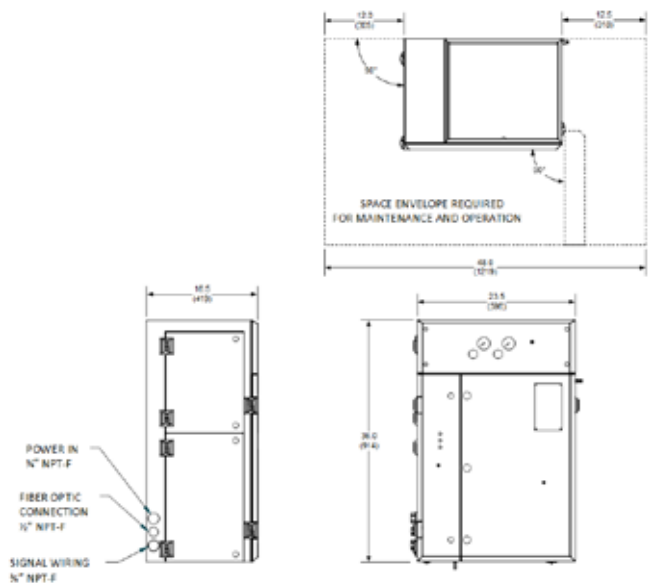
External dimensions
PGC5000A Master Controller
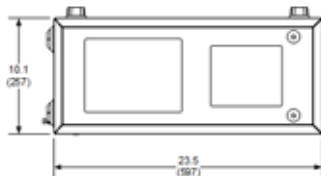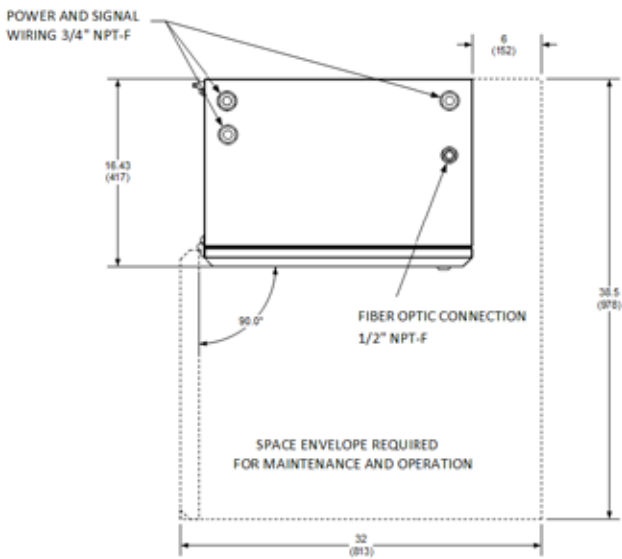
PGC5000B Oven
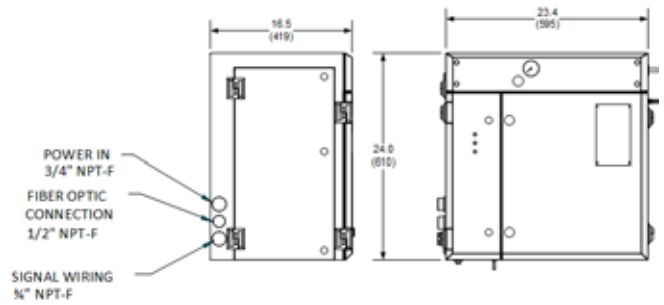
PGC5000C Oven

PGC1000
Process Gas Chromatograph

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01 PGC1000

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02 PGC1000
modular design

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The PGC1000 is ideal for measuring light hydrocarbon gases in locations where minimal space is available and a simple, reliable, low-cost measurement is required.

The PGC1000 is a field-mounted GC capable of measurements of C1 through C9+, inerts, H2S, H2, H2O, CO, O2, etc., in various Hydrocarbon Processing Industry streams.

The analyzer is an excellent choice for most gas processing industry applications, its integral stream selector allows sampling up to four (4) different streams. Up to two of these sample streams can be designated as the "calibration/validation sample".

PGC1000 main attributes:
- Compact design: Mounted much closer to the sample point
- Versatile: Capable of a variety of simple vapor applications
- Cost effective: Shelter-less and low utility consumptions
- Technological leader: Highly sensitive TCD and modularity of hardware and software

The PGC1000 is designed to retain historical data. This data can be used for audit trails, maintenance, and troubleshooting to verify chromatograph operation over time and provide a limited data backup for communication link reliability.

Servicing the PGC1000 requires minimal effort. It was designed from the ground up to be maintained by personnel with little or no prior knowledge of process gas chromatography. Both hardware and software are designed to provide low maintenance through easily replaceable electro-mechanical modules such as:
- PGC1000 termination panel
- PGC1000 analytical module, an easily removable chromatograph subassembly, containing: PGC1000 manifold, stream selector solenoid valves, GC valve assembly, dual electronic carrier pressure regulator valves, chromatograph pilot valve, and the PGC1000 analytical processor
- Heated PGC1000 feed-through
- Sample conditioning module (SCM)
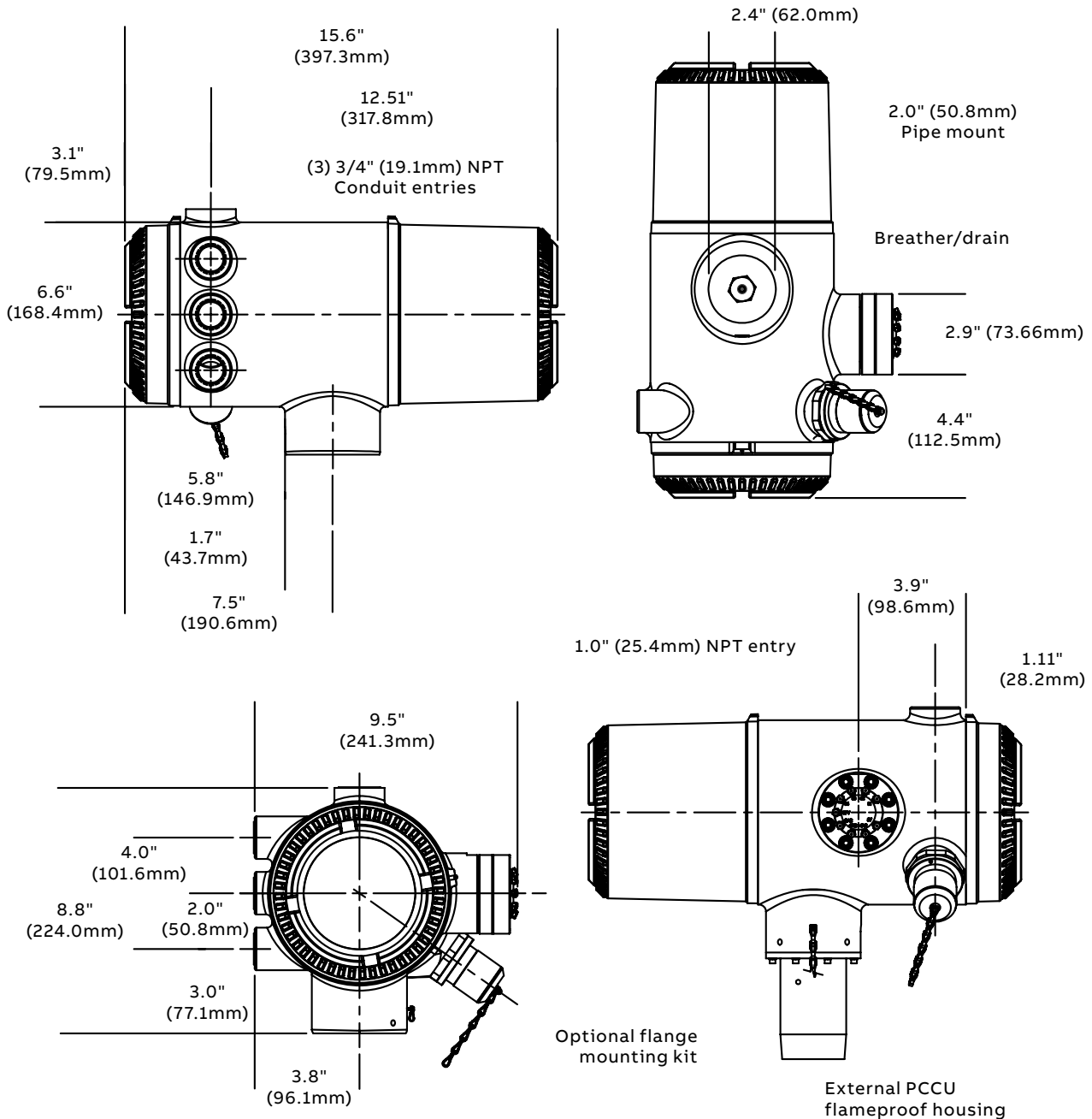- PGC1000 controller (32-bit Processor)

Digital Controller Assembly

Analytical Module Assembly

Termination Board

Sample Interface Assembly

Display
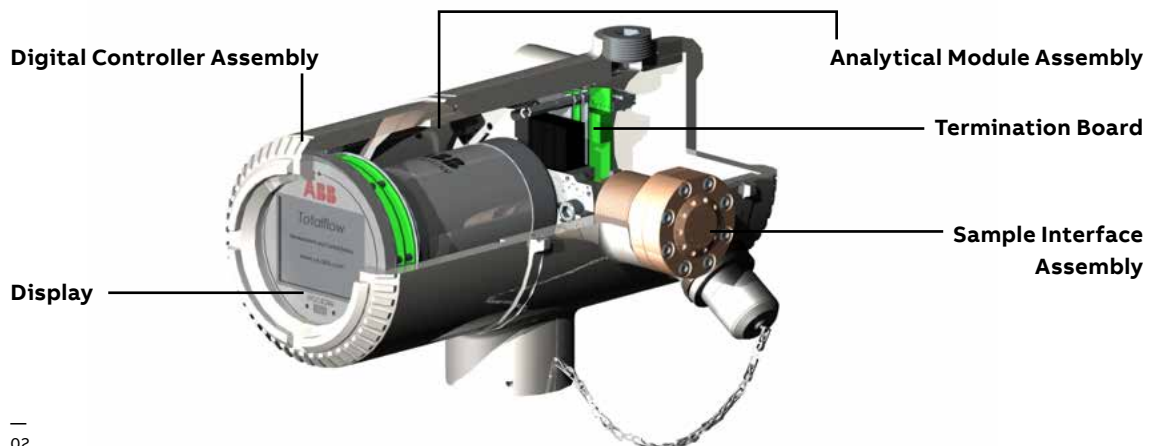
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PGC1000 specifications

- Enclosure: CSA Type 4X, IECEx IP56, ATEX Type 4X
- Area classification:
  CSA: Explosion-proof, Class I, Div 1, Groups B, C and D, T6
  ATEX / IECEx: Flameproof, II 2G Ex d IIB+H2, T6 Gb
- Carrier gas: Helium, Hydrogen or Nitrogen
- Repeatability: Typically ±1% of the measured value
- Ambient temperature range: 0°F to 130°F (-18°C to 55°C)
- Supply voltage: 12 or 24 VDC
- Communication: Two serial digital ports (RS-232, RS-485 or RS-422). One USB MMI (RS-232 or USB). Optional USB hub (host and client) and Ethernet ports
- Protocols: Modbus ASCII; Modbus RTU; Modbus TCP/IP
- Standard Inputs / Outputs: 2 Digital inputs (DI); 2 Digital outputs (DO)
- Additional I/O's available externally

External dimensions

15.6"
(397.3mm)

12.51"
(317.8mm)

(3) 3/4" (19.1mm) NPT
Conduit entries

3.1"
(79.5mm)

6.6"
(168.4mm)

5.8"
(146.9mm)

1.7"
(43.7mm)

7.5"
(190.6mm)

2.4" (62.0mm)

2.0" (50.8mm)
Pipe mount

Breather/drain

2.9" (73.66mm)

4.4"
(112.5mm)

9.5"
(241.3mm)

4.0"
(101.6mm)

8.8"
(224.0mm)

2.0"
(50.8mm)

3.0"
(77.1mm)

3.8"
(96.1mm)

3.9"
(98.6mm)

1.11"
(28.2mm)

1.0" (25.4mm) NPT entry

Optional flange
mounting kit

External PCCU
flameproof housing

STAR Data Management System

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01 Plant view

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02 Historical
results trend

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03 Star DMS - typical
network architecture

The Analyzer Network is a critical component as part of the end user's installed base and must be considered as a key item when planning for the replacement of Legacy GC's. The upgrade of the Analyzer Network not only grant extended protection associated with Cybersecurity aspects, but also ensures the benefit to explore the full potential of an updated Process Gas Chromatograph installed base. ABB's STAR Data Management System meets those features, allowing remote access to all networked analyzer assets from a central control point.

The STAR Data Management System is a client-server software platform that empowers users to gain the maximum benefit from process analyzer data. It is constituted by the STAR Client and STAR Server. The Star Client is a remote user interface, or portal into your analyzer network, for data display and analysis and the Star Server is a centralized sever for data collection and storage, enabling statistical trending and reporting of analyzer performance based on historical data.

The **STAR Client** software is single application for viewing Process Analyzer Data Statistics, Analyzer Availability Calculations, Maintenance Logs, Trending and Reporting that also contains a single launch portal for the Remote User Interfaces (RUIs) of the PGC5000, NGC / PGC1000 and legacy products, including the PGC2000 and 3100 Series. It runs on user workstations located anywhere on the analyzer network for data display and analysis and establishes connection to the STAR Server. Analyzer Data content can be accessed and managed, such as GC reports,

chromatograms, alarms, events, analyzer documents and measurements, like components concentrations. The Analyzer data can be accessed in real time or when stored on the STAR Server or on the SD card from the PGC5000A Master Controller or PGC5000 Integrated Controller oven.

Value added features:
- **Plat View** - End users can have a visual perspective about the condition of the analyzers. In the event of an alarm or issue with any analyzer, a visual identification is highlighted in the application, alerting the Maintenance Department for a quick action.
- **Analyzer Availability Calculation** - Unique feature highlighting the uptime and downtime conditions of the analyzer installed base. Pie chart can be generated per tag, showing the analyzer health condition divided in 7 different states of operation, displaying as % and total hours.
- **Maintenance Logs** - Maintenance logs can be added to each analyzer for the improvement of maintenance history. Can be tied to the maintenance flag in the analyzer.
- **Analyzer Configuration, Upgrades and Log Files** – Remote capability for analyzer software upgrades, troubleshooting, save and create backup configurations.
- **Overlays of Trends and Chromatograms** – Enhancing the troubleshooting ability of analyzer devices.
- **Export Data** – Ability to export data for further analysis.

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The STAR Server is built on a Centralized Server that collects and stores critical data from the gas chromatographs located in the analyzer network, including alarm status, analysis results, statistical, trending and reporting of process analyzer data. It stores simple and complex process analyzer data, such as analyzer configuration, chromatograms, and analytical methods.

The STAR Server supports the PGC5000 family of analyzers, PGC2000/3100, PGC1000/NGC, Multi-Wave, RVP, and data from any OPC DA server.
The data stored enables end users to better maintain and optimize their analyzer assets and access to an extensive collection of data that maximizes plant operational capacity with correlation to analyzer's performance.

Main benefits:
- **Analyzer Report Storage** – Normal, Validation and Calibration analyses, Standard and Raw analysis reports for existing and new analyzers.
- **Chromatogram Storage** – Overlay, zoom, view analytical methods, and reprocess component integration.
- **Events and Status Storage** – Hardware indicators, conditional alarms, online / offline status, subscribed data and user access.
- **Trending Historical Results** – Components results, alarms and indicators, multiple trend values and SQC reporting, allowing end users to select repeatability acceptance criteria for process control.
- **Analyzer Repeatability and Performance Calculations** – Calculate analyzer repeatability on collected data, analyzer performance analysis. Process control rejection rules available.
- **Additional process related data** – Ability to pull in non-analyzer data from any OPC DA server to round out troubleshooting processes (e.g., shelter temperature, external Sample Handling System).

The Star Data Management System is a rich and powerful tool, adding value to the daily routines from the Maintenance department . It allows remote access to all the analyzers located in the analyzer network, supporting with a friendly and safe environment for the troubleshooting of the analyzers and, consequently, saving valuable time from Maintenance team.
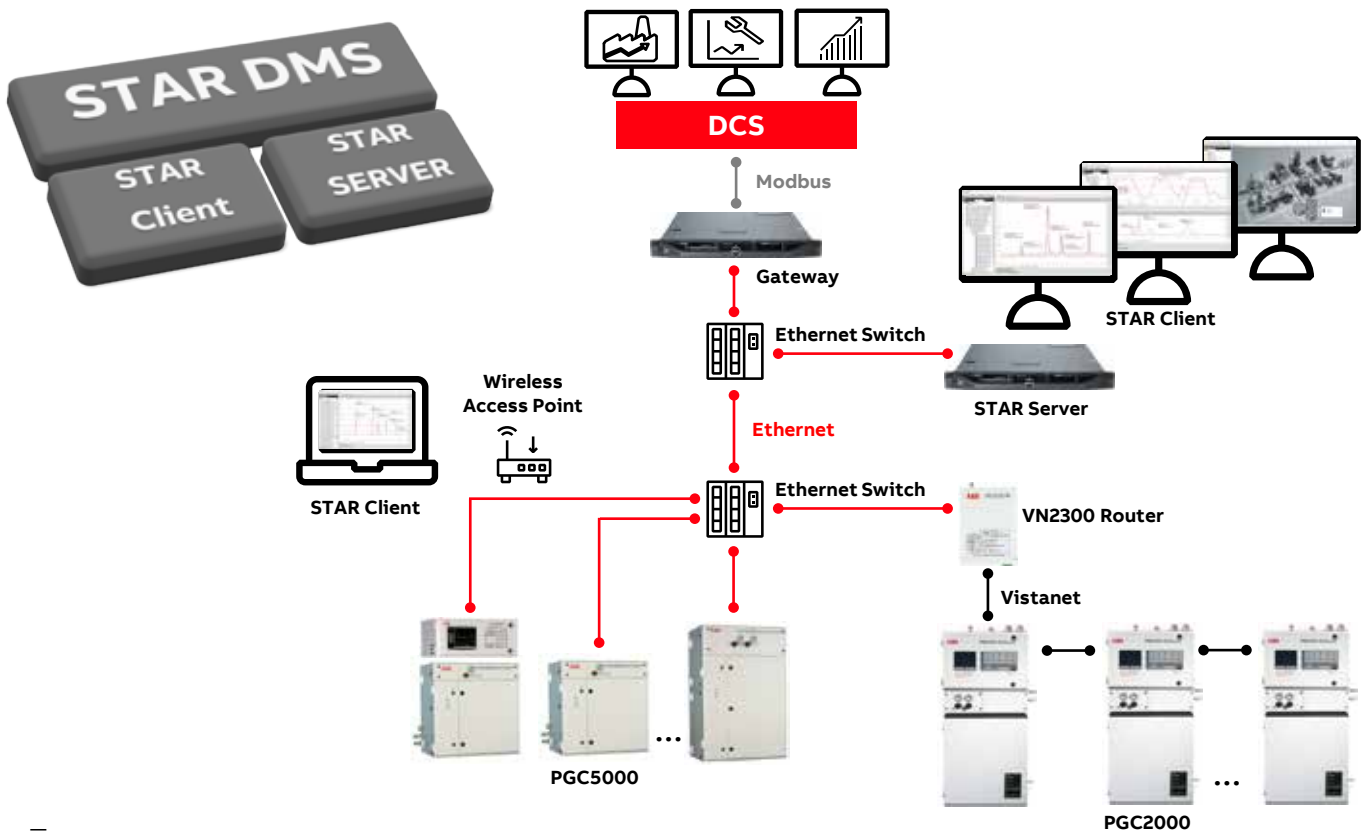
Advanced and Digital Services
World-class after-sales support

ABB Ability™ Cybersecurity Services
- ABB Ability™ Cybersecurity services provides a range of cybersecurity solutions that minimize cyber risks and provide the highest level of protection for automation assets & analyzer networks.
- Scope: OS, Network and Application Hardening, definition and deployment of policies, Antivirus and Malware protection solution, back-up and restore, logging solution and Patch management.

ABB Ability Condition Monitoring for measurement devices
- ABB Ability™ Condition Monitoring for measurement devices can reduce and often eliminate costly equipment failures that lead to increased service needs. As a remote service, the condition of your devices is always being monitored, and status updates are generated periodically. This produces continuous recommendations that will help increase plant uptime and reduce costs.
- ABB's solution provides you with a system that streamlines your maintenance approach, performs time-saving analysis of data, identifies significant or undesirable changes in device condition and produces the necessary information for on-site personnel to leverage their own expertise.

ABB Ability Genix Datalyzer
- ABB Ability Genix Datalyzer lowers cost of ownership, improve reliability, and provides easy access to data and ensures value added process insights.
- Solution which combines power of cloud and helps improve uptime of gas analyzers.
- Enterprise grade, comprehensive, yet modular cloud-based analyzer fleet monitoring applications suite. Multiple analyzers are connected to an edge device (MicroPC) which sends out the data to cloud.
- Unlocks the value of product and process data and displays the same in easy-to-understand parameters
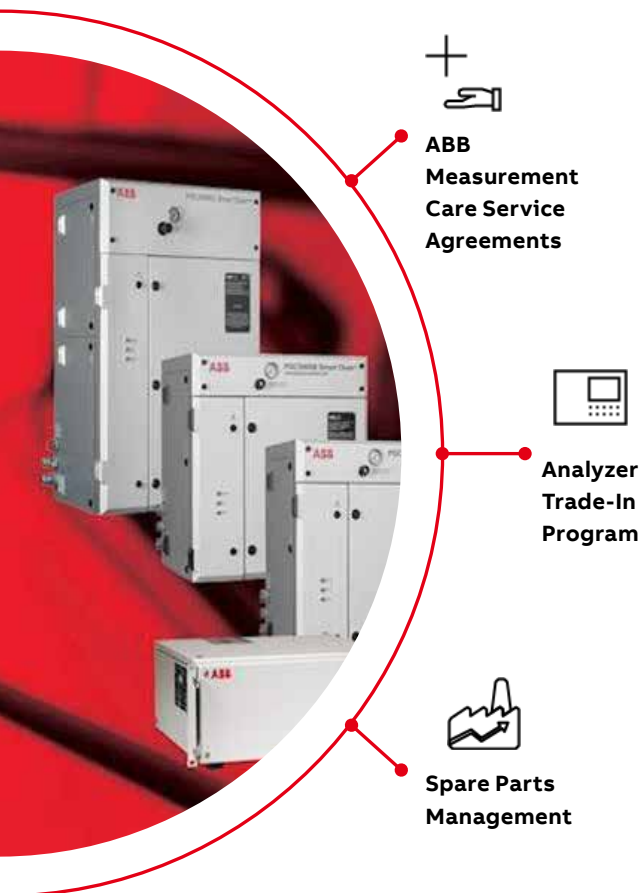
ABB Ability™ Cybersecurity Services

ABB Ability™ Condition Monitoring for measurement devices

ABB Ability™ Genix Datalizer

ABB Measurement Care Service Agreements

Analyzer Trade-In Program

Spare Parts Management

ABB Measurement Care Service Agreements
- ABB offers customized solutions to meet your service needs, improve production efficiency and reduce capital outlays.
- Basic Agreement – It includes Contract management to ensure a smooth service delivery with single point of contact and regular communication to ensure customer satisfaction and continuous improvement.
- Rapid Response - Guaranteed urgent action within an agreed time frame. You can count on professional prioritized support from highly skilled specialists.
- Lifecycle Management - Product age and condition can adversely affect the performance of your process. An installed base assessment coupled with an effective preventive maintenance program improves uptime while reducing capital costs.
- Performance Improvement - Remote and on-site monitoring identifies ways to improve process performance. Monitoring al¬lows accurate predictive maintenance plans to be employed to keep products running at opti¬mum levels.

Analyzer Trade-In Program
- Service program developed to support customers with the replacement of legacy process gas chromatographs.
- Customizable scope to adapt different customers necessities and demands, including the replacement of sample conditioning systems and Analyzer Network upgrade.
- Please contact ABB Service team for further details.

Spare Parts Management
- Spare part stock availability and management
- Genuine spare parts covered under a warranty
- Annual spare parts review
- Logistics and inventory managed by ABB

ABB

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