Gantner instruments

Innovative Solutions for Data Acquisition in Test and Measurement Technology

Gantner Instruments

**Test and Measurement Technology.
Designed for You.**

Gantner Instruments is a global leader in the development of high precision measurement and control systems. Founded in 1982, Gantner excels in delivering products and services in the fields of electrical, mechanical and thermal measurement. We always prioritize flexibility, usability and accessibility.

Our test automation and performance monitoring solutions can be found in many applications around the world, particularly in the automotive, aerospace, civil engineering, and energy industries.

More Power and More Flexibility:
the new Q.series X

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Experience

Going New Ways – Developing Intelligent Solutions

Are you searching for the data acquisition (DAQ) solution that sets the standard for both usability and innovation? Do you need to process and store increasing amounts of high speed measurement data in optimum quality?

Gantner Instruments offers innovative, state-of-the art DAQ solutions that satisfy even the most demanding applications within test and measurement - precisely, efficiently and reliably.

37+

sales offices worldwide

"Our agile product development and customer-centric corporate culture are both reflected in our ability to provide signal inputs for any physical sensor and data interfaces for all main platforms."

Werner Ganahl,
CEO Ganter Instruments

More than

1 million

measurement channels installed by Gantner customers annually

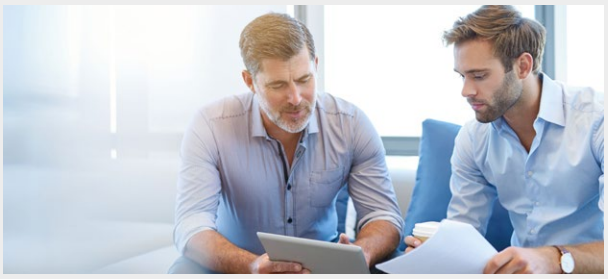
Working Together on the Test and Measurement Technology of the Future

Reliability | Appreciation | Openness

Gantner Instruments is motivated and driven by eagerness, enthusiasm, and belief that every innovation can be continuously improved upon. Join us at Gantner Instruments. Experience an inspiring corporate culture and help us shape the test and measurement solutions of tomorrow.

87%

of our employees have been with us for over 8 years



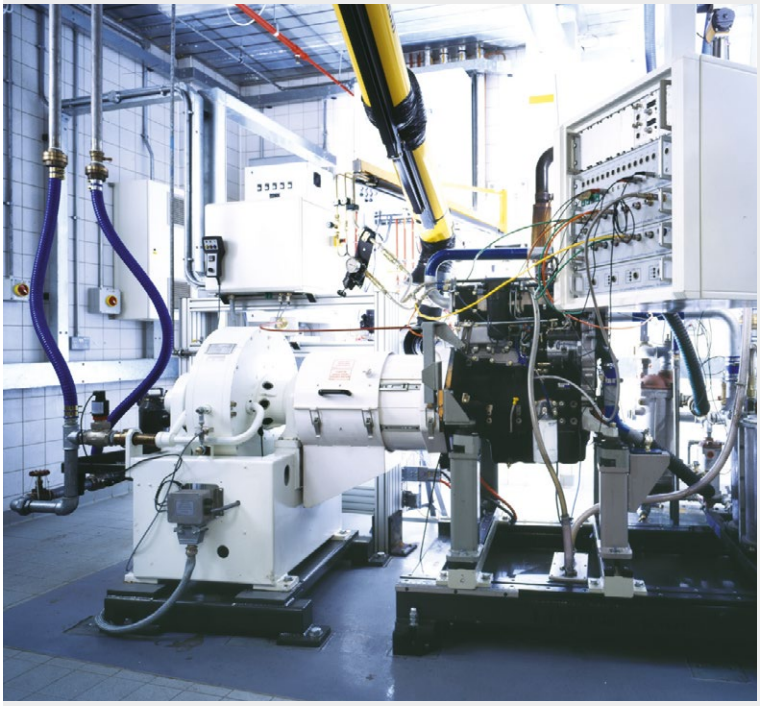
> 320,000

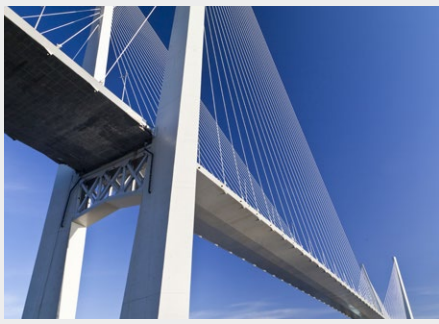
measurement modules currently in operation, with mean time between failures (MTBF) rates > 30 years

Solutions

Innovative Solutions for Data Acquisition in Test and Measurement Technology

Our solutions are ideal for applications such as collecting physical data to monitor load and stress on bridges, measuring vibration and displacement of railway tracks, testing aircraft structure integrity and engine performance, monitoring energy generation assets (e.g. hydro, wind, solar) and measuring energy stored (e.g. batteries).





2000
e.series

2009
Q.series

1 Hz > 1 kHz
Sampling rates

> 100 kHz

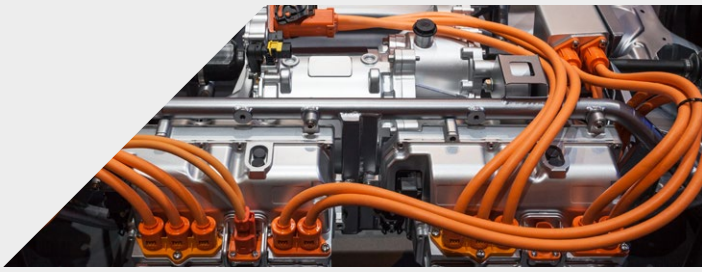
Mobility

Aerospace

Energy

Civil Engineering

"We are an enabler of digitalization in monitoring and control applications. We offer extendable, scalable and distributed solutions. Our global sales and support network provides our customers with advanced solutions, today and into the future."



2018

Q.series eXtended Performance

> up to **4 MHz**

Future-proof

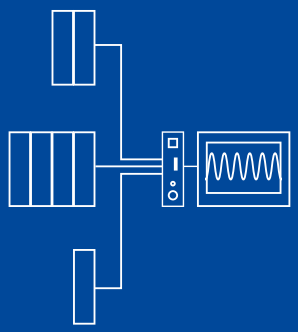
All product generations are upward compatible, extendable with our latest products and lifetime calibration support.

Foto: Volvo Car Group

Q.series X

NeXt Generation

More Power and More Flexibility – One Module Fits All



Future-Oriented, High-Performance Industrial Measurement and Data Processing

More Power and More Flexibility –
One Module Fits All

Q.series X – neXt Generation in Data Acquisition

Gantner Instruments is introducing the new, flexible and more powerful Q.series X – an extended edition of the Q.series.

For many years now, thousands of channels of Gantner´s data acquisition (DAQ) modules have been operating reliably, fulfilling customer demands in various industrial segments, from automotive and civil engineering to aerospace.

Q.series X improves upon the performance of the hugely successful Q.series product line possessing advanced edge computing technologies and more intelligent data filtering and noise reduction. It offers sampling rates up to the MHz range and optical interfaces for harsh environments. Q.series X modules enable the most future-proof solution for advanced DAQ tasks.

Q.series X Comes with Impressive X-tras:

- Powerful signal conditioning, filtering, and channel-to-channel operations
- Higher ADC rates
- Higher data rates
- Customized connectors
- Re-configuration during operation

Features

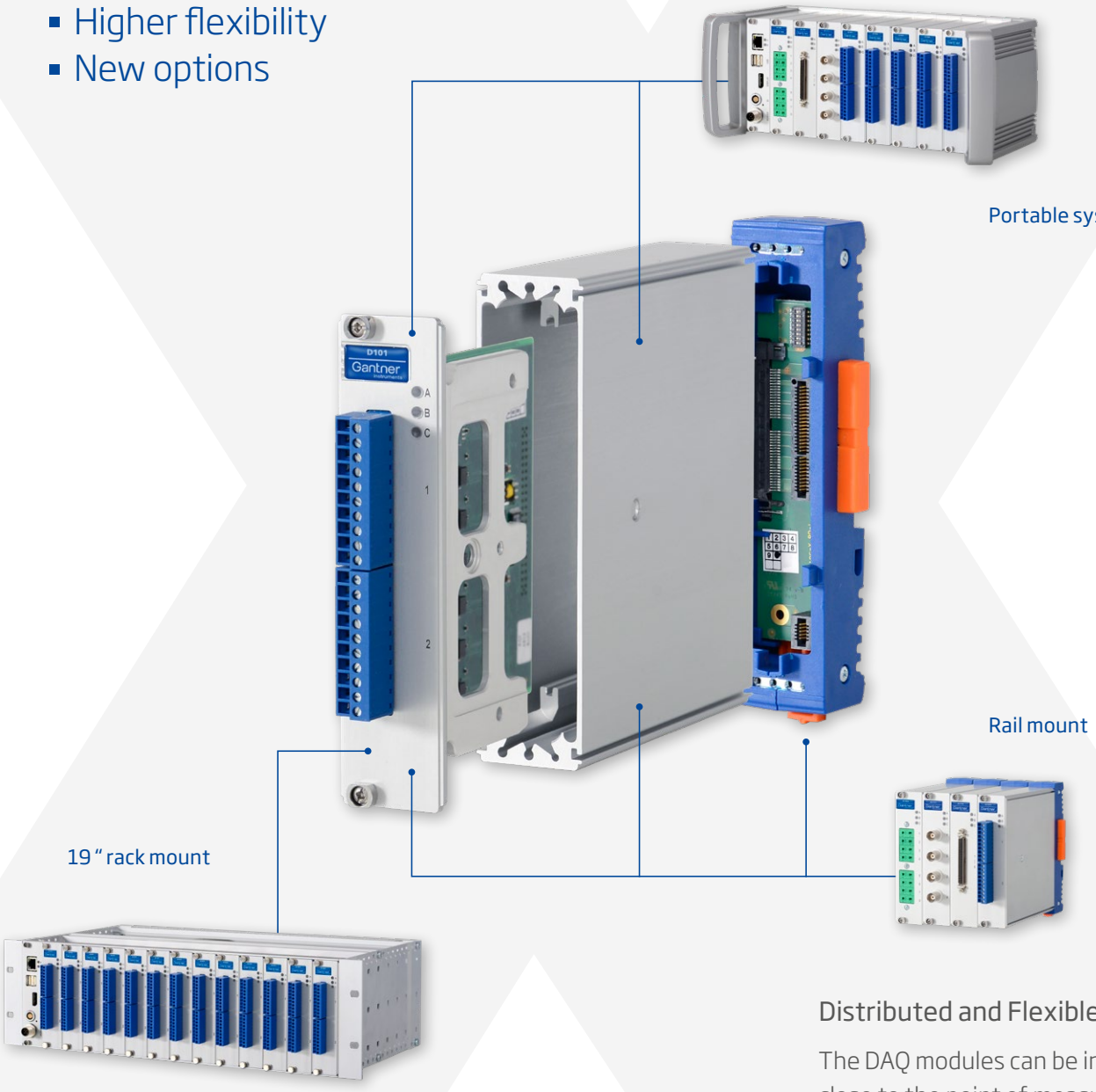
- Interface upgrade from UART to EtherCAT
- A141 charge amplifier
- A108 with excitation for MEMS sensors
- Q.boost A101 MHz module
- Fiber optic sensor module
- Time synchronization over Ethernet (PTPv2)

Q.series X
eXtended Performance Edition

- More power
- Improved features
- Higher flexibility
- New options

Portable and Compact

The ideal DAQ solution for on-the-go applications requiring higher performance in potentially harsh environments.



Multi-channel Measuring System

Efficient distributed DAQ with high-precision synchronization and gradual expansion up to thousands of channels.

Distributed and Flexible

The DAQ modules can be installed close to the point of measurement and connected to the controller. This reduces cable clutter and is user friendly. Measurements are less prone to noise due to short sensor cables.

DAQ Modules Overview

All electrical, mechanical and thermal parameters can be measured with dedicated Q.series X modules. They can be easily combined and extended. Data streams with different sampling rates can be merged together for efficient post-processing.

Signal Inputs		A101	A102	A103	A104	A105	A105 CR	A106	A107
U	Voltage	■	■	■	■				■
U ϟ	Voltage (1.2 kV isolation)								
I	Current	■	■	■					■
	Resistance	■				■	■		■
	Potentiometer	■							■
	RTD	■				■	■		■
	Cryogenic thermistor						■		
	Thermocouple	■			■				■
ϟ	High voltage (1.2 kV isolation)								
	Full-bridge strain gage	■	■					■	■
	Half-bridge strain gage	■	■					■	■
	Quarter-bridge strain gage	■	■					■	■
	Inductive full-bridge							■	
	Inductive half-bridge							■	
	LVDT							■	
	IEPE	■	■						
	Charge								
	Frequency / Counter								
PWM	Pulse-width modulation								
OUT	Analog out		■					■	
	Time								
	Status	■	■	■				■	
	Number of channels	2	1	8	8	4	4	2	4
	Data rate (Hz)	100 k	100 k	100	100	100	100	20 k	20 k

All modules share some key features

- Galvanic isolation (up to 1200 V) for each channel, supply and interface
- Low susceptibility to electro-magnetic interference
- Independent filtering, signal conditioning, and math functionality on every channel
- All 24 bit ADC
- 10 to 30 VDC power
- Operating temperature in the range of -4 °F to +140 °F (-20 °C to +60 °C)
- Re-configuration during operation

A108	A109	A111	A116	A121	A123	A124	A127	A128	A141	A146	C101	D101	D104	D105	D107
■		■		■	■		■	■			■				
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8	4	4	8	2	4	4	4	4	4	16	4	8	16	16	2 - 6
20 k	100 k	100 k	20 k	100 k	100 k	20 k	100 k	100 k	100 k	20 k	20k	100 k	20 k	20 k	0.1 - 1 M

Find out more:
https://tinyurl.com/y5gfgx8d

For sampling rates up to 4 MHz: see Q.boost A101

Q.controller

Edge Devices for High Performance Monitoring and Control, Remote Configuration and Universal Connectivity

Converting raw data to preprocessed information for efficient storage, enrichment and analytics.

High-performance Controller

Q.station X is a high-performance data acquisition controller and edge computing device that provides accurate and reliable synchronization of high-speed measurement data and redundant data logging. It offers an optional full-featured programmable environment, designed for sophisticated automation, control and parallel communication over TCP/IP, CAN, ProfiNet, Modbus, and EtherCAT.

Smart Edge Device for Monitoring Applications

Q.monixx is a new addition to the Q.series product family - the ideal edge computing and data logging solution for reliable process control and asset monitoring. The standard I/O configuration for the Q.monixx includes up to 8 universal analog inputs, 8 digital inputs, 4 digital outputs, 2 relay outputs, and 8 serial channels for communication.

Also included are 4 data loggers for parallel data acquisition to either local storage or to a GI.cloud storage solution for easy accessibility, additional analytics, and detailed diagnostics. Third-party apps can also be hosted on the device.

Advanced Features Matching Your Needs

Q.controller

	Q.station X	Q.monixx
Interfaces		
Ethernet TCP / IP	■	■
EtherCAT	■	-
ProfiNet	■	-
RS-485	up to 48 Mbps	7 interfaces
CAN	■	(optional)
SDI-12	-	1
Connectivity		
Configuration (local or remote) via GI.bench	■	■
Modem	(optional external device)	(optional)
GI.cloud connection	■	■
Data logging / Control		
Sampling rate	up to 100 kHz [1]	up to 100 Hz
Continuous / event-based logging	■ / ■	■ / ■
Number of data loggers with arithmetics, filters	20	4
Data storage		
RAM [MB] / Flash [MB]	500 / 4000	64 / -
SD card	■	■
USB expandable	2 slots	■
DAQ Modules		
Number of DAQ modules	Connect up to 64 different Q.series X modules	DAQ module integrated
Digital inputs and outputs	6 inputs / 4 outputs	8 input, up to 2 kHz / 4 output / 2 relays
Analog Input	-	8 multi-purpose (voltage, current, resistance, Pt100, Pt1000) [2]
Programming		
Programmable edge computing functionality real time / non real time	■ / ■	- / ■
Apps (external) can be installed	■	■
Display with touch (optional)	■	■
Typical power consumption [W]	<12	<8

[1] With Q.boost A101 up to 4MHz sampling

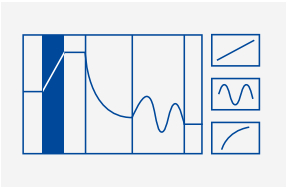
[2] Other configurations Q3/2019

test.con

Simple Graphical Programming for Edge Computing Devices

The complete measuring, signal conditioning, data management, control, visualization, and operation tool for your edge-computing controller.

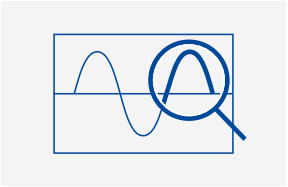
test.con Studio allows graphical programming of application-specific functionalities, which run on the edge in real time.



Curve Generator

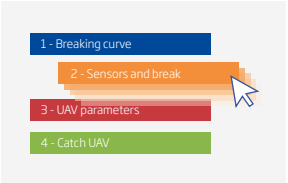
Test and simulate different signals
(e.g. Type K, PT100, NTC) in real time

- Simulation signal setups, e.g. Voltage or Current output to control or test various applications
  - Temperature transient simulation as real thermocouple or RTD output
  - Specific curve shapes can be be generated by drag and drop
  - PID controller



Power Quality Monitoring

- Real time calculation of active power, apparent power and power factor for sinus shaped signals
- Pre-calculations of rms values, efficiency can be done also in the DAQ Module.
- Effective DC and AC monitoring for converter testing



Flow control

Design and control your measurement setup

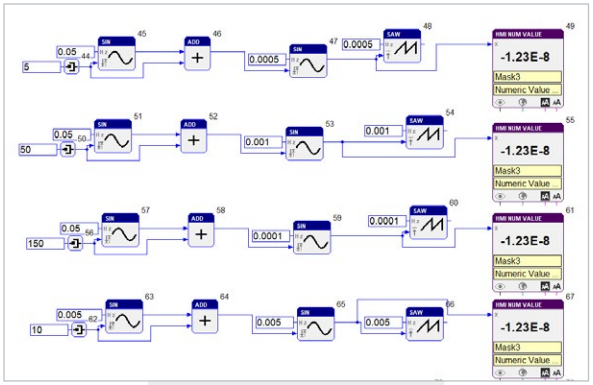
Find out more:

www.gantner-instruments.com/products/test-con

test.con

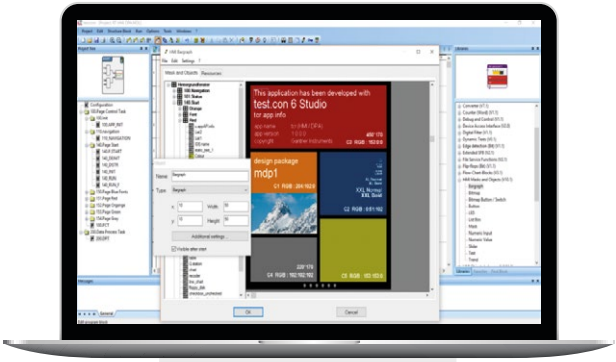
- Arithmetic (V5.1)
- Control elements (V0.0)
- Controller (floating) (V1.1)
  - PID-Controller
- Converter (time) (V3.1)
- Converter (V7.1)
- Counter (word) (V1.1)
- Digital filter (V1.1)
- Dynamic texts (V0.1)
- Edge detection (Bit) (V1.1)
  - Falling edge (1-0)
  - Rising edge (0-1)
- Extended SFB (V2.1)
- Flip-flops (bit) (V1.1)
- HMI masks and objects (V8.1)
- HMI parameter blocks (V4.1)
- Logic (Bit) (V2.1)
  - AND
  - NOT
  - OR
  - XOR
- Numeric (floating) (V2.1)
- PID-Controller (floating) (2.0)
- Selection and comparison (V3.1)
- Sequence blocks (V2.1)
- Signal generators (V1.1)
  - Pulse signal
  - Rectangle signal
  - Sawtooth signal
  - Sawtooth signal
  - Sine signal
  - Triangle signal
- Signal processing (V2.1)
- Standard
- Standard transmission terms (floating)
  - Derivative term
  - DT1-Term
  - Integral term
  - Nonlinearity
  - Proportional term
  - PT1-Term
  - PT2-Term (able to oscillate)
- Timer (floating) (V1.1)

01



Create specific applications with a comprehensive library

02



Individual design of multiple displays for operation and visualization using the mask designer

03

After loading the application to the Q.controller, it runs independently of a PC

test.con Studio is a free application and runs on any T version of the Q.controller

Q.station X

Q.screen

Q.monixx

Distributed & synchronized

Distributed and Synchronized DAQ

Timer

Depending on the application and environment, different time sources are available.

Radio time (z.B. DCF77)

GPS

Time server

Precision time protocol

Distributed clock

Time Master

The Q.controller receives the time signal and converts it into a Q.sync signal for all subsequent controllers.

IRIG over RS-485 / TTL

NMEA over RS-232 / USB

NTP over Ethernet

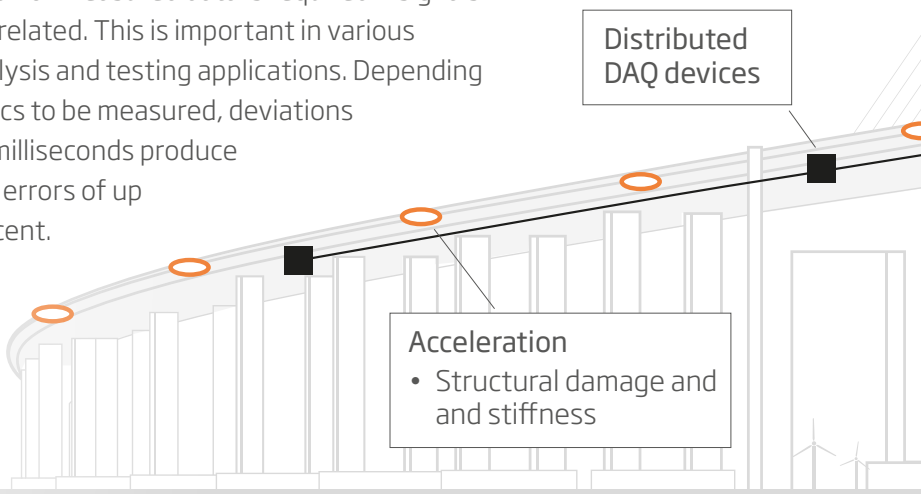
PTPv2 over Ethernet

DC over EtherCAT

Q.sync over RS-485

Synchronized Measurement

Synchronization of measured data is required if signals have to be correlated. This is important in various structural analysis and testing applications. Depending on the dynamics to be measured, deviations of only a few milliseconds produce measurement errors of up to several percent.



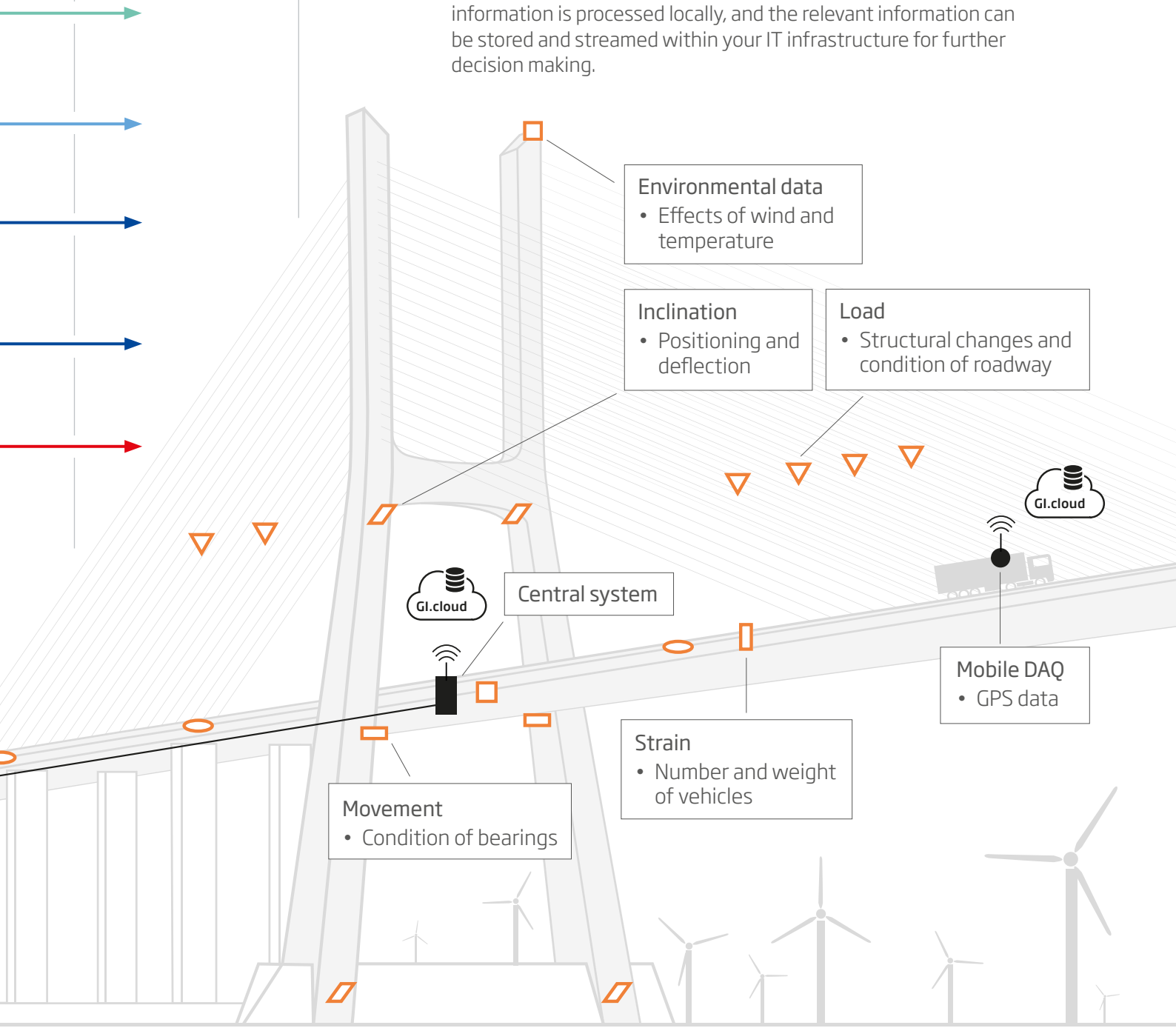
Distributed Monitoring and Control

Q.series modules provide the perfect solution in installations where multiple signals are widely dispersed and require simultaneous sampling and comparison (less than a microsecond). In the structural testing of bridges and wind turbines, where a deviation of only a few milliseconds in the measurement data can result in significant dynamic analysis errors, this functionality is vital.

- Typical variables like strain, acceleration, displacement, tilt or forces are acquired, recorded and converted into characteristic values.
- For example, in the bridge application (see figure below), measured values can include traffic load, deflection, misalignment, bearing load or vibration with FFT calculation and damping behavior. This information is processed locally, and the relevant information can be stored and streamed within your IT infrastructure for further decision making.

Time Slaves

The controllers and DAQ modules receive either a Q.sync or an external time signal.



High Voltage

High Isolation Modules for Electric Vehicle Testing

Leading manufacturers and testing laboratories, such as Bosch Battery Systems, GM and TÜV SÜD, use solutions based on the Q.series. The key benefits of selecting the Q.series include superior channel-to-channel isolation, high noise immunity, and precise high-speed measurements.

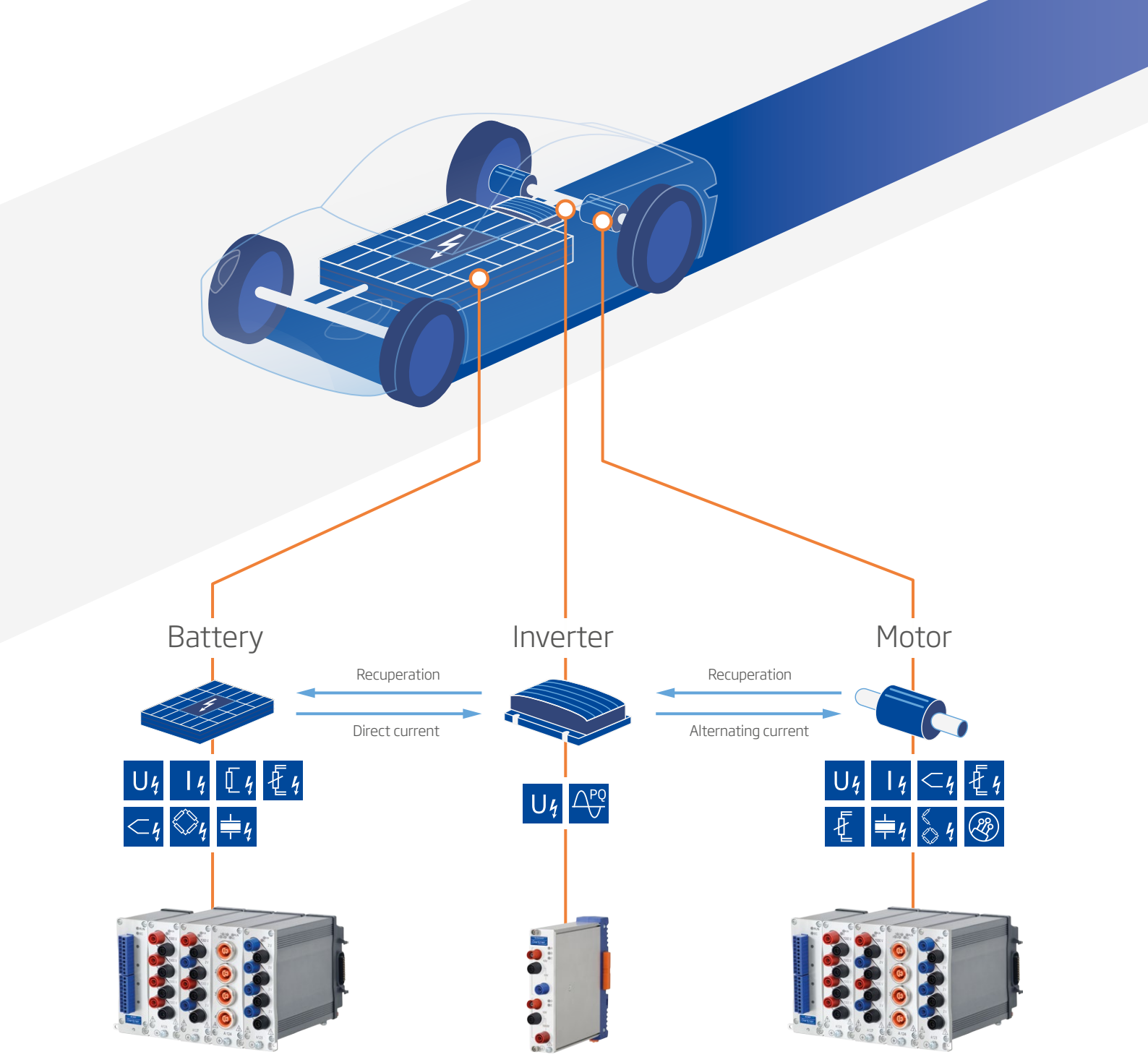
Accelerating the Electro Mobility

The Q.series modules A121, A123, A124, A127 and A128 provide permanent galvanic isolation of 1200 VDC of each channel, power supply, and communication interface.

Such isolation allows for the measurement of voltages, currents and temperatures at a high voltage potential. The Q.series modules A121, A127 and A128 enable measurements up to ± 1200 VDC. High currents are measured via Hall effect sensors or current shunts.

Isolation 1200 VDC

- Channel to channel
- Channel to power supply
- Channel to interface



Q.series X

- Isolation 1200 VDC
  - Channel to channel
  - Channel to power supply
  - Channel to interface
- A121, A123, A124, A127, A128

Q.boost

- Up to 4 MHz per channel, triggered or continuously
- 2 inputs for voltage and current
- 10 VDC or 1000 VAC range
- Single phase power measurement
- Optional: IEPE/ICP, Piezo, Pulse/Counter
- Q.boost A101

Q.series X

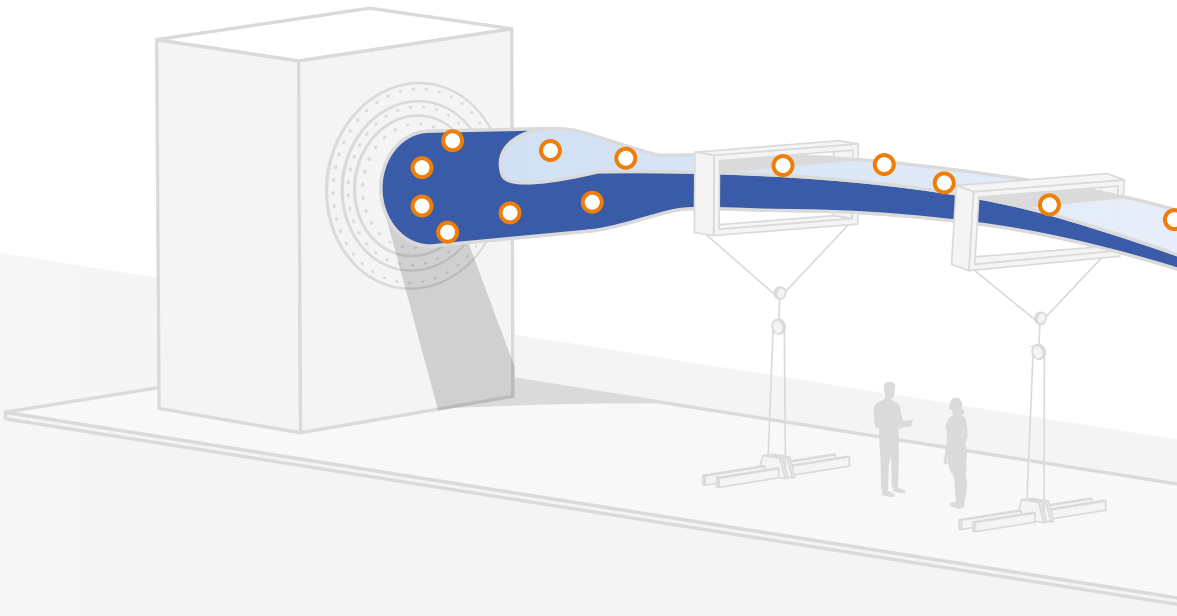
- Up to 100 kHz per channel
- Inputs for voltage, current, thermocouple, Pt100, NTC, IEPE/ICP, full and half-bridge strain gage, and optical sensors
- A121, A123, A124, A127, A128

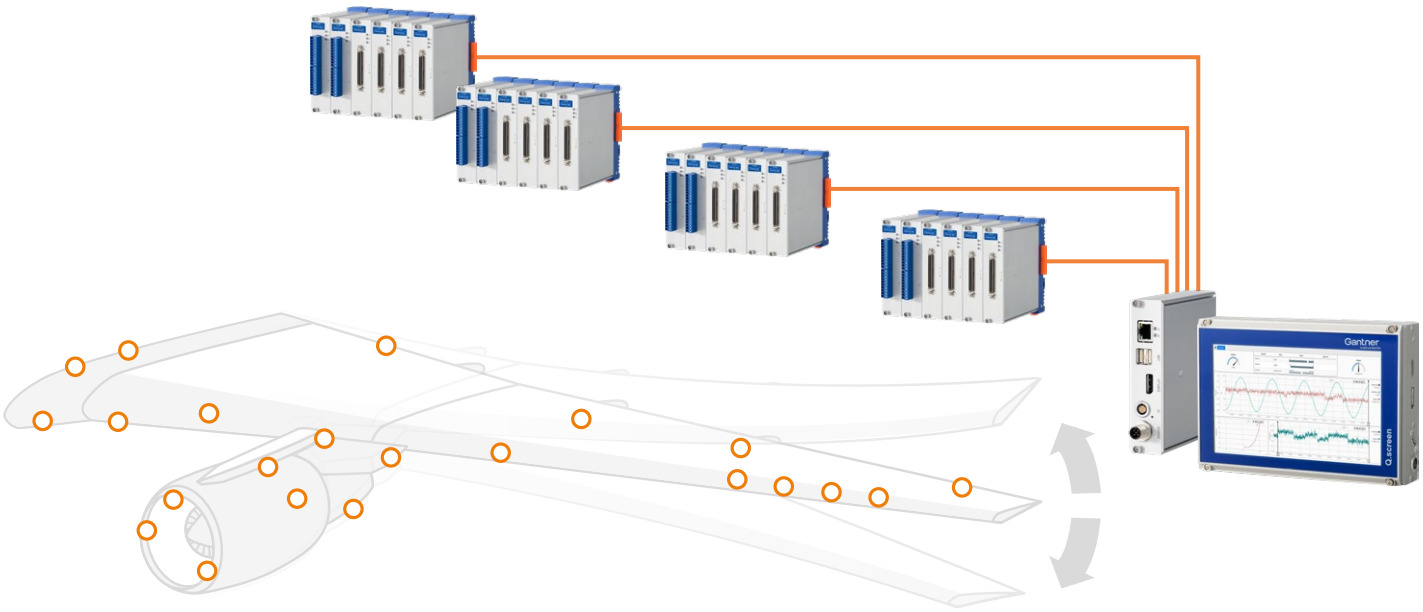
Multi-channel DAQ Solution

The Q.series X is the ideal DAQ solution for multi-channel installations, e.g. applications involving large quantities of strain gauges, temperature sensors or other sensor types. Multiple systems can be connected to facilitate efficient DAQ distribution with high-precision synchronization and gradual expansion up to thousands of channels.

Features

- Flexibility to mix and distribute DAQ modules
- High channel density packaging for minimal footprint
- Quick setup with automatic module detection
- Out-of-the-box time synchronization with less than 1 µs jitter
- Smart data reduction techniques to minimize data overhead
- GI.bench software for multi-channel configuration, visualization and, data logging
- GI.cloud for remote data storage and backup





Q.series X A106

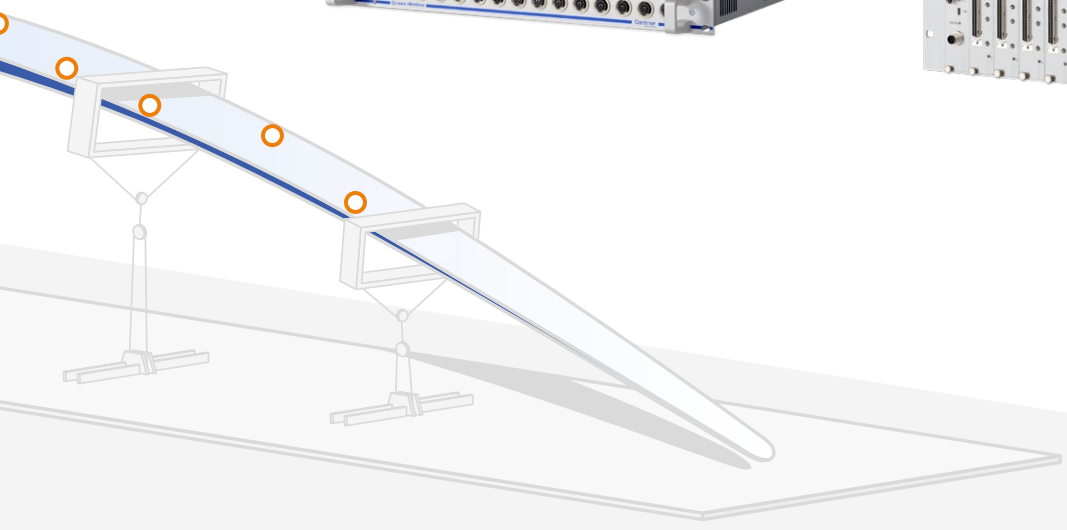
- 2 inputs for full-, half- and quarter-bridge
- Carrier frequency or DC bridge excitation
- 2.5 and 5 VDC excitation
- 600 Hz and 4.8 kHz CF excitation
- 1.25 up to 1,000 mV/V range in 14 steps, scaling function
- 20 kHz sample rate

Q.series X A116

- 8 inputs for full-, half- and quarter-bridge
- Built-in 120 Ω / 350 Ω low TC bridge completion resistors
- Accuracy class 0.05
- 2 and 4 VDC bridge excitation
- 2,000 and 20,000 µm/m range
- 20 kHz sample rate OCS technique for lead wire compensation

Q.series X A146

- 16 inputs for quarter-bridge
- Built-in 350 Ω low TC bridge completion resistors
- Accuracy class 0.05
- 2 VDC bridge excitation
- 2,000 and 20,000 µm/m range
- 20 kHz sample rate
- OCS technique for lead wire compensation

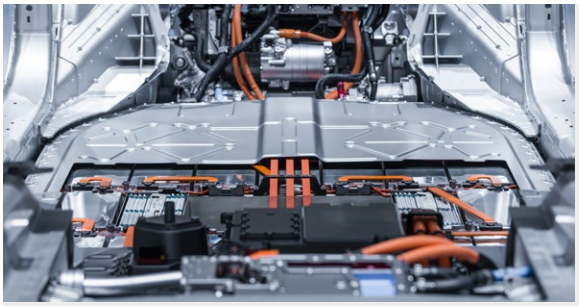


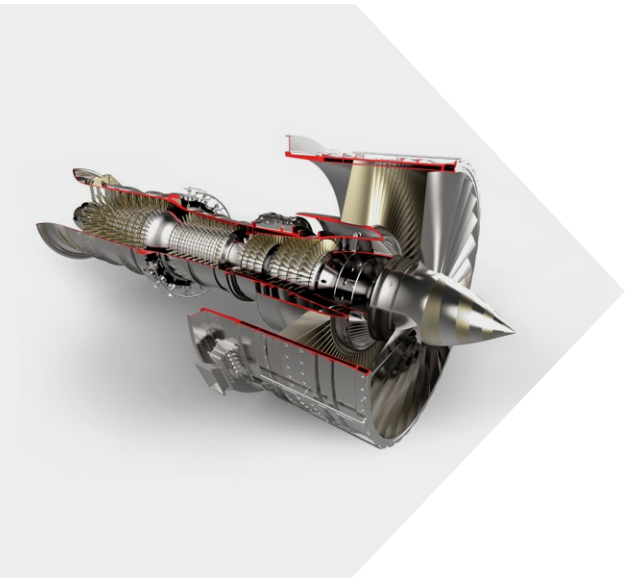
Q.series X F108 Optical Gage Amplifier

Ready-to-use Fiber Optic Measurement Technology

Advantages of fiber optic sensors

- High-voltage isolation
- EM and radiation immune
- Inherently intrinsically safe
- Insensitive to lightning strikes
- Cryogenic and high temperature tolerant





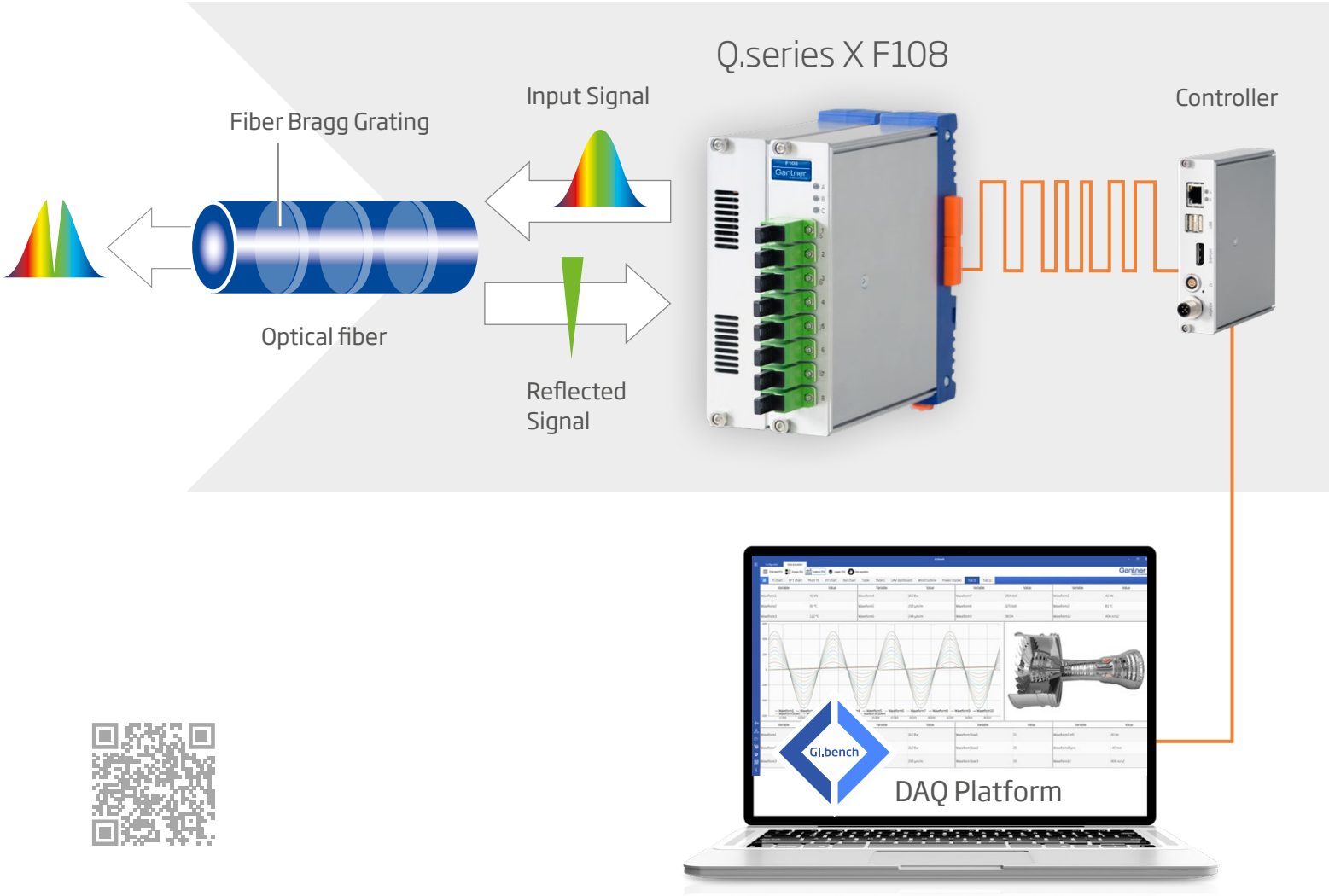
Typical operating environments:

- Cryogenic and ultra-high temperature
- Ionizing (gamma) radiation
- Electromagnetic radiation
- Hazardous areas
- High-voltage

All the benefits of fiber optic measurement without the hassle

The F108 Optical Gage Amplifier seamlessly integrates with the Q.series X data acquisition platform. Benefit from the modularity and versatility of the Q.series X product line to address any of your measurement challenges. Connect with GI.bench software for the quick and easy setup of your multi-channel DAQ system or GI.cloud for cloud-based storage and monitoring.

- 8 inputs for strain, pressure, acceleration, temperature measurement
  - Strain up to 1,100 µm/m
  - Acceleration up to 1,000 g (peak)
  - Pressure up to 10,000 PSI
  - Temperature up to 1,000 °C
- Measurement bandwidth up to 50 kS/s
- Transmission distance up to 25 km



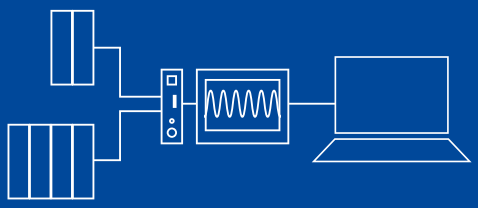
Find out more:

https://gantner-instruments.com/fiber-optic-measurement

Connectivity

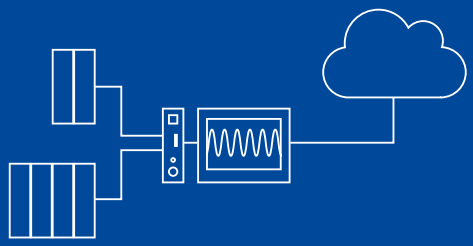
GI.bench

Superior and Scalable Platform for Modern and Robust Measurement Setups



GI.cloud

Adaptive and Scalable Platform for High Performance Edge Computing Services



Open and scalable platforms with scalable and distributed data processing and analytics. Configure, operate and visualize your data.

Connectivity

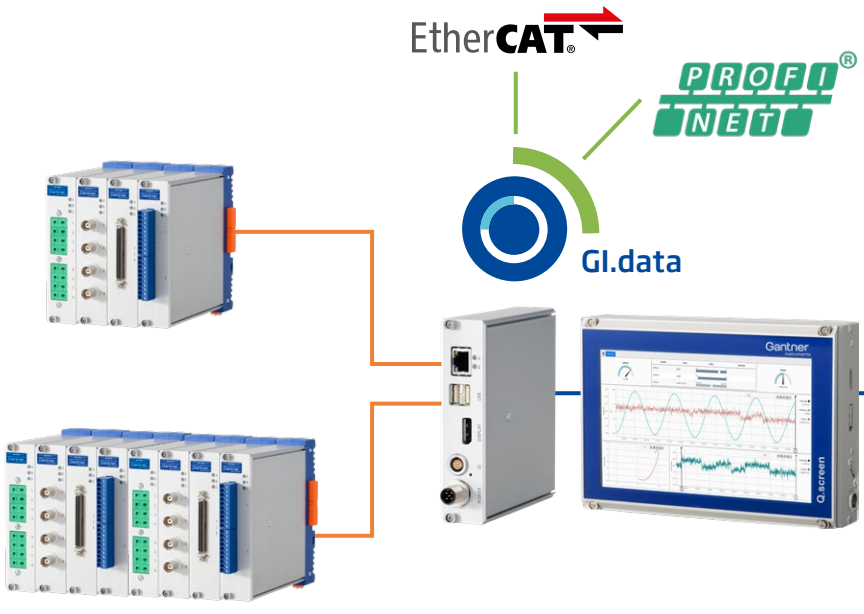
GI.connectivity

Access, store and handle your edge device data with high performance interfaces on GI proprietary platforms or any industrial third-party system

Cloud

Desktop

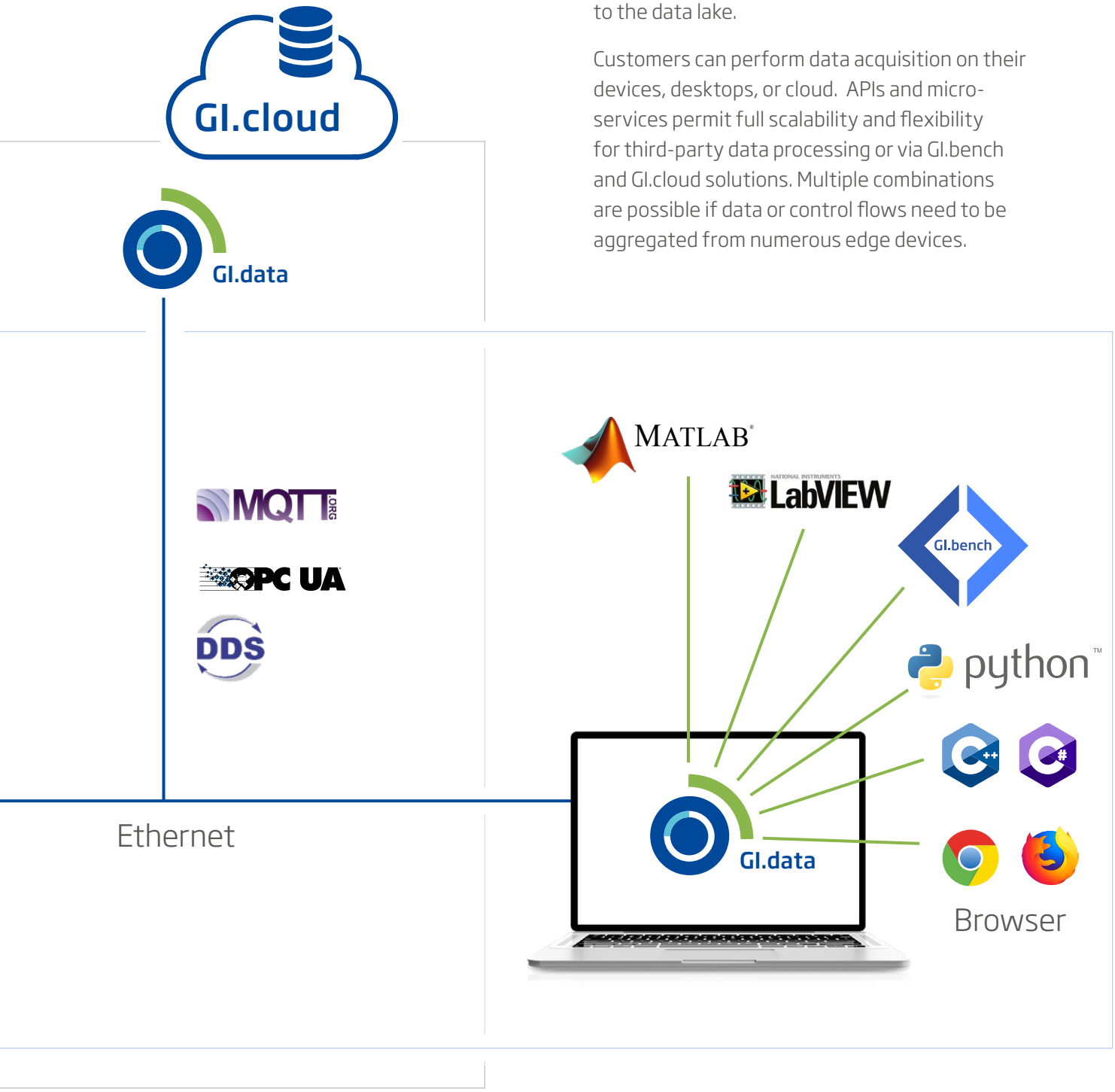
Smart Edge



Run Your Data Acquisition on Your Devices, Desktop or Cloud

GI.connectivity fully integrates data storage, security, configuration, authentication and update management from the sensor interface to the data lake.

Customers can perform data acquisition on their devices, desktops, or cloud. APIs and micro-services permit full scalability and flexibility for third-party data processing or via GI.bench and GI.cloud solutions. Multiple combinations are possible if data or control flows need to be aggregated from numerous edge devices.



GI.bench

Superior and Scalable Platform for Modern and Robust Measurement Setups

GI.bench is a multi-function software package which runs on a PC. It provides users with a combination of tools for connectivity, configuration, basic analytics, visualization and data storage.

Setup, Configuration, Operation, Visual and Analysis

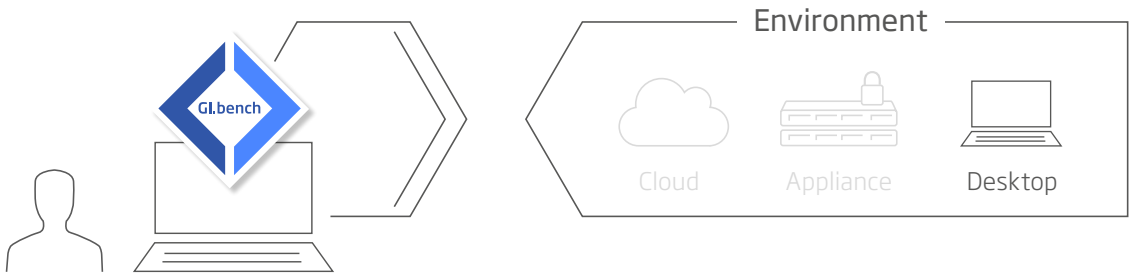
GI.bench permits the configuration, execution and analysis of your test and measurement tasks on the fly. It further enables access to live data and historical measurements anywhere. The required information is transmitted directly to your screen or to any mobile device.

GI.bench offers everything from evaluation and display of real time measured data, data storage based on simple and fast configuration of decentralized measuring systems, through universal data availability in your local network.

Find out more:

https://gantner-instruments.com/gi-bench

GI.bench



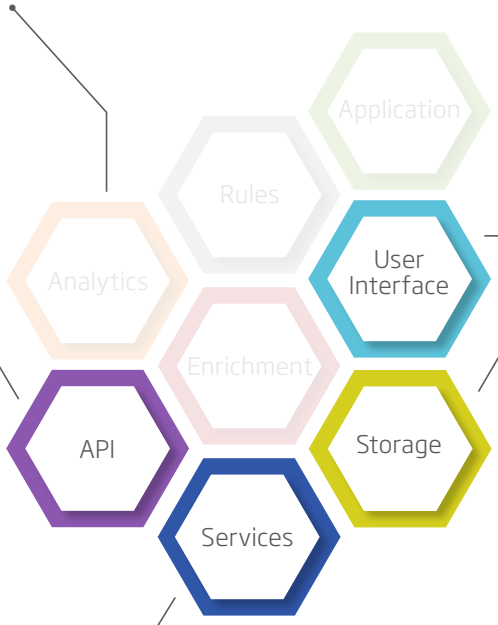
File-based single PC

Upgrade to GI.cloud

GI.bench setup can be upgraded and transferred within minutes to the GI.cloud platform

User Interface

- Flexible network-wide visualization
- Show your data in real-time tables
- Customized data dashboard for fast overview
- Data export: raw or aggregated data in various formats (e.g. csv, UDBF)
- Create your own customized user interface
- Rules/notifications: configuration and visualization in WebUI, accessible at API (e.g. system status, ...) or push notification



API: Application Programming Interface for Open Interfaces

- Binary API: for real-time buffer
- XML-RPC for configuration
- REST for data access, analytics and integration (test.con)

Storage

- Data storage and aggregation in real-time buffer and files
- Event-based data processing
- Third-party data streaming protocols (MQTT, UPC UA, ...)
- Arithmetic stack for data enrichment
- Calculation of key performance indicators
- Your customized analytics plug-in (e.g. test.con)

Services

GI.config:

- Configuration of parameters, arithmetics and rules
- Easy third-party access

GI.com:

- Communication between I/O devices, controller and GI.bench/GI.cloud
- Secure and reliable information and protocol transport
- No network limits

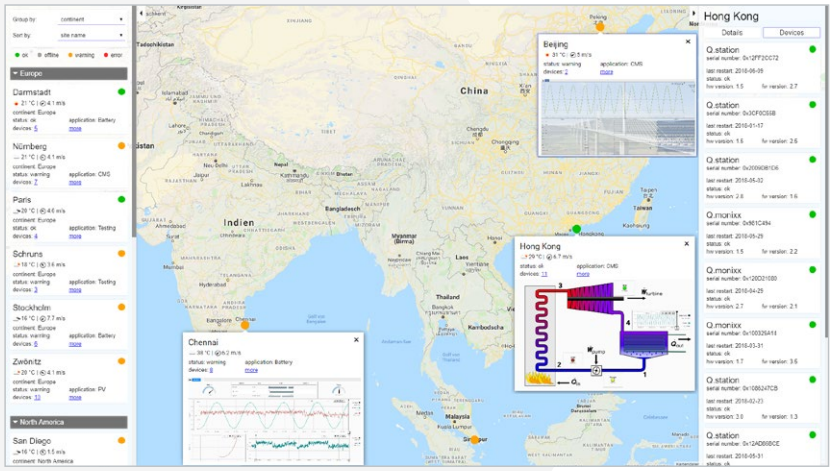
GI.data:

- High-speed data acquisition, storage of all measurement data in shared memory for multiple processes
- Data-logging function with file storage
- Specific data post-processing

GI.cloud

Adaptive and Scalable Platform for High Performance Edge Computing Services

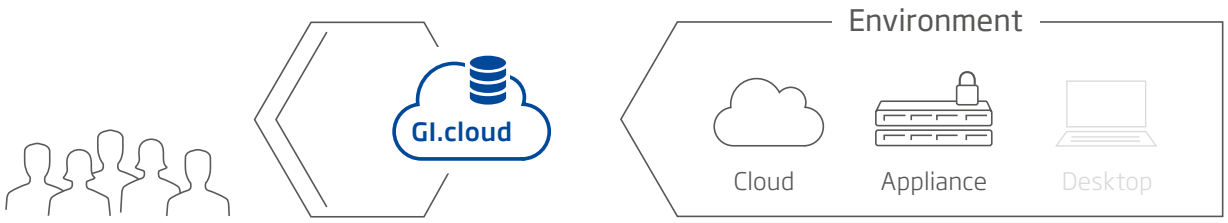
GI.cloud provides integrated high-resolution measurement, advanced big data analytics and secure data accessibility. It facilitates connectivity, as well as acquisition and processing of data from distributed measurement devices. The platform combines Gantner's proven edge-type monitoring and control units, an adaptive and scalable cloud backend, a comprehensive user interface and applications with state-of-the-art APIs.



GI.cloud cockpit

Cloud Benefits

- Seamless combination of Gantner's edge computing devices with cloud platform solutions (micro-services)
- Customizable user interfaces with easy-to-use feature add-ons
- Create your own dashboard for visualization
- API's designed for quick integration into customer platforms and secure data access
- Efficient time series data processing (in microseconds) due to scalable platform
- Clustered hot/cold data storage for minimum running cost
- Unlimited data storage on the device or based on a scalable data stream processing platform (granularity: microseconds to minutes)
- Continuous integration of GI.bench services and configuration to cloud level
- Available platforms: cloud, appliance or desktop



Distributed Streaming Platform and Database

- Scalable
- Clustered

Rules

- Execution based on different event sources
- Configuration via UI or script, link to AI

Analytics

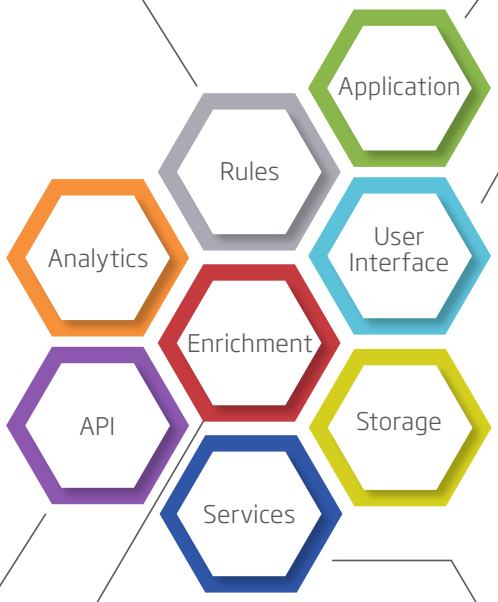
- Specific calculations
- KPIs
- Stream processing
- Metadata
- Third-party plug-ins

API

- Access to data streams (binary, REST, GQL API)
- Third-party integration

Enrichment

- Aggregation
- Event-based processing
- Third-party clients / plug-ins
- Specific and replayable enrichment



Applications

- Designed for testing, aerospace, asset monitoring, industrial tasks, condition monitoring, energy control

User Interface

- Charts, tables, cockpit, dashboard, data export, reporting
- Device and user management, 2-way control

Storage

- Real-time buffer, distributed streaming platform or database storage available
- Live and historical data access with hot/cold data handling
- Execution of backup services

Services

- Provides communication, configuration, data acquisition and authentication as well as hosting of all Gantner plug-ins

Find out more:

https://gantner-instruments.com/gi-cloud

Q.series Classic

Q.series Classic Edition

The Q.series Classic offers modular and flexible DAQ system configurations.

We are committed to deliver upwards compatibility across our entire range of products and systems to enable our customers to utilize their existing instrumentation and software for decades to come.

Features

- Multi-channel applications with highest density
- High availability, short lead times
- DIN rail mounting
- Connection on front of module
- Distributed setup using test.controller

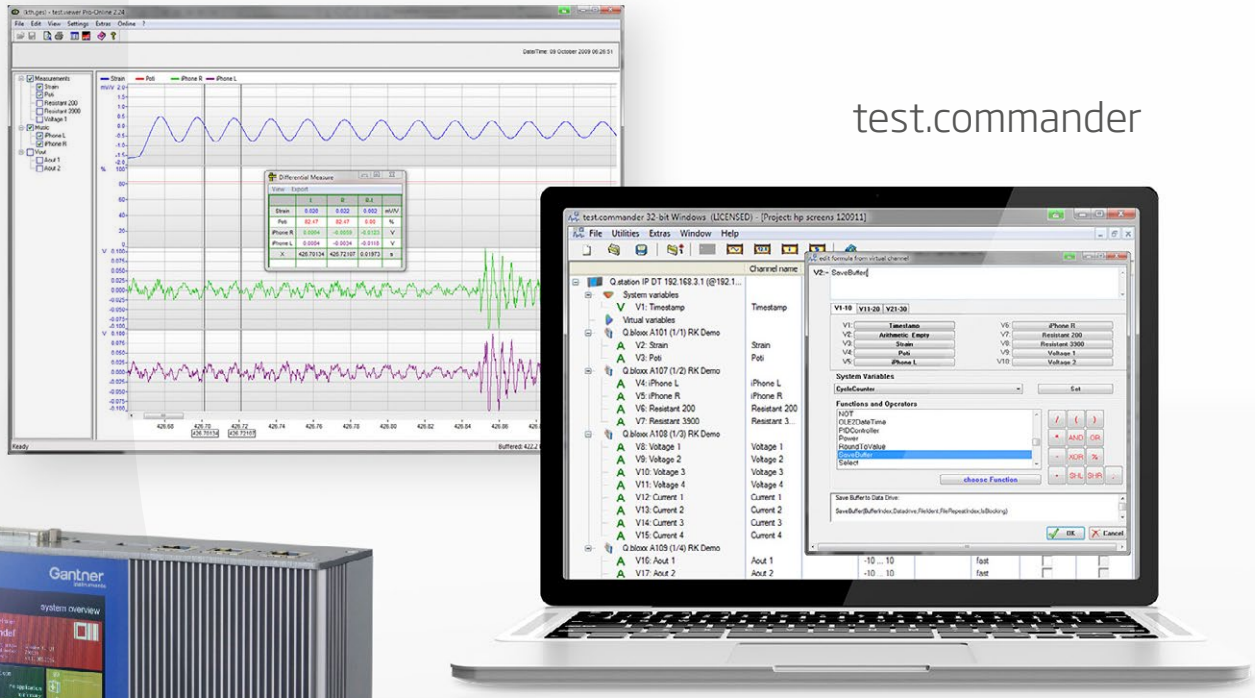
Q.staxx

Q.bloxx

Q.raxx slimline

test.viewer

test.commander



Q.station

Gantner instruments

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