

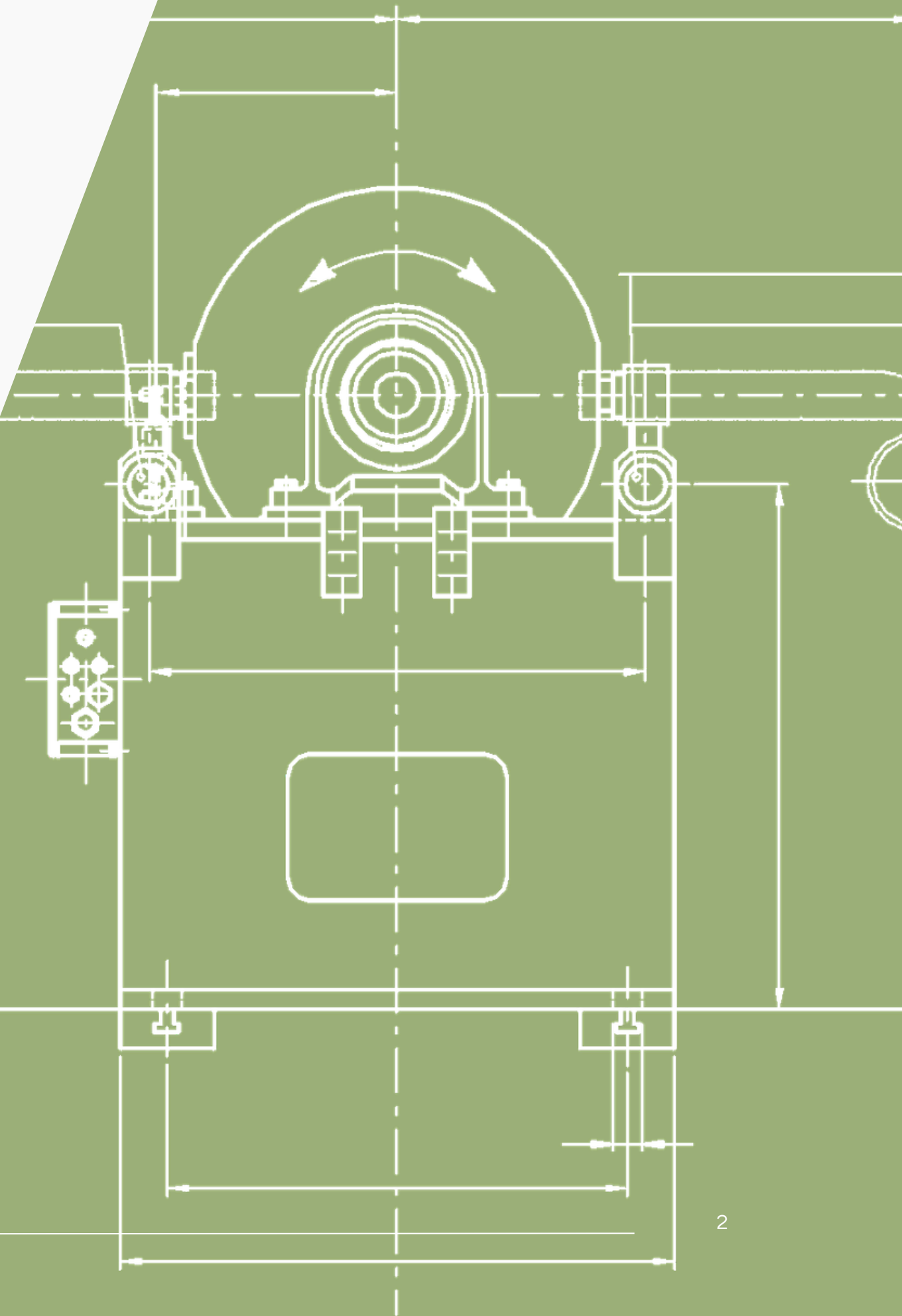
Automation and Control System

Borghi & Saveri

Founded in **1935** in the heart of Italy's Motor Valley, Borghi & Saveri began as a manufacturer of measuring instruments for industrial applications, gradually evolving into the design and production of dynamometers and engine testing systems.

With over **80 years of experience**, the company has supported the evolution of testing technologies, progressing from compact applications to complex systems **for motorsport, automotive, and advanced industrial uses**.

Today, Borghi & Saveri is a recognized reference in the **design of complete test cells**, combining mechanical, electronic, and automation expertise.



The Group

Over the years, Borghi & Saveri has strengthened its identity and market positioning through a strategy focused on integration and consolidation of its offering.

The collaboration with **Alma Automotive** represents a key pillar of this evolution: a partnership that enables the Group to deliver **turnkey solutions**, covering the entire process: from mechanics to electronics, from real-time control to software supervision.

Mission and Strategy

The Group’s mission is to position itself as a **strategic technology partner**, able to:

- understand customer needs,
- design tailor-made systems,
- deliver reliable, scalable, and future-oriented solutions.

Being part of the **Motor Valley** fosters a unique ecosystem where tradition, innovation, and collaboration with leading automotive players coexist and continuously reinforce one another.



Test Cell Automation System

Designed to ensure **long-term reliability** and **ease of use**, our Automation System enables **fast remote updates** and intuitive operation.

It is a **powerful, efficient, and future-proof control solution**, engineered to adapt to **any test bench**, from the simplest configurations to the most complex test cells.

A single platform for control, data acquisition, and supervision of the entire test cell.

Why Choose Our Automation System

- Open and Flexible Platform
- Fully Customizable User Interface
- Perpetual Software License
- No Annual Subscription Costs
- Designed to Grow with Your Test Bench





Dynamic control and integrated data acquisition

The Automation System integrates **dynamic test bench control** with **signal acquisition**, enabling complete and centralized management of:

- real-time monitoring,
- alarms,
- automated procedures,
- test cell safety.

A **modular real-time controller** ensures **deterministic and precise** execution of control logic, making the system **scalable** and adaptable to different test bench configurations.

The test cell is therefore managed as a **single coordinated system**, reliable and ready to evolve over time.



Hardware Architecture of the Automation System

The Automation System consists of two main components: **dynamic test bench control** and **signal acquisition**, used both for test bench management (alarms, procedures, safety) and for test recording and monitoring.

The system is managed by a **National Instruments Real-Time controller**, ensuring deterministic execution of all calculations.

A **modular architecture** allows system expandability and adaptation to different test bench configurations.

Channel Type	Range	Max Frequency	Resolution	Application
Analog Input	±10 V (4-20 mA)	1 kHz	16 bit	Pressure, position, flow sensors, etc.
Digital Input	5 V TTL	1 MHz	-	Encoders, torque meter, etc.
PT100-1000	-	25 Hz	24 bit	Temperature sensors
TC-K-J-S-R-B-E-T-N	-	25 Hz	16 bit	Temperature sensors
Analog Output	±10 V	1 kHz	16 bit	System output setpoints
Digital Output	5 V TTL	1 MHz	-	Trigger wheels, PWM signals, etc.
Relay	Contatto pulito	1 Hz	-	Auxiliary test bench actuators
CAN/CAN FD / LIN	-	Up to 8 Mbit/s	-	Test bench data & interface to external devices
RS232 / RS485	-	-	-	Test bench data & interface to external devices
ETH	-	1000 Mbit/s	-	Connection to the host PC and third-party equipment

User Interface

The Automation System is designed to ensure **ease of use** and fast learning, even in complex testing environments. The interface is **fully customizable** and allows operators to clearly and intuitively view and control all relevant test cell variables.

- Measurement scales and calculated channels,
- Alarms, procedures, and counters,
- A customizable interface with:
 - LEDs,
 - charts,
 - knobs,
 - dedicated indicators.



Automation

Automation cycles are fully configurable by the operator, enabling the creation of customized sequences and automatic procedures tailored to specific test requirements.

The system supports advanced interaction with **ECUs**, allowing the execution of sophisticated tests and automatic calibration procedures.

- Operator-configurable automation cycles,
- Customized automatic procedures,
- ECU interaction via:
 - iLinkRT,
 - XCP,
 - CAN,
- Support for automatic calibration strategies.

Control Console



The **Control Console** enables operators to manage the test cell in an intuitive, safe, and immediate way.

Fully customizable in terms of controls, indicators, and layout, it integrates all the tools required to manage the main operational functions:

- **Emergency push button** for controlled stop of the test cell
- **Rotary Touch encoder** for RPM control
- **Rotary Touch encoder** for load control or for a physical/virtual actuator
- **Programmable keypad** for custom functions
- **Status LEDs**

The two touch rotary encoders allow **precise and dynamic setpoint adjustment**, ensuring smooth and responsive control throughout all phases of the test.

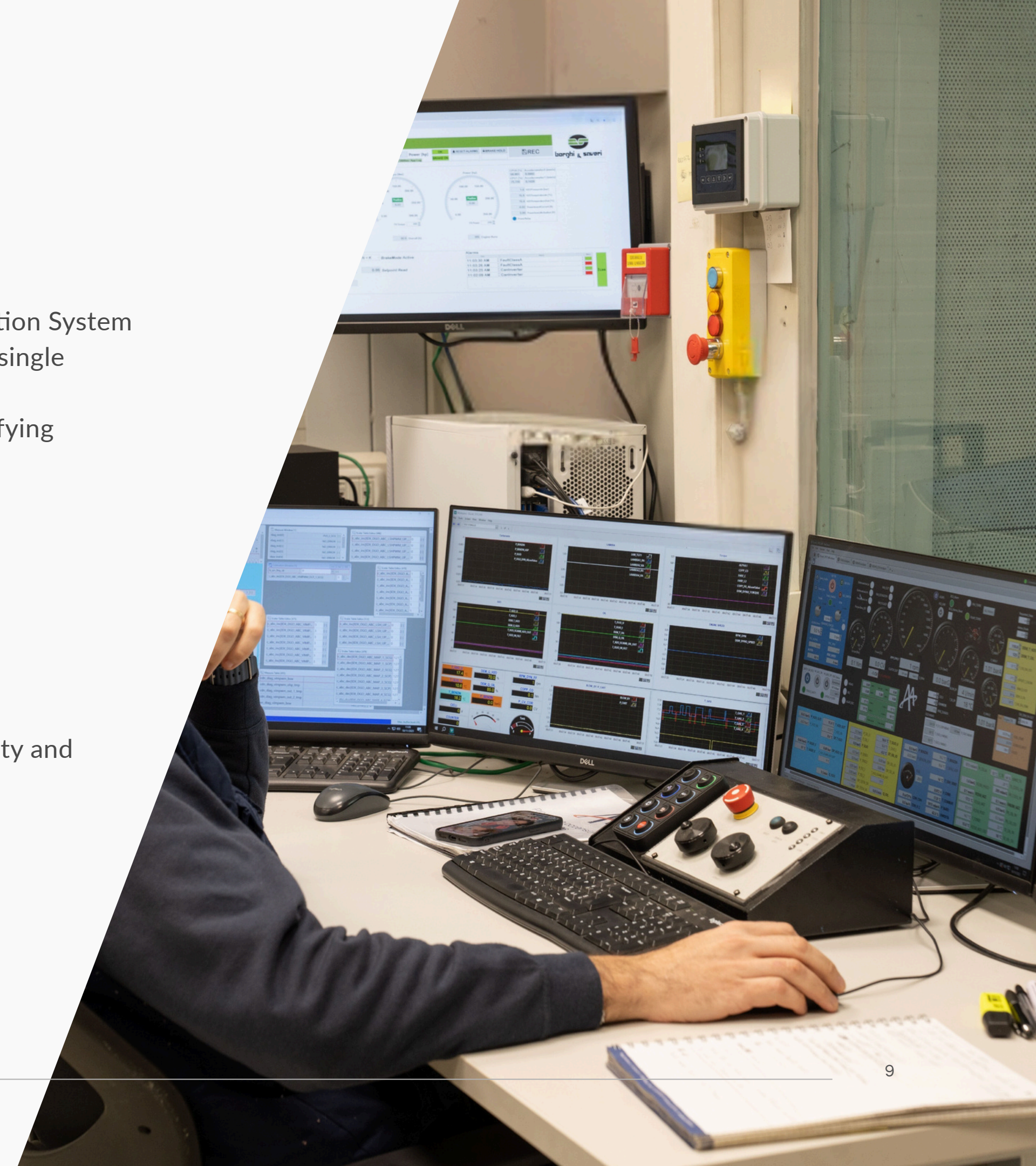
Key Benefits

Designed to support the evolving needs of modern test facilities, the Automation System combines real-time control, scalable architecture, and intuitive operation in a single platform.

Its **open and customizable** approach ensures long-term flexibility while simplifying everyday testing activities.

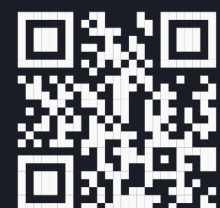
- Long-term reliability
- Ease of use and reduced learning time
- Fast updates, including remote updates
- High flexibility and extensive customization options
- Support for manual, semi-automatic, and automatic testing

A system designed to **optimize testing activities**, reduce operational complexity and support both current and future test cell requirements.





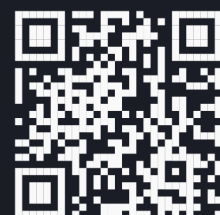
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