



Corporate Presentation

Benches and equipment for
functional **testing** and
electrical **safety**

From 1986 till now

Microline was born from the idea of a **group of technicians specialised** in the world of automated testing who founded DITECH in 1986.

In 1993, during a corporate update that is still operational, it opened new horizons while maintaining the group's **engineering skills** unchanged and started again with the name **Microline**.

In 1994 it acquired compliance, still maintained and updated, to the requirements of UNI EN ISO 9001 in the application field: 'Design, manufacture, sale and service of electrical, functional and quality control and testing systems on products and components in the appliance, automotive and related sectors (IAF 19)'.

Microline today

Microline represents a pioneering reality able not only to offer equipment for electrical testing in accordance with standards, but above all to design and realise solutions for functional testing and measuring efficiency according to specific customer requirements.



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Fields of application

Microline's decades of experience in the field of testing have made the company flexible and versatile, capable of ranging not only in standard fields but even in different areas of application with customised solutions to the highest technological standards.



CONDITIONING

Customised, modular and flexible solutions for the production line and for the research and development lab in the air-conditioning sector.

Microline manufactures equipment for control testing, data acquisition, electrical data acquisition, the processing of electrical and physical parameters, functional and life tests and for tests under special conditions of use.

Where we operate: Refrigerators, heat pumps, compressors, heat exchangers, etc.



HOUSEHOLD APPLIANCE

Specialisation in the field of electrical appliances makes it possible to guarantee advanced support by offering tailor-made solutions, both for routine tests - complying international standards and for type tests according to specific parameters required by the customer. All tests can be integrated in the customer's production lines and customer management systems.

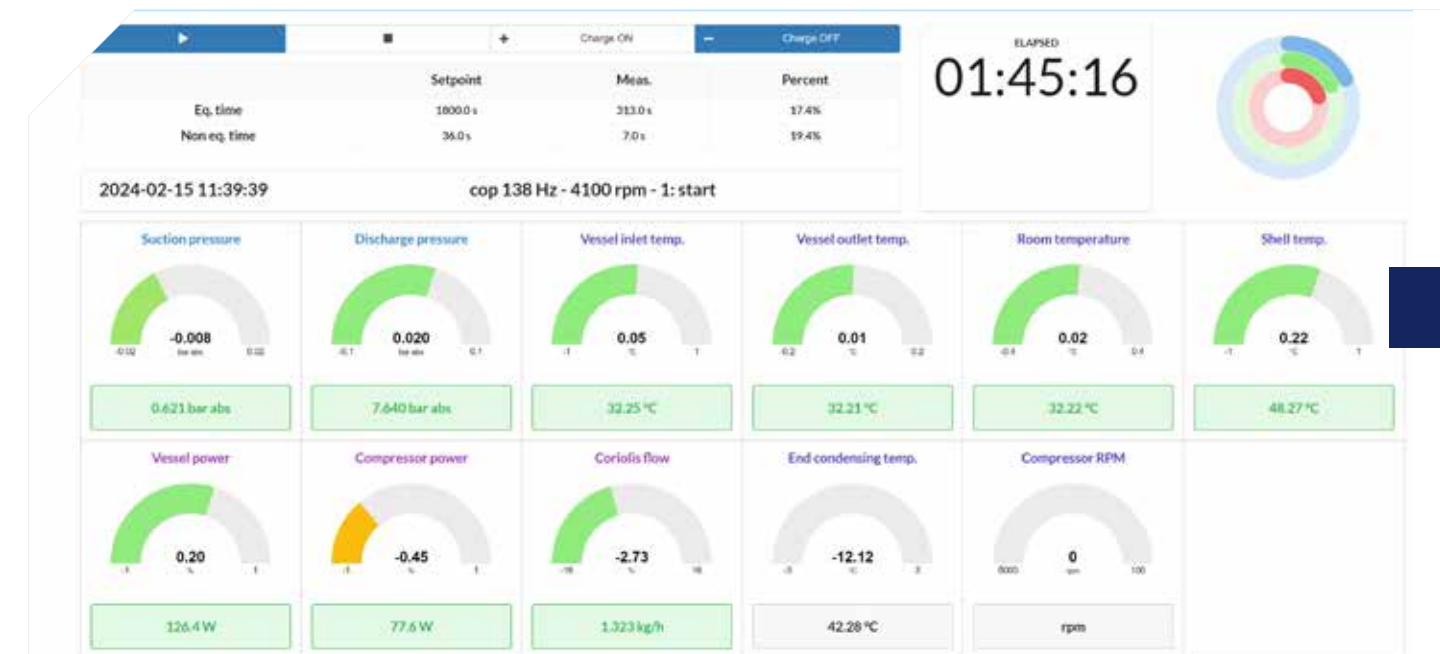
Where we operate: Pellet stoves, coffee machines hobs, ovens, etc.



AUTOMOTIVE

Many years of experience in personalised, modular and flexible solutions for the functional test, visual inspection, data acquisition and life testing.

Where we operate: Fans, switchgear, dashboard parts, tank parts, electrical components, mechanical, hydraulic etc



Our Products

Microline designs and manufactures test **equipment for the control of electrical safety** in accordance to recognised international standards, combined with functional testing. Functional testing is becoming increasingly important within the production process to ensure greater efficiency and efficacy in business strategies, production organisation and R&D.

Electrical safety equipment

Standard product with integrated functions

Equipment for product monitoring - from the beginning to the end of the production chain - according to the requirements.

- MP 500
- MP 510
- ESC 800
- ESC 830

Dedicated testing systems

Customisable system with functions integrable on request

Sample tests are carried out to measure product efficiency in cooperation with the customer's R&D department.

- CALORIMETER TESTS
- TESTING SYSTEMS

Equipment for functional tests

Stand-alone product that can be easily integrated on customer system

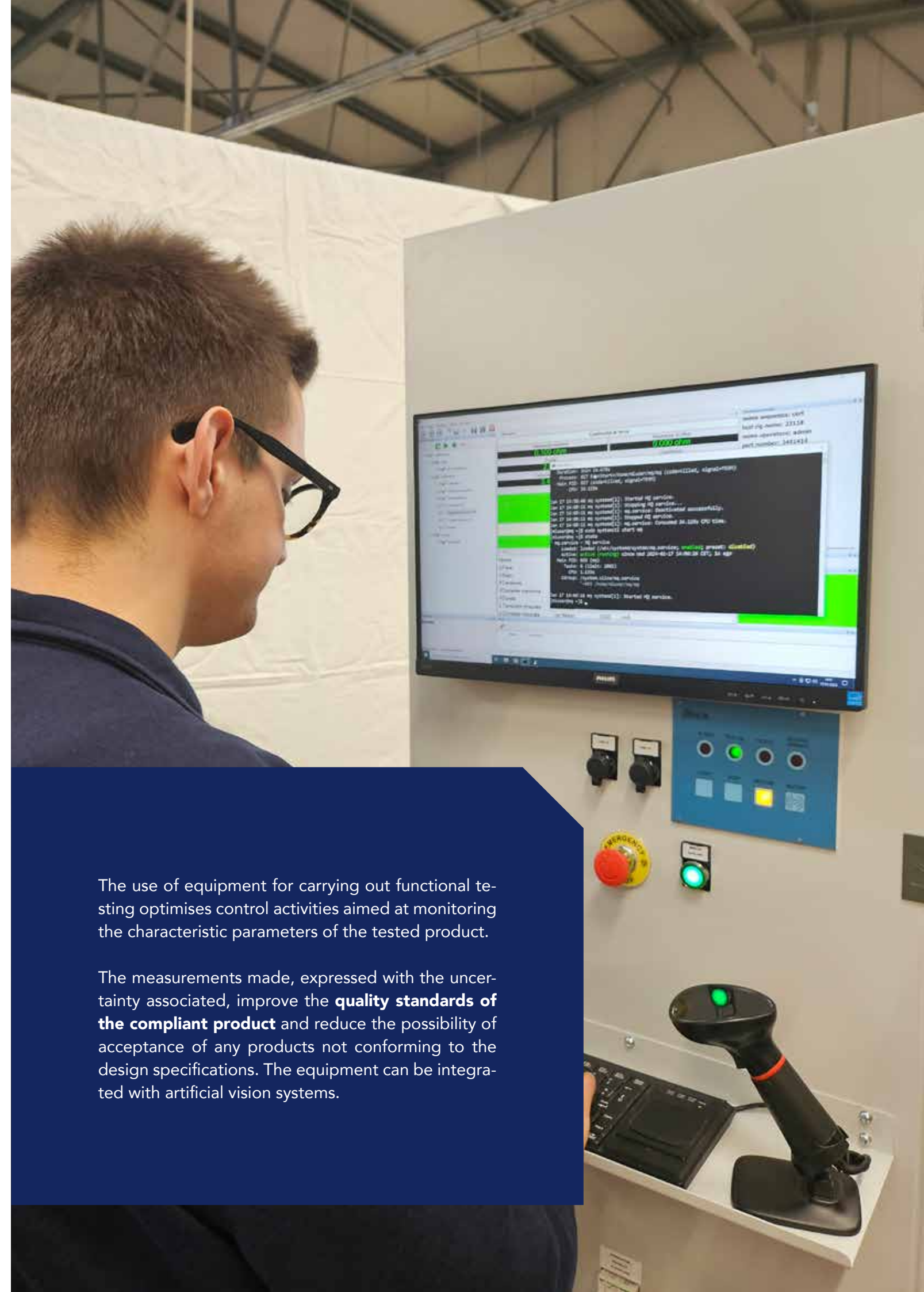
Microline designs and manufactures equipment for electrical and functional testing by offering solutions that certify product's performance.

- MP LEAK
- MP FLOW
- LF 300
- ACQUISITION DATA

Test benches

Fully customisable products

Microline designs and manufactures handling automated systems, assembly and testing for specific products. It is possible to integrate controlled axes, robots, vision and marking systems



The use of equipment for carrying out functional testing optimises control activities aimed at monitoring the characteristic parameters of the tested product.

The measurements made, expressed with the uncertainty associated, improve the **quality standards of the compliant product** and reduce the possibility of acceptance of any products not conforming to the design specifications. The equipment can be integrated with artificial vision systems.

Electrical safety equipment



MP 500

Non-powered device:

- earth connector efficiency
- insulation resistance
- a.c. or d.c. dielectric strength

Powered device:

- residual voltage

Functional tests:

- single-phase electrical power supply
- short-circuit power measurement
**optional
- resistance measurement
**optional
- sensors and transducers reading
**optional

AREAS OF USE

- Electrical appliances for domestic and commercial



MP 510

Non-powered device:

- earth connector efficiency
- insulation resistance
- a.c. or d.c. dielectric strength

Powered device:

- residual voltage
- earth leakage current

Functional tests:

- single-phase electrical power supply
- short-circuit power measurement
**optional
- resistance measurement **optional
- sensors and transducers reading
**optional

AREAS OF USE

- Electrical appliances for domestic and commercial



ESC 800

Non-powered device:

- earth connector efficiency
- insulation resistance
- a.c. or d.c. dielectric strength

Powered device:

- residual voltage
- earth leakage current
- insulation resistance
- a.c. or d.c. dielectric strength

Functional tests:

- single-phase electrical power supply
- short circuit power measurement
- resistance measurement
- sensors and transducers reading

AREAS OF USE

- Household electrical appliances, commercial and industrial



ESC 830

Non-powered device:

- earth connector efficiency
- insulation resistance
- a.c. or d.c. dielectric strength

Powered device:

- residual voltage
- earth leakage current
- insulation resistance
- a.c. or d.c. dielectric strength

Functional tests:

- single-phase/three-phase electrical power supply
- short circuit power measurement
- resistance measurement
- sensors and transducers reading

AREAS OF USE

- Household electrical appliances, commercial and industrial

Equipment for functional test



MP LEAK

Automatic equipment that performs leakage test of gas and hydraulic circuits. Using air.

Portable product with high sensitivity thanks to differential methodology. Easily integrated in third-party systems due to its expandability and programmability.

AREAS OF USE

- Household electrical appliances, commercial and industrial



MP FLOW

Automatic product that performs flow test using air for pneumatic circuit.

The equipment has different configurations that allow its use in various areas either "stand-alone" or integrated into third-party system. Versatility product that allows the measurement of different scales from cc/h to mc/h.

AREAS OF USE

- Household electrical appliances, commercial and industrial



LF 300

In addition to the leakage tests of MP LEAK and flow tests of MP FLOW, LF 300 allows the use of one or more combustible gases, the adjustment of the supply pressure of the product under test and the verification of the safety thermocouple switch cut-in.

ESC and **LF** products could be integrated into a single test bench.

AREAS OF USE

- Household electrical appliances, commercial and industrial



DATA ACQUISITION

Acquisition/reading of:

- temperature values with thermocouples and/or PT100
- single-phase/three-phase electrical power supply
- sensors and transducers reading with current or voltage output

Functional tests on domestic and industrial devices to determine the quality of the product by analysing the refrigeration cycle.

Control values:

- temperature
- electrical consumption

Available version:

- multi-channel trolley
- cabinet mounted on transport with wireless connection (+100 units)
- static test bay (+100 units)

AREAS OF USE

- Household electrical appliances, commercial and industrial

Customised test system



HEAT PUMP TESTING

Electrical safety tests, power measurement, measurement of thermal power output and verification of working conditions of the refrigerator circuit.

Possibility of communicating directly with the product under test and automated programming of the parameters of the control board.

AREAS OF USE

- air conditioning



COFFEE MACHINE TESTING

Fully automated functional tests on coffee machines.

Possibility to communicate directly with the final product to set configuration parameters and perform function tests of the product.

AREAS OF USE

- household appliance



CALORIMETER

Laboratory measurements on compressors refrigerators. Characterisation of the compressor under standard (CECOMAF, ASHRAE) and customised conditions. Verification of characteristic parameters of compressors on extreme conditions.

Performance is measured by means of a calorimetric vessel to achieve high-precision measurements.

Available tests:

- C.O.P.
- Startability
- Break down

AREAS OF USE

- air conditioning, refrigeration



RESISTANCE TESTING

Complete electrical testing of heating elements.

It can be integrated with vision systems (checking the presence of additional components such as seals or mechanical parts) and laser marking systems.

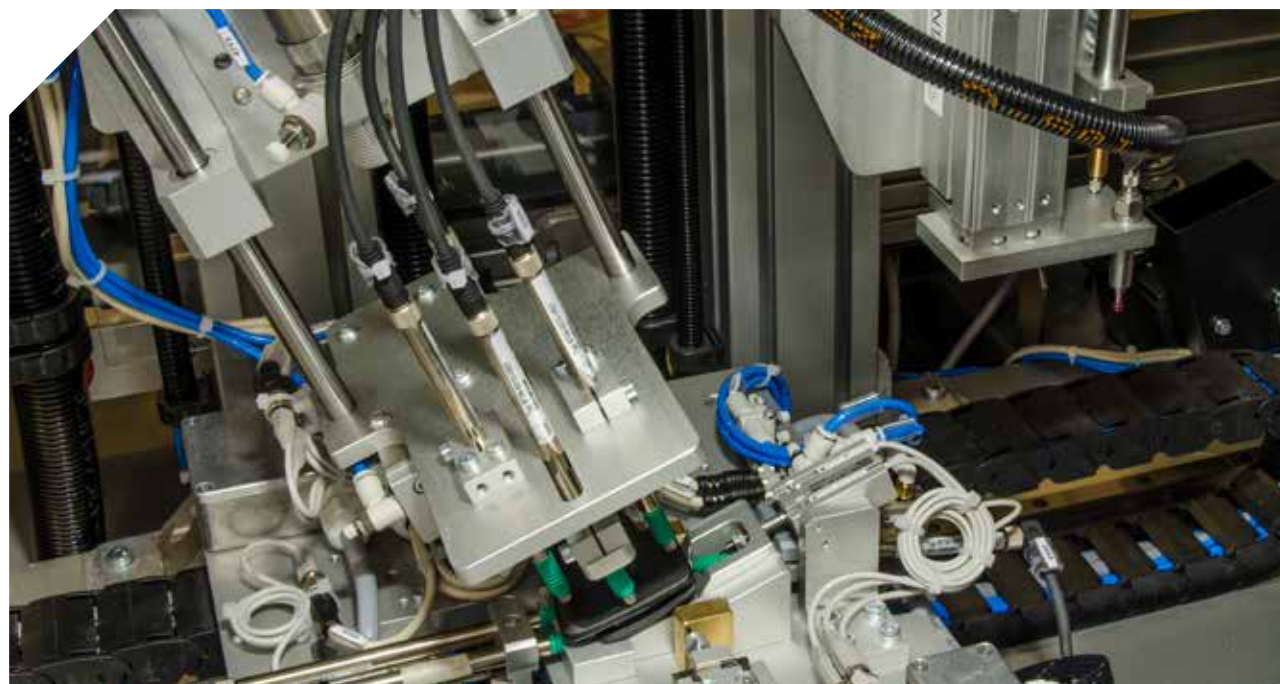
AREAS OF USE

- air conditioning
- household appliance
- components

Test benches

Assembly and testing bench for automotive components

Automotive component testing with electrical functionality, dimensional verification, acquisition of force/displacement curves, aesthetic and functional checks with vision system.



Detail of a component test bench

Test station for aesthetic and dimensional checks on rotary pivot to be combined with the unloading of plastic parts production units, with loading of products in bulk, in continuous through a loader belt.

Tests foreseen:

- Quality in moulded rubber
- Impression number reading on surface external two-character $h \leq 2\text{mm}$
- Height of print burrs
- Injection point quality
- Dimensional measurements

Productivity: 4,000pcs/h * 24h

Laboratory testing

Characterisation and control of products in stable environments. Life tests on components for household appliances / heating / air conditioning.



Functional test bench for main-boards domestic refrigerators

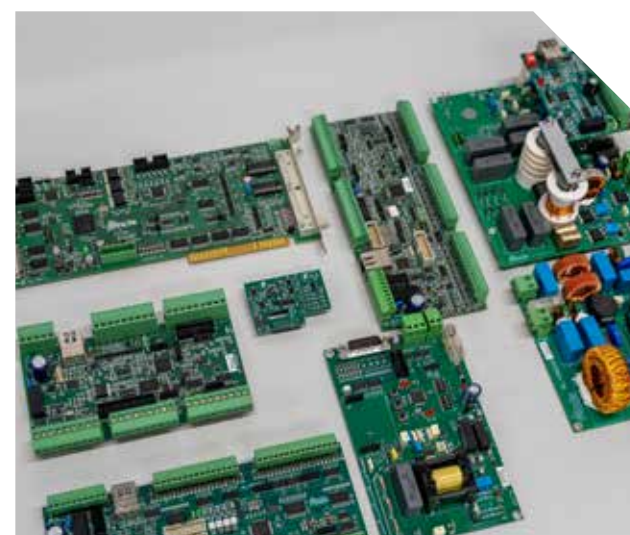
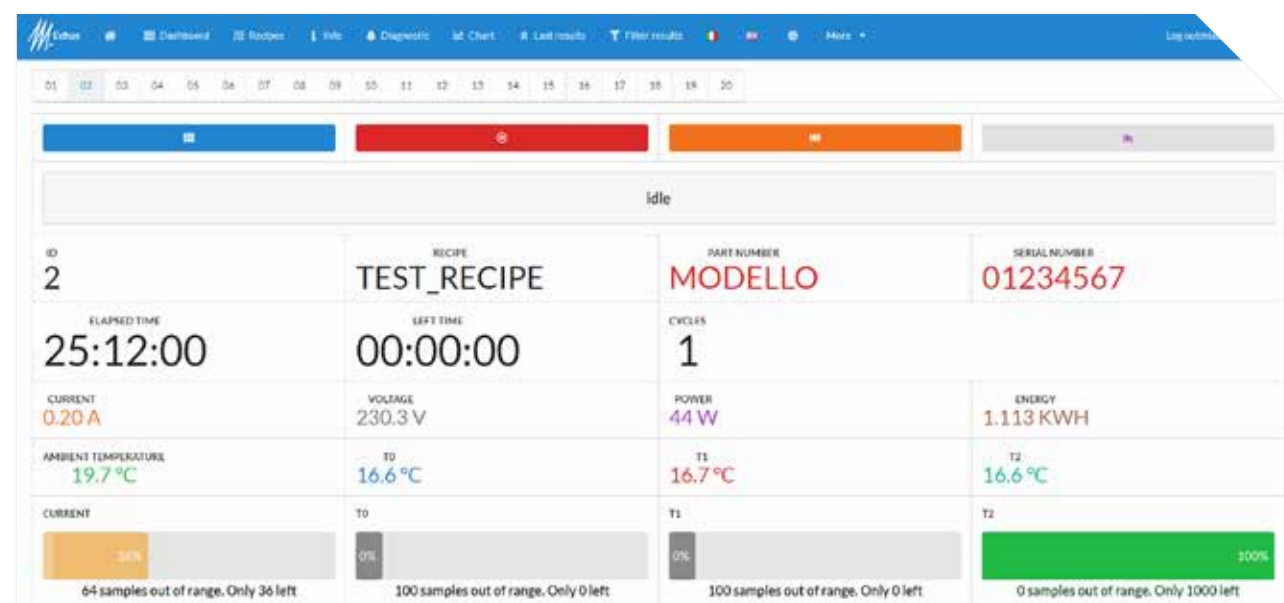
Temperature probe reading, no-frost outputs habilitation, fan, internal light, communication with compressor driver, communication with dashboard.

Software and Hardware

Conceived and designed by us, with you, for you

One of Microline's flagships is the software: conceived and designed in-house

Our software boasts unique features: highly customisable, flexible to the continuous needs of the customer may present and can be integrated with corporate databases.



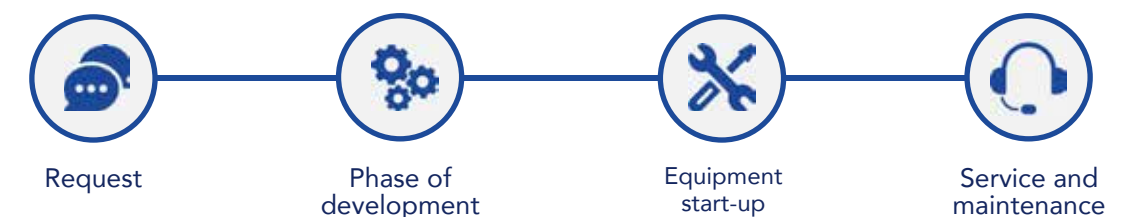
Electronic Test Boards

Microline designs and manufactures in-house customised electronic boards, guaranteeing reliability and high performance during the testing phase, as well as the spare parts.

Microline Team

Service, support and training

Microline's staff consists of engineers, hardware designers, specialised software, R&D employees, mechanical specialists, electrical specialists, pneumatics experts, and much more. **After-sales service** plays a pivotal role in our organisation: the ability to **understand the needs** and to **intervene in real time**, make Microline a key partner.



Thanks to our team of technicians and engineers, we are able to support our customers in a timely and efficient manner.

*Customised solutions
for your testing*

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