

# User Guide & Technical Reference

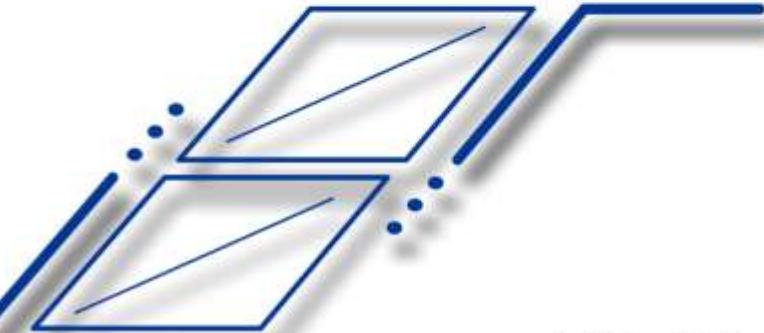
## G4-GV



Série 8



Brasil



v1.2.3.121

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# 1 - Introduction

Congratulations on choosing TEX as your quality testing technology partner for leak measurement.

The **G4-S8** equipment is the result of more than 20 years of TEX experience, being state of the art in leak testing. It was developed entirely in Brazil and is manufactured with the most advanced technology, with internationally guaranteed quality. It has a friendly and intuitive graphical interface and several options for communicating with the outside world, as well as many other innovative features!

This manual contains all the information necessary to install, operate, program and maintain your leak testing equipment working properly. Please read the entire contents of this carefully manual before putting your equipment into operation. Using it correctly and following the preventive maintenance suggestions contained here, your device will last longer.



## IMPORTANT

- *Keep this manual properly filed after reading it. It may be useful at an opportune moment.*

### 1.1 Warranty Term

The **G4-S8** leak test equipment has a **3 (three) year** warranty against any electronic or electro-pneumatic defects occurring during this period, except those caused by misuse of the device, accidents or failure to comply with any item in this manual.

Unauthorized maintenance of any parts of the equipment, except those described in this manual, also invalidates this warranty term.



## IMPORTANT

*Leak testing equipment is a precision measuring device and requires some special care to operate in industrial environments:*

- *Do not subject it to contact with water, oil, conductive dust (graphite, solder or metals in general), abrasives or solvents.*
- *Operate it under correct electrical supply conditions, as specified in the manual and on the rear of the equipment – adequate electrical grounding is essential for its proper functioning.*
- *Utilize na câmara (acessório) somente vedações especificadas pela TEX – elas garantem uma excelente vedação e estabilidade mecânica;*
- *Operate it under stable temperature conditions during test execution, avoiding contact of any heat source with the equipment and components of the pneumatic test circuit (for example: fans directed towards the part, operator's hand in direct contact with it and parts that have not yet been thermally stabilized due to operations in the process that cause changes in temperature in relation to the environment).*

Following all these precautions guarantees testing within the standards acceptable to your client and quality control.

## 1.2 Security Recommendations

Below are instructions for safe use of the product, avoiding the risk of physical injury to the user or other people and without damaging property. Handle or operate the equipment according to the instructions given in this operating manual.

Signals	Explanation
 <b>WARNING</b>	Failure to perform or avoid a specific action may result in death or serious physical injury to the user.
 <b>CAUTION</b>	Failure to perform or avoid a specific action may result in minor physical injury to the user or property damage.

This symbol () denotes a warning (including caution) intended to alert the user. A specific description of the warning follows.

(Example:  Risk of electric shock)

 <b>WARNING</b>
A. Ground the equipment before connecting it to a power source. If it is not grounded, it may present a risk of electric shock. Never

connect the ground wire to a gas line. This may cause fire or risk of electric shock.

- B. If the metal pins of the power plug or the area near them are dusty, clean them thoroughly with a dry cloth. Using the equipment in this condition may cause fire or risk of electric shock.
- C. Never operate the equipment with a power supply other than the original. Operating the equipment with sources outside of specification may cause fire or risk of electric shock.
- D. Check that the mains voltage is compatible with that of the equipment's power supply. Connecting it to an electrical network with a voltage outside the specified range may cause a fire or risk of electric shock.
- E. If the equipment falls or is damaged, turn it off and disconnect the power plug from the outlet. Continued use, without due care, may cause fire or risk of electric shock.
- F. If foreign materials, such as water or oil, enter the instrument or fall onto the power supply, immediately remove the plug from the socket. Continued use, without due care, may cause fire or risk of electric shock. Be careful when installing the equipment in an environment where water or oil is used close to it.
- G. Stop using the equipment if it:
  - *Exhale smoke.*
  - *Emit abnormal noises.*
  - *Cause problems that are not covered in the operating manual.*
  - *It cannot be operated as indicated in the operating manual.*



### CAUTION

- A. Do not use the equipment in humid places, exposed to direct sunlight or with temperatures outside the limits of 5°C to 45°C. Using the equipment in such environments may cause malfunctions or failures.
- B. To prevent damage to the power cord, which could cause fire or risk of electric shock, observe the following precautions:
  - Do not damage, modify, or apply undue force to the power cord.
  - Before carrying out authorized maintenance on the equipment, disconnect the power plug from the socket.
  - Do not handle the power plug with wet hands.
  - When disconnecting the power plug, do not pull on the cord.
  - Make sure the cabling is correct. Incorrect cabling may cause damage to equipment and peripheral hardware.
- C. Mount the equipment and the test chamber (accessory) in a stable position and on a structure capable of fully supporting their weight. Do not install them in locations with intense vibration, on inclined surfaces, or on mechanically unstable surfaces. If installed in such locations, they may fall, resulting in physical injury and material damage.
- D. Do not step on the equipment or place liquid containers on it. These liquids may spill, causing physical damage, electric shock risk, oxidation, or other damages.
- E. Do not disassemble the equipment. If disassembled, it may malfunction, resulting in physical injury or electric shock risk.
- F. When transporting the equipment, hold it by the base or the

carrying handle to avoid it falling. If it falls, it may be damaged or cause physical injury.

- G. When transporting the chamber (accessory), hold it firmly by the sides with the lid closed. If it falls, it may cause physical injury or be damaged.
- H. Clean the unit gently with a soft, dry cloth for maintenance. If the unit is covered with heavy dirt, dilute neutral detergent in water, soak a cloth in the detergent, wring it out, and clean the dirt. Do not use organic solvents.

### 1.3 Observations

- The information contained in this document is subject to change without prior notice for operational or functional updates and is valid only for the firmware version of the equipment indicated on the cover.
- *This document may not be reproduced, in whole or in part, without prior approval from TEX.*
- *TEX Equipamentos will not be responsible for items tested using this product, nor for the consequences of the tests, as the configuration of the equipment is entirely the responsibility of the user.*

We recommend that the user contact **TEX Equipamentos** (or one of its representatives) directly if there are any questions about the use of this product.

## 2 - General Information

With the quest for quality and, consequently, competitiveness, companies like yours are acquiring devices that certify the quality of their products, from specific parts to packaging.

Some of these products must be sealed in certain areas, meaning they must not leak the contents they are meant to hold, such as water, air, oil, etc. Other products must be well-protected by their packaging so that they do not leak, spoil, oxidize, emit odors, or contaminate the environment, even when subjected to extreme external mechanical stress, such as compression due to storage conditions or decompression due to high altitudes, as happens when these packages are transported by cargo planes. But how do you test for this resistance and "hermeticity"? Or even, which part of your product or packaging shows greater weakness?

TEX offers various solutions for leak (hermeticity) testing, from those that measure the amount of leakage and the average diameter of the hole where it occurs to those that show, through immersion tank testing, the location where the leakage appears and how much pressure the part can withstand. TEX equipment manages the entire test based on pressure and time parameters set by the user or standards.

Why use equipment that manages a hermeticity test?

- **To minimize or completely eliminate operator interference in the decision:** A simple distraction at work could compromise the product's quality by approving a defective part.
- **To verify if a leak is acceptable (only for equipment that measures leak values):** Suppose a small leak is detected during a leak test on a part or package that will later be used with oil. We know that air is much less dense than oil. So why reject parts with small leaks if these will

not cause problems with oil? Why lose productivity and spend on process development if, in reality, the problem **doesn't exist?**

- **To ensure the test pressure is accurate:** Who guarantees that the internal pressure of the device under test is exactly the same as that specified by engineering and quality control standards?

- **To gain agility in testing:** As the equipment is fully adapted and customized to your test type, the process becomes faster and easier.

- **To track and record tests performed:** The equipment records various test information, such as the operator's name, test pressure, leak amount, selected part, test type, and more; this helps, for example, in identifying process flaws.

So, why use outdated and inefficient methods when you can rely on the precision of electronics for a much more reliable, practical, and faster test?

With this in mind, we present **the S8-GV leak testing equipment**.

### 2.1 What is Hermeticity?

Hermeticity is a technical term derived from the word *hermetic*, meaning sealed or airtight. The hermeticity test verifies the airtightness or sealing of the part under test and can be determined in various ways:

- **Flow measurement:** Using flow sensors (flow meters), air is injected into a part or extracted from it over a period of time. If, after this time, the air does not stop entering or exiting (i.e., the flow meter shows a value other than zero), it means the internal volume of the part is communicating with the atmosphere through a hole, crack, etc. Therefore, the part is leaking by the amount indicated by the sensor.

- **Pressure measurement:** During a test, the internal part of the piece or a chamber containing a hollow volume is pressurized or

depressurized, causing a pressure difference between the inside and outside of the piece. Afterward, the test system is isolated; thus, if a pressure variation is measured over time, it means the part has a leak.

- **Visual inspection:** Using a water tank, the piece (or package) is submerged, and the internal part is pressurized or the internal tank pressure is reduced. In both situations, if there is a leak, air will always flow from inside the piece to the tank, meaning from the area of higher pressure to lower pressure. This flow into the water causes bubbles to form, indicating where the part is leaking.

There are many ways to measure leaks, but the two methods mentioned above are the most common and widely used. The first method is slightly more expensive due to the sensors used. Both techniques are based on thermodynamic principles, as the tests use air as the test fluid. Thermodynamic equipment for hermeticity testing offers a good cost-benefit ratio.

The *visual inspection method* has the drawback of needing to wet the part and not providing a leak measurement. However, as mentioned earlier, it is useful for verifying where and at what pressure a leak occurs – for example, this test can be used to check whether a sample food package, whose quantity is defined by the user, has a specific leak point. If there is one, the focus can shift to addressing the cause of the weakness at that point.

## 2.2 What Does Your Equipment Measure?

The **S8-GV** hermeticity testing equipment was developed to be used with either a variable geometry chamber or a fixed geometry chamber, both of which are sold separately.

The equipment performs a **pressure measurement** over time within its internal space using a pressure transducer. The system generates a

**depressurization (vacuum)** through the test output for a set period. After this, the vacuum generation stops, isolating the chamber's volume from the atmosphere. The pressure variation within this volume is then monitored over a standardized time. If there is a hole in the piece, the air will flow from it into the chamber, causing an increase in pressure. Based on this pressure variation, the test is either approved or rejected.

Note that in this type of test, the air inside the piece flows into the chamber so that a leak can be detected. **Therefore, it is essential that the part being tested has a hollow volume.**

Now, you might be asking: "But how can I quantify the flow rate from the pressure variation?"

## 2.3 Pressure Variation vs. Flow Rate

The first thermodynamics concepts studied in physics teach us about a fundamental law that governs the behavior of ideal gases (even though air is not a perfect gas, since it is a mixture of gases, we can still use the formulas for approximate calculations), as shown below:

$$P \cdot V = n \cdot R \cdot T$$

Where:

- $P$  - Pressure
- $V$  - Volume
- $n$  - Number of moles of gas
- $R$  - Universal gas constant
- $T$  - Temperature

In other words, by keeping temperature and volume constant, the relationship between pressure and the number of moles is also constant. This means that if the number of moles (leakage) changes, the internal pressure must change to maintain equilibrium.

We know that the international unit of flow rate is given in ml/min, which is milliliters (cubic centimeters) per minute. Therefore, we have the variation of volume over a certain time interval.

By measuring the pressure variation over a certain time, we can determine, based on the gas law, the flow rate or leak amount of the part being tested.

Simply put, we can calculate the flow rate using the following mathematical relationship:

$$Q = \frac{V_0 \times \Delta P}{\Delta t \times Patm}$$

Where:

- $Q$  = Flow rate [ml/min]
- $\Delta P$  = Pressure drop
- $\Delta t$  = Monitoring time [min]
- $V_0$  = Volume of the part [ml]
- $Patm$  = Atmospheric pressure

## 2.4 Graphical Analysis

To simplify the understanding of the above expression, let's make some graphical analyses with results obtained from the mathematical function.

### 2.4.1 Flow Rate vs. Time

$$Q(\Delta t) = \frac{V_0 \cdot \Delta P}{\Delta t \cdot Patm}$$

Flow



In the graph above, we see that the longer the test time, the smaller the flow rate we can measure. This graph also proves that a flow rate of zero does not exist, as the test time would be **infinite!**

### 2.4.2 Flow Rate vs. Pressure Drop

$$Q(\Delta P) = \frac{V_0 \cdot \Delta P}{\Delta t \cdot Patm}$$

Flow



In this other graph, we observe that the more precise the equipment, i.e., the smaller the pressure variation it can measure, the smaller the flow rate it can detect in the same time interval.

From these graphs, we can conclude that precision in measuring both pressure and time, along with some calculations, allows us to use hermeticity testing equipment to measure pressure variations.

### **IMPORTANT**

- *Precision in time measurement and **instant** pressure variation measurement is vital for the quality of the flow rate measurement. Some sensors or pressure transducers, as well as most analog/digital converters, have electronic stabilization systems that generally **delay** pressure variation information. To eliminate noise that affects the last decimal digits of the display, manufacturers use electronic systems that only read slow pressure variations, compromising instant pressure readings.*

## 3 - O Equipamento G4-S8

After years of developing and improving TEX's equipment lines, we identified the need to incorporate cutting-edge leak measurement technology, operational simplicity, and robustness into a single device—suitable for both factory floors and laboratories.

With measurement quality and features specially tailored for the global market, such as ease of use, intelligent flow and pressure compensation, data transmission through serial communication, Ethernet, USB port, RFID card access, and more, this equipment represents the state-of-the-art in dry leak testing, fully developed in Brazil.

Your equipment uses a vacuum pump and a *Feed & Bleed* pressure regulation system developed by TEX, providing excellent pressure adjustment autonomy. The precise automatic pressure regulation eliminates the need for operator adjustments, ensuring even more test reliability and safety.

The S8-GV equipment conducts tests on parts or packaging through the *variable geometry chamber* or *fixed geometry chamber*. The purpose of this type of test is to measure a leak or estimate the diameter of an equivalent hole through which the leak occurs.

For each type of part to be tested, a user-created profile is required, where the necessary configurations and parameters for each test stage are entered, such as pressures, durations, leak limits, packaging film thickness, and more. The S8-GV has only one type of test called *Leak Test*, which consists of five stages: *Depressurization*, *Stabilization*, *Leak Evaluation*, *Volumetric Verification*, and *Relief*.

The **Depressurization** stage adjusts a negative pressure (vacuum) inside the chamber according to the test pressure value configured in the part profile. If the **Optimize Depressurization** option is active, this stage will

end as quickly as possible to reach the test pressure. In tests with variable geometry chambers, the membranes take a shape close to the part being tested—at this point, the equipment considers the volume between the part and the membranes to be zero.

The equipment waits for the air to stabilize during the *Stabilization* stage. In the *Leak Evaluation* stage, the device measures the air escaping from the part (or the average diameter of the hole through which the leak occurs) by detecting the pressure increase (vacuum decrease) inside the chamber over time. If the measured value exceeds the leak limit configured in the part profile, the test is failed. This measurement method detects micro-leaks.

Afterward, the *Volumetric Verification* stage begins, measuring the volume of air transferred from the part into the chamber by monitoring the pressure increase inside the device. During this stage, the equipment tracks pressure variation over time, starting from the *Stabilization* stage. If the measured volume transfer exceeds the limit configured in the part profile, the test is failed. This measurement method detects large leaks, which cause air to escape quickly from the part, preventing measurement during the *Leak Evaluation* stage.

Upon completing the *Volumetric Verification* stage, the *Relief* stage starts, during which the chamber's pressure is equalized with the atmosphere, allowing it to be opened. At this stage, some electrical output signals are activated to notify the start, end, and whether the test passed or failed. Electrical input and output signals can be configured by the user in the test programming or pre-programmed at our factory according to your needs.

After the *Relief* stage, the equipment displays the test result on the screen: test pressure and leak amount. However, when a failure occurs due to excessive volume, the equipment shows the test pressure and the amount of air transferred to the chamber.

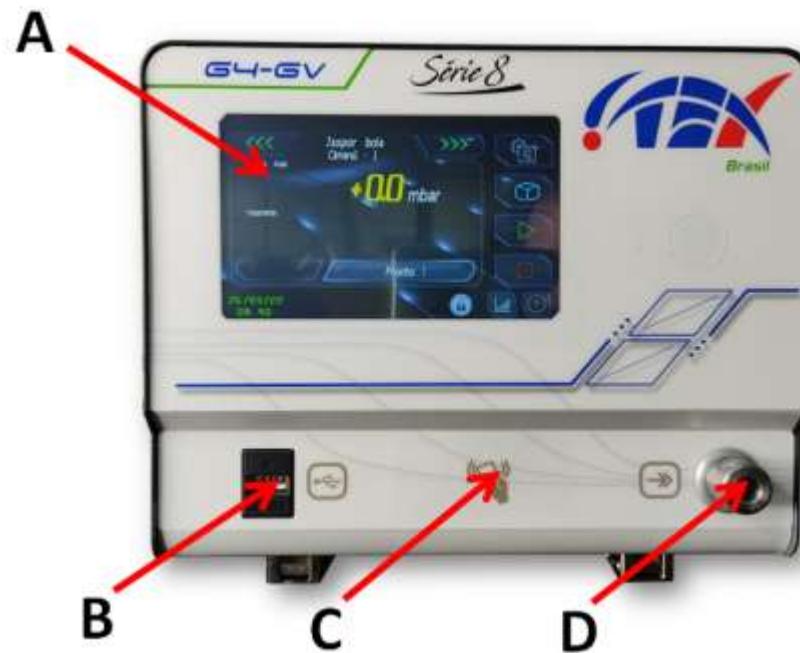
The equipment generates statistical performance graphs based on data collected from all tests, which can be extracted and analyzed on a computer.

Your equipment also has a calibration expiration alert, digital adjustment of transducers (allowing a technician to adjust the equipment without opening it), and self-adjusting offset or zero (which makes measurement more accurate and stable without variations throughout the day). All these features are explained in detail throughout this manual.

### 3.1 External Appearance and Item Identification

Your equipment is all-in-one, meaning it combines both electronic and pneumatic parts in a single standard case. This design provides greater mobility and ease of installation.

#### 3.1.1 Front Panel



##### A. 5" Color Touchscreen Display:

This is the interface between the operator and the equipment, used to display information and operate the device.

##### B. USB Port:

Through this port, user access is granted via TEX Flash Disk, data collection and backups are performed, image files are uploaded, and updates are made.

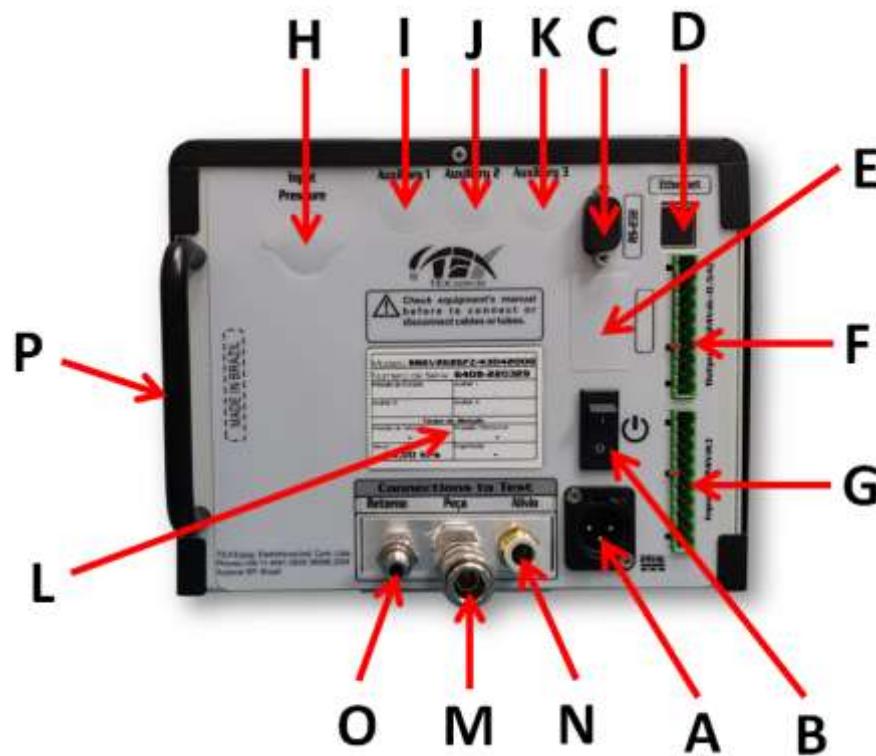
##### C. RFID TAG Reading Area (optional):

This is the area where RFID TAGs are read, which can also grant user access to the equipment functions.

##### D. Standard Connection:

Connect a Leak Master or Leak Calibrator to this port for test verification.

### 3.1.2 Rear Panel



#### A. Power Cable Connector:

Used to connect the power supply cable (provided with the equipment).

#### B. Power Switch:

The equipment can be turned on and off using this switch.

#### C. DB9 Connector:

This connector is male, providing an RS-232 port. However, if the equipment model has the PROFIBUS protocol option, the connector will be female and provide both RS-232 and RS-485 ports.

#### D. RJ45 Connector (for models with MODBUS protocol):

Provides an Ethernet port for the MODBUS network.

#### E. RJ45 Connector (for models with PROFINET or EtherNET/IP protocol):

Provides an Ethernet port for the PROFINET or EtherNET/IP network.

#### F. Electrical Output Connector (optional):

A 10-terminal connector with digital outputs.

#### G. Electrical Input Connector (optional):

A 10-terminal connector with digital inputs.

#### H. Input Pressure:

Not used for this model of equipment.

#### I. Auxiliary 1 (optional):

Provides a connection for an external vacuum generator with higher capacity.

#### J. Auxiliary 2 (optional):

This location is used for generic pneumatic input or output connections, such as auxiliary pilot output, exhaust pilot output, pressure feedback, exhaust, etc. The availability of a connection depends on the model. Check the identification label for information about Auxiliary 2.

#### K. Auxiliary 3 (optional):

This location is used for generic pneumatic input or output connections, such as auxiliary pilot output, exhaust pilot output, pressure feedback, exhaust, etc. The availability of a connection depends on the model. Check the identification label for information about Auxiliary 3.

#### L. Identification Label:

Label with information about the model, serial number, pressure range, flow rate range, supply pressure limits, and the inputs and outputs located at Auxiliary 1, Auxiliary 2, and Auxiliary 3.

#### M. Test Part Output:

Output for depressurizing a *variable geometry chamber* or a *fixed geometry chamber* (purchased separately).

**N. Relief (used only in models with variable geometry chambers with acrylic domes):**

Opens or closes the dome volume to the atmosphere during a test.

**O. Pressure feedback:**

Reads the internal pressure of a chamber (purchased separately) in real-time.

**P. Carrying Handle:**

Used to carry the equipment by hand.

## 4 - Installation

This chapter contains the information necessary for the correct and safe installation of the equipment. It is important that the "Safety Recommendations" section is fully read and understood before installing the equipment.



### CAUTION

- *Before connecting or disconnecting wires and tubes, consult the equipment manual!*
- *The equipment should only be handled by qualified and trained personnel.*

### 4.1 Installation Location

The equipment should be installed as close as possible to the test part to reduce the length of the tubing and, consequently, the stabilization time of the test. The equipment should be placed on a regular, horizontal surface, free of vibrations, and allowing free access to the front panel controls and rear panel connectors.

#### 4.1.1 Thermal Influences of the Environment

The hermeticity test is based on the laws of thermodynamics, so it is sensitive to thermal variations in the environment, the test part, and the

device. To avoid these influences during testing, follow these recommendations:

- Avoid direct sunlight and proximity to heat sources (furnaces, ovens, lamps, sealers, etc.).
- Avoid air drafts (doors, air conditioning vents, fans, etc.).
- When the above situations cannot be avoided, use protective barriers.

#### 4.1.2 Thermal Influences of the Production Process

The production process can also generate thermal variations in the part due to previous processes like washing, stamping, sealing, among others, which may increase or decrease the temperature of the part relative to the testing environment. To minimize these effects, we recommend:

- Do not install the testing apparatus immediately after the processes mentioned above.
- To avoid interference from previous processes, create a buffer of parts (temporary stock) so they can stabilize thermally.

If the storage temperature of the parts and the testing location are different, temperature variation will occur due to thermal transfer, causing instability in the test. The parts to be tested should preferably be stored under the same thermal conditions as where they will be tested.

### 4.2 Mechanical Installation

To operate in the most adverse industrial environments, the equipment has a robust metal casing, as well as equally robust internal components.

However, some precautions must be taken to ensure the integrity and proper functioning of your device:

- The installation location must have sufficient strength to support the weight of the equipment (about 12 kg in its heaviest version) and the chamber (an accessory for the equipment). If you need to transport the equipment, use the handle provided.
- The equipment should be placed on a flat, horizontal surface, free of vibrations, allowing free access to the front panel controls and rear panel connectors.
- Do not block the equipment's lateral ventilation openings to avoid overheating of internal components. Leave at least 50 mm of space from the sides.
- Do not apply excessive load on the equipment, such as pressing the sides or placing heavy objects on top of it, as this may damage the casing.



#### CAUTION

- *When transporting the equipment, hold it by the rear handle to avoid drops. Do not lift the equipment by any of the rear panel components, such as filters, output connections, or power cables.*
- *To avoid damage and drops, mount the equipment on a stable structure that can support its weight.*



#### NOTE

- *The equipment's casing has an IP 41 protection rating, meaning it is protected against vertically falling water droplets and solid objects larger than 1.0 mm in diameter.*

### 4.2.1 Mounting

The equipment is equipped with two rubber feet installed on the rear side and two retractable silicone supports installed on the front side, preventing it from slipping on smooth surfaces and reducing vibration transfer to the equipment.

The retractable supports allow the equipment to be mounted both horizontally and at an incline, adapting to the most comfortable position for the operator.

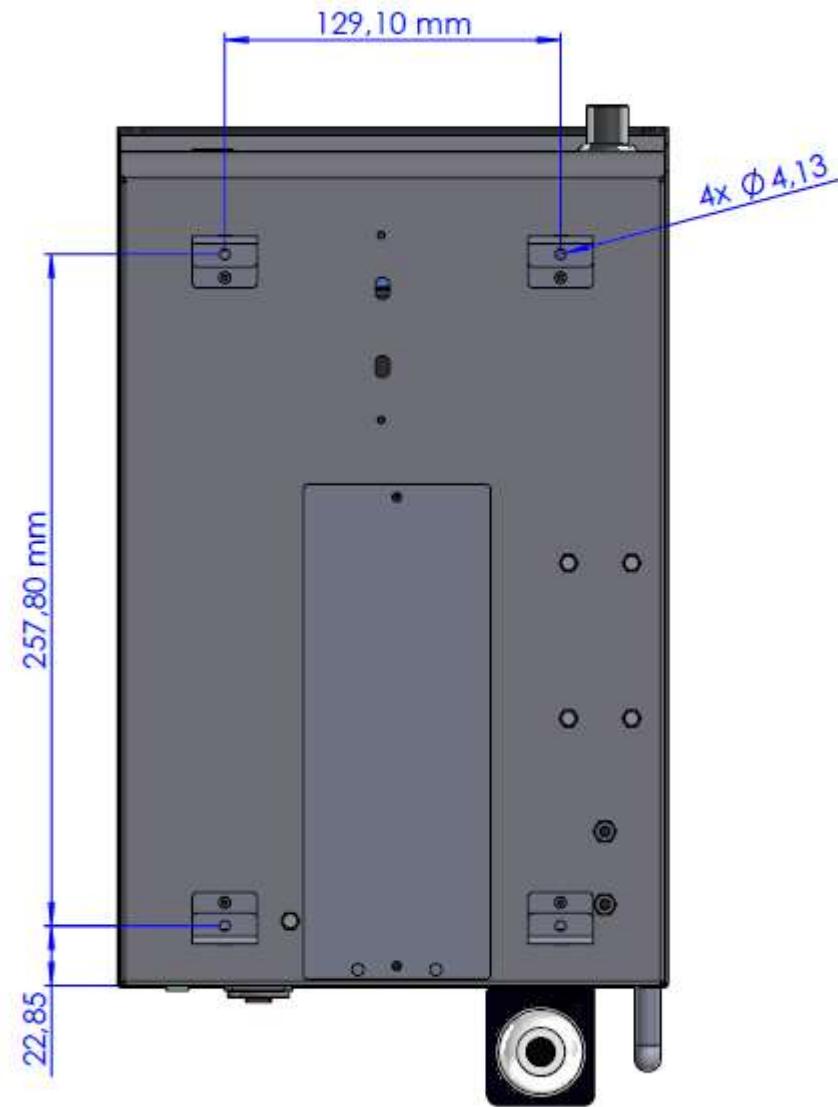
To mount the equipment at an incline, lift the front part of the device with one hand and, with the other hand, pull the supports forward. When you hear a click, the supports are locked, and you can set the device on the surface.

To position the equipment horizontally, lift the front part with one hand and, with the other hand, push the supports backward. When you hear a click, the supports are locked, and you can place the equipment on the surface. The rubber feet remain at the rear of the equipment.



**Retractable  
supports**

Additional mechanical supports for fixing to machines are included with the equipment, allowing it to be fixed to the surface using screws. Simply replace the rubber feet to use this feature. See the illustration below with the assembly dimensions:



## CAUTION

- *The maximum screw length must not exceed 10 mm from the support hole to avoid issues with mounting or even damage to the casing and/or support.*
- *Before putting the equipment into operation, make sure all mounting screws are tightly fastened.*

## NOTE

- *Caso sejam necessários suportes adicionais ou outra configuração de suporte, consulte a TEX.*

### 4.3 Electrical Installation

The G4-S8 leak testing equipment operates with an external power supply that must be connected to an electrical network providing alternating current between **50 and 60 Hertz** and voltage between **100 and 240 Volts**.



## WARNING

- *Before connecting your equipment to the electrical network, verify that it meets the above requirements. Connecting the equipment to a power source that does not meet these specifications may cause malfunction or even damage and accidents.*

## CAUTION

- *Since this is precision measurement equipment, the power source must be free of noise and voltage fluctuations. If the power source is unstable, use a suitable voltage stabilizer.*
- *Use the cable and power supply provided with the equipment – they meet the electrical specifications required by the equipment, in addition to the cable following standard **NBR 14136/02**, which*

defines the standard for plugs and sockets in Brazil – if the equipment is being used outside of Brazil, check the current standard and the standard for plugs and sockets in your country.



#### NOTE

- If the cable or power supply needs to be replaced, please contact TEX.

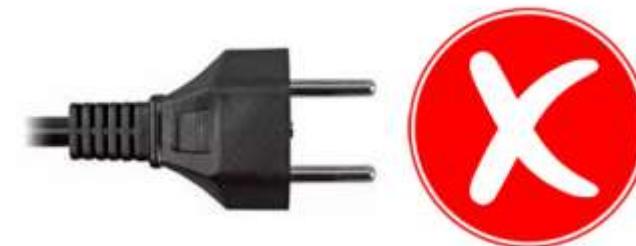
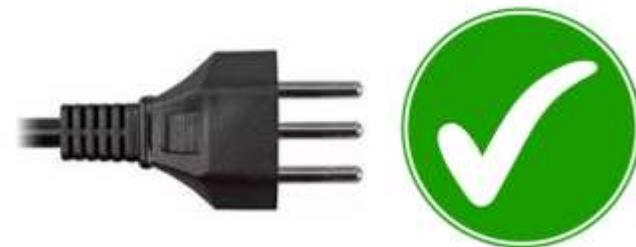
#### 4.3.1 Grounding

To ensure the performance, extended lifespan, and safety of your **G4-S8** equipment, it is necessary that it is electrically grounded. The provided power cable has a grounding terminal and should be connected to a grounded outlet.



#### IMPORTANT

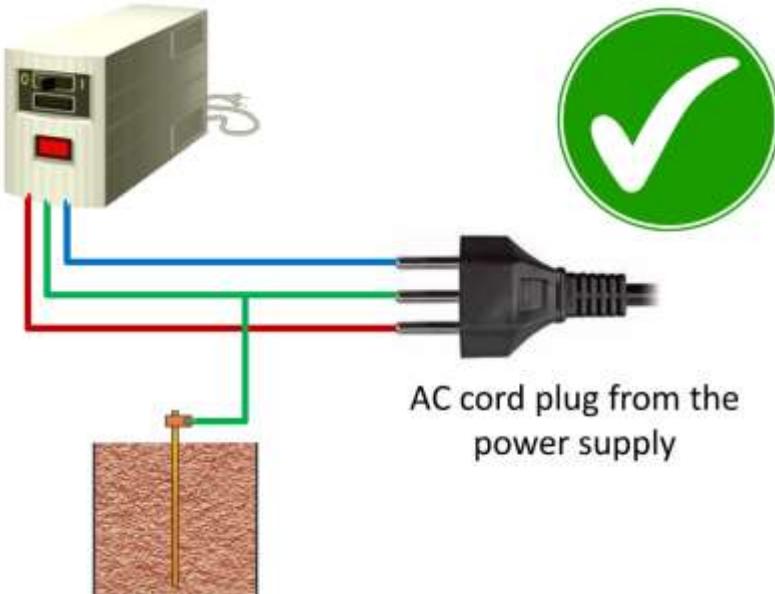
- The plug on the power supply cable has three terminals: two side terminals (phases) and a central terminal (ground). The outlet must be specific for this plug, respecting the equipment's limits. **Never remove the central (ground) terminal from the plug.**



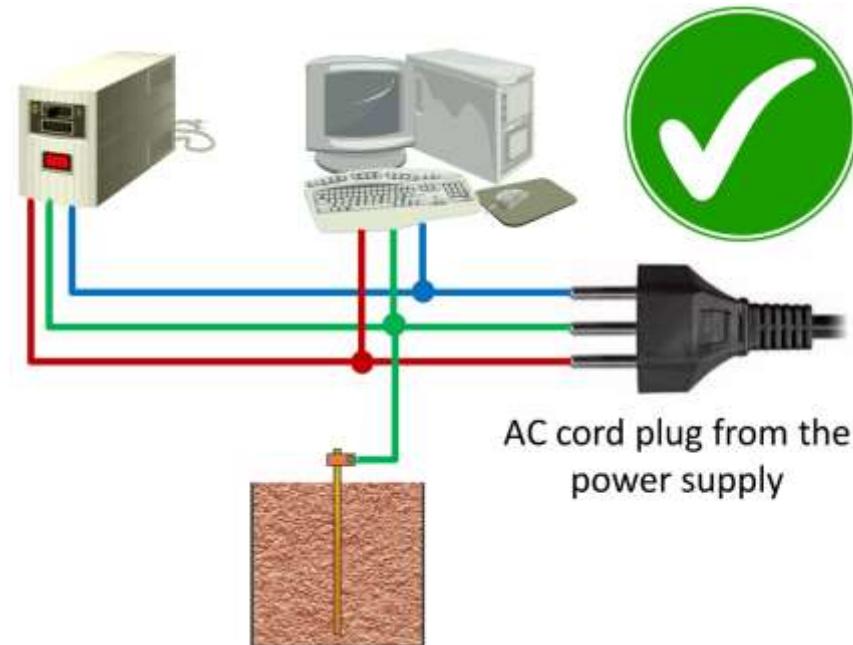
#### IMPORTANT

- Not connecting the ground pin will automatically void the equipment's warranty.

Grounding helps reduce electromagnetic interference, static energy discharges, and protects the equipment and user against shock risks or atmospheric electrical discharges. We also recommend that the equipment's power supply passes through a **voltage stabilizer**, the same used for computers, as this helps eliminate part of the problems related to noise, spikes, and sudden power drops.



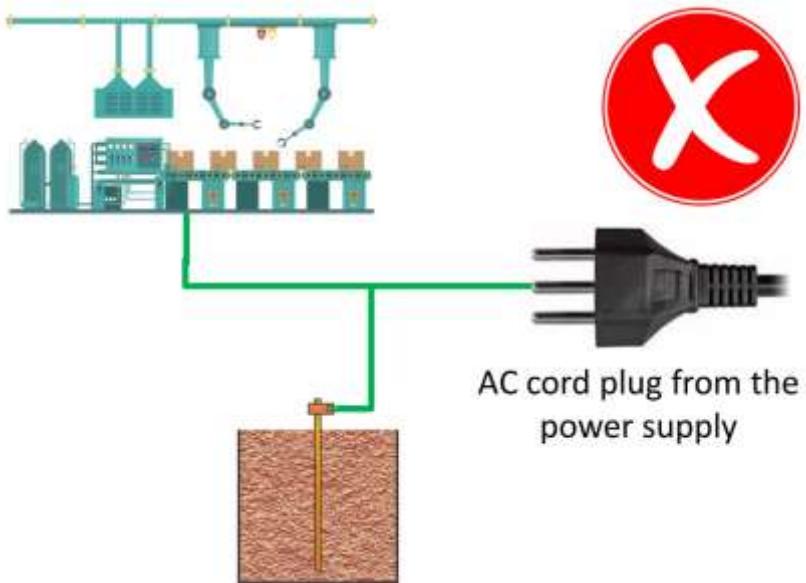
AC cord plug from the power supply



AC cord plug from the power supply

The **Brazilian Association of Technical Standards (ABNT)** has a standard that sets guidelines for electrical grounding installations in industrial environments. This standard is **NBR 5410/2004**, and its subsections refer to possible grounding systems. TEX suggests the **TT (Isolated Rod / ABNT standard)**. The most commonly available grounding rods in the market are about 2.50 meters long. If the equipment is being used outside Brazil, check the applicable standard and grounding system for your country.

Since the equipment is typically used in production lines, it is necessary to avoid electrical noise and discharges from machines interfering with your TEX equipment's operation. To achieve this, it is crucial to have an **independent** grounding system. If there is a dedicated grounding system for a computer network, it can be used for the equipment.



## **! IMPORTANT**

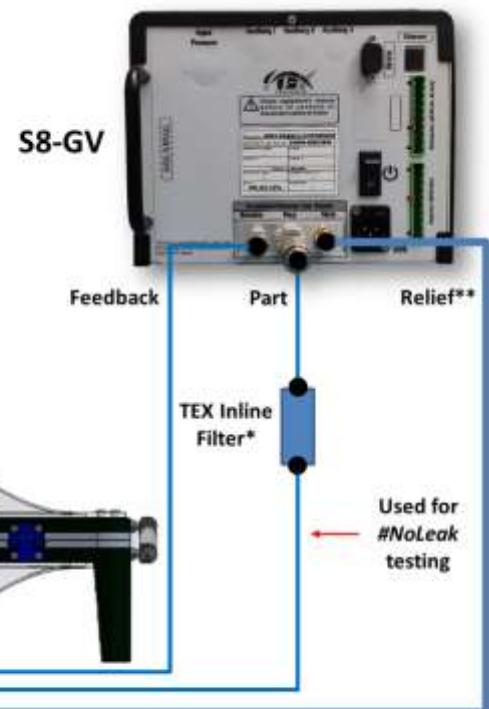
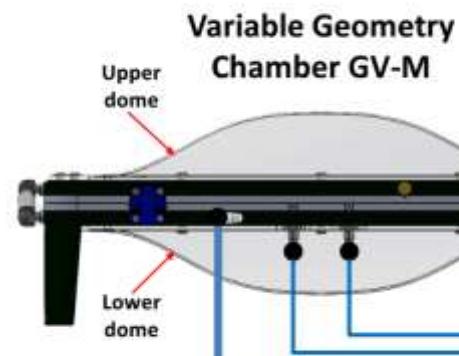
- Do not use the same systems connected to industrial machines.

## 4.4 Pneumatic Installation

The following are two installation diagrams for the most common devices: the first is between a *variable geometry chamber* and an *S8-GV*, and the second is between a *fixed geometry chamber* and an *S8-GV*. For more detailed installation information, refer to the device's manual or datasheet.

**Legend:**

- 6/4 mm tube
- 8/6 mm tube

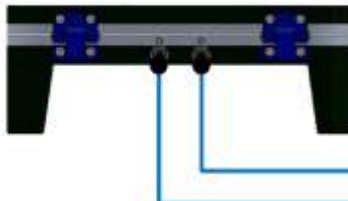


\*Installation requirement assessed by TEX.

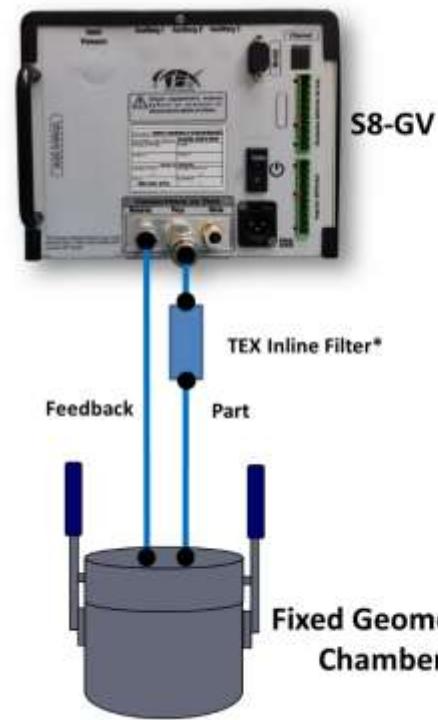
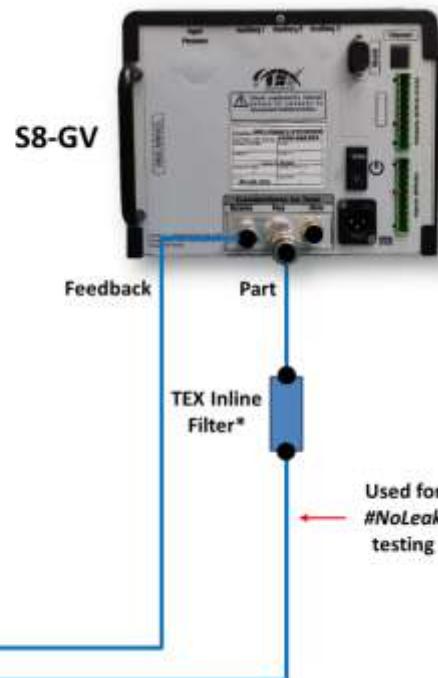
\*\*Connection only made if the camera has domes.



Variable Geometry  
Chamber GV-P



\*Installation requirement assessed by TEX.



\*Installation requirement assessed by TEX.

The piping assembly shown in the GV-M and GV-P installation diagrams also serves to interconnect the “Part” and “Feedback” ports of the equipment when it is necessary to perform the **#NoLeak test** or the **volumeter compensation**. For information on this test procedure, refer to sections “9.1.6 #NoLeak Part Registration” and “13.6 #NoLeak Part Registration”.

## ATTENTION

- When replacing any component of the pneumatic circuit in the chamber, such as membranes, tubes, or seals, it is necessary to perform the **Auto Zero Execution** procedure with the registered part #**GV-X** related to the installed chamber. Refer to section “9.3 - Auto Zero Execution”.
- Never modify the original tubes without informing TEX, because for some chamber models, one of the tubes is also used to interconnect the rear connections of the equipment and perform

the **#NoLeak** test. If the volume of this tube is altered, the **#NoLeak** test results will be compromised.

#### 4.4.1 Tubing and Connections

Do not use tubing that is too flexible, such as PU (polyurethane, the popular "blue tube"), PE (polyethylene), or other materials, as they easily expand under pressure. Such expansion compromises the stability of the hermeticity tests.

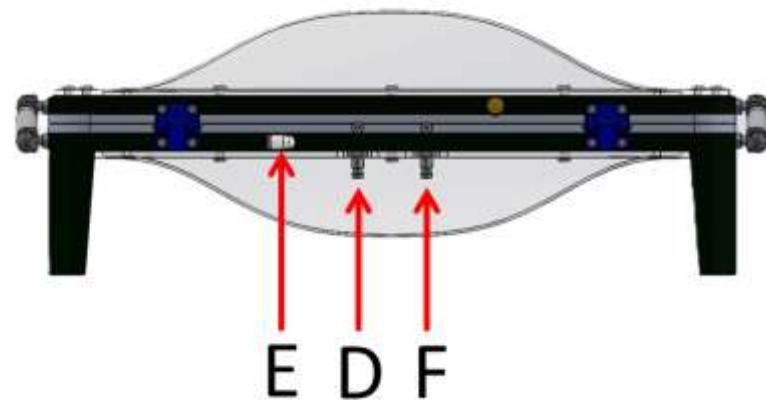


Do not use swivel or "quick-connect" fittings that are not guaranteed to be leak-proof in the test circuit. Over time, these fittings wear out and leak excessively. Always prefer fittings with a compression nut system for securing the tube.



#### 4.4.2 Variable Geometry Chamber (not included)

TEX manufactures several types of *variable geometry chambers*, in various sizes, adapted to your product type and process conditions. In the *variable geometry chamber*, parts and packaging are placed and subjected to the vacuum generated by the S8-GV. Below is an overview. For more information, refer to the device's manual or datasheet.



- A. Lid Handle:**  
Segure nela para abrir e fechar a tampa.

- B. Membranes and tulle:**  
This part will come into contact with the packaging – keep this area clean and dry to maintain test effectiveness.

**C. Seal:**

Its function is to seal the junction area between the lid and the chamber body – keep the seal clean and take care not to damage it.

**D. Connection for the Equipment's Test Part Output:**

Connect this fitting to the equipment's *Test Part* output.

**E. Chamber Relief (for models with acrylic domes):**

Connect the equipment's *Relief* input to these two fittings – they function to isolate the entire assembly from the atmosphere and relieve pressure inside the acrylic domes when closing the lid.

**F. Connection for the Equipment's Sensor:**

Connect this fitting to the equipment's Feedback input.

To perform a test with the chamber properly installed, place the packaging in the center of the membrane, close the lid, start a test on the equipment, and apply slight pressure to the handle.

If the automatic start option is enabled on the S8-GV, simply close the lid and apply slight pressure to the handle to begin the test.

For detailed test procedures, refer to section “10.8 - *Test Procedure with a Variable Geometry Chamber*”.



**ATTENTION**

- When replacing any component of the pneumatic circuit in the chamber, such as membranes, tubes, or seals, it is necessary to perform the **Auto Zero Execution** procedure with the registered part #GV-X related to the installed chamber. Refer to section “9.3 - Auto Zero Execution”.
- Never modify the original tubes without informing TEX, as for some chamber models, one of the tubes is also used to

*interconnect the rear connections of the equipment and perform the **#NoLeak** test. If the volume of this tube is altered, the **#NoLeak** test results will be compromised.*

# 5 - Interfaces

The G4-S8 equipment features several interfaces for communication with external devices, such as computers, PLCs (Programmable Logic Controllers), industrial networks, scanners, and more. There are also interfaces for user interaction, located on the front of the equipment.

The main interfaces on the rear panel are the electrical inputs and outputs, the RS-232/RS-485 port, and the Ethernet port. On the front panel, the primary interfaces are the 5" display, USB port, and RFID reader.

## 5.1 Electrical Inputs and Outputs

The electrical inputs and outputs are typically used to connect to a PLC or control small automation systems.

It is possible to change the operating logic of the electrical inputs and outputs, from NPN to PNP and vice versa, entirely via software, without the need for physical alterations. The configuration is individual for the inputs and outputs, meaning that the inputs can be NPN while the outputs are PNP.

The equipment includes a feature for monitoring these inputs and outputs, allowing the user to check if any of them are enabled, disabled, or short-circuited. Additionally, they are protected against short circuits and overcurrent.

### 5.1.1 Electrical Specifications

The equipment's internal power supply provides energy for the electrical inputs and outputs, and the outputs can supply a maximum current of 500 mA (the total current for all used pins).

However, if multiple electrical outputs are activated and the total current exceeds 500 mA, an external power supply must be used to provide this current. To do this, activate the "External 24 V source for I/O" option – refer to section "[11.3 - Configurations for Electrical Inputs and Outputs](#)".

The following are the specifications for each pin:

	<b>Input</b>	<b>Output</b>
<b>Activation Type:</b>	Optocoupler input	Solid State, by Smart MOSFET
<b>Operating Logic:</b>	NPN or PNP, selectable via software	NPN or PNP, selectable via software
<b>Operating Voltage:</b>	24 VDC +/- 5%	24 VDC +/- 5%
<b>Max Current with Internal Power Supply:</b>	10 mA	*500 mA
<b>Max Current with External Power Supply:</b>	10 mA	**500 mA

\* If more outputs are used, the total current across all output pins should not exceed 500 mA.

\*\* The current per output pin must not exceed 500 mA. Ensure the external power supply can provide sufficient current for the sum of the electrical outputs.

### 5.1.2 Functions of the Electrical Inputs and Outputs

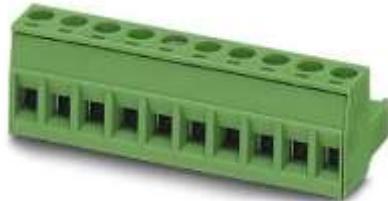
The electrical inputs and outputs have two connectors: one for the inputs and another for the outputs. Both connectors are physically identical, and the functionality is fully compatible with previous equipment versions.

Connector specifications:

- On the equipment: **Phoenix Contact – MSTBA 2.5/10-G – Manufacturer Code 1757543**



- External (connected to the equipment): **Phoenix Contact – MSTB 2.5/10-ST – Manufacturer Code 1754601**



Some terminals of the electrical inputs and outputs can be configured to perform different functions, allowing them to be adapted to your application. Refer to section “9.2.7 – Advanced Parameters” to configure

these terminals. Below is a description of the functions for the connector terminals:

Inputs		
Terminal	Function	Type
+	+24 VDC (input or output)	Power
1	BCD 0	Input
2	BCD 1	Input
3	Stop	Input
4	Start	Input
5	BCD 2 / Scrap Sensor	Input
6	BCD 3 / Previous Part	Input
7	BCD 4 / Next Part	Input
8	---	---
-	0 VDC	Power

The following is a detailed description of the functions for the input connector:

**Terminal [+]:** +24 VDC output. It can also be used as a voltage input to power the electrical inputs and outputs, if necessary. In this case, the option “External 24 V source for I/Os” must be enabled (see section “11.3 Configurations for Electrical Inputs and Outputs”).

-  **CAUTION:** Never use an external power supply on this terminal if the “External 24 V source for I/Os” option is disabled.

**Terminal 1 – BCD 0 –** Input signal for binary logic selection of part registration.

**Terminal 2 – BCD 1** – Input signal for binary logic selection of part registration.

**Terminal 3 – Stop** – When activated during a test process or stand-by, it interrupts the test process, disables digital outputs 1, 2, and 3, and activates the *busy* output.

**Terminal 4 – Start** – When activated by a pulse, it initiates a test process. If the signal remains constant during and after the test, the signal must be interrupted to start another test.

**Terminal 5 – Configurable for BCD 2 and Scrap Sensor functions – BCD 2:** Input signal for binary logic selection of part registration. **Scrap Sensor:** Awaits a signal indicating that the part has been rejected (e.g., a sensor on a chute for rejected parts). The equipment will remain locked until the rejection signal is received.

**Terminal 6 – Configurable for BCD 3 and Previous Part functions: – BCD 3:** Input signal for binary logic selection of part registration. **Previous Part:** Decreases part selection using the remote part selection control.

**Terminal 7 – Configurable for BCD 4 and Next Part functions – BCD 4:** Input signal for binary logic selection of programs. **Próxima Peça:** Increases part selection using the remote part selection control.

**Terminal 8** – Not used in this equipment model.

**Terminal [-] – 0 VDC:** Common ground for internal or external power supplies.

Outputs		
Terminal	Function	Type
+	+24 VDC (input or output)	Power
1	Digital 1	Output

2	Approved	Output
3	Reproved	Output
4	Digital 2	Output
5	Digital 3 / Fail	Output
6	---	---
7	---	---
8	Busy	Output
-	0 VDC	Power

The following is a detailed description of the functions for the output connector:

**Terminal [+]** – +24 VDC output. It can also be used as a voltage input to power the electrical inputs and outputs, if necessary. In this case, the option “External 24 V source for I/Os” must be Enabled (see section “11.3 – Configurations for Electrical Inputs and Outputs”).

-  **CAUTION:** Never use an external power supply on this terminal if the “External 24 V source for I/Os” option is Disabled.

**Terminal 1 – Digital 1** – Output with configurable function.

**Terminal 2 – Approved** – Output to indicate that the test result was approved. The signal remains active during the relief time.

**Terminal 3 – Reproved** – Output to indicate that the part being tested was rejected. The signal remains active during the relief time.

**Terminal 4 – Digital 2** – Output with configurable function.

**Terminal 5 – Configurable for Digital 3 and Fail functions – Digital 3:**

Output with configurable function; **Fail**: Output to indicate that the test cannot be performed due to unstable pressure, large leak, etc.

**Terminal 6** – Not used in this equipment model.

**Terminal 7** – Not used in this equipment model.

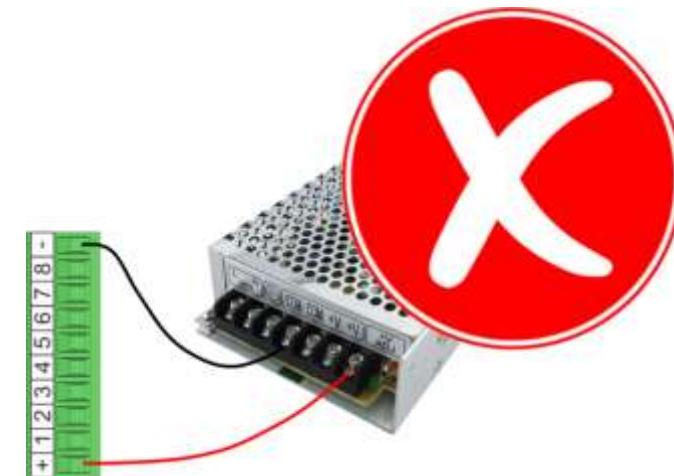
**Terminal 8 – Busy** – This output indicates that the equipment is busy. It is activated during testing, initialization, and while accessing the *Options Menu*.

**Terminal [-]** – 0 V: Common ground for internal or external power supplies.

For configuring Digital Outputs 1, 2, and 3, see sections “9.2.3 Adjusting Test Options” and “11.3 Configurations for Electrical Inputs and Outputs”.

**CAUTION**

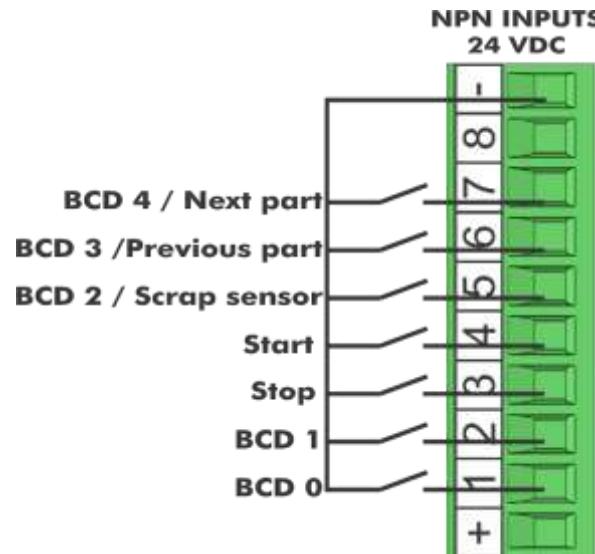
- Never connect an external power supply in parallel with the terminals "+" and "-" of the Electrical Inputs or Outputs connectors if the **External 24 V Source for I/Os** option is **Enabled**.



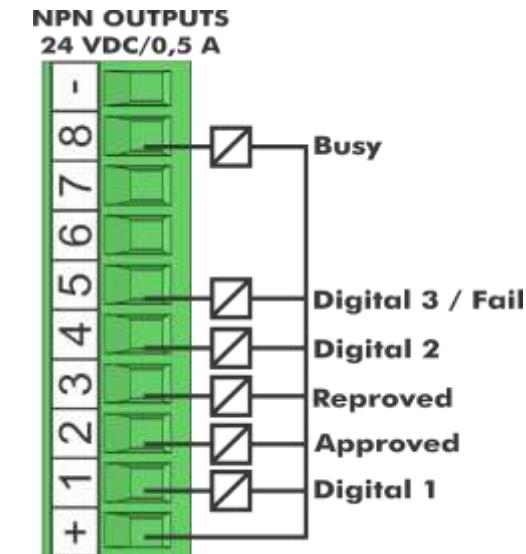
#### 5.1.2.1 Typical Connections

The electrical inputs and outputs allow the equipment to send signals to a PLC and receive signals from it, or even control small automation systems, such as small test benches. Below are the electrical diagrams using the equipment's internal power supply and an external power supply.

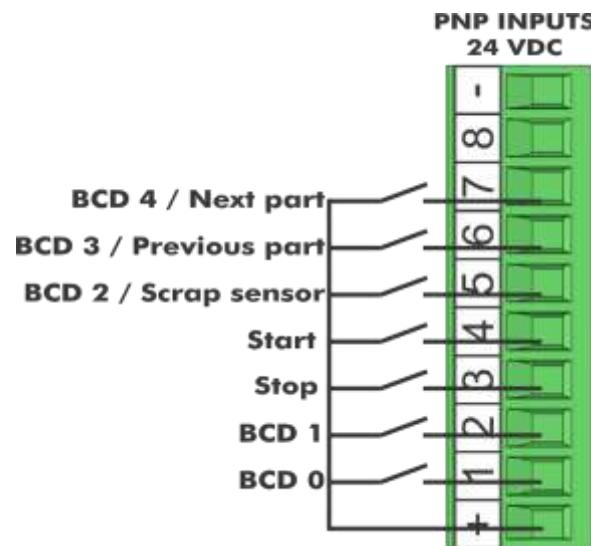
NPN Inputs (using the internal power supply):



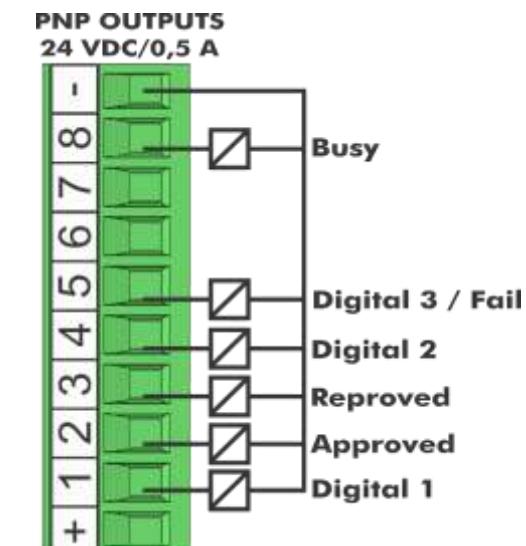
NPN Outputs (using the internal power supply):



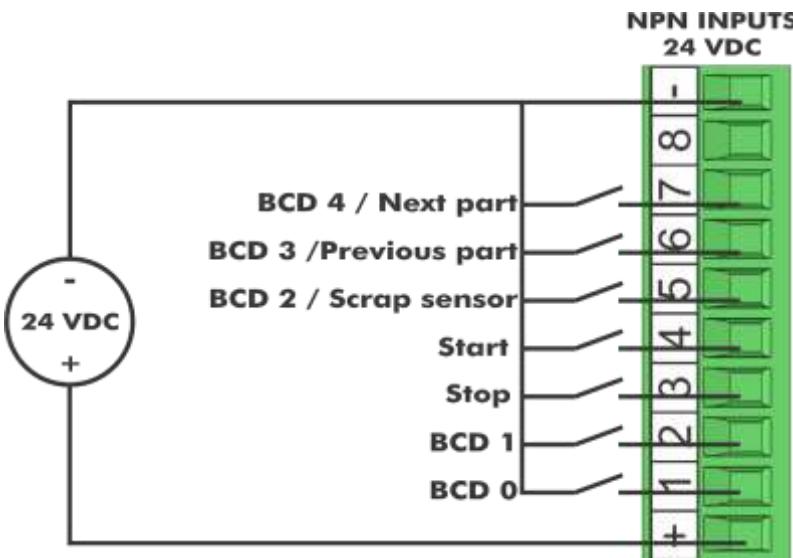
PNP Inputs (using the internal power supply):



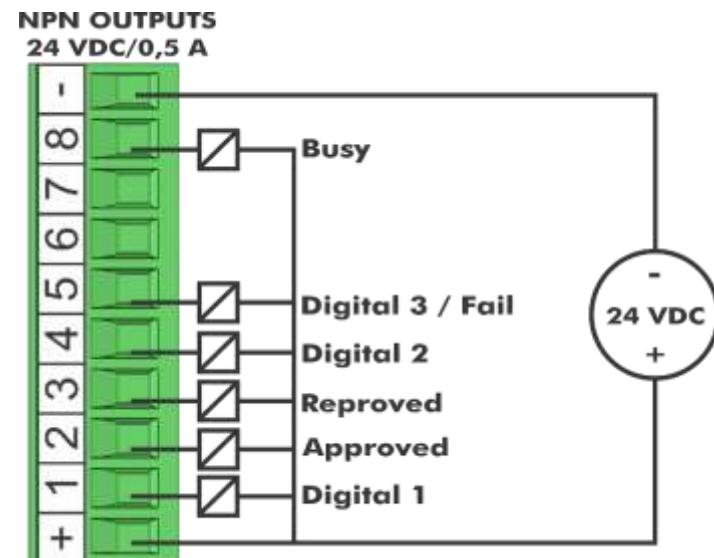
PNP Outputs (using the internal power supply):



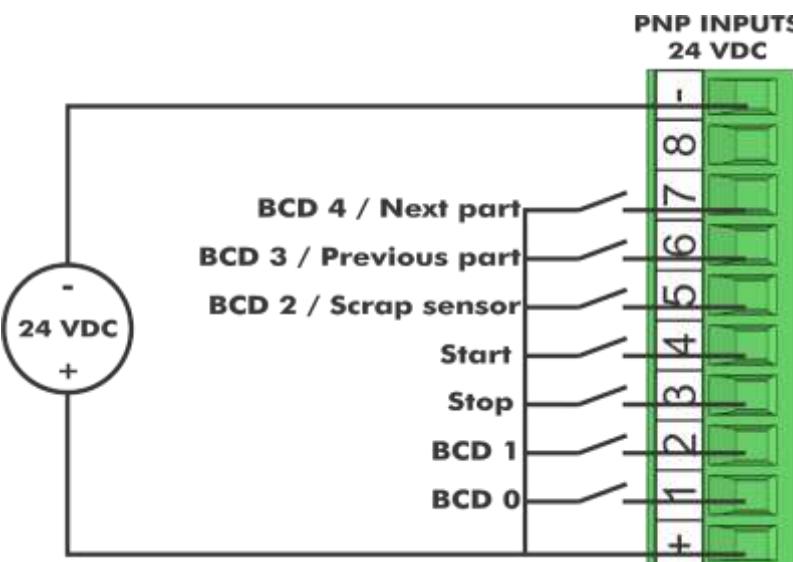
NPN Inputs (using an external power supply):



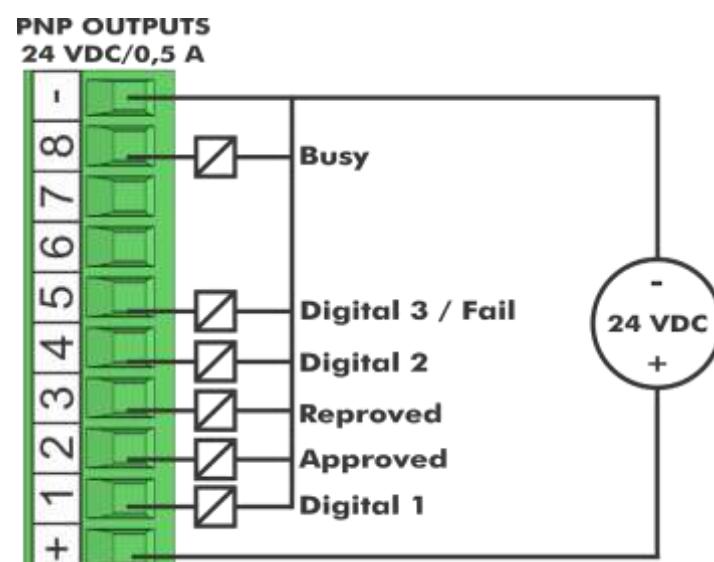
NPN Outputs (using an external power supply):



PNP Inputs (using an external power supply):



PNP Outputs (using an external power supply):

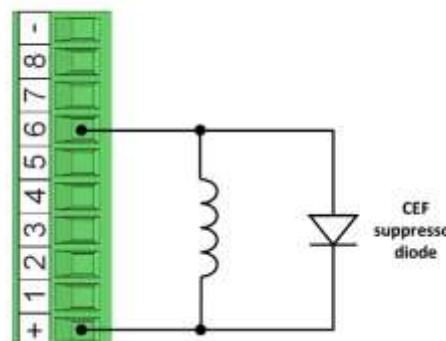




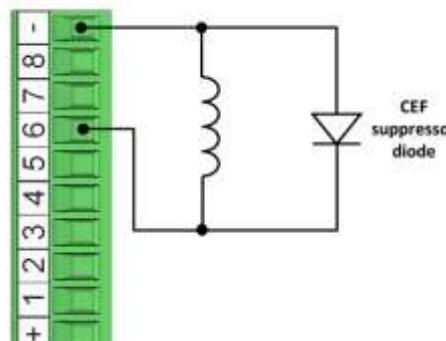
## CAUTION

- ***It is mandatory to install a surge suppression diode in parallel with inductive loads to prevent possible voltage spikes. If this diode is not installed, the Digital Output to which the load is connected may be damaged due to the back electromotive force (EMF). Consult the datasheet of the device to be installed on the Digital Output to select an appropriate diode. The following images show an example of surge suppression diode installation on the inductive load connected to Digital Output 6, for both NPN and PNP configurations.***

NPN OUTPUTS



OUTPUTS PNP



## 5.1.3 PLC Connection

Through the electrical inputs and outputs, the equipment can be connected to a PLC, either via a relay interface or directly through the PLC's digital inputs and outputs. Since the operating logic of the equipment's inputs and outputs can be changed between NPN and PNP, the equipment does not require signal converters.

The equipment's inputs and outputs can be directly connected to the PLC's inputs and outputs, as long as the PLC card operates at 24 VDC. For this, the negative (-) of the equipment and the PLC must be interconnected. The following are the electrical diagrams.

### Entradas

NPN or PNP INPUTS  
24 VDC

1	Interconnect it to the "-" of the machine/PLC power supply	
2	BCD 4 / Next part	PLC X.X Output
3	BCD 3 / Previous part	PLC X.X Output
4	BCD 2 / Scrap sensor	PLC X.X Output
5	Start	PLC X.X Output
6	Stop	PLC X.X Output
7	BCD 1	PLC X.X Output
8	BCD 0	PLC X.X Output

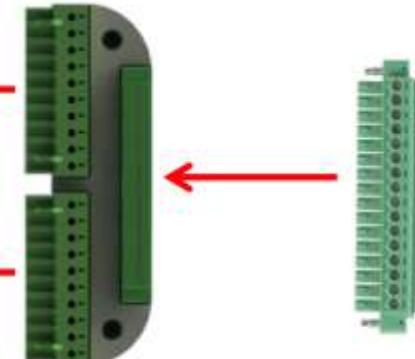


## Saídas

NPN or PNP OUTPUTS 24 VDC/0,5 A	
8	+
7	-
6	1
5	2
4	3
3	4
2	5
1	6
+/-	7/8
Bus	PLC X.X Input
Digital 3 / Fail	PLC X.X Input
Digital 2	PLC X.X Input
Reproved	PLC X.X Input
Approved	PLC X.X Input
Digital 1	PLC X.X Input



G4 Standard  
Converter Module



### 5.1.4 Standard Converter Module (Optional)

This accessory converts the electrical inputs and outputs of the G4-S8 to a connector standard compatible with various market devices.

Connector specifications:

- On the converter output: **Phoenix Contact – MC 1.5/16-GF-3.81 – Manufacturer Code 1828003**
- External (plugged into the converter output): **Phoenix Contact – MC 1.5/16-STF-3.81 – Manufacturer Code 1827842**



Below is a description of the output terminals' functions on the converter:

Terminal	Function	Type
1	Input 1: Reset	Input
2	+24 VDC Output	Power
3	Input 2: Start	Input
4	+24 VDC Output	Power
5	Input 3: BCD Selection Bit 0	Input
6	Input 4: BCD Selection Bit 1	Input
7	Input 5: BCD Selection Bit 2	Input
8	Input 6: BCD Selection Bit 3	Input
9	Input 7: BCD Selection Bit 4	Input
10	+24 VDC Input (floating common)	Power
11	Output 1: Approved	Output
12	Output 2: Reproved	Output
13	Output 3: Digital 2	Output
14	Output 4: Alarm / Digital 3	Output
15	---	---
16	0 V	Power

Detailed Description of the Functions:

**Terminal 1 – Reset (Stop)** – When activated, it interrupts the test process.

**Terminal 2 – +24 VDC Output**.

-  **CAUTION:** Never use an external power supply on this terminal.

**Terminal 3 – Start** – When activated by a pulse, it starts the test process. It can also be used with a part presence sensor to initiate a test. After the test is completed, the equipment waits for the part to be disconnected before starting a new cycle.

**Terminal 4 – +24 VDC Output**.

-  **CAUTION:** Never use an external power supply on this terminal.

**Terminal 5 – Selection BDC Bit 0** Input signal for binary logic selection of part registration.

**Terminal 6 – Selection BDC Bit 1** – Input signal for binary logic selection of part registration.

**Terminal 7 – Selection BDC Bit 2** Input signal for binary logic selection of part registration.

**Terminal 8 – Selection BDC Bit 3** – Input signal for binary logic selection of part registration.

**Terminal 9 – Selection BDC Bit 4** – Input signal for binary logic selection of part registration.

**Terminal 10 – +24 VDC voltage input** – Used as a voltage input when necessary to power the Electrical Inputs and Outputs. In this case, the “**External 24 V Source for I/Os**” option must be “**Enabled**” (see section “**11.3 Configurations for Electrical Inputs and Outputs**”).

-  **CUIDADO:** Never use an external power source on this terminal if the “**External 24V source for I/Os**” option is **Disabled**.

**Terminal 11 – Approved** – Output to indicate that the test result was approved. The signal remains active during the *Relief* time.

**Terminal 12 – Reproved** – Output to indicate that the part being tested was rejected. The signal remains active during the *Relief* time.

**Terminal 13 – Digital 2:** Configurable digital output.

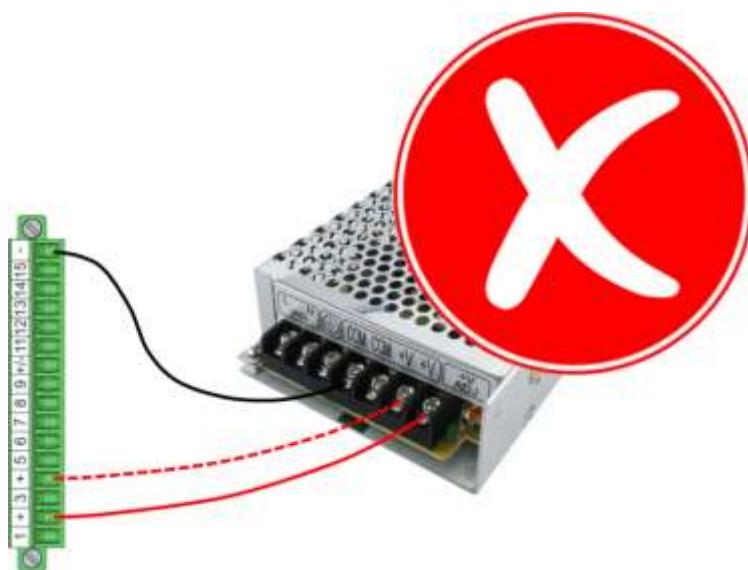
**Terminal 14** – Configurable in **Digital 3** and **Alarm (Fail)** functions – **Digital 3:** Configurable function output; **Alarm (Fail):** output to indicate when a failure occurs in the equipment or indicate that the test cannot be performed, due to unstable pressure, very large leak, etc.

**Terminal 15** – Not used for this model.

**Terminal 16** – 0 V: Common ground for internal or external power supplies.

## ⚠ CAUTION

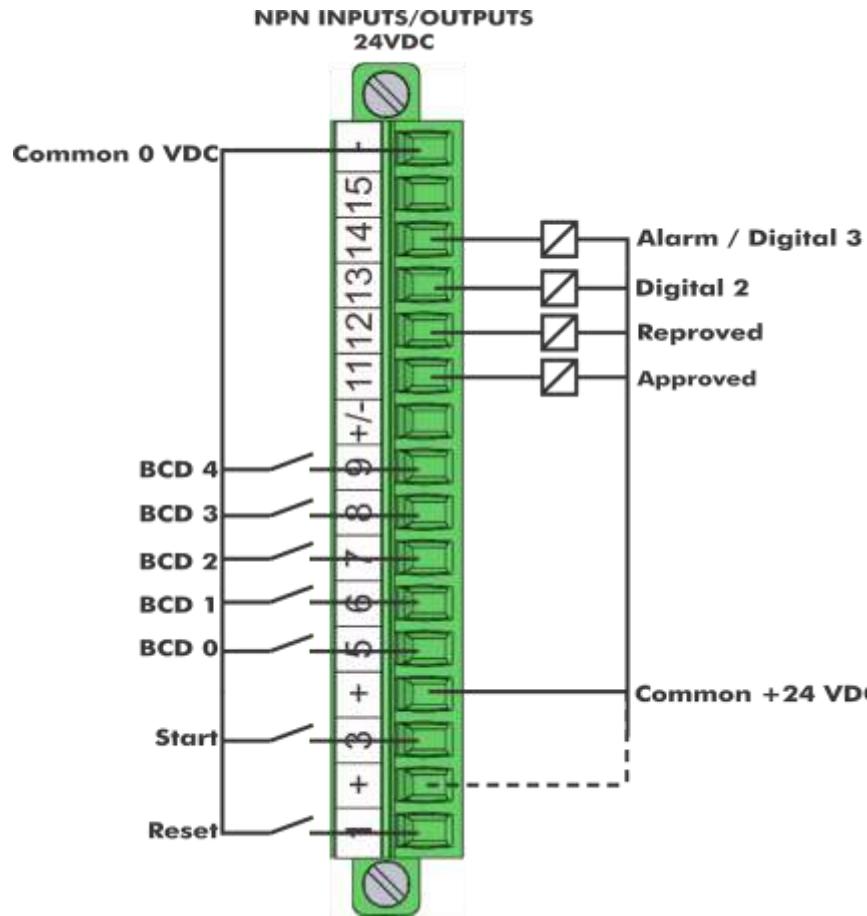
- *Never connect an external power source in parallel with the "+" and "-" terminals of the Electrical Input or Output connectors, as these terminals refer to the equipment's power supply outputs.*



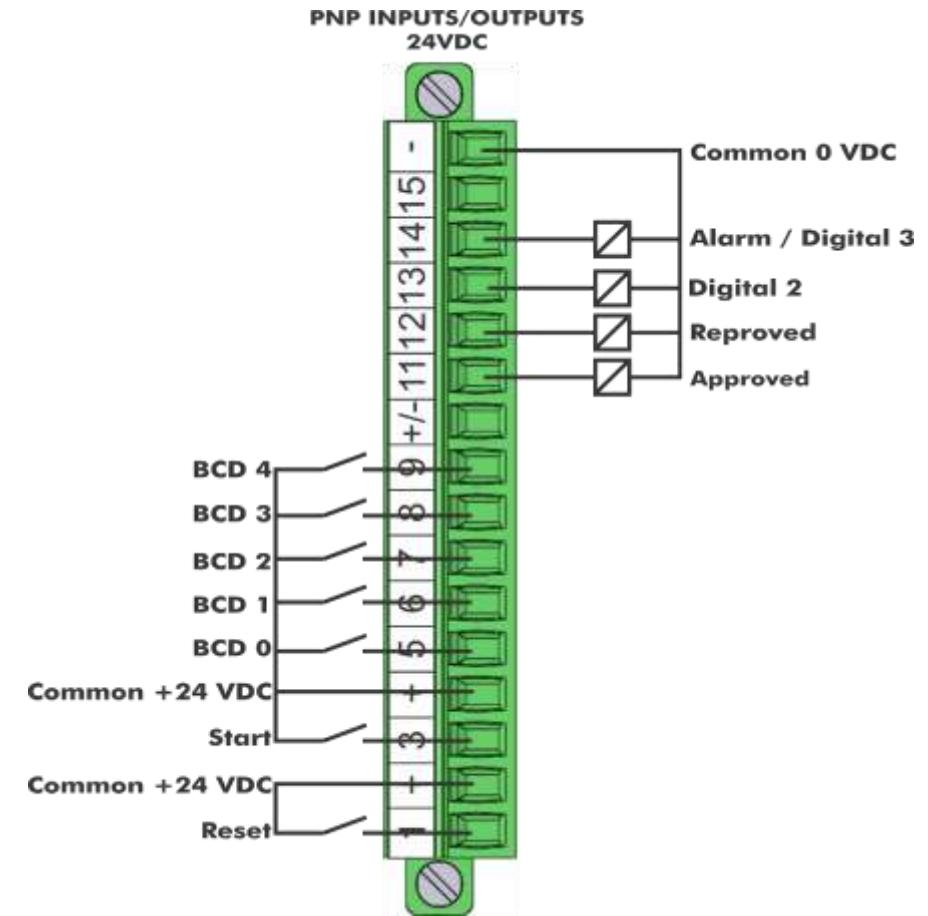
### 5.1.4.1 Typical Connections

Electrical Inputs and Outputs allow the equipment to send signals to and receive signals from a PLC, or even control small automation systems, such as small test benches. The following electrical diagrams show the equipment's internal power source and its external power source.

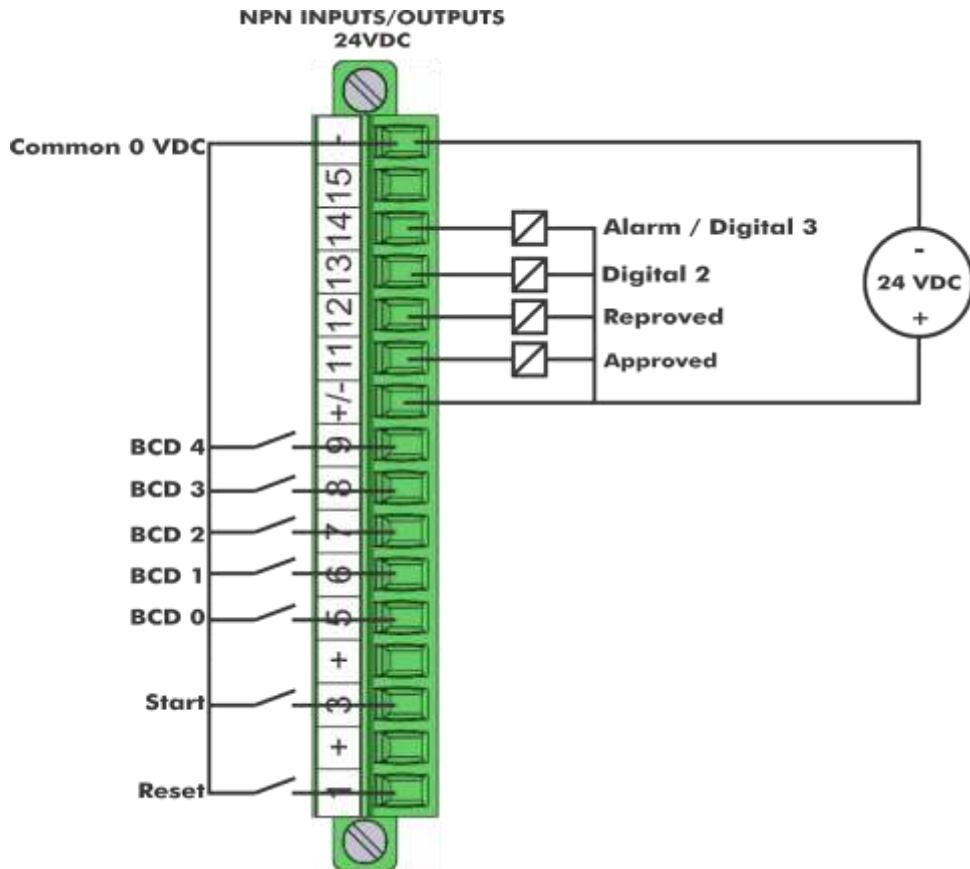
### NPN Inputs and Outputs (using internal power source)



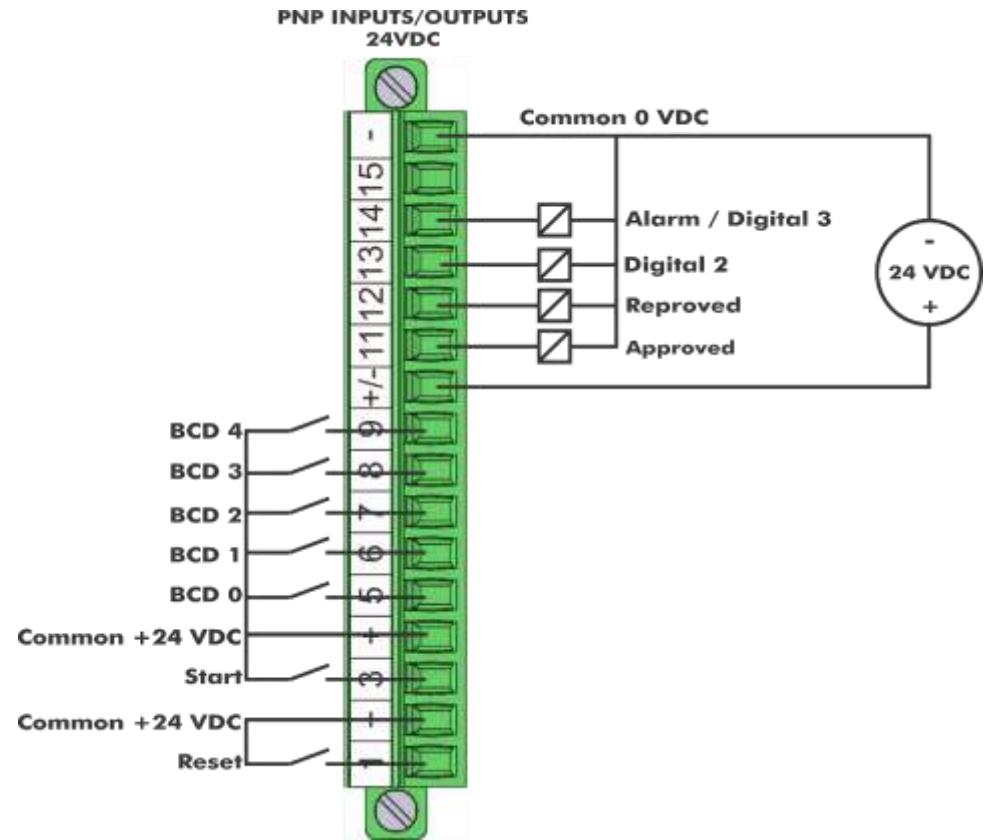
### PNP Inputs and Outputs (using internal power source)



### NPN Inputs and Outputs (using an external power source)



### PNP Inputs and Outputs (using an external power source)

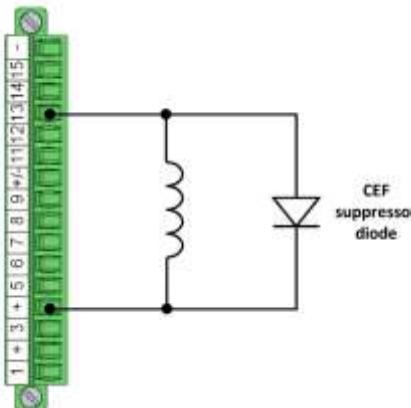




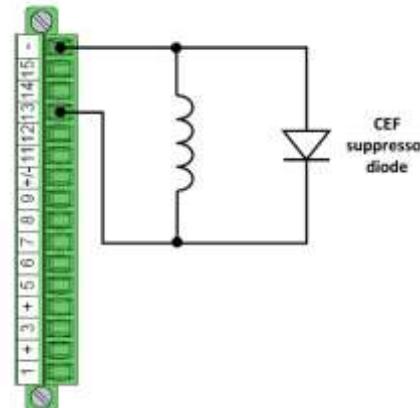
## CAUTION

- It is mandatory to install a surge suppression diode in parallel with inductive loads to prevent possible voltage spikes. If this diode is not installed, the Digital Output to which the load is connected may be damaged due to the back electromotive force (EMF). Consult the datasheet of the device to be installed on the Digital Output to select an appropriate diode. The following images show an example of surge suppression diode installation on the inductive load connected to Digital Output 6, for both NPN and PNP configurations.*

OUTPUTS NPN

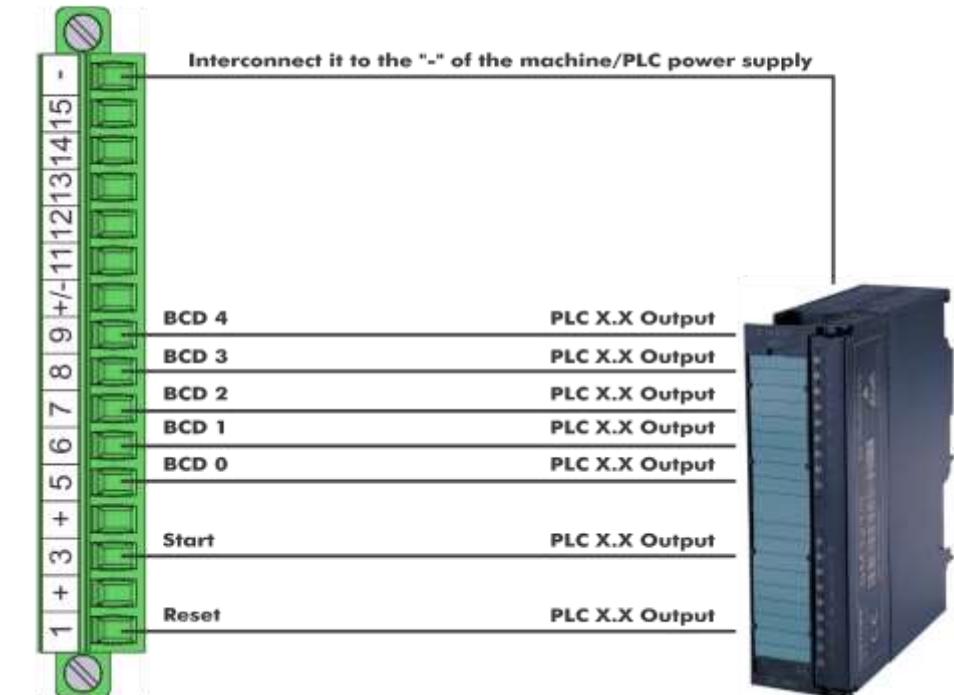


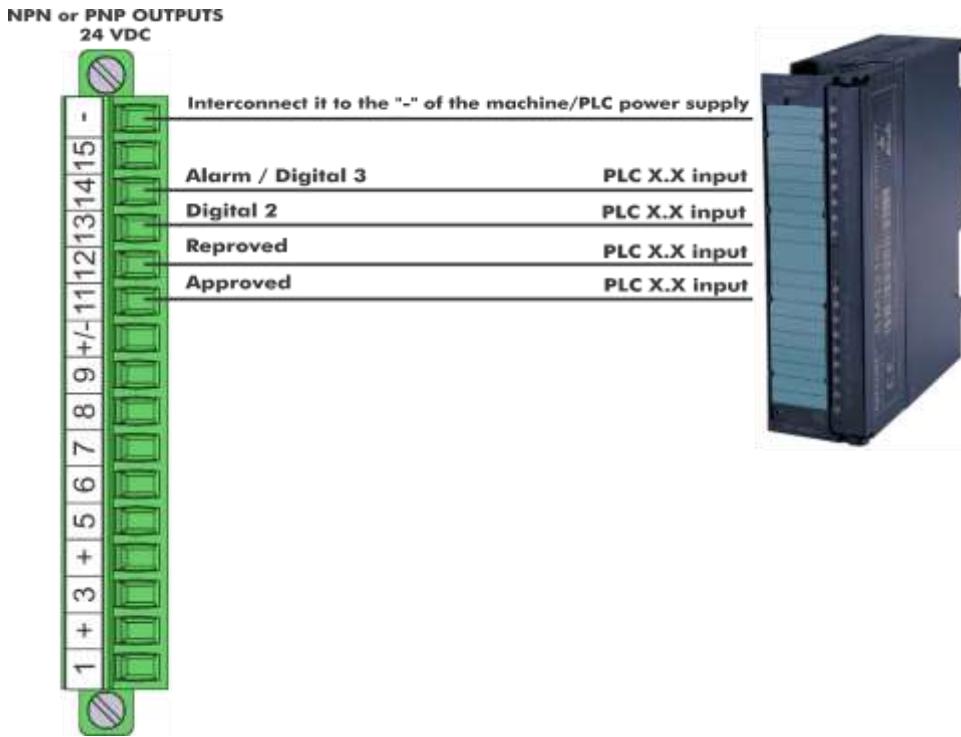
OUTPUTS PNP



### 5.1.4.2 Connection to PLC

NPN or PNP INPUTS  
24 VDC





present at the inputs. With the 5 BCD inputs, up to 32 parts can be selected. Through MODBUS, PROFIBUS, PROFINET, and EtherNET/IP communication, it is possible to select up to 1000 parts. For more technical information, please refer to the appendix "G4-S8 Communication Protocols."

Number BCD of the Part	Bit 4 MSB	Bit 3	Bit 2	Bit 1	Bit 0 LSB
	Terminal 9 CONVERTER Terminal 7 G4-S8	Terminal 8 CONVERTER Terminal 6 G4-S8	Terminal 7 CONVERTER Terminal 5 G4-S8	Terminal 6 CONVERTER Terminal 2 G4-S8	Terminal 5 CONVERTER Terminal 1 G4-S8
0	0	0	0	0	0
1	0	0	0	0	1
2	0	0	0	1	0
3	0	0	0	1	1
4	0	0	1	0	0
5	0	0	1	0	1
6	0	0	1	1	0
7	0	0	1	1	1
8	0	1	0	0	0
9	0	1	0	0	1
10	0	1	0	1	0
11	0	1	0	1	1
12	0	1	1	0	0

### 5.1.5 Part Selection by BCD

Registered parts can be selected remotely through the BCD inputs. Selection is made by entering the codes into the BCD inputs. In the Standard G4 Converter Module (optional), the least significant bit (LSB) is Bit 0 (terminal 5 of the connector), and the most significant bit (MSB) is Bit 4 (terminal 9 of the connector). In the G4-S8 Digital Electrical Inputs, the least significant bit (LSB) is Bit 0 (terminal 1 of the connector), and the most significant bit (MSB) is Bit 4 (terminal 7 of the connector).

When part selection by BCD is enabled, a value must be assigned to each part, and the part will be selected when the corresponding BCD value is

13	0	1	1	0	1
14	0	1	1	1	0
15	0	1	1	1	1
16	1	0	0	0	0
17	1	0	0	0	1
18	1	0	0	1	0
19	1	0	0	1	1
20	1	0	1	0	0
21	1	0	1	0	1
22	1	0	1	1	0
23	1	0	1	1	1
24	1	1	0	0	0
25	1	1	0	0	1
26	1	1	0	1	0
27	1	1	0	1	1
28	1	1	1	0	0
29	1	1	1	0	1
30	1	1	1	1	0
31	1	1	1	1	1

“0” represents the disabled input, and “1” represents the enabled input.

### 5.1.6 Remote Control for Part Registration Selection

Selection is made by sending pulses to terminals 6 (Previous Part) and 7 (Next Part) of the input connector. Part Selection by BCD must be disabled for the remote control to function. See section “11.3 Configurations for Electrical Inputs and Outputs” to enable or disable Part

Selection by BCD. It is necessary to have at least two or more parts registered in the equipment.

Input 6 (Previous Part) decrements the part selection, serving the same function as the left arrow for part selection on the Main Screen. Send a pulse to this input to select the part prior to the currently selected part.

Input 7 (Next Part) increments the part selection, serving the same function as the right arrow for part selection on the Main Screen. Send a pulse to this input to select the next part.



#### NOTE

- *This feature is not available in the Standard G4 Converter Module.*

### 5.1.7 Monitoring of Open Load and Short-Circuit Load

The equipment's electrical outputs feature a monitoring system for open load and short-circuit load on each output terminal.

To enable or disable monitoring, access the “Diagnose Digital Inputs and Outputs” option in the equipment's “Inputs/Outputs” configuration submenu.

*Open load monitoring* checks whether the load connected to the corresponding output has good electrical contact. If not, the fault is detected by the internal circuit and signaled by the equipment. This feature is very useful for diagnosing failures and strange behaviors that may occur in the testing system.

*Short-circuit load monitoring* detects whether any of the outputs are short-circuited or overloaded. An internal measurement circuit monitors the current of the outputs and signals the equipment in case of any faults.

This feature prevents damage to the equipment's outputs by shutting them down when faults are detected.

For more information, please refer to section “[13.3 Verification of Inputs and Outputs](#)”.



### IMPORTANTE

- *Even with the aforementioned features, it is very important to verify the correct connection of the digital Inputs and Outputs. When the equipment signals a fault, a qualified and trained professional should perform the diagnosis.*

## 5.2 Serial RS-232 Interface

The RS-232 serial port allows the equipment to send and receive data from devices such as computers, PLCs, HMIs, and scanners. By default, the equipment provides an RS-232 port on a DB9 male connector. However, if a model is purchased with PROFIBUS communication protocol, the DB9 connector will be female, with an additional RS-485 port for connecting to networks operating with this protocol.

### 5.2.1 Using an RS-232 Scanner

By connecting a scanner to the RS-232 port, it is possible to read a code linked to a part, and the equipment automatically selects that part's program.

Only scanners approved by TEX should be used to ensure compatibility and proper functionality. The approved scanners are:

- *Honeywell Xenon 1950G*
- *Zebra/Symbol DS3508*



It is not recommended to use non-approved scanners. However, if you wish to use them, please consult TEX.

Alternatively, a scanner connected to the USB port may be used. Refer to section “[5.4.1 Using a USB Scanner](#)” for more information.

### 5.2.2 Printer

The G4-S8 equipment has a communication protocol with thermal printers, enabling communication with models that have an RS-232 port.

The homologated printers are from the manufacturer Argox, model OS-214plus (compatible with PPLB protocol), and Zebra, model GC420t

(compatible with EPL and EPL2 protocols). Please consult TEX for the use of different printers or protocols.



Serial Port	Function
2	Rx
3	Tx
5	GND

Rx – Receives data; Tx – Transmits data; GND – Common ground

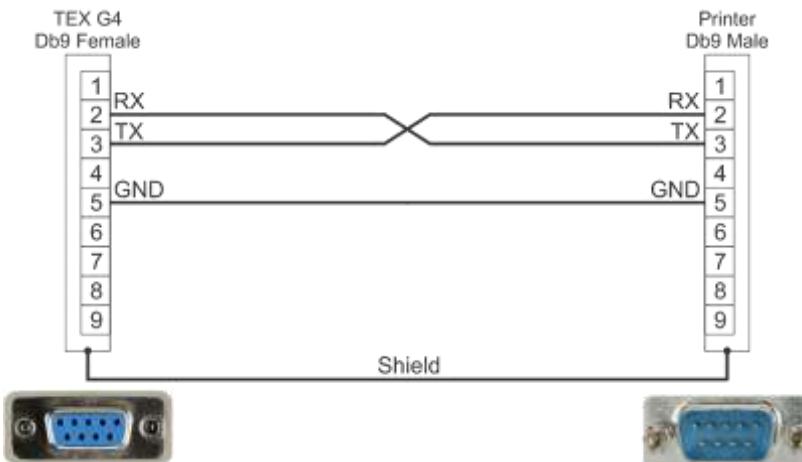
To use the printer, it is necessary to properly configure the equipment. See section "*5.6 Data Printing Communication Protocols via Ethernet and RS-232 Ports*" and "*11.4 Communication Settings*" to correctly configure the equipment.

 After executing a test, if the equipment is configured correctly, an icon will appear at the bottom of the Main Screen. Tapping this icon allows reprinting of the data upon confirmation via a pop-up.

### 5.2.3 Wiring Diagram for RS-232 Port with DB9 Male Connector (Non-PROFIBUS Models)

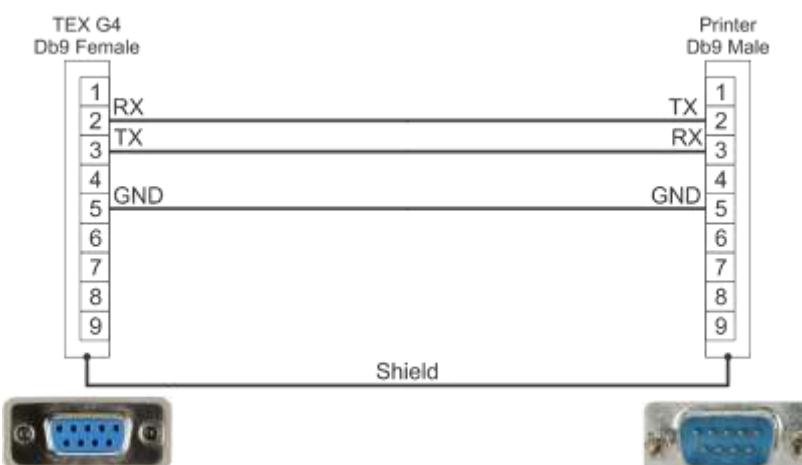
Before making any connections, it is important to know the function of each terminal on the equipment's serial ports.

Connection diagram with Argox OS-214plus Printer:



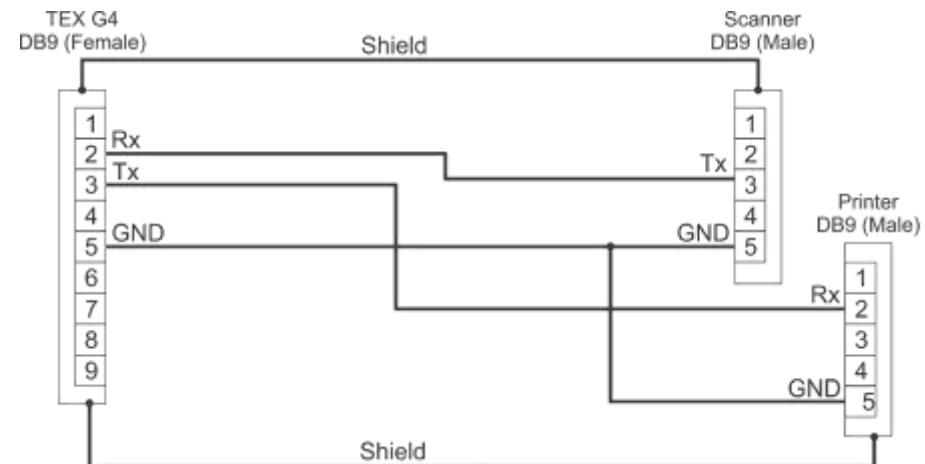
The DB9 connector for the equipment must be “female” and, for the printer, it must be “male”.

Diagrama de ligação com Impressora Zebra GC420t:



The DB9 connector for the equipment must be “female” and, for the printer, it must be “male”.

Combined Scanner and Printer connection diagram:



The DB9 connector for the equipment must be “female” and, for the scanner and printer, the connectors must match the types available on the devices.

The connection diagrams presented are only valid for scanners and printers approved by TEX Equipamentos. Consult TEX Equipamentos for the use of non-approved devices.



### IMPORTANT

- *The use of a shielded cable is not mandatory, but should be considered in cases of environments with high electromagnetic interference or the length is greater than 2m.*

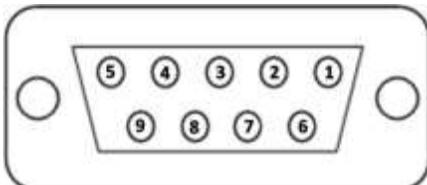
## 5.2.4 Wiring Diagram for RS-232 Port with DB9 Female Connector (PROFIBUS Communication Models)

Before making any connections, it is important to understand the function of each terminal on the equipment's serial ports.



### IMPORTANT

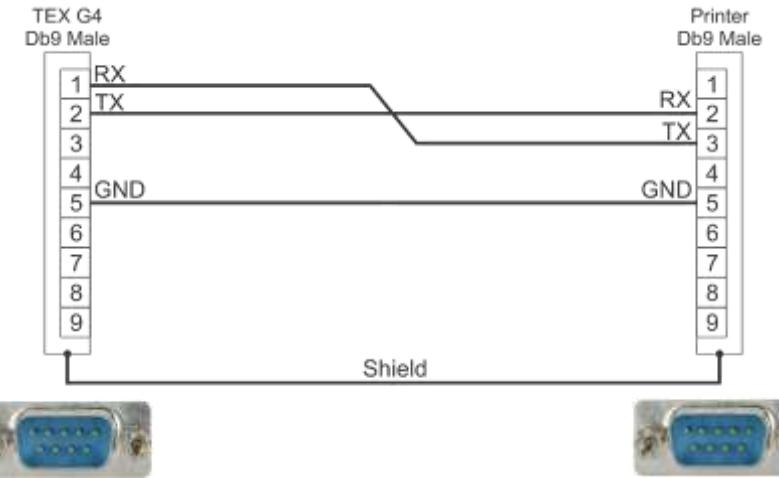
- Since the RS-232 and RS-485 ports are present on the same connector in equipment with PROFIBUS communication, the standard pinout is maintained only for the RS-485 port. Therefore, when using the RS-232 port or both ports simultaneously, a harness must be assembled according to the diagrams provided.



<i>Serial Port</i>	<i>Function</i>
1	Rx
2	Tx
5	GND

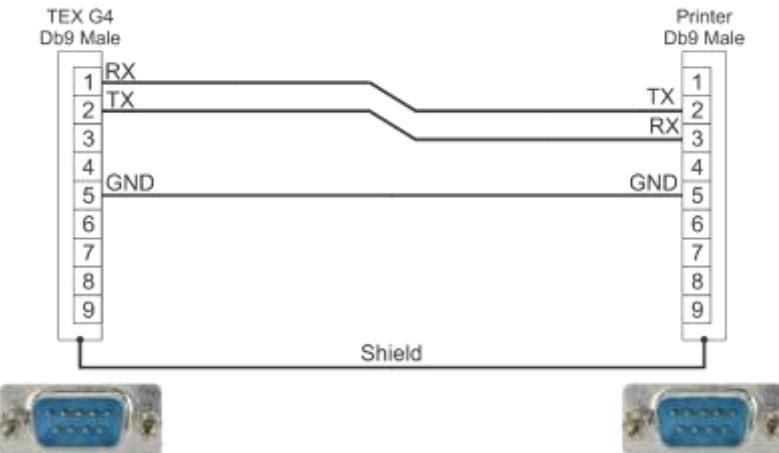
Rx – Receives data; Tx – Transmits data; GND – Common ground

Connection diagram with Argox OS-214plus Printer:



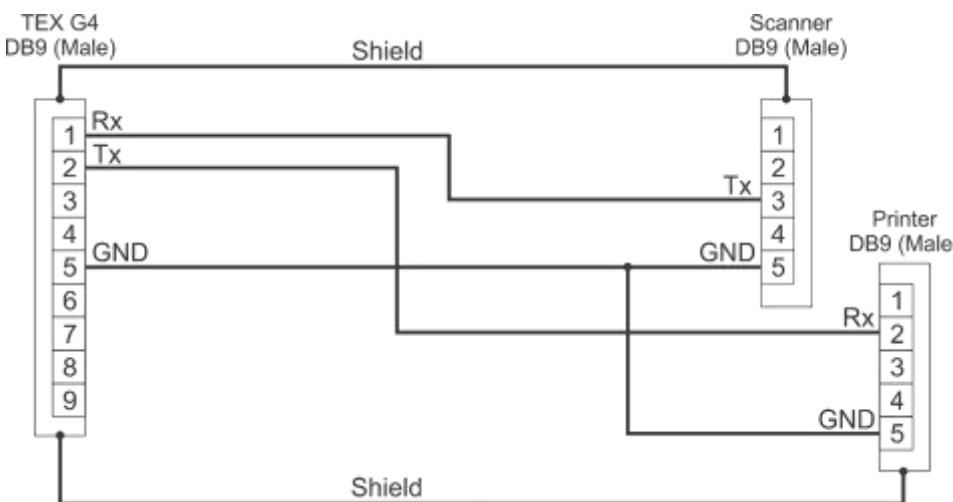
The DB9 connector for the equipment and the printer must be “male”.

Connection diagram with Zebra GC420t Printer:



The DB9 connector for the equipment and the printer must be “male”.

## Combined Scanner and Printer connection diagram:



The DB9 connector for the equipment must be “male” and, for the scanner and printer, the connectors must comply with the types available on the devices.

The connection diagrams presented are only valid for scanners and printers approved by TEX Equipamentos. Consult TEX Equipamentos for the use of non-approved devices.



### IMPORTANT

- The use of a shielded cable is not mandatory but should be considered in cases of environments with high electromagnetic interference or the length is greater than 2m.

## 5.2.5 RS-232 Port Parameters

The serial port parameters are factory pre-configured to be compatible with most applications. Transmission speed, parity, data length, and stop bit can be adjusted.

Refer to section “5.2.3 - Wiring Diagram for RS-232 Port with DB9 Male Connector” and “5.2.4 - Wiring Diagram for RS-232 Port with DB9 Female Connector (PROFIBUS Communication Models)” and “11.4 Communication Settings” for wiring diagrams and parameter adjustments.

RS-232 Parameters			
<b>Data Transmission:</b>			Full duplex
<b>Transmission (Baudrate):</b>	<b>Speed</b>	Configurable via software	(default: 115200)
<b>Start Bit:</b>			1 bit
<b>Data Length:</b>			Configurable via software (default: 8 bit)
<b>Parity:</b>			Configurable via software (default: None)
<b>Stop Bit:</b>			Configurable via software (default: 1 bit)
<b>Flow Control:</b>			None

The equipment must be restarted after changing the communication speed. Select the communication speed in the “RS-232 configuration” option under the “Communication” submenu. Refer to section “11.4

*Communication Settings*" for further information on communication configuration.

### 5.3 RS-485 Interface (PROFIBUS Communication Models)

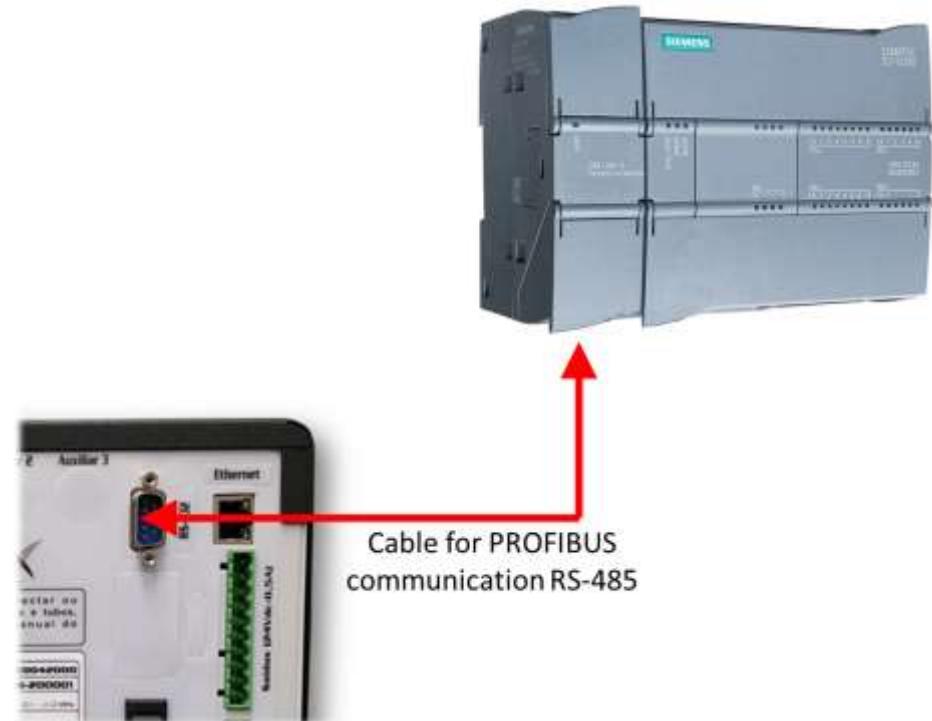
At the rear of equipment that features PROFIBUS communication, there is an RS-485 port (DB9 female connector) enabling the device to connect to a PLC through a cable. Before making any connections, it is important to know the function of each terminal of the RS-485 port on the equipment.



Serial Port	Function
3	B
5	GND
8	A

B – Non-inverting bus; A – Inverting bus; GND – Common ground.

Connect the cable to the RS-485 connector at the rear of the device, and the other end to a PLC that supports PROFIBUS, as shown in the illustration below.

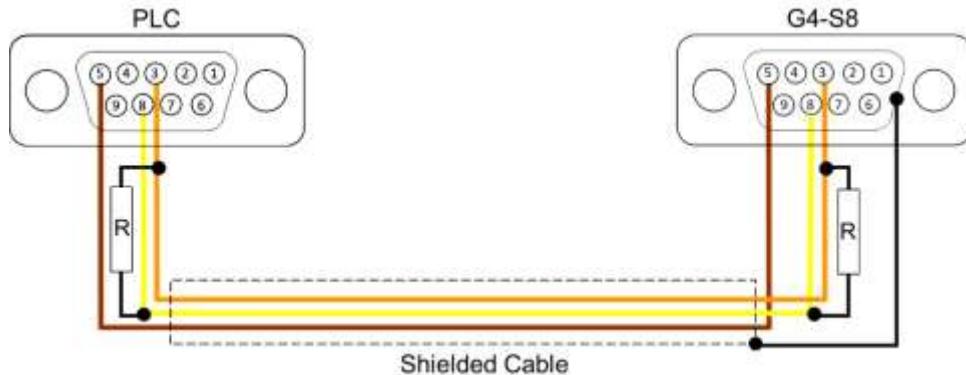


To consult information about equipment configurations regarding the PROFIBUS protocol, see the application note "G4-S8 Communication Protocols".

#### 5.3.1 RS-485 Cable Wiring Diagram

There are ready-made RS-485 standard cables compatible with PROFIBUS networks on the market. However, there is also the option to make the cable yourself.

For effective communication between the equipment and the PLC, the cable must be shielded, and a 120 Ω termination resistor should be soldered onto both connectors. Below is the wiring diagram:



**The plastic tab must be facing upwards**



Before inserting, make sure there is no foreign material or obstruction in the connector.

When connected correctly, the G4-S8 equipment will emit a sound indicating that your *Flash Disk* or scanner has been recognized by the system and is ready for use. In some screens, an icon is displayed when a USB device is connected.

The system accepts any storage size. Up to the time of this manual's publication, *Flash Disk* of up to 32GB have been tested.

The content saved on the *Flash Disk* can be read directly on a computer, allowing you to use your favorite programs to edit the recorded data. Some files can only be read by specific programs provided by TEX, as they contain encrypted data such as test part information, user registrations, and other equipment configurations.

A TEX *Flash Disk* (included with the equipment) automatically grants user access at level 4 when connected to the USB port. See sections "6.3 *Unlocking Equipment Access*" and "8 *User Management*" for access levels and user configuration details.

## 5.4 USB Port

The front panel of the equipment has a USB port with multiple functions such as collecting data, loading image files, updating the equipment, granting user access, connecting a scanner, among others.

The physical format of the port is USB type A (the same as the majority of *Flash Disk* on the market). The transmission speed follows the USB 2.0 standard at 480 Mbps.

Only *scanners* and *Flash Disk* such as USB sticks and SD card readers can be connected to the USB port. For connecting the flash drive or scanner, ensure the connector is oriented correctly: the inner tab should be facing upwards.

## CAUTION

- *Do not remove the flash drive while it is being accessed. Removing the flash drive during this process may result in data loss or damage to the flash drive. In some cases, it may even cause file system errors on the equipment.*



## IMPORTANT

- *The flash drive must be formatted in FAT32. Other formats may not be recognized by the equipment.*



## WARNING

- *Only use flash drives approved by TEX. The use of non-approved flash drives may lead to long-term data loss or even cause malfunction in the equipment! Beware of counterfeits! The brands approved by TEX are: **SanDisk, Kingston, TDK, and Corsair**.*
- *Only flash drives and scanners can be connected to the USB port. Do not connect phones, external hard drives, or any other device not approved by TEX. The connection of devices not approved by TEX may cause malfunctions or even damage the equipment, which will not be covered under the warranty.*

#### **5.4.1 Using a USB Scanner**

A scanner can be connected to the equipment's USB port. It can then read a code from a part, and the equipment will automatically select the part to be tested.

Only scanners approved by TEX should be used to ensure compatibility and proper functionality. Currently, the USB scanner approved by TEX is: **Scan Home – SH-400**.



The use of non-approved scanners is not recommended. Please consult TEX for the use of non-approved scanners.

Alternatively, a scanner with RS-232 communication may be used. Refer to section “*5.2.1 - Using an RS-232 Scanner*” for more details.

#### **5.5 *Ethernet Port***

Located on the rear panel of the equipment, there is an Ethernet port provided by an RJ45 connector, allowing the device to be connected to an Ethernet network via a standard CAT-5 cable. Through this port, the equipment can also be connected to a network using one of the following protocols: MODBUS/TCP, PROFINET, or EtherNET/IP. Please check your equipment model to know which protocol it operates with.

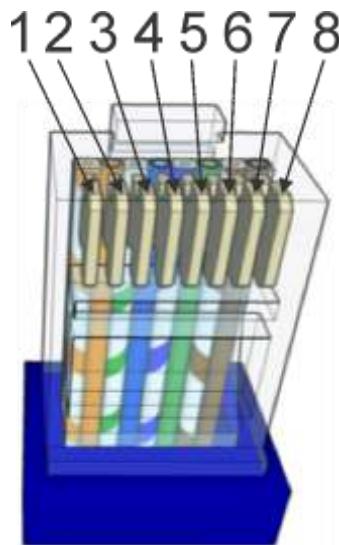
##### **5.5.1 Cable Setup**

The cable must follow the CAT-5 standard, and the connectors must be assembled using the T-568B standard.

It is recommended to use shielded cables (with mesh/shield) and metallic RJ45 connectors to avoid environmental electrical interference and noise during installation.



The cable assembly should follow the T-568B standard:



Layout of  
Terminals



Connection Diagram –  
Connector 2



Connection Diagram –  
Connector 1

Pin	Cable Color
1	Orange-white or light orange
2	Orange or dark orange
3	Green-white or light green
4	Blue or dark blue
5	Blue-white or light blue
6	Green or dark green
7	Brown-white or light brown
8	Brown or dark brown

Some cable models have pairs with the same color, in a light and dark shade. Other cables have a solid color and a white-striped pair.

Both cable ends must be identical. For direct connection to a PC, a crossover cable is not required, as the TEX G4 equipment has an automatic crossover feature.



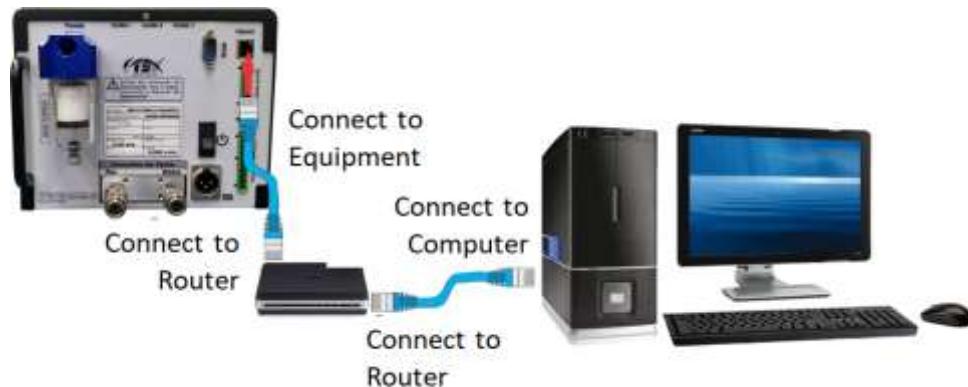
The icon shown below is displayed on the equipment's home screen when it recognizes that a device has been correctly connected.

### 5.5.2 Connection Diagrams

Connect one end of the cable to the RJ45 connector at the back of the equipment, and the other end to a router or switch as shown in the illustration below.



The equipment can also be connected directly to the computer's Ethernet port.



## 5.6 Data Printing Communication Protocols via Ethernet and RS-232 Ports

Upon completing each test, the G4-S8 equipment sends a data package for collection/printing through the **RS-232** or **Ethernet port**, containing relevant information about the test results.

Up to seven serial data transmission formats can be selected, including **“Result,” “Customized,” and “TEX Collector”**.

To configure this feature, access the **“Communication”** submenu and select the **“RS-232”** or **“Ethernet”** option under the **“Communication Interface”** parameter. Next, in the same submenu, choose a print format using the **“Communication Protocol”** parameter.

If the data is being printed via Ethernet, enter the server's IP address and port under the **“Server IP/Port”** parameter to which the equipment will send the data.

For more information, refer to section **“11.4 Communication Settings.”**



Once a test is completed and the equipment is properly configured, an icon will appear at the bottom of the Main Screen. Tapping this icon allows reprinting of the data via confirmation in a pop-up.

Veja, a seguir, os dados enviados em cada formato.



### NOTE

- The data printing communication protocol is available for the Ethernet port if the equipment model has the character **2** in the **16th** position: S8XXXXXXXXXXXX**2**XXX.*

### 5.6.1 Results

The results format is based on the “CSV” standard, with the semicolon (“;”) used as the separator. Empty spaces between separators indicate non-enabled resources on the equipment or unused test functions.

- Print example:

- Description of print fields:

Date; Time; Part; Abbreviated Name; Measured Pressure; Pressure Unit; Measured Leak; Leak Unit; Measured Volume; Volume Unit; Test Result; Checklist Line 1; Checklist Line 2; Checklist Line 3; Checklist Line 4; Checklist Line 5; Checklist Line 6; Checklist Line 7; Checklist Line 8; Checklist Line 9; Checklist Line 10; Checklist Line 11; Checklist Line 12; Production Order; Information; Equipment Serial Number; User; Nominal Pressure; Minimum Pressure; Maximum Pressure; Maximum Leakage; Fixed Offset; Volumetric Variation; Packaging Thickness; Leak Unit; Test Volume (kVe); Total Test Time; Depressurize Time; Stabilize Time; Measure Time; Relief Time; Step Time Unit; Temperature; Temperature Unit; Atmospheric Pressure; Unit of Atmospheric Pressure.

### 5.6.2 Customized

In this format, the transmitted data can be customized by editing print fields and text. Test data can be printed according to specific

requirements. For more details on how to use this format, see section “[10.5.2 Customized Printing](#)”

### 5.6.3 TEX Collector

This format is for proprietary use. Please consult TEX for more information.

#### 5.6.4 Sending Commands via RS-232 to Operate the Equipment

The RS-232 serial port can receive commands to perform basic operations through a scanner. To use this feature, enable the option “*Control via RS-232/USB*” in the “*Communication*” submenu – see section “*11.4 Communication Settings*”. Below are the available commands and their functions:

- Start a test  
**>>**
  - Stop a test  
**STO**
  - Select a test using the nickname part name  
**PRT:Nickname**
  - Display a pop-up message on the screen  
**SHO:Desired\_Message**

- Insert a prefix for the Short Name of the part records to be created or for the existing records (to learn how to use this command, see section “10.1.1.5 Barcode Prefixing”)

**PRE:Desired\_Prefix**

Commands must be sent with ‘LF’ (end of line) at the end. Check the device configuration to add this command.

Example 1: Select a part with the short name “PART1”.

PRT:PART1

Example 2: Show a pop-up to the operator with the information “Hello”.

SHO>Hello

## 5.7 TAG RFID (optional)

On the front panel of the equipment, there is the RFID (*Radio Frequency Identification*) interface, which functions to read RFID tags such as badges, labels, or key fobs. The purpose of reading the tags is to allow or block access to the equipment, replacing access keys or passwords (which can be lost or forgotten). To read the tag, simply bring it close to the identified area on the equipment.



If the tag is compatible, the equipment will read it, signaling on the screen and emitting a beep. Only tags that are registered on the equipment will allow access. Refer to sections “6.3 Releasing Access to the Equipment” and “8 User Management” for access levels and user configuration.

As TAG's compatíveis devem ter a seguinte especificação:

Specifications	
<b>Protocol:</b>	MIFARE
<b>Operating Frequency:</b>	125 kHz
<b>Maximum Distance:</b>	20 mm

Note: Some tags are provided as a courtesy to the customer. However, new tags can be purchased directly from TEX. Please contact our sales team.

## 6 - Operating the Equipment

### 6.1 Turning on the Equipment

With the equipment correctly connected to the compressed air network and the external source properly plugged into the equipment's power connector, turn on the main switch, symbolized by  and located on the rear panel of the equipment, above the power connector.



The equipment will emit a welcome sound, showing a video with the TEX logo. The Home Screen will then be displayed.



**NOTE:** It is possible to insert your company logo in the startup animation, along with a phrase (slogan). Consult TEX Equipamentos to insert this feature.

#### IMPORTANTE

- Leave the equipment turned on for at least 5 minutes before running a test. This time is necessary to carry out the warm-up (heating up to the ideal operating temperature), since the temperature directly influences the pressure measurement.

### 6.2 The Touchscreen Interface

The equipment has a 5" color LCD display, with a touch screen, located on the front panel of the equipment. By touching the various fields on the screens, the corresponding function will be activated, such as access to an options screen, a selection menu, a keyboard for entering parameters, among others. All features and options are accessed via the touchscreen interface, as are settings and parameters.



## ATTENTION

- Use only your fingers or a rubber tip to operate the touchscreen display! Never use sharp objects such as keys, pens, toothpicks, or any other object! Do not apply excessive pressure to the display, as there is a risk of causing it to crack or even break.

### 6.2.1 Screen and Menu Structure

The screens feature a structure of buttons and commands designed to facilitate operation and navigation. From the main screen, it is possible to switch between different screens, access the options menu, and configure the part registers.



The equipment is factory configured to show the *Measurement Screen* as the initial screen. However, it can be configured to show the test *Dynamic Chart* screen or the *Part Choice* screen as the initial screen.



Switching between the "Part Choice" screen and the "Dynamic Chart" screen.

Each screen has specific buttons and fields, just touching them to perform actions, such as starting a test, accessing time and pressure limit parameters and entering equipment settings.

Buttons change their appearance when they are inactive, active, or pressed. See the examples:



Inactive button



Active Button



Button Pressed



**Start** – starts a test for the selected part.



**Stop** – aborts the test for the part being tested.



**Help** – accesses the user guide screen and the cause and effect table (no unlocking required). This screen also contains contacts for people who can help in case of doubts.

## 6.2.2 Itens da Tela Principal

A tela principal possui diversos itens para facilitar a navegação do usuário e a visualização do estado do equipamento.

### 6.2.2.1 Side Buttons

On the right side of the screen, there are five buttons that provide access to the *Options Menu*, User Guide, and tests related to the chamber for packaging. Except for the help button, at least level 1 access is required to choose any of these options:



**Options** – opens the Equipment Options menu.



**Auto Zero Execution** – automatically defines some test parameters for all registered parts (global parameters) and some parameters for a specific part (local parameters). See section "9.3 – Auto Zero Execution".

### 6.2.2.2 Bottom of the Screen

To the left, there is a clock displaying the current date and time. At the center, from right to left, you will find icons indicating errors, Auto-check status, ongoing tests with Leak Master, *flash disk* connection, Ethernet connection, data printing, and whether the equipment is locked or unlocked (symbolized by a padlock).



### 6.2.2.3 Accessing Result Charts



At the bottom of the main screen, there is a button that allows access to the result charts of the currently selected part, starting from Level 1. See section "7.2.3 Charts" for more details.

#### 6.2.2.4 Displaying Results and Pressure Adjustment Shortcuts

Touching on the numeric value in the *Upper Measurement Field* or the *Part Identification Field* provides access to the selected part's Test Parameters Pressure screen.



Each tap on the numeric value in the *Lower Measurement Field*, after the equipment displays a test result, toggles the results between **leakage** and **volume variation**.



#### 6.2.3 Shortcuts and Icons on Screens



On every screen, there is a button that provides help for the current screen. Tapping on it will present help without requiring the equipment to be unlocked.

In the top right corner of all screens, except the main screen, there is a button that closes the current screen and returns to the main screen. Below this button, additional shortcuts might exist, which lead to the original screen.



#### 6.2.4 Numeric keyboard

Certain functions, when accessed, require numerical values to be entered, such as test times, pressure, etc. For this, a numeric keypad appears on the screen.



At the top of the keyboard, there is the field where the value being entered is shown.

Keys containing numbers enter the corresponding numbers. When touching a key for the first time, the value is cleared and the new value being entered is shown.

The +/- key makes the value positive or negative.

The ← key deletes one number at a time, from right to left.

The *ESC* key leaves the keyboard without modifying any value.

The *Enter* key confirms the entered values and closes the keyboard.

For security reasons, the value entered for passwords is not displayed directly, instead the character # (hash) is shown.

To enter dates, type only the numbers in sequence (two-digit day, two-digit month and four-digit year). For example, the date 10/01/2023 will be entered by typing "0 1 0 2 0 2 3" without the quotation marks.

This applies to entering clock values.

To enter negative values, type the desired value, and press the +/- key. For example, to enter the value -16.20, type "1 6 . 2 0 +/-", without quotation marks.

### 6.2.5 Alphanumeric Keyboard

Other items require the insertion of texts, such as part name, user name, etc. When the item is accessed, the alphanumeric keyboard appears so that text can be entered.



At the top of the keyboard, there is the field where the value being entered is shown.

Keys containing numbers, letters and special characters insert the corresponding characters. For keys that have two characters, you can enter the upper character when CAPS or SHIFT is active.

When you touch a key for the first time, the content is erased and the new content being entered is shown.

When touching the CAPS key, uppercase characters and uppercase characters of keys that have two characters will be inserted.

Touching the SHIFT key allows you to enter an uppercase character or a higher character of a two-character key. After typing one of these characters, SHIFT will be deactivated – the same way the SHIFT key works on computer keyboards.

The ← key deletes the character before the cursor.

The DEL key, when pressed for the first time, erases the pre-filled content and, pressed the next time, erases the character after the cursor.

The ← and → keys move the cursor between characters in the text.

The ESC key exits the keyboard, without modifying any text.

The Enter key confirms the entered text and closes the keyboard.

To type accented letters, first press the desired accent and then the letter. For example, to type “Não”, press “SHIFT N SHIFT ~ a o”, without quotation marks. To insert the cedilla (ç), press ““ c” (acute accent + c). The input mode is similar to that of computer keyboards.

## 6.2.6 List

There are screen items that have predefined parameters. To change these parameters, a list is used, which appears when accessing the item. The list contains all parameters that can be entered into the item.



On the left are the parameters that can be selected. On the right, there are the navigation and selection buttons. The up arrow button scrolls the list up and the down arrow button scrolls the list down. The central circular button confirms the parameter selection.

You can also directly press one of the options in the list to choose it.

## 6.2.7 Pop-ups

Pop-ups are dialog windows that appear in front of the current screen, when an event occurs or the equipment requires the user to take some action. There are three types of Pop-ups: messages, access and question.

**Message Pop-ups** inform the operator about events that have occurred or are occurring on the equipment. They have three levels of criticality: The first level is **information**, warning about important events, but which do not present risk, such as warnings from already registered users; the second level is **alert**, warning the operator about events that require attention, but do not pose risks, such as an overdue calibration/revision alert; the third level is **critical**, informing the operator that an event is critical and requires immediate attention, such as shorted electrical outputs.

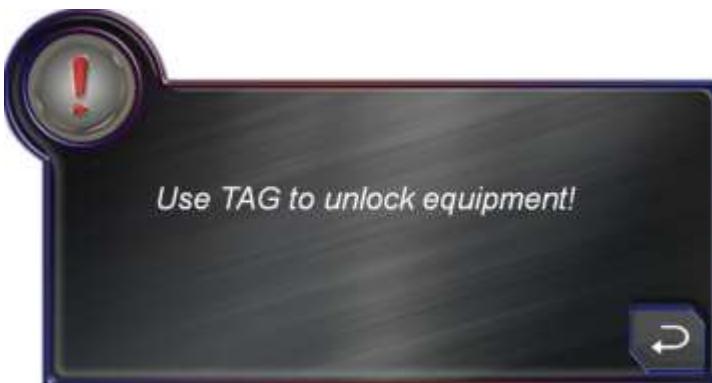
## Information



## Critical



## Alert



**Access pop-ups** appear when the equipment is unlocked using an RFID TAG or *Flash Disk TEX*, presenting a welcome message to the user who performed the unlocking.



In **Question Pop-ups**, the user is asked to confirm an action, such as deleting a part or adding a new user.



Message and access pop-ups are displayed for a specified time and are no longer displayed after that time. However, events from these Pop-ups are recorded in the equipment Log. The display time of these Pop-ups can be adjusted, see section “[11.1 Administrative Settings](#)” to adjust the time. Critical Pop-ups will be displayed until confirmed by the operator.

Some question pop-ups are also displayed for a period of time, while others require operator confirmation and are displayed until the operator chooses an option.

### ***6.3 Releasing Access to Equipment***

When turning on the equipment, it may be locked or have a specific access level. To configure the access level when calling, see section “[11.2 Access Settings](#)”.



When this icon is displayed at the bottom of the main screen (lock closed), access to the menus will be blocked, allowing access only to the help screens and switching between main screens.



When this icon is displayed at the bottom of the main screen (lock open), access to the equipment's functions will be available, according to the level granted to each user.

The RFID TAGs (optional accessory) or the *Flash Disk* provided by TEX are already configured to allow level 4 access. To do this, simply insert the *Flash Disk* into the USB port (remove it afterwards if desired) or bring the RFID TAG closer to the indicated location.



After that, an access pop-up will be displayed, with the welcome message, the registered username, the access level and the photo associated with that user.

The registration of TAGs and Flash Disk provided by TEX can be changed by a level 4 user. Thus, you can modify the name, upload a photo, choose another access level and add other information. See section “[8 User Management](#)”.

Only RFID TAGs compatible with the equipment can be read and registered – see section “[5.6 RFID TAGs \(optional\)](#)” for information on

compatibility. In the case of *Flash Disks*, only those provided by TEX can grant access to the equipment and register users. If you need more *Flash Disks* with this feature, contact TEX Equipamentos.

If the device is granting access to a user and someone touches the padlock icon (mentioned previously), the Welcome Pop-up related to that user opens. When touching this icon a second time, the equipment ceases permission for that user and grants the initial level of access (when turned on). If access was granted by an RFID TAG, you have the option of interrupting access by reading that TAG again. Access granted to a user is also interrupted if the equipment remains inactive for a while or is turned off. This time can be adjusted – see section “*11.2 Access Settings*”.

If a user has been registered using a password and the equipment has the initial access level (access level when turned on), touch the padlock-shaped icon once. This action will cause a list to be presented with all users registered through this modality. Choose a user and enter the password on the numeric keypad. If for any user the password was entered incorrectly three times in a row, it will be blocked, but can be unlocked by a Level 4 user. For more information, see chapter “*8 User Management*” for more information.

If the equipment already has access granted to a user, when approaching an RFID TAG or inserting a Flash Disk relating to another user, the equipment cancels the current permission and grants a new one.



#### IMPORTANT

- All access and blocking of the equipment are sent to the Messages log.

### 6.3.1 Access Levels

There are 4 possible access levels on the equipment. Each user, registered with a card, *Flash Disk* or password, can only have a single level of access. Each level allows access to different areas and equipment settings. They are, from lowest to highest:

**Level 1** – This is the most basic access level. At this level, it is possible to start a test, change the test piece and view some parameters and menus.

**Level 2** – The user has level 1 access and can change part parameters, perform basic configurations, view and save parts and equipment records.

**Level 3** – The user has access to level 2 and the adjustment screens.

**Level 4** – This level allows general access and modifications to equipment. New users can be registered, change advanced settings, manage calibration certificates and perform equipment software updates.



#### CAUTION

- *Level 4 allows access to parameters and settings that are fundamental to the operation of the equipment and the reliability of the tests. Be careful when granting access at this level.*

### 6.4 Measurement Screens

There are three types of screens that can be selected on the main screen to be displayed as the initial screen: the measurement screen, the *chart screen*, and the *parts selection screen*.

To switch between them, press the <<< and >>> buttons at the top of the main screen.



By default, when the equipment starts up, the *Measurement Screen* is first displayed as the initial screen. However, through the settings in the "Administrative" submenu, under equipment configurations, it is possible to select one of the other two screens as the initial screen.



#### NOTE

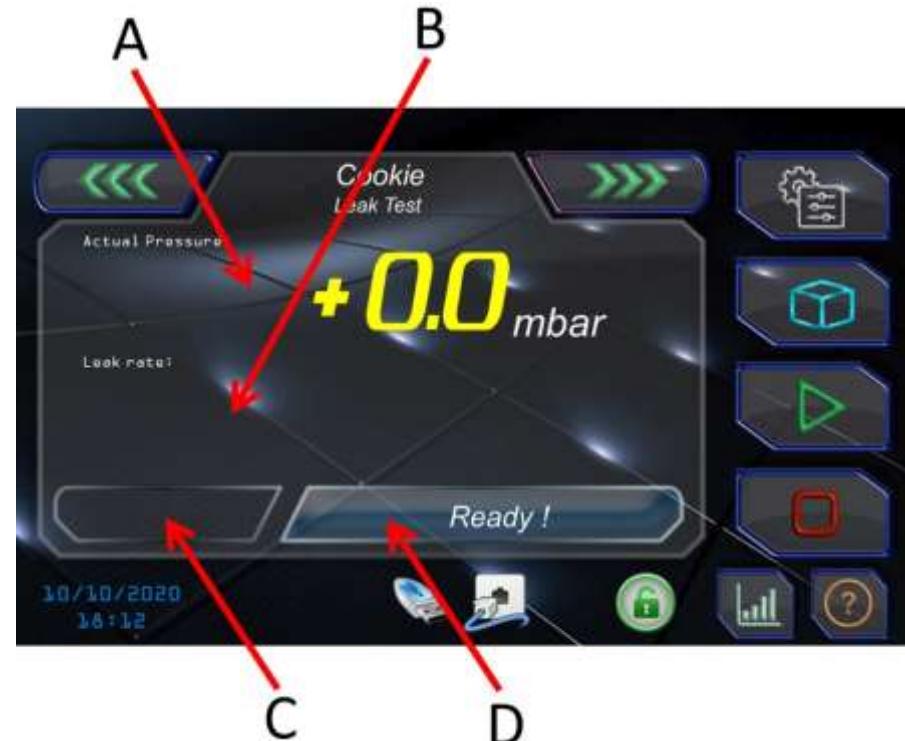
- In order for these buttons to select the chart screen and the parts selection screen, make sure that the parameter "Select part on main screen" in the "Administrative" submenu is inactive – refer to sections "11.1 Administrative Settings" and "10.1 Selecting Parts" for more information.*

Between the buttons, the Part Identification Field is displayed, containing the NAME (upper position) and TEST TYPE (lower position) of the current part.

#### 6.4.1 Measurement Screen

The measurement screen displays the pressure and leakage values (or the size of the hole where the leakage occurs) in numerical format. After the test is completed, the status of *Approved* or *Reproved* is indicated by changing the font color (simplified display mode, adjusted only by Tex) or

by changing the background color of the *upper* and *lower fields*, in addition to an indication in the status bar. See section "10.6.1 Simplified Display of Results".



##### A. Upper Measurement Field

This field shows the test pressure and its unit. By tapping on the numerical value, the *Pressure Test Parameters* screen is displayed. For more information, see sections "6.2.2.4 Displaying Results and Shortcuts to Pressure Adjustment" and "9.2.4 Adjusting Pressure".

##### B. Lower Measurement Field

This field shows the *Leakage* (or the diameter of the hole through which the leakage occurs) and its unit, as well as the *Volume Variation*. With each tap on the numerical value, the last test result alternates between *Leakage* and

*Volume Variation.* For more information, see sections “6.2.2.4 Displaying Results and Shortcuts to Pressure Adjustment” and “9.2.5 Adjusting the Limits”.

#### C. Progress Bar

It fills up as the test progresses. At the end of the test, the bar will be completely filled in a blue tone.

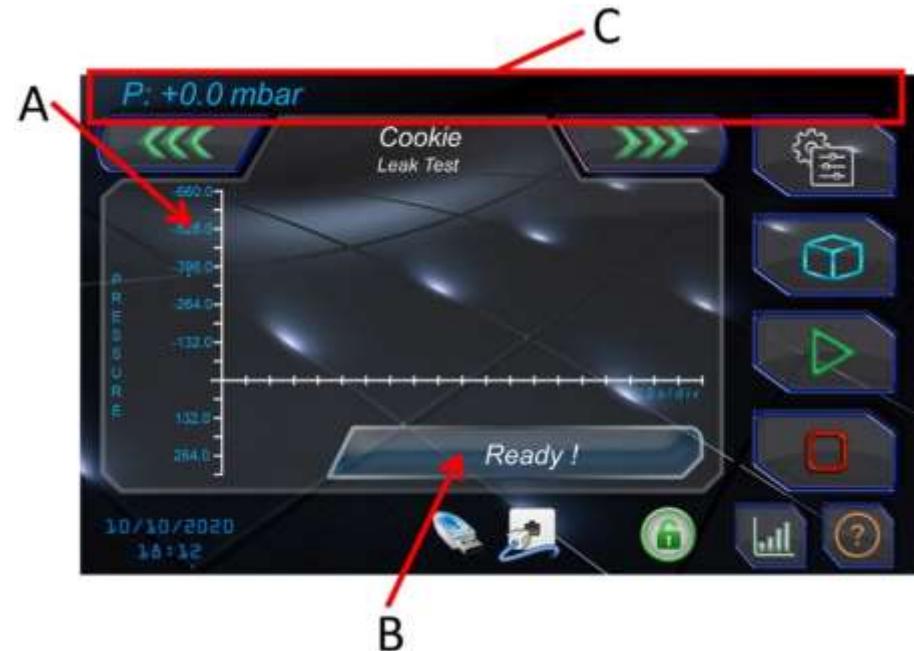
#### D. Time, Test Stage, and Status Indicator

During the test, this field indicates the stage the test is in (depressurization, stabilization, etc.) and the remaining time to complete a stage. At the end of the test, it indicates whether the part was approved or rejected (due to packaging leakage or pressure failure).

As mentioned earlier, the *Upper Measurement Field* and the *Lower Measurement Field* change their background color based on the final test status: green for *Approved Part* and red for *Reproved Part*. When a rejection occurs, the reason is indicated. When the rejection is due to a pressure failure, only the *Upper Field* turns red, and when the rejection is due to leakage, only the *Lower Field* turns red. The values displayed (frozen) after the test are the results measured at the test decision point.

## 6.4.2 Dynamic Chart Screen

The graph screen displays the pressure (P) and leakage (Q) values as a function of time (t) in a Cartesian chart format. The status of Approved or Reproved is indicated by changing the background color of the *time and test stage indicator* field after the test is completed. The chart screen is very useful for analyzing the behavior of the part.



#### A. Plotting Area

In this field, the graph of the selected variable is plotted. The Y-axis (vertical) indicates the magnitude of the variable, and the X-axis (horizontal) indicates the elapsed time. The pressure graph (P) is displayed for all tests, and the leakage graph (Q) or a combination of both is displayed for the leak test. **To switch between displays, tap on the plotting area.** On the left side of the plotting area, there is the scale and legend for the variable indicated on the Y-axis. Tap this area to change the scale in the combined pressure/leakage mode. The time per division value on the X-axis is shown at the end of this axis.

#### B. Time, Test Stage, and Test Status Indicator

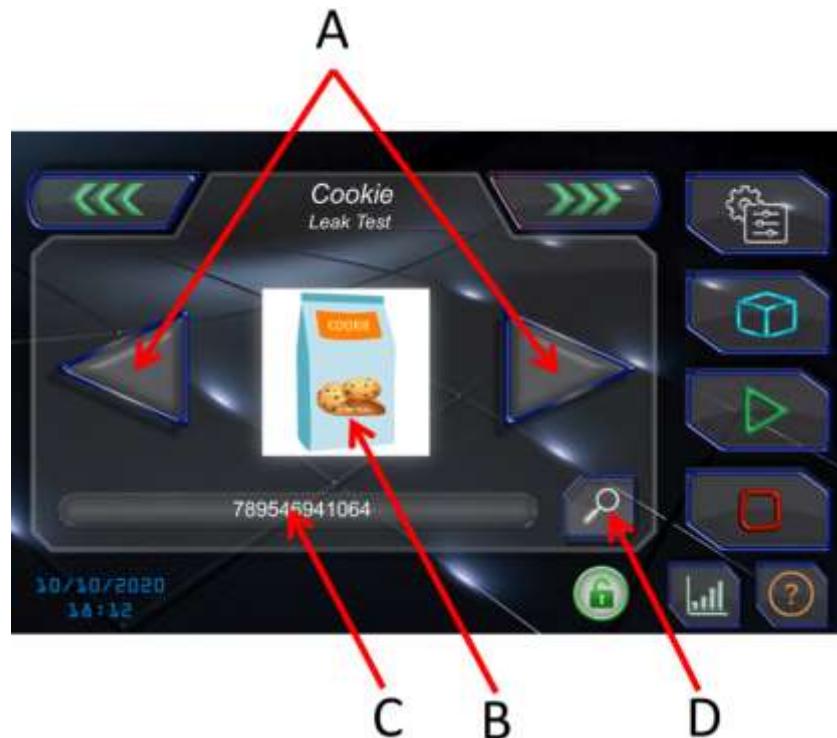
In this field, the stage of the test is indicated (depressurization, stabilization, etc.) and the remaining time to complete the stage. At the end of the test, it indicates whether the part was approved or reproved (due to packaging leakage or pressure failure). The background color of the field changes according to the test status: green for approved and red for reproved.

### C. P and Q Indicators

At the top of the screen, there are P and Q indicators, which represent pressure and leakage (or the diameter of the hole through which a leak occurs), respectively. Both values are displayed regardless of the graph chosen on the screen.

## 6.5 Selecting Parts for Testing

On the main screen, it is possible to access the parts selection screen using the <<< and >>> buttons. The Parts Selection Screen has several buttons and controls, described below:



### A. Selection Buttons

Navigate between the existing parts.

### B. Part Photo

Graphical representation of the part being tested. To load a photo, refer to section "9.1.8 Including a Part Photo." Tap on the part image to access the part

### C. Lower Field

Nickname of the registered part.

### D. Search Button

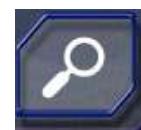
Parts can be located using a search system. The equipment searches for the part using the **nickname of the part**. Tap this button to enter the nickname and perform the search.



### NOTE

- For this screen to be available for selection, make sure the "Select parts on main screen" parameter in the "Administrative" submenu is inactive – refer to sections "11.1 Administrative Settings" and "10.1 Selecting Parts" for more information.

While on the parts selection screen, use the Selection Buttons to navigate between the parts. Simply stop navigation and leave the desired part on the screen for it to be selected. There is no need to confirm the selection, just start the test.



The part can also be located and selected using the search button. The search is performed using the **nickname of the part** you want to locate – for example, for the part "789546941064," you should enter "7 8 9 5 4 6 9 4 1 0 6 4."

Tap the button to enter the barcode on the alphanumeric keyboard.

If the part is found, it will be automatically selected. If the part is not found, a pop-up will display a message saying the part was not found.

It is possible to remotely select parts through the Electrical Inputs by sending pulses to the corresponding inputs. The Remote Parts Selection Control performs the same function as the selection buttons. See section “[5.1.6 – Remote Parts Selection Control](#)”.

Parts can also be selected through the BCD Link. The part to be selected via BCD Link must have an assigned value, and the corresponding BCD signals on the electrical inputs can be applied. See section “[5.1.5 Selecting Parts via BCD](#)” for more information on selecting parts via BCD.

It is possible to select parts via the RS-232 port or the USB port, using a barcode scanner. See sections “[5.2.1 Using RS-232 Scanner](#),” “[5.4.1 Using USB Scanner](#)”, and “[9.1.2.4 Scanner Reading](#)” for more information.

Parts with an abbreviated name starting with a hash (#) are Try-out parts, whose parameters were defined during the part's try-out, conducted by TEX. Try-out Part parameters are optimized for the part and test conditions and cannot be modified by the customer. However, the user can clone these parameters and modify the copy. See section “[9.1.2.2 Cloning a Part](#)” for more information.

## 6.6 Power Saving Mode

The G4-S8 Equipment has the Low Power concept (low energy consumption), which aims to consume energy intelligently, avoiding waste and thinking about the environment.

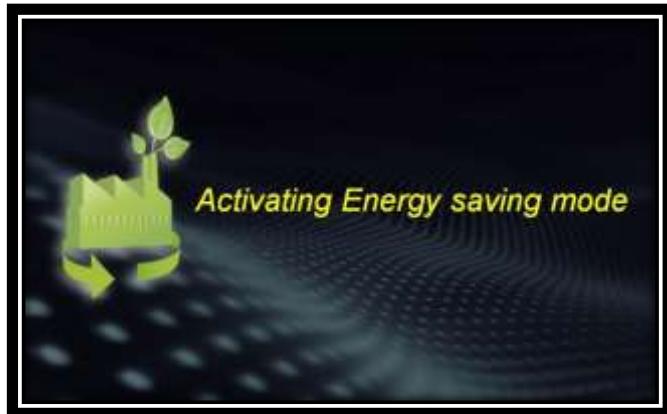
The equipment has an Energy Saving feature. When it is activated, the display turns off.

This feature only turns off the display, but all operational parts continue to function normally, that is, tests can be performed normally in this mode. Therefore, this feature is very useful when the equipment is installed in a fully automated production line, with little or no access to the equipment screen.

At any time when current access is BLOCKED or level 1, Power Saving mode can be activated. To do this, on the home screen, press the clock area.



Power Saving mode may be activated automatically. After a period of inactivity, when the interface is not operated, the equipment will automatically enter Power Saving mode. To automatically activate saving mode and adjust idle time, see section “11.1 Administrative Settings”. When activating Energy Saving mode, the equipment will display an image signaling the mode.



To exit Energy Saving mode, insert a TEX Flash Disk or read an RFID TAG.

#### **IMPORTANT**

- When accessing above level 2, the clock area will not activate Energy Saving mode, but will access the Set local Date and Time option.

## 6.7 Help



On all screens, there is a help button, represented by the icon on the side. When you touch this button, the user guide will be displayed on the corresponding screen. It is not necessary to unlock the device to access the help screen.

On the main screen, the help button gives access to the help menu, where “Troubleshooting”, “User Guide” and “Contacts” can be selected. The **Troubleshooting** option contains topics related to troubleshooting. In **User Guide**, the topics are divided into information about conservation, maintenance, equipment operation and help related to the current menu. In the **Contacts** option, TEX contacts and two contacts entered by the customer can be viewed.



On other screens, the help option is specific to the screen. See below for a description of the help screen items.



**E. Identification**

Field that identifies whether the help topic accessed is the Troubleshooting or User Guide option.

**F. Help Topic Title**

The help topic title is displayed here. When related to a menu or screen, the title receives the same name as them.

**G. Selection Buttons**

Selection buttons allow you to navigate between existing topics.

**H. Scroll Buttons**

Scrolls through the pages of the current help topic (if the topic has more than one page).

**I. Text**

The text of the current help topic can be viewed in this field.

**J. Image for guidance**

Image related to the current topic, displaying a thumbnail of the screen, image of the component or even demonstrating a procedure.

## 6.8 Using Flash Disk for Data Transfer

Flash Disk is used to collect data from parts records and backups, upload images to parts and registered users, copy calibration certificates and user manuals, and update equipment firmware. On the main screen, the user registration screen and the specifications screen, the icon to the side will be displayed.



Para coletar dados de registros e realizar backups de peças, insira o Flash Disk na porta USB e utilize os comandos correspondentes nas telas.

Em algumas telas, a inserção do Flash Disk ativará automaticamente as transações correspondentes. Nesse caso, um pop-up para confirmação surgirá.

Para atualização do firmware, consulte a seção “14.4 Atualização do Software”.



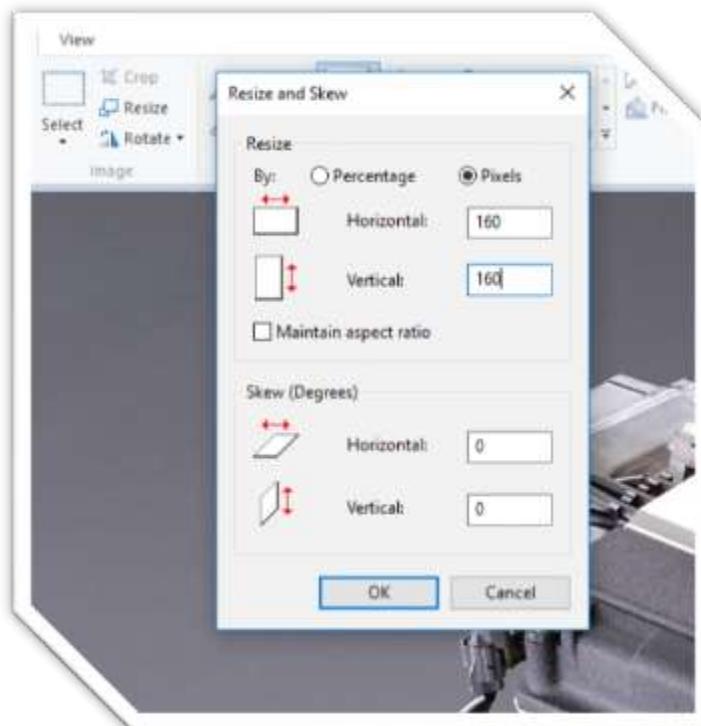
**CAUTION**

- *Do not remove the Flash Disk while it is being accessed. Removing the Flash Disk in this condition may cause data loss or render the Flash Disk unusable. In some cases, it can even cause failures in the equipment's file system.*

## 6.8.1 Inserting Images

When inserting images from Flash Disk, there are two important requirements: **it must be in 24bit Bitmap format (.bmp) and have a size of 160x160 pixels.** An image with a format and size different from that specified will not be accepted.

A simple application like Paint (Windows tool) can resize and save the image in this format.



Open the desired image with Paint and, in the top toolbar, click on the "Resize" option. In the window that will appear, select the "Pixels" option and uncheck the "Maintain aspect ratio" option. In the "Horizontal" and "Vertical" fields, enter 160, which is the horizontal and vertical dimension of the image, in 160 pixels.

Save the image in the ".bmp" format, assigning the file name to match either the registered user's name or the part's abbreviated name, with the following conditions:

- For user images, the file name should contain only the registered first name, without needing to distinguish between uppercase and lowercase letters – for example, an image for the user João Silva's registration can be named "João.bmp," "joão.bmp," or "JOÃO.bmp";
- For part images, the file name must contain all the characters of the part's NICKNAME, including spaces, without needing to distinguish between uppercase and lowercase letters – for example, an image for the part registration "Chocolate 60" can be named "Chocolate 60.bmp," "chocolate 60.bmp," or "CHOCOLATE 60.bmp."

On the *Flash Disk*, create a folder and name it "TEX\_G4\_XX," where "XX" indicates the equipment model (SE, VE, DF, VZ, VH, EC, GV, among others). Then, transfer the desired image to this folder.

## 6.8.2 Decrypting Equipment Files in Traceability Mode

If the *Traceability Mode* option is activated in the *Administrative Settings* submenu, the result log files and messages downloaded to the *Flash Disk* by the equipment are protected against changes (encrypted) and cannot be read directly on the computer. In fact, this guarantees the integrity of

\*Windows and Paint are registered trademarks of Microsoft Corporation.

this data. To learn how to enable *Traceability Mode*, see section “11.1 Administrative Settings”.

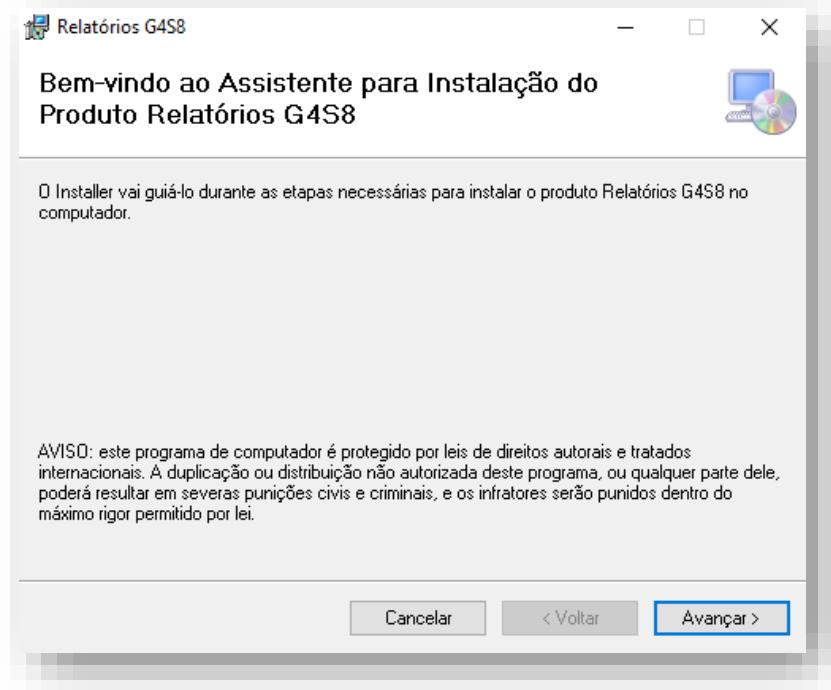
The user has the option to view the result logs and messages and copy this data to the Windows clipboard. To do this, use the *TEX – G4S8 Reports* software available on the equipment's Flash Disk. The following sections will show you how to install this software on your computer and use it.

#### 6.8.2.1 Installation

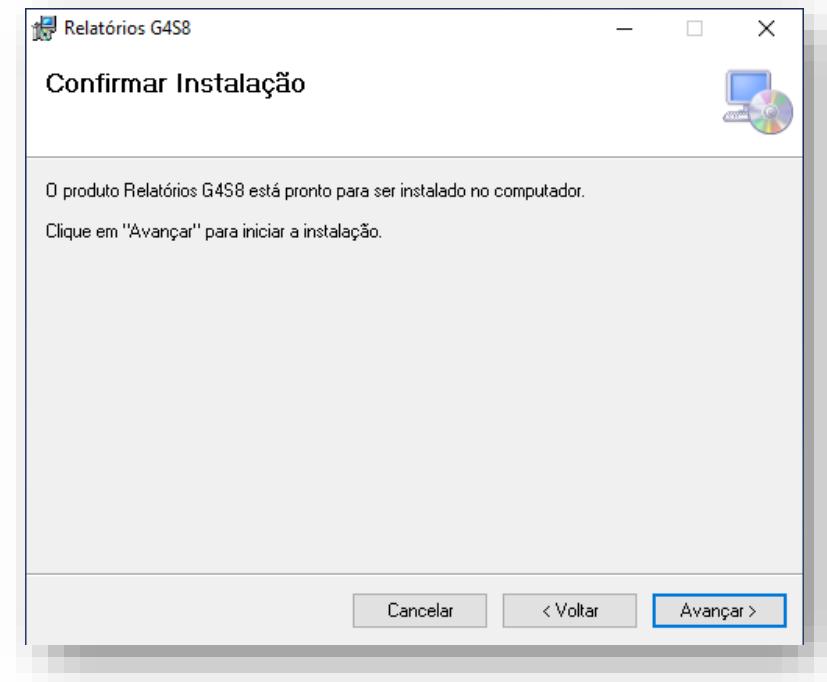
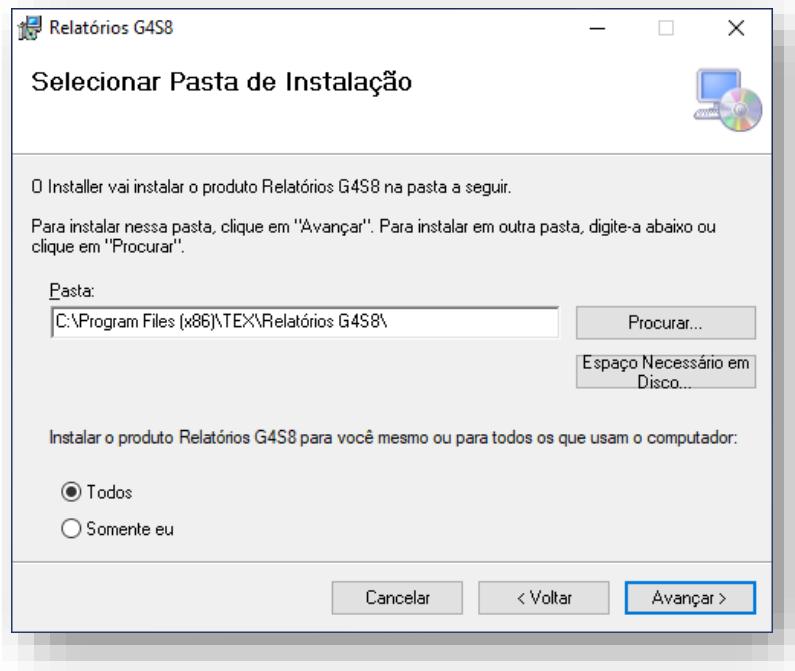
In the root of the equipment's *Flash Disk*, open the *G4S8 Report* folder and run the *setup.exe* file – this installer is only for the Windows platform.



Click Next.

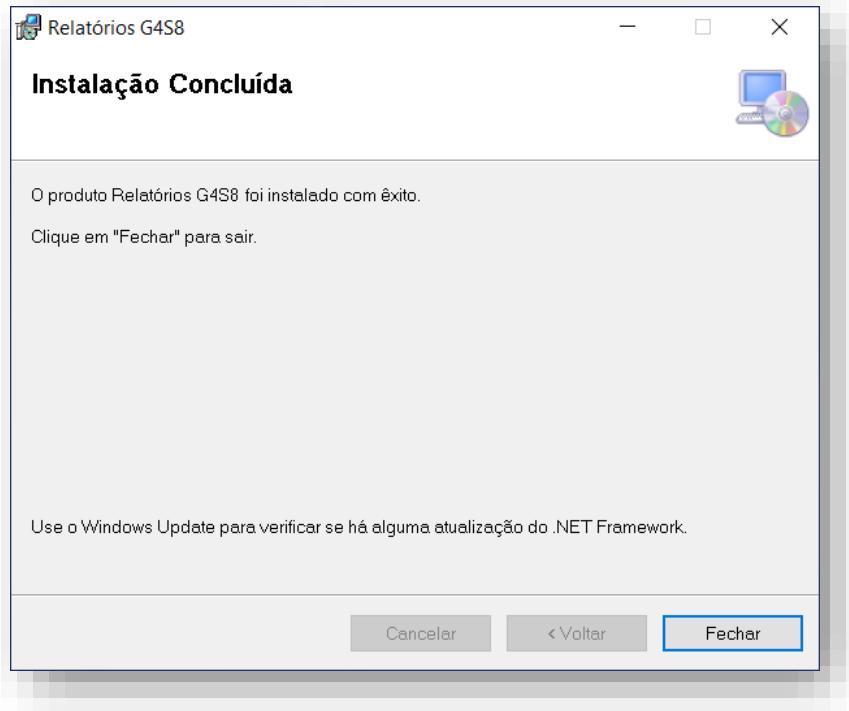


Choose whether you want to install the program only on your username or on all those available on your computer, view the available space on each disk on your computer and select the directory where the program will be installed. The installer already sets a default directory – it is highly recommended that you do not change it. Once the options have been configured, click *Next*.



The installer will send a message to confirm the installation. Click *Next* to continue.

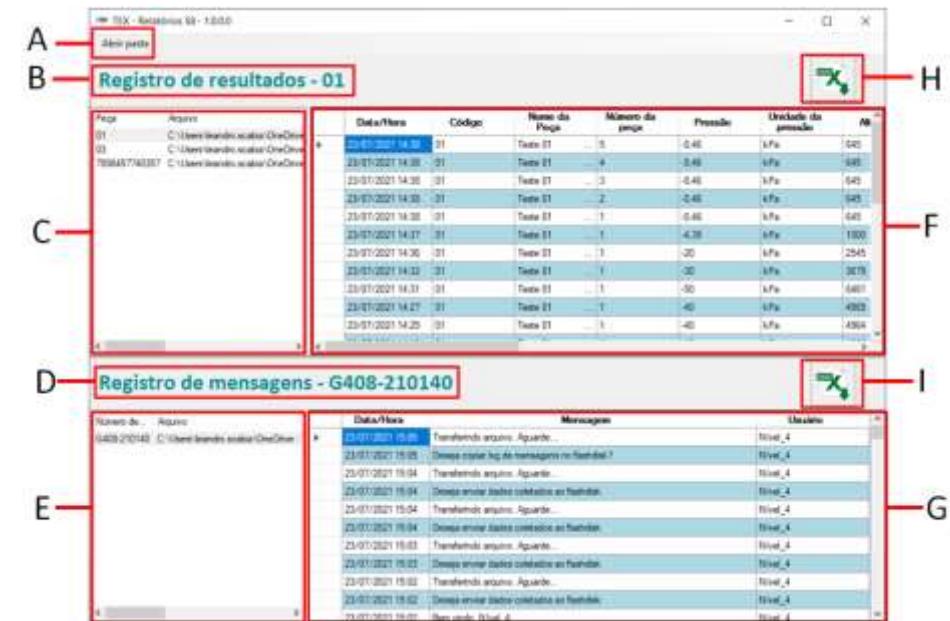
The installation will run and at the end a window should appear informing you that the program was installed successfully. Click *Close*.



That's it, now the *TEX - G4S8 Reports* software is ready to use. To run it, navigate to *Start Menu -> TEX -> G4S8 Reports*.

### 6.8.2.2 Utilização do Software *TEX-Relatórios G4S8*

The *TEX-Reports G4S8* software has a simple interface for viewing and copying encrypted data. The functions of this tool are presented below.



#### A. Abrir Pasta

Opens a window to indicate to the program the *TEX\_G4\_GV* folder directory.

#### B. Registro de resultados

Indicates the results record for the selected part. The information after the dash is the *Nickname* of the selected part.

#### C. Part File Selection Field

Displays the available result record files in the *TEX\_G4\_GV* folder. Double click on the desired part line to view the file contents.

#### D. Registro de mensagens

Indicates the message log of the selected device. The information after the dash is the serial number of the selected equipment.

#### E. Equipment File Selection Field

Displays the available message log files in the *TEX\_G4\_GV* folder. Double click on the desired equipment line to view the file contents.

#### F. Presentation of the Selected Results File of the Part

Shows the contents of the part results file. Each line represents a test performed and each column represents information about the test. Note that there is a horizontal and vertical scroll bar to show information that does not fit

in this field. If a test is performed with multiple parts, each line will represent a part of that test.

#### G. Presentation of the Message File of the Selected Equipment

Shows the contents of the device's message file. Each line represents an event that occurred, and each column represents information about that event. Note that there is a horizontal and vertical scroll bar to show information that does not fit in this field.

#### H. Generates Spreadsheet from the Selected Results File

This button generates a protected ".xlsx" file from the Results Archive. This file allows you to view and copy data to the Windows clipboard.

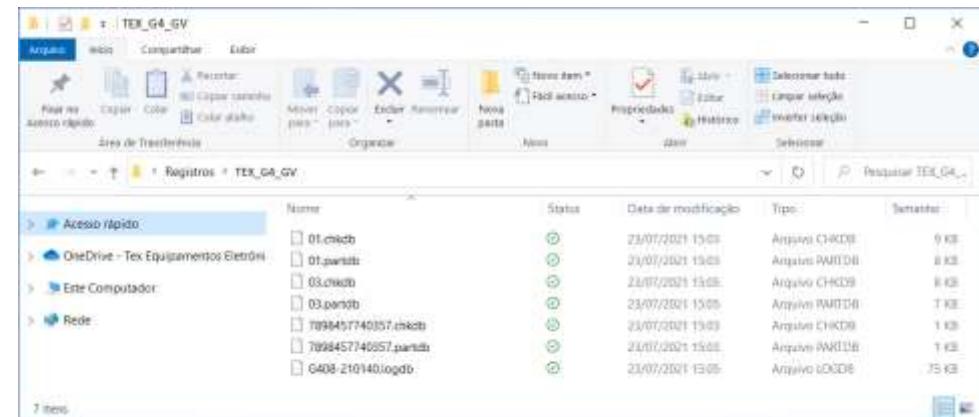
#### I. Generates Spreadsheet from the Selected Message File

This button generates a protected ".xlsx" file from the Message Archive. This file allows you to view and copy data to the Windows clipboard.

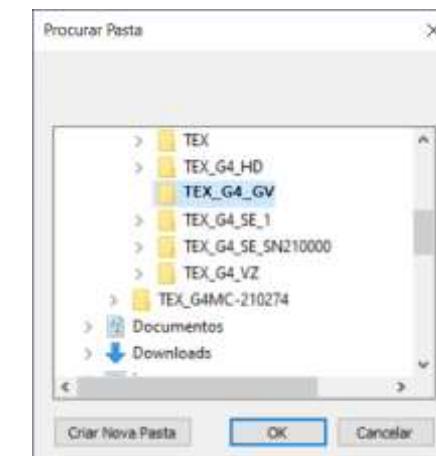
First, download the desired message and result records onto the equipment's Flash Disk. The device will create a folder called *TEX\_G4\_GV*, and the files will be transferred there. Note that the files will have extensions like ".logdb", ".partdb" and ".chkdb". That first extension refers to the message record file, while these last two refer to the parts record files and cannot be separated. The message log file will be named after the equipment serial number, and the parts files will be named after the part *Nickname*.

You can copy the *TEX\_G4\_GV* folder to a directory on your computer, but it is important to keep its file structure intact.

In the following example, the *TEX\_G4\_GV* folder contains the log files for the parts whose short names are 01, 03 and 7898457740357 and contains the message log file for the equipment whose serial number is G408-210140.



Run *TEX-Reports G4S8* and click the *Abrir Pasta* button (indicated by A). This action will open a window for the user to indicate the directory of the *TEX\_G4\_GV* folder.



When you click *OK*, the available files appear in the fields indicated by C and E.

TEX - Relatórios S8 - 1.0.0.0

Abrir pasta

### Registro de resultados - C

Peca	Arquivo
01	C:\Users\Leandro scabia\OneDrive\
03	C:\Users\Leandro scabia\OneDrive\
7890457740357	C:\Users\Leandro scabia\OneDrive\

### Registro de mensagens -

Número de	Arquivo
G408-210140	C:\Users\Leandro scabia\OneDrive\

- 01



Data/Hora	Código	Nome da Peça	Número da peça	Pressão	Unidade da pressão	Alt
23/07/2021 14:38	01	Teste 01	5	-0,46	kPa	645
23/07/2021 14:38	01	Teste 01	4	-0,45	kPa	645
23/07/2021 14:38	01	Teste 01	3	-0,46	kPa	645
23/07/2021 14:38	01	Teste 01	2	-0,46	kPa	645
23/07/2021 14:38	01	Teste 01	1	-0,45	kPa	645
23/07/2021 14:37	01	Teste 01	1	-4,39	kPa	1000
23/07/2021 14:36	01	Teste 01	1	-20	kPa	2545
23/07/2021 14:32	01	Teste 01	1	-30	kPa	3679
23/07/2021 14:31	01	Teste 01	1	-50	kPa	6461
23/07/2021 14:27	01	Teste 01	1	-40	kPa	4965
23/07/2021 14:25	01	Teste 01	1	-40	kPa	4964

- G408-210140



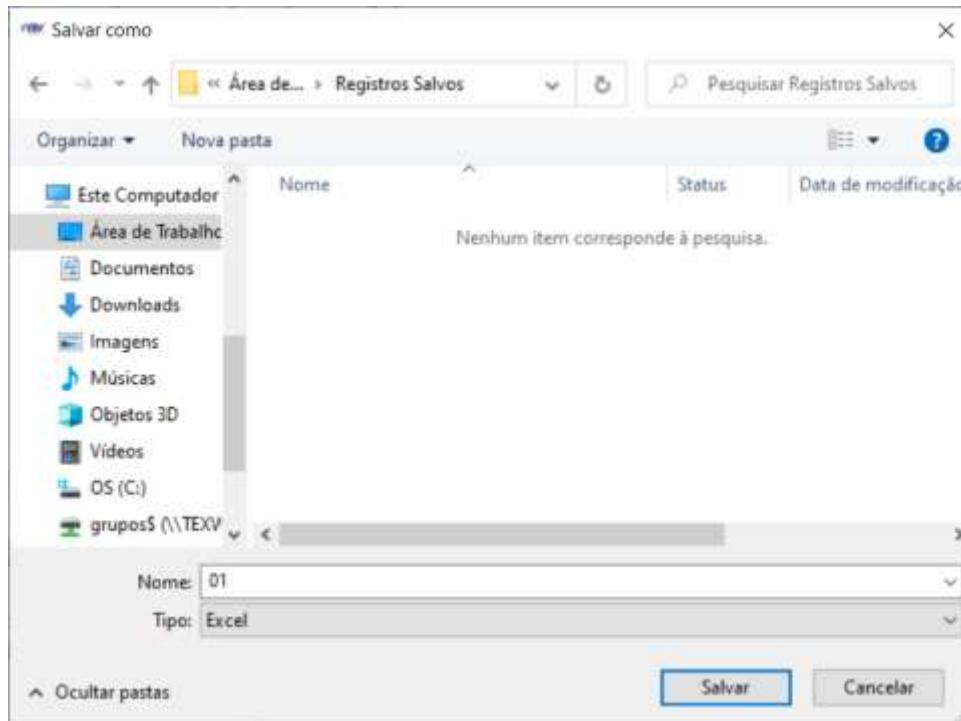
Data/Hora	Mensagem	Usuário
23/07/2021 15:05	Transferindo arquivo. Aguarde...	Nível_4
23/07/2021 15:05	Deseja copiar log de mensagens no flashdisk?	Nível_4
23/07/2021 15:04	Transferindo arquivo. Aguarde...	Nível_4
23/07/2021 15:04	Deseja enviar dados coletados ao flashdisk	Nível_4
23/07/2021 15:04	Transferindo arquivo. Aguarde...	Nível_4
23/07/2021 15:04	Deseja enviar dados coletados ao flashdisk	Nível_4
23/07/2021 15:03	Transferindo arquivo. Aguarde...	Nível_4
23/07/2021 15:03	Deseja enviar dados coletados ao flashdisk	Nível_4
23/07/2021 15:02	Transferindo arquivo. Aguarde...	Nível_4
23/07/2021 15:02	Deseja enviar dados coletados ao flashdisk	Nível_4
23/07/2021 15:02	Bem vindo. Nível_4	Nível_4

When double-clicking on one of the lines, the file will be selected and shown in the fields indicated by **F** and **G**.



To generate a spreadsheet from the selected file, click the button next to it. The generated spreadsheet is protected. You can only view and copy data to the Windows clipboard.

A window will open for the user to choose the directory where the spreadsheet will be created. After choosing the directory, click the *Save* button.



## 7 - Options Menu

The Options Menu allows access to all other submenus: **Information**, **Loggin**, **Configuration**, **Schedule**, **Maintenance**, **Customize** and **Help**.



To access the *Options Menu*, touch the *Options* button on the main screen. It is only possible to access the Menu with the device unlocked.

### 7.1 Information Menu

The Information Menu contains two submenus, with technical information about the equipment and calibration. The submenus are **Equipment**, with technical information about the equipment, and **Cal. Reports**, with information about the equipment's calibration certificate.



#### 7.1.1 Equipment

The **Equipment** menu displays screens relating to the modules that make up the device. It is possible to view information from these modules and make some changes to them.

##### 7.1.1.1 Equipment Information (MPI)

MPI is the main module of the equipment. On the corresponding screen, there is general information such as equipment model, pressure and measurement ranges, among others. It is also possible to change the IP address/Network Mask. There are 9 fields on this screen, described below.



<b>Last Revision:</b>	Date of the last inspection carried out on the equipment.	5
<b>Next Revision:</b>	Date of the next inspection to be carried out on the equipment. We recommend that the review be carried out every three years. When this date is reached, the equipment will display a pop-up after initialization. To change the date, touch this field and enter the month, day and year in this format: "M M D D A A A A". After that, confirm with Enter.	4
<b>Ethernet IP/Mask:</b>	Field for entering the IP address and Network mask. The IP must be entered by completing the values with zeros. Ex.: IP 192.168.4.2 must be entered in the sequence "1 9 2 1 6 8 0 0 4 0 0 2". Confirm with Enter.	4
<b>Navigation Buttons:</b>	Navigate between the information pages of other modules.	

#### Equipment Information (General)

Item	Description	Level
<b>MODEL:</b>	Equipment coding, with 19 characters.	5
<b>SERIAL NB:</b>	Serial number of the equipment, with 11 characters.	5
<b>Pressure Range:</b>	Pressure range allowed in the equipment, indicating the minimum and maximum pressure.	N/A
<b>Measure Range:</b>	Measurement Range allowed on the equipment, indicating the maximum and minimum values of the sensor.	N/A
<b>Firmware Version:</b>	Firmware version, build and build date.	N/A
<b>Operation Time:</b>	Period of time of equipment turned on and number of cycles.	N/A

### 7.1.1.2 Equipment Information (MEV)



**Equipment Information (MEV)**

Item	Description	Level
<b>MODEL:</b>	Equipment model.	N/A
<b>SÉRIE NB:</b>	Equipment serial number.	N/A
<b>Pressure Range:</b>	Pressure Range allowed by the equipment, indicating the minimum and maximum pressure.	N/A
<b>Measure Range:</b>	Measurement range allowed by the equipment, indicating the maximum and minimum values of the sensor.	N/A
<b>Firmware Version:</b>	MEV module firmware version.	N/A
<b>Operation Time:</b>	MEV module operating time. By touching this field and entering a	N/A

number (which represents a valve) it is possible to view the number of times it has operated. For example, for equipment with three valves, the user can enter 1, 2 or 3 to know the number of times each of them worked.

<b>Last Revision:</b>	Date of the last inspection carried out on the equipment.	N/A
<b>Next Revision:</b>	Date of the next inspection to be carried out on the equipment. We recommend that the review be carried out every three years.	N/A
<b>Ethernet IP/Mask:</b>	Field for entering the IP address and Network mask. The IP must be entered by completing the values with zeros. Ex.: IP 192.168.4.2 must be entered in the sequence "1 9 2 1 6 8 0 0 4 0 0 2". Confirm with <i>Enter</i> .	N/A
<b>Navigation Buttons:</b>	Navigate between the information pages of other modules.	

### 7.1.1.3 Equipment Information (REPi)



### 7.1.1.4 Equipment Information (Leak Master)



**Equipment Information (REPi)**

Item	Description	Level
<b>MODEL:</b>	REPi electronic regulator model.	N/A
<b>Firmware Version:</b>	Versão do firmware do REPi.	N/A
<b>Ethernet IP/Mask:</b>	Field for entering the IP address and Network mask. The IP must be entered by completing the values with zeros. For example, for the IP 192.168.4.2, you must enter the sequence "1 9 2 1 6 8 0 0 4 0 0 2". Confirm with <i>Enter</i> .	N/A
<b>Navigation buttons:</b>	Navigate between the information pages of other modules.	

**Equipment Information (Leak Master)**

Item	Description	Level
<b>MODELO:</b>	Internal Leak Master model.	N/A
<b>SERIAL NB:</b>	Internal Leak Master serial number.	N/A

### 7.1.1.5 Equipment Information (HMI)



**Equipment Information (HMI Module)**

Item	Description	Level
<b>MODEL:</b>	HMI code.	N/A
<b>SERIAL NB:</b>	HMI serial number.	N/A
<b>Firmware Version:</b>	HMI firmware version.	5
<b>Operation Time:</b>	HMI on time.	N/A
<b>Ethernet IP/Mask:</b>	Field for entering the IP address and Network mask. The IP must be entered by completing the values with zeros. For example, the IP 192.168.4.2 must be entered in the sequence "1 9 2 1 6 8 0 0 4 0 0 2". Confirm with Enter.	N/A

### Navigation Buttons:

Navigate between the information pages of other modules.

### 7.1.2 Calibration Certificates

Information about equipment calibration is displayed on this screen. From access level 4 onwards, it is also possible to change calibration dates and expiration alerts and manage Calibration Certificates. There are 9 fields on this screen, described below.



**Calibration Reports**

Item	Description	Level
<b>ACTUAL CALIB. REPORT:</b>	In this field, the current Calibration Certificate code is inserted. touch the	4

	field to enter the name on the alphanumeric keyboard.			expired. With access from level 2, it is possible to turn the option on or off. Touch the field to toggle between "YES" and "NO".
<b>LABORATORY:</b>	Name of the laboratory in which the equipment was calibrated.	4		
<b>Calibrated Pressure Range:</b>	Indicates the minimum and maximum values of the calibrated range on the equipment. touch the field to enter range values using the numeric keypad.	4	<b>Pop-up Alert of Calibration:</b>	Time before calibration is due to issue an alert that calibration is approaching due date. Touch the field to enter the number of days, using the numeric keypad.
<b>Calibrated Dif. Pressure Range:</b>	-	4		
<b>Last Calibration Date:</b>	Date the last calibration was performed. Touch the field to enter the date using the numeric keypad.	4	<b>Certificate (Icon):</b>	When activated (strong color), it indicates that there is a digital copy of the Calibration Certificate saved on the equipment, which can be copied to a Flash Disk, simply connecting it when on this screen.  To transfer a new certificate, a new calibration must be added. Consult TEX Equipamentos for this operation.
<b>Next Calibration Date:</b>	Current calibration due date. <b>The customer determines the calibration interval.</b> TEX recommends that calibration be carried out annually. This date is also used to generate expiration alerts. To enter the date, touch this field and enter the month, day and year in this format: "M M D D A A A A". After that, confirm with Enter.	4		
<b>Alert Expiration?</b>	The calibration due alert can be turned on or off. Touch the field to toggle between "YES" and "NO".	4		
<b>Look on Expiration?</b>	With this option turned on, the equipment will be prevented from carrying out tests after calibration has	2		

## 7.2 Login Menu

The Logs Menu contains three submenus with message records, test results and a graph of tested parts. The submenus are **Alerts**, with records of events occurring in the equipment, **Results**, with records of test results for the currently selected part, and **Charts**, displaying the results in statistical form, of tests for the selected part.



### 7.2.1 Alerts

Displays the summary message log of events that occurred on the equipment. From access level 2, it is possible to copy messages to a Flash Disk and, with level 4, clean the registry. The screen content will be described below. Part parameter modifications will be saved with the previous parameter, the new parameter and the user:

**10/03/24; 14:38; Alterado: Pressão min. = +270.0  
-> +300.0; Isaac Newton;**

Showed Mensagens		
Item	Description	Level
<b>Message Field:</b>	The date, time and event that occurred on the equipment are displayed, in reverse chronological order. Touch the table to transfer the record to a Flash Disk (if connected to the USB port) and confirm. After copying, the registry can be cleaned by confirming again in the pop-up presented. The data is exported to Flash Disk in <i>log</i> file format, which can be opened by any text editor, or in encrypted file format, which can be opened by the <i>TEX – G4S8 Reports</i> program. Copying to Flash Disk is done from access level 2, while	2

	cleaning the records is done from access level 4. For more information, see sections “6.8.2 Decrypting Device Files in Traceability Mode” and “11.1 Administrative Settings”.
<b>Navigation Buttons:</b>	Navigate between message log pages. 1

## 7.2.2 Results

Displays the record of test results for the selected part on the equipment. From access level 2 onwards, it is possible to copy the results to a *Flash Disk* and, from level 4 onwards, clean the equipment's records. The screen content will be described below.



Test Results		
Item	Description	Level
<b>Message Field:</b>	The date, time, test results, leakage value, and volumetric variation are displayed in reverse chronological order. Tap the field to transfer the record to a Flash Disk (if connected to the USB port) and confirm. After copying, the record can be cleared upon further confirmation. The data is exported to the Flash Disk in CSV format, which can be opened by any spreadsheet program, or in encrypted file format, which can be opened using the TEX – G4S8 Reports program. Copying to the Flash Disk is done from access level 2, while clearing the records is done at access level 4. For more information, refer to sections “6.8.2 Decrypting Files from the Equipment in Traceability Mode” and “11.1 Administrative Settings”.	2
<b>Navigation Buttons:</b>	Navigate between results recording pages.	1

### 7.2.3 Charts

There are two screens displaying the test results of the part in a statistical way. The first screen displays a **pie chart** and the second displays a **histogram** of the results. The screens are described below.

The part nickname is displayed in the title of both charts.



**Charts (Statistical Indexes).**

Item	Description	Level
<b>Statistical Indexes</b>	Displays a pie chart, where each part represents a testing status for the current part. On the right side of the screen is the legend, indicating, in different colors, the status of the tests with their respective quantities and percentages of the total number of parts tested.	1

	parts tested.	
<b>Reset Counters:</b>	With this button, it is possible to reset the counters of the current part, from Level 2 access. With Level 1 it will only be possible to reset them if the "Operator can reset counters" option is activated in the Access submenu - see section "11.2 Settings Access".	2
<b>Navigation Buttons:</b>	Toggles between screens 1 and 2.	1



**Charts (Histogram)**

Item	Description	Level
<b>Histogram Field:</b>	Displays a vertical bar chart, where each one represents the percentage of the leakage limit (X axis) and the	1

	quantity of part with that percentage (Y axis).	
<b>Navigation Buttons:</b>	Toggles between screens 1 and 2.	1

performing operations with **Flash Disk**. **Up to 100 users can be registered**. If it is necessary to increase user capacity, consult TEX. Registration can only be done by people with access level 4. The screen content will be described below.

### 7.3 Configuration Menu

The Configuration Menu contains three submenus, making it possible to manage users, configure the equipment and adjust part parameters. The submenus are **Users**, **Equipment** and **Measurement**. The access level varies depending on the option being accessed.



#### 7.3.1 Users

The users of the equipment are managed on these screens. It is possible to insert and delete users, add a photo, change access level, in addition to



**Users register**

Item	Description	Level
<b>NAME:</b>	Username. Enter it using the alphanumeric keyboard. Two users with the same name cannot be registered.	4
<b>POSITION:</b>	User position. Enter it using the alphanumeric keyboard.	4
<b>Access Level:</b>	Using the list, select the user's access level, from 1 to 4.	4

<b>Office</b>	User's work department. Enter using the alphanumeric keyboard.	4
<b>Phone:</b>	User contact, such as cell phone, extension, etc. Enter using the alphanumeric keyboard.	4
<b>User Photo:</b>	User photo. To insert an image, touch the square with a <i>Flash Disk</i> inserted and confirm. The file format and name must meet the requirements described in section “6.9 Using Flash Disk for data transfer”.	4
<b>Navigation Buttons:</b>	The navigation buttons at the top of the screen select registered users.	4
<b>Bottom Buttons:</b>	The 4 buttons at the bottom of the screen allow you to add or delete users and cancel or save changes. The use of these buttons is described in chapter “8 User Management”.	4



### 7.3.2 Equipment

The *Equipment* menu has several settings related to testing and equipment operation that can be adjusted by the user. They are divided into six categories (submenus): *Administrative*, *Access*, *Inputs/Outputs*, *Communication*, *Test* and *Instrumentation*. The Equipment menu is accessible from level 4. Below is a description of the structure of the screens for the six submenus.

Equipment		
Item	Description	Level
<b>Navigation Buttons:</b>	The navigation buttons at the top of the screen switch between the various pages of options available.	4
<b>On/Off indicator:</b>	Indicates the status of the option: green when enabled, gray when disabled.	4
<b>Opções:</b>	Descrição da opção e seus ajustes	4

See more information in chapter “11 Equipment Configuration”.

### 7.3.3 Measurement

This option contains three submenus, focused on adjusting the parts. The submenus are **Test Part**, **Parameters** and **Advanced** (the latter will only be available if the corresponding option is activated in the Access submenu - see section “11.2 Access Settings”). The access level varies depending on the option selected.



On this screen, accessible from level 2, the parts are managed and parameterized. You can insert and delete parts, add a photo, insert test chambers, and perform *Flash Disk* operations. Up to 1000 pieces can be registered. If it is necessary to register a larger quantity of parts, consult TEX Equipamentos.

Parts that are registered with the # symbol (hash) in Nickname indicate that they were configured in try-out by a TEX technician. They cannot be changed or removed. The screen content will be described below.



**Test Part Setting**

Item	Description	Level
<b>NAME:</b>	Full name of the part to be tested (e.g., Cookie). Enter using the alphanumeric keyboard.	2
<b>NICKNAME:</b>	Unique model or name of the part being tested (e.g., 789546941064). This name will be used for part searches and image loading. Enter using the alphanumeric keyboard.	2
<b>Image of the Part:</b>	Image of the current part. To insert an image, tap this field with a <i>Flash Disk</i> connected to the USB and confirm. The format and file name must meet the requirements described in section “6.8 Using the Flash Disk for Data Transfer”.	2

<b>Link BCD:</b>	Identification of the part for selection via BCD. A number from 0 to 31 can be assigned. Enter using the numeric keypad. If a number already assigned to another part is entered, a reconfiguration confirmation will be requested. If confirmed, the entered number is assigned to the current part in the BCD table. To remove the BCD Link, enter 32.	2
<b>TEST CHAMBER:</b>	Each cube represents a part of the piece (volume) to be tested sequentially. Since this model tests only parts with a single volume, additional cubes cannot be created. Note that the first one will be enabled (green color), and the other three will be disabled (gray color). Tap the enabled volume to access the testing parameters of the part.	2
<b>Navigation Buttons:</b>	The navigation buttons at the top of the screen select the existing parts.	2
<b>Bottom Buttons:</b>	Composed of 7 buttons at the bottom of the screen, allowing you to copy, add, or delete the part registration, cancel or save modifications, generate or restore backup. The use of these buttons is described in " <i>Chapter 9 - Parameterization of Tests</i> ".	2

### 7.3.3.1 Parâmetros

É um atalho (disponível a partir do nível 2) para acessar diretamente os parâmetros da peça em teste atual. A seguir, a descrição dos itens da tela.



Test Parameters

Item	Description	Level
<b>Selection tabs (Test, Pressure, Limits and Times):</b>	Tabs on the left side select test parameters, pressures, leakage limits, test times and advanced parameters. The corresponding tab will be green when selected.	2
<b>Parameters and Units:</b>	Displays the parameters available in the selected tab. Adjust values using the numeric keypad and select units from a list.	2

<b>Navigation Buttons:</b>	The navigation buttons at the top of the screen select existing test parameters.	2
<b>Bottom Buttons:</b>	Made up of 4 buttons at the bottom of the screen, they allow you to delete the current parameters, cancel or save changes and return to the previous screen. The use of these buttons is described in chapter "9 Test Parameterization".	2

### 7.3.3.2 Advanced

The tab is only available from level 4 onwards. It displays advanced parameters.



Advanced		
Item	Description	Level
<b>Selection tabs (Test, Pressure, Limits, Times and Advanced):</b>	Tabs on the left side select test parameters, pressures, leakage limits, test times and advanced parameters. The corresponding tab will be green when selected.	4
<b>Parameters:</b>	Displays the parameters available in the selected tab. Adjust the values using the numeric keypad.	4
<b>Navigation Buttons:</b>	The navigation buttons at the top of the screen select existing volumes and parameters.	4
<b>Bottom Buttons:</b>	Made up of 4 buttons at the bottom of the screen, they allow you to delete the current parameters, cancel or save changes and return to the previous screen. The use of these buttons is described in chapter "9 Test Parameterization".	4

## 7.4 Schedule Menu

In the *Schedule* menu, up to 4 alerts are programmed to be generated when a defined deadline or number of events is reached. The *Schedule* can generate a warning on the screen or even block the equipment. For example, every 100 tests, the equipment can be programmed to generate a seal change alert and block the execution of tests until it is unlocked from level 2. Below are descriptions of the screen elements.



### Events/Alerts Schedule

Item	Description	Level
stopwatch:	Each time you touch this button, one of these functions can be chosen for the alert: <i>Inactive</i> (the button turns gray), <i>Active</i> (the button turns green) or <i>Block</i> (the button turns red). In <i>Inactive</i> , the function will be turned off; in <i>Active</i> , the equipment counts the event or waits for the configured period to generate the alert (presents a pop-up on the equipment screen); in <i>Block</i> , the equipment counts the event or waits for the configured period to generate the alert and block access to the user, level 0.	4
Interval:	Determines the number of events to	4

be counted or the deadline to be reached for the equipment to generate an alert or, in addition, block access to users. Touch this field to define, through a list, the type of event or deadline available, which can be time interval (months, weeks, days, hours or minutes), date, time, when calling, test rejection percentage (% REJ.), test fail (NOK), test approval (OK) or pressure fail (Pressure F.). Once this is defined, the equipment will request, via another numeric keypad, the number of events or the deadline.

Description:	Enter, using the alphanumeric keyboard, the message to be displayed on the display when the event number or deadline is reached.	4
Legend:	Legend of possible alert activation timer statuses.	N/A

### 7.5 Maintenance Menu

The *Maintenance* menu contains three submenus, making it possible to manage inspections, perform adjustments and configure advanced parameters related to testing and operation of the equipment. The submenus are **Inspections**, **Settings** and **Experts**. The access level varies depending on what is being selected.



### 7.5.1 Inspections

Up to 4 routine inspection items can be checked. After initializing the equipment or, when making a new access, the operator will be asked to confirm each of the items, through a pop-up. This is very useful for remembering important items that should be checked periodically. To activate or deactivate routine inspections or define whether they will be requested at startup or upon new access, touch the "*Routine Inspections*" parameter, located in the "*Administrative*" submenu – see section "*11.1 Administrative Settings*". Confirmations are recorded by equipment alert messages. The screen content will be described below.

### Routine Inspections

Item	Description	Level
<b>Confirmation Box:</b>	Box to signal that item verification has been performed.	4
<b>Item to be checked:</b>	Description of the item to be checked.	4

### 7.5.2 Settings

This is the equipment's sensor adjustment screen. Accessible only from level 3.



### NOTE

- For safety reasons, the menu may be locked. Please consult TEX to unlock it.



### IMPORTANT

- Any adjustments must be made by a qualified technician or by TEX.*



### Ajustes

Item	Descrição	Nível
S1 Test Pressure:	Indicator of the pressure read on the sensor. Tap the value to reset the indication. Tap the unit to select another desired unit.	3

S1:	Fator de ajuste do sensor de pressão (S1).	3
Side Button:	Allows for “zeroing” the S1 sensor (at atmospheric pressure).	3
Bottom Buttons:	A group of 3 buttons at the bottom of the screen that allow you to cancel or save modifications and return to the previous screen. The use of these buttons is described in chapter “13 - Zero Adjustment”.	3

### 7.5.3 Expert

Various advanced settings related to equipment testing and operation can be adjusted. **They are only accessible by a TEX technician.**

### 7.6 Customize Menu

It is a Menu reserved for customizing the display of logos and phrases and for customizing equipment settings.

The G4-S8 already has several mechanisms and options to perform much more than a simple test, being able to carry out cyclical tests with the part, test for obstruction, activate seals, etc. However, if you need a more specific test, TEX Equipamentos has an engineering team that makes modifications to the equipment's software, to adjust your test to the needs of your factory. Contact TEX Equipamentos to customize your equipment!



## 7.7 Help Menu

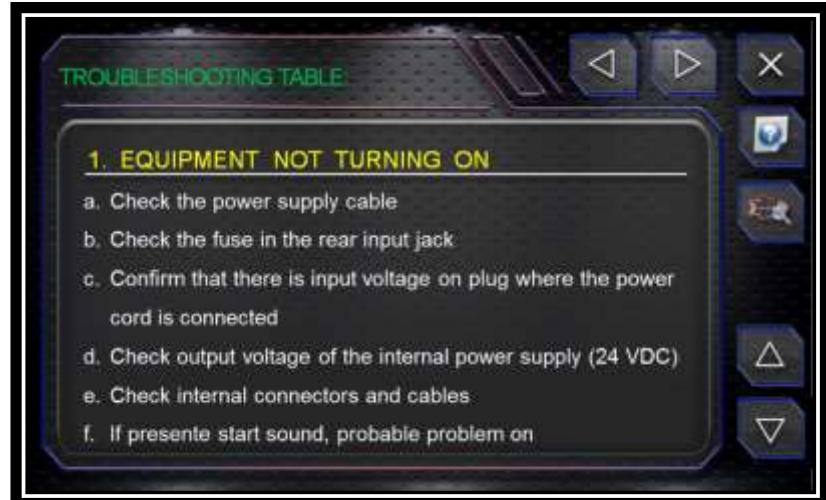


It is not necessary to unlock the equipment to access this menu and can be accessed via the button on the side, on the home screen or configuration screens.

The Help Menu contains three submenus, with troubleshooting help, operating instructions and TEX contacts. Much information from the equipment manual can be viewed in this menu, providing practical support for new users and for faster troubleshooting.

### 7.7.1 Troubleshooting

The *Troubleshooting* option contains topics related to troubleshooting.



Troubleshooting Table		
Item	Description	Level
<b>Identification:</b>	Field that identifies whether the help topic accessed is the Troubleshooting Table or User Guide.	N/A
<b>Help Topic Title:</b>	The help topic title appears. When related to a menu/screen, the title receives the same name as it.	N/A
<b>Selection Buttons:</b>	The selection buttons advance between chapters of help topics, as well as allowing you to navigate between existing topics.	N/A
<b>Scroll Buttons:</b>	Scrolls through the pages of the current help topic (if the topic has more than one page).	N/A
<b>Help Text:</b>	The text of the current help topic can be viewed in this field.	N/A

### 7.7.2 User Guide

In the *User Guide*, the topics are divided into help related to the current menu and information about care, maintenance and operation of the equipment.



User Guide		
Item	Description	Level
<b>Identification:</b>	Field that identifies whether the help topic accessed is the Troubleshooting Table or User Guide.	N/A
<b>Help Topic Title:</b>	The help topic title appears. When related to a menu/screen, the title receives the same name as it.	N/A
<b>Selection Buttons:</b>	The selection buttons advance between chapters of help topics, as well as allowing you to navigate between existing topics.	N/A
<b>Scroll Buttons:</b>	Scrolls through the pages of the current help topic (if the topic has more than one page).	N/A

<b>Help Text:</b>	The text of the current help topic can be viewed in this field.	N/A
<b>Image for guidance:</b>	It is the Image related to the current topic, displaying a thumbnail of the screen, image of the component or even demonstrating a procedure.	N/A

### 7.7.3 Contacts

This screen displays TEX Equipamentos contacts, telephone number, 24-hour support, website and address. At the bottom of the screen, two registered contacts of internal users can be inserted that can assist in resolving the operator's queries.

Contatcts		
Item	Description	Level
<b>TEX contacts:</b>	Displays the TEX logo with the address, the telephone number during business hours and the 24-hour support number, in addition to the website.	N/A
<b>Customer contact identification:</b>	The name of the internal contact can be entered by approaching the TAG or by inserting a Flash Disk with a key.	4
<b>Emergency contact number:</b>	Telephone number or email of the internal contact.	4



## 8 - User Management

The G4-S8 equipment has a complete and efficient user management system. User management allows traceability of tests performed, modifications made, and even ensures that routine inspections are carried out.

It is possible to include and exclude users, assign various data, define an access level and even include a photo.

Up to 100 user records can be included and, among them, up to 50 can be associated with a password. If it is necessary to include a larger number of users, consult TEX Equipamentos.



It is only possible to access user management from level 4. To access the user management screen, follow the sequence: Options > Configurations > Users. See section "7.3.1 Users" for information on screen elements.

User registration creations or modifications are recorded in the equipment's message logs. To access these logs, navigate to Options -> Logs -> Alerts. For more information, see section "7.2.1 Alerts".

The equipment has a *Flash Disk* and three *RFID TAGS* (optional accessory) configured to have level 4 access. However, you can modify the factory registration related to them, adding a new name, a new photo and other information.

### 8.1 Adding Users

To add a new user, go to the users screen and place the *RFID TAG* in the location indicated by the equipment or insert a *Flash Disk* TEX into the USB port. When you do this, the equipment requests confirmation of inclusion.



When confirming inclusion, a registration screen linked to this *RFID TAG* or *Flash Disk* is created.



The button indicated on the side, located at the bottom of the screen, also has the function of adding a new user. When you touch this button, a registration screen is also created.

At this point, read an *RFID TAG* or insert a *Flash Disk TEX* into the USB port, to link the user registration created to one of them. To do this, reject the pop-up that opens to register a new user and accept the next pop-up to replace the current TAG. Choose an access level for the user being registered.

If you do not want to link the registration to a Flash Disk TEX or an RFID TAG, you can associate it with a password to later grant access using it. Tap the “Access Level” field and choose an access permission level for the user. Once this is done, the equipment will display a numeric keypad for you to enter a desired password. Next, another numeric keypad will be shown so that the password can be confirmed and, finally, registered.

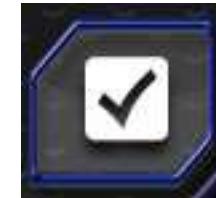
If the “Access with expiration date” option in the *Access* submenu is active, a numeric keypad will appear after selecting the access level in the records, to enter the expiration date. After the expiration of this date, the information in the “Access Level” field will be changed to “Blocked” and you will no longer be able to log in. For registrations with a password, access to a user is also blocked if they change any information in their registration or if there are more than three consecutive access attempts with incorrect passwords. To activate a user again, go to their respective registration and choose an access level. See section “11.2 Access Settings” for more information.

Enter the user data to be registered in the “NAME”, “POSITION”, “Office” and “Telephone” fields. Filling in the “access level” and “NAME” fields are mandatory. Other data is not mandatory but may be important to facilitate user identification or contact with the user.

## NOTE

- *It is not allowed to register users with the same information in the NAME field.*

Touch the confirmation button to save the registration or the cancel button to cancel the registration.



Confirm



Cancel

## 8.2 Adding a Photo

At the root of a *Flash Disk*, create a folder with the name “TEX\_G4\_XX”, where “XX” indicates the equipment model: DF, VE, SS, SE, HD, VF, SH, VZ or VH. Place, within this folder, a photo of a user, properly sized, named and with the correct format. See section “6.8. Using Flash Disk for Data Transfer” to carry out the procedure.

To add an image to the user record, insert a *Flash Disk* and touch the image like the one shown below.



If there is no *Flash Disk* connected, a Pop-up will appear asking you to insert the *Flash Disk*. If the image is found, a pop-up will appear for the user to confirm uploading the image.



If there is no image or it does not meet the equipment's requirements, a Pop-up will signal that it was unable to load.

### 8.3 Selecting Users



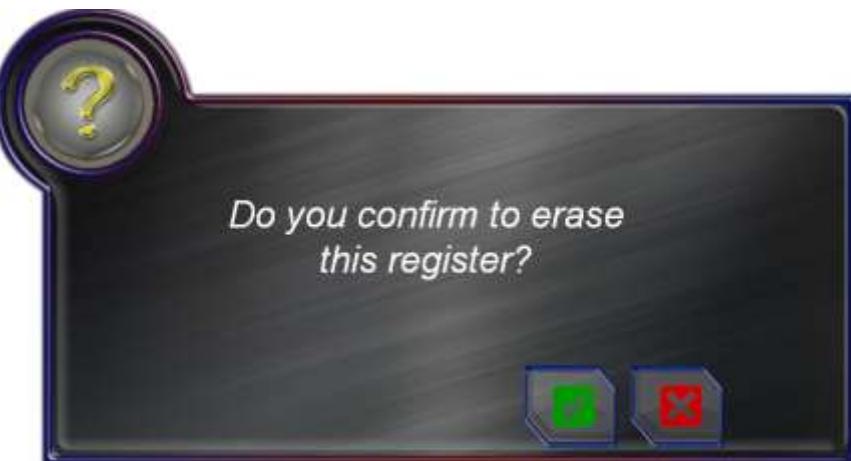
The navigation buttons at the top of the screen select user registration.

A user can also be selected on the registration screen, reading an *RFID TAG* or inserting a *Flash Disk TEX* into the USB port. Of course, both must be linked to a registration.

### 8.4 Deleting Users



Select the user you want to delete and tap the delete button. A Pop-up will appear, asking you to confirm the deletion.



All registered users, regardless of level, can be deleted by the user who accessed them, except the user who is logged in to the equipment.

## 8.5 Changing a User's Access Level

To change the access level of an existing user, simply choose the user configuration screen, select the desired user and, in the “access level” field, select another level. Confirm changes after completion. When changing the access level of a user registered by password, they will be asked to choose a new password.

## 8.6 Replacing the TAG or Flash Disk of a registered user

If a user's TAG or *Flash Disk* is lost or damaged, it is possible to replace them, without having to register again or delete it.

To do this, with access level 4, select the user for whom you want to make the replacement and read the new TAG or insert the Flash Disk to be registered. A Pop-up will appear, asking you to confirm the addition of a new user. **DO NOT** confirm, just tap “X”. After that, a new Pop-up will appear, asking you to replace the current TAG.



Confirm, and the new TAG or *Flash Disk* TEX will be assigned to the current user. After confirmation, save the replacement process by tapping the confirmation button on the User Registration screen.

The previous TAG or *Flash Disk* will be automatically deleted and will no longer have access to the equipment, only the new registered item will be valid.

If you choose to replace the TAG of the current registered user with a password, that same user will have the option of logging in using both the password and the *RFID TAG* or *Flash Disk*.

## 8.7 Initial Unlock Level

In some usage situations, it is interesting that the equipment remains unlocked at least at level 1. The “Access level after turn-on” option allows you to define an access level when turn on the equipment, which can range from locked to level 4.

See section “11.2 Access Settings” for more details.

## 8.8 Emergency user password

It is possible to grant access at level 4, even without an *RFID TAG* or *Flash Disk TEX*, through the *Emergency User Password*, as long as there are no users registered with a password or all of them are blocked. It is a help resource in case you lose your *RFID TAGs* and *Flash Disk TEX* and forget your user passwords. As it is a resource that gives privileged access to the equipment's settings, **the Emergency Password can only be used once**.

After access with the Emergency User Password, a new use can be released by a level 4 user. To do this, activate the "*Emergency user password*" option by navigating to *Options -> Configuration -> Equipment -> Access*.

The emergency password is entered by touching the icon shown below (bottom of the main screen), using a numeric keypad. This keyboard will only be available if all users registered by password are blocked or if there are only registrations using *RFID TAGs* or *Flash Disk TEX*.



When the keyboard appears, enter the password **19972015**. Once this is done, the equipment will be unlocked at level 4. The "Access level at turn-on" option in the "Access" settings submenu is reset to level 2, allowing you to access the equipment at this level, even when it is turned off, such as a power outage, for example.

## 8.9 Master Password

If the user does not have an *RFID TAG*, *Flash Disk TEX* and user password available and, in addition, the *Emergency User Password* option is inactive, he or she can contact TEX and request a *Master Password*, which allows access to be granted. at level 4, once.

First, on the locked device's home screen, insert any *Flash Disk* and touch the clock.



The numeric keypad will appear on the left of the home screen. A code will be displayed on the numeric keypad. Write it down. **Do not leave the numeric keypad or press any key!**



With the code written down, contact TEX Equipamentos, using the contacts available in the chapter “*16 TEX Contacts*”. Inform TEX of the code noted, and the *Master Password* will be informed.

Return to locked equipment. On the same numeric keypad, type the password entered and press *Enter*. The equipment will be enabled at level 4. The “Access level at turn-on” option in the “Access” settings submenu can be changed to level 4, allowing the equipment to be accessed at this level, even if it is restarted, without the need to generate a new *Master Password*.

## 9 - Parametrização dos Testes

The TEX G4 equipment features a simple, intuitive, and innovative part management system. There are no more traditional "test programs" but rather the registration of parts with their attributes and parameters. Up to 1000 parts can be registered in the equipment. If more parts need to be registered, please consult TEX.

It is now possible to copy registered parts, back them up to a *Flash Disk*, restore them from a *Flash Disk*, register parts via a barcode reader, and save try-out part registration data, among other features.



*Flash Disk* operations are possible when connected to the USB port. An icon next to the lower buttons indicates that the *Flash Disk* is correctly inserted.

To access the test parameters, there are three ways:

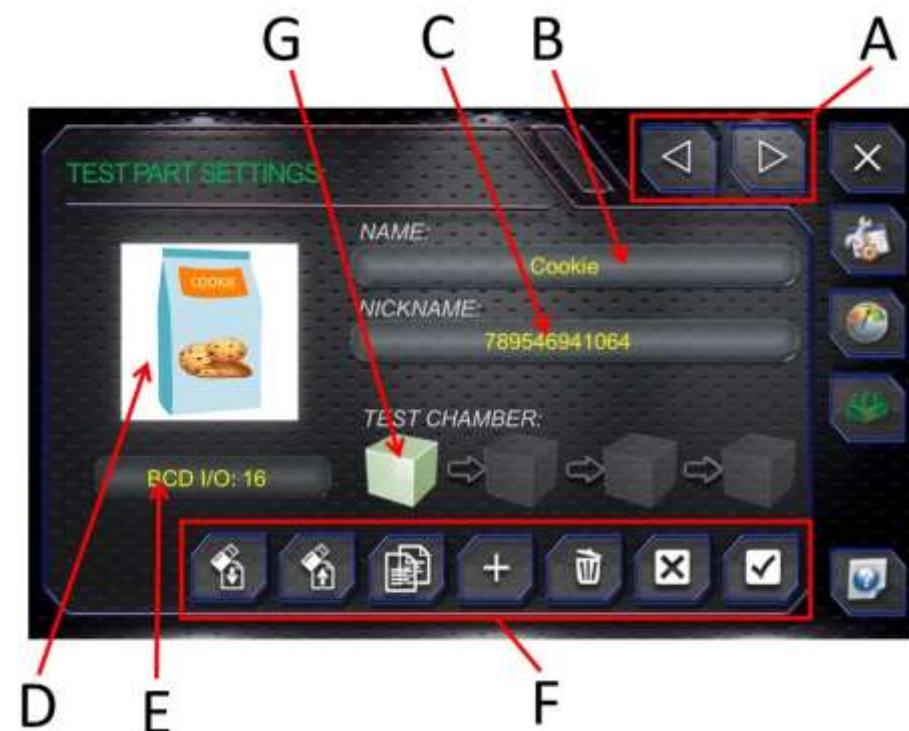
1. Navigate through the sequence Options -> Configuration -> Measurement, then select one of the options: "Test Part", "Parameters", or "Advanced".
2. From the *Measurement Screen*, touch the shortcut buttons in the *Upper Measurement Field* or *Part Identification Field* (between the <<< and >>> buttons on the main screen).
3. From the *Part Selection Screen*, tap the image field – to access the *Part Selection Screen*, touch the <<< and >>> buttons on the main screen.

### 9.1 Part Management

With the new part management system, there are several resources available for part control. This section will cover part management activities such as copying and backing up parts.

#### 9.1.1 "Test Part Specifications" Screen

In this screen, you can manage and parameterize parts. It allows you to insert and delete parts, add a photo, and perform operations with the *Flash Disk*. Access to this screen is available from level 2.



#### A. Navigation Buttons

The buttons at the top of the screen allow you to navigate between the existing parts.

#### B. NAME

Complete name of the part to be tested. Multiple parts can have the same name in the 'NAME' field. Input using the alphanumeric keyboard.

#### C. NICKNAME

Identifies the model/code of the registered part. This is the most important name of the part and is used in registration searches, which can be performed in several ways: search button, scanner and BCD selection. Each 'NICKNAME' can be assigned to a single part registration – there cannot be registrations with the same abbreviated name repeated. Parts whose NICKNAME begins with '#' are parts with parameters defined by a TEX technician in try-out. They cannot be modified or deleted, but they can be cloned. Enter using the alphanumeric keyboard.

#### D. Part Image

Displays the current part image, useful for identifying parts with similar names. To insert an image, connect a Flash Disk and touch on the image field. The format and name of the file must comply with the requirements described in the section "6.8 Using the Flash Disk for Data Transfer".

#### E. BCD Link

Part identification for BCD selection. See sections "9.1.9 BCD Part Selection (Digital I/O and MODBUD)" and "5.1.5 BCD Part Selection" for more information on BCD part selection.

#### F. Lower Buttons

The 7 buttons at the bottom of the screen allow you to copy, add or delete parts, cancel or save modifications and make or restore part backups. See the items below for a description of each button.

#### G. TEST CHAMBER

Each cube represents a part of the piece (volume) to be tested sequentially. For this equipment model, only one cube will be enabled (in green) for testing. Tap on the enabled volume to access the test parameters of the piece.

#### 9.1.1.1 Botões Inferiores

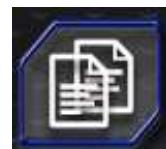
The buttons at the bottom of the screen allow you to copy, add or delete parts and cancel or save changes. Some buttons have their function changed when a *Flash Disk* is connected. All part management functions are performed through these 7 buttons. The following is a description of each button.



By tapping this button, it is possible to recover the part parameters from the *Flash Disk* (recovery of the part backup), if a *Flash Disk* is inserted.



With this button you can copy the part to the *Flash Disk* (backup), if a *Flash Disk* is inserted.



The button next to it has the function of cloning the currently selected part.



This button has the function of inserting a new part registration, through confirmation in a Pop-up.



The button shown next to it deletes the currently selected part, upon confirmation in a Pop-up.



This button cancels the modifications made to the parts, upon confirmation in a Pop-up and, after that, returns to the Measurement Menu.



Using this button, save the changes made to the parts and return to the Measurement Menu.

## 9.1.2 Adding Parts

There are several ways to insert a part: inserting a new part using the corresponding button, cloning an existing part, restoring a part that has been backed up, and reading it with a scanner.

### 9.1.2.1 New Part



Touch the button shown to the side to register a new part. A pop-up will ask you to confirm the inclusion. Once this is done, enter the NICKNAME of the part.

### 9.1.2.2 Cloning a Part



Touch this button to clone (copy) the current part. A pop-up will ask you to confirm the copy. Once done, enter the NICKNAME of the part.

### 9.1.2.3 Restore Backup

The first step is to insert a new part, following the steps from item “9.1.2 Adding Parts”. The NICKNAME must be the same as the part you wish to restore or the same name as the one stored in the Flash Disk backup. Insert the *Flash Disk*, and tap the button represented by a USB drive with a downward-pointing arrow (illustrated beside it). A pop-up will ask for confirmation of the action.



If the backup file is found, the restoration will begin; otherwise, an error message will be displayed. **The backup restoration can also be performed for parts that already exist.**



### IMPORTANT

- *The NICKNAME must be exactly the same as the part for which the backup was previously made. For example, if the previous part “789546941064” had a backup created, it must be named “789546941064.” If it is not named correctly, the backup file will not be found.*
- *The G4-S8 equipment allows parts to be copied between different equipment models. Be careful when copying parts from equipment with different pressure or flow ranges, as the parameters may not be compatible and might need to be adjusted for the other model.*

### 9.1.2.4 Scanner Reading

Using a scanner connected to the RS-232 port or the USB port, it is possible to add and select parts. A TEX-approved scanner must be properly connected and configured. Refer to section “5.2 - RS-232 Serial

*Interface*" and section "5.4 - USB Port" to correctly connect your scanner. Also, see section "10.1.1 - Adding and Selecting Parts via Scanner" for adding parts.

### 9.1.3 Part Backup



It is possible to back up registered parts to a *Flash Disk*. Insert a *Flash Disk*, tap the button represented beside it, and confirm in the pop-up. The current part will be copied.

### 9.1.4 Delete Parts



To delete a part, simply tap the button represented beside it and confirm in the pop-up.



#### ATENÇÃO

- *Parts whose NICKNAME starts with '#' are Try-out Parts and cannot be deleted. See section "9.1.5 Special Part Registrations."*

### 9.1.5 Special Part Registrations

Special part registrations have their NICKNAME starting with '#' (hash). These registrations are used for specific configurations or tests on the

equipment, or they have optimized parameters from try-out procedures, performed by a specialized TEX technician.

Since these registrations have optimized or special parameters, they cannot be deleted or have their parameters modified; they can only be viewed. However, it is possible to clone these registrations and create a backup. Cloning these parts can be useful for making parameter modifications without losing the original settings.

### 9.1.6 #NoLeak Part Registration

The registration of a part with the abbreviated name #NoLeak is used to perform a leak test that allows the detection of defects or leaks in the internal circuit of the equipment in isolation.

The volumeter is factory-calibrated; however, if for some reason there is a deviation in this calibration, the volume and leakage readings during tests will become unstable, even if the equipment is correctly parameterized. In such cases, the #NoLeak piece registration also functions to recalibrate the volumeter.

To perform a leak test or recalibrate the volumeter, refer to section "13.6 #NoLeak Part Registration".



#### WARNING

- *The volumeter recalibration should only be performed when necessary, and before pressing the "Auto Zero Execution" button, it is mandatory to connect the "Piece" output with the "Pressure Return" input. If this is not done correctly, the equipment will lose its ability to accurately measure leakage.*

### **9.1.7 #GV-X Chamber Registrations**

Each chamber registration with the Abbreviated Name #GV-X (where X is an identifier made up of one or more characters) pertains to a chamber used in the equipment.

This registration is used to perform a leak test, which allows for the evaluation of defects or leaks in the pneumatic circuit between the equipment and the chamber related to the registration. To perform a system leak test, refer to section “*14.7 – #GV-X Chamber Test*”.

It also functions to define global parameters for the chamber associated with the registration, such as system volume and pressure and leak offset. Defining these parameters is essential for the equipment to correctly perform the tests. To define these parameters, connect a chamber to the equipment, select the chamber registration relevant to that chamber, and perform the *Auto Zero Execution* with the empty chamber. For instructions on performing an *Auto Zero Execution*, refer to section “*9.3 Auto Zero Execution*”.

Each chamber registration must be linked to the part registrations whose packages are tested in the chamber associated with that registration. This ensures that the equipment has the necessary global and local parameters to execute a test. For instructions on linking chamber registrations, refer to section “*9.2.1 Volume Properties Screen*”.

### **9.1.8 Adding a Part Photo**

In the root directory of a Flash Disk, create a folder named “TEX\_G4\_XX,” where “XX” indicates the model of the equipment. Place a properly sized, named, and formatted photo of a part inside this folder. Refer to section “*6.8 Flash Disk Usage*” for the procedure.

Connect a *Flash Disk* and touch the image (which may either show a placeholder for no photo or display a previously inserted image). If the image is found on the *Flash Disk*, a pop-up will prompt you to confirm the insertion of the photo.

### **9.1.9 Part Selection via BCD (Digital I/O and MODBUS)**

Below the part image, there is a field for part identification for selection via BCD. A number from 0 to 31 can be assigned. Enter the number using the numeric keypad. If a number already assigned to another part is entered, a confirmation for reconfiguration will be requested. If confirmed, the entered number is assigned, and the existing part with that number will have its link removed — for example, part ABC is assigned number 10, and for the current part XYZ, we want to assign 10; by confirming this, part XYZ will receive number 10, and part ABC will have its link removed. To remove the BCD link, enter 32. Refer to section “*5.1.5 Part Selection via BCD*” for more information on selecting parts via BCD.

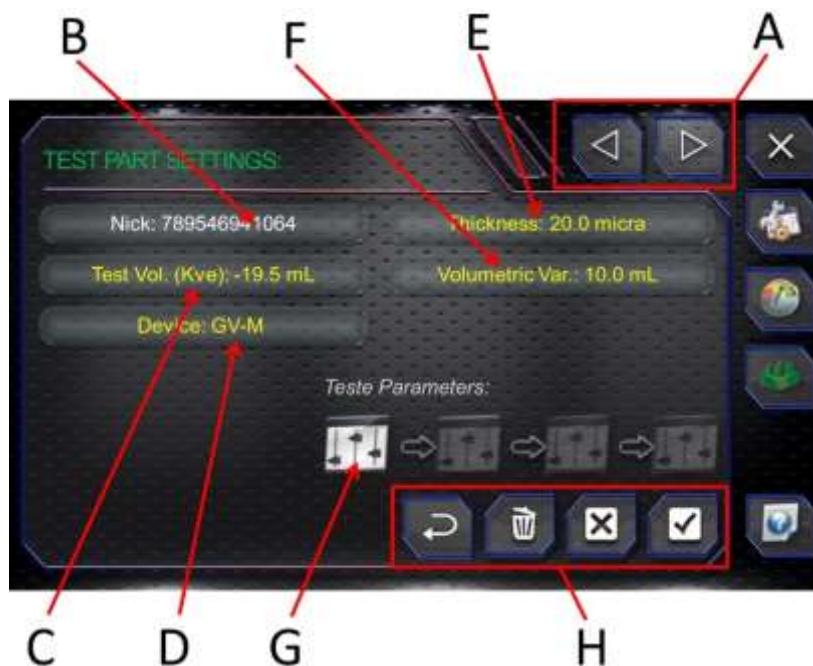
Through ModBUS, EtherNET/IP, PROFIBUS, and PROFINET communication, it is possible to select up to 1000 parts. Refer to one of these chapters in the document “*G4-S8 Communication Protocols*,” according to the communication protocol your equipment operates with. To select parts with a BCD greater than 31, the desired BCD number must be included in the NICKNAME. For example, if you want to select part 128, simply include “128” in the NICKNAME.

## 9.2 Parameterization

The new management system also brings various features for the parameterization of parts. This section will cover the parameterization of the parts.

### 9.2.1 “Volume Properties” Screen

When you tap on the cube of item **G** in section “9.1.1 Test Part Specifications Screen”, the following screen opens. Here you can link the registration of a chamber, enter the thickness of the material that makes up the part, adjust the test volume (KVe), enter the permissible volumetric variation and access the test parameters of the selected part. These parameters are accessible from level 2.



#### A. Navigation Buttons

The buttons at the top of the screen select between the available volumes of the selected part registration. However, since it is not possible to create additional volumes for the S8-GV, these buttons have no function.

#### B. Part Identification

Identification of the current part (NICKNAME). Non-editable.

#### C. Test Volume (KVe)

Thermodynamic volume coefficient (KVe) referring to the selected parameterized part. This parameter adds or subtracts volume due to the presence of the part in the chamber to the system volume. This setting is extremely important for accurate leak readings, as this value is used in the pressure drop-to-leak conversion calculation. This value is automatically calculated and updated when the *Auto Zero Execution* is performed on the selected part. See how to automatically adjust the volume in section “9.3 – Auto Zero Execution.”

#### D. Device

Links a chamber registration to a part registration. It indicates to the equipment which chamber will be used in the tests of a specific part. Tap on this parameter to open a list of the NICKNAMES of the available chamber registrations.

#### E. Thickness

Thickness in microns ( $\mu\text{m}$ ) of the wall (film of a package) of the part. This information is used by the equipment to determine the diameter of the hole through which a leak occurs during the *Measuring* stage. Enter this value using the numeric keypad.

#### F. Volumetric Variation

Defines the acceptable limit of air volume transferred from the part to the chamber during a test—this volume increases when there is a leak in the part. This parameter is important for the test to detect large leaks where the part empties quickly. Enter the volumetric limit value using the numeric keypad.

#### G. Test Parameters

The active icon represents the sets of parameters for the part. Tap the available icon to access the Test Parameters screens.

#### H. Lower Buttons

The 4 buttons at the bottom of the screen allow you to return to the previous screen, delete the current volume, and cancel or save changes. See below for the description of each button.

##### 9.2.1.1 Lower Buttons

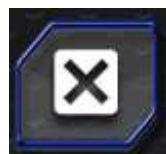
The buttons at the bottom of the screen allow you to return to the previous screen, delete the current volume, and cancel or save changes. Below is a description of each button.



The button next to it returns to the "Test Part Specifications" screen.



This button deletes the current volume, upon confirmation in a Pop-up.



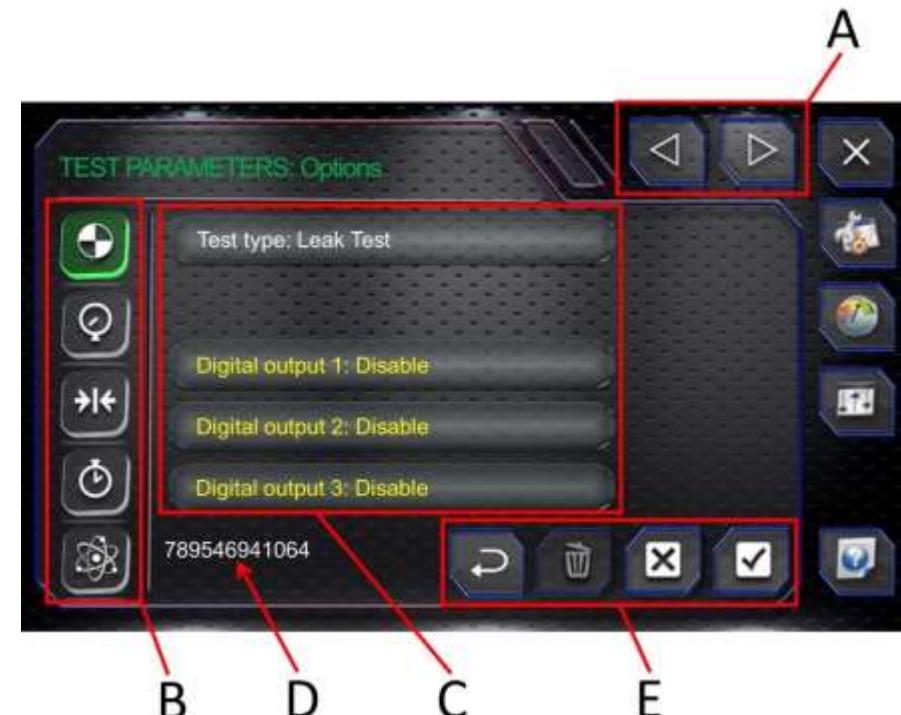
With this button, the modifications made to the current volume are canceled, upon confirmation in a Pop-up, and the "Test Part Specifications" screen is returned.



This button saves the changes made to the volume and returns you to the "Test Part Specifications" screen.

#### 9.2.2 "Test Parameters" Screen

This screen is where the actual parameterization of the part tests is performed. Pressure parameters, limits, times, and others are provided here, along with the option to delete the current set of parameters. Accessible from level 2.



#### A. Navigation Buttons

The navigation buttons at the top of the screen have no function for this model of equipment.



This button accesses the pressure adjustment parameters, its unit, and limits. See section “9.2.4 Adjusting Pressure” for more information.

#### B. Side Buttons

The buttons on the left side of the screen select various parameters, such as Test Options, Pressure, Limits, Time, and Advanced. Some buttons may not be available depending on the type of test selected. See the descriptions below for the function of each button.



With the button represented next to it, you can access the leak limit parameters and their unit. See section “9.2.5 Adjusting Limits” for more information.

#### C. Parameterization Area

This space displays the parameters being edited.



This button accesses parameters related to test times. See section “9.2.6 Adjusting Times” for more information.

#### D. Part Identification

Displays the NICKNAME of the selected part.



This button accesses advanced parameters. It is only accessible if the “Access to Advanced Parameters” option in the “Equipment” Menu is enabled. See sections “9.2.7 Advanced Parameters” and “11.2 Access Settings” for more information.

#### E. Lower Buttons

The 4 buttons at the bottom of the screen allow you to return to the previous screen, delete the current list, and cancel or save changes. See below for the description of each button.

### 9.2.2.1 Side Buttons

The buttons on the left side of the screen select various parameters, such as Test Options, Pressure, Limits, Time, and Advanced. Touch a button to select the desired parameter; it will turn green. Below is a description of each button.



The button next to it allows access to the selection of the test type and the corresponding electrical and pneumatic output options. See section “9.2.3 Adjusting Test Options” for more information.



The button next to it returns to the “Volume Properties” screen.

### 9.2.2.2 Lower Buttons

The buttons at the bottom of the screen allow you to return to the previous screen, delete the current volume, and cancel or save changes. Below is a description of each button.



This button deletes the current parameter list, upon confirmation in a pop-up.



This button cancels any modifications made to the current set, upon confirmation in a pop-up, and returns to the “Volume Properties” screen.



This button saves the modifications made to the set and returns to the “Volume Properties” screen.

### 9.2.3 Adjusting Test Options

By accessing the Test Options, you can select the type of test and enable or disable the corresponding electrical and pneumatic outputs.



**Type of Test:** For this model of equipment, the only available type of test is *Leak Test*.

**Auxiliary Pilot (optional for the equipment):** This parameter defines whether the pneumatic output “Auxiliary Pilot” at the rear of the equipment will be activated and how long it will remain active until the next test on the same piece begins. If this parameter is inactive, the output will not be activated during the test. This parameter is hidden if the “Access to Advanced Parameters” option is inactive in the Access submenu—see section “11.2 Access Settings” for more information.

**Digital Output 1 (for models with Digital Electrical Outputs):** Similar to the previous parameter, if *Digital Output 1* is inactive, the electrical output will not be activated during the test. This parameter is hidden if the “Access to Advanced Parameters” option is inactive in the Access submenu – see section “11.2 Access Settings” for more information.

**Digital Output 2 (for models with Digital Electrical Outputs):** Similar to the previous parameter, if *Digital Output 2* is inactive, the electrical output will not be activated during the test. This parameter is hidden if the “Access to Advanced Parameters” option is inactive in the Access submenu—see section “11.2 Access Settings” for more information.

**Digital Output 3 (for models with Digital Electrical Outputs):** Similar to the previous parameter, if *Digital Output 3* is inactive, the electrical output will not be activated during the test. It will only be available if the “Digital Fail Signal” option is inactive—see section “11.3 Electrical Input and Output Settings” for more information. This parameter is hidden if the “Access to Advanced Parameters” option is inactive in the Access submenu—see section “11.2 Access Settings” for more information.

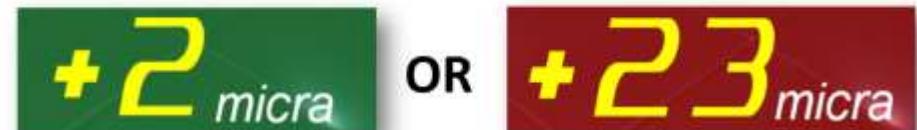
#### 9.2.3.1 Leak Test

In this type of test, the equipment depressurizes the chamber to a pressure value configured for the piece being tested, waits for the air to stabilize, and measures the variation in pressure over time in two stages: *leak measurement* and *evaluation of the volume variation in the chamber*. For the test to be approved, the measured values in both stages must remain below the configured limit.

The second measurement stage is designed for situations where the first stage is unable to detect a leak, such as when the packaging has large holes or tears and loses air during the *leak measurement*.

If all the air in a piece escapes quickly before the *leak measurement* stage is completed, the equipment may display a value close to zero, which does not accurately reflect the condition of the piece. Thus, with the aid of the second stage, the equipment measures how much volume the piece transferred to the chamber and can determine whether the piece exhibited a significant leak during the test by comparing it to the volumetric variation limit configured in the piece's record.

If the volume measured in the second stage is less than the configured volumetric variation limit, the equipment will approve or reject the test based on the result of the first stage, and it will display the **leak result on the screen** (or the diameter of the hole through which it occurs).



However, if the volume measured in the second stage exceeds the configured volumetric limit, the equipment will reject the test, regardless of the result of the first stage, and will display the **volumetric variation result on the screen**.



#### 9.2.4 Adjusting the Pressure

Accessing the *Pressure Test Parameters* screen allows you to adjust the test pressure and the maximum and minimum limits, as well as select the unit of measurement. It can also be accessed by touching the *Part Identification Field* on the main measurement screen.



**Unit:** Selected from the list of various available pressure units. When changing the unit, the values are automatically converted to the new unit (for example, -0.5 bar will be converted to -50 kPa if the original unit, bar, is changed to kPa). The pressure unit is defined by the user. The available pressure units are: **kPa, mbar, psi, mmH2O, and mmHg.**

#### NOTE

- It is possible to enter a custom pressure unit. Please consult TEX for this.

**Test Pressure:** This is the nominal pressure for the test. The internal pneumatic circuit adjusts the test pressure based on this value. The numerical value is automatically converted when changing the pressure

unit. When entering the nominal test pressure value, the equipment recalculates the maximum and minimum limits by adding  $\pm 10\%$  to this value. The test pressure is defined by the customer. Enter using the numeric keypad.

**Minimum Pressure:** Defines the minimum test pressure. If during the test the pressure reaches a value lower than the adjusted minimum pressure, the test is rejected. Various factors can cause the test pressure to fall below the minimum pressure. The main causes are insufficient depressurization time, expansive behavior of the piece, damaged seals, or significant leakage. Enter the value using the numeric keypad. The minimum pressure adjustment depends on the model of the equipment.

**Maximum Pressure:** Defines the maximum test pressure. If during the test the pressure reaches a value higher than the adjusted maximum, the test is rejected. Various factors can cause the test pressure to exceed the maximum pressure. The main causes are insufficient depressurization time or retractile behavior of the part, and varying mechanical seals. Enter the value using the numeric keypad. The equipment does not allow the user to set a value greater than 120% of the equipment's range in *Maximum Pressure* (for example, for equipment with a range of -80 kPa, the maximum value for adjusting the maximum pressure will be -96 kPa). **This parameter is hidden if the option for Access to advanced parameters is inactive – refer to section “11.2 Access Settings”.**

#### 9.2.5 Adjusting the Leakage Limits

On the *Limits Test Parameters* screen, permissible leakage limits for the piece, the leakage unit, and the fixed offset can be adjusted. The equipment uses the configured values to evaluate the piece. It can also be accessed by touching the numerical value in the lower field on the main measurement screen.



**Unit:** Selects from the list of various available leakage units. When changing the unit, the values are automatically converted to the new unit. Refer to item “9.2.5.1 Leakage Units” for more information about the leakage units. The leakage unit is defined by the customer.

**Fixed Offset:** This parameter allows a constant leakage value to be deducted from the process, due to a specific behavior that repeats with each test. This value is automatically set for the selected piece when the *Auto Zero Execution* is performed – see section “9.3 Auto Zero Execution” for more information. **If the option “Access to advanced parameters” is active in the submenu “Access”, this value can be manually entered using the numeric keypad, although it is not recommended.**

**Part Leak Rate:** Adjusts the maximum permissible leakage for the piece. When the measured leakage exceeds the set parameter, the piece will be rejected. Note that in the image, the limit is +20 microns, meaning rejection occurs when an airflow exiting the packaging to the chamber

passes through a hole with a measured equivalent diameter greater than 20 microns during the *Measurement* phase. Enter the value using the numeric keypad. The limit for the size of the piece is defined by the customer.

### **IMPORTANT**

- *The automatic conversion only works for values with units of the same magnitude, meaning that conversion can only occur between pressure leakage units (mbar or mmHg) or between leakage units (mL/min, mL/s, etc.).*

#### 9.2.5.1 Leakage Units

The leakage units are divided into three distinct groups:

1. **mbar e mmHg;**
2. **mL/min, mbarL/s, mL/s;**
3. **micra.**

The first group consists of pressure measurement units and is related to the increase or decrease of pressure in a given volume, measured over a time interval. In other words, for a part with a certain leakage, the longer the measurement time, the greater this pressure value will be, as presented at the end of the test.

The second group consists of flow measurement units, which indicate the airflow or the rate of volume change over time. The flow value, when the equipment is set to one of the flow units, will be mathematically determined by the following expression:

$$Q = \frac{V_0 \times \Delta P}{\Delta t \times P_{atm}}$$

Where:

- $Q$  = Leakage;
- $\Delta P$  = Pressure drop;
- $\Delta t$  = Monitoring time;
- $V_0$  = Volume of the part;
- $P_{atm}$  = Local atmospheric pressure.

The third group, consisting solely of the micron unit, is a dimensional unit that refers to the diameter of a theoretical hole based on the packaging leakage, the dynamic viscosity of air, and the thickness of the packaging. The equipment determines the diameter of this hole through the Hagen-Poiseuille equation:

$$D = \sqrt[4]{\frac{128 \times \mu \times L \times Q}{\pi \times \Delta P}}$$

Where:

- $D$  = Diameter of the hole through which the leakage occurs;
- $\mu$  = Dynamic viscosity of air;
- $L$  = Thickness of the packaging;
- $Q$  = Leakage through the hole;
- $\Delta P$  = Pressure difference between the inside and outside of the packaging.



#### NOTE

- *The volume of the piece must be programmed correctly; otherwise, the measurement of the leakage or the hole diameter will be incorrect. See "9.2.1 Volume Properties Screen" for instructions on how to adjust the volume.*
- *The thickness of the packaging film must be entered with the appropriate value; otherwise, the equipment will not correctly measure the diameter of the hole through which the leakage occurs. Refer to section "9.2.1 Volume Properties Screen" for how to enter the thickness of the packaging film.*
- *The equipment has an internal barometric station that automatically measures atmospheric pressure. Therefore, it is not necessary to adjust the atmospheric pressure value, as it is measured instantaneously.*

#### 9.2.6 Adjusting Times

Accessing the Times screen allows the adjustment of test times. The equipment uses the adjusted values to time the stages of the test. The Times can be accessed through the buttons Options >> Configuration >> Measurement >> Parameters.



**Unit:** Select from the list of various available time units. When changing the unit, the values are automatically converted to the new unit. The available time units are: **h, min, and s.**

**Depressurize:** Refers to the adjustment time for the chamber's depressurization stage. Ideally, this time should be as short as possible, just enough to reach the required vacuum level for the part – enter the time using the numeric keypad by tapping on the *Depressurize* tab. If the depressurization time is too long, there is a risk of the piece being completely emptied, making it impossible to measure the leakage. If this occurs, only the volume transferred from the part to the chamber will be measured. For this reason, it is recommended that this time be configured to optimize automatically – in this case, the *Depressurize* tab will be omitted. See section “9.2.7 Advanced Parameters” for more information.

**Stabilize:** Refers to the time necessary to equalize pressure and temperature during the test, following the *Depressurization* stage. This

value should be adjusted so that, when performing a test with a non-leaking part, the equipment does not indicate an increase or decrease in leakage or volume values, respectively, during the *Measure* and *Volumetric Verification* stages. Once the pressure stops varying, we can determine the ideal minimum stabilization time.

**Measure:** If there is a testing standard for the piece, this measurement time should comply with the specifications of that standard. If no testing standard exists but you have a part with leakage, the measurement time should be sufficient to differentiate a passed piece from a failed piece. If the measurement unit is leakage (mL/min, mL/s, etc.), the measurement time should be long enough for the known flow measurement to stabilize close to the expected value. Enter the values using the numeric keypad.



#### NOTE

- Using a known leakage generator (Leak-Master or Leak Calibrator connected to the Standard connection at the front of the equipment) is extremely important for determining this stage of the test, as this resource allows us to evaluate whether the equipment is passing or failing the piece with the configured time. For the correct specification of the Leak Master, contact TEX or the nearest representative in your area.



**Volumetric Verification:** This is the stage of the test that occurs after the Measure stage. Unlike the other test stages, where time can be individually adjusted for each part, the *Volumetric Variation* stage has a global time parameter used by all part registrations. To adjust it, tap on the parameter “Volume Meter Time” in the “Test” submenu – see section “11.5 – Test Configurations” for more information.

**Relief:** Upon entering this stage, the interior of the chamber is relieved (the pressure rises to the same level as atmospheric pressure) so that it can be opened. During this stage, the corresponding electrical and pneumatic outputs for the test diagnosis are activated. After this time has elapsed, the equipment displays the test result. **This parameter is hidden if the option Access to advanced parameters is inactive** – refer to section “11.2 Access Settings” for more information.

### 9.2.7 Advanced Parameters

Accessing the *Advanced Parameters* Screen allows the activation of features such as depressurization optimization, thermal auto-compensation, and external pressure source. These settings help improve

test performance and are only accessible if the option *Access to Advanced Parameters* in the *Access* submenu is enabled.



**Thermal Self-Compensation:** Enables or disables the thermal compensation feature for the selected piece registration.

**Optimize Depressurizing:** When this feature is activated, the *Depressurize* parameter is omitted from the *Test Time Parameters* screen – refer to section “9.2.6 Adjusting Times”. By performing an *Auto Zero Execution* on a standard package placed in the chamber, the equipment determines the shortest possible time for that type of package to reach the test pressure. Activating the *Optimize Depressurizing* feature allows the equipment to use this time in the *Depressurization* stage for that package’s registration. This increases the chances of packages with small or medium leaks retaining air during the *Measure* stage, enabling the equipment to detect leakage at that stage.

**Auxiliary Pressure Source (optional feature for the equipment):** This parameter enables the *External Vacuum Adjustment* input and turns off the internal vacuum generator. In this way, an external vacuum generator with higher capacity can be connected to this input, allowing the equipment's internal pressure regulator to adjust the pressure during the test.

### 9.3 Execução do Auto Zero



The *Auto Zero Execution* is used to automatically define certain test parameters and has different functions depending on the selected registration.

If a chamber registration is selected, pressing this button will determine the global test parameters for the chamber associated with that registration. Consequently, the piece registrations linked to this chamber registration will use these parameters. Chamber registrations have a **NICKNAME** in the format **#GV-X** (where **X** is a differentiator consisting of one or more characters). For this case, the parameters determined by the *Auto Zero Execution* are:

- System leakage offset;
- System leakage offset pressure;
- Test system volume (chamber, equipment, and piping).

If a piece registration is selected, touching this button will determine the local test parameters, i.e., the specific parameters for the registered part. For this case, the parameters determined by the *Auto Zero Execution* are:

- Test Volume (kVe) (Thermodynamic volume coefficient of the part) – refer to section “9.2.1 Volume Properties Screen” for more information;
- Depressurization time;

- Fixed offset (deducts a constant leakage value in the part's measurement) – refer to section “9.2.5 Adjusting Limits” for more information.

#### 9.3.1 Defining Global Parameters for a Chamber

Before changing the global parameters for a chamber, ensure that the entire pneumatic system is correctly installed: all tubes are connected, the chamber is empty (no packaging inside), and the seals, membranes, and meshes are intact, clean, and free of leaks.

**The global parameters must be redefined whenever there is maintenance on the chamber or a change in the tubing,** as these situations may alter the characteristics of the new materials or the system's volume.

For users of variable geometry chambers, it is important to perform periodic checks using the chamber registration **#GV-X** (where **X** is an identifier of the chamber being used, consisting of one or more characters) to evaluate if there is a sensor zero shift. Sometimes, the elasticity of the membranes may change over time, which can cause the equipment to deviate from the leakage reading for all registered parts. Whenever this occurs, the global parameters must be redefined.



#### WARNING

- *The global parameters for a chamber must be defined before the local parameters and must be set correctly. If the global parameters are incorrect, the local parameters will also be incorrectly determined by the equipment.*

Instructions for properly defining the global parameters of a **variable geometry chamber**:

1. Select the chamber registration **#GV-X** corresponding to the chamber installed in the equipment. For convenience, the equipment can be configured to read the identification label code of the device and select this registration using a scanner – see section “*10.1.1 Adding and Selecting Parts Using a Scanner*” for more information.
2. Open the lid of the variable geometry chamber, press the *Auto Zero Execution* button, close the lid, and confirm the message in the pop-up window – if the result is rejected at the end of the execution, ignore it, as the membranes have not yet stabilized.
3. Repeat the previous step (2) until the equipment shows a leakage value close to zero (this should occur after around four cycles) – this step is important so that the **global parameters for the installed chamber** are redefined with the stabilized membranes.
4. If in the previous step (3) the result was close to zero and approved, proceed to the next step (5). If rejected, the system's pneumatic circuit may have a leak – in this case, investigate the issue and redo the procedure starting from step (2). If the problem persists, contact TEX.
5. Insert a Leak Master into the *Standard Outlet* (located at the front of the equipment) and start a test – the displayed reading should be **Leakage  $\text{Leak Master} \pm 20\%$**  (ignore the test rejection). If the result falls outside this range, contact TEX.



Instructions for properly defining the global parameters of a **fixed geometry chamber**:

1. Select the chamber registration **#GV-X** corresponding to the chamber installed in the equipment. For convenience, the equipment can be configured to read the identification label code of the device and select this registration using a scanner – see section “*10.1.1 Adding and Selecting Parts Using a Scanner*” for more information.
2. Close the lid of the fixed geometry chamber.
3. Press the *Auto Zero Execution* button and confirm the message in the pop-up window – if the result is rejected at the end of the execution, ignore it.
4. Repeat the previous step (3) one more time so the equipment can correctly reset the **global parameters** – the leakage result shown by the equipment should be close to zero.
5. If in the previous step (4) the result approached zero and was approved, proceed to the next step (6). If there is a failure, the system's pneumatic circuit may have a leak – in this case, investigate the issue and redo the procedure starting from step (2). If the problem persists, contact TEX.

6. Insert a Leak Master into the *Standard Outlet* (located at the front of the equipment) and start a test – the displayed reading should be ***Leakage* *Leak Master*  $\pm 20\%$**  (ignore the test rejection). If the result falls outside this range, contact TEX.



### 9.3.2 Defining Local Parameters for a Part

Local parameters are the individual settings for each part registered in the equipment. **Before configuring the local parameters for a given part, it is essential that the global parameters for the chamber to be used have been previously defined, and that the chamber registration is linked to the part registration.** For more information, see sections “9.2.1 Volume Properties Screen” and “9.3.1 Defining Global Parameters for a Chamber”.

To define the local parameters for a part, it is necessary that its test pressure parameters, leakage limits, volumetric variation, and test times are correctly configured. Additionally, a standard part must be available, representing the other parts to be tested, meaning it must be leak-free

and its geometry and physical characteristics should be the same as the parts it represents.



#### WARNING

- *The local parameters must be set correctly. If they are incorrectly configured, the test results will be compromised.*

Follow these instructions to properly define the local parameters for **flexible packaging** registrations using a **variable geometry chamber**:

1. Select the chamber registration **#GV-X** corresponding to the chamber installed in the equipment. For convenience, the equipment can be configured to read the identification label code of the device and select this registration using a scanner – see section “10.1.1 Adding and Selecting Parts Using a Scanner” for more information.
2. Open and close the chamber lid and run a test by pressing the *Start* button (if the *Automatic Start* option is enabled in the *Test* submenu, the test will start when the lid is closed) – if the test result is rejected, ignore it, as the membranes have not yet stabilized.
3. Repeat the previous step (2) until the equipment shows a leakage value close to zero and approves the test (this should occur in about three cycles).
4. If in the previous step (3) the result was close to zero and was approved, proceed to the next step (5). In case of failure, the pneumatic circuit of the system may have a leak, or the sensor zero may be misaligned – in this case, investigate the causes and perform the procedure to define the global parameters (refer to

section "9.3.1 Defining Global Parameters for a Chamber"). However, if the problem persists, contact TEX.

5. Select the part registration whose local parameters need to be changed.
6. Open the chamber lid, insert the standard part, tap the *Auto Zero Execution* icon, close the lid, and confirm the message in the pop-up (if the lid does not close, tap the *Stop* button to relieve the domes).
7. During the *Auto Zero Execution*, look through the acrylic dome and ensure that **the package remains inflated with air (1st condition)** and that **the leakage result is close to zero (2nd condition)** – in this first execution, ignore if the equipment displays a failure due to high volume variation.
8. If both conditions from the previous step (7) are true, the standard package is validated, and the equipment can reference it in the next step (9); however, if any of these conditions are false, replace the standard part and go back to step (6).
9. With the validated standard part inside the chamber, open and close the lid and tap the *Auto Zero Execution* button. Repeat this process several times (around two to three), until the results approach zero, allowing the equipment to refine the determination of the local parameters for the selected part registration.

Follow these instructions to properly set the local parameters for **rigid packaging** registrations using a **variable geometry chamber**.

1. Select the chamber registration #GV-X corresponding to the chamber installed in the equipment. To make this easier, the equipment can be configured to read the identification label code of the device and select this registration using a scanner – refer to

section "10.1.1 Adding and Selecting Parts via Scanner" for more information.

2. Open and close the chamber lid and run a test by tapping the *Start* button (if the *Automatic Start* option is enabled in the *Test* submenu, the test will begin when the lid is closed) – if the test result fails at the end, ignore it, as the membranes have not stabilized yet.
3. Repeat the previous step (2) until the equipment shows a leakage value close to zero and approves the test (this should happen in about three cycles).
4. If the result in the previous step (3) approached zero and was approved, proceed to the next step (5). If there is a failure, the system's pneumatic circuit may have a leak or the sensor's zero may have shifted – in this case, investigate the causes and follow the procedure to set the global parameters (refer to section "9.3.1 Defining the Global Parameters for a Chamber"). However, if the problem persists, contact TEX.
5. Select the part registration whose local parameters need to be changed.
6. Open the chamber lid, insert the standard part (**known to be leak-free**), tap the *Auto Zero Execution* button, close the lid, and confirm the message in the opened pop-up (if the lid does not close, tap the *Stop* button to relieve the domes) – if the result is rejected after execution, ignore it.
7. Keeping the standard part in the chamber, repeat the previous step (6) a few more times (between one and two), until the results approach zero, allowing the equipment to refine the determination of the local parameters for the selected part registration.

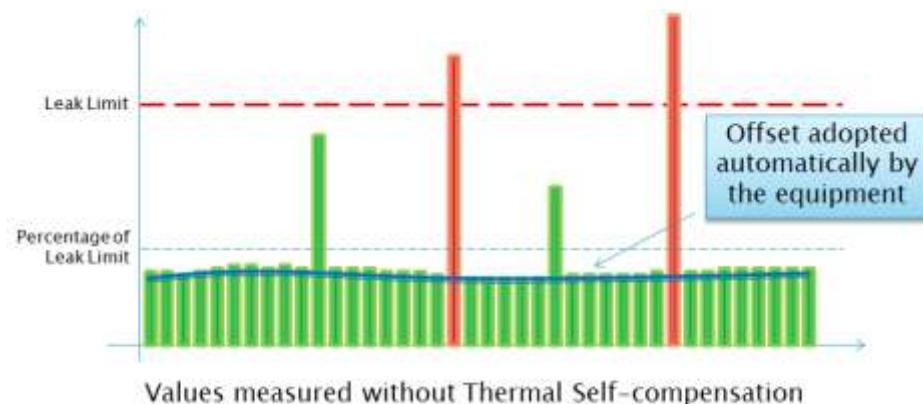
Follow these instructions to properly define the local parameters for registered parts using a **fixed geometry chamber**:

1. Select the chamber registration #GV-X corresponding to the chamber installed in the equipment. To make it easier, the equipment can be configured to read the identification label code of the device and select this registration through a scanner – refer to section “*10.1.1 Adding and Selecting Parts via Scanner*” for more information.
2. Close the chamber lid and perform a test by pressing the *Start* button (if the *Automatic Start* option is enabled in the *Test* submenu, the test will start upon closing the lid).
3. If the result in the previous step (2) approached zero and was approved, proceed to the next step (4). If there is a failure, the system's pneumatic circuit may have a leak, or the sensor's zero may have shifted – in this case, investigate the causes and perform the procedure to define the global parameters (refer to section “*9.3.1 Defining Global Parameters for a Chamber*”), but if the problem persists, contact TEX.
4. Select the part whose local parameters need to be altered.
5. Open the chamber lid, insert the standard part (**known to be leak-free**), press the *Auto Zero Execution* button, close the lid, and confirm the message in the pop-up window – if the result is a failure at the end of the execution, ignore it.
6. Keeping the chamber closed with the standard part inside, perform the previous step (5) several more times (between one and two times), until the results approach zero, allowing the equipment to refine the determination of the local parameters for the selected part registration.

#### 9.4 Thermal Self-Compensation

The compensation for deviation is a statistical method used to account for interferences caused by gradual changes in ambient temperature or the characteristic behavior of the piece. A current average of the last approved pieces is used as the compensation value. This value can be negative or positive. The maximum compensation value is defined in the “*Thermal Compensation Limit*” option, located in the “*Test*” submenu of the equipment’s settings.

An internal cyclic table will be created to store the most recent valid results for defining the compensation value (referencing). As new values are added to the table, the oldest recorded values are discarded and replaced by the new results. This way, the table tracks the performance and small variations in the manufacturing process of the piece. The number of samples in this table can be adjusted in the “*Samples for Thermal Compensation*” option within the “*Test*” submenu. Refer to section “*11.5 Test Settings*” for adjusting the sample quantity.

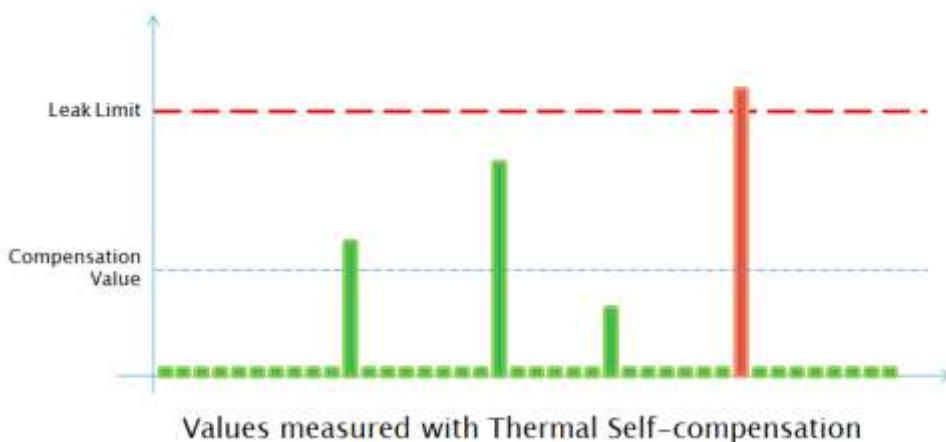


As long as the table is not completely filled, the equipment adopts the percentage defined at option “Self-Compensation Limit” as leak limit and table input as the part leak limit. For example, if the part limit is 10,0 ccm and the option is set at 50%, leak limit for part rejection and input on the table will be 5,0 ccm. Higher values are rejected and discarded from the table. The option value “Self-Compensation Limit” also defines the maximum permitted compensation value.

After the table is filled, the exhibited leak value will have been compensated with a table average, and the leak limit goes back to the nominal value of the part. The table is constantly updated provided the measured values without compensation are within the option limit “Self-Compensation Limit”.

The leak value calculation with compensation on operation will be:

$$\text{Leak} = \text{Sensor Reading} - \text{Auto-Zero} - \text{Average (Data Table)}.$$



When enabled, the Thermal Self-compensation feature performs initial referencing, only:

After the equipment start-up or reset;

After 1 equipment idle time.

# 10 - Running a Test

After correctly configuring the parts, the tests can be started. Below, instructions on how to select parts, start a test, and a description of the operation of the Measurement and Charts screens are provided.

## 10.1 Selecting Parts

If the parameter "**Change part on the main screen**" is set to "**Disable**" in the "*Administrative*" submenu, the "*Chart Screen*" and the "*Part Selection Screen*" will be available and can be selected using the following buttons. Then, touch the buttons until you reach the "*Part Selection Screen*".



In this screen, there are two arrows, one to the left and one to the right (Selection Buttons), which navigate between the parts.



While on the part selection screen, use the Selection Buttons to navigate between parts. Simply stop the navigation on the desired part for it to be selected.



If the parameter "Change part on the main screen" is set to "Enable" in the "Administrative" submenu, only the "Measurement Screen" will be available, and the following buttons will function to select a registered part.



For more information about these settings, refer to section "11.1 Administrative Settings".



If the desired part is not found using the Selection Buttons, the search feature can be used. Tap the corresponding button to start the search.

The search is conducted using the NICKNAME of the part you want to locate, and the exact name must be entered (for example, for a part with the Abbreviated Name "789507741125," you must enter "7 8 9 5 0 7 7 4 1 1 2 5"). Tap the button to enter the part name using the alphanumeric keyboard.



If the part is found, it will be automatically selected. If the part is not found, a pop-up will inform you that the part was not found.



It is possible to remotely select parts through the digital electrical inputs by sending pulses to the corresponding inputs. The Remote Control for Part Selection performs the same function as the selection buttons. See section “*5.1.6 Remote Control for Part Registration Selection*”.

Parts can also be selected via BCD Link. To do this, the part to be selected via BCD must have a value assigned, and the corresponding BCD signals must be applied to the electrical inputs. See sections “*5.1.5 Part Selection by BCD*” and “*9.1.9 Part Selection via BCD*” for more information on part selection via BCD.

It is possible to select parts through the serial port by reading a barcode with a scanner or by transmission via PLC/computer. See sections “*5.2.1 Using a Scanner*,” “*5.4.1 Using the USB Scanner*,” and “*9.1.2.4 Scanner Reading*” for more information.

Parts whose Abbreviated Name starts with a hash (#) are Try-out Parts, whose parameters were defined during the part try-out, conducted by TEX. The parts with Abbreviated Names “#NoLeak” and “GV-X” are programs for performing internal equipment leakage tests and pneumatic circuit leakage tests, respectively. They cannot be modified or deleted.

### **10.1.1 Adding and Selecting Parts via Scanner**

It is possible to include and select parts using a scanner connected to the RS-232 or USB port. A scanner approved by TEX must be correctly connected and configured. Refer to section “*5.2 – RS-232 Serial Interface*” to correctly connect your scanner if it connects via an RS-232 port. The parameters that need to be adjusted can be found under *Options -> Configuration -> Equipment -> Communication*, accessible from Level 4 with advanced parameter access enabled (see section “*11.4 Communication Settings*”).

#### **10.1.1.1 Configuring the Scanner**

For scanner usage, it is necessary to enable the option “Control via RS-232” in the “Communication” submenu. When this option is activated, the equipment can be controlled by the scanner, whether via USB or RS-232 ports, allowing part selection. The option “Start with barcode” can also be activated so that, in addition to selecting parts, the scanner can also initiate the test.

If the scanner's communication port is RS-232, configure the parameters in the “*RS-232 configuration*” item according to your scanner's configuration requirements.

For more information on the settings mentioned here, refer to section “*11.4 Communication Settings*.”

#### **10.1.1.2 Adjusting the Code to be Scanned**

Barcodes in various formats and sizes can be read by the scanner, especially modern models. First, the option “*Commands through RS-232/USB*” in the Communication submenu must be enabled for the

scanner settings to be available. For more information, refer to section "11.4 Communication Settings".

For common use cases where the barcode is fixed and does not change for each part, simply access the "Communication" submenu and verify if the "Size of barcode" parameter is set to *flexible*.



In the industry, there are also parts with barcodes that register a serial number, which changes with each unit produced. In such cases, the relevant part of the code for scanner use is the part model (fixed part). Thus, the G4-S8 has parameters to define which part of the scanned code corresponds to the part model.

For example, the code "012017-K20Z3" consists of a serial number, a separator, and the part model, totaling 12 characters. "012017" is the serial number of the part, which changes with each produced part. The character "-" separates the serial number from the model. "K20Z3" is the part model and does not change for each part produced; therefore, it is the part of the code that must match the part's NICKNAME.

To adjust the barcode length, enter the total number of characters in the "Size of barcode" parameter, including the serial number, separator, and model. Following the previous example, you would enter the number 12 in this option. After that, the parameter "Position of Serial & Model" becomes available just below.



The "*Position of Serial & Model*" parameter defines the position of the serial number and model within the scanned code. In this parameter, there are four values: S:(first\_value ~ second\_value) M:(third\_value ~ fourth\_value). The first and second values indicate the character range for the serial number; the third and fourth values indicate the range for the model.

Based on the code shown in the example, the first value will be 1, indicating that the first character is part of the serial number, and the second value will be 7, which defines “-” as the end of the serial number; meaning this information, including the separator, is within the range of 1 to 7. The third value should be set to 8, indicating the start of the model, and 12 as the fourth value, defining the end of the model. Thus, the example code can be associated with a part with the Abbreviated Name "K20Z3", meaning that whenever the code has "K20Z3" in the defined range, the part will be selected and tested, regardless of the initial characters. If there are more characters beyond the fourth value, they will be ignored.

To enter these four values, tap the "*Position of Serial & Model*" parameter. The equipment will individually and sequentially request each of these values via the numeric keypad. After entering the four values from the presented example, they will be displayed on the screen as: "*Position of Serial & Model S: 1 ~ 7 M: 8 ~ 12*".

## **IMPORTANT**

- *The scanner can read up to 100 characters in the code. Contact Tex for support on using longer codes.*

### **10.1.1.3 Adding and Selecting Parts and Starting a Test**



After the correct configuration, it is necessary to add the desired part. On the "*Test Part Specifications*" screen or the "*Home Screen*", scan the code. The equipment will signal that the part is not registered, and shortly after, a pop-up will appear to confirm the addition of a new part. Following this, a new part is registered, which is assigned the model characters as its NICKNAME. If the settings from the example in the previous section are used, where the barcode changes with each part, upon scanning the code "012017-K20Z3", the equipment will receive "K20Z3".

When scanning a valid code with the Scanner, the part is automatically selected if it is already registered. If the option "*Start by barcode*" is enabled, the part is selected, and the test is initiated.

#### **NOTE**

- *The code presented is just an example and does not represent a real part code. The customer is responsible for identifying the part model within the code.*

#### **WARNING**

- *The scanner will not work if the scanner settings and code configuration are incorrect.*

#### **IMPORTANT**

- *For codes where the entire structure changes with each part produced, this feature cannot be used.*

#### 10.1.1.4 Barcode Composition

There are occasions when it is necessary to perform tests with different characteristics for a specific type of part, such as subjecting them to different pressures or times, changing leakage limits, etc. For this, different registrations for the same type of part must be created, which often share the same barcode. Since it is not possible to associate the same barcode with two or more different part registrations, the barcode composition feature can be used. This function consists of combining the information from two codes through a sequential two-step scan. This can be done to either register a part or to select it and start a test. The scanning between one code and another must occur within a time interval of less than 5 seconds. Below is a diagram showing two distinct registrations made using the barcode composition method. To activate this feature, go to the “Communication” submenu and select the “Fragmented Barcode” option.

In the diagram, note that the NICKNAME is composed of the part's barcode (13 characters) and the QR code (1 character). Therefore, 14 characters must be entered in the “Size of Barcode” parameter in the “Communication” submenu.

#### ! IMPORTANT

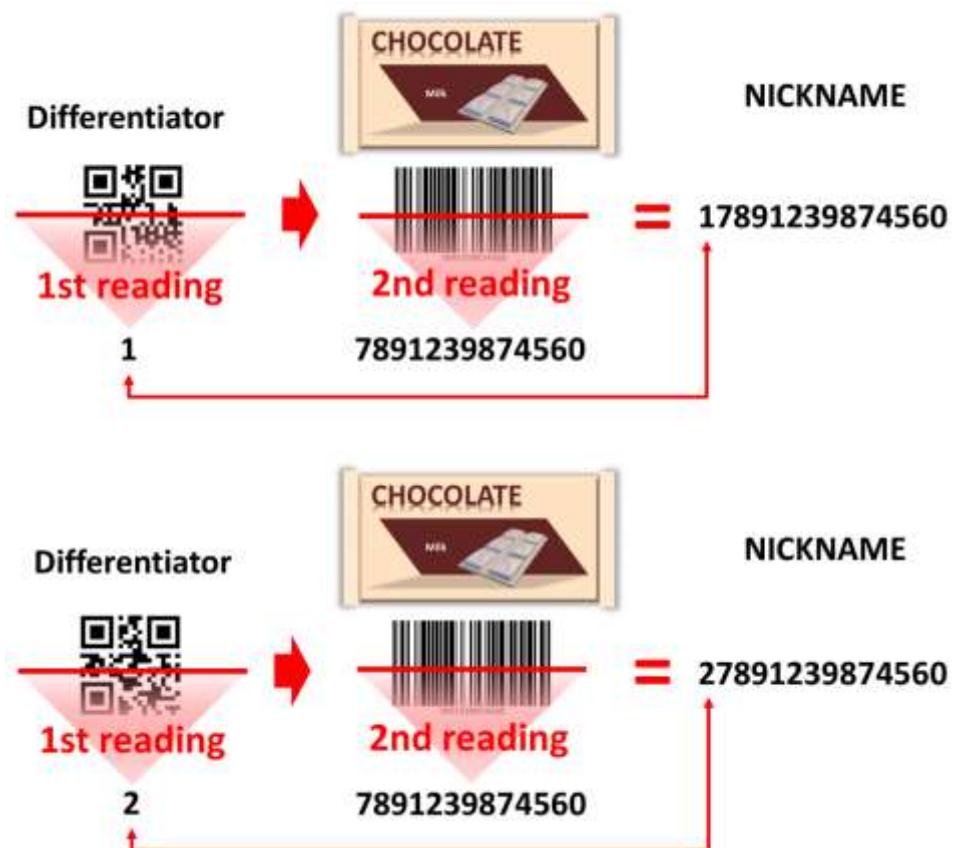
- The “Barcode Composition” method will not work if the “Size of barcode” parameter is set to “Flexible.”
- For the scanner to work for all registered parts, their Nickname must have the same length as the one configured in the “Size of barcode” parameter.



#### NOTE

- The code presented is just an example and does not represent a real part code. The customer is responsible for identifying the part model within the code.

For more information on scanner settings, see the section “11.4 Communication Settings”.



### 10.1.1.5 Barcode Prefixing

This feature, similar to the *Barcode Composition* method, is used to create multiple registrations for the same part in the equipment, meaning with the same barcode. As mentioned in section “*10.1.1.4 Barcode Composition*”, it is not possible to register more than one part with the same NICKNAME. To enable multiple registrations of the same part, with the same barcode, a differentiator needs to be introduced in each Abbreviated Name. The method described in this section, through a scanner connected to the equipment, allows a prefix to be added to the part's barcode. For this, the operator must perform a sequential two-step scan: first the prefix code (PRE:) along with the prefix, and then the part's barcode:

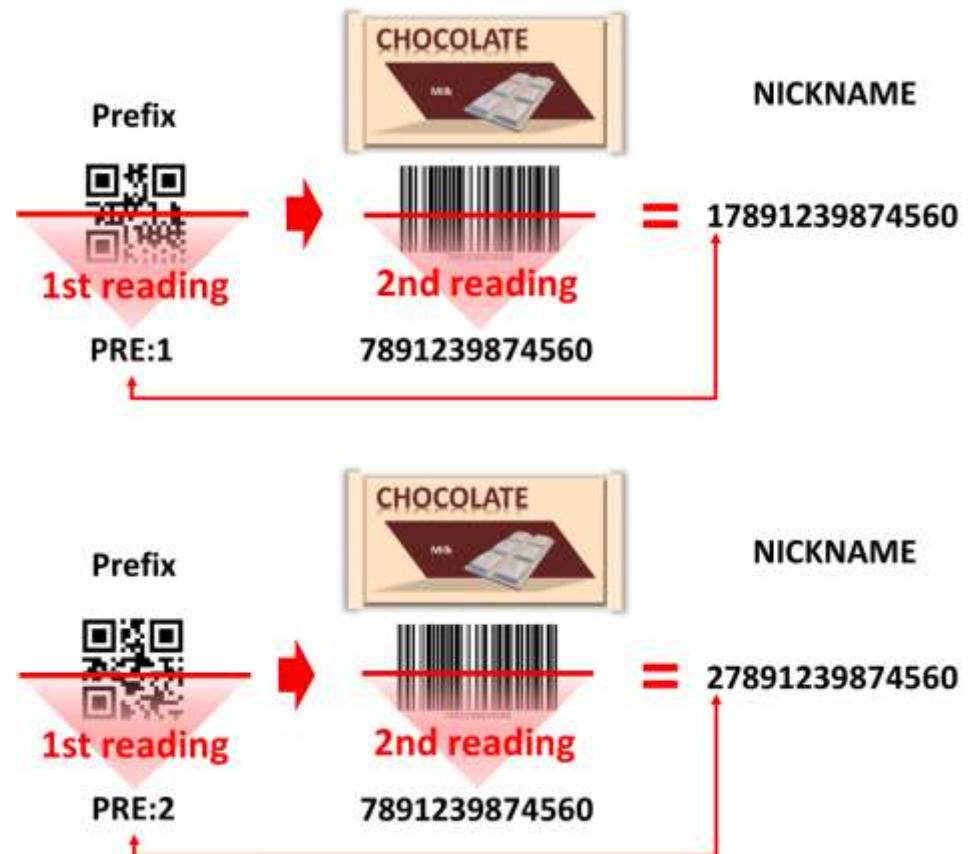
*Scan = PRE:Prefix + part\_code*

This process is used both for registering a part and for selecting it and starting a test.

To configure this feature, enter the “*Communication*” submenu and set the items as follows (see section “*11.4 Communication Settings*”):

- Commands through RS-232/USB: Enable;
- Size of barcide: Flexible.

Below is a diagram showing two distinct registrations made using the *Barcode Prefixing* method:



Since the barcode length is flexible for this method, the scanner will work for all parts, even if they have different NICKNAMES.

The equipment stores the last prefix value read in memory. Therefore, when scanning a part's code with the scanner, the equipment may consider the last prefix read.

For example, if the last prefix read was “2” and the user wants to select the program with the NICKNAME “27891239874560,” simply scan the part's code “7891239874560.”

To insert the last prefix read into an already registered part, access the *Test Part Specifications* screen, tap the NICKNAME field, press the OK key on the alphanumeric keyboard, and confirm the pop-up message sent by the equipment.



## Prefix added

To insert the last prefix read into a part to be registered, follow the normal registration process. Upon completion, the equipment will ask, through the same pop-up as shown previously, if the user wants to add that prefix.

### 10.2 Starting a Test

The test can be started in several ways: by pressing the *Start* button (as shown below), by closing the variable geometry chamber (when the

automatic start parameter is enabled), by using the corresponding electrical input, by scanning with the scanner, or through MODBUS/TCP, PROFIBUS, PROFINET, or EtherNET/IP registers (see the "G4-S8 Communication Protocols" application note).

The equipment must be unlocked, at least with access *level 1*, to allow a test to be started via the *Start* button. With the equipment unlocked, press the *Start* button on the equipment's home screen to execute the test.



If the *Start* button is disabled, the test will not begin, and a message will be displayed on the screen. Refer to section "11.3 Electrical Input and Output Settings" to enable the *Start* button.

To start a test through the Electrical Inputs, simply apply the electrical signal to the corresponding input. The equipment does not need to be unlocked to start a test via Electrical Inputs. See item "5.1 Electrical Inputs and Outputs" for the wiring diagram of the corresponding input.

A test can also be started by scanning a code with a scanner connected to the RS-232 serial port. For this to work, the part must be previously registered, and the serial port parameters must be correctly configured. Refer to sections "5.2.1 Scanner Usage", "5.4.1 USB Scanner Usage", "9.1.2.4 Scanner Reading", and "11.4 Communication Settings" for more information.

### **10.2.1 Automatic Start (for Variable Geometry Chamber)**

The equipment has a feature that allows the test to start automatically when the lid of a variable geometry chamber is closed. To enable this function, "Automatic Start" must be activated in the "Test" submenu – refer to section "11.5 Test Settings" for more information.

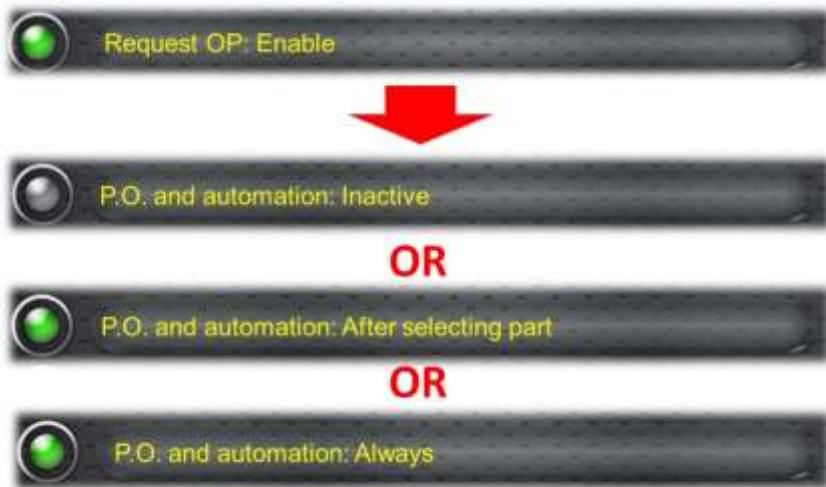
**Close the chamber to automatically start a test**



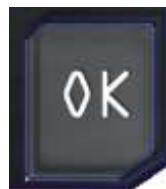
### **10.2.2 Test Linked with Production Order Number**

At times, it is necessary for the tests conducted, due to traceability requirements, to be linked to Production Order (P.O.) codes. To access these settings, navigate to *Options -> Configuration -> Equipment -> Test* – see section "11.5 – Test Settings".

By enabling the "*Request P.O.*" option in the Test configuration submenu, the equipment makes available another parameter called "*P.O. and automation*", which can be configured in three distinct ways: "*Inactive*", "*After selecting part*", and "*Always*". To choose one of these options, tap this parameter until the desired configuration appears.



For each of these configurations, the P.O. code is requested from the user in a specific way when tests are initiated. The request is made through an alphanumeric keypad, where up to 12 characters must be entered using either the keypad or a USB scanner.



After entering the P.O. code, tap the **OK** key to confirm and start the test. The last entered code is stored and visible on the keypad. Thus, when the equipment requests this information again and it is the same as the previous one, simply tap **OK** to start the test.

Later, the *Results* spreadsheet for the current part can be transferred to a *Flash Disk*, where these P.O. codes linked to the conducted tests can be accessed.

If the **P.O. and automation** parameter is set to **Inactive**, the equipment will open the alphanumeric keypad to request the P.O. code only when the *Start* button (on the equipment display) is pressed.



If the **P.O. and automation** parameter is set to **After selecting part**, the equipment will open an alphanumeric keypad to request a P.O. code when a new part record is selected and, subsequently, a command is sent to start a test via the *Start* button, the network, the electrical input, or the serial port. In other words, as long as no other part record is selected, the equipment will not request a P.O. code and will consider the last entered one for subsequent tests.



If the **P.O. and automation** parameter is set to **Always**, the equipment will always request a new P.O. number, regardless of the method used to start a test.



### 10.2.3 Procedure for Performing a Test with a Variable Geometry Chamber

To carry out this procedure, both the part to be tested and the chamber being used must be properly configured.

1. Ensure that the chamber to be used has not been inactive for more than 15 minutes.



#### NOTE

- If the inactivity period exceeds 15 minutes, select the chamber record being used and perform the membrane stabilization procedure and sensor zero check – refer to

section "13.7 Chamber Registration #GV-X" for more information.

- The chamber has an identification label with a QR code, which contains the same Abbreviated Name as the chamber record associated with this device. Thus, with a properly configured scanner on the equipment, you can easily select this record and perform the membrane stabilization procedure, as shown in the image below. Refer to section "10.1.1 Adding and Selecting Parts via Scanner" for more information.



2. On the equipment, select the packaging record with which you wish to test.



### NOTE

- If local parameters for the part have not been defined, perform the "Auto Zero Procedure" with the **standard part** – refer to section "9.3.2 Defining Local Parameters for a Part".
3. Open the lid of the *Variable Geometry Chamber* and place the part in the center of the membrane.

4. Close the chamber lid by pressing the handle. If the packaging prevents the lid from closing, touch the *Stop* button to relieve the domes.



- Start the test by pressing the *Start* button – if the equipment is configured for automatic start, the test will begin when the lid is closed. For more information, refer to section "10.2.1 Automatic Start for Variable Geometry Chamber".



### IMPORTANT

- To ensure measurement quality, check the zero and sensor reading with a Leak Master every 1000 tests or per shift, using the #GV-X chamber registration – refer to section "13.7 Chamber Registration #GV-X".
- To detect a leak in this type of test, the part must have a hollow volume (air inside it).
- It is not possible to test parts containing liquids or pasty materials. These materials obstruct air leak points.

### 10.3 Stopping a Test

Tests can be stopped in three ways: by pressing the *Stop* button (as shown below), via the corresponding electrical input, through the MODBUS, PROFIBUS, PROFINET, and ETHERNET/IP networks (see the "G4-S8 Communication Protocols" application note), or via the RS-232 serial port. Refer to sections "5.1 Electrical Inputs and Outputs", "5.2.1 Scanner Usage", "5.4.1 USB Scanner Usage", and "Chapter 9 Test Parameterization" for more details on Electrical Inputs and Outputs, Serial Ports, and Part Parameterization.



The *Stop* button is used to open the Relief connection to the atmosphere, located at the rear of the equipment – refer to section "3.1.2 Rear Panel" for more information. This button should be pressed when the air inside the chamber domes prevents the lid from closing when starting a test.

## 10.4 Status do Teste

At the end of the test, the equipment evaluates and displays the result. If an error occurs during the test, a failure will be indicated, signaling the error. The Measurement Screen and the Chart Screen display the test result in different ways. There are three possible test outcomes:

- **Approved**  
Indicates that the test pressure, leakage, and volumetric variation readings are within the configured limits for the part being tested.
- **Part Leaks**  
Indicates that the leakage value of the part is outside the configured limits for the part being tested.
- **High Volume**  
Indicates that the volume of air transferred from the part to the chamber exceeded the configured volumetric variation limit for the part being tested.
- **Pressure Fail**  
Occurs when there is a failure during the test. The most common cause is sealing issues in the chamber, causing the pressure to drop after the depressurization phase or not reach the minimum value for that phase. Very short depressurization times can also cause this failure.

The Test Status is also signaled through the Electrical Outputs. See section "5.1 – Electrical Inputs and Outputs" for more information.



### IMPORTANTE

- *The determination of leakage and pressure limits for each part is the responsibility of the customer. TEX does not set any test limits, but can only assist in their determination through its expertise. TEX*

*cannot be held liable for problems or recalls when leakage limits are incorrectly set by the customer.*

### 10.4.1 Rejection Sensor and Part Disposal Confirmation

The G4-S8 is equipped with a feature to control rejected parts, similar to a Poka-yoke system, requiring confirmation of the disposal of the part to prevent rejected parts from being mixed with approved ones.

Part disposal confirmation can be done either through a rejection sensor (not available for the *G4 Standard Converter Module*) or through confirmation in a pop-up window on the equipment screen (only for Level 4 access or higher). Activate this function through the *Test* submenu (see section "11.5 – Test Settings"). The function will not be available if the Part Selection by BCD is enabled.

When a part is rejected, the equipment will be locked from performing a new test until it receives confirmation that the part has been discarded. Even if the equipment is turned off or another part is selected, the disposal confirmation is required when starting a new test, as the rejection condition is memorized.

#### 10.4.1.1 Confirmation through Rejection Sensor

When Part Selection by BCD is not activated, disposal can be confirmed by sending a signal (e.g., from a sensor that can be installed on a part collection chute or at the entrance to a rejected parts bin) to terminal 5 of the Digital Input connector. Confirmation through the sensor does not depend on any access level, and the equipment only needs to be unlocked. See section "5.1 Electrical Inputs and Outputs" for information on the digital inputs.

#### 10.4.1.2 Confirmation on the Screen

Starting from Level 2 access, part disposal can be confirmed through a pop-up window on the screen. At Level 1, only a message alerting the need for disposal is displayed.



At Level 1 access, it is not possible to confirm disposal on the screen, only through the Digital Inputs.



Starting from Level 2 access, disposal can be confirmed either on the equipment screen or by a signal via the Digital Inputs. Once confirmed, the equipment will be unlocked and ready for another test.



#### IMPORTANT

- A confirmação de descarte somente estará disponível quando a opção de **Selecionar Peças por BCD** estiver desativada. A confirmação através de sinal nas Entradas Digitais (**sensor de refugo**) não está disponível para o **Módulo Conversor G4 Standard**.
- Disposal confirmation will only be available when the **Part Selection by BCD** option is **disabled**. Confirmation through the Digital Inputs (**Scrap sensor**) is not available for the **G4 Standard Converter Module**.
- Disposal confirmation is recorded in the equipment's message log.

#### 10.4.2 Custom Printing

It is possible to customize the data sent via the serial port at the end of the test, editing print fields and texts. Test data can be printed as needed. Test data is represented by standard text between two “^” characters. The table below describes the standard data that can be printed.

Test Data			
<b>^Nome_Abreviado^</b>	Send the nickname of the part	<b>^NOK^</b>	If the part is rejected, print the text written on the right side of this command.
<b>^Nome_Peca^</b>	Send the name of the part	<b>^FAIL^</b>	If the test fails, print the text written next to this command.
<b>^Nome_Camara^</b>	Sends the name of the test chamber	<b>^Pressao_Simples^</b>	Test result pressure, without unit.
<b>^Teste_Atual^</b>	Indicates which current chamber parameter set was executed	<b>^Fluxo_Simples^</b>	Test result leak, without the unit
<b>^Resultado^</b>	Test result, Approved or Reproved	<b>^Unidade_Pressao^</b>	Pressure unit
<b>^Tipo_de_Teste^</b>	Indicates the type of test performed	<b>^Unidade_Fluxo^</b>	Leak Unit
<b>^Data^</b>	Send the test date	<b>^DP.^</b>	Force the "." as the decimal separator of floating point numbers.
<b>^Hora^</b>	Send the test time	<b>^DP,^</b>	Forces "," as the decimal separator for floating point numbers.
<b>^Pressao^</b>	Sends test pressure	<b>^Data_Completa^</b>	Date and time, with 4 digits in the year
<b>^Fluxo^</b>	Submit the leak	<b>^SEM_LF^</b>	Removes the character LF (0x0A) from printing
<b>^G4_Modelo^</b>	Indicates the equipment model	<b>^SEM_+^</b>	Removes the + sign from the numerical representation for positive numbers.
<b>^G4_Serial^</b>	Indicates the serial number of the equipment	<b>^{XX}^</b>	Value of XX, where XX is the hexadecimal value of the character you want to print.
<b>^Operador^</b>	Indicates the operator who accessed the equipment	<b>^PECAS_OK^</b>	Sends the total value of approved
<b>^Serial_Peca^</b>	Sends the serial number of the part, when using a scanner		
<b>^OK^</b>	If the part is approved, it prints the text written on the right side of this command.		

	parts	
<b>^PECAS_NOK^</b>	Sends the total value of failed parts	
<b>^TOTAL_PECAS^</b>	Sends the total value of failed parts	
<b>^BCD^</b>	Sends the BCD number of the part	
<b>^Sem_Carac_Esp^</b>	Swap special characters for simple characters	
<b>^PressaoFmt:+0ATS.P^</b>	<p>Pressure with specific formatting:</p> <ul style="list-style-type: none"> <li>• <b>+ -</b> Maintains the value sign. Can be deleted</li> <li>• <b>0 -</b> Does not remove non-significant zeros. Can be deleted</li> <li>• <b>T -</b> Truncates the length of the string to the specified size. Can be deleted</li> <li>• <b>A -</b> Absolute value.</li> <li>• <b>S -</b> Total field size. Can be deleted</li> <li>• <b>. -</b> Indicates accuracy. Can be deleted. If you use ';' the decimal separator will be ';' not '.'</li> <li>• <b>P -</b> Precision (Decimal places)</li> </ul>	<p><b>Examples:</b></p> <ul style="list-style-type: none"> <li>• <b>^PressaoFmt:T5.2^</b> - Truncates result into 5 characters, sets decimal separator to '.', shows 2 decimal places and suppresses non-significant 0s.</li> <li>• <b>^PressaoFmt:+6,3^</b> - Determines the minimum size of the field with 6 characters, puts a + sign for positive values, shows 3 decimal places and suppresses non-significant 0s.</li> </ul>
		<p>Leak with specific formatting:</p> <ul style="list-style-type: none"> <li>• <b>+ -</b> Maintains the value sign. Can be deleted</li> <li>• <b>0 -</b> Does not remove non-significant zeros. Can be deleted</li> <li>• <b>T -</b> Truncates the length of the string to the specified size. Can be deleted</li> <li>• <b>A -</b> Absolute value.</li> </ul>
		<b>^FluxoFmt:+0ATS.P^</b>

- **S** - Total field size. Can be deleted
- **.** - Indicates accuracy. Can be deleted. If you use ',' the decimal separator will be ';' not '.'
- **P** - Precision (Decimal places)

#### Examples:

- **^FluxoFmt:T5.2^** - Truncates result into 5 characters, sets decimal separator to '.', shows 2 decimal places and suppresses non-significant 0s.
- **^FluxoFmt:+6,3^** - Determines the minimum field size with 6 characters, puts a + sign for positive values, shows 3 decimal places and suppresses non-significant 0s.

#### 10.4.2.1 Data file

To send the data, it is necessary to create a text file. This file must be named with the equipment serial number plus the ".prt" extension. For example, if the equipment has a serial number of G408-200003, the text file must be named as follows: G408-200003.prt. In this file, the texts you want to print must be inserted, including the desired standard fields. Below is an example of text to be inserted into the text file:

#### Custom Printing

Part:	<b>^Nome_Abreviado^</b>
Chamber under Test:	<b>^Nome_Camara^</b>
Result:	<b>^Resultado^</b>
Test type:	<b>^Tipo_do_Teste^</b>
Date:	<b>^Data^</b>
Time:	<b>^Hora^</b>
Pressure:	<b>^Pressao^</b>
Flow:	<b>^Fluxo^</b>
Equipment:	<b>^G4_Modelo^</b>
Serial Number:	<b>^G4_Serial^</b>
Operator:	<b>^Operador^</b>
Serial Part:	<b>^Serial_Peca^</b>
<b>^OK^</b>	<b>PART OK!</b>
<b>^NOK^</b>	<b>PART WITH LEAKAGE!</b>

In the example above, common texts and standard fields indicated by texts between two "^^" characters are being used. The text can be edited as desired, regardless of the position of the characters. Sending data, however, takes into account spaces, tabs and edited lines. Only the standard fields **^OK^** and **^NOK^** must start a line and immediately after the text, otherwise they will not be printed correctly. Take special care with the configuration of the device that will receive the data. An incorrect configuration can cause the data to be organized in an undesired way.

The text edited above will be sent via serial by the equipment as follows:

Custom Printing	
Part:	7891239874560
Chamber under Test:	Chocolate
Result:	APPROVED!
Teste type:	Leak Test
Date:	10/10/20
Time:	16:58:02
Pressure:	+2.60 kPa
Flow:	+0.00 cm <sup>3</sup> /min
Equipment:	S8GV2HFZFZ/73042000
Serial Number:	G408-240003
Operator:	Pascal
Serial Part:	PART OK!

The default fields are replaced by equipment and test data. The fields ^OK^ and ^NOK^ are replaced by the text next on the line and follow the test result, writing the text in front of ^OK^ with the approved part and the text in front of ^NOK^ with the part reproved.

#### 10.4.2.2 Configuring the Equipment to Send Data

The *Flash Disk* must be in FAT 32 formatting and contain a folder called *TEX* in its root. The text file must be saved in the Flash Disk's *TEX* folder, and the folder must contain only this file. With Level 4 access, insert the *Flash Disk* and go to *Options -> Configuration -> Equipment -> Administrative*. Then, tap on the "Update equipment software" option. The text file is transferred to the device and then a Pop-up indicates that the file has been found.



Then, in the *Communication* submenu of the equipment settings, select the option to send data via *Ethernet* or *RS-232* under the "*Communication Interface*" parameter. Next, in the "*Communication Protocol*" parameter, select the "*Custom*" option. After these steps, the equipment is ready to send data in a customized manner.

Refer to the following sections: "*11.4 Communication Settings*" for information on serial port configuration and output format; "*11.1 Administrative Settings*" for inserting the file with print commands; "*5.2 RS-232 Serial Interface*" for wiring diagrams and parameters; "*5.4 USB Port*" for instructions on the Flash Disk.

#### 10.5 Measurement Screen

The measurement screen displays pressure and leakage values in numerical format. The status of *Approved* or *Reproved* is indicated by changing the font color (simplified display mode, adjusted only by Tex) or by changing the background color of the *Upper Measurement Field* and the *Lower Measurement Field* after the test is completed, along with an indication in the status bar. See section "*6.4 Measurement Screens*".

When turning on the equipment or interrupting the test (via Electrical Inputs or the *Stop* button), the equipment will be ready to start a new test.

The values will indicate zero, the *Progress Bar* will be clear, and the *Status Bar* will show the message “*Ready*”.



When starting a test, the current pressure is indicated, the *Progress Bar* begins, and the *Status Bar* displays the stage of the test and the remaining time for that stage.



The *Progress Bar* fills up from the beginning of the test. At the end of the test, the bar will be completely filled in blue.

The *Status Bar* indicates the stage of the test (depressurization, stabilization, etc.) and the remaining time to complete that stage. At the end of the test, it is shown whether the piece was *Approved* or if there was a *Test Error*.

**Approved:** the *upper and lower measurement fields* have a green background, indicating that both the pressure and leakage are within the limits.



**Part Leaks:** the *lower measurement field* has a red background, indicating that the leakage in the part exceeded the configured leakage limit.



**High Volume:** the *lower measurement field* has a red background, indicating that the leakage in the piece transferred a volume of air to the chamber that exceeded the configured volumetric variation limit in the equipment.



**Pressure Fail:** the *upper measurement field* has a red background, indicating that there was some problem during the test.



## 10.6 Graph Screen

The *Chart Screen* displays pressure and leakage values in a Cartesian chart. The information of *Approved* or *Reproved* is shown in the *Status Bar*, with the background color changing after the test is completed. The *Chart Screen* is very useful for analyzing the behavior of the part. See section “*6.4 Measurement Screens*”.

When turning on the equipment or interrupting the test (via Electrical Inputs or the *Stop* button), the equipment will be ready to start a new test.

The values will indicate zero, the Progress Bar will be clear, and the *Status Bar* will show the message “*Ready*”.

The pressure (P) chart, the leakage (Q) chart, or a combination of both can be displayed. To switch between displays, tap the plotting area. At the top of the screen, there are indicators P and Q, which represent Pressure and Leakage, respectively. P and Q are displayed with the

combined chart; P is displayed in the pressure chart; Q is displayed in the leakage chart.



When starting a test, the plotting of the chart begins to form, and the *Status Bar* indicates the stage of the test and the remaining time to complete that stage.



Approved

At the end of the test, it is indicated whether the part was *Approved* or *Reapproved*. The indication of results is the same as in the *Measurement Screen*, except for the background color filling of the *Status Bar*.



Part leaks



High Volume



Pressure Fail

## 10.7 Failure Checklist

If the *Test Checklist* option is active in the “*Test*” submenu (see section “11.5 Test Settings”), the device will present a checklist whenever there is a failure, so that the user can fill in the reason. Touch the option that represents the reason for the leak.

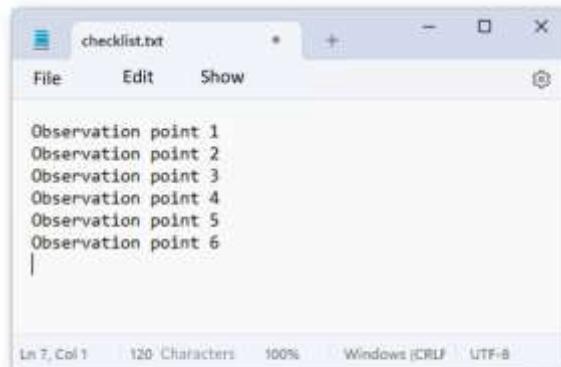


Then, tap the button next to save the checklist filling information. After that, the data will be stored in Part Results of the selected parts register.

### 10.7.1 Customization of the Failure Checklist

If the checklist does not meet the test requirements, it can be fully customized to the user's liking, using a text file. To do this, perform the following steps.

Create a text file (.txt) on a computer, rename it "checklist" and insert a desired checklist item into each line of the text file. The following figure shows how the equipment will create the checklist from the text file.



Create a folder called TEX at the root of a *Flash Disk*, transfer the *checklist.txt* file to this folder and insert the *Flash Disk* into the equipment's USB port.

Go to *Options -> Configuration -> Equipment -> Administrative* and touch "*Update equipment firmware*". Once this is done, the device will show two information pop-ups with the following messages: "*We recommend performing a Backup before and after an update*" and "*Checklist file found*".

Okay, now the equipment checklist has been replaced by a personalized one and, from the next tank tests, this new checklist will be shown.

To restore the equipment's original checklist, perform the same process described previously, transferring the empty "*checklist.txt*" file to the equipment.

## 11 - Equipment Settings

The G4-S8 has several options to customize, change or adapt the operation of the equipment to your needs. There is a menu dedicated to equipment options, selectable from access level 4. To enter the menu, go to the main screen and follow the sequence: Options -> Configuration -> Equipment.



Within the *Equipment* menu, configuration parameters are divided into six submenus: *Administrative*, *Access*, *I/O*, *Communication*, *Test* and *Instrumentation*.



Some parameters will only be available from access level 4, indicated in this chapter by the ④ icon, while others will be available if the “Access to advanced Parameters” option is active, indicated in this chapter by the α icon.

The configuration options in each submenu are organized into multiple pages: use the top navigation buttons to switch between them.



Touch an option to activate or deactivate it. Depending on which it is, the change is made through a list, keyboard or a dedicated screen. Some options will only take effect after leaving the Equipment Settings menu; others, just by restarting the equipment. In the latter case, a Pop-up will appear requesting that the equipment be restarted.

Next to each option are option status indicators: green indicates that it is enabled; gray indicates it is disabled.



Inactive



Active

The equipment options will be described below.

## 11.1 Administrative Settings

Through this submenu, you can adjust the date and time, backup settings, update the equipment software, adjust the sound volume and display contrast, change the language and type of initial screen and activate routine inspection, energy saving time and traceability mode.



④ **Adjust local Date and Time** – Adjust the equipment's date and time using the numeric keypad. To enter the date, type only the numbers in sequence (two-digit month, two-digit day and four-digit year). For example, the date 11/10/2020 will be entered by typing "1 1 1 0 2 0 20", without the quotation marks. This applies to entering the hours – for 10h, 17min and 34s, type "1 0 1 7 3 4", without quotation marks. The hours must be entered in 24h format, that is, for the 3:00PM format, enter "1 5 0 0".

④ **Equipment Backup** – Opens a list with the following options: "Run", "Restore" and "Restore from". These three options give access to a secondary list with the following items: "Part", "Full", "Settings" and "Users". Before performing any operation, insert a *Flash Disk*. When executing the options below, a Pop-up asks for backup or restore confirmation. If the *Flash Disk* is not inserted, a Pop-up alerts you that it needs to be inserted.

- Execute – Through the secondary list, this option performs the complete backup of the equipment or the partial backup of the following categories: general equipment settings (alerts, equipment settings and certificate), user data (information and photos) and parts data (photos, records and registered parts).



### NOTE

- *The complete backup may take a while (around 2 minutes or more) depending on the number of parts and registered users.*
- Restore – Through the secondary list, this option retrieves the complete backup of the equipment or the partial backup of the following categories: general equipment settings (alerts, equipment settings and certificate), user data (information and

photos) and parts data (photos, records and registered parts). The backup folder must be in the root of the FlashDisk and named “TEX\_G4\_XX”, with XX being the equipment model.

- Restaure from – It has the same functionality as the “Restore” option, but this option allows you to restore information from other devices. After touching “Restore from”, before displaying the secondary list, the equipment displays the numeric keypad so that the user can enter the part of the serial number after the “-“ character. For example, the Flash Disk inserted into the USB port contains a backup of a device whose serial number is G408-200008 and whose information you want to recover. So, on this numeric keypad, just enter “200008” and follow the same steps as the previous option, “Restore”.



#### IMPORTANT

- *Backup restores parts and information by overwriting current content. Running backups between different devices is an operation that must be performed with caution. Consult TEX Equipamentos for guidance on how to proceed in this case.*

- ④ **Update equipment firmware** – Touch the option to update the software of the equipment modules. A Flash Disk must be inserted with the appropriate folders and files. Two pop-ups appear, warning of the importance of performing a backup before updating and another requesting confirmation of the update, if a Flash Disk with the correct structure is inserted. See section “13.4 Software Update” for more details. The Customized Printing and Checklist file can also be inserted in

this option – see sections “10.4.1 Customized Printing” and “10.7.1 Customization of the Failure Checklist” for more information.



#### IMPORTANT

- *The software update can be carried out by the customer, with Level 4 access. However, we suggest that a complete backup be made before carrying out the update process so that, in the event of a malfunction, the configuration files can be recovered.*

④ **Buzzer volume** – adjusts the volume of sound alerts, using the numeric keypad. The maximum value allowed is 100% and the minimum volume is 1%. Audible alerts can be turned off by setting the value to 0.

④ **Contrast level** – Adjusts the contrast level of the display, using the numeric keypad. The maximum value allowed is 100% and the minimum 10%.

④ **Idiom of interface** – selects the equipment interface language from the list. *Portuguese, English and Spanish* are available. The equipment requests a restart for the change to take effect if the language has been changed. Consult TEX Equipamentos if it is necessary to include another language.

④ **Start Screen** – selects from the list the screen that will be displayed when starting the equipment. It can be selected between the *Measurement, Chart or Test Part* screen.

④ **Routine Inspections** – Each time the option is tapped, the function changes to: “At turn on”, “After new access” or “Inactive”. The “At turn on” function requests inspections when turning on the equipment and the “After new access” function requests inspections with each new

access with TAG carried out on the equipment. See item “7.5.1 – Inspections” for more details.

④ **Time of energy saving** – adjusts, using the numeric keypad, the time for the equipment to automatically enter energy saving mode. Time counting starts when there is no activity on the equipment's touchscreen. It is a useful feature when the equipment is installed in automated production lines, where the operator is not constantly visible. To disable the feature, set the value to “0”.

④ **Traceability Mode** – If this function is disabled, the equipment will record messages and test results in CSV files. However, by activating this feature, the device will permanently delete these files and, in the next records, will start to store this data in encrypted mode. Therefore, the data collected by a Flash Disk through the “*Logging*” submenu can only be accessed by the *TEX – G4S8 Reports* software, whose installer is available on the equipment's *Flash Disk*. **This feature should be used with caution, as it does not require deactivation again.** For more information, see sections “6.9.2 Decryption Equipment Files in Traceability Mode”, “7.2.1 Alerts” and “7.2.2 Results”.

## 11.2 Access Settings

Through this submenu, you can adjust the access level at power-on, allow the operator to select a part and reset the counters, grant access to advanced parameters, adjust the time to block the user and enable access with an expiration date.



- ④ **Access level after turn-on** – selects the access level when turning on the equipment. The equipment can be started in Locked mode, level 1, level 2, level 3 or level 4.
- ④ **Operator can change part** – Enables or disables part selection. When active, part selection is made even if the equipment is blocked.

**④ Operator can reset counters** – Activates or deactivates, at access level 1, the function of resetting counters on the Results Graphs screen. Direct selection: Tap the option to toggle between Active or Inactive.

**④ Access to advanced Parameters** – Enables or disables access to advanced parameters. With the option activated and the equipment logged in with Level 4 access, the advanced parameters of the part and the advanced configurations of the equipment are available. Parameters listed with **a** can only be accessed with this option activated. Touch this option to toggle between Active or Inactive.

**④ Time to block logged user** – Adjusts, using the numeric keypad, the time for the equipment to automatically return to the initial access level, adjusted in the “Access level at turn on” parameter. Time counting starts when there is no operating activity on the equipment. To disable the feature, set the value to “0”.

**④ Access with expiration date** – Once this feature is activated, when choosing an access level for a user, the equipment will display a numeric keypad so that an expiration date can be entered for that user. When this date expires, the user's access level will be changed to “blocked”. For more details, see chapter “8 User Management”.

**④ Emergency user password** – Activates or deactivates the use of the emergency password. Direct selection on the screen. See item “8.8 Emergency User Password” for more information.

source, deactivate the digital inputs and diagnose the electrical inputs and outputs.



**④ Start by front Panel button** – This option activates or deactivates the test initialization using the *Start* buttons (green triangle). Touch this parameter to toggle between Active or Inactive.

### 11.3 Electrical Input and Output Configurations

Through this submenu, you can allow the test to be started using the panel buttons, choose the polarity of the inputs and outputs, enable part selection by BCD, invert the busy signal, activate the results output pulse function and the signal digital fault, enable the use of an external power

**④ α Digital Input Polarity** – Defines the polarity of the Digital Inputs between NPN or PNP. Direct selection on the screen. See item “*5.1 Electrical Inputs and Outputs (digital I/O)*” for more details.

**④ α Digital Output Polarity** – Defines the polarity of the Digital Outputs between NPN or PNP. Direct selection on the screen. See item “*5.1 Electrical Inputs and Outputs (digital I/O)*” for more details.

**④ α Part selection by BCD (I/O)** – Activates or deactivates the selection of parts via BCD combination in the Digital Inputs or in the MODBUS, PROFIBUS, PROFINET or EtherNET/IP register. Touch this parameter to toggle between Active or Inactive. See sections “*5.1.5 Part Selection via BCD*”, “*9.1.9 Part Selection via BCD (BCD Link)*” and the application note “*G4-S8 Communication Protocols*” for more details.

**④ α BUSY signal inverted** – Activates or deactivates the inversion of the operating logic of the BUSY electrical output. This option is useful for adapting equipment to devices that had imported equipment. Tap this parameter to toggle between Active or Inactive.

**④ α Pulse result outputs** – Activates or deactivates the pulse function of the test result outputs (Approved, Reproved and Pressure Fail), both in the electrical outputs and in the MODBUS, PROFIBUS, PROFINET or EtherNET/IP outputs. Touching this parameter brings up a numeric keypad. Enter the pulse time through it. The minimum value is 0.1s and the maximum is 20.0s. When inactive (entering 0.0 on the numeric keypad), the result signals are activated constantly, being turned off only when starting a test or pressing the *Stop* button.

**④ α Digital FAIL signal** – Activates or deactivates the Test Fail signaling on Digital Output 3. When inactive, this output is adjusted on the part parameterization screen. Touch this parameter to toggle between Active or Inactive. See sections “*5.1 Electrical Inputs and Outputs (digital I/O)*” and “*9.2.3 Setting Test Options*” for more details.

**④ α External 24V source for I/Os** – Enables the use of an external power source for the Electrical Inputs and Outputs. When activating this option, the equipment does not supply voltage between the “+” and “-” terminals on the Digital Electrical Inputs and Outputs. See item “*5.1 Electrical Inputs and Outputs (digital I/O)*” for more details.

**④ α Disable digital inputs** – Disables the reading of Digital Electrical Inputs. Direct selection on the screen. See item “*5.1 Electrical Inputs and Outputs (digital I/O)*” for more details.

**④ Diagnostic of digital outputs and inputs** – Allows you to access the Digital Inputs and Outputs Diagnostics screen. See item “*13.3 I/O Check*” on how to use the function.

## 11.4 Communication Settings

Through this submenu, you can change the communication settings of the RS-232 port, choose the print format for the RS-232 port, allow the equipment to be controlled via the RS-232 and USB ports and a test to be initiated via these doors and adjust the barcode size.



**④ Communication Interface:** Each time this parameter is tapped, one of the following options is selected: *Inactive*, **RS-232**, or **Ethernet**. The **Inactive** function disables the printing protocols. The **RS-232** function enables the printing protocols for the RS-232 port. The **Ethernet** function enables the printing protocols for the Ethernet port. When the **RS-232** or **Ethernet** function is selected, the parameter below, “Communication

*Protocol*”, becomes available. The **Ethernet** function will also make another parameter below available: “*Server IP/Port*”.

**④ Communication Protocol:** Touch this parameter to select from a list the data printing format – see more details in section “*5.6 Data Printing Communication Protocols*”. This parameter becomes available if the **RS-232** or **Ethernet** option is selected in the “*Communication Interface*” parameter.

**④ Server IP/Port:** Touch this parameter to enter the IP address and port of the TCP server to which the equipment connects via socket. This parameter becomes available if the **Ethernet** option is selected in the “*Communication Interface*” parameter.

**④ RS-232 Configuration:** Adjusts the parameters of the RS-232 Port. The communication speed, parity, data length, and Stop Bit can be adjusted. First, select the communication speed from a list, then select the parity from another list. Next, a numeric keypad will appear to first adjust the data length and, after confirmation, adjust the Stop Bit. It is necessary to restart the equipment for the changes to take effect. For more details on the Ports, see item “*5.2 RS-232 Serial Interface*”.

**④ Commands through RS-232/USB** – Activates or deactivates the option of receiving commands via the RS-232 serial port and USB port, such as reading a code with a scanner. Direct selection on the screen. See items “*5.2 RS-232 Serial Interface*” and “*5.4.1 Using the USB Scanner*” for more details.

**④ Start by barcode** – Activates or deactivates the option to start a test by reading a code with a scanner. If the code read corresponds to an already registered part, the part is automatically selected and the test begins. Direct selection on the screen. See items “*5.2 RS-232 Serial Interface*” and “*5.4.1 Using the USB Scanner*” for more details.

④ **Size of barcode** – This parameter is available if the “*Commands through RS-232/USB*” option is active. This parameter defines the size of the character string sent by the scanner. For simple reading of a barcode, configure this parameter as flexible (entering the value zero). If you need to capture part of the character string of a barcode, you must enter the total size of the barcode in this parameter – the value must be between 1 and 100. Once this is done, the “*Position of Serial & Model*” parameter (see below) becomes available, and it inserts the range of characters to be considered by the equipment and the range to be disregarded. See section “*10.1.1 Adding and Selecting Parts by Scanner*” for information.

④ **Position of Serial & Model** – This parameter is unavailable if the “*Size of Barcode*” option is configured as *flexible* (zero value). This parameter defines which part of the character string, sent by a scanner, the equipment will capture and which part of this string the equipment will discard. In this parameter, there are four values: the first and second indicate the range of characters that will be discarded by the equipment (S:1~1); the third and fourth indicate the range of characters that will be used by the device (M:1~13). Enter these values using the numeric keypad. See section “*10.1.1 Adding and Selecting Parts by Scanner*” for information.

④ **Fragmented barcode** – Enables or disables the fragmented barcode function. In this way, the operator reads two barcodes in sequence, and the equipment joins them together. This option is useful when you want to register more than two pieces with the same barcode in the part's “*Nickname*”. For this parameter to be available, the “Command via RS-232” parameter must be enabled. For more information, see section “*10.1.1.4 Barcode Composition*”.

④ **Swap Modbus reg** – Activates or deactivates the inversion of the operating logic of the Modbus protocol registers. This option is useful for

adapting equipment to devices that have imported equipment. Direct selection, touch the option to toggle between Active or Inactive.

## 11.5 Test Settings

Through this submenu, you can enable the request for the PO code when starting a test, completing the checklist, activating the test with multiple parts and choosing how the equipment saves the test results.





④ **Request P.O.** – When this option is enabled, the parameter below, **P.O. and automation**, is made available, initially configured as inactive. This way, the equipment requests, through a numeric keypad, the Production Order number when a test is started. This entered number is stored in the results of the part being tested. For more information, refer to section “*10.2.1 - Test Linked with Production Order Number*”.

④ **O.P. c/ automação** – This option is only available if the previous parameter, “*Request O.P.*”, is set to **active**. This parameter can be configured with the following options: “*Inactive*”, “*After selecting part*”, and “*Always*”. If the parameter is set to “**Inactive**”, the equipment will open an alphanumeric keypad to request the OP code only when the *Start* button (on the equipment display) is pressed. If the parameter is set to “**After selecting part**”, the equipment will open an alphanumeric keypad to request a P.O. code when a new part record is selected, and a command is sent to start a test via the *Start* button, network, electrical input, or serial port. This means the equipment will not request a P.O. code as long as another part record is not selected, and it will use the last entered code for subsequent tests. If the parameter is set to “**Always**” the

equipment will always request a new P.O. number, regardless of the method used to start a test.

④ **Test checklist** – When this option is enabled, the equipment displays the checklist when a test fails, so the user can fill in the reason for the failure. The completed information is stored in the results of the part being tested. For more information, see section “*10.7 Failure Checklist*”.

④ **Volume meter time** – This parameter determines the duration of the *Volumetric Verification* step for all registered parts. Touch this option to enter the time value in seconds using the numeric keypad.

④ **Save Results** – This function allows the user to choose which test results the equipment should record: *all*, *rejected*, or *none* (disabled). Touch this item on the screen to select one of the three options.

④ **Thermal Self-Compensation** – Enables or disables the automatic thermal compensation feature for all registered parts.

④ **Samples to Thermal Compensation** – Defines the number of valid samples for the dynamic table of Automatic Thermal Compensation. Enter the value through the numeric keypad. See section “*9.4 Thermal Self-Compensation*” for more information about this feature.

④ **Timeout Self Compensation** – Resets the thermal compensation samples if the equipment does not perform at least one test within the time configured by this parameter.

④ **Thermal Compensation Limits** – Defines the limit for automatic thermal compensation, as a percentage, using the leakage limit as a reference. Enter the negative and then the positive value using the numeric keypad. The minimum value is 0% (- and +), and the maximum value is 100% (- and +). See section “*9.4 Thermal Self-Compensation*” for more information about this feature.

④ **Confirm Discarded Part** – Enables or disables part discard confirmation through the scrap sensor (this feature is unavailable when the equipment is using the G4 Standard Converter Module) or confirmation on the screen. Direct selection on the screen. See sections “5.1 Electrical Inputs and Outputs (I/O Digital)” and “10.4.1 – Scrap Sensor and Discard Confirmation” for more details.

④ **Início automático** – Enables automatic start of the test when the Variable Geometry Chamber lid is closed.

## 11.6 Instrumentation Settings

Through this submenu, it is possible to view the barometric station information, the last auto-check error, and activate the execution of the dynamic auto-check.



④ **Barometry** – Displays the environmental conditions of the equipment's installation site, CPU temperature, and the internal backup battery voltage level. The data is presented in the following format:

933.5hPa +36.1°C / CPU: +48 [-18]°C. The first data indicates the local atmospheric pressure, the next indicates the internal temperature of the equipment. The CPU temperature is shown in the next data, along with the temperature correction differential. Tap the option to check the internal backup battery voltage. Refer to section “13.8 – Checking Internal Backup Battery Voltage” for battery information.



### NOTE

- *The atmospheric pressure and internal temperature data are for informational purposes only and are neither calibrated nor certified.*

④ **Last Auto-check Error** – Displays the last error that occurred during the auto-check. When you tap this option, the equipment provides a description of the items to be checked. Refer to section “13.5 – Dynamic Auto-check” for more information.

④ **Executar Auto-check dinâmico** – Enables or disables the dynamic auto-check. Direct selection. Tap the option to toggle between Active or Inactive. See “13.5 Dynamic Auto-check” for more details.

## 11.7 Equipment Settings Parameter Map

Equipment Settings		
Submenu	Parameters	access level
Administrative	Adjust local Date and Time	④
	Equipment Backup	④
	Update equipment firmware	④

Buzzer volume	(4)		External 24V source for I/Os	(4)α
Contrast level	(4)		Disable digital inputs	(4)α
Idiom of interface	(4)		Diagnostic of digital outputs and inputs	(4)
Start Screen	(4)		Communication interface	(4)α
Routine Inspections	(4)		Communication protocol	(4)α
Time of energy saving	(4)		Server IP/Port	(4)α
Traceability Mode	(4)		RS-232 configuration	(4)α
Access level after turn-on	(4)		Commands through RS-232/USB	(4)
Operator can change part	(4)		Start by barcode	(4)
Operator can reset counters	(4)		Size of barcode	(4)α
Access to advanced Parameters	(4)		Position of Serial & Model	(4)α
Time to block logged user	(4)		Fragmented barcode	(4)α
Access with expiration date	(4)		Swap Modbus reg	(4)
Emergency user password	(4)		Request P.O.	(4)
Start by front Panel button	(4)		P.O. and automation	(4)
Digital Input Polarity	(4)α		Test checklist	(4)
Digital Output Polarity	(4)α		Volume meter time	(4)α
Part selection by BCD (I/O)	(4)α		Save results	(4)
BUSY signal inverted	(4)α		Thermal Self-Compensation	(4)
Pulse result outputs	(4)α		Samples to thermal compensation	(4)α
Digital FAIL signal	(4)α			

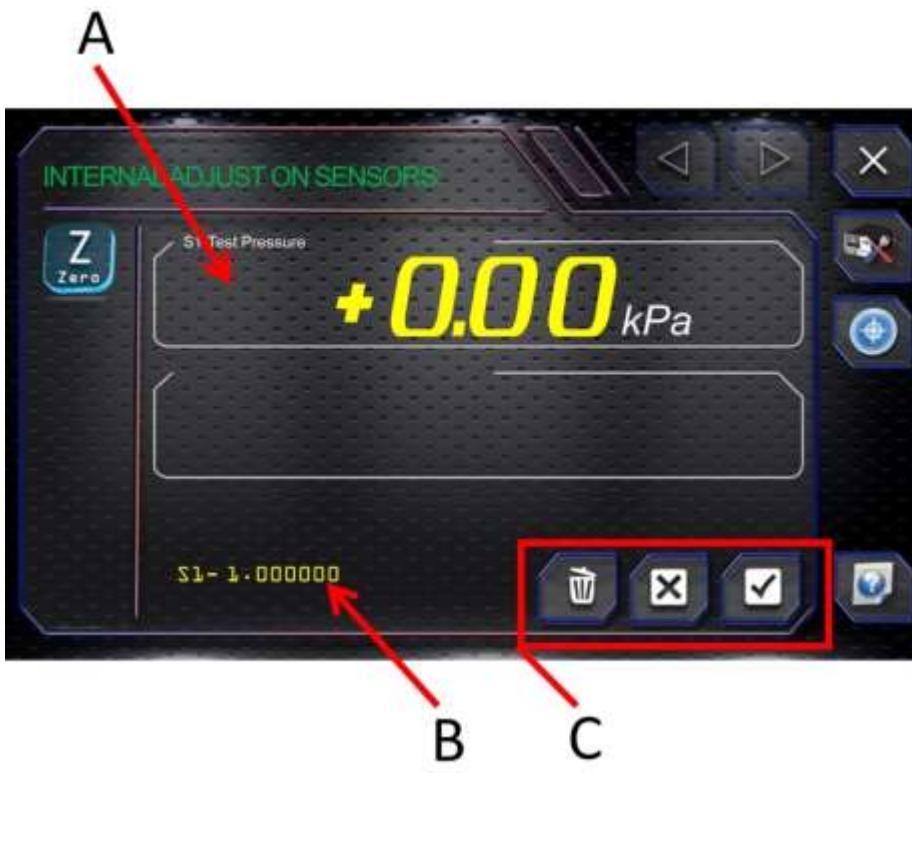
	Timeout Self compensation	(4)
	Thermal compensation limits	(4)α
	Confirm discarded part	(4)α
Instrumentation	Barometrics	(4)
	Last auto-check error	(4)
	Do Dynamic Auto-check	(4)α

**Legenda:**

- (4) Level 4;
- (4)α Level 4 with advanced parameters activated.

## 12 - Adjustments

The **Adjustments** menu allows the pressure sensor zeroing process. The sensor's zero point may drift over time, making it important to adjust when this is noticed. The **Adjustments** menu is accessible from level 3. Its items are described below.



### A. S1 Test Pressure

Indicates the pressure read by the sensor. Tap the value to reset the indication to zero. Tap the unit to select the desired unit.

### B. S1

Adjustment factor for the pressure sensor (S1) – only adjusted by a TEX technician.

### C. Bottom Buttons

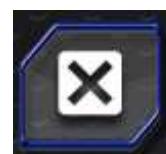
The three buttons at the bottom of the screen allow you to cancel or save modifications and return to the previous screen. See below for a description of each button.

#### Bottom Buttons

The buttons at the bottom of the screen allow you to cancel or save modifications and return to the previous screen. Below is the description of each button.



The button shown alongside cancels the zeroing adjustment made, without exiting the menu, upon confirmation in a pop-up.



This button cancels the zeroing adjustment made, and returns to the **Expert** menu screen, upon confirmation in a pop-up.



This button saves the zeroing adjustment made, without exiting the menu, upon confirmation in a pop-up.

## *12.1 Zeroing the Pressure and Indications*

Disconnect the **Feedback** input of the equipment, leaving it open to the atmosphere. Then, enter the **Adjustments** menu and tap the sensor reading field for which you want to zero. Afterward, you will see that the indication will show zero.

## *12.2 Selecting Units*

To select the desired unit, tap the unit in the **S1** field and choose the desired unit from the list.



# 13 - Maintenance and Inspections

This section of the manual must be read completely before performing any adjustment or maintenance on the equipment. The information contained here will help resolve technical questions about the equipment, carry out minor maintenance and learn about some of the components that make up it.

## 13.1 Cautions

Some caution must be taken before carrying out any maintenance on the G4-S8 equipment.

**Only a specialized technician can open the equipment.** The warranty is automatically invalidated if the equipment is opened by an unauthorized person.



### CAUTION

- *Do not open the external power supply. The voltages involved are in the order of 230 VAC and 24 VDC. Risk of electric shock!*

## 13.2 Inspections

The **G4-S8** equipment has a routine inspection checklist that can be activated to remind the operator of these inspections. First, activate the routine inspection in *Options -> Configuration -> Equipment*. Then, access the **Routine Inspections** menu through *Options -> Expert -> Inspections*.

### 13.2.1 Frequent Inspections

Some checks should be made before starting the daily operation of the equipment:

- Coalescent filter must be clean and dry (white element inside the cup) – located at the back of the *Variable Geometry Chamber*, if applicable;
- Power cable connected to the 90~240 VAC socket with proper electrical grounding;
- *Variable Geometry Chamber* lid seal without breaks and properly cleaned;
- Cleaning of the membranes and mesh of the *Variable Geometry Chamber*;
- Sensor zero check with the chamber connected to the equipment, using the chamber registration #GV-X (refer to section "13.7 Chamber Registration #GV-X");
- Cleaning of the equipment and the chamber.

### 13.2.2 Periodic Inspections

Other inspections should be conducted periodically, at intervals defined by the equipment supervisor:

- All frequent inspections;
- Leaks in the pneumatic tubes and connections of the entire test circuit;
- Checking the validity of the equipment calibration – if it is expired, send it to the **calibration laboratory at TEX** or request a visit for **field calibration**;
- Check if the membranes of the *Variable Geometry Chamber* are less than 3 years old;

- Check the condition of the electrical and pneumatic connections between the equipment and the *Variable Geometry Chamber*.

The inspections described above are to ensure that the equipment is fit for use. If any of these checks fail, notify the maintenance department for necessary intervention.

### 13.2.3 Daily Inspections

It is highly recommended to check the sensor's zero and reading every 1000 tests or at the beginning of each shift. To do this, perform the test procedure with the chamber registration #GV-X relevant to the sensing device used. For more details, refer to section "*13.7 Chamber Registration #GV-X*".

### *13.3 I/O check*

The Inputs and Outputs Module has a feature that allows you to monitor and diagnose Electrical Inputs and Outputs.

#### **!** CAUTION

- When diagnosing the electrical outputs, they are energized. Before carrying out the diagnosis, check that there is no risk of unwanted activation. Disconnect any power sources (electrical, hydraulic or pneumatic) when carrying out the diagnosis!

It is possible to access the diagnostic screen, through the option "*Diagnostic of digital outputs and inputs*", in the "*Inputs/Outputs*"

settings submenu. Navigate to *Options -> Configuration -> Equipment -> Inputs/Outputs*.



#### Diagnosis of inputs and outputs

Item	Description
Digital Inputs:	Indicates the status of each digital input. If the input is not energized, the icon corresponding to it will be gray. If the input is energized, the icon corresponding to it will be green.
Digital Outputs:	Indicates the status of each digital output. The outputs can have different statuses, indicated in the legend. When the output is monitored but not energized, the icon representing that output is shown in yellow. Tap the desired output to energize it.

#### Monitor Connection:

Enter, using the numeric keypad, the electrical output to be monitored. The icon turns blue when an output is being monitored. Monitoring is activated by entering the number of an output on the numeric keypad and deactivated by entering 0. If you want to monitor more than one output, just enter the numbers referring to the outputs of interest on the numeric keypad.

#### Legend:

Legend of the possible states of the Digital Inputs and Outputs. The green color indicates that the input is energized, and the output is activated. Red indicates that the output is short-circuited. Yellow indicates that the output is disconnected.

#### Conector:

Representation of the Inputs and Outputs connector used.

The icons that represent the Electrical Inputs can assume two states: green, meaning that there is a signal at the corresponding input; gray, indicating that there is no signal at the input.

Os ícones que representam as Saídas Elétricas, quando não estão sendo monitoradas, também podem assumir dois estados: verde, significando que há sinal na saída correspondente; cinza, indicando que não há sinal na saída.

When an output is monitored, it may present two more states: yellow, showing that there is no load connected, meaning that there may be a loose wire or poor electrical contact; red, showing that the corresponding output has an overcurrent or short circuit, check the connections.

When the Electrical Output is being monitored, the equipment also issues warnings outside this screen, in the form of Pop-ups.

During the test execution, if a digital output fails, the test fails the part and indicates failure on the display through a Pop-up.

#### 13.4 Software Update

It is possible to update the software of the equipment modules, through the option “*Update equipment firmware*”, in the “*Administrative*” submenu. Go to *Options -> Configuration -> Equipment -> Administrative*, with access level 4.

Prepare a *Flash Disk* with FAT 32 formatting and create a folder called *TEX*, in the root of the *Flash Disk*.

Name	Modification date
TEX	24/08/2017 11:11
TEX_G4_VH	24/08/2017 11:11
TEX_G4_VZ	24/08/2017 11:11



#### ATENTION

- Only a trained and qualified user can update the equipment's software!



#### IMPORTANT

- We suggest that a backup be made before performing the update so that, in case of failure, the configuration files can be recovered.

Inside the *TEX* folder, the update files must be added. They have the following structure in their name: G4S8\_W.X.Y.Z.pppp01.

The “G4S8” part identifies the generation and series of the equipment; the “\_” part. W.X.Y.Z” shows the software version, for example 1.1.0.1; the “pppp01” part is the file extension, which is related to the module for which it was made – for example, “miti01” indicates the extension of the firmware used in the equipment's MITI module. Thus, **G4S8\_1.1.0.1.miti01** indicates that it is a firmware used for fourth generation and series 8 equipment, that it is in version 1.1.0.1 and that it is used in the equipment's MITI module. The internal regulator firmware file, REPi, has an exception: the extension does not have 01, it is just .rep.i.

Name	Modification date
G4S8_1.1.4.44.mitv01	21/10/2020 15:15
G4S8_1.1.4.46.miti01	21/10/2020 15:15
REPI_5.0.4.58.repi	21/10/2020 09:56

For each equipment module, during the update process, the firmware will only be updated if a newer version is found.



Insert the *Flash Disk* with the necessary files and access the *Administrative Settings* submenu, touch the option to update the firmware of the equipment modules. Two Pop-ups appear.

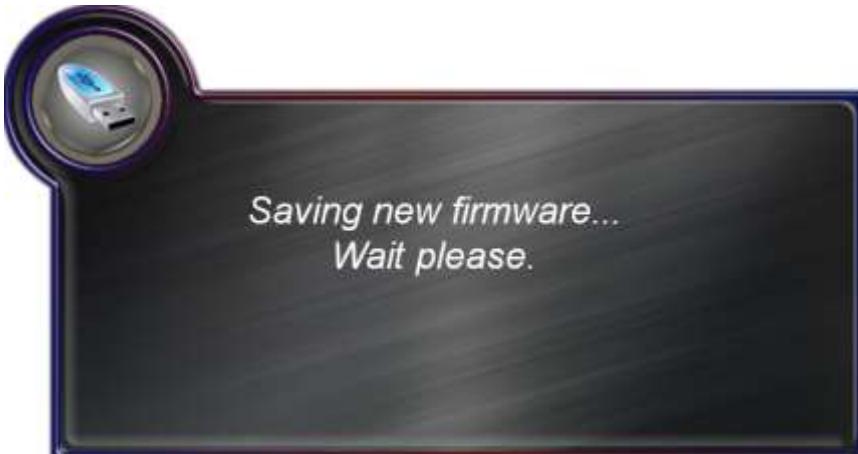
The first pop-up warns about the importance of making a backup before updating.



The second Pop-up asks you to confirm the update. Once this is done, the update begins.



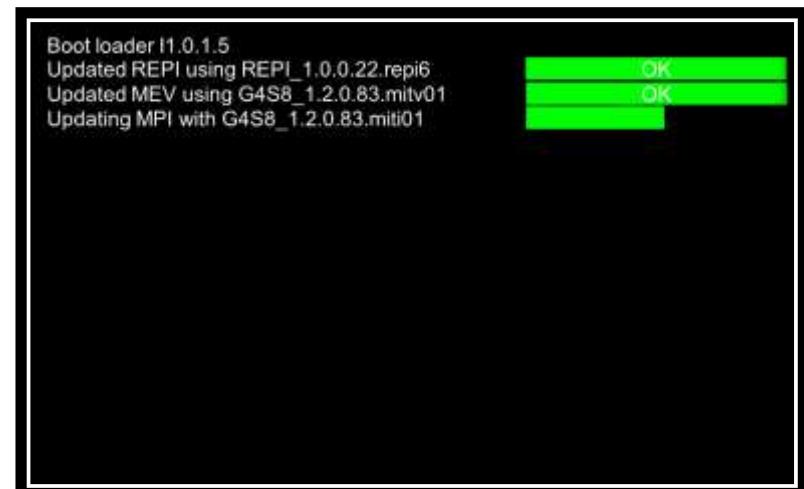
A message alerts you that the firmware is being written.



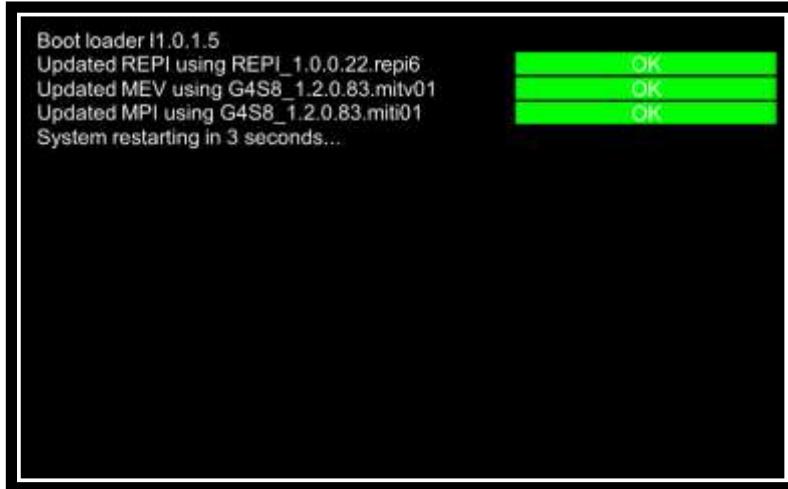
After recording, remove the Flash Disk.



When removing the *Flash Disk*, the equipment enters update mode, and a screen displays information about the update progress.

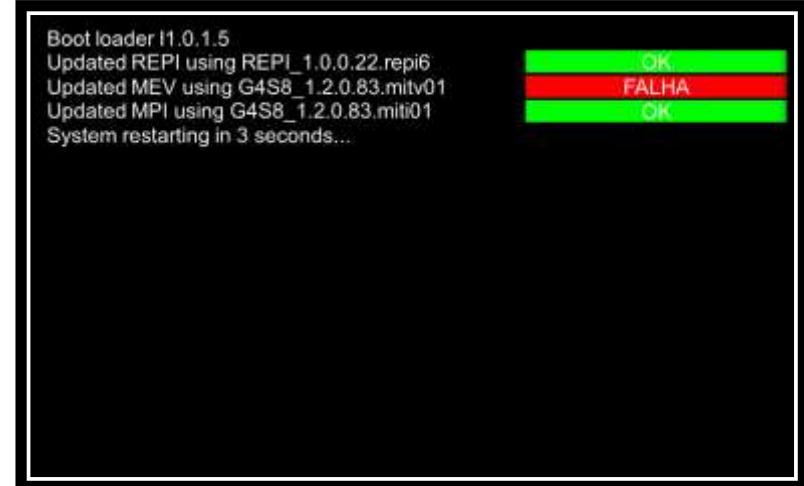


The first line displays the boot firmware version (Boot Loader). In the following lines, which module is being updated, the software version being installed, and a progress bar are displayed. At the end of each module update, the progress bar displays the status, OK or FAIL.



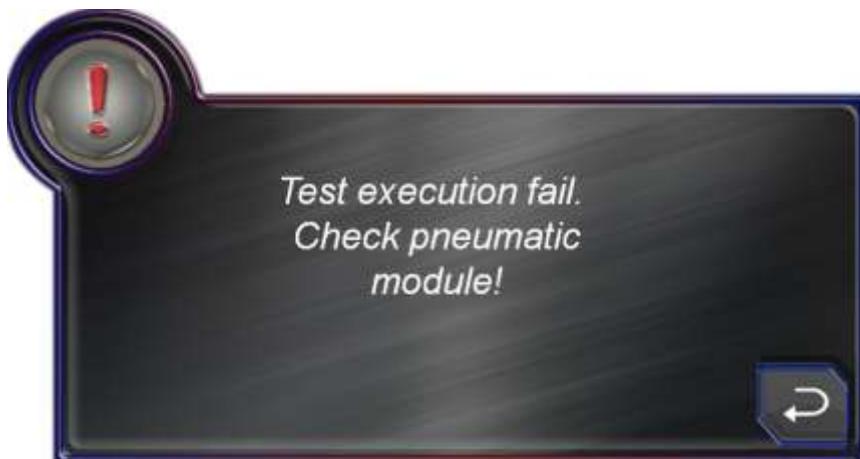
When all updates are finished, the equipment restarts. Turn off the equipment, wait a few seconds and turn the equipment on again. This ensures that all modules are updated correctly. After initialization, the equipment is ready for use.

Failures may occur when updating a module. In this case, the progress bar corresponding to the module will turn red and signal "FAIL". Wait for the equipment to restart.



After initialization, turn off the equipment, wait a few seconds and turn it on again. If possible, the equipment will update the module that caused the failure. If the problem persists, contact TEX Equipamentos.

When updating any of the modules, a message may be displayed that the firmware version is invalid. This occurs because the firmware version you intend to install is not compatible with other firmware versions installed on other modules. In this case, request the most current version of the software from TEX Equipamentos.

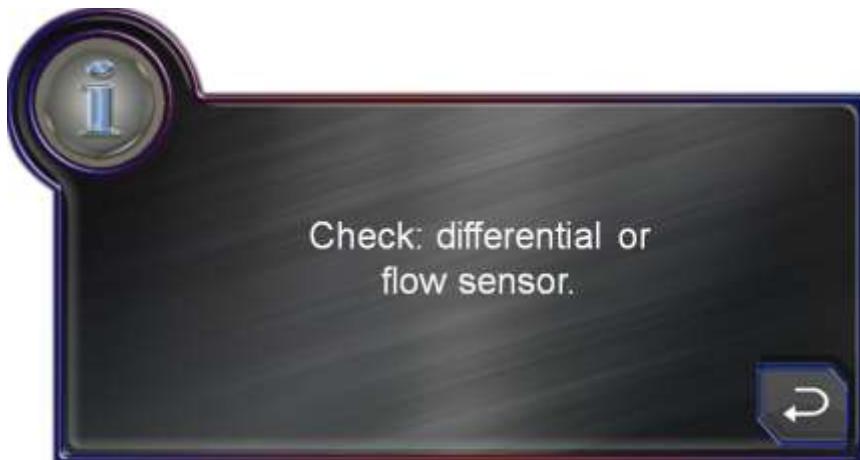


### 13.5 Dynamic self-check

Dynamic Auto-check performs a dynamic check on the pneumatic circuit during each test, checking valve activation, sensor behavior, among other checks. The feature does not increase testing time, as it is done automatically and simultaneously. If a problem is detected during the Dynamic Self-check, an error is signaled in a Pop-up.



At the bottom of the Home Screen, an icon indicating an error is also displayed. With access level 4, tap this icon to go to the "*Instrumentation Settings*" submenu. The "*Last self-check error*" option will indicate the error code. Tap the option to display a description of possible errors in a Pop-up.



After this error is displayed, it is possible to clear the Auto-check error indication by confirming it in a Pop-up.



## ! NOTES

- The "#NoLeak" part registration has parameters specifically set and suitable for the NoLeak Test. This piece cannot be modified or deleted.

### 13.6.1 #NoLeak Test

When a leak is detected in the test system through the #GV-X test, it is essential to verify that this leak is not occurring in some part of the equipment, such as the connections on the rear or the internal pneumatic circuit.

To check this, there is a procedure called NoLeak, which consists of verifying the operation of the equipment in isolation (without the chamber connected) through the following steps:

1. Disconnect the tubes from the test connections at the rear of the equipment;
2. Connect the *Part* output to the *Feedback* input (both connections are located at the rear of the S8-GV) using the adapter tube provided with the equipment – see section “4.4 Pneumatic Installation”;
3. Select the "#NoLeak" part registration;
4. Start the test.

After the test, the result should be "Approved." If the test is failed, there is likely a leak in the rear connection of the equipment. If a leak is confirmed, eliminate it and repeat the test. If the test fails again, there may be an issue with the equipment's pneumatic circuit. Contact TEX for technical assistance.

## ! IMPORTANT

- Contact TEX Equipamentos if the error persists.

## 13.6 #NoLeak Part Registration

This piece registration, performed by TEX, serves to execute a NoLeak test or to recalibrate the volumeter.

### **13.6.2 Volumeter Recalibration**

When the equipment is unable to measure leakage correctly with the chamber, even after performing the procedures described in section "13.7 #GV-X Chamber Registration," perform a volumeter recalibration using the following steps:

1. Disconnect the tubes from the test connections at the rear of the equipment;
2. Connect the Part output to the Feedback input (both connections are located at the rear of the S8-GV) using the adapter tube provided with the equipment – see section "4.4 Pneumatic Installation";
3. Select the "#NoLeak" part registration;
4. Perform the recalibration by pressing the *Auto Zero Execution* button (in the form of a blue cube) – see section "6.2.2.1 Side Buttons".

Afterward, repeat the procedure described in the "13.7 #GV-X Chamber Registration" section. If the problem persists, contact TEX technical support.

#### **! CAUTION**

- *The volumeter recalibration must be performed correctly as described in this procedure, and it should only be done if the equipment is unable to determine the correct leakage value using the procedures described in section "13.7 #GV-X Chamber Registration."*

### **13.7 #GV-X Chamber Registration**

The #GV-X chamber registration (where X is an identifier for the chamber made up of one or more characters) is used to perform tests in conjunction with the corresponding chamber installed on the equipment. Its purpose is to verify that there is no shift in the sensor zero or to redefine the global test parameters when *executing the Auto Zero*.

Several reasons can cause a shift in the sensor zero: leaks, tube changes, membrane and sleeve replacements, thermal influences, or even changes in membrane characteristics over time.



#### **CAUTION**

- *If the Auto Zero Execution procedure for a specific chamber is performed incorrectly, the leak readings and volumetric variation of all parts using that chamber will be compromised.*
- *When replacing any component of the pneumatic circuit, such as membranes, sleeves, seals, or tubes, it is necessary to select the #GV-X chamber registration corresponding to the chamber in use and perform the Auto Zero Execution procedure—refer to section "9.3 Auto Zero Execution."*



#### **NOTE**

- *#GV-X registrations cannot be modified or deleted.*

### **13.7.1 Test with the #GV-X Chamber Registration**

Perform this procedure to check the sensor zero, stabilize the membranes, and assist in diagnosing defects. For **variable geometry chambers**, the following procedure must be performed every 1000 tests, at the end of each shift, or when inactive for more than 15 minutes:

1. Ensure that the chamber is properly connected to the equipment, without any piece placed inside it.
2. Select the #GV-X chamber registration corresponding to the chamber installed on the equipment. To facilitate this, the equipment can be configured to read the identification label code of the device and select this registration using a scanner.
3. Open and close the chamber lid and execute a test by pressing the *Start* button (if the *Auto Start option* is enabled in the Test submenu, the test will begin upon closing the lid) – if the result at the end of the test is failed, ignore it, as the membranes have not yet stabilized.
4. Repeat the previous step (3) until the equipment shows a leak value close to zero and approves the test (this should occur in about three cycles). If this happens, the sensor zero is correct, and the membranes are stabilized, therefore:
  - a. If the equipment has been inactive for more than 15 minutes, **it is ready to perform tests with the chamber connected**;
  - b. If the equipment has performed more than 1000 tests or worked for more than one shift, insert a Leak Master and run a test to check if the result is within the Leak Master range: **±20% of the nominal value** (ignore the test failure) – if it is within this range, **the equipment is ready to perform tests with the chamber connected**; if it is outside the range, the equipment may have global parameters misconfigured, so proceed to the next step (5).

5. If the test was failed, perform the *Auto Zero Execution* procedure with the registration of the chamber being used to redefine the global parameters – refer to section “*9.3 Auto Zero Execution*”. If the procedure is approved, **the equipment is ready to perform a test with the chamber connected**.
6. If there was a failure in the *Auto Zero Execution* procedure, check for tears in the membranes, ensure the chamber lid seal is clean and in good condition, and verify that the tubes are intact and free of kinks.
7. After identifying the possible issue, redo the *Auto Zero Execution* procedure, and if the failure persists, perform the #NoLeak test procedure to verify the equipment's operation in isolation – refer to section “*13.6.1 #NoLeak Test*”.
8. After these checks, if the #NoLeak test failed, the internal pneumatic circuit of the equipment may be defective; if the #NoLeak test passed, there may be a leak in the chamber or the external pneumatic circuit. In this case, contact TEX technical support.

For **fixed geometry chambers**, the following procedure must be performed every 1000 tests or at the end of each shift:

1. Ensure that the chamber is properly connected to the equipment, without any part placed inside it.
2. Select the #GV-X chamber registration corresponding to the chamber installed on the equipment. To facilitate this, the equipment can be configured to read the identification label code of the device and select this registration using a scanner.
3. Close the *fixed geometry chamber* lid, execute a test by pressing the *Start* button, and check the result. If approved, the equipment is ready to perform a test with the chamber connected.

4. If the result was failed, check for dirt or damage on the device seal and in its contact area.
5. Execute a new test, and if it fails again, perform the *Auto Zero Execution* procedure to redefine the global parameters – refer to section “9.3 Auto Zero Execution”. If the procedure is approved, the equipment is ready to perform a test with the chamber connected.
6. If the procedure failed, follow the steps of the #NoLeak test to verify the equipment's operation in isolation – refer to section “13.6.1 #NoLeak Test”.
7. After these checks, if the #NoLeak test failed, the internal pneumatic circuit of the equipment may be defective; if the #NoLeak test passed, there may be a leak in the chamber or the external pneumatic circuit. In this case, contact TEX technical support.

### 13.8 Check the Internal Backup Battery voltage

The TEX-G4 equipment has an internal backup battery, which keeps the clock and other items running, even when the equipment is turned off. Like any battery, it has a useful life and must be replaced periodically. You can check the battery voltage in the *Instrumentation* submenu, in the *Barometry* option. Tapping this option will display a pop-up that informs you of the battery voltage.



See section “11.6 Instrumentation Settings” for information on the Barometry option. When the battery reaches a critical voltage level, an alert pop-up will be displayed at each time interval.





## IMPORTANT

- The battery used is type CR2032. The minimum safe voltage level is 2.8 VDC. If the voltage is below this level or the equipment displays a low voltage alert, consult TEX Equipamentos to replace the backup battery.*

## 13.9 Troubleshooting

We describe below in a table some problems and their possible causes and solutions. This table does not eliminate all possible problems and their causes, but it helps to resolve the most common ones. All solutions must be tried **without opening the equipment lid!**

PROBLEM	POSSIBLE CAUSE	SOLUTION			
Equipment does not turn on	a. Electrical connection.	Check if the power cord is properly connected to an outlet between 96 and 230 VAC and if the power supply connector is securely plugged into the back of the equipment.	All parts fail the test	c. Operation time is too long.	button" option in the Equipment Settings menu.
				a. Insufficient test time.	Check if the time for any operation is too high or misconfigured. Adjust it if necessary.
				b. Leak parameters are poorly adjusted.	Verify that the times for all stages are correct.
				c. Leaks in connections or seal of the chamber lid.	Check the leak limits.
			Does not pressurize the test part	a. Short depressurization time.	Check for leaks in the connections or the seal of the lid.
				b. Leaks in connections or seal of the chamber lid.	Check the depressurization time and adjust it correctly.
Test does not start	a. Test start signal is not activated.	Check the connections of the electrical inputs.	Pressure indication fluctuates greatly	a. Damaged regulator.	Check for leaks in the connections or the seal of the lid.
	b. Front button Start is disabled.	Enable the button in the "Start from panel			Request a specialized TEX technician to maintain the precision regulator.

	b. Damaged sensor.	Check for dirt in the tubing and if the filter is contaminated. Sensors do not tolerate air mixed with impurities. Request a specialized TEX technician.
<b>Approves parts with leaks</b>	a. Poorly adjusted leakage parameters.	Check the leak limits.
	b. Insufficient test time.	Verify that the times for all stages are correct.
<b>Indicação de Falha no Auto-Check</b>	a. Failure in some component of the pneumatic system.	Request a specialized TEX technician.

# 14 - Technical Reference

Technical information about the equipment is described below, such as the equipment specifications and its dimensions.



## IMPORTANT

- To obtain the best levels of accuracy, the equipment must be switched on for at least 10 minutes and calibrated regularly.*

### 14.1 Technical Characteristics

These are the general technical characteristics of the G4-S8 leak test equipment.

General Specifications	
<b>CPU Main Module (MPI):</b>	ARM Cortex M3, 80 MHz.
<b>CPU Leak Test and Flow Module (MEV):</b>	ARM Cortex M3, 48 MHz.
<b>Memory:</b>	Limited to the size of the internal SD Card (minimum 8 GB).
<b>LCD Touch Interface:</b>	5-inch, LCD, color, 800 x 480 dots 24-bit color palette.
<b>Interface languages:</b>	Portuguese, English and Spanish available. New languages on request.
<b>Ambient</b>	Operating Temperature: 5 to 45°C.

<b>temperature:</b>	Storage Temperature: -20 to 60°C.
<b>Humidity:</b>	80% RH or lower, non-condensing.
<b>Degree of Protection:</b>	IP 41.
<b>Mass:</b>	7.3 kg for the heaviest version.
<b>Electrical Power:</b>	<p>Input Voltage: 24 VDC. Power in energy saving mode: 6 W. Operating power: 9 W. Maximum operating power (I/Os with maximum load of 500 mA*): 22 W.</p> <p>External power supply (item included): 100 to 240 VAC / 50 to 60 Hz / 24 VDC / 2.5 ADC, with AC plug** standard NBR 14136/02 and DC plug type XLR L3FNN-01.</p>
<b>Digital Inputs and Outputs:</b>	<p>*To increase the current capacity of the Digital Outputs, see section “5.1 Electrical Inputs and Outputs”.</p> <p>**Other standard AC plugs can be ordered if necessary.</p> <p>Optocoupler inputs, 24 VDC +/-5%, NPN or PNP logic, selectable via software. Solid state outputs via Smart MOSFET, 24 VDC +/-5%, max. 500 mA total, NPN or PNP logic, selectable via software. Connector type: Phoenix Contact – MSTBA</p>

	2.5/10-G – Manufacturer code 1757543.
<b>RS-232 Communication:</b>	1 port via DB9 connector. Transmission speed selectable via software (14400, 19200, 28800, 38400, 57600, 115200 or 230400 bps).
<b>USB port:</b>	Type A port format, USB 2.0 standard.
<b>RFID:</b>	125 kHz, maximum distance 20 mm.
<b>Ethernet Port:</b>	RJ45 connector, CAT-5 standard.
<b>RS-485 Port:</b>	Female DB9 connector (only on equipment that has PROFIBUS).
<b>Connection port for calibrator:</b>	Female quick coupling, 3 mm, Stäubli, mod: RBE 03.2200.
<b>Test Output (Part):</b>	Female quick coupling, Camozzi, model: 5083 1/4.
<b>Feedback Input:</b>	Male quick coupling, Camozzi, model: 5150 1/8.
<b>Dome Relief Input:</b>	Plastic quick connection SMC, 1/8", for 8mm tube, model: KQ2H08-U01A.
<b>Pressure Regulator:</b>	Feed & Bleed system controlled by valves and electric vacuum pump.
<b>Maximum vacuum capacity of internal pump:</b>	-90 kPa at sea level.

\*ARM e Cortex são marcas registradas da ARM Ltd.

Pressure Return Sensor	
<b>Range (kPa):</b>	-100 ~ 0
<b>Resolution (kPa):</b>	0.01
<b>Accuracy (% of F.S.):</b>	±0.25
<b>Maximum Pressure:</b>	3 bar
<b>Stability over Time:</b>	< 1%

## 14.2 Equipment Dimensions

Equipment dimensions. Measurements in millimeters.



## 15 - TEX Contacts



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### ***24 Hour Support***

To be at our customers' side at any time,  
TEX Equipamentos provides a telephone number for Technical Support service 24 hours a day, 7 days a week.

**TEX 24 Hours – (55-11) 98598-2509**

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