

The New Generation of ESD Testing

When managing an electrostatically protected area EPA (ESD Protected Area), the monitoring of efficiency of clothes used by the technicians is fundamental. Regular tests of personnel protection systems, such as bracelet and electrical ground cables, shoes and clothes are required by the latest ESD standard from the IEC 61340-5-1 regulation

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Investing in an adequate ESD testing system that is capable of reveal when and which personnel ESD equipment has lost their anti-static properties, helps increasing the security when producing PCB (printed circuit boards) and electronic devices. Regularly testing of ESD clothes, leads to faster identification of problems, facing and solving such problems earlier. The sooner the problem gets identified, the better will be possible to intervene before damages happen, saving time, money and expensive reworks.

The principle behind the ESD bracelet consists in connecting the electric conductivity of the human body via the bracelet and the electric ground cable. When used, the bracelet must be in contact to the skin of the wrist, it must not be on top of the clothes and has to be clean on the inside with no evident sign of worn out. A regular substitution is suggested, based on the

usage. An ESD floor implies the usage of ESD shoes and vice versa, guaranteeing an optimal protection. Also in this case, the floor's surface and the sole of the shoes must be kept clean, else canceling off the protection process. Regarding the shoes, we recommend to wear them only within the company, avoiding to introduce dirt or small rock in a clean ambient, altering resistive values measured at the ingress of the protected area.

For every ingress to the protected EPA area in the company, an ESD test station is needed in order to permit or block access. Via these test stations, every operator has to test shoes and bracelets before accessing the area, ensuring that the conductivity defined by the ESD supervisor, is maintained throughout all their usage. A good practice is to periodically test both operators and equipment (coats, table mats, etc) according to the internal standard defined by the ESD supervisor of the company.

Our test station for controlling accesses, can work offline or connected to the local company's network, together with other test stations and exchanging in real-time the collected data. It is also possible to connect with the already in place access control systems, transmitting data to the company's computer systems.

In order to ensure the quality of the process and to report to the customers, it is possible to archive and date back to the single values each operator had for a specific day, allowing the complete traceability of the process.

Usually, protected areas are well defined and enclosed. Therefore, GATEKEEPER can control the electric opening of a door or a turnstile, opening the access if the operators parameters fall within the established range of allowed values.

The importance of the test consists in measuring the resisting value to the



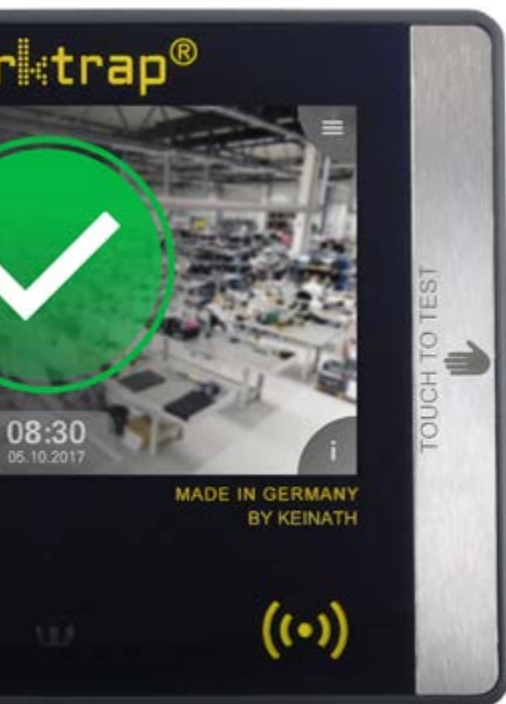
1. Front panel, multilingual, of the test station. It is possible see the side the touch bars

2. Station with platform integrated

ground of the operator. The various measuring parameters can be adjusted by the supervisor. With a value above $0,9\text{ M}\Omega$, the test ensure that there is no short circuit towards ground wire. It has been calculated that a resistance value of $0,75\text{ M}\Omega$ offers a protection against a discharge of 250 Vac or 500 Vcc .

A resistance value below $35\text{ M}\Omega$ assures that the resistance towards the ground is not too high, with the result of becoming insulating.

It is important to note that if the test of the GATEKEEPER device returns a negative result (regardless if bracelet or shoes), access to the protected area will not be granted. A negative result, implies values outside the allowed parameters, which may be caused by different factors.



A common reason is the presence of dirt on the sole of the shoes or the bracelet worn out or dirty.

Gatekeeper for a more secure EPA

At the moment, Gatekeeper is the most innovative instrument for measuring the grounding resistance of operators (bracelets and shoes). Via this modern test station, presented by technoLASA, it is possible to create and manage access lists for protected areas, recording schedules and other functional data for each operator in transit, leaving to the past the inadequate, unreliable and uncontrollable manual handling of sheets or boards to be signed which need to be later transformed into Excel file with a tremendous waste of time and resources.

The device allows for the exchange of access data with other similar devices. Measurements are automatically recorded during measurement and exchanged between the devices in real-time.

Data, in CSV format, can be transferred to a USB stick or through the network via FTP on a regular basis or, in the case of the MQTT version, in real-time to a server that collects data, completely satisfying the requirements of "Industry 4.0".

As a person approaches the GATEKEEPER, the movement sensor activates the big LCD display, waiting for the selection of the operator on the display or through an RFID card. Test parameters and measurement can be set for every access and are executed by the device at the moment of the selection from the LCD display or through the RFID tag of the operator who is accessing the area.

The identification is immediate and the test measurements that are set and needed for that operator will be carried out (e.g. solo right and left



shoes or both shoes and bracelet).

If needed, the validity of the test can be manually set from 1 to 24 hours. In this way the operator is required to test at every beginning of the shift or after leaving the protected area.

EPA GATEKEEPER is available in five versions, which differ for their functionalities:

Compact and Compact+, Net and Net+, Net+/LiveData.

The models are scalable and can be upgraded.

Every model is composed by:

- Measuring unit;
- Base for wall or table mounting;
- optionally, a kit that includes a support column with a floor base for the measuring of feet is available;
- Base with electrodes for shoes with cables;
- Power unit;
- Cable for electrical grounding;
- Cable for connection to the door or turnstile;
- UBS stick with system guide and example file as template.

Visual signal with halo effect

The control panel is equipped with plugs for bracelets, realized in stainless steel; there are three connections on the frontal plane, based on standard connectors.

All the three plugs are connected

the same way with each other. The connection elements have pressure buttons for 3 mm, 10 mm, and a 4 mm laboratory plug for banana connectors.

The display is a capacitive display TFT with a 7" display and a resolution of 800x480 pixels.

The frontal LCD plane is in glass and terminates laterally with two touch bars in stainless steel. Their positioning facilitates the ergonomic usage (for both right- and left-handed people).

The measuring phase starts when one of the two lateral bars gets touched by the operator.

The time required for measuring is less than 2 seconds and it can be varied, after which an either green or red light behind the device will project the result of the test on the surface behind the device (halo effect); the colored light is emitted by powerful LED diodes.

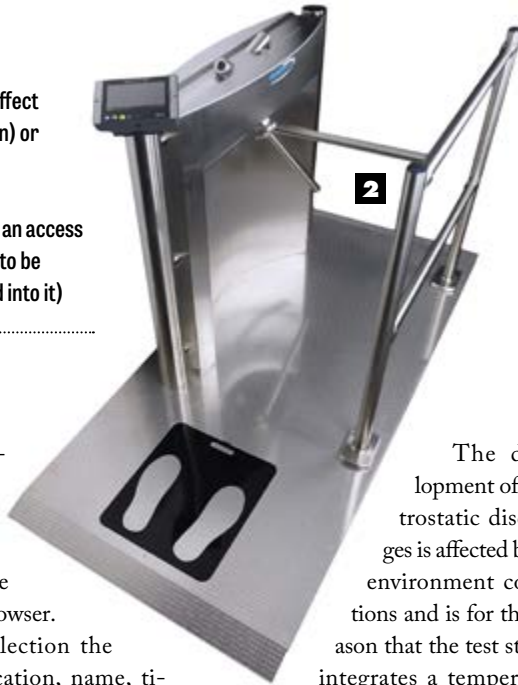
A green light signals correct measuring values, a red-light signals measuring values outside the allowed range and does not open the door.

A proximity sensor is also incorporated in the device, functionality that turns on the display after standby when an operator approaches the device for testing.

After the operator leaves, the display is turned off in a stand-by state; this functionality has a double purpose: to avoid waste of electricity and to increase the lifetime of the display.

3. The lamp with halo effect signals the go (green) or stop (red)

4. The station controls an access turnstile (it is possible to be structurally integrated into it)



The device settings are accessible via password from the menu or, if connected to the network, via web browser.

In the data collection the personnel identification, name, timestamp, measurement type, measured values and result, validity of the ESD class, temperature and humidity at moment of the test are collected and stored; all this information can be individually excluded or hidden.

An emergency selection allows, in any moment, to enter without any measurement and is therefore reserved to the personnel which provides first aid.

Technical details that make the difference

Although the test is performed with a voltage that can be freely set between 30V and 100V, the upper limit of the supplied current has a maximum of 400 μ A for the security of operators.

The system is equipped with a relay interface for the opening of access to the EPA, in addition to the USB interface for HID compatible devices (e.g., barcode scanner) and LAN port for exchanging measured values automatically with other devices compatible and connected to the same net.

Power can be supplied with either plug-in power supply external equipped, or PoE (Power of Ethernet).

The development of electrostatic discharges is affected by the environment conditions and is for this reason that the test station integrates a temperature and a humidity sensor.

In addition to the proximity sensor which, allows the system to enter the stand-by mode, it is present, not on every model, an RFID reader compatible with the most common cards and tags.

The range EPA Gatekeeper also includes a calibrator that can be used on all five models.

With this instrument, a periodic calibration of the devices of the company can be easily carried out on site, without interfering or interrupting the normal course of the working activities.

During the operation of calibration, the instrument gets attached to one of the two bars on the sides of the display, thanks to magnets. Pictograms will then guide the procedure. Periodically is also possible to send, to a certified calibration center, the calibrator alone and not every single instrument.

Data Collection and Measurement Settings

Thanks to the EPA Gatekeeper system, physical lists and paper registers

of access to ESD protected areas belong to the past.

With the versions COMPACT and NET, the identification of the operator is performed by selecting name or code from a list on the display, while for the versions COMPACT+, NET+ and NET+/LIVE DATA, the identification is performed via an RFID reader.

In every version, the user database and their access history is updated in real-time.

The CSV file manually collected via the USB port or regularly transferred via FTP or sent in real-time to an MQTT server, allows to integrate access data with many systems.

Once the user is authenticated, pictograms instructing the user how to perform the measurement appear on the display.

The type of measurement the operator must test and pass, is defined in the user database, based on the individual needs:

- Only bracelet;
- Only shoes (right and left);
- Both bracelet and shoes (right and left).

On the system there's also a special access for rescue and one for occasional visitors.

In case the operator is unsure about the test, hesitating in front of the test station, a graphical animation will start on the display, showing a video with the steps the operator has to follow in order to be tested.

The device can store up to 250.000 individual measurements.

The measurement history shows a complete list of the stored measurements: date and time, operator, identification, test result and values measured.

It is possible to visualize all records or filter only those with a negative result. The measurement log can also be anonymized, hiding certain data. ■