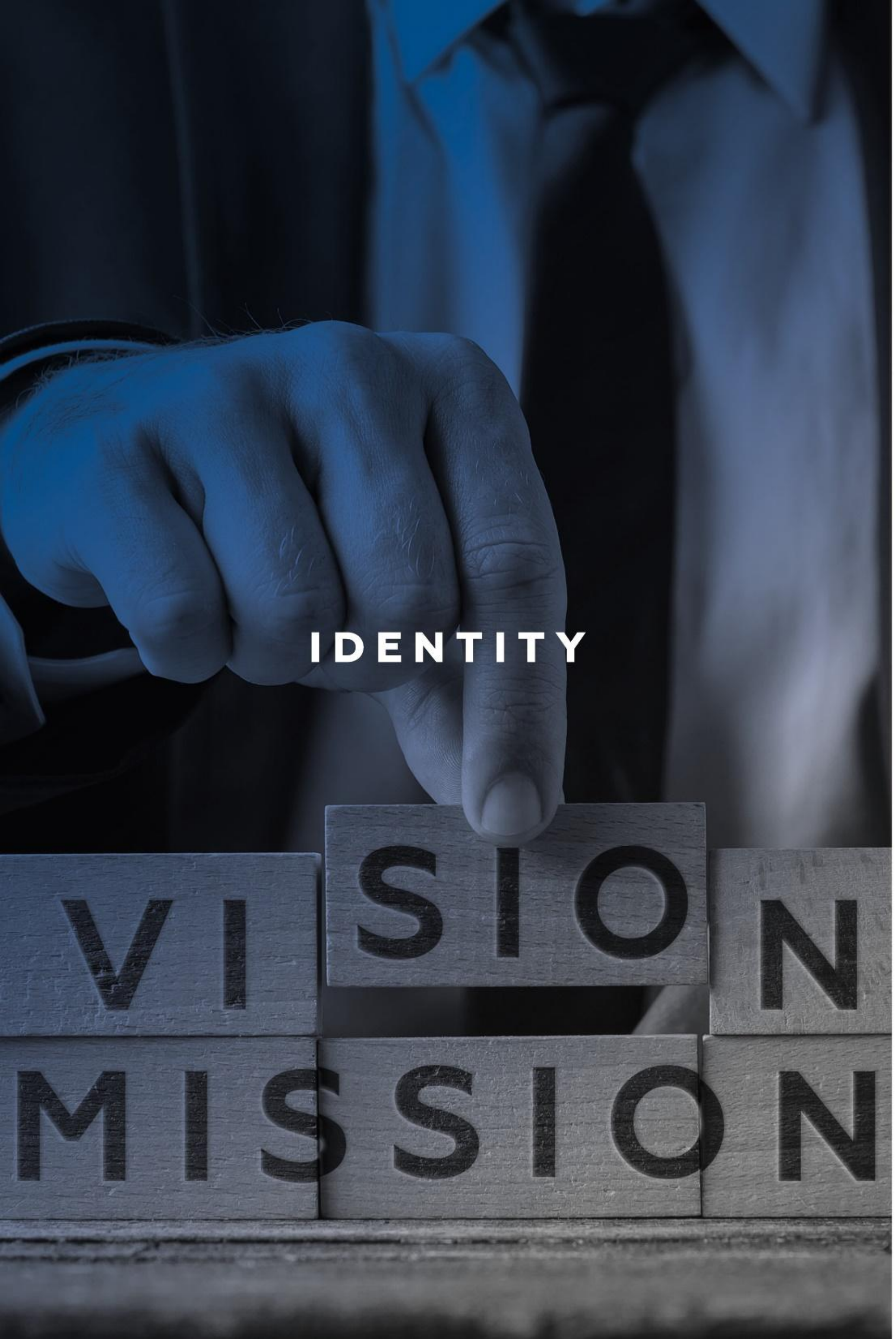

WE BUILD THE FUTURE SINCE 1983
HT
COMPANY PROFILE



VISION

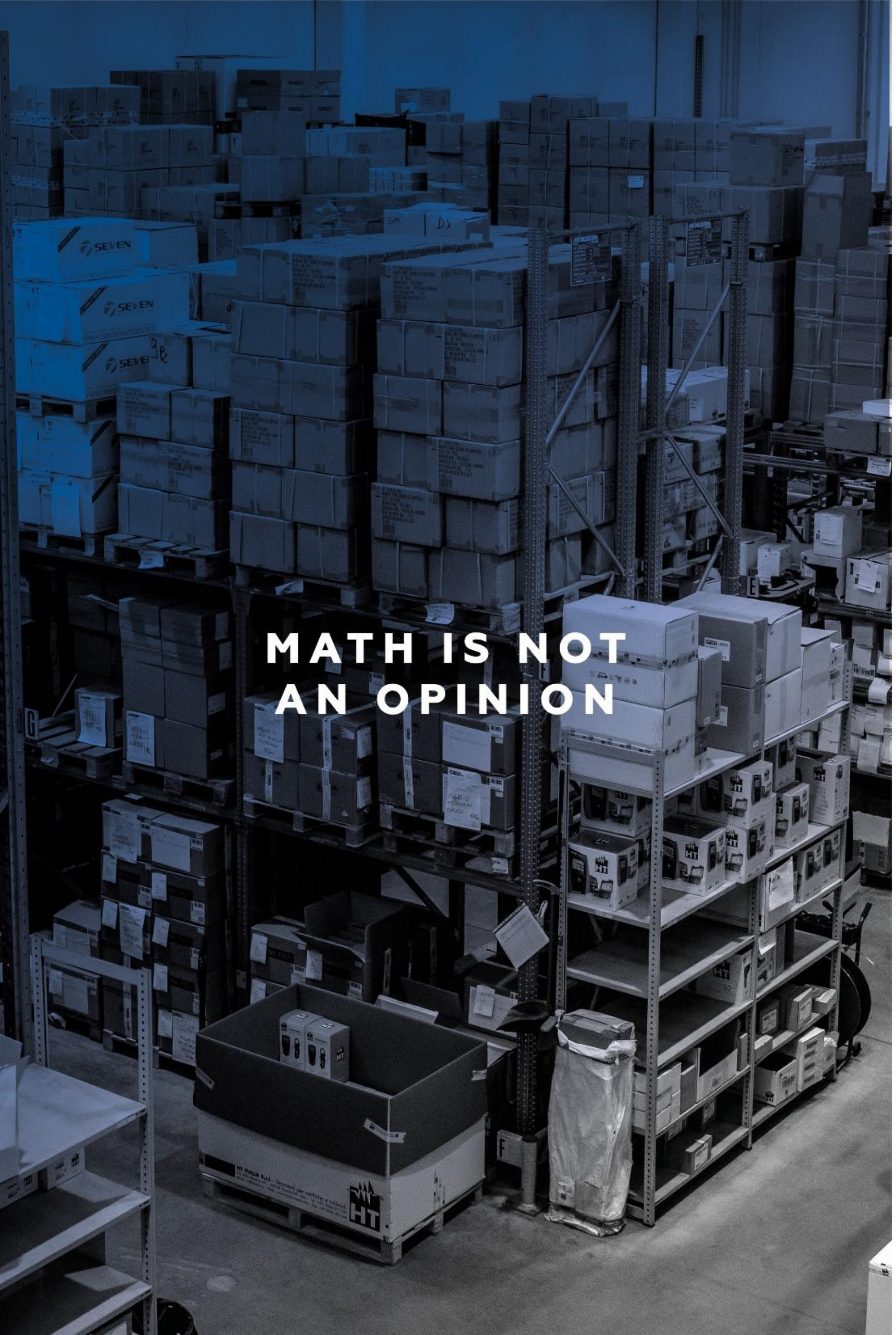
Raise awareness on electric security
and sustainability.

MISSION

Provide easy-to-use and innovative
technology tools for professionals everyday job.

SUCCESS PILLARS

Made in Italy, Smartness, Solutions, Safety



MATH IS NOT AN OPINION

The Company

- BOARD OF DIRECTORS
- MARKETING
- RESEARCH AND DEVELOPMENT
- TECHNICAL
- LOGISTICS
- PURCHASING
- DOMESTIC SALES
- EXPORT SALES
- PRODUCTION
- CUSTOMER SERVICE

Italian sales network

18 AGENCIES

50 AGENTS ON THE TERRITORY

5 AREA MANAGER

Distributors

186

Sales outlets

750

Headquarter

3.800 square meters

Warehouse

15.000 cubic meters

Global sales network

67 DISTRIBUTORS

2 EUROPEAN BRANCHES

38 EMPLOYEES

Instruments portfolio

over 680

MATH IS NOT AN OPINION

End users

1.200.000

Instruments sold in the last 20 years

2.848.700

- Installation safety testers
- Power Quality Analyzers
- Photovoltaic installations testers
- EVSE testers
- Machines and switchboards safety testers
- Infrared Cameras
- Multimeters
- Clamp meters
- Process calibrators
- Instruments for environmetal measurements
- Accessories and tools

Domestic sales

40%

Export sales

60%

WHO AND WHERE

Operational offices / Contacts

Operational offices	Contacts
HT Italia Via della Boaria Faenza (RA) Italy	sales@ht-instruments.com
HT Instruments S.L. C/ Legalitat 89 Barcelona Spain	info@htinstruments.es
HT Instruments GMBH Am Waldfriedhof 1B Korschenbroich Germany	info@ht-instruments.de
HT Instruments Co. Ltd. Guangzhou China	info@ht-instruments.cn
HT Instruments Middle East Amman Jordan	info@ht-instruments.ae
HT Instruments Mexico Mexico City Mexico	info@ht-instruments.mx

MILESTONES

	Year	
HT Italia borns in Faenza first branded HT portable instruments	1983	
	1990	**MASTER HT2031**
	1995	**MACROTEST 2033**
HT Instruments	1996	
	2000	**MAXTEST 2038**
	2005	**GSC53**
HT Instruments Germany	2007	**SOLAR300N**
HT Instruments China	2009	
	2016	**PQA820**
HT Instruments Middle East	2019	
	2020	**MACROEVTEST**
HT Instruments Mexico	2021	**ACCREDIA CALIBRATION CENTER**
	2023	**HT CLOUD INFRASTRUCTURE**

PRODUCT CATEGORIES


POWER QUALITY ANALYZERS


INSTALLATION SAFETY TESTERS


EV SAFETY TESTERS


PHOTOVOLTAIC TESTERS


DIGITAL MULTIMETERS


CLAMP METERS

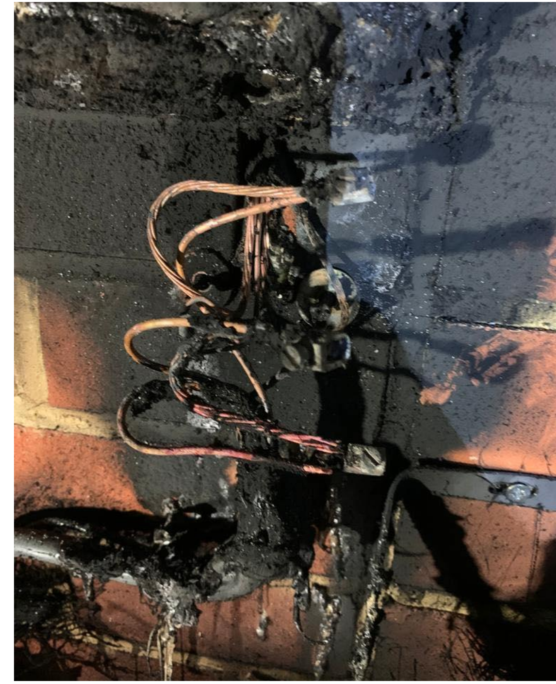

INFRARED CAMERAS


ENVIRONMENTAL MEASUREMENTS

Introduction to EVSE testing

Electric car bursts into flames and burns to the ground after it was left charging overnight 'at a faulty power point'

By Alice Evans For Mailonline
14:13 09 Jul 2017, updated 02:39 10 Jul 2017

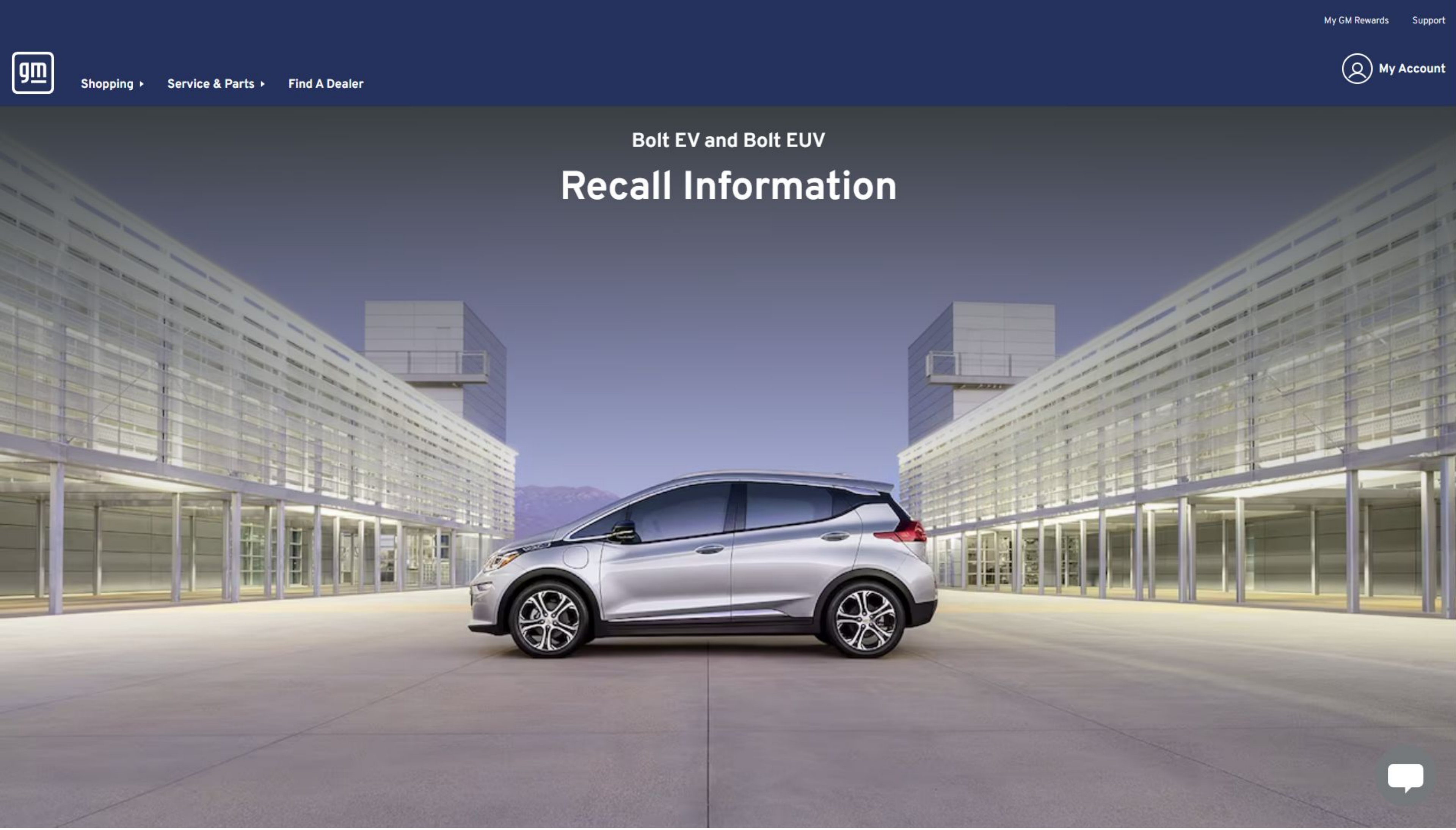


11th of October, 2021 Bicester, UK

An EVSE catching fire in the middle of the night while charging an EV.

17th of August, 2020 somewhere in the UK

An EVSE catching fire during an overnight charging.



Every Chevrolet Bolt EV and Bolt EUV that GM has made is under recall because their batteries could be defective and cause a fire.

Source: https://www.caranddriver.com/news/a37552121/chevy-bolt-battery-recall-deep-dive-details/ 13th of September, 2021

In the Dutch city of Groningen this VW ID.3 burst into flames just after its owner disconnected it from the charger. She noticed the car started to smoke, and barely had time to unbuckle her child from the child-seat. They were able to leave the vehicle quickly and unharmed, but the ID.3 itself was completely enveloped by flames and burnt beyond repair.

Source: https://insideevs.com/news/527874/volkswagen-id3-netherlands-fire-charging/

I was wondering if...

AC EVSEs transfer AC power from the grid to the electrical vehicle. The guidelines set the charging current up to: 13A, 20A, 32A, 63A.

Is the existing electrical installation already sized to welcome such a heavy load? Would a new line be necessary?

Are cables and connections able to withstand such a high current flow, or will they overheat and potentially cause a fire?

Thermography could be of great help.

Electric vehicle charging systems just transfer the power from the grid to the EV, harmonics and other electrical garbage included. Is power quality fine or would the noisy power damage the car’s battery and potentially cause a fire?

Power quality analysis could be of great help.

Safety standard references

IEC 61851-1 : 2017
Electric vehicle conductive charging system – General requirements

IEC 62196-1/-2 : 2014
Plugs, socket-outlets, vehicle connectors and vehicle inlets – Conductive charging of electric vehicles – General requirements

IEC 60364-7-722 : 2018
Low voltage electrical installations – Part 7-722: Requirements for special installations or locations – Supplies for electric voltage

Safety of EVSE is a concern. They carry high currents to charge batteries in a small and poorly ventilated environment such as a garage, where people usually store even flammable stuff. Don't we usually store in the garage our bicycles or motorbikes (whose tires are flammable), or the petrol for the lawn mower?

EV-TEST100 - Overview

EV-TEST100 simulates an electric vehicle connected to the charging station (EVSE), allowing you to fully verify the EVSE functionality and electrical safety.

EV-TEST100 is able to test charging tethered and untethered charging stations with charging modes 2 and 3 and cases A, B, and C.

EV-TEST100 - MACROEVTEST

MACROEVTEST

All electrical installation safety tests:

- Continuity of the protection cable
- Insulation resistance
- RCD
- Line/fault impedance
- Ground resistance and soil resistivity
- Phase sequence
- I^2t
- PQA
- EVSE testing procedure

EV-TEST100

- Simulation of EV connected to the EVSE
- fault simulation
- Absorbed power measurement option

EV-TEST100 – COMBI521EV

COMBI521EV

Electrical installation safety tests:

- Continuity of the protection cable
- Insulation resistance
- RCD
- Line/fault impedance
- Phase sequence
- PQA
- EVSE testing procedure

EV-TEST100

- Simulation of EV connected to the EVSE
- fault simulation
- Absorbed power measurement option

EV-TEST100 - Functions

PP STATE

Position	Description
NC	EVSE disconnected
13A	EVSE connected with maximum current of 13A
20A	EVSE connected with maximum current of 20A
32A	EVSE connected with maximum current of 32A
63A	EVSE connected with maximum current of 63A

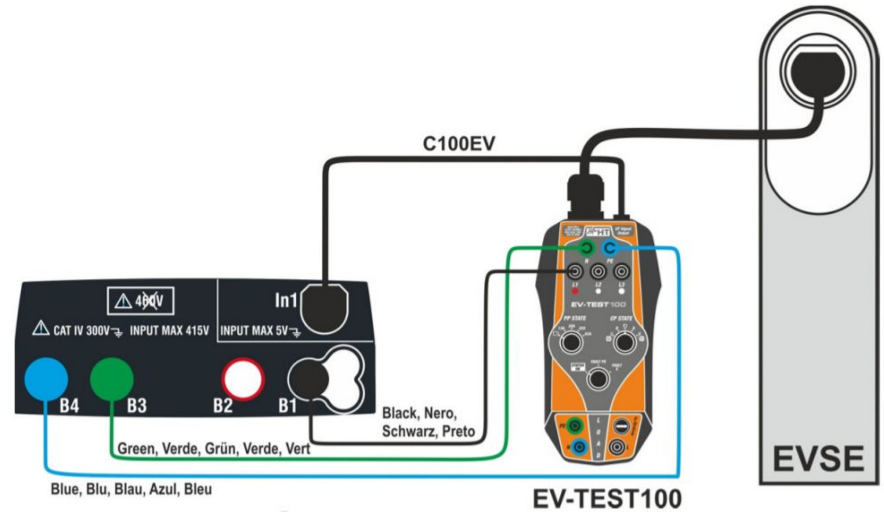
CP STATE

Position	Description
A	Electric vehicle disconnected
B	Electric vehicle connected, not ready for charging
C	Electric vehicle connected, ready for charging, ventilation not required
D	Electric vehicle connected, ready for charging, ventilation required

FAULT

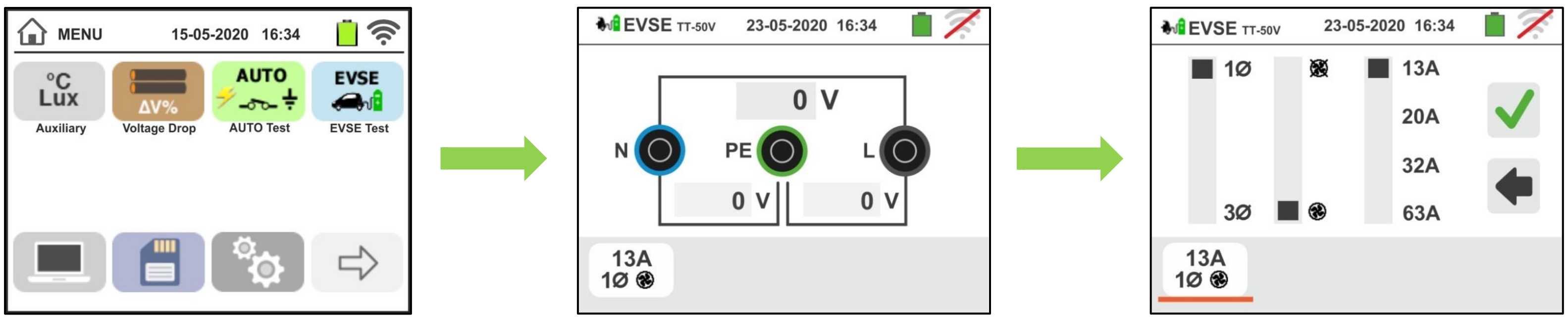
Position	Description
STATUS OK	No fault simulation
FAULT PE	Fault condition simulation on PE protective conductor (EVSE does not recharge)
FAULT E	Fault condition simulation on the Control Pilot (EVSE does not recharge)

Connection to EVSE



EVSE Test sequence

The EVSE guided test sequence can be performed on all AC EVSE (single- or three-phase) connected to TT or TN distribution systems. EVSE connected to IT systems cannot be tested. After selecting the distribution system to which the EVSE is connected, the nominal voltage and the grid frequency, the EVSE testing sequence can be started.

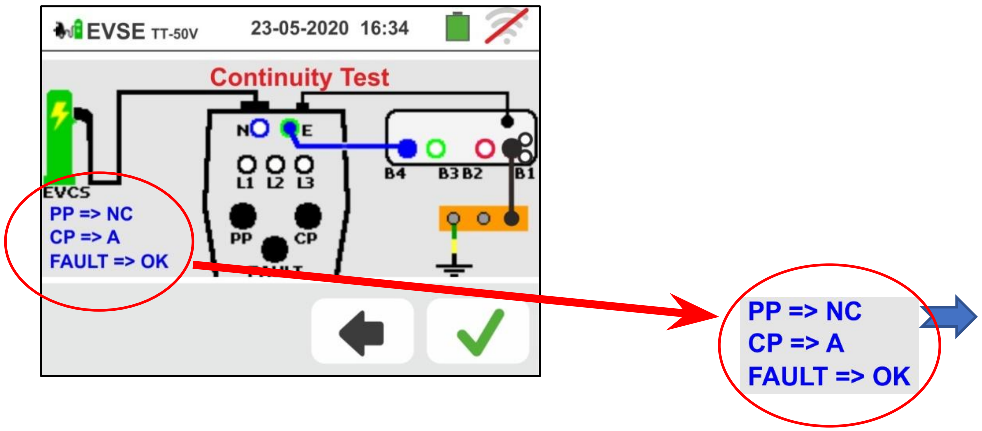


The first test performed is the verification of PE. No voltage must be present, especially between neutral and earth. Otherwise, the sequence cannot continue because of potential risk of electrocution of the operator.

Once PE has been checked, the rated current of the EVSE under test, the system type of the EVSE (single- or three-phase output) and ventilation system (if required) could be tested.

For safety reasons, it is not possible to skip any test. If any step of the sequence fails, the sequence is terminated.

1: Continuity

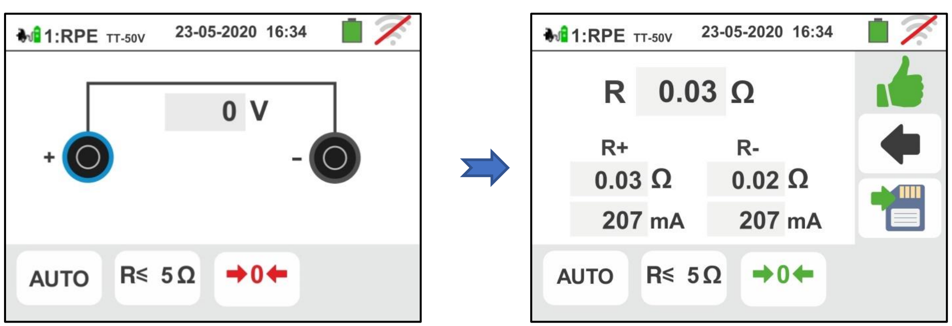


The first step is the continuity of the PE conductor.

Each step is introduced by a simple and clear connection diagram between **EV-TEST100** and the master unit.

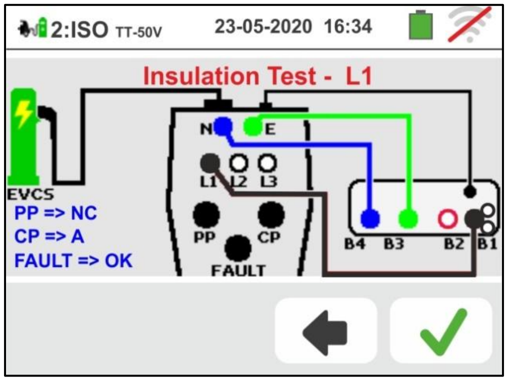
In this case, the connection between the EVSE's PE conductor and the earth rod of the system which the EVSE is connected to is checked.

This section guides you in setting **EV-TEST100** for current test.



Test is performed in both polarities with test current > 200mA DC for R≤5Ω (calibrated test cables included).
Once the test has been successfully completed, it is possible to move to next step.

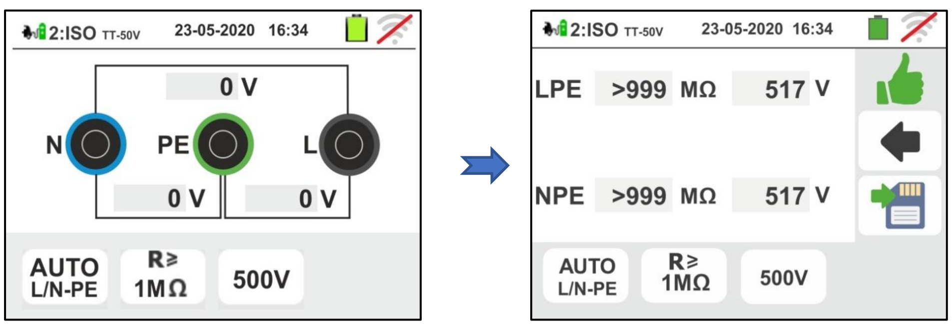
2: Insulation



The second step is the insulation test.

With this test the instrument checks the correct insulation between line and PE and between neutral and PE conductors.

Note: in case of three-phases EVSE, the master instrument will require you to test each line insulation in sequence.

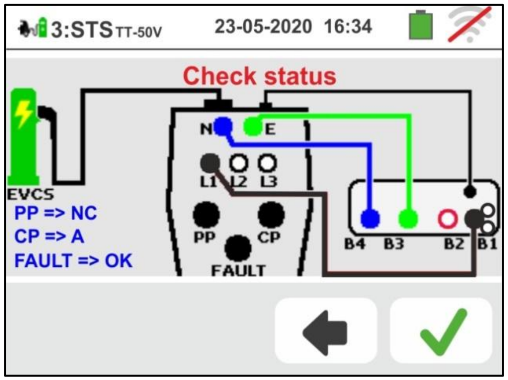


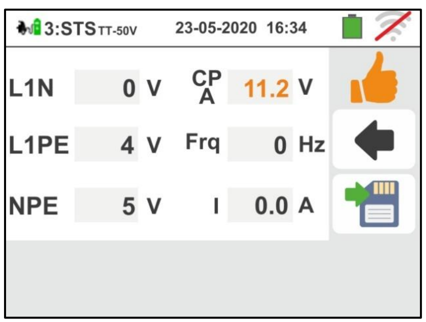
Normally, for AC EVSE, the output supply is 400V L-L, so the insulation must be tested at least by generating 500V.

The master unit applies the test voltage for a time long enough to reach a steady condition. Then it returns the measured insulation resistance value.

The minimum insulation resistance value accepted, as required by the guideline, is 1MΩ.

3/1: Check Status A





With the third step we get to the core of the functional tests of the EV charging stations. This step consists in 6 tests performed in a sequence.

Third step verifies the consistency between the state as set on **EV-TEST100** (vehicle simulation) and the response of the EVSE under test.

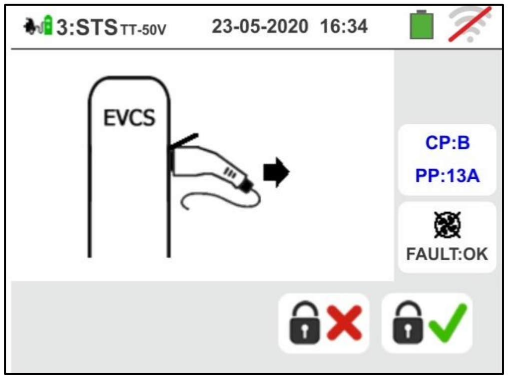
It is necessary to pay close attention to the settings of **EV-TEST100** as suggested in the various screens.

State A simulates no vehicle connected. The EVSE is normally in stand-by.

The master unit then checks the coding voltage of the CP signal and verifies that the EVSE under test generates no output voltage.

The EVSE and the EV connected exchange information on the rate control and the state of charging through the control pilot (CP) signal.

3/2: Locking



The second check of third step is to verify the interlocking of the EVSE*.

Once the selectors of **EV-TEST100** have been set as suggested (note: PP has to be set as per the EVSE rated current – in the hereby picture is set to 13 A as an example), the status selector of **EV-TEST100** has to be set to B.

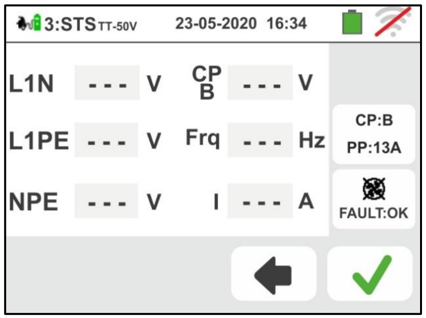
The EVSE must mechanically lock the **EV-TEST100**'s connector and prevent its release.

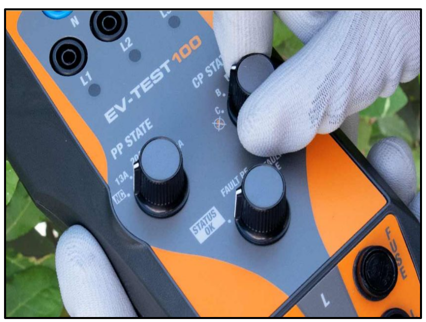
Status B indicates that the vehicle is connected to the EVSE, but it is not yet ready to start charging.

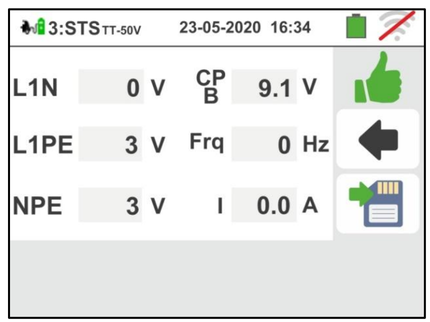
To carry out this check, the operator is required to pull the connector from the EVSE, then confirm it by clicking the lock with the green thick sign on the display of the master unit.

*only for EV charging stations supporting this function.

3/3: Check Status B





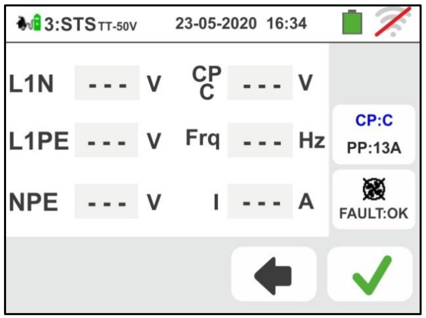


The third check of the third step is the verifying of state B.

After checking the mechanical lock of the connector, the master unit checks the coding voltage of the CP signal and verifies its consistency to the state B, as set on **EV-TEST100**.

The EVSE under test still must generate no output voltage.

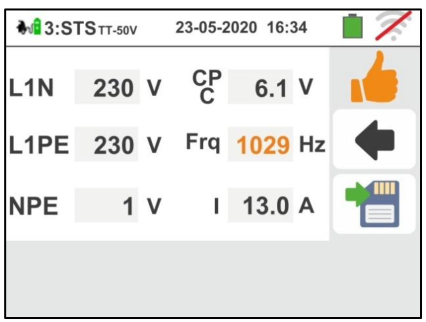
3/4: Check Status C-D



The fourth check of the third step is the verification of state C (or state D) identifying the vehicle charging.

The status selector of **EV-TEST100** has to be set to C (or state D). On the display of the master unit this setting change is highlighted in blue.

The master unit checks the coding voltage of the CP signal and verifies its consistency to the state C or D, as set on **EV-TEST100**.

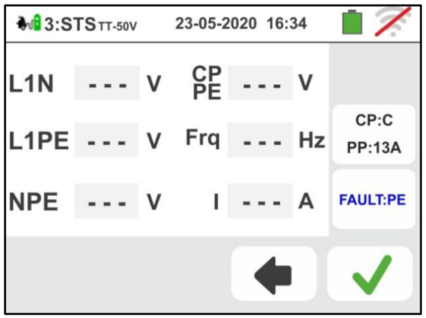


Once the selector of **EV-TEST100** has been set to C or D, the EVSE notifies the start of the charging phase by means of a LED or a message on its display, depending on the model. In this phase, in addition to the CP status coding voltage, the master unit checks the nominal output voltage and the frequency of the PWM EVSE's output signals as well.

State C and state D differ just for the forced ventilation during the charging phase. State C does not require forced ventilation, state D does require it.

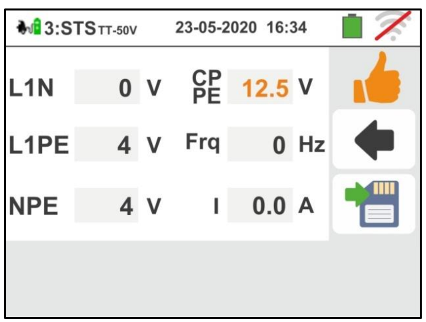
Note: Incorrect setting of status D on EV charging stations not supporting ventilation (or vice versa), could cause an error message on the EVSE under test.

3/5: Fault PE



The fifth test of the third step is the simulation of a fault on the PE conductor.

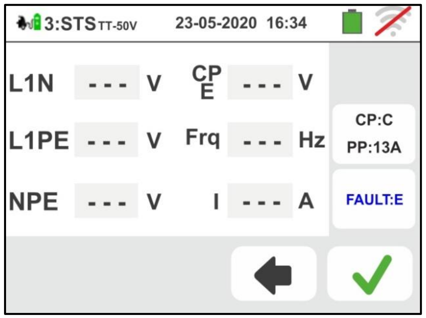
Same as before, the master unit highlights in blue on its display the setting of **EV-TEST100** to be changed.



Any failure of the protective conductor puts the user under potential electrical hazard. So the EVSE must immediately stop the power generation.

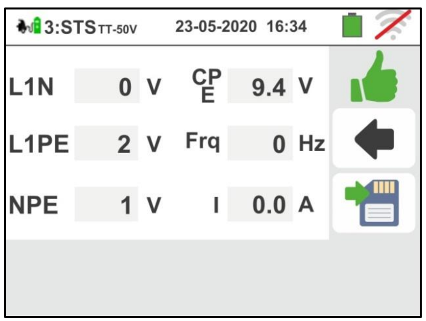
The master unit checks that the EVSE under test stops generating output power and that the CP coding voltage is the same of state A (stand-by).

3/6: Fault E



The sixth test of the third step is the simulation of a fault on the CP signal. It is called Fault E.

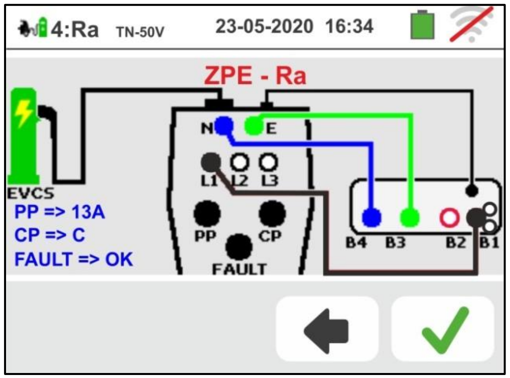
Same as before, the master unit highlights in blue on its display the setting of **EV-TEST100** to be changed.



The EVSE must stop supplying power as soon as it senses a short circuit.

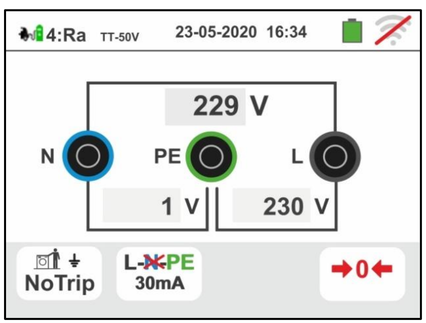
The master unit checks both fault E coding voltage and the absence of voltage at EVSE's output. At the same time, the EVSE should notify the user an error by means of a LED or a message on its display, depending on the model.

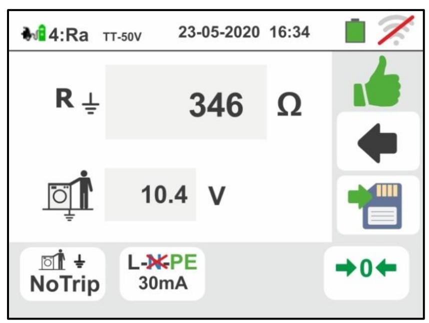
4: Ra (TT Systems)



The fourth step concerns the measurement of Ra in TT systems, as Za measurement is required in TN systems.

The master unit the right settings of rotary selectors on **EV-TEST100** to run the test.



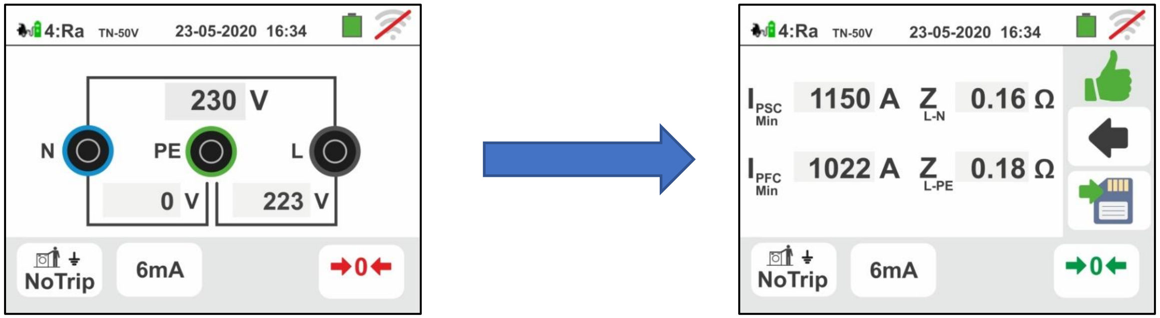


This test is the same usually performed on TT systems.

It is necessary to set the nominal rated current of the protection RCD.

The master unit checks if the Ra value is correct for the nominal current selected and the contact voltage Ut is <50V.

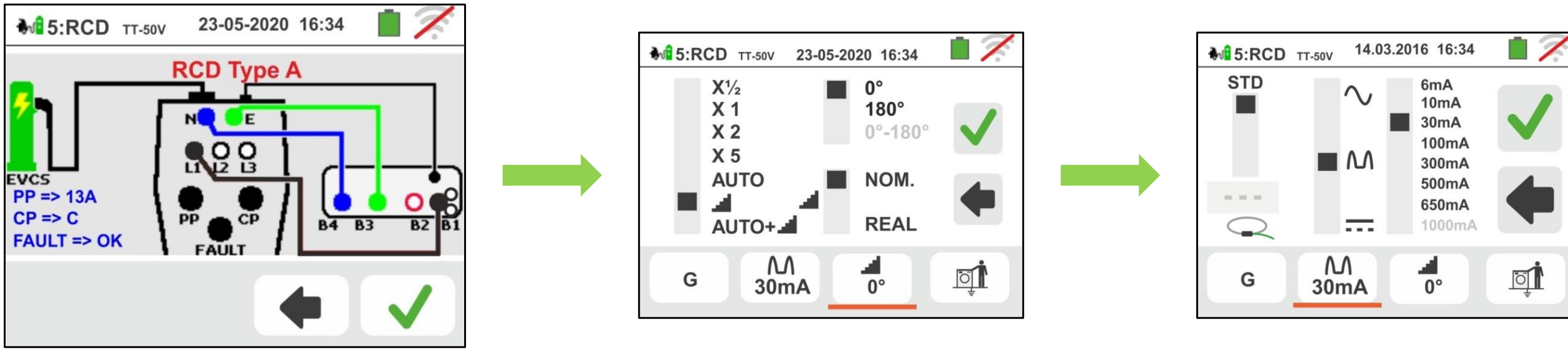
4: Z L-PE (TN Systems)



If the EVSE is connected to a TN system (a neutral-grounded grid system), the measurement of Ra is replaced by the measurement of Z L-PE and Z L-N.

The master unit measures the impedance values and verifies that the trip time of the protections installed is correct.

5: RCD Type A

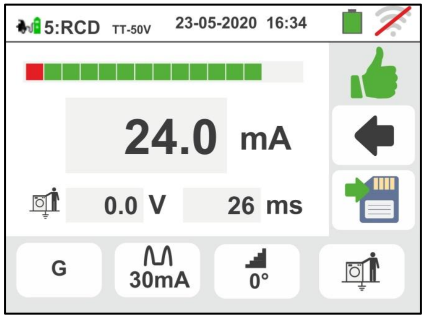


The fifth step concerns the checking of the RCD protecting the EVSE. This can be built-in as well as external and composed by a 30mA type A RCD with an additional 6mA DC module, or as an alternative by a 30mA type B RCD.

In case the EVSE is protected by a 30mA type A RCD and a 6mA DC module, two tests in a row are required, the first with unidirectional waveform to test the type A RCD, and the second with direct current to test the DC module.

The tests are performed in ramp mode: the user is required to select the waveform (type A for the first test) and the nominal tripping current of the RCD to be tested (usually 30mA).

5: RCD Type A

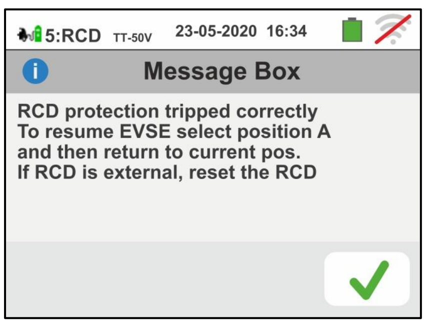


At the end of the test, the master unit shows the actual values of:

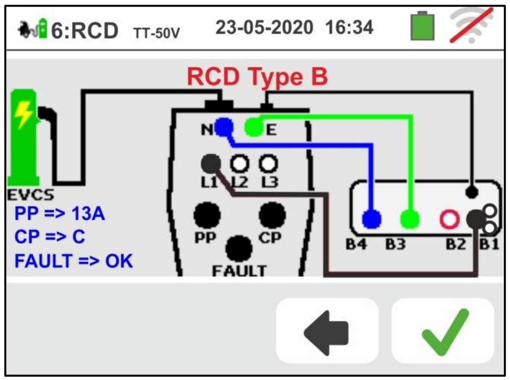
- RCD tripping current,
- RCD tripping time,
- contact voltage.

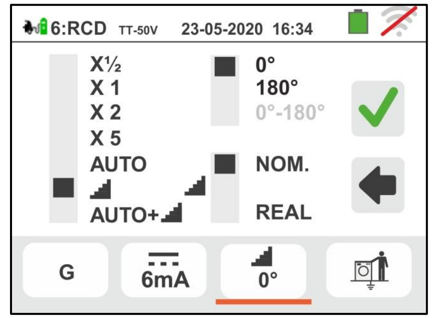
The EVSE should notify the user an error by means of a LED or a message on its display, depending on the model.

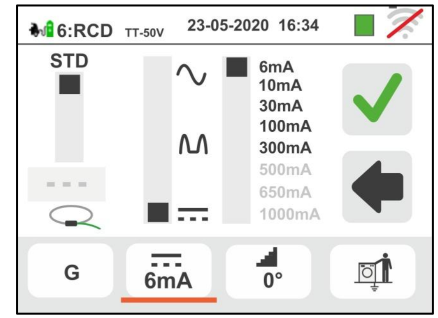
A message box on the master unit provides instructions for resetting the EVSE.



6: RCD Type B





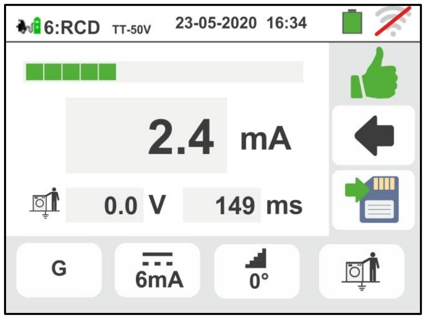


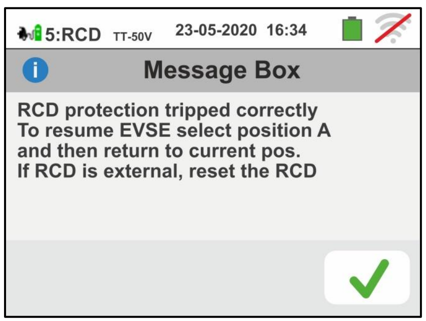
The sixth step concerns the checking of the 6mA DC module or the type B RCD, either built-in or external.

If the EVSE under test is protected by a 30mA type A RCD (already tested) and a 6mA DC module, the user is required to select the waveform (type B for the second test) and the nominal tripping current of the DC module to be tested (6mA). Otherwise, if the EVSE is protected by a 30mA type B RCD, the user is required to select the waveform (type B) and the nominal tripping current of the RCD to be tested (usually 30mA).

The tests is performed in ramp mode.

6: RCD Type B





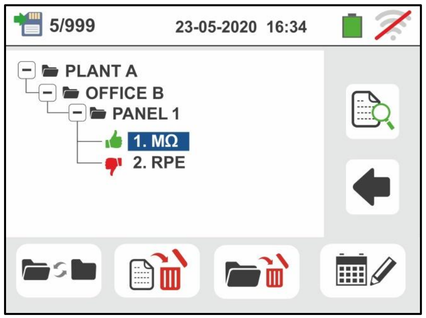
At the end of the test, the master unit shows the actual values of:

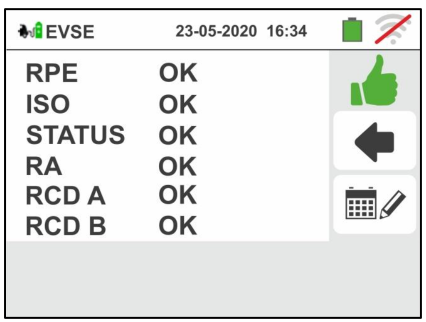
- RCD tripping current,
- RCD tripping time,
- contact voltage.

The EVSE should notify the user an error by means of a LED or a message on its display, depending on the model.

A message box on the master unit provides instructions for resetting the EVSE.

Data saving & recall



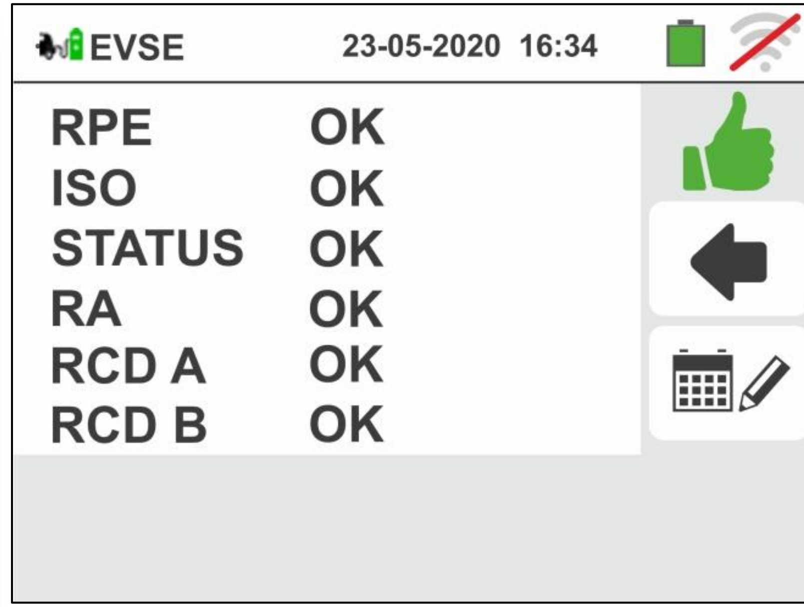


Once the EVSE test sequence is completed, it is possible to save all measures and test results onto the master unit's internal memory for further recalling and/or downloading to the computer via optical/USB connection cable or to the smartphone/tablet via Wi-Fi.

In case any of the test fails, the sequence is aborted, and it would not be possible to move forward to next test steps. Partially completed sequence data cannot be saved.

By touching the calendar icon, it is possible to recall and edit the comments entered while saving test results. A practical virtual keyboard speeds this process.

Safe EVSE for safe users



Teşekkürler