

User Manual

Version 1.0



AVI3000

- CN-BT7
- SHUNT0E1
- CN-GI-CI-V

The Manufacturer

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The small print



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Subject to change without notice.

Safety instructions



This warning sign is visible on the tester. Meaning: This equipment should only be operated by trained personnel after carefully reading the user manual.

The system belongs to Safety class 1

The system fulfills the requirements of the safety standards IEC 61010 for laboratory measurements equipment "Safety requirements for electrical measuring, control and laboratory equipment".

Consider always the following safety points

- Dangerous mains voltage or high voltages are present inside the test equipment and ALL devices attached to it.
- The protective Earth must be connected to Earth on the test equipment.
- Before removing any covers from the test equipment, remove all external connection cables.
- Before changing the mains fuse, remove all external connection cables.
- Fuses should only be replaced with the same type and value.
- People with heart pacemakers must not be in the vicinity of the test equipment when it is in operation.
- Do not switch on or operate the test equipment if an explosion hazard exists.
- The test equipment should be operated in a dry room. If condensation is visible, the affected unit(s) should be dried before operating.
- Never touch the Equipment under Test (EUT), when the test system is operating.
- Establish a safety barrier around the EUT and if required connect it to the safety circuit in the auxiliary connector on the rear panel. The cables under high voltage must not be touched during testing.
- The EUT should be covered and/or well marked during the tests.
- If protective elements, which are tested are likely to explode during tests they must be covered with a protective cabinet.
- If the test equipment or any of the system components are damaged or it is possible that damage has occurred, for example during transportation, do not apply any voltage.
- This user manual is an integral part of the Test-System. EMC PARTNER and its sales partners refuse to accept any responsibility for consequential or direct damage to persons and/or goods due to non-observance of instructions contained herein or due to incorrect use of the test equipment

Typographical Conventions



Warnings

Safety notices that must be heeded are indicated with this warning triangle.



additional advice

Throughout the user manual very important or helpful advice is indicated with this symbol.

Sicherheitshinweise



Gefahr! Dieses Warnsymbol ist am Tester sichtbar angebracht. Es bedeutet: Diese Ausrüstung darf nur durch ausgebildetes Personal bedient werden, nachdem diese die Bedienungsanleitung sorgfältig gelesen hat.

Das Gerät gehört der Schutzklasse I an.

Das Gerät erfüllt die Anforderungen der Sicherheitsnormen IEC 61010 für Messungen in Laboratorien "Sicherheitsanforderungen an elektrische Mess- und Regelgeräte sowie Laborausrüstung".

Beachten Sie stets die folgenden Sicherheitshinweise:

- Gefährliche Netzspannung oder Hochspannung liegt im Inneren der Testausrüstung und an ALLEN daran angeschlossenen Geräten an.
- Der Schutzerdeanschluss der Testausrüstung muss mit der Schutzerde des Netzes verbunden sein.
- Bevor Sie irgendwelche Abdeckungen von der Testausrüstung entfernen, entfernen Sie alle äusseren Anschlusskabel.
- Bevor Sie die Netzsicherung austauschen, entfernen Sie alle äusseren Anschlusskabel.
- Netzsicherung nur mit demselben Typ und Ansprechwert ersetzen.
- Personen mit Herzschrittmacher dürfen sich nicht in der Nähe des Geräts aufhalten, wenn dieses in Betrieb ist.
- Schalten Sie die Testausrüstung nicht ein oder betreiben Sie das Gerät nicht, wenn Explosionsgefahr besteht.
- Die Testausrüstung darf nur in einem trockenen Raum betrieben werden. Wenn Kondensation (Beschlag) sichtbar ist, sind die betroffenen Teile der Ausrüstung zu trocknen.
- Berühren Sie niemals die getestete Ausrüstung (EUT), wenn das Testsystem arbeitet.
- Stellen Sie eine Sicherheitsabtrennung rund um das EUT auf und verbinden Sie diese, wenn verlangt, mit dem Sicherheitskreis im Hilfsanschluss (Auxiliary) an der Rückwand. Die unter Hochspannung stehenden Kabel dürfen während des Tests nicht berührt werden.
- Während des Tests sollte das EUT abgedeckt und/ oder gut markiert werden.
- Wenn Schutzelemente leicht explodieren können während Tests, müssen diese mit einem schützenden Deckel abgedeckt werden.
- Legen sie keine Spannung an, wenn die Testeinrichtung oder irgendwelche Systembestandteile beschädigt sind oder möglicherweise ein Schaden eingetreten ist, zum Beispiel beim Transport.
- Diese Bedienungsanleitung ist ein vollständiger Bestandteil des Testsystems. EMC PARTNER und seine Verkaufspartner lehnen jede Verantwortung für direkte wie für Folgeschäden an Personen oder Gütern ab, die aufgrund von Nichtbeachten von hierin enthaltenen Anweisungen oder aufgrund von unrichtigem Gebrauch dieser Testausrüstung entstehen.

Typografische Übereinkünfte



Warnung

Sicherheitshinweise, die befolgt werden müssen, sind mit diesem Warndreieck gekennzeichnet



Zusätzlicher Hinweis

Überall in der Bedienungsanleitung wird ein sehr wichtiger oder hilfreicher Hinweis mit diesem Symbol gekennzeichnet.

Consignes de sécurité



Ce sigle d'avertissement est visible sur le testeur. Signification: Cet équipement ne doit être utilisé que par du personnel formé et après avoir soigneusement lu le mode d'emploi.

Le système appartient à la classe de sécurité 1

Le système répond aux exigences des normes de sécurité CEI 61010 pour les équipements de laboratoire "Exigences de sécurité pour les appareils électriques de mesure, de contrôle et d'équipement de laboratoire".

Considérez toujours les points de sécurité suivants:

- Des tensions secteur dangereuses ou des tensions élevées sont présentes à l'intérieur de l'équipement de test et de TOUS les périphériques.
- La mise à la terre de l'équipement de test doit être effectuée.
- Avant de retirer les couvercles de l'équipement, débranchez tous les câbles de connexion externes.
- Avant de changer le fusible secteur, débranchez tous les câbles de connexion externes.
- Les fusibles ne doivent être remplacés que par le même type et valeur.
- Les personnes portant un stimulateur cardiaque ne doivent pas se tenir à proximité de l'équipement de test lorsqu'il est sous tension d'opération.
- Ne pas allumer ou faire fonctionner l'équipement de test si un risque d'explosion existe.
- L'équipement de test doit être utilisé dans un local sec. Si de la condensation est visible, les appareils affectés doivent être séchés avant utilisation.
- Ne jamais toucher l'équipement sous test (EST), lorsque le système est sous fonction.
- Mettre en place une barrière de sécurité autour de l'EST et, si nécessaire raccorder la au circuit de sécurité du connecteur auxiliaire sur le panneau arrière. Les câbles sous haute tension ne doivent pas être touchés pendant le test.
- L'EST doit être couvert et / ou bien marqué pendant les essais.
- Si des éléments de protection sont susceptibles d'exploser lors de tests, ils doivent être couverts avec un boîtier de protection.
- Si l'équipement de test ou l'un des composants du système ont été endommagés ou il est possible que des dommages ont eu lieu, par exemple pendant le transport, ne pas appliquer de tension.
- Ce manuel fait partie intégrante du Système de Test. EMC PARTNER et ses partenaires commerciaux refusent d'accepter toute responsabilité pour des dommages indirects ou directs à des personnes et / ou des marchandises dues au non-respect des instructions contenues dans ce document ou en raison d'une mauvaise utilisation de l'équipement de test.

Conventions Typographiques



Avertissements

Les consignes de sécurité qui doivent être respectées sont indiqués par ce triangle de signalisation.



Conseils supplémentaires

Tout au long du manuel d'utilisateur des conseils très important ou utile sont indiqués par ce symbole

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1 System overview

AVI3000 (PN 107630)



AVI3000 generator is a compact system with all waveforms for DO-160 section 22 up to level 3 and MIL-STD-461 CS117 for internal tests. A coupling transformer, for cable injection tests, completes the system. The 7 inch graphic colour touch panel provides an intuitive and comfortable user interface. Interactive parameter input, help text and graphic illustrations, guide the user through the instrument programming process.

CN-BT7 (PN 107632)



Coupling transformer for Cable Bundle testing used with WF1, WF2, WF3, WF5A, WF6. The CN-BT7 has a large aperture of 6 x 9cm and is equipped with a monitor loop for calibration and supervision during the test.

SHUNT0E1 (PN 103575)



0.1 Ohm shunt with SHV-BNC connector for direct measurement of current impulses on AVI3000 and CN-BT7.

CN-GI-CI-V (PN 103577)



The preferred coupling method for WF4 is Ground Injection. Ground Injection is possible directly with AVI3000 without any additional coupling device. The CN-GI-CI-V is only necessary if WF4 will be applied as Cable Induction test.



Not all accessories are used for all tests. The chapter “Perform a test” provides more information.

2 Initial Operation

2.1 Unpacking and Checking

1. Check the packaging for signs of damage. If damage is visible, report this to the shipping company immediately.
2. Gently remove the equipment from the packaging.
3. Check the delivery for completeness using the delivery note and the accessory lists for the various items. If something is missing, contact EMC PARTNER or your local sales representative immediately.
4. Check the equipment for any damage. If there is damage, immediately contact the shipping company who made the delivery.



Retain the original packing material for a safe transport at a later date.

2.2 Installation

The equipment is designed for use under laboratory conditions. Make sure that all fan openings are unobstructed, that the airflow perforations are unimpeded, and that the minimum distance from the wall is 10cm. An insufficient airflow can cause the equipment to overheat, which may disturb the operation and even cause damage.



Most equipment from EMC PARTNER can be mounted in a 19" Rack. A special rack mounting kit is available. Contact your local sales company for a quotation.

2.3 Powering the Equipment

Check that the local AC-supply is suitable for the equipment. Power rating of the instrument is indicated on the type plate next to the AC power supply connector located on the rear panel. Only use the supplied power cord to connect to your public power supply.



The equipment must always be connected to protective earth. Check the earth connection on your power outlet before you connect and turn on the equipment.

2.4 Safety Circuit

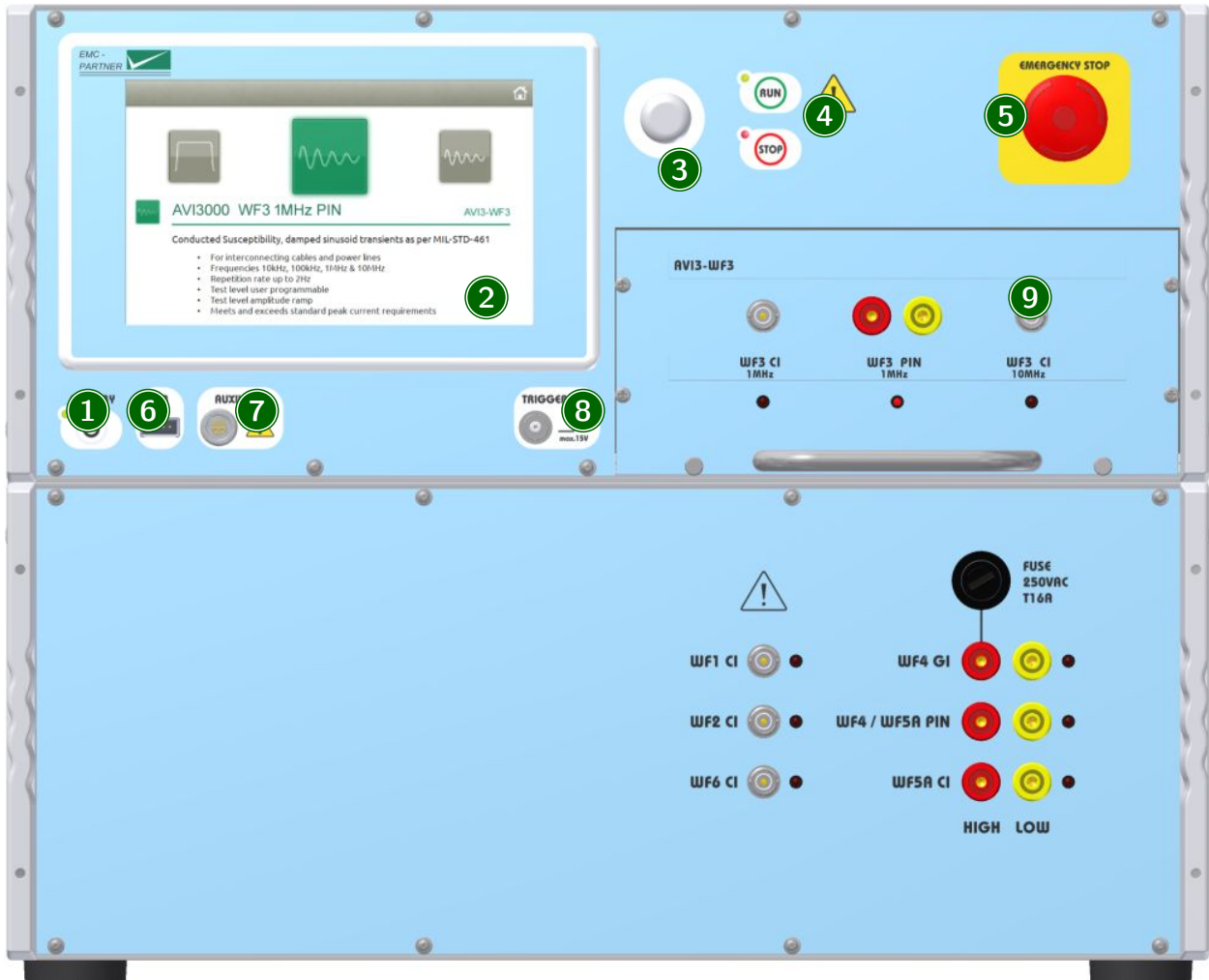
The Generator is equipped with a Safety Circuit. As long as the safety circuit is open, no test can be started. To close the safety circuit

1. connect the auxiliary Connector on the rear panel
2. pull out the emergency stop button on the front panel with a slight turn clockwise

A closed safety circuit is indicated by a red illuminated emergency stop button

3 Using the Generator

3.1 Front panel



1 ON/STBY

Power-up or power-down the generator.

2 Touchscreen monitor

User interface to perform all functions including test types selection, parameter entry, saving and recalling tests.

3 Rotary knob

Entry device enables faster navigation and parameter entry.

4 Run/Stop

Starts or stops the selected test.

A green blinking LED indicates a running test.

A red blinking LED indicates a stopped test due to an error.

A red LED indicates a finished test.

5 Emergency stop button

Push to open the safety circuit.

As soon as the safety circuit is open, all running tests are immediately stopped and no more tests can be started.

Release the emergency stop button with a slight turn clockwise.

A closed safety circuit is indicated by a red illuminated emergency stop button.

6 USB Port

Connect a USB memory stick to copy files (setups, protocols, error logs) from the generator. The USB interface is also used to update the internal firmware.

7 Auxiliary Connection

Interface for additional external equipment.

8 Trigger out

BNC output for a direct connection to the scope to start pulse acquisition. Level and duration depend on the specific test. Some typical values are

- 12V primary impulse trigger
- 8V secondary impulse trigger
- 5V EUT power state

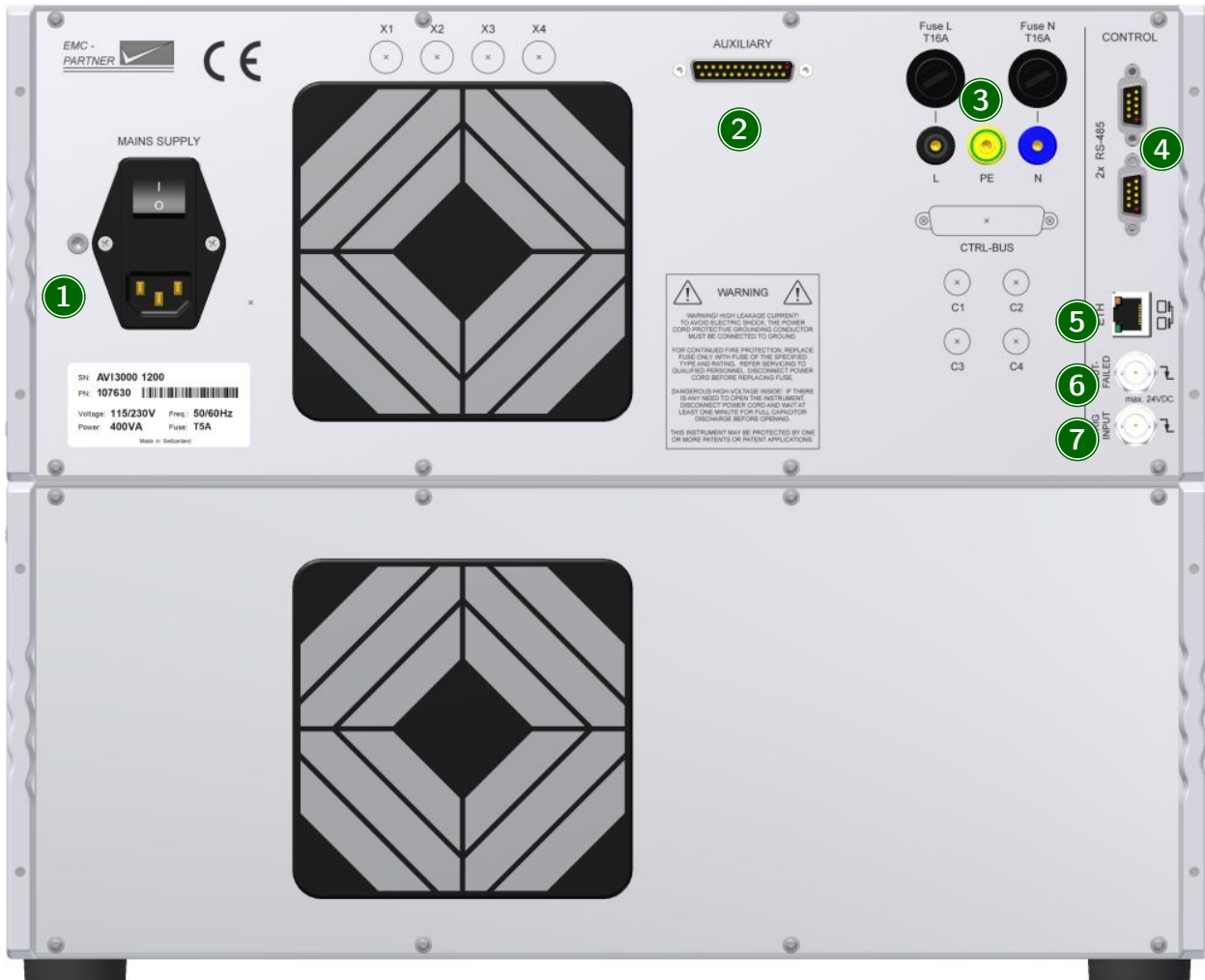
9 Plug-in module

The plug-in contains all WF3 circuits. It is part of the AVI3000 standard delivery. Future plug-ins could be developed for different wave forms. The plug-ins are secured by two retained screws on the bottom.



Never remove a plug-in during a running test.

3.2 Rear panel



1 AC Socket / Main fuse

A country specific mains cable is delivered with the equipment, this should be used to connect to the mains power supply. A mains fuse is located in the socket housing. The value is indicated on the equipment type plate.



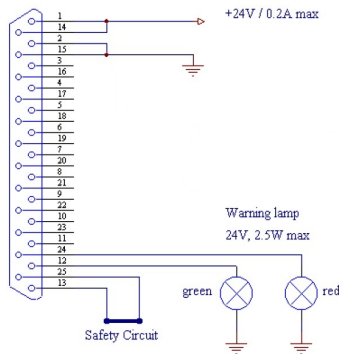
Take care to ensure the power main matches the power ratings on the equipment type plate.

The generator must always be connected to protective earth

2 Auxiliary connector

Fit the auxiliary connector delivered with the equipment, to close the safety circuit.

It is possible to extend the safety circuit or to connect additional external warning lamps.



- The green lamp indicates safety circuit open, no test can be started
- The red lamp indicates safety circuit closed, tests can be started

3 EUT Power Input

Separate EUT Power input if required for a specific plug-in.

4 RS485 Interfaces

Interfaces to connect additional equipment that is controlled directly from the test equipment.

5 Ethernet Interface

Remote control using TEMA3000 software via a common Ethernet interface.

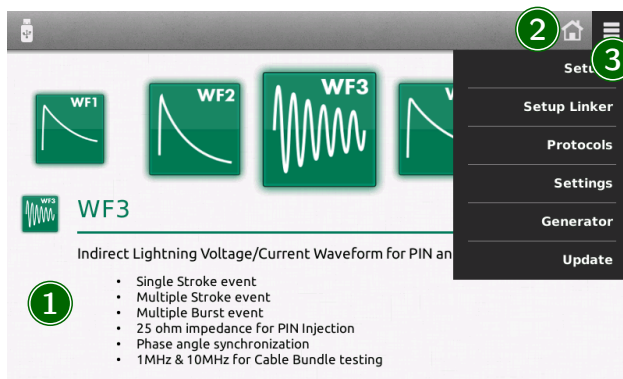
6 EUT Failed

A falling edge to ground impressed on the BNC connector is indicated in the test protocol as an EUT Fail condition. The input is internally pulled up to max. 24V. Driving with an open-collector output is recommended.

7 Trigger Input

A falling edge to ground on the BNC connector, triggers impulse release. This function must be configured in the test parameter menu. The input is internal pulled up to max. 24V. Driving with an open-collector output is recommended.

3.3 Software User Interface



1 Test selection

The main window is a carousel of all tests available in the equipment. A short description is included with each test type. A green icon indicates test is available, a grey icon indicates test

is not currently available. Select a test by bringing the relevant icon to centre screen. This is achieved by finger swipe on the touch panel or by using the rotary knob.



Not all tests are available all the time. Availability depends on hardware configuration. To simplify the menu structure, tests that are unavailable can be removed from the configuration.

≡ (General Menu) -> Settings -> Test Settings

2 Home button

Select from any point in the menu structure to return to main window.

3 General menu

Activates a drop-down menu on the right side giving access to equipment configuration settings.

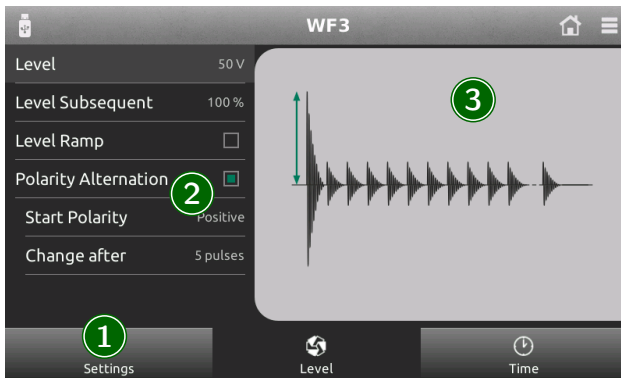
4 Perform a test



Additional information for calibration is also available in the calibration report.

4.1 Programming the generator

The same process is used to program the generator for different tests. In the first step, the parameters should be set according to the requirement of the test.



1 Main category

For quick access, categories at the bottom of the display contain groups of relevant parameters. Select a category using the touch panel.

2 Parameter list

All parameters from a selected category are shown on a single screen. Click on a parameter to edit the value.

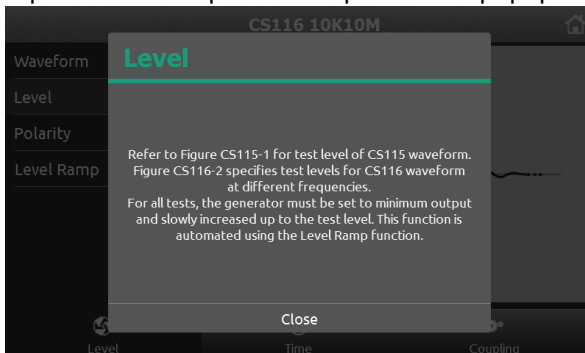


Press and turn the rotary knob at the same time for a quick parameter change.

All parameters are checked for validity during the entry process. If necessary (for example test level too high), the system automatically corrects the value. Corrected values are indicated by a red background.

The system also checks for inconsistencies with other parameters and, where necessary, makes an adjustment. It is not possible to create a test containing invalid parameters.

For each parameter, an additional help text ist provided directly on the generator. Press and hold a parameter to open the help text in a popup window.

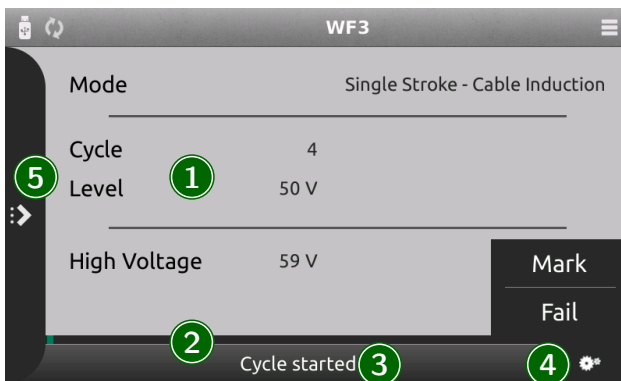


3 Parameter image

Individual images clarify the effect of each parameter.

4.2 Run a test

Starting a test by pressing the run button on the front panel, changes the display to the run view.



1 Information Area

Indicates the most important information about a running test.

2 Progress bar

Indicates progress of the whole test and, if available, about the current cycle.

3 Status bar

Provides information about the current event.

4 Running options

Click to open a menu where it is possible to mark or fail a test at the current position. This information will be included in the protocol.

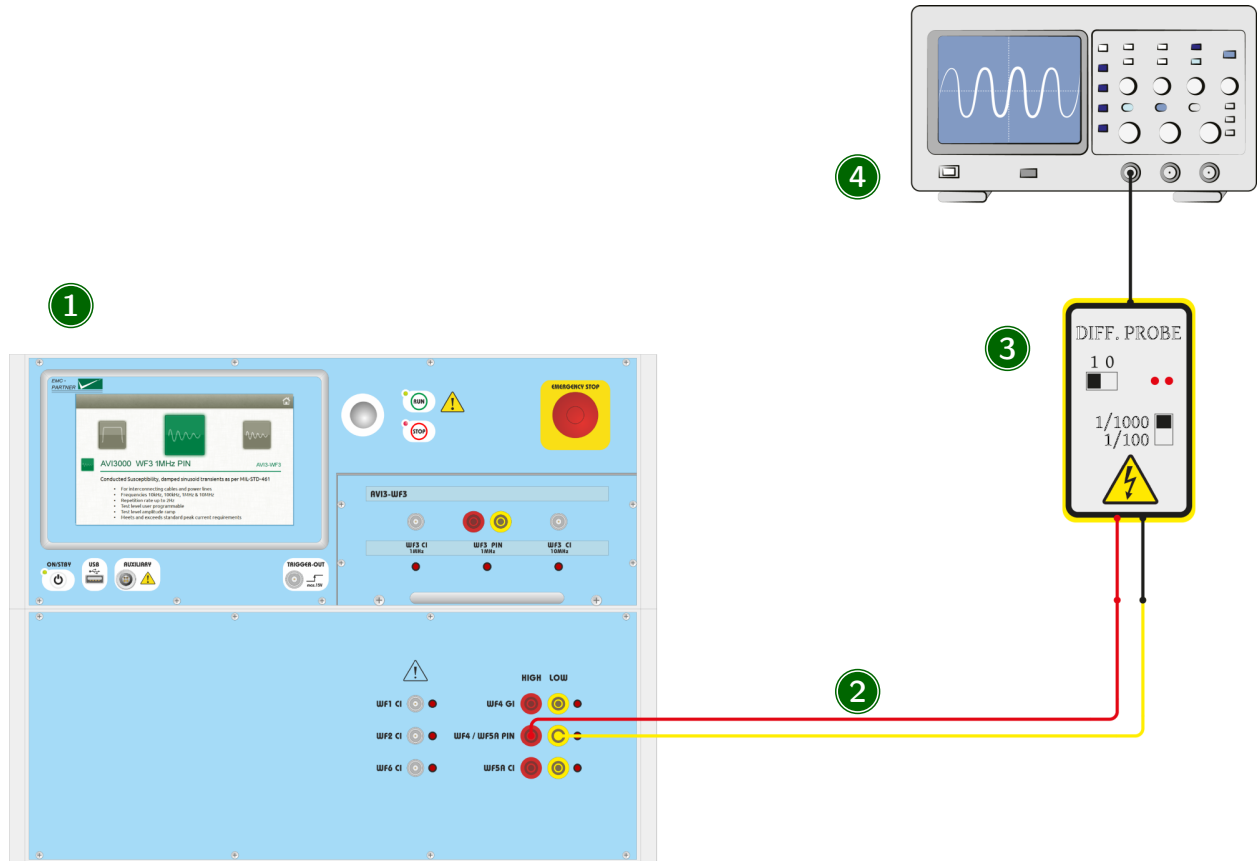
5 Parameter change

Click to open a shutter menu containing all parameters that can be edited while a test is running. Depending on the test type, parameter change will take place with the next cycle or after a few seconds. Changed values are highlighted for a few seconds in the information area.

4.3 Pin Injection WF3 / WF4 / WF5A

4.3.1 System Calibration

Prior to each test, the system has to be calibrated. The calibration is made using the 2m cable on the AVI3000 at the desired test level with both polarities.



1 Generator

Select the desired Waveform and Pin Injection as coupling type.



For all Pin Tests, the necessary decoupling elements are already built into the generator.

2 Connection cable

The calibration is performed including a 2m MC-cable. Connect the cable to the correct output.



The pictures shows the setup for WF4 and WF5A. For WF3, the output is on the front of the plugin. The correct output is always indicated by a red LED.

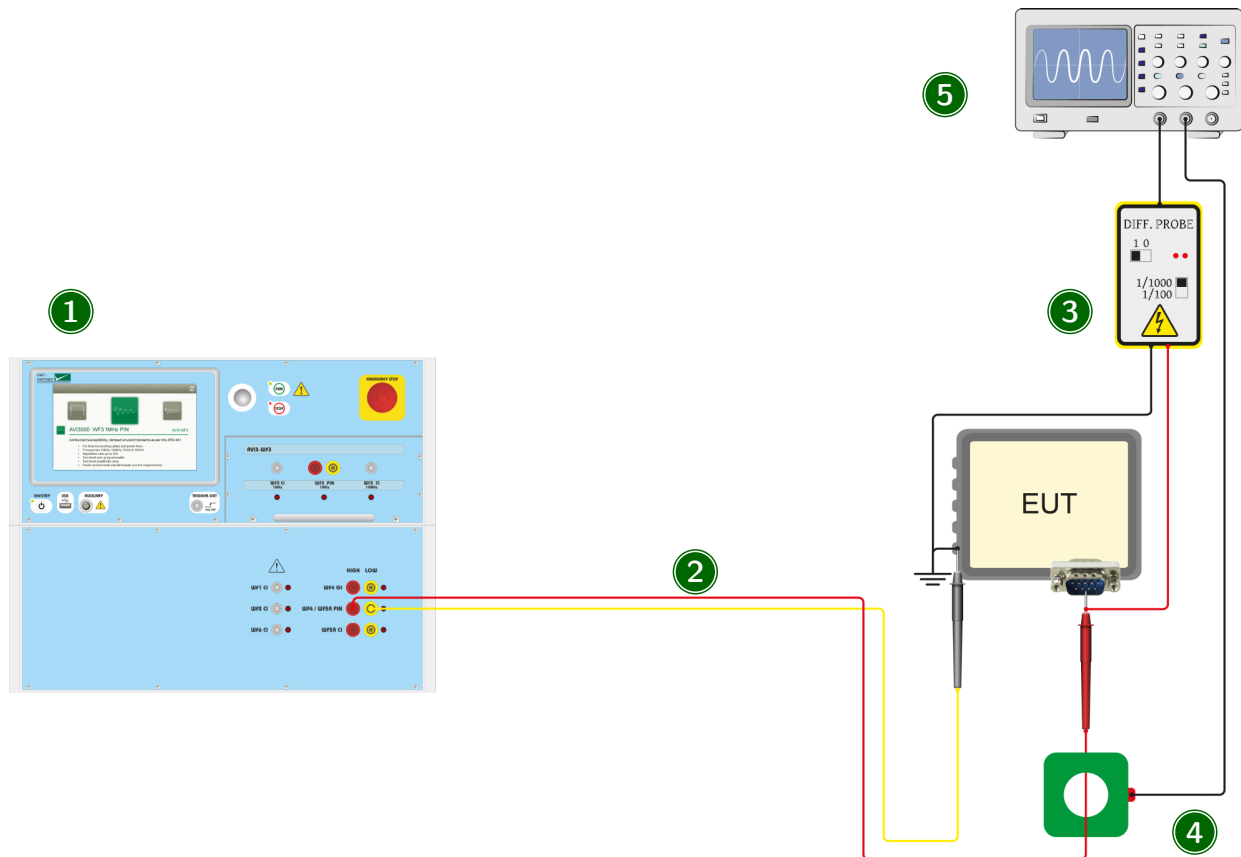
3 Measurement Equipment

Use a HV differential probe to measure the open circuit voltage. The current is measured with a current probe with a short circuit at the end of the connection cable. It may be necessary to adjust the generator output to achieve the required test level. Current measurements must be made at the adjusted level to determine the generator impedance.

4 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.3.2 EUT-Test



1 Generator

Select the desired Waveform and Pin Injection as coupling type. For all Pin Tests, the necessary decoupling elements are already built into the generator.

2 Connection cable

The 2m MC-cable is connected between the EUT and the generator output.



The picture shows the setup for WF4 and WF5A. For WF3, the output is on the front of the plugin. The correct output is always indicated by a red LED.

3 Voltage monitor

Use a HV differential probe to monitor the voltage during the test.

4 Current monitor

Use a current probe to monitor the current during the test.

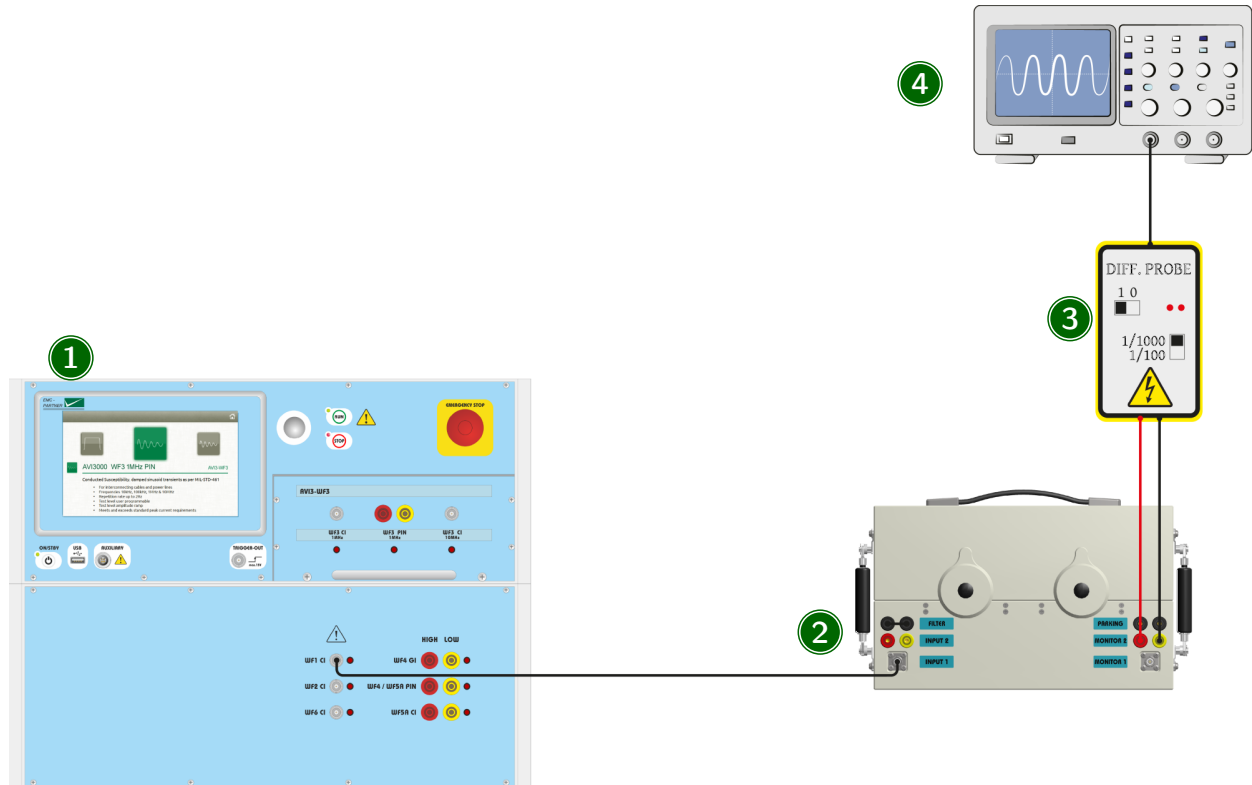
5 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.4 Cable Bundle WF1, WF2, WF3, WF5A, WF6

4.4.1 Calibration

Prior to each test, the system has to be calibrated. The calibration is made at the desired test level with both polarities.



1 Generator

Select the desired Waveform and Cable Induction. The correct output is always indicated with a red LED.



The connection setup for SingleStroke, MultipleStroke and MultipleBurst is the same. The desired mode has to be selected in the generator menu.

2 CN-BT7

The output of the generator is connected with the input of the CN-BT7. For the different waveforms, different setups are used.

- For WF1, connect the WF1-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF2, connect the WF2-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF3 1MHz, connect the WF3 1MHz-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF3 10MHz, connect the WF3 10MHz-output on the generator with the CN-BT7 INPUT 1 using a 1 m HV-BNC cable. On the coupler, put the MC-bridge in the PARKING position.
- For WF5A, connect the WF5A-output on the generator with the CN-BT7 INPUT 2 using a 2 m MC cable. On the coupler, put the MC-bridge in the FILTER position.

- For WF6, connect the WF6-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.

3 Measurement Equipment

Use a HV differential probe to measure the open circuit voltage on MONITOR 1. For the current measurement, different setups are used.

- For WF1, short-circuit MONITOR 2 with a 0.25 m MC cable and measure with a current probe.
- For WF2 measured directly with SHUNT0E1 on MONITOR1
- For WF3 1MHz and 10MHz measured directly with SHUNT0E1 on MONITOR1
- For WF5A, short-circuit MONITOR 2 with a 0.25 m MC cable and measure with a current probe.

4 Oscilloscope

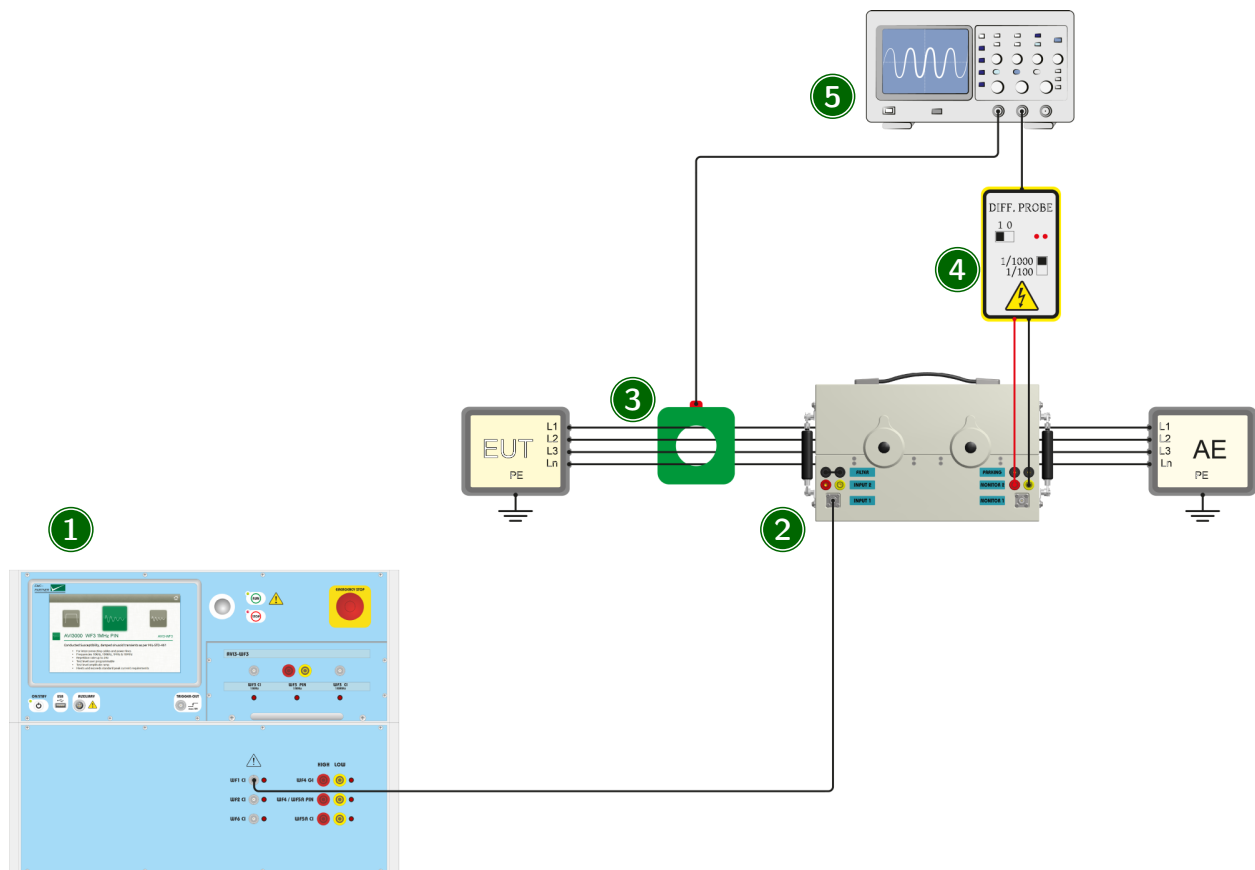
The oscilloscope must have a minimum bandwidth of 500 MHz.

4.4.2 EUT-Test

Testing an EUT requires the impulse amplitude to be set to a low level and slowly adjusted to the defined test level. This can be automated with the level ramp function in the parameter menu.



The pulse amplitude must be continuously monitored during the testing process for both TEST and LIMIT values.



1 Generator

Select the desired Waveform. The correct output is always indicated with a red LED.



The connection setup for SingleStroke, MultipleStroke and MultipleBurst is the same. The desired mode has to be selected in the generator menu.

2 CN-BT7

The output of the generator is connected with the input of the CN-BT7. For the different waveforms, different setups are used.

- For WF1, connect the WF1-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF2, connect the WF2-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF3 1MHz, connect the WF3 1MHz-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF3 10MHz, connect the WF3 10MHz-output on the generator with the CN-BT7 INPUT 1 using a 1 m HV-BNC cable. On the coupler, put the MC-bridge in the PARKING position.
- For WF5A, connect the WF5A-output on the generator with the CN-BT7 INPUT 2 using a 2 m MC cable. On the coupler, put the MC-bridge in the FILTER position.
- For WF6, connect the WF6-output on the generator with the CN-BT7 INPUT 1 using a 2 m HV-BNC cable. On the coupler, put the MC-bridge in the FILTER position.

3 Voltage monitor

Use a HV differential probe to monitor the peak voltage during the test directly on the monitor loop. The pulse shape is not relevant.

4 EUT cable

The coupler and monitor probes are placed around a cable bundle interfacing with the EUT. During the test, the peak current must be monitored to ensure the amplitude does not exceed the test or limit levels. The pulse shape is not relevant.

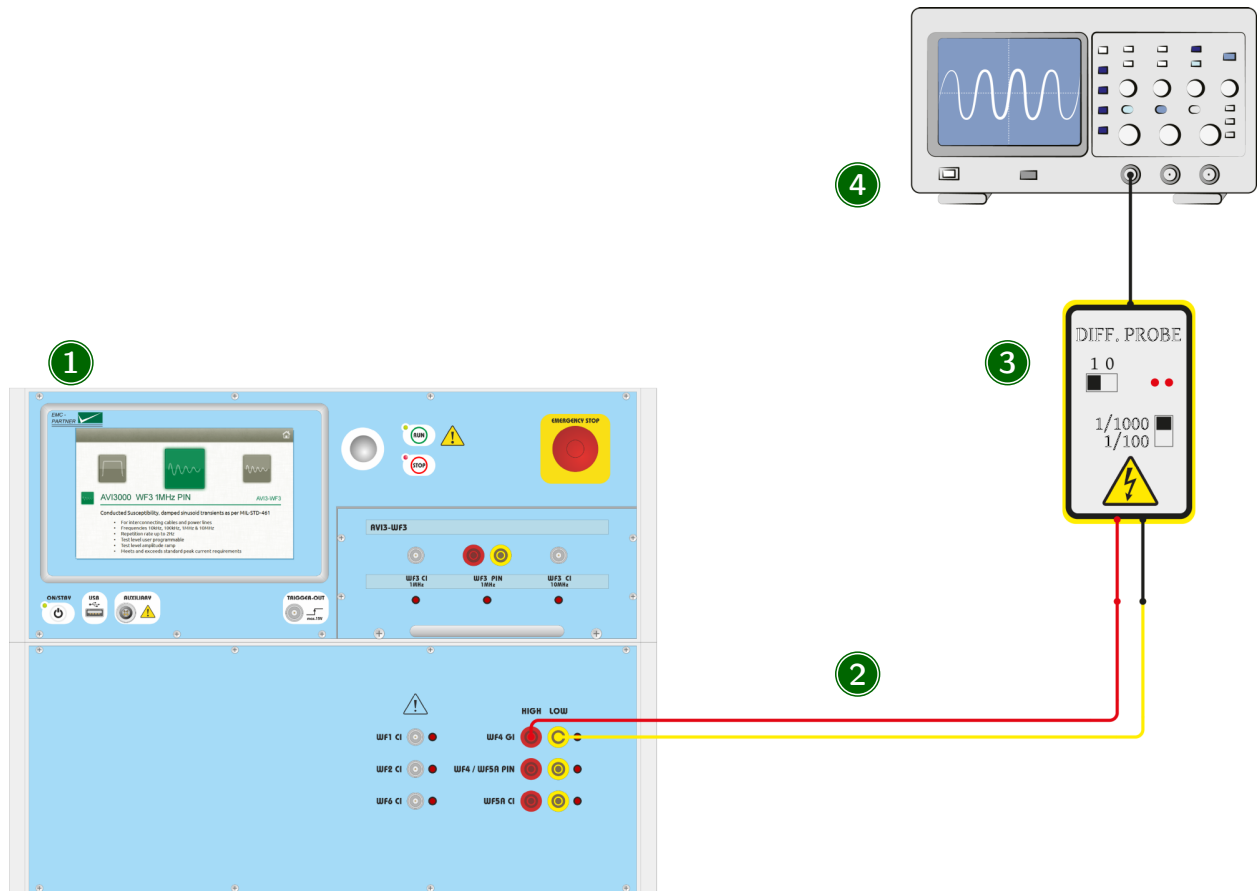
4 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.5 Ground Injection WF4

4.5.1 System Calibration

Prior to each test, the system has to be calibrated. The calibration is made at the desired test level with both polarities.



1 Generator

Select the desired Waveform and Ground Injection as coupling type.

2 Connection cable

The calibration is performed including a 2m MC-cable. Connect the cable to the correct output. The correct output is always indicated by a red LED.

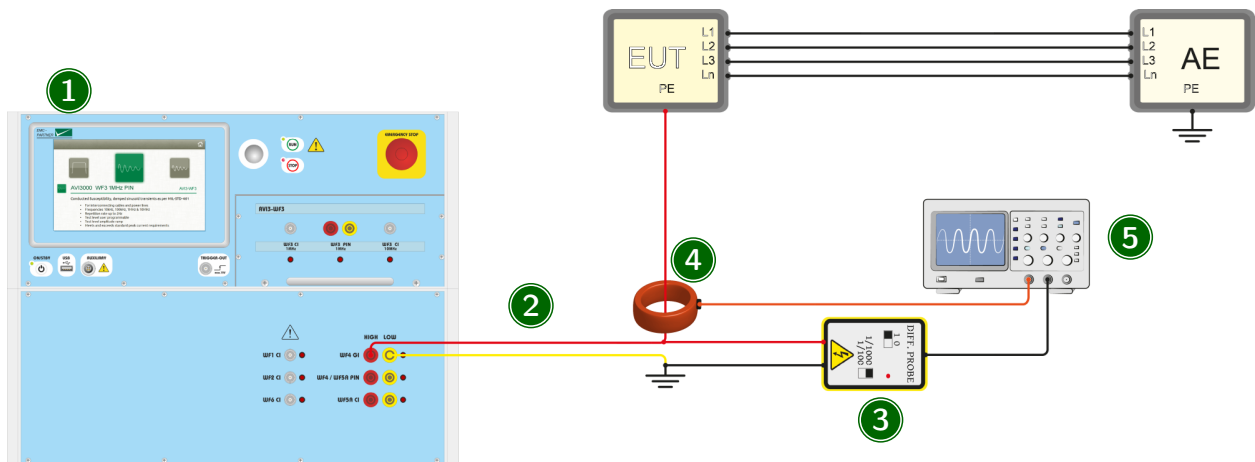
3 Measurement Equipment

Use a HV differential probe to measure the open circuit voltage. The current is measured with a current probe with a short circuit at the end of the connection cable.

4 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.5.2 EUT-Test



1 Generator

Select the desired Waveform and Ground Injection as coupling type.

2 Connection cable

The 2m MC-cable is connected between the EUT and the generator output. The generator is protected with a 16A / 250V fuse against overcurrent.

3 Voltage monitor

During the test, peak voltage must be monitored to ensure the amplitude does not exceed the test level. The pulse shape is not relevant.

4 Current monitor

Use a current probe to monitor the current during the test to ensure the peak does not exceed the limit level.

5 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.6 Cable Induction WF4



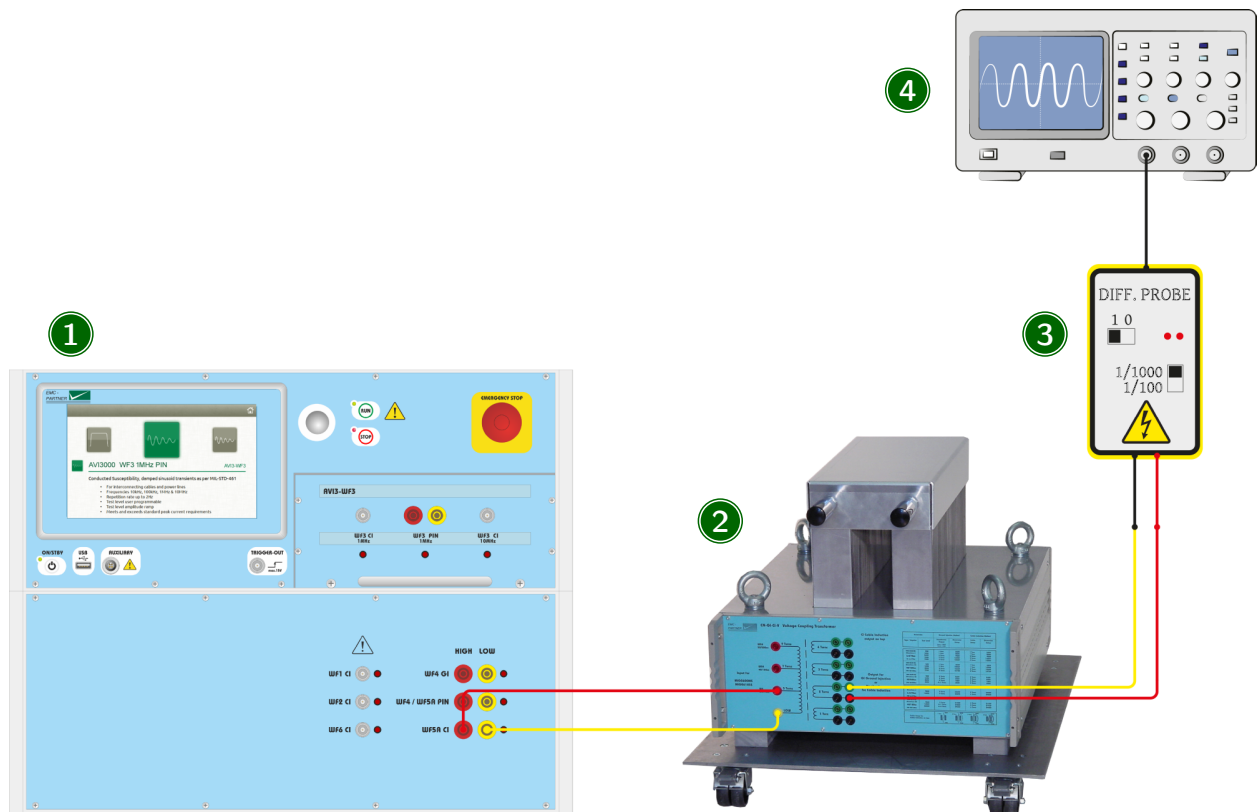
The preferred coupling method for WF4 is Ground Injection. Ground Injection is possible directly with AVI3000 without any additional coupling device. The CN-GI-CI-V is only necessary if WF4 will be applied as Cable Induction test.

4.6.1 System Calibration

Prior to each test, the system has to be calibrated. The calibration is made at the desired test level with both polarities.



The tests can be realized with 1 or 2 turns on the coupler output. With 2 turn, Level 3 can be achieved with every kind of load. In many cases is it also possible with one turn on the output. The setting has to be considered in the calibration and later in the EUT test. The ratio is also selectable in the generator parameters.



1 Generator

Select WF4 Cable Induction with the CN-GI-CI-V as Coupling Device. The correct output is indicated with a red LED.



The connection setup for SingleStroke and MultipleStroke is the same. The desired mode has to be selected in the generator menu.

2 CN-GI-CI-V

The output of the generator is connected with a 2m MC-cable to the 5 Turn input of the CN-GI-CI-V.

3 Measurement Equipment

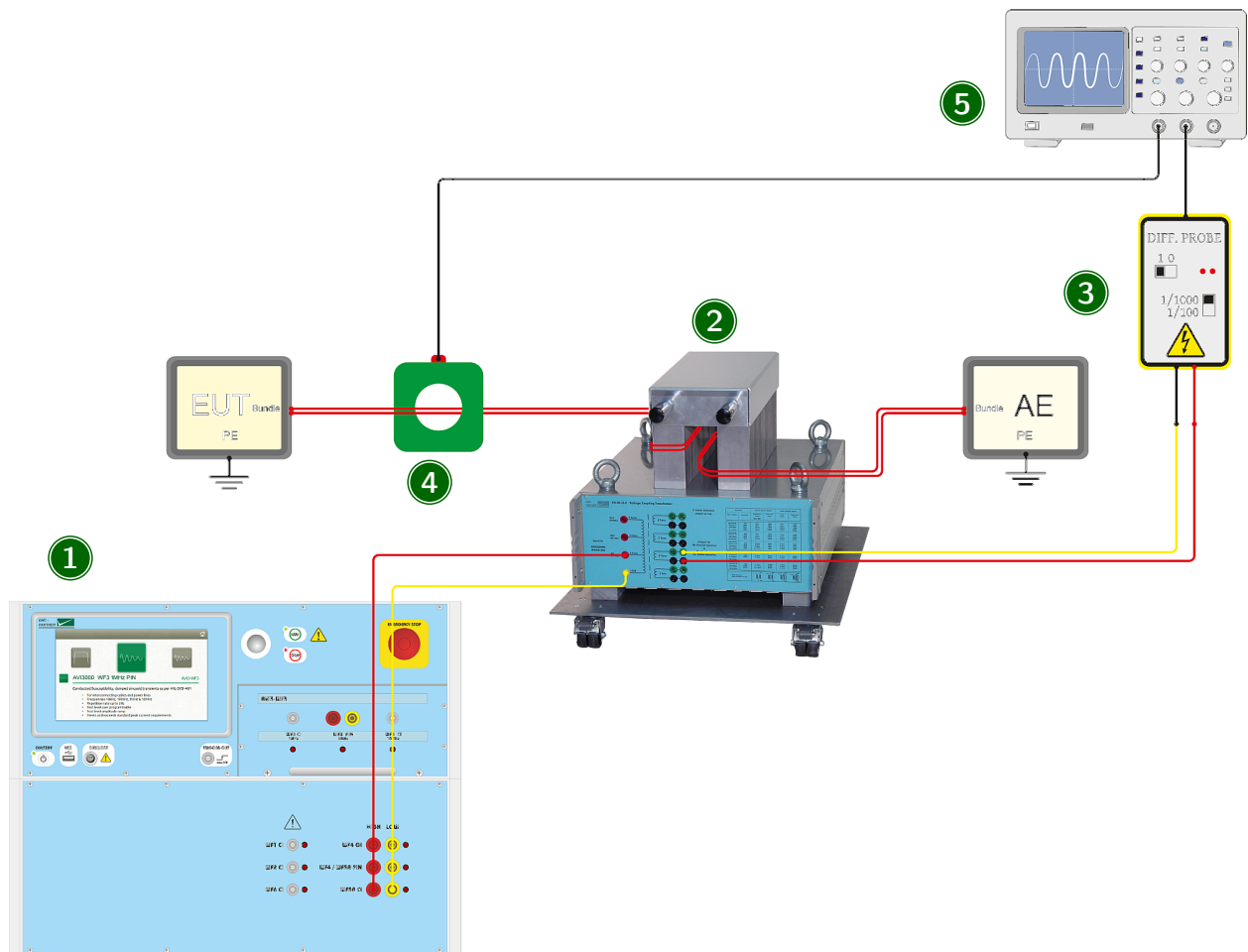
Use a HV-Differential probe to measure the open circuit voltage on the output. The current is measured with a current probe on the same output.

- Up to Level 2, the 1 Turn Output can be used
- Up to Level 3, the 2 Turn Output can be used

4 Oscilloscope

The oscilloscope must have a minimum bandwidth of 500 MHz.

4.6.2 EUT-Test



1 Generator

Select WF4 Cable Induction with the CN-GI-CI-V as Coupling Device. The correct output is indicated with a red LED.

2 CN-GI-CI-V

The output of the generator is connected with a 2m MC cable to the 5 Turn input of the CN-GI-CI-V. The cable bundle of the EUT is wound one or two times through the coupler.

3 Voltage monitor

During the test, the peak voltage must be monitored to ensure the amplitude does not exceed the test level. The pulse shape is not relevant.

4 Current monitor

Use a current probe to monitor the current during the test to ensure the peak does not exceed the limit level.

5 Oscilloscope

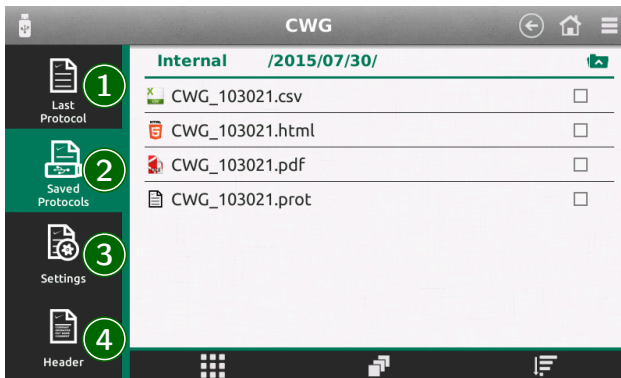
The oscilloscope must have a minimum bandwidth of 500 MHz.

5 Additional Software Features

5.1 Protocols

Select ≡ (General Menu) → Protocols

A protocol containing test parameters and results can be saved in the equipment. Additional information about the EUT and environment conditions can be added.



1 Last Protocol

Shows a preview of the latest protocol, even if Create Protocol is not selected. It will be overwritten by the next test.

2 Saved Protocols

All saved protocols are listed here in the selected formats. The internal file format *.prot can be converted to CSV, HTML and PDF. Select a protocol to open the file manager. Protocol files can be deleted, copied, moved individually or as blocks of files. For more information about the internal file manager see Section "File Manager".



Single protocol files are copied to a USB memory stick by selecting the file and choosing copy to USB from the menu. To copy multiple protocol files, select with the check box on the right side. When all files to be copied are marked, press Copy selection to USB from the left hand menu.

3 Settings

Select if and in which format the protocols should be stored. Basic storage format is for internal use. Stored protocols can be converted to other formats at any time.

Define the root directory for saving protocols. The default directory structure creates sub directories in the format <year>/<month>/<day>. The file itself is saved in the format specified in Save Name.

4 Header

Enter additional information about the EUT and the test environment. This data will be displayed together with the test results in the protocol.

5.2 Setup library

Select ≡ (General Menu) → Setups

A predefined EMCP test setup library is included in the equipment. User defined tests can also be stored internally or externally on a USB stick.



The EMCP Library is read only. It is possible to copy a test from the library to the user space and edit the copy.

5.2.1 Store setup



1 Create new setup

Configure a test setup in a new window. The current test in the generator will not be changed.

2 Save current setup

The currently configured test will be saved.

5.2.2 Load setups

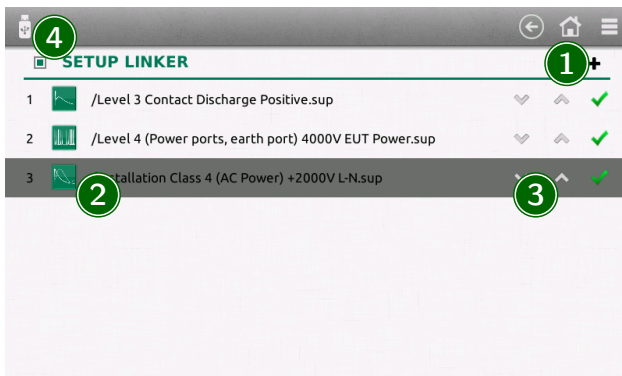
Choose between the EMCP Library with predefined setups, the user defined internal library or setups on the USB stick.

Select a setup, then choose load to configure the generator with the current setup.

5.3 Setup linker

Select ≡ (General Menu) -> Setup Linker

You can link up to 15 tests, saved internally to run concurrently.



1 Add a setup to the list

Existing setups can be added into the sequence from the library or a new setup can be created directly.

2 Edit the setup

Click on a setup to edit, modify or delete from the list. Setups are stored as a copy in the setup linker. Any change to parameters does not affect the source file in the library.

3 Change order

Use the up and down arrows to move a setup position in the sequence.

4 Activate

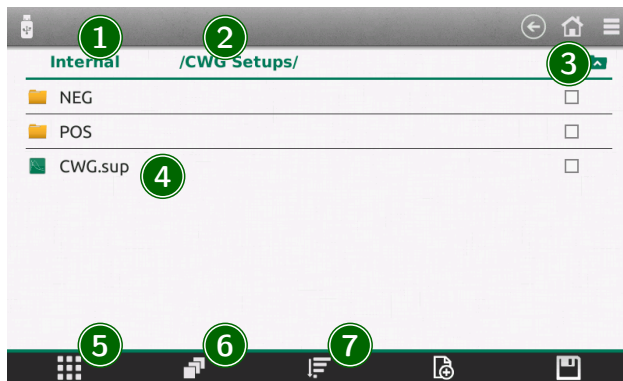
If checked, the setup linker is activated. Press run to start the linked tests.



A linked sequence cannot be saved internally. TEMA3000 Software provides a complete sequence generation package including DSO and other applications.

5.4 File manager

The generator has a powerful file manager. It is used for the setup library and the saved protocols.



1 Root directory

Files can be selected from the internal memory or, if connected, the USB memory stick

2 Selected path

Shows the current location in the file structure.

3 Path up

Select to move to a higher level in the file structure.

4 Current folder

Shows the content of the selected folder. Press and hold on the file name to open a menu enabling modification of the file (cut, copy, delete, rename).

5 Context menu

Opens a menu for different actions like create directories, copy, paste and delete multiple selected items.

6 Multiselect mode

To perform an action (copy, delete, move) on multiple files. Activate directly from this menu point or select the checkboxes behind each file.

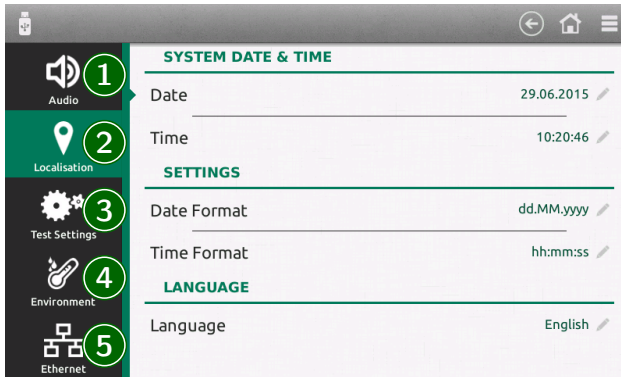
7 Sort

Files can be sorted by name, by date or by type.

6 Configuration

6.1 Settings

Select ≡ (General Menu) -> Settings



1 Audio

Volume and type of the different audio messages

2 Localisation

Set equipment time and date and the required format. This information will be included in the test report and file data.



The user interface is available in different languages. English (Default), German, French, Spanish, Italian, Chinese Traditional and Chinese Simplified. Additional languages can be provided on request. Please contact EMC PARTNER. All translations are made to the best of our knowledge and abilities, however, we cannot guarantee the correctness of all translations.

3 Test Settings

Behaviour of the generator during the test

- Generator can stop as soon as the EUT failed
- The generator can perform different tests from the setup linker
- During a running test changed parameters can be resetted when the test is over
- Unavailable tests due to missing hardware can completely be removed (instead marked with a gray icon)

4 Environment

Units for the internal temperature sensor can be selected between Celcius (°C), Fahrenheit (°F) and Kelvin (K). This information is included in the test protocols. This function is not available with all generators.

5 Ethernet

Depending on the network capability, the TCP/IP address information for the equipment can be obtained in different ways. If the network supports dynamic TCP/IP configuration using the Dynamic Host Configuration Protocol (DHCP), all address information can be assigned automatically. If the network does not support DHCP, or if the equipment is set to use alternate TCP/IP configuration, the address must be set manually. By default, the equipment is configured to use manual address.

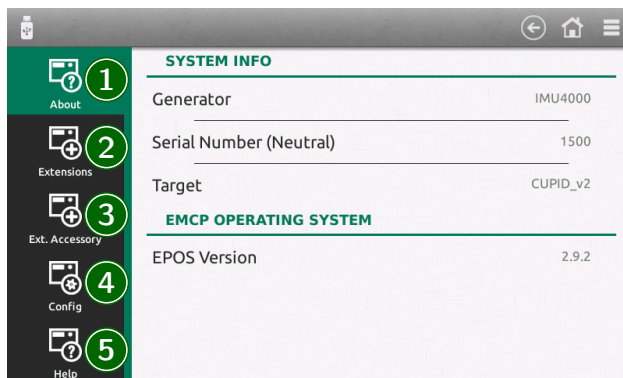


Risk of network errors

Connection errors can affect the entire network. If the network does not support DHCP, or dynamic TCP/IP configuration is disabled, assign a valid address information before connecting the equipment to the LAN. Contact the local network administrator to obtain a valid IP address.

6.2 Generator

Select ≡ (General Menu) -> Generator



1 About

Information about the generator (type, serial number) and the current version of the system software

2 Extension

Name, serial number and firmware version of all currently connected extensions (internal and external)

3 Ext. Accessory

Only external accessories available for connection to the test equipment are shown in this list. Any test requiring an external accessory will only be available to the user after correct selection has been made.

A further advantage is that only those accessories available to the test system will be shown.

Press "Change Accessories" and select all available items. This needs to be done only once when setting up test equipment for the first time.

4 Config

Save or restore the current configuration of the generator.

5 Help

A Factory reset will set the generator to the default configuration

Format SD card will delete all stored user information

Copy information to USB transfers different system information to a connected memory stick. This is useful for failure analysis. See chapter Service.

7 Accessories

There are accessories available to enhance the system capability for different applications. The following list is a short overview. For detailed information contact your local representative or EMC PARTNER directly.

V-PROBE-SI

Differential HV-Probe up to 7kV with a bandwidth up to 70MHz to measure all Waveforms of AVI3000 during calibration and test.

I-PROBE-MB-P1

Clamp on current monitor probe for maximum 5cm cable diameter and a bandwidth up to 15MHz. Suitable for current monitoring during test and waveform calibration.

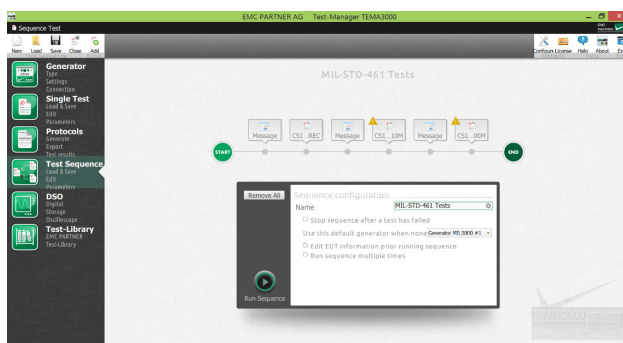
8 Remote Operation

The latest test protocols can be accessed quickly using the internal webserver. Access is through any common web browser and is totally independent of any operating system. In the web browser, enter only the address `http://<ip-address>`



The factory default IP address is 192.168.0.150

8.1 TEMA3000



Forward looking software suite designed to run on operating systems from Windows 7 and upwards. Graphic user interface with icons to simplify operation. Parameter entry through Remote EMC PARTNER Operating System (REPOS) interface reduces learning time for users familiar with the generator hardware. TEMA3000 base version includes generator remote control interface and single test capability, save and recall of files and a comprehensive help file. Test routines can be prepared in TEMA3000 and then uploaded into the generator in the test lab. Programming with the REPOS interface is exactly the same as sitting in front of a generator. Report generation in TEMA3000 base version is through the Web Server in the generator or the generator USB port.

Main features of TEMA3000 are

- Remote control of generator
- Save single tests
- Combine different tests to a test sequence with pictures about test setups and additional help for test operator
- Outstanding protocol features including export in different file formats
- Easy to use test library with hundreds of tests
- Seamless integration of your DSO

Get in touch with your local representative or directly with EMC PARTNER for more information about TEMA3000.



Go to www.emc-partner.com for a free software demo version.

9 Maintenance and Service

9.1 Firmware update

Keeping test instrumentation up to date is an important part of the product life cycle. EMC PARTNER makes continuous improvements to all products. This can be in the form of hardware changes or software changes. Software updates for all instruments are provided free of charge to existing customers. EMC PARTNER recommends to update the system regularly.

Online Update

Select ≡ (General Menu) -> Update

The easiest way if the generator is connected to the internet. If a newer version is available, the installation is made with a single click.

Update via USB

You can also download the newest version from www.emc-partner.com. Store the update file on a USB-Stick and transfer into the equipment via the USB port on the front panel. The update process starts automatically.



We recommend storing only one update file at a time on the USB-Stick



Do not switch off the generator during a firmware update

9.2 Maintenance

9.3 Cleaning

Cleaning the front and rear panels can be made with warm soapy water and a soft cloth. The display can be cleaned with a cleaning tissue. EMC PARTNER recommends that the air filter of the ventilator be cleaned from time to time. The cleaning cycle depends on the environmental conditions. Wash out the air filter of the ventilator in soapy water. The air filter must be dried before being reinstalled.

9.4 Warranty

EMC PARTNER's warranty is two years from date of invoice for manufacturing defects and one year from date of invoice for consumable parts, e.g. relays, capacitors, variac, connectors. During the warranty period it is EMC PARTNER's goal to repair the equipment within one working week at the service plant in Laufen, Switzerland. However, due to excessive work load or component supply deliveries this repair time may be extended. The warranty on demo equipment is limited in all cases to a maximum period of 2 years after delivery ex works (see EMC PARTNER Invoice date). For sales by sub-resellers or rental companies, the warranty will not be extended. Shipping expenses "Customer to EMC PARTNER " must be paid by customer or reseller. Return shipments "EMC PARTNER to Customer" are sent DAP delivery address using normal road transport for all destinations within Europe or CIP destination airport by airfreight through our house forwarder for all oversea shipments. Additional costs for express delivery must be borne by the customer. Return of EMC PARTNER's equipment for warranty repair is at the sole discretion of EMC PARTNER's Customer service department. An RMA number has to be requested from EMC PARTNER before sending any equipment back to Switzerland. EMC PARTNER reserves the right to reject or invoice repairs on equipment returned for repair without such authorization.

9.5 Customer Service

EMC PARTNER is an international organization with designated service centres in all major markets. When any of the following occur:

- Accessories or replacement parts are needed
- Questions arise that are not covered in the user manual
- The equipment must be recalibrated
- The equipment needs repairing

contact the local EMC PARTNER representative or service centre. If the local contact is not known, check the Internet site www.emc-partner.com and select contacts. If there is no local organization, contact EMC PARTNER headquarters in Switzerland. Our contact details are also given on the web site. Whenever further assistance is required, provide as much data as possible to help with a speedy solution. Service relevant information (System configuration, error logs, etc.) is collected by the equipment. This information can be very helpful in providing an early solution. Copy service information to a USB memory stick as follows:

- Plug in a USB stick
- Select ≡ (General Menu) → Generator
- In the tab Help select Copy to USB

The information is transferred to the root folder of the USB. Send file by e-mail to service@emc-partner.ch

10 Technical Data



All parameters of the different Waveforms are guaranteed up to DO160 Level3 or MIL-STD-461G CS117 internal (whichever is higher) in the defined calibration setup (open circuit or short circuit). AVI3000 can reach the test level or the corresponding limit level with every kind of load. To fulfill this condition, the programmable levels are higher than needed during calibration.

10.1 Max. Test Levels

Pin Injection		
WF3 1MHz	600V / 24A	Open Circuit / Short Circuit
WF4	300V / 60A	Open Circuit / Short Circuit
WF5A	300V / 300A	Open Circuit / Short Circuit
Cable Bundle Single Stroke		
WF1	600A / 300V	Test / Limit level
WF2	300V / 600A	Test / Limit level
WF3	600V / 120A	Test / Limit level
WF4	300V / 600A	Test / Limit level
WF5A	1000A / 300V	Test / Limit level
Ground Injection Single Stroke		
WF4	300V / 600A	Test / Limit level
Cable Bundle Multiple Stroke		
WF1	600A / 300V 150A / 150V	Test / Limit level
WF2	300V / 300A 150V / 150A	Test / Limit level
WF3	600V / 120V 300V / 60V	Test / Limit level
WF4	150V / 300A 75V / 150A	Test / Limit level
WF5A	1000A / 300V 200A / 75V	Test / Limit level
Ground Injection Multiple Stroke		
WF4	150V / 300A 75V / 150A	Test / Limit level
Cable Bundle Multiple Burst		
WF3	360V / 6A	Test / Limit level
WF6	30A / 600V	Test / Limit level

10.2 WF1 Cable Induction

Standard	DO-160 Section 22 MIL-STD-461G CS117	
Coupling Type	Cable Induction	
Level		
Single Stroke	25A - 900A	
Multiple Stroke	25A - 900A 20A - 300A	First Stroke Subsequent Strokes
Current		
Risetime	6.4us ±20%	
Duration	69us ±20%	
Voltage		
Risetime	<6.4us	
Duration	>6.4us	
Coupling Device	CN-BT7	

10.3 WF2 Cable Induction

Standard	DO-160 Section 22	
Coupling Type	Cable Induction	
Level		
Single Stroke	25V - 1600V	
Multiple Stroke	25V - 600V 25V - 300V +50% / -0%	First Stroke Subsequent Strokes
Voltage		
Risetime	<340ns	
Duration	6.4us ±20%	
Coupling Device	CN-BT7	

10.4 WF3 1MHz Pin Injection

Standard	DO-160 Section 22	
Voltage	100V - 700V +10% / -0%	
Current	4A - 28A +10% / -0%	
Impedance	250ohm	
Voltage		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Current		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Syncro	0-359° \pm 10°	
EUT		
max. Voltage	230V	
max. Frequency	800Hz	
Coupling Device	direct	

10.5 WF3 1MHz Cable Induction

Standard	DO-160 Section 22 MIL-STD-461G CS117	
Level		
Single Stroke	50V - 1900V	
Multiple Stroke	50V - 1900V	First Stroke
	50V - 1000V	Subsequent Strokes
Multiple Burst	50V - 700V	
Voltage		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Current		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Coupling Device	CN-BT7	

10.6 WF3 10MHz Cable Induction

Standard	DO-160 Section 22 MIL-STD-461G CS117	
Level		
Single Stroke	50V - 1100V	
Multiple Stroke	50V - 1100V	First Stroke
	50V - 1100V	Subsequent Strokes
Multiple Burst	50V - 800V	
Voltage		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Current		
Frequency	1MHz \pm 20%	
Damping	25% - 75%	First Peak to Fifth Peak
Coupling Device	CN-BT7	

10.7 WF4 Pin Injection

Standard	DO-160 Section 22	
Voltage	50V - 500V +10% / -0%	
Current	10A - 100A +10% / -0%	
Impedance	50hm	
Voltage		
Risetime	6.4us \pm 20%	
Duration	69us \pm 20%	
Current		
Risetime	6.4us \pm 20%	
Duration	69us \pm 20%	
Syncro	90° \pm 10°	positive Pulse
	270° \pm 10°	negative Pulse
EUT		
max. Voltage	230V	
max. Frequency	800Hz	
Coupling Device	direct	

10.8 WF4 Ground Injection

Standard	DO-160 Section 22	
Level		
Single Stroke	10V - 1600V	
Multiple Stroke	10V - 800V	First Stroke
	10V - 400V	Subsequent Strokes
Voltage		
Risetime	6.4us ±20%	
Duration	69us ±20%	
Current		
Risetime	<6.4us	
Duration	>69us	
EUT		
Bypass Current	max. 16A	
Coupling Device	direct	

10.9 WF4 Cable Injection

Standard	DO-160 Section 22	
Level Turn Ratio 5:1		
Single Stroke	10V - 300V	
Multiple Stroke	10V - 150V	First Stroke
	10V - 75V	Subsequent Strokes
Level Turn Ratio 5:2		
Single Stroke	10V - 600V	
Multiple Stroke	10V - 300V	First Stroke
	10V - 150V	Subsequent Strokes
Voltage		
Risetime	6.4us ±20%	
Duration	69us ±20%	
Current		
Risetime	<6.4us	
Duration	>69us	
Coupling Device	CN-GI-CI-V	

10.10 WF5A Pin Injection

Standard	DO-160 Section 22	
Voltage	50V - 500V +10% / -0%	
Current	50A - 500A +10% / -0%	
Impedance	10hm	
Current		
Risetime	40us ±20%	
Duration	120us ±20%	
Voltage		
Risetime	40us ±20%	
Duration	120us ±20%	
Syncro	90° ±10°	positive Pulse
	270° ±10°	negative Pulse
EUT		
max. Voltage	230V	
max. Frequency	800Hz	
Coupling Device	direct	

10.11 WF5A Cable Induction

Standard	DO-160 Section 22 MIL-STD-461G CS117	
Level		
Single Stroke	30A - 1800A	
Multiple Stroke	30A - 1800A	First Stroke
	20A - 390A	Subsequent Strokes
Current		
Risetime	40us ±20%	
Duration	120us ±20%	
Voltage		
Risetime	6.4us to 40us	
Duration	>6.4us	
Coupling Device	CN-BT7	

10.12 WF6

Standard	DO-160 Section 22 MIL-STD-461G CS117
Coupling Type	Cable Induction
Level	
Multiple Burst	2.5A - 75A
Current	
Risetime	250ns ±20%
Duration	4us ±20%
Coupling Device	CN-BT7

10.13 Multiple Stroke Timing

DO160 Pattern		
Pulses	1 First transient 14 Subsequent Transients	
Duration	<1.5s	
Spacing	10ms to 200ms	randomly
User defined pattern		
Pulses	1 First transient up to 30 Subsequent Transients	
Duration	20ms to 10s	
Spacing	10ms to 400ms	randomly

10.14 Multiple Burst Timing

DO160 Pattern		
Pulses	3 bursts with each 20 pulses	
Burst repetition	30ms to 300ms	randomly
Pulse spacing	50us to 1000us	randomly
User defined pattern		
Max. Pulses	60 500	WF6 WF3
Pulse Spacing	25us to 50000us	
Spacing	1ms to 10000ms	

10.15 AVI3000

Input Power		
Voltage	100V - 240V	
Frequency	50Hz - 60Hz	
Current	max. 4A	
Consumption		
Switched off	0VA	
Standby	<15VA	
Test running	max. 400VA	
Dimensions	60cm x 45cm x 37cm	l x h x w
Weight	50kg	
Environmental Conditions		
Temperature	20°C - 35°C	
Humidity	30% - 60%	non condensing
Pressure	860hPa - 1060hPa	
System		
Display	7" Touch 640 x 400px VGA	
Internal memory	8GB	
Connections		
USB	Typ A Plug	
LAN	RJ45 10/100 BaseT	
EXT. Trigger Input	BNC	max. 24V
EUT Fail Input	BNC	max. 24V
Warning Lamps	24V / max. 2.4W	
Safety	Emergency Stop Safety Circuit	
Control Ports	2 x RS485	

10.16 CN-BT7

max. EUT Current	16A 32A 32A	WF2 / up to 800Hz WF2 / up to 400Hz all other Waveforms up to 800Hz
Turn-Ratio	1:1	
Dimension	34cm x 18cm x 21cm	l x h x w
Aperture	5.5cm x 8cm	
Weight	18kg	

10.17 CN-GI-CI-V

max. EUT Current	10A	WF4 @ 800Hz
	20A	WF4 @ 400Hz
	32A	WF4 @ 50/60Hz
Turn-Ratio	5:2	up to Level 3
	5:1	up to Level 2
Dimension	65cm x 53cm x 50cm	l x h x w
Aperture	6cm x 12cm	
Weight	190kg	

10.18 SHUNT0E1

Dimension	12cm x 2.5cm x 2.5cm	l x h x w
Weight	0.15kg	

11 Appendix

11.1 Recycling / Disposal

RoHS directive 2011/65/EU

The system complies with the directive 2011/65/EU (RoHS - Restriction of certain Hazardous Substances). From December 2005, all EMC PARTNER products either hand soldered or by machine are produced using lead-free solder.

WEEE directive 2012/19/EU

The system is exempted from the directive 2012/19/EU (WEEE) under category 9. The product should be recycled through a professional organization with appropriate experience for the disposal and recycling of electronic products. EMC PARTNER is also available to help with questions relating to the recycling of this product.

Dismantling

There is no special danger involved in dismantling.

Parts which can be recycled

The system contains parts made from steel, aluminium, PVC, two-component sealing compound. The impulse capacitors are filled with non-poisonous mineral oil. The various parts can be separated and recycled.

Parts which cannot be recycled

None