V-TEST II
SPD component tester

Manual

Weidmüller

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General

Meaning of symbols

	**Dangerous voltage!** Danger to life or risk of serious injury. Disconnect system and instrument from power supply before beginning work.

	**Caution!** Please follow the documentation. This symbol warns of possible dangers that can arise during installation, commissioning and use.

	**Note!**

Safety

de **Sicherheitshinweise**

Das Gerät darf nur von einer Elektrofachkraft in Betrieb genommen und gewartet werden, die mit den nationalen und internationalen Gesetzen, Vorschriften und Standards vertraut ist.

GEFAHR

Gefahr des elektrischen Schlags
Die Kontakte des Prüfadapters führen während des Prüfvorgangs Hochspannung!
► Verwenden Sie das Gerät nicht in der Nähe von explosiven Gasen, Dämpfen oder in feuchter Umgebung.
► Drücken Sie die Taste „TEST“ nur dann, wenn alle 3 Steckplätze des Prüfadapters bestückt sind (1 Prüfling und 2 Leergehäuse).

VORSICHT

Gefahr durch spannungsführende Teile
► Verwenden Sie keine beschädigten Messleitungen.
► Verbinden Sie die Messleitungen zuerst mit dem Prüfadapter. Schließen Sie erst danach die Messleitungen an das Gerät an.
► Schließen Sie die Messleitungen niemals an spannungsführende Leitungen an.
► Achten Sie immer darauf, dass alle 3 Steckplätze des Prüfadapters bestückt sind (1 Prüfling und 2 Leergehäuse).
► Stecken Sie keine fremden Gegenstände in die Kontaktbuchsen des Prüfadapters.

ACHTUNG

- Verwenden Sie das Gerät nur zum bestimmungsgemäßen Gebrauch.
- Das Gerät darf nicht verwendet werden, wenn es beschädigt ist oder andere Mängel aufweist.
- Das Gerät darf nicht geöffnet, verändert oder umgebaut werden.
- Verwenden Sie nur die angegebenen Ersatzteile und Zubehörteile.
- Verwenden Sie nur die mitgelieferten Messleitungen.
- Verwenden Sie die Messleitungen nur zusammen mit dem mitgelieferten Prüfadapter.
- Ersetzen Sie den Prüfadapter (Bestellnummer 2661050000), wenn der Aufkleber beschädigt ist.

Das Gerät besitzt eine doppelte oder verstärkte Isolierung in den Bereichen, die gefährliche Spannung führen.
Das Gerät wird mit einem Prüfadapter ausgeliefert. Der Prüfadapter ist mit 3 Leergehäusen bestückt, die als Platzhalter (Dummy-Ableiter) dienen.

Safety instructions

The device must only be put into operation and maintained by qualified electricians who are familiar with national and international laws, provisions and standards.

DANGER

Risk of electric shock
The contacts of the test adapter carry high voltage during the test procedure!
- ► Do not use the device near explosive gases, vapours or in a humid environment.
- ► Only press the “TEST” button if all 3 slots of the test adapter are occupied (1 test object and 2 empty enclosures).

CAUTION

Risk from live parts
- ► Do not use damaged test leads.
- ► First connect the test leads to the test adapter. Then connect the test leads to the device.
- ► Never connect the test leads to live cables.
- ► Always make sure that all 3 slots of the test adapter are occupied (1 test object and 2 empty enclosures).
- ► Do not insert any foreign objects into the contact sockets of the test adapter.

NOTICE

- Only use the device for its intended purpose.
- The device must not be used if it is damaged or other defects have been identified.
- The device must not be opened, modified or converted.
- Use only the specified spare parts and accessories.
- Use only the supplied test leads.
- Use the test leads only together with the supplied test adapter.
- Replace the test adapter (order number 2661050000) if the label is damaged.

The device has double or reinforced insulation in areas where dangerous voltages are present. The device is supplied with a test adapter. The test adapter is equipped with 3 empty enclosures, which serve as placeholders (dummy arresters).

(fr) **Consignes de sécurité**

Seuls des électriciens qualifiés et connaissant bien les lois, dispositions et normes nationales et internationales peuvent mettre en service et entretenir l'appareil.

DANGER

Risque de choc électrique
Pendant la procédure de test, les contacts de l'adaptateur de test sont soumis à une tension élevée !
- ► Ne pas utiliser l'appareil près de gaz explosifs, de vapeurs ou dans un lieu humide.
- ► N'appuyez sur la touche « TEST » que si chacun des 3 emplacements de l'adaptateur de test sont occupés (1 élément testé et 2 boîtiers vides).

ATTENTION

Danger dû aux pièces sous tension
- ► Ne pas utiliser des fils d'essai endommagés.
- ► Connecter d'abord les fils d'essai à l'adaptateur de test. Puis connecter les fils d'essai à l'appareil.
- ► Ne jamais connecter les fils d'essai aux câbles sous tension.
- ► S'assurer toujours que les 3 connecteurs de l'adaptateur de test sont occupés (1 élément testé et 2 boîtiers vides).
- ► Ne pas introduire de corps étrangers dans les contacts femelles de l'adaptateur de test.

AVIS

- Utiliser l'appareil uniquement pour l'usage prévu.
- L'appareil ne doit pas être utilisé si des dommages ou d'autres défauts sont constatés.
- Il est interdit d'ouvrir, de modifier ou de transformer l'appareil.
- Utiliser uniquement les pièces de rechange et les accessoires spécifiés.
- Utiliser uniquement les fils d'essai fournis.
- Utiliser les fils d'essai uniquement avec l'adaptateur de test fourni.
- Remplacer l'adaptateur de test (référence 2661050000) si la plaquette de marquage est endommagée.

L'appareil dispose d'une isolation double ou renforcée là où des tensions dangereuses sont présentes.
L'appareil est fourni avec un adaptateur de test. L'adaptateur de test est équipé de 3 boîtiers vides, servant d'emplacements (parafoudres factices).

(it) Indicazioni di sicurezza

Il dispositivo deve essere messo in funzione e sottoposto a manutenzione esclusivamente da elettricisti qualificati che conoscano le leggi, disposizioni e le norme nazionali e internazionali.

PERICOLO

Rischio di scossa elettrica
Durante la procedura di test i contatti dell'adattatore di prova sono sottoposti a tensione elevata!
► Non utilizzare il dispositivo in prossimità di gas o vapori esplosivi o in un ambiente umido.
► Premere il pulsante "TEST" unicamente se tutti e 3 gli slot dell'adattatore di prova sono occupati (1 oggetto da testare e 2 custodie vuote).

ATTENZIONE

Pericolosità dei componenti sotto tensione
► Non utilizzare puntali di prova danneggiati.
► Per prima cosa collegare i puntali di prova all'adattatore di prova. Quindi collegare i puntali di prova al dispositivo.
► Mai collegare i puntali di prova a cavi sotto tensione.
► Assicurarsi sempre che tutte e 3 le fessure dell'adattatore di prova siano occupate (1 oggetto da testare e 2 custodie vuote).
► Non inserire corpi estranei nelle prese di contatto dell'adattatore di prova.

AVVISO

- Utilizzare il dispositivo esclusivamente per gli scopi previsti.
- Il dispositivo non deve essere utilizzato se è danneggiato o se sono stati identificati altri difetti.
- Non aprire, modificare o alterare l'apparecchio.
- Utilizzare esclusivamente i ricambi e gli accessori indicati.
- Utilizzare esclusivamente i puntali di prova forniti.
- Utilizzare i puntali di prova esclusivamente con l'adattatore di prova fornito.
- Sostituire l'adattatore di prova (n. cat. 2661050000) qualora l'etichetta fosse danneggiata.

Il dispositivo presenta un isolamento doppio o rinforzato nelle aree in cui sono presenti tensioni pericolose.
Il dispositivo è fornito di adattatore di prova. L'adattatore di prova include 3 custodie vuote che servono da segnaposti (scaricatori ciechi).

(es) Indicaciones de seguridad

Únicamente deben llevar a cabo la puesta en servicio y el mantenimiento del dispositivo electricistas cualificados familiarizados con las normas, leyes y disposiciones nacionales e internacionales.

PELIGRO

Riesgo de descarga eléctrica
Tenga en cuenta que los contactos del adaptador de prueba pueden conducir alta tensión durante el procedimiento de prueba!
- ► No utilice el dispositivo cerca de vapores o gases explosivos ni en entornos húmedos.
- ► Pulse el botón “TEST” solo si las 3 ranuras del adaptador de prueba están ocupadas (1 objeto de prueba y 2 carcasas vacías).

ATENCIÓN

Peligro por piezas conductoras de tensión
- ► No utilice cables de prueba dañados.
- ► En primer lugar, conecte los cables de prueba al adaptador de prueba. A continuación, conecte los cables de prueba al dispositivo.
- ► Nunca conecte los cables de prueba a cables con carga eléctrica.
- ► Asegúrese siempre de que las 3 ranuras del adaptador de prueba estén ocupadas (1 objeto de prueba y 2 carcasas vacías).
- ► No introduzca objetos extraños en los conectores de contacto del adaptador de prueba.

AVISO

- Utilice el dispositivo solo para el propósito para el que fue diseñado.
- El dispositivo no se debe utilizar si está dañado o si se han detectado otros defectos.
- El dispositivo no se podrá abrir, modificar ni convertir.
- Utilice solo los accesorios y las piezas de repuesto especificadas.
- Utilice solo los cables de prueba suministrados.
- Utilice solo los cables de prueba con el adaptador de prueba suministrado.
- Sustituya el adaptador de prueba (número de pedido 2661050000) si la etiqueta presenta daños.

El dispositivo cuenta con aislamiento doble o reforzado en áreas en las que se registran tensiones peligrosas.
El dispositivo se suministra con un adaptador de prueba. El adaptador de prueba dispone de 3 carcasas vacías que pueden utilizarse como referentes (descargadores ficticios).

(zh) **安全规程**

设备必须由具备资质的、熟悉国内国际法律、规定和标准的专业电气技术人员进行操作和维护。

危险

电击的危险
在测试过程中，测试用适配器的端头带有高电压！
► 请勿在爆炸性气体、蒸汽附近或潮湿环境中使用设备。
► 只有在测试用适配器的所有 3 个插槽都被占用时才能按“TEST”键（1 个测试对象和 2 个空接线盒）。

注意

带电部分危险
► 请勿使用损坏的测试引线。
► 首先请将测试引线连接至测试用适配器。然后将测试引线连接至设备。
► 切勿将测试引线连接至带电的电缆。
► 始终确保测试用适配器的所有 3 个插槽均被使用（1 个测试样本和 2 个空接线盒）。
► 请勿将任何外来对象插入到测试用适配器的接触插座中。

注意

- 该设备仅可用于其既定用途。
- 如果设备损坏或发现了其他缺陷，则不得使用该设备。
- 设备不得打开、修改或改装。
- 仅可使用规定的备件和附件。
- 仅可使用随附提供的测试引线。
- 测试引线仅可与随附提供的测试用适配器一同使用。
- 如果标签已损坏，请更换测试用适配器（订购号 2661050000）。

设备在存在危险电压的区域采用了双重或加强绝缘。
设备配有测试用适配器。测试用适配器配有 3 个用于占位的空接线盒（虚设放电管）。

SPD component tester

Intended use

The “V-TEST II” is a test instrument for electronic surge protection components (SPD component tester), such as gas discharge tubes (GDTs), metal oxide varistors (MOVs) and transient voltage suppressor diodes (TVS diodes).
The surge protection component can be analyzed as part of an overvoltage protection device.
The “V-TEST II” is suitable for Weidmüller surge protection devices of the “VPU AC” series. The built-in surge protection component is connected to the test instrument with the test leads and the test adapter.

The SPD component tester is a portable, battery operated, instrument with integrated battery charger and housed in a robust ergonomic enclosure. The instrument features a 320 x 240 pixel TFT color display with touch screen user interface.

Unpacking the instrument

The standard product is supplied with the following items:

- Instrument V-TEST II
- Test adapter
- Test leads
- 3x dummy arresters
- 5x AA NiMH batteries, 1.2 V, 2450 mAh
- 12 V DC multi-system power adapter, 100...240 V AC, 2000 mA
- LCD touch screen stylus
- This manual (2661740000)

If the product is damaged or an item is missing, please contact the place of purchase immediately.

First use!
It is recommended that battery be fully charged before its use. This is accomplished by inserting the 5x AA NiMH batteries provided into the battery compartment and connecting the AC charger to the instrument for 14 hours before using the instrument. The **Battery screen** provides information of the status of the instrument battery (refer to **Battery Monitoring** section).

Indicators, connections and controls

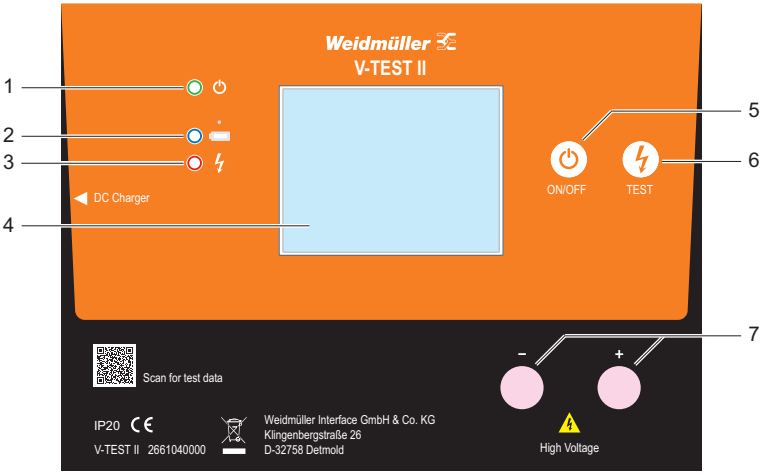


Figure 1: Front view of instrument.

1. Operating status LED (green) – pulses to indicate instrument is alive.
2. Battery status LED (blue) – illuminates when battery is completely flat (< 1.12 V/cell) and requires recharging.
3. High voltage LED (red) – illuminates when high voltage is present at the output terminals during a measurement.
4. TFT LCD display with resistive touch panel.
5. **ON/OFF** button – press briefly to switch instrument on or off.
6. **TEST** button – to take a measurement.
7. Output terminal connections.

⚠	High voltage are present at these terminals (refer to **Safety** section).

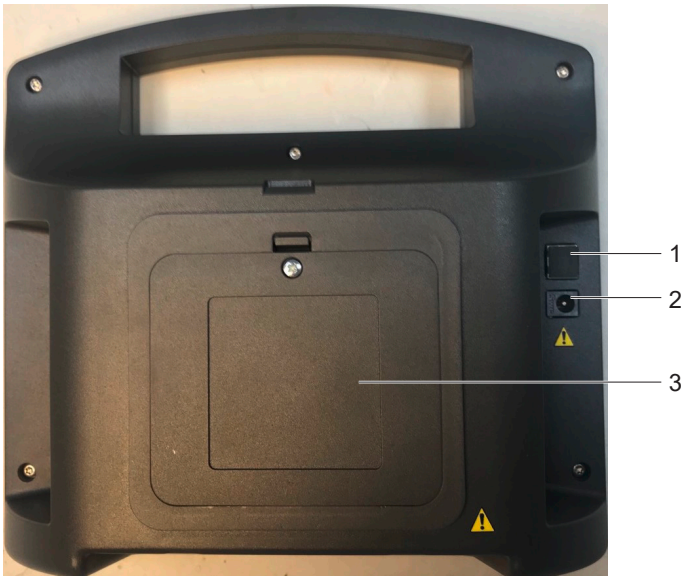


Figure 2: Rear view of instrument.

1. USB: for factory use and used during firmware update.
2. DC power supply input: 12 V DC, 2000 mA.

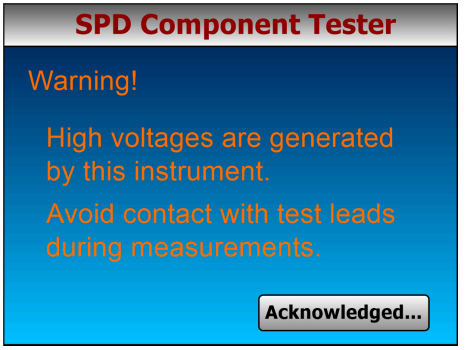
⚠	The unit is charged by external power supply (refer to **Safety** section). Only use the DC power supply provided.

3. Battery compartment: 5x AA NiMH batteries, 1.2 V, 2450 mAh.

⚠	Do not use non rechargeable batteries (refer to **Safety** section).

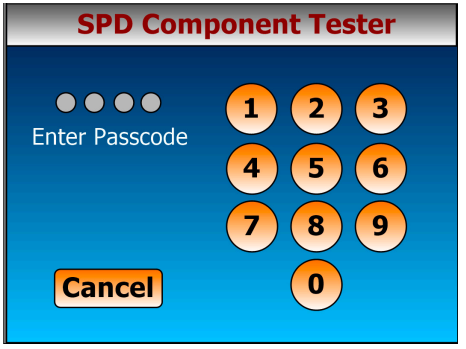
User displays, menu structure and navigation

Splash screen



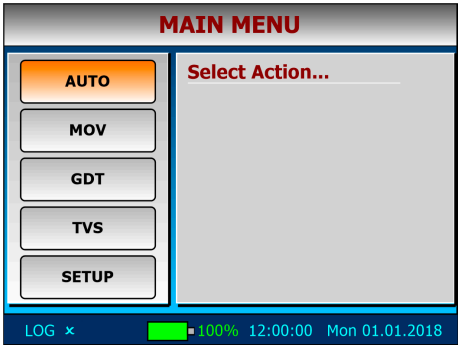
The **Splash screen** is used to greet the user and provide important safety information. The user is required to read the information and by clicking the **Acknowledged...** button is signifying that the potential hazard is understood and that precautions indicated will be followed (refer to **Safety** section).

Passcode screen



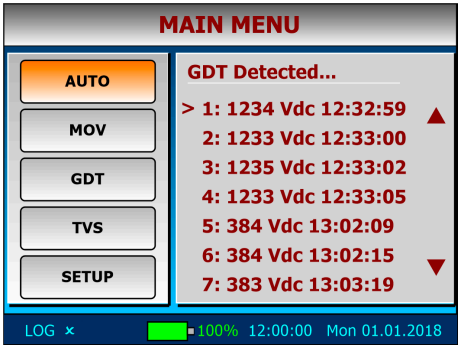
The passcode is used to unlock the instrument to prevent unauthorized use. On first use of the instrument before any user options have been configured, the **Passcode screen** is displayed to the user. The default passcode is 1_2_3_4. This code can be changed in the **Set Passcode** menu (refer to **Change passcode screen** section). If the passcode is forgotten, the unit can be restored to its user commissioning state where the passcode will be reset to the default (refer to **Restoring factory defaults** section).

Main screen



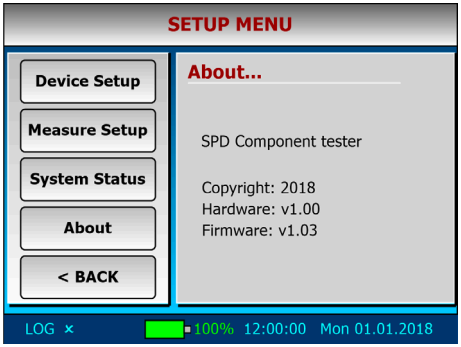
The **Main screen** comprises four display panels. On the left is the buttons panel where the user selects various actions by clicking the required button. On the right is the output panel, where results of measurements are displayed. At the top is the title panel, where menu navigation information is displayed, and at the bottom is the footer panel where status information, such as the time and date, the condition of the battery, whether the AC ~ mains is plugged in, and whether the instrument is set to **Log Measurement** mode or not.

Log screen



The **Log screen** is displayed when the instrument is set to **Log Measurement** mode. This is done by clicking the **LOG** option in the footer panel. A check ✓ indicates this mode has been activated. If the **LOG** mode is active, the instrument will display successive measurement readings and allow the user to scroll backwards and forwards through the list. Up to 50 successive readings are logged before the list is overwritten, oldest reading first. The **LOG** mode is useful when the user is wishing to batch-test, or compare results between various surge protective components (SPCs) or surge protective devices (SPDs).

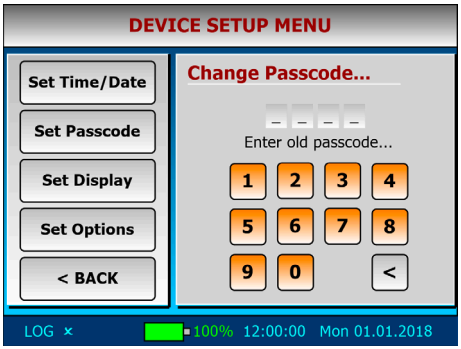
About screen



The **About screen** provides information about the instrument manufacturing build.

If the firmware is updated, this will be reflected in the firmware version shown.

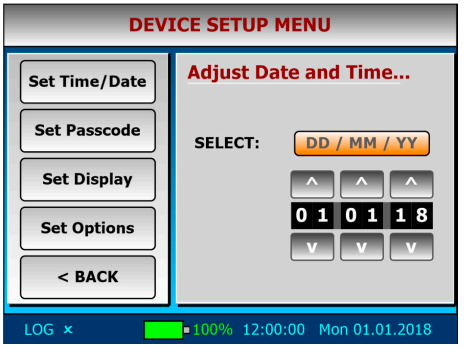
Change passcode screen



The **Change passcode screen** allows the user to change the passcode required to unlock the instrument on startup.

The requirement that a passcode be entered in order to allow access to the instrument can be turned on or off in the **DEVICE SETUP MENU** (refer to **Options screen** section).

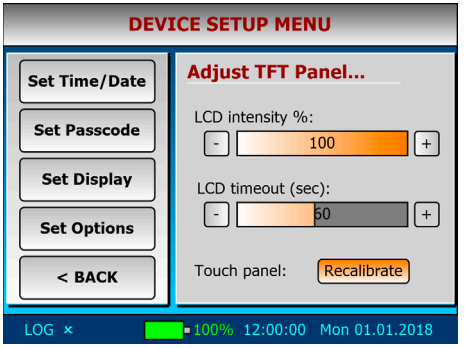
Time/Date screen



The **Time/Date screen** allows the user to set the time and date. Start by clicking the **DD/MM/YY** button. This will toggle between **DD/MM/YY** and **HH:MM:SS** setting. The up/down arrows are used to adjust each digit of the time or date.
On exiting the screen, the time and date will be stored and maintained when instrument is powered off.

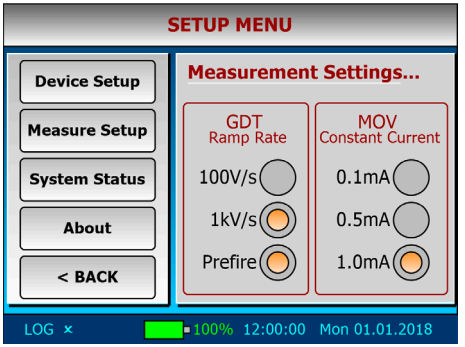
The real time clock uses an internal battery to maintain the time and date settings. The condition of this battery is checked each time the instrument is started, and the user informed if replacement is required (refer to **Replacing clock battery** section).

Display screen



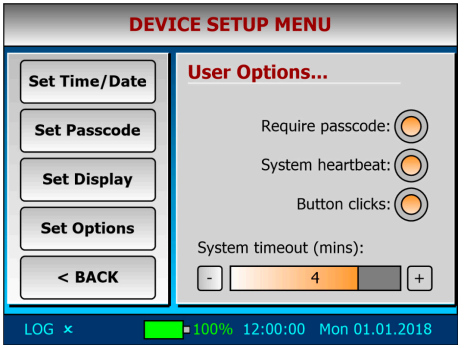
Adjustment of the TFT LCD panel settings is possible in the **Display screen**. The intensity of the LCD backlight can be set between 0...100 %.
Setting the LCD determines the time after user inactivity when the display turns off to conserve battery power. This can be set from 10...120 s. Moving the slider completely to the right turns off the LCD timeout function. The **Recalibrate** button allows the user to recalibrate the touch panel display coordinates should this become necessary.

Measurement screen



The **Measurement screen** is where the user selects the rate of voltage ramp (ramp rate) used in the testing of gas discharge tubes, and the constant current used in the testing of metal oxide varistors and avalanche breakdown diodes. It is sometimes important during the measurement of GDTs to stimulate the gas inside before taking a measurement. The GDT **Prefire** setting allows this feature to be turned on. In this mode, the GDT will be fired three times before the measurement is recorded. These settings are retained for when the instrument is next used after a power down.

Options screen

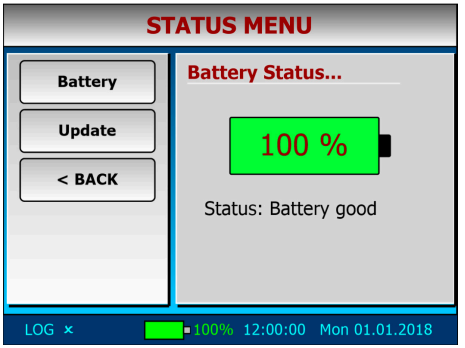


The **Options screen** is where various user preferences can be configured. These include whether:

- A passcode is required to access the instrument.
- The system heartbeat (blinking green LED on front of the instrument) is required.
- A sound is required each time a button or control on the LCD is touched.

The **System timeout** slider allows the user to configure the inactivity timeout from 1 to 5 minutes in minute increments. If no button or touch control has been activated within the assigned time, the instrument will enter an automated shut-down (refer to **Power off** section).

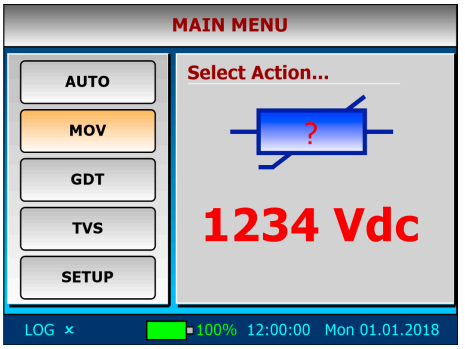
Battery screen



The **Battery screen** provides information of the status of the instrument battery (refer to **Battery monitoring** section). The battery icon shows either the % remaining, or the of AC ~ symbol if the DC charger is connected. The battery icon is color-coded to depict the battery condition:

- Gradient green: charging
- Green: fully charged
- Orange: needs charging
- Red: flat

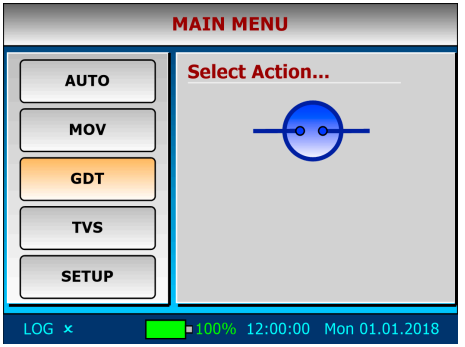
MOV screen



The **MOV screen** is where the clamp voltage of the MOV under test (or SPD surge protector) is displayed. The measurement is performed by pressing the **TEST** button on the front of the instrument. The constant current setting used is configured in the **Measurement screen**.

If the **LOG** mode is switched on, the measured value can be read directly on the **Log screen**.

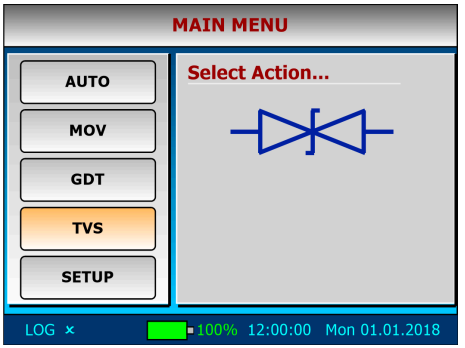
GDT screen



The **GDT screen** is where the firing voltage of the GDT under test is displayed. The measurement is performed by pressing the **TEST** button on the front of the instrument. The rate of voltage ramp in V/s used in this measurement is configured in the **Measurement screen**.

If the **LOG** mode is switched on, the measured value can be read directly on the **Log screen**.

TVS screen



The **TVS screen** is where the clamp voltage of the TVS device under test (or SPD surge protector) is displayed. The measurement is performed by pressing the **TEST** button on the front of the instrument. The constant current setting used is configured in the **Measurement screen**. The only difference between the TVS and MOV modes is that the possible voltage at the test leads is limited to 200 V in the TVS mode, while in the MOV mode a maximum of 1500 V DC is possible to drive the required constant current.

If the **LOG** mode is switched on, the measured value can be read directly on the **Log screen**.

Using instrument

Power on

With instrument in its off state, momentarily depress the **ON/OFF** button on the front panel to turn the instrument on.
Enter the passcode (if **Require passcode** option is enabled in the **Set Options** menu) and click the **Acknowledge...** button in the **Splash screen** signifying that the warning message has been read (refer to **Safety** section).
At the **Main screen** the Welcome prompt will be displayed along with information such as the date and time when the instrument was last used, and a prompt to replace the clock battery if it is found to be low (refer to **Replacing clock battery** section).

Power off

With instrument in its on state, momentarily depress the **ON/OFF** button on the front panel to put the instrument into its powering down sequence, during which it will perform an orderly shutdown and save various user configurations settings, and show the message “Shutting Down, please wait...”.

In the event of an abnormal lock-up of the instrument or its firmware, the unit can be forced into a hardware power down by depressing the **ON/OFF** button and holding it depressed until the unit switches off after a few seconds.

Restoring factory defaults

When instrument is started for the first time, it enters its user commissioning mode where factory defaults are loaded. It may also be forced to enter this mode if the user depresses the **TEST** button on the front panel at the same time the **ON/OFF** button is pressed to power up the instrument.

During the user commissioning phase, the following factory defaults are restored:

Date/Time defaults

Time hh:mm:ss	12:00:00
Date wdy dd-mm-yyyy:	Thu 01:01:2015

Measurement defaults

MOV constant current:	1 mA
GDT ramp rate:	1 kV/s
Prefire GDT:	ON

LCD defaults

Backlight intensity:	100 %
Backlight:	ON
Backlight timeout:	60 s

User options defaults

Default passcode:	1_2_3_4
Passcode required:	YES
System heartbeat:	YES
Button clicks:	YES
System inactivity timeout:	5 mins
LOG mode:	OFF (**x**)

User commissioning

Step 1 Touch panel calibration:
The user is requested to 'touch' using the stylus on the top right-hand corner of the frame, and then again on the bottom left-hand corner. If the touch is within expected limits, the coordinates are accepted and the display calibrated accordingly.

Step 2 Instrument self-calibration:
Please follow the instructions to first remove the test leads from the front terminal sockets and then press the **Continue...** button.
The red high voltage LED will briefly illuminate, indicating that high voltage is being produced at the terminals. Internal calibration is now complete.

Step 3 Observe the **Splash screen** warning – clicking the **Acknowledge...** button to signify that the warning has been read and the potential hazard is understood.

Step 4 Enter the default passcode 1_2_3_4 to unlock the instrument.

The instrument enters the **Main screen** and the blue LED extinguishes. The user can now proceed to customize the instrument in the **Device Setup** and **Measure Setup** menus.

Device setup

From the **Main screen** navigate to: **SETUP** / **Device Setup**

The **DEVICE SETUP MENU**, allows the user to select one of the following sub-menus:
- **Set Time/Date**
- **Set Passcode**
- **Set Display**
- **Set Options**

Click the **< BACK** button to return to the **Main screen**.

Measure setup

From the **Main screen** navigate to: **SETUP** / **Measure Setup**

The **Measurement Settings...** menu, allows the user to select one of the following sub-menus:
- set **GDT Ramp Rate**
- set **MOV Constant Current**

Click the **< BACK** button to return to the **Main screen** (refer to **Measurement screen**).

System status

From the **Main screen** navigate to: **SETUP** / **System Status**

The **System Status** menu, allows the user to select one of the following sub-menus:
- **Battery**
- **Update**

Click the **< BACK** button to return to the **Main screen**.

About instrument

From the **Main screen** navigate to: **SETUP** / **About**

Displays information about the instrument including:
- Model
- Copyright
- Hardware version
- Firmware version

Click the **< BACK** button to return to the **Main screen**.

Battery monitoring

The battery voltage is continuously monitored by the instrument and displayed by way of the battery icon on the display footer.
If the battery charger is plugged in (signified by AC ~), the battery is being maintained in a charged state. The charger automatically regulates as the battery condition determines, between a fast charge stated (gradient green battery icon) and a trickle charge state (solid green battery icon).
If the instrument is running on battery power, the battery icon will indicate its percentage capacity in the range from 0...100 %. In addition, the icon will be colored to indicate the battery condition as:
- Green: fully charged (> 1.18 V/cell).
- Orange: requires recharging (1.14 V < Bat < 1.18 V).

  In this condition the instrument may yield inaccurate results when measuring MOV components which clamp above 900 V DC, or GDT components which fire above 1000 V DC.

- Red: completely flat (< 1.12 V/cell). The blue battery LED on the front of the instrument will illuminate.

⚠	To avoid false readings, recharge the batteries as soon as the battery icon appears is orange.

Measuring

Auto / Manual measurement mode

Measurements of surge protective components (SPCs) or surge protective devices (SPDs) can be performed in one of two ways with this instrument – using the auto mode or using the manual mode. The auto mode is selected by clicking the **AUTO** button on the button panel.
When in auto mode the instrument attempts to carry out an auto-detection of the type of SPC or SPD connected, and configures itself to measure such device accordingly.
If a GDT component (voltage-switching device) is detected, it will configure itself into the voltage ramp mode. The measurement is performed by ramping the voltage across the component until it fires (also known as avalanche, breakdown, spark-over or crowbar). The peak voltage reached before breakdown is displayed on the output panel. The rate of voltage ramp applied is setup in the **Measure Setup** menu (refer to **Measurement screen** section).

- During measurement unit has to be disconnected from any power supply. Protective device must also be disconnected from power supply and must not be grounded.
- During measurement of the protective device, USB port must not be used.

If an MOV or TVS component (voltage-limiting device) is detected, it will configure itself into the constant current mode. The measurement is performed by driving a fixed constant current through the device and recording what voltage appears across the device (often referred to as the clamping voltage). The clamping voltage is displayed on the output panel. The constant current applied is setup in the **Measure Setup** menu (refer to **Measurement** screen section).

The manual mode allows the user to override auto-detection and specifically select the type of component or device being tested. This is done by clicking the **MOV**, **GDT** or **TVS** buttons on the button panel. The selection is indicated by shading the relevant button orange.
In general, the auto mode is more convenient where the SPD consists of a single protection component, or when multiple protection components of the same kind are used – for example, an SPD where the internal protection components are all MOVs. When a mix of technologies is used, such as in a so-called combination-type SPD where an MOV and GDT may be connected in series, it is generally better to use the manual mode, thereby having control over the instrument to enforce either a constant current, or a voltage ramp in performing the measurement.

In either manual mode or auto mode the instrument will display the unknown SPD Icon with either the word ‘Open’ or ‘Short’ if it encounters either an open-circuit or short-circuit path respectively. Under such condition, please check the lead set is correctly plugged into the instrument and connections to the device or component under test is secure.

Measuring MOVs

To measure an MOV component (Varistor), or an SPD comprising several metal oxide varistor internally:

Step 1 Decide if using the auto or manual detection mode by pressing either the **AUTO** button or the **MOV** button respectively.

Step 2 Set the required constant current for the measurement (refer to **Measurement screen** section). The current used can be selected from one of 0.1 mA, 0.5 mA, 1.0 mA.

It is normal to define the clamping voltage of an MOV as Un @ 1 mA DC, so typically the 1.0 mA setting is the default option.

Step 3 If desired, enable the **Log Measurement** mode **LOG** mode (refer to **Log screen** section). A check ✓ in the footer panel indicates this mode has been activated.

Step 4 Press the **TEST** button on the front panel of the instrument. The red high voltage LED will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets (refer to **Safety** section).

Step 5 The measured values will be displayed on the output panel.
Compare the measured values with the given table values in the chapter “Surge protection products from Weidmüller”.
The MOV component is defective if the measured value is outside of the minimum to maximum range given.

For more information on measurement of MOV components, the user is referred to:
IEC 61643-331 Components for low-voltage surge protective devices – Part 331: Specification for metal oxide varistors (MOV).

Measuring TVSs

Transient Voltage Suppressors (TVS), also called Avalanche Breakdown Decides (ABDs), are tested in much the same way as an MOV. In the TVS mode the maximum voltage used to drive the constant current is limited to 200 V since most TVS devices are below this voltage. To perform a measurement, please refer to the steps in the **Measuring MOVs** section.
The reading will be displayed on the output panel.

For more information on measurement of TVS components, the user is referred to: IEC 61643-321 Components for low-voltage surge protective devices – Part 321: Specifications for avalanche breakdown diode (ABD)

Measuring GDTs

To measure a GDT component (arrestor), or an SPD comprising voltage switching technology:

Step 1 Decide if using the auto or manual detection mode by pressing either the **AUTO** button or the **GDT** button respectively.

Step 2 Set the required voltage rate ramp for the measurement (refer to **Measurement screen** section). The ramp rate can be selected from one of 100 V/s, or 1 kV/s.

It is normal to define the DC spark-over voltage of a GDT as U DC @ 1 kV/s, so the 1 kV/s setting is the default option.

Step 3 If required, enable the GDT **Prefire** mode which will force the GDT to be fired three times (pre-ionization) before the measurement is recorded.

The GDT **Prefire** option is disabled when the voltage ramp rate is set to 100 V/s as it would take too long to measure a GDT with high spark-over voltage. For example, if the GDT being tested has a spark-over voltage of 1500 V, and the ramp rate is set to 100 V/s, each reading would take 15 s.

Step 4 If desired, enable the **Log Measurement** mode **LOG** mode (refer to **Log screen** section). A check ✓ in the footer panel indicates this mode has been activated.

Step 5 Press the **TEST** button on the front panel of the instrument. The red high voltage LED will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets (refer to **Safety** section).

Step 6 The measured values will be displayed on the output panel.
Compare the measured values with the given table values in the chapter “Surge protection products from Weidmüller”.
The GDT component is defective if the measured value is outside of the minimum to maximum range given.

For more information on measurement of GDT components, the user is referred to: IEC 61643- 311 Components for low-voltage surge protective devices – Part 311: Performance requirements and test circuits for gas discharge tubes (GDT).

Measuring SPDs

Surge Protective Device (SPDs) in their simplest form comprise one or more non-linear surge protective components (SPC), a disconnector (thermal or overcurrent) and some form of status indicator (mechanical or electronic).
The internal surge protective components are generally of two types – voltage switching (GDT, Thyristor etc.) and voltage limiting (MOV, ABD, TVS etc.). An SPD may also combine such components for example, a GDT and MOV in series.
An SPD may also have a number of modes of protection, such as Line-Neutral, Line-Line, Neutral-Ground etc.
Due to these many variations, no one method can be completely outlined for the testing of SPDs. In general, this requires some understanding and experience on the part of the operator. As a guide:

Step 1 Ensure the status indication of the SPD will not interfere with measurements. If the SPD is a typical DIN rail type, as used in many IEC based markets, the status indication will be a mechanical flag, rather than electronic circuit, so isolation of this circuit is not required.

Step 2 Using the manual mode select either GDT or MOV mode based on the components inside the SPD.

If the SPD is a combination type comprising MOV+GDT it is recommended to manually set the instrument to its MOV mode by pressing the **MOV** button. In this mode the instrument will raise the voltage across the combination type SPD until the switching component fires and a constant current flows through the combination.
The measurement obtained will be a function of the MOV clamp voltage @ 1.0 mA and the break down voltage of the GDT.

Set the required constant current for the measurement to 1.0 mA (refer to **Measurement screen** section).

Step 3 If desired, enable the **Log Measurement** mode **LOG** mode (refer to **Log screen** section). A check ✓ in the footer panel indicates this mode has been activated.

Step 4 Press the **TEST** button on the front panel of the instrument. The red high voltage LED will briefly illuminate to indicate that high voltage is being produced at the output terminal sockets (refer to **Safety** section).

Step 5 The measured values will be displayed on the output panel.
Compare the measured values with the given table values in the chapter “Surge protection products from Weidmüller”.
The SPD component is defective if the measured value is outside of the minimum to maximum range given.

For more information on measurement of SPD devices, the user is referred to:
IEC 61643-11 Low-voltage surge protective devices – Part 11: Requirements and test methods.

Updating the firmware

The firmware developed for the instrument has been extensively tested and found to be stable and reliable in use, however as with all software, unanticipated behavior may occur requiring correction, or improvements with additional features and functionality may be released from time-to-time. The firmware in the instrument incorporates its own ‘bootloader’ program which allows it to install updated firmware revisions as and when the factory makes this available.

A small utility program needs to be installed on the PC which will be used to download the new firmware file (V-TEST IIxxx.hex) to the instrument. This is a third party software developed by MikroElektronika* for this purpose (refer to Figure 3).

Figure 3: Bootloader PC application software used to upload instrument firmware updates.

⚠	Updating the firmware in the instrument is a complicated process and should only be undertaken if absolutely necessary and where the user feels he has sufficient capability. Incorrectly following the steps provided, or prematurely terminating the update once started, may leave instrument in a locked-up state, and require return to the factory. If the user is unable to perform this update, please contact our technical support department for assistance.

* USB HID Bootloader Tool is registered to MikroElektronika D.O.O., Belgrade.

To upgrade the firmware please follows these steps:

1. Turn on the instrument.
2. From the **Main screen** click to reach the **SETUP** / **System Status** sub-menu.
3. Click **Update** in the buttons panel.
4. Follow user prompts – an **< Exit** button is provided at the last prompt should the user wish to exit back to the **MAIN MENU** at this stage.
5. If **Continue...** is pressed the instrument will reboot and the red LED light to show it has entered the BL mode
   - red LED: instrument is in bootloader mode (BL mode)
   - green LED blinking: instrument is waiting for PC application to connect
6. Connect instrument to the PC using a standard USB printer cable
7. Start the USB HID Bootloader PC application and click the **Connect** button
   - green LED solid: PC application is now connected with instrument
   - Bootloader firmware in instrument is now waiting for upload of the new firmware file
8. On the USB HID Bootloader PC application click browse and select the update firmware file “V-TEST IIxxx.hex”
9. Click the **Begin Upload** button
   - The progress bar shows the new firmware being loading to instrument
10. Once the upload is complete, instrument will reboot into its user configuration mode
    - blue LED: instrument is in program mode (PR mode)
11. Disconnect the USB cable.
12. Update is complete and the **About screen** should show the new version of firmware installed.

Maintenance

Cleaning

Periodically wipe the case and display with a damp cloth and mild detergent. Do not use abrasives or solvents. Dirt or moisture in the terminals can affect readings and should be removed when evident.

To clean the terminals:
1. Ensure that the instrument is in the shutdown state.
2. Remove the battery cover and remove one of the batteries, remove the charge unit cord from the DC socket.
3. Remove the test leads.
4. Shake out any dirt that may be in the terminals.
5. Soak a cotton swab with white spirits alcohol and clean inside and around each terminal socket on the instrument.
6. Likewise, clean the test lead plugs with white spirits alcohol.

Replacing main battery

It is recommended that AA NiMH cells with at least 2300 mAh be used in this instrument (refer to **General specifications** section). Typically, such batteries can withstand 500 recharge cycles.

- Do not use non-rechargeable batteries. Use only rechargeable batteries NiMH, 1.2 V, AA.
- To avoid electrical shock or personal injury, remove the DC charger plug and the test lead set before replacing the battery. Be sure that the battery polarity is correct. A reversed battery may damage the instrument.

To replace the batteries:
1. Turn off the instrument.
2. Remove the test lead set from the front terminals.
3. Remove the battery cover locking screw if present using a small Philips screwdriver.
4. Press the release latch and remove the battery cover.
5. Replace the batteries by observing the marked polarities and replace the battery cover.
6. Secure the cover by replacing the locking Philips screw.

Replacing clock battery

The real-time-clock (RTC) which maintains the time and date on the main screen footer is backed up with an internal 3 V Lithium coin cell battery (CR2032). In order to replace this battery, the back cover of the instrument must be removed.

	To avoid electrical shock or personal injury, remove the DC charger plug and the test lead set before replacing the internal clock battery. Be sure that the battery polarity is correct. A reversed battery may damage the instrument.

To replace the RTC battery:

1. Turn off the instrument.
2. Remove the test lead set from the front terminals.
3. Remove the main battery cover locking screw if present using a small Philips screwdriver.
4. Press the release latch and remove the battery cover.
5. Remove an AA cell of the main battery.
6. Remove the six screws securing the back half of instrument enclosure to the front half. Carefully separate the two halves avoiding placing any strain on the interconnecting wiring between the two halves.
7. The CR2032 coin battery is clearly evident on the main PCB in a small battery holder.
8. Taking careful note of the battery polarity, remove the depleted coin battery and replace with a fresh one.
9. Reposition the two halves of the enclosure and replace the six screws avoiding over tightening.
10. Insert the main AA batteries by observing the marked polarities and replace the battery cover.
11. Secure the cover by replacing the locking Philips screw.
12. Restart the instrument in its **User Commissioning** mode by depressing the **TEST** button on the front panel at the same time the **ON/OFF** button is pressed (refer to **Restoring factory defaults** section).
13. Adjust the time and date (refer to **Time/Date screen** section).

Specifications

Features

- Self-calibration
- Illuminated color TFT display and touch screen interface
- User configurable menu and options
- Auto-detection of type of SPD component connected
- Measurement programs for MOVs, GDTs and ABDs
- Test GDTs and MOVs up to 1500 V DC
- Display of successive measurements using **LOG** mode
- Internal intelligent battery charger
- Remote firmware update capability

General specifications

Specification	Characteristics
Size	220 mm (W) x 205 mm (H) x 82 mm (D)
Weight (with batteries)	1.1 kg
Battery size, quantity	Type AA, 5 ea.
Battery type	NiMH (supplied)
Battery life (typical)	200 hours idling
Operating temperature	-10 ºC...+50 ºC
Storage temperature	-10 ºC...+60 ºC indefinitely (to -40 ºC for 100 hrs)
Relative humidity	80 % @ 10 ºC...35 ºC 70 % @ 35 ºC...40 ºC
Operating altitude	0...2000 m
Vibration	Class 3 per Mil-Prf-28800F
Enclosure sealing	IP 20
Enclosure material	ABS (UL 94 HB)
Pollution degree	2

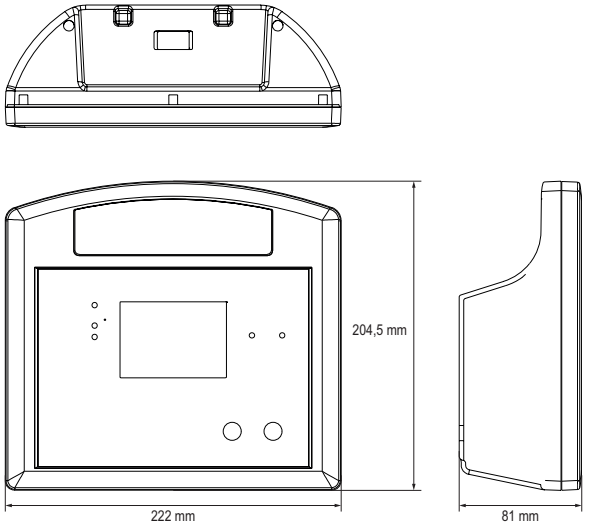
Measurement accuracy

Specification	Characteristics
MOV / ABD constant currents options	0.1 mA, 0.5 mA, 1.0 mA
GDT voltage ramp rate options	100 V/s, 1000 V/s
Max. Test voltage	1500 V DC
MOV measurement accuracy*	1.5 % +/- 2 digit counts
GDT measurement accuracy*	1 kV/s: 3.5 % ±2 digit counts 100 V/s: 1.6 % ±2 digit counts

* The accuracy specification is defined as ±(% reading + digit counts) at 25 ºC ±5 ºC, < 80 % RH.

Physical dimensions

Physical dimensions



Surge protection products from Weidmüller

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC I 275V 25kA LCF S [1]					
VPU AC I 1 275/25 LCF S	2726620000	550	950		
VPU AC I 1 R 275/25 LCF S	2726660000	550	950		
VPU AC I 1+1 275/25 LCF S	2726680000	550	950	500	900
VPU AC I 1+1 R 275/25 LCF S	2726700000	550	950	500	900
VPU AC I 2 275/25 LCF S	2726720000	550	950		
VPU AC I 2 R 275/25 LCF S	2726730000	550	950		
VPU AC I 3 275/25 LCF S	2726740000	550	950		
VPU AC I 3 R 275/25 LCF S	2726750000	550	950		
VPU AC I 4 275/25 LCF S	2726780000	550	950		
VPU AC I 4 R 275/25 LCF S	2726790000	550	950		
VPU AC I 1 N-PE 305/100 S	2726800000	n.a.		500	900
VPU AC I 0 275/25 LCF S	2730860000	550	950		
VPU AC I 3+1 275/25 LCF S 2N	2730280000	550	950	500	900
VPU AC I 3+1 R 275/25 LCF S 2N	2730290000	550	950	500	900
VPU AC I 0 N-PE 305/100 S	2733790000	n.a.		500	900
VPU AC I 3+1 275/25 LCF S 2PE	2726760000	550	950	500	900
VPU AC I 3+1 R 275/25 LCF S 2PE	2726770000	550	950	500	900
VPU AC I 0 N-PE 305/100 2PE	2733790000	n.a.		500	900
VPU AC I 0 275/25 LCF 2PE	2730840000	550	950		

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC I 300V 12.5kA					
VPU AC I 0 300/12.5	2591370000	423	517		
VPU AC I 1 300/12.5	2591380000	423	517		
VPU AC I 1 R 20/12.5	2591390000	423	517		
VPU AC I 2 300/12.5	2591400000	423	517		
VPU AC I 2 R 300/12.5	2591410000	423	517		
VPU AC I 4 300/12.5	2591420000	423	517		
VPU AC I 4 R 300/12.5	2591430000	423	517		
VPU AC I 3 300/12.5	2591440000	423	517		
VPU AC I 3 R 300/12.5	2591450000	423	517		
VPU AC I 3+1 300/12.5	2591460000	423	517	500	900
VPU AC I 3+1 R 300/12.5	2591470000	423	517	500	900
VPU AC I 1+1 300/12.5	2591480000	423	517	500	900
VPU AC I 1+1 R 300/12.5	2591490000	423	517	500	900
VPU AC I 300V 12.5kA LCF [2)]					
VPU AC I 0 300/12.5 LCF	2636900000	800	1363		
VPU AC I 3+1 300/12.5 LCF	2636910000	800	1363	500	900
VPU AC I 3+1 R 300/12.5 LCF	2636920000	800	1363	500	900
VPU AC I 1+1 300/12.5 LCF	2636930000	800	1363	500	900
VPU AC I 1+1 R 300/12.5 LCF	2636940000	800	1363	500	900
VPU AC I 1 300/12.5 LCF	2636950000	800	1363		
VPU AC I 1 R 300/12.5 LCF	2636960000	800	1363		
VPU AC I 3 300/12.5 LCF	2636970000	800	1363		
VPU AC I 3 R 300/12.5 LCF	2636980000	800	1363		
VPU AC I 480V 10kA					
VPU AC I 0 480/10	2591500000	702	858		
VPU AC I 1 480/10	2591510000	702	858		
VPU AC I 1 R 480/10	2591520000	702	858		
VPU AC I 3 480/10	2591530000	702	858		
VPU AC I 3 R 480/10	2591540000	702	858		
VPU AC I 4 480/10	2591550000	702	858		
VPU AC I 4 R 480/10	2591560000	702	858		

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC I 950V / 12.5kA					
VPU AC I 3+MOV R 950/12.5	2845570000	469	510	585	715
VPU AC I 0 950/12.5	2855240000	469	510		
VPU AC I 0 MOV 950/12.5	2855250000	585	715		
VPU N-PE					
VPU AC I 1 N-PE 305/50	2591570000	n.a.		500	900
VPU AC I 0 N-PE 305/50	2591590000	n.a.		500	900
VPU AC II 75V 50kA					
VPU AC II 0 75/50	2591610000	135	165		
VPU AC II 1 75/50	2636990000	135	165		
VPU AC II 1 R 75/50	2591620000	135	165		
VPU AC II 2 75/50	2637000000	135	165		
VPU AC II 2 R 75/50	2591630000	135	165		
VPU AC II 150V 50kA					
VPU AC II 0 150/50	2591640000	297	363		
VPU AC II 1 150/50	2591650000	297	363		
VPU AC II 1 R 150/50	2591660000	297	363		
VPU AC II 2 150/50	2591670000	297	363		
VPU AC II 2 R 150/50	2591680000	297	363		
VPU AC II 3 150/50	2591690000	297	363		
VPU AC II 3 R 150/50	2591700000	297	363		
VPU AC II 4 150/50	2591710000	297	363		
VPU AC II 4 R 150/50	2591000000	297	363		
VPU AC II 300V 50kA					
VPU AC II 0 300/50	2591010000	423	517		
VPU AC II 1 300/50	2591020000	423	517		
VPU AC II 1 R 300/50	2591030000	423	517		
VPU AC II 2 300/50	2591040000	423	517		
VPU AC II 2 R 300/50	2591050000	423	517		
VPU AC II 1+1 300/50	2591060000	423	517	500	900
VPU AC II 1+1 R 300/50	2591070000	423	517	500	900
VPU AC II 3+1 300/50	2591080000	423	517	500	900
VPU AC II 3+1 R 300/50	2591090000	423	517	500	900

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC II 4 300/50	2591140000	423	517		
VPU AC II 4 R 300/50	2591150000	423	517		
VPU AC II 3 300/50	2591160000	423	517		
VPU AC II 3 R 300/50	2591170000	423	517		
VPU AC II 300V 50kA Y					
VPU AC II 1 R 300/50 Y	2639350000	423	517		
VPU AC II 1+1 R 300/50 Y	2639340000	423	517	500	900
VPU AC II 2 R 300/50 Y	2639360000	423	517		
VPU AC II 3 R 300/50 Y	2639330000	423	517		
VPU AC II 3+1 R 300/50 Y	2639320000	423	517	500	900
VPU AC II 4 R 300/50 Y	2639370000	423	517		
VPU AC II 305V 65kA N-PE					
VPU AC II 1 N-PE 305/65	2591180000	n.a.		500	900
VPU AC II 0 N-PE 305/65	2591190000	n.a.		500	900
VPU AC II 350V 50kA					
VPU AC II 0 350/50	2591340000	558	682		
VPU AC II 1 350/50	2591350000	558	682		
VPU AC II 1 R 350/50	2591360000	558	682		
VPU AC II 3 350/50	2591100000	558	682		
VPU AC II 3 R 350/50	2591110000	558	682		
VPU AC II 4 350/50	2591120000	558	682		
VPU AC II 4 R 350/50	2591130000	558	682		
VPU AC II 2 350/50	2637010000	558	682		
VPU AC II 2 R 350/50	2637020000	558	682		
VPU AC II 1+1 350/50	2637030000	558	682	500	900
VPU AC II 1+1 R 350/50	2637040000	558	682	500	900
VPU AC II 3+1 350/50	2637050000	558	682	500	900
VPU AC II 3+1 R 350/50	2637060000	558	682	500	900
VPU AC II 480V 50kA					
VPU AC II 0 480/50	2591200000	702	858		
VPU AC II 1 480/50	2591210000	702	858		
VPU AC II 1 R 480/50	2591220000	702	858		
VPU AC II 2 480/50	2591230000	702	858		
VPU AC II 2 R 480/50	2591240000	702	858		

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC II 3 480/50	2591250000	702	858		
VPU AC II 3 R 480/50	2591260000	702	858		
VPU AC II 4 480/50	2591270000	702	858		
VPU AC II 4 R 480/50	2591280000	702	858		
VPU AC II 750V 35kA					
VPU AC II 0 750/35	2591290000	1215	1485		
VPU AC II 1 R 750/35	2591300000	1215	1485		
VPU AC II 2 R 750/35	2591310000	1215	1485		
VPU AC II 3 R 750/35	2591320000	1215	1485		
VPU AC II 4 R 750/35	2591330000	1215	1485		
VPU AC II US 60V 50kA					
VPU AC II US 0 60/50	2726810000	135	165		
VPU AC II US 1 60/50	2736210000	135	165		
VPU AC II US 1 R 60/50	2736270000	135	165		
VPU AC II US 2 60/50	2736280000	135	165		
VPU AC II US 2 R 60/50	2730790000	135	165		
VPU AC II US 120V 50kA					
VPU AC II US 0 120/50	2730440000	297	363		
VPU AC II US 1 120/50	2730450000	297	363		
VPU AC II US 1 R 120/50	2730460000	297	363		
VPU AC II US 2 120/50	2730470000	297	363		
VPU AC II US 2 R 120/50	2730480000	297	363		
VPU AC II US 4 120/50	2730490000	297	363		
VPU AC II US 4 R 120/50	2730500000	297	363		
VPU AC II US 3 120/50	2730510000	297	363		
VPU AC II US 3 R 120/50	2730520000	297	363		
VPU AC II US 240V 50kA					
VPU AC II US 0 240/50	2730530000	423	517		
VPU AC II US 1 240/50	2736300000	423	517		
VPU AC II US 1 R 240/50	2736310000	423	517		
VPU AC II US 2 240/50	2736320000	423	517		
VPU AC II US 2 R 240/50	2736330000	423	517		

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC II US 1+1 240/50	2736340000	423	517	500	900
VPU AC II US 1+1 R 240/50	2736350000	423	517	500	900
VPU AC II US 3+1 240/50	2736360000	423	517	500	900
VPU AC II US 3+1 R 240/50	2736390000	423	517	500	900
VPU AC II US 4 240/50	2736400000	423	517		
VPU AC II US 4 R 240/50	2736410000	423	517		
VPU AC II US 3 240/50	2730540000	423	517		
VPU AC II US 3 R 240/50	2730550000	423	517		
VPU AC II US 240V 50kA Y					
VPU AC II US 3+1 R 240/50 Y	2736440000	423	517	500	900
VPU AC II US 3 R 240/50 Y	2736450000	423	517		
VPU AC II US 1+1 R 240/50 Y	2736460000	423	517	500	900
VPU AC II US 1 R 240/50 Y	2736470000	423	517		
VPU AC II US 2 R 240/50 Y	2736480000	423	517		
VPU AC II US 4 R 240/50 Y	2736490000	423	517		
VPU AC II US 0 240/50 Y	2736500000	423	517		
VPU AC II US 0 N-PE 240 Y	2736520000	n.a.		500	900
VPU AC II US 277V 50kA					
VPU AC II US 0 277/50	2730560000	558	682		
VPU AC II US 1 277/50	2730570000	558	682		
VPU AC II US 1 R 277/50	2730580000	558	682		
VPU AC II US 3 277/50	2730590000	558	682		
VPU AC II US 3 R 277/50	2730600000	558	682		
VPU AC II US 4 277/50	2730610000	558	682		
VPU AC II US 4 R 277/50	2730620000	558	682		
VPU AC II US 2 277/50	2730630000	558	682		
VPU AC II US 2 R 277/50	2730640000	558	682		

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU AC II US 1+1 277/50	2730650000	558	682	500	900
VPU AC II US 1+1 R 277/50	2730660000	558	682	500	900
VPU AC II US 3+1 277/50	2730670000	558	682	500	900
VPU AC II US 3+1 R 277/50	2730680000	558	682	500	900
VPU AC II US 400V 50kA					
VPU AC II US 0 400/50	2730690000	702	858		
VPU AC II US 1 400/50	2730700000	702	858		
VPU AC II US 1 R 400/50	2730710000	702	858		
VPU AC II US 3 400/50	2730720000	702	858		
VPU AC II US 3 R 400/50	2730730000	702	858		
VPU AC II US 4 400/50	2730740000	702	858		
VPU AC II US 4 R 400/50	2730750000	702	858		
VPU AC II US 600V 35kA					
VPU AC II US 0 600/35	2730760000	1215	1485		
VPU AC II US 1 R 600/35	2736420000	1215	1485		
VPU AC II US 2 R 600/35	2736430000	1215	1485		
VPU AC II US 3 R 600/35	2730780000	1215	1485		
VPU AC II US 4 R 600/35	2730770000	1215	1485		
VPU AC II F SERIE					
VPU AC II F 1 300/40	2827580000	423	517		
VPU AC II F 1 R 300/40	2807390000	423	517		
VPU AC II F 2 300/40	2827590000	423	517		
VPU AC II F 2 R 300/40	2807400000	423	517		
VPU AC II F 3 300/40	2827600000	423	517		
VPU AC II F 3 R 300/40	2807410000	423	517		
VPU AC II F 4 300/40	2827610000	423	517		
VPU AC II F 4 R 300/40	2807420000	423	517		
VPU AC II F 1+1 300/40	2827620000	423	517	500	900
VPU AC II F 1+1 R 300/40	2807430000	423	517	500	900
VPU AC II F 3+1 300/40	2827630000	423	517	500	900
VPU AC II F 3+1 R 300/40	2807440000	423	517	500	900
VPU AC II F 0 300/40	2807520000	423	517		
VPU AC II F 0 N-PE 305/65	2807540000	n.a.		500	900

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

Surge protection products from Weidmüller

Product designation	Order number	Test results			
		MOV @ 1 mA		GDT @ 100 V/s	
		Minimum value in V	Maximum value in V	Minimum value in V	Maximum value in V
VPU PV I+II 1000V					
VPU PV I+II 3 1000	2530610000	675	825		
VPU PV I+II 3 R 1000	2530620000	675	825		
VPU PV I+II 0 1000	2530600000	675	825		
VPU PV I+II 0M 1000	2534300000	675	825		
VPU PV I+II 1000V E					
VPU PV I+II 3 R 1000 E	2530190000	675	825		
VPU PV I+II 3 1000 E	2530520000	675	825		
VPU PV I+II 0 1000 E	2530530000	675	825		
VPU PV I+II 1500V					
VPU PV I+II 3 1500	2530580000	900	1100		
VPU PV I+II 3 R 1500	2530590000	900	1100		
VPU PV I+II 0 1500	2530570000	900	1100		
VPU PV I+II 0M 1500	2534330000	900	1100		
VPU PV I+II 1500V E					
VPU PV I+II 3 1500 E	2795570000	900	1100		
VPU PV I+II 3 R 1500 E	2795580000	900	1100		
VPU PV I+II 0 1500 E	2795590000	900	1100		
VPU PV II 1000V					
VPU PV II 3 1000	2530550000	675	825		
VPU PV II 3 R 1000	2530180000	675	825		
VPU PV II 0 1000	2530660000	675	825		
VPU PV II 1500V					
VPU PV II 3 1500	2530640000	900	1100		
VPU PV II 3 R 1500	2530650000	900	1100		
VPU PV II 0 1500	2530630000	900	1100		
VPU DC II 1000V					
VPU DC II 3 R 1000	2829480000	738	902	500	900

1) Note: Device uses PGDT technology. Recommended measuring settings are GDT.
2) Note: Device uses hybrid technology. Recommended measuring settings are MOV @ 0.1 mA.

For other Weidmüller products ask for further infomation.

Surge protection products from Weidmüller

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